

Please keep for later reference and forward to the end customer together with the product.



### USE

Pressure switches are switching devices that switch on, switch off or switch between electrical currents on a pressure-dependent basis. The pressure to be monitored actuates an electromechanical switching element via a pressure sensor and a transmission mechanism.

### DEVICE SELECTION

The necessary data for operation in accordance with the intended use such as pressure connections, electrical connections, permissible operating and other technical data of the various device models can be found in the following information and tables 1-4.

### EXPLOSION PROTECTION IN ACCORDANCE WITH EU DIRECTIVE 2014/34/EU

The pressure switches can be used

- in Zone 2 gas explosion hazard areas. They conform to category II 3G with ignition protection class Ex nA nC IIC T6 Gc.
- in areas with combustible dust in Zone 22. They conform to category II 3D with ignition protection class:
- for devices with plugs as per DIN EN 175 301-803: Ex tc IIIC T50 °C Dc
- for devices with plug M12 x 1: Ex tc IIIC T80 °C Dc

Compliance with the basic safety and health requirements has been assured by compliance with  
 EN 60079-0:2012 + A11:2013,  
 EN 60079-15:2010,  
 EN 60079-31:2014

### TECHNICAL CHARACTERISTICS

Operating fluids: neutral, gaseous and liquid fluids (see devices in tables 1 and 2) or hydraulic oils (see devices in tables 3 and 4). It is recommended that the compatibility of the operating fluid with the components in contact with the fluid, particularly seals, be tested.

Permitted fluid and ambient temperature:

- for devices with plugs as per DIN EN 175 301-803 (table 1): 0...+50 °C
- for devices with plug M12 x 1 (table 2): 0...+80 °C

Rated operational voltages and switching currents (DC/AC)

- for devices with plugs as per DIN EN 175 301- 803 (tables 1 and 3):  
 $U = 250 \text{ V} / I = 0.1 \text{ A}$
- for devices with plugs M12 x 1 (tables 2 and 4):  $U = 30 \text{ V} / I = 0.1 \text{ A}$

### Permitted switching currents

The contacts of the switch are gold-plated. Thus, they are suitable for the following switching currents: see table, column 1. The following maximum switching currents are permitted; however, the gold layer can be destroyed: see table, column 2.

Voltage up to	Switching current max.
250V AC	0,1A
30V DC	0,1A

To extinguish sparks it is recommended to install a suitable protective switch (diode, RC link or something similar) parallel to the inductive load.

### INSTALLATION

The relevant Ex directives, in particular EN 60079-14 and EN 60079-17 must be followed for installation, maintenance and repair. Electrical installation must be performed or supervised by a qualified electrician and/or under his supervision in compliance with relevant domestic regulations.

Prior to installation, the information on the equipment label must be compared with the expected operating conditions in order to ensure operation in accordance with intended use.

Information about the year of manufacture of the device: in the 5-digit date code on the rating label, the first two characters indicate the decade and the year, whereby A stands for the years 2000...2009, B for the years 2010...2019, etc. (example: A9111 = the year 2009).

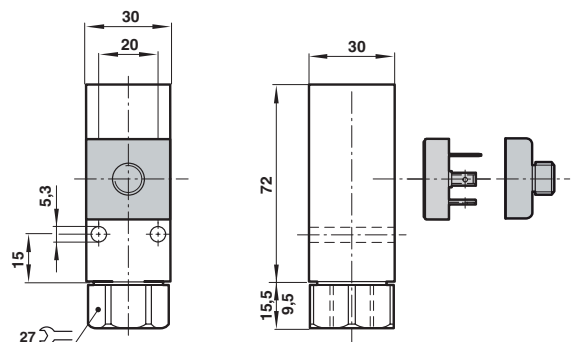
The installation position may be freely selected.

### ATTENTION:

The pressure switches must be operated in a cabinet or protective housing or protected by a protective device (e.g. protective grating) from any mechanical damage and especially from impacts from all directions.

The **fluid connection** is made via tube connection with a G 1/4" inside thread or flange connection.

Tube connection  
 G 1/4



With the flange version an O-ring 5x1.5 is included; the required rough depth of the opposite surface is less than <math>12 \mu\text{m}</math>.

