



VHD4.21/VHD4.21R

User Guide



Important safety instructions

Before using your VHD4.21, 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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VHD 4.21
ACTIVE

VHD 4.21
PASSIVE

VHD4.21 ACTIVE - part number KVV 987 333
VHD4.21 PASSIVE - part number KVV 987 336

VHD4.21R ACTIVE - part number KVV 987 480
VHD4.21R PASSIVE - part number KVV 987 481



Application

The Ultimate seismic Subwoofer to add to any KV2 Audio or third party manufacturers system.

- Large scale live music and playback performance
- Dance Clubs and Nightclubs where Music comes first
- Hire and Production
- Large Concert venues
- Cinema
- Fixed installation
- Easily incorporated into multiple system projects with VHD, SL, ES and ESR

Introduction

The VHD4.21 is a high output, high definition ultra low frequency 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 VHD4.21 delivers tight, fast, controlled bass response at very high output levels. The system establishes new performance standards for an active powered subwoofer that can only be achieved through the integration of new amplifier and power supply topologies, transducer designs and electronic control technologies.

Originally designed as part of a VHD system it is voiced for live music but also excels in the field of club and dance music. In any situation it works very effectively, operating down to 28Hz, alongside other VHD products, the SL range, or as an incredible stand-alone subwoofer that can complement any other manufacturers systems.

There is also a flyable version available - VHD4.21R Active Passive Bass Module (KVV 987 480 / KVV 987 481) with additional fixings and requirements for the VHD4.21R / VHD2.21R Flybar (KVV 987 398).

Electronics

The VHD4.21 Active Bass Module consists of two purpose designed Very High Definition enclosures, one active and one passive, each containing two custom designed 21" woofers. A Low Q design has been applied to attain the optimum speaker loading, enabling a high sensitivity of 109dB 1w/1m. Running at close to 100% efficiency on any voltage from 160 to 270 Volts, the amplifier for the VHD4.21 is a revolution in electronic engineering, utilising a huge bank of capacitors as a power store. This unique and innovative new power management system enables the onboard amplifier to deliver peak output levels of 14 kW, whilst operating at a modest constant power consumption of 3.5 kW from a 16 A circuit. The VHD4.21 Active Module represents proven KV2 Subwoofer Amplifier technology that has been consistently improved over the last decade to provide maximum control over the movement of large mass speakers. The end result is a fast, dynamic, Very High Definition subwoofer, truly capable of reproducing the articulation in a bass guitar, whilst also extending down to 28Hz.

Acoustic Components

The VHD4.21'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 VHD4.21 chambers. The VHD4.21 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

The VHD4.21 Active Subwoofer Module consists of two purpose designed 'Low Loss-Band Pass' enclosures, one Active and one Passive, with each enclosure containing two specific custom designed large format 21" woofers.

AC Power

The VHD4.21 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 VHD4.21.

The VHD4.21 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.

Voltage Requirements

The VHD4.21 operates safely and without audio discontinuity if the AC voltage stays within the operating window of 160V-260V at 50 or 60Hz. The VHD4.21 operates in 230V mode. The VHD4.21 features constant power source array ensuring the power remains the same in case of power drops.

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.

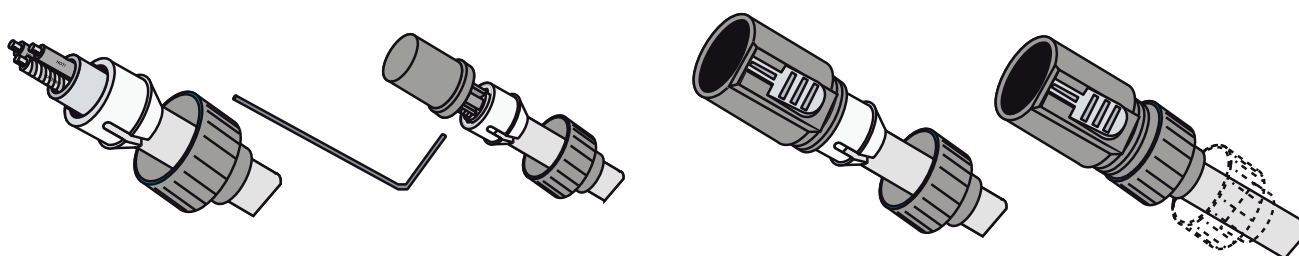
If the voltage drops below the low boundary of its safe operating range, the loudspeaker will shut down if the voltage does not rise above the low boundary before storage circuits are depleted. How long the loudspeaker will continue to function during brownout depends on the amount of voltage drop and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

NOTE: 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.

