



# Operating Instructions for the Power Plant P500



*PS Audio International, Inc.  
4826 Sterling Dr.  
Boulder, CO 80301 USA*

*Toll Free: 877-772-8340  
Ph: 720-406-8946  
Fax: 720-406-8967*

*[www.psaudio.com](http://www.psaudio.com)*

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## *What's in the Box*

- One Power Plant P500
- One 6 foot AC power cable
- One user's manual
- One warranty card
- One spare 1 amp fast blow fuse
- One spare 15 amp slow blow fuse

### **IMPORTANT:**

Be sure to save all packing materials included with the Power Plant P500 as this will be required if you ever need to ship the unit for service or modification.



## Warning

To prevent fire or shock hazard, do not expose the unit to rain or moisture. To avoid electrical shock, do not open the enclosure. Refer servicing to qualified personnel only.

To prevent electric shock, use a 3 prong, grounded type power cable.

Any change or modifications not expressly approved in the manual could void your warranty.

## Safety Instructions

Any turntable or equipment with AC synchronous motors, such as some cooling fans should not be used with MultiWave II. This equipment must be used with 60Hz SineWave mode.

We recommend the use of the SineWave [SINE] or TubeWave [TWAVE] with any type of tube based audio products.

Read the operating instructions provided with your P500.

Retain the operating instructions for later use and reference

Unplug the P500 from the wall outlet before changing the fuse or performing any cleaning or service.

Do not operate the P500 near water. Avoid placement near a water reservoir or excessive moisture.

When replacement parts are required, be sure they are specified by the manufacturer to have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.

Do not operate with faulty or frayed power cables.

## Overview

The Power Plant P500 is a power regenerator capable of delivering the highest level of AC performance to all audio and video components.

The PS Audio Power Plant P500 is designed to operate as a stand-alone power management device, or as part of a larger power management system. In many cases one P500 will be all that is necessary to protect, clean and regenerate power for a 2 channel audio system or small home theater system.

The P500 has two power delivery zones: Four outlets produce "Regenerated AC" with MultiWave II™. Two outlets pass "Filtered AC" by filtering power with Ultimate Outlet™ technology.

The Regenerated AC zone is capable of delivering up to 500 watts of peak power, depending on the load. The filtration zone is not current limiting and will deliver as much power as your wall socket can provide.

All settings in the P500 are non-volatile. Any changes made to the settings will not be lost, even if the P500 is disconnected from AC power.



## Specifications

<b>Output:</b>	
Power (regenerated)	- 500 Watts
(filtered)	- 1800 Watts
Voltage	- 95 - 250 Volts (depending on model)
Frequency	- 50 - 120 Hz
Current	- 7 Amps
Peak	- 10 Amps (soft limit)
Distortion (THD)	- 0.1%

<b>Input:</b>	
AC input range	- 90-250 Volts (depending on model)
Frequency input	- 50/60 Hz
Input capacity	- 750 VA
Power consumption	- 35 Watts (with no load)

### General

Width	- 17.25 in
Height	- 4.25 in
Depth	- 13 in
Weight	- 33 lbs
Cooling system	- forced convection

## Warranty and Service

### Inside the U.S. and Canada

PS Audio's warranty is 3 years parts and labor, from the date of original purchase. The warranty follows the product itself regardless of ownership, new or used.

### Outside the U.S. and Canada

PS Audio has authorized distribution in many countries of the world. In each country, the authorized importing retailer or distributor has accepted the responsibility for warranty of products sold by that retailer or distributor. Warranty service should normally be obtained from the importing retailer or distributor from whom you purchased the product. In the unlikely event of service required beyond the capability of the importer, PS Audio will fulfill the conditions of the warranty. Such product must be returned at the owner's expense to the PS Audio factory. Contact your PS Audio distributor or the PS Audio customer service department for more information.

### Service issues

Should your unit ever require service or if you have any technical questions about the P500, you must either contact your dealer (PS Audio if purchased direct) or your PS Audio distributor. No equipment will be received at our service facilities without an attached RA number.

If the product was purchased through an authorized PS Audio dealer or distributor, the RA number must be obtained by the dealer or distributor. If the product was purchased from PS Audio direct, the RA number can be easily obtained by contacting PS Audio by phone at **720-406-8946** or by e-mail at **<service@psaudio.com>**

- Up to 500 watts power delivery - depending on load requirements.\*

- Next generation MultiWave II technology featuring AutoWave and TubeWave.

- Independent power zones keep power for analog, digital and high current equipment electrically isolated.

- Regenerated AC delivered through 4 Power Port outlets.

