

Labnet Enduro™ Power Supplies

Instruction Manual

Catalog Numbers:

High Amperage (250V)

E0203

E0203-230V

General Purpose (300V)

E0303

E0303-230V



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1.0 Warning: Federal Communications Commission Advisory

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2.0 Safety Information

2.1 Avoiding Electrical Shock

The Labnet Enduro™ 250V and 300V Power Supplies produces up to 250 or 300 voltage outputs respectively which, are electrically isolated from ground to reduce the risk of electrical shock to the user. Please follow the guidelines below, and read this manual in its entirety to ensure safe operation of the units described herein.

The Labnet Enduro Power Supplies have been designed for use with electrophoresis gel box systems with shielded banana plugs thus minimizing any potential shock hazard to the user. Always use gel box systems that are compatible with the Power Supply, have been designed for your specific applications, and are suitable for the voltage, current, and power range of the Power Supply. To prevent accidental electric shocks to the user, always use gel box systems that have safety lids. Labnet recommends against the use of gel box systems and/or power leads that have unshielded banana plugs, thus minimizing any potential shock hazard to the user.



To avoid electrical shock:

- ▶ NEVER connect or disconnect wire leads from the power jacks when the red indicator light at the Start/Stop key is on or when "RUNNING" is displayed on the screen.
- ▶ WAIT at least 5 seconds after stopping a run before handling output leads or connected apparatus.
- ▶ ALWAYS make sure that hands, work area, and instruments are clean and dry before making any connections or operating the power supply.
- ▶ ONLY connect the power supply to a properly grounded AC outlet.

2.2 Avoiding Damage to the Instrument

- ▶ For proper ventilation, leave at least 10 cm of space behind the instrument, and at least 5 cm of space on each side.
- ▶ Do not operate the power supply in high humidity environments (>95%), or where condensation may occur.
- ▶ To avoid condensation after operating the power supply in a cold room, wrap the unit in a plastic bag, and allow at least 2 hours for the unit to equilibrate to room temperature before removing the bag and operating the unit.



NOTE: If the unit is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



This symbol is used on the Labnet Enduro Power Supplies to indicate an area where a potential shock hazard may exist.

3.0 Package Contents

Description	Quantity
Labnet Enduro 250V or 300V Power Supply*	1 each
Instruction Manual	1 each
Fuse (additional)	1 each
Power Cord	
▶ E0203 or E0303 115V unit	1 each (US)
▶ E0203-230V or E0303-230V 230V unit	2 each (UK, EU)
Warranty Card	1 each

*250V and 300V are ordered separately

3.1 Upon Receiving the Instrument



Examine the unit carefully for any damage incurred during transit. Any damage claims must be filed with the carrier, keep the supplied box for inspection. The warranty does not cover in-transit damage.



To ensure safe, reliable operation, always operate the Labnet Enduro™ Power Supply in accordance with the manufacturer's instructions. Always wear protective gloves and safety glasses when working in a laboratory environment. See Safety Information and Warranty Information in this manual.

4.0 Specifications

	250V	300V
Input power (switchable)	115 VAC, 50/60 Hz	115 VAC, 50/60 Hz
	230 VAC, 50/60 Hz	230 VAC, 50/60 Hz
Fuse	4A/250V	2A/250V
Output power	300W	90W
Output voltage range	5 to 250V	2 to 300V
Output current range	10 to 3000 mA	4 to 500 mA
Operating modes		
▸ Constant voltage	1V step	1V step
▸ Constant current	10 mA step	1 mA step
▸ Constant power	1W step	–
Programmable	Yes	No
	▸ Store file no.: 20	–
	▸ Program: up to 10 steps	–

