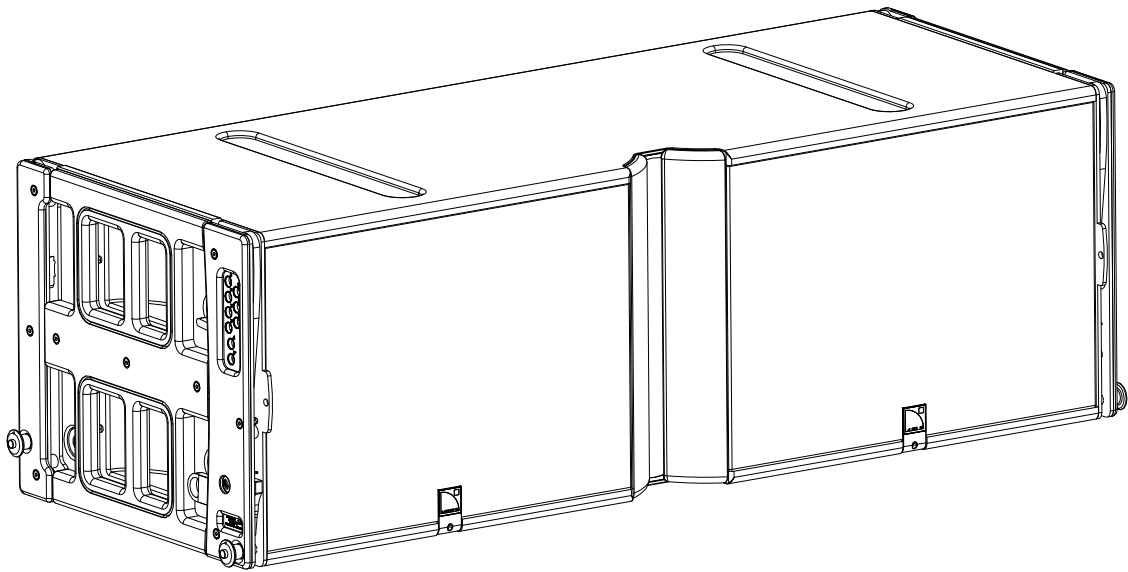


K 1



user manual (EN)



Document reference: K1 user manual (EN) version 6.0

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Safety

Instructions

- !** **Inspect the system before any deployment.**
Perform safety related checks and inspections before any deployment.

Perform preventive maintenance at least once a year.
Insufficient upkeep of the product can void the warranty.

If any safety issue is detected during inspection, do not use the product before performing corrective maintenance.
Check for issues. A rigging system part or fastener is missing or loose. A rigging system part exhibits: bends, breaks, broken parts, corrosion, cracks, cracks in welded joints, deformation, denting, wear, holes. A safety cue or label is missing.
- !** **Never incorporate equipment or accessories not approved by L-Acoustics.**




! **Read all the related PRODUCT INFORMATION documents shipped with the products before exploiting the system.**
- !** **Do not store the product on an unstable cart, stand, tripod, bracket, or table.**
- !** **Beware of sound levels.**
Do not stay within close proximity of loudspeakers in operation.
Loudspeaker systems are capable of producing very high sound pressure levels (SPL) which can instantaneously lead to permanent hearing damage to performers, production crew and audience members. Hearing damage can also occur at moderate level with prolonged exposure to sound.
Check the applicable laws and regulations relating to maximum sound levels and exposure times.
- !** **Intended use**
This system is intended for use by trained personnel for professional applications.
- !** **Read the RIGGING MANUAL before installing the system.**
Use the rigging accessories described in the rigging manual and follow the associated procedures.

As part of a continuous evolution of techniques and standards, L-Acoustics reserves the right to change the specifications of its products and the content of its documents without prior notice.
Check www.l-acoustics.com on a regular basis to download the latest document and software updates.
- !** **Long term exposure to extreme conditions may damage the product.**
For more information, refer to the **Products weather protection** document, available on the website.
- !** **Read the maintenance section of this document before servicing the product.**
- !** **Contact L-Acoustics for advanced maintenance.**
Any unauthorized maintenance operation will void the product warranty.
- i** This marking indicates that this product should not be disposed of with other household waste throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.



Symbols

The following symbols are used in this document:

-  This symbol indicates a potential risk of harm to an individual or damage to the product. It can also notify the user about instructions that must be strictly followed to ensure safe installation or operation of the product.
-  This symbol notifies the user about instructions that must be strictly followed to ensure proper installation or operation of the product.
-  This symbol notifies the user about complementary information or optional instructions.

Welcome

Thank you for purchasing the LAcoustics K1.

This document contains essential information on using the system properly.

As part of a continuous evolution of techniques and standards, LAcoustics reserves the right to change the specifications of its products and the content of its document without prior notice. Please check www.l-acoustics.com on a regular basis to download the latest document and software updates.

K1 large format WST line source

The K1 enclosure is the full-range element of a large format WST[®] line source with variable curvature. The K1 features two 15" speakers mounted in a bass-reflex enclosure, four 6.5" high-efficiency direct radiating speakers, and three 3" diaphragm compression drivers coupled to individual DOOSC[®] waveguides. The transducers are implemented in a K-shape configuration. The K1 enclosure is based on a 3-way active design with 2 LF sections, 1 MF section and 1 HF section, each one at the nominal impedance of 8 ohms. The K1 enclosure is made of first grade Baltic birch plywood to ensure maximum acoustical and mechanical integrity. A four-point rigging system is integrated into the cabinet.

The K1 enclosure operates over the nominal frequency range of 35 Hz to 20 kHz. The frequency response of the system can be extended down to either 30 Hz or 25 Hz with the addition of the dedicated K1-SB extension, or the KS28SB28 subwoofer, respectively. The K1 generates a symmetric horizontal coverage of 90°.

The rigging system allows vertically assembling K1 enclosures with various inter-element angles up to 5°, constituting a line array with variable curvature. The combination of the coplanar symmetry and the DOOSC[®] waveguide in the HF region ensure a perfect acoustic coupling between the elements of an array. The WST[®] (Wavefront Sculpture Technology) criteria are fulfilled, so that such an array can be qualified as a true line source. Any WST[®] line source provides a smooth tonal response and a coverage that is free of secondary lobes over the entire frequency range.

The K1 system is driven by the LA8LA12X amplified controller which ensures active system linearization, intelligent transducer protection, and optimization of the loudspeaker system in its different operating modes. The acoustic performances of the system will depend upon the used preset and the chosen physical configuration

System components

Loudspeaker enclosures

K1	3-way full-range active WST® enclosure
K2	3-way full-range active WST enclosure
Kara	2-way modular WST enclosure
K1-SB	K1 system subwoofer 2x15"
SB28	High power subwoofer: 2 x 18"
KS28	Flyable subwoofer 2 x 18"

Powering and driving system

LA8 / LA12X	Amplified controller with DSP, preset library and networking capabilities
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Refer to the LA8 / LA12X owner's manual for operating instructions.

Racks

LA-RAK	Touring rack containing three LA8 and power, audio and network distribution
LA-RAK II AVB	Touring rack containing three LA12X, LA-POWER II for power distribution, LA-PANEL II for audio and network distribution, and two LS10 for AVB distribution

Cables

SP cables	4-point speakON loudspeaker cables (4 mm ² gauge) SP cables come in four sizes: SP.7 (0.7 m/2.3 ft), SP5 (5 m/16.4 ft), SP10 (10 m/32.8 ft) and SP25 (25 m/82 ft)
SP-Y1	breakout cable for two passive enclosures (2.5 mm ² gauge) provided with a CC4FP adapter 4-point speakON to 2 x 2-point speakON
DO	8-point PA-COM loudspeaker cables (4 mm ² gauge) DO cables come in three sizes: DO.7 (0.7 m/2.3 ft), DO10 (10 m/32.8 ft) and DO25 (25 m/82 ft)
DOSUB-LA8	breakout cable for four passive enclosures (4 mm ² gauge) 8-point PA-COM to 4 x 2-point speakON
DOFILL-LA8	breakout cable for two 2-way active enclosures (4 mm ² gauge) 8-point PA-COM to 2 x 4-point speakON
DO3WFILL	breakout cable for one 2-way active enclosure and two passive enclosures (4 mm ² gauge) 8-point PA-COM to 1 x 4-point speakON and 2 x 2-point speakON



Information about the connection of the enclosures to the LA amplified controllers is given in this document.

Refer to the LA8 / LA12X owner's manual for detailed instructions about the whole cabling scheme, including modulation cables and network.

Rigging elements



Rigging elements or procedures are not presented in this document.

Refer to the K1 rigging manual.

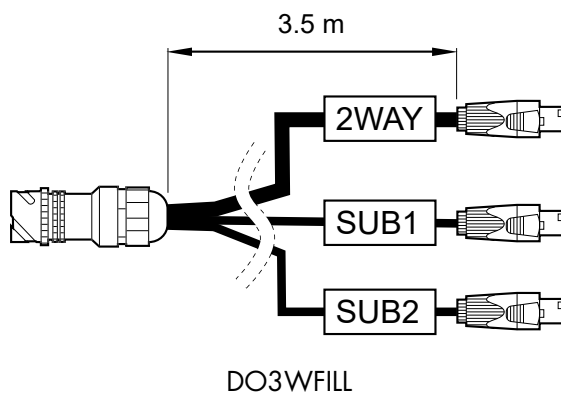
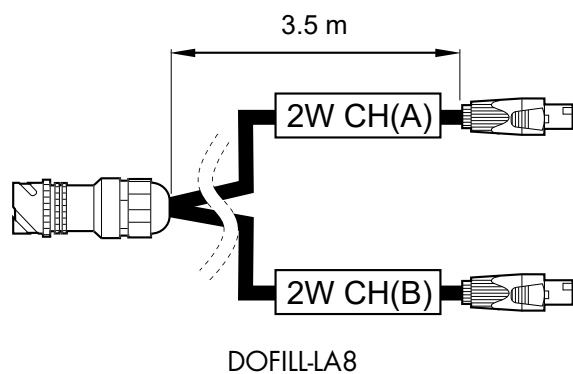
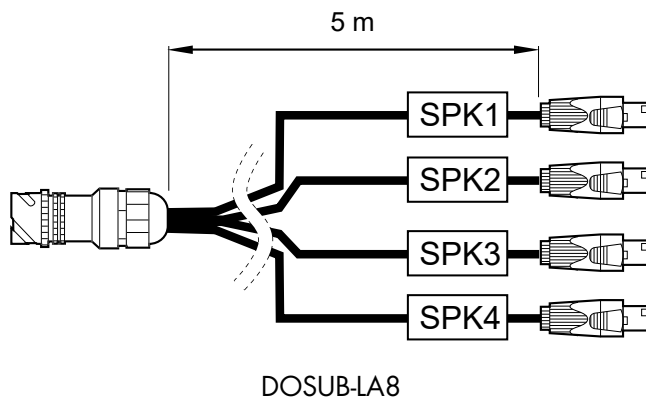
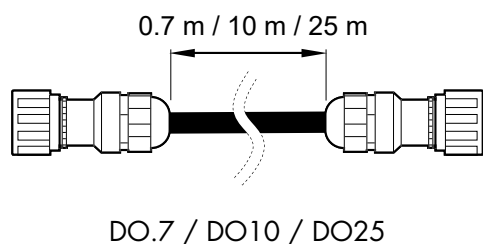
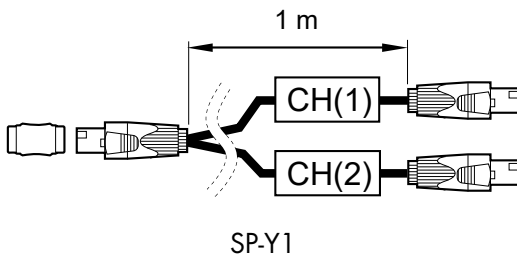
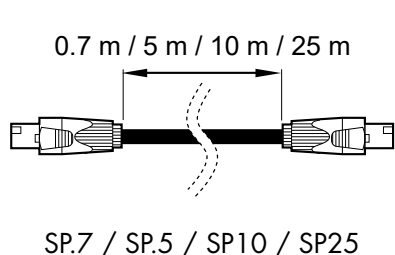
Software applications

- Soundvision 3D acoustical and mechanical modeling software
- LA Network Manager Software for remote control and monitoring of amplified controllers

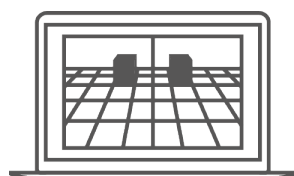
i Refer to the **Soundvision** help.
 Refer to the **LA Network Manager** help.

System component illustrations

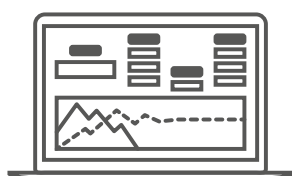
Cables



Software applications



Soundvision



LA Network Manager

Technical description

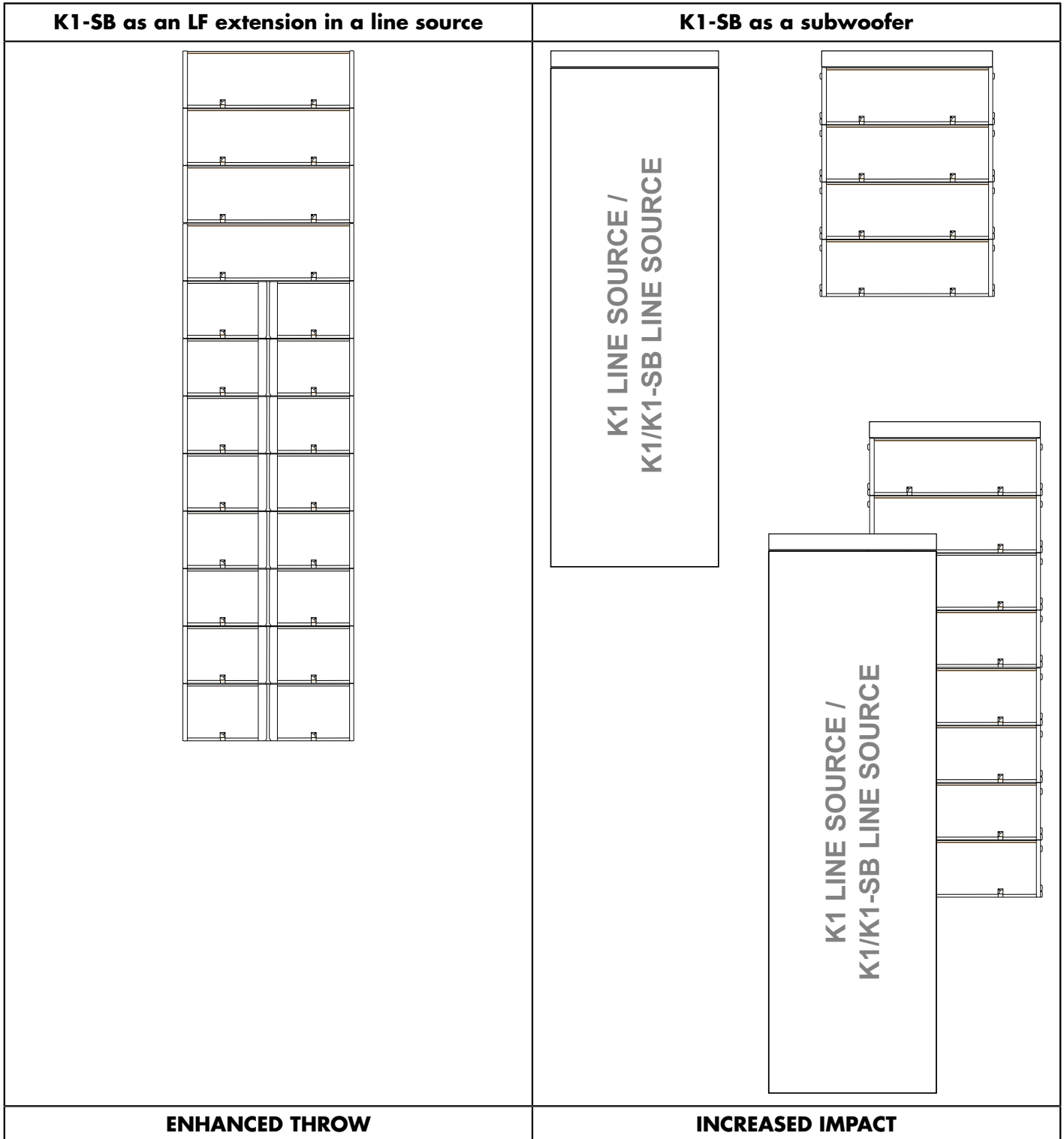
K1-SB applications

There are two distinct applications for K1-SB in a K1 system:

- As an LF extension in a line source for enhanced throw, using the [K1SB_X] preset with K1.
- As a subwoofer for increased impact, using the [K1SB_60] preset.



