

# SUCO

## Pressure Monitoring



Mechanical Pressure Switches

Electronic Pressure Switches

Pressure Transmitters

Sensor Technology



## Product Catalogue Pressure Monitoring

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# Welcome to SUCO

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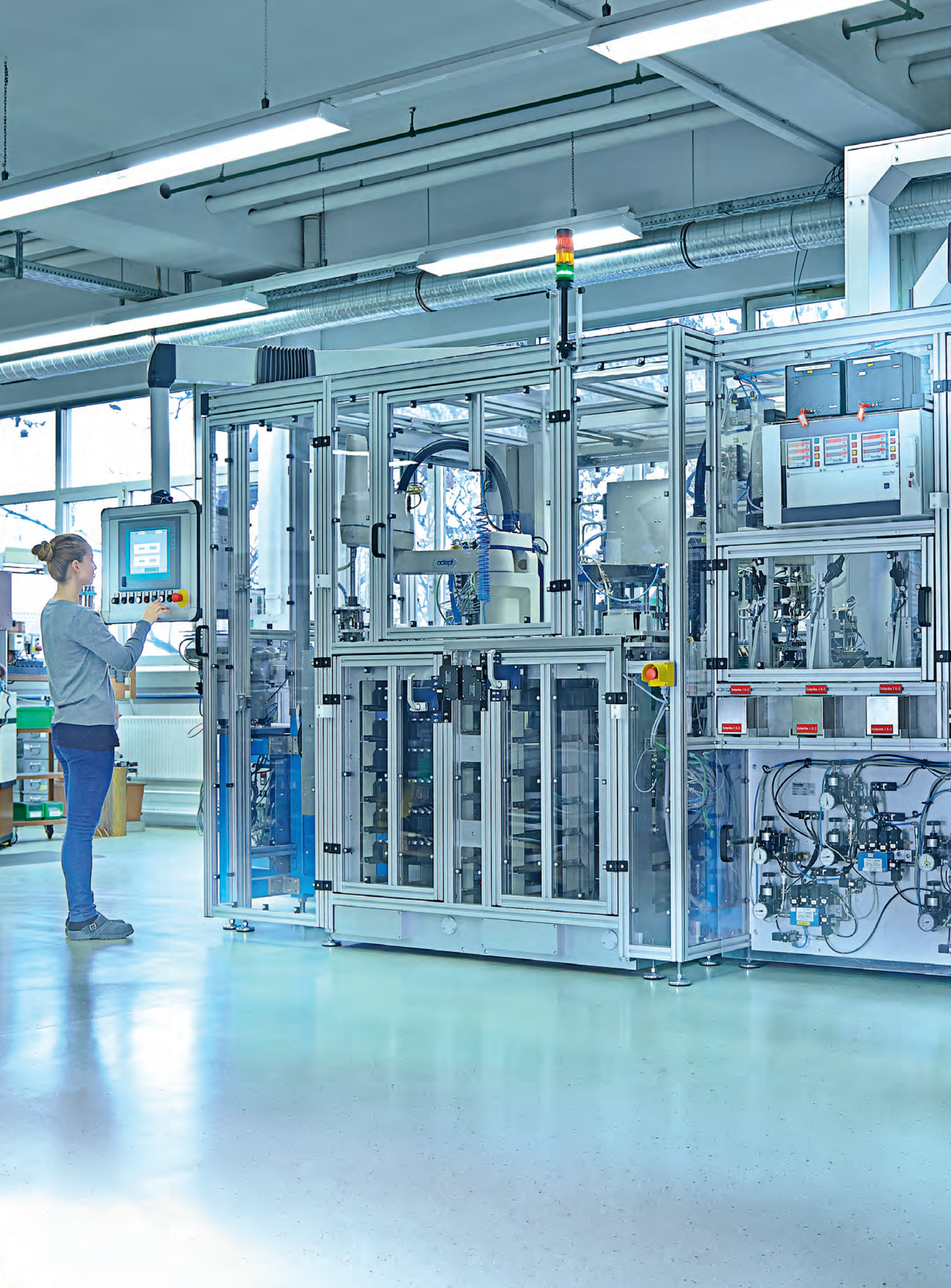
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# SUCO Robert Scheuffele GmbH & Co. KG

A pressure monitoring specialist setting standards on the global stage

SUCO Robert Scheuffele GmbH & Co. KG was founded in 1938 and has established itself across the globe under the trade name SUCO. The two main product groups, pressure monitoring (mechanical pressure switches, vacuum switches, electronic pressure switches and pressure transmitters) and transmission technology (centrifugal clutches and brakes, electromagnetic clutches and brakes), as well as descent devices with centrifugal technology, are developed, designed and manufactured at the Bietigheim-Bissingen site, approximately 20 km north of Stuttgart in Germany.



Peter Stabel, Director



Marcell Kempf, Director

## Highest quality in all areas

The development and continual expansion of the company premises are indications of a thriving company.

Work on global presence has been rigorous, and today SUCO is actively represented by distribution companies in France (SUCO VSE France – a 50/50 joint venture with VSE Volumentechnik GmbH) and in the USA (SUCO Technologies Inc.), by associate company ESI Technology Ltd in Wrexham, North Wales, and by more than 40 mostly exclusive sales partners in over 50 countries.

Certified to DIN EN ISO 9001:2008, SUCO has retained its consistently high quality standards for many years, something substantiated by numerous audits by reputable companies from a broad diversity of industry sectors.

This worldwide acknowledged product quality is guaranteed with CNC-controlled machining centres, automated assembly machines, sophisticated test systems and the latest in measuring equipment. Outstanding products, high level of customer service and excellent price/performance ratio guarantee SUCO good market positioning within the product sectors mentioned.

A sophisticated level of personnel qualification, a high identification of the employees with the company, process-oriented structures and efficient organisation are guarantees for continued company growth into the future.

Observance of ethical principles and comprehensive environmental awareness are standard at SUCO, and guarantee business relationships on the highest level for our customers all over the world.

This catalogue does not only give a clear and structured overview of our capabilities all around our comprehensive range of pressure monitoring products but also offers detailed technical explanations supporting you in many challenges occurring in your specific applications.

**Please trust in a company with over 75 years of experience.**

# SUCO – A success story

From a mechanical workshop to an industrial company operating on the global stage

**1938**

Robert Scheuffele starts up a mechanics workshop

**1945**

Start of the partnership between Robert Scheuffele and Georg Fuhrmann



\*16.10.1909 † 20.02.1966 \*15.01.1912 † 04.02.1982

**1946**

Start of production of centrifugal clutches and brakes

**1953**

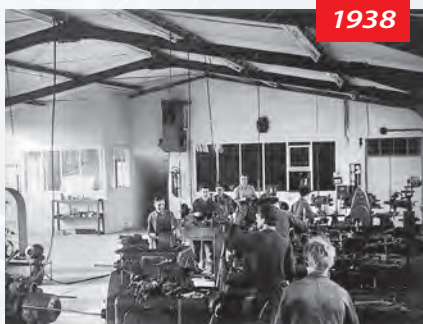
Move into the new premises in Bietigheim-Bissingen, Keplerstrasse (still headquarter today)

**1956**

Registration of trade name SUCO with worldwide trademark protection

**1960**

Start of production of mechanical pressure switches for the automotive industry



**1938**

A view into production



**1970**

Administration building, Bietigheim-Bissingen



**1989**

Aerial shot of premises, Bietigheim-Bissingen

**1997**

First DIN ISO 9001 company certification

**1998**

Start of market penetration in Asia with set-up of a company pool

Broadening of product expertise to electronic pressure monitoring

Start of the "fully automatic pressure switch adjusting" development project with the Fraunhofer Institute

**1999**

Founding of subsidiary SUCO VSE France

**2001**

Certification to DIN ISO 9001:2000

**2002**

Penetration of the markets in South America and Eastern Europe

**2004**

Start of development of fully automatic assembly systems for pressure switch modules

**2005**

New company name: SUCO Robert Scheuffele GmbH & Co. KG

Development of the SUCO zero clutch



**1969**

Start of production of electromagnet clutches and brakes

Set-up of a pan-European sales network



**1979**

Further development of SUCO pressure switches especially for hydraulic and pneumatic applications

Strategic alignment to the industry

**1980**

Development of the hex 24 pressure switch series for broad industrial applications

**1984**

Development of the hex 27 pressure switch series for broad industrial applications

**1987**

Broadening of the product range to include custom pre-wired pressure switches

**1988**

Start of sales in the US

**1993**

Development of pressure dampers for ABS brake systems in the automotive industry



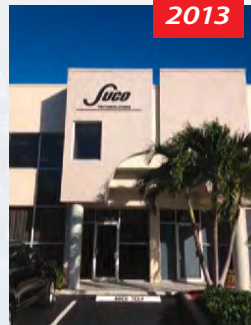
**2011**

Aerial shot of premises, Bietigheim-Bissingen



**2012**

ESI Technology, Wrexham, UK



**2013**

SUCO Technologies, Boca Raton, USA



**2014**

SUCO VSE France, Le Mans, France

**2006**

Development and production start of descenders with centrifugal technology

Enhancement of the laboratory test facility for simulating several million test cycles under different test conditions

Development of the world's smallest pressure switch with adjustable switching point to 400 bar (patented)

**2007**

Founding of subsidiary SUCO Technologies Inc., USA

**2009**

Acquisition of ESI Technology Ltd. (UK)

**2010**

Across-the-board use of enhanced automatic pressure switch adjusters

Development of a transmitter series based on SoS technology

**2011**

Development of the SUCO thermal brake

**2013**

75-year company anniversary celebrations

**2014**

Development of additional intelligent functions integrated in mechanical pressure switches



# Tradition and Innovation

The preservation of proven traditions and continuous efforts in innovation enable visions to become successful reality



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



Products are subjected to comprehensive testing and measurements to simulate realistic ambient conditions and loads.



Assembly and test of pressure switches on semi and fully automated installations.



Fully automated switching point adjustment with computer-aided documentation of readings.

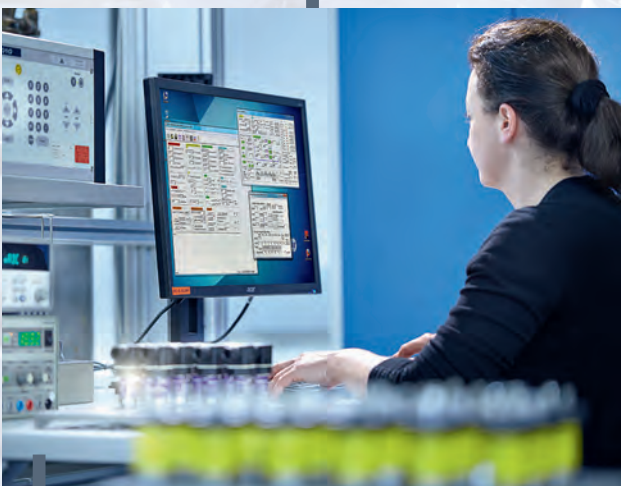




Ultra-modern production facilities with integrated, fully automated component handling for high efficiency.



Encapsulating system for custom ready-wired pressure switches for strictest requirements of IP protection class.



State of the art measuring and test methods for assembly and alignment of our electronic products.



Product final inspection with ultra-modern computer-aided test systems.

# 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.

## 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 long-term 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.**

## 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.

## 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.

| 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        |

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

Using additional sealant to attain the required leak tightness may be necessary for gas applications.



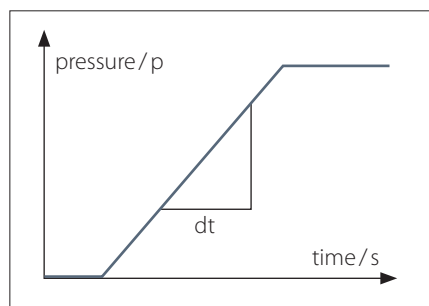
## Vacuum

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. The pressure change rate is specified in bar/s or bar/ms.

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



## Over pressure protection

The specified over pressure 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 ratios are known and the pressure change rates are  $\leq 0.1$  bar/ms, 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  $\leq 1$  bar/ms for mechanical pressure switches, and at  $\leq 5$  bar/ms for transmitters.

## RoHS-Compliance

### RoHS

= Restriction of Hazardous Substances  
(EC Directive 2011/65/EU (RoHS II))



## CE mark

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.

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 CE declaration is available for download from the download area on our homepage:  
[www.suco.de/Downloads.htm](http://www.suco.de/Downloads.htm)



Subject to technical changes.

# M • Mechanical Pressure Switches







# 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 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, stainless steel (CrVI-free) or brass
- Types: 0110, 0111, 0112, 0113, 0114, 0115, 0116, 0117, 0118, 0119, 0120, 0121, 0122, 0123



### 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°, M12 x 1 DIN EN 61076-2-101A,  
Deutsch DT04-3P, DIN connector EN 175301
- Housing material: zinc-plated steel
- Types: 0132, 0133, 0134, 0135, 0136, 0137, 0184, 0185, 0194, 0195



### M.3 Pressure switches NC/NO, hex 24

from page 40

- Max. voltage up to 42 V
- Switching points: 0.1 – 150 bar
- IP protection up to IP65 (IP00 terminals)
- Housing materials: zinc-plated steel, stainless steel or brass
- Types: 0163, 0164, 0166, 0167, 0168, 0169



### 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 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, stainless steel or brass
- Types: 02XX,  
special feature: 0240/0241 – switch 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

- Numerous additional safety functions
- LED for visual check of switching status
- Overvoltage protection (varistor)
- Max. voltage dependent on custom function up to 42 V
- Types: 04XX



**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: 0161, 0162, 0175,  
special feature: 0159 with knurled screw for simple adjustment of the switching point



**M.8 Pressure switches  
ATEX versions**

from page 80

- hex 27 for dust protection zone 22
- 30 A/F for gas protection zones 1 and 2
- Housing material: zinc-plated steel or aluminium
- Types: 0165, 0340, 0341



**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 protected up to 35 bar
- Housing material: brass or aluminium
- Types: 0150, 0151



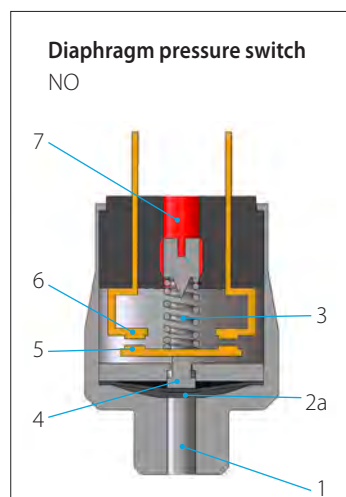
**M.10 Accessories  
for mechanical pressure switches**

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 over pressure safety of 35, 100, 300 and 600 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); an over pressure safety of up to 600 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)**:

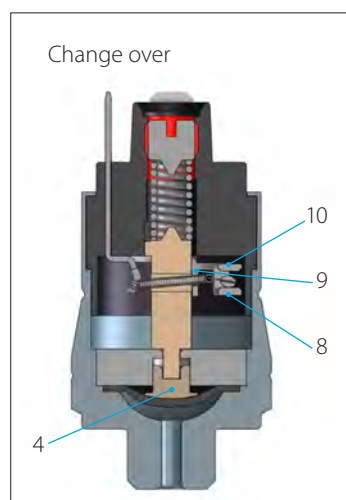
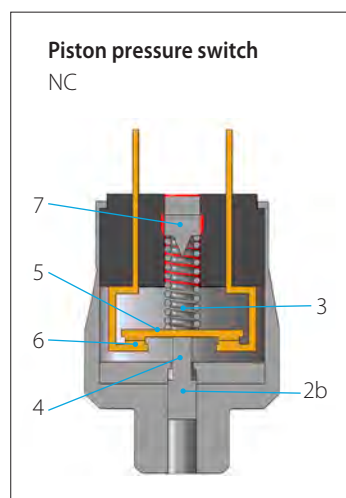
Pressure is applied to the diaphragm (2a) / pistons (2b) through the pressure connector (1).

If the generated pressure force is greater than the pre-tensioned force of the 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 (to DIN EN 60947-5-1).

## AC voltage

**AC12:** Control of ohmic loads and semiconductor loads in input circuits of optocouplers (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 optocouplers (such as PLC inputs).

**DC13:** Control of electromagnets.



## Classification of electrical switch functions

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

### B10d value

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. 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.

### 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 switch-back 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.

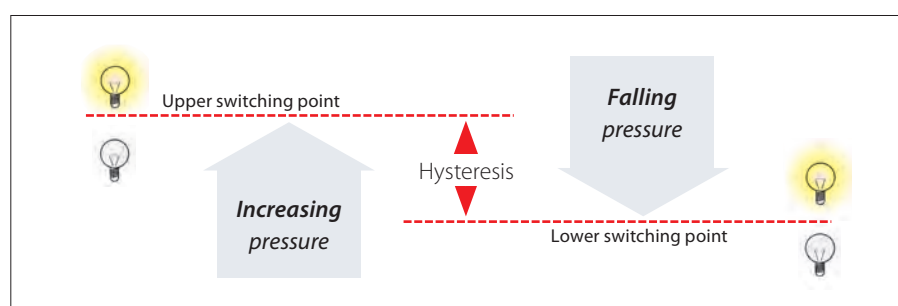
### Hysteresis

#### Rising / falling switching point

The pressure difference between the rising (upper) and falling (lower) switching points (refer to the figure) is known as hysteresis (switch-back difference).

Hysteresis is derived from the structural layout of a mechanical pressure switch. It has no constant value within the adjustment range, and is lowest for the lowest adjustment value. It is greatest at the end of the adjustment range.

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.



# Technical explanations for mechanical 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/minute specified by us is a guideline value. Higher cycle values 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 item 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 item number.

## EPDM with drinking water approval W270

This EPDM material is intended for drinking water applications and for use in medical and pharmaceutical applications. Approval as per code "DVGW Technical Codes, Worksheet W270" is in place for this.

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 W270 is denoted by number "5" in our item 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 item 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 item 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 item 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 item 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 <sup>2</sup> | bar     | rising  | lbf/in <sup>2</sup> , PSI |
|-------------------------------|-----------------------------|----------------------|---------|---------|---------------------------|
| 1 Pa = N/m <sup>2</sup>       | Pascal                      | 1                    | 0.00001 | 0.0075  | 0.00014                   |
| 1 bar                         | Bar                         | 100 000              | 1       | 750.062 | 14.5                      |
| 1 Torr = 1 mm Hg              | Millimetres, mercury column | 133.322              | 0.00133 | 1       | 0.01934                   |
| 1 lbf/in <sup>2</sup> = 1 PSI | Pound-force per square inch | 6894                 | 0.06894 | 51.71   | 1                         |

Conversion table for temperature units

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

Please consult us about gas, water and oxygen applications.

Water applications

Standard piston switches are not suitable for water applications. This also applies for stainless steel switches with EPDM seals. The use of water with corrosion protection, water mixtures and emulsions needs to be clarified with SUCO.

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).

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

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

Pressure switches in 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 from the download area on the homepage: <http://www.suco.de/Downloads.htm>

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.

Subject to technical changes.

# At-a-glance overview of mechanical pressure switches

[illegible]





[illegible]

| M.6<br>PLUS pressure switches<br>hex 24 with intelligent additional funktions |      |      |      |      |      |      |      |      |      |      |      | M.7<br>30 A/F<br>CO |      |      |      | M.8<br>ATEX<br>Variant |      |      | M.9<br>Vacuum<br>Switch |      |                      |  |                           |  |
|-------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|---------------------|------|------|------|------------------------|------|------|-------------------------|------|----------------------|--|---------------------------|--|
| 0410                                                                          | 0411 | 0412 | 0413 | 0414 | 0415 | 0416 | 0417 | 0418 | 0419 | 0424 | 0425 | 0159                | 0161 | 0162 | 0175 | 0165                   | 0340 | 0341 | 0150                    | 0151 |                      |  |                           |  |
| 70                                                                            | 72   | 70   | 72   | 70   | 72   | 70   | 72   | 70   | 72   | 70   | 72   | 76                  | 77   | 77   | 78   | 83                     | 84   | 84   | 88                      | 89   | Page                 |  |                           |  |
| ■                                                                             | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■                   | ■    | ■    | ■    | ■                      | ■    | ■    | ■                       | ■    | 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 – 300 bar        |  |                           |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      |                     | ■    | ■    |      | ■                      |      |      |                         |      | 100 (200) – 400 bar  |  |                           |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      |                     |      |      | ■    |                        |      |      | (■)                     | ■    | (20 bar) 35 bar      |  | Overpressure safety up to |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      | ■                   | ■    | ■    |      | ■                      |      |      |                         |      | 100 bar              |  |                           |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      |                     |      |      |      |                        | ■    |      |                         |      | 200 bar              |  |                           |  |
| ■                                                                             |      | ■    |      | ■    |      | ■    |      | ■    |      | ■    |      | ■                   | ■    | ■    |      | ■                      |      | ■    |                         |      | 300 bar              |  |                           |  |
|                                                                               | ■    |      | ■    |      | ■    |      | ■    |      | ■    |      | ■    | ■                   | ■    | ■    |      | ■                      |      | ■    |                         |      | 600 bar              |  |                           |  |
| ■                                                                             | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |                     |      |      |      |                        |      |      |                         | ■    | hex 24               |  | Size                      |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      |                     |      |      |      |                        |      |      |                         |      | hex 27               |  |                           |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      | ■                   | ■    | ■    | ■    | ■                      |      |      | ■                       |      | 30 A/F               |  |                           |  |
| ■                                                                             | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |                     |      |      |      |                        | ■    | ■    |                         |      | Zinc-plated steel    |  | Housing material          |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      |                     |      |      |      |                        |      |      |                         |      | Stainless steel      |  |                           |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      |                     |      |      |      |                        |      |      |                         | ■    | Brass                |  |                           |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      | ■                   | ■    | ■    | ■    | ■                      |      |      | ■                       |      | Aluminium            |  |                           |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      |                     |      |      |      | ■                      | ■    | ■    |                         |      | ATEX                 |  | Custom variant            |  |
|                                                                               |      |      |      |      |      |      |      |      |      |      |      |                     |      |      |      |                        | ■    | ■    |                         | ■    | Configurable         |  |                           |  |
| ■                                                                             | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |                     |      |      |      |                        |      |      |                         |      | additional functions |  |                           |  |



M.1

hex 24 integrated

# Pressure switches hex 24 with integrated connector

NC or NO, maximum operating voltage up to 42 V

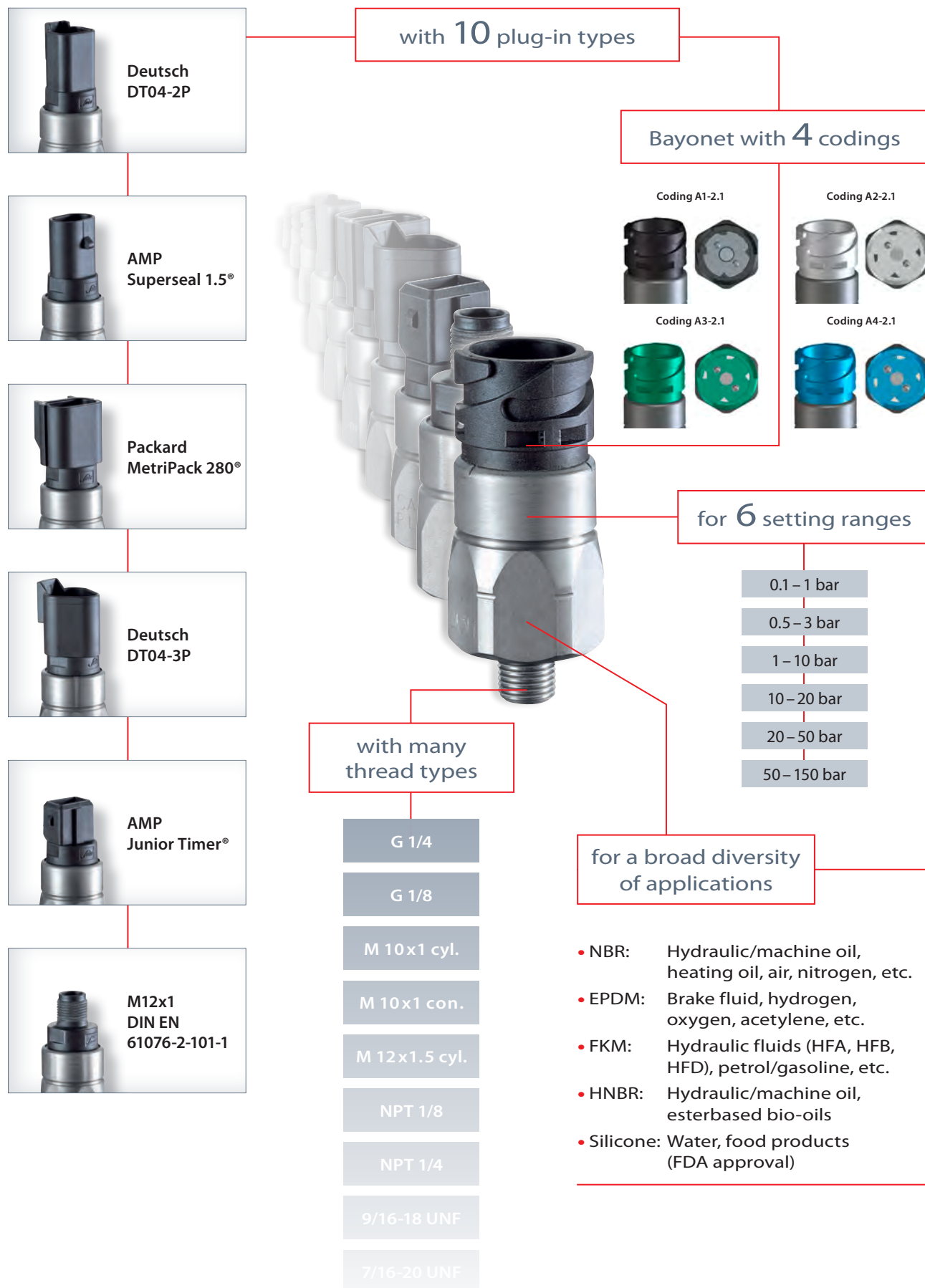


- Large selection of electrical plug-in types for quick attachment and reliable connection
- High protection class (to IP67 or IP6K9K)
- Compact and rugged design in industrial environments like construction and agricultural machinery or commercial vehicles
- Switching point can be set on site with adjusting screw in the connector<sup>1)</sup>
- High overpressure resistance, compact, small switches, available as normally open or normally closed

<sup>1)</sup> 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 data

|                                                        |                                                                                                                                           |                    |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Rated working voltage:                                 | 10 ... 42 VAC/DC                                                                                                                          |                    |
| Rated current range (resistive load, 12 DC and 12 AC): | 10 mA ... 4 A                                                                                                                             |                    |
| Switching power DC12 / AC12:                           | 100 W / 100 VA                                                                                                                            |                    |
| Temperature resistance of sealing materials:           | NBR                                                                                                                                       | -40 °C ... +100 °C |
|                                                        | EPDM                                                                                                                                      | -30 °C ... +120 °C |
|                                                        | FKM (in diaphragm pressure switch)                                                                                                        | -5 °C ... +120 °C  |
|                                                        | FKM (in piston pressure switch)                                                                                                           | -15 °C ... +120 °C |
|                                                        | Silicone                                                                                                                                  | -40 °C ... +120 °C |
|                                                        | HNBR                                                                                                                                      | -30 °C ... +120 °C |
| Switching frequency:                                   | 200 / min.                                                                                                                                |                    |
| Mechanical life expectancy:                            | 1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures to max. 50 bar)             |                    |
| Pressure rise rate:                                    | ≤ 1 bar/ms                                                                                                                                |                    |
| Hysteresis:                                            | Average value 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 <sup>2</sup> ; 14 ms half sine wave; DIN EN 60068-2-27                                                                            |                    |
| Protection class:                                      | Up to IP67 / IP6K9K according to the manufacturer's specifications for the respective plug-in system only when plugged in, otherwise IP00 |                    |
| Weight:                                                | approx. 90 g                                                                                                                              |                    |

### Contact assignment for bayonet connectors

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

**0110/0111**

**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 61076-2-101-1**  
IP67





# 0110/0112/0114/0116/0118/0122

## Diaphragm pressure switches with integrated connector

- Setting ranges to up to 50 bar (higher settings refer to page 26)
- NC or NO, maximum voltage 42 V
- Zinc-plated steel (Cr VI-free)
- Overpressure safety up to 300 bar<sup>1)</sup>

### Plug-in types for diaphragm pressure switches

|                        |                         |                         |
|------------------------|-------------------------|-------------------------|
| Deutsch DT04-2P        | 0110 - XXX XX - X - XXX | 0110 - XXX XX - X - XXX |
| AMP Superseal 1.5°     | 0112 - XXX XX - X - XXX | 0112 - XXX XX - X - XXX |
| Packard MetriPack 280° | 0114 - XXX XX - X - XXX | 0114 - XXX XX - X - XXX |
| Deutsch DT04-3P        | 0116 - XXX XX - X - XXX | 0116 - XXX XX - X - XXX |
| AMP Junior Timer°      | 0118 - XXX XX - X - XXX | 0118 - XXX XX - X - XXX |
| M12x1 DIN EN 61076-2-D | 0122 - XXX XX - X - XXX | 0122 - XXX XX - X - XXX |

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|
|---------------------------------------------------|----------------|-------------------------|------------------------|

### Diaphragm pressure switches with integrated connector

|                    |               |                         |                         |
|--------------------|---------------|-------------------------|-------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4         | XXXX - 403 03 - X - 011 | XXXX - 404 03 - X - 015 |
|                    | G 1/8         | XXXX - 403 28 - X - 603 | XXXX - 404 28 - X - 604 |
|                    | M 10x1 cyl.   | XXXX - 403 13 - X - 003 | XXXX - 404 13 - X - 004 |
|                    | M 10x1 con.   | XXXX - 403 01 - X - 009 | XXXX - 404 01 - X - 013 |
|                    | M 12x1.5 cyl. | XXXX - 403 02 - X - 010 | XXXX - 404 02 - X - 014 |
|                    | NPT 1/8       | XXXX - 403 04 - X - 012 | XXXX - 404 04 - X - 016 |
| 0.5 – 3 (±0.3) bar | G 1/4         | XXXX - 423 03 - X - 070 | XXXX - 424 03 - X - 070 |
|                    | G 1/8         | XXXX - 423 28 - X - 070 | XXXX - 424 28 - X - 070 |
|                    | M 10x1 cyl.   | XXXX - 423 13 - X - 070 | XXXX - 424 13 - X - 070 |
|                    | M 10x1 con.   | XXXX - 423 01 - X - 070 | XXXX - 424 01 - X - 070 |
|                    | M 12x1.5 cyl. | XXXX - 423 02 - X - 070 | XXXX - 424 02 - X - 070 |
|                    | NPT 1/8       | XXXX - 423 04 - X - 070 | XXXX - 424 04 - X - 070 |
| 1 – 10 (±0.5) bar  | G 1/4         | XXXX - 407 03 - X - 027 | XXXX - 408 03 - X - 031 |
|                    | G 1/8         | XXXX - 407 28 - X - 607 | XXXX - 408 28 - X - 608 |
|                    | M 10x1 cyl.   | XXXX - 407 13 - X - 007 | XXXX - 408 13 - X - 008 |
|                    | M 10x1 con.   | XXXX - 407 01 - X - 025 | XXXX - 408 01 - X - 029 |
|                    | M 12x1.5 cyl. | XXXX - 407 02 - X - 026 | XXXX - 408 02 - X - 030 |
|                    | NPT 1/8       | XXXX - 407 04 - X - 028 | XXXX - 408 04 - X - 032 |

### 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 |
| HNBR | Hydraulic/machine oil, ester-based bio-oils             | 9 |

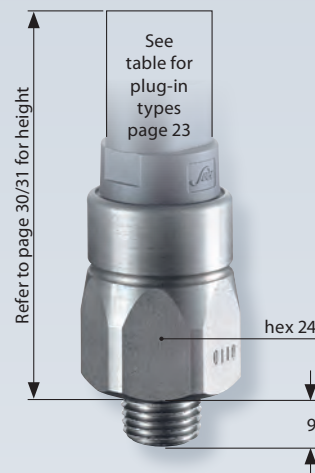
Refer to page 24 for the temperature range and application thresholds of sealing materials.

Your order number:

01XX - XXX XX - X - XXX

M.1

hex 24 integrated

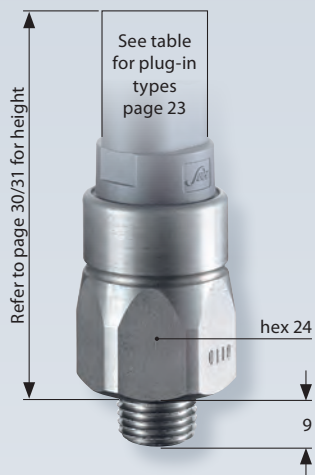


*suco*

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





## 0110/0112/0114/0116/0118/0122

### Diaphragm pressure switches with integrated connector

- Setting ranges up to 50 bar (lower settings refer to page 25)
- NC or NO, maximum operating voltage up to 42 V
- Zinc-plated steel (Cr VI-free)
- Overpressure safety up to 300 bar<sup>1)</sup>

#### 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-D (1 + 3) | 0122 - XXX XX - X - XXX | 0122 - XXX XX - X - XXX |

|                                                   |                |                         |                        |
|---------------------------------------------------|----------------|-------------------------|------------------------|
| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|

#### Diaphragm pressure switches with integrated connector

|                |               |                         |                         |
|----------------|---------------|-------------------------|-------------------------|
| 10-20 (±1) bar | G 1/4         | XXXX - 411 03 - X - 043 | XXXX - 412 03 - X - 047 |
|                | G 1/8         | XXXX - 411 28 - X - 611 | XXXX - 412 28 - X - 612 |
|                | M 10x1 cyl.   | XXXX - 411 13 - X - 011 | XXXX - 412 13 - X - 012 |
|                | M 10x1 con.   | XXXX - 411 01 - X - 041 | XXXX - 412 01 - X - 045 |
|                | M 12x1.5 cyl. | XXXX - 411 02 - X - 042 | XXXX - 412 02 - X - 046 |
|                | NPT 1/8       | XXXX - 411 04 - X - 044 | XXXX - 412 04 - X - 048 |
| 20-50 (±2) bar | G 1/4         | XXXX - 415 03 - X - 059 | XXXX - 416 03 - X - 063 |
|                | G 1/8         | XXXX - 415 28 - X - 615 | XXXX - 416 28 - X - 616 |
|                | M 10x1 cyl.   | XXXX - 415 13 - X - 015 | XXXX - 416 13 - X - 016 |
|                | M 10x1 con.   | XXXX - 415 01 - X - 057 | XXXX - 416 01 - X - 061 |
|                | M 12x1.5 cyl. | XXXX - 415 02 - X - 058 | XXXX - 416 02 - X - 062 |
|                | NPT 1/8       | XXXX - 415 04 - X - 060 | XXXX - 416 04 - X - 064 |

#### 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 |
| 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

# 0111 / 0113 / 0115 / 0117 / 0119 / 0123

## Piston pressure switches with integrated connector

- Setting range up to 150 bar
- NC or NO, maximum operating voltage up to 42 V
- Zinc-plated steel (Cr VI-free)
- Overpressure safety up to 600 bar<sup>1)</sup>

### 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-D (1 + 3) | 0123 - XXX XX - X - XXX | 0123 - XXX XX - X - XXX |

|                                                   |                |                         |                        |
|---------------------------------------------------|----------------|-------------------------|------------------------|
| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|

### Piston pressure switches with integrated connector

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

### 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 |
| HNBR | Hydraulic/machine oil, ester-based bio-oils             | 9 |

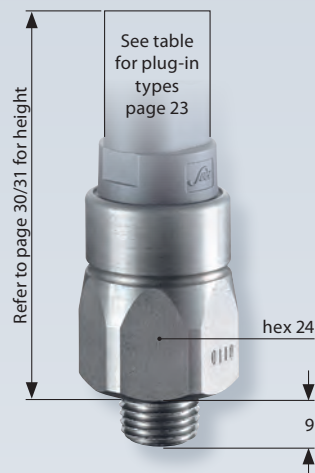
Refer to page 24 for the temperature range and application thresholds of sealing materials.

Your order number:

01XX - XXX XX - X - XXX

M.1

hex 24 integrated



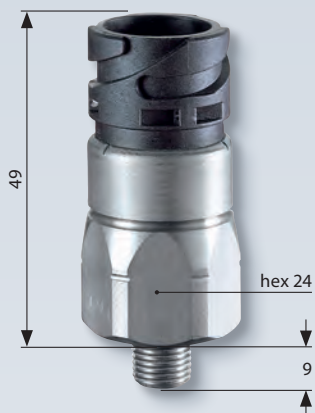
*suco*

M

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



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 300 bar<sup>1)</sup>

|                                                   |                |                         |                        |
|---------------------------------------------------|----------------|-------------------------|------------------------|
| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|

#### 0120 Diaphragm pressure switches with integrated connector

|                    |               |                         |                         |
|--------------------|---------------|-------------------------|-------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4         | 0120 – X03 03 – X – 011 | 0120 – X04 03 – X – 015 |
|                    | G 1/8         | 0120 – X03 28 – X – 603 | 0120 – X04 28 – X – 604 |
|                    | M 10x1 cyl.   | 0120 – X03 13 – X – 003 | 0120 – X04 13 – X – 004 |
|                    | M 10x1 con.   | 0120 – X03 01 – X – 009 | 0120 – X04 01 – X – 013 |
|                    | M 12x1.5 cyl. | 0120 – X03 02 – X – 010 | 0120 – X04 02 – X – 014 |
|                    | NPT 1/8       | 0120 – X03 04 – X – 012 | 0120 – X04 04 – X – 016 |
| 0.5 – 3 (±0.3) bar | G 1/4         | 0120 – X23 03 – X – 070 | 0120 – X24 03 – X – 070 |
|                    | G 1/8         | 0120 – X23 28 – X – 070 | 0120 – X24 28 – X – 070 |
|                    | M 10x1 cyl.   | 0120 – X23 13 – X – 070 | 0120 – X24 13 – X – 070 |
|                    | M 10x1 con.   | 0120 – X23 01 – X – 070 | 0120 – X24 01 – X – 070 |
|                    | M 12x1.5 cyl. | 0120 – X23 02 – X – 070 | 0120 – X24 02 – X – 070 |
|                    | NPT 1/8       | 0120 – X23 04 – X – 070 | 0120 – X24 04 – X – 070 |
| 1 – 10 (±0.5) bar  | G 1/4         | 0120 – X07 03 – X – 027 | 0120 – X08 03 – X – 031 |
|                    | G 1/8         | 0120 – X07 28 – X – 607 | 0120 – X08 28 – X – 608 |
|                    | M 10x1 cyl.   | 0120 – X07 13 – X – 007 | 0120 – X08 13 – X – 008 |
|                    | M 10x1 con.   | 0120 – X07 01 – X – 025 | 0120 – X08 01 – X – 029 |
|                    | M 12x1.5 cyl. | 0120 – X07 02 – X – 026 | 0120 – X08 02 – X – 030 |
|                    | NPT 1/8       | 0120 – X07 04 – X – 028 | 0120 – X08 04 – X – 032 |

#### Coding

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

#### Seal material – Application areas

|      |                                                         |   |
|------|---------------------------------------------------------|---|
| NBR  | Hydraulic/machine oil, 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:

0120 – XXX XX – X – XXX

<sup>1)</sup> 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 300 bar<sup>1)</sup> for diaphragm variant  
Overpressure safety up to 600 bar<sup>1)</sup> for piston variant

|                                                   |                |                         |                        |
|---------------------------------------------------|----------------|-------------------------|------------------------|
| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|

### 0120 Diaphragm pressure switches with integrated connector

|                |               |                         |                         |
|----------------|---------------|-------------------------|-------------------------|
| 10–20 (±1) bar | G 1/4         | 0120 – X11 03 – X – 043 | 0120 – X12 03 – X – 047 |
|                | G 1/8         | 0120 – X11 28 – X – 611 | 0120 – X12 28 – X – 612 |
|                | M 10x1 cyl.   | 0120 – X11 13 – X – 011 | 0120 – X12 13 – X – 012 |
|                | M 10x1 con.   | 0120 – X11 01 – X – 041 | 0120 – X12 01 – X – 045 |
|                | M 12x1.5 cyl. | 0120 – X11 02 – X – 042 | 0120 – X12 02 – X – 046 |
|                | NPT 1/8       | 0120 – X11 04 – X – 044 | 0120 – X12 04 – X – 048 |
| 20–50 (±2) bar | G 1/4         | 0120 – X15 03 – X – 059 | 0120 – X16 03 – X – 063 |
|                | G 1/8         | 0120 – X15 28 – X – 615 | 0120 – X16 28 – X – 616 |
|                | M 10x1 cyl.   | 0120 – X15 13 – X – 015 | 0120 – X16 13 – X – 016 |
|                | M 10x1 con.   | 0120 – X15 01 – X – 057 | 0120 – X16 01 – X – 061 |
|                | M 12x1.5 cyl. | 0120 – X15 02 – X – 058 | 0120 – X16 02 – X – 062 |
|                | NPT 1/8       | 0120 – X15 04 – X – 060 | 0120 – X16 04 – X – 064 |

### 0121 Piston pressure switches with integrated connector

|                 |               |                         |                         |
|-----------------|---------------|-------------------------|-------------------------|
| 50–150 (±5) bar | G 1/4         | 0121 – X19 03 – X – 011 | 0121 – X20 03 – X – 015 |
|                 | G 1/8         | 0121 – X19 28 – X – 603 | 0121 – X20 28 – X – 604 |
|                 | M 10x1 cyl.   | 0121 – X19 13 – X – 003 | 0121 – X20 13 – X – 004 |
|                 | M 10x1 con.   | 0121 – X19 01 – X – 009 | 0121 – X20 01 – X – 013 |
|                 | M 12x1.5 cyl. | 0121 – X19 02 – X – 010 | 0121 – X20 02 – X – 014 |
|                 | NPT 1/8       | 0121 – X19 04 – X – 012 | 0121 – X20 04 – X – 016 |

#### Coding

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

#### Seal material – Application areas

|      |                                                         |   |
|------|---------------------------------------------------------|---|
| NBR  | Hydraulic/machine oil, 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:

012X – XXX XX – X – XXX

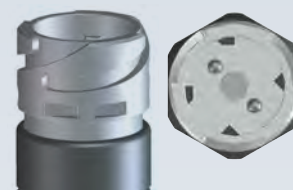
M.1

hex 24 integrated

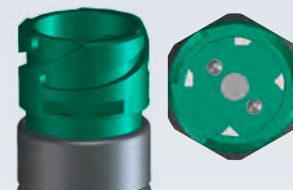
Coding A1-2.1



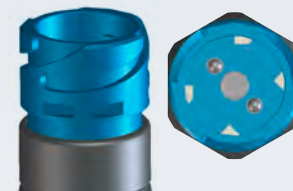
Coding A2-2.1



Coding A3-2.1



Coding A4-2.1



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

## Technical details, contact assignment and accessories for hex 24 pressure switches with integrated connector

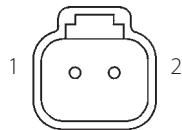
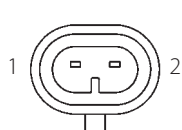
**Please note:**

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

### Mating plug accessories

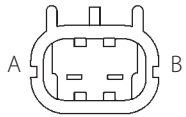
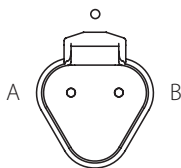
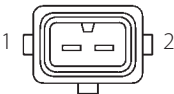
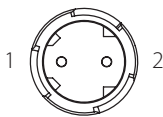
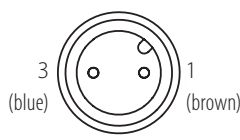
| Mating plug type ►    | Deutsch DT06-2S<br>(für DT04-2P)                                                    | AMP-<br>Superseal 1.5®                                                              |
|-----------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Including 2 m cable ► |  |  |
| Cable cross-section ► | 2 x 0.5 mm <sup>2</sup> Radox cables                                                | 2 x 0.5 mm <sup>2</sup> Radox cables                                                |
| Protection class ►    | IP65                                                                                | IP65                                                                                |
| Order number ►        | 1-1-10-653-118                                                                      | 1-1-12-653-113                                                                      |

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

| Model / type ►       | 0110 / 0111                                                                           | 0112 / 0113                                                                           |
|----------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Connector ►          |  |  |
| Protection class ►   | IP67, IP6K9K                                                                          | IP67                                                                                  |
| Overall height ►     | H ≈ 61 mm                                                                             | H ≈ 61 mm                                                                             |
| Contact assignment ► |  |  |



| Packard<br>MetriPack 280®                                                         | Deutsch DT06-3S<br>(für DT04-3P)                                                  | AMP<br>Junior Timer®                                                              | Bayonet<br>DIN 72585 / ISO 15170<br>A1-2.1                                          | M12x1<br>DIN EN 61076-2-101-LF                                                      |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |
| 2 x 0.5 mm <sup>2</sup> Radox cables                                              | 2 x 0.5 mm <sup>2</sup> PUR-cables                                                | 2 x 0.5 mm <sup>2</sup> Radox cables                                              | 2 x 0.5 mm <sup>2</sup> Radox cables                                                | 4 x 0.34 mm <sup>2</sup> PUR-cables                                                 |
| IP65                                                                              | IP67                                                                              | IP65                                                                              | IP65                                                                                | IP67                                                                                |
| 1-1-14-653-114                                                                    | 1-1-36-653-160                                                                    | 1-1-18-653-116                                                                    | 1-1-20-653-112                                                                      | 1-1-00-653-162                                                                      |

| 0114 / 0115                                                                         | 0116 / 0117                                                                         | 0118 / 0117                                                                         | 0120 / 0121                                                                                                | 0122 / 0123                                                                           |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |                       |  |
| Packard<br>MetriPack 280®                                                           | Deutsch<br>DT04-3P                                                                  | AMP<br>Junior Timer®                                                                | Bayonet<br>DIN 72585/ISO 15170                                                                             | M12x1 DIN EN<br>61076-2-101-1                                                         |
| IP67                                                                                | IP67, IP6K9K                                                                        | IP65, IPx4K                                                                         | IP67, IP6K9K                                                                                               | IP67                                                                                  |
| H ≈ 62 mm                                                                           | H ≈ 63 mm                                                                           | H ≈ 54 mm                                                                           | H ≈ 49 mm                                                                                                  | H ≈ 51 mm                                                                             |
|  |  |  | <br>Coding:<br>A1-2.1 |  |

## 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 (up 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 <sup>1)</sup>
- Very high overpressure safety
- The corresponding mating plugs are available as accessories (please refer to page 34)

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

## Technical data

|                                                     |                                                                                                                               |                   |                    |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------|
| Types:                                              | 0132 – 0137                                                                                                                   | 0184 / 0185       | 0194 / 0195        |
| Rated working voltage:                              | 10 ... 48 VAC/DC                                                                                                              | 10 ... 250 VAC/DC | 5 ... 24 VDC       |
| Rated current:<br>(resistive load, 12 DC and 12 AC) | 10 mA ... 4 A                                                                                                                 | 10 mA ... 4A      | 3 ... 50 mA        |
| Temperature resistance<br>of sealing materials:     | NBR (Overpressure safety up to 100 bar)                                                                                       |                   | -30 °C ... +100 °C |
|                                                     | NBR (Overpressure safety up to 300 bar)                                                                                       |                   | -40 °C ... +100 °C |
|                                                     | EPDM                                                                                                                          |                   | -30 °C ... +120 °C |
|                                                     | FKM (in diaphragm pressure switch)                                                                                            |                   | -5 °C ... +120 °C  |
|                                                     | FKM (in piston pressure switch)                                                                                               |                   | -15 °C ... +120 °C |
|                                                     | Silicone                                                                                                                      |                   | -40 °C ... +120 °C |
|                                                     | HNBR                                                                                                                          |                   | -30 °C ... +120 °C |
| Switching frequency:                                | 200 / min.                                                                                                                    |                   |                    |
| Mechanical life expectancy:                         | 1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures to max. 50 bar) |                   |                    |
| Pressure rise rate:                                 | ≤ 1 bar/ms                                                                                                                    |                   |                    |
| Hysteresis:<br>(can only be set at factory)         | 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 <sup>2</sup> ; 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<br>(can only be set at factory) | ●                     | ●    | ●                             | ●    | ●                  | ●    | ●             | ●    | ●    | ●    |
| Connector type                                        | AMP<br>Superseal 1.5® |      | M12x1 DIN EN<br>61076-2-101-1 |      | Deutsch<br>DT04-3P |      | DIN EN 175301 |      |      |      |
| Protection class                                      | IP67                  |      | IP67                          |      | IP67, IP6K9K       |      | IP65          |      |      |      |

○ Available as an option



# 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)

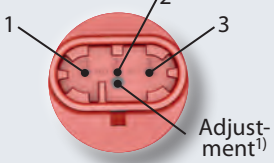
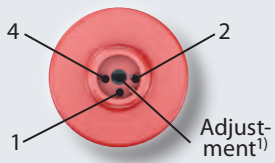
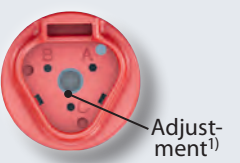
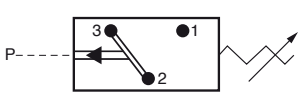
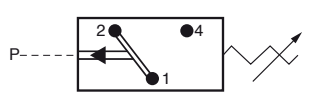
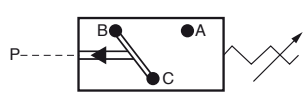
### Model / type ►

### Height without thread ►

### Contact assignments ►

<sup>1)</sup>Blade of screwdriver max. 2 mm

### Circuit diagrams ►

| 0132 / 0133                                                                         | 0134 / 0135                                                                          | 0136 / 0137                                                                           |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    |    |    |
| <b>TE AMP Superseal 1.5°</b><br>IP67                                                | <b>M12x1 DIN EN 61076-2-101A</b><br>Contact assignment<br>DIN 60947-5-2<br>IP67      | <b>Deutsch DT04-3P°</b><br>IP67, IP6K9K                                               |
| <b>L ~ 73 mm</b>                                                                    | <b>L ~ 65 mm</b>                                                                     | <b>L ~ 71 mm</b>                                                                      |
|  |  |  |
|  |  |  |

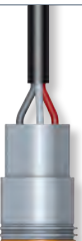
### Accessory ►

Not included  
in the delivery.  
Please order separately.

