

DA4280

Power Amplifier

Procella audio®



User Manual V1.0

www.procella.audio
contact@procella.audio

Statutory and Safety Notices

Please read the following important technical, safety and environmental notices before installing and using your amplifier.

Technical Notices

Procella Audio has taken all reasonable design and engineering steps to ensure that the Procella DA4280 amplifier always performs satisfactorily in the intended application and environment and will provide appropriate levels of support to ensure that all reasonable customer needs and expectations are met. Such support however is contingent on the following provisions.

1. The Procella DA4280 amplifier is a Class-I product and should be installed with a mains cable including the required earth connection to comply with the Safety Class-I.
2. The Procella DA4280 amplifier is intended for professional audio applications and should always be installed and operated by competent and qualified personnel. The Procella DA4280 amplifier damage or failure caused by installation or operational errors may invalidate support, warranty or guarantees of performance.
3. The Procella DA4280 amplifier is intended for professional use only and are not suitable for use in locations where they may be accessible to minors.
4. The Procella DA4280 amplifier is intended to be used specifically for the amplification of audio signals and for connection to conventional moving-coil loudspeaker systems. Use of the Procella DA4280 amplifier for amplification of signals outside the audio band (20Hz to 20kHz) or to drive transducers other than conventional moving-coil loudspeakers may invalidate support, warranty or guarantees of performance.
5. The Procella DA4280 amplifier should only be used within professionally installed and configured audio systems comprising input and output ancillary equipments that is known to be of an appropriate level of performance and in good operating condition. Any damage to, or unsatisfactory performance from, the Procella DA4280 amplifier caused by inadequate or failed input or output ancillaries may invalidate support, warranty or guarantees of performance.
6. The Procella DA4280 amplifier is intended to be installed and operated indoor in a controlled environment (pollution degree, PD2) within an ambient temperature range of 0°C to 40°C. the Procella DA4280 amplifier is not intended for use in heights above 2000 meters. The Procella DA4280 amplifier installed or operated in environments outside these limits may invalidate support, warranty or guarantees of performance.

7. Procella Audio offers a limited warranty on all Procella Audio amplifier contingent on their installation and operation being compliant with published Procella Audio documentation and/or formally agreed standards. This warranty may not cover malfunctions or failures due to incorrect or unauthorised installation, inappropriate use or operation, unauthorised repair or material modification, exposure to environmental conditions outside published specifications, mechanical damage and normal wear and tear.

Safety and Environmental Notices

Note: The intent of the lightning flash with arrowhead symbol in a triangle is to alert the user to the presence of uninsulated "dangerous" voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to humans.

Note: The intent of the exclamation point within an equilateral triangle is to alert the user to the presence of important safety, and operating and maintenance instructions in this manual.

WARNING! TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.



Ambient Temperature Note: If this equipment is operated in a confined or multiple rack installation, the internal ambient operating temperature may exceed the external ambient temperature. It is important to ensure in these circumstances that the published maximum operating temperature for the equipment is not exceeded.



Reduced Air Flow: Ensure that rack or other closed installation does not restrict the cooling airflow required for safe and reliable operation of the equipment.

Statutory and Safety Notices

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. Do not submerge the equipment in water or liquids.
7. Do not use any aerosol spray, cleaner, disinfectant or fumigant on, near or into the equipment.
8. Clean only with a dry cloth.
9. Do not block any ventilation opening. Install in accordance with the manufacturer's instructions.
10. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifier) that produce heat.
11. To reduce the risk of electrical shock, the power cord shall be connected to a mains socket outlet with a protective earthing connection.
12. 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.
13. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
14. Do not unplug the unit by pulling on the cord, use the plug.
15. Only use attachments/accessories specified by the manufacturer.
16. Unplug this apparatus during lightning storms or when unused for long periods of time.
17. 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.
18. The appliance coupler, or the AC Mains plug, is the AC mains disconnect device and shall remain readily accessible after installation.
19. Adhere to all applicable, local codes.
20. Consult a licensed, professional engineer when any doubt or questions arise regarding a physical equipment installation.

