ExBin-P Pressure switches from 5 Pa ... 100 Pa

ExBin - P-100
ExBin - P-100 - CT
ExBin - P-100 - OCT

Subject to change!

Electrical, explosion proof binary pressure or differential pressure switches
with adjustable switch activation delay
24 VAC/DC supply voltage, output potential free switching contact
PTB-certified in acc. with ATEX directive 94/9/EC for zone 1, 2, 21, 22

Compact. Easy installation. Universal. Cost effective. Safe.

Type	Sensor	Supply	Range	Min. setting	Max. pressure	Output switch	Max. ratings	Wiring diagram
ExBin - P-100	Pressure	24 VAC/DC	0...100 Pa	5 Pa	5.000 Pa	pot. free contact	250 VAC, 0,1 A / 30 V, 0,5 A	SB 1.0
ExBin - P-100 - CT	as above with aluminium housing and Amercoat painting (sensor connection and cable glands nickel-plated, screws in stainless steel)							
ExBin - P-100 - OCT	as above offshore version seawater-resistant, with aluminium housing and Amercoat painting (stainless steel tubes for clamping ring connection, cable glands M20 × 1,5 mm nickel-plated, screws in stainless steel)							

Application

Pressure or Δ pressure switch

Amercoat version ...-CT

Offshore version ...-OCT

Description

The **ExBin-P-100** pressure switch generation from 5...100 Pa is a revolution for differential pressure switches in HVAC systems, in chemical, pharmaceutical, industrial and Offshore-/Onshore plants, for use in hazardous areas zone 1, 2 (gas) and zone 21, 22 (dust).
Highest protection class (ATEX) and IP66 protection, small dimensions, universal functions and technical data guarantee safe operation even under difficult environmental conditions.
The switching point is scalable within the maximum ranges. The integrated display is for actual value indication which can be switched off. All sensors are programmable on site without any additional tools.
ExBin-P-100-OCT is equipped with stainless steel 316L tubing Ø 6 mm.

Highlights

- ▶ For all type of gas, mixtures, vapours and dust for use in zone 1, 2, 21 and 22
- ▶ No addionally Ex-i module required
- ▶ No intrinsically safe wiring/installation between panel and sensor required
- ▶ No intrinsically safe wiring/installation and no space in the panel required
- ▶ Integrated Ex-e junction box
- ▶ Power supply 24 VAC/DC
- ▶ Output potential free switching contact
- ▶ Display with backlight, can be switched off
- ▶ Adjustable switching characteristics
- ▶ Adjustable hysteresis
- ▶ Adjustable starting bypass time
- ▶ Adjustable switch activation delay
- ▶ Compact design and small dimension (L × B × H = 180 × 107 × 66 mm)
- ▶ Robust aluminium housing in protection class IP66
- ▶ Down to −20°C ambient temperature applicable
- ▶ Password locking
- ▶ CT versions have an excellent resistance to chemicals and seawater
- ▶ OCT as CT version plus pressure tube connection for clamping ring Ø 6 mm