	250V and 300V
Duration Timer	Approx. 99.99 hr./min.
Terminal pairs	4 positive voltage and 4 negative voltage
Crossover	Automatic
Display type	Backlit LCD graphic type
Display size (W x H)	2.11 x 0.62 in. (5.4 x 1.6 cm)
Pause function	Yes
Safety features	<ul style="list-style-type: none"> ▸ No load detection ▸ Load change detection ▸ Overload detection ▸ Ground leak detection ▸ Auto restart
Stackable	Yes
Housing material	Flame retardant ABS
Housing size (W x D x H)	7.9 x 12.4 x 3.4 in. (20 x 31.4 x 8.5 cm)
Operating temperature	0°C to 40°C
Environmental conditions	95% RH, 75 to 106 Kpa, Altitude not to exceed 2000 meters
Weight	5.4 lbs (2.45 kg)
Certifications	CE; cETLus
Warranty	3 years

5.0 Overview and Operational Modes

The Labnet Enduro™ Power Supplies are microprocessor-controlled power supplies that are designed to meet most electrophoresis needs in a single, easy to use unit. The power supply's small footprint and stacking feature conserve valuable bench and wall mounted shelf space. The power supplies can run various modes for constant voltage, constant current (250V and 300V) or constant power applications and programming mode concurrently (only 250V).

- The Labnet Enduro 250V Power Supply is designed to run applications at maximal power and efficiency. This instrument is ideal for DNA/RNA electrophoresis, SDS-PAGE, native PAGE, Western Blotting applications.
- The Labnet Enduro 300V Power Supply is designed to efficiently handle multiple electrophoresis gel tanks and use a small amount of lab space. This instrument is ideal for DNA/RNA electrophoresis and mini-PAGE gels.

Both units are equipped with four sets of output jacks that can be used simultaneously. The Power Supplies are equipped with a constant mode feature. The constant mode is used for applications that require only one specific voltage limit, current limit, and power limit continuously during the entire duration of electrophoresis.

This manual describes the setup and operation of Labnet Enduro 250V and 300V Power Supplies including important information on safety and maintenance of the unit.

6.0 Description of Buttons and Switches

Front View of Labnet Enduro Power Supply



Rear View of Labnet Enduro Power Supply



Control Buttons



- ▶ **Up Arrow:** Used to move cursor up between parameters and to increase numeric values.
- ▶ **Down Arrow:** Used to move cursor down between parameters and to decrease numeric values.
- ▶ **Mode:** Used to choose either Constant Voltage, Constant Current, or Constant Power mode, and sets timer settings.
- ▶ **Constant:** Used to set up parameters of Constant Voltage, Constant Current, or Constant Power.
- ▶ **Start/Pause:** Used to start operation or temporarily interrupt power to an operation in progress without terminating electrophoresis and to resume power after pausing without resetting the timer.
- ▶ **Stop:** Used to stop operation from the Running Screen.

7.0 Getting Started

Installing the Labnet Enduro™ Power Supply

1. Check the label located near the AC inlet to ensure that the unit is compatible with locally provided voltage.
2. Place the Labnet Enduro Power Supply on a level laboratory bench. Keep the area around the power supply clear to ensure proper ventilation of the unit.
3. For your safety: Position the unit properly such that the power switch and the AC inlet located on the rear of the unit are easily accessible.
4. Ensure the AC power switch is in the Off position.
5. Attach the power cord to the AC inlet. Use only properly grounded AC outlets and power cords.
6. Connect the leads from the electrophoresis unit; insert the red lead (+) into the red output jack, and the black lead (-) into the black output jack.

8.0 Recommendations

- ▶ The duration of electrophoresis can be defined in time (hours/minutes). When using this or any electrophoresis product, we recommend that you adhere to the time provided in the protocol and application manuals.
- ▶ For best results when running multiple gels and electrophoresis units concurrently, avoid running samples with differing buffer salt concentrations at the same time. Variations in conductivity due to differences in buffer salt concentrations can affect the run of all the samples run at the same time. Always properly prepare and desalt your samples.

NOTE: For best results, DO NOT use the Labnet Enduro Power Supply at its maximum electrical load limits. Variations in buffer conditions can result in exceeding the power supply's maximum voltage, current, or power output capacity and produce undesirable variations in electrophoretic separations.

