



ESP2000

User Guide



The Future of Sound. Made Perfectly Clear.

At KV2 Audio our vision is to constantly develop technologies that eliminate distortion and loss of information providing a true dynamic representation of the source.

Our aim is to create audio products that absorb you, place you within the performance and deliver a listening experience beyond expectations.

Important Safety Instructions

Before using your ESP2000, be sure to carefully read the applicable items of these operating instructions and the safety suggestions.

1. Read all product instructions.
2. Keep printed instructions, do not throw away.
3. Respect and review all warnings.
4. Follow all instructions.
5. Do not use this unit near water, in unprotected out door areas or in rain or wet conditions.
6. Clean only with dry cloth.
7. Do not block any ventilation openings.
8. Install in accordance with KV2 Audio's recommended installation instructions.
9. Do not install near any heat sources such as heat radiators, heat registers, stoves or other apparatus that produce heat.
10. Do not defeat the safety purpose of the grounding type plug. A grounding type plug has two blades and a third grounding connector. The third connector is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
11. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles and the point where they exit from the amplifier. The AC mains plug or appliance coupler shall remain readily accessible for operation.
12. Only use accessories specified by KV2 Audio.
13. The unit is intended for use in a 19" rack. Follow the mounting instructions. When a rack on wheels is use, use caution when moving the loaded rack to avoid injury from tipping over.
14. Install the product only with both front and rear supports.
15. Unplug this amplifier during lightning storms or when unused for long periods of time.
16. Do not connect a ESP2000's output in parallel or series with any other ESP2000's output. Do not connect the ESP2000 output to any other voltage source, such as a battery, mains source or power supply, regardless of whether the ESP2000 is turned on or off.
17. Do not run the output of any ESP2000 back into another channels input.
18. Refer all servicing to qualified service personnel. Servicing is required when the amplifier has been damaged in any way, such as when the power-supply cord or plug has been damaged; liquid has been spilled or objects have fallen into the amplifier; rain or moisture has entered the amplifier; the amplifier has been dropped; or when for undetermined reasons the amplifier does not operate normally.
19. Do not remove top or bottom covers. Removal of the cover will expose hazardous voltages. There are no user serviceable parts inside and removable may void the warranty.
20. An experienced user shall always supervise this professional audio equipment.

**CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE THE COVER.
NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.**

WARNING: To prevent fire or electric shock, do not expose this equipment to rain or moisture.

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ESP 2000

VERY HIGH DEFINITION AMPLIFIER

ESP2000 - part number KVV 987 271 (250V)
KVV 987 269 (230V)
KVV 987 270 (115V)



Application

Designed to drive the ESD and ESM range of passive loudspeaker units with superior sound quality

- Portable PA
- Fixed installations

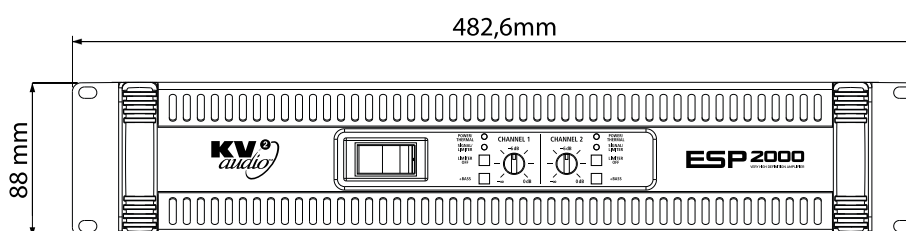
Introduction

The ESP2000 is a two channel rack mountable power amplifier. The unit contains two separate 1000 watt amplifiers, two independent power supplies, (each channel running off each power supply), two signal paths, inputs and outputs as well as limiting and low frequency enhancement on each of the two channels within a two rack unit chassis. It can be used to power any range of passive loudspeakers as well as being specifically designed for optimised performance with KV2 Audio's ESD Series.

