Professional 4 Channel Digital Amplifier

QPA 4200

QPA 4400

QPA 4600

Operation Manual

Contents

Welcome

Thank you for choosing our product. This user manual has been carefully crafted to ensure you get the most out of your product.

Your trust in our brand means a lot to us. We are proud to have you as part of our growing customer base.

Please read this guide carefully to make the most of all the features and capabilities. If you have any questions, our customer service is here to assist you.

Warning

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product' s enclosure that may be of suf-ficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operation and mainte-nance (servicing) instructions in the literature accompanying the appliance.

Caution: To prevent electric shock do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade expo-sure.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

Attentions: Pour prévenir les chocs électriques ne pas utiliser cette fiche polarisée avec un prolongateur, une prise de courant on une autre sortie de courant, sauf si les lames peuvent étre insérées à fond sans en laisser aucune partie à découvert.

* For the terminals marked with symbol of "⚠" may be of sufficient magnitude to constitute a risk of electric shock. The external wiring connected to the terminals requires installation by an instructed person or the used of ready-made leads or cords.
*The apparatus shall not be exposed to dripping or splashing and that objects filled with liquids, such as vases, shall not be placed on apparatus.
* The appliance coupler is used as disconnect device, the disconnect device shall remain readily operable.
* Protective earthing terminal. The apparatus should be connected to a mains socket outlet with a protective earthing connection.
* Increase the minimum distance of the prototype to the surrounding environment.
* no naked flame sources, such as lighted candles, should be placed on the apparatus;
* The use of apparatus in tropical climates.
* The use of apparatus in moderate climates.

* Do not install this equipment in a confined space such as a book case or similar unit.
* The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such vases, shall be placed on the apparatus.
* Worded: "WARNING FOR YOUR PROTECTION PLEASE READ THE FOLLOWING-WATER AND MOISTURE: Unit should not be used near water(e.g. near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc). Care should be taken so than objects do not fall and liquids are not spilled into the enclosure through openings."

Service Instructions
* Worded: "Caution: These servicing 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."
* Location: Instruction Manual.

NOTE : This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Installation Environment

Installation this system is not difficult and complex. But you still need to spend some time to read this manual and ensure the connection and installation is exact.
Never place this product in an environment which could alter its performance or reduce its service life.
Such environments usually include high levels of heat, dust, moisture, and vibration.

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparaus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

- Avoid excessive heat, humidity, dust and vibration
  Keep the unit away from locations where it is likely to be exposed to high temperatures or humidity-such as near radiators, stoves, etc. Also avoid locations which are subject to excessive dust accumulation, or to vibration that could cause mechanical damage.

- Avoid physical shocks
  Strong physical shocks to the unit may cause damage. Handle the unit with care.

- Do not open the case or attempt repairs or modifications yourself
  This product contains no user-serviceable parts. Refer all maintenance to qualified service personnel. Opening the case and/or tampering with internal circuitry voids the warranty.

- Always power off before making connections
  Always turn the AC mains OFF before connecting or disconnecting cables. This is important to prevent damage to the unit itself as well as other connected equipment.

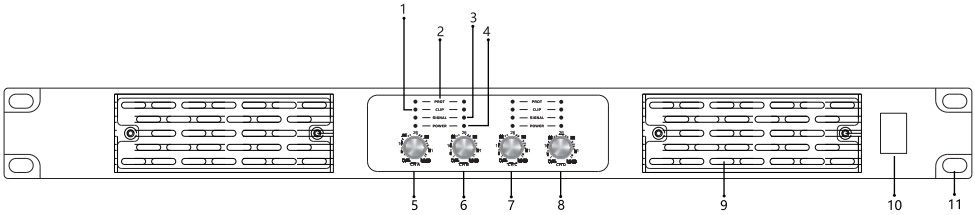
- Handle cables carefully
  Always plug and unplug cables (including the AC mains power cord) by gripping the connector, not the cord.

- Clear with a soft dry cloth
  Never use solvents such as benzine or paint thinner to clean the unit. Wipe clean with a soft, dry cloth.

