the t.amp

# TSA 1400, TSA 2200, TSA 4000

power amplifier

th•mann
MUSIC IS OUR PASSION

user manual

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14.03.2019, ID: 218912, 218913, 287602

# Table of contents

# 1 General information

This user manual contains important information on the safe operation of the device. Read and follow all safety notes and all instructions. Save this manual for future reference. Make sure that it is available to all persons using this device. If you sell the device to another user, be sure that they also receive this manual.

Our products and user manuals are subject to a process of continuous development. We therefore reserve the right to make changes without notice. Please refer to the latest version of the user manual which is ready for download under *www.thomann.de*.

## 1.1 Further information

On our website (*www.thomann.de)* you will find lots of further information and details on the following points:

| | |
|---|---|
| Download | This manual is also available as PDF file for you to download. |
| Keyword search | Use the search function in the electronic version to find the topics of interest for you quickly. |
| Online guides | Our online guides provide detailed information on technical basics and terms. |
| Personal consultation | For personal consultation please contact our technical hotline. |
| Service | If you have any problems with the device the customer service will gladly assist you. |

## 1.2 Notational conventions

This manual uses the following notational conventions:

**Letterings**

The letterings for connectors and controls are marked by square brackets and italics.

**Examples:** *[VOLUME]* control, *[Mono]* button.

**Cross-references**

References to other locations in this manual are identified by an arrow and the specified page number. In the electronic version of the manual, you can click the cross-reference to jump to the specified location.

Example: See *'Cross-references' on page 6*.

## 1.3 Symbols and signal words

In this section you will find an overview of the meaning of symbols and signal words that are used in this manual.

| Signal word | Meaning |
|---|---|
| **DANGER!** | This combination of symbol and signal word indicates an immediate dangerous situation that will result in death or serious injury if it is not avoided. |
| **CAUTION!** | This combination of symbol and signal word indicates a possible dangerous situation that can result in minor injury if it is not avoided. |
| **NOTICE!** | This combination of symbol and signal word indicates a possible dangerous situation that can result in material and environmental damage if it is not avoided. |

| Warning signs | Type of danger |
|---|---|
|  | Warning – high-voltage. |
|  | Warning – danger zone. |

# 2 Safety instructions

**Intended use**

This device amplifies electric audio frequency signals to operate passive speakers. Use the device only as described in this user manual. Any other use or use under other operating conditions is considered to be improper and may result in personal injury or property damage. No liability will be assumed for damages resulting from improper use.

This device may be used only by persons with sufficient physical, sensorial, and intellectual abilities and having corresponding knowledge and experience. Other persons may use this device only if they are supervised or instructed by a person who is responsible for their safety.

**Safety**

**DANGER!**

**Danger for children**

Ensure that plastic bags, packaging, etc. are disposed of properly and are not within reach of babies and young children. Choking hazard!

Ensure that children do not detach any small parts (e.g. knobs or the like) from the unit. They could swallow the pieces and choke!

Never let children unattended use electrical devices.

**DANGER!**

**Electric shock caused by high voltages inside**

Within the device there are areas where high voltages may be present. Never remove any covers.

There are no user-serviceable parts inside.

Do not use the device if covers, protectors or optical components are missing or damaged.

**DANGER!**

**Electric shock caused by short-circuit**

Always use proper ready-made insulated mains cabling (power cord) with a protective contact plug. Do not modify the mains cable or the plug. Failure to do so could result in electric shock/death or fire. If in doubt, seek advice from a registered electrician.

**CAUTION!**

**Possible hearing damage**

The device can produce volume levels that may cause temporary or permanent hearing impairment. Over an extended period of time, even levels that seem to be uncritical can cause hearing damage.

Decrease the volume level immediately if you experience ringing in your ears or hearing impairment. If this is not possible, keep a greater distance or use sufficient ear protectors.

**NOTICE!**

**Risk of fire**

Do not block areas of ventilation. Do not install the device near any direct heat source. Keep the device away from naked flames.

**NOTICE!**

**Operating conditions**

This device has been designed for indoor use only. To prevent damage, never expose the device to any liquid or moisture. Avoid direct sunlight, heavy dirt, and strong vibrations.