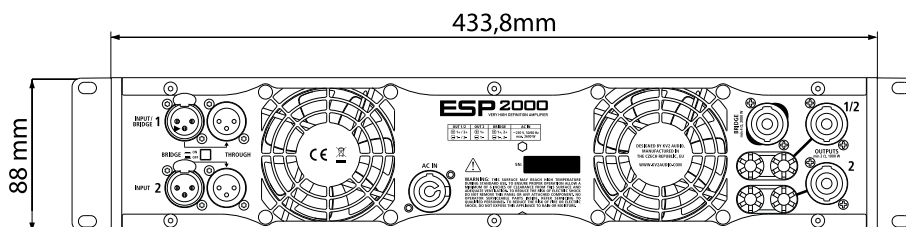
Whilst this unit is simple to operate improper use can be dangerous. This is a very highpowered device that can output high voltages and sizeable currents. Always use safe operating techniques with the ESP2000.

FOR YOUR SAFETY, READ THE IMPORTANT PRECAUTIONS SECTION AS WELL AS THE INPUT, OUTPUT AND POWER CONNECTION SECTIONS OF THIS MANUAL.

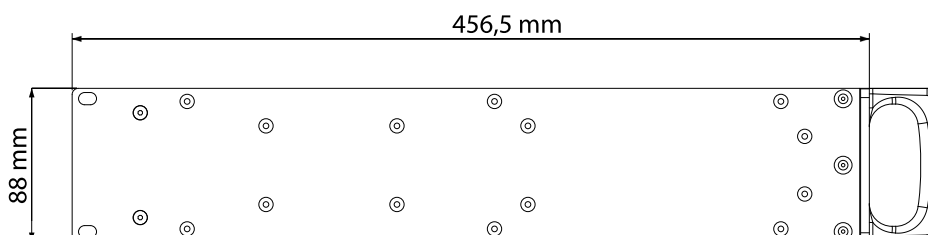
Front Panel:



Rear Panel:



Side Panel:



Unpacking

Unpack the ESP2000 and check to see if there is any damage to it. If you find any damage, notify your supplier immediately. Only the consignee may institute a claim with the carrier for any damage incurred during shipping. Be sure to save the carton and all packaging materials for the carrier's inspection.

Should you ever need to ship the unit, only use the original factory packaging. If the shipping carton is unavailable, contact your supplier to obtain a replacement.

The ESP2000 carton should contain:

- ESP2000 power amplifier
- User's Guide
- PowerCon detachable power cable

Rack mounting

The ESP2000 will mount in a standard 19" rack system. Integral rear mounting rack ears are also provided for additional support. It is important that you do not rely on fixing and mounting the ESP2000 using just the front panel as the support. Use eight screws and washers to mount the amplifier to the equipment rack rails, (four for the fronts and four for the rear). We recommend using a shock mounted rack for touring use to prolong the life of your ESP2000.

Cooling

The ESP2000 has a comprehensive cooling system featuring chassis-sealed PCB board mounting and shock mounted, speed controlled fans. This means that the cooling system never drives air across PCB boards, connectors or components ensuring prolonged electronic component lifespan and minimizing maintenance cycles.

Air is drawn into the front of the amplifier by the two fans on the rear panel, this passes over the cooling fins of the heat sinks and exhausts through the rear. If the heat sink gets too hot, its sensing circuit will open the output relay, disconnecting the load.

It is important to have an adequate air supply at the front of the amplifier, and enough space around the rear of the amplifier to allow the cooling air to escape. If the unit is rack-mounted, do not use doors or covers on the rear of the rack; the exhaust air must flow without restriction. If you are using racks with closed backs, use fans on the rear rack panel to ensure an ample air supply.

IMPORTANT! Please note that for correct full performance of the unit AND ANY WARRANTY COVER, it is important that regular maintenance of the front vents and filters as well as the rear panel fans be inspected and cleaned by removing any dust and debris build-up. Any product failure due to lack of attention in this matter will immediately void any current warranty. (Please refer to notes re ventilation procedures).

AC Power requirements

The ESP2000 is an advanced power amplifier. Understanding power distribution, voltage and current requirements, as well as electrical safety issues, is critical to the safe operation of the ESP2000.

AC Power

The ESP2000 uses a single PowerCon 3-pole AC main systems with locking connectors to prevent accidental disconnection. The main AC connectors (blue) serve as the power inputs.

The ESP2000 operates in either 115V, 230V or 250V modes. Although pre-configured at the factory, the unit's operating voltage mode can be changed in the field.

Voltage requirements

The ESP2000 operates safely and without audio discontinuity if the AC voltage stays within the operating window of 100V to 120V in 115V mode, 205V to 240V when working in 230V mode and 225 to 260V when working in 250V mode at 50 or 60Hz.

