

CLASS-AB STEREO POWER AMPLIFIER P-4600



Accuphase Laboratory, Inc.

1

When Accuphase introduced the P-300 power amplifier in 1973, its power and driving capability were a very big surprise to the market.

The P-4000 series is the standard category of the class-AB power amplifier which is in the tradition of P-300. The new P-4600 is the fourth generation since the P-4100 was released in 2008 and has greatly improved its performance and ease of use over the generations.

The P-4600 has a significantly increased maximum output compared to its predecessor, with specifications of 150 watts into 8 ohms, and its high damping factor allows it to drive all speakers flawlessly.

The low-noised balanced circuit operation with the instrumentation amplifier can extract information from any music source. The P-4600 vividly reproduces the performer's emotion and the atmosphere of the stage.

Dimensions and Weight

- Unit dimensions are the same as P-4500
Weight is slightly heavier

- Width 465mm
- Height 190mm
- Depth 427mm
- Weight 30.0kg



Accuphase Laboratory, Inc.

2

The dimensions of the P-4600 are the same as the P-4500, and the weight is a little heavier, it weighs 30.0kg.

** P-4500: Width 465mm, Height 190mm, Depth 427mm, Weight 29.2kg

Front and Rear View



Front View



Speaker, Meter Display Selector

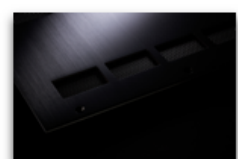


Gain Selector



Rear View

Two pairs of large speaker terminals



Aluminum Top plate

Accuphase Laboratory, Inc.

3

The P-4600 is equipped with large analog “needle” meters which offer an output power monitor with good visibility. They are high-sensitivity of the -50dB indicator, which allows you to enjoy the upbeat needle move even under the low volume operation.

We also put the gain selector in the front panel, You can choose the appropriate gain level from the 4 settings, “Max, -3dB, -6dB, and -12dB.”

The P-4600 also has two independent speaker terminals, making it easy to use different types of speakers.

The gain switching does not attenuate the signals with an attenuator. However, it controls the gain at the input amplifier section, making the power amplifier section stable and reducing the residual noise when using high-efficiency loudspeakers. We can simultaneously decrease the noise, which occurs when operating the unit under a low gain level.

Internal View



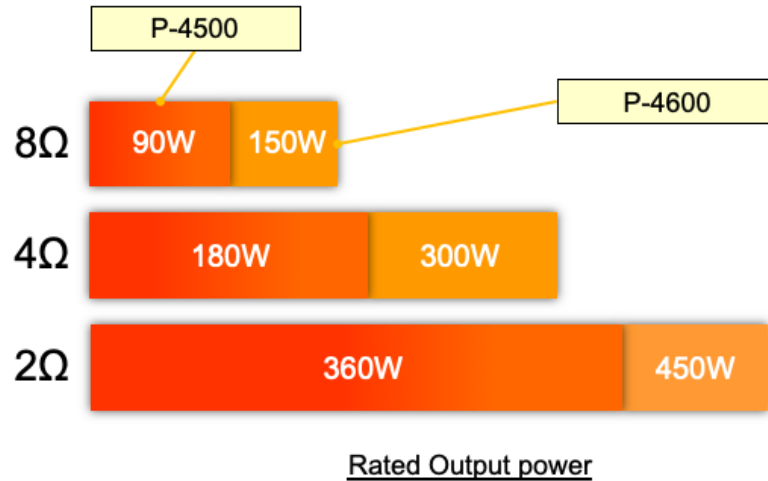
P-4600 has a mono-block construction.

It contains an intense power supply with a massive special-made and high-efficiency toroidal transformer and two sizeable 50000µF filtering capacitors in the center of the unit.

In addition, the two power amplifier units are kept separate for the left and right channels.

High Output Power

- Class-AB 150W / 8Ω, 450W / 2Ω

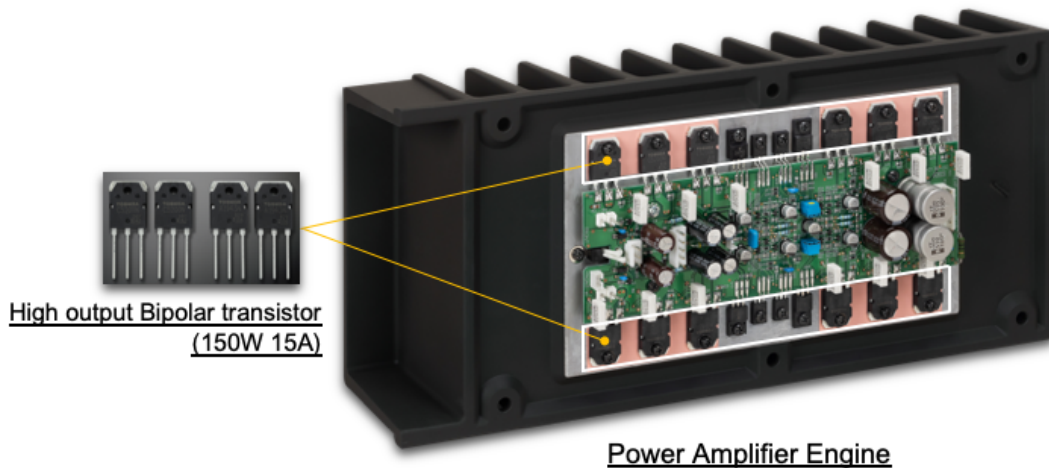


Accuphase Laboratory, Inc.

