

Pressure Switch Type 20D ATEX

Type No. 184xx05, 184xx15,
185xx05, 185xx15

Operating
Instructions

Engineering
GREAT Solutions



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1. 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.

2. 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 1-2.

3. Explosion protection in accordance with EU Directive 2014/34/EU (ATEX)

The pressure switches can be used

- in Zone 1 and 2 gas explosion hazard areas. They conform to category II 2G with Ignition Protection Class Ex db eb IIC T6 Gb
- in areas with combustible dust in Zones 21 and 22. They conform to category II 2D with Ignition Protection Class Ex tb IIIC T80°C Db
- Compliance with the basic safety and health requirements has been assured by compliance with EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-7: 2015, EN 60079-31:2014.
-

4. Technical characteristics

Operating fluids:	Neutral, gaseous and liquid fluids. The fluid connection is made using a G 1/4 internal screw thread or G1/2 external screw thread.
Permitted fluid temperature:	0 ... +75 °C
Permitted ambient temperature:	-10°C to +75°C

When the pressurized fluid has a temperature below 0 °C (risk of icing) and above + 70 °C, a sufficiently long feed line must be provided. In the case of assembly outdoors, the devices must be adequately protected from critical ambient conditions such as aggressive atmosphere, extreme temperatures, considerable temperature fluctuations, direct solar exposure, and humidity.

Rated operational voltage U= 230 V Permitted switching direct-current voltage dc

Rated voltage	Rated voltage	Inductive load L/R = 3μs
30V	7A *)	5A **)
250V	0,4A	0,03A

Permitted switching alternating current voltage ac

Rated voltage	Resistive load	Inductive load cosφ = 0,6
30V	7A *)	3A
250V	5A **)	0,03A

*) At an ambient temperature of 50°C to 60°C limited to 6A and at an ambient temperature of 60°C to 75°C limited to 3A

***) At an ambient temperature of 60°C to 75°C limited to 3A

5. 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: B0111 ≡ the year 2010).

6. Use, getting started, maintenance

This range of pressure switches consists of relative pressure switches that switch on, switch off or switch between electrical currents on a pressure-dependent basis. The pressure to be monitored acts via a pressure transducer with a transmission mechanism on an electromechanical switching element (microswitch in Ex d). The medium is kept exclusively in the pressure transducer and does not penetrate the inner chamber of the housing.

The pressure transducers vary with respect to their functions and material (see selection list for types).

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 pressure switches 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.

6.1 Installation notes

In the case of gaseous fluids, the installation position can be freely chosen. For pressure switches for hydraulic systems, the pressure connection must be positioned vertically facing downwards. Leak oil (in steel piston-sensor systems with leak oil connections) must be evacuated without pressure; otherwise oil may penetrate the switch component.

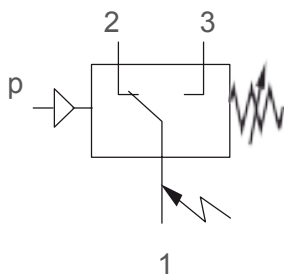
In the case of liquid fluids with pressure spikes (e.g. in hydraulic accumulators or directional control valves) and in cases of pulsating pressure (e.g. in piston pumps) the pressure switch must be positioned downstream from an absorption prechamber; otherwise switching point scattering, higher wear and possibly failure of the differential setting are to be expected.

In the case of steam as a fluid, a condensation coil or a water pouch tube must be installed in front of the pressure sensor.

Twisting of the pressure sensor must be avoided at all costs; it must be held in place when being connected.

6.2 Electrical connection

Symbol



The pressure switch is connected via the 3-pin terminal in the terminal compartment (type of protection Ex e) and lying in the interior of the separate protective conductor terminal.

For connecting the housing to the local potential equalization system, the pressure switch has an external terminal. Here are the requirements of EN 60079-14, defined in Point 6.2.

The terminal areas, the stripping length and the tightening torques please refer to the lower table.

	three-pole terminal	inside earth terminal	outside potential equalisation terminal
wire cross- section	1...2,5 mm ²	0,75...1,5 mm ²	1,5... 4 mm ²
stripping length	6 ...8 mm	6 ...8 mm	10...12 mm
tightening torque	0,4 Nm	1,2 Nm	2 Nm

When selecting the connection line, the diameter of the cable connection (6 to 14 mm) and the required cable quality (EN 60079-14) must be noted. When using a silicone connection line (or one containing silicone) or a line which is not scratch-proof, it must be protected from mechanical damage.

In the case of ambient temperatures higher than $>70\text{ }^{\circ}\text{C}$ the cable must be correspondingly temperature-resistant.