CAUTION: IF THE ON LED DOES NOT ILLUMINATE OR THE SYSTEM DOES NOT RESPOND TO AUDIO INPUT, REMOVE AC POWER IMMEDIATELY. VERIFY THAT THE VOLTAGE IS WITHIN THE PROPER RANGE. IF THE PROBLEM PERSISTS, PLEASE CONTACT KV2 AUDIO OR AN AUTHORIZED SERVICE CENTER.

If the voltage drops below the low boundary of its safe operating range, the amplifier will shut down if the voltage does not rise above the low boundary before storage circuits are depleted. How long the amplifier will continue to function during brownout depends on the amount of voltage drop and the audio source level during the drop. If the voltage increases above the upper boundary of the range, the power supply can be damaged.

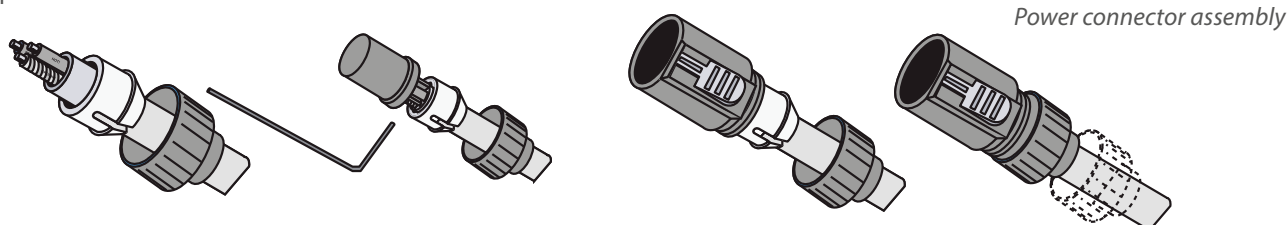
IT IS RECOMMENDED THAT THE VOLTAGE SUPPLY BE WITHIN THE RATED VOLTAGE WINDOW. THIS ENSURES THAT AC VOLTAGE VARIATIONS FROM THE SERVICE ENTRY - OR PEAK VOLTAGE DROPS DUE TO CABLE RUNS - DO NOT CAUSE THE AMPLIFIER TO CYCLE ON AND OFF OR CAUSE DAMAGE TO THE POWER SUPPLY.

FOR BEST PERFORMANCE, THE AC CABLE VOLTAGE DROP SHOULD NOT EXCEED 10 VOLTS, OR 10 PERCENT AT 115 VOLTS AND 5 PERCENT AT 230 OR 250 VOLTS.

Make sure that even with the AC voltage drop, the AC voltage always stays within recommended operating ranges. The minimum electrical service amperage required by an ESP2000 amplifier is the sum of each amplifiers maximum continuous rms current. An additional 50 percent above that amperage is recommended to prevent peak voltage drops at the service entry.

The Power Connector

The ESP2000 requires grounded outlets. It is very important that the amplifiers AC supply be properly grounded in order to operate safely and properly. Use the PowerCon AC cable-wiring diagram overleaf to create international or special-purpose power connectors:



Current Requirements

The ESP2000's power supply input requires approximately 20 Amps max at 115V AC for proper operation.

When operating in 230 V mode the ESP2000's power supply input requires approximately 10 Amps max.

The ESP2000 presents a dynamic load to the AC mains, which causes the amount of current to fluctuate depending on quiet or loud operating levels. Since different cables and circuit breakers heat up at varying rates, it is essential to understand the types of current ratings and how they correspond to circuit breaker and cable specifications.

The maximum long-term continuous current is the maximum rms current during a period of at least ten seconds. It is used to calculate the temperature rise in cables in order to select a cable size and gauge that conforms to electrical code standards. It is also used to select the rating for slow-reacting thermal breakers.