1. Amplifier

The amplifier offers a variety of power outputs.
Each channel is independently adjustable and all can be used at 4Ω load.
Use high efficiency, energy saving and environmental protection design.
Each channel is a high power audio dedicated MOS tube output.
The voltage management part uses "high power and high speed IGBT tube".
CLASS D high-efficiency power amplifier output stage.

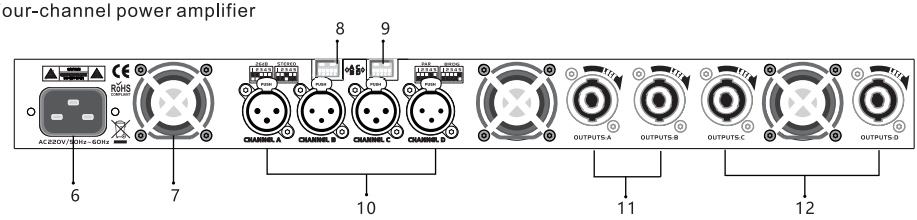
2. Device



2.1 Front panel

1. "Clip" (Clip) LED
2. "Protect" (PROT) LED
3. "Signal level" (Signal) LED
4. "Power light" (On) LED
5. Channel A volume control
6. Channel B volume control
7. Channel C volume control
8. Channel D volume control
9. Removable ventilation holes (dust-proof cotton can be taken out for cleaning)
10. On/Off switch
11. Cabinet mounting hole position

Four-channel power amplifier



2.2 Rear panel

Four-channel power amplifier

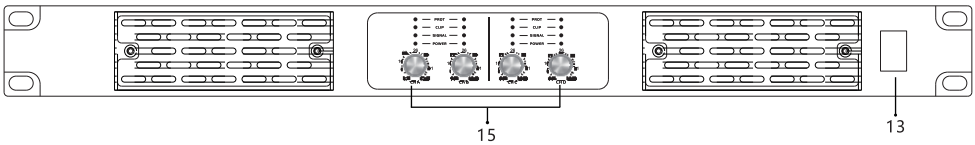
6. AC input power line interface
7. Cooling air outlet vents
8. CHA, CHB amplifier mode switch, see 4.2.2 for details.
9. CHC, CHD amplifier mode switch, see 4.2.2 for details.
10. CHA, CHB, CHC, CHD signal input
11. CHA, CHB SPEAKON speaker output interface
12. CHC, CHD SPEAKON speaker output interface

2.3 Factory settings

The amplifier is delivered with the following factory settings:

Front panel:

13. On/Off switch (Pop-up, amplifier is off)
15. Volume control (Volume set to minimum)

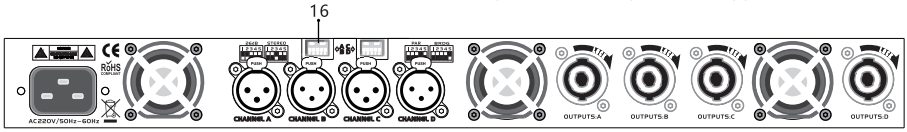


Rear panel:

16.Input sensitivity and amplifier operating mode selection

(Stereo, Parallel, Bridge)

Ensure that the switch is set to the configuration required for each particular application.



3.1 Power supply

Always disconnect the amplifier from the power supply when installing or connecting it.

Reference sign for 185V-265V ~50/60Hz power supply.

Attention: Only a fixed 185V-265V operation can be selected. The amplifier should not be used outside the specified range (220V ± 10% of rated voltage) for long periods of time, as doing so will affect overall performance.

Note: The rated power consumption and power supply current consumption are measured at 1/8 of the rated output power, that is, 800W*2 is tested at 2 x 150W, and pink noise represents a typical music signal. Depending on the effective output power, the power supply current and power can reach quite high (or quite low) values.

3.2 On/Off switch

The "on/off" switch is a push-button switch. It is located on the right side of the front panel. To turn on the amplifier, press the switch button down, that is, start the amplifier by activating the surge current limiter. During power on, the Clip, Limit and Signal LED will light up for a few seconds. To turn off the amplifier, press the switch up.