The high-power design provides the rated output power of 150W/8Ω, 300W/4Ω, and 450W/2Ω that vastly exceeds conventional models, securing an overwhelming dynamic range.

Technology for High Output Power

- 6 Parallel Output stage per channel (P-4500: 4 parallel)



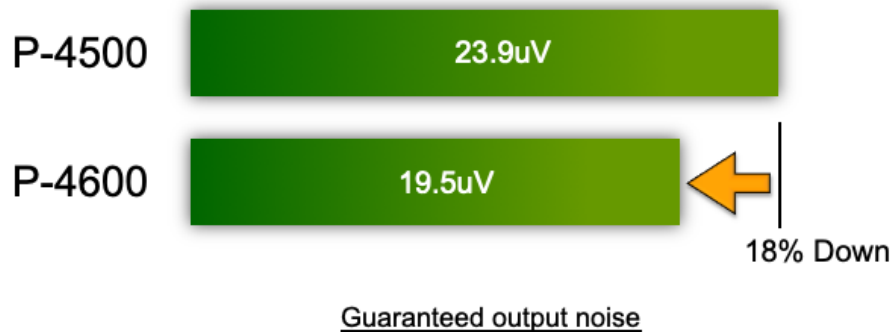
Accuphase Laboratory, Inc.

6

The P-4600 power amplification stage uses a 6-parallel push-pull power transistor architecture. By connecting output elements in parallel, the output impedance is lowered to improve the driving capability. And the same time, the load per transistor is reduced and it enables power to be supplied with a margin of safety under all conditions.

Ultra Low Noise

- High power but low noise
 - S/N ratio: 125dB guarantee (P-4500: 121dB)



Accuphase Laboratory, Inc.

7

The noise performance of the P-4600 is remarkable compared with the former P-4500.

With the state-of-the-art circuitry, the P-4600 improves noise level suppression by 17% over the previous model as guaranteed spec.

The guaranteed S/N ratio achieves 125dB, which is 4dB of performance improvement over P-4500.

Technology for ultra low noise

- Instrumentation Amplifier architecture
- Balanced signal transfer with the optimization of gain distribution



Signal Input Section



Balanced Input Module

Accuphase Laboratory, Inc.

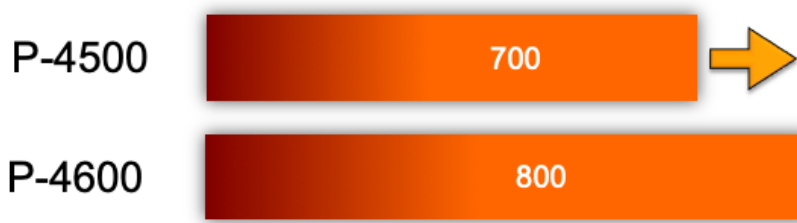
8

With balanced circuits in the signal input section, the amplification stage entirely comprises an instrumentation amplifier principle that equalizes input impedance on the + and – sides for excellent external noise suppression and provides optimal circuitry for this high-end audio amplifier.

Noise Level suppression has been dramatically improved by assigning a high gain (12.6x) in the signal input section with excellent noise figure results.

Super high Damping Factor

- Increase Damping Factor for high driving ability
 - Damping Factor: 800 guaranteed



Guaranteed Damping Factor

Accuphase Laboratory, Inc.

9

The P-4600 achieves 800 of guaranteed Damping Factor, significantly improved driving capability compared to previous models

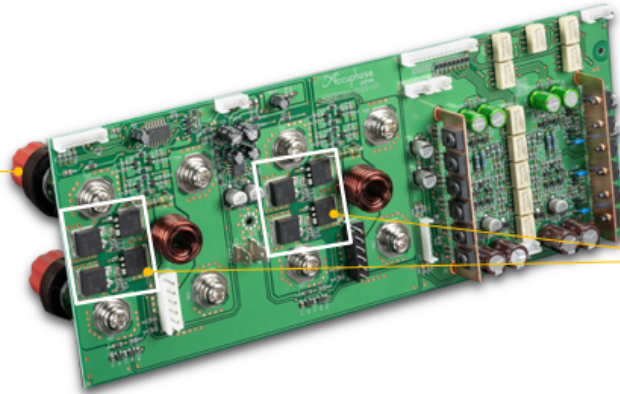
*Damping Factor, DF: The damping factor is an index of speaker driving ability. A Higher Damping-Factor amplifier has a higher speaker driving ability. $DF = 8 \text{ ohm} / \text{Output-impedance}$

Technology for super high Damping Factor

- Speaker protection equipped with MOSFET switch circuit
- Short signal path configuration



Large speaker terminals



Protection circuit Assembly



MOS-FET switch
On-resistance: 1.6mΩ

Accuphase Laboratory, Inc.

