PowerPro Power Supplies

Instruction manual

Catalog No.	**PowerPro300**
	PowerPro3AMP
	PowerPro500

www.cleaverscientific.com

Version 1
Revised on: 2017/7/19

Table of Contents

Packing list

PowerPro 300

- 1x PowerPro 300 Power Supply
- 1x Power Cord
- 1x Instruction Manual

PowerPro 3AMP

- 1x PowerPro 3AMP Power Supply
- 1x Power Cord
- 1x Instruction Manual

PowerPro 500

- 1x PowerPro 500 Power Supply
- 1x Power Cord
- 1x Instruction Manual

Packing list checked by _____ Date _____

Cleaver Scientific is liable for all missing or damaged parts / accessories within 7 days after customer received this instrument package. Please contact Cleaver Scientific immediately regarding this issue. If no response within such period from consignee party, that will be consignee party's whole responsibility.

Warning

Cleaver Scientific PowerPro Power Supply has been tested and found to comply with the limits for the CE regulation. Also, it is RoHS compliant to deliver confident product which meets the environmental directive. These limits are designed to provide reasonable protection against harmful interference when the instrument series is operated in a commercial environment. This instrument series used together with power supply unit 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 instrument series 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. It is strongly recommended for the user to read the following points carefully before operating this equipment.

1. Read and follow the manual instructions carefully.
2. Do not alter the equipment. Failure to follow these directions could result in personal and/or laboratory hazards, as well as invalidate equipment warranty.
3. Use a properly grounded electrical outlet with correct voltage and current handling capacity.
4. Disconnect from power supply before maintenance and servicing. Refer servicing to qualified personnel.
5. Never use this instrument series without having the safety cover correctly in position.
6. Do not use the unit if there is any sign of damage to the external tank or cover. Replace damaged parts.
7. Do not use in the presence of flammable or combustible material; fire or explosion may result. This device contains components which may ignite such materials.
8. Refer maintenance and servicing to qualified personnel.
9. Ensure that the system is connected to electrical service according to local and national electrical codes. Failure to make a proper connection may create fire or shock hazard.
10. Use appropriate materials and operate correctly to avoid possible hazards of explosion, implosion or release of toxic or flammable gases arising from overheated materials.

11. The unit shall be operated only by qualified personnel.

Safety Information

Use high level of precaution against any electrical device. Before connecting the electrical supply, check to see if the supply voltage is within the range stated at the rating label, and see to it that the device be seated firmly. Place the unit in a safe and dry location; it must NOT touch the surrounding. Follow the safety precautions for chemicals / dangerous materials. If needed, please contact qualified service representative or support@cleaverscientific.com

Environmental Conditions

Ensure the instrument is installed and operated strictly under the following conditions:

1. Indoor use only
2. ≤95% RH
3. 75 kPa – 106 kPa
4. Altitude must not exceed 2000 meters
5. 4°C~ 40°C operating temperature
6. Pollution degree: 2
7. Mains supply voltage fluctuations up to ±10% of the normal voltage

Avoiding Electrical Shock

Follow the guidelines below to ensure safe operation of the unit.

The PowerPro Power Supply has been designed to utilize shielded wires thus minimizing any potential shock hazard to the user. Cleaver Scientific recommends against the use of unshielded wires.

To avoid electrical shock:

1. In the event of solution spilling on the instrument, it must be dried out for at least 2 hours and restored to NORMAL CONDITION before each operation.
2. Never connect or disconnect wires loading from the power jacks when the red indicator light of power switch is on.
3. WAIT at least 5 seconds after stopping a run before handling output leads or any connected apparatus.
4. ALWAYS make sure that your hands, work area, and instruments are **clean** and **dry** before making any connections or operating the power supply.
5. ONLY connect the power cord to a properly grounded AC outlet.

Avoiding Damage to the Instrument

1. Do not attempt to operate the device if damage is suspected.
2. Protect this unit from physical damage, corrosive agents and extreme temperatures (direct sunlight, etc.).
3. For proper ventilation and safety concerns, keep at least 10 cm of space behind the instrument, and at least 5 cm of space on each side.
4. Use high level of precaution against the damages on the unit.
5. Do not operate the unit out of environmental conditions addressed above.
6. Do not operate the power supplies in high humidity environments (> 95%), or where condensation may occur.
7. 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.
8. Prior to applying any cleaning or decontamination methods other than manufacturer's recommendation, users should check with the manufacturer's instruction to see if the proposed method will damage the equipment.

