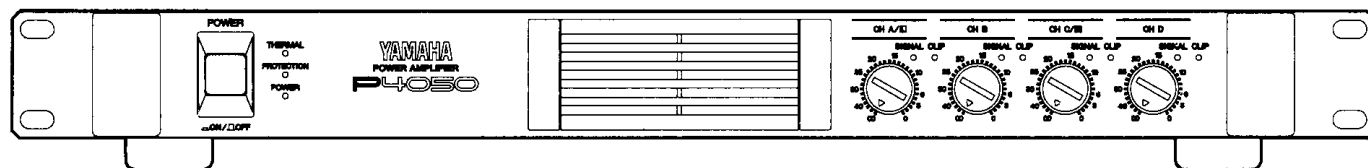




POWER AMPLIFIER
AMPLIFICATEUR DE PUISSANCE

P4050

OPERATION MANUAL
MODE D'EMPLOI
BEDIENUNGSANLEITUNG



FCC INFORMATION (U.S.A.)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!

This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.

2. IMPORTANT: When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product **MUST** be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

Relocate either this product or the device that is being affected by the interference.

Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to coaxial type cable.

If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA 90620

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

CANADA

THIS DIGITAL APPARATUS DOES NOT EXCEED THE "CLASS B" LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS SET OUT IN THE RADIO INTERFERENCE REGULATION OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

LE PRESENT APPAREIL NUMERIQUE N'EMET PAS DE BRUITS RADIOELECTRIQUES DEPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMERIQUES DE LA "CLASSE B" PRESCRITES DANS LE REGLEMENT SUR LE BROUILLAGE RADIOELECTRIQUE EDCITE PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

* This applies only to products distributed by YAMAHA CANADA MUSIC LTD.

Dette apparat overholder det gældende EF-direktiv vedrørende radiostøj.

Cet appareil est conforme aux prescriptions de la directive communautaire 87/308/CEE.

Diese Geräte entsprechen der EG-Richtlinie 82/499/EWG und/oder 87/308/EWG.

This product complies with the radio frequency interference requirements of the Council Directive 82/499/EEC and/or 87/308/EEC.

Questo apparecchio è conforme al D.M.13 aprile 1989 (Direttiva CEE/87/308) sulla soppressione dei radiodisturbi.

Este producto está de acuerdo con los requisitos sobre interferencias de radio frecuencia fijados por el Consejo Directivo 87/308/CEE.

YAMAHA CORPORATION

IMPORTANT NOTICE FOR THE UNITED KINGDOM

Connecting the Plug and Cord

WARNING : THIS APPARATUS MUST BE EARTHED

IMPORTANT. The wires in this mains lead are coloured in accordance with the following code:

GREEN-AND-YELLOW	: EARTH
BLUE	: NEUTRAL
BROWN	: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol  or coloured GREEN or GREEN-AND-YELLOW.

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

* This applies only to products distributed by YAMAHA - KEMBLE MUSIC (U.K.) LTD.

Thank you for purchasing the Yamaha P4050 Power Amplifier. The P4050 is a fine example of the experience and skill Yamaha has developed for the production of superior audio and PA equipment. It is not only highly reliable and stable, but also very compact and light. The amplifier offers three output modes — 2-channel, 3-channel and 4-channel amplification — which are selected by simple switch operation. In 2-channel mode the power output is 140W x 2 (8 ohm loads), and in 3-channel mode 140W (8 ohm loads) + 50W x 2 (8 ohm loads). Even in 4-channel mode it boasts an impressive power output of 50W x 4 (8 ohm loads).

Furthermore, to assure stable and safe operation even under extreme conditions, the amplifier is equipped with extensive protection circuitry: an automatic fan provides variable rate cooling depending on the internal temperature of the amplifier; DC detection circuitry continuously monitors for harmful DC voltages in the power output; a PC limiter circuit prevents excessive power output levels; and a POWER ON MUTE circuit protects valuable speakers.

Read this operation manual thoroughly in order to take full advantage of the P4050's performance capabilities and to ensure continued enjoyment in years to come.

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PRECAUTIONS

1. Avoid Excessive Heat, Humidity, Dust and Vibration

Keep the unit away from locations where it is likely to be exposed to high temperatures or humidity — such as near radiators, stoves, etc. Also avoid locations which are subject to excessive dust accumulation or vibration which could cause mechanical damage.

2. Amplifier Ventilation

The power amplifier is equipped with cooling fans. It is important to ensure that proper air flow can be maintained. Position the amplifier so that the front and side ventilation airflow paths are not blocked. For details about rack mount ventilation, refer to the “INSTALLATION DETAILS” section on page 8.

3. Air Filter Maintenance

This unit uses two fans for taking in cool air from the outside. To prevent dust from penetrating the interior, the air inlets are equipped with filters. When the filter elements becomes clogged, the cooling efficiency will be impaired. For this reason, the filter elements should be checked periodically, and rinsed if necessary. For details, refer to page 10, “CLEANING THE FILTER ELEMENTS”.

4. Avoid Physical Shocks

Strong physical shocks to the unit can cause damage. Handle it with care.

5. Do Not Open The Case Or Attempt Repairs Or Modifications Yourself

This product contains no user-serviceable parts. Refer all maintenance to qualified Yamaha service personnel. Opening the case and/or tampering with the internal circuitry will void the warranty.

6. Make Sure Power Is Off Before Making Or Removing Connections

Always turn the power OFF prior to connecting or disconnecting cables. This is important to prevent damage to the unit itself as well as other connected equipment.

7. Handle Cables Carefully

Always plug and unplug cables — including the AC cord — by gripping the connector, not the cord.

8. Clean With a Soft Dry Cloth

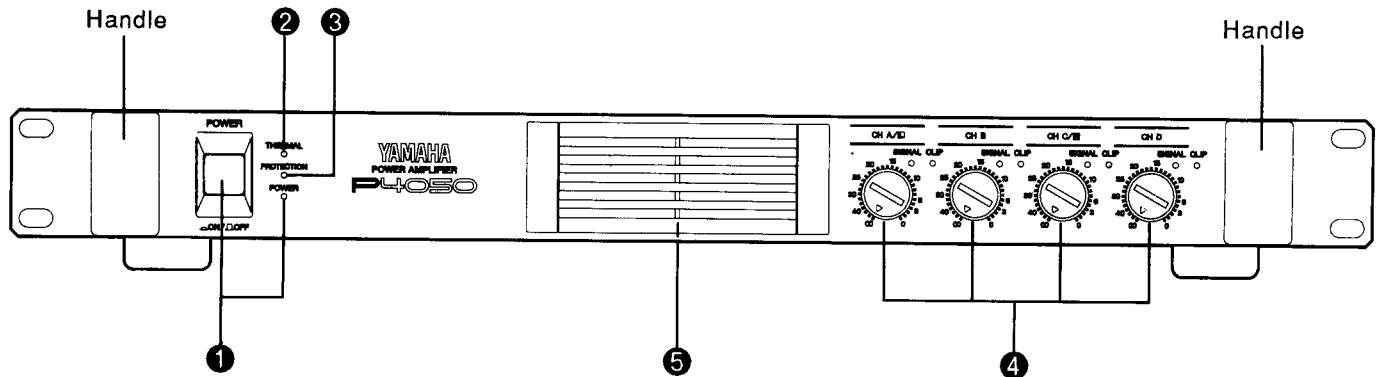
Never use solvents such as benzine or thinner to clean the unit. Wipe clean with a soft, dry cloth.

