VHD5 Rigging Manual

User Guide

The Future of Sound. Made Perfectly Clear.

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

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

Content

This manual is presented by KV2 Audio, to enable the clear and precise instructions for the safe practice and execution, suspension and general rigging of the **VHD5 Constant Power Point Source System**, using the **VHD5 FLYBAR** system.

It is vitally important that operators and users familiarize themselves with all of the components, parts, products and safety instructions, as described and indicated within this document, before attempting any over-head suspension, flying and rigging.

The VHD5 Loudspeaker cabinets are designed with integral suspension points to facilitate secure flying and rigging, providing that no modifications or external parts are substituted, and that all instructions are adhered to at all times.

KV2 Audio s.r.o. operates a rigorous policy of attaining and improving standards.

This means that instructions and methods may be subject to change without notification, and it is the sole responsibility of the operator/user to check for any updated information regarding safe flying procedures whether locally or internationally.

1. **Study this manual thoroughly**

2. **Keep printed instructions, do not throw away**

3. **Do not use this system in unprotected outdoor areas, during lightning storms or in rain or wet conditions.**

4. **Obey all SAFETY INSTRUCTIONS as well as HAZARD and REQUIREMENT warnings.**

5. **Never integrate equipment or any other fixtures that have not been approved by KV2 AUDIO**

6. **Study all the associated User Guide documents before operating the system.**
   This product information document is included in the shipping carton of the associated system components.

7. **This system must only be rigged by qualified and Certified operators.**
   Installation should only be carried out by qualified personnel that are familiar with the rigging procedures and safety guidelines defined in this manual.

8. **Safeguard workers OH&S.**
   Throughout loading, installation and deployment, workers must wear a protective helmet, high-Vis vest and suitable footwear at all times. Under no circumstance should workers be permitted to climb on to any VHD5 system, either ground stacked or flown.

9. **Conform to the Working Load Limit (WLL) of all non KV2 AUDIO equipment.**
   KV2 Audio will not be held responsible for the use of any non KV2 AUDIO rigging equipment or accessories. Confirm that the Working Load Limit (WLL) of all hanging points, chain motors and all supplementary rigging hardware is not exceeded.

10. **Conform to the maximum system configurations.**
    To avoid overloading, adhere to the published configurations defined in this manual. To check the compliance of any VHD5 configuration recommended by KV2 AUDIO, check the information contained within the VHD5 USER GUIDE.

11. **Hazard of falling objects**
    Before flying or transporting, confirm that all unattached items have been removed from the system.

12. **Removal of Flybar and rigging**
    Remove flybar and any other rigging items prior to transporting system.

13. **Remain vigilant when flying the VHD5 system.**
    Always confirm that there is no one underneath the loudspeaker system while it is being flown into position. As the system is being flown, ensure that each cabinet is correctly attached to the adjoining cabinet. Never leave the system unattended, until it has been safely flown into its final trim position. KV2 Audio advocates the use of rated safety slings with all flown systems.
    Failure to do so can cause injury or death and will immediately void your warranty.

14. **Use caution when ground-stacking any loudspeaker system.**
    Ensure that the loudspeaker system is always constructed on a stable base. Make sure that the structure is rated to the total weight of the system. KV2 AUDIO advocates the use of rated safety slings and/or ratchet-straps with all ground-stacked systems. KV2 AUDIO does NOT recommend ground stacking the VHD5 system.

15. **Wind effects on the dynamic load of a flown system.**
    When a VHD5 system is flown outdoors subject to the weather, wind can create dynamic stress to the rigging hardware and hanging points. If the wind strength exceeds 6 bft (Beaufort scale) which is between 39-49kmh, reduce the height of the system and secure to avoid any unacceptable movement.

HAZARD!
This image denotes a potential risk of injury to a person or damage to the equipment.
It may also alert the user about a process that must be followed exactly to ensure safe deployment and operation of the equipment.

REQUIREMENT!
This image alerts the user about a process that must be followed exactly to ensure safe deployment and operation of the equipment.

System weight

The total load per side of the recommended system configuration (1x VHD5.0, 3x VHD8.10, 1x VHD5.1, 1x Tilt Flybar, 1x Pan Flybar) including all cabling is 596 kg (1314 lbs).

Safety Warning

- The VHD5 rigging components (Flybar, Integral Flyware, Locking pins) must only be used with the matching KV2 Audio VHD5 loudspeakers VHD5.0, VHD8.10, VHD5.1.

