

PIEZUS

PRESSURE SWITCH

ASZ

(3410p, 3410r, 3420p, 3420r)



Operation manual

www.piezus.ru



This manual covers ASZ pressure switches (hereinafter referred to as "switch" or "device"); it contains technical data, description of design and other information necessary for proper application and maintenance of the device.

See datasheets at <http://piezus.ru> for complete specifications.

Production regulated by TOR 4212-000-7722857693-2015.

Terms and abbreviations used in the manual:

Span – measurement range; NC - normally closed (NC contact); NO - normally open (NO contact); PC - personal computer; DC - direct current.

1 Purpose of the device

1.1 Pressure switches find application in monitoring, protection, alarm and control systems in heat and power installations, air conditioning systems, various industrial environments and public utilities.

1.2 The device:

- proportionally and linearly converts the pressure measured into a normalized output signal;

3410p, 3420p - voltage, 1 ... 5 V; 3410r, 3420r - current, 4 ... 20 mA;
- compares current pressure value to the preset thresholds and outputs two discrete signals when the monitored parameter crosses those thresholds (as prescribed by the selected operation algorithm, hysteresis or window);

2 Technical specifications

2.1 General technical data

2.1.1 Refer to the device's passport and label (sticker) for span and accuracy info.

2.1.2 P-Conf communication interface allows controlling value of the measured pressure from a PC, as well as changing operation modes and parameters as required.

2.1.3. Power supply - 12 ... 36 V (DC), - rated voltage - 24 V.

2.1.4 Current consumption, max: models 3410r, 3420r - 100 mA;
models 3410p, 3420p – 10 mA (excl. key outputs load).

2.1.5 Power consumption, max - 3.6 W (0.36 W for "p" models).

2.1.6 See Supplement A for design of the devices. Overall dimensions: 3410p and 3420p - Ø28x90 mm; 3410r and 3420r - Ø48 × 120 mm.

2.1.7 Weight, max: "p" models - 0.15 kg; "r" models - 0.25 kg.

2.1.8 Housing ingress protection (GOST 14254) - IP65.

1.2 See Table 1 for output specifications.

Table 1 - Output parameters

Parameter	Value (properties)
Analog output:	
Number of measuring channels	one
Output signal parameter: - 3410p, 3420p - voltage (Uout) - 3410r, 3420r - current (Iout)	1 ... 5 V 4 ... 20 mA
Switch outputs:	
Tripping threshold (configurable)*	0 ... 100% of span
Operation mode (outputs switching) *	hysteresis / window / pulse
Switching accuracy**:	
- 3410p, 3410r	≤ ± 0.5% of span
- 3420p, 3420r (P > 0.4 bar)	≤ ± 0.25% of span
- 3420p, 3420r (P ≤ 0.4 bar)	≤ ± 0.5% of span
Switching delay*	0...650 s
- models 3410p, 3420p:	
Output type (configurable)*	direct/inverse
Max switching voltage	36 V (DC)
Max switching current	400 mA, short-circuit protection
- models 3410r, 3420r:	
Type of switch contact outputs (specified in ordering code)	NC and NO
Max switching voltage	250 V (AC); 30 V (DC)
Max switching current (contact type)	5 A (NO)/3 A (NC)

* Configurable by user. See Setup manual for instructions.

** Accuracy includes non-linearity, hysteresis and repeatability (under IEC 60770).

2.2. Operating conditions:

2.2.1 The device was designed to operate in the following conditions:

- no aggressive vapors, gases and liquids in the environment;
- ambient temperature from -40 to +70 °C;
- permissible media temperatures depends on seal material, see Technical specifications;
- sensor exposure (liquids, gases and vapors):
 - ASZ 3420p, ASZ 3420r - media non-aggressive to stainless steel;
 - ASZ 3410p, ASZ 3410r - aggressive media;
- atmospheric pressure from 84 to 106.7 kPa (group R1 under GOST R 52931);

2.2.2 Resistance to mechanical attack puts the device in group N2 under GOST R 52931.

2.3 Operating limitations:

- medium should be free from crystallizable impurities, contaminations and dust;
- connect the device where the medium is still or almost still and produces no vortices;
- install DZ 10 or the like pressure snubber before the device if the system can produce hydraulic shocks;
- use impulse tubing (pre-filled with water) when measuring vapour pressure.



