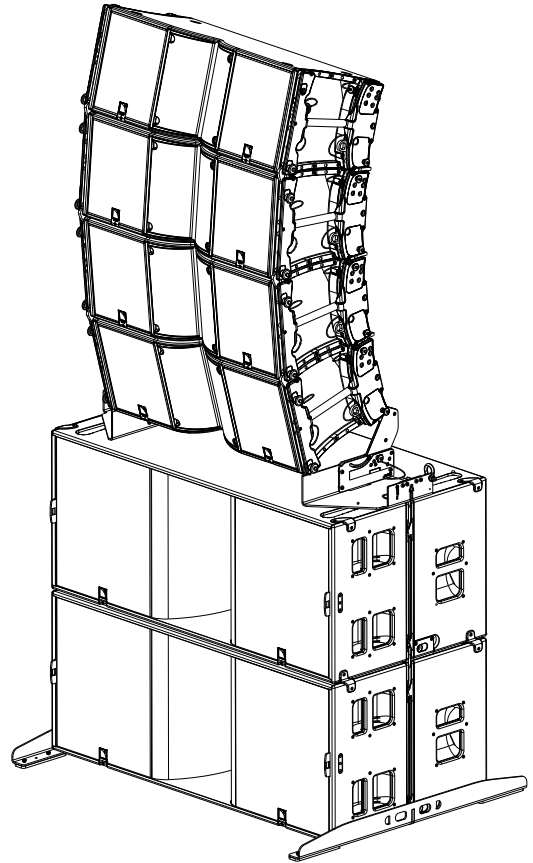
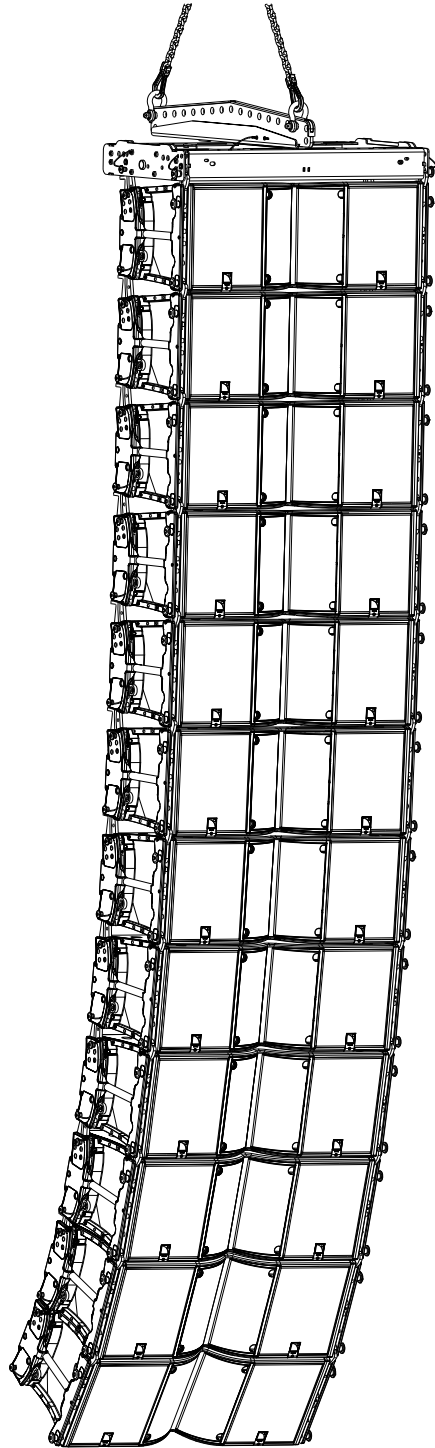


K3



owner's manual (EN)



Document reference: K3 owner's manual (EN) version 1.0

Distribution date: October 1, 2020

© 2020 L-Acoustics. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means without the express written consent of the publisher.

Contents

Safety.....	6
Introduction.....	8
K3 long throw line source.....	8
How to use this manual.....	9
System components.....	10
Loudspeaker cables.....	11
Rigging elements.....	13
Electro-acoustical description.....	14
Directivity.....	14
Adjustable fins.....	14
Directivity.....	17
Preset description.....	18
Connectors.....	19
Rigging system description.....	21
K3.....	21
KS28.....	22
Rigging elements for flown arrays.....	23
K3-BUMP.....	23
K3-BAR.....	24
K3-RIGBAR.....	25
KARADOWNK3.....	26
DELTA 1.5T.....	27
LA-RAKMOUNT.....	28
Rigging elements for stacked arrays.....	29
K2-JACK.....	29
K3-TILT.....	30
KS28-OUTRIG.....	30
Storage and handling elements.....	31
K3-CHARIOT.....	31
K3-CHARIOTCOV.....	32
K3-CHARIOTLID.....	33
K3-BUMPFLIGHT.....	34

Mechanical safety.....	35
Loudspeaker configurations.....	37
Line source.....	37
Line source with low-frequency element.....	38
Additional downfill element.....	40
Kara / Kara II.....	40
Inspection and preventive maintenance.....	41
How to do preventive maintenance.....	41
Rigging part inspection.....	42
Mechanical system overview.....	42
K3 array with K3-BUMP and K3-BAR.....	43
K3 array with K3-BUMP and KARADOWNK3.....	44
K3 array with K3-RIGBAR as pullback.....	45
K3 array with K3-BAR, LA-RAKMOUNT, and K3-BUMP.....	46
K3 array with K3-CHARIOT and K2-JACK.....	47
K3 stacked on K3-TILT and KS28 with KS28-OUTRIG.....	48
K3 stacked on K3-CHARIOT with K3-CHARIOTCOV and K3-CHARIOTLID.....	49
Inspection references.....	50
Rigging check.....	53
Acoustical check.....	57
Rigging procedures.....	61
Preparing a block of four K3.....	61
Pre-setting the inter-enclosure angles.....	65
Flying.....	67
Flying an array with K3-BUMP and K3-BAR.....	67
Adding a pullback with K3-RIGBAR.....	73
Rigging a Kara II downfill array under a K3 array with KARADOWNK3.....	76
Securing LA-RAK II AVB on LA-RAKMOUNT.....	80
Stacking.....	83
Stacking K3 on KS28 with K3-TILT.....	83
Attaching K2-JACK stabilizers to K3-CHARIOT.....	89
Adjusting the K3-CHARIOT site angle.....	92
Transporting.....	94
Stacking multiple K3-CHARIOTLID on K3-CHARIOT.....	94
Mounting K3-CHARIOTLID to K3.....	96

Connection to LA amplified controllers..... 99

Specifications..... 101

APPENDIX: Recommendation for speaker cables..... 119

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.

Refer to the preventive maintenance section for a list of actions and their periodicity.

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. A loose part is not adequately secured.



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.



Work with qualified personnel for rigging the system

Installation should only be carried out by qualified personnel that are familiar with the rigging techniques and safety recommendations outlined in this manual.

Ensure personnel health and safety

During installation and set-up personnel must wear protective headgear and footwear at all times. Under no circumstances is personnel allowed to climb on a loudspeaker assembly.

Respect the Working Load Limit (WLL) of third party equipment.

L-Acoustics is not responsible for any rigging equipment and accessories provided by third party manufacturers.

Verify that the Working Load Limit (WLL) of the suspension points, chain hoists and all additional hardware rigging accessories is respected.

Respect the maximum configurations and the recommended safety precautions.

For safety issue, respect the maximum configurations outlined in this manual. To check the conformity of any configuration in regards with the safety precautions recommended by L-Acoustics, model the system in Soundvision and refer to the warnings in Mechanical Data section.

Be cautious when flying a loudspeaker configuration.

Before installing/raising the product, check each individual element to make sure that it is securely fastened to the adjacent element. Always verify that no one is standing underneath the product when it is being installed/raised. Never leave the product unattended during the installation process.

As a general rule, L-Acoustics recommends the use of secondary safety at all times.

Be cautious when ground-stacking a loudspeaker array.

Do not stack the loudspeaker array on unstable ground or surface. If the array is stacked on a structure, platform, or stage, always check that the latter can support the total weight of the array.

As a general rule, L-Acoustics recommends the use of safety straps at all times.

Risk of falling objects

Verify that no unattached items remain on the product or assembly.

Risk of tipping

Remove all rigging accessories before transporting a product or an assembly.

Take into account the wind effects on dynamic load.

When a loudspeaker assembly is deployed in an open air environment, wind can produce dynamic stress to the rigging components and suspension points.

If the wind force exceeds 6 bft (Beaufort scale), lower down and/or secure the product or the assembly.

**Intended use**

This system is intended for use by trained personnel for professional applications.

**Read the OWNER'S MANUAL before installing the system.**

Use the loudspeaker system components described in the manual and follow the operating instructions.

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.

**Do not expose the product to extreme conditions.**

Do not expose the product to moisture (rain, mist, sea spray, steam, humidity, condensation...) or excessive heat (direct sun, radiator...) for a long period of time.

For more information, refer to the **Product protection ratings** 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.

Before sending a product to L-Acoustics for maintenance, save all user presets to files using LA Network Manager.

Introduction

K3 long throw line source



Part of the K Series, K3 is a full range line source system designed for production applications beyond 35 m of throw. Housing the internationally recognized K2 system components into a medium-sized enclosure, K3 is ideal for applications that require reinforced low-frequency contour, broad bandwidth and limited footprint such as live events in mid-sized festivals, and tours, performing arts, corporate events in large exhibition halls or special events.

With exceptional bandwidth for its size - 42 Hz - 20 kHz - K3 system can be used as a stand-alone line source boasting strong output and innate reinforced LF contour. K3 can be supplemented by the KS28 subwoofer for infra reinforcement.

K3 features Panflex™ to offer four horizontal directivity patterns: 70° or 110° symmetrical or 90° asymmetrical on either side. With Panflex and inter-element angles ranging from 0° to 10°, a K3 line source coverage can be precisely tailored to any audience geometry.

On its own K3 can be used as a main system for vocal and music reinforcement in most applications, or as a complement to K1 or K2 as outfills or delays. Deployed with KS28 subwoofer, K3 is perfect as a compact main system for demanding live events or for LISA Wide designs.

How to use this manual

The K3 owner's manual is intended for all actors involved in the system design, implementation, preventive and corrective maintenance of the K3 system. It must be used as follows:

1. Read the technical description for an overview of all system elements, their features, and their compatibilities.
 - [Electro-acoustical description](#) (p.14)
 - [Rigging system description](#) (p.21)
2. Prepare the system configuration. Consider the mechanical limits and the available acoustical configurations.
 - [Mechanical safety](#) (p.35)
 - [Loudspeaker configurations](#) (p.37)
3. Before rigging the system, perform mandatory inspections and functional checks.
 - [Inspection and preventive maintenance](#) (p.41)
4. To deploy the system, follow the step-by-step rigging instructions and refer to the cabling schemes.
 - [Rigging procedures](#) (p.61)
 - [Connection to LA amplified controllers](#) (p.99)

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 document without prior notice. Please check www.l-acoustics.com on a regular basis to download the latest document and software updates.




Contact information

For information on advanced corrective maintenance:

- contact your Certified Provider or your L-Acoustics representative
- for Certified Providers, contact the L-Acoustics customer service: customer.service@l-acoustics.com

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.

System components

Loudspeaker enclosures

K3	2-way active WST® enclosure: 2 x 12" LF + 4" HF diaphragm
KS28	Flyable subwoofer 2 x 18"
KS21	High power compact subwoofer: 1x21"
Kara II	2-way active WST® enclosure: 2 x 8" LF + 3" HF diaphragm

Powering and driving system

LA4X / LA8 / LA12X	Amplified controller with DSP, preset library and networking capabilities
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



Refer to the LA4X / LA8 / LA12X owner's manual for operating instructions.

Loudspeaker 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 LA4X / LA8 / LA12X owner's manual for detailed instructions about the whole cabling scheme, including modulation cables and network.

Rigging elements

K3-BUMP	Flying frame for K3
K3-BAR	Extension bar for K3-BUMP
K3-RIGBAR	Rigging bar and pullback for K3 (includes LA-SLING2T)
KARADOWNK3	Interface for flying Kara below K3
LA-RAKMOUNT	Mounting cradles for LA-RAK
K3-TILT	Rigging element for stacking K3 on KS28
KS28-OUTRIG	Stability bars for KS28

BPCCHAIN 1.5T	Extension sling 1.5 tons (included in K3-BUMP)
LA-SLING2T	Lifting chain (DIN EN 818-4) 2-leg , 8 mm
DELTA 1.5T	Azimuth angle tuning accessory 1.5T
K2-JACK	4 tilt adjustment screw jacks + bar for K2-CHARIOT

Transportation accessories

K3-CHARIOT	Chariot for up to 4 K3
K3-CHARIOTCOV	Protective cover for 4 K3 on K3-CHARIOT
K3-CHARIOTLID	Protective lid for K3-CHARIOT
K3-BUMPFLIGHT	Modular flightcase for 1 K3-BUMP and rigging elements

Software applications

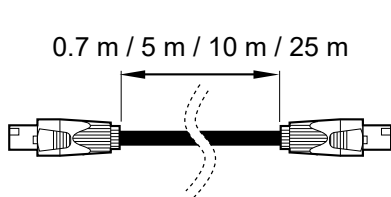
Soundvision	3D acoustical and mechanical modeling software
LA Network Manager	Software for remote control and monitoring of amplified controllers



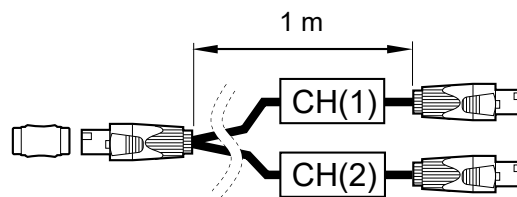
Refer to the **Soundvision** help.

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

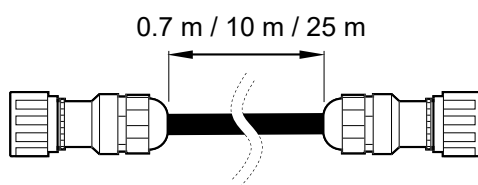
Loudspeaker cables



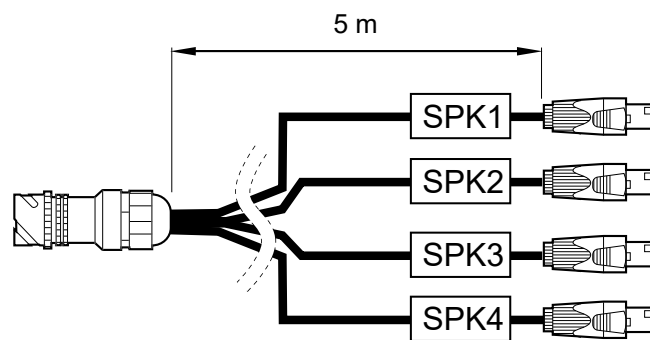
SP.7 / SP5 / SP10 / SP25



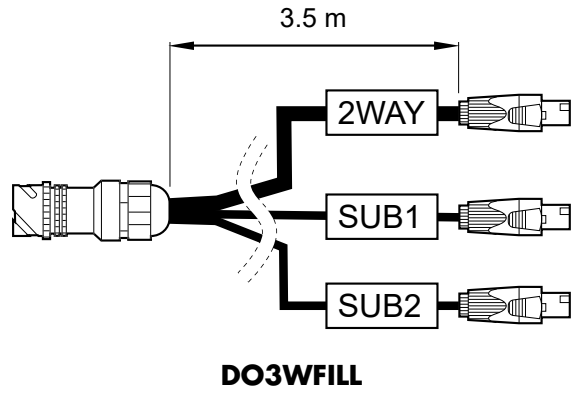
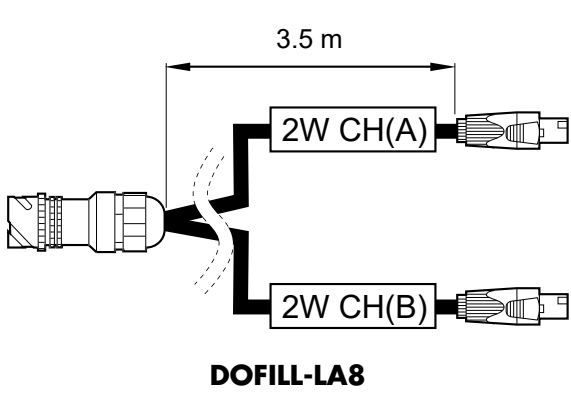
SP-Y1



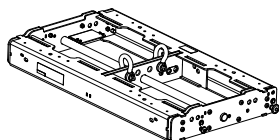
DO.7 / DO10 / DO25



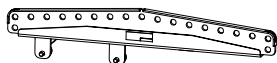
DOSUB-LA8



Rigging elements



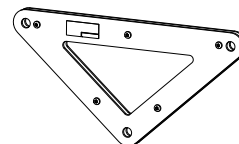
K3-BUMP



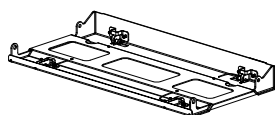
K3-BAR



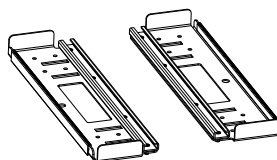
K3-RIGBAR



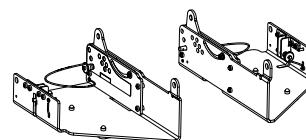
DELTA 1.5T



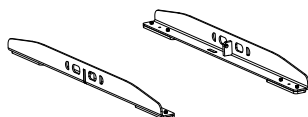
KARADOWNK3

BPCHAIN
1.5T

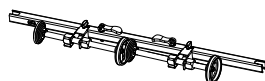
LA-RAKMOUNT



K3-TILT



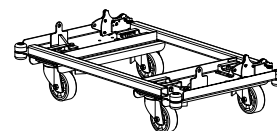
KS28-OUTRIG



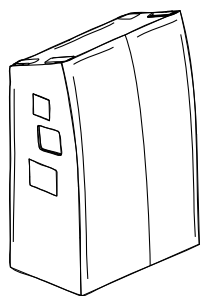
K2-JACK



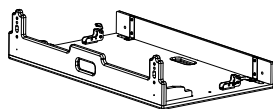
LA-SLING2T



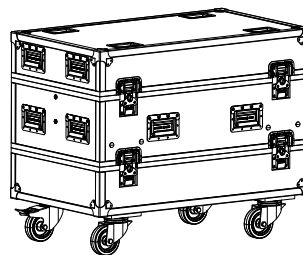
K3-CHARIOT



K3-CHARIOTCOV



K3-CHARIOTLID



K3-BUMPFLIGHT

Electro-acoustical description

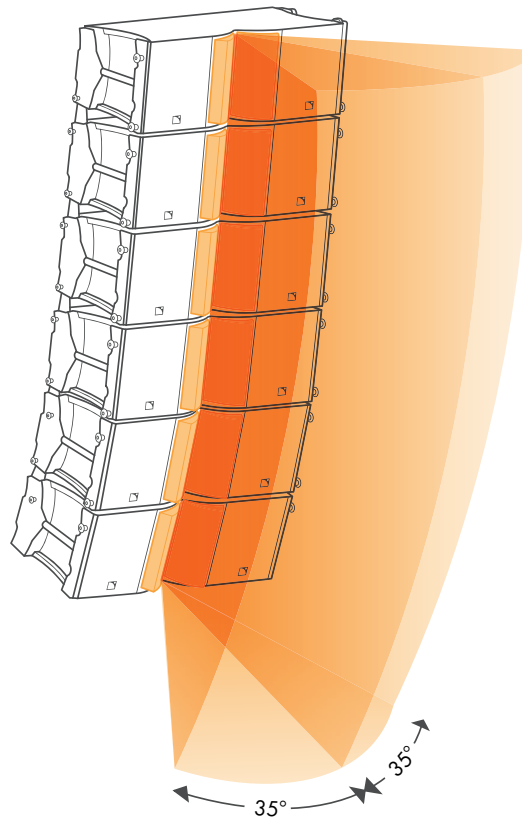
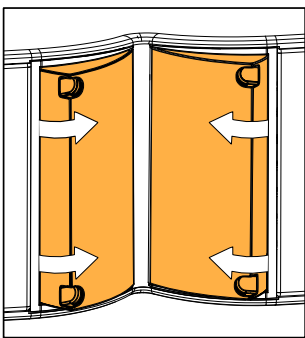
Directivity

Adjustable fins

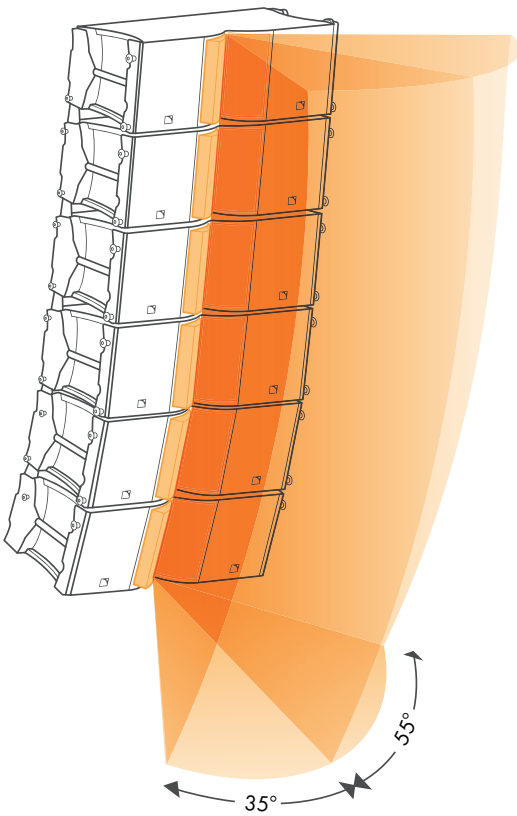
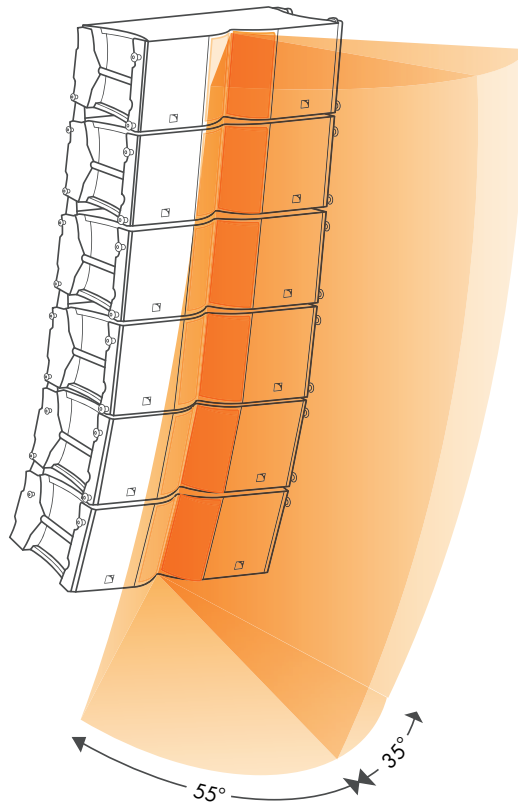
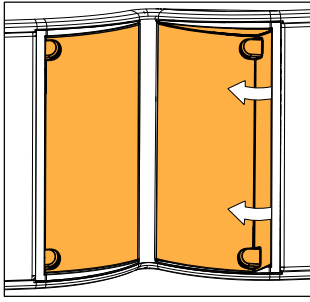
The K3 enclosure features an adjustable horizontal directivity system. Using the adjustable fins, horizontal directivity can be adjusted with four different settings: 70° / 110° symmetric or 90° asymmetric. A specific K3 preset must be used for each directivity setting.

Within a line source, different directivity settings can be combined to improve the coverage of the audience geometry.

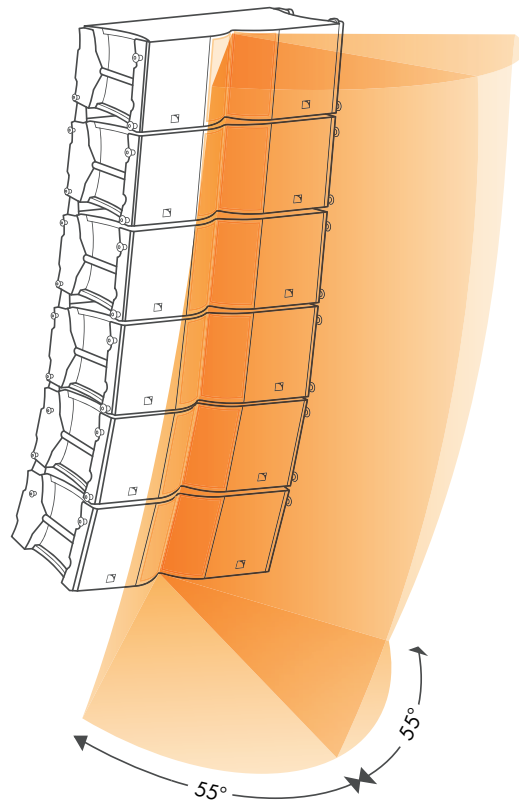
70° setting



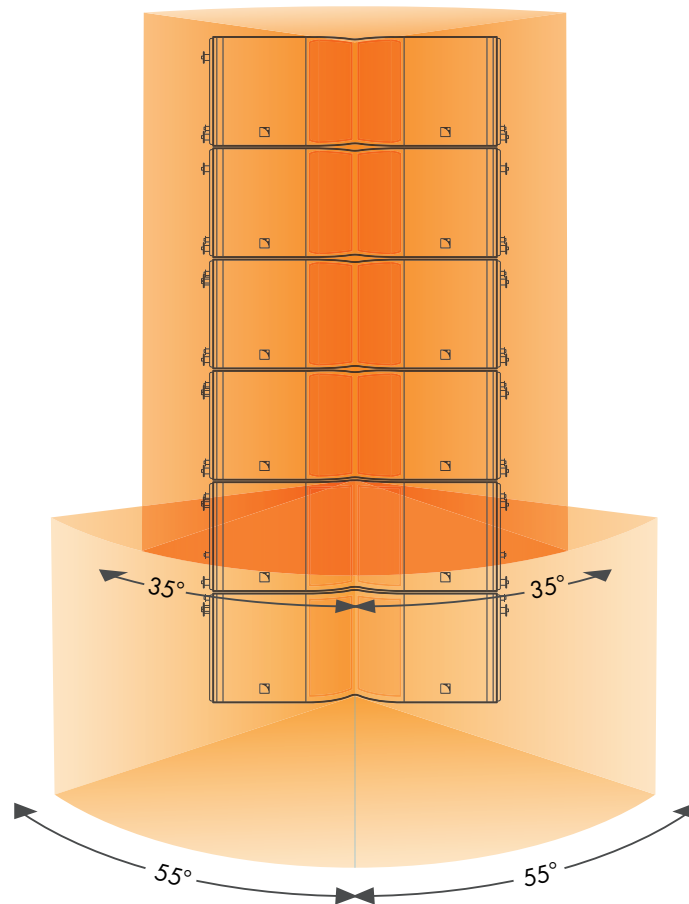
90° settings



110° setting

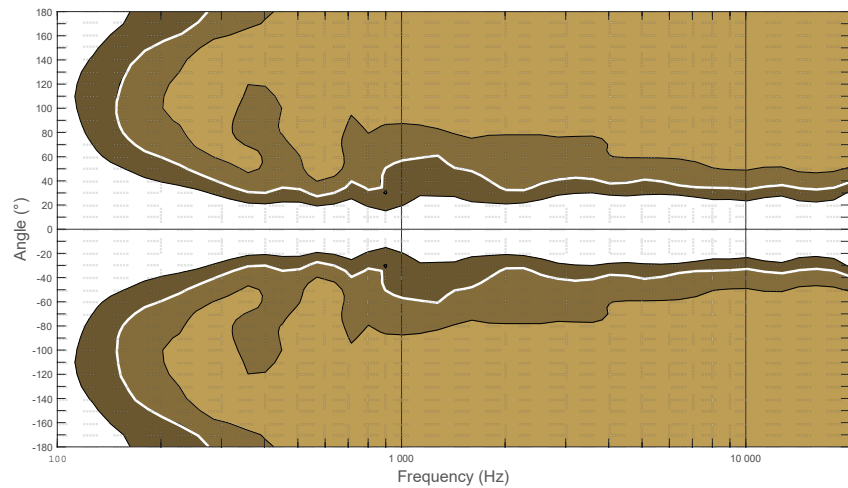
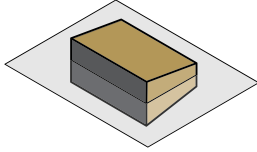


Mixed settings

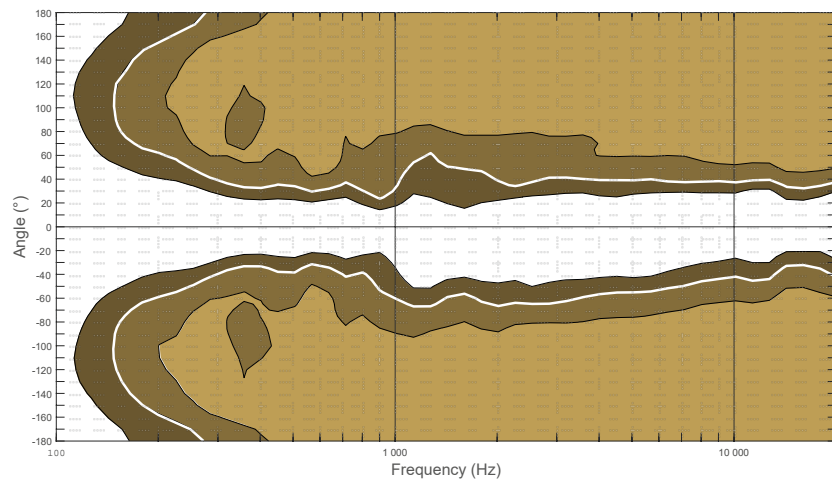
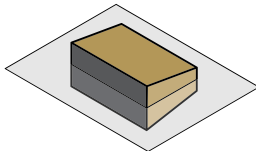


Directivity

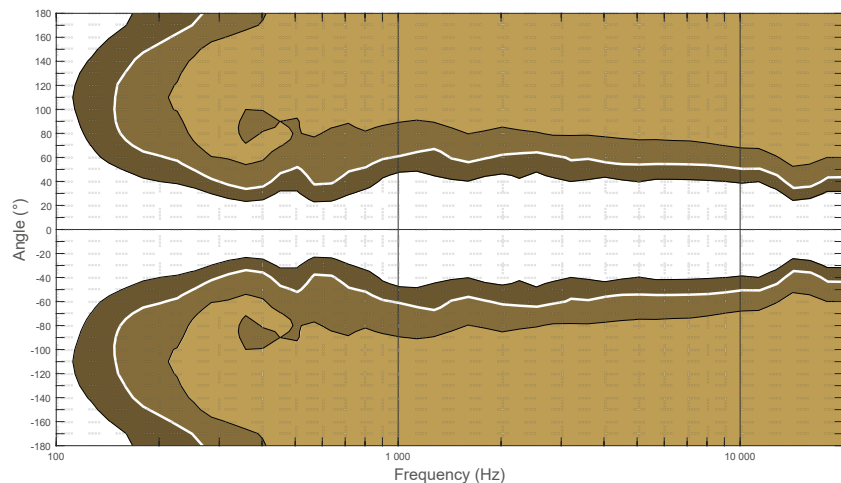
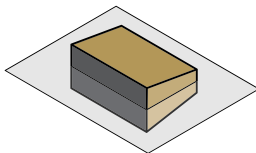
Horizontal



Dispersion angle diagram of a K3 array with 70° fins setting, using lines of equal sound pressure at -3 dB, -6 dB, -12 dB.



Dispersion angle diagram of a K3 array with 90° fins setting, using lines of equal sound pressure at -3 dB, -6 dB, -12 dB.



Dispersion angle diagram of a K3 array with 110° fins setting, using lines of equal sound pressure at -3 dB, -6 dB, -12 dB.

Preset description

[K3 70] [K3 90] [K3 110] [KARAIIDOWNK3] [KARADOWNK3]

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

[KS28_60] [KS28_100] [KS21_60] [KS21_100]

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

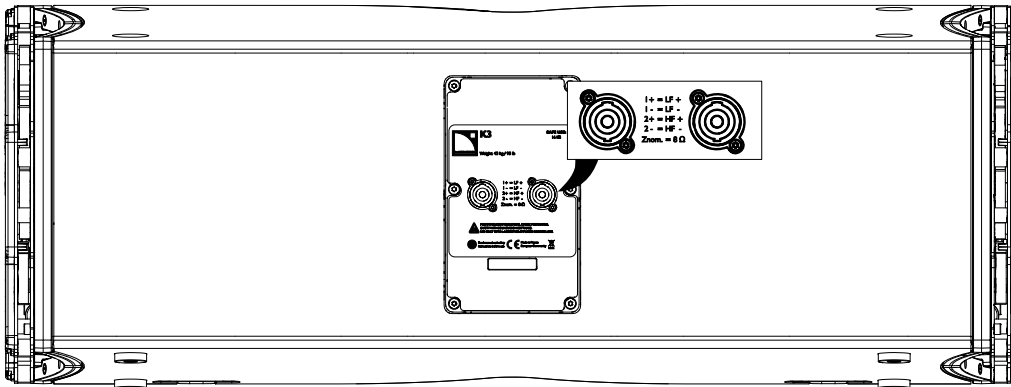
[KS28_60_C] [KS28_100_C] [KS28_60_Cx] [KS28_100_Cx] [KS21_60_C] [KS21_100_C] [KS21_60_Cx] [KS21_100_Cx]

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

Connectors



SpeakON connectors can be used interchangeably as IN or LINK connector.

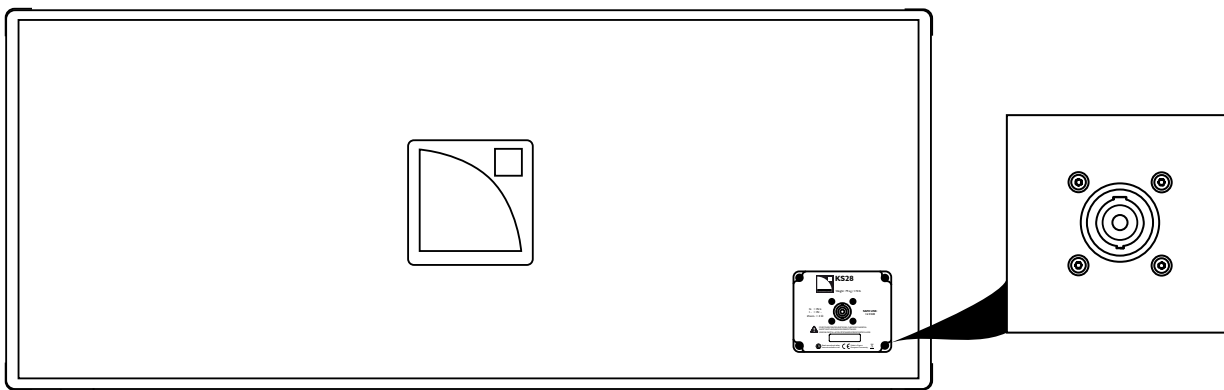


K3

2 × 4-point speakON

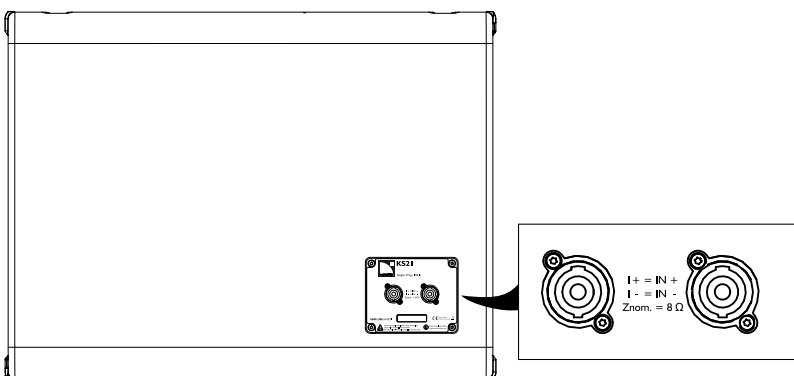
Internal pinout for L-Acoustics 2-way active enclosures

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



KS28

1 × 4-point speakON



KS21

2 × 4-point speakON

Internal pinout for L-Acoustics subwoofers

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

Rigging system description

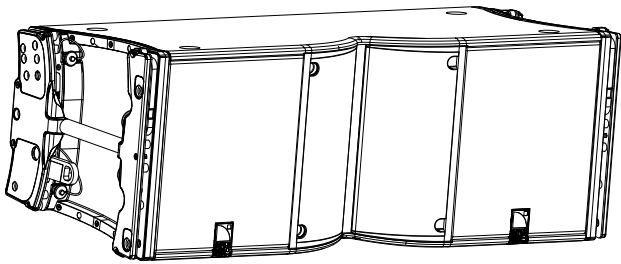
K3

On both sides, K3 integrates two arms to connect another element of the rigging system, such as an enclosure or a flying frame.

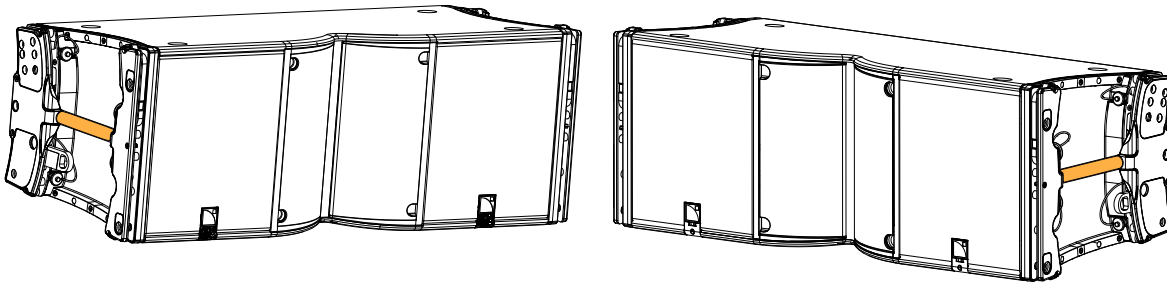
- At the front, a rotating arm provides a fixed point around which the enclosure can freely rotate until its connection at the rear.
- At the rear, a sliding arm enables the inter-element angle setting and the inter-element rear connection.

The angles between adjacent enclosures are secured by an automatic system that is activated in advance and locks itself during the stacking and lifting procedures.

