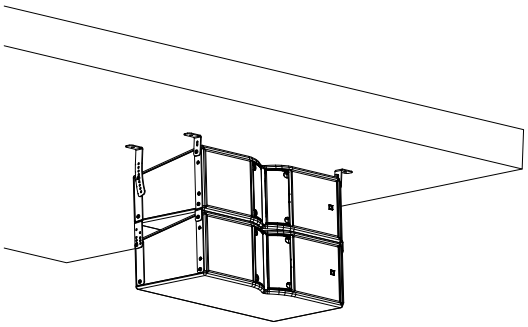
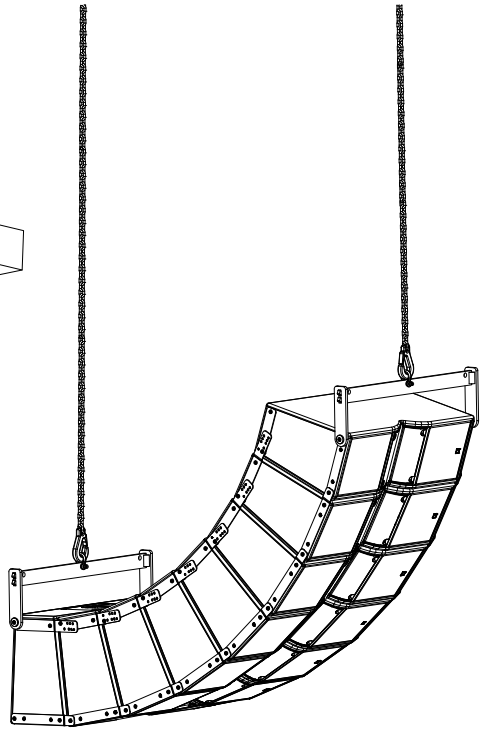
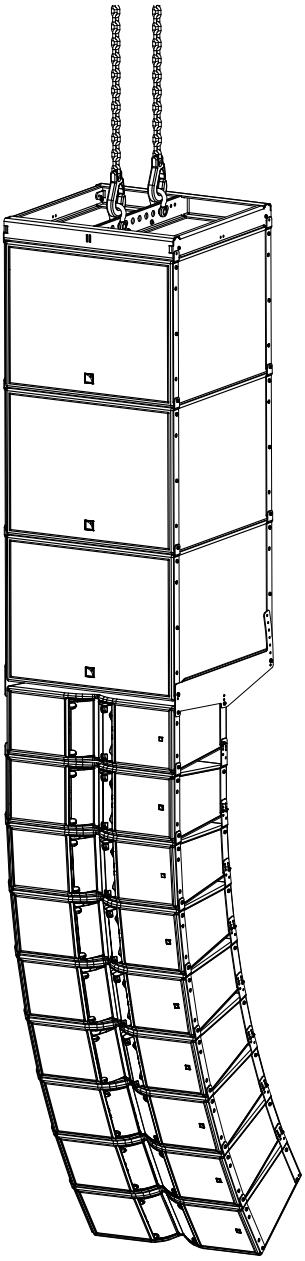
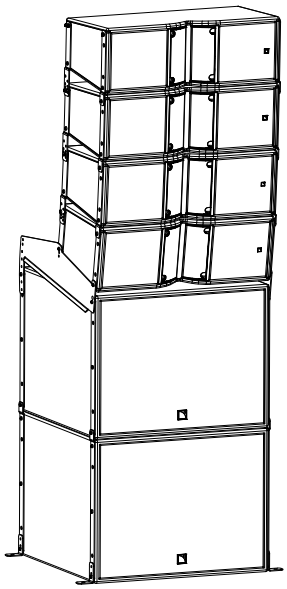
Kara II

owner's manual (EN)









Document reference: Kara II owner's manual (EN) version 5.0
Distribution date: September 5, 2022

Contents

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.

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.

As part of a continuous evolution of techniques and standards, L-Acoustics reserves the right to change the specifications of its products and the content of its documents without prior notice.

Check www.l-acoustics.com on a regular basis to download the latest document and software updates.

Long term exposure to extreme conditions may damage the product.

For more information, refer to the **Products weather protection** document, available on the website.

Read the maintenance section of this document before servicing the product.

Contact L-Acoustics for advanced maintenance.

Any unauthorized maintenance operation will void the product warranty.

This marking indicates that this product should not be disposed of with other household waste throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.

Introduction

Kara III long throw line source for install

Kara III is the installation version of the Kara II, designed for long-throw installation applications. Kara III shares identical sonic performance with its touring counterpart but features a sleeker design and streamlined mounting hardware fitting integration requirements.

With class-leading SPL per weight and footprint, Kara III is ideal for venues that require clarity and long throw capability such as performing arts centers, theaters, operas, houses of worship, corporate facilities and exhibition centers.

Inter-element angles and Panflex™ for user-adjustable horizontal directivity enable integrators, consultants and sound designers to precisely tailor the array coverage to any audience geometry.

Kara III is a discreet yet powerful solution featuring a range of accessories dedicated to installations. Kara III is highly weather-resistant as standard and can be color-matched to melt into any venue decor, indoor or outdoor.

How to use this manual

The Kara III owner's manual is intended for all actors involved in the system design, implementation, preventive and corrective maintenance of the Kara III 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.11)
   - Rigging system description (p.17)
2. Prepare the system configuration. Consider the mechanical limits and the available acoustical configurations.
   - Mechanical safety (p.36)
   - Loudspeaker configurations (p.39)
3. Before rigging the system, perform mandatory inspections and functional checks.
   - Inspection and preventive maintenance (p.47)
4. To deploy the system, follow the step-by-step rigging instructions and refer to the cabling schemes.
   - Rigging procedures (p.55)
   - Connection to LA amplified controllers (p.105)

The Corrective maintenance (p.112) section contains the operations authorized for the end user.
Performing another operation exposes to hazardous situations.
For advanced maintenance, contact your L-Acoustics representative.

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 (EMEA/APAC), laus.service@l-acoustics.com (Americas).

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.

Revision history

version number	publication date	modification
1.0	Mar. 2021	Initial version.
2.0	Mar.2021	Added Corrective maintenance section.
3.0	Jun. 2021	Added Inspection and preventive maintenance section.
4.0	Oct. 2021	• Added new troubleshooting for the listening test to detect air leaks. See Troubleshooting for installation enclosures (p.54). • Changed maximum limits for pullback configurations following the release of Soundvision 3.6.0. See Mechanical safety (p.36).
5.0	Sep. 2022	Updated Specifications for custom rigging systems (p.152).