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Technical data

Power supply	24 VAC/DC ± 20% (19,2…28,8 VAC/DC) 50…60 Hz
Current, power consumption	150 mA, ~ 4 W, internal fuse 500 mAT, without bracket, not removable
Galvanic isolation	Supply – output 1,5 kV
Electrical connection	Terminals 0,14…2,5 mm² at integrated Ex-e junction box, stripping length 9 mm, torque 0,4…0,5 Nm
Cable entry	2 × M16 × 1,5 mm, Ex-e approved, cable diameter ~ Ø 5…10 mm (**...-CT** in nickel-plated)
Cable entry ...-OCT	2 × M20 × 1,5 mm, Ex-e approved, cable diameter ~ Ø 6…13 mm **(...-OCT** in nickel-plated)
Display	LCD with backlight, display for configuration, user guidance, parameter and actual value indication via LEDs
Control elements	3 buttons for configuration
Housing protection	IP66 in acc. to IEC 60529
Housing material	Aluminium casting, coated (**...-CT/...-OCT** = version in Amercoat marine painting, seawater-resistant **...-OCT** = Offshore version)
Dimension / weight	L × W × H = 180 × 107 × 66 mm / ~ 950 g
Ambient temperature/-humidity	−20…+50 °C / 0…95 % rH, non condensed
Storage temperature	−40…+70 °C
Measuring range	0…100 Pa
Range scalable on site	Minimum measuring range is 5 % of full range = 5 Pa
Maintenance	Maintenance free, nevertheless maintenance must be complied with regional standards, rules and regulations
Sensor circuit	Internal „IS“ circuit
Sensor	Piezo-pressure-transmitter
Pressure connection	P+ / P− sleeves Ø 4…6 mm, **OCT**-version has a Ø 6 mm stainless steel tube connection for clamp ring fittings.
Response time of sensor	T90 / 5 sec.
Accuracy of pressure	< ± 1 % typically, max. ± 5 % of end value ± 1 Pa
Setting range hysteresis	0,1 Pa…10 Pa (factory setting 2 Pa)
Start delay	5 sec.
Starting bypass time	3…240 sec. (via menu adjustable; preset 120 sec.)
Switch activation delay	0...240 sec. (via menu adjustable; preset 0 sec./Off)
Setting zero point	Via menu, mechanical short circuit of P+ / P− for the moment of zero point setting
Output switch	Potentail free switching contact
	Ratings load max. 0,5 A at 30 VAC/DC / 0,1 A at 250 VAC / 0,1 A at 220 VDC
	Ratings load min. 10 mW / 0,1 V / 1 mA
Mechanical life	10×10^6
Electrical life (rated load)	100×10^3
Wiring diagram (SB)	SB 1.0
Installation sensor / tubing	In Ex-area zone 1, 2, 21, 22

Approbations

PTB-tested	PTB 09 ATEX 2011	94/9/EC (ATEX)
Approval for gas	II 2 (1) G Ex e mb [ia] IIC T6	for zone 1, 2
Approval for dust	II 2 (1) D Ex tD A21 [iaD] IP66 T80 °C	for zone 21, 22
CE-Mark	CE No. 0158	
EMC directive	2004/108/EC	
Low voltage directive	2006/95/EC	
Protection type	IP66 in acc. to EN 60529	
Potential compensation	external PA-terminal, 4 mm²	
Protection Class	Class I (grounded),	
	overload voltage category II acc. EN 61010-1	

Accessories

MKR	Mounting bracket for round ducts up to Ø 600 mm
Kit 2	Consists of 2 m flexible pressure tube Ø 6 mm, 2 connection nipples
Kit PTC	consisting of 2 connecting tubes Ø 6 mm for tube fittings

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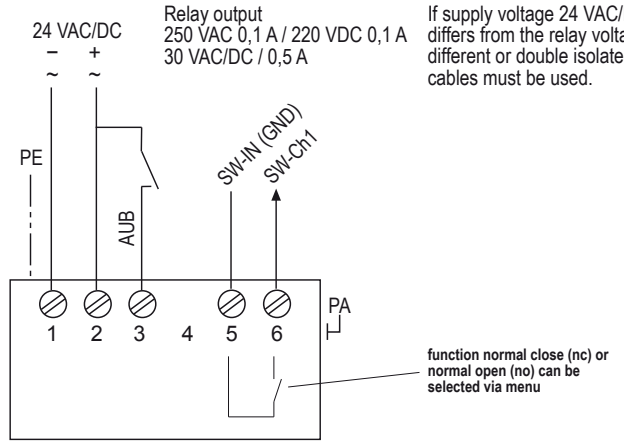
Electrical connection

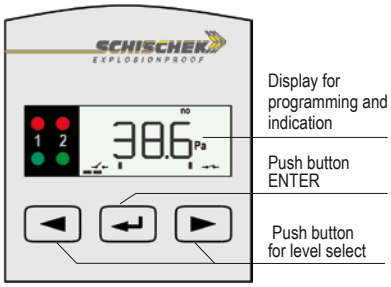
ExBin-P-100 switches are equipped with a 24 VAC/DC power supply. The supply has to be connected at terminal 1 (−/~) and 2 (+/~). The electrical wiring must be realized via integrated Ex-e junction box in acc. to ATEX. Type of protection for the terminals is „Ex-e“. If supply voltage 24 VAC/DC differs from the relay voltage different or double isolated cables must be used.The starting bypass delay can be activated by a short circuit of terminal 2 and teminal 3 (AUB). An active bypass delay is indicated with green blinking LEDs.
Attention: Do not open covers when circuits are alive!