Both applications of K1-SB can be combined in the same configuration.



Loudspeaker configurations

Line source

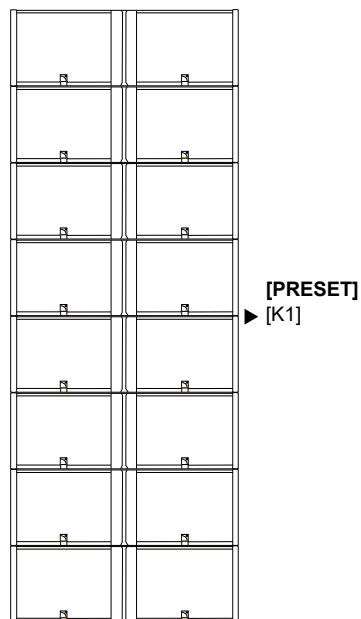
Deployed as a line source, the system operates over the nominal bandwidth of the K1 enclosure.

Two configurations are possible:

- K1 line source
- K1/K1-SB line source: enhanced LF throw

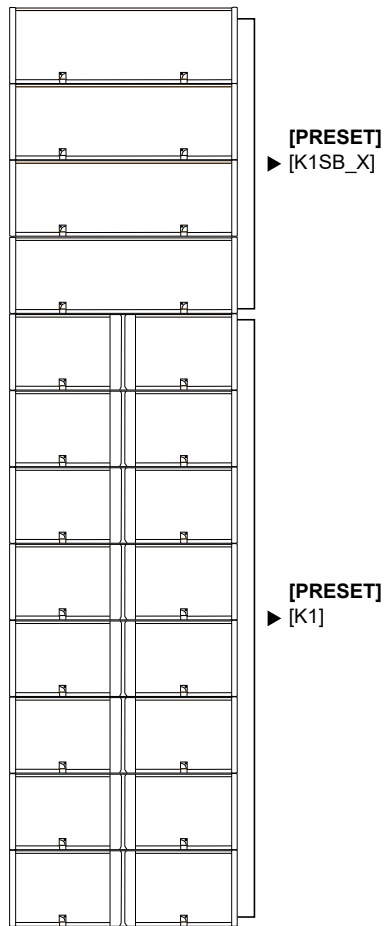
By providing the K1-SB with the same frequency response as the K1 low section, the [K1SB_X] preset allows the K1-SB enclosure to be used as an LF line source element, increasing the length of the sub-low line source.

The K1 and K1-SB enclosures are driven by the LA8 / LA12X amplified controllers.



Standalone K1 line source

Enclosure	K1
Preset	[K1]
Frequency range (-10 dB)	35 Hz - 20 kHz



K1/K1-SB line source

Enclosure	K1	K1-SB
Preset	[K1]	[K1SB_X]
Frequency range (-10 dB)	35 Hz - 20 kHz	
Recommended ratio	2 K1 : 1 K1-SB	
Minimum line length	8 K1 + 4 K1-SB	

! When using [K1] with [K1SB_X], do not add any delay value between the K1 and K1-SB elements of a same line source.

Additional subwoofer system

A K1 line source or a K1/K1-SB line source can be deployed with additional subwoofer enclosures to provide increased sub-low resources to demanding applications.

Two subwoofer systems are available:

- K1-SB for increased impact
- KS28 or SB28 for infra extension

The recommended ratio is one K1 for one subwoofer, whether using K1-SB subwoofers only, KS28 or SB28 subwoofers only, or a combination of both.

The [K1SB_60], [KS28_60], and [SB28_60] presets provide the subwoofers with an upper frequency limit at 60 Hz for an optimal frequency coupling with the line source.

K1-SB and SB28 are driven by the LA8 / LA12X amplified controller.

KS28 is driven by the LA12X amplified controller.

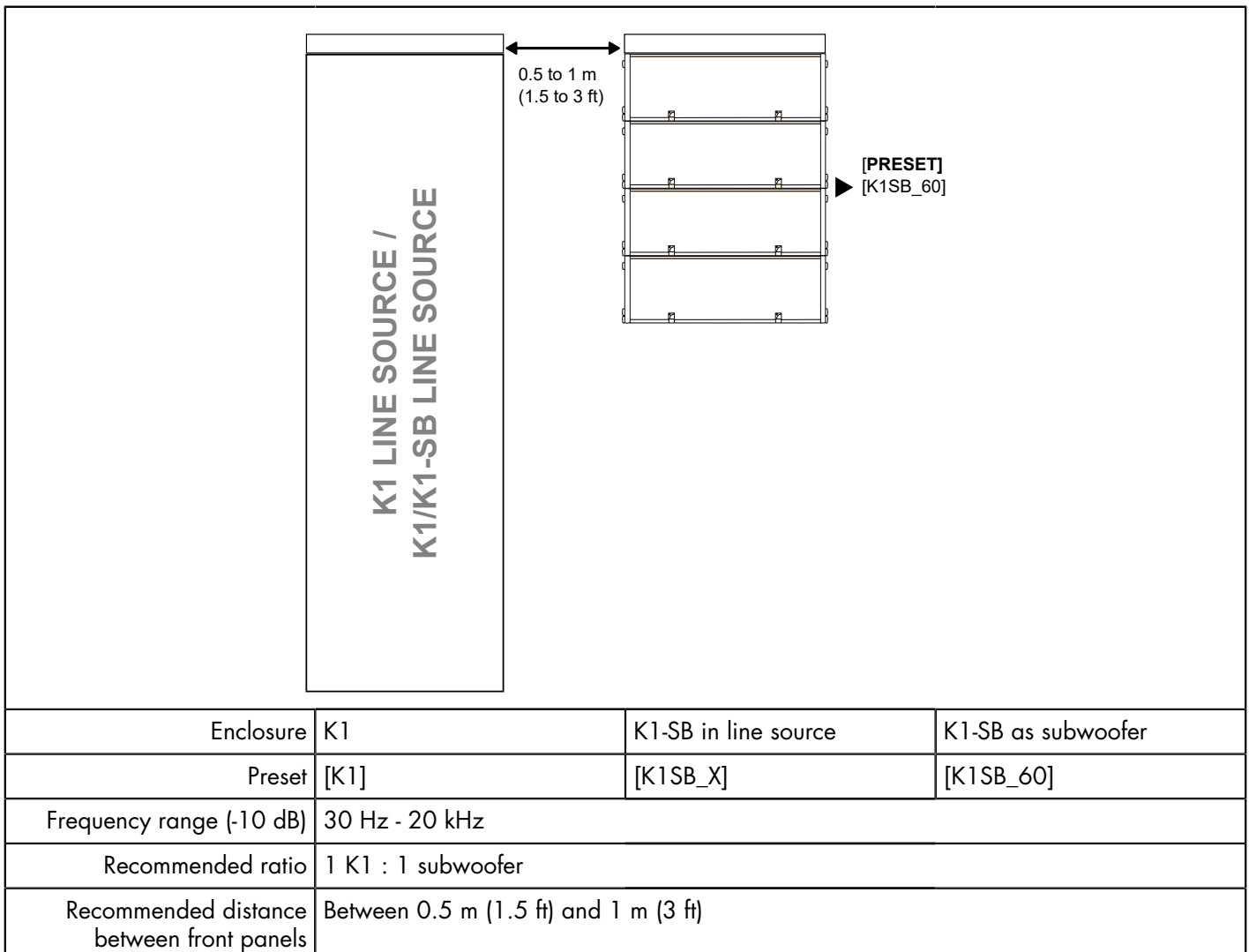
K1-SB

K1-SB provides an extension of the bandwidth in the low end, down to 30 Hz. Depending on the deployment, LF rejection can be produced.

Two deployments are available in this configuration:

- K1-SB beside the K1 or K1/K1-SB line source : side LF rejection (polarized)
- K1-SB behind the K1 or K1/K1-SB line source : rear LF rejection (cardioid)

Line source with K1-SB beside



! Delay values

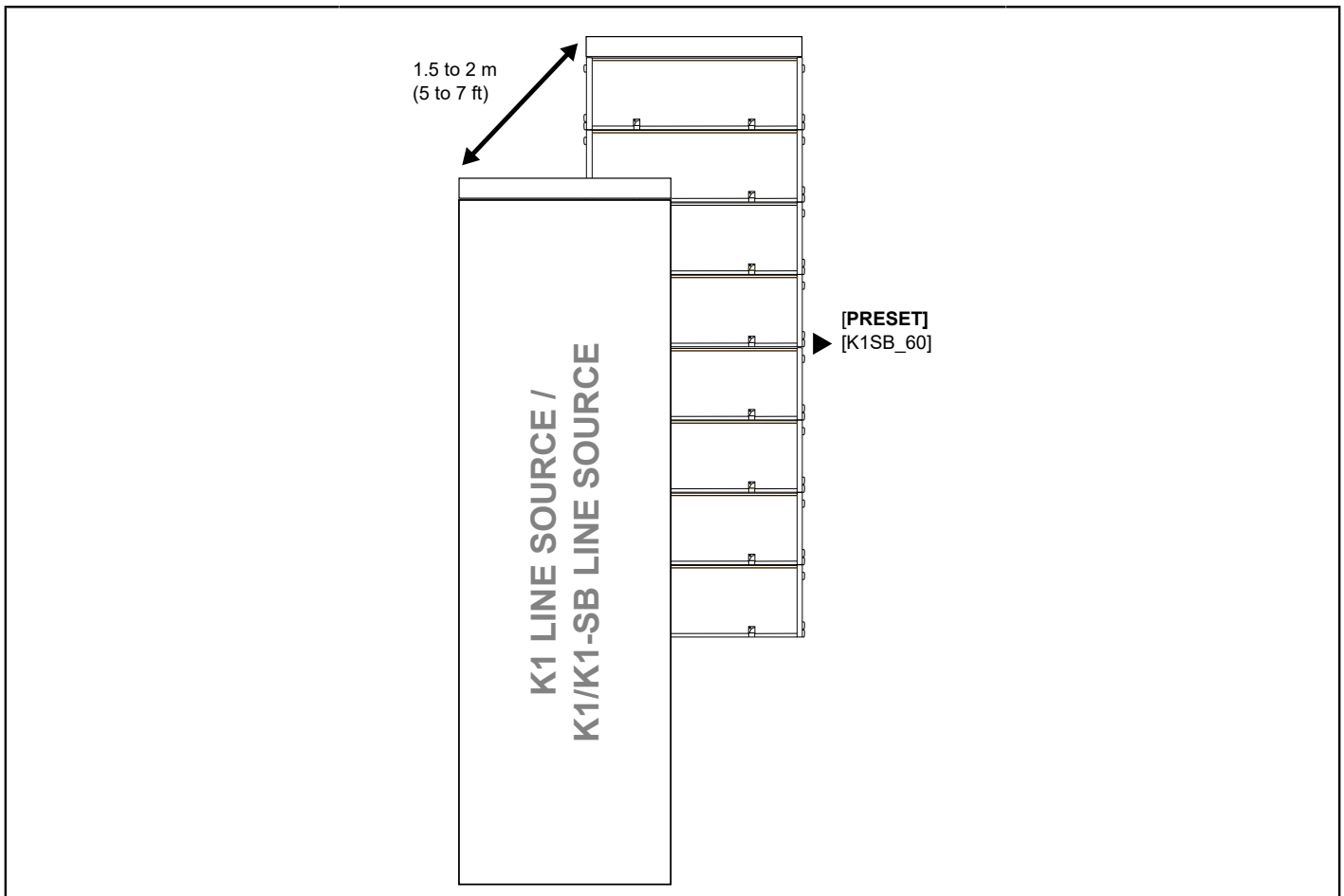
Do not forget to add the pre-alignment and geometric delays depending on the configuration.

! When using [K1] with [K1SB_X], do not add any delay value between the K1 and K1-SB elements of a same line source.

Pre-alignment delays

presets	pre-alignment delay values and polarity settings	
[K1] + [K1SB_60]	K1 = 6 ms <input style="float: right;" type="button" value="+"/>	K1-SB = 0 ms <input style="float: right;" type="button" value="+"/>

Line source with K1-SB behind



Enclosure	K1	K1-SB in line source	K1-SB as subwoofer
Preset	[K1]	[K1SB_X]	[K1SB_60]
Frequency range (-10 dB)	30 Hz - 20 kHz		
Recommended ratio	1 K1 : 1 subwoofer		
Recommended distance between front panels	Between 1.5 m (5 ft) and 2 m (7 ft)		

! Delay values

Do not forget to add the pre-alignment and geometric delays depending on the configuration.

! When using [K1] with [K1SB_X], do not add any delay value between the K1 and K1-SB elements of a same line source.

Pre-alignment delays

presets	pre-alignment delay values and polarity settings	
[K1] + [K1SB_60]	K1 = 6 ms <input type="checkbox"/>	K1-SB = 0 ms <input type="checkbox"/>

Geometric delays

1.5 m (5 ft)	Line source = 4.5 ms
2 m (7 ft)	Line source = 6 ms

KS28 or SB28

The KS28/SB28 subwoofers provide an extension of the bandwidth in the low end, down to 25 Hz.

Line source with KS28 or SB28

Enclosure	K1	K1-SB in line source	K1-SB as subwoofer	KS28 or SB28
Preset	[K1]	[K1SB_X]	[K1SB_60]	[xxxx_60]
Frequency range (-10 dB)	25 Hz - 20 kHz			
Recommended ratio	1 K1 : 1 subwoofer			



Grouping subwoofers

Place the subwoofer enclosures side by side. If not possible, the maximum distance between two adjacent acoustic centers must be 2.8 m or 1.7 m if the upper frequency limit of the subwoofer system is at 60 Hz or 100 Hz, respectively.

! Use [xxxx_xx_C] or [xxxx_xx_Cx] on a reversed subwoofer in a cardioid configuration

The cardioid configuration consists in reversing 1 element in an array of 4 subwoofers.

Refer to the subwoofer owner's manual and to the **Cardioid configurations** technical bulletin.

! Delay values

Do not forget to add the pre-alignment and geometric delays depending on the configuration.

! When using [K1] with [K1SB_X], do not add any delay value between the K1 and K1-SB elements of a same line source.

! Pre-alignment delays are identical for KS28 and SB28.

Pre-alignment delays

presets	pre-alignment delay values and polarity settings			
[K1] + [KS28_60]	K1 = 0.5 ms	<input type="checkbox"/>	KS28 = 0 ms	<input type="checkbox"/>
[K1] + [KS28_60_C]	K1 = 6 ms	<input type="checkbox"/>	KS28 = 0 ms	<input type="checkbox"/>
[K1] + [KS28_60_Cx]	K1 = 4 ms	<input type="checkbox"/>	KS28 = 0 ms	<input type="checkbox"/>

presets	pre-alignment delay values and polarity settings					
[K1] + [K1SB_60] + [KS28_60]	K1 = 6 ms	<input type="checkbox"/>	K1-SB = 0 ms	<input type="checkbox"/>	KS28 = 6 ms	<input type="checkbox"/>
[K1] + [K1SB_60] + [KS28_60_C]	K1 = 6 ms	<input type="checkbox"/>	K1-SB = 0 ms	<input type="checkbox"/>	KS28 = 0.5 ms	<input type="checkbox"/>
[K1] + [K1SB_60] + [KS28_60_Cx]	K1 = 6 ms	<input type="checkbox"/>	K1-SB = 0 ms	<input type="checkbox"/>	KS28 = 4 ms	<input type="checkbox"/>

Additional downfill element

All K1 system configurations can be combined with an additional Kara or K2 line source downfill system. This allows an extension of the vertical coverage to the closer audience.