Environmental Statement



This product complies with international directives, including but not limited to the Restriction of Hazardous Substances (RoHS) in electrical and electronic equipment, the Registration, Evaluation, Authorization and restriction of Chemicals (REACH) and the disposal of Waste Electrical and Electronic Equipment (WEEE). Consult your local waste disposal authority for guidance on how properly to recycle or dispose of this product.



Introduction and Overview

1. Introduction

The Procella DA4280 power amplifier has been designed to provide configurable, consistent and reliable high performance audio power amplification. Please read this installation and operation manual fully before installing and using the amplifier. If you have any questions regarding amplifier configuration, installation or operation please contact the customer support department at: contact@procella.audio

Following this introduction, the manual is divided into sections covering the following topics:

Overview

Carton Contents

Configuration

Installation

Connections

Operation

Maintenance

Frequently Asked Questions

2. Amplifier Overview

The **Procella DA4280** is a 1U rack format, four channel audio power amplifier that can drive both conventional low impedance (4Ω to 16Ω , - Low-Z) loudspeaker loads and constant voltage (70V/100V - Hi-Z) transformer coupled loudspeaker loads. Each Procella DA4280 is preset at the factory for operation with 4 to 16 ohm loads. The Procella DA4280 is capable of a maximum output of 280 Watts per channel.

The Procella DA4280 amplifier channel gain control knobs and status indicators are located on the front panel. Signal input and output connections are accomplished via 'Euro Block' connectors and operational configurations are set up through a DIP switch module located on the amplifier rear panel. A rear panel GPIO (General Purpose In/Out) connector is also provided that enables some amplifier functions to be controlled or monitored remotely, including standby mode. The Procella DA4280 amplifier has no mains power switch and are operational as soon as mains power is connected. The Procella DA4280 amplifier should be connected to switched mains sockets.

Amplifier dimensions and features are illustrated in **Diagram 1**. The Procella DA4280 amplifier is primarily intended for installation in an equipment rack but can also be under-desk or wall mounted, or used free standing. It is fan-cooled and must be installed such that ventilation apertures are not obstructed.

3. Carton Contents

The Procella DA4280 amplifier are shipped in a cardboard carton containing the amplifier unit, a mains cable appropriate for the sales territory, an accessory pack, and a document pack. The full contents is listed below.

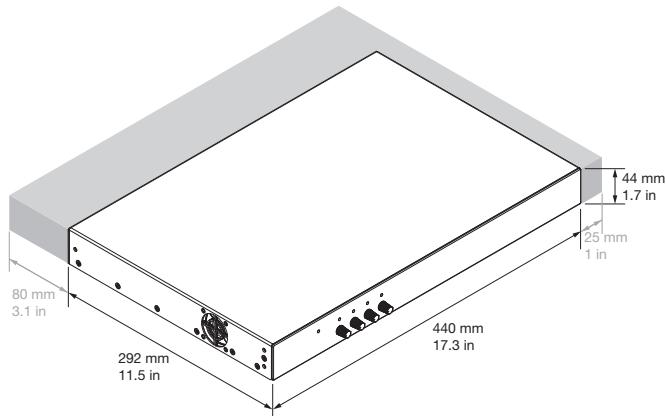
- Procella DA4280 amplifier unit
- Mains power cable
- 4x XLR to Euroblock cables
- Input connector x 4
- GPIO socket connector
- Output connector x 4
- Adhesive rubber feet x 4
- Document pack

Optional accessories

- Pair of Rear Support Brackets

Diagram 1

The Procella DA4280 dimensions.
Shaded area defines ventilation space.



Configuration and Installation

4. Configuration

The Procella DA4280 amplifier operational configuration is set up through selections made on a rear mounted DIP switch module. A GPIO (General Purpose In/Out) connector is also provided that enables some amplifier functions to be controlled or monitored remotely.

4.1 DIP Switch Configuration

The DIP switch module is illustrated and its functions described in the adjacent matrix. DIP switch options are selected (ON) when the switch is in the UP position. DIP switches should only be operated when the amplifier is disconnected from mains power.

