

KLING &
FREITAG

SOUND SYSTEMS

EN | VERSION 2.0 | 06/16/21



USER'S MANUAL

K&F SPECTRA 212

Table of Content

Chapter / Content	Page
1 Introduction	5
1.1 Icons Used	5
1.2 About this user's manual	5
1.3 Scope of Application	5
2 Product Description	6
2.1 Intended Use	6
2.2 System requirements	7
3 Items Included	8
3.1 Components	8
3.2 Connectors and Controls	8
3.3 Accessories	9
3.4 Dimensions	11
4 Technical Specifications	12
4.1 K&F SPECTRA 212 N Specifications	12
4.2 K&F SPECTRA 212 XW Specifications	13
5 Measuring Diagrams	14
5.1 SPECTRA 212 N	14
5.1.1 Line source, horizontal directivity	14
5.1.2 Line source, vertical directivity	14
5.1.3 Point source, horizontal directivity	15
5.1.4 Point source, vertical directivity	15
5.1.5 Line source, on-axis frequency response	16
5.1.6 Point source, on-axis frequency response	16
5.2 SPECTRA 212 XW	17
5.2.1 Line source, horizontal directivity	17
5.2.2 Line source, vertical directivity	17
5.2.3 Point source, horizontal directivity	18
5.2.4 Point source, vertical directivity	18
5.2.5 Line source, on-axis frequency response	19
5.2.6 Point source, on-axis frequency response	19
6 Safety Instructions	20
6.1 Notes on Upright Operation	20
6.2 Preventing Hearing Damage	20
6.3 Protecting the Speakers, Reliability	21
7 Operating Modes	22
7.1 Line-Source Mode	22
7.2 Point-Source Mode	22
7.2.1 Point Source with Down-Tilt	22
7.2.2 Point Source with Up-Tilt	22

7.3	Determining the Selected Operating Mode	23
7.3.1	Midrange/Tweeter Unit Orientation	24
7.3.2	The position of the operating-mode switch	25
7.4	Changing the Operating Mode	26
7.4.1	Rotating the VariQ Unit	26
7.4.2	Setting the Operating-Mode Switch	29
8	Horizontal and vertical arrays	30
9	Wiring	31
9.1	Terminal assignment	31
10	Initial Operation	32
11	Setups and Use Cases	33
11.1	Setup 1: 1x SPECTRA 212 Point Source in Full Range Mode	33
11.2	Setup 2: 1x K&F SPECTRA 212 point source with additional subwoofer	34
11.3	Setup 3: 2x K&F SPECTRA 212 line source in full range mode	35
11.4	Setup 4: 3x SPECTRA 212 line source with additional subwoofer	36
12	Maintenance	37
13	Transportation and Storage	37
14	Disposal	38
14.1	Germany	38
14.2	EU, Norway, Iceland, and Liechtenstein	38
14.3	All Other Countries	38
15	EC Declaration of Conformity	39

1 Introduction

1.1 Icons Used



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 user's 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 product must have access to this manual and all other relevant material during installation. The speaker system may neither be set up nor used until these user's manual has been read, understood and kept readily available in site.

All KLING & FREITAG manuals are originally authored in German.

KLING & FREITAG spare manuals are separately available for order or can be downloaded

Contact Us: info@kling-freitag.de

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

Phone +49 (0) 511 96 99 70, fax +49 (0) 511 67 37 94

1.3 Scope of Application

If you have purchased this product together with other accessories, the instructions of those accessories including, but not limited to, mounting-accessory instructions become part of these instructions by reference.

If the SPECTRA 212 speaker is used together with accessories that restrict the use specified in here, those restrictions will apply.

2 Product Description

The SPECTRA 212 is a compact 3-way, convertible line array speaker with equalization in two ways. Separate K&F power amplifiers are required for driving the SPECTRA 212.

The connection system and the optionally available K&F rigging system allow for creating and suspending either a horizontal line of up to six SPECTRA 212 or a vertical array of up to four SPECTRA 212.

The speaker is available in two versions:

- XW (extra wide) with $120^\circ \times 30^\circ$ directivity
- N (narrow) with $60^\circ \times 30^\circ$ directivity

These versions can be used both in a line array (in **line-source** mode) or as a point source (in **point-source mode**). To change the operating mode, you need to rotate the internal mid-range/tweeter unit.

Various point-source modes are available:

- **Point source with a VariQ midrange/tweeter unit down-tilt by -10°**

Asymmetrical vertical directivity ($30^\circ \times +5^\circ \dots -25^\circ$)

In point-source mode with down-tilt, the asymmetrical vertical directivity simplifies orientation towards the audience while reducing unwanted ceiling reflections.

- **Point source with a VariQ midrange/tweeter unit up-tilt by 10°**

Asymmetrical vertical directivity ($30^\circ \times +25^\circ \dots -5^\circ$)

In point-source mode with up-tilt, the asymmetrical vertical directivity simplifies orientation towards the audience if they are positioned above the speaker.

2.1 Intended Use

Be sure to use the K&F SPECTRA 212 only with system amplifiers or controllers approved by KLING & FREITAG.

The product and any optional accessories are suitable for indoor use (exhibition halls, event halls, etc.). This product is not designed for prolonged use in corrosive environments. Outdoor operation is permitted, provided that the speaker is protected against direct weather impact. For outdoor installation, you will need to manufacture appropriate custom fastening equipment with regard to the place and purpose of use. Be sure to take outdoor effects (wind, snow loads, etc.) into account. The use of standard accessories for temporary or permanent outdoor installation is not permitted.

When using the optional K&F SPECTRA 212 subwoofer adapter, you can use K&F subwoofers as a pedestal provided the required stability is ensured. Refer to the manual for K&F SPECTRA 212 accessories for more information. The connection system and the optionally available K&F rigging system allow for creating and suspending either a horizontal line of up to six SPECTRA 212 or a vertical array of up to four SPECTRA 212. In outdoor use, if the product is suspended using the optional K&F rigging system, be sure to guy it and to end operation at wind forces of 8 bft or more. People may safely stand below the structure during operation.

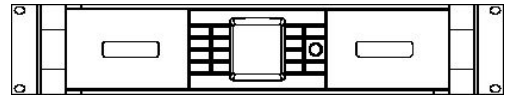
Installation and operation must be performed by qualified event technicians or appropriately trained persons. Planning must be performed and responsibility be taken by qualified personnel only.

Any other use not described in this document is not an intended use.

2.2 System requirements

Recommendation:

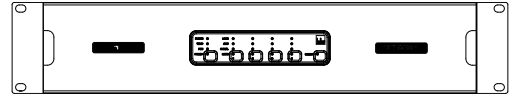
K&F PLM+ 20k44 (SystemAmp, ProRental)
K&F PLM+ 12k44 (SystemAmp, ProRental)



or

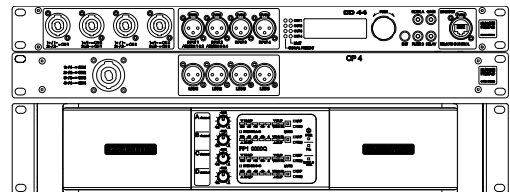
Recommendation:

K&F D200:4 (SystemAmp, InstallSound)
K&F D120:4 (SystemAmp, InstallSound)
K&F D80:4 (SystemAmp, InstallSound)



or

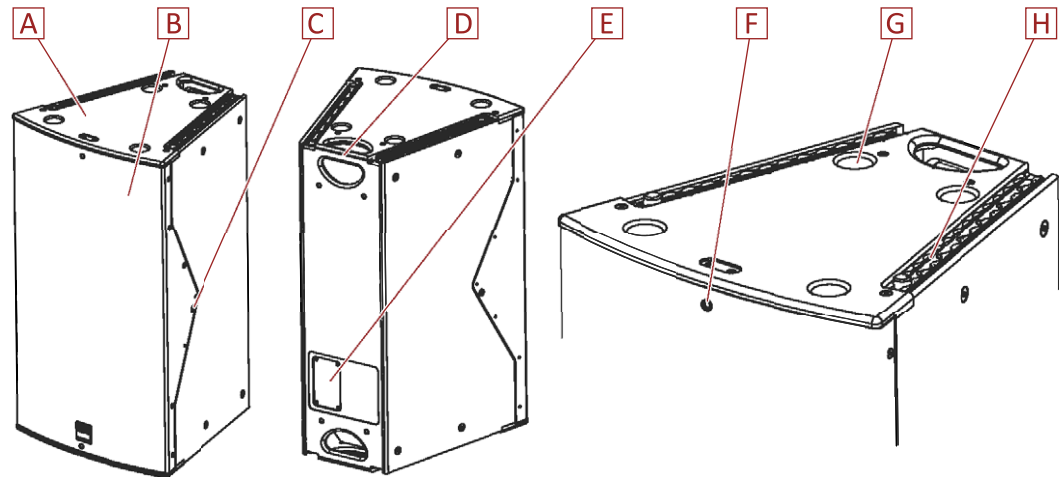
K&F SystemRack:



3 Items Included

- K&F SPECTRA 212 speaker (1 item)
- User's manual (1 item)

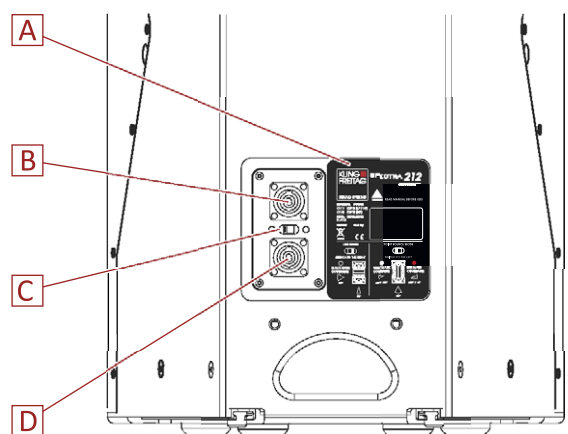
3.1 Components



- [A] Housing
- [B] grille
- [C] Inspection opening for identifying the orientation of the VariQ unit (operating-mode identification)
- [D] handle
- [E] Connector panel
- [F] 'Camlock'-fixture for transportation cover
- [G] Stacking grooves at cover, adjacent: stacking feet at bottom
- [H] Flybar

3.2 Connectors and Controls

- [A] Nameplate sticker with serial number and switch details
- [B] SpeakOn port 1
- [C] Switch for toggling between point-source and line-source operating modes
- [D] SpeakOn port 2



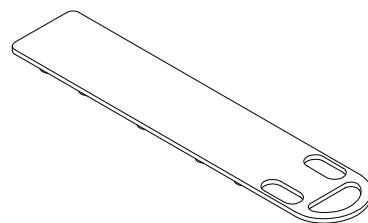
3.3 Accessories

K&F SPECTRA 212 Connector

Connecting element between two K&F SPECTRA 212

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

Weight: 1.3 kg

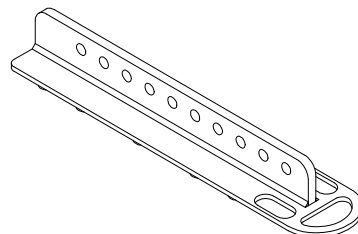


K&F SPECTRA 212 Flybar Connector horizontal

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 a horizontal array from several K&F SPECTRA 212.

