



Programmable atmospheric pressure transmitter

**PA-101D**

**with 4-20 mA output**

**Instruction Manual**

# Instruction manual for use of PA-101D device

Device is designed for measurement of atmospheric pressure at hPa, PSI, inHg, mBar, oz/in<sup>2</sup>, mmHg, inH<sub>2</sub>O and kPa. It is possible to set pressure correction for altitude (offset). Device setting is provided by user's software, see latter. Pressure sensor is placed inside the electronic case. Measured value is optionally shown on LCD display. Display can be switched OFF too. Please read instruction manual before the first device connection. Device is connected to circuitry by means of current loop. Current loop has two-wire connection and requires power from evaluation device.

All transducer setting is performed by means of the PC connected via the optional ATS-AC17 communication cable (not included in delivery). Program enables to set pressure measuring range of current output. It supports make the adjustment of the device too. This procedure is described at file „*Calibration manual.pdf*“ which is installed commonly with the software.

## Device setting from the manufacturer

If special setting was not required in the order device is set from the manufacturer to the following parameters:

**value at output I1:** 4 – 20 mA corresponds to atmospheric pressure from **800 to 1100 hPa**<sup>1</sup>

**correction for altitude:** 0 hPa (absolute pressure)

**display:** switched ON

**pressure unit:** hPa

**Modification of the setting is possible to do by means of the PC using procedure described at the end of this document.**

## Device installation

Device is designed for wall mounting. There are two mounting holes at the sides of the case. It is NOT recommended to use the device for long time under condensation conditions. It could be the cause of water steam condensation inside the sensor's cover into water phase. This liquid phase stays inside sensor's cover and can't escape from the cover easily. If water condensation occurs for longer time it can cause device damage. Don't connect device while power supply voltage is on. Interconnection terminals are accessible after unscrewing four screws and removing the lid. Lace the cable through a gland at the case wall. Connect the cable to terminals with respecting the signal polarity (see figure). Terminals are self-clamping and can be opened by a suitable screwdriver. For the opening, insert the screwdriver to upper terminal hole and lever by him. Do not remember to tighten glands and case lid with inserted packing after cables connecting.

It is recommended to use shielded copper cable (e.g. SYKFY) with outside diameter of the cable must be from 3.5 to 8 mm, maximal length 1200m. The cable must be located at indoor rooms (probe is not protected for outdoor use). The cable should not be led in parallel along power cabling. Safety distance is up to 0.5 m otherwise undesirable induction of interference signals can appear. Working position: communication cable is entering from the top side.

Electrical system (wiring) may do only worker with required qualification by rules in operation.

## Setting of pressure correction for altitude

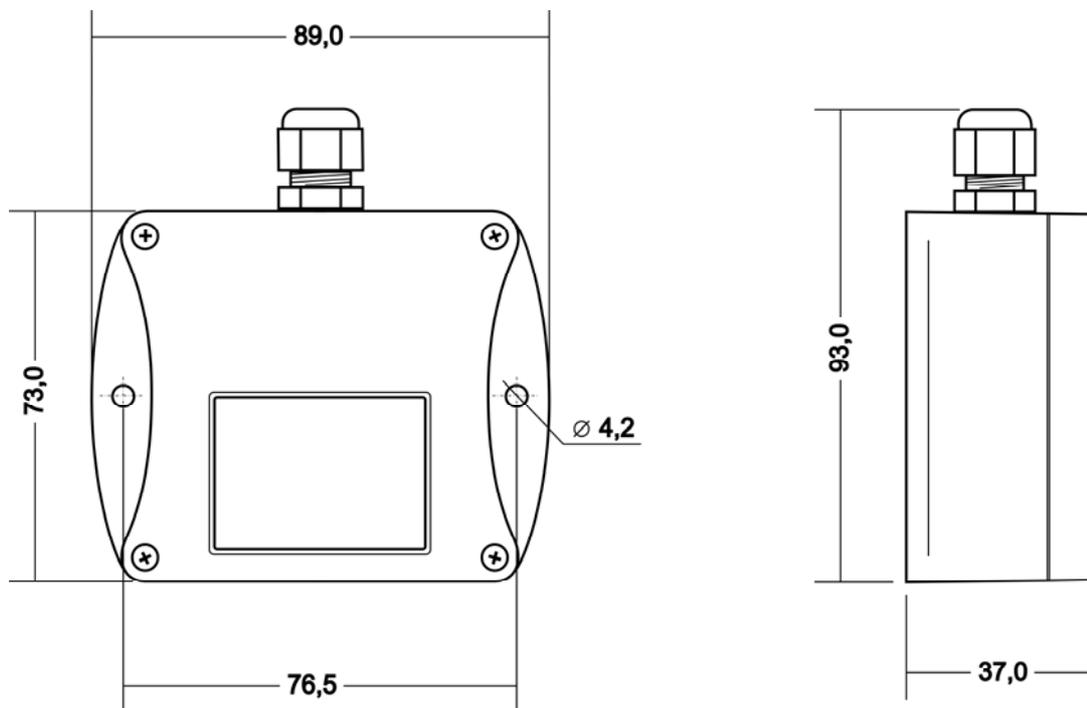
If there is necessary to read value of atmospheric pressure corrected with respect to altitude, it is possible to set corresponding pressure offset for this altitude. It is possible to do it with Users software. This value is then automatically added to measured pressure value. The resultant value of

