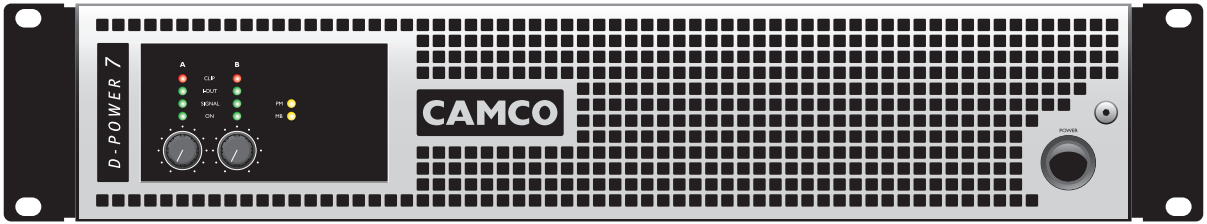


INFORMATION FOR USE FOR
D-POWER 7

TDA225USERENB

The leading version of this brochure is the English one which shall prevail to the exclusion of the national translation on hand.

D - POWER
SERIES

Please visit our website www.camcoaudio.com for the latest version of this user manual. Please note that the leading version of CAMCO manuals is always the English one.

IMPORTANT SAFETY INSTRUCTIONS

1. General
The amplifier may only be used in accordance with the information provided in the user manual. Before and during the usage of the amplifier please ensure that all recommendations, especially the safety recommendations as detailed in the user manual, are adhered to.

The ***D-POWER 7*** amplifier is designed for the amplification of pulsed audio signals. The amplifier should only be connected to speakers with an average impedance as indicated.

2. User Manual
Read the information for use (user manual) and heed all warnings. Keep this user manual in a safe place during the lifetime of the amplifier. The user manual forms an integral part of the amplifier. Reselling the amplifier is only possible if the user manual is available. In case of reselling the amplifier, the reseller has to document any changes made to the amplifier in writing and pass the documentation on to the buyer.

3. Environments
Use this amplifier only in E1, E2, E3, or E4 environments according to EN55103-2 “Electromagnetic compatibility – Product family standard for audio, video, and audio-visual and entertainment lighting control apparatus for professional use – Part 2: Immunity”.

4. Mounting/Placement
Do not place this amplifier on an unstable cart, stand, tripod, bracket, or table. The amplifier may fall causing serious injury and serious damage to the product. Any mounting of the amplifier should follow the manufacturer´s instructions. Only mounting accessory shall be used which is recommended by the manufacturer.

5. Power Cord Protection
Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon them or against them, paying particular attention to cords and plugs and the point where they exit from the amplifier.

6. Heat
Do not use this amplifier near any heat sources such as radiators, heat registers, stoves, or other apparatuses that produce heat.

7. Water and Moisture
Do not expose this device to rain or moisture. Do not use this amplifier near water (for example swimming pools and fountains). Do not place any objects containing liquids, such as bottles or glasses, on the top of the unit. Do not splash liquids on the unit. IP-20 equipment. There is no protection against splashing water.

8. Ventilation
Slots and openings in the cabinet are provided for ventilation to ensure reliable operation of the amplifier and to protect it from overheating. These openings must not be blocked or covered. This amplifier should not be installed unless proper ventilation is provided or manufacturer’s instructions have been adhered to.

9. Interference Of External Objects and/or Liquids with the Appliance
Never push objects of any kind into this amplifier through openings as they may touch dangerous voltage points or short-out parts that could result in fire or electric shock. Never spill liquid of any kind on the amplifier.

10. Connections
When you connect the amplifier to other equipment, turn off the power and unplug all of the equipment from the supply source. Failure to do so may cause an electric shock and serious personal injury. Read the user manual of the other equipment carefully and follow the instructions when making the connections.

11. Lightning
For additional protection of this amplifier during lightning storms or when it is left unattended and/or unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the amplifier due to lightning and power line surges. Disconnection from the mains power supply can only be achieved by removing the plug from the mains socket and by external disconnecting all poles from the mains.

12. Damages that Require Service
Unplug this amplifier from the mains supply and refer to your dealer/distributor or other authorized repair workshop if any of the following situations occur:
- if liquid has been spilled or objects have fallen into the amplifier
- if the amplifier has been exposed to rain or moisture
- if the amplifier has been dropped or damaged in any other way
- if the power supply cord or plug has been damaged
- when the amplifier exhibits a distinct change from its normal function or performance
- in case the amplifier has been used in a dusty environment for quite a period of time

13. Servicing
All service and repair work must be carried out by a dealer/distributor authorized by **CAMCO**. Do not attempt to service this amplifier yourself. As opening or removing covers may expose you to dangerous voltage or other hazards, the amplifier may only be opened by qualified personnel. Please refer to your dealer/distributor.

14. Spare Parts
When spare parts are required, please ensure that the dealer/distributor only uses spare parts specified by the manufacturer. The use of unauthorized spare parts may result in injury and/or damage through fire or electric shock or other electricity-related hazards.

15. Safety Check
Upon completion of any service or repairs to this product, ask the dealer/distributor to perform safety checks to determine that the amplifier works properly.
Recommendations on how to carry out the safety test can be found in DIN VDE 0701-1 “Maintenance, Modification and Test of Electronic Appliances“.

16. Cleaning
Unplug this amplifier from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Clean only with dry cloth.

17. Packaging and Shipping
When shipping the ***D-POWER 7*** amplifier, always use the original shipping carton and packing materials. For maximum protection repack the unit as it was originally packed at the factory.

EXPLANATION OF SYMBOLS

CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN

CAUTION – HIGH VOLTAGE HAZARDS EXIST WITHIN THIS PRODUCT. REFER ALL SERVICING TO AUTHORIZED PERSONNEL.

THE LIGHTNING FLASH WITH ARROW HEAD SYMBOL IS INTENDED TO ALERT THE USER TO THE PRESENCE OF UNINSULATED DANGEROUS VOLTAGE WITHIN THE PRODUCT'S ENCLOSURE.

THE EXCLAMATION MARK IS INTENDED TO ALERT THE USER TO IMPORTANT INSTRUCTIONS ALSO FOR MAINTENANCE IN THE LITERATURE ACCOMPANYING THE AMPLIFIER.

THE LIGHTNING FLASH WITH ARROW HEAD SYMBOL ALERTS THE USER TO DANGEROUSLY HIGH VOLTAGE AT THE OUTPUT CONNECTORS! THAT COULD POTENTIALLY BE LIFE THREATENING.

CAUTION – RISK OF ELECTRIC SHOCK – DO NOT OPEN.

WARNING – TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS AMPLIFIER TO RAIN OR MOISTURE.

THE AMPLIFIER MAY ONLY BE CONNECTED TO A SOCKET WITH A PROTECTIVE EARTH CONDUCTOR.

EC Declaration Of Conformity In Accordance To EC Directives:
electromagnetic compatibility (Council Directive 2004/108/EC);
low-voltage electrical equipment (Council Directive 2006/95/EC)

Manufacturer´s Name:
CAMCO Produktions- und Vertriebs-GmbH
für Beschallungs- und Beleuchtungsanlagen

Manufacturer´s Address:
Fischpicke 5, D-57482 Wenden, Germany

Declares That The Product With The Model Name:
CAMCO Power amplifier ***D-POWER 7***

Conforms To The Following Standards:
- EN60065 Safety
- EN55103-1 Emission
- EN55103-2 Immunity

The operating conditions and application environments presupposed in the information for use (user manual) are to be kept to accordingly.

Wenden, 07.10.2011

Joachim Stöcker

CONTENTS

1.1 Welcome to CAMCO

Established in 1983, **CAMCO** has gained worldwide experience with professional sound reinforcement technology. Within the audio market, **CAMCO** specialises in the production and marketing of high quality power amplifiers and sound systems for use both on tour and in static installations.