- Installation and deployment must be conducted by Certified and authorized personnel following the local OH&S standards in place.

- The person responsible for deploying the system must ensure that the hanging points are suitably rated for their intended use.

- KV2 Audio, as such is not responsible for the safety of any suspension, flying over-head of all specific KV2 Audio Loudspeaker products, or Rigging configurations as executed in practice by users.

- It is expressly the sole responsibility of the user to ensure that at all times any KV2 Audio product or system is suspended and rigged in accordance with current International and local regulations.

- All non KV2 Audio products such as hoists, clamps, wires, truss, supports used, or required to suspend KV2 Audio Loudspeaker systems are the sole responsibility of the user.

Preparation

Check the proposed system placement and flying plan with the EASE Focus aiming and modelling program and print out the simulations for each system hanging point.

Utilising this plot, the riggers will be able to accurately set up the hanging points and chain motors in the correct positions.

The working load limit (WLL) of individual chain motors and their hanging points has to be sufficient to carry the total system weight, including cabling, flyware and any accessories.

It is possible that when two chain motors are being used to hang a system, that they might not always be synchronised. For this reason, both of the hanging points must be capable of carrying the total system weight independently.

System Inspection

All system components must be examined for faults prior to being deployed. This includes the loudspeaker connectors and in particular the internal cabinet rigging components.

The flybar, chains and clips must also be inspected, and cleared of any faults.

Any damaged components must be replaced immediately or taken out of service. Refer to the **Care and Maintenance** section of this manual. (Page 17).

VHD5 Transportation

The VHD5 system is transported on a total of six transport carts.

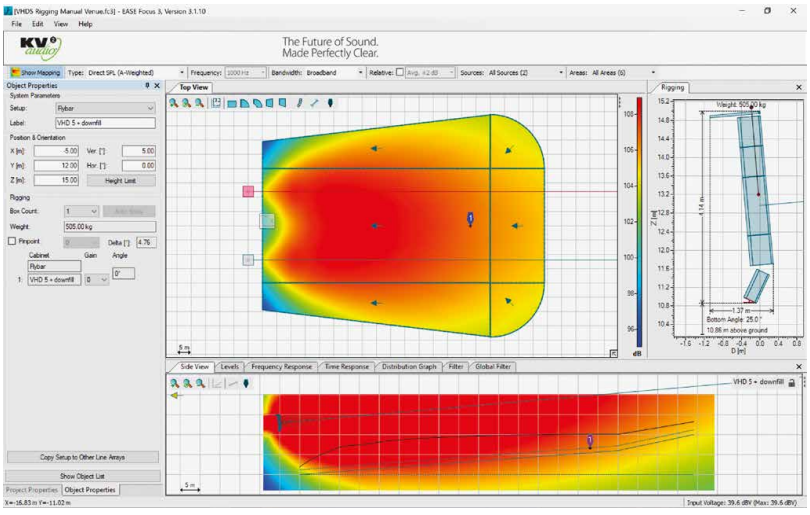
1. **1x VHD5.0 (left side)**
2. **1x VHD5.0 (right side)**
3. **2x VHD8.10 (left side)**
4. **2x VHD8.10 (right side)**
5. **2x VHD8.10 (one left side, one right side)**
6. **2x VHD5.1 (one left side, one right side)**

During transportation, the cabinets are secured to their transport carts using the internal rigging hardware and locking pins, and in the case of the VHD8.10 cabinets, in pairs on top of each other using the same method.

VHD5 SIMULATION SOFTWARE

Because VHD5 is a point source system, there is not the requirement for extensive and complicated configurations, normally associated with multi-source arrays.

The unique design of the system ensures that as long as the system is carefully placed and aimed correctly, the sound will be extremely even and linear within the entire listening area, out to beyond 100 metres.



In the case of a venue where the audience areas extend to the sides of the stage, there may also be a need for side hangs to cover these zones.

In addition, there will be cases when there will be infills and lip-fills used to cover zones not covered by the main system.

KV2 AUDIO recommends using EASE Focus software by AFMG, which provides a simulation of coverage and SPL, ensuring that all of the system components are placed in the optimum position for any given situation.