6.3 Cable connections

The supplied cable gland is only allowed for the connection of static cables and wires. An additional strain relief must be ensured.

If the cable gland included with delivery is not to be used, please note that for use in areas at risk of gas explosions only Ex e cable glands, and in areas at risk of dust explosions only Ex t cable glands with at least IP65 and in each case with corresponding EU prototype test certification must be used.

The connection thread for the cable connection is M 20x1.5.

Reductions, expansions, transitional pieces and similar components must likewise be certified accordingly.

All connecting parts must belong to at least protection class IP65 (EN 60529); the required temperature range is must also be noted.

The connecting parts must be correctly installed to guarantee protection class IP65.

6.4 Cover assembly

After the device is connected, the cover must be reattached carefully. To guarantee at least the protection class IP65, the original seal (just as with the cable connection) must be used.

Versions with already connected cable are ready to use, i.e. it is not necessary to open the connection space.

6.5 Setting the switching points

The switching points are freely configurable 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.

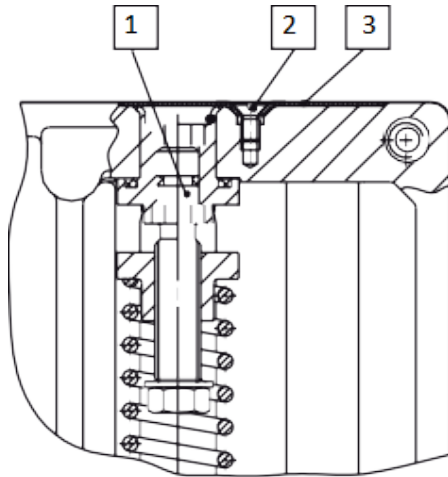
When setting the switching point, please note the following:

- In the model with a **fixed switching pressure** difference, the lower switching point is set with the range spindle; the upper switching point results from the fixed switching pressure difference.
- In the model with **adjustable switching pressure** difference, the lower switching point is set with the range spindle and the upper switching point with the difference spindle.

By rotating the range spindle to the right, both switching points can be moved upward. Rotating the difference spindle to the right will shift only the upper switching point upwards, i.e. the switching pressure difference becomes greater.

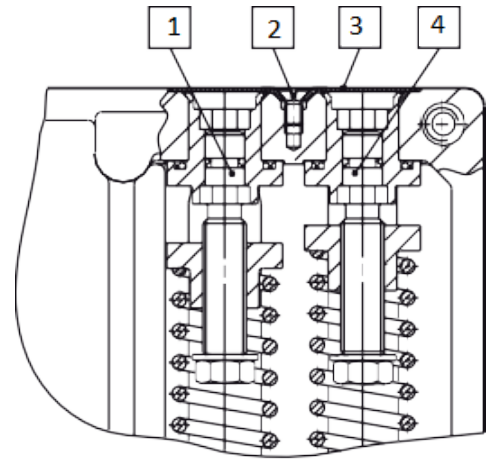
**Setting the switching points
difference**

Design with fixed switching difference



- 1 Range spindle
- 2 Screw M 2,5 x 5
- 3 Cover
- 4 Differential spindle

Design with adjustable switching



7. 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.

Schock- and Vibration loads are not allowed when using pressure switches with a switching pressure range up to 2,5 bar, when using pressure switches with a larger pressure range, they are limited to 4 g max. (sinusoidal) and 5 Hz max.

The maximum switching rate is 20/minute.

8. 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 2014/34/EU, 2014/35/EU and 2014/30/EU apply to these products.

- ➔ *Notes on the directive 2014/34/EU (explosion protection directive ATEX):
The pressure switches correspond to the design described in the EC prototype test certification TPS 03 ATEX 1122 010X and fulfill the relevant requirements of directive 2014/34/EU; they are thus marked with the CE mark in accordance with Appendix X of the directive. The EU declaration of conformity is enclosed.*
- ➔ *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).*