Eight angle positions are available: 0.25°, 1°, 2°, 3°, 4°, 5°, 7.5°, 10°.

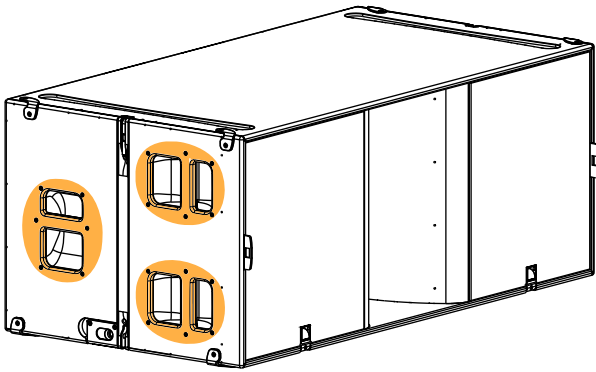


Two ergonomic handles on both sides of the enclosure are available for transportation.

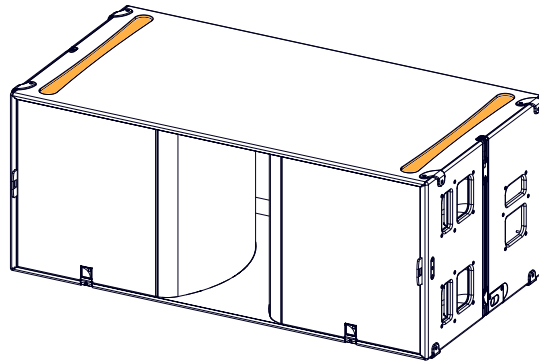
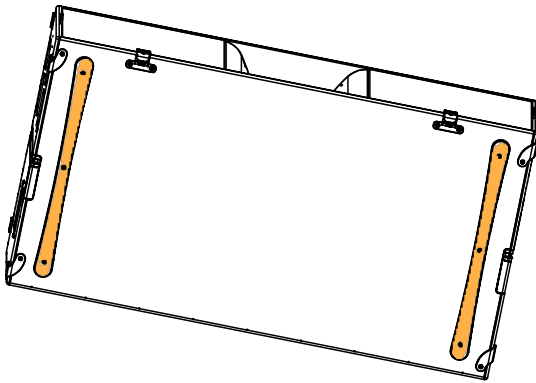


KS28

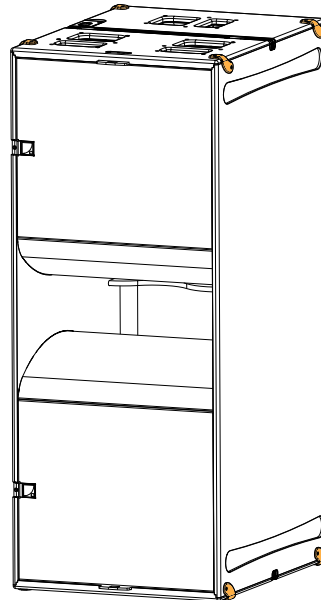
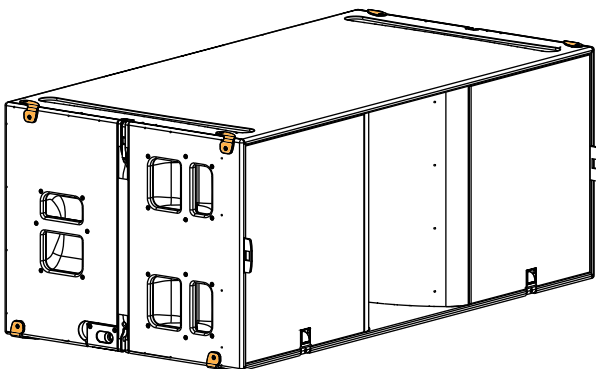
KS28 features three ergonomic handles on each side.



KS28 features two ground runners for enclosure protection. Two tracks on the top of the enclosure fit the ground runners in stacking deployment.



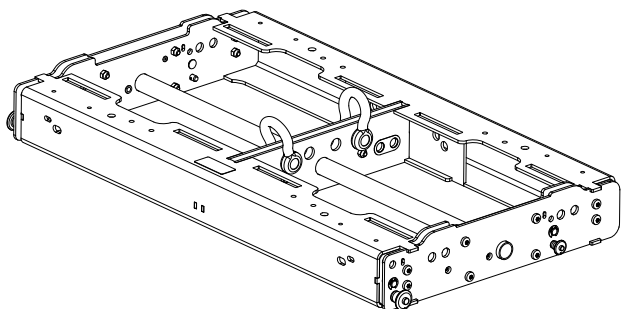
KS28 features eight L-shaped side runners for side protection and upright stacking.



Rigging elements for flown arrays

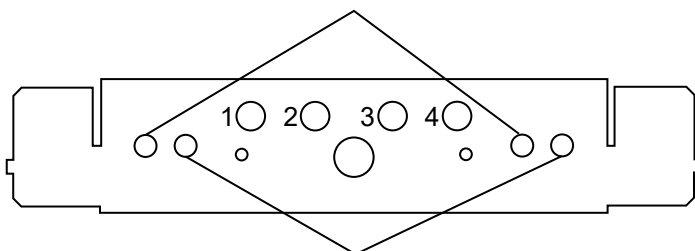
K3-BUMP

K3-BUMP is a rigging frame designed for flying K3.



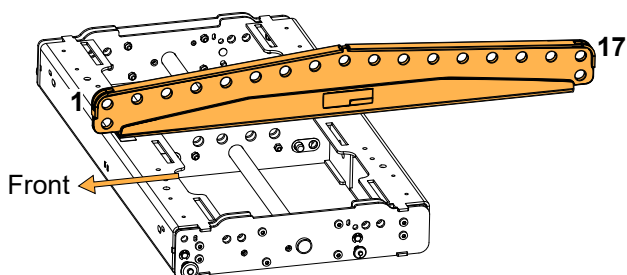
Four holes are available on the central bar of K3-BUMP for site angle adjustments. Four additional holes are available to add K3-BAR to K3-BUMP as an extension to increase the site angle.

Position A

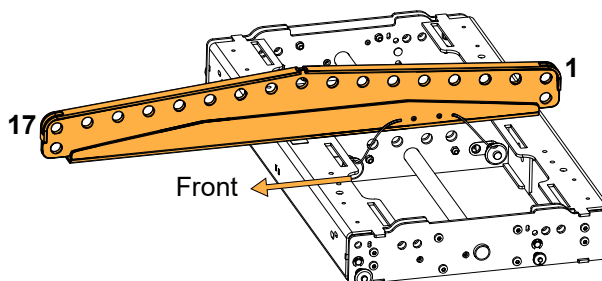


Position B

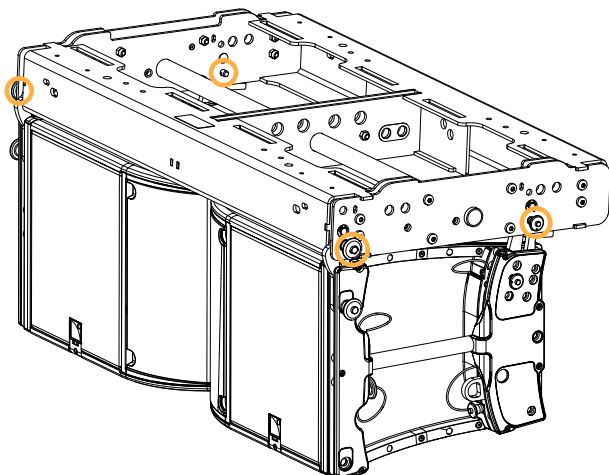
Rear extension



Front extension

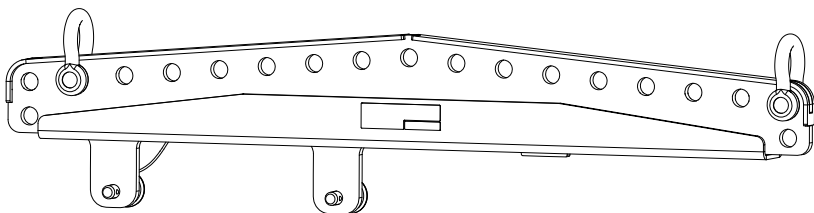


K3-BUMP is equipped with ball-locking pins to match the enclosure rigging system.



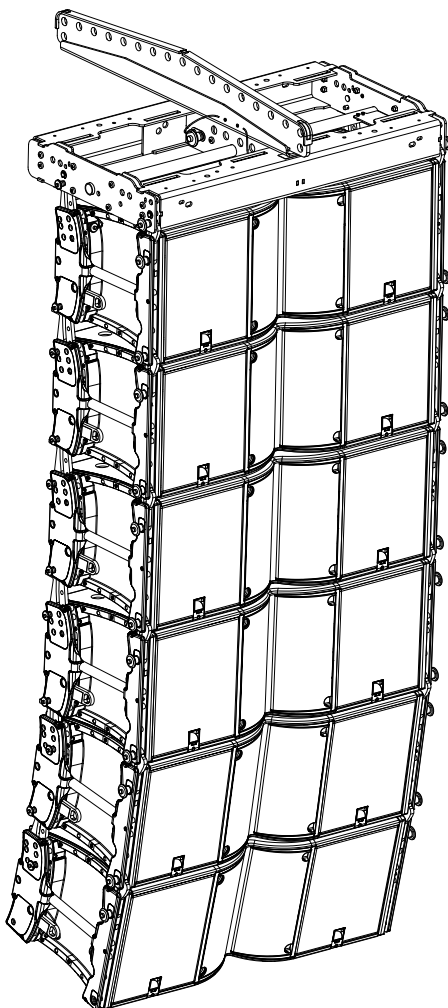
K3-BAR

K3-BAR is an extension bar designed to be combined with K3-BUMP.



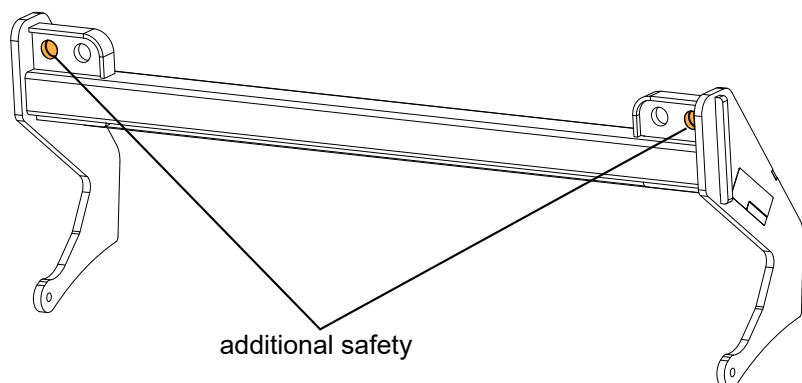
By adding a K3-BAR to the K3-BUMP, the site angle range can be increased. Seventeen holes are available on the K3-BAR which can be attached to the K3-BUMP as a rear or a front extension and in position A or B, thus offering a total of 68 discrete positions for pick-up points.

The rear extension is suited to downwards site angles. The front extension is suited to upwards site angles.



K3-RIGBAR

Secured at the bottom of the array, K3-RIGBAR can be used as a pullback either with K3-BUMP or another K3-RIGBAR as the main lifting accessory.

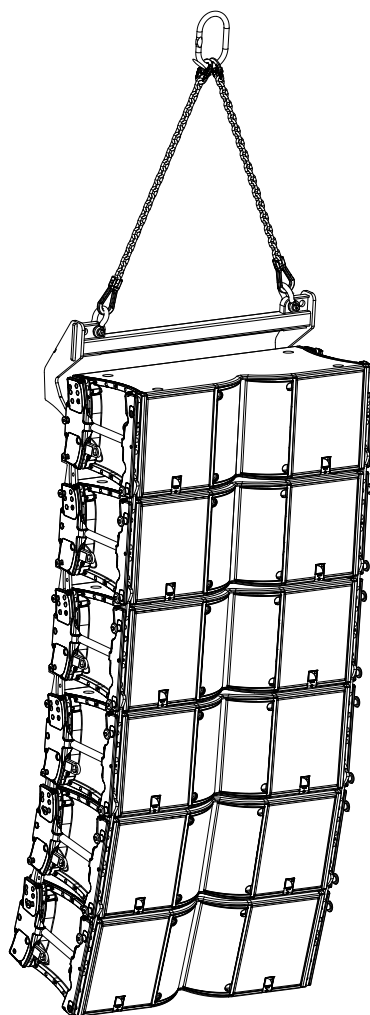


K3-RIGBAR is equipped with two shackles to secure LA-SLING2T.

The external holes are dedicated to implement an additional safety.

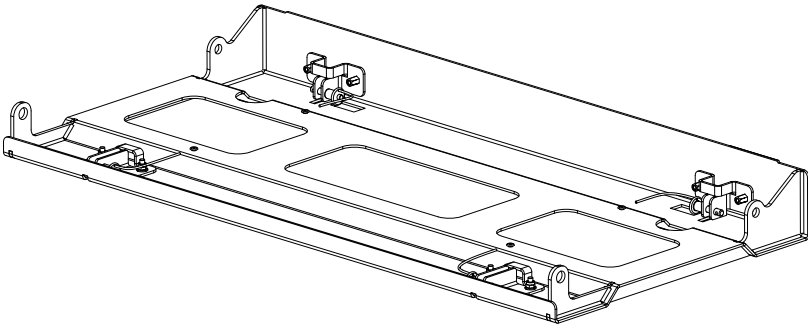
K3-RIGBAR can be used as the main lifting accessory, to provide a lightweight solution for flying up to 16 K3.

K3-RIGBAR must be used with LA-SLING2T.



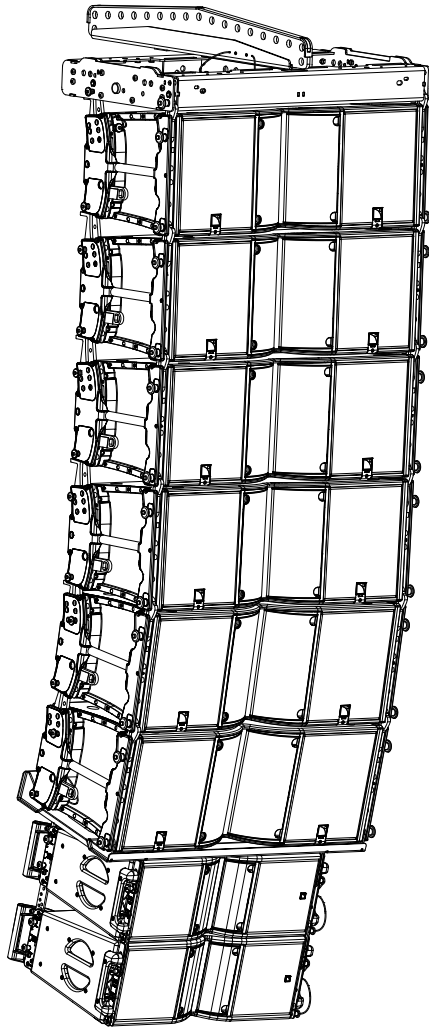
KARADOWNK3

KARADOWNK3 is a rigging interface for a Kara / Kara II array under a K3 array.



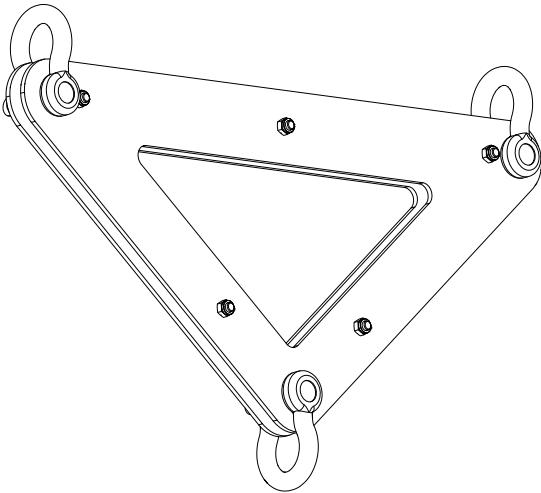
The four tabs on the top are compatible with the K3 rigging system.

The four slits fitted with ball-locking pins accommodate the Kara / Kara II rigging arms.

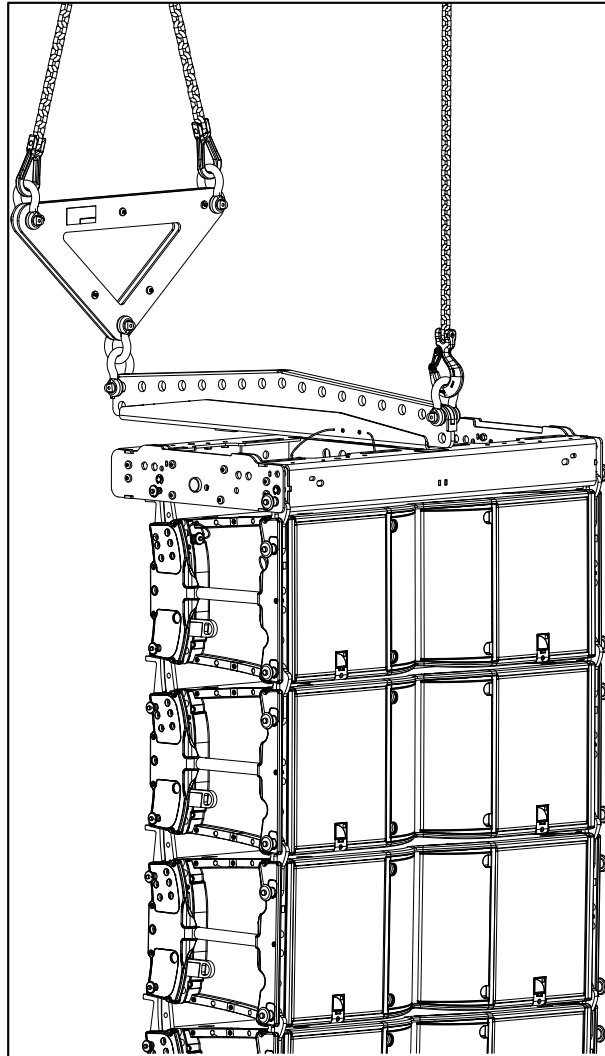


DELTA 1.5T

DELTA 1.5T is designed for azimuth setting.



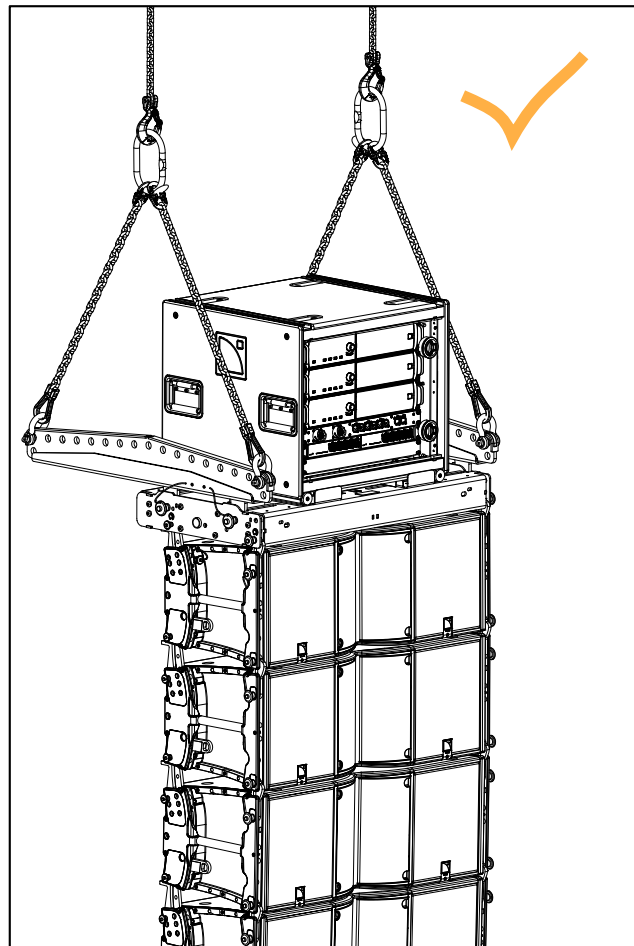
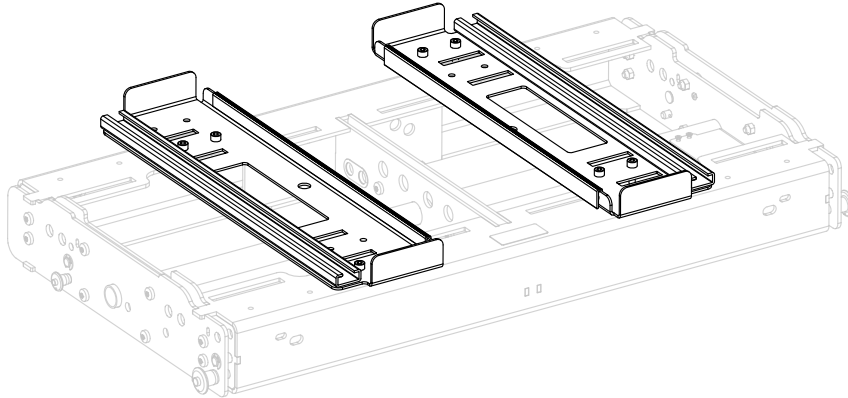
Combined with K3-BUMP and K3-BAR, DELTA 1.5T can be used to control the azimuth angle while K3-BAR controls the site angle.



LA-RAKMOUNT

LA-RAKMOUNT is designed to stack one LA-RAK II AVB on top of a flown array. LA-RAKMOUNT is composed of two mounting cradles with rails.

The two cradles are screwed on K3-BUMP. LA-RAKMOUNT must be used along with two K3-BAR.



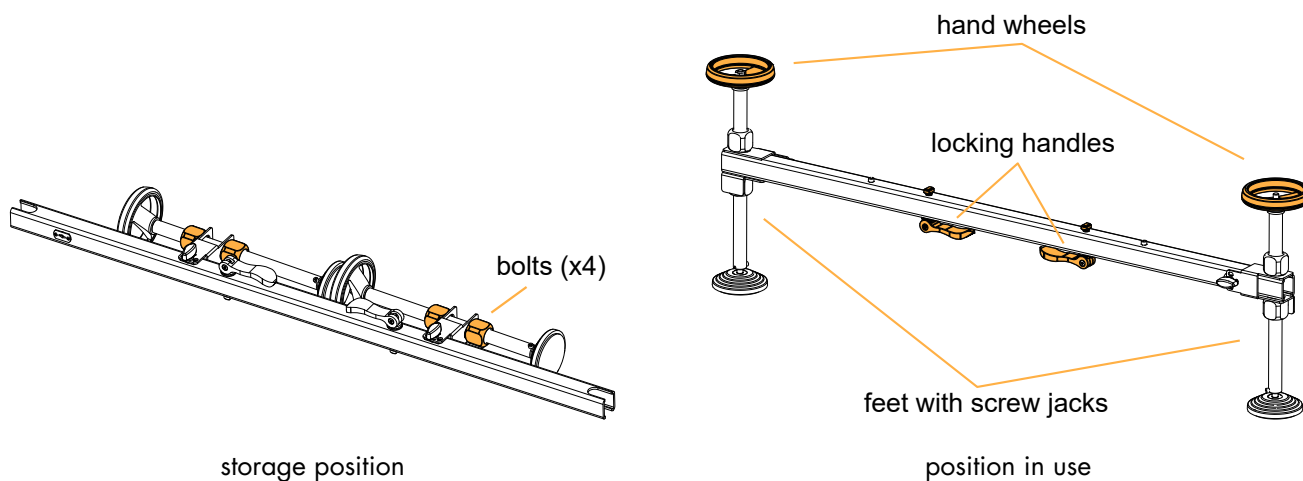
Rigging elements for stacked arrays

K2-JACK

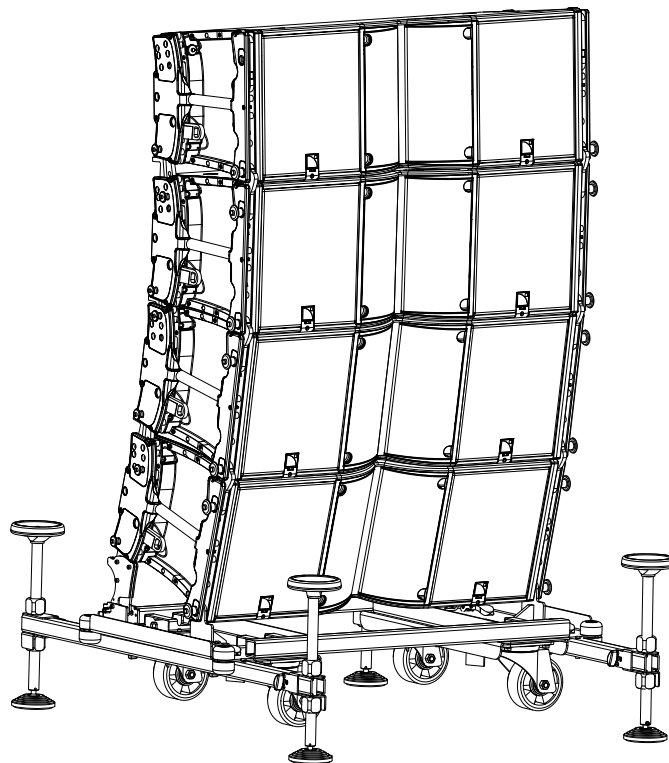
K2-JACK is a set of two bars and four feet with screw jacks and hand wheels. K2-JACK can be fitted onto K3-CHARIOT to improve stability or correct floor discrepancies.

i During transportation, make sure the bolts are tightened.

i K2-JACK cannot be stored on K3-CHARIOT.



With K2-JACK, the site angle of the K3 array can be adjusted between -23° and $+13^{\circ}$.

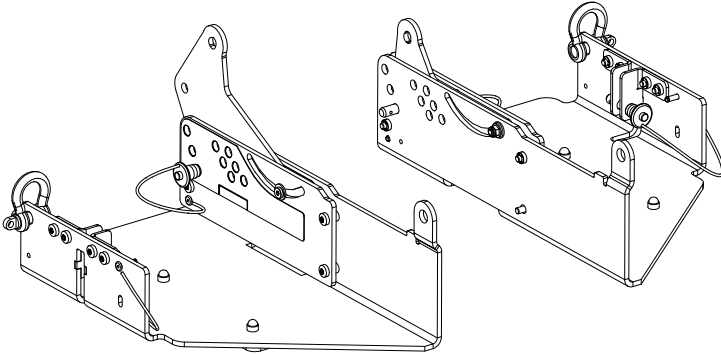


K3-TILT

K3-TILT is a site angle adjustment accessory that interfaces between KS28 and K3 in a stacked array. It is used in combination with two KS28-OUTRIG to ensure stability.

! Do not use K3-TILT in a flown array.

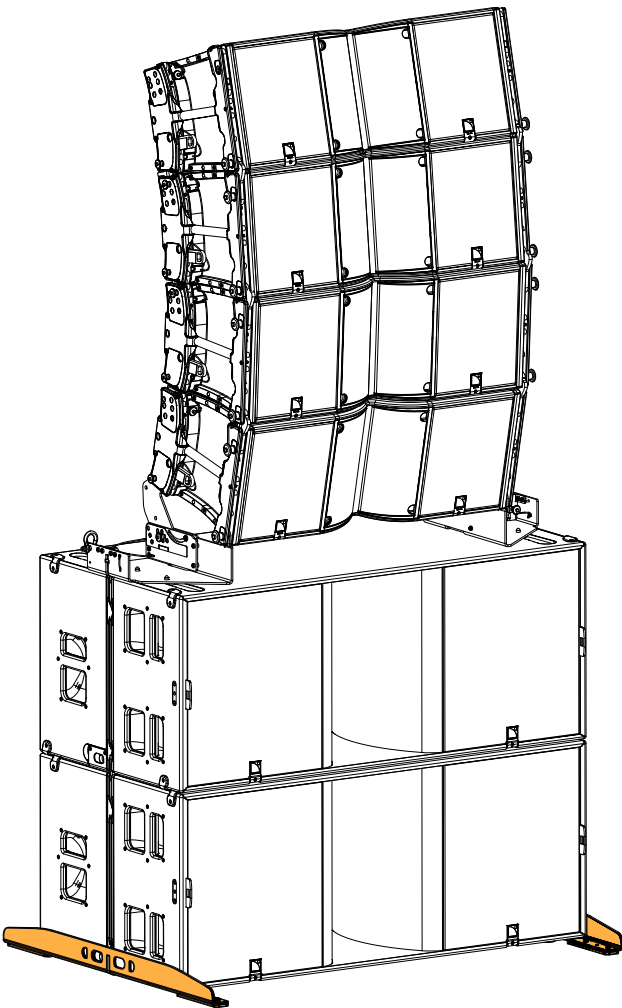
The opening angle of K3-TILT can be adjusted between 0 and -20°.



K3-TILT features two shackles to implement an additional safety.

KS28-OUTRIG

KS28-OUTRIG is a set of two stability bars for KS28. KS28-OUTRIG matches the rigging system of KS28.



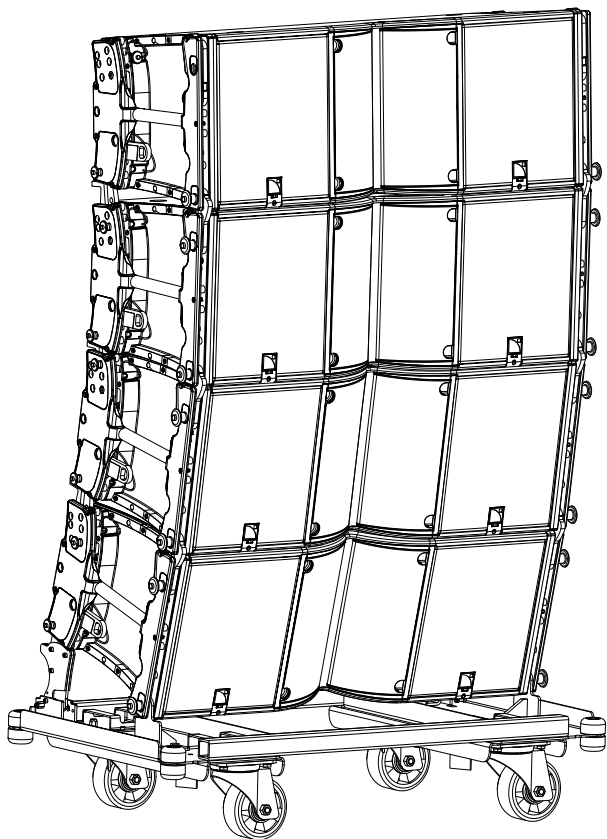
Storage and handling elements

K3-CHARIOT

K3-CHARIOT is a chariot designed for the transportation and storage of blocks of up to four K3. It features two rear rigging arms to secure the lower K3.

During transportation, the blocks must have an inter-enclosure angle of 10° to avoid any separation of the enclosures. This angle must be set using the enclosure rear rigging arm pin. The automatic locking system must remain unloaded.

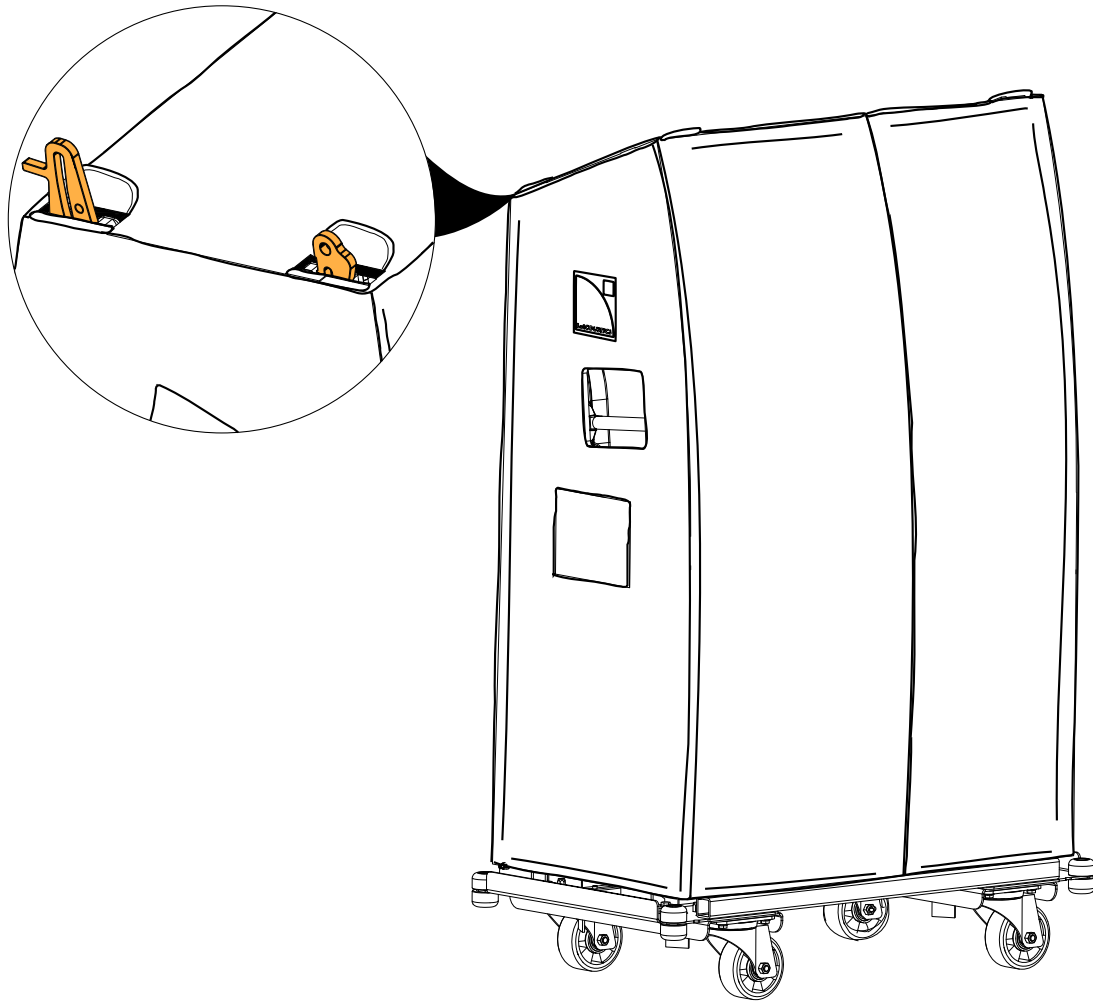
The K3-CHARIOT rear rigging arm must be at its -15° site angle position.



K3-CHARIOTCOV

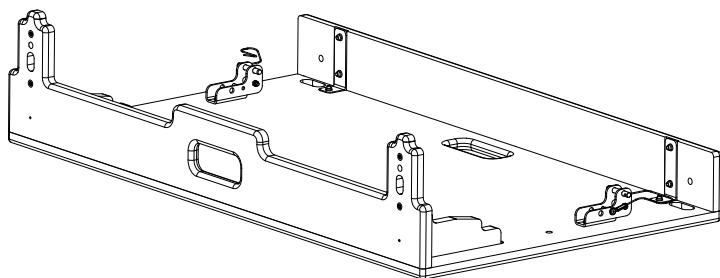
K3-CHARIOTCOV is a protective cover for four K3 on K3-CHARIOT.

K3-CHARIOTCOV features four flaps with velcro fasteners at the top to pull out the rigging arms of the top enclosure in order to mount K3-CHARIOTLID.

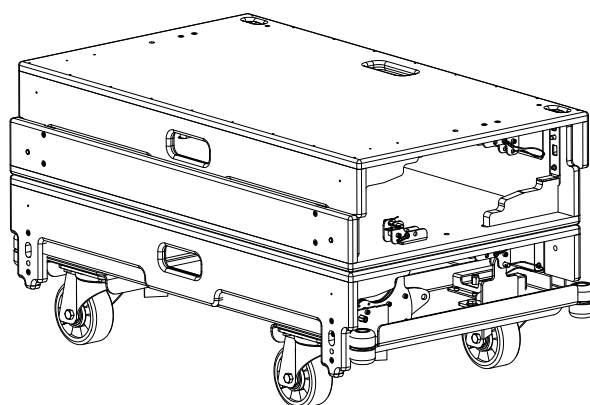
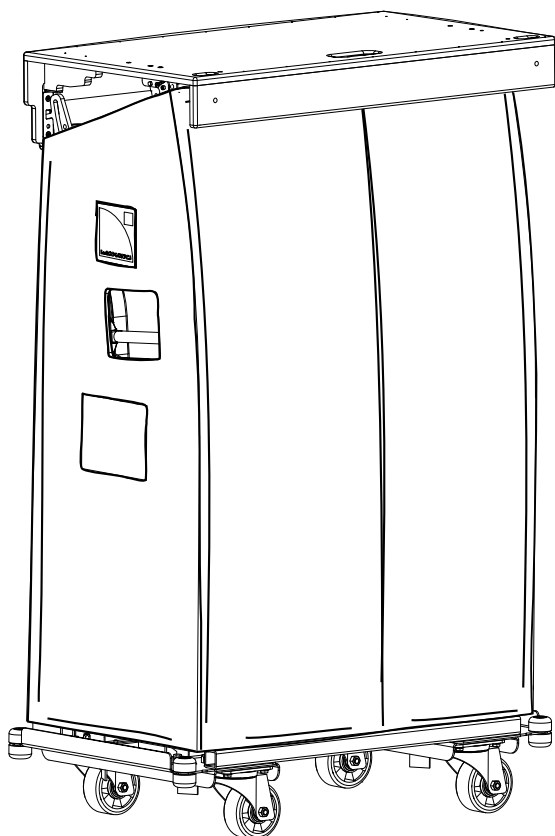


K3-CHARIOTLID

K3-CHARIOTLID can be used to store equipment on top of K3 during transportation. Its load capacity is up to 400 kg/881.8 lb.