This can be downloaded for free at http://focus.afmg.eu/index.php/fc-downloads-en.html
KV2 files for EASE Focus can be downloaded at https://www.kv2audio.com/downloads.html

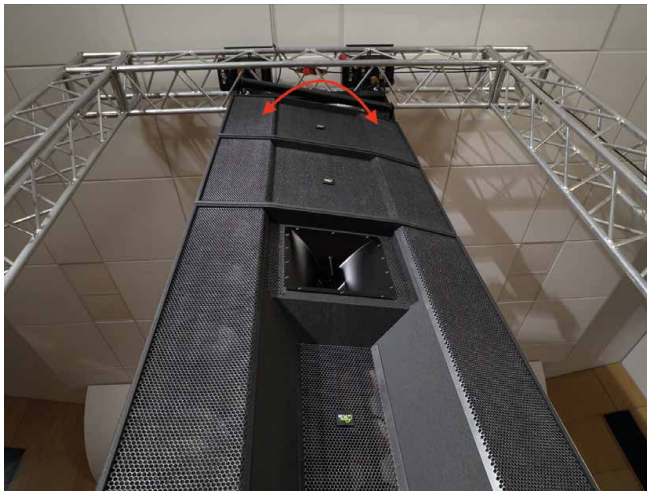
VHD5 Flybar & Chain

Due to the unique design of the KV2 flying systems, all of the internal and external flyware is static and does not require any adjustment.

The exception to this are the remote controlled motorized flybars that can be rotated/panned and tilted to adjust for environmental and climatic changes which can affect the systems high frequency response. This allows for correction at any time if required with the simple push of a button.

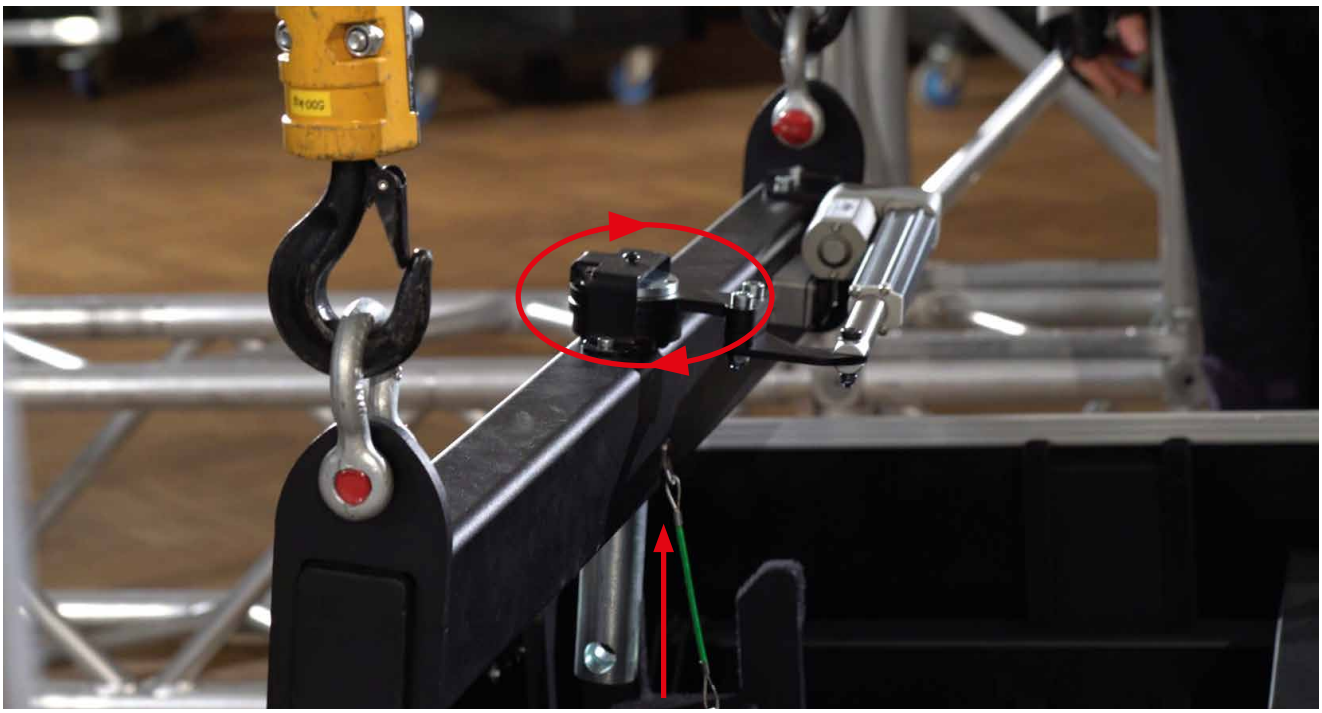
The VHD5 flybars feature ingenious engineering, and are simple to deploy using the remote control on the VHD5.0 amplifier rack, or the GUI of the VHD5 Web Control.

