OPERATING MANUAL

P O W E R

AMPLIFIER

M-500/700/1000

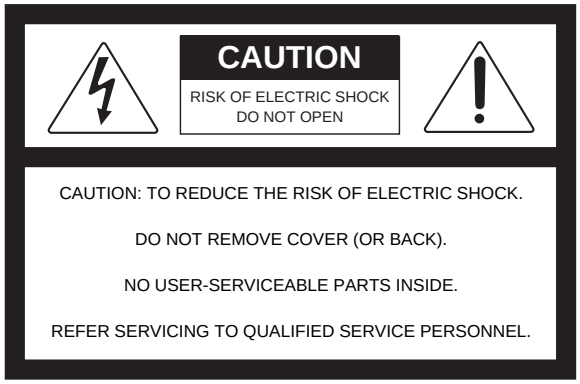
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UNPACKING AND INSTALLATION

Although it is neither complicated to install nor difficult to operate your power Amplifier, a few minutes of your time is required to read this manual for a properly wired installation and becoming familiar with its many features and how to use them. Please take a great care in unpacking your set and do not discard the carton and other packing necessary to return your set for when moving your set and are required if it ever becomes necessary to return your set for service. Never place the unit near radiators, in front of heating vents, to direct sun light, in excessive humid or dusty location to avoid early damage and for your years of quality use. Connect your complementary components as illustrated in the following page.



WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.



This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operation and maintenancy (servicing) instructions in the literature accompanying the appliance.

Caution: To prevent electric shock do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposture.

Attentions: Pour prévenir les chocs électriques ne pas utilizer cette fiche polarisée avec un prolongateur, une prise de courant on une autre sortie de courant, sauf si les lames peuvent étre insérées à fond sans en laisser aucune partie à découvert.

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FEATURES

- **SUBSTANTIAL PROTECTION CIRCUITRY**
  To insure stability and reliability against over current and overheating extra protection circuitry is provided. In addition, turn on delay and DC detection circuitry is provided to protect the loud-speaker.

- **BRIDGED MONO FUNCTION**
  These stereo amplifiers can be used for monoral powerful sound by selecting the mode switch.