9. Always Use the Correct Power Supply

Make sure that the power supply voltage specified on the rear panel matches your local AC mains supply. Also make sure that the AC mains supply can deliver more than enough current to handle all equipment used in your system.

OPERATION

■ FRONT PANEL



❶ POWER Switch & Indicator

Pressing this switch turns the power ON, and pressing again turns the power OFF. The indicator lights when the power is ON.

❷ THERMAL Indicator

When the heat sink temperature exceeds 80 degC, the cooling fan will operate at high speed and the thermal indicator will light. If the indicator remains lit for a long time, check for cooling problems such as blocked air vents. For proper ventilation details, refer to the "Installation Details" on page 8.

❸ PROTECTION Indicator

The PROTECTION indicator lights for approximately 7 seconds after the POWER switch is pressed to indicate that the protection circuitry is operating. No sound is output from the speakers while this indicator is lit. This indicator will also light and sound will be cut off to the speakers if the protection circuitry is activated at any other time during amplifier operation due to factors such as overheating or the detection of excessive DC voltage at the outputs. When the problem is corrected, the protection circuitry is automatically deactivated, the indicator goes out, and the amplifier resumes normal operation.

❹ Input Attenuators

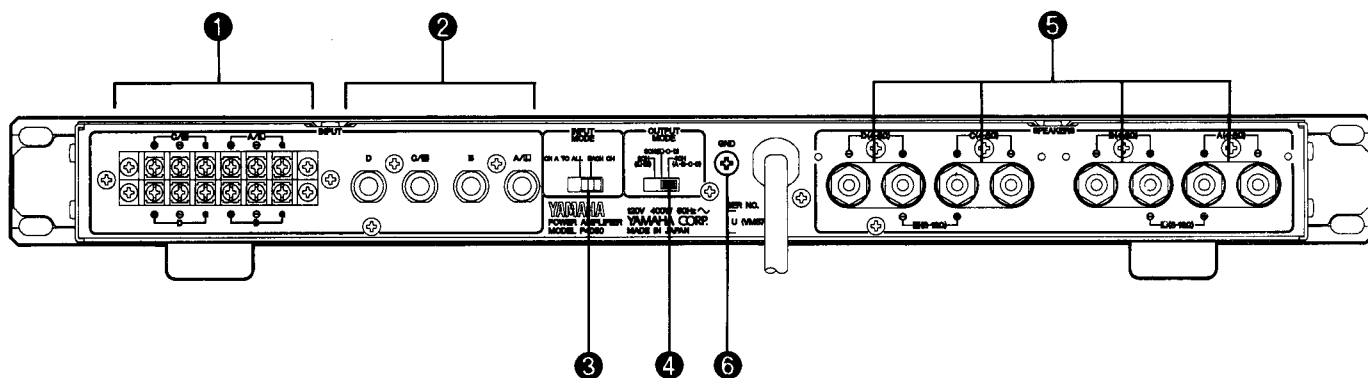
The input attenuators are 31-position click-stop controls used for adjusting input sensitivity. Rotating fully in the clockwise direction sets the attenuator at 0 dB, while rotating fully in the counterclockwise direction provides infinite attenuation.

❺ Cooling Fans

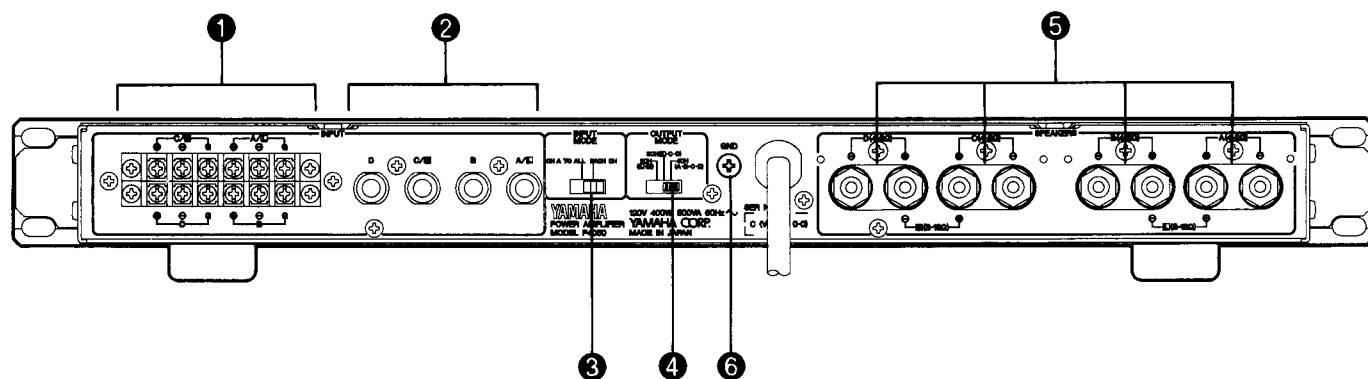
The amplifier is cooled with a variable rate, cooling fans.

When there is no output signal, or when the heat sink temperature is low, the fan is stopped. When the heat sink temperature exceeds 60 degC, the fan will begin to rotate. The fan speed will increase as the heat sink temperature increases.