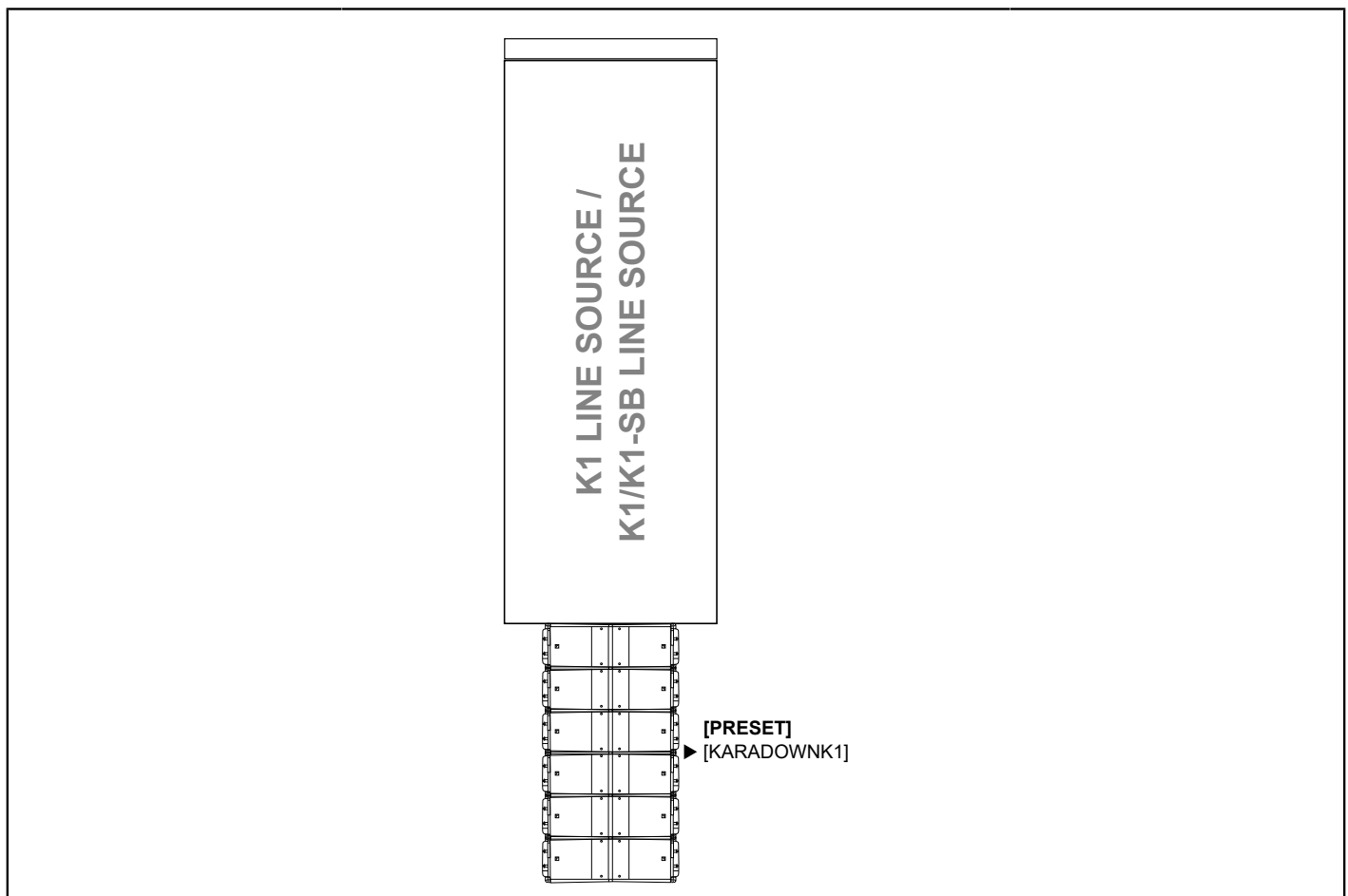
Kara

The [KARADOWNK1] preset features a high-pass filter at 100 Hz for the low section, along with specific delay settings, in order to optimize the acoustic coupling between the Kara and K1 line sources.

The Kara enclosure is driven by the LA4X / LA8 / LA12X amplified controller.

i **This section is about Kara downfill only.**
Refer to the **K1 addendum** for information about using Kara II as a downfill.

Line source with Kara downfill system



Enclosure	K1	K1-SB in line source	Kara
Preset	[K1]	[K1SB_X]	[KARADOWNK1]
Frequency range (-10 dB)	35 Hz - 20 kHz		
Kara array	Up to 6 Kara enclosures		

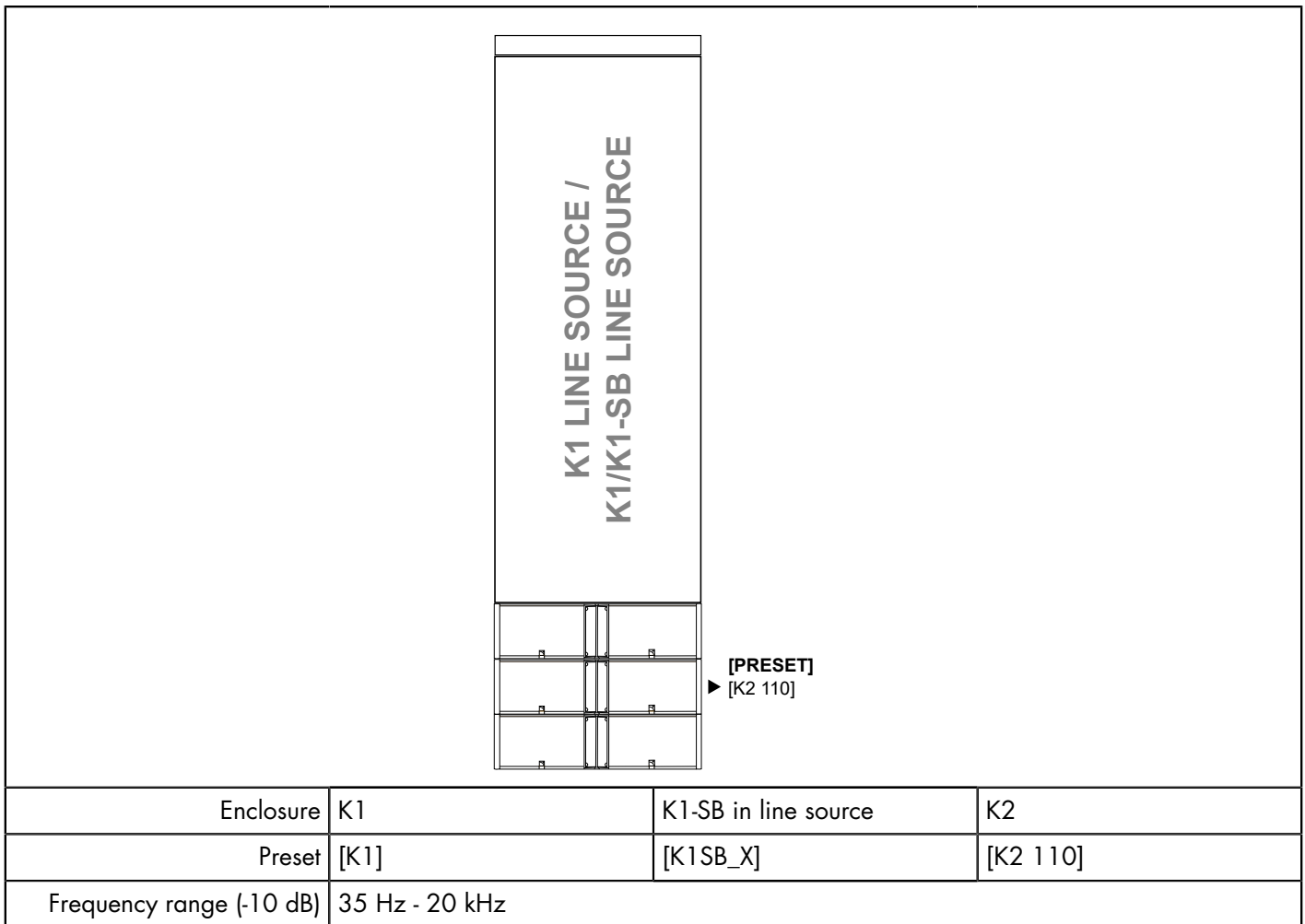
- !** Do not add any delay between the K1 and Kara elements of a mixed line source.
- !** When using [K1] with [K1SB_X], do not add any delay value between the K1 and K1-SB elements of a same line source.
- i** **Using the Kara system**
Refer to the **Kara owner's manual** for the operating modes of Kara as a main system.




K2

The [K2 110] preset provides K2 with the same horizontal coverage as K1 for optimal downfill.

The K2 enclosure is driven by the LA4X / LA8 / LA12X amplified controller.

Line source with K2 downfill system

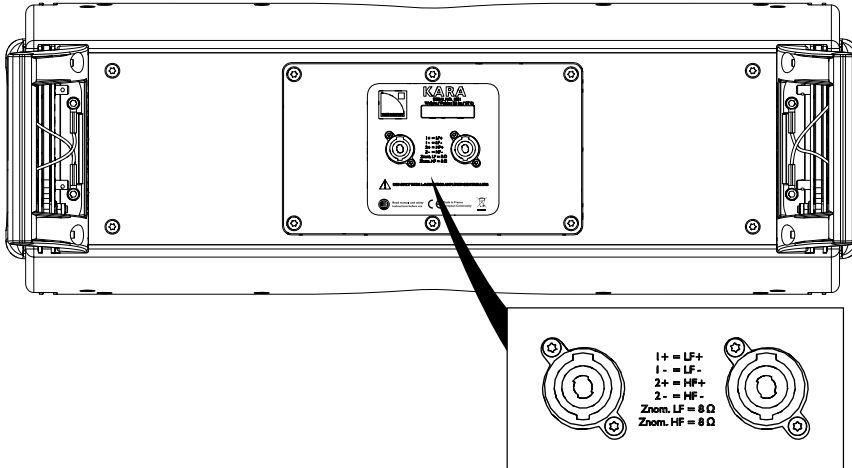


-  Do not add any delay between the K1 and K2 elements of a mixed line source.
-  When using [K1] with [K1SB_X], do not add any delay value between the K1 and K1-SB elements of a same line source.
-  **Using the K2 system**
 Refer to the **K2 user manual** for the operating modes of K2 as a main system.

Loudspeaker connection

Connectors

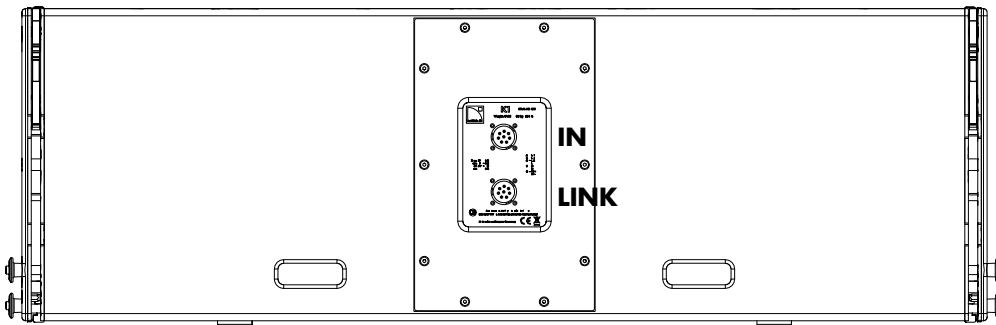
Kara is equipped with two 4-point speakON connectors.



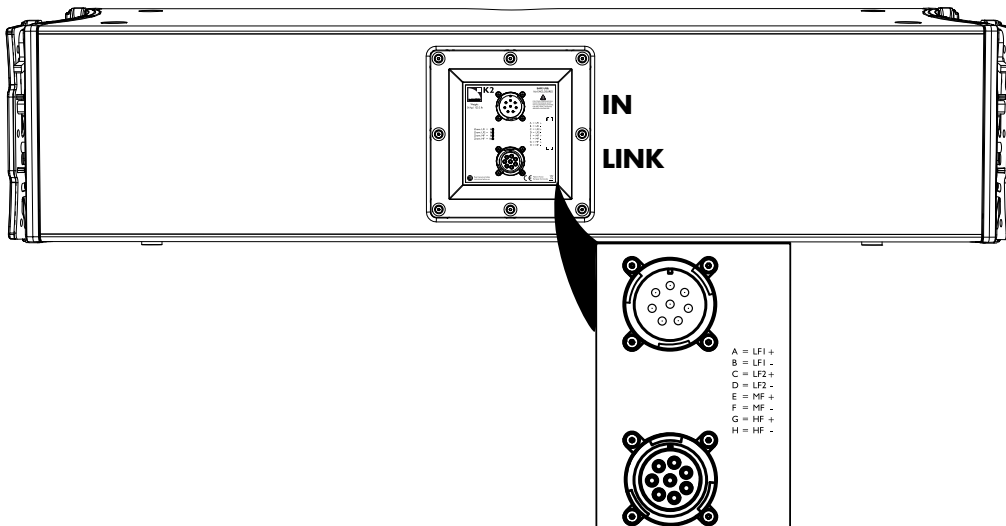
Internal pinout for L-Acoustics 2-way active enclosures

speakON points	1 +	1 -	2 +	2 -
Transducer connectors	LF +	LF -	HF +	HF -

K1 is equipped with two 8-point PA-COM connectors.



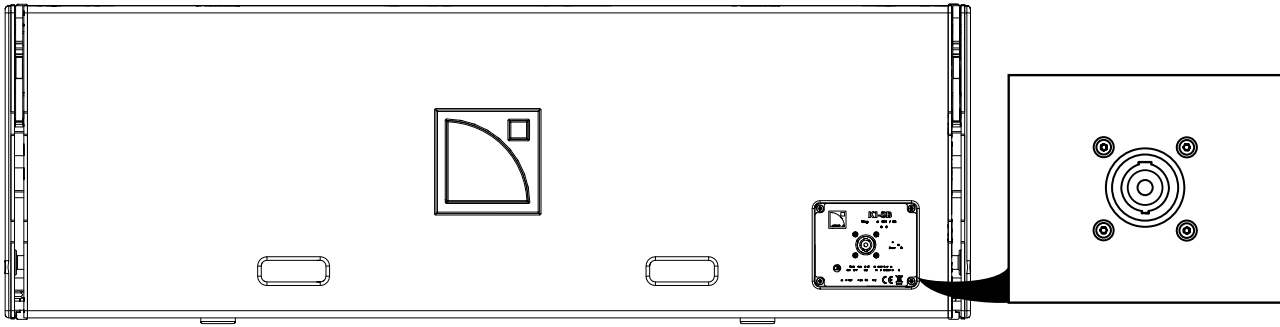
K2 is equipped with two 8-point PA-COM connectors.



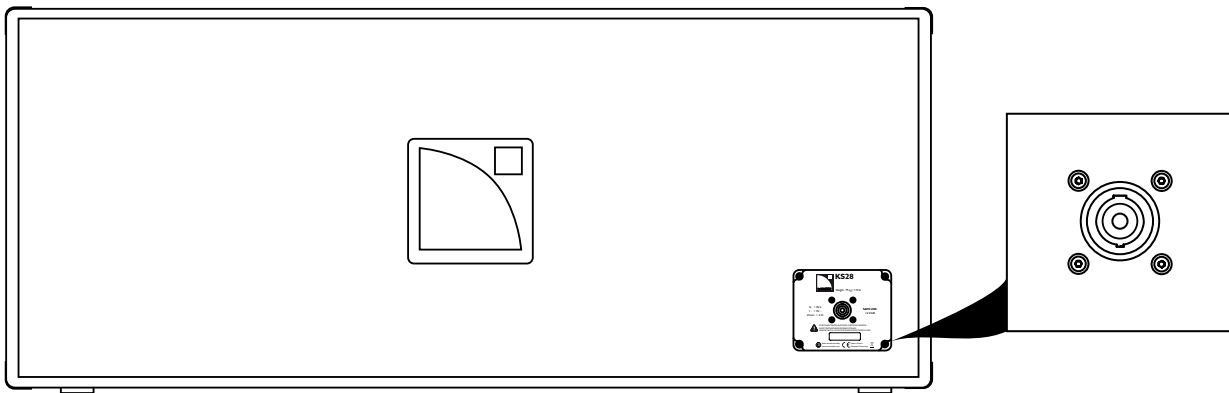
Internal pinout for L-Acoustics 3-way active enclosures

PA-COM points	A/B	C/D	E/F	G/H
Transducer connectors	left LF	right LF	MF	HF

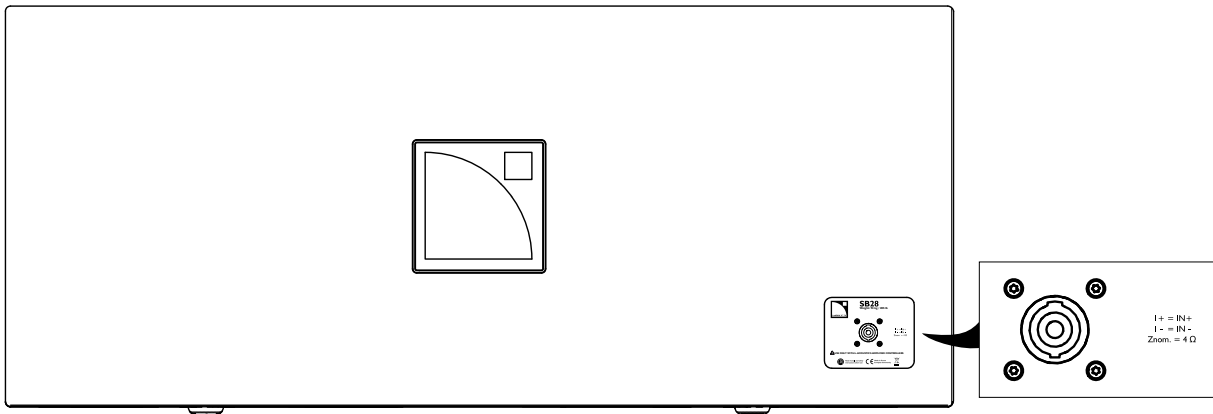
K1-SB is equipped with one 4-point speakON connector.



