

User's Manual of Electrophoresis Power Supply PS-220 (firmware v.2.4)



Designed and Manufactured by Signal Electronics

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Introduction

The PS-220 Power Supply is a versatile device, suitable for electrophoresis applications using small and medium sized tanks. It keeps very stable output voltage in a wide range of loads. It boasts 3 parallel pairs of standard 4mm output plugs allowing 3 procedures at the same time with the same voltage setting.

Design and Manufacturing

The device is designed and manufactured by:

Signal Electronics

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Warranty

Signal Electronics warrants that the device sold shall be free of any defects in material or workmanship, provided that this warranty shall apply only to defects which will become apparent within 24 months of purchase. The warranty applies only if the device is used according to the instructions described in the manual and the operators are trained. Signal Electronics shall repair any defects or malfunction at no charge, except any transportation costs, to and from point of service.

Signal Electronics will be relieved of any liability to repair or replace any device if the product is not used in accordance with the user's manual, altered in any way not specified by Signal Electronics, not regularly maintained, used for purposes not intended to or designed for or used with equipment not approved.

This warranty does not apply to damages that incurred by shipping of the device. Buyer shall claim any damages from the freight carrier.

Also, warranty does not apply to:

- 1. Not authorized repairs or modifications by third parties*
- 2. Damages provoked by accidental causes*
- 3. Improper use of the device*
- 4. Use of accessories or other devices not approved*

The warranty is exclusive and replaces other expressed or implicit.

This device is to be used for the designed purposes and in perfect condition by qualified personnel, in working and maintenance conditions as described in the manual, according to General Safety Warnings. This manual contains instructions for the professional qualified operators.

Before returning the device for service or repair it is very important to disinfect thoroughly all possibly contaminated parts. Same applies if the device is to be disposed. Disinfection or decontamination should be performed by authorized and well trained personnel only observing all necessary safety precautions. Any device to be returned should be accompanied by a decontamination certificate signed by the responsible lab manager. If such a certificate is missing charges may apply for the local decontamination.

Returning for Service

If for any reason the device is to be returned to Signal Electronics the following items should NOT be included:

1. Manual
2. Cables
3. Any other accessories



General Safety Warnings

The PS-220 is capable of delivering very high voltages that can be **lethal** to the operator. This manual contains important information regarding use and safety of the operator and must be read carefully. Although by design the device is safe, due to high voltages special caution should be exercised.

1. DO NOT touch the output jacks of the power supply either with bare fingers or any metallic objects or cables. Another person is strongly recommended to be present in the area in case of an accident.
2. DO NOT touch any point of the electrophoresis tanks, cables or plugs during operation.
3. DO NOT touch with wet hands any point of the Power Supply, cables, jacks or tanks.
4. Use proper cables and tanks in excellent condition.
5. DO NOT make other connections than the appropriate for the purposes of electrophoresis to the tanks.
6. DO NOT disassemble the device for any reason. **Electric shock hazard!**
7. DO NOT expose the device in water, rain or other liquids.
8. DO NOT cover the ventilation openings or the fan. **Danger of overheating and fire!**
9. DO NOT insert any metallic objects or cables through the ventilation holes. **Electric shock hazard!**
10. DO NOT drop the device. It is heavy and there is a risk of injury or damage to the device. In such a case, DO NOT operate the device if it is not checked by an authorized technician.

11. DO NOT place the device on or near heat sources.
12. DO NOT expose the device to direct sunlight.
13. DO NOT operate the device in an un-earthed electric network.
14. Always check the condition of the device, power cable, connection cables and tanks for any damages, frayed insulation or loose jack contacts.

Operation

After Power On, the power switch will glow red and the illuminated LCD will show the following message for about one and a half second. A short beep will also be heard.

```
220v DC Power  
Supply v2.2
```

Right after the display will show the Ready state with the voltage and time setting:

```
Ready Uo=100v  
Time set: 20:00
```

Pressing the START/STOP button the session is started with the set voltage. On the second line the output voltage and count down time is displayed:

```
Power ON  
Uout=100V 20:00
```

At any time the START/STOP button can be pressed again to stop the session. Then the display will return back to Ready. When countdown is finished, the display will show:

```
Finished...  
Press Start
```

and a tone will be heard for 10 seconds. After that, the display returns to the Ready state. Also can return sooner if the START/STOP is pressed.

