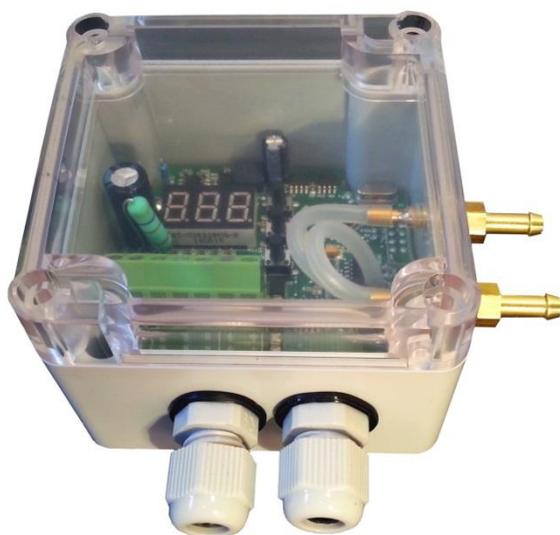


Differential Pressure Transmitter EL-PS-xxx-LED

1. Technical data

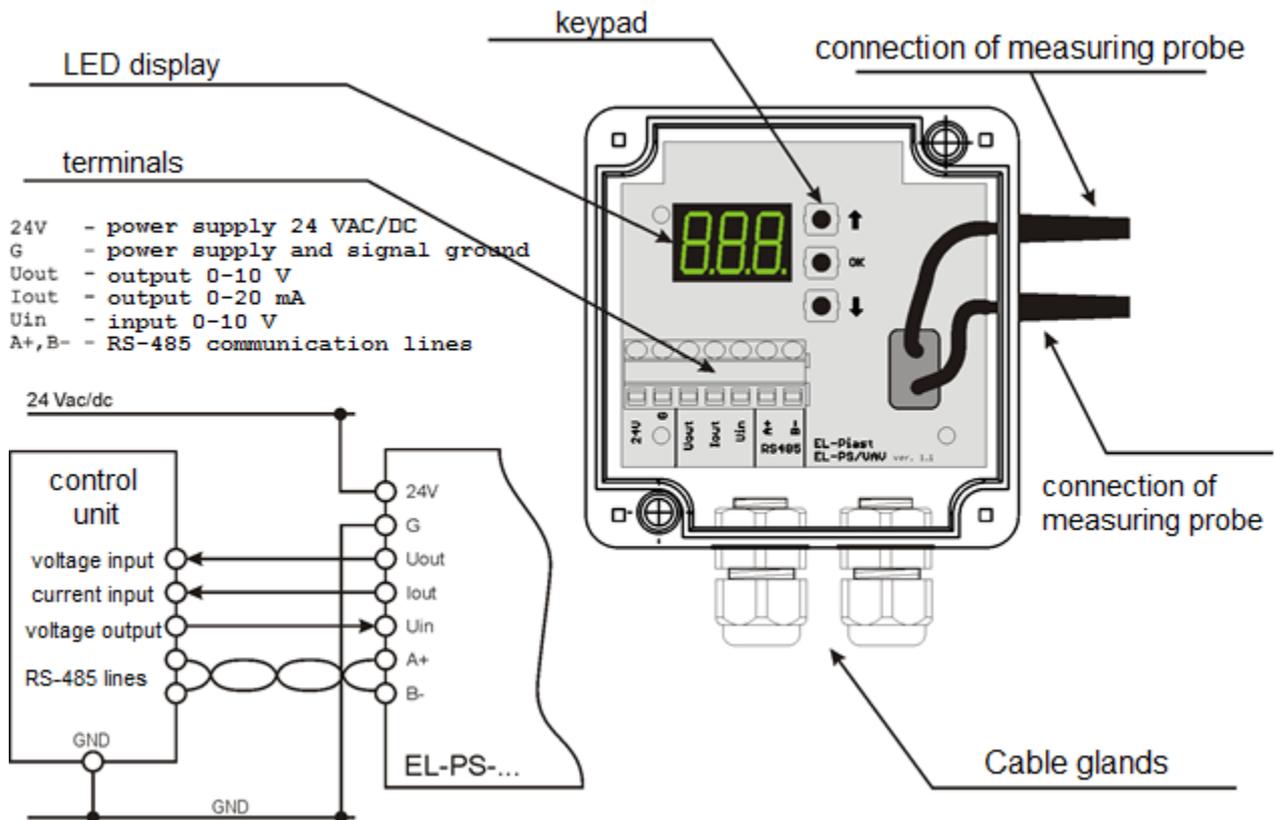


- Dimensions: 95 x 104 x 55mm
- Differential pressure measurement range:
 - EL-PS-2.5: -2.5...2.5 kPa
 - EL-PS-7.5: -7.5...7.5 kPa
 - EL-PS-35: -35...35 kPa
 - EL-PS-100: -100...100 kPa
 - EL-PS-200: -200...200 kPa
- Power supply 24 V AC / DC
- Outputs:
 - voltage 0-10V
 - current 0-20mA
- Voltage input 0-10V
- Communication interface RS-485
BACnet MS/TP or Modbus RTU
- Operating temperature -20...50 °C
- LED display and keypad build-in
- Protection IP65

2. Description

Differential Pressure Transmitter EL-PS-xxx measures the differential pressure and on its basis generates a proportional analog signal at the voltage output in the range 0-10V, and, in parallel, at the current output in the range 0-20mA. The signals level at the analog outputs