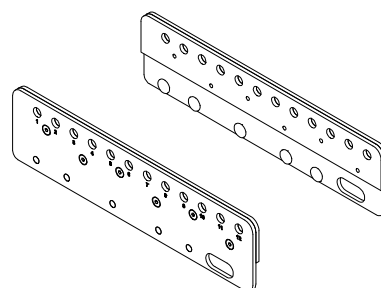
Weight: 2.6 kg



K&F SPECTRA 212 Flybar Connector vertical

For installation at the top K&F SPECTRA 212 speaker to adapt the K&F SPECTRA 212 flybar for a vertical array.

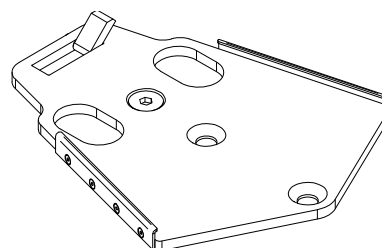
Weight: 4.5 kg



K&F SPECTRA 212 Subadapter

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

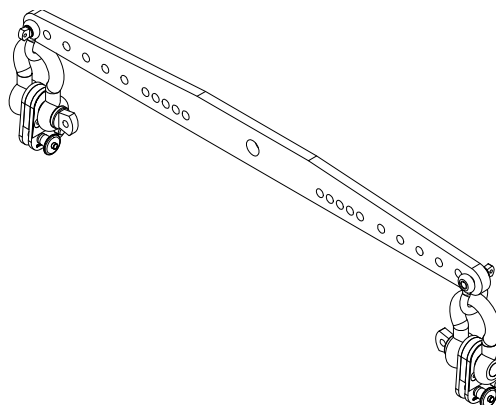
Weight: 3.1 kg



K&F SPECTRA 212 Flybar

Connector for a single strand suspension of a K&F SPECTRA 212 array, in conjunction with 'K&F SPECTRA 212 Flybar Connector horizontally' or with 'K&F SPECTRA 212 Flybar Connector' vertically.

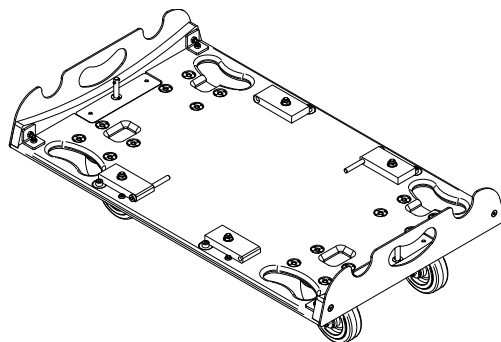
Weight: 7.4 kg



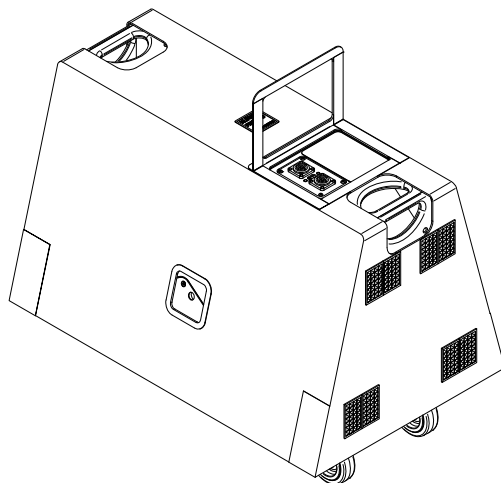
K&F SPECTRA 212 Transport Cover

Transport with castors for the safe transport of a K&F SPECTRA 212 loudspeaker and for a more comfortable setup of a vertical K&F array.

Weight: 11.3 kg

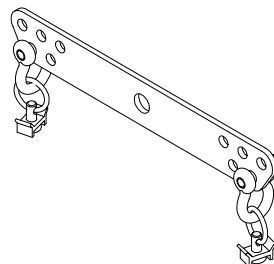
**K&F SPECTRA 212 Protective Cover**

Weatherproof protective cover for the transport of a K&F SPECTRA 212 loudspeaker.

**K&F SPECTRA 212 Single Bar (1 item)**

Connector for a single strand suspension of a single K&F SPECTRA 212 loudspeaker.

Weight: 1.0 kg

**K&F Single Stud Fitting**

Used for fastening to the fly track for a **two-strand** suspension of a single speaker. (2 pieces per single speaker necessary!)

**K&F Rotation Clamp 450**

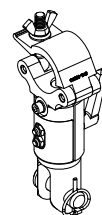
With 50-mm clamp for mounting to a truss or pipe (diameter: 48 – 51 mm)

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

Weight:

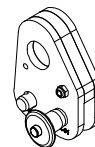
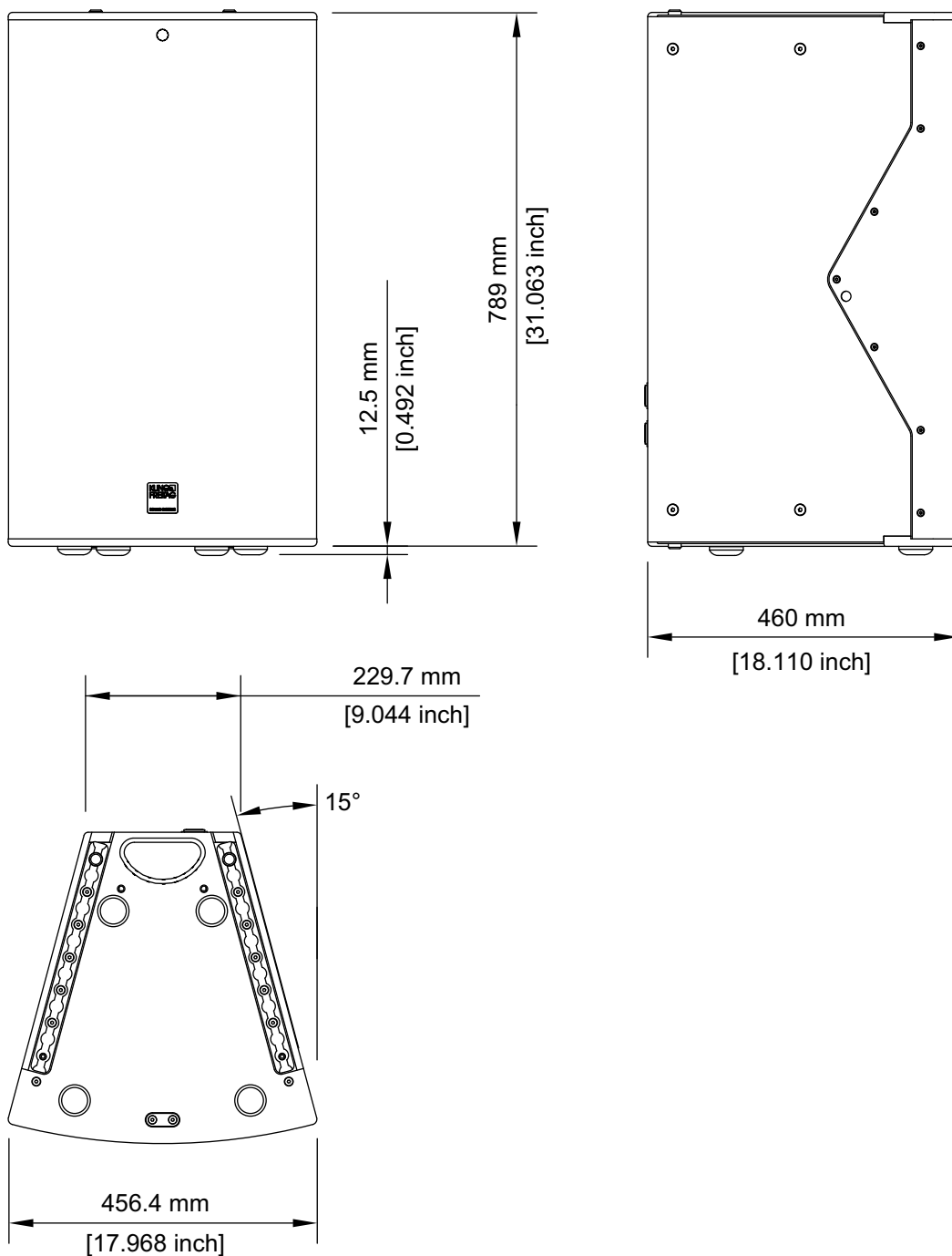
50 mm type: 2,9 kg,

60 mm type: 3,1 kg



K&F VIDA L Load Adapter

Used for mounting on a 'K&F SPECTRA 212 Flybar Connector Horizontal' or 'K&F SPECTRA 212 Flybar Connector vertical'.