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<sup>1</sup> It is possible to set own output scale with user's software

pressure with added correction for altitude must be between 300 hPa and 1350 hPa (from 4.351 PSI to 19.580 PSI). Outside this range device sends value of Error 2!

### Dimensions:



### Typical application wiring

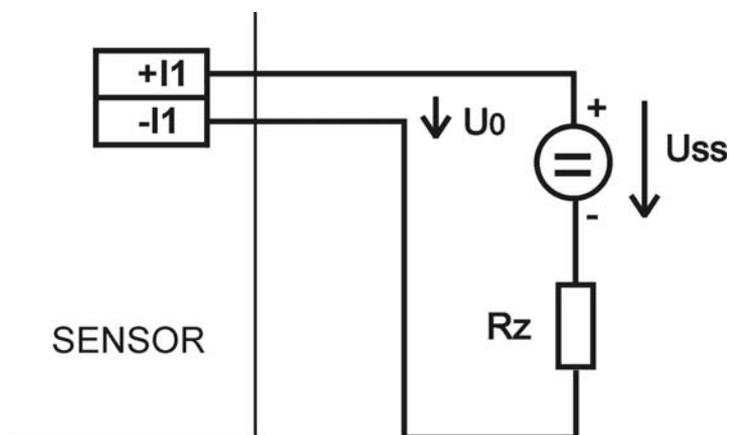
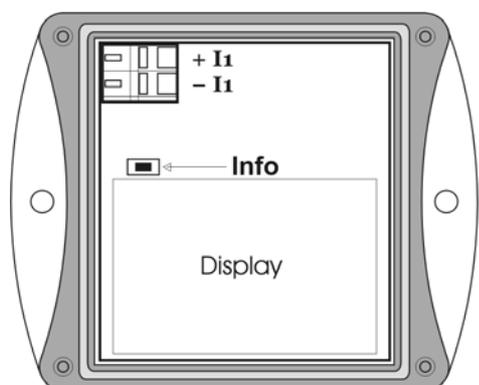
Calculation of minimum power voltage  $U_{ss}$  for proper operation:

$$U_{ss} \text{ min} > U_0 + I_{max} * R_z,$$

where:  $U_0 = 9 \text{ V}$

$I_{max}$ ... about 20 mA

$R_z$ ...sensing resistor (shunt)



## LCD Info mode

It is possible to check stored output scale without using of computer. It is necessary to have connected current loop I1 (device is powered throw loop).

Unscrew the transducer lid and shortly press button between display and interconnection terminals by means of a tool (e.g. screwdriver).



It shows preset value of pressure for current output I1. Lower LCD line shows current value (at mA) which is associated to the lowest pressure output (value displayed at upper LCD line). Here 4 mA corresponds to 800 hPa.



Press button again to get value for upper point similarly as at previous point. Here 20 mA corresponds to 1100 hPa

**Notice:** during info mode no measurement and no output current generation proceed. The device stays at info mode 15 s and then automatically goes back to measuring cycle.

## Readings on LCD display

**hPa, PSI, inHg,**

Reading next to this symbol is measured pressure or error state of value. If selected pressure unit is **mBar** or **oz/in<sup>2</sup>** or **mmHg** or **inH<sub>2</sub>O** or **kPa**, there is shown only value (number) without corresponding pressure unit!

symbol **3** near by left display margin

Is on if jumper is closed.

