DYNACORD

IPX Series DSP Multichannel Networking Power Amplifier

IPX5:4 | IPX10:4 | IPX10:8 | IPX20:4

en Installation manual

Table of contents

1 Safety

1.1 Safety messages explained

Four types of signs can be used in this manual. The type is closely related to the effect that may be caused if it is not observed. These signs - from least severe effect to most severe effect - are:

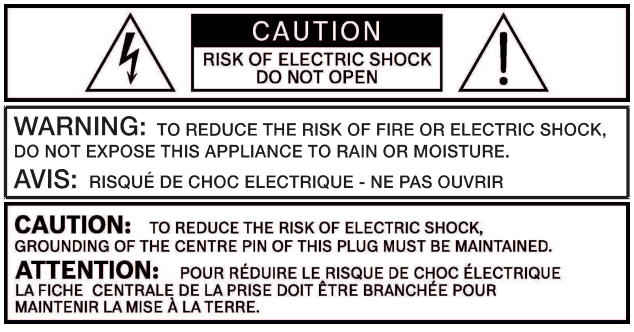
Notice!
Containing additional information. Usually, not observing a ‘notice’ does not result in damage to the equipment or personal injuries.

Caution!
The equipment or the property can be damaged, or persons can be lightly injured if the alert is not observed.

Warning!
The equipment or the property can be seriously damaged, or persons can be severely injured if the alert is not observed.

Danger!
Not observing the alert can lead to severe injuries or death.

1.2 Important safety instructions



Danger!
The lightning symbol inside a triangle notifies the user of high-voltage, uninsulated lines and contacts inside the devices that could result in fatal electrocution if touched.

Warning!
An exclamation mark inside a triangle refers the user to important operating and service instructions in the documentation for the equipment.

1. Read these safety notes.
2. Keep these safety notes in a safe place.
3. Heed all warnings.
4. Observe all instructions.

5. Do not operate the device in close proximity to water.
6. Use only a dry cloth to clean the unit.
7. Do not cover any ventilation slots. Always refer to the manufacturer's instructions when installing the device.
8. Do not install the device close to heaters, ovens, or other heat sources.
9. Note: The device must only be operated via the mains power supply with a safety ground connector. Do not disable the safety ground connection function of the supplied power cable. If the plug of the supplied cable does not fit your mains socket, please contact your electrician.
10. Ensure that it is not possible to stand on the mains cable. Take precautions to ensure the mains cable cannot become crushed, particularly near the device connector and mains plug.
11. Only use accessories/extensions for the device that have been approved by the manufacturer.
12. Unplug the device if there is risk of lightning strike or in the event of long periods of inactivity. However, this does not apply if the device is to be used as part of an evacuation system!
13. Have all service work and repairs performed by a trained customer service technician only. Service work must be carried out immediately following any damage such as damage to the mains cable or plug, if fluid or any object enters the device, if the device has been used in rain or become wet, or if the device has been dropped or no longer works correctly.
14. Please ensure that no dripping water or spray can penetrate the inside of the device. Do not place any objects filled with fluids, such as vases or drinking vessels, on top of the device.
15. To ensure the device is completely free of voltage, unplug the device from the power supply.
16. When installing the device, ensure the plug is freely accessible.
17. Do not place any sources of open flame, such as lit candles, on top of the device.
18. This PROTECTION CLASS I device must be connected to a MAINS socket with a safety ground connection.

Notice!
Use only manufacturer-approved carts, stands, brackets, or tables that you acquired together with the device. When using carts to move the device, make sure the transported equipment and the cart itself cannot tip over or cause injury or material damage.

Important service information

Caution!
This service information is for use by qualified service personnel only. To avoid the risk of electric shock, do not perform any maintenance work that is not described in the operating instructions unless you are qualified to do so. Have all service work and repairs performed by a trained customer service technician.

1. Repair work on the device must comply with the safety standards specified in EN 60065 (VDE 0860).
2. A mains isolating transformer must be used during any work for which the opened device is connected to and operated with mains voltage.
3. The minimum distance between voltage-carrying parts and metal parts that can be touched (such as the metal housing) or between mains poles is 3 mm, and must be observed at all times.
4. The minimum distance between voltage-carrying parts and circuit parts that are not connected to the mains (secondary) is 6 mm, and must be observed at all times.
5. Special components that are marked with the safety symbol in the circuit diagram (note) must only be replaced with original parts.
6. Unauthorized changes to the circuitry are prohibited.

7. The protective measures issued by the relevant trade organizations and applicable at the place of repair must be observed. This includes the properties and configuration of the workplace.
8. Observe the guidelines with respect to handling MOS components.

Danger!
SAFETY COMPONENT (MUST BE REPLACED BY ORIGINAL PART)

1.3 Safety precautions

Speaker system damage and protection of human beings
Power amps provide extremely high power output that might be dangerous for human beings as well as for the connected speaker systems. High output voltages can damage or even destroy the connected speaker systems, especially, when the amplifier is operated in bridge mode. Prior to connecting any loudspeakers, make sure to check the speaker system's specifications for continuous and peak power handling capacities. Even if amplification has been reduced through lowering the input level controls on the amplifier's front panel, it is still possible to achieve full power output with a sufficiently high input signal.

Danger!
Danger at the loudspeaker/power outputs
Power amplifiers are capable of producing dangerously high voltage output that is present at the output connectors.
To protect yourself from electric shock, do not touch any blank speaker cables during operation of the power amp.

Danger!
The terminals marked with a lightning bolt are hazardous live and the external wiring connected to these terminals requires installation by an instructed person or the use of ready-made leads of cords.

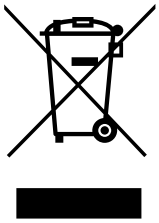
Danger!
In case of using the amplifier with speakers including a primary tapped transformer, it is possible that during operation shock hazard voltages may be present at the taps of the transformer.
Therefore, the taps have to be insulated sufficiently in accordance with applicable safety regulations.

1.4 High frequency interference – FCC/EN55032

IMPORTANT: Do not modify this unit! Changes or modifications not expressly approved by the manufacturer could void the user's authority, granted by the FCC, to operate the equipment.

Notice!
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules and EN55032. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

1.5 Notices



Old electrical and electronic appliances
Electrical or electronic devices that are no longer serviceable must be collected separately and sent for environmentally compatible recycling (in accordance with the European Waste Electrical and Electronic Equipment Directive).
To dispose of old electrical or electronic devices, you should use the return and collection systems put in place in the country concerned.

Copyright and disclaimer

All content including specifications, data, and illustrations in this manual are subject to change without prior notice.

IT security disclaimer
In order to offer maximum compatibility with all networked audio devices and to allow for fast and easy setup and maintenance, our OMNEO-enabled amplifier products do not support encrypted communications for audio or control data and do not verify the authenticity of any Dante or OCA controllers (or any other node) on the network.
This means that these devices do not take any special precautions against malicious or accidental attacks via their network interfaces. Such attacks happen every day on the public internet. It is strongly recommended to set up the system in a safe, isolated network, meaning a network where all hardware components are known and physically owned and none of them is connected to the public internet.

Network cabling
The OMNEO network comprises audio transport using the Dante protocol as well as OCA control commands. In order to guarantee the product performance according to specifications, network cabling has to be shielded, fulfilling the requirements of CAT 5e as a minimum.
For integration in networks, the network switches require a dedicated configuration. Further details will be explained in the documentation of the related network control software.

2 About this manual

2.1 Manual purpose and intended audience

This is a professional product that should be installed, used and maintained by trained professionals only.
The purpose of this manual is to provide information required for installing, configuring, operating and maintaining the IPX multi-channel amplifier. This manual is intended for installers, operators, and users of IPX series powered amplifier systems.
Read through this manual to familiarize yourself with the safety information, features, and applications before you use these products.

2.2 Digital document

This manual is available as a digital document in the Adobe Portable Document Format (PDF).
You can find information about Dynacord products on the product related information at www.dynacord.com.

3 System overview

3.1 Application area

The IPX series power amplifiers are designed to power professional loudspeaker systems in fix installed audio applications such as e.g. stadiums, arenas, houses of worship, concert halls, theaters and other applications that require a high-power multichannel amplifier with sophisticated speaker processing.

