PLENA Mixer amplifier, 4-zone, 240W

PLE-4MA240-CN
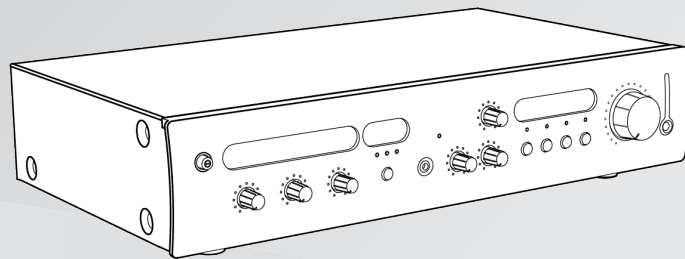
en   Operation manual

Table of contents

1   Safety

Prior to installing or operating products, always read the Important Safety Instructions which are available as a separate multilingual document: Important Safety Instructions (Safety_ML). These instructions are supplied together with all equipment that can be connected to the mains supply.

Safety precautions

The PLENA Mixer amplifier is designed to be connected to the public distribution network.

–   To avoid any risk of electric shock, all interventions must be carried out with disconnected mains supply.
–   The ventilation should not be impeded by covering the ventilation openings with items such as newspapers, table cloths or curtains.
–   Connection of external wiring to this equipment requires installation by qualified personnel only.
–   The operation must only be performed by qualified personnel.
–   Use the apparatus in moderate climate.

Caution!

These service instructions are for use by qualified service personnel only.

To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

2   About this manual

Please read this manual carefully before installing and operating the PLENA Mixer amplifier and retain it for future reference.

2.1   Manual purpose

The purpose of this manual is to provide information required for installing, configuring and operating a PLENA Mixer amplifier.

2.2   Digital document

This manual is available as a digital document in the Adobe Portable Document Format (PDF). Refer to the product related information at: www.boschsecurity.com.

2.3   Intended audience

This manual is intended for installers and users of a PLENA system.

2.4   Alerts and notice signs

Four types of signs can be used in this manual. The type is closely related to the effect that may be caused if it is not observed. These signs - from least severe effect to most severe effect - are:

Notice!
Containing additional information. Usually, not observing a 'notice' does not result in damage to the equipment or personal injuries.

Caution!
The equipment or the property can be damaged, or persons can be lightly injured if the alert is not observed.

Warning!
The equipment or the property can be seriously damaged, or persons can be severely injured if the alert is not observed.

Danger!
Not observing the alert can lead to severe injuries or death.

2.5   Conversion tables

In this manual, SI units are used to express lengths, masses, temperatures etc. These can be converted to non-metric units using the information provided below.

1 in =	25.4 mm	1 mm =	0.03937 in
1 in =	2.54 cm	1 cm =	0.3937 in
1 ft =	0.3048 m	1 m =	3.281 ft
1 mi =	1.609 km	1 km =	0.622 mi

Tab. 2.1: Conversion of units of length

1 lb =	0.4536 kg	1 kg =	2.2046 lb

Tab. 2.2: Conversion of units of mass

1 psi =	68.95 hPa	1 hPa =	0.0145 psi

Tab. 2.3: Conversion of units of pressure

> **Notice!**
> 1 hPa = 1 mbar

$$°F = \frac{9}{5} . °C + 32$$

$$°C = \frac{5}{9} . (°F - 32)$$

°F =	9/5 (°C + 32)	°C =	5/9 (°F - 32)

Tab. 2.4: Conversion of units of temperature

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2.7 Document history

Release date	Documentation version	Reason
2018.11	V1.0	1st edition.

3   Introduction

3.1   The PLENA product range

The PLENA Mixer amplifier is part of the PLENA product range. PLENA provides public address solutions for places where people gather to work, worship, trade, or relax. It is a family of system elements that are combined to create commercial audio systems tailored for virtually any application.

The PLENA product range includes:
–   mixers
–   preamplifiers
–   power amplifiers
–   a music source unit
–   digital message manager
–   a feedback suppressor
–   call stations
–   an All-in-One system
–   a voice alarm system
–   a timer
–   a charger
–   a loop amplifier.

The various elements are designed to complement each other thanks to matched acoustical, electrical and mechanical specifications.