The success of the ***TECTON*** and ***VORTEX*** series power amps has made the **CAMCO** name synonymous with professional quality, high performance and utterly reliable power amps.

CAMCO's commitment to research and development, seen not just in the area of materials and technology but also most importantly in its highly skilled and motivated workforce, is one of the keys to its ongoing success.

With its all-new ***D-POWER 7*** power amp, **CAMCO** is pioneering a new dimension in professional power amp construction. The seamless combination of ground-breaking technology with proven safety elements is the hallmark of the new amplifier.

Welcome to the new world of professional power amplifiers –

WELCOME TO CAMCO!

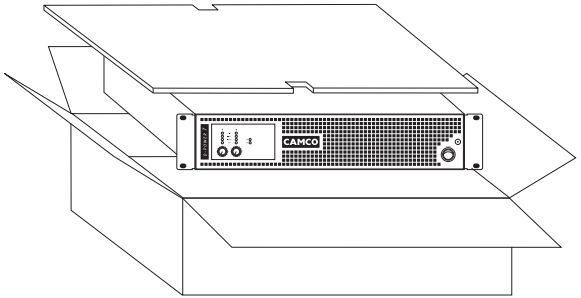
2.1 Unpacking

Please unpack and inspect your new amplifier for any damage that may have occurred during transit. If damage is found, notify the transportation company immediately. Only you the consignee may initiate a claim for shipping damage. **CAMCO** will be happy to cooperate fully as needed. Please save the shipping carton as evidence of damage for the shipper's inspection.

Even if the amplifier has arrived in perfect condition, save all packing materials so you will have them if you ever need to transport the unit.

NEVER SHIP THE AMPLIFIER WITHOUT THE ORIGINAL PACKING MATERIALS.

When shipping the ***D-POWER 7*** amplifier, always use the original shipping carton and packing materials. For maximum protection, repack the unit as it was originally packed at the factory.



2.2 The Amplifier

The ***D-POWER 7*** is a Class-H power amplifier with a power output of:

- 3 kW per channel @ 2 Ω
- 6 kW in Mono Bridge @ 4 Ω
- 6 kW in Parallel Mono @ 1 Ω

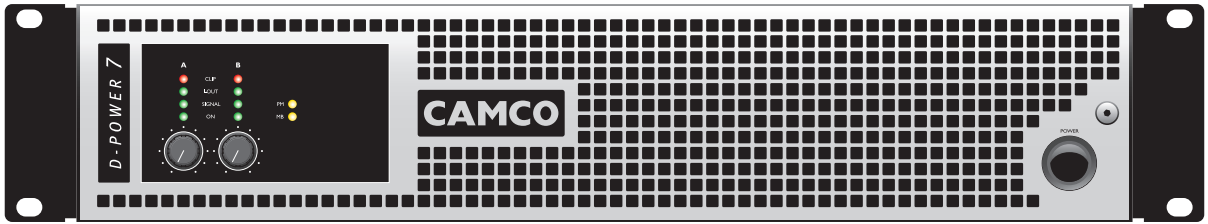
The ***D-POWER 7*** power amplifier is fitted with Switched Mode Power Supply (SMPS), which significantly reduces the weight and size (only 2U). Using SMPS, the 3 symmetrical supply voltages of the power amplifier are more stable than the power supplies used in conventional amplifiers.

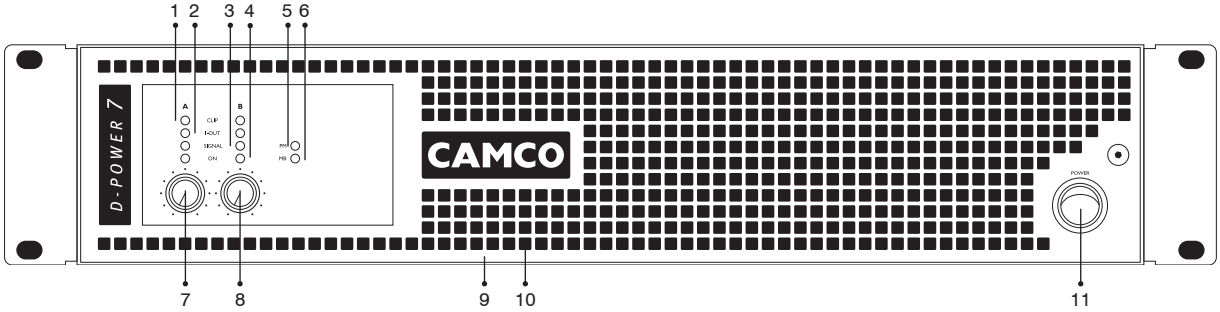
The ***D-POWER 7*** also uses a microprocessor for controlling and monitoring the power amp. This has four main advantages over more traditional power amp systems:

- Reduced Distortion
- Improved Noise Characteristics
- Indication of Protection or Failures by different LED sequences

The ***D-POWER 7*** has been designed as an intelligent and powerful amplifier for performing specialised tasks within a complex audio system. Users can adapt the power amp to meet their specific audio requirements before use. Controls mounted on the front and the rear of the ***D-POWER 7*** allow the different functions to be accessed.
Since some of the externally mounted controls have multiple functions, it is important that users should familiarise themselves thoroughly with the entire range of controls and programmable features before using the power amp.

If you have any questions regarding features and/or functions of your ***D-POWER 7***, **CAMCO** will be pleased to offer you further information. Alternatively, contact your dealer or distributor.



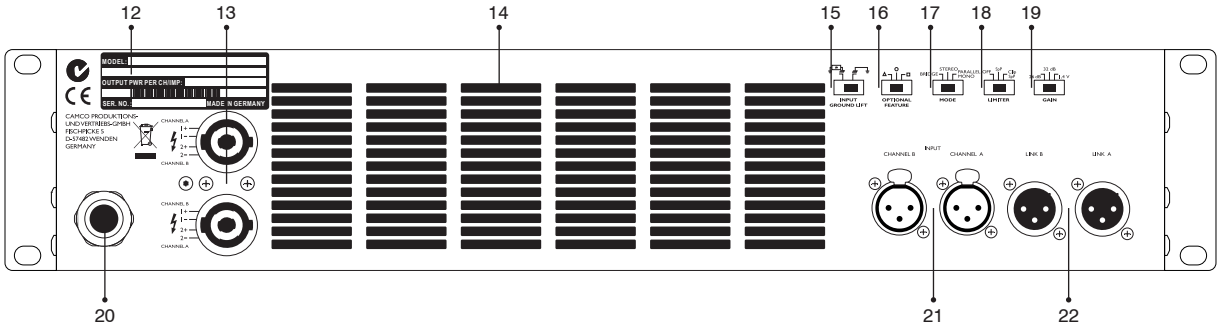


2.3 *D-POWER 7* - The Front

1 Clip LEDs
2 Output Current LEDs
3 Signal LEDs
4 On LEDs
5 Parallel Mono Mode LED
6 Mono Bridge Mode LED
7 Volume Control Channel A
8 Volume Control Channel B
9 Removable Air Filter System
10 Cooling Air Inlet Vents
11 On/Off Switch

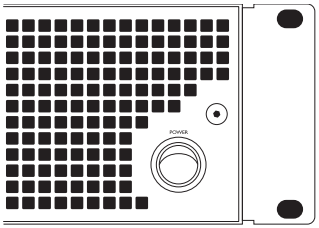
2.4 *D-POWER 7* - The Rear

12 Rating Plate
13 SPEAKON® Connectors
14 Cooling Air Outlet Vents
15 Input Ground Lift Switch
16 Optional Feature Selector
17 Mode Selector
18 Limiter Switch
19 Gain Selector
20 AC Power Connector
21 XLR - Line Inputs
22 XLR - Line Link Outputs



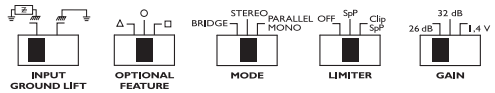
2.5 Factory settings

D-POWER 7 amplifiers are delivered with the following factory settings



Front panel:

On/Off Switch	Off	Amplifier is switched off

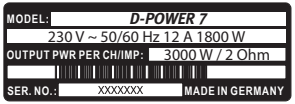


Rear panel:

Input Ground Lift	Grounded
Optional Feature	Circle
Mode	Stereo
Limiter	SpP
Gain	26 dB

3.1 Mains supply

When mounting or connecting the amp always disconnect it from mains. Only connect the *D-POWER 7* amplifier to an appropriate AC circuit and outlet, according to the requirements indicated in the second line on the rating plate.