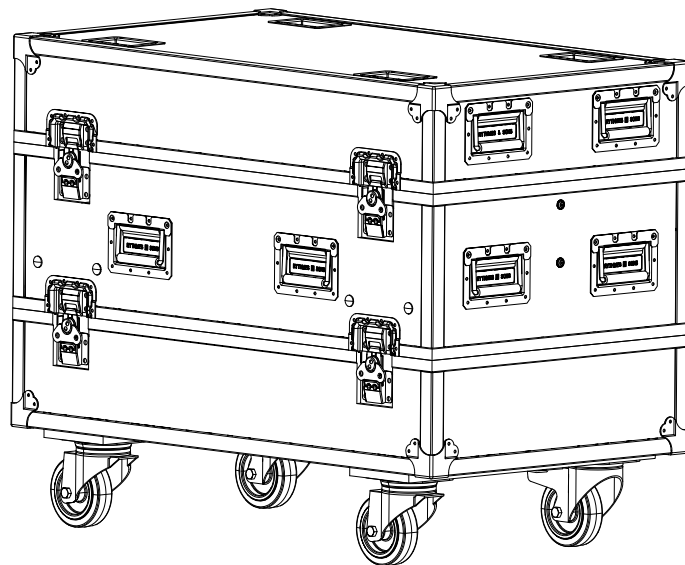


Multiple K3-CHARIOTLID can be stacked for storage. Refer to [Stacking multiple K3-CHARIOTLID on K3-CHARIOT](#) (p.94) for more information.



K3-BUMPFLIGHT

K3-BUMPFLIGHT is a flightcase for transporting the accessories of the K3 system.



The flightcase contains:

- 1 K3-BUMP
- 1 K3-BAR
- 1 KARADOWNK3
- 1 K3-RIGBAR
- 1 K3-TILT
- 1 KS28-OUTRIG
- 1 DELTA 1.5T
- 1 LA-SLING2T
- 1 BPCHAIN 1.5T

Mechanical safety

Flown configurations

The K3 rigging system complies with 2006/42/EC: Machinery Directive. It has been designed following the guidelines of BGV-C1.

2006/42/EC: Machinery Directive specifies a safety factor of 4 against the rupture. The flown deployments described in this manual achieve a safety factor of **4 or more**.

Refer to Soundvision for the safety factor of a specific deployment.

The **safe limit** gives the maximum number of elements for which the safety factor is compliant with the 2006/42/EC: Machinery Directive, within the use defined in this manual and regardless of the other deployment parameters (site angles, inter-enclosure angles, etc.).

The **maximum limit** gives the maximum number of elements for which the safety factor can be compliant with the 2006/42/EC: Machinery Directive, when the other deployment parameters provide the best mechanical conditions.

For mixed arrays refer to your Soundvision model.

K3

configuration	rigging accessory	safe limit	maximum limit
flown	K3-BUMP	16	24
	K3-BUMP + K3-BAR	16	24
	K3-BUMP + 2 K3-BAR + 2 LA-SLING2T + LA-RAKMOUNT	18 K3 + 1 LA-RAK II AVB	24
flown and pullback	K3-RIGBAR	16	16

K3 + Kara II

configuration	rigging accessory	safe limit	maximum limit
flown with a downfill	KARADOWNK3	12 K3 + 6 Kara II	18 K3 + 6 Kara II

KS28

configuration	rigging accessory	maximum / safe limit
Flown	KS28-BUMP	16

Other configurations

For other configurations, respect the recommended maximum limit for optimal stability.



Use safety straps

Always use safety straps on stacked arrays higher than four enclosures.

K3

configuration	rigging accessory	safe limit	maximum limit
Stacked	K3-CHARIOT + K2-JACK	4	6


K3 + KS28

configuration	rigging accessory	safe limit	maximum limit
Stacked	K3-TILT + KS28-OUTRIG	5 enclosures	4 K3 + 4 KS28


KS28

configuration	rigging accessory	maximum limit
Ground-stacked	No rigging accessory or KS28-OUTRIG (optional)	4 or 5

Assessing mechanical safety

-  **Mechanical safety of the rigging system**
 Before any installation, always model the system in Soundvision and check the **Mechanical Data** section for any stress warning or stability warning.

In order to assess the actual safety of any array configuration before implementation, refer to the following warnings:

-  **Rated working load limit (WLL) is not enough**
 The rated WLL is an indication of the element resistance to tensile stress. For complex mechanical systems such as loudspeaker arrays, WLLs cannot be used per se to determine the maximum number of enclosures within an array or to assess the safety of a specific array configuration.

Maximum pullback angle

If a pullback accessory is available, the pullback angle must not exceed a 90° negative site angle.

Mechanical modeling with Soundvision

The working load applied to each linking point, along with the corresponding safety factor, will depend on numerous variables linked to the composition of the array (type and number of enclosures, splay angles) and the implementation of the flying or stacking structure (number and location of flying points, site angle). This cannot be determined without the complex mechanical modeling and calculation offered by Soundvision.

Assessing the safety with Soundvision

The overall safety factor of a specific mechanical configuration always corresponds to the lowest safety factor among all the linking points. Always model the system configuration with the Soundvision software and check the **Mechanical Data** section to identify the weakest link and its corresponding working load. By default, a stress warning will appear when the mechanical safety goes beyond the recommended safety level.

Safety of ground-stacked arrays in Soundvision

For ground-stacked arrays, a distinct stability warning is implemented in Soundvision. It indicates a tipping hazard when the array is not secured to the ground, stage or platform. It is the user's responsibility to secure the array and to ignore the warning.

Additional safety for flown arrays

When flying an array, use available holes to implement a secondary safety.

Considerations must be given to unusual conditions

Soundvision calculations are based on usual environmental conditions. A higher safety factor is recommended with factors such as extreme high or low temperatures, strong wind, prolonged exposition to salt water, etc. Always consult a rigging specialist to adopt safety practices adapted to such a situation.

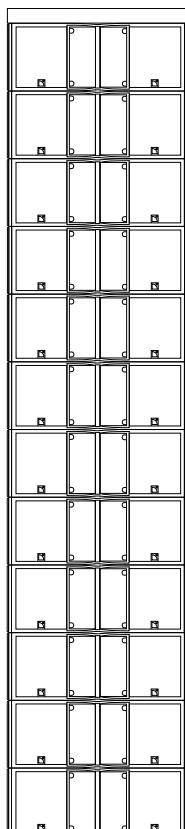
Loudspeaker configurations

Line source

Deployed as a line source, the system operates over the nominal bandwidth of the K3 enclosure, with an adjustable horizontal directivity.

The [K3 70], [K3 90], and [K3 110] presets allow for a reference frequency response in long throw applications. Each preset is dedicated to a horizontal directivity setting.

K3 is driven by the LA4X / LA8 / LA12X amplified controllers.



Enclosure	K3
Preset	[K3 70] [K3 90] [K3 110]
Frequency range (-10 dB)	42 Hz - 20 kHz

Line source with low-frequency element

A K3 line source can be deployed with additional subwoofer enclosures to extend the bandwidth in the low-end or increase sub-low resources.

The [K3 70], [K3 90], and [K3 110] presets allow for a reference frequency response in long throw applications. Each preset is dedicated to a horizontal directivity setting.

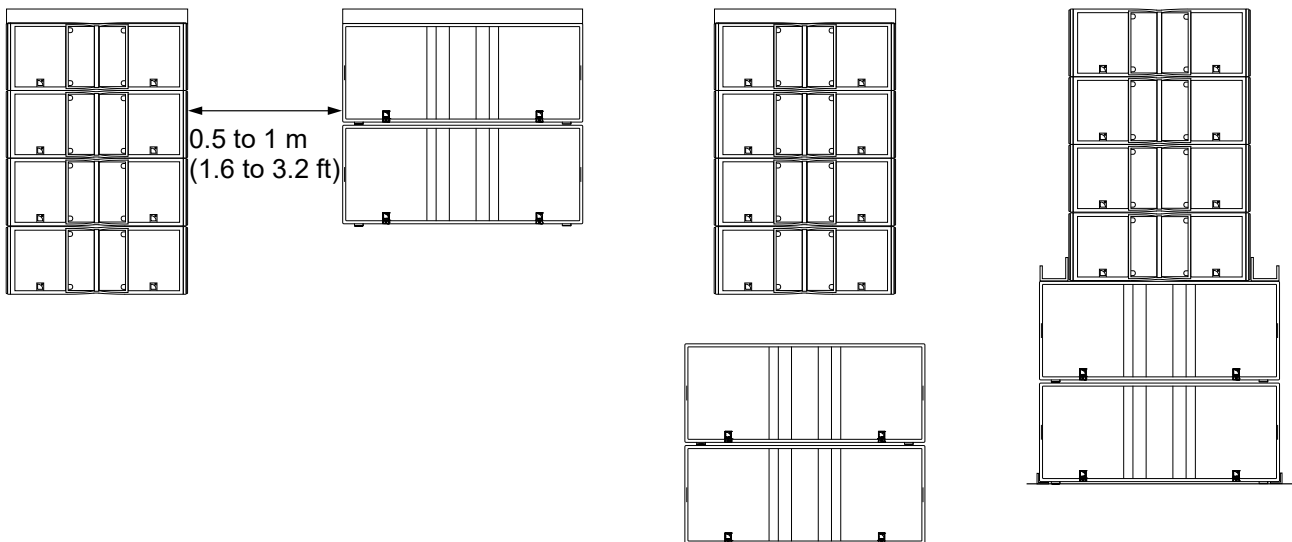
The [xxxx_60] presets provides the subwoofers with an upper frequency limit at 60 Hz in separated or coupled configuration for an optimal frequency coupling with the K3 line source.

Amplified controllers compatibility

	LA4X	LA8	LA12X
K3	✓	✓	✓
KS28	—	—	✓
KS21	—	✓	✓

K3 line source with coupled KS28 or KS21

2 K3 : 1 KS28 / 3 K3 : 2 KS21*



Enclosure	K3	KS28 or KS21
Preset	[K3 70] [K3 90] [K3 110]	[xxxx_60]
Frequency range (-10 dB)	25 Hz - 20 kHz 29 Hz - 20 kHz	

! 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.

* KS21 cannot be mechanically coupled with a K3 line source in an array. The KS21 and K3 arrays must be flown independently. Refer to the **KS21 owner's manual** for more information on how to set up a KS21 array.

**Delay values**

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

Pre-alignment delays**K3 + KS28**

presets	pre-alignment delay values and polarity settings			
[K3] + [KS28_60]	K3 = 0.5 ms	<input type="checkbox"/>	KS28 = 0 ms	<input type="checkbox"/>
[K3] + [KS28_60_C]	K3 = 6 ms	<input type="checkbox"/>	KS28 = 0 ms	<input type="checkbox"/>
[K3] + [KS28_60_Cx]	K3 = 4 ms	<input type="checkbox"/>	KS28 = 0 ms	<input type="checkbox"/>

K3 + KS21

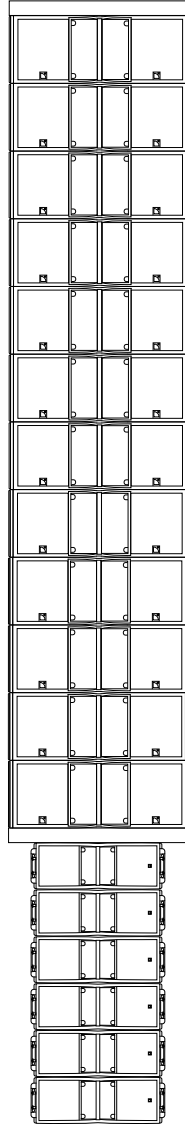
presets	pre-alignment delay values and polarity settings			
[K3] + [KS21_60]	K3 = 0 ms	<input type="checkbox"/>	KS21 = 0 ms	<input type="checkbox"/>
[K3] + [KS21_60_C]	K3 = 5.5 ms	<input type="checkbox"/>	KS21 = 0 ms	<input type="checkbox"/>
[K3] + [KS21_60_Cx]	K3 = 5 ms	<input type="checkbox"/>	KS21 = 0 ms	<input type="checkbox"/>

Additional downfill element

All K3 system configurations can be combined with an additional Kara / Kara II line source downfill system. This allows an extension of the vertical coverage to the closer audiences.

Kara / Kara II

The Kara / Kara II enclosures are driven by the LA4X / LA8 / LA12X amplified controllers.



Enclosure	K3	Kara II or Kara
Preset	[K3 70] [K3 90] [K3 110]	[KARAIIDOWNK3] [KARADOWNK3]
Frequency range (-10 dB)	42 Hz - 20 kHz	



Do not add any delay between the K3 and Kara / Kara II elements of a mixed line source.



Using the Kara / Kara II system

Refer to the **Kara II owner's manual** for the operating modes of Kara / Kara II as a main system.

Inspection and preventive maintenance

How to do preventive maintenance

Inspect the system before any deployment and after any corrective maintenance operation.

Perform preventive maintenance at least once a year.

Refer to the maintenance manuals for advanced maintenance.

Rigging and hardware

Perform the [Rigging part inspection](#) (p.42) on each rigging part.

Use the [Mechanical system overview](#) (p.42) to identify critical parts of the system and apply the specific checks described in the [Inspection references](#) (p.50).

Do the [Rigging check](#) (p.53).

If any parts are damaged, contact your L-Acoustics representative for further instructions.

Acoustics

Perform the [Enclosure check](#) (p.57).

Perform the [Listening test](#) (p.59) to detect any degradation in sound quality.

Rigging part inspection

About this task

For critical rigging parts, use the [Inspection references](#) (p.50) for comparison and specific manipulations.

Prerequisite

Perform the inspection in a well-lit environment.

Procedure

1. Check that the rigging part is present.
2. If applicable, disassemble the rigging part from the enclosure or the rigging accessory.

Check that the tethers are intact and safely secured.

3. Inspect the part from every side.

Compare with the **reference pictures**.

Check for:

- corrosion
- wear and cracks
- bends and dents
- holes
- missing safety cues
- missing identification labels
- missing or loose fasteners



Replacing screws

If a screw is loose, remove and replace it.

Always use the new screws provided in the repair kit.

If no new screw is available, add blue threadlocker before reusing the screw.

Do not apply more than the indicated torque.

4. Check the **geometry** of the part to identify critical deformations.

Place the rigging part on a flat surface or hold a level against it.

5. Check the **moving parts**.

Make sure that the mechanism engages correctly.



What to do next

If a problem is detected, perform the authorized maintenance operations or contact your L-Acoustics representative.

Mechanical system overview

Critical parts of the lifting chains are highlighted.



The  indicates a visual inspection. The  indicates a functional check.



Perform the [Rigging part inspection](#) (p.42) on critical parts.

For each part, refer to the [Inspection references](#) (p.50).



Replacing screws

If a screw is loose, remove and replace it.

Always use the new screws provided in the repair kit.

If no new screw is available, add blue threadlocker before reusing the screw.

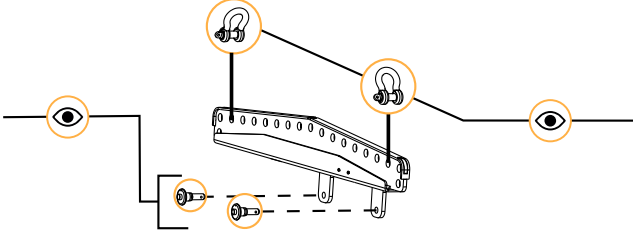
Do not apply more than the indicated torque.

K3 array with K3-BUMP and K3-BAR

Refer to [Rigging part inspection](#) (p.42).

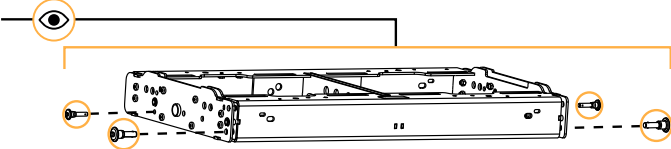


[Ball-locking pins](#) (p.50)

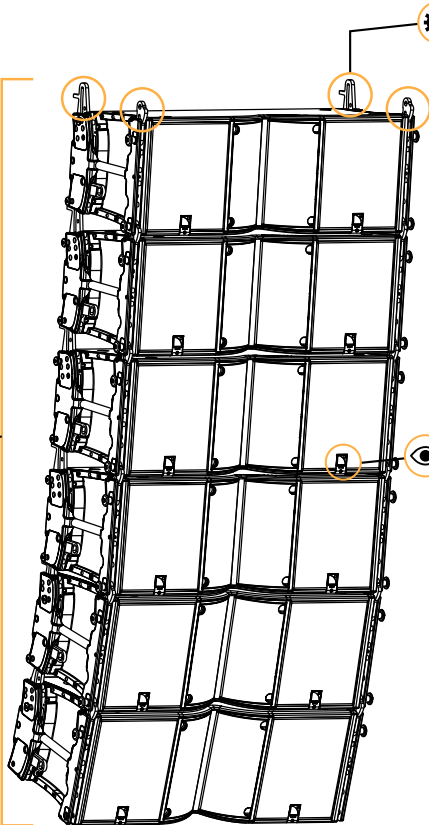


[Shackles](#) (p.52)

[Ball-locking pins](#) (p.50)



[Rigging check](#) (p.53)



[Ball-locking pins](#) (p.50)

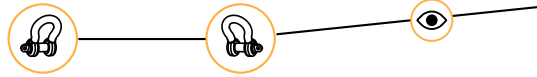
the screw of the grill locking system is present

K3 array with K3-BUMP and KARADOWNK3

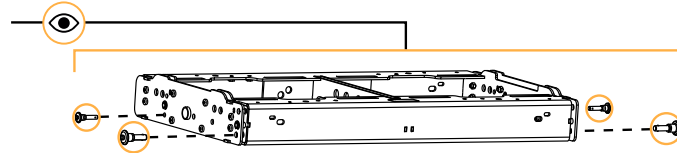
Refer to [Rigging part inspection](#) (p.42).



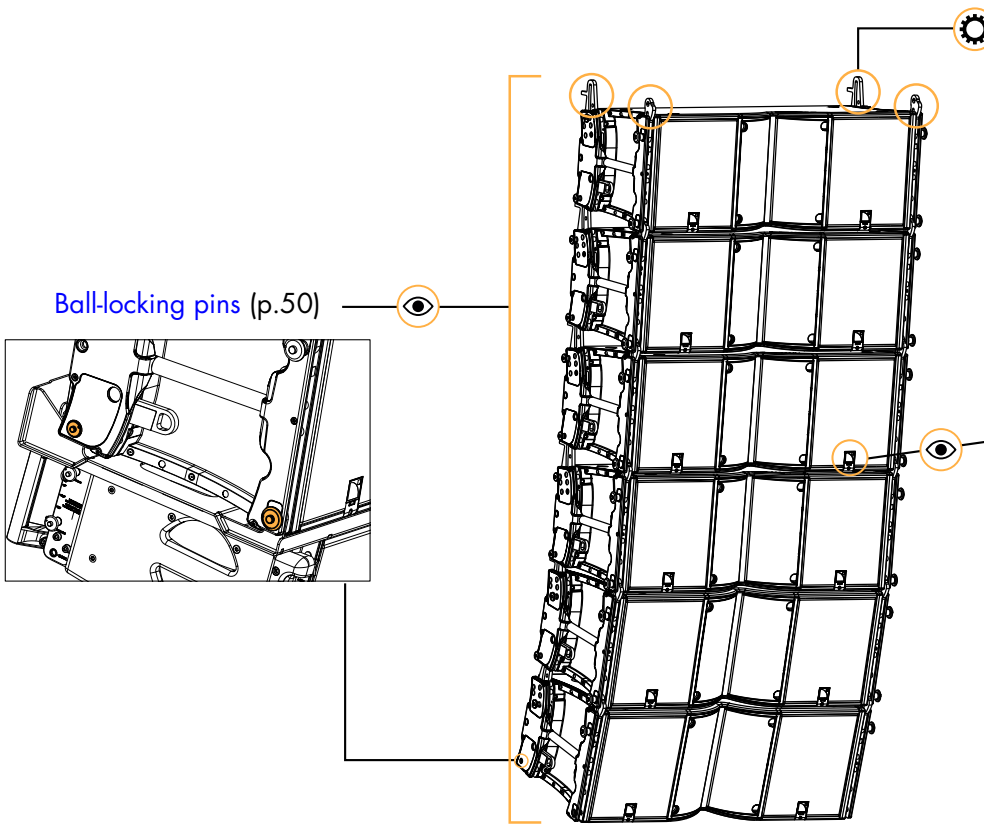
Shackles (p.52)



Ball-locking pins (p.50)

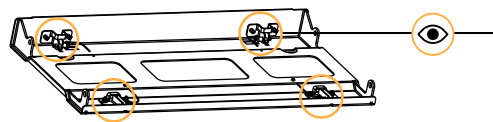
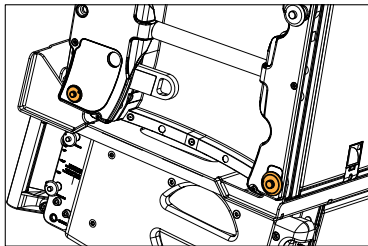


Rigging check (p.53)

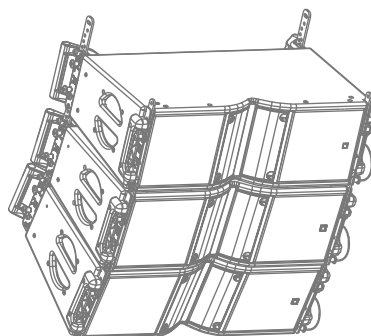
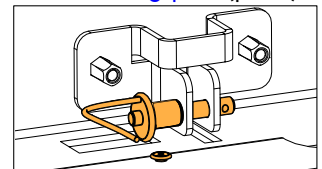


Ball-locking pins (p.50)

the screw of the grill locking system is present



Ball-locking pins (p.50)



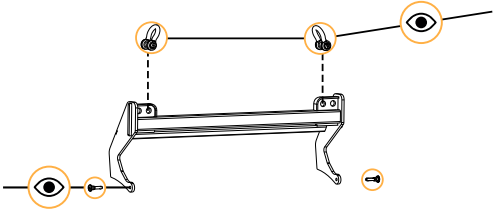
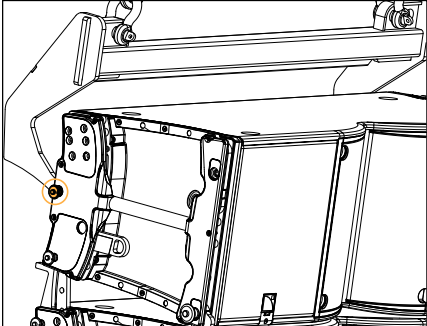
Refer to the **Kara II owner's manual**.

K3 array with K3-RIGBAR as pullback



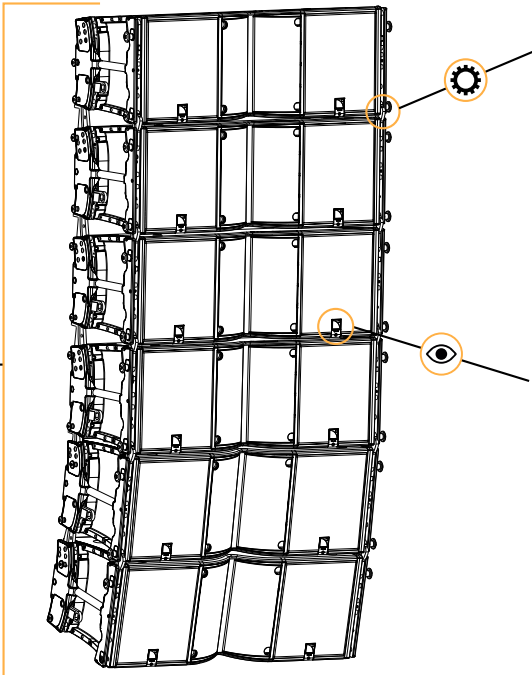
Shackles (p.52)

Ball-locking pins (p.50)



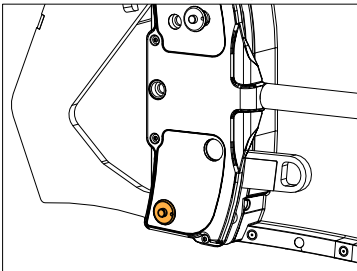
Rigging check (p.53)

Ball-locking pins (p.50)

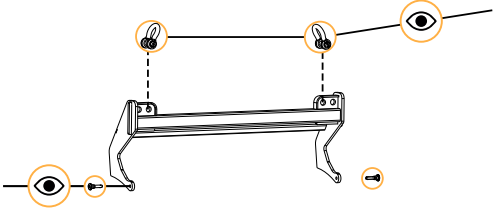


the screw of the grill locking system is present

Ball-locking pins (p.50)



Shackles (p.52)

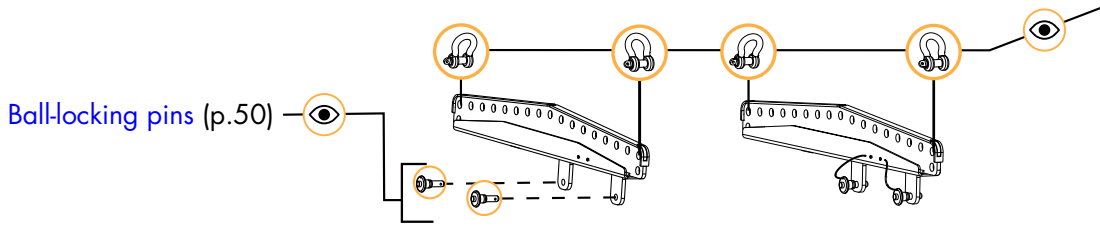


K3 array with K3-BAR, LA-RAKMOUNT, and K3-BUMP

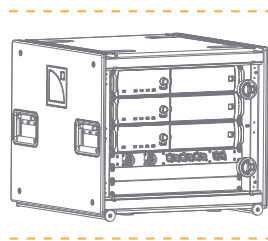
Refer to [Inspection references](#) (p.50).



[Shackles](#) (p.52)

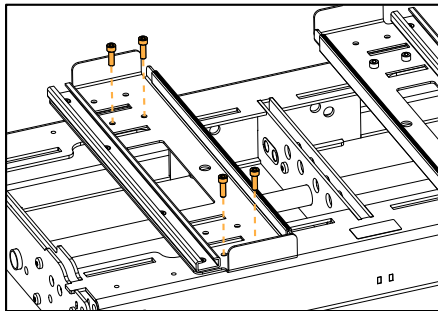


[Ball-locking pins](#) (p.50)

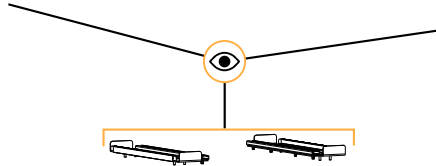


Refer to the **LA-RAK II AVB owner's manual**.

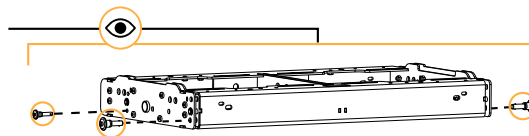
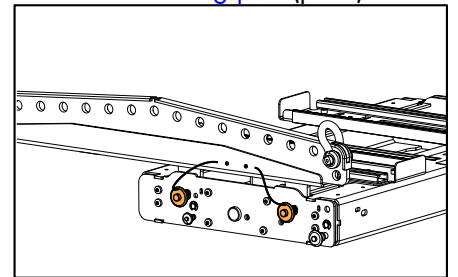
screws are tightened



[Ball-locking pins](#) (p.50)

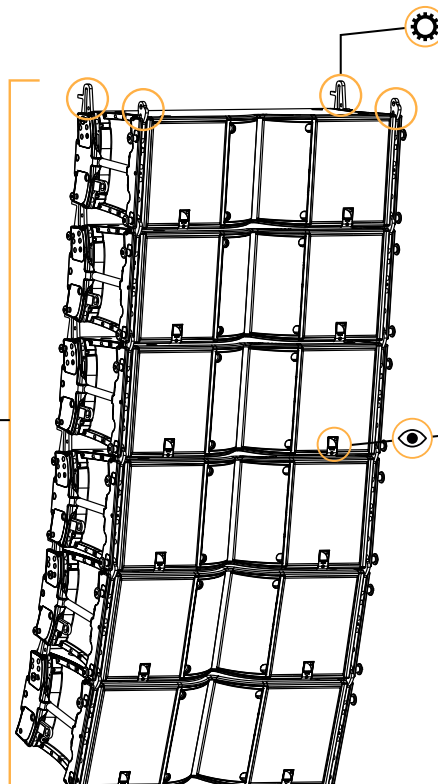


[Ball-locking pins](#) (p.50)



[Rigging check](#) (p.53)

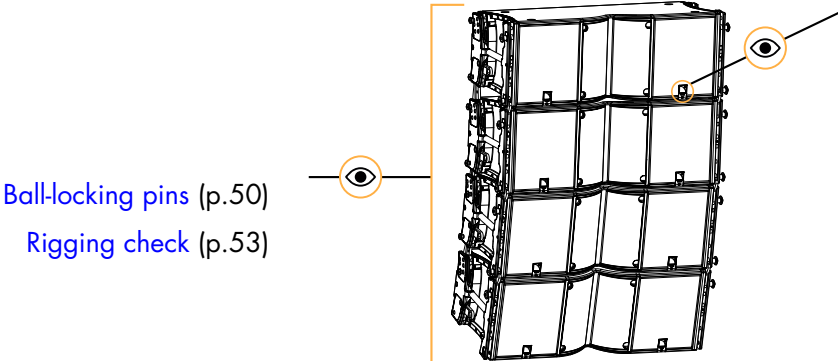
[Ball-locking pins](#) (p.50)



the screw of the grill locking system is present

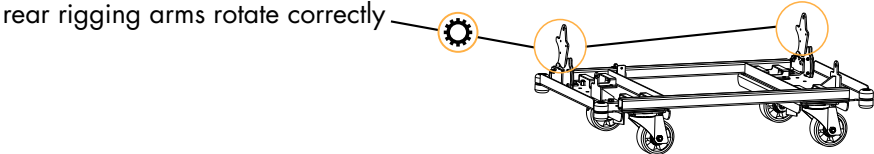
K3 array with K3-CHARIOT and K2-JACK

Refer to [Rigging part inspection](#) (p.42).

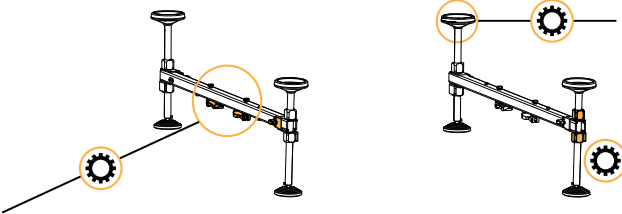


Ball-locking pins (p.50)
Rigging check (p.53)

the screw of the grill locking system is present



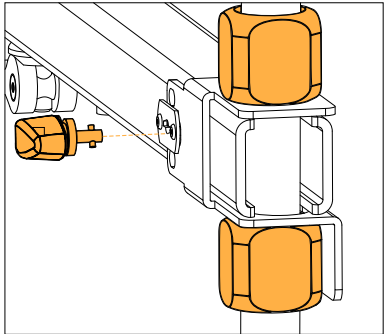
rear rigging arms rotate correctly



turn the hand wheels:
the central part is raised (clockwise) or lowered (counter-clockwise)

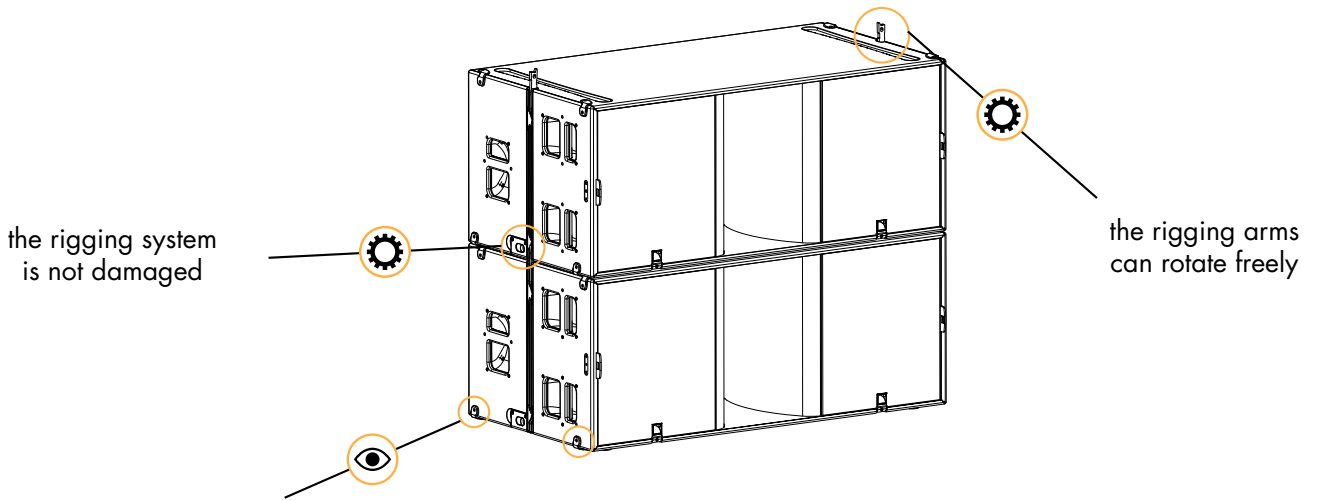
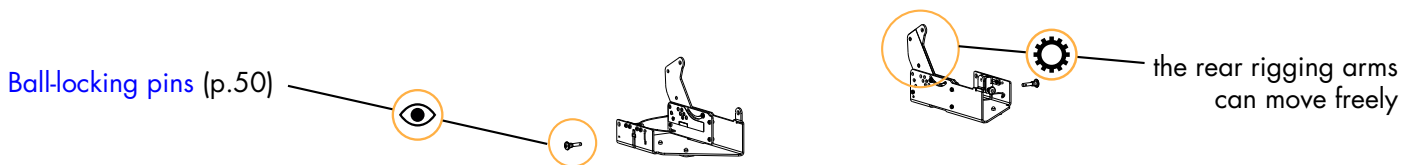
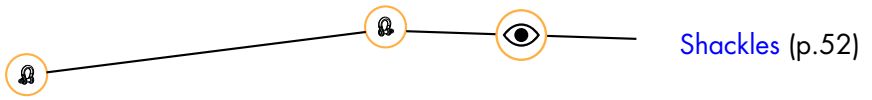
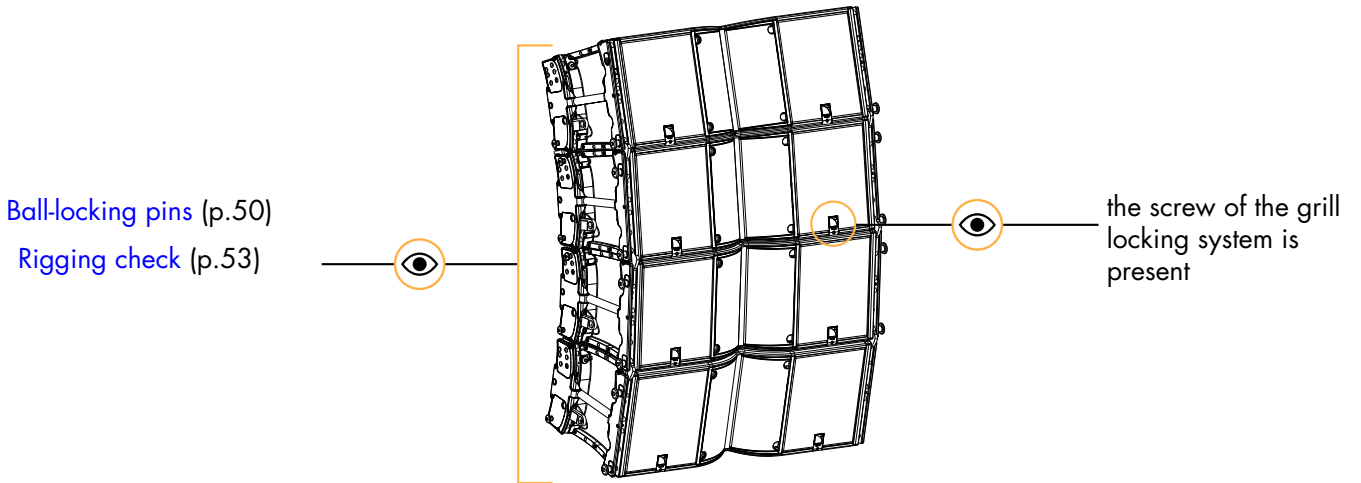
check the integrity of the quarter-turn locking system

the locking handles can be tightened and loosened by hand



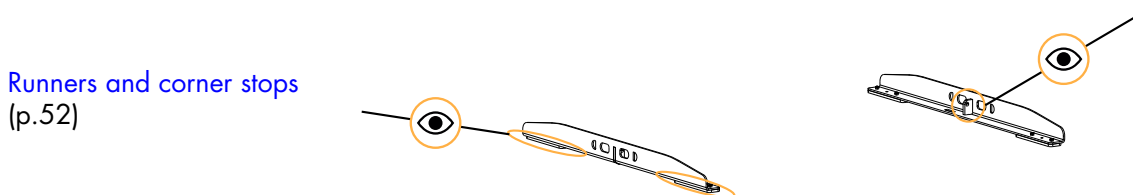
K3 stacked on K3-TILT and KS28 with KS28-OUTRIG

Refer to [Rigging part inspection](#) (p.42).