Equipment Operation

Follow the guidelines below to ensure safe operation of the unit:

1. NEVER access dangerous chemicals or other materials to prevent possible hazard of explosion and damage.
2. Do not operate the unit without lids or covers to prevent possible hazards.
3. A temporary conductivity caused by condensation might occur even though this series is rated Pollution Degree 2 in accordance with IEC 664.

Symbol

Symbols used on the power supply are explained below.

Indicates an area where a potential shock hazard may exist.
Consult the manual to avoid possible personal injury or instrument damage.

Indicates disposal instruction.
DO NOT throw this unit into a municipal trash bin when this unit has reached the end of its lifetime. To ensure utmost protection of the global environment and minimize pollution, please recycle this unit.

Caution/ Warning: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

PowerPro 300	
	Max. voltage: 300 V Max. current: 700 mA Max. watt: 150 W
PowerPro 3AMP	
	Max. voltage: 300 V Max. current: 3000 mA Max. watt: 300 W
PowerPro 500	
	Max. voltage: 500 V Max. current: 800mA Max. watt: 300W

Potential Risk and Preventive Measure

1. Risk assessment table

Potential Risk / Frequency	Frequent	Likely	Possible	Rare	Unlikely
Bruise			√		
Slash					√
Electrical shock			√		
Power cord plug wrong				√	

2. Preventative measures of risk

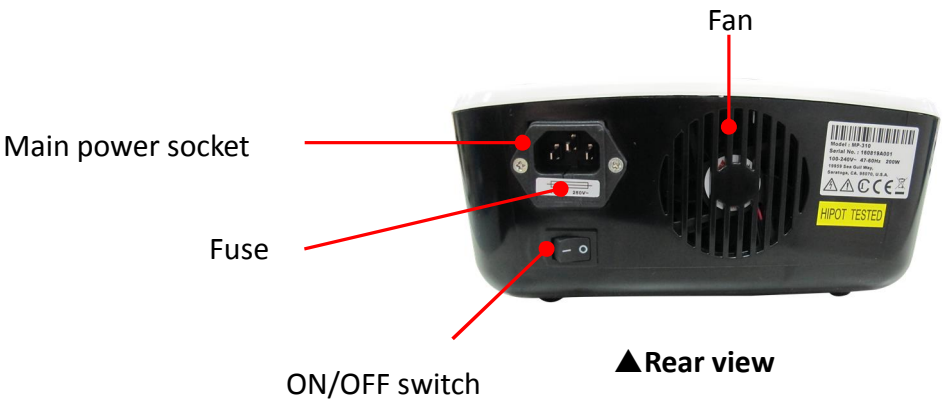
Potential Risk	Preventive measures
Bruise	Do not put the machine near the table edge.
Slash	Prevent hard impact on the case.
Electrical Shock	Make sure that your hands, work area, and devices are **clean** and **dry**
Power cord plug wrong	Observe correct adapter plug.

Section 1 Introduction

2.1 Overview

Cleaver Scientific PowerPro Series Power Supplies are recognized as unique power supplies equipped with very powerful specifications to cover the majority of electrophoresis applications on the market. Sufficient and accurate output voltages, five terminal pairs, and its compacted size can deliver accurate and reliable experimental results from one experiment to another. PowerPro Series Power Supplies are RoHS and CE compliant for environmental and safety concerns.

▲**Front view**



▲**Rear view**

2.2 Product Description & Feature

Cleaver Scientific PowerSeries Power Supply are microprocessor controlled and designed to meet most electrophoresis needs. This manual describes the setup and operation of the PowerPro Series Power Supply including important information on safety and maintenance of the unit. The PowerPro Series Power Supply are capable of running horizontal & vertical electrophoresis, SDS-PAGE, native PAGE applications, two-dimensional electrophoresis, and electro-blotting. Furthermore, the powerful specifications plus five terminal pairs can be used for multi electrophoresis units simultaneously.

Cleaver Scientific PowerPro Series Power Supply provides Constant Voltage or Constant Current or Constant Power to instruments used in electrophoresis. 5 terminal pairs and the powerful specification equipped enable the maximum capability of PowerPro Series Power Supply compared to other existing similar product on the market.

