DAD DP8002 Power Amplifiers User Manual

Contents

DAD DP8002 Power Amplifiers

Product Information

The Dynamic Audio Device DP8002 is an amplifier that belongs to the DP8002 series. It is designed with advanced circuitry to reduce weight and heat dissipation. The efficiency of this amplifier is 95%, meaning it converts a high percentage of the absorbed power into available output power. This series offers superior sound quality and unmatched reliability. It is equipped with protection circuits to handle greater operational loads and challenging power conditions.

In order to improve the quality of products, Music&Lights S.r.l. reserves the right to modify the characteristics stated in this instruction manual at any time and without prior notice. All revisions and updates are available in the 'manuals' section on site **www.musiclights.it**

Packing content:

- DP8002
- Power cord
- User manual

SAFETY

General instruction

- The products referred to in this manual conform to the European Community Directives and are therefore marked with.
- The unit is supplied with hazardous network voltage (230V~). Leave servicing to skilled personnel only. Never make any modifications on the unit not described in this instruction manual, otherwise, you will risk an electric shock.
- The connection must be made to a power supply system fitted with efficient earthing (Class I appliance according to standard EN 60598-1). It is, moreover, recommended to protect the supply lines of the units from indirect contact and/or shorting to earth by using appropriate-sized residual current devices.
- The connection to the main network of electric distribution must be carried out by a qualified electrical installer. Check that the main frequency and voltage correspond to those for which the unit is designed as given on the electrical data label.
- This unit is not for home use, only profes-sional applications.
- Make certain that no inflammable liquids, water or metal objects enter the fixture.
- Do not dismantle or modify the fixture.
- All work must always be carried out by qualified technical personnel. Contact the nearest sales point for an inspection or contact the manufacturer directly.
- If the unit is to be put out of operation definitively, take it to a local recycling plant for disposal which is not harmful to the environ-ment.

Warnings and installation precautions

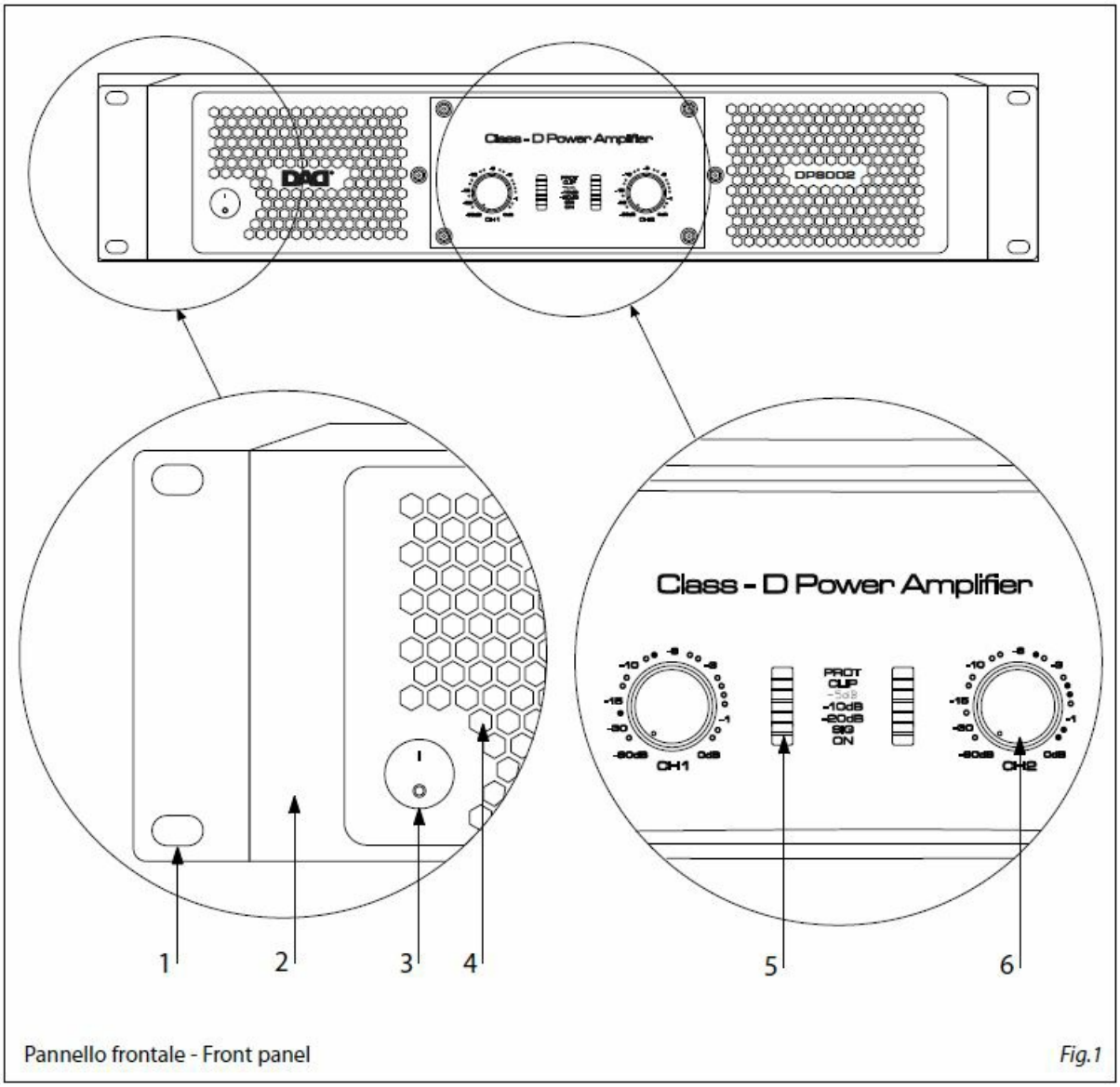
- This product in combination with amplifier, may be capable of producing dangerous sound levels that could cause permanent hearing loss. Do not operate for a long period of time at high volume level or at a level that is uncomfortable.
- Do not install the fixture near sources of heat.