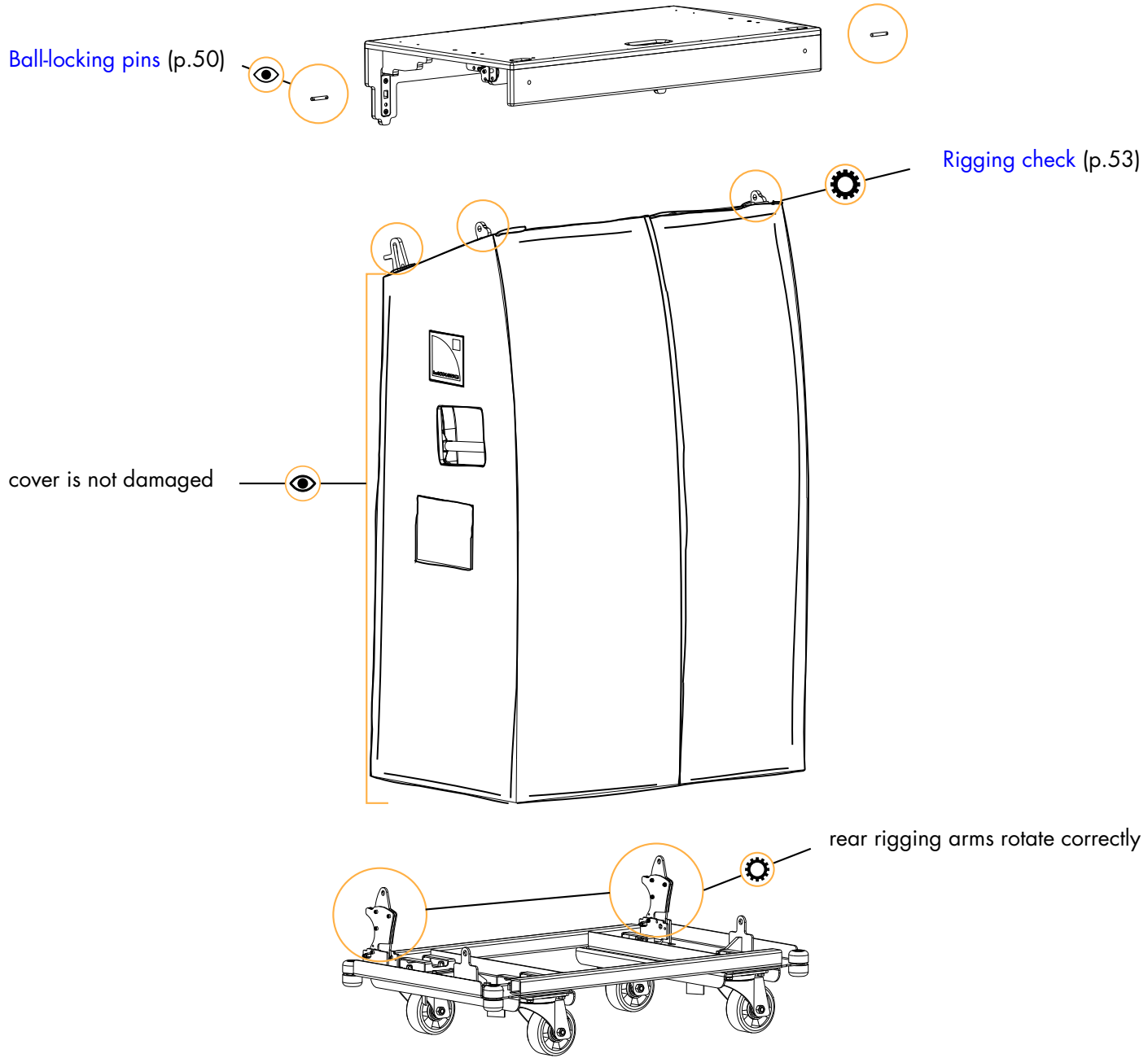
Runners and corner stops (p.52)

tabs are not bent



K3 stacked on K3-CHARIOT with K3-CHARIOTCOV and K3-CHARIOTLID

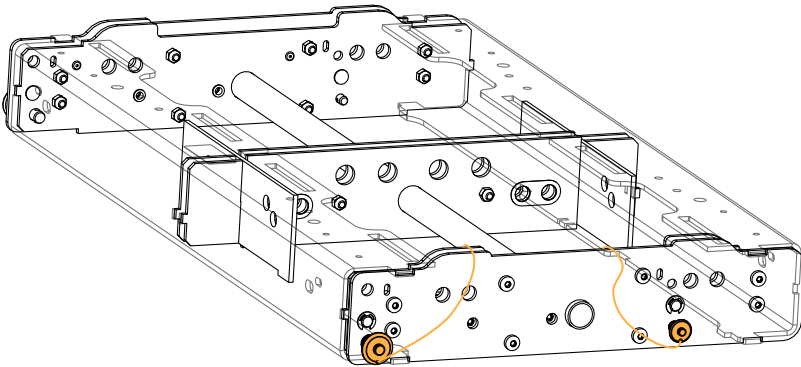
Refer to [Rigging part inspection](#) (p.42).



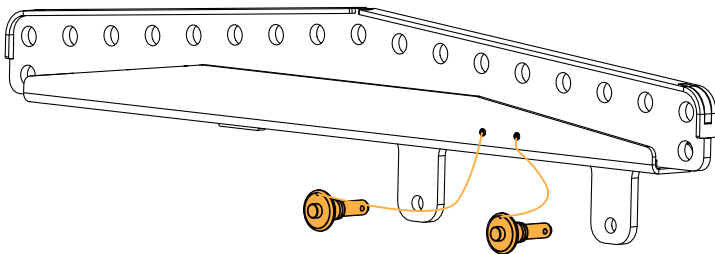
Inspection references

Ball-locking pins

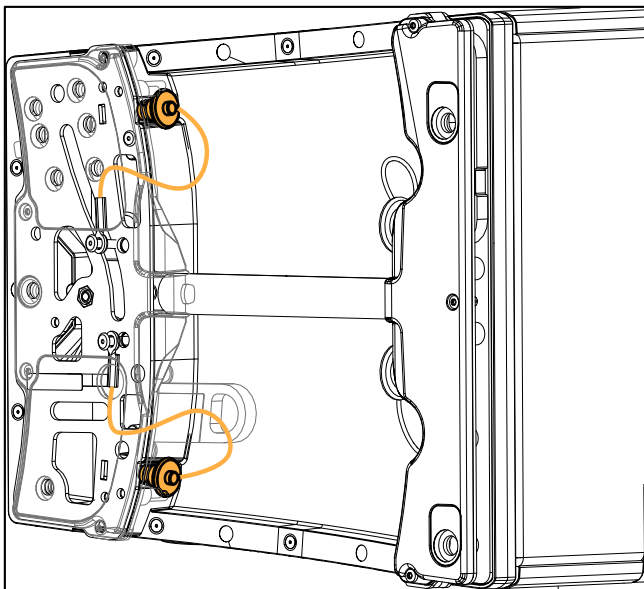
Reference pictures



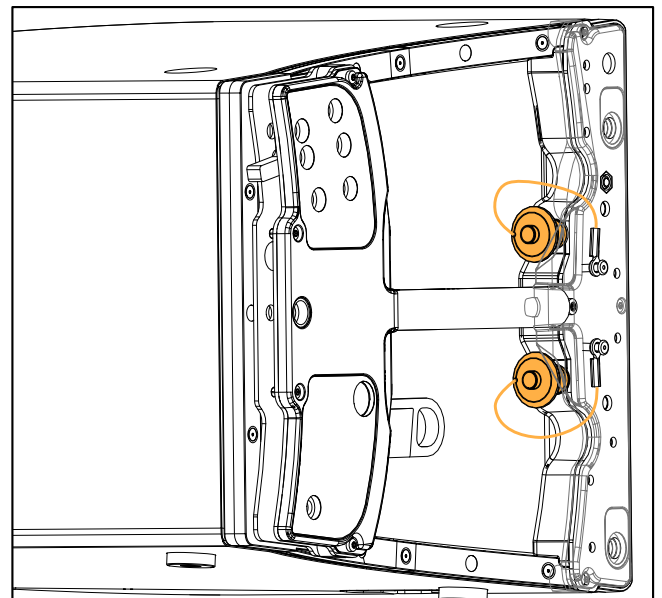
tether (K3-BUMP)



tether (K3-BAR)



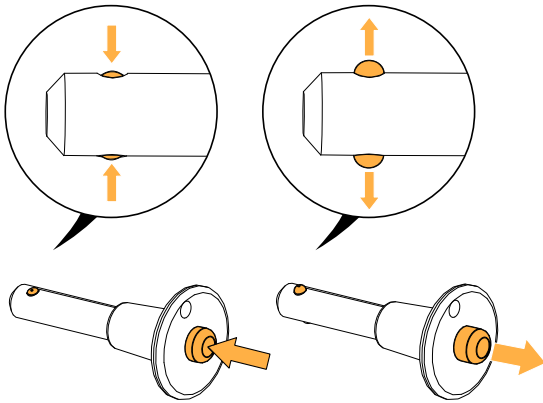
tether (K3)



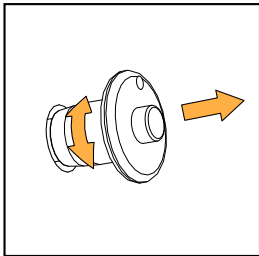
tether (K3)

Moving parts

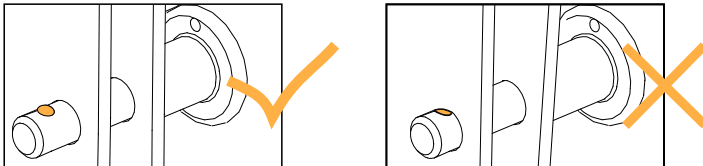
1. Press the push button. The ball-locking mechanism is retracted.
2. Release the button. The ball-locking mechanism is activated.



3. Insert the pin in each storage and rigging hole. Pull and rotate the pin. The pin must remain inside the hole.



If the pin is inserted in two plates, the ball must pass through both plates and lock the pin in place.



If the check fails, **immediately withdraw the product from use and contact L-Acoustics.**

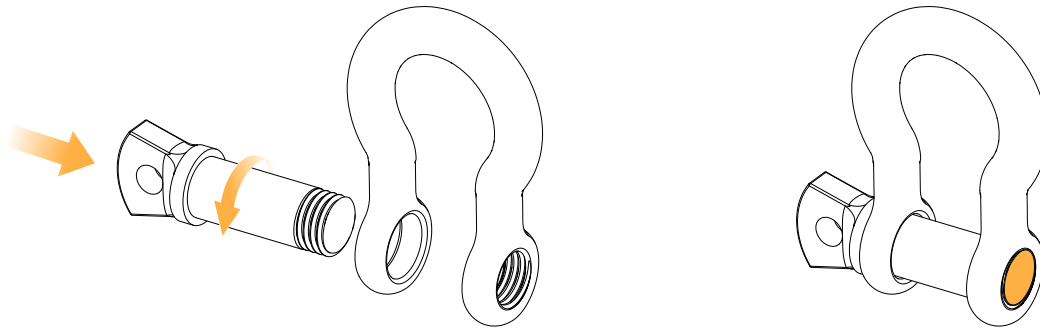
Related tasks

[Rigging part inspection](#) (p.42)

Shackles

Moving parts

Drive the shackle axis in its lodging. Make sure that the end is flush with the shackle.



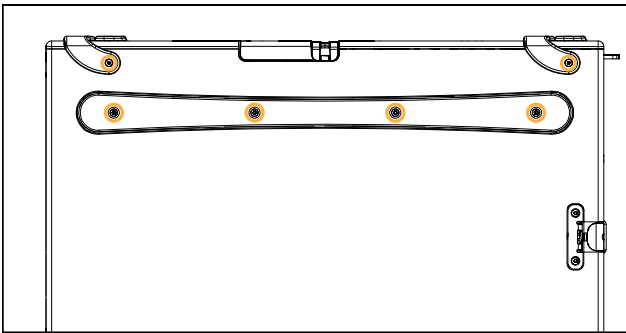
Related tasks

[Rigging part inspection](#) (p.42)

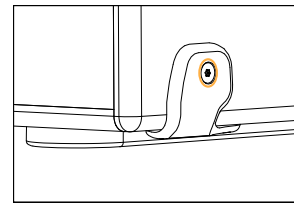
Runners and corner stops

- Runners are not worn out.
- Screws are tightened.

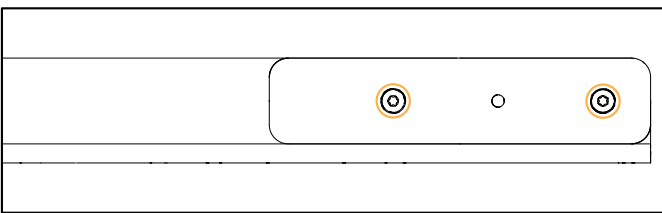
Reference pictures



KS28 ground runner and corner stops



KS28 corner stop



KS28-OUTRIG runner

! Contact your L-Acoustics representative for repair instructions.

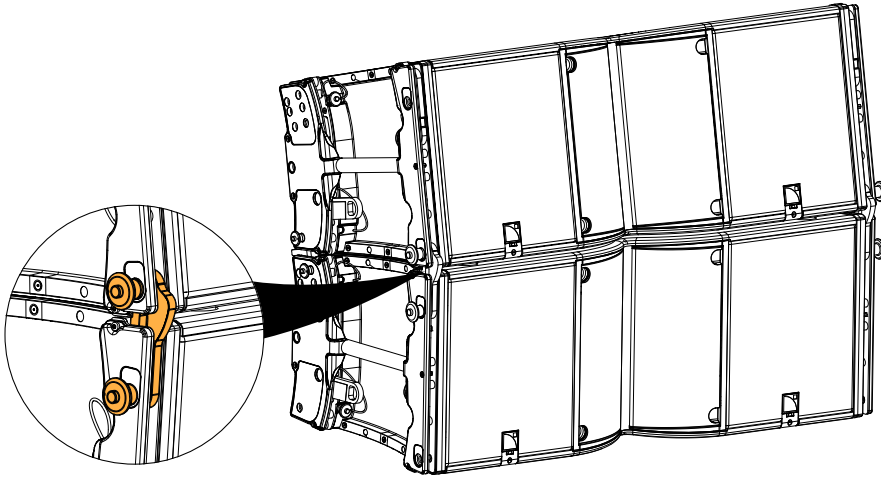
Related tasks

[Rigging part inspection](#) (p.42)

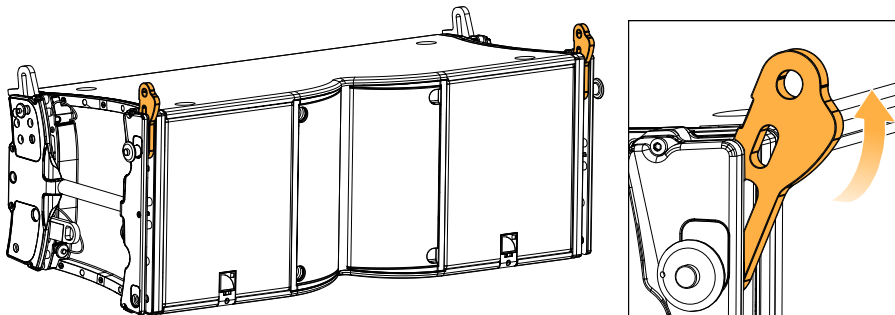
Rigging check

Procedure

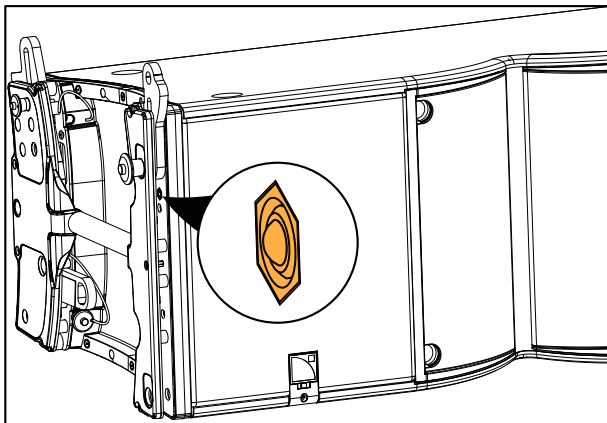
1. Position one K3 on top of another one.
2. Secure the front rigging arms at the LINK holes.



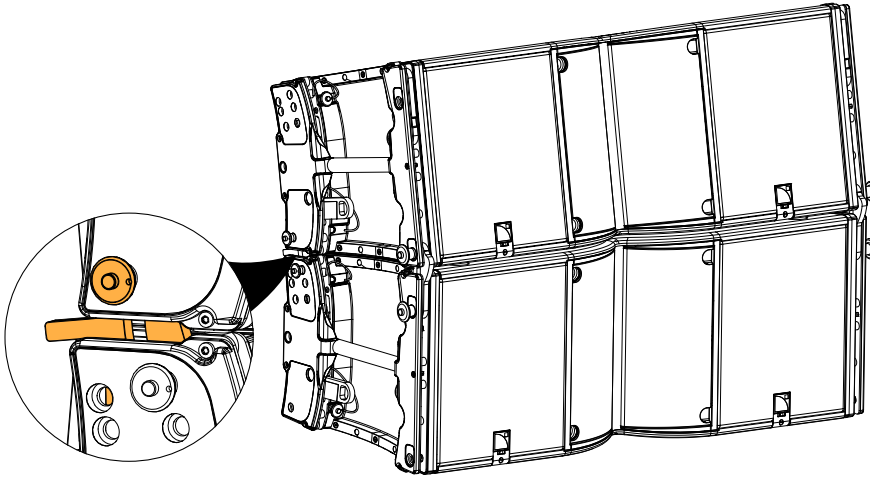
- The front rigging arms can be deployed with some resistance, and rotate correctly.



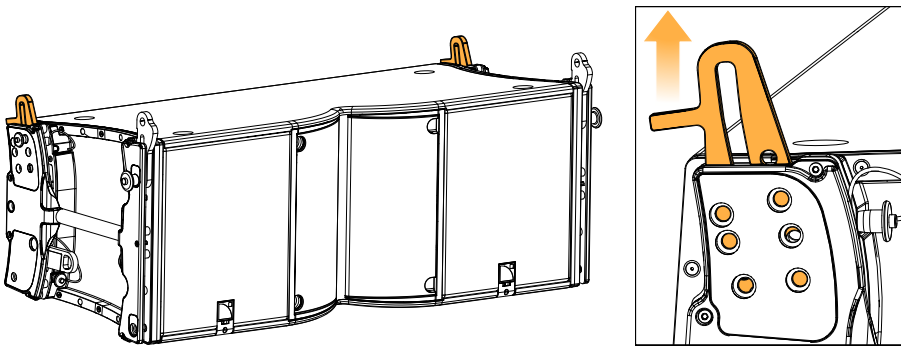
- The ball-type plunger protrudes out the rigging system.



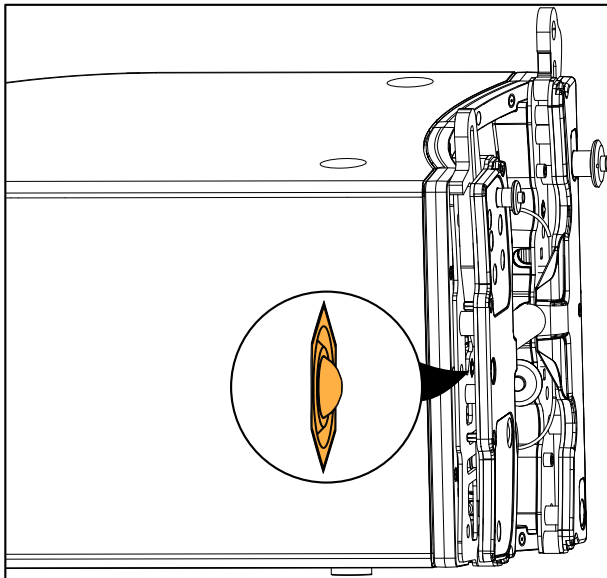
3. Secure the rear rigging arms at the LINK holes.



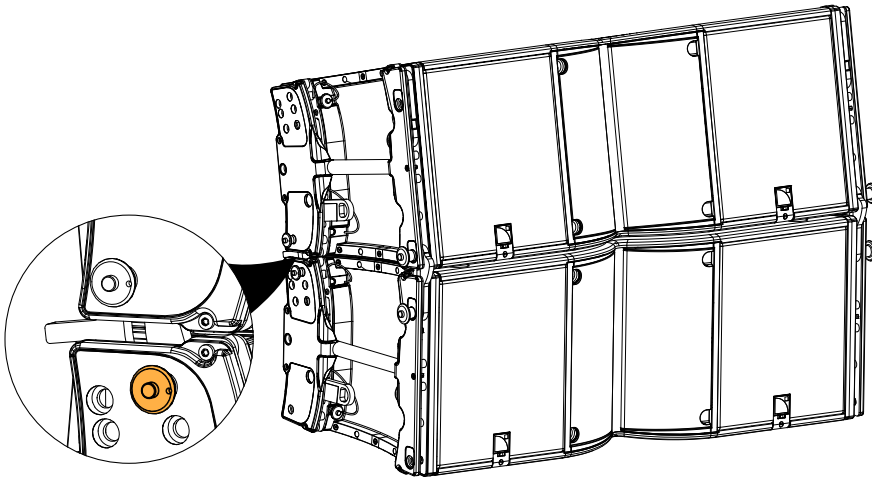
- The rear rigging arms can be deployed with some resistance, and slide correctly.



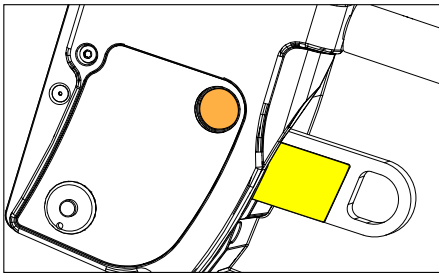
- The ball-type plunger protrudes out the rigging system.



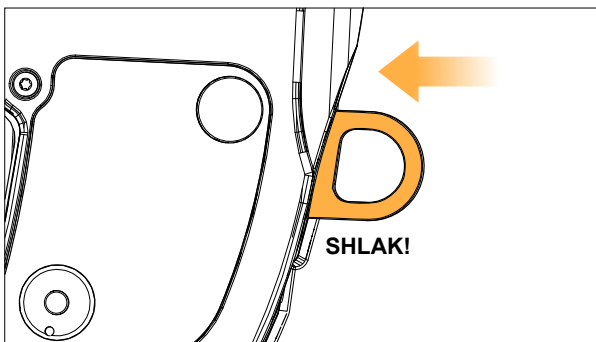
4. Secure the rear rigging arms at one of the inter-enclosure holes.



5. Press the button to activate the automatic locking system.
- The latch slightly retracts when the button is pushed (yellow label visible).



6. Hold and lift the array to lock the inter-enclosure angles.
- The two enclosures remain attached.
 - The automatic locking system button locks and the latches engage (no yellow label visible).

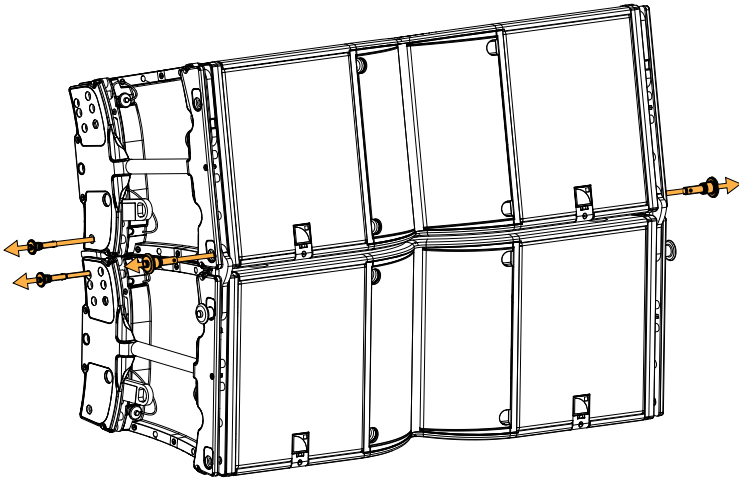


7. Disassemble the two enclosures.



Risk of trapping fingers

When disassembling the enclosures, hold the top one by the handles.




8. Repeat the procedure with the other enclosures.

Acoustical check

Enclosure check

-  **This feature is available on:**
 LA4X
 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:

- LA4X must run at least firmware version 1.1.0.
- LA4X load sensors must be calibrated. Refer to the **Load Sensor Calibration Tool** technical bulletin for more information.
- LA4X must warm up for at least 10 minutes after power up. Do not power off, reboot or switch to standby mode to avoid resetting the countdown.
- 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. Let LA4X warm up for at least 10 minutes.
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.58)
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.58)
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
K3	[K3 70]	42 Hz - 20 kHz
Kara II	[KARA II 70]	55 Hz - 20 kHz
KS28	[KS28_100]	25 Hz - 110 Hz
KS21	[KS21_100]	31 Hz - 100 Hz

Procedure

1. Load the preset on an LA4X / 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 speakers

One or more LF 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. Perform the speaker disassembly procedure.
2. Visually inspect the cables and the connectors.
3. Visually inspect the speaker cone, the voice coil and the spider.

If any damage is visible, replace the speaker.

4. Carefully clean the speaker with a dry cloth.
5. Perform the reassembly procedure.
Replace the speaker gasket and the screws.
Apply the recommended torque.

6. 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.

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.
Apply the recommended torque.
5. Repeat the listening test.
If the problem persists, replace the driver.

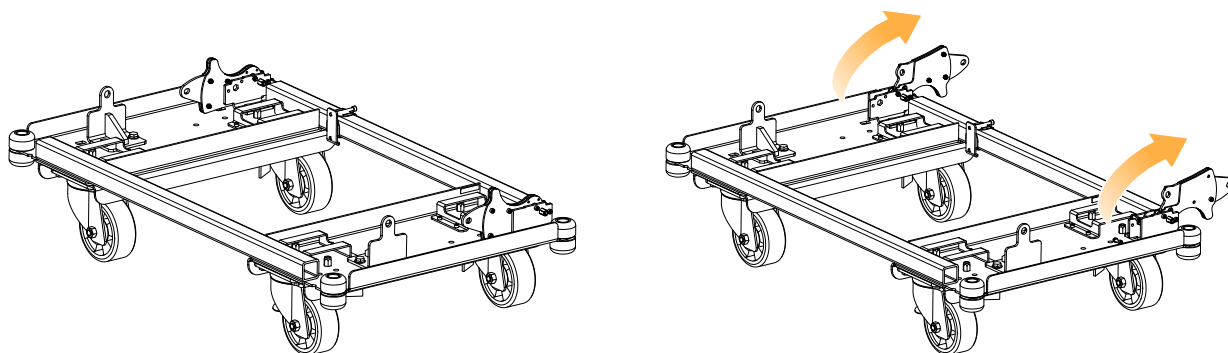
Rigging procedures

Preparing a block of four K3

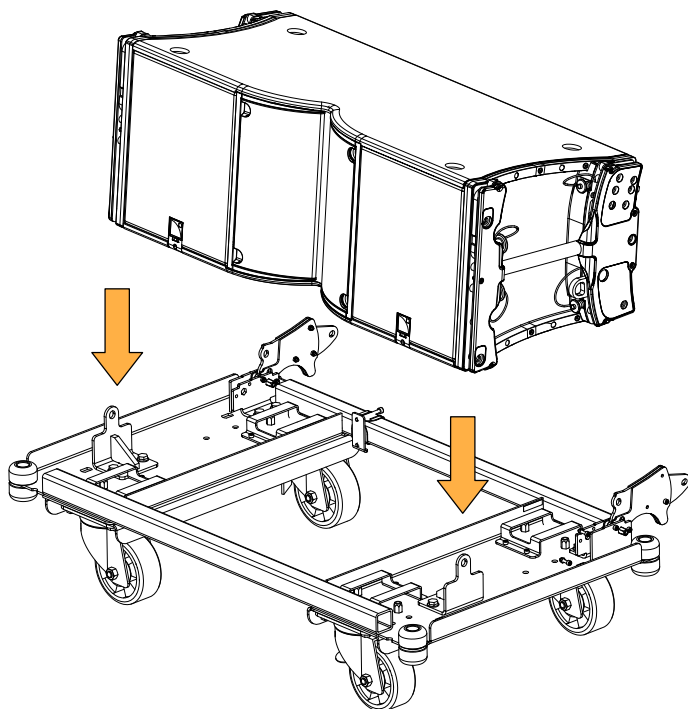
Type of deployment	stacked array
Rigging accessory	K3-CHARIOT
Min number of operators	2

Procedure

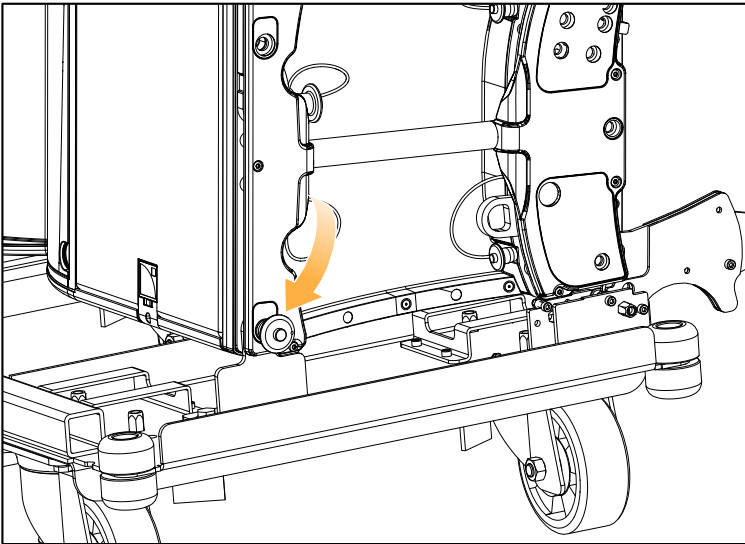
1. Prepare K3-CHARIOT.
Fully rotate the rear rigging arms of K3-CHARIOT to attach a first K3.



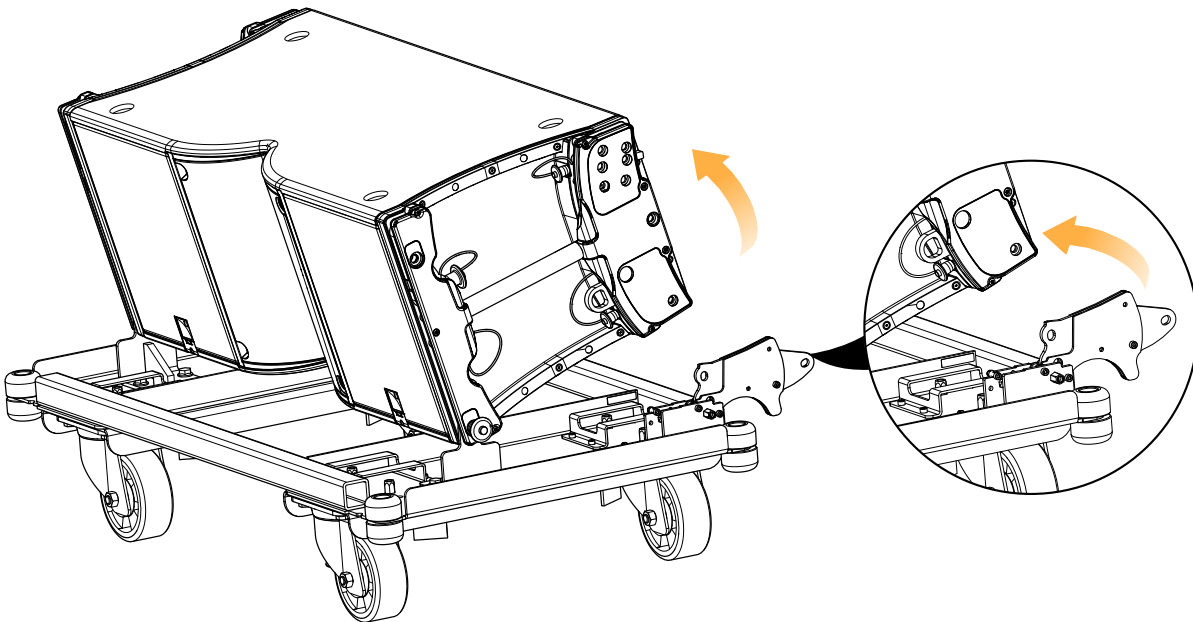
2. Position a first K3 on K3-CHARIOT.



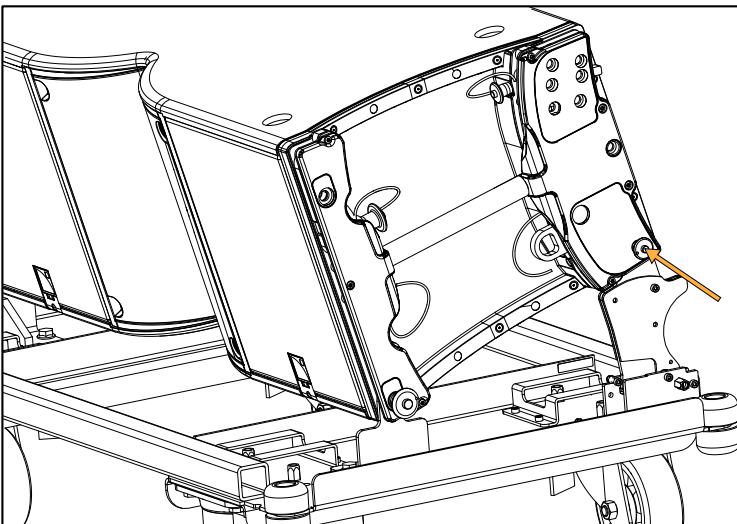
3. Secure the enclosure at the front using the LINK hole.



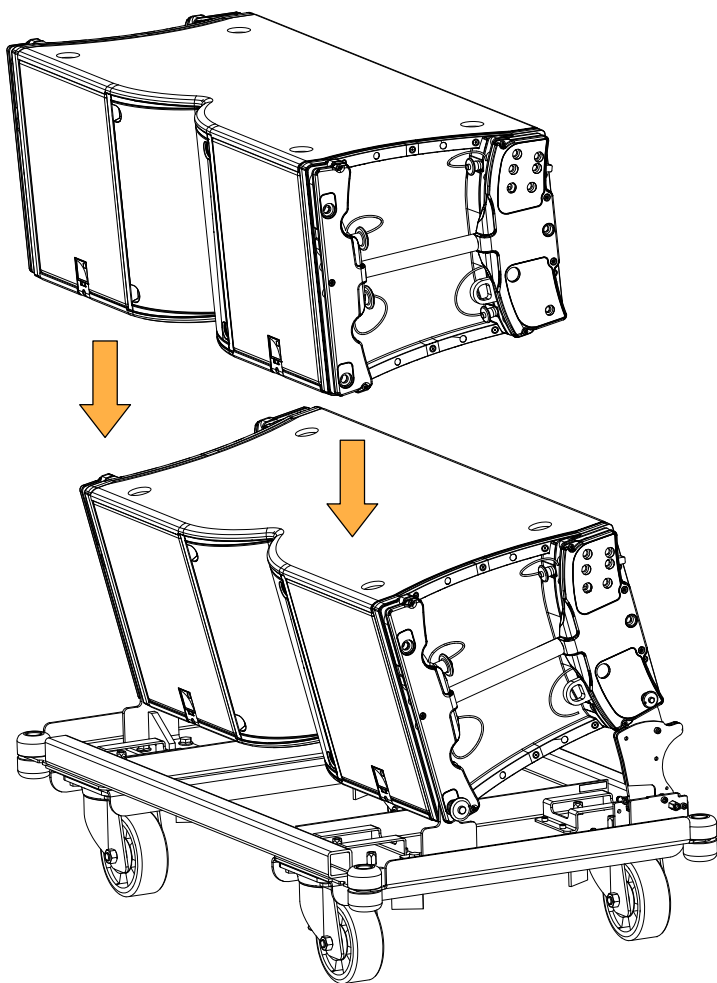
4. Lift the rear of the enclosure and rotate the dolly rear rigging arm in its upward position.



5. Secure the enclosure using the LINK hole.

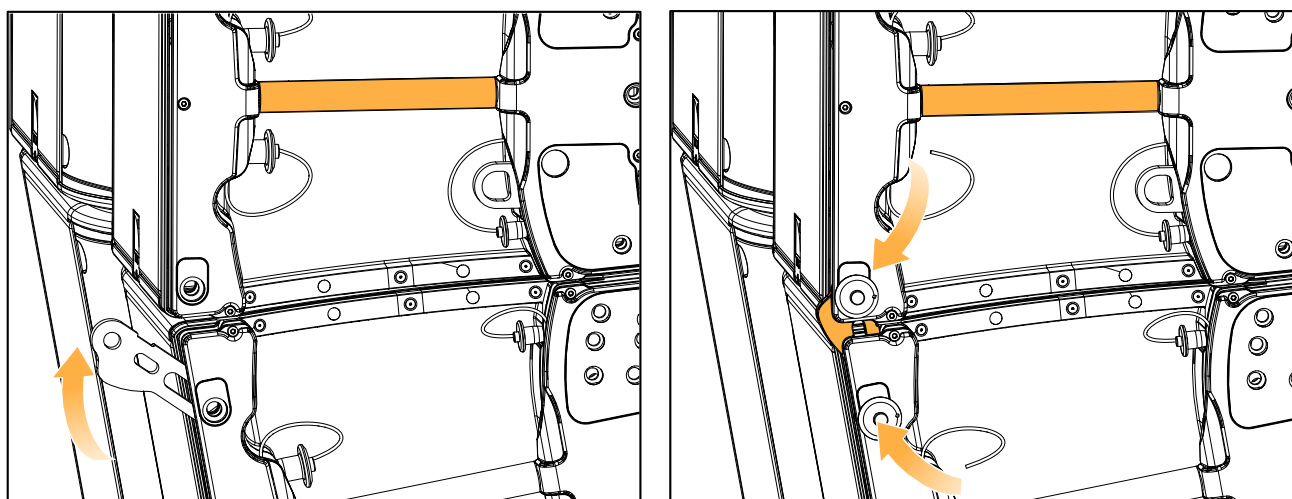


6. Position another K3 on the first one.

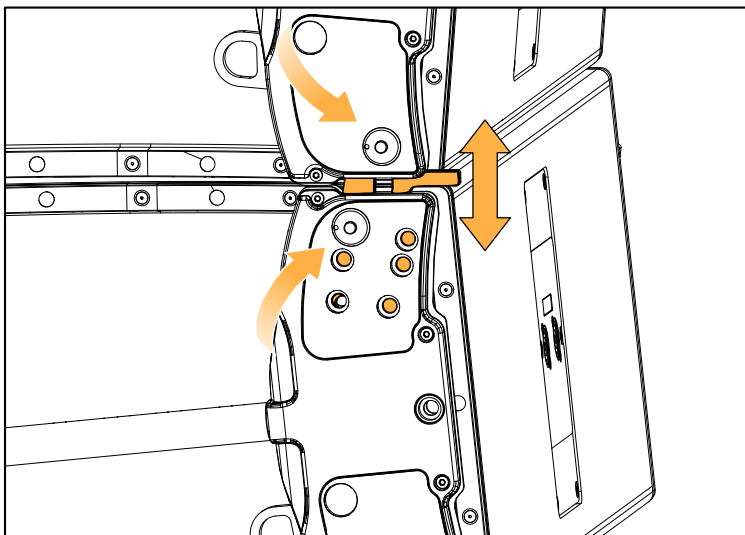


Keep holding the enclosure with the handles until the front rigging arm is secured.

