

K&F SPECTRA 212 Rigging System



User's Manual

Translation of the original instructions

Version 1.4

Released: 15.10.2018



**Important Information,
Please Read Before Use!**

KLING & FREITAG GmbH
Wohlenbergstrasse 5
D-30179 Hannover
TEL +49 (0) 511 96 99 70
FAX +49 (0) 511 67 37 94
www.kling-freitag.de



Table of contents

1	Introduction	4
1.1	Icons Used	4
1.2	About this Manual	4
2	Product Description	5
3	Intended Use	7
4	Safety Instructions	7
4.1	Safety Instructions for Flying Configurations	7
4.2	Wind loads	9
5	Flying Configurations	10
5.1	Horizontal Arrays	11
5.2	Vertical Arrays	12
6	Mounting and Suspending	13
6.1	Mounting Horizontal Arrays	13
6.1.1	Horizontal arrays with up to five speakers	13
6.1.2	Horizontal Arrays With Six Speakers	15
6.2	Mounting Vertical Arrays	19
6.3	K&F VIDA L Load Adapter	24
6.3.1	Mounting the K&F VIDA L Load Adapter	24
6.4	Pinpoint Tables	26
6.4.1	Pinpoint table for vertical arrays	26
6.4.2	Pinpoint table for horizontal arrays	27
6.4.3	Pinpoint table for vertical arrays with Single Stud Fitting	28
6.5	K&F SPECTRA 212 Singlebar and Single Stud Fitting	29
6.6	K&F SPECTRA 212 Flybar	30
6.7	K&F Rotation Clamp 450	32
7	Dismounting a Flying Speaker Array	33
8	Flying Speakers Material Lists	34
8.1	Material overview: Standalone Setup	34
8.2	Material overview: Vertical, single-stranded arrays	35
8.3	Material overview: Vertical, double-stranded arrays	36
8.4	Material overview: Horizontal, single-stranded arrays	37
8.5	Material overview: Horizontal, double-stranded arrays	38
9	Transportation and Storage	39
10	Care and Maintenance	39
11	Declaration of Conformity (CE)	40
12	Notes	41

1. Introduction

Thank you for purchasing a KLING & FREITAG product. To guarantee trouble-free operation and enable the KLING & FREITAG SPECTRA 212 speaker system to achieve its full potential, please read this manual carefully before use. This item is a quality accessory for the K&F SPECTRA 212 speaker system. Combining it with your existing speaker system creates an extremely versatile pro-grade tool that meets all requirements in terms of audio quality and safe installation.

1.1 Icons Used



Warning



Caution



Notice



Tip

This icon indicates a risk of injury or death. Not following these instructions may result in serious health problems including potentially fatal injuries.

This icon indicates a possibly dangerous situation. Not following these instructions may cause minor injuries or damage.

This icon marks instructions for proper use of the described products. Not following these instructions may cause malfunctions or damage.

This icon marks information provided for simplified use of the described products.

1.2 About this Manual

© KLING & FREITAG GmbH. All rights reserved.

All specifications regarding the features of the described products and applicable safety guidelines provided in this manual are based on information available at the time of publishing.

We assume no responsibility for technical specifications, dimensions, weights, and properties.

All information in this manual is subject to change without notice.

To ensure safe operation, all persons using the speaker accessories must have access to this guide and all other relevant material during installation. The speaker accessories must not be set up nor operated unless this manual has been read, understood and kept readily available on site.

All KLING & FREITAG manuals are originally authored in German.

KLING & FREITAG spare manuals are separately available for order or can be downloaded from our website: www.kling-freitag.de.

Contact Us:

info@kling-freitag.de

KLING & FREITAG GMBH, Wohlenbergstr. 5, D-30179 Hannover

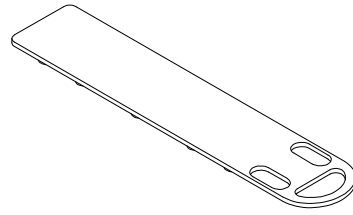
Phone +49 511 96 99 70, fax +49 511 67 37 94 (other countries)

2. Product Description

K&F SPECTRA 212 Connector

Connecting element between two K&F SPECTRA 212

Weight: 1.3 kg

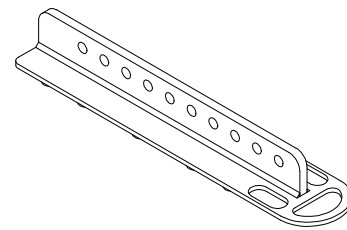


K&F SPECTRA 212 Flybar Connector horizontal

Connecting element between two K&F SPECTRA 212 with fixture for K&F SPECTRA 212 flybar and K&F VIDA L load adapter

Allows for creating and suspending a horizontal array from several K&F SPECTRA 212.

Weight: 2.6 kg



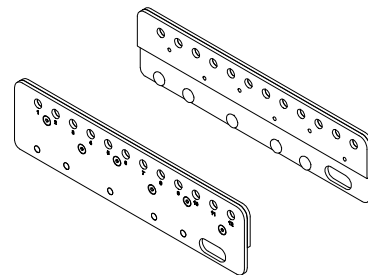
K&F SPECTRA 212 Flybar Connector vertical

Items included: 2 (1 for the left-hand and right-hand sides each)

Single-fall suspension: For installation at the top K&F SPECTRA 212 speaker to adapt the K&F SPECTRA 212 flybar for a vertical array.

Dual-fall suspension: using K&F VIDA L load adapter

Weight: 4.6 kg

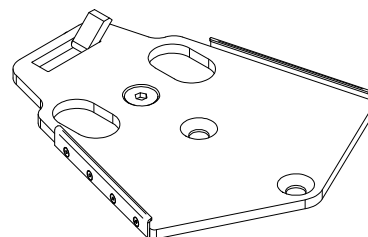


K&F SPECTRA 212 Sub Adapter

For mounting a K&F SPECTRA 212 onto a K&F subwoofer

Separate user manual

Weight: 3.1 kg



K&F SPECTRA 212 Flybar

Used for **single-fall suspension** of a vertical or horizontal array.

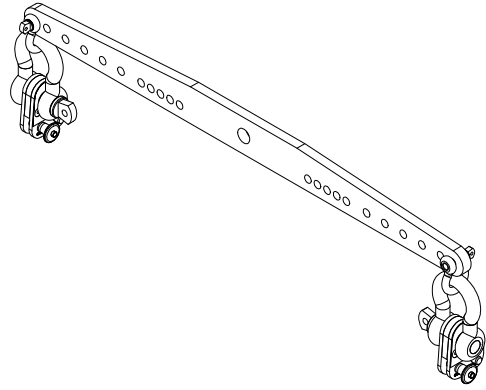
Items included:

K&F SPECTRA 212 flybar (1 item)

Shackles (2 items)

K&F VIDA L load adapters (2 items)

Weight: **7.4 kg**



K&F SPECTRA 212 Singlebar

Used for **single-fall suspension** of a single K&F SPECTRA 212 speaker.

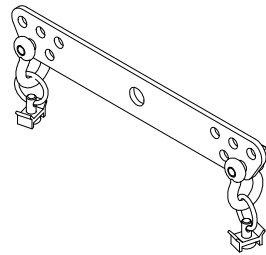
Items included:

K&F SPECTRA 212 singlebar (1 item)

Shackles (2 items)

Single Stud Fittings (2 items)

Weight: **1.2 kg**



Single Stud Fitting

Used for fastening to the fly bar for **dual-fall** suspension of a single speaker.
(Requires 2 items per single speaker.)



K&F Rotation Clamp 450

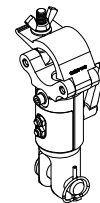
With 50-mm clamp for mounting to a truss or pipe (diameter: 48 – 51 mm)

A 60-mm version of the K&F 450 swivel clamp is also available.

Weight:

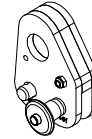
50-mm type: **2.9 kg**,

60-mm type: **3.1 kg**



K&F VIDA L Load Adapter

Used as an attachment point on a K&F SPECTRA 212 Flybar Connector. As either side of the K&F VIDA load adapter can be used, you can set the position in half-steps. This doubles the bore grid on the K&F SPECTRA 212 Flybar Connector and thus the adjustment options.



Items included:

K&F VIDA L load adapter (1 item)

K&F fixing pins (2 items)

3. Intended Use

The K&F SPECTRA 212 rigging system is intended for exclusive use in the following:

- 1) Creating and suspending a horizontal array of up to six K&F SPECTRA 212 speakers
- 2) Creating and suspending a vertical array of up to four K&F SPECTRA 212 speakers

People may safely stand below the suspended structure during operation. The configuration is designed for indoor use (trade shows, venues, etc.). Outdoor use is allowable if wind pressures are horizontally dissipated at the top and bottom ends and the structure can be taken down at wind forces of 8 bft or more. Be sure to use only genuine KLING & FREITAG components. All parts must be secured against unwanted loosening.

4. Safety Instructions



Warning

The information described here does not relieve the user of the duty to follow the given safety requirements and legal regulations.

Only technicians qualified as "riggers" are permitted to perform the installation steps. Be sure to use personal protective equipment at all times.

The technicians responsible for installing the system on site are responsible for and guarantee safe setup and use.

To prevent injury and damage, be sure to securely place or suspend arrays as specified in the DGUV regulations 17 (BGV C1) or similar locally applicable accident-control standards.

Unless otherwise stated, use only KLING & FREITAG original parts for mounting the speakers. Never use other parts (in particular, parts not made by KLING & FREITAG).

In mobile and stationary installations, always use installation parts supplied by KLING & FREITAG.

Be sure to always visually inspect all components before use. In fixed installations, regularly check all array components for signs of wear. Visual inspection includes checking all speaker-system and flying components, supporting components (e.g. trusses, ceiling structures, etc.), and all screwed connections. During the inspection, check all flying-system components carefully for deformation, cracks, bolt damage, and corrosion. Remember checking the ball-lock pin and pin bolts for proper functioning. Also check slings and lifts (e.g. shackles, chains, and steel ropes) carefully for wear and deformation. If there are signs of wear, cracks, or deformation, etc., replace the affected parts immediately. See also the "Care and Maintenance" chapter on page 39.

