



TSA 4–700, TSA 1400,
TSA 2200, TSA 4000
power amplifier

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1 General notes


This user manual contains important information on 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, include the manual for the next owner.

Our products are subject to a process of continuous development. We therefore reserve the right to make changes without notice.

Symbols and signal words

This section provides an overview of the symbols and signal words used in this user 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 signs	Type of danger
	Warning – danger zone.

2 Safety notes

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.



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 cover the device nor any ventilation slots. Do not place 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.

3 Features

Common features of all device models described here:

- built-in switched-mode power supply
- XLR inputs and outputs
- lockable NL4 output sockets
- protective circuits
 - audio limiter
 - thermal protection
 - short-circuit protection
- suitable for 19" racks (2 rack units)

Device-specific features, see ↪ *Chapter 5 'Connectors and controls' on page 16*, ↪ *Chapter 6 'Current consumption' on page 24* and ↪ *Chapter 7 'Technical data' on page 27*.

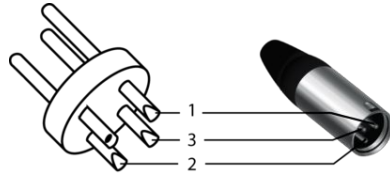
4 Installation and operation

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

Establish all connections as long as the unit is switched off. Use the shortest possible high-quality cables for all connections.

4.1 Pin assignment

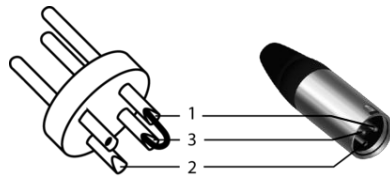
XLR connections for signal inputs/outputs



XLR panel sockets are provided for signal inputs. XLR panel plugs are provided for signal outputs. The figures and tables show the XLR pin assignment.

Balanced pinout:

1	Ground
2	Positive signal (+)
3	Negative signal (-)

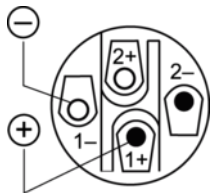


Unbalanced pinout:

1	Ground
2	Signal
3	Jumpered with pin 1

NL4 panel connectors

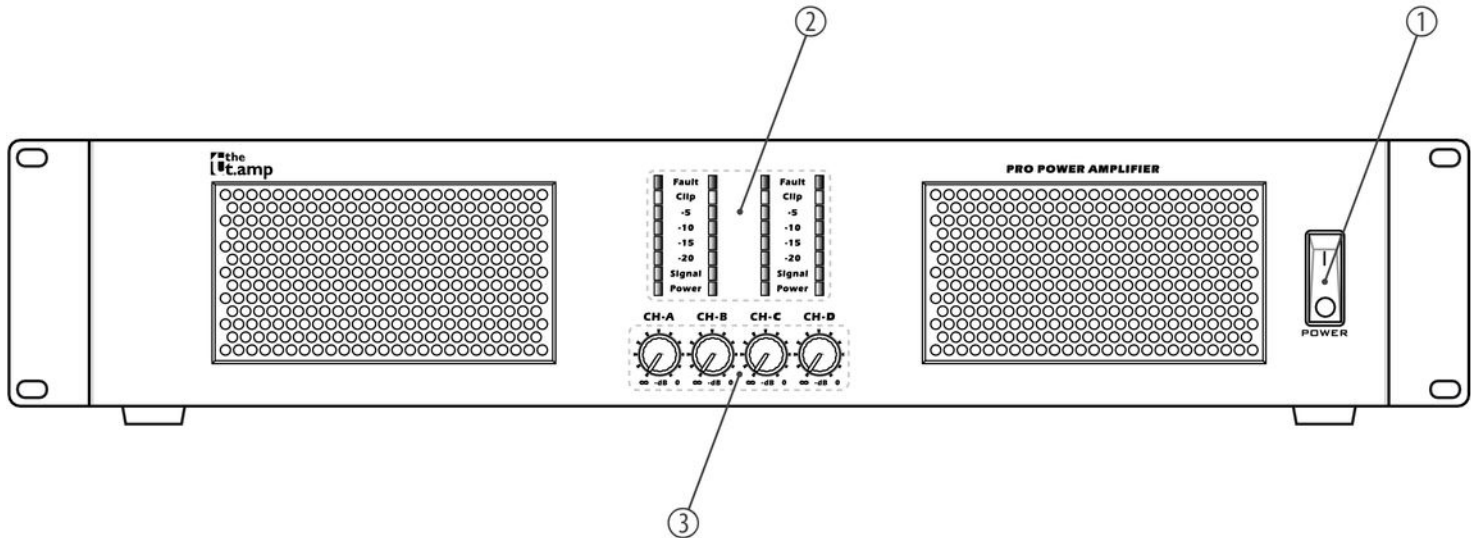
The adjoining figure shows the pin assignment of the lockable NL4 panel connectors.