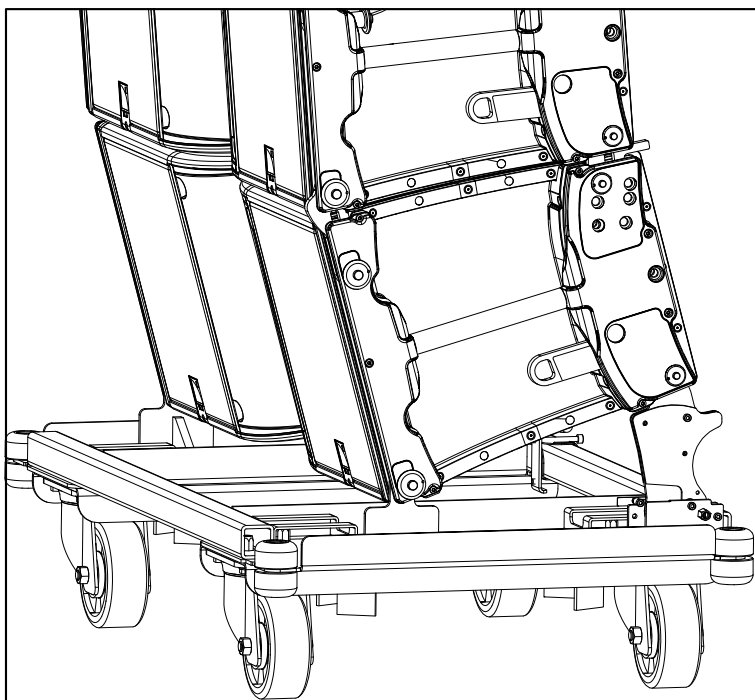
7. While holding the handle, rotate the front rigging arm and secure it with both LINK pins.



8. Slide the rear rigging arm and secure it with both pins, in the LINK and 10° holes.



9. Make sure the automatic locking system button is unloaded.
If the button has been pressed, pull to disengage the latch.

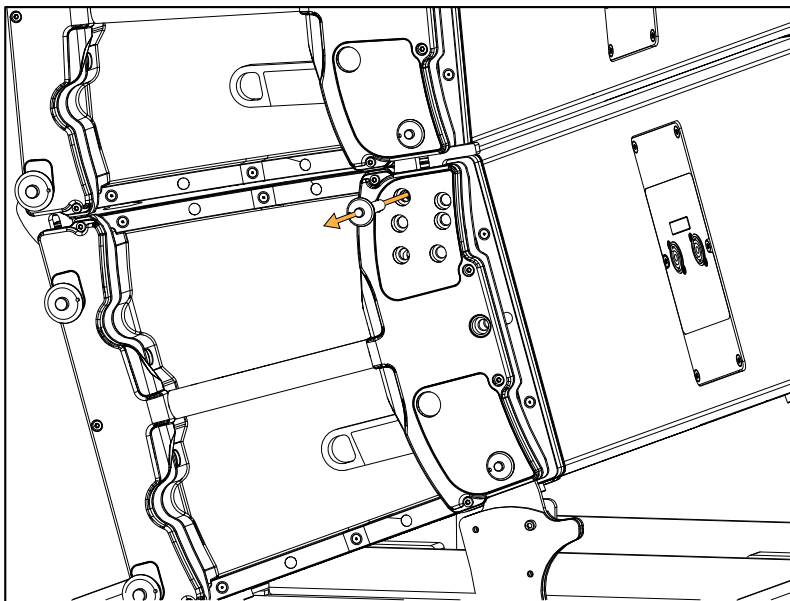


10. Repeat steps 6 (p.63) to 9 (p.64) until the block of four is complete.

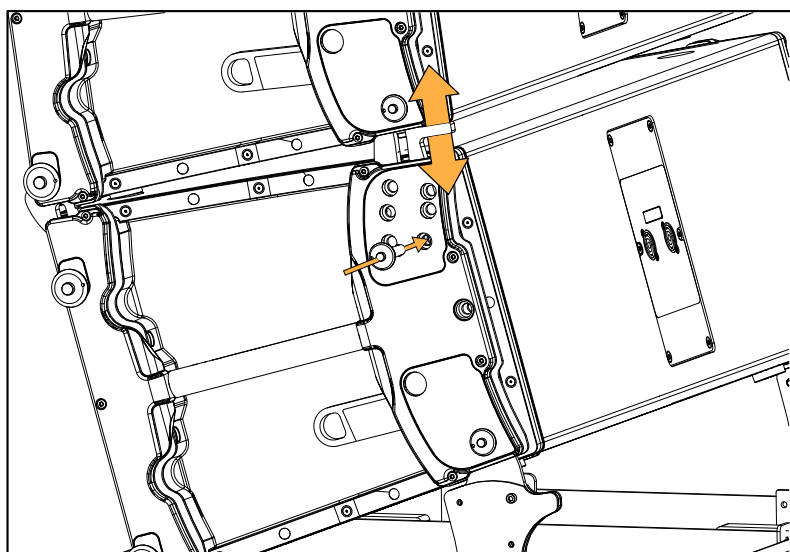
Pre-setting the inter-enclosure angles

Procedure

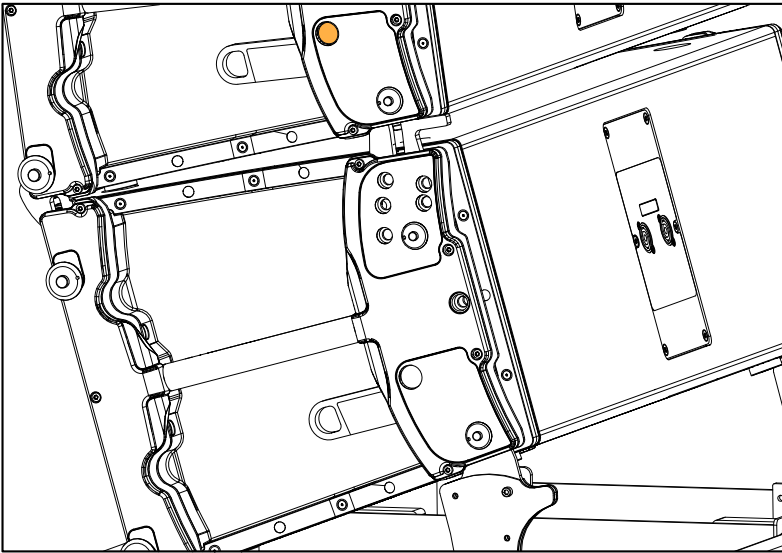
1. On both sides, remove the pin from its current angle hole.



2. Position the pin at the chosen angle hole and slide the rigging arm until the pin goes in.



3. Press the lock button to lock the inter-enclosure angle.



Flying

Flying an array with K3-BUMP and K3-BAR

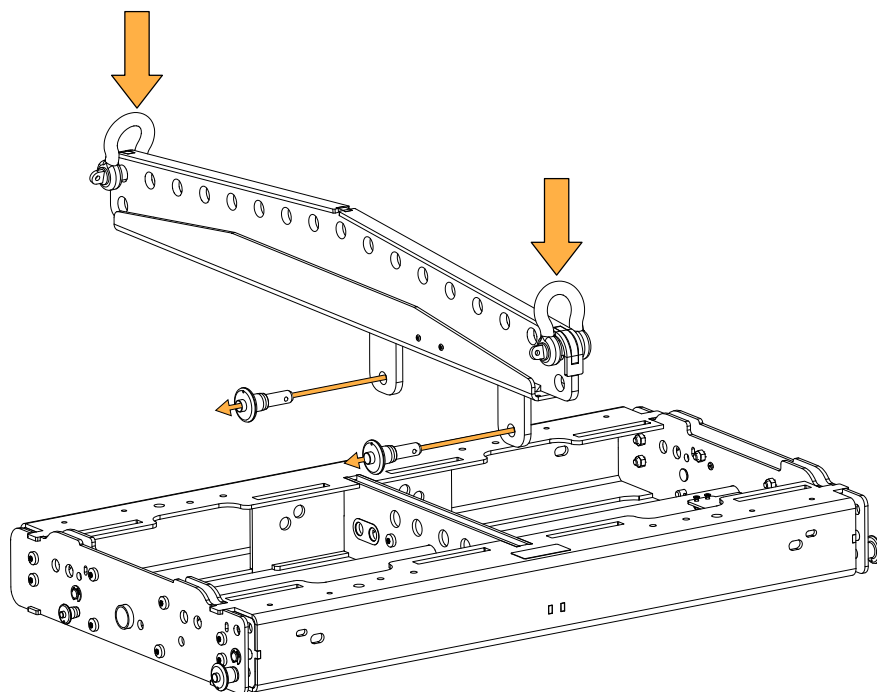
Type of deployment	flown array
Rigging accessory	K3-BUMP 2 x Ø19 mm shackles WLL 3.25 t (provided)
Min number of operators	2

Prerequisite

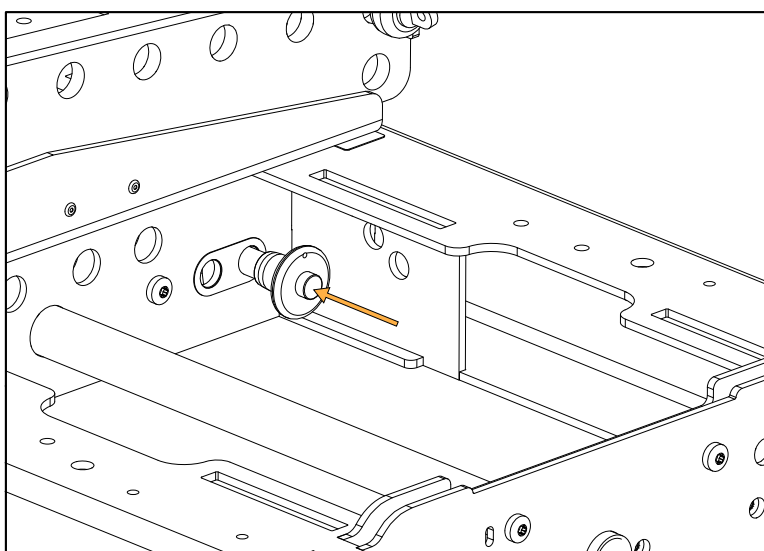
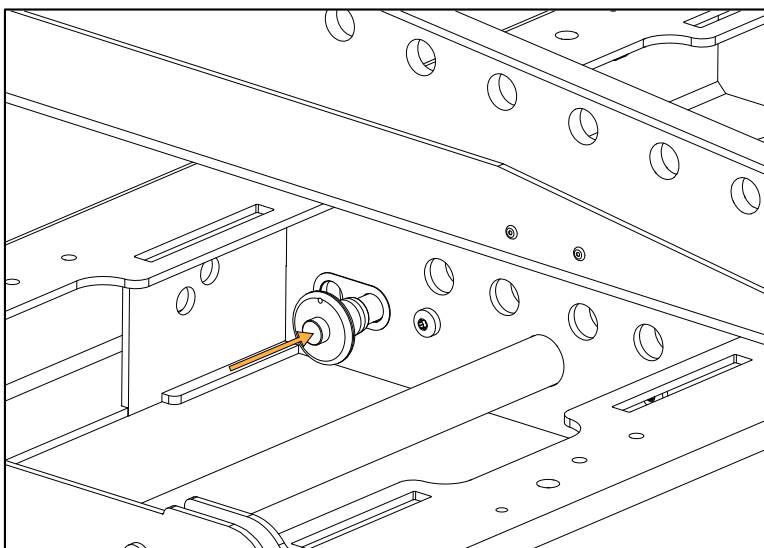
- !** **Preset inter-enclosure angles**
Preset the inter-enclosure angles before performing this procedure. Refer to [Pre-setting the inter-enclosure angles](#) (p.65).

Procedure

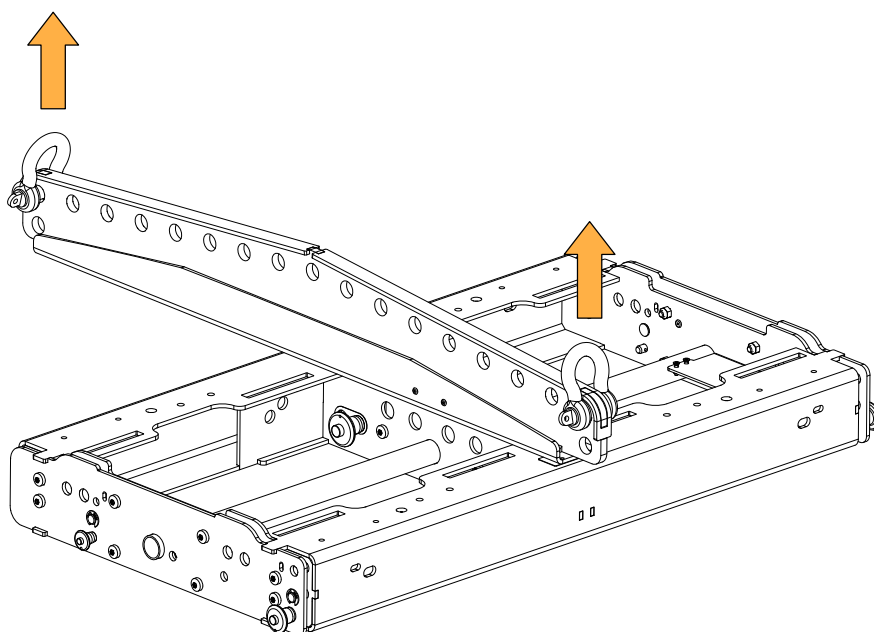
1. Prepare a block of K3 enclosures. Refer to [Preparing a block of four K3](#) (p.61).
2. Connect K3-BAR to K3-BUMP.
 - a) Remove the pins from K3-BAR and position K3-BAR on K3-BUMP.
Refer to Soundvision to identify the extension and position of the bar.



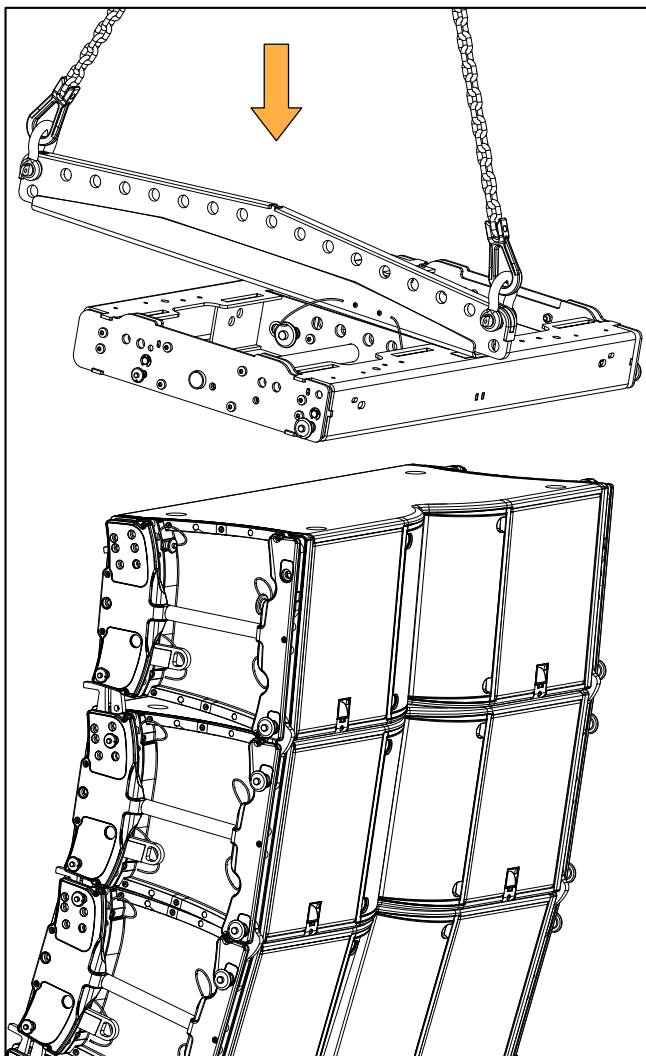
b) Secure K3-BAR to K3-BUMP with the pins.



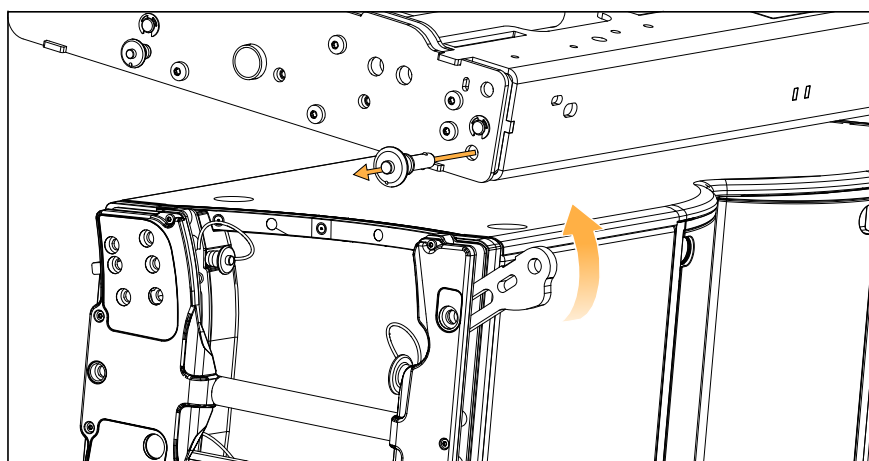
c) Lift K3-BUMP using the motor.



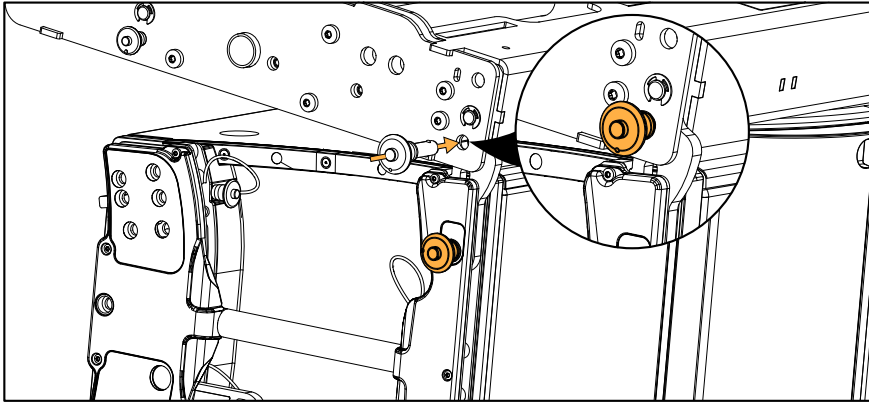
- 3.** Lower K3-BUMP to facilitate the connection between the enclosures and the rigging frame.



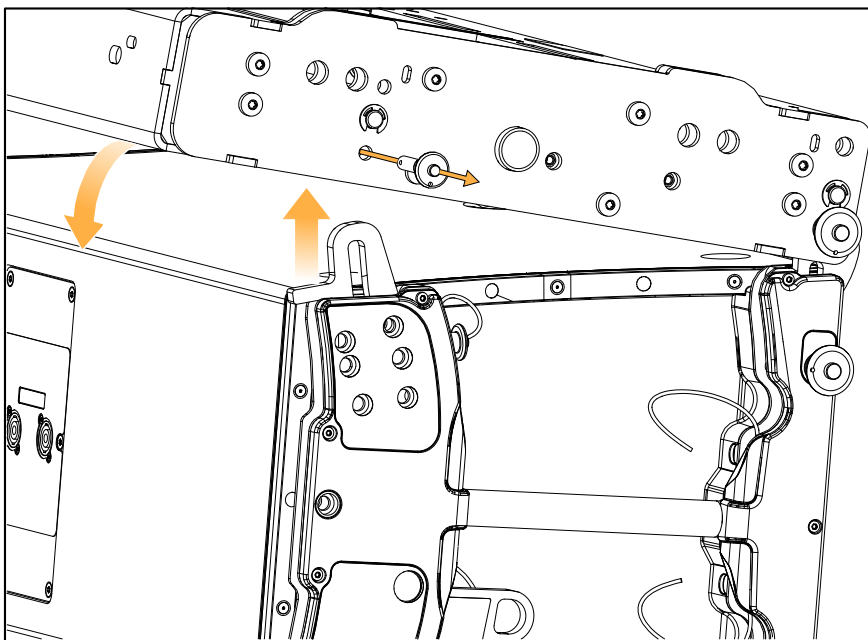
- 4.** Secure K3-BUMP on top of the array.
a) Attach the front rigging arm on both sides.
Rotate the arm and secure it with the K3-BUMP pin.



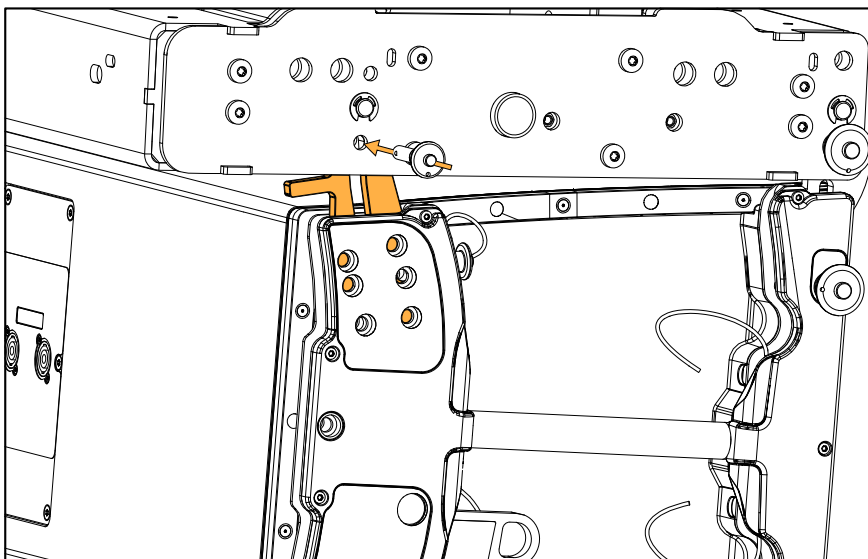
- b) Lower the K3-BUMP and secure the connection with the K3 pin.
If the pin resists, move the frame back and forth.



- c) Lower the rear of the K3-BUMP.

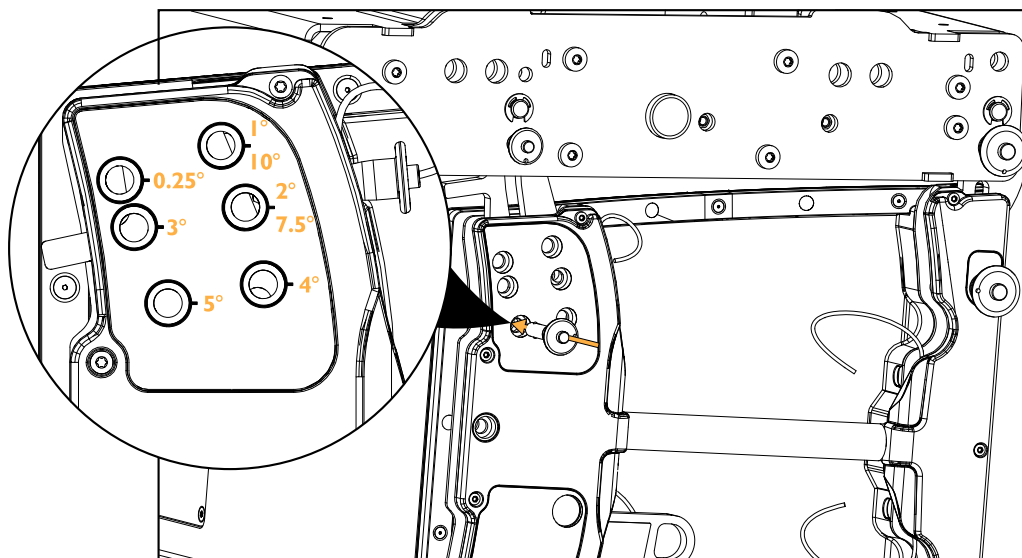


- d) Attach the rear rigging arm to the frame.

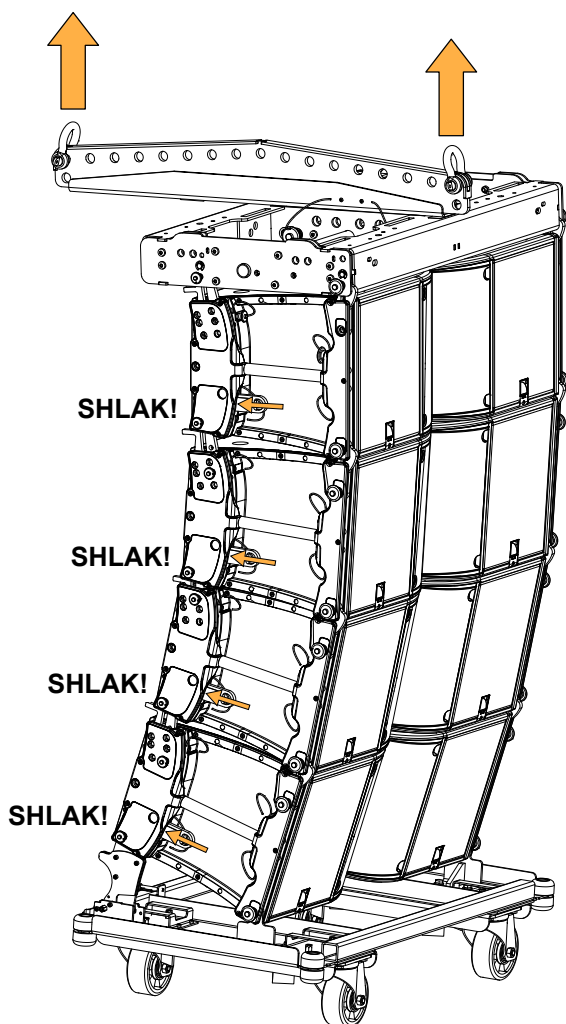


- e) Slide the arm to its 5° position.
- f) Preset the angle at 5° with the enclosure pin.

g) Secure the arm with the K3-BUMP pin.

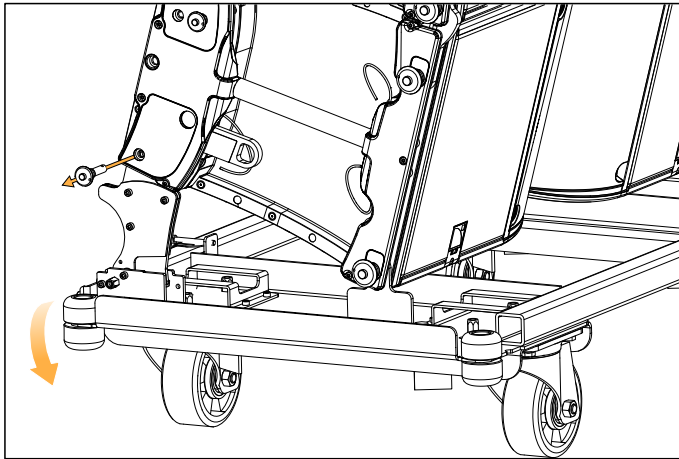


5. Raise the array to lock the inter-enclosure angles.

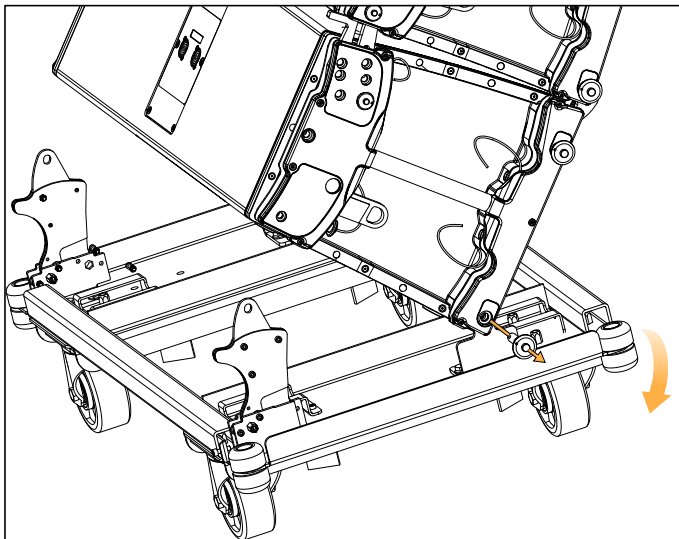


6. Remove the chariot from the array.

- a) Hold the chariot with one hand. Remove the back pin on both sides.



- b) Hold the chariot with one hand. Remove the front pin on both sides.



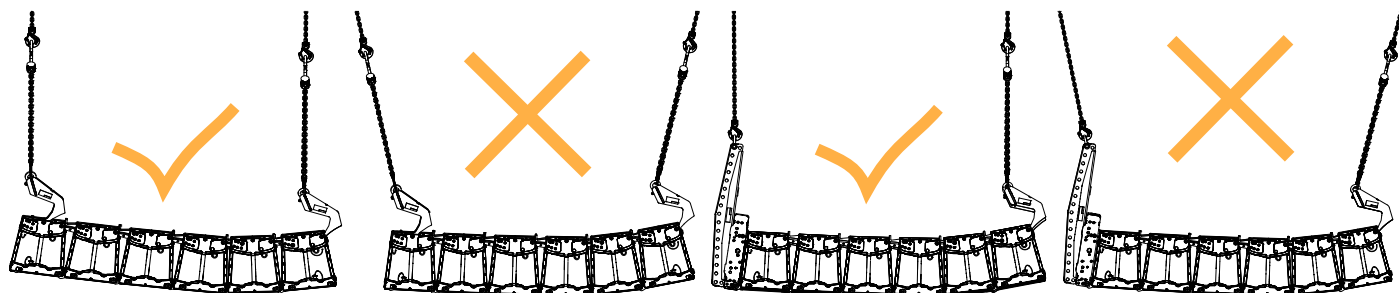
Adding a pullback with K3-RIGBAR

Type of deployment	flown array
Rigging accessory	K3-RIGBAR 2 x Ø19 mm shackles WLL 3.25 t (provided)
Min number of operators	2

! Pickup points must be aligned with the linking points.

under K3-RIGBAR

under K3-BAR



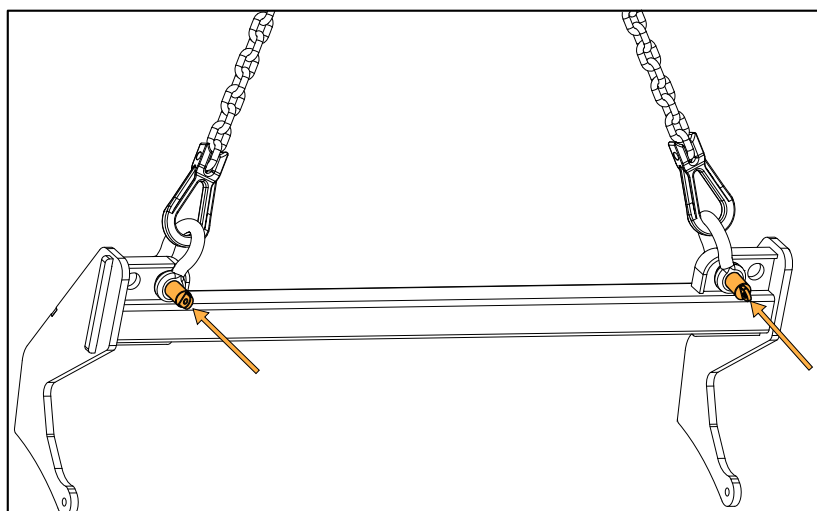
Procedure

i Optionally, secure another K3-RIGBAR on the top enclosure to replace K3-BUMP as the main lifting accessory.

1. Prepare an array of K3. Refer to [Flying an array with K3-BUMP and K3-BAR](#) (p.67).
2. Raise the array.
3. Secure the LA-SLING2T to the second motor hook.

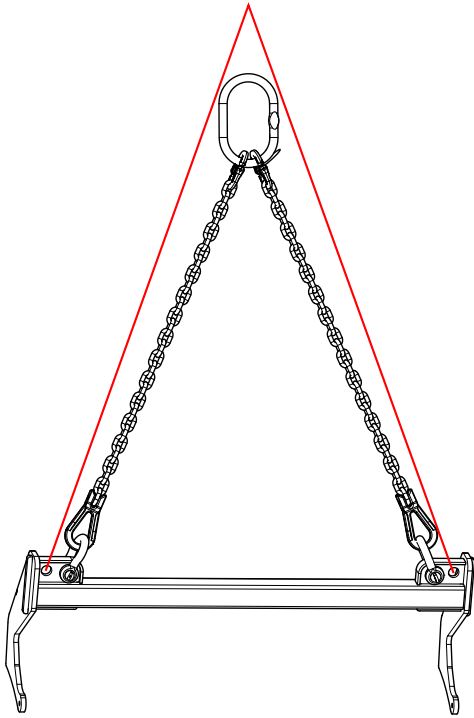
! Make sure the chains are not twisted.

4. Attach K3-RIGBAR to the sling using the two 3.25 t WLL shackles. Use the interior holes of the bar.

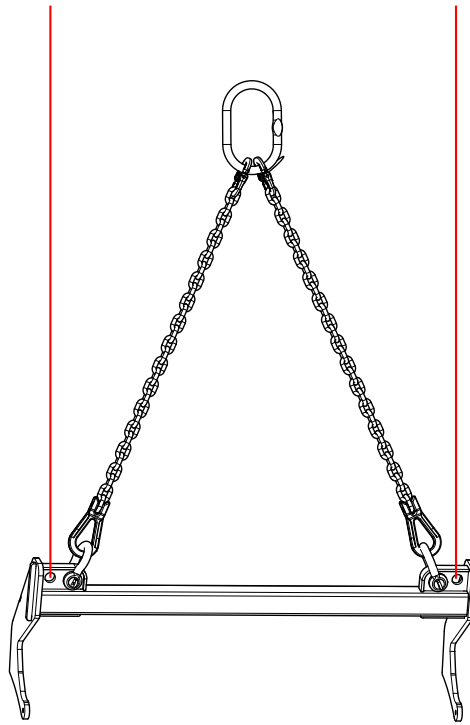


The external holes are dedicated to additional safety.

The additional safety must either be:



A two-leg bridle sling with a pickup point higher than the LA-SLING2T.

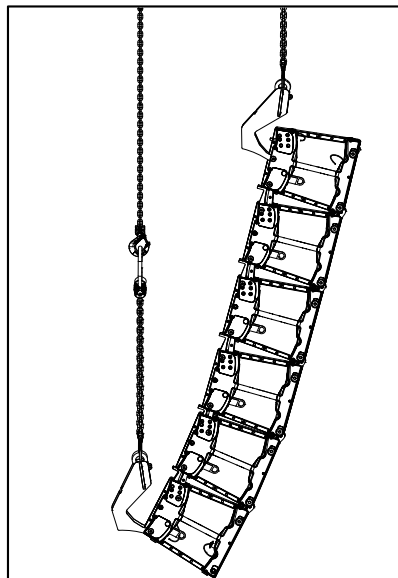
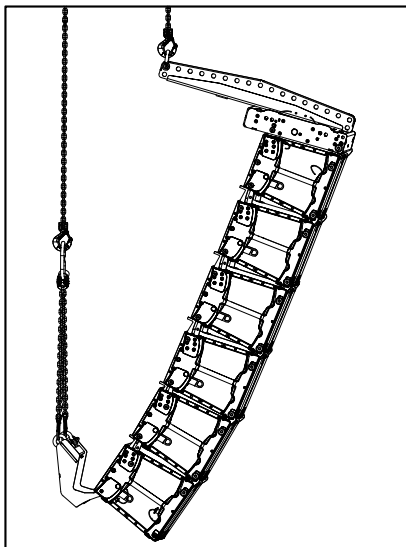
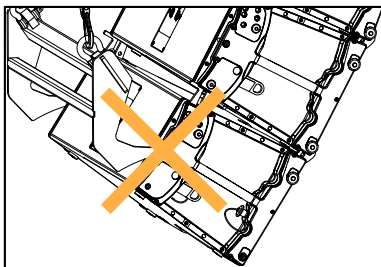


Two safety slings.

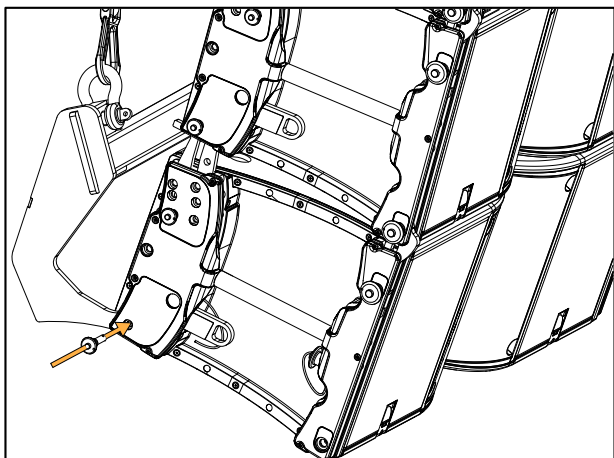
5. Attach the K3-RIGBAR to the bottom enclosure.



Do not use the rear rigging middle hole.



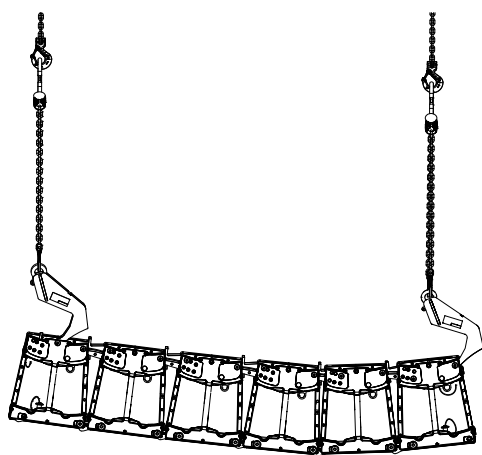
Use the rear rigging hole.



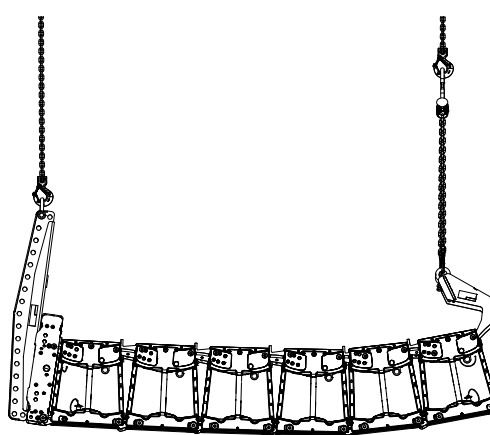
6. Adjust the height of the pickup-point.



