

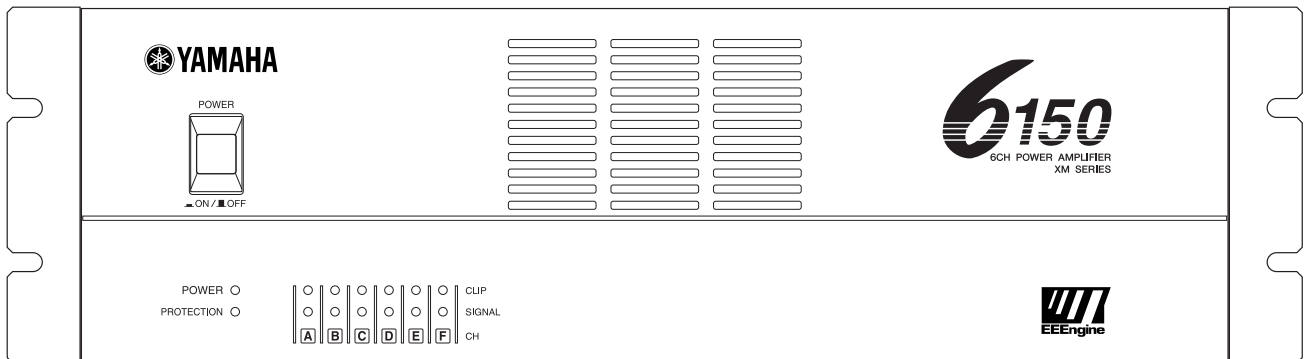


POWER AMPLIFIER

XM6150

XM4220

Owner's Manual



Introduction

Thank you for purchasing a Yamaha 6150, or 4220 XM Series Power Amplifier.

The XM Series of power amplifiers was developed from Yamaha's wealth of experience in building PA equipment and its tradition of careful attention to every detail of circuit design. These power amplifiers feature high power and superb quality together with superior reliability and stability, guaranteeing the highest possible audio performance.

Main features include

- Six amplifiers (four on the 4220) that can be used independently or in stereo pairs. Channel pairs can also be bridged.
- Balanced XLR and Euroblock connector inputs, 5-way binding post outputs.
- Each channel features a switchable HPF, which filters frequencies below 80 Hz, a detented attenuator, and SIGNAL and CLIP indicators.
- The input signal connected to channel A can easily be fed to the other channels using the CH A TO ALL CH switch.
- Protection includes power on/off muting, DC detection, temperature, and protection indicator.
- Variable-speed, low-noise cooling fan system ensures high reliability even under the most demanding conditions.

This Owner's Manual applies to the XM6150 6CH and XM4220 4CH power amplifier. In order to take full advantage of your power amplifier and enjoy long and trouble-free operation, please read this Owner's Manual carefully before using your XM Series Power Amplifier.


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 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.

Precautions

Warnings

- Do not allow water to enter this unit or allow the unit to become wet. Fire or electrical shock may result.
- Connect this unit's power cord only to an AC outlet of the type stated in this Owner's Manual or as marked on the unit. Failure to do so is a fire and electrical shock hazard.
- Do not scratch, bend, twist, pull, or heat the power cord. A damaged power cord is a fire and electrical shock hazard.
- Do not place heavy objects, including this unit, on top of the power cord. A damaged power cord is a fire and electrical shock hazard. In particular, be careful not to place heavy objects on a power cord covered by a carpet.
- If you notice any abnormality, such as smoke, odor, or noise, or if a foreign object or liquid gets inside the unit, turn it off immediately. Remove the power cord from the AC outlet. Consult your dealer for repair. Using the unit in this condition is a fire and electrical shock hazard.
- Should this unit/AC adapter/power supply be dropped or the cabinet be damaged, turn the power switch off, remove the power plug from the AC outlet, and contact your dealer. If you continue using the unit without heeding this instruction, fire or electrical shock may result.
- If the power cord is damaged (i.e., cut or a bare wire is exposed), ask your dealer for a replacement. Using the unit with a damaged power cord is a fire and electrical shock hazard.
- Do not remove the unit's cover. You could receive an electrical shock. If you think internal inspection, maintenance, or repair is necessary, contact your dealer.
- Do not modify the unit. Doing so is a fire and electrical shock hazard.

