

M. Mechanical Pressure Switches



General technical explanations

User information

Our pressure monitoring products may only be installed and started up by authorised specialists. The safety regulations of country-specific authorities must be observed, especially when working with mains voltages and oxygen, and in potentially explosive areas.

Product information

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

Testing of the suitability of our products for a specific application (such as the checking of material compatibilities) remains the responsibility of the user. It may be the case that suitability can only be verified by appropriate field testing.

Mounting position

For mechanical and electronic pressure switches as well as transmitters there is no limitation due to the mounting position with regard to the accuracy of the pressure measurement.

However, other boundary conditions of the application may require a certain mounting position, e. g. horizontal installation to avoid waterlogging on the electrical connection or vertical installation to prevent debris from accumulating in the bore of the pressure connection.

IP protection class

The IP protection class is a defined protection level code (sealing) of electrical equipment housings in line with IEC 60529 (formerly DIN 40050 – Part 2). Protection of a housing against the following is tested here:

- The penetration of solid extraneous particles, such as dust
- Access of hazardous parts
- Penetration of water

IP protection tests are performed as type tests.

The IP protection type code, made up of two digits, specifies the protection of a housing against the penetration of solid extraneous particles and water.

The numeric code therefore provides conclusions to be drawn on the level of personal safety as well as the functional protection / mid to longterm functional reliability of electrical equipment.

Protection types IP00, IP65, IP67 and IP6K9K

IP00:

No protection against penetration of solid particles or water, no protection against contact.

IP6X:

Protection against penetration of dust (dust proof). Full contact protection.

IPX5:

A jet of water from a nozzle, aimed at equipment (such as a pressure switch) from all directions, must not have any harmful effect.

IPX7:

Protection from water, when equipment (such as a pressure switch) is immersed in water under defined pressure and time conditions. Water must not penetrate into the equipment in harmful quantities.

IP6K9K:

Devices satisfying these requirements must be dust-proof and be able to withstand loads during the use of high-pressure cleaners and steam jets. The standard stipulates a water pressure from 80 to 100 bar at a temperature of 80 °C for testing.

IP6KX:

Dust must not penetrate. Letter K: Specific to the electrical equipment of road vehicles.

IPX9K:

Protection against penetration of water at high pressure / for steam jet cleaning. Water aimed at the housing from every direction at greatly increased pressure may not have any damaging effects.

We are able to offer IP67 / IP6K9K for many of our mechanical and electronic pressure switches (pre-wired or with integrated connector) and for our transmitters.

IP67 / IP6K9K is the recommended protection for mobile hydraulics and any equipment exposed to the outdoor environment.

Cylindrical threads

Cylindrical threads are either sealed on the front by underlaying an appropriate sealing ring (such as a copper sealing ring) or by already having integrated O-rings or gaskets.

If the corresponding thread types do not provide specifications regarding the roughness of the counter sealing surface, we recommend the following values:

$$R_{\text{amax}} 1.6 \mid R_{\text{max}} 6.3 \mid R_{\text{mr}} (-0.10) > 5\% C_{\text{rel}} 5\%$$

Conical threads (cone-shaped threads)

Conical threads guarantee tolerance compensation of the two threaded parts. The sealing function is realised with thread flanks which deform permanently and enter into a metallic frictional fit. Conical threads are not screwed in down to the screw-in depth, but fixed with the tightening torque required for the leak tightness.

Remember not to exceed the permitted tightening torque of the pressure switch or transmitter presented in the following table (to prevent damaging the threaded pin beforehand, causing it to become untight during operation or to snap off when tightened).

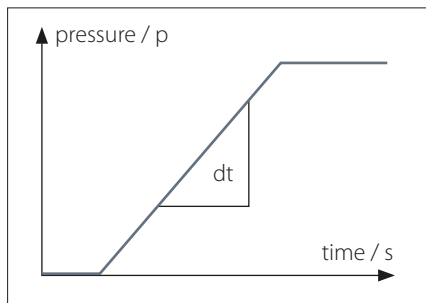
Tightening torques of steel threads

The specifications below are to be understood upper material thresholds for the housing of pressure switches or transmitters. Remember during installation that the type and material of the seal, the condition of mating surfaces (e.g. dry or oily) and the material of the counter-piece all have a bearing on the tightening torque.

Threads M10, G 1/8, R 1/8 and NPT 1/8 are limited to overpressure strengths of up to 600 bar.

Values 30% lower than in the following table must be used for brass housings.

Thread	Tightening torque
NPT 1/8; M 10 x 1 conical	max. 18 Nm
M 10 x 1 cyl.; G 1/8	max. 20 Nm
M 12 x 1.5; 7/16 – 20 UNF	max. 30 Nm
G 1/4; 9/16 – 18 UNF	max. 40 Nm
NPT 1/4; M 14 x 1.5	max. 40 Nm



Gaseous applications

In particular using additional sealant to attain the required leak tightness may be necessary for gas applications.

Plasma cleaning for oxygen applications

When pressure switches/transmitters are used with oxygen, the surfaces must be free of oil and grease residues to prevent spontaneous combustion. Special requirements must also be observed for oxygen applications with regard to the material selection of housings and seals as well as the permitted operating pressure (see also page 17). We would be pleased to advise you if necessary.

For these operating conditions, we offer plasma cleaning of the components in order to achieve the required elimination of oil and grease. The components are packed and sealed in plastic bags. The packaging is marked with safety instructions for use in oxygen applications.

Plasma cleaning LABS-free (PWIS-free)

Our products are always manufactured without the use of substances that interfere with the wetting of the paint throughout the entire manufacturing process. For use in LABS-free applications, we offer plasma cleaning of the components. The components are packed and sealed in plastic bags. The packaging is marked with safety instructions for use in LABS applications.

Vacuum

The values given in the technical details for the vacuum range are specified in millibars (mbar) below atmospheric pressure.

Pressure change rate (~rise / ~fall)

The pressure change rate denotes the pressure over time for the rising/falling pressure. It is specified in bar/s.

The maximum pressure change rate for mechanical pressure switches is 1,000 bar/s. For SUCO electronic pressure monitoring products the maximum pressure change rate can be up to 5,000 bar/s.

Overpressure protection

The specified overpressure protection in the catalogue is based on a static pressure. The values refer to the hydraulic or pneumatic part of the switch.

It is best practice to use 30 - 50% lower values for dynamic pressure compared to static pressure. These empirical values are based on the knowledge that, in pressure systems, unexpected pressure peaks which are higher than the working pressure are generated as a result of activation of valves, sudden falling or rising load or simply the change of cross-sections in the pipes. With conventional measurement techniques (such as manometers), these pressure peaks are hardly measurable. Faster measurement systems must therefore be used for this data acquisition. Attempts are being made to take this into account by using empirical or corrective factors.

If the pressure conditions are known and the pressure change rates are 100 bar/s, our pressure switches and transmitters can be used up to the permitted overpressure protection as per data sheet / catalogue. Only 50 % of the specified overpressure protection is permitted when operating at the maximum permitted pressure change rate of $\leq 1,000$ bar/s for mechanical pressure switches, and at $\leq 5,000$ bar/s for transmitters.

RoHS-Compliance

= Restriction of Hazardous Substances (Directives 2011/65/EU and 2020/863/EU)



CE-Mark

= Communauté Européenne



European Parliament and Council directives must be observed when products are launched onto the market. If a directive exists for a product, it must be applied. Only products for which a directive exists may bear the CE mark.

Only products which have been tested according to CE directive or corresponding standards may carry the CE mark.

Mechanical pressure switches with a supply voltage above 50 VAC or 75 VDC are covered by the 2014/35/EU Low Voltage Directive. Variants for potentially explosive areas are covered in addition by the 2014/34/EU ATEX Product Directive.

Our electronic products satisfy EMC (Electromagnetic Compatibility) Directive 2014/30/EC. Mechanical pressure switches do not fall under the EMC Directive.

The Machinery Directive 2006/42/EC is not applicable, because our products are classed as components.

Our product designs are based upon „good engineering practise“ in line with Article 4, Paragraph 3 of the Pressure Equipment Directive (2014/68/EU), meaning neither a declaration of conformity may be issued nor a CE mark affixed.

The current product-specific EU declaration is available in the download area of our homepage:

www.suco.de/en/downloads

Subject to technical changes

M. Overview of mechanical pressure switches

Technical explanations

for mechanical pressure switches

from page 14

Selection matrix

Help in selecting a suitable pressure switch

from page 18



M.1

M.1 Pressure and vacuum switches with integrated connector NC/NO, hex 24

from page 22

- Max. voltage up to 42 V
- Switching points: 0.1 – 150 bar or vacuum
- IP protection up to IP67 (IP6K9K)
- Available connectors:
Deutsch DT04-2P, AMP Superseal 1.5°, Packard MetriPack 280°,
Deutsch DT04-3P, AMP Junior Timer®, Bayonet DIN 72585 A1–2.1,
M12x1 DIN EN 61076-2-D
- Housing materials: zinc-plated steel (CrVI-free), stainless steel or brass
- Types: 0110, 0111, 0112, 0113, 0114, 0115, 0116, 0117, 0118, 0119, 0120, 0121, 0122, 0123, 0124, 0125



M.2

M.2 Pressure switches with integrated connector Changeover contacts, hex 27

from page 32

- Adjustable hysteresis
- Max. voltage up to 250 V
- Switching points: 0.3 – 200 bar
- IP protection up to IP67 (IP6K9K)
- Available connectors:
TE AMP Superseal 1.5°, M12x1 DIN EN 61076-2-101A,
Deutsch DT04-3P, DIN connector EN 175301
- Housing material: zinc-plated steel (CrVI-free), others on request
- Types: 0132, 0133, 0134, 0135, 0136, 0137, 0184, 0185, 0194, 0195



M.3

M.3 Pressure switches NC/NO, hex 24

from page 40

- Max. voltage up to 42 V
- Switching points: 0.1 – 200 bar
- IP protection up to IP65 (IP00 terminals)
- Housing materials: zinc-plated steel (CrVI-free), stainless steel or brass
- Types: 0163, 0164, 0166, 0167, 0168, 0169



M.4

M.4 Pressure switches Changeover contacts, hex 27

from page 52

- Adjustable hysteresis (apart from 0140 and 0141)
- Max. voltage up to 250 V
- Switching points: 0.3 – 400 bar
- IP protection up to IP65
- Housing materials: zinc-plated steel (CrVI-free) or stainless steel
- Types: 0140, 0141, 0170, 0171, 0180, 0181, 0183, 0186, 0187, 0190, 0191, 0196, 0197

M.5 Ready-wired pressure switches, cabled and encapsulated individually to customer requirements from page 62

- Numerous cable and connector variants
- IP protection up to IP67 (IP6K9K)
- Housing materials: zinc-plated steel (CrVI-free), stainless steel or brass
- Types: 0240, 0241
 - special feature: switching point adjustable on site even after assembly
- Technical characteristics for hex 24: see chapter M.3
- Technical characteristics for hex 27: see chapter M.4



M.6 „PLUS“ – Pressure switches with integrated connector and intelligent supplementary functions, hex 24 from page 66

- Max. voltage dependent on custom function up to 42 V
- Numerous additional safety functions, such as:
 - diagnostic function („fail-safe“) according to NAMUR (resistor)
 - LED for visual check of switching status
 - Overvoltage / overload protection (varistor)
- Types: 0410, 0411, 0412, 0413, 0414, 0415, 0416, 0417, 0418, 0419, 0424, 0425



M.7 Pressure switches Changeover contacts, 30 A/F from page 74

- Square or block style
- Some with adjustable hysteresis
- Max. voltage up to 250 V
- Switching point adjustable 0.1 – 400 bar
- Housing material: aluminium
- Types: 0159, 0161, 0162, 0175
 - special feature: 0159 with knurled screw for simple adjustment of the switching point



M.8 Pressure switches according to ATEX directive and IECEx scheme from page 80

- Hex 27 for gas protection zones 1 + 2, dust protection zones 21 + 22 and mining M2
- 30 A/F for gas protection zones 1 + 2
- Housing material: zinc-plated steel (CrVI-free) or aluminium
- Types: 0165, 0340, 0341, 0342, 0343



M.9 Vacuum switches NC/NO or Changeover contacts, hex 24 or 30 A/F from page 86

- Max. voltage up to 250 V
- Overpressure protection up to 35 bar
- Housing material: brass or aluminium
- Types: 0150, 0151

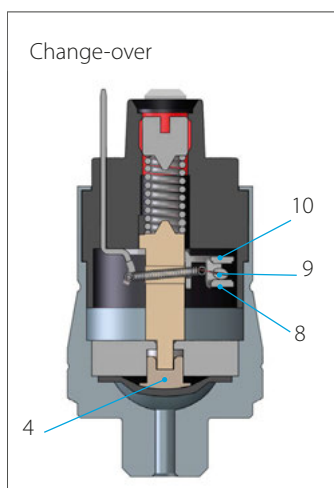
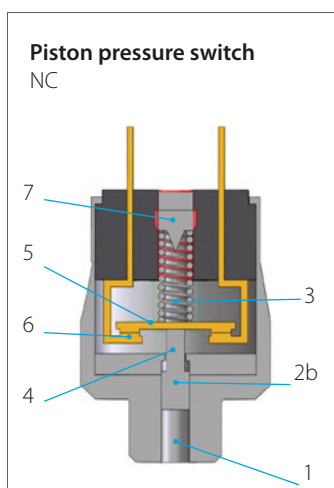
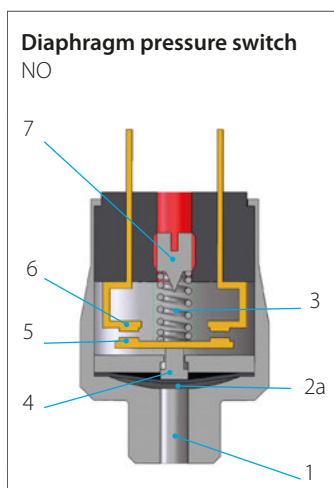


M.10 Accessoires for mechanical pressure switches from page 90

- Protective caps
- Socket devices
- Thread adapters
- Plugs with ready-to-use cables (for pressure switches with integrated connector)



Technical explanations for mechanical pressure switches



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.

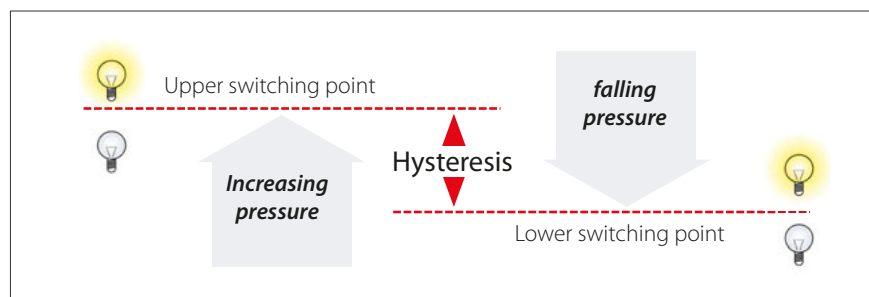
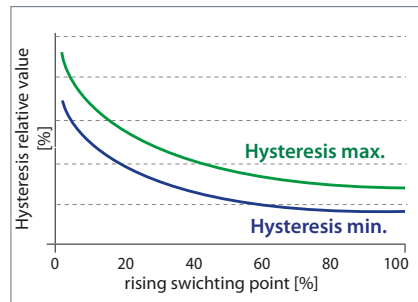
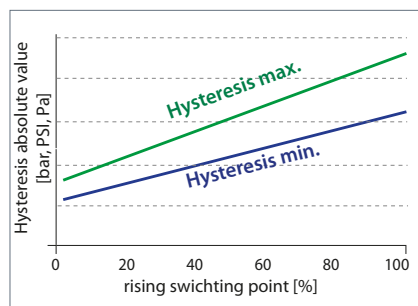
Hysteresis

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 electronic 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 SUCO (e.g. swelling of EPDM sealing could happen by water – oil mixture).

Pressure switches with stainless steel housings with EPDM-TW diaphragm, SUCO 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: <https://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.





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 – 200 (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.2 hex 27 with int. connector					M.3 hex 24 NO / NC						M.4 hex 27 CO						M.5 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 – 200 (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 PLUS 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	0342	0343	0150	0151						
70	72	70	72	70	72	70	72	70	72	70	72	70	72	76	77	77	78	83	84	84	85	85	88	89						
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			Overpressure	Function		
																							■	■			Vacuum			
																								■			NO / NC			
														■	■	■	■	■	■	■	■	■	■	■			Changeover contacts			
■	■	■	■	■	■	■	■	■	■	■	■	■	■											■			max. 42 V	Voltage		
																											max. 48 V			
														■	■	■	■	■	■	■	■	■	■	■			max. 250 V			
																											max. 24 V / 50 mA			
																							■				100 – 950 mbar	Adjustment range		
																								■			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 – 200 (300) bar			
																■	■	■									100 (200) – 400 bar			
																	■						(■)	■			35 bar	Overpressure safety up to		
														■	■	■		■									100 bar			
														■	■	■											200 bar			
■		■		■		■		■		■		■							■		■						300 (400) bar			
	■		■		■		■		■		■		■	■	■	■		■		■	■	■					600 (700) bar			
■	■	■	■	■	■	■	■	■	■	■	■	■	■											■			hex 24	Size		
																			■	■	■	■					hex 27			
														■	■	■	■	■					■				30 A/F			
■	■	■	■	■	■	■	■	■	■	■	■	■	■						■	■	■	■					Zinc-platted steel	Housing material		
																								■			stainless steel			
																											Brass			
														■	■	■	■	■					■				Aluminium			
																		■	■	■	■	■					ATEX	Custom variant		
																			■	■	■	■		■			Configurable			
■	■	■	■	■	■	■	■	■	■	■	■	■	■											■			additional functions			
																							■				cCSAus approval			

Pressure switches hex 24 with integrated connector

NC or NO, maximum operating voltage up to 42 V

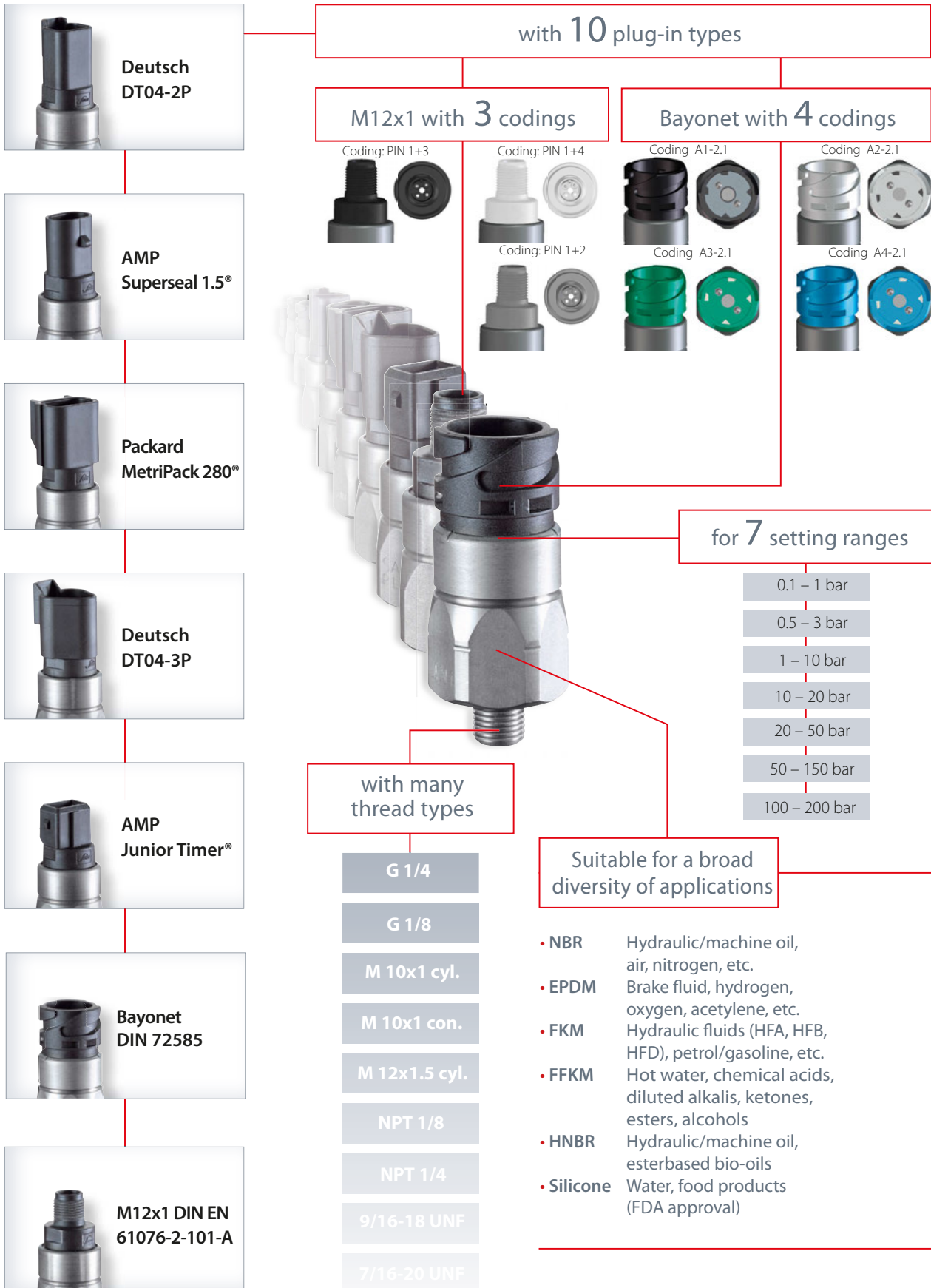


- Large selection of electrical plug-in types for quick attachment and reliable connection
- High protection class (to IP67 or IP6K9K)
- Compact and rugged design in industrial environments like construction and agricultural machinery or commercial vehicles
- Switching point can be set on site with adjusting 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