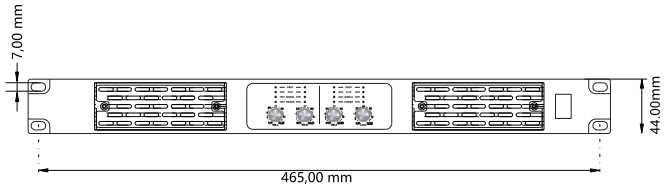
Attention: This switch does not disconnect the amplifier from the power supply.

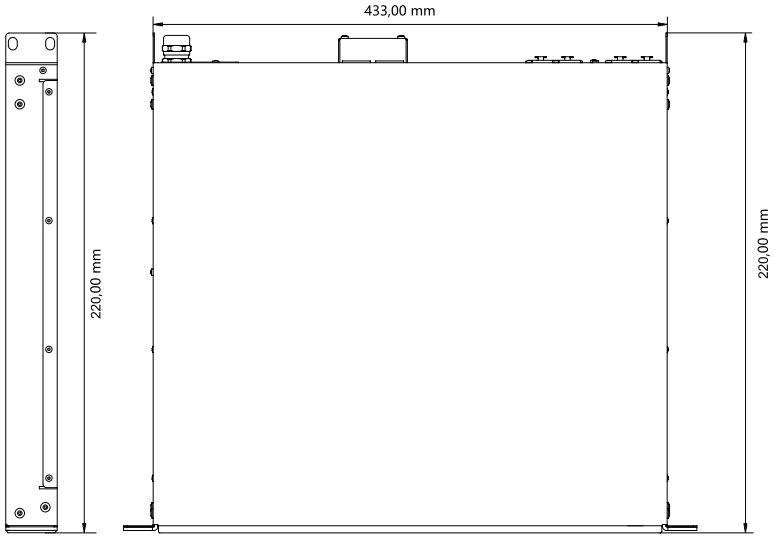
The switch starts the amplifier by activating the current limit function. After connecting the power amplifier to the power supply, voltage is immediately supplied to the line filter and to the input of the controlled rectifier equipped with a fuse. Disconnection of the amplifier from the power supply can only be accomplished by a physical separation like unplugging the power supply. Therefore, the power plug must be easily accessible. During storms accompanied by lightning or when the amplifier is not used for a long period of time, unplug it from the socket. Alternatively, you can cut off the power supply of the amplifier by disconnecting all external electrodes from the power supply.

If the power supply is cut off when the amplifier is turned on, the amplifier will automatically restart after the power supply is restored. All settings before the power-down operation will be maintained.

3.3 Installation

When mounting the amplifier to the front rack rail, four screws and washers will be used. Since the amplifier can be used mobile, the mounting elements should also be used on the back panel to fix the amplifier.

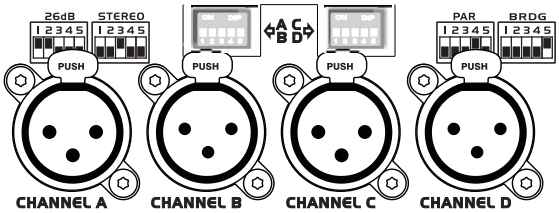




3.4 Cooling

Under the normal operation of the power amplifier, overheating is no problem. The air enters from the front, passes through it and then flows out from the back. Of course, when the power amplifier is in operation, air can freely circulate around it. The cooling efficiency will depend on the surrounding direct environment (e.g., closed rack, direct sunlight) and whether the front panel pre-filter is clogged. If the amplifier is installed in a cabinet, the open area behind this cabinet must be at least 140 cm^2. This area should be in a row with the amplifier.

If the above conditions cannot be met, then a pressurized ventilation system must be used.