**NOTICE!**

**Power supply**

Before connecting the device, ensure that the input voltage (AC outlet) matches the voltage rating of the device and that the AC outlet is protected by a residual current circuit breaker. Failure to do so could result in damage to the device and possibly injure the user.

Unplug the device before electrical storms occur and when it is unused for long periods of time to reduce the risk of electric shock or fire.

**NOTICE!**

**Magnetic fields**

The device generates strong magnetic fields that can interfere with the function of poorly shielded devices. The strongest magnetic fields are directly above and below the power amplifier. Therefore, never place sensitive devices such as pre-amplifiers, radio transmission systems, or tape decks directly above or below the power amplifier. When installing the power amplifier into a rack, you should place it in the lowest position, and further equipment such as pre-amplifiers in the highest position.

**NOTICE!**

**Possible staining**

The plasticiser contained in the rubber feet of this product may possibly react with the coating of your parquet, linoleum, laminate or PVC floor and after some time cause permanent dark stains.

In case of doubt, do not put the rubber feet directly on the floor, but use felt-pad floor protectors or a carpet.

# 3 Features

Common features of all models described:

- integrated switching power supply
- XLR inputs
- lockable NL4 output sockets
- protective circuits
  - audio limiter
  - Thermal protection
  - short circuit protection
- 19" rack-mountable (2 RU)

Find device-specific features here, *Chapter 5 'Connections and controls' on page 15* and *Chapter 6 'Technical specifications' on page 23*.

# 4 Installation and starting up

**NOTICE!**

**Possible staining**

The plasticiser contained in the rubber feet of this product may possibly react with the coating of your parquet, linoleum, laminate or PVC floor and after some time cause permanent dark stains.

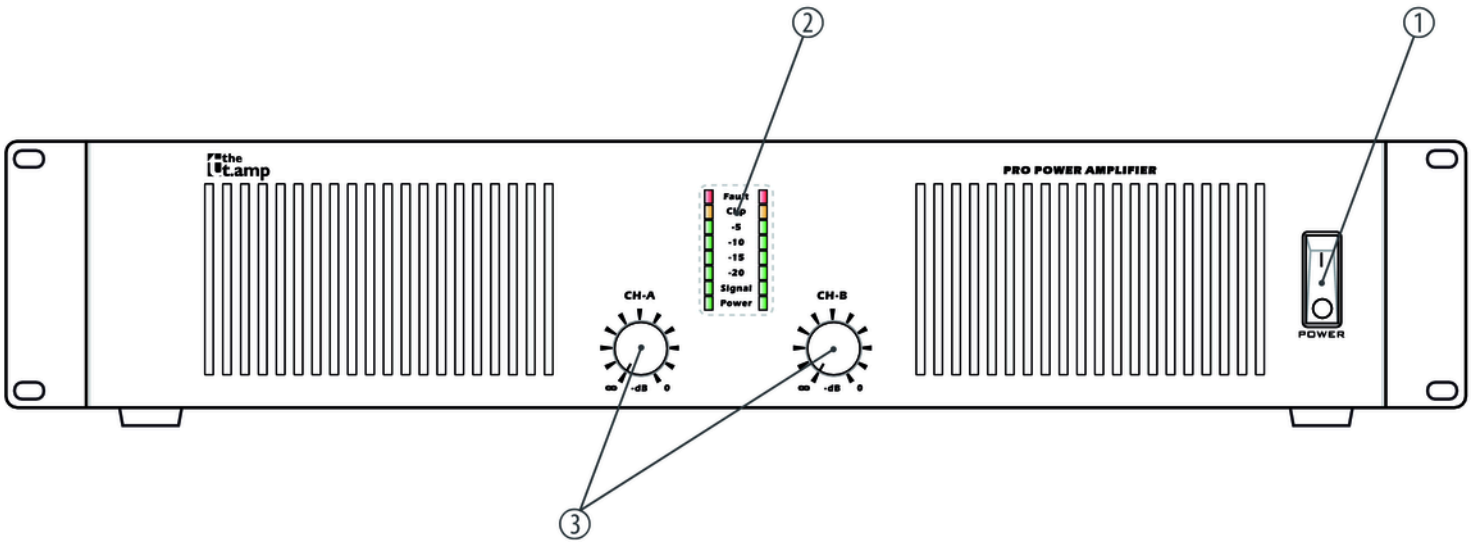
In case of doubt, do not put the rubber feet directly on the floor, but use felt-pad floor protectors or a carpet.