DO NOT:

- 1 allow voltage exceeding maximum specified for the transmitter;
- 2 use any objects to touch or otherwise apply mechanical force to the diaphragm;
- 3 use transmitters bearing visible signs of mechanical damage;
- 4 use transmitters in inappropriate climatic conditions;
- 5 allow medium temperatures above or below the limits specified for the transmitter.

3 Design and operation

3.1 Diagrams of Figure 1 explain the principle of operation of the device.

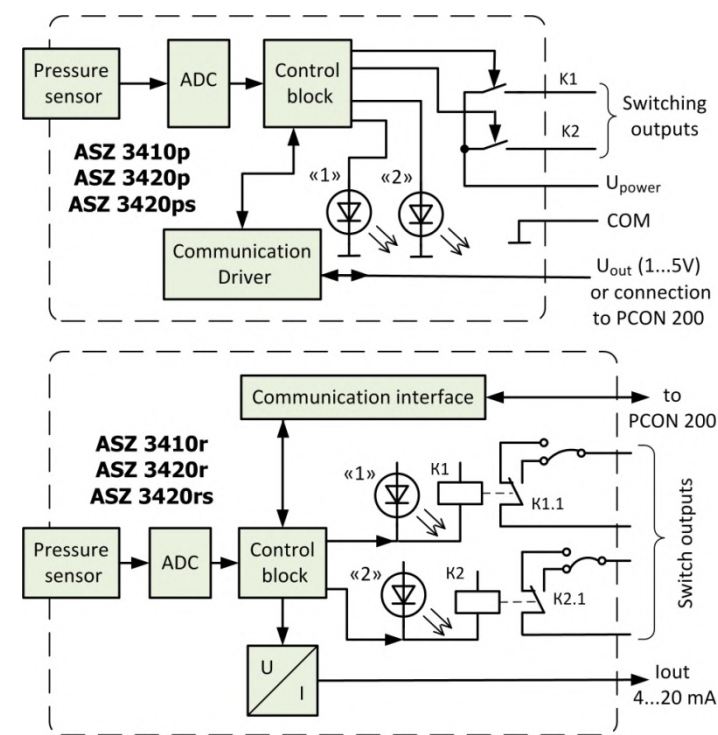


Figure 2 - Structural diagram

Analog-to-digital converter (ADC) receives signal from the sensor and sends it to the microprocessor that filters, corrects, scales it, generates signals for switches (K1, K2) and outputs a normalized analog signal linear to the pressure measured. Digital representation of the measured pressure can reach a PC via P-Conf software (ASZ 3410p and ASZ 3420p models need to have their analog outputs off to transfer data to PC).

3.2 LEDs 1 and 2 (located on the side, next to electrical connector) light up when the pressure is within the keys tripping range.

4 Installation instructions

4.1 Install the transmitter with maintenance convenience (incl. mounting, dismantling) in mind. We recommend mounting the device with its pressure port pointing downwards (to allow condensate draining).

4.2 If the medium is gaseous, position the device so that the pressure take-off tubes slope up uniformly (1:10 min) to the device and slope down if the medium is liquid. In case such installation positions are impossible, mount settling vessels at lower portions of pressure take-off tubes for gaseous media and gas holders at their higher portions for liquid media.

4.3 Screw the device into a prepared hole (must be of the required size) to expose the diaphragm to the medium. Use the seals supplied or those resistant to the medium.

4.4 Use an S24 wrench to lock the transmitter in place.



DO NOT USE any thread seals (fiber, Teflon tape) other than supplied.

DO NOT CONNECT pressure switches to enclosed volumes filled with liquid.

Never hold onto the device's body when screwing it in! Use the hexagon found on the housing for that purpose.