- If this device will be operated in any way different to the one described in this manual, it may suffer damages and the guarantee becomes void. Furthermore, any other operation may lead to dangers like short circuit, burns, electric shock, ect.
- The fixture must be located in a place where a proper ventilation or thermal dissipation is not impeded. Do not install the fixture in a confined space.
- After connecting to the power supply, standby LED lights up to show that some components inside have already been electrified.
- Linking an output to an oscilloscope – when in “bridge” mode – is forbidden or it will cause damage to the amplifier and to the equipment.
- The output level of the amplifier must never exceed the marked sensitivity.
- Do not link the output of any amplifier channel back into another channel‘s input. Do not parallel or series connect an amplifier’s output with any other amplifier’s output.
- In system’s setup, amplifier’s output power must be from 50% up to 100% greater than the loudspeaker’s rated power.
- Make sure that the signal is correctly connected to the amplifier’s input channel and set to the proper input mode.
- Please turn off the power switch before pulling off the power cord.
- At the beginning, please always set the volume at the -80dB position.
- Before starting any maintenance work or cleaning the unit, cut off power from the main supply.
- Please clean the dust filter placed on front panel.

INTRODUCTION

The innovative amplifier series DP class D of DAD use an advanced circuit that dramatically reducing weight and heat dissipated. The efficiency between the absorbed power and available output power equal to 95%. This revolutionary amplifier series offers a superior sound quality and unmatched reliability. Protection circuits allow for greater operational loads and power conditions difficult.

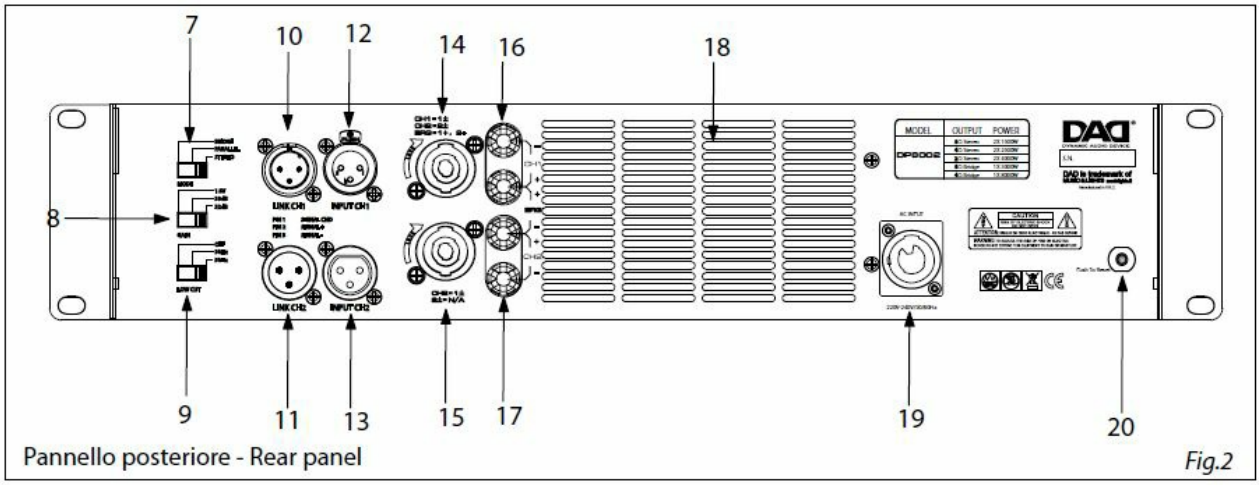
OPERATING ELEMENTS AND CONNECTIONS



Pannello frontale - Front panel *Fig.1*

1. MOUNTING HOLES for fixing the rack
2. HANDLES
3. POWER SWITCH
4. **VENTILATION OPENINGS:** the openings let the air flow in. Do not obstruct them.
5. **LED INDICATORS:**
   - **PROT (PROTECTION):** When this indicator is illuminated, the amplifier is in protection status, this includes for example: over-heat, high frequency self-excitation or long time whistle.
   - **CLIP:** When this indicator is on, the amplifier has distortion (CLIP). The distortion is about 0,5%.
   - **OUTPUT LEVEL:** Allow to monitor the level of the respective channels of the amplifier. The output level indicator includes four LEDs: -5/-10/-20dB.
   - **SIG:** the led lights up indicates a input singnal.
   - **POWER ON:** : when this indicator is on, the amplifier main power supply is working.
6. **ROTARY LEVEL CONTROL:** Input gain attenuator potentiometers. Attenuate the level of the external signal sent to the respective channels of the amplifier. Continuous values, expressed in dB, varying among:
   “-80dB”: fully closed (the signal is completely attenuated and therefore it is not sent to the channel of the amplifier);
   “0”: fully open, i.e. nominal level (the signal is not attenuated in any way, so it is sent to the amplifier channel at the same level at which it arrives on input).

