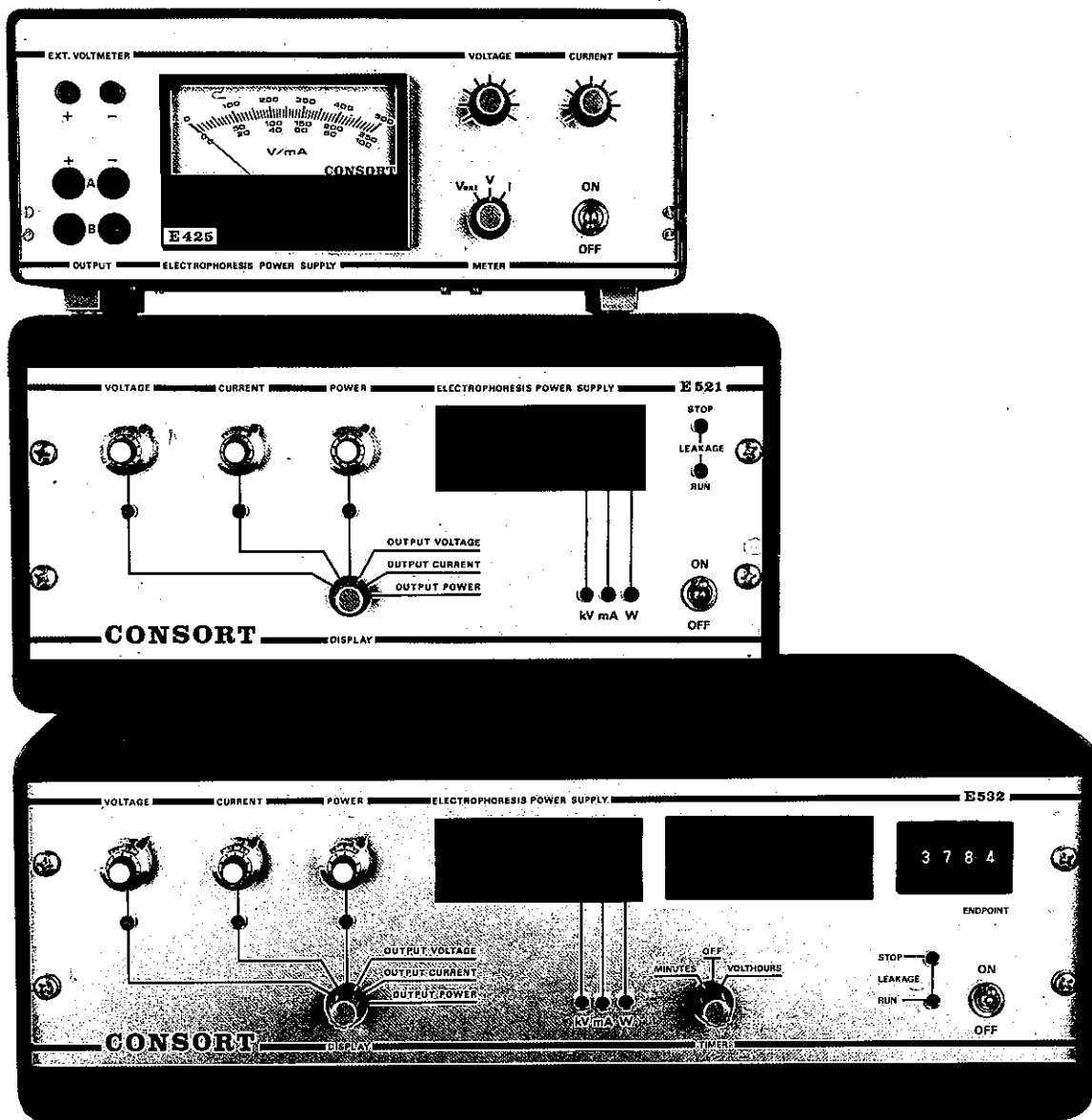


ELECTROPHORESIS POWER SUPPLIES



CONSTANT POWER VOLTAGE OR CURRENT
AUTOMATIC CROSS OVER
TWO OUTPUTS
ALL SAFETY PRECAUTIONS

CONSORT

The E 500 series of high voltage power supplies is designed for electrofocussing, preparative isotachopheresis and electrophoresis.