System components

Loudspeaker enclosures

Kara Ili	2-way active WST® enclosure: 2 × 8" LF + 3" HF diaphragm (installation version)
SB18 Ili	High power compact subwoofer: 1 x 18" (installation version)
KS21i	High power compact subwoofer: 1 x 21" (installation version)
KS28	Flyable subwoofer 2 x 18''
SB28	High power subwoofer: 2 x 18''

Powering and driving system

LA2Xi / LA4X / LA8 / LA12X	Amplified controller with DSP, preset library and networking capabilities

Refer to the LA2Xi / LA4X / LA8 / LA12X owner's manual for operating instructions.

Cables

2 × 2.5 mm² cable	speaker cable with bare wire endings Adapt the cable length to the installation.
4 × 2.5 mm² cable	speaker cable with bare wire endings Adapt the cable length to the installation.
custom 4-point speakON cable	4-point speakON cable (2.5 mm² gauge) to bare wire cable

This cable needs to be custom made.

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

Refer to the LA2Xi / LA4X / LA8 / LA12X owner's manual for detailed instructions about the whole cabling scheme, including modulation cables and network.

Rigging elements

KARAIIi-LINK	Rigging plates for Kara IIi
KARAIIi-ENDLINK	End rigging plates for Kara IIi
KARAIIi-TILT	Rigging element with angles for Kara IIi above or under SB18 IIi
SB18IIi-LINK	Rigging plates for SB18 IIi
SB18IIi-ENDLINK	End rigging plates for SB18 IIi
KARAIIi-FIXBRACKET	Fastening brackets for Kara IIi and SB18 IIi
KARAIIi-TILTBRACKET	Fastening brackets with angles for Kara IIi
KARAIIi-BUMP	Flying frame for vertical deployment of Kara IIi and SB18 IIi
KARAIIi-RIGBAR	Rigging bar and pullback for Kara IIi and SB18 IIi
M-BARi	Extension bar for rigging frame (installation version)
CLAMP250	Clamp certified for 250 kg

Screens

KARAIIi-SCREEN	Acoustically transparent front screen for Kara IIi
SB18IIi-SCREEN	Acoustically transparent front screen for SB18 IIi

Software applications

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

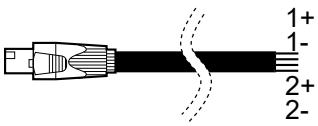
Refer to the **Soundvision** help.
Refer to the **LA Network Manager** help.

System component illustrations

Cables

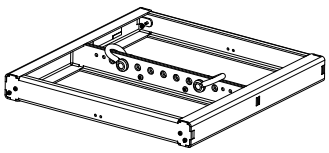
2 × 2.5 mm² cable

4 × 2.5 mm² cable

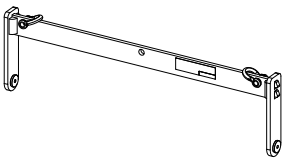


custom 4-point speakON cable

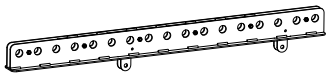
Rigging accessories



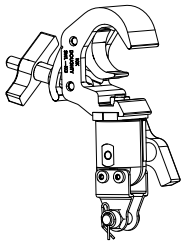
KARAIIi-BUMP



KARAIIi-RIGBAR

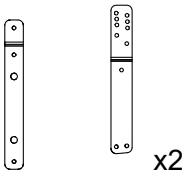


M-BARi

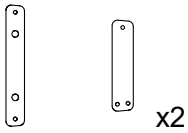


CLAMP250

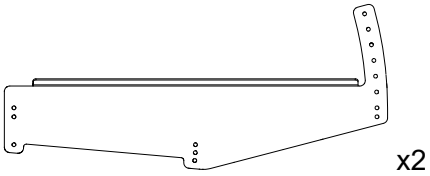
Rigging plates



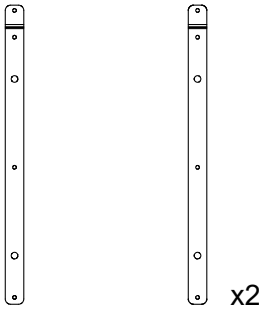
KARAIIi-LINK



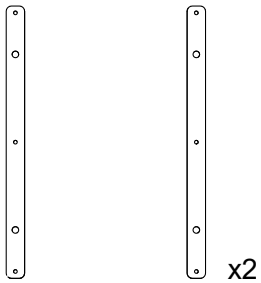
KARAIIi-ENDLINK



KARAIIi-TILT

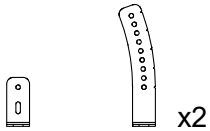


SB18IIi-LINK



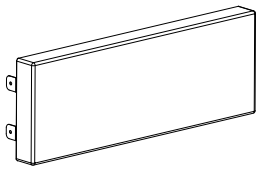
SB18IIi-ENDLINK

KARAIIi-FIXBRACKET

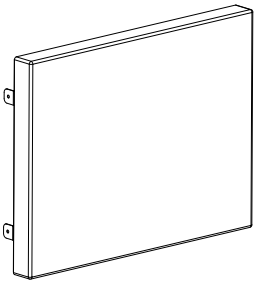


KARAIIi-TILTBRACKET

Screens

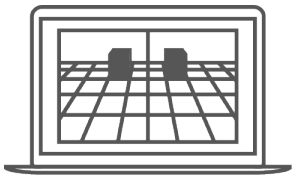


KARAIIi-SCREEN



SB18IIi-SCREEN

Software applications



Soundvision

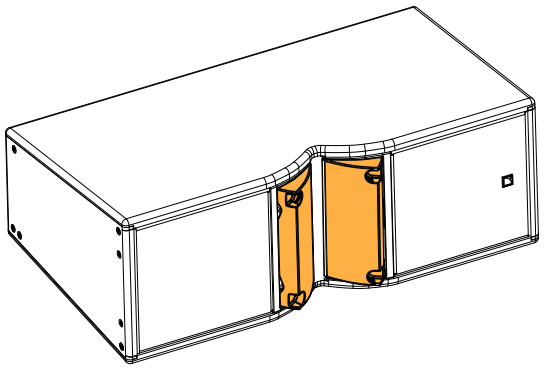
LA Network Manager

Electro-acoustical description

Adjustable fins

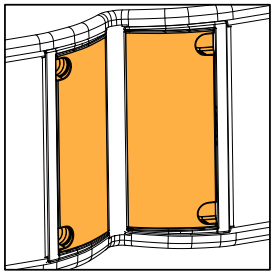
Kara II features L-Fins to adjust the waveguide directivity to one of four settings: 110° / 70° symmetric or 90° asymmetric (35°/55° or 55°/35°).