Cautions

- When rack-mounting the unit, allow enough free space around the unit for normal ventilation. This should be: 10 cm at the sides, 30 cm behind, and 20 cm above. For normal ventilation during use, remove the rear of the rack or open a ventilation hole. If the airflow is not adequate, the unit will heat up inside and may cause a fire.
- To mount several of these units in an EIA-compliant rack, refer to the rack mounting instructions on page 8.
- This unit has ventilation holes at the (top, bottom, front, rear, and sides) to prevent the internal temperature rising too high. Do not block them. Blocked ventilation holes are a fire hazard.
- Clean the contacts of the phone plug before connecting it to the SPEAKERS jack of this unit. Dirty contacts may generate heat.
- Use only speaker cables when connecting speakers to amplifier outputs. Using other types of cables is a fire hazard.
- Hold the power cord plug when disconnecting it from an AC outlet. Never pull the cord. A damaged power cord is a potential fire and electrical shock hazard.
- Do not touch the power plug with wet hands. Doing so is a potential electrical shock hazard.
- Do not use this amplifier for any purpose other than driving loudspeakers.

Usage

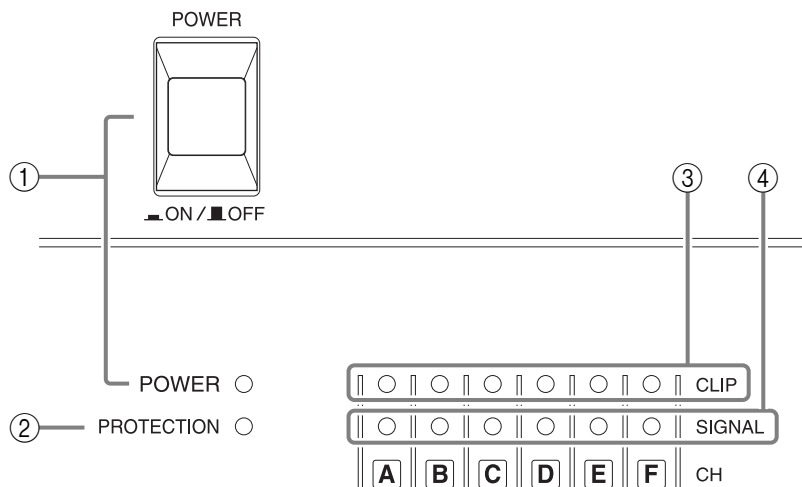
- Using a mobile telephone near this unit may induce noise. If noise occurs, use the telephone away from the unit.
- XLR-type connectors are wired as follows: pin 1: ground, pin 2: hot (+), and pin 3: cold (-).

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Controls and Functions

■ Front Panel



* The illustration shows model XM6150.

① POWER switch and indicator

This is the main POWER switch. Press to turn on the amplifier. Press it again to turn off. The POWER indicator lights up when the amplifier is turned on.

② PROTECTION indicator

When the protection system is active, the PROTECTION indicator lights up and the speakers are automatically disconnected from the amplifier's outputs. The protection system activates in the following situations:

• When the amplifier is turned on

The protection system activates for approximately three seconds when the amplifier is turned on. After three seconds, the protection system deactivates automatically and the amplifier is ready for normal operation.

• If a DC voltage is detected at the amplifier's outputs

The protection system activates if a DC voltage is detected at the amplifier's outputs. Once the DC voltage problem is corrected, the protection system deactivates automatically and the amplifier is ready for normal operation.

• If the amplifier overheats

If the amplifier overheats, the protection system activates. In this case, you should turn off the amplifier and allow it time to cool down. When it has cooled down, the protection system deactivates automatically and the amplifier can be turned on again ready for normal operation. See the Precautions section of this Owner's Manual for ways to prevent the amplifier overheating.