3.2 Features

IPX5:4 features

- 4 x 1250 W multichannel installation DSP amplifier with digitally controlled PFC supply
- Fully integrated DSP with native 96 kHz and FIR Drive technology
- Dante and OCA integration via OMNEO with fallback options
- Parallel, Bridge and Parallel-bridge modes with 70/100/140/200 V and low impedance operation
- High efficiency Eco Rail technology for lower operating costs

IPX10:4 features

- 4 x 2500 W multichannel installation DSP amplifier with digitally controlled PFC supply
- Fully integrated DSP with native 96 kHz and FIR Drive technology
- Dante and OCA integration via OMNEO with fallback options
- Parallel, Bridge and Parallel-bridge modes with 70/100/140/200 V and low impedance operation
- High efficiency Eco Rail technology for lower operating costs

IPX10:8 features

- 8 x 1250 W multichannel installation DSP amplifier with digitally controlled PFC supply
- Fully integrated DSP with native 96 kHz and FIR Drive technology
- Dante and OCA integration via OMNEO with fallback options
- Parallel, Bridge and Parallel-bridge modes with 70/100/140/200 V and low impedance operation
- High efficiency Eco Rail technology for lower operating costs

IPX20:4 features

- 4 x 5000 W multichannel installation DSP amplifier with digitally controlled PFC supply
- Fully integrated DSP with native 96 kHz and FIR Drive technology
- Dante and OCA integration via OMNEO with fallback options
- Parallel mode with 70/100/140 V and low impedance operation
- High efficiency Eco Rail technology for lower operating costs

3.3 Unpacking and inspection

Carefully open the packaging and take out the power amplifier. Inspect the power amp’s enclosure for damages that might have happened during transportation. Each amplifier is examined and tested in detail before leaving the manufacturing site to ensure that it arrives in perfect condition at your place. Please inform the transport company immediately, if the power amplifier shows any damage. Being the addressee, you are the only person who can claim damages in transit. Keep the cardboard box and all packaging materials for inspection by the transport company.
Keeping the cardboard box including all packing materials is also recommended, if the power amplifier shows no external damages.

Caution!
Do not ship the power amp in any other but its original packaging.

When shipping the power amp, make sure to always use its original box and packaging materials. Packing the power amplifier like it was packed by the manufacturer guarantees optimum protection from transport damage.

3.4 Scope of delivery

IPX5:4, IPX10:4, and IPX20:4 components:

Quantity	Component
1	IPX series DSP power amplifier
1	8-pin Euroblock-type connector, Output, 6 mm
2	6-pin Euroblock-type connector, Input
1	8-pin Euroblock-type connector, GPIO
4	M6x20 screw for rack mounting
1	Installation manual
1	Mains power connector, 32 A with safety & assembly instruction
1	Safety instruction booklet

IPX10:8 components:

Quantity	Component
1	IPX series DSP power amplifier
2	8-pin Euroblock-type connector, Output, 6 mm
4	6-pin Euroblock-type connector, Input
1	8-pin Euroblock-type connector, GPIO
4	M6x20 screw for rack mounting
1	Installation manual
1	Mains power connector, 32 A with safety & assembly instruction
1	Safety instruction booklet

Keep the original invoice that states the purchase/delivery date in a safe place.

4 Planning information

Ensure the following:

- You make use of manufacturer specified installation materials.
- No liquids can spill into or on the products.
- Installation is in a clean environment free of dust.
- The ventilation airflow of the 19" units is not obstructed.
- There is a mains power outlet of sufficient rating close to the intended location of the products.
- Sufficient free space and access at the rear of the 19" units for connectors and wiring.

To find current user documentation, firmware, or software visit our product related information at www.dynacord.com.

5 Installation

5.1 Mounting

IPX Series amplifiers are designed for installation in a conventional 19-inch rack case. Attach the power amp with its frontal rack mount ears using four 20 mm screws and washers. If the rack will be transported secure the amplifier at the rear. Failure to do so may result in damage to the power amplifier as well as to the rack case. Attach the power amp using four case nuts and screws. Brackets for securing the power amplifier in the rear are available as accessories (RMK-15).

5.2 Mains power connection

Mains power connection (all countries except the USA)
The power amplifier receives its power supply via the MAINS connector. It is recommended to use either the listed power cords or power distributions. Custom power cords using the supplied connector have to be built from qualified personal following the safety and assembly instructions. During installation, always separate the power amplifier from the mains. Connect the power amplifier only to a mains network, which corresponds to the requirements indicated on the type plate.

Mains power connection (USA only)
The power amplifier receives its power supply via the MAINS connector. Only the listed power cords or power distributions shall be used. During installation, always separate the power amplifier from the mains. Connect the power amplifier only to a mains network, which corresponds to the requirements indicated on the type plate.

Refer to
– *Accessories, page 36*

5.3 Power

The IPX power switch is located on the rear panel of the power amplifier. Press the switch towards the label ON powers on the amplifier. Press the switch to the other side powers the amplifier down. A soft start circuit compensates mains inrush current peaks and thus prevents triggering AC mains fuse when switching on the amplifier.
Speaker system switch-on is delayed by approximately 15 seconds, while the amplifier is booting—indicated by the green power LED flashing. During that time the speakers are decoupled by relays. Reactivating the amplifier from Standby will take only a few seconds.

5.4 Ventilation

As with all Dynacord fan cooled power amps, the airflow direction is front-to-rear. When installing the power amp in a case or rack system, attention should be paid to provide sufficient ventilation. Allow for an air duct of at least 60 mm x 330 mm between the rear panel of the power amplifier and the inner wall of the cabinet/rack case. Ensure the duct reaches up to the cabinets or the rack case's top ventilation louvers. Leave room of at least 100 mm above the cabinet/rack case for ventilation. Temperatures inside of the cabinet/rack case can easily rise up to 40 °C (104 °F) during operation of the power amp, it is mandatory to bear in mind the maximum allowable ambient temperature for all other appliances installed in the same cabinet/rack case.

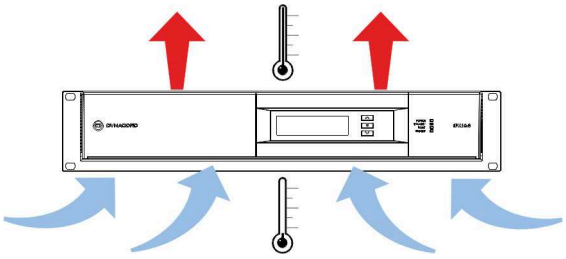


Figure 5.1: Power amplifier ventilation

Caution!
Blocking/closing the power amp's ventilation louvers is not permissible. Without sufficient cooling/ ventilation, the power amplifier may enter protect mode.
Keep ventilation louvers free from dust to ensure unhindered airflow.

Notice!
Do not use the power amplifier in direct sunlight or near heat sources, like heater blowers, stoves, or any other heat radiating devices.

Notice!
Do not use the power amplifiers in an environment where temperatures are below 5 °C (41 °F) or exceed +40 °C (104 °F).

For fixed amplifier installations in a device control room that incorporate a central air-cooling system or air conditioners, calculating the maximum heat emission may be necessary.

Refer to
– *Mains operation & resulting temperature, page 29*

6 Controls, indicators, and connections

6.1 Front panel

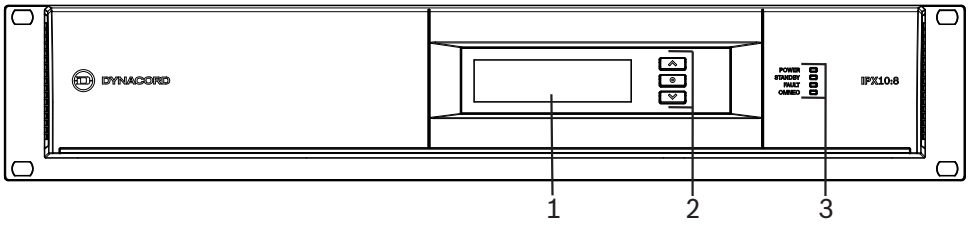


Figure 6.1: IPX front panel

1. OLED display for amplifier status and level information.
2. Menu navigation buttons, up, down, and enter for display changes and editing.
3. Amplifier status indications:

   POWER LED indicates power on status.

   STANDBY LED indicates standby status.

   FAULT detect LED indicates a fault message.

   OMNEO present LED indicates OMNEO network is present.