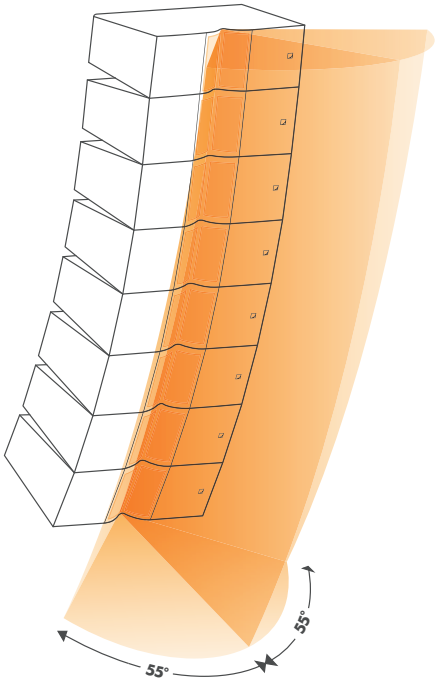
A specific Kara II preset must be used for each directivity setting.



Within a line source, combine Kara II with custom directivity settings to improve SPL mapping and throw capability.

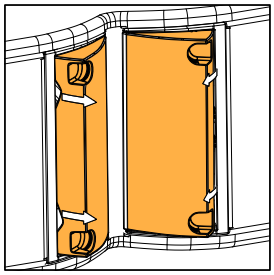
110° setting (preset [KARA II 110])

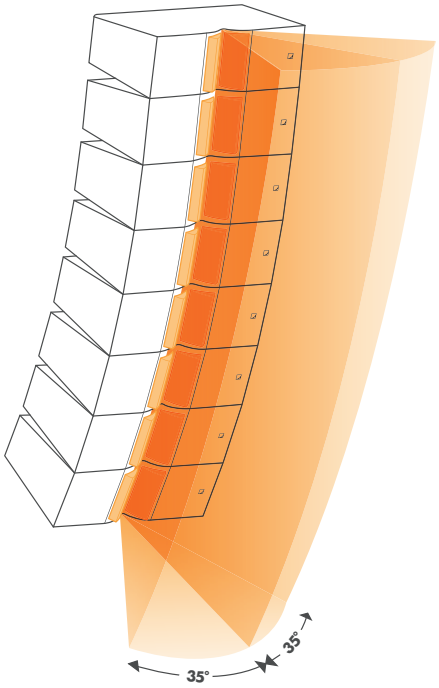




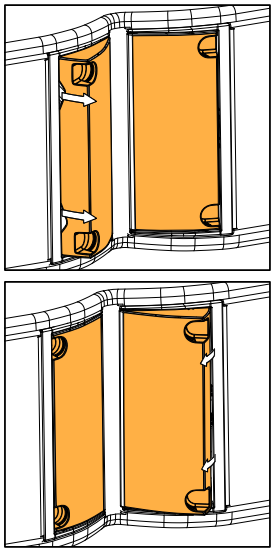
70° setting (preset [KARA II 70])

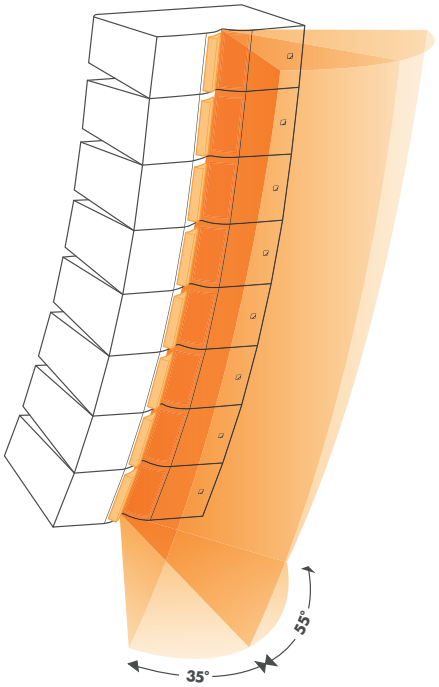
Set the fins in the 35° position to provide the system with a 2 dB on-axis gain (> 1 kHz), compared to the 110° setting.

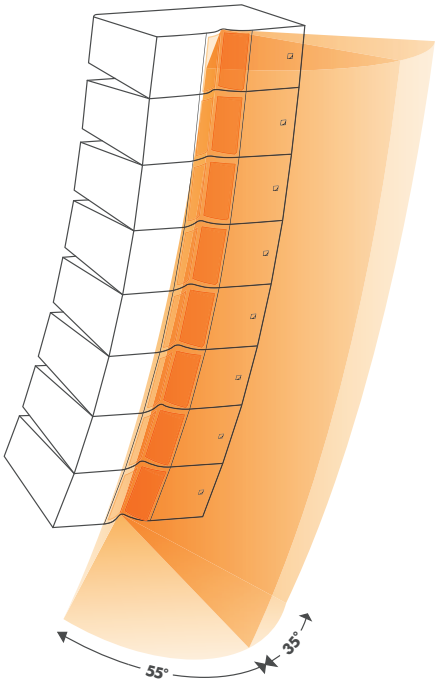




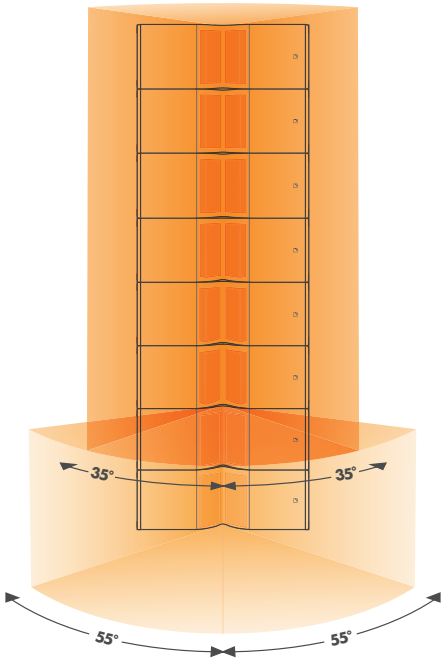
90° settings (preset [KARA II 90])







