



Power B Series Power Supply

POWER B POWER Bs

POWER BC POWER BV

POWER BU POWER B4A

POWER B1000 POWER B3000

Instruction Manual

Catalog Numbers

PP-1150	PP-1151
PP-1152	PP-1156
PP-1157	PP-1158
PP-1159	PP-1160



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Safety

Caution/Warning



Power B series power Supplies use high output voltages that are electrically isolated from earth ground to minimize the risk of electrical shock to the user. The following guidelines should be observed and followed when using the power supply.

Power B series power supplies have passed tests for operation at temperatures between 0° and 40° C, with relative humidity between 0 and 95% non-condensing. Operating the power supply outside these conditions is not recommended by CAVOY and will void the warranty



1. To ensure adequate cooling of the power supply, be sure that there is at least 6 cm clearance around the power supply. Do not block the fan vents at the rear of the unit.
2. Always connect the power supply to a 3-prong, grounded AC outlet, using the 3-prong AC power cord provided with the power supply.
3. CAVOY electrophoresis cells have molded two-prong plugs which are inserted into the power supply's high voltage output jacks. These plugs have been EN 61010* certified for safety compliance for use with Power B power supplies. Use of other plugs or banana jacks, including the Power B Adapter, is done at the user's own risk and is not recommended by CAVOY. When inserting and removing the molded two-prong plug, always grasp the plug by the molded support at the rear of the plug. Do not grasp the individual prong ends!
4. Do not operate the power supply in extreme humidity ($\geq 95\%$) or where condensation can short the internal electrical circuits of the power supply.
5. When taking the power supply into a cold room, the unit can be operated immediately. However, when removing the power supply from the cold room, let the unit equilibrate to room temperature for a minimum of 2 hours before using it.
6. Never connect a high voltage output lead to earth ground. This defeats the floating electrical isolation of the power supply and expose the user to potentially lethal high voltages

Important

This instrument is intended for laboratory use only.

This product conforms to the **CE** standards for Electromagnetic Emissions, intended for laboratory equipment applications. It is possible that emissions from this product may interfere with some sensitive appliances when placed nearby or on the same circuit as those appliances. The user should be aware of this potential and take appropriate measures to avoid interference.

CAVOY's Power B series power supplies are designed and certified to meet EN 61010* safety standards. Certified products are safe to use when operated in accordance with the instruction manual. This safety certification does not extend to electrophoresis cells or accessories which are not EN 61010* certified, even when connected to this power supply.

This instrument should not be modified or altered in any way. Alteration of this instrument will void the manufacturer's warranty, void the EN 61010* certification, and create a potential safety hazard for the user.

CAVOY is not responsible for any injury or damage caused by the use of this instrument for purposes other than for which it is intended or by modifications of the instrument not performed by CAVOY or an authorized agent.

* EN 61010 is an internationally accepted electrical safety standard for laboratory instruments

Unpacking

When you receive the power supply, carefully inspect the container for any damage which may have occurred in shipping. Severe damage to the container may indicate damage to the power supply itself. If you suspect damage to the unit, immediately file a claim with the carrier in accordance with their instructions before contacting CAVOY or your local agent.

Unpack the power supply. The Power B series power supplies are shipped with the following:

- Power supply unit.
- 3-prong, AC power cord.
- Two fuses

If any part is missing or damaged, contact CAVOY or local agent immediately.

Section 1

Introduction

1.1 Overviews

Power B series power supplies provide constant voltage or constant current to instruments used in electrophoresis and blotting. The Power Bs are capable of the following adjustable outputs:

Power B

Voltage output: Adjustable from 10 to 300 volts in increments of 1 volt.

Current output: Adjustable from 4 to 400 milliamps (mA) in increments of 1 mA.

Power output: 75 watts (maximum)

Power Bs

Voltage output: Adjustable from 10 to 300 volts in increments of 1 volt.

Current output: Adjustable from 4 to 600 milliamps (mA) in increments of 1 mA.

Power output: 100 watts (maximum)

Power BC

Voltage output: Adjustable from 10 to 300 volts in increments of 1 volt.

Current output: Adjustable from 10 to 2000 milliamps (mA) in increments of 10 mA.

Power output: 200 watts (maximum)

Power BV

Voltage output: Adjustable from 10 to 600 volts in increments of 1 volt.