3.2   Parts included

Quantity	Component
1	PLE-4MA240-CN PLENA Mixer amplifier
1	Power cord
1	Set of 19"mounting brackets
1	Manual
1	Important safety instructions

3.3   The PLENA Mixer amplifier

The PLENA Mixer amplifier is a high performance 4-zone mixer amplifier, built on energy efficient class-D technology. Three selectable music sources, including a front panel 3.5 mm input for hand-held device connection, provide flexibility for background music source. Multiple levels of priorities and ducking of music make this amplifier an excellent choice for background music and business paging.
One microphone input (Input 1) can be switched between microphone level and line level sensitivity. The other two microphone inputs can be connected with XLR or TRS type connectors. Phantom power can be switched on to provide power to condenser microphones.

Input 1 can take priority over all other microphone and music inputs: Input 1 priority can be activated by contact closure on the PTT (push to talk). A 2-tone chime can be configured to precede an announcement.

The volume of each microphone input can be individually adjusted to obtain the required mix; the mixed output is controlled via the master volume control and separate high/low tone controls.

Separate music inputs are available with their own input selector and volume control. The user can choose a music source like a CD/DVD player or radio (like the PLE-SDT), and set the level of music. A front panel music input makes it easier to connect a hand-held device as music source.

A telephone / 100V emergency input is provided for easy integration with a telephone paging system or another Public Address system. It has its own preset volume control and overrides all other inputs, including input 1.

The unit also provides a 24V DC output to override remote loudspeaker volume control whenever there is a telephone or emergency input signal.

The unit has a line output to add amplifiers for larger systems with more output power.

Users can create custom labels for inputs, music sources, and output zones. These labels can be attached to the special holders at the front of the mixer amplifier. Colored pins can also be inserted at various positions around the volume and tone controls to indicate favorite settings for a particular application.

An LED VU meter monitors the master output. A headphone socket, below the VU meter, provides the mixer output. For total reliability and ease of use, a limiter is integrated into the output stage to restrict output if the user applies too much signal.

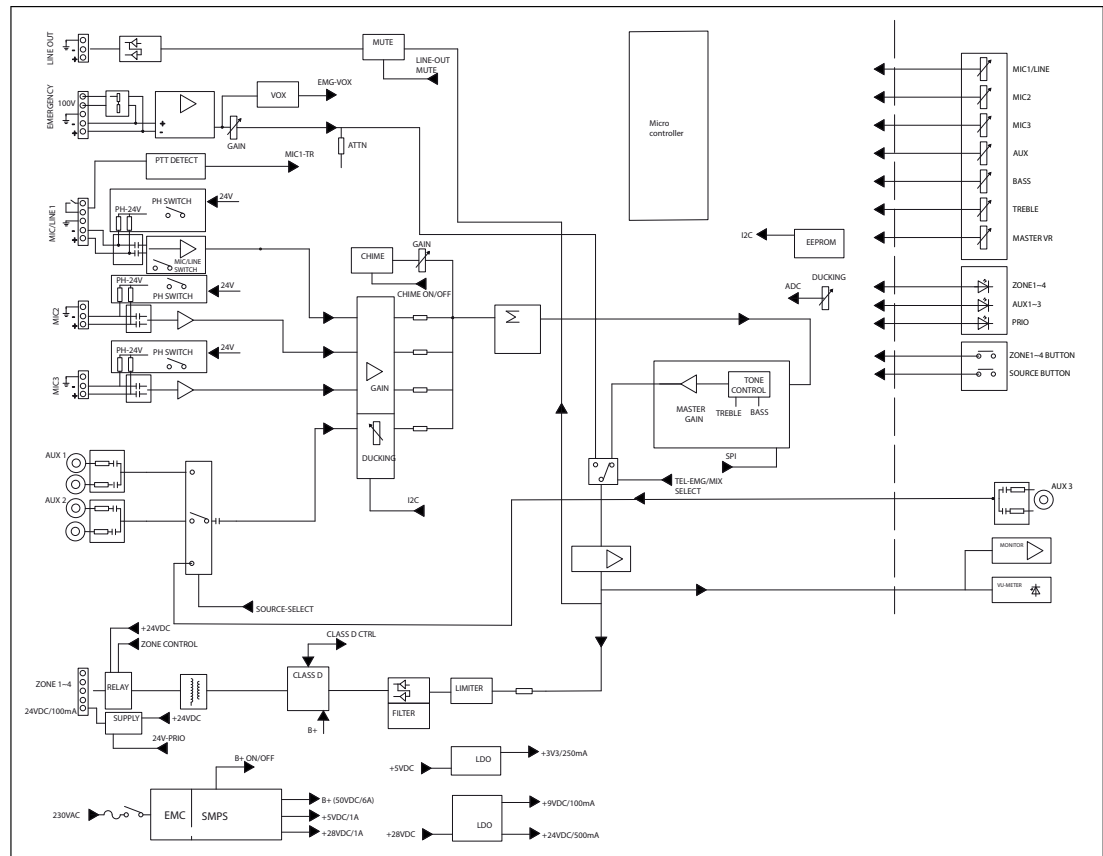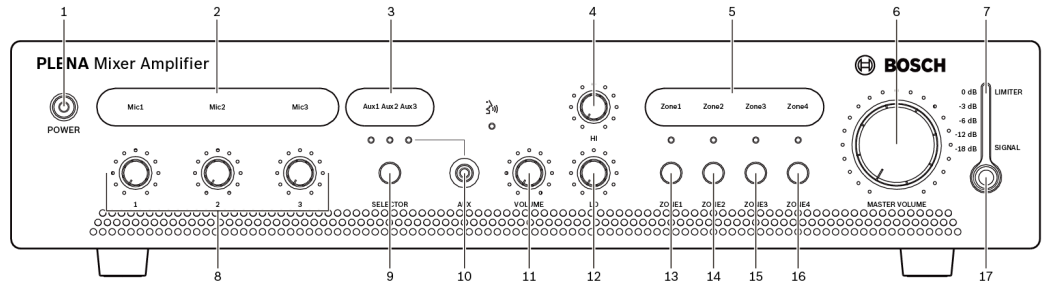For a schematic overview of the PLENA Mixer amplifier, see figure 3.1.