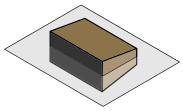
Mixed settings

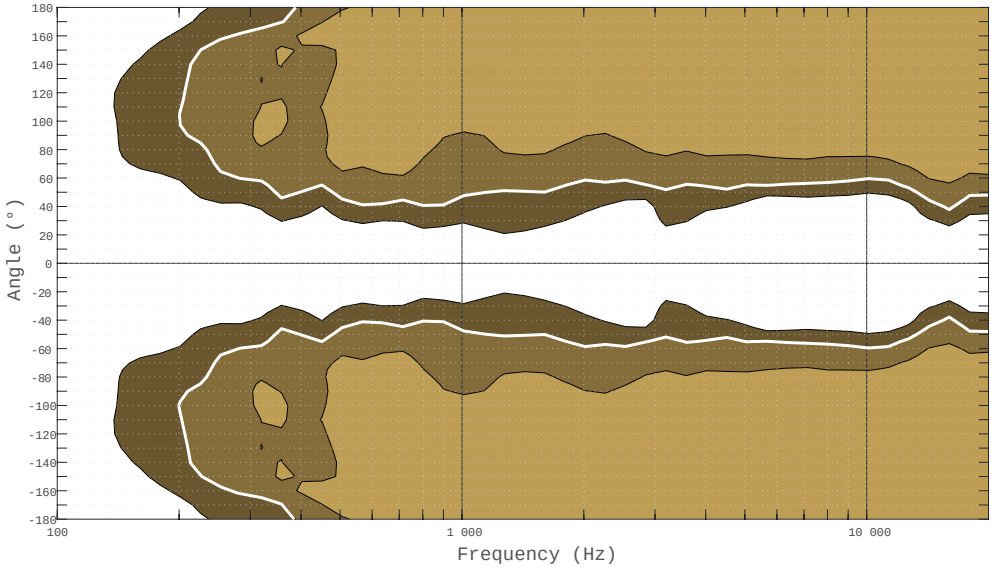


Directivity

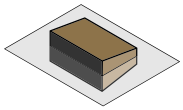
Horizontal

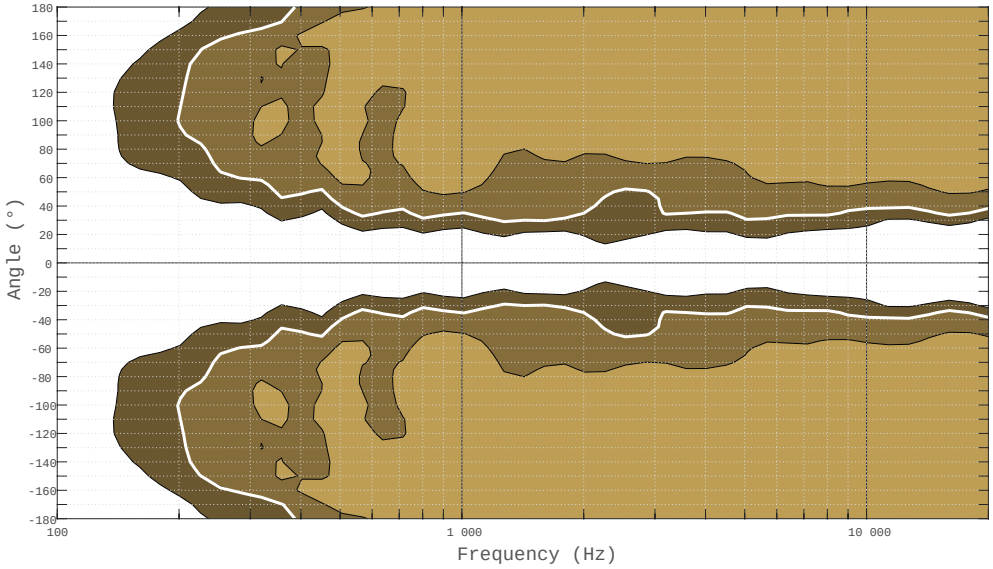
Dispersion angle diagrams of one Kara IIi in the horizontal plane for all fins settings using lines of equal sound pressure at -3 dB, -6 dB, -12 dB.



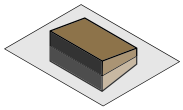


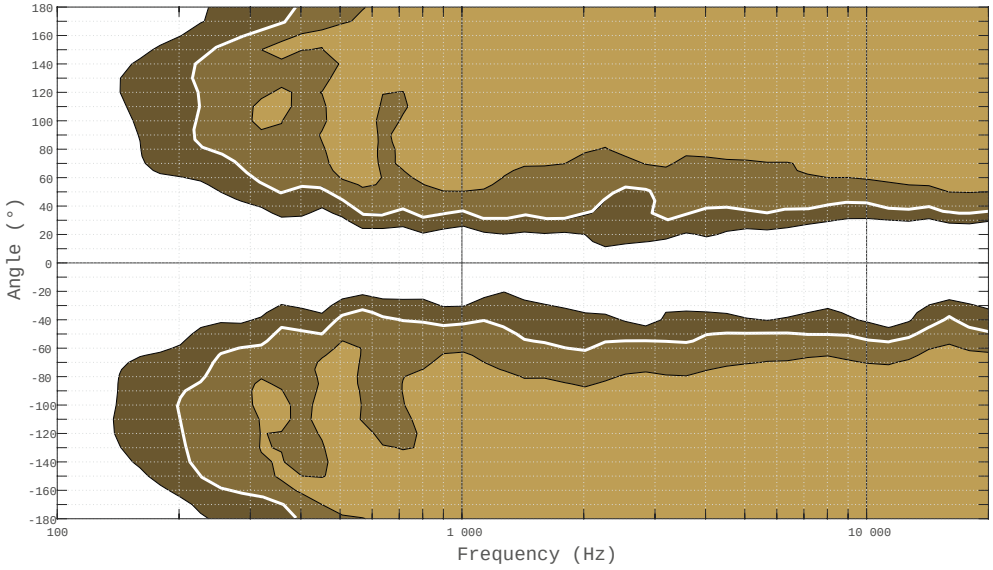
110° fins setting





70° fins setting





90° fins setting

Preset description

[KARA II 70] [KARA II 90] [KARA II 110]