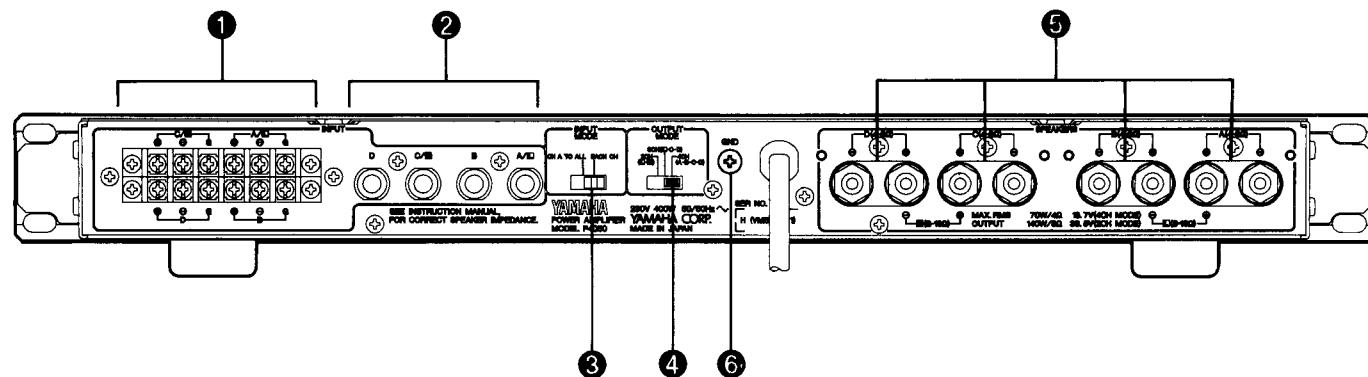
■ REAR PANEL



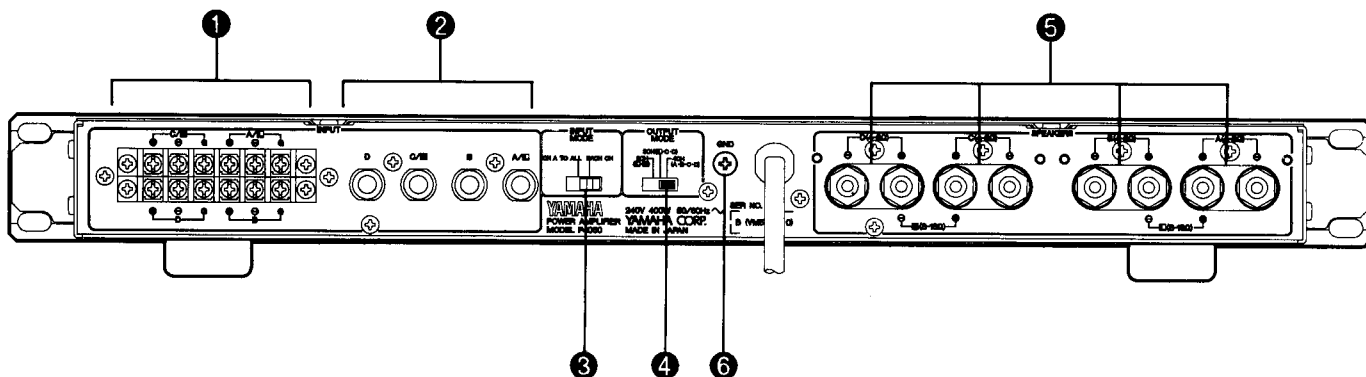
U.S. model



Canadian model



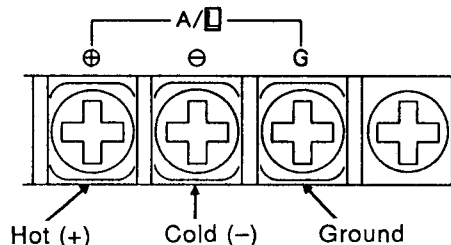
General model



British model

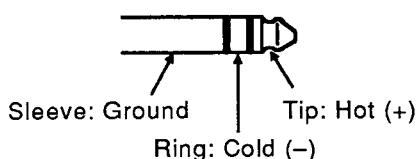
① INPUT Terminals (screw type)

These screw terminals can be used for balanced and unbalanced input signal connection.



② INPUT Connectors (TRS Phone type)

These 1/4-inch balanced TRS connectors accept balanced and unbalanced input signals.
Tip=hot, Ring=cold, Sleeve=ground.



③ INPUT MODE Switch

This switch is used for input source selection.

• CH.A TO ALL

The input signal connected to the INPUT A terminals is the source for output channels A, B, C, and D.

• EACH CH.

Each input signal connected to the INPUT A, B, C and D terminals is the source for the corresponding output channel.

④ OUTPUT MODE Switch

This switch allows selection of the number of output channels to be used.

• 4CH. (A - B - C - D)

For use as a 4-channel amplifier with signal output from the A, B, C and D terminals.

• 3CH. (L - C - D)

For use as a 3-channel amplifier with signal output from the L, C and D terminals.

• 2CH. (L - R)

For use as an ordinary 2-channel amplifier with signal output from the L and R terminals.

⑤ SPEAKER Terminals

These are used for connecting the speakers. The terminals to be connected depend on the setting of the OUTPUT MODE switch. When connecting the speakers, observe the terminal and polarity markings on the rear panel.

Refer to page 6,7 for details on speaker connection.

⑥ GND Terminal

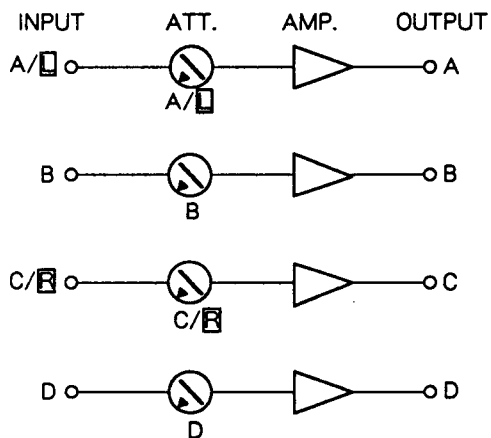
The GND terminal is used to make a physical connection to earth. In cases of hum or other abnormal noise, connect the GND terminal to the chassis of a mixer or pre-amplifier.