Outdoor use is allowable if wind pressures are horizontally dissipated at the top and bottom ends and the structure can be taken down at wind forces of 8 bft or more.

All connections must be secured against unwanted loosening.

**Warning**

4.1 Safety Instructions for Flying Configurations

**Loudspeakers falling down impose a deadly risk for people standing near-by!
Never use the array if you have any doubt regarding its safety and reliability!**

Only event technicians qualified as “riggers” are permitted to suspend a SPECTRA 212 system.

Never suspend the speakers without appropriate flying accessories.

Maximum-load specifications refer to configurations including cabling and any fittings. Always observe the allowed configurations for the various flying scenarios.

Ensure that all connections are secured against coming loose and that only authorized, statically tested and correctly sized supports, mounting equipment, wire ropes and chains are used. Follow the relevant specified safety factors. Be sure to follow the relevant national specifications, norms, and safety regulations.

Note that every suspension point as well as the supporting structure of the building (i.e. ceiling points, cross beams and stage or PA tower, etc.) must be capable of carrying the total load of the system (including cabling and additional fittings).

Note that the suspension points on the hall ceiling (i.e. shackles, attachment points, or chain hoists) must comply with the DGUV regulations 17 (BGV C1) or similar locally applicable accident-control standards. The maximum load must have been certified by an authorized expert. When in doubt, request a confirmation by local authorities.

Also follow the operating and safety instructions supplied with the product you intend to suspend the flying parts from (e.g. a truss). Never mount the flying parts to a product if there is no information on safe use and maximum load.

Even with two-fall suspension, each chain and motor must be capable of carrying the entire array mass! Make sure that the motor chains hang down vertically and are not twisted, and that the motors are located at the required positions.

During setup, installation, and dismantling, when using chain hoists that do not comply with the DGUV regulations 17 (BGV C1) or similar locally applicable accident-control standards, make sure no persons stand in the danger zone below or near the speaker system.

When using a BGV C1 motor, the SPECTRA 212 system is intrinsically safe, so no secondary safety components are required in operation;

Never use signal cables or power cords for suspending, aligning, or securing the systems. Run the cables in a way that nobody can trip over them.

Ensure there is sufficient clear space for assembling and suspending the array on-site.

Note that arrays being lifted may swing out.

Permit only personnel directly involved with assembly or disassembly to access the working area. The person in charge must announce all flying-part lifting and lowering activities beforehand and make sure all people attending are aware. In this case, all persons present must leave the swing and lifting range immediately.

Never use the flying parts for lifting or safeguarding persons or objects other than the above speakers.

4.2 Wind loads

In case of outdoor use, stay informed of the latest wind and weather conditions. See the following table for provisional guidance.

bft	m/s	Wind force	Impact
0	0–0.2	Calm	Smoke rises vertically.
1	0.3–1.5	Light air	Direction shown by smoke drift but not by wind vanes.
2	1.6–3.3	Light breeze	Wind felt on face; leaves rustle; wind vane moved by wind.
3	3.4–5.4	Gentle breeze	Leaves and small twigs in constant motion; light flags extended.
4	5.5–7.9	Moderate breeze	Raises dust and loose paper; small branches moved.
5	8.0–10.7	Fresh breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters.
6	10.8–13.8	Strong breeze	Large branches in motion; whistling heard in telegraph wires.
7	13.9–17.1	High wind	Whole trees in motion; inconvenience felt when walking against the wind.
8	17.2–20.7	Gale	Twigs break off trees.



Warning

Outdoor use is allowable if wind pressures are horizontally dissipated at the top and bottom ends and the structure can be taken down at wind forces of 8 bft or more.

For outdoor uses, we recommend using at least a BGV D8+ hoisting device to prevent the secondary safety device from loosening in the wind.

When wind speeds exceed 5 bft, be sure to constantly monitor the wind speeds and consider possible wind effects on flying speakers. Also remember that wind speeds increase with height.

If wind speeds might exceed 5 bft, be sure to choose rigging and securing so that they are able to absorb at least twice the static load.

We recommend not using arrays at wind speeds exceeding 6 bft (14 m/s).

With wind speeds equaling or exceeding 6 bft, be sure to immediately clear the area below the speakers. Use roping or lateral spanning to effectively prevent motion build-up of flying speakers. Failing to do so may result in the emergence of large inertial forces leading to the tower collapsing or tipping over.

At wind speeds equaling or exceeding 8 bft, be sure to get down and uninstall flying speakers.

5. Flying Configurations



Warning

For commercial use as specified in this document only!

To prevent personal injury and damage, be sure to securely place or suspend the speaker as specified in the locally applicable standards.

The information described here does not relieve the user of the duty to follow the given safety requirements and legal regulations.

In mobile and stationary installations, always use installation parts supplied by KLING & FREITAG.

Unless otherwise stated, use genuine KLING & FREITAG parts only. Never use other parts (in particular, parts not made by KLING & FREITAG).

Be sure to always visually inspect all safety-related speaker and accessory components before use. In stationary installations, check the speaker and accessories for signs of wear at regular intervals. If there are signs of wear, cracks, or deformation, etc., replace the affected parts immediately.

You can fly K&F SPECTRA 212 speakers vertically or horizontally.

You can fly K&F SPECTRA 212 speakers either separately or as an array. With an array of K&F SPECTRA 212 speakers, you can choose between horizontal (A) and vertical (B) orientation.



Warning

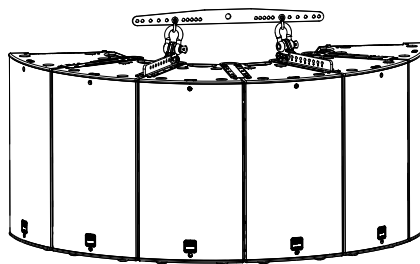
Never exceed the maximum number of speakers allowed.

The maximum number of speakers allowed in a horizontal array (A) is six (6). With horizontal arrays, the maximum number of speakers allowed means that the horizontal coverage angle adds to 180° (max.).

The maximum number of speakers allowed in a vertical array is four (4). With vertical arrays, the maximum number of speakers allowed means that the vertical coverage angle adds to 120° (max.).

Number of speakers included in the array:

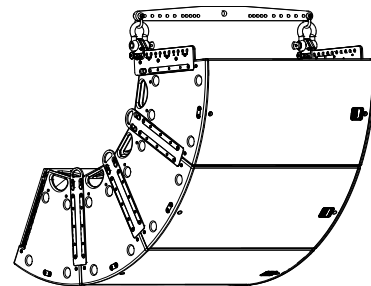
A)



Horizontal array: 6 K&F SPECTRA 212 speakers (max.)

Suspended using 2 x symmetrically arranged K&F SPECTRA 212 Flybar Connector horizontal
K&F SPECTRA 212 speakers are mounted using K&F SPECTRA 212 Connector.

B)



Vertical array: 4 speakers (max.)

Mounted to each other using K&F SPECTRA 212 Connectors
2 x K&F SPECTRA 212 Flybar Connector vertical (left/right) for safe fastening to the K&F SPECTRA 212 flybar (requires 2 K&F VIDA L load adapters)

5.1 Horizontal Arrays

Horizontal array with two speakers

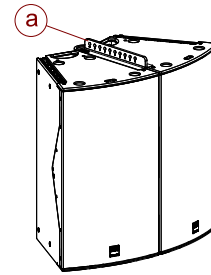
a: K&F SPECTRA 212 Flybar Connector horizontal ([...] items)

Single-fall suspension:

- VIDA L load adapter (1 item)
- Optional: K&F 450 rotation clamp (1 extra item)

Dual-fall suspension:

- –



Horizontal array with three speakers

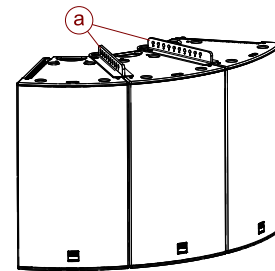
a: K&F SPECTRA 212 Flybar Connector horizontal ([...] items) 2

Single-fall suspension:

- K&F SPECTRA 212 flybar (1 item)
- Optional: K&F 450 rotation clamp (1 extra item)

Dual-fall suspension:

- K&F VIDA L Load Adapter (2 items)



Horizontal array with four speakers

a: K&F SPECTRA 212 Flybar Connector horizontal ([...] items) 1

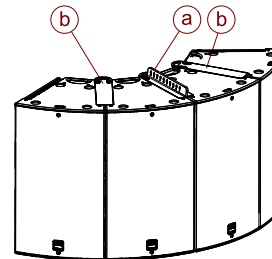
b: K&F SPECTRA 212 Connector (2 items)

Single-fall suspension:

- VIDA L load adapter (1 item)
- Optional: K&F 450 rotation clamp (1 extra item)

Dual-fall suspension:

- K&F VIDA L Load Adapter (2 items)



Horizontal array with five speakers

a: K&F SPECTRA 212 Flybar Connector horizontal ([...] items) 2

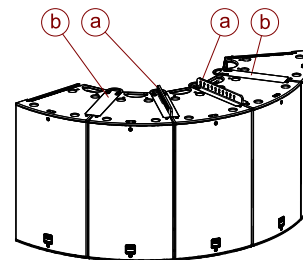
b: K&F SPECTRA 212 Connector (2 items)

Single-fall suspension:

- K&F SPECTRA 212 flybar (1 item)
- Optional: K&F 450 rotation clamp (1 extra item)

Dual-fall suspension:

- K&F VIDA L Load Adapter (2 items)

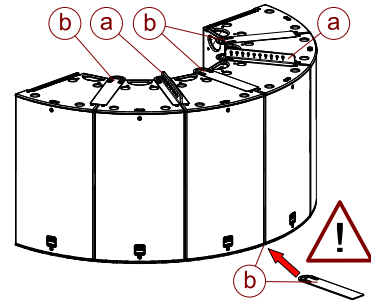


Notice
Horizontal array with six speakers

a: K&F SPECTRA 212 Flybar Connector horizontal ([...] items) 2

b: K&F SPECTRA 212 Connector (4 items)

Note the additional K&F SPECTRA 212 Connector at the bottom of the array!