**Figure 3.1: Schematic overview of PLE-4MA240-CN**

3.4   Controls, connectors and indicators

3.4.1   Front panel

Number	Description
1	Power button, with power-on LED.
2	Label holder for user-defined description of microphone/line 1 and microphone 2 and 3 inputs. Custom labels can be created by user.
3	Label holder for user-defined description of music sources (Aux 1, 2 and 3). Custom labels can be created by user.
4	High tone (treble) control knob for mixed output.
5	Label holder for user-defined description of zone names. Custom labels can be created by user.
6	Master volume control knob. It controls all inputs except emergency.
7	LED VU meter for master output, with LEDs for -18, -12 -6, -3, 0 dB.
8	Input level control knobs for: • microphone/line 1 • microphone 2 • microphone 3.
9	Music source selector (for Aux inputs 1, 2, and 3). Selected Aux input LED switches on (green), unselected Aux input LEDs remain off.
10	Aux-3: Music input with 3.5 mm mini-TRS connector for a music source like a mobile phone or laptop. Stereo signals are converted into mono.
11	Volume control knob for selected music source input.
12	Low tone (bass) control knob for mixed output.
13-16	Zone 1 to 4 selection buttons with LED indicator.
17	Headphone socket.

3.4.2   Rear panel
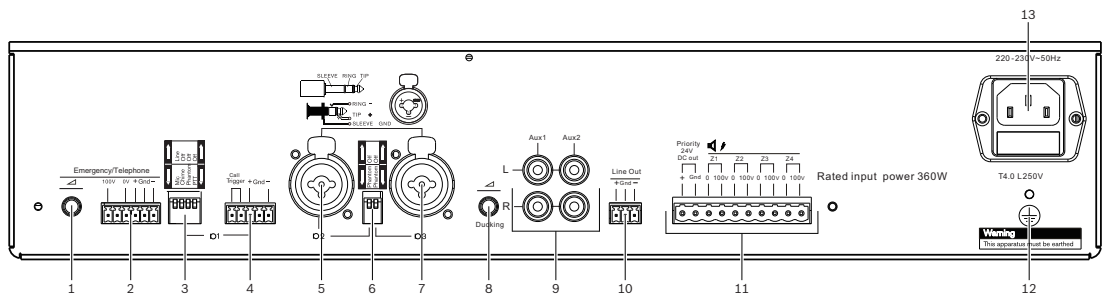
Number	Description
1	Telephone / 100V emergency input volume control knob - from -20 dB to 0 dB.
2	Telephone / 100V emergency input, with Euro style pluggable screw terminal connector. This input has the highest priority amongst all inputs. 100V emergency input shall be connected to pins marked as 100V and 0V; telephone signal (through coupler) shall be connected to +,Gnd, -.
3	DIP switch for microphone/line 1 with selection for: line/mic level, chime tone on/off, phantom power (24V), and PTT (push to talk).
4	Microphone/line 1 input, with 5-pin Euro style pluggable screw terminal connector. Balanced mic/line input (3 pins), remaining 2 pins for trigger input, if these two pins are not connected this input will be mixed with other inputs without priority.
5	Microphone 2 input, with combo (XLR +TRS) balanced signal input connector.
6	DIP switch for microphone 2 and 3 with selection for phantom power (18VDC).
7	Microphone 3 input, with combo (XLR +TRS) balanced signal input connector.
8	Ducking level control knob for microphone/line 1 input. It sets the required BGM (background music) level when trigger (PTT) is active.
9	Aux-1 and 2: Music inputs with Cinch connector for a music source like a CD/DVD player or radio. Stereo signals are converted into mono.
