

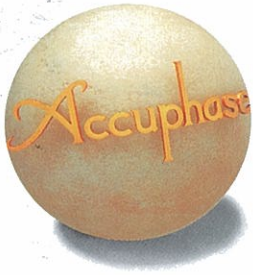
Accuphase

CLEAN POWER SUPPLY

PS-1200

- Clean AC power supply based on waveform shaping technology
- Highly effective waveform compensation
- Outstanding current capability
- Superb interference rejection
- Built-in meter for monitoring of output power, input/output voltage, input/output distortion
- Large "Super Ring" toroidal transformer





Tap into a totally clean source of AC energy, providing up to 1200 VA. Revolutionary waveform shaping technology compares the AC input to an ideal sine waveform and provides highly precise compensation. High-frequency interference components are reliably removed, for further improved sound quality and video image purity. A built-in meter allows monitoring of output power, input/output voltage, and input/output distortion.

The Clean Power Supply PS-1200 is a high-power version of the renowned PS-500. It can deliver up to 1200 VA which is more than ample to cover the requirements of most high-quality systems. The PS-1200 is based on waveform shaping, a revolutionary technique that drastically improves the purity of the AC power going into an audio system.

Power Supply Waveform

The power generated by the power plant originally is fed into the electrical grid with a clean sine waveform. However, when power is withdrawn from the local AC outlet, the waveform almost invariably is clipped. The reason for this phenomenon lies in the electrical appliances used in the household. Conventional TV sets, personal computers, audio components, as well as many other appliances convert AC input into a DC current for powering the internal circuits. This task is performed by a rectifier consisting of a diode and capacitor arrangement. As shown in photograph (a), the rectifier load current has a pulse waveform. In the vicinity of the voltage peak of the sinus waveform, a large current flows momentarily which causes a voltage drop, or in other words a clipping of the voltage waveform, as shown in photograph (b). A clipped waveform with a high amount of distortion contains many unwanted frequency components, or harmonics. When entering the audio circuitry of an amplifier through the power supply, such harmonic components can interfere with the audio signal and cause intermodulation distortion which has a highly detrimental effect on sound quality. When passing through the PS-1200, the deformed waveform is restored to its original sine wave pattern, as shown in photograph (c).



Photo (a) Current waveform of rectified load

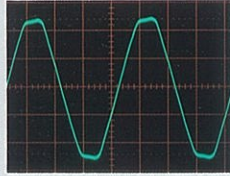


Photo (b) Voltage waveform of current line (distortion: approx. 3%)

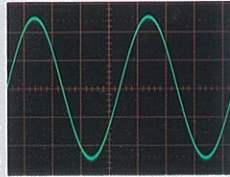


Photo (c) Output waveform of PS-1200 (distortion: approx. 0.2%)

become able to develop their full potential. Consequently, upgrading the quality of the AC power source of an audio system results in a sound quality improvement that must be heard to be believed. The PS-1200 incorporates a revolutionary new technique which constantly monitors the input voltage waveform and adds or subtracts exactly the required amount of compensation to achieve a perfectly regular, sinusoidal waveform. This allows it to supply up to 1200 VA of extremely stable and clean energy to the components of an audio system. Of course, the PS-1200 also has the ability to completely block any high-frequency noise components, resulting in total absence of modulation noise.

AC Voltage Stabilizer Based on Waveform Shaping Technology

The PS-1200 accepts AC power on the input side, processes it by comparing it to a precise reference waveform, and supplies it as clean AC power on the output side. Most of the AC energy from the input is carried over to the output. The loss introduced by the PS-1200 is very small, since it consists only of the power required for waveform compensation. Compared to conventional AC voltage stabilizers, efficiency is much higher and excess thermal energy is low, allowing the unit to be made relatively small and lightweight. Since the power supply frequency is synchronized to the input, an internal oscillator is not required. Therefore the unit itself does not generate any high-frequency noise.

Figure 1 shows the circuit diagram of the unit. The signal from the secondary winding S_1 of the transformer is routed through the adding/subtracting circuit and appears at the output as output voltage (e_o). The S_2 signal from the transformer is supplied to the reference waveform generating circuit where it is turned into the high-precision sine waveform (e) synchronized to the input frequency. This sine wave signal is then routed to the waveform

comparator to be used as reference signal. By comparing the output voltage (e_o) to this reference sine waveform (e_i), the differential component is detected. Based on this information, the adding/subtracting circuit can provide exactly the required amount of compensation for turning the output into a high-precision sine waveform.