Single-fall suspension:

- K&F SPECTRA 212 flybar (1 item)
- Optional: K&F 450 rotation clamp (1 extra item)

Dual-fall suspension:

- K&F VIDA L Load Adapter (2 items)

5.2 Vertical Arrays

Vertical array with two speakers

a: K&F SPECTRA 212 Flybar Connector vertical (1 items)

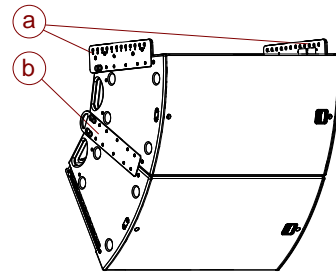
b: K&F SPECTRA 212 Connector (2 items)

Single-fall suspension:

- K&F SPECTRA 212 flybar (1 item)
- Optional: K&F 450 rotation clamp (1 extra item)

Dual-fall suspension:

- K&F VIDA L Load Adapter (2 items)


Vertical array with three speakers

a: K&F SPECTRA 212 Flybar Connector vertical (1 items)

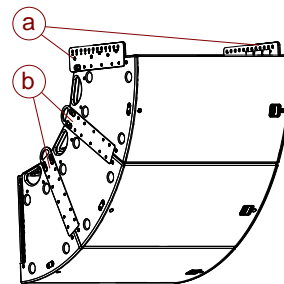
b: K&F SPECTRA 212 Connector (4 items)

Single-fall suspension:

- K&F SPECTRA 212 flybar (1 item)
- Optional: K&F 450 rotation clamp (1 extra item)

Dual-fall suspension:

- K&F VIDA L Load Adapter (2 items)



Vertical array with four speakers

a: K&F SPECTRA 212 Flybar Connector vertical (1 items)

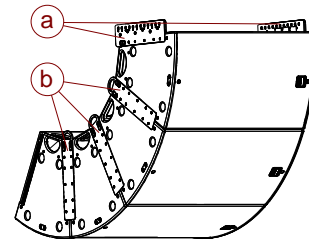
b: K&F SPECTRA 212 Connector (6 items)

Single-fall suspension:

- K&F SPECTRA 212 flybar (1 item)
- Optional: K&F 450 rotation clamp (1 extra item)

Dual-fall suspension:

- K&F VIDA L Load Adapter (2 items)



6. Mounting and Suspending

6.1 Mounting Horizontal Arrays

With almost all horizontal K&F SPECTRA 212 arrays, speakers are connected at their tops only. An exception are horizontal arrays with six K&F SPECTRA 212 speakers.

Failing to attach all required connecting elements may result in a severe accident.

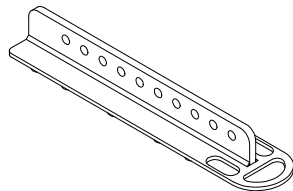
With an array with six K&F SPECTRA 212 speakers, be sure to always mount and secure an extra K&F SPECTRA 212 Connector at the bottom center (i.e. between speakers 3 and 4).



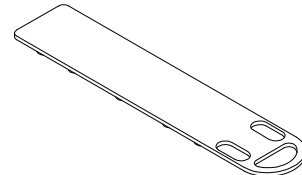
Warning

6.1.1 Horizontal arrays with up to five speakers

A)



B)

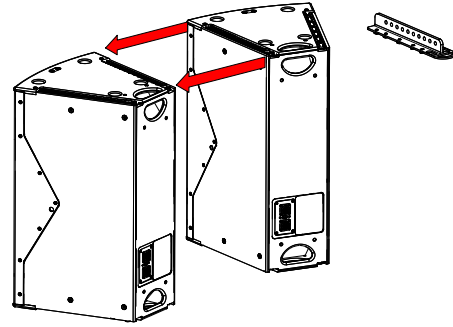


With horizontal arrays, you need K&F SPECTRA 212 Flybar Connector horizontal (A) and K&F SPECTRA 212 Connectors (B) as per the number of speakers installed. Refer to the Flying Speakers Material Lists chapter (page 34) for accessories required for the various array types.

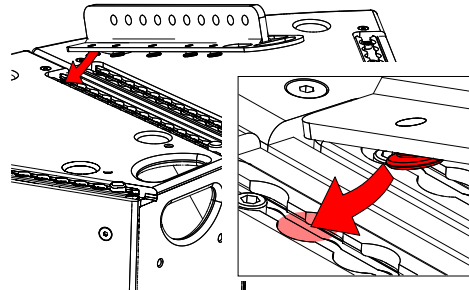
Notice

The procedures for mounting the K&F SPECTRA 212 Connector and the K&F SPECTRA 212 Flybar Connectors are the same.

- 1) Place the speakers close together so that each side panel is in entire contact with the next.



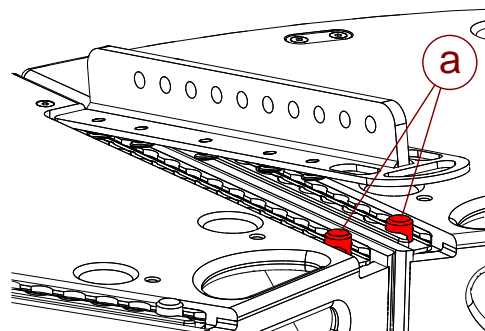
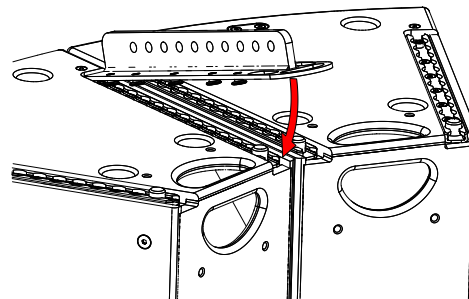
- 2) Insert the foremost studs of the connector into the foremost flybar receptacles.



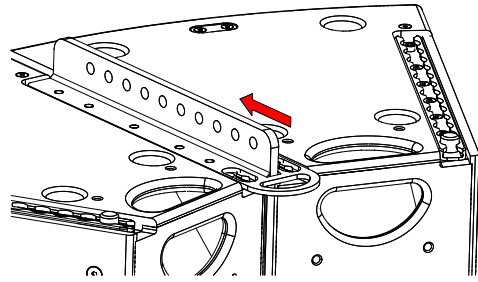
- 3) Fold down the K&F SPECTRA 212 Flybar Connector.

Please note:

- When folding down the connector, make sure all studs slide into the flybar openings.
- Folding down the K&F SPECTRA 212 flying adapter will press the two spring bolts (a) at the rear end of the speaker downwards through the connector.

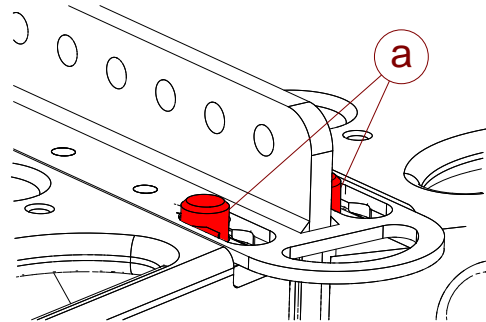


- 4) When the K&F SPECTRA 212 connector is horizontally flat, push it towards the speaker front.



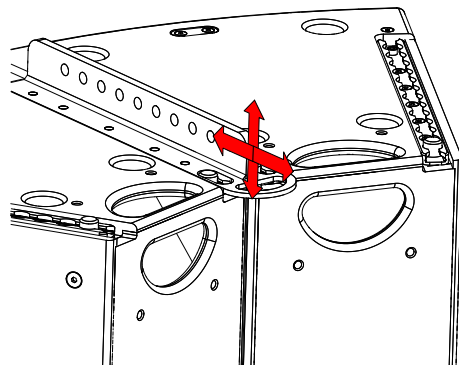
Warning

- 5) Make sure that the two spring bolts (a) are fully extended.



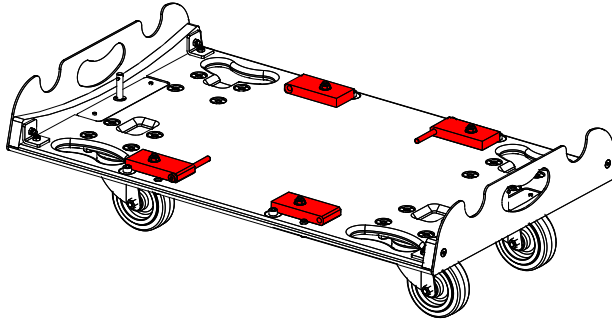
Warning

- 6) Check the K&F SPECTRA 212 Flybar Connector for secure fit.



6.1.2 Horizontal Arrays With Six Speakers

To prevent a horizontal array with six K&F SPECTRA 212 speakers from spreading when pulling up, you need to connect the two middle speakers to each other **both at the top and the bottom** using a K&F SPECTRA 212 Connector. To prevent the rigging system from overloading, perform the necessary steps on the floor at the start of the installation process as explained below. We recommend using two K&F SPECTRA 212 transport covers that include the optional K&F SPECTRA 212 rigging aid set.

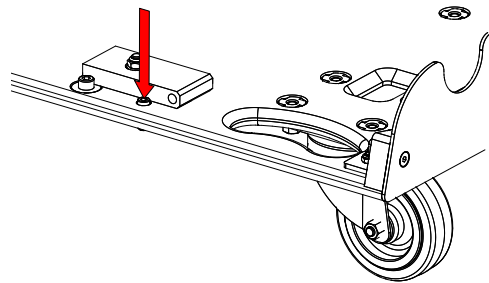

Notice

The following steps require the use of a transport cover including a K&F SPECTRA 212 rigging aid set for each speaker. The hinges are required for a single person to set up the speaker array; otherwise, the process must be performed by at least two people.

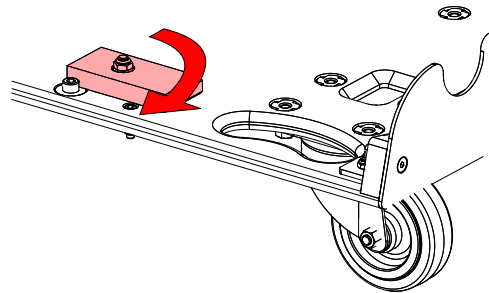


- 1) The hinge leaves of the K&F SPECTRA 212 rigging aid set are easily accessible even with the transport lid mounted.

