

ANALYTIC SYSTEMS

Power Conversion Solutions

INSTALLATION & OPERATION MANUAL

PWS150 AC-SOURCE POWER SUPPLY



An ISO9001 Registered Company Battery Chargers • Inverters • Power Supplies • Voltage Converters

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POWER SUPPLY IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS — This manual contains important safety and operating instructions for the power supply.

POWER SUPPLY PRECAUTIONS

1. Do not expose power supply to rain or snow unless it is a sealed model.
2. Use of an attachment not recommended or sold by the manufacturer may result in risk of electric shock, fire, or injury to persons.
3. Do not disassemble power supply. If service or repair is required, return it to the manufacturer or an authorized service center. Incorrect reassembly may result in a risk of electric shock or fire. Voltages in excess of 350 volts are present inside the unit any time it is plugged into an AC outlet, even if it is switched OFF.
4. To reduce risk of electric shock, disconnect the unit from the AC power source before attempting any maintenance or cleaning. Switching the unit OFF will not reduce this risk.
5. To reduce risk of electric shock, the power switch must be OFF when connecting anything to the AC input or DC outputs.
6. The AC outlet that this unit is plugged into must be properly installed and grounded in accordance with all local codes and ordinances.

WARNING: Do not use this power supply to charge a battery. It does not have the necessary circuitry on the output to prevent it from overcharging a battery.

DANGER: Never alter the AC power cord or plug provided. If it will not fit the outlet, use an approved adapter or have the proper AC power cord installed by a qualified electrician. Improper installation can result in the risk of electric shock.

MEDICAL EQUIPMENT NOTICE

Analytic Systems does not recommend the use of their products in life support applications where failure or malfunction of this product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. Analytic Systems does not recommend the use of any of its products in direct patient care. Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), auto-transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, and infusion pumps as well as any other devices designated as “critical” by the U.S. FDA.



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Introduction

The PWS150 AC-source power supply provides up to 150 continuous watts and 180 peak watts of precision DC power to up to two connected loads at 12 or 24 VDC.

The PWS150 features advanced Power Factor Correction circuitry on the AC input to use electricity in the most effective and efficient way possible. This unit will accept from any standard AC voltage worldwide (85-265 VAC) at 50-60 Hz and 400 Hz. Internally, the recently updated single board design incorporates modern switch-mode technology for unmatched efficiency and ultra-quiet operation.

Built for maximum safety, unit's reliability features include spark-free connections, reverse connection protection, over temperature shutdown with automatic recovery and both input and output fuses. Additional features include an optional drip shield for wall mounting and bright LED indicators for monitoring the unit's operating condition.

Box Contents

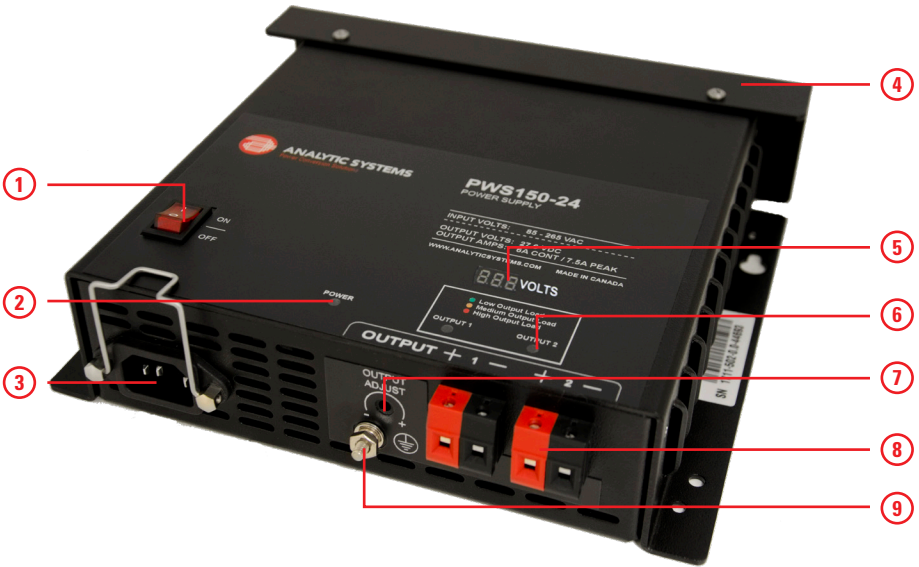
The box that you've received should contain the following:

- One PWS150 Power Supply
- One IEC320-compatible AC input cable
- This manual
- One warranty card

If there is anything is damaged or missing from your box, please contact your dealer or Analytic Systems for a replacement.



Main Parts



Front Panel

1. Lighted Power Switch
2. Input Power LED
3. **AC Input Connection:**
Bulgin IEC320 Flange Mount Inlet
6.3mm
4. Drip Shield
5. Integrated Voltmeter
6. Output 1 and Output 2 LEDs
7. Output Voltage Adjust
8. **DC Output Connections:** 2 sets
Phoenix VDFK4 Terminal Blocks
(Red: Positive, Black: Negative)
9. Chassis Drounding Stud



Operation

The PWS150 is designed for simple and intuitive operation. Before using the power supply, it must be properly installed and connected to the load and power source. See *Installation* for more details.