M.1

hex 24 integrated

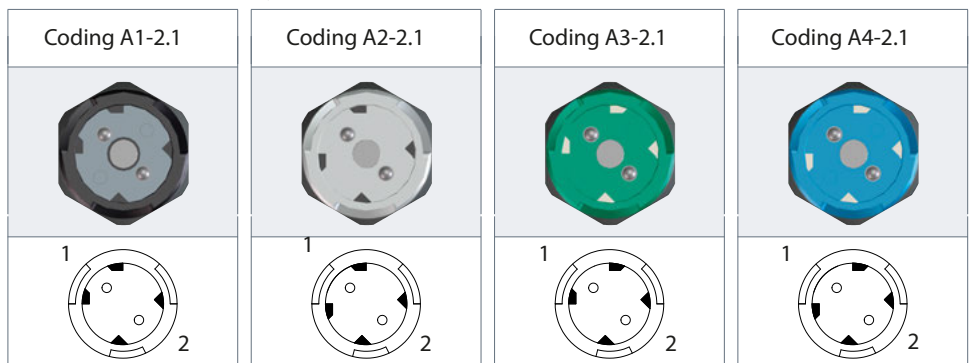
Pressure switches hex 24 with integrated connector

Technical details

	0110 / 0111 Deutsch DT04-2P IP67, IP6K9K
	0112 / 0113 AMP Superseal 1.5° IP67
	0114 / 0115 Packard MetriPack 280° IP67
	0116 / 0117 Deutsch DT04-3P IP67, IP6K9K
	0118 / 0119 AMP Junior Timer® IP65, IPx4K
	0120 / 0121 Bayonet DIN 72585 IP67, IP6K9K
	0122 / 0123 M12x1 DIN EN 61076-2-101-A IP67
	0124 / 0125 M12x1 DIN EN 60947-5-2 IP67

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 °F ... +212 °F (-40 °C ... +100 °C)
	NBR (piston pressure switch)	-22 °F ... +212 °F (-30 °C ... +100 °C)
	EPDM	-22 °F ... +248 °F (-30 °C ... +120 °C)
	FKM (diaphragm pressure switch)	+23 °F ... +248 °F (-5 °C ... +120 °C)
	FKM (piston pressure switch)	+5 °F ... +248 °F (-15 °C ... +120 °C)
	FFKM	-4 °F ... +248 °F (-20 °C ... +120 °C)
	Silicone	-40 °F ... +248 °F (-40 °C ... +120 °C)
	HNBR	-22 °F ... +248 °F (-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:	≤ 1,000 bar/s	
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:	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



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

M.1

hex 24 integrated



Diaphragm pressure switches with integrated connector

- Setting ranges to up to 725 psi (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 4,350 psi (300 bar)

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 (A+B)	0116 - XXX XX - X - XXX	0116 - XXX XX - X - XXX
AMP Junior Timer°	0118 - XXX XX - X - XXX	0118 - XXX XX - X - XXX
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	Order number NO → :	Order number NC → :
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Diaphragm pressure switches with integrated connector

1.45 - 14.5 ± 2.90 psi (0.1 - 1 ± 0.2 bar)	M 10x1 taper	XXXX - 403 01 - X - 009	XXXX - 404 01 - X - 013
	M 12x1.5 cyl.	XXXX - 423 02 - X - 010	XXXX - 404 02 - X - 013
	1/4" BSPP	XXXX - 403 03 - X - 011	XXXX - 404 03 - X - 015
	1/8" BSPP	XXXX - 403 28 - X - 603	XXXX - 404 28 - X - 604
	1/4" NPT	XXXX - 403 09 - X - 345	XXXX - 404 09 - X - 346
	1/8" NPT	XXXX - 403 04 - X - 012	XXXX - 404 04 - X - 016
	7/16 - 20 UNF	XXXX - 403 20 - X - 305	XXXX - 404 20 - X - 307
	9/16 - 18 UNF	XXXX - 403 21 - X - 306	XXXX - 404 21 - X - 308

7.25 - 43.5 ± 4.35 psi (0.5 - 3 ± 0.3 bar)	M 10x1 taper	XXXX - 423 01 - X - 070	XXXX - 424 01 - X - 070
	M 12x1.5 cyl.	XXXX - 423 02 - X - 070	XXXX - 424 02 - X - 070
	1/4" BSPP	XXXX - 423 03 - X - 070	XXXX - 424 03 - X - 070
	1/8" BSPP	XXXX - 423 28 - X - 070	XXXX - 424 28 - X - 070
	1/4" NPT	XXXX - 423 09 - X - 070	XXXX - 424 09 - X - 070
	1/8" NPT	XXXX - 423 04 - X - 070	XXXX - 424 04 - X - 070
	9/16 - 18 UNF	XXXX - 423 20 - X - 070	XXXX - 424 20 - X - 070
	9/16 - 18 UNF	XXXX - 423 21 - X - 070	XXXX - 424 21 - X - 070

14.5 - 145 ± 7.25 psi (1 - 10 ± 0.5 bar)	M 10x1 taper	XXXX - 407 01 - X - 025	XXXX - 408 01 - X - 029
	M 12x1.5 cyl.	XXXX - 407 02 - X - 026	XXXX - 408 02 - X - 030
	1/4" BSPP	XXXX - 407 03 - X - 027	XXXX - 408 03 - X - 031
	1/8" BSPP	XXXX - 407 28 - X - 607	XXXX - 408 28 - X - 608
	1/4" NPT	XXXX - 407 09 - X - 349	XXXX - 408 09 - X - 350
	1/8" NPT	XXXX - 407 04 - X - 028	XXXX - 408 04 - X - 032
	7/16 - 20 UNF	XXXX - 407 20 - X - 313	XXXX - 408 20 - X - 315
	9/16 - 18 UNF	XXXX - 407 21 - X - 314	XXXX - 408 21 - X - 316

Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, 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

Your order 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.

M.1

hex 24 integrated

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

Diaphragm pressure switches with integrated connector

- Setting ranges up to 725 psi (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 4,350 psi (300 bar)¹⁾



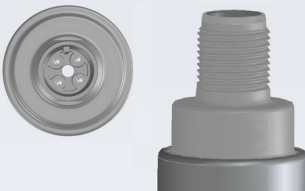
0122 Coding: PIN 1+3



0124 Coding: PIN 1+4 (NO)



0124 Coding: PIN 1+2 (NC)



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 (A+B)	0116 - XXX XX - X - XXX	0116 - XXX XX - X - XXX
AMP Junior Timer°	0118 - XXX XX - X - XXX	0118 - XXX XX - X - XXX
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	Order number NO → ;	Order number NC → ;
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Diaphragm pressure switches with integrated connector

145 - 290 ± 14.50 psi (10 - 20 ± 1.0 bar)	M 10x1 taper	XXXX - 411 01 - X - 041	XXXX - 412 01 - X - 045
	M 12x1.5 cyl.	XXXX - 411 02 - X - 042	XXXX - 412 02 - X - 046
	1/4" BSPP	XXXX - 411 03 - X - 043	XXXX - 412 03 - X - 047
	1/8" BSPP	XXXX - 411 28 - X - 611	XXXX - 412 28 - X - 612
	1/4" NPT	XXXX - 411 09 - X - 353	XXXX - 412 09 - X - 354
	1/8" NPT	XXXX - 411 04 - X - 044	XXXX - 412 04 - X - 048
	7/16-20 UNF	XXXX - 411 20 - X - 321	XXXX - 412 20 - X - 323
9/16-18 UNF	XXXX - 411 21 - X - 322	XXXX - 412 21 - X - 324	

290 - 725 ± 29.00 psi (20 - 50 ± 2.0 bar)	M 10x1 taper	XXXX - 415 01 - X - 057	XXXX - 416 01 - X - 061
	M 12x1.5 cyl.	XXXX - 415 02 - X - 058	XXXX - 416 02 - X - 062
	1/4" BSPP	XXXX - 415 03 - X - 059	XXXX - 416 03 - X - 063
	1/8" BSPP	XXXX - 415 28 - X - 615	XXXX - 416 28 - X - 616
	1/4" NPT	XXXX - 415 09 - X - 357	XXXX - 416 09 - X - 358
	1/8" NPT	XXXX - 415 04 - X - 060	XXXX - 416 04 - X - 064
	7/16-20 UNF	XXXX - 415 20 - X - 329	XXXX - 416 20 - X - 331
9/16-18 UNF	XXXX - 415 21 - X - 330	XXXX - 416 21 - X - 332	

Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	FFKM Hot water, chemical acids, diluted alkalis, ketones, esters, 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.

Your order 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 2,175 psi (150 bar)
- NC or NO, maximum operating voltage up to 42 V
- Zinc-plated steel (Cr VI-free)
- Overpressure safety up to 8,700 psi (600 bar)¹⁾

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 (A+B)	0117 - XXX XX - X - XXX	0117 - XXX XX - X - XXX
AMP Junior Timer®	0119 - XXX XX - X - XXX	0119 - XXX XX - X - XXX
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	Order number NO → :	Order number NC → :
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Piston pressure switches with integrated connector

725 - 2,175±72.5 psi (50 - 150 ± 5 bar)	M 10x1 taper	XXXX - 419 01 - X - 009	XXXX - 420 01 - X - 013
	M 12x1.5 cyl.	XXXX - 419 02 - X - 010	XXXX - 420 02 - X - 014
	1/4" BSPP	XXXX - 419 03 - X - 011	XXXX - 420 03 - X - 015
	1/8" BSPP	XXXX - 419 28 - X - 603	XXXX - 420 28 - X - 604
	1/4" NPT	XXXX - 419 09 - X - 311	XXXX - 420 09 - X - 312
	1/8" NPT	XXXX - 419 04 - X - 012	XXXX - 420 04 - X - 016
	7/16-20 UNF	XXXX - 419 20 - X - 305	XXXX - 420 20 - X - 307
	9/16-18 UNF	XXXX - 419 21 - X - 306	XXXX - 420 21 - X - 308

1,450 - 2,900 ±72.5 psi (100 - 200 ± 5 bar)	G 1/4 DIN 3852-2-A	XXXX - 493 60 - X - 011	XXXX - 494-60- X - 015
	M 12x1.5 DIN 3852-1-A	XXXX - 493 68 - X - 010	XXXX - 494-68- X - 014

Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating 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.

↓

Your order number:	01XX - XXX XX - X - XXX
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M.1

hex 24 integrated



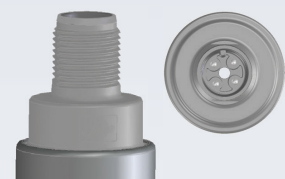
0123 Coding: PIN 1+3



Coding: PIN 1+4 (NO)



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.

M.1

hex 24 integrated

Bayonet ISO 15170
(DIN 72585)



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 4,350 psi (300 bar)¹⁾

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0120 Diaphragm pressure switches with integrated connector

1.45 - 14.5 ±2.90 psi (0.1 - 1 ±0.2 bar)	M 10x1 taper	0120 - X03 01 - X - 009	0120 - X04 01 - X - 013
	M 12x1.5 cyl.	0120 - X03 02 - X - 010	0120 - X04 02 - X - 014
	1/4" BSPP	0120 - X03 03 - X - 011	0120 - X04 03 - X - 015
	1/8" BSPP	0120 - X03 28 - X - 011	0120 - X04 28 - X - 604
	1/4" NPT	0120 - X03 09 - X - 345	0120 - X04 09 - X - 346
	1/8" NPT	0120 - X03 04 - X - 012	0120 - X04 04 - X - 016
	7/16-20 UNF	0120 - X03 20 - X - 305	0120 - X04 20 - X - 307
9/16-18 UNF	0120 - X03 21 - X - 306	0120 - X04 21 - X - 308	
7.25 - 43.5 ±4.35 psi (0.5 - 3 ±0.3 bar)	M 10x1 taper	0120 - X23 01 - X - 070	0120 - X24 01 - X - 070
	M 12x1.5 cyl.	0120 - X23 02 - X - 070	0120 - X24 02 - X - 070
	1/4" BSPP	0120 - X23 03 - X - 070	0120 - X24 03 - X - 070
	1/8" BSPP	0120 - X23 28 - X - 070	0120 - X24 28 - X - 070
	1/4" NPT	0120 - X23 09 - X - 070	0120 - X24 09 - X - 070
	1/8" NPT	0120 - X23 04 - X - 070	0120 - X24 04 - X - 070
	7/16-20 UNF	0120 - X23 20 - X - 070	0120 - X24 20 - X - 070
9/16-18 UNF	0120 - X23 21 - X - 070	0120 - X24 21 - X - 070	
14.5 - 145 ±7.25 psi (1 - 10 ±0.5 bar)	M 10x1 taper	0120 - X07 01 - X - 025	0120 - X08 01 - X - 029
	M 12x1.5 cyl.	0120 - X07 02 - X - 026	0120 - X08 02 - X - 030
	1/4" BSPP	0120 - X07 03 - X - 027	0120 - X08 03 - X - 031
	1/8" BSPP	0120 - X07 28 - X - 607	0120 - X08 28 - X - 608
	1/4" NPT	0120 - X07 09 - X - 349	0120 - X08 09 - X - 350
	1/8" NPT	0120 - X07 04 - X - 028	0120 - X08 04 - X - 032
	7/16-20 UNF	0120 - X07 20 - X - 313	0120 - X08 20 - X - 315
9/16-18 UNF	0120 - X07 21 - X - 314	0120 - X08 21 - X - 316	

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 (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 24 for the temperature range an

Your order number: 0120 - XXX XX - X - XXX

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

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)
- Overpressure safety up to 4,350 psi (300 bar)¹⁾ for diaphragm variant
- Overpressure safety up to 8,700 psi (600 bar)¹⁾ for piston variant

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0120 Diaphragm pressure switches with integrated connector

145 - 290 ± 14.50 psi (10 - 20 ± 1.0 bar)	M 10x1 taper	0120 - X11 01 - X - 041	0120 - X12 01 - X - 045
	M 12x1.5 cyl.	0120 - 11 02 - X - 042	0120 - X12 02 - X - 046
	1/4" BSPP	0120 - X11 03 - X - 043	0120 - X12 03 - X - 047
	1/8" BSPP	0120 - 11 28 - X - 611	0120 - 12 28 - X - 612
	1/4" NPT	0120 - X11 09 - X - 353	0120 - X12 09 - X - 354
	1/8" NPT	0120 - X11 04 - X - 044	0120 - X12 04 - X - 048
	7/16-20 UNF	0120 - X11 20 - X - 321	0120 - X12 20 - X - 323
9/16-18 UNF	0120 - X11 21 - X - 322	0120 - X12 21 - X - 324	
290 - 725 ± 29.0 psi (20 - 50 ± 2.0 bar)	M 10x1 taper	0120 - X15 01 - X - 057	0120 - X16 01 - X - 061
	M 12x1.5 cyl.	0120 - X15 02 - X - 058	0120 - X16 02 - X - 062
	1/4" BSPP	0120 - X15 03 - X - 059	0120 - X16 03 - X - 063
	1/8" BSPP	0120 - 15 28 - X - 615	0120 - 16 28 - X - 616
	1/4" NPT	0120 - X15 09 - X - 357	0120 - X16 09 - X - 358
	1/8" NPT	0120 - X15 04 - X - 060	0120 - X16 04 - X - 064
	7/16-20 UNF	0120 - X15 20 - X - 329	0120 - X16 20 - X - 331
9/16-18 UNF	0120 - X15 21 - X - 330	0120 - X16 21 - X - 332	

0121 Piston pressure switches with integrated connector

725 - 2,175 ± 72.5 psi (50 - 150 ± 5.0 bar)	M 10x1 taper	0121 - X19 01 - X - 009	0121 - X20 01 - X - 013
	M 12x1.5 cyl.	0121 - X19 02 - X - 010	0121 - X20 02 - X - 014
	1/4" BSPP	0121 - X19 03 - X - 011	0121 - X20 03 - X - 015
	1/8" BSPP	0121 - X19 28 - X - 603	0121 - X20 28 - X - 604
	1/4" NPT	0121 - X19 09 - X - 311	0121 - X20 09 - X - 312
	1/8" NPT	0121 - X19 04 - X - 012	0121 - X20 04 - X - 016
	7/16-20 UNF	0121 - X19 20 - X - 305	0121 - X20 20 - X - 307
9/16-18 UNF	0121 - X19 21 - X - 306	0121 - X20 21 - X - 308	
1,450 - 2,900 ± 72.5 psi (100 - 200 ± 5 bar)	G 1/4 DIN 3852-2-A	0121 - X 93 60 - X - 011	0121 - X 94 60 - X - 015
	M 12x1.5 DIN 3852-1-A	0121 - X 93 68 - X - 010	0121 - X 94 68 - X - 014

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 (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, 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.

Your order number:

012X - XXX XX - X - XXX

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



Coding A1-2.1



Coding A2-2.1



Coding A3-2.1



Coding A4-2.1




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 (A)
2 x 0,5 mm ² PUR cables	2 x 0,5 mm ² Radox cables	2 x 0,5 mm ² Radox cables	4 x 0.34 mm ² 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

M.2
hex 27 integrated



Technical details

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, $p_{max} = 5,800 \text{ psi} / 400 \text{ bar}$)		-22 °F ... +212 °F (-40 °C ... +100 °C)
	NBR (diaphragm pressure switch, $p_{max} = 1,450 \text{ psi} / 100 \text{ bar}$) (piston pressure switch)		-40 °F ... +212 °F (-30 °C ... +100 °C)
	EPDM		-22 °F ... +248 °F (-30 °C ... +120 °C)
	FKM (diaphragm pressure switch)		+23 °F ... +248 °F (-5 °C ... +120 °C)
	FKM (piston pressure switch)		+5 °F ... +248 °F (-15 °C ... +120 °C)
	FFKM		-4 °F ... +248 °F (-20 °C ... +120 °C)
	Silicone		-40 °F ... +248 °F (-40 °C ... +120 °C)
	HNBR		-22 °F ... +248 °F (-30 °C ... +120 °C)
Burst pressure (diaphragm pressure switch, overpressure resistance 1,450 psi)	2,900 psi (200 bar)		
Burst Pressure (diaphragm pressure switch, overpressure resistance 5,800 psi)	10,153 psi (700 bar) for threads M10, G 1/8, R 1/8 and NPT 1/8 up to max. 8,700 psi (600 bar)		
Burst pressure (Piston pressure switch)	14,500 psi (1,000 bar) for threads M10, G 1/8, R 1/8 and NPT 1/8 up to max. 8,700 psi (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. 725 psi (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)

M.2

hex 27 integrated

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 ►




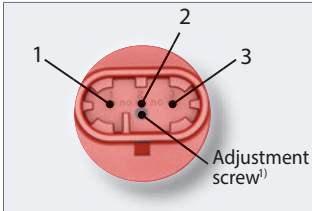
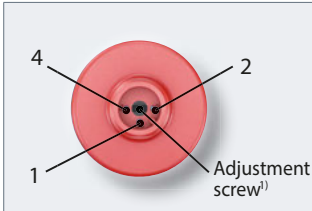
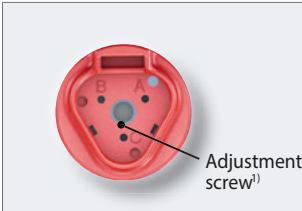
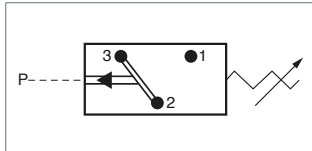
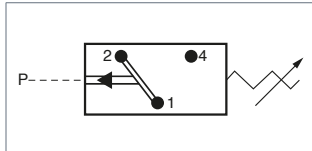
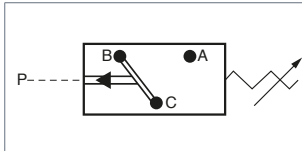



Accessory ►

Not included in the delivery.