- Filtered AC by High Current Ultimate Outlet™ delivered through 2 Power Port outlets.

- Front panel display for systems monitoring and user interface.

- Front panel displays waveform setting, output voltage, wattage and percentage of maximum power output.

- Massive heat sink with thermally controlled cooling fan.

- Reduction of AC line noise by more than 70dB.

- High voltage surge suppression devices for surge and spike protection.

- Lower AC impedance for better transients.

- Massive toroidal transformer for extended headroom.

- PS Audio's brushed aluminum FRAME chassis.

- Optional rack mount capability.

- PS Bus for communication with other PS Audio devices.

#### \* Note about power consumption:

The P500 is capable of delivering up to 500 watts into a reactive load and up to 350 watts into a resistive load. Examples of a reactive load are: most solid state equipment and video products. An example of a resistive load is: tube based equipment.

## Quick Start Guide

**1.** Place the P500 in a rack or on a shelf in the audio/video system. If placed on carpet it is necessary to use isolation or accessory feet to elevate it above the carpet 1 inch. Ensure there are no objects within 6 inches of the rear of the unit as it is necessary for proper ventilation. Failure to do so could compromise the power regeneration capabilities of the P500.

**2.** Connect audio/video equipment to the P500. There are three electrically isolated duplex receptacles on the P500, which are oriented vertically.

For optimum performance, we recommend that equipment with low wattage power requirements be plugged into the "Regenerated AC" receptacles (2-ch preamps, AV processors, DVD/CD players, Satellite receivers, PVR's, D to A converters, low power solid state amplifiers, etc).

Equipment with high wattage power requirements should be plugged into the "Filtered AC" receptacles (direct view TVs, plasma or projection displays, multi channel, tube or high powered amplifiers).

**3.** Plug the P500 into a power source such as a wall AC outlet. Use the supplied AC power cable, or an aftermarket power cable. We would strongly urge the use of an xStream Power Cable.

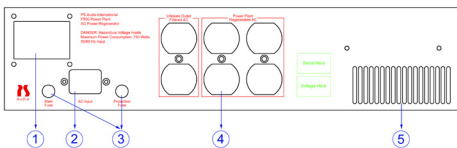
**4.** Turn on the P500 by pressing the power button located on the far left side of the front panel. The Regenerated AC zone will become active. The Filtered AC zone becomes active when the P500 is plugged into a live outlet.

**5.** If desired, select a MultiWave II setting or allow AutoWave to adapt to the power needs of your system using the front panel controls.

### Default settings

The P500 comes from the factory with standard default settings that should work well for most situations. The type of power delivery can be configured to achieve the optimal performance for any system.

## Rear Panel Layout



### 1. PS Bus

The P500 comes equipped with a built in PS Bus. The PS Bus allows other PS Audio products equipped with a PS Bus to communicate via standard RJ11 "twisted end" crossover cable.

### 2. IEC AC Power Inlet

15 Amp IEC standard male socket.

### 3. Main and Protection Fuses

The main fuse is a 15 Amp slow blow. The protection fuse is a 1 Amp fast blow. Both can be removed by inserting a flat device into the fuse holder and twisting counter-clockwise.

### 4. Power Ports™

Three PS Audio Power Ports™ provide the best possible connection to power equipment.

### 5. Ventilation slots

The ventilation slots provide exhaust for the thermally controlled cooling fan. Leave at least 6 inches of clearance behind the unit at all times.

## Front Panel Controls

There are five buttons on the front panel of the Power Plant P500.

1. Power
2. Mode Down
3. Mode Up
4. Edit Down
5. Edit Up

### Power On/Off

The power button will activate the front panel display and output AC power to the Regenerated AC zones. Power will continue to pass through the Filtered AC power zone as long as the P500 is plugged into a live AC outlet.

### Mode

The Mode Up and Mode Down buttons cycle through the available display modes.

### Edit

The Edit Up and Edit Down buttons cycle through the available options within each display mode.

## Display Modes

There are six available display modes on the front panel of the P500. The Mode Up and Mode Down buttons cycle through the following six modes:

1. Waveform setting
2. Frequency generated (SINE mode only)
3. Voltage produced
4. Wattage produced
5. Percentage of maximum power output
6. Display blanking mode

### Waveform setting

This mode will display the name of the waveform presently being delivered through the Regenerated AC outlets. In the SINE mode the P500 will generate a perfect SineWave (50-120Hz). Each of the successive MultiWave™ modes will generate a different series of frequencies through the Regenerated AC outlets.

For more information about each of the MultiWave™ settings, see the MultiWave II section of the manual.