CONNECTIONS

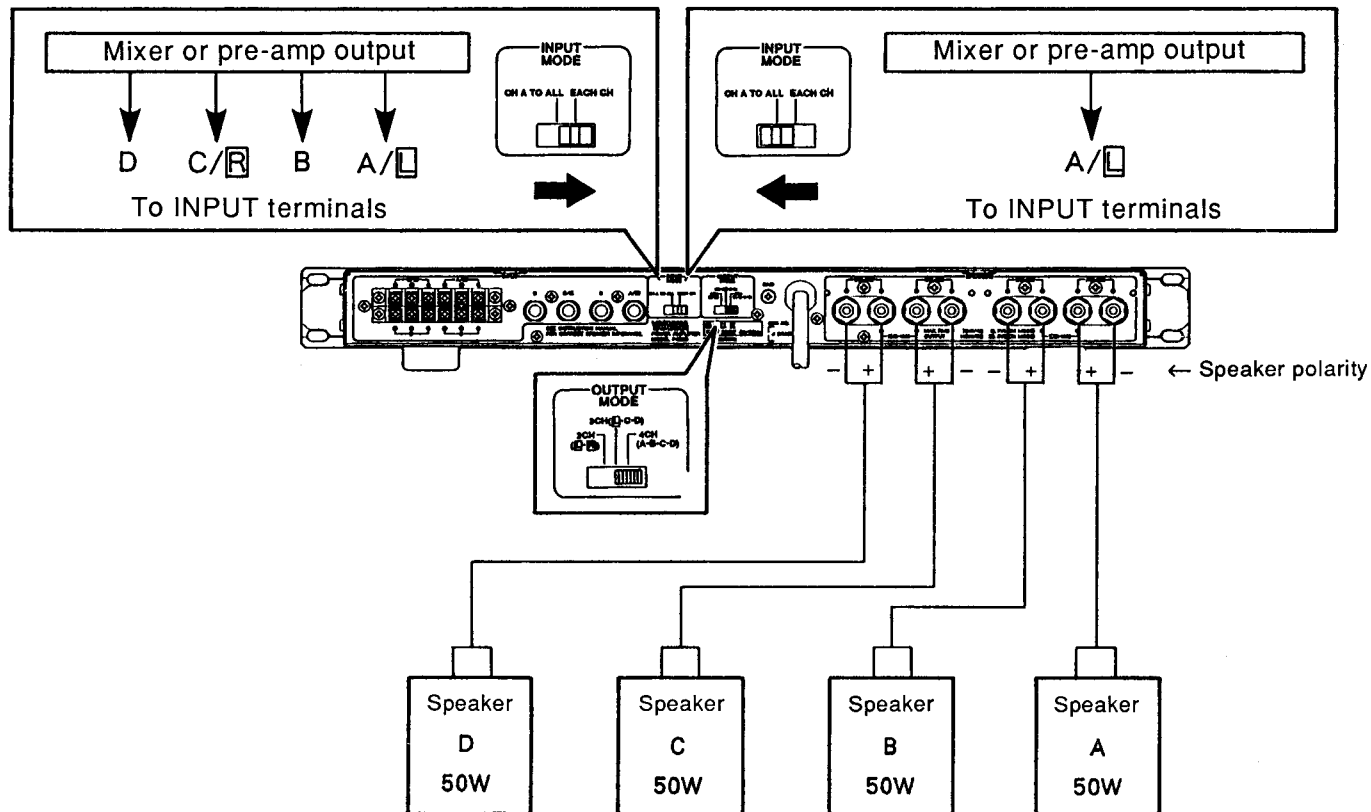
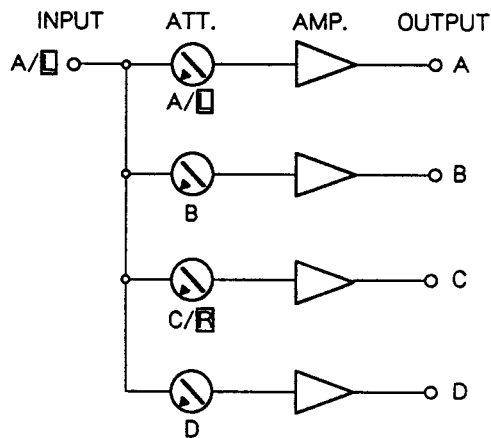
Combining the INPUT MODE and OUTPUT MODE switch settings, the amplifier offers the following six application setups.

- 4 inputs/4 outputs
- 1 input/4 outputs
- 3 inputs/3 outputs
- 1 input/3 outputs
- 2 inputs/ 2 outputs
- 1 input/2 outputs

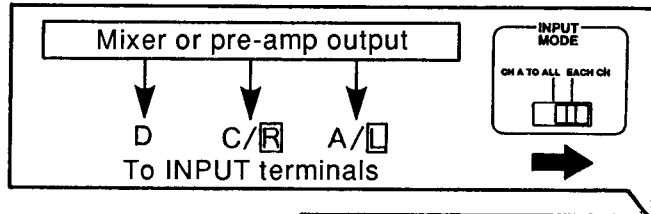
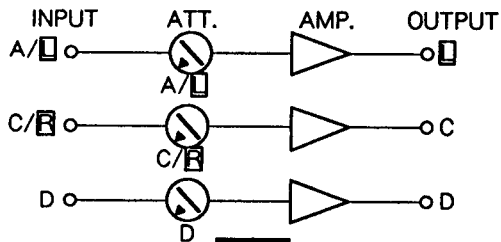
Amplifier with 4 inputs and 4 outputs



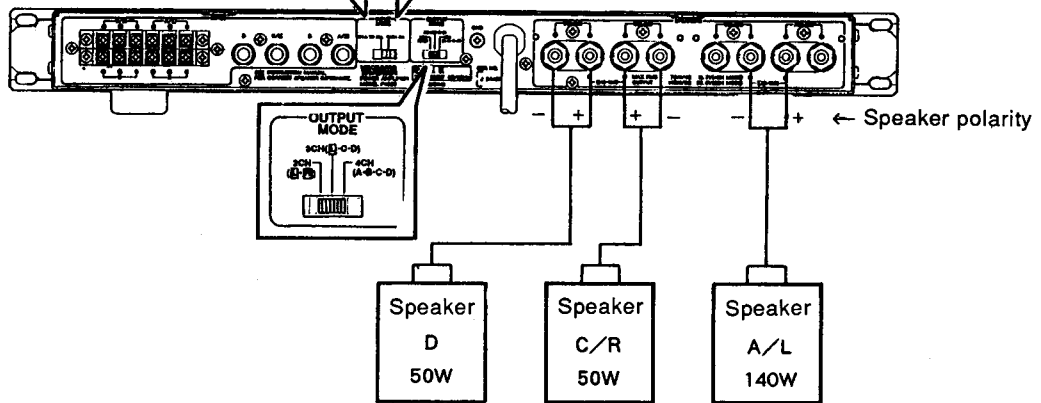
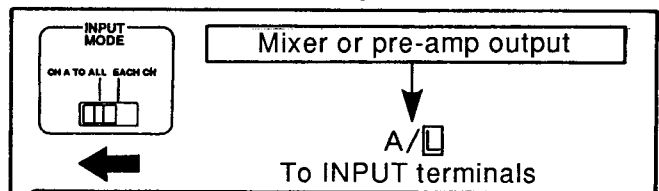
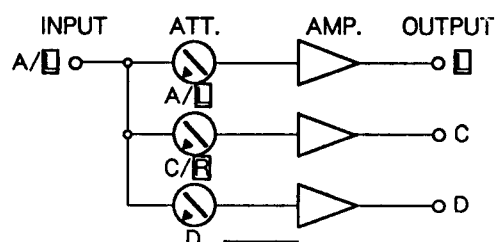
Amplifier with 1 input and 4 outputs



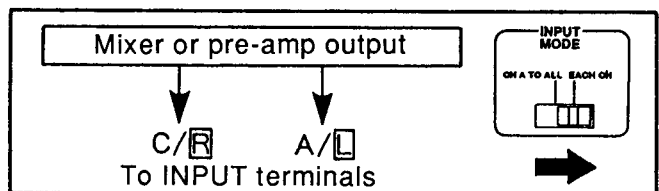
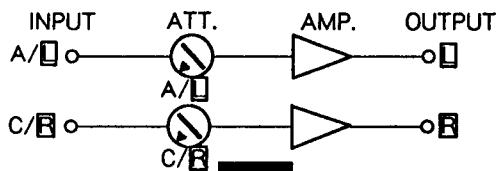
Amplifier with 3 inputs and 3 outputs