Features of PowerPro Series Power Supply:

- Compact size
- Advanced capacity:

PowerPro 300	PowerPRO 3AMP	PowerPro 500
150W, 700mA, 300V	300W, 3000mA, 300V	300W, 800mA, 500V

- Microprocessor controller
- Constant voltages, constant currents and constant power
- Five terminal outlets
- LCD display
- Timer with alarm function
- Advanced safety devices
- Stackability
- Wide applications for DNA, RNA and protein electrophoresis

Section 2 Technical Specification

	PowerPro 300	PowerPro 3AMP	PowerPro 500
Output Voltage / Inc	5 - 300V / 1V	5 – 300 / 1V	5 – 500 / 1V
Output Current / Inc	1 - 700mA / 1mA	10 – 3,000mA / 10mA	1 – 800mA / 1mA
Max. Watt	150W	300W	300W
Rated Voltages	100~ 240V; 47-60Hz, 200W: T2.5A/250V	100-240V: 47-60Hz,410W: T4A/250V	100-240V: 47-60Hz,400W: T4A/250V
Type of Output	1. Voltage or Current with automatic crossover 2. When target constant mode is set, system automatically adjusts the two other parameter to maximum to allow constant run (later could be changed by user)		
Program Storage	30 programmed files		
Program Multi-Step	Up to 6 steps		
Editable Program Function	1.Have typical running conditions program 2.Manual editable program		
Display	2.4” TFT		
Control	Microprocessor controller		
Safety Device	No Load detect		
	Leakage detect		
	Over temperature protection		
	Over load detection		
	Sudden load change detection (could be disabled by proper setting)		
	Shrouded plugs and sockets		
Timer	Constant: 1~9999 mins with alarm, continuous Program: 1~999 mins with alarm, continuous		
Crossover	Yes		
Stackable	Yes		
Automatic Recovery After Power Failure	Yes		
IQ/OQ Protocols	Yes, optional		
Regulatory	CE, ETL	CE	CE
Operating Temperature	4°C~ 40°C		
Construction Material	Flame retardant ABS faceplate		
Unit Dimension	215 x 335 x 104 mm (W x L x H)		
Weight	approx. 2.1 kg		

Section 3 Installation Instructions

PowerPro Series Power Supply is actually a pre-installed instrument. As long as it is placed on a sturdy and level surface in a safe, dry place, and further connects with well-prepared electrophoresis system, it is ready for operation.

Section 4 Operation Instructions

4.1 Control interface

LED Indicator: It indicates running condition

Button Functions

No.	Icon	Function
1		Press to activate or stop the unit
2		Press to temporarily interrupt power to an operation in progress; resume power after pausing without resetting the timer
3		Press to select either Constant/ Program Mode or Constant Voltage or Constant Current mode or Time
4		Press to enter the numeric value set up

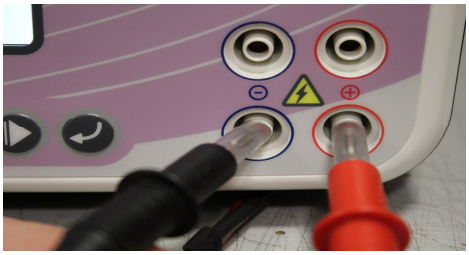
5		Press to move cursor left forward between parameters
6		Press to move cursor right forward between parameters
7		Press to move cursor up between parameters and to increase numeric values
8		Press to move cursor down between parameters and to decrease numeric values

4.2 Start the operation

1. Place the unit on a sturdy and level surface in a safe, dry place, away from laboratory traffic.

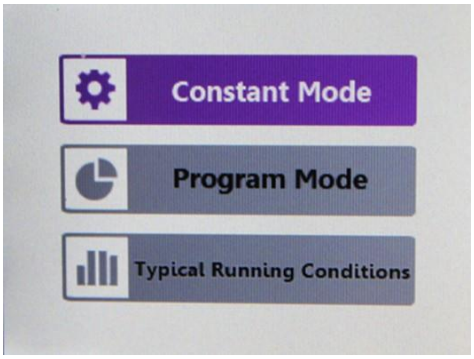
2. Ensure that the AC power switch is OFF, and then plug the three-pronged power cord one end into a grounded three-prong AC outlet with appropriate voltage (100V to 240V as indicated on the rating sticker near the AC cord on the back of the unit), and plug the other end into the main power socket.

3. Connect the DC output jacks from the electrophoresis unit; insert the red lead (+) into the red output jack, and the black lead (-) into the black output jack.