The burst current is the maximum rms current during a period of approximately one second, used to select the rating of most magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula:

$$V_{pk}(\text{drop}) = I_{pk} \times R(\text{cable total})$$

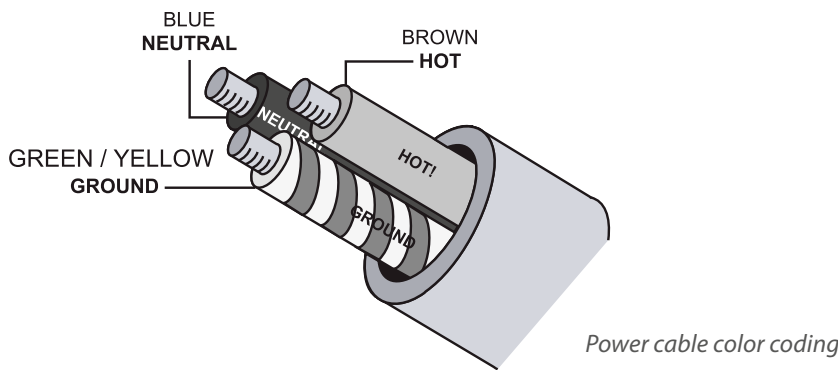
The ultimate short-term peak current is used to select the rating of fast reacting magnetic breakers. Use the table below as a guide when selecting cable gauge size and circuit breaker ratings for your operating voltage.

Current Draw

Current Draw	115V Mode	230V, 250V
Max Long Term Continuous	20 A rms	10 A rms
Burst Current	30 A rms	15 A rms
Short Term Peak	80 A peak	40 A peak

AC Cable Colour Coding

If the colours referred to in the diagram don't correspond to the terminals in your plug, use the following guidelines: Connect the blue wire to the terminal marked with an N or coloured black. Connect the brown wire to the terminal marked with an L or coloured red. Connect the green and yellow wire to the terminal marked with an E or coloured green or green and yellow.



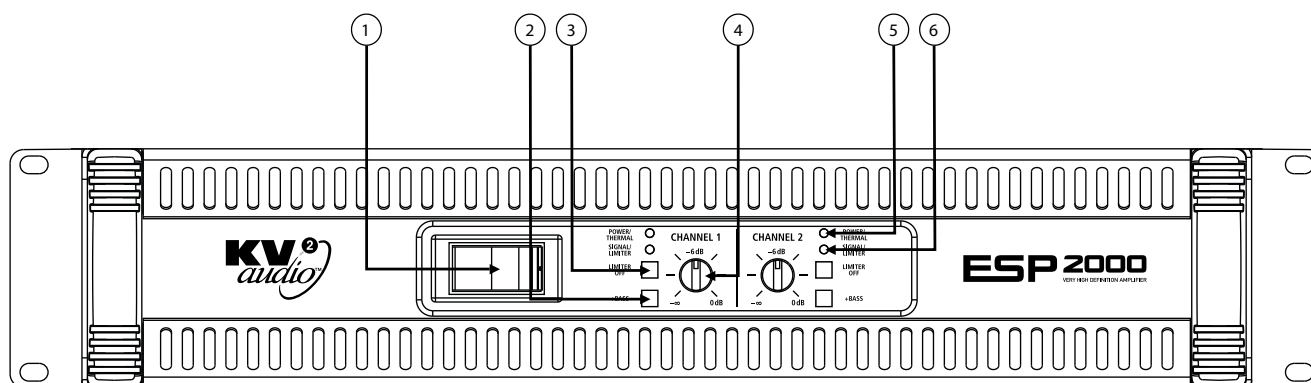
CAUTION: THE ESP2000 REQUIRES A GROUND CONNECTION. ALWAYS USE A GROUNDED OUTLET AND PLUG.

Safety Summary

To reduce the risk of electric shock, disconnect the amplifier from the AC mains before installing the audio cable. Reconnect the power cord only after making all signal connections. Connect the amplifier to a two pole, three wire grounding mains receptacle. The mains plug shall remain easy to operate. The amplifier must be powered from the same phase as other interconnected powered units.

The receptacle must be connected to a fuse or circuit breaker. Connection to any other type of receptacle poses a shock hazard and may violate local electrical codes. Do not allow water or any foreign object to get inside the amplifier. Do not put objects containing liquid on or near the unit. To reduce the risk of overheating the amplifier, avoid exposing it to direct sunlight. Do not install the unit near heatemitting appliances, such as a room heater or stove. This amplifier contains potentially hazardous voltages. Do not attempt to disassemble the unit. The unit contains no user serviceable parts, repairs should be performed.

Front Panel



1) AC Mains Switch

The ESP2000 has combination AC mains switch/circuit breakers on the front panel. If either of the switches shut off during normal use, push it back to the ON position once. If it will not stay on you should take the unit to qualified service personnel to have it serviced.