- **CH1 LEVEL CONTROL:** in bridge mode, this potentiometer controls the level of two chan-nels, the CH2 potentiometer is inactive. In stereo or parallel mode: this potentiometer just controls CH1 level. Gain control range: -80 ~ 0dB, effective rotation angle is 280 degrees.
- **CH2 LEVEL CONTROL:** in bridge mode, this potentiometer is inactive, the level is controlled by CH1 potentiometer. In stereo or parallel mode, the potentiometer just controls CH2 level. Gain control range: -80 ~ 0dB, effective rotation angle is 280 degrees.



Pannello posteriore - Rear panel *Fig.2*

7. **STEREO/ BRIDGE/ PARALLEL MODE:** It selects the op-eration mode of the amplifier.
8. **GAIN SWITCH:** 1V/38dB/32dB
   Allows the selection of the amplifier gain.
9. **LOW CUT SWITCH:** OFF/30Hz/50Hz
   The low cut filter rolls eliminates signals below either 30Hz or 50Hz. This improves bass performance by sub-sonic signals. As a rule, full-range speakers will sound better with the filtering activated. The 50Hz filter works well with most compact full-range speakers, and has a slight boost at 100Hz for greater fullness. The 30Hz filter is intended for subwoofers and large full-range cabinets. The “off” position should be used only for applications such as studio playback/monitoring, where you need to know if there are sub-sonic signals unwanted ones present in the mix.
10. **CH1 XLR INPUT:** XLR female connector with a balanced line level input.
    - Pin 1 = shield or ground;
    - Pin 2 = + positive or “hot”
    - Pin 3 = – negative or “cold”. NOTE: This is the input of Channel 1 in STEREO mode, or the input of both chan-nels 1 and 2 in PARALLEL mode, or the only input in BRIDGE mode.
11. **CH2 XLR INPUT:** same as above, but channel 2 operates only in STEREO mode.
12. **CH1 XLR LINK:** This XLR male connector is connected in parallel with the respective XLR input female connector of channel 1. This enables a second unit (e.g. another amplifier) to be daisy-chained to the first.
13. **CH2 XLR LINK:** this XLR male connector is connected in parallel with the respective XLR female connector of Channel 2.
14. **CH1 SPEAKON OUTPUT:**
    - Pin 1+ SPEAKON connected to POSITIVE output of channel 1;
    - Pin 1- SPEAKON connected to NEGATIVE output of channel 1;
    - Pin 2+ SPEAKON connected to POSITIVE output of channel 2;
    - Pin 2- SPEAKON connected to NEGATIVE output of channel 2.
      Connecting a standard 2 wire cable (1+/1-), the speaker receives the amplified output of the signal applied to channel 1 input.

Connecting a standard 4 wire cable (1+/1- /2+/2-), the speaker receives:

- with amplifier set in STEREO mode, the amplified outputs of the signal applied to channel 1 input (1+/1-) and to channel 2 input (2+/2-), or – with amplifier set in PARALLEL mode, the amplified outputs of the signal applied to channel 1 input only,(1+/1-) = (2+/2-).
- **BRIDGE CH1 SPEAKON OUTPUT:**
  - Pin 1+ SPEAKON, negative polarity;
  - Pin 2+ SPEAKON negative polarity.
    This is the amplified output of the signal applied to channel 1 input if the amplifier is set in BRIDGE mode.

15. **CH2 SPEAKON OUTPUT:**
    - Pin 1+ SPEAKON connected to POSITIVE output of channel 2;
    - Pin 1- SPEAKON connected to NEGATIVE output of channel 2;
      This is the amplified output of the signal applied to channel 2 input if the amplifier is set in STEREO mode or the signal applied to channel 1 input if the amplifier is set in PARALLEL mode.
16. **CH1 binding post output:** This is the binding post out-put pole. Red color links to positive pole of speaker, black color links to negative pole of speaker. While bridge, only red color links to negative pole of speaker.
17. **CH2 binding post output:** This is the binding post out-put pole. Red color links to positive pole of speaker, black color links to negative pole of speaker. While bridge, only black color links to negative pole of speak-er.
18. **VENTILATION OPENINGS:** air flow outlet openings. Do not obstruct them.
19. **LOCKING POWER SOCKET:** This is where you connect the detachable locking power cable. Connect the other end to a 220-240V, 50/60Hz AC outlet.
20. **COOLING SYSTEM AND THERMAL PROTECTION:** a highly sophisticated cooling system prevents any problems of thermal nature. Fans create a cooling air flow: the rear-to-front flow-through system takes in air through the vents on the rearpanel, passes it through the entire unit and feeds it out through the slits on the front panel.

FUNCTIONS AND SETTINGS

RELIABILITY PROTECTION FUNCTION

All the models in the DP series are fitted with a series of extremely efficient protection, which ensure they can always be used with the utmost security.