Please order separately.

Cable cross-section / IP protection ►

Article number ►

	0132 / 0133	0134 / 0135	0136 / 0137
			
	TE AMP Superseal 1.5® IP67	M12x1 EN 61076-2-101-A Contact assignment DIN 60947-5-2 IP67	Deutsch DT04-3P® IP67, IP6K9K
	H ≈ 73 mm	H ≈ 65 mm	H ≈ 71 mm
			
			
			¹⁾ Blade of screwdriver max. 2 mm
	Mating plug with 2 m cable ²⁾		
	TE AMP Superseal 1.5®	M12x1 DIN EN 61076-2-101-LF	Deutsch DT06-3S®
			
	3 x 0,5 mm ² Radox cable / IP65	4 x 0,34 mm ² PUR cable / IP67	3 x 0,5 mm ² PUR cable / IP67
	1-1-32-653-158	1-1-00-653-162	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 psi/bar	Adjustment range in bar	Tolerance at room temperature in bar	Thread	Article number
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0132 / 0134 / 0136 Diaphragm pressure switches

1,450 psi ₁₎ (100 bar)	4.35 - 21.75 psi (0.3 - 1.5 bar)	± 2.90 psi (± 0.2 bar)	1/4" BSPP	013X - 457 03 - X - 003
			M 10x1 taper	013X - 457 01 - X - 001
			M12x1.5 cyl.	013X - 457 02 - X - 002
			1/4" NPT	013X - 457 09 - X - 314
			1/8" NPT	013X - 457 04 - X - 318
			7/16-20 UNF	013X - 457 20 - X - 301
			9/16-18 UNF	013X - 457 21 - X - 302
14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)	± 7.25 psi (± 0.5 bar)	1/4" BSPP	013X - 458 03 - X - 042
			M 10x1 taper	013X - 458 01 - X - 040
			M12x1.5 cyl.	013X - 458 02 - X - 041
			1/4" NPT	013X - 458 09 - X - 340
			1/8" NPT	013X - 458 04 - X - 343
			7/16-20 UNF	013X - 458 20 - X - 341
			9/16-18 UNF	013X - 458 21 - X - 342
5,801 psi ₁₎ (400 bar)	145 - 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)	1/4" BSPP	013X - 459 03 - X - 009
			M 10x1 taper	013X - 459 01 - X - 007
			M12x1.5 cyl.	013X - 459 02 - X - 008
			1/4" NPT	013X - 459 09 - X - 316
			1/8" NPT	013X - 459 04 - X - 320
			7/16-20 UNF	013X - 459 20 - X - 305
			9/16-18 UNF	013X - 459 21 - X - 306
145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)	1/4" BSPP	013X - 461 03 - X - 012
			M 10x1 taper	013X - 461 01 - X - 010
			M12x1.5 cyl.	013X - 461 02 - X - 011
			1/4" NPT	013X - 461 09 - X - 317
			1/8" NPT	013X - 461 04 - X - 321
			7/16-20 UNF	013X - 461 20 - X - 307
			9/16-18 UNF	013X - 461 21 - X - 308

0133 / 0135 / 0137 Piston pressure switches

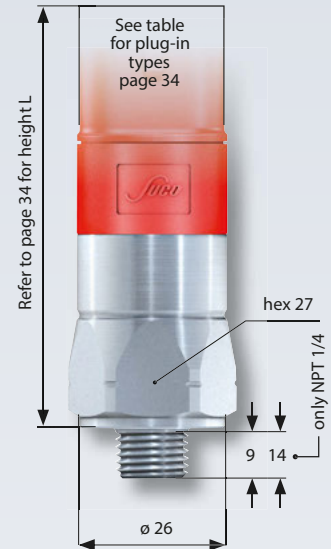
10,152 psi ₁₎₂₎ (700 bar)	725 - 2,900 psi (50 - 200 bar)	± 72.5 psi (± 5.0 bar)	1/4" BSPP	013X - 460 03 - X - 003
			M 10x1 taper	013X - 460 01 - X - 001
			M12x1.5 cyl.	013X - 460 02 - X - 002
			1/4" NPT	013X - 460 09 - X - 303
			1/8" NPT	013X - 460 04 - X - 304
			7/16-20 UNF	013X - 460 20 - X - 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	Hot water, chemical acids, diluted alkalis, ketones, esters, 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.



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)
- Snap action with silver contacts
- Overpressure safety up to 1,450 / 5,801 psi (100 / 400 bar)¹⁾
- Differential adjustable at factory

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0184 Diaphragm pressure switches

1,450 psi ¹⁾ (100 bar)	4.35 - 21.75 psi (0.3 - 1.5 bar)	± 2.90 psi (± 0.2 bar)	M 10x1 taper	0184 - 457 01 - X - 001
			M 12x1.5 cyl.	0184 - 457 02 - X - 002
			1/4" BSPP	0184 - 457 03 - X - 003
			1/4" NPT	0184 - 457 09 - X - 314
			1/8" NPT	0184 - 457 04 - X - 318
			7/16-20 UNF	0184 - 457 20 - X - 301
			9/16-18 UNF	0184 - 457 21 - X - 302

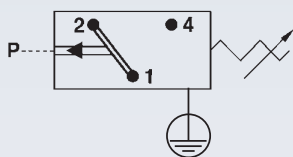
	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)	M 10x1 taper	0184 - 458 01 - X - 040
			M 12x1.5 cyl.	0184 - 458 02 - X - 041
			1/4" BSPP	0184 - 458 03 - X - 042
			1/4" NPT	0184 - 458 09 - X - 340
			1/8" NPT	0184 - 458 04 - X - 343
			7/16-20 UNF	0184 - 458 20 - X - 341
			9/16-18 UNF	0184 - 458 21 - X - 342

5,801 psi ¹⁾ (400 bar)	145 - 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)	M 10x1 taper	0184 - 459 01 - X - 007
			M 12x1.5 cyl.	0184 - 459 02 - X - 008
			1/4" BSPP	0184 - 459 03 - X - 009
			1/4" NPT	0184 - 459 09 - X - 311
			1/8" NPT	0184 - 459 04 - X - 320
			7/16-20 UNF	0184 - 459 20 - X - 305
			9/16-18 UNF	0184 - 459 21 - X - 306

	145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)	M 10x1 taper	0184 - 461 01 - X - 010
			M 12x1.5 cyl.	0184 - 461 02 - X - 011
			1/4" BSPP	0184 - 461 03 - X - 012
			1/4" NPT	0184 - 461 09 - X - 312
			1/8" NPT	0184 - 461 04 - X - 321
			7/16-20 UNF	0184 - 461 20 - X - 307
			9/16-18 UNF	0184 - 461 21 - X - 308



Socket device included in the delivery



Seal material – Application areas

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

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



Your order 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.

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)
- Snap action with silver contacts
- Overpressure safety up to 10,152 psi (700 bar)¹⁾
- Differential adjustable at factory

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0185 Piston pressure switches

10,152 psi ¹⁾ (700 bar) ¹⁾	725 - 2,900 psi (50 - 200 bar)	± 72.5 psi (± 5.0 bar)	M 10x1 taper	0185 - 460 01 - X - 001
			M 12x1.5 cyl.	0185 - 460 02 - X - 002
			1/4" BSPP	0185 - 460 03 - X - 003
			1/4" NPT	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 (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	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.

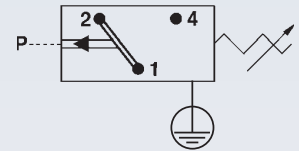
Your order number: 0185 - 460 XX - X - XXX

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.



M.2

hex 27 integrated

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 1,450 / 5,800 psi (100 / 400 bar)¹⁾
- 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
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0194 Diaphragm pressure switches

1,450 psi ¹⁾ (100 bar)	0.3 - 1.5	± 0.2	1/4" BSP	0194 - 457 03 - X - 003
			M 10x1 con.	0194 - 457 01 - X - 001
			M 12x1.5 cyl.	0194 - 457 02 - X - 002
			1/4" NPT	0194 - 457 09 - X - 314
			1/8" NPT	0194 - 457 04 - X - 318
			7/16-20 UNF	0194 - 457 20 - X - 301
1,450 psi ¹⁾ (100 bar)	0.3 - 1.5	± 0.2	9/16-18 UNF	0194 - 457 21 - X - 302
			1/4" BSP	0194 - 458 03 - X - 042
			M 10x1 con.	0194 - 458 01 - X - 040
			M 12x1.5 cyl.	0194 - 458 02 - X - 041
			1/4" NPT	0194 - 458 09 - X - 340
			1/8" NPT	0194 - 458 04 - X - 343
5,800 psi ¹⁾ (400 bar)	10 - 50	± 0.5	7/16-20 UNF	0194 - 458 20 - X - 341
			9/16-18 UNF	0194 - 458 21 - X - 342
			1/4" BSP	0194 - 459 03 - X - 009
			M 10x1 con.	0194 - 459 01 - X - 007
			M 12x1.5 cyl.	0194 - 459 02 - X - 008
			1/4" NPT	0194 - 459 09 - X - 311
5,800 psi ¹⁾ (400 bar)	10 - 50	± 3.0	1/8" NPT	0194 - 459 04 - X - 320
			7/16-20 UNF	0194 - 459 20 - X - 305
			9/16-18 UNF	0194 - 459 21 - X - 306
			1/4" BSP	0194 - 461 03 - X - 012
			M 10x1 con.	0194 - 461 01 - X - 010
			M 12x1.5 cyl.	0194 - 461 02 - X - 011
5,800 psi ¹⁾ (400 bar)	10 - 100	± 3.0 - 5.0	1/4" NPT	0194 - 461 09 - X - 312
			1/8" NPT	0194 - 461 04 - X - 321
			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	Hot water, chemical acids, diluted alkalis, ketones, esters, 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 10,150 psi (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
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0195 Piston pressure switches

p_{max} 10,152 psi (700 bar) ^{1) 2)}	50 - 200	± 5.0	1/4 BSP	0195 - 460 03 - X - 003
			M 10x1 con.	0195 - 460 01 - X - 001
			M 12x1.5 cyl.	0195 - 460 02 - X - 002
			1/4 NPT	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

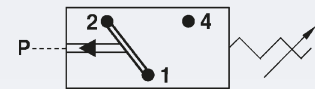
Refer to page 33 for the temperature range and application thresholds of sealing materials.

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 M 10x1 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

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 data

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 (BunaN)	-40 °F ... +212 °F (-40 °C ... +100 °C)
	NBR (in piston pressure switch)	-22 °F ... +212 °F (-30 °C ... +100 °C)
	EPDM	-22 °F ... +248 °F (-30 °C ... +120 °C)
	EPDM-W270, diaphragm	-4 °F ... +212 °F (-20 °C ... +100 °C)
	FKM (Viton®) (in diaphragm pressure switch)	+23 °F ... +248 °F (-5 °C ... +120 °C)
	FKM (Viton®) (in piston pressure switch)	+5 °F ... +248 °F (-15 °C ... +120 °C)
	FFKM	-4 °F ... +248 °F (-20 °C ... +120 °C)
	Silicone, diaphragm	-40 °F ... +248 °F (-40 °C ... +120 °C)
	HNBR	-22 °F ... +248 °F (-30 °C ... +120 °C)
Burst pressure (diaphragm pressure switch):	5,800 psi (400 bar)	
Burst pressure (piston pressure switch):	10,150 psi (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. 725 psi / 50 bar)	
Pressure rise rate:	≤ 14.5 psi/ms (1 bar/ms)	
Differential:	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. 3.17 oz (90 g)	

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	●	●				●



0163

Diaphragm pressure switches up to 42 V with spade terminal

- Made of zinc-plated steel (CrVI-free)
- Spade terminal
- Overpressure safety up to 8,700 psi (600 bar)¹⁾, Burst pressure safety up to 10,153 psi (700 bar)¹⁾

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0163 Diaphragm pressure switches with spade terminal

1.45 - 14.5 ± 2.90 psi (0.1 - 1 ± 0.2 bar)	M 10x1 taper	0163 - 403 01 - X - 009	0163 - 404 01 - X - 013
	M 12x1.5 cyl.	0163 - 403 02 - X - 010	0163 - 404 02 - X - 014
	1/4" BSPP	0163 - 403 03 - X - 011	0163 - 404 03 - X - 015
	1/8" BSPP	0163 - 403 28 - X - 603	0163 - 403 28 - X - 604
	1/4" NPT	0163 - 403 09 - X - 345	0163 - 404 09 - X - 346
	1/8" NPT	0163 - 403 04 - X - 012	0163 - 404 04 - X - 016
	7/16-20 UNF	0163 - 403 20 - X - 305	0163 - 404 20 - X - 307
	9/16-20 UNF	0163 - 403 21 - X - 306	0163 - 404 21 - X - 308
7.25 - 43.5 ± 4.35 psi (0.5 - 3 ± 0.3 bar)	M 10x1 taper	0163 - 423 01 - X - 070	0163 - 424 01 - X - 070
	M 12x1.5 cyl.	0163 - 423 02 - X - 070	0163 - 424 02 - X - 070
	1/4" BSPP	0163 - 423 03 - X - 070	0163 - 424 03 - X - 070
	1/8" BSPP	0163 - 423 28 - X - 070	0163 - 424 28 - X - 070
	1/4" NPT	0163 - 423 09 - X - 070	0163 - 424 09 - X - 070
	1/8" NPT	0163 - 423 04 - X - 070	0163 - 424 04 - X - 070
	7/16-20 UNF	0163 - 423 20 - X - 070	0163 - 424 20 - X - 070
	9/16-20 UNF	0163 - 423 21 - X - 070	0163 - 424 21 - X - 070
14.5 - 145 ± 7.25 psi (1 - 10 ± 0.5 bar)	M 10x1 taper	0163 - 407 01 - X - 025	0163 - 408 01 - X - 029
	M 12x1.5 cyl.	0163 - 407 02 - X - 026	0163 - 408 02 - X - 030
	1/4" BSPP	0163 - 407 03 - X - 027	0163 - 408 03 - X - 031
	1/8" BSPP	0163 - 407 28 - X - 607	0163 - 408 28 - X - 608
	1/4" NPT	0163 - 407 09 - X - 349	0163 - 408 09 - X - 350
	1/8" NPT	0163 - 407 04 - X - 028	0163 - 408 04 - X - 032
	7/16-20 UNF	0163 - 407 20 - X - 313	0163 - 408 20 - X - 315
	9/16-20 UNF	0163 - 407 21 - X - 314	0163 - 408 21 - X - 316
145 - 290 ± 14.50 psi (10 - 20 ± 1.0 bar)	M 10x1 taper	0163 - 411 01 - X - 041	0163 - 412 01 - X - 045
	M 12x1.5 cyl.	0163 - 411 02 - X - 042	0163 - 412 02 - X - 046
	1/4" BSPP	0163 - 411 03 - X - 043	0163 - 412 03 - X - 047
	1/8" BSPP	0163 - 411 03 - X - 043	0163 - 412 03 - X - 047
	1/4" NPT	0163 - 411 09 - X - 353	0163 - 412 09 - X - 354
	1/8" NPT	0163 - 411 28 - X - 611	0163 - 412 28 - X - 612
	7/16-20 UNF	0163 - 411 20 - X - 321	0163 - 412 20 - X - 323
	9/16-20 UNF	0163 - 411 21 - X - 322	0163 - 412 21 - X - 324
290 - 725 ± 29.0 psi (20 - 50 ± 2.0 bar)	M 10x1 taper	0163 - 415 01 - X - 057	0163 - 416 01 - X - 061
	M 12x1.5 cyl.	0163 - 415 02 - X - 058	0163 - 416 02 - X - 062
	1/4" BSPP	0163 - 415 03 - X - 059	0163 - 416 03 - X - 063
	1/8" BSPP	0163 - 415 28 - X - 615	0163 - 416 28 - X - 616
	1/4" NPT	0163 - 415 09 - X - 357	0163 - 416 09 - X - 358
	1/8" NPT	0163 - 415 04 - X - 060	0163 - 416 04 - X - 064
	7/16-20 UNF	0163 - 415 20 - X - 329	0163 - 416 20 - X - 331
	9/16-20 UNF	0163 - 415 21 - X - 330	0163 - 416 21 - X - 332

Seal material – Application areas

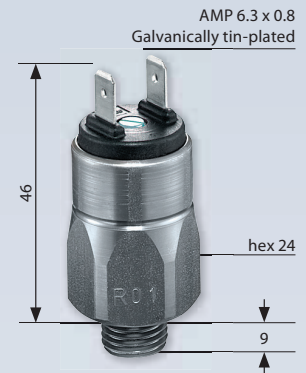
NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, alcohols	6
HNBR	Hydraulic/machine oil, ester-based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

Your order 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.

M.3

hex 24



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 8,700 psi (600 bar) ¹⁾

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0163 Diaphragm pressure switches with M3 screw terminal

1.45 - 14.5 ± 2.90 psi (0.1 - 1 ± 0.2 bar)	M 10x1 taper	0163 - 401 01 - X - 001	0163 - 402 01 - X - 005
	M 12x1.5 cyl.	0163 - 401 02 - X - 002	0163 - 402 02 - X - 006
	1/4" BSPP	0163 - 401 03 - X - 003	0163 - 402 03 - X - 007
	1/8" BSPP	0163 - 401 28 - X - 601	0163 - 402 28 - X - 602
	1/4" NPT	0163 - 401 09 - X - 343	0163 - 402 09 - X - 344
	1/8" NPT	0163 - 401 04 - X - 004	0163 - 402 04 - X - 008
	7/16-20 UNF	0163 - 401 20 - X - 301	0163 - 402 20 - X - 303
9/16-20 UNF	0163 - 401 21 - X - 302	0163 - 402 21 - X - 304	
7.25 - 43.5 ± 4.35 psi (0.5 - 3 ± 0.3 bar)	M 10x1 taper	0163 - 421 01 - X - 070	0163 - 422 01 - X - 070
	M 12x1.5 cyl.	0163 - 421 02 - X - 070	0163 - 422 02 - X - 070
	1/4" BSPP	0163 - 421 03 - X - 070	0163 - 422 03 - X - 070
	1/8" BSPP	0163 - 421 28 - X - 070	0163 - 422 28 - X - 070
	1/4" NPT	0163 - 421 09 - X - 070	0163 - 422 09 - X - 070
	1/8" NPT	0163 - 421 04 - X - 070	0163 - 422 04 - X - 070
	7/16-20 UNF	0163 - 421 20 - X - 070	0163 - 422 20 - X - 070
9/16-20 UNF	0163 - 421 21 - X - 070	0163 - 422 21 - X - 070	
14.5 - 145 ± 7.25 psi (1 - 10 ± 0.5 bar)	M 10x1 taper	0163 - 405 01 - X - 017	0163 - 406 01 - X - 021
	M 12x1.5 cyl.	0163 - 405 02 - X - 018	0163 - 406 02 - X - 022
	1/4" BSPP	0163 - 405 03 - X - 019	0163 - 406 03 - X - 023
	1/8" BSPP	0163 - 405 28 - X - 605	0163 - 406 28 - X - 606
	1/4" NPT	0163 - 405 09 - X - 347	0163 - 406 09 - X - 348
	1/8" NPT	0163 - 405 04 - X - 020	0163 - 406 04 - X - 024
	7/16-20 UNF	0163 - 405 20 - X - 309	0163 - 406 20 - X - 311
9/16-20 UNF	0163 - 405 21 - X - 310	0163 - 406 21 - X - 312	
145 - 290 ± 14.50 psi (10 - 20 ± 1.0 bar)	M 10x1 taper	0163 - 409 01 - X - 033	0163 - 410 01 - X - 037
	M 12x1.5 cyl.	0163 - 409 02 - X - 034	0163 - 410 02 - X - 038
	1/4" BSPP	0163 - 409 03 - X - 035	0163 - 410 03 - X - 039
	1/8" BSPP	0163 - 409 28 - X - 609	0163 - 410 28 - X - 610
	1/4" NPT	0163 - 409 09 - X - 351	0163 - 410 09 - X - 352
	1/8" NPT	0163 - 409 04 - X - 036	0163 - 410 04 - X - 040
	7/16-20 UNF	0163 - 409 20 - X - 317	0163 - 410 20 - X - 319
9/16-20 UNF	0163 - 409 21 - X - 318	0163 - 410 21 - X - 320	
290 - 725 ± 29.0 psi (20 - 50 ± 2.0 bar)	M 10x1 taper	0163 - 413 01 - X - 049	0163 - 414 01 - X - 053
	M 12x1.5 cyl.	0163 - 413 02 - X - 050	0163 - 414 02 - X - 054
	1/4" BSPP	0163 - 413 03 - X - 051	0163 - 414 03 - X - 055
	1/8" BSPP	0163 - 413 28 - X - 051	0163 - 414 28 - X - 055
	1/4" NPT	0163 - 413 09 - X - 355	0163 - 414 09 - X - 356
	1/8" NPT	0163 - 413 04 - X - 052	0163 - 414 04 - X - 056
	7/16-20 UNF	0163 - 413 20 - X - 325	0163 - 414 20 - X - 327
9/16-20 UNF	0163 - 413 21 - X - 326	0163 - 414 21 - X - 328	

Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, 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.