4.5 Always cut off power when connecting the device's circuits.

4.5 Connect circuits as shown on the wiring diagram in Supplement B (the device has reverse polarity protection).

5 Setup

The device is programmable, i.e. you can select operation algorithms and set the parameters. See Setup manual for programming instructions.

6 Operation and maintenance



DO NOT:

- 1 **allow voltage exceeding maximum specified for the transmitter;**
- 2 **use any objects to touch or otherwise apply mechanical force to the diaphragm;**
- 3 **use the device that bears visible signs of mechanical damage;**
- 4 **use the device in inappropriate climatic conditions;**
- 5 **allow medium temperatures above or below the limits specified for the device.**

Routine maintenance frequency - at least once a year; it includes checking reliability of mounting and removal of dust and dirt.

6.2 Check the diaphragm (it should be clean) and electrical connections on a regular basis after putting the transmitter into operation.

6.3 Do not use forced rinsing for cleaning purposes.

6.4 Routine checkups of the device in operation follow data specified in its passport.

6.5 See the device's passport for its calibration interval and manufacturer's warranty.

6.6 The manufacturer refuses all claims, reclamations, complaints related to devices with damaged manufacturer seals and showing signs of damage resulting from inappropriate operation, transportation or storage.

6.7 All and any repairs are done by the manufacturer exclusively.

7 Marking

The device bears a label (sticker on the back of the housing) that contains the following information:

- name of the manufacturer, bar code (QR code);
- code of the device;
- measured pressure range;
- output signal range;
- circuits contacts numbers;
- serial number and production date;
- manufacturer's trademark;
- supply voltage, power consumption;
- electric shock protection class (GOST 12.2.007.0);
- ingress protection rate (GOST 14254).

8 Package contents

See Table 2 for delivery package contents.

Table 2 - Package contents

Name	Quantity
ASZ 3410(p, r) or ASZ 3420(p, r) pressure switch	1 pc
Passport	1 copy
User manual (this paper)	1 copy*
Setup Manual	1 copy*
Calibration leaflet	1 copy **
P-Conf device programmer (adapter) and P-Conf software	1 set **

* 1 copy per 10 devices for batch supplies to the same address. Papers can be downloaded from the manufacturer's website.
** Supplied on request.

9 Resource and service life

9.1 Operating mode: continuous.

9.2 Mean time between failures: 120,000 h.

9.3 Service life - 12 years (normal working conditions: non-aggressive medium, temperature at $+23 \pm 3$ °C, no vibrations and shaking).

10 Disposal

10.1 The device contains no precious metals.

10.2 Dispose of as prescribed by regulations adopted by the operator.

Supplement A

Appearance of the pressure switch

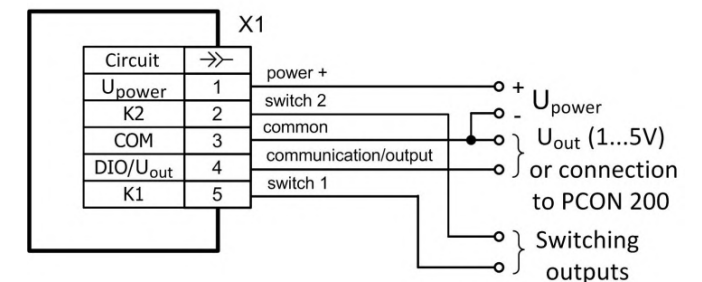


ASZ 3410p, ASZ 3420p

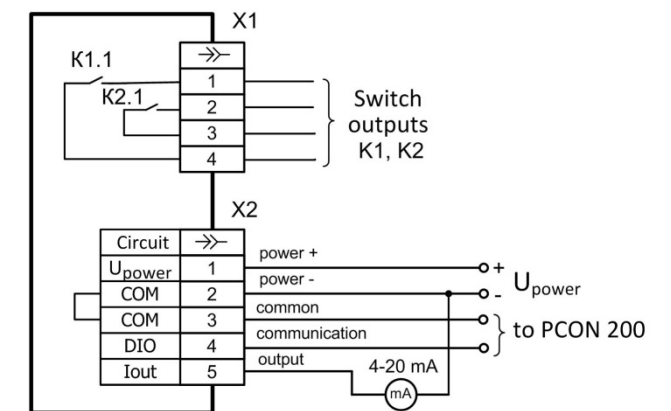
ASZ 3410r, ASZ 3420r

Supplement B

Electrical connections diagram



ASZ 3410p, ASZ 3420p



ASZ 3410r, ASZ 3420r



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2) select "Connection" - "Setup Serial Port" (Figure 1), then select the port the programmer is connected to, click OK to confirm (Figure 2);