Unpack and check carefully there is no transportation damage before using the unit. Keep the equipment packaging. To fully protect the product against vibration, dust and moisture during transportation or storage use the original packaging or your own packaging material suitable for transport or storage, respectively.

Create all connections while the device is off. Use the shortest possible high-quality cables for all connections. Take care when running the cables to prevent tripping hazards.

# 5 Connections and controls

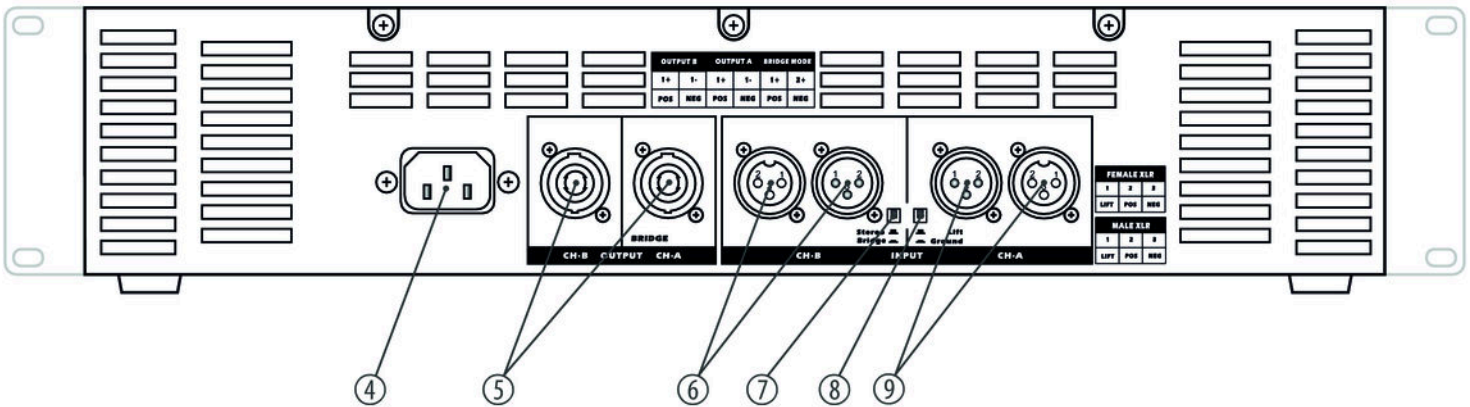
**Front panel TSA 1400, 2200**



| | |
|---|---|
| 1 | *[POWER]*<br>Main switch to turn the device on and off. |
| 2 | LED displays for *[CH-A]*, *[CH-B]*<br>These LEDs indicate the ready status of the device (*[Power]*), the input signal level (*[Signal]* / *[-20]* / *[-15]* / *[-10]* / *[-5]*), channel overdrive (*[Clip]*) and a fault condition (*[Fault]*). |
| 3 | *[CH-A]*, *[CH-B]*<br>Input gain controls for channels A and B. |