10	Line-out: Balanced line-level output (nominal level: 1V) for system expansion, with 3-pin Euro style pluggable screw terminal connector.
11	Loudspeaker outputs: – Zone 1 to 4 outputs, Euro style pluggable screw terminal connector - 100 V. – 24V DC output for loudspeaker volume control override. It is activated when there is a telephone or emergency input signal.
12	Earth connection screw.
13	Mains connector (3-pole) with fuse inside.

> **Notice!**
> The unit must be earthed.

4   Installation

4.1   Unpack unit

1.   Remove the unit from the box, and discard the packaging material according to local regulations.
2.   Use your fingernails to carefully peel off the protective plastic film from the label holders. Do not use sharp or pointed objects.

4.2   Install unit in 19" rack (optional)

The PLENA Mixer amplifier is intended for tabletop use or installation in a 19" rack (see figure 4.1).

If you install the unit in a 19" rack:

–   Ensure that it does not exceed the overheating temperature (+45°C ambient).
–   Use the included Bosch 19" mounting brackets.
–   Remove the 4 feet from the bottom of the unit.
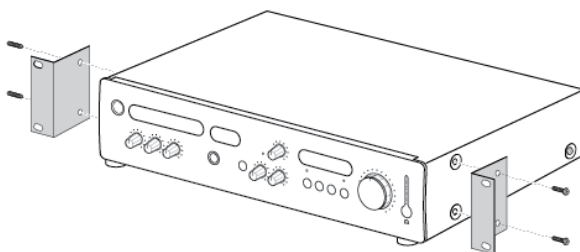
Figure 4.1: 19" bracket and rack mounting

4.3   Check settings/configurations

1.   Connect any additional equipment (see *Connecting inputs, page 12*, and *Connecting outputs, page 13*).
2.   Check the settings (see *Configuration, page 14*).

4.4   Connect unit to mains

1.   Make sure the power switch, on the front of the unit, is set to Off.
2.   Connect the power cord to the mains connector and plug it into the mains outlet.

5   Connections

5.1   Connecting inputs

5.1.1   Priority microphone (input 1)

The priority microphone (or a generic call station) that can be used with push to talk (PTT) should be connected to microphone/line 1 input. The PTT mode can be activated by setting the DIP switch (3) at the rear of the unit. Microphone/line 1 input has priority over all other microphone and music inputs.

If, however, the telephone / 100V emergency input receives a signal, all inputs including microphone/line 1 input will be overridden.

The microphone/line 1 input has a 5-pin Euro style pluggable screw terminal connector, the first 3 pins for a balanced mic/line input, the remaining 2 pins for a trigger input. If these two pins are not connected, this input will be mixed with other inputs without priority.

Set the DIP switch settings next to the Euro connector for microphone/line 1, as required. See *Unit settings, page 14*.

	Notice!
i	When connecting an unbalanced line level (200 mV) signal to the microphone/line input, connect it as follows: Signal to pin 2, pin 1 and pin 3 to ground.