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5 Connectors and controls

TSA 4-700 front panel

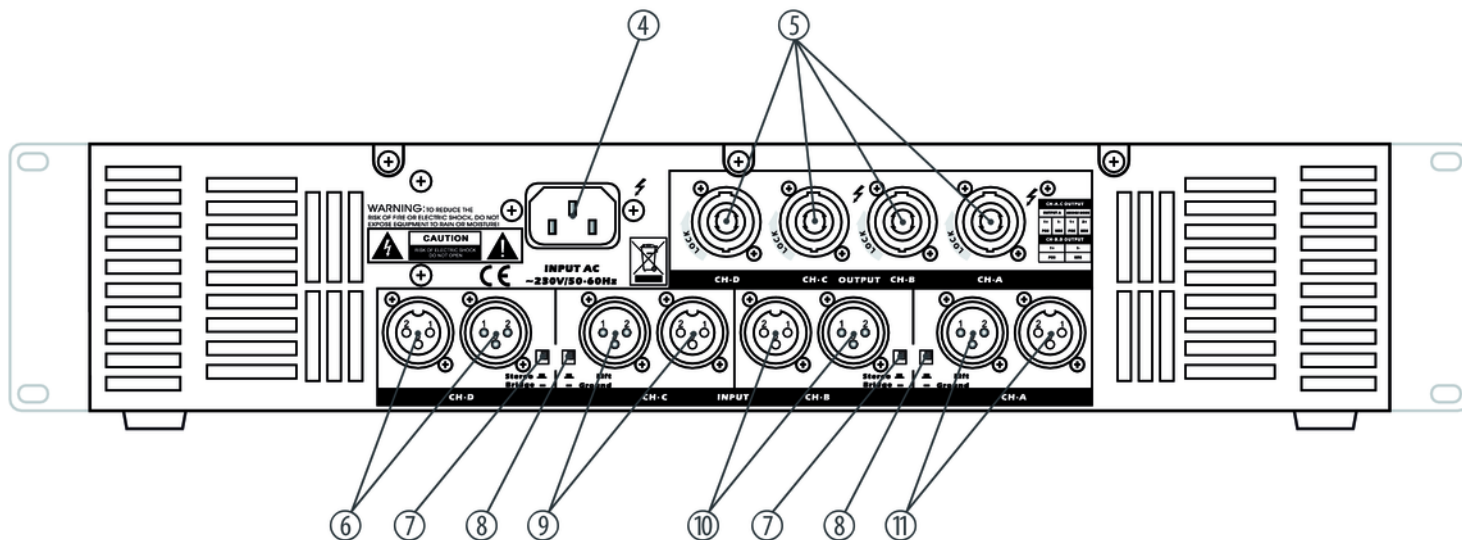


1	POWER Mains switch to turn the device on/off.
2	LED indicators for channels CH-A ... CH-D These LEDs indicate the ready status of the device (Power), the input signal level (Signal / -20 / -15 / -10 / -5), channel overdrive (Clip) and a fault condition (Fault).
3	CH-A ... CH-D Controls for input gain of channels CH-A to CH-D.