COOLING SYSTEM AND THERMAL PROTECTION

A highly sophisticated cooling system prevents any problems of thermal nature. Fans create a cooling air flow: the front-to-rear flow-through system takes in air through the vents on the rear panel, passes it through the entire unit and feeds it out through the slits on the front panel. A special thermal control device constantly varies fan speed according to the temperature detected by the sensors located on the heat sink. This type of control ensures that airflow always matches temperature conditions, makes the fan quieter when the amplifier is running with low signals and reduces the dust build-up inside the unit. At high temperatures, the fan is able to drive a very large amount of air. When the amplifier works at full load and the fan runs at the highest speed, if this state is kept for a long time, the amplifier probably will go in “over-heat” protection. The PROT protection LED lights up and you will not have any signal on output. Users must always operate the equipment correctly, not loading the amplifier with less than 2 Ohms and leave un-obstructed the air flow coming from the cooling system fan. In these conditions, there are no reason for the amplifier to go in over-heat protection and the sound should come out from all loudspeakers.
NOTE – It’s possible to reduce the temperature reducing the output volume.

CURRENT PROTECTION ON THE OUTPUT STAGE

All the models in the DP series have short circuit and overload protection. It makes the output stage work in safety zone. The PROT protection indicator, on front panel will light up when output is short-circuited, then amplifier has no output. If the problem is solved, it shall automatically recover after 10 seconds.

LOUDSPEAKERS PROTECTION
In the event of output stage breakdown or other forms of faulty operations sending DC>2,6V volt-age or excessive subsonic frequencies the amplifier will automatically activate the DC protection to protect the speakers. On the front panel the PROT protection LED will light up, while no sound will come out from the speakers. To protect the loudspeaker enclosures from dangerous transients or signal peaks the outputs are muted every time the amplifier is switched on or off. Muting takes place as follows:

- 10 seconds muting (also known as “delay”) when switching on;
- Instantaneous muting when switching off.

CLIP/ LIMIT
This feature has two protection functions:

- Limits the input signal range, to prevent input signal overload from being beyond the amplifier rated range. Under this condition the square wave output would cause damage to the speaker.
- When in presence of a signal waveform distortion, it will automatically adjust gain and limit distortion signal output.

In both cases the protection features avoid the harmonic distortion (THD) to be present in the signal output, this can cause damage to the loudspeakers.
NOTE – If input signal = +22dBu (10V), clip limit will also be helpless, so do not increase input source signal unlimitedly.

CONNECTION MODE

STEREO MODE
Connection of this Mode:
Set the amplifier operation mode to ‘Stereo’ posi-tion. When in this setting, the 2 separate signals are treated separately by channels 1 and 2 of the amplifier. In other words, a signal connected to input 1 is only treated by channel 1 of the amplifier and only fed to output 1 and a signal connected to input 2 is only treated by channel 2 of the amplifier and only fed to output 2. ATTENTION – Before inserting and pulling out input signal connection please switch the volume control to be the minimum position, so as to avoid that the impact noise damages the amplifiers and the speakers.
NOTE – 2 Ohm minimum loading!