In case the fan is not spinning or is slow spinning, then:

a) if the session has already started the LCD will show the Fan error message and a beeping sound is heard. The session will be completed but if long times are set (above 30 min), it is recommended to stop because overheating may occur.

```
Power ON Fan err  
Vout=100V  20:00
```


b) If the session is not started then pressing START/STOP button does not start new session and the "Fan error... Cannot start" message is displayed:

```
Fan Error...  
Cannot start
```

ATTENTION!

If the fan is not spinning, the power supply cannot be used and an authorized technician should check it. In general, fans do have many thousands of operational life but dust or moist environments can reduce their life making them slow or stall. This will overheat the power supply so its operation is prohibited.


Settings

While in Ready state, if the  button is pressed the display shows the Parameters setup for a second:

```
Parameter setup
```

and then the Voltage setting menu:

```
Set Voltage  
100 V  [+/-]
```

The + or - buttons can set new voltage level between 35 to 220 volt. Keeping the buttons pressed will increase the speed of voltage setting along with a clicking sound. To store the new setting press  button.

Next menu item is displayed, the countdown time:

```
Time set:  
20:00 min [+/-]
```

Again, the + or – buttons can set new time between 1 to 60 minutes. Keeping the buttons pressed will increase the speed of time setting along with a clicking sound. To store the new setting press ↵ button.

Next menu item is the offset time value in order to calibrate time precision. The setting can be anywhere between 1 and 65535, with default value 41180. It is recommended to keep this value if there is no reason to change it.

```
Set TMR1 offset  
41180 [+/-]
```

Again, the + or – buttons can set new offset value between 1 to 65535. Keeping the buttons pressed will increase the speed of time setting along with a clicking sound. To store the new setting press ↵ button.

Last menu item is displayed. The fan sensing sensitivity with a default value of 2. Setting can be any value from 1 to 10 and is recommended not to change this if there is no reason.

```
Fan reset period  
2 [+/-]
```

Again, the + or – buttons can set new time between 1 to 10. Keeping the buttons pressed will increase the speed of setting along with a clicking sound. To store the new setting press ↵ button.

New values are stored in non volatile memory and will be used now on. The LCD returns to Ready state.

The START/STOP button starts a new session or stops it completely. During the session only START/STOP is active except in case of an overload. Then the LCD will show the "Overload !!!" message:

A rectangular LCD display with a light green background showing the text "Overload!!!".

and a alarm sound is heard non-stop, until the operator either powers off the device or button – is pressed.

ATTENTION!

If the device is overloaded the cause of overload should be found before any new attempt to start new session. It may be a short in cables, a short in tank or other reason.

Problems and solutions

In case of a problem start with these steps by step guide:

1. No power on.

Check power plug and power cable with other known working device.

Check for blown fuse in the power inlet connector. There is a second fuse provided in the fuse holder.

Check if the power switch is in 0 position.

2. If device powers on but is not responding.

Power off and wait 1 minute before power on again.

If above steps do not help please contact manufacturer or reseller for a repair.

Specifications:

Operating voltage:	230Vac. +/-10%
Output voltage range:	35-220 Vdc
Max output current:	400mA
Max output power:	88 Watt
Min resistor load:	88 ohm
Voltage step resolution:	1 V
Time settingrange:	10 sec.-60 min
Ambient temperature:	0-40°C
Relative humidity:	0-90%
Dimensions (WxDxH):	26.1x22x9 εκ.
Weight:	4 Kg.

Declaration of Conformity

Signal Electronics certifies that the PS-220 power supply has been manufactured according to the regulations of the following European directives and standards:

EMC Directive 2004/108/EC

LVD Directive 2006/95/EC

EN 61326-1/2006

EN 61010-1/2001

EN 55011/2007

EN 6100-4-5/2006

EN 61000-4-2/1995

EN 61000-4-4/2004

EN 1000-4-6/1996

EN 61000-4-3/2006

EN 61000-4-11/2004

EN 1010-1/2002

The equipment as mentioned above was tested to be stated standards and directives and was found to be compliant with the applicable standards.

Authorized by Signal Electronics

Regulatory manager Ioannis Kyriakidis