KS28 is equipped with one 4-point speakON connector.



SB28 is equipped with one 4-point speakON connector.



Internal pinout for L-Acoustics subwoofers

speakON points	1 +	1 -	2 +	2 -
Transducer connectors	LF +	LF -	Not linked	Not linked

Connection to LA8

Maximum number of enclosures per LA8

enclosure	max enclosures in parallel *	max enclosures per controller
K1	2	2
K2	3	3
Kara	3	6
K1-SB	1	4
SB28	1	4

*For passive loudspeakers, the value corresponds to the number of enclosures in parallel on the output. For active loudspeakers, the value corresponds to the number of sections in parallel on the output.



Risks of output mute, global attenuation, or loss of audio quality.

Do not exceed the maximum number of connected enclosures per channel and in total.

Driving more enclosures than indicated can trigger the amplified controller protection systems.



Do not use LA8 with KS28.

Impedance load

K1

1 enclosure: LF 8 Ω / MF 8 Ω / HF 8 Ω

2 enclosures in parallel: LF 4 Ω / MF 4 Ω / HF 4 Ω

3 enclosures in parallel: LF 2.7 Ω / MF 2.7 Ω / HF 2.7 Ω

K2

1 enclosure: LF 8 Ω / MF 8 Ω / HF 16 Ω

2 enclosures in parallel: LF 4 Ω / MF 4 Ω / HF 8 Ω

3 enclosures in parallel: LF 2.7 Ω / MF 2.7 Ω / HF 5.2 Ω

Kara

1 enclosure: LF 8 Ω / HF 8 Ω

2 enclosures in parallel: LF 4 Ω / HF 4 Ω

3 enclosures in parallel: LF 2.7 Ω / HF 2.7 Ω

SB28 K1-SB

1 enclosure: 4 Ω

Connection to LA12X

Maximum number of enclosures per LA12X

enclosure	max enclosures in parallel *	max enclosures per controller
K1	2	2
K2	3	3
Kara	3	6
K1-SB	1	4
KS28	1	4
SB28	1	4

*For passive loudspeakers, the value corresponds to the number of enclosures in parallel on the output. For active loudspeakers, the value corresponds to the number of sections in parallel on the output.

⚠ Risks of output mute, global attenuation, or loss of audio quality.

Do not exceed the maximum number of connected enclosures per channel and in total.

Driving more enclosures than indicated can trigger the amplified controller protection systems.

Impedance load

K1

1 enclosure: LF 8 Ω / MF 8 Ω / HF 8 Ω

2 enclosures in parallel: LF 4 Ω / MF 4 Ω / HF 4 Ω

K2

1 enclosure: LF 8 Ω / MF 8 Ω / HF 16 Ω

2 enclosures in parallel: LF 4 Ω / MF 4 Ω / HF 8 Ω

3 enclosures in parallel: LF 2.7 Ω / MF 2.7 Ω / HF 5.2 Ω

Kara

1 enclosure: LF 8 Ω / HF 8 Ω

2 enclosures in parallel: LF 4 Ω / HF 4 Ω

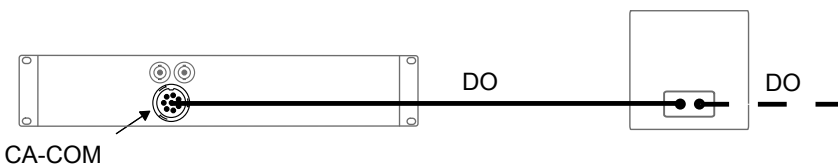
3 enclosures in parallel: LF 2.7 Ω / HF 2.7 Ω

SB28 KS28 K1-SB

1 enclosure: 4 Ω

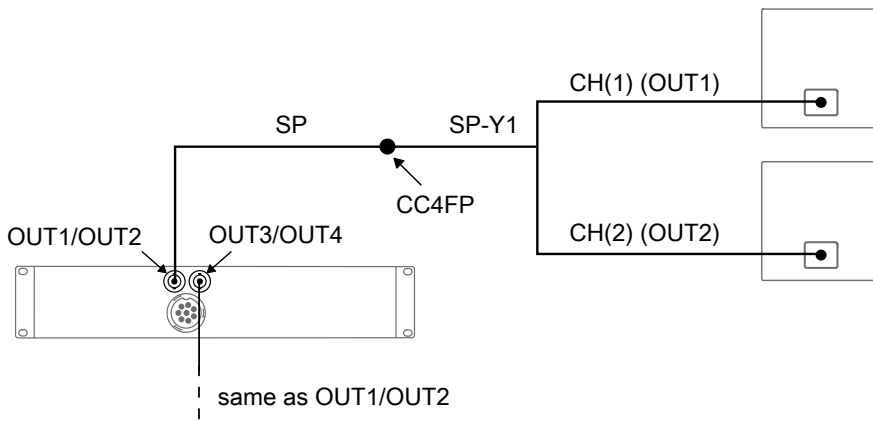
Connecting 3-way active enclosures

DO on CA-COM output

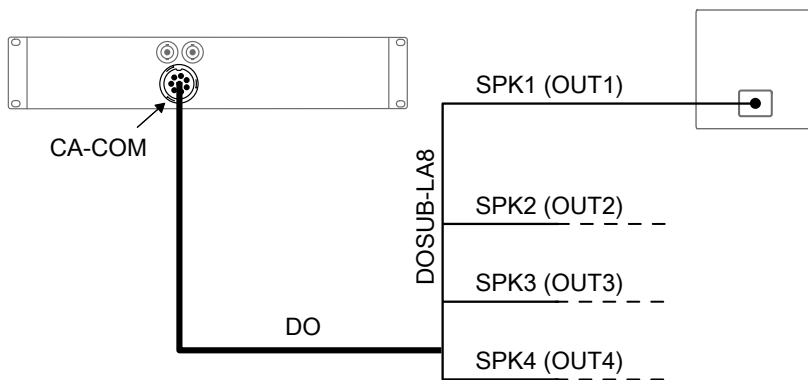


Connecting subwoofers

SP and SP-Y1 on speakON output

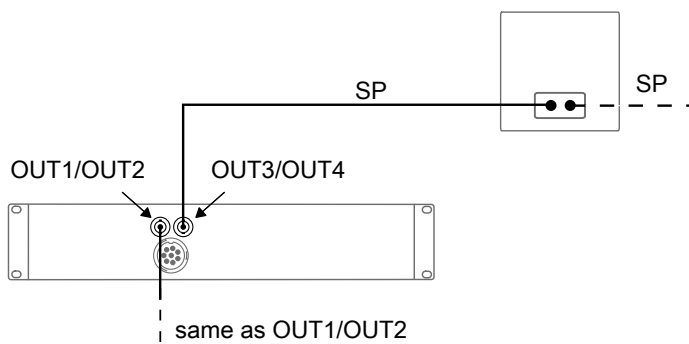


DO and DOSUB-LA8 on CA-COM output

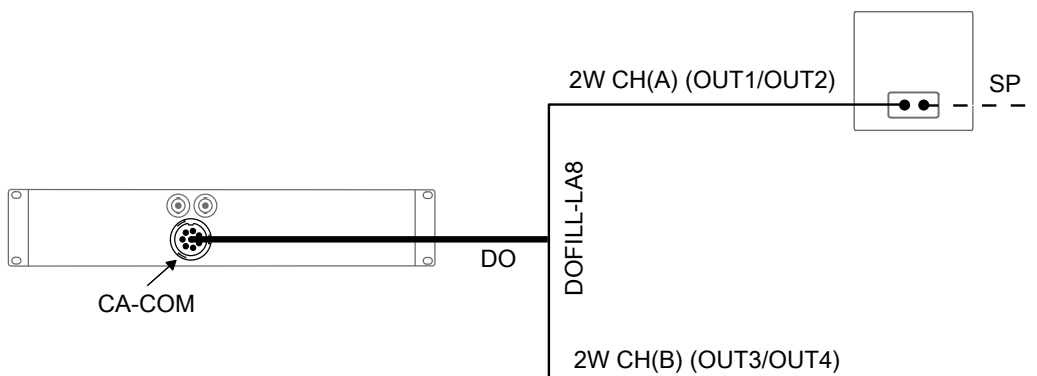


Connecting 2-way active enclosures

SP on speakON output

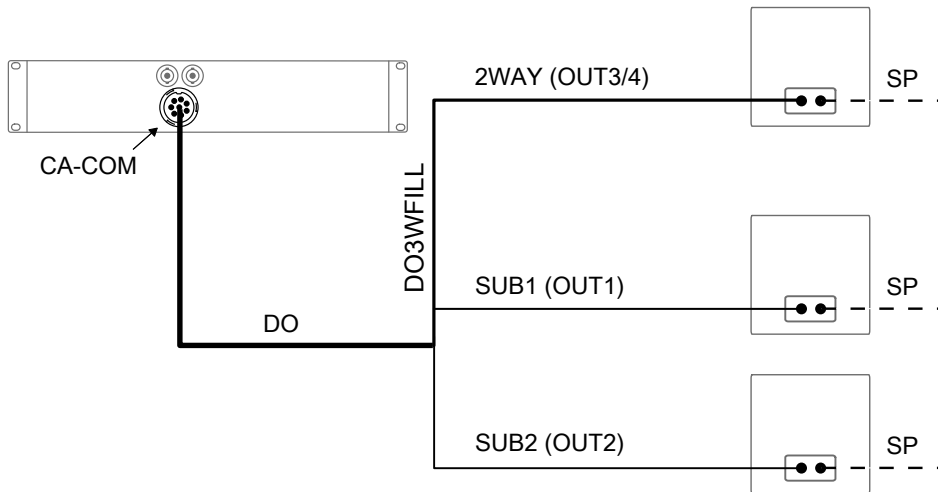


DO and DOFILL-LA8 on CA-COM output



Connecting a 2-way active enclosure with subwoofers

DO and DO3WFILL on CA-COM output



Preset description

[K1] [K2 110]

loudspeaker elements	outputs	channels	routing	gain	delay	polarity	mute
left LF	OUT 1	LF	IN A	0 dB	0 ms	+	ON
right LF	OUT 2	LF					ON
MF	OUT 3	MF					ON
HF	OUT 4	HF					ON

[KARADOWNK1]

loudspeaker elements	outputs	channels	routing	gain	delay	polarity	mute
LF	OUT 1	LF	IN A	0 dB	0 ms	+	ON
HF	OUT 2	HF					ON
LF	OUT 3	LF	IN A	0 dB	0 ms	+	ON
HF	OUT 4	HF					ON

[K1SB_60] [K1SB_X] [KS28_60] [SB28_60]

outputs	channels	routing	gain	delay	polarity	mute
OUT 1	SB	IN A	0 dB	0 ms	+	ON
OUT 2	SB	IN A	0 dB	0 ms	+	ON
OUT 3	SB	IN A	0 dB	0 ms	+	ON
OUT 4	SB	IN A	0 dB	0 ms	+	ON

[KS28_60_C] [KS28_60_Cx] [SB28_60_C] [SB28_60_Cx]

loudspeaker elements	outputs	channels	routing	gain	delay	polarity	mute
SR	OUT 1	SR	IN A	0 dB	0 ms	+	ON
SB	OUT 2	SB					ON
SB	OUT 3	SB					ON
SB	OUT 4	SB					ON

Recommendation for speaker cables

Follow the recommended maximum length for loudspeaker cables to ensure minimal SPL attenuation.



Cable quality and resistance

Only use high-quality fully insulated speaker cables made of stranded copper wire.

Use cables with a gauge offering low resistance per unit length and keep the cables as short as possible.

The table below provides the recommended maximum length for loudspeaker cables depending on the cable gauge and on the impedance load connected to the amplifier.

cable gauge			recommended maximum length					
			8 Ω load		4 Ω load		2.7 Ω load	
mm ²	SWG	AWG	m	ft	m	ft	m	ft
2.5	15	13	30	100	15	50	10	33
4	13	11	50	160	25	80	17	53
6	11	9	74	240	37	120	25	80

Use the more detailed L-Acoustics calculation tool to evaluate cable length and gauge based on the type and number of enclosures connected. The calculation tool is available on our website:

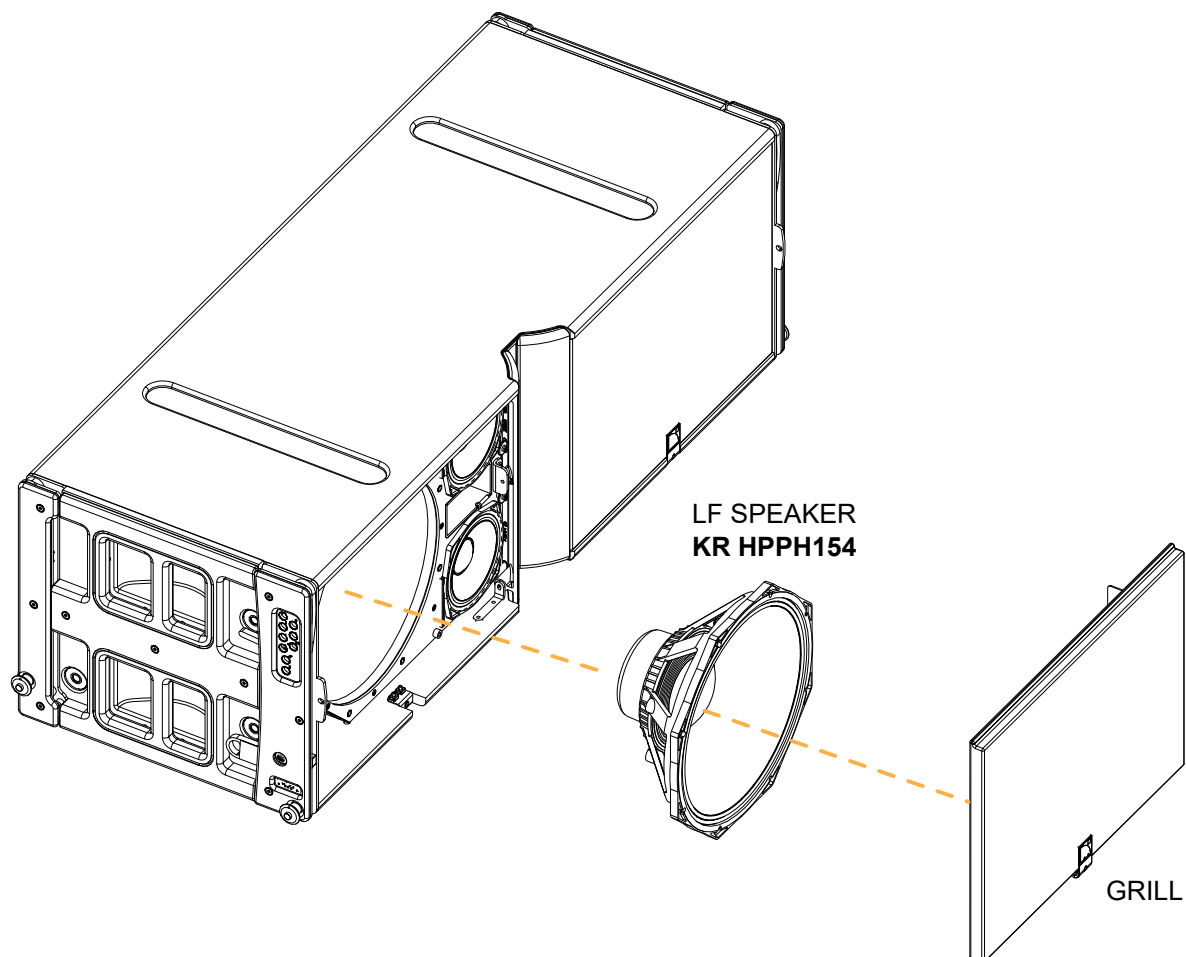
<https://www.l-acoustics.com/en/installation/tools/>