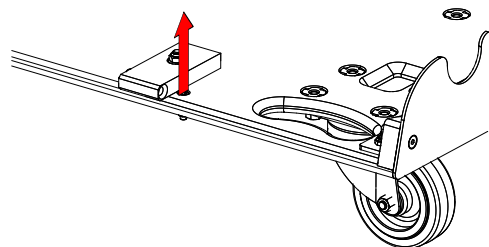
To unscrew the hinge leaves of the K&F SPECTRA 212 rigging aid set, press the locking screw mounted right in front of the selected hinge leaf.



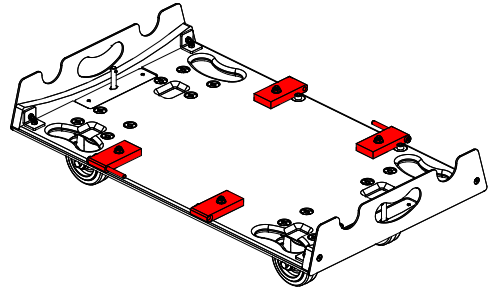
- 2) Rotate the leaf clockwise by 90° across the locking screw.



- 3) Make sure the locking screw has moved up from the lid again and locks the hinge leaf.

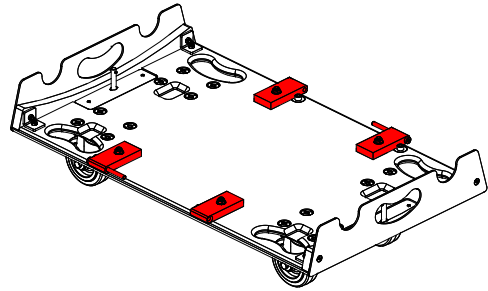


- 4) Repeat the previous steps for the remaining three leaves.

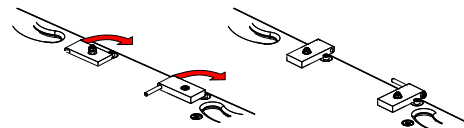


Tip

- 5) The hinge leaves of the K&F SPECTRA 212 rigging aid set are easily accessible even with the transport lid mounted.

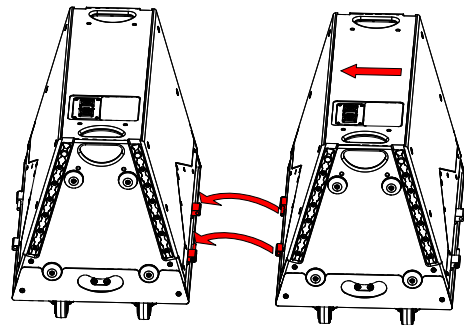


With each speaker, completely fold out the two hinge leaves between the K&F SPECTRA 212 transport covers.



- 6) Mount two speakers to be part of the array to one another.

Push the speakers slightly offset towards each other until the hinge leaves are located next to each other.

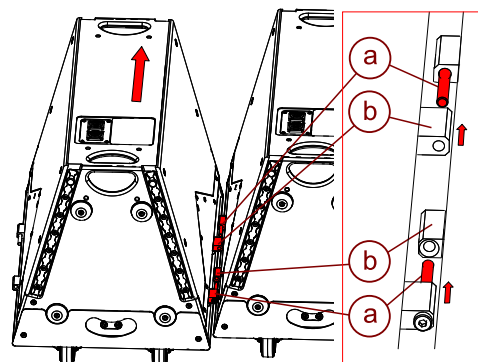


- 7) To make the hinges fully engage, slide the speakers together lengthways.

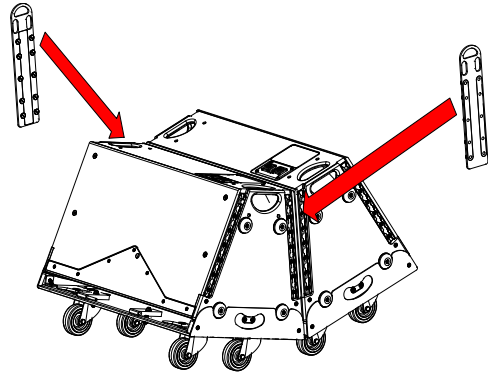
Make sure that the pins (a) of both hinges are fully inserted into the appropriate knuckles (b).



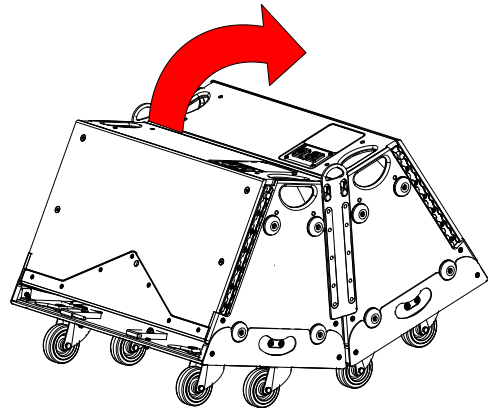
Warning



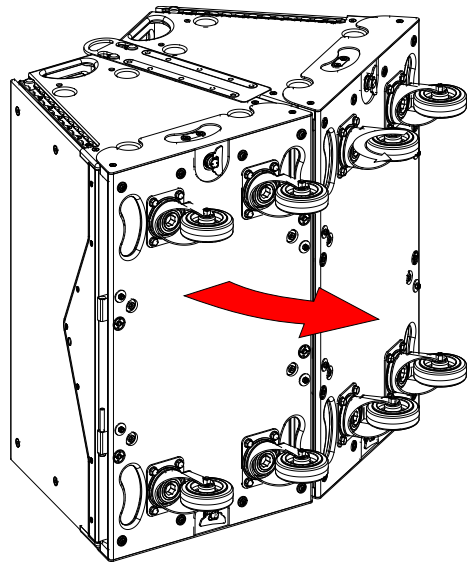
- 8) Pull the two speakers together as shown and fasten them to each other using one K&F SPECTRA 212Connector on **each** side.



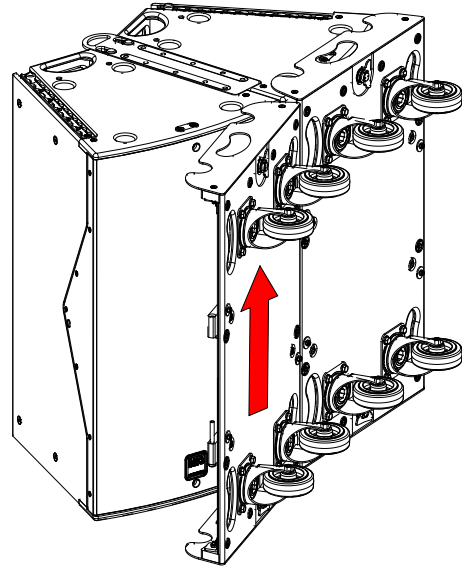
- 9) Place the two firmly connected K&F SPECTRA 212 speakers onto their bottoms (with the plastic feet).



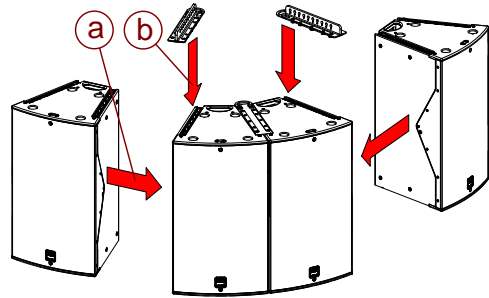
- 10) Remove the left-hand K&F SPECTRA 212 transport cover from the speaker and pull it forward.



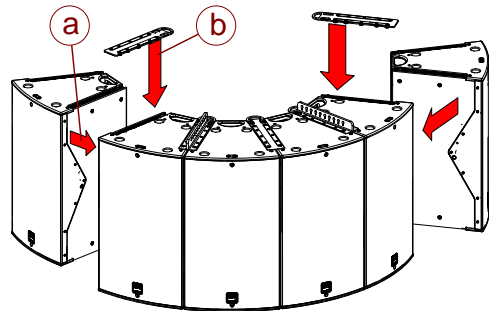
- 11) Slightly lift the K&F SPECTRA 212 transport cover upwards to separate the hinge leaves from each other.



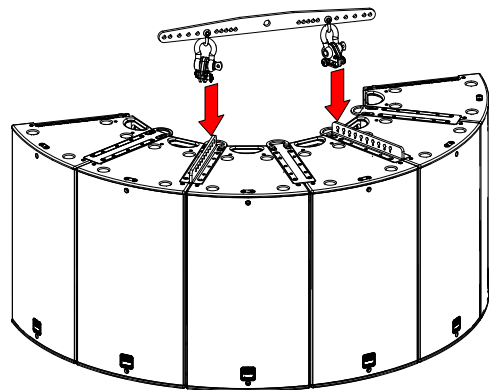
- 12) Place one more K&F SPECTRA 212 speaker on each side and connect it using a K&F SPECTRA 212 Flybar Connector horizontal.



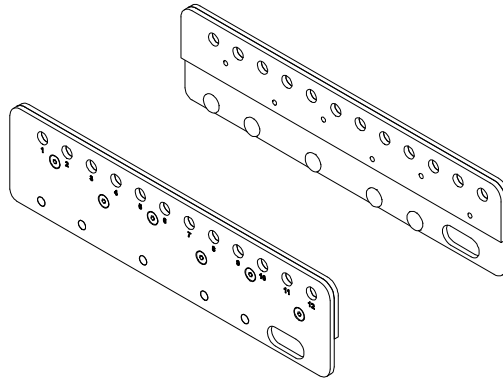
- 13) Again, place one more K&F SPECTRA 212 speaker on each side and connect it using a K&F SPECTRA 212 Connector.



- 14) Mount the flybar as described in the K&F SPECTRA 212 Flybar chapter (page 30).