**3.4 Dimensions**

4 Technical Specifications

4.1 K&F SPECTRA 212 N Specifications

Concept	Passive 3-way system, 2-way active equalized, LF bass reflex, MF Closed, HF waveformer horn loaded
Supported amplifiers	K&F PLM+ Serie, K&F D-Serie (recommended) K&F SystemRack (supported)
Frequency range @-10 dB	70 Hz – 20 kHz
Frequency range @±3 dB	86 Hz – 18 kHz
Coverage angles nominal (hor. x vert.)	Line Source: 30° x 60° Point Source: 60° x +5°/-25° Convertible trough rotation of the K&F VariQ unit
Power handling	500 W
Program load	1000 W
Peak load	2000 W
SPL (1 m, max.)	Point Source: 141 dB SPL (1x) Line Source (30°): 143 dB SPL (2x) Line Source (60°): 145 dB SPL (3x) Line Source (90°): 146 dB SPL (4x) Line Source (120°): 147 dB SPL
Impedance (nominal)	2 x 8 ohm
Speakers / channels	2 per channel recommended, max. 3 per channel
Components	(2x) 12" LF, (6x) 5" MF, (4x) 1" HF
Connection	SpeakOn NL4 (1+/1- LF+HF, 2+/2- MF)
Enclosure	Frame-reinforced 15 mm Multiplex enclosure with 30° angle for ideal cluster setups with highly resistant Polyurea synthetic coating in black, convertible between line source and point source through rotation of integrated VariQ unit, integrated flying track system, ergonomic handles on top and bottom for horizontal and vertical transport, sunk-in connector panel, 4 non-abrasive plastic sliding feet on bottom, ball proof steel grille with black acoustic foam behind the grille.
Dimensions (W x H x D)	456.4 mm x 789 mm x 460 mm
Colors	black special finish in RAL colours
Weight	48 kg

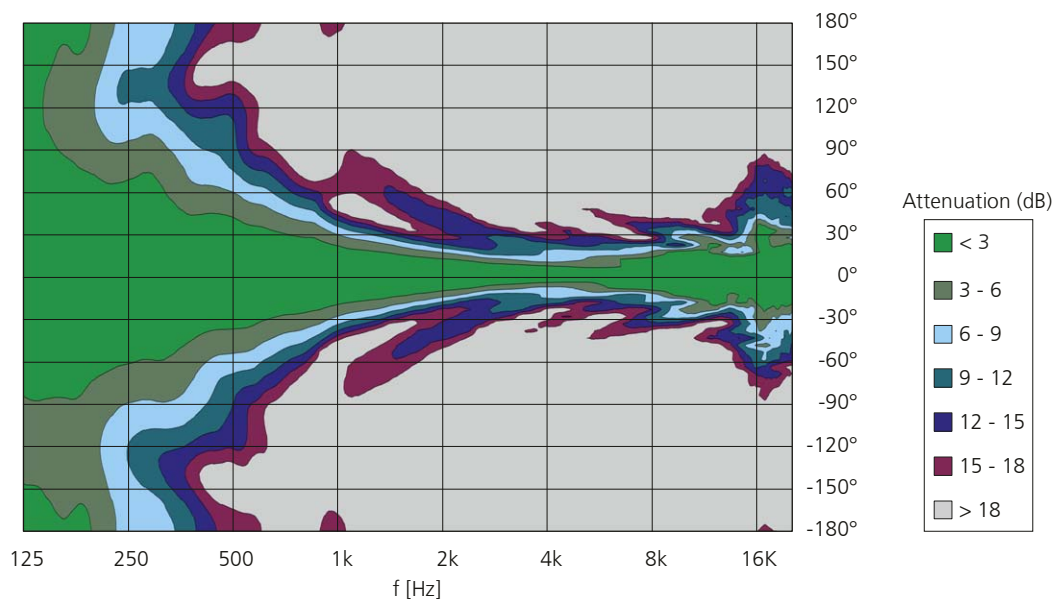
4.2 K&F SPECTRA 212 XW Specifications

Concept	Passive 3-way system, 2-way active equalized, LF bass reflex, MF Closed, HF waveformer horn loaded
Supported amplifiers	K&F PLM+ Serie, K&F D-Serie (recommended) K&F SystemRack (supported)
Frequency range @-10 dB	70 Hz – 20 kHz
Frequency range @±3 dB	86 Hz – 18 kHz
Coverage angles nominal (hor. x vert.)	Line source: 30° x 120° Point source: 120° x +5°...-25° Convertible trough rotation of the K&F VariQ unit
Power handling	500 W
Program load	1000 W
Peak load	2000 W
SPL (1 m, max.)	Point source: 138 dB SPL (1x) line source (30°): 140 dB SPL (2x) line source (60 °): 142 dB SPL (3x) line source (90 °): 143 dB SPL (4x) line source (120 °): 144 dB SPL
Impedance (nominal)	2 x 8 ohm
Speakers / channels	2 per channel recommended, max. 3 per channel
Components	(2x) 12" LF, (6x) 5" MF, (4x) 1" HF
Connection	SpeakOn NL4 (1+/1- LF+HF, 2+/2- MF)
Enclosure	Frame-reinforced 15 mm Multiplex enclosure with 30° angle for ideal cluster setups with highly resistant Polyurea synthetic coating in black, convertible between line source and point source through rotation of integrated VariQ unit, integrated flying track system, ergonomic handles on top and bottom for horizontal and vertical transport, sunk-in connector panel, 4 non-abrasive plastic sliding feet on bottom, ball proof steel grille with black acoustic foam behind the grille.
Dimensions (W x H x D)	456.4 mm x 789 mm x 460 mm
Colors	black special finish in RAL colours
Weight	48 kg

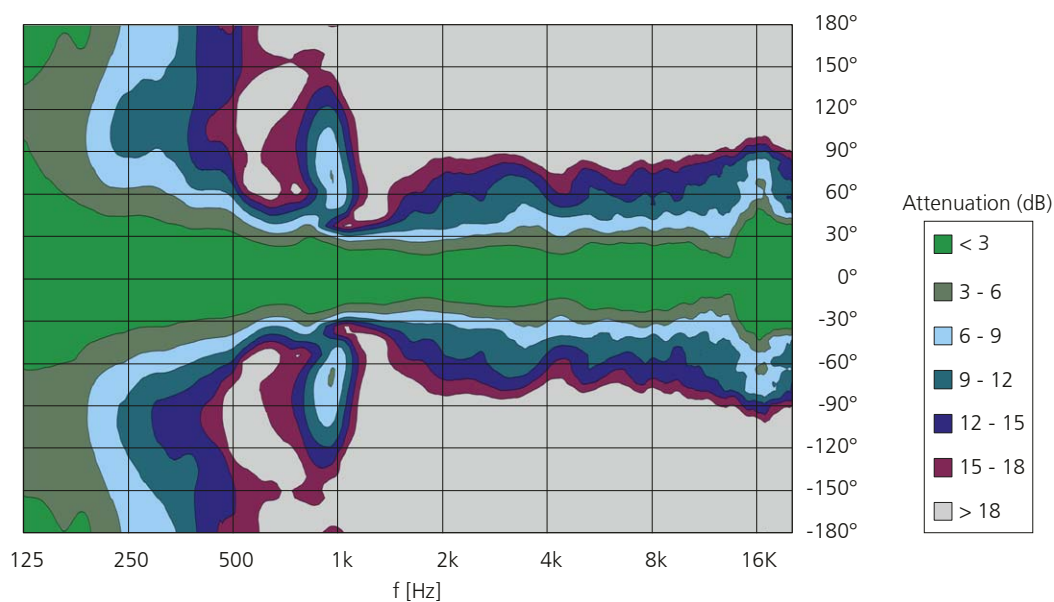
5 Measuring Diagrams

5.1 SPECTRA 212 N

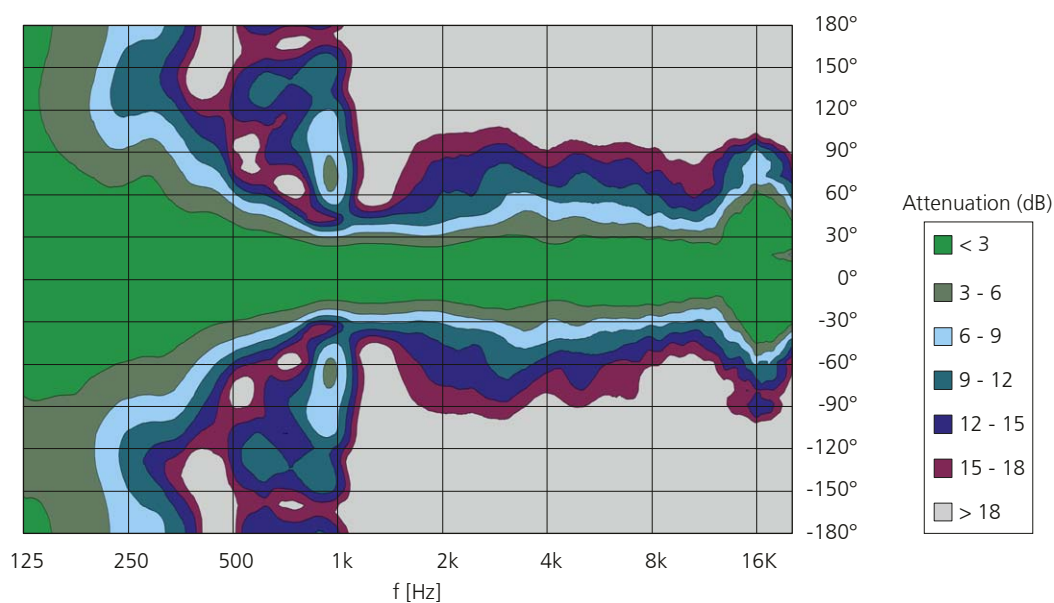
5.1.1 Line source, horizontal directivity