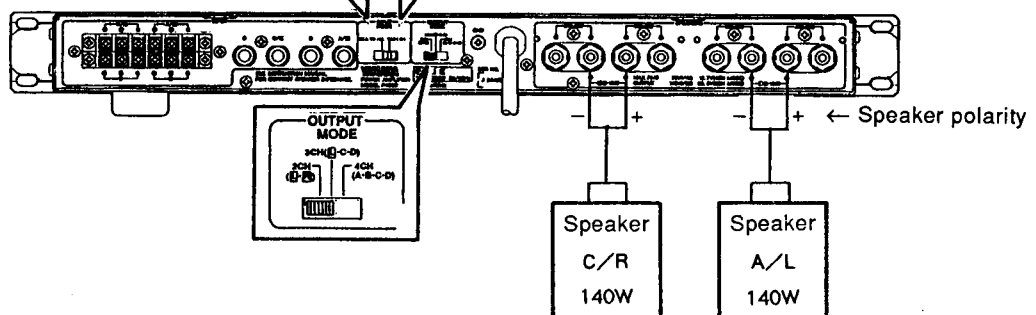
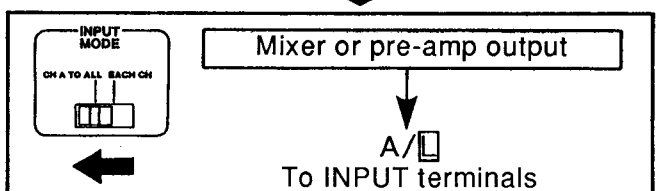
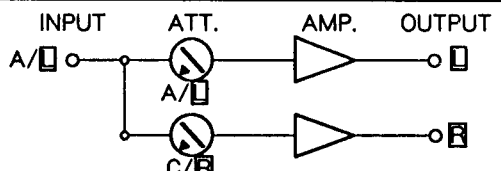
Amplifier with 1 input and 3 outputs



Amplifier with 2 inputs and 2 outputs



Amplifier with 1 input and 2 outputs



INSTALLATION DETAILS

Make sure that the amplifier has adequate ventilation. The unit is equipped with a twin fan cooling system. For this reason the airflow to the front and side panels should not be blocked.

■ Permanent Rack Mounting

When high-powered amplifiers are rack mounted, the heat generated from each amplifier can build up inside the rack causing excessive temperatures. This is especially true if there is no rear opening in the rack mount enclosure. To lower the interior temperature, it is necessary to improve the ventilation of the rack mount. Since warm air rises to the top of the rack mount, cooling will be most effective if air can be expelled from the top directly.

1. When installing the amplifier in a rack, observe the following points.

- 1-1. When installing more than four P4050s, make sure to leave one 1U space every four units, and install a blank panel without any ventilation holes. (Fig. 1)
Do not just leave this space open or cover it with a slotted ventilation panel, as warm air escaping at the front of the rack will be drawn in again by the cooling fans, causing heat to build up inside the rack. (Fig. 2)

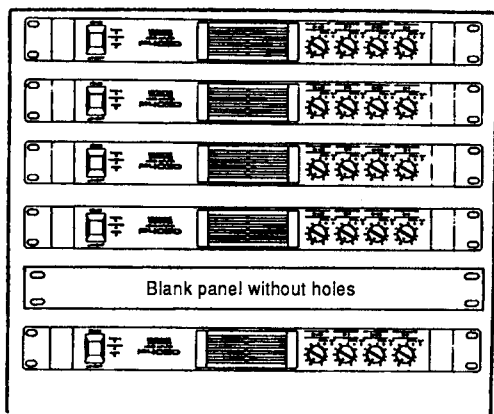


Fig. 1

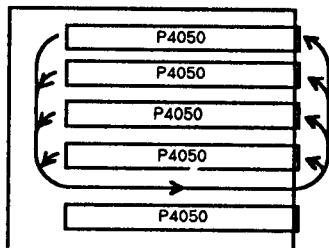


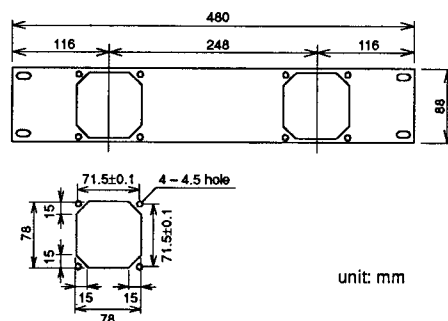
Fig. 2

The above illustration shows an example for poor ventilation.

- 1-2. Provide an air outlet at the rear of the rack.

To facilitate proper cooling, an air outlet at the top will allow warm air to escape naturally from the inside of the rack; if required, a fan may also be installed to forcibly blow out warm air.

- In case of unforced air outflow a full 1U-size outlet must be provided for up to 4 amplifiers, and a 2U-size outlet when 5 to 8 amplifiers are installed.
- When employing forced cooling, for up to 4 amplifiers one fan with a no-load output of $0.8\text{m}^3/\text{min}$ and a maximum hydrostatic pressure of $5\text{mm H}_2\text{O}$ must be installed, while for 5 to 8 amplifiers two such fans are required.



unit: mm

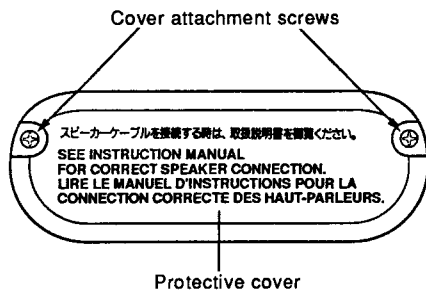
2. Make sure that a space of at least 100 mm exists between the power amplifier's rear panel and the rear of the rack.
3. Place the rack in a well-ventilated location.
4. When a power amplifier is mounted in a rack with other types of components, be careful that the heat generated by the power amplifier does not affect the other components.

■ Portable Rack Mounting

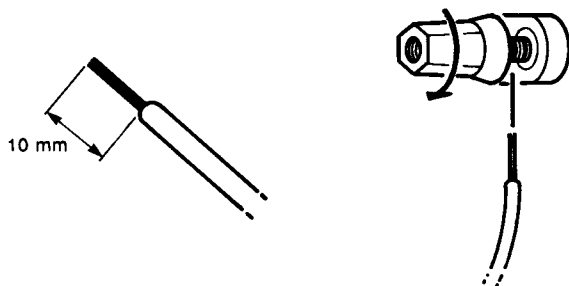
The amplifier intakes cool air through the front panel and exhausts warm air out the side panels. When mounting amplifiers in a portable rack, make sure the side panels are exposed where necessary.

CAUTION FOR SPEAKER CONNECTION

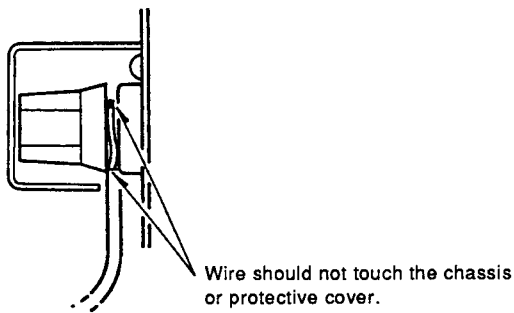
1. Turn off the POWER switch.
2. Remove the cover attachment screws and remove the protective cover from the speaker terminals.
* The protective cover is equipped with British model and general model.