Wiring diagram ExBin-P-100

ExBin-P-100 **SB 1.0**



Display and buttons



Change operation-/parametrisation mode

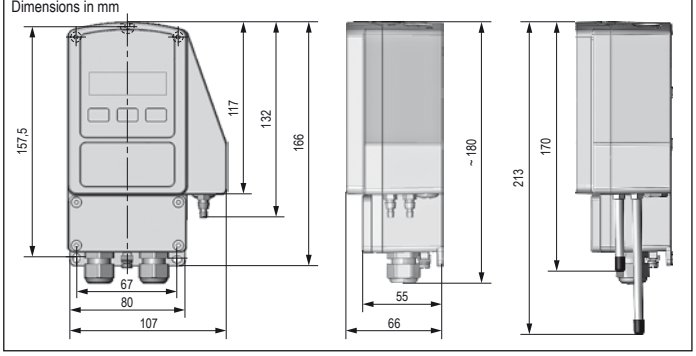
To change from operation to parametrisation mode push the enter button ↵ for minimum 3 seconds. Back over the menu save.

Indication of data logging

A blinking unit in the display shows that data is received and the device is working.

Dimensions/drillings

Dimensions in mm



Password input

The default / delivery setup is **0000**. In this configuration the password input is not activated. To activate a password change the 4 digits into your chosen numbers (e.g. 1234) and press Enter. **Please keep your password in mind for next parameter change!**
Due to a new parameter setup the password is requested.

Important information for installation and operation

A. Installation, commissioning, maintenance
The cable has to be drawn through the cable gland. After electrical connection the cable gland must be fixed tighten. IP66 must be fulfilled. In acc. with operation ExBin switches are maintenance free. The sensors must not be opened by the customer. For electrical connection use the internal approved Ex-e junction box.
Attention: Note the explosion proof rules before opening the internal junction box. Cut off the power supply.

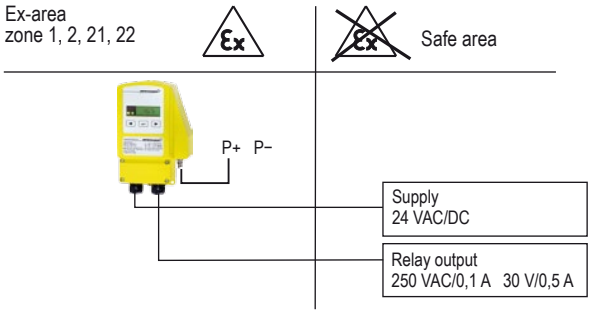
B. Supply and Contact
Wires from safety extra low voltage must be separated from others. Only at 24 VAC/DC supply and signal wires in one cable is permitted. All others use separate or double isolated cables. Install overload protection fuse < 10 A.

C. Pressure sensors
After mounting and installation, a zero point compensation must be done, because the offset value depends on the installation position. Have a look to parametrisation.

D. Long cabling
For using long signal wires, shielded cables are recommended. The shield must be connected to the ExBin-P switch inside the terminal box.