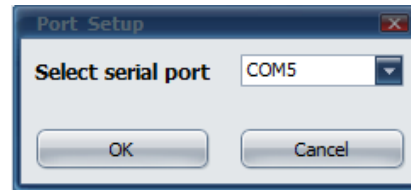


Figure 2 - Port selection dialog

3) select "Connection" - "Connect"; successful connection brings up a window with configurable settings (Figures 3 or 4).

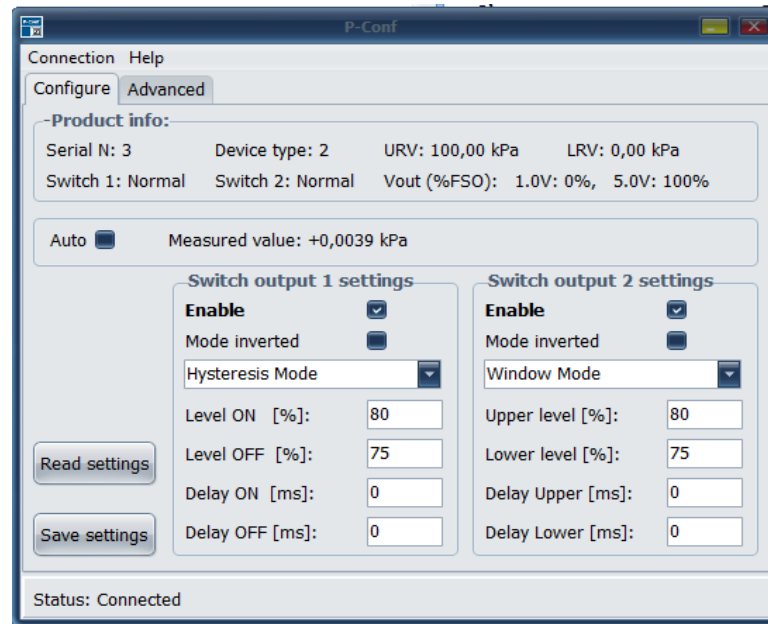


Figure 3 - Configuration tab, models 3410p, 3420p

The "Product info" section shows current settings of the device (these can only be changed at the Advanced tab):

Serial N - Serial number of the batch;

Device type – type of switch outputs:
1 – mechanical contacts; 2 – electronic PNP keys;

URV and LRV – upper range value (upper range limit) and lower range value (lower range limit);

Switch 1 (2) - switch 1 (2) operation mode, Normal and Inverted;

Vout (%FSO) - in "p" versions, voltage output, characteristic's start (1 V) and end (5 V) points as percentage of the entire measurement range. This setting allows narrowing the controlled range.

Iout (%FSO) - in "r" versions, current output, characteristic's start (4 mA) and end (20 mA) points as percentage of the entire measurement range. This setting allows narrowing the controlled range.