4-channel signal inputs

3.5 Wiring

3.5.1 Input connector

XLR:

Pin 1 = Ground

Pin 2 = hot (in phase, +)

Pin 3 = cold (out-phase, -)

3.5.2 Output connector

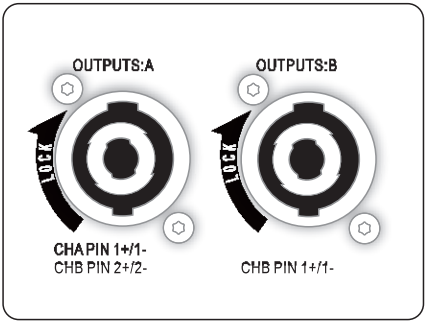
The SPEAKON connector is connected to the amplifier output of channel A and channel B.

Be sure to always use high-quality, well-proportioned (steady) shielded cables to ensure the best audio quality.

Do not connect two separate signal sources to the XLR input connector of the same channel at the same time.

Otherwise, the volume and audio quality will decrease, and the connected signal source may be damaged.

The pin configuration of "SPEAKON" connector is as follows:



Attention:

Stereo and parallel input mode: A, B channel speakers can respectively use two-core cable to connect A, B channel SPEAKON interface 1 +, 1 -; or use a four-core cable to connect 1+, 1- and 2+, 2- of channel A SPEAKON.

Bridge mode: the speaker is connected to the 1+, 2+ of the channel A SPEAKON interface.

The same applies to channels C and D

The amplifier has been optimized for a speaker impedance of 4Ω. Connecting a lower impedance may affect audio quality and the overall performance of the amplifier.

Attention/Important notes:

When the power is on, the amplifier volume output gradually increase function is a normal phenomenon, so as to better protect the speaker.

The wiring of the output connector must meet the safety standard or the equivalent requirements of all international and local electrical codes.

For safety and performance reasons, only high-quality, completely insulated stranded copper speaker cables can be used. Please use the largest wire size that is economical and practical, but make sure that the cable does not exceed the necessary length.

Warning!

A lightning symbol near the output connector indicates that a potentially life-threatening high-voltage electricity is present.

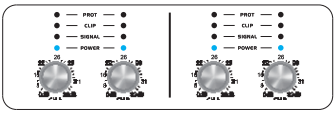
Wiring to these terminals will need to be installed by instructors or using ready-made wires or cords. Self-planned wiring should only be performed by qualified personnel. To prevent electric shock, do not use any part of the speaker's exposed wire to operate the amplifier.

Note: Any damage to the speaker or amplifier caused by incorrect wiring is not covered by the warranty.

4.1 Indicator light

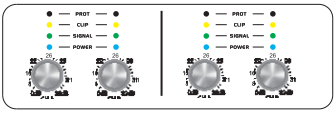
4.1.1 POWER LED

During normal operation, the blue power LED is always on after the amplifier is turned on.



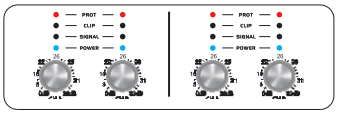
4.1.2 SIGNAL LED (multifunction)

When the voltage level at the output gradually rises, the green LED gradually rises to orange, which is equivalent to the maximum power of the 4 ohms load.



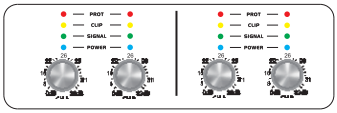
4.1.3 PROT LED

When the amplifier is in "protection mode (mute)" (For example, the continuous DC voltage at the output terminal is too high); or at the moment of startup, the channel "PROT" LED will light up in red.



4.1.4 CLIP LED

When the input volume is too high, this LED will indicate that the amplifier is overloaded.



4.2 Control

4.2.1 Volume control

The volume control uses a step potentiometer with 41 sawtooth setting bits to control the audio signal. These settings are selected to match human hearing characteristics (logarithmic way), thus ensuring the best range of settings in practical applications. Each channel can be set separately. Set the volume to the minimum before turning on the amplifier, in order to prevent sudden high volume (which will cause damage to hearing or speakers).

4.2.2 Gain selector and amplifier operation mode switch (stereo, parallel, bridge mode)

Using the switch at the back of the amplifier, the maximum amplification can be set directly in the input stage.

The amplifier has 26dB gain setting and default 0.775V sensitivity setting.