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 VHD4.21 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.

The Power Connector

The VHD4.21 requires a grounded outlet. It is very important that the loudspeaker AC supply be properly grounded in order to operate safely and correctly. PowerCon 32A AC cable-wiring diagram to create international or special-purpose power connectors:



Power connector assembly

Current Requirements

Each VHD4.21 requires approximately 15 Amps max at 230V AC for proper operation.

The VHD4.21 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.

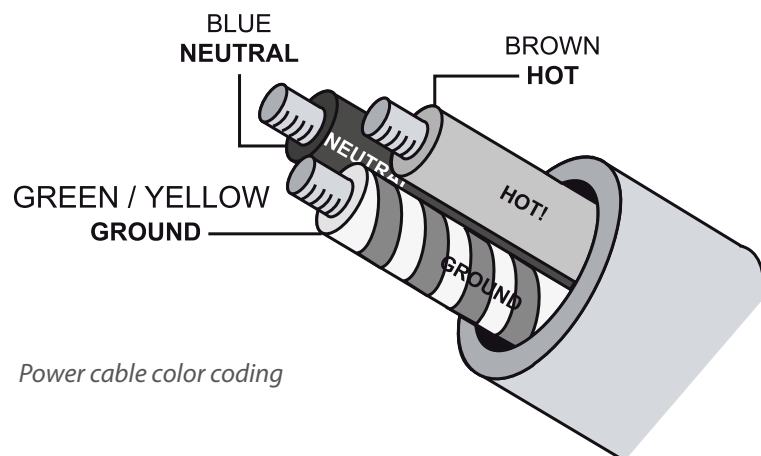
The burst current consumption is the maximum rms current during a period of approximately one second, used to select the rating of most magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula: $V_{pk(drop)} = I_{pk} \times R \text{ (cable total)}$.

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	230 V Mode
Max Long Term Continuous	8 A rms
Burst Current	15 A rms
Short Term Peak	26 A peak