6.2 Rear panel

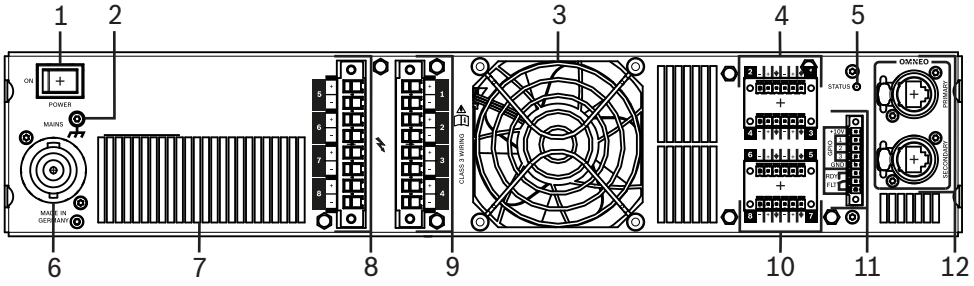


Figure 6.2: IPX rear panel

1. Power ON switch.
2. Ground contact.
3. FAN - Exhaust air vent for amplifier cooling. Do not obstruct!
4. Audio inputs channels 1, 2, 3, 4.
5. Status LED, indicating faults.
6. MAINS IN - AC mains input socket.
7. Exhaust air vent for PSU. Do not obstruct!
8. Power amp outputs Euroblock channels 1, 2, 3, 4 - Class 3 wiring.
9. Power amp outputs Euroblock channels 5, 6, 7, 8 - Class 3 wiring (IPX10:8 only).
10. Audio inputs channels 5, 6, 7, 8 (IPX10:8 only).
11. Control port (GPIO) connector.
12. PRIMARY and SECONDARY OMNEO/Dante network connector (EtherCON/RJ45).

6.3 Control port

The control port features three GPIOs (general purpose in & outputs) and a ready and fault contact. It is equipped with an 8-pin Euroblock type connector. Three GPIOs can be defined by the user to change parameters of the amplifier or get parameter indication to external devices. They are configurable for analog in, digital in or digital out. The other two ports are potential free relay toggle contacts for READY or FAULT indication.

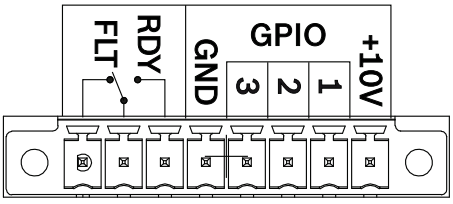


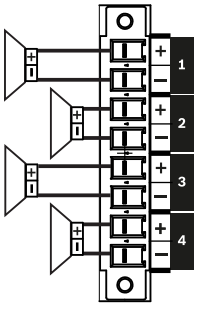
Figure 6.3: Control port

6.4 Power outputs

The output connectors on IPX series are in Euroblock type for 4 channels (IPX5:4, IPX10:4, IPX20:4) respectively 8 channels (IPX10:8). This allows an easy pre-wiring of the cables outside the rack and a fast - one connection for multiple channels at once, without the danger of wiring errors. Cabling requires class 3 wiring. The operation modes (normal, bridge, parallel, parallel-bridge can be set in the DSP menu.

Normal mode cabling

The speaker is connected to the respective + and - pole. The correct connection is also indicated at the amplifiers rear panel.



Normal mode

Figure 6.4: Normal mode

Bridge mode cabling

In Bridge mode both amp channels work in push-pull operation to provide doubled output voltage. In bridge mode operation speaker connection has to be established using pins 1+ and 2+, resp. 3+ and 4+, (5+ and 6+, 7+ and 8+ on IPX10:8), see illustration.

Caution!

In Bridge mode operation, it is not allowable for the load connected to all below a value of 4 ohms. Extremely high voltages can be present at the output. The connected speaker systems must be able to handle such voltages. Make sure to completely read and fully observe power rating specifications of the speaker systems to be used and to check them against the output power capacity of the power amp.

Property damage and/or personal injury may occur.

Parallel mode cabling

In parallel mode two amplifier channels are coupled to deliver double the output current, while the maximum voltage is the same as an individual channel, see illustration.

Parallel-bridge mode cabling

This mode combines four amplifier channels into one drive channel. Speaker gets connected to 1+ and 3+ (resp. 5+ and 7+) with a connection between 1+ and 2+, as well 3+ and 4+ (5+ and 6+, 7+ and 8+), see illustration.

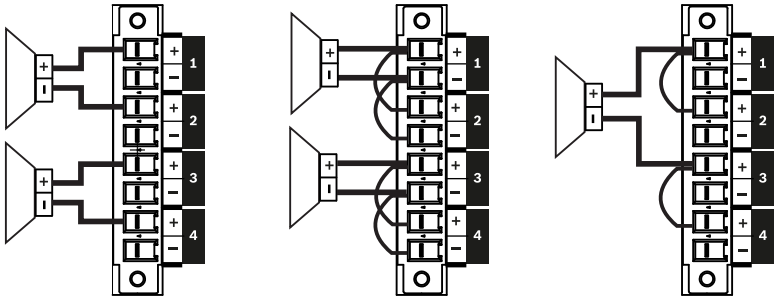


Figure 6.5: Output wiring for different operation modes on IPX amplifiers combining 2 or 4 channels.

6.5 Audio inputs

Audio input connectors on IPX series are Euroblock type for 4 channels (IPX5:4, IPX10:4, IPX20:4) respectively 8 channels (IPX10:8). This allows an easy pre-wiring of the cables outside the rack and a fast single connector for connecting multiple channels at once, without the danger of wiring errors.

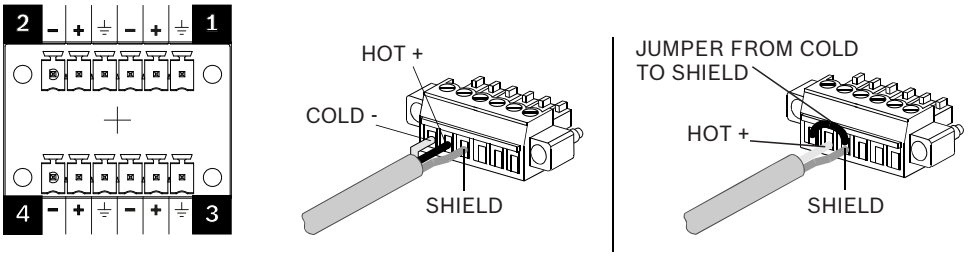


Figure 6.6: Input connectors, wiring for balanced operation, wiring for unbalanced operation

The pin out is labeled on the rear of the amplifier. It is highly recommended to use a balanced input cabling whenever possible.

In addition to the analogue inputs IPX amplifiers can also receive their input signals from an OMNEO or a Dante network. Input source can be changed via the front panel or using remote control software.

6.6 Fan cooling

The power amplifier has four fans. The fans are fully controlled and supervised by the amplifiers management system and adjust their speed depending on the temperature. The temperatures of the power amplifier's channels are registered and monitored individually.

7 Power amplifier menu navigation

7.1 Display and control menu

The IPX series uses an OLED display to show information such as VU metering or amplifier state, temperatures, voltages, IP address, and other useful information as well as limited access to basic parameters for editing, if not locked by software. The navigation is provided by three buttons: up/left, down/right, and for enter. The IPX control menu has three screens: home screen, channel menu, and device menu.

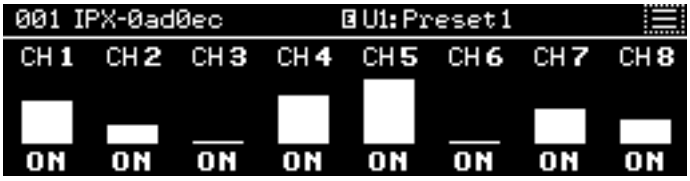


Figure 7.1: Home screen

Figure 7.2: Channel menu

The actual menu content is subject to change with firmware updates. For more information, see the product's support section on our website: www.dynacord.com.

7.2 Standby and Eco Rail mode

IPX amplifiers will automatically operate in Eco Rail mode when no or small audio signal (e.g. pilot tones or background music), which results in a significantly reduced power consumption compared to other amplifiers (see specifications for power consumption). The amplifier is ready for operation, when the Power ON switch on the rear panel is in position ON and the green POWER LED on the front panel is steady.

Turning on Standby mode

If no audio signal at all is required the IPX amplifiers can be switched to STANDBY mode.

To **switch to Standby mode**, do the following:

1. On the front panel, press the **enter button** to access the device menu.
2. Use the **down button** to scroll to POWER OFF.
3. Press the **enter button** to select POWER OFF.
   The amplifier is now in STANDBY mode indicated by the yellow LED on the front panel.