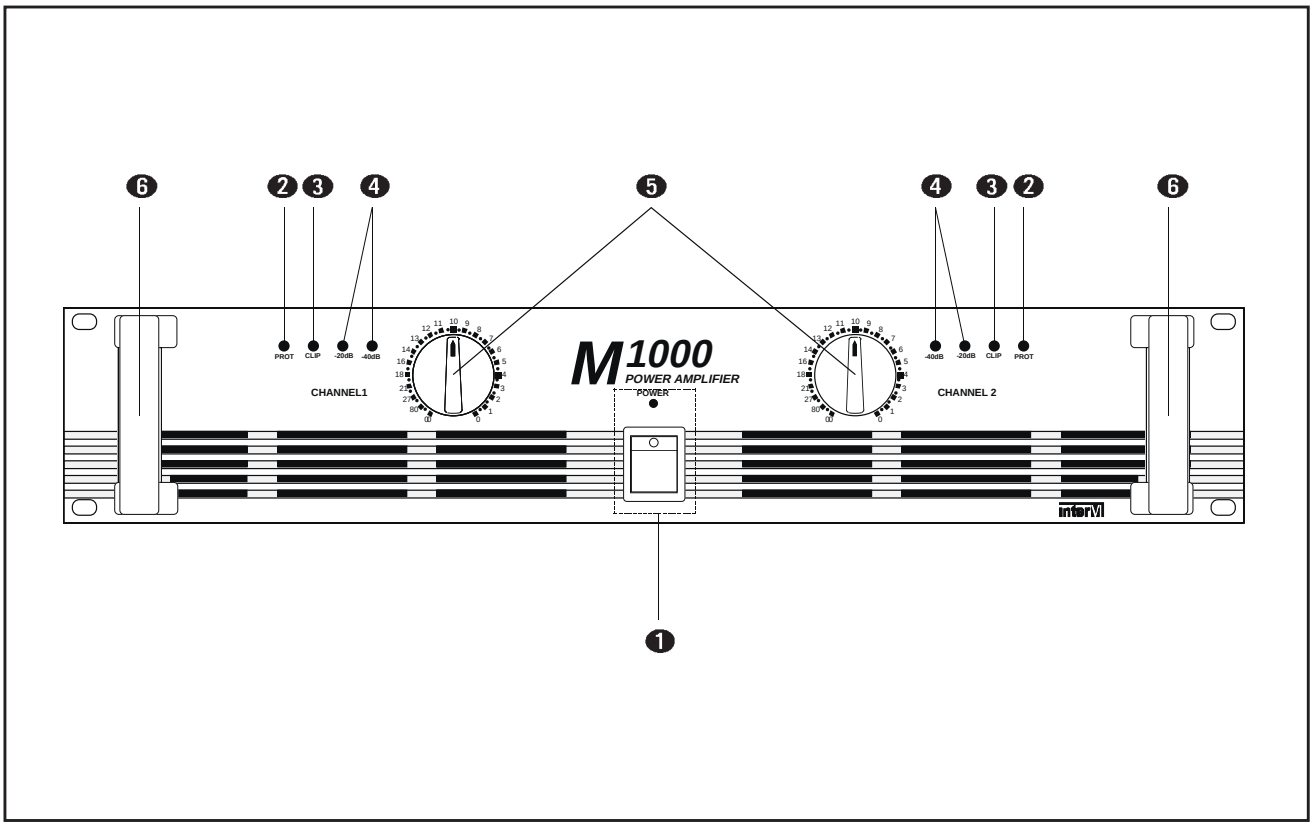
- **VARIOUS DISPLAY**
  To confirm the operating status, LED displays of protection, clip, and signals are provided on front panel.

- **COMPACT SIZE**
  For valuable saving in rack space and slim exterior view, these amplifier is designed within compact size.

- **SOFT-START SYSTEM**
  To prevent inrush current when turn on the amplifier, soft-start circuit is provided on primary power lines.

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FRONT PANEL CONTROLS



1. **POWER SWITCH AND INDICATOR**
   The power switch is used to turn on and off the AC main power.
   The power indicator lights up when the amplifier is powered ON.

2. **PROTECTION INDICATOR**
   This red LED indicator lights up for approximately six seconds when the amplifier is powered ON, indicating that the soft-start protection system is working. No sound is output during soft-start up. If one of the protection systems is activated during normal use, this indicator lights up and no sound is output. The speaker system is actually disconnected from the amplifier outputs when this indicator lights up. The protection systems are activated when overheating occurs or a DC voltage is present at the amplifier outputs. If the problem is corrected, the protection systems deactivate automatically, this indicator goes out, and normal amplifier operation is resumed.

3. **CLIP INDICATORS**
   CLIP indicator on each channel illuminates when distortion reaches or exceeds approximately 0.1%, indicating that the amplifier is being driven by excessively high inputs.