### Cable cross-section / IP protection ►

### Order number ►

### Mating plug with 2 m cable

| TE AMP Superseal 1.5°                                                               | M12x1 DIN EN 61076-2-101A                                                             | Deutsch DT06-3S°                                                                      |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |
| 3 x 0.5 mm <sup>2</sup> Radox cable / IP65                                          | 4 x 0.34 mm <sup>2</sup> PUR cable / IP67                                             | 3 x 0.5 mm <sup>2</sup> PUR cable / IP67                                              |
| <b>1-1-32-653-158</b>                                                               | <b>1-1-00-653-162</b>                                                                 | <b>1-1-36-653-160</b>                                                                 |

M.2

hex 27 integrated

suco

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|--------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|--------|--------------|

**0132 / 0134 / 0136 Diaphragm pressure switches**

|                   |           |             |               |                         |
|-------------------|-----------|-------------|---------------|-------------------------|
| 100 <sup>1)</sup> | 0.3 – 1.5 | ± 0.2       | G 1/4         | 013X – 457 03 – X – 003 |
|                   |           |             | M 10x1 con.   | 013X – 457 01 – X – 001 |
|                   |           |             | M 12x1.5 cyl. | 013X – 457 02 – X – 002 |
|                   |           |             | NPT 1/8       | 013X – 457 04 – X – 318 |
|                   |           |             | NPT 1/4       | 013X – 457 09 – X – 314 |
|                   |           |             | 7/16-20 UNF   | 013X – 457 20 – X – 301 |
|                   |           |             | 9/16-18 UNF   | 013X – 457 21 – X – 302 |
| 300 <sup>1)</sup> | 1 – 10    | ± 0.5       | G 1/4         | 013X – 458 03 – X – 042 |
|                   |           |             | M 10x1 con.   | 013X – 458 01 – X – 040 |
|                   |           |             | M 12x1.5 cyl. | 013X – 458 02 – X – 041 |
|                   |           |             | NPT 1/8       | 013X – 458 04 – X – 343 |
|                   |           |             | NPT 1/4       | 013X – 458 09 – X – 340 |
|                   |           |             | 7/16-20 UNF   | 013X – 458 20 – X – 341 |
|                   |           |             | 9/16-18 UNF   | 013X – 458 21 – X – 342 |
|                   | 10 – 50   | ± 3.0       | G 1/4         | 013X – 459 03 – X – 009 |
|                   |           |             | M 10x1 con.   | 013X – 459 01 – X – 007 |
|                   |           |             | M 12x1.5 cyl. | 013X – 459 02 – X – 008 |
|                   |           |             | NPT 1/8       | 013X – 459 04 – X – 320 |
|                   |           |             | NPT 1/4       | 013X – 459 09 – X – 316 |
|                   |           |             | 7/16-20 UNF   | 013X – 459 20 – X – 305 |
|                   |           |             | 9/16-18 UNF   | 013X – 459 21 – X – 306 |
|                   | 10 – 100  | ± 3.0 – 5.0 | G 1/4         | 013X – 461 03 – X – 012 |
|                   |           |             | M 10x1 con.   | 013X – 461 01 – X – 010 |
|                   |           |             | M 12x1.5 cyl. | 013X – 461 02 – X – 011 |
|                   |           |             | NPT 1/8       | 013X – 461 04 – X – 321 |
|                   |           |             | NPT 1/4       | 013X – 461 09 – X – 317 |
|                   |           |             | 7/16-20 UNF   | 013X – 461 20 – X – 307 |
|                   |           |             | 9/16-18 UNF   | 013X – 461 21 – X – 308 |

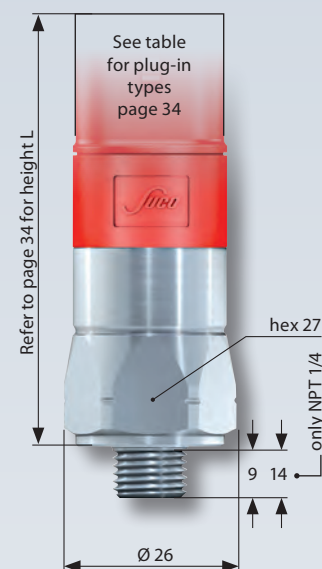
**0133 / 0135 / 0137 Piston pressure switches**

|                   |          |       |               |                         |
|-------------------|----------|-------|---------------|-------------------------|
| 600 <sup>1)</sup> | 50 – 200 | ± 5.0 | G 1/4         | 013X – 460 03 – X – 003 |
|                   |          |       | M 10x1 con.   | 013X – 460 01 – X – 001 |
|                   |          |       | M 12x1.5 cyl. | 013X – 460 02 – X – 002 |
|                   |          |       | NPT 1/8       | 013X – 460 04 – X – 304 |
|                   |          |       | NPT 1/4       | 013X – 460 09 – X – 303 |
|                   |          |       | 7/16-20 UNF   | 013X – 460 20 – X – 301 |
|                   |          |       | 9/16-18 UNF   | 013X – 460 21 – X – 302 |

**Seal material – Application areas**

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

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

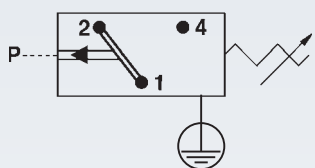
**Your order number:****013X – XXX XX – X – XXX**

M

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



Socket device  
included in the delivery



## 0184

### Diaphragm pressure switches up to 250 V

- Made of zinc-plated steel (CrVI-free, other housing materials available as option)
- Socket device similar to DIN EN 175301 (DIN 43650)
- Changeover with silver contacts
- Overpressure safety up to 100 / 300 bar<sup>1)</sup>
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

#### 0184 Diaphragm pressure switches

|                   |           |             |               |                         |
|-------------------|-----------|-------------|---------------|-------------------------|
| 100 <sup>1)</sup> | 0.3 – 1.5 | ± 0.2       | G 1/4         | 0184 – 457 03 – X – 003 |
|                   |           |             | M 10x1 con.   | 0184 – 457 01 – X – 001 |
|                   |           |             | M 12x1.5 cyl. | 0184 – 457 02 – X – 002 |
|                   |           |             | NPT 1/8       | 0184 – 457 04 – X – 318 |
|                   |           |             | NPT 1/4       | 0184 – 457 09 – X – 314 |
|                   |           |             | 7/16-20 UNF   | 0184 – 457 20 – X – 301 |
|                   |           |             | 9/16-18 UNF   | 0184 – 457 21 – X – 302 |
| 300 <sup>1)</sup> | 1 – 10    | ± 0.5       | G 1/4         | 0184 – 458 03 – X – 042 |
|                   |           |             | M 10x1 con.   | 0184 – 458 01 – X – 040 |
|                   |           |             | M 12x1.5 cyl. | 0184 – 458 02 – X – 041 |
|                   |           |             | NPT 1/8       | 0184 – 458 04 – X – 343 |
|                   |           |             | NPT 1/4       | 0184 – 458 09 – X – 340 |
|                   |           |             | 7/16-20 UNF   | 0184 – 458 20 – X – 341 |
|                   |           |             | 9/16-18 UNF   | 0184 – 458 21 – X – 342 |
|                   | 10 – 50   | ± 3.0       | G 1/4         | 0184 – 459 03 – X – 009 |
|                   |           |             | M 10x1 con.   | 0184 – 459 01 – X – 007 |
|                   |           |             | M 12x1.5 cyl. | 0184 – 459 02 – X – 008 |
|                   |           |             | NPT 1/8       | 0184 – 459 04 – X – 320 |
|                   |           |             | NPT 1/4       | 0184 – 459 09 – X – 311 |
|                   |           |             | 7/16-20 UNF   | 0184 – 459 20 – X – 305 |
|                   |           |             | 9/16-18 UNF   | 0184 – 459 21 – X – 306 |
|                   | 10 – 100  | ± 3.0 – 5.0 | G 1/4         | 0184 – 461 03 – X – 012 |
|                   |           |             | M 10x1 con.   | 0184 – 461 01 – X – 010 |
|                   |           |             | M 12x1.5 cyl. | 0184 – 461 02 – X – 011 |
|                   |           |             | NPT 1/8       | 0184 – 461 04 – X – 321 |
|                   |           |             | NPT 1/4       | 0184 – 461 09 – X – 312 |
|                   |           |             | 7/16-20 UNF   | 0184 – 461 20 – X – 307 |
|                   |           |             | 9/16-18 UNF   | 0184 – 461 21 – X – 308 |

#### Seal material – Application areas

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

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



Your order number:

0184 – XXX XX – X – XXX

# 0185

## Piston pressure switches up to 250 V

- Made of zinc-plated steel (CrVI-free, other housing materials available as option)
- Socket device similar to DIN EN 175301 (DIN 43650)
- Changeover with silver contacts
- Overpressure safety up to 600 bar<sup>1)</sup>
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

### 0185 Piston pressure switches

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

### Seal material – Application areas

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

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

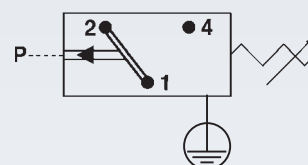
**Your order number:** 0185 – 460 XX – X – XXX

# M.2

## hex 27 integrated



Socket device  
included in the delivery



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





Socket device  
included in the delivery



## 0194

Diaphragm pressure switches up to 24 V with gold contacts

- Made of zinc-plated steel (CrVI-free)
- Socket device similar to DIN EN 175301 (DIN 43650)
- Changeover with gold contacts
- Overpressure safety up to 100/300 bar<sup>1)</sup>
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Order number |
|-----------------------------|----------------------------|-----------------------------------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|--------------|

### 0194 Diaphragm pressure switches

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

### Seal material – Application areas

|             |                                                         |   |
|-------------|---------------------------------------------------------|---|
| <b>NBR</b>  | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | 1 |
| <b>EPDM</b> | Brake fluid, hydrogen, oxygen, acetylene, etc.          | 2 |
| <b>FKM</b>  | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc. | 3 |
| <b>HNBR</b> | 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:

0194 – XXX XX – X – XXX

# 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 600 bar<sup>1)</sup>
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

### 0195 Piston pressure switches

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

### Seal material – Application areas

|             |                                                         |   |
|-------------|---------------------------------------------------------|---|
| <b>NBR</b>  | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | 1 |
| <b>EPDM</b> | Brake fluid, hydrogen, oxygen, acetylene, etc.          | 2 |
| <b>FKM</b>  | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc. | 3 |
| <b>HNBR</b> | 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:** 0195 – 460 XX – X – XXX

# M.2

## hex 27 integrated



Socket device  
included in the delivery



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

# 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 site <sup>1)</sup>
- 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

<sup>1)</sup> 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<br>(resistive load, 12 DC and 12 AC): | 10 mA ... 4 A                                                                                                                       |                    |
| Switching power DC12 / AC12:                              | 100 W / 100 VA                                                                                                                      |                    |
| Temperature resistance<br>of sealing materials:           | NBR                                                                                                                                 | -40 °C ... +100 °C |
|                                                           | EPDM                                                                                                                                | -30 °C ... +120 °C |
|                                                           | EPDM-W270, diaphragm                                                                                                                | -20 °C ... +100 °C |
|                                                           | FKM<br>(in diaphragm pressure switch)                                                                                               | -5 °C ... +120 °C  |
|                                                           | FKM<br>(in piston pressure switch)                                                                                                  | -10 °C ... +120 °C |
|                                                           | Silicone, diaphragm                                                                                                                 | -40 °C ... +120 °C |
|                                                           | HNBR                                                                                                                                | -30 °C ... +120 °C |
| Switching frequency:                                      | 200 / min.                                                                                                                          |                    |
| Mechanical life expectancy:                               | 1,000,000 cycles (for diaphragm pressure switches,<br>life expectancy value only applies for switching<br>pressures to max. 50 bar) |                    |
| Pressure rise rate:                                       | ≤ 1 bar/ms                                                                                                                          |                    |
| Hysteresis:                                               | Average value 5 – 30 % depending on type,<br>not adjustable                                                                         |                    |
| Vibration resistance:                                     | 10 g; 5 – 200 Hz sine wave; DIN EN 60068-2-6                                                                                        |                    |
| Shock resistance:                                         | 294 m/s <sup>2</sup> ; 14 ms half sine wave; DIN EN 60068-2-27                                                                      |                    |
| Protection class:                                         | IP65<br>Terminals IP00                                                                                                              |                    |
| Weight:                                                   | approx. 90 g                                                                                                                        |                    |

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



M



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 600 bar<sup>1)</sup>

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC →  : |
|---------------------------------------------------|----------------|-------------------------|-------------------------|
|---------------------------------------------------|----------------|-------------------------|-------------------------|

**0163 Diaphragm pressure switches with M3 screw terminal**

|                    |               |                         |                         |
|--------------------|---------------|-------------------------|-------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4         | 0163 – 401 03 – X – 003 | 0163 – 402 03 – X – 007 |
|                    | G 1/8         | 0163 – 401 28 – X – 601 | 0163 – 402 28 – X – 602 |
|                    | M 10x1 cyl.   | 0163 – 401 13 – X – 001 | 0163 – 402 13 – X – 002 |
|                    | M 10x1 con.   | 0163 – 401 01 – X – 001 | 0163 – 402 01 – X – 005 |
|                    | M 12x1.5 cyl. | 0163 – 401 02 – X – 002 | 0163 – 402 02 – X – 006 |
|                    | NPT 1/8       | 0163 – 401 04 – X – 004 | 0163 – 402 04 – X – 008 |
| 0.5 – 3 (±0.3) bar | G 1/4         | 0163 – 421 03 – X – 070 | 0163 – 422 03 – X – 070 |
|                    | G 1/8         | 0163 – 421 28 – X – 070 | 0163 – 422 28 – X – 070 |
|                    | M 10x1 cyl.   | 0163 – 421 13 – X – 070 | 0163 – 422 13 – X – 070 |
|                    | M 10x1 con.   | 0163 – 421 01 – X – 070 | 0163 – 422 01 – X – 070 |
|                    | M 12x1.5 cyl. | 0163 – 421 02 – X – 070 | 0163 – 422 02 – X – 070 |
|                    | NPT 1/8       | 0163 – 421 04 – X – 070 | 0163 – 422 04 – X – 070 |
| 1 – 10 (±0.5) bar  | G 1/4         | 0163 – 405 03 – X – 019 | 0163 – 406 03 – X – 023 |
|                    | G 1/8         | 0163 – 405 28 – X – 605 | 0163 – 406 28 – X – 606 |
|                    | M 10x1 cyl.   | 0163 – 405 13 – X – 005 | 0163 – 406 13 – X – 006 |
|                    | M 10x1 con.   | 0163 – 405 01 – X – 017 | 0163 – 406 01 – X – 021 |
|                    | M 12x1.5 cyl. | 0163 – 405 02 – X – 018 | 0163 – 406 02 – X – 022 |
|                    | NPT 1/8       | 0163 – 405 04 – X – 020 | 0163 – 406 04 – X – 024 |
| 10 – 20 (±1) bar   | G 1/4         | 0163 – 409 03 – X – 035 | 0163 – 410 03 – X – 039 |
|                    | G 1/8         | 0163 – 409 28 – X – 609 | 0163 – 410 28 – X – 610 |
|                    | M 10x1 cyl.   | 0163 – 409 13 – X – 009 | 0163 – 410 13 – X – 010 |
|                    | M 10x1 con.   | 0163 – 409 01 – X – 033 | 0163 – 410 01 – X – 037 |
|                    | M 12x1.5 cyl. | 0163 – 409 02 – X – 034 | 0163 – 410 02 – X – 038 |
|                    | NPT 1/8       | 0163 – 409 04 – X – 036 | 0163 – 410 04 – X – 040 |
| 20 – 50 (±2) bar   | G 1/4         | 0163 – 413 03 – X – 051 | 0163 – 414 03 – X – 055 |
|                    | G 1/8         | 0163 – 413 28 – X – 613 | 0163 – 414 28 – X – 614 |
|                    | M 10x1 cyl.   | 0163 – 413 13 – X – 013 | 0163 – 414 13 – X – 014 |
|                    | M 10x1 con.   | 0163 – 413 01 – X – 049 | 0163 – 414 01 – X – 053 |
|                    | M 12x1.5 cyl. | 0163 – 413 02 – X – 050 | 0163 – 414 02 – X – 054 |
|                    | NPT 1/8       | 0163 – 413 04 – X – 052 | 0163 – 414 04 – X – 056 |

**Seal material – Application areas**

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

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



**Your order number:**

**0163 – XXX XX – X – XXX**

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

# 0163

## Diaphragm pressure switches up to 42 V with spade terminal

- Made of zinc-plated steel (CrVI-free)
- Spade terminal
- Overpressure safety up to 600 bar<sup>1)</sup>

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|
|---------------------------------------------------|----------------|-------------------------|------------------------|

### 0163 Diaphragm pressure switches with spade terminal

|                    |               |                         |                         |
|--------------------|---------------|-------------------------|-------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4         | 0163 – 403 03 – X – 011 | 0163 – 404 03 – X – 015 |
|                    | G 1/8         | 0163 – 403 28 – X – 603 | 0163 – 404 28 – X – 604 |
|                    | M 10x1 cyl.   | 0163 – 403 13 – X – 003 | 0163 – 404 13 – X – 004 |
|                    | M 10x1 con.   | 0163 – 403 01 – X – 009 | 0163 – 404 01 – X – 013 |
|                    | M 12x1.5 cyl. | 0163 – 403 02 – X – 010 | 0163 – 404 02 – X – 014 |
|                    | NPT 1/8       | 0163 – 403 04 – X – 012 | 0163 – 404 04 – X – 016 |
| 0.5 – 3 (±0.3) bar | G 1/4         | 0163 – 423 03 – X – 070 | 0163 – 424 03 – X – 070 |
|                    | G 1/8         | 0163 – 423 28 – X – 070 | 0163 – 424 28 – X – 070 |
|                    | M 10x1 cyl.   | 0163 – 423 13 – X – 070 | 0163 – 424 13 – X – 070 |
|                    | M 10x1 con.   | 0163 – 423 01 – X – 070 | 0163 – 424 01 – X – 070 |
|                    | M 12x1.5 cyl. | 0163 – 423 02 – X – 070 | 0163 – 424 02 – X – 070 |
|                    | NPT 1/8       | 0163 – 423 04 – X – 070 | 0163 – 424 04 – X – 070 |
| 1 – 10 (±0.5) bar  | G 1/4         | 0163 – 407 03 – X – 027 | 0163 – 408 03 – X – 031 |
|                    | G 1/8         | 0163 – 407 28 – X – 607 | 0163 – 408 28 – X – 608 |
|                    | M 10x1 cyl.   | 0163 – 407 13 – X – 007 | 0163 – 408 13 – X – 008 |
|                    | M 10x1 con.   | 0163 – 407 01 – X – 025 | 0163 – 408 01 – X – 029 |
|                    | M 12x1.5 cyl. | 0163 – 407 02 – X – 026 | 0163 – 408 02 – X – 030 |
|                    | NPT 1/8       | 0163 – 407 04 – X – 028 | 0163 – 408 04 – X – 032 |
| 10 – 20 (±1) bar   | G 1/4         | 0163 – 411 03 – X – 043 | 0163 – 412 03 – X – 047 |
|                    | G 1/8         | 0163 – 411 28 – X – 611 | 0163 – 412 28 – X – 612 |
|                    | M 10x1 cyl.   | 0163 – 411 13 – X – 011 | 0163 – 412 13 – X – 012 |
|                    | M 10x1 con.   | 0163 – 411 01 – X – 041 | 0163 – 412 01 – X – 045 |
|                    | M 12x1.5 cyl. | 0163 – 411 02 – X – 042 | 0163 – 412 02 – X – 046 |
|                    | NPT 1/8       | 0163 – 411 04 – X – 044 | 0163 – 412 04 – X – 048 |
| 20 – 50 (±2) bar   | G 1/4         | 0163 – 415 03 – X – 059 | 0163 – 416 03 – X – 063 |
|                    | G 1/8         | 0163 – 415 28 – X – 615 | 0163 – 416 28 – X – 616 |
|                    | M 10x1 cyl.   | 0163 – 415 13 – X – 015 | 0163 – 416 13 – X – 016 |
|                    | M 10x1 con.   | 0163 – 415 01 – X – 057 | 0163 – 416 01 – X – 061 |
|                    | M 12x1.5 cyl. | 0163 – 415 02 – X – 058 | 0163 – 416 02 – X – 062 |
|                    | NPT 1/8       | 0163 – 415 04 – X – 060 | 0163 – 416 04 – X – 064 |

### 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 |
| 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

# M.3

hex 24



M



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

M.3

hex 24



0166

Diaphragm pressure switches up to 42 V with M3 screw terminal

- Made of zinc-plated steel (CrVI-free)
- M3 screw terminal
- Overpressure safety up to 300 bar<sup>1)</sup>

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC →  : |
|---------------------------------------------------|----------------|-------------------------|-------------------------|
|---------------------------------------------------|----------------|-------------------------|-------------------------|

**0166 Diaphragm pressure switches with M3 screw terminal**

|                    |               |                         |                         |
|--------------------|---------------|-------------------------|-------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4         | 0166 – 401 03 – X – 003 | 0166 – 402 03 – X – 007 |
|                    | G 1/8         | 0166 – 401 28 – X – 601 | 0166 – 402 28 – X – 602 |
|                    | M 10x1 cyl.   | 0166 – 401 13 – X – 001 | 0166 – 402 13 – X – 002 |
|                    | M 10x1 con.   | 0166 – 401 01 – X – 001 | 0166 – 402 01 – X – 005 |
|                    | M 12x1.5 cyl. | 0166 – 401 02 – X – 002 | 0166 – 402 02 – X – 006 |
|                    | NPT 1/8       | 0166 – 401 04 – X – 004 | 0166 – 402 04 – X – 008 |
| 0.5 – 3 (±0.3) bar | G 1/4         | 0166 – 421 03 – X – 070 | 0166 – 422 03 – X – 070 |
|                    | G 1/8         | 0166 – 421 28 – X – 070 | 0166 – 422 28 – X – 070 |
|                    | M 10x1 cyl.   | 0166 – 421 13 – X – 070 | 0166 – 422 13 – X – 070 |
|                    | M 10x1 con.   | 0166 – 421 01 – X – 070 | 0166 – 422 01 – X – 070 |
|                    | M 12x1.5 cyl. | 0166 – 421 02 – X – 070 | 0166 – 422 02 – X – 070 |
|                    | NPT 1/8       | 0166 – 421 04 – X – 070 | 0166 – 422 04 – X – 070 |
| 1 – 10 (±0.5) bar  | G 1/4         | 0166 – 405 03 – X – 019 | 0166 – 406 03 – X – 023 |
|                    | G 1/8         | 0166 – 405 28 – X – 605 | 0166 – 406 28 – X – 606 |
|                    | M 10x1 cyl.   | 0166 – 405 13 – X – 005 | 0166 – 406 13 – X – 006 |
|                    | M 10x1 con.   | 0166 – 405 01 – X – 017 | 0166 – 406 01 – X – 021 |
|                    | M 12x1.5 cyl. | 0166 – 405 02 – X – 018 | 0166 – 406 02 – X – 022 |
|                    | NPT 1/8       | 0166 – 405 04 – X – 020 | 0166 – 406 04 – X – 024 |
| 10 – 20 (±1) bar   | G 1/4         | 0166 – 409 03 – X – 035 | 0166 – 410 03 – X – 039 |
|                    | G 1/8         | 0166 – 409 28 – X – 609 | 0166 – 410 28 – X – 610 |
|                    | M 10x1 cyl.   | 0166 – 409 13 – X – 009 | 0166 – 410 13 – X – 010 |
|                    | M 10x1 con.   | 0166 – 409 01 – X – 033 | 0166 – 410 01 – X – 037 |
|                    | M 12x1.5 cyl. | 0166 – 409 02 – X – 034 | 0166 – 410 02 – X – 038 |
|                    | NPT 1/8       | 0166 – 409 04 – X – 036 | 0166 – 410 04 – X – 040 |
| 20 – 50 (±2) bar   | G 1/4         | 0166 – 413 03 – X – 051 | 0166 – 414 03 – X – 055 |
|                    | G 1/8         | 0166 – 413 28 – X – 613 | 0166 – 414 28 – X – 614 |
|                    | M 10x1 cyl.   | 0166 – 413 13 – X – 013 | 0166 – 414 13 – X – 014 |
|                    | M 10x1 con.   | 0166 – 413 01 – X – 049 | 0166 – 414 01 – X – 053 |
|                    | M 12x1.5 cyl. | 0166 – 413 02 – X – 050 | 0166 – 414 02 – X – 054 |
|                    | NPT 1/8       | 0166 – 413 04 – X – 052 | 0166 – 414 04 – X – 056 |

**Seal material – Application areas**

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

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



**Your order number:**

**0166 – XXX XX – X – XXX**

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

# 0166

## Diaphragm pressure switches up to 42 V with spade terminal

- Made of zinc-plated steel (CrVI-free)
- Spade terminal
- Overpressure safety up to 300 bar<sup>1)</sup>

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|
|---------------------------------------------------|----------------|-------------------------|------------------------|

### 0166 Diaphragm pressure switches with spade terminal

|                    |               |                         |                         |
|--------------------|---------------|-------------------------|-------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4         | 0166 – 403 03 – X – 011 | 0166 – 404 03 – X – 015 |
|                    | G 1/8         | 0166 – 403 28 – X – 603 | 0166 – 404 28 – X – 604 |
|                    | M 10x1 cyl.   | 0166 – 403 13 – X – 003 | 0166 – 404 13 – X – 004 |
|                    | M 10x1 con.   | 0166 – 403 01 – X – 009 | 0166 – 404 01 – X – 013 |
|                    | M 12x1.5 cyl. | 0166 – 403 02 – X – 010 | 0166 – 404 02 – X – 014 |
|                    | NPT 1/8       | 0166 – 403 04 – X – 012 | 0166 – 404 04 – X – 016 |
| 0.5 – 3 (±0.3) bar | G 1/4         | 0166 – 423 03 – X – 070 | 0166 – 424 03 – X – 070 |
|                    | G 1/8         | 0166 – 423 28 – X – 070 | 0166 – 424 28 – X – 070 |
|                    | M 10x1 cyl.   | 0166 – 423 13 – X – 070 | 0166 – 424 13 – X – 070 |
|                    | M 10x1 con.   | 0166 – 423 01 – X – 070 | 0166 – 424 01 – X – 070 |
|                    | M 12x1.5 cyl. | 0166 – 423 02 – X – 070 | 0166 – 424 02 – X – 070 |
|                    | NPT 1/8       | 0166 – 423 04 – X – 070 | 0166 – 424 04 – X – 070 |
| 1 – 10 (±0.5) bar  | G 1/4         | 0166 – 407 03 – X – 027 | 0166 – 408 03 – X – 031 |
|                    | G 1/8         | 0166 – 407 28 – X – 607 | 0166 – 408 28 – X – 608 |
|                    | M 10x1 cyl.   | 0166 – 407 13 – X – 007 | 0166 – 408 13 – X – 008 |
|                    | M 10x1 con.   | 0166 – 407 01 – X – 025 | 0166 – 408 01 – X – 029 |
|                    | M 12x1.5 cyl. | 0166 – 407 02 – X – 026 | 0166 – 408 02 – X – 030 |
|                    | NPT 1/8       | 0166 – 407 04 – X – 028 | 0166 – 408 04 – X – 032 |
| 10 – 20 (±1) bar   | G 1/4         | 0166 – 411 03 – X – 043 | 0166 – 412 03 – X – 047 |
|                    | G 1/8         | 0166 – 411 28 – X – 611 | 0166 – 412 28 – X – 612 |
|                    | M 10x1 cyl.   | 0166 – 411 13 – X – 011 | 0166 – 412 13 – X – 012 |
|                    | M 10x1 con.   | 0166 – 411 01 – X – 041 | 0166 – 412 01 – X – 045 |
|                    | M 12x1.5 cyl. | 0166 – 411 02 – X – 042 | 0166 – 412 02 – X – 046 |
|                    | NPT 1/8       | 0166 – 411 04 – X – 044 | 0166 – 412 04 – X – 048 |
| 20 – 50 (±2) bar   | G 1/4         | 0166 – 415 03 – X – 059 | 0166 – 416 03 – X – 063 |
|                    | G 1/8         | 0166 – 415 28 – X – 615 | 0166 – 416 28 – X – 616 |
|                    | M 10x1 cyl.   | 0166 – 415 13 – X – 015 | 0166 – 416 13 – X – 016 |
|                    | M 10x1 con.   | 0166 – 415 01 – X – 057 | 0166 – 416 01 – X – 061 |
|                    | M 12x1.5 cyl. | 0166 – 415 02 – X – 058 | 0166 – 416 02 – X – 062 |
|                    | NPT 1/8       | 0166 – 415 04 – X – 060 | 0166 – 416 04 – X – 064 |

### 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 |
| 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:

0166 – XXX XX – X – XXX

# M.3

hex 24



*suco*

M



<sup>1)</sup> 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 300 bar<sup>1)</sup>
- With female thread for compression-type fitting to DIN 2353

| Adjustment range<br>tolerance at room temperature | Female<br>thread | Order number<br>NO → : | Order number<br>NC → : |
|---------------------------------------------------|------------------|------------------------|------------------------|
|---------------------------------------------------|------------------|------------------------|------------------------|

## 0168 Diaphragm pressure switches with M3 screw terminal

|                    |                                |                                |                                |
|--------------------|--------------------------------|--------------------------------|--------------------------------|
| 0.1 – 1 (±0.2) bar | M 12x1.5<br>female<br>DIN 2353 | 0168 – 401 16 – <b>X</b> – 001 | 0168 – 402 16 – <b>X</b> – 002 |
| 0.5 – 3 (±0.3) bar |                                | 0168 – 421 16 – <b>X</b> – 070 | 0168 – 422 16 – <b>X</b> – 070 |
| 1 – 10 (±0.5) bar  |                                | 0168 – 405 16 – <b>X</b> – 005 | 0168 – 406 16 – <b>X</b> – 006 |
| 10 – 20 (±1) bar   |                                | 0168 – 409 16 – <b>X</b> – 009 | 0168 – 410 16 – <b>X</b> – 010 |
| 20 – 50 (±2) bar   |                                | 0168 – 413 16 – <b>X</b> – 013 | 0168 – 414 16 – <b>X</b> – 014 |

## 0168 Diaphragm pressure switches with spade terminal

|                    |                                |                                |                                |
|--------------------|--------------------------------|--------------------------------|--------------------------------|
| 0.1 – 1 (±0.2) bar | M 12x1.5<br>female<br>DIN 2353 | 0168 – 403 16 – <b>X</b> – 003 | 0168 – 404 16 – <b>X</b> – 004 |
| 0.5 – 3 (±0.3) bar |                                | 0168 – 423 16 – <b>X</b> – 070 | 0168 – 424 16 – <b>X</b> – 070 |
| 1 – 10 (±0.5) bar  |                                | 0168 – 407 16 – <b>X</b> – 007 | 0168 – 408 16 – <b>X</b> – 008 |
| 10 – 20 (±1) bar   |                                | 0168 – 411 16 – <b>X</b> – 011 | 0168 – 412 16 – <b>X</b> – 012 |
| 20 – 50 (±2) bar   |                                | 0168 – 415 16 – <b>X</b> – 015 | 0168 – 416 16 – <b>X</b> – 016 |

## Seal material – Application areas

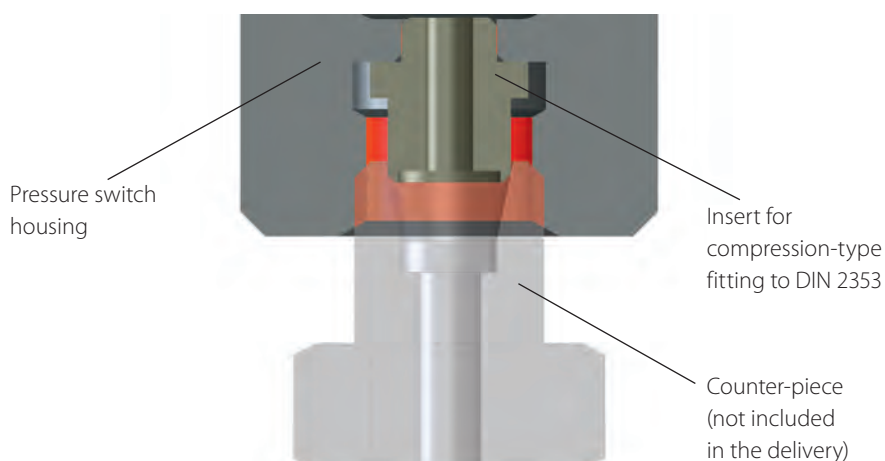
|             |                                                         |          |
|-------------|---------------------------------------------------------|----------|
| <b>NBR</b>  | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | <b>1</b> |
| <b>EPDM</b> | Brake fluid, hydrogen, oxygen,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

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

**Your order number:**

**0168 – XXX XX – **X** – XXX**

## Seal type 0168 Insert with counter-piece



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

# 0169

## Piston pressure switches up to 42 V

- Made of zinc-plated steel (CrVI-free)
- Spade or M3 screw terminal
- Overpressure safety up to 600 bar<sup>1)</sup>

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|
|---------------------------------------------------|----------------|-------------------------|------------------------|

### 0169 Piston pressure switches with M3 screw terminal

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

### 0169 Piston pressure switches with spade terminal

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

### Seal material – Application areas

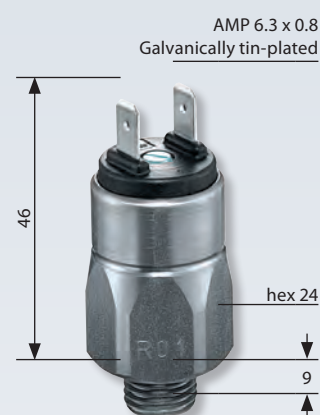
|      |                                                         |   |
|------|---------------------------------------------------------|---|
| NBR  | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | 1 |
| EPDM | Brake fluid, hydrogen, oxygen, acetylene, etc.          | 2 |
| FKM  | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc. | 3 |
| 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: 0169 – XXX XX – X – XXX

M.3

hex 24



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

M.3

hex 24



0164

Diaphragm pressure switches up to 42 V with stainless steel housing

- Stainless steel housing (1.4305 / AISI 303)
- Spade or M3 screw terminal
- Overpressure safety up to 600 bar<sup>1)</sup>  
(EPDM-W270 and silicone diaphragm up to 35 bar<sup>2)</sup>)

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO → : | Order number<br>NC → : |
|---------------------------------------------------|----------------|------------------------|------------------------|
|---------------------------------------------------|----------------|------------------------|------------------------|

**0164 Diaphragm pressure switches with M3 screw terminal**

|                    |         |                                |                                |
|--------------------|---------|--------------------------------|--------------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4-E | 0164 – 401 41 – <b>X</b> – 001 | 0164 – 402 41 – <b>X</b> – 002 |
|                    | R 1/8   | 0164 – 401 12 – <b>X</b> – 001 | 0164 – 402 12 – <b>X</b> – 002 |
|                    | R 1/4   | 0164 – 401 46 – <b>X</b> – 001 | 0164 – 402 46 – <b>X</b> – 002 |
| 0.5 – 3 (±0.3) bar | G 1/4-E | 0164 – 421 41 – <b>X</b> – 070 | 0164 – 422 41 – <b>X</b> – 070 |
|                    | R 1/8   | 0164 – 421 12 – <b>X</b> – 070 | 0164 – 422 12 – <b>X</b> – 070 |
|                    | R 1/4   | 0164 – 421 46 – <b>X</b> – 070 | 0164 – 422 46 – <b>X</b> – 070 |
| 1 – 10 (±0.5) bar  | G 1/4-E | 0164 – 405 41 – <b>X</b> – 005 | 0164 – 406 41 – <b>X</b> – 006 |
|                    | R 1/8   | 0164 – 405 12 – <b>X</b> – 005 | 0164 – 406 12 – <b>X</b> – 006 |
|                    | R 1/4   | 0164 – 405 46 – <b>X</b> – 005 | 0164 – 406 46 – <b>X</b> – 006 |
| 10 – 20 (±1) bar   | G 1/4-E | 0164 – 409 41 – <b>X</b> – 009 | 0164 – 410 41 – <b>X</b> – 010 |
|                    | R 1/8   | 0164 – 409 12 – <b>X</b> – 009 | 0164 – 410 12 – <b>X</b> – 010 |
|                    | R 1/4   | 0164 – 409 46 – <b>X</b> – 009 | 0164 – 410 46 – <b>X</b> – 010 |
| 20 – 50 (±2) bar   | G 1/4-E | 0164 – 413 41 – <b>X</b> – 013 | 0164 – 414 41 – <b>X</b> – 014 |
|                    | R 1/8   | 0164 – 413 12 – <b>X</b> – 013 | 0164 – 414 12 – <b>X</b> – 014 |
|                    | R 1/4   | 0164 – 413 46 – <b>X</b> – 013 | 0164 – 414 46 – <b>X</b> – 014 |

**Seal material – Application areas**

|                  |                                                           |          |
|------------------|-----------------------------------------------------------|----------|
| <b>NBR</b>       | Hydraulic/machine oil, heating oil, air, nitrogen, etc.   | <b>1</b> |
| <b>EPDM</b>      | Water, Brake fluid, hydrogen, oxygen, acetylene, etc.     | <b>2</b> |
| <b>EPDM-W270</b> | Drinking water ( $p_{\max} \leq 35$ bar)                  | <b>5</b> |
| <b>FKM</b>       | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.   | <b>3</b> |
| <b>Silicone</b>  | Water, food products, air, etc. ( $p_{\max} \leq 35$ bar) | <b>8</b> |
| <b>HNBR</b>      | Hydraulic/machine oil, ester-based bio-oils               | <b>9</b> |

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



**Your order number:** 0164 – XXX XX – **X** – XXX

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

<sup>2)</sup> Overpressure safety of pressure switch up to 600 bar. Functional reliability only up to 35 bar with diaphragm materials EPDM-W270 and silicone.

# 0164

Diaphragm pressure switches up to 42 V with stainless steel housing

- Stainless steel housing (1.4305 / AISI 303)
- Spade or M3 screw terminal
- Overpressure safety up to 600 bar<sup>1)</sup>  
(EPDM-W270 and silicone diaphragm up to 35 bar<sup>2)</sup>)

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|
|---------------------------------------------------|----------------|-------------------------|------------------------|

## 0164 Diaphragm pressure switches with spade terminal

|                    |         |                                |                                |
|--------------------|---------|--------------------------------|--------------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4-E | 0164 – 403 41 – <b>X</b> – 003 | 0164 – 404 41 – <b>X</b> – 004 |
|                    | R 1/8   | 0164 – 403 12 – <b>X</b> – 003 | 0164 – 404 12 – <b>X</b> – 004 |
|                    | R 1/4   | 0164 – 403 46 – <b>X</b> – 003 | 0164 – 404 46 – <b>X</b> – 004 |
| 0.5 – 3 (±0.3) bar | G 1/4-E | 0164 – 423 41 – <b>X</b> – 070 | 0164 – 424 41 – <b>X</b> – 070 |
|                    | R 1/8   | 0164 – 423 12 – <b>X</b> – 070 | 0164 – 424 12 – <b>X</b> – 070 |
|                    | R 1/4   | 0164 – 423 46 – <b>X</b> – 070 | 0164 – 424 46 – <b>X</b> – 070 |
| 1 – 10 (±0.5) bar  | G 1/4-E | 0164 – 407 41 – <b>X</b> – 007 | 0164 – 408 41 – <b>X</b> – 008 |
|                    | R 1/8   | 0164 – 407 12 – <b>X</b> – 007 | 0164 – 408 12 – <b>X</b> – 008 |
|                    | R 1/4   | 0164 – 407 46 – <b>X</b> – 007 | 0164 – 408 46 – <b>X</b> – 008 |
| 10 – 20 (±1) bar   | G 1/4-E | 0164 – 411 41 – <b>X</b> – 011 | 0164 – 412 41 – <b>X</b> – 012 |
|                    | R 1/8   | 0164 – 411 12 – <b>X</b> – 011 | 0164 – 412 12 – <b>X</b> – 012 |
|                    | R 1/4   | 0164 – 411 46 – <b>X</b> – 011 | 0164 – 412 46 – <b>X</b> – 012 |
| 20 – 50 (±2) bar   | G 1/4-E | 0164 – 415 41 – <b>X</b> – 015 | 0164 – 416 41 – <b>X</b> – 016 |
|                    | R 1/8   | 0164 – 415 12 – <b>X</b> – 015 | 0164 – 416 12 – <b>X</b> – 016 |
|                    | R 1/4   | 0164 – 415 46 – <b>X</b> – 015 | 0164 – 416 46 – <b>X</b> – 016 |

## Seal material – Application areas

|           |                                                           |   |
|-----------|-----------------------------------------------------------|---|
| NBR       | Hydraulic/machine oil, heating oil, air, nitrogen, etc.   | 1 |
| EPDM      | Water, Brake fluid, hydrogen, oxygen, acetylene, etc.     | 2 |
| EPDM-W270 | Drinking water ( $p_{\max} \leq 35$ bar)                  | 5 |
| FKM       | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.   | 3 |
| Silicone  | 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.

Your order number:

0164 – XXX XX – **X** – XXX

# M.3

hex 24



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

<sup>2)</sup> Overpressure safety of pressure switch up to 600 bar. Functional reliability only up to 35 bar with diaphragm materials EPDM-W270 and silicone.



