Thermo SCIENTIFIC

EC300XL

Electrophoresis Power Supply

LTM1596X2 4/7/10

Thermo Scientific EC300 Electrophoresis Power Supply

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Safety Considerations

Read and understand this manual completely before attempting to set up or use this instrument.

This equipment has been designed and tested to conform to CSA1010 safety standards, as applicable to laboratory instrumentation. This applies only to the EC300 when used as specified in the documentation, in its intended applications, with Thermo approved electrophoresis apparatus only. Usage in any other manor may not provide similar performance or safety protection.

This equipment is provided with a 3-conductor, grounded AC line cord. The protective earth ground is necessary for safe operation. Do not use any other AC line cord with this instrument.

The EC300 is a high voltage power supply capable of generating dangerous levels of voltage and current during operation. Exercise caution when working around and with the electrical connections of this equipment. Always check electrical connectors, wires, and associated apparatus for any signs of wear or damage before using with this equipment. Be sure to use only electrophoresis equipment that is suitably rated for the voltage and current capabilities of the EC300 power supply.

The output of the EC300 power supply is intended for connection to electrically isolated electrophoresis apparatus only. Use only with electrically isolated electrophoresis apparatus with minimum isolation of 600V. Do not connect any terminal of the EC300 output to earth ground. This may impair the safety protection provided by the equipment, or cause equipment damage.

The high voltage output of the EC300 power supply takes some amount of time to decay when unloaded or lightly loaded. Wait a minimum of 60 seconds after stopping a run before touching the power supply leads.

This equipment has a protective ground leakage current of less than 0.5 mA using test methods defined in CSA1010 and CSA151.

This equipment is for indoor use only.

Introduction

Thank you for selecting a Thermo Scientific EC300 Electrophoresis power supply. This manual describes the operation of the EC300. The power supply that you have purchased is the most productive and easy-to-use unit available anywhere. This manual should answer any questions that might arise in operating your power supply; however, don't hesitate to call our Thermo Lab Equipment Technical Support Hotline at 1-800-943-2006 or 1-800-926-0505 if you need any assistance.

The EC300 power supply is designed to provide constant voltage or constant current output to apparatus used in electrophoresis applications. One to three sets of electrophoresis cells can be connected in parallel and run simultaneously. The EC300 can deliver up to 75W of total output power. When operating in constant voltage or constant current mode, the power supply automatically limits the other parameter to either the power supply maximum, or a lower limit if set by the user. If this non-constant limit is reached, the power supply will automatically switch control modes, from constant voltage to constant current, or vice versa. In this way, the EC300 protects your electrophoresis cells from damaging over power conditions. The EC300 power supply also provides for timed operation in either voltage or current modes, and allows an automatic completion in the event of a power loss if enabled by the user.

- 10-300V, adjustable in 1 volt steps
- 4-400mA, adjustable in 1mA steps
- 75W maximum output
- Automatic control mode crossover
- 0-999 minute timed run
- Automatic restart if loss of AC power (if enabled)
- Bright 3-digit display

Unpacking the Power Supply

When unpacking your EC300 power supply, be sure you have received the following items.

- EC300 unit
- AC line cord
- This manual

Inspect your equipment and packaging material for signs of damage. Damage to the shipping container may indicate rough handling which could cause internal damage to the power supply. If you suspect shipping damage to the power supply, contact your carrier for instructions on filing a claim. If you are missing any of the above items, contact your supplier for instructions.

Specifications

AC input Power

100-120 VAC, 50-60Hz, 100VA Max

Environmental

Operating temperature: 0-40°C, 0-95% R.H. non-condensing
Altitude: 2000m
Overvoltage category II, IEC664
Pollution degree 2, IEC664

DC output Power

10-300VDC, 75W Max
4-400mA, 75W Max
Ripple: ± 1%
Drift: ± 1%, after 30-minute warm-up

Getting Started

Select a location that allows for 3" clearance behind the power supply, and comfortable reach of the front panel controls and cell connections. Do not block the vented area of the case - on the front bottom of the unit, or the fan area at the rear. Connect the electrophoresis apparatus to the power supply, making sure to match the red positive lead to the red positive jack, and the black negative lead to the black negative jack. Power the unit on by connecting the AC power cord to the power entry on the rear panel then plugging the 3 prong AC plug into a power source. Connect the power supply to a 3-prong grounded AC outlet, **using the AC cord provided with the unit only**.