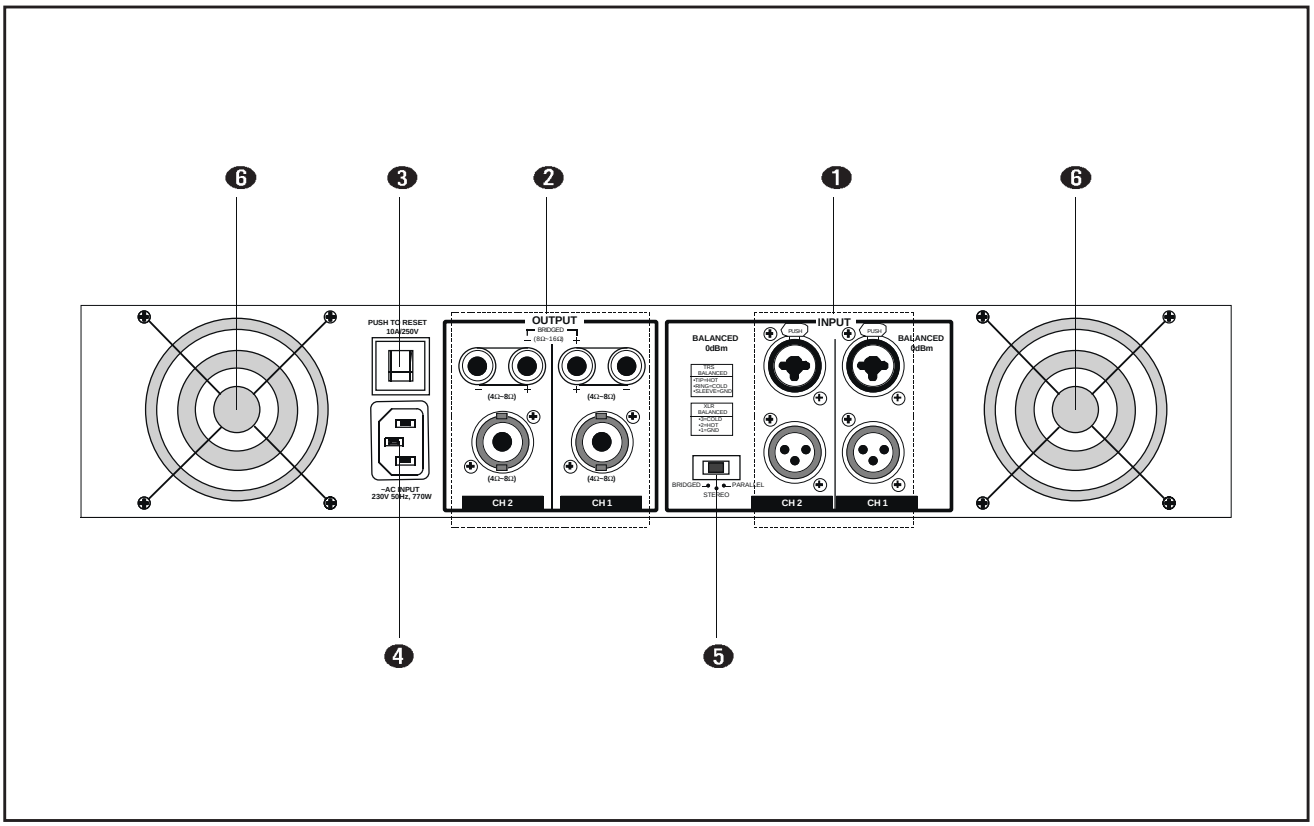
4. **OUTPUT LEVEL INDICATORS**
   Output level indicating LEDs indicate the output level of this amplifiers. These LEDs illuminate when the outputs are –40dB and –20dB of rated power.

5. **INPUT ATTENUATORS**
   Separate level controls are provided for channel one and channel two input, clockwise rotation of the controls increase level. These are 21-step detented input signal attenuators.

6. **HANDLES**
   You can handle this amplifier easily by using these handles.

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REAR PANEL CONTROLS

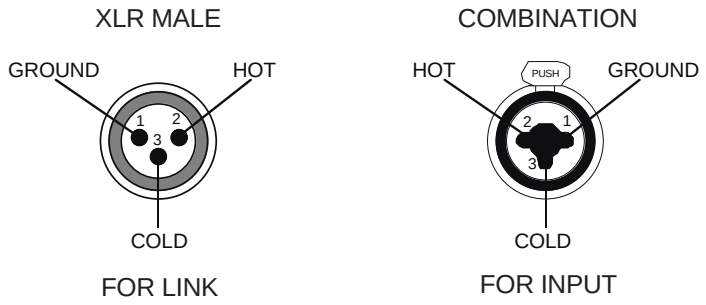


1. INPUT TERMINALS (CHANNEL 1, 2)

Input connectors are provided both balanced combination jacks.
Channel 1 input terminal is used in Bridge mode and parallel mode.