M.3

hex 24



0167

Diaphragm pressure switches up to 42 V with brass housing

- Brass housing
- M3 screw terminal
- Overpressure safety up to 35 bar<sup>1)</sup>

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC →  : |
|---------------------------------------------------|----------------|-------------------------|-------------------------|
|---------------------------------------------------|----------------|-------------------------|-------------------------|

**0167 Diaphragm pressure switches with M3 screw terminal**

|                    |             |                         |                         |
|--------------------|-------------|-------------------------|-------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4       | 0167 – 401 03 – X – 037 | 0167 – 402 03 – X – 038 |
|                    | G 1/8       | 0167 – 401 28 – X – 001 | 0167 – 402 28 – X – 002 |
|                    | R 1/8       | 0167 – 401 12 – X – 002 | 0167 – 402 12 – X – 005 |
|                    | R 1/2       | 0167 – 401 07 – X – 003 | 0167 – 402 07 – X – 006 |
|                    | M 10x1 con. | 0167 – 401 01 – X – 001 | 0167 – 402 01 – X – 004 |
|                    | NPT 1/8     | 0167 – 401 04 – X – 004 | 0167 – 402 04 – X – 008 |
| 0.5 – 3 (±0.3) bar | G 1/4       | 0167 – 421 03 – X – 070 | 0167 – 422 03 – X – 070 |
|                    | G 1/8       | 0167 – 421 28 – X – 070 | 0167 – 422 28 – X – 070 |
|                    | R 1/8       | 0167 – 421 12 – X – 070 | 0167 – 422 12 – X – 070 |
|                    | R 1/2       | 0167 – 421 07 – X – 070 | 0167 – 422 07 – X – 070 |
|                    | M 10x1 con. | 0167 – 421 01 – X – 070 | 0167 – 422 01 – X – 070 |
|                    | NPT 1/8     | 0167 – 421 04 – X – 070 | 0167 – 422 04 – X – 070 |
| 1 – 10 (±0.5) bar  | G 1/4       | 0167 – 405 03 – X – 041 | 0167 – 406 03 – X – 042 |
|                    | G 1/8       | 0167 – 405 28 – X – 005 | 0167 – 406 28 – X – 006 |
|                    | R 1/8       | 0167 – 405 12 – X – 014 | 0167 – 406 12 – X – 017 |
|                    | R 1/2       | 0167 – 405 07 – X – 015 | 0167 – 406 07 – X – 018 |
|                    | M 10x1 con. | 0167 – 405 01 – X – 013 | 0167 – 406 01 – X – 016 |
|                    | NPT 1/8     | 0167 – 405 04 – X – 020 | 0167 – 406 04 – X – 024 |
| 10 – 20 (±1) bar   | G 1/4       | 0167 – 409 03 – X – 045 | 0167 – 410 03 – X – 046 |
|                    | G 1/8       | 0167 – 409 28 – X – 009 | 0167 – 410 28 – X – 010 |
|                    | R 1/8       | 0167 – 409 12 – X – 026 | 0167 – 410 12 – X – 029 |
|                    | R 1/2       | 0167 – 409 07 – X – 027 | 0167 – 410 07 – X – 030 |
|                    | M 10x1 con. | 0167 – 409 01 – X – 025 | 0167 – 410 01 – X – 028 |
|                    | NPT 1/8     | 0167 – 409 04 – X – 036 | 0167 – 410 04 – X – 040 |

**Seal material – Application areas**

|           |                                                         |   |
|-----------|---------------------------------------------------------|---|
| NBR       | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | 1 |
| EPDM      | Water, Brake fluid, hydrogen, oxygen, acetylene, etc.   | 2 |
| EPDM-W270 | Drinking water                                          | 5 |
| FKM       | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc. | 5 |
| Silicone  | Water, food products, air, etc.                         | 8 |

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



**Your order number:**

**0167 – XXX XX – X – XXX**

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

- Brass housing
- Spade terminal
- Overpressure safety up to 35 bar<sup>1)</sup>

| Adjustment range<br>tolerance at room temperature | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|---------------------------------------------------|----------------|-------------------------|------------------------|
|---------------------------------------------------|----------------|-------------------------|------------------------|

**0167 Diaphragm pressure switches with spade terminal**

|                    |             |                         |                         |
|--------------------|-------------|-------------------------|-------------------------|
| 0.1 – 1 (±0.2) bar | G 1/4       | 0167 – 403 03 – X – 039 | 0167 – 404 03 – X – 040 |
|                    | G 1/8       | 0167 – 403 28 – X – 003 | 0167 – 404 28 – X – 004 |
|                    | R 1/8       | 0167 – 403 12 – X – 008 | 0167 – 404 12 – X – 011 |
|                    | R 1/2       | 0167 – 403 07 – X – 009 | 0167 – 404 07 – X – 012 |
|                    | M 10x1 con. | 0167 – 403 01 – X – 007 | 0167 – 404 01 – X – 010 |
|                    | NPT 1/8     | 0167 – 403 04 – X – 012 | 0167 – 404 04 – X – 016 |
| 0.5 – 3 (±0.3) bar | G 1/4       | 0167 – 423 03 – X – 070 | 0167 – 424 03 – X – 070 |
|                    | G 1/8       | 0167 – 423 28 – X – 070 | 0167 – 424 28 – X – 070 |
|                    | R 1/8       | 0167 – 423 12 – X – 070 | 0167 – 424 12 – X – 070 |
|                    | R 1/2       | 0167 – 423 07 – X – 070 | 0167 – 424 07 – X – 070 |
|                    | M 10x1 con. | 0167 – 423 01 – X – 070 | 0167 – 424 01 – X – 070 |
|                    | NPT 1/8     | 0167 – 423 04 – X – 070 | 0167 – 424 04 – X – 070 |
| 1 – 10 (±0.5) bar  | G 1/4       | 0167 – 407 03 – X – 043 | 0167 – 408 03 – X – 044 |
|                    | G 1/8       | 0167 – 407 28 – X – 007 | 0167 – 408 28 – X – 008 |
|                    | R 1/8       | 0167 – 407 12 – X – 020 | 0167 – 408 12 – X – 023 |
|                    | R 1/2       | 0167 – 407 07 – X – 021 | 0167 – 408 07 – X – 024 |
|                    | M 10x1 con. | 0167 – 407 01 – X – 019 | 0167 – 408 01 – X – 022 |
|                    | NPT 1/8     | 0167 – 407 04 – X – 028 | 0167 – 408 04 – X – 032 |
| 10 – 20 (±1) bar   | G 1/4       | 0167 – 411 03 – X – 047 | 0167 – 412 03 – X – 048 |
|                    | G 1/8       | 0167 – 411 28 – X – 011 | 0167 – 412 28 – X – 012 |
|                    | R 1/8       | 0167 – 411 12 – X – 032 | 0167 – 412 12 – X – 035 |
|                    | R 1/2       | 0167 – 411 07 – X – 033 | 0167 – 412 07 – X – 036 |
|                    | M 10x1 con. | 0167 – 411 01 – X – 031 | 0167 – 412 01 – X – 034 |
|                    | NPT 1/8     | 0167 – 411 04 – X – 044 | 0167 – 412 04 – X – 048 |

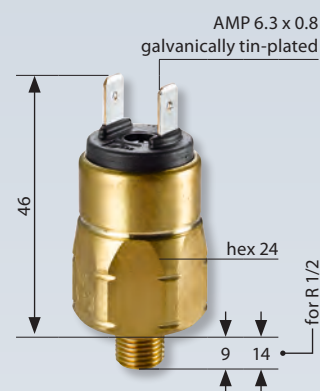
**Seal material – Application areas**

|                  |                                                         |   |
|------------------|---------------------------------------------------------|---|
| <b>NBR</b>       | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | 1 |
| <b>EPDM</b>      | Water, Brake fluid, hydrogen, oxygen, acetylene, etc.   | 2 |
| <b>EPDM-W270</b> | Drinking water                                          | 5 |
| <b>FKM</b>       | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc. | 5 |
| <b>Silicone</b>  | Water, food products, air, etc.                         | 8 |

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

**Your order number:**

**0167 – XXX XX – X – XXX**



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

## Pressure switches hex 27

Changeover with silver or gold contacts



- Switching point can be adjusted when fitted on site <sup>1)</sup>
- 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

<sup>1)</sup> 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 data

M.4

hex 27



|                                              |                                                                                                                               |                    |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Temperature resistance of sealing materials: | NBR (max. overpressure up to 100 bar)                                                                                         | -30 °C ... +100 °C |
|                                              | NBR (max. overpressure up to 300 bar)                                                                                         | -40 °C ... +100 °C |
|                                              | EPDM                                                                                                                          | -30 °C ... +120 °C |
|                                              | EPDM-W270 (in diaphragm pressure switch)                                                                                      | -20 °C ... +100 °C |
|                                              | FKM (in diaphragm pressure switch)                                                                                            | -5 °C ... +120 °C  |
|                                              | FKM (in piston pressure switch)                                                                                               | -15 °C ... +120 °C |
|                                              | Silicone (in diaphragm pressure switch)                                                                                       | -40 °C ... +120 °C |
|                                              | HNBR                                                                                                                          | -30 °C ... +120 °C |
| Switching frequency:                         | 200 / min.                                                                                                                    |                    |
| Mechanical life expectancy:                  | 1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures to max. 50 bar) |                    |
| Pressure rise rate:                          | ≤ 1 bar / ms                                                                                                                  |                    |
| Hysteresis (only adjustable at factory):     | Adjustable average value 10 ... 30 % depending on type<br>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 <sup>2</sup> ; 14 ms half sine wave;<br>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 VDC                  |      |      |      |      |      |      |      |      |      | ●    | ●    | ●    | ●    |
| 10 ... 42 VAC/DC              |      |      | ●    | ●    |      |      |      |      |      |      |      |      |      |
| 10 ... 250 VAC/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

| <b>0140 / 0141</b>                                        |                             |                              |
|-----------------------------------------------------------|-----------------------------|------------------------------|
| Rated working voltage $U_e$                               | Rated working current $I_e$ | Usage category <sup>1)</sup> |
| 250 VAC 50 / 60 Hz                                        | 2 A                         | AC 12                        |
| 24 VDC                                                    | 2 / 1 A                     | DC 12 / DC 13                |
| 50 VDC                                                    | 1 / 0.5 A                   | DC 12 / DC 13                |
| 75 VDC                                                    | 0.5 / 0.25 A                | DC 12 / DC 13                |
| 125 VDC                                                   | 0.2 / 0.1 A                 | DC 12 / DC 13                |
| 250 VDC                                                   | 0.15 / 0.1 A                | DC 12 / DC 13                |
| 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 50/60Hz              |                              |
| Nominal current of short-circuit mechanism:               | to 3.5 A                    |                              |
| Rated short-circuit current:                              | < 350 A                     |                              |
| IP class of protection according to EN60529:1991+A1:1999: | IP65 with connector         |                              |
| Tightening torque of terminal screws:                     | < 0.35 Nm                   |                              |
| Connector cross-section:                                  | 0.5 – 1.5 mm <sup>2</sup>   |                              |

| <b>0170 / 0171 / 0180 / 0181 / 0183 / 0186 / 0187 / 0190 / 0191 / 0196 / 0197</b> |                             |                              |
|-----------------------------------------------------------------------------------|-----------------------------|------------------------------|
| Rated working voltage $U_e$                                                       | Rated working current $I_e$ | Usage category <sup>1)</sup> |
| 250 VAC 50 / 60 Hz                                                                | 4 A                         | AC 12                        |
| 250 VAC 50 / 60 Hz                                                                | 1 A                         | AC 14                        |
| 24 VDC                                                                            | 4 / 2 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 $I_{the}$ :                                          | 5 A                         |                              |
| Switching overvoltage:                                                            | < 2.5 kV                    |                              |
| Rated frequency:                                                                  | DC and 50/60Hz              |                              |
| Nominal current of short-circuit mechanism:                                       | to 5 A                      |                              |
| Rated short-circuit current:                                                      | < 350 A                     |                              |
| IP-Protection class nach EN60529:1991+A1:1999:                                    | IP65 with connector         |                              |

<sup>1)</sup> For technical explanations refer to page 9

# 0140/0141

## Diaphragm / piston pressure switches 250 V

- Protection class 2, protective insulation ☐
- Zinc-plated steel (CrVI-free)
- Changeover with silver contacts
- Overpressure safety up to 300 / 600 bar<sup>1)</sup>
- Includes polyamide cap, protection class IP65

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

### 0140 Diaphragm pressure switches with screw terminals

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

### 0141 Piston pressure switches with screw terminals

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

### 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 |
| 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: 014X – XXX XX – X – XXX

M.4

hex 27



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

# M.4

hex 27



## 0170 / 0171

Diaphragm / piston pressure switches up to 42 V

- Zinc-plated steel (CrVI-free)
- Changeover with silver contacts
- Overpressure safety up to 100 / 300 / 600 bar<sup>1)</sup>
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

### 0170 Diaphragm pressure switches with spade terminal

|                   |           |       |               |                         |
|-------------------|-----------|-------|---------------|-------------------------|
| 100 <sup>1)</sup> | 0.3 – 1.5 | ± 0.2 | G 1/4         | 0170 – 457 03 – X – 003 |
|                   |           |       | M 10x1 con.   | 0170 – 457 01 – X – 001 |
|                   |           |       | M 12x1.5 cyl. | 0170 – 457 02 – X – 002 |
|                   |           |       | NPT 1/8       | 0170 – 457 04 – X – 318 |
|                   |           |       | NPT 1/4       | 0170 – 457 09 – X – 314 |
|                   |           |       | 7/16-20 UNF   | 0170 – 457 20 – X – 301 |
|                   |           |       | 9/16-18 UNF   | 0170 – 457 21 – X – 302 |

|  |        |       |               |                         |
|--|--------|-------|---------------|-------------------------|
|  | 1 – 10 | ± 0.5 | G 1/4         | 0170 – 458 03 – X – 042 |
|  |        |       | M 10x1 con.   | 0170 – 458 01 – X – 040 |
|  |        |       | M 12x1.5 cyl. | 0170 – 458 02 – X – 041 |
|  |        |       | NPT 1/8       | 0170 – 458 04 – X – 343 |
|  |        |       | NPT 1/4       | 0170 – 458 09 – X – 340 |
|  |        |       | 7/16-20 UNF   | 0170 – 458 20 – X – 341 |
|  |        |       | 9/16-18 UNF   | 0170 – 458 21 – X – 342 |

|                   |         |       |               |                         |
|-------------------|---------|-------|---------------|-------------------------|
| 300 <sup>1)</sup> | 10 – 50 | ± 3.0 | G 1/4         | 0170 – 459 03 – X – 009 |
|                   |         |       | M 10x1 con.   | 0170 – 459 01 – X – 007 |
|                   |         |       | M 12x1.5 cyl. | 0170 – 459 02 – X – 008 |
|                   |         |       | NPT 1/8       | 0170 – 459 04 – X – 320 |
|                   |         |       | NPT 1/4       | 0170 – 459 09 – X – 316 |
|                   |         |       | 7/16-20 UNF   | 0170 – 459 20 – X – 305 |
|                   |         |       | 9/16-18 UNF   | 0170 – 459 21 – X – 306 |

|  |          |             |               |                         |
|--|----------|-------------|---------------|-------------------------|
|  | 10 – 100 | ± 3.0 – 5.0 | G 1/4         | 0170 – 461 03 – X – 012 |
|  |          |             | M 10x1 con.   | 0170 – 461 01 – X – 010 |
|  |          |             | M 12x1.5 cyl. | 0170 – 461 02 – X – 011 |
|  |          |             | NPT 1/8       | 0170 – 461 04 – X – 321 |
|  |          |             | NPT 1/4       | 0170 – 461 09 – X – 317 |
|  |          |             | 7/16-20 UNF   | 0170 – 461 20 – X – 307 |
|  |          |             | 9/16-18 UNF   | 0170 – 461 21 – X – 308 |

### 0171 Piston pressure switches with spade terminal

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

### Seal material – Application areas

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

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



Your order number:

017X – XXX XX – X – XXX



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

# 0180/0181

## Diaphragm / piston pressure switches up to 250 V

- Zinc-plated steel (CrVI-free)
- Changeover with silver contacts
- Overpressure safety up to 100/300/600 bar<sup>1)</sup>
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

### 0180 Diaphragm pressure switches with spade terminal

|                   |           |             |               |                         |
|-------------------|-----------|-------------|---------------|-------------------------|
| 100 <sup>1)</sup> | 0.3 – 1.5 | ± 0.2       | G 1/4         | 0180 – 457 03 – X – 003 |
|                   |           |             | M 10x1 con.   | 0180 – 457 01 – X – 001 |
|                   |           |             | M 12x1.5 cyl. | 0180 – 457 02 – X – 002 |
|                   |           |             | NPT 1/8       | 0180 – 457 04 – X – 318 |
|                   |           |             | NPT 1/4       | 0180 – 457 09 – X – 314 |
|                   |           |             | 7/16-20 UNF   | 0180 – 457 20 – X – 301 |
|                   |           |             | 9/16-18 UNF   | 0180 – 457 21 – X – 302 |
| 300 <sup>1)</sup> | 1 – 10    | ± 0.5       | G 1/4         | 0180 – 458 03 – X – 042 |
|                   |           |             | M 10x1 con.   | 0180 – 458 01 – X – 040 |
|                   |           |             | M 12x1.5 cyl. | 0180 – 458 02 – X – 041 |
|                   |           |             | NPT 1/8       | 0180 – 458 04 – X – 343 |
|                   |           |             | NPT 1/4       | 0180 – 458 09 – X – 340 |
|                   |           |             | 7/16-20 UNF   | 0180 – 458 20 – X – 341 |
|                   |           |             | 9/16-18 UNF   | 0180 – 458 21 – X – 342 |
|                   | 10 – 50   | ± 3.0       | G 1/4         | 0180 – 459 03 – X – 009 |
|                   |           |             | M 10x1 con.   | 0180 – 459 01 – X – 007 |
|                   |           |             | M 12x1.5 cyl. | 0180 – 459 02 – X – 008 |
|                   |           |             | NPT 1/8       | 0180 – 459 04 – X – 320 |
|                   |           |             | NPT 1/4       | 0180 – 459 09 – X – 311 |
|                   |           |             | 7/16-20 UNF   | 0180 – 459 20 – X – 305 |
|                   |           |             | 9/16-18 UNF   | 0180 – 459 21 – X – 306 |
|                   | 10 – 100  | ± 3.0 – 5.0 | G 1/4         | 0180 – 461 03 – X – 012 |
|                   |           |             | M 10x1 con.   | 0180 – 461 01 – X – 010 |
|                   |           |             | M 12x1.5 cyl. | 0180 – 461 02 – X – 011 |
|                   |           |             | NPT 1/8       | 0180 – 461 04 – X – 321 |
|                   |           |             | NPT 1/4       | 0180 – 461 09 – X – 317 |
|                   |           |             | 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

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

### Seal material – Application areas

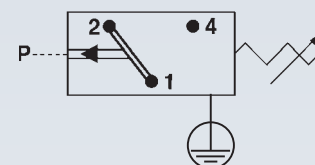
|      |                                                         |   |
|------|---------------------------------------------------------|---|
| NBR  | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | 1 |
| EPDM | Brake fluid, hydrogen, oxygen, acetylene, etc.          | 2 |
| FKM  | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc. | 3 |
| 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 XX – X – XXX

M.4

hex 27



suco

M

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

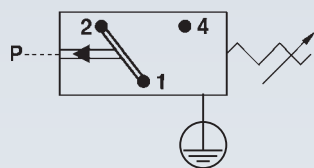




# M.4

hex 27

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



# 0183

Piston pressure switches up to 250 V

- Zinc-plated steel (CrVI-free)
- Changeover with silver contacts
- Overpressure safety up to 600 bar<sup>1)</sup>, Hysteresis adjustable at factory
- Adjustment range: 100 – 400 bar
- Height only 51 mm

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

## 0183 Piston pressure switches with spade terminal

|                   |           |        |                        |                         |
|-------------------|-----------|--------|------------------------|-------------------------|
| 600 <sup>1)</sup> | 100 – 300 | ± 10.0 | M 14x1.5<br>DIN 6149-3 | 0183 – 462 45 – X – 051 |
|                   | 200 – 400 |        |                        | 0183 – 462 45 – X – 061 |

## 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 |
| 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: 0183 – 462 45 – X – XXX

<sup>1)</sup> 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<br>M 14 x 1.5 |                 |                |
|--------------------|-----------------|----------------|
| to<br>G 1/4        | to<br>M12 x 1.5 | to<br>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 (1.4305 / AISI 303)
- Changeover with silver contacts
- Overpressure safety up to 300 / 600 bar<sup>1)</sup>  
(EPDM-W270 and silicone diaphragm up to 35 bar<sup>2)</sup>)
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

## 0186 Diaphragm pressure switches with spade terminal

|                      |          |             |       |                         |
|----------------------|----------|-------------|-------|-------------------------|
| 300 <sup>1)+2)</sup> | 0.5 – 5  | ± 0.3       | G 1/4 | 0186 – 457 03 – X – 003 |
|                      | 1 – 10   | ± 0.5       |       | 0186 – 458 03 – X – 006 |
|                      | 10 – 50  | ± 3.0       |       | 0186 – 459 03 – X – 009 |
|                      | 10 – 100 | ± 3.0 – 5.0 |       | 0186 – 461 03 – X – 012 |

## 0187 Piston pressure switch with spade terminal

|                   |          |       |       |                         |
|-------------------|----------|-------|-------|-------------------------|
| 600 <sup>1)</sup> | 50 – 200 | ± 5.0 | G 1/4 | 0187 – 460 03 – X – 003 |
|-------------------|----------|-------|-------|-------------------------|

## Seal material – Application areas

|           |                                                                                |   |
|-----------|--------------------------------------------------------------------------------|---|
| NBR       | 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 <sub>max</sub> ≤ 35 bar)                  | 5 |
| FKM       | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.                        | 3 |
| Silicone  | Water, food products, air, etc. (only in diaphragm, p <sub>max</sub> ≤ 35 bar) | 8 |
| HNBR      | Hydraulic/machine oil, ester-based bio-oils                                    | 9 |

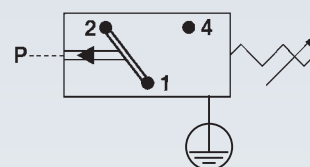
Refer to page 53 for the temperature range and application thresholds of sealing materials.

Your order number:

018X – XXX 03 – X – XXX

M.4

hex 27

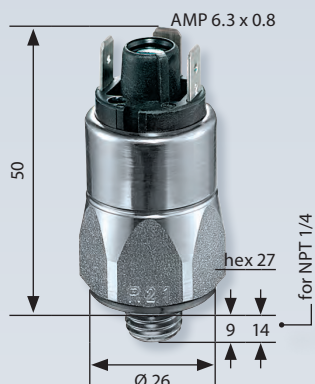


<sup>1)</sup> Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

<sup>2)</sup> Overpressure safety of diaphragm pressure switch up to 300 bar. Functional reliability only up to 35 bar with diaphragm materials EPDM-W270 and silicone.

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
- Changeover with gold contacts
- Overpressure safety up to 100/300/600 bar<sup>1)</sup>
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

### 0190 Diaphragm pressure switches with spade terminal

|                   |           |       |               |                         |
|-------------------|-----------|-------|---------------|-------------------------|
| 100 <sup>1)</sup> | 0.3 – 1.5 | ± 0.2 | G 1/4         | 0190 – 457 03 – X – 003 |
|                   |           |       | M 10x1 con.   | 0190 – 457 01 – X – 001 |
|                   |           |       | M 12x1.5 cyl. | 0190 – 457 02 – X – 002 |
|                   |           |       | NPT 1/8       | 0190 – 457 04 – X – 318 |
|                   |           |       | NPT 1/4       | 0190 – 457 09 – X – 314 |
|                   |           |       | 7/16-20 UNF   | 0190 – 457 20 – X – 301 |
|                   |           |       | 9/16-18 UNF   | 0190 – 457 21 – X – 302 |

|  |        |       |               |                         |
|--|--------|-------|---------------|-------------------------|
|  | 1 – 10 | ± 0.5 | G 1/4         | 0190 – 458 03 – X – 042 |
|  |        |       | M 10x1 con.   | 0190 – 458 01 – X – 040 |
|  |        |       | M 12x1.5 cyl. | 0190 – 458 02 – X – 041 |
|  |        |       | NPT 1/8       | 0190 – 458 04 – X – 343 |
|  |        |       | NPT 1/4       | 0190 – 458 09 – X – 340 |
|  |        |       | 7/16-20 UNF   | 0190 – 458 20 – X – 341 |
|  |        |       | 9/16-18 UNF   | 0190 – 458 21 – X – 342 |

|                   |         |       |               |                         |
|-------------------|---------|-------|---------------|-------------------------|
| 300 <sup>1)</sup> | 10 – 50 | ± 3.0 | G 1/4         | 0190 – 459 03 – X – 009 |
|                   |         |       | M 10x1 con.   | 0190 – 459 01 – X – 007 |
|                   |         |       | M 12x1.5 cyl. | 0190 – 459 02 – X – 008 |
|                   |         |       | NPT 1/8       | 0190 – 459 04 – X – 320 |
|                   |         |       | NPT 1/4       | 0190 – 459 09 – X – 316 |
|                   |         |       | 7/16-20 UNF   | 0190 – 459 20 – X – 305 |
|                   |         |       | 9/16-18 UNF   | 0190 – 459 21 – X – 306 |

|  |          |             |               |                         |
|--|----------|-------------|---------------|-------------------------|
|  | 10 – 100 | ± 3.0 – 5.0 | G 1/4         | 0190 – 461 03 – X – 012 |
|  |          |             | M 10x1 con.   | 0190 – 461 01 – X – 010 |
|  |          |             | M 12x1.5 cyl. | 0190 – 461 02 – X – 011 |
|  |          |             | NPT 1/8       | 0190 – 461 04 – X – 321 |
|  |          |             | NPT 1/4       | 0190 – 461 09 – X – 317 |
|  |          |             | 7/16-20 UNF   | 0190 – 461 20 – X – 307 |
|  |          |             | 9/16-18 UNF   | 0190 – 461 21 – X – 308 |

### 0191 Piston pressure switches with spade terminal

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

### Seal material – Application areas

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

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



Your order number:

019X – XXX XX – X – XXX

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

# 0196 / 0197

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

- Stainless steel housing (1.4305 / AISI 303)
- Fitted with changeover contact and gold contacts
- Overpressure safety up to 300 / 600 bar<sup>1)</sup>  
(EPDM-W270 and silicone diaphragm up to 35 bar<sup>2)</sup>)
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

## 0196 Diaphragm pressure switches with spade terminal

|                      |          |             |       |                         |
|----------------------|----------|-------------|-------|-------------------------|
| 300 <sup>1)+2)</sup> | 0.5 – 5  | ± 0.3       | G 1/4 | 0196 – 457 03 – X – 003 |
|                      | 1 – 10   | ± 0.5       |       | 0196 – 458 03 – X – 006 |
|                      | 10 – 50  | ± 3.0       |       | 0196 – 459 03 – X – 009 |
|                      | 10 – 100 | ± 3.0 – 5.0 |       | 0196 – 461 03 – X – 012 |

## 0197 Piston pressure switches with spade terminal

|                   |          |       |       |                         |
|-------------------|----------|-------|-------|-------------------------|
| 600 <sup>1)</sup> | 50 – 200 | ± 5.0 | G 1/4 | 0197 – 460 03 – X – 003 |
|-------------------|----------|-------|-------|-------------------------|

## Seal material – Application areas

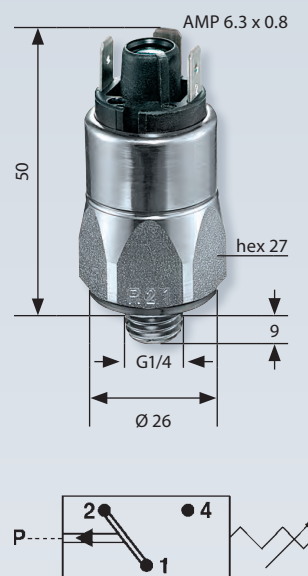
|           |                                                                                |   |
|-----------|--------------------------------------------------------------------------------|---|
| NBR       | Hydraulic/machine oil, heating oil, air, nitrogen, etc.                        | 1 |
| EPDM      | Brake fluid, hydrogen, oxygen, acetylene, etc.                                 | 2 |
| EPDM-W270 | Drinking water (only in diaphragm, p <sub>max</sub> ≤ 35 bar)                  | 5 |
| FKM       | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.                        | 3 |
| Silicone  | Water, food products, air, etc. (only in diaphragm, p <sub>max</sub> ≤ 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

M.4

hex 27



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

<sup>2)</sup> Overpressure safety of diaphragm pressure switch up to 300 bar. Functional reliability only up to 35 bar with diaphragm materials EPDM-W270 and silicone.

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

Please note our detailed information on

- CE marking
- protection class
- custom applications

in the general technical explanations on page 14, and the technical explanations on mechanical pressure switches on page 17.

### A selection from the wide variety of connectors we can supply

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

M

### 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 -40 °C ... +100 °C                                                                                                        |
|                                              | EPDM -30 °C ... +120 °C                                                                                                       |
|                                              | FKM (in diaphragm pressure switch) -5 °C ... +120 °C                                                                          |
|                                              | FKM (in piston pressure switch) -15 °C ... +120 °C                                                                            |
|                                              | Silicone -40 °C ... +120 °C                                                                                                   |
|                                              | HNBR -30 °C ... +120 °C                                                                                                       |
| Switching frequency:                         | 200 / min.                                                                                                                    |
| Mechanical life expectancy:                  | 1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures to max. 50 bar) |
| Pressure rise rate:                          | ≤ 1 bar/ms                                                                                                                    |
| Hysteresis:                                  | Average value 10 – 20 % (not adjustable)                                                                                      |
| Vibration resistance:                        | 10 g / 5 – 200 Hz sine wave, DIN EN 60068-2-6                                                                                 |
| Shock resistance:                            | 294 m/s <sup>2</sup> ; 14 ms half sine wave, DIN EN 60068-2-6                                                                 |
| Materials:                                   | Housing material: zinc-plated steel<br>Protective cap: anodised aluminium                                                     |
| Protection class:                            | IP67                                                                                                                          |
| Cable:                                       | Standard length 2 m with wire end sleeves                                                                                     |
| Weight:                                      | approx. 120 g                                                                                                                 |

### Options for 0240 / 0241

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

# 0240 / 0241

## Diaphragm / piston pressure switches, hex 27

- Zinc-plated steel (CrVI-free)
- Overpressure safety up to 300 / 600 bar <sup>1)</sup>
- Switching point can also be adjusted during use
- Protection class 2, protective insulation ☐

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Male thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|-------------|--------------|

### 0240 Diaphragm pressure switches

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

### 0241 Piston pressure switches

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

### Seal material – Application 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 |
| HNBR | Hydraulic/machine oil, ester-based bio-oils             | 9 |

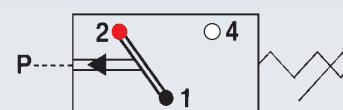
Refer to page 64 for the temperature range and application thresholds of sealing materials.

Your order number:

024X – XXX XX – X – XXX

# M.5

hex 24 / 27  
Ready-wired



### Contact assignment:

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



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

M.6

PS **PLUS** hex 24

# Pressure switches **PLUS** with integrated connector and supplementary functions

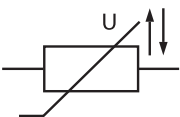
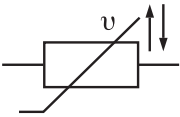
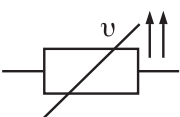
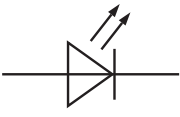
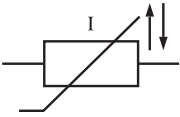
Hex 24, NC or NO, voltage up to 42 V



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

- 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. switching function does not become active until from a certain temperature)
- In-rush current limitation (overload limitation of switching contacts from too high a switch loading, e.g. lamp load, motor start-up)
- Display of the switching status with LED
- Overload protection with self-resetting electrical fuse
- High protection class to IP67 and IP6K9K
- Large selection of electrical plug-in types for quick installation and reliable connection
- Switching point can be set on site with adjusting screw in the connector<sup>1)</sup>

## Overview of possible supplementary functions

| Circuit                                                                               | Switch symbol                                                                       | Function                                                                                                                                                                                                                                                                    | Application                                                                                                                                                                                                                                                                                                                                                                                                                   | Code for order number |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Resistor</b><br>Resistor circuit to NAMUR, refer to page 68                        |    | <ul style="list-style-type: none"> <li>Diagnostic function (fail-safe) with short-circuit and cable break detection</li> </ul>                                                                                                                                              | Safety systems such as brake systems, hydrostatic steering systems and fire extinguisher systems                                                                                                                                                                                                                                                                                                                              | 04XX - R              |
| <b>Varistor</b><br>Circuit with varistor for overvoltage limitation, refer to page 69 |    | <ul style="list-style-type: none"> <li>Overvoltage protection for the prolonging of contact service life under conditions of inductive load and long connection length</li> <li>Active reduction of EMC emissions on switching of the pressure switch</li> </ul>            | The flyback voltage is effectively limited if the pressure switch interrupts the current in circuits with magnetic valves, relays or motors                                                                                                                                                                                                                                                                                   | 04XX - V              |
| <b>NTC thermistor</b>                                                                 |   | <ul style="list-style-type: none"> <li>Temperature-controlled switch behaviour (e.g. filter monitoring)</li> <li>In-rush current limitation, e.g. for motors ("soft start") and in PSUs</li> <li>On-delay (in series) and dropout delay (in parallel) for relays</li> </ul> | 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              |
| <b>PTC thermistor</b>                                                                 |  | <ul style="list-style-type: none"> <li>Protection against overcurrent</li> <li>In-rush current limitation, such as for filament lamps and condenser load</li> </ul>                                                                                                         | 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.                                                                                                                                                  | 04XX - P              |
| <b>LED</b>                                                                            |  | <ul style="list-style-type: none"> <li>Displays the switching status of the integrated LED</li> </ul>                                                                                                                                                                       | 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.                                                                                                                                                                                                                                            | 04XX - L              |
| <b>Multifuse, PPTC</b>                                                                |  | <ul style="list-style-type: none"> <li>Displays the switching status of the integrated LED</li> <li>Protection against overcurrent</li> <li>Self-resetting: After removing the short-circuit (cooling the MF) the fuse resets</li> </ul>                                    | In applications which need to be protected against overcurrent e.g. electronic applications                                                                                                                                                                                                                                                                                                                                   | 04XX - M              |

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



## M.6

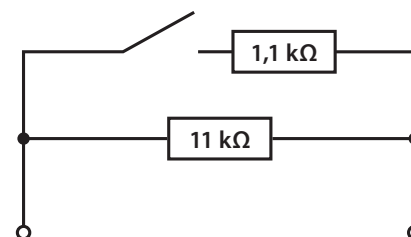
## Pressure switches *PLUS*

PS *PLUS*  
hex 24

Resistor circuit to NAMUR  
(pressure switches with part numbers 04XX-R)

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 V must be provided for NAMUR-compliant operation. A resistance of 11 k $\Omega$  is present in the circuit when the switch contact is open. The resistance is 1 k $\Omega$  when the switch contact is closed. Other resistance values can also be realised.



| Switching status | Closed | Open | Short-circuit SC | Line break LB |
|------------------|--------|------|------------------|---------------|
| <b>Contact</b>   |        |      |                  |               |
| <b>Resistor</b>  |        |      |                  |               |
| <b>Current</b>   |        |      |                  |               |

| Technical data                          |                                                                                                                                                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated working voltage $U_{cc}$ :        | 8.2 VDC ... 30 VDC                                                                                                                                                |
| Maximum rated operating current:        | $\leq 30$ mA                                                                                                                                                      |
| Switching capacity:                     | $< 1$ W                                                                                                                                                           |
| Switching frequency:                    | 200 / min.                                                                                                                                                        |
| Mechanical and electrical service life: | 1,000,000 cycles                                                                                                                                                  |
| Permitted pressure rise rate:           | $\leq 1$ bar / ms                                                                                                                                                 |
| Vibration resistance:                   | 10 g; 5 – 200 Hz sine wave; DIN EN 60068-2-6                                                                                                                      |
| Shock resistance:                       | 294 m/s <sup>2</sup> ; 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 (but only when plugged in), otherwise IP00. |

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

The switching off of 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:

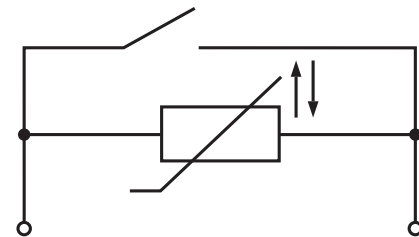
$$U_L = -L \frac{di}{dt}$$

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-peak value of the supply voltage.



| Technical data                                       |                                                                                                                                                                   |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated operating voltage U <sub>cc</sub> :            | 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 ± 10 % @ 1 mA                                                                                                                                              |
| Maximum varistor energy:                             | 0.4 J (10/1000 µs); 0.3 J (2 ms)                                                                                                                                  |
| Maximum varistor peak current:                       | 120 A (8/20 µs, one-off loading), 60 A (8/20 µs, dual loading)                                                                                                    |
| Mechanical service life:                             | 1,000,000 cycles                                                                                                                                                  |
| Permitted pressure rise rate:                        | ≤ 1 bar / ms                                                                                                                                                      |
| Vibration resistance:                                | 10 g; 5 – 200 Hz sine wave; DIN EN 60068-2-6                                                                                                                      |
| Shock resistance:                                    | 294 m/s <sup>2</sup> ; 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 (but only when plugged in), otherwise IP00. |

Diaphragm pressure switches, up to 42 V  
with supplementary functions

- Zinc-plated steel (CrVI-free)
- Overpressure safety up to 300 bar<sup>1)</sup> (footnote see next page)

### Plug-in types for diaphragm pressure switches

|                            |                         |
|----------------------------|-------------------------|
| Deutsch DT04-2P            | 0410 – XXX XX – X – 001 |
| AMP Superseal 1.5°         | 0412 – XXX XX – X – 001 |
| Packard MetriPack 280°     | 0414 – XXX XX – X – 001 |
| Deutsch DT04-3P            | 0416 – XXX XX – X – 001 |
| AMP Junior Timer°          | 0418 – XXX XX – X – 001 |
| M12x1 DIN EN 61076-2-101-1 | 0424 – XXX XX – X – 001 |

|                         |
|-------------------------|
| 0410 – XXX XX – X – 002 |
| 0412 – XXX XX – X – 002 |
| 0414 – XXX XX – X – 002 |
| 0416 – XXX XX – X – 002 |
| 0418 – XXX XX – X – 002 |
| 0424 – XXX XX – X – 002 |



| Adjustment range<br>(tolerance at room temperature) | Male thread |
|-----------------------------------------------------|-------------|
|-----------------------------------------------------|-------------|

| Order number<br>NO →  : |
|-------------------------|
|-------------------------|

| Order number<br>NC →  : |
|-------------------------|
|-------------------------|

### 04XX Diaphragm pressure switches

|                    |               |
|--------------------|---------------|
| 0.1 – 1 (±0.2) bar | G 1/4         |
|                    | G 1/8         |
|                    | M 10x1 cyl.   |
|                    | M 10x1 con.   |
|                    | M 12x1.5 cyl. |
|                    | NPT 1/8       |

|                          |
|--------------------------|
| 04XX – X 03 03 – X – 001 |
| 04XX – X 03 28 – X – 001 |
| 04XX – X 03 13 – X – 001 |
| 04XX – X 03 01 – X – 001 |
| 04XX – X 03 02 – X – 001 |
| 04XX – X 03 04 – X – 001 |

|                          |
|--------------------------|
| 04XX – X 04 03 – X – 002 |
| 04XX – X 04 28 – X – 002 |
| 04XX – X 04 13 – X – 002 |
| 04XX – X 04 01 – X – 002 |
| 04XX – X 04 02 – X – 002 |
| 04XX – X 04 04 – X – 002 |

|                    |               |
|--------------------|---------------|
| 0.5 – 3 (±0.3) bar | G 1/4         |
|                    | G 1/8         |
|                    | M 10x1 cyl.   |
|                    | M 10x1 con.   |
|                    | M 12x1.5 cyl. |
|                    | NPT 1/8       |

|                          |
|--------------------------|
| 04XX – X 23 03 – X – 001 |
| 04XX – X 23 28 – X – 001 |
| 04XX – X 23 13 – X – 001 |
| 04XX – X 23 01 – X – 001 |
| 04XX – X 23 02 – X – 001 |
| 04XX – X 23 04 – X – 001 |

|                          |
|--------------------------|
| 04XX – X 24 03 – X – 002 |
| 04XX – X 24 28 – X – 002 |
| 04XX – X 24 13 – X – 002 |
| 04XX – X 24 01 – X – 002 |
| 04XX – X 24 02 – X – 002 |
| 04XX – X 24 04 – X – 002 |

|                   |               |
|-------------------|---------------|
| 1 – 10 (±0.5) bar | G 1/4         |
|                   | G 1/8         |
|                   | M 10x1 cyl.   |
|                   | M 10x1 con.   |
|                   | M 12x1.5 cyl. |
|                   | NPT 1/8       |

|                          |
|--------------------------|
| 04XX – X 07 03 – X – 001 |
| 04XX – X 07 28 – X – 001 |
| 04XX – X 07 13 – X – 001 |
| 04XX – X 07 01 – X – 001 |
| 04XX – X 07 02 – X – 001 |
| 04XX – X 07 04 – X – 001 |

|                          |
|--------------------------|
| 04XX – X 08 03 – X – 002 |
| 04XX – X 08 28 – X – 002 |
| 04XX – X 08 13 – X – 002 |
| 04XX – X 08 01 – X – 002 |
| 04XX – X 08 02 – X – 002 |
| 04XX – X 08 04 – X – 002 |

### Supplementary functions

|                        |                        |         |
|------------------------|------------------------|---------|
| <b>Resistor</b>        | Diagnostics function   | R XX XX |
| <b>Varistor</b>        | Overvoltage protection | V XX XX |
| <b>NTC thermistor</b>  | Filter monitoring      | N XX XX |
| <b>PTC thermistor</b>  | Overcurrent protection | P XX XX |
| <b>LED</b>             | Display                | L XX XX |
| <b>Multifuse, PPTC</b> | Overcurrent protection | M XX XX |

### Seal material – Application areas

|             |                                                         |   |
|-------------|---------------------------------------------------------|---|
| <b>NBR</b>  | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | 1 |
| <b>EPDM</b> | Brake fluid, hydrogen, oxygen, acetylene, etc.          | 2 |
| <b>FKM</b>  | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc. | 3 |
| <b>HNBR</b> | 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:

04XX – XXX XX – X – 00X

# 0410 / 0412 / 0414 / 0416 / 0418 / 0424

Diaphragm pressure switches, up to 42 V  
with supplementary functions

- Zinc-plated steel (CrVI-free)
- Overpressure safety up to 300 bar<sup>1)</sup>

## 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 61076-2-101-1 | 0424 - XXX XX - X - 001 | 0424 - XXX XX - X - 002 |

| Adjustment range<br>(tolerance at room temperature) | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|-----------------------------------------------------|----------------|-------------------------|------------------------|
|-----------------------------------------------------|----------------|-------------------------|------------------------|

## 04XX Diaphragm pressure switches

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

## Supplementary functions

|                 |                        |         |
|-----------------|------------------------|---------|
| Resistor        | Diagnostics function   | R XX XX |
| Varistor        | Overvoltage protection | V XX XX |
| NTC thermistor  | Filter monitoring      | N XX XX |
| PTC thermistor  | Overcurrent protection | P XX XX |
| LED             | Display                | L XX XX |
| Multifuse, PPTC | Overcurrent protection | M XX XX |

## 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 |
| 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:

04XX - XXX XX - X - 00X

M.6

PS PLUS hex 24



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

- Zinc-plated steel (CrVI-free)
- Overpressure safety up to 600 bar<sup>1)</sup>

### 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 61076-2-101-1 | 0425 – XXX XX – X – 001 | 0425 – XXX XX – X – 002 |



|                                                     |                |                         |                        |
|-----------------------------------------------------|----------------|-------------------------|------------------------|
| Adjustment range<br>(tolerance at room temperature) | Male<br>thread | Order number<br>NO →  : | Order number<br>NC → : |
|-----------------------------------------------------|----------------|-------------------------|------------------------|

### 04XX Piston pressure switches

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

### Supplementary functions

|                 |                        |         |
|-----------------|------------------------|---------|
| Resistor        | Diagnostics function   | R XX XX |
| Varistor        | Overvoltage protection | V XX XX |
| NTC thermistor  | Filter monitoring      | N XX XX |
| PTC thermistor  | Overcurrent protection | P XX XX |
| LED             | Display                | L XX XX |
| Multifuse, PPTC | Overcurrent protection | M XX XX |

### 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 |
| 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:** 04XX – XXX XX – X – 00X

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



# PS *PLUS*

Plug-in types for diaphragm and piston pressure switches

## M.6

PS *PLUS* hex 24



### Technical data of plug-in types

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

| 0416 / 0417                | 0418 / 0419                  | 0424 / 0425                           |
|----------------------------|------------------------------|---------------------------------------|
|                            |                              |                                       |
| <b>Deutsch<br/>DT04-3P</b> | <b>AMP<br/>Junior Timer®</b> | <b>M12x1 DIN EN<br/>61076-2-101-1</b> |
| IP67, IP6K9K               | IP65, IPx4K                  | IP67                                  |
| H ≈ 63 mm                  | H ≈ 54 mm                    | H ≈ 51 mm                             |
|                            |                              |                                       |

◀ Model / type

◀ Connector

◀ Protection class

◀ Overall height

◀ Contact assignment

◀ Model / type

◀ Connector

◀ Protection class

◀ Overall height

◀ Contact assignment



M

M.7

30 A/F

# Pressure switches 30 A/F

Changeover with silver contacts



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

# Pressure switches 30 A/F

## Technical data

M.7

30 A/F



|                                              |                                                                                                                             |                                          |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Temperature resistance of sealing materials: | NBR                                                                                                                         | -40 °C ... +100 °C                       |
|                                              | EPDM                                                                                                                        | -30 °C ... +120 °C                       |
|                                              | FKM (in diaphragm pressure switch)                                                                                          | -5 °C ... +120 °C                        |
|                                              | FKM (in piston pressure switch)                                                                                             | -15 °C ... +120 °C                       |
| Switching frequency:                         | 200 / min.                                                                                                                  |                                          |
| Mechanical life expectancy:                  | 1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures up to 50 bar) |                                          |
| Pressure rise rate:                          | ≤ 1 bar / ms                                                                                                                |                                          |
| Hysteresis:                                  | Typ 0159:                                                                                                                   | approx. 10 ... 30 % (not adjustable)     |
|                                              | Typ 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 <sup>2</sup> ; 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. 240 g                            |
|                                              | Typ 0175:                                                                                                                   | approx. 310 g                            |

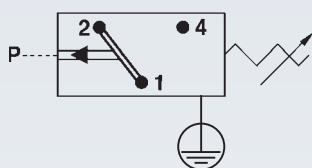
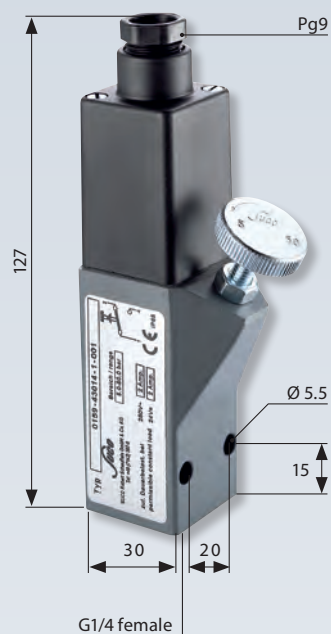
| Electrical values                                  | 0159                                 | 0161 / 0162 / 0175 |
|----------------------------------------------------|--------------------------------------|--------------------|
| Rated working voltage U <sub>e</sub>               | Rated working current I <sub>e</sub> |                    |
| 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 <sub>i</sub> :          | 300 V                                |                    |
| Rated impulse withstand voltage U <sub>imp</sub> : | 2.5 kV                               |                    |
| Conventional thermal current I <sub>the</sub> :    | 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 <sup>2</sup>            |                    |



M

M.7

30 A/F



0159

Diaphragm / piston pressure switch up to 250 V

- Aluminium housing
- Changeover with silver contacts
- Overpressure safety up to 200 / 600 bar<sup>1)</sup>
- Switching point continuously adjustable by turning knurled screw whilst system in operation

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Thread | Order number: |
|-----------------------------|----------------------------|-----------------------------------------|--------|---------------|
|-----------------------------|----------------------------|-----------------------------------------|--------|---------------|

With female thread

**0159 Diaphragm pressure switches**

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

**0159 Piston pressure switches**

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

**Seal material – Application areas**

|             |                                                         |   |
|-------------|---------------------------------------------------------|---|
| <b>NBR</b>  | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | 1 |
| <b>EPDM</b> | Brake fluid, hydrogen, oxygen, acetylene, etc.          | 2 |
| <b>FKM</b>  | 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

<sup>1)</sup> 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
- Changeover with silver contacts
- Overpressure safety up to 200 / 600 bar<sup>1)</sup>
- Socket device similar to DIN EN 175301 (DIN 43650)
- Hysteresis adjustable at factory

| P <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Dimension A<br>in mm | Order number: |
|-----------------------------|----------------------------|-----------------------------------------|----------------------|---------------|
|-----------------------------|----------------------------|-----------------------------------------|----------------------|---------------|

With female G 1/4 thread

## 0161 Diaphragm pressure switches

|                   |          |            |                         |
|-------------------|----------|------------|-------------------------|
| 200 <sup>1)</sup> | 0.5 – 1  | ±0.2       | 0161 – 436 14 – X – 001 |
|                   | 0.5 – 5  | ±0.2 – 0.5 | 0161 – 437 14 – X – 001 |
|                   | 1 – 10   | ±0.5       | 0161 – 438 14 – X – 001 |
|                   | 10 – 50  | ±3.0       | 0161 – 439 14 – X – 001 |
|                   | 50 – 100 | ±3.0 – 5.0 | 0161 – 440 14 – X – 001 |

## 0161 Piston pressure switches

|                   |           |            |                         |
|-------------------|-----------|------------|-------------------------|
| 600 <sup>1)</sup> | 100 – 400 | ±5.0 – 9.0 | 0161 – 441 14 – X – 001 |
|-------------------|-----------|------------|-------------------------|

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

## 0162 Diaphragm pressure switches

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

## 0162 Piston pressure switches

|                   |           |            |      |                         |
|-------------------|-----------|------------|------|-------------------------|
| 600 <sup>1)</sup> | 100 – 400 | ±5.0 – 9.0 | 19.5 | 0162 – 441 14 – X – 001 |
|-------------------|-----------|------------|------|-------------------------|

## 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 |

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.