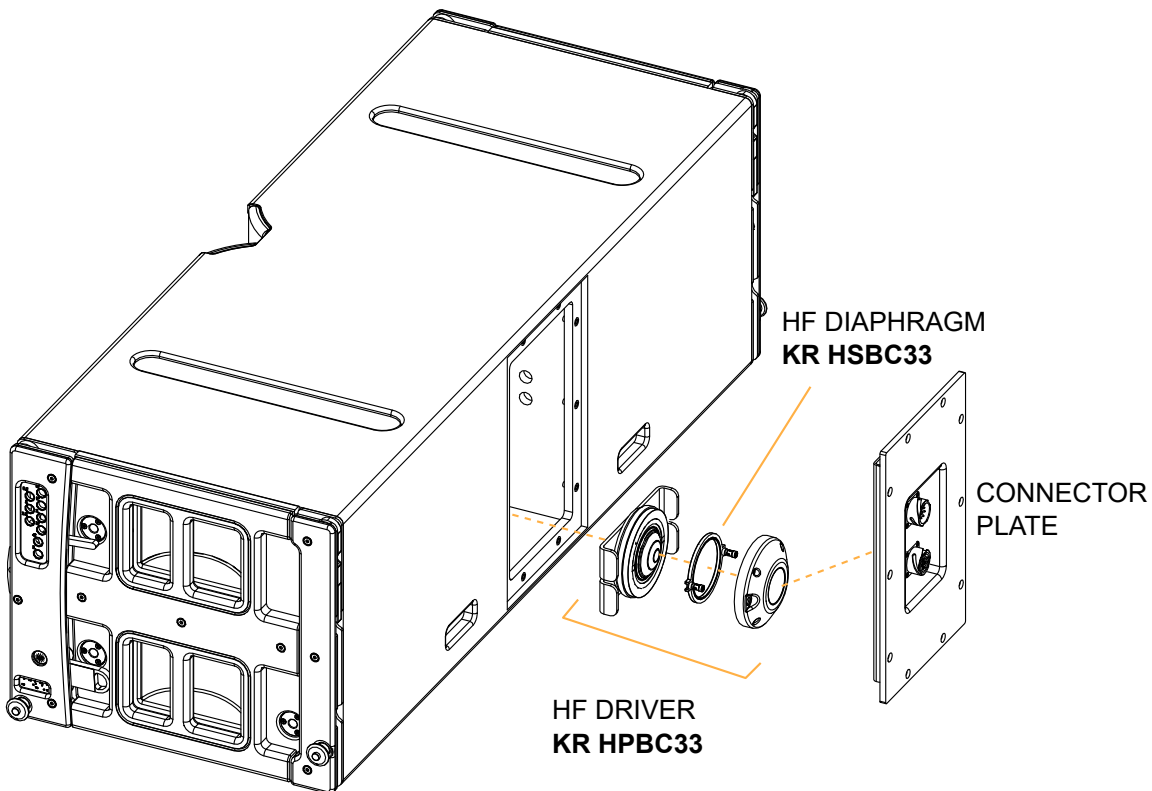
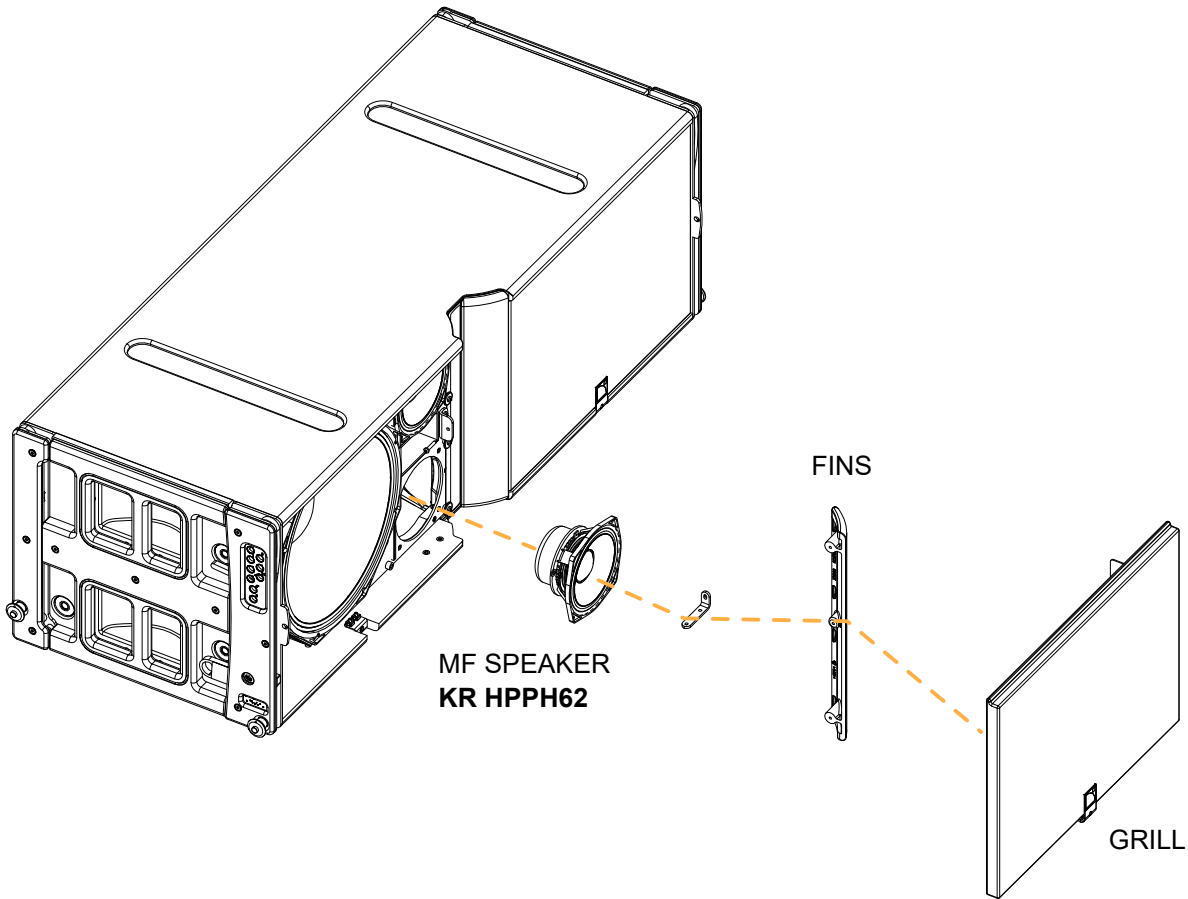
Corrective maintenance

K1

K1 exploded views

In order to operate, follow the order outlined here. Each assembly refers to the corresponding Disassembly/Reassembly (D/R) procedure and the necessary repair kit.





Disassembly and Reassembly procedures

D/R - Grill

Tools

- torque screwdriver
- 4 mm hex bit

Repair kit

KR HPPH154 - Kit HP PH154 Speaker 15" - 8 ohms, or

KR HPPH62 - Kit HP PH62 Speaker 6.5" - 8 ohms



x2

S100155

M5x25 hex



x2

S158

plain washer Ø5 mm

Prerequisite

The enclosure is placed on its top.

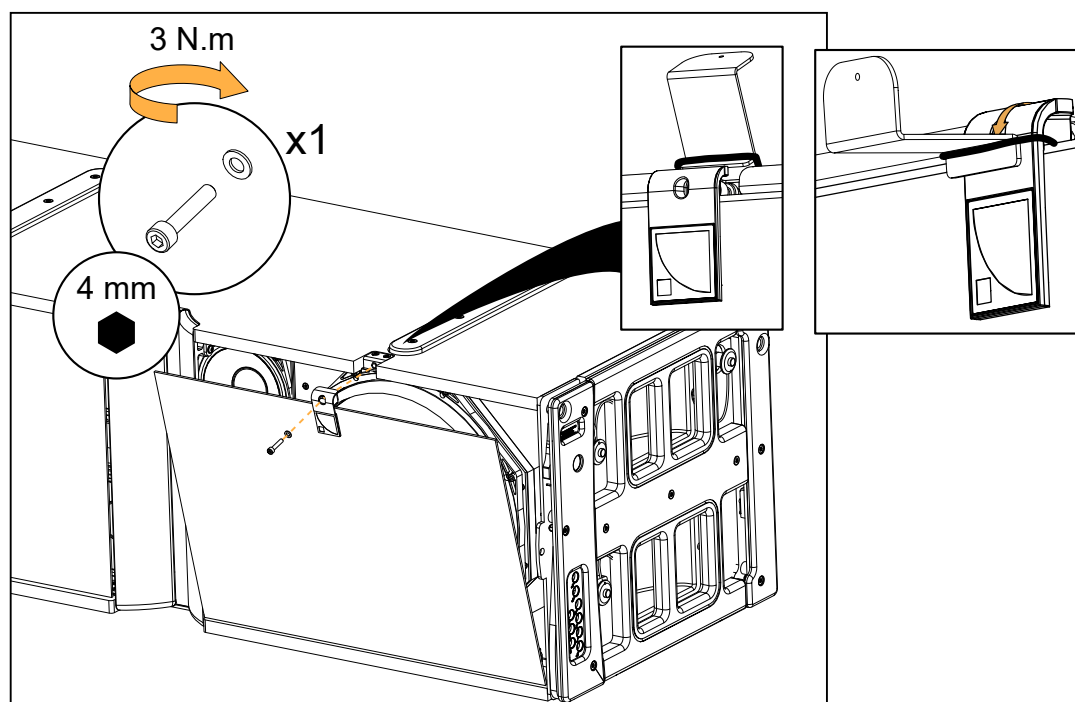
Exploded view



For safety reasons, always use the new screws and spare parts provided in the KR.

If no new screws are available, use blue threadlocker.

Use a flat tool to pull the O-ring over the logo.



D/R - LF speaker

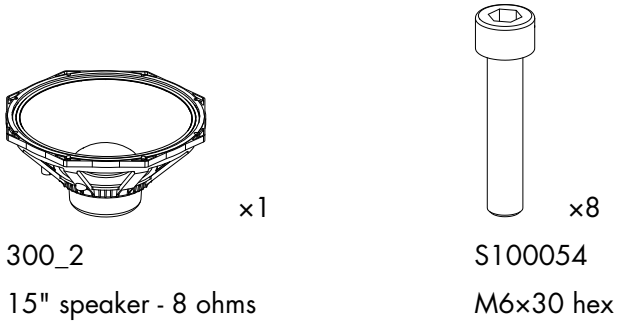
Tools

- torque screwdriver
- 5 mm hex bit

Repair kit

KR HPPH154

Kit HP PH154 Speaker 15" - 8 ohms



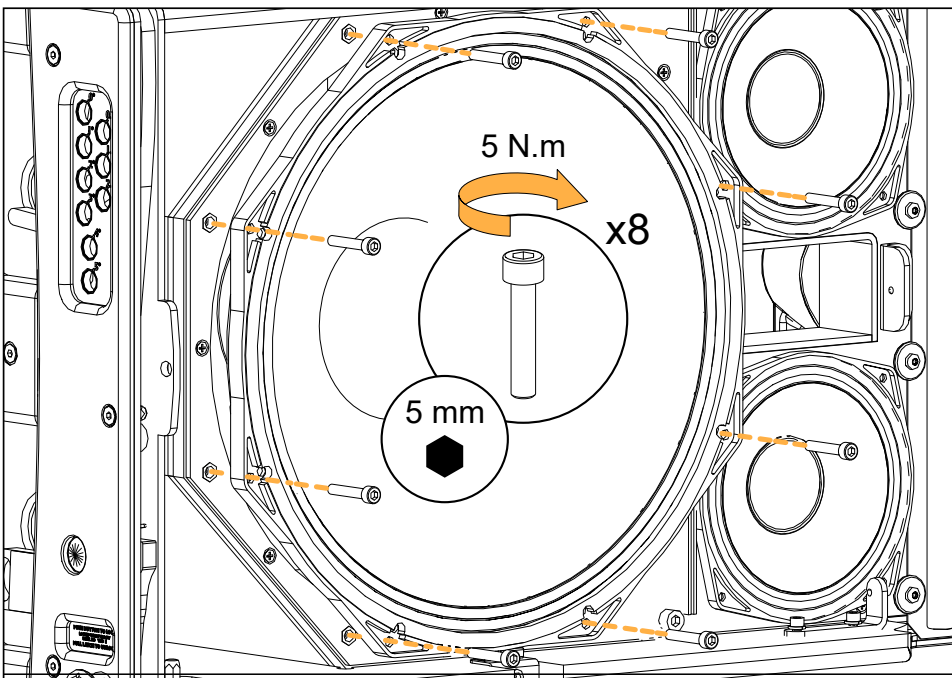
Prerequisite

Grill disassembled.

See [Grill](#) (p.27).

Exploded view

- ! For safety reasons, always use the new screws and spare parts provided in the KR. If no new screws are available, use blue threadlocker.
- ! Gradually tighten the screws following a star pattern.



What to do next

Perform the [Acoustical check](#) (p.38) procedures.

D/R - Fins

Tools


- torque screwdriver
- T20 Torx bit

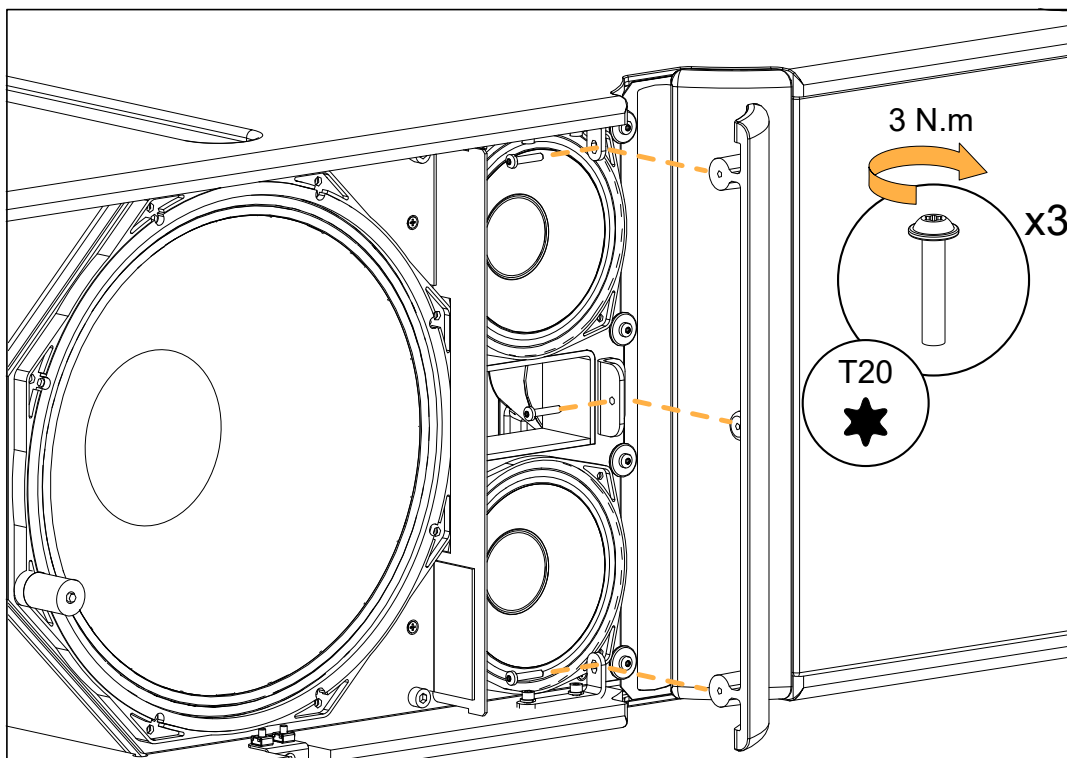
Prerequisite

Grill disassembled.

See [Grill](#) (p.27).

Exploded view

 Save the screws and fasteners for reassembly.



