



MMA series

Mixing Amplifier



User Manual

CONTENTS:

Before you start

| | |
|------------------|---|
| Precautions | 3 |
| Before you start | 5 |

Controls and connections

| | |
|-------------|---|
| Front panel | 6 |
| Rear panel | 6 |

Installation

| | |
|---------------------|----|
| Rack mounting | 7 |
| Wire connectors | 8 |
| Connections | 10 |
| Adjusting amplifier | 14 |

Specifications

| | |
|----------------|----|
| Block diagram | 17 |
| Technical data | 18 |

Security Precautions



- ⊙ Carefully **READ** instructions before use.
- ⊙ Amplifiers can be operated on either 115 V or 230 V (50-60Hz), which can be selected by changing switch position on the rear panel. The amplifier is factory set to 230 VAC mains voltage.
- ⊙ Keep this user manual nearby for any reference.

Precaution points and notices

Below-described precaution points and notices are to prevent self injury and property damage. Before operating the amplifier, read this manual first to get known of potential safety hazard and to understand the meaning of the precaution points and notices.

- **DO NOT** install or mount the amplifier on unstable objects, such as on the rickety table or the slanted surface. It may result in the amplifier to fall and cause body injury and/or property damage.
- **Be sure to ground** to the safety ground (earth) terminal to avoid electric shock. Never ground to a gas pipe.
- Use the amplifier only with appropriate voltage specified on the amplifier. Using the voltage higher than specified may cause fire or electric shock.
- **DO NOT** cut, twist, damage, nor modify the power supply cord. In addition, avoid using the power cord close to heaters and don't place heavy object, including the amplifier itself, on the power cord, as it may cause fire or electric shock.
- **DO NOT** expose the amplifier to rain or the environment where water or other liquids may be splashed, doing this, it may cause fire or electric shock.
- **DO NOT** remove nor plug in the power supply with wet hands, for it may cause electric shock.
- Be sure to grasp the power supply plug when unplugging. **DO NOT** pull on the cord itself. Operating the amplifier with damaged power supply cord may cause fire or electric shock.
- **Avoid** installing the amplifier in humid or dusty places, the area exposed to the direct sunlight, locations generating smoke or steam, or the spot near the heaters. It may result in fire or electric shock.
- When moving the amplifier, be sure to remove its power supply cord from the wall outlet. Moving the amplifier with the power cord connected to the outlet may cause damage to the power cord and resulting in fire or electric shock. When removing the power cord, be sure to grasp its plug to pull.
- **DO NOT** block the ventilation slots of the amplifier chassis. It will cause the temperature rising and may result fire.

WARNING:
TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK OR PRODUCT DAMAGE, DO NOT EXPOSE THIS APPARATUS TO RAIN, MOISTURE, DRIPPING OR SPLASHING AND THAT NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHALL BE PLACED ON THE APPARATUS.

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN |  |
| CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE SCREWS. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL. | | |

- **AC Power Source.** The supply transformer has been designed for use on either 115V or 230V, (50-60Hz), selected by a push switch on the rear panel. The amplifier is factory set to 230V mains voltage.

When using the Amplifier

- When following irregular situations are found while using amplifier, immediately switch off the power, disconnect the power supply plug from the AC outlet. Don't try to operate the amplifier again until inspected by local dealer. Contact your local dealer to check the amplifier.
- ✓ The amplifier falls.
- ✓ Amplifier is malfunction.
- ✓ Water or any metallic object gets into the amplifier.
- ✓ The smoke or strange smell coming from the amplifier.
- ✓ The power supply cord is damaged, such as exposure of the core, disconnection etc.
- **DO NOT** put cups, bowls or other containers with liquid or metallic object in it on the top of the amplifier. If accidentally spilled onto the amplifier, it may result fire or electric shock.
- **DO NOT** touch the power supply plug during thundering and lightning, for it may result electric shock.
- **DO NOT** insert or drop the metallic objects or flammable materials into the ventilation slots of the amplifier, for it may result fire or electric shock.
- **DO NOT** open nor remove the amplifier cover to prevent fire or electric shock, for there are high voltage components inside.
- Make sure that the volume control is turned to minimum position before power is switched on. Loud sound produced at high volume when power is switched on may damage hearing.
- **DO NOT** place heavy objects on the amplifier, for it may cause it fall and may result in body injury and/or property damage. Besides, the object itself may cause damage or body injury.
- **DO NOT** operate the amplifier for the extended period of time when sound distortion is heard. It is an indication of malfunction, which may cause heat and result fire.
- Switch the power off and unplug the power supply plug from the AC outlet for safety purposes, when cleaning or leaving the amplifier unused for 7 days or more. Fire or electric shock may occur.
- If the dust accumulates on the power supply plug or on the wall AC outlet, fire may result in. Clean it periodically. In addition, make sure the plug is inserted in the wall outlet securely.
- Contact your local dealer to clean the dust, if the dust has accumulated in the amplifier for a long period of time. Dust accumulation may result fire or damage.

Welcome

Congratulations on purchasing MMA series multi-function commercial amplifier. New MMA series amplifiers are designed to provide a big impact in sound reproduction and to produce highest quality audio at an affordable price. We wish you great enjoyment and satisfaction when using your amplifiers, whether you are an installation, or reinforcement engineer.

Unpacking and Installation

Although installing and operating this amplifier is not complicated, a few minutes of your time is required to read this manual to install this device properly and become familiar with its features and how to use them. Please pay attention to given precautions when using or moving this device. Never place the unit near radiator, in front of heating vents, to direct sun light. It should not be used in excessive humidity or dusty environment. Otherwise warranty may be voided.