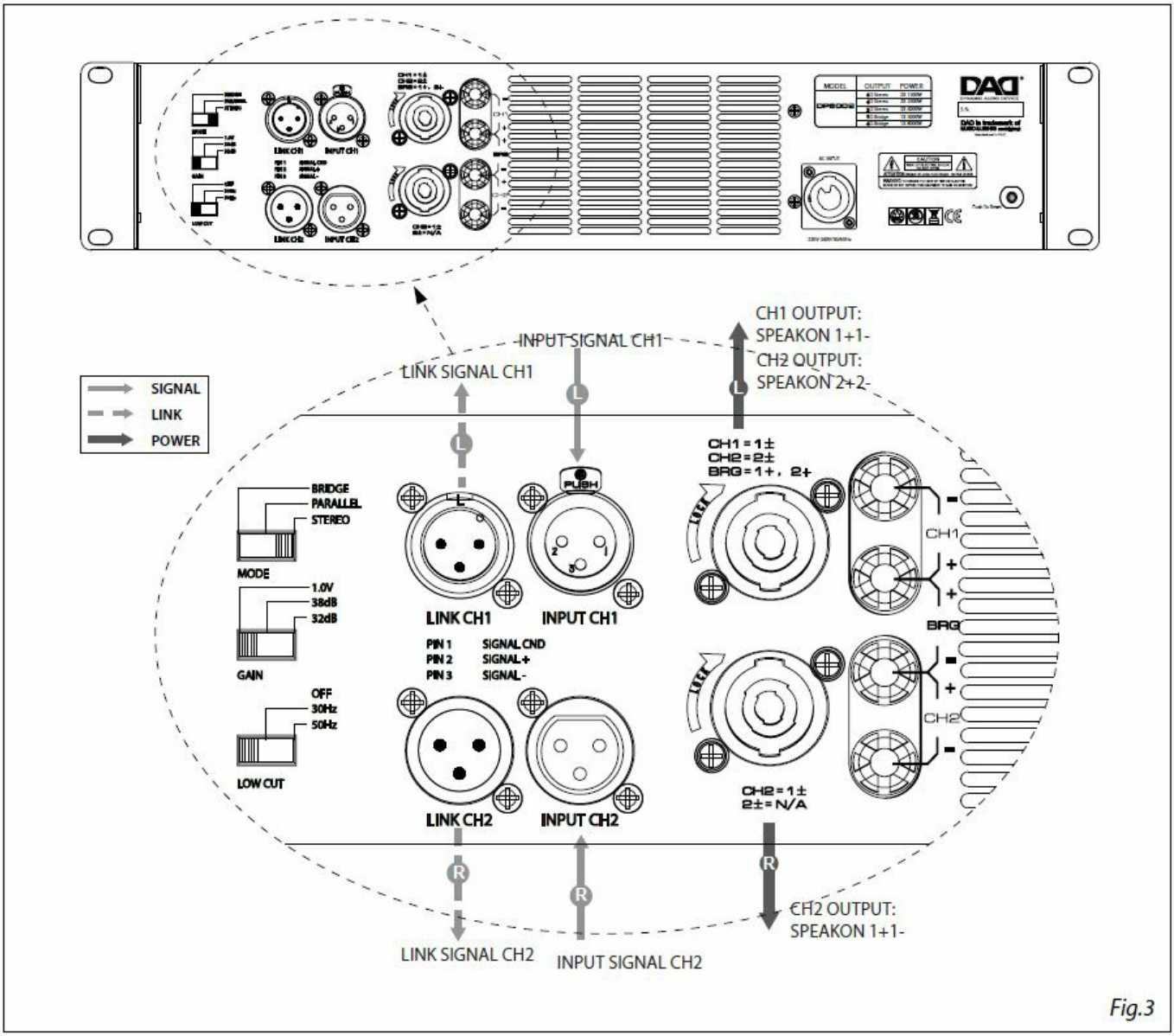


Fig.3

PARALLEL MODE

Connection of this Mode:

Set the amplifier operation mode to the ‘Parallel’ position. When in this setting, one signal is treated by both channel 1 and 2 of the amplifier. In other words a signal connected to input 1 is sent to both out-put 1 and output 2.

NOTE – 2 Ohm minimum loading!

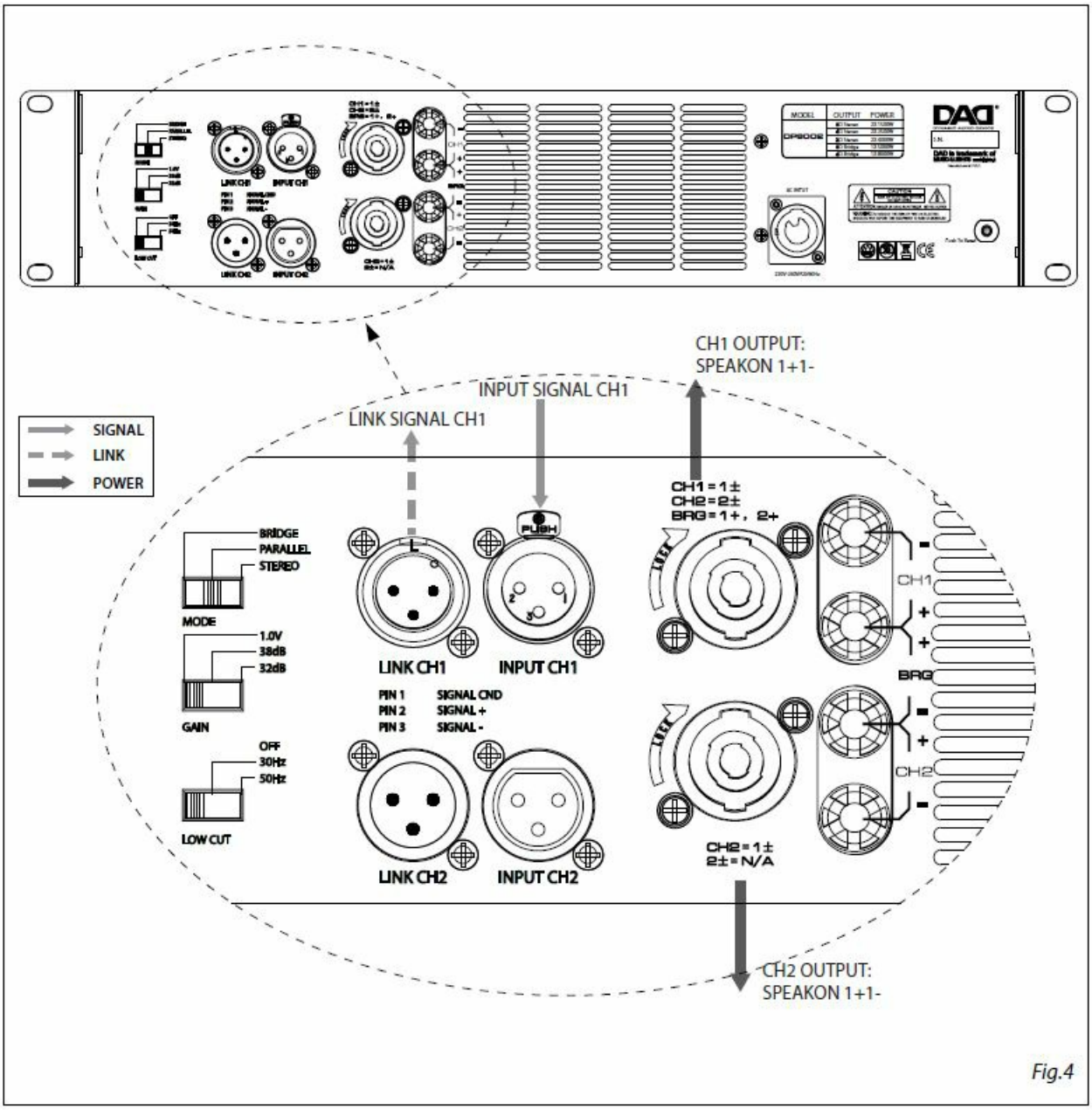


Fig.4

BRIDGE MODE

Connection of this Mode:

Set the amplifier operation mode to ‘Bridge’ posi-tion.