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

[KARA II_FI]

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 B	0 dB	0 ms	+	ON
HF	OUT 4	HF					ON

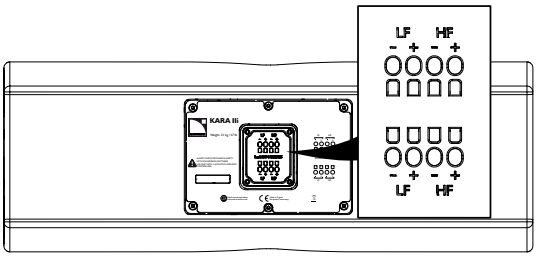
[KS28_60] [SB28_60] [KS21_60] [KS21_100] [SB18_60] [SB18_100]

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_60_Cx] [SB28_60_C] [SB28_60_Cx] [KS21_60_C] [KS21_100_C] [KS21_60_Cx] [KS21_100_Cx] [SB18_60_C] [SB18_100_C] [SB18_60_Cx] [SB18_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

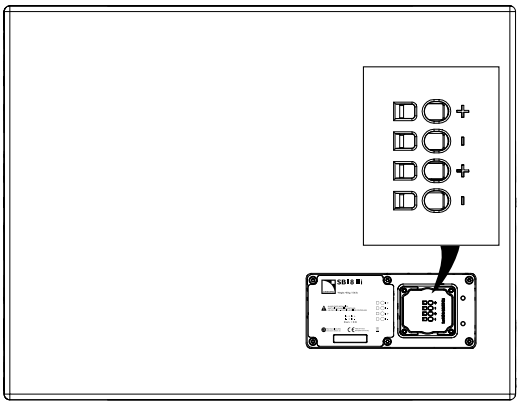


Kara IIi

2 × 4-point terminal block with push-in connection

Internal pinout for L-Acoustics 2-way active enclosures

Terminal block points	1 +	1 -	2 +	2 -
Transducer connectors	LF +	LF -	HF +	HF -



SB18 IIi

1 × 4-point terminal block with push-in connection

Internal pinout for L-Acoustics subwoofers

Terminal block points	IN +	IN -
Transducer connectors	LF +	LF -

Rigging system description

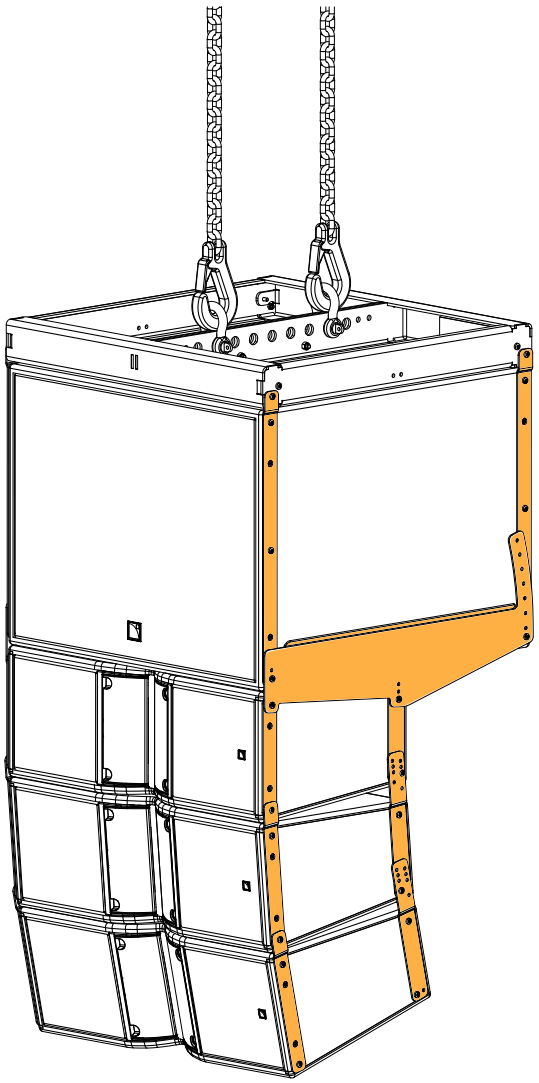
Kara IIi / SB18 IIi system rigging

The Kara IIi / SB18 IIi system is the installation version of the Kara II / SB18 system and features a simplified rigging approach to optimize visual impact.

The enclosures are assembled together with rigging plates and rigging accessories suited for installation. Like the Kara II / SB18 system, the enclosures can be deployed in flown or stacked arrays. Multiple rigging kits are available depending on the desired configuration.

Do not combine Karai / SB18i elements and Kara IIi / SB18 IIi elements within the same array.

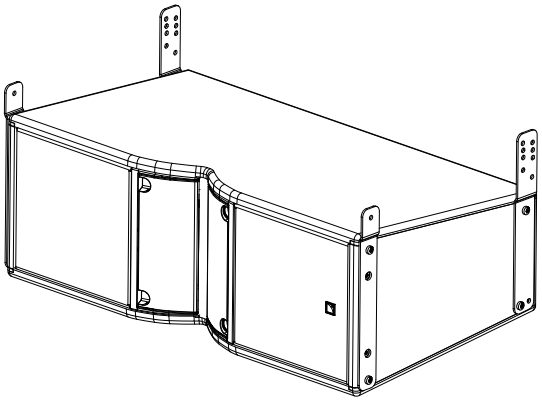
The two systems are not mechanically compatible.