AC Cable Color Coding

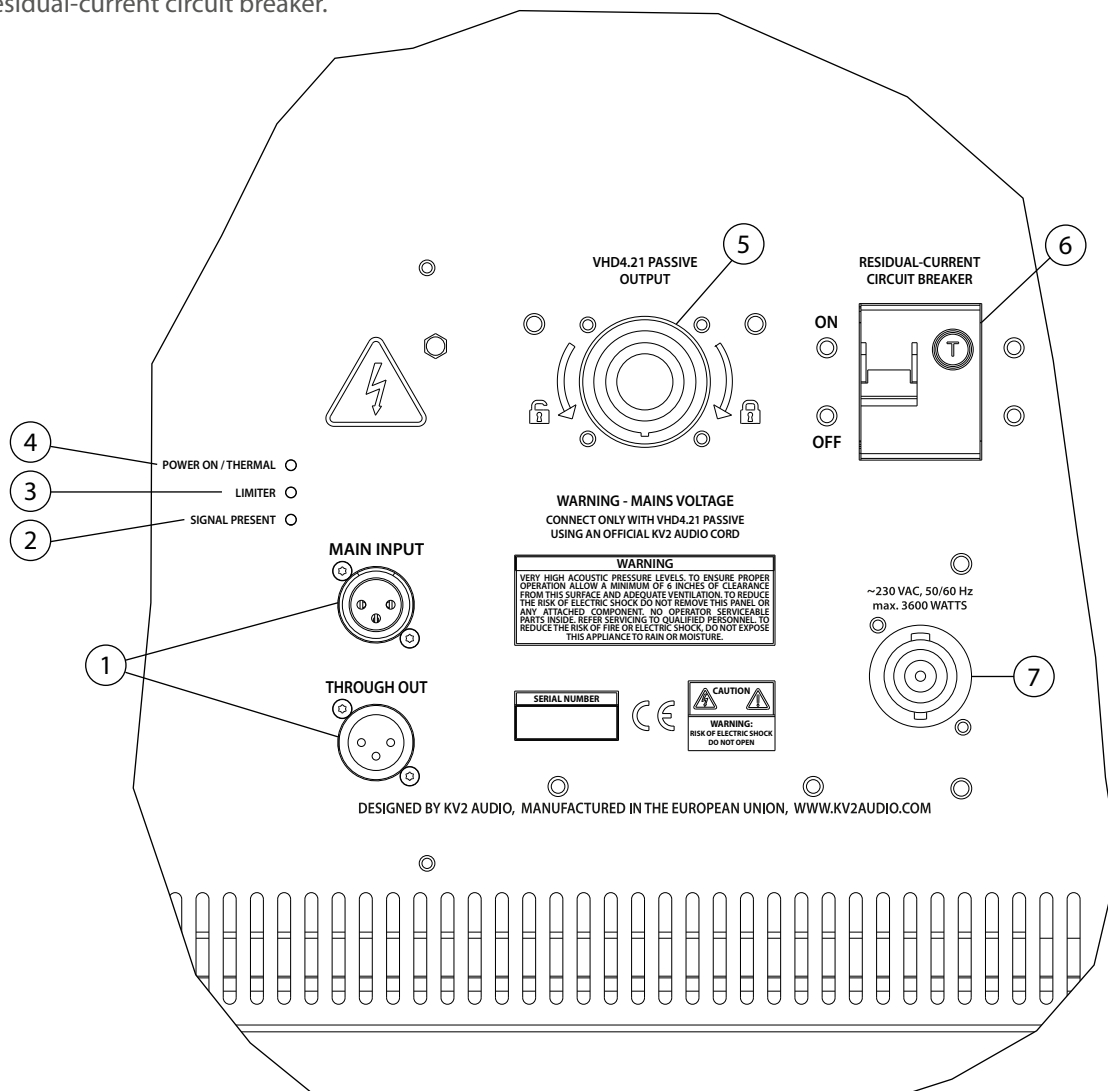
If the colors referred to in the diagram don't correspond to the terminals in your plug, use the following guidelines: *Connect the blue wire to the terminal marked with a N or colored black. Connect the brown wire to the terminal marked with an L or colored red. Connect the green and yellow wire to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



CAUTION: The VHD4.21 requires a ground connection. Always use a grounded outlet and plug.

VHD4.21/VHD4.21R · Control Panel / Inputs and Outputs

The VHD4.21 features an easy to use rear control panel featuring audio input and output connections, LED status lights and residual-current circuit breaker.



VHD4.21 Amplifier Control Panel

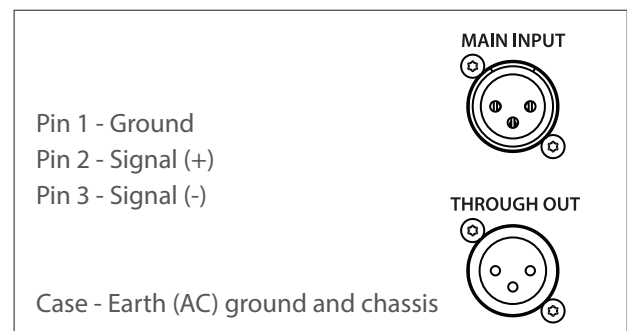
1) Audio Input and Output

The VHD4.21 uses balanced, female XLR connectors for audio signal input, and a male XLR connector to provide through output signal.

The through output connector, wired in parallel to the audio input, will continue to provide the input signal if the VHD4.21 is turned off. The audio input circuit presents a 20 kOhm balanced input impedance to a three-pin XLR connector with the following connectors:

Audio signal can be daisy-chained using the through output connector on the input panel. A single source can drive multiple VHD4.21 subwoofers with a paralleled input loop. If you are driving multiple VHD4.21'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.

XLR Connectors



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 VHD4.21 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 VHD4.21'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.

2) 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 VHD4.21. This signal indicator can be used to troubleshoot wiring problems.

3) Limiter

Should the rms limiting system be engaged due to overdriving of the VHD4.21, 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.

4) Power On / Thermal

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.