With the this setting signal is amplified by the two sections (1&2) summed together of the amplifier summed together. In other words the signal connected to input 1 is:

- amplified by both the amplification sections summed together;
- fed to a single output (Bridge).

The characteristic of this setting provides a signal fed out with double the power and rated imped-ance (see “Technical specifications”)

NOTE – 4 Ohm minimum loading!

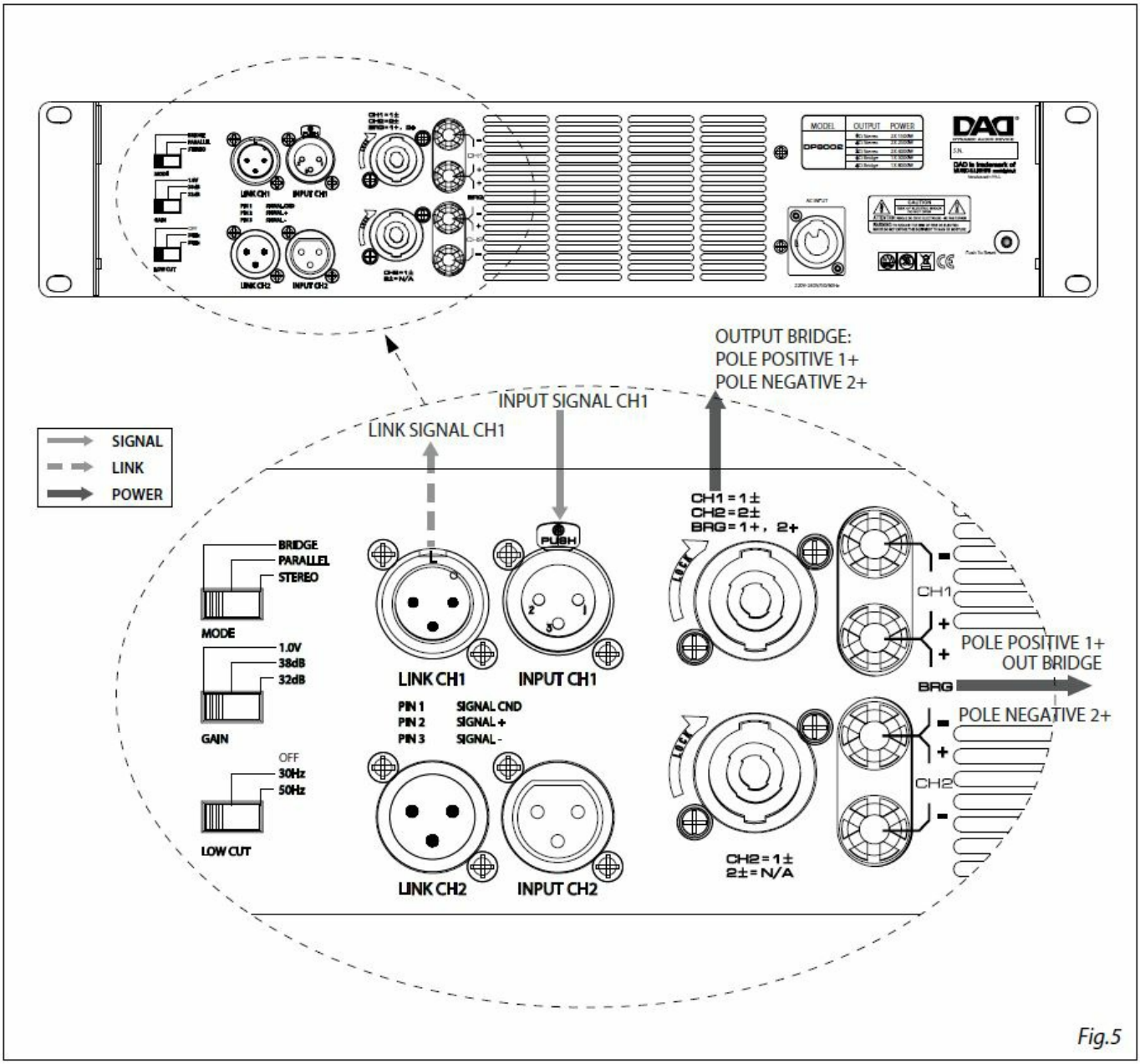


Fig.5

CONNECTION CABLES

INPUT CONNECTION

To connect the mixer outputs to the amplifiers inputs, make sure to always use balanced signal cables. Unbalanced lines may also be used but may result in noise over long cable runs. In any case, avoid using a balanced cable for one channel and an unbalanced one for the other, or a balanced cable for input and an unbalanced for link, as this would cause a considerable difference in channel levels and/or noise.

OUTPUT CONNECTION

To connect the amplifier to the loudspeaker enclosures always use power cables (speaker cables made up of two wires, normally with a large cross-section). Therefore it is advisable to check the fol-lowing chart to asses the cable section proportioned with its length.

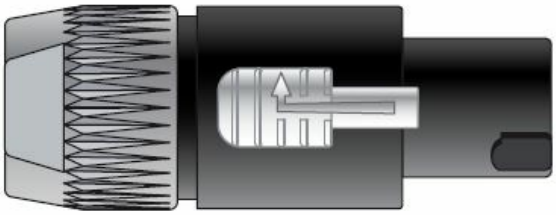
NOTE – Take care of your connector cables, always gripping them by the plugs, avoid pulling them directly and winding them without knots or bends: they will last longer and be more reliable, which is to your advantage. Check periodically that your cables are in good conditions, correctly wired and with perfectly efficient contacts: in fact many problems and drawbacks (false contacts, ground hum, crackles, etc.) are caused by the use of unsuitable or damaged cables.

