



EX Series Subwoofers

User Guide

• EX1.2MkII • EX1.5 • EX1.8 • EX2.2 • EX2.5MkII



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.

EX Series Subwoofers · Important Safety Instructions

Important Safety Instructions

Before using your EX Series Subwoofers, 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. The AC mains plug or appliance coupler shall remain readily accessible for operation.
12. Only use accessories specified by KV2 Audio.
13. Install the product only with rigging specified by KV2 Audio, or sold with the loudspeaker.
14. Unplug this loudspeaker during lightning storms or when unused for long periods of time.
15. Refer all servicing to qualified service personnel. Servicing is required when the loudspeaker 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 loudspeaker; rain or moisture has entered the loudspeaker; the loudspeaker has been dropped; or when for undetermined reasons the loudspeaker does not operate normally.
16. Do not remove front or back panels. Removal of the panel will expose hazardous voltages. There are no user serviceable parts inside and removable may void the warranty.
17. An experienced user shall always supervise this professional audio equipment.

**CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE THE PANELS.
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.

SAFETY SUMMARY

To reduce the risk of electric shock, disconnect the loudspeaker from the AC mains before installing audio cable. Reconnect the power cord only after making all signal connections. Connect the loudspeaker to a twopole, three-wire grounding mains receptacle. 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 loudspeaker. Do not put objects containing liquid on or near the unit. To reduce the risk of overheating the loudspeaker, avoid exposing it to direct sunlight. Do not install the unit near heat-emitting appliances, such as a room heater or stove. This loudspeaker contains potentially hazardous voltages. Do not attempt to disassemble the unit. The unit contains no user serviceable parts, repairs should be performed only by factory trained service personnel.

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EX1.2MkII

BASS MODULE

Ultra Compact Active Subwoofer

*High Efficiency, Current Enhancing,
Switch Mode Technology*

part number
KVV 987 360 (230V)
KVV 987 359 (115V)



Application

Specifically designed to accompany and compliment the EX6/EX10 as a true full range system

- For fixed installation
- Bars, restaurants and small entertainment projects
- Small footprint and dimensions allow placement under seating and fixtures

Introduction

The EX1.2MkII is a small single 12" active subwoofer system. Employing passive cooling the EX1.2MkII boasts output that belies its compact, low profile cabinet size, as with all KV2 Audio products. The enclosure dimensions makes it ideal for discreet installations, as it can be installed either horizontally or vertically under seating and in furniture surrounds. Featuring KV2 Audio's switching amplifier technology, the EX1.2MkII delivers tight, fast and controlled bass response at very high output levels from an impressively conservative cabinet footprint.

Electronics

Amplifier power, electronic crossovers, equalization and speaker protection are integrated into the EX1.2MkII's amplifier module. On-board electronics ensures fast, easy set up and complete control making it easy to setup and provides long-term reliability. An improved version of KV2 Audio's switch mode, current enhancing low frequency amplifier has been specially developed for the EX1.2MkII. The new design improves overall system efficiency to over 90% and delivers 500 watts of continuous power.

KV2 Audio has developed an amplifier topology that possesses two unique characteristics that are critically important for high performance, active subwoofer systems. The EX1.2MkII amplifier topology delivers very high efficiency and generates minimal thermal losses allowing the amplifier to deliver extremely high power levels reliably whilst employing a simple cooling system.

Secondly, in order to reproduce low frequency information with high transient content and extend the operational boundaries of the acoustic design, the amplifier needs to deliver an extraordinary amount of current in order to keep the woofer's high mass under control. This is especially true under typical "phase shift" conditions, in which the amount of the current requirement is sometimes doubled. Through the implementation of a proprietary, switch mode amplifier technology, the EX1.2MkII amplifier provides extremely high efficiency with low losses and delivers the highest woofer control by delivering higher current levels under "phase shift" conditions.

Acoustic Components

The EX1.2MkII's woofer technology is based around high efficiency, high power woofer designs. The device features: high temperature polyimide voice coil assemblies that undergo multiple baking and curing processes as well as advanced magnetic structures with complex cooling systems. The woofer cones have been specially developed to withstand the demanding environment created by the high acoustic loading inside the EX1.2MkII chambers. The EX1.2MkII was designed using new concepts in twin asymmetrical acoustic chambers that deliver very high speaker loading and output from a relatively small cabinet footprint. It is ideal for use in live applications that require reproduction of low frequencies with very high transient content at high output levels.

Enclosure Design

There are four industrial grade, internal braces two placed at the top and two at the bottom of the cabinet. Each brace is held in place by four M8 bolt and feature two M10 hang points providing a wide range of installation and suspension flexibility. There is also a standard 33mm pole mount "top hat" located on the top side of the cabinet.

AC Power

The EX1.2MkII is an advanced self-powered loudspeaker system with on-board amplification and control systems. Understanding power distribution, voltage and current requirements, as well as electrical safety issues, is critical to the safe operation of the EX1.2MkII.

The EX1.2MkII uses a PowerCon 3-pole AC main system with locking connectors to prevent accidental disconnection. The main AC connector (blue) serves as the power input.

The EX1.2MkII operates in either 115V or 230V modes. Although pre-configured at the factory, the unit's operating voltage mode can be changed in the field.

Voltage Requirements

The EX1.2MkII operates safely and without audio discontinuity if the AC voltage stays within the operating window of 100V to 120V in 115V mode and 205V to 250V when working in 230V mode, at 50 or 60Hz.

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 loudspeaker will shut down if the voltage does not rise above the low boundary before storage circuits are depleted. How long the loudspeaker 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.

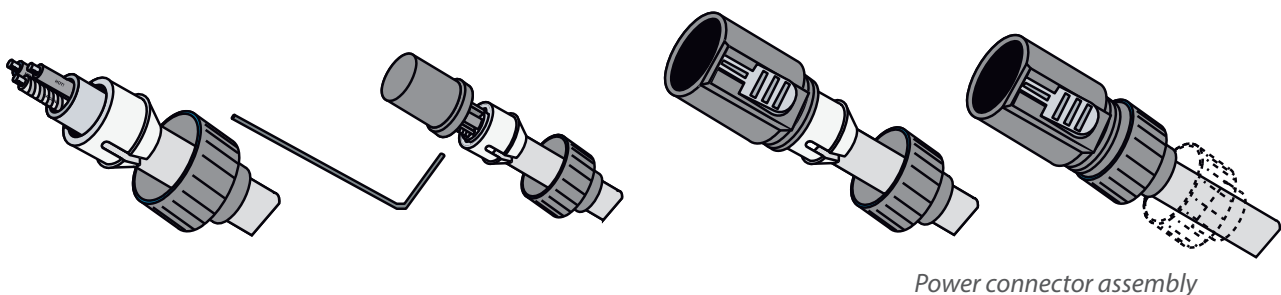
It is recommended that the voltage supply be within the rated voltage window. This ensures that AC voltage variations from the service entry-or peak voltage drops due to cable runs-do not cause the amplifier to cycle on and off or cause damage to the power supply.

For best performance, the AC cable voltage drop should not exceed 10 volts, or 10 percent at 115 volts and 5 percent at 230 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 a EX1.2MkII speaker system is the sum of each loudspeaker's maximum continuous rms current. An additional 50 percent above the minimum amperage is recommended to prevent peak voltage drops at the service entry.

The Power Connector

The EX1.2MkII requires a grounded outlet. It is very important that the loudspeaker AC supply be properly grounded in order to operate safely and correctly. Use the PowerCon AC cable-wiring diagram on page 7 to create international or specialpurpose power connectors:



Power connector assembly

Current Requirements

Each EX1.2MkII requires approximately 115V AC for proper operation. This allows two EX1.2MkII to be powered from one 16A breaker at 115V and up to four subwoofers at 230V.

The EX1.2MkII 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 consumption 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.

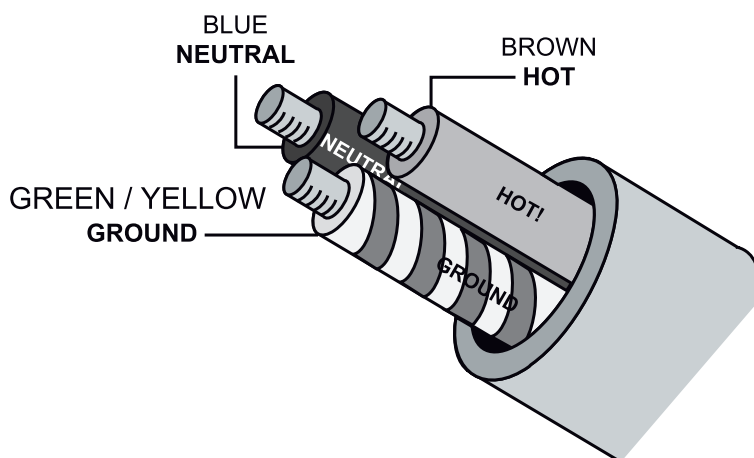
The burst current consumption is the maximum rms current during a period of approximately one second, used to select the rating of most magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula: $V_{pk}(\text{drop}) = I_{pk} \times R(\text{cable total})$.

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	115V Mode	230V Mode
Max Long Term Continuous	4A rms	2A rms
Burst Current	8A rms	4A rms
Short Term Peak	20A peak	10A peak

AC Cable Color Coding

If the colors 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 a N or colored black. Connect the brown wire to the terminal marked with a L or colored red. Connect the green and yellow wire to the terminal marked with a E or colored green or green and yellow.*

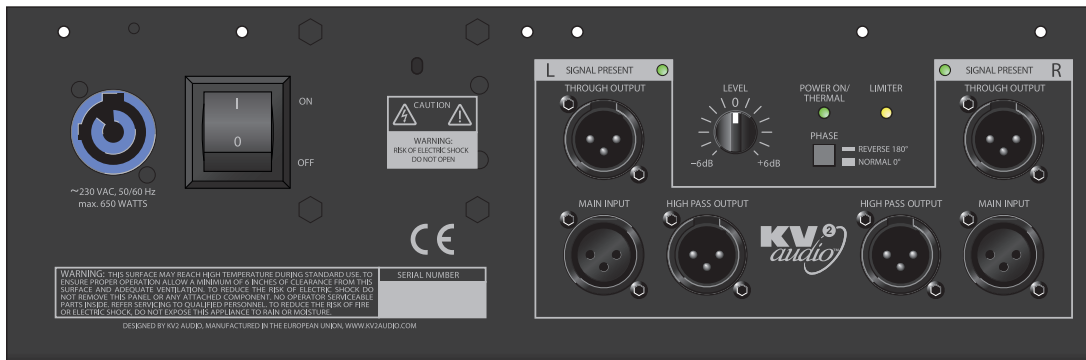


Power cable color coding

The EX1.2MkII requires a ground connection. Always use a grounded outlet and plug.

The EX1.2MkII Control Panel

The EX1.2MkII features an easy to use rear control panel featuring audio input and output connections, level control, LED status lights and a phase switch, that changes the phase of the high pass audio output signal. This serves as a tool for integrating the full range cabinet and the subwoofer into challenging audio environments.



EX1.2MkII Rear panel

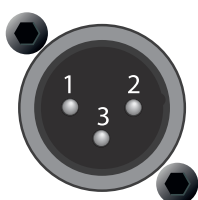
Audio Input and Output

The EX1.2MkII uses balanced, female XLR connectors for audio signal input, and a male XLR connector to provide through output signal. The EX1.2MkII features Left and Right stereo inputs and outputs allowing the product to be integrated into stereo systems that require one subwoofer.

The EX1.2MkII also features Left and Right High Pass Outputs that can be used to provide audio signal to full range speakers being used in conjunction with the EX1.2MkII. The high pass filter provides a crossover point of 125Hz. The through output connector, wired in parallel to the audio input, will continue to provide the input signal if the EX1.2MkII is turned off. The audio input circuit presents a 20 kOhm balanced input impedance to a three-pin XLR connector with the following connectors:



Main input



Through output

- Pin 1 - Ground
- Pin 2 - Signal (+)
- Pin 3 - Signal (-)

Case - Earth (AC) ground and chassis

Audio signal can be daisy-chained using the through output connector on the input panel. A single source can drive multiple EX1.2MkII subwoofers with a paralleled input loop. If you are driving multiple EX1.2MkII's in an array, make certain that the source device can drive the total load impedance presented by the paralleled input circuit of the array.

Most source equipment is safe for driving loads no smaller than 10 times the source's output impedance. For example, cascading an array of 10 units consisting of EX1.2MkII subwoofers produces an input impedance of 2000 ohms (20kOhms divided by 10). The source equipment should have output impedance of 200 ohms or less. This is also true when connecting EX1.2MkII's in parallel (loop out) with other KV2 Audio amplifiers, active speakers and subwoofers.

If the loudspeaker produces noises such as hiss and popping, disconnect the audio cable from the loudspeaker, if the noise stops, then most likely the problem is not with the loudspeaker. Check the audio cable, source, and AC power for the source of the problem.

Ensure that all cabling carrying signal to multiple amplifiers and active speaker systems is wired correctly. Make sure that the polarity has not been reversed. Reversed polarity can cause severe degradation in frequency response and can also impact the dispersion characteristics of the speaker.

Amplifiers and Acoustic Filters

A power amplifier specifically designed and optimized for the low frequency woofer powers the EX1.2MkII . The control system in the EX1.2MkII processes the audio signal through a series of electronic filters and circuits providing equalization, crossover filters, thermal and overdrive protection.

LED Status Lights

The EX1.2MkII control panel uses three distinct LED's to provide operating status information.

Power On / Thermal LED

This LED turns green when the speaker is turned ON. The light will continue to be green during normal operation of the speaker system. The LED will change from green to yellow under a thermal condition resulting from overheating of the amplifier system. Under this condition, the speaker system will shut down. You can expect for the system to be down for at least 2-3 minutes depending the ambient temperature and whether the system is being exposed to direct sun light.