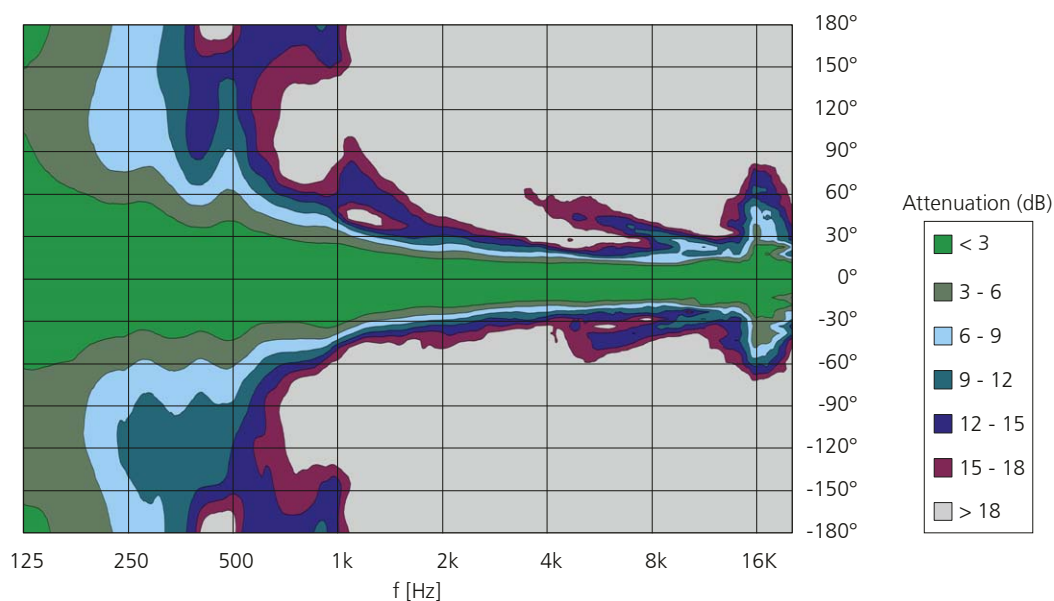
5.1.2 Line source, vertical directivity



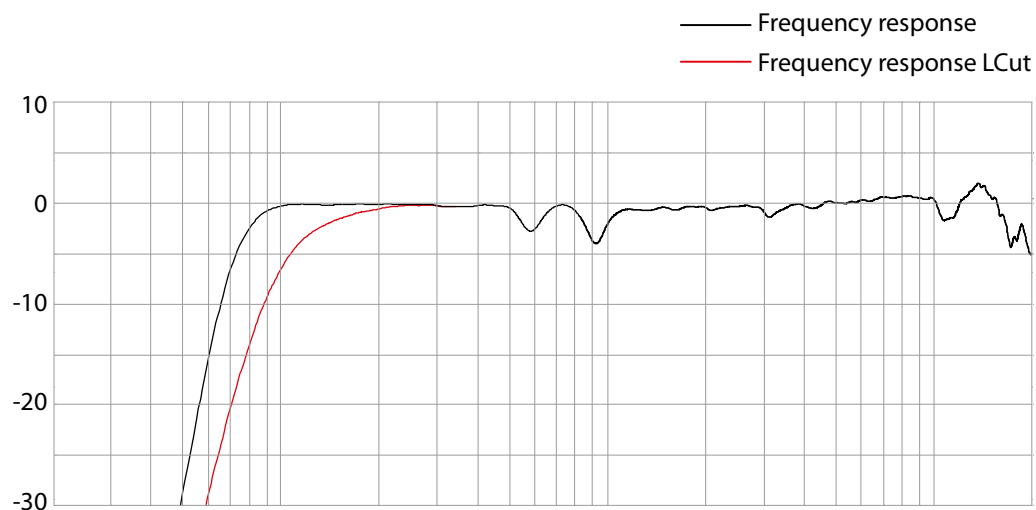
5.1.3 Point source, horizontal directivity



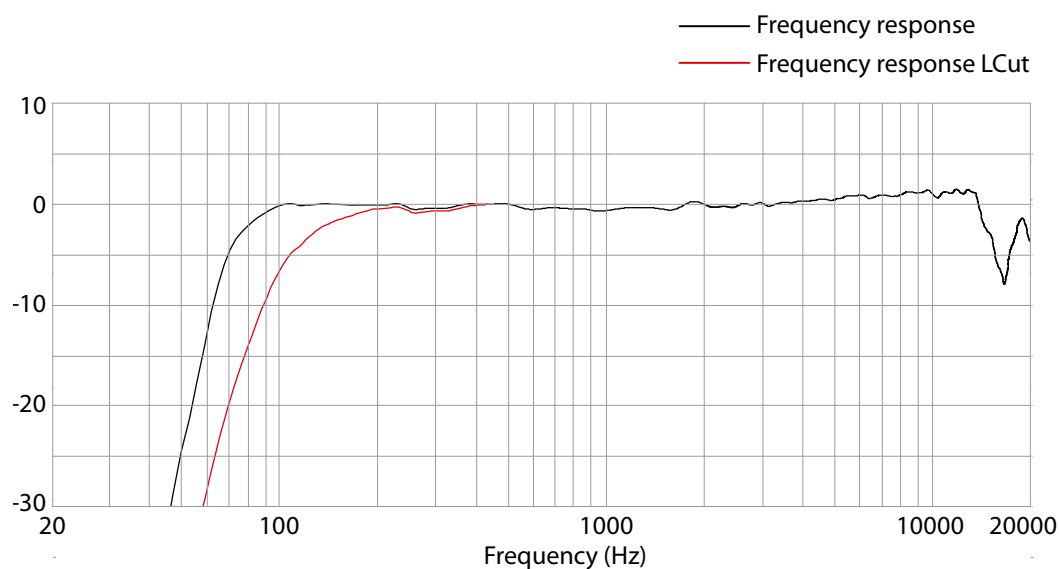
5.1.4 Point source, vertical directivity



5.1.5 Line source, on-axis frequency response

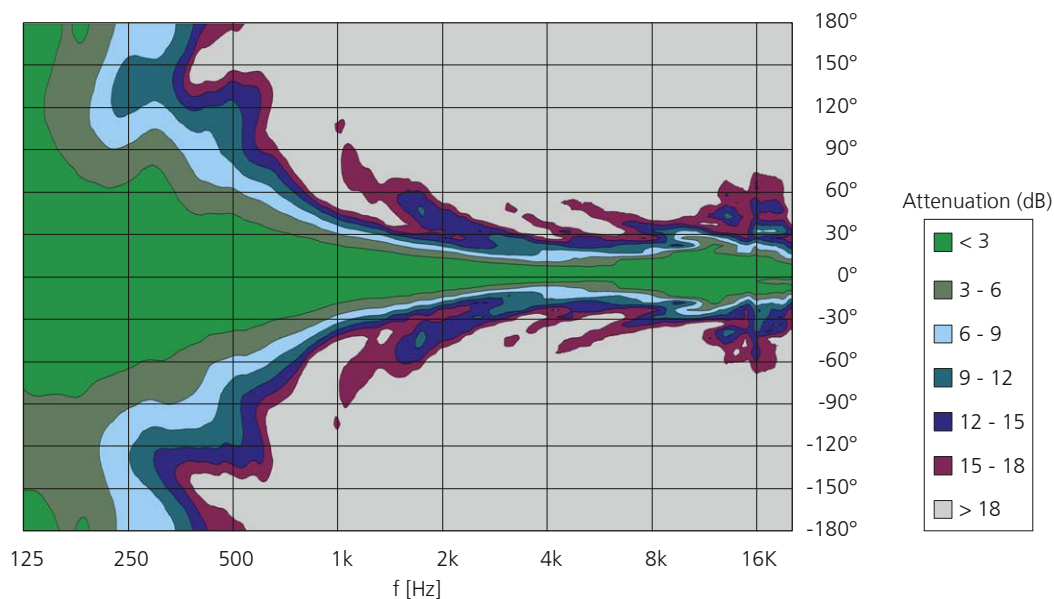


5.1.6 Point source, on-axis frequency response

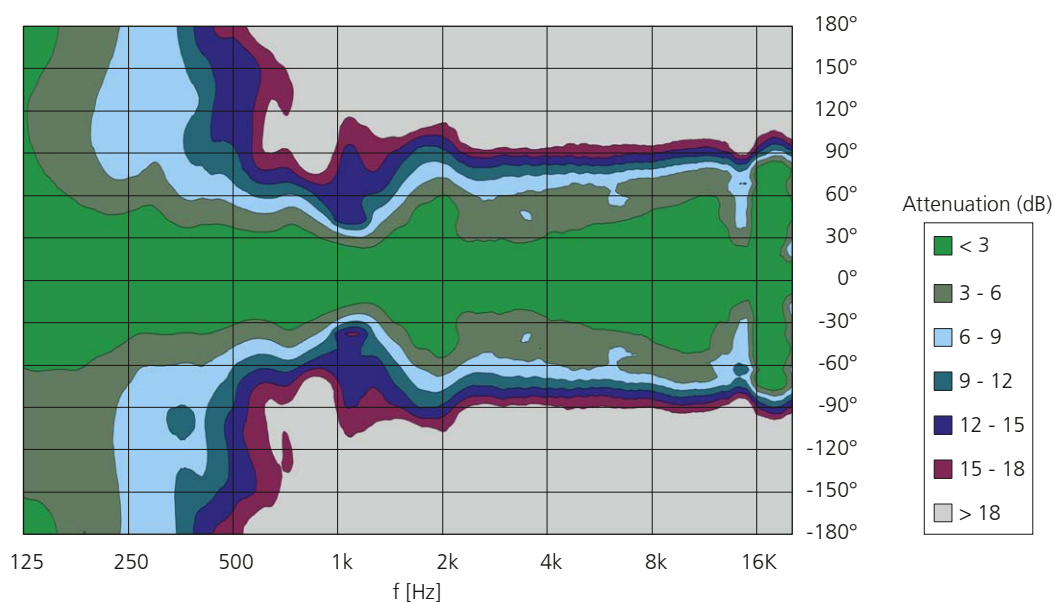


5.2 SPECTRA 212 XW

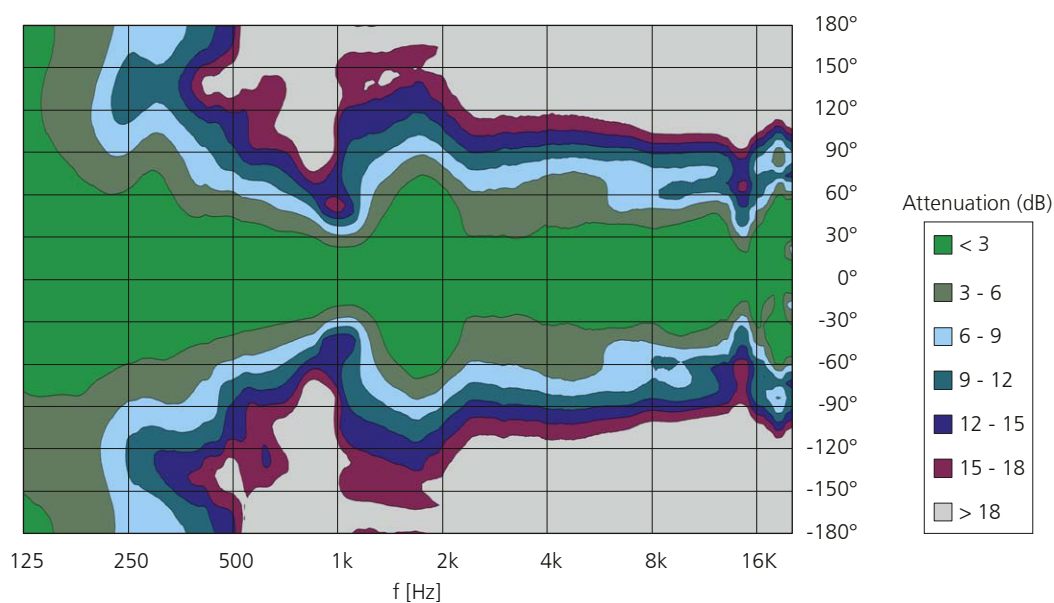
5.2.1 Line source, horizontal directivity