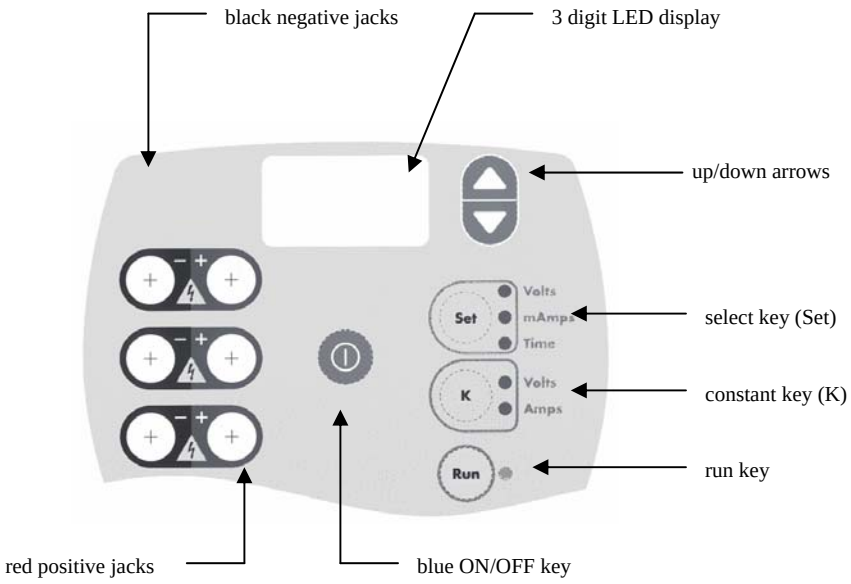

Figure 1. Front Panel Controls

Using the Power Supply

Press the blue key on the front center of the unit to enable the control logic. The 3-digit display will illuminate and show the setpoint value of the last saved run setup. The EC300 preserves the run settings each time you start a run. One set of conditions is saved for each mode, constant voltage or constant current. The setpoint value, limit parameter, time duration, and power-fail restart setting is saved. This allows convenient setup for repetitive runs.

To change the control mode, press the constant key. This key toggles control from constant voltage to constant current. Each time, the EC300 will display the last saved setpoint value for that particular mode.

After selecting a control mode, either constant voltage or current, and setting the limit and timed run parameters if desired (see Constant Voltage/Current Operations) press the Run key to energize the power supply output. The power supply output will ramp up to the appropriate setpoint, while not allowing the limit parameter to be exceeded. If the limit parameter should be exceeded, then

the power supply will crossover control modes, making the limit parameter the new control setpoint. The front panel constant mode LED indicator will change to indicate that a crossover has occurred.

To stop a run in progress, press the Run key or the blue ON/OFF key. The display will change to "OFF" signifying that the output is no longer energized. Pressing run again resumes the run from the previous point (i.e. for a timed run). Pressing any other key will return to setup mode in either constant voltage or constant current mode as appropriate.

During a run, the display will automatically cycle between voltage, current, and time displays. Voltage and current is displayed as actually measured by the EC300. When displaying the controlled setpoint, i.e. voltage for constant voltage control, the arrow keys can be used to modify the setpoint. The limit parameter cannot be changed during a run. The time parameter displays elapsed time for an untimed run, and time left for a timed run.

Constant Voltage Operations

Press the constant key (labeled K) until the LED indicating "Volts" is illuminated. Each time the constant key is pressed, the EC300 will display the last saved setpoint value for that particular mode. Use the UP and DOWN arrow keys to change the setpoint to the desired value (10-300 volts). The EC300 will not allow setting a voltage setpoint outside of the allowed range. Press and hold either arrow key to quickly change the setpoint.

The limit parameter, in this case current, is normally set to the power supply maximum value of 400 mA. To set a lower limit value, press the Set key until the LED indicating "mAmps" is illuminated. Use the UP and DOWN arrow keys to change the limit to the desired value (4-400 mA). The EC300 will not allow setting a current limit outside of the allowed range.

In addition, the EC300 will never exceed the maximum power output specification of 75W. When starting a run, the power supply calculates a maximum limit parameter, above which the power supply maximum power output rating would be exceeded. If this value is lower than the limit setpoint entered, the EC300 will use this lower limit parameter.

Constant Current Operations

Press the constant key (labeled K) until the LED indicating "Amps" is illuminated. Each time the constant key is pressed, the EC300 will display the last saved setpoint value for that particular mode. Use the UP and DOWN arrow keys to change the setpoint to the desired value (4-400 mA). The EC300 will not allow setting a current setpoint outside of the allowed range. Press and hold either arrow key to quickly change the setpoint.

The limit parameter, in this case voltage, is normally set to the power supply maximum value of 300 volts. To set a lower limit value, press the Set key until the LED indicating "Volts" is illuminated. Use the UP and DOWN arrow keys to change the limit to the desired value (10-300 volts). The EC300 will not allow setting a voltage limit outside of the allowed range.

In addition, the EC300 will never exceed the maximum power output specification of 75W. When starting a run, the power supply calculates a maximum limit parameter, above which the power supply maximum power output rating would be exceeded. If this value is lower than the limit setpoint entered, the EC300 will use this lower limit parameter.

Timed Operations

It is possible to enter an amount of time for the power supply to provide power, after which it will automatically shut off. Use this feature for timed runs.

Press the Set key until the LED indicating "Time" is illuminated. Use the UP and DOWN arrow keys to change the time duration to the desired value (0-999 minutes). A time duration of zero effectively disables timed run mode.