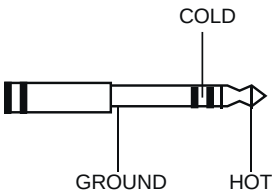
- **XLR-TYPE CONNECTOR**

  They are wired pin 1-ground, pin 2-hot (+), and pin 3 cold (–).



- **PHONE JACK**

  They are wired tip-hot (+), ring-cold (–), and sleeve-ground.



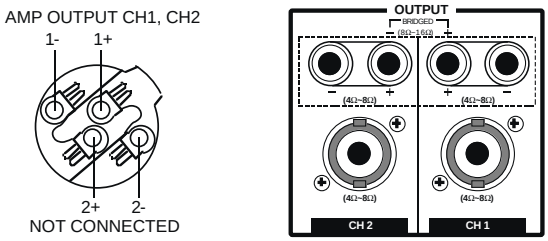
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2. OUTPUT TERMINALS

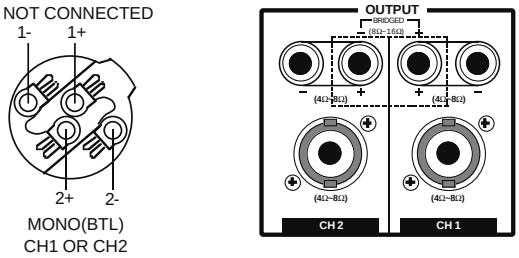
Output terminals are dual five-way binding posts and speaker connectors. Do not parallel the two outputs of each channel by connecting them (together, or parallel them) with any other amplifier output.

* When speakers are connected through speaker, please make sure correct connection of each pin, and refer speaker pin number.

• STEREO MODE



• BRIDGED MODE



The minimum impedance for the connected speaker system is specified in “Speaker Impenance” on page 6.

3. CIRCUIT BREAKER

When the circuit breaker is cut, push to reset again. In case of occurring trouble to the set by means of overload or error, circuit breaker will protect the set from trouble by breaking AC power source.

4. AC POWER CORD

Plug this AC input cord into AC outlet.

5. MODE SELECTOR

Bridged mono or parallel operation are easily accessed by the slide switch. The input is applied channel one only the corresponding front panel control is used to set the level, please refer bridged mono operation or parallel operation.

6. FANS

The fans should be kept free of all obstructions and be accessible to cool fresh air when

• STEREO MODE

In this mode, channels 1 and 2 operate independently (typical stereo amplifier). Channel 1 input signal feeds channel 1 power amp, and channel 2 input signal feeds channel 2 power amp. In this mode, the minimum speaker impedance per channel is 4Ω.

• BRIDGED MODE

In this mode, channels 1 and 2 are bridged together and work as one mono amplifier. In this mode, the minimum speaker impedance is 8Ω.

• PARALLEL MODE

In this mode, channels 1 and 2 are operate two mono amplifier. In this mode channel 1 input signal feeds channel 1 and channel 2 power amp, the minimum speaker impedance per channel is 4Ω.

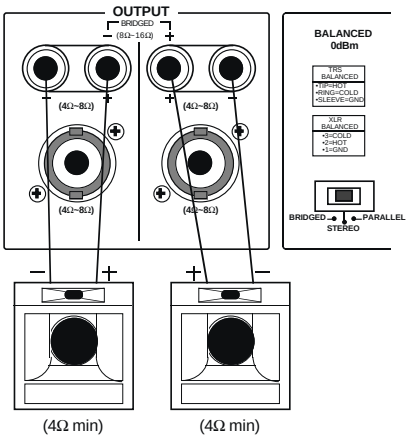
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SPEAKER IMPEDANCE