Exemplary rating plate for a mains supply of 230 V AC 50/60 Hz.

Power Supply Data:

Voltage	Mains Frequency	Current	Power Consumption
100 V	50/60 Hz	28 A	1800 W
120 V	50/60 Hz	24 A	1800 W
220 V	60 Hz	12 A	1800 W
230 V	50/60 Hz	12 A	1800 W

NOTE: Even under normal conditions the mains current can reach levels up to 60 A (230 V), 120 A (120 V) and 140 A (100 V), respectively; this could cause lamps to flicker if connected to the same mains as the amp. The impedance of the AC circuit should be less than 0,157 Ohms to avoid flicker according to EN61000-3-11 "Electromagnetic compatibility – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in the public low-voltage supply systems – Equipment with rated current
≤ 75 A and subject to conditional connection".
If in any doubt, consult your local power provider. Never attempt to measure this impedance level with your ohmmeter. This may damage your meter and expose you to the risk of electric shock!

3.2 On/Off Switch

The On/Off Switch is a rocker-type switch. It is located on the right side of the front panel. To turn the amplifier on, press on the upper part of the switch. During power up the Clip and Signal LEDs from both channels will light up in red for a few seconds. To turn the amplifier off, press on the lower part of the switch.

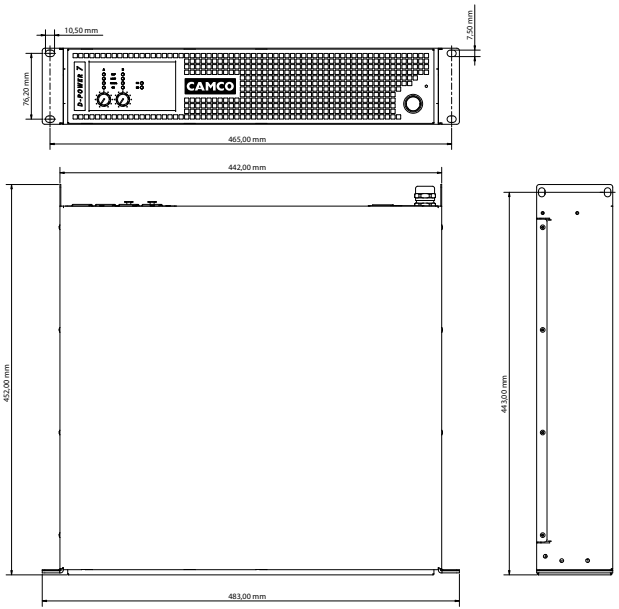
Amplifier is switched on Amplifier is switched off

NOTE: This switch does NOT disconnect the amplifier from mains. Make sure the mains power socket or an alternative disconnect device is nearby and easily accessible.

The switch initiates start-up by activating the inrush current limiter. As soon as the power amplifier is connected to the mains power supply, a voltage is supplied to both the line-filter and the fused input of the controllable rectifier. Disconnecting the amplifier from the main power supply can only be achieved by physically separating the amplifier from the mains by pulling the mains plug. The mains plug therefore has to be freely accessible. Disconnect the mains plug from the mains during a lightning storm or when the amplifier remains unused or unsupervised for a prolonged period of time. Alternatively, you can disconnect the amplifier via an external all-pole disconnection from the mains.
If a power cut occurs while the amplifier is switched on, it will restart automatically once the power supply has been restored. All amplifier settings prior to the loss of power will be maintained.

3.3 Mounting

Use four screws and washers when mounting the amplifier to the front rack rails. For mobile use, the amplifier should also be secured using the 19" mounting elements on the rear panel.

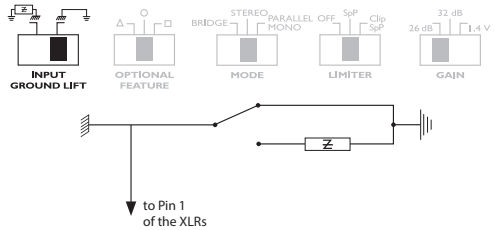


3.4 Cooling

Under normal operation of the power amp, overheating should never be a problem. The air is taken in from the front and out through the back. It is of course essential that while the power amp is running air is able to circulate around it freely.
The efficiency of the cooling will depend on the immediate environment (e.g. an enclosed rack, direct sunlight) and on whether the front filter is clogged. If the amp is installed in a case, the open area at the back of the case must be at least 140 cm². This area should be in line with the amp.
If this can not be achived a forced ventilation system has to be used.

3.5 Ground Lift

The input signal ground (pin 1 for all 4 XLRs) is connected to the ground of the mains supply. In order to avoid ground loops, this connection can be separated via a resistor. The ground potential of the power amp and the ground of the loudspeaker always remain connected to the ground of the mains supply regardless of the setting of this switch.

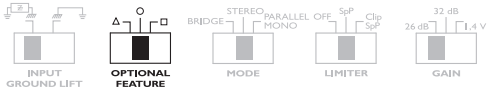


Removing or taping the mains connector ground is illegal and dangerous.

DO NOT REMOVE MAINS CONNECTOR GROUND
IT IS ILLEGAL AND DANGEROUS

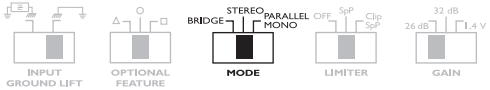
3.6 Optional Feature

Could be activated with future released software versions.



3.7 Mode Selector

The switch on the rear panel changes the operating mode. Moving this switch will shutdown the amplifier and restart it in the new operating mode.

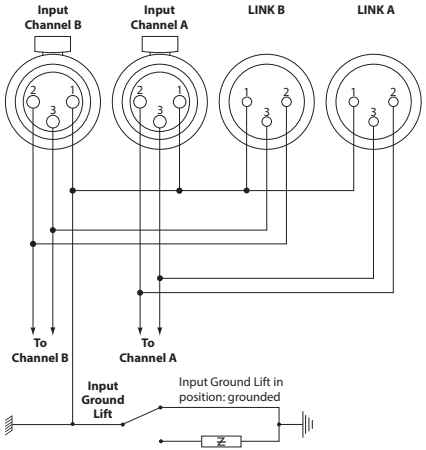


3.8 Wiring

3.8.1 E.U.I. and XLR Connection

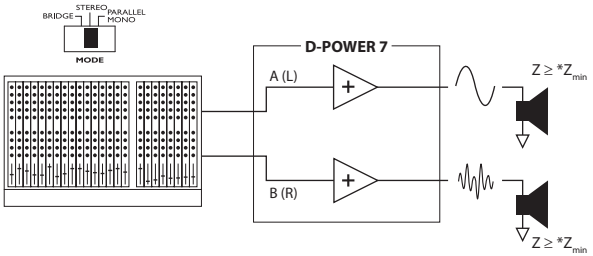
XLR: Pin 1 = Ground (or lifted via 15 Ω resistor)
Pin 2 = Hot (inphase)
Pin 3 = Cold (out of phase)

Always use symmetrical (balanced) shielded cable to connect the amplifier



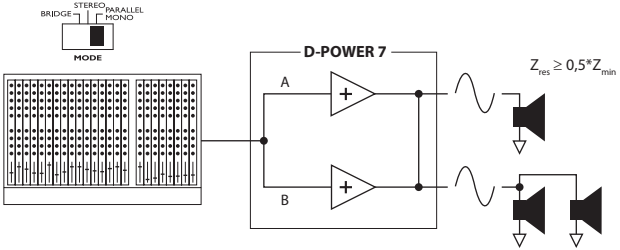
3.8.2 Stereo Operation

Two fully independent amplifier channels (normal operating mode).