9.0 Operating Instructions

9.1 Constant Operation Protocol

The Constant Voltage, Current (250V and 300V), or Power Mode (250V Only) allow you to specify a voltage limit, current limit, and power limit to be used during the entire duration of electrophoresis. Review the guidelines provided in this manual before starting electrophoresis using the Labnet Enduro™ Power Supplies.

A basic Constant Voltage, Constant Current, or Constant Power operating procedure of the Labnet Enduro Power Supplies is provided below. We recommend reading the guidelines provided in this manual for best results before starting an operation. The figures in section 9.1 are examples from the 300V display screen. Please note that the 250V model has the same functionality herein with the addition of constant power as viewed within the NOTE section of 9.1.

1. Press the Power Switch on the rear side of the instrument to turn on the Labnet Enduro Power Supply. Upon start-up, the Display Screen on the front of the instrument will illuminate. The factory default settings (or last settings used) will be displayed.



300V TIME: 00:00
AMP: 400mA

- ▶ The chosen constant parameter (Voltage or Current) is displayed in bold on the left side of the display.
 - ▶ The Timer is the first line on the top right, and the non-constant value is displayed in the second line on the right side of the display screen.
2. Press Constant button to choose constant volt or amperage.
 - ▶ Choosing constant VOLT, the VOLT setting will be large. Amperage defaults to “maximum setting” and TIME will be “0”.



300V TIME: 00:00
AMP: 400mA

- ▶ Choosing constant AMP, the AMP setting will be large. VOLT will be “maximum value” and TIME will be “0”.



400mA TIME: 00:00
VOLT: 300V

3. Press Mode to choose the large VOLT/AMP value on the left side of the display. VOLT/AMP is blinking, press the Up or Down Arrow to increase or decrease value. **NOTE:** Parameters will blink for 5 seconds. After 5 seconds, if you don't press any button, the parameters will stop blinking and the value will be entered.



400mA TIME: 00:00
VOLT: 300V

4. Press Mode. TIME is blinking, press the Up or Down Arrow to increase or decrease value. Time set to 00:00 means “continuous”, and the timer will count up. Time can be set for 00:01 to 99:99. The timer will count down until the time is up and then stop the power supply.



400mA TIME: 00:00
VOLT: 300V

5. Press Mode. Smaller AMP/VOLT on the right side of the display is blinking, press the Up or Down Arrow to increase or decrease the value.



400mA TIME: 00:00
VOLT: 300V

6. Press Start/Pause to start the power supply. The parameters will stop blinking and the “run” LED will illuminate. “CONSTANT VOLT/AMP” will show on the display.



400mA TIME: 00:00
VOLT: 300V
CONSTANT AMP

7. Press Start/Pause again to pause power supply, and the “run” LED will flash. To change the run settings, press MODE (see Step 3).



400mA TIME:00:00
VOLT:300V
PAUSE

8. When the run is completed the power supply will beep and the screen displays TIME UP.



400mA TIME:00:00
VOLT:300V
TIME UP

9. Press Stop to stop the powers supply. The “run” LED and the power to the output jacks will be off.



400mA TIME:00:00
VOLT:300V

NOTE: After stopping and restarting an operation, the timer resets to selected time and does not take into account the time that electrophoresis was in progress before it was stopped.

Follow the same steps above for constant power mode with the 250V power supply. Notice W is the large value and select volt and amp values according to your protocol.



10W TIME:00:00
VOLT:300V
AMP:3.00A

9.2 Basic Programming Protocol (250V only)

A basic Programmable Mode operating procedure of the Labnet Enduro™ 250V Volt Power Supply is provided below. We recommend reading the guidelines provided in this manual for best results before starting an operation. The Programmable Mode allows you to vary levels in voltage (V), current (mA), and power (W) during specified periods of time as discrete changes (STEP) for up to 10 steps, depending upon your electrophoresis needs.