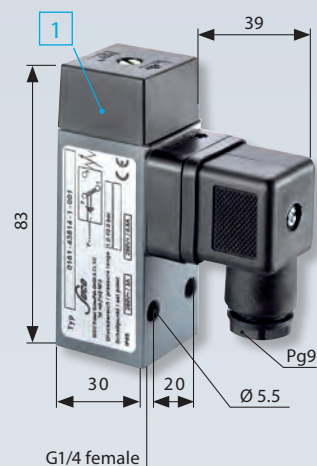
<sup>1)</sup> Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

M.7

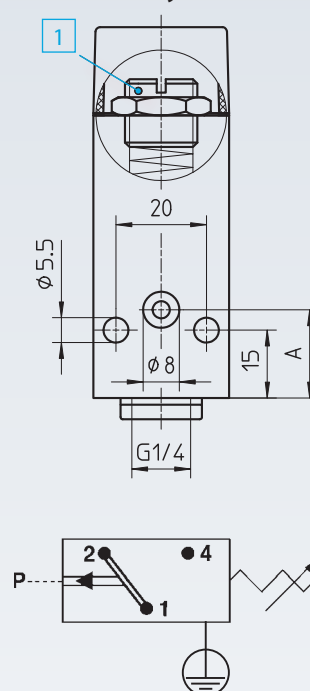
30 A/F

suco

## 0161 with female thread



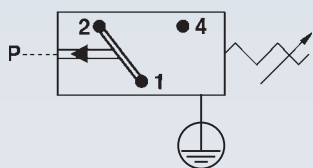
## 0162 Block style





M.7

30 A/F



0175

Diaphragm pressure switches up to 250 V

- For low pressure, high accuracy
- Aluminium housing
- Changeover with silver contacts
- Overpressure safety up to 25 bar<sup>1)</sup>
- Socket device similar to DIN EN 175301 (DIN 43650)
- Hysteresis adjustable at factory

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|--------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|--------|--------------|

With female thread

**0175** Diaphragm pressure switches

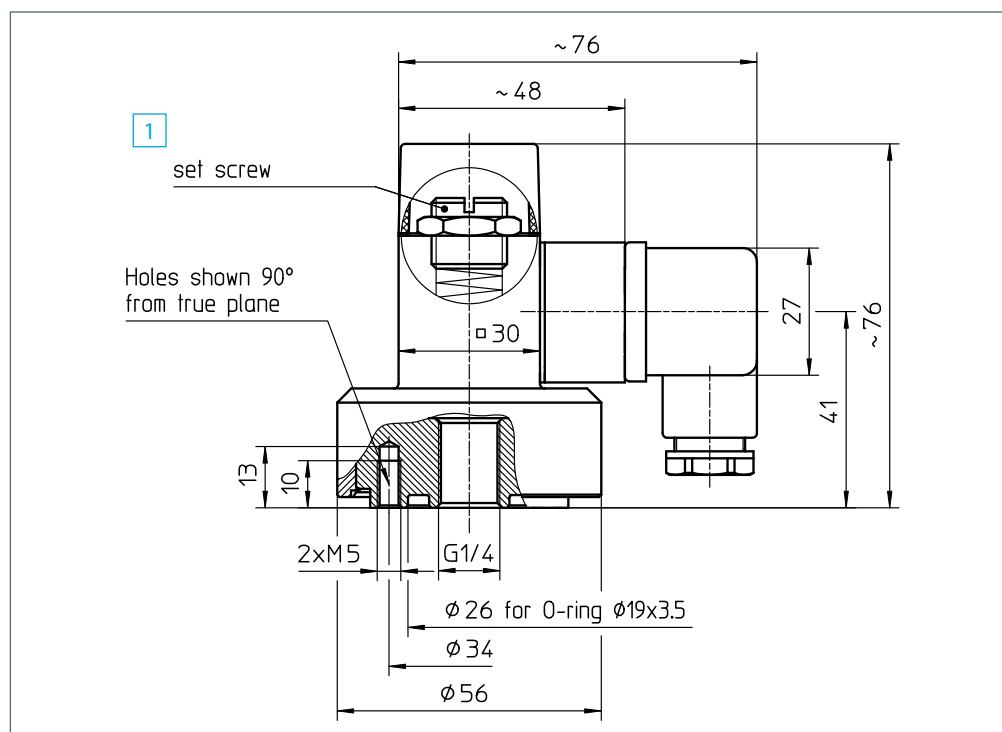
|                  |         |             |              |                                |
|------------------|---------|-------------|--------------|--------------------------------|
| 25 <sup>1)</sup> | 0.1 – 1 | ± 0.1 – 0.2 | G 1/4 female | 0175 – 435 14 – <b>1</b> – 001 |
|------------------|---------|-------------|--------------|--------------------------------|

Seal material – Application areas

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

Your order number:

0175 – 435 14 – **1** – 001



#### 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.

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



M.8

ATEX

# Explosion-protected pressure switches

To ATEX standard



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

# Explosion-protected pressure switches

## Technical data

M.8

ATEX



### Technical explanations

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

|                                  |                           |                                     |
|----------------------------------|---------------------------|-------------------------------------|
| <b>Gases and vapours</b><br>0165 | <b>Dusts</b><br>0340/0341 | <b>Methane dust</b><br>not suitable |
|----------------------------------|---------------------------|-------------------------------------|

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

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

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

### Conditions in potentially explosive atmosphere

| Com-<br>bustible<br>materials | Temporary behaviour<br>of combustible materials<br>in potentially explosive area         | Categori-<br>sation of<br>potentially<br>explosive<br>areas | Marking required on<br>equipment to be used |                       |
|-------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------|-----------------------|
|                               |                                                                                          |                                                             | Equipment<br>group                          | Equipment<br>category |
| Gases<br>Vapours              | are present continually, frequently<br>or for long periods                               | Zone 0                                                      | II                                          | 1G                    |
|                               | occur occasionally                                                                       | Zone 1                                                      | II                                          | 2G or 1G              |
|                               | are unlikely to occur, and if so, are<br>then only seldom or for short periods           | Zone 2                                                      | II                                          | 3G or 2G<br>or 1G     |
| Dusts                         | are present continually, frequently<br>or for long periods                               | Zone 20                                                     | II                                          | 1D                    |
|                               | occur occasionally                                                                       | Zone 21                                                     | II                                          | 2D or 1D              |
|                               | occur if accumulated dust is whirled<br>up, and then only seldom or for short<br>periods | Zone 22                                                     | II                                          | 3D or 2D<br>or 1D     |
| Methane<br>dust               | –                                                                                        | Mining<br>industry                                          | I                                           | M1                    |
|                               | –                                                                                        | Mining<br>industry                                          | I                                           | M1 or M2              |



M

## Explosion-protected pressure switches

### Technical data

|                             |                                                                                           |                  |                                                     |
|-----------------------------|-------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------|
| Type:                       | <b>0165</b>                                                                               |                  | <b>0340 / 0341</b>                                  |
| ATEX protection zone:       | 1 and 2                                                                                   |                  | 22                                                  |
| Combustible Material:       | Gases and vapours                                                                         |                  | Dusts                                               |
| Rated working voltage:      | 10 ... 250 VAC                                                                            | 10 ... 250 VDC   | 10 ... 250 VAC                                      |
| Rated working current:      | 10 mA ... 1 A                                                                             | 10 mA ... 250 mA | 10 mA ... 2 A                                       |
| Temperature resistance:     | NBR                                                                                       |                  | -20 °C ... +80 °C                                   |
|                             | EPDM                                                                                      |                  | -20 °C ... +80 °C                                   |
|                             | FKM (in diaphragm pressure switch)                                                        |                  | -5 °C ... +80 °C                                    |
|                             | FKM (in piston pressure switch)                                                           |                  | -15 °C ... +80 °C                                   |
| Switching frequency:        | 200 / min.                                                                                |                  |                                                     |
| Mechanical life expectancy: | 1,000,000 cycles                                                                          |                  |                                                     |
| Pressure rise rate:         | ≤ 1 bar/ms                                                                                |                  |                                                     |
| Hysteresis:                 | 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 <sup>2</sup> ; 14 ms half sine wave; DIN EN 60068-2-27                            |                  |                                                     |
| Cable length:               | Standard length approx. 2m with wire end sleeve, also available in lengths of approx. 5m. |                  |                                                     |
| Cable cross-section:        | 3 x 0.75 mm <sup>2</sup>                                                                  |                  | 3 x 0.5 mm <sup>2</sup>                             |
| Housing material:           | Aluminium                                                                                 |                  | Zinc-plated steel (CrVI-free)<br>anodised aluminium |
| Protection class:           | IP65                                                                                      |                  |                                                     |
| Weight:                     | approx. 380 g                                                                             |                  | approx. 230 g                                       |



# 0165

Diaphragm / piston pressure switches up to 250 V

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

- Aluminium housing
- Changeover with silver contacts
- Operating voltage up to 250 V
- Overpressure safety up to 200/600 bar<sup>1)</sup>

| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|--------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|--------|--------------|

## 0165 Diaphragm pressure switches

|                   |        |       |              |                         |
|-------------------|--------|-------|--------------|-------------------------|
| 200 <sup>1)</sup> | 1 – 6  | ± 0.5 | G 1/4 female | 0165 – 448 14 – X – 001 |
|                   | 5 – 50 | ± 3.0 |              | 0165 – 449 14 – X – 001 |

## 0165 Piston pressure switches

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

## Seal material – Application areas

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

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

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

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

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

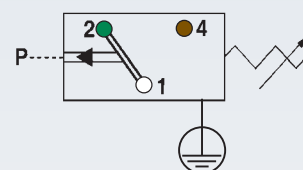
M.8

ATEX



## Contact assignment:

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



M.8

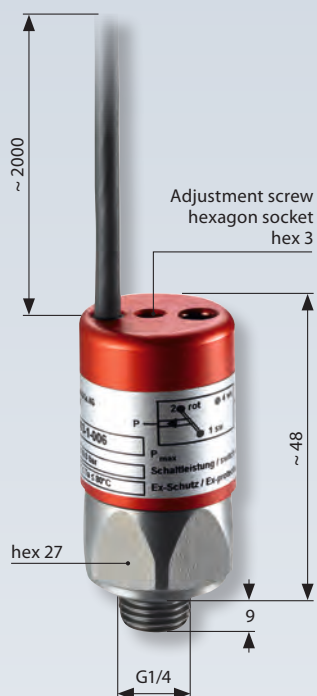
ATEX

0340 / 0341

Diaphragm / piston pressure switches up to 250 V

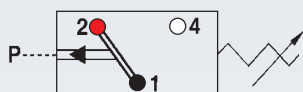
ATEX CEE II 3D IP65 T90°C (dust protection zone 22)

- Zinc-plated steel housing (CrVI-free), with anodised aluminium protective cap
- Changeover with silver contacts
- Operation voltage up to 250 V, protection class 2, protective insulation □
- Overpressure safety up to 300 / 600 bar<sup>1)</sup>



Contact assignment:

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



| p <sub>max.</sub><br>in bar | Adjustment<br>range in bar | Tolerance in bar at<br>room temperature | Thread | Order number |
|-----------------------------|----------------------------|-----------------------------------------|--------|--------------|
|-----------------------------|----------------------------|-----------------------------------------|--------|--------------|

#### 0340 Diaphragm pressure switches

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

#### 0341 Piston pressure switches

|                   |          |       |       |                         |
|-------------------|----------|-------|-------|-------------------------|
| 600 <sup>1)</sup> | 50 – 150 | ± 5.0 | G 1/4 | 0341 – 460 03 – X – 003 |
|-------------------|----------|-------|-------|-------------------------|

#### 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 |

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



Your order number: 034X – XXX 03 – X – XXX

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

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



# Vacuum switches



- Switching point can be adjusted when fitted on site <sup>1)</sup>
- 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

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

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

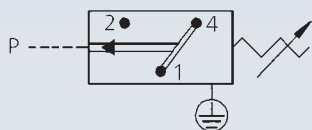
| Rated working voltage $U_e$                 | Rated working current $I_e$ (usage category) |
|---------------------------------------------|----------------------------------------------|
| 250 VAC 50 / 60 Hz                          | 5 A (AC 12)                                  |
| 250 VAC 50 / 60 Hz                          | 1 A (AC 14)                                  |
| 24 VDC                                      | 3.5 / 3.5 A (DC 12 / DC 13)                  |
| 50 VDC                                      | 2 / 1 A (DC 12 / DC 13)                      |
| 75 VDC                                      | 1 / 0.5 A (DC 12 / DC 13)                    |
| 125 VDC                                     | 0.3 / 0.2 A (DC 12 / DC 13)                  |
| 250 VDC                                     | 0.25 / 0.2 A (DC 12 / DC 13)                 |
| Rated insulation voltage $U_i$ :            | 300 V                                        |
| Rated impulse withstand voltage $U_{imp}$ : | 2.5 kV                                       |
| Conventional thermal current $I_{the}$ :    | 6 A                                          |
| Switching overvoltage:                      | < 2.5 kV                                     |
| Rated frequency:                            | DC and 50 / 60 Hz                            |
| Nominal current of short-circuit mechanism: | up to 6.3 A                                  |
| Conditional short-circuit current:          | < 350 A                                      |
| Tightening torque of terminal screws:       | < 0.35 Nm                                    |
| Connector cross-section:                    | 0.5 ... 1.5 mm <sup>2</sup>                  |

M



# M.9

Vacuum



## 0150

Vacuum switch up to 250 V with changeover contact

- Aluminium housing
- Operating voltage up to 250 V
- Changeover with silver contacts
- Overpressure safety up to 20 bar<sup>1)</sup>
- Socket device similar to DIN EN 175301 (DIN 43650)
- Hysteresis approx. 50 – 150 mbar (cannot be changed)

| P <sub>max.</sub><br>in bar | Adjustment range<br>in mbar (relative) | Tolerance in mbar<br>at room temperature | Thread | Order number |
|-----------------------------|----------------------------------------|------------------------------------------|--------|--------------|
|-----------------------------|----------------------------------------|------------------------------------------|--------|--------------|

### 0150 Vacuum switch

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

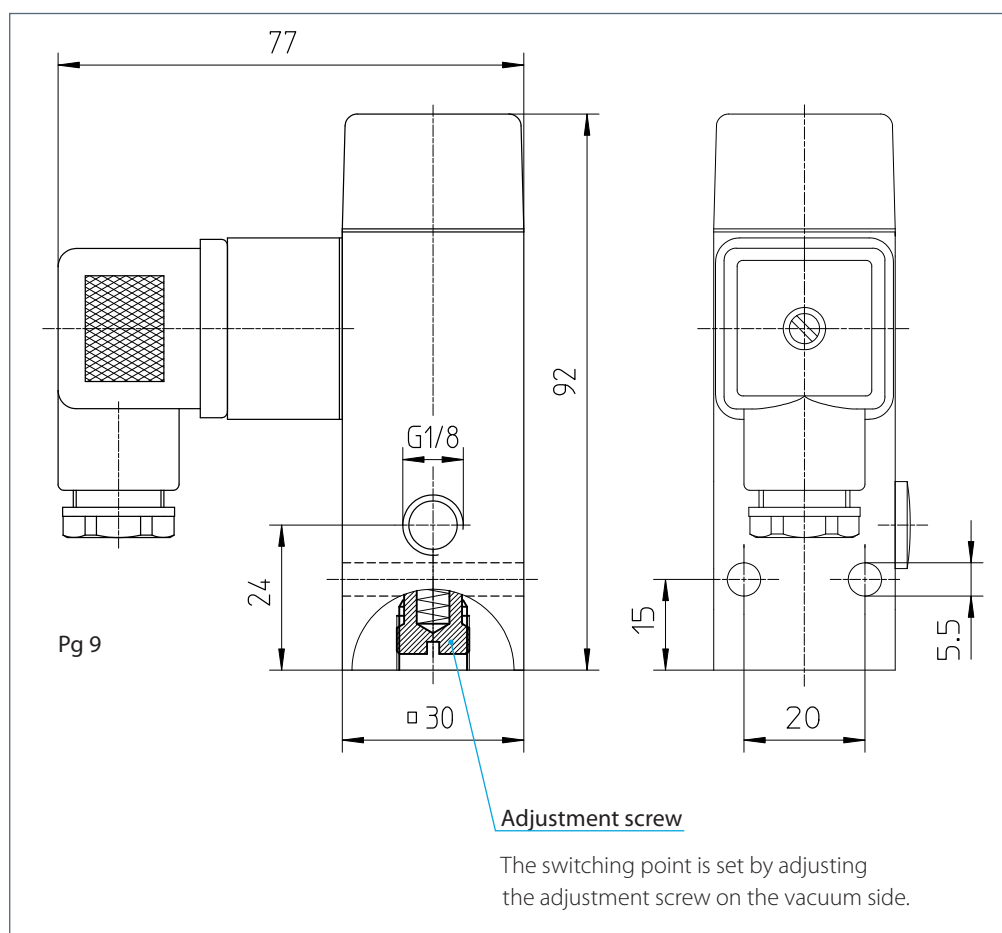
### Seal material – Application areas

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

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

**Your order number:**

**0150 – 456 15 – 4 – 001**



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

# 0151

Vacuum switch up to 42 V, NO or NC

- Brass housing
- Spade or M3 screw terminal
- Operating voltage up to 42 V
- Overpressure safety up to 35 bar<sup>1)</sup>

| $p_{\max.}$<br>in bar | Adjustment range<br>in mbar (relative) | Tolerance in mbar<br>at room temperature | Thread | Order number |
|-----------------------|----------------------------------------|------------------------------------------|--------|--------------|
|-----------------------|----------------------------------------|------------------------------------------|--------|--------------|

## 0151 Vacuum switches with M3 screw terminal

|                  |           |       |              |                         |
|------------------|-----------|-------|--------------|-------------------------|
| 35 <sup>1)</sup> | 200 – 950 | ± 100 | G 1/8 female | 0151 – 452 15 – 3 – 001 |
|------------------|-----------|-------|--------------|-------------------------|

NO → |:

NC → :|

|                         |
|-------------------------|
| 0151 – 453 15 – 3 – 001 |
|-------------------------|

## 0151 Vacuum switches with spade terminal

|                  |           |       |              |                         |
|------------------|-----------|-------|--------------|-------------------------|
| 35 <sup>1)</sup> | 200 – 950 | ± 100 | G 1/8 female | 0151 – 454 15 – 3 – 001 |
|------------------|-----------|-------|--------------|-------------------------|

NO → |:

NC → :|

|                         |
|-------------------------|
| 0151 – 455 15 – 3 – 001 |
|-------------------------|

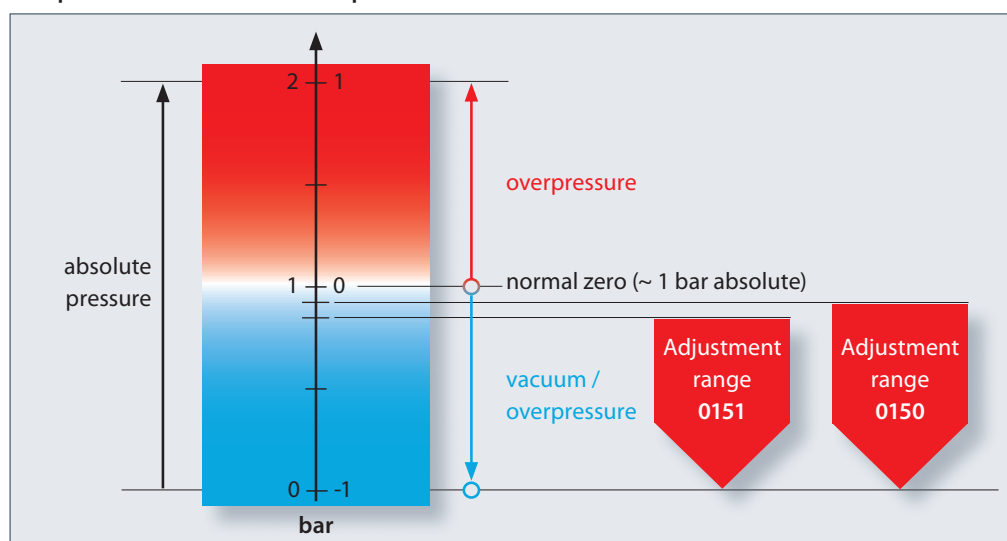
## Seal material – Application areas

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

Temperature resistance: -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.

<sup>1)</sup> 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.





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

# Mating plugs

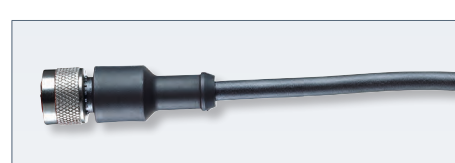
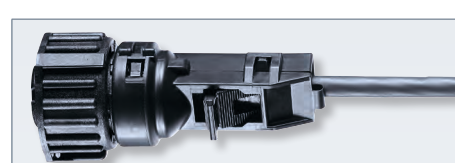
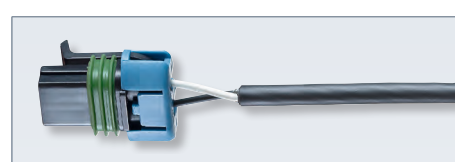
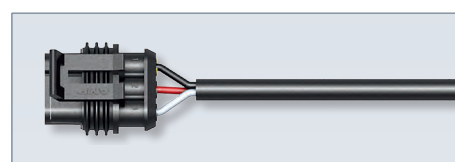
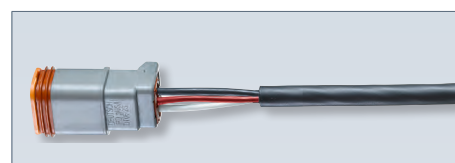
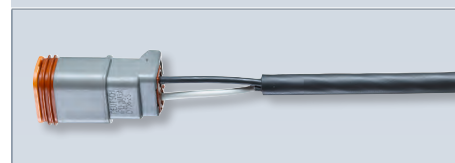
For pressure switches with integrated connector

## M.10

Accessories

*suco*

|                                                                                             |                                                                                             |                                        |
|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Deutsch DT06-2S</b><br><b>(for DT04-2P)</b><br>2 x 0.5 mm <sup>2</sup> Radox cable, IP65 | suitable for series<br><b>0110 / 0111</b><br><b>0410 / 0411</b>                             | Order number:<br><b>1-1-10-653-118</b> |
| <b>Deutsch DT06-3S</b><br><b>(for DT04-3P)</b><br>3 x 0.5 mm <sup>2</sup> PUR cable, IP67   | suitable for series<br><b>0116 / 0117 / 0136 / 0137</b><br><b>0416 / 0417</b>               | Order number:<br><b>1-1-36-653-160</b> |
| <b>TE AMP Superseal 1.5®, 2-pin</b><br>2 x 0.5 mm <sup>2</sup> Radox cable, IP65            | suitable for series<br><b>0112 / 0113</b><br><b>0412 / 0413</b>                             | Order number:<br><b>1-1-12-653-113</b> |
| <b>TE AMP Superseal 1.5®, 3-pin</b><br>3 x 0.5 mm <sup>2</sup> Radox cable, IP65            | suitable for series<br><b>0132 / 0133</b>                                                   | Order number:<br><b>1-1-32-653-158</b> |
| <b>TE AMP Junior Timer, 2-pin</b><br>2 x 0.5 mm <sup>2</sup> Radox cable, IP65              | suitable for series<br><b>0118 / 0119</b><br><b>0418 / 0419</b>                             | Order number:<br><b>1-1-18-653-116</b> |
| <b>Packard MetriPack 280, 2-pin</b><br>2 x 0.5 mm <sup>2</sup> Radox cable, IP65            | suitable for series<br><b>0114 / 0115</b><br><b>0414 / 0415</b>                             | Order number:<br><b>1-1-14-653-114</b> |
| <b>Bayonet DIN 72585 A1-2.1</b><br>2 x 0.5 mm <sup>2</sup> Radox cable, IP65                | suitable for series<br><b>0120 / 0121</b>                                                   | Order number:<br><b>1-1-20-653-112</b> |
| <b>M12 DIN EN 61076-2-LF, 4-pin</b><br>4 x 0.34 mm <sup>2</sup> PUR cable, IP65             | suitable for series<br><b>0122 / 0123 / 0124 / 0125</b><br><b>0134 / 0135 / 0424 / 0425</b> | Order number:<br><b>1-1-00-653-162</b> |



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><b>Rubber protective cap</b></p> <p>With central cable feed-through for 1.5 – 5 mm cable diameter</p> <p><b>With rubber protective cap fitted: IP54</b></p> <p>Suitable for voltages up to 42 V</p> | <p><b>Rubber protective cap</b></p> <p>With two cable feed-throughs for 1.7 – 2.2 mm cable diameter</p> <p><b>With rubber protective cap fitted: IP54</b></p> <p>Suitable for voltages up to 42 V</p> | <p><b>Rubber protective cap</b></p> <p>With two cable feed-throughs for 1.7 – 2.3 mm cable diameter</p> <p><b>With rubber protective cap fitted: IP54</b></p> <p>Suitable for voltages up to 42 V</p> | <p><b>Socket device</b></p> <p>Pg9 screw fitting (tightening range 6 – 9 mm)</p> <p><b>With socket device fitted: IP65</b></p> <p>Suitable for voltages up to 250 V</p> |
| <p>suitable for series</p> <p><b>0151 / 0163 / 0164 / 0166<br/>0167 / 0168 / 0169</b></p>                                                                                                              | <p>suitable for series</p> <p><b>0151 / 0163 / 0164 / 0166<br/>0167 / 0168 / 0169</b></p>                                                                                                             | <p>suitable for series</p> <p><b>0170 / 0171 / 0180* / 0181*<br/>0183* / 0186* / 0187*<br/>0190 / 0191 / 0196 / 0197</b></p> <p>(*up to 42V)</p>                                                      | <p>suitable for series</p> <p><b>0170 / 0171 / 0180 / 0181<br/>0183 / 0186 / 0187<br/>0190 / 0191 / 0196 / 0197</b></p>                                                 |
| <p>Order number:</p> <p><b>1-1-66-621-010</b></p>                                                                                                                                                      | <p>Order number:</p> <p><b>1-1-66-621-003</b></p>                                                                                                                                                     | <p>Order number:</p> <p><b>1-1-70-621-007</b></p>                                                                                                                                                     | <p>Order number:</p> <p><b>1-1-80-652-002</b></p>                                                                                                                       |



|                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                  |
| <p><b>Socket device</b></p> <p>to DIN EN 175301-803-A<br/>(DIN 43650)</p> <p>Pg9 screw fitting<br/>(tightening range 6 – 9 mm)<br/>terminals for wire cross-sections:<br/>0.34 ... 1.5 mm<sup>2</sup><br/>(AWG 22 ... AWG 16),<br/>tightening torque<br/>for terminal screw 0.4 Nm</p> <p><b>With socket device<br/>fitted: IP65</b></p> <p>Suitable for voltages<br/>up to 250 V</p> | <p><b>Socket device</b></p> <p>With indicator lamp to DIN EN<br/>175301-803-A<br/>(DIN 43650)</p> <p>Pg9 screw fitting<br/>(tightening range 6 – 9 mm)<br/>terminals for wire cross-sections:<br/>0.34 ... 1.5 mm<sup>2</sup><br/>(AWG 22 ... AWG 16),<br/>tightening torque<br/>for terminal screw 0.4 Nm</p> <p><b>With socket device<br/>fitted: IP65</b></p> <p>Suitable for voltage<br/>24 or 250 V</p> | <p><b>Socket device</b></p> <p>M 12x1<br/>DIN EN 61071-2-101 D<br/>Straight<br/>4-pin</p> <p>Terminals for wire cross-section<br/>0.75 mm<sup>2</sup> (AWG 18),<br/>tightening torque for terminal<br/>screw 0.4 Nm</p> <p><b>With socket device<br/>fitted: IP65</b></p> <p>Suitable for voltages<br/>up to 48 V</p> | <p><b>Socket device</b></p> <p>M 12x1<br/>DIN EN 61071-2-101 D<br/>Angled<br/>4-pin</p> <p>Terminals for wire cross-section<br/>0.75 mm<sup>2</sup> (AWG 18),<br/>tightening torque for terminal<br/>screw 0.4 Nm</p> <p><b>With socket device<br/>fitted: IP65</b></p> <p>Suitable for voltages<br/>up to 48 V</p> |
| <p>suitable for series</p> <p><b>0150 / 0161 / 0162 / 0175<br/>0184 / 0185 / 0194 / 0195</b></p>                                                                                                                                                                                                                                                                                      | <p>suitable for series</p> <p><b>0150 / 0161 / 0162 / 0175<br/>0184 / 0185 / 0194 / 0195</b></p>                                                                                                                                                                                                                                                                                                             | <p>suitable for series</p> <p><b>0122 / 0123 / 0124 / 0125<br/>0134 / 0135 / 0424 / 0425</b></p> <p>and for all transmitters and<br/>electronic pressure switches<br/>with an M12 connector</p>                                                                                                                       | <p>suitable for series</p> <p><b>0122 / 0123 / 0124 / 0125<br/>0134 / 0135 / 0424 / 0425</b></p> <p>and for all transmitters and<br/>electronic pressure switches<br/>with an M12 connector</p>                                                                                                                     |
| <p>Order number:</p> <p><b>1-1-84-652-009</b></p>                                                                                                                                                                                                                                                                                                                                     | <p>Order number:</p> <p>for 24 VDC: <b>1-1-84-652-011</b><br/>for 250 VAC: <b>1-1-84-652-010</b></p>                                                                                                                                                                                                                                                                                                         | <p>Order number:</p> <p><b>1-6-00-652-016</b></p>                                                                                                                                                                                                                                                                     | <p>Order number:</p> <p><b>1-6-00-652-017</b></p>                                                                                                                                                                                                                                                                   |

# 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 SUCO thread code 15



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

All pressure switches and transmitters  
with SUCO thread code 41

## Dual nipple brass

### G 1/8 Shape E

DIN EN ISO 1179-2  
includes  
sealing ring NBR



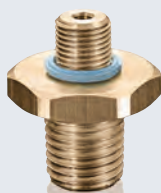
**NPT 1/8-27**

Order number:

**1-1-00-420-014**

### G 1/8 Shape A

includes  
sealing ring OL-1/8



**NPT 1/4-18**

Order number:

**1-1-00-420-029**

## Thread adapters stainless steel (1.4305 / AISI 303)

### G 1/4

DIN EN ISO 1179-1 (DIN 3852-E)  
female thread



**M10 x 1 Shape A**  
DIN 3852-1

Order number:

**1-1-00-420-020**



**M14 x 1.5 Shape E**  
DIN 3852-E  
includes  
sealing ring FKM

Order number:

**1-1-00-420-028**



**NPT 1/4-18**

Order number:

**1-1-00-420-021**



**9/16-18UNF**  
includes  
O-ring FKM

Order number:

**1-1-00-420-027**

# M.10

Accessories




**For G1/4**  
All hex 24 and hex 27 pressure switches  
with SUCO thread code 03



**For M14x1.5 DIN ISO 6149-3**  
Pressure switch series 0183  
with SUCO thread code 45



**For G1/4**  
All hex 24 and hex 27  
pressure switches  
with SUCO thread code 03

| Thread adapters<br>zinc-plated steel (CrVI-free)                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                       | Adapter<br>Aluminium                                                                  |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>G 1/4</b><br>female thread<br>includes sealing ring FKM                          |                                                                                     | <b>M 14 x 1.5</b><br>DIN ISO 6149-1<br>female thread                                |                                                                                     |                                                                                       | <b>G 1/4</b><br>female thread<br>includes copper sealing ring                         |
|  |  |  |  |  |  |
| <b>R 1/4</b>                                                                        | <b>3/8-24 UNF-2A</b>                                                                | <b>G 1/4</b>                                                                        | <b>M12 x 1.5</b>                                                                    | <b>NPT 1/8-27</b>                                                                     | <b>Flange design</b><br>includes<br>NBR O-ring                                        |
| Order number:                                                                       | Order number:                                                                       | Order number:                                                                       | Order number:                                                                       | Order number:                                                                         | Order 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                                                                        |

M

# E. Electronic Pressure Switches









## E. Overview of electronic pressure switches

### Technical explanations

Electronic pressure

from page 100

### Selection matrix

A guide to choosing the correct pressure switch

from page 105

### Electronic pressure switches with ceramic measuring cell



E.1

#### E.1. Electronic pressure switches, Performance series, hex 24, adjustable at factory

from page 106

|                          |                                      |
|--------------------------|--------------------------------------|
| Switching point:         | 0 – 100 bar                          |
| Overpressure protection: | Up to 2 x                            |
| Transistor outputs:      | Qty: 1, maximum output current 0.5 A |
| Variant:                 | PNP                                  |
| Housing materials:       | Stainless steel 1.4305 (AISI 303)    |
| Sealing materials:       | NBR, FKM                             |
| Thread:                  | G1/4, NPT1/4                         |
| Types:                   | 0500, 0501, 0502, 0503               |



E.2

#### E.2. Electronic pressure switches, Performance series, hex 24, adjustable by user

from page 110

|                          |                                       |
|--------------------------|---------------------------------------|
| Switching point:         | 0 – 100 bar                           |
| Overpressure protection: | Up to 2 x                             |
| Transistor outputs:      | Qty: 1, output current: max. 0.5 A    |
| Variant:                 | PNP                                   |
| Housing materials:       | Stainless steel 1.4305 (AISI 303)     |
| Sealing materials:       | NBR, FKM                              |
| Thread:                  | G1/4, NPT1/4                          |
| <b>Special feature:</b>  | <b>Switching status display (LED)</b> |
| Types:                   | 0510, 0511, 0512, 0513                |



E.3

#### E.3. Electronic pressure switches hex 27 / A/F 30, adjustable by user

from page 114

|                          |                                           |
|--------------------------|-------------------------------------------|
| Switching point:         | 0 – 250 bar                               |
| Overpressure protection: | Up to 2 x                                 |
| Transistor outputs:      | Qty: 1, output current: <b>max. 1.4 A</b> |
| Variant:                 | PNP                                       |
| Housing materials:       | Zinc-plated steel (CrVI-free)             |
| Sealing materials:       | NBR, FKM, EPDM                            |
| Thread:                  | G1/4 male or female thread                |
| Types:                   | 0520                                      |

**E.4. Menu-controlled electronic pressure switches with display** from page 118

|                                    |                                                                                            |
|------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Special feature:</b>            | <b>All functions programmable from menu</b><br>Switching state LEDs, display, coding, etc. |
| Switching point:                   | 0 – 400 bar                                                                                |
| Overpressure protection:           | Up to 2 x                                                                                  |
| Transistor outputs:                | Qty: 2, output current: max. 1.4 A                                                         |
| Variant:                           | PNP                                                                                        |
| <b>Additional analogue output:</b> | <b>4 – 20 mA</b>                                                                           |
| Housing materials:                 | Anodised aluminium and die-casted zinc                                                     |
| Sealing materials:                 | NBR, FKM, EPDM                                                                             |
| Thread:                            | Female thread                                                                              |
| Types:                             | 0570                                                                                       |



Electronic pressure switches with SoS technology

**E.5. Electronic pressure switches, High-Performance series, hex 22 with 1 switch output** from page 122

|                          |                                                 |
|--------------------------|-------------------------------------------------|
| <b>Special feature:</b>  | <b>Highest accuracy and long-term stability</b> |
| Switching point:         | 0 – 600 bar                                     |
| Overpressure protection: | Up to 4 x                                       |
| Transistor outputs:      | Qty: 1, maximum output current 0.5 A            |
| Variant:                 | PNP or NPN                                      |
| Housing materials:       | Stainless steel 1.4305 (AISI 303)               |
| Sealing materials:       | <b>All welded, without elastomer seal</b>       |
| Thread:                  | Different male threads                          |
| Types:                   | 0530, 0531, 0532, 0533                          |



**E.6. Electronic pressure switches, High-Performance series, hex 22 with 2 switching outputs** from page 126

|                          |                                                 |
|--------------------------|-------------------------------------------------|
| <b>Special feature:</b>  | <b>Highest accuracy and long-term stability</b> |
| Switching point:         | 0 – 600 bar                                     |
| Overpressure protection: | Up to 4 x                                       |
| Transistor outputs:      | Qty: 2, maximum output current 0.5 A            |
| Variant:                 | PNP or NPN                                      |
| Housing materials:       | Stainless steel 1.4305 (AISI 303)               |
| Sealing materials:       | <b>All welded, without elastomer seal</b>       |
| Thread:                  | Different male threads                          |
| Types:                   | 0540, 0541, 0542, 0544, 0545, 0546              |



**E.7. Accessories** from page 130

- Mating plugs
- Thread adapters
- Programming tools



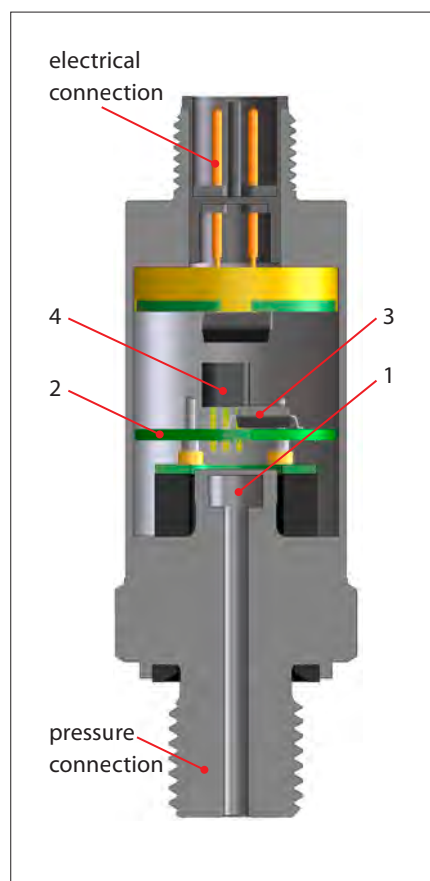
# Technical explanations for electronic pressure switches

## What is an electronic pressure switch?

An electronic pressure switch converts the medium pressure which is present at the measuring cell into a digital, electrical switch signal (ON/OFF).

An electronic pressure switch is more complex than a mechanical pressure switch, and thus generally more expensive. As an electronic pressure switch has no moving parts (relative to each other), it usually has a much prolonged service life and provides a higher level of precision (depending on application). The hysteresis can be set over a wide range and virtually independently of the switching point.

Electronic pressure switches can also be equipped with additional functions, such as optical displays and menu control.



## How does an electronic pressure switch work?

The pressure measuring cell fitted (1) has a membrane that is exposed to the pressure to be measured. Affixed to this membrane is a bridge circuit consisting of four ohmic resistors in the form of a Wheatstone bridge. The values of these resistors change proportionally to the pressure load present at the measuring cell or membrane. The bridge voltage of the measuring cell is amplified in the evaluation electronics (2) and processed digitally by a microcontroller (3).

Once the switching point or switch-back point is reached, the output transistor (4) closes or opens depending on the output function (normally open/closed contact).

## SoS technology

In the silicone-on-sapphire technology, the substrate of the thin film measuring cell is synthetic sapphire. This has excellent mechanical and temperature stable properties and prevents undesired parasitic effects, thereby having a positive effect on accuracy and stability. In conjunction with a titanium membrane, this results in virtually unique coaction between the temperature coefficients of sapphire and titanium. This is because, unlike silicon and stainless steel, they are more closely matched and thus require only a low level of compensation. This also has a favourable effect on long-term stability.

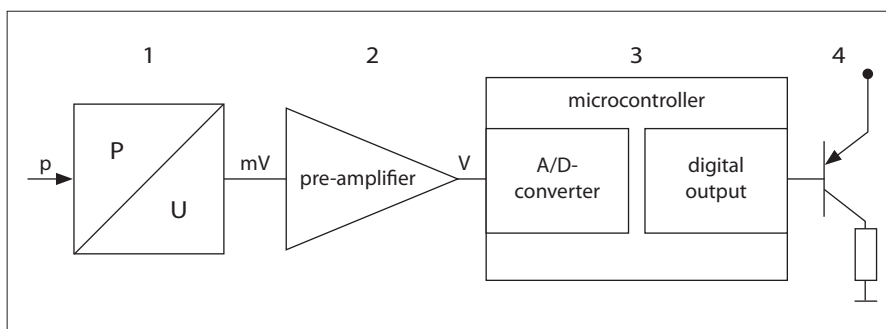
## "Oil-filled" stainless steel measuring cell

In this measuring cell technology, the piezo-resistive measuring cell is packaged within a metallic housing filled with fluorine oil. This means the measuring cell is virtually free of external mechanical stress. Fluorine oil has excellent characteristics in regards to temperature and ageing behaviour, and is not flammable and so fits perfectly for oxygen applications. It is not recommended for food applications.

## Ceramic measuring cell / thick film technology

Ceramic thick film pressure measuring cells are made up of a sintered ceramic body. The ceramic body sleeve already has the key geometries for the subsequent pressure range. The membrane thickness required and thus, the pressure range required is established with grinding and lapping. The resistors are imprinted with thick film technology and interconnect to form a measuring bridge.

Block diagram



### Adjustment range of switching point

The pressure range within which the switching point of an electronic pressure switch can be set is called adjustment range. The switching point corresponds to the pressure value at which the electric circuit of the output is opened or closed.

### Switching point accuracy and tolerances

The switching point accuracy of electronic pressure switches is specified by SUCO and relates to the full scale value (FS). The switching point tolerances specified by us are valid at room temperature (RT) and new state. The values can change as a result of temperature, ageing and application specific conditions. Switching points can either be set at the factory or by the customer on site (depending on model).

### Hysteresis

#### Rising/falling switching point

The difference between the rising (upper) and falling (lower) switching points (refer to the figure) is known as hysteresis (switch-back difference).

Our electronic pressure switches are a perfect fit to extremely low or high hysteresis.

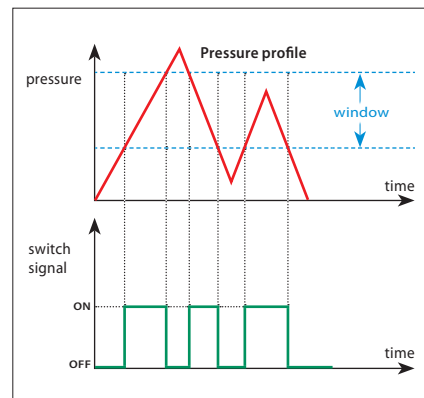
Hysteresis is either set at the factory or by the customer on site (only the 0570 series). The hysteresis or switch-back point of all pressure switches can be set over almost the entire adjustment range.

Please ask about the possible setting ranges you may require.

**The hysteresis specified in the data sheet is set if nothing is specified in the order.**

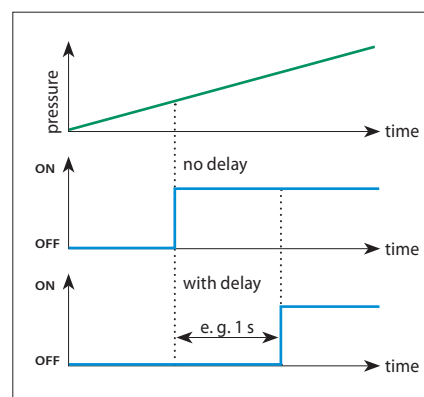
### Window function

In the window function, the switch signal is programmed such that it remains ON or OFF between two values. This means a defined pressure range can be monitored. This function is only possible on the 053X series.

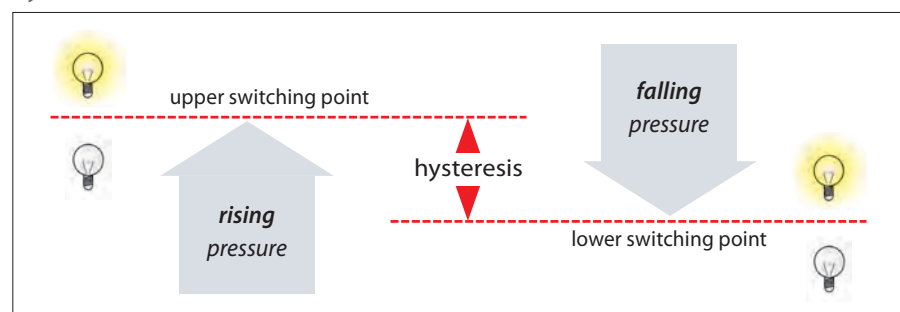


### Switching delay

Switch outputs can be programmed with a delay separately for switch-on and switch-off (depending on model). Delays of up to several seconds are possible.



### Hysteresis



### Operating/supply voltage

All electronic pressure switches work with DC voltage and have no galvanic isolation. Within the thresholds specified in the relevant data sheet, the supply voltage may change without influencing the output signal. In order to guarantee the functionality of an electronic pressure switch, the minimum operating voltage must be respected. The maximum operating voltage may not be exceeded to avoid damage on the electronics.

### Output current

Depending on the model, electronic pressure switches have a maximum output current of 0.5 A to 1.4 A and therefore are also suitable for applications requiring relatively high control and switching currents.

### Load

The output transistor is an open collector, i.e. the output must be wired with a load. The load limits the switching current and is selected according to the application.

Electronic pressure switches have protection from voltage peaks at the output, and are short-circuit proof. When inductive loads are switched (relays, motors, etc.), provision may have to be made for an additional electronic snubber to eliminate high voltage peaks. This is realised e.g. with flyback diodes, or even better with suppressor diodes or varistors.

