

# INSTALLATION & OPERATION MANUAL

**PWI320**  
**Intelligent Power Supply**





# IMPORTANT & SAFETY INSTRUCTIONS

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**SAVE THESE INSTRUCTIONS** — this user guide contains important safety and operating instructions for the Power Supply.

## Precautions

1. Do not expose the Power Supply to rain or snow unless it is a sealed model.
2. Use of an attachment not recommended or sold by the Power Supply manufacturer may result in a risk of fire, electric shock, or injury to persons.
3. Do not disassemble the Power Supply; return it to the manufacturer or an authorized service center when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire. Voltages in excess of 350 volts are present inside the Power Supply anytime it is plugged into an AC outlet, even if it is switched off.
4. To reduce risk of electric shock, unplug the Power Supply from the AC outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
5. Never place the Power Supply directly above a battery; gases from battery will corrode and damage the unit.
6. Never allow battery acid to drip on the Power Supply.

## GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS

The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

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

### Medical Equipment Notice

Analytic Systems does not recommend the use of the PWI Series Power Supplies 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.

**WARNING** Do not connect a power supply to a battery. It does not have the circuitry or programming to properly charge a battery. Both the power supply and the battery could be damaged or destroyed!

# Specifications

Input	
Volts	85 - 265 VAC, 1 Phase, 45 - 65 Hz
Current (max) *	4 Amps with Inrush Protection
Input Fuse	AGC 5 Amp
Power Factor	> 0.99 at Full Load
Efficiency	> 90% at Full Load
*	Maximum Input Current Specified at 85 VAC

Output					
Nominal Voltage	12 VDC	24 VDC	32 VDC	36 VDC	48 VDC
Voltage Range **	12.0 - 14.0	24.0 - 28.0	32.0 - 37.3	36.0 - 42.0	48.0 - 56.0
Output Amps Cont/Peak	20 / 25	10 / 12.5	8.0 / 9.6	7.5 / 9.4	5 / 6.25
**	Actual Output Voltage determined by User Settings or by Power Supply Firmware				

Mechanical	
Dimensions	9.5 in / 24.1cm Long x 8.0 in / 20.3 cm Wide x 3.25 in / 8.3 cm High
Clearance	2.0 in / 5.0 cm all around
Weight	6.2 lb / 2.8 kg
Material and Finish	Marine Grade Black Anodized Aluminum with 18-8 Stainless Fasteners
Mounting	Wall or Shelf Mount
Connections	Integrated Color Coded Terminal Blocks

Environmental and Safety	
Operating Temperature Range	-25°C to +40°C (-40°C to +55°C Optional)
Storage Temperature Range	-55°C to +85°C
Humidity	0 - 95% Relative Humidity (non-condensing)
Emissions	Complies with FCC Class B, Part 15
Isolation	> 1500 VDC Input-Output, Input-Case, Output-Case
Audible Noise	None
Duty Cycle	Continuous
Warranty	Five Years Parts and Labor
Safety	Built to meet ABS, CE, UL458 and CSA 22.2.107.1

\* Specifications subjects to change without notice.

Designed and manufactured by: **ANALYTIC SYSTEMS WARE (1993) LTD.**

8128 River Way

Delta, BC V4G 1K5 Canada

www.analyticssystem.com

p. 604.946.9981 f. 604.946.9983

tf. 800.668.3884 US/Canada

info@analyticssystem.com

# PWI320 Intelligent Power Supply

## USER GUIDE

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### Introduction

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The PWI320 Intelligent Power Supply delivers a full 300 watts of output power for communications, control or a wide variety of other devices. It comes standard with easy to use color coded DC connection terminals.

The Power Supply uses advanced Power Factor Correction circuitry on the AC input so it will work from any standard AC voltage anywhere in the world and use the electricity in the most effective and efficient way. LLC Resonant Converter technology allows Zero Voltage/Zero Current switching on the Primary or high voltage side of the main power transformer, and Active Rectification on the Secondary or low voltage side ensures maximum efficiency and the lowest Electromagnetic Interference (EMI) so the PWI320 will not interfere with sensitive voice or data RF communication equipment.

