

Operating Manual



ROTH-Power Supply STANDARD

Manufactured by Cleaver Scientific

2908.1

WARNING:
Please read the entire operator's manual thoroughly before operating this unit.

Warning:

Like all apparatus run by electricity these units are capable of delivering potentially lethal voltage. They should be operated only by qualified technically trained personnel. The Power Supplies from ROTH are designed for long term laboratory use and to obtain reproducible results. Please spend a few moments reading the instruction manual thoroughly.

This power supply series has been tested and found to comply with the limits for the CE regulation. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This power supply series 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 power supply 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 the user reads carefully the following points before this equipment is operated.

1. Read and follow carefully the manual instructions.
2. Do not alter the power supply series. Failure to adhere to these directions could result in personal and/ or laboratory hazards, as well as invalidate the equipment warranty.
3. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
4. Disconnect from the power source before maintenance and servicing. Refer servicing to qualified personnel.
5. If a solution is accidentally spilled into the instrument, disconnect the grounded plug and the user must carry out appropriate procedure or contact their supplier. Replace damaged parts.
6. Do not use in the presence of flammable or combustible material as fire or explosion may result. This device contains components, which may ignite such materials.
7. Refer maintenance and servicing to qualified personnel.
8. Ensure that the system is connected to the electrical source according to the local and national electrical codes. Failure to establish a proper connection may create a fire or shock hazard.
9. Ensure the appropriate used materials and correct operation to avoid possible hazards of explosion, implosion or release of toxic or flammable gases arising from the materials being heated.

Please verify that you received the unit completely and without any damage. Any faults or losses have to be reported to ROTH immediately. ROTH can not accept responsibility for goods that were sent back without informing them.

Please take a look at the packing list and check whether all components and accessories are present.

**Please retain all packaging material until the warranty period has expired.
For further information, please contact us at Tel.: 0721/5606-0.**

SAFETY INFORMATIONS

Use high level precautions against any electrical device. Before connecting with the electrical supply, check the supply voltage is within the range stated at the rating label, and that this device is earthed. Place the unit in a safe and dry location not touching any surrounding material. Follow safety precautions for chemicals and dangerous materials. If needed, please contact us at Tel.: 0721/5606-0.

Avoiding Electrical Shock

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

The Mini power supply series has been designed for use with insulated wires, minimizing any potential shock hazard to the user. We recommend against the use of uninsulated wires.

To avoid electrical shock:

1. In case of spillage, any parts of the cable or power supply must be dried out for a period of time and restored to NORMAL CONDITION before the operation.
2. NEVER connect or disconnect wire leads from the power jacks when the red indicator light at the Start/Stop key is on.
3. WAIT at least 5 seconds after stopping a run before handling output leads or connected apparatus.
4. ALWAYS make sure that hands, work area, and instruments are **dry** before making any connections or operating the power supply.
5. ONLY connect the power cord to a proper 3-pronged grounded AC outlet, using the power cord provided with the power supply.

Avoiding Damage to the Instrument

1. Do not attempt to operate the device if damaged.
2. Protect this unit from physical damage, corrosive agents and extreme temperatures (direct sunlight etc).
3. For proper ventilation, leave at least 10 cm of space behind the instrument, and at least 5 cm of space on each side.
4. Do not operate the Power Supply in high humidity environments (> 95%), or where condensation may occur.
5. When the power supply series is taken into a cold room environment, the unit can be operated immediately. However, when the power supply series is removed from the cold room environment, let the unit equilibrate to room temperature for a minimum of 2 hours before using it.
6. Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with us that the proposed method will not damage the equipment.

Equipment Operation

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

1. The displayed figure must be checked to see if it is in the normal condition for use before using this unit.
2. NEVER access any HAZARDOUS LIVE parts.

Symbols

The following symbols are used on the Power Supplies:



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.

Environmental Conditions

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

- RH ≤95 %
- 75 KPa-106 kPa
- Altitude not to exceed 2000 meters
- Ambient temperature of 15 °C (only MINI) or 4 °C (STANDARD and BLOT) in minimum. 40 °C in maximum

Maintenance

The ROTH-Power Supplies require little maintenance to ensure reliable operation. The housing may be cleaned with a dry cloth.

All Roth products available for delivery have undergone rigorous quality controls.

Encountering Problems

Check the troubleshooting section.

Call Technical Service under 0049 721 5606-0

If the unit must be shipped back for repair, contact Carl Roth GmbH + Co. KG for shipping instructions.

The unit will be repaired or replaced as quickly as possible and returned to you.