Perdite di collegamento linee altoparlanti (massima lunghezza possibile per perdite inferiori a 0,5 dB tensione o spl)		
Loudspeaker Line Losses (maximum permissible line lenghths for 0,5 dB losses, voltage or spl)		
4 Ohm load	**8 Ohm load**	**Wire section data**
meter	**meter**	**mm^2**
25	50	4,0
17,5	35	2,5
10	20	1,5

CONNECTOR

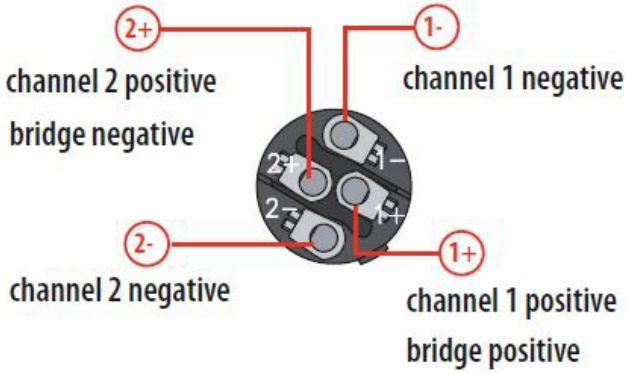
SPEAKON POWER CONNECTOR

INPUT

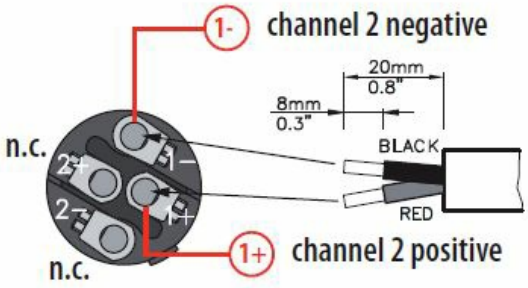


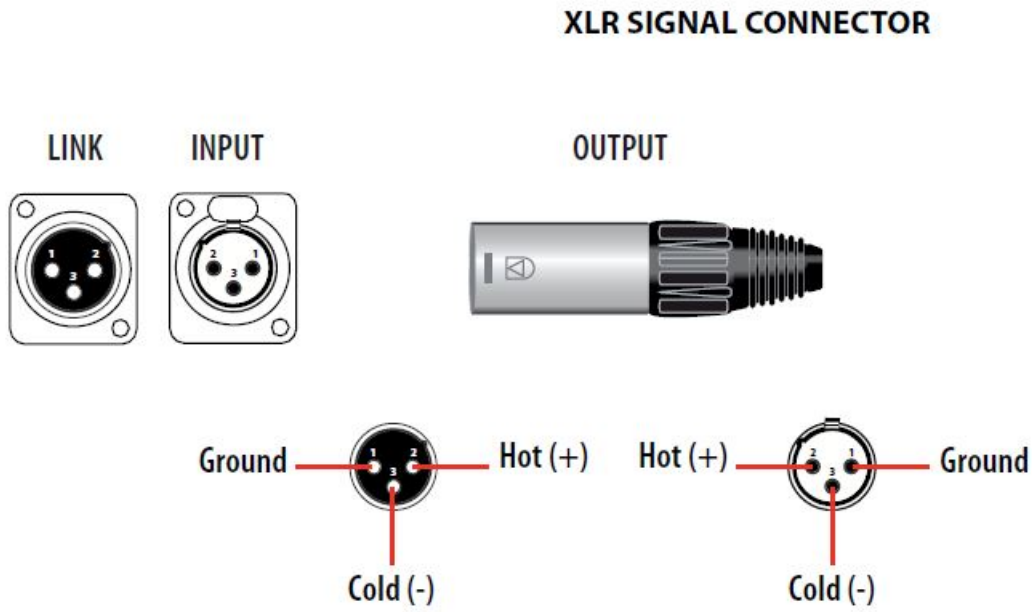
SPEAKER POWER OUTPUTS

OUTPUT 1



OUTPUT 2





MAINTENANCE

ORDINARY MAINTENANCE

In order to prevent the dust accumulation inside the amplifier, the two air vents on front panel have a dust filter. Each time these filter area dirty (it depends on environment conditions) you have to remove the air slots using a screwdriver and clean the dust filter using compressed air or a soft brush.

MAINTENANCE AND TROUBLESHOOTING

Here you are some simple methods to check whether the equipment is damaged or not.

- **No output:** If the signal LED lights up, then the amplifier should be fine: please check whether the output connection port is connected prop-erly.
- **Low signal output:** If the signal LED lights up and the clip/limit LED also lights, then please check whether the output port is short-circuited or not. If the signal LED lights up and the protect LED is also lit, then the amplifier should be in protection status. There are two possibilities: the former is that the over-heat protection is active, the latter is that the VHF protection is active. Cut the signal out, then you can test whether it is VHF protection or not. If the temperature of chassis is very high, it should be in overheat protection. If the input voltage is too low, it could lead to voltage-lacking protection. If after the above-mentioned check-up, the malfunction is still not solved: please return the equipment to an authorized service centre. It must be repaired by professional repairers.