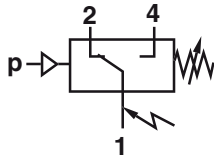
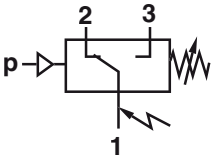
In the case of liquid fluids with pressure spikes (e.g. in hydraulic accumulators or directional control valves) and in cases of pulsating pressure (e.g. in piston pumps) the pressure switch must be positioned downstream from an absorption prechamber (Order No. 0574773) otherwise switching point scattering, higher wear and possibly failure of the differential setting are to be expected.

**ELECTRICAL CONNECTION**

Switching function  
 One single-pin microswitch (converter)

Terminals  
 1 - 3, contact closes when standard value rises  
 1 - 2, contact opens when standard value rises

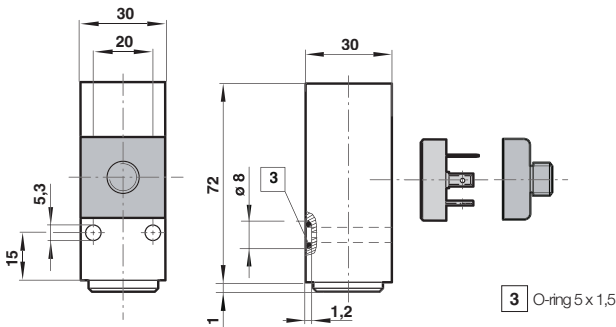
Terminals  
 1 - 4, contact closes when standard value rises  
 1 - 2, contact opens when standard value rises



Model No. 088xx80  
 (DIN EN 175 301 - 803)

Model No. 088xx81  
 (Connector M12)

Flange



**PRESSURE SWITCH WITH ORDER NO. 088XX80 (TABLES 1 AND 3):**

These pressure switches are equipped with an ATEX approved DIN 175301-803 connector. When selecting the connection line, the diameter of the cable connection (6 to 11 mm) and the required cable quality (EN 60079-14) must be noted. In the case of ambient temperatures higher than 70 °C the cable must be correspondingly temperature-resistant. After disassembly of the plug socket, the connection cable is connected to the screw terminals. The ground wire must always be connected. The terminals are designed for cross sections 0.5 to 1.5 mm<sup>2</sup>. After attachment to the terminals, the plug must be carefully reinstalled on the pressure switch to ensure protection class IP65; this also applies to the cable connection on the plug.

Starting torque  
 Terminal screws: 0.2 Nm ±0.1 Nm  
 Central screw for the connector attachment: 0.5Nm ±0.1 Nm.

Pressure screw of the table connector: manually with Order No. 088xx80 (tables 2 and 4):

These pressure switches are equipped with an **M12 connector** with cable tail in protection class III. These pressure switches may be operated only in an electrical circuit that is safely isolated from the power supply (PELV as per DIN VDE 0100-410, IEC 364-4-43, HD 384.4.41 S2, EN 60079-14); the electrical circuit must be potential-free (not grounded).

The knurled nut of the plug socket must be tightened adequately so that the locking is noticeably effective.

**CONNECTOR**

**Only the connectors and connection cables with integrated connectors may be used. The use of other contact boxes voids the Ex equipment approval.**

For the pressure switches with M12 plug connectors (see devices in tables 2 and 4), the following parts are available:  
 ID No. 0524206 - straight, 2 m, 4 wires  
 ID No. 0524207 - 90°, 2 m, 4 wires  
 ID No. 0524208 - straight, 5 m, 4 wires  
 ID No. 0524209 - 90°, 5 m, 4 wires

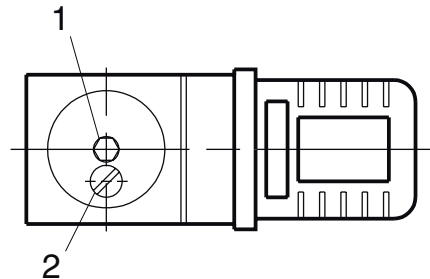
**For all pressure switches, please note that the connectors must not be disconnected under voltage! The power supply must remain switched off with the plug connectors disconnected.**

When used in areas at risk of dust explosions, the penetration dust into the disconnected plug socket must be prevented, e.g. by putting on a dust protection cap.