Returning to Eco Rail mode

To **return the amplifier back to Eco Rail mode**, do the following:

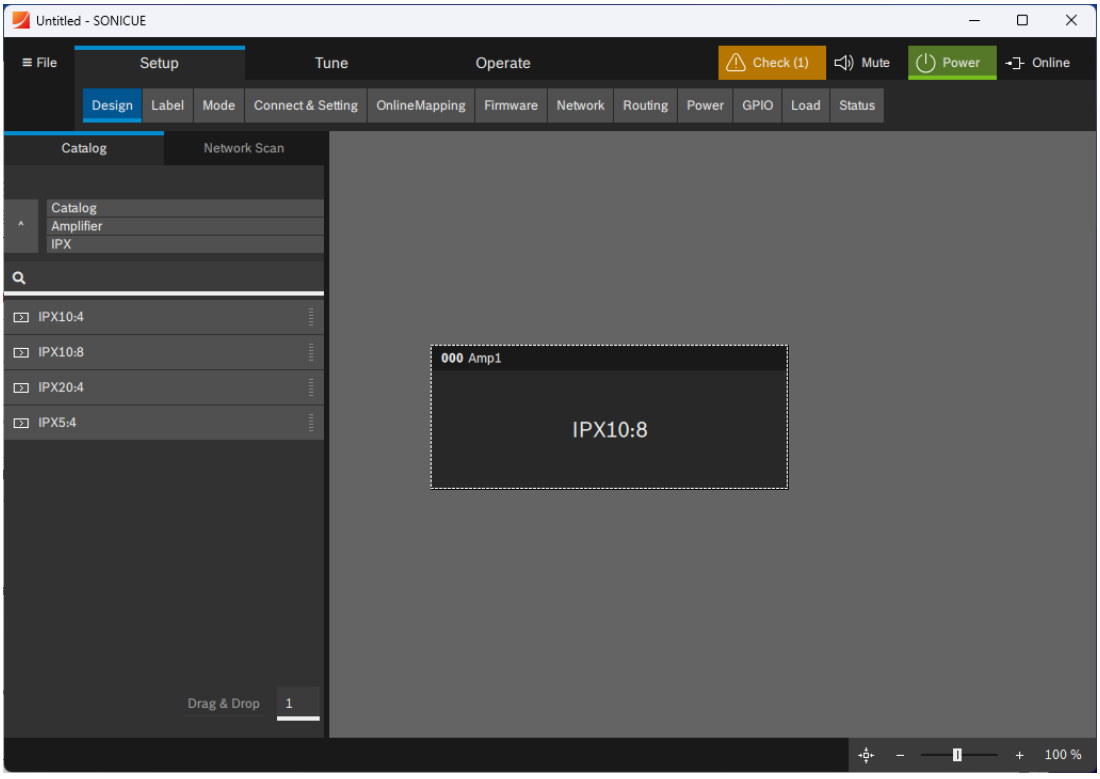
1. On the front panel, press any **button**.
   "Press the middle key to switch on power" message appears.
2. Press the **enter button**.
   The amplifier returns to Eco Rail mode (normal operation) indicated by the green LED on the front panel.

Refer to

– *Technical data, page 20*

8 Configuration in SONICUE

The entire configuration and operation of IPX series amplifiers is done via SONICUE Sound System Software.



SONICUE is available as a free download at www.dynacord.com
For information on the way of working of SONICUE, refer to the online video tutorials.

8.1 Updating the firmware

Notice!
When the device is operated in Glitch-Free mode, firmware update is only possible via **PRIMARY** port.

Each release of SONICUE Sound System Software includes a folder with matching firmware for all supported devices and a matching version of the OMNEO Firmware Upload Tool, which is required to update the firmware for most devices within the SONICUE eco system.
In addition, you can always find the latest firmware version for devices supported in SONICUE on the dedicated firmware download site, accessible straight from the SONICUE Settings Page.
To update firmware with the OMNEO Firmware Upload Tool:

Notice!
You need administrator rights on your PC to run the OMNEO Firmware Upload Tool. Mains power operation is mandatory for firmware updates. Use only a LAN connection, not WiFi.

1. Install the OMNEO Firmware Upload Toolthat is part of the SONICUE release.
   Skip this step if you have the correct SONICUE version.
2. Execute the device firmware .msi, e.g., IPX...msi.
   This will configure all files correctly and place them in the expected folders.

3. Connect the IPX amplifier to your PC and start theOMNEO Firmware Upload Tool app.
   The tool will display the available devices.
   Ensure the network interface of your PC is set to **Obtain IP address automatic**.
   Ensure that the OMNEO Firmware Upload Tool is not set to **Secure** operation.
   The dedicated check box should be unchecked.

Notice!
It is possible to update multiple IPX amplifiers connected in a network in parallel.

4. Select the device type, the individual devices and the firmware version you want to upload.
5. Click **Start**.
   The firmware update will start. Progress will display in the progress bar.
6. When the green bar is complete and the **State** shows **Finished**, all files were transferred successfully.
   Some firmware components might still get updated on the device. Keep mains power running.

Notice!
A firmware update will reset the configuration including TaskEngine of the IPX amplifier. If you are updating amplifiers already in use, make sure to save a project file beforehand and go online “writing” after a firmware update.

9 Technical data

9.1 IPX5:4

OUTPUT POWER				
Low-Z mode: Load Impedance	**2 Ω**	**2.7 Ω**	**4 Ω**	**8 Ω**
Maximum Output Power[1]				
Normal Mode, all channels driven	1300 W	1500 W	1250 W	1250 W
Normal Mode, asymmetrical drive[3]	1300 W	1800 W	2000 W	1300 W
Bridge	-	-	2600 W	2500 W
Parallel	2500 W	3000 W	2500 W	1250 W
Parallel-Bridge	5200 W	6000 W	5000 W	5000 W
Direct Drive Mode: Nominal Voltage	**70 V**	**100 V**	**140 V**[2]	**200 V**[2]
Maximum Output Power[1]				
All channels driven	1250 W	1250 W	2500 W	2500 W
Asymmetrical drive[3]	1800 W	2000 W	3600 W	4000 W
Number of Amplifier Channels	4			
Maximum Output Voltage, Normal mode, per channel	150 V_{peak}			
Maximum Output Current, Normal mode, per channel	41 A_{peak}			
AMPLIFIER				
Voltage Gain				
Low-Z mode, ref.1 kHz	32.0 dB, adjustable 20.0-44.0 dB			
Direct Drive mode	33.2/36.2/39.2/42.2 dB for 70/100/140/200 V			
Input Sensitivity				
Low-Z mode, Max. Output Voltage	10.7 dBu (2.66 V), adjustable -1.3-22.7 dBu			
Direct Drive mode	6 dBu (1.55 V), fixed			
THD 3 dB below max, AES17, 1 kHz	< 0.05 %			
DIM 100 3.15 kHz, 15 kHz	< 0.15 %			
IMD-SMPTE 60 Hz, 7 kHz	< 0.05 %			
Crosstalk ref. 1 kHz, 12 dB below Max, 8 Ω	< -80 dB			
Frequency Response ref. 1 kHz, analog in to speaker out	20 Hz to 20 kHz (±0.5 dB)			

OUTPUT POWER	
Damping Factor 20 Hz to 200 Hz, 8 Ω	> 400
Output Stage Topology	Class D, fixed frequency
Signal to Noise Ratio Amplifier	
A-weighted, analog input	112 dB
A-weighted, digital input	115 dB
Output Noise	
A-weighted, analog input	< -70 dBu
A-weighted, digital input	< -73 dBu
CONNECTIVITY	
Analog Audio Input/Thru	
Type	2 x 6-pin Euroblock, male
Maximum Input Level	+21 dBu
Input Impedance, active balanced	20 kΩ
Reference level equal to digital input	+21 dBu for 0 dBFS
Speaker Output	1 x 8-pin Euroblock, 6mm, female
GENERAL	
Power Consumption	
Rated power consumption (see BTU table)	700 W
1/8 Maximum Output Power at 4 Ω	900 W
Idle Mode (no input signal)	75 W
Standby Mode	< 15 W
Dimensions (W x H x D), mm	483 x 88.1 x 514.2
Weight	14.3 kg (31.5 lb)
Shipping Weight	16.5 kg (36.4 lb)

Amplifier at rated conditions, Low-Z Normal operation mode, all channels driven, 4 Ω loads, Analog input, 32 dB Gain, 48 kHz sample rate, unless otherwise specified.