Current output: Adjustable from 4 to 400 milliamps (mA) in increments of 1 mA.

Power output: 150 watts (maximum)

Power BU

Voltage output: Adjustable from 10 to 600 volts in increments of 1 volt.

Current output: Adjustable from 10 to 2000 milliamps (mA) in increments of 10 mA.

Power output: 400 watts (maximum)

Power B4A

Voltage output: Adjustable from 10 to 300 volts in increments of 1 volt.

Current output: Adjustable from 10 to 4000 milliamps (mA) in increments of 10 mA.

Power output: 400 watts (maximum)

Power B1000

Voltage output: Adjustable from 10 to 999 volts in increments of 1 volt.

Current output: Adjustable from 4 to 999 milliamps (mA) in increments of 1 mA.

Power output: 200 watts (maximum)

Power B3000

Voltage output: Adjustable from 10 to 3000 volts in increments of 1 volt.

Current output: Adjustable from 4 to 200 milliamps (mA) in increments of 1 mA.

Power output: 120 watts (maximum)

Up to four electrophoresis cells can be connected in parallel to the power supply.

The Power Bs are programmed with default limit values for voltage and current. These are the values which are available when the unit first is turned on. These values may be changed for each application.

The power supplies operate at the values specified for the constant parameter. However, to prevent damage to your electrophoresis cell, both Power Bs provide automatic crossover to constant current or constant voltage, depending on which set value is first reached. When the set limit of the non-constant parameter is reached, and the power capability of the unit is not exceeded, the power supply will switch, making the non-constant parameter the new constant parameter.

This manual describes the function and use of the Power B, Power BC and Power BV power supplies, including all of the necessary information for system setup, operation, and maintenance.

The Power B, Power BC and Power BV power supplies offer a number of features, including the following:

- Constant voltage or constant current operation with automatic crossover.
- Timer control.
- Viewing angle adjustment.
- 3-digit LED display.
- Stackable case.
- Automatic detection of no-load conditions and rapid changes in resistance.
- Automatic completion of a run interrupted by a power failure, when user enabled.

1.2 Specifications

Input Power

100/120 V model:	90 - 132 VAC, 47 Hz - 63 Hz
220/240 V model:	198 - 264 VAC, 47 Hz - 63 Hz

Fuses

100/120 V units:	2.0 A, 250 V, 5mm x 20mm, Type T
220/240 V units:	2.0 A, 250 V, 5mm x 20mm, Type T

Input Power Cord: 3-wire; grounded

Output (Programmable) Constant voltage, constant current; with automatic crossover

Voltage: Power B:	10 V to 300 V, fully adjustable in 1 V steps
Power Bs:	10 V to 300 V, fully adjustable in 1 V steps
Power BC:	10 V to 300 V, fully adjustable in 1 V steps
Power BV:	10 V to 600 V, fully adjustable in 1 V steps
Power BU:	10 V to 600 V, fully adjustable in 1 V steps
Power B4A:	10 V to 300 V, fully adjustable in 1 V steps
Power B1000:	10 V to 999 V, fully adjustable in 1 V steps
Power B3000:	10 V to 3000 V, fully adjustable in 10 V steps

Current: Power B:	4 mA to 400 mA, fully adjustable in 1 mA steps
Power Bs:	4 mA to 600 mA, fully adjustable in 1 mA steps
Power BC:	10 mA to 2000 mA, fully adjustable in 10 mA steps
Power BV:	4 mA to 800 mA, fully adjustable in 1 mA steps
Power BU:	10 mA to 2000 mA, fully adjustable in 10 mA steps

Power B4A: 10 mA to 4000 mA, fully adjustable in 10 mA steps
 Power B1000: 4 mA to 999 mA, fully adjustable in 10 mA steps
 Power B3000: 4 mA to 200 mA, fully adjustable in 1 mA steps

Power:	Power B:	75 W	Power BU:	400 W
(max.)	Power Bs:	100 W	Power B4A:	400 W
	Power BC:	200 W	Power B1000:	200 W
	Power BV:	200 W	Power B3000:	120 W