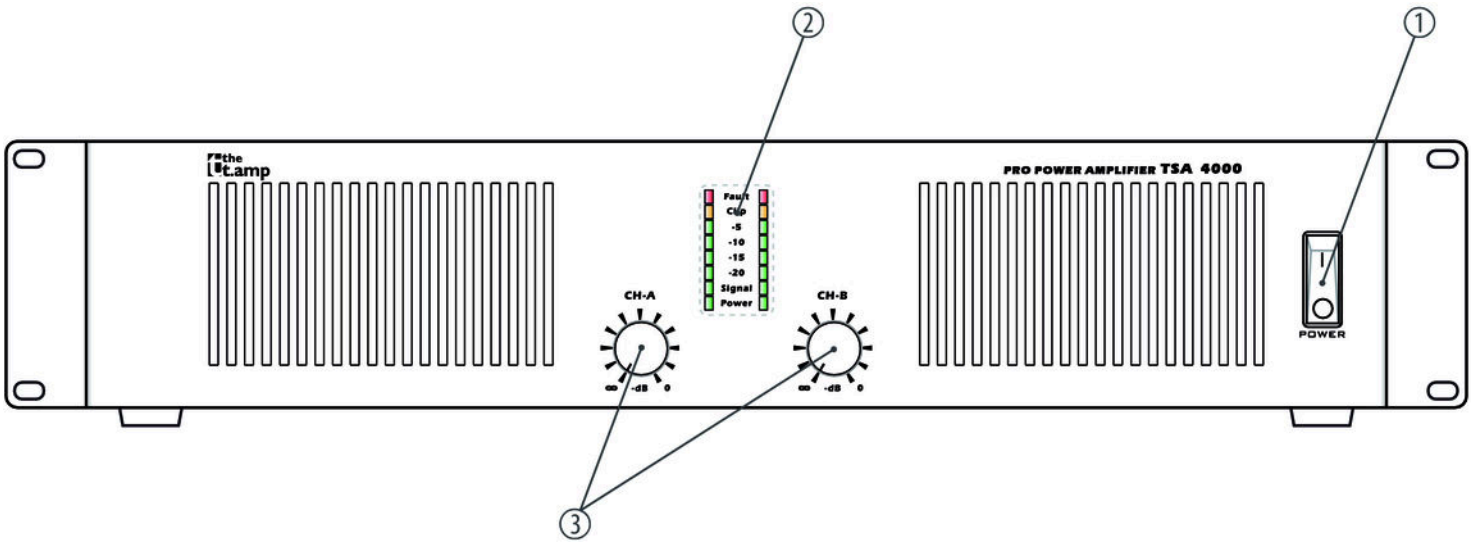
*The [Power] LED is permanently lit during operation. The [Signal] / [–20] / [–15] / [–10] / [–5] LEDs respond to the input signal. If any of these LEDs are lit without an input signal is present disconnect the speakers from the amplifier and turn the input gain controls of channels A and B down to minimum. If the LEDs will still light, the device must be checked by an authorized service workshop.*

**Rear panel TSA 14002200**



| | |
|---|---|
| 4 | IEC chassis plug for the power supply. |
| 5 | *[OUTPUT CH-A]*, *[OUTPUT CH-B]*<br>Signal outputs, designed as lockable NL4 chassis socket to connect speakers. |
| 6, 9 | *[INPUT CH-A]*, *[INPUT CH-B]*<br>Signal input channels, designed as XLR socket pair (input / output) to loop the audio signal to other devices. |
| 7 | *[Stereo \| Bridge]* selector switch<br>Switch for operating modes 'Stereo' (channels operate independently of each other) and 'Bridge' (two channels are interconnected to form one channel with double output). |
| 8 | *[Lift \| Ground]* selector switch<br>Use the Ground / Lift switch to separate the connection between the earth pin of the device and the unit's signal ground to prevent ground loops:<br>■ 'Lift' position (not pressed): no connection<br>■ 'Ground' position (pressed): earth pin and signal ground are electrically connected |