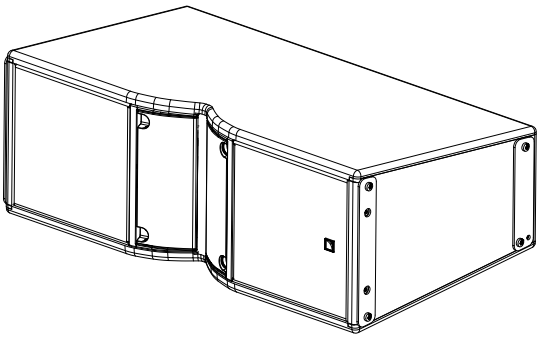
Enclosures

Kara Ili

Kara Ili is compatible with two types of rigging plates:

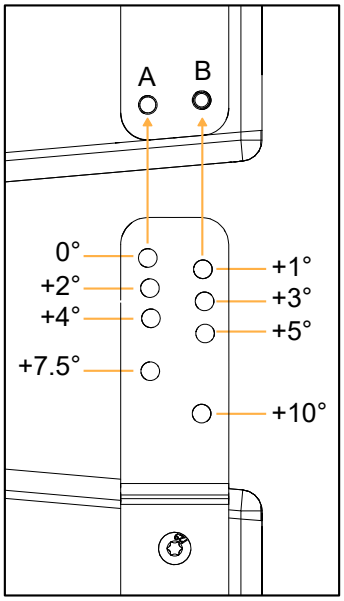


standard rigging plates (KARAIli-LINK)



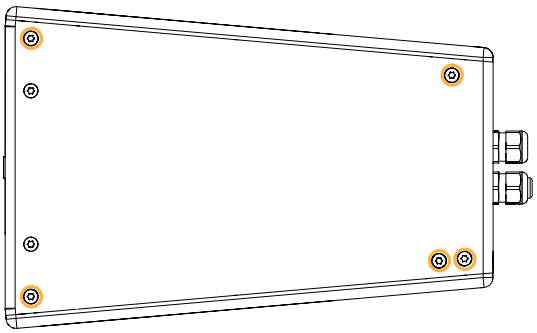
end rigging plates (KARAIli-ENDLINK)

With KARAIli-LINK, the inter-element angle between two Kara Ili can be set to 0°, 1°, 2°, 3°, 4°, 5°, 7.5° or 10°.

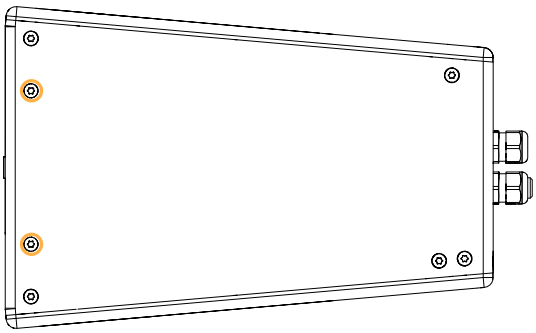


(right-hand-side KARAIli-LINK)

Kara Ili features seven M6 inserts on each side:



Five M6 inserts for rigging

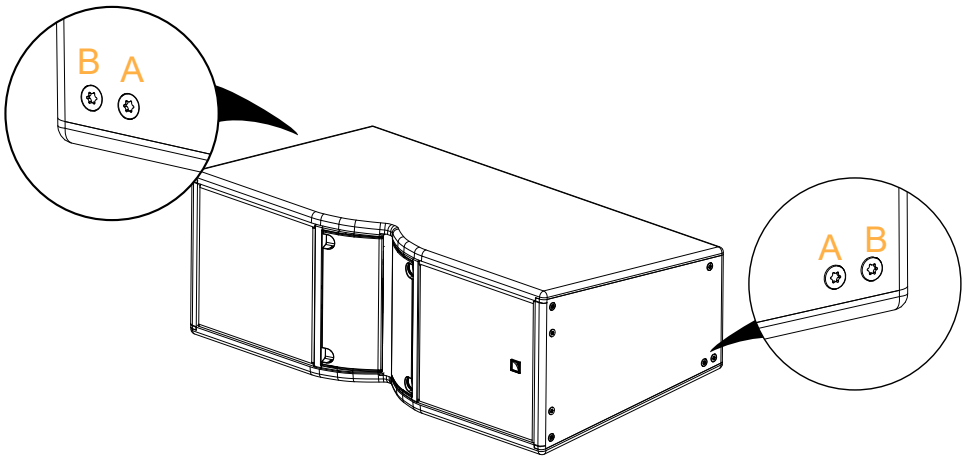


Two M6 inserts for securing a screen

Refer to Securing a screen (p.102).

All inserts are fitted with placeholder screws. Leave the placeholder screws in the inserts that are not used.

The two inserts at the bottom rear on each side are used depending on the rigging accessory secured under the enclosure, and on the inter-element angle.



Risk of acoustic leaks

Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

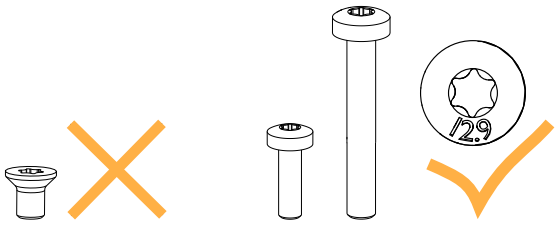
Kara II rear linking points

rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

Rigging screws

Only use the rigging screws provided by L-Acoustics.

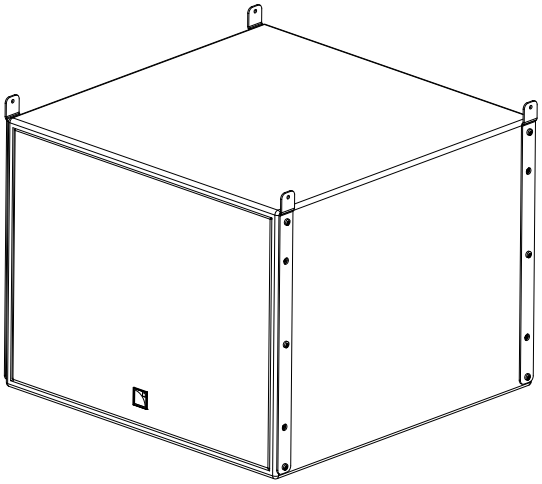
Do not use the placeholder screws for rigging.



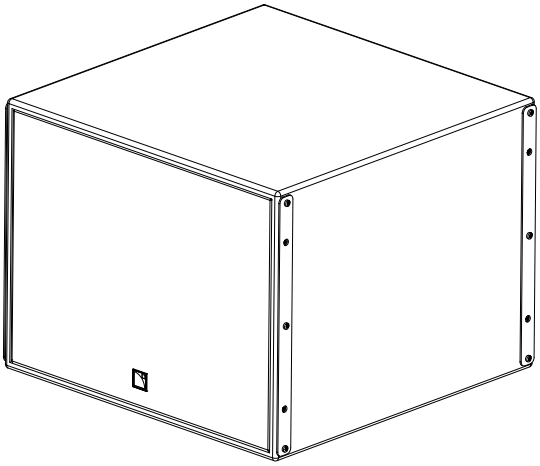
SB18 IIi

SB18 IIi is the dedicated subwoofer for Kara IIi.