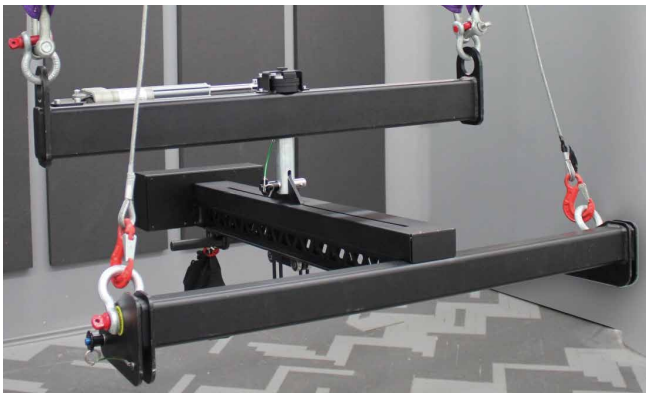
With the Pan/Rotate flybar attached to the main tilt flybar, this also provides horizontal trim for the flown VHD5 system, which together with the tilting function on the Main flybar, allows for extreme accuracy when aiming the system on all axes once it has been flown to trim height.



VHD5 Top (Pan) Flybar Configuration

Another unique feature of the VHD5 flybar system, is the ability to deploy the top pan flybar either parallel or at 90 degrees to the main tilt flybar. This is simply achieved by pushing the spigot up within its housing to disengage the locking mechanism, and then rotating the spigot by 90 degrees. This will change the engagement angle between the spigot on the top flybar and fin on the main flybar, between parallel and right angle. This provides additional versatility for rigging, depending on what hanging points are available in any given situation.





90° mode

Parallel mode

Main Tensioning Chain

A high tensile chain is used to apply tension to the system, and spread the weight evenly across the flybar.
This chain is permanently attached to the main (Tilt) flybar and during transport and initial setup , is stored in a chain-bag located at the rear of the main flybar.

The tensioning chain includes a number of marked tags that correspond to the possible system configurations.

HAZARD!
This chain has been pre-measured to ensure correct tension and angle of the system components. Under no circumstances must any change be made to the length or attachment method of the chain. Doing so can create a hazard and will immediately void your warranty.

VHD5 Internal Rigging

Each VHD5.0 and VHD8.10 cabinet has its own internal flyware. It consists of a hinged rigging bar with a small external silver handle located at the top of each cabinet, a push pin attached by a wire harness for locking the rigging bar into place, and corresponding holes at the base of each cabinet with a push pin attached by a wire harness for connecting adjacent cabinets. When the handle is rotated, the bar protrudes vertically from the top of the cabinet and fits neatly into a slot in the flybar, or into the cabinet above. The two locking push-pins are employed, one to lock the rigging bar in the upright position, and the second to secure the flybar or two cabinets together.

Fly Bar Deployment

1. Remove the fly bar transit-case lid and position the case so it is sitting directly under the 2 chain motors.
2. Attach the 2 rated shackles to the top (rotating) flybar and lock the pins with Heavy Duty cable-ties.
3. Lower the chain motor hooks to the top fly bar and attach the chain-motor hooks to the flybar shackles, (or steel extension cables).
   These chain motors should be rated at a minimum of 1 tonne each, and should be rigged with the centre of the motors 1 metre apart.

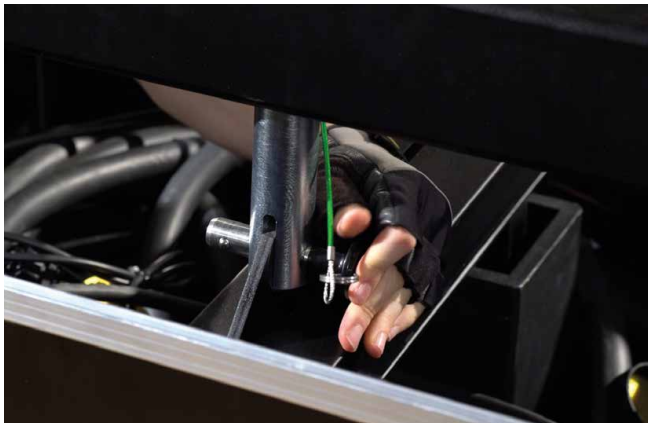
IMPORTANT!
It is very important that the integrated flybar motor is in its 'parked' position. Otherwise the flybar is placed under considerable strain, and the flying process becomes a lot slower.