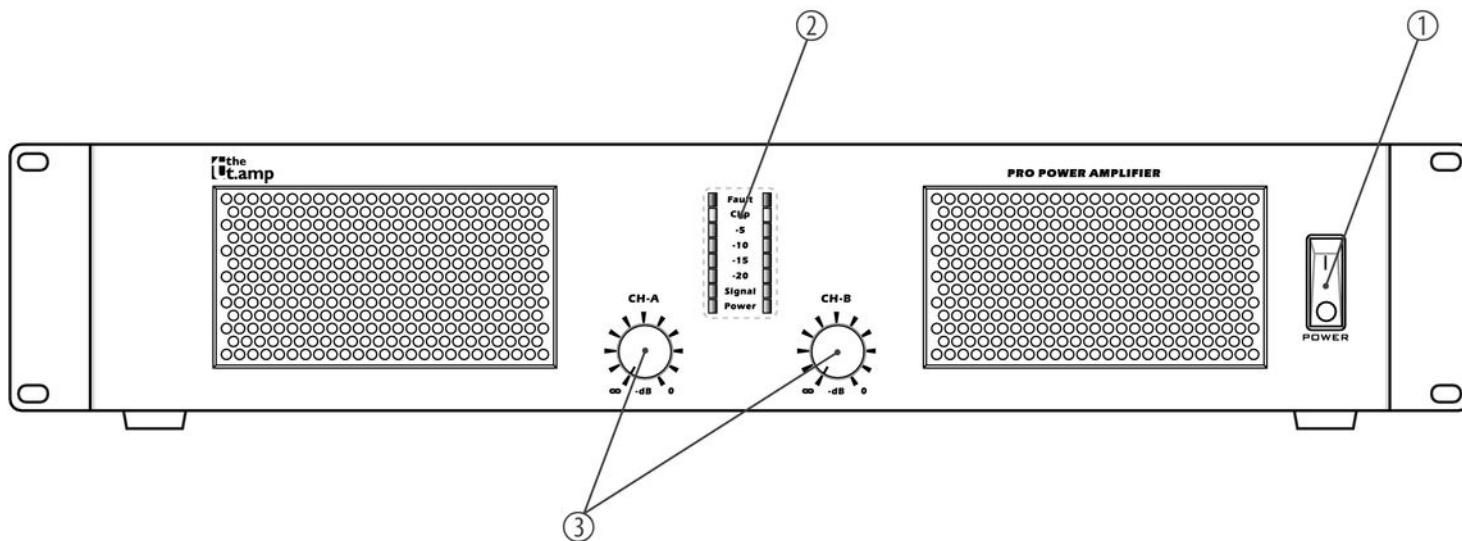
*The **Power** LED is permanently lit during operation. The **Signal / -20 / -15 / -10 / -5** LEDs respond to the input signal. If one of these LEDs is lit without an input signal being present, disconnect the loudspeakers from the power amplifier and turn the input gain control knobs of channels CH-A to CH-D to their minimum levels. If the LEDs are still permanently lit, the device must be checked by an authorized technical service centre.*

TSA 4-700 rear panel



4	Plug for mains cable with fuse holder.
5	OUTPUT CH-A ... CH-D Signal outputs, designed as lockable NL4 panel sockets for connecting speakers.
6, 9, 10, 11	INPUT CH-A ... CH-D Signal input channels, designed as XLR socket pairs (input/output) for looping the signals through to other devices.
7	Stereo Bridge selector switch Switch for toggling between "Stereo" mode (all channels are operating independently of each other) and "Bridge" mode (two channels are combined into a single one with double power output).
8	Lift Ground selector switch The Ground/Lift switch allows you to interrupt the connection between the device's protective earth terminal and signal ground in order to prevent hum loops (Lift/unpressed state: disconnected; Ground/pressed state: protective earth terminal and signal ground are electrically connected).

TSA 1400, 2200, 4000 front panel

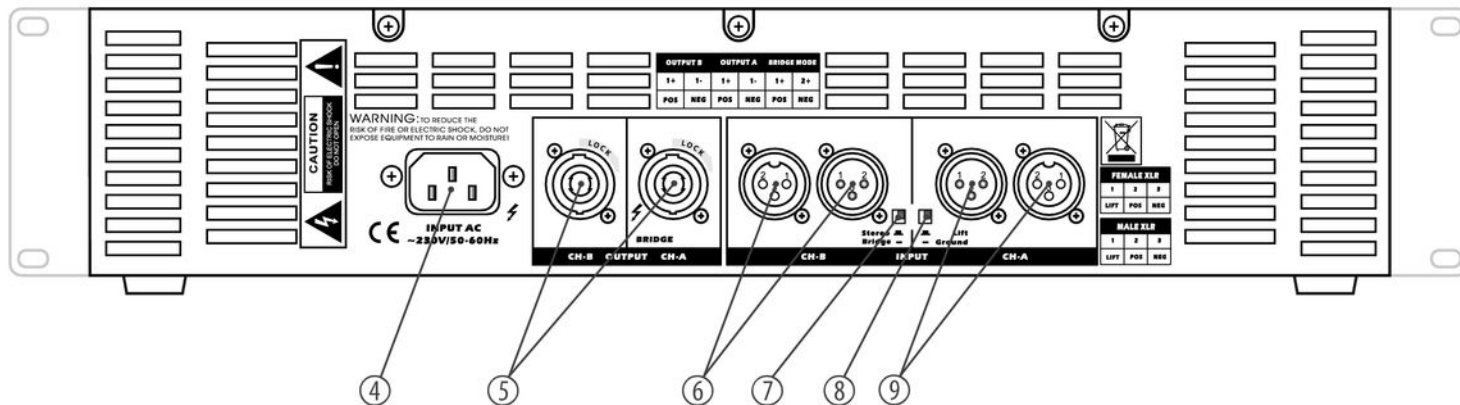


1	POWER Mains switch to turn the device on/off.
2	LED indicators for channels CH-A and CH-B These LEDs indicate the ready status of the device (Power), the input signal level (Signal / -20 / -15 / -10 / -5), channel overdrive (Clip) and a fault condition (Fault).
3	CH-A ... CH-B Controls for input gain of channels CH-A and CH-B.