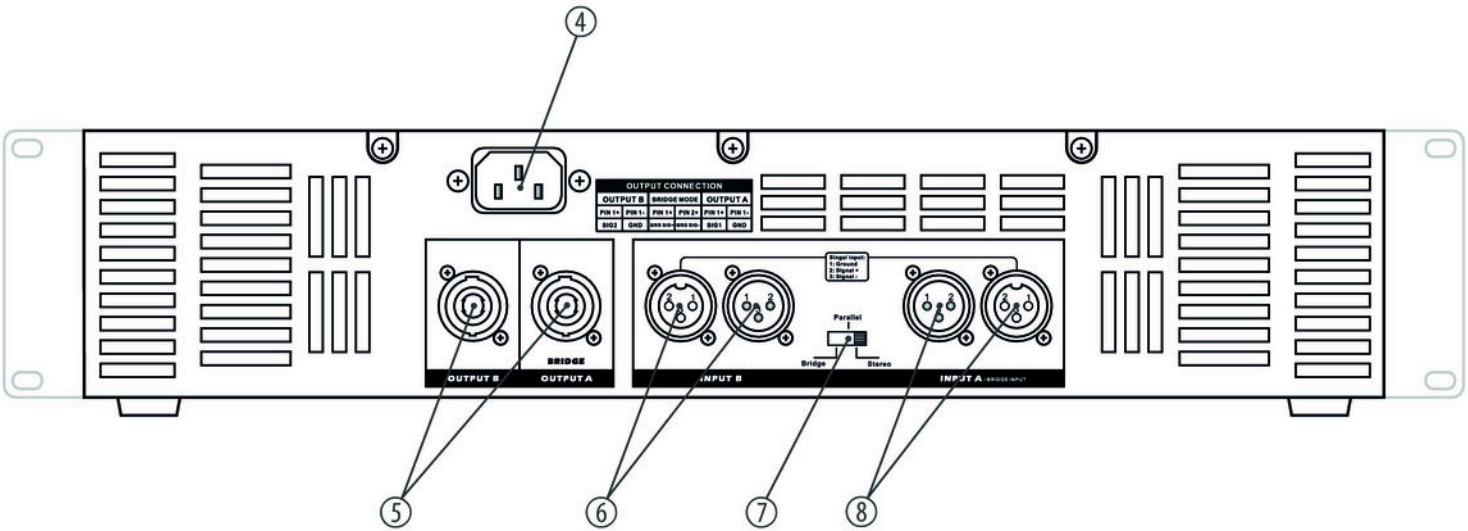
**Front panel TSA 4000**



| | |
|---|---|
| 1 | *[POWER]*<br>Main switch to turn the device on and off. |
| 2 | LED displays for *[CH-A]*, *[CH-B]*<br>These LEDs indicate the ready status of the device (*[Power]*), the input signal level (*[Signal]* / *[-20]* / *[-15]* / *[-10]* / *[-5]*), channel overdrive (*[Clip]*) and a fault condition (*[Fault]*). |
| 3 | *[CH-A]*, *[CH-B]*<br>Input gain controls for channels A and B. |

*The [Power] LED is permanently lit during operation. The [Signal] / [–20] / [–15] / [–10] / [–5] LEDs respond to the input signal. If any of these LEDs are lit without an input signal is present disconnect the speakers from the amplifier and turn the input gain controls of channels A and B down to minimum. If the LEDs will still light, the device must be checked by an authorized service workshop.*

**Rear panel TSA 4000**



| | |
|---|---|
| 4 | IEC chassis plug for the power supply. |
| 5 | *[OUTPUT A]*, *[OUTPUT B]*<br>Signal outputs, designed as lockable NL4 chassis socket to connect speakers. |
| 6, 8 | *[INPUT A]*, *[INPUT B]*<br>Signal input channels, designed as XLR socket pair (input / output) to loop the audio signal to other devices. |
| 7 | *[Stereo \| Parallel \| Bridge]*<br>Switch for operating modes 'Stereo' (channels operate independently of each other), 'Parallel' (two channels are interconnected) and 'Bridge' (two channels are interconnected to form one channel with double output). |

# 6 Technical specifications

**TSA 1400**

| | | |
|---|---|---|
| Amplifier class | H | |
| Input impedance | 20 kΩ (balanced)<br>10 kΩ (unbalanced) | |
| Nominal power output (THD ≤1%, 1 kHz) | $_{RMS}$ 8 Ω, stereo | 2 × 450 W |
| | $_{RMS}$ 4 Ω, stereo | 2 × 670 W |
| | $_{RMS}$ 2 Ω, stereo | 2 × 800 W |
| Max. power output, bridged mode (THD ≤1%, 1 kHz) | $_{RMS}$ 8 Ω, stereo | 1 × 1380 W |
| | $_{RMS}$ 4 Ω, stereo | 1 × 1600 W |
| | $_{RMS}$ 2 Ω, stereo | – |
| Max. voltage increase (RMS) (THD ≤1%, 1 kHz) | 60 V | |