Connect this unit with matching system components described on the following pages.

Features

MMA 60, MMA 120 and MMA 240 are comprehensive, all-in-one mixer-amplifier solutions for commercial and industrial applications, providing all necessary features in a single unit.

- Six microphone or line inputs offering XLR and RCA jacks,
- Adjustable input gain,
- Remote microphone via phoenix connector,
- M.O.H (Music On Hold) output,
- Telephone paging input via phoenix connector,
- Assignable phantom power for Channel 1 and Channel 2,
- Three level priority muting,
- Built in four type user selectable pre-announce chime,
- 60 watts (MMA 60), 120 watts (MMA 120), 240 watts (MMA 240) rated power output,
- High efficiency Class-D Amplifier (MMA 240),
- Advanced protection system includes current limiting, over current and thermal protection,
- Seven band graphic equalizer,
- Expendable by adding audio mixer and power amplifier with LINK and PRE-AMP terminal,
- Low distortion and low noise level,
- Compact size and lightweight.
- Ideal for commercial and industrial use.

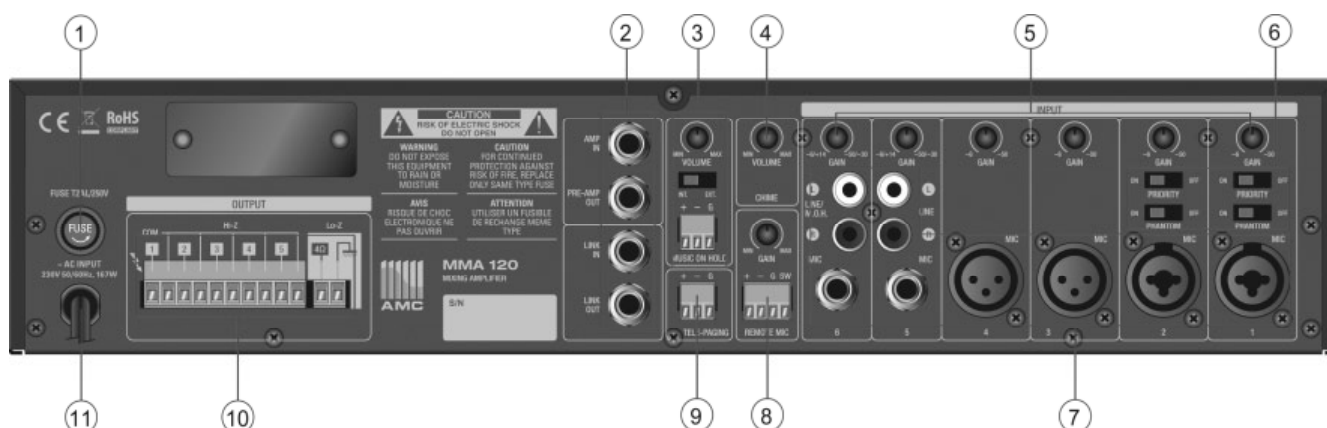
6 Controls and connections

Front panel description



| | |
|------------------------------------------------------------------------------------------------|----------------------------------------------|
| 1. Bay for adding optional music source (CD player with AM/FM Tuner, Compressed audio player). | 6. Pre-announce chime switch. |
| 2. Graphic equalizer controls (125Hz/250Hz/500Hz/1kHz/2kHz/4kHz/8kHz). | 7. All speaker zone output selector. |
| 3. Indicators (Protection/Output level/Power). | 8. Individual speaker zone output selectors. |
| 4. Input channel volume controls. | 9. Power switch |
| 5. Master volume controls. | |

Rear panel description



| | |
|-----------------------------------------------------------|-----------------------------------------------------------------------------|
| 1. AC fuse. | 7. Signal input connectors. |
| 2. Expansion ports (AMP-IN/PRE-AMP-OUT/LINK-IN/LINK-OUT). | 8. Remote microphone station input connector and output level control |
| 3. M.O.H (Music On Hold) output and level controls. | 9. Telephone paging input connector. |
| 4. Pre-announce chime level control. | 10. Speaker outputs connector (4 Ω , selectable 25V, 70V and 100V). |
| 5. Gain controls for variable input level. | 11. AC power cable. |
| 6. Phantom power and priority control switches. | |

Installation

CAUTION: Before beginning make sure the power cord is disconnected from mains source, set power switch to “OFF” position and turn all level controls counterclockwise.

When using single mixer-amplifier application leave around 12 inch (about 30 cm) of air space around the unit for efficient convection cooling.

When stacking units in an equipment rack allow 2U rack space between units for efficient convection cooling. There should be also left 2-inches space between unit sides and rack side walls, and 4-inches from unit rear panel and back of the rack.

How to attach rack mount bracket:

1. Each amplifier is supplied with two rack mount brackets and six screws for attaching to the unit.
2. Place a rack mount bracket flush to the side of the unit orienting rack mounting surface to front of the unit.
3. Fix it with screwing in given screws.
4. Repeat the same operations for attaching mount bracket to the other side of device.
5. Remove the four legs from bottom of unit.

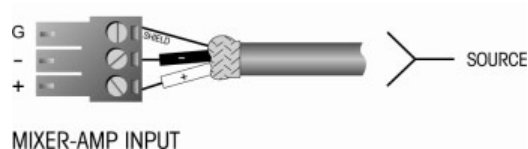


8 Installation

We recommend using pre-built or professionally wired balanced line, 22 to 24 gauge cables.

Figure shows connector pin assignment for appropriate wiring application. RCA input connectors may also be used for unbalanced signal inputs.