Signal

There are individual LED's for each the Left and Right signal inputs. The LED turns green when there is audio signal present in the EX1.2MkII. This signal indicator can be used to troubleshoot wiring problems.

Limiter

Should the rms limiting system be engaged due to overdriving of the EX1.2MkII, the LED will light up yellow. The audible effect of the rms limiter is a lowering of overall output level. The rms limiter will disengage only if the input level is turned down.

Please contact KV2 Audio or a local service representative should the system enter a thermal condition under normal operating conditions.

Phase Switch

The EX1.2MkII features a phase switch that changes the phase of the high pass audio output signal. Changing the phase of the output signal serves as a tool for integrating the full range cabinet and the subwoofer into challenging audio environments. We recommend using a suitable measuring device for performing relevant measurements and determining whether the phase should be reversed.

Level Control

The EX1.2MkII features a rotary control knob providing adjustment of the audio level. The operational range of the control is -6dB to +6dB.

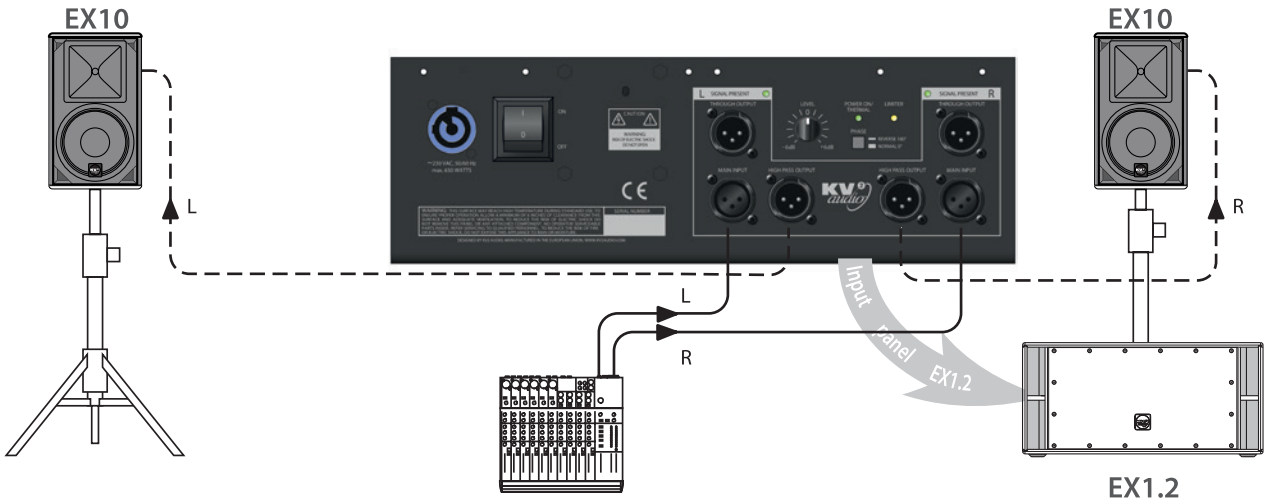
Specifications

System Acoustic Performance	
Max SPL Long-term	124dB
Max SPL Peak	127dB
-3dB Response	38Hz to 120Hz
-10dB Response	32Hz to 120Hz
Crossover Point	120Hz
Low Frequency Section	
Acoustic Design	Twin Asymmetrical loading
Woofer Size / Voice Coil Diameter / Design	12" / 3" / Inside outside
Magnet Type	Neodymium
Diaphragm Material	Epoxy Reinforced Cellulose
Low Frequency Amplifier Specification	
Type	High efficiency, Current-enhancing switch mode
Rated Continuous Power	500W
Distortion	<0.05%
Signal Input	
Input Sensitivity	1.0V RMS
Input Impedance	20k Ω (balanced)
Power Requirements	
Power Connector	Neutrik PowerCon [®]
Operating Voltage	115V / 230V
Operating Voltage Range	100 to 120V@60Hz 205 to 250V@50Hz
Recommended Amperage	4A 115V 2A 230V
Cabinet	
Cabinet Material	Baltic birch
Handles	2
Pole Mount	M20
Color	"Orange peeled" Matt Black or any RAL
Physical Dimensions	
Height	370 mm (14.57")
Width	800 mm (31.49")
Depth	400 mm (15.75")
Weight	32 kg (70.5lbs)

Single Subwoofer Configuration

Connection of two mid-hi EX10 cabinets with single active subwoofer EX1.2MkII and mixing console.

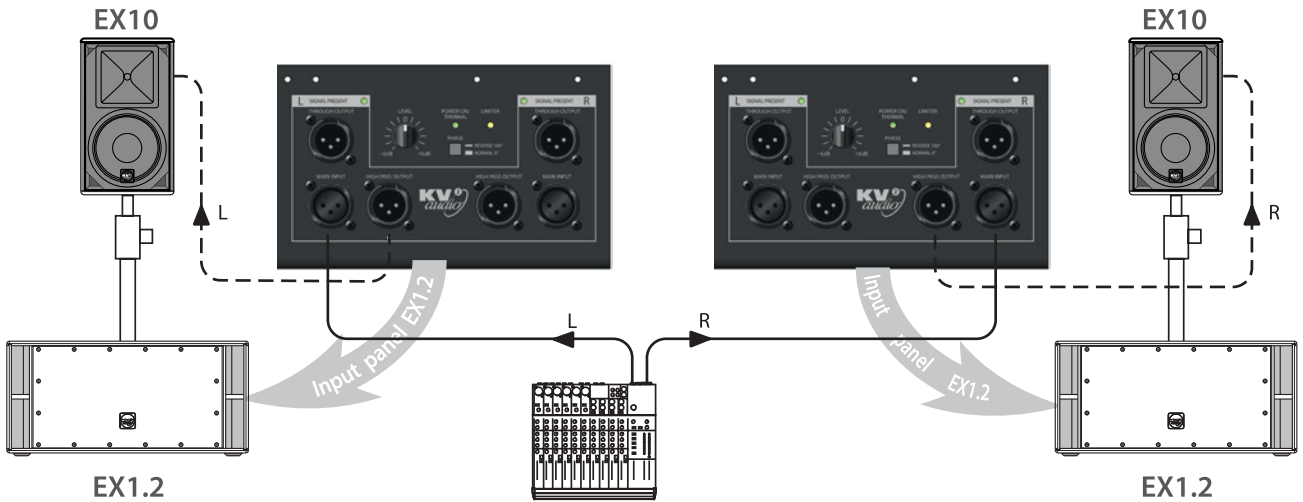
The EX1.2MkII features two channel active crossover, input L and R signals are summed together under crossover frequency and then feeding subwoofer. Signal over crossover frequency are separated and connected through XLR L,R HI PASS outputs



Two Subwoofers Configuration

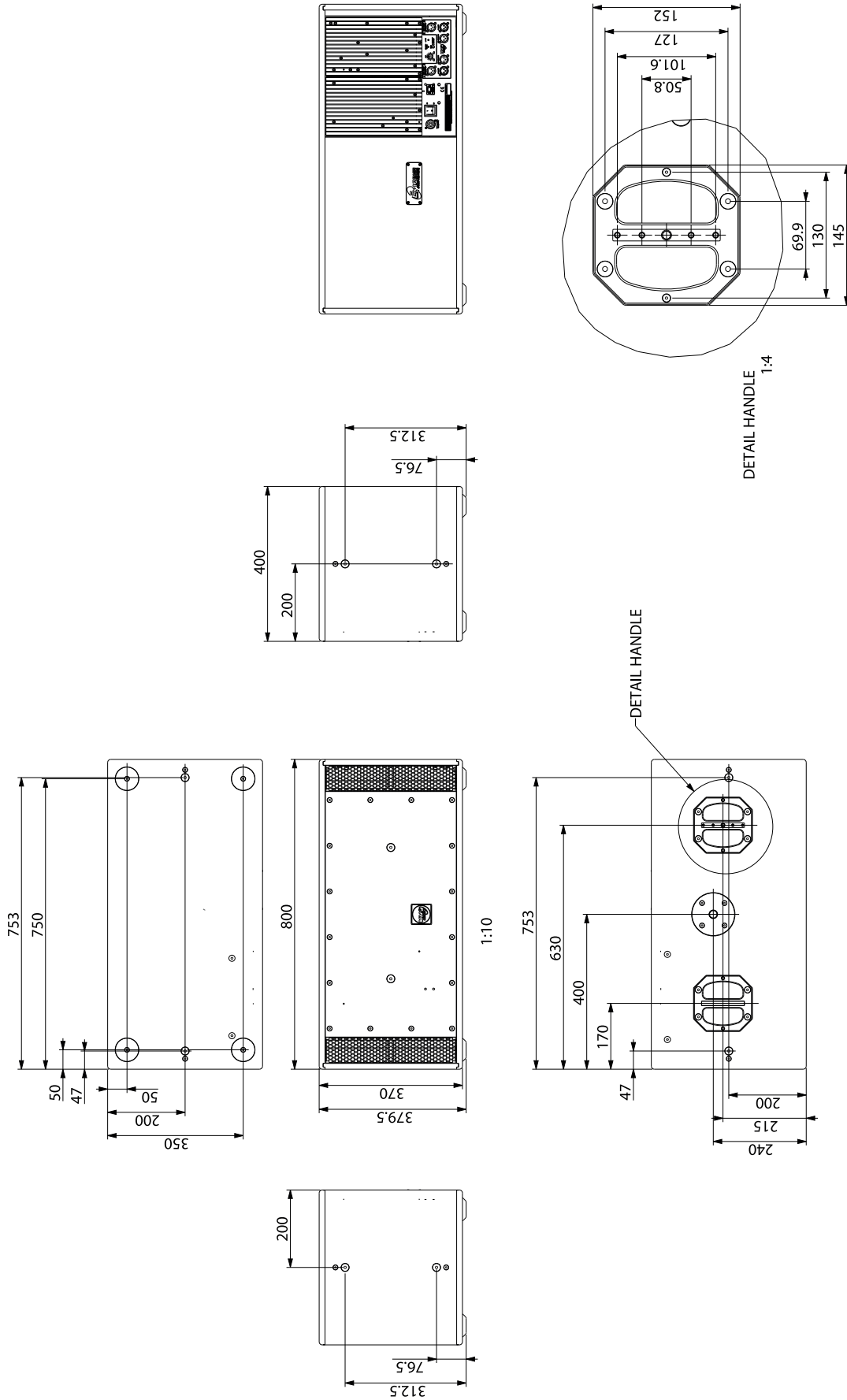
Connection of two mid-hi EX10 cabinets with two active subwoofers EX1.2MkII and mixing console.

The EX1.2MkII features two channel active crossover, each channel uses one EX1.2MkII as a crossover.



EX1.2MkII · Using Multiple Boxes

Drawings



EX1.5 BASS MODULE

500 Watt 15" active subwoofer

*High Efficiency, Current Enhancing,
Switch Mode Technology*

part number
KVV 987 264 (230V)
KVV 987 265 (115V)



Application

Specifically designed to accompany and compliment the EX10 / EX12 as a true full range high output system

- Portable PA applications
- Fixed Installations
- Scalable into multiple-larger systems
- Easy to add to existing systems

Introduction

The EX1.5 is a compact active subwoofer system featuring a single 15" neodymium woofer and a 500-watt high efficiency power amplifier. Offering a peak SPL in excess of 130dB, the EX1.5 produces considerable output, yet in true KV2 style retains a small footprint. A great all round subwoofer that will compliment any speaker system with tight and dynamic bass. Designed to be both robust and easily transported, the EX1.5 sets the standard in active single 15" subwoofers.

Electronics

Amplifier power, electronic crossovers, equalization and speaker protection are integrated into the EX1.5's amplifier module. On-board electronics ensures fast, easy set up and complete control making it easy to set up and provides long-term reliability. An improved version of KV2 Audio's switch mode, current enhancing low frequency amplifier has been specially developed for the EX1.5. The new design improves overall system efficiency to over 90% and delivers 1000 watts of continuous power.

KV2 Audio has developed an amplifier topology that possesses two unique characteristics that are critically important for high performance, active subwoofer systems. The EX1.5 amplifier topology delivers very high efficiency and generates minimal thermal losses allowing the amplifier to deliver extremely high power levels reliably whilst employing a simple cooling system.

Secondly, in order to reproduce low frequency information with high transient content and extend the operational boundaries of the acoustic design, the amplifier needs to deliver an extraordinary amount of current in order to keep the woofer's high mass under control. This is especially true under typical "phase shift" conditions, in which the amount of the current requirement is sometimes doubled. Through the implementation of a proprietary, switch mode amplifier technology, the EX1.5 amplifier provides extremely high efficiency with low losses and delivers the highest woofer control by delivering higher current levels under "phase shift" conditions.

The amplifier module is fitted onto a large format, finned, aluminum alloy heat sink providing high flow, passive cooling and eliminating standard maintenance cycles associated with forced cooled amplifier designs. The entire mechanical assembly is fitted on a mechanical suspension system that isolates low frequency energy and ensures long-term reliability.

Acoustic Components

The EX1.5's woofer technology is based around high efficiency, high power woofer designs. The device features: high temperature polyimide voice coil assemblies that undergo multiple baking and curing processes as well as advanced magnetic structures with complex cooling systems. The woofer cones have been specially developed to withstand the demanding environment created by the high acoustic loading inside the EX1.5 chambers. The EX1.5 was designed using new concepts in twin asymmetrical acoustic chambers that deliver very high speaker loading and output from a relatively small cabinet footprint. It is ideal for use in live applications that require reproduction of low frequencies with very high transient content at high output levels.

Enclosure Design

There are two industrial grade, internal braces placed at the top of the cabinet. Each brace is held in place by four M8 bolt and feature two M10 hang points providing a wide range of installation and suspension flexibility. There is also a pole mount "top hat" located on the top side of the cabinet.