Selecting a program

1. Select Program Mode by scrolling down using the ▼ key.
2. When highlighted press Mode key.
3. Select file number using the a ▼ ▲ arrow keys.
4. When file number is located press the Mode key.
5. Select the number of steps by using the arrow ▼ ▲ arrow keys.
6. To enter the parameters of the run press the Mode key.
7. Voltage will appear on the display to enter voltage press Mode key.
8. To change voltage, use the ▼ ▲ arrow keys.
9. Select Amperage or Watts by pressing the Mode key until desired parameter is flashing.
10. Increase or decrease the value by using the ▼ ▲ arrow keys.
11. To set the time in hours press the Mode key.
12. Increase or decrease the value by using the ▼ ▲ arrow keys.
13. Select the Mode key again to select minutes.
14. Increase or decrease the value by using the ▼ ▲ arrow keys.
15. Repeat 6 thru 14 above to program successive steps.

Viewing a Program

1. Select the file number using the ▼ ▲ arrow keys when highlighted press the Mode key.
2. Press the Mode key 3 more times to advance to the programming.
3. If multiple steps use the Mode key to advance through the program to the next step.

Editing a program

1. When a file is selected the parameters can be edited by the Mode button.
2. When the parameter is selected, it will flash. Use the ▼ ▲ arrow keys to either increase or decrease values.
3. Press the Mode key to migrate to the next parameter.
4. When the parameter is selected use the ▼ ▲ arrow keys to increase or decrease the values.
NOTE: The controlling value (volts, amps, or watts) is displayed on the left-top side of the display screen. The Timer is the first line on the right-top, and the other values (volts, amps, or watts) are displayed in the second and third line on the right side of the display screen.

10.0 Choosing Limiting Parameter Settings

The Labnet Enduro™ Power Supplies can operate at limiting Voltage, limiting Current (250V and 300V), or limiting Power (250V only). We recommend operating the Labnet Enduro Power Supplies at limiting voltage for most applications. See below for more details.

10.1 Voltage Limiting

For most electrophoresis methods resistance increases throughout the run. Limiting the voltage provides the following advantages:

- ▶ Current and power decrease throughout the run, providing an improving margin of safety over time.
- ▶ The same voltage setting can be used regardless of the number or thickness of gels being ran.

10.2 Current Limiting

Discontinuous buffer systems and, to a lesser extent, continuous systems increase resistance during the run. If you use the current limiting setting on the Labnet Enduro Power Supplies, the voltage will increase as resistance increases to satisfy Ohm's law ($V = IR$). If no voltage limit is set and a local fault condition occurs, such as a poor connection, very high local resistance may cause the voltage to increase to the maximum capacity of the power supply. This may lead to local overheating and damage to the electrophoresis cell or create unsafe conditions. When operating under constant current conditions, set a voltage limit on the power supply at or slightly above the maximum expected voltage.

10.3 Power Limiting (250V only)

Power is a function of voltage and current $P = IV$. If voltage is increased power will also be increased depending on the gel system, R should be a constant. Power will be reflected by the heat generated during a gel run. The power limiting function may be used when running sequencing gels to remove the APS from the wells and to heat the gel to an optimal temperature for DNA separations.

11.0 Troubleshooting

Review the information in the table below to troubleshoot operating problems.