[1]Test signal for max. output power according IHF-A-202 (Dynamic-Headroom, burst 1 kHz/20 ms on/480 ms off/low level -20 dB).

[2]Available in Bridge operation mode only.

[3]Asymmetrical drive: using half of the available channels at -6 dB.

9.2 IPX10:4

OUTPUT POWER				
Low-Z mode: Load Impedance	**2 Ω**	**2.7 Ω**	**4 Ω**	**8 Ω**
Maximum Output Power[1]				
Normal Mode, all channels driven	2600 W	3000 W	2500 W	1250 W
Bridge	-	-	5200 W	5000 W
Parallel	5000 W	4000 W	2500 W	1250 W
Parallel-Bridge	10400 W	12000 W	10000 W	5000 W
Direct Drive Mode: Nominal Voltage	**70 V**	**100 V**	**140 V**[2]	**200 V**[2]
Maximum Output Power[1]	2500 W	2500 W	5000 W	5000 W
Number of Amplifier Channels	4			
Maximum Output Voltage, Normal mode, per channel	150 V_{peak}			
Maximum Output Current, Normal mode, per channel	53 A_{peak}			
AMPLIFIER				
Voltage Gain				
Low-Z mode, ref.1 kHz	32.0 dB, adjustable 20.0-44.0 dB			
Direct Drive mode	33.2/36.2/39.2/42.2 dB for 70/100/140/200 V			
Input Sensitivity				
Low-Z mode, Max. Output Voltage	10.7 dBu (2.66 V), adjustable -1.3-22.7 dBu			
Direct Drive mode	6 dBu (1.55 V), fixed			
THD 3 dB below max, AES17, 1 kHz	< 0.05 %			
DIM 100 3.15 kHz, 15 kHz	< 0.15 %			
IMD-SMPTE 60 Hz, 7 kHz	< 0.05 %			
Crosstalk ref. 1 kHz, 12 dB below Max, 8 Ω	< -80 dB			
Frequency Response ref. 1 kHz, analog in to speaker out	20 Hz to 20 kHz (±0.5 dB)			
Damping Factor 20 Hz to 200 Hz, 8 Ω	> 400			
Output Stage Topology	Class D, fixed frequency			
Signal to Noise Ratio Amplifier				
A-weighted, analog input	112 dB			

OUTPUT POWER	
A-weighted, digital input	115 dB
Output Noise	
A-weighted, analog input	< -70 dBu
A-weighted, digital input	< -73 dBu
CONNECTIVITY	
Analog Audio Input/Thru	
Type	2 x 6-pin Euroblock, male
Maximum Input Level	+21 dBu
Input Impedance, active balanced	20 kΩ
Reference level equal to digital input	+21 dBu for 0 dBFS
Speaker Output	1 x 8-pin Euroblock, 6 mm, female
GENERAL	
Power Consumption	
Rated power consumption (see BTU table)	1200 W
1/8 Maximum Output Power at 4 Ω	1765 W
Idle Mode (no input signal)	80 W
Standby Mode	< 16 W
Dimensions (W x H x D), mm	483 x 88.1 x 514.2
Weight	15.0 kg (33.0 lb)
Shipping Weight	17.2 kg (37.8 lb)

Amplifier at rated conditions, Low-Z Normal operation mode, all channels driven, 4 Ω loads, Analog input, 32 dB Gain, 48 kHz sample rate, unless otherwise specified.

[1]Test signal for max. output power according IHF-A-202 (Dynamic-Headroom, burst 1 kHz/20 ms on/480 ms off/low level -20 dB).

[2]Available in Bridge operation mode only.

9.3 IPX10:8

OUTPUT POWER				
Low-Z mode: Load Impedance	**2 Ω**	**2.7 Ω**	**4 Ω**	**8 Ω**
Maximum Output Power[1]				
Normal Mode, all channels driven	1300 W	1500 W	1250 W	1250 W
Normal Mode, asymmetrical drive[3]	1300 W	1800 W	2000 W	1300 W
Bridge	-	-	2600 W	2500 W
Parallel	2500 W	3000 W	2500 W	1250 W
Parallel-Bridge	5200 W	6000 W	5000 W	5000 W
Direct Drive Mode: Nominal Voltage	**70 V**	**100 V**	**140 V**[2]	**200 V**[2]
Maximum Output Power[1]				
All channels driven	1250 W	1250 W	2500 W	2500 W
Asymmetrical drive[3]	1800 W	2000 W	3600 W	4000 W
Number of Amplifier Channels	8			
Maximum Output Voltage, Normal mode, per channel	150 V_{peak}			
Maximum Output Current, Normal mode, per channel	41 A_{peak}			
AMPLIFIER				
Voltage Gain				
Low-Z mode, ref.1 kHz	32.0 dB, adjustable 20.0-44.0 dB			
Direct Drive mode	33.2/36.2/39.2/42.2 dB for 70/100/140/200 V			
Input Sensitivity				
Low-Z mode, Max. Output Voltage	10.7 dBu (2.66 V), adjustable -1.3-22.7 dBu			
Direct Drive mode	6 dBu (1.55 V), fixed			
THD 3 dB below max, AES17, 1 kHz	< 0.05 %			
DIM 100 3.15 kHz, 15 kHz	< 0.15 %			
IMD-SMPTE 60 Hz, 7 kHz	< 0.05 %			
Crosstalk ref. 1 kHz, 12 dB below Max, 8 Ω	< -80 dB			
Frequency Response ref. 1 kHz, analog in to speaker out	20 Hz to 20 kHz (±0.5 dB)			
Damping Factor 20 Hz to 200 Hz, 8 Ω	> 400			

OUTPUT POWER	
Output Stage Topology	Class D, fixed frequency
Signal to Noise Ratio Amplifier	
A-weighted, analog input	112 dB
A-weighted, digital input	115 dB
Output Noise	
A-weighted, analog input	< -70 dBu
A-weighted, digital input	< -73 dBu
CONNECTIVITY	
Analog Audio Input/Thru	
Type	4 x 6-pin Euroblock, male
Maximum Input Level	+21 dBu
Input Impedance, active balanced	20 kΩ
Reference level equal to digital input	+21 dBu for 0 dBFS
Speaker Output	2 x 8-pin Euroblock, 6 mm, female
GENERAL	
Power Consumption	
Rated power consumption (see BTU table)	1300 W
1/8 Maximum Output Power at 4 Ω	1780 W
Idle Mode (no input signal)	105 W
Standby Mode	< 18 W
Dimensions (W x H x D), mm	483 x 88.1 x 514.2
Weight	16.8 kg (37.1 lb)
Shipping Weight	19.1 kg (42.1 lb)

Amplifier at rated conditions, Low-Z Normal operation mode, all channels driven, 4 Ω loads, Analog input, 32 dB Gain, 48 kHz sample rate, unless otherwise specified.

[1]Test signal for max. output power according IHF-A-202 (Dynamic-Headroom, burst 1 kHz/20 ms on/480 ms off/low level -20 dB).

[2]Available in Bridge operation mode only.

[3]Asymmetrical drive: using half of the available channels at -6 dB.