Terminals: 4-pair recessed female banana jacks, floating in parallel

Timer Control: 001 to 999 minutes, fully adjustable

Resolution

Ripple:	Power B:	$\pm 1\%$ @ 300 V and 75 W	Power BU:	$\pm 1\%$ @ 600 V and 400 W
	Power BC:	$\pm 1\%$ @ 300 V and 200 W	Power B4A:	$\pm 1\%$ @ 200 V and 400 W
	Power BV:	$\pm 1\%$ @ 600 V and 150 W	Power B1000:	$\pm 1\%$ @ 999 V and 200 W
			Power B3000:	$\pm 1\%$ @ 3000 V and 120 W

Readout Stability

Volts:	Power B:	± 1 V	Power BU:	± 1 V
	Power BC:	± 1 V	Power B4A:	± 1 V
	Power BV:	± 1 V	Power B1000:	± 1 V
			Power B3000:	± 10 V
Current:	Power B:	± 1 mA	Power BU:	± 10 mA
	Power BC:	± 10 mA	Power B4A:	± 10 mA
	Power BV:	± 1 mA	Power B1000:	± 1 mA
			Power B3000:	± 1 mA

Safety Features

No load detection:	Indicated by error message on LED display
Sudden load change detection:	Indicated by error message on LED display
Overload/short circuit protection:	Indicated by error message on LED display; fuse on both hot and neutral
Auto power up after power failure:	User-selectable, setup values maintained
Safety Compliance:	EN 61010
EMI	Conforms to CE standards for Emissions and Immunity; Tested only at 220 V. See Declaration of Conformity for details.

Display Functions: 3-digit LED displays voltage, current, time

Function Modes: Constant voltage, constant current, timer
 User-selectable automatic power-up after power failure

Environmental

Operating Temp.: 0 - 40°C
 Humidity: 0 - 95%, in the absence of condensation

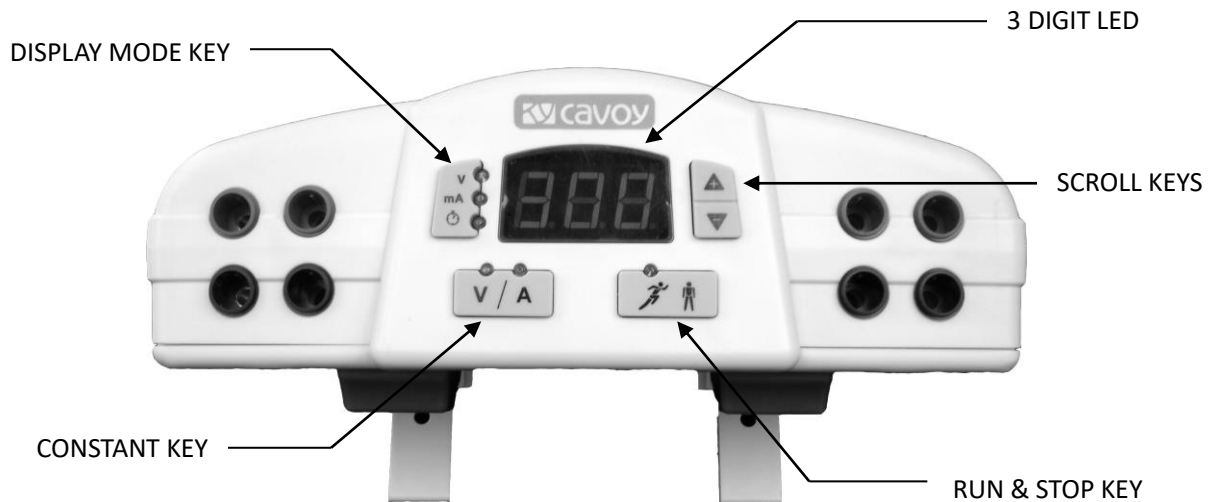
Dimensions: 29 (L) x 21 (W) x 8 (H) cm.

Unit is stackable

Weight: 1.5 kg

Section 2

Control Features



Key	Description
DISPLAY MODE KEY	Selects the parameter (volts, milliamps, or time) to be displayed. The LED displays the value of indicated parameter.
CONSTANT KEY	Selects whether voltage or current is to be constant. The LED indicates the selected parameter. During a run, maximum power is indicated when both LED's are lit
SCROLL KEYS	Changes the displayed value of the selected parameter. Holding SCROLL KEY more than 10 units in either direction, +/-, the values will increase/decrease in increments of 10 units to reach desired value faster.
RUN & STOP KEY	Starts and stops the output of power from the power supply. The indicator is lit when power is being output.