are scaled according to the appropriate settings. The transmitter also has the possibility of providing measurements using protocol BACnet MS / TP or Modbus RTU. For this purpose, a communication link RS-485 is used. Additionally, the device has a built-in LED display that displays, among other things, the current measured pressure.

3. Scheme



The device EL-PS-xxx does not use the input voltage U_{in} , however, the reading is available from the BACnet communication protocol and Modbus RTU.

U_{out} and I_{out} outputs work in parallel. This means that when the output voltage U_{out} is present in the range 0-10V, the output current I_{out} is present in the range 0-20 mA with a value of twice as large as voltage signal.

4. Operation and configuration

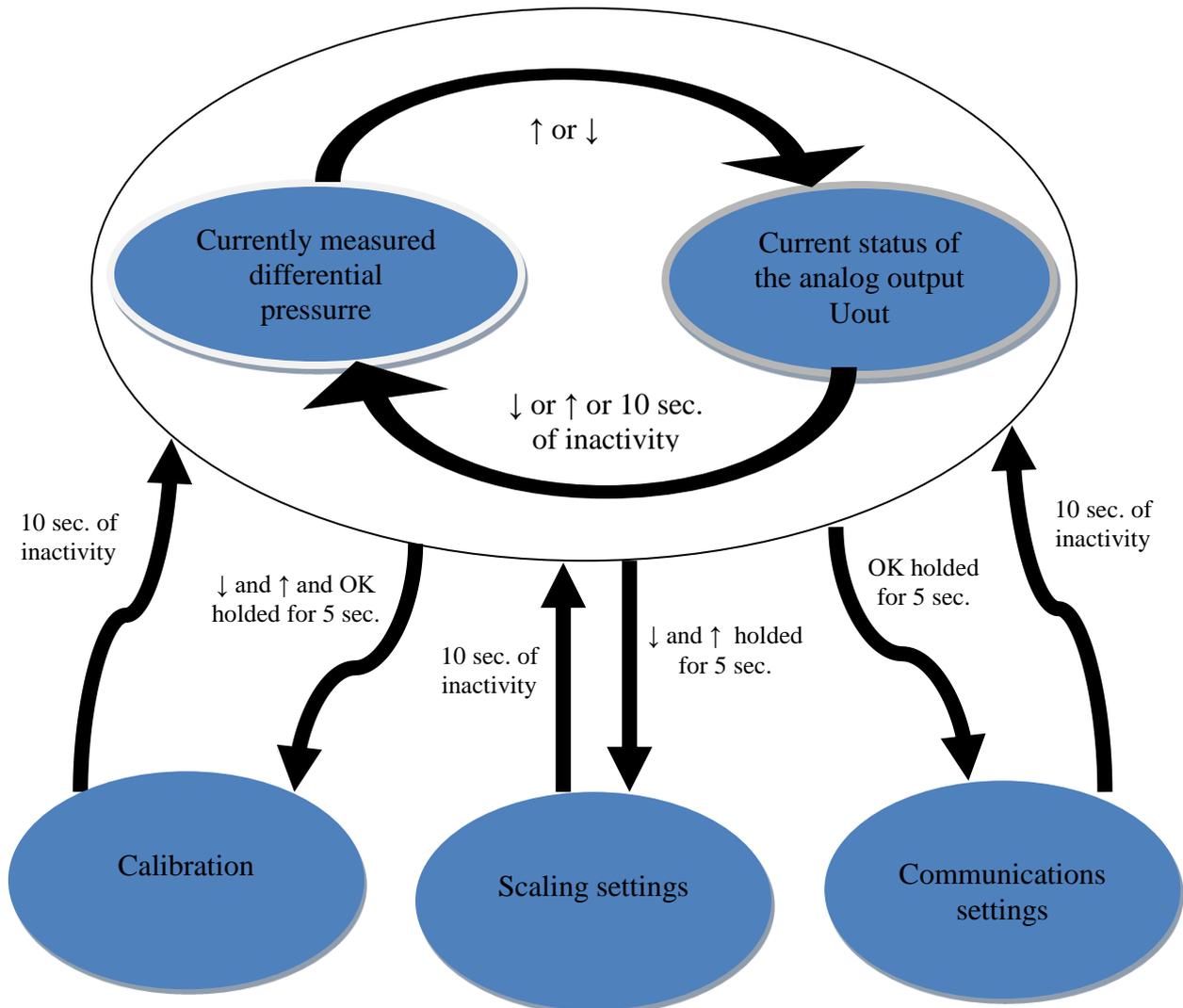
EL-PS-xxx transmitter has LED display and three buttons that can be used to parameterize the device.