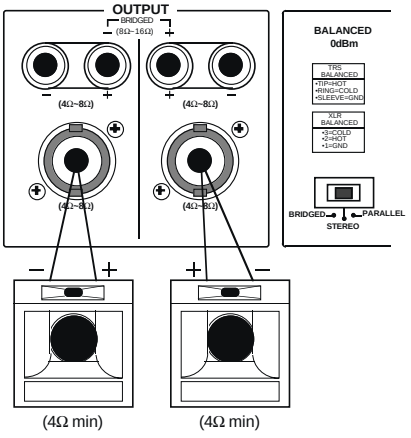
M-500/M-700/M-1000 series amplifier has three operating modes: Stereo, Bridged and Parallel and allows you to connect multiple speaker systems in parallel. Therefore, the minimum speaker impenance various depending on the combination of these speakers. Be sure that the speaker impedance falls below the specified impedance.

The figures below show the examples of connection is Stereo mode and Bridged mode, and speaker systems connected in parallel in Stereo mode, and the respective minimum impedance.

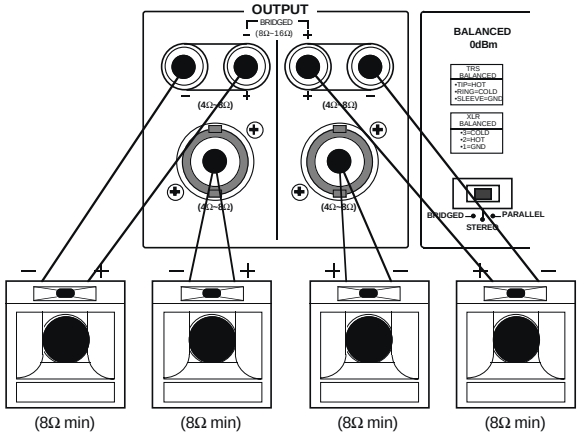
STEREO MODE CONNECTIONS



(4Ω min) (4Ω min)

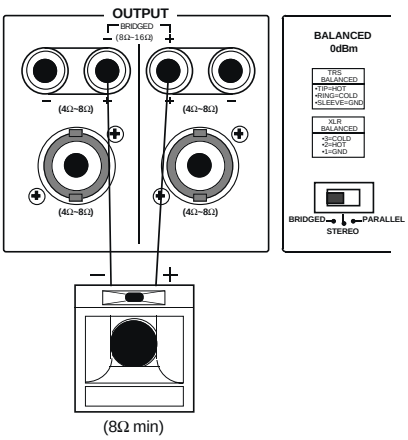


(4Ω min) (4Ω min)

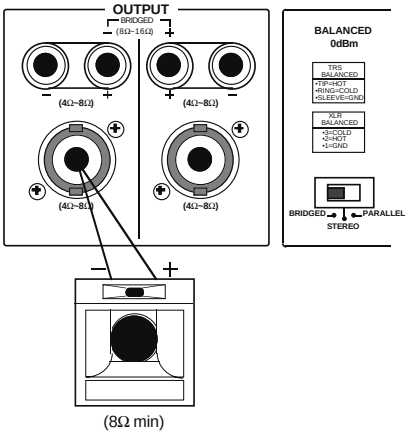


(8Ω min) (8Ω min) (8Ω min) (8Ω min)

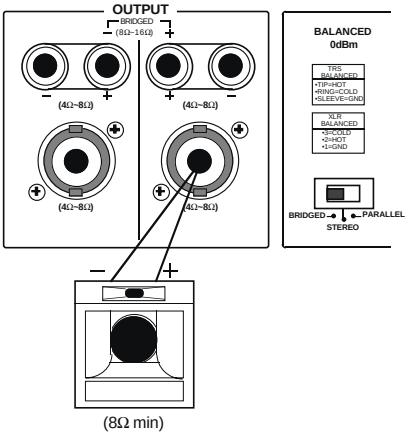
BRIDGED MODE CONNECTIONS



(8Ω min)



(8Ω min)



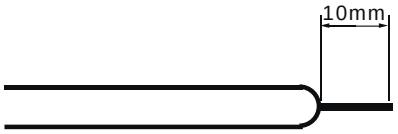
(8Ω min)