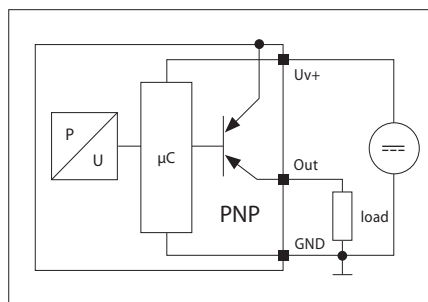
# Technical explanations for electronic pressure switches

## Connection types and output functions

There are essentially two different ways to connect the load or apparent ohmic resistance to electronic pressure switches:

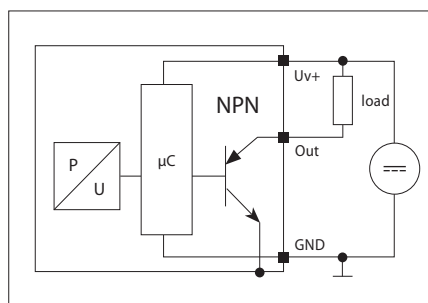
### PNP output / high-side / plus-switching

PNP output (plus-switching) is the most popular variant in Europe. Here the load is connected to the output of the switch and ground (GND as reference potential).



### NPN output / low-side / minus-switching

For an NPN output (minus-switching), the load is connected to the switching output and to the positive line of the supply voltage (Uv+ as reference potential).

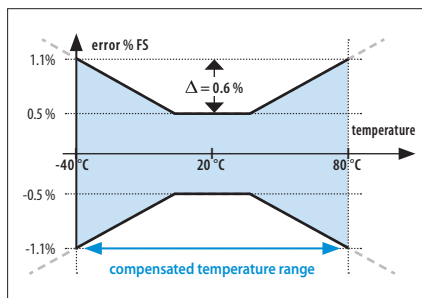


### NO/NC

Electronic pressure switches are available as normally open (NO) or normally closed (NC) versions. Also refer to section M.0, page 14.

## Temperature errors and ranges

The temperature (both of the medium and environment) generally has a significant influence on the accuracy of an electronic pressure switch. Electronic pressure switches are temperature compensated over a particular range corresponding to the typical application. This means that temperature errors within this temperature range are minimised by means of circuitry design and algorithms. The temperature error is added to the accuracy, and shown in the total error band of the electronic pressure switch, also called "butterfly graph". Outside the compensated temperature range, the maximum error is not defined, however the electronic pressure switch still functions. To prevent mechanical and electrical damage, electronic pressure switches may not be used beyond the threshold temperature ranges specified in the data sheet.

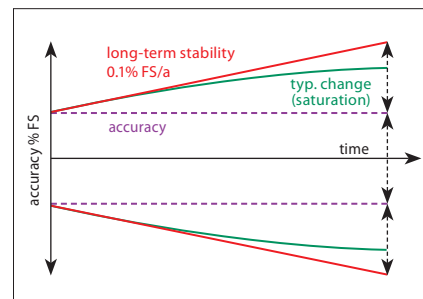


## Service life and long-term stability

Service life information pertains to nominal conditions specified in the data sheet, and can vary considerably when a product is operated mechanically or electrically outside the specifications. Service life essentially depends on the used measuring cell technology.

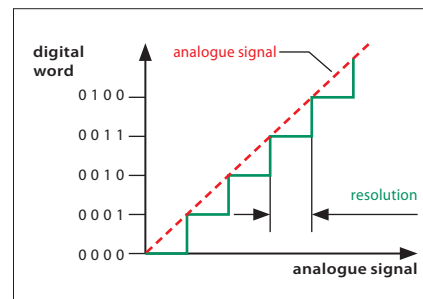
Ageing is accelerated (or slowed) due to different factors - such as temperature, temperature change and reduction of mechanical forces. The occurrence of ageing does effect the total accuracy.

SUCO specifies long-term stability in accordance with DIN 16086 in relation to one year. Typically the influence of aging on the accuracy reduces with increasing operating duration. The information in the data sheet corresponds to the worst case scenario.



## Resolution

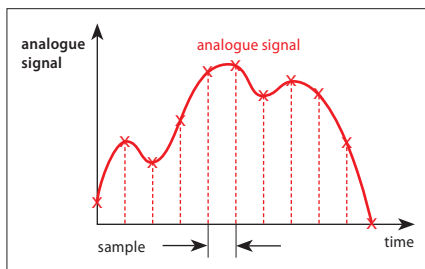
The A/D resolution (analogue - digital) of an electronic pressure switch defines the smallest change of the analogue - digital - analogue conversion which takes place by the signal processing of an electronic pressure switch. If for example 13-bit resolution is used for an electronic pressure switch with a 100 bar setting range, the smallest signal change is 8192 steps ( $2^{13}$ ). As state of the art a resolution of 12 bits and hence 4096 steps ( $2^{12}$ ) is typical. Therefore pressure changes of  $100 \text{ bar} / 4096 = 0.024 \text{ bar}$  can be recorded.





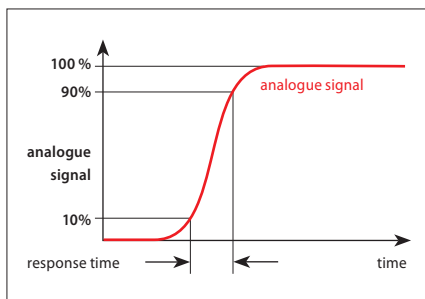
### Sampling rate

The sampling rate (or sampling frequency) defines the number of samples per time unit (typically in seconds or milliseconds) taken from an analogue signal and converted to a digital signal. The sampling rate is an indicator of how fast the output signal of an electronic pressure switch responds to the pressure change at the input.



### Response time

The response or circuit time is shorter than 2 to 4 milliseconds (depending on model). The sum of A/D and D/A conversions, and the analogue and digital filters in the signal chain from the measuring bridge to the output, make up the response time. Filtering is used to suppress unwanted pressure peaks and electrical interference signals, and for good EMC characteristics.



### CE mark

Electronic pressure switches from SUCO fall under the 2014/30/EU EMC Directive. EC declarations of conformity have been issued for the electronic pressure switches are available on request or can be downloaded from our website. The relevant devices are denoted by a CE mark in our catalogue.

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

Our products are designed for Group 2 fluids based upon good engineering practise in line with Pressure Equipment Directive 2014/68/EU, meaning neither a declaration of conformation may be issued nor a CE mark affixed.

### Electromagnetic compatibility (EMC)

Electronic pressure switches from SUCO do comply to all important industrial EMC standards. The basis for the standards are the stricter thresholds for transient emissions in residential environments (EN 61000-6-3) and immunity for industrial environments (EN 61000-6-2).

| Generic standard                                                      | Test standard                | Parameter(s)                                                          |
|-----------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------|
| Radio disturbance and immunity                                        | EN 55016-2-1<br>EN 55016-2-3 | 60 dBuV                                                               |
| Radiated, high-frequency electromagnetic field immunity test          | EN 61000-4-3                 | 10 V/m; 80-2700 MHz,<br>3 V/m; 1400-2000 MHz,<br>1 V/m; 2000-2700 MHz |
| Immunity to conducted disturbances, induced by radio-frequency fields | EN 61000-4-6                 | 10 V; 0.15-80 MHz                                                     |
| Electrical fast transient / burst immunity test                       | EN 61000-4-4                 | ±2 kV                                                                 |
| Surge immunity test                                                   | EN 61000-4-5                 | ±0.5 kV (common)<br>±0.5 kV (differential)                            |
| Electrostatic discharge (ESD) immunity test                           | EN 61000-4-2                 | air: 8 kV<br>with contact: 4 kV                                       |

# Technical explanations for electronic pressure switches

## Conversion chart for pressure units

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

## Conversion chart 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            |

### Insulation strength

According to the latest specifications for immunity to surges and lightning protection, the following must be taken into account when testing insulation strength: With insulation test devices having an inner resistance exceeding 42 Ohm, the insulation strength of electronic pressure switches can be tested up to 500 VDC. All contacts must be tested short-circuited against the housing. For a specific threshold value of test voltage, the protective circuit for surge protection is activated without any defects arising within the circuit. In the process, the current may rise to a point at which an insulation strength fault is indicated. The recommendation therefore is to conduct the insulation test of the electronic pressure switch when it is removed, or independently of the overall system.

### Medium compatibility

The specifications on medium compatibility in this catalogue pertain to the specific seal and housing materials as well as the used measuring cell technology and so cannot be generalised.

### Titanium

Its high levels of mechanical resistance and the wide media compatibility – in particular to corrosive media – do make titanium the ideal material for measuring cells and membranes. It is not recommended for oxygen or hydrogen applications.

### Stainless steel (1.4305 / AISI 303)

Stainless steel with broad level of media compatibility. Also suitable for oxygen and hydrogen applications.

### Stainless steel (1.4404 / AISI 316L)

Stainless steel with broad level of media compatibility. Also suitable for chemical industry and sea water applications.

### Oxygen and hydrogen

Country-specific safety requirements and application guidelines must be observed if the medium to be monitored is oxygen or hydrogen, such as DGUV accident prevention regulations (DGUV 500, Section 2.32 and BGI 617).

**Please specify when ordering  
"for oxygen, oil and grease-free".**

### Pressure peak dampening

If required, our electronic pressure switches can also be fitted with a pressure snubber (pressure peak orifice) to protect the measuring cell against transient pressure loads such as pressure peaks due to the switching of valves, cavitation effects, etc. which can shorten life expectancy.

For liquid media, the hole of a pressure snubber cannot be chosen to be any small size. At low temperatures the viscosity of the media will increase. In a case of dropping pressure the media might remain in the cavity behind the snubber which might affect the functionality of the electronic pressure switch. Thus a bore diameter of 0.8 mm has been established.

### 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) falls under the responsibility of the user. It may be the case that suitability can only be guaranteed with appropriate field testing.**

**Subject to technical changes.**

# Selection matrix for electronic pressure switches

| Type / series                |                                   | 0500 | 0501 | 0510 | 0511 | 0520 | 0570 | 0530 | 0531 | 0532 | 0533 | 0540 | 0541 | 0542 | 0544 | 0545 | 0546 |
|------------------------------|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Page                         |                                   | 109  | 109  | 113  | 113  | 117  | 120  | 125  | 125  | 125  | 125  | 129  | 129  | 129  | 129  | 129  | 129  |
| Technology<br>Measuring cell | ceramic / thick-film              | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |      |      |      |      |      |      |      |
|                              | titanium / SoS                    |      |      |      |      |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
| Variants                     | NO                                | ■    | ■    | ■    | ■    | ■    | ■    | ■    |      | ■    |      | ■    |      | ■    | ■    |      | ■    |
|                              | NC                                | ■    | ■    | ■    | ■    |      |      |      | ■    | ■    | ■    |      | ■    | ■    |      | ■    | ■    |
|                              | 1 switching output                | ■    | ■    | ■    | ■    | ■    |      | ■    | ■    | ■    | ■    |      |      |      |      |      |      |
|                              | 2 switching outputs               |      |      |      |      |      | ■    |      |      |      |      | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | PNP (High Side)                   | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |      |      | ■    | ■    | ■    |      |      |      |
|                              | NPN (Low Side)                    |      |      |      |      |      |      |      |      | ■    | ■    |      |      |      | ■    | ■    | ■    |
|                              | analogue output 4 - 20 mA         |      |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |
| Supply voltage               | 9.6 – 32 V                        | ■    | ■    | ■    | ■    |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | 12 – 30 V                         |      |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |
|                              | 15 – 36 V                         |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |      |
| Adjustment range             | 0 – 2 bar                         | ■    | ■    | ■    | ■    |      |      |      |      |      |      |      |      |      |      |      |      |
|                              | 0 – 4 bar                         | ■    | ■    | ■    | ■    |      |      |      |      |      |      |      |      |      |      |      |      |
|                              | 0 – 10 bar                        | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | 0 – 16 bar                        | ■    | ■    | ■    | ■    |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | 0 – 25 bar                        |      |      |      |      |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | 0 – 40 bar                        | ■    | ■    | ■    | ■    |      |      |      |      |      |      |      |      |      |      |      |      |
|                              | 0 – 100 bar                       | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | 0 – 250 bar                       |      |      |      |      | ■    |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | 0 – 400 bar                       |      |      |      |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | 0 – 600 bar                       |      |      |      |      |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
| Switch point adjustability   | at factory                        | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | by customer (on site)             |      |      | ■    | ■    | ■    | ■    |      |      |      |      |      |      |      |      |      |      |
| Hysteresis adjustability     | at factory                        | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | by customer (on site)             |      |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |
|                              | window mode (settable at factory) |      |      |      |      |      |      | ■    | ■    | ■    | ■    |      |      |      |      |      |      |
| Max. overpressure            | up to 2 x                         | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |      |      |      |      |      |      |      |
|                              | up to 4 x                         |      |      |      |      |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
| Size                         | hex 22                            |      |      |      |      |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | hex 24                            | ■    | ■    | ■    | ■    |      |      |      |      |      |      |      |      |      |      |      |      |
|                              | A/F 30                            |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |      |
|                              | A/F 32                            |      |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |
| Housing material             | zinc-plated steel                 |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |      |
|                              | stainless steel 1.4305 / AISI 303 | ■    | ■    | ■    | ■    |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                              | aluminium / die-casted zinc       |      |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |
| Additional functions         | 7-segment and menu control        |      |      |      |      |      | ■    |      |      |      |      |      |      |      |      |      |      |
|                              | LED switching state indicator     | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |

■ M12x1 DIN EN 61076-2 101 A connector only

## Electronic pressure switches, Performance series

hex 24, adjustable at factory



- Very attractively priced electronic pressure switches, particularly for high volume deployment
- High overpressure protection (up to 2 x)
- Small, compact electronic switches
- Broad diversity of electronic and mechanical connection options
- High level of adaptability to your requirements (custom solutions)
- Ceramic sensor in thick film technology
- Housing made of stainless steel (1.4305), others on request
- Hysteresis adjustable within a wide range (1 % – 98 %, set at factory)

## Technical details

|                                     |                 |                                                                                                                                         |           |            |            |            |             |
|-------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|------------|------------|-------------|
| Type:                               |                 | <b>0500 NO</b><br><b>0501 NC</b>                                                                                                        |           |            |            |            |             |
| Transistor output:                  |                 | PNP output (High-Side N-channel)                                                                                                        |           |            |            |            |             |
| Supply voltage:                     |                 | 9.6 – 32 VDC with reverse voltage protection                                                                                            |           |            |            |            |             |
| Output current:                     |                 | 0.5 A with short-circuit and overvoltage protection                                                                                     |           |            |            |            |             |
| Idle power consumption:             |                 | < 30 mA                                                                                                                                 |           |            |            |            |             |
| Adjustment range p <sub>nom</sub> : |                 | 0 – 2 bar                                                                                                                               | 0 – 4 bar | 0 – 10 bar | 0 – 16 bar | 0 – 40 bar | 0 – 100 bar |
| Max. overpressure <sup>1)</sup> :   |                 | 4 bar                                                                                                                                   | 10 bar    | 20 bar     | 40 bar     | 100 bar    | 200 bar     |
| Burst pressure <sup>1)</sup> :      |                 | 8 bar                                                                                                                                   | 20 bar    | 35 bar     | 60 bar     | 140 bar    | 300 bar     |
| Mechanical life expectancy:         |                 | 5,000,000 pulsations at rise rates to 1 bar/ms at p <sub>nom</sub>                                                                      |           |            |            |            |             |
| Pressure rise:                      |                 | ≤ 1 bar/ms                                                                                                                              |           |            |            |            |             |
| Accuracy:                           |                 | ±0.5 % of adjustment range p <sub>nom</sub> (full scale (FS)) at room temperature                                                       |           |            |            |            |             |
| Switching point adjustment range:   |                 | 2 ... 100 % of adjustment range p <sub>nom</sub> (FS), set at factory                                                                   |           |            |            |            |             |
| Hysteresis:                         |                 | 1 ... 98 % FS, programmable at factory (max. tolerance ±1.0% of adjustment range p <sub>nom</sub> )                                     |           |            |            |            |             |
| Resolution:                         |                 | 0.1 % of adjustment range p <sub>nom</sub> (FS)                                                                                         |           |            |            |            |             |
| Long term stability:                |                 | ±0.1 % of adjustment range p <sub>nom</sub> (FS) per year                                                                               |           |            |            |            |             |
| Repeatability <sup>2)</sup> :       |                 | ±0.1 % of adjustment range p <sub>nom</sub> (FS)                                                                                        |           |            |            |            |             |
| Switching time:                     |                 | < 4 ms                                                                                                                                  |           |            |            |            |             |
| Temperature error <sup>2)</sup> :   |                 | ±0.04 % of adjustment range p <sub>nom</sub> (FS) / °C                                                                                  |           |            |            |            |             |
| Compensated temperature range:      |                 | 0 °C ... +70 °C (32 °F ...158 °F), total error ≤ 2 %                                                                                    |           |            |            |            |             |
| Temperature range ambient:          |                 | -30 °C ... +100 °C (-22 °F ... 212 °F)                                                                                                  |           |            |            |            |             |
| Temperature range media:            |                 | with NBR seal:        -30 °C ... +100 °C (-22 °F ... +212 °F)                                                                           |           |            |            |            |             |
|                                     |                 | with EPDM seal:     -30 °C ... +125 °C (-22 °F ... +257 °F)                                                                             |           |            |            |            |             |
|                                     |                 | with FKM seal:       -20 °C ... +125 °C (-4 °F ... +257 °F)                                                                             |           |            |            |            |             |
| Wetted parts material               | Housing:        | Stainless steel (1.4305 / AISI 303)                                                                                                     |           |            |            |            |             |
|                                     | Messuring cell: | Ceramic                                                                                                                                 |           |            |            |            |             |
|                                     | Seal material:  | NBR, EPDM or FKM                                                                                                                        |           |            |            |            |             |
| Insulation resistance:              |                 | > 100 MΩ (500 VDC, Ri > 42 Ω)                                                                                                           |           |            |            |            |             |
| Vibration resistance:               |                 | 20 g; at 4...2000 Hz sine wave, DIN EN 60068-2-6                                                                                        |           |            |            |            |             |
| Shock resistance:                   |                 | 500 m/s <sup>2</sup> , 11 ms half sine wave; DIN EN 60068-2-27                                                                          |           |            |            |            |             |
| Protection class:                   |                 | IP65: DIN EN 175301-803-A<br>IP67: M12x1, AMP-Superseal®, cable connector<br>IP67 and IP6K9K: Bayonet ISO 15170-A1-4.1, Deutsch DT04-3P |           |            |            |            |             |
| Electromagnetic compatibility:      |                 | EMV 2014/30/EU, EN 61000-6-2:2005, EN 61000-6-3:2007                                                                                    |           |            |            |            |             |
| Cable output thread size:           |                 | For DIN EN 175301: Pg9 (outside diameter of cable 6 to 9 mm)                                                                            |           |            |            |            |             |
| Weight:                             |                 | approx. 80 g (DIN EN 175301 approx. 110 g)                                                                                              |           |            |            |            |             |

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the electronic pressure switch.

<sup>2)</sup> Within the compensated temperature range



# E.1

hex 24  
Performance  
adjustable at factory



hex 24

|     | no / nc |               |
|-----|---------|---------------|
| ○ 1 | (+)     | — — — — —     |
| ○ 2 | (GND)   | — ⊗ — — — — — |
| ○ 3 | (OUT)   | — — — — —     |

## 0500 / 0501

Electrical connectors and threads

| DIN EN 175301-803-A                                                             |                  |
|---------------------------------------------------------------------------------|------------------|
|                                                                                 |                  |
| Pin                                                                             | Assignment       |
| 1                                                                               | Uv+              |
| 2                                                                               | Gnd              |
| 3                                                                               | U <sub>out</sub> |
| PE                                                                              | PE               |
| IP65                                                                            |                  |
| <b>x</b> ~ 60 mm without coupler socket<br><b>x</b> ~ 77 mm with coupler socket |                  |
| Order number: 013                                                               |                  |

| M 12 – DIN EN 61076-2-101 A |                  |
|-----------------------------|------------------|
|                             |                  |
| Pin                         | Assignment       |
| 1                           | Uv+              |
| 2                           | nc               |
| 3                           | Gnd              |
| 4                           | U <sub>out</sub> |
| IP67                        |                  |
| <b>x</b> ~ 54 mm            |                  |
| Order number: 002           |                  |

| ISO 15170-A1-4.1  |                  |
|-------------------|------------------|
|                   |                  |
| Pin               | Assignment       |
| 1                 | Uv+              |
| 2                 | nc               |
| 3                 | Gnd              |
| 4                 | U <sub>out</sub> |
| IP67, IP6K9K      |                  |
| <b>x</b> ~ 56 mm  |                  |
| Order number: 004 |                  |

| AMP Superseal 1.5® |                  |
|--------------------|------------------|
|                    |                  |
| Pin                | Assignment       |
| 1                  | U <sub>out</sub> |
| 2                  | Gnd              |
| 3                  | Uv+              |
| IP67               |                  |
| <b>x</b> ~ 61 mm   |                  |
| Order number: 007  |                  |

| Deutsch DT04-3P   |                  |
|-------------------|------------------|
|                   |                  |
| Pin               | Assignment       |
| A                 | Uv+              |
| B                 | Gnd              |
| C                 | U <sub>out</sub> |
| IP67, IP6K9K      |                  |
| <b>x</b> ~ 61 mm  |                  |
| Order number: 010 |                  |

| Cabel connection                                                |                  |
|-----------------------------------------------------------------|------------------|
|                                                                 |                  |
| Pin                                                             | Assignment       |
| red                                                             | Uv+              |
| white                                                           | U <sub>out</sub> |
| black                                                           | Gnd              |
| IP67                                                            |                  |
| <b>x</b> ~ 47 mm<br>(+ 25 mm bend relief)<br>Cable length ~ 2 m |                  |
| Order number: 011                                               |                  |

|                                                       |  |
|-------------------------------------------------------|--|
|                                                       |  |
| G 1/4 DIN<br>EN ISO 1179-2<br>(DIN 3852-11)<br>form E |  |
| Thread code: 41                                       |  |

|                 |  |
|-----------------|--|
|                 |  |
| NPT 1/4         |  |
| Thread code: 09 |  |



# 0500 / 0501

## Order matrix for electronic pressure switches

E.1

hex 24  
Performance  
adjustable at factory



|  | Type | Adjustment range | Pressure connection | Seal material | Electrical connection |
|--|------|------------------|---------------------|---------------|-----------------------|
|--|------|------------------|---------------------|---------------|-----------------------|

### Type

|                                                                                 |      |
|---------------------------------------------------------------------------------|------|
| Normally open (NO), PNP, switching points programmed at factory <sup>1)</sup>   | 0500 |
| Normally closed (NC), PNP, switching points programmed at factory <sup>1)</sup> | 0501 |

| Max. overpressure <sup>2)</sup> | Burst pressure | Adjustment range <sup>1)</sup>  |     |
|---------------------------------|----------------|---------------------------------|-----|
| 4 bar                           | 8 bar          | 0 – 2 bar (approx. 29 PSI)      | 200 |
| 10 bar                          | 20 bar         | 0 – 4 bar (approx. 58 PSI)      | 400 |
| 20 bar                          | 35 bar         | 0 – 10 bar (approx. 145 PSI)    | 101 |
| 40 bar                          | 60 bar         | 0 – 16 bar (approx. 230 PSI)    | 161 |
| 100 bar                         | 140 bar        | 0 – 40 bar (approx. 580 PSI)    | 401 |
| 200 bar                         | 300 bar        | 0 – 100 bar (approx. 1,450 PSI) | 102 |

### Pressure connection

|                                                    |    |
|----------------------------------------------------|----|
| G 1/4 – ISO 1179-2 (DIN 3852), form E, male thread | 41 |
| NPT 1/4                                            | 09 |

### Seal material – Application areas

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

### Electrical connection

|                                                           |     |
|-----------------------------------------------------------|-----|
| DIN EN 175301-803-A (DIN 43650-A); socket device included | 013 |
| M 12x1 - DIN EN 61076-2-101-A                             | 002 |
| Bayonet ISO 15170-A1-4.1 (DIN 72585-A1-4.1)               | 004 |
| AMP Superseal 1.5*                                        | 007 |
| Deutsch DT04-3P                                           | 010 |
| Cable connection (length of cable 2 m standard)           | 011 |

|               |      |     |    |   |     |
|---------------|------|-----|----|---|-----|
| Order number: | 05XX | XXX | XX | X | XXX |
|---------------|------|-----|----|---|-----|

<sup>1)</sup> Please state switching point and hysteresis when ordering.

<sup>2)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the electronic pressure switch.



## Electronic pressure switches, Performance series

hex 24, adjustable by user



- Very competitively priced electronic pressure switches
- High overpressure protection (up to 2 x)
- Small, compact electronic switches
- Broad diversity of electronic and mechanical connection options
- High level of adaptability to your requirements (custom solutions)
- Ceramic sensor in thick film technology
- Housing made of stainless steel (1.4305), others on request
- Easy adjustment of switching point from the outside using set screw
- Hysteresis adjustable within broad range (1 % – 98 %, set at factory)

## Technical details

|                                     |                 |                                                                                                                                         |           |            |            |            |             |
|-------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|------------|------------|-------------|
| Type:                               |                 | <b>0510 NO</b><br><b>0511 NC</b>                                                                                                        |           |            |            |            |             |
| Transistor output:                  |                 | PNP output (High-Side N-channel)                                                                                                        |           |            |            |            |             |
| Supply voltage:                     |                 | 9.6 – 32 VDC with reverse voltage protection                                                                                            |           |            |            |            |             |
| Output current:                     |                 | 0.5 A with short-circuit and overvoltage protection                                                                                     |           |            |            |            |             |
| Idle power consumption:             |                 | < 30 mA                                                                                                                                 |           |            |            |            |             |
| Adjustment range p <sub>nom</sub> : |                 | 0 – 2 bar                                                                                                                               | 0 – 4 bar | 0 – 10 bar | 0 – 16 bar | 0 – 40 bar | 0 – 100 bar |
| Max. overpressure <sup>1)</sup> :   |                 | 4 bar                                                                                                                                   | 10 bar    | 20 bar     | 40 bar     | 100 bar    | 200 bar     |
| Burst pressure <sup>1)</sup> :      |                 | 8 bar                                                                                                                                   | 20 bar    | 35 bar     | 60 bar     | 140 bar    | 300 bar     |
| Mechanical life expectancy:         |                 | 5,000,000 pulsations at rise rates to 1 bar/ms at p <sub>nom</sub>                                                                      |           |            |            |            |             |
| Pressure rise:                      |                 | ≤ 1 bar/ms                                                                                                                              |           |            |            |            |             |
| Accuracy:                           |                 | ±0.5 % of adjustment range p <sub>nom</sub> (full scale (FS)) at room temperature                                                       |           |            |            |            |             |
| Switching point adjustment range:   |                 | 2 ... 100 % of adjustment range p <sub>nom</sub> (FS), adjustable by user                                                               |           |            |            |            |             |
| Hysteresis:                         |                 | 1 ... 98 % FS, programmable at factory (max. tolerance ±1.0 % of adjustment range p <sub>nom</sub> )                                    |           |            |            |            |             |
| Resolution:                         |                 | 0.1 % of adjustment range p <sub>nom</sub> (FS)                                                                                         |           |            |            |            |             |
| Long term stability:                |                 | ±0.1 % of adjustment range p <sub>nom</sub> (FS) per year                                                                               |           |            |            |            |             |
| Repeatability <sup>2)</sup> :       |                 | ±0.1 % of adjustment range p <sub>nom</sub> (FS)                                                                                        |           |            |            |            |             |
| Switching time:                     |                 | < 4 ms                                                                                                                                  |           |            |            |            |             |
| Temperature error <sup>2)</sup> :   |                 | ±0.04 % of adjustment range p <sub>nom</sub> (FS) / °C                                                                                  |           |            |            |            |             |
| Compensated temperature range:      |                 | 0 °C ... +70 °C (32 °F ...158 °F), total error ≤ 2 %                                                                                    |           |            |            |            |             |
| Temperature range ambient:          |                 | -30 °C ... +100 °C (-22 °F ... 212 °F)                                                                                                  |           |            |            |            |             |
| Temperature range media:            |                 | with NBR seal:                -30 °C ... +100 °C (-22 °F ... +212 °F)                                                                   |           |            |            |            |             |
|                                     |                 | with EPDM seal:            -30 °C ... +125 °C (-22 °F ... +257 °F)                                                                      |           |            |            |            |             |
|                                     |                 | with FKM seal:             -20 °C ... +125 °C (-4 °F ... +257 °F)                                                                       |           |            |            |            |             |
| Wetted parts material               | Housing:        | Stainless steel 1.4305 (AISI 303)                                                                                                       |           |            |            |            |             |
|                                     | Measuring cell: | Ceramic                                                                                                                                 |           |            |            |            |             |
|                                     | Seal material:  | NBR, EPDM or FKM                                                                                                                        |           |            |            |            |             |
| Insulation resistance:              |                 | > 100 MΩ (500 VDC, Ri > 42 Ω)                                                                                                           |           |            |            |            |             |
| Vibration resistance:               |                 | 20 g; at 4 ... 2000 Hz sine wave; DIN EN 60068-2-6                                                                                      |           |            |            |            |             |
| Shock resistance:                   |                 | 500 m/s <sup>2</sup> ; 11 ms half sine wave; DIN EN 60068-2-27                                                                          |           |            |            |            |             |
| Protection class:                   |                 | IP65: DIN EN 175301-803-A<br>IP67: M12x1, AMP Superseal®, cable connector<br>IP67 and IP6K9K: Bayonet ISO 15170-A1-4.1, Deutsch DT04-3P |           |            |            |            |             |
| Electromagnetic compatibility:      |                 | EMC 2014/30/EU, EN 61000-6-2:2005, EN 61000-6-3:2007                                                                                    |           |            |            |            |             |
| Cable output thread size:           |                 | For DIN EN 175301: Pg9 (outside diameter of cable 6 to 9 mm)                                                                            |           |            |            |            |             |
| Weight:                             |                 | approx. 80 g (DIN EN 175301 approx. 110 g)                                                                                              |           |            |            |            |             |

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the electronic pressure switch.

<sup>2)</sup> Within the compensated temperature range

## E.2

hex 24  
Performance  
adjustable by user

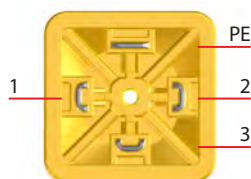


|     | no / nc |   |
|-----|---------|---|
| ○ 1 | (+)     | — |
| ○ 2 | (GND)   | ⊗ |
| ○ 3 | (OUT)   | ⊗ |

## 0510 / 0511

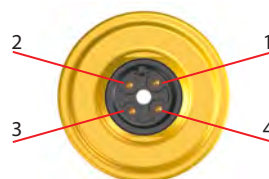
Electrical connectors and threads

### DIN EN 175301-803-A



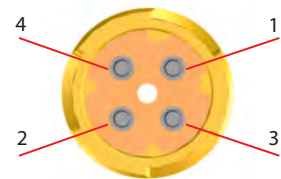
| Pin                                                               | Assignment       |
|-------------------------------------------------------------------|------------------|
| 1                                                                 | Uv+              |
| 2                                                                 | Gnd              |
| 3                                                                 | U <sub>out</sub> |
| PE                                                                | PE               |
| IP65                                                              |                  |
| x ~ 60 mm without coupler socket<br>x ~ 77 mm with coupler socket |                  |
| Order number: 013                                                 |                  |

### M 12 – DIN EN 61076-2-101 A



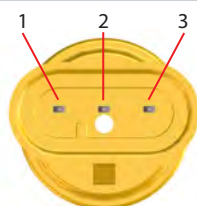
| Pin               | Assignment       |
|-------------------|------------------|
| 1                 | Uv+              |
| 2                 | nc               |
| 3                 | Gnd              |
| 4                 | U <sub>out</sub> |
| IP67              |                  |
| x ~ 54 mm         |                  |
| Order number: 002 |                  |

### ISO 15170-A1-4.1



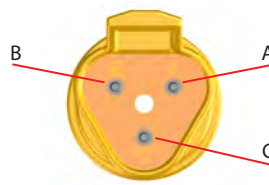
| Pin               | Assignment       |
|-------------------|------------------|
| 1                 | Uv+              |
| 2                 | nc               |
| 3                 | Gnd              |
| 4                 | U <sub>out</sub> |
| IP67, IP6K9K      |                  |
| x ~ 56 mm         |                  |
| Order number: 004 |                  |

### AMP Superseal 1.5®

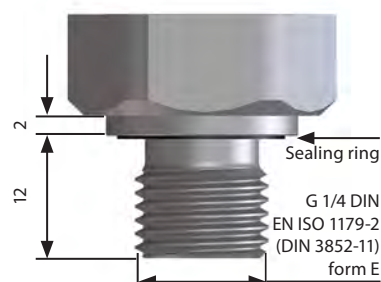


| Pin               | Assignment       |
|-------------------|------------------|
| 1                 | U <sub>out</sub> |
| 2                 | Gnd              |
| 3                 | Uv+              |
| IP67              |                  |
| x ~ 61 mm         |                  |
| Order number: 007 |                  |

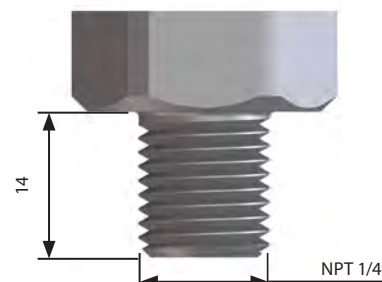
### Deutsch DT04-3P



| Pin               | Assignment       |
|-------------------|------------------|
| A                 | Uv+              |
| B                 | Gnd              |
| C                 | U <sub>out</sub> |
| IP67, IP6K9K      |                  |
| x ~ 61 mm         |                  |
| Order number: 010 |                  |



Thread code: 41



Thread code: 09



# 0510/0511

## Order matrix for electronic pressure switches

E.2

hex 24  
Performance  
adjustable by user



|  | Type | Adjustment range | Pressure connection | Seal material | Electrical connection |
|--|------|------------------|---------------------|---------------|-----------------------|
|--|------|------------------|---------------------|---------------|-----------------------|

### Type

|                                                                       |      |
|-----------------------------------------------------------------------|------|
| EDS, NOC, PNP,<br>with switching point adjustment<br>by potentiometer | 0510 |
| EDS, NCC, PNP,<br>with switching point adjustment<br>by potentiometer | 0511 |

| Max. overpressure <sup>1)</sup> | Burst pressure | Adjustment range                   |     |
|---------------------------------|----------------|------------------------------------|-----|
| 4 bar                           | 8 bar          | 0 – 2 bar<br>(approx. 29 PSI)      | 200 |
| 10 bar                          | 20 bar         | 0 – 4 bar<br>(approx. 58 PSI)      | 400 |
| 20 bar                          | 35 bar         | 0 – 10 bar<br>(approx. 145 PSI)    | 101 |
| 40 bar                          | 60 bar         | 0 – 16 bar<br>(approx. 230 PSI)    | 161 |
| 100 bar                         | 140 bar        | 0 – 40 bar<br>(approx. 580 PSI)    | 401 |
| 200 bar                         | 300 bar        | 0 – 100 bar<br>(approx. 1,450 PSI) | 102 |

### Pressure connection

|                                                    |    |
|----------------------------------------------------|----|
| G 1/4 – ISO 1179-2 (DIN 3852), form E, male thread | 41 |
| NPT 1/4                                            | 09 |

### Seal material – Application areas

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

### Electrical connection

|                                                                       |     |
|-----------------------------------------------------------------------|-----|
| DIN EN 175301-803-A (DIN 43650-A) coupler socket included in delivery | 013 |
| M 12x1 - DIN EN 61076-2-101-A                                         | 002 |
| Bayonet ISO 15170-A1-4.1 (DIN 72585-A1-4.1)                           | 004 |
| AMP Superseal 1.5®                                                    | 007 |
| Deutsch DT04-3P                                                       | 010 |

|               |      |     |    |   |     |
|---------------|------|-----|----|---|-----|
| Order number: | 05XX | XXX | XX | X | XXX |
|---------------|------|-----|----|---|-----|

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the electronic pressure switch.



## E.3

hex 27 / 30 A/F  
adjustable by user

# Electronic pressure switches

hex 27 and 30 A/F, adjustable by user



- Ceramic sensor in thick film technology
- High overpressure protection to 500 bar
- Easy adjustment of switching point from the outside using set screw
- Hysteresis available within broad range (1 % – 98 %, set at factory)
- **Very high switching currents (to 1.4 A)**

## Technical details

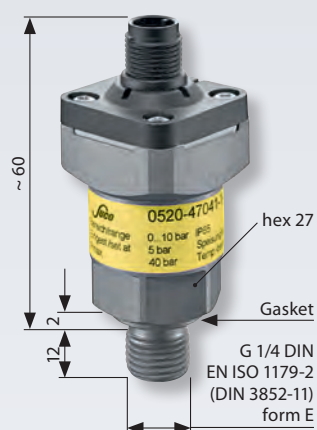
|                                                  |                 |                                                                                         |                                         |                |
|--------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------|-----------------------------------------|----------------|
| Type:                                            |                 | 0520 NO or NC                                                                           |                                         |                |
| Transistor output:                               |                 | PNP output (High-Side N-channel)                                                        |                                         |                |
| Supply voltage:                                  |                 | 15 – 36 VDC                                                                             |                                         |                |
| Output current:                                  |                 | 1.4 A transistor output (PNP, DC12) with short-circuit and overvoltage protection       |                                         |                |
| Idle power consumption:                          |                 | < 15 mA                                                                                 |                                         |                |
| Adjustment range p <sub>nom</sub> :              |                 | 0 – 10 bar                                                                              | 0 – 100 bar                             | 0 – 250 bar    |
| Max. overpressure <sup>1)</sup> :                |                 | 20 bar                                                                                  | 150 bar                                 | 500 bar        |
| Burst pressure <sup>1)</sup> :                   |                 | 25 bar                                                                                  | 175 bar                                 | 600 bar        |
| Mechanical life expectancy:                      |                 | 5,000,000 switching cycles in adjustment range at p <sub>nom</sub>                      |                                         |                |
| Pressure rise:                                   |                 | ≤ 1 bar/ms                                                                              |                                         |                |
| Accuracy:                                        |                 | ±0.5 % of adjustment range p <sub>nom</sub> (full scale (FS)) at room temperature       |                                         |                |
| Switching point adjustment range:                |                 | 2 ... 100 % of adjustment range p <sub>nom</sub> (FS), set from outside using set screw |                                         |                |
| Hysteresis:                                      |                 | 2 ... 95 % FS, programmable at factory (max. tolerance ± 1.0 % of adjustment range)     |                                         |                |
| Standard hysteresis without order specification: |                 | approx. 0.5 bar                                                                         | approx. 5 bar                           | approx. 10 bar |
| Resolution:                                      |                 | 0.15 % of adjustment range p <sub>nom</sub> (FS)                                        |                                         |                |
| Long term stability:                             |                 | ±0.1 % of adjustment range p <sub>nom</sub> (FS) per year                               |                                         |                |
| Repeatability <sup>2)</sup> :                    |                 | ±0.1 % of adjustment range p <sub>nom</sub> (FS)                                        |                                         |                |
| Switching time:                                  |                 | < 4 ms                                                                                  |                                         |                |
| Temperature error <sup>2)</sup> :                |                 | ±0.04 % of adjustment range p <sub>nom</sub> (FS) / °C                                  |                                         |                |
| Compensated temperature range:                   |                 | 0 °C ... +70 °C (32 °F ...158 °F), total error ≤ 2 %                                    |                                         |                |
| Temperature range ambient:                       |                 | -30 °C ... +80 °C (-22 °F ... 212 °F)                                                   |                                         |                |
| Temperature range media:                         |                 | with NBR seal:                                                                          | -30 °C ... +100 °C (-22 °F ... +212 °F) |                |
|                                                  |                 | with EPDM seal:                                                                         | -30 °C ... +125 °C (-22 °F ... +257 °F) |                |
|                                                  |                 | with FKM seal:                                                                          | -20 °C ... +125 °C (-4 °F ... +257 °F)  |                |
| Wetted parts material                            | Housing:        | zinc-plated steel                                                                       |                                         |                |
|                                                  | Measuring cell: | Ceramic                                                                                 |                                         |                |
|                                                  | Seal material:  | NBR, EPDM or FKM                                                                        |                                         |                |
| Insulation resistance:                           |                 | > 100 MΩ (500 VDC, Ri > 42 Ω)                                                           |                                         |                |
| Vibration resistance:                            |                 | 10 g at 4 ... 2000 Hz sine wave; DIN EN 60068-2-6                                       |                                         |                |
| Shock resistance:                                |                 | 294 m/s <sup>2</sup> ; 11 ms half sine wave; DIN EN 60068-2-27                          |                                         |                |
| Protection class:                                |                 | IP65: (DIN EN 175301-803-A); IP67: (M12x1)                                              |                                         |                |
| Electromagnetic compatibility:                   |                 | EMC 2014/30/EU, EN 61000-6-2:2005, EN 61000-6-3:2007                                    |                                         |                |
| Weight:                                          |                 | approx. 240 g                                                                           |                                         |                |

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Value refers to the hydraulic or pneumatic part of the electronic pressure switch.

<sup>2)</sup> Within the compensated temperature range

# E.3

hex 27 / 30 A/F  
adjustable by user

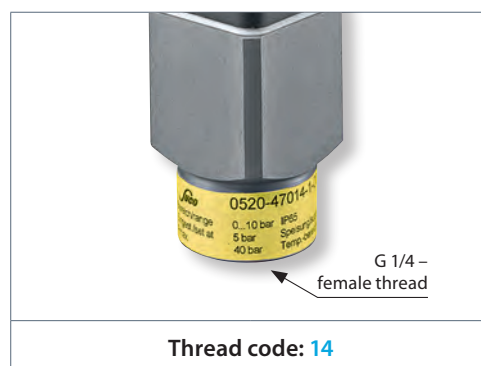


|     | no / nc |  |
|-----|---------|--|
| ○ 1 | (+)     |  |
| ○ 2 | (GND)   |  |
| ○ 3 | (OUT)   |  |

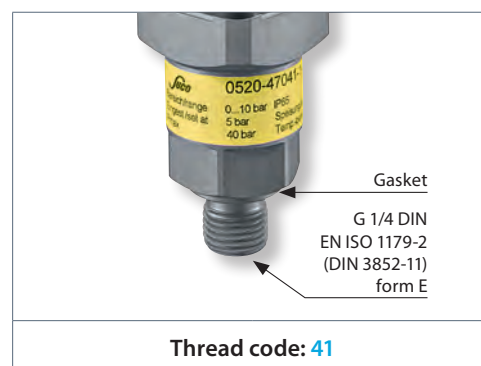
# 0520

Electrical connectors and threads

| DIN EN 175301-803-A (DIN 43650-A)                                 |                  |
|-------------------------------------------------------------------|------------------|
|                                                                   |                  |
| Pin                                                               | Assignment       |
| 1                                                                 | Uv+              |
| 2                                                                 | Gnd              |
| 3                                                                 | U <sub>out</sub> |
| PE                                                                | PE               |
| IP65<br>Cable output Pg9<br>(outside diameter of cable 6 to 9 mm) |                  |
| Order number: 001                                                 |                  |



| M 12x1 - DIN EN 61076-2-101-A |                  |
|-------------------------------|------------------|
|                               |                  |
| Pin                           | Assignment       |
| 1                             | Uv+              |
| 2                             | nc               |
| 3                             | Gnd              |
| 4                             | U <sub>out</sub> |
| IP67                          |                  |
| Order number: 002             |                  |



|  | Type | Adjustment range | Pressure connection | Seal material | Electrical connection |
|--|------|------------------|---------------------|---------------|-----------------------|
|--|------|------------------|---------------------|---------------|-----------------------|

## Type

|                            |      |
|----------------------------|------|
| Electronic pressure switch | 0520 |
|----------------------------|------|

Adjustment range<sup>1)</sup> for NO

|                                |     |
|--------------------------------|-----|
| 0 – 10 bar (approx. 145 PSI)   | 470 |
| 0 – 100 bar (approx. 1450 PSI) | 472 |
| 0 – 250 bar (approx. 3620 PSI) | 474 |

Adjustment range<sup>1)</sup> for NC

|                                |     |
|--------------------------------|-----|
| 0 – 10 bar (approx. 145 PSI)   | 471 |
| 0 – 100 bar (approx. 1450 PSI) | 473 |
| 0 – 250 bar (approx. 3620 PSI) | 475 |

## Pressure connection

|                                                    |    |
|----------------------------------------------------|----|
| G 1/4 – female thread                              | 14 |
| G 1/4 – ISO 1179-2 (DIN 3852), form E, male thread | 41 |

## Seal material – Application areas

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

## Electrical connection

|                                                            |     |
|------------------------------------------------------------|-----|
| DIN EN 175301-803-A (DIN 43650-A) ; socket device included | 001 |
| M 12x1 - DIN EN 61076-2-101-A                              | 002 |

|               |      |     |    |   |     |
|---------------|------|-----|----|---|-----|
| Order number: | 0520 | 47X | XX | X | XXX |
|---------------|------|-----|----|---|-----|

Also available factory adjusted. If you require factory adjustment, please state switching point and hysteresis when ordering.

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Value refers to the hydraulic or pneumatic part of the electronic pressure switch.