3. After removing approx. 10 mm of covering insulation from the ends of the speaker cables, pass the bare ends of the speaker wires through the holes in the corresponding speaker terminals and tighten the terminals to securely clamp the wires.



At this time make sure that the bare ends of the speaker cables do not extend from the terminals in such a way that they touch the chassis or protective cover.



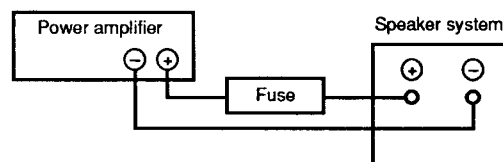
4. Reattach the protective cover over the speaker terminals.

— Speaker output terminals —

Connect the speakers used for 2-channel, 3-channel, or 4-channel output to the corresponding speaker terminals.

Take care that the end of each speaker cable does not short with another end of the speaker cable or with the chassis or protective cover, and then secure the wire in place by tightening down the terminal. Also, always make sure that the power is OFF before attaching or removing speaker wires.

- If long speaker cables are required, use cables with as heavy a gauge as possible to protect against degradation caused by the damping factor and to prevent power loss inside the speaker cables.
- When operating the P4050 in 2-channel output mode, it delivers a hefty 140W + 140W (8 ohms). Be sure to use speaker systems of sufficient input capacity. If the allowable input power of the speaker system is lower than the rated output power of the amplifier, you can protect the speakers by connecting an in-line fuse between each speaker and the amplifier.



- * You can use the following formula to determine the size of fuse needed for your system.

$$P_o = I^2 R \rightarrow I = \sqrt{\frac{P_o}{R}}$$

P_o : Continuous allowable input power of speaker (noise or RMS)

R : Nominal impedance of speaker

I : Necessary fuse capacity (A)

Example: Speaker continuous allowable input power ; 100 W
Speaker impedance ; 8 ohm
Using these values.

$$I = \sqrt{\frac{100}{8}} = 3.5$$

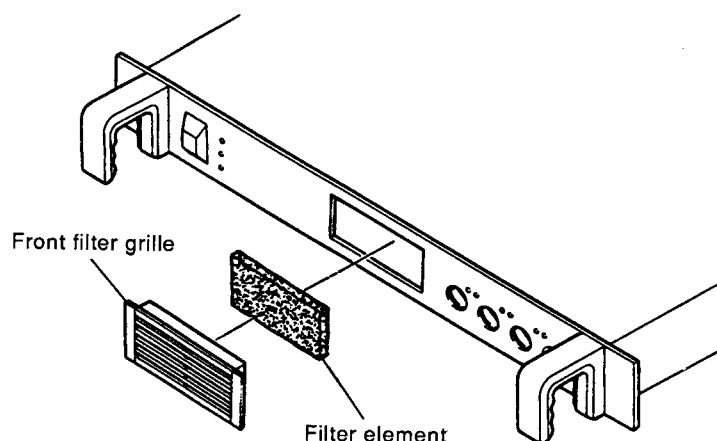
Necessary fuse capacity (A) = 3.5

CLEANING THE FILTER ELEMENTS

To ensure adequate cooling air intake, the filter element must be cleaned when it has become clogged. The following points describe the cleaning procedure:

1. Make sure the power to the amplifier is OFF.
2. Remove the power plug from the AC mains socket.
3. Remove the filter elements, and wash in plain water. If the filter elements are exceptionally dirty, detergent (washing-up liquid) may be used.

4. Dry the filter elements thoroughly.
NEVER REPLACE THE FILTER ELEMENTS WHILE THEY ARE STILL WET!
 Replace the elements and front filter grilles. (The replacement part number of the filter element is VM57950.)



TROUBLESHOOTING

The following table lists the main causes of abnormal operation and the corrective measures required, as well as the protective circuit operation in each case.

Indicator display	Probable cause	Remedy	Protective circuit operation
CLIP indicator lights.	There is a short at a speaker terminal, amplifier terminal, or wire.	Locate and correct the cause of the short.	The PC limiter circuit operates to protect the power transistors.
	The amplifier load is excessive.	When speakers are connected to the A, B, C and D speaker terminals, make sure that their impedance is 4 ohms or more. In case of connection to the L and R terminals, the speaker impedance should be 8 ohms or less.	Same as above.
PROTECTION indicator lights.	The heat sink temperature has exceeded 100°C.	Check the amplifier ventilation conditions and take appropriate measures to improve airflow around the amplifier.	The thermal protection circuit operates to protect the power transistors.
	A DC voltage of +/-2V or greater was generated in the power amplifier's output circuit.	Consult your dealer or nearest Yamaha service center.	The relay operates to protect the speaker system.

SPECIFICATIONS

POWER OUTPUT LEVEL

4 CH:

50W + 50W + 50W + 50W; RL = 8 ohms, f = 20 Hz — 20 kHz, THD = 0.1 %
70W + 70W + 70W + 70W; RL = 4 ohms, f = 20 Hz — 20 kHz, THD = 0.1 %

2 CH:

140W + 140W; RL = 8 ohms, f = 20 Hz — 20 kHz, THD = 0.1 %

FREQUENCY RESPONSE

0 dB $\pm$ 1 dB; f = 20 Hz — 20 kHz, RL = 8 ohms, Po = 1 W

POWER BANDWIDTH

4 CH:

20 Hz — 20 kHz; Po = 25 W, RL = 8 ohms, THD = 0.1 %
20 Hz — 20 kHz; Po = 35 W, RL = 4 ohms, THD = 0.1 %

2 CH:

20 Hz — 20 kHz; Po = 70 W, RL = 8 ohms, THD = 0.1 %

TOTAL HARMONIC DISTORTION (THD)

4 CH:

$\leq$ 0.05%; Po = 25 W, RL = 8 ohms, f = 20 Hz — 20 kHz
 $\leq$ 0.1%; Po = 35 W, RL = 4 ohms, f = 20 Hz — 20 kHz

2 CH:

$\leq$ 0.1%; Po = 70 W, RL = 8 ohms, f = 20 Hz — 20 kHz

INTERMODULATION DISTORTION (IMD)

4 CH:

$\leq$ 0.05%; Po = 25 W, RL = 8 ohms, f = 60 Hz : 7 kHz, 4 : 1
 $\leq$ 0.1%; Po = 35 W, RL = 4 ohms, f = 60 Hz : 7 kHz, 4 : 1

2 CH:

$\leq$ 0.1%; Po = 70 W, RL = 8 ohms, f = 60 Hz : 7 kHz, 4 : 1

CHANNEL SEPARATION

ATT max, Input 600 ohms shunt

$\geq$ 60 dB; Po = 25 W, RL = 8 ohms, f = 20 Hz — 20 kHz

RESIDUAL NOISE

$\leq$ -68 dBm; ATT min, fc = 12.7 kHz -6 dB/oct LPF

SIGNAL-TO-NOISE RATIO

$\geq$ 96 dB; Input 600 ohms shunt, fc = 12.7 kHz -6 dB/oct LPF

DAMPING FACTOR

$>$ 50; RL = 8 ohms, f = 1 kHz

SLEW RATE

4 CH; $\pm$ 10 V/ μ sec, RL = 8 ohms, Full Swing
2 CH; $\pm$ 15 V/ μ sec, RL = 8 ohms, Full Swing

SENSITIVITY

+ 4 dBm; Po = 50 W, 8 ohms, ATT max., f = 1 kHz

VOLTAGE GAIN

24.2 dB; ATT max, f = 1 kHz, RL = 8 ohms

INPUT IMPEDANCE

$\geq$ 15 kohms; Balance/Unbalance, ATT max.