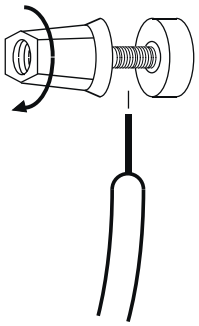
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CAUTION FOR SPEAKER CONNECTION

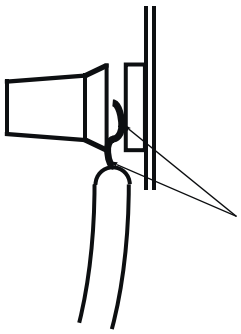
1. Turn off the POWER switch.

2. After removing approx. 10 mm of 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.
   Refer to page 4 for speaker porality.



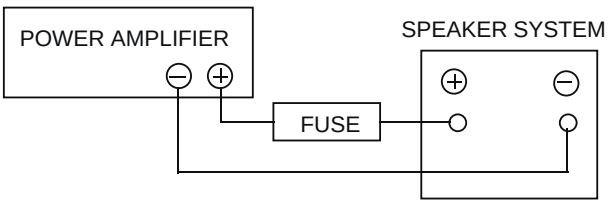


At this time make sure that the bare ends of the speaker cables do not extend from the terminals in such a way that they touch the chassis.



Wire should not
touch the chassis

- **SPEAKER FUSE**
  The output capacity of your amplifier is very high: 500W+500W (4Ω) in stereo and 1000W (8Ω) in monaural on the M-1000: 350W+350W (4Ω) in stereo and 700W (8Ω) in monaural on the M-700: 250W+250W (4Ω) in stereo and 500W (8Ω) in monaural on the M-500. Be sure to use a speaker system that has sufficient input capacity.
  If the input capacity of your speaker system is lower than the rated output of the power amplifier, you can protect your speakers by connecting a fuse serially between the speaker and amplifier as shown below.



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Use the following formula to determine the fuse capacity according to the speaker's input capacity.

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

P0 [W] : Speaker's continuous input capacity (noise or RMS)
R [Ω] : Speaker's nominal impedance
I [A] : Required fuse capacity

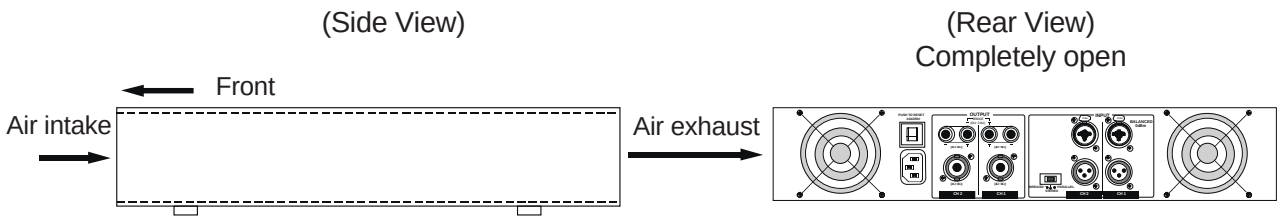
ex.) Speaker's continuous input capacity: 100W
Speaker's impedance: 8Ω

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

In this example, the required fuse capacity is calculated as 3.5 [A].

- **SPEAKER CABLE**
  If you use a long speaker cable, use as thick a cable as possible to prevent deterioration of the damping factor or power loss inside the cable. Even the thickest cable can be used for the speaker terminal of this unit.

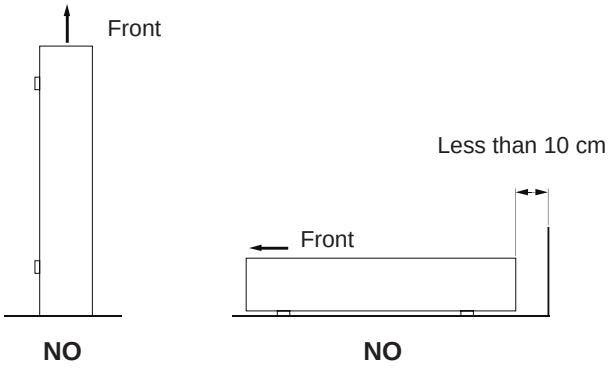
The amplifier intakes cool air through the front panel and exhausts warm air out the rear panel. When mounting amplifiers in a portable rack, make sure the rear panel is completely open for ventilation.