When running a timed run, the time parameter displays the time remaining in the run. When running a non-timed run, the time parameter displays the elapsed time during the run

Automatic Power-fail Restart

Automatic power-fail restart capability allows a timed run which is interrupted by loss of AC power to be restarted automatically, so that the total time programmed for the time parameter will be met. **NOTE:** Loss of AC power includes unplugging the unit. *When performing timed runs with power-fail restart enabled, always use the front panel controls to stop a run in progress.*

To enable power-fail restart, press and hold the Set key when changing to the time parameter (from the current parameter). While continuing to hold the Set key, simultaneously press and release the UP arrow key. The display will show "PF" momentarily to indicate power-fail restart is active. Whenever power-fail restart is enabled, "PF" is displayed briefly as the time parameter is selected by pressing the Set key. The power-fail restart feature can be enabled either before or after changing the time duration to the desired value (0-999 minutes). Setting the time duration to zero will automatically disable power-fail restart (if you have enabled power-fail restart before setting a time value, and want to disable it, then simply increment and then decrement the time parameter back to zero to disable power-fail restart).

When AC power is restored during a timed run in which power-fail restart is enabled, the display will show "PF" for approximately 10 seconds indicating power-fail restart pending. During this time the output is not energized, to allow safely stopping the run (by pressing RUN). After the power-fail restart pending delay is completed, the power supply output will ramp up to the setpoint value and the time will continue from that point. Any number of power interruptions can occur during the completion of a single run.

Cleaning

Before cleaning the unit, be sure to always remove power by unplugging the unit from the AC power source. The front of the unit is sealed and can be wiped clean with any mild detergent solution. Avoid harsh cleaners or agents as they may deteriorate the surface of the tactile membrane keys.

Troubleshooting and Error Indications

The EC300 detects and reports several events and conditions that are considered errors. The EC300 will stop any run in process and display "EXX" where XX is one of the below listed errors. When the EC300 is displaying an error indication, press the blue ON/OFF key to clear the error and return to setup mode, or press the Run key to resume the run (after correcting the cause of the error). Note that loss of AC power during a run is considered an error condition. Always stop a run before turning off AC power to the EC300.

E'XX'	Condition and possible remedy
00	Minimum load current detected. The output is not connected, or the electrophoresis apparatus is not set up properly. Check your setup and connections.
01	Maximum load current exceeded. The output is short circuit, or the electrophoresis apparatus is not set up properly. Check your setup and connections
03	Loss of AC power; PF enabled and completed. The EC300 detected loss of AC power, however the run was completed as programmed.
04	Loss of AC power; PF disabled and not completed. The EC300 detected loss of AC power, the run was not completed since PF not enabled.
05	Loss of AC power; run not timed. The EC300 detected loss of AC power.
06-99	The EC300 detected an internal error condition. Contact technical support for instructions.

Before servicing the unit, be sure to always unplug the unit from the AC power source. The EC300 power supply requires no periodic servicing and should provide years of trouble free operation. Should you need to replace the fuses proceed as follows:

Replacing a fuse

CAUTION: The EC300 may use double pole neutral fusing.
Turn off AC power by disconnecting the AC line cord. Remove the fuse holder assembly using a small flat blade screwdriver. Always replace both fuses with appropriate replacement fuses: 1.5A, 250V, 5X20mm, type T fuse (T1.5A,250V) (Thermo catalog number FB-FUSE-1).

EC300 Warranty Statement

The Thermo Scientific Company ("Thermo") warrants to the direct purchaser that the EC300 will be free from defects in material or workmanship for a specified warranty period. During that period, Thermo will repair or replace the product or provide credit, at its sole option, upon prompt notification and compliance with its instructions. For EC300 power supplies that specified period is 48 months from manufacturing date.

Unless otherwise agreed, the warranty is limited to the country in which the product is sold.

No Thermo employee, agent or representative has the authority to bind Thermo to any oral representation or warranty concerning any product sold. Any oral representation or warranty made prior to purchase of any product and not set forth in writing and signed by a duly authorized officer of Thermo shall not be enforceable by the purchaser.

THERMO EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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Each article that Thermo furnishes will conform to the written specifications given in this manual, or those of a further improved model. Changes are made often to the information in the manual and will be incorporated into future editions.

Compliance

CSA 1010

This equipment has been designed and tested to conform to CSA1010 safety standards, as applicable to laboratory instrumentation. This applies only to the EC300 when used as specified in the documentation, in its intended applications, with Thermo approved electrophoresis apparatus only. Usage in any other manner may not provide suitable protection.

Accessories

Adapter for Cells	FBAD-1
Under Counter Bracket	FBUB300

Replacement Parts

AC line cord	FB-CORD-1
Fuse, T1.5A, 250V	FB-FUSE-1

Technical Support: 1-800-943-2006 or 1-800-926-0505