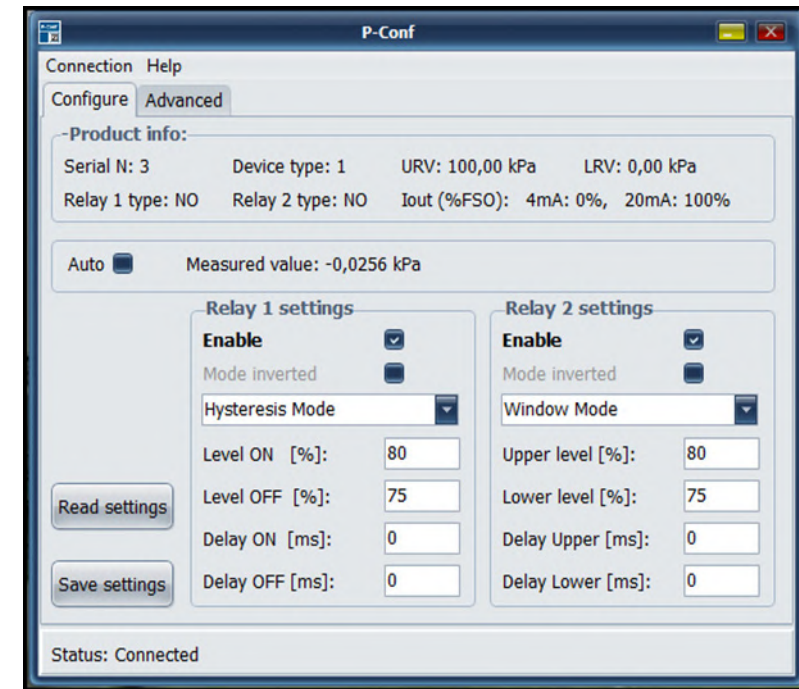


Figure 4 - Configuration tab, models 3410r, 3420r

The "Auto" section shows the pressure measured (when enabled).

With Enable checked, sections "Switch output 1 (2) settings" (Figure 3) or "Relay 1/2 Settings" (Figure 4) allow setting basic parameters for each switch, depending on the selected output operating mode: hysteresis, window or pulse (Table 1).

Table 1 – Output operation modes parameters

Mode	Operation mode parameter
Hysteresis Mode	Level ON
	Level OFF
	Delay ON
	Delay OFF
Window Mode	Upper level
	Lower level
	Delay Upper
	Delay Lower
Pulse Mode (Figure 5)	Start level
	Reset level
	Delay Pulse
	Pulse width*

* Pulse width minimum values: 10 ms for 3410p, 3420p; 20 ms for 3410r, 3420r

HYSTERESIS, WINDOW or PULSE modes are selected separately for each switch from the special menu.

Note: the "Advanced" tab should only be used by certified dealers for the purposes of calibration. This tab is password protected.

This setup manual applies to ASZ pressure switch. It is a supplement to the operation manual.

Terms and abbreviations used in the manual:

Span - measurement range;

PC - personal computer.

1 General information

You can change the factory settings depending on your goals and operating conditions. The device is programmable, i.e. you can select operation algorithm and set the parameters. See Section 2 for programming instructions.

2 Setup order

2.1 Connecting device programmer

2.1.1 To setup the device, you need a PC with the P-Conf software installed and a P-Conf device programmer (adapter) (Supplement A).

Run P_Conf.exe to launch programmer software.

2.1.2. Connect the switch to any USB port of the PC through the device programmer as shown on the diagram in Supplement B.

Both the device programmer and the switch receive power from the PC during setup. There is no need to disconnect the device from the medium, i.e. you can see its pressure in the software's window.

2.2 Using P-Conf software

2.2.1 To configure the device, proceed as follows.

1) turn on the PC and launch P-Conf; a window with two menu items shows up (Figure 1);