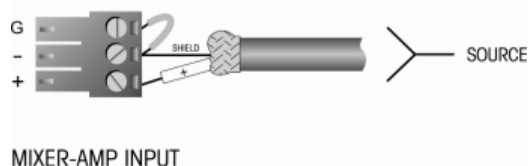
Balanced line



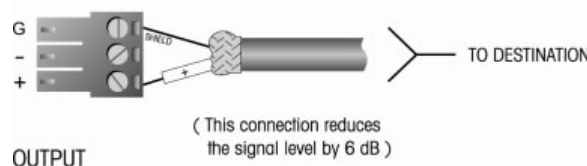
Balanced line



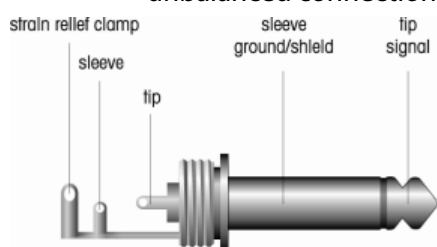
Unbalanced line



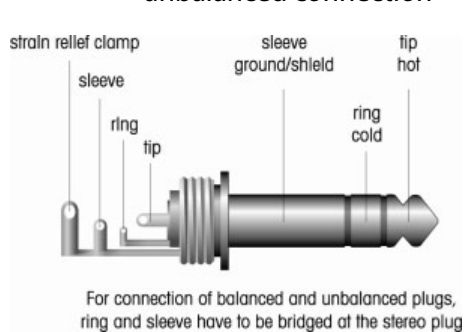
Unbalanced line



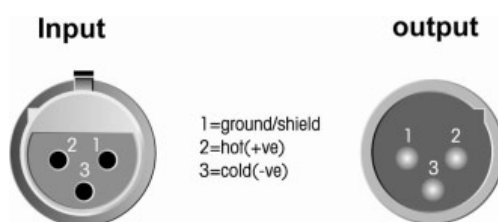
¼" TRS mono jack for unbalanced connection



¼" TRS mono jack for unbalanced connection



Balanced XLR wiring guide



For unbalanced use pin 1 and 3 have to be bridged

Choosing right wire diameter and connectors

For output connector we recommend using pre-built or professionally wired high quality and heavy gauge speaker wires. You may use Phoenix blocks for your output connectors.

To prevent the possibility of short-circuits, wrap or insulate exposed loudspeaker cable connectors.

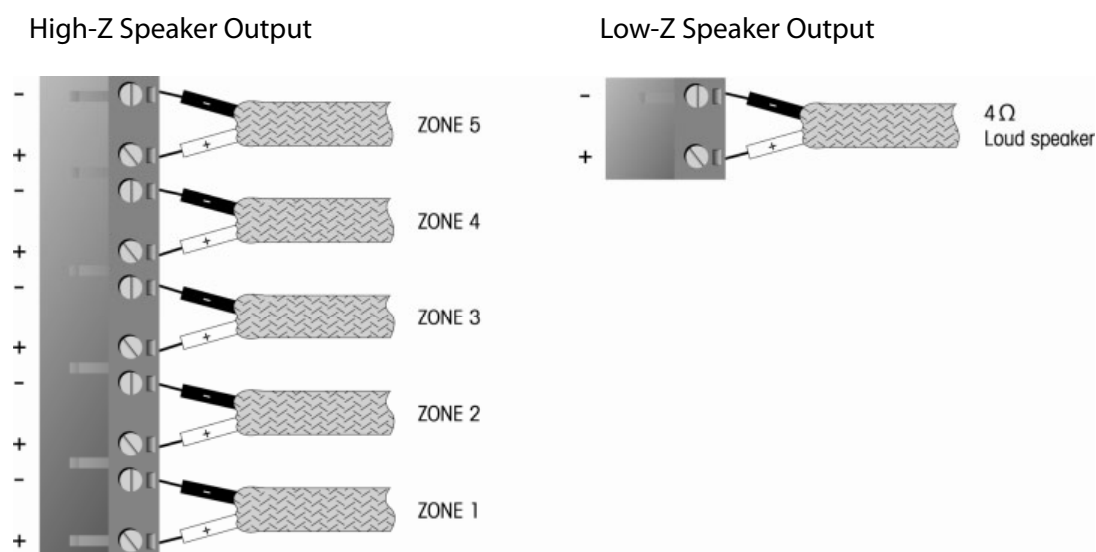
Using the guidelines below, select the appropriate size wire based on the distance between amplifier and speaker. The wire sizes are given for a 4 Ω load.

NOTE : Custom wiring should only be performed by qualified personnel.

CAUTION : Never use shielded cable for output power wiring

| Distance | Wire size |
|-----------------------------|-------------------|
| Up to 25 ft. (7,5 m) | 16 AWG (Ø 1,29mm) |
| 25 - 40 ft. (7,5 - 12 m) | 14 AWG (Ø 1,62mm) |
| 40 - 60 ft. (12 m - 18 m) | 12AWG (Ø 2,05 mm) |
| 60 -100 ft. (18 m - 30 m) | 10AWG (Ø 2,5 mm) |
| 100 - 150 ft. (30 m - 45 m) | 8AWG (Ø 3,2 mm) |
| 150 - 200 ft (45 m - 60m) | 6AWG (Ø 4,11 mm) |

Figure shows connector pin assignments for wiring





Connections

INPUTS: Connect microphones or balanced line-level sources to mixer-amplifier balanced input connectors.

Set gain to desired level. Connect unbalanced line-level signals to RCA input connectors.

OUTPUT: Maintain proper polarity on output connectors.