3.8.3 Parallel Mono Operation

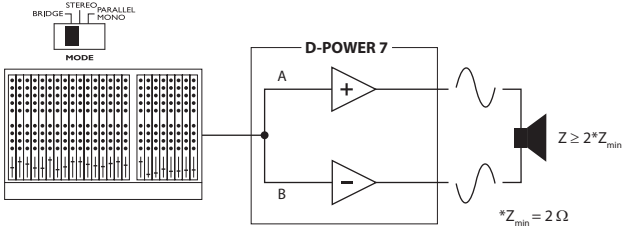
Parallel operation of the two channels together.



The output terminals of the two channels are configured in parallel using an internal relay. The (single) load is connected either to the output of channel A or to that of channel B (as if in stereo). While the total output of the amplifier remains the same and the output voltage level is also the same as in stereo operation, the minimum impedance that can be connected is reduced by half due to the fact that current capability is doubled. Only channel A-Input is active. The channel B-Input is inactive – turn the volume on channel B down to zero. This mode is useful when, for example, 3 identical loudspeakers are to be operated with the same power.

3.8.4 Mono Bridge Operation

One-channel mono bridged operation.



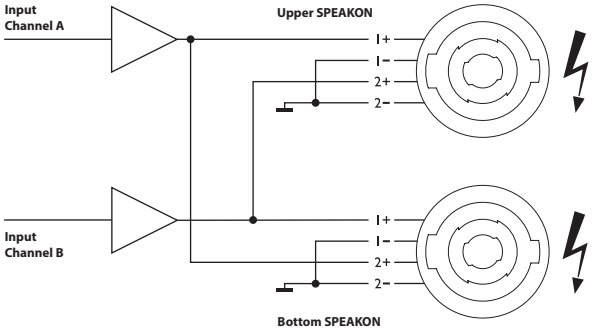
The second channel processes the same input signal, but with reversed phase. The (single) load is connected between the two positive channel outputs using a suitable connected SPEAKON® connector. While the total output of the amplifier remains the same, both the available output voltage and the minimum impedance that can be connected are doubled, as compared with stereo operation. Only channel A-Input is active – turn the volume on channel B down to zero.

WARNING !
In Mono Bridge mode RMS output voltages are as high as 230 V. Wiring to the speaker loads must conform to NEC Class 3 safety standards or its equivalent that meets all national and local electric codes. All customer specific cables may only be manufactured by qualified suppliers/personnel. All cabeling or rewiring work must be carried out by qualified personnel.

3.8.5 SPEAKON® Connection

Both SPEAKON® connectors are connected to channel A and channel B outputs. The pin configuration of the SPEAKON® connectors is as follows:

Upper SPEAKON®:	Pin 1+	Channel A signal
	Pin 1-	Channel A ground
	Pin 2+	Channel B signal
	Pin 2-	Channel B ground
Bottom SPEAKON®:	Pin 1+	Channel B signal
	Pin 1-	Channel B ground
	Pin 2+	Channel A signal
	Pin 2-	Channel A ground



WARNING!
SPEAKON® connectors marked with the lightning flashes indicate high voltages that are potentially life threatening.

Wiring to these terminals requires installation by an instructed person or the use of ready-made leads or cords.

Custom wiring should only be carried out by qualified personnel.

To prevent electric shock, do not operate the amplifier with any of the conductor portion of the speaker wire exposed.

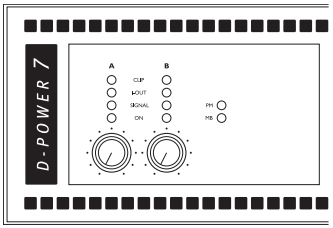
NOTE:
For reasons of safety and performance, use only high-quality fully insulated speaker cables of stranded copper wire. Use the largest wire size that is economically and physically practical, and make sure the cables are no longer than necessary.

IMPORTANT:
When connecting speaker cabinets in parallel, always use all the contacts in both SPEAKON® connectors. If not, this may cause permanent damage to the connectors and considerably reduce performance.

4.1 Controls

4.1.1 Volume Control

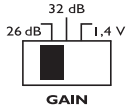
A microprocessor-controlled DCA (Digital Controlled Attenuator) with a control resolution of 12 bits per channel is integrated into the signal path. This means that the signal is not subject to an A/D followed by a D/A conversion with associated losses and delay.
Using a DCA instead of the “conventional” VCA significantly reduces distortion and, at the same time, it improves the noise characteristics. A volume control with 41 notched settings controls the DCA via a microchip. These settings have been selected to correspond to human hearing characteristics and therefore guarantee an optimal range of settings for practical applications. Each channel can be set individually except when operating in mono modes whereby only channel A is active.



Set the volume to zero before turning on the amplifier to prevent the occurrence of sudden high volume levels which may cause damage to your hearing and/or the speakers.

4.1.2 Gain Selector

This switch on the rear of the ***D-POWER 7*** allows the maximum amplification attainable to be set directly in the input stage.



The ***D-POWER 7*** amplifier has a 26 dB and 32 dB voltage gain setting along with a 1,4 V sensitivitysetting.

4.1.3 Gain and Input Sensitivity

The table shows input sensitivity per channel for a given gain and load. It also shows the gain for the 1,4 V input sensitivity.

	26 dB	**32 dB**	**1,4 V**
3500 W @ 2 Ω	4,19 V	2,10 V	
2500 W @ 4 Ω	5,01 V	2,51 V	37,5 dB
1450 W @ 8 Ω	5,40 V	2,71 V	

4.1.4 Limiter Switch

This switch is located at the rear of ***D-POWER 7***. It allows you to set the mode of the limiter. There are three modes *(See 4.3.1 Clip Limiter and 4.3.4 Speaker Protect Limiter)*:

Right position:
Clip Limiter: On
Speaker Protect: On

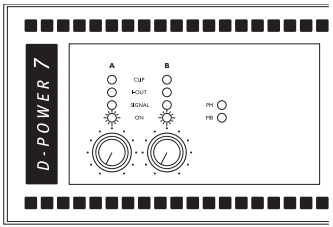
Middle position:
Clip Limiter: Off
Speaker Protect: On

Left position:
Clip Limiter: Off
Speaker Protect: Off

4.2 Indicators

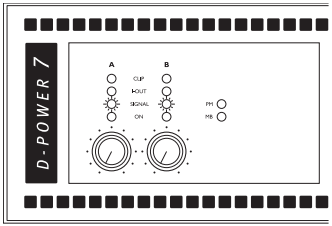
4.2.1 On LEDs (multifunctional)

Under normal operation, after the amp has started, the green On LEDs are permanently lit. A variety of different sequences of flashing LEDs are used to indicate other operating states and errors in the relevant channels of the power amp *(See 6.1 Flashing sequences for On LEDs)*.



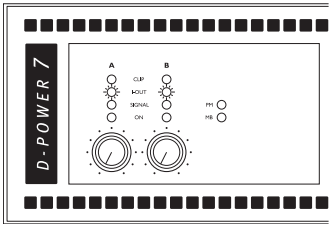
4.2.2 Signal LEDs

The green Signal LED is illuminated when the voltage level at the output reaches approx. 4 V; this corresponds to a power of approx. 4 W over a 4 Ohm resistor.