4.2.3 Limiter switch

This switch is located inside the amplifier.

It is the electronic switch separately used on channel A, B, C and D, with input signal over-large limit and clipping limit function.

4.3 Power amplifier protection system

4.3.1 Clipping limiter

If the power amplifier is overloaded and the limiter is set to "on" (Please refer to section 4.2.3), clipping detection will trigger the Activation Release Circuit (ARC). The ARC will provide the control voltage used to reduce the gain.

4.3.2 SOA Protection

As soon as the transistors of the amplifier leave their safe operating area (SOA), the SOA protection switches back to the current track of the respective channel.

4.3.3 DC Protection

For continuous DC voltage levels, the output of each power amplifier is constantly monitored. If an output exceeds the 3V threshold, the corresponding channel will be muted. If DC is applied only for a short time, the amplifier will release the mute and operate normally. If DC is applied for a long time or several short periods, the amplifier will switch to standby mode. If this happens, turn off the amplifier, wait until the indicator LED goes off, and then turn on the amplifier again.

4.3.4 DC servo system

To prevent DC offset at the speaker output, the amplifier is equipped with DC servo system.

4.3.5 Overcurrent protection

Overcurrent is permanently controlled in the output stage. When overload occurs, it will automatically limit the maximum output current of the amplifier. In this way, the stability is improved when driving complex loads, but the sound quality is not reduced.

4.3.6 Thermal protection

There are sensors in each heat sink of the amplifier to obtain temperature data. If a temperature above 85 degrees is detected on the heat sink, the input signal on that channel will be reduced appropriately to prevent the amplifier from further heating. If the temperature is about to exceed 95℃, the relay will break(safety shutdown).

4.4 Power supply protection

4.4.1 Surge current limit

Within about 2 seconds of turning on the amplifier, the surge current limiter will smoothly increase the power supply current from near-zero to the rated value. This value depends on the material, output level and speaker load.

4.4.2 Power supply overvoltage detection

Always perform power supply overvoltage detection. The amplifier will shut down if the supply voltage exceeds approximately 265V or falls below 185V. A soft start occurs when the supply voltage returns to the rated value.

4.4.3 Power failure detection

Always perform power failure detection. When the power supply is cut off for about 2 power cycles, the amplifier will be disconnected. A soft start occurs when the supply voltage returns to the normal value.

4.4.4 Fuse protection

If you still want to force the amplifier to be used when all channels are at high output power, the fuse protection circuit can prevent the amplifier from shutting down (For example, the power fuse blows or triggers the circuit breaker). If there is no intelligent power supply current monitoring and control, this situation can easily happen. Because the rated output power is several times higher than the output power of the standard power supply. To prevent shutdown under extreme conditions, the amplitude of the input signal will be reduced, thus reducing power supply current consumption.

4.5 Power supply SMPS protection

4.5.1 Overcurrent protection

Continuously monitor the power transformer current of the amplifier. If an overcurrent occurs, the power supply SMPS will stop working immediately. If there is an internal fault, this function can prevent other components from being damaged.

4.5.2 Thermal protection

If the temperature of the power supply SMPS transformer exceeds 90°C, the power supply SMPS will disconnect (safety shutdown).

4.6 Heat dissipation fan

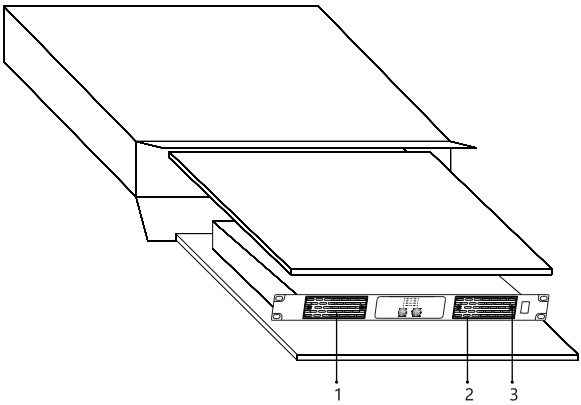
The fan installed in the amplifier runs all the time, but once the temperature stays below 40°C, the fan runs at the slowest speed and is barely audible. The speed of the fan is controlled by the highest temperature detected in any amplifier channel. When the temperature exceeds 40°C, the fan speed will keep increasing until it reaches its maximum value.