Each output channel may be connected via Phoenix connectors.

Use terminals marked  (GND) and  for a 4 Ω loudspeaker load, or use terminals marked **1** to **5** and COM for constant - voltage loudspeaker loads.

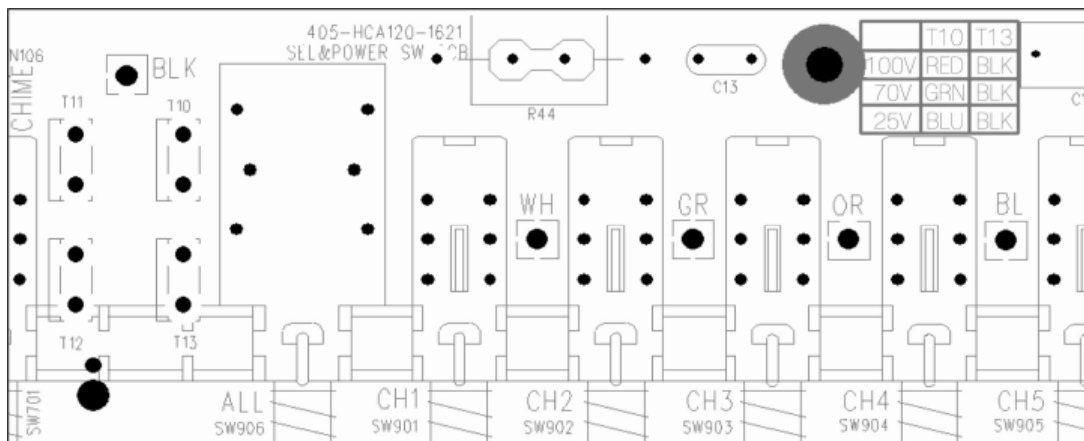
Connect the COM terminal to speaker negative (-) lead; connect one of the other terminals to speaker positive (+) lead.

Impedance and output voltages ratios

| | | | | |
|---------|------------|------------|-----------|-------------|
| MMA 60 | 4Ω / 15.5V | 10Ω / 25V | 83Ω / 70V | 165Ω / 100V |
| MMA 120 | 4Ω / 22V | 5.2Ω / 25V | 42Ω / 70V | 83Ω / 100V |
| MMA 240 | 4Ω / 31V | 2.6Ω / 25V | 21Ω / 70V | 42Ω / 100V |

NOTE : The total speaker system impedances indicated in the table represent.

Different voltages and impedance could be selected to Hi-Z outputs by changing wires connected to T10, T11, T12 and T13 terminals.

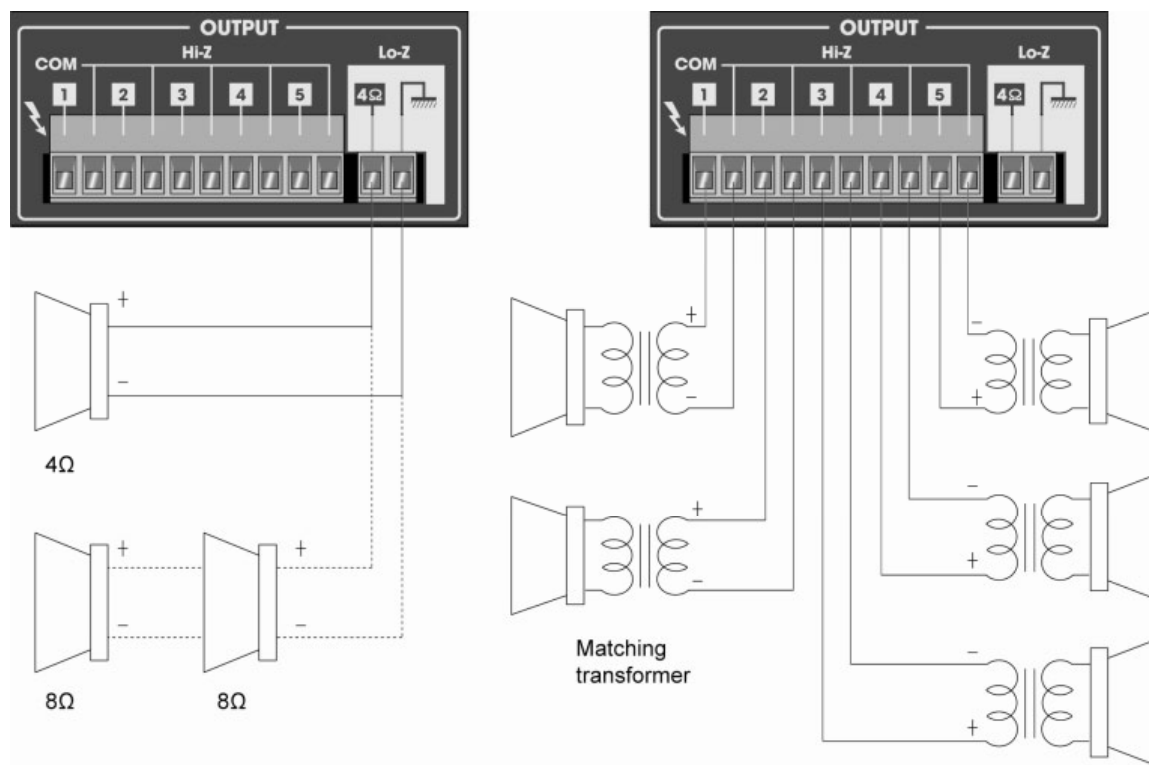


By default unit is set to provide 100V lines. Different output line modes could be set by plugging appropriate color wires to particular terminals. Possible output modes are listed in a wire to terminal table.