4. Power on the unit by pressing the ON/OFF switch on the back.

5. The screen will show  for few seconds then enter to the mode-selecting page.

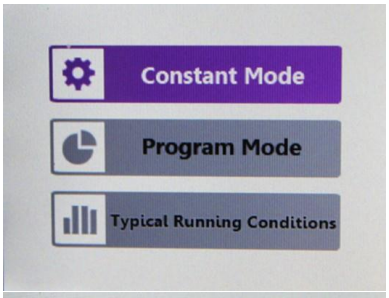


4.3 Constant Mode

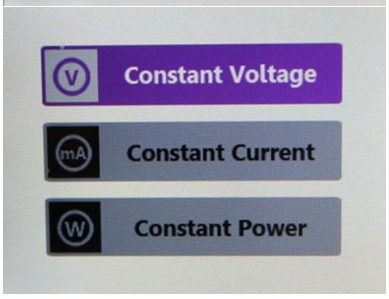
Use the **Constant Voltage / Current / Power Operation** for applications that require only one specific voltage limit, current limit, and power limit continuously during the entire operation of electrophoresis.

Note: When target constant mode is set, system automatically adjusts the other two parameters to maximum to allow constant run. For example, if constant voltage is set, system will adjust current and power to the maximum value.
Users could later lower the other two values by themselves. System will hold the value either at target constant value or the one which has been reached first.

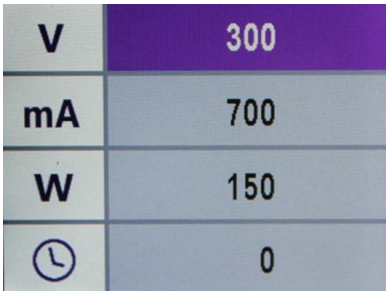
- Use Key and Key to select **Constant Mode**, and then press either or to enter the next page.



- Use and to select ether Constant Voltage(V) or Constant Current(mA) or Constant Power(W), and then press or to enter the next page



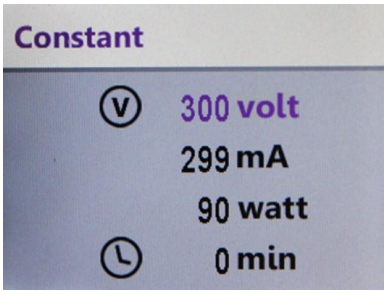
- Use and to move cursor to the parameter such as voltage (V) current (mA) or power (W) or time (min.). Press Key to set the specified parameter.



- Use or to set the appropriate value, and then press Key, and move to the next parameter until all the parameters are set in the same operation method.

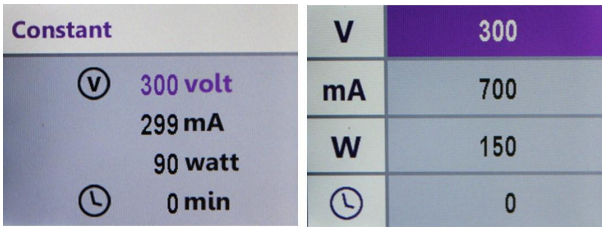
Note: If the time value is set "0," it indicates the power supplier will constantly operate until user manually stops it.

- Press Key to start electrophoresis. The LED is lit, and the screen will show the real time parameter values.



- When parameters reach the assigned value, the color would turn orange.

- Press  to switch pages between real-time value display and value set up page.



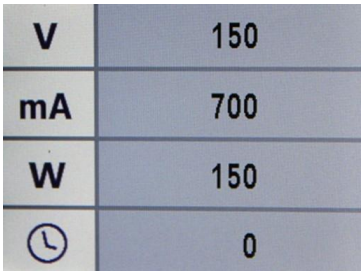
- Press  Key to temporarily interrupt power to ongoing electrophoresis without terminating the operation. The LED is flashing. Press  Key to resume the run.
- Press the  Key again to stop electrophoresis and to terminate a timed run.
- When the run is completed, operation stops with alarm and 

is displayed on the screen. Press  Key to terminate a timed run, and turn the AC power OFF by the switch on the back.

  Note: It would take some time (about 5 seconds) for the unit to power off.

- If you need to make changes to the values of parameters during current running but do not want to terminate the time run, you may pause electrophoresis by pressing the  Key. Press  Key to enter the setting screen.

  Adjust the values and then press  Key to resume your operation.