Do not raise the rear pick-up point above the front pick-up point.
The chains must be as vertical as possible.



Under K3-RIGBAR



Under K3-BAR

Rigging a Kara II downfill array under a K3 array with KARADOWNK3

Type of deployment	flown array
Rigging accessory	KARADOWNK3
Min number of operators	2

About this task

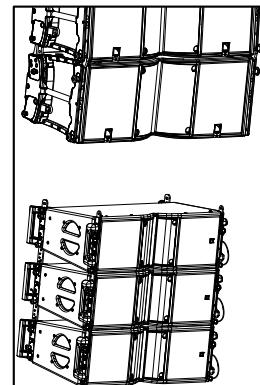
! Reference rigging manuals

This procedure is complementary to the rigging instructions available in the main system rigging manuals. Refer to **the Kara II owner's manual** for more details.

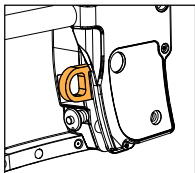
i The following procedure also applies for Kara.

Prerequisite

- Prepare and raise a K3 array. Refer to [Flying an array with K3-BUMP and K3-BAR](#) (p.67).
- Prepare an array of three Kara II with 0° inter-enclosure angles.
- Position the Kara II array under the K3 array.

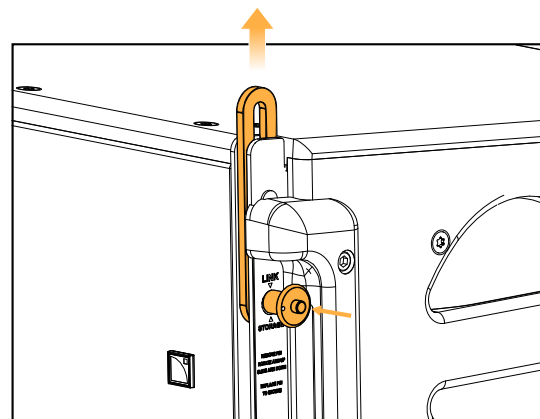
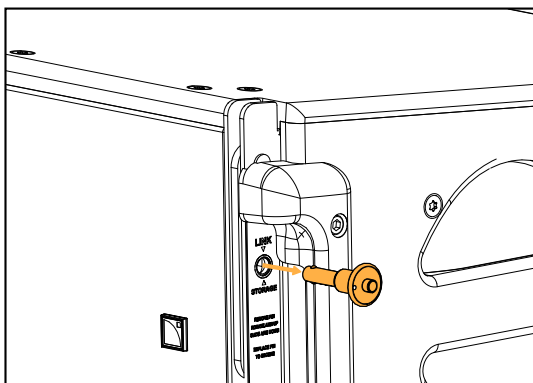


! Make sure the latches on the bottom K3 are in storage position.

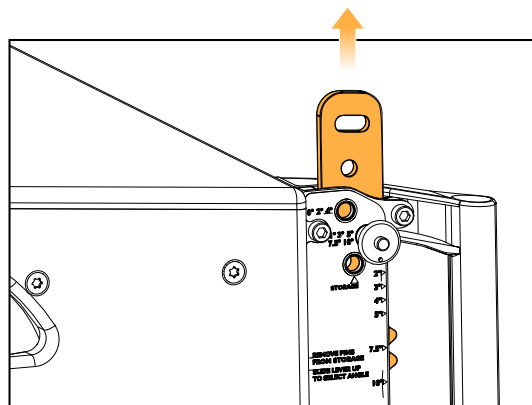
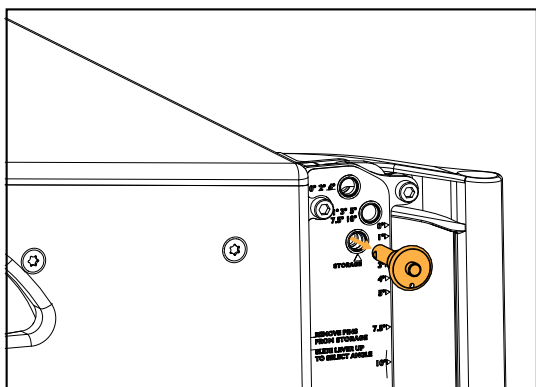


Procedure

1. Take out the four rigging arms on the top Kara II enclosure.
 - a) Lock the front rigging arms in linking position.



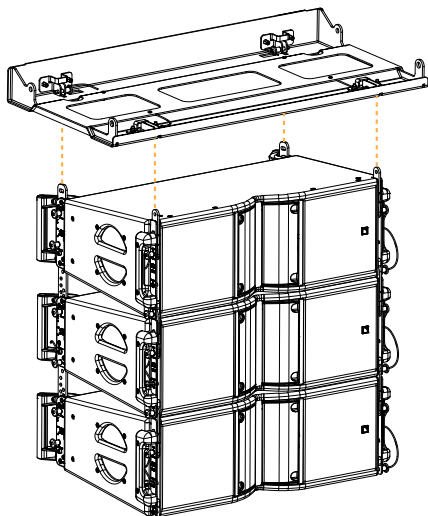
b) Slide up the rear rigging arms and select the same inter-element angle, from 0° to 10°.



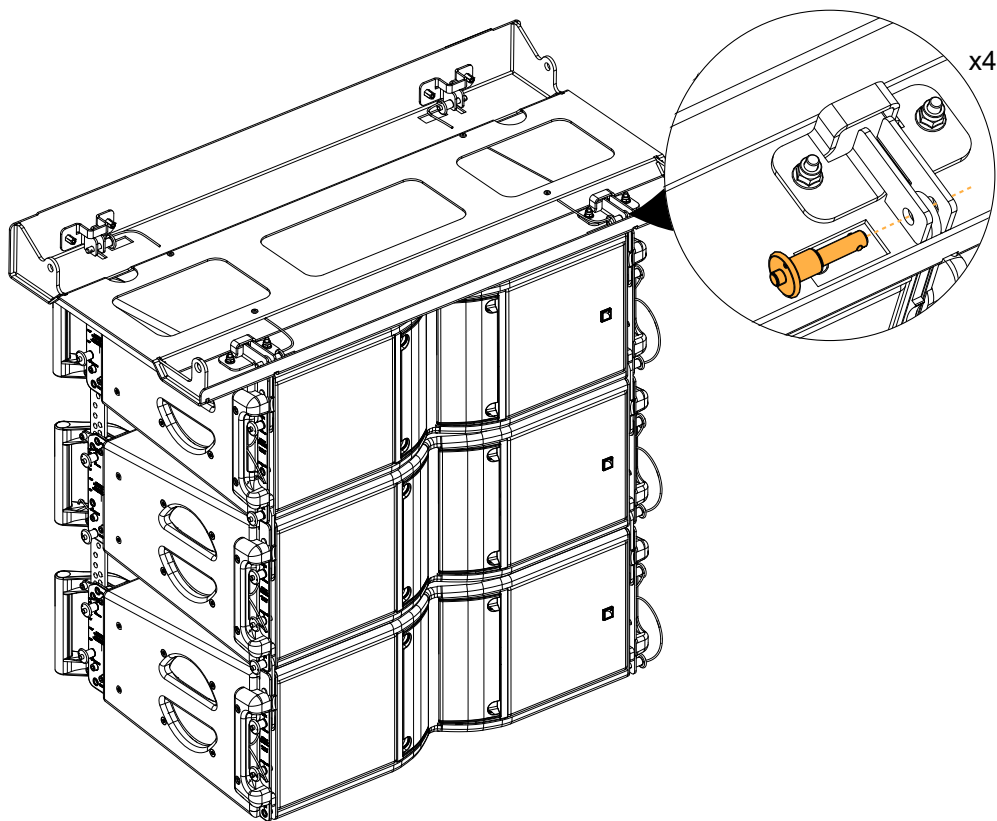
2. Secure a KARADOWNK3 on top of the Kara II array.



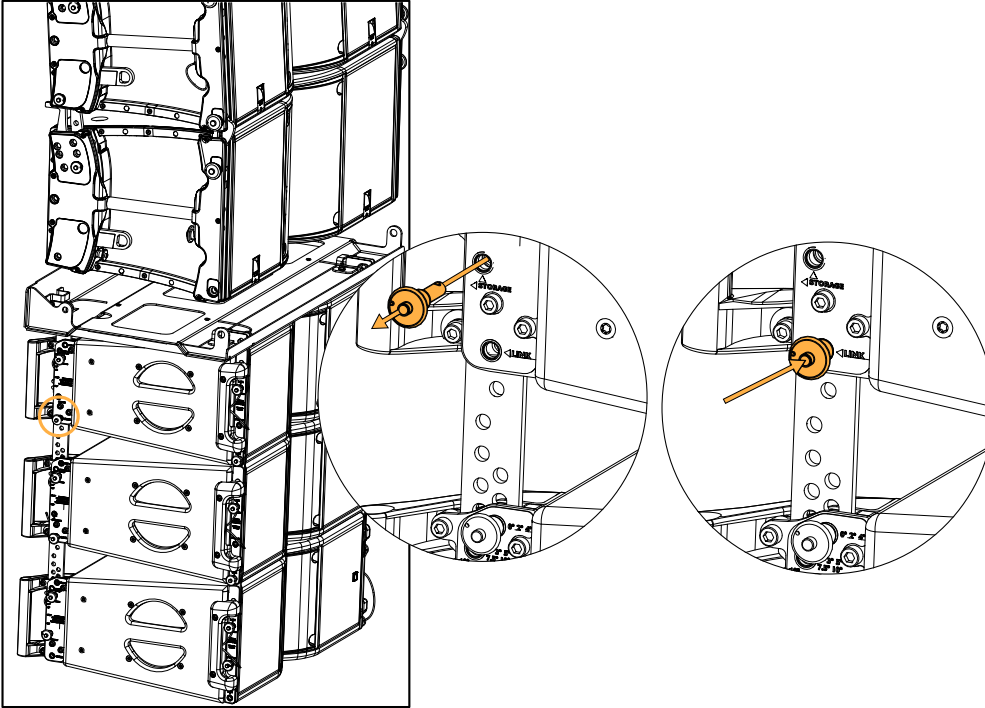
Position the higher ledge at the rear.





Secure the Kara II rigging arms inside the slits with the ball-locking pins.



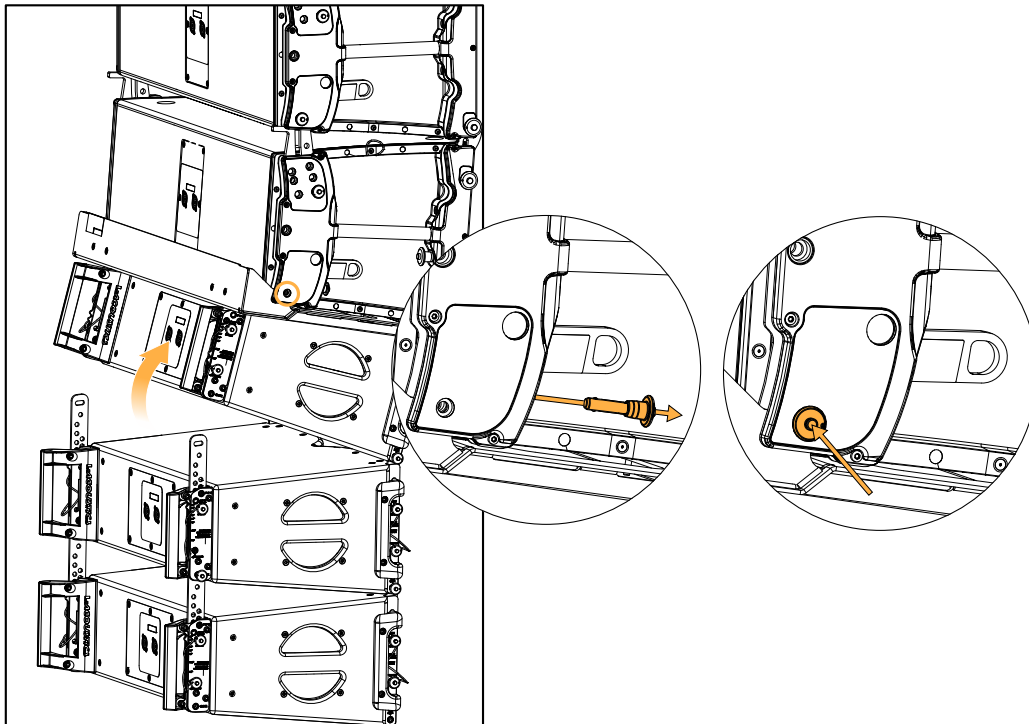
3. Lower the K3 array as close as possible to the assembly without resting on it.
4. Disconnect the rear rigging between the two top Kara II enclosures.



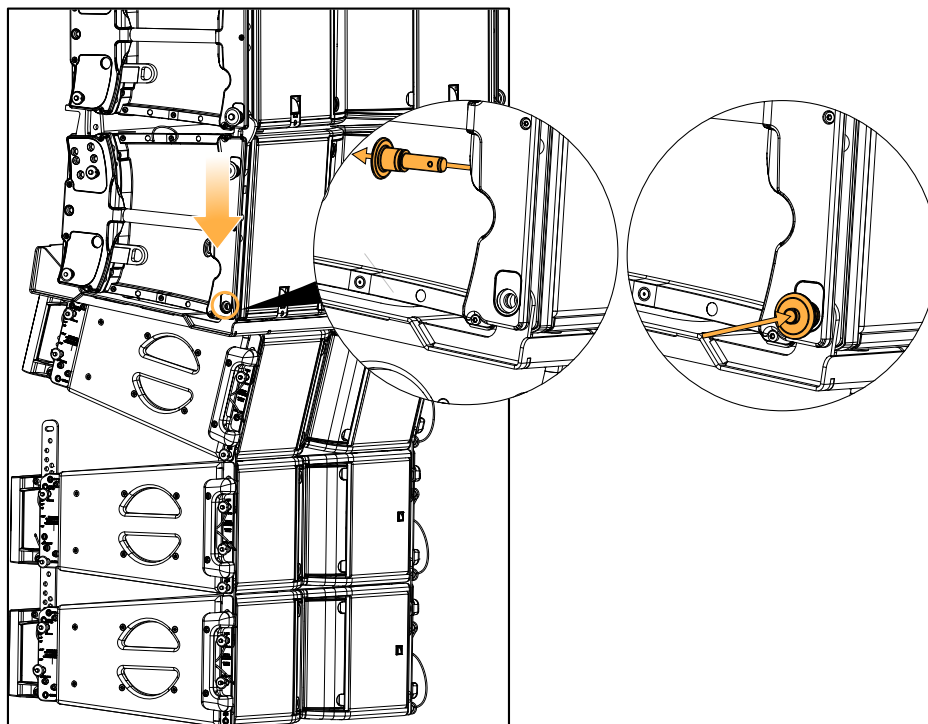
5. Connect KARADOWNK3 to the bottom of the K3 array.

- a)  **Risk of crushing injury.** Keep fingers away from the contact area between the ledge and the cabinet.
-  **Risk of cable damage.** Disconnect any cable from the K3 bottom connector.

Rotate the top Kara II upwards and secure the rear KARADOWNK3 tabs to the K3 rigging.



- b) Secure the front KARADOWNK3 tabs to the K3 rigging.
Slightly lower the K3 array if necessary.



- c) Reconnect the top Kara II at the rear to the assembly.



6. Raise the array.



Do not implement a pullback on a K3 array with a Kara II downhill.

7. Set the inter-enclosure angles.



Refer to the **Kara II owner's manual**.

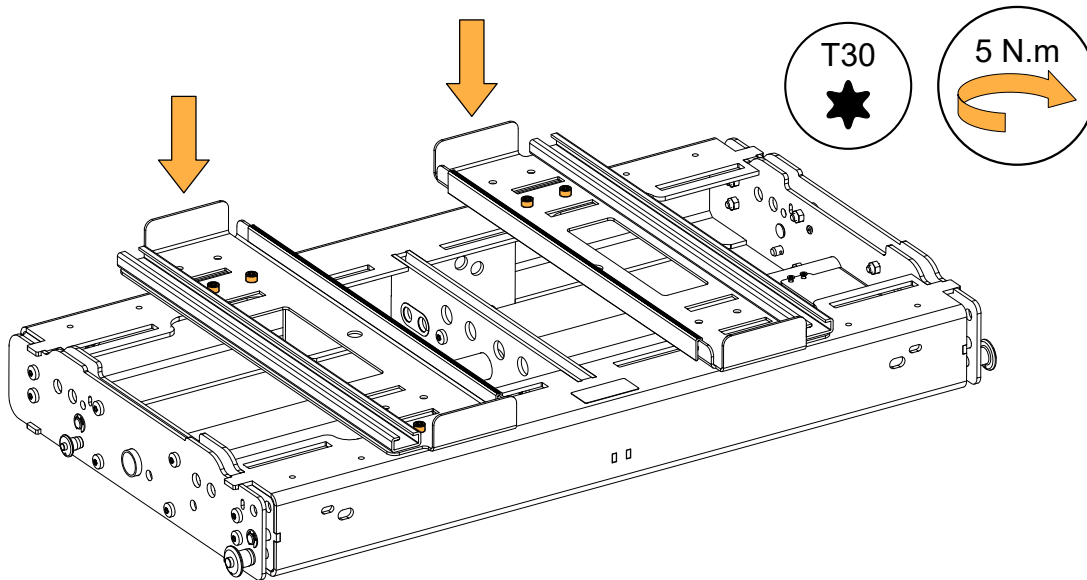
Securing LA-RAK II AVB on LA-RAKMOUNT

Type of deployment	flown array
Rigging accessories	LA-RAKMOUNT (2 rails for 1 LA-RAK II AVB*) 8 M8x30 screws (provided with LA-RAKMOUNT) K3-BUMP LA-RAK II AVB
Additional accessories	electric screwdriver with torque selector
Min number of operators	2

Procedure

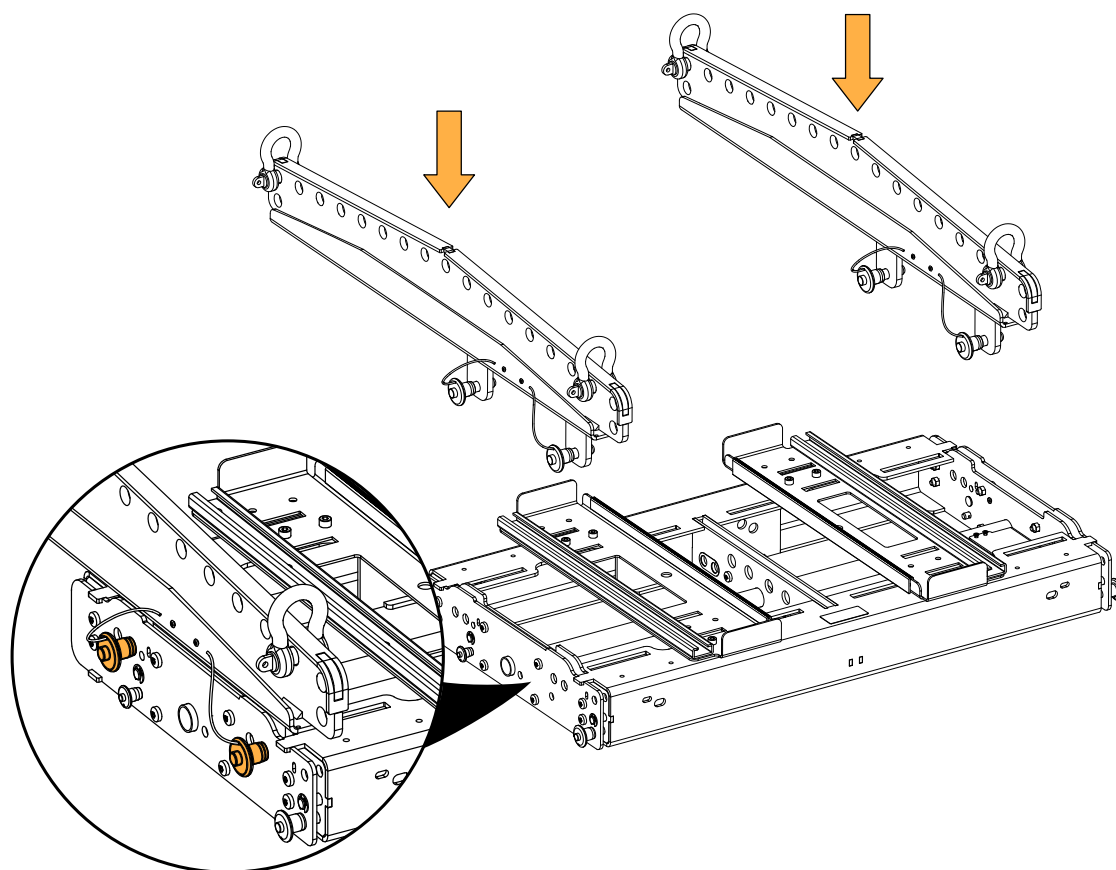
1. Position and secure the two rails on the K3-BUMP.

Use the electric screwdriver. Set the torque to 5 N.m. Before securing the side rails, make sure the frame pins are on the outside.

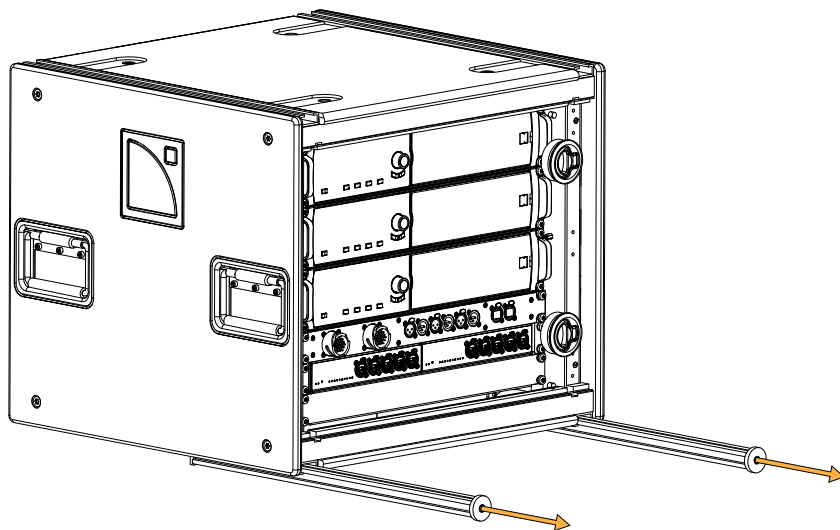


* The following procedure is also applicable for previous LA-RAK products.

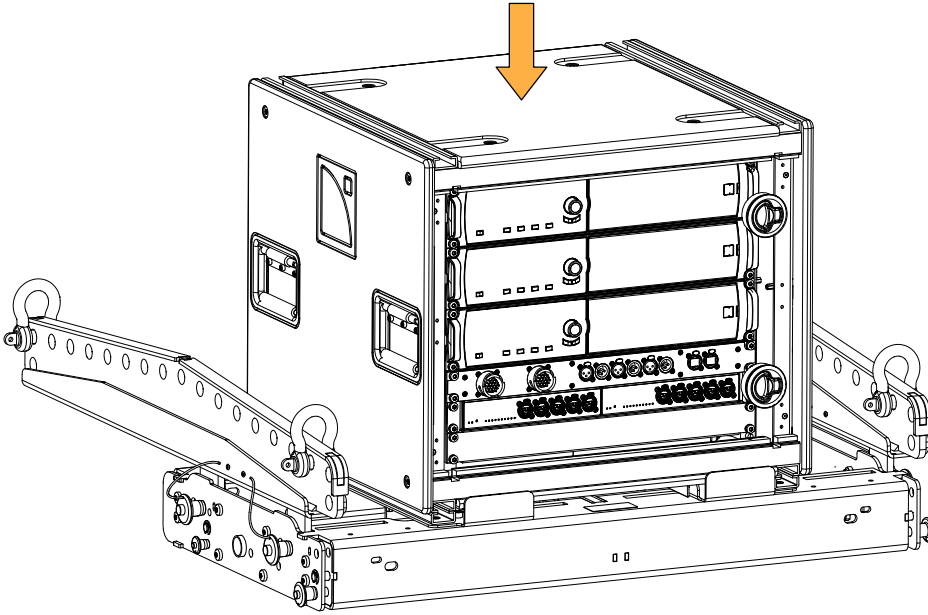
- 2.** Install two K3-BAR on both sides of the K3-BUMP.



- 3.** Remove the LA-RAK II AVB coupling bars.
Turn the bars to release the spring-loaded safety and slide them out.

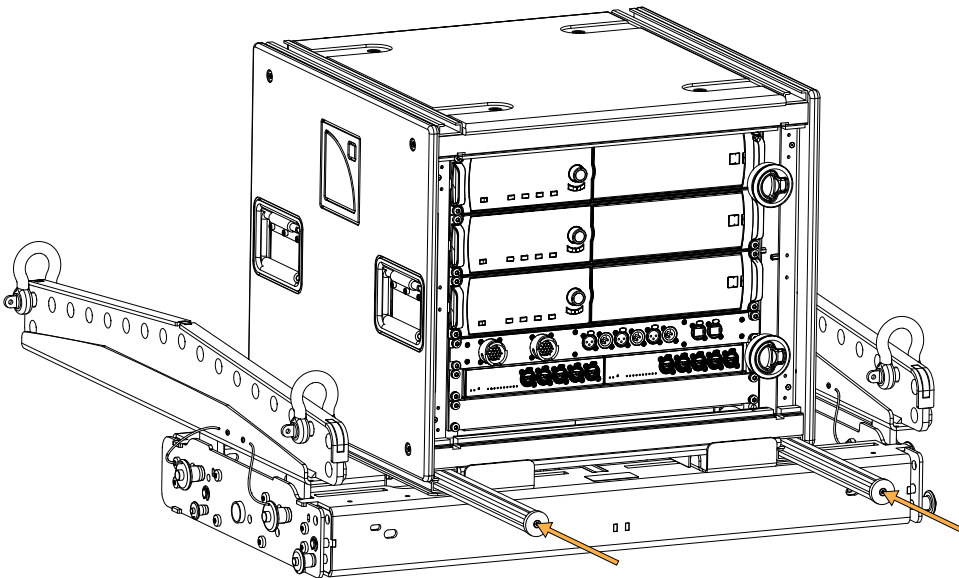


4. Position the LA-RAK II AVB on the rails.



5. Secure the LA-RAK II AVB with the coupling bars.

Insert the spring-loaded safety in the LA-RAK II AVB rails, give a quarter turn and slide the bar until the safety locks into place.



Coupling bars

Always insert the coupling bars so that the round metallic safety is pointed upward (depending on the tilt angle):

- from the back for a negative angle (rear extension)
- from the front for a positive angle (front extension)

Stacking

Stacking K3 on KS28 with K3-TILT

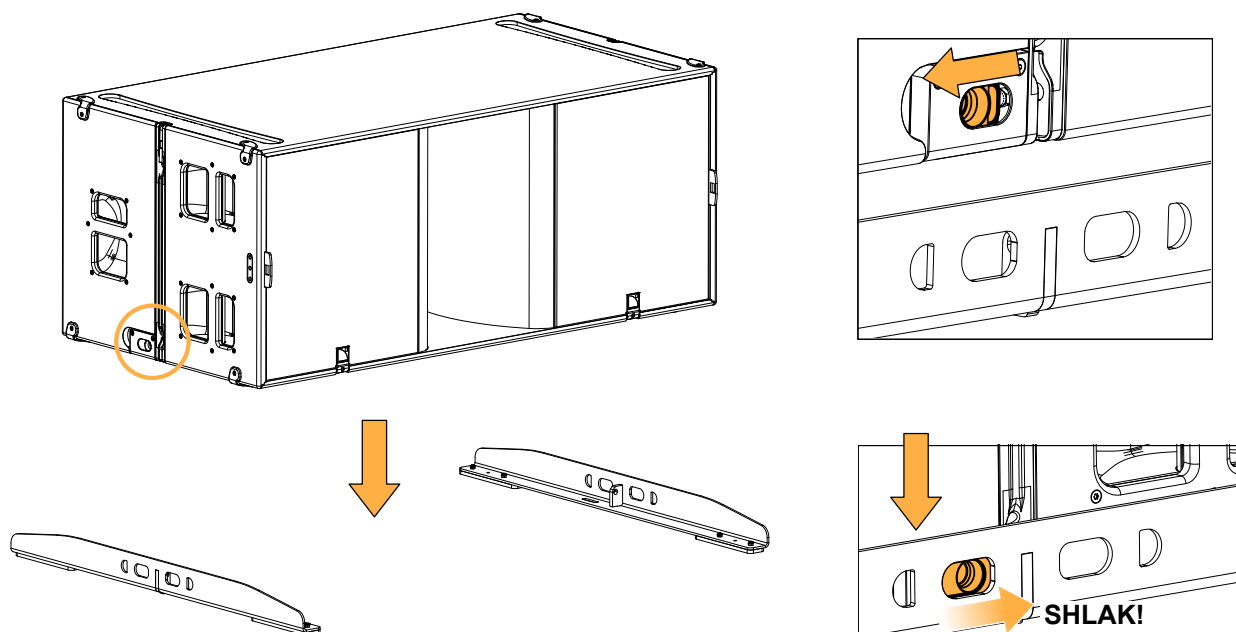
Type of deployment	stacked array
Rigging accessory	K3-TILT KS28-OUTRIG
Min number of operators	2

i **Stacking KS28**
Refer to **KS28 documentation** for more information.

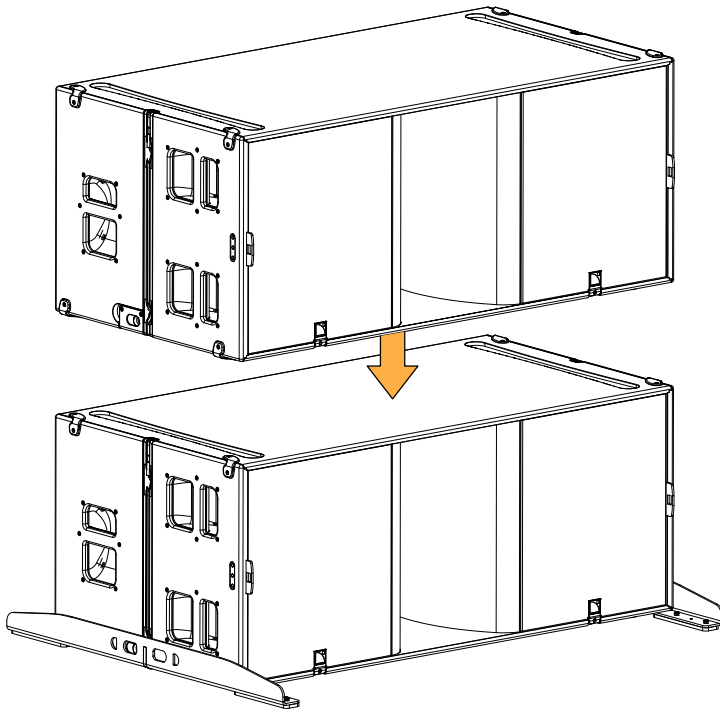
Procedure

1. Secure KS28-OUTRIG under KS28.

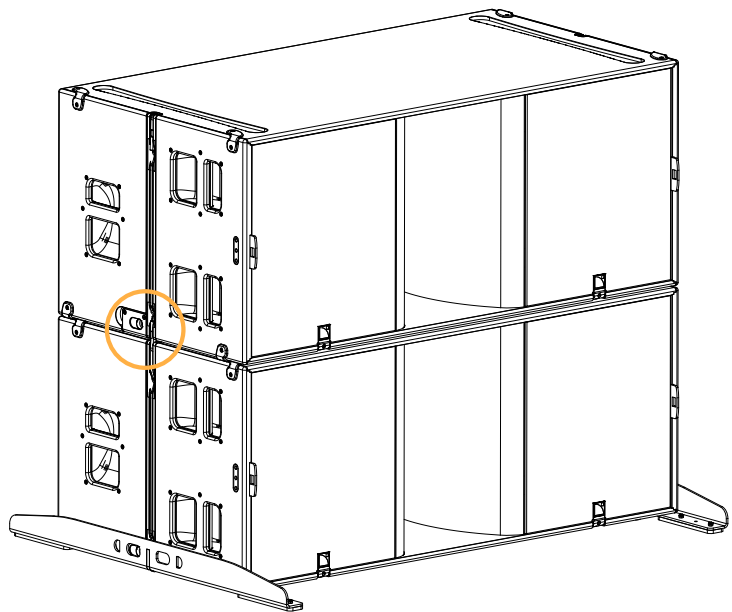
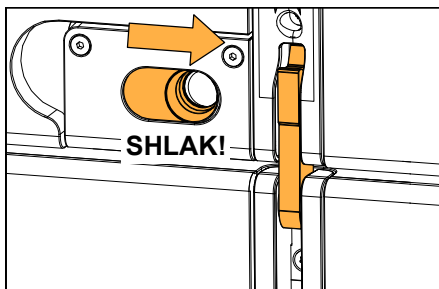
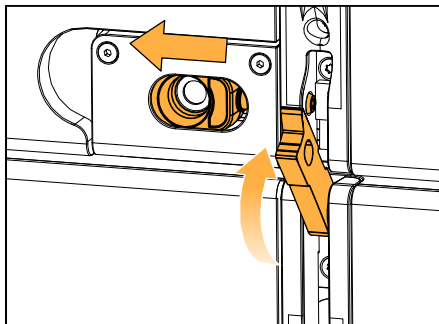
! **Risk of crushing injury.**
Keep fingers away from the contact area between the ledge and the cabinet.



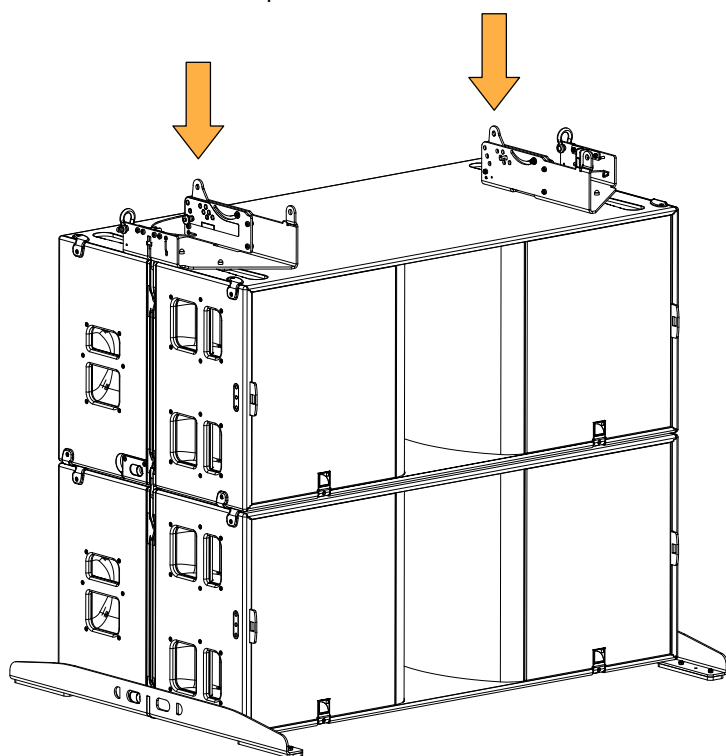
2. Optionally, secure an additional KS28 on top.



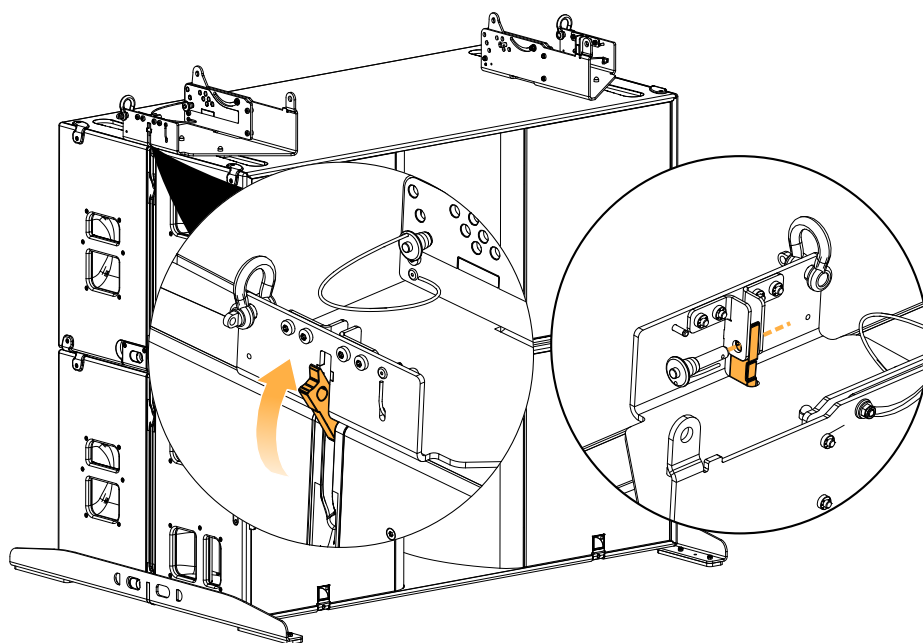
Connect each enclosure on both sides before adding the new one.



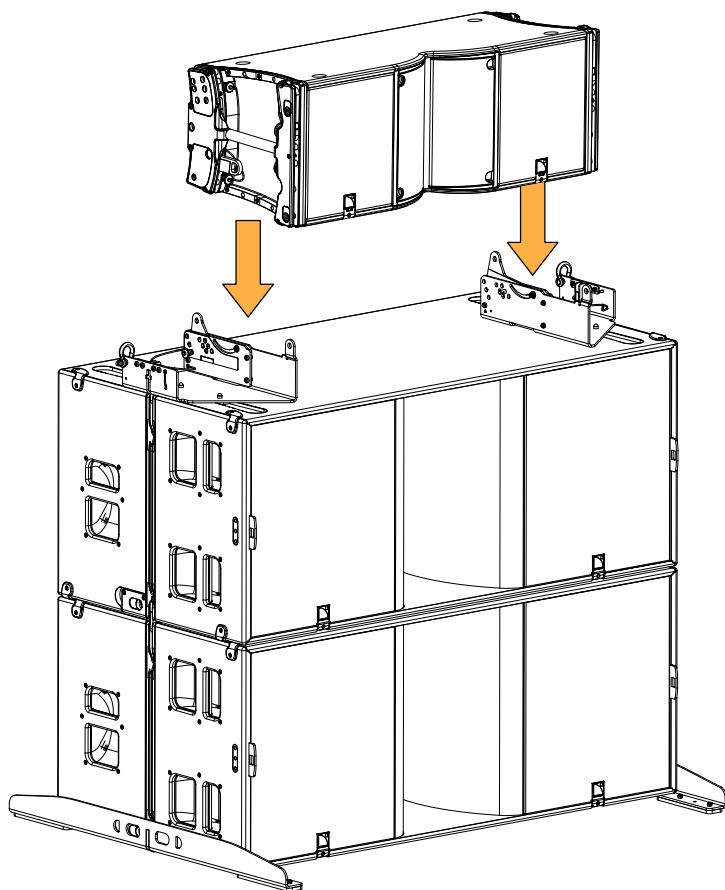
3. Place the K3-TILT on top of KS28.



