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# PA1000

USER MANUAL

**EC SYSTEMS**

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## **I. INTRODUCTION**

PA1000 is a universal conditioner designed to interface with sensors made in the IEPE standard.

Thanks to its small size and weight, robust design, very good operational parameters and ease of use, it is ideally suited for carrying out measurements both in the laboratory and in the field.

The conditioner is equipped with input circuits enabling powering up the IEPE sensor, while maintaining wide frequency response, very good linearity and low noise. Is also equipped with an LED indicating open or short circuit in the sensor loop.

The device can be powered up either by an adapter or an internal battery pack 4xAAA.

## II. SPECIFICATION

Specification	
number of channels	1
input type	IEPE 24V DC / 2,4 mA
input / output connector	BNC / BNC
input impedance	100 k $\Omega$
output impedance	120 $\Omega$
gain	1x (0 dB)
gain error	< 0,1%
gain drift	< 5 ppm / $^{\circ}$ C
output range	$\pm$ 10V
offset	< 10 mV
SNR	> 90 dB
frequency range (- 3 dB)	0,5 Hz – 100 kHz *
power supply	9V DC/100 mA
batteries	4 x AAA
dimensions	60 x 100 x 30 mm
weight	225 g
operating temperature	0 $^{\circ}$ C - 60 $^{\circ}$ C
storage temperature	-10 $^{\circ}$ C – 70 $^{\circ}$ C (without batteries)

\*) optional 500 kHz

### III. DESCRIPTION OF THE PA1000 CONDITIONER

Fig. 1 shows a plan view of the PA1000 conditioner with marked important elements. They are described in Table 1.



Figure 1 » View of the PA1000 conditioner

Item	Description
1	BNC connectors used to connect the sensor ( <i>IN</i> ) and measuring equipment ( <i>OUT</i> )
2	Power switch, switching to the <i>ON</i> position activates the device.
3	Red LED <i>Sensor Error</i> , continuous light indicates open or short-circuit
4	Red LED <i>Power</i> ; continuous light indicates operation
5	Red LED <i>Low Batt</i> ; continuous light indicates the need to replace batteries
6	Connector of AC adapter 9V DC/100mA

Tab. 1 » Conditioner elements description

## IV. POWER SUPPLY

The PA1000 conditioner can be powered by AC adapter supplying 9V DC / 100 mA or internal AAA batteries. When the external power supply is used, the internal battery is automatically disconnected to prevent the discharge.

### IV.1. INSTALLING / REPLACING BATTERIES

In order to install or replace the batteries, remove the front panel of the casing after removing two screws marked with the number 1 on Fig.2, so that container for four AAA cells can be reached (Fig. 3). After putting new AAA cells into the container, insert it into the housing, and mount the front panel back on its place with the screws.

The need to replace the cells is indicated by the 'Low Batt' LED.



Figure 2 » View of the screws allowing access to the battery compartment.

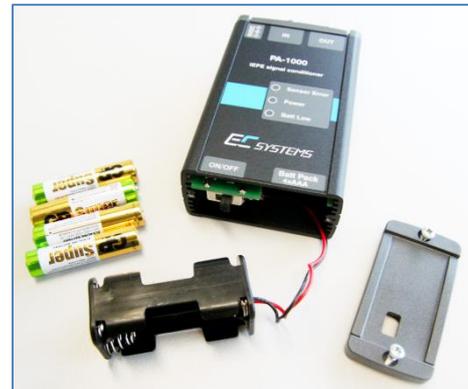


Figure 3 » View of the removed battery container

### WARNING!

Do not leave discharged batteries in the device, as it may cause a leak, resulting in damaging of the conditioner.

### WARNING!

If the conditioner is not used for a long time, remove the batteries to avoid leakage and damage.

## IV.2. POWER SUPPLY

The unit can be powered with external power supply with 9V DC output voltage and minimal current load of 100 mA. AC adapter is available as an option. It is recommended to use the AC transformer with linear stabilization. Using a power supply with pulse stabilization can drastically increase the noise level at the output of the conditioner.

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### **WARNING!**

**Pay attention to the polarity of the adapter plug – it should be in line with the outlet polarity marked on the top of the cabinet. Connecting the power supply incorrectly may damage the conditioner.**

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## V. USING THE CONDITIONER

Operation is reduced to few steps:

- Connect an IEPE standard sensor with the IN connector using a shielded cable, terminated with BNC plug
- Connect the conditioner output to measuring equipment (oscilloscope, data acquisition card, etc.)
- Connect an external power supply - necessary if the batteries haven't been installed in the device
- Turn on the conditioner - switch should be placed to the ON position

When the conditioner is turned on, the red LED labeled Power will lit, which means that the device is ready for use.

## VI. TROUBLESHOOTING

The table contains the solution to some problems that the user may encounter during the operation of the conditioner.

Problem	Solution
The unit will not turn on	<p>Check if the switch is set to the ON position.</p> <p>If the conditioner is battery powered, make sure that the batteries are installed in the device and that they are in working order.</p> <p>If an external power supply is used, make sure that the power adapter is connected correctly (with compatible polarity), in case of a regulated power supply make sure that it is set to supply 9V, check that the power supply is turned on.</p>
No signal on conditioner's output	<p>Check if the 'Sensor Error' LED shines, if yes - check connection of the sensor to the conditioner and make sure that the sensor cable is OK - any breaks, cuts and abrasions qualify it to be replaced. Make sure that the sensor is operational.</p>
Output signal conditioner is noisy and/or disturbed	<p>When an external power supply is used, make sure that it is a transformer with linear stabilization. Using a power supply with pulse stabilization (inverter) may increase the noise level.</p> <p>Make sure the signal cable used to connect the sensor and the measuring equipment are shielded cables.</p> <p>Make sure that nearby there are no electrical devices turned on, that may interfere with the operation of the conditioner.</p> <p>Disconnect the AC adapter from the conditioner and power it up with batteries - in some cases, excessive noise can penetrate from the network through the AC adapter and affect the operation of the conditioner</p>

If the above table does not include the problem or given solution has been unsuccessful, contact EC Systems service.



**EC Systems Sp. z o.o.**

Ul. Lublanska 34

31-476 Krakow

POLAND

**Phone:** +48 12 627 77 40

**Sales:** +48 12 627 77 23

**Fax:** +48 12 627 77 11

**e-mail:** [info@ec-systems.pl](mailto:info@ec-systems.pl)