4.7 Filter cleaning

A detachable filtration system is installed at the air vents in front of the amplifier. If the filter is blocked, the device will not be cooled as efficiently as usual, which will cause the output level to decrease.

Warning: Turn off the amplifier before removing the front panel dust cover.

The disassembly method is simple, only two screws on the air inlet need to be unscrewed, and then the dust-proof filter screen needs to be taken out for cleaning, without removing the whole front panel of the amplifier.



Filter components:

1. External metal fixing parts
2. Internal dust-proof filter screen
3. Screws

4.8 Install volume control safety cover

A protection device can be installed for the volume control to prevent intentional or unintentional changes to the amplifier volume setting.

Warning: Disconnect the power supply of the amplifier before installing the safety cover.

In its original state, the holes needed to install the safety cover on either side of the volume knob are hidden behind the plastic front label. If you want to install the safety cover, please penetrate the two holes in the front label first so as to screw in the screws.

5. Troubleshooting

5.1 Problem: No sound

Indication: Power is on, LED is not on.
Signal LED is not on.

- Check the AC plug.
- Check whether the AC power outlet is working properly by plugging in other devices.

Indication: Power is on, LED is not on.
Signal LED is not on.
Clipping LED is not on.

- Make sure the signal source is working and try the other cables last.
- Check the position of the volume potentiometer and gain selector.

Indication: The signal LED reflects the signal level.
Output current LED is not on.

- Check whether the speaker wiring is disconnected.
- Try other speakers and cables.

Indication: Protection LED shows red (protection mode).

- High temperature will cause protective mute. Check whether proper ventilation conditions exist. If the fan is not running, the amplifier needs to be repaired.
- Continuous DC at the output will force the amplifier to be in protection mode and shut down the power supply.
- Try to mute or disconnect the signal connection, then restart the amplifier (i.e., cut off the power supply of the amplifier, wait until all LEDs are off, and then turn on the amplifier again).

Note: If other LED indications not listed above appear or if the problem continues, unplug the amplifier from the power supply and take the amplifier to the authorized dealer/wholesaler or to the factory for repair.

5.2 Problem: Sound distortion

Indication: The output current LED is on.
Signal LED reflects signal level.
Clipping LED is not on.

- This can be caused by a faulty speaker or a loose connection. Check the wiring and try other speakers.
- The signal source may be clipped. Keep the amplifier volume potentiometer at least above half, so that the sound source will not be overloaded to increase and cause distortion of the input signal.
- Keep the amplifier volume potentiometer at least half above and try to use the gain selector at the back to change the input sensitivity from 26dB or 0.775V.

Indication: The output current LED is on.
Signal LED reflects signal level.
Clipping LED is on.

- The signal source makes the amplifier overloaded, please reduce the input signal level.

5.3 Problem: Noise

- Unplug the amplifier input to confirm whether the noise is coming from the source or upstream of the device. Irregular or sudden noise indicates that there is an electrical fault in the interfering equipment.
- To keep the noise level low, use a full-level main signal source without clipping.
- Avoid further increasing the signal between the source and the amplifier.

5.4 Problem: Harsh sound

- Mixing controls should be used to eliminate harsh sounds. If the noise continues to increase without microphone gain, there is a serious fault in the signal processor or cable. Work continuously from the signal source to the amplifier and check each device in the signal line by reducing the gain of the device or unplugging the power supply.