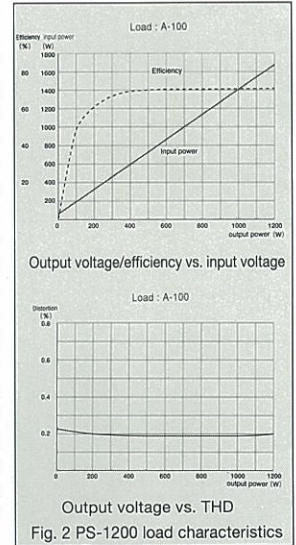


Fig. 2 PS-1200 load characteristics

Superior Waveform Compensating Power

Generally speaking, if the input voltage is for example 110V/220V, 10 volts must be added to bring

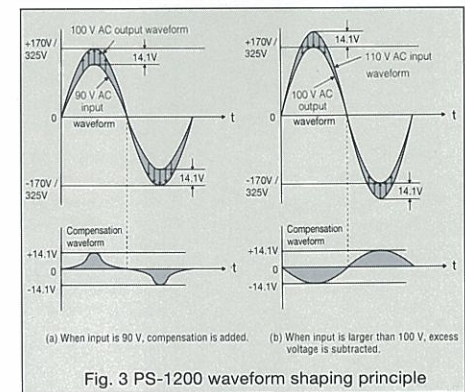


Fig. 3 PS-1200 waveform shaping principle

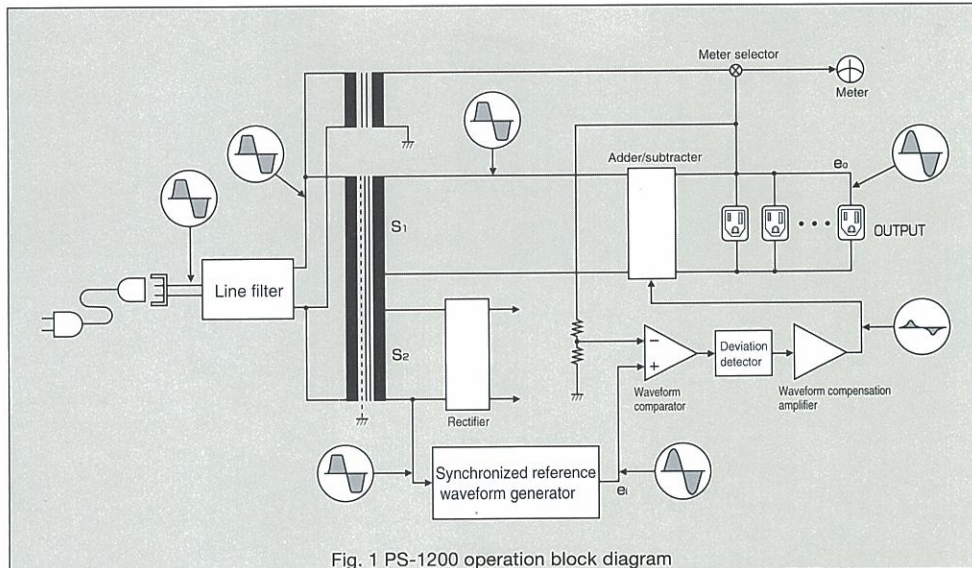
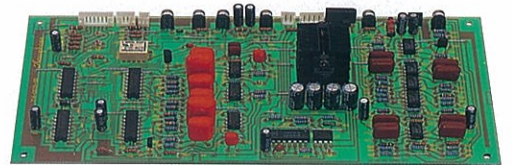


Fig. 1 PS-1200 operation block diagram

The AC power lines in homes as well as in office buildings, recording studios, and elsewhere are also connected to equipment containing digital circuits and microprocessors, such as computers and many kinds of electrical appliances. High-frequency noise components originating in such equipment can enter audio components via the power supply and severely affect sound quality by causing intermodulation noise and distortion. Only when such noise interference is removed and totally clean power is supplied, do audio components



■ Assembly with waveform compensation amplifier for addition/subtraction, output stage with 20-parallel push-pull multi-emitter devices mounted to large heat sink, comparator for reference waveform and output waveform, deviation detector, etc.



■ Assembly with synchronized reference waveform generator, etc.

it to 120V/230V, as shown in Figure 3 (a). Conversely, if the input is 130V/240V as in (b), 10 volts must be subtracted to yield 120V/230V. (Actually, the peak value of 10 V, namely 14.1 V is added or subtracted.)

By comparing a precise sine wave synchronized to the input frequency with the output voltage, a compensation waveform is created which is then imposed on the output voltage. Consequently, for an input voltage range of 108-132V/200-253V AC and a constant load of 1200 W, the output voltage remains constant at 120V/230V ($\pm 2\%$), with a maximum distortion ratio of 0.3%. These values demonstrate the outstanding waveform compensation ability of the PS-1200.