9.4 IPX20:4

OUTPUT POWER				
Low-Z mode: Load Impedance	**2 Ω**	**2.7 Ω**	**4 Ω**	**8 Ω**
Maximum Output Power[1]				
Normal Mode, all channels driven	5200 W	6000 W	5000 W	2500 W
Bridge	n.a			
Parallel	10000 W	8000 W	5000 W	
Parallel-Bridge	n.a.			
Direct Drive Mode: Nominal Voltage	**70 V**	**100 V**	**140 V**	
Maximum Output Power[1]	3550 W	5000 W	5000 W	
Number of Amplifier Channels	4			
Maximum Output Voltage, Normal mode, per channel	210 V_{peak}			
Maximum Output Current, Normal mode, per channel	84 A_{peak}			
AMPLIFIER				
Voltage Gain				
Low-Z mode, ref.1 kHz	32.0 dB, adjustable 20.0-44.0 dB			
Direct Drive mode	33.2/36.2/39.2 dB for 70/100/140 V			
Input Sensitivity				
Low-Z mode, Max. Output Voltage	13.7 dBu (3.73 V), adjustable 1.7-25.7 dBu			
Direct Drive mode	6 dBu (1.55 V), fixed			
THD 3 dB below max, AES17, 1 kHz	< 0.05 %			
DIM 100 3.15 kHz, 15 kHz	< 0.15 %			
IMD-SMPTE 60 Hz, 7 kHz	< 0.15 %			
Crosstalk ref. 1 kHz, 12 dB below Max, 8 Ω	< -80 dB			
Frequency Response ref. 1 kHz, analog in to speaker out	20 Hz to 20 kHz (±1.0 dB)			
Damping Factor 20 Hz to 200 Hz, 8 Ω	> 400			
Output Stage Topology	Class D, fixed frequency			
Signal to Noise Ratio Amplifier				

A-weighted, analog input	115 dB
A-weighted, digital input	118 dB
Output Noise	
A-weighted, analog input	< -70 dBu
A-weighted, digital input	< -73 dBu
CONNECTIVITY	
Analog Audio Input/Thru	
Type	2 x 6-pin Euroblock, male
Maximum Input Level	+21 dBu
Input Impedance, active balanced	20 kΩ
Reference level equal to digital input	+21 dBu for 0 dBFS
Speaker Output	1 x 8-pin Euroblock, 6 mm, female
GENERAL	
Power Consumption	
Rated power consumption (see BTU table)	2250 W
1/8 Maximum Output Power at 4 Ω	2850 W
Idle Mode (no input signal)	110 W
Standby Mode	< 19 W
Dimensions (W x H x D), mm	483 x 88.1 x 514.2
Weight	18.3 kg (40.3 lb)
Shipping Weight	20.5 kg (45.1 lb)

Amplifier at rated conditions, Low-Z Normal operation mode, all channels driven, 4 Ω loads, Analog input, 32 dB Gain, 48 kHz sample rate, unless otherwise specified.

[1]Test signal for max. output power according IHF-A-202 (Dynamic-Headroom, burst 1 kHz/20 ms on/480 ms off/low level -20 dB).

9.5 IPX5:4, IPX10:4, IPX10:8, and IPX20:4

DIGITAL SIGNAL PROCESSING	
Sampling rate	48 kHz/96 kHz, OMNEO/Dante synchronized
Signal delay/latency Analog In to Speaker Out, 48 kHz/96 kHz	0.70 ms/0.53 ms
Dante Network Latency	typ. 1.00 ms
Signal Processing	
User EQ	12 filters per channel, selectable as PEQ, Lo-Shelv, Hi-Shelv, Lo-ShelvQ, Hi-ShelvQ, Hi-Pass, Lo-Pass and Notch; 2 filters of them with additional asymmetric filter type
User Delay	0 to 2000 ms per channel (units: µs, ms, s, cm, m, inches, feet)
Array EQ	5 filters per channel, selectable as PEQ, Lo-Shelv, Hi-Shelv, Lo-ShelvQ, Hi-ShelvQ, Hi-Pass, Lo-Pass, and All-Pass
Array Delay	0 to 500 ms per channel (units: µs, ms, s, cm, m, inches, feet)
Speaker EQ	10 filters per channel, selectable as PEQ, Lo-Shelv, Hi-Shelv, Hi-Pass, Lo-Pass and All-Pass
Speaker X-Over	Hi-Pass, and Lo-Pass per channel, 6/12/18/24/30/36/42/48 dB Bessel/ Butterworth, 12/24/48 dB Linkwitz-Riley; Alignment Delay, 0 to 20 ms per channel
Speaker FIR	Up to 1025 taps, Linear Phase Filter, Linear Phase Brickwall X-Over
Speaker Limiters	Peak Anticipation Limiter and RMS/TEMP Limiter per channel
Other Functions	Source Selection and Mix, Level, Mute, Polarity, Sine and Noise Generator, Pilot Tone Generator and Detection, Level Meters, Impedance Measurement and Load Monitoring
Memory	
DSP Presets	1 Factory + 20 User
Source Supervision and Fallback	Pilot Tone supervision at Analog and OMNEO/Dante inputs, switchover to alternative Source Selection
CONNECTIVITY	
Network	
Type	2 x Neutrik EtherCON/RJ45, redundant PRIMARY/SECONDARY
General	1000base-T/100base-TX, integrated switch
Network Audio Inputs	8 channels, 48/96 kHz, OMNEO/Dante format
Network Audio Outputs (Monitor)	2 channels, 48/96 kHz, OMNEO/Dante format
Mains Input	1 x Neutrik powerCON-HC
GPIO Control Port	
Type	1 x 8-pin Euroblock, male

Ports and Operating Modes	3 x GPIO, switchable Analog In/Digital In/Digital Out
Analog Input Range	0 V to +13 V, 40 kΩ input resistance
Digital Input Limits	ON: < 1.5 V OFF: > 2.0 V, internal Pull Up (10 kΩ)
Digital Outputs	ON: Output switched to GND, max. 200 mA OFF: Open Collector (40 kΩ to GND)
Reference Voltage Output	+10 V, max. 200 mA, supervised, short circuit protected
READY/FAULT contact	Galvanic isolated relay, max. 30 VDC/500 mADC
GENERAL	
User Interface	
Display	Black/white OLED 256 x 64 pixel
Front panel indicators	4 x status LEDs (POWER, STANDBY, FAULT, OMNEO)
Front panel operating elements	3 buttons (UP, ENTER, DOWN)
Rear panel indicators	1 x status LED (STATUS)
Rear panel operating elements	Mains Switch
Power Requirements	100 V to 240 V, 50 Hz to 60 Hz AC
Power Supply Topology	Switching Mode Power Supply with digital controlled Power Factor Correction
Protections	Audio Limiters, High Temperature, DC, HF, Short Circuit, Back-EMF, Peak Current Limiters, Inrush Current Limiters, Turn-on Delay, Mains Circuit Breaker Protection, Mains Over-/Under voltage Protection
Cooling	Front-to-rear, temperature controlled fans, supervised
Ambient Temperature Limits	+5 °C to +40 °C (+40 °F to +105 °F)
IEC Protection Class	Class I (grounded)
Electromagnetical Environment	E1, E2, E3
Color	Black

9.6 Mains operation & resulting temperature

The power drawn from the mains network is converted into output power to feed the connected loudspeaker systems and into heat. The difference between power consumption and dispensed power is called power dissipation (Pd). The amount of heat resulting from power dissipation might remain inside of a rack-shelf and needs to be diverted using appropriate measures.

IPX5:4	Umains [V] [5]	Imains [A]	Pmains [W]	Pout [W]	Pd [W] [4]	BTU/hr [3]
Standby	230	0.60	15	0	15	51
Idle	230	0.75	75	0	75	256

IPX5:4	Umains [V] [5]	Imains [A]	Pmains [W]	Pout [W]	Pd [W] [4]	BTU/hr [3]
1/8 Max. Output Power @ 8 Ω [2]	230	5.4	831	4 x 156	207	706
1/8 Max. Output Power @ 4 Ω [2]	230	5.8	881	4 x 156	257	877
1/8 Max. Output Power @ 2 Ω [2]	230	6.6	1018	4 x 163	366	1249
1/8 Max. Output Power @ 70 V/100 V [2]	230	5.5	840	4 x 156	216	737
Nominal Operation Mode @ 4 Ω [1]	230	3.50	700	4 x 94	324	1106

Table 9.1: Mains operation & resulting temperature and mains fusing IPX amplifiers

[1] Sine Modulation (1 kHz)
[2] Pink Noise according to EN60065 / 8. Edition
[3] 1 BTU = 1055.06 J = 1055.06 Ws
[4] Pd = Power Dissipation
[5] The following conversion factors can be used for easy conversion of mains current: 100 V = 2.3; 120 V = 1.9; 240 V = 0.96

IPX10:4	Umains [V] [5]	Imains [A]	Pmains [W]	Pout [W]	Pd [W] [4]	BTU/hr [3]
Standby	230	0.61	16	0	16	55
Idle	230	0.75	80	0	80	273
1/8 Max. Output Power @ 8 Ω [2]	230	4.60	850	4 x 156	226	771
1/8 Max. Output Power @ 4 Ω [2]	230	8.50	1700	4 x 313	448	1529