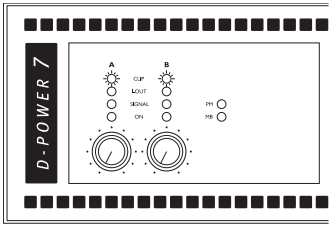
4.2.3 I-Out LEDs

The brightness is proportional to the output current in the corresponding channel.



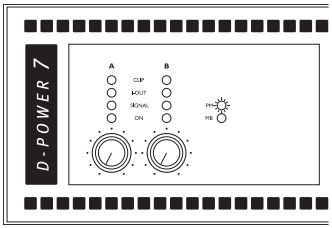
4.2.4 Clip LEDs (multifunctional)

The colour of the bi-coloured LED changes between orange and red, depending on the clip intensity. Orange indicates light clipping, red indicates heavy clipping.

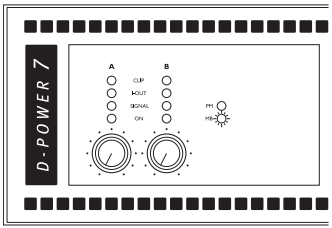


4.2.5 Mode Indicators

On the front panel there are two yellow LEDs to indicate the mode that is set. In stereo mode (2-channel) none of them will be lit. In Parallel Mono the (PM) LED will be lit and in Mono Bridge, the (MB) LED will be lit.



Amplifier in Parallel Mono mode



Amplifier in Mono Bridge mode

4.3 Power Amp Protection Systems

4.3.1 Clip Limiter

If the power amp is overdriven, the clip detection circuit triggers the microprocessor. The processor reduces input signal level by controlling the DCA. The strategy is implemented in software. For sinusoidal input signals the microprocessor limits the input signal in such a way that non-linear distortions of the signal never exceed 1 %.
The Clip Limiter can work on each channel independently (except in the two mono operation modes). *(To disable the Clip Limiter, see 4.1.4 Limiter Switch.)*

4.3.2 Under Impedance Limiter

As a result of incorrectly connected or defective loads, under impedance or even short circuits may occur in one or both power amp channels.
The microprocessor constantly calculates the load impedance at the output channels. If an impedance of less than 1,33 ohms/channel is detected, the microprocessor limits the signal to the power amp until a subsequent measurement indicates that impedance has risen to a safe level. Whenever the Under Impedance Limiter is active, the corresponding channel's On LED is turned off *(See 5 Troubleshooting)*.

4.3.3 SOA Protection

To ensure that the power transistors are only used in the Safe Operation Area (SOA), the SOA-protection in stereo mode switches back the rail voltages of the respective power stage. In mono modes the rail voltages of both channels are switched back.

4.3.4 Speaker Protect Limiter

Whenever the SOA protection of the power amp switches back the current rail there could be a small clipping at the output; but the microprocessor is also triggered by this protection and will reduce the signal level immediately to minimise the effect.
The user can decide either to use Speaker Protect or not. If you use this amp for low frequencies (bass / Sub bass) and you want to squeeze the absolute maximum out of it, Speaker Protect can be switched off. For all other applications (e.g. Full Range) it's recommended to keep Speaker Protect switched on.

4.3.5 DC Protection

Each output of the power amp is constantly monitored for persistent DC voltage levels. If the 3 V threshold voltage is exceeded at any of the outputs, the main SMPS will shut down and the channel will be automatically switched off. The microprocessor performs a sophisticated strategy to locate the cause of the malfunction. DC can be located in the output stage, driver stage or at the input of the amplifier.

Output Stage

When a DC voltage is located at an output stage, the main SMPS remains switched off. The On LEDs will show a flash sequence corresponding to this malfunction *(See 5 Troubleshooting)*.

Driver Stage

When a DC voltage is located at the driver stage only the defective channel's output stage and the DCA are muted. The other channel continues to work. The On LED of the defective channel will indicate the malfunction by starting the relevant flash sequence *(See 5 Troubleshooting)*.

Amplifier Input

When DC is located at the input stage only the DCA of the affected channel is muted. The other channel continues to operate normally. If the DC signal at the input vanishes, the microprocessor will de-mute the affected channel and the amplifier will work as usual again.

4.3.6 DC Servo

To prevent DC Offset at the speaker output the ***D-POWER 7*** is fitted with two DC Servos. (Hence there are no capacitors in the signal path)

4.3.7 Over Current Protection

The output stage is permanently monitored for possible current surges. There are two limiting levels of over current depending on output voltage. These limits will be set automatically. This improves reliability without degrading sound quality when driving complex loads.

4.3.8 Thermal Protection

The microprocessor uses several sensors in the amp in order to ascertain temperature data. If the microprocessor detects a temperature of more than 85 °C at the heat sinks, the input signal on that channel is reduced. If the temperature exceeds 100 °C, the main SMPS is switched off.
The On LED of the overheated channel will start a blinking-sequence *(See 5 Troubleshooting)*.

4.4 Mains Protections

4.4.1 Inrush Current Limitation

Within 2 seconds of the ***D-POWER 7*** being switched on, the inrush current limiter will increase mains current from nearly zero to nominal value. This value depends on program material, output level and speaker loads.

4.4.2 Mains Over Voltage Detection

Mains Over Voltage Detection is always operative. When the mains voltage exceeds approx. 267 V (230 V operation), 134 V (120 V operation) or 117 V (100 V operation), the amplifier will switch off. When the mains voltage returns to nominal value, a soft start occurs.

4.4.3 Mains Failure Detection

Mains Failure Detection is always operative. When the mains supply is interrupted for about 2 mains cycles, the amplifier will switch off. When the mains voltage returns to a normal value, a soft start occurs.

4.4.4 Fuse Protection

The average mains current can peak temporarily, depending on the load impedance and type of signal, at values several times higher than the nominal value allowed by the fuse protection.
Continuous monitoring of the fuse protection status allows the conditions that would trigger the fuse protection to be predicted. In order to avoid shut-down of the amplifier due to current overload, the amplitude of the input signals will be limited.
The limitation of the input signal allows a 6 kW ***D-POWER 7*** power amplifier to be operated reliably from a mains power supply of 230 V/16 A (120 V/30 A; 100 V/30 A).

4.5 Main SMPS Protections

4.5.1 Over Current Protection

Main SMPS (Switched Mode Power Supply) transformer current of your ***D-POWER 7*** is continuously monitored. If over current occurs, the main SMPS immediately stops working. Should there be an internal failure, this feature prevents other parts being damaged.

4.5.2 Thermal Protection

The temperature of the main SMPS transformer of your ***D-POWER 7*** is permanently monitored. If the temperature exceeds 85 °C, the microchip reduces the input signals of both channels. If the temperature surpasses 100 °C, the main SMPS is switched off. The On LEDs will start a blinking sequence corresponding to this malfunction *(See 5 Troubleshooting)*.

4.6 Fans

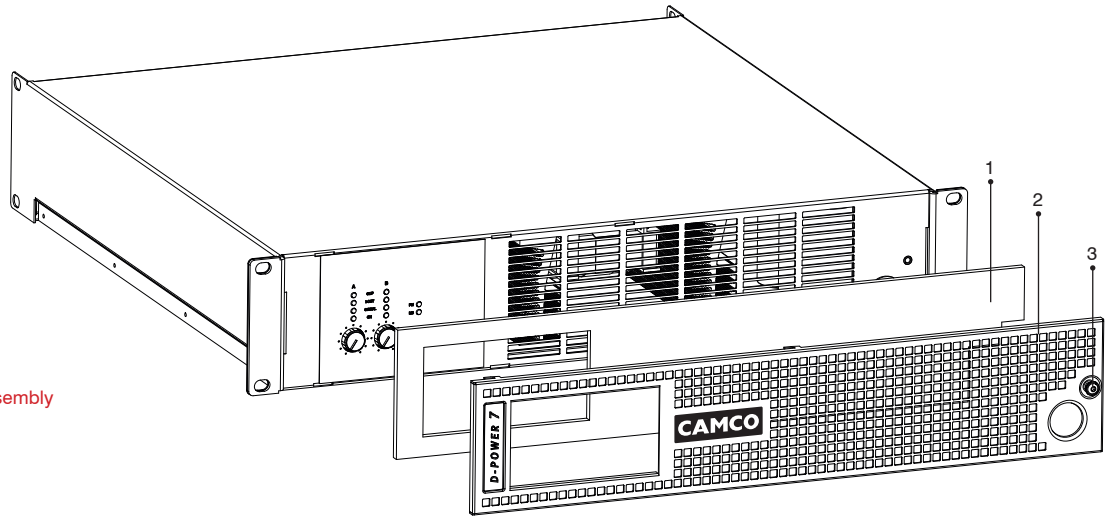
The fans mounted in your ***D-POWER 7*** operate permanently, but as long as the temperature remains below 40 °C, they run at their slowest speed and can hardly be heard. The highest detected temperature from either channel controls the speed of the fans. Above 40 °C the speed is increased until it reaches its maximum value.