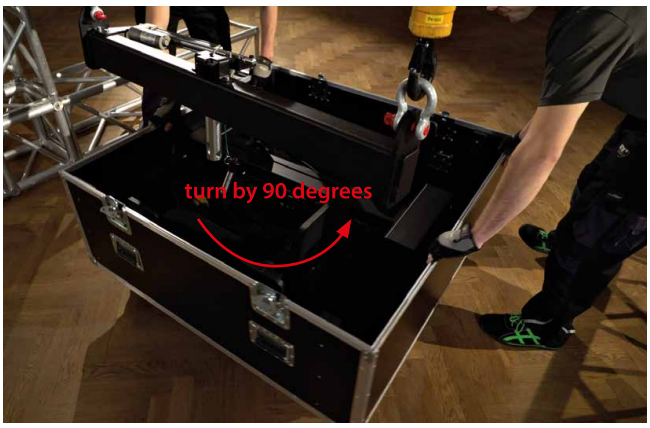
NOTE: If the main flybar is NOT in the parked position at the commencement of the system setup, it may be necessary to connect the tilt flybar control cable and power on the amplifier rack at the beginning of this process, in order to place the main flybar in the park position and ensure that the system is hanging vertically during the setup process. When disassembling system it is important to place the main tilt flybar in the PARKED position before disconnecting the flybar power. This will ensure it is the correct position the next time it is deployed.

1. In 90 DEGREE MODE, raise the top flybar slightly and rotate the Flybar transit case through 90 degrees or by one quarter turn. Position the large metal spigot directly above the black centre fin of the tilt flybar below, and then lower the top flybar and insert the locking pin all the way through both sides of the spigot, connecting the two flybars. Ensure that the 5 pin XLR panel connector on the top flybar is facing upstage.

2. In PARALLEL MODE, simply move the flybar transit case so that the spigot is directly above the black centre fin of the tilt flybar below, and then lower the top flybar and insert the locking pin all the way through both sides of the spigot, connecting the two flybars. Ensure that the 5 pin XLR panel connector on the top flybar is located at the upstage end of the assembly.

3. Raise the flybar to ≈1.4 metres working height.





HAZARD!
When the flybars are being rigged in the 90 DEGREE MODE, ensure that the top flybar is absolutely level before connecting the second main (tilting) flybar. Failure to do so will make the connection process difficult, and potentially cause damage to the flybar assembly by placing unnecessary strain on the internal components. The same practice should be followed when the flybars are in PARALLEL MODE to ensure even distribution of weight between the 2 chain motors.
It is recommended to use the flybars in PARALLEL MODE when possible, as this eliminates the possibility of damaging the flybar assembly.

4. Attach the steel safety cables to the flybar safety points, using two rated shackles.

HAZARD!
It is very important that safety cables are always used when flying the VHD5 system. Failure to do so could cause injury or death, and will immediately void warranty.

Flying cabinets and cabling

HAZARD!
It is essential that the cabinets are placed directly underneath the flybar, otherwise it can be difficult to line up and insert the rigging bars. You must land each flown cabinet on to the next cabinet to be flown, to ensure that the hinged rigging bar can accurately swing into the vertical position, ready to be pinned.
Failure to do so can cause damage to the rigging bars and cabinets.

The order of cabinets from the top is;

1. VHD8.10 **2. VHD8.10** **3. VHD5.0** **4. VHD8.10** **5. VHD5.1**

Top 2 VHD8.10 Cabinets

1. Remove the transport cover from the first two VHD8.10 cabinets, and roll the cabinets into position directly under the flybars.

2. Land the flybar assembly onto the top VHD8.10 cabinet, so that the front section is directly above the VHD8.10 rigging arms, at the front of the cabinet.

3. Remove the push pins from the main flybar and the top of the upper VHD 8.10. Rotate the silver knobs which will raise up the rigging arms to fit into the flybar double fin shaped front section. Lock them into the vertical position by replacing the push pins into hole no 2.

4. The Holes on the rigging arm must be aligned with the bottom rear holes on the flybar fin. Adjust the height of the flybar assembly if needed, then insert the push pins into the flybar locking points.