5.1.2   Additional microphones (inputs 2 and 3)

Additional microphones can be connected to microphone input 2 and 3 with XLR or TRS type connectors. These microphones will mix with the background music. Phantom power can be switched on to provide power to condenser microphones.

The telephone / 100V emergency input and microphone/line input 1 have priority over microphone inputs 2 and 3.

5.1.3   Emergency inputs

The telephone / 100V emergency input is used for receiving emergency announcements from a Public Address or telephone system. This input has absolute priority, and will override all inputs when an emergency announcement or telephone signal is received.

Either a telephone line or a 100 V input signal can be connected to the Euro style pluggable screw terminal connector (2) at the rear of the unit.

To adjust the volume of the emergency announcement or signal, turn the rotary knob (1) at the rear of the unit. For safety reasons, the volume of the emergency announcement or signal cannot be set to zero.

The master volume control setting (6) does not influence the volume setting of the emergency announcement or signal.

Caution!

A connection to a telephone network must always be made via a telephone coupler that provides adequate isolation between the telephone network (PBX) and the PLENA system. The telephone coupler must also meet all relevant requirements for this type of communication equipment as imposed by law and/or responsible telecommunication organizations in the country of use. Never try to make a direct connection between the telephone network and the mixer amplifier.

5.1.4   Music source inputs

When using a CD player, tuner or other auxiliary device for background music, connect the line-out connectors of the music source to the appropriate line-in connectors of the mixer amplifier. The unit has three music source inputs:
–   two stereo Cinch inputs (Aux 1 and Aux 2) on the rear panel for music from an installed device like a CD/DVD player or radio
–   one 3.5mm stereo mini-jack input (Aux 3) on the front panel for music from mobile devices like a mobile phone or laptop.

5.2   Connecting outputs

5.2.1   Connecting loudspeakers

The mixer amplifier can drive 100 V constant voltage loudspeakers.

Connect loudspeakers to the 100 V terminal on the Euro style pluggable screw terminal connector (11) of zones 1, 2, 3 and/or 4 at the rear of the unit.

Connect the loudspeakers in parallel and check the loudspeaker polarity for in-phase connection. The summed loudspeaker power should not exceed the rated amplifier output power.
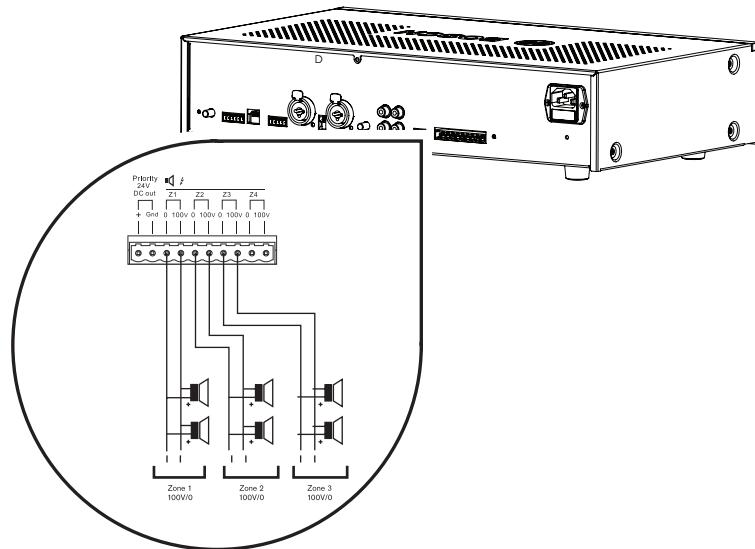

Figure 5.1: Connecting loudspeakers

6   Configuration

6.1   Unit settings

6.1.1   Rear panel settings

The unit can be quickly set-up for operation by setting the following controls at the rear of the unit:

– DIP switches
  Default settings: mic/line-1: mic, chime: on, phantom power: on, PTT: on.
– Rotary knobs
  Default settings: ducking: max (mute), telephone/emergency: max.

See the following tables for an overview of the settings and typical examples of their use.