Note: Use a small flat blade screwdriver blade to operate the DIP switches.

Note: Channels operating in Hi-Z mode have a 80Hz second order (12dB/octave) high-pass filter automatically inserted into the signal path in order to prevent speaker transformer core saturation.

1 2 3 4 5 6 7 8 ■ ■ ■ ■ ■ ■ ↑ ↑ On ■ ■ ■ ■ ■ ■ ↓ ↓ Off	OFF	ON
SWITCH 1	Channel 1 in Low-Z mode	Channel 1 in Hi-Z mode
SWITCH 2	Channel 2 in Low-Z mode	Channel 2 in Hi-Z mode
SWITCH 3	Channel 3 in Low-Z mode	Channel 3 in Hi-Z mode
SWITCH 4	Channel 4 in Low-Z mode	Channel 4 in Hi-Z mode
SWITCH 5	70V Hi-Z mode (for channels in Hi-Z mode)	100V Hi-Z mode (for channels in Hi-Z mode)
SWITCH 6	Input ganging 1: All	Input ganging 1:1
SWITCH 7	GPIO standby polarity NO (Normally Open)	GPIO standby polarity NC (Normally Closed)
SWITCH 8	Front panel control locked.	Front panel control unlocked.

4.2 GPIO Functions

The GPIO connector is illustrated and its functions described in the adjacent matrix.

Note: The GPIO connector must not be used for any unintended purpose. Amplifier damage may result from incorrect use of GPIO.

Note: In order to conform to EMC specifications, shielded cable must be employed when connecting external volume control potentiometers to the GPIO connector.

	FUNCTION	NOTES
GPIO GND (1)	Ground reference for all GPIO pins	
GPIO V12 (2)	Channel 1 & 2 auxiliary gain control.	Connect to a potentiometer ($>10k\Omega$) wiper between the VCC and GND pins. The maximum level available when using GPIO control is defined by the front panel gain control setting.
GPIO V34 (3)	Channel 1 & 2 auxiliary gain control (four channel amplifier only).	Connect to a potentiometer ($>10k\Omega$) wiper between the VCC and GND pins. The maximum level available when using GPIO control is defined by the front panel gain control setting.
GPIO VCC (4)	Control voltage output.	Provides a 3.3Vdc control output (100Ω output impedance) for up to two volume control potentiometers ($>10k\Omega$).
GPIO STB (5)	Remote standby control.	Pull to GND to engage standby mode.
GPIO GPO (6)	System status indication.	0V DC indicates normal status, +3.3Vdc indicates one or more channels in protection mode.

Configuration and Installation

5. Installation

Note: It is important in all installations that the amplifier mains supply switch is easily accessible.

5.1 Rack Mounting

The Procella DA4280 amplifier is shipped with rack mount 'ears' attached as illustrated in **Diagram 2a** and is primarily intended to be installed in an equipment rack. The installation and equipment rack should be configured to provide appropriate ventilation airflow space around the sides and rear of the amplifier as illustrated in **Diagram 1**. Ventilation airflow space of at least 25 mm (1 in) should be maintained along at least one side of the amplifier at all times. Ventilation apertures are also located on the rear panel of the amplifier and must not be obstructed. It is important to retain at least 80 mm (3.1 in) free space for airflow behind the amplifier rear panel.