IPX10:4	Umains [V] [5]	Imains [A]	Pmains [W]	Pout [W]	Pd [W] [4]	BTU/hr [3]
1/8 Max. Output Power @ 2 Ω [2]	230	9.50	2100	4 x 325	800	2730
1/8 Max. Output Power @ 70 V/100 V [2]	230	8.9	1692	4 x 313	440	1501
Nominal Operation Mode @ 4 Ω [1]	230	5.73	1200	4 x 188	448	1529

Table 9.2: Mains operation & resulting temperature and mains fusing IPX amplifiers

[1] Sine Modulation (1 kHz)
[2] Pink Noise according to EN60065 / 8. Edition
[3] 1 BTU = 1055.06 J = 1055.06 Ws
[4] Pd = Power Dissipation
[5] The following conversion factors can be used for easy conversion of mains current: 100 V = 2.3; 120 V = 1.9; 240 V = 0.96

IPX10:8	Umains [V] [5]	Imains [A]	Pmains [W]	Pout [W]	Pd [W] [4]	BTU/hr [3]
Standby	230	0.62	18	0	18	61
Idle	230	0.85	105	0	105	358
1/8 Max. Output Power @ 8 Ω [2]	230	8.9	1709	8 x 156	461	1573
1/8 Max. Output Power @ 4 Ω [2]	230	9.5	1776	8 x 156	528	1802
1/8 Max. Output Power @ 2 Ω [2]	230	10.8	2218	8 x 163	914	3119
1/8 Max. Output Power @ 70 V/100 V [2]	230	9.60	1773	8 x 156	525	1791

IPX10:8	Umains [V] [5]	Imains [A]	Pmains [W]	Pout [W]	Pd [W] [4]	BTU/hr [3]
Nominal Operation Mode @ 4 Ω [1]	230	6.00	1300	8 x 94	548	1870

Table 9.3: Mains operation & resulting temperature and mains fusing IPX amplifiers

[1] Sine Modulation (1 kHz)
[2] Pink Noise according to EN60065 / 8. Edition
[3] 1 BTU = 1055.06 J = 1055.06 Ws
[4] Pd = Power Dissipation
[5] The following conversion factors can be used for easy conversion of mains current: 100 V = 2.3; 120 V = 1.9; 240 V = 0.96

IPX20:4	Umains [V] [5]	Imains [A]	Pmains [W]	Pout [W]	Pd [W] [4]	BTU/hr [3]
Standby	230	0.63	19	0	19	65
Idle	230	0.94	110	0	110	375
1/8 Max. Output Power @ 8 Ω [2]	230	8.75	1730	4 x 313	478	1631
1/8 Max. Output Power @ 4 Ω [2]	230	16.70	3450	4 x 625	950	3242
1/8 Max. Output Power @ 2 Ω [2]	230	18.70	4150	4 x 650	1550	5289
1/8 Max. Output Power @ 70V [2]	230	15.1	3006	4 x 444	1230	4197
1/8 Max. Output Power @ 70 V/140 V [2]	230	17.0	3558	4 x 625	1058	3610
Nominal Operation Mode @ 4 Ω [1]	230	10.8	2178	4 x 375	678	2313

Table 9.4: Mains operation & resulting temperature and mains fusing IPX amplifiers

[1] Sine Modulation (1 kHz)
[2] Pink Noise according to EN60065 / 8. Edition
[3] 1 BTU = 1055.06 J = 1055.06 Ws
[4] Pd = Power Dissipation
[5] The following conversion factors can be used for easy conversion of mains current: 100 V = 2.3; 120 V = 1.9; 240 V = 0.96

Amp model	Rating of mains breaker [1]	Mains cable cross-section [1,2]
IPX5:4	13 A - 16 A (100 V - 240 V)	3 x 1.5 mm^2 - 3 x 2.5 mm^2 (AWG14)
IPX10:4	13 A - 16 A (208 V - 240 V) 30 A (100 V - 120 V)	3 x 1.5 mm^2 - 3 x 2.5 mm^2 (AWG14) AWG12 (3 x 3.3 mm^2)
IPX10:8	13 A - 16 A (208 V - 240 V) 30 A (100 V - 120 V)	3 x 1.5 mm^2 - 3 x 2.5 mm^2 (AWG14) AWG12 (3 x 3.3 mm^2)
IPX20:4	16 A (208 V - 240 V) 30 A (100 V - 120 V) 30 A (208 V)[3] 32 A (220 V - 240 V)[3]	3 x 1.5 mm^2 - 3 x 2.5 mm^2 (AWG14) AWG12 (3 x 3.3 mm^2) AWG12 (3 x 3.3 mm^2) 3 x 4.0 mm^2

Table 9.5: Recommended mains fusing and mains cable diameter for IPX amplifiers

[1] Additional and/or other requirements from local authorities may apply.
[2] The detachable power supply cord must be an approved type acceptable to the authorities of the respective country. The maximum recommended length of the power supply cord set is 5 m (16 ft).
[3] Preferred operation mode for IPX20:4 for high power subwoofer applications.