| | | | |
|---|---|---|---|
| Slew rate (1 kHz) | 35 V/µs | | |
| IMD-SMPTE (60 Hz, 7 kHz) | <0.1 % | | |
| DIM 30 (3.15 kHz, 15 kHz) | <0.1 % | | |
| Crosstalk (at 1 kHz, 10 % nominal power) | > 70 dB | | |
| Frequency response (at 1 kHz) | 20 Hz … 20 kHz (0 – 2 dB) | | |
| Signal-to-noise ratio | 105 dB (A-weighted) | | |
| Total harmonic distortion (THD) | <0.1 % | | |
| Damping factor (100 Hz / 1 kHz, 8 Ω) | >400 | | |
| Sensitivity | 1 V | | |
| Gain | 38.3 dB | | |
| Power consumption | Typical current consumption depending on the output power level ($A_{RMS}$). All values based on a 230 V ~ mains voltage and a 1 kHz input signal at 0 dB (sine). | | |
| | Load | 1/8 nominal power | 1/3 nominal power |
| | (2 ×) 8 Ω | 330 W / 1.8 A | 734 W / 4.2 A |

| | | | |
|---|---|---|---|
| | (2 ×) 4 Ω | 480 W / 2.7 A | 1200 W / 6.6 A |
| | (2 ×) 2 Ω | 700 W / 3.9 A | 1313 W / 6.9 A |
| | 8 Ω, bridged | 500 W / 2.9 A | 1200 W / 6.6 A |
| | 4 Ω, bridged | 984 W / 5.2 A | 2690 W / 13.6 A |
| Supply voltage | 230 V ~ 50/60 Hz | | |
| Dimensions (W × H × D) | 484 mm × 97 mm × 370 mm | | |
| Weight | 10.6 kg | | |
| Ambient conditions | Temperature range | | 0 °C…40 °C |
| | Relative humidity | | 50 %, non-condensing |

**TSA 2200**

| | | |
|---|---|---|
| Amplifier class | H | |
| Input impedance | 20 kΩ (balanced)<br>10 kΩ (unbalanced) | |
| Nominal power output (THD ≤1%, 1 kHz) | $_{RMS}$ 8 Ω, stereo | 2 × 590 W |
| | $_{RMS}$ 4 Ω, stereo | 2 × 910 W |
| | $_{RMS}$ 2 Ω, stereo | 2 × 1200 W |
| Max. power output, bridged mode (THD ≤1%, 1 kHz) | $_{RMS}$ 8 Ω, stereo | 1 × 1800 W |
| | $_{RMS}$ 4 Ω, stereo | 1 × 2400 W |
| | $_{RMS}$ 2 Ω, stereo | – |
| Max. voltage increase (RMS) (THD ≤1%, 1 kHz) | 68.7 V | |
| Slew rate (1 kHz) | 41 V/µs | |
| IMD-SMPTE (60 Hz, 7 kHz) | <0.1 % | |

| | | | |
|---|---|---|---|
| DIM 30 (3.15 kHz, 15 kHz) | <0.1 % | | |
| Crosstalk (at 1 kHz, 10 % nominal power) | > 70 dB | | |
| Frequency response (at 1 kHz) | 20 Hz … 20 kHz (0 – 2 dB) | | |
| Signal-to-noise ratio | 105 dB (A-weighted) | | |
| Total harmonic distortion (THD) | <0.1 % | | |
| Damping factor (100 Hz / 1 kHz, 8 Ω) | >400 | | |
| Sensitivity | 1 V | | |
| Gain | 39.8 dB | | |
| Power consumption | Typical current consumption depending on the output power level ($A_{RMS}$). All values based on a 230 V ~ mains voltage and a 1 kHz input signal at 0 dB (sine). | | |
| | Load | 1/8 nominal power | 1/3 nominal power |
| | (2 ×) 8 Ω | 260 W / 1.6 A | 400 W / 2.6 A |
| | (2 ×) 4 Ω | 680 W / 3.8 A | 1180 W / 6.2 A |
| | (2 ×) 2 Ω | 850 W / 4.8 A | 1800 W / 9.4 A |