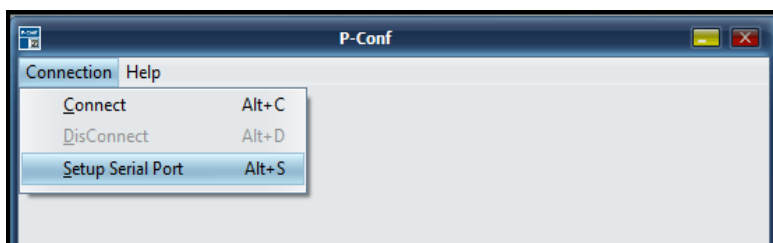


Figure 1 - P-Conf starting window

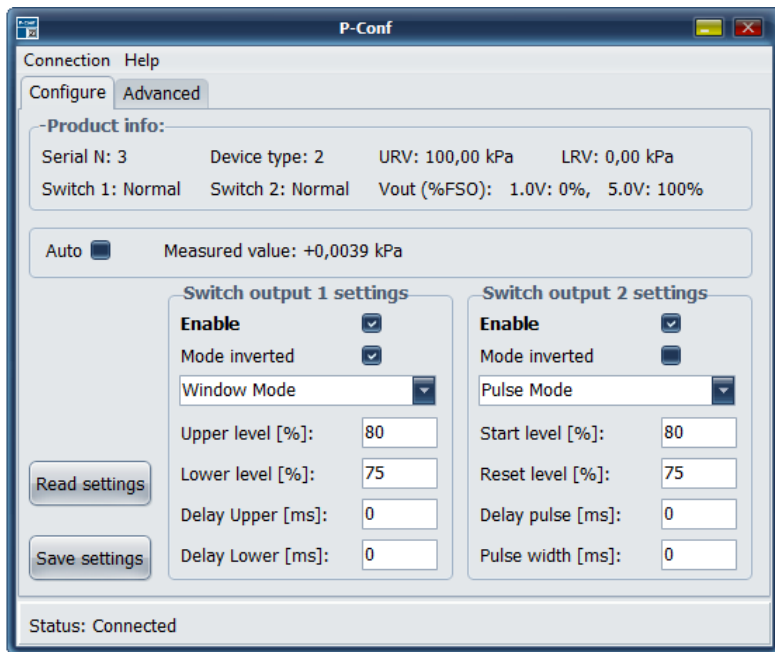


Figure 5 - Main window of the configuration software

See graphs at Figure 6 to understand the difference between the modes.

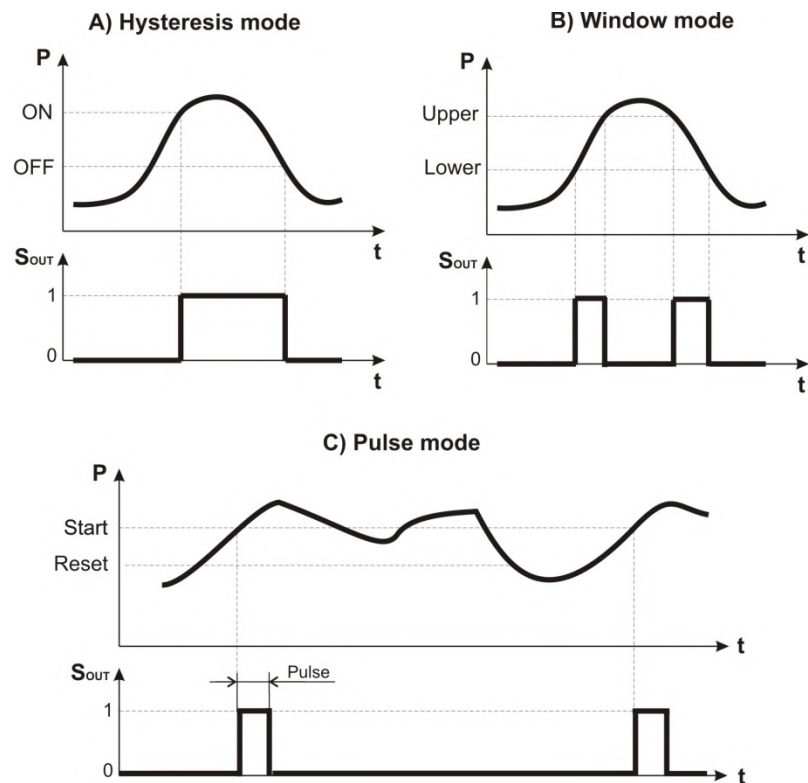


Figure 6 - Switching outputs operating modes (Sout), inlet pressure (P) changes

Note: when operating in Mode Inverted, Sout graph is flipped over.

PULSE mode is used with automatically locking starters. The next pulse forms if the pressure falls to RESET level and then reaches START level.

The switching point (level) can be set between 0 and 100% of the entire span (the smallest difference between ON and OFF pressure levels should be $\geq 1\%$ of span).

Delay (Delay ON, Delay Upper, Delay Pulse) allows filtering out short-term pressure changes. The switch does not change its state during the delay time after the pressure has exceeded the threshold (Figure 7).