DIP switch	On	Off	Typical example
Line (mic/line-1)	Input signal from line.	Input signal from microphone.	Depends on set-up.
Chime (mic/line-1)	Chime will be sounded at the beginning of an announcement.	Chime will not be sounded at the beginning of an announcement.	Use a chime to attract listener's attention before making an announcement.
Phantom power (mic/line-1, mic-2, mic-3)	Provides power to condenser microphones.	Phantom power unavailable.	Enable phantom power if you use electret or condenser microphones.
PTT "Push to talk" (mic/line 1)	When the Push to talk contact is closed (for example, by pressing the PTT button of PLE-1CS call station): • this input is available for speech. • a chime will sound, if selected. • the music and other mic inputs will be reduced in volume to the level set by the ducking level control knob.	Mic/line-1 input will mix with the background music or the other microphones in the selected zones.	Live broadcast with PTT on will override all other audio inputs, except the emergency input.

Rotary knob	Effect	Typical example
Ducking level control	Sets the required ducking level when Push to talk is active (see table 6.5). When the ducking level is set to max (mute), the music volume will be fully attenuated; when the ducking level is set to mix, both music and speech inputs can be heard.	Set the ducking level control to mute or attenuate the background music when an announcement is being made.
Telephone / 100V emergency input volume control	Attenuates the emergency announcement or signal. Control range from -20dB to 0dB. For safety reasons, the volume of the emergency announcement or signal cannot be fully set to zero.	Set the volume of the emergency announcement to a higher level when the system is being used in large open areas.

> **Notice!**
> When PTT is selected, the ducking control ranges between 0dB attenuation (very little ducking) to -∞dB (muted). Ducking also impacts the music level in the unselected zone(s).

6.1.2   Pin settings and labeling

Users can create custom labels for the microphone/line inputs, description of the music sources, and audio output zones 1 to 4. These labels can be attached to the mixer amplifier at position numbers 2, 3, and 5 (see *Front panel, page 9*). Colored pins can also be inserted at various positions around control knobs to indicate the favorite settings for a particular application.

The pins are engineered in such a way that they cannot be taken out by hand. This is to prevent tampering. The pins are intended to be inserted once, during installation of the unit. The silver pins should be used to indicate the preferred settings of the unit. The red pins can optionally be used to indicate the maximum setting of a knob.

If these settings have to be changed, use a pair of soft-tipped pliers to carefully remove the pins. If you do not have a pair of soft-tipped pliers, you can use ordinary pliers instead, but first place some plastic tape on the tips of the pliers to prevent damaging the front of the unit.

To remove the clear plastic covers in front of the labels:
1.   Carefully insert a small screwdriver into the cut-out at the bottom of the plastic cover.
2.   Gently lift the cover, and bend it in the middle. Take care not to force the cover or the front panel.

To reattach the plastic covers with paper labels:

1. Insert the paper label into the holder at the front of the unit.
2. Pick up the cover, and then bend it slightly in the middle by hand.
3. Fit the cover into the slot at the front of the unit, and then gently release the cover, making sure that the paper label stays in place.

7   Operation

7.1   Switching on and off

To switch on unit, set the power button (1) on the front panel to On - pushed in (see *Front panel, page 9*).

To switch off the unit, set the power button (1) on the front panel to Off - popped out (see *Front panel, page 9*).

7.2   Microphone control

Use the input level control knobs to individually control the sound level of microphone/line input 1 and microphone inputs 2 and 3.

> **i** | **Notice!**
> Users can create custom labels for the microphone and microphone/line inputs, description of the music sources, and audio output zones 1 to 4. These labels can be attached to the mixer amplifier at position numbers 2, 3, and 5 (see *Front panel, page 9*).
> Colored pins can also be inserted at various positions around the control knobs to indicate the favorite settings for a particular application.

7.3   Music control

7.3.1   Source selection

Use the music source selector (9) to select one of the connected music sources. The selected source will be indicated by a green LED.

The music input selected is stored in the unit. Therefore, it is not necessary to repeat the selection after restart.

7.3.2   Volume control

Use the music source volume control knob (11) to control the sound level of the selected music source.

7.4   Tone control

The tone control knobs provide separate control of high frequency (treble) and low (bass) frequency audio for the mixed input of mic/line and music.

The tone controls are not standard bass and treble controls: they can be used as a traditional tone control with high and low control, but also have a powerful contour that addresses problems found in real situations.

The tone control boosts warmth in voices and deep bass without boosting rumble, and cuts rumble without losing warmth or making the sound boomy in the low frequencies. In the high frequencies, the tone control boosts sparkle without adding sharpness, but when cutting is first, cuts harshness and sharpness without reducing audio clarity.