### Frequency generated

This mode will display the frequency the P500 is generating, while in SINE mode. The frequency

### The P500 will not power up during the cool down process.

The P500 is ready to be reactivated only after it returns to safe operating temperature, at this time the power button will become active.

Please use this time to reduce the load that is connected to the Regenerated AC outlets of the P500. This message will be displayed when the P500 is being overworked.

#### Note about operation:

This message applies only to the regenerator circuit. The Power Port receptacle dedicated to the built in High Current Ultimate Outlet will continue to pass AC.

### The display is flashing a percentage

The P500 will turn itself off and flash a percentage (for example, "184%") on the display if it detects an over-current condition.

If the current draw exceeds 100% of the P500's maximum recommended capacity for more than 3 seconds, it will power down and display the over-current amount.

If the current draw exceeds 200% of the P500's maximum recommended capacity, it will instantaneously power down and display the over-current amount.

Press the front panel power button once to clear the flashing display and again to turn the unit back on. If this message continues to appear, you must reduce the load on the P500.

#### Note about operation:

This message applies only to the regenerator circuit. The Power Port receptacles dedicated to the built in High Current Ultimate Outlet will continue to pass AC.

### The display is flashing "SHORT"

The P500 will turn itself off and flash "SHORT" on the display if it detects an electrical short, which means a product connected to the P500 is trying to draw too much current. This could be related to a defective power cable that is plugged into the back of the P500.

Press the front panel power button once to clear the flashing display and again to turn the unit back on. If it continues to flash "SHORT" disconnect all output connections from the back of the P500 and power it up again. Be sure to check the power cables for any defects before plugging them back in.

If the display continues to read "SHORT" please contact your dealer for additional service.

#### Note about operation:

This message applies only to the regenerator circuit. The Power Port receptacles dedicated to the built in High Current Ultimate Outlet will continue to pass AC.

### The display is flashing "FAULT"

The P500 will turn itself off and flash "FAULT" on the display if it detects a general hardware or software error. It is highly unlikely that the P500 will ever experience this condition, but FAULT indicator has been built-in to ensure proper and long-term product reliability.

If this message is displayed, simply turn the P500 off using the front panel power button, let it sit for a few seconds and power it back up. If the "FAULT" message continues to appear, please contact your dealer for additional service.

#### Note about operation:

This message applies only to the regenerator circuit. The Power Port receptacle dedicated to the built in High Current Ultimate Outlet will continue to pass AC.

### The P500 shut down but the display is blank and the fuses are not blown

The P500 has redundant thermal protection that will shut the unit down in the event the internal temperature is too hot. If airflow is inadequate or room temperature is very warm and the P500 is run near 100% capacity for very long periods of time this type of shut-down may occur. The P500 will automatically turn back on when it has cooled sufficiently. If this occurs the load should be lessened on the P500 or else improve the airflow around the P500.

### How do I reset the settings to factory default?

The P500 was designed to easily reset the microprocessor back to the original factory default. If the P500 is displaying any characters in the front panel that seem abnormal, if the front panel buttons do not correlate with the display read-outs or to simply reset all settings back to the factory defaults follow these instructions.

With the unit powered off, hold down both Mode buttons (Up and Down) and press the Power button. This will activate the Setup Display Mode. Using the Mode Up or Down buttons, cycle to the "RESET" mode. Press either Edit button (Up or Down) and the display will read "GO ->" to confirm the choice. Press either Edit button again to perform the reset function. Once it is complete, the P500 will exit the Setup Display Mode automatically.

## Servo System

The Power Plant provides a virtual Servo System to continually correct for any DC offset. This will reduce hum from problematic or sensitive transformers as the Power Plant produces pure AC waveforms indefinitely without the need for calibration.

## Troubleshooting Guide

The Power Plant P500 sets a new mark for performance and protection. It has been designed to bring forth the absolute best from the connected equipment. In addition to the audio and video improvements, the P500 will also provide long-term product reliability and the piece of mind that connected equipment is safe from electrical disturbances.

In the event of abnormal operation with the P500, please refer to the following suggestions:

### Unit will not turn on

1. Check the obvious. Is it plugged in and is the AC wall outlet live? This can easily be tested by using a functional lamp. Plug the lamp into the wall outlet and see if the light works. If not, the P500 may be plugged into a switched outlet, or perhaps the circuit breaker feeding the outlet has tripped and needs resetting.

2. After plugging the unit into the wall, the display will read "WAIT" for several seconds to initialize its circuitry. The P500 will only become activated after pressing the front panel power button. Be sure that the unit is both plugged into the wall and turned on by the front panel power button.