Normally, after power up, the display shows the current measured differential pressure. Pressure indication in units of kPa.

0.85

Example display 0,85 kPa = 850 Pa.

Using \uparrow and \downarrow buttons you can switch the currently displayed parameter between the pressure and the value of the output voltage U_{out} . After about 10 seconds, the display returns to display the currently measured pressure difference.



4.1 Calibration

ATTENTION!

Calibration should be carried out only when it is sure that the transmitter does not work under any pressure difference. To do this, unplug the tubes inlet pressure to the transmitter.

Simultaneously hold the \uparrow and \downarrow and OK for a minimum of 5 seconds. It will bring you to transmitter calibration options. On the display will be shown and blinks CAL.

CAL

To perform a calibration process correctly, when displaying CAL please hold OK button for about 5 seconds. When calibration carried out properly on a display should appear indication 0, the currently measured pressure difference. If for a period of 10 seconds OK button will not be pressed, the calibration process will be interrupted.

4.2 Scaling settings

In order to scaling, reducing analog outputs, and time measurement averaging of the transmitter, go to the settings of the measuring range. To do this, simultaneously hold the ↑ and ↓ for at least 5 seconds.

The process comprises sequentially setting of the five parameters. Press OK to go to the next parameter. Saving of the all parameters following only after approval of the last of them. There is no possibility of going back to the previously edited parameter. The scaling settings is canceled if no key is pressed for 10 seconds.

Parameters:

- **Minimum pressure** – parameter range: -200...200kPa
- **Maximum pressure** – parameter range: -200...200kPa
- **Minimum output voltage** – parameter range: 0...10V
- **Maximum output voltage** – parameter range: 0...10V
- **Averaging time** – parameter range: 0...10s

Indicated value of analog outputs can be calculated according to the formula:

$$U_{out} = \left(\frac{P - P_{min}}{P_{max} - P_{min}} \right) * (U_{max} - U_{min}) + U_{min}$$

$$I_{out} = U_{out} * 2$$

P – current read of pressure difference

P_{min} – minimum pressure setting

P_{max} – maximum pressure setting

U_{min} – minimum output voltage setting

U_{max} – maximum output voltage setting

In addition, restrictions are imposed: $0 \leq U_{min} \leq U_{out} \leq U_{max} \leq 10$

Setting of the time averaging is the time during the samples are collected in order to determine the average value. Within one second about 10 samples (measurements) are collected, it means that if you set the averaging time for 4 seconds, the average value is calculated from approximately 40 samples.

Note that, depending on the mounted sensing element (symbol of the model) range of the measured pressure is different. However, this does not affect the adjustable scaling, which pertain to only the signal at the analog outputs. For example, if you used a transmitter EL-PS-2.5, and set the range $P_{min} = 0\text{kPa}$, $P_{max} = 200\text{kPa}$, $U_{min} = 0\text{V}$, $U_{max} = 10\text{V}$ analog output U_{out} it will show up to 0.125V which is a scaled value of 2.5kPa, as the sensing element is not able to measure higher pressures.

4.3 Communication settings

The transmitter is compatible with automation devices using one of two popular communication protocols: BACnet or Modbus. To configure the communication settings please hold the OK button for at least 5 seconds.

The settings include four parameters. Press OK to go to the next parameter. Saving parameters only after approval of the last of them. There is no possibility of going back to the previously edited parameter. The process of setting of communication is terminated if no key is pressed for 10 seconds.