6.2 Mounting Vertical Arrays



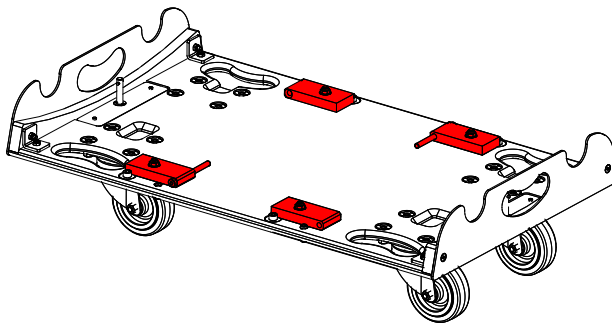
Warning

The SPECTRA 212 Flybar Connector Vertical allows for suspending a vertical array of up to four SPECTRA 212 speakers.



Tip

To create a vertical array of K&F SPECTRA 212 speakers, we recommend using K&F SPECTRA 212 Transport Cover with the 'K&F SPECTRA 212 Rigging Help Set'..



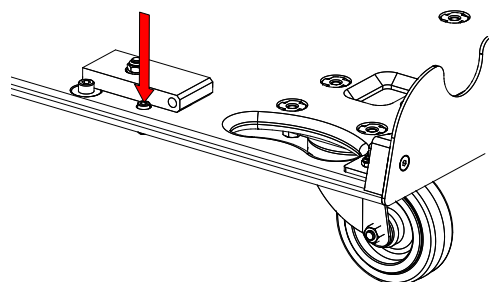
The following steps require the use of a transport cover including a K&F SPECTRA 212 rigging aid set for each speaker. The hinges are required for a single person to set up the speaker array; otherwise, the process must be performed by at least two people.



Tip

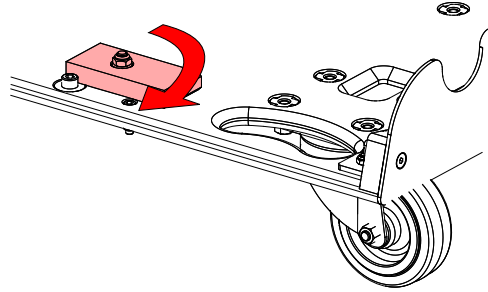
1)

The hinge leaves of the K&F SPECTRA 212 rigging aid set are easily accessible even with the transport lid mounted.



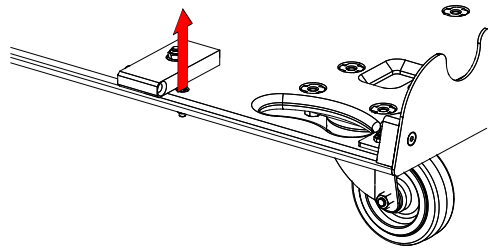
To unscrew the hinge leaves of the K&F SPECTRA 212 rigging aid set, press the locking screw mounted right in front of the selected hinge leaf.

- 2) Rotate the leaf clockwise by 90° across the locking screw.

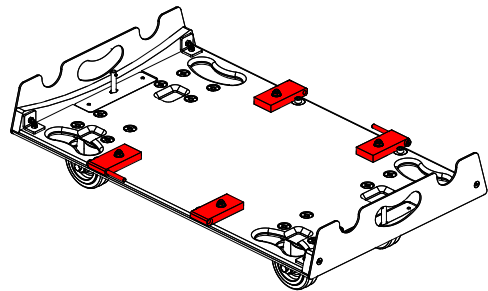


Caution

- 3) Make sure the locking screw has moved up from the lid again and locks the hinge leaf.



- 4) Repeat the previous steps for the remaining three leaves.



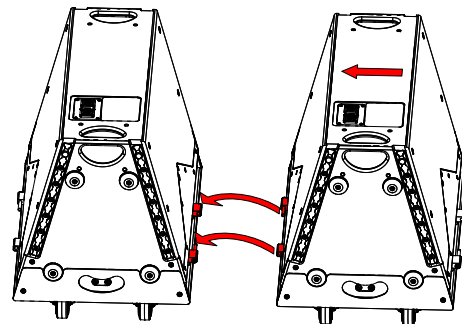
- 5) Mount all speakers to be part of the array to one another:



Warning

In order not to exceed the maximum load of a K&F SPECTRA 212 array, be sure to fly not more than four SPECTRA 212 speakers in a vertical array.

Push the speakers slightly offset towards each other until the hinge leaves are located next to each other.

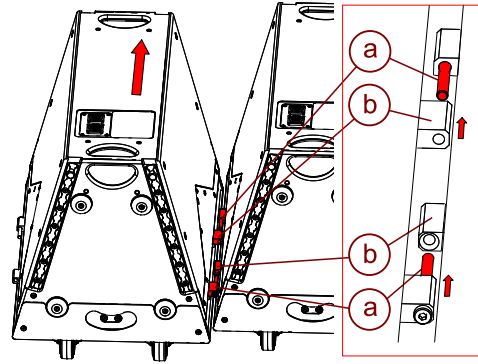




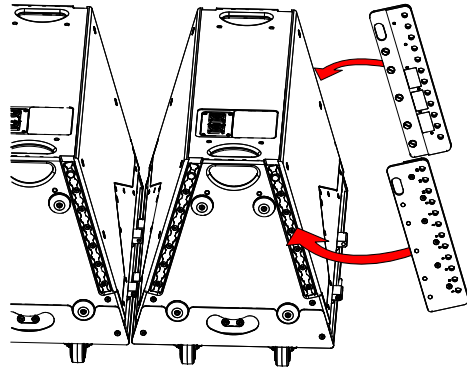
Warning

- 6) To make the hinges fully engage, slide the speakers together lengthways.

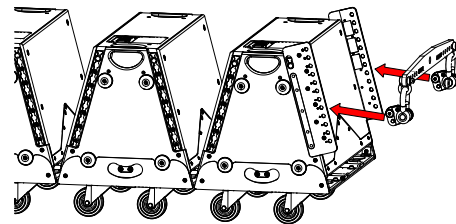
Make sure that the pins (a) of both hinges are fully inserted into the appropriate knuckles (b).



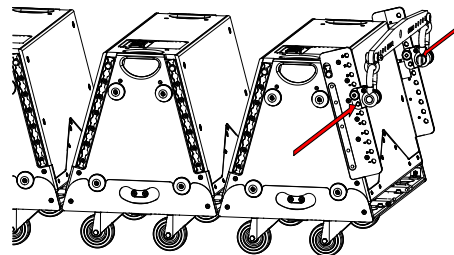
- 7) Mount the K&F SPECTRA 212 Flybar Connector Vertical to the upper end of the topmost speaker as described in the K&F SPECTRA 212 Flybar Connector chapter (see page 13).



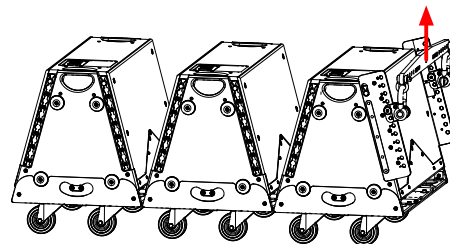
- 8) Align the K&F VIDA L load adapter to the bore previously determined for the appropriate tilt angle using the pinpoint table at page 26.



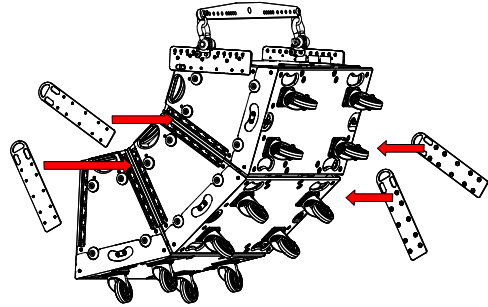
- 9) Fasten the K&F VIDA L load adapter using the supplied K&F fixing pins.



- 10) Attach the suspension strand to the K&F SPECTRA 212 Flybar and slowly pull up the top of the array.



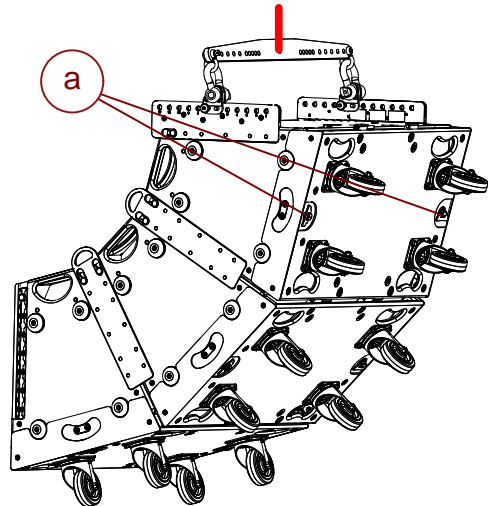
- 11) To fasten the speakers securely with each other, make sure that the long sides of the speakers are in contact and mount the K&F SPECTRA 212 Connectors on the left-hand side and the right-hand side of the speaker.



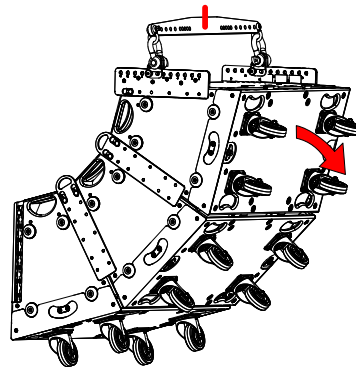
Caution

- 12) Note that turning the cover catches carelessly may unlock the K&F SPECTRA 212 Transport Cover, resulting in injury to the operators or damage to the speakers.

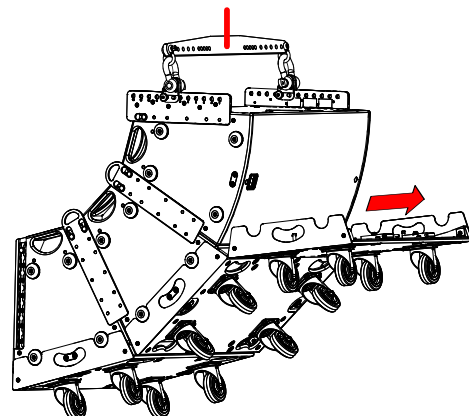
To fold down the K&F SPECTRA 212 Transport Cover, open the two catches while pressing the cover against the speaker.



