



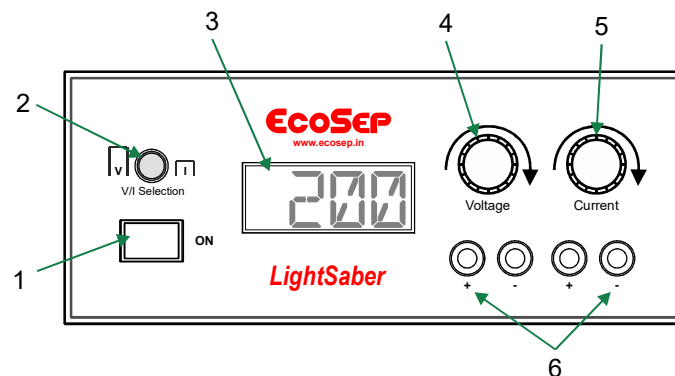
All EcoSep products are manufactured and marketed by

TechResource

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Switch panel for Lightsaber



1. Mains switch

An illuminated DPST rocker switch to control the mains supply.

2. Selection switch

To select between displaying voltage or current on the display (3). In the pushed out position, voltage is shown on the display. In the pushed in position it displays the current.

3. Display

A 3.5 digit display which shows voltage or current as selected by the selection switch

4. Voltage adjustment knob

A one turn knob which adjusts the voltage from 50-200 V.

5. Current adjustment knob

A one turn knob which adjusts the current from 0-150 mA

6. Outputs

Two pairs of outputs terminals with partly-recessed contacts.

7. Mains cable

On back panel (not shown in figure). Connects to mains socket via a two pin plug

Technical Specifications

Feature	Lightsaber
Voltage output	50-200 V
Current output	up to 150 mA
Power (wattage)	30 W
Voltage adjustment	1 V increment (1 turn knob)
Current adjustment	1 mA increment (1 turn knob)
Mode of regulation	CV/ CC
Timer	No
Auto recovery on power failure	Yes
Set point stays indefinitely	Yes
Timer recovery on power failure	No
Pause resume function key	No
Operating temperature range	-10°C to +50°C
Voltage input	230 V rms, 50 Hz, single phase
Voltage variation accepted (from nominal AC input voltage)	+10%, -15%
Frequency	47 Hz to 53 Hz
Component details	
Mains switch	Illuminated rocker switch
Fuse	Internal
Output socket	4 mm partly-recessed female
Mains inlet	Permanently attached

Technical Specifications (contd.)

Feature	Lightsaber
Transient suppression provided	Yes
Output is fully isolated from input	No
Line regulation	Better than
in CV mode	+/- 1 %
in CC mode	+/- 2 %
Load regulation in	Better than
- No load to full load variation (CV)	+/- 1 %
- Change in 0 to max output (CC)	+/- 2 %
Ripple and noise in CV mode	NOT TESTED
Automatic overload & short circuit protection with self-recovery	Yes
3.5 digit voltmeter/ ammeter	Yes
Isolation	
- Bet. AC input/ DC output terminals	2.1 KV AC for 1 min
- Bet. DC output terminals /chassis	2 KV AC for 1 min
Insulation between outputs/ chassis	100 M ohms Min at 500 VDC
Humidity tolerance	Up to 95% (non-condensing)
Cooling by normal convection	Venting at the bottom & sides
Dimensions of the body (excluding projections)	200 mm (w) x 80 mm (h) x 130 mm (d)

Components of the Ready-to-use system

Power supply with the following components

1. Power supply with all the components
2. Instruction manual

Additional handy components available on request

1. Extension wires
2. Connecting adapters

Powersupplies manufactured by us under the EcoSep brand are listed below:

- 1) Beacon: 80/140 V, up to 250 mA
- 2) Electravolt 2.0: 80/ 110/ 140/ 200 V, up to 150 mA
- 3) Electravolt 3.0: 50/ 100/ 150/ 200 V, up to 150 mA
- 4) LightSaber: 50-200 V/ 0-150 mA
- 5) Spark: 25-250 V/ up to 250 mA

Precautions

Keep the power supply dry at all times

Avoid utilizing very high current at very low voltage settings

Please read the manual carefully before using the power supply

Check before installation

Carefully remove all plastic/ paper covering the power supply. Ensure there are no stray pieces covering the vents on the power pack.

Check for any physical damage to the power supply that may have occurred in transit

Check the mains supply with a multi-meter for proper earthing and correctness of voltage and polarity.