INDICATORS

POWER (Red)	turns on when Power is ON
PROTECTION (Red)	turns on when protection or muting is ON
CLIP (Red) x4	turns on when THD $\geq$ 1 %
SIGNAL (Green) x4	lights when the output level exceeds 2Vrms
THERMAL (Red)	turns on when Fan Speed is "HIGH"

PROTECTION CIRCUITS

OUTPUT MUTING	7 sec. $\pm$ 2 sec.; after power is ON
DC sense	DC $\pm$ 2 V; output shut off
THERMAL	$\geq$ 80 degree C.; heat sink temp.
PC LIMITER	RL $\leq$ 2 ohms

CONTROLS

FRONT

POWER switch; push ON/ push OFF
INPUT attenuator x4; 31-position

REAR

MODE switch ;4 CH/3 CH/2 CH
PARALLEL INPUT

POWER REQUIREMENTS

U.S. & Canadian Models; 120 V, 60 Hz
British Model; 240 V, 50/60 Hz
General Model; 230 V, 50/60 Hz

POWER CONSUMPTION

U.S. Model; 400 W
Canadian Model; 400 W/500 VA
British Model; 400 W
General Model; 400 W

DIMENSIONS (W x H x D)

480 x 56 x 444 mm (18-7/8" x 2-3/16" x 17-1/2")
(Height including feet)

WEIGHT

7 kg (15 lbs. 7 oz)

- * 0 dB = 0.775 Vr.m.s.
- * Specifications and appearance subject to change without notice.

• For European Model

Purchaser/User information specified in EN55103-1 and EN55103-2.

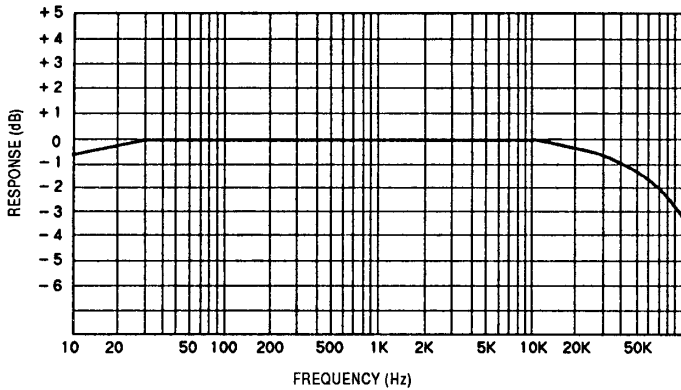
Inrush Current:16A

Conformed Environment:E1, E2, E3 and E4.

PERFORMANCE GRAPHS

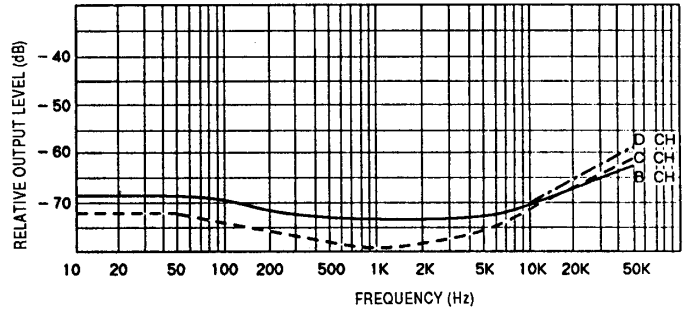
FREQUENCY RESPONSE

Load Impedance: 8Ω
Input Attenuators: Max.
Input Mode: EACH CH.
Output Mode: 4 CH.



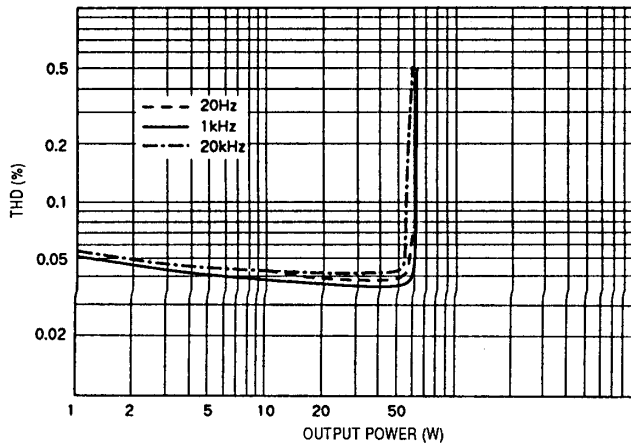
CHANNEL SEPARATION

Load Impedance: 8Ω
Input Attenuators: Max.
Input Mode: EACH CH.
Output Mode: 4 CH.
0 dB = 25W (A CH.)
Input 600 Ω Shunt

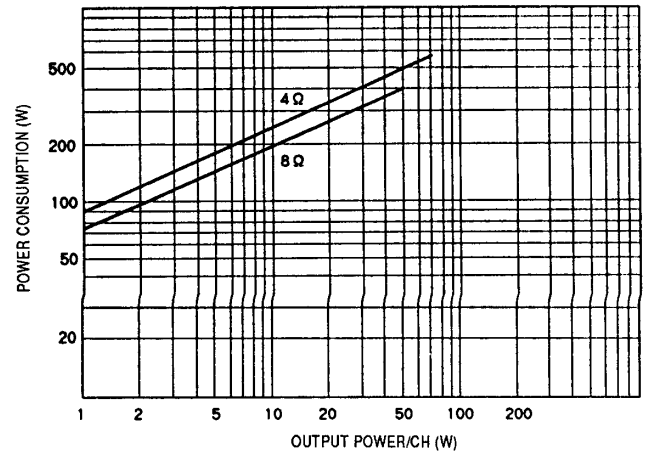


THD vs OUTPUT POWER

Load Impedance: 8Ω
Input Attenuators: Max.
Input Mode: EACH CH.
Output Mode: 4 CH.