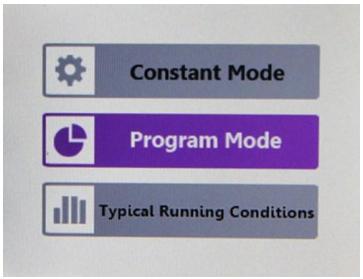
- If you want to change values of parameters and start a new operation run during current running, press  Key instead of  . After adjusting the values press  Key once again to start a new operation run.

  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.

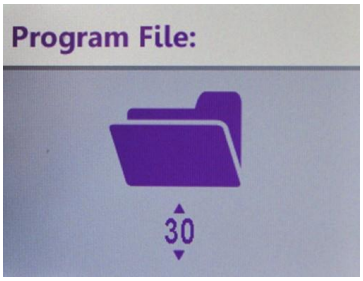
4.4 Program Mode

Instructions for operating PowerPro Series Power Supply in the programming operation are provided in this section. The Program Mode allows you to vary levels in voltage (V), current (mA), and power (W) during specified time periods for up to 6 Steps, depending upon your electrophoresis needs. The PowerPro Series power supply is capable of having 30 different program files storages for user's convenience. After starting the operation (see the above **4.2** instruction), set the Program Mode as follow:

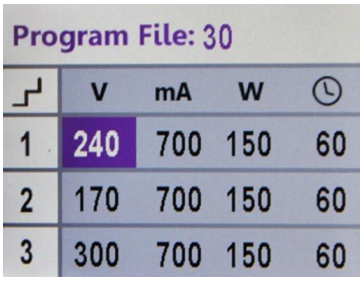
- Use Key and Key to select **Program Mode**, and then press either or to enter the next page.

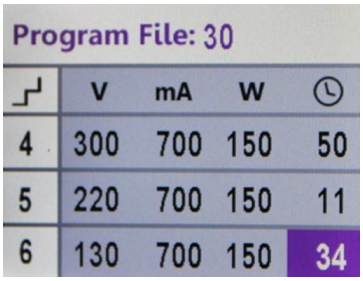


- Press or Key to select appropriate file number, and then press or Key to enter the next page.

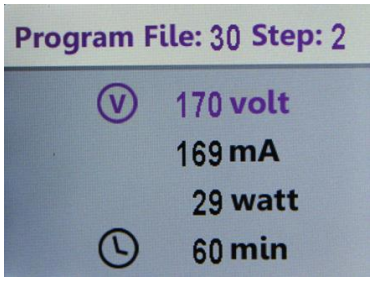


- Use , , or to move cursor to parameters such as voltage (V) current (mA) or power (W) or time (min.). Press Key and use and to set the appropriate value, and then press Key. Repeat this step until all the parameters are set properly. There are 6 stages available for use; use to move down for setting Stage 4-6, and to go back Stage 1-3.

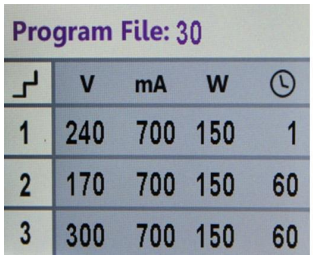


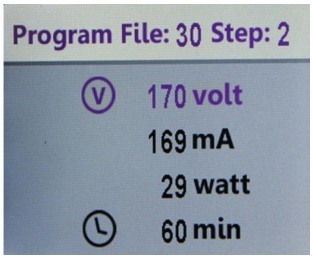


- Press  Key to start electrophoresis. The LED is lit, and the screen will show the real time parameter values.
- When parameters reach the assigned value, the color would turn orange.



- Press  to switch pages between real-time value display and value set up page.





- Press  Key to temporarily interrupt power to ongoing electrophoresis without terminating the operation. The LED is flashing. Press  Key to resume the run.
- Press the  Key again to stop electrophoresis and to terminate a timed run.

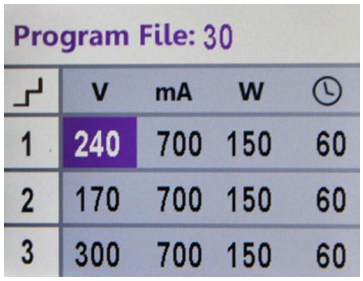
- When the run is completed, operation stops with alarm and 

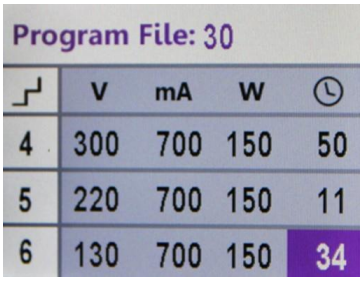
is displayed on the screen. Press  Key to terminate a timed run, and turn the AC power OFF by the switch on the back.