The Power Supply is preset to the same voltage as a fully charged battery of the nominal output voltage (ie. 13.6V for a 12V model, etc.). The voltage can be adjusted over a reasonable range using the PowerWizard software that is free to download from [www.analyticsystems.com](http://www.analyticsystems.com).

Seven dual color LEDs clearly indicate output current levels as well as indicating faults with the Power Supply. The 'PowerWizard' software adds advanced programming and monitoring as well as a graphing function through the built in USB port.

Safety features include Power Supply over temperature shutdown, current limiting, short circuit protection, input under voltage shutdown and output over-voltage protection all with automatic recovery.

The Power Supply requires no maintenance other than the occasional wipe down to remove any accumulation of dust or dirt.

# Installation

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## Package Contents

The box should contain:

- One PWI320 Intelligent Power Supply,
- One Mini-USB to Laptop cable,
- This user guide (a pdf copy can be requested from [sales@analyticssystem.com](mailto:sales@analyticssystem.com))
- One Warranty Registration Card. Returning this card is not mandatory for warranty coverage, but will assist us to stay in touch with you for updates and other news. Warranty registration can also be completed at [www.analyticssystem.com](http://www.analyticssystem.com)
- The 'PowerWizard' software can be downloaded from [www.analyticssystem.com](http://www.analyticssystem.com)

If anything is damaged or missing, please contact us immediately at 1-800-668-3884 for by emailing [sales@analyticssystem.com](mailto:sales@analyticssystem.com)

## Location and Mounting

1. Mount the Power Supply so that the indicator LEDs and controls on the front panel are reasonably easy to see and access.
2. Make sure there is at least 2 inches of clearance all around the Power Supply so that air can circulate through the Power Supply to keep it cool.
3. Mount the Power Supply in a location that allows easy connection to the load. Use the wire gauge table and the maximum input current rating from the load to choose the appropriate wire gauge to connect to the Power Supply. The maximum wire gauge the DC output terminals can accept is AWG10 wire.
4. Make sure the Power Supply is protected from water. In a marine environment, install the optional drip shield above the Power Supply if there is any possibility of water dripping onto it.

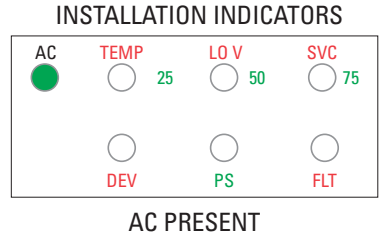
AWG	Amps
24	2
22	3
20	5
18	7
16	10
14	15
12	20

AWG	Amps
10	30
8	40
6	55
4	70
3	80
2	95
1	110

# Connection

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1. Connect the Power Supply to the load before connecting the AC mains.
2. Connect the Power Supply to the AC mains. The AC LED should illuminate. This indicates that the Power Supply is receiving power from the AC mains and that the internal power supply is running.
3. The unit should turn on automatically and the power switch will illuminate. Press the power switch if you want to turn the Power Supply Off.



# Front Panel Adjustments

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The PRG and SEL buttons on the front panel currently have no function. However, in a future firmware update they will add the capability to adjust the output voltage over a range from nominal to +17% (-0V to +2V for a 12V model for example). Subscribe to our newsletter to be notified when this update becomes available.



# Operation

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Operation of the PWI320 Power Supply is very simple. It is intended to operate fully unattended, and will attempt to recover from any fault, such as Power Supply Over-Temperature, Insufficient Input Voltage, Output Overload, Output Short Circuit, Power Failure and more.

Connect the Power Supply to a source of AC power. Confirm that the "AC" LED IS illuminated (Green). The Power Supply should automatically turn on. If it does not, press the Power button on the front panel.