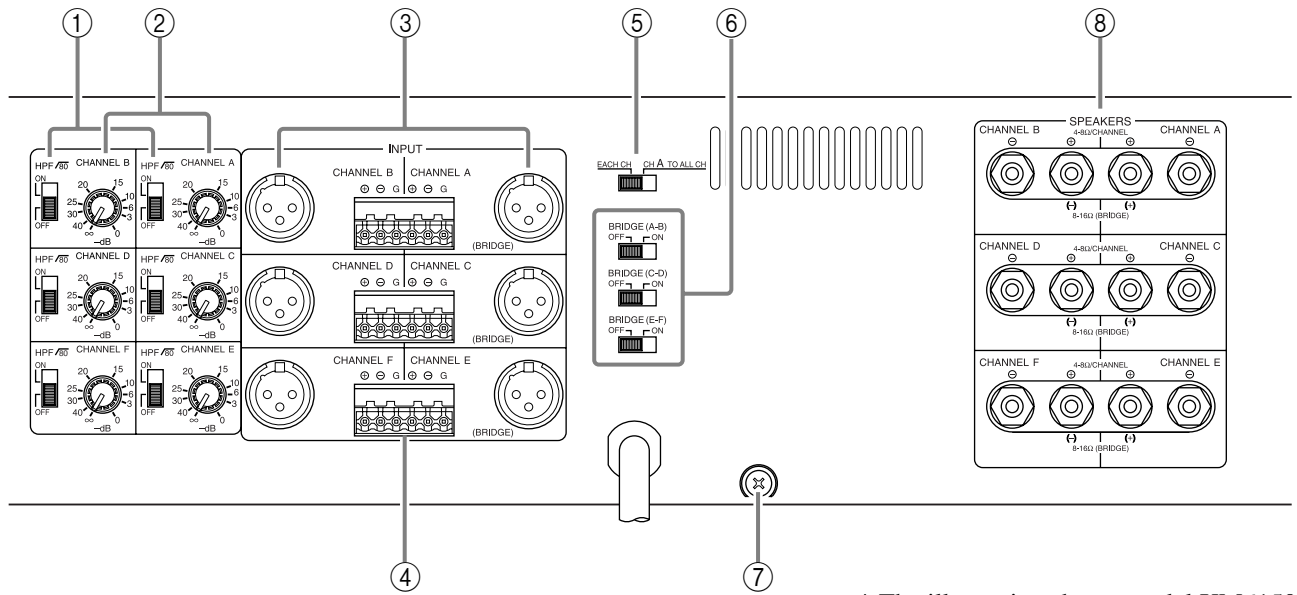
③ CLIP indicator

A channel's CLIP indicator lights up when its output distortion exceeds 1% (i.e., clipping). Output signal clipping is typically caused by excessive input signal levels.

④ SIGNAL indicator

A channel's SIGNAL indicator lights up when its output exceeds 2 V rms, which is equivalent to 1/2 watt into 8 ohms, or 1 watt into 4 ohms.

■ Rear Panel



* The illustration shows model XM6150.

① HPF switches

These switches are used to turn on and off the HPF (High Pass Filter) for each channel. When set to ON, frequencies below 80 Hz are filtered using a 12 dB/octave high pass filter.

Turn this switch ON if 70V-line, high-impedance speakers are connected.

In Bridge mode, only the HPF switch of the first channel in the pair is active, i.e., channel A of pair A–B, channel C of pair C–D, and channel E of pair E–F (XM6150 only).

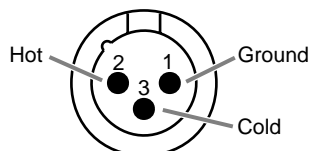
② Attenuators

These detented controls are used to attenuate the input signal from $-\infty$ dB to 0 dB for each channel.

In Bridge mode, only the attenuator of the first channel in the pair is active, i.e., channel A of pair A–B, channel C of pair C–D, and channel E of pair E–F (XM6150 only).

③ XLR inputs

These balanced XLR-3-31 type connectors are used to connect input signals. They are wired pin 1–ground, pin 2–hot (+), and pin 3–cold (–).



In Bridge mode, only the XLR input of the first channel in the pair is active, i.e., channel A of pair A–B, channel C of pair C–D, and channel E of pair E–F (XM6150 only).

④ Euroblock connectors

These balanced Euroblock connectors are used to connect input signals.

In Bridge mode, only the Euroblock connector of the first channel in the pair is active, i.e., channel A of pair A–B, channel C of pair C–D, and channel E of pair E–F (XM6150 only).

⑤ CH A TO ALL CH switch

This switch is used to feed the input signal connected to channel A to all channels.