*The **Power** LED is permanently lit during operation. The **Signal / -20 / -15 / -10 / -5** LEDs respond to the input signal. If one of these LEDs is lit without an input signal being present, disconnect the loudspeakers from the power amplifier and turn the input gain control knobs of channels CH-A and CH-B to their minimum levels. If the LEDs are still permanently lit, the device must be checked by an authorized technical service centre.*

TSA 1400, 2200, 4000 rear panel



4	Plug for mains cable with fuse holder.
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6 Current consumption

The tables below list typical current consumption values as a function of the power output level (A_{RMS} values). All values are based on a 220 V mains voltage. With a 230 V mains voltage, all values must be multiplied by 0.96. With a 120 V mains voltage, all values must be multiplied by 1.83. With a 100 V mains voltage, all values must be multiplied by 2.2.

TSA 4-700

Load	1/8 power (pink noise)	1/3 power (pink noise)	full power (sine wave)
(4 ×) 8 Ω	400 W / 3.1 A	860 W / 5.8 A	1400 W / 9.5 A
(4 ×) 4 Ω	650 W / 4.4 A	1500 W / 9.8 A	2450 W / 15.4 A
(4 ×) 2 Ω	950 W / 6.4 A	1800 W / 11.6 A	3100 W / 20 A
(2 ×) 8 Ω, bridged	620 W / 4.3 A	2450 W / 15 A	2450 W / 15 A
(2 ×) 4 Ω, bridged	870 W / 6.1 A	3300 W / 19.5 A	3300 W / 19.5 A

TSA 1400

Load	1/8 power (pink noise)	1/3 power (pink noise)	full power (sine wave)
(2 ×) 8 Ω	330 W / 1.93 A	734 W / 4.4 A	1400 W / 7.74 A
(2 ×) 4 Ω	480 W / 2.86 A	1200 W / 6.9 A	2300 W / 12.2 A
(2 ×) 2 Ω	700 W / 4.1 A	1313 W / 7.2 A	3345 W / 17.3 A
8 Ω, bridged	500 W / 3.0 A	1200 W / 6.9 A	2300 W / 12.4 A
4 Ω, bridged	984 W / 5.4 A	2690 W / 14.2 A	3310 W / 17.2 A

TSA 2200

Load	1/8 power (pink noise)	1/3 power (pink noise)	full power (sine wave)
(2 ×) 8 Ω	260 W / 1.69 A	400 W / 2.73 A	1700 W / 9.5 A
(2 ×) 4 Ω	680 W / 4.0 A	1180 W / 6.5 A	2800 W / 14.97 A

Load	1/8 power (pink noise)	1/3 power (pink noise)	full power (sine wave)
(2 ×) 2 Ω	850 W / 5.0 A	1800 W / 9.8 A	4200 W / 21 A
8 Ω, bridged	680 W / 4.1 A	1200 W / 6.8 A	2850 W / 15.2 A
4 Ω, bridged	820 W / 4.5 A	1900 W / 10.1 A	4600 W / 23 A

TSA 4000

Load	1/8 power (pink noise)	1/3 power (pink noise)	full power (sine wave)
(2 ×) 8 Ω	475 W / 3.7 A	974 W / 6.8 A	2732 W / 17 A
(2 ×) 4 Ω	708 W / 5.1 A	1640 W / 11 A	4018 W / 26 A
(2 ×) 2 Ω	–	–	–
8 Ω, bridged	677 W / 5 A	1520 W / 10.2 A	4346 W / 27 A
4 Ω, bridged	–	–	–

7 Technical data

TSA 4-700

Load impedance	8 Ω	4 Ω	2 Ω
Nominal power output (THD = 1 %, 1 kHz)	4 \times 490 W	4 \times 810 W	4 \times 930 W
Max. power output, bridged mode (THD = 1 %, 1 kHz)	2 \times 1600 W	2 \times 1800 W	–
Max. voltage increase (RMS) (THD = 1 %, 1 kHz)	62.6 V		
Slew rate (1 kHz)	38 V/ μ s		
Total harmonic distortion (THD)	< 0,1 %		
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)		