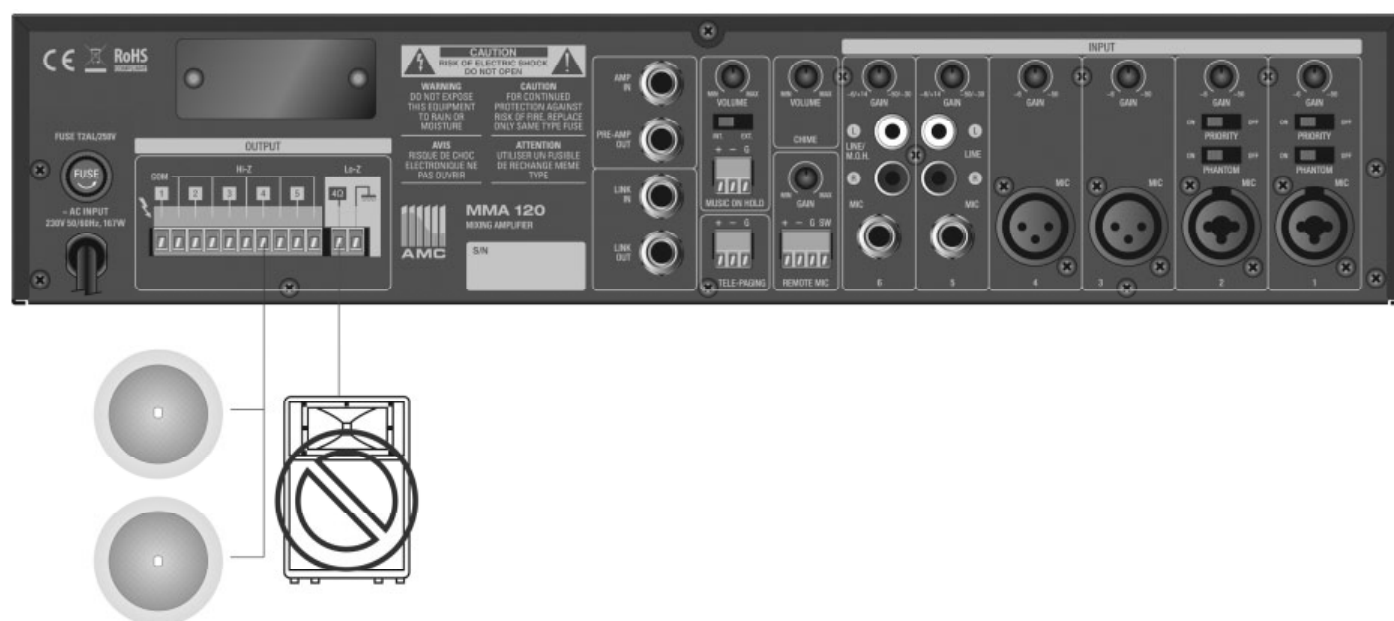
| Mode\Terminals | T10 | T11 | T12 | T13 |
|----------------|------------|------------|------------|------------|
| 100V | RED wire | BLUE wire | GREEN wire | BLACK wire |
| 70V | GREEN wire | RED wire | BLUE wire | BLACK wire |
| 25V | BLUE wire | GREEN Wire | RED wire | BLACK wire |

11 Installation

Possible speaker connection types are shown in a figure below.

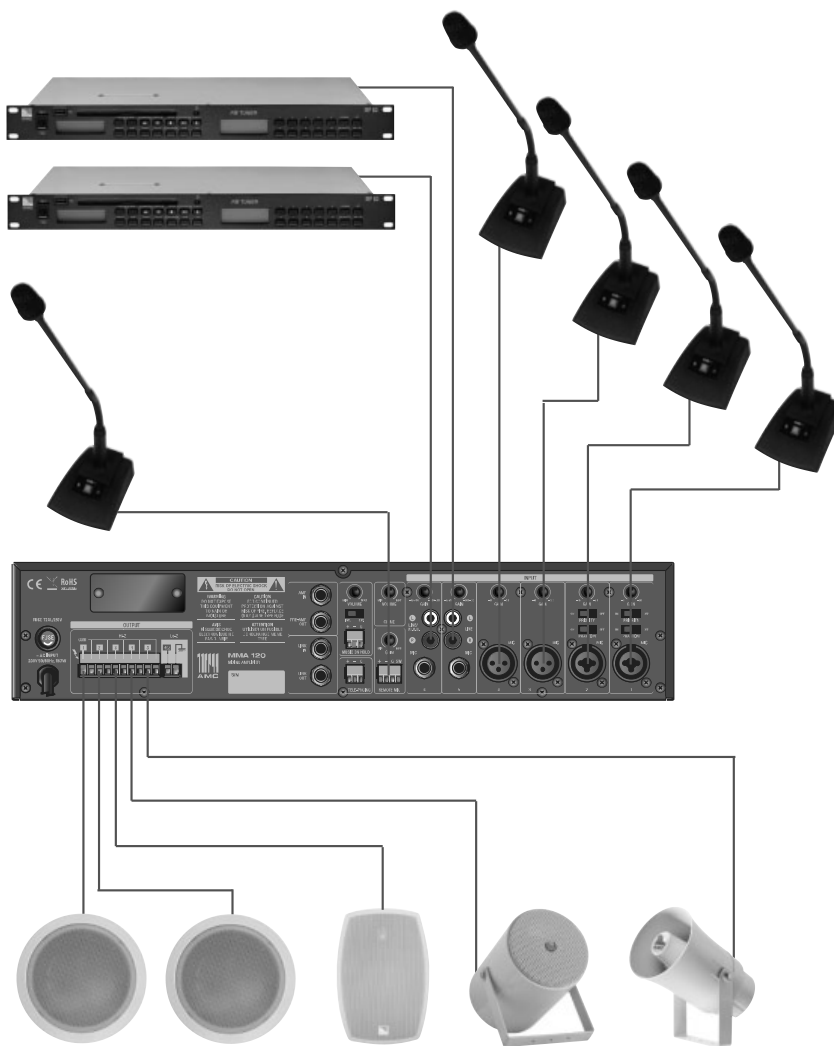


CAUTION: Never use both the Low-Z(4 Ω) and Hi-Z (25V, 70V and 100V) terminals at the same time.