Problem	Possible Cause	Solution
LCD screen remains blank, and the fan does not run when the power is turned on	AC power cord is not connected.	Check AC power cord connections at both ends. Use the correct cords.
	The fuse has blown.	Replace the fuse.
Operation stops with alarm: The screen displays “NO LOAD”	Electrophoresis leads are not connected to the power supply or to the electrophoresis unit(s).	<ul style="list-style-type: none"> ▶ Check the connections to the power supply and your electrophoresis cell to make sure the connection is intact. ▶ Check the condition of the wires in your electrophoresis unit.
	A broken circuit in the electrophoresis cell.	<ul style="list-style-type: none"> ▶ Close the circuit by reconnecting the cables. ▶ Press START/PAUSE to restart the run.
Operation stops with alarm: The screen displays “NO LOAD”	High resistance due to tape left on a pre-cast gel, incorrect buffer concentration, or incorrect buffer volumes in the electrophoresis cell.	Correct the condition by making sure the tape is removed from the pre-cast gel or buffers are prepared correctly, and the recommended volume of buffer is added to the electrophoresis unit.
	High voltage application is set to run on a very low current.	Disable “NO LOAD” alarm on the Display Screen.
Operation stops with alarm: Display shows “OVER VOLTAGE”	Circuit is interrupted.	<ul style="list-style-type: none"> ▶ Verify the running buffer is correct. ▶ Verify all cables are attached correctly. ▶ Turn the Power switch off and on again; restart the application. ▶ If you cannot restart the instrument, turn off the power, disconnect the power cord from the outlet, and contact Scientific Support.
Operation stops with alarm: Display shows “LEAKAGE”	Ground leak detected during the run.	<ul style="list-style-type: none"> ▶ Check the electrophoresis system for improper grounding. ▶ Restart the power supply by turning the Power switch off and on.
Operation stops with alarm: Display shows “OVER TEMP”	Power supply is overheating.	<ul style="list-style-type: none"> ▶ Turn off the power supply. Check for sufficient airflow around the power supply fan. After cooling down, restart the power supply by turning the Power switch to the On position. ▶ If you cannot restart the instrument, turn off the power, disconnect the power cord from the outlet, and contact Scientific Support.

12.0 Ohm's Law Conversions

Electrophoresis is the migration of a charged particle under the influence of an electrical field. The power supply output parameters voltage, current, and power are related by the following two equations:

$$\text{Voltage (V)} = \text{Current (I)} \times \text{Resistance (R)}; (V = I \times R)$$

$$\text{Power (P)} = \text{Current (I)} \times \text{Voltage (V)}; (P = I \times V)$$

Resistance	Resistance of the assembled electrophoresis cell is dependent on the conductivity of the gel buffer, the thickness of the gel, and the number of gels being run. Although the resistance is determined by the gel system, the resistance can vary over the course of an electrophoretic separation.
Voltage	The velocity with which an ion moves in an electric field will vary in proportion to the field strength (volts per unit distance). The higher the voltage the faster an ion will move.
Current	Current is a function of the number of ions passing a given cross-section of the circuit at a given time. For a given gel/buffer system, at a given temperature, current will vary in proportion to the field strength (voltage) and/or cross-sectional area (number and/or thickness of the gels).
Power	The power in Watts, or the rate of heat generated by the system, is directly proportional to voltage and current ($P = I \times V$).

13.0 Common Errors Found with Electrophoresis Power Supplies

No load

- ▶ The electrophoresis system is not connected to the power leads, check the power leads
- ▶ The electrophoresis system has a short, the Pt wire is broken or the banana connectors are damaged
- ▶ Buffer concentration too low
- ▶ Buffer volume too low
- ▶ Short in power cord
- ▶ Current has dropped below acceptable rating (4 mA)

Short circuit

- ▶ Load exceeds 3000 mA (250V) or 500 mA (300V)
- ▶ Blown fuse in the power supply
- ▶ Incorrect input voltage (check input voltage switch near power inlet)

Change in load

- ▶ Electrophoresis systems were added or removed during a run
- ▶ Buffer leaking in a connected system
- ▶ Excessive temperature increase
- ▶ Excessive buffer evaporation
- ▶ Loose connection in a connected system
- ▶ Amperage set too low

Change in constant mode

- ▶ **Voltage changes to amperage**
Amperage set too low. Ceiling hit and constant mode changed from voltage to amperage. Increase amperage to 500 mA (250V) or 3000 mA (300V).
- ▶ **Amperage changes to voltage**
Voltage set too low. Ceiling hit and constant mode changed from amperage to voltage. Increase voltage to 500 mA (250V) or 3000 mA (300V).