## Technical parameters:

**Power:** 9 to 30 V dc, maximum ripple 0.5 %

**Measuring parameters:**

**Atmospheric pressure:**

- accuracy of value shown on LCD display:

Unit	hPa, mBar	PSI	mmHg	inHg	inH <sub>2</sub> O	oz/in <sup>2</sup>	kPa
<b>Range</b>	600	8.70	450.0	17.72	240.9	139.2	60.00
	1100	15.95	825.1	32.48	441.6	255.3	110.00
<b>accuracy</b>							
<b>T=23 °C</b>	±1.3	±0.02	±1.0	±0.04	±0.5	±0.3	±0.13
<b>0≤T≤40°C</b>	±1.5	±0.02	±1.1	±0.04	±0.6	±0.3	±0.15
<b>Else</b>	±2.0	±0.03	±1.5	±0.06	±0.8	±0.5	±0.20

Response time<sup>2</sup>: **t90 <44s**

**Analog output:**

<sup>2</sup> There is possible to change response time. For more details see file "Description of calibration and adjustment procedure.pdf", which is installed together with Users software.

Range: 4 to 20 mA

Current output in case of error: <3.8 mA or >24 mA

Output accuracy:  $\pm(\text{accuracy of value shown on LCD display} + 0.06\% \text{ FS})\text{hPa}$

Recommended calibration interval: 1 year

Measuring interval and LCD display refresh: 2 s

Communication with computer: via USB port by means of USB communication cable ATS-AC17 (option)

Protection: IP54

Operating conditions:

Operating temperature range: -30 to +80 °C, over +70 °C switch LCD display OFF

Operating humidity range: 0 to 100 %RH

Outer characteristics in accordance with EN 33-2000-3:

normal environment with the specifications: AE1, AN1, BE1

Working position: communication cable is entering from the top side

Electromagnetic compatibility: complies EN 61326-1

Not allowed manipulations:

It is not allowed to operate the device under other than specified conditions in technical parameters. Devices are not designed for locations with chemically aggressive environment. **Do not use the device in an explosive environment.**

Storing conditions: temperature -30 to +80 °C, humidity 0 to 100 %RH without condensation

Dimensions: 89 x 73 x 37 mm

Weight: approximately 100 g

Material of the case: ABS

## Procedure of modification of device adjustment:

- device adjustment is performed by means of the optional ATS-AC17 communication cable, connected to USB port of the PC.
- It is necessary to have installed configuration program Tsensor on the PC. During installation please take care about installation of driver for USB communication cable
- Connect ATS-AC17 communication cable to the PC. Installed USB driver detect connected cable and create virtual COM port inside the PC.
- Unscrew four screws of the device lid a remove the lid. If device is already installed to measuring system, disconnect leads from terminals
- Connect ATS-AC17 communication cable to the device. Display must light up, or at least must light up all symbols for one second (if LCD was switched OFF by program before).
- Run installed Tsensor program and select corresponding communication COM port (as described above).
- When new setting is saved and finished, disconnect the cable from the device, connect leads into its terminals and place the lid back to the device.

## Error States of the device

Device continuously checks its state during operation. In case error is found LCD displays corresponding error code:

### Error 0

There is a reading „Err0“ on LCD display.

Check sum error of stored setting inside device's memory. Output value is <3.8 mA. This error appears if incorrect writing procedure to device's memory occurred or if damage of calibration data appeared. At this state device does not measure and calculate values. It is a serious error, contact distributor of the device to fix.

### Error 2

There is a reading „Err2“ on LCD display.

Atmospheric pressure measurement error occurred. Output value is about 3.8 mA. Measured pressure value **with added correction for altitude** is outside of range from 300 hPa to 1350 hPa (from 4.351 PSI to 19.580 PSI) or the pressure sensor is damaged. Please check setting of pressure correction for altitude with User's software.

### Error 4

There is a reading „Err4“ on LCD display.

It is internal device error during pressure sensor initialization. Under this condition device does NOT measure atmospheric pressure Output value is about 3.8 mA. Pressure sensor is probably damaged. It is a serious error, contact distributor of the device.

## End of operation

Device itself (after its life) is necessary to liquidate ecologically!

## Technical support and service

Technical support and service is provided by distributor. For contact see warranty certificate

Notes:

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