It is available in five versions:

E 554 10 ... 500 V / 0 ... 400 mA / 0 ... 200 W
E 512 10 ... 1000 V / 0 ... 200 mA / 0 ... 200 W
E 521 10 ... 2000 V / 0 ... 100 mA / 0 ... 200 W
E 532 10 ... 3000 V / 0 ... 150 mA / 0 ... 200 W / 0 ... 9999 Vh (min.)
E 562 20 ... 6000 V / 0 ... 150 mA / 0 ... 400 W / 0 ... 9999 Vh (min.)

All models can operate at constant power, constant voltage or constant current, and feature an automatic cross-over between these modes.

No manual control during the experiment is needed since each parameter can be presetted by a vernier dial before the experiment.

Models E 532 and E 562 also feature a build-in Volthour integrator and timer for accurate reproductions of the experiment.

A bright LED display shows the maximum power, voltage or current level, and also permits to control the output throughout the run.

Three green lightdiodes indicate which parameter is kept constant.

All models are fully protected against short circuit of the output or ground leakage, and a remote switch possibility automatically cuts the output voltage if e.g. the protective cover of the electrophoresis cells is lifted.

A red lightdiode illuminates and an acoustic alarm is activated whenever one of these dangerous overload conditions is present.

A dual set of safety output terminals allows a simultaneous run of two experiments.

COMMON SPECIFICATIONS:

Accuracy:	Voltage and current: 1 % f.s. Power: 2 % f.s.
Display:	3 1/2 digit, 13 mm LED
Resolution:	1 V (*) / 1 mA / 0,1 W (**)
Ambient temperature:	0 ... 40 °C
Power requirements:	200 ... 250 V, 50 ... 60 Hz
Dimensions:	18 × 28 × 35 cm model E 532: 18 × 28 × 49 cm model E 562: 18 × 50 × 49 cm
Weight:	14 kg (model E 562: 24 kg)

(*) 0,01 kV on model E 532 and E 562

(**) 1 W on model E 562

The E 400 series of high voltage power supplies is designed for simple electrophoresis or electroblotting experiments.

It is available in three versions, each with maximum 100 W output power:

E 411 10 ... 100 V / 0 ... 1000 mA
E 425 10 ... 200 V / 0 ... 500 mA
E 443 10 ... 400 V / 0 ... 250 mA

All models can operate at constant voltage or constant current, and feature an automatic cross-over between these modes. An external voltmeter possibility permits to measure voltage directly on the electrophoresis apparatus.

Voltage and current are indicated by a large panelmeter. The output is protected against short circuit, and a dual output allows a simultaneous run of two experiments.

COMMON SPECIFICATIONS:

Accuracy:	3 % f.s.
Ambient temperature:	0 ... 40 °C
Power requirements:	200 ... 250 V, 50 ... 60 Hz
Dimensions (H × D × W):	12 × 18 × 30 cm
Weight:	5,5 kg

(alterations reserved)

CONSORT pvba

PARKLAAN 36
B-2300 TURNHOUT - BELGIUM
TEL. (014) 41 12 79 - TELEX 73 476

This instrument is manufactured with the latest technology and needs no particular maintenance. CONSORT PVBA certifies that this instrument was thoroughly inspected and tested at the factory prior to shipment and found to meet all requirements defined by contract under which it is furnished.

The normal operating temperature should be between 0°C and 40°C.

Connect the mains operated instruments to an earthed power line only (190...250 V, 50...60 Hz).

The battery of portable instruments can be replaced by opening the bottom-compartment of the cabinet.