AC Power

The EX1.5 is an advanced self-powered loudspeaker system with on-board amplification and control systems. Understanding power distribution, voltage and current requirements, as well as electrical safety issues, is critical to the safe operation of the EX1.5.

The EX1.5 uses a PowerCon 3-pole AC main system with locking connectors to prevent accidental disconnection. The main AC connector (blue) serves as the power input.

The EX1.5 operates in either 115V or 230V modes. Although pre-configured at the factory, the unit's operating voltage mode can be changed in the field.

Voltage Requirements

The EX1.5 operates safely and without audio discontinuity if the AC voltage stays within the operating window of 100V-130V in 115V mode and 200V-250V when working in 230V mode, at 50 or 60Hz.

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 loudspeaker will shut down if the voltage does not rise above the low boundary before storage circuits are depleted. How long the loudspeaker 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.

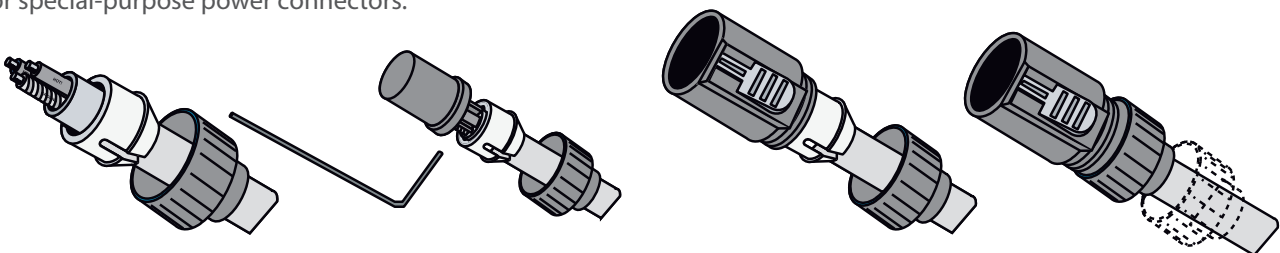
It is recommended that the voltage supply be within the rated voltage window. This ensures that AC voltage variations from the service entry-or peak voltage drops due to cable runs-do not cause the amplifier to cycle on and off or cause damage to the power supply.

For best performance, the AC cable voltage drop should not exceed 10 volts, or 10 percent at 115 volts and 5 percent at 230 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 a EX1.5 system is the sum of each loudspeaker's maximum continuous rms current. An additional 50 percent above the minimum amperage is recommended to prevent peak voltage drops at the service entry.

The Power Connector

The EX1.5 requires a grounded outlet. It is very important that the loudspeaker AC supply be properly grounded in order to operate safely and correctly. Use the PowerCon AC cable-wiring diagram on page 16 to create international or special-purpose power connectors:



Power connector assembly

Current Requirements

Each EX1.5 requires approximately 10 Amps max at 115V AC for proper operation. This allows one EX1.5 to be powered from one 15 A breaker at 115 V and up to 2 subwoofers at 230 V.

The EX1.5 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 consumption 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 slowreacting thermal breakers.

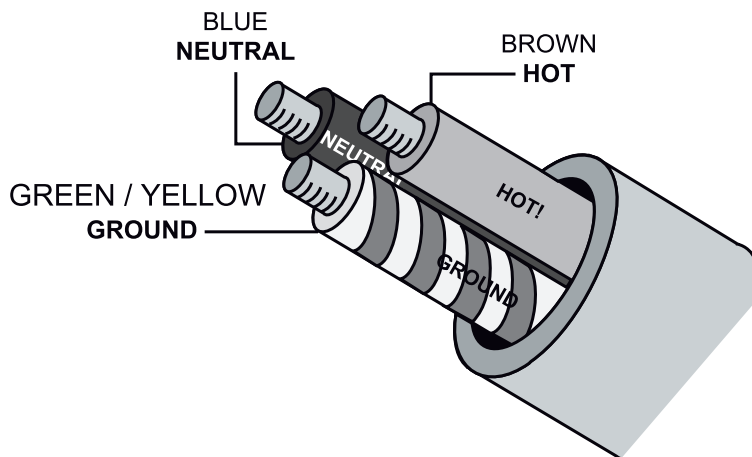
The burst current consumption is the maximum rms current during a period of approximately one second, used to select the rating of most magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula: $V_{pk}(\text{drop}) = I_{pk} \times R(\text{cable total})$.

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	115V Mode	230V
Max Long Term Continuous	4A rms	2A rms
Burst Current	8A rms	4A rms
Short Term Peak	20A peak	10A peak

AC Cable Color Coding

If the colors 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 a N or colored black. Connect the brown wire to the terminal marked with a L or colored red. Connect the green and yellow wire to the terminal marked with a E or colored green or green and yellow.*

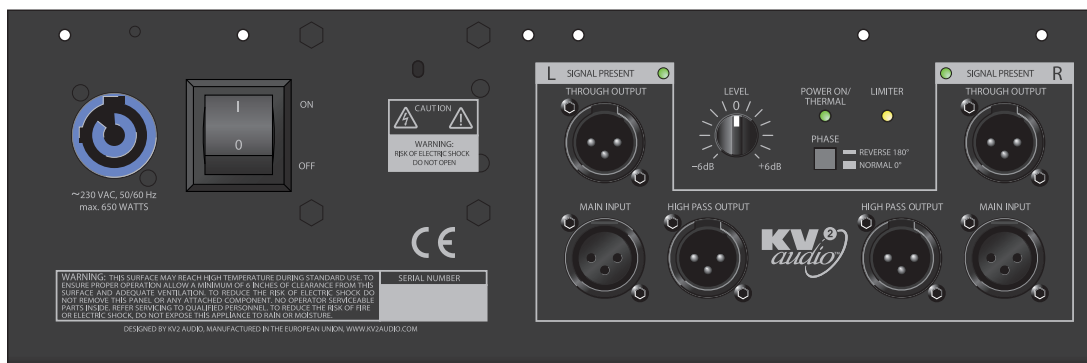


Power cable color coding

The EX1.5 requires a ground connection. Always use a grounded outlet and plug.

The EX1.5 Control Panel

The EX1.5 features an easy to use rear control panel featuring audio input and output connections, level control, LED status lights and a low pass filter that can be engaged when the loudspeaker is used as a stage monitoring device.



EX1.5 Rear panel

Audio Input and Output

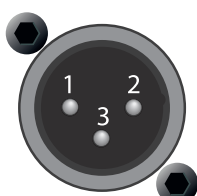
The EX1.5 uses balanced, female XLR connectors for audio signal input, and a male XLR connector to provide through output signal. The EX1.5 features Left and Right stereo inputs and outputs allowing the product to be integrated into stereo systems that require one subwoofer.

The EX1.5 also features Left and Right High Pass Outputs that can be used to provide audio signal to full range speakers being used in conjunction with the EX1.5. The high pass filter provides a crossover point of 125Hz.

The through output connector, wired in parallel to the audio input, will continue to provide the input signal if the EX1.5 is turned off. The audio input circuit presents a 20 kOhm balanced input impedance to a three-pin XLR connector with the following connectors:



Main input



Through output

- Pin 1 - Ground
- Pin 2 - Signal (+)
- Pin 3 - Signal (-)

Case - Earth (AC) ground and chassis

Audio signal can be daisy-chained using the through output connector on the input panel. A single source can drive multiple EX1.5 subwoofers with a paralleled input loop. If you are driving multiple EX1.5's in an array, make certain that the source device can drive the total load impedance presented by the paralleled input circuit of the array.

Most source equipment is safe for driving loads no smaller than 10 times the source's output impedance. For example, cascading an array of 10 units consisting of EX1.5 subwoofers produces an input impedance of 2000 ohms (20kOhms divided by 10). The source equipment should have output impedance of 200 ohms or less. This is also true when connecting EX1.5's in parallel (loop out) with other KV2 Audio amplifiers, active speakers and subwoofers.

If the loudspeaker produces noises such as hiss and popping, disconnect the audio cable from the loudspeaker, if the noise stops, then most likely the problem is not with the loudspeaker. Check the audio cable, source, and AC power for the source of the problem.

Ensure that all cabling carrying signal to multiple amplifiers and active speaker systems is wired correctly. Make sure that the polarity has not been reversed. Reversed polarity can cause severe degradation in frequency response and can also impact the dispersion characteristics of the speaker.

Amplifiers and Acoustic Filters

A power amplifier specifically designed and optimized for the low frequency woofer powers the EX1.5. The control system in the EX1.5 processes the audio signal through a series of electronic filters and circuits providing equalization, crossover filters, thermal and overdrive protection.

LED Status Lights

The EX1.5 control panel uses three distinct LED's to provide operating status information.

Power On / Thermal LED

This LED turns green when the speaker is turned ON. The light will continue to be green during normal operation of the speaker system. The LED will change from green to yellow under a thermal condition resulting from overheating of the amplifier system. Under this condition, the speaker system will shut down. You can expect for the system to be down for at least 2-3 minutes depending the ambient temperature and whether the system is being exposed to direct sun light.

Signal

There are individual LED's for each the Left and Right signal inputs. The LED turns green when there is audio signal present in the EX1.5. This signal indicator can be used to troubleshoot wiring problems.

Limiter

There are individual LED's for each the Left and Right signal inputs. The LED turns green when there is audio signal present in the EX1.5. This signal indicator can be used to troubleshoot wiring problems.

Please contact KV2 Audio or a local service representative should the system enter a thermal condition under normal operating conditions.

Phase Switch

The EX1.5 features a phase switch that changes the phase of the high pass audio output signal. Changing the phase of the output signal serves as a tool for integrating the full range cabinet and the subwoofer into challenging audio environments. We recommend using a suitable measuring device for performing relevant measurements and determining whether the phase should be reversed.

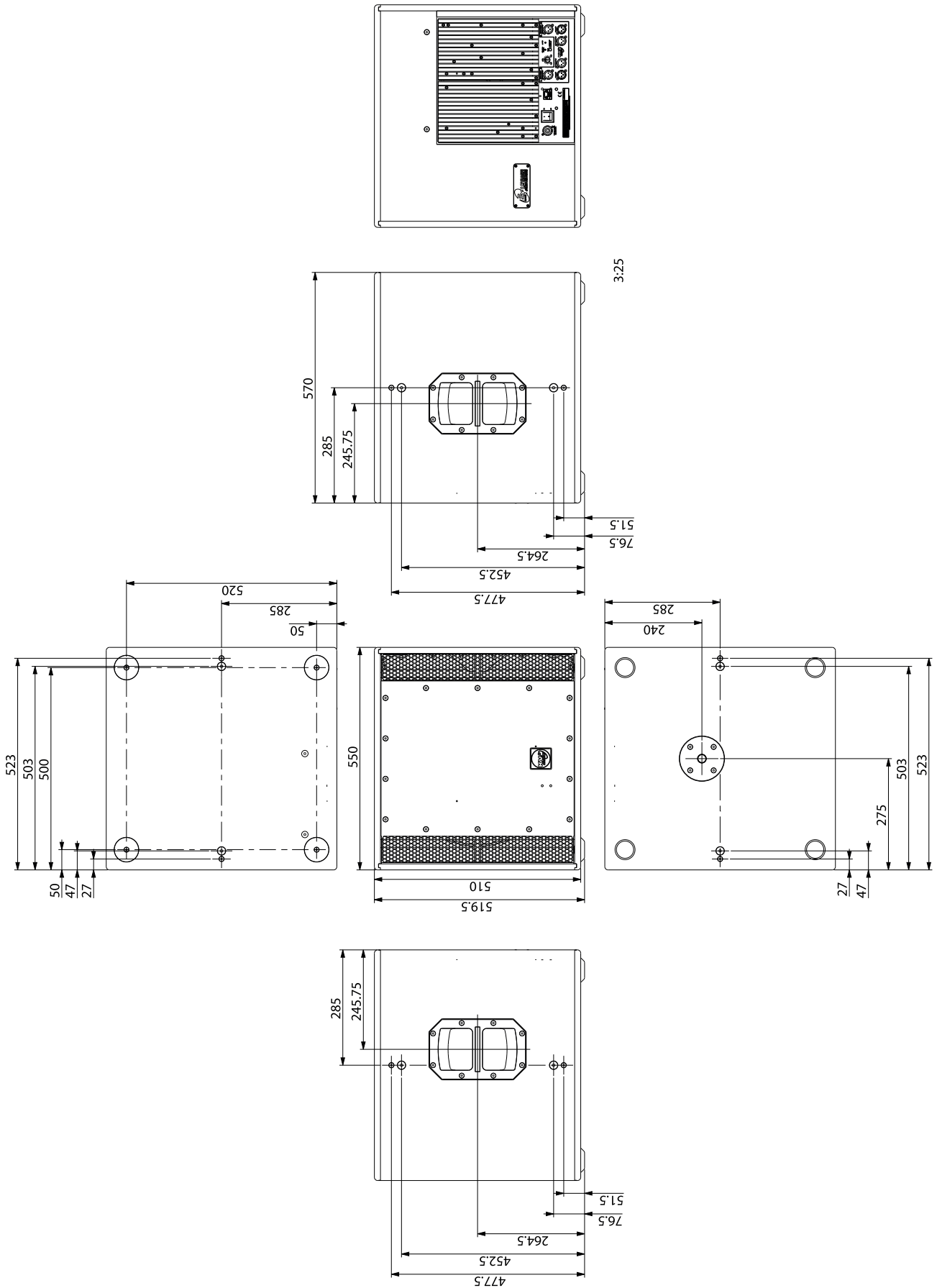
Level Control

The EX1.5 features a rotary control knob providing adjustment of the audio level. The operational range of the control is -6dB to +6dB.