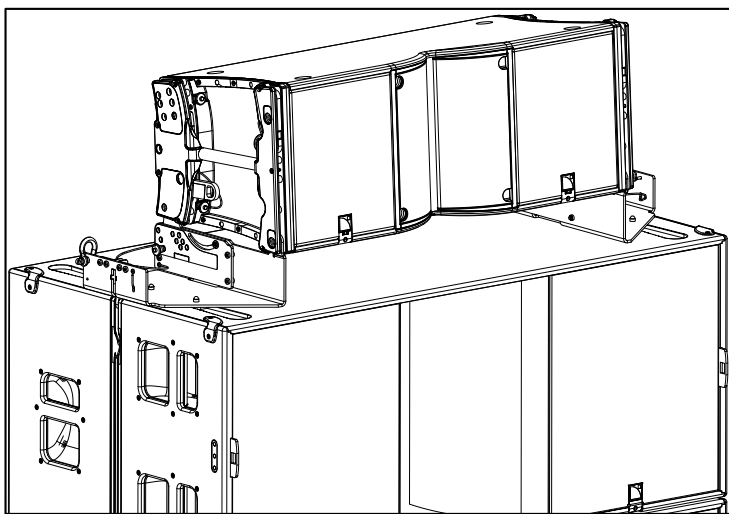
4. Secure the K3-TILT to KS28.



5. Place one K3 on KS28.



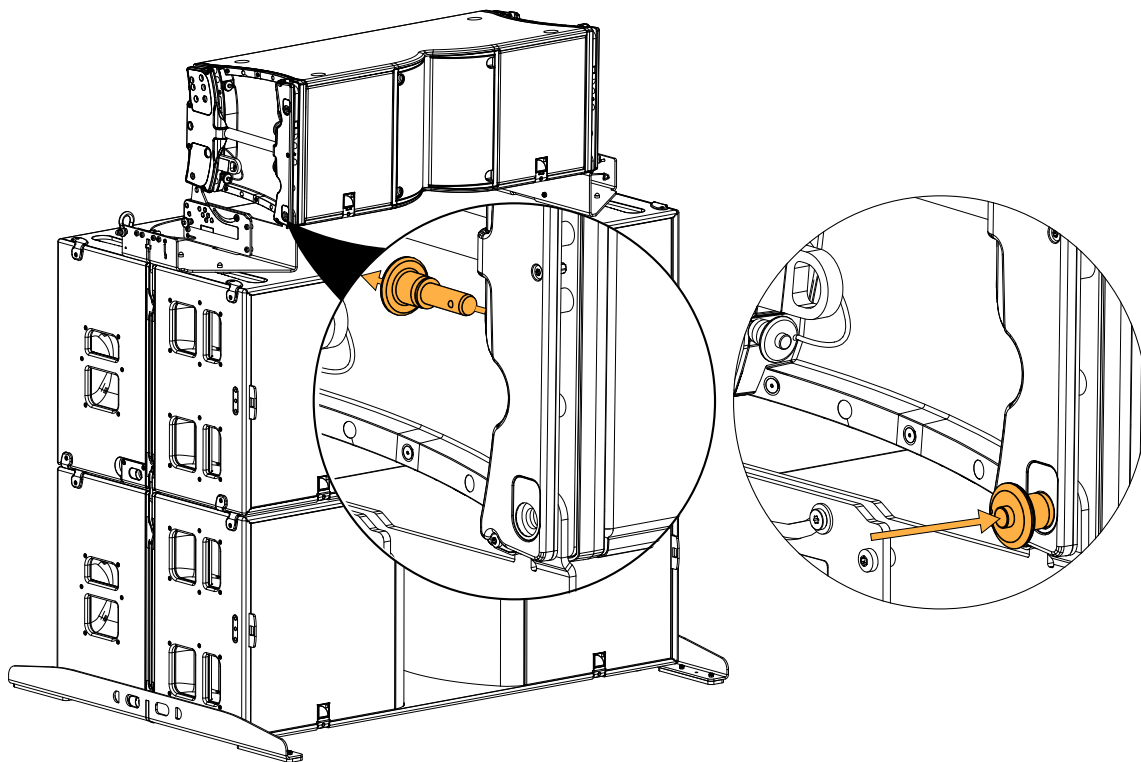
Align the enclosure to the arms of K3-TILT.



6. Secure K3 to the K3-TILT.

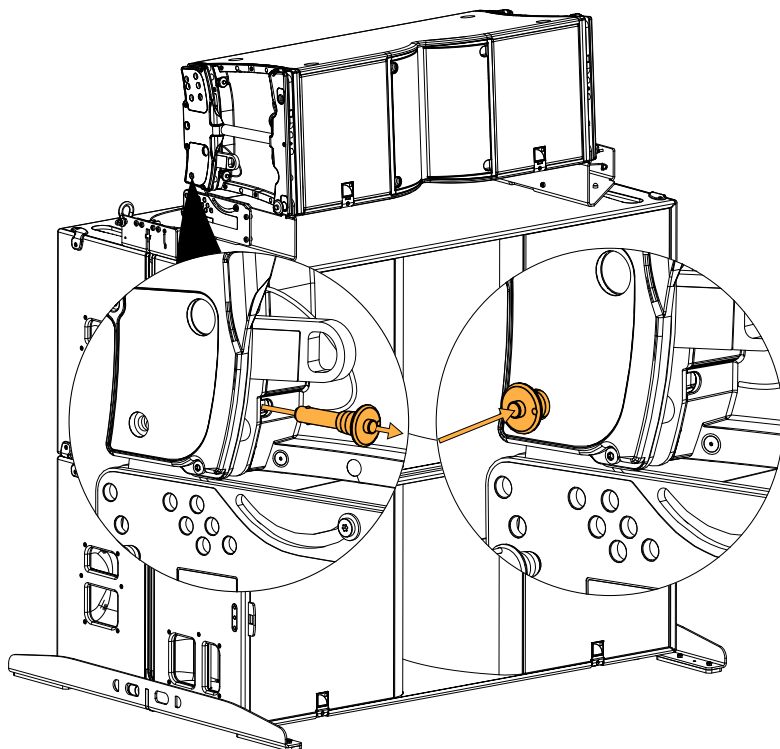
a) Secure the front arms of K3-TILT to the bottom front of the enclosure.

Connect the K3 ball-locking pin to the front arms of K3-TILT.



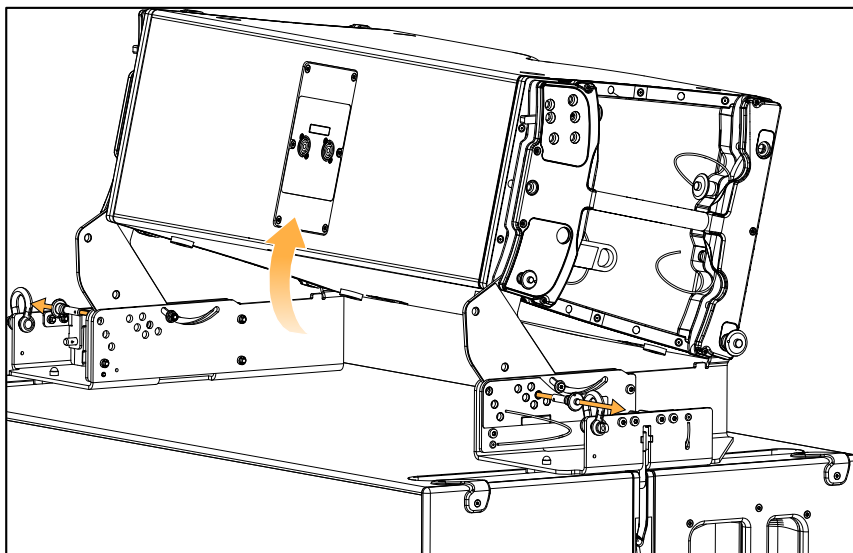
b) Secure the rear arms of K3-TILT to the bottom rear of the enclosure.

Connect the K3 ball-locking pin to the rear sliding arms of K3-TILT.



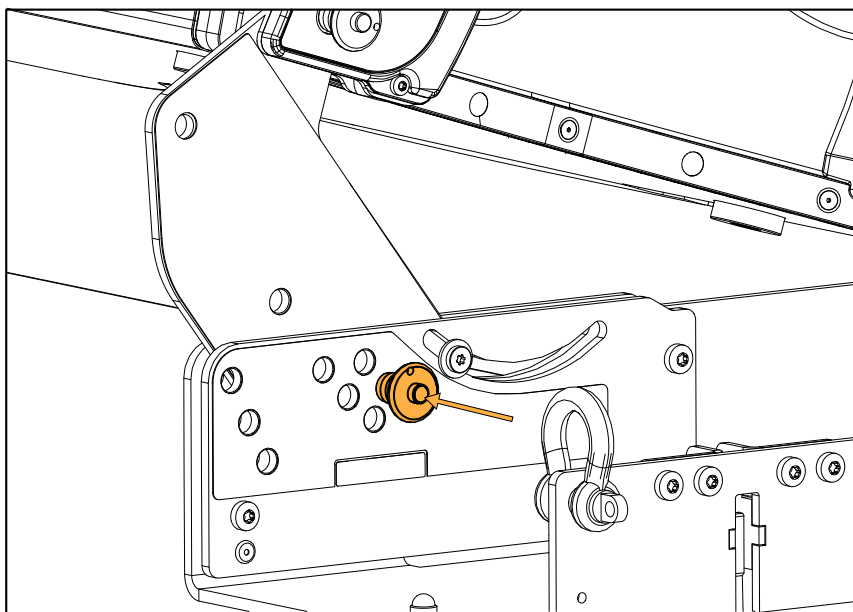
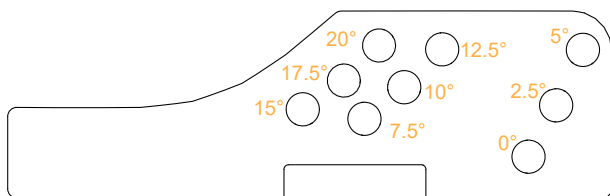
c) Set the site angle with the rear arms of K3-TILT.

Remove the ball-locking pin of the sliding arms and lift the enclosure to set the angle.



Set the angle and secure the sliding arm with the ball-locking pin.

Multiple angles are available:



Number of stacked K3 on KS28

Refer to Soundvision for the maximum number of enclosures.

7. Add another K3 to the first one.

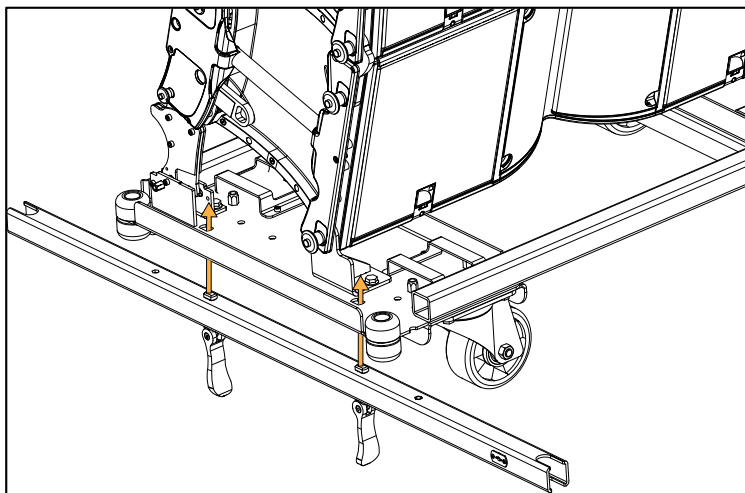
Refer to [Preparing a block of four K3](#) (p.61).

Attaching K2-JACK stabilizers to K3-CHARIOT

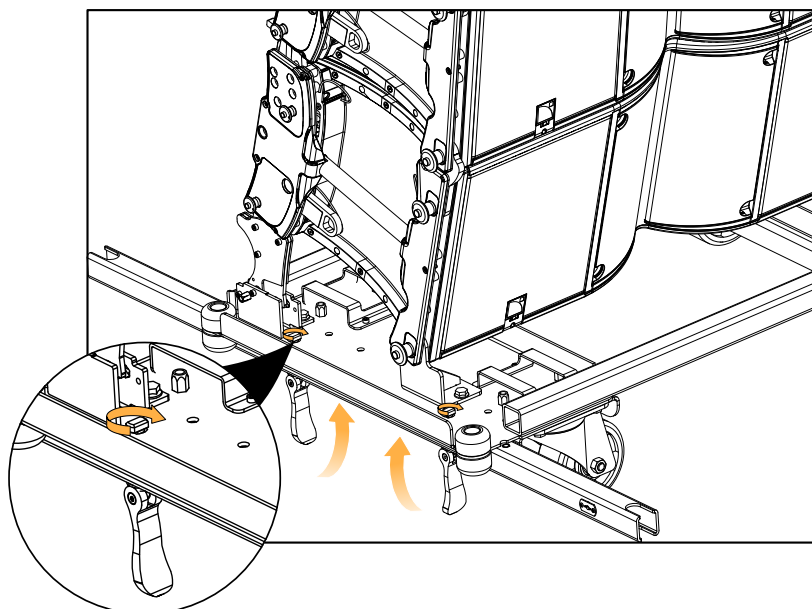
Type of deployment	stacked array
Rigging accessory	K2-JACK K3-CHARIOT
Min number of operators	2

Procedure

1. Attach the K2-JACK to the K3-CHARIOT:
 - a) Insert the K2-JACK studs through the K3-CHARIOT.



- b) Raise and turn the K2-JACK handles to secure the locking system.



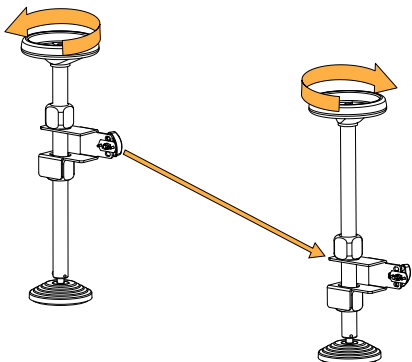


Dust

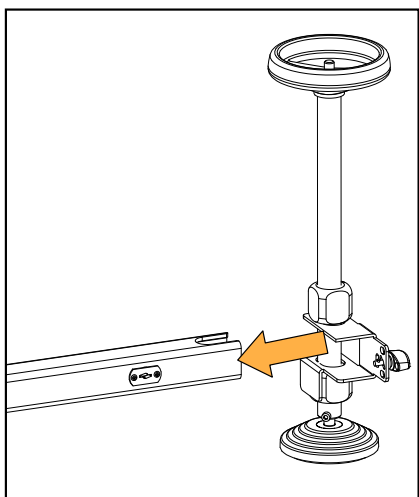
During the K2-JACK stabilizers first use dust will come off the threaded rod. It is expected and does not indicate a malfunction.

2. Prepare the K2-JACK stabilizers.

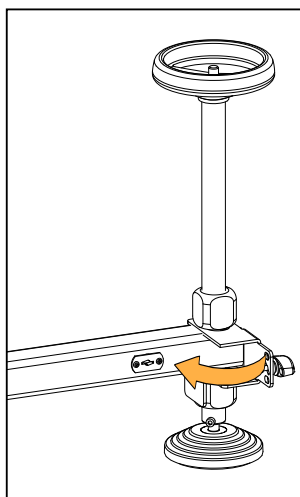
Rotate the threaded rod counter-clockwise so the central part of the stabilizer is closest to the base.



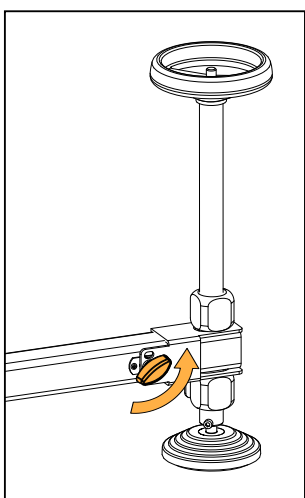
3. Attach the stabilizers to the bar.



Insert the feet in the guides at both ends of the bar.

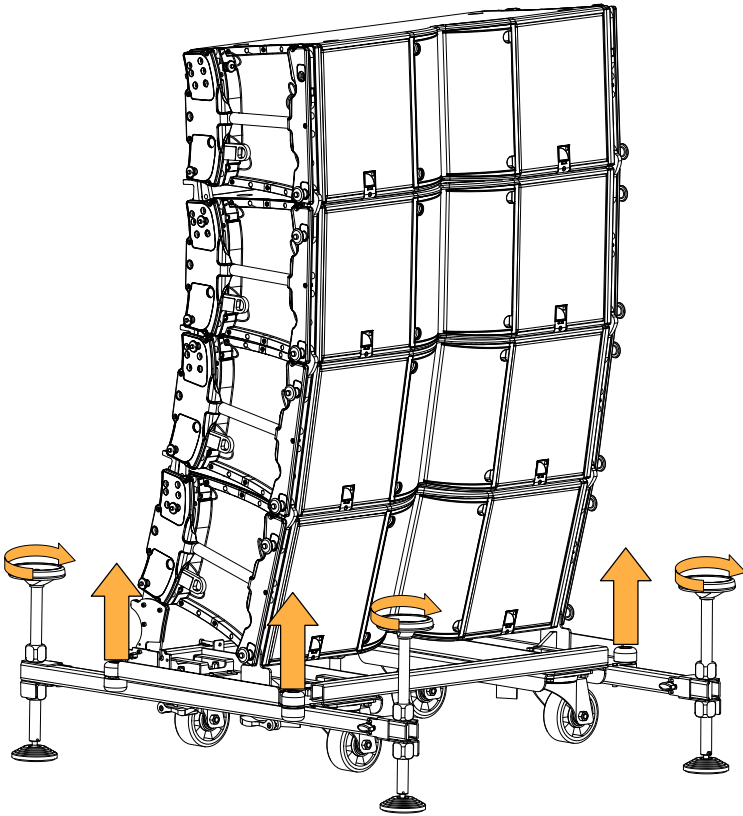


Pivot the feet so they come in contact with the bar.



Lock the feet in position by giving a quarter-turn to the locking system.

4. Rotate the feet clockwise to raise the K3-CHARIOT off the ground.
Stop raising the stack as soon as the wheels get off the ground.

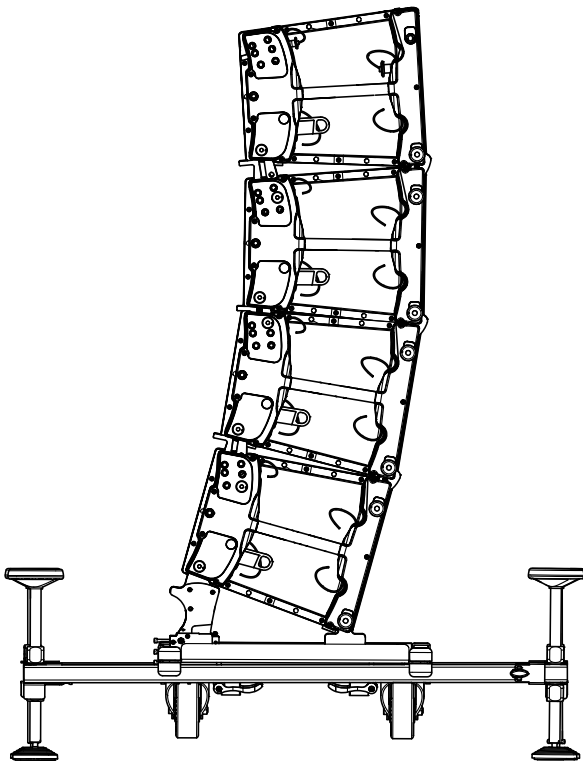


Adjusting the K3-CHARIOT site angle

Type of deployment	stacked array
Rigging accessory	K2-JACK K3-CHARIOT
Min number of operators	2

Procedure

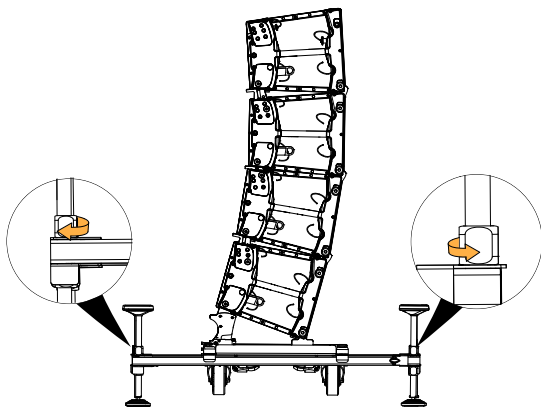
1. Verify the wheels are as close as possible to the ground without touching it.



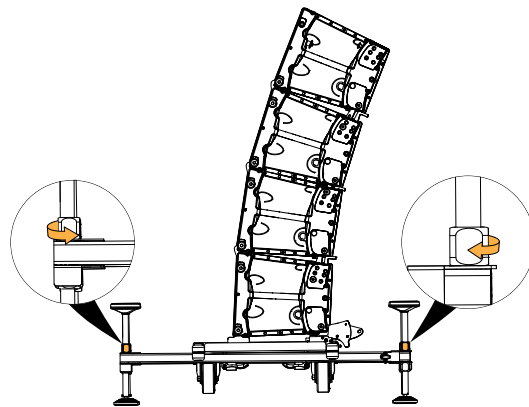
2. Loosen one stabilizer bolt and tighten the other one depending of the target site angle.

! Tighten the bolt by hand only.

Negative site angle



Positive site angle

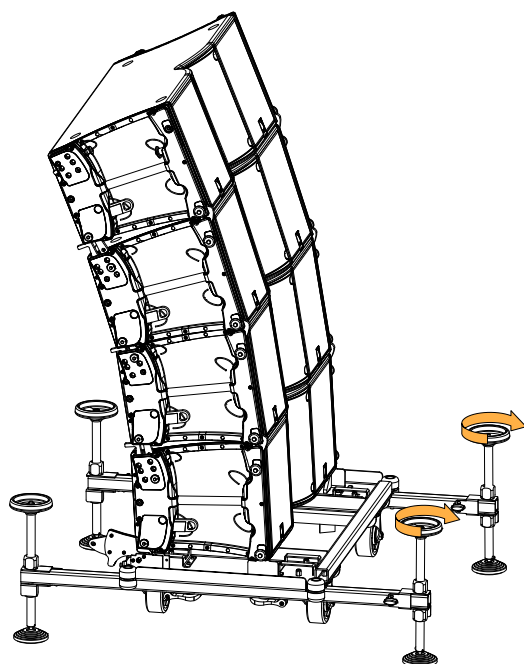


3. Adjust the site angle:

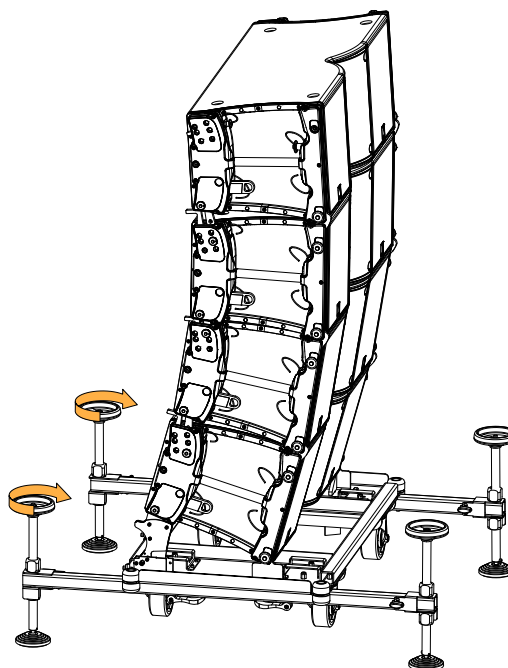


Tipping hazard

Adjust either the stabilizer at the front or at the back of the stack. Do not adjust both the front and back of the stack.



With the front screw jacks for a positive site angle.

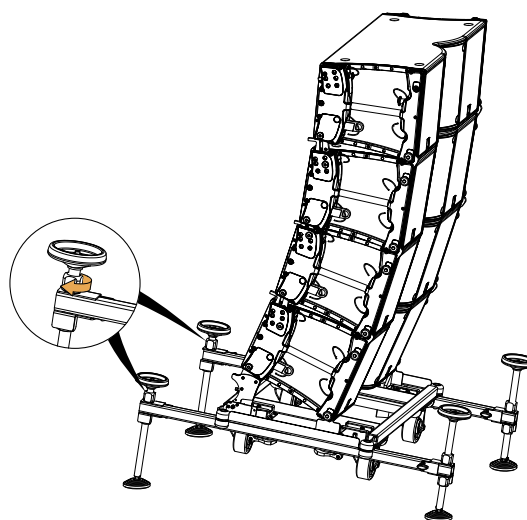
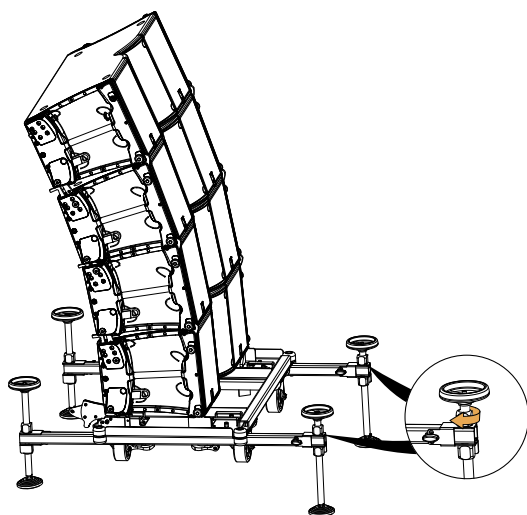


With the back screw jacks for a negative site angle.

4. Tighten the front or back bolts depending on the site angle.



Tighten the bolt by hand only.



Transporting

Stacking multiple K3-CHARIOTLID on K3-CHARIOT

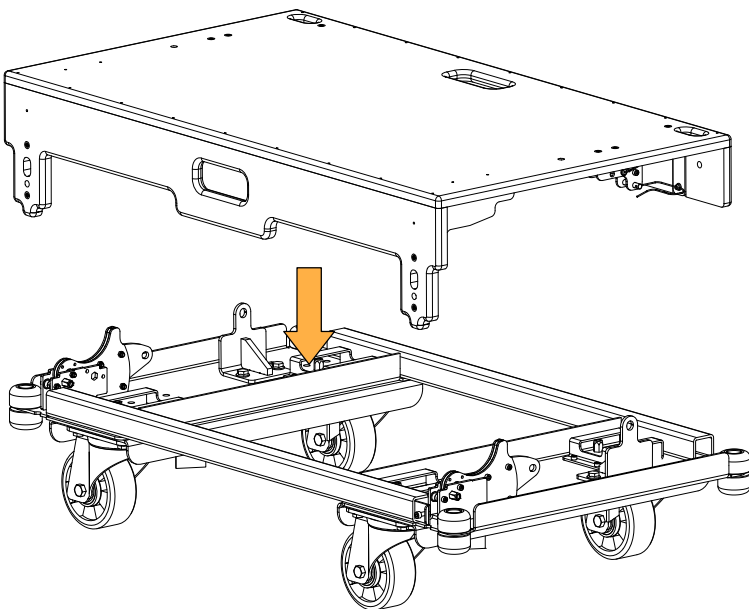
Type of deployment	stacked array
Rigging accessory	K3-CHARIOTLID K3-CHARIOT
Min number of operators	1

Prerequisite

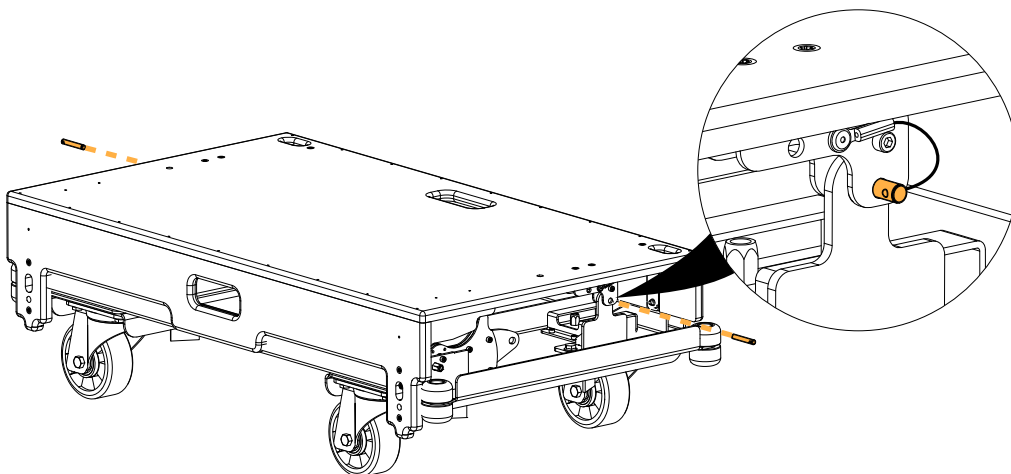
The rear rigging arms of K3-CHARIOT are on storage position.

Procedure

1. Position one K3-CHARIOTLID on K3-CHARIOT.
The longer side must be on the rear rigging arms of K3-CHARIOT.



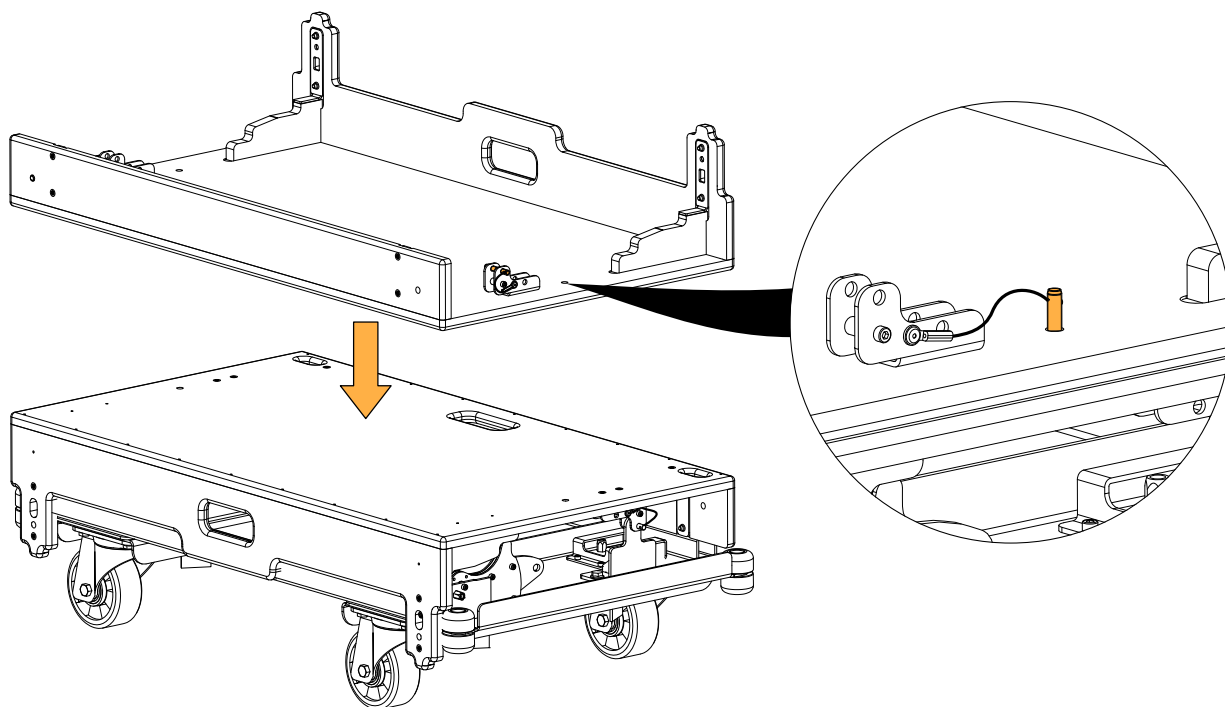
2. Secure K3-CHARIOTLID to the front rigging arms of K3-CHARIOT using the locking pin.



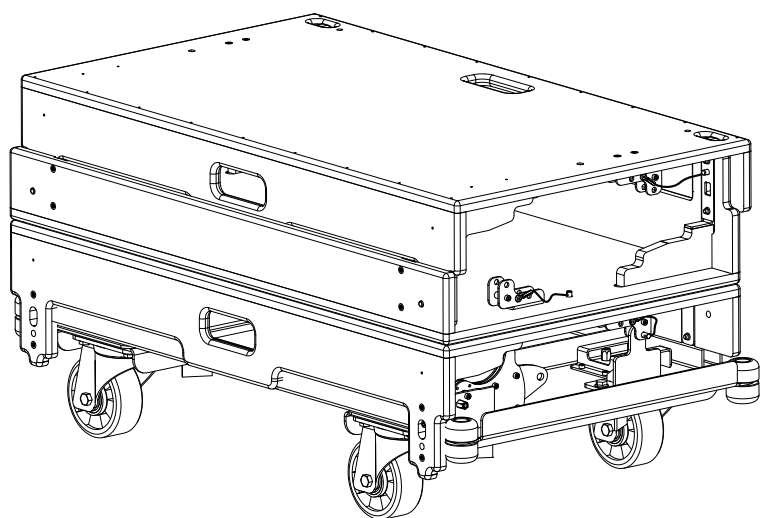
3. Position another K3-CHARIOTLID (reverted) on the first one.
The longer side must be on the front side of K3-CHARIOT.

! **Storing multiple K3-CHARIOTLID on K3-CHARIOT**

Alternate the position of each K3-CHARIOTLID.



- 4.** Repeat steps 1 to 3 until each K3-CHARIOTLID is stacked on K3-CHARIOT.



Mounting K3-CHARIOTLID to K3

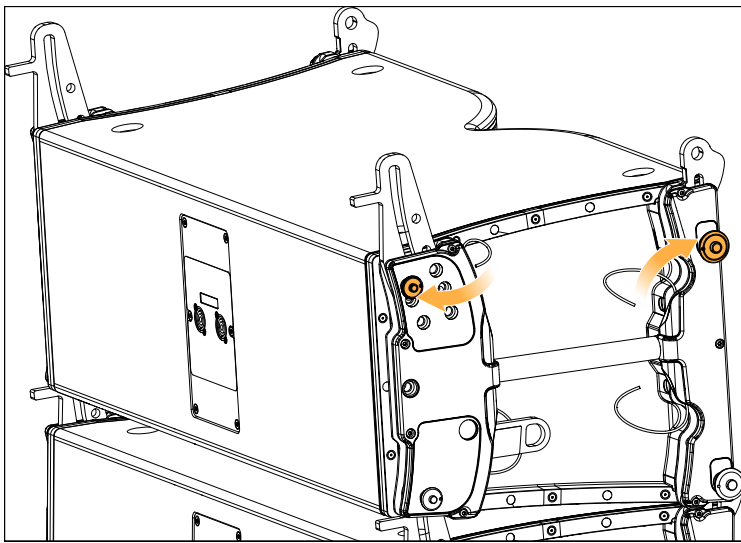
Type of deployment	stacked array
Rigging accessory	K3-CHARIOTLID K3-CHARIOT
Min number of operators	1

Prerequisite

An array of four K3 is stacked on K3-CHARIOT.

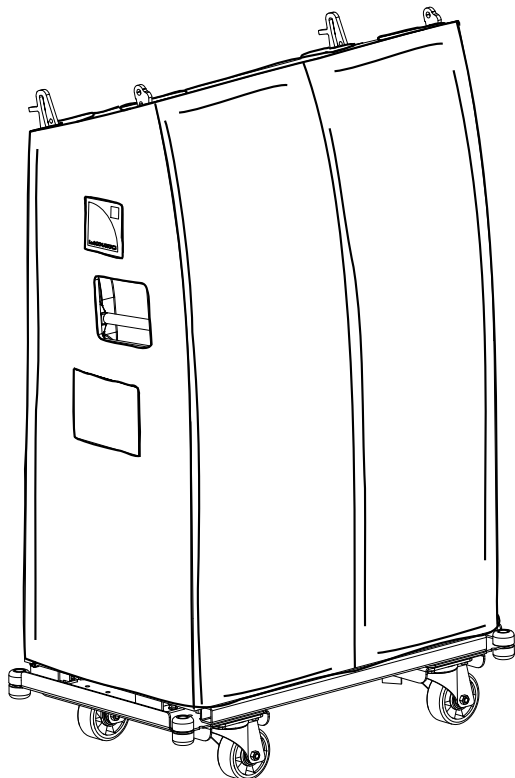
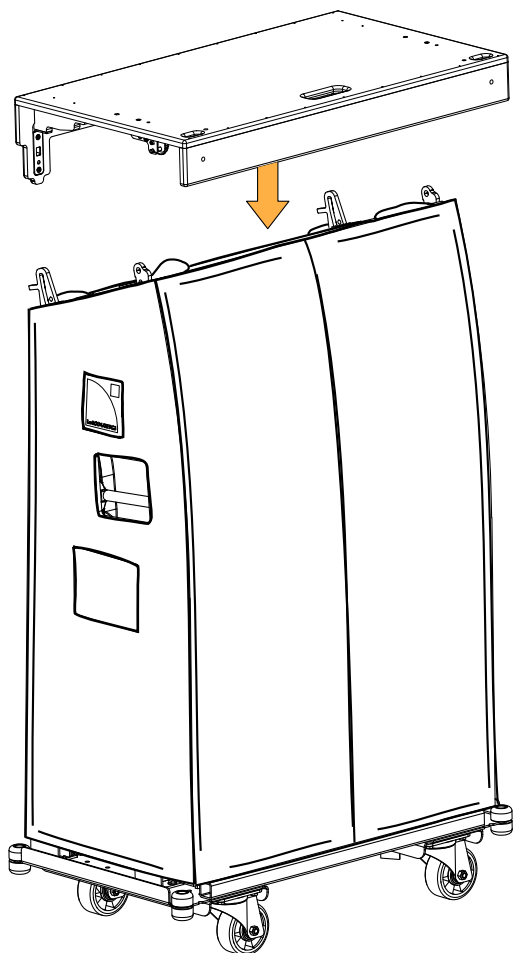
Procedure

1. Prepare the top enclosure for K3-CHARIOTLID.
 - a) Lift the front rigging arms and secure the ball-locking pin to the LINK position.
 - b) Lift the rear rigging arms and secure the ball-locking pin to 0.25° position.