If the instrument is equipped with a rechargeable battery, it should be connected permanently to the mains (100...250 V, 50...60 Hz) in order to keep the batteries in good condition. Do not store the instrument for longer than 1 month without recharging the batteries.

WARRANTY AND SERVICING

This instrument is warranted against defective material and workmanship for a period of 3 years from the date of delivery, (except for the batteries and electrodes). CONSORT PVBA will repair or replace all defective equipment returned to it during the warranty period without charge, provided the equipment has not been mishandled or abused.

Repairs by unqualified persons may cause lapse of warranty.

CONSORT PVBA is not liable for consequential damages arising out of the use or handling of its products.

In the event of this instrument being returned for servicing, the owner is requested to remove the power supply lead and NOT send following items unless they are suspect:

Manual
Electrodes
Power supply lead
Cables

All requests for repairs or replacement parts should be directed to our representative in your country. This procedure will assure you the fastest service.

CONSORT PVBA PARKLAAN 36 B2300 TURNHOUT TEL 014/411279 TX 73476

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This power supply is a high technology instrument available in 9 different models. As it is capable of giving dangerous voltage levels by which high power is involved, we suggest that you take a few moments to read this manual thoroughly.

To fully appreciate and protect your instrument only use it at full output current within the following limits :

Model E411:	from	20	to	100 V	(max. 1000 mA)
Model E425:	from	20	to	200 V	(max. 500 mA)
Model E443:	from	40	to	400 V	(max. 250 mA)
Model E502:	from	20	to	200 V	(max. 2000 mA)
Model E554:	from	50	to	500 V	(max. 400 mA)
Model E512:	from	100	to	1000 V	(max. 200 mA)
Model E521:	from	200	to	2000 V	(max. 100 mA)
Model E532:	from	300	to	3000 V	(max. 150 mA)
Model E562:	from	600	to	6000 V	(max. 150 mA)

At lower levels of the output current the instrument can be used below the minimum voltages shown in the table above. However 20 V should be considered as the lowest usable voltage. A shut down due to an overload condition will always cause the output to drop below 20 V.

Since all power supplies are equipped with an automatic cross-over between the different possible modes (constant voltage, current or power), it is important to preset the proper values for the voltage, current and power. You can e.g. never get a constant power of 50 W if the presetted voltage is 500 V with a presetted current of only 30 mA (500 V x 30 mA is only 15 W!) On the E500 series the green lightdiodes will warn you which mode is kept constant.

After presetting the different maximum levels, it is preferable to put the display or meter switch on the output voltage control unless the output current or power should be monitored continuously. Never leave the switch on one of the preset positions since this can give you a completely false image of what is going on at the output terminals.

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The electrochemical behavior of an electrophoresis system is given by the Ohms-law ($V=I.R$) and the Power-equation ($P=V.I$), in which:

V = voltage across the electrophoresis cell.

I = current through the electrophoresis cell.

P = power dissipation of the electrophoresis cell.

R = resistance of the electrophoresis cell.

The amount of power applied to a cell is a direct measure of the heat produced. Optimizing the effects of a high potential gradient while minimizing the effects of heat production results in the maximum obtainable resolution.

The gel and buffer vessels in an electrophoresis system represent a resistor which conducts electricity from the anode to the cathode. Depending upon the chemical makeup of the gel, anode- and cathode-buffers, the total resistance of the system may either increase or decrease during the experiment.

Buffer systems, which are continuous in composition, can generally be run in the constant voltage or constant current mode.

Discontinuous buffer systems and ampholyte systems result in increased cell resistance. They can be run in the constant voltage or constant power mode. This will keep heat production within the cell to an acceptable level. At a higher power level, the constant power mode gives maximum separation and resolution, decreasing the running time.