5. Make sure that the two VHD8.10 cabinets are attached together securely with the rigging bars and push pins.

6. At this point the long black tensioning chain can be released for utilisation later in the flying process. This chain has tags marked for different system configurations. **If you are not using a VHD5.1 down fill, you can also connect the last Double Stud L-Track clip to the L-Track on the bottom VHD8.10 when you reach that point.**

7. To begin the system cabling process, position yourself at the rear of the cabinets and connect the speaker break-out cable to the main speaker multi-pin cable located in the flybar transit case.

8. Then attach the cable strain relief using the Double Stud L-Track clip to the top VHD 8.1 0 L-Track located on the back of the cabinet.

9. Take the looped Flybar pan and tilt control cables and place them around the rear lifting bar, in front of the tensioning chain bag on the opposite side to the male XLR panel connector. Then take the XLR female connector and plug it into the male panel XLR located at the rear of the tilt flybar. The male XLR connects to the female panel XLR located on the top rotating flybar.

10. Take two of the Blue LK connectors, and insert one into each of the two VHD8.10 cabinets and twist until they lock into place.

11. Release the transport cart by removing the push pins on both sides at the base of the lower VHD8.10. You will notice the Rigging arms drop through below the cart floor. Once released replace the push pins back into the locking point hole no 1 at the base of the VHD8.10's.

12. Raise the flybars and VHD8.10 cabinets a further 1.3 metres and wheel away the empty VHD8.10 cart.

VHD5 Cabinet

1. Remove the transport cover from the VHD5.0 cabinet and wheel into position directly below the flown VHD8.10 cabinets.

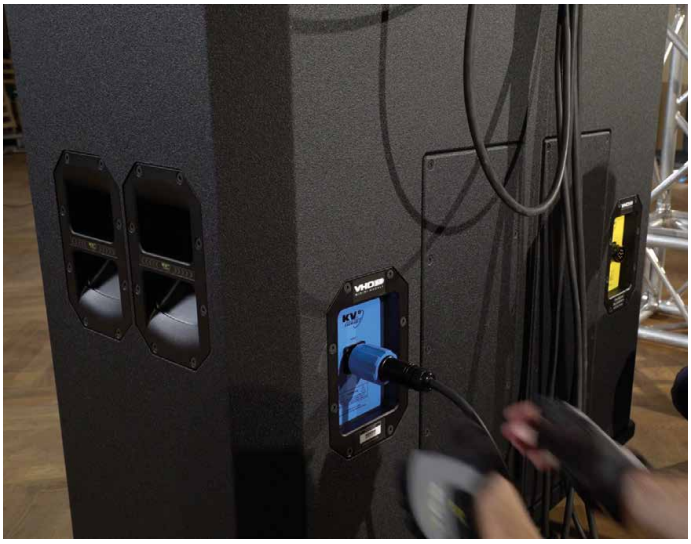
2. Lower the two VHD8.10's, so that they rest completely on top of the VHD5.0 cabinet with their feet interlocked.

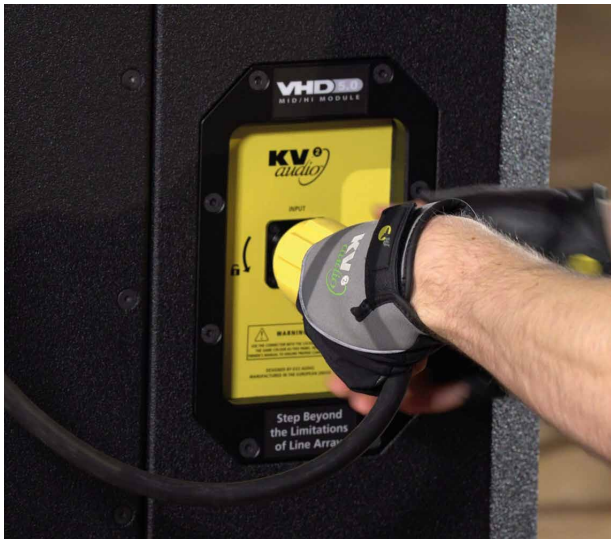
HAZARD! DO NOT rotate the connecting bars into place until the VHD8.10 cabinets have been landed accurately on top of the VHD5.0 cabinet. **Doing so can damage the rigging bars and the cabinets.**

3. Remove the push pins at the top of the VHD5.0 and the bottom of the VHD8.10. Then rotate the silver knob on both sides of the VHD5.0 which will allow the rigging arms to raise up in to the bottom VHD8.10. Once in position replace the push pins on the VHD5.0 and the adjacent VHD8.10 in to the respective locking point no's 1 and 2.