3. Check the Main Fuse. The chances of the Power Plant's main fuse being blown are very remote. However, if the Main Fuse is blown, the P500 will be completely inoperable. To check the fuse locate the section of the back panel labeled "Main Fuse." **Unplug the unit from the wall**, remove the fuse and check its conductivity. If necessary, replace the fuse and

try powering up the P500. If the main fuse is blown and a replacement fuse does not solve the problem, please contact your dealer for additional service.

### The Regenerator outlets are passing AC, but the Filtered AC outlets are not functioning

Check the Protection Fuse. To check the fuse locate the section of the back panel labeled "Protection Fuse." **Unplug the unit from the wall**, remove the fuse and check its conductivity. If necessary, replace the fuse and try powering up the P500. If the Filtered AC outlets still do not pass AC, please contact your dealer for additional service.

### The P500 seems to be working, but the display is blank

The P500 may be in the display blanking mode. Press the Mode Up or Down buttons on the front panel and the display should turn back on.

### My turntable or fan based equipment is not operating normally.

Any turntable or equipment with AC synchronous fans should not be used with MultiWave II or AutoWave. These products must be used with 60Hz SINE mode or be plugged into the Filtered AC outlets.

### The display is flashing "HOT!"

The P500 will turn itself off and flash "HOT!" on the display if it detects an internal temperature that exceeds safe operating limits. The internal cooling system will continue to operate until the temperature has been reduced to a safe limit.

can be adjusted in 1 hertz increments from 50Hz to 120Hz by using the Edit Up and Edit Down buttons. The default setting is 60Hz.

The frequency setting will only be displayed if the Waveform menu is set to SINE.

### Voltage produced

This mode will display the output voltage of the Power Plant at the Regenerated AC outlets. The output voltage can be adjusted in 1 volt increments by using the Edit Up and Down buttons. The range varies depending on the Power Plant model:

- 100 volt model ranges from 95 - 105 v  
Default setting is 100 volts.
- 120 volt model ranges from 110 - 125 v  
Default setting is 117 volts.
- 240 volt model ranges from 220 - 240 v  
Default setting is 220 volts.  
(adjustments in 2 volt increments)

As long as the voltage to the Power Plant does not deviate more than 10% below normal it will continue to output the voltage displayed on the front panel.

### Wattage produced

This mode will display, in real-time, the wattage the P500 is generating. The P500 is capable of delivering up to 500 watts for short amounts of time, however if over 500 watts is drawn for too long or peak wattage is too large then the P500 will go into protection mode. The watt meter will only show the total wattage produced for the zone labeled Regenerated AC.

### Percentage of maximum power output

This mode will display, in real-time, the percentage of total power currently being used by equipment on the Regenerated AC outlets. This reading will factor the type of load into the percentage of maximum power output. The percentage of maximum power output is not necessarily

proportional to the wattage produced, as it will vary with the type of load.

It is possible that the display will show over 100% for short amounts of time during heavy current draw. This will typically occur during loud or very dynamic passages of music or very bright scenes in video. The P500 will not maintain 100% output power continuously.

### Display Blanking

This mode allows discrete front panel operation by blanking the display. The PS logo will continue to illuminate in blue to indicate that the unit is operational.



## Additional Display Notifications

**HOT!** - If the P500 exceeds safe operating temperature the front panel display will flash "HOT!". The Regenerated AC outlets will stop generating AC until the P500 returns to safe operating temperature. The internal fan will continue to run and the power should not be disconnected at this time. See troubleshooting guide if problem persists.

**PERCENTAGE** - If the equipment connected to the Regenerated AC outlets draws current over 100% for more than 3 seconds, or over 200% for any amount of time, the display will flash the over current percentage (ex. 184%) and the P500 will shut down. If the behavior continues the load should be reduced. This can be done by moving some of the equipment powered by the Regenerated AC outlets to the Filtered AC outlets. See troubleshooting guide if problem persists.

**SHORT** - If the P500 detects an electrical short either internal or external the front panel display will flash "SHORT". If turning the unit off and back on again from the front panel does not correct the problem then the power cable should be removed and reinserted. See troubleshooting guide if problem persists.

**FAULT** - If there is any other type of operational error the P500 will flash "FAULT" in the display. The same procedure should be taken as in SHORT mode. See troubleshooting guide if problem persists.

### Note About Operation:

In all of these situations the Regenerated AC outlets will not produce power, however, the Filtered AC outlets will continue to pass power. If the P500 is in display blanking mode the above notifications will still be displayed.

## Setup Display Mode

There are 4 additional parameters that you can access in the setup display mode. The setup display mode can be activated by pressing the Mode Up and Mode Down buttons simultaneously while powering on the P500.