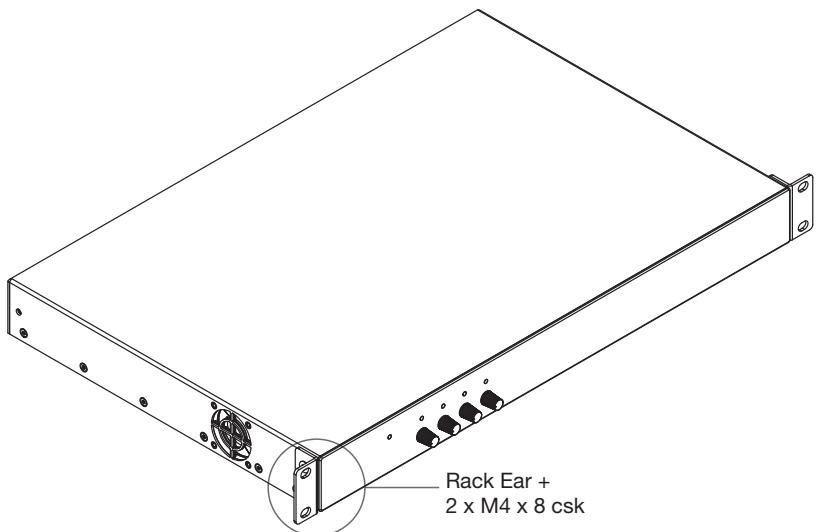


Diagram 2a

Procella DA4280 rack ears. 2 positions.

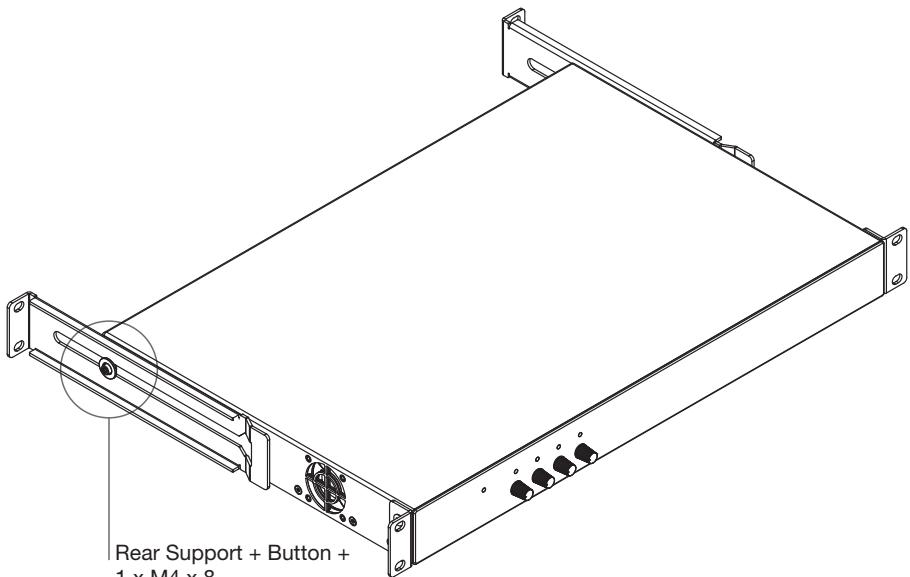


Diagram 2b

Procella DA4280 rear support hardware.
2 positions.

In addition to rack mount ears, optional rack mount rear support hardware is available and can be attached to the amplifier. Rear support hardware may be appropriate if the amplifier is to be used in a mobile rack or potentially be subject to significant movement. **Diagram 2b** illustrates the use of rack mount rear support hardware.

Connections

6. Connections

Note: The micro USB socket located on the amplifier rear panel is present for service and diagnostic purposes only.

The Procella DA4280 amplifier rear panel connection sockets are illustrated in **Diagram 3**.

6.1 Mains Power Connection

The Procella DA4280 amplifier has a power factor corrected universal power supply and can be used with mains input voltage from 100V AC to 240V AC, 50/60Hz. Use the mains cable supplied with the amplifier and connect it to a switched mains supply. The power consumption of the Procella DA4280 amplifier is 300W.

The Procella DA4280 amplifier has no mains power switch and are operational as soon as mains power is connected. Ensure that all signal, GPIO and output connections are made and that all DIP switch options are selected appropriately before connecting the amplifier to mains power.

6.2 Input Connections

The Procella DA4280 amplifier inputs are of balanced, line level format with a full output power sensitivity of +5.5dBu in 8Ω and Hi-Z mode and +2.5dBu in 4Ω mode. Input signal levels up to +24dBu can be handled without input clipping.