When set to EACH CH, the input signal connected to each channel is amplified and output by each channel respectively. When set to CH A TO ALL CH, however, the input signal connected to channel A is fed to all channels.

⑥ BRIDGE switches

These switches are used to bridge the following channel pairs: A–B, C–D, and E–F (XM6150 only).

When set to OFF, the two channels operate independently. For example, the signal connected to input channel A is amplified and output by the channel A outputs, while the signal connected to input channel B is amplified and output by the channel B outputs.

When set to BRIDGE, the signal connected to input channel A is amplified and output by the bridged outputs A–B, and channel B's inputs are not used.

⑦ **GND terminals**

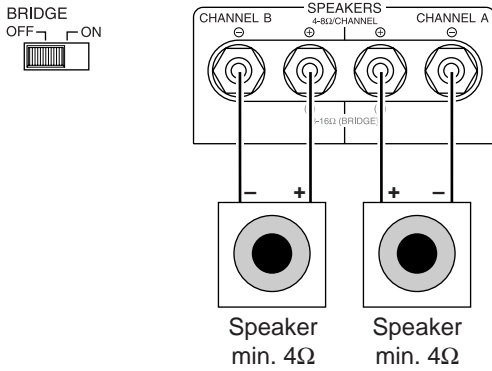
This is the grounding screw terminal. If hum or noise occurs, ground (earth) the unit via this jack, or try connecting it to the chassis of the mixer or preamp, etc.

⑧ **Speaker outputs**

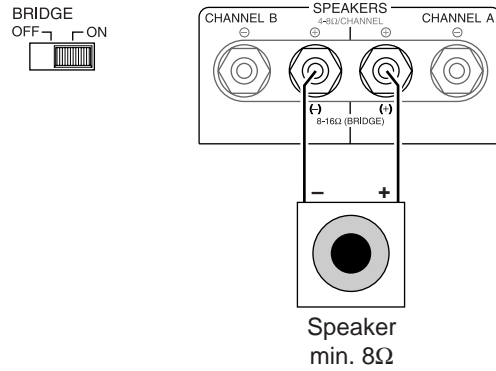
These 5-way binding posts are used to connector speakers.

The following illustrations show how speakers should be connected for normal and Bridge mode operation.

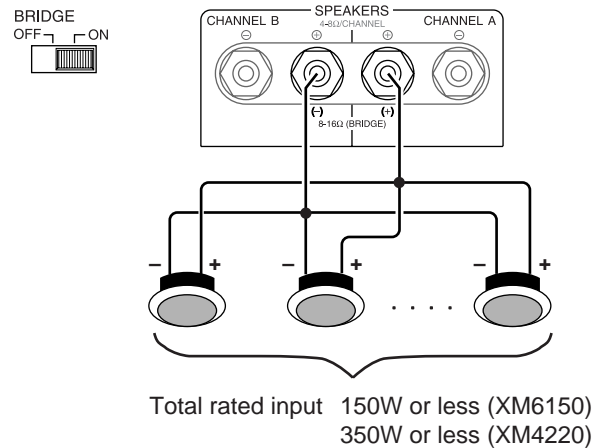
Normal mode



Bridge mode



In Bridge mode, you can connect multiple high-impedance speakers (that are compatible with 70V line output) in parallel. The number of speakers you can connect is determined by the rated input of each speaker. For each channel, you can connect speakers as long as the speakers' total rated input does not exceed 150W (for XM6150) or 350W (for XM4220).

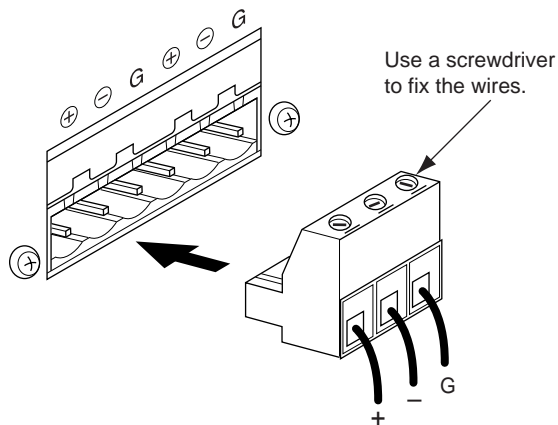


Note: Be sure to use speakers that support the 70V line-out voltage.