D/R - MF speaker

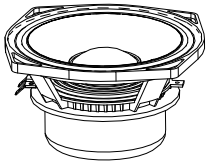
Tools

- torque screwdriver
- 4 mm hex bit

Repair kit

KR HPPH62

Kit HP PH62 Speaker 6.5" - 8 ohms



x1

FT796

6.5" coaxial speaker - 8 ohms



x4

S342

M5x20 hex



x2

S100113

M5x16 hex

Prerequisite

Grill removed.

See [Grill](#) (p.27).

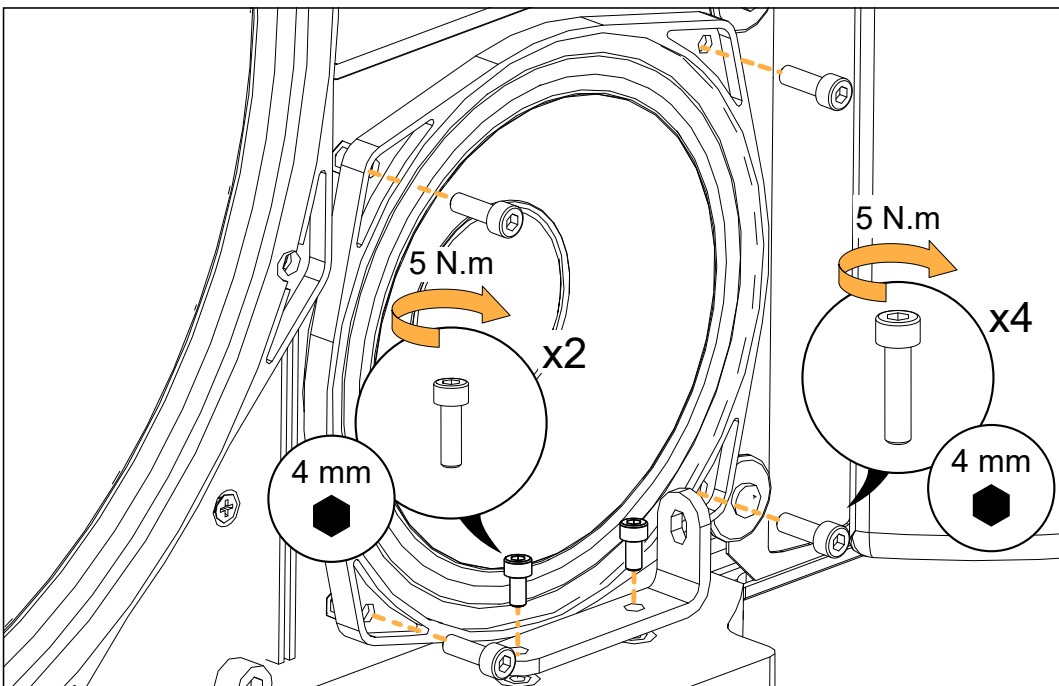
Fins removed.

See [Fins](#) (p.29).

Exploded view



For safety reasons, always use the new screws and spare parts provided in the KR.



What to do next

Perform the [Acoustical check](#) (p.38) procedures.

D/R - Connector plate

Tools

- torque screwdriver
- T30 Torx bit

Repair kit

KR HPBC33 - Kit HP BC33 Driver 3" - 20 ohms, or

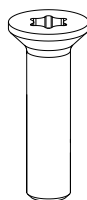
KR HSBC33 - Kit diaphragm for 3" driver



x1

100585_2

adhesive gasket kit



x10

S100110

M6x25 Torx

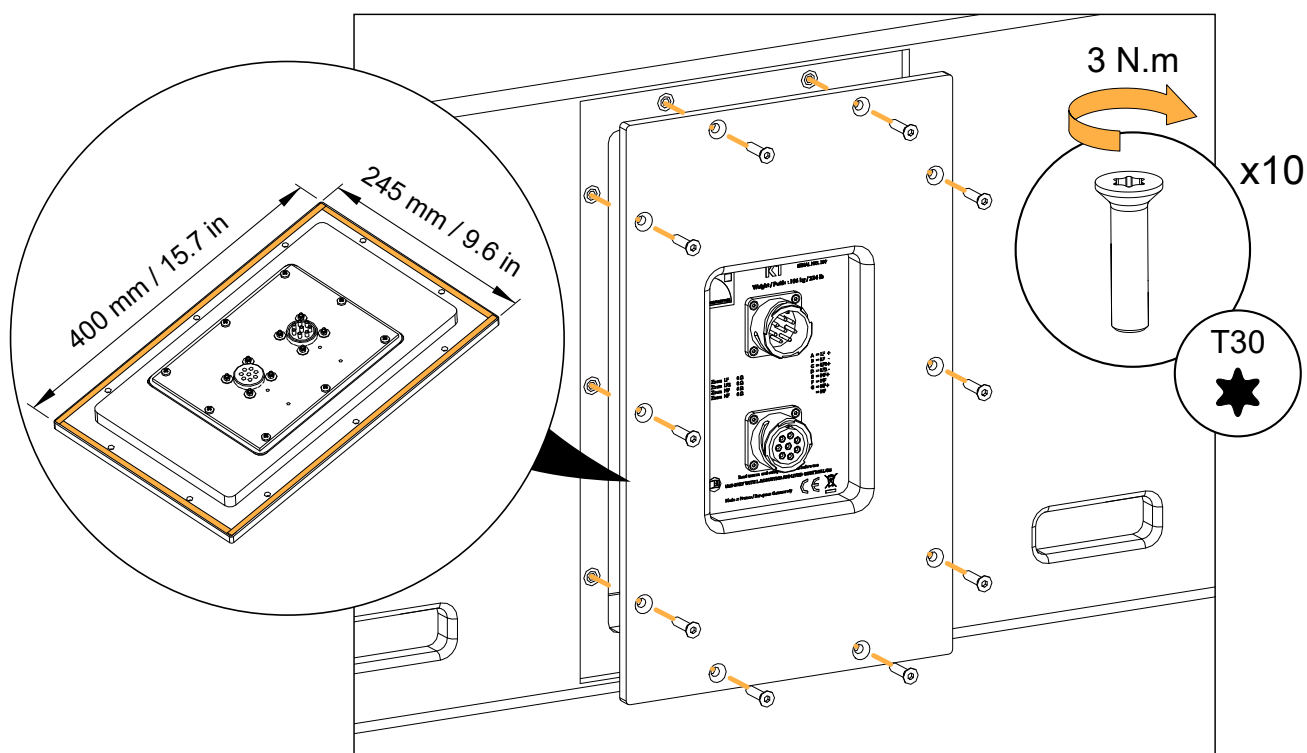
Exploded view



For safety reasons, always use the new screws and spare parts provided in the KR.
If no new screws are available, use blue threadlocker.



If the gasket is damaged, remove and replace it.



D/R - HF driver

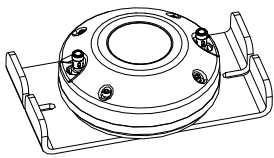
Tools

- torque screwdriver
- 5 mm hex bit

Repair kit

KR HPBC33*

Kit HP BC33 Driver 3" - 20 ohms



x1

G223

3" HF driver - 20 ohms assembly



x1

100585_2

adhesive gasket kit



x6

S100036

M6x25 hex

i * The gasket and the screws are also provided in the KR HSBC33 (Kit diaphragm for 3" driver).

Prerequisite

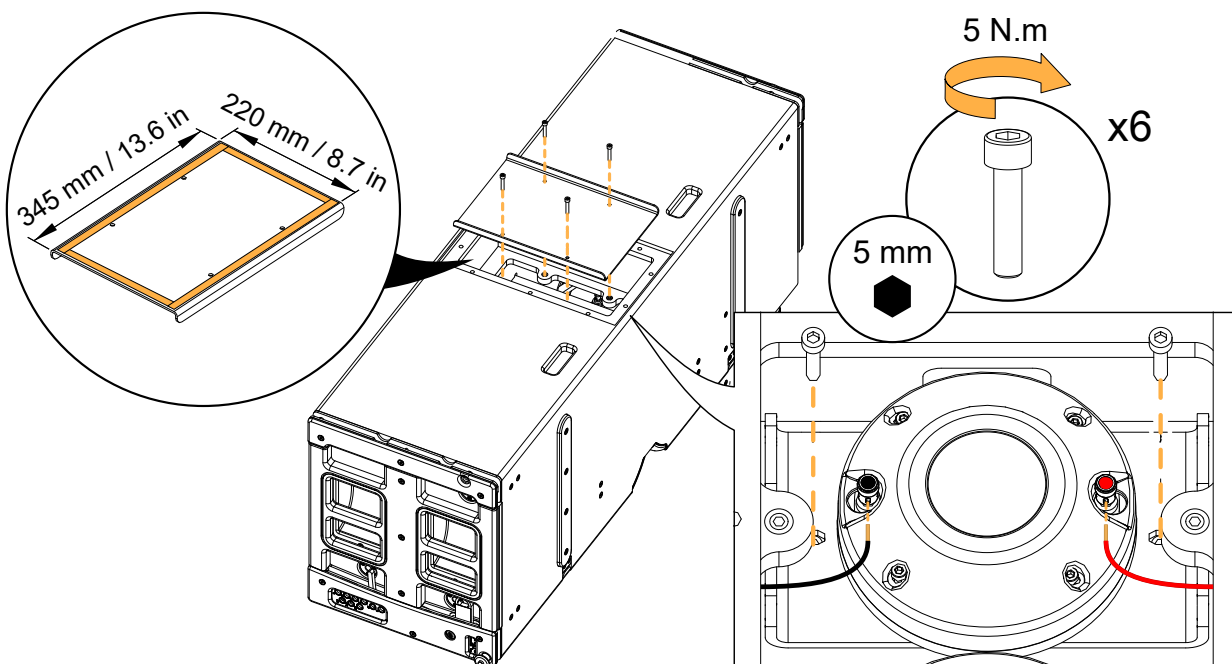
Connector plate removed.

See [Connector plate](#) (p.31).

Exploded view

! For safety reasons, always use the new screws and spare parts provided in the KR.
If no new screws are available, use blue threadlocker.

i If the gasket is damaged, remove and replace it.



What to do next

Perform the [Acoustical check](#) (p.38) procedures.

D/R - HF diaphragm

Tools

- torque screwdriver
- 3 mm hex bit
- 3 mm hex wrench
- compressed air blower

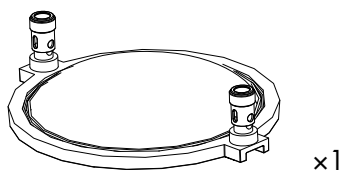
Consumables

- double face adhesive tape

Repair kit

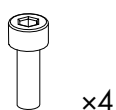
KR HSBC33

Kit diaphragm for 3" driver



03024

diaphragm for 1.4" driver - 20 ohms (with shims)



S03024

M4x14 hex

Prerequisite

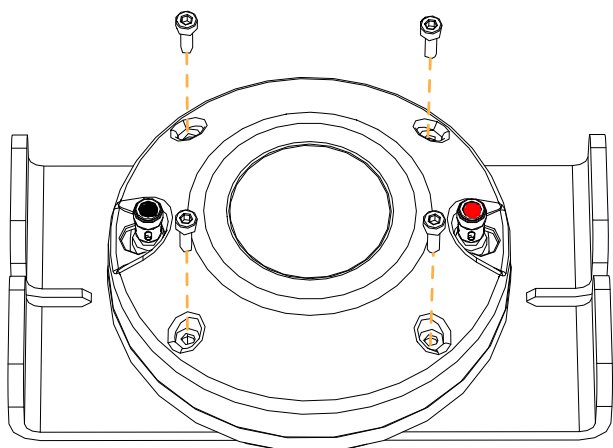
Connector plate removed.

HF loudspeaker removed.

See [Connector plate](#) (p.31).

See [HF driver](#) (p.32)

Exploded view



Disassembly

Procedure

1. Remove the four screws securing the cover.
Use the 3 mm hex bit.
2. Remove the cover.
3. Carefully remove the diaphragm.
Note the position of the part.
4. If there are shims on the dome, carefully remove them.
Take note of how many and what kind of shims are present.



Reassembly

About this task



For safety reasons, always use the new screws and spare parts provided in the KR.

Procedure

1. Clean the dome and the air gap.
Use a blower or double face adhesive tape to remove any particle.
 Make sure the air gap is perfectly clean before moving to the next step.
2. Place the same kind and number of shims that were initially present.
3. Carefully place the diaphragm.
Use the cable connectors as reference points.
4. Secure the cover to the speaker with the four screws.
 - a)  Gradually tighten the screws following a star pattern.

Gradually tighten each screw manually with the Allen wrench n°3.
 - b) Tighten the screws in the same order with the torque screwdriver.
Use the 3 mm hex bit and set the torque to 3.5 Nm.

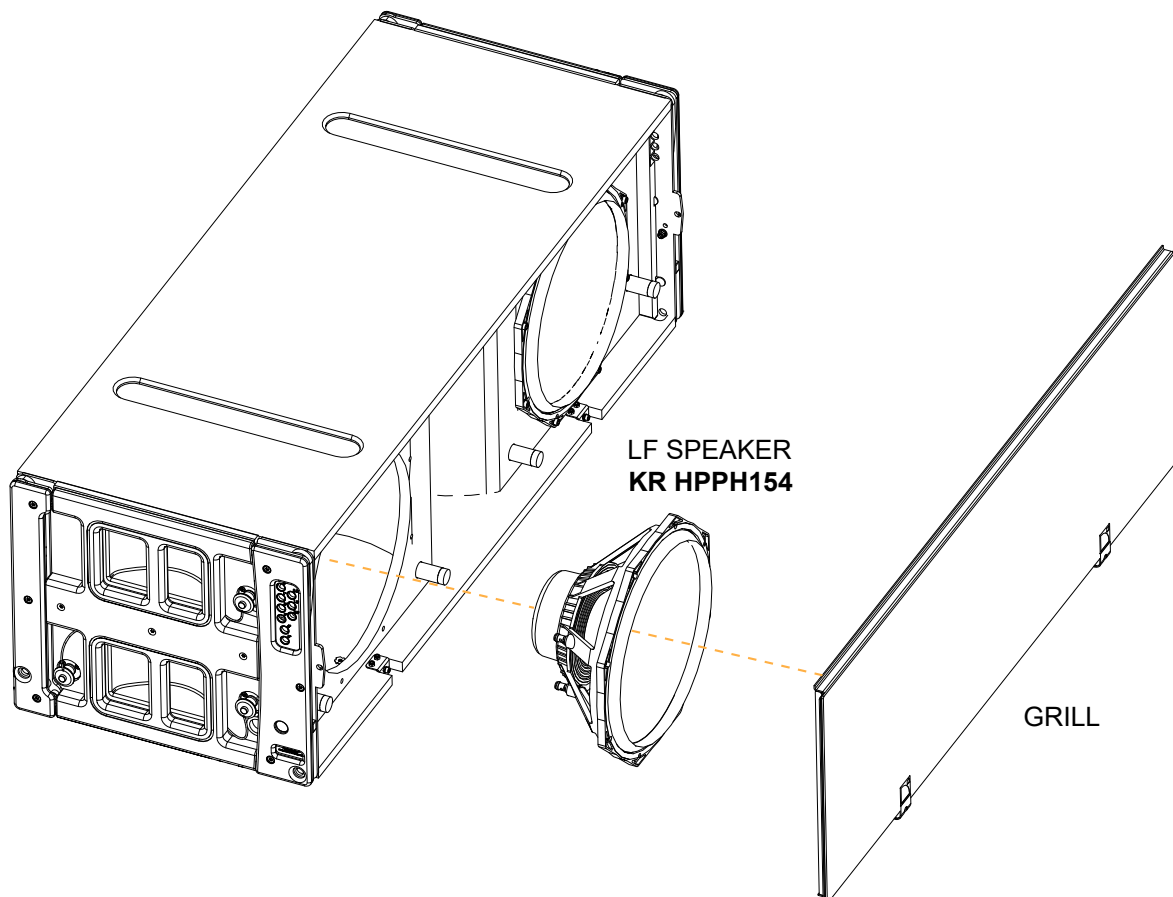
What to do next

Perform the [Acoustical check](#) (p.38) procedures.

K1-SB

K1-SB exploded view

In order to operate, follow the order outlined here. Each assembly refers to the corresponding Disassembly/Reassembly (D/R) procedure and the necessary repair kit.