5) Cliffcon 8 pole connector socket

For connection between Active and Passive Module - cable is included with the product (part no. KVV 987 337).

6) Residual Circuit Breaker Switch

It disconnects current to prevent serious harm from an ongoing electric shock.

7) PowerCON 32 A socket

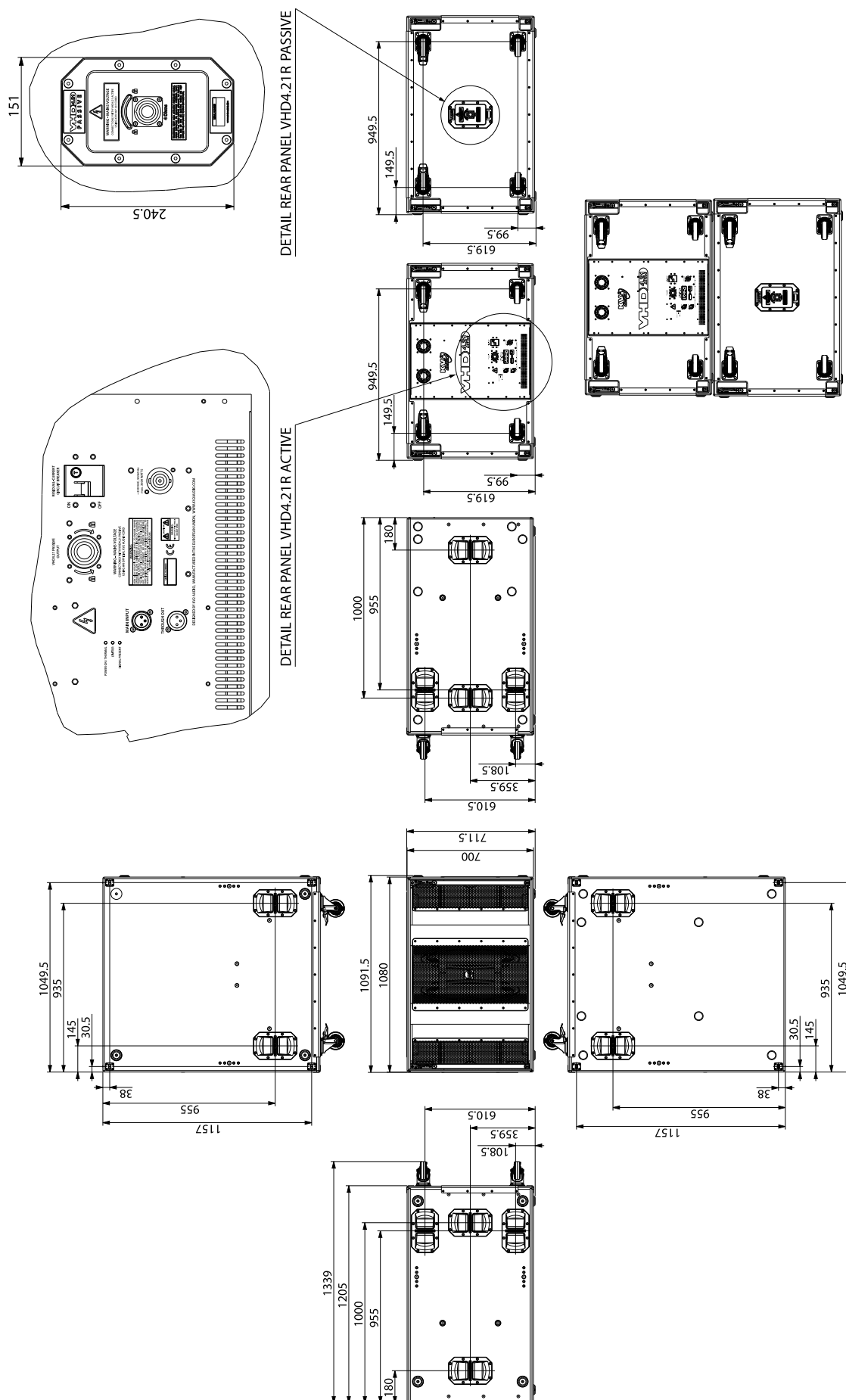
The connectors comprise of contacts for phase, neutral and protective earth (ground) conductors rated for currents up to 32 A and for voltages up to 250V.