**SETTING THE SWITCHING POINTS**

The switching points are freely adjustable in the pressure switching range. Switching points should ideally be in the middle of the pressure switching range. Do not exploit the limit value (corresponds to the test pressure) during operation.

To set the switching points, the fixing screw 2 must be loosened. The upper and lower switching points are set by turning adjustment screw 1 (turn to the right for rising and to the left for falling pressure). The adjustment value can be checked with a manometer. To complete the procedure, tighten the fixing screw 2.



**GETTING STARTED, MAINTENANCE**

**WARNING:**  
 When putting the pressure switch into operation with flammable fluids, an ignitable mixture can form due to the atmospheric air present in the adjacent cavities including the feed lines. It must therefore be ensured that any ignitable mixture in these cavities is eliminated (by rinsing, inerting, evacuation, etc.) and that potential ignition sources are avoided (temperature influence, adiabatic compression, electrostatic discharge, etc.).

The pressure switches are maintenance-free. If the devices fail or malfunction during operation for unknown reasons, they must be replaced. Defective microswitches or other components cannot be repaired or replaced.

Pressure switches that show signs of damage must not be installed or must be replaced.

The pressure switches may not be used as levers. If they are exposed to special types of external stresses, additional safety measures are required.

## OPERATION

Proper use must be ensured during operation. This applies particularly to the ambient and fluid temperatures, pressure loads and electrical data. If necessary, the pressure switch must be protected against overload.

The maximum switching rate is 100/minute.

## CE MARK

The CE mark is not a quality characteristic, but is aimed at the relevant authorities.

The European Council has issued common directives for the European market which specify the minimum requirements for safety and health protection specifically for the purpose of facilitating the free movement of goods in the EU. The CE mark confirms that products are in accordance with all of the relevant directives, i.e. that they conform to the relevant standards, particularly those that are harmonized. The directives 2011/65/EU, 2014/34/EU, 2014/35/EU, 2014/30/EU apply to these products.

Notes on the directive 2014/34/EU (explosion protection directive ATEX):  
 The pressure switches meet the requirements of the directive. The EU declaration of conformity is enclosed.  
 Reference is made to further relevant directives, particularly to the directive 1999/92/EC for the planning, installation, operation and maintenance of systems in potentially explosive areas.

Notes on directive 2014/35/EU (low voltage directive):  
 The pressure switches were developed, designed and manufactured in compliance with the relevant standards VDE 0100 ff and the harmonized standard "Electrical Equipment", EN 60204-1. Thus the requirements of the low voltage directive, which applies to nominal voltages of 50 to 1000 V AC and from 75 to 1500 V DC, are also fulfilled.

Notes on Directive 2014/30/EU (EMC Directive):  
 The micro switch installed in the pressure switch is a passive component in a non-repeating mode < 10Hz and is therefore not subject of the EMC directive. Voltage and current spikes are to be limited by the user to a permissible level by an external circuit. (E.g. clamping diode for inductive loads).

## MODEL SELECTION LISTS

### Pressure switch 18D for neutral, gaseous and liquid fluids Electrical connection: Plug as per DIN EN175301-803

Table 1

Model No.	Pressure range (bar)	Max. over pressure (bar)	Switching pressure difference max		Materials of parts in contact with fluid	Fluid connection	Protection class (ATEX)
			Lower range (bar)	Upper range (bar)			
880180	-1 .. 0	80	0,15	0,18	Al/MS/FKM/NBR	G1/4	
880280	0,2 .. 2	80	0,2	0,35		G1/4	
880380	0,5 .. 8	80	0,35	0,85		G1/4	
880480	1 .. 16	80	0,4	1,2		G1/4	
880680	1 .. 30	80	1	5		G1/4	II 3G Ex nA nC IIC T6 Gc
881180	-1 .. 0	80	0,15	0,18		Flange	II 3D Ex tc IIIC T50°C Dc
881280	0,2 .. 2	80	0,2	0,35		Flange	
881380	0,5 .. 8	80	0,35	0,85		Flange	
881480	1 .. 16	80	0,4	1,2		Flange	
881680	1 .. 30	80	1	5		Flange	