Pressing Mode Up/Down will scroll through the 4 setup parameters. The 4-setup parameters are:

- |                     |         |
|---------------------|---------|
| 1. Software version | [VER.]  |
| 2. Network Address  | [N ADR] |
| 3. Network Group    | [N GRP] |
| 4. Reset            | [RESET] |

To exit the setup menu at any time, power down the P500 and all changes will be saved.

### Software version

This mode will display the current version of the P500 operation software. Press the Edit Up/Down key to display the version number. This mode cannot be edited.

### Network Address

If more than one piece of PS Audio equipment is used in a system, then each piece connected to the PS Bus must have a unique Network Address. In this way, each piece of PS Audio equipment can easily be recognized and identified in the Network Bus. There are 8 possible Addresses which can be selected by pressing the Edit Up/Down buttons when in the Network Address mode.

If no Network Address is set then the P500 will operate independently of any other PS Audio equipment on the PS Bus.

### Network Group

It is possible to assign the P500 to a unique Network Group. There are 3 possible groups which can be selected by pressing the Edit Up/Down buttons when in the Network Group mode. If it is necessary to have more than one Group on the PS Bus then, all PS Audio products can exist on the same PS Bus yet communicate in separate groups so each Group will operate independently.

### Reset

If at any time it is necessary to reset all of parameters of the P500 to their default settings, it can be done by pressing the Edit Up/Down button twice while in RESET mode. See Also the troubleshooting guide.

## MultiWave II

MultiWave II is a technology available exclusively on the newest PS Audio Power Plant series of AC Regenerators. The P500 includes MultiWave II and also features AutoWave and TubeWave. There are 4 MultiWave II waveforms as well as TubeWave, AutoWave and SineWave mode. MultiWave II is only available at the Regenerated AC outlets.

**Any turntable or equipment with AC synchronous motors, such as some cooling fans should not be used with MultiWave II. This equipment must be used with 60Hz sine mode.**

**We recommend the use of the SineWave [SINE], or TubeWave [TWAVE] with any type of tube based audio products.**

### [SINE] SineWave

In the SineWave mode the Power Plant will generate a perfect SineWave (50-120Hz).

### [TWAVE] TubeWave

TubeWave is specifically designed to optimize the performance of tube based audio products.

TubeWave uses the same pseudorandom generation of frequencies as MultiWave2 waveform, however it generates more tube-friendly frequencies.

### [MWAV1] MultiWave1

MultiWave1 is a single 60Hz SineWave with a minute amount of 3rd Harmonic SineWaves mixed together to form a single partial square MultiWave. This is an improved version of PS2 from the original MultiWave™ series.

The partial square wave setting improves the power supply's ability to charge the capacitors in equipment by extending the length of time available to "top off" the capacitors' voltage. Use this setting to enhance the performance of both source and power equipment.

### [MWAV2] MultiWave2

MultiWave2 is a 60Hz SineWave that incorporates a pseudorandom collection of frequencies which are dithered from 55-65Hz.

Using this slightly random frequency deviation is similar to adding dither on a digital audio source. Power supply dithering can lower the perceived noise floor and help remove apparent glare on the audio signal.

### [MWAV3] MultiWave3

MultiWave3 is a combination of MultiWave1 with a slight degree of 3rd harmonic addition (MultiWave1).

Try this setting and see how the audio sounds and the video looks. All systems can respond differently to each MultiWave pattern.

### [MWAV4] MultiWave4

MultiWave4 is full combination of MultiWave1 and MultiWave2. It generates a pseudorandom collection of frequencies, however instead of generating SineWaves it generates the same waveform as MultiWave1.

Again, try these setting on your system to see which one has the highest perceived benefit in terms of performance.

### [AUTO] AutoWave

This revolutionary new process automatically computes the best MultiWave II setting for a particular power load as presented by the connected equipment. The beauty of this system is its ability to instantly change the power setting of the AC regenerator with the dynamic load variations the equipment presents.

AutoWave automatically selects MultiWave™ 2-4 depending on the dynamics of the power load. The selection is made continuously as the power factor changes.

Music is a dynamic medium as is video. One MultiWave II setting may be the best when an audio/video system is reproducing low level information and another MultiWave II setting is probably better when higher levels of power are delivered to either the loudspeaker or to a video monitor.

AutoWave provides a solution by selecting the exact waveform combination based on the equipment's dynamic needs.

### Notice of MultiWave II operation:

Any turntable or equipment with AC synchronous fans should not be used with MultiWave II or AutoWave. These products must be used with 60Hz SINE mode or be plugged into the Filtered AC outlets.