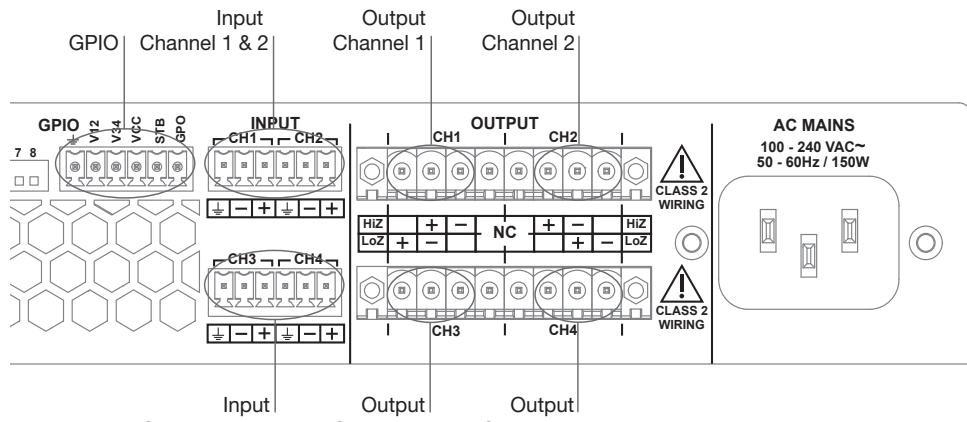
Input connections to the Procella DA4280 amplifier are achieved via male 'Euro Block' connectors. Connecting cables to the supplied female **input** connectors is illustrated in **Diagram 4a**.

6.3 Output Connections

Output connections from the Procella DA4280 amplifier are achieved via male 'Euro Block' connectors. Ensure that speaker connection polarity is correct throughout the installation: positive (+) amplifier terminals should always be connected to positive speaker terminals and negative (-) amplifier terminals always connected to negative speaker terminals.

No bridge mode - The Procella DA4280 employs an inherently bridged Class D output topology; therefore, an alternate bridge mode output connection should NOT be used, even when only one loudspeaker (such as a subwoofer) will be connected. Under no circumstances should the amplifier connection be bridged, as this may cause undesired operating performance or damage.

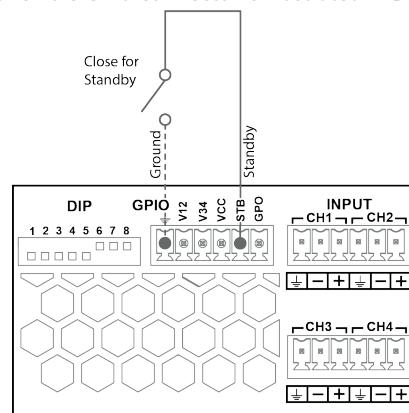
Together with DIP switch configuration, the output connector blocks provide connection options that enable channel



independent selection of Hi-Z or Low-Z mode. Connecting cables to the supplied female **output** connector, and the selection of Hi-Z or Low-Z connection options, are illustrated in **Diagrams 4b** and **4c** respectively.

6.4 GPIO Connections

If any GPIO functionality is required, cables will need to be connected to the supplied GPIO connector. Connecting cables to the supplied female GPIO connector is illustrated in **Diagrams 4d**.



6.5 Speaker Cable Gauge

Speaker connection cable gauge should be chosen appropriately to reflect the type of installation. The adjacent tables specify the appropriate cable gauge for less than 0.5dB cable loss with different installation types and cable lengths.

Cable Cross Section (mm ²)	Cable Gauge (US)	Max Cable Length (metres, 8Ω load)
2.5	≈14	up to 25m (80')
4.0	≈12	25 - 45m (80' - 150')

Cable Gauge Table

Low-Z installations. 8Ω loads

Connections

Diagram 4a

Cable connections to the **input** connector.