Note: It would take a little time (about 5 seconds) for the unit to power off.

- If you need to make changes to the values of parameters during current running but do not want to terminate the time run, you may pause electrophoresis by pressing the  Key. Press  Key to enter the setting screen.

  Adjust the values and then press  Key to resume your operation.





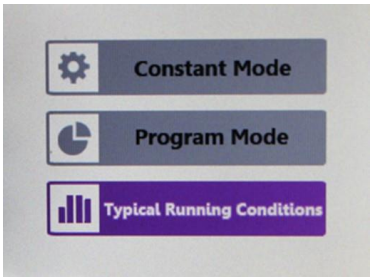
- If you want to change values of parameters and start a new operation run during current running, press  Key instead of  . After adjusting the values press  Key once again to start a new operation run.

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.

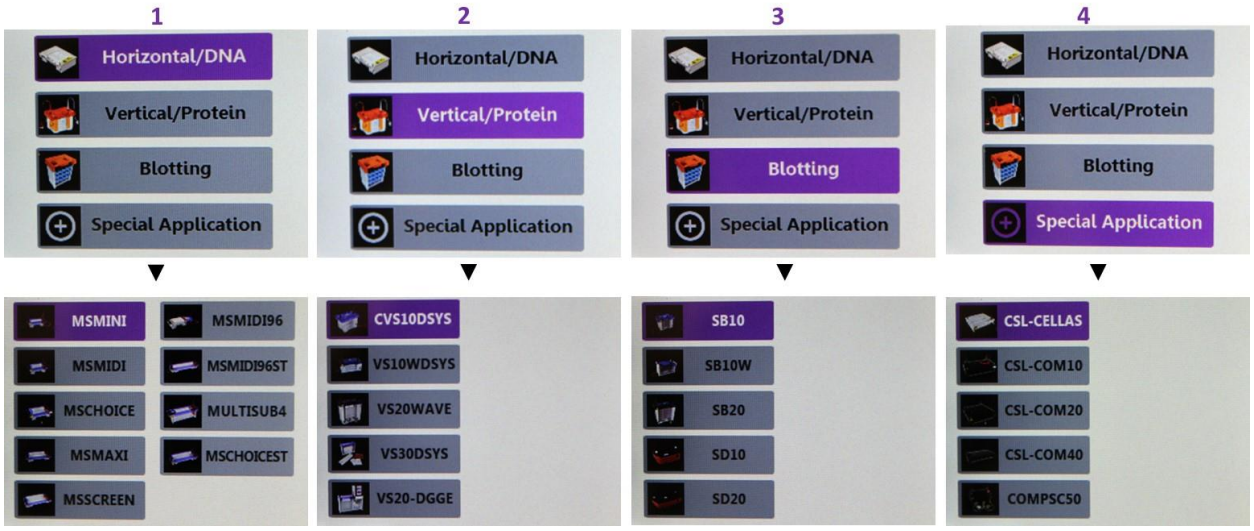
4.5 Typical Running Condition

Besides Constant Mode and Program Mode, PowerPro Power Supply provide a third option, **Typical Running Condition**. It is helpful for those beginning users who are not familiar with the parameter setting and is convenience for quick start.

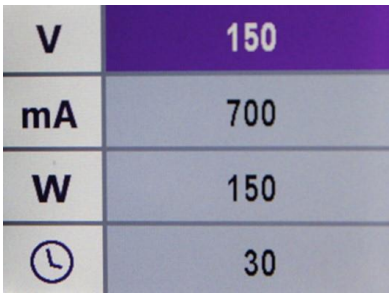
- Turn on the unit; use  key to select and then press  to enter the next page.



- There are 4 categories that can be selected. Choose the model according to your experiment need.



- After selecting model, the preset value will display. User could adjust the value or simply just press  to start operation.



Section 5 Trouble shooting and Maintenance

Many operating problems may be solved by carefully reading and following the instructions in this manual accordingly. Some suggestions for troubleshooting are given below. Should these suggestions not resolve the problem, contact our SERVICE DEPARTMENT or a distributor in your region for assistance. If troubleshooting service is required, please include a full description of the problem.