Connection

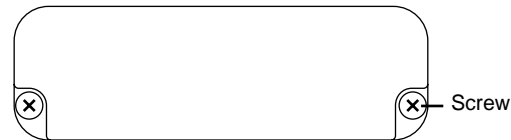
■ Using a Euroblock connector

1. If the wire insertion ports are closed, turn the screws on top of the connector counterclockwise to open the ports.
2. Insert the wires into the appropriate ports, following the indication of the pole on the input terminal, turn the screws on top of the connector clockwise to fix the wires.
3. Attach the Euroblock connector to the input terminal on the unit.

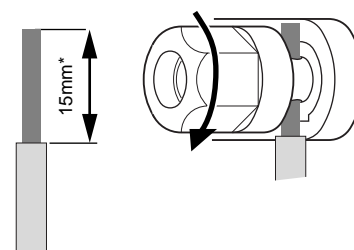


■ Speaker Connection

1. Turn off the POWER switch.
2. Remove the cover attachment screws and remove the protective cover from the speaker terminals.

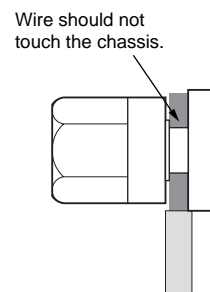


3. After removing approx. 15 mm of insulation from the ends of the speaker cables, pass the bare ends of the speaker wires through the holes in the corresponding speaker terminals and tighten the terminals to securely clamp the wires. Refer to page 6 for speaker polarity.



* Shown actual size.

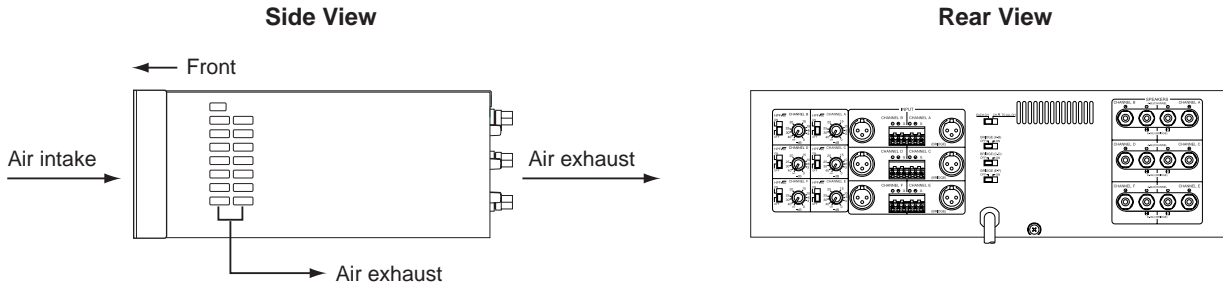
At this time make sure that the bare ends of the speaker cables do not extend from the terminals in such a way that they touch the chassis.



4. Reattach the protective cover over the speaker terminals.

Air Flow

This unit uses a forced cooling system in which air comes in through the front opening and goes out the sides and rear.



Rack Mounting

If multiple high-power amp units are mounted in a rack with poor ventilation, the heat from the amps will cause the interior of the amp to become very hot, causing the performance of the amps to be impaired. In particular, when mounting in a rack whose back can not be left open, mount according to the following instructions.

Rack: Leave a gap of 10 cm or more between the rear panel of the rack and the rear panel of the amplifier.

Fan: Use a fan with 1.5 m³/min or more maximum wind and 5 mmH₂O or more maximum static pressure.