Specifications

System Acoustic Performance	
Max SPL Long-term	127dB
Max SPL Peak	130dB
-3dB Response	38Hz to 120Hz
-10dB Response	34Hz to 120Hz
Crossover Point	120Hz
Low Frequency Section	
Acoustic Design	Front Loaded, Bass Reflex
Woofer Size / Voice Coil Diameter / Design	15" / 3" / Inside Outside
Magnet Type	Neodymium
Diaphragm Material	Epoxy Reinforced Cellulose
Protection	RMS Limiter
Low Frequency Amplifier Specification	
Type	High efficiency, Low frequency, Current-enhancing switch mode
Rated Continuous Power	500W
Distortion	<0.05%
Signal Input	
Input Sensitivity	1.0V RMS
Input Impedance	20kΩ (balanced)
Power Requirements	
Power Connector	Neutrik PowerCon®
Operating Voltage	115V / 230V
Operating Voltage Range	100 to 120V@60Hz 205 to 250V@50Hz
Recommended Amperage	4A 115V 2A 230V
Cabinet	
Cabinet Material	Baltic birch
Handles	2
Pole Mount	M20
Color	"Orange peeled" Matt Black or any RAL
Physical Dimensions	
Height	510 mm (20.08")
Width	550 mm (21.65")
Depth	570 mm (22.44")
Weight	43kg (94,8 lbs)

Drawings



EX1.8 BASS MODULE

1000 Watt 18" active subwoofer

*High Efficiency, Current Enhancing,
Switch Mode Technology*

part number
KVV 987 223 (250V)
KVV 987 007 (230V)
KVV 987 008 (115V)



Application

Specifically designed to accompany any of the EX range as a true full range option

- High powered portable PA
- Fixed installations
- Scalable into larger systems

Introduction

The EX1.8 is a high output, active subwoofer system. Through the use of proprietary amplifier technology, a precision manufactured state of the art woofer component and the innovative implementation of a high efficiency, twin chamber acoustic design, the EX1.8 delivers tight, fast, controlled bass response at very high output levels. This system falls directly out of KV2 Audio's philosophy to develop products with increased dynamic range, very high output and a consistent sound character no matter what the output level.

The system establishes new performance standards for an active powered subwoofer that can only be achieved through the integration of new amplifier topologies, transducer designs and electronic control technologies that are closely tied to a passion for taking performance to the next level.

The EX1.8 can be used in a variety of system applications. It can add high performance bass reproduction to active speaker systems such as KV2 Audio's EX12 loudspeaker, or it can be easily used with passive speaker systems. The built in electronic high pass filter, phase and independent output level controls provide high precision, easy to use system integration circuitry.

Electronics

Amplifier power, electronic crossovers, equalization and speaker protection are integrated into the EX1.8's amplifier module. On-board electronics ensures fast, easy set up and complete control making it easy to set up and provides long-term reliability. An improved version of KV2 Audio's switch mode, current enhancing low frequency amplifier has been specially developed for the EX1.8. The new design improves overall system efficiency to over 90% and delivers 1000 watts of continuous power.

KV2 Audio has developed an amplifier topology that possesses two unique characteristics that are critically important for high performance, active subwoofer systems. The EX1.8 amplifier topology delivers very high efficiency and generates minimal thermal losses allowing the amplifier to deliver extremely high power levels reliably whilst employing a simple cooling system.

Secondly, in order to reproduce low frequency information with high transient content and extend the operational boundaries of the acoustic design, the amplifier needs to deliver an extraordinary amount of current in order to keep the woofer's high mass under control. This is especially true under typical "phase shift" conditions, in which the amount of the current requirement is sometimes doubled. Through the implementation of a proprietary, switch mode amplifier technology, the EX1.8 amplifier provides extremely high efficiency with low losses and delivers the highest woofer control by delivering higher current levels under "phase shift" conditions.

The amplifier module is fitted onto a large format, finned, aluminum alloy heat sink providing high flow, passive cooling and eliminating standard maintenance cycles associated with forced cooled amplifier designs. The entire mechanical assembly is fitted on a mechanical suspension system that isolates low frequency energy and ensures long-term reliability.

Acoustic Components

The EX1.8's woofer technology is based around high efficiency, high power woofer designs. The device features: high temperature polyimide voice coil assemblies that undergo multiple baking and curing processes as well as advanced magnetic structures with complex cooling systems. The woofer cones have been specially developed to withstand the demanding environment created by the high acoustic loading inside the EX1.8 chambers. The EX1.8 was designed using new concepts in twin asymmetrical acoustic chambers that deliver very high speaker loading and output from a relatively small cabinet footprint. It is ideal for use in live applications that require reproduction of low frequencies with very high transient content at high output levels.

Enclosure Design

There are two industrial grade, internal braces placed at the top of the cabinet. Each brace is held in place by four M8 bolt and feature two M10 hang points providing a wide range of installation and suspension flexibility. There is also a pole mount "top hat" located on the top side of the cabinet.

AC Power

The EX1.8 is an advanced self-powered loudspeaker system with on-board amplification and control systems. Understanding power distribution, voltage and current requirements, as well as electrical safety issues, is critical to the safe operation of the EX1.8.

The EX1.8 uses a PowerCon 3-pole AC main system with locking connectors to prevent accidental disconnection. The main AC connector (blue) serves as the power input.

The EX1.8 operates in either 115V or 230V modes. Although pre-configured at the factory, the unit's operating voltage mode can be changed in the field.

Voltage Requirements

The EX1.8 operates safely and without audio discontinuity if the AC voltage stays within the operating window of 100V-130V in 115V mode and 200V-250V when working in 230V mode, at 50 or 60Hz.

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 loudspeaker will shut down if the voltage does not rise above the low boundary before storage circuits are depleted. How long the loudspeaker 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.

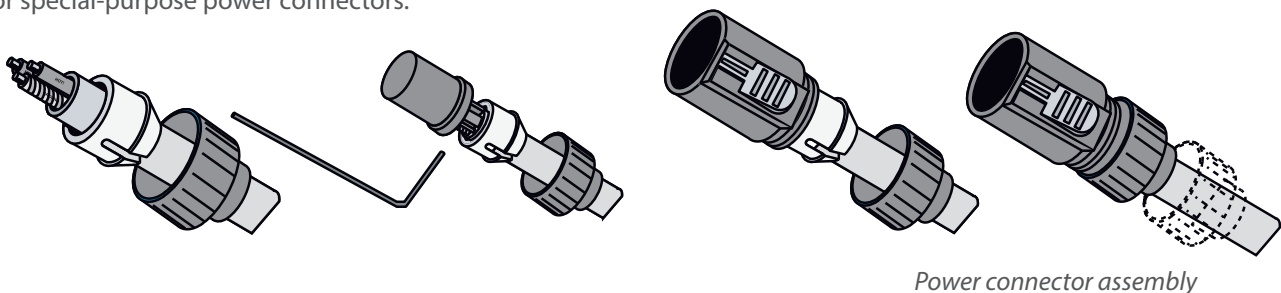
It is recommended that the voltage supply be within the rated voltage window. This ensures that AC voltage variations from the service entry-or peak voltage drops due to cable runs-do not cause the amplifier to cycle on and off or cause damage to the power supply.

For best performance, the AC cable voltage drop should not exceed 10 volts, or 10 percent at 115 volts and 5 percent at 230 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 a EX1.8 system is the sum of each loudspeaker's maximum continuous rms current. An additional 50 percent above the minimum amperage is recommended to prevent peak voltage drops at the service entry.

The Power Connector

The EX1.8 requires a grounded outlet. It is very important that the loudspeaker AC supply be properly grounded in order to operate safely and correctly. Use the PowerCon AC cable-wiring diagram on page 24 to create international or special-purpose power connectors:



Current Requirements

Each EX1.8 requires approximately 10 Amps max at 115V AC for proper operation. This allows one EX1.8 to be powered from one 15 A breaker at 115 V and up to 2 subwoofers at 230 V.

The EX1.8 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 consumption 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 slowreacting thermal breakers.

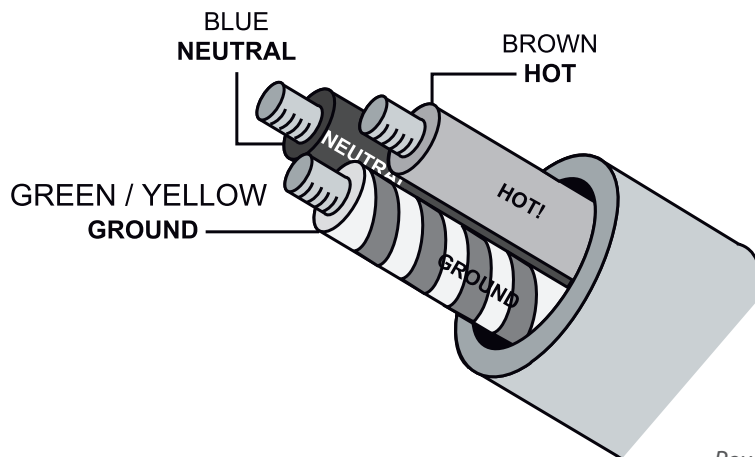
The burst current consumption is the maximum rms current during a period of approximately one second, used to select the rating of most magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula: $V_{pk}(\text{drop}) = I_{pk} \times R(\text{cable total})$.

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	115V Mode	230V
Max Long Term Continuous	10A rms	5A rms
Burst Current	15A rms	10A rms
Short Term Peak	40A peak	20A peak

AC Cable Color Coding

If the colors 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 a N or colored black. Connect the brown wire to the terminal marked with a L or colored red. Connect the green and yellow wire to the terminal marked with a E or colored green or green and yellow.*

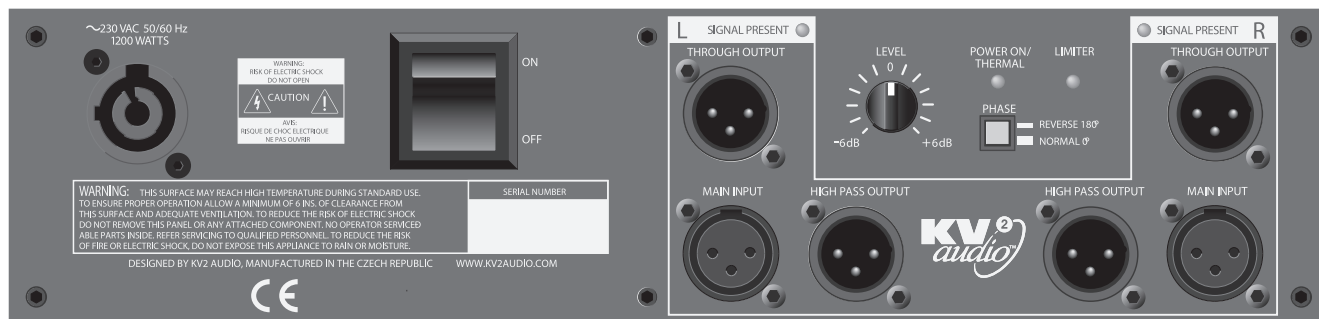


Power cable color coding

The EX1.8 requires a ground connection. Always use a grounded outlet and plug.

The EX1.8 Control Panel

The EX1.8 features an easy to use rear control panel featuring audio input and output connections, level control, LED status lights and a low pass filter that can be engaged when the loudspeaker is used as a stage monitoring device.



EX1.8 Rear panel

Audio Input and Output

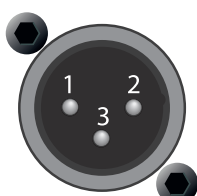
The EX1.8 uses balanced, female XLR connectors for audio signal input, and a male XLR connector to provide through output signal. The EX1.8 features Left and Right stereo inputs and outputs allowing the product to be integrated into stereo systems that require one subwoofer.

The EX1.8 also features Left and Right High Pass Outputs that can be used to provide audio signal to full range speakers being used in conjunction with the EX1.8. The high pass filter provides a crossover point of 125Hz.

The through output connector, wired in parallel to the audio input, will continue to provide the input signal if the EX1.8 is turned off. The audio input circuit presents a 20 kOhm balanced input impedance to a three-pin XLR connector with the following connectors:



Main input



Through output

- Pin 1 - Ground
- Pin 2 - Signal (+)
- Pin 3 - Signal (-)

Case - Earth (AC) ground and chassis

Audio signal can be daisy-chained using the through output connector on the input panel. A single source can drive multiple EX1.8 subwoofers with a paralleled input loop. If you are driving multiple EX1.8's in an array, make certain that the source device can drive the total load impedance presented by the paralleled input circuit of the array.

Most source equipment is safe for driving loads no smaller than 10 times the source's output impedance. For example, cascading an array of 10 units consisting of EX1.8 subwoofers produces an input impedance of 2000 ohms (20kOhms divided by 10). The source equipment should have output impedance of 200 ohms or less. This is also true when connecting EX1.8's in parallel (loop out) with other KV2 Audio amplifiers, active speakers and subwoofers.

If the loudspeaker produces noises such as hiss and popping, disconnect the audio cable from the loudspeaker, if the noise stops, then most likely the problem is not with the loudspeaker. Check the audio cable, source, and AC power for the source of the problem.

Ensure that all cabling carrying signal to multiple amplifiers and active speaker systems is wired correctly. Make sure that the polarity has not been reversed. Reversed polarity can cause severe degradation in frequency response and can also impact the dispersion characteristics of the speaker.

Amplifiers and Acoustic Filters

A power amplifier specifically designed and optimized for the low frequency woofer powers the EX1.8. The control system in the EX1.8 processes the audio signal through a series of electronic filters and circuits providing equalization, crossover filters, thermal and overdrive protection.

LED Status Lights

The EX1.8 control panel uses three distinct LED's to provide operating status information.

Power On / Thermal LED

This LED turns green when the speaker is turned ON. The light will continue to be green during normal operation of the speaker system. The LED will change from green to yellow under a thermal condition resulting from overheating of the amplifier system. Under this condition, the speaker system will shut down. You can expect for the system to be down for at least 2-3 minutes depending the ambient temperature and whether the system is being exposed to direct sun light.

Signal

There are individual LED's for each the Left and Right signal inputs. The LED turns green when there is audio signal present in the EX1.8. This signal indicator can be used to troubleshoot wiring problems.