2) +Bass Switch

When depressed this switch activates a bass enhancement feature that increases the chosen channels output by 6dB at 60Hz. This is suitable for low frequency compensation when using passive speakers.

3) Limiter Switch

The ESP2000 features RMS limiting on each channel. This feature is active so long as the switch is left un-pressed. The RMS limiting is deactivated when the switch is depressed. The limiter constrains the continuous RMS power to approximately 350 W. It provides essential baseline protection against thermal overload of the loudspeaker drivers and is factory-set to match the characteristics of typically connected loudspeaker

4) Channel Input Level Adjustment

Each channel of the ESP2000 features an Input Level adjustment potentiometer that allows the user to individually adjust all four channel's input levels from 00 through -6dB in the vertical position and up to 0dB.

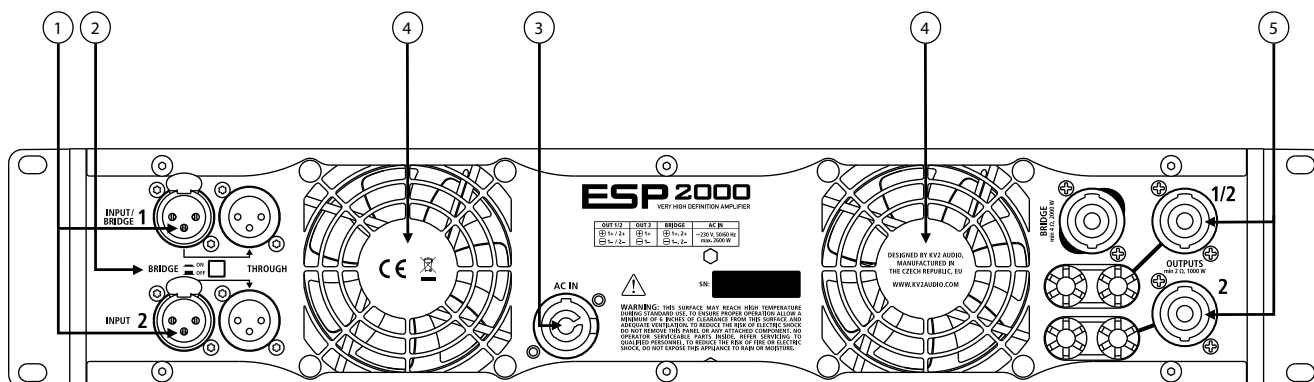
5) Power / Thermal

These are dual colour LED's. When green they indicate that the Power Switch is ON and that channel of the amplifier is powered up. When red they indicate that that channel has overheated and shut down. The unit will Auto Reset after it cools down to a safe operating temperature.

6) Signal Present / Limiter Indicator

These are dual colour LED's. When green they indicate that signal is present at the Input to that particular channel of the amplifier. When yellow they indicate that the audio limiter has been activated for that particular channel of the amplifier.

Rear Panel



1) Main Inputs

These are the input connectors for two channels with associated 'Through Output' connectors for sending signal to other devices.

2) Bridge Mono Mode

As well as being a high quality stereo channel amplifier solution the ESP2000 is capable of working in "Bridge Mono" mode. This requires the utilisation of two channels working together to produce a larger single output - suitable for driving large subwoofers or high powered full range boxes. Use channel INPUT 1 only as bridge mode input, INPUT 2 is unconnected. For speaker output use the dedicated BRIDGE Speakon 4pin connector (1,2 pins wired in parallel or plug positive speaker input pin at positive (RED) OUTPUT 1 and negative speaker pin at positive (RED) OUTPUT 2.

IF BRIDGE MONO IS YOUR SPECIFIC REQUIREMENT, PARTICULARLY DRIVING SUBWOOFERS, YOU MAY PREFER TO UTILISE A KV2 AUDIO VHD3200 SUBWOOFER AMPLIFIER WHICH WILL OFFER THE SAME POWER OUTPUT BUT WITH IMPROVED PERFORMANCE. FOR APPLICATIONS WHERE THE HIGH POWERED LOUDSPEAKER LOAD IS REQUIRED TO PRODUCE A FULL RANGE SIGNAL, INCLUDING MID AND HIGH FREQUENCY REPRODUCTION ABOVE 1KHZ AN ESP2000 WILL OFFER SUPERIOR RESULTS.