Problem	Possible Causes	Solution
No Display / lights	No AC power	➢ Check if PowerPro power supply is plugged, or AC power source has problem.
	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.
Repeated fuse broken	Hardware failure	➢ Contact Cleaver Scientific service department
Operation stops and the screen displays **PLC ERROR**	Communication wires on circuit board have loosen or broken.	➢ It is recommended to send the machine back to local distributor or our Service Department for maintenance.
Operation stops with alarm: The screen displays **NO LOAD**	Electrophoresis leads are not connected to the power supply or to the electrophoresis unit(s), or there is a broken circuit in the electrophoresis cell	➢ Check the connections to the power supply and on your electrophoresis cell to make sure the connection is intact; check condition of wires in electrophoresis unit. Close the circuit by reconnecting the cables. Press **START/STOP** to restart the run.
	High resistance due to tape left on a pre-cast gel, incorrect buffer concentration, or incorrect buffer volumes in the electrophoresis cell	➢ Make sure the tape is removed from the pre-cast gel, 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 **LOAD CHANGED**	Bad connections for terminal connectors or damaged wires or damaged platinum wires	➢ Check all the connections to terminators, cables, wires, and gel tanks
Operation stops with alarm: Display shows **OVER VOLTAGE**	Circuit is interrupted	➢ Verify that the running buffer is correct. ➢ Verify the all cables are attached correctly ➢ Turn the Power switch off and on again; restart application. ➢ If you cannot restart the instrument, turn off the power, disconnect the power cord from the outlet, and contact Technical Service.
Operation stops with alarm: Display shows **OVER CURRENT**	Circuit is interrupted	➢ Verify that the running buffer is correct. ➢ Verify the all cables are attached correctly ➢ Turn the Power switch off and on again; restart application. ➢ If you cannot restart the instrument, turn off the power, disconnect the power cord from the outlet, and contact Technical Service.
Operation stops with alarm: Display shows **LEAKAGE**	Ground leak detected during run	➢ 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 	Power supply is overheating	➢ Turn off 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 Technical Service.
Warning message displays with 5-second beep sound. The screen shows 	The power once been cut and now recover	➢ User does not need to take extra action. The warning sign and beep sound would only last for 5 second; after that, the machine will continue running the unfinished project. ➢ The  sign indicates the machine has been interrupted by sudden power off. Press Enter Key  to clear the sign.

Encountering Problems

1. Check the troubleshooting section.
2. Call Technical Service or e-mail to support@cleaverscientific.com
3. If the unit must be shipped back for repair, contact Cleaver Scientific or the distributor for a Return Material Authorization number and shipping instructions. The unit will be repaired and returned to you as quickly as possible.

Replacing the Fuses

1. Turn off the main power switch at the rear of Power Supply and detach the power cord.
2. Open the fuses compartment located inside the Power Entry Module by inserting a small flat blade screwdriver into the slot above the ON/OFF switch. Turn the screwdriver to gently pry open the fuses compartment.

Note: The fuses compartment will not open with the power cord in place.

3. Pull the fuses holder out of the compartment and inspect the fuses. If the fuses are burned or there is a break in the fuses element, replace the fuses with identical type of fuses.
4. Place the fuses holder back into the compartment.
5. Snap the cover closed.

For additional fuses, contact Cleaver Scientific

Maintenance

PowerPro Series Power Supply uses all solid-state components and should require no maintenance or recalibration under normal use. If the unit must be returned for repair, contact our **SERVICE DEPARTMENT** or your local distributor for shipping instruction.

Section 6 Ordering Information

Cat. No.	Description
PowerPro300	300V, 700mA, 150W Power Supply
PowerPro3AMP	300V, 3000mA, 300W Power Supply
PowerPro500	500V, 800mA, 300W Power Supply

Section 7 Warranty

Cleaver Scientific warrants apparatus of its manufacture against defects in materials and workmanship, under normal service, for ***one year from the shipping date to purchaser***. This warranty excludes damages resulting from shipping, misuse, carelessness, or neglect. Cleaver Scientific's liability under the warranty is limited to the receipt of reasonable proof by the customer that the defect is embraced within the terms of the warranty. All claims made under this warranty must be presented to Cleaver Scientific within one year following the date of delivery of the product to the customer.

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