This instrument has a dual output which permit to run two similar experiments. The following relations should aid in the interpretation of the values showed by the display:

a) Total voltage as indicated on the display:

$$V = V(\text{cell-1}) = V(\text{cell-2})$$

b) Total current as indicated on the display:

$$I = I(\text{cell-1}) + I(\text{cell-2})$$

c) Total power as indicated on the display:

$$P = P(\text{cell-1}) + P(\text{cell-2})$$

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This instrument has three adjusters for presetting voltage, current, or power. Each parameter can be shown on the display by choosing the desired mode on the six-range "DISPLAY" switch.

No manual control during the experiment is needed since the automatic cross-over switches to a different mode whenever one of the presetted limits is exceeded.

Three green lightdiodes under the dials indicate which limit is kept constant.

The electronic timer/volthour-integrator on model E532 automatically stops the experiment after a presetted value. Connected to the protective cover of the vessel or cell, the remote switch also can stop the run, if it is opened. Either case will cause the red lightdiode "STOP" to illuminate and an acoustic alarm to be activated.

If the instrument is operating normally, the green lightdiode "RUN" will illuminate. Only a dangerous condition as a short-circuit or a ground leakage is indicated by both lightdiodes "RUN" and "STOP" illuminating simultaneously. If this happens, immediately check every part of the assembly.

Use the "DISPLAY" switch to adjust the dials or to read the output parameters.

1) Constant Power Electrophoresis with presetted max. Voltage:

- Verify if the instrument is switched "OFF".
- Connect the electrophoresis cells.
- Turn all adjusters to zero.
- Switch the instrument "ON".
- Turn the current adjuster fully clockwise or to a limiting value.
- Turn the voltage adjuster to the limiting maximum value.
- Turn the power adjuster carefully to the right until the desired value is reached.

Power will now remain constant and normally the current will decrease slowly, which tends the voltage to rise. The presetted limiting voltage compensates overheating at the end of the experiment.

2) Constant Current Electrophoresis with presetted max. Power:

- Verify if the instrument is switched "OFF".
- Connect the electrophoresis cells.
- Turn all adjusters to zero.
- Switch the instrument "ON".
- Turn the voltage adjuster fully clockwise or to a limiting value.
- Turn the power adjuster to the limiting maximum value.
- Turn the current adjuster carefully to the right until the desired value is reached.

Current will now remain constant and normally the voltage will increase slowly, which tends the power to rise. The presetted limiting power compensates overheating at the end of the experiment.

3) Constant Voltage Electrophoresis with presetted max. Power:

- Verify if the instrument is switched "OFF".
- Connect the electrophoresis cells.
- Turn all adjusters to zero.
- Switch the instrument "ON".
- Turn the current adjuster fully clockwise or to a limiting value.
- Turn the power adjuster to the limiting maximum value.
- Turn the voltage adjuster carefully to the right until the desired value is reached.

Voltage will now remain constant and normally the current will increase slowly, which tends the power to rise. The presetted limiting power compensates overheating at the end of the experiment.

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Models E532 and E562 feature a digital volthour-integrator and timer. A switch permits to choose one of the following modes:

"MINUTES": the timer-display shows the running time expressed in minutes.

"VOLTHOURS": the timer-display shows the running progress expressed in volts x hours, which is an accurate parameter for repeated experiments.

How to use the volthour-integrator/timer:

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- Verify that the instrument is switched "OFF".
 - Preset the thumbwheelswitch to the desired value.
 - Put the timer-switch to the desired mode.
 - Proceed with a run as described on page 162/163 .

When the instrument is switched "ON" the timer automatically is reset and starts the counter. If the presetted value is reached the experiment stops, which is shown by the red lighthdiode "STOP" and an acoustic alarm. Putting the timer-switch to "OFF" disconnects the counter and can be used if no timing is required. Note that the display blanks the leading zeros.

OVERLOAD ON THE E500 SERIES

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The power supply is fully protected against any overload condition by a special security system which automatically disconnect the high voltage output if:

- 1) the output is short circuited.
- 2) the high voltage to ground leakage is too large.
- 3) the timer reaches the presetted value.
- 4) the remote shunt is opened.