The systems have automatic crossover, set voltage or amperage, and preset wattage. During the electrophoresis process only one parameter is limiting at a time. The limiting parameter, together with the conductivity in the electrophoresis system, and the values for the other parameters determine the maximum output.

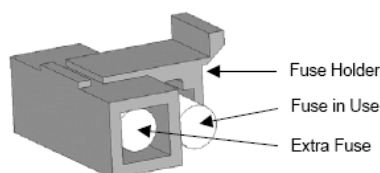
14.0 Repair and Maintenance

The Labnet Enduro™ Power Supplies require no periodic maintenance program with the exception of an occasional dry wipe-down of the instrument.

Replacing the Fuse

For additional fuses contact Scientific Support.

To replace the fuse:



1. Turn off the main power switch at the rear of the Labnet Enduro Power Supply and detach the power cord from the rear of the instrument.
2. Open the fuse compartment located inside the Power Entry Module by inserting a small flat blade screwdriver into the slot below the ON/OFF switch. Turn the screwdriver to gently pry open the fuse compartment.
NOTE: The fuse compartment will not open with the power cord in place.
3. Pull the fuse holder out of the compartment and inspect the fuse. If the fuse is burned or there is a break in the fuse element, replace the fuse with an identical type of fuse (4A/250V for 250V or 2A/250V for 300V) as provided in the fuse holder see figure above).
4. Place the fuse holder back into the compartment.
5. Snap the cover closed.

15.0 Limited Warranty

Corning Incorporated (Corning) warrants that this product will be free from defects in material and workmanship for a period of three (3) years from date of purchase. CORNING DISCLAIMS ALL OTHER WARRANTIES WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. Corning's sole obligation shall be to repair or replace, at its option, any product or part thereof that proves defective in material or workmanship within the warranty period, provided the purchaser notifies Corning of any such defect. Corning is not liable for any incidental or consequential damages, commercial loss or any other damages from the use of this product.

This warranty is valid only if the product is used for its intended purpose and within the guidelines specified in the supplied instruction manual. This warranty does not cover damage caused by accident, neglect, misuse, improper service, natural forces or other causes not arising from defects in original material or workmanship. This warranty does not cover motor brushes, fuses, light bulbs, batteries or damage to paint or finish. Claims for transit damage should be filed with the transportation carrier.

In the event this product fails within the specified period of time because of a defect in material or workmanship, contact Corning Customer Service at: USA/Canada 1.800.492.1110, outside the U.S. +1.978.442.2200, visit www.corning.com/lifesciences, or contact your local support office.

Corning's Customer Service team will help arrange local service where available or coordinate a return authorization number and shipping instructions. Products received without proper authorization will be returned. All items returned for service should be sent postage prepaid in the original packaging or other suitable carton, padded to avoid damage. Corning will not be responsible for damage incurred by improper packaging. Corning may elect for onsite service for larger equipment.

Some states do not allow limitation on the length of implied warranties or the exclusion or limitation of incidental or consequential damages. This warranty gives you specific legal rights. You may have other rights which vary from state to state.

No individual may accept for, or on behalf of Corning, any other obligation of liability, or extend the period of this warranty.

For your reference, make a note of the serial and model number, date of purchase, and supplier here.

Serial No. _____ Date Purchased _____

Model No. _____ Supplier _____

16.0 Equipment Disposal



According to Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), this product is marked with the crossed-out wheeled bin and must not be disposed of with domestic waste.

Consequently, the buyer shall follow the instructions for reuse and recycling of waste electronic and electrical equipment (WEEE) provided with the products and available at www.corning.com/weee.

To request certificates, please contact us at www.labnetlink.com.

Warranty/Disclaimer: Unless otherwise specified, all products are for research use only. Not intended for use in diagnostic or therapeutic procedures. Corning Life Sciences makes no claims regarding the performance of these products for clinical or diagnostic applications.

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