4.7 Filter Cleaning

The air intake on the front of your ***D-POWER 7*** Amplifier is fitted with a removable filter system. If the filter becomes clogged, the unit will not cool as efficiently as it should and may result in reduced output levels.

WARNING: Disconnect the amplifier from the mains before removing the front frame.

To clean or replace the filter just slightly unscrew the fixing screw with the help of a 3 mm allen key. The screw will be held back by a small plastic spacer on the back of the frame to avoid losing it. Then shift the front frame slightly to the right. Then you should be able to remove the frame from the amplifier completely (pull gently to avoid any bending of the front frame).



D-POWER 7 Filter Assembly
1 Foam Filter
2 Front Frame
3 Screw

5.1 On LED Flashing Sequences

When switching on the amp the On LEDs flash twice accompanied by a flash of Clip LEDs. This is normal for the 'Start' sequence of the ***D-POWER 7***.

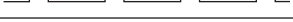
When switching off the amp the On LEDs flash several times followed by a flash of Clip LEDs. This is normal for the 'Shut Down' sequence of the ***D-POWER 7***. (It is the same as the loss of the mains voltage.)

In the following table you will find the possible LED sequences of the On LEDs:

Examples of LED sequences

LED sequence: Channel 1 :
Channel 2 :
Malfunction: Channel 1: high temperature with signal attenuation
Channel 2: normal operation

LED sequence: Channel 1 :
Channel 2 :
Malfunction: Channel 1: DC, output stage defect
Channel 2: main SMPS off

Operating Status	LED Sequence (⎍) = flash, (_) = off	Description of repeated sequences
Normal (no failure)		Permanently lit
Power Fail (i.e. switch off)		Short 50 ms flash + 950 ms pause
High Temperature signal attenuation		750 ms flash + 250 ms pause
Over Temperature main SMPS off		250 ms flash + 750 ms pause
DC reason unknown		250 ms flash + 250 ms pause
DC input-signal-fault		3 * flashing + 0.5 s pause
DC fault in driver stage		4 * flashing + 0.5 s pause
DC output stage defect		5 * flashing + 0.5 s pause
Output Stage Defect without DC		6 * flashing + 0.5 s pause
Main SMPS off (unless high temperature/ power fail)		2 * flashing + 0.5 s pause

5.2 Problem: No Sound

Indication: On LEDs not lit
Clip LEDs not lit

- Check AC plug.
- Confirm that AC outlet works by plugging in another device.

Indication: On LEDs lit
Signal LED not lit

- Make sure the signal source is operating and try another cable.
- Check position of Volume Pots.

Indication: On LEDs lit
Signal LEDs responding to signal level

- Check the speaker wiring for breaks.
- Try another speaker and cable.

Indication: On LED(s) sequence

The amplifier is in protective muting. Refer to On LED flashing sequences table to find out the cause for the mute.

- Overheating will cause protective muting.
- If the fans aren't running the amplifier requires servicing

5.3 Problem: No Sound or Sound Is Too Low

Indication: On LED not or sporadically lit
Signal LED not lit
Clip LED lit

Under Impedance Limiter is active. The load impedance is abnormally low or shorted.

- Unplug each speaker one-by-one. If the On LED indicates normally when you disconnect a cable, that cable or speaker is shorted.
- Take care not to use too many speakers in parallel, which would result in an impedance that is too low for normal operation!

Indication: On LED(s) sequence

Please refer to the On LED flashing sequences table to find out which protection is active. High temperature will cause an attenuation of output level! DC will cause the amp to mute or shut down.

- If the On LED sequence indicates "DC, Input Signal Fault", switch off the ***D-POWER 7*** and unplug the amp to disconnect it from the signal source. If the On LED shows the same sequence when the ***D-POWER 7*** is switched on again, the amp will need to be serviced by a qualified technician.

All other On LED sequences that shut down or mute the *D-POWER 7* indicate a serious internal fault. At this point, turn the *D-POWER 7* off, remove AC power and have the amplifier serviced by a qualified technician.

5.4 Problem: No Channel Separation

- Check the mode indicators on the front panel and make sure the mode selector on the rear panel is in the Stereo-position.
- Make sure other equipment in the signal path such as mixers and preamps are set for stereo, not mono.

5.5 Problem: Distorted Sound

Indication: On LED lit
Signal LED responding to signal level
Clip LED lit only green

- A faulty speaker or a loose connection could cause this. Check the wiring and the speakers systematically (i.e. step by step) and replace them if necessary.
- The signal source might be clipping. Keep the ***D-POWER 7*** volume pots at least halfway up so that the source does not have to be overdriven.
- Keep the ***D-POWER 7*** Volume Pots at least halfway up and try changing input sensitivity from 1,4 V to 32 dB or 26 dB with the Gain Selector on the rear.

5.6 Problem: Hiss

- Unplug the amplifier input to check that the hiss is coming from the source or from a device upstream. Erratic or popping noises indicate an electronic fault in the offending unit.
- To keep the noise floor low, operate the primary signal source at full level, without clipping.
- Avoid boosting the signal further between the source and the amplifier.

5.7 Problem: Squeals and Feedback

- Microphone feedback must be eliminated by the mixer controls. If noise continues to build up with no microphone gain, there is a serious fault in the signal processors or cables. Working in stages from the signal source towards the amplifier and check each device in the signal path by reducing its gain or by unplugging it

	D-POWER 7
Output Power, both channels driven 1 kHz, THD ≤ 1 % @230 V/50 Hz, duration limited by fuse/thermal protection for RL<16 Ω	2 x 800 W @ 16 Ω 2 x 1450 W @ 8 Ω 2 x 2500 W @ 4 Ω 2 x 3500 W @ 2 Ω
Peak Output Power 1 kHz, single sine wave	2 x 2950 W @ 4 Ω 2 x 4000 W @ 2 Ω
Output Power, Mono Bridge Mode 1 kHz, THD ≤ 1 % @230 V/50 Hz, duration limited by fuse/thermal protection	1 x 2900 W @ 16 Ω 1 x 5000 W @ 8 Ω 1 x 7000 W @ 4 Ω
Output Power, Parallel Mono Mode 1 kHz, THD ≤ 1 % @230 V/50 Hz, duration limited by fuse/thermal protection	1 x 5000 W @ 2 Ω 1 x 7000 W @ 1 Ω
Circuitry	Bipolar, Class H 3-step high effiency circuit
Signal to Noise-Ratio 20 Hz - 20 kHz, 8 Ω load, unweighted A-weighted	 >107 dB >110 dB

Power Consumption @ 230 V
(both channels driven)

	Idle	8 Ω	4 Ω	2 Ω
Typical [1]	1 A	5,5 A	8 A	12 A
	60W	700 W	1100 W	1800 W
Max [2]	-	21 A	35 A	60 A
	-	3200 W	5800 W	9400 W