# Menu-controlled electronic pressure switches

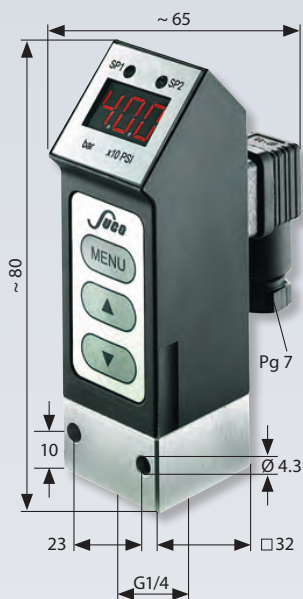
display



- Menu-controlled, simple programming of switching functions
- 2 switching outputs and 1 analogue output
- Numerous programming functions, such as
  - switching time delay
  - zero point reset
  - peak value memory
  - switching point counter
- Current pressure value and switching states shown on 3-digit display
- Very high switching currents up to 1.4 A

## Technical details

|                           |                                                                                                                                                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type:                     | <b>0570 Electronic pressure switches</b>                                                                                                              |
| Switching function:       | NC/NO, programmable, 2 switching points, switching time delay, zero point reset, peak value memory (within adjustment range), switching point counter |
| Settings:                 | Programmable using keypad on front                                                                                                                    |
| Outputs:                  | 2 transistor outputs (each 1.4 A DC12 / PNP)<br>1 analogue output (4 – 20 mA)                                                                         |
| Supply voltage $U_B$ :    | 12 – 30 VDC                                                                                                                                           |
| Switching status display: | 2 LEDs (yellow)                                                                                                                                       |
| Pressure display:         | Current pressure displayable in bar or PSI on 3-digit LED (red)                                                                                       |
| Life expectancy:          | 5,000,000 pulsations at rise rates to 1 bar/ms at $p_{nom}$                                                                                           |
| Pressure rise rate:       | $\leq 1 \text{ bar/ms}$                                                                                                                               |
| Switching time:           | $< 4 \text{ ms}$                                                                                                                                      |
| Switching time delay:     | Adjustable between 0 and 3.0 s                                                                                                                        |
| Hysteresis:               | 1 – 99 % FS, programmable from keypad                                                                                                                 |
| Accuracy:                 | $\pm 0.5 \%$ (FS at room temperature)                                                                                                                 |
| Accuracy, display:        | $\pm 0.5 \%$ (FS at room temperature) $\pm 2$ digits                                                                                                  |
| Temperature drift:        | $\pm 0.2 \%$ / $1^\circ\text{C}$                                                                                                                      |
| Temperature range:        | NBR, EPDM: $-20^\circ\text{C} \dots +80^\circ\text{C}$                                                                                                |
|                           | FKM: $-5^\circ\text{C} \dots +80^\circ\text{C}$                                                                                                       |
| Temperature compensation: | $-20^\circ\text{C} \dots +80^\circ\text{C}$ , error $\leq \pm 1.5 \%$ overall                                                                         |
| Materials:                | Wetted parts anodised aluminium,<br>body made of die-casted zinc                                                                                      |
| Vibration resistance:     | 10 g at 5 ... 2000 Hz sine wave; DIN EN 60068-2-6                                                                                                     |
| Shock resistance:         | 294 m/s <sup>2</sup> ; 11 ms half sine wave; DIN EN 60068-2-27                                                                                        |
| Protection class:         | IP65                                                                                                                                                  |
| EMV:                      | acc. to EN 50081-1, EN 50081-2, EN 50082-2                                                                                                            |
| Weight:                   | approx. 340 g                                                                                                                                         |
| Access pin:               | The switch can be protected with a pin between 1 and 999                                                                                              |



## 0570

### Electronic pressure switches

- Anodised aluminium and die-casted zinc
- Ceramic measuring cell in thick-film technology
- Supply voltage 12 ... 30 VDC
- Overpressure protection to 20 / 150 / 600 bar<sup>1)</sup>
- Programmable using keypad on front
- Switching time delay (setting from 0 to 3 s)
- Peak value memory (within the measurement range)
- Pin protection possible to prevent misuse
- Socket device included

| pmax.<br>in bar | Burst pressure<br>in bar | Adjustment<br>range in bar | Thread | Order number: |
|-----------------|--------------------------|----------------------------|--------|---------------|
|-----------------|--------------------------|----------------------------|--------|---------------|

#### 0570 Electronic switches

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

#### Seal material – Application areas

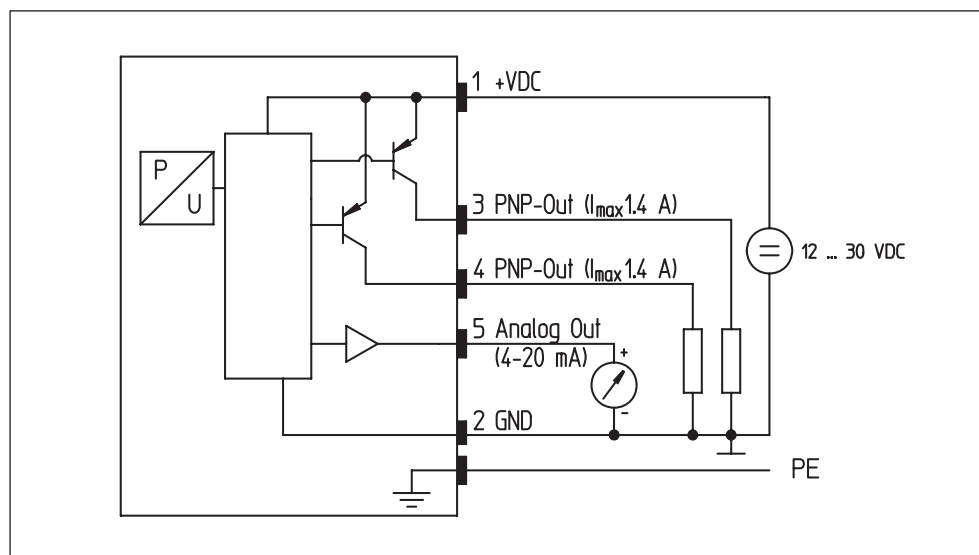
|             |                                                         |          |
|-------------|---------------------------------------------------------|----------|
| <b>NBR</b>  | Hydraulic/machine oil, heating oil, air, nitrogen, etc. | <b>1</b> |
| <b>EPDM</b> | Brake fluid, water, acetylene,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

Refer to page 119 for the temperature range and application thresholds of sealing materials



**Order number:** 0570 – XXX 14 – X – 001

#### Wiring chart



<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the electronic pressure switch.



# Electronic pressure switches, High-Performance series

hex 22 with one switching output



- Outstanding overpressure protection (up to 4 x)
- Ideal choice for mobile hydraulic applications
- Long service life even under high pressure change rates
- Wetted parts made of stainless steel and titanium ensuring excellent media compatibility
- All welded design, no elastomeric seal
- Silicon-on-sapphire technology (SoS) for highest reliability, accuracy and reliable process monitoring
- Very low temperature error and very good long-term stability
- Adjustment of switching point and hysteresis at factory

For versions with 2 switching outputs,  
please refer to chapter E.6, page 126



## Technical details

|                                                                             |                                                                                                                                                                                               |            |             |                                          |             |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|------------------------------------------|-------------|
| Type                                                                        | 0530 NO<br>0531 NC                                                                                                                                                                            |            |             | 0532 NO<br>0533 NC                       |             |
| Number of transistor outputs:                                               | 1 PNP output (High Side N-channel MOSFET)                                                                                                                                                     |            |             | 1 NPN output (Low Side N-channel MOSFET) |             |
| Supply voltage:                                                             | 9.6 – 32 VDC                                                                                                                                                                                  |            |             |                                          |             |
| Idle power consumption:                                                     | < 15 mA                                                                                                                                                                                       |            |             |                                          |             |
| Standard adjustment range p <sub>nom</sub> :                                | 0 – 10 bar                                                                                                                                                                                    | 0 – 25 bar | 0 – 100 bar | 0 – 250 bar                              | 0 – 600 bar |
| Overpressure protection p <sub>u</sub> <sup>1)</sup> :                      | 40 bar                                                                                                                                                                                        | 100 bar    | 400 bar     | 1,000 bar                                | 1,650 bar   |
| Burst pressure <sup>1)</sup> :                                              | 80 bar                                                                                                                                                                                        | 200 bar    | 800 bar     | 2,000 bar                                | 2,000 bar   |
| Mechanical life expectancy:                                                 | 10,000,000 pulsations at rise rates to 5 bar/ms at p <sub>nom</sub>                                                                                                                           |            |             |                                          |             |
| Permitted pressure change rate:                                             | ≤ 5 bar / ms                                                                                                                                                                                  |            |             |                                          |             |
| Switching point adjustment range:                                           | 2 ... 100 % of the nominal pressure range (Full Scale, FS), programmable at factory                                                                                                           |            |             |                                          |             |
| Hysteresis:                                                                 | 0.2 ... 99.8 % of the nominal pressure range (FS), programmable at factory (set to 5% of the switching point as standard)                                                                     |            |             |                                          |             |
| Accuracy:                                                                   | ±0.5 % of the nominal pressure range (FS) at room temperature, ±0.25 % BFSL                                                                                                                   |            |             |                                          |             |
| Resolution:                                                                 | 0.1 % of the nominal pressure range (FS)                                                                                                                                                      |            |             |                                          |             |
| Switching delay:                                                            | ON (0 ... 0.5 s) / OFF (0 ... 2 s) delay in increments of 1 ms, irrespective of switching point, programmable at factory (specify value when ordering, otherwise default value of 0 s is set) |            |             |                                          |             |
| Output:                                                                     | 0.5 A transistor output with short-circuit and overvoltage protection                                                                                                                         |            |             |                                          |             |
| Operating mode:                                                             | With hysteresis or window mode, programmable at factory                                                                                                                                       |            |             |                                          |             |
| Long term stability:                                                        | ±0.1 % FS p. a.                                                                                                                                                                               |            |             |                                          |             |
| Repeatability <sup>1)</sup> :                                               | ±0.1 % FS                                                                                                                                                                                     |            |             |                                          |             |
| Temperature error <sup>1)</sup> :                                           | ±0.02 % / 1 K FS                                                                                                                                                                              |            |             |                                          |             |
| Compensated temperature range:                                              | -20 °C ... +80 °C (-4 °F ... +176 °F)                                                                                                                                                         |            |             |                                          |             |
| Temperature range media:                                                    | -40 °C ... +125 °C (-40 °F ... +257 °F)                                                                                                                                                       |            |             |                                          |             |
| Temperature range ambient:                                                  | -40 °C ... +100 °C (-40 °F ... +212 °F)                                                                                                                                                       |            |             |                                          |             |
| Wetted parts material:                                                      | Stainless steel 1.4305 (AISI 303) and titanium                                                                                                                                                |            |             |                                          |             |
| Housing material:                                                           | Stainless steel 1.4305 (AISI 303)                                                                                                                                                             |            |             |                                          |             |
| Insulation resistance:                                                      | > 100 MΩ (500 VDC, Ri > 42 Ω)                                                                                                                                                                 |            |             |                                          |             |
| Switching time:                                                             | < 2 ms                                                                                                                                                                                        |            |             |                                          |             |
| Vibration resistance:                                                       | 20 g at 4 ... 2000 Hz sine wave; DIN EN 60068-2-6                                                                                                                                             |            |             |                                          |             |
| Shock resistance:                                                           | half sine wave 500 m/s <sup>2</sup> ; 11 ms; DIN EN 60068-2-27                                                                                                                                |            |             |                                          |             |
| Protection class:                                                           | Refer to the electrical connections                                                                                                                                                           |            |             |                                          |             |
| EMC:                                                                        | EMC 2014/30/EU, EN 61000-6-2:2005, EN 61000-6-3:2007                                                                                                                                          |            |             |                                          |             |
| Protection against reverse polarity, short-circuit and over voltage surges: | built-in                                                                                                                                                                                      |            |             |                                          |             |
| Weight:                                                                     | approx. 80 g (DIN 175301 approx. 110 g, cable version approx. 135 g)                                                                                                                          |            |             |                                          |             |

<sup>1)</sup> Within the compensated temperature range.

<sup>2)</sup> Static pressure. Dynamic value is 30 to 50 % lower. Values refer to the hydraulic/pneumatic part of the electronic pressure switch.

# E.5

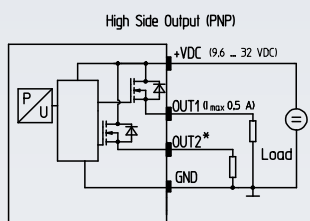
hex 22  
High Performance  
1 switching output

## 0530 / 0531 / 0532 / 0533

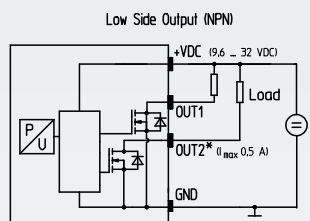
Electrical connectors and threads



### Connection diagrams



Pin assignment depending on electr. connection  
\*OUT2 only for 054x

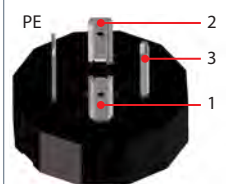


Pin assignment depending on electr. connection  
\*OUT2 only for 054x

Technical modifications and errors excepted.



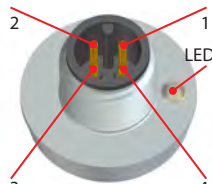
#### DIN EN 175301-803-A



| Pin | Assignment |
|-----|------------|
| 1   | Uv+        |
| 2   | Out        |
| 3   | Gnd        |
| PE  |            |

IP65  
x ~ 60 / 76 mm\*  
d ~ Ø 30 mm  
Order number: 001

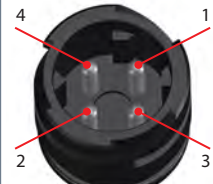
#### M 12 – DIN EN 61076-2-101 A



| Pin | Assignment |
|-----|------------|
| 1   | Uv+        |
| 2   | nc         |
| 3   | Gnd        |
| 4   | Out        |

IP67  
x ~ 54 mm  
d ~ Ø 22 mm  
Order number: 002

#### ISO 15170-A1-4.1



| Pin | Assignment |
|-----|------------|
| 1   | Uv+        |
| 2   | nc         |
| 3   | Gnd        |
| 4   | Out        |

IP67, IP6K9K  
x ~ 65 mm mm  
d ~ Ø 27 mm  
Order number: 004

#### AMP Superseal

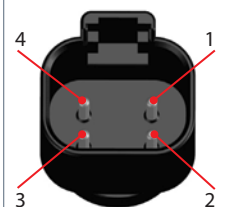


| Pin | Assignment |
|-----|------------|
| 1   | Out        |
| 2   | Gnd        |
| 3   | Uv+        |

IP67  
x ~ 73 mm  
d ~ Ø 26 mm  
Order number: 007

\* without coupler socket x ~ 60 mm, with coupler socket x ~ 76 mm

#### DEUTSCH DT04-4P



| Pin | Assignment |
|-----|------------|
| 1   | Gnd        |
| 2   | Uv+        |
| 3   | nc         |
| 4   | Out        |

IP67, IP6K9K  
x ~ 74 mm  
d ~ Ø 23 mm  
Order number: 008

#### DEUTSCH DT04-3P



| Pin | Assignment |
|-----|------------|
| A   | Uv+        |
| B   | Gnd        |
| C   | Out        |

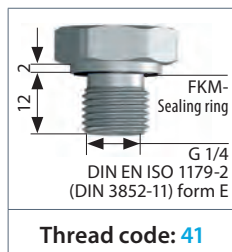
IP67, IP6K9K  
x ~ 74 mm  
d ~ Ø 23 mm  
Order number: 010

#### Cable connection

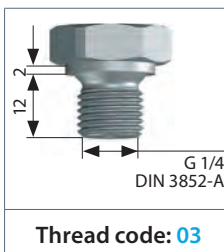


| Cable | Assignment |
|-------|------------|
| red   | Uv+        |
| white | Out        |
| black | Gnd        |

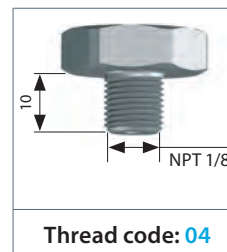
IP67  
x ~ 44 mm  
(+ 20 mm bend relief)  
cable length ~ 2 m  
d ~ Ø 22 mm  
Order number: 011



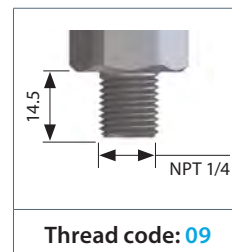
Thread code: 41



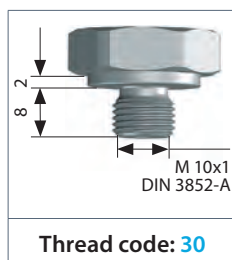
Thread code: 03



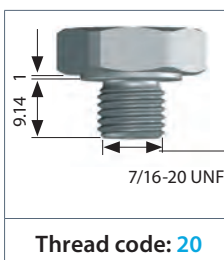
Thread code: 04



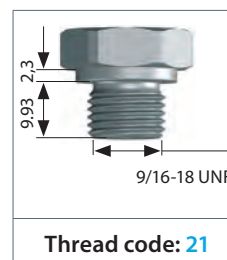
Thread code: 09



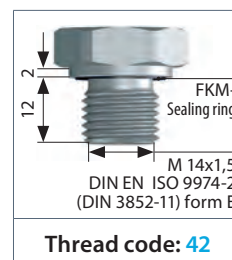
Thread code: 30



Thread code: 20



Thread code: 21



Thread code: 42

# 0530 / 0531 / 0532 / 0533

## Order matrix for electronic pressure switches

E.5

hex 22  
High Performance  
1 switching output



|                            | Type | Pressure range | Pressure connection | Pressure unit | Electrical connection |
|----------------------------|------|----------------|---------------------|---------------|-----------------------|
| Type                       | ↓    | ↓              | ↓                   | ↓             | ↓                     |
| PNP output (High Side), NO | 0530 |                |                     |               |                       |
| PNP output (High Side), NC | 0531 |                |                     |               |                       |
| NPN output (Low Side), NO  | 0532 |                |                     |               |                       |
| NPN output (Low Side), NC  | 0533 |                |                     |               |                       |

| Max. overpressure <sup>2)</sup> | Burst pressure | Adjustment range <sup>1)</sup>  |     |
|---------------------------------|----------------|---------------------------------|-----|
| 40 bar                          | 80 bar         | 0 – 10 bar (approx. 145 PSI)    | 101 |
| 100 bar                         | 200 bar        | 0 – 25 bar (approx. 362 PSI)    | 251 |
| 400 bar                         | 800 bar        | 0 – 100 bar (approx. 1,450 PSI) | 102 |
| 1,000 bar                       | 2,000 bar      | 0 – 250 bar (approx. 3,620 PSI) | 252 |
| 1,650 bar                       | 2,000 bar      | 0 – 600 bar (approx. 8,700 PSI) | 602 |

Pressure connection ↓

|                                                   |    |
|---------------------------------------------------|----|
| G 1/4 – DIN EN ISO 1179-2 (DIN 3852-11) form E    | 41 |
| G 1/4 – DIN 3852-A                                | 03 |
| NPT 1/8                                           | 04 |
| NPT 1/4                                           | 09 |
| M 10x1 cyl. DIN 3852-A                            | 30 |
| 7/16-20 UNF                                       | 20 |
| 9/16-18 UNF                                       | 21 |
| M 14x1.5 – DIN EN ISO 9974-2 (DIN 3852-11) form E | 42 |

Pressure unit ↓

|     |   |
|-----|---|
| bar | B |
|-----|---|

Electrical connection ↓

|                                                           |     |
|-----------------------------------------------------------|-----|
| DIN EN 175301-803-A (DIN 43650-A); socket device included | 001 |
| M 12 – DIN EN 61076-2-101 A                               | 002 |
| Bayonet ISO 15170-A1-4.1 (DIN 72585-A1-4.1)               | 004 |
| AMP Superseal 1.5®                                        | 007 |
| Deutsch DT04-4P                                           | 008 |
| Deutsch DT04-3P                                           | 010 |
| Cable connection (length of cable 2 m standard)           | 011 |

|               | Type | Pressure range | Pressure connection | Pressure unit | Electrical connection |
|---------------|------|----------------|---------------------|---------------|-----------------------|
| Order number: | 05XX | XXX            | XX                  | B             | XXX                   |

<sup>1)</sup> Please state switching point and hysteresis when ordering.

<sup>2)</sup> Static pressure, dynamic pressure 30 to 50% lower. Value refers to the hydraulic or pneumatic part of the electronic pressure switch.



## E.6

hex 22  
High Performance

2 switching outputs

# Electronic pressure switches, High-Performance series

hex 22 with two switching outputs



- Outstanding overpressure protection (up to 4 x)
- Ideal choice for mobile hydraulic applications
- Long service life even under high pressure change rates
- Wetted parts made of stainless steel and titanium ensuring excellent media compatibility
- All welded design, no elastomeric seal
- Silicon-on-sapphire technology (SoS) for highest reliability, accuracy and reliable process monitoring
- Very low temperature error and very good long-term stability
- Adjustment of switching point and hysteresis at factory

## Technical details

|                                                            |                                                                                                                                                                                               |            |             |                                              |             |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|----------------------------------------------|-------------|
| Type                                                       | 0540 NO / NO<br>0541 NC / NC<br>0542 NO / NC                                                                                                                                                  |            |             | 0544 NO / NO<br>0545 NC / NC<br>0546 NO / NC |             |
| Number of transistor outputs:                              | 2 PNP outputs (High Side N-channel MOSFET)                                                                                                                                                    |            |             | 2 NPN outputs (Low Side N-channel MOSFET)    |             |
| Supply voltage:                                            | 9.6 – 32 VDC                                                                                                                                                                                  |            |             |                                              |             |
| Idle power consumption:                                    | < 15 mA                                                                                                                                                                                       |            |             |                                              |             |
| Standard-Adjustment range p <sub>nom</sub> :               | 0 – 10 bar                                                                                                                                                                                    | 0 – 25 bar | 0 – 100 bar | 0 – 250 bar                                  | 0 – 600 bar |
| Overpressure protection p <sub>u</sub> <sup>1)</sup> :     | 40 bar                                                                                                                                                                                        | 100 bar    | 400 bar     | 1,000 bar                                    | 1,650 bar   |
| Burst pressure <sup>1)</sup> :                             | 80 bar                                                                                                                                                                                        | 200 bar    | 800 bar     | 2,000 bar                                    | 2,000 bar   |
| Mechanical life expectancy:                                | 10,000,000 pulsations at rise rates to 5 bar/ms at p <sub>nom</sub>                                                                                                                           |            |             |                                              |             |
| Permitted pressure change rate:                            | ≤ 5 bar / ms                                                                                                                                                                                  |            |             |                                              |             |
| Switching point adjustment range:                          | 2 ... 100 % of the nominal pressure range (Full Scale, FS), programmable at factory                                                                                                           |            |             |                                              |             |
| Hysteresis:                                                | 0.2 ... 99.8 % of the nominal pressure range (Full Scale, FS), programmable at factory (5 % of the switching point is set as standard)                                                        |            |             |                                              |             |
| Accuracy:                                                  | ±0.5 % of the nominal pressure range (FS) at room temperature, ±0.25 % BFSL                                                                                                                   |            |             |                                              |             |
| Resolution:                                                | 0.1 % of the nominal pressure range (FS)                                                                                                                                                      |            |             |                                              |             |
| Switching delay:                                           | ON (0 ... 0.5 s) / OFF (0 ... 2 s) delay in increments of 1 ms, irrespective of switching point, programmable at factory (specify value when ordering, otherwise default value of 0 s is set) |            |             |                                              |             |
| Output:                                                    | 0.5 A transistor output with short-circuit and overvoltage protection                                                                                                                         |            |             |                                              |             |
| Long term stability:                                       | ±0.1 % FS p. a.                                                                                                                                                                               |            |             |                                              |             |
| Repeatability <sup>1)</sup> :                              | ±0.1 % FS                                                                                                                                                                                     |            |             |                                              |             |
| Temperature error <sup>1)</sup> :                          | ±0.02 % / 1 K FS                                                                                                                                                                              |            |             |                                              |             |
| Compensated temperature range:                             | -20 °C ... +80 °C (-4 °F ... +176 °F)                                                                                                                                                         |            |             |                                              |             |
| Temperature range media:                                   | -40 °C ... +125 °C (-40 °F ... +257 °F)                                                                                                                                                       |            |             |                                              |             |
| Temperature range ambient:                                 | -40 °C ... +100 °C (-40 °F ... +212 °F)                                                                                                                                                       |            |             |                                              |             |
| Wetted parts material:                                     | Stainless steel 1.4305 (AISI 303) and titanium                                                                                                                                                |            |             |                                              |             |
| Housing material:                                          | Stainless steel 1.4305 (AISI 303)                                                                                                                                                             |            |             |                                              |             |
| Insulation resistance:                                     | > 100 MΩ (500 VDC, Ri > 42 Ω)                                                                                                                                                                 |            |             |                                              |             |
| Switching time:                                            | < 2 ms                                                                                                                                                                                        |            |             |                                              |             |
| Vibration resistance:                                      | 20 g at 4 ... 2000 Hz sine wave; DIN EN 60068-2-6                                                                                                                                             |            |             |                                              |             |
| Shock resistance:                                          | half sine wave 500 m/s <sup>2</sup> ; 11 ms; DIN EN 60068-2-27                                                                                                                                |            |             |                                              |             |
| Protection class:                                          | Refer to the electrical connections                                                                                                                                                           |            |             |                                              |             |
| EMC:                                                       | EMC 2014/30/EU, EN 61000-6-2:2005, EN 61000-6-3:2007                                                                                                                                          |            |             |                                              |             |
| Short-circuit, overvoltage and reverse polarity protection | Built-in                                                                                                                                                                                      |            |             |                                              |             |
| Weight:                                                    | approx. 80 g (DIN 175301 approx. 110 g, cable version approx. 135 g)                                                                                                                          |            |             |                                              |             |

<sup>1)</sup> Within the compensated temperature range.

<sup>2)</sup> Static pressure. Dynamic value is 30 to 50 % lower. Values refer to the hydraulic/pneumatic part of the electronic pressure switch.

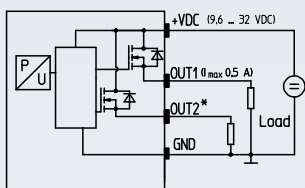
# E.6

hex 22  
High Performance  
2 switching outputs



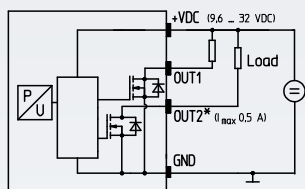
## Connection diagrams

High Side Output (PNP)



Pin assignment depending on electr. connection  
\*OUT2 only for 054x

Low Side Output (NPN)



Pin assignment depending on electr. connection  
\*OUT2 only for 054x

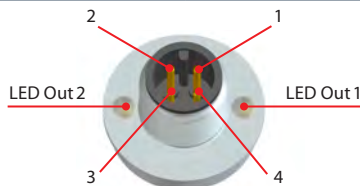
Technical modifications and errors excepted.



# 0540 / 0541 / 0542 / 0544 / 0545 / 0546

Electrical connectors and threads

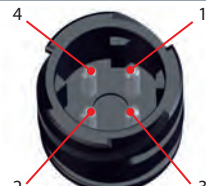
## M 12 – DIN EN 61076-2-101 A



| Pin | Assignment |
|-----|------------|
| 1   | Uv+        |
| 2   | Out 2      |
| 3   | Gnd        |
| 4   | Out 1      |

IP67  
x ~ 54 mm  
d ~ Ø 22 mm  
**Order number: 002**

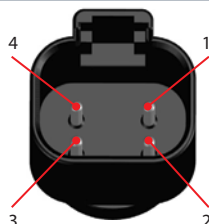
## ISO 15170-A1-4.1



| Pin | Assignment |
|-----|------------|
| 1   | Uv+        |
| 2   | Out 2      |
| 3   | Gnd        |
| 4   | Out 1      |

IP67, IP6K9K  
x ~ 65 mm  
d ~ Ø 27 mm  
**Order number: 004**

## DEUTSCH DT04-4P



| Pin | Assignment |
|-----|------------|
| 1   | Gnd        |
| 2   | Uv+        |
| 3   | Out 2      |
| 4   | Out 1      |

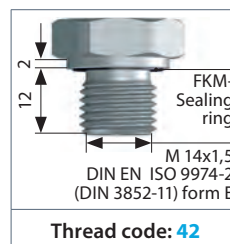
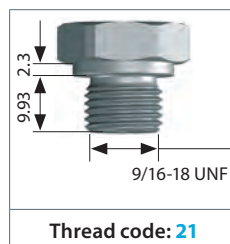
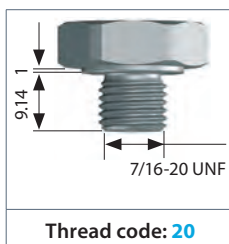
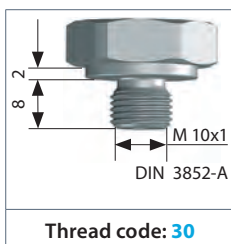
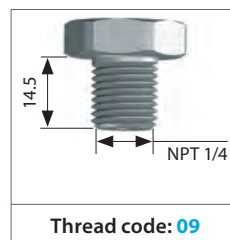
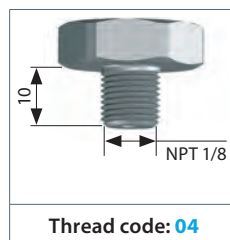
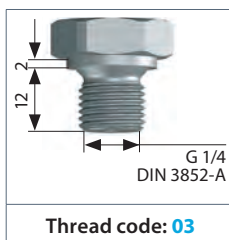
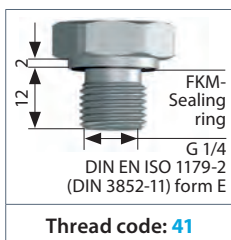
IP67, IP6K9K  
x ~ 74 mm  
d ~ Ø 23 mm  
**Order number: 008**

## Cable connection



| Cable | Assignment |
|-------|------------|
| brown | Uv+        |
| white | Out 2      |
| black | Out 1      |
| blue  | Gnd        |

IP67  
x ~ 44 mm (+ 20 mm bend relief)  
Cable length ~ 2 m  
d ~ Ø 22 mm  
**Order number: 011**





# 0540 / 0541 / 0542 / 0544 / 0545 / 0546

## Order matrix for electronic pressure switches

E.6

hex 22

High Performance

2 switching outputs



|  | Type | Pressure range | Pressure connection | Pressure unit | Electrical connection |
|--|------|----------------|---------------------|---------------|-----------------------|
|--|------|----------------|---------------------|---------------|-----------------------|

### Type

|                                         |      |
|-----------------------------------------|------|
| PNP output (High Side), NO / NO (NO/NO) | 0540 |
| PNP output (High Side), NC / NC (NC/NC) | 0541 |
| PNP output (High Side), NO / NC (NO/NC) | 0542 |
| NPN output (Low Side), NO / NO (NO/NO)  | 0544 |
| NPN output (Low Side), NC / NC (NC/NC)  | 0545 |
| NPN output (Low Side), NO / NC (NO/NC)  | 0546 |

| Max. overpressure <sup>2)</sup> | Burst pressure | Adjustment range <sup>1)</sup>  |     |
|---------------------------------|----------------|---------------------------------|-----|
| 40 bar                          | 80 bar         | 0 – 10 bar (approx. 145 PSI)    | 101 |
| 100 bar                         | 200 bar        | 0 – 25 bar (approx. 362 PSI)    | 251 |
| 400 bar                         | 800 bar        | 0 – 100 bar (approx. 1,450 PSI) | 102 |
| 1,000 bar                       | 2,000 bar      | 0 – 250 bar (approx. 3,620 PSI) | 252 |
| 1,650 bar                       | 2,000 bar      | 0 – 600 bar (approx. 8,700 PSI) | 602 |

### Pressure connection

|                                                   |    |
|---------------------------------------------------|----|
| G 1/4 – DIN EN ISO 1179-2 (DIN 3852-11) form E    | 41 |
| G 1/4 – DIN 3852-A                                | 03 |
| NPT 1/8                                           | 04 |
| NPT 1/4                                           | 09 |
| M 10x1 cyl. DIN 3852-A                            | 30 |
| 7/16-20 UNF                                       | 20 |
| 9/16-18 UNF                                       | 21 |
| M 14x1,5 – DIN EN ISO 9974-2 (DIN 3852-11) form E | 42 |

### Pressure unit

|     |   |
|-----|---|
| bar | B |
|-----|---|

### Electrical connection

|                                                 |     |
|-------------------------------------------------|-----|
| M 12 – DIN EN 61076-2-101 A                     | 002 |
| Bayonet ISO 15170-A1-4.1 (DIN 72585-A1-4.1)     | 004 |
| Deutsch DT04-4P                                 | 008 |
| Cable connection (length of cable 2 m standard) | 011 |

|               |      |     |    |   |     |
|---------------|------|-----|----|---|-----|
| Order number: | 05XX | XXX | XX | B | XXX |
|---------------|------|-----|----|---|-----|

<sup>1)</sup> Please state switching point and hysteresis when ordering.

<sup>2)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the electronic pressure switch.



# Accessories

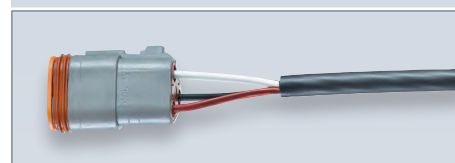


- High-quality accessories
- Developed for our products
- Aligned to our products
- Direct from the manufacturer

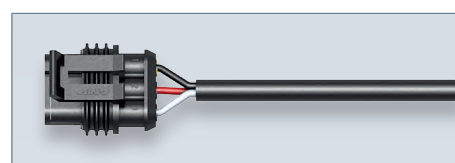
# Accessories

## Mating plugs

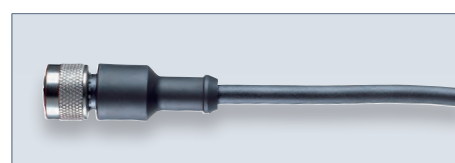
|                                                                                                 |                                                                     |                                        |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|
| <b>Deutsch DT06-3S</b><br><b>(for DT04-3P)</b><br>3 x 0.5 mm <sup>2</sup> PUR cable (2 m), IP67 | Suitable for connector code<br><b>010</b><br><b>Deutsch DT04-3P</b> | Order number:<br><b>1-1-36-653-160</b> |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|



|                                                                                        |                                                                        |                                        |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------|
| <b>TE AMP Superseal 1.5®, 3-pin</b><br>3 x 0.5 mm <sup>2</sup> Radox cable (2 m), IP65 | Suitable for connector code<br><b>007</b><br><b>AMP Superseal 1.5®</b> | Order number:<br><b>1-1-32-653-158</b> |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------|



|                                                                                       |                                                                              |                                        |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|
| <b>M12 DIN EN 61076-2-LF, 4-pin</b><br>4 x 0.34 mm <sup>2</sup> PUR cable (2 m), IP65 | Suitable for connector code<br><b>002</b><br><b>M12 DIN EN 61076-2-101 A</b> | Order number:<br><b>1-1-00-653-162</b> |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|



|                                                                                                                    |                                                                              |                                        |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|
| <b>M 12x1 DIN EN 61071-2-101 D straight, 4-pin</b><br>Terminals for wire diameter<br>0.75 mm <sup>2</sup> (AWG 18) | Suitable for connector code<br><b>002</b><br><b>M12 DIN EN 61076-2-101 A</b> | Order number:<br><b>1-6-00-652-016</b> |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|



|                                                                                                                                           |                                                                              |                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|
| <b>Coupler socket</b><br><b>M 12x1 DIN EN 61071-2-101 D Angled, 4-pin</b><br>Terminals for wire diameter<br>0.75 mm <sup>2</sup> (AWG 18) | Suitable for connector code<br><b>002</b><br><b>M12 DIN EN 61076-2-101 A</b> | Order number:<br><b>1-6-00-652-017</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|



E.7

Accessories



E

# Thread adapters

For requirements at short notice and for realising custom solutions

- The materials and shapes of thread adapters are aligned perfectly to our electronic pressure switches and transmitters
- Thread adapters are provided together with seals to ensure safe and easy installation of our electronic pressure switches and transmitters

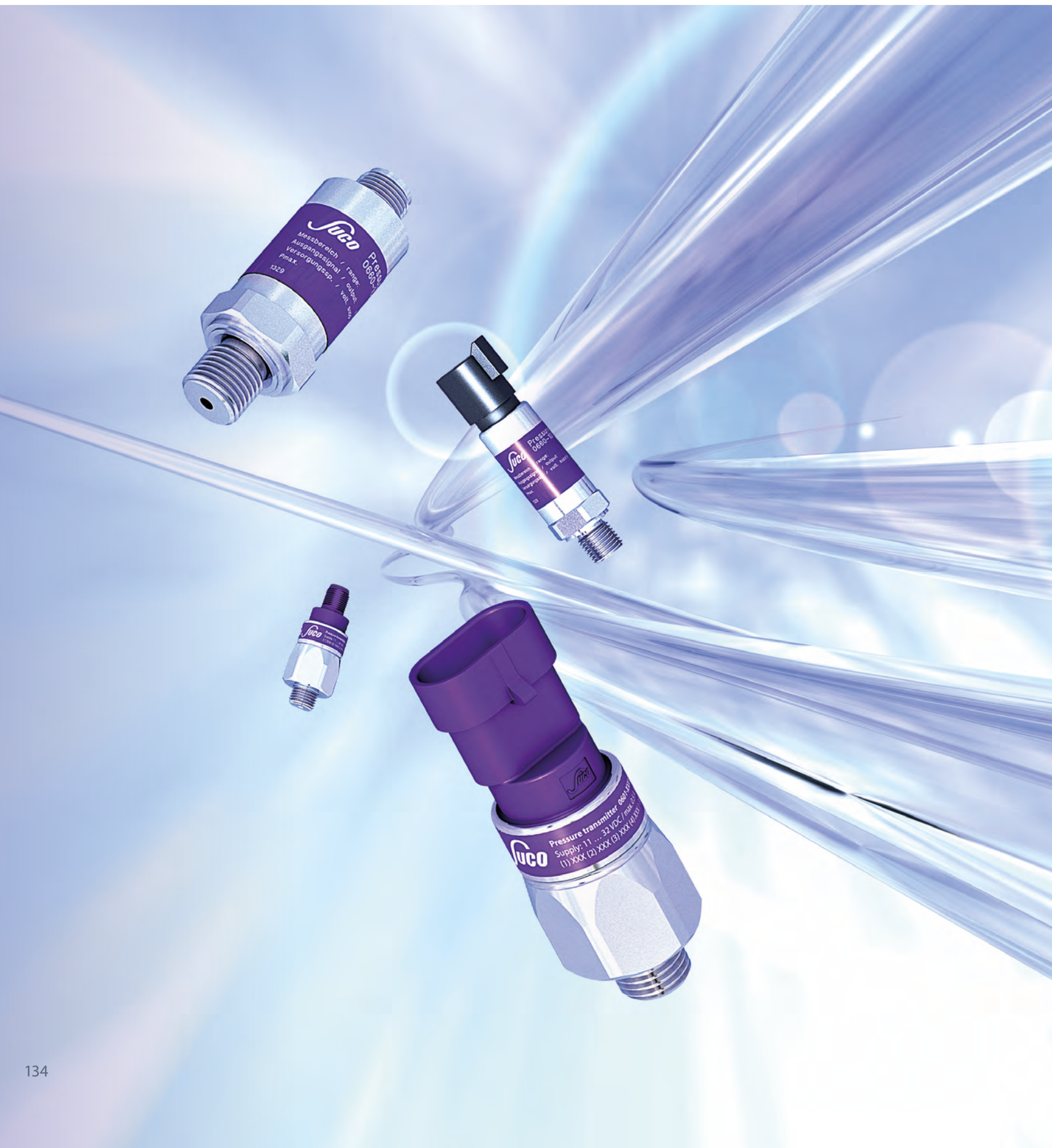


| Stainless steel 1.4305 / AISI 303 thread adapters        |                                                             |                |                                |
|----------------------------------------------------------|-------------------------------------------------------------|----------------|--------------------------------|
| G 1/4<br>DIN EN ISO 1179-1 (DIN 3852-E)<br>female thread |                                                             |                |                                |
|                                                          |                                                             |                |                                |
| M10 x 1 form A<br>DIN 3852-1                             | M14 x 1.5 form E<br>DIN 3852-E<br>incl.<br>sealing ring FKM | NPT 1/4-18     | 9/16-18UNF<br>incl. O-ring FKM |
| Order number:                                            | Order number:                                               | Order number:  | Order number:                  |
| 1-1-00-420-020                                           | 1-1-00-420-028                                              | 1-1-00-420-021 | 1-1-00-420-027                 |





# T • Pressure Transmitters







# T. Overview of pressure transmitters

## Technical explanations for pressure transmitters

from page 138

## Selection matrix

A guide to choosing the correct pressure transmitter

from page 143

## Pressure transmitters with ceramic measuring cell



### T.1. Pressure transmitters, Performance series, hex 24

from page 144

|                              |                                                                          |
|------------------------------|--------------------------------------------------------------------------|
| Standard pressure ranges:    | 0 – 2 bar, 0 – 4 bar, 0 – 10 bar, 0 – 16 bar,<br>0 – 40 bar, 0 – 100 bar |
| Overpressure protection:     | 2 x                                                                      |
| Output signal (alternative): | 0 – 10 V or<br>4 – 20 mA                                                 |
| Housing materials:           | Stainless steel 1.4305 (AISI 303)                                        |
| Sealing materials:           | NBR, EPDM, FKM                                                           |
| Thread:                      | G 1/4 E, NPT 1/4                                                         |
| Types:                       | 0601, 0602                                                               |

## Pressure transmitters with oil-filled measuring cell



### T.2. Robust pressure transmitter, hex 22, stainless steel „303“

from page 148

|                              |                                                                                                             |
|------------------------------|-------------------------------------------------------------------------------------------------------------|
| Standard pressure ranges:    | -1 – 0 bar (vacuum),<br>0 – 1 bar, 0 – 4 bar, 0 – 6 bar, 0 – 10 bar,<br>0 – 16 bar, 0 – 40 bar, 0 – 100 bar |
| Overpressure protection:     | 2 x                                                                                                         |
| Output signal (alternative): | 0.5 – 4.5 V ratiometric or<br>0 – 10 V or<br>4 – 20 mA                                                      |
| Housing materials:           | Stainless steel 1.4305 (AISI 303)                                                                           |
| Sealing materials:           | NBR, FKM                                                                                                    |
| Thread:                      | G 1/4 E                                                                                                     |
| Types:                       | 0645, 0650, 0660                                                                                            |

**T.3. Robust pressure transmitter, hex 22, stainless steel „316 L“**

from page 152

Standard pressure ranges: -1 – 0 bar (vacuum),  
0 – 1 bar, 0 – 4 bar, 0 – 6 bar, 0 – 10 bar,  
0 – 16 bar, 0 – 40 bar, 0 – 100 bar

Overpressure protection: 2 x

Output signal (alternative): 0.5 – 4.5 V ratiometric or  
0 – 10 V or  
4 – 20 mA

Housing materials: Stainless steel 1.4404 (AISI 316 L)

Sealing materials: NBR, FKM

Thread: G 1/4 E

Types: 0675, 0680, 0690



Pressure transmitters with SoS technology



**T.4. Pressure transmitters, High-Performance series, hex 22**

from page 156

Standard pressure ranges: 0 – 10 bar, 0 – 16 bar, 0 – 25 bar, 0 – 40 bar,  
0 – 60 bar, 0 – 100 bar, 0 – 160 bar,  
0 – 250 bar, 0 – 400 bar, 0 – 600 bar

**Overpressure protection: Up to 4 x**

Output signal (alternative): 0.5 – 4.5 V ratiometric or  
0 – 10 V or  
4 – 20 mA

Housing materials: Stainless steel 1.4305 (AISI 303)

**Sealing materials: All welded, without elastomeric seal**

Thread: different male threads

Types: 0705, 0710, 0720



**T.5. Accessories**

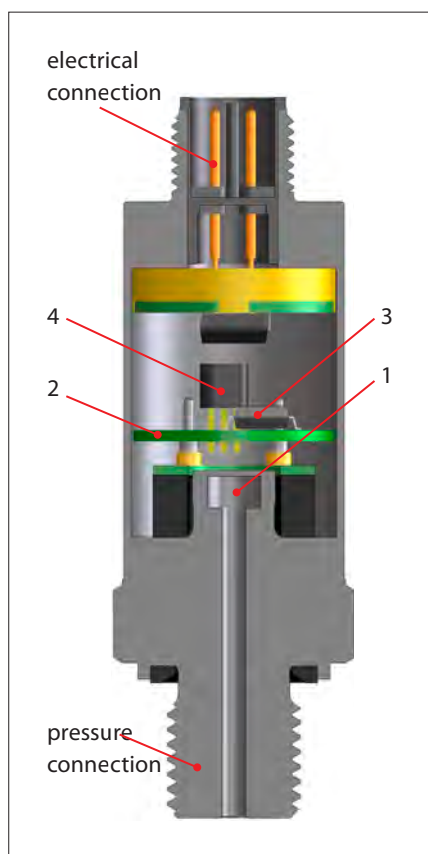
from page 160

- Mating plugs
- Thread-Adapters
- Display





# Technical explanations for pressure transmitters



## What is a pressure transmitter?

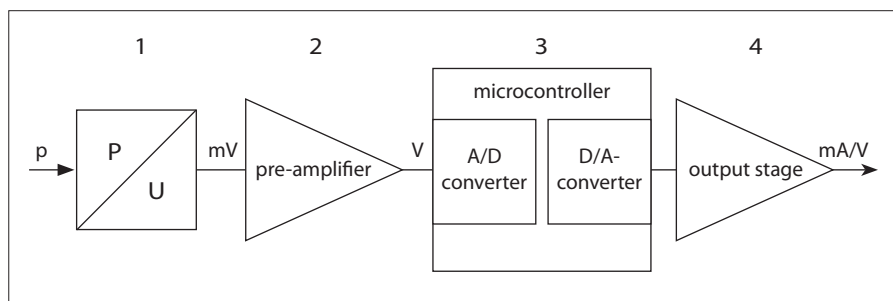
A pressure transmitter (also called pressure transducer or pressure converter) is a component used to convert a pneumatic or hydraulic pressure to an electric (usually analogue and linear) output signal, such as a current or voltage.

## How does a pressure transmitter work?

The pressure measuring cell fitted has a membrane (1) that is exposed to the pressure to be measured. Affixed on this membrane is a bridge circuit consisting of four ohmic resistors in the form of a Wheatstone bridge. The values of these resistors change proportionally to the pressure load present at the measuring cell or membrane. The bridge voltage of the measuring cell is amplified in the evaluation electronics (2) and processed digitally by a microcontroller (3).

The downstream output stage (4) converts this signal to the output signal required (such as 4 - 20 mA or 0 - 10 V).

## Block diagram:



## SoS technology

In the silicone-on-sapphire technology, the substrate of the thin film measuring cell is synthetic sapphire. This has excellent mechanical and temperature stable properties and prevents undesired parasitic effects, thereby having a positive effect on accuracy and stability. In conjunction with a titanium membrane, this results in virtually unique coaction between the temperature coefficients of sapphire and titanium.

This is because, unlike silicon and stainless steel, they are more closely matched and so only require a low level of compensation overhead. This also has a favourable effect on long-term stability.

## "Oil-filled" stainless steel measuring cell

In this measuring cell technology, the piezo-resistive measuring cell is packaged within a metallic housing filled with fluorine oil. This means the measuring cell is virtually free of external mechanical stress. Fluorine oil has excellent characteristics in regards to temperature and ageing behaviour, and is not flammable and so fits perfectly to oxygen applications. It is not recommended for food applications.

## Ceramic measuring cell / thick film technology

Ceramic thick film pressure measuring cells are made up of a sintered ceramic body. The ceramic body sleeve already has the key geometries for the subsequent pressure range. The membrane thickness required and thus, the pressure range required is established with grinding and lapping. The resistors are imprinted with thick film technology and interconnect to form a measuring bridge.

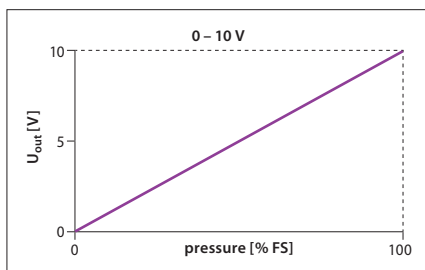
## Standard signals

Output signals 4 - 20 mA, 0 - 10 V and 0.5 - 4.5 V ratiometric in particular have established themselves in the industry. SUCO also offers transmitters with customer-specific output signals (such as 1 - 5 V).

### Voltage output 0 - 10 V

Transmitters with an output signal of 0 to 10 V are a commonly used variant due to their simple initial operation and straightforward scaling of the signal (0 V for 0 bar). The output load must be selected as highly resistive (with typical minimum value 4.7 kΩ). SUCO transmitters with voltage output have a 3-wire design.