Disassembly and Reassembly procedures

D/R - Grill

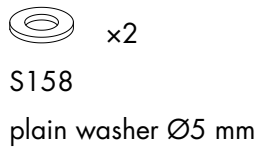
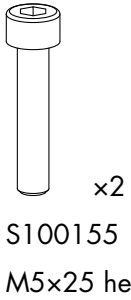
Tools

- torque screwdriver
- 4 mm hex bit

Repair kit

KR HPPH154

Kit HP PH154 Speaker 15" - 8 ohms

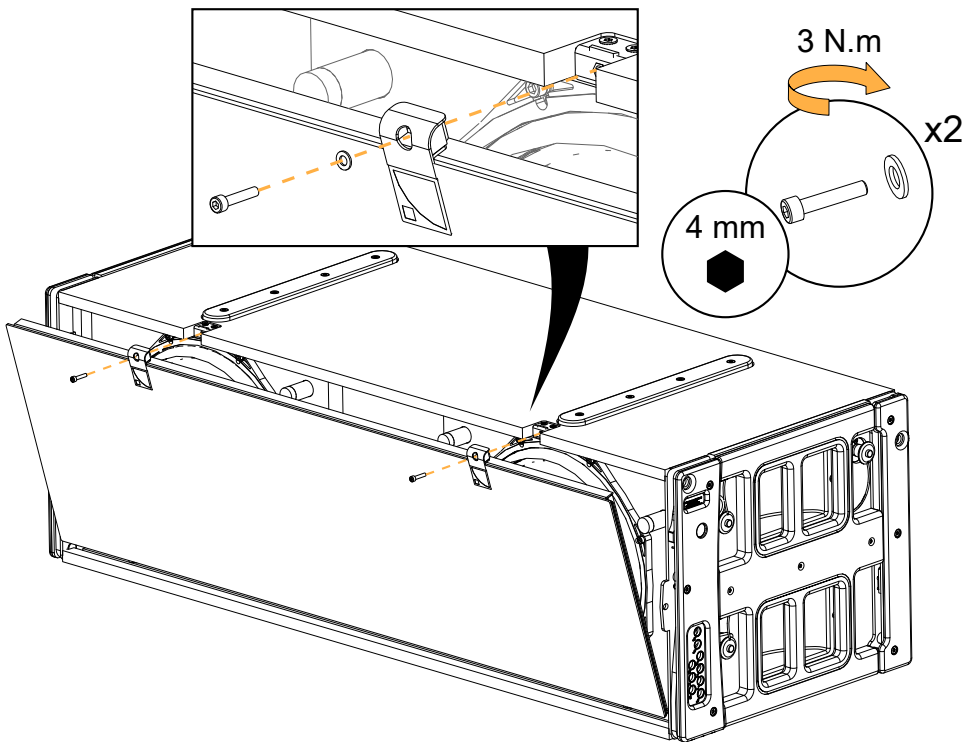


Prerequisite

The enclosure is placed on its top.

Exploded view

- ! For safety reasons, always use the new screws and spare parts provided in the KR. If no new screws are available, use blue threadlocker.



D/R - LF speaker

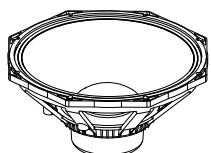
Tools

- torque screwdriver
- 5 mm hex bit

Repair kit

KR HPPH154

Kit HP PH154 Speaker 15" - 8 ohms



x1

300_2

15" speaker - 8 ohms



x8

S100054

M6x30 hex

Prerequisite

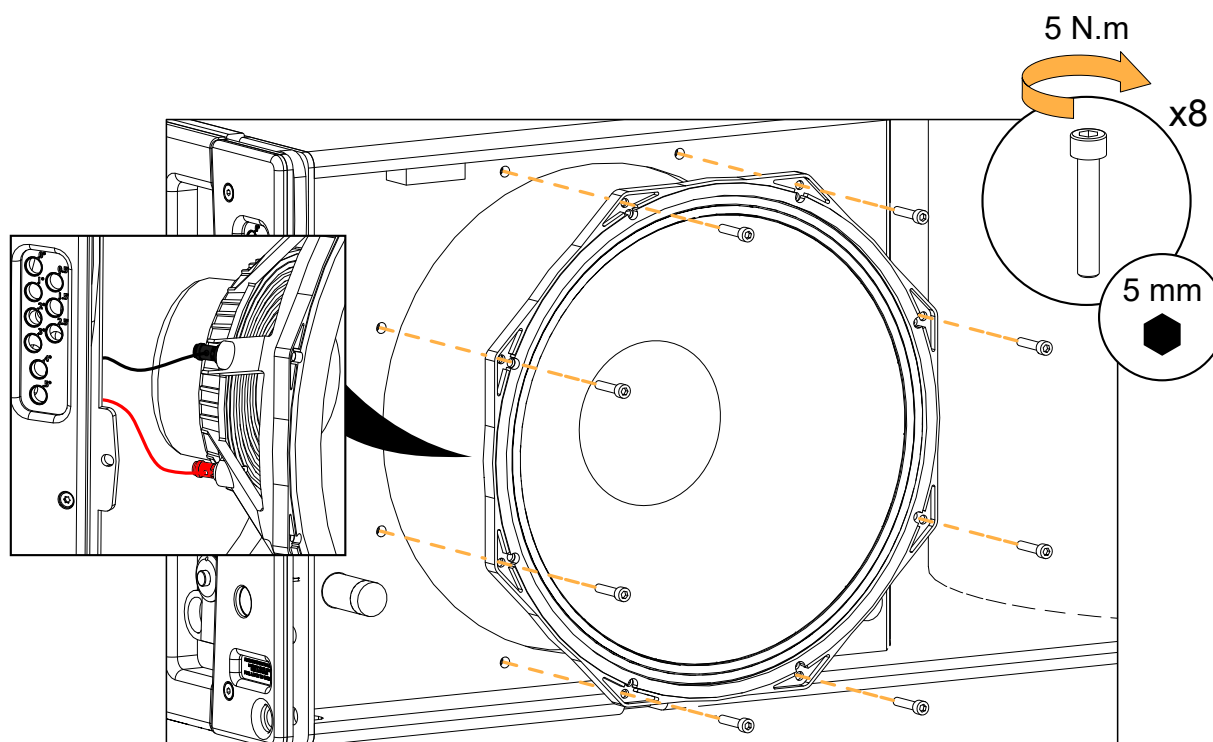
Grill disassembled.

See [Grill](#) (p.36).

Exploded view



For safety reasons, always use the new screws and spare parts provided in the KR.
If no new screws are available, use blue threadlocker.



Acoustical check

Enclosure check



This feature is available on:

LA12X

ENCLOSURE CHECK measures impedance at the reference frequencies for the connected loudspeaker family. The measured impedance is compared to the expected range allowing for fast detection of loudspeakers presenting circuit continuity issues.



The results can be used for preliminary diagnosis but cannot replace a comprehensive quality control.

Prerequisite



ENCLOSURE CHECK measurements can only be reliable if the following requirements are met:

Environment and temperature:

- Ambient temperature must be comprised between 0 °C / 32 °F and 40 °C / 104 °F. Ideal temperature is 20 °C / 68 °F.
- Enclosures must be at room temperature. If warm from a recent high level use or recently moved from a cold environment, let the loudspeakers reach room temperature before starting.

Enclosures:

- Enclosures must be included in the embedded factory preset library.
- Enclosures must be in nominal operating conditions:
 - Remove covers or dollies obstructing the loudspeakers or the vents.
 - Check for obvious physical damage or air leak: visually inspect the grill, gasket, cabinet, and connector plate for loose, missing or damaged parts.

Connection:

- Use only 10 m / 30 ft 4 mm² / AWG 11 speaker cables.
- Do not connect enclosures in parallel.

Amplified controllers:

- Load a preset corresponding to the connected loudspeaker's family. Presets from the user memories may be used on condition they are made of presets supported in the embedded factory preset library.

Procedure

1. Power up the amplified controller.
2. Connect the loudspeaker enclosures to the amplified controller.
3. Load a preset from or built from the embedded library corresponding to the connected loudspeaker family.
4. On the amplified controller, use the encoder wheel to select **MONITORING & INFO**. Press the OK key or the encoder wheel to validate.
5. Use the encoder wheel to select **ENCLOSURE CHECK**.



Beware of sound levels.

Although the sound pressure levels generated for the ENCLOSURE CHECK are moderate, do not stay within close proximity of the loudspeakers and consider wearing ear protection.

6. Press the OK key or the encoder wheel to launch the ENCLOSURE CHECK.

The amplified controller generates short sinusoidal signals simultaneously for each connected output.

The amplified controller displays the results for each output.

7. Depending on the displayed results, follow the instructions in the table.

result	interpretation	instructions
OK	measured impedance is within expected range	enclosure is in working order electrically
?	unsupported preset family	only supported enclosures should be tested
NC	Not Connected	if cables are connected: a. inspect the cables and connections b. go to step 8 (p.39)
NOK	measured impedance is not within expected range	a. check that all the prerequisites are met, in particular that the loaded preset corresponds to the connected speaker's family b. inspect the cables and connections c. go to step 8 (p.39)
UNDEF	measured impedance is undefined	

8. Under NC, NOK and UNDEF results, press and hold the corresponding OUT key.

The amplified controller displays:

- the tested frequencies,
- information on the measured impedance:
 - OPEN for open circuit (found in NC results),
 - SHORT for short circuit (found in NOK results), or
 - a percentage of variation from the expected range (found in NOK and UNDEF results)
- the number of operational transducers out of the total



Low variations from the expected range are acceptable: displayed percentage can be different from 0 and all transducers considered operational.

Listening test

enclosure	preset	usable bandwidth
K1	[K1]	35 Hz - 20 kHz
K2	[K2 70]	35 Hz - 20 kHz
Kara	[KARA]	55 Hz - 20 kHz
SB28	[SB28_100]	25 Hz - 117 Hz
KS28	[KS28_100]	25 Hz - 110 Hz
K1-SB	[K1SB_60]	30 Hz - 80 Hz

Procedure

1. Load the preset on an LA8 / LA12X amplified controller.
2. Connect a sinus generator to the amplified controller.



Risk of hearing damage

Set a low sound level to start and use ear protection to adjust before testing.

3. Scan the bandwidth focusing on the usable range.
The sound should remain pure and free of unwanted noise.

Troubleshooting for LF/MF speakers

One or more LF/MF speaker produces distorted, buzzing, rubbing, clicking, muffled or weak sound.

Possible causes

- The screws are not tightened with the appropriate torque.
- There is an air leak in the gasket.
- There is dust on the cone.
- The cone is damaged.
- The surround is torn or delaminated.
- The voice coil or the spider is damaged.

Procedure

1. Visually inspect the cables and the connectors.
2. Visually inspect the speaker cone, the voice coil and the spider.

If any damage is visible, replace the speaker.

3. Carefully clean the speaker with a dry cloth.
4. Repeat the listening test.

If the problem persists, replace the speaker.

Troubleshooting for HF drivers

One or more HF driver produces high-frequency harmonic distortions, strange vibrations or weak sound.

Possible causes

- There are foreign particles on the air gap.
- The diaphragm is not centered correctly.
- The screws used for reassembly are too loose.
- The diaphragm is damaged.
- The number of shims is wrong.

Procedure

1. Perform the diaphragm disassembly procedure.

2. Visually inspect the diaphragm and the voice coil.

If any damage is visible, replace the diaphragm.

3. Clean the air gap thoroughly.

Use double-face adhesive tape to remove any particles.

4. Perform the diaphragm reassembly procedure.

Pay close attention to the number of shims and the position of the diaphragm.

Apply the recommended torque.

5. Repeat the listening test.

If a buzzing sound is still audible, it might be necessary to add an extra shim on the air gap.

If the problem persists, replace the driver.

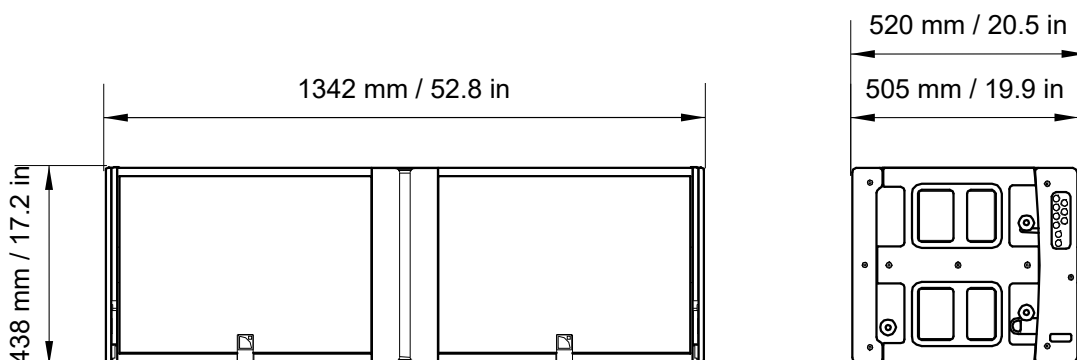
Specifications

K1 specifications

Description	3-way full-range active WST® enclosure , quad-amplified by LA8 / LA12X
Usable bandwidth (-10 dB)	35 Hz - 20 kHz ([K1])
Maximum SPL¹	149 dB ([K1])
Nominal directivity (-6 dB)	horizontal: 90° symmetric vertical: dependent upon the number of elements and the line source curvature
Transducers	LF: 2 × 15" neodymium MF: 4 × 6.5" neodymium, direct-radiating HF: 3 × 3" diaphragm compression drivers
Acoustical load	LF: bass-reflex MF: bass-reflex HF: DOSC waveguide
Nominal impedance	LF: 2 × 8 Ω MF: 8 Ω HF: 8 Ω
Connectors	IN: 1 × 8-point PA-COM LINK: 1 × 8-point PA-COM
Rigging and handling	4 handles integrated into the cabinet inter-enclosure angles: 0°, 0.5°, 1°, 1.5°, 2°, 2.5°, 3°, 4° or 5°
Weight (net)	106 kg / 234 lb
Cabinet	premium grade Baltic birch plywood high density polyethylene
Front	coated steel grill acoustically neutral 3D fabric
Rigging components	high grade steel with anti-corrosion coating
Finish	grey brown RAL 8019
IP	IP43

¹ Peak level measured at 1 m under free field conditions using pink noise with crest factor 4 (preset specified in brackets).

K1 dimensions

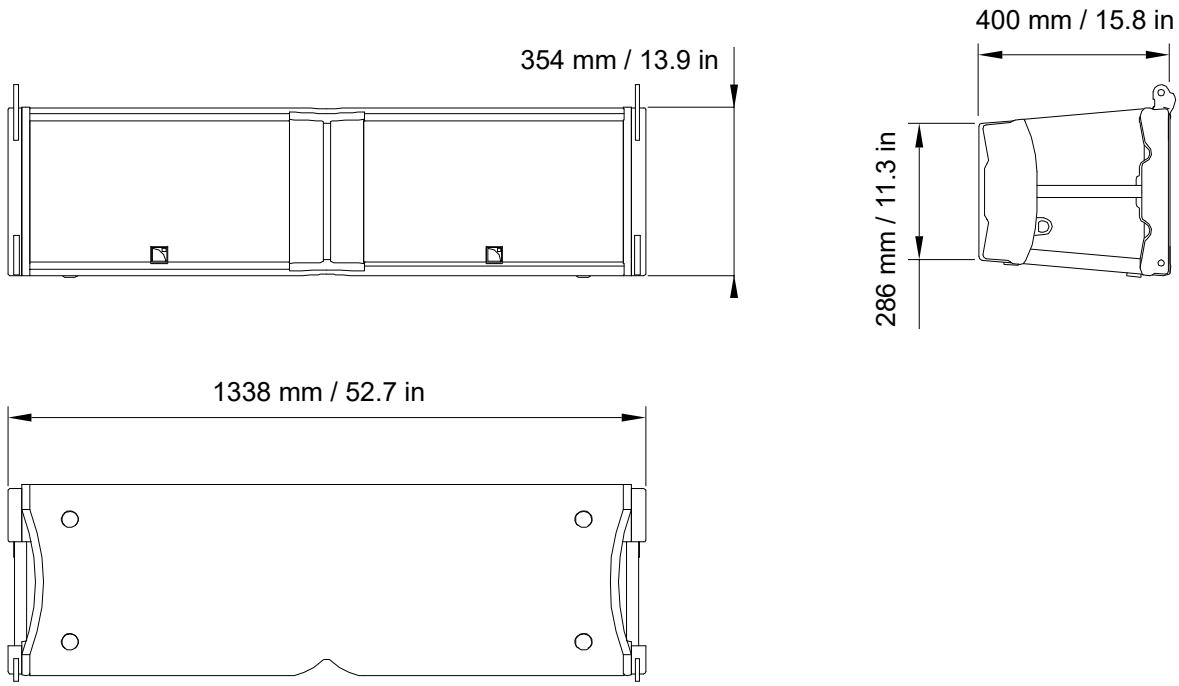


K2 specifications

Description	3-way full-range active WST enclosure, quad-amplified by LA4X / LA8 / LA12X
Usable bandwidth (-10 dB)	35 Hz - 20 kHz ([K2 70])
Maximum SPL ¹	147 dB ([K2 70])
Nominal directivity (-6 dB)	horizontal: 110°/70° symmetric or 90° asymmetric (35°/55° or 55°/35°) vertical: dependent upon the number of elements and the line source curvature
Transducers	LF: 2 × 12" cone drivers MF: 4 × 6.5" cone drivers HF: 2 × 3" diaphragm compression drivers
Acoustical load	LF: bass-reflex, L-Vents MF: bass-reflex HF: DOSC waveguide
Nominal impedance	LF: 2 × 8 Ω MF: 8 Ω HF: 16 Ω
Connectors	IN: 1 × 8-point PA-COM LINK: 1 × 8-point PA-COM
Rigging and handling	4-point captive rigging system inter-enclosure angles: 0.25°, 1°, 2°, 3°, 4°, 5°, 7.5° or 10°
Weight (net)	56 kg / 123.2 lb
Cabinet	premium grade Baltic birch plywood
Front	coated steel grill acoustically neutral 3D fabric
Rigging components	high grade steel with anti-corrosion coating
Finish	dark grey brown Pantone 426 C
IP	IP55

¹ Peak level measured at 1 m under free field conditions using pink noise with crest factor 4 (preset specified in brackets).