| | | | |
|---|---|---|---|
| | 8 Ω, bridged | 680 W / 3.9 A | 1200 W / 6.5 A |
| | 4 Ω, bridged | 820 W / 4.3 A | 1900 W / 9.7 A |
| Supply voltage | 230 V ~ 50/60 Hz | | |
| Dimensions (W × H × D) | 485 mm × 97 mm × 370 mm | | |
| Weight | 10.4 kg | | |
| Ambient conditions | Temperature range | | 0 °C…40 °C |
| | Relative humidity | | 50 %, non-condensing |

**TSA 4000**

| | | |
|---|---|---|
| Amplifier class | H | |
| Input impedance | 20 kΩ (balanced)<br>10 kΩ (unbalanced) | |
| Nominal power output (THD ≤1%, 1 kHz) | $_{RMS}$ 8 Ω, stereo | 2 × 100 W |
| | $_{RMS}$ 4 Ω, stereo | 2 × 1500 W |
| | $_{RMS}$ 2 Ω, stereo | – |
| Max. power output, bridged mode (THD ≤1%, 1 kHz) | $_{RMS}$ 8 Ω, stereo | 1 × 2865 W |
| | $_{RMS}$ 4 Ω, stereo | – |
| | $_{RMS}$ 2 Ω, stereo | – |
| Max. voltage increase (RMS) (THD ≤1%, 1 kHz) | 89 V | |
| Slew rate (1 kHz) | 50 V/µs | |
| IMD-SMPTE (60 Hz, 7 kHz) | <0.35 % | |

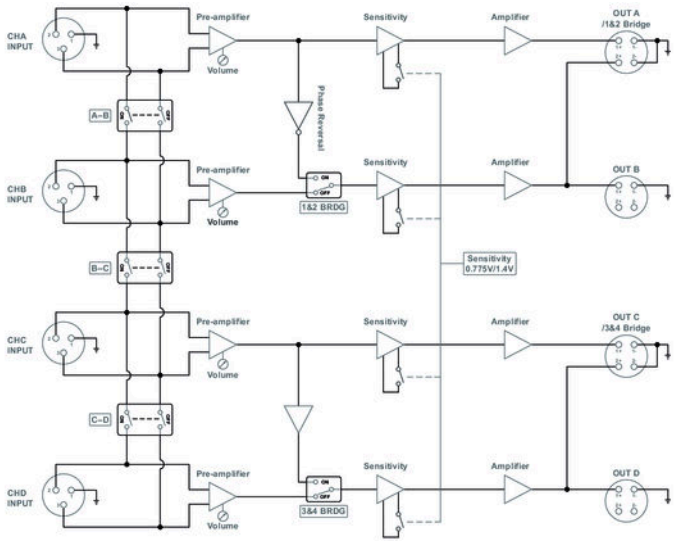
| | | | |
|---|---|---|---|
| DIM 30 (3.15 kHz, 15 kHz) | <0.35 % | | |
| Crosstalk (at 1 kHz, 10 % nominal power) | < –80 dB | | |
| Frequency response (at 1 kHz) | 20 Hz … 20 kHz (0 – 2 dB) | | |
| Signal-to-noise ratio | 106 dB (A-weighted) | | |
| Total harmonic distortion (THD) | <0.1 % | | |
| Damping factor (100 Hz / 1 kHz, 8 Ω) | >450 | | |
| Sensitivity | 1 V | | |
| Gain | 37 dB | | |
| Power consumption | Typical current consumption depending on the output power level ($A_{RMS}$). All values based on a 230 V ~ mains voltage and a 1 kHz input signal at 0 dB (sine). | | |
| | Load | 1/8 nominal power | 1/3 nominal power |
| | (2 ×) 8 Ω | 475 W / 3.5 A | 974 W / 6.5 A |
| | (2 ×) 4 Ω | 708 W / 4.9 A | 1640 W / 10.5 A |
| | (2 ×) 2 Ω | – | – |

| | | | |
|---|---|---|---|
| | 8 Ω, bridged | 677 W / 4.8 A | 1520 W / 9.8 A |
| | 4 Ω, bridged | – | – |
| Supply voltage | 230 V ~ 50/60 Hz | | |
| Dimensions (W × H × D) | 483 mm × 88 mm × 455 mm | | |
| Weight | 12 kg | | |
| Ambient conditions | Temperature range | | 0 °C…40 °C |
| | Relative humidity | | 50 %, non-condensing |