Your order number:

0163 - XXX XX - X - XXX

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 4,350 psi (300 bar), Burst pressure safety up to 5,800 psi (400 bar) ¹⁾

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0166 Diaphragm pressure switches with spade terminal

1.45 - 14.5 ± 2.90 psi (0.1 - 1 ± 0.2 bar)	M 10x1 taper	0166 - 403 01 - X - 009	0166 - 404 01 - X - 013
	M 12x1.5 cyl.	0166 - 403 02 - X - 010	0166 - 404 02 - X - 014
	1/4" BSPP	0166 - 403 03 - X - 011	0166 - 404 03 - X - 015
	1/8" BSPP	0166 - 403 28 - X - 603	0166 - 404 28 - X - 604
	1/4" NPT	0166 - 403 09 - X - 345	0166 - 404 09 - X - 346
	1/8" NPT	0166 - 403 04 - X - 012	0166 - 404 04 - X - 016
	7/16-20 UNF	0166 - 403 20 - X - 305	0166 - 404 20 - X - 307
	9/16-18 UNF	0166 - 403 21 - X - 306	0166 - 404 21 - X - 308
7.25 - 43.5 ± 4.35 psi (0.5 - 3 ± 0.3 bar)	M 10x1 taper	0166 - 423 01 - X - 070	0166 - 424 01 - X - 070
	M 12x1.5 cyl.	0166 - 423 02 - X - 070	0166 - 424 02 - X - 070
	1/4" BSPP	0166 - 423 03 - X - 070	0166 - 424 03 - X - 070
	1/8" BSPP	0166 - 423 28 - X - 070	0166 - 424 28 - X - 070
	1/4" NPT	0166 - 423 09 - X - 070	0166 - 424 09 - X - 070
	1/8" NPT	0166 - 423 04 - X - 070	0166 - 424 04 - X - 070
	7/16-20 UNF	0166 - 423 20 - X - 070	0166 - 424 20 - X - 070
	9/16-18 UNF	0166 - 423 21 - X - 070	0166 - 424 21 - X - 070
14.5 - 145 ± 7.25 psi (1 - 10 ± 0.5 bar)	M 10x1 taper	0166 - 407 01 - X - 025	0166 - 408 01 - X - 029
	M 12x1.5 cyl.	0166 - 407 02 - X - 026	0166 - 408 02 - X - 030
	1/4" BSPP	0166 - 407 03 - X - 027	0166 - 408 03 - X - 031
	1/8" BSPP	0166 - 407 28 - X - 607	0166 - 408 28 - X - 608
	1/4" NPT	0166 - 407 09 - X - 349	0166 - 408 09 - X - 350
	1/8" NPT	0166 - 407 04 - X - 028	0166 - 408 04 - X - 032
	7/16-20 UNF	0166 - 407 20 - X - 313	0166 - 408 20 - X - 315
	9/16-18 UNF	0166 - 407 21 - X - 314	0166 - 408 21 - X - 316
145 - 290 ± 14.50 psi (10 - 20 ± 1.0 bar)	M 10x1 taper	0166 - 411 01 - X - 041	0166 - 412 01 - X - 045
	M 12x1.5 cyl.	0166 - 411 02 - X - 042	0166 - 416 02 - X - 046
	1/4" BSPP	0166 - 411 03 - X - 043	0166 - 412 03 - X - 047
	1/4" NPT	0166 - 411 09 - X - 353	0166 - 412 09 - X - 354
	1/8" NPT	0166 - 411 04 - X - 044	0166 - 412 04 - X - 048
	7/16-20 UNF	0166 - 411 20 - X - 321	0166 - 412 20 - X - 323
	9/16-18 UNF	0166 - 411 21 - X - 322	0166 - 412 21 - X - 324
	290 - 725 ± 29.0 psi (20 - 50 ± 2.0 bar)	M 10x1 taper	0166 - 415 01 - X - 057
M 12x1.5 cyl.		0166 - 415 02 - X - 058	0166 - 416 02 - X - 062
1/4" BSPP		0166 - 415 03 - X - 059	0166 - 416 03 - X - 063
1/8" BSPP		0166 - 415 28 - X - 615	0166 - 416 28 - X - 616
1/4" NPT		0166 - 415 09 - X - 357	0166 - 416 09 - X - 358
1/8" NPT		0166 - 415 04 - X - 060	0166 - 416 04 - X - 064
7/16-20 UNF		0166 - 415 20 - X - 329	0166 - 416 20 - X - 331
9/16-18 UNF		0166 - 415 21 - X - 330	0166 - 416 21 - X - 332

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

Your order 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.



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 4,350 psi (300 bar)¹⁾ Burst pressure safety up to 5,800 psi (400 bar)¹⁾

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0166 Diaphragm pressure switches with M3 screw terminal

1.45 - 14.5 ± 2.90 psi (0.1 - 1 ± 0.2 bar)	M 10x1 taper	0166 - 401 01 - X - 001	0166 - 402 01 - X - 005
	M 12x1.5 cyl.	0166 - 401 02 - X - 002	0166 - 402 02 - X - 006
	1/4" BSPP	0166 - 401 03 - X - 003	0166 - 402 03 - X - 007
	1/8" BSPP	0166 - 401 28 - X - 601	0166 - 402 28 - X - 602
	1/4" NPT	0166 - 401 09 - X - 343	0166 - 402 09 - X - 344
	1/8" NPT	0166 - 401 04 - X - 004	0166 - 402 04 - X - 008
	7/16-20 UNF	0166 - 401 20 - X - 301	0166 - 402 20 - X - 303
	9/16-18 UNF	0166 - 401 21 - X - 302	0166 - 402 21 - X - 304
7.25 - 43.5 ± 4.35 psi (0.5 - 3 ± 0.3 bar)	M 10x1 taper	0166 - 421 01 - X - 070	0166 - 422 01 - X - 070
	M 12x1.5 cyl.	0166 - 421 02 - X - 070	0166 - 422 02 - X - 070
	1/4" BSPP	0166 - 421 03 - X - 070	0166 - 422 03 - X - 070
	1/8" BSPP	0166 - 421 28 - X - 070	0166 - 422 28 - X - 070
	1/4" NPT	0166 - 421 09 - X - 070	0166 - 422 09 - X - 070
	1/8" NPT	0166 - 421 04 - X - 070	0166 - 422 04 - X - 070
	7/16-20 UNF	0166 - 421 20 - X - 070	0166 - 422 20 - X - 070
	9/16-18 UNF	0166 - 421 21 - X - 070	0166 - 422 21 - X - 070
14.5 - 145 ± 7.25 psi (1 - 10 ± 0.5 bar)	M 10x1 taper	0166 - 405 01 - X - 017	0166 - 406 01 - X - 021
	M 12x1.5 cyl.	0166 - 405 02 - X - 018	0166 - 406 02 - X - 022
	1/4" BSPP	0166 - 405 03 - X - 019	0166 - 406 03 - X - 023
	1/8" BSPP	0166 - 405 28 - X - 605	0166 - 406 28 - X - 606
	1/4" NPT	0166 - 405 09 - X - 347	0166 - 406 09 - X - 348
	1/8" NPT	0166 - 405 04 - X - 020	0166 - 406 04 - X - 024
	7/16-20 UNF	0166 - 405 20 - X - 309	0166 - 406 20 - X - 311
	9/16-18 UNF	0166 - 405 21 - X - 310	0166 - 406 21 - X - 312
145 - 290 ± 14.50 psi (10 - 20 ± 1.0 bar)	M 10x1 taper	0166 - 409 01 - X - 033	0166 - 410 01 - X - 037
	M 12x1.5 cyl.	0166 - 409 02 - X - 034	0166 - 410 02 - X - 038
	1/4" BSPP	0166 - 409 03 - X - 035	0166 - 410 03 - X - 039
	1/8" BSPP	0166 - 409 28 - X - 609	0166 - 410 28 - X - 610
	1/4" NPT	0166 - 409 09 - X - 351	0166 - 410 09 - X - 352
	1/8" NPT	0166 - 409 04 - X - 036	0166 - 410 04 - X - 040
	7/16-20 UNF	0166 - 409 20 - X - 317	0166 - 410 20 - X - 319
	9/16-18 UNF	0166 - 409 21 - X - 318	0166 - 410 21 - X - 320
290 - 725 ± 29.0 psi (20 - 50 ± 2.0 bar)	M 10x1 taper	0166 - 413 01 - X - 049	0166 - 414 01 - X - 053
	M 12x1.5 cyl.	0166 - 413 02 - X - 050	0166 - 414 02 - X - 054
	1/4" BSPP	0166 - 413 03 - X - 051	0166 - 414 03 - X - 055
	1/8" BSPP	0166 - 413 28 - X - 613	0166 - 414 28 - X - 614
	1/4" NPT	0166 - 413 09 - X - 355	0166 - 414 09 - X - 356
	1/8" NPT	0166 - 413 04 - X - 052	0166 - 414 04 - X - 056
	7/16-20 UNF	0166 - 413 20 - X - 325	0166 - 414 20 - X - 327
	9/16-18 UNF	0166 - 413 21 - X - 326	0166 - 414 21 - X - 328

Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, 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

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

M.3

hex 24



0168

Diaphragm pressure switches up to 42 V

- Made of zinc-plated steel (CrVI-free)
- Spade or M3 screw terminal
- Overpressure safety up to 4,351 psi (300 bar)¹⁾, Burst pressure safety up to 5,800 psi (400 bar)
- With female thread with compression-type fitting to DIN EN ISO 8434-1 (former DIN 2353)

Adjustment range tolerance at room temperature	Female thread	Order number NO → :	Order number NC → :
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0168 Diaphragm pressure switches with M3 screw terminal

1.45 – 14.5 ± 2.90 psi (0.1 – 1 ± 0.2 bar)	M 12x1.5 female DIN 2353	0168 – 401 16 -X - 001	0168 – 402 16 -X - 002
7.25 – 43.5 ± 4.35 psi (0.5 – 3 ± 0.3 bar)		0168 – 421 16 -X - 070	0168 – 422 16 -X - 070
14.5 – 145 ± 7.25 psi (1 – 10 ± 0.5 bar)		0168 – 405 16 -X - 005	0168 – 406 16 -X - 006
145 – 290 ± 14.5 psi (10 – 20 ± 1.0 bar)		0168 – 409 16 -X - 009	0168 – 410 16 -X - 010
290 – 725 ± 29.0 psi (20 – 50 ± 2.0 bar)		0168 – 413 16 -X - 013	0168 – 414 16 -X - 014

0168 Diaphragm pressure switches with spade terminal

1.45 – 14.5 ± 2.90 psi (0.1 – 1 ± 0.2 bar)	M 12x1.5 female DIN 2353	0168 – 403 16 -X - 003	0168 – 404 16 -X - 004
7.25 – 43.5 ± 4.35 psi (0.5 – 3 ± 0.3 bar)		0168 – 423 16 -X - 070	0168 – 424 16 -X - 070
14.5 – 145 ± 7.25 psi (1 – 10 ± 0.5 bar)		0168 – 407 16 -X - 007	0168 – 408 16 -X - 008
145 – 290 ± 14.5 psi (10 – 20 ± 1.0 bar)		0168 – 411 16 -X - 011	0168 – 412 16 -X - 012
290 – 725 ± 29.0 psi (20 – 50 ± 2.0 bar)		0168 – 415 16 -X - 015	0168 – 416 16 -X - 016

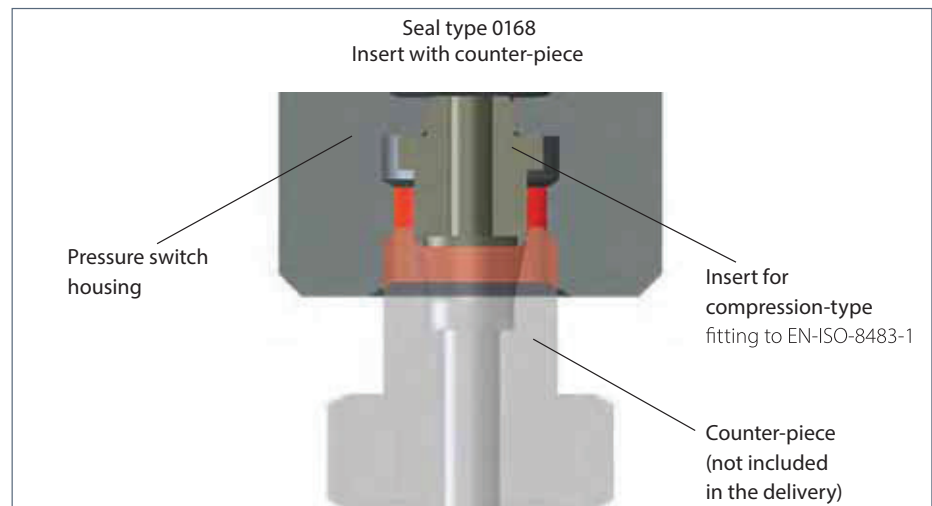
Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, 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.



Your order number: 0168 – XXX XX – X – XXX



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 8,700 psi (600 bar), Burst pressure safety up to 10,153 psi (700 bar)¹⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
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0169 Piston pressure switches with spade terminal

725 - 2175 ± 72.5 psi (50 - 150 ± 5 bar)	1/4" BSPP	0169 - 419 03 - X - 011	0169 - 420 03 - X - 015
	1/8" BSPP	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
1450 - 2900 ± 72.5 psi (100 - 200 ± 5 bar)	1/4" BSPP	0169 - 493 03 - X - 011	0169 - 494 03 - X - 015
	1/8" BSPP	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
	G 1/4 DIN 3852-2-A	0169 - 491 60 - X - 003	0169 - 492 60 - X - 007
	M12x1.5DIN3852-1-A	0169 - 491 68 - X - 002	0169 - 492 68 - X - 006

0169 Piston pressure switches with M3 screw terminal

725 - 2175 ± 72.5 psi (50 - 150 ± 5 bar)	1/4" BSPP	0169 - 417 03 - X - 003	0169 - 418 03 - X - 007
	1/8" BSPP	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
1450 - 2900 ± 72.5 psi (100 - 200 ± 5 bar)	1/4" BSPP	0169 - 491 03 - X - 003	0169 - 492 03 - X - 007
	1/8" BSPP	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
	G 1/4 DIN 3852-2-A	0169 - 491 60 - X - 003	0169 - 492 60 - X - 007
	M12x1.5DIN3852-1-A	0169 - 491 68 - X - 002	0169 - 492 68 - X - 006

Seal material – Application areas

NBR	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, 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⁾ Further thread types are available from a minimum order quantity of 500 pieces.

0164

Diaphragm pressure switches up to 42 V with stainless steel housing

- Stainless steel housing (AISI 303 / 1.4305)
- Spade or M3 screw terminal
- Overpressure safety up to 8,700 psi (600 bar)¹⁾ Burst pressure safety up to 10,153 psi (700 bar)¹⁾ (EPDM-W270 and silicone diaphragm up to 500 psi (35 bar))²⁾

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0164 Diaphragm pressure switches with spade terminal

1.45 - 14.5 ± 2.90 psi (0.1 - 1 ± 0.2 bar)	1/4" BSPP-E	0164 - 403 41 - X - 003	0164 - 404 41 - X - 004
	1/8" BSPT	0164 - 403 12 - X - 003	0164 - 404 12 - X - 004
	1/4" BSPT	0164 - 403 46 - X - 003	0164 - 404 46 - X - 004
	1/8" NPT	0164 - 403 04 - X - 003	0164 - 404 04 - X - 004
7.25 - 43.5 ± 4.35 psi (0.5 - 3 ± 0.3 bar)	1/4" BSPP-E	0164 - 423 41 - X - 070	0164 - 424 41 - X - 070
	1/8" BSPT	0164 - 423 12 - X - 070	0164 - 424 12 - X - 070
	1/4" BSPT	0164 - 423 46 - X - 070	0164 - 424 46 - X - 070
	1/8" NPT	0164 - 423 04 - X - 070	0164 - 424 04 - X - 070
14.5 - 145 ± 7.25 psi (1 - 10 ± 0.5 bar)	1/4" BSPP-E	0164 - 407 41 - X - 007	0164 - 408 41 - X - 008
	1/8" BSPT	0164 - 407 12 - X - 007	0164 - 408 12 - X - 008
	1/4" BSPT	0164 - 407 46 - X - 007	0164 - 408 46 - X - 008
	1/8" NPT	0164 - 407 04 - X - 007	0164 - 408 04 - X - 008
145 - 290 ± 14.5 psi (10 - 20 ± 1 bar)	1/4" BSPP-E	0164 - 411 41 - X - 011	0164 - 412 41 - X - 012
	1/8" BSPT	0164 - 411 12 - X - 011	0164 - 412 12 - X - 012
	1/4" BSPT	0164 - 411 46 - X - 011	0164 - 412 46 - X - 012
	1/8" NPT	0164 - 411 04 - X - 011	0164 - 412 04 - X - 012
290 - 725 ± 29.0 psi (20 - 50 ± 2 bar)	1/4" BSPP-E	0164 - 415 41 - X - 015	0164 - 416 41 - X - 016
	1/8" BSPT	0164 - 415 12 - X - 015	0164 - 416 12 - X - 016
	1/4" BSPT	0164 - 415 46 - X - 015	0164 - 416 46 - X - 016
	1/8" NPT	0164 - 415 04 - X - 015	0164 - 416 04 - X - 016

Seal material – Application areas

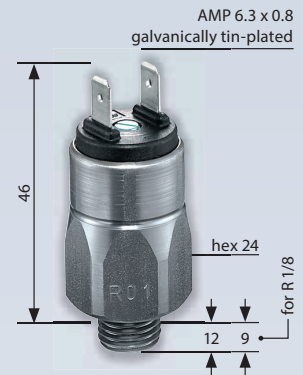
NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-W270	Drinking water (p _{max} ≤ 500 psi / 35 bar)	5
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, alcohols	6
Silicone	Water, food products, air, etc. (p _{max} ≤ 500 psi / 35 bar)	8
HNBR	Hydraulic/machine oil, ester-based bio-oils	9



Your order number: 0164 - 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.