Parameters:

- **Protocol:**

Modbus RTU 

BACnet MS/TP 

- **Transmission rate** – range: 2.4 – 115.2 kbit/s
- **Address on the bus / MAC address** – range: 0-255
- **Number of the instance** – range: 0-999 (valid only for BACnet)

5. Modbus RTU

In the transmitter EL-PS-xxx support for the Modbus RTU protocol has been implemented. Speed, and the address on the bus, you can configure in the options of the communication settings. The other transmission parameters:

Stop bits: 1

Parity: none

5.1 Registers map

Adres	Description	Numerical representation	Read / Write
Analog inputs			
0x0000	Currently measured pressure difference	<p>EL-PS-2.5 / EL-PS-7.5</p> <p>Pressure is written in the Pascal. The value of 3492 means that the measured pressure difference is 3492 Pa.</p> <p>EL-PS-35 / EL-PS-100 / EL-PS-200</p> <p>Pressure is written in the tens of Pascal. The value of 3492 means that the measured pressure difference is 34920 Pa.</p>	R
0x0001	Currently measured voltage input U _{in}	Voltage is recorded in hundredths of volts. The value of 835 means that the measured input voltage is 8,35 V	R
Analog outputs			
0x0100	Current status of the analog output U _{out}	Voltage is recorded in hundredths of volts. The value of 835 means that the output voltage is 8,35 V	R
Scaling settings			
0x0200	Minimum pressure value	Pressure is written in the tens of Pascal. The value of 3492 means the pressure 34920 Pa.	R/W
0x0201	Maximum pressure value	Pressure is written in the tens of Pascal. The value of 3492 means the pressure 34920 Pa	R/W
0x0202	Minimum output voltage	Voltage is recorded in hundredths of volts. The value of 835 means voltage 8,35 V	R/W
0x0203	Maximum output voltage	Voltage is recorded in hundredths of volts. The value of 835 means voltage 8,35 V	R/W
0x0204	Averaging time	Time is recorded in hundredths of a second. The value of 400 means the time 4 s	R/W

Special			
0x0300	Calibration	Writing any value triggers the calibration operation considering the actual measured pressure difference as 0 Pa	W

5.2 Allowed Modbus RTU commands

Transmitter EL-PS-xxx supports only a few standard Modbus RTU commands:

Read multiple registers 0x03

Write single register 0x06

Write multiple registers 0x10

Write mask register 0x16

Reading device descriptor 0x11 or 0x12

The returned descriptor contains 16 bytes in the following format:

Firmware version (2 x byte): XX.YY

Date of the firmware (3 x byte): DD, MM, YY

Name of the device (11 x byte): 'EL-PS-7.5', with zeros to 11 bytes

6. BACnet MS/TP

If in the communication settings BACnet protocol has been selected, transmitter is activated as a master in a BACnet MS / TP. Note that the maximum MAC address of the master in the BACnet network is 127

The transmitter provides a total of nine objects:

PS-X (Device) - the transmitter unit

Pres (Analog Input) - currently measured pressure difference

Uin (Analog Input) - currently measured voltage of an analog input

Uout (Analog Output) - current state of the analog output Uout

Min_Pres (Analog Value) - the minimum pressure value (scaling setpoint)

Max_Pres (Analog Value) - maximum pressure value (scaling setpoint)

Min_Voltage (Analog Value) - the minimum output voltage (scaling setpoint)

Max_Voltage (Analog Value) - maximum output voltage (scaling setpoint)

Average_Time (Analog Value) - averaging time (scaling setpoint)

The default service code for a reset : *elpiast*

In order to remotely activate the calibration process, use the BACnet service:

REINITIALIZE DEVICE.

The call to service must enter a service password and a custom status:

BACNET_REINIT_CALIBRATION = 8

7. Norms

This device complies with standards and directives:

Directive 2004/108 / EC - Electromagnetic Compatibility (EMC) Directive.

Directive 2001/95 / EC – The General Product Safety Directive

Standard EN 60730-1: 2002 - Automatic electrical controls for household and similar use - Part 1: General requirements.

8. Mounting

The pressure transmitter is designed for wall mounting. To keep the declared degree of IP protection, device has to be installed with cable glands facing down and proper arrange the connection of electrical cables and air pipes. The cables and pipes must be laid with the "overhang" that no water flow over the cables and pipes to the device. If you are using only one of the two cable glands, unused cable gland must be plugged by the supplied plug.