The Power Supply will go through a startup sequence that consists of turning the 6 LEDs controlled by the computer all Red, then all Green. The Power button will illuminate once the Power Supply has completely turned on.

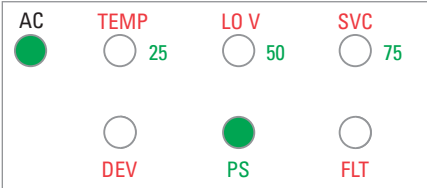
If the AC power fails or is disconnected, the Power Supply will resume operation when AC is restored.

The PWI320 Power Supply is so efficient that it does not need a cooling fan to operate at maximum performance. However, in a very hot ambient environment the microprocessor will reduce power output as needed to keep the circuitry operating at a safe and reliable temperature. In extreme cases, the Power Supply may shut off completely until it cools sufficiently to resume operation.

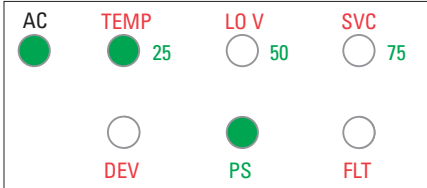


1. The Output Power LEDs will indicate the approximate load percentage the Power Supply is delivering.
2. The Output Power indicator LEDs will all blink GREEN any time the output current reaches 100%.
3. The Output Power indicator LEDs will all blink YELLOW any time the output current reaches 125%. If this happens frequently, the Power Supply is overloaded and the number of devices connected must be reduced.
4. By use of the Power Wizard PC software, it is possible to customize the output voltage in Power Supply mode within the working range of the unit (12.0 to 15.0 volts for a 12V model, scale appropriately for other output voltages). Select the Active Profile and set the desired voltage in the 'Float Voltage' field and then press 'Apply Changes'.

### POWER SUPPLY INDICATORS



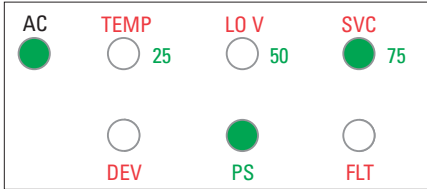
CURRENT < 10%



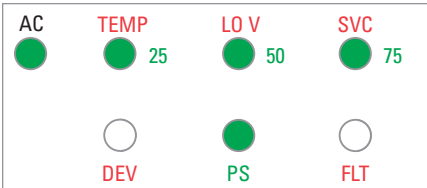
CURRENT 11 - 39%



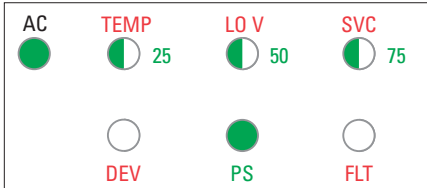
CURRENT 40 - 59%



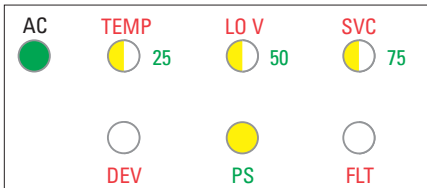
CURRENT 60 - 84%



CURRENT 85 - 99%



CURRENT >= 100%



CURRENT = 125%

## Maintenance

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The Power Supply requires no maintenance other than the occasional wipe down to remove dust that could reduce its ability to dissipate heat, and carefully blow air through the cooling vent to remove any dust buildup on it or inside the unit.

## Dry Contact Relay (option)

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The Power Supply can be fitted with a 1 amp dry contact relay that can be used to indicate Power Supply status to a monitoring system. It has both a normally open and normally closed contact which changes state depending on the presence or absence of charging voltage on the output of the Power Supply and is independent of the microprocessor. If the Power Supply is producing voltage on the output, the normally closed contact will be closed and there will be an electrical connection between NC and COM. If the voltage on the output of the Power Supply goes to zero, the contact will change state. The Normally Open contact operates exactly in the reverse of the Normally Closed contact.