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Technical data

Input impedance (20 Hz – 20 kHz, balanced)	20 k Ω (balanced) 10 k Ω (unbalanced)
Input sensitivity (nominal power output, 1 kHz)	1 V
Damping factor (100 Hz / 1 kHz, 8 Ω)	> 400
Signal-to-noise ratio (SNR)	105 dB (A-weighted)
Protective circuits	Thermal, short circuit, limiter
Cooling	from front to back
Mains power supply	230 V ~ (AC), 50/60 Hz
Power consumption	see ↪ <i>Chapter 6 'Current consumption' on page 24</i>
Dimensions (W × H × D)	488 × 97 × 370 mm (19.21 × 3.28 × 14.57 inches)
Weight	10.7 kg (23.6 lbs)

TSA 1400

Load impedance	8 Ω	4 Ω	2 Ω
Nominal power output (THD = 1 %, 1 kHz)	2 \times 450 W	2 \times 670 W	2 \times 800 W
Max. power output, bridged mode (THD = 1 %, 1 kHz)	2 \times 1380 W	2 \times 1600 W	–
Max. voltage increase (RMS) (THD = 1 %, 1 kHz)	60 V		
Slew rate (1 kHz)	35 V/ μ s		
Total harmonic distortion (THD)	< 0,1 %		
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)		

Technical data

Input impedance (20 Hz – 20 kHz, balanced)	20 k Ω (balanced) 10 k Ω (unbalanced)
Input sensitivity (nominal power output, 1 kHz)	1 V
Damping factor (100 Hz / 1 kHz, 8 Ω)	> 400
Signal-to-noise ratio (SNR)	105 dB (A-weighted)
Protective circuits	Thermal, short circuit, limiter
Cooling	from front to back
Mains power supply	230 V ~ (AC), 50/60 Hz
Power consumption	see ↪ <i>Chapter 6 'Current consumption' on page 24</i>
Dimensions (W × H × D)	484 × 97 × 370 mm (19.05 × 3.28 × 14.57 inches)
Weight	10.6 kg (23.4 lbs)

TSA 2200

Load impedance	8 Ω	4 Ω	2 Ω
Nominal power output (THD = 1 %, 1 kHz)	2 × 590 W	2 × 910 W	2 × 1200 W
Max. power output, bridged mode (THD = 1 %, 1 kHz)	2 × 1800 W	2 × 2400 W	–
Max. voltage increase (RMS) (THD = 1 %, 1 kHz)	68.7 V		
Slew rate (1 kHz)	41 V/μs		
Total harmonic distortion (THD)	< 0,1 %		
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)		

Technical data

Input impedance (20 Hz – 20 kHz, balanced)	20 k Ω (balanced) 10 k Ω (unbalanced)
Input sensitivity (nominal power output, 1 kHz)	1 V
Damping factor (100 Hz / 1 kHz, 8 Ω)	> 400
Signal-to-noise ratio (SNR)	105 dB (A-weighted)
Protective circuits	Thermal, short circuit, limiter
Cooling	from front to back
Mains power supply	230 V ~ (AC), 50/60 Hz
Power consumption	see ↪ <i>Chapter 6 'Current consumption' on page 24</i>
Dimensions (W × H × D)	485 × 97 × 370 mm (19.09 × 3.28 × 14.57 inches)
Weight	10.4 kg (22.9 lbs)

TSA 4000

Load impedance	8 Ω	4 Ω	2 Ω
Nominal power output (THD = 1 %, 1 kHz)	2 \times 1000 W	2 \times 1500	–
Max. power output, bridged mode (THD = 1 %, 1 kHz)	2 \times 2865 W	–	–
Max. voltage increase (RMS) (THD = 1 %, 1 kHz)	89 V		
Slew rate (1 kHz)	50 V/ μ s		
Total harmonic distortion (THD)	< 0,1 %		
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)		

Technical data

Input impedance (20 Hz – 20 kHz, balanced)	20 k Ω (balanced) 10 k Ω (unbalanced)
Input sensitivity (nominal power output, 1 kHz)	1 V
Damping factor (100 Hz / 1 kHz, 8 Ω)	> 450
Signal-to-noise ratio (SNR)	106 dB (A-weighted)
Protective circuits	Thermal, short circuit, limiter
Cooling	from front to back
Mains power supply	230 V ~ (AC), 50/60 Hz
Power consumption	see ↪ <i>Chapter 6 'Current consumption' on page 24</i>
Dimensions (W × H × D)	483 × 88 × 420 mm (19.02 × 3.46 × 1.53 inches)
Weight	12 kg (26.5 lbs)

8 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 device is subject to the European directive 2002/96/EC.

Do not dispose of the device 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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