The red lighthdiode "STOP" indicates this overload condition. If point 1) or 2) caused the experiment to stop, the green lighthdiode "RUN" will remain illuminated in order to show that the electrophoresis has not been completed.

REMOTE SHUNT ON THE E500 SERIES

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Safety of the operator is greatly improved by a remote shunt output, which enables to automatically switch off the high voltage of the electrophoresis cells when they are opened. No voltage will appear unless a micro switch or reed contact is closed before the instrument is switched "ON".

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The electrochemical behavior of an electrophoresis system is given by the Ohms-law ($V=I.R$) and the Power-equation ($P=V.I$), in which:

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I = current through the electrophoresis cell.

P = power dissipation of the electrophoresis cell.

R = resistance of the electrophoresis cell.

The amount of power applied to a cell is a direct measure of the heat produced. Optimizing the effects of a high potential gradient while minimizing the effects of heat production results in the maximum obtainable resolution.

The gel and buffer vessels in an electrophoresis system represent a resistor which conducts electricity from the anode to the cathode. Depending upon the chemical makeup of the gel, anode- and cathode-buffers, the total resistance of the system may either increase or decrease during the experiment.

Buffer systems, which are continuous in composition, can generally be run in the constant voltage or constant current mode.

Discontinuous buffer systems and ampholyte systems result in increased cell resistance. They can be run in the constant voltage or constant current mode. This will keep heat production within the cell to an acceptable level. At a higher power level, the constant current mode gives maximum separation and resolution, decreasing the running time.

This instrument has a dual output which permit to run two similar experiments. The following relations should aid in the interpretation of the values showed by the panelmeter:

a) Total voltage as indicated on the meter:

$$V = V(\text{cell-1}) = V(\text{cell-2})$$

b) Total current as indicated on the meter:

$$I = I(\text{cell-1}) + I(\text{cell-2})$$

c) Total power:

$$P = V \times I$$

2) Constant Current Electrophoresis:

- Verify if the instrument is switched "OFF".
- Connect the electrophoresis cells.
- Turn all adjusters to zero.
- Switch the instrument "ON".
- Turn the voltage adjuster fully clockwise or to an approximate limiting value.
- Put the meter switch to "I".
- Turn the current adjuster carefully to the right until the desired value is reached.

Current will now remain constant and normally the voltage will increase slowly, which tends the power to rise. A presetted limiting voltage can compensate overheating at the end of the experiment.

NOTE

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The power supply is protected against a short circuit of the output by a fuse on the rearpanel. Only replace this fuse by a new one of the same value:

- a) Model E411: 2 A fuse.
- b) Model E425: 1 A fuse.
- c) Model E443: 500 mA fuse.

SYMPTOM

POSSIBLE CAUSE

UNSUFFICIENT VOLTAGE:

Verify if the preset values of current or power are not exceeded.

The connected electrophoresis apparatus has a too low resistance.

If none of the green preset light diodes is illuminating: too low line voltage or malfunction of the electronics.

UNSUFFICIENT CURRENT:

Verify if the preset values of voltage or power are not exceeded.

Verify the external electric wiring.

The connected electrophoresis apparatus has a too high resistance.

If none of the green preset light diodes is illuminating: too low line voltage or malfunction of the electronics.

UNSUFFICIENT POWER:

Verify if the preset values of voltage or current are not exceeded.

Verify the external electric wiring.

The connected electrophoresis apparatus has a too high resistance.

If none of the green preset light diodes is illuminating: too low line voltage or malfunction of the electronics.

STOP LIGHT ILLUMINATES ALWAYS:

Verify if the rear jackplug is plugged in and the remote switch closed.

Ground leakage.

Too high output current and too low output voltage. The connected electrophoresis apparatus has a too low resistance.

NO CONSTANT CURRENT OR POWER:

No load.

The connected electrophoresis apparatus has a very high resistance.