E. Separate ground wires
Use for supply and signal wires a separate ground.

Installation



- Maintenance must comply with regional standards, rules and regulations
- Do not open covers when circuits are alive
- For electrical connection use the integrated junction box Ex-e
- The cable must be installed in a fixed position and protected against mechanical and thermical damage
- Connect protection earth
- Avoid thermal transfer from sensor probe to transducer (ensure max. ambient temperature)
- Ambient temperature −20…+50 °C
- Close all covers, entries with min. IP66
- All transducers are maintenance free
- For outdoor installation a protective housing against rain, snow and sun should be applied
- Only wet cleaning

Zero point compensation for pressure transmitter

For a **ExBin-P-100** pressure switch installation a zero point compensation should be performed to adjust value deviations of the module's installation position. Therefore the pressure nipples P+ / P− must be connected with a short circuit tube and the zero point compensation accomplished by following the menu.
Before starting the compensation the device should be connected to the power supply for minimum of 15 minutes to reach the working temperature!

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Parametrisation and commissioning of ExBin-P-100 transducers

Preparation of parametrisation / operation

Operation ↔ Parametrisation, push ↵ for 3 sec.
If password (PW) protection is active: put PW in, push ↵

Change operation-/parametrisation mode

To change from operation to parametrisation mode push „Enter button“ ↵ for minimum 3 seconds. Back over the menu save.

Menu	Function	Enter	Indication	Select	Enter	Next indication	Next selection	Enter	Next menu
Menu 1	**Preset** select application	PSEt	PRO	◄ ►	↵				►
Menu 2	**unit sensor 1** select physical unit	Un it	Pa	◄ ►	↵ Pa, mBar, InH2O				►
Menu 3	**set 1** select switching point 1	SEt 1	100.0 Pa	◄ ►	↵ adjust set 1				►
Menu 4	no function – menu skip								
Menu 5	**hysteresis*** select physical unit	HYSt	10.0 Pa	◄ ►	↵ adjust hysteresis				►
Menu 6	**mode*** select switching charateristic	ModE	UP nc	◄ ►	↵ norm. open (no), norm. closed (nc)	NC nc	◄ ►	↵ select normal sensor interval	►
Menu 7	no function – menu skip								
Menu 8	no function – menu skip								
Menu 9	no function – menu skip								
Menu 10	no function – menu skip								
Menu 11	no function – menu skip								
Menu 12	**time** select time for starting bypass (AUB) and switch activation delay	t IME	100 5	◄ ►	↵ adjust bypass time**	100 5	◄ ►	↵ adjust switching off delay***	►
Menü 13	**lamp** select backlight	LAMP	ON	◄ ►	↵ on, off				►
Menu 14	**zero point compensation**	0-Pt	RUN						
Menu 15	**security** select password	SECU	0000	◄ ►	↵ enter password				►
Menu 16	**save** select save data	SAVE	YES	◄ ►	↵ no, yes, return, default setting				►

* Useable in professional mode only (see Menu 1 – professional mode)

** Bypass delay

*** Switch activation delay:
With this function the condition „normal operation“can be hold for the selected time.
Setting the switching off delay to „0“ will deactive the function.

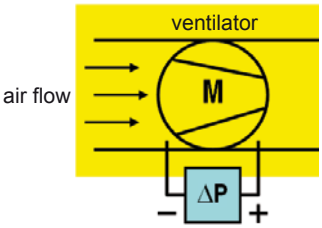
Using the menu 1 „Preset“

To beware complexity during the parametrisation process, the ExBin-P has several predefined setups which distinguish between its intended application.
You'll find a detailed desciption of all possible presets in the following section.

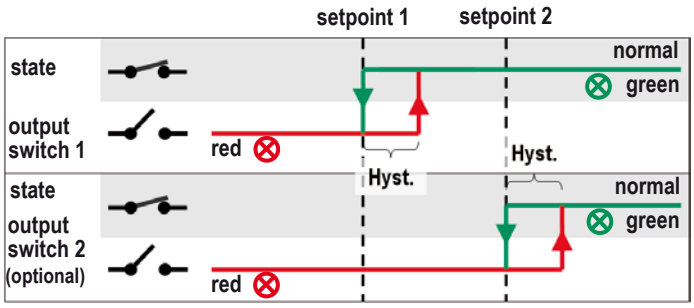
Fan speed monitoring

The preset „FAN“ is designed for use in fan speed monitoring applications.