9. Type selection lists

Table 1
Types with adjustable switching pressure difference

Type Order No	Operating pressure range (bar)	Over pressure (bar)	Approximate switching pressure difference (bar)			Switching cycles /min	Material of parts in contact with fluid	Fluid connection	Operating fluids
			Lower range	Upper range					
				Min.	Max.				
1852715	0...0,16	0,5	0,007	0,025	0,12	20	1.4305 / 1.4301	G 1/4 I	Pneumatics*
1854115	0...0,6	15	0,09	0,16	0,8	20	1.4305 / 1.4301	G 1/4 I	
1850115	-1...0	10	0,19	0,25	0,8	20	1.4404	G 1/2 A	Allfluid**
1850215	-1...1	10	0,20	0,30	1,00	20	1.4404	G 1/2 A	
1850415	-1...2,5	10	0,20	0,28	2,50	20	1.4404	G 1/2 A	
1851115	0,05...1	10	0,16	0,18	0,80	20	1.4404	G 1/2 A	
1851215	0...1,6	10	0,1	0,22	0,35	20	1.4404	G 1/2 A	
1851315	0,1...2,5	10	0,18	0,22	2,00	20	1.4404	G 1/2 A	
1851415	0,5...4	20	0,50	0,60	2,50	20	1.4404	G 1/2 A	
1851515	0,5...6	20	0,60	0,70	5,00	20	1.4404	G 1/2 A	
1851615	0,5...10	20	0,70	0,90	8,00	20	1.4404	G 1/2 A	
1851715	1...16	50	1,60	2,00	12,00	20	1.4404	G 1/2 A	
1851815	1...25	50	2,50	2,8	20,00	20	1.4404	G 1/2 A	
1851915	5..63	85	2,00	5,00	20,00	20	1.4404	G 1/2 A	
1856505	5...160	300	8,00	22,00	120,00	20	MS/ Stahl	G 1/2 A	
1856705	10...400	550	15,00	35,00	300,00	20	MS/ Stahl	G 1/4 I	

* Neutral gases and fluids (hydraulic oil, lubricating oil, fluids)

** Neutral and aggressive gases and fluids

*** Hydraulic oil, compressed air containing oil droplets and miscellaneous fluids with sliding properties

Table 2
Types with fixed switching pressure difference

Type Order No	Operating pressure range (bar)	Over pressure (bar)	Approximate switching pressure difference (bar)(bar)			Switching cycles/m min	Material of parts in contact with fluid	Fluid connection	Operating fluids
			Lower range	Upper range					
				Min.	Max.				
1842715	0...0,16	0,5	0,015		0,02	20	1.4305 / 1.4301	G 1/4 I	Pneumatics*
1844115	0...0,6	15	0,06		0,15	20	1.4305 / 1.4301	G 1/4 I	
1840115	-1...0	10	0,2		0,23	20	1.4404	G 1/2 A	Allfluid**
1840215	-1...1	10	0,2		0,25	20	1.4404	G 1/2 A	
1840415	-1...2,5	10	0,22		0,26	20	1.4404	G 1/2 A	
1841115	0,05...1	10	0,16		0,18	20	1.4404	G 1/2 A	
1841215	0...1,6	10	0,16		0,20	20	1.4404	G 1/2 A	
1841315	0,1...2,5	10	0,18		0,22	20	1.4404	G 1/2 A	
1841415	0,5...4	20	0,50		0,55	20	1.4404	G 1/2 A	
1841515	0,5...6	20	0,60		0,70	20	1.4404	G 1/2 A	
1841615	0,5...10	20	0,70		0,90	20	1.4404	G 1/2 A	
1841715	1...16	50	1,00		1,40	20	1.4404	G 1/2 A	
1841815	1...25	50	1,30		1,80	20	1.4404	G 1/2 A	
1841915	5...63	85	2,00		5,00	20	1.4404	G 1/2 A	
1846505	5...160	300	7,00		18,00	20	MS/ Stahl	G 1/4 A	
1846705	10...400	550	32,00		48,00	20	MS/ Stahl	G 1/4 I	

* Neutral gases and fluids (hydraulic oil, lubricating oil, fluids)

** Neutral and aggressive gases and fluids

*** Hydraulic oil, compressed air containing oil droplets and miscellaneous fluids with sliding properties

-TRANSLATION-

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**EU-Declaration of Conformity
in accordance
with Directive: 2014/34/EU**

Equipment: Pressure switch
Model series: 184xx05, 184xx15, 185xx05, 185xx15




Herewith the manufacturer declares in its sole responsibility, 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+A11:2013	General requirements
EN 60079-1:2014	flameproof enclosure "d"
EN 60079-7:2015	Increased safety "e"
EN 60079-31:2014	Protection by enclosure "t"

Equipment group, Categories, Types of protection

 II 2G Ex db eb IIC T6 Gb
II 2D Ex tc IIIC 80°C Db

EC- Type Examination Certificate:

TPS 03 ATEX 11122 010 X
issued by TÜV SÜD Product Service GmbH,
D-80339 München (Notified Body No. 0123)

EU-Certificate for quality system:

issued by TÜV SÜD Product Service GmbH,
D-80339 München (Notified Body No. 0123)

Remark:


The standards which are mentioned in the type examination certificate were replaced by updated versions. Nevertheless the products meet the requirements of the new standards, due to the fact that the changed requirements are not relevant for these products.

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Fellbach, January 2018

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