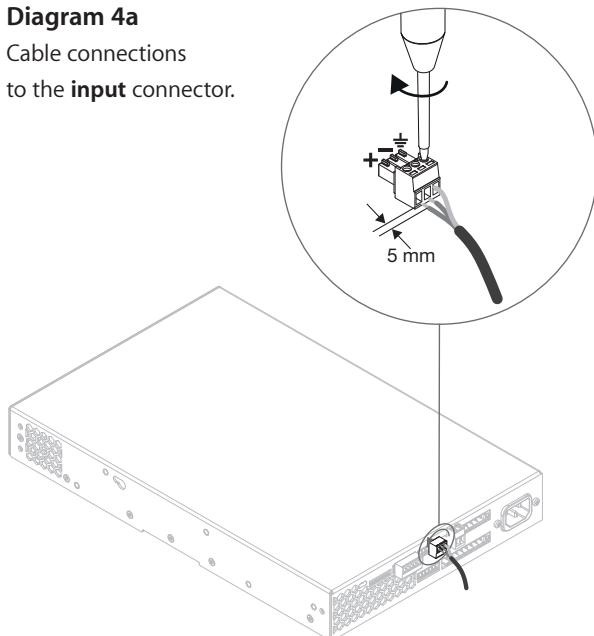


Diagram 4b

Cable connections to the **output** connector.

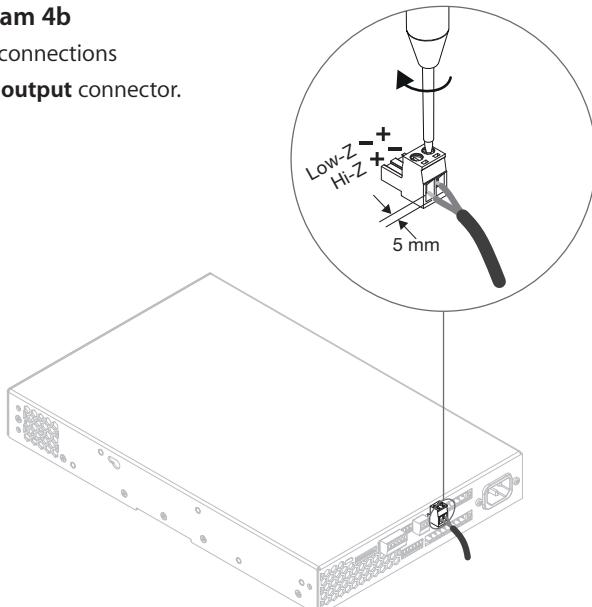
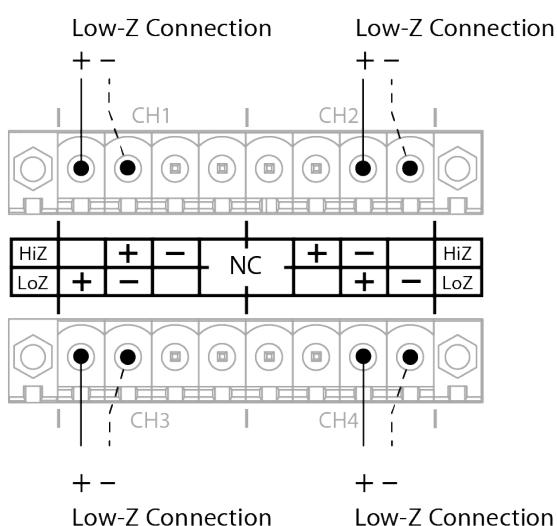


Diagram 4c

Example **output** connections.



Channel 1: Low-Z connection illustrated

Channel 2: Low-Z connection illustrated

Channel 3: Low-Z connection illustrated

Channel 4: Low-Z connection illustrated

Note: DIP switch options must be set appropriately.



The exclamation point printed next to the output terminals of the Procella DA4280 amplifier is, in addition to the CLASS 2 WIRING text, intended to alert users to the risk of hazardous voltages. Output connectors that could pose a risk are marked with the exclamation point. Do not touch the output terminals while the amplifier is switched on. Make all connections with the amplifier switched off.

Operation

7. Operation

Once all connections have been made and DIP switches set, the Procella DA4280 amplifier can be connected to mains power. After a short delay the front panel standby indicator will illuminate green to indicate normal amplifier operation. Indicators adjacent to each channel gain control knob illuminate in different colours to indicate specific amplifier states:

Green: Signal present (> -45dB)

Orange: Output limiter active (0dB)

Red: Input overload, output protection operational or amplifier fault

Set the channel gain controls appropriately in respect of the input signal level and required speaker volume. **Diagram 5** illustrates the front panel controls and indicators.