K2 dimensions

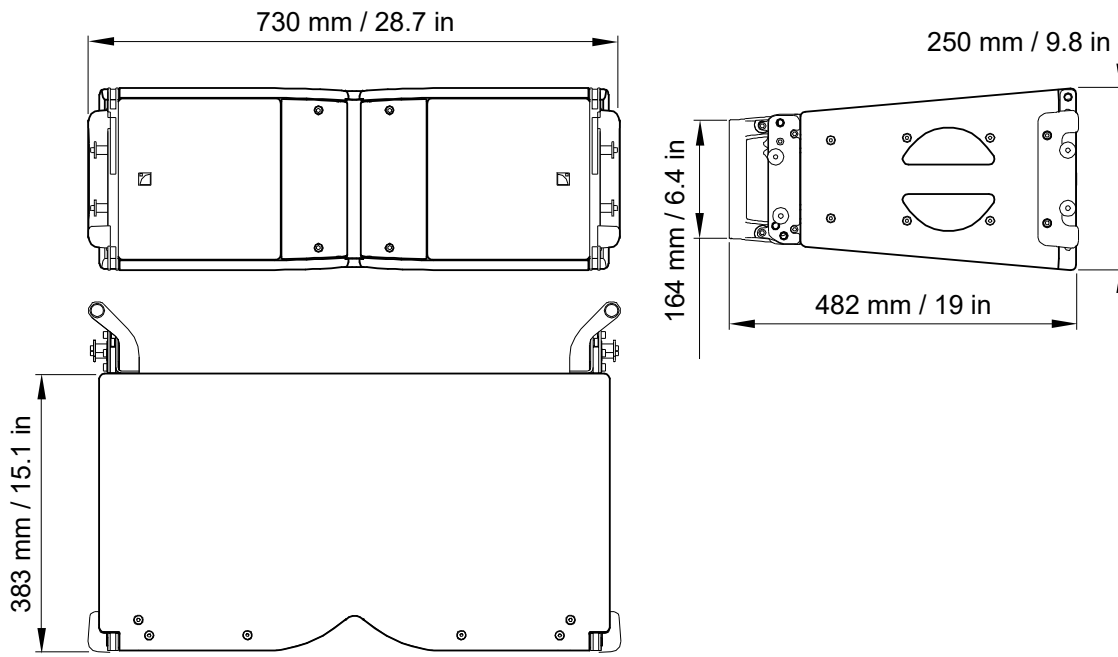


Kara specifications

Description	2-way modular WST enclosure, bi-amplified by LA4X / LA8 / LA12X
Usable bandwidth (-10 dB)	55 Hz - 20 kHz ([KARA])
Maximum SPL¹	141 dB ([KARA])
Nominal directivity (-6 dB)	horizontal: 110° symmetric vertical: dependent upon the number of elements and the line source curvature
Transducers	LF: 2 × 8" neodymium cone drivers HF: 1 × 3" neodymium diaphragm compression driver
Acoustical load	LF: bass-reflex HF: DOOSC waveguide
Nominal impedance	LF: 8 Ω HF: 8 Ω
Connectors	IN: 1 × 4-point speakON LINK: 1 × 4-point speakON
Rigging and handling	captive rigging system rigging system handles integrated into the cabinet inter-enclosure angles: 0°, 1°, 2°, 3°, 4°, 5°, 7.5° or 10°
Weight (net)	26 kg / 57 lb
Cabinet	premium grade Baltic birch plywood
Front	coated steel grill acoustically neutral 3D fabric
Rigging components	high grade steel with anti-corrosion coating
Finish	dark grey brown Pantone 426 C
IP	IP45

¹ Peak level measured at 1 m under free field conditions using pink noise with crest factor 4 (preset specified in brackets).

Kara dimensions

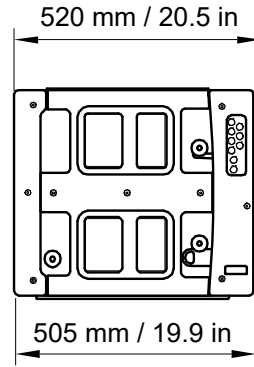
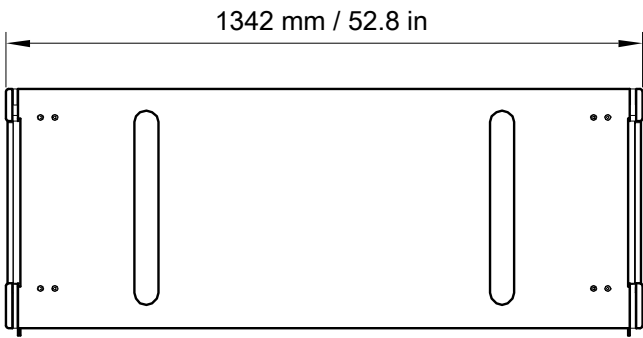
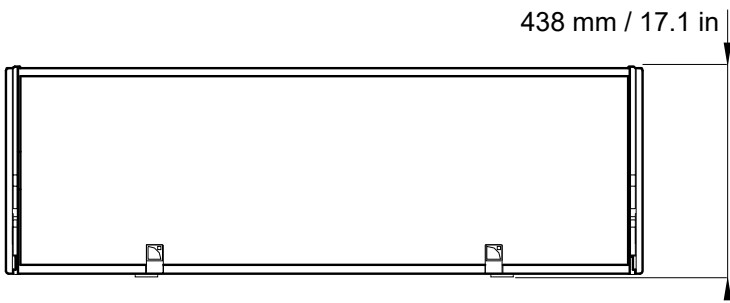
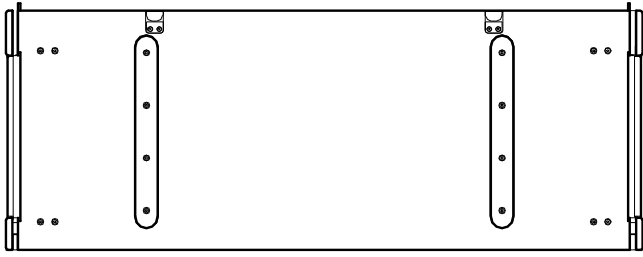


K1-SB specifications

Description	K1 system subwoofer 2×15", amplified by LA8 / LA12X
Low frequency limit (-10 dB)	30 Hz ([K1SB_60])
Maximum SPL¹	145 dB ([K1SB_X])
Transducers	2 × 15" cone drivers
Acoustical load	bass-reflex, L-Vents
Nominal impedance	4 Ω
Connectors	IN: 1 × 4-point speakON
Rigging and handling	captive rigging system 4-point rigging system inter-enclosure angles: 0°, 0.5°, 1°, 1.5°, 2°, 2.5°, 3°, 4° or 5° 4 handles integrated into the cabinet
Weight (net)	83 kg / 183 lb
Cabinet	premium grade Baltic birch plywood
Front	coated steel grill acoustically neutral 3D fabric
Rigging components	high grade steel with anti-corrosion coating
Finish	dark grey brown Pantone 426 C pure white RAL 9010
IP	IP45

¹ Peak level at 1 m under half space conditions using pink noise with crest factor 4 (preset specified in brackets).

K1-SB dimensions

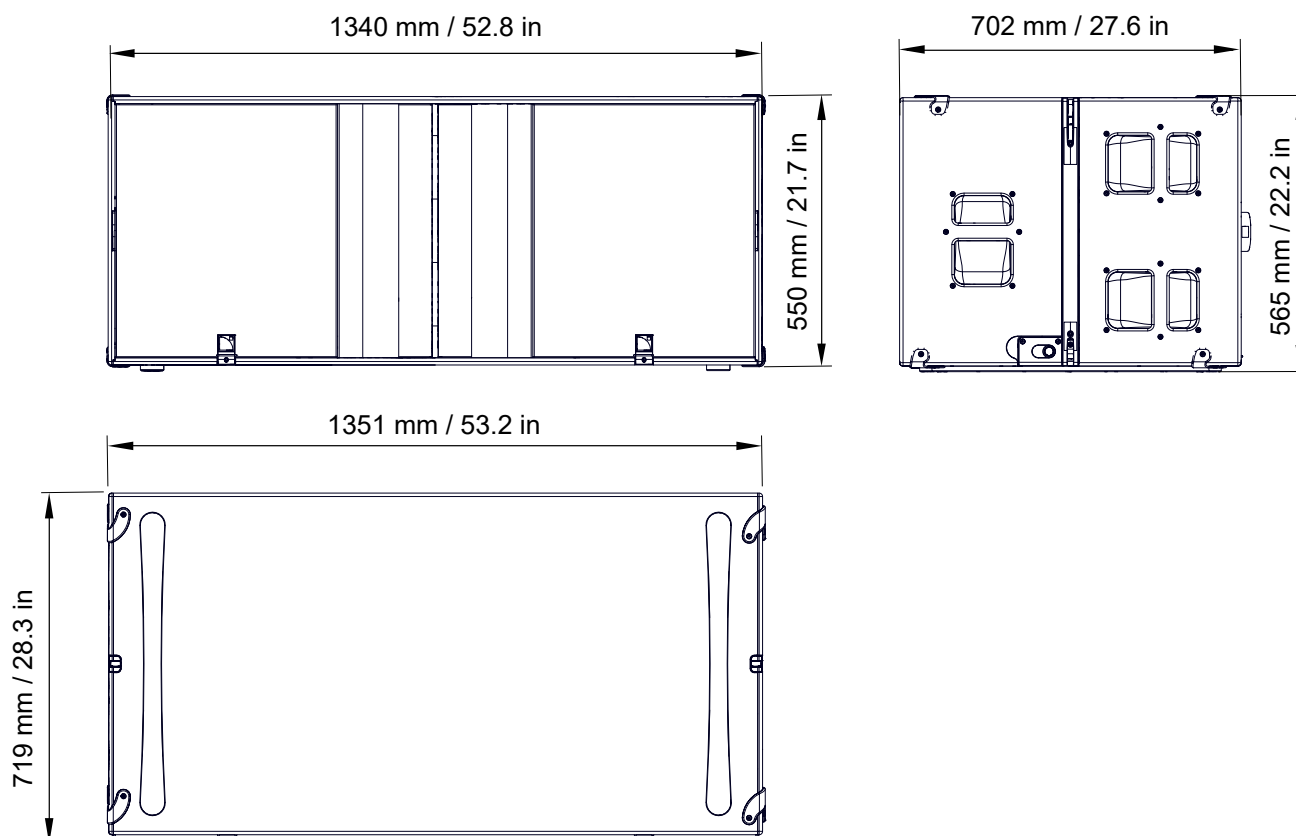


KS28 specifications

Description	Flyable subwoofer 2 x 18" , amplified by LA12X
Low frequency limit (-10 dB)	25 Hz ([KS28_100])
Maximum SPL¹	143 dB ([KS28_100])
Directivity	standard or cardioid
Transducers	2 x 18" neodymium cone drivers
Acoustical load	bass-reflex, L-Vents
Nominal impedance	4 Ω
Connectors	IN: 1 x 4-point speakON
Rigging and handling	flush-fitting 2-point rigging system 6 ergonomic handles 2 ground runners 8 side runners
Weight (net)	79 kg / 174 lb
Cabinet	premium grade Baltic beech and birch plywood
Front	coated steel grill acoustically neutral 3D fabric
Rigging components	high grade steel
Finish	dark grey brown Pantone 426 C

¹ Peak level at 1 m under half space conditions using pink noise with crest factor 4 (preset specified in brackets).

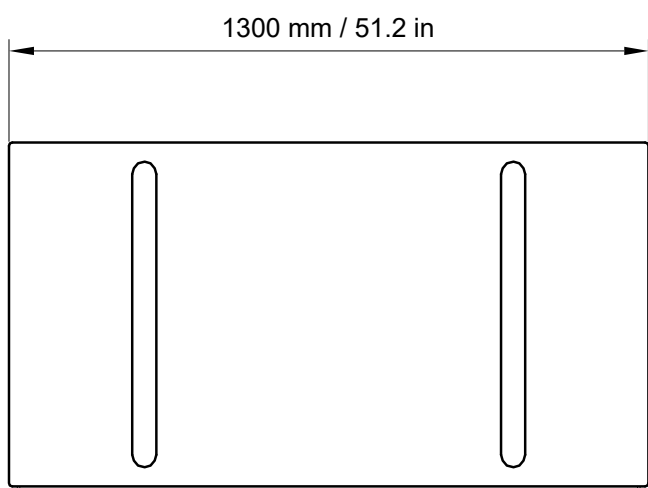
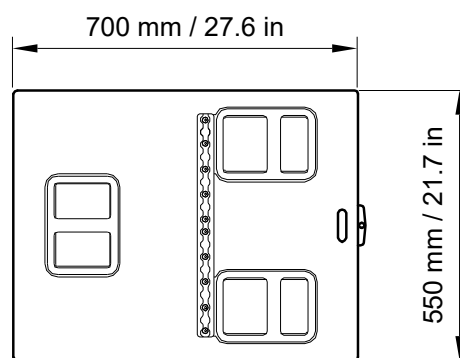
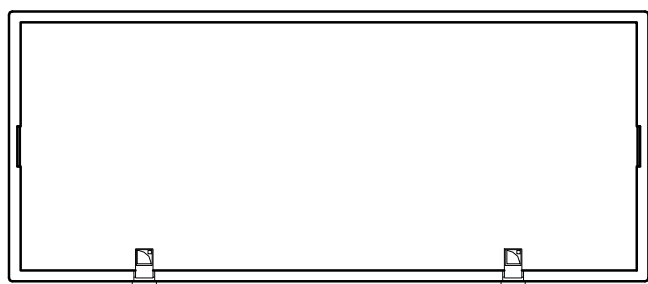
KS28 dimensions



SB28 specifications

Description	High power subwoofer: 2 x 18" , amplified by LA8 / LA12X
Low frequency limit (-10 dB)	25 Hz ([SB28_100])
Maximum SPL¹	142 dB ([SB28_100])
Directivity	standard or cardioid
Transducers	2 x 18" neodymium direct-radiating
Acoustical load	bass-reflex, L-Vents
Nominal impedance	4 Ω
Connectors	IN: 1 x 4-point speakON
Rigging and handling	integrated rigging system handles integrated into the cabinet
Weight (net)	93 kg / 205 lb
Cabinet	premium grade Baltic birch plywood
Front	coated steel grill acoustically neutral 3D fabric
Rigging components	high grade steel with anti-corrosion coating
Finish	dark grey brown Pantone 426 C
IP	55

¹ Peak level at 1 m under half space conditions using pink noise with crest factor 4 (preset specified in brackets).

SB28 dimensions



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