Limiter

There are individual LED's for each the Left and Right signal inputs. The LED turns green when there is audio signal present in the EX1.8. This signal indicator can be used to troubleshoot wiring problems.

Please contact KV2 Audio or a local service representative should the system enter a thermal condition under normal operating conditions.

Phase Switch

The EX1.8 features a phase switch that changes the phase of the high pass audio output signal. Changing the phase of the output signal serves as a tool for integrating the full range cabinet and the subwoofer into challenging audio environments. We recommend using a suitable measuring device for performing relevant measurements and determining whether the phase should be reversed.

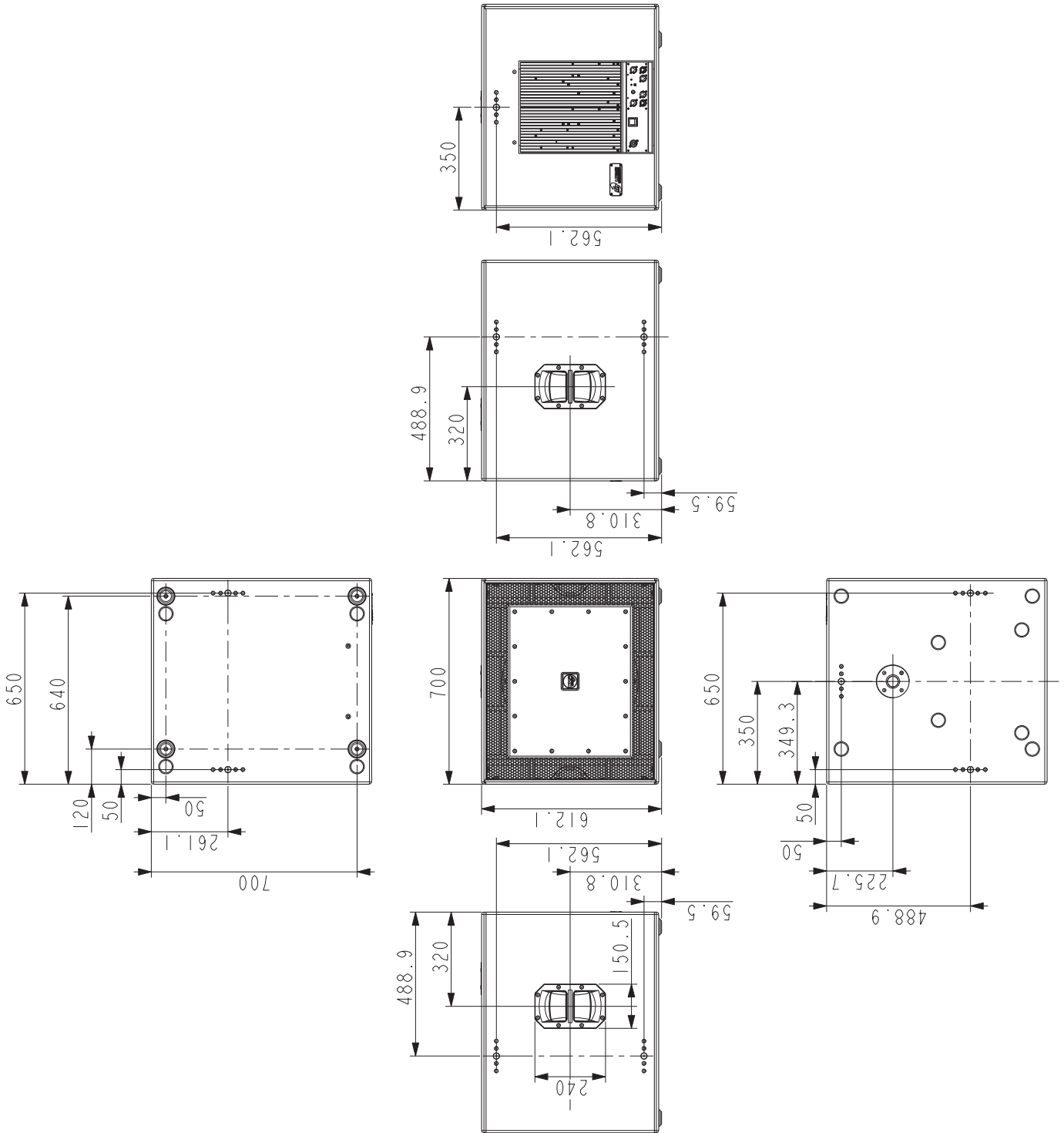
Level Control

The EX1.8 features a rotary control knob providing adjustment of the audio level. The operational range of the control is -6dB to +6dB.

Specifications

System Acoustic Performance	
Max SPL Long-term	131dB
Max SPL Peak	134dB
-3dB Response	30Hz to 125Hz
-10dB Response	27Hz to 125Hz
Crossover Point	125Hz
Low Frequency Section	
Acoustic Design	Asymmetrical Bandpass
Woofer Size / Voice Coil Diameter / Design	18" / 4" / Inside Outside
Diaphragm Material	Epoxy Reinforced Cellulose
Magnet Type	Neodymium
Low Frequency Amplifier Specification	
Type	High efficiency, Low frequency, Current-enhancing switch mode
Rated Continuous Power	1000W
Distortion	<0.05%
Signal Input	
Input Channels	2
Input Sensitivity	1.0V RMS
Input Impedance	20 kΩ
Signal Output	
Output Channels	Mid/High, Through
Features	
Level Control	-6 to +6dB
Phase	0° / 180°
RMS Limiter	YES
Indicators	Power ON/Thermal, Limiter
Power	
Power Connector	Neutrik PowerCon®
Operating Voltage Range	100 to 120V@60Hz 205 to 240V@50Hz 225 to 260V@50Hz
Recommended Amperage	10A 115V 5A 230V 5A 250V
Cabinet	
Cabinet Material	Baltic birch
Handles	2
Pole Mount	M20
Color	"Orange peeled" Matt Black or any RAL
Physical Dimensions	
Height	612 mm (24.1")
Width	700 mm (27.56")
Depth	750 mm (29.5")
Weight	65 kg (143.3lbs)

Drawings



EX2.2 BASS MODULE

Double 12", compact,
active subwoofer system

*High Efficiency, Current Enhancing,
Switch Mode Technology*

part number
KVV 987 135 (250V)
KVV 987 013 (230V)
KVV 987 014 (115V)



Application

Specifically designed to accompany and compliment the EX10 / EX26 as a true full range high output system

- Portable PA applications
- Fixed Installations
- Scalable into multiple-larger systems
- Easy to add to existing systems

Introduction

The EX2.2 is a high output, active subwoofer system. Through the use of proprietary amplifier technology, a precision manufactured state of the art woofer component and the innovative implementation of a high efficiency, twin chamber acoustic design, the EX2.2 delivers tight, fast, controlled bass response at very high output levels. This system falls directly out of KV2 Audio's philosophy to develop products with increased dynamic range, very high output and a consistent sound character no matter what the output level.

The system establishes new performance standards for an active powered subwoofer that can only be achieved through the integration of new amplifier topologies, transducer designs and electronic control technologies that are closely tied to a passion for taking performance to the next level.

The EX2.2 can be used in a variety of system applications. It can add high performance bass reproduction to active speaker systems such as KV2 Audio's EX12 loudspeaker, or it can be easily used with passive speaker systems. The built in electronic high pass filter, phase and independent output level controls provide high precision, easy to use system integration circuitry.

Electronics

Amplifier power, electronic crossovers, equalization and speaker protection are integrated into the EX2.2's amplifier module. On-board electronics ensures fast, easy set up and complete control making it easy to set up and provides long-term reliability. An improved version of KV2 Audio's switch mode, current enhancing low frequency amplifier has been specially developed for the EX2.2. The new design improves overall system efficiency to over 90% and delivers 1000 watts of continuous power.

KV2 Audio has developed an amplifier topology that possesses two unique characteristics that are critically important for high performance, active subwoofer systems. The EX2.2 amplifier topology delivers very high efficiency and generates minimal thermal losses allowing the amplifier to deliver extremely high power levels reliably whilst employing a simple cooling system.

Secondly, in order to reproduce low frequency information with high transient content and extend the operational boundaries of the acoustic design, the amplifier needs to deliver an extraordinary amount of current in order to keep the woofer's high mass under control. This is especially true under typical "phase shift" conditions, in which the amount of the current requirement is sometimes doubled. Through the implementation of a proprietary, switch mode amplifier technology, the EX2.2 amplifier provides extremely high efficiency with low losses and delivers the highest woofer control by delivering higher current levels under "phase shift" conditions.

The amplifier module is fitted onto a large format, finned, aluminum alloy heat sink providing high flow, passive cooling and eliminating standard maintenance cycles associated with forced cooled amplifier designs. The entire mechanical assembly is fitted on a mechanical suspension system that isolates low frequency energy and ensures long-term reliability.

Acoustic Components

The EX2.2's woofer technology is based around high efficiency, high power woofer designs. The device features: high temperature polyimide voice coil assemblies that undergo multiple baking and curing processes as well as advanced magnetic structures with complex cooling systems. The woofer cones have been specially developed to withstand the demanding environment created by the high acoustic loading inside the EX2.2 chambers. The EX2.2 was designed using new concepts in twin asymmetrical acoustic chambers that deliver very high speaker loading and output from a relatively small cabinet footprint. It is ideal for use in live applications that require reproduction of low frequencies with very high transient content at high output levels.

Enclosure Design

There are two industrial grade, internal braces placed at the top of the cabinet. Each brace is held in place by four M8 bolt and feature two M10 hang points providing a wide range of installation and suspension flexibility. There is also a pole mount "top hat" located on the top side of the cabinet.

AC Power

The EX2.2 is an advanced self-powered loudspeaker system with on-board amplification and control systems. Understanding power distribution, voltage and current requirements, as well as electrical safety issues, is critical to the safe operation of the EX2.2.

The EX2.2 uses a PowerCon 3-pole AC main system with locking connectors to prevent accidental disconnection. The main AC connector (blue) server as the power input.

The EX2.2 operates in either 115V, 230V or 250V modes. Although pre-configured at the factory, the units operating voltage mode can be changed in the field.

Voltage Requirements

The EX2.2 operates safely and without audio discontinuity if the AC voltage stays within the operating window of 100V-120V in 115V mode and 205V-240V in 230V mode and 225V - 260V when working in 250V mode, at 50 or 60Hz.

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 loudspeaker will shut down if the voltage does not rise above the low boundary before storage circuits are depleted. How long the loudspeaker 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.

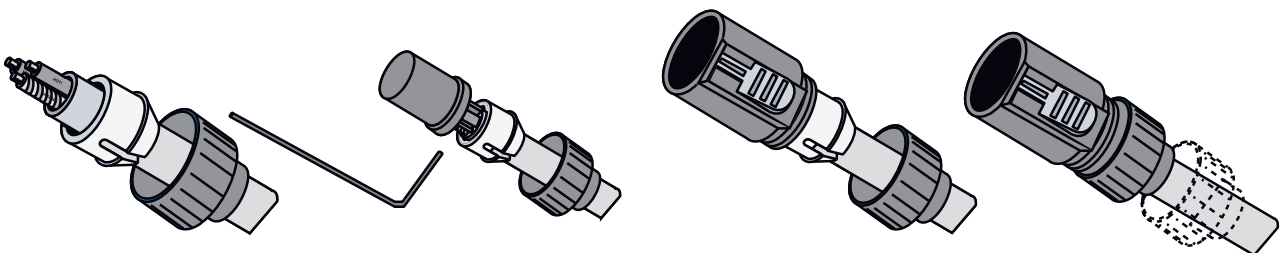
It is recommended that the voltage supply be within the rated voltage window. This ensures that AC voltage variations from the service entry-or peak voltage drops due to cable runs-do not cause the amplifier to cycle on and off or cause damage to the power supply.

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 a EX2.2 speaker system is the sum of each loudspeaker's maximum continuous rms current. An additional 50 percent above the minimum amperage is recommended to prevent peak volt-age drops at the service entry.

The Power Connector

The EX2.2 requires a grounded outlet. It is very important that the loudspeaker AC supply be properly grounded in order to operate safely and correctly. Use the PowerCon AC cable-wiring diagram on page 5 to create international or special-purpose power connectors:



Power connector assembly

Current Requirements

Each EX2.2 requires approximately 10 Amps max at 115V AC for proper operation. This allows one EX2.2 to be powered from one 15 A breaker at 115 V and up to 2 subwoofers at 230 or 250 V.

The EX2.2 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 consumption 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 slowreacting thermal breakers.

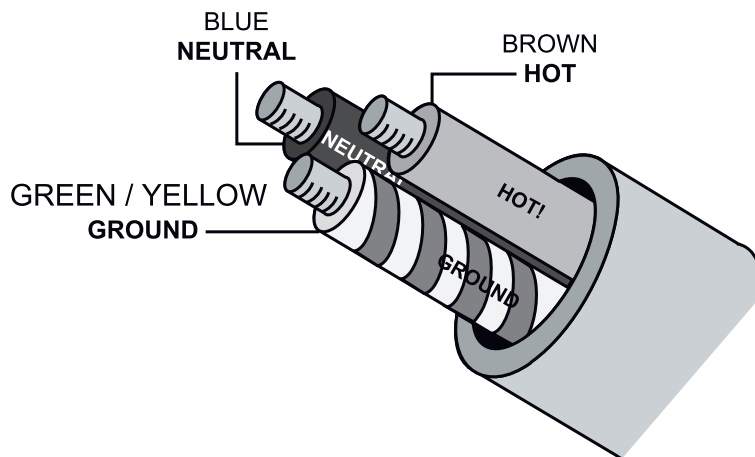
The burst current consumption is the maximum rms current during a period of approximately one second, used to select the rating of most magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula: $V_{pk}(\text{drop}) = I_{pk} \times R(\text{cable total})$.