HAZARD! Don't forget, that this always has to be done on both sides. Failure to do so could cause the rigging arms to be bent and become inoperable.

4. At the rear of the cabinet connect one of the Blue LK connectors into the blue LK socket, and the Yellow LK connector into the Yellow socket on the VHD5.0 cabinet.





5. Remove the bottom push pins of the VHD5.0 which will release the transport cart in the same way as on the VHD8.10 cabinets. Replace the push pins in the bottom holes of the VHD5.0 cabinet.

6. Raise the system slightly, and remove the VHD5.0 transport cart.

Bottom VHD8.10 Cabinet

1. Remove the transport cover from the last pair of VHD8.10 cabinets.

2. Fly the system up to a level where the last two VHD8.10 cabinets can be rolled into position, directly under the VHD5.0 cabinet.

3. Carefully land the VHD5.0 cabinet on to the top of the 2 VHD8.10 cabinets, ensuring that the feet are aligned correctly with the VHD8.10 cabinets.

4. Remove the push pins at the top of the third VHD8.10 and the bottom of the VHD5.0. Then rotate the silver knob on both sides of the VHD8.10 which will allow the rigging arms to raise up in to the bottom VH5.0. Once in position replace the push pins on the VHD8.10 and the adjacent VHD5.0 into the respective locking point no's 1 and 2.

5. Remove the pushpins from both lower sides of the third VHD8.10 cabinet, where it connects to the bottom VHD8.10 cabinet, and disconnect the two cabinets by rotating the rigging bars on the bottom VHD8.10 cabinet into the transport position. Replace the pushpins.

6. Find the tag on the tensioning chain, near the bottom, which corresponds to using one VHD5.0 with three VHD8.10's per side and attach that point to the L-Track on the third VHD8.10 cabinet.

7. By raising the flybar slightly you will be able to wheel out the remaining single VHD8.10 cabinet, which can then be moved to the other side of the stage for the second system hang.

8. Land the system on the ground, so that the tensioning chain can be connected to the fly track on the bottom VHD8.10 cabinet, with the Double Stud L Track clip which has a marked with a tag near the bottom of the tensioning chain.
Find the tag on the chain which corresponds to using **one VHD5.0 with three VHD8.10's per side** and attach that point to the L-Track on the bottom VHD8.10 cabinet.

9. Take the final Blue LK connector, and insert it into the third VHD8.10 cabinet.

VHD5.1 Cabinet

1. If you are using a VHD5.1 downfill cabinet then after attaching the tensioning chain, raise the system by 1 metre before wheeling the downfill into place Unlike all of the other cabinets, the VHD5.1 downfill does not use a rotating rigging arm. Instead there is a vertical sliding rail which can be manually engaged from the recess within the top sides of the cabinet.

2. Lower the hang so that the front feet of the bottom VHD 8.10 cabinet sit directly within the foot recess points on the top front of the VHD5.1 downfill box.

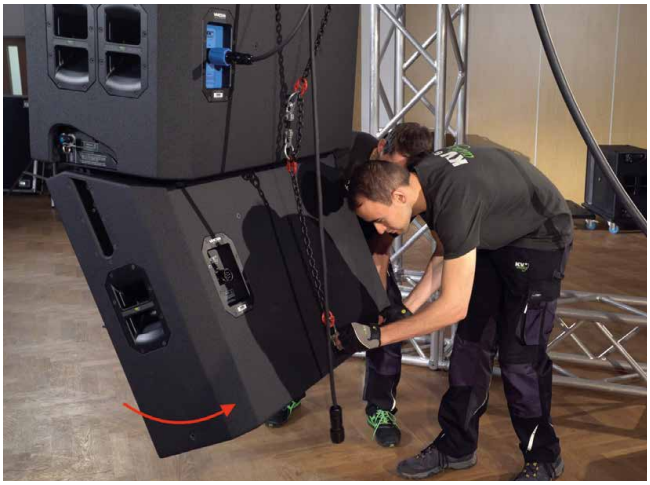
3. Remove the push pins from the lower rigging points of the bottom VHD8.10 and slide up the rigging arms from the VHD5.1 downfill so that they align with those holes. Once fully extended replace the push pins into hole no 1 on both side of the VHD8.10.