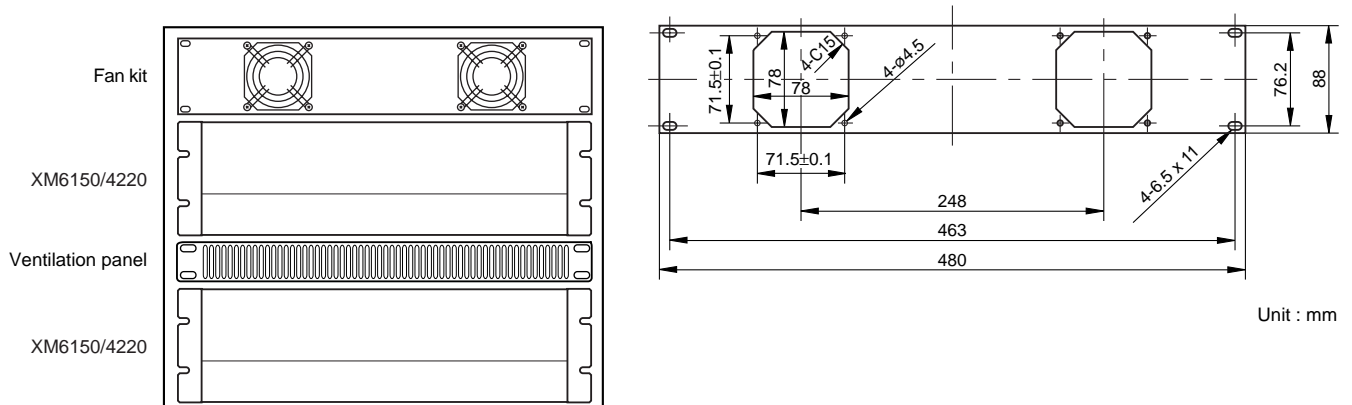
Mounting: Install the fan kit on the top slot or the top panel of the rack and install a blanking panel between two amps.

Ventilation panel: The ventilation panel should be a 1U size, and more than 35% of the entire area should be open.

Example of mounting

The figure on the left below shows an example of a fan kit (panels and two fans) on the top slot of the rack. The fans are Minebia 3115PS-12T-B30 (with 0.9 m³/min maximum wind and 5 mmH₂O maximum static pressure).

The figure on the right below is a dimensional diagram of a panel on which two 3115PS-12T-B30 are installed.



Specifications

■ General Specifications

		XM6150	XM4220
Power Output Level (Rated Power)	8Ω	100 W x 6	140 W x 4
	4Ω	120 W x 6	180 W x 4
THD+N= 0.2%	8Ω/BRIDGE	240 W x 3	360 W x 2
1 kHz	8Ω	120 W x 6	170 W x 4
	4Ω	150 W x 6	220 W x 4
THD+N= 0.2%	8Ω/BRIDGE	300 W x 3	440 W x 2
	70.7V/BRIDGE	150 W x 3	350 W x 2
Power Bandwidth	Half Power	10 Hz~40 kHz (THD+N= 1%)	
Total Harmonic Distortion (THD + N)	20 Hz~20 kHz, Half Power	≤0.2%	
Frequency Response	8Ω, Po= 1 W	0 dB, 0.5 dB, -1 dB 20 Hz~50 kHz	
Intermodulation distortion (IMD)	60 Hz:7 kHz, 4:1, Half Power	≤0.2%	
Channel Separation	Half Power, RL= 8Ω, 1 kHz Vol. max., input 600Ω shunt	≥60 dB	
Residual Noise	Vol. max. 12.7 kHz LPF	≤ -68 dB	≤ -66.5 dB
SN Ratio	12.7 kHz LPF	100 dB	
Damping Factor	8Ω, 1f= 1 kHz	≥100	
Sensitivity (Vol. max.)	Rated Power into 8Ω	0 dB	
Voltage Gain (Vol. max.)		32.1 dB	33.6 dB
Input Impedance		30 kΩ/Balanced, 15 kΩ/Unbalanced	
Controls	Front Panel Rear Panel	POWER switch (ON/OFF) Volume (31 position) /ch BRIDGE switch (ON/OFF) /2ch HPFswitch (ON/OFF) /ch fc=80 Hz, -12 dB/oct. CH A TO ALL CH switch	
Connectors	Input Output	XLR-3-31 type/ch Euroblock connector 5-way binding posts	
Indicators	POWER PROTECTION CLIP SIGNAL	Green Red Red Green	
Protection Circuits		POWER switch ON muting, DC detection, Temp. detection (heatsink temp ≥ 85°C)	
PC limiter		RL ≤ 2 Ω	
Fan Speed		Low/~50°C, Variable, High/70°C~	
Power Requirements	US & Canada Europe Other	120 V, 60 Hz 230 V, 50 Hz 240 V, 50 Hz	
Power Consumption	Idling 1/8 output power, 4Ω Maximum output, 4Ω	45 W 400 W/550 VA 1800 W	45 W 400 W/500 VA 1800 W
Dimensions (W x H x D)		480 x 132 x 319 mm	
Weight		18 kg	18 kg
Accessories		Euroblock connector x 6	Euroblock connector x 4

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

Specifications subject to change without notice.