6. Specification

Model		QPA 4200	QPA 4400	QPA 4600
Output power (1KHz, THD<1%, all channels driven)	8Ω Stereo	200W*4	400W*4	600W*4
	4Ω Stereo	280W*4	560W*4	840W*4
	8Ω Bridge	480W*2	960W*2	1440W*2
	4Ω Bridge	670W*2	1300W*2	2000W*2
	DC Protection	√	√	√
	Short-circuit protection	√	√	√
	Sensitivity overheat management system	√	√	√
	Overheat protection	√	√	√
	Input overload protection	√	√	√
	Output overload protection	√	√	√
	Soft start protection	√	√	√
	Limiting protection	Up to 10V	Up to 10V	Up to 10V
Frequency response (1W 8ohms) 20Hz-20KHz		(±0.5dB)	(±0.5dB)	(±0.5dB)
Sensitivity (8ohms 1KHz)		0.775v/26	0.775v/26	0.775v/26
Connector	Input Connector	XLR female	XLR female	XLR female
	Output Connector	SPEAKON	SPEAKON	SPEAKON
Input impedance	Balanced input	20KΩ	20KΩ	20KΩ
	Unbalanced input	10KΩ	10KΩ	10KΩ
SNR (A weighted, rated power 8 ohms)		≥ 108dB	≥ 105dB	≥ 108dB
Damping factor (1KHz & 8ohms)		≥900	≥900	≥900
Intermodulation distortion (20Hz-20KHz, half power)		≤0.02%	≤0.02%	≤0.05%
THD (20Hz-20KHz, half power)		≤0.03%	≤0.03%	≤0.05%
Phase response (1W & 8ohms, 20Hz-20KHz)		≤±6.5°	≤±6.5°	≤±6.5°
Conversion rate		≥60V/μs	≥60V/μs	≥60V/μs
Output circuit type		CLASS-D		
Installation space		1U		
Cooling system		Fully intelligent system adjusts automatically with temperature changes		
Dimensions (W×H×D)		482×44×220mm		

We may make technical changes without prior notice.

7. Measured value

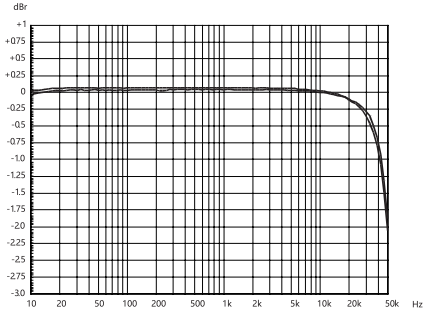


Figure 7.1
Gain and Frequency (Class D)
(Typical performance measurement value)

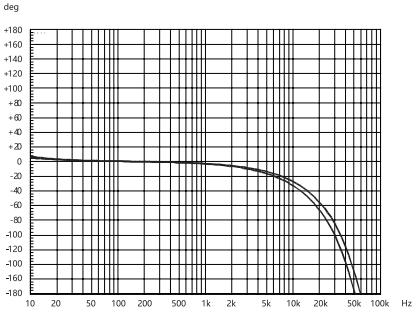


Figure 7.3
Phase and frequency (Class D)
(Typical performance measurement value)

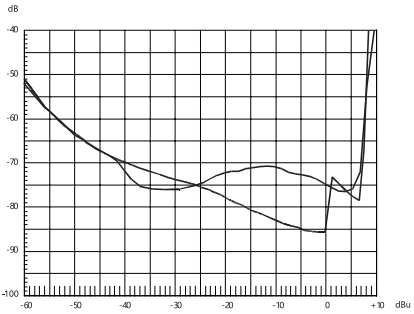


Figure 7.2
THD @ 1KHz, 8Ωand input voltage (Class D)
(Typical performance measurement value)

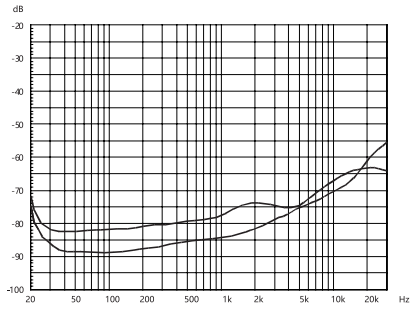


Figure 7.4
THD and frequency, 10dB below clip, 8Ω (Class D)
(Typical performance measurement value)