Section 3

Setup and Operation

Step	Procedure	Description
1	Turn power on	<p>Press the power switch located on left side of the unit to the on position</p> <p>The default setting is constant V, and the LED display shows zero value</p> <p>Note: The Power B, Power BC and Power BV return to these settings each time the unit is turned off.</p>
2	Connect the electrophoresis cell(s) to the power supply.	The power leads are color coordinated to the output terminals in red and black.
3	Select the constant parameter.	<p>Press the Constant key to select constant voltage (V) or constant current (mA).</p> <p>The LED on the CONSTANT key corresponding to the selected constant parameter will light up, the display shows zero for the constant parameter.</p>
4	Enter the constant value.	Use the Scroll keys to enter a value.
5	Change the default limit if necessary.	<p>Press the Display Mode key to select limit parameter. The maximum default value is displayed. Select a suitable limit value to avoid excessive power conditions for the application.</p> <p>Note:</p> <p>Constant voltage:</p> <p>Power B default current limit is 400 mA</p> <p>Power BC default current limit is 2000 mA.</p> <p>Power BV default current limit is 400 mA</p> <p>Constant current:</p> <p>Power B default voltage limit is 300 V.</p> <p>Power BC default voltage limit is 300 V.</p> <p>Power BV default voltage limit is 600 V</p>
6	Program a timed run.	<p>Press the Display Mode key to select the time. The display will show a zero value. Use the Scroll key to enter a desired time up to 999 minutes.</p> <p>Note: During timed runs, the remaining time can be viewed. When time is not set, the elapsed time can be viewed during the run. If the run is stopped, and then restarted, the timer will start over.</p>

- | | | |
|----|--|---|
| 7 | <p>Optional; available only when a timed run is programmed</p> <p>Select Power Failure Recovery (PF!)</p> <p>Caution: Always use the Stop key and not the Power switch to stop a run in progress. Turning off the Power switch during a PF1 run is treated as a power failure. The run will automatically continue when the unit is turned back on.</p> | <p>Activating the Power Failure Recover mode is possible for timed runs only.</p> <p>Make sure the Display Mode Key is in time mode
Enter the desired time if not previously entered
Simultaneously push and momentarily hold both Scroll keys. Observe PF1 is displayed momentarily</p> <p>To de-activate PF1 before starting the run, set the timer to 0 minutes or turn the power supply off and back on.
In the event of a power failure, all operating parameters including time are retained in memory. When power is restored, the power supply automatically completes the run. After the run is completed, the E6 error code is displayed to alert the operator that a power failure occurred</p> <p>Reminder: After each run, PF1 is de-activated.</p> |
| 8 | Start the run | <p>Press the Run & Stop key to start a run
The run LED is lit.</p> |
| 9 | Viewing and editing options during a run. | <p>Press the Display Mode key to view the corresponding run conditions on the display.
To change the value of the constant parameter or the length of a timed run, use the Display Mode key and the Scroll keys.</p> |
| 10 | End of run | <p>When a run is complete, i.e., a timed run has ended or an untimed run is stopped, the constant parameter value and limit parameter value are preserved. The timer is reset to zero. The run LED is not lit indicating that no power is supplied to the output jacks.</p> |
| 11 | Terminating a timed run in progress. | <p>Press the Stop key to terminate a time run. The constant parameter value and limit parameter value are preserved. The timer is reset to zero. The run LED is not lit indicating that no power is supplied to the output jacks</p> |
| 12 | Powering down | <p>Press the Stop key before turning the power switch to the off position. If this is not down, a power failure will be detected causing a automatic restart if the Power Failure Recovery (PF!) is enabled.</p> |

Section 4

Maintenance and Troubleshooting

4.1 Maintenance

Power B series power supplies require very little maintenance to assure reliable operation. To clean the case, first unplug the power supply. Use a damp cloth to wipe down the outer case. Avoid wetting the connectors located below the front panel and on the rear of the unit.

4.2 Troubleshooting

If there is no LED display, check the power cord connections and the fuse in the back of the unit. If a system or operator error occurs, the appropriate error code will appear flashing on the LED display. The power supply does not output power when an error code is displayed.