12 Installation

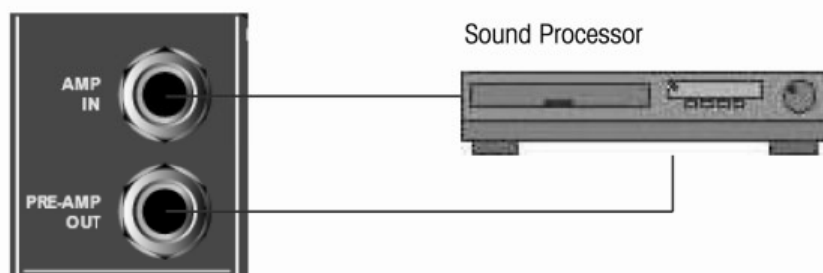
Typical input and output wiring diagram is shown in a figure below.



Connecting external equipment

Signal processors such as equalizers or limiters could be connected between the mixer section (PRE-AMP OUT) and the power amplifier section (AMP IN) connectors, signals can be tailored for desired sound output.

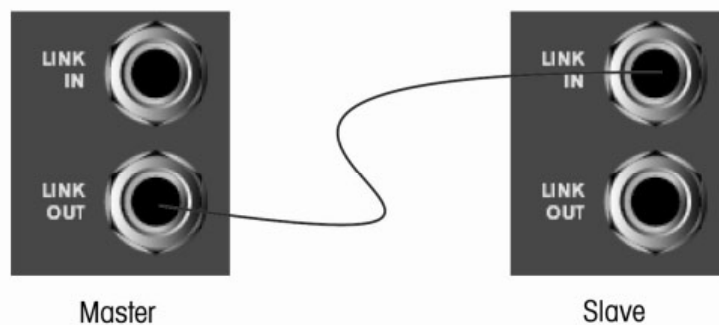
NOTE: Inserting a 1/4" TRS jack into AMP IN terminal disconnects internal power amplifier section from the mixer section.



Expanding MMA series

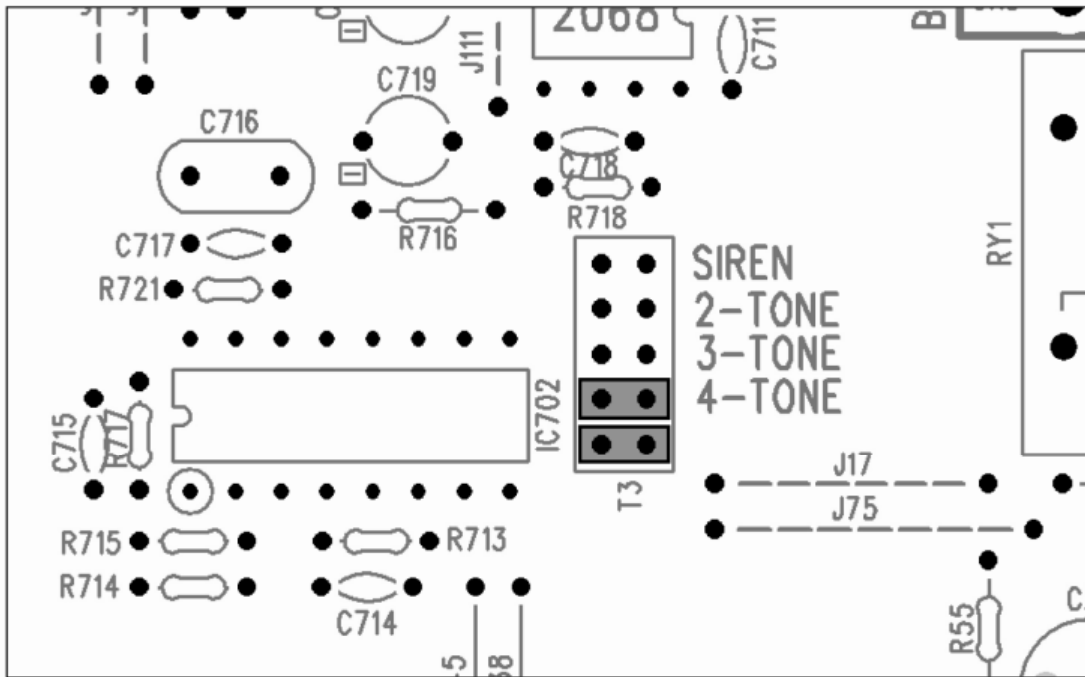
MMA series mixer-amplifier allows expansion using LINK IN and LINK OUT connectors.

This function can be used for additional inputs and outputs and also affects amplifier to which signals are heard when another mixer or MMA series mixer-amplifier is wired.



Preannounce chime

MMA series mixer-amplifier supply user selectable 4 kinds of preannounce chime. The way of set up is same as follow figure.



Above figure shows default factory setup. Pre-announce chime type could be changed by changing jumper position on a T3.