**Pressure switch 18D for neutral, gaseous and liquid fluids**  
**Electrical connection: Plug M12 x1 (max. voltage 30V, max. current 0.1 A)**

**Table 2**

Model No.	Pressure range (bar)	Max. over pressure (bar)	Switching pressure difference max		Materials of parts in contact with fluid	Fluid connection	Protection class (ATEX)
			Lower range (bar)	Upper range (bar)			
880181	-1 .. 0	80	0,15	0,18	Al/MS/FKM/NBR	G1/4	II 3G Ex nA nC IIC T6 Gc  II 3D Ex tc IIIC T80°C Dc
880281	0,2 .. 2	80	0,2	0,35		G1/4	
880381	0,5 .. 8	80	0,35	0,85		G1/4	
880481	1 .. 16	80	0,4	1,2		G1/4	
880681	1 .. 30	80	1	5		G1/4	
881181	-1 .. 0	80	0,15	0,18		Flange	
881281	0,2 .. 2	80	0,2	0,35		Flange	
881381	0,5 .. 8	80	0,35	0,85		Flange	
881480	1 .. 16	80	0,4	1,2		Flange	
881681	1 .. 30	80	1	5		Flange	

**Pressure switch 18D for hydraulic oils**  
**Electrical connection: Plug as per DIN EN175301-803**

**Table 3**

Model No.	Pressure range (bar)	Max. over pressure (bar)	Switching pressure difference max		Materials of parts in contact with fluid	Fluid connection	Protection class (ATEX)
			Lower range (bar)	Upper range (bar)			
882180	5 .. 70	400	10,5	15	Al/Steel/PTFE/NBR	G1/4	II 3G Ex nA nC IIC T6 Gc  II 3D Ex tc IIIC T50°C Dc
882280	10 .. 160	400	11	17		G1/4	
882380	25 .. 250	400	13	21		G1/4	
882480	40 .. 420	600	17	38		G1/4	
883180	5 .. 70	400	10,5	15		Flange	
883280	10 .. 160	400	11	17		Flange	
883380	25 .. 250	400	13	21		Flange	
883480	40 .. 420	600	17	38		Flange	

**Pressure switch 18D for hydraulic oils**
**Electrical connection: Plug M12 x1 (max. voltage 30V, max. current 0.1 A)**
**Table 4**

Model No.	Pressure range (bar)	Max. over pressure (bar)	Switching pressure difference max		Materials of parts in contact with fluid	Fluid connection	Protection class (ATEX)
			Lower range (bar)	Upper range (bar)			
882181	5 .. 70	400	10,5	15	Al/Steel/PTFE/NBR	G1/4	II 3G Ex nA nC IIC T6 Gc
882281	10 .. 160	400	11	17		G1/4	
882381	25 .. 250	400	13	21		G1/4	
882481	40 .. 420	600	17	38		G1/4	
883181	5 .. 70	400	10,5	15		Flange	II 3D Ex tc IIIC T80°C Dc
883281	10 .. 160	400	11	17		Flange	
883381	25 .. 250	400	13	21		Flange	
883481	40 .. 420	600	17	38		Flange	

-TRANSLATION-

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## EU – Declaration of Conformity in accordance with Directive: 2014/34/EU

**Equipment:** Pressure Switch  
**Model series:** 088xx80, 088xx81

Herewith the manufacturer declares that the named products are in conformity with all relevant provisions of the above mentioned directive to use in potentially explosive atmospheres.




### Referenced normative standards:


EN 60079-0:2012	General requirements
EN 60079-15:2010	Type of protection "n"
EN 60079-31:2014	Protection by enclosure "t"

### Equipment group, Categories, Types of protection:

Versions with EN 175301-803 Connector, Order numbers 088xx80:

 II 3G Ex nA nC IIC T6 Gc  
II 3D Ex tc IIIC T50°C Dc

Versions with M12 Connector, Order numbers 088xx81:


 II 3G Ex nA nC IIC T6 Gc  
II 3D Ex tc IIIC T80°C Dc

Certificate Number: 16.0002X

Fellbach, December 2016

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