**Further information**

| | |
|---|---|
| Channels | 2 |
| suitable for 19" racks | 2 RU |
| 2 Ω stability | Yes |
| DSP / frequency | No |
| Convection cooling | No |
| Protective circuits (temperature, short circuit, limiter) | Yes |

**Block diagram**



# 7 Plug and connection assignment

**Introduction**

This chapter will help you select the right cables and plugs to connect your valuable equipment in such a way that a perfect sound experience is ensured.

Please note these advices, because especially in 'Sound & Light' caution is indicated: Even if a plug fits into the socket, an incorrect connection may result in a destroyed power amp, a short circuit or 'just' in poor transmission quality!

**Balanced and unbalanced transmission**

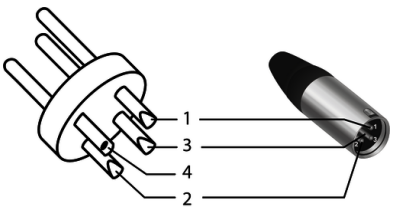
Unbalanced transmission is mainly used in semi-professional environment and in hifi use. Instrument cables with two conductors (one core plus shielding) are typical representatives of the unbalanced transmission. One conductor is ground and shielding while the signal is transmitted through the core.

Unbalanced transmission is susceptible to electromagnetic interference, especially at low levels, such as microphone signals and when using long cables.

In a professional environment, therefore, the balanced transmission is preferred, because this enables an undisturbed transmission of signals over long distances. In addition to the conductors 'Ground' and 'Signal', in a balanced transmission a second core is added. This also transfers the signal, but phase-shifted by 180°.

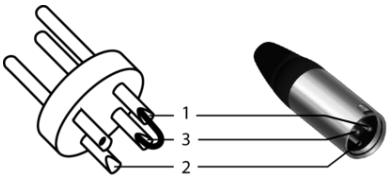
Since the interference affects both cores equally, by subtracting the phase-shifted signals, the interfering signal is completely neutralized. The result is a pure signal without any noise interference.

**XLR plug (balanced)**




| | |
|---|---|
| 1 | Ground, shielding |
| 2 | Signal (in phase, +) |
| 3 | Signal (out of phase, –) |
| 4 | Shielding on plug housing (option) |

**XLR plug (unbalanced)**




| | |
|---|---|
| 1 | Ground, shielding |
| 2 | Signal |
| 3 | Bridged to pin 1 |

**Speaker Twist chassis connector**


| | |
|---|---|
| 1, + | Signal 1 (in phase) |
| 1, – | Signal 1 (out of phase) |
| 2, + | Signal 2 (in phase) |
| 2, – | Signal 2 (out of phase) |

# 8 Cleaning

**Fan grids**

The fan grids of the device must be cleaned of any contamination, such as dust, etc. on a regular basis. Before cleaning, switch off the device and disconnect mains-operated devices from the mains. Only use pH-neutral, solvent-free and non-abrasive cleaning agents. Clean the unit with a slightly damp lint-free cloth.

# 9 Protecting the environment

**Disposal of the packaging material**

For the transport and protective packaging, environmentally friendly materials have been chosen that can be supplied to normal recycling.

Ensure that plastic bags, packaging, etc. are properly disposed of.

Do not just dispose of these materials with your normal household waste, but make sure that they are collected for recycling. Please follow the notes and markings on the packaging.

**Disposal of your old device**

This product is subject to the European Waste Electrical and Electronic Equipment Directive (WEEE) in its currently valid version. Do not dispose with your normal household waste.

Dispose of this device through an approved waste disposal firm or through your local waste facility. When discarding the device, comply with the rules and regulations that apply in your country. If in doubt, consult your local waste disposal facility.

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