Contact: Phone 0049 721 5606-0; Fax 0049 721 5606-149; info@carlroth.de

TECHNICAL DATA

Type	MINI	STANDARD	BLOT
Model	nanoPAC-300P	PowerPro300	PowerPro3AMP
Voltage (V)	10-300	5-300	5-300
Max. intensity of current	1-400 mA	1-700 mA	10-3000 mA
Max. output	60 W	150 W	300 W
Timer	1-999 min.	1-999 min.	1-999 min.
Volt-hours	49,995 kWh		
Display	LED	2,4" TFT	2,4" TFT
Resolution	1 V, 1 mA	1 V, 1 mA	1 V, 10 mA, 1 W
Type of output	Constant V or mA with automatic crossover		
	-	During constant mode not adjusted parameters are automatically set to maximum	
Programs	Manuell adjustable mode (Constant Mode)		
	2-step program editable	30 programs, each with up to 6 steps editable (Program Mode)	
	2-step program, pre-assigned	Pre-assigned programs for different applications (Typical running condition Mode)	
Outlets (parallel socket pairs)	2 (4 mm)	5 (4 mm)	5 (4 mm)
Min. load resistor	5 Ω	3 Ω	0,1 Ω
Safety detections	No load Over load Over temperature	No load Over load Leakage	No load Over load Leakage
Protection	-	Over temperature	Over temperature
Automatic recovery after power failure	-	Yes	Yes
IQ/OQ Protocols	-	Yes, optional	Yes, optional
Ambient temperature	4-40 °C	4-40 °C	4-40 °C
Regulatory	CE, ETL, FCC	CE, ETL	CE
Dimensions (cm)	14 x 19,1 x 8,4	21,5 x 33,5 x 10,4	21,5 x 33,5 x 10,4
Weight	1,0 kg	2,1 kg	2,1 kg
Rated Voltages	100-240 V, 50-60 Hz, 2,5 A	100-240 V, 47-60 Hz, 200 W	100-240 V, 47-60 Hz, 410 W

PACKING LIST

<u>No. Items</u>	<u>Description</u>
1	Power Supply
1	Power Cord
1	Extra fuse inside power plug on the rear of the unit
1	Instruction manual

DESCRIPTION

ROTH-Power Supply STANDARD is a microprocessor-controlled power supply designed to meet most electrophoresis needs in a personal, single, easy to use unit. The power supply is capable of running DNA/RNA electrophoresis, Electroblothing, SDS-PAGE, native PAGE applications, and second-dimension SDS-PAGE applications. Furthermore, the powerful specifications plus five pairs of terminal pairs can be used for multi electrophoresis units simultaneously.

FEATURES

- Compact size
- Advanced capacity:

Roth STANDARD	Rothe BLOT
150W, 700mA, 300V	300W, 3000mA, 300V

- 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

INSTALLATION









ROTH-Power Supply STANDARD 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.

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

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.

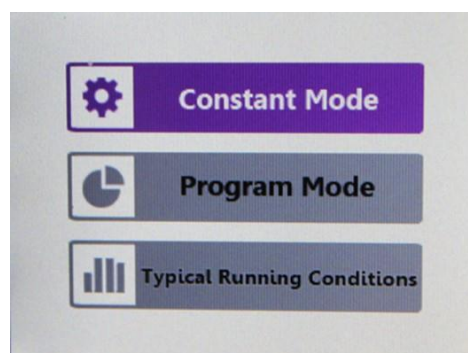


3. Connect the DC output jacks from the electrophoresis unit; insert the red lead (+) into the red output jack, and the black lead (-) into the black output jack.



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.











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.

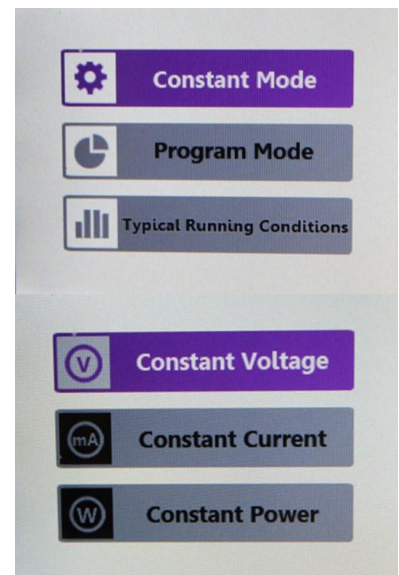
Users could later lower the other two values by themselves. System will hold the value either at target constant value or the one which has been reached first.


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

- Use  and  to select either 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.

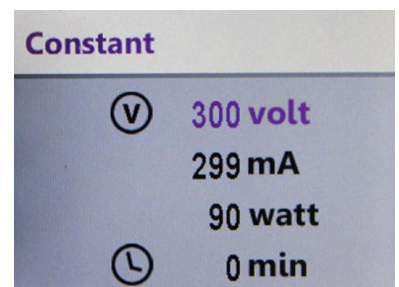
- Use  or  to set the appropriate value, and then press  Key, and move to the next parameter until all the parameters are set in the same operation method.







V	300
mA	700
W	150
	0





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.


Constant	V	300
 300 volt 299 mA 90 watt	mA	700
 0 min	W	150
		0


- 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 **COMPLETE** 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.




