Multiply currents by 2 for 120 V
Multpy currents by 2,3 for 100V
1) ⅛ of max. Output Power with pink noise to represent typical music signal
2) max. rated Output Power (see above)

Frequency Range 8 Ω load, 10 dB below rated power	20 Hz - 20 kHz ± 0,15 dB
Input Impedance	40 kΩ balanced
Voltage Gain	selectable: 26 dB, 32 dB, or 1,4 V input sensitivity
Protection Circuits	inrush-current limitation, temperature monitoring of transformers and heatsinks, output DC protection, SOA protection, output over current protection, under impedance limiter, intelligent mains fuses protection
Limiter	switchable clip- and speaker protect limiter
Fan	two temperature dependent speed-controlled axial fans
Ground Lift	input ground lift switch on back panel
Indicators	LEDs for On, Signal, I-Out, Clip, Mode, indicating additionally Output Current and faults such as DC and High Temperature
Input Connectors	3-pin XLR, male and female per channel, pin 2 = hot (inphase)
Output Connectors	one 4-pole SPEAKON® connector for each output channel (wired using 2 channel cable)
Modes of Operation	Stereo, Mono Bridge and Parallel Mono
THD+N (typical) 20 Hz - 10 kHz, 8 Ω load, 10 dB below rated power	< 0,01 %
SMPTE (typical) 20 Hz - 20 kHz, 8 Ω load, 10 dB below rated power	< 0,01 %
Damping Factor 8 Ω load, 1 kHz and below	> 400
Dimensions (WxHxD)	483 x 88,9 x 422 mm (19”, 2U)
Net Weight	12,4 kg
Shipping Dimensions (WxHxD)	615 x 135 x 540 mm (0,045 m3)
Shipping Weight	15 kg

We reserve the right to make technical alterations without prior notice

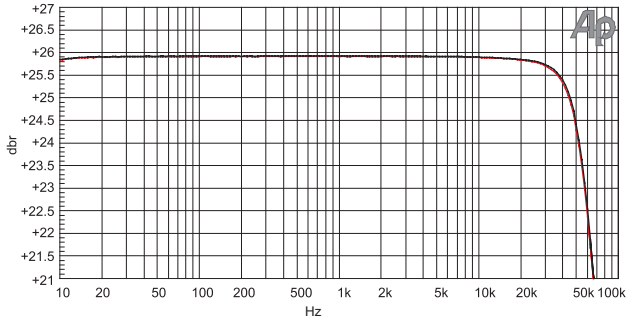


Figure 7.1
Gain vs. frequency (Ch1, Ch2)
(Measurements of a typical performance)

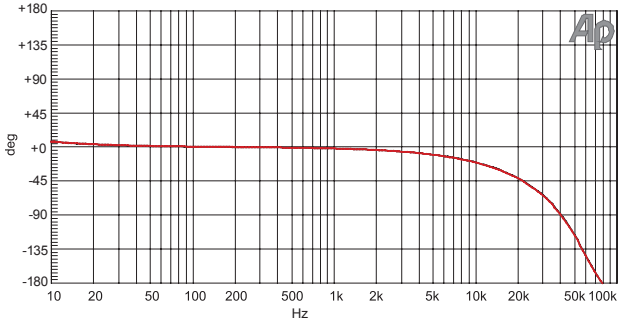


Figure 7.3
Phase vs. frequency (Ch1, Ch2)
(Measurements of a typical performance)

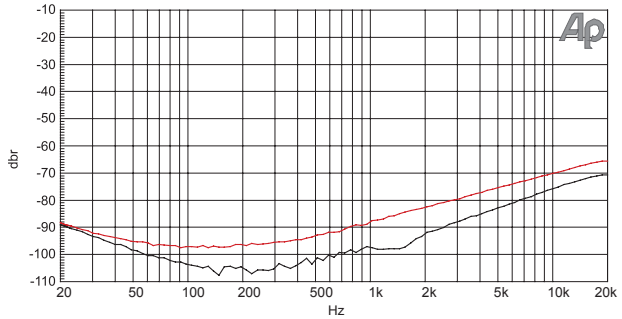


Figure 7.2
Channel separation vs. frequency @ 10 W / 4 Ω (Ch2 => Ch1, Ch1 => Ch2) *(Measurements of a typical performance)*

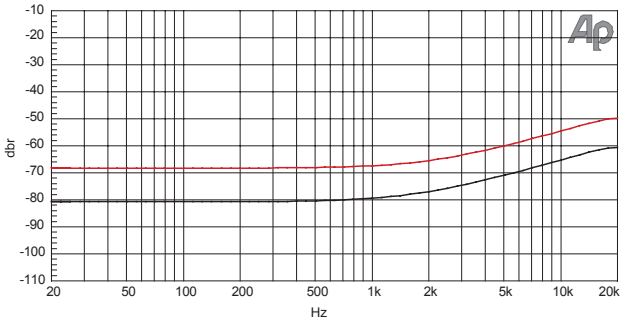


Figure 7.4
Common mode rejection ratio (Ch1, Ch2)
(Measurements of a typical performance)

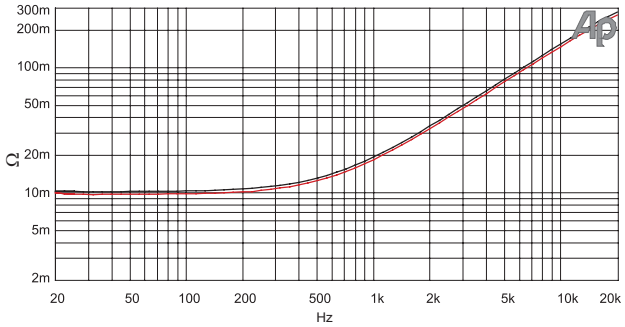


Figure 7.5

Output impedance vs. frequency @ 1 Amp RMS injected current (Ch1, Ch2) equivalent 11 mΩ + 2,1 uH *(Measurements of a typical performance)*

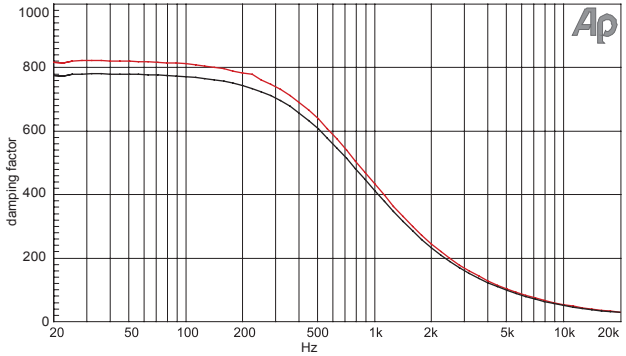


Figure 7.7

Damping factor into 8 Ω (Ch1, Ch2)
equation: damping factor = loaded impedance / amplifier output impedance *(Measurements of a typical performance)*

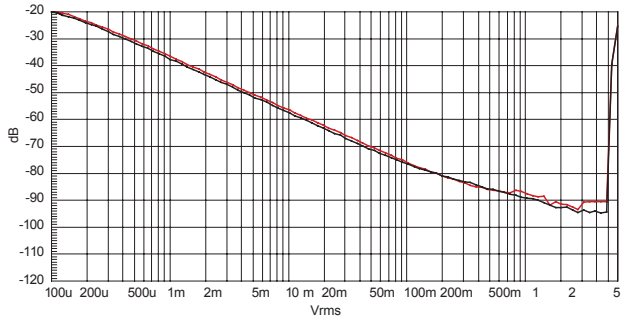


Figure 7.6

THD+N vs. input voltage @ 1 kHz, 4 Ω (Ch1, Ch2)
(Measurements of a typical performance)