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POSITIONING THE HOUSED AMPLIFIER

Place the case so that the ventilation airflow paths are not blocked.



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	Probable Cause	Remedy	Protection Circuit
–40dB indicator lights only.	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.
CLIP indicator lights.	The amplifier load is excessive.	Use a speaker system with an impedance of at least 4Ω (stereo) or 8Ω (bridge).	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.
	DC voltage of +/–2V or greater was generated in the power amplifier's output circuit.	Consult your dealer.	The relay operates to protect the speaker system.

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SPECIFICATIONS

	M-500	M-700	M-1000
Power Output Level f=1KHz, THD+N≤0.05% (Typical) STEREO RL=8Ω RL=4Ω BRIDGED RL=8Ω One Channel Driven f=1KHz THD+N≤0.05% RL=8Ω	 130W+130W 250W+250W 500W 150W	 220W+220W 350W+350W 700W 250W	 330W+330W 520W+520W 1000W 350W
Frequency Response RL=8Ω, P.=1W	0dB+0.5, –1.5dB: f=DC~55KHz		
Power Bandwidth Half Power, THD+N≤0.1% STEREO RL=8Ω	10Hz~70KHz		
Total Harmonic Distortion (THD+N) f=20Hz~20KHz, Half Power STEREO RL=8Ω RL=4Ω BRIDGED RL=8Ω	 ≤ 0.05% ≤ 0.07% ≤ 0.07%		
Channel Separation Half Power RL=8Ω, f=1KHz, ATT. max. Input 600Ω shunt	≥ 80dB		
Residual Noise (DIN Audio Filter)	≤ –70dB: ATT min.		
Signal-to-Noise Ratio DIN Audio, Input 600Ω Shunt	≥100dB		
Damping Factor RL=8Ω, f=1KHz	≥150		
Slew Rate 8Ω Full Swing STEREO BRIDGED	±40V/μs		
Sensitivity (ATT max.) Rated Power into 4Ω 1KHz	0dBm		
Voltage Gain (ATT max.) 4Ω 1KHz	32dB	33.5dB	35dB
Input Impedance (ATT max.)	≥ 20KΩ (Balance/Unbalance)		
Indicators	Power (Red) Protection (Mute) x 2 (Red) Clip x 2 (Orange) Signal x 4 (Green)		
Protection	Power SW ON/OFF muting Heatsink Temp ≥ 100˚C (212˚F)		
PC Limiter	RL < 2Ω		
Fan Circuit	–50˚C (122˚F)–60˚C (140˚F)– Low-Speed – Variable – Hi-Speed		
Controls	(Front) Power SW: Push up On/Push down Off Attenuator: 21-position dB calibrated (Rear) Mode Sw: Bridge=BTL/STEREO/PARALLEL		
Power Source	UL & Canadian Model: 120V, 60Hz General Model: 230V, 50Hz British Model: 240V, 50Hz		
Power Consumption	420W	520W	770W
Weight	12kg/26.4lb	15kg/33lb	17kg/37.5lb
Dimensions	482(W) x 88(H) x 369(D) mm/19(W)x3.5(H)x14.5(D)in		
Connectors	Input XLR-3-31 type + 1/4" Phone (balanced), XLR Output 5-Way binding posts x 2, Speakon Terminal x 2		

0dB=0.775 Vrms, Half Power=1/2 Power Output Level (Rated Power)

* Using reactive 2Ω speakers at high power levels may cause overheating, excessive power consumption, and shutdowns. Please note that below 2Ω the PC limiter will work. Before using 2Ω speakers in a real application, test the system completely.

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