V	150
mA	700
W	150
	0

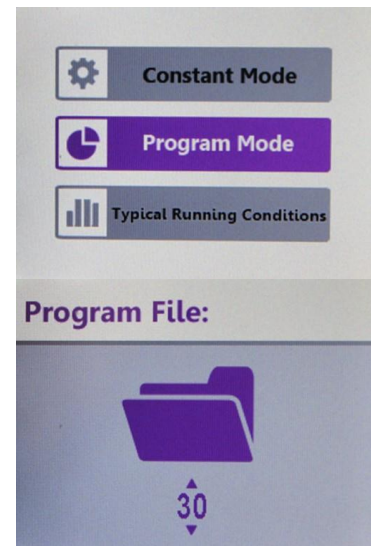
- If you want to change values of parameters and start a new operation run during current running, press  Key instead of . After adjusting the values press  Key once again to start a new operation run.

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.

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 above), 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.

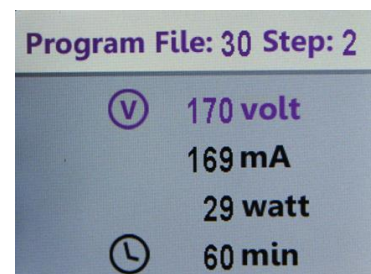



Program File: 30

	V	mA	W	⌚
1	240	700	150	60
2	170	700	150	60
3	300	700	150	60





Program File: 30

	V	mA	W	⌚
4	300	700	150	50
5	220	700	150	11
6	130	700	150	34






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

Program File: 30					Program File: 30 Step: 2	
	V	mA	W	⌚		
1	240	700	150	1	ⓧ	170 volt
2	170	700	150	60		169 mA
3	300	700	150	60		29 watt
					⌚	60 min




- 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 **COMPLETE** 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.

Program File: 30				
	V	mA	W	⌚
1	240	700	150	60
2	170	700	150	60
3	300	700	150	60

- 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.

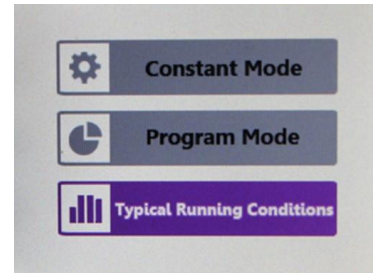
Program File: 30				
	V	mA	W	⌚
4	300	700	150	50
5	220	700	150	11
6	130	700	150	34

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.

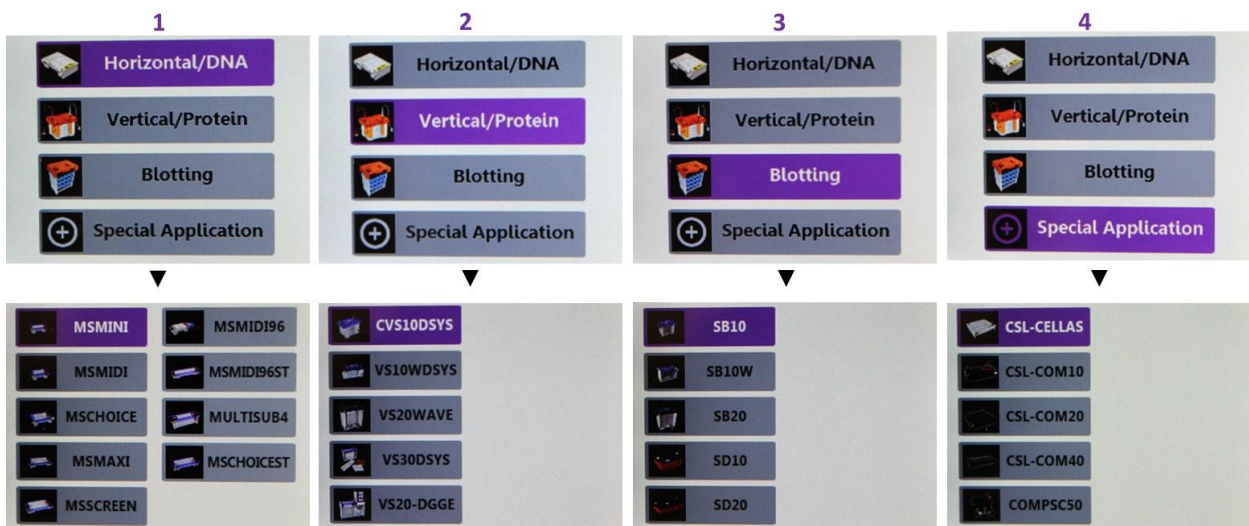
Typical Running Condition

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.

V	150
mA	700
W	150
⌚	30

TROUBLE SHOOTING

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	<ul style="list-style-type: none"> ➤ 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.

<p>Operation stops with alarm: Display shows</p> <p>OVER CURRENT</p>	<p>Circuit is interrupted</p>	<ul style="list-style-type: none"> ➤ 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.
<p>Operation stops with alarm: Display shows</p> <p>LEAKAGE</p>	<p>Ground leak detected during run</p>	<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.
<p>Operation stops with alarm: Display shows</p> <p>OVER TEMPERATURE</p>	<p>Power supply is overheating</p>	<ul style="list-style-type: none"> ➤ 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.
<p>Warning message displays with 5-second beep sound. The screen shows</p> <p>Power Recovery</p>	<p>The power once been cut and now recover</p>	<ul style="list-style-type: none"> ➤ 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. <p>Press Enter Key  to clear the sign.</p>

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