OPERATING THE UNIT

1. Move the Power Switch to the ON position.
2. The Power LED will glow green indicating that the unit is receiving the necessary AC power to operate.
3. The unit will automatically begin supplying the connected load(s) with the voltage listed on its chassis label.
4. The Output 1 and Output 2 LEDs will also begin glowing indicating the current being corresponding connected load. See *LED Indicators* for more details.

ADJUSTING THE OUTPUT VOLTAGE

The output voltage can be adjusted over a range of $\pm 0.6V$ (or $\pm 1.2V$ for the 24V model) to suit your specific needs. To adjust the output voltage:

1. Using a small flat-blade screwdriver to access it, rotate the Output Voltage Adjust potentiometer on the front panel to adjust the voltage.
2. Rotating it clockwise will increase the output voltage. Counterclockwise will decrease the output voltage.
3. You can check the new output voltage using the integrated digital voltmeter. If your unit does not have this feature, an external voltmeter/multimeter must be used.

ENDING OPERATION

1. Move the Power Switch to the OFF position.
2. Wait for all of the LEDs on the unit to stop glowing.
3. Once all of the LEDs are dark, it is safe to disconnect the power source and load from the power supply.
4. The unit can now be safely serviced or put into storage.



LED Indicators




The PWS150 features several indicator LEDs on its top panel to display the unit's operating condition. Their meanings are detailed below.

POWER:

This LED glows green when the unit is connected to an AC power source and energized.

OUTPUT 1 & OUTPUT 2:

These LEDs indicate the amount of current being drawn by the load connected to the corresponding output connector.

-  If the Output LED is glowing green, the load is **drawing less than the maximum continuous output current.**
-  If the Output LED is glowing yellow, the load is **drawing the maximum continuous output current.**
-  If the Output LED is glowing red, the load is **drawing the maximum peak output current.**

Fuse Replacement

The output fuses will blow if the load is connected in reverse or if there is a malfunction otherwise. In the event the output fuses blow, they will need to be replaced before the unit can be used.

TO REPLACE THE FUSES

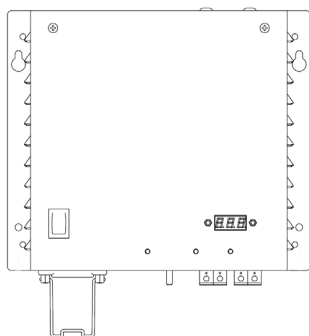
1. Loosen and remove the 8 screws located on the vented side panels. (There are 4 screws on either side of the unit.)
2. Loosen and remove the 2 screws securing the drip shield to the top panel.
3. Slide the top panel free from the bottom panel to access the internal components.
4. Locate the output fuses. They can be found on the front panel circuit board. They are directly behind the DC Output connections.
5. Replace the fuses. For more information on the make and model of the replacements output fuses, see *Specifications*.
6. Return the top panel to its original position and insert and tighten the 8 side panel screws.
7. Return the drip shield to its original position and insert and tighten the 2 screws.



Installation

MOUNTING

Mount the unit in a WELL VENTILATED and DRY area with at least one inch (2.54 cm) of clearance surrounding the unit's extruded vents. Ideally, the unit should be mounted on a vertical surface with the included drip shield facing upward as shown below.



AC INPUT CONNECTION

This unit is equipped with a 3-pin Bulgin AC Inlet (6.3mm) Tab Flange Mount to serve as an AC input connection. Your unit is supplied with an IEC320-compatible cable for connection to an AC power source, if the supplied cable does not fit your AC receptacle, any other IEC320-compatible cable can be used.

DC OUTPUT CONNECTION

This unit is equipped with two pairs of Phoenix VDFK4 terminal block connectors to serve as DC Output Connections. The red output connectors connects to the Positive DC Terminal and the black, Negative DC Terminal.

Connect the load here using an appropriate gauge of wire for the maximum output current (See below for the recommended wire gauge and *Specifications* for your unit's Maximum Output Current.)

Max. Output Current	24.00 A	15.00 A	9.30 A	5.90 A	3.70 A
American Wire Gauge	#8AWG	#10AWG	#12AWG	#14AWG	#16AWG

Max. Output Current	2.30 A	1.50 A	0.92 A	0.58 A	0.23 A
American Wire Gauge	#18AWG	#20AWG	#22AWG	#24AWG	#28AWG



Troubleshooting

In the event of a malfunction, the table below can be used to troubleshoot the issues and figure out the next course of action.