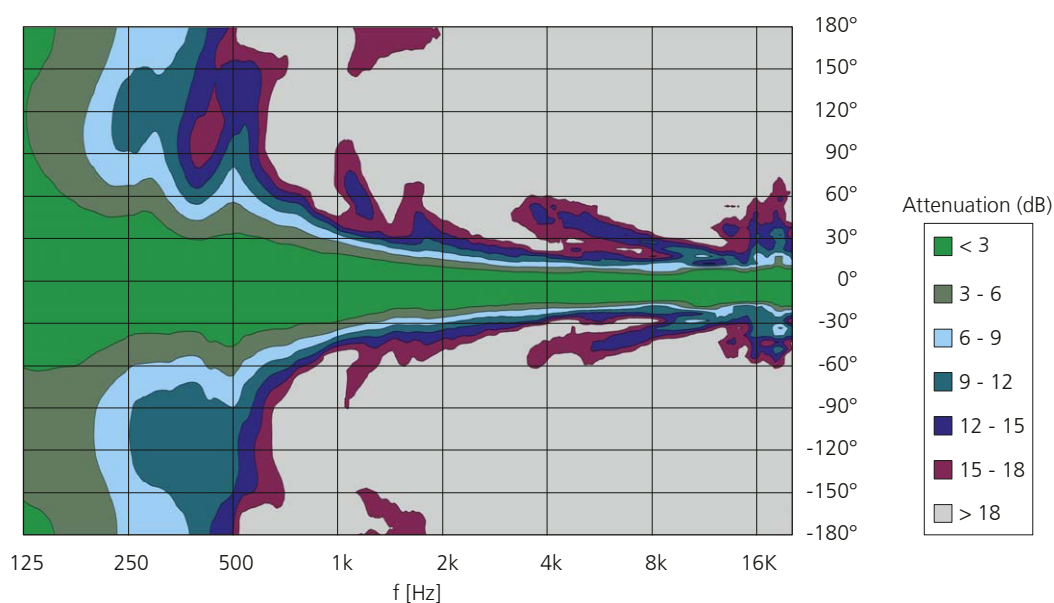
5.2.2 Line source, vertical directivity



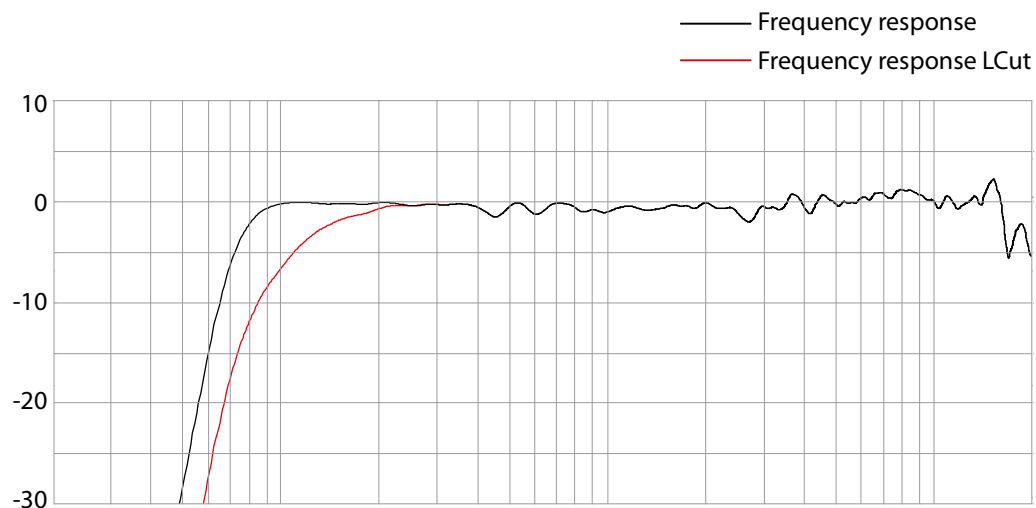
5.2.3 Point source, horizontal directivity



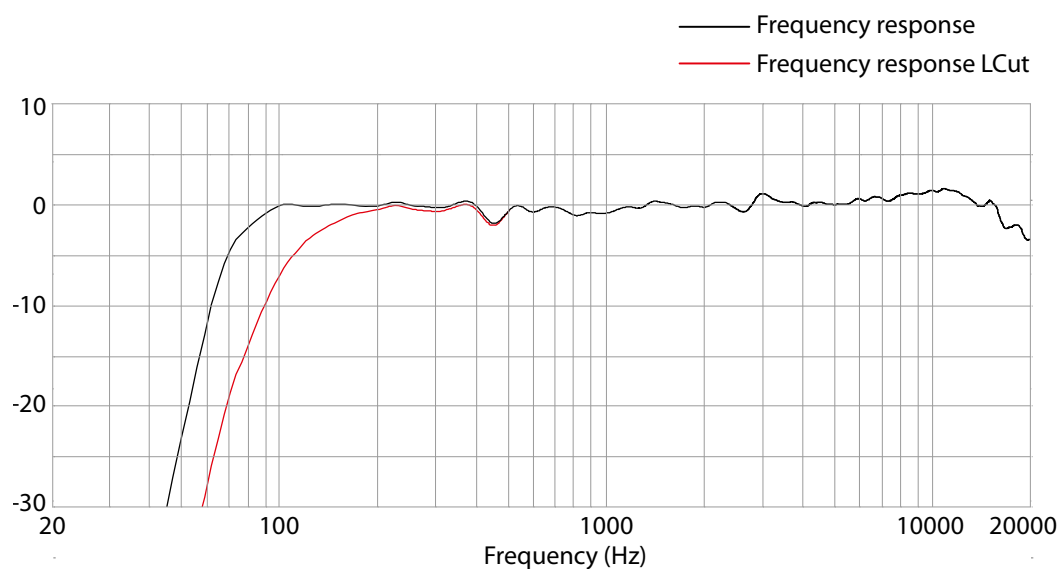
5.2.4 Point source, vertical directivity



5.2.5 Line source, on-axis frequency response



5.2.6 Point source, on-axis frequency response



6 Safety Instructions

WARNING

Installation and operation must be performed by qualified event technicians or appropriately trained persons. Planning must be performed and responsibility be taken by qualified personnel only.

K&F SPECTRA 212 speakers are to be flown by qualified personnel (riggers) only! For instructions for flying speakers, handling arrays, pickpoint tables, and other information, refer to the relevant accessory manuals. The manuals are available for free download on our website at www.kling-freitag.de.

With regard to its weight of 48 kg, two people are required for handling the K&F SPECTRA 212.

For safety instructions on the various installation options, refer to the respective manuals.

6.1 Notes on Upright Operation

WARNING

If you use your speakers in an upright position, ensure sufficient stability. To avoid injury or damage, always be sure to mount the speakers securely so that they do not fall.

Note that the speakers can move as a result of vibrations. To prevent them from falling from their mounted position, they must be secured properly.

Mounted speaker(s) must not tilt even at an inclination angle of 15°. If necessary, use extra fastenings.

Be sure to follow the relevant national specifications, norms, and safety regulations.

When laying the connecting cables, make sure that nobody can trip.

6.2 Preventing Hearing Damage

CAUTION

Keep your distance from operating speakers. This equipment is capable of delivering sound pressure levels in excess of 90dB SPL, which may cause permanent hearing damage.

Be sure to comply with your local noise regulations.

If possible, install the speakers in a place where nobody can stand right in front of them. If necessary, limit the maximum volume level.

6.3 Protecting the Speakers, Reliability

NOTICE

Be sure to connect the K&F SPECTRA 212 speaker to a K&F SystemAmp or a K&F SystemRack.

Never feed audio at excessive levels to the speaker. This may be caused by mixing consoles, equalizers, effect equipment, etc. and should be indicated on this equipment. Clipping at the power-amp output is typically shown by a red clipping indicator. In any case, be sure to lower the signal level once it sounds distorted.

For damage caused by

- overloading the speakers or
- using the speakers without K&F SystemAmp or K&F SystemRack

we do not assume warranty and excludes liability for possible consequential damage.

Signals that may damage the speakers include the following:

- Continuous high-volume signals at high frequencies, continuous audio feedback
- Continuously distorted signals at high levels
- Sounds occurring when connecting, disconnecting, or switching on a device on the audio system while the speaker is on

Never place your speakers

- where they are permanently exposed to direct sunlight,
- where the devices are exposed to high moisture or rain.
- where they are exposed to strong vibrations or dust.

Damage Caused by the Speaker's Magnetic Fields

Even when not connected, loudspeakers continuously produce a magnetic field. Therefore, when transporting or placing the speaker, be sure to keep a minimum distance of about 1 meter between the speaker and magnetic disks or computer/video displays.

7 Operating Modes

The speakers can be operated either in point-source or line-source mode.

The line-source mode is the default mode of the SPECTRA 212 at shipment. On request, the SPECTRA 212 is also available in point-source mode.

You can change the operating mode by rotating the VariQ midrange/tweeter unit and adjusting a mode switch on the connector panel (see the »Changing the Operating Mode« section on page 26).

7.1 Line-Source Mode

Enable this mode when using your SPECTRA 212 speaker as part of an array.

In this mode, sound emission is determined by the sidewalls, meaning that the speakers can be arranged right next to each other as part of an array. Selecting the line-source mode ensures a smooth sound image as there is no interference caused by overlapping sound sources.

Vertical directivity:

- SPECTRA 212 N: 60°
- SPECTRA 212 XW: 120°

Horizontal directivity: 30°.

7.2 Point-Source Mode

Enable this mode when using the SPECTRA 212 as a single speaker.

If the angle between the speaker side walls is at least 15°, you can also use the point-source mode with clusters. Using the horizontal cluster flying set or the horizontal cluster plate set ensures this requirement is met.