Error Code	Explanation	Solution
E1	No Load Detected * The electrophoresis cell(s) are not plug in. * The cell was unplugged during a run. * The current load is below minimum value.	Check all electrical connections to the electrophoresis cell and whether the cell contains the appropriate buffer volume. Then, * Press the Run & Stop key to resume the run or, * To clear the error code, press any key.
E2	Short Circuit The current load exceeded the following: Power B: 400 mA Power Bs: 600 mA Power BC: 2000 mA Power BV: 400 mA Power BU: 2000 mA Power B4A: 4000mA Power B1000: 1000 mA Power B3000: 200 mA	Check for and correct any short circuit or excessive load problem. Excessive load due to a high buffer concentration will require the buffer be remade. Then, * Press the Run & Stop key to resume the run or, * To clear the error code, press any key (other than Run & Stop key).
E3	Change in Load Resistance The Power Supply detects a drastic changes in resistance which may indicate failure of cells power leads or a loose output connection. • Electrophoresis cells were added or removed during a run • Buffer leaking in a connected Cell • Loose connection in a connected cell.	Check and correct any potential resistance problems. and Than, * Press the Run & Stop key to resume the run or, * To clear the error code, press any key.

Error Code	Explanation	Solution
E4	<p>Power Failure During an Untimed Run</p> <p>Run was terminated either due to power failure, or because the previous run was stopped by turning off the power supply or unplugging the unit</p>	<p>To clear the error code, press any key (other than Run & Stop key)</p> <p>The Run & Stop key is disabled until the error code is cleared from the display.</p> <p>Reminder: PF1 can only be activated prior to a TIMED run.</p>
E5	<p>Power Failure During a Timed Run</p> <p>Power Failure Recovery (PF!) was not active, and the run is not complete.</p>	<p>To clear the error code, press any key (other than Run & Stop key)</p> <p>The Run & Stop key is disabled until the error code is cleared from the display.</p> <p>Reminder: Time is reset to zero after each timed run. Enter a time value prior to each timed run. If PF1 is required, activate it prior to starting the run.</p>
E6	<p>Power Failure During a Timed Run</p> <p>Power Failure Recovery (PF!) was active, and the run was complete after a power failure..</p> <p>Caution: If a timed run with PF1 activation is terminated by turning the main power switch off, the power supply will resume operation under the previous run parameters when the main power switch is turned back on.</p>	<p>To clear the error code, press any key (other than Run & Stop key)</p> <p>The Run & Stop key is disabled until the error code is cleared from the display.</p> <p>Reminder: Time is reset to zero after each timed run. Enter a time value prior to each timed run. If PF1 is required, activate it prior to starting the run.</p>
E7	<p>The current load exceeded the following during a run:</p> <p>Power B: 400 mA Power Bs: 600 mA Power BC: 2000 mA Power BV: 400 mA Power BU: 2000 mA Power B4A: 4000mA Power B1000: 1000 mA Power B3000: 200 mA</p>	<p>Check for and correct any short circuit or excessive load problem. Excessive load due to a high buffer concentration will require the buffer be remade.</p> <p>Then,</p> <p>* Press the Run & Stop key to resume the run or,</p> <p>* To clear the error code, press any key (other than Run & Stop key).</p>

Appendix

Warranty and Ordering Information

Warranty

The Power B series power supply is warranted for 3 year against defects in materials and workmanship. If any defects should occur during this warranty period, CAVOY will replace the defective parts without charge. However, the following defects are specifically excluded:

1. Defects caused by improper operation.
2. Repair or modification done by anyone other than CAVOY or their authorized agent.
3. Use with cables or connectors not specified by CAVOY for this power supply.
4. Deliberate or accidental misuse.
5. Damage caused by disaster.

Warranty information

Model: _____

Serial Number: _____

Date of Delivery: _____

Warranty Period: _____

Ordering information

PP-1150	Power B Power Supply, 300 V, 400 mA, 75 W
PP-1151	Power Bs Power Supply, 300 V, 600 mA, 100 W
PP-1152	Power BC Power Supply, 300 V, 2000 mA, 200 W
PP-1156	Power BV Power Supply, 600 V, 400 mA, 150 W
PP-1157	Power BU Power Supply, 600 V, 2000 mA, 400 W
PP-1158	Power B4A Power Supply, 300 V, 4000 mA, 400 W
PP-1159	Power B1000 Power Supply, 1000 V, 1000 mA, 200 W
PP-1160	Power B3000 Power Supply, 3000 V, 200 mA, 120 W