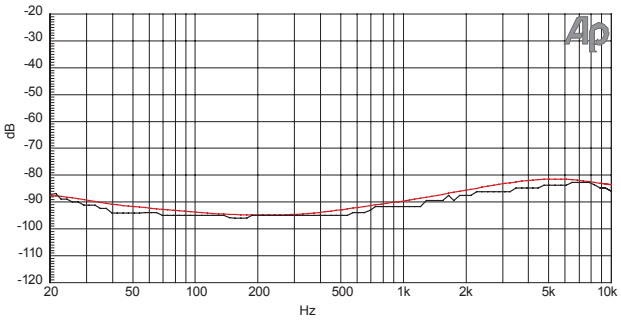


Figure 7.8

THD+N vs. frequency (BW 22 kHz), 10 dB below clip, 4 Ω (Ch1, Ch2)
(Measurements of a typical performance)

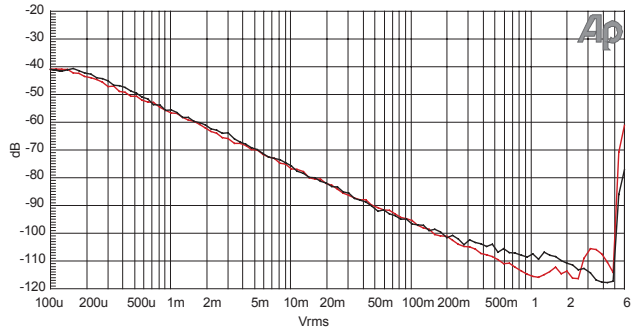


Figure 7.9
CCIF difference frequency method (10,5 kHz and 11,5 kHz) vs. input level @ 4 Ω (Ch1, Ch2) *(Measurements of a typical performance)*

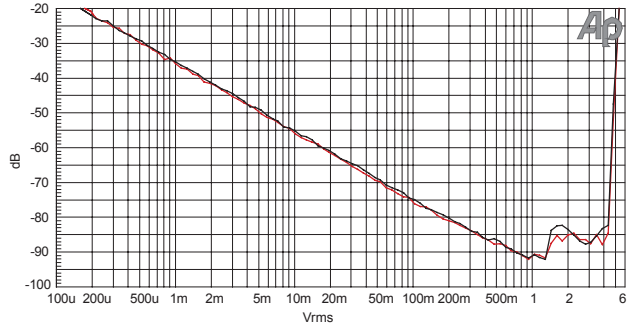


Figure 7.10
SMPTE intermodulation distortion (60 Hz and 7 kHz) @ 4 Ω vs. input level (Ch1, Ch2) *(Measurements of a typical performance)*

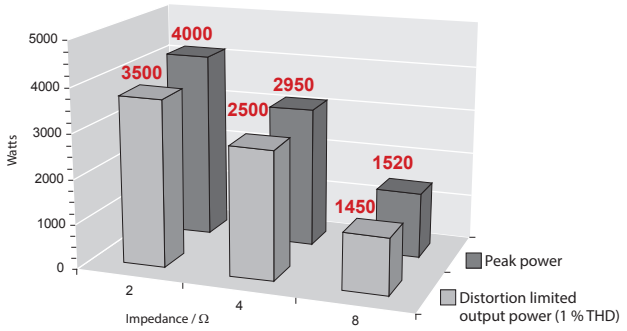


Figure 7.12
D-POWER 7 *(Measurements of a typical performance)*

8.1 Summary of Warranty

CAMCO guarantees the ***D-POWER 7*** Amplifier to be free from defective material and/or workmanship for a period of six (6) years from the date of sale. When a defect occurs under normal installation and use, **CAMCO** will repair the product under this warranty. In this event, please return the amplifier to your dealer/distributor together with a copy of your sales receipt as proof of purchase.

This warranty provides that examination of the returned product must indicate in our judgement a manufacturing defect.

8.2 Items Excluded from This Warranty

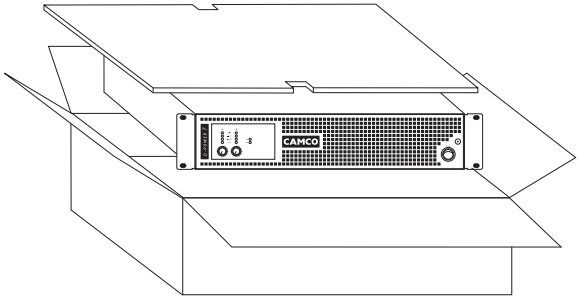
CAMCO is not liable for any damage caused by shipping accidents, misuse, abuse, operation with incorrect AC voltage, operation with faulty peripheral equipment, modification or alteration without prior factory approval, service by an unauthorized service center and normal wear and tear. Amplifiers on which the serial number has been removed or defaced are not eligible for warranty service.

8.3 What **CAMCO** Will Do

CAMCO (or its appointed agent) undertakes to rectify any defect regardless of the reason for failure (unless excluded from this warrenty), by repair, replacement or refund as it sees fit.

8.4 How to Obtain Warranty Service

You must notify your dealer/distributor of your need for warranty service. All components must be shipped in the original packaging.



8.5 **CAMCO**'s Product Improvement

CAMCO reserves the right to improve the technical standard of its products without giving prior notice. If in any doubt, please consult your dealer/distributor or contact **CAMCO** directly for clarification.

PLEASE ENCLOSE THIS COMPLETED FORM WITH THE AMPLIFIER
DO NOT SEND SEPARATELY

Owner's Information

Company Name: ______________________________
____
Contact: ______________________________
Address: ______________________________
____
____
____
Telephone: ______________________________
Facsimile: ______________________________
eMail Address: ______________________________
Model: ______________________________
Serial Number: ______________________________
Purchase Date: ______________________________

Expired Warranty

If the warranty has expired, payment will be:

- ☐ Cash/Cheque
- ☐ VISA
- ☐ MasterCard

Shipping Address

To transport the amplifier, the original packing materials must be used. Please return the amplifier to the following address or your nearest **CAMCO** appointed distributor.

Nature of problem occurred

Please describe the conditions that existed when the problem occured and what attempts were made to correct it: ______________________________
____
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Other equipment in your system: ______________________________
____
____
____
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____

Our web site: **www.camcoaudio.com** provides a complete list of **CAMCO** dealers/distributors.

CAMCO Produktions- und Vertriebs-GmbH für Beschallungs- und Beleuchtungsanlagen, Fischpicke 5, D-57482 Wenden, Germany

10 Maintenance Information

Cleaning and servicing the inside of the amplifier must never be carried out by unqualified personnel. The amplifier must never be opened by unqualified personnel.

Cleaning and servicing work on the inside of the amplifier must only be carried out by qualified personnel.

Qualified personnel is defined as a person who has gained specialised relevant knowledge of electronic engineering through education, training, and experience, and who has sufficient knowledge of all relevant governmental work safety regulations to be in a position to judge the safe functioning of power amplifiers based on technical rules according to IEC 60065 (IEC 60065 (DIN EN 60065) “Safety Requirements for Audio, Video or simlar Electronic Appliances”).

In order to guarantee the safe functioning of the amplifier, it has to be checked regularly, depending on its application but at least once a year, by a properly qualified person.
Advice on how to carry out these checks can be found in DIN VDE 0702-1 “Safety Checks for Electronic Appliances” .

An amplifier that is considered to be unsafe must be labelled accordingly and stored in a safe place to prevent this amplifier being used mistakenly.

11 Decommissioning

During the decommissioning process of the amplifier, all legally prescribed rules and procedures must be adhered to.

Mailing Address:
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für Beschallungs- und Beleuchtungsanlagen
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D-57482 Wenden
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Facsimile:
+49 (0) 2762 408-10

Internet:
www.camcoaudio.com

Email:
postmaster@camcoaudio.com

Changes Made To The Amplifier

NOTE / IMPORTANT:
Please consider that any changes made to the amplifier have to be documentated in writing and passed on to the buyer in the event of resale!