4. Raise up the system up enough to wheel out the transport cart.

5. Find the marked tag on the chain that corresponds to the configuration using a VHD5.1 downfill.

6. To set the correct angle for the downfill, pull the VHD5.1 downfill cabinet back and upwards in an arc motion using the handle on the back of the cabinet and then connect the chain to the rear of the cabinet with the attached Double Stud L Track clip.

7. At the rear of the cabinet connect the Black LK connector into the Black LK socket.



Cabling

MAIN SPEAKER MULTI-CABLE

The main amplifier output feeds for VHD5 are carried on a 20 metre 48 core Eurocable and are connected from the VHD5 amplifier rack to the speaker breakout by 48 pin LK Connectors.

The main speaker multi-core cable has a Stainless Steel Cable Grip, which connects to the L-Track on the top VHD8.10 cabinet with a Double Stud L Track clip. This provides a fast and secure method, guaranteeing minimal stress to both the main cable and breakout.

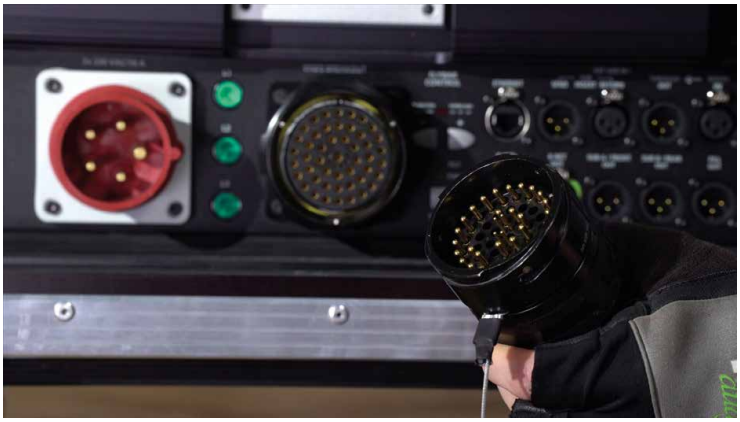
BREAKOUT SPEAKER CABLE

The breakout speaker cable utilises a 48 pin LK connector breaking out to 4 – Blue LK connectors for the LF, 1 - Yellow LK connector for the VHD5.0 Mid High, 1 - Black LK connector for the VHD5.1 downfill, and 2 - 5 pin XLR's for the Fly Bar remote control.

The cable connector colour coding corresponds to the colour of the speaker input panels on the cabinets.

AMPLIFIER RACK CONNECTIONS

Connect the amplifier side of the speaker multi cable to the LK 48 way multi pin panel connector, located on the front of the VHD5 signal and power distribution unit. Then connect the power. Once connected to the control and amplification system you will have the option to rotate the fly bar left and right as well as tilt it up and down.



NOTE: If the main flybar is NOT in the parked position at the commencement of the system setup, it may be necessary to connect the tilt flybar control cable and power on the amplifier rack at the beginning of this process, in order to place the main flybar in the park position and ensure that the system is hanging vertically during the setup process.

Care and Maintenance

IMPORTANT!
All KV2 Audio equipment that is designed to be flown or suspended has undergone thorough testing and is certified to be used safely, according to the published user guides and manuals.

All equipment should be regularly checked for any visible damage to chains, slings, shackles, and all working parts of the flying systems.

If any damage at all is detected or there is a suspicion that any part of the system may not be operating safely or correctly, it must immediately be removed from service and either repaired and recertified, or safely disposed of. Under no circumstances should any equipment be used if there is any obvious sign of damage.

Doing so can cause injury or death, and will immediately void the warranty of that part and any equipment attached to it.

We recommend performing the following checks once a year:

FLYBARS:
- Test flybar pan & tilt control, and compare it with the other system flybars.
- Check and tighten all screws.
- Grease the threaded rod with Vaseline A00.
- Clean and check all Push Pins.

SPEAKERS:
- Check and tighten all screws.
- Perform a listening comparison test.
- Clean and check all connectors for correct operation.
- Clean and check Rigging Bars for correct operation.

AMP RACKS:
- Clean the front panel air filters.
- Clean and check all connectors for correct operation.
- Test flybar remote controls for correct operation.

The Future of Sound.
Made Perfectly Clear.

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