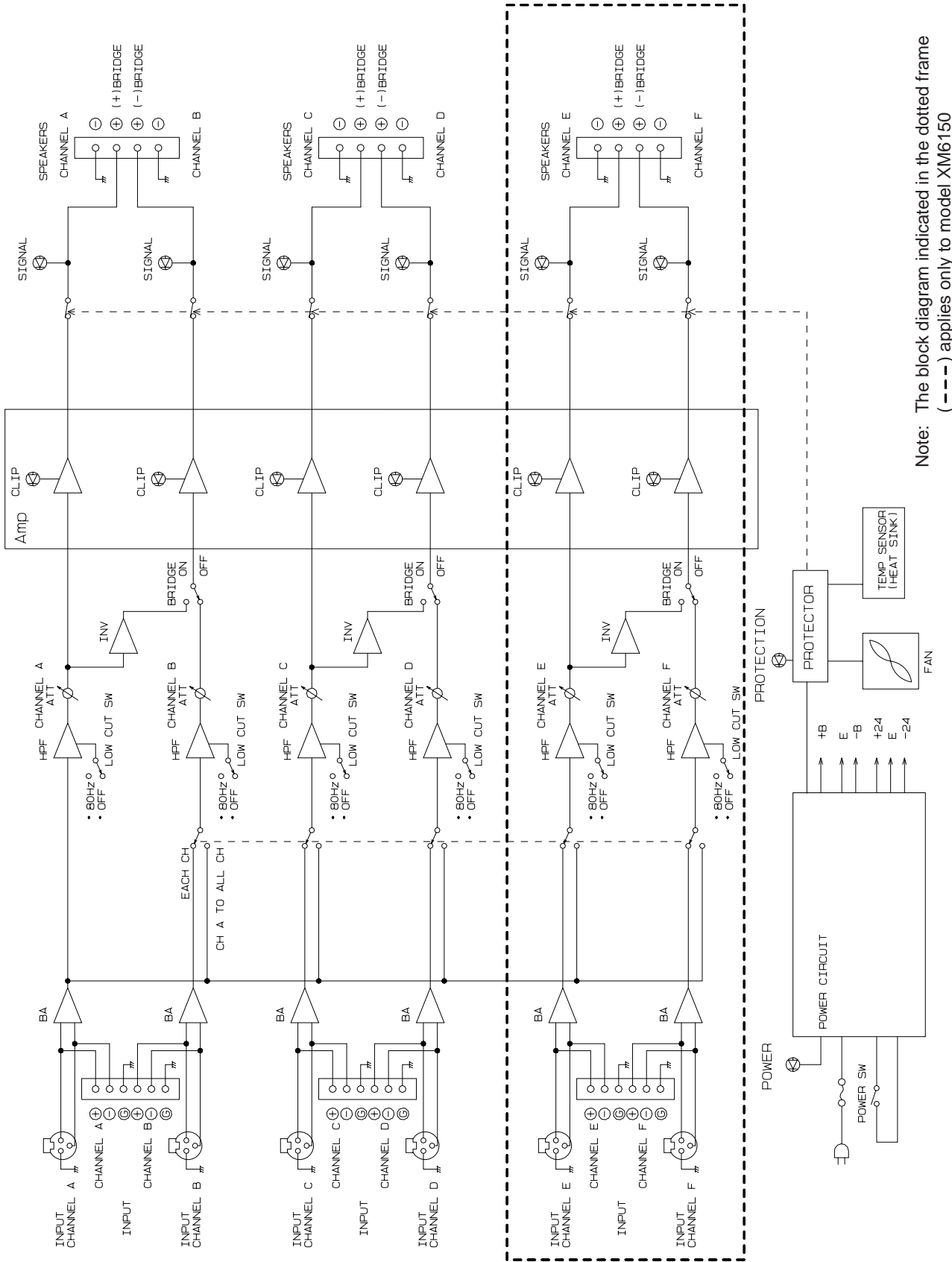
For European Model

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

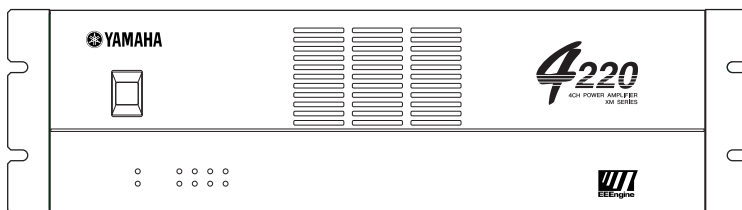
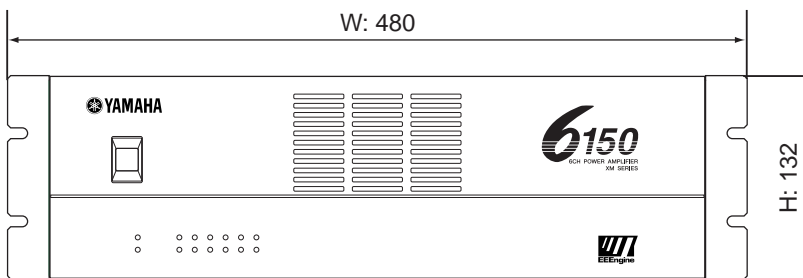
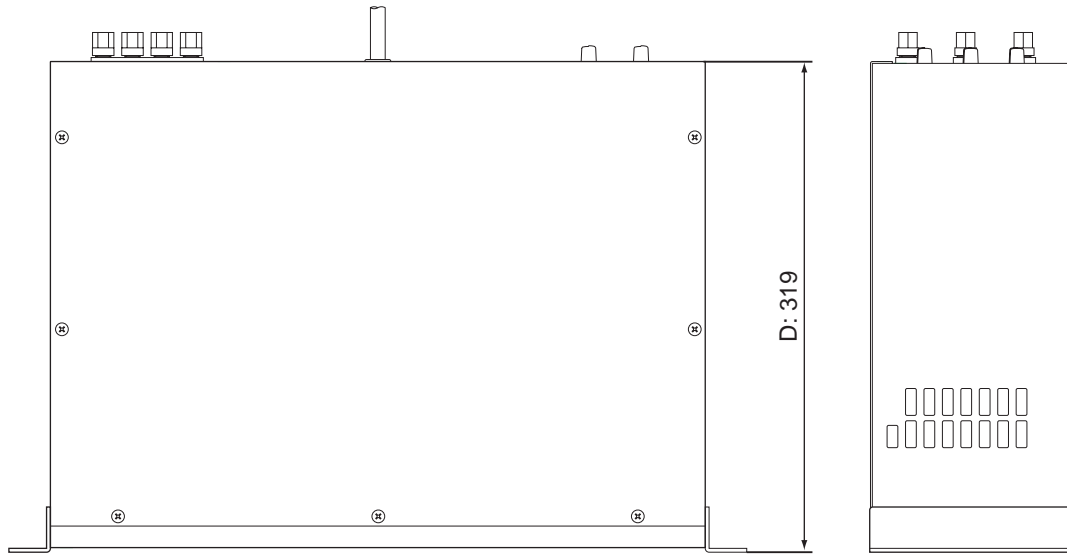
Inrush Current: 56A

Conformed Environment: E1, E2, E3 and E4.

Block Diagram



■ Dimensions



Unit: mm

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	Possible Cause	Remedy	Protection Circuit
CLIP indicator lights up	There is a short at the amplifier's speaker outputs, the speaker's inputs, or in the wiring.	Locate and remove the short.	The PC limiter circuit activates to protect the power transistors.
	The impedance of the connected speaker is too low.	Use a speaker with a minimum impedance of 4Ω (8Ω in Bridge mode).	
PROTECTION indicator lights up	The heat sink temperature has exceeded 90°C.	Check the ventilation around the amplifier and improve the airflow if necessary.	The thermal protection circuit activates to protect the power transistors.
	A DC voltage of ±2 V or greater was detected in the amplifier's output circuit.	Consult your dealer or a Yamaha service center.	The output relay activates to protect the speaker system.



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