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 8,700 psi (600 bar)¹⁾
EPDM-TW and silicone diaphragm up to max. 35 bar²⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
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0164 Diaphragm pressure switches with screw terminal M3

1.45 - 14.5 ±2.90 psi 0.1 - 1 (± 0.2) bar	1/4 BSPP-E	0164 - 401 41 - X - 001	0164 - 402 41 - X - 002
	1/8" BSPT	0164 - 401 12 - X - 001	0164 - 402 12 - X - 002
	1/4" BSPT	0164 - 401 46 - X - 001	0164 - 402 46 - X - 002
	1/8" NPT	0164 - 401 04 - X - 001	0164 - 402 04 - X - 002
7.25 - 43.5 ±4.35 psi 0.5 - 3 (± 0.3) bar	1/4 BSPP-E	0164 - 421 41 - X - 070	0164 - 422 41 - X - 070
	1/8" BSPT	0164 - 421 12 - X - 070	0164 - 422 12 - X - 070
	1/4" BSPT	0164 - 421 46 - X - 070	0164 - 422 46 - X - 070
	1/8" NPT	0164 - 421 04 - X - 070	0164 - 422 04 - X - 070
14.5 - 145 ±7.25 psi 1 - 10 (± 0.5) bar	1/4 BSPP-E	0164 - 405 41 - X - 005	0164 - 406 41 - X - 006
	1/8" BSPT	0164 - 405 12 - X - 005	0164 - 406 12 - X - 006
	1/4" BSPT	0164 - 405 46 - X - 005	0164 - 406 46 - X - 006
	1/8" NPT	0164 - 405 04 - X - 005	0164 - 406 04 - X - 006
145 - 290 ±14.5 psi 10 - 20 (± 1) bar	1/4 BSPP-E	0164 - 409 41 - X - 009	0164 - 410 41 - X - 010
	1/8" BSPT	0164 - 409 12 - X - 009	0164 - 410 12 - X - 010
	1/4" BSPT	0164 - 409 46 - X - 009	0164 - 410 46 - X - 010
	1/8" NPT	0164 - 409 04 - X - 009	0164 - 410 04 - X - 010
290 - 725 ±29.0 psi 20 - 50 (± 2) bar	1/4 BSPP-E	0164 - 413 41 - X - 013	0164 - 414 41 - X - 014
	1/8" BSPT	0164 - 413 12 - X - 013	0164 - 414 12 - X - 014
	1/4" BSPT	0164 - 413 46 - X - 013	0164 - 414 46 - X - 014
	1/8" NPT	0164 - 413 04 - X - 013	0164 - 414 04 - X - 014

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Water, Brakefluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-TW ²⁾	Drinking water ($p_{max} \leq 35$ bar)	5
FKM	Hydraulicfluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, alcohols	6
Silicone ²⁾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



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

²⁾ Functional safety and reliability only up to max. 35 bar with EPDM-TW and silicone diaphragm.

³⁾ The G 1/4-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 500 psi (35 bar)¹⁾

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0167 Diaphragm pressure switches with spade terminal

1.45 - 14.5 ± 2.9 psi (0.1 - 1 ± 0.2 bar)	M 10x1 taper	0167 - 403 01 - X - 007	0167 - 404 01 - X - 010
	1/8" BSPT	0167 - 403 12 - X - 008	0167 - 404 12 - X - 011
	1/2" BSPT	0167 - 403 07 - X - 009	0167 - 404 07 - X - 012
	1/4" BSPP	0167 - 403 03 - X - 039	0167 - 404 03 - X - 040
	1/8" BSPP	0167 - 403 28 - X - 003	0167 - 404 28 - X - 004
	1/8" NPT	0167 - 403 04 - X - 012	0167 - 404 04 - X - 016
7.25 - 43.5 ± 4.35 psi (0.5 - 3 ± 0.3 bar)	M 10x1 taper	0167 - 423 01 - X - 070	0167 - 424 01 - X - 070
	1/8" BSPT	0167 - 423 12 - X - 070	0167 - 424 12 - X - 070
	1/2" BSPT	0167 - 423 07 - X - 070	0167 - 424 07 - X - 070
	1/4" BSPP	0167 - 423 03 - X - 070	0167 - 424 03 - X - 070
	1/8" BSPP	0167 - 423 28 - X - 070	0167 - 424 28 - X - 070
	1/8" NPT	0167 - 423 04 - X - 070	0167 - 424 04 - X - 070
14.5 - 145 ± 7.25 psi (1 - 10 ± 0.5 bar)	M 10x1 taper	0167 - 407 01 - X - 019	0167 - 408 01 - X - 022
	1/8" BSPT	0167 - 407 12 - X - 020	0167 - 408 12 - X - 023
	1/2" BSPT	0167 - 407 07 - X - 021	0167 - 408 07 - X - 024
	1/4" BSPP	0167 - 407 03 - X - 043	0167 - 408 03 - X - 044
	1/8" BSPP	0167 - 407 28 - X - 007	0167 - 408 28 - X - 008
	1/8" NPT	0167 - 407 04 - X - 028	0167 - 408 04 - X - 032
145 - 290 ± 14.5 psi (10 - 20 ± 1 bar)	M 10x1 taper	0167 - 411 01 - X - 031	0167 - 412 01 - X - 034
	1/8" BSPT	0167 - 411 12 - X - 032	0167 - 412 12 - X - 035
	1/2" BSPT	0167 - 411 07 - X - 033	0167 - 412 07 - X - 036
	1/4" BSPP	0167 - 411 03 - X - 047	0167 - 412 03 - X - 048
	1/8" BSPP	0167 - 411 28 - X - 011	0167 - 412 28 - X - 012
	1/8" NPT	0167 - 411 04 - X - 044	0167 - 412 04 - X - 048

Seal material – Application areas

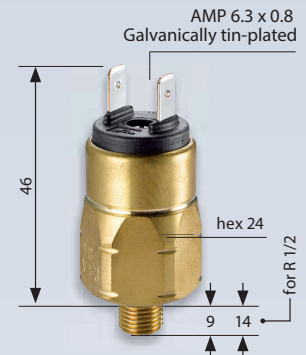
NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-W270	Drinking water. ≥ 500 psi (p _{max} ≥ 35 bar)	5
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, alcohols	6
Silicone	Water, food products, air, etc. ≥ 500 psi (p _{max} ≥ 35 bar)	8

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

Your order number: 0167 - 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.

M.3

hex 24



0167

Diaphragm pressure switches up to 42 V with brass housing

- Brass housing
- M3 screw terminal
- Overpressure safety up to 500 psi (35 bar)¹⁾

Adjustment range tolerance at room temperature	Male thread	Order number NO → :	Order number NC → :
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0167 Diaphragm pressure switches with M3 screw terminal

1.45 - 14.5 ± 2.9 psi (0.1 - 1 ± 0.2 bar)	M 10x1 taper	0167 - 401 01 - X - 001	0167 - 402 01 - X - 004
	1/8" BSPT	0167 - 401 12 - X - 002	0167 - 402 12 - X - 005
	1/2" BSPT	0167 - 401 07 - X - 003	0167 - 402 07 - X - 006
	1/4" BSPP	0167 - 401 03 - X - 037	0167 - 402 03 - X - 038
	1/8" BSPP	0167 - 401 28 - X - 001	0167 - 402 28 - X - 002
	1/8" NPT	0167 - 401 04 - X - 004	0167 - 402 04 - X - 008
7.25 - 43.5 ± 4.35 psi (0.5 - 3 ± 0.3 bar)	M 10x1 taper	0167 - 421 01 - X - 070	0167 - 422 01 - X - 070
	1/8" BSPT	0167 - 421 12 - X - 070	0167 - 422 12 - X - 070
	1/2" BSPT	0167 - 421 07 - X - 070	0167 - 422 07 - X - 070
	1/4" BSPP	0167 - 421 03 - X - 070	0167 - 422 03 - X - 070
	1/8" BSPP	0167 - 421 28 - X - 070	0167 - 422 28 - X - 070
	1/8" NPT	0167 - 421 04 - X - 070	0167 - 422 04 - X - 070
14.5 - 145 ± 7.25 psi (1 - 10 ± 0.5 bar)	M 10x1 taper	0167 - 405 01 - X - 013	0167 - 406 01 - X - 016
	1/8" BSPT	0167 - 405 12 - X - 014	0167 - 406 12 - X - 017
	1/2" BSPT	0167 - 405 07 - X - 015	0167 - 406 07 - X - 018
	1/4" BSPP	0167 - 405 03 - X - 041	0167 - 406 03 - X - 042
	1/8" BSPP	0167 - 405 28 - X - 005	0167 - 406 28 - X - 006
	1/8" NPT	0167 - 405 04 - X - 020	0167 - 406 04 - X - 024
145 - 290 ± 14.5 psi (10 - 20 ± 1 bar)	M 10x1 taper	0167 - 409 01 - X - 025	0167 - 410 01 - X - 028
	1/8" BSPT	0167 - 409 12 - X - 026	0167 - 410 12 - X - 029
	1/2" BSPT	0167 - 409 07 - X - 027	0167 - 410 07 - X - 030
	1/4" BSPP	0167 - 409 03 - X - 045	0167 - 410 03 - X - 046
	1/8" BSPP	0167 - 409 28 - X - 009	0167 - 410 28 - X - 010
	1/8" NPT	0167 - 409 04 - X - 036	0167 - 410 04 - X - 040

Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-W270	Drinking water. ≥ 500 psi (p _{max} ≥ 35 bar)	5
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, alcohols	6
Silicone	Water, food products, air, etc. ≥ 500 psi (p _{max} ≥ 35 bar)	8



Your order number: **0167 - XXX XX - X - XXX**

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, $p_{max} = 4,352 / 5,800$ psi (300 / 400 bar)	-40 °F ... +212 °F (-40 °C ... +100 °C)
	NBR - diaphragm pressure switch, $p_{max} = 1,450$ psi (100 bar)	-22 °F ... +212 °F (-30 °C ... +100 °C)
	EPDM	-22 °F ... +248 °F (-30 °C ... +120 °C)
	EPDM-TW (in diaphragm pressure switch)	-4 °F ... +212 °F (-20 °C ... +100 °C)
	FKM (in diaphragm pressure switch)	+23 °F ... +248 °F (-5 °C ... +120 °C)
	FKM (in piston pressure switch)	+5 °F ... +248 °F (-15 °C ... +120 °C)
	FFKM	-4 °F ... +248 °F (-20 °C ... +120 °C)
	Silicone (in diaphragm pressure switch)	-40 °F ... +248 °F (-40 °C ... +120 °C)
	HNBR	-22 °F ... +248 °F (-30 °C ... +120 °C)
Burst pressure (diaphragm pressure switch, overpressure resistance 100 bar)	2,900 psi (200 bar)	
Burst pressure (diaphragm pressure switch, overpressure resistance 400 bar)	10,152 psi (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)	14,500 psi (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	≤ 14,500 psi/ms (≤ 1,000 bar/s)	
Hysteresis (only adjustable at factory)	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								•	•			•	•

M

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 4,300 psi / 8,700 psi (300 / 600 bar) ¹⁾
- Includes polyamide cap, protection class IP65

P _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
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0140 Diaphragm pressure switches with screw terminals

P _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	1/4" BSPP	0140 - 457 03 - X - 003
			1/8" NPT	0140 - 457 04 - X - 300
4,350 psi (300 bar)	0.4.35 - 21.75 psi (0.3 - 1.5 bar)	± 2.90 psi (± 0.2 bar)	1/4" NPT	0140 - 457 09 - X - 305
			7/16-20 UNF	0140 - 457 20 - X - 310
			9/16-18 UNF	0140 - 457 21 - X - 315
			1/4" BSPP	0140 - 458 03 - X - 006
14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)	1/8" NPT	1/4" NPT	0140 - 458 04 - X - 301
			7/16-20 UNF	0140 - 458 09 - X - 306
			9/16-18 UNF	0140 - 458 20 - X - 311
			9/16-18 UNF	0140 - 458 21 - X - 316
145 - 290 psi (10 - 20 bar)	± 14.50 psi (± 1.0 bar)	1/4" BSPP	1/8" NPT	0140 - 459 03 - X - 009
			1/4" NPT	0140 - 459 04 - X - 302
			7/16-20 UNF	0140 - 459 09 - X - 307
			9/16-18 UNF	0140 - 459 20 - X - 312
290 - 725 psi (20 - 50 bar)	± 29 psi (± 2.0 bar)	1/4" BSPP	1/8" NPT	0140 - 459 21 - X - 317
			1/4" NPT	0140 - 461 03 - X - 012
			7/16-20 UNF	0140 - 461 04 - X - 303
			9/16-18 UNF	0140 - 461 09 - X - 308
8,700 psi (600 bar)	725 - 2,175 psi (50 - 150 bar)	± 72.5 psi (± 5.0 bar)	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

P _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	1/4" BSPP	0141 - 460 03 - X - 003
			1/8" NPT	0141 - 460 04 - X - 304
8,700 psi (600 bar)	725 - 2,175 psi (50 - 150 bar)	± 72.5 psi (± 5.0 bar)	1/4" NPT	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, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, 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.

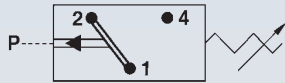
M.4

hex 27

0170 / 0171

Diaphragm / piston pressure switches up to 42 V

- Zinc-plated steel (CrVI-free)
- Snap action with silver contacts
- Overpressure safety up to 1,450 / 5,801 / 10,152 psi (100 / 400 / 700 bar)¹⁾
- Differential adjustable at factory



P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0170 Diaphragm pressure switches with spade terminal

1,450 psi ¹⁾ (100 bar) ¹⁾	4.35 - 21.75 psi (0.3 - 1.5 bar)	± 2.90 psi (± 0.2 bar)	M 10x1 taper	0170 - 457 01 - X - 001
			M 12x1.5 cyl.	0170 - 457 02 - X - 002
			1/4" BSPP	0170 - 457 03 - X - 003
			1/8" NPT	0170 - 457 04 - X - 318
			1/4" NPT	0170 - 457 09 - X - 314
			7/16-20 UNF	0170 - 457 20 - X - 301
			9/16-18 UNF	0170 - 457 21 - X - 302

	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)	M 10x1 taper	0170 - 458 01 - X - 040
			M 12x1.5 cyl.	0170 - 458 02 - X - 041
			1/4" BSPP	0170 - 458 03 - X - 042
			1/8" NPT	0170 - 458 04 - X - 343
			1/4" NPT	0170 - 458 09 - X - 340
			7/16-20 UNF	0170 - 458 20 - X - 341
			9/16-18 UNF	0170 - 458 21 - X - 342

5,801 psi ¹⁾ (400 bar) ¹⁾	145 - 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)	M 10x1 taper	0170 - 459 01 - X - 007
			M 12x1.5 cyl.	0170 - 459 02 - X - 008
			1/4" BSPP	0170 - 459 03 - X - 009
			1/8" NPT	0170 - 459 04 - X - 320
			1/4" NPT	0170 - 459 09 - X - 316
			7/16-20 UNF	0170 - 459 20 - X - 305
			9/16-18 UNF	0170 - 459 21 - X - 306

	145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)	M 10x1 taper	0170 - 461 01 - X - 010
			M 12x1.5 cyl.	0170 - 461 02 - X - 011
			1/4" BSPP	0170 - 461 03 - X - 012
			1/8" NPT	0170 - 461 04 - X - 321
			1/4" NPT	0170 - 461 09 - X - 317
			7/16-20 UNF	0170 - 461 20 - X - 307
			9/16-18 UNF	0170 - 461 21 - X - 308

0171 Piston pressure switches with spade terminal

10,152 psi ¹⁾ (700 bar) ¹⁾	725 - 2,900 psi (50 - 200 bar)	± 72.5 psi (± 5.0 bar)	M 10x1 taper	0171 - 460 01 - X - 001
			M 12x1.5 cyl.	0171 - 460 02 - X - 002
			1/4" BSPP	0171 - 460 03 - X - 003
			1/8" NPT	0171 - 460 04 - X - 304
			1/4" NPT	0171 - 460 09 - X - 303
			7/16-20 UNF	0171 - 460 20 - X - 301
			9/16-18 UNF	0171 - 460 21 - X - 302

Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, 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. ↓

Your order 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 M 10x1 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)
- Snap action with silver contacts
- Overpressure safety up to 1,450 / 5,801 / 10,152 psi (100 / 400 / 700 bar)¹⁾
- Differential adjustable at factory

p _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0180 Diaphragm pressure switches with spade terminal

p _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
			M 10x1 taper	0180 - 457 01 - X - 001
1,450 psi ¹⁾ (100 bar)	4.35 - 21.75 psi (0.3 - 1.5 bar)	± 2.90 psi (± 0.2 bar)	M 12x1.5 cyl.	0180 - 457 02 - X - 002
			1/4" BSPP	0180 - 457 03 - X - 003
			1/8" NPT	0180 - 457 04 - X - 318
			1/4" NPT	0180 - 457 09 - X - 314
			7/16-20 UNF	0180 - 457 20 - X - 301
			9/16-18 UNF	0180 - 457 21 - X - 302
	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)	M 10x1 taper	0180 - 458 01 - X - 040
			M 12x1.5 cyl.	0180 - 458 02 - X - 041
			1/4" BSPP	0180 - 458 03 - X - 042
			1/8" NPT	0180 - 458 04 - X - 343
			1/4" NPT	0180 - 458 09 - X - 340
			7/16-20 UNF	0180 - 458 20 - X - 341
	145 - 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)	M 10x1 taper	0180 - 459 01 - X - 007
			M 12x1.5 cyl.	0180 - 459 02 - X - 008
			1/4" BSPP	0180 - 459 03 - X - 009
			1/8" NPT	0180 - 459 04 - X - 320
			1/4" NPT	0180 - 459 09 - X - 311
			7/16-20 UNF	0180 - 459 20 - X - 305
	145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)	M 10x1 taper	0180 - 461 01 - X - 010
			M 12x1.5 cyl.	0180 - 461 02 - X - 011
			1/4" BSPP	0180 - 461 03 - X - 012
			1/8" NPT	0180 - 461 04 - X - 321
			1/4" NPT	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

p _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
			M 10x1 taper	0181 - 460 01 - X - 001
10,152 psi ¹⁾ (700 bar)	725 - 2,900 psi (50 - 200 bar)	± 72.5 psi (± 5.0 bar)	M 12x1.5 cyl.	0181 - 460 02 - X - 002
			1/4" BSPP	0181 - 460 03 - X - 003
			1/8" NPT	0181 - 460 04 - X - 304
			1/4" NPT	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

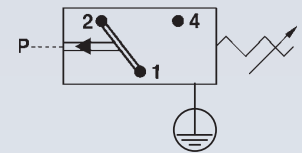
NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM(Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, alcohols	6
HNBR ²⁾	Chemical acids, diluted alkalis, ketones, ester's, alcohols	9

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

Your order number: 018X - XXX XX - X - XXX

M.4

hex 27



M



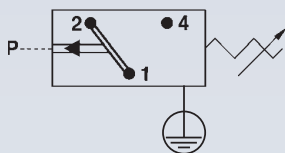
¹⁾ Static value. Dynamic value is 30-50% lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ HNBR diaphragm not available for pressure ranges between 4.35 - 21.75 psi (0.3 - 1.5 bar).

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)
- Snap action with silver contacts
- Overpressure safety up to 8,700 psi (600 bar)¹⁾, Differential adjustable at factory
- Adjustment range: 1,450 - 5,800 psi (100 - 400 bar)
- Height only 51 mm

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0183 Piston pressure switches with spade terminal

8,700 psi ¹⁾ (600 bar) ¹⁾	1,450 - 4,350 psi (100 - 300 bar)	± 145 psi (±10.0 bar)	M 14x1.5	0183 - 462 45 - X - 051
	2,900 - 5,800 psi (200 - 400 bar)			0183 - 463 45 - X - 061

Seal material – Application areas

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



Your order 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.