Issue	Explanation
Unit repeatedly turns OFF	The unit's thermal derating may be causing it turn OFF.
Fix:	Check that the unit's temperature is within its operating range. If the unit feels significantly hot, it may need to be remounted for better ventilation and cooling.
Unit will not turn ON	The AC input voltage is too low for proper operation.
Fix:	Check that the AC power source is a proper voltage rating for the power supply. Check that the input wiring and connectors are free of damage and corrosion. If the above is in proper working order, the cause is likely an internal component failure and the unit must be returned to an authorized service center for repair.
Input fuse blows during operation	The design of the unit makes it impossible to supply an input over current by conventional means. The input fuse blowing means there is an internal component failure
Fix:	The unit must be returned to an authorized service center for repair.
Output fuses immediately blow when unit is turned ON	The load is likely connected to the unit in reverse polarity.
Fix:	The output fuses have blown to protect the unit. The unit cannot be operated until these fuses have been replaced. See <i>Fuse Replacement</i> for details.



Specifications

Input Specifications	
Unit Model	PWS150
Voltage	85-265 VAC
Current	3A (Max @ 90 VAC in)
Power Factor	>0.98 at full load (>0.86 @ 400Hz)
Input Frequency	45 - 405 Hz
Noise on Input	< 50 mV

Output Specifications		
Nominal Voltage	12 VDC	24 VDC
Float Voltage	13.8 ± 0.6 VDC	27.6± 1.2 VDC
Charging Current	12 A (Cont.)/ 15 A (Peak)	6 A (Cont.) / 7.5 A (Peak)
Output Fuse	2x ATL-15	2x ATL-8
Duty Cycle	Continuous: 24 hours per day, Peak: 1 minute per hour	
Efficiency	> 90% @ Maximum Output	

Mechanical Specifications	
Width	8.0 in / 20.3 cm
Length	8.8 in / 22.4 cm
Height	2.2 in / 5.6 cm
Clearance	1.0 in/2.5 cm all around
Weight	3.6 lb / 1.6 kg
Mounting	Wall mount recommended (includes Drip Shield)
Material & Finish	Marine-grade Black Powdered Aluminum
Fasteners	18-8 Stainless Steel
Connectors	AC input - Bulgin IEC320 Flange Mount Inlet 6.3mm (supplied with mating cable) DC Output - 2x Phoenix VDFK4 Terminal Blocks (Red:Positive, Black: Negative)

Environmental and Safety Specifications	
Operating Temperature Range	-25°C to +40°C @ Continuous Output
Humidity	0 - 95% Relative Humidity (non-condensing) with standard conformal coating
Isolation	Input-Case & Input-Output:2000 VDC, Output-Case: 1500VDC
Emissions	Meets FCC Part 15, Class B
Safety	Built to meet CE, UL458 and CSA 22.2.107.1
Typical Service Life	> 10 years (87,600 hrs)
Warranty	Three years parts and labor

* Specifications subjects to change without notice.

Limited Warranty

1. The equipment manufactured by Analytic Systems Ware (1993) Ltd. (the "Warrantor") is warranted to be free from defects in workmanship and materials under normal use and service.
2. This warranty is in effect for:
 - a. 3 Years from date of purchase by the end user for standard products offered in our catalog.
 - b. 2 Years from date of manufacture for non-standard or OEM products
 - c. 1 Year from date of manufacture for encapsulated products.
3. Analytic Systems will determine eligibility for warranty from the date of purchase shown on the warranty card when returned within 30 days, or
 - a. The date of shipment by Analytic Systems, or
 - b. The date of manufacture coded in the serial number, or
 - c. From a copy of the original purchase receipt showing the date of purchase by the user.
4. In case any part of the equipment proves to be defective, the Purchaser should do the following:
 - a. Prepare a written statement of the nature of the defect to the best of the Purchasers knowledge, and include the date of purchase, the place of purchase, and the Purchasers name, address and telephone number.
 - b. Call Analytic Systems at 800-668-3884 or 604-946-9981 and request a return material authorization number (RMA).
 - c. Return the defective part or unit along with the statement at the Purchasers expense to the Warrantor; Analytic Systems Ware (1993) Ltd., 8128 River Way, Delta, B.C., V4G 1K5, Canada.
5. If upon the Warrantor's examination the defect proves to be the result of defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense by the most economical means. Requests for a different method of return or special handling will incur additional charges and are the responsibility of the Purchaser.
6. Analytic Systems reserves the right to void the warranty if:
 - a. Labels, identification marks or serial numbers are removed or altered in any way.
 - b. Our invoice is unpaid.
 - c. The defect is the result of misuse, neglect, improper installation, environmental conditions, non-authorized repair, alteration or accident.
7. No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so.
8. Only the Warrantor shall perform warranty service. Any attempt to remedy the defect by anyone else shall render this warranty void.
9. There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specifically stated to be waterproof.
10. No other express warranty is hereby given and there are no warranties that extend beyond those described herein. This warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, or any other obligations on the part of the Warrantor or its employees and representatives.
11. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof.
12. The Warrantor assumes no liability for incidental or consequential damages of any kind



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Battery Chargers • Inverters • Power Supplies • Voltage Converters



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