Priority

This function allows talk over for MIC channel 1 and 2. While this function is activated all other input signals are muted. Figure shows the priority switches and its "ON" and "OFF" positions.

Phantom power

MMA series mixer-amplifier supply DC + 15 Volts phantom power to use condenser microphone with MIC 1 and 2 channels. Figure shows the phantom power switches and its "ON" and "OFF" positions.



Connect mixer-amplifier MUSIC ON HOLD connector to music-on-hold input on telephone interface/PBX like telephone pager. Set MUSIC ON HOLD volume to proper level. MMA series mixer-amplifier supply two way of MUSIC ON HOLD function.

Music On Hold

When MUSIC ON HOLD dip switch is set to "INT", MUSIC ON HOLD output is routed from optional internal CD player or compressed audio player.

While dip switch is set to "EXT" position, MUSIC ON HOLD output is routed from LINE IN (Channel 6) input channel.

Tele - paging function

Priority signal from PBX station could be connected to MMA series mixer-amplifier via TELE-PAGING Phoenix connector. This way public announcement could be made via PBX.



Signal input gain control

MMA series mixer-amplifier can accept variable and wide range input signals by input level control. Input level can be adjusted to -44dB letting to accept various external equipment.

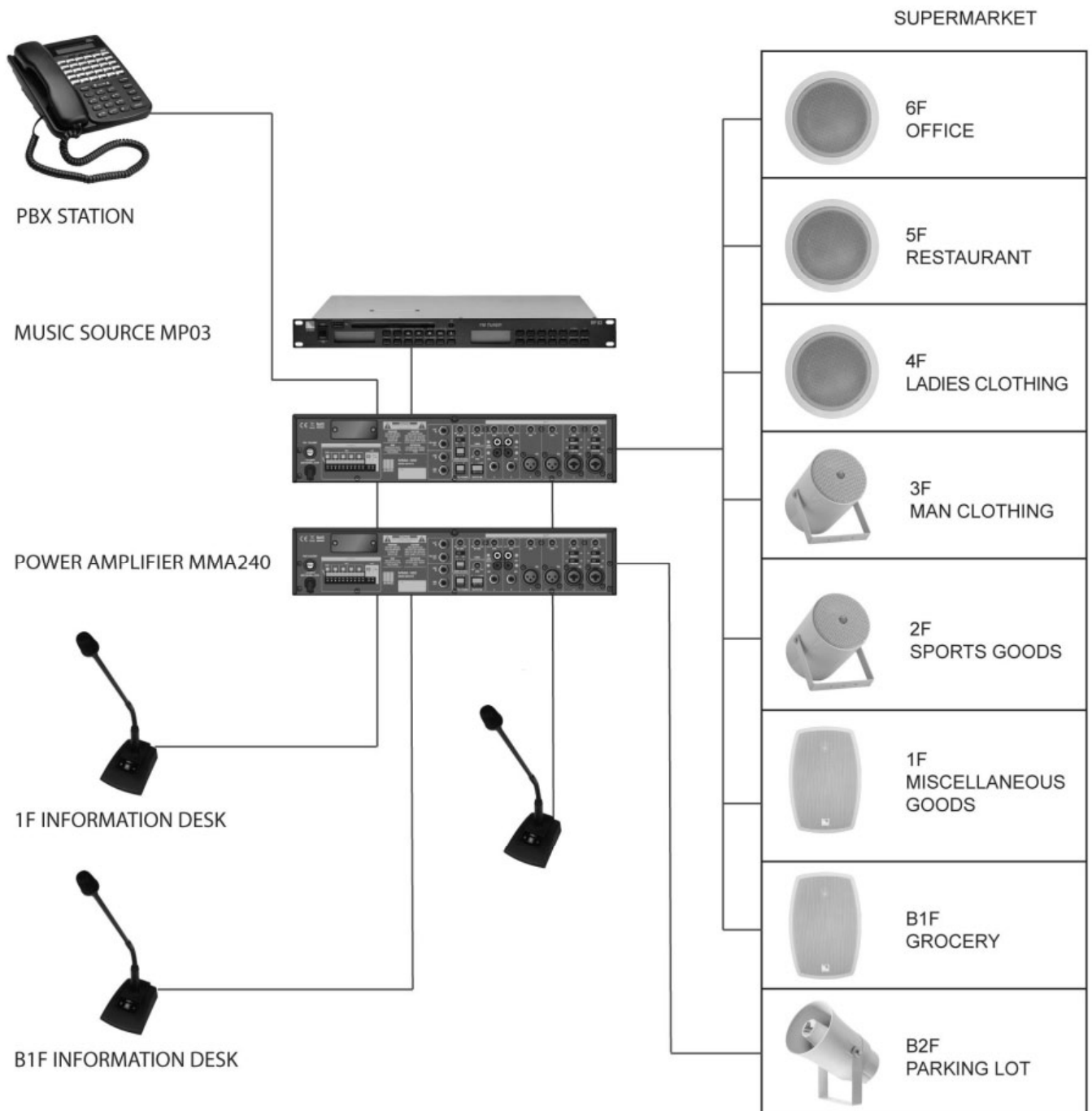


Priority Control

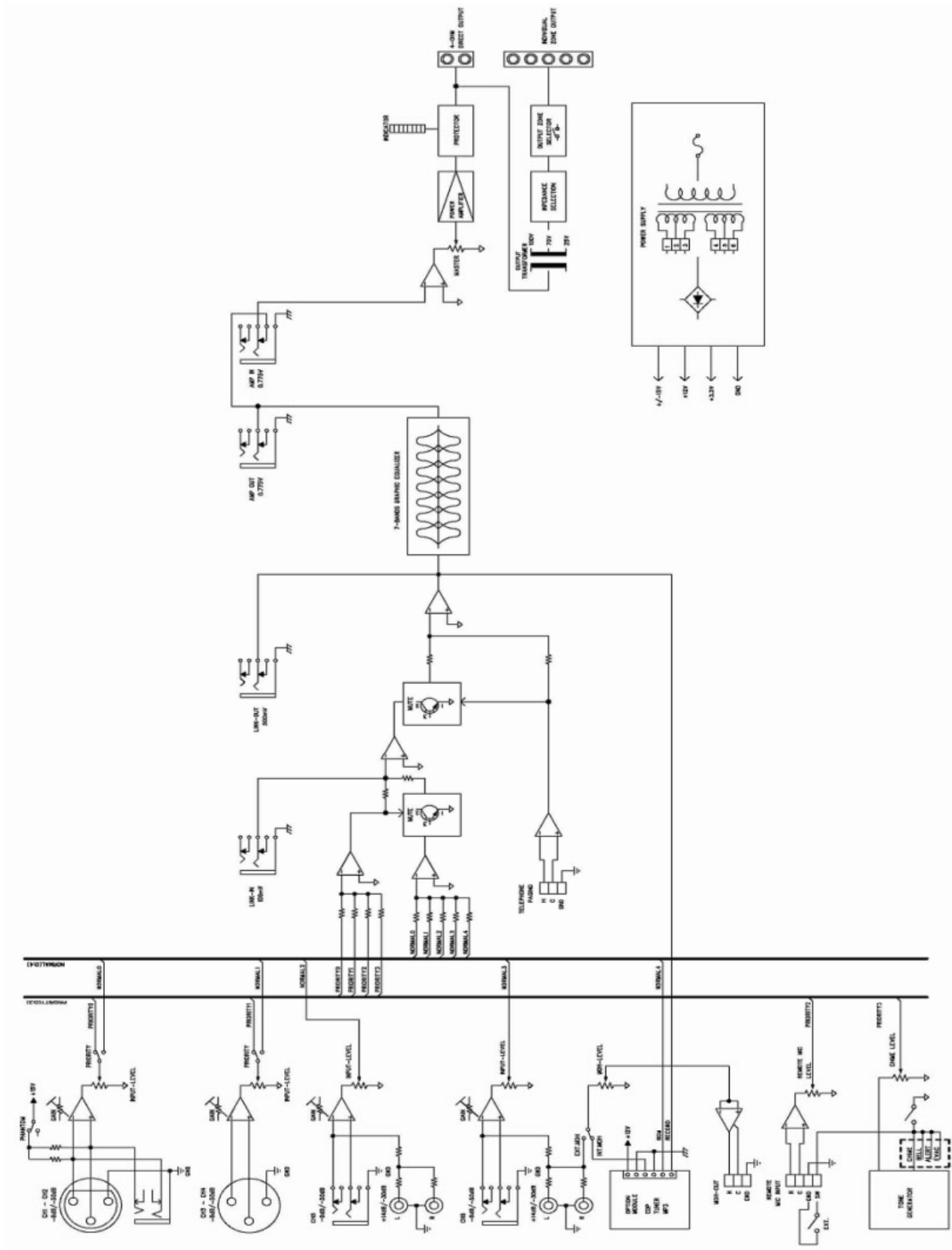
MMA series mixer-amplifier has three layer priority mute functions. When higher level source is activated, other input signals are muted except same priority level source.