Order number ▶

Thread adapters

from M 14 x 1.5		
to 1/4 BSPP	to M12 x 1.5	to NPT 1/8
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 (AISI 303 / 1.4305)
- Snap action with silver contacts
- Overpressure safety up to 5,801 / 10,152 psi (400 / 700 bar)¹⁾ (EPDM-W270 and silicone diaphragm up to 500 psi (35 bar)²⁾
- Differential adjustable at factory

p _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0186 Diaphragm pressure switches with spade terminal

1,450 psi (100 bar)	4.3 - 21.7 psi (0.3 - 1.5 bar)	2.9 psi (± 0.2 bar)	1/4 BSPP DIN 3852-2-A	0186 - 446 60 - X - 001
	14.5 - 145 psi (1-10 bar)	7.25 psi (± 0.5 bar)		0186 - 458 60 - X - 050

5,800 psi (400 bar) ¹⁾⁺²⁾	7.25 - 72.5 psi (0.5 - 5 bar)	± 4.35 psi (± 0.3 bar)	1/4 BSPP	0186 - 457 03 - X - 003
	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)		0186 - 458 03 - X - 006
	145 - 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)		0186 - 459 03 - X - 009
	145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)		0186 - 461 03 - X - 012

0187 Piston pressure switches with spade terminal

10,152 psi ¹⁾ (700 bar) ¹⁾	725 - 2,900 psi (50 - 200 bar)	± 7.25 psi (± 0.5 bar)	1/4 BSPP	0187 - 460 03 - X - 003
8,700 psi (600 bar)			1/8" NPT	0187 - 460 04 - X - 304

Seal material – Application areas

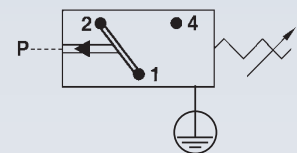
NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-W270	Drinking water (only in diaphragm, p _{max} ≤ 500 psi / 35 bar)	5
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, esters, alcohols	6
Silicone	Water, food products, air, etc(only in diaphragm (p _{max} ≤ 500 psi / 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.

Your order number: 018X - 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) Functional safety and reliability only up to max. 35 bar with EPDM-TW and silicone diaphragm.
3) Including the thread sizes 1/8 BSPP, 1/8 BSPT and M 10x1 cylindrical/conical.

M.4

hex 27

0190 / 0191

Diaphragm / piston pressure switches up to 24 V with gold contacts

- Zinc-plated steel (CrVI-free), with spade terminal
- Snap action with gold contacts
- Overpressure safety up to 1,450 / 5,801 / 10,152 psi (100 / 400 / 700 bar)¹⁾
- Differential adjustable at factory

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0190 Diaphragm pressure switches with spade terminal

1,450 psi ¹⁾ (100 bar) ¹⁾	4.35 - 21.75 psi (0.3 - 1.5 bar)	± 2.90 psi (± 0.2 bar)	M 10 x1 taper	0190 - 457 01 - X - 001
			M 12x1.5 cyl.	0190 - 457 02 - X - 002
			1/4" BSPP	0190 - 457 03 - X - 003
			1/4" NPT	0190 - 457 09 - X - 314
			1/8" NPT	0190 - 457 04 - X - 318
			7/16-20 UNF	0190 - 457 20 - X - 301
			9/16/18 UNF	0190 - 457 21 - X - 302

14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)	M 10 x1 taper	0190 - 458 01 - X - 040	
		M 12x1.5 cyl.	0190 - 458 01 - X - 041	
		1/4" BSPP	0190 - 458 03 - X - 042	
		1/4" NPT	0190 - 458 09 - X - 340	
		1/8" NPT	0190 - 458 04 - X - 343	
		7/16-20 UNF	0190 - 458 20 - X - 341	
			9/16/18 UNF	0190 - 458 21 - X - 342

5,801 psi ¹⁾ (400 bar) ¹⁾	145- 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)	M 10 x1 taper	0190 - 459 01 - X - 007
			M 12x1.5 cyl.	0190 - 459 01 - X - 008
			1/4" BSPP	0190 - 459 03 - X - 009
			1/4" NPT	0190 - 459 09 - X - 316
			1/8" NPT	0190 - 459 04 - X - 320
			7/16-20 UNF	0190 - 459 20 - X - 305
			9/16/18 UNF	0190 - 459 21 - X - 306

145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)	M 10 x1 taper	0190 - 461 01 - X - 010	
		M 12x1.5 cyl.	0190 - 461 02 - X - 011	
		1/4" BSPP	0190 - 461 03 - X - 012	
		1/4" NPT	0190 - 461 09 - X - 317	
		1/8" NPT	0190 - 461 04 - X - 321	
		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

10,152 psi ¹⁾ (700 bar) ¹⁾	725 - 2,900 psi (50- 200 bar)	± 72.5 psi (± 5.0 bar)	M 10 x1 taper	0191 - 460 01 - X - 001
			M 12x1.5 cyl.	0191 - 460 02 - X - 002
			1/4" BSPP	0191 - 460 03 - X - 003
			1/4" NPT	0191 - 460 09 - X - 303
			1/8" NPT	0191 - 460 04 - X - 304
			7/16-20 UNF	0191 - 460 20 - X - 301
			9/16/18 UNF	0191 - 460 21 - X - 302

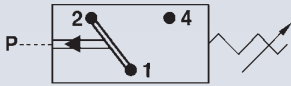
Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton®)	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. ↓

Your order 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 M 10x1 cylindrical/conical.
 3) HNBR diaphragm not available for pressure ranges between 0.3 - 1.5 bar.

0196 / 0197

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

- Stainless steel housing (AISI 303 / 1.4305)
- Fitted with snap action contact and gold contacts
- Overpressure safety up to 5,801 / 10,152 psi (400 / 700 bar)¹⁾
(EPDM-W270 and silicone diaphragm up to 500 psi / 35 bar)²⁾
- Differential adjustable at factory

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0196 Diaphragm pressure switches with spade terminal

1,450 psi (100 bar)	4.3 - 21.7 psi (0.3 - 1.5 bar)	2.9 psi (± 0.2 bar)	1/4 BSPP DIN 3852-2-A	0196 - 446 60 - X - 001
	14.5 - 145 psi (1-10 bar)	7.25 psi (± 0.5 bar)		0196 - 458 60 - X - 050

5,801 psi ¹⁾⁺²⁾ (400 bar) ¹⁾⁺²⁾	7.25 - 72.5 psi (0.5 - 5 bar)	± 4.35 psi (± 0.3 bar)	1/4 BSPP	0196 - 457 03 - X - 003
	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)		0196 - 458 03 - X - 006
	145 - 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)		0196 - 459 03 - X - 009
	145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)		0196 - 461 03 - X - 012

0197 Piston pressure switches with spade terminal

10,152 psi ¹⁾ (700 bar) ¹⁾	725 - 2,900 psi (50 - 200 bar)	± 7.25 psi (± 0.5 bar)	1/4 BSPP	0197 - 460 03 - X - 003
8,700 psi (600 bar)			1/8" NPT	0197 - 460 04 - X - 304

Seal material – Application areas

NBR (BunaN)	Hydraulic/machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-TW	Drinking water (only in diaphragm, p _{max} ≤ 500 psi / 35 bar)	5
FKM (Viton®)	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Hot water, chemical acids, diluted alkalis, ketones, ester's, alcohols	6
Silicone	Water, food products, air, etc (only in diaphragm, p _{max} ≤ 500 psi / 35 bar)	8
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

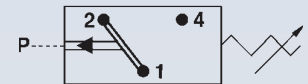
Refer to page 53 for the temperature range and application thresholds of sealing materials.

Your order number: 019X - XXX 03 - X - XXX

- 1) Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.
- 2) Functional safety and reliability only up to max. 35 bar with EPDM-TW and silicone diaphragm.
- 3) Including the thread sizes G 1/8, R 1/8 and M 10x1 cylindrical/conical.

M.4

hex 27



M

M.5

hex 24 / 27
Ready-wired

hex 24 / hex 27 ready-wired pressure switches

Custom designs



- Ready-wired pressure switches hex 24 and hex 27, available with all commercial plug-in types and individual cable length.
- The technical details of ready-wired pressure switch types correspond to those of the same standard pressure switch types. Different technical details will be agreed with the customer.
- Pressure switches usually have protection class IP65. Our ready-wired pressure switches attain IP67 or IP6K9K. This is a requirement particularly in commercial vehicle construction, mobile hydraulics and similarly demanding applications.
- Ready-wired pressure switches enable plug connectors to be moved in climatically non-critical and low-vibration areas.
- The modular layout also enables the production of lower volumes.
- The switching point for ready-wired pressure switches is factory-set to a fixed value. Exception: The switching point of the 0240/0241 can be adjusted on site even after the sealing process.

hex 24 / 27

Custom designs

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

M.5

hex 24 / 27
Ready-wired



Standard types suitable for ready-wiring

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

Please note our detailed information on

- CE marking
- protection class
- custom applications

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

A selection from the wide variety of connectors we can supply

<p>Connector to DIN 72585-A1-4.1</p>	
<p>AMP Junior Timer®</p>	
<p>Cannon connector</p>	
<p>AMP Superseal 1.5°</p>	
<p>Packard connector (Weather Pack® 2-wire)</p>	
<p>Packard connector (Weather Pack® 3-wire)</p>	
<p>Deutsch connector (DT 06 - 2S)</p>	
<p>Deutsch connector (DT 04 - 2P)</p>	
<p>Deutsch connector (DT 04 - 3P)</p>	

M.5

hex 24 / 27
Ready-wired

0240 / 0241

Diaphragm / piston pressure switches, hex 27

Technical data

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 °F...+212 °F (-40 °C...+100 °C)
	NBR (piston pressure switch) -22 °F...+212 °F (-30 °C...+100 °C)
	EPDM -22 °F...+248 °F (-30 °C...+120 °C)
	FKM (Viton®) (in diaphragm pressure switch) +23 °F...+248 °F (-5 °C...+120 °C)
	FKM (Viton®) (in piston pressure switch) +5 °F...+248 °F (-15 °C...+120 °C)
	FFKM +5 °F...+248 °F (-15 °C...+120 °C)
	Silicone -4 °F...+248 °F (-20 °C...+120 °C)
HNBR -22 °F...+248 °F (-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. 725 psi (50 bar))
Pressure rise rate:	≤ 14,500 psi/s (1,000 bar/s)
Differential:	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
Cable:	Standard length 6.5 ft (2 m) with wire end sleeves
Weight:	approx. 4.5 oz (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 4,350 / 8,700 psi (300 / 600 bar)¹⁾
- Switching point can also be adjusted during use
- Protection class 2, protective insulation

p _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Male thread	Order number
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0240 Diaphragm pressure switches

4,350 psi ¹⁾ (300 bar) ¹⁾	4.35 - 21.75 psi (0.3 - 1.5 bar)	± 2.90 psi (± 0.2 bar)	1/4" BSPP	0240 - 457 03 - X - 003
			1/8" NPT	0240 - 457 04 - X - 300
			1/4" NPT	0240 - 457 09 - X - 305
			7/16-20 UNF	0240 - 457 20 - X - 310
			9/16-18 UNF	0240 - 457 21 - X - 315
	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)	1/4" BSPP	0240 - 458 03 - X - 006
			1/8" NPT	0240 - 458 04 - X - 301
			1/4" NPT	0240 - 458 09 - X - 306
			7/16-20 UNF	0240 - 458 20 - X - 311
			9/16-18 UNF	0240 - 458 21 - X - 316
	145 - 290 psi (10 - 20 bar)	± 14.5 psi (± 1.0 bar)	1/4" BSPP	0240 - 459 03 - X - 009
			1/8" NPT	0240 - 459 04 - X - 302
			1/4" NPT	0240 - 459 09 - X - 307
			7/16-20 UNF	0240 - 459 20 - X - 312
			9/16-18 UNF	0240 - 459 21 - X - 317
	290 - 725 psi (20 - 50 bar)	± 29.0 psi (± 2.0 bar)	1/4" BSPP	0240 - 461 03 - X - 012
1/8" NPT			0240 - 461 04 - X - 303	
1/4" NPT			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

8,700 psi ¹⁾ (600 bar) ¹⁾	725 - 2,175 psi (50 - 150 bar)	± 72.5 psi (± 5.0 bar)	1/4" BSPP	0241 - 460 03 - X - 003
			1/8" NPT	0241 - 460 04 - X - 304
			1/4" NPT	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 areas

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

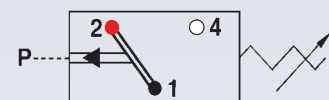
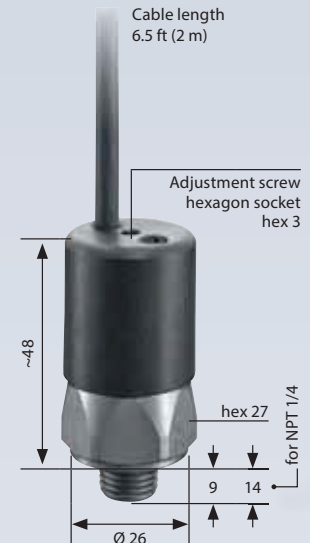
Refer to page 64 for the temperature range and application thresholds of sealing materials. ↓

Your order number: 024X - 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) 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.

M.5

hex 24 / 27
Ready-wired



Contact assignment:

- 1 = Black
- 2 = Red
- 4 = White



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*



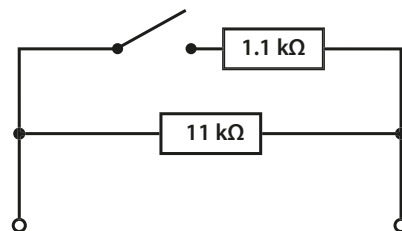
Overview of possible supplementary functions

Circuit	Symbole	Function	Application	Code for order number
Resistor Resistor circuit to NAMUR, refer to page 68		<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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 12VDC	$I = \frac{U_{cc}}{1\text{ k}\Omega} = \frac{12\text{ V}}{1\text{ k}\Omega} = 12\text{ mA}$	$I = \frac{U_{cc}}{11\text{ k}\Omega} = \frac{12\text{ V}}{11\text{ k}\Omega} = 1,1\text{ mA}$	$I \gg \frac{U_{cc}}{1\text{ k}\Omega} \quad I \gg \frac{12\text{ V}}{1\text{ k}\Omega} \quad I \gg 12\text{ mA}$	$I = 0\text{ mA}$

Technical details	
Rated working voltage U_{cc} :	8.2 VDC ... 30 VDC
Maximum rated operating current:	≤ 30 mA
Switching capacity:	< 1 W
Switching frequency:	200 / min.
Mechanical and electrical service life:	1,000,000 cycles
Permitted pressure rise rate:	≤ 1,000 bar / s
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:

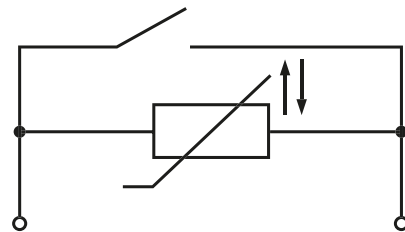
$$U_L = -L \frac{di}{dt}$$

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 1,000 bar / s
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 4,350 psi (300 bar)¹⁾
- Burst pressure safety up to 5,800 psi (400 bar)¹⁾

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 → :
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04XX Diaphragm pressure switches

1.45 - 14.5 ± 2.90 psi 0.1 - 1 (± 0.2) bar	M 10x1 taper	04XX - X 03 01 - X - 001	04XX - X 04 01 - X - 002
	1/4" BSPP	04XX - X 03 03 - X - 001	04XX - X 04 03 - X - 002
	1/8" NPT	04XX - X 03 04 - X - 001	04XX - X 04 04 - X - 002
	1/4" NPT	04XX - X 03 09 - X - 001	04XX - X 04 09 - X - 002
	7/16-20 UNF	04XX - X 03 20 - X - 001	04XX - X 04 20 - X - 002
	9/16-18 UNF	04XX - X 03 21 - X - 001	04XX - X 04 21 - X - 002

7.25- 43.5 ± 4.35 psi 0.5 - 3 (± 0.3) bar	M 10x1 taper	04XX - X 23 01 - X - 001	04XX - X 24 01 - X - 002
	1/4" BSPP	04XX - X 23 03 - X - 001	04XX - X 24 03 - X - 002
	1/8" NPT	04XX - X 23 04 - X - 001	04XX - X 24 04 - X - 002
	1/4" NPT	04XX - X 23 09 - X - 001	04XX - X 24 09 - X - 002
	7/16-20 UNF	04XX - X 23 20 - X - 001	04XX - X 24 20 - X - 002
	9/16-18 UNF	04XX - X 23 21 - X - 001	04XX - X 24 21 - X - 002

14.5 - 145 ± 7.25 psi 1 - 10 (± 0.5) bar	M 10x1 taper	04XX - X 07 01 - X - 001	04XX - X 08 01 - X - 002
	1/4" BSPP	04XX - X 07 03 - X - 001	04XX - X 08 03 - X - 002
	1/8" NPT	04XX - X 07 04 - X - 001	04XX - X 08 04 - X - 002
	1/4" NPT	04XX - X 07 09 - X - 001	04XX - X 08 09 - X - 002
	7/16-20 UNF	04XX - X 07 20 - X - 001	04XX - X 08 20 - X - 002
	9/16-18 UNF	04XX - X 07 21 - X - 001	04XX - X 08 21 - 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	Hot water, chemical acids, diluted alkalis, ketones, esters, 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 4,350 psi (300 bar)¹⁾
- Burst pressure safety up to 5,800 psi (400 bar)¹⁾

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 → :
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04XX Diaphragm pressure switches

145 - 290 ± 14.50 psi 10 - 20 (± 1) bar	M 10x1 taper	04XX - X 11 01 - X - 001	04XX - X 12 01 - X - 002
	1/4" BSPP	04XX - X 11 03 - X - 001	04XX - X 12 03 - X - 002
	1/8" NPT	04XX - X 11 04 - X - 001	04XX - X 12 04 - X - 002
	1/4" NPT	04XX - X 11 09 - X - 001	04XX - X 12 09 - X - 002
	7/16-20 UNF	04XX - X 11 20 - X - 001	04XX - X 12 20 - X - 002
	9/16-18 UNF	04XX - X 11 21 - X - 001	04XX - X 12 21 - X - 002

290 - 725 ± 29.0 psi 20 - 50 (± 2) bar	M 10x1 taper	04XX - X 15 01 - X - 001	04XX - X 16 01 - X - 002
	1/4" BSPP	04XX - X 15 03 - X - 001	04XX - X 16 03 - X - 002
	1/8" NPT	04XX - X 15 04 - X - 001	04XX - X 16 04 - X - 002
	1/4" NPT	04XX - X 15 09 - X - 001	04XX - X 16 09 - X - 002
	7/16-20 UNF	04XX - X 15 20 - X - 001	04XX - X 16 20 - X - 002
	9/16-18 UNF	04XX - X 15 21 - X - 001	04XX - X 16 21 - 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	Hot water, chemical acids, diluted alkalis, ketones, esters, 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



M

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)



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 4,350 psi (600 bar)¹⁾
- Overpressure safety up to 5,800 psi (700 bar)¹⁾

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 → :
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04XX Piston pressure switches

725 - 2,175 ± 72.5 psi 50 - 150 (± 5.0) bar	M 10x1 taper	04XX - X 19 01 - X - 001	04XX - X 20 01 - X - 002
	1/4" BSPP	04XX - X 19 03 - X - 001	04XX - X 20 03 - X - 002
	1/8" NPT	04XX - X 19 04 - X - 001	04XX - X 20 04 - X - 002
	1/4" NPT	04XX - X 19 09 - X - 001	04XX - X 20 09 - X - 002
	7/16-20 UNF	04XX - X 19 20 - X - 001	04XX - X 20 20 - X - 002
	9/16-18 UNF	04XX - X 19 21 - X - 001	04XX - X 20 21 - 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 (BunaN)	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, water, hydrogen, oxygen, acetylene, etc.	2
FKM (Viton)	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	 1: brown 3: blue	 1: brown 2: black 4: white

◀ Model / type

◀ Connector

◀ Protection class

◀ Overall height

◀ Contact assignment



Pressure switches 30 A/F

Snap action 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 data

M.7

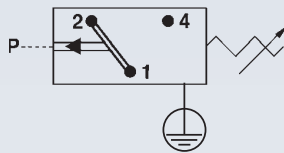
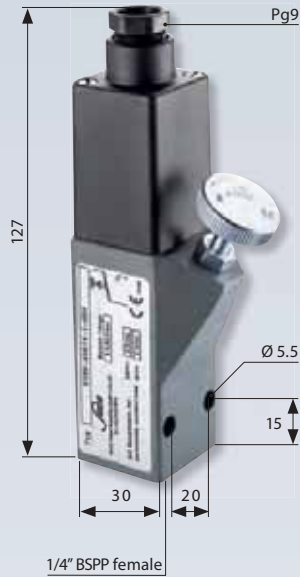
30 A/F