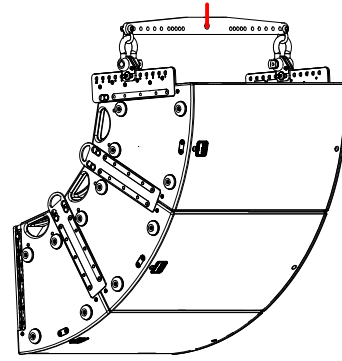
- 13) Carefully fold down the K&F SPECTRA 212 Transport Cover.



- 14) Pull the K&F SPECTRA 212 transport cover out of the hinge



- 15 Stow the K&F SPECTRA 212 Transport Covers, then lift the K&F SPECTRA 212 speaker array to the desired level.



6.3 K&F VIDA L Load Adapter



Warning



Warning

Danger! Risk of injury from falling objects!

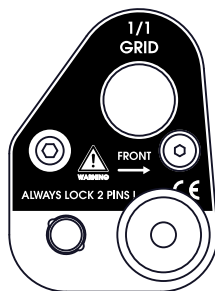
Improperly mounted speakers are not safe for suspending. Objects falling down impose a deadly risk for people standing near-by!

For fastening one K&F VIDA L load adapter to a K&F SPECTRA 212 flying adapter, you need to use **two** K&F fixing pins.

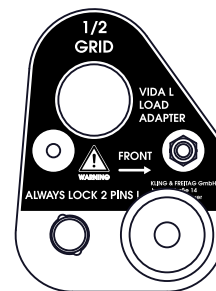
Note that the K&F VIDA L load adapter can be adjusted in half-steps. This doubles the flying-component frame bore grid and thus the adjustment options.

The K&F VIDA L load adapter has a 1/1 Grid marking on one side and a 1/2 Grid marking on the other side. The pinpoint table provides information on which load-adapter grid should be used.

- With the 1/1 grid **(A)**, the arrow on the 1/1 side of the K&F VIDA L load adapter points towards the speaker front;
- with the 1/2 grid **(B)**, the arrow on the 1/2 side of the K&F VIDA L load adapter points towards the speaker front.



A: 1/1 load-adapter grid



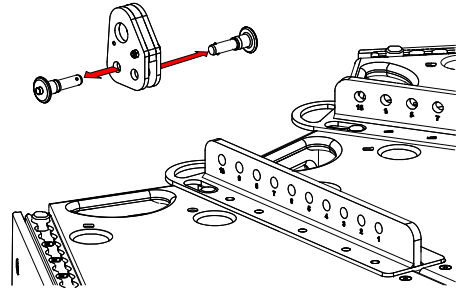
B: 1/2 load-adapter grid

6.3.1 Mounting the K&F VIDA L Load Adapter

The position and orientation of the K&F VIDA L load adapter defines the down-tilt angle of a flying SPECTRA 212 system.

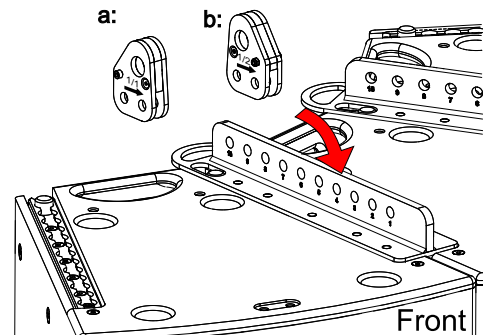
Follow these steps to place the K&F VIDA L load adapter as determined using the above table:

- 1) Remove the two lock pins from the base of the K&F VIDA load adapter.



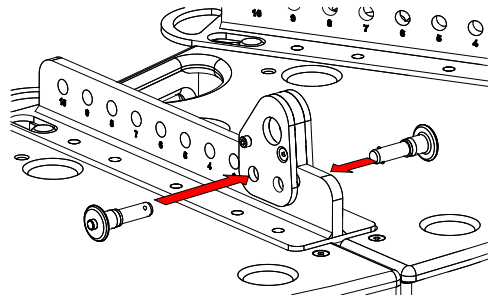
- 2) Find the configuration you need in the pinpoint tables and determine the pinpoints required for the speaker array.

If necessary, align the K&F VIDA L load adapter as required (a: 1/1 grid, or b: 1/2 grid), then insert it into the pinpoint.

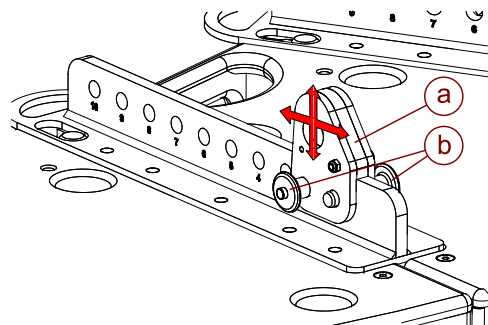


Warning

- 3) To attach and secure the K&F VIDA load adapter, always use both of the two lock pins.



- 4) Double-check the K&F VIDA load adapter (a) and, in particular, the ball-lock pins (b) for secure fit.



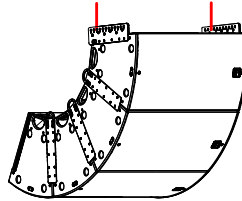
6.4 Pinpoint Tables

The following tables provide an overview of the achievable tilt angles of a flying array. Use the specified suspension points with regard to the number of speakers and the desired tilt angle.

For example:

If you want to fly a vertical array of three K&F SPECTRA 212 speakers at a 5° angle, you need to use pinpoint 7.

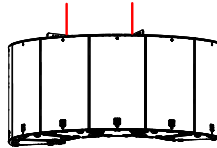
6.4.1 Pinpoint table for vertical arrays



Pinpoint	(1x) K&F SPECTRA 212	(2x) K&F SPECTRA 212	(3x) K&F SPECTRA 212	(4x) K&F SPECTRA 212
1 (1/1 grid)	11.6	12.3	18.2	25.5
1 (1/2 grid)	8.7	10.5	16.9	24.6
2 (1/1 grid)	5.6	8.7	15.7	23.7
2 (1/2 grid)	2.3	6.8	14.4	22.7
3 (1/1 grid)	-1.0	4.9	13.1	21.7
3 (1/2 grid)	-4.5	2.9	11.7	20.7
4 (1/1 grid)	-8.0	0.9	10.3	19.7
4 (1/2 grid)	-11.6	-1.2	8.9	18.6
5 (1/1 grid)	-15.2	-3.3	7.4	17.6
5 (1/2 grid)	-18.8	-5.4	5.9	16.4
6 (1/1 grid)	-22.4	-7.6	4.4	15.3
6 (1/2 grid)	-26.0	-9.8	2.9	14.1
7 (1/1 grid)	-29.4	-12.0	1.3	12.9
7 (1/2 grid)	-32.7	-14.2	-0.3	11.7
8 (1/1 grid)	-36.0	-16.4	-1.9	10.5
8 (1/2 grid)	-39.1	-18.6	-3.6	9.2
9 (1/1 grid)	-42.0	-20.8	-5.2	7.9
9 (1/2 grid)	-44.8	-23.0	-6.9	6.6

10 (1/1 grid)	-47.5	-25.1	-8.6	5.2
10 (1/2 grid)	-50.0	-27.3	-10.3	3.8
11 (1/1 grid)	-52.3	-29.4	-12.1	2.4
11 (1/2 grid)	-54.5	-31.4	-13.8	1.0

6.4.2 Pinpoint table for horizontal arrays



Pinpoint	(1x) K&F SPECTRA 212	2 x SPECTRA 212	3 x SPECTRA 212	4 x SPECTRA 212	5 x SPECTRA 212	6 x SPECTRA 212
1 (1/1 grid)	–	12.0	13.5	21.8	25.5	24.6
1 (1/2 grid)	–	10.2	11.7	20.2	24.0	23.1
2 (1/1 grid)	–	8.4	10.0	18.5	22.4	21.5
2 (1/2 grid)	–	6.5	8.2	16.8	20.9	19.9
3 (1/1 grid)	–	4.6	6.3	15.0	19.2	18.3
3 (1/2 grid)	–	2.7	4.5	13.2	17.6	16.6
4 (1/1 grid)	–	0.9	2.7	11.4	15.9	15.0
4 (1/2 grid)	–	-1.0	0.9	9.6	14.2	13.2
5 (1/1 grid)	–	-2.9	-1.0	7.8	12.5	11.5
5 (1/2 grid)	–	-4.8	2.8	5.9	10.7	9.7
6 (1/1 grid)	–	-6.7	-4.7	4.0	8.9	8.0
6 (1/2 grid)	–	-8.5	-6.5	2.1	7.1	6.2
7 (1/1 grid)	–	-10.4	-8.3	0.3	5.3	4.3

7 (1/2 grid)	–	-12.2	-10.1	-1.6	3.5	2.5
8 (1/1 grid)	–	-14.0	-11.9	-3.5	1.6	0.7
8 (1/2 grid)	–	-15.7	-13.6	-5.4	-0.2	-1.1
9 (1/1 grid)	–	-17.5	-15.3	-7.3	-2.0	-3.0
9 (1/2 grid)	–	-19.2	-17.0	-9.1	-3.9	-4.8

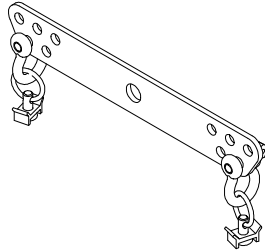
6.4.3 Pinpoint table for vertical arrays with Single Stud Fitting



Pinpoint	(1x) K&F SPECTRA 212
1	7.8
2	4.4
3	1.0
4	-2.4
5	-5.8
6	-9.1
7	-12.4
8	-15.6
9	-18.7
10	-21.7

6.5 K&F SPECTRA 212 Singlebar and Single Stud Fitting

K&F SPECTRA 212 Singlebar



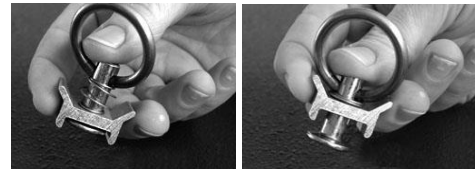
Single Stud Fitting



You can fly individual K&F SPECTRA 212 speakers in a single-fall configuration using the K&F SPECTRA 212 singlebar; Single Stud Fittings allow for setting up dual-fall configurations of individual K&F SPECTRA 212 speakers.