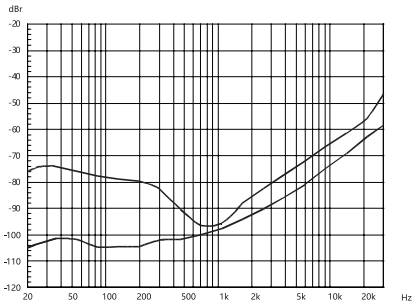


Figure 7.5
Channel separation and frequency
@10W / 4Ω (Class D)
(Typical performance measurement value)

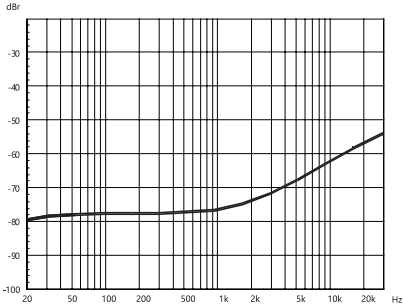


Figure 7.7
Common mode rejection ratio (Class D)
(Typical performance measurement value)

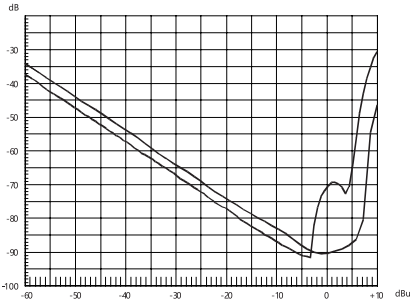


Figure 7.6
DIM intermodulation distortion
@8Ω and input Level(Class D)
(Typical performance measurement value)

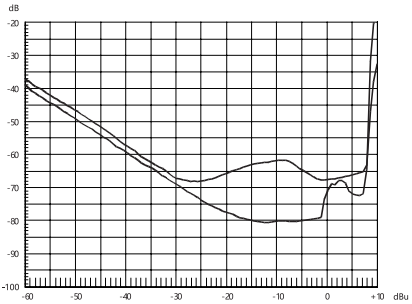
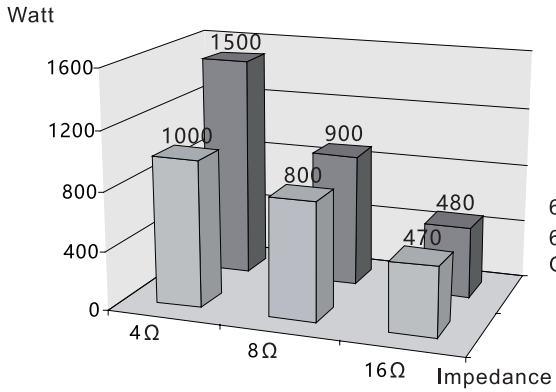
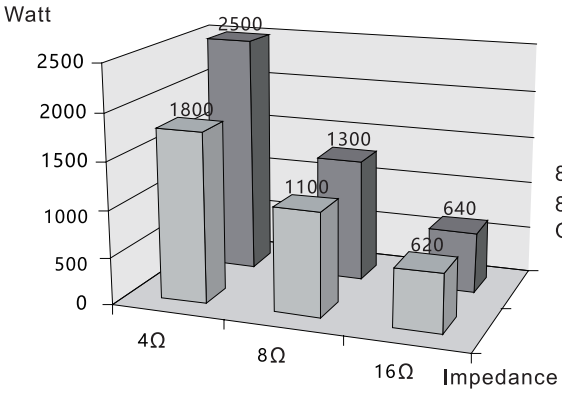


Figure 7.8
SMPTE Intermodulation distortion(60Hz and 7KHz)
@8Ω and input Level(Class D)
(Typical performance measurement value)



650W*2 Peak power
650W*2 Distortion limited
Output power (1% THD)

Figure 7.9
650W*2 (Typical performance measurement value)



850W*2 Peak power
850W*2 Distortion limited
Output power (1% THD)

Figure 7.10
850W*2 (Typical performance measurement value)

All technical and visual features may vary due to production tolerances. Qsone reserves the right to make changes and/or improvements in manufacturing or design, which may also affect the specifications.

Qsone professional audio
www.qsone.ch

Distributed by:
Z-AUDIO Animatec AG
Schickmattweg 7
CH8332 Russikon / Switzerland