Temperature resistance of sealing materials:	NBR (diaphragm pressure switch) -40 °F...+212 °F (-40 °C...+100 °C)
	NBR (piston pressure switch) -22 °F...+212 °F (-30 °C...+100 °C)
	EPDM -22 °F...+248 °F (-30 °C...+120 °C)
	FKM (Viton®) (in diaphragm pressure switch) +23 °F...+248 °F (-5 °C...+120 °C)
	FKM (Viton®) (in piston pressure switch) +5 °F...+248 °F (-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 725 psi / 50 bar)
Pressure rise rate:	≤ 1,450 psi / s (≤ 1,000 bar / s)
Differential:	Typ 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
Weight:	Typ 0159, 0161, 0162: approx. 8.5 oz (240 g)
	Typ 0175: approx. 11 oz (310 g)

Electrical values	0159	0161 / 0162 / 0175
Rated working voltage U_r	Rated working current I_r	
250 VAC 50 / 60 Hz, AC 12	2.5 A	5 A
250 VAC 50 / 60 Hz, AC 14	1 A	1 A
24 VDC, DC 12 / DC 13	2 / 2 A	3.5 / 3.5 A
50 VDC, DC 12 / DC 13	1 / 0.5 A	2 / 1 A
75 VDC, DC 12 / DC 13	0.75 / 0.4 A	1 / 0.5 A
125 VDC, DC 12 / DC 13	0.3 / 0.2 A	0.3 / 0.2 A
250 VDC, 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	





0159

Diaphragm / piston pressure switch up to 250 V

- Aluminium housing
- Snap action with silver contacts
- Overpressure safety up to 2,900 / 8,700 psi (200 / 600 bar)¹⁾
- Switching point continuously adjustable by turning knurled screw whilst system in operation

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Thread	Order number:
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With female thread

0159 Diaphragm pressure switches

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Thread	Order number:
2,900 psi ¹⁾ (200 bar) ¹⁾	2.90 - 29 psi (0.2 - 2 bar)	± 2.90 - 4.35 psi (± 0.2 - 0.3 bar)	1/4" BSPP female	0159 - 426 14 - X - 001
	7.25 - 72.5 psi (0.5 - 5 bar)	± 2.90 - 7.25 psi (± 0.2 - 0.5 bar)		0159 - 427 14 - X - 001
	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)		0159 - 428 14 - X - 001
	29 - 290 psi (2 - 20 bar)	± 14.5 psi (± 1.0 bar)		0159 - 429 14 - X - 001
	72.5 - 725 psi (5 - 50 bar)	± 43.5 psi (± 3.0 bar)		0159 - 430 14 - X - 001
	145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)		0159 - 431 14 - X - 001

0159 Piston pressure switches

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Thread	Order number:
8,700 psi ¹⁾ (600 bar) ¹⁾	145 - 1,450 psi (10 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)	1/4" BSPP female	0159 - 432 14 - X - 001
	362.5 - 3,625 psi (25 - 250 bar)	± 72.5 - 101.5 psi (± 5.0 - 7.0 bar)		0159 - 433 14 - X - 001
	580 - 5,800 psi (40 - 400 bar)	± 72.5 - 130.5 psi (± 5.0 - 9.0 bar)		0159 - 434 14 - X - 001

Seal material – Application areas

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

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



Your order number: 0159 - XXX 14 - X - XXX

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

0161 / 0162

Diaphragm / piston pressure switches up to 250 V

- Aluminium housing
- Snap action with silver contacts
- Overpressure safety up to 2,900 / 8,700 psi (200 / 600 bar)¹⁾
- Socket device similar to DIN EN 175301 (DIN 43650)
- Differential adjustable at factory

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Dimension A in mm	Order number:
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With female 1/4 BSPP thread

0161 Diaphragm pressure switches

2,900 psi ¹⁾ (200 bar ¹⁾)	7.25 - 14.5 psi (0.5 - 1 bar)	± 2.90 psi (± 0.2 bar)		0161 - 436 14 - X - 001
	7.25 - 72.5 psi (0.5 - 5 bar)	± 2.90 - 72.5 psi (± 0.2 - 0.5 bar)		0161 - 437 14 - X - 001
	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)		0161 - 438 14 - X - 001
	145 - 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)		0161 - 439 14 - X - 001
	725 - 1,450 psi (50 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)		0161 - 440 14 - X - 001

0161 Piston pressure switches

8,700 psi ¹⁾ (600 bar ¹⁾)	1,450 - 5,800 psi (100 - 400 bar)	± 72.5 - 130.5 psi (± 5.0 - 9.0 bar)		0161 - 441 14 - X - 001
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Block style (with O-ring NBR 5 x 1.5 mm)

0162 Diaphragm pressure switches

2,900 psi ¹⁾ (200 bar ¹⁾)	7.25 - 14.5 psi (0.5 - 1 bar)	± 2.90 psi (± 0.2 bar)	15	0162 - 436 14 - X - 001
	7.25 - 72.5 psi (0.5 - 5 bar)	± 2.90 - 72.5 psi (± 0.2 - 0.5 bar)		0162 - 437 14 - X - 001
	14.5 - 145 psi (1 - 10 bar)	± 7.25 psi (± 0.5 bar)		0162 - 438 14 - X - 001
	145 - 725 psi (10 - 50 bar)	± 43.5 psi (± 3.0 bar)		0162 - 439 14 - X - 001
	725 - 1,450 psi (50 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)		0162 - 440 14 - X - 001

0162 Piston pressure switches

8,700 psi ¹⁾ (600 bar ¹⁾)	1,450 - 5,800 psi (100 - 400 bar)	± 72.5 - 130.5 psi (± 5.0 - 9.0 bar)	19.5	0162 - 441 14 - X - 001
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Seal material – Application areas

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

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

Your order number: 016X - XXX 14 - X - XXX

1 Adjusting the set point

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

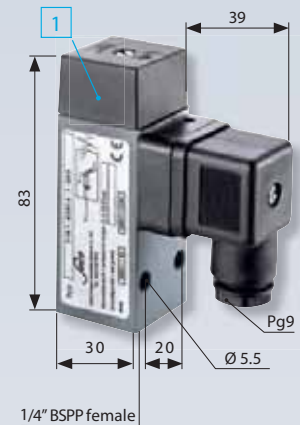
¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

M.7

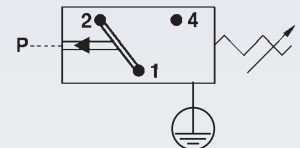
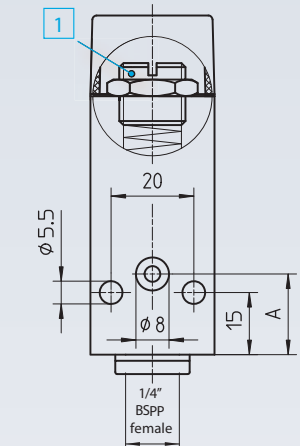
30 A/F

Suco

0161 with female thread



0162 Block style



M

0175

Diaphragm pressure switches up to 250 V

- For low pressure, high accuracy
- Aluminium housing
- Changeover with silver contacts
- Overpressure safety up to 363 psi (25 bar)¹⁾
- 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
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With female thread

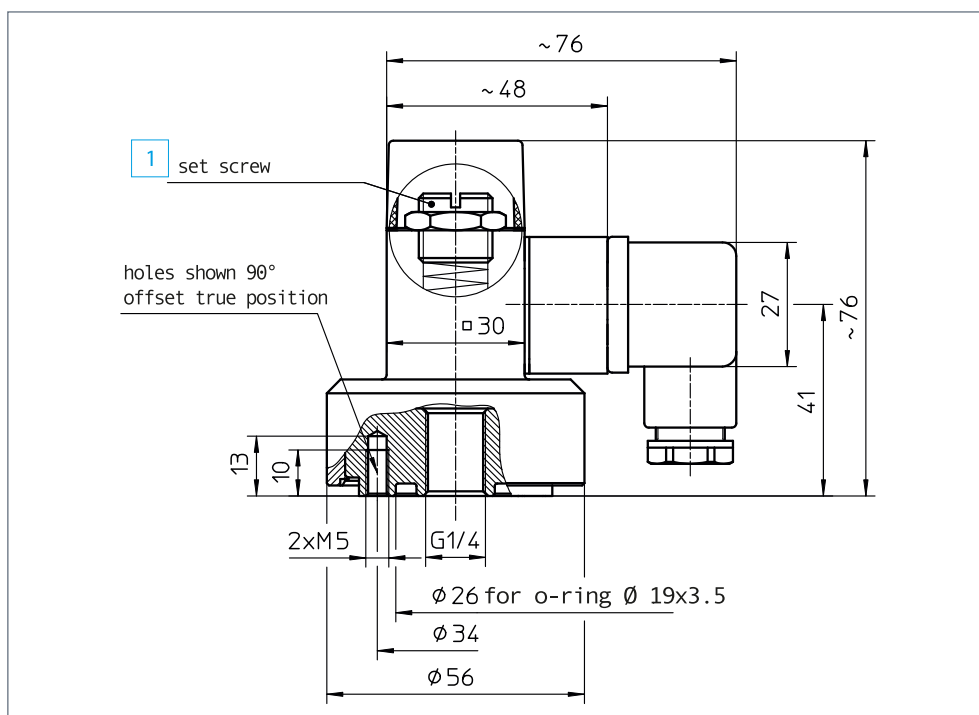
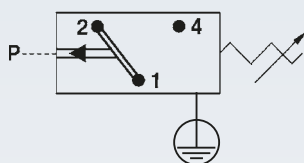
0175 Diaphragm pressure switches

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

according to ATEX directive 2014/34/EU and IECEx scheme



- ATEX certification for the Ex-protected zones:
 - 1 + 2 (Gases and vapours)
 - 21 + 22 (Dust)
 - M2 Mining (Methane / coal dust)
- Types 0342/0343 are certified according to IECEx scheme
- Switching point can be easily adjusted by the user while 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, 0342 / 0343	Dusts 0340 / 0341, 0342 / 0343	Methane / coal dust 0342 / 0343
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ATEX/IECEx marking for pressure switches

Our pressure switches are designed for gases and vapours (G), dust (D) and methane / coal dust (M) in mining:

Series	Flammable materials	Ex zones	Ex marking acc. to 2014/34/EU
0165	Gases and vapours	1 + 2	⊕ II 2G Ex d II C T6/T5 X
0340 / 0341	Dusts	22	⊕ II 3D Ex tc IIIC T90°C Dc
0342 / 0343	Gases and vapours	1 + 2	⊕ II 2G Ex db IIC T6 / T5 Gb
	Dusts	21 + 22	⊕ II 2D Ex tb IIIC T80°C/ T100°C Db
	Methane / coal dust	M2 (Mining)	⊕ I M2 Ex db I Mb

The following table shows an overview of the explosion protection zones, device groups and categories. The applications covered by our pressure switches (according to Ex zones) are highlighted in colour.

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
	are unlikely to occur, and if so, are then only seldom or for short periods	Zone 2	II	2G
Dusts	are present continually, frequently or for long periods	Zone 20	III	1D
	occur occasionally	Zone 21	III	2D
	occur if accumulated dust is whirled up, and then only seldom or for short periods	Zone 22	III	3D or 2D
Methane / Coal dust	operation where there is a risk of explosions	-	I	M1
	disconnection where there is a risk of explosion	-	I	M2 or M1



Explosion-protected pressure switches

Technical details

Type	0165	0340 / 0341	0342 / 0343		
Ex zones:	1 + 2	22	1 + 2	21 + 22	Mining
Flammable materials:	Gases and vapours	Dusts	Gases and vapours	Dusts	Methan / coal dust
Temperature resistance:	NBR		-4 °F... +176 °F (-20 °C ... +80 °C)		
	EPDM		-4 °F... +176 °F (-20 °C ... +80 °C)		
	FKM (Diaphragm pressure switch)		41 °F... +176 °C (-5 °C ... +80 °C)		
	FKM (Piston pressure switch)		5 °F... +176 °C (-15 °C ... +80 °C)		
	FFKM (0340 + 0342 only)		-4 °F... +176 °F (-20 °C ... +80 °C)		
	HNBR		-4 °F... +176 °F (-20 °C ... +80 °C)		
Switching frequency:	200 / min				
Mechanical life expectancy:	1.000.000 cycles				
Pressure rise rate:	≤14,500 psi/s (≤ 1.000 bar/s)				
Hysteresis:	10 ... 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 as well as customer-specific lengths				
Protection class:	IP65				
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			
Weight:	approx. 380 g	approx. 230 g			

Elektrische Werte

Rated working voltage U_e (usage category)	Rated working current I_e :	
250 VAC 50 / 60 Hz, AC 12	2 A	5 A
250 VAC 50 / 60 Hz, AC 14	1 A	1 A
24 VDC, DC 12 / DC 13	2 / 1 A	3,5 / 3,5 A
50 VDC, DC 12 / DC 13	1 / 0,5 A	2 / 1 A
75 VDC, DC 12 / DC 13	0,5 / 0,25 A	1 / 0,5 A
125 VDC, DC 12 / DC 13	0,2 / 0,1 A	0,3 / 0,2 A
250 VDC, DC 12 / DC 13	0,15 / 0,1 A	0,25 / 0,2 A
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 und 50 / 60 Hz	
Nominal current of short-circuit mechanism:	bis 3,5 A	
Conditional short-circuit current:	< 350 A	

0165

Diaphragm / piston pressure switches up to 250 V

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

- Aluminium housing
- Snap action with silver contacts
- Operating voltage up to 250 V
- Overpressure safety up to 2,900 / 8,700 psi (200 / 600 bar)¹⁾

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Thread	Order number
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0165 Diaphragm pressure switches

2,900 psi ¹⁾ (200 bar ¹⁾)	14.5 - 87 psi (1 - 6 bar)	± 7.25 psi (± 0.5 bar)	1/4" BSPP female	0165 - 448 14 - 1 - 001
	72.5 - 725 psi (5 - 50 bar)	± 43.5 psi (± 3.0 bar)		0165 - 449 14 - 1 - 001

0165 Piston pressure switches

8,700 psi ¹⁾ (600 bar ¹⁾)	290 - 1,450 psi (20 - 100 bar)	± 43.5 - 72.5 psi (± 3.0 - 5.0 bar)	1/4" BSPP female	0165 - 450 14 - X - 001
	362.5 - 3,625 psi (25 - 250 bar)	± 72.5 - 101.5 psi (± 5.0 - 7.0 bar)		0165 - 452 14 - X - 001
	1,450 - 5,800 psi (100 - 400 bar)	± 72.5 - 130.5 psi (± 5.0 - 9.0 bar)		0165 - 451 14 - X - 001

Seal material – Application areas

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

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

Your order number: 0165 - XXX 14 - X - 001

Piston pressure switches only have limited suitability for use with gases.

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

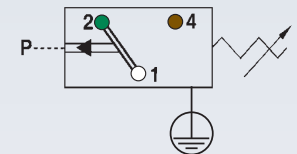
M.8

ATEX



Contact assignment:

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



M.8

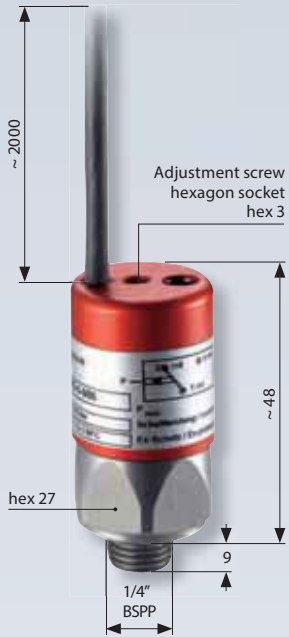
ATEX

0340 / 0341

Diaphragm / piston pressure switches up to 250 V

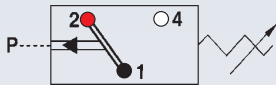
ATEX CE II 3D IP65 T90°C (dust protection zone 22)

- Zinc-plated steel housing (CrVI-free), with anodised aluminium protective cap
- Snap action with silver contacts
- Operation voltage up to 250 V, protection class 2, protective insulation
- Overpressure safety up to 4,350 / 8,700 psi (300 / 600 bar)¹⁾



Contact assignment:

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



P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Thread	Order number
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0340 Diaphragm pressure switches

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Thread	Order number
4,350 psi ¹⁾ (300 bar) ¹⁾	4.35 - 21.75 psi (0.3 - 1.5 bar)	± 2.90 psi (± 0.2 bar)	1/4" BSPP	0340 - 457 03 - X - 003
	14.5 - 145 psi (1 - 10 bar)	± 7.25 - 14.5 psi (± 0.5 - 1.0 bar)		0340 - 458 03 - X - 006
	145 - 290 psi (10 - 20 bar)	± 14.5 psi (± 1.0 bar)		0340 - 459 03 - X - 009
	290 - 725 psi (20 - 50 bar)	± 29 psi (± 2.0 bar)		0340 - 461 03 - X - 012

0341 Piston pressure switches

P _{max.} in psi (bar)	Adjustment range in psi (bar)	Tolerance in psi (bar) at room temperature	Thread	Order number
8,700 psi ¹⁾ (600 bar) ¹⁾	725 - 2,175 psi (50 - 150 bar)	± 72.5 psi (± 5.0 bar)	1/4" BSPP	0341 - 460 03 - X - 003

Seal material – Application areas

Seal material	Application areas	Order number
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 ²⁾	Hot water, chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

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.
2) Only suitable for diaphragm pressure switches (Type 0340).