In point-source mode, the VariQ midrange/tweeter unit is tilted either downwards or upwards by 10°.

7.2.1 Point Source with Down-Tilt

To direct the emitted sound towards the audience while reducing ceiling reflections, the midrange/tweeter unit is down-tilted by –10° in this operating mode.

Horizontal directivity:

- SPECTRA 212 N: 60°
- SPECTRA 212 XW: 120°

Vertical directivity:

- Point source, –10° down-tilt:
Asymmetrical directivity (30°x +5°...–25°)

7.2.2 Point Source with Up-Tilt

Use this mode in scenarios where the listening area is located above the speaker. In this mode, the midrange/tweeter unit is tilted upwards by 10°.

Horizontal directivity:

- SPECTRA 212 N: 60°
- SPECTRA 212 XW: 120°

Vertical directivity:

- Point source, 10° up-tilt:
Asymmetrical directivity (30°x +25 °...–5 °)

7.3 Determining the Selected Operating Mode

The selected operating mode is determined by two factors:

- The mounting direction of the VariQ midrange/tweeter unit
- The position of the operating-mode switch

NOTICE

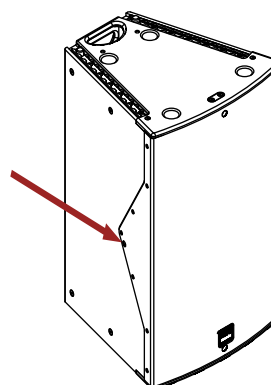
To achieve optimum sonic results, make sure that the »Midrange/Tweeter Unit Orientation« orientation of the midrange/tweeter unit matches the setting of the »The position of the operating-mode switch« operating-mode switch.

7.3.1 Midrange/Tweeter Unit Orientation

Look at the side panel of the speaker to identify the position of the VariQ unit.

There is an opening in the grid showing a color mark.

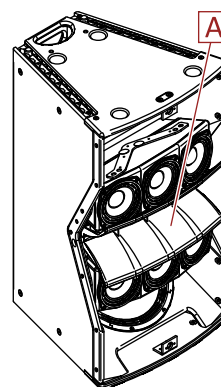
Color mark



[A] Black ●: line source

The K&F VariQ unit is installed for line-source mode.

The H/V directivity is $30^\circ \times 60^\circ$ (N version) or $30^\circ \times 120^\circ$ (XW version).

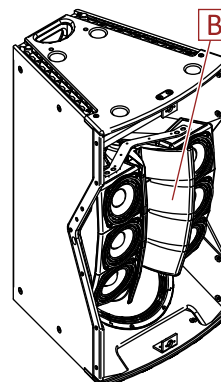


[B] White ○: point source, down-tilt

The K&F VariQ unit is installed for point-source mode.

The horizontal directivity is 60° (N variant) or 120° (XW variant); the vertical directivity is 30° .

The directivity is asymmetrically extended downwards by 10° .

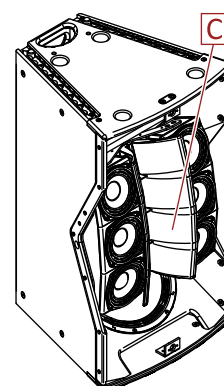


[C] Red ●: point source, up-tilt

The K&F VariQ unit is installed for point-source mode.

The horizontal directivity is 60° (N variant) or 120° (XW variant); the vertical directivity is 30° .

The directivity is asymmetrically extended upwards by 10° .

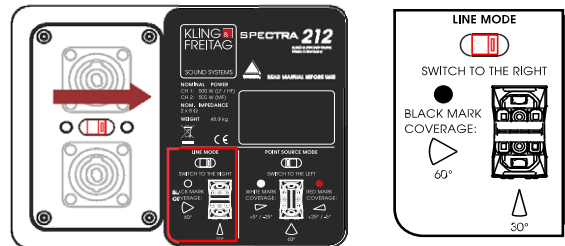


7.3.2 The position of the operating-mode switch

The position of the operating-mode switch must match the orientation of the VariQ unit.

Line-Source Mode

- Switch position right
- Orientation:
Black mark



Point-Source Mode

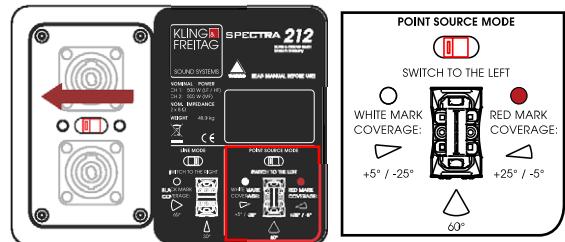
- Switch in left position:
Midrange/Tweeter Unit Orientation
Down-tilt:

- White mark ○

or

- Midrange/Tweeter Unit Orientation
Up-tilt:

- Red mark ●



7.4 Changing the Operating Mode

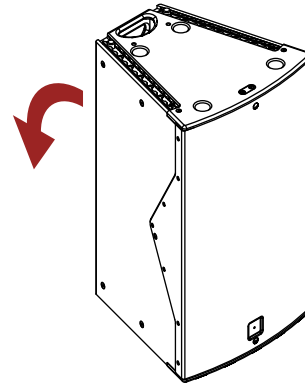
To rotate the midrange/tweeter unit in order to change the operating mode, you need to remove the grille and loosen two locking screws.

In addition, use the switch at the rear panel to change between point source and line source operation.

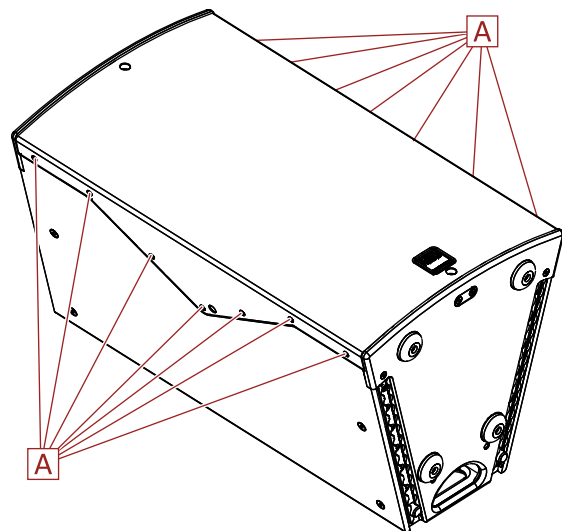
Before changing the configuration, use the side opening to confirm the current coverage mode of the K&F VariQ unit.

7.4.1 Rotating the VariQ Unit

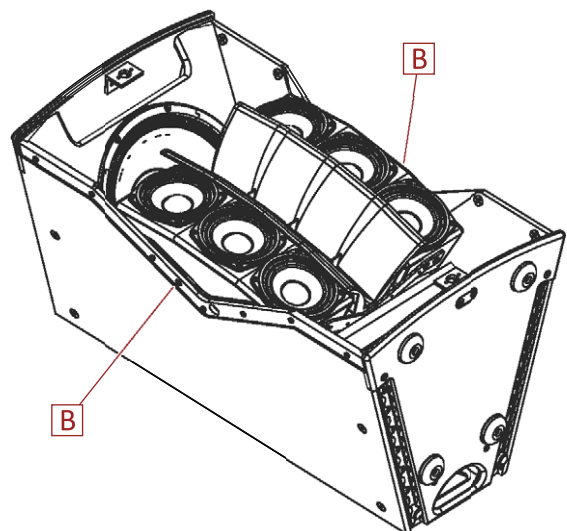
1. Carefully place the K&F SPECTRA 212 speaker on its backside.



2. Remove the grille screws [A], then remove the grille.



3. Remove the two screws [B] holding the VariQ unit in place.

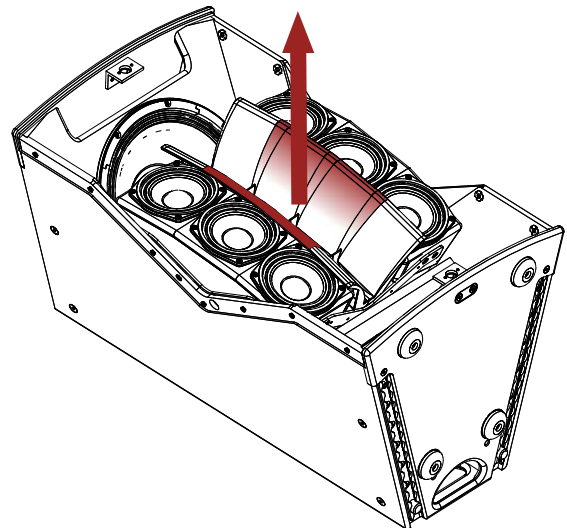


NOTICE

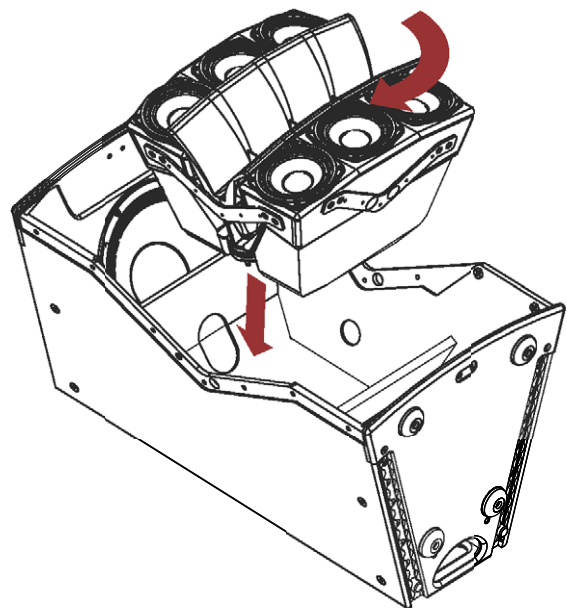
4. Grasp the waveformers of the K&F VariQ unit with both hands and lift the unit upwards from the cabinet right until you can rotate it.

Note that lifting the VariQ unit too far might result in loosening the connection cable.

If this happens, be sure to reconnect the cable.