Use the Hi (high) and Lo (low) tone control knobs (see *Front panel, page 9*, numbers 4 and 12) to change the tone of the mixed output.

7.5   Output control

7.5.1   Zone selection

Use the zone selection buttons (13 to 16) to route the music/microphone, line mix from the amplifier output to loudspeaker zone 1, 2, 3 and/or 4.

However, telephone/ 100V emergency announcements are always routed to all zones, irrespective of the position of the zone selection buttons.

7.5.2   Master volume control

Use the master volume control knob (6) to collectively control the sound level of all outputs, except the emergency announcement/signal.

8   Troubleshooting

Problem	Possible cause	Possible solution
Amplifier does not work and power LED is not illuminated.	– Power (plug) is disconnected and/or the unit is switched off.	– Insert power cord and switch on the unit.
No audio.	– An audio output cable has come loose or has not been properly plugged in. – Input source is not working correctly.	– Check all input and output audio connections, plug in audio cables properly. – Check the input source is working correctly and sending an appropriate level of signal.
The audio output sound is distorted or sounds strange.	– The audio output cable has not been properly plugged in. – The correct cables have not been used. – The input level is clipping. – Music source signal level is not correct.	– Check all connections are plugged in properly. – Use correct cable type for input and output. – Turn down the input signal level using the level control knob or the master volume control knob. – Increase signal level for the source or change the source.

8.1   Customer service

If a fault cannot be resolved, please contact your supplier or system integrator, or go directly to your Bosch representative.

9   Maintenance

The unit requires minimum maintenance. However, to keep it in good condition, the following tasks should be carried out.

Clean the unit
– Periodically clean the unit with a damp, lint-free cloth.

Clean the air inlets
– The unit can collect dust from operation. Clean the air inlets at least once a year.

Check the connectors and grounding
– Periodically check:
    – All cable connections for corrosion and the screw terminals to make sure that they have not become loosened.
    – The ground (Protective Earth) connection of the unit.

10 Technical data

Electrical

Mains power supply	
Voltage	220-230 VAC, ±10%, 50/60 Hz
Power Consumption	
Rated Output (0 dB)	360W
-3dB	180W
Idle	20W
Performance	
Frequency response	70Hz to 18kHz (+1/-3dB @-10dB ref. rated output)
Distortion	<1% @ rated output power, 1kHz
Bass control	+/-12dB (frequency is setting dependent)
Treble control	+/-12dB (frequency is setting dependent)
Mic/line input	1x
Input 1 (Push-to-talk contact with ducking functionality)	5-pin, Euro style, balanced, phantom
Mic input	2x
Input 2-3	Combo (XLR or TRS), balanced, phantom
Sensitivity	1mV +1/-3dB (mic), 300mV +1/-3 dB (line)
Impedance	>1 kOhm (mic); >1.5 kOhm (line)
S/N (flat at max volume)	>60dB (mic), >70dB (line)
S/N (flat at min volume/muted)	>75dB
CMRR (mic)	60dB
Headroom	25dB
Phantom power supply	18VDC
Music input	3x
Aux 1-2	Cinch, stereo converted to mono
Aux 3	3.5mm mini-TRS; stereo converted to mono
Sensitivity	200mV +1/-3dB
Impedance	30 kOhm

S/N (flat at max volume)	>75dB
S/N (flat at min volume/muted)	>75dB
Headroom	20dB
Emergency/telephone	
Connector	5-pin, Euro style pluggable screw terminal
Sensitivity (telephone)	10mV ~100mV
Sensitivity (emergency)	10V-100V
Impedance	>10 kOhm
S/N (flat at max volume)	>80dB
Line output	1x
Connector	3-pin, Euro style pluggable screw terminal
Nominal level	1V
Impedance	<100 Ohm
Loudspeaker Output	
Connector	Screw, floating
Max/rated	240W
Zones	4
Priority	24VDC (for loudspeaker volume control override)

Mechanical

Dimensions (HxWxD)	100 x 430 x 270 mm (19" wide, 2U high, with feet)
Mounting	Stand-alone, 19" rack
Color	Charcoal
Weight (net)	Approx. 5 kg

Environmental

Operating temperature	-10 ºC to +45 ºC
Storage temperature	-40 ºC to +70 ºC
Relative humidity	<95%