3) PowerCon Power Connectors

The ESP2000 accept standard PowerCon terminated AC Mains cables. The ESP2000 uses one connector per two channels.

4) Fans

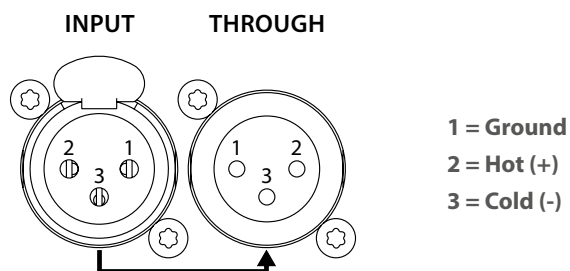
The cooling fans operate continuously while the ESP2000 is on. An internal temperature sensor increases the speed of the fans during high temperature conditions. Air enters through the front grille and exits through the rear. Be sure to allow adequate air flow to the front of the rack in which the ESP2000 is mounted.

5) Main Outputs

Each channel of the ESP2000 and is equipped with binding posts and Neutrik Speakon® 4pin connectors on the Main Outputs. The minimum recommended output is 2Ω. When running in Bridge Mono Mode 4Ω. For maximum versatility, Output 1/2 features dual-channel wiring, Output 2 operates in single-channel mode, and the Bridge output is configured with parallel wiring. Please refer to the Connector wiring section.

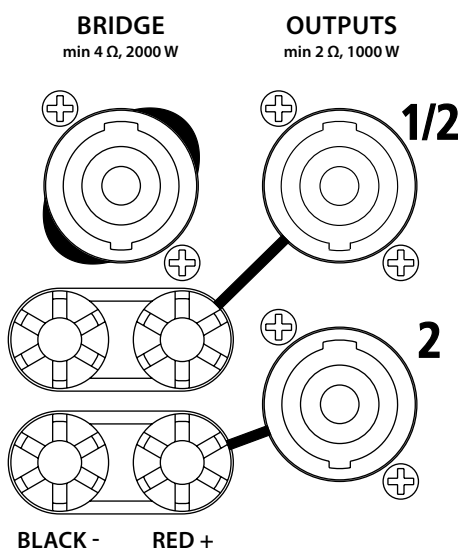
Input Connectors

XLR Balanced Input and Through Output connectors.



Output Connectors

Each channel of the ESP2000 and is equipped with binding posts and Neutrik Speakon® 4pin connectors.



Speakon

Output 1/2 features dual-channel wiring
Output 2 operates in single-channel mode
Bridge output is configured in parallel wiring

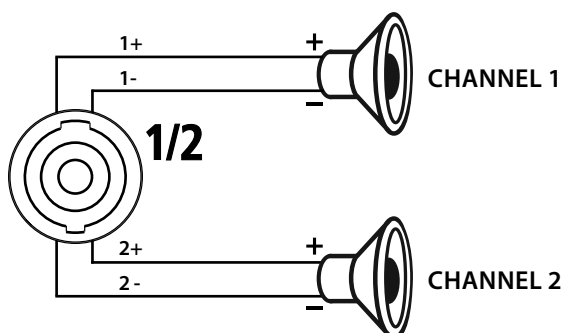
OUT 1/2	OUT 2	BRIDGE
⊕ 1+ / 2+	⊕ 1+	⊕ 1+, 2+
⊖ 1- / 2-	⊖ 1-	⊖ 1-, 2-

Binding posts

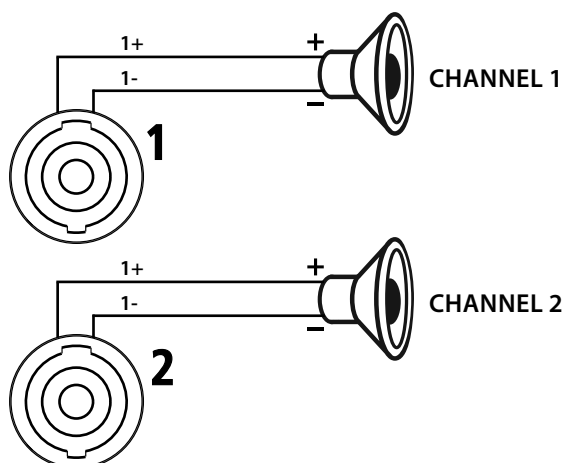
Binding posts outputs (BLACK -, RED +)
are wired in parallel with Speakon Outputs.