Menu1: Select "FAN" and press the enter button.



If the „FAN“-preset has been selected in menu 1, all settings were made as the following ones:

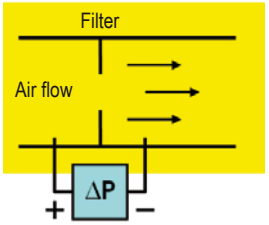


The user has not to set the menu 5 „hysteresis“ and menu 6 „mode“, this will be done via software. These menus will be skipped during the further parametrisation process.

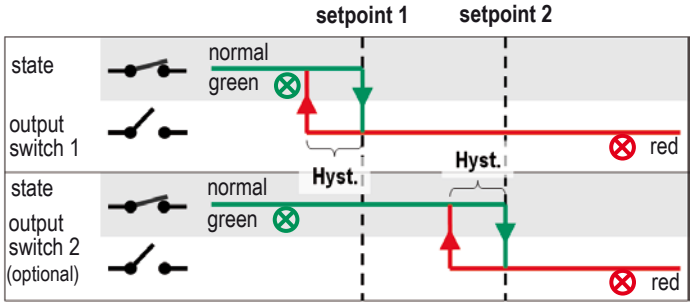
Filter monitoring

The preset „FILT“ is designed for use in filter monitoring applications.

Menu1: Select „FILT“ and press the enter button.



If the „FILT“-preset has been selected in menu 1, all settings were made as the following ones:



The user has not to set the menu 5 „hysteresis“ and menu 6 „mode“, this will be done via software. These menus will be skipped during the further parametrisation process.

Professional mode

For all other applications the professional mode is designed for.

Menu1: Select „PRO“ and press the enter button.

If the „PRO“-preset has been selected in menu 1, the parametrisation procedure will be added by two further menus: menu 5 „hysteresis“ and menu 6 „mode“. For this preset the user has to select the values for the hysteresis and for the mode.

Using the menu 6 „mode“

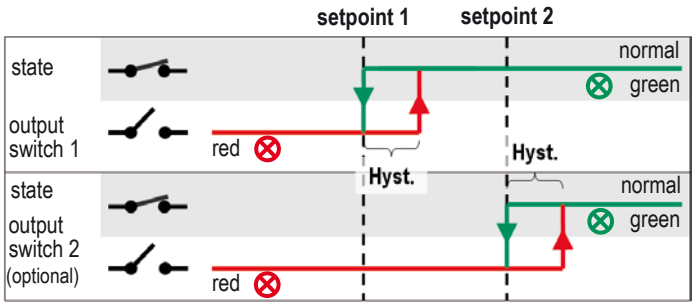
First of all the user has to define the device normal range. For example:
- The device should indicate (green LED) if the pressure is under the setpoints, mode „down-range“ has to be selected. With other words: the measure value is normally under the setpoints.
- The device should indicate (green LED) if the pressure is over the setpoints, mode „up-range“ has to be selected. (The measure value is normally over the setpoints.)
- The device should indicate (green LED) if the pressure is between the setpoints, mode „mid-range“ has to be selected. (The measure value is normally between the setpoints). This mode is only for 2-stage devices available (ExBin-P...-2).

In the second step the switching characteristic of the output relay has to be selected:
- „normally closed“ (nc): if the measure value is in the normal range (see above), the corresponding relays were closed.
- „normally open“ (no): if the measure value is in the normal range (see above), the corresponding relays were open.

You'll find a detailed desciption of all possible settings in the following section.