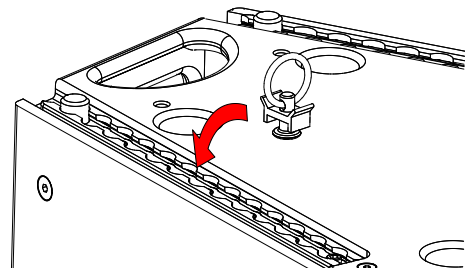
- 1) **Using the Single Stud Fitting:** While holding the K&F tie-down with the index and middle fingers, press the bolt down with your thumb.

With the Single Stud Fitting under tension, insert it into the speaker's mounting rail and move it as required.

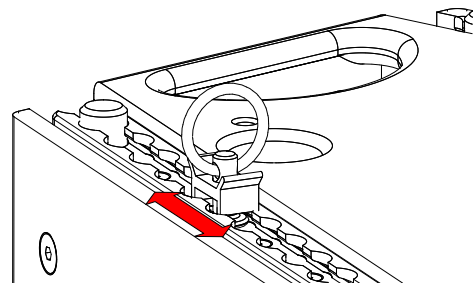


- 2) Move the Single Stud Fitting to the appropriate position on the speaker's mounting rail.

(The figure shows a configuration without the K&F SPECTRA 212 singlebar.)

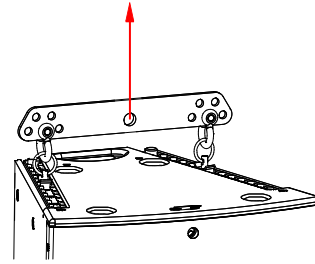


- 3) You can easily move the Single Stud Fitting to any position on the rail as long as you press and hold the bolt down.



- 4) Using appropriate means such as K&F swivel clamps, shackles, wire ropes, or chains, you can now set up a single-fall flying configuration.

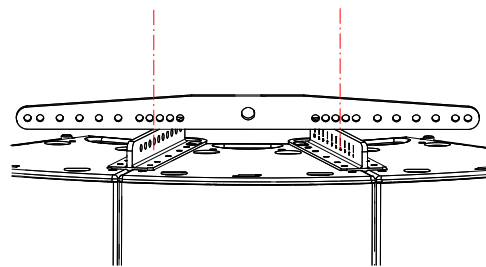
For possible combinations and options, refer to the Flying Speakers Material Lists chapter (page 34).



6.6 K&F SPECTRA 212 Flybar

- 1) Refer to the pinpoint table on page 26 and find the bores matching the selected tilt angle on the previously mounted K&F Flybar Connectors.

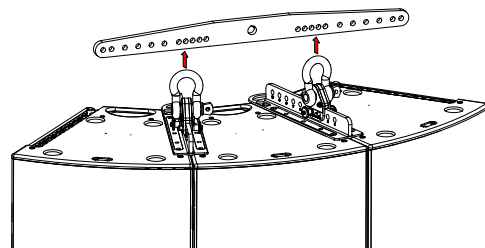
Center the K&F flybar on top of the two determined bores inclination holes of the flying bars.



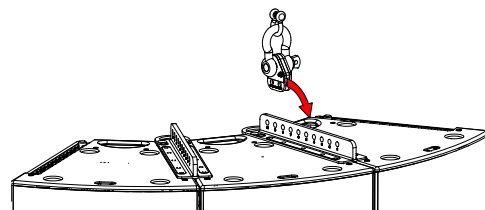
Warning

- 2) Align the bore position **vertically** to the K&F SPECTRA 212 Flybar. Determine the bore that is closest to the selected position on the K&F SPECTRA 212 Flybar.

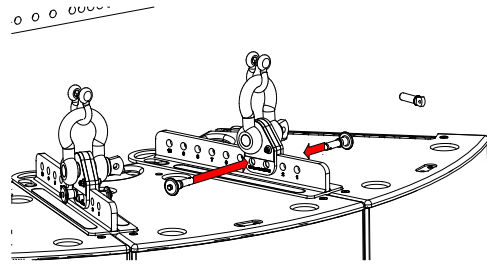
To ensure even load distribution, be sure to select the K&F SPECTRA 212 flybar bores symmetrically to the central suspension point.



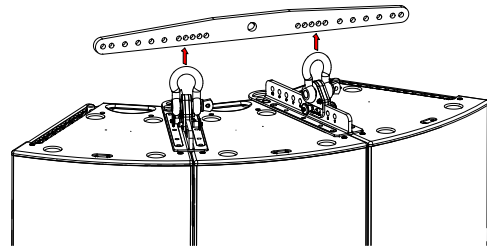
- 3) Place the K&F VIDA L load adapter to the bore selected for the desired tilt angle.



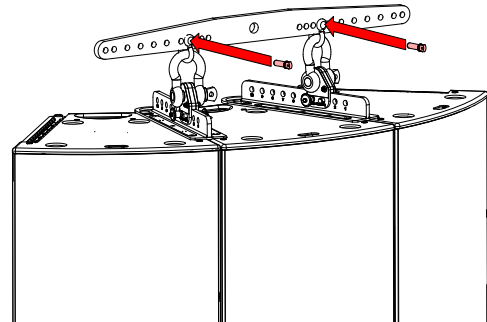
- 4) Be sure to use only the supplied ball-lock pins for fastening K&F VIDA L load adapters.



- 5) Place the K&F SPECTRA 212 flybar above the K&F VIDA L load adapters.

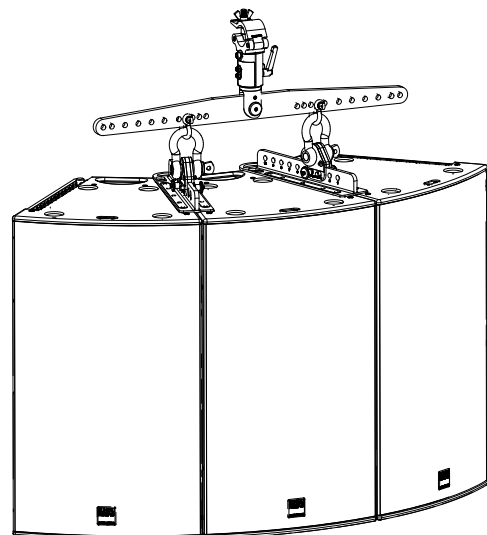


- 6) Mount the K&F SPECTRA 212 flybar onto the K&F VIDA L load adapters.

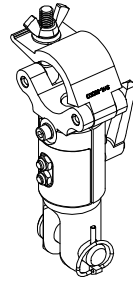


- 7) The horizontal K&F SPECTRA 212 speaker array is now ready for use and can be mounted to a suitable truss, pipe connection or another mounting point using the swivel clamp.

Alternatively, you can horizontally align and fasten the array using the K&F swivel clamp.



6.7 K&F Rotation Clamp 450



The K&F rotation clamp 450 creates a robust and safe connection between K&F flying components and a standard truss or similar pipe system (depending on the mounted half coupler). It allows you to freely rotate the suspended speakers and to lock them in the desired position using a clamping lever.

Note that the half couplers of the K&F rotation clamp 450 are not interchangeable. Structures made of trusses or pipes with a diameter of 48–51 or 60 mm, respectively, can be used.



Warning

The K&F Rotation Clamp 450 is exclusively designed for the following K&F components: K&F SPECTRA 212 Flybar, K&F SPECTRA 212 Single Bar, K&F VIDA L Flying Frame, K&F SEQUENZA 5 Flying Frame, and K&F SEQUENZA 10 Flying Frame. Never use it for mounting any other items!

The maximum load including the flying components, all speakers, and all connecting cables must never exceed **450 kg** (as required by DGUV regulations 17 (BGV C1)).

The K&F Rotation Clamp 450 is designed for suspending KLING & FREITAG speakers indoors at no wind loads.

Always be sure to use the supplied couplers and screws only.

The permissible load is limited to 450 kg as per DGUV regulation 17 (BGV C1).

Vertical lifting of loads only.

For more information, refer to the user manual of the K&F Rotation Clamp 450.

The manual is available for free download on our website at www.kling-freitag.de.

Notice

7. Dismounting a Flying Speaker Array



Warning

Risk of injury: Never disconnect speakers that are suspended or are installed by stretching!

Make sure that the connecting interface is unloaded before starting dismounting. Therefore, always lower vertical speaker arrays right onto transport covers before removing the connecting elements between the speakers.

Basically, dismounting the speakers is performed in reverse order of the installation process.



Caution

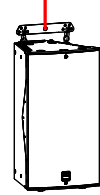
Do not apply excessive force when disconnecting speakers. If you have problems disconnecting the speakers, try again at a more level place and/or shake gently.

8. Flying Speakers Material Lists

8.1 Material overview: Standalone Setup

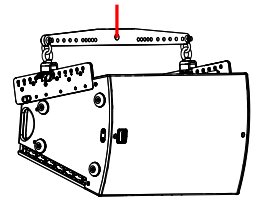
Single-strand suspension with vertical speaker:

(1x)	–	(1x)	optional: (1x)
K&F		K&F	K&F
SPECTRA		SPECTRA	Rotation Clamp
212		212	450
		Singlebar	



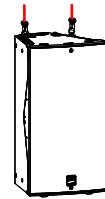
Single-strand suspension with horizontal speaker:

(1x)	(1x)	(1x)	optional: (1x)
K&F	K&F SPECTRA	K&F	K&F
SPECTRA	212	SPECTRA	Rotation Clamp
212	Flybar	212	450
	Connector	Flybar	
	Vertical		
	(content 2 pcs.)		



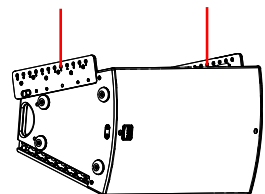
Double-stranded suspension with vertical loudspeaker:

(1x)	–	(2x)	–
K&F		Single	
SPECTRA		Stud	
212		Fitting	



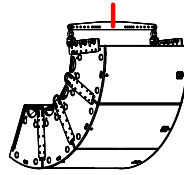
Double-stranded suspension with horizontal loudspeaker:

(1x)	(1x)	–	(2x)
K&F	K&F SPECTRA		K&F VIDA L
SPECTRA	212		Load Adapter
212	Flybar		
	Connector		
	Vertical		
	(content 2 pcs.)		