Functionality tests

1. Connect the power supply directly or through the stabilizer to the mains
2. Switch it ON via the mains switch on the front panel
3. Upon activating the power supply unit the digital panel meters (DPM) will light up
4. Switch off the power supply

Dear Customer,

Congratulations on procuring the Lightsaber a versatile, robust & highly functional DC power supply designed & manufactured particularly for electrophoresis & electro-blotting.

It is indigenously manufactured from high quality parts & is specifically designed to suit Indian laboratory conditions. It is an auto-crossover, constant current (CC) & constant voltage (CV) DC power supply. This facility allows you to carry on the experiment as per your requirements within the specified range (without overriding OHM's law). The power supply provides protection against accidental short circuit. It is possible to change the voltage or current setting during the experiment without stopping the run. In the event of a power failure the unit will come on and continue operations when the power is restored.

This power supply will give you many years of trouble free use. In any event that there is a problem our warranty covers all manufacturing defects. We sincerely hope you that you gain as much satisfaction in using this power supply as we achieved in designing and manufacturing it.

Regards,

The production team of TechResource

Using the power supply for the first time:

- 1. Connect the power supply directly or through the stabilizer to the mains.
- 2. Switch it ON via the mains switch on the front panel.
- 3. Upon activating the power supply unit the digital panel meters (DPM) will light up.

Using the power supply in the CV mode:

- 1. While the power supply is OFF turn the voltage knob fully counter clockwise and the current knob fully clockwise.
- 2. Connect the electrophoresis apparatus or blotting unit to the output terminals taking care of polarity.
- 3. Switch ON the power supply.
- 4. Bring the selector switch to the pushed out position to read voltage on the display.
- 5. Slowly turn the voltage knob clockwise till the desired voltage value is reached.
- 6. Press the selector switch to the pushed in position & ascertain that the current is flowing through the apparatus by reading the mA value on the display.
- 7. Check the electrophoresis or blotting unit to confirm the presence of bubbles. Do note that the cathode generates more bubbles than the anode.

- 7. If the mA value is within the expected range continue with the experiment. (Note that voltage and current values will follow Ohms law).
- 8. If the mA value is zero or near zero and/ or there are no bubbles forming in the apparatus then check the tips and notes and the trouble shooting guide.
- 9. You can leave the selector switch in the V or I position but it is recommended to leave it in I position when running at constant voltage. This is so that you can keep an eye on the change of current and you can make alterations if required.
- 10. If the resistance of the buffer drops, the current flowing through the apparatus rises to reach the maximum or the set value. If the current goes beyond that then the power supply will automatically switch to the CC mode. Due to this the voltage will start dropping.
- 11. To get back into the CV mode either increase the set current value or by increasing the resistance of the external circuit or by decreasing the voltage.

Using the power supply in the CC mode:

- 1. While the power supply is OFF turn the current knob fully counter clockwise and the voltage knob fully clockwise.
- 2. Connect the electrophoresis apparatus or blotting unit to the output terminals taking care of polarity.
- 3. Switch ON the power supply.

- 4. Bring the selector switch to the pushed in position to read current on the display.
- 5. Slowly turn the current knob clockwise till the desired current value is reached.
- 6. Press the selector switch to the pushed out position and check the voltage value on the display.
- 7. Check the electrophoresis or blotting unit to confirm the presence of bubbles. Do note that the cathode generates more bubbles than the anode.
- 7. If the mA and V values are within the expected range continue with the experiment. (Note that voltage and current values will follow Ohms law).
- 8. If the mA value is not settable i.e. it is zero or near zero; or the voltage value is maximum or above expected then check the tips and notes and the trouble shooting guide.
- 9. You can leave the selector switch in the V or I position but it is recommended to leave it in V position when running at constant current. This is so that you can keep an eye on the change of voltage and you can make alterations if required.
- 10. If the voltage goes beyond 200 V (or the set value) then the power supply will automatically switch to the CV mode. Due to this, the current will start dropping.
- 11. This will occur when the resistance rises and the voltage rises in tandem to reach the maximum or the set value.

- 12. To get back into the CC mode either; increase the set voltage value (turn the knob clockwise), or increase the resistance of the external circuit, or decrease the voltage (turn the voltage knob counter clockwise)

CAUTION:

- Use the apparatus with care. Do not wash the power supply. To clean - wipe the power supply with a damp cloth. Always dry the connecting pins/ terminals before attaching the electrical cords.
- The apparatus should **NOT BE**:
- 1. subjected to impact.
 - 2. exposed continuously to temperatures outside the range of 0-40° C.
 - 3. handled with abrasive or sharp objects.
 - 4. exposed to organic solvents (aromatic or halogenated hydrocarbons, ketones, esters, alcohols over 30% or concentrated acids over 25%)
 - 5. exposed to other solutions which will attack plastic/ metal.