The Procella DA4280 amplifier outputs will mute if no input signal is present for 10 minutes, and the amplifier will switch automatically to standby mode if no signal is present on any input for more than 25 minutes. Standby mode can also be triggered remotely via a switch connected between the STB and GND GPIO connector pins. In both cases the front panel standby indicator will illuminate red.

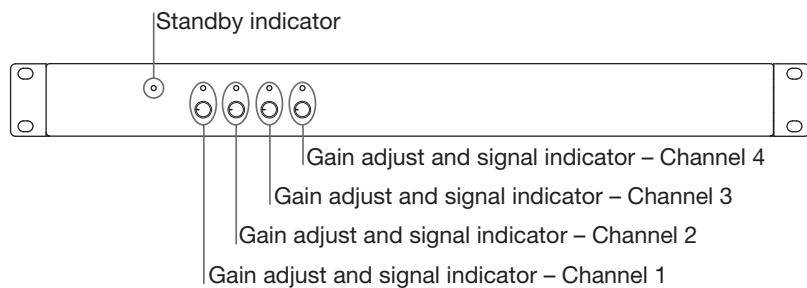


Diagram 5

Procella DA4280
front panel.

Specifications

Model	the Procella DA4280
Channels	4
Output power @ 4Ω/8Ω/70V/100V* All channels driven	280 W
Output power @ 4Ω/8Ω/70V/100V* Single channel driven	280 W
Output power @ 16Ω All channels driven	140 W
Power Consumption	300 W
Dimensions	44.5 x 440 x 292 mm (1.75 x 17.32 x 11.50 in)
Weight	3.9 kg (7.9 lbs)

Output Circuitry	UMAC™ Class D - full bandwidth PWM modulator with ultra-low distortion
Output Voltage	140 Vp / 280 Vpp (unloaded)
Max. Output current	25A peak
Signal To Noise-Ratio	> 100 dB (A-weighted, 20 Hz - 20 kHz, 8 Ω load)
THD+N (typical)	< 0.05 % (20 Hz - 20 kHz, 8 Ω load, 3 dB below rated power)
Frequency Response	20 Hz - 20 kHz (+0/-0.25 dB (8 Ω load, 3 dB below rated power))
Protection Circuits	Short circuit protection, DC protection, under voltage protection, temperature protection, overload protection
Power Supply	URECTM universal mains switch mode power supply with Power Factor Correction (PFC) and integral standby converter
Operating Voltage/Frequency.	Universal Mains, 100-240V, 50-60Hz
Standby Consumption	< 0.5 W (Energy Star & ErP 1275/2008/EC compliant)

PROCCELLA AUDIO LIMITED WARRANTY

Procella Audio components are warranted to be free from original manufacturing defects as follows:

For all amplifier components, for a period of two years from date of delivery to the original purchaser from an authorized dealer.

The Procella Audio obligation under this warranty is limited to repairing or replacing any component which it shall find defective in material or workmanship under normal non-commercial conditions of use. This warranty shall not apply to products which have been abused, modified, disassembled or repaired by anyone other than Procella Audio or one of its appointed service centers.

Products to be repaired under this warranty must be returned to the factory or designated service center with all transportation and insurance charges prepaid.

All warranties of whatever character are void and unenforceable if the component or any part thereof is not purchased from an authorized dealer.

This warranty is in lieu of all other warranties, expressed or implied, and of all other obligations or liabilities on our part, and Procella Audio neither assumes nor authorizes any other person to assume for it, any other liability in connection with the sale, repair, or return of any product.

We encourage all Procella owners to register their components. While this is not required to receive warranty benefits, it will allow you to receive warranty coverage without providing proof of purchase, and it will enable us to keep you advised of Procella product information, new products, and updates.

Please contact your local Procella Audio dealer or Procella Audio directly should you have any further questions. We love to hear from our customers, especially with feedback on our loudspeaker products.

Email: contact@procella.audio

Website: www.procella.audio