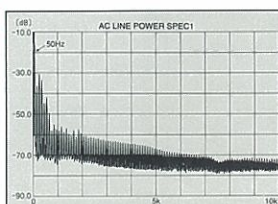
Excellent Current Capability

The power amplifier which performs waveform compensation is configured as a pure complementary symmetrical circuit using current feedback for unsurpassed operation stability. The output stage uses 20 transistors rated for a maximum current of 16 amperes. These devices are connected in a parallel complementary push-pull arrangement which boasts a rated output current of 10A/5.2A and an instantaneous peak current (inrush current)

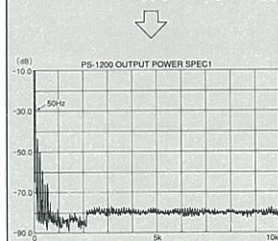
rating of 120A/60A. This kind of current capability is an order of magnitude better than that of conventional power supplies.

Highly Effective Interference Rejection

The input side of the PS-1200 also contains a line filter for removing high-frequency noise components that may be present in the power line. The primary and secondary windings of the power transformer are kept totally separate, and the fully shielded design shuts out any externally induced noise.



(a) Frequency spectrum of power supply line in photo (b)



(b) Frequency spectrum of PS-1200 output in photo (c)

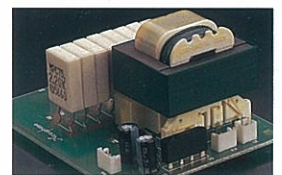
Fig. 4 Frequency spectrum of current

Since the PS-1200 uses the AC feedback principle, output impedance is extremely low. This prevents any possibility of mutual interference between components connected to the outputs of the PS-1200.

Figure 4 shows the frequency spectrum of the power supply line and the PS-1200 output. It clearly demonstrates that unwanted high-frequency components within the audible range are effectively suppressed by the PS-1200.

Built-in Meter Allows Monitoring of Output Power, Input/Output Voltage, Input/Output Distortion

The meter of the PS-1200 lets the user see at a glance how much power the connected equipment is consuming at any given time. This is especially helpful for components such as integrated amplifiers or power amplifiers whose power consumption differs considerably depending on the volume set-

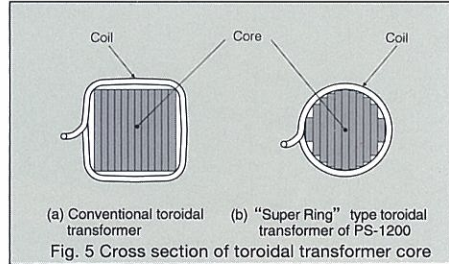


Assembly with input voltage/distortion monitor circuitry

ting and actual music signal. A meter selector also allows monitoring of input/output voltage or input/output distortion in real time.

Strong Power Supply With Large "Super Ring" Toroidal Transformer and High Filtering Capacity

The power transformer plays a vital role in any power supply. The PS-1200 uses a large toroidal type rated for 1500 VA. Toroidal power transformers have very low impedance and achieve high efficiency with compact dimensions. In particular, the "Super Ring" transformer used in the PS-1200 has the following advantages for audio applications:

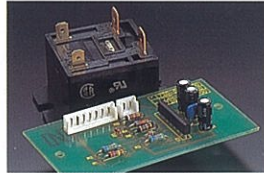


① Near-circular core caliber allows near-circular coil windings with high packing density, resulting in low weight, low losses, low leakage flux under actual load conditions, and minimum vibrations.

② Smaller ferrite core diameter and copper windings with high specific gravity mean low ferrite losses and low inrush current.

Elaborate Protection Features Assure Total Operation Safety

If any of the conditions described below should arise during operation, the circuit breaker integrated in the power switch immediately shuts off the power, to protect the unit and any connected components.



① Input current overload protection

The protection is activated when the combined power consumption of equipment connected to the

AC outputs of the PS-1200 exceeds 1200 VA, causing the rated input current to surpass 10A/5.2A, or when an output connector is short-circuited.

② Instantaneous output current overload protection

For operation safety, a 120A/60A current limiter provides protection against momentary power overload such as caused by inrush current when a component is switched on.

③ DC voltage in output

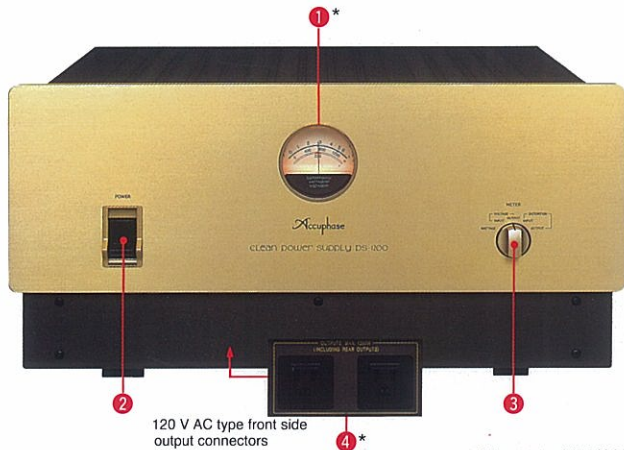
Output is cut off before any DC components can reach connected equipment.