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	115V Mode	230V, 250V
Max Long Term Continuous	10A rms	5A rms
Burst Current	15A rms	10A rms
Short Term Peak	40A peak	20A peak

AC Cable Color Coding

If the colors 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 a N or colored black. Connect the brown wire to the terminal marked with a L or colored red. Connect the green and yellow wire to the terminal marked with a E or colored green or green and yellow.*

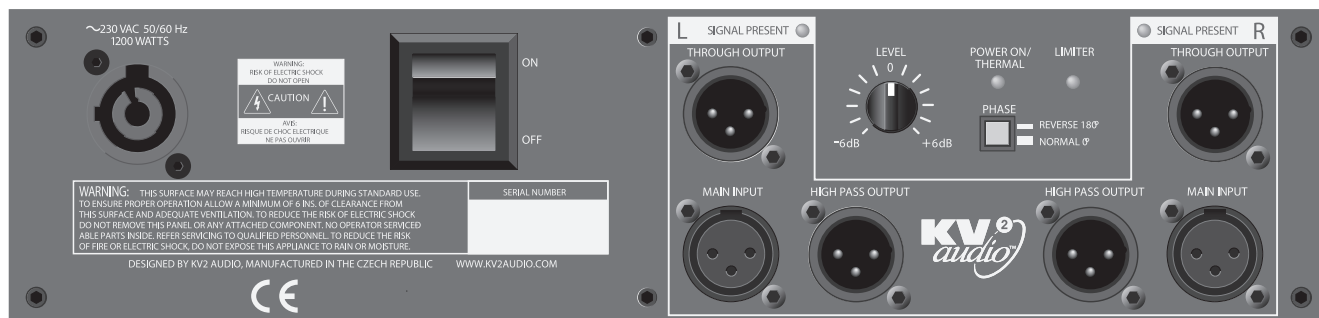


Power cable color coding

The EX2.2 requires a ground connection. Always use a grounded outlet and plug.

The EX2.2 Control Panel

The EX2.2 features an easy to use rear control panel featuring audio input and output connections, level control, LED status lights and a low pass filter that can be engaged when the loudspeaker is used as a stage monitoring device.



EX2.2 Rear panel

Audio Input and Output

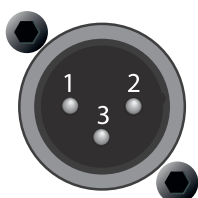
The EX2.2 uses balanced, female XLR connectors for audio signal input, and a male XLR connector to provide through output signal. The EX2.2 features Left and Right stereo inputs and outputs allowing the product to be integrated into stereo systems that require one subwoofer.

The EX2.2 also features Left and Right High Pass Outputs that can be used to provide audio signal to full range speakers being used in conjunction with the EX2.2. The high pass filter provides a crossover point of 125Hz.

The through output connector, wired in parallel to the audio input, will continue to provide the input signal if the EX2.2 is turned off. The audio input circuit presents a 20 kOhm balanced input impedance to a three-pin XLR connector with the following connectors:



Main input



Through output

- Pin 1 - Ground
- Pin 2 - Signal (+)
- Pin 3 - Signal (-)

Case - Earth (AC) ground and chassis

Audio signal can be daisy-chained using the through output connector on the input panel. A single source can drive multiple EX2.2 subwoofers with a paralleled input loop. If you are driving multiple EX2.2's in an array, make certain that the source device can drive the total load impedance presented by the paralleled input circuit of the array.

Most source equipment is safe for driving loads no smaller than 10 times the source's output impedance. For example, cascading an array of 10 units consisting of EX2.2 subwoofers produces an input impedance of 2000 ohms (20kOhms divided by 10). The source equipment should have output impedance of 200 ohms or less. This is also true when connecting EX2.2's in parallel (loop out) with other KV2 Audio amplifiers, active speakers and subwoofers. If the loudspeaker produces noises such as hiss and popping, disconnect the audio cable from the loudspeaker, if the noise stops, then most likely the problem is not with the loudspeaker. Check the audio cable, source, and AC power for the source of the problem.

If the loudspeaker produces noises such as hiss and popping, disconnect the audio cable from the loudspeaker, if the noise stops, then most likely the problem is not with the loudspeaker. Check the audio cable, source, and AC power for the source of the problem.

Ensure that all cabling carrying signal to multiple amplifiers and active speaker systems is wired correctly. Make sure that the polarity has not been reversed. Reversed polarity can cause severe degradation in frequency response and can also impact the dispersion characteristics of the speaker.

Amplifiers and Acoustic Filters

A power amplifier specifically designed and optimized for the low frequency woofer powers the EX2.2. The control system in the EX2.2 processes the audio signal through a series of electronic filters and circuits providing equalization, crossover filters, thermal and overdrive protection.

LED Status Lights

The EX2.2 control panel uses three distinct LED's to provide operating status information.

Power On / Thermal LED

This LED turns green when the speaker is turned ON. The light will continue to be green during normal operation of the speaker system. The LED will change from green to yellow under a thermal condition resulting from overheating of the amplifier system. Under this condition, the speaker system will shut down. You can expect for the system to be down for at least 2-3 minutes depending the ambient temperature and whether the system is being exposed to direct sun light.

Signal

There are individual LED's for each the Left and Right signal inputs. The LED turns green when there is audio signal present in the EX2.2. This signal indicator can be used to troubleshoot wiring problems.

Limiter

Should the rms limiting system be engaged due to overdriving of the EX2.2, the LED will light up yellow. The audible effect of the rms limiter is a lowering of overall output level. The rms limiter will disengage only if the input level is turned down.

Please contact KV2 Audio or a local service representative should the system enter a thermal condition under normal operating conditions.

Phase Switch

The EX2.2 features a phase switch that changes the hase of the high pass audio output signal. Changing the phase of the output signal serves as a tool for integrating the full range cabinet and the subwoofer into challenging audio environments. We recommend using a suitable measuring device for performing relevant measurements and determining whether the phase should be reversed.

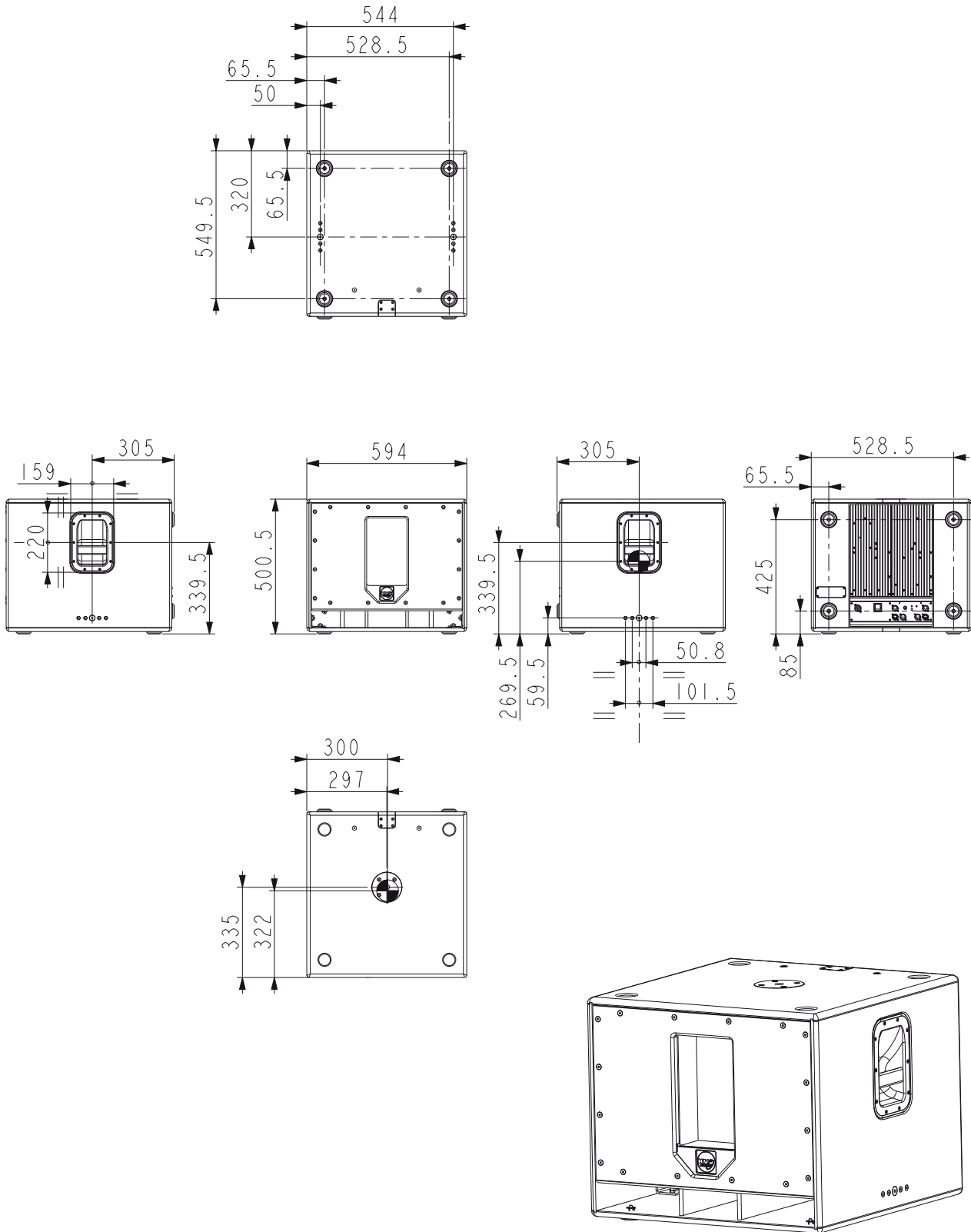
Level Control

The EX2.2 features a rotary control knob providing adjustment of the audio level. The operational range of the control is -6dB to +6dB.

Specifications

System Acoustic Performance	
Max SPL Long-term	130dB
Max SPL Peak	133dB
-3dB Response	45Hz to 125Hz
-10dB Response	40Hz to 125Hz
Crossover Point	125Hz
Low Frequency Section	
Acoustic Design	Twin Asymmetrical loading
Number of Drivers	2
Woofer Size / Voice Coil Diameter / Design	12" / 3" / Inside Outside
Diaphragm Material	Epoxy Reinforced Cellulose
Magnet Type	Neodymium
Low Frequency Amplifier Specification	
Type	High efficiency, Low frequency, Current-enhancing switch mode
Rated Continuous Power	1000W
Distortion	<0.05%
Operating Bandwidth	40Hz to 125Hz
Signal Input	
Input Channels	2
Input Sensitivity	1.0V RMS
Input Impedance	20 kΩ
Signal Output	
Output Channels	Mid/High, Through
Features	
Level Control	-6 to +6dB
Phase	0° / 180°
RMS Limiter	YES
Power Requirements	
Power Connector	Neutrik PowerCon®
Operating Voltage Range	100 to 120V@60Hz 205 to 240V@50Hz 225 to 260V@50Hz
Recommended Amperage	10A 115V 5A 230V 5A 250V
Cooling	Passive
Cabinet	
Cabinet Material	Baltic birch
Handles	2
Pole Mount	M20
Color	"Orange peeled" Matt Black or any RAL
Physical Dimensions	
Height	491 mm (19.33")
Width	594 mm (23.38")
Depth	616 mm (24.25")
Weight	49 kg (107.8lbs)

Drawings

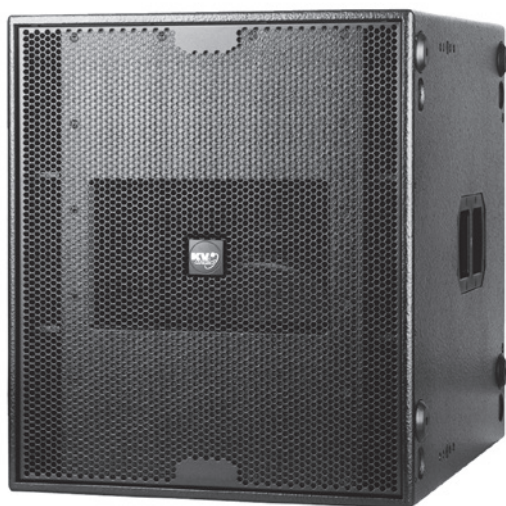


EX2.5MkII BASS MODULE

1600 Watt dual 15"
active subwoofer

*High Efficiency, Current Enhancing,
Switch Mode Technology*

part number
KVV 987 180 (250V)
KVV 987 179 (230V)
KVV 987 178 (115V)



Application

Specifically designed to accompany and compliment the EX Mid High speakers to create a true full range high output system

- Easily incorporated as a system with multiples of any of the EX range
- Scalable into multiple-larger systems
- Fixed installations

Introduction

The EX2.5MkII is a high output, double 15" active subwoofer system. It is the 'active' brother of the ES2.6 passive subwoofer module.

Through the use of proprietary amplifier technology, a precision manufactured state of the art woofer component and the innovative implementation of a high efficiency, twin chamber acoustic design, the EX2.5MkII provides depth and power that belies in size. This system falls directly out of KV2 Audio's philosophy to develop products with increased dynamic range, very high output and a consistent sound character no matter what the output level.

The product uses the same low frequency amplifier found inside the EPAK2500/R. Internal amplifier features Speaker Level Output on a AP4 connector to drive one additional ES2.6 subwoofer. (Not to be used with ES2.5(4)). EX2.5MkII also features a stereo crossover, High Pass Outputs and full overdrive protection.

The EX2.5MkII can be used in a variety of system applications. It can add high performance bass reproduction to active speaker systems such as KV2 Audio's EX12 loudspeaker, or it can be easily used with passive speaker systems. The built in electronic high pass filter, phase and independent output level controls provide high precision, easy to use system integration circuitry.

Electronics

Amplifier power, electronic crossovers, equalization, phase alignment and speaker protection are integrated into the EX2.5MkII's amplifier module.