SB18 IIi is compatible with two types of rigging kits:

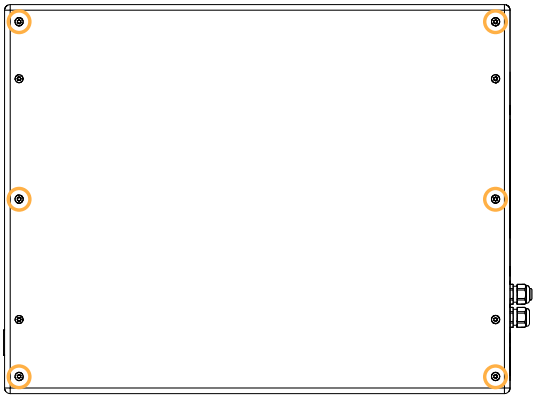


standard rigging plates (SB18IIi-LINK)

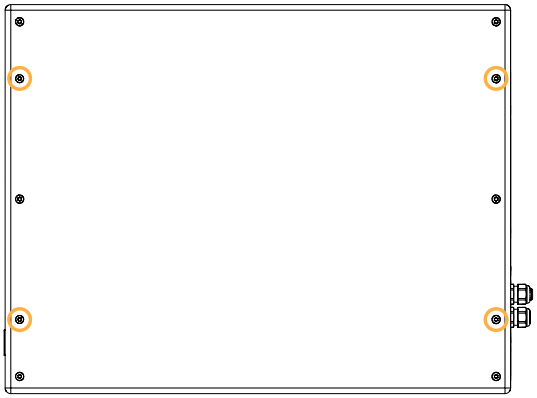


end rigging plates (SB18IIi-ENDLINK)

SB18 IIi features ten M6 inserts on each side:



Six M6 inserts for rigging



Four M6 inserts for securing a screen in standard or cardioid configurations

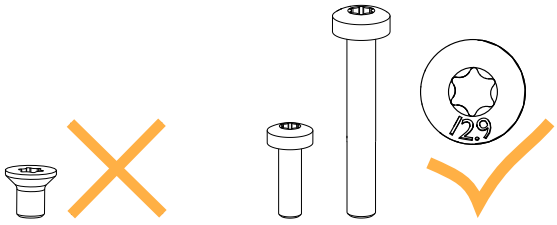
Refer to Securing a screen (p.102).

The inserts are fitted with placeholder screws.

Rigging screws

Only use the rigging screws provided by L-Acoustics.

Do not use the placeholder screws for rigging.

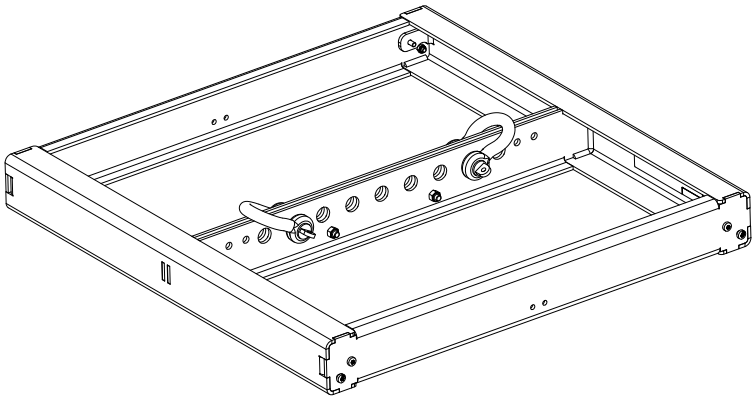


Always put the placeholder screws back in place to avoid leaks.

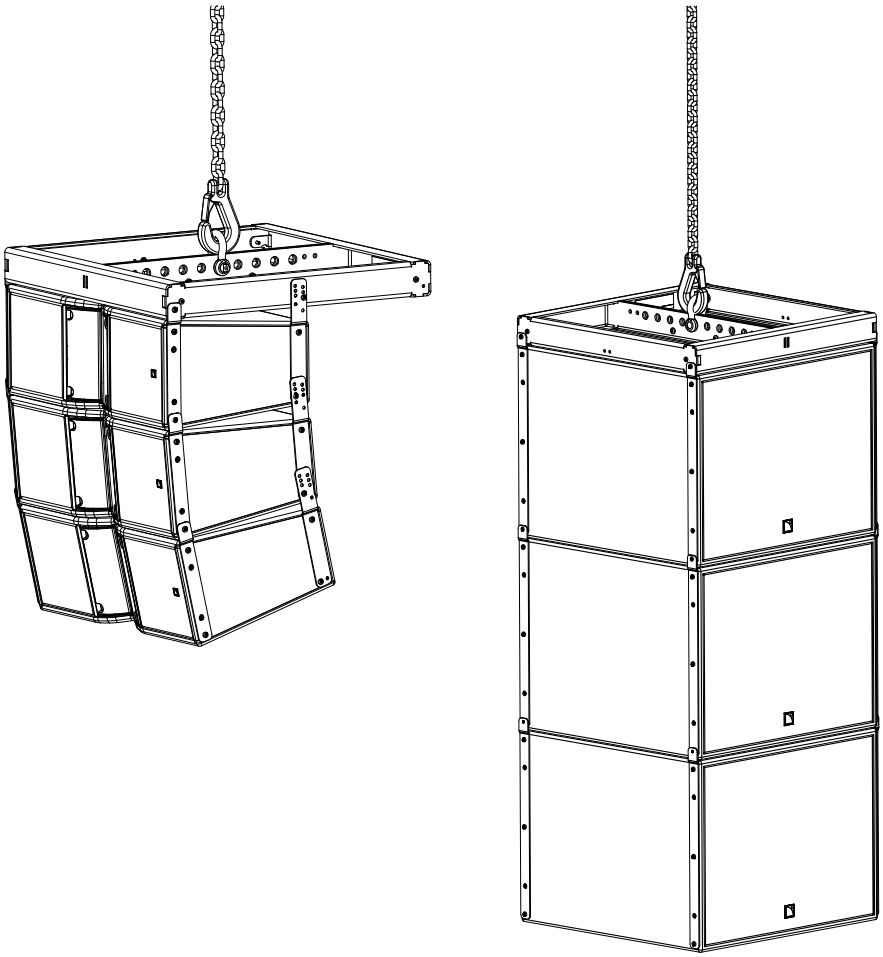
Rigging elements

KARAIIi-BUMP

KARAIIi-BUMP is a rigging frame for flying arrays of Kara IIi or SB18 IIi.