8.2 Material overview: Vertical, single-stranded arrays

In the following combinations you can assemble vertical, single-stranded K&F SPECTRA 212 arrays:



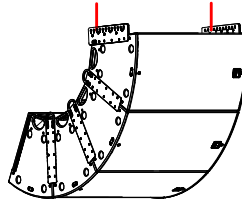
(2x) K&F SPECTRA 212	(1x) K&F SPECTRA 212 Flybar Connector Vertical (content 2 pcs.) and (2x) K&F SPECTRA 212 Connector	(1x) K&F SPECTRA 212 Flybar	optional: (1x) K&F Rotation Clamp 450
(3x) K&F SPECTRA 212	(1x) K&F SPECTRA 212 Flybar Connector Vertical (content 2 pcs.) and (4x) K&F SPECTRA 212 Connector	(1x) K&F SPECTRA 212 Flybar	optional: (1x) K&F Rotation Clamp 450
(4x) K&F SPECTRA 212	(1x) K&F SPECTRA 212 Flybar Connector Vertical (content 2 pcs.) and (6x) K&F SPECTRA 212 Connector	(1x) K&F SPECTRA 212 Flybar	optional: (1x) K&F Rotation Clamp 450

8.3 Material overview: Vertical, double-stranded arrays

In the following combinations you can assemble vertical, double-stranded K&F SPECTRA 212 arrays:



Note that the suspension strands must be vertical and parallel.



(2x)
K&F SPECTRA 212

(1x)
K&F SPECTRA 212
Flybar Connector
Vertical (content 2
pcs.)

(2x)
K&F SPECTRA 212
Connector

(2x)
K&F VIDA L
Load Adapter

(3x)
K&F SPECTRA 212

(1x)
K&F SPECTRA 212
Flybar Connector
Vertical (content 2
pcs.)

(4x)
K&F SPECTRA 212
Connector

(2x)
K&F VIDA L
Load Adapter

(4x)
K&F SPECTRA 212

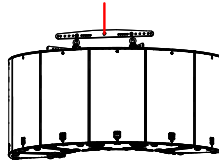
(1x)
K&F SPECTRA 212
Flybar Connector
Vertical (content 2
pcs.)

(6x)
K&F SPECTRA 212
Connector

(2x)
K&F VIDA L
Load Adapter

8.4 Material overview: Horizontal, single-stranded arrays

In the following combinations you can assemble horizontal, single-stranded K&F arrays:



(2x) K&F SPECTRA 212	(1x) K&F SPECTRA 212 Flybar Connector Horizontal	(1x) K&F VIDA L Load Adapter	optional: (1x) K&F Rotation Clamp 450
(3x) K&F SPECTRA 212	(2x) K&F SPECTRA 212 Flybar Connector Horizontal	(1x) K&F SPECTRA 212 Flybar	optional: (1x) K&F Rotation Clamp 450
(4x) K&F SPECTRA 212	(1x) K&F SPECTRA 212 Flybar Connector Horizontal and (2x) K&F SPECTRA 212 Connector	(1x) K&F VIDA L Load Adapter	optional: (1x) K&F Rotation Clamp 450
(5x) K&F SPECTRA 212	(2x) K&F SPECTRA 212 Flybar Connector Horizontal and (2x) K&F SPECTRA 212 Connector	(1x) K&F SPECTRA 212 Flybar	optional: (1x) K&F Rotation Clamp 450
(6x) K&F SPECTRA 212	(2x) K&F SPECTRA 212 Flybar Connector Horizontal and (4x) K&F SPECTRA 212 Connector	(1x) K&F SPECTRA 212 Flybar	optional: (1x) K&F Rotation Clamp 450 SPECTRA 212

8.5 Material overview: Horizontal, double-stranded arrays

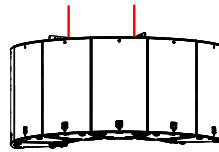
In the following combinations you can assemble horizontal, double-stranded K&F SPECTRA 212 arrays:

Note that the suspension strands must be vertical and parallel.



This means that you will always need two K&F SPECTRA 212 Flybar Connectors.

Always mount the K&F SPECTRA 212 Flybar Connectors units symmetrically to the array centerline. (See the Flying Configurations chapter on page 10.)



(3x) K&F SPECTRA 212	(2x) K&F SPECTRA 212 Flybar Connector Horizontal	(2x) K&F VIDA L Load Adapter	–
(4x) K&F SPECTRA 212	(1x) K&F SPECTRA 212 Flybar Connector Horizontal	(2x) K&F SPECTRA 212 Connector	(2x) K&F VIDA L Load Adapter
(5x) K&F SPECTRA 212	(2x) K&F SPECTRA 212 Flybar Connector Horizontal	(2x) K&F SPECTRA 212 Connector	(2x) K&F VIDA L Load Adapter
(6x) K&F SPECTRA 212	(2x) K&F SPECTRA 212 Flybar Connector Horizontal	(4x) K&F SPECTRA 212 Connector	(2x) K&F VIDA L Load Adapter

9. Transportation and Storage

All parts are protected against the effects of unfavorable temporary weather conditions, etc.; despite, be sure to store, transport, and use the accessories in dry environments only. Speaker accessories are not designed for prolonged use in corrosive environments.

Make sure that the system is adequately ventilated during longer storage periods so any residual moisture can escape from the equipment.

In addition, protect all system parts and K&F SPECTRA 212 accessories from mechanical strains in order to prevent damage.

10. Care and Maintenance



Warning

1. For the owner and user, it is mandatory to be aware that speaker accessories used to fly or mount the speakers are fundamentally safety-relevant.

Over time, the accessories may exhibit signs of wear, for example, from mechanical strain, transport damage, corrosion, or improper handling.

As a basic principle, you must visually inspect the speaker accessory before and after you use it. For fixed installations, you must inspect it for signs of wear at regular intervals.

When performing those checks, particularly look for deformations, cracks, dents, damage to threads, and corrosion. Also check slings and lifts (e.g. shackles, chains, and steel ropes) carefully for wear and deformation.

If as a result of these checks any uncertainty should arise with regard to safety or if specific faults are found, stop using the accessories and send in the product to KLING & FREITAG GmbH for inspection and repairs, if necessary.

Inspection regulations may vary depending on application and country of use. Observe all applicable regulations; when in doubt, contact the local authorities.

Many countries require regular inspection of mounting components and accessories. An additional annual inspection is typically required to be performed by a technical expert. Moreover, a legally certified or official authority must perform a detailed inspection every four years.

Therefore, be sure to maintain an inspection log. Enter the values determined for each speaker and accessory during the periodic checks into this log. This way, relevant data are always at hand in case of inspection. The log should also document maintenance measures and inspection intervals and contain parts lists.

2. Clean this speaker accessory regularly using a corrosion-prevention penetrating oil (for example, WD-40).

11. Declaration of Conformity (CE)

EG-Konformitätserklärung

(Declaration of EG-Conformity)



Hersteller:
(Manufacturer)

Kling & Freitag GmbH
Junkersstraße 14
30179 Hannover
Deutschland

**Bevollmächtigter
für die Zusammenstellung der
technischen Unterlagen:**
(Authorized representative
for the compilation of technical
documents)

Kling & Freitag GmbH
Abt. Entwicklung
+49 (0)511 / 96997-50
Deutschland

Produkt:
(Product)

**K&F SPECTRA 212 Rigging System
(K&F SPECTRA 212 Rigging System)**
- K&F SPECTRA 212 Verbindungsschiene
(- K&F SPECTRA 212 Connector)
- K&F SPECTRA 212 Flugverbinder Horizontal
(- K&F SPECTRA 212 Flybar Connector Horizontal)
- K&F SPECTRA 212 Flugverbinder Vertikal
(- K&F SPECTRA 212 Flybar Connector Vertical)
- K&F SPECTRA 212 Flybar
(- K&F SPECTRA 212 Flybar)
- K&F SPECTRA 212 Singlebar
(- K&F SPECTRA 212 Singlebar)

Wir erklären, dass das genannte Produkt den aufgeführten Schutzanforderungen der folgenden EG-Richtlinien entspricht:

(We declare that the designated product is in conformity with the protection requirements imposed by the following EU directives:)

- 2006/42/EG, Maschinenrichtlinie (Machinery Directive)

Zur Beurteilung hinsichtlich der Einhaltung wurden folgende harmonisierte Normen herangezogen:

(Conformance of the products with the requirements is approved by compliance with the following harmonized European standards:)


- DIN 12100 : 2011-03
- Eurocode 1/DIN EN 1991-1-1 : 12/2010
- Eurocode 3/DIN EN 1993-1-41 : 10/2010

Nationale Vorschriften:

(National regulations:)

- DGUV Vorschrift 17 und 18 (BGV C1)

Hannover, 6.8.2018


 Jürgen Freitag, Geschäftsführung (CEO)

INDEX

• connecting.....	13
• Declaration of Conformity.....	40
• Dismounting.....	33
• Flybar.....	30
• Flying Configurations.....	10
• horizontal, double-stranded arrays.....	38
• horizontal, single fall.....	37
• Horizontal Arrays.....	11
• Installation.....	13
• Intended Use.....	7
• Load Adapters.....	24
• Maintenance.....	39
• material overview.....	34
• Mounting the load adapter.....	24
• Pinpoint Table.....	26
• Pinpoint table for horizontal arrays.....	27
• Pinpoint table for vertical arrays.....	26
• Pinpoint table for vertical arrays with Single Stud Fitting.....	28
• Product Description.....	5
• Safety Instructions.....	7
• Storage.....	39
• Swivel clamp.....	32
• vertical, double-stranded.....	36
• vertical, single-stranded.....	35
• Vertical Arrays.....	12
• Wind loads.....	9

12. Notes

Translated version of the original SPECTRA 212 Operating Manual
© Kling & Freitag GmbH, 2018
Wohlenbergstrasse 5
D-30179 Hannover
Germany
www.kling-freitag.de
All rights reserved.