Connect only with supplied audio cord Cliffcon (part no. KVV 987 337)!.



VHD4.21R Active/Passive · Drawings

Drawing VHD4.21R Active/Passive



Flying instructions

VHD4.21R / VHD2.21R FLYBAR

MAXIMUM ALLOWANCE:

4x VHD4.21R Active + 4x VHD4.21R Passive or 8x VHD2.21 R Passive Subwoofer

FLYBAR WEIGHT:

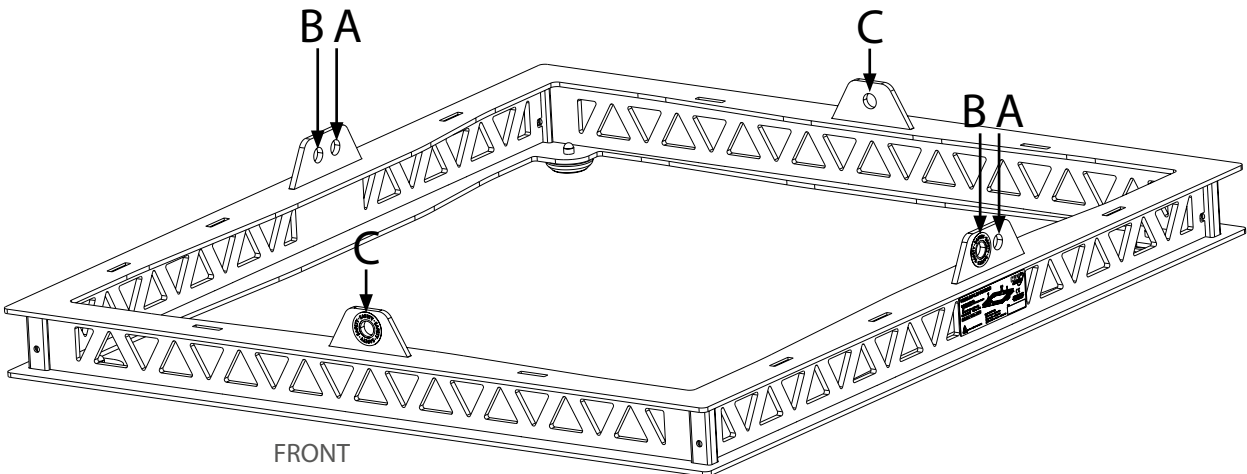
43,5 kg (96 lbs)

MAX. LOAD:

1400 kg (3087 lbs)

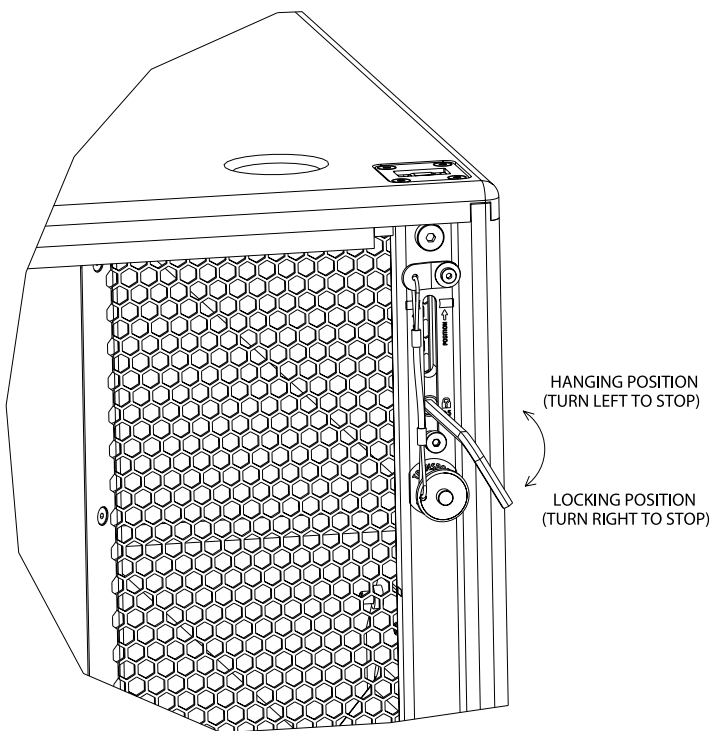
HANGING OPTION:

A	for VHD4.21 R - C for SAFETY
B	for VHD2.21 R - C for SAFETY
C	for VHD2.21 R or VHD4.21 R - B for SAFETY



Instructions for hanging or locking positions

1. PLACE THE ALLEN KEY IN THE SLOT
 - 2A. TURN RIGHT TO STOP FOR LOCKING POSITION
 - 2B. TURN LEFT TO STOP FOR HANGING POSITION
- (ALL 4 HANGING SLOTS)



Specifications

System Acoustic Performance

Max SPL Long-term	147dB
Max SPL Peak	153dB
-3dB Response	34Hz to 180Hz
-10dB Response	28Hz to 240Hz
Crossover Point	60Hz to 120Hz

Low Frequency Section

Acoustic Design	Bandpass with low port losses
Woofer Size / Voice Coil Diameter / Design	4x 21" / 5.3"
Diaphragm Material	Epoxy Reinforced Cellulose with Carbon Fiber and Double Surround
Magnet Type	Neodymium Advanced Ventilated

Low Frequency Amplifier Specification

Type	High efficiency, Current-Enhancing, Switched-Rail Amplifier
Rated Continuous Power	3500W
Short Term Power	14000W
Distortion	<0.05%

Signal Input

Input Sensitivity	1.55V RMS
Input Impedance	20 kΩ

Power Requirements

Power Connector	Neutrik PowerCon® 32A
Operating Voltage	180V - 260V @ 50Hz 60Hz
Recommended Amperage	16A

Cabinet

Cabinet Material	Baltic birch
Handles	12
Color	Black (wear resistant polymer coating)

Physical Dimensions

Height	700mm (27.56")
Width	1080mm (42.52")
Depth	1200mm (47.24")
Weight (Active)	175 kg (386lbs)
Weight (Passive)	155 kg (342lbs)
Weight (Active) R - flying version	178 kg (392lbs)
Weight (Passive) R - flying version	158 kg (348lbs)

VHD2.21/VHD4.21 Padded Heavy Duty Cover

part name:
VHD2.21/VHD4.21 Cover
part number:
KVV 987 352
description:
- heavy duty
- padded



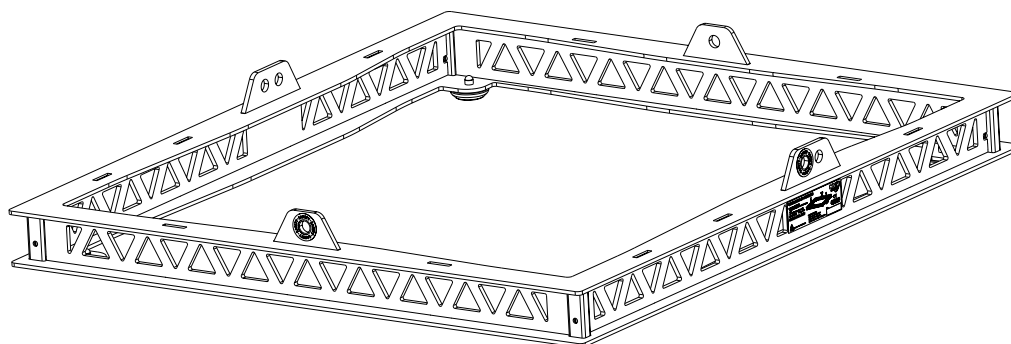
VHD4.21 Amplifier Transport and Fabric Cover

part name:
**Transport and Fabric Cover
for VHD4.21 Amplifier**
number:
KVV 987 390
description:
- heavy duty
- padded



VHD4.21R / VHD2.21R Flybar

part name:
VHD4.21R / VHD2.21R Flybar
part number:
KVV 987 398
description:
- heavy duty
- padded



Warranty

Your VHD4.21 is covered against defects in material and workmanship.

Refer to your supplier for more details.

Service

In the unlikely event that your VHD4.21 develops a problem, it must be returned to an authorised distributor, service centre or shipped directly to the KV2 Audio 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.



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Made Perfectly Clear.

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