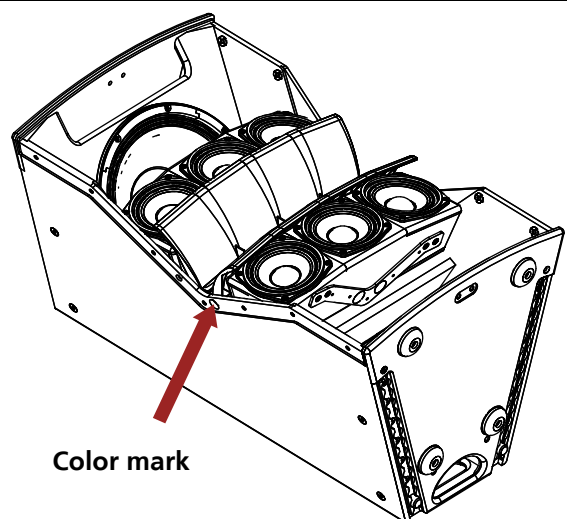


5. Rotate the VariQ unit into the desired position, then move it back into place.
6. Next, make sure that the threads in the steel brackets of the VariQ unit are properly aligned with the corresponding holes in the cabinet.

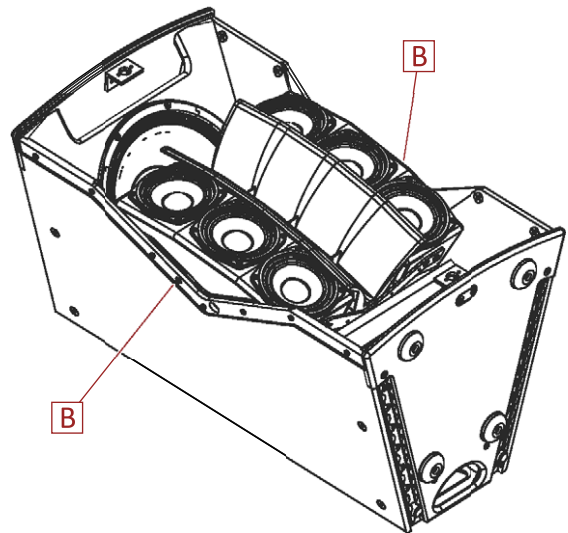


7. Make sure the color mark visible in the opening matches the desired operating mode:

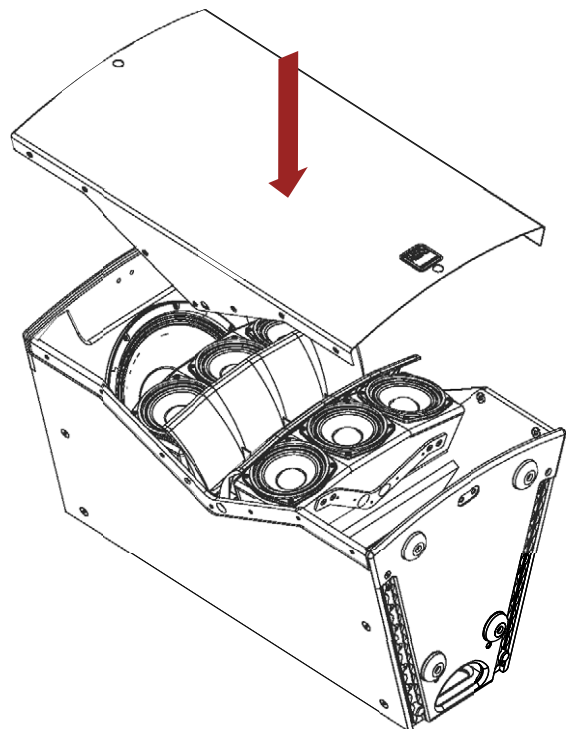
- **Black:** line source
- **White:** point source, down-tilt
- **Red:** point source, up-tilt



8. Replace the previously removed screws **[B]** to fasten the K&F VariQ unit.
Hand-tighten the screws.

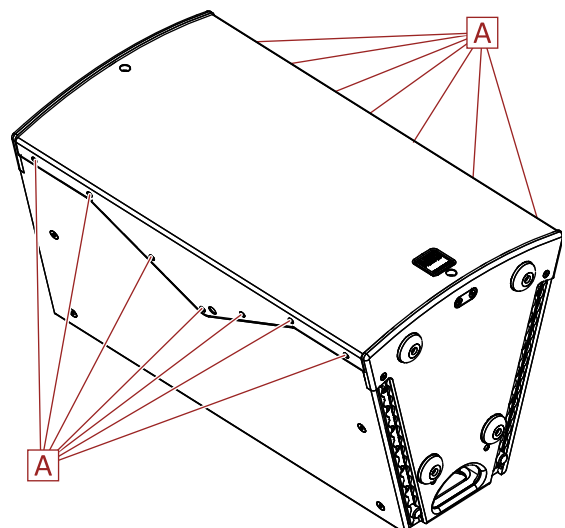


9. Align the grille properly (with the company logo at the front-panel bottom) and replace it.



10. Replace the grid screws **[A]**.

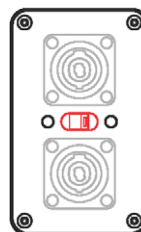
To avoid incorrect screw replacement causing thread damage, press the grille against the cabinet and insert the screws perpendicular to the side panel of the cabinet.

**NOTICE**

7.4.2 Setting the Operating-Mode Switch

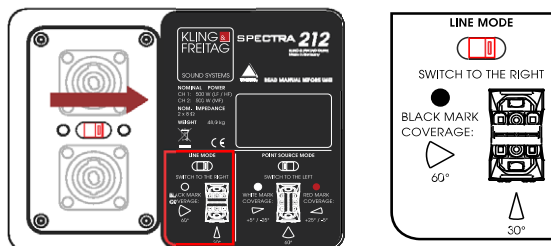
11. Move the switch to the required operating-mode setting.

Make sure the switch position matches the orientation of the VariQ unit.



Line-Source Mode

- Switch position right
- Orientation:
Black mark



Point-Source Mode

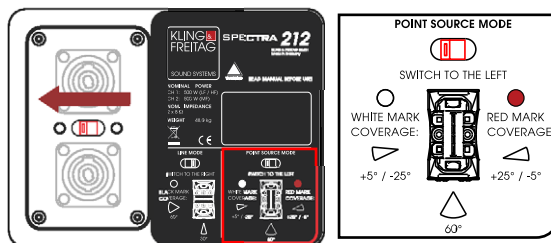
- Switch in left position:
Midrange/Tweeter Unit Orientation
Down-tilt:

- White mark ○

or

- Midrange/Tweeter Unit Orientation
Up-tilt:

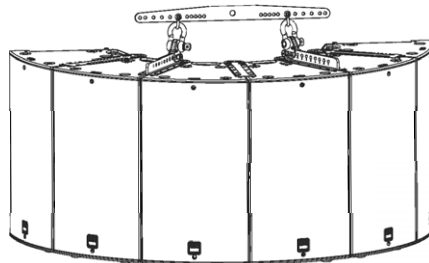
- Red mark ●



8 Horizontal and vertical arrays

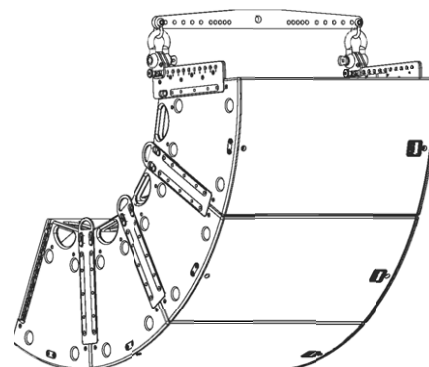
You can fly K&F SPECTRA 212 speakers either separately or as an array. With an array of K&F SPECTRA 212 speakers, you can choose between horizontal (A) and vertical (B) orientation.

A)



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

B)



Vertical array: 4 x K&F SPECTRA 212 speakers max.

Be sure to configure arrays of K&F SPECTRA 212 speakers only using K&F SPECTRA 212 Flybar Connector horizontal or K&F SPECTRA 212 Flybar Connector vertical. For more information, refer to the rigging system manual of the K&F SPECTRA 212 speaker.

WARNING

K&F SPECTRA 212 speakers to be suspended by qualified personnel (riggers) only. Always adhere to the rigging-system manual. For instructions for flying speakers, handling arrays, pick-point tables, and other information, refer to the "K&F SPECTRA 212 Rigging" manual. The manual is available for free download on our website at www.kling-freitag.de.

Never exceed the maximum number of speakers allowed.

The maximum number of speakers allowed in a horizontal array (A) is six (6).

The maximum number of speakers allowed in a vertical array is four (4).

With horizontal arrays, the maximum number of speakers allowed means that the horizontal directivity adds up to 180° (max.).

With vertical arrays, the maximum number of speakers allowed means that the vertical directivity angle adds up to 120° (max.).

9 Wiring

NOTICE

- Before connecting your SPECTRA 212 speaker, switch off all devices and turn down all faders and encoders.
- Be sure to use high-end speaker cables with an appropriate wire gauge. Select the wire gauge with regard to the cable length.
Min. Wire Gauge (mm²) = Req. Cable Length (m) / (2xSpeaker Impedance (Ohm))
- To connect the mixing console to the power-amp inputs, use shielded 2-pole balanced microphone cables equipped with quality connectors.
- Avoid creating ground loops.
- Be sure to follow the pinouts shown in this manual.
- Check for correct polarity of the speaker links to the power amplifier.
- Upon completing wiring, ensure that the connected speaker channels are working in phase, for example, using a phase tester. When the connected channels are used simultaneously, you can identify out-of-phase statuses by bass cancellation or mid-frequency signals (e.g. voices) that cannot be located properly.
- When connecting multiple speakers, you can daisy-chain the signal from one speaker to the next. Make sure that the total impedance of all speakers connected to an amplifier does not fall below the minimum impedance specified for the amplifier. **$1/R1 + 1/R2 + 1/R3 + \dots = 1/R_{total}$**

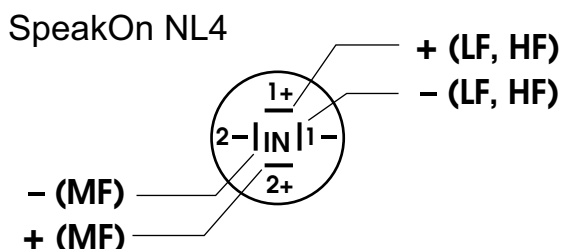
WARNING

Speaker-signal currents are potentially hazardous to the human body.

When the system is in use, make sure that the connectors are secured against inadvertent touch.