The maximum connection length should not exceed 30 m to prevent significant voltage drops in the signal line.



Conversion formula for pressure and voltage:

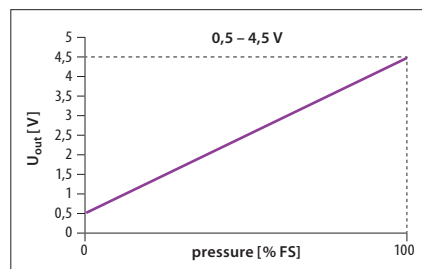
$$U_{\text{out}} = \frac{\text{pressure applied}}{\text{pressure range}} \times 10 \text{ V}$$

### Voltage output 0.5 – 4.5 V ratiometric

SUCO transmitters with ratiometric output are operated with a 5 V supply voltage as 3-wire configuration.

The output signal is directly proportional/dependent to/on the supply voltage; this is known as a ratiometric dependency. 0.5 – 4.5 V is established as an output voltage because many A/D converters work with reference voltage  $U_{V+}$  of 5 V. The output voltage 0.5 V equals to 10% and 4.5 V corresponds to 90% of the supply voltage. The span is therefore 80% of the supply voltage.

This variant is used for example when a transmitter and a downstream A/D converter as an evaluation unit are to be powered with the same reference / operating voltage.



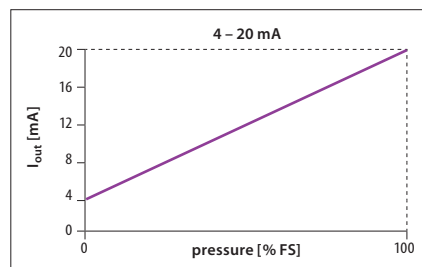
Conversion formula for pressure and voltage:

$$U_{\text{out}} = 0.1 \times U_{V+} + \frac{\text{pressure applied}}{\text{pressure range}} \times 0.8 \times U_{V+}$$

where  $U_{V+}$  = operating voltage

### Current output 4 – 20 mA

The most common analogue output signal of sensors is 4 – 20 mA current output (as 2-wire configuration). The advantage of a 4 – 20 mA output signal is the 4 mA offset which allows the monitoring of potential wire break and short-circuit (life zero signal). The signal can also be transmitted over long distances with no loss in accuracy. This variant is also the least sensitive to EMC factors. 2-wire technology also means wiring overhead is reduced.



Conversion formula for pressure and current:

$$I_{\text{out}} = 4 \text{ mA} + \frac{\text{pressure applied}}{\text{pressure range}} \times 16 \text{ mA}$$

### Load / apparent ohmic resistance for pressure transmitters

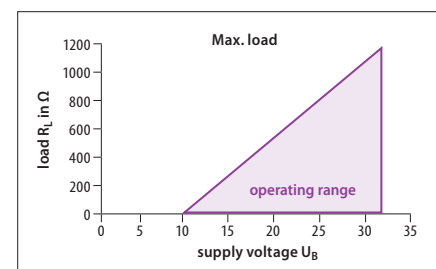
An appropriate ohmic load must be connected to guarantee perfect functioning of a pressure transmitter.

For transmitters with a voltage output (V), the load should be at least 4.7 kΩ.

For transmitters with a current output (4 – 20 mA), the maximum load is calculated using the following formula:

$$R_L = \frac{U_{V+} - U_{V+(\min)}}{20 \text{ mA}}$$

$U_{V+(\min)}$  is the minimum supply voltage - to be taken from the data sheet.  $U_{V+(\min)} = 10 \text{ V}$  gives the following operating range for example:



### Supply / operating voltage $U_B$

All pressure transmitters work with DC voltage and have no galvanic isolation. Within the thresholds specified in the relevant data sheet, the supply voltage may change without influencing the output signal. (the ratiometric variant is an exception).

To guarantee the functionality of a transmitter, the minimum supply voltage may not fall below. The maximum operating voltage may not be exceeded to avoid damage on the electronics.

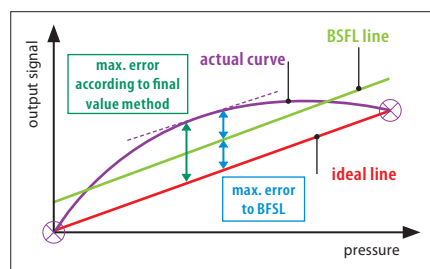
# Technical explanations for pressure transmitters

## Accuracy (to DIN EN 61298)

The (measuring) accuracy of pressure transmitters is specified by SUCO as  $\pm 0.5\%$  or  $\pm 1\%$  of the span (also called full scale). Accuracy includes zero point offset, non-linearity, hysteresis and non-repeatability, and is defined at room temperature and new state. This method defines the maximum deviation from the ideal line (in contrast to the BSFL method in which the average deviation is given). Other factors influencing the total accuracy, such as temperature and ageing, are specified separately.

## Non-linearity (to DIN EN 61298)

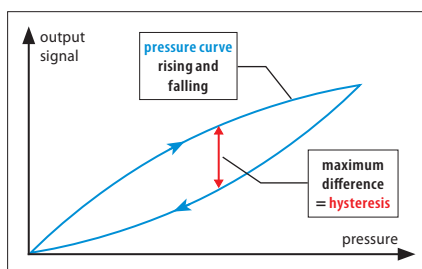
Non-linearity (also linearity) defines the deviation of the actual output curve from the theoretical ideal line. SUCO specifies the maximum error in relation to the overall span or full scale (FS) of the pressure range.



Non-linearity is also shown as BSFL (Best Fit Straight Line) as a reference value in the technical specifications. Non-linearity generally has the biggest influence on the overall error rate. Typically, non-linearity as per BSFL corresponds to half of non-linearity as per the full scale method ( $1\% \text{ FS} \sim 0.5\% \text{ BSFL}$ ).

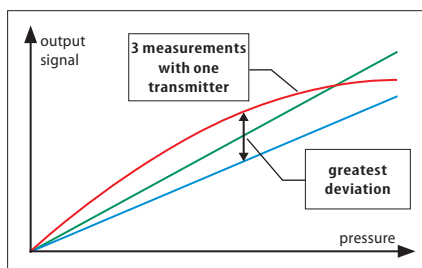
## Hysteresis (to DIN EN 61298)

For a pressure transmitter, hysteresis specifies the difference of output signal between a rising and falling pressure, and is typically very low and negligible for SUCO pressure transmitters.



## Non-repeatability (to DIN EN 61298)

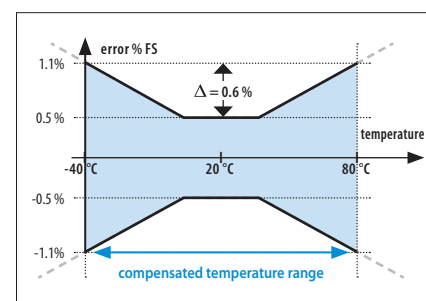
Non-repeatability defines reproducibility of the output signal. The pressure is attained three times for example - the maximum variance between these three values gives the non-repeatability.



## Temperature errors and ranges

The temperature (both of the medium and ambience) generally has a significant influence on the accuracy of a pressure transmitter. Pressure transmitters are temperature compensated over a particular range corresponding to the typical application. This means that temperature errors within this temperature range are minimised by means of circuitry design and algorithms. The temperature error is added to the accuracy, and shown in the total error band of the pressure transmitter, also called *butterfly graph*. Outside the compensated temperature range, the maximum error is not defined, however the pressure transmitter still functions.

To prevent mechanical and electrical damage, pressure transmitters may not be deployed beyond the threshold temperature ranges specified in the data sheet.

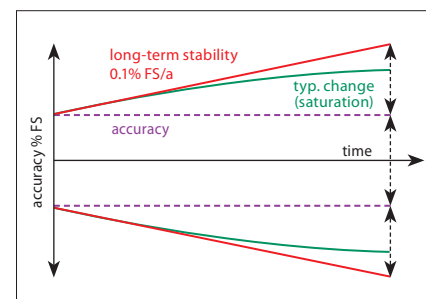


## Service life and long-term stability

Service life information pertains to nominal conditions specified in the data sheet, and can vary considerably when a product is operated mechanically or electrically outside the specifications. Service life essentially depends on the used measuring cell technology.

Ageing is accelerated (or slowed) due to different factors - such as temperature, temperature change and reduction of mechanical forces. The occurrence of ageing does effect the total accuracy.

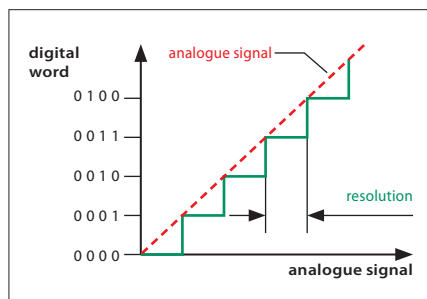
SUCO specifies long-term stability in accordance with DIN 16086 in relation to one year. Typically the influence of aging on the accuracy reduces with increasing operating duration. The information in the data sheet corresponds to the worst case scenario.





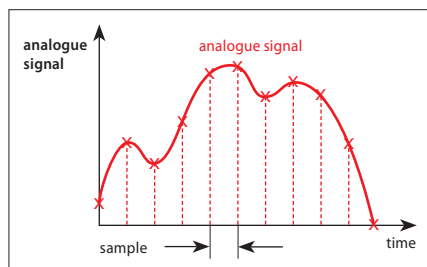
## Resolution

The A/D resolution (analogue - digital) of an pressure transmitter defines the smallest change of the analogue – digital – analogue conversion which takes places by the signal processing of an pressure transmitter. If for example 13-bit resolution is used for an pressure transmitter with a 100 bar setting range, the smallest signal change is 8192 steps ( $2^{13}$ ). As state of the art a resolution of 12 bits and hence 4096 steps ( $2^{12}$ ) is typical. Therefore pressure changes of 100 bar / 4096 = 0.024 bar can be recorded.



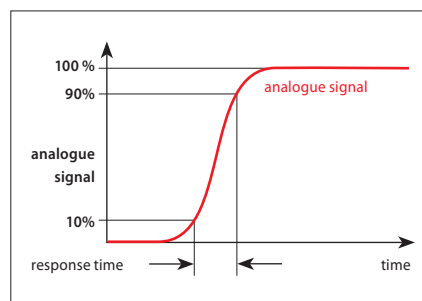
## Sampling rate

The sampling rate (or sampling frequency) defines the number of samples per time unit (typically in seconds or milliseconds) taken from an analogue signal and converted to a digital signal. The sampling rate is an indicator of how fast the output signal of a pressure transmitter responds to the pressure change at the input.



## Response time

The response or circuit time is shorter than 2 to 4 milliseconds (depending on model). The sum of A/D and D/A conversions, and the analogue and digital filters in the signal chain from the measuring bridge to the output, make up the response time. Filtering is used to suppress unwanted pressure peaks and electrical interference signals, and for good EMC characteristics.



## CE mark

Pressure transmitters from SUCO fall under the 2014/30/EU EMC Directive. EC declarations of conformity have been issued for the pressure transmitters are available on request or can be downloaded from our website. The relevant devices are denoted by a CE mark in our catalogue.

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

Our products are designed for Group 2 fluids based upon good engineering practise in line with Pressure Equipment Directive 2014/68/EU, meaning neither a declaration of conformation may be issued nor a CE mark affixed.

| Generic standard                                                      | Test standard                | Parameter(s)                                                          |
|-----------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------|
| Radio disturbance and immunity                                        | EN 55016-2-1<br>EN 55016-2-3 | 60 dBuV                                                               |
| Radiated, high-frequency electromagnetic field immunity test          | EN 61000-4-3                 | 10 V/m; 80-2700 MHz,<br>3 V/m; 1400-2000 MHz,<br>1 V/m; 2000-2700 MHz |
| Immunity to conducted disturbances, induced by radio-frequency fields | EN 61000-4-6                 | 10 V; 0.15-80 MHz                                                     |
| Electrical fast transient / burst immunity test                       | EN 61000-4-4                 | ±2 kV                                                                 |
| Surge immunity test                                                   | EN 61000-4-5                 | ±0.5 kV (common)<br>±0.5 kV (differential)                            |
| Electrostatic discharge (ESD) immunity test                           | EN 61000-4-2                 | air: 8 kV<br>with contact: 4 kV                                       |

## Electromagnetic compatibility (EMC)

Pressure transmitters from SUCO do comply to all important industrial EMC standards. The basis for the standards are the stricter thresholds for transient emissions in residential environments (EN 61000-6-3) and immunity for industrial environments (EN 61000-6-2).

# Technical explanations for pressure transmitters

## Conversion chart for pressure units

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

## Conversion chart 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            |

### Insulation strength

According to the latest specifications for immunity to surges and lightning protection, the following must be taken into account when testing insulation strength: With insulation test devices having an inner resistance exceeding 42 Ohm, the insulation strength of pressure transmitters can be tested up to 500 VDC. All contacts must be tested short-circuited against the housing. For a specific threshold value of test voltage, the protective circuit for surge protection is activated without any defects arising within the circuit. In the process, the current may rise to a point at which an insulation strength fault is indicated. The recommendation therefore is to conduct the insulation test of the pressure transmitter when it is removed, or independently of the overall system.

### Medium compatibility

The specifications on medium compatibility in this catalogue pertain to the specific seal and housing materials as well as the used measuring cell technology and so cannot be generalised.

### Titanium

Its high levels of mechanical resistance and the wide media compatibility – in particular to corrosive media – do make titanium the ideal material for measuring cells and membranes. It is not recommended for oxygen or hydrogen applications.

### Stainless steel (1.4305 / AISI 303)

Stainless steel with broad level of media compatibility. Also suitable for oxygen and hydrogen applications.

### Stainless steel (1.4404 / AISI 316L)

Stainless steel with broad level of media compatibility. Also suitable for chemical industry and sea water applications.

### Oxygen and hydrogen

Country-specific safety requirements and application guidelines must be observed if the medium to be monitored is oxygen or hydrogen, such as DGUV accident prevention regulations (DGUV 500, Section 2.32 and BGI 617).

**Please specify when ordering  
"for oxygen, oil and grease-free".**

### Pressure peak dampening

If required, our pressure transmitters can also be fitted with a pressure snubber (pressure peak orifice) to protect the measuring cell against transient pressure loads such as pressure peaks due to the switching of valves, cavitation effects, etc. which can shorten life expectancy.

For liquid media, the hole of a pressure snubber cannot be chosen to be any small size. At low temperatures the viscosity of the media will increase. In a case of dropping pressure the media might remain in the cavity behind the snubber which might affect the functionality of the pressure transmitter. Thus a bore diameter of 0.8 mm has been established.

### 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) falls under the responsibility of the user. It may be the case that suitability can only be guaranteed with appropriate field testing.**

**Subject to technical changes.**

# Selection matrix for pressure transmitters

| Type / Serie                  |                                              | 0601 | 0602 | 0645 | 0650 | 0660 | 0675 | 0680 | 0690 | 0705 | 0710 | 0720 |
|-------------------------------|----------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Page                          |                                              | 147  | 147  | 151  | 151  | 151  | 155  | 155  | 155  | 159  | 159  | 159  |
| Measuring cell technology     | stainless steel, oil-filled, piezo-resistive |      |      | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |
|                               | ceramic / thick-film                         | ■    | ■    |      |      |      |      |      |      |      |      |      |
|                               | SoS/titanium                                 |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
| Function                      | overpressure                                 | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                               | vacuum                                       |      |      | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |
| Output                        | 0.5 – 4.5 V ratiometric                      |      |      | ■    |      |      | ■    |      |      | ■    |      |      |
|                               | 0 – 10 V                                     | ■    |      |      | ■    |      |      | ■    |      |      | ■    |      |
|                               | 4 – 20 mA                                    |      | ■    |      |      | ■    |      |      | ■    |      |      | ■    |
| Operating voltage             | 5 V DC ±10 %                                 |      |      | ■    |      |      | ■    |      |      | ■    |      |      |
|                               | (9.6 ... 12) – 32 V DC                       | ■    | ■    |      | ■    | ■    |      | ■    | ■    |      | ■    | ■    |
| Pressure range                | -1 – 0 bar                                   |      |      | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |
|                               | 0 – 1 bar                                    |      |      | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |
|                               | 0 – 2 bar                                    | ■    | ■    |      |      |      |      |      |      |      |      |      |
|                               | 0 – 4 bar                                    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |
|                               | 0 – 6 bar                                    |      |      | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |
|                               | 0 – 10 bar                                   | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                               | 0 – 16 bar                                   | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                               | 0 – 25 bar                                   |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
|                               | 0 – 40 bar                                   | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                               | 0 – 60 bar                                   |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
|                               | 0 – 100 bar                                  | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                               | 0 – 160 bar                                  |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
|                               | 0 – 250 bar                                  |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
|                               | 0 – 400 bar                                  |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
|                               | 0 – 600 bar                                  |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
| Overpressure protection       | up to 2 x                                    | ■    | ■    |      |      |      |      |      |      |      |      |      |
|                               | up to 3 x                                    |      |      | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |
|                               | up to 4 x                                    |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
| Compensated temperature range | -10 ... +70 °C                               |      |      | ■    | ■    | ■    | ■    | ■    | ■    |      |      |      |
|                               | 0 ... +70 °C                                 | ■    | ■    |      |      |      |      |      |      |      |      |      |
|                               | -40 ... +80 °C                               |      |      |      |      |      |      |      |      | ■    | ■    | ■    |
| Size                          | hex 22                                       |      |      | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    | ■    |
|                               | hex 24                                       | ■    | ■    |      |      |      |      |      |      |      |      |      |
| Housing material              | stainless steel 1.4305                       | ■    | ■    | ■    | ■    | ■    |      |      |      | ■    | ■    | ■    |
|                               | stainless steel 1.4404                       |      |      |      |      |      | ■    | ■    | ■    |      |      |      |
| Option                        | suitable for oxygen                          |      |      | ■    | ■    | ■    |      |      |      |      |      |      |

# Pressure transmitters, Performance series

hex 24



- Very attractively priced electronic pressure transmitters
- High overpressure protection (up to 2 x)
- Small, compact transmitters
- Broad diversity of electronic and mechanical connection options
- High level of adaptability to your requirements (custom solutions)
- Ceramic sensor in thick film technology
- Housing made of stainless steel (1.4305), others on request

## Technical details

|                                             |                            |                                           |
|---------------------------------------------|----------------------------|-------------------------------------------|
| Type:                                       | <b>0601</b>                | <b>0602</b>                               |
| Output signal:                              | 0 – 10 V (3-wire)          | 4 – 20 mA (2-wire)                        |
| Supply voltage $U_b$ :                      | 11 – 32 VDC                | 9.6 – 32 VDC                              |
| Permissible load apparent ohmic resistance: | $\geq 4.7 \text{ k}\Omega$ | $\leq (U_b - 10 \text{ V}) 20 \text{ mA}$ |
| Idle power consumption:                     | approx. 5 mA               | < 4 mA                                    |

|                                                                     |                 |                                                                                                                                              |           |            |            |            |             |
|---------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|------------|------------|-------------|
| Type:                                                               |                 | 0601 / 0602                                                                                                                                  |           |            |            |            |             |
| Standard pressure ranges p <sub>nom</sub> :                         |                 | 0 – 2 bar                                                                                                                                    | 0 – 4 bar | 0 – 10 bar | 0 – 16 bar | 0 – 40 bar | 0 – 100 bar |
| Overpressure protection p <sub>u</sub> <sup>1)</sup> :              |                 | 4 bar                                                                                                                                        | 10 bar    | 20 bar     | 40 bar     | 100 bar    | 200 bar     |
| Burst pressure <sup>1)</sup> :                                      |                 | 8 bar                                                                                                                                        | 20 bar    | 35 bar     | 60 bar     | 140 bar    | 300 bar     |
| Mechanical life expectancy:                                         |                 | 5,000,000 pulsations at rise rates to 1 bar/ms at p <sub>nom</sub>                                                                           |           |            |            |            |             |
| Pressure rise:                                                      |                 | ≤ 1 bar/ms                                                                                                                                   |           |            |            |            |             |
| Accuracy:                                                           |                 | ≤ ±1 % full scale (FS) at room temperature, ±0.5 % BFSL                                                                                      |           |            |            |            |             |
| Long term stability:                                                |                 | ±0.3 % FS p. a.                                                                                                                              |           |            |            |            |             |
| Repeatability <sup>2)</sup> :                                       |                 | ±0.1 % FS                                                                                                                                    |           |            |            |            |             |
| Temperature error <sup>2)</sup> :                                   |                 | ≤ ±0.04 % of full scale (FS) / °C                                                                                                            |           |            |            |            |             |
| Compensated temperature range:                                      |                 | 0 °C ... +70 °C (32 °F ...158 °F)                                                                                                            |           |            |            |            |             |
| Temperature range ambient:                                          |                 | -30 °C ... +100 °C (-22 °F ... 212 °F)                                                                                                       |           |            |            |            |             |
| Temperature range media:                                            |                 | with NBR seal: -30 °C ... +100 °C (-22 °F ... +212 °F)                                                                                       |           |            |            |            |             |
|                                                                     |                 | with EPDM seal: -30 °C ... +125 °C (-22 °F ... +257 °F)                                                                                      |           |            |            |            |             |
|                                                                     |                 | with FKM seal: -20 °C ... +125 °C (-4 °F ... +257 °F)                                                                                        |           |            |            |            |             |
| Wetted parts material                                               | Housing:        | Stainless steel 1.4305 (AISI 303)                                                                                                            |           |            |            |            |             |
|                                                                     | Measuring cell: | Ceramic                                                                                                                                      |           |            |            |            |             |
|                                                                     | Seal material:  | NBR, EPDM or FKM                                                                                                                             |           |            |            |            |             |
| Insulation resistance:                                              |                 | > 100 MΩ (500 VDC, Ri > 42 Ω)                                                                                                                |           |            |            |            |             |
| Response time 10 – 90 %:                                            |                 | ≤ 2 ms                                                                                                                                       |           |            |            |            |             |
| Vibration resistance:                                               |                 | 20 g; at 4 ... 2000 Hz sine wave; DIN EN 60068-2-6                                                                                           |           |            |            |            |             |
| Shock resistance:                                                   |                 | half sine wave 500 m/s <sup>2</sup> ; 11 ms; DIN EN 60068-2-27                                                                               |           |            |            |            |             |
| Protection class                                                    |                 | IP65: DIN EN 175301-803-A,<br>IP67: M12x1, AMP Superseal 1.5®, cable connector<br>IP67 and IP6K9K: Bayonet ISO 15170-A1-4.1, Deutsch DT04-3P |           |            |            |            |             |
| Electromagnetic compatibility:                                      |                 | EMC 2014/30/EU, EN 61000-6-2:2005, EN 61000-6-3:2007                                                                                         |           |            |            |            |             |
| Max. length of connection cable:                                    |                 | 30 m                                                                                                                                         |           |            |            |            |             |
| Protection against reverse polarity, short-circuit and overvoltage: |                 | Built-in                                                                                                                                     |           |            |            |            |             |
| Cable output thread size:                                           |                 | For DIN EN 175301: Pg9 (outside diameter of cable 6 to 9 mm)                                                                                 |           |            |            |            |             |
| Weight:                                                             |                 | approx. 80 g (DIN EN 175301 approx. 110 g)                                                                                                   |           |            |            |            |             |

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the pressure transmitter.

<sup>2)</sup> Within the compensated temperature range





DIN EN 175301-803-A



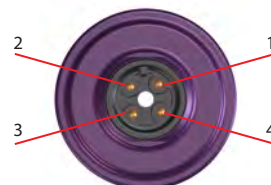
| Pin | 0601             | 0602             |
|-----|------------------|------------------|
| 1   | Uv+              | Uv+              |
| 2   | Gnd              | I <sub>out</sub> |
| 3   | U <sub>out</sub> | nc*              |

IP65

x ~ 60 mm without coupler socket  
x ~ 77 mm with coupler socket

Order number: 013

M 12 – DIN EN 61076-2-101 A



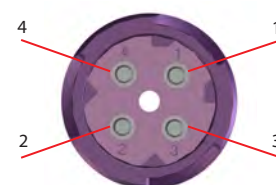
| Pin | 0601             | 0602             |
|-----|------------------|------------------|
| 1   | Uv+              | Uv+              |
| 2   | U <sub>out</sub> | nc*              |
| 3   | Gnd              | I <sub>out</sub> |
| 4   | nc*              | nc*              |

IP67

x ~ 54 mm

Order number: 002

ISO 15170-A1-4.1



| Pin | 0601             | 0602             |
|-----|------------------|------------------|
| 1   | Uv+              | Uv+              |
| 2   | Gnd              | nc*              |
| 3   | U <sub>out</sub> | I <sub>out</sub> |
| 4   | nc*              | nc*              |

IP67, IP6K9K

x ~ 56 mm

Order number: 004

AMP Superseal 1.5®



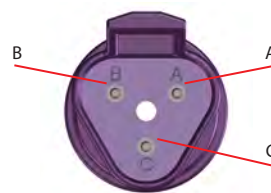
| Pin | 0601             | 0602             |
|-----|------------------|------------------|
| 1   | U <sub>out</sub> | nc*              |
| 2   | Gnd              | I <sub>out</sub> |
| 3   | Uv+              | Uv+              |

IP67

x ~ 61 mm

Order number: 007

Deutsch DT04-3P

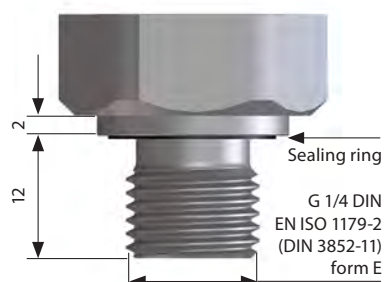


| Pin | 0601             | 0602             |
|-----|------------------|------------------|
| A   | Uv+              | Uv+              |
| B   | Gnd              | nc*              |
| C   | U <sub>out</sub> | I <sub>out</sub> |

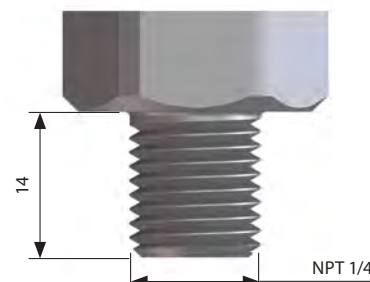
IP67, IP6K9K

x ~ 61 mm

Order number: 010



Thread code: 41



Thread code: 09

# 0601 / 0602

## Order matrix for pressure transmitters

T.1

hex 24 Performance



|  | Type | Pressure range | Pressure connection | Seal material | Electrical connection |
|--|------|----------------|---------------------|---------------|-----------------------|
|--|------|----------------|---------------------|---------------|-----------------------|



|                   |             |
|-------------------|-------------|
| 0 – 10 V, 3-wire  | <b>0601</b> |
| 4 – 20 mA, 2-wire | <b>0602</b> |

| Max. overpressure <sup>1)</sup> | Burst pressure | Pressure range                  |            |
|---------------------------------|----------------|---------------------------------|------------|
| 4 bar                           | 8 bar          | 0 – 2 bar (approx. 29 PSI)      | <b>200</b> |
| 10 bar                          | 20 bar         | 0 – 4 bar (approx. 58 PSI)      | <b>400</b> |
| 20 bar                          | 35 bar         | 0 – 10 bar (approx. 145 PSI)    | <b>101</b> |
| 40 bar                          | 60 bar         | 0 – 16 bar (approx. 230 PSI)    | <b>161</b> |
| 100 bar                         | 140 bar        | 0 – 40 bar (approx. 580 PSI)    | <b>401</b> |
| 200 bar                         | 300 bar        | 0 – 100 bar (approx. 1,450 PSI) | <b>102</b> |



### Pressure connection

|                                         |           |
|-----------------------------------------|-----------|
| G 1/4 – (DIN 3852), form E, male thread | <b>41</b> |
| NPT 1/4                                 | <b>09</b> |



### Seal material – Application areas

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



### Electrical connection

|                                                            |            |
|------------------------------------------------------------|------------|
| DIN EN 175301-803-A (DIN 43650-A) ; socket device included | <b>013</b> |
| M 12x1 - DIN EN 61076-2-101-A                              | <b>002</b> |
| Bayonet ISO 15170-A1-4.1 (DIN 72585-A1-4.1)                | <b>004</b> |
| AMP Superseal 1.5®                                         | <b>007</b> |
| Deutsch DT04-3P                                            | <b>010</b> |



|                      |             |            |           |          |            |
|----------------------|-------------|------------|-----------|----------|------------|
| <b>Order number:</b> | <b>06XX</b> | <b>XXX</b> | <b>XX</b> | <b>X</b> | <b>XXX</b> |
|----------------------|-------------|------------|-----------|----------|------------|

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the pressure transmitter.



## T.2

hex 22

Stainless steel

1.4305 / AISI 303

# Robust pressure transmitters

Stainless steel housing (1.4305 / AISI 303, SW22)



- Pressure transmitters specially for low pressures, including vacuum applications
- High overpressure protection (up to 3 x)
- Long life time even under high pressure change rates
- Housing and wetted parts are made of stainless steel providing excellent media compatibility
- Suitable for hydrogen and oxygen applications
- The highly-sensitive piezo-resistive sensor in the measuring cell filled with oil guarantees high level of accuracy, repeatability and long-term stability
- The availability of different sealing materials enables deployment in a broad temperature range and with a diverse array of media
- Custom variants (e.g. cleaned for oxygen applications) are available on request

## Technical details

|                                             |                               |                            |                                             |
|---------------------------------------------|-------------------------------|----------------------------|---------------------------------------------|
| Type:                                       | <b>0645</b>                   | <b>0650</b>                | <b>0660</b>                                 |
| Output signal:                              | 0.5 – 4.5 V ratiometric       | 0 – 10 V (3-wire)          | 4 – 20 mA (2-wire)                          |
| Supply voltage $U_B$ :                      | 5 VDC $\pm 10$ % max. 6.5 VDC | 12 – 32 VDC                | 10 – 32 VDC                                 |
| Permissible load apparent ohmic resistance: | $\geq 4,7 \text{ k}\Omega$    | $\geq 4,7 \text{ k}\Omega$ | $\leq (U_B - 10 \text{ V}) / 20 \text{ mA}$ |
| Idle power consumption:                     | approx. 5 mA                  |                            | < 4 mA                                      |

|                                                                     |                 |                                                                               |           |           |           |            |            |            |             |
|---------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------|-----------|-----------|-----------|------------|------------|------------|-------------|
| Type:                                                               |                 | 0645 / 0650 / 0660                                                            |           |           |           |            |            |            |             |
| Standard pressure ranges p <sub>nom</sub> :                         |                 | -1 – 0 bar<br>(vacuum)                                                        | 0 – 1 bar | 0 – 4 bar | 0 – 6 bar | 0 – 10 bar | 0 – 16 bar | 0 – 40 bar | 0 – 100 bar |
| Overpressure protection p <sub>u</sub> <sup>1)</sup> :              |                 | 3 bar                                                                         | 3 bar     | 8 bar     | 12 bar    | 20 bar     | 32 bar     | 80 bar     | 200 bar     |
| Burst pressure <sup>1)</sup> :                                      |                 | 10 bar                                                                        | 10 bar    | 20 bar    | 30 bar    | 35 bar     | 40 bar     | 100 bar    | 250 bar     |
| Mechanical life expectancy:                                         |                 | 10,000,000 pulsations at rise rates to 1 bar/ms at p <sub>nom</sub>           |           |           |           |            |            |            |             |
| Permitted pressure change rate:                                     |                 | ≤ 1 bar/ms                                                                    |           |           |           |            |            |            |             |
| Accuracy:                                                           |                 | ±0.5 % full scale (FS) at room temperature, ±0.25 % BFSL                      |           |           |           |            |            |            |             |
| Long term stability:                                                |                 | < ±0.2 % of full scale (FS) per year                                          |           |           |           |            |            |            |             |
| Repeatability <sup>2)</sup> :                                       |                 | ±0.1 % FS                                                                     |           |           |           |            |            |            |             |
| Temperature error <sup>2)</sup> :                                   |                 | ±0.02 % of full scale (FS) / °C; -1 ... 1 bar ±0.03 % of full scale (FS) / °C |           |           |           |            |            |            |             |
| Compensated temperature range:                                      |                 | -10 °C ... +70 °C (14 °F ... 158 °F)                                          |           |           |           |            |            |            |             |
| Temperature range ambient:                                          |                 | -40 °C ... +100 °C (-40 °F ... 212 °F)                                        |           |           |           |            |            |            |             |
| Temperature range media:                                            |                 | with NBR seal: -40 °C ... +100 °C (-40 °F ... +212 °F)                        |           |           |           |            |            |            |             |
|                                                                     |                 | with FKM seal: -20 °C ... +125 °C (-4 °F ... +257 °F)                         |           |           |           |            |            |            |             |
| Wetted parts material                                               | Housing:        | Stainless steel 1.4305 / AISI 303                                             |           |           |           |            |            |            |             |
|                                                                     | Measuring cell: | Stainless steel 1.4404 / AISI 316L                                            |           |           |           |            |            |            |             |
|                                                                     | Seal material:  | NBR or FKM                                                                    |           |           |           |            |            |            |             |
| Standard sensor oil:                                                |                 | Fluorine oil (not suitable for food applications)                             |           |           |           |            |            |            |             |
| Insulation resistance:                                              |                 | > 100 MΩ (500 VDC, Ri > 42Ω)                                                  |           |           |           |            |            |            |             |
| Response time 10 – 90%:                                             |                 | < 2 ms                                                                        |           |           |           |            |            |            |             |
| Vibration resistance:                                               |                 | 20 g at 4 – 2000 Hz sine wave; DIN EN 60068-2-6                               |           |           |           |            |            |            |             |
| Shock resistance:                                                   |                 | half sine wave 500 m/s²; 11ms; DIN EN 60068-2-27                              |           |           |           |            |            |            |             |
| Protection class                                                    |                 | Refer to the electrical connections                                           |           |           |           |            |            |            |             |
| Electromagnetic compatibility:                                      |                 | EMC 2014/30/EU, EN 61000-6-2:2005, EN 61000-6-3:2007                          |           |           |           |            |            |            |             |
| Max. length of connection cable:                                    |                 | 30 m                                                                          |           |           |           |            |            |            |             |
| Protection against reverse polarity, short-circuit and overvoltage: |                 | Built-in                                                                      |           |           |           |            |            |            |             |
| Weight:                                                             |                 | approx. 80 g (DIN EN 175301 approx. 110 g, cable output approx. 135 g)        |           |           |           |            |            |            |             |

<sup>1)</sup> Static pressure. Dynamic value is 30 to 50% lower. Values refer to the hydraulic/pneumatic part of the pressure transmitter.

<sup>2)</sup> Within the compensated temperature range.

# T.2

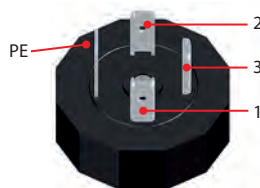
hex 22  
Stainless steel  
1.4305 / AISI 303



## 0645 / 0650 / 0660

Electrical connectors and threads

### DIN EN 175301-803-A



| 0645 + 0650         | 0660                |
|---------------------|---------------------|
| 1: Uv+              | 1: Uv+              |
| 2: Gnd              | 2: I <sub>out</sub> |
| 3: U <sub>out</sub> | 3: nc               |
| PE                  | ⚡                   |

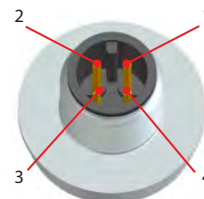
IP65

x ~ 60 mm (without coupler socket)  
x ~ 76 mm (with coupler socket)

d ~ Ø 30 mm

Order number: 013

### M 12 – DIN EN 61076-2-101 A



| 0645 + 0650         | 0660                |
|---------------------|---------------------|
| 1: Uv+              | 1: Uv+              |
| 2: U <sub>out</sub> | 2: nc               |
| 3: Gnd              | 3: I <sub>out</sub> |
| 4: nc               | 4: nc               |

IP67

x ~ 54 mm

d ~ Ø 22 mm

Order number: 002

### ISO 15170-A1-4.1



| 0645 + 0650         | 0660                |
|---------------------|---------------------|
| 1: Uv+              | 1: Uv+              |
| 2: Gnd              | 2: nc               |
| 3: U <sub>out</sub> | 3: I <sub>out</sub> |
| 4: nc               | 4: nc               |

IP67

x ~ 65 mm

d ~ Ø 27 mm

Order number: 004

### Cable connection



1: red  
2: white  
3: black

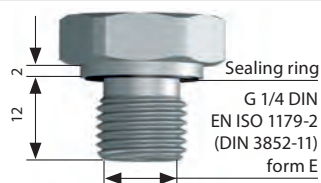
| 0645 + 0650         | 0660                |
|---------------------|---------------------|
| 1: Uv+              | 1: Uv+              |
| 2: U <sub>out</sub> | 2: nc               |
| 3: Gnd              | 3: I <sub>out</sub> |

IP67

x ~ 44 mm (+ 20 mm Bend relief)  
Cable length ~ 2 m

d ~ Ø 22 mm

Order number: 011



Thread code: 41

# 0645 / 0650 / 0660

## Order matrix for pressure transmitters

T.2

hex 22

Stainless steel

1.4305 / AISI 303



|                          | Type        | Pressure range | Pressure connection | Seal material | Electrical connection |
|--------------------------|-------------|----------------|---------------------|---------------|-----------------------|
|                          | ↓           | ↓              | ↓                   | ↓             | ↓                     |
| 0.5 – 4.5 V, ratiometric | <b>0645</b> |                |                     |               |                       |
| 0 – 10 V, 3-wire         | <b>0650</b> |                |                     |               |                       |
| 4 – 20 mA, 2-wire        | <b>0660</b> |                |                     |               |                       |

| Pressure range                          | Max. overpressure <sup>1)</sup> |            |
|-----------------------------------------|---------------------------------|------------|
| -1 – 0 bar (vacuum, approx. -29.6 inHg) | 3 bar                           | <b>000</b> |
| 0 – 1 bar (approx. 14.5 PSI)            | 3 bar                           | <b>100</b> |
| 0 – 4 bar (approx. 58 PSI)              | 8 bar                           | <b>400</b> |
| 0 – 6 bar (approx. 87 PSI)              | 12 bar                          | <b>600</b> |
| 0 – 10 bar (approx. 145 PSI)            | 20 bar                          | <b>101</b> |
| 0 – 16 bar (approx. 232 PSI)            | 32 bar                          | <b>161</b> |
| 0 – 40 bar (approx. 580 PSI)            | 80 bar                          | <b>401</b> |
| 0 – 100 bar (approx. 1,450 PSI)         | 200 bar                         | <b>102</b> |

### Pressure connection

|                                                 |           |
|-------------------------------------------------|-----------|
| G 1/4 – DIN EN ISO 1179-2 (DIN 3852-11), form E | <b>41</b> |
|-------------------------------------------------|-----------|

### Seal material – Application areas

|            |                                                                |                                          |          |
|------------|----------------------------------------------------------------|------------------------------------------|----------|
| <b>NBR</b> | Hydraulic/machine oil, heating oil, air, nitrogen, water, etc. | -40 °C ... 100 °C<br>(-40 °F ... 212 °F) | <b>1</b> |
| <b>FKM</b> | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.        | -20 °C ... 125 °C<br>(-4 °F ... 257 °F)  | <b>3</b> |

### Electrical connection

|                                                           |            |
|-----------------------------------------------------------|------------|
| DIN EN 175301-803-A (DIN 43650-A); socket device included | <b>013</b> |
| M 12x1 – DIN EN 61076-2-101 A                             | <b>002</b> |
| Bayonet ISO 15170-A1-4.1 (DIN 72585-A1-4.1)               | <b>004</b> |
| Cable connection (length of cable 2 m standard)           | <b>011</b> |

|                      |             |            |           |          |            |
|----------------------|-------------|------------|-----------|----------|------------|
| <b>Order number:</b> | <b>06XX</b> | <b>XXX</b> | <b>41</b> | <b>X</b> | <b>XXX</b> |
|----------------------|-------------|------------|-----------|----------|------------|

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the pressure transmitter.





## T.3

hex 22  
Stainless steel

1.4404 / AISI 316L

# Robust pressure transmitters

Stainless steel housing 1.4404 / AISI 316L, hex 22



- Pressure transmitters specially for low pressures, including vacuum applications
- Long life time even under high pressure change rates
- Housing and wetted parts are made of stainless steel 1.4404 providing excellent media compatibility when used in seawater, chemical and process technology applications
- The highly-sensitive piezo-resistive sensor in the measuring cell filled with oil guarantees high level of accuracy, repeatability and long-term stability
- The availability of different sealing materials enables deployment in a broad temperature range and with a diverse array of media

## Technical details

|                                             |                               |                            |                                             |
|---------------------------------------------|-------------------------------|----------------------------|---------------------------------------------|
| Type:                                       | <b>0675</b>                   | <b>0680</b>                | <b>0690</b>                                 |
| Output signal:                              | 0.5 – 4.5 V ratiometric       | 0 – 10 V (3-wire)          | 4 – 20 mA (2-wire)                          |
| Supply voltage $U_B$ :                      | 5 VDC $\pm 10\%$ max. 6.5 VDC | 12 – 32 VDC                | 10 – 32 VDC                                 |
| Permissible load apparent ohmic resistance: | $\geq 4.7 \text{ k}\Omega$    | $\geq 4.7 \text{ k}\Omega$ | $\leq (U_B - 10 \text{ V}) / 20 \text{ mA}$ |
| Idle power consumption:                     | approx. 5 mA                  |                            | –                                           |

|                                                                     |                 |                                                                               |           |           |           |            |            |            |             |
|---------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------|-----------|-----------|-----------|------------|------------|------------|-------------|
| Typen:                                                              |                 | 0675 / 0680 / 0690                                                            |           |           |           |            |            |            |             |
| Standard pressure ranges p <sub>nom</sub> :                         |                 | -1 – 0 bar<br>(vacuum)                                                        | 0 – 1 bar | 0 – 4 bar | 0 – 6 bar | 0 – 10 bar | 0 – 16 bar | 0 – 40 bar | 0 – 100 bar |
| Overpressure protection p <sub>u</sub> <sup>1)</sup> :              |                 | 3 bar                                                                         | 3 bar     | 8 bar     | 12 bar    | 20 bar     | 32 bar     | 80 bar     | 200 bar     |
| Burst pressure <sup>1)</sup> :                                      |                 | 10 bar                                                                        | 10 bar    | 20 bar    | 30 bar    | 35 bar     | 40 bar     | 100 bar    | 250 bar     |
| Mechanical life expectancy:                                         |                 | 10,000,000 pulsations at rise rates to 1 bar/ms at p <sub>nom</sub>           |           |           |           |            |            |            |             |
| Permitted pressure change rate:                                     |                 | ≤ 1 bar/ms                                                                    |           |           |           |            |            |            |             |
| Accuracy:                                                           |                 | ±0.5 % full scale (FS) at room temperature, ±0.25 % BFSL                      |           |           |           |            |            |            |             |
| Long term stability:                                                |                 | < ±0.2 % of full scale (FS) per year                                          |           |           |           |            |            |            |             |
| Repeatability <sup>2)</sup> :                                       |                 | ±0.1 % FS                                                                     |           |           |           |            |            |            |             |
| Temperature error <sup>2)</sup> :                                   |                 | ±0.02 % of full scale (FS) / °C; -1 ... 1 bar ±0.03 % of full scale (FS) / °C |           |           |           |            |            |            |             |
| Compensated temperature range:                                      |                 | -10 °C ... +70 °C (14 °F ... 158 °F)                                          |           |           |           |            |            |            |             |
| Temperature range ambient:                                          |                 | -40 °C ... +100 °C (-40 °F ... 212 °F)                                        |           |           |           |            |            |            |             |
| Temperature range media:                                            |                 | with NBR seal: -40 °C ... +100 °C (-40 °F ... +212 °F)                        |           |           |           |            |            |            |             |
|                                                                     |                 | with FKM seal: -20 °C ... +125 °C (-4 °F ... +257 °F)                         |           |           |           |            |            |            |             |
| Wetted parts material                                               | Housing:        | Stainless steel 1.4404 / AISI 316L                                            |           |           |           |            |            |            |             |
|                                                                     | Measuring cell: | Stainless steel 1.4404 / AISI 316L                                            |           |           |           |            |            |            |             |
|                                                                     | Seal material:  | NBR or FKM                                                                    |           |           |           |            |            |            |             |
| Standard sensor oil:                                                |                 | Fluorine oil (not suitable for food applications)                             |           |           |           |            |            |            |             |
| Insulation resistance:                                              |                 | > 100 MΩ (500 VDC, Ri > 42Ω)                                                  |           |           |           |            |            |            |             |
| Response time 10 – 90%:                                             |                 | < 2 ms                                                                        |           |           |           |            |            |            |             |
| Vibration resistance:                                               |                 | 20 g at 4 – 2000 Hz sine wave; DIN EN 60068-2-6                               |           |           |           |            |            |            |             |
| Shock resistance:                                                   |                 | half sine wave 500 m/s <sup>2</sup> ; 11ms; DIN EN 60068-2-27                 |           |           |           |            |            |            |             |
| Protection class                                                    |                 | Refer to the electrical connections                                           |           |           |           |            |            |            |             |
| Electromagnetic compatibility:                                      |                 | EMC 2014/30/EU, EN 61000-6-2:2005, EN 61000-6-3:2007                          |           |           |           |            |            |            |             |
| Max. length of connection cable:                                    |                 | 30 m                                                                          |           |           |           |            |            |            |             |
| Protection against reverse polarity, short-circuit and overvoltage: |                 | Built-in                                                                      |           |           |           |            |            |            |             |
| Weight:                                                             |                 | approx. 80 g (DIN EN 175301 approx. 110 g, cable output approx. 135 g)        |           |           |           |            |            |            |             |

<sup>1)</sup> Static pressure. Dynamic value is 30 to 50% lower. Values refer to the hydraulic/pneumatic part of the pressure transmitter.

<sup>2)</sup> Within the compensated temperature range.