9.7 Block diagram

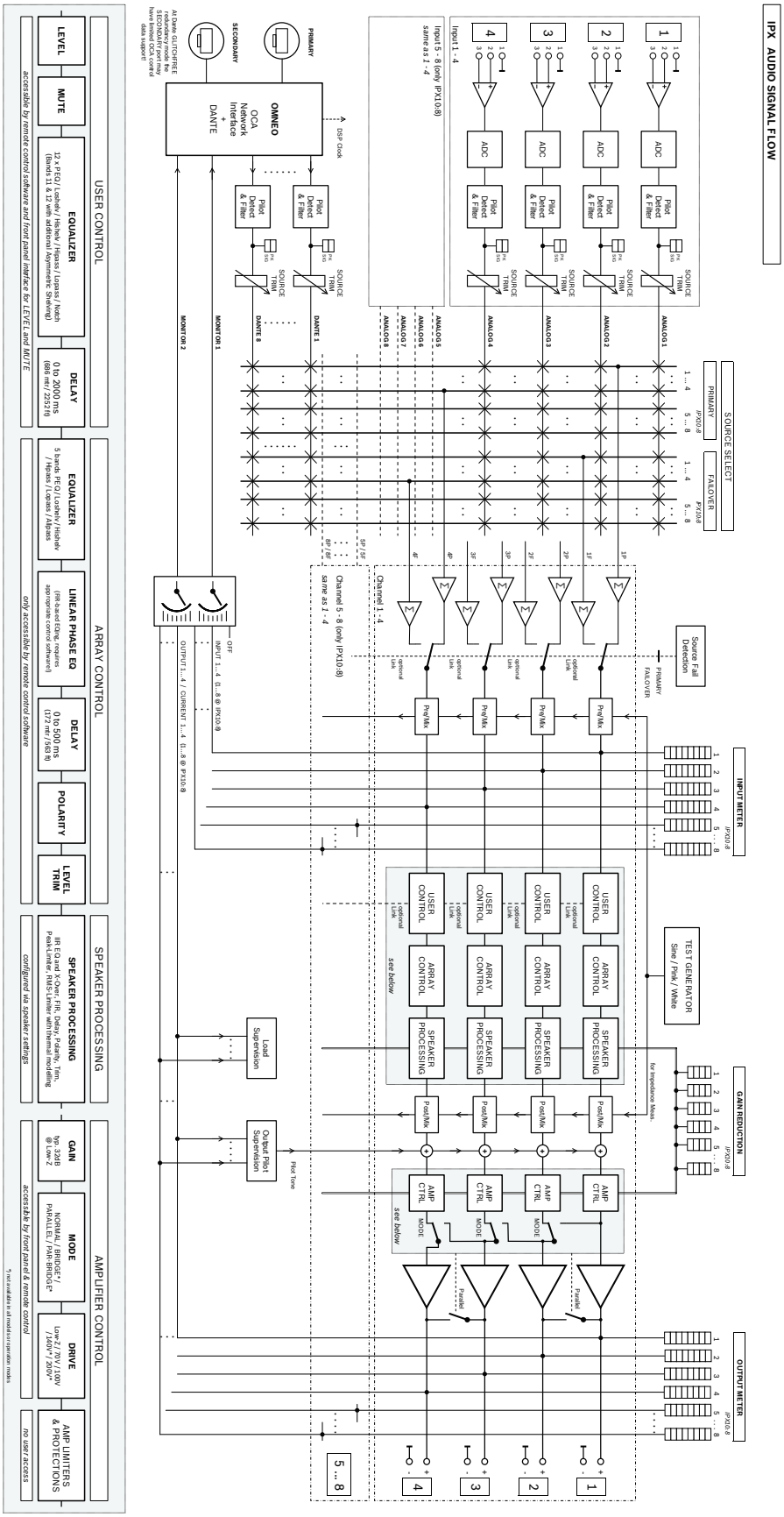


Figure 9.1: Block diagram: IPX

9.8 Dimensions

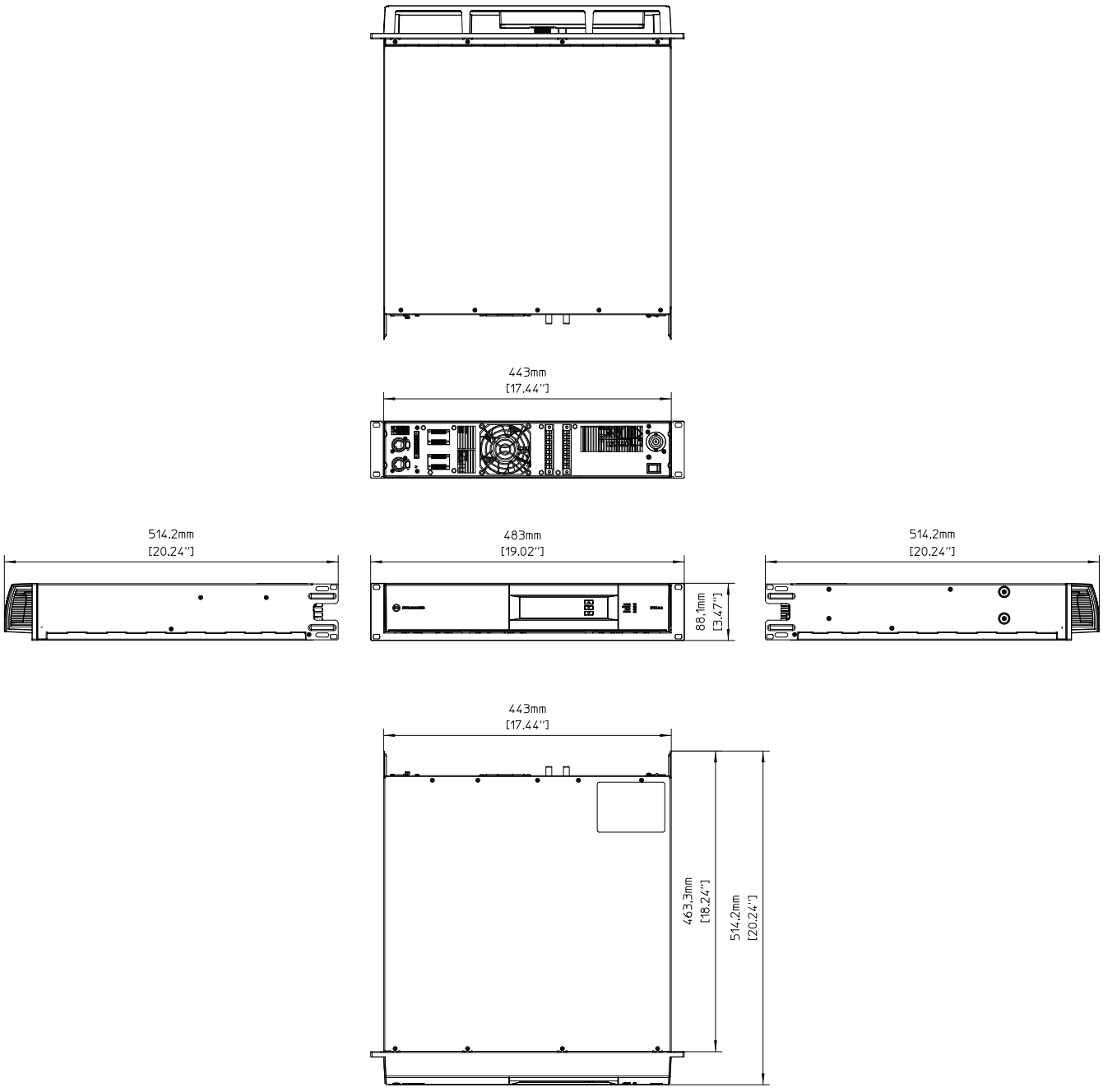
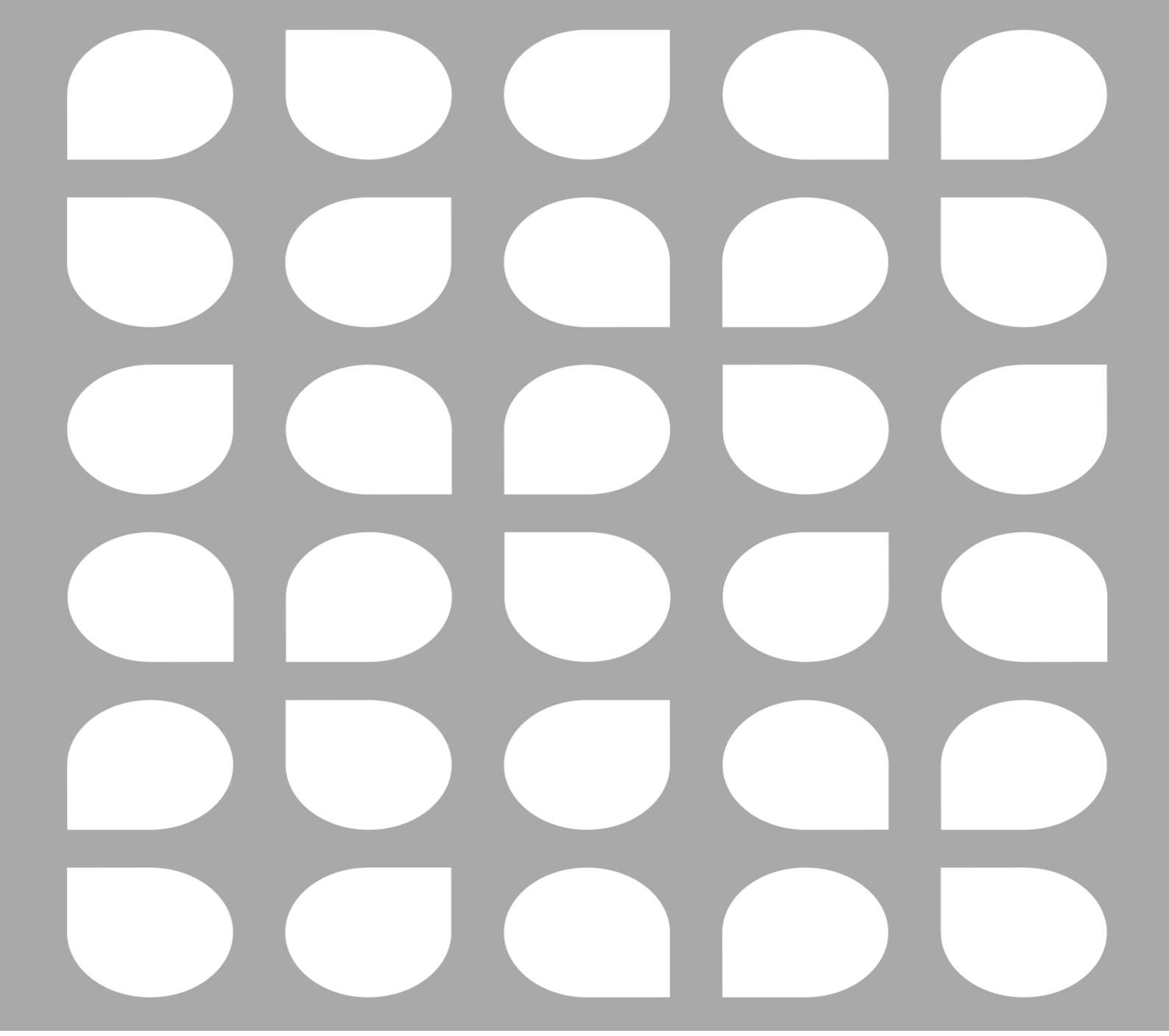


Figure 9.2: Dimensions: IPX

10 Accessories

The following accessories are available for the IPX amplifiers:

CTN	Description
PCO32A30-US	Power cord, powerCon32/NEMA L5-30
PCO32A16-EU	Power cord, powerCon32/CEE7/7
PCO32A16-UK	Power cord, powerCon32/BS1363
RMK-15	Rear rack mount kit for amplifiers



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