On-board electronics ensures fast, easy set up and complete control making it easy to set up and provides long-term reliability. An improved version of KV2 Audio's switch mode, current enhancing low frequency amplifier increases overall system efficiency to over 90% and delivers 1000 watts of continuous power.

KV2 Audio has developed an amplifier topology that possesses two unique characteristics that are critically important for high performance, active subwoofer systems. The EX2.5MkII amplifier topology delivers very high efficiency and generates minimal thermal losses allowing the amplifier to deliver extremely high power levels reliably whilst employing a simple cooling system.

Secondly, in order to reproduce low frequency information with high transient content and extend the operational boundaries of the acoustic design, the amplifier needs to deliver an extraordinary amount of current in order to keep the woofer's high mass under control. This is especially true under typical "phase shift" conditions, in which the amount of the current requirement is sometimes doubled. Through the implementation of a proprietary, switch mode amplifier

technology, the EX2.5MkII amplifier provides extremely high efficiency with low losses and delivers the highest woofer control by delivering higher current levels under "phase shift" conditions. The new configuration improves overall system efficiency and increases output allowing passive radiation of heat to take place through a unique "fin-less" heat sink that can be placed in any position or direction. Additionally, the EX2.5MkII amplifier unit contains an internally located electric fan that is operated by a temperature sensing circuit which will slowly bring the fan online as required.

Acoustic Components

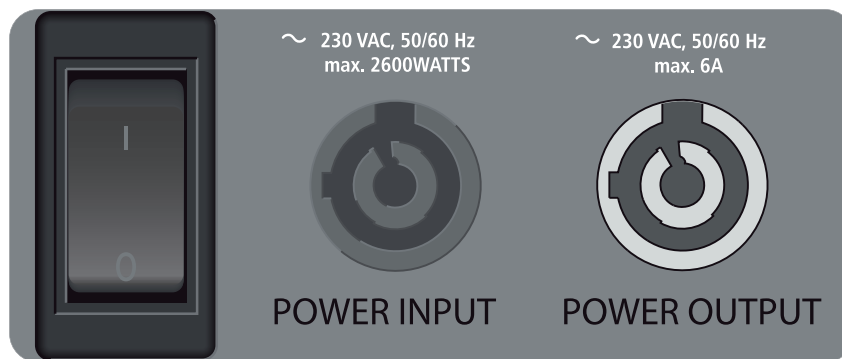
The EX2.5MkII's woofers technology is based around two 15" high efficiency, high power woofer designs. The device features: high temperature polyimide voice coil assemblies that undergo multiple baking and curing processes as well as advanced magnetic structures with complex cooling systems. The woofer cones have been specially developed to withstand the demanding environment created by the high acoustic loading inside the EX2.5MkII chambers. The EX2.5MkII was designed using new concepts in twin asymmetrical acoustic chambers that deliver very high speaker loading and output from a relatively small cabinet footprint. It is ideal for use in live applications that require reproduction of low frequencies with very high transient content at high output levels.

Enclosure Design

There are six industrial grade, internal braces placed at the corners of the cabinet. Each brace is held in place by four M8 bolt and feature two M10 hang points providing a wide range of installation and suspension flexibility. There is also a M20 pole mount "top hat" located on the top side of the cabinet.

AC Power

The EX2.5MkII is an advanced self-powered loudspeaker system with on-board amplification and control systems. Understanding power distribution, voltage and current requirements, as well as electrical safety issues, is critical to the safe operation of the EX2.5MkII.



EX2.5MkII Power connector Rear panel

The EX2.5MkII uses a PowerCon 3-pole AC main system with locking connectors to prevent accidental disconnection. The main AC blue connector serves as the power input. AC grey connector serves as power output max. 12A when running on 115V, 6A when running on 230V or 250V.

The EX2.5MkII 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 EX2.5MkII operates safely and without audio discontinuity if the AC voltage stays within the operating window of 100V-120V in 115V mode, 205V-240V in 230V mode and 225V-260V when working in 250V mode, at 50 or 60Hz.

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 loudspeaker will shut down if the voltage does not rise above the low boundary before storage circuits are depleted. How long the loudspeaker 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.

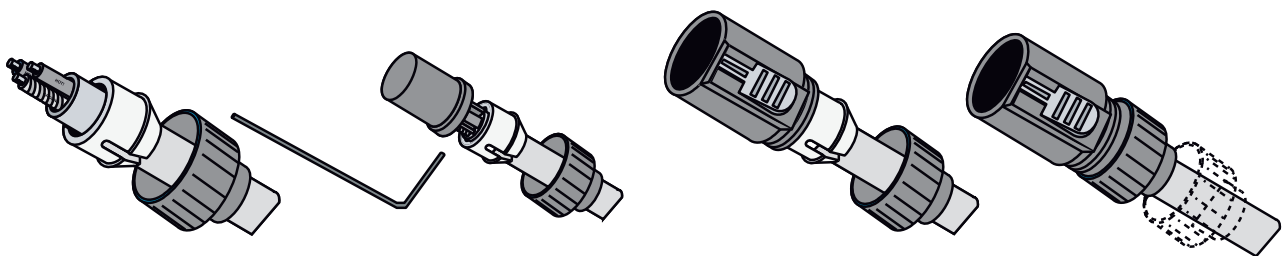
It is recommended that the voltage supply be within the rated voltage window. This ensures that AC voltage variations from the service entry-or peak voltage drops due to cable runs-do not cause the amplifier to cycle on and off or cause damage to the power supply.

For best performance, the AC cable voltage drop should not exceed 10 volts, or 10 percent at 115 volts and 5 percent at 230 volts 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 a EX2.5MkII speaker system is the sum of each loudspeaker's maximum continuous rms current. An additional 50 percent above the minimum amperage is recommended to prevent peak voltage drops at the service entry.

The Power Connector

The EX2.5MkII requires a grounded outlet. It is very important that the loudspeaker AC supply be properly grounded in order to operate safely and correctly. Use the PowerCon AC cable-wiring diagram on page 40 to create international or special-purpose power connectors:



Power connector assembly

Current Requirements

Each EX2.5MkII requires approximately 15 Amps max at 115V AC for proper operation. This allows one EX2.5MkII to be powered from one 15 A breaker at 115V and up to 2 EX2.5MkII subwoofers at 230V or 250V.

The EX2.5MkII 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 consumption 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 slowreacting thermal breakers.

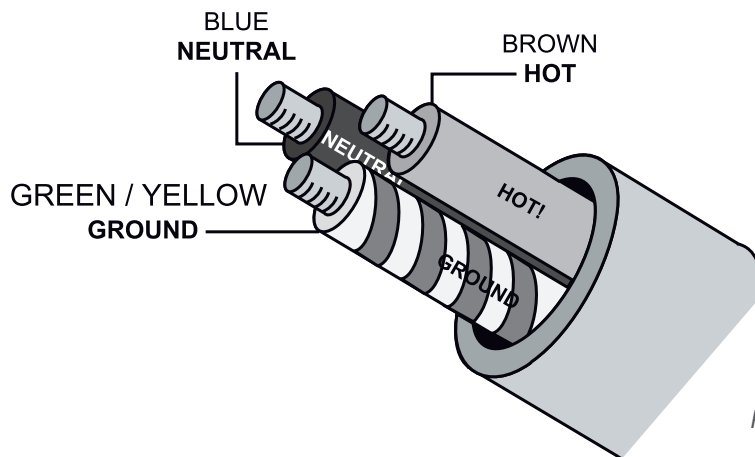
The burst current consumption is the maximum rms current during a period of approximately one second, used to select the rating of most magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula: $V_{pk}(\text{drop}) = I_{pk} \times R(\text{cable total})$.

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	115V Mode	230V, 250V
Max Long Term Continuous	12A rms	6A rms
Burst Current	24A rms	24A rms
Short Term Peak	50A peak	25A peak

AC Cable Color Coding

If the colors 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 a N or colored black. Connect the brown wire to the terminal marked with a L or colored red. Connect the green and yellow wire to the terminal marked with a E or colored green or green and yellow.*



Power cable color coding

The EX2.5MkII requires a ground connection. Always use a grounded outlet and plug.

The EX2.5MkII Control Panel

The EX2.5MkII features an easy to use rear control panel featuring audio input and output connections, level control, LED status lights, phase reverse switch and speaker level output.

Audio Input and Output

The EX2.5MkII uses balanced, female XLR connectors for audio signal input, and a male XLR connector to provide through output signal. The EX2.5MkII features Left and Right stereo inputs and outputs allowing the product to be integrated into stereo systems that require one subwoofer. The EX2.5MkII also features Left and Right High Pass Outputs that can be used to provide audio signal to full range speakers being used in conjunction with the EX2.5MkII. The high pass filter provides a crossover point of 125Hz.

The through output connector, wired in parallel to the audio input, will continue to provide the input signal if the EX2.5MkII is turned off. The audio input circuit presents a 20 kOhm balanced input impedance to a three-pin XLR connector with the following wiring:

- Pin 1 - Ground
- Pin 2 - Signal (+)
- Pin 3 - Signal (-) Case - Earth (AC) ground and chassis

Audio signal can be daisy-chained using the through output connector on the input panel. A single source can drive multiple EX2.5MkII subwoofers with a paralleled input loop. If you are driving multiple EX2.5MkII's in an array, make certain that the source device can drive the total load impedance presented by the paralleled input circuit of the array.

Main Input

Signal applied to the left channel Main Input is summed with any signal applied to the right channel Main Input and then fed to the EX2.5MkII amplifier. When using the EX2.5MkII with a mono signal, then either Main Input can be used.

Mid-Hi Output

Signal applied to either Main Input also passes through a stereo crossover. This gives each respective channel a Mid-Hi Output (crossover frequency 125Hz) that can be used to feed other enclosures such as EX6, 26, 10 and 12.

Most source equipment is safe for driving loads no smaller than 10 times the source's output impedance. For example, cascading an array of 10 units consisting of EX2.5MkII subwoofers produces an input impedance of 2000 ohms (20kOhms divided by 10). The source equipment should have output impedance of 200 ohms or less. This is also true when connecting EX2.5MkII's in parallel (loop out) with other KV2 Audio amplifiers, active speakers and subwoofers.

Ensure that all cabling carrying signal to multiple amplifiers and active speaker systems is wired correctly. Make sure that the polarity has not been reversed. Reversed polarity can cause severe degradation in frequency response and can also impact the dispersion characteristics of the speaker.



EX2.5MkII Rear panel

Amplifiers and Acoustic Filters

A power amplifier specifically designed and optimized for the low frequency woofer powers the EX2.5MkII . The control system in the EX2.5MkII processes the audio signal through a series of electronic filters and circuits providing equalization, crossover filters, thermal and overdrive protection.

Power On / Thermal LED

This LED turns green when the speaker is turned ON. The light will continue to be green during normal operation of the speaker system. The LED will change from green to yellow under a thermal condition resulting from overheating of the amplifier system. Under this condition, the speaker system will shut down. You can expect for the system to be down for at least 2-3 minutes depending the ambient temperature and whether the system is being exposed to direct sun light.

Signal present

There are individual LED's for each the Left and Right signal inputs. The LED turns green when there is audio signal present in the EX2.5MkII. This signal indicator can be used to troubleshoot wiring problems.

Limiter LED

This LED turns yellow when the limiter is activated.

Limiter

The EX2.5MkII employs a protection system based on rms limiting of the amplifiers. This type of protection strategy allows the speaker to operate safely under overload conditions. When the rms "limiter" engages, the output level of the amplifier is reduced to a safe operating level. This type of protection allows the frequency response of the system to remain unchanged. The control objective is to regulate the operating temperature of the transducers magnetics circuits long term. This ensures no impact on performance due to power compression and allows the components to retain their ability to reproduce high dynamics. When overdriven the rms limiter will disengage only if the input level is turned down.

Phase Switch

The EX2.5MkII features a phase switch that changes the phase of the high pass audio output signal. Changing the phase of the output signal serves as a tool for integrating the full range cabinet and the subwoofer into challenging audio environments. We recommend using a suitable measuring device for performing relevant measurements and determining whether the phase should be reversed.

Level Control

The EX2.5MkII features a rotary control knob providing adjustment of the audio level. The operational range of the control is -6dB to +6dB.

Transportation

To keep your EX2.5MkII speakers in optimum condition we recommend transportation in an optional KV2 Audio EX2.5MkII padded cover. There is also a CART-0009 wheelboard for EX2.5MkII. Contact your KV2 Audio dealer for further details.

Output ES2.6

This AP4 connector output allows you to connect the EX2.5MkII to one KV2 Audio ES2.6 enclosure thus expanding the capability of the EX2.5MkII. No other cabinet can be connected to this output and no responsibility will be taken for any misuse of this facility.