For bridged connection, use only the + outputs (RED):
Channel 1 output +, Channel 2 output -.

Output 1/2, Dual-channel wiring (4 core cable)



Output 1, Output 2, Single channel wiring (2x 2 core cable)



Specifications

System Acoustic Performance

-1dB Response	3Hz to 40kHz
Channel Crosstalk	>70dB
Signal to Noise Ratio	>115dB
Total Harmonic Distortion	<0.005% (1W) / <0.01% (clip -1dB)

Output Channels

Amplifier Type	High Efficiency, Emitter coupled
Number of Channels	2
Total Output Power	2000W
Max. Output Voltage	78V (peak) per channel
Max. Output Current	48A (peak) per channel
Minimum load impedance per channel	2Ω
Out. Power 16Ω - 1 channel / 2 channels loaded	175W / 160W (RMS)
Out. Power 8Ω - 1 channel / 2 channels loaded	340W / 300W (RMS)
Out. Power 4Ω - 1 channel / 2 channels loaded	600W / 500W (RMS)
Out. Power 2Ω - 1 channel / 2 channels loaded	1000W / 800W (RMS)
Out. Power 16Ω - bridged	600W (RMS)
Out. Power 8Ω - bridged	1000W (RMS)
Out. Power 4Ω - bridged	1500W (RMS), 2000W short term

Signal Input

Input Channels	XLR
Input Sensitivity	1.55V RMS
Input Impedance	20kΩ (balanced)
Signal Output	XLR Through

Speaker Input

Speaker Output	Neutrik Speakon®, 2x Binding posts
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Features

Level Control	-∞ to 0dB
Loudness bass enhancement	+6dB @ 60Hz
RMS Limiter	On / Off
Indicators	Power ON/Thermal, Signal/Limiter

Power

Power Connector	Neutrik PowerCon®
Operating Voltage	115V / 230V / 250V
Operating Voltage Range	100 to 120V@60Hz 205 to 240V@50Hz 225 to 260V@50Hz
Recommended Amperage	20A 115V 10A 230V 10A 250V
Soft Start	YES
Protection	Thermal breaker
Cooling	2x temperature controlled fans

Physical Dimensions

Height	88 mm (3.5"), 2RU
Width	482.6 mm (19.00")
Depth	496.4 mm (19.54")
Weight	18.8 kg (41.23 lbs)

Speakon speaker cable 4.15

part name:
CABLE SPEAKON 4.15
part number:
KVV 987 326
description:
- 4 wire speaker cable
- Speakon NL4FX connectors
- 1,5m (5ft)



Speakon speaker cable 4.40

part name:
CABLE SPEAKON 4.40
part number:
KVV 987 327
description:
- 4 wire speaker cable
- Speakon NL4FX connectors
- 4m (13ft)



Speaker cables

part name:
Round Flexible Speaker Cable
- cross section $2 \times 1.5 \text{ mm}^2$
- sold by length (1–500 m)
part number:
WX 002



part name:
Round Flexible Speaker Cable
- cross section $4 \times 2.5 \text{ mm}^2$
- sold by length (1–500 m)
part number:
WX 003



part name:
SPEAKON NL4
part number:
KA 027



Recommended maximum speaker cable length

MINIMUM CROSS SECTION [mm²]	LENGTH [m], impedance 4Ω	LENGTH [m], impedance 8Ω	LENGTH [m], impedance 16Ω
1.5	8	15	30
2.5	15	30	60
2 x 2.5	20	40	90
4	25	50	100

Warranty

Your ESP2000 is covered against defects in material and workmanship.

Refer to your supplier for more details.

Service

In the unlikely event that your ESP2000 develops a problem, it must be returned to an authorized distributor, service centre or shipped directly to our factory. Because of the complexity of the design and the risk of electrical shock, all repairs must be attempted only by qualified technical personnel.

If the unit needs to be shipped back to the factory, it must be sent in its original carton. If improperly packed, the unit may be damaged.

To obtain service, contact your nearest KV2 Audio Service Centre, Distributor or Dealer.



The Future of Sound.
Made Perfectly Clear.

KV2 Audio International

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