Tips and Notes

- 1. Voltage can be set between 50-200 V in load or no load conditions. That means that whether you have connected any apparatus to the power supply or not, the voltage value can be set by turning the voltage knob. If the voltage is not settable that can mean one of these things.
 - a) *The current knob has been set to a certain limit.* Please turn the current knob fully clockwise. You can now try setting the voltage knob to the desired voltage.
 - b) *The current limit has been reached.* Disconnect the apparatus and set the voltage to the desired value. Reconnect the apparatus. If the voltage value decreases then check if the current value has reached 150 mA. This means that the current limit has been reached and the power supply has automatically shifted to the constant current (CC) mode. Now the current value will not increase and will stay on 150 mA while the voltage values will change.
- 2. Current values can be set between 0-150 mA only when an apparatus (with the appropriate buffer) is connected to the power supply. This is because the power supply display shows actual values at the moment. If the apparatus is connected and still you are unable to set the current to the desired value within the range, then it would be because of one of the following points.

- a) If the current value does not rise above 0 mA it could be due to the cords not being connected, buffer not touching the electrodes, or many of other similar reasons. Refer to the Trouble shooting guide section ‘Power supply ON but no movement of samples/ bubbles in the buffer’.
- b) The lowest output voltage of the power supply is 50 V. If the conditions in the apparatus (buffer, samples, size of the gel) are such that the resistance is low, then the minimum current will be set automatically. For e.g. If the resistance of the buffer is 1000 Ohms then the current cannot be set below 50 mA, taking into consideration Ohms law (V=IR). In this circumstance, you will have to run the system at higher currents or use another power supply which can go below 50V.
- c) The highest output voltage is 200 V and once this has been reached the power supply cannot give any more higher voltages.

- 3. In all events the power supply will follow Ohms law. If the voltage exceeds 200 V or the current exceeds 150 mA the power supply will switch from CV to CC or vice versa. If this is the case, use a different buffer, use less buffer, use a smaller gel tank, use a different power supply or come up with a novel solution to this issue and do not forget to contact us.

Troubleshooting Guide

Before reading the trouble shooting guide make sure you have clearly read and understood the instructions of how to use the power supply in the CC and CV modes.

Indication	Cause	Remedy
Power supply will not switch 'ON'. i.e. light on mains switch indicator does not come 'ON'.	Check 230 V mains supply	Restore the mains supply
	Power supply fuse blown	Try replacing with correct fuse (1.5 A) only once. Do not use fuse of higher rating
	Fuse blows again	Contact us
Power supply ON but display (DPM) not ON	Power to DPM lost or DPM non functional	Contact us
Display shows 000	Connection to DPM lost or DPM non functional	Contact us
Power supply 'ON' but no movement of samples/ bubbles in the buffer	Cathode and anode are not connected to the right output terminals	Connect the cathode and anode to the right output terminals i.e. red to red and black to black
	Electrical connecting cords are not properly inserted	Insert the electrical connecting cords properly
	The connecting cords are damaged	Use new connecting cords
	Low level of buffer in the apparatus	Raise the level of buffer in the apparatus such that the circuit is formed
	Cello tape stuck on the ends of the tray	Remove cello tape and check
	Wrong composition of buffer	Check the buffer composition
	Oxidation/deposit formation on the contact terminals/ connectors of the power supply	Disconnect the instrument. Shut down the power supply. Clean the terminals. Reconnect the instrument and try again.
	Oxidation/deposit formation on the contact terminals/ connectors of the instrument	Disconnect the instrument. Clean the terminals. Reconnect the instrument and try again.
	Defective switch or circuit	Contact us
Slow movement of samples	Voltage or current displayed is not correct	Use a multimeter to test the voltage and current on the terminals of the power supply and on the ends of the connecting cords
	Problems with the electrophoresis or blotting apparatus	Check the trouble shooting guide for the apparatus in use
	Incorrect buffer, sample preparation or gel preparation	Check a suitable trouble shooting guide to ascertain the issue

If you are facing any difficulty in understanding the instructions or in operating the LightSaber power supply, kindly contact us at: sales@techresource.in with your comments on steps given above. This will provide us with necessary information to advise you properly.