T.3

hex 22  
Stainless steel

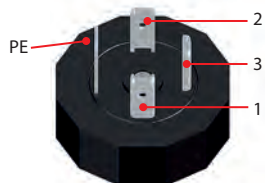
1.4404 / AISI 316L



0675 / 0680 / 0690

Electrical connectors and threads

**DIN EN 175301-803-A**



| 0675 + 0680         | 0690                |
|---------------------|---------------------|
| 1: Uv+              | 1: Uv+              |
| 2: Gnd              | 2: I <sub>out</sub> |
| 3: U <sub>out</sub> | 3: nc               |
| PE                  | ⚡                   |

IP65

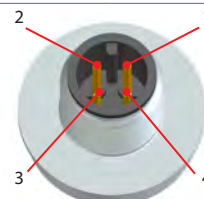
**x** ~ 60 mm (without coupler socket)

**x** ~ 76 mm (with coupler socket)

**d** ~ Ø 30 mm

**Order number: 013**

**M 12 – DIN EN 61076-2-101 A**



| 0675 + 0680         | 0690                |
|---------------------|---------------------|
| 1: Uv+              | 1: Uv+              |
| 2: U <sub>out</sub> | 2: nc               |
| 3: Gnd              | 3: I <sub>out</sub> |
| 4: nc               | 4: nc               |

IP67

**x** ~ 54 mm

**d** ~ Ø 22 mm

**Order number: 002**

**ISO 15170-A1-4.1**



| 0675 + 0680         | 0690                |
|---------------------|---------------------|
| 1: Uv+              | 1: Uv+              |
| 2: Gnd              | 2: nc               |
| 3: U <sub>out</sub> | 3: I <sub>out</sub> |
| 4: nc               | 4: nc               |

IP67

**x** ~ 65 mm

**d** ~ Ø 27 mm

**Order number: 004**

**Cable connection**



1: red  
2: white  
3: black

| 0675 + 0680         | 0690                |
|---------------------|---------------------|
| 1: Uv+              | 1: Uv+              |
| 2: U <sub>out</sub> | 2: nc               |
| 3: Gnd              | 3: I <sub>out</sub> |

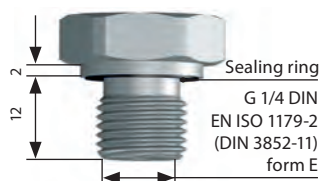
IP67

**x** ~ 44 mm (+ 20 mm bend relief)

Cable length ~ 2 m

**d** ~ Ø 22 mm

**Order number: 011**



**Thread code: 41**

# 0675 / 0680 / 0690

## Order matrix for pressure transmitters

T.3

hex 22

Stainless steel

1.4404 / AISI 316L



|  | Type | Pressure range | Pressure connection | Seal material | Electrical connection |
|--|------|----------------|---------------------|---------------|-----------------------|
|--|------|----------------|---------------------|---------------|-----------------------|



|                          |             |
|--------------------------|-------------|
| 0.5 – 4.5 V, ratiometric | <b>0675</b> |
| 0 – 10 V, 3-wire         | <b>0680</b> |
| 4 – 20 mA, 2-wire        | <b>0690</b> |

| Pressure range                         | Max. overpressure <sup>1)</sup> |            |
|----------------------------------------|---------------------------------|------------|
| -1 – 0 bar (vacuum approx. -29.6 inHg) | 3 bar                           | <b>000</b> |
| 0 – 1 bar (approx. 14.5 PSI)           | 3 bar                           | <b>100</b> |
| 0 – 4 bar (approx. 58 PSI)             | 8 bar                           | <b>400</b> |
| 0 – 6 bar (approx. 87 PSI)             | 12 bar                          | <b>600</b> |
| 0 – 10 bar (approx. 145 PSI)           | 20 bar                          | <b>101</b> |
| 0 – 16 bar (approx. 232 PSI)           | 32 bar                          | <b>161</b> |
| 0 – 40 bar (approx. 580 PSI)           | 80 bar                          | <b>401</b> |
| 0 – 100 bar (approx. 1,450 PSI)        | 200 bar                         | <b>102</b> |



| Pressure connection                             |           |
|-------------------------------------------------|-----------|
| G 1/4 – DIN EN ISO 1179-2 (DIN 3852-11), form E | <b>41</b> |



| Seal material – Application areas |                                                                |                                          |          |
|-----------------------------------|----------------------------------------------------------------|------------------------------------------|----------|
| <b>NBR</b>                        | Hydraulic/machine oil, heating oil, air, nitrogen, water, etc. | -40 °C ... 100 °C<br>(-40 °F ... 212 °F) | <b>1</b> |
| <b>FKM</b>                        | Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.        | -20 °C ... 125 °C<br>(-4 °F ... 257 °F)  | <b>3</b> |



| Electrical connection                                     |            |
|-----------------------------------------------------------|------------|
| DIN EN 175301-803-A (DIN 43650-A); socket device included | <b>013</b> |
| M 12x1 – DIN EN 61076-2-101 A                             | <b>002</b> |
| Bayonet ISO 15170-A1-4.1 (DIN 72585-A1-4.1)               | <b>004</b> |
| Cable connection (length of cable 2 m standard)           | <b>011</b> |



|                      |             |            |           |          |            |
|----------------------|-------------|------------|-----------|----------|------------|
| <b>Order number:</b> | <b>06XX</b> | <b>XXX</b> | <b>41</b> | <b>X</b> | <b>XXX</b> |
|----------------------|-------------|------------|-----------|----------|------------|

<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the pressure transmitter.



# Pressure transmitters, High-Performance series

hex 22



- Outstanding overpressure protection (up to 4 x)
- Ideal choice for mobile hydraulic applications
- Long service life even under high pressure change rates
- Wetted parts made of stainless steel and titanium ensuring excellent media compatibility
- All welded design, no elastomeric seal
- Silicon-on-sapphire technology (SoS) for highest reliability, accuracy and reliable process monitoring
- Very low temperature error and very good long-term stability
- Customer specific solutions available on request

## Technical details

|                                             |                               |                            |                                             |
|---------------------------------------------|-------------------------------|----------------------------|---------------------------------------------|
| Type:                                       | <b>0705</b>                   | <b>0710</b>                | <b>0720</b>                                 |
| Output signal:                              | 0.5 – 4.5 V ratiometric       | 0 – 10 V (3-wire)          | 4 – 20 mA (2-wire)                          |
| Supply voltage $U_B$ :                      | 5 VDC $\pm$ 10 % max. 6.5 VDC | 12 – 32 VDC                | 10 – 32 VDC                                 |
| Permissible load apparent ohmic resistance: | $\geq 4.7 \text{ k}\Omega$    | $\geq 4.7 \text{ k}\Omega$ | $\leq (U_B - 10 \text{ V}) / 20 \text{ mA}$ |
| Idle power consumption:                     | approx. 5 mA                  |                            |                                             |

|                                                                     |                                                                                        |        |        |        |        |         |         |         |         |         |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| Type:                                                               | <b>0705 / 0710 / 0720</b>                                                              |        |        |        |        |         |         |         |         |         |
| Standard pressure ranges $p_{nom}$ in bar:                          | 0 – 10                                                                                 | 0 – 16 | 0 – 25 | 0 – 40 | 0 – 60 | 0 – 100 | 0 – 160 | 0 – 250 | 0 – 400 | 0 – 600 |
| Overpressure protection $p_u^{1)}$ in bar:                          | 40                                                                                     | 64     | 100    | 160    | 240    | 400     | 640     | 1,000   | 1,600   | 1,650   |
| Burst pressure <sup>1)</sup> in bar:                                | 80                                                                                     | 128    | 200    | 320    | 480    | 800     | 1,280   | 2,000   | 2,000   | 2,000   |
| Mechanical life expectancy:                                         | 10,000,000 pulsations at rise rates to 5 bar/ms at $p_{nom}$                           |        |        |        |        |         |         |         |         |         |
| Permitted pressure change rate:                                     | $\leq 5 \text{ bar/ms}$                                                                |        |        |        |        |         |         |         |         |         |
| Accuracy:                                                           | $\pm 0.5 \%$ full scale (FS) at room temperature, $\pm 0.25 \%$ BFSL                   |        |        |        |        |         |         |         |         |         |
| Long term stability:                                                | $\pm 0.1 \%$ FS p. a.                                                                  |        |        |        |        |         |         |         |         |         |
| Repeatability <sup>2)</sup> :                                       | $\pm 0.1 \%$ FS                                                                        |        |        |        |        |         |         |         |         |         |
| Temperature error <sup>2)</sup> :                                   | $\pm 0.01 \%$ FS / °C                                                                  |        |        |        |        |         |         |         |         |         |
| Compensated temperature range:                                      | -40 °C ... +80 °C (-40 °F ... 176 °F)                                                  |        |        |        |        |         |         |         |         |         |
| Temperature range ambient:                                          | -40 °C ... +100 °C (-40 °F ... 212 °F)                                                 |        |        |        |        |         |         |         |         |         |
| Temperature range media:                                            | -40 °C ... +125 °C (-40 °F ... 257 °F)                                                 |        |        |        |        |         |         |         |         |         |
| Wetted parts material:                                              | stainless steel 1.4305 / SAE Grade 303, titanium                                       |        |        |        |        |         |         |         |         |         |
| Insulation resistance:                                              | $> 100 \text{ M}\Omega$ (500 VDC, $R_i > 42 \Omega$ )                                  |        |        |        |        |         |         |         |         |         |
| Response time 10 – 90%:                                             | $< 2 \text{ ms}$                                                                       |        |        |        |        |         |         |         |         |         |
| Vibration resistance:                                               | 20 g at 4 – 2000 Hz sine wave; DIN EN 60068-2-6                                        |        |        |        |        |         |         |         |         |         |
| Shock resistance:                                                   | half sine wave 500 m/s <sup>2</sup> ; 11ms; DIN EN 60068-2-27                          |        |        |        |        |         |         |         |         |         |
| Protection class                                                    | IP67 for M 12x1, DIN 72585 (bayonet) and cable connector<br>IP65 for DIN EN 175301-803 |        |        |        |        |         |         |         |         |         |
| Electromagnetic compatibility:                                      | EMC 2014/30/EU, EN 61000-6-2, EN 61000-6-3                                             |        |        |        |        |         |         |         |         |         |
| Max. length of connection cable:                                    | 30 m                                                                                   |        |        |        |        |         |         |         |         |         |
| Protection against reverse polarity, short-circuit and overvoltage: | Built-in                                                                               |        |        |        |        |         |         |         |         |         |
| Weight:                                                             | approx. 80 g (DIN 175301 approx. 110 g, cable outlet approx. 135 g)                    |        |        |        |        |         |         |         |         |         |

<sup>1)</sup> Static value. Dynamic value is 30 to 50% lower. Values refer to the hydraulic/pneumatic part of the pressure transmitter / transducer.

<sup>2)</sup> Within the compensated temperature range.



# T.4

hex 22  
High-Performance



## 0705 / 0710 / 0720

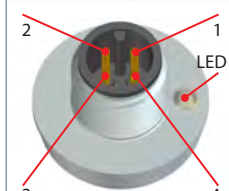
Electrical connectors and threads

### DIN EN 175301-803-A



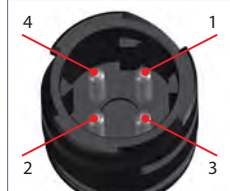
| 0705 + 0710              | 0720                |
|--------------------------|---------------------|
| 1: U <sub>out</sub>      | 1: nc               |
| 2: Gnd                   | 2: I <sub>out</sub> |
| 3: Uv+                   | 3: Uv+              |
|                          |                     |
| IP65                     |                     |
| x ~ 60 / 76 mm*          |                     |
| d ~ Ø 30 mm              |                     |
| Order number: <b>001</b> |                     |

### M 12 – DIN EN 61076-2-101 A



| 0705 + 0710              | 0720                |
|--------------------------|---------------------|
| 1: Uv+                   | 1: Uv+              |
| 2: U <sub>out</sub>      | 2: nc               |
| 3: Gnd                   | 3: I <sub>out</sub> |
| 4: nc                    | 4: nc               |
|                          |                     |
| IP67                     |                     |
| x ~ 54 mm                |                     |
| d ~ Ø 22 mm              |                     |
| Order number: <b>002</b> |                     |

### ISO 15170-A1-4.1



| 0705 + 0710              | 0720                |
|--------------------------|---------------------|
| 1: Uv+                   | 1: Uv+              |
| 2: Gnd                   | 2: nc               |
| 3: U <sub>out</sub>      | 3: I <sub>out</sub> |
| 4: nc                    | 4: nc               |
|                          |                     |
| IP67, IP6K9K             |                     |
| x ~ 65 mm                |                     |
| d ~ Ø 27 mm              |                     |
| Order number: <b>004</b> |                     |

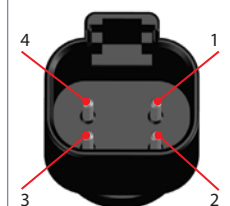
### AMP Superseal



| 0705 + 0710              | 0720                |
|--------------------------|---------------------|
| 1: U <sub>out</sub>      | 1: nc               |
| 2: Gnd                   | 2: I <sub>out</sub> |
| 3: Uv+                   | 3: Uv+              |
|                          |                     |
| IP67                     |                     |
| x ~ 73 mm                |                     |
| d ~ Ø 26 mm              |                     |
| Order number: <b>007</b> |                     |

\* without coupler socket x ~ 60 mm, with coupler socket x ~ 76 mm

### DEUTSCH DT04-4P



| 0705 + 0710              | 0720                |
|--------------------------|---------------------|
| 1: GND                   | 1: I <sub>out</sub> |
| 2: Uv+                   | 2: Uv+              |
| 3: nc                    | 3: nc               |
| 4: U <sub>out</sub>      | 4: nc               |
|                          |                     |
| IP67, IP6K9K             |                     |
| x ~ 74 mm                |                     |
| d ~ Ø 23 mm              |                     |
| Order number: <b>008</b> |                     |

### DEUTSCH DT04-3P



| 0705 + 0710              | 0720                |
|--------------------------|---------------------|
| A: Uv+                   | A: Uv+              |
| B: GND                   | B: nc               |
| C: U <sub>out</sub>      | C: I <sub>out</sub> |
|                          |                     |
| IP67, IP6K9K             |                     |
| x ~ 74 mm                |                     |
| d ~ Ø 23 mm              |                     |
| Order number: <b>010</b> |                     |

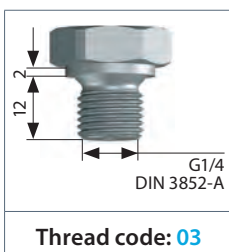
### Cable connection



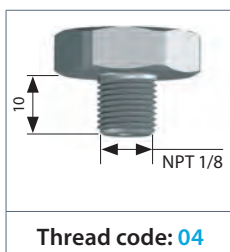
| 0705 + 0710                                              | 0720                |
|----------------------------------------------------------|---------------------|
| 1: Uv+                                                   | 1: Uv+              |
| 2: Gnd                                                   | 2: nc               |
| 3: U <sub>out</sub>                                      | 3: I <sub>out</sub> |
|                                                          |                     |
| IP67                                                     |                     |
| x ~ 44 mm<br>(+ 20 mm bend relief)<br>Cable length ~ 2 m |                     |
| d ~ Ø 22 mm                                              |                     |
| Order number: <b>011</b>                                 |                     |



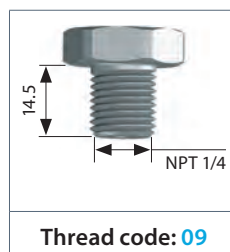
Thread code: **41**



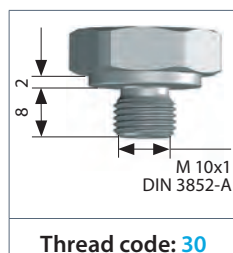
Thread code: **03**



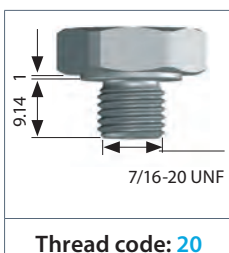
Thread code: **04**



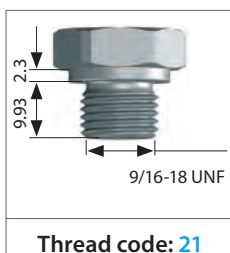
Thread code: **09**



Thread code: **30**



Thread code: **20**



Thread code: **21**



Thread code: **42**

# 0705 / 0710 / 0720

## Order matrix for pressure transmitters

T.4

hex 22  
High-Performance



|                          | Type        | Pressure range | Pressure connection | Seal material | Electrical connection |
|--------------------------|-------------|----------------|---------------------|---------------|-----------------------|
|                          | ↓           | ↓              | ↓                   | ↓             | ↓                     |
| 0.5 – 4.5 V, ratiometric | <b>0705</b> |                |                     |               |                       |
| 0 – 10 V, 3-wire         | <b>0710</b> |                |                     |               |                       |
| 4 – 20 mA, 2-wire        | <b>0720</b> |                |                     |               |                       |

| Pressure range                  | Max. overpressure <sup>1)</sup> |            |
|---------------------------------|---------------------------------|------------|
| 0 – 10 bar (approx. 145 PSI)    | 40 bar                          | <b>101</b> |
| 0 – 16 bar (approx. 232 PSI)    | 64 bar                          | <b>161</b> |
| 0 – 25 bar (approx. 362 PSI)    | 100 bar                         | <b>251</b> |
| 0 – 40 bar (approx. 580 PSI)    | 160 bar                         | <b>401</b> |
| 0 – 60 bar (approx. 870 PSI)    | 240 bar                         | <b>601</b> |
| 0 – 100 bar (approx. 1,450 PSI) | 400 bar                         | <b>102</b> |
| 0 – 160 bar (approx. 2,320 PSI) | 640 bar                         | <b>162</b> |
| 0 – 250 bar (approx. 3,620 PSI) | 1000 bar                        | <b>252</b> |
| 0 – 400 bar (approx. 5,800 PSI) | 1600 bar                        | <b>402</b> |
| 0 – 600 bar (approx. 8,700 PSI) | 1650 bar                        | <b>602</b> |

### Pressure connection

|                                            |           |
|--------------------------------------------|-----------|
| G 1/4 – DIN 3852-E                         | <b>41</b> |
| G 1/4 – DIN 3852-A                         | <b>03</b> |
| NPT 1/8 (max. to 250 bar)                  | <b>04</b> |
| NPT 1/4                                    | <b>09</b> |
| M 10 x 1 tap. DIN 3852-A (max. to 250 bar) | <b>30</b> |
| 7 / 16 – 20 UNF (max. to 250 bar)          | <b>20</b> |
| 9 / 16 – 18 UNF                            | <b>21</b> |
| M 14 x 1.5 – DIN 3852-E                    | <b>42</b> |

### Pressure unit

|     |          |
|-----|----------|
| bar | <b>B</b> |
| PSI | <b>P</b> |

### Electrical connection

|                                                             |            |
|-------------------------------------------------------------|------------|
| DIN EN 175301-803-A (DIN 43 650-A) ; socket device included | <b>001</b> |
| M 12 – DIN EN 61071-2-101 D                                 | <b>002</b> |
| Bayonet ISO 15170-A1-4.1 (DIN 72585-A1-4.1)                 | <b>004</b> |
| AMP Superseal 1,5°                                          | <b>007</b> |
| Deutsch DT04-4P                                             | <b>008</b> |
| Deutsch DT04-3P                                             | <b>010</b> |
| Cable connection (length of cable 2 m standard)             | <b>011</b> |

|                      |             |            |           |          |            |
|----------------------|-------------|------------|-----------|----------|------------|
| <b>Order number:</b> | <b>07XX</b> | <b>XXX</b> | <b>XX</b> | <b>X</b> | <b>XXX</b> |
|----------------------|-------------|------------|-----------|----------|------------|



<sup>1)</sup> Static pressure, dynamic pressure 30 to 50% lower. Values refer to the hydraulic or pneumatic part of the pressure transmitter.

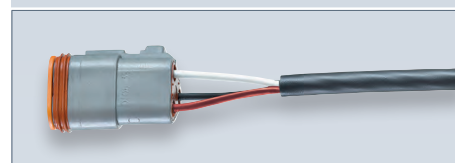


- High-quality accessories
- Developed for our products
- Aligned to our products
- Direct from the manufacturer

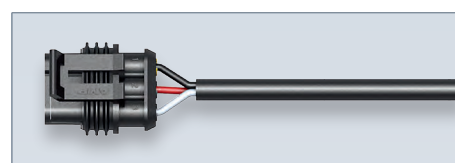
# Accessories

## Mating plugs

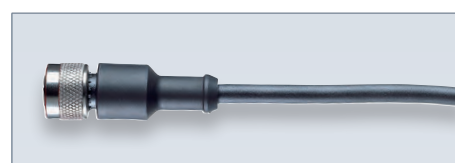
|                                                                                       |                                                                     |                                        |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|
| <b>Deutsch DT06-3S (for DT04-3P)</b><br>3 x 0.5 mm <sup>2</sup> PUR cable (2 m), IP67 | Suitable for connector code<br><b>010</b><br><b>Deutsch DT04-3P</b> | Order number:<br><b>1-1-36-653-160</b> |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|



|                                                                                        |                                                                        |                                        |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------|
| <b>TE AMP Superseal 1.5®, 3-pin</b><br>3 x 0.5 mm <sup>2</sup> Radox cable (2 m), IP65 | Suitable for connector code<br><b>007</b><br><b>AMP Superseal 1.5®</b> | Order number:<br><b>1-1-32-653-158</b> |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------|



|                                                                                       |                                                                              |                                        |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|
| <b>M12 DIN EN 61076-2-LF, 4-pin</b><br>4 x 0.34 mm <sup>2</sup> PUR cable (2 m), IP65 | Suitable for connector code<br><b>002</b><br><b>M12 DIN EN 61076-2-101 A</b> | Order number:<br><b>1-1-00-653-162</b> |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|



|                                                                                                                    |                                                                              |                                        |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|
| <b>M 12x1 DIN EN 61071-2-101 D straight, 4-pin</b><br>Terminals for wire diameter<br>0.75 mm <sup>2</sup> (AWG 18) | Suitable for connector code<br><b>002</b><br><b>M12 DIN EN 61076-2-101 A</b> | Order number:<br><b>1-6-00-652-016</b> |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|



|                                                                                                                                           |                                                                              |                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|
| <b>Coupler socket</b><br><b>M 12x1 DIN EN 61071-2-101 D Angled, 4-pin</b><br>Terminals for wire diameter<br>0.75 mm <sup>2</sup> (AWG 18) | Suitable for connector code<br><b>002</b><br><b>M12 DIN EN 61076-2-101 A</b> | Order number:<br><b>1-6-00-652-017</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|



# Thread adapters

For requirements at short notice and for realising custom solutions

- The materials and shapes of thread adapters are aligned perfectly to our electronic pressure switches and transmitters
- Thread adapters are provided together with seals to ensure safe and easy installation of our electronic pressure switches and transmitters



**For G1/4 DIN EN ISO 1179-1 (DIN 3852-E)**  
 SUCO thread code 41, transmitters and electronic pressure switches

| Stainless steel (1.4305 / AISI 303) thread adapters                                 |                                                                                      |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| G 1/4<br>DIN EN ISO 1179-1 (DIN 3852-E)<br>female thread                            |                                                                                      |                                                                                       |                                                                                       |
|  |  |  |  |
| <b>M10 x 1 shape A</b><br>DIN 3852-1                                                | <b>M14 x 1.5 shape E</b><br>DIN 3852-E<br>incl.<br>sealing ring FKM                  | <b>NPT 1/4-18</b>                                                                     | <b>9/16-18UNF</b><br>incl. O-ring FKM                                                 |
| Order number:                                                                       | Order number:                                                                        | Order number:                                                                         | Order number:                                                                         |
| 1-1-00-420-020                                                                      | 1-1-00-420-028                                                                       | 1-1-00-420-021                                                                        | 1-1-00-420-027                                                                        |

# SUCO transmitter display STD

- For pressure transmitters with 4 – 20 mA current output
- Connection to DIN EN 175301-803-A (DIN 43650)
- No additional voltage supply required
- Simple installation and programming
- Switching output option available

## Technical details

|                                                |                                                                                                                                                                                                                                                                                 |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display:                                       | LED, red, 4-digits, rotatable (4x90°)                                                                                                                                                                                                                                           |
| Display range:                                 | -999 to 9999                                                                                                                                                                                                                                                                    |
| Input signal:                                  | 4 – 20 mA, 2-wire                                                                                                                                                                                                                                                               |
| Standard display:                              | 4.00 – 20.00 (pre-set at factory)                                                                                                                                                                                                                                               |
| Accuracy:                                      | 0.2 % FS ±1 digit                                                                                                                                                                                                                                                               |
| Supply voltage:                                | 17 – 32 V DC                                                                                                                                                                                                                                                                    |
| Max. loop current:                             | 60 mA                                                                                                                                                                                                                                                                           |
| Sampling rate:                                 | 300 ms – 25.5 s (configurable with filter)                                                                                                                                                                                                                                      |
| Switching output<br>(only for 1-6-20-656-008): | PNP transistor output 90 mA (P-MOSFET)<br>Embedded overcurrent protection                                                                                                                                                                                                       |
| Programming:                                   | 2 programming buttons are located underneath<br>the removable front panel                                                                                                                                                                                                       |
| <b>Programming options:</b>                    |                                                                                                                                                                                                                                                                                 |
| Zero point setting:                            | -999 ... 9999                                                                                                                                                                                                                                                                   |
| Range:                                         | 0 ... 9999                                                                                                                                                                                                                                                                      |
| Decimal points:                                | 3 positions or disable                                                                                                                                                                                                                                                          |
| Average filter:                                | 0.3 ... 25.5 s                                                                                                                                                                                                                                                                  |
| Overrun:                                       | On / off                                                                                                                                                                                                                                                                        |
| Switching point (for 1-6-20-656-008):          | -999 ... 9999                                                                                                                                                                                                                                                                   |
| Switch function (for 1-6-20-656-008):          | NO/NC                                                                                                                                                                                                                                                                           |
| Save settings:                                 | In EEPROM                                                                                                                                                                                                                                                                       |
| Error messages:                                | If the overrun function is selected, "HI" is shown on the<br>display when 20 mA is exceeded.<br>"LO" is displayed when the current drops below 4 mA.<br>When the overrun function is disabled, "ErC6" is displayed<br>as soon as the value is no longer in range -999 ... 9999. |
| Temperature range:                             | -10 °C ... +60 °C                                                                                                                                                                                                                                                               |
| Housing material:                              | ABS / acrylic (display window)                                                                                                                                                                                                                                                  |
| Protection class                               | IP65 when fitted                                                                                                                                                                                                                                                                |
| Electrical connection:                         | DIN EN 175301-803-A (DIN 43650); suitable for connector<br>assignment with order number -001 (such as the 07xx family)                                                                                                                                                          |
| Attachment screw:                              | Included in the delivery                                                                                                                                                                                                                                                        |

## Order number:

|                       |                                              |
|-----------------------|----------------------------------------------|
| <b>1-6-20-656-007</b> | <b>Display (STD 0)</b>                       |
| <b>1-6-20-656-008</b> | <b>Display with switching output (STD 1)</b> |

T.5

Accessories



## Contact assignment:

| PIN | Display (STD 0): |
|-----|------------------|
| 1   | nc               |
| 2   | I <sub>out</sub> |
| 3   | U <sub>v+</sub>  |
| ⏏   | Ground           |

| PIN | Display with<br>switching output<br>(STD 1): |
|-----|----------------------------------------------|
| 1   | PNP                                          |
| 2   | I <sub>out</sub>                             |
| 3   | U <sub>v+</sub>                              |
| ⏏   | Ground                                       |



# S. ESI Sensor Technology



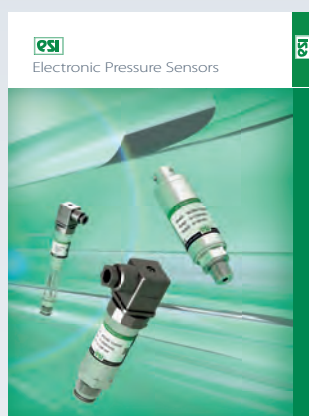






# ESI Technology Ltd

The worldwide specialist for customized high precision electronic pressure sensors



For full information please ask for our brochure

For decades, ESI Technology with headquarters in Wrexham (UK) has served its customers with consistent product development, special engineered solutions and outstanding technical service and sales support.

In 2009 ESI Technology Ltd was acquired by SUCO. Since then ESI stands for Electronics, Sensors and Instruments. By forming part of a bigger organisation, yet keeping its own independence, ESI has gained the strength to expand its sales efforts and services worldwide.

ESI Technology has become one of the leading suppliers for specialised pressure sensors by offering bespoke solutions for specific applications.

With a dedicated manufacturing and engineering facility in Wrexham, ESI serves an extensive range of major industries such as Oil and Gas, Subsea, Aerospace, Process, Test and Calibration.

Being one of the key suppliers to these industries requires high performance not only of its products. From design and sourcing through to shipment and customer service, ESIs' Management System is approved to

ISO 9001:2008 and ATEX and IECEx approval is available on a wide range of products.

Throughout the product range, ESI uses a variety of state of the art sensor technologies to make each product a perfect fit to the desired application.

Though, the jewel of ESI's sensor technologies is Silicon-on-Sapphire which has redefined the performance capability of pressure monitoring products.

Additional services, such as tailoring of the existing product range to suit application requirements, product conditioning such as ESS (Environmental Stress Screening) and product documentation packaging, make ESI the perfect partner for customers who need a bespoke service.

With a wide sales network, ESI Technology is able to deliver its' special services globally.

If you can't find the suitable solution on the following pages, please do not hesitate to contact the ESI Technology sales team or one of its partners which is always near to you.

We are looking forward to supporting you!



# Pressure Sensors Overview

For full information, please ask for our brochure  
ESI - Electronic Pressure Sensors

## S.1. High-Pressure Transmitter

|                     |                                                                                                                    |    |  |
|---------------------|--------------------------------------------------------------------------------------------------------------------|----|--|
| Pressure Ranges:    | 0 – 600 bar; 0 – 1,000 bar; 0 – 1,500 bar; 0 – 2,000 bar;<br>0 – 3,000 bar; 0 – 4,000 bar; (other ranges possible) |    |  |
| Sensor Technology:  | Silicon-on-Sapphire (SoS)                                                                                          |    |  |
| Accuracy:           | $\pm 0.25$ % FS typ. max., BFSL                                                                                    |    |  |
| Output Signal:      | 10 mV/V                                                                                                            | or |  |
|                     | 0 – 5 V                                                                                                            | or |  |
|                     | 0 – 10 V                                                                                                           | or |  |
|                     | 4 – 20 mA                                                                                                          |    |  |
| Wetted Parts:       | All titanium, machined from a single piece                                                                         |    |  |
| Process Connection: | Autoclave F250-C female; M16 x 1.5 female                                                                          |    |  |
| Option:             | ATEX/IECEx (available only for 4 – 20mA),<br>includes mining areas (Group I M1)                                    |    |  |
| Types:              | HP1000; HP1001; HP1002; HP1003; HP1011; HP1012;<br>HP1100; HP1101; HP1102; HP1103; HP1111; HP1112                  |    |  |



## S.2. Low-Pressure Transmitter

|                     |                                                                                  |    |  |
|---------------------|----------------------------------------------------------------------------------|----|--|
| Pressure Ranges:    | 0 – 50 mbar; 0 – 100 mbar; 0 – 250 mbar; 0 – 500 mbar<br>(other ranges possible) |    |  |
| Sensor Technology:  | Piezoresistive Silicon Sensor                                                    |    |  |
| Accuracy:           | $\pm 0.5$ % FS typ. max., BFSL                                                   |    |  |
| Output Signal:      | 10 mV/V (typ.)                                                                   | or |  |
|                     | 0 – 5 V                                                                          | or |  |
|                     | 0 – 10 V                                                                         | or |  |
|                     | 4 – 20 mA                                                                        |    |  |
| Wetted Parts:       | Stainless steel (316) with O-ring                                                |    |  |
| Process Connection: | ¼" BSP (G ¼); ½" BSP; ¼" NPT; ½" NPT; (all male)<br>(others on request)          |    |  |
| Types:              | LP1000; LP1001; LP1002; LP1003; LP1011; LP1012                                   |    |  |



## S.3. High-Precision Pressure Transducer

|                        |                                                               |    |  |
|------------------------|---------------------------------------------------------------|----|--|
| Pressure Ranges:       | 0 – 500 mbar to 0 – 1,500 bar                                 |    |  |
| Sensor Technology:     | Silicon-on-Sapphire (SoS)                                     |    |  |
| Accuracy:              | $\pm 0.1$ % FS typ. max., BFSL                                |    |  |
| Temperature Effects:   | $\pm 1.0$ % FS max. thermal error band over -20 °C ... +70 °C |    |  |
| Output Signal:         | 10 mV/V (typ.)                                                | or |  |
|                        | 0 – 5 V                                                       | or |  |
|                        | 0 – 10 V                                                      | or |  |
|                        |                                                               |    |  |
| Wetted Parts:          | All Titanium                                                  |    |  |
| Process Connection:    | ¼" BSP (G ¼); ¼" NPT; (all male)                              |    |  |
| Electrical Connection: | MIL-C-26482 6 pin Bayonet or 1 m PTFE cable                   |    |  |
| Option:                | ATEX/IECEx (available only for mV output)                     |    |  |
| Types:                 | HI2000; HI2001; HI2002<br>HI2010; HI2011; HI2012              |    |  |





# Pressure Sensors Overview



## S.4. High-Temperature Pressure Transmitter

|                            |                                                               |
|----------------------------|---------------------------------------------------------------|
| <b>Temperature Ranges:</b> | <b>Media temperature up to 250 °C</b>                         |
| Pressure Ranges:           | 0 – 1 bar up to 0 – 1,500 bar                                 |
| Output Signal:             | mV or 4 – 20 mA                                               |
| Process Connection:        | ¼" BSP (G ¼); ¼" NPT; (all male)<br>or ½" BSP flush diaphragm |
| Electrical Connection:     | MIL-C-26482 6 pin Bayonet;<br>1 m PTFE cable; DIN EN 175301   |
| Option:                    | ATEX/IECEX                                                    |
| Types:                     | HI2200; HI2210; HI2300; HI2310; PR3860; PR3861; PR3862        |



## S.5. USB-Transducer

|                        |                                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------|
| Pressure Ranges:       | -1 – 2.5 bar; 0 – 16 bar; 0 – 100 bar; 0 – 400 bar;<br>0 – 1,500 bar; 0 – 2,000 bar; 0 – 4,000 bar; |
| Sensor Technology:     | Silicon-on-Sapphire (SoS)                                                                           |
| Accuracy:              | ±0.15 % FS typ. max., BFSL                                                                          |
| <b>Output Signal:</b>  | <b>USB-Interface power supply and data transfer via USB</b>                                         |
| Wetted Parts:          | All titanium                                                                                        |
| Process Connection:    | ¼" BSP (G ¼); ¼" NPT; (all male) or<br>Autoclave F-250-C female;                                    |
| Electrical Connection: | USB Mini B                                                                                          |
| Types:                 | GS4200-USB                                                                                          |



## S.6. Submersible Depth / Level Pressure Transmitter

|                        |                                      |
|------------------------|--------------------------------------|
| Pressure Ranges:       | 0 – 1 mWG up to 0 – 500 mWG          |
| Accuracy:              | ±0.3 % FS typ. max., BFSL            |
| Output Signal:         | 4 – 20 mA (other options on request) |
| Electrical Connection: | Vented Cable                         |
| Option:                | ATEX/IECEX                           |
| Types:                 | PR3420; PR3441; PR3442               |



## S.7. Flush Diaphragm Pressure Transmitter

|                     |                                                                                                   |
|---------------------|---------------------------------------------------------------------------------------------------|
| Pressure Ranges:    | 0 – 200 mbar up to 0 – 1,000 bar                                                                  |
| Sensor Technology:  | Thick Film Ceramic Sensor                                                                         |
| Accuracy:           | ±0.3 % FS typ. max., BFSL                                                                         |
| Output Signal:      | 4 – 20 mA (other options on request)                                                              |
| Wetted Parts:       | Stainless steel 316                                                                               |
| Process Connection: | ½" BSP; Pipe-clamp; DIN 11851; (other options on request)                                         |
| Option:             | ATEX/IECEX                                                                                        |
| Types:              | PR3800; PR3801; PR3802; PR3820; PR3821; PR3822;<br>PR3850; PR3851; PR3852; PR3860; PR3861; PR3862 |



## S.8. Special Solutions

Application Specific Design Solutions  
 Customised Housing Design  
 Choice of Output Signals and Pressure Ranges  
 Specialised Process Connections  
 Various Electrical Connectors  
 Special Housing Materials

## S.9. Oil & Gas and Subsea Solutions

Dual Redundancy (Pressure Sensors and Electronics)  
 Hyperbaric Testing to 3000 m Depth  
 Environmental Stress Screening (ESS)  
 Bespoke Process Connections  
 Extended Service life  
 Special Housing Materials  
 Comprehensive Documentation Package and Certification

## S.10. Differential Pressure Transmitter

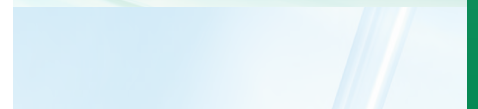
|                      |                                      |
|----------------------|--------------------------------------|
| Pressure Ranges:     | 0 – 5 mbar up to 0 – 200 bar         |
| Accuracy:            | ±0,3 % FS typ. max., BFSL            |
| Output Signal:       | 4 – 20 mA (other options on request) |
| <b>Wetted Parts:</b> | <b>Suitable for liquids or gases</b> |
| Option:              | ATEX/IECEX                           |
| Types:               | PR3200; PR3202; PR3203; PR3204       |

## S.11. Accessories

Panel Meter  
 High Temperature Pressure Adapter  
 Adapters for Process Connectors

### Selection Matrix

Help in selecting a suitable pressure sensor





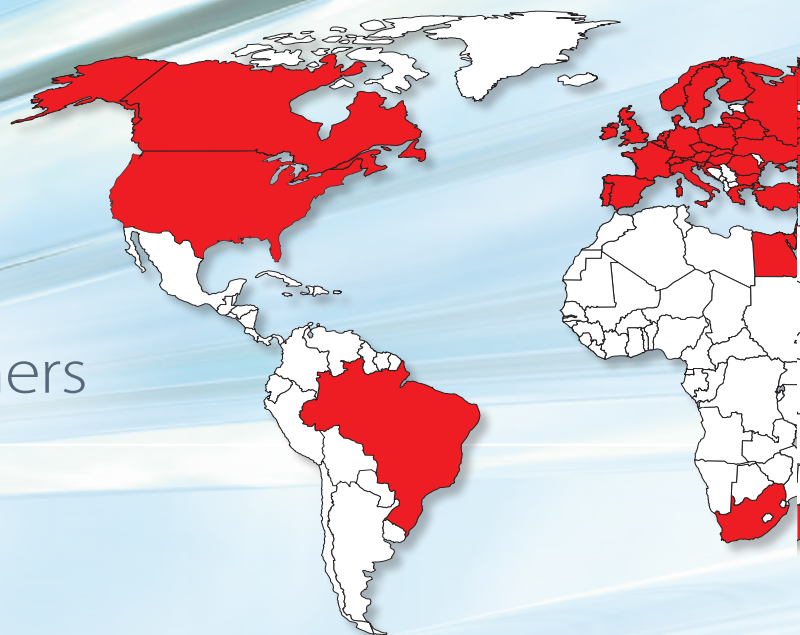


# Selection Matrix

|                                                                    |            |                                                                                          | Silicon-on-Sapphire | Ceramic Thick Film | Isolated Piezoresistive | Piezoresistive Silicon |
|--------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------|---------------------|--------------------|-------------------------|------------------------|
| High Specification<br>High Temperature<br>Pressure<br>Transmitters | HI2000     | Silicon-on-Sapphire Pressure Transmitter, mV output, 1 m cable                           | ■                   |                    |                         |                        |
|                                                                    | HI2001     | Silicon-on-Sapphire Pressure Transmitter, 5 V output, 1 m cable                          | ■                   |                    |                         |                        |
|                                                                    | HI2002     | Silicon-on-Sapphire Pressure Transmitter, 10 V output, 1 m cable                         | ■                   |                    |                         |                        |
|                                                                    | HI2010     | Silicon-on-Sapphire Pressure Transmitter, mV output, MIL-C-26482                         | ■                   |                    |                         |                        |
|                                                                    | HI2011     | Silicon-on-Sapphire Pressure Transmitter, 5 V output, MIL-C-26482                        | ■                   |                    |                         |                        |
|                                                                    | HI2012     | Silicon-on-Sapphire Pressure Transmitter, 10 V output, MIL-C-26482                       | ■                   |                    |                         |                        |
|                                                                    | HI2200     | Silicon-on-Sapphire Pressure Transmitter, mV output, 1 m cable                           | ■                   |                    |                         |                        |
|                                                                    | HI2210     | Silicon-on-Sapphire Pressure Transmitter, mV output, MIL-C-26482                         | ■                   |                    |                         |                        |
|                                                                    | HI2300     | Silicon-on-Sapphire Pressure Transmitter, mV output, 1 m cable                           | ■                   |                    |                         |                        |
|                                                                    | HI2310     | Silicon-on-Sapphire Pressure Transmitter, mV output, MIL-C-26482                         | ■                   |                    |                         |                        |
| Digital USB                                                        | GS4200-USB | Silicon-on-Sapphire Pressure Transducer, USB connector                                   | ■                   |                    |                         |                        |
| Differential                                                       | PR3200     | Differential Pressure Transmitter, 4 – 20 mA (2 wire)                                    | ■                   |                    |                         |                        |
|                                                                    | PR3202     | Air Differential Pressure Transmitter, 4 – 20 mA (2 wire), 0 – 5 up to 0 – 1,000 mbar DP |                     |                    |                         | ■                      |
|                                                                    | PR3203     | Air Differential Pressure Transmitter, 5 V (3 wire), 0 – 5 up to 0 – 1,000 mbar DP       |                     |                    |                         | ■                      |
|                                                                    | PR3204     | Air Differential Pressure Transmitter, 10 V (3 wire), 0 – 5 up to 0 – 1,000 mbar DP      |                     |                    |                         | ■                      |
| Submersible                                                        | PR3420     | Submersible Pressure Transmitter, sludge platform, 4 – 20 mA (2 wire)                    |                     |                    | ■                       |                        |
|                                                                    | PR3441     | Depth/Level Pressure Transmitter, 25 mm diameter, 4 – 20 mA (2 wire)                     |                     |                    | ■                       |                        |
|                                                                    | PR3442     | Depth/Level Pressure Transmitter, 16.5 mm diameter, 4 – 20 mA (2 wire)                   |                     |                    | ■                       |                        |
| Hygienic/<br>Barrier Seal                                          | PR3800     | Pressure Transmitter, pipe-clamp barrier seal, 4 – 20 mA (2 wire)                        |                     | ■                  |                         |                        |
|                                                                    | PR3801     | Pressure Transmitter, pipe-clamp barrier seal, 0 – 5 V (4 wire)                          |                     | ■                  |                         |                        |
|                                                                    | PR3802     | Pressure Transmitter, pipe-clamp barrier seal, 0 – 10 V (4 wire)                         |                     | ■                  |                         |                        |
|                                                                    | PR3820     | Pressure Transmitter, choice of barrier seal fittings, 4 – 20 mA (2 wire)                |                     | ■                  |                         |                        |
|                                                                    | PR3821     | Pressure Transmitter, choice of barrier seal fittings, 0 – 5 V (4 wire)                  |                     | ■                  |                         |                        |
|                                                                    | PR3822     | Pressure Transmitter, choice of barrier seal fittings, 0 – 10 V (4 wire)                 |                     | ■                  |                         |                        |
|                                                                    | PR3850     | Pressure Transmitter, flush diaphragm, 4 – 20 mA (2 wire)                                |                     | ■                  |                         |                        |
|                                                                    | PR3851     | Pressure Transmitter, flush diaphragm, 0 – 5 V (4 wire)                                  |                     | ■                  |                         |                        |
|                                                                    | PR3852     | Pressure Transmitter, flush diaphragm, 0 – 10 V (4 wire)                                 |                     | ■                  |                         |                        |
|                                                                    | PR3860     | High Temperature Pressure Transmitter, flush diaphragm, 4 – 20 mA (2 wire)               |                     | ■                  |                         |                        |
|                                                                    | PR3861     | High Temperature Pressure Transmitter, flush diaphragm, 0 – 5 V (4 wire)                 |                     | ■                  |                         |                        |
|                                                                    | PR3860     | High Temperature Pressure Transmitter, flush diaphragm, 0 – 10 V (4 wire)                |                     | ■                  |                         |                        |
| Oil & Gas,<br>Subsea                                               | PR3913     | Control Valve Pressure Transmitter, 4 – 20 mA output                                     | ■                   |                    |                         |                        |
|                                                                    | PR3914     | Subsea Pressure Transmitter, 4 – 20 mA output                                            | ■                   |                    |                         |                        |
|                                                                    | PR3915     | Dual Redundant Control Valve Pressure Transmitter, 4 – 20 mA output                      | ■                   |                    |                         |                        |
|                                                                    | PR3920     | DP Control Valve Pressure Transmitter, 4 – 20 mA output                                  | ■                   |                    |                         |                        |
| High Pressure                                                      | HP1000     | High Pressure Transducer, mV output, pressures to 2,000 bar                              | ■                   |                    |                         |                        |
|                                                                    | HP1001     | High Pressure Transducer, 5 V (4 wire), pressures to 2,000 bar                           | ■                   |                    |                         |                        |
|                                                                    | HP1011     | High Pressure Transducer, 5 V (3 wire), pressures to 2,000 bar                           | ■                   |                    |                         |                        |
|                                                                    | HP1002     | High Pressure Transducer, 10 V (4 wire), pressures to 2,000 bar                          | ■                   |                    |                         |                        |
|                                                                    | HP1012     | High Pressure Transducer, 10 V (3 wire), pressures to 2,000 bar                          | ■                   |                    |                         |                        |
|                                                                    | HP1003     | High Pressure Transmitter, 4 – 20 mA output, pressures to 2,000 bar                      | ■                   |                    |                         |                        |
|                                                                    | HP1100     | High Pressure Transducer, mV output, pressures to 4,000 bar                              | ■                   |                    |                         |                        |
|                                                                    | HP1101     | High Pressure Transducer, 5 V (4 wire), pressures to 4,000 bar                           | ■                   |                    |                         |                        |
|                                                                    | HP1111     | High Pressure Transducer, 5 V (3 wire), pressures to 4,000 bar                           | ■                   |                    |                         |                        |
|                                                                    | HP1102     | High Pressure Transducer, 10 V (4 wire), pressures to 4,000 bar                          | ■                   |                    |                         |                        |
|                                                                    | HP1112     | High Pressure Transducer, 10 V (3 wire), pressures to 4,000 bar                          | ■                   |                    |                         |                        |
|                                                                    | HP1103     | High Pressure Transmitter, 4 – 20 mA output, pressures to 4,000 bar                      | ■                   |                    |                         |                        |
| Low Pressure                                                       | LP1000     | Air, Low Pressure Transducer, mV output                                                  |                     |                    | ■                       |                        |
|                                                                    | LP1001     | Air, Low Pressure Transducer, 5 V (4 wire)                                               |                     |                    | ■                       |                        |
|                                                                    | LP1011     | Air, Low Pressure Transducer, 5 V (3 wire)                                               |                     |                    | ■                       |                        |
|                                                                    | LP1002     | Air, Low Pressure Transducer, 10 V (4 wire)                                              |                     |                    | ■                       |                        |
|                                                                    | LP1012     | Air, Low Pressure Transducer, 10 V (3 wire)                                              |                     |                    | ■                       |                        |
|                                                                    | LP1003     | Air, Low Pressure Transmitter, 4 – 20 mA output                                          |                     |                    | ■                       |                        |

|  | Differential | ATEX/ IECEx / M1 Option  | High Accuracy                       | Highest Pressure | High Specification                  | High Temperature (>125°C)           | Lowest Pressure | Wireless |  | Aerospace                           | Automotive | Clean Room | Defence                             | Depth & Level | Hydraulic | Hygienic | Oil & Gas                           | Process | Subsea | Test & Calibration                  |
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