10

Mechanical relays are the typical components for speaker protection. Still, the contact resistance of mechanical relays is higher than people think.

Therefore, Accuphase has chosen the MOS-FET switch instead of conventional mechanical relays for speaker protection.

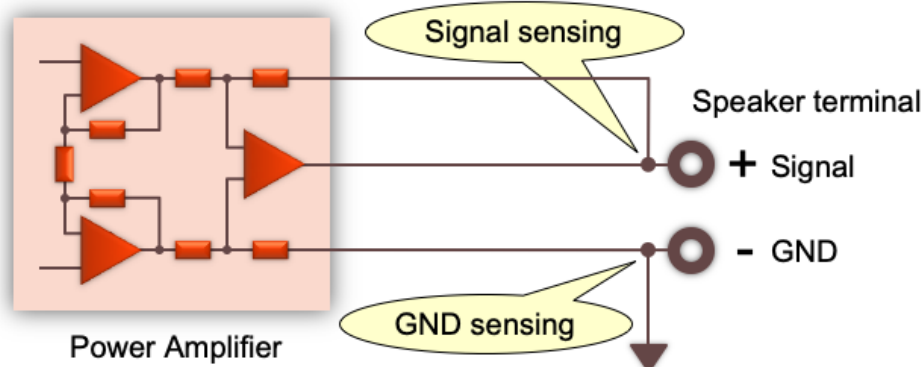
Thanks to this MOS-FET switch, the damping factor, reliability, and sound quality are improved.

The P-4600 employs carefully selected very low-impedance components such as the large speaker terminals. Making signal paths thick and short also helps to attain low impedance.

** MOS-FET switch On-resistance
P-4600's MOS-FET: 1.6mΩ
P-4500's MOS-FET: 2.0mΩ

Technology for super high Damping Factor

- Balanced Remote sensing
 - Feedback from speaker terminal proximity
 - Signal-line and GND-line sensing



Accuphase Laboratory, Inc.

11

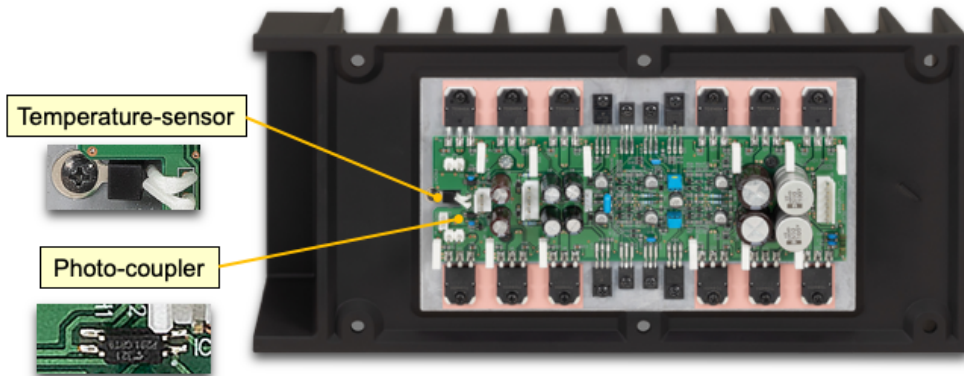
“Remote Sensing” is the technique to lower the output impedance of the amplifier by the negative feedback with a signal sensing from nearby the speaker terminals.

“Balanced Remote Sensing” is the technique to make the output impedance even lower by both the signal sensing and the GND sensing, that is, the negative feedback of the GND level.

Not only the Damping Factor but also the Total Harmonic Distortion and Intermodulation Distortion are all improved by the Balanced Remote Sensing.

Pursuing further product safety and reliability

- Power amplifier
 - Protection circuit using Photo-couplers for terminal short
 - Temperature sensors are installed on the heatsink



Accuphase Laboratory, Inc.

12

The newly designed output protection circuit can detect any short-circuiting of the speaker terminals with due consideration for product safety.

Temperature sensors that detect the heatsink temperature are installed. Thanks to this, the unit accurately ascertains the high-temperature alarm in the power amplifier section.

Thanks to the photo-coupler, the detected signal is completely isolated from the output signal to minimize the adverse effects on the sound quality.

**When these protection circuits are activated, the unit completely interrupts speaker output. It makes the power meters flash to indicate the abnormal condition.