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 data

M.9

Vacuum

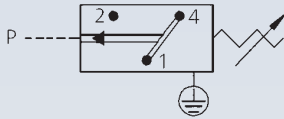


Type:	0150	0151
Operating voltage:	10 ... 250 VAC/DC	10 ... 42 VAC/DC
Rated current (resistive load):	Refer to electrical values below	10 mA ... 4 A
Switching power:	Refer to electrical values below	100 VA
Temperature resistance of sealing materials:	-4 °F ... +212 °F (-20 °C ... +100 °C)	+5 °F ... +248 °F (-15 °C ... +120 °C)
Switching frequency:	200 / min.	
Mechanical life expectancy:	1,000,000 cycles	
Pressure rise rate:	≤ 14.5 psi/ms (≤ 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. 9.5 oz (270 g)	approx. 5 oz (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 snap action switch

- Aluminium housing
- Operating voltage up to 250 V
- Snap action with silver contacts
- Overpressure safety up to 290 psi (20 bar)¹⁾
- Socket device similar to DIN EN 175301 (DIN 43650)
- Differential approx. 1.5" - 3" HG (50 - 150 mbar)(non-adjustable)

P _{max.} in psi (bar)	Adjustment range in HG (mbar) (relative)	Tolerance in HG (mbar) at room temperature	Thread	Order number
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0150 Vacuum switch

290 psi ¹⁾ (20 bar) ¹⁾	3" - 29" (100-950 mbar)	± 1.5" (± 50 mbar)	1/8" BSPP female	0150 - 456 15 - 4 - 001
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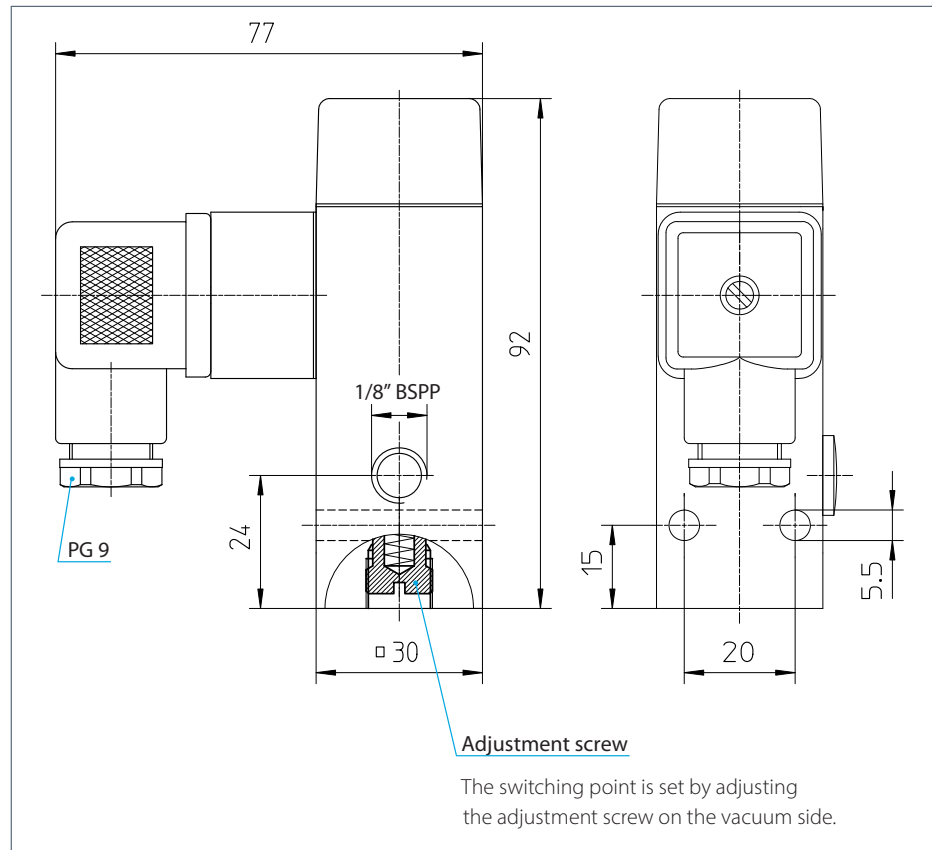
Seal material – Application areas

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

Temperature resistance: - 4 °F... +212 °F (-20 °C... +100 °C)

Your order 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 500 psi (35 bar)¹⁾

P _{max.} in psi (bar)	Adjustment range in HG (mbar) (relative)	Tolerance in HG (mbar) at room temperature	Thread	Order number
-----------------------------------	---	---	--------	--------------

0151 Vacuum switches with M3 screw terminal

500 psi ¹⁾ (35 bar) ¹⁾	6" - 29" (200 - 950 mbar)	± 3" (± 100 mbar)	1/8" BSPP female	NO → : 0151 - 452 15 - 3 - 001
---	------------------------------	----------------------	------------------	---------------------------------

NO → |:

NC → |:

0151 - 453 15 - 3 - 001

0151 Vacuum switches with spade terminal

500 psi ¹⁾ (35 bar) ¹⁾	6" - 29" (200 - 950 mbar)	± 3" (± 100 mbar)	1/8" BSPP female	NO → : 0151 - 454 15 - 3 - 001
---	------------------------------	----------------------	------------------	---------------------------------

NO → |:

NC → |:

0151 - 455 15 - 3 - 001

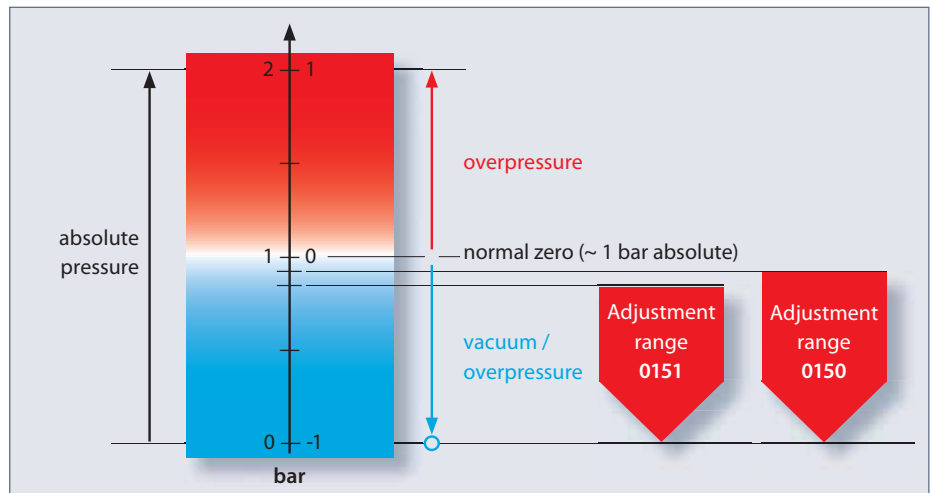
Seal material – Application areas

FKM (Viton®)	Air, oils, greases, fuel/gasoline	3
--------------	-----------------------------------	---

Temperature resistance: +5 °F...+248 °F (-15 °C...+120 °C)

Your order number: 0151 - XXX 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.



M

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

<p>Deutsch DT06-2S (for DT04-2P) 2 x 0,5 mm² Radox cable, IP65</p>	<p>suitable for series 0110 / 0111 0410 / 0411</p>	<p>Article number: 1-1-10-653-118</p>	 <p>1: white 2: black</p>	
<p>Deutsch DT06-3S (for DT04-3P) 3 x 0,75 mm² PUR cable, IP67</p>	<p>suitable for series 0116 / 0117 / 0136 / 0137 0416 / 0417</p>	<p>Article number: 1-1-36-653-160</p>	 <p>A: brown B: blue C: black</p>	
<p>TE AMP Superseal 1.5[®], 2-pin 2 x 0,5 mm² Radox cable, IP65</p>	<p>suitable for series 0112 / 0113 0412 / 0413</p>	<p>Article number: 1-1-12-653-113</p>	 <p>1: white 2: black</p>	
<p>TE AMP Superseal 1.5[®], 3-pin 3 x 0,5 mm² Radox cable, IP65</p>	<p>suitable for series 0132 / 0133</p>	<p>Article number: 1-1-32-653-158</p>	 <p>1: black 2: red 3: white</p>	
<p>TE AMP Junior Timer, 2-pin 2 x 0,5 mm² Radox cable, IP65</p>	<p>suitable for series 0118 / 0119 0418 / 0419</p>	<p>Article number: 1-1-18-653-116</p>	 <p>1: black 2: white</p>	
<p>Packard MetriPack 280, 2-pin 2 x 0,5 mm² Radox cable, IP65</p>	<p>suitable for series 0114 / 0115 0414 / 0415</p>	<p>Article number: 1-1-14-653-114</p>	 <p>A: black B: white</p>	
<p>Bayonet DIN 72585 A1-2.1 2 x 0,5 mm² Radox cable, IP65</p>	<p>suitable for series 0120 / 0121</p>	<p>Article number: 1-1-20-653-112</p>	 <p>1: black 2: white</p>	
<p>M 12x1 DIN EN 61076-2-101-LF, 4-pin 4 x 0,34 mm² PUR cable, IP65</p>	<p>suitable for series 0122 / 0123 / 0124 / 0125 0134 / 0135 / 0424 / 0425</p>	<p>Article number: 1-1-00-653-162</p>	 <p>1: brown 2: white 3: blue 4: black</p>	

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

 <p>60 Ø 28</p>	 <p>46 Ø 28</p>	 <p>55 Ø 31</p>	 <p>~ 54 45 Ø 34 CE CSA US</p>
<p>Rubber protective cap</p> <p>With central cable feed-through for 1.5 - 5 mm cable diameter</p> <p>With rubber protective cap fitted: IP54</p> <p>Suitable for voltages up to 42 V</p>	<p>Rubber protective cap</p> <p>With two cable feed-throughs for 1.7 - 2,2 mm cable diameter</p> <p>With rubber protective cap fitted: IP54</p> <p>Suitable for voltages up to 42 V</p>	<p>Rubber protective cap</p> <p>With two cable feed-throughs for 1.7 - 2,3 mm cable diameter</p> <p>With rubber protective cap fitted: IP54</p> <p>Suitable for voltages up to 42 V</p>	<p>Socket device</p> <p>cCSAus approval Housing: Polyamide PG9 screw fitting (tightening range 6 - 9 mm)</p> <p>With socket device fitted: IP65</p> <p>Suitable for voltages up to 250 V</p>
<p>suitable for series 0151 / 0163 / 0164 / 0166 0167 / 0168 / 0169</p>	<p>suitable for series 0151 / 0163 / 0164 / 0166 0167 / 0168 / 0169</p>	<p>suitable for series 0170 / 0171 / 0180* / 0181* / 0183* / 0186* / 0187* 0190 / 0191 / 0196 / 0197 (*up to 42 V)</p>	<p>suitable for series 0170 / 0171 / 0180 / 0181 0183 / 0186 / 0187 0190 / 0191 / 0196 / 0197</p>
<p>Article number: 1-1-66-621-010</p>	<p>Article number: 1-1-66-621-003</p>	<p>Article number: 1-1-70-621-007</p>	<p>Article number: 1-1-80-652-002</p>



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

suitable for series

0150 / 0161 / 0162 / 0175
0184 / 0185 / 0194 / 0195

Article number:
1-1-84-652-009



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

suitable for series

0150 / 0161 / 0162 / 0175
0184 / 0185 / 0194 / 0195

Article number:
for 24 VDC: **1-1-84-652-011**
for 250 VAC: **1-1-84-652-010**



Socket device

M 12x1
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

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:
1-6-00-652-016



Socket device

M 12x1
DIN EN 61076-2-101 A
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

0122 / 0123 / 0124 / 0125
0134 / 0135 / 0424 / 0425

and for all transmitters and
electronic pressure switches
with an M12 connector

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 G1/4 DIN EN ISO 1179-1 (DIN 3852-E)

All pressure switches and transmitters
with thread code 41

Dual nipple brass		Thread adapters stainless steel (1.4305 / AISI 303)			
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	G 1/4 DIN EN ISO 1179-1 (DIN 3852-E) female thread			
					
NPT 1/8-27	NPT 1/4-18	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	9/16 -18UNF includes O-ring FKM
hex 15 h = 25 mm	hex 24 h = 28 mm	hex 22 h = 30,5 mm	hex 22 h = 35 mm	hex 22 h = 35,5 mm	hex 22 h = 33 mm
Article number:	Article number:	Article number:	Article number:	Article number:	Article number:
1-1-00-420-014	1-1-00-420-029	1-1-00-420-020	1-1-00-420-028	1-1-00-420-021	1-1-00-420-027


M.10

Accessories



For G 1/4

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 G 1/4

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



M14 x 1.5
DIN EN ISO 6149-1
female thread



Adapter Aluminium

G 1/4
female thread
includes copper sealing ring



R 1/4

3/8-24 UNF-2A

G 1/4

M12 x 1.5

NPT 1/8-27

Block style
includes
NBR O-ring

hex 24
h = 30 mm

hex 24
h = 26 mm

hex 24
h = 26 mm

hex 24
h = 26 mm

hex 24
h = 26 mm

35 A/F
h = 22 mm

Article number:

Article number:

Article number:

Article number:

Article number:

Article number:

1-1-00-420-009

1-1-00-420-013

1-1-83-420-006

1-1-83-420-007

1-1-83-420-008

1-1-00-420-025

Order correctly - it's quite simple

Explanation of SUCO article numbers

p_{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
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0170 Diaphragm pressure switches with spade terminals

p_{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
			G 1/4	0170 - 457 03 - X - 003 - YZ
			M 10x1 con.	0170 - 457 01 - X - 001 - YZ
			M 12x1.5 cyl.	0170 - 457 02 - X - 002 - YZ
100 ¹⁾	0.3 - 1.5	± 0.2	NPT 1/8	0170 - 457 04 - X - 318 - YZ
			NPT 1/4	0170 - 457 09 - X - 314 - YZ
			7/16-20 UNF	0170 - 457 20 - X - 301 - YZ
			9/16-18 UNF	0170 - 457 21 - X - 302 - YZ

Article number: 0170 - 457 04 - X - 318 - YZ

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

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

These two digits provide information about the desired thread.
Our example: **NPT 1/8.**

Important - Code for the seal material:

- 1** = NBR (Buna-N): hydraulic fluid, machine oil, etc.
- 2** = EPDM: water, brake fluid, ozone, acetylene, etc.
- 3** = FKM: hydraulic fluid, petrol/gasoline, etc.
- 4** = ECO (epichlorhydrin): air, oils, fats, fuels (used only in SUCO vacuum switches).
- 5** = EPDM-TW: drinking water (only in diaphragm, $p_{max} \leq 35$ bar).
- 6** = FFKM: acids, diluted alkalis, ketones, esters, alcohols, fuels and hot water.
- 7** = TPE: hydraulic fluid, water, machine oil, heating oil, etc.
- 8** = **Silicone**: water, food products, air, etc. (only in diaphragm, $p_{max} \leq 35$ bar).
- 9** = HNBR: hydraulic / machine oil, ester-based bio-oils.

The last three digits are reserved for further differentiation of the switch.
Our example: **318**

New - Code for the cleaning process (optional):

- C** = Plasma cleaning (e.g. oxygen applications)
- L** = LABS-free (PWIS-free)
- X** = no cleaning process

New - Diameter of the pressure snubber (optional):

- 5** = Pressure snubber \varnothing 0.5 mm
- 8** = Pressure snubber \varnothing 0.8 mm
- S** = Sinter filter
- X** = no pressure snubber

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

Coding or way of short embossment on the switch body. Example: 0166 41203-1-047-C8, adjusted on rising 0.75 bar

Face front side:

SUCO part number, 12-digits (without leading zero)

0166-41203-1-047

Face back side:

Set point, 1 to 4-digits (optional)
e.g. 0.75 (bar), 1 (bar), 10 (bar), 100 (bar)

Direction of set point, 1-digit (optional)
↑ rising ↓ falling

Cleaning process, 1-digit (optional)
C = Plasma cleaning **L** = LABS-/PWIS-free
X = no cleaning

Diameter of pressure snubber, 1-digit (optional)
5 = \varnothing 0.5 mm **8** = \varnothing 0.8 mm
S = Sinter filter **X** = no pressure snubber

Date of manufacturing (DDDY), 4-digits
Day (D) 000 ... 365, Year (Y) acc. DIN EN 60062

valid from July 2020

Questionnaire for Mechanical Pressure Switches

This questionnaire should be helpful to show, which information are important to give you a fast and detailed answer to your inquiry. Please fulfil as much points as you can; not all variations are implementable!

Contact data

Company / customer:					
Address:				ZIP Code / City:	
Contact person:				Division:	
Email:		Telephone:		Telefax:	
Business field:	<input type="checkbox"/> manufacture of components	<input type="checkbox"/> service	<input type="checkbox"/> OEM	<input type="checkbox"/> dealer	<input type="checkbox"/> customer:
Project:		<input type="checkbox"/> new	<input type="checkbox"/> redesign	<input type="checkbox"/> replaces competitor:	
Quantity:		<input type="checkbox"/> annual	<input type="checkbox"/> one-time	<input type="checkbox"/> sample till:	
Target price:					

Operating conditions

Function / application:					
Media:					
Media temperature:				Environment temp.:	
Set point:		<input type="checkbox"/> mbar	<input type="checkbox"/> bar	<input type="checkbox"/> PSI	<input type="checkbox"/> rising <input type="checkbox"/> falling
Reset point:		<input type="checkbox"/> mbar	<input type="checkbox"/> bar	<input type="checkbox"/> PSI	<input type="checkbox"/> rising <input type="checkbox"/> falling
Set points:	<input type="checkbox"/> adjusted at works	<input type="checkbox"/> adjustable from		to:	
Pressure range		<input type="checkbox"/> mbar	<input type="checkbox"/> bar	<input type="checkbox"/> PSI	
Pressure frequency:		Hz	Life time:		cycles
Switching frequency:	<input type="checkbox"/> continuous	<input type="checkbox"/> irregularly	<input type="checkbox"/>	cycles per day	<input type="checkbox"/> one-time
Max. working pressure:				Min. working pressure:	
Profile of pressure:	<input type="checkbox"/> static	<input type="checkbox"/> dynamic	Pressure ramp rate:		bar/ms
Shock load:		g	Vibrations:		m/s ²

Electrical data

Working voltage U_v :				Working current I_v :	
Load:		<input type="checkbox"/> resistive	<input type="checkbox"/> inductive	<input type="checkbox"/> capacitive	<input type="checkbox"/> inrush
Utilization category:	<input type="checkbox"/> AC12	<input type="checkbox"/> AC14	<input type="checkbox"/> DC12	<input type="checkbox"/> DC13	
Switching function:	<input type="checkbox"/> SPDT (NO)	<input type="checkbox"/> SPDT (NC)	<input type="checkbox"/> SPDT (changeover)		
Output signal:	<input type="checkbox"/> 0-10 V	<input type="checkbox"/> 4-20 mA	<input type="checkbox"/> 0.5 - 4.5 V ratiometric	<input type="checkbox"/> other:	

General data

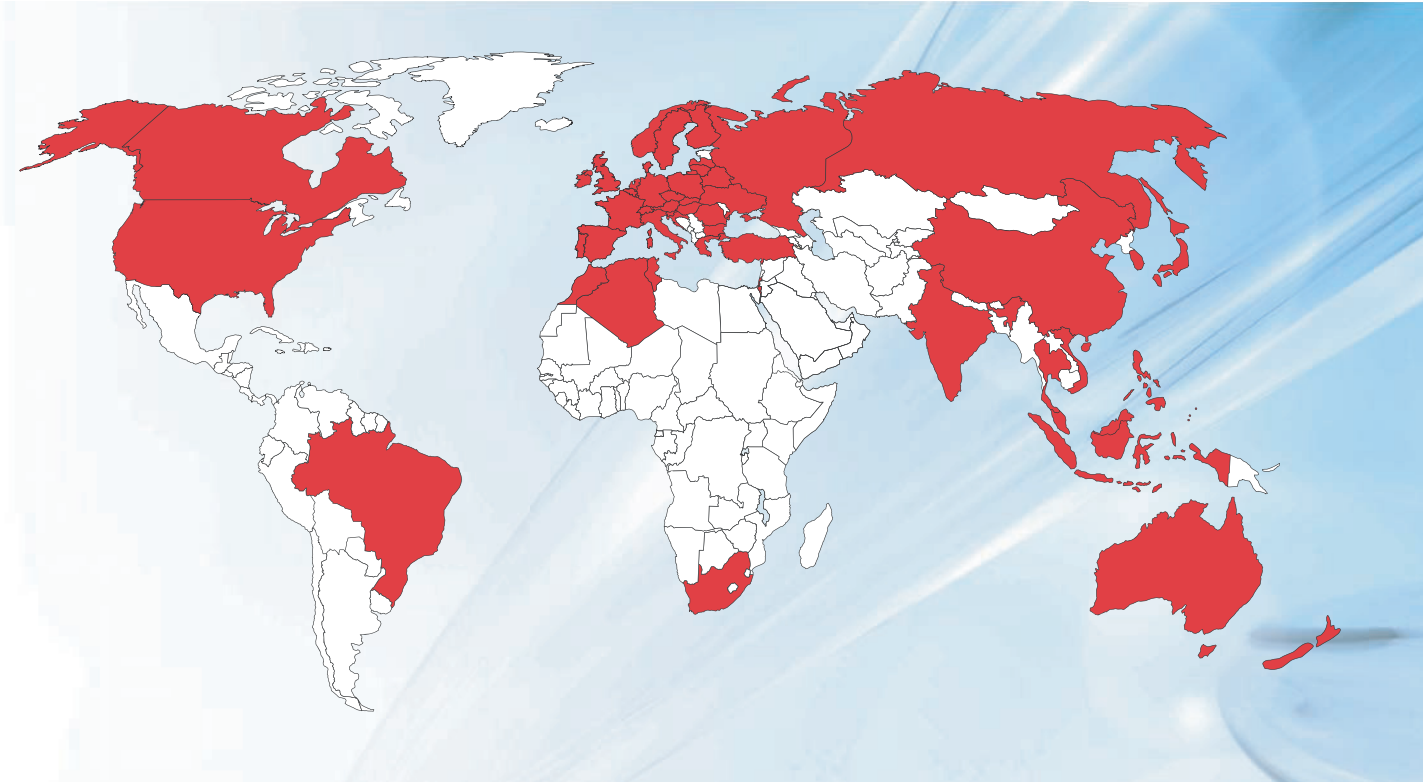
Media connection				IP protection class:	
Electrical connection:	<input type="checkbox"/> screw terminal	<input type="checkbox"/> spade terminal	<input type="checkbox"/> integrated plug	<input type="checkbox"/> other:	
	<input type="checkbox"/> cable + length		mm	<input type="checkbox"/> incl. socket device (EN 175301-803-A)	
Connector- / cable:				Housing:	<input type="checkbox"/> steel <input type="checkbox"/> stainless steel <input type="checkbox"/> brass
Remarks:					



Pressure Monitoring Systems and Transmission Technology

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