9.1 Terminal assignment

Speakon connector



10 Initial Operation

NOTICE

- Switch off all devices and turn down all volume controls on the mixing console and the amplifiers.
- Wire your K&F SPECTRA 212 systems as described in this manual.
- Switch on the devices in the following order: **first** the mixing console, then the controller and finally the power amplifiers! Be sure to observe this power-up sequence at all times. Otherwise switching noises may damage the system.
- If you hear noise, turn off all devices in reverse order, then check all cable connections.
- Turn up all amplifier channels one after another and output a low-volume signal to the system. Check to see if the desired signals are applied to the intended speakers and make sure there is no interference.
- With amplifiers with insufficient input-stage headroom, you may not always be able to prevent distortion by reducing the power-amp volume controls. In this case, the clipping indicator may not light when clipping actually occurs! To prevent damage to the speakers, we recommend fully turning up the power-amp volume controls, then carefully turn up the volume on the mixing console or controller or reduce the limiter threshold of the controller as appropriate in order not to overload the amplifiers.
- When turning off the system, first turn down the amplifier input controls. Next, power down the amplifiers, then turn off the remaining devices.

11 Setups and Use Cases

The K&F SPECTRA 212 speaker is designed as a midrange/tweeter system. When using it as a main sound-reinforcement system, we recommend using an additional K&F subwoofer.

Our recommendation is using K&F subwoofers from the K&F NOMOS range.

Example configurations:

- (1x) K&F SPECTRA 212
(1x) K&F NOMOS LS2
(1x) K&F NOMOS LT
- 3 x SPECTRA 212
(3x) K&F NOMOS XLT

All setups depend on their intended use, the required beamwidth, and the on-site conditions.

11.1 Setup 1: 1x SPECTRA 212 Point Source in Full Range Mode

To operate the K&F SPECTRA 212 as a point source in full-range mode, configure the speaker as a point source; for more information, refer to the »Changing the Operating Mode« chapter on page 26. Select the appropriate preset on the K&F SystemAmp or K&F SystemRack. When wiring your system, ensure correct Terminal assignment pinout (see page 31).

Presets:

K&F SystemAmp:	SPECTRA 212 PS FR
K&F SystemRack:	Spec212 PS FR

11.2 Setup 2: 1× K&F SPECTRA 212 point source with additional subwoofer

If you want to use the K&F SPECTRA 212 as a line source in combination with a subwoofer, be sure to configure the VariQ unit properly. Select the appropriate preset on the K&F SystemAmp or K&F SystemRack. When wiring your system, ensure correct Terminal assignment pinout (see page 31).

Presets:

K&F SystemAmp: **SPECTRA 212 PS LCut**

To ensure optimum load distribution on the K&F SystemAmp, we recommend using channels 3 and 4 for the K&F SPECTRA 212 and channels 1 and 2 for the subwoofers.

By default, the crossover frequency between the subwoofer and top is 100 Hz. If you prefer a lower frequency (for example, because the subwoofer and the top will be located relatively far apart from each other), you might want to select the full-range mode for the K&F SPECTRA 212 while feeding the subwoofers in 60-Hz mode.

K&F SystemRack: **Spec212 PS LC**

By default, the crossover frequency between the subwoofer and top is 100 Hz. If you prefer a lower frequency (for example, because the subwoofer and the top will be located relatively far apart from each other), you might want to select the full-range mode for the K&F SPECTRA 212 while feeding the subwoofers in 60-Hz mode.

Suggested configurations include:

(1x)
K&F SPECTRA 212
(Point Source)
(1x)
K&F NOMOS LT
(1x)
K&F NOMOS LS2



(1x)
K&F SPECTRA 212
(Point Source)
(1x)
K&F NOMOS XLT
(1x)
K&F NOMOS XLS



11.3 Setup 3: 2× K&F SPECTRA 212 line source in full range mode

To operate the K&F SPECTRA 212 as a line source in full-range mode, configure the speaker as a line source; for more information, refer to the »Changing the Operating Mode« chapter on page 26. Select the appropriate preset on the K&F SystemAmp or K&F SystemRack. When wiring your system, ensure correct Terminal assignment pinout (see page 31). You can operate up to three K&F SPECTRA 212 in parallel. The resulting overall load impedance is 2.7 ohms per channel.

Presets:

K&F SystemAmp:

SPECTRA 212 LS FR

With a cluster of 2 setup, enable the switchable Cluster of 2 filter in the Input EQ of the K&F SystemAmp.

K&F SystemRack:

2xSpec212 LS FR

11.4 Setup 4: 3× SPECTRA 212 line source with additional subwoofer

Presets:

K&F SystemAmp:

SPECTRA 212 LS LCut

With a cluster of 3 setup, enable the switchable Cluster of 3 filter in the Input EQ of the K&F SystemAmp.

By default, the crossover frequency between the subwoofer and top is 100 Hz. If you prefer a lower frequency (for example, because the subwoofer and the top will be located relatively far apart from each other), you might want to select the full-range mode for the K&F SPECTRA 212 while feeding the subwoofers in 60-Hz mode.

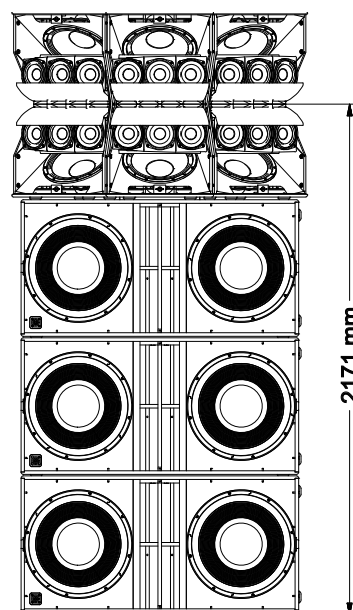
K&F SystemRack:

3xSpec212 LS LCut

By default, the crossover frequency between the subwoofer and top is 100 Hz. If you prefer a lower frequency (for example, because the subwoofer and the top will be located relatively far apart from each other), you might want to select the full-range mode for the K&F SPECTRA 212 while feeding the subwoofers in 60-Hz mode.

Suggested configurations include:

(3x)
K&F SPECTRA 212
(Line Source)
(3x)
K&F NOMOS XLT



12 Maintenance

In addition to the instructions given here, please also read carefully those in the manuals of any mounting accessories used.

- Perform a visual inspection before each installation.
- Visually inspect the entire setup every six months.
- 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.

WARNING

Risks imposed by undetected damages

- The inspection must be carried out by a qualified expert.
- If as a result of these checks any uncertainty should arise with regard to safety or defects are found, don't use the speaker any longer. Contact your retailer.
- Be sure to use self-locking screws no more than five times. Using them more often may result in screws loosening in operation. If in doubt, use new screws. Never use other types of screws.
- All repair work must be performed by Kling & Freitag after evaluation carried out by engineering.
- 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. This inspection log book shall be updated with the inspection steps, test intervals and parts lists.
- If necessary, use multifunction oil for care.

The polyurea coating utilized by KLING & FREITAG is shock-resistant and highly resilient. We recommend using protective coverings or transport cases to help avoid damaging the paint in case of continuous mobile use, etc.

To have the acoustic foam replaced, send the grille including the foam layer to KLING & FREITAG GMBH. We will then replace the foam layer with a new one at a fixed charge and return your grille.

13 Transportation and Storage

The K&F SPECTRA 212 system is protected against the effects of unfavorable temporary weather conditions, etc.; despite, be sure to store, transport, and use the accessories in dry environments only. The K&F SPECTRA 212 is 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 order to prevent damage, please make sure to avoid mechanical strains.

To protect the speaker from the above impacts, we recommend using the optional soft cover and suitable transport and storage cases.

14 Disposal

Please recycle the packaging material of the device.

14.1 Germany

Don't dispose of waste electrical equipment through household waste.

Don't deliver it to official recycling points either.

All KLING & FREITAG products are plain business-to-business (B2B) products. Therefore, KLING & FREITAG GmbH is exclusively responsible for disposing of all KLING & FREITAG waste equipment marked with a crossed-out garbage-can icon. Please call the below phone number when you have a KLING & FREITAG product (marked with the crossed-out garbage-can icon) for disposal. We will offer you a straightforward and professional disposal at no cost.



KLING & FREITAG equipment with no such icon was distributed before 24 March 2006; in that case, the owner is legally responsible for disposal. We will, however, gladly assist you by naming appropriate ways of disposal.

For further disposal information of KLING & FREITAG waste products, call +49 511 -96 99 7 -0

Explanation: The Electrical and Electronic Equipment and Appliances Act (ElektroG) is the German implementation of the European (EU) Waste Electrical and Electronic Equipment Directive (WEEE, 2002/96/EC).

Therefore, starting on 24 March 2006, KLING & FREITAG GmbH has marked all products subject to the WEEE that are distributed in Germany with an icon showing a crossed-out garbage can with a white bar below it. The icon indicates that the equipment was distributed on or after 24 March 2006 and must not be disposed of through household waste.

KLING & FREITAG GmbH is legally registered as a manufacturer with the German waste-equipment registration authority (EAR). Unsere WEEE-Reg.Nr. lautet: DE64110372.

We substantiated towards the EAR that our products are for B2B trade only.

14.2 EU, Norway, Iceland, and Liechtenstein

Don't dispose of waste electrical equipment through household waste.

Starting on 13 August 2005, KLING & FREITAG GmbH has marked all products subject to the WEEE directive that are distributed in any member state of the European Union (except Germany), Norway, Iceland, or Liechtenstein with an icon showing a crossed-out garbage can with a white bar below it.



This sign indicates that the disposal on domestic waste is prohibited and that the product has been put into circulation on 08/13/2005 at the earliest.

The local distributor (sales partner) in the respective country is responsible for complying with the applicable legislation.

Contact your retailer or the local authorities for information on the regulations applicable in any EU member state (except Germany).

14.3 All Other Countries

Contact your retailer or the local authorities for information on the regulations applicable in any country not listed above.

15 EC Declaration of Conformity**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)***Lautsprechersystem
K&F SPECTRA 212****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:)*

- 2014/35/EU, Niederspannungsrichtlinie (Low Voltage Directive)
- RoHS II 2011/65/EU, Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment)

Hannover, 26.7.2018


Jürgen Freitag, Geschäftsführung (CEO)



**THANK
YOU** FOR
CHOOSING
K&F.



KLING & FREITAG GmbH

Wohlenbergstrasse 5 · D-30179 Hannover

Phone +49 (0)511 969970

www.kling-freitag.de · info@kling-freitag.de