# Troubleshooting

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The PWI320 Power Supply is designed to provide years of reliable service. However in the event that it does not seem to be operating correctly, here are some things you can check.

## **AC Present LED does not come on.**

First make sure any external circuit breaker is ON. Unplug or turn off the external power to the Power Supply. Plug any other device into the AC receptacle or use a multimeter to make sure AC is present. Remove the fuse and check for continuity with a multimeter. If the fuse is open, replace it with the recommended fuse listed on the label and reconnect or turn the power back on. The AC Present LED should come on. If it does not, then there is an internal failure and the Power Supply will have to be returned for service.

## **Output Low Voltage Indication (overload)**

If the Power Supply is overloaded and the output voltage drops below 1/2 the nominal voltage for the unit, the output will cycle on/off until the overload condition is removed.

## **Power Supply Overtemp**

If the Power Supply gets too hot, it will switch to Standby until it cools sufficiently to resume normal operation.

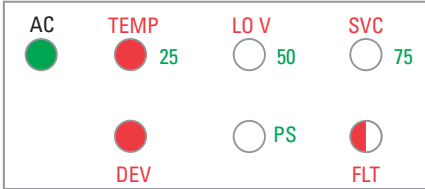
## **Low Input Volts**

If the input voltage drops below the minimum voltage necessary for normal operation, the Power Supply will show this display. The Power Supply will switch to Standby and wait for the voltage to recover

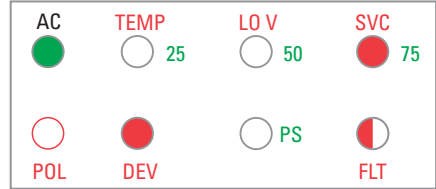
## **Power Supply Failed**

If the processor detects a condition that prevents the Power Supply from operating, it will show this display. Try unplugging and re-plugging the power a couple of times to see if that clears the problem. If it does not clear the display the Power Supply will have to be returned for repair. More information on the nature of the fault can be determined by connecting the Power Supply, using a laptop, and using the Power Wizard program to see if a more detailed error message is displayed.

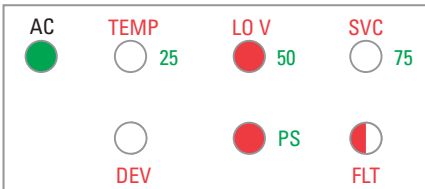
## FAULT INDICATORS



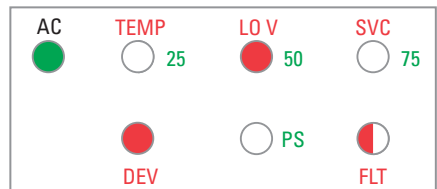
OVER-TEMPERATURE



POWER SUPPLY FAILED



OUTPUT OVERLOAD/SHORT CIRCUIT



INSUFFICIENT INPUT VOLTAGE

## Abbreviations and definitions

We use a number of abbreviations on the labels to save space. Here are the full words corresponding to each abbreviation along with common battery Power Supply terms and their definitions:

### ABBREVIATIONS

DEV – Device. Refers to the Power Supply. Used together with the Fault LED to indicate a problem with the Device.

FLT – Fault. Used to indicate a problem with the battery (BAT) or the device (DEV)

AC – Alternating Current

TEMP – Temperature. Used to indicate that the Device is too hot.

LO V – Low Voltage. Used to indicate that the Input Voltage is too low.

FAIL – Used to indicate that the device needs repair or replacement.

PRG – Program - Button used to initiate the Programming Mode (not used)

SEL – Select – Button used to make choices during front panel programming (not used)

PS – Power Supply

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# Limited Warranty

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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 5 years from the date of purchase by the end user.
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 or malfunction of the equipment, or part thereof.
12. The Warrantor assumes no liability for incidental or consequential damages of any kind.