Switching characteristic „up-range“ – „normally closed“

„Up-range“: the normal range is above setpoint 1 and setpoint 2



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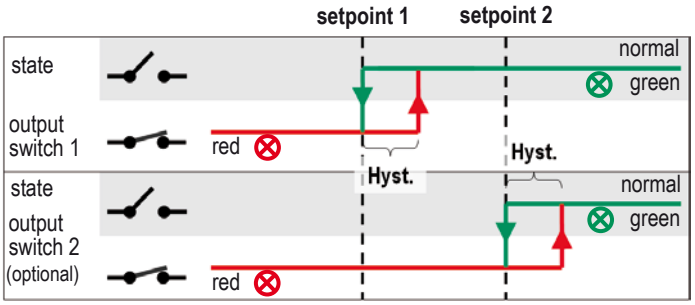
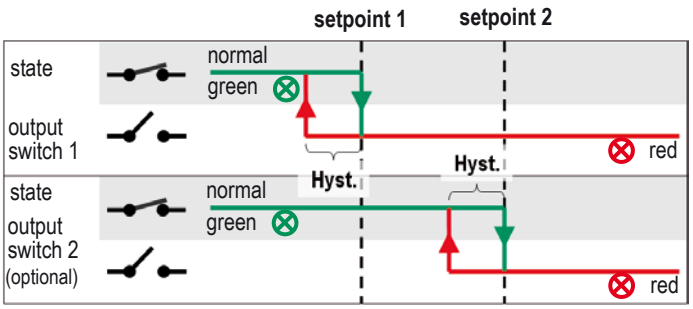
Switching characteristic „up-range“ – „normally open“

„Up-range“: the normal range is above setpoint 1 and setpoint 2



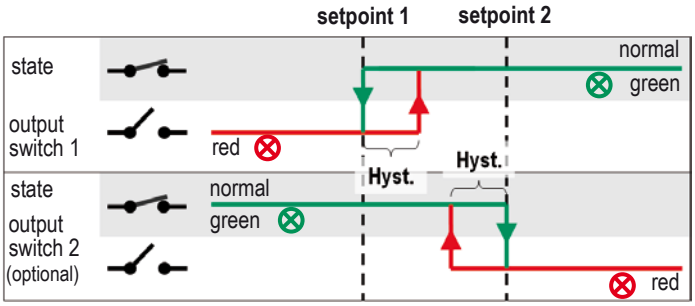
Switching characteristic „down-range“ – „normally closed“

„Mid-range“: the normal range is under setpoint 1 and setpoint 2



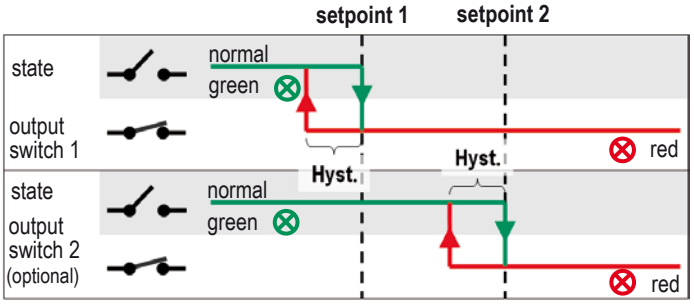
Switching characteristic „mid-range“ – „normally closed“

„Mid-range“: the normal range is between setpoint 1 and setpoint 2 (for 2-stage devices only)



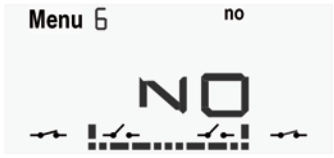
Switching characteristic „down-range“ – „normally closed“

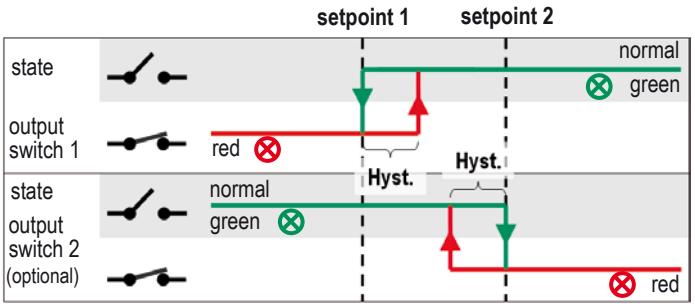
„Mid-range“: the normal range is under setpoint 1 and setpoint 2



Switching characteristic „mid-range“ – „normally open“

„Mid-range“: the normal range is between setpoint 1 and setpoint 2 (for 2-stage devices only)





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