Multiple Output Connectors

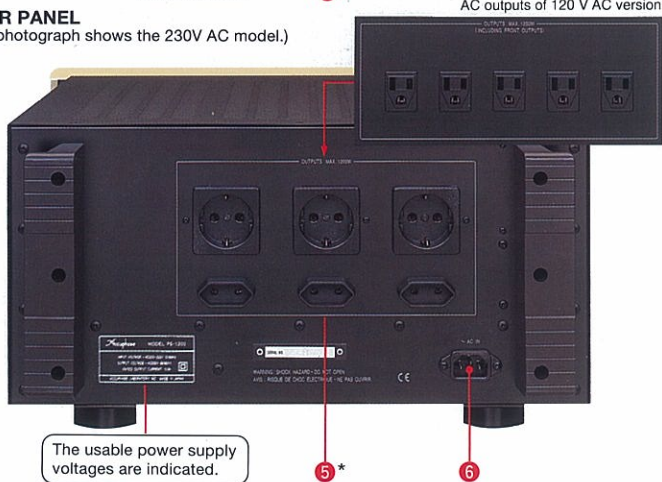
The PS-1200 can supply a number of components such as a CD player, DAT recorder, preamplifier, power amplifier etc., provided the combined power consumption is less than 1200 VA.

Note:
When two figures are given in this document, these refer to the 120V AC and 230V AC version of the PS-1200 respectively.

FRONT PANEL (The photograph shows the 230V AC model.)



REAR PANEL (The photograph shows the 230V AC model.)



- ① Meter *
- ② Power Switch/circuit protector
- ③ Meter selector
- ④ ⑤ AC outlets *
- ⑥ AC input connector (for supplied power cord) *

Remarks
 * The actual allowable voltage is indicated next to the AC power connectors on the rear panel. Be sure to check this indication before using the PS-1200.
 * The 120V AC and 230V AC versions of the PS-1200 differ regarding meter voltage indication, AC output connector shape, supplied power cord, etc. Make sure that you have the correct version.
 * The shape of the plug of the supplied power cord depends on the voltage rating and destination.

PS-1200 Power Meter Indication and Load

The power consumption of electrical equipment as indicated on the equipment itself and in catalogs and other documentation is usually given in watts (W). This figure represents the so-called effective power which is stated according to legal requirements. However, the actual power drawn by the equipment is larger than the effective power. This is called the apparent power which is calculated by multiplying the applied voltage (120V/230V) with the actual current. The unit for apparent power is VA (volt-ampere).

Since the value shown by the power meter of the PS-1200 in the "Wattage" position is the apparent power, the reading will be higher than the power consumption (W) given in catalogs and specification sheets.

- The rated power limit of the PS-1200 is 1200 VA. When deciding on equipment to be connected, power consumption figures given in catalogs and the like can be used for a general estimate, but actual power consumption should be checked using the meter.
- The power consumption of integrated amplifiers and power amplifiers varies considerably depending on the actual audio output. After connecting such equipment, perform playback and verify that power consumption does not exceed 1200 VA also when peaks in the music are reproduced at high volume levels.

※ This unit is designed to be used only with an ordinary household AC outlet. Do not connect it to portable AC generators or other AC sources on boats, etc.
 ※ This unit is designed to be used only for powering audio and video equipment, with the aim of improving sound or picture quality. Do not connect any other appliances to the unit.

GUARANTEED SPECIFICATIONS

※ Guaranteed specifications are measured according to EIA standard RS-490.

- **Rated output capacity :** 1200 VA (continuous)
- **Rated output voltage :** 120 V AC \pm 2.4 V/230 V AC 4.6 V
- **Rated output current :** 10 A/5.2 A
- **Output frequency :** 50 Hz or 60 Hz (identical to input frequency)
- **Instantaneous peak current capacity :** 120 A/60 A
- **Output waveform THD :** 0.3% or less
- **Input voltage range :** 108-132 V AC / 200-253 V AC
- **Input frequency :** 50 Hz or 60 Hz
- **Input capacity :** 1500 VA (at rated output)
- **No-load power consumption :** 60 W
- **Cooling principle :** Natural air cooling
- **Meter :**
 - WATTAGE : 0-1200 W
 - VOLTAGE INPUT/OUTPUT : 120V/230V \pm 5% (red zone)
 - DISTORTION INPUT/OUTPUT : 0-6%
- **Maximum dimensions :**
 - Width 475 mm (18-1/16")
 - Height 242 mm (9-1/2")
 - Depth 508 mm (20")
- **Weight :**
 - 37.2 kg (82 lbs.) net
 - 47 kg (103.6 lbs.) in shipping carton

※ Specifications and design subject to change without notice for improvements.

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