ES2.6 Output connector wiring:

- Pin 1 - Power Output (-)
- Pin 2 - Power Output (-)
- Pin 3 - Power Output (+)
- Pin 4 - Power Output (+)



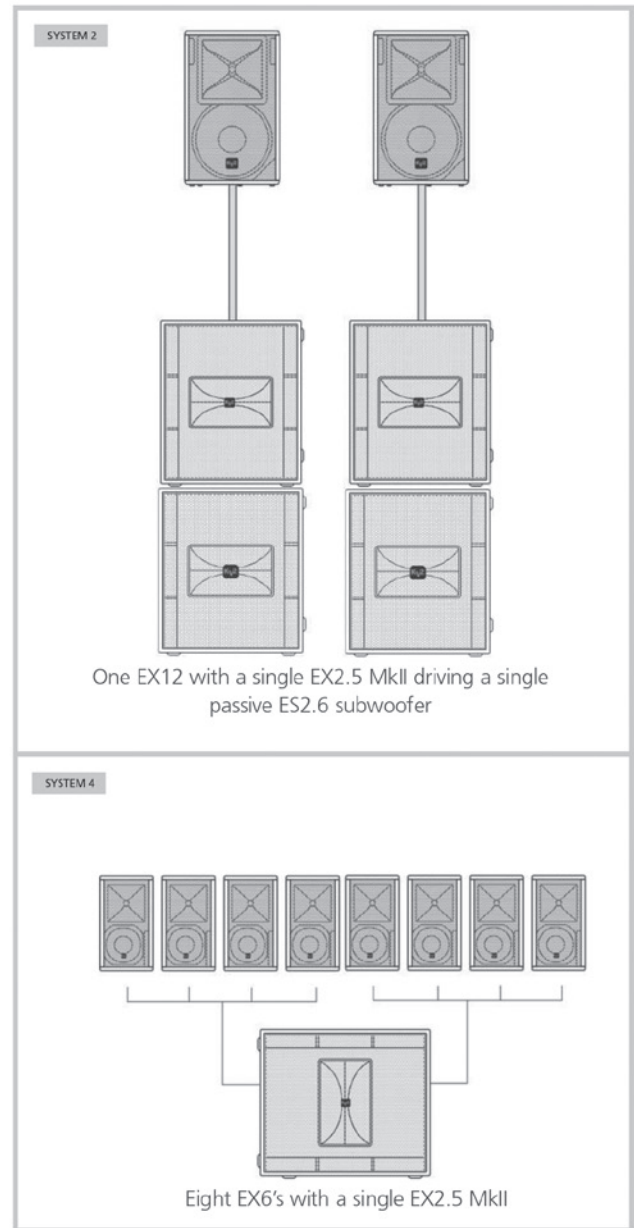
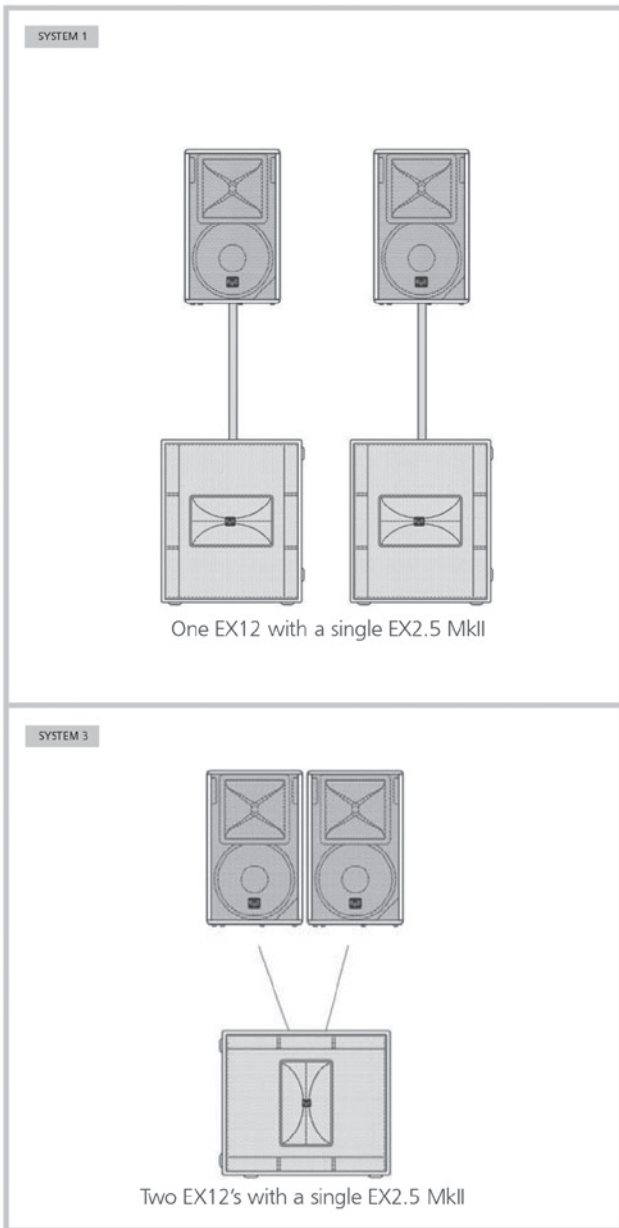
ES2.6 AP4 Output connector

If the loudspeaker produces noises such as hiss and popping, disconnect the audio cable from the loudspeaker, if the noise stops, then most likely the problem is not with the loudspeaker. Check the audio cable, source, and AC power for the source of the problem.

Specifications

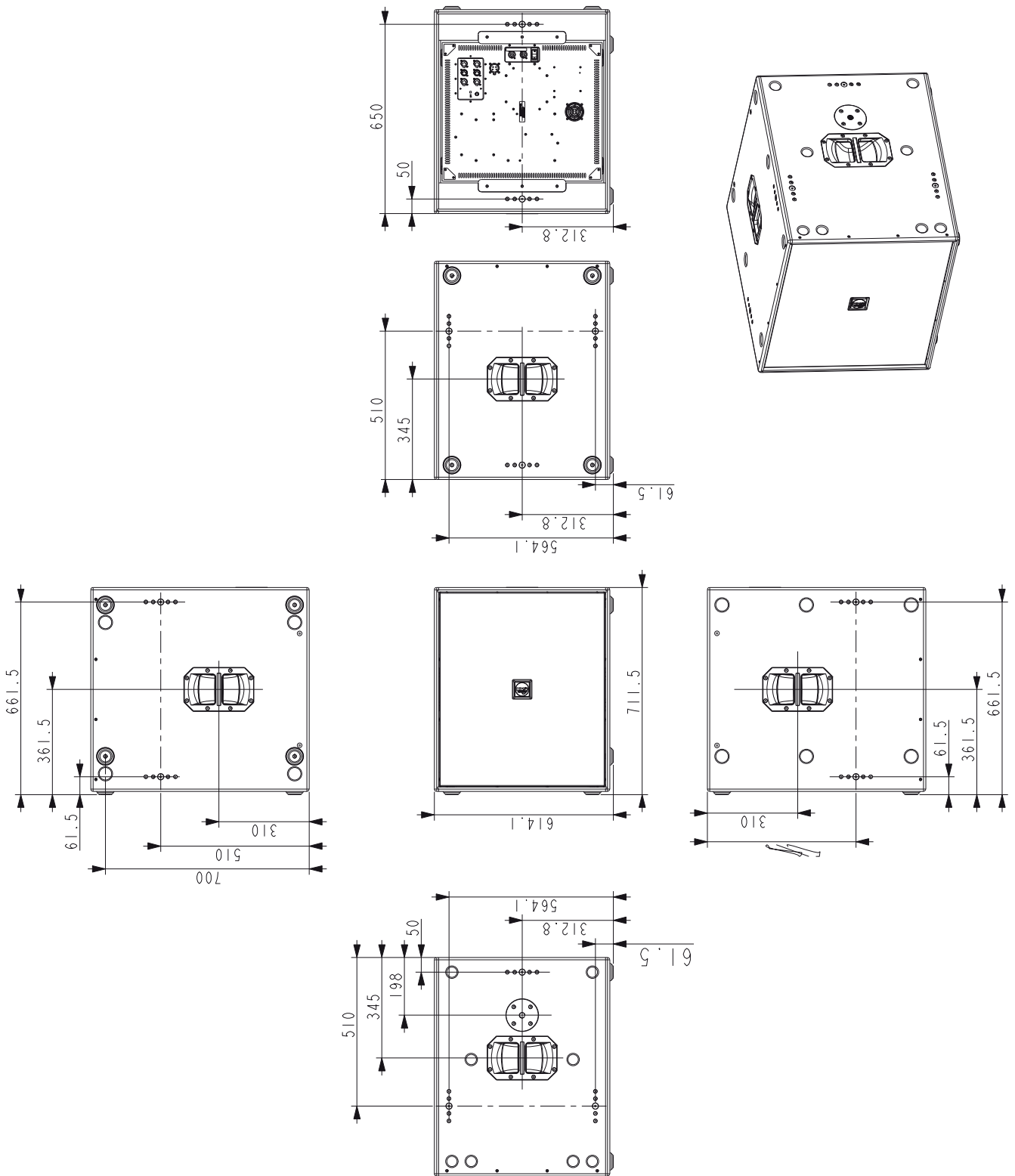
System Acoustic Performance	
Max SPL Long-term	134dB
Max SPL Peak	131dB
-3dB Response	38Hz to 125Hz
-10dB Response	34Hz to 125Hz
Impedance	8Ω
Crossover Point	125Hz
Output Channels	
Number of Channels	1
Minimum load impedance per channel	4Ω
Low Frequency Section	
Acoustic Design	Twin Asymmetrical loading
Woofer Size / Voice Coil Diameter / Design	2x 15" / 4" / Inside Outside
Diaphragm Material	Epoxy Reinforced Cellulose
Magnet Type	Ferrite
Low Frequency Amplifier Specification	
Type	High efficiency, Low frequency, Current-enhancing switch mode
Rated Continuous Power	1600W
Distortion	<0.05%
Operating Bandwidth	34Hz to 125Hz
Signal Input	
Input Channels	2
Input Sensitivity	1.0V RMS
Input Impedance	20kΩ (balanced)
Signal Output	
Signal Output Channels	Mid/High, Through
Slave Speaker Output	AP4
Features	
Level Control	-6 to +6dB
Phase	0° / 180°
RMS Limiter	YES
Indicators	Power ON/Thermal, Limiter
Power Requirements	
Power Connector	Neutrik PowerCon®
Output 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	12A 115V 6A 230V 6A 250V
Cabinet	
Cabinet Material	Baltic birch
Handles	4
Pole Mount	M20
Color	"Orange peeled" Matt Black or any RAL
Physical Dimensions	
Height	711.5 mm (28.0")
Width	602.6 mm (23.72")
Depth	750 mm (29.52")
Weight	97 kg (214lbs)

Suggested Systems



Drawings

EX2.5MkII · Drawings



Covers

Cover for EX1.2MkII

part name:
Cover EX1.2
 part number:
KVV 987 256
 description:
 - durable material



Heavy duty cover for EX1.8

part name:
Cover EX1.8
 part number:
KVV 987 258
 description:
 - durable material



Cover for EX1.8 used with cart

part name:
Cover EX1.8 with cart
 part number:
KVV 987 257
 description:
 - used with cart CRT - 0011
 - heavy duty



Heavy duty cover for EX2.2

part name:
Cover EX2.2
 part number:
KVV 987 072
 description:
 - durable material



Heavy duty cover for EX2.2 with cart

part name:
Cover EX2.2 with cart
 part number:
KVV 987 133
 description:
 - durable material



Cover for EX2.5MkII

part name:
Cover EX2.5
 part number:
KVV 987 163
 description:
 - durable material



Cover for EX2.5MkII with cart

part name:
Cover EX2.5 with cart
 part number:
KVV 987 162
 description:
 - durable material



Carts

Cart for EX1.8

part name:

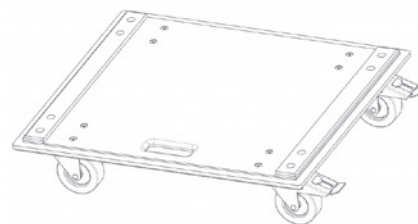
CRT - 0011

part number:

KVV 987 230

description:

- wheels (KVV 987 031) not included



Cart for EX2.2

part name:

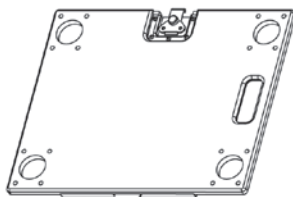
CRT - 0004

part number:

KVV 987 025

description:

- wheels (KVV 987 031) not included



Front mount magnetic cart for EX2.5MkII

part name:

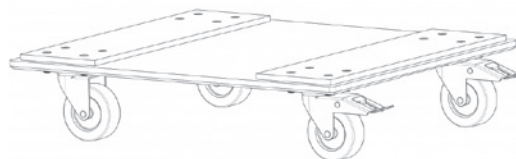
CRT - 0009

part number:

KVV 987 114

description:

- wheels (KVV 987 128) not included
 - 16x M8x 35mm Screw Countersunk Hexagon Socket Head
 - 16x Nut Hexagon with blue plastic insert M8



Wheels

Cart Wheels for CRT 0009

part name:

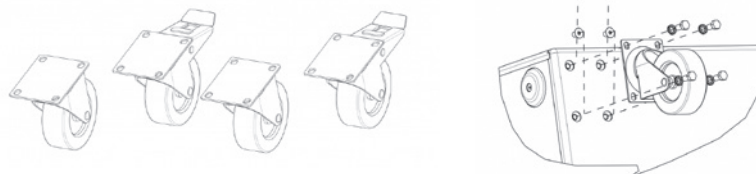
CRT 0009 - WHL KIT

part number:

KVV 987 128

description:

- with bolts nut kit - 4 pcs in pack, rotating, blue
 - 16x M8x 35mm Screw Countersunk Hexagon Socket Head
 - 16x Nut Hexagon with blue plastic insert M8



Cart Wheels for CRT 004 / CRT 0011

part name:

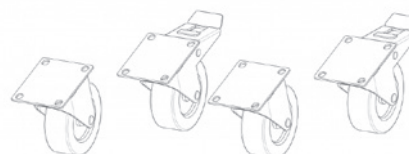
CRT - WHL

part number:

KVV 987 031

description:

- with bolts nuts kit - 4 pcs in pack, rotating, blue
 - 16x M8x 25mm Screw Countersunk Hexagon Socket Head
 - 16x Nut Hexagon with blue plastic insert M8



Speaker pole - universal

part name:

KV2-H

part number:

KVV 987 130

description:

- Heavy duty telescopic speakerpole
- 0,735 to 1,23 m
- diameter 35 mm
- weight 2,2 kg
- max. load 50 kg
- bottom terminal M20
- matte black



Warranty

Your EX Series Subwoofers is covered against defects in material and workmanship.

Refer to your supplier for more details.

Service

In the unlikely event that your EX Series Subwoofers develops a problem, it must be returned to an authorised 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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