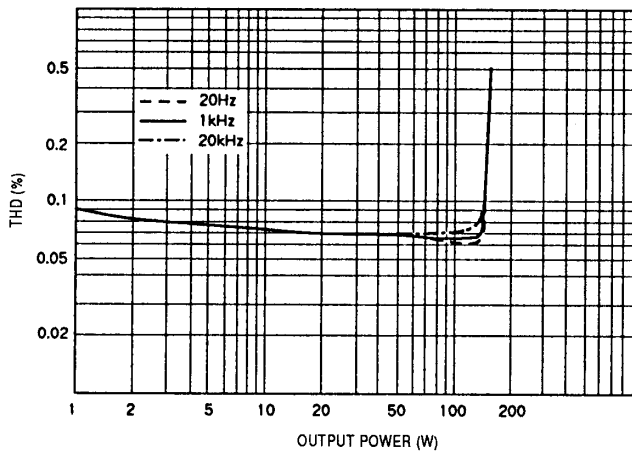


OUTPUT POWER vs POWER CONSUMPTION

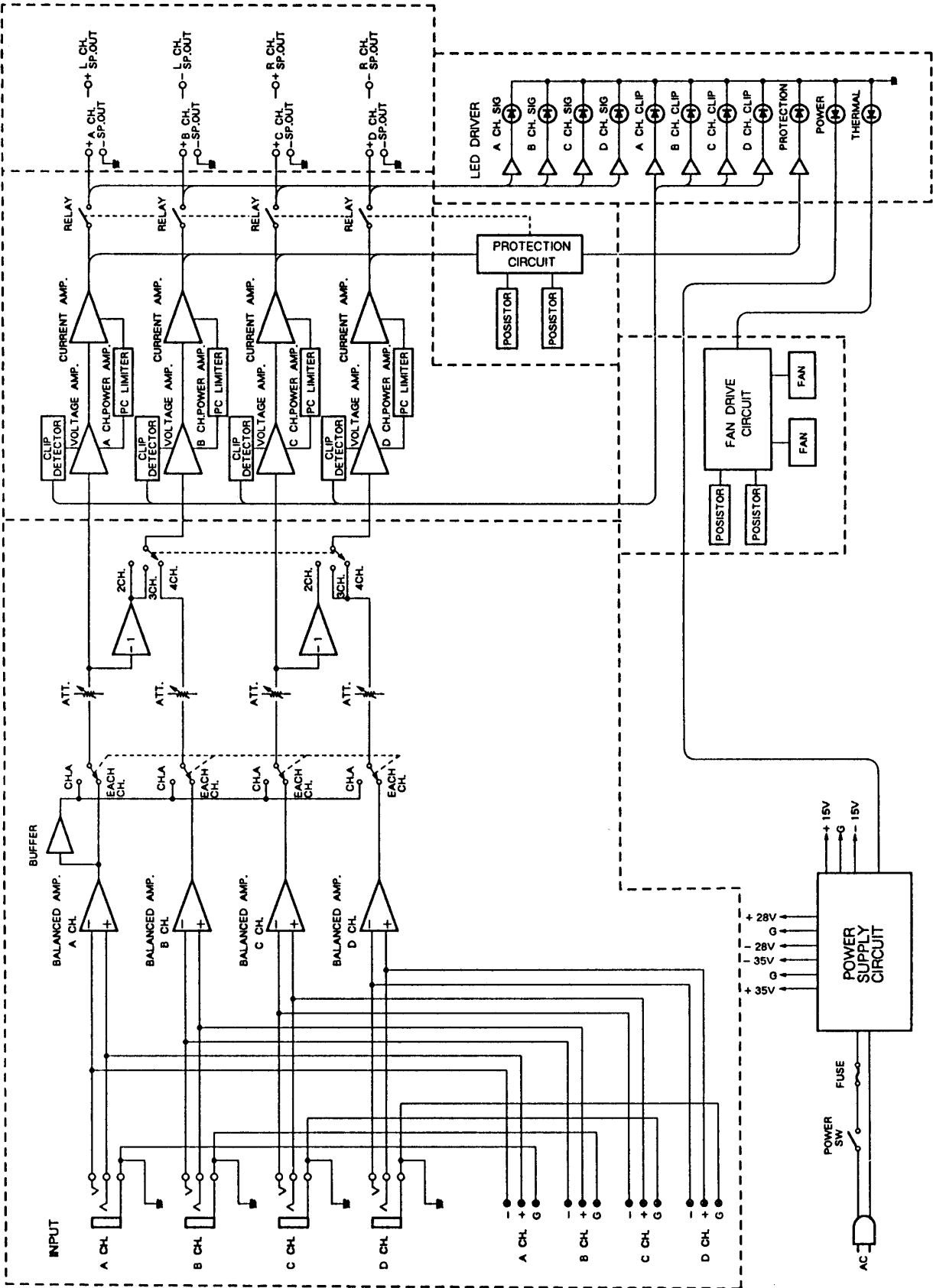


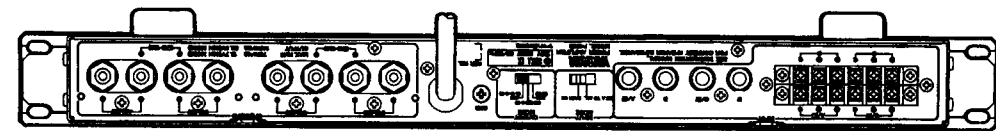
THD vs OUTPUT POWER

Load Impedance: 8Ω
Input Attenuators: Max.
Input Mode: EACH CH.
Output Mode: 2 CH.



BLOCK DIAGRAM





Unit: mm (inch)

CAUTION

The power switch does not disconnect the complete apparatus from the mains line.

ATTENTION

L'appareil reste toujours sous tension lorsque la touche secteur est en position arrêt.

ACHTUNG

Das Gerät steht auch bei der Netzschalter-Stellung "Aus" noch unter Spannung.

OBSERVERA

Apparaten kopplas inte bort från växelströmskällan (nätet) så länge som den är ansluten till vägguttaget, även om själva apparaten har stängts av.

ADVARSEL

Netspændingen til dette apparat er IKKE afbrudt, så længe netledningen sidder i en stikkontakt, som er tændt - også selvom der er slukket på apparatets afbryder.

VAROITUS

Laitteen toisiopiiriin kytketty käyttökytkin ei irroita koko laitetta verkosta.

AVVERTENZA

L'apparecchio rimane sotto tensione anche quando è spento tramite l'interuttore principale.

SERVICE

This product is supported by YAMAHA's worldwide network of factory trained and qualified dealer service personnel. In the event of a problem, contact your nearest YAMAHA dealer.

ENTRETIEN

L'entretien de cet appareil est assuré par le réseau mondial YAMAHA de personnel d'entretien qualifié et formé en usine des concessionnaires. En cas de problème, prendre contact avec le concessionnaire YAMAHA le plus proche.

KUNDENDIENST

Für dieses Gerät steht das weltweite YAMAHA Kundendienstnetz mit qualifiziertem, werksgeschultem Personal zur Verfügung. Bei Störungen und Problemen wenden Sie sich bitte an Ihren YAMAHA-Händler.