CH3~CH6>CH1~CH2, Remote MIC, Chime>Telephone paging.

Example application diagram is shown in a figure below



Block diagram



Technical Specifications

| | | MMA 60 | MMA 120 | MMA 240 |
|------------------------------------------------------------|---------------------------------------|----------------------------|--------------|--------------|
| Rated Output Power at THD 0.5% | | 60Watts | 120Watts | 240Watts |
| Input Sensitivity for full output at maximum Gain | Balanced Microphone Channels | -50dB \pm 3dB | | |
| | Balanced Line Channels | -22dB \pm 3dB | | |
| | Balanced Remote Microphone Station | -50dB \pm 3dB | | |
| | Balanced Telephone Paging | -21dB \pm 3dB | | |
| | Unbalanced Link-In | -17dB \pm 3dB | | |
| | Unbalanced Amp-In | 0dB \pm 3dB | | |
| Frequency Response | | 50Hz~15kHz | | |
| Graphic Equalizer 125Hz,250Hz,500Hz,1kHz,2kHz,4kHz,8kHz | | \pm 12dB | | |
| Signal to Noise Ratio at rated power output | | Better than 90dB | | |
| Crosstalk at all control maximum | | -70dB at 1kHz | | |
| Total Harmonic Distortion(THD) at 1kHz rated power | | Less than 0,5% | | |
| Phantom Power | | 15VDC | | |
| DC Output Offset | | Less than \pm 3mV | | |
| Operating Temperature/Humidity at non-condensing | | 0°~40°C at 95% humidity | | |
| Output Voltage and Impedance | 4 Ω | 15.5V | 22V | 31V |
| | 25V | 10 Ω | 5.2 Ω | 2.6 Ω |
| | 70V | 83 Ω | 42 Ω | 21 Ω |
| | 100V | 165 Ω | 83 Ω | 42 Ω |
| Construction | Cooling | Convection Cooled | | |
| | Dimensions (Width/Height/Depth) | 420(W) x 88(H) x 320(D) mm | | |
| | Net Weight | 8.72 kg | 9.76kg | 10.70 kg |