TECHNICAL SPECIFICATION

	DP8002
Single channel power 8Ω	2 x 1500W
Single channel power 4Ω	2 x 2500W
Single channel power 2Ω	2 x 4000W
Bridge mode power 8Ω	1 x 5000W
Bridge mode power 4Ω	1 x 8000W
Frequency response	20Hz-20Khz@ 8 Ohm -1dB
Damping factor	200
S/N rate	>100dB
Input sensitivity/gain	1V/32dB or 38dB
Input impedance balance	20K
Input impedance unbalance	10K
Output circuit class	D class
Protection	Soft-start, short circuit, overload, DC, overheat, clip/limit, progressive volume
LED indicators	Power, active, signal and clip
Input connections	2 x XLR sockets, 1 x powerCON mains input
Output connections	2 x speakON connectors and 2 pairs of binding posts
Cooling air-flow	Airflow from front panel to rear panel
Power supply	220-240V/50Hz
Power consumption	1860W (1/8 power @ 8Ω)
Dimensions (WxHxD)	483x89x460 mm
Net Weight	10.8 kg
Gross weight	13 kg

BRIEF NOTES ON ACOUSTIC

Spreading sound into a room means distributing sound signals to a given audience and the results depend on several environmental factors (room shape, volume, etc.), the number of people present and their precise location, the type of sound source (live or recorded music or speech), and the level of the background ambient noise.

EFFICIENCY

Sound pressure (SPL) of a speaker depends on three factors: efficiency, dimensions and use in combination with other speakers. Efficiency, the quantity of energy generated by the amplifier and transformed into sound, determines the volume that can be obtainable by an amplifier of a given power rating. A 50W amplifier combined with highly efficient speakers may be able to produce a higher volume than a 100W amplifier combined with less efficient speakers.

IMPEDANCE

One of the electrical features of a speaker is its impedance (resistance opposite to the passage of alternate current). Both resistance and impedance are measured in Ohm; impedance varies at different frequencies so different frequencies can be delivered with different sound pressure levels. If a loudspeaker has an higher impedance than the minimal required to the amplifier to work properly, it can be used but this would result in a power reduction; but loudspeakers with an impedance lower than amplifier's minimum load, must not be connected. If the systems adopted are more complex (e.g. several speakers connected to the same amplifier), you must be sure that the overall speaker impedance value corresponds to the amplifier output impedance. There are two possible connection systems: serial or parallel mode. Connecting two speakers in series means connecting the positive pole of the first speaker to the negative pole of the second one and then to connect the two free poles to the amplifier. In this case the impedance values are summed up: e.g. Two 8 Ohm speakers connected in parallel give a 16 Ohm load. To connect two speakers in parallel mode, simply inter-connect the two speakers terminals of the same sign. To obtain the total value, in this case a calculation is required. Indicating R1 and R2 as the two loudspeaker values, the following formula has to be used: (R1 x R2) / (R1 + R2). E.g.: with two 8 Ohm speakers, we have that: (8×8)/(8+8) = 64/16 = 4 Ohm, that is to say that when identical speakers are connected in parallel, the impedance value is halved.

CHOOSING THE RIGHT AMPLIFIER

AES long term applicable power denotes the thermal power that can be dissipated by the loudspeaker or by the individual drivers when operated in BI-AMP mode. This value is measured in accordance with the AES standard, which involves a 2 hour test with pink noise signal, crest factor of 2. Power is determined by the square of the RMS voltage divided by the minimum impedance of the loudspeaker or the individual driver. Although the power of the recommended amplifier is not measured, it is equivalent to double the AES power value and it takes account of the dynamic capacities of the speakers to withstand short-duration power peaks. The value supplied corresponds to the RMS power required of the amplifier in order to supply the test signal (pink noise with crest factor 2) utilised to measure AES power. An amplifier of this power, if used with music signals with crest factor greater than or equal to 6dB, makes it possible to get the best performance out of the speaker, delivering along term power output that is no higher than the AES power of the loudspeaker. On the contrary, when using highly compressed music signals or if the amplifier volume is increased to the point of intensive clipping, then the effective long-term power tends to reach or even exceed the RMS output of the amplifier, resulting in irreversible damage to the speakers. With signals of this type it is always advisable to use an amplifier whose RMS output is identical to the speaker AES power, while taking care to ensure that the signal supplied is such that the amplifier is not caused to function in clipping mode too frequently IEC268-5 short term ap-plicable power corresponds to the power that the loud-speaker can withstand for a very short time interval. This value corresponds to 4 times the AES power value and it is calculated on the basis of the maximum peak voltage that the recommended amplifier can supply to the loudspeaker. Capacities in terms of SPL in transient components of music signals, effectively correspond to the short-term applicable power value; therefore, the max. SPL value specified in the technical specifications table is calculated on the basis of this power value Warn-ing: the power value that effectively corresponds to the thermal capacity of the loudspeaker to dissipate electri-cal energy over the long term is represented by the AES value. All other values refer to the "transient capacity" of the loudspeaker to accept power inputs, correlated with the nature of the audio signal that the drivers are destined to reproduce.

MUSIC & LIGHTS S.r.l.
Phone +39 0771 72190

www.musiclights.it

Documents / Resources

	DAD DP8002 Power Amplifiers [pdf] User Manual DP8002 Power Amplifiers, DP8002, Power Amplifiers, Amplifiers

References

- HOME - M & L Company