2. Put K3-CHARIOTCOV on K3.

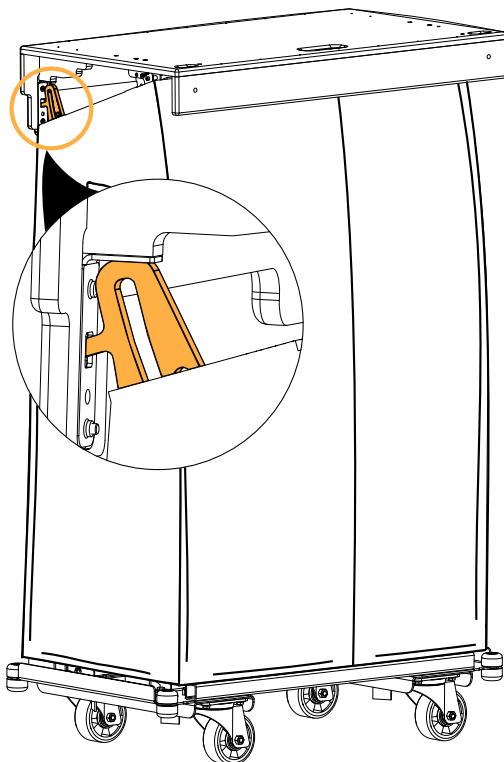
Open the top flaps to pull out the front and rear rigging arms of the top enclosure.

**3.** Position one K3-CHARIOTLID on K3.

4. Connect the front rigging arms of K3
Secure the ball-locking pin to the front rigging arm.



5. Position the back of K3-CHARIOTLID on the rear rigging arms.
The rear rigging arm must be in the notch of K3-CHARIOTLID.



Connection to LA amplified controllers

Enclosure drive capacity per amplified controller

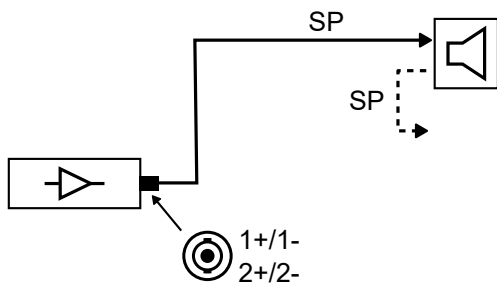
Make sure the total number of connected enclosures does not exceed the maximum number of enclosure per controller (refer to the footnote).

	LA4X	LA8	LA12X
	per output[*] / total	per output[*] / total	per output[*] / total
K3	1 / 2	2 / 4	3 / 6
Kara II	2 / 4	3 / 6	3 / 6
KS28	–	–	1 / 4
KS21	1 / 4	2 / 6 ^b	2 / 8

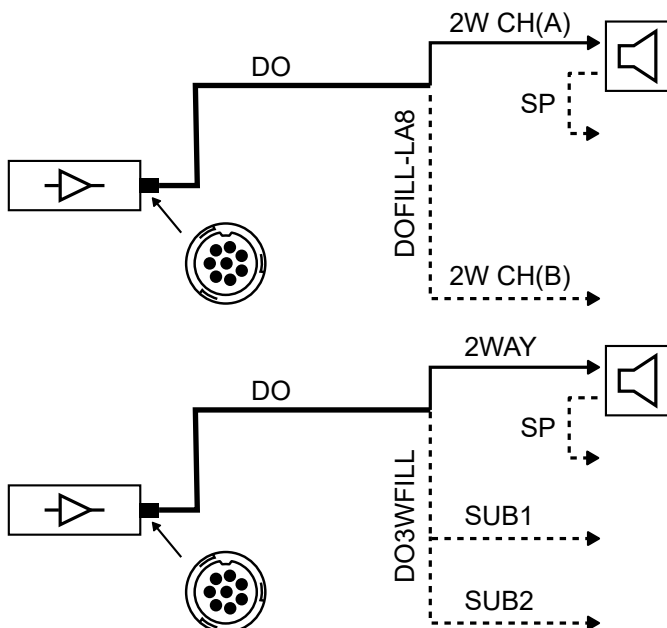
Cabling schemes for K3 / Kara II

Refer to the cabling schemes to connect the enclosures to different types of output connectors.

Two-channel speakON output



Four-channel CA-COM output

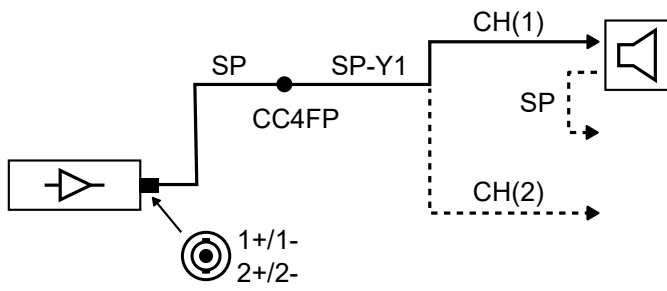


^b LA8 can drive up to two KS21 or KS21i per output, but no more than six per controller at high level.

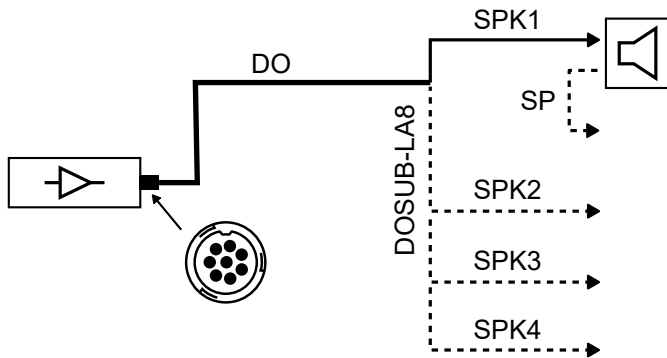
^{*} For passive loudspeakers, the value corresponds to the number of enclosures in parallel on the output. For active loudspeakers, the value corresponds to the number of sections in parallel on the output.

Cabling schemes for KS28

Two-channel speakON output



Four-channel CA-COM output



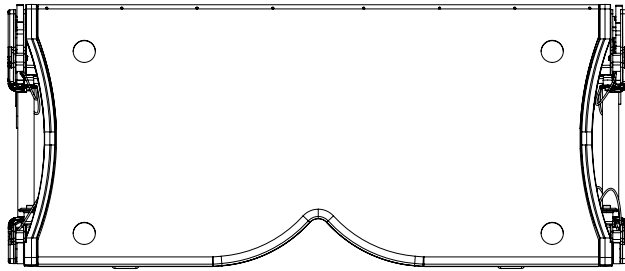
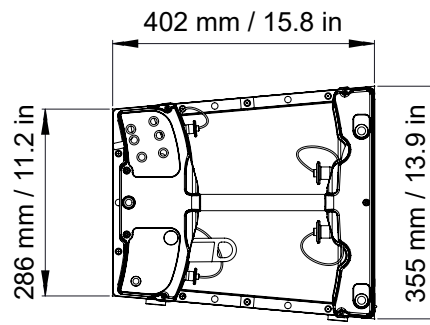
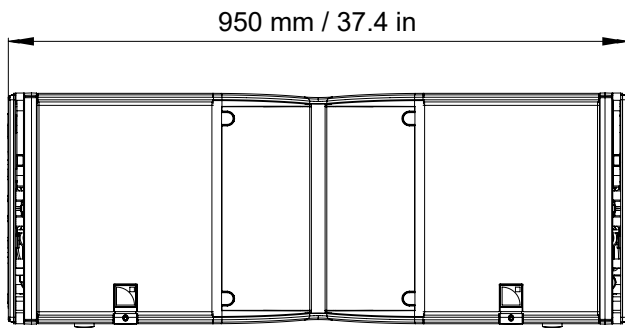
Specifications

K3 specifications

Description	2-way active WST® enclosure: 2 x 12" LF + 4" HF diaphragm, amplified by LA4X / LA8 / LA12X
Usable bandwidth (-10 dB)	42 Hz - 20 kHz ([K3 70])
Maximum SPL¹	143 dB ([K3 70])
Nominal directivity (-6 dB)	horizontal: 70° / 110° symmetric or 90° asymmetric vertical: depending on number of elements and array curvature
Transducers	LF: 2 x 12" neodymium cone driver HF: 1 x 4" diaphragm compression driver, neodymium
Acoustical load	LF: bass-reflex, L-Vents HF: DOSC waveguide, L-Fins
Nominal impedance	LF: 8 Ω HF: 8 Ω
Connectors	2 x 4-point speakON
Rigging and handling	flush-fitting 4-point rigging system 2 handles inter-enclosure angles: 0.25°, 1°, 2°, 3°, 4°, 5°, 7.5° or 10°
Weight (net)	43 kg / 95 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).

K3 dimensions

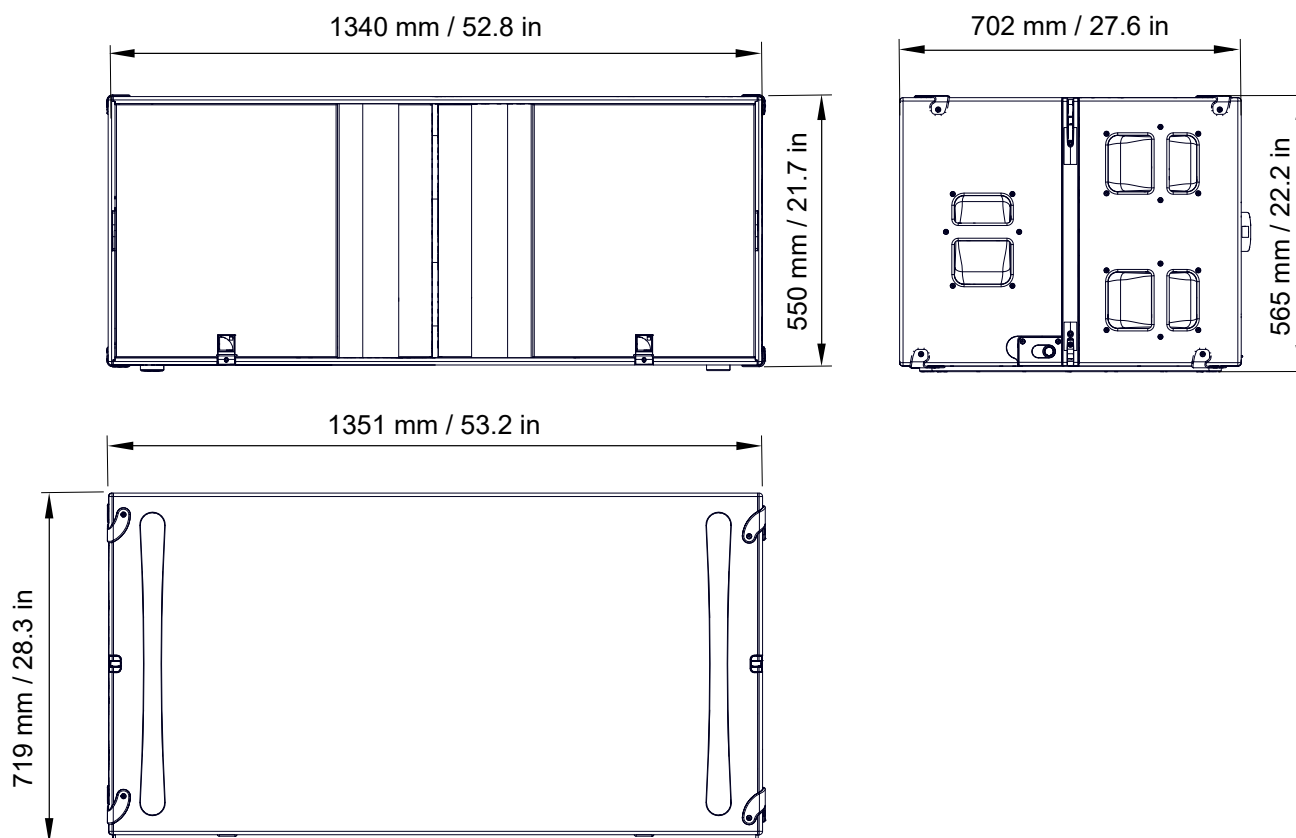


KS28 specifications

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

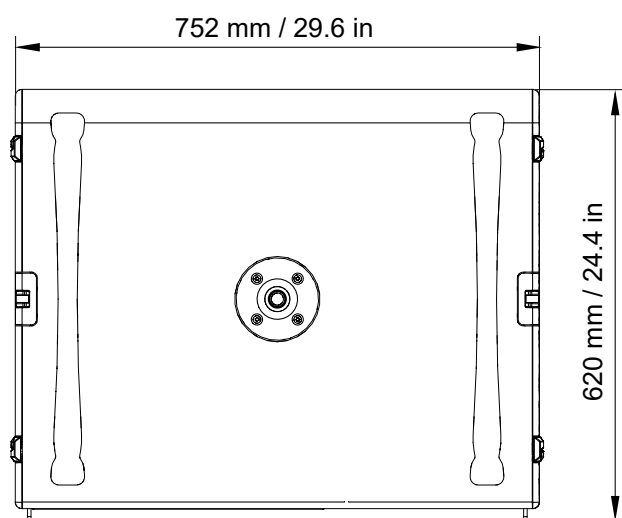
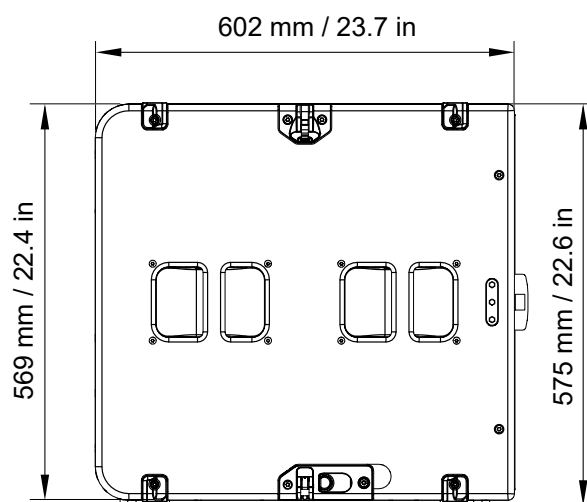
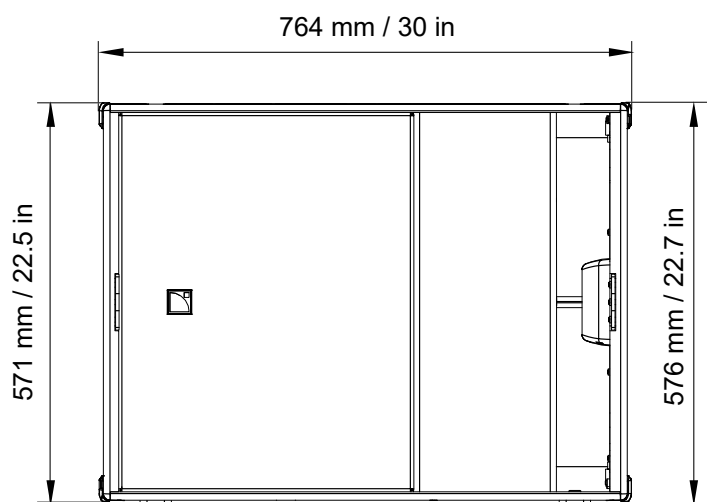


KS21 specifications

Description	High power compact subwoofer: 1x21" , amplified by LA4X / LA8 / LA12X
Low frequency limit (-10 dB)	31 Hz ([KS21_100])
Maximum SPL¹	138 dB ([KS21_100])
Nominal directivity (-6 dB)	standard or cardioid configuration
Transducers	1 × 21" neodymium cone driver
Acoustical load	bass-reflex, L-Vents
Nominal impedance	8 Ω
Connectors	IN: 1 × 4-point speakON LINK: 1 × 4-point speakON
Rigging and handling	flush-fitting 2-point rigging system 4 handles 8 corner stops 2 ground runners 1 pole mount with M20×150 insert
Weight (net)	49 kg / 108 lb
Cabinet	premium grade Baltic beech and 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

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

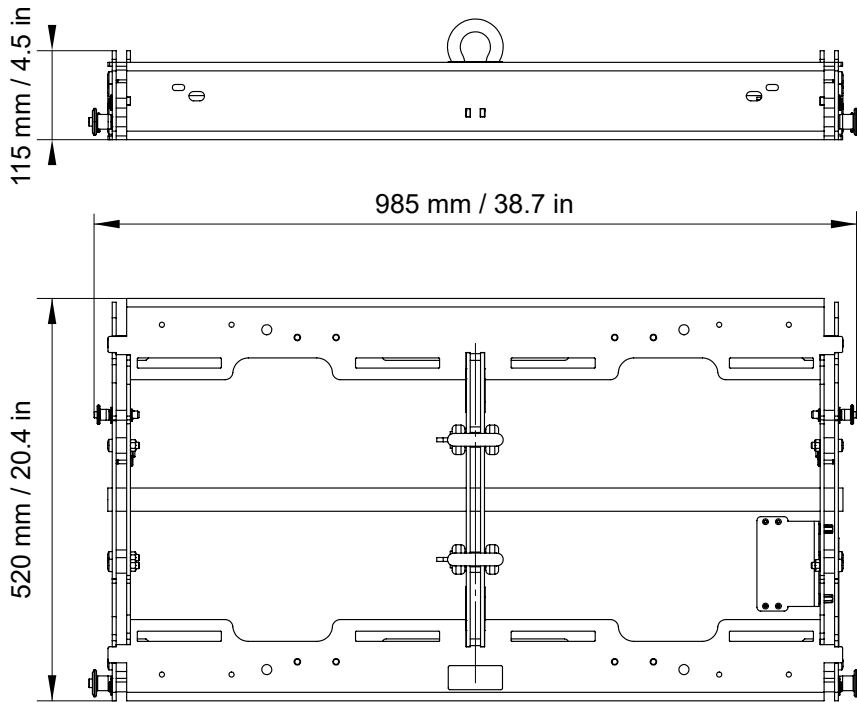
KS21 dimensions



K3-BUMP specifications

Description	Flying frame for K3
Weight (net)	35 kg / 77 lb
Material	high grade steel with anti-corrosion coating

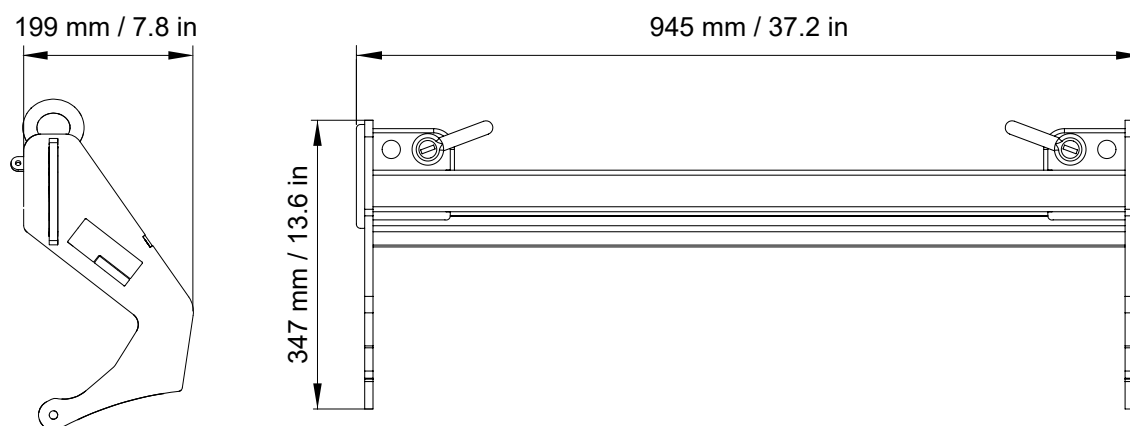
K3-BUMP dimensions



K3-RIGBAR specifications

Description	Rigging bar and pullback for K3 (includes LA-SLING2T)
Weight (net)	18 kg / 40 lb
Material	high grade steel with anti-corrosion coating

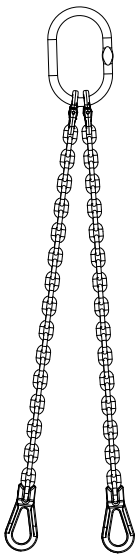
K3-RIGBAR dimensions



LA-SLING2T specifications

Description	Lifting chain (DIN EN 818-4) 2-leg , 8 mm
Material	high grade steel with anti-corrosion coating
Weight (net)	3.7 kg / 1.2 lb
Lifting chain (DIN EN 818-4)	2-leg, 8 mm
Steel grade	8
Nominal length incl. hooks	3.7 kg / 1.2 lb
Maximum sling angle β_{\max}	60°
Load rating	2.8 t for β : 0° - 45° 2 t for β : 46° - 60°

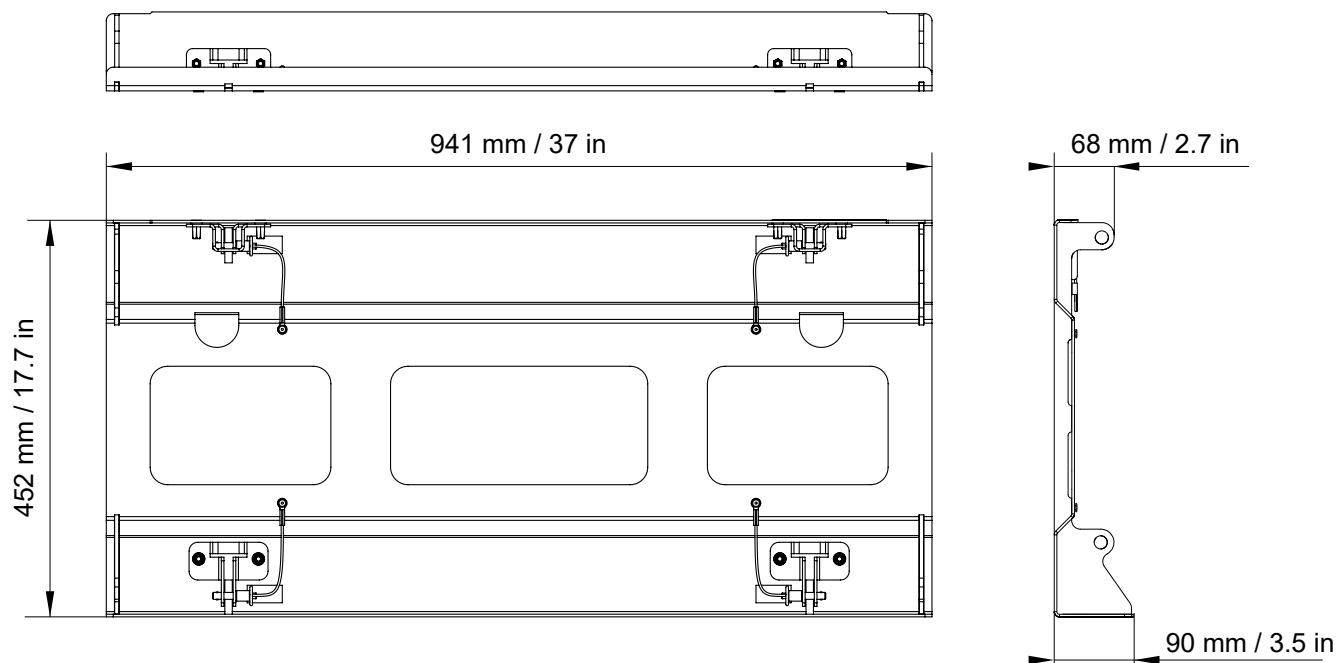
LA-SLING2T illustration



KARADOWNK3 specifications

Description	Interface for flying Kara below K3
Weight (net)	13 kg / 29 lb
Material	high grade steel with anti-corrosion coating

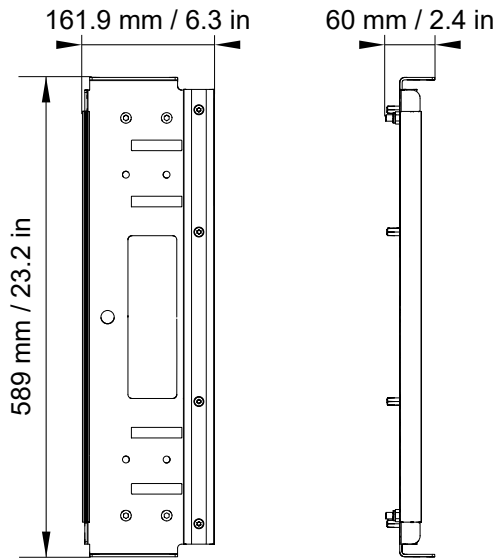
KARADOWNK3 dimensions



LA-RAKMOUNT specifications

Description	Mounting cradles for LA-RAK
Weight (net)	7 kg / 15 lb
Material	high grade steel with anti-corrosion coating

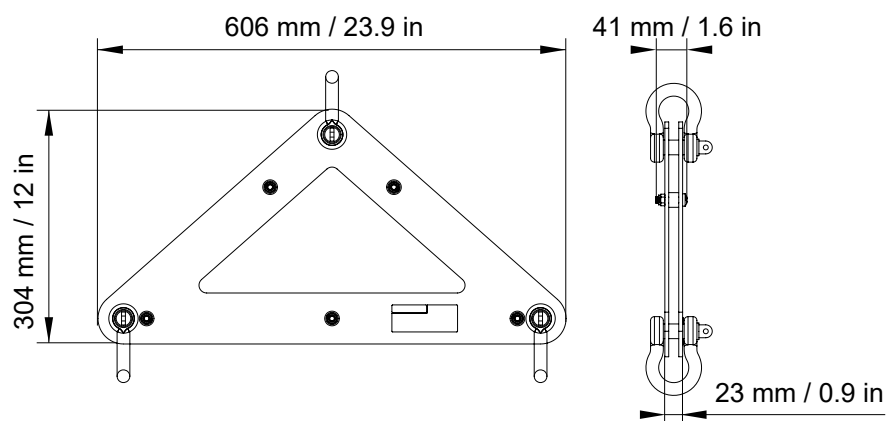
LA-RAKMOUNT dimensions



DELTA 1.5T specifications

Description	Azimuth angle tuning accessory 1.5T
Weight (net)	8 kg / 18 lb
Material	high grade steel with anti-corrosion coating

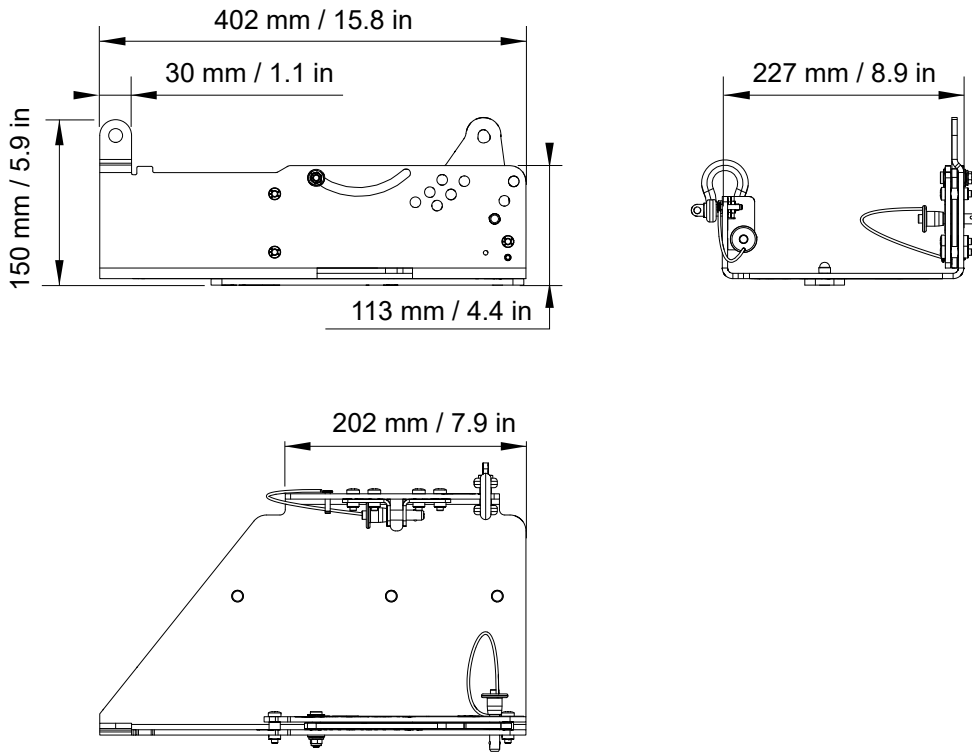
DELTA 1.5T dimensions



K3-TILT specifications

Description	Rigging element for stacking K3 on KS28
Weight (net)	14 kg / 31 lb
Material	high grade steel with anti-corrosion coating

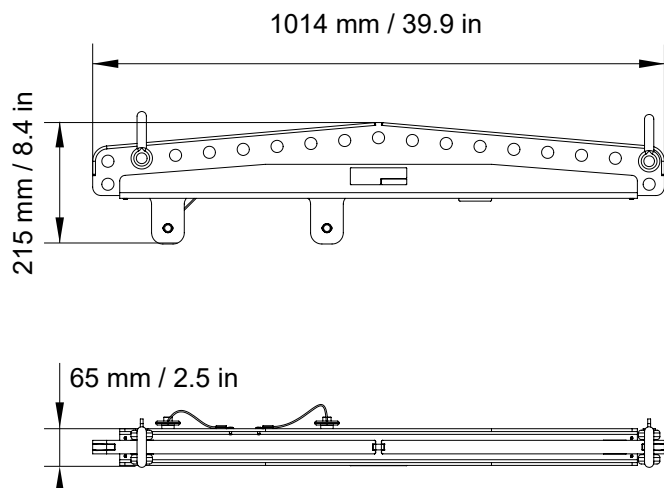
K3-TILT dimensions



K3-BAR specifications

Description	Extension bar for K3-BUMP
Weight (net)	16 kg / 35 lb
Material	high grade steel with anti-corrosion coating

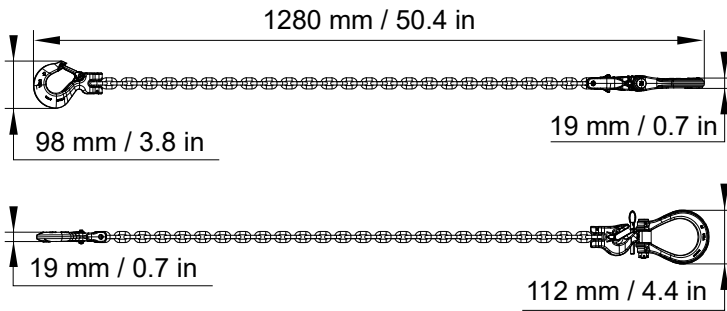
K3-BAR dimensions



BPCHAIN 1.5T specifications

Description	Extension sling 1.5 tons (included in K3-BUMP)
Weight (net)	4 kg / 9 lb
Material	high grade steel with anti-corrosion coating

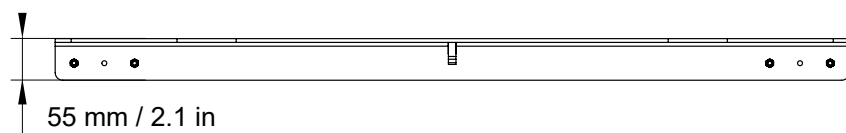
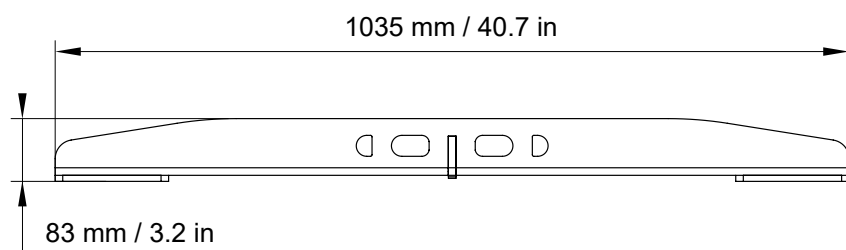
BPCHAIN 1.5T dimensions



KS28-OUTRIG specifications

Description	Stability bars for KS28
Weight (net)	9.4 kg / 20 lb
Material	high grade steel with anti-corrosion coating

KS28-OUTRIG dimensions

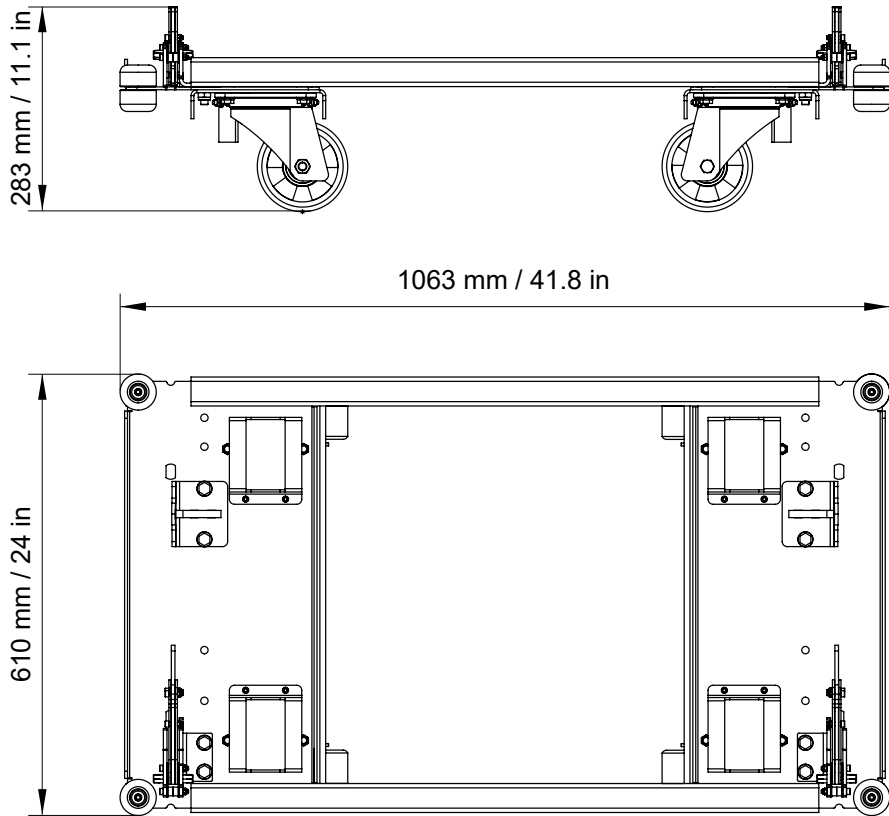


K3-CHARIOT specifications

Description Chariot for up to 4 K3

Weight (net) 47 kg / 104 lb

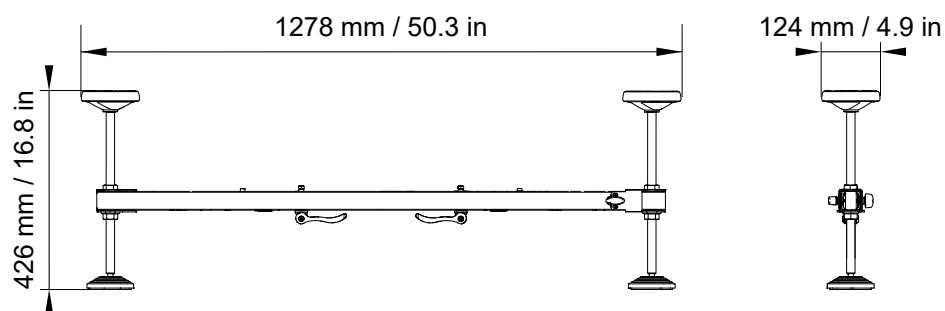
K3-CHARIOT dimensions



K2-JACK specifications

Description	4 tilt adjustment screw jacks + bar for K2-CHARIOT
Weight (net)	10.1 kg / 22.3 lb (for one stabilizer)
Material	high grade steel with anti-corrosion coating

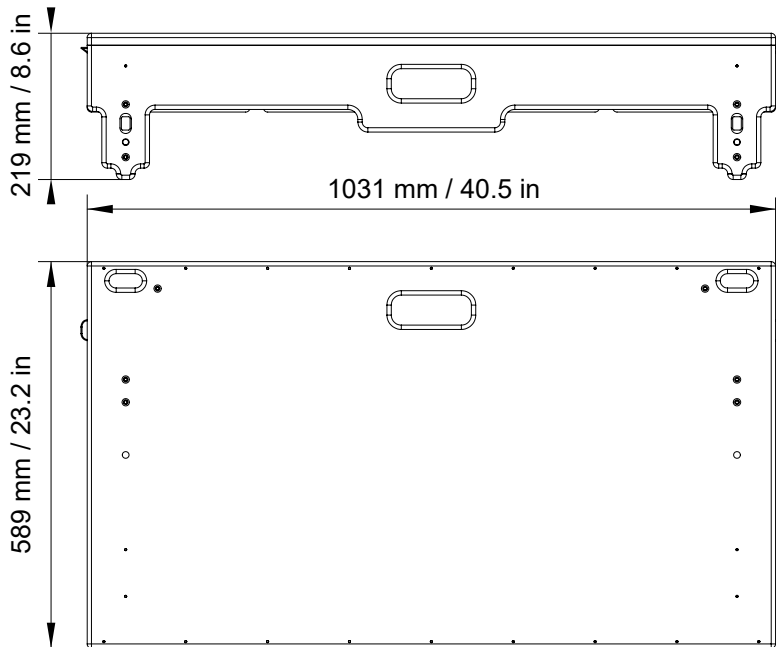
K2-JACK dimensions



K3-CHARIOTLID specifications

Description	Protective lid for K3-CHARIOT
Weight (net)	11 kg / 24 lb
Material	high grade steel with anti-corrosion coating

K3-CHARIOTLID dimensions



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/>



L-Acoustics

13 rue Levacher Cintrat - 91460 Marcoussis - France
+33 1 69 63 69 63 - info@l-acoustics.com
www.l-acoustics.com



 **L.ACOUSTICS**
GROUP