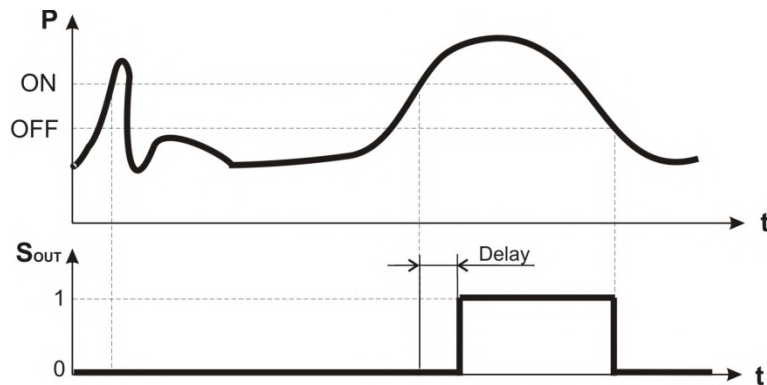


Figure 7 - Switch contacts delay, HYSTERESIS mode example

4) once done changing the settings, press "Save settings" and wait at least 10 seconds for the process to complete;

5) disconnect the programmer from PC and device; setup is now complete.

3 Factory settings

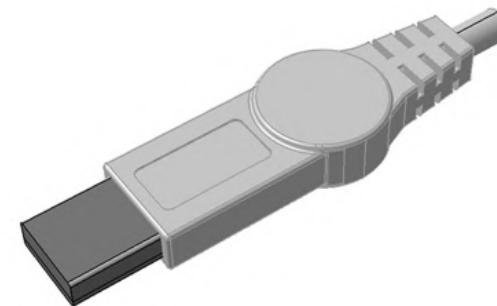
The standard settings are as follows.

- switches 1 and 2 operating mode - HYSTERESIS;
- switching-on level - 80% of span;
- switching-off level - 75% of span;
- delay ON - 0 ms;
- delay OFF - 0 ms;

Press "Read settings" to see the settings of a newly connected device (when the software is running).

Supplement A

Exterior of the device programmer



P-Conf's housing has a USB port and a cable that connects it to the configured device via the 5-pin M12x1 connector.

Supplement B

Connecting the device programmer

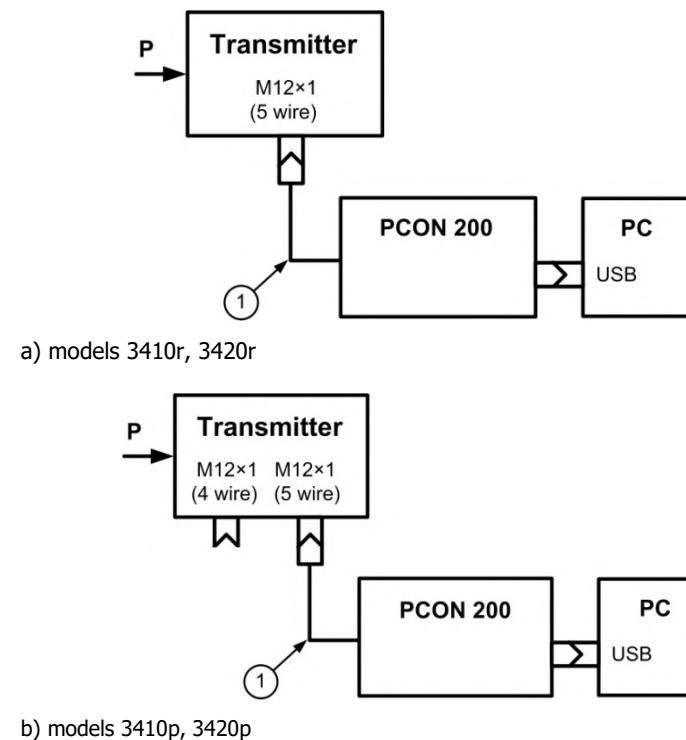


Figure B.1 - Connecting the device programmer:
1 - built-in cable, P - pressure measured