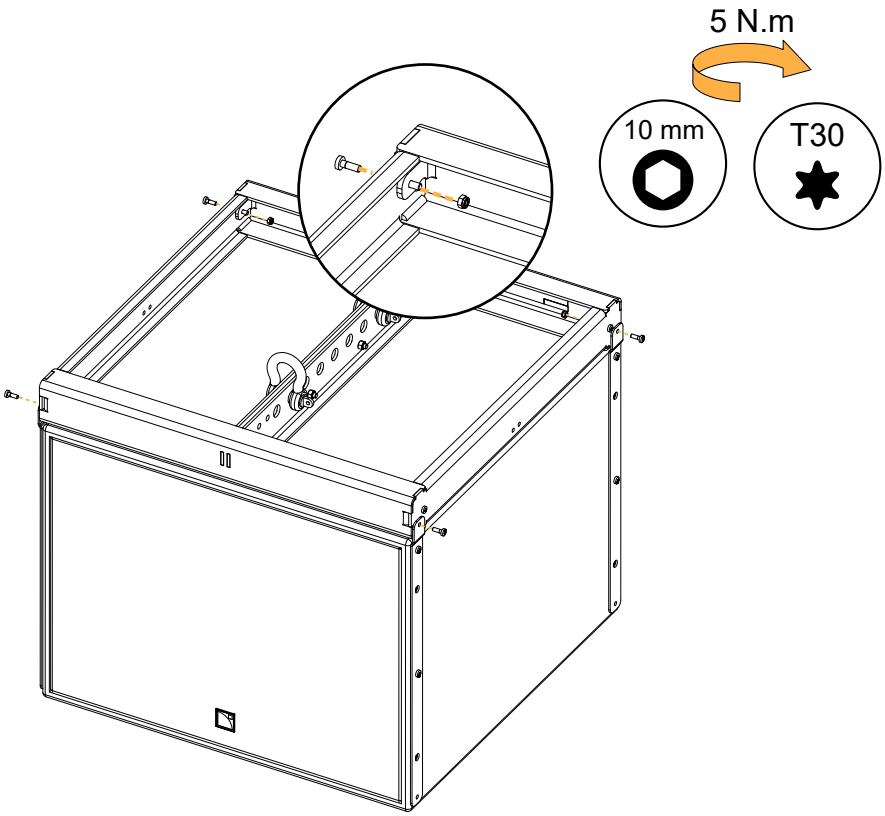


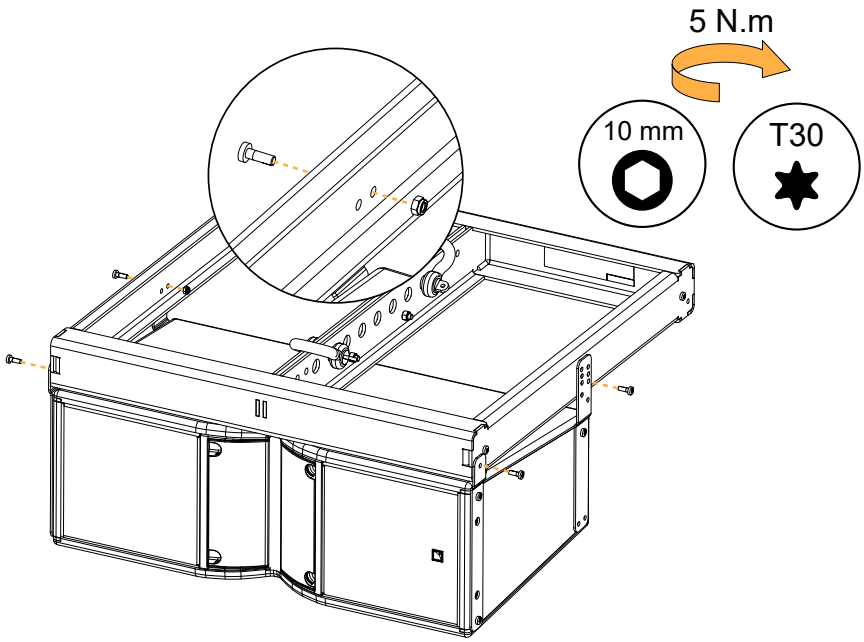
KARAIIi-BUMP can be used as the main lifting accessory for flying vertical arrays of Kara IIi and SB18 IIi with one or two lifting points.

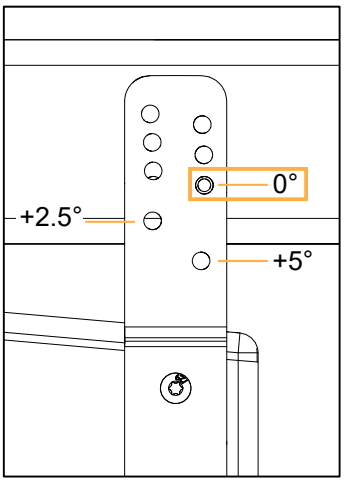


KARAIIi-BUMP is secured to the array with four M6x18 screws and M6 nuts (provided).

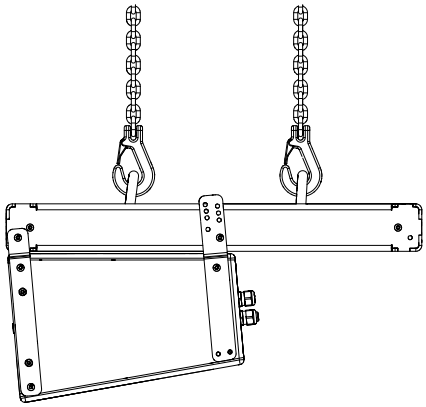
With KARAIIi-LINK, the splay angle with Kara IIi can be set to 0°, +2.5°, or +5°.







To calculate the site angle of the first enclosure, subtract the splay angle from the site angle of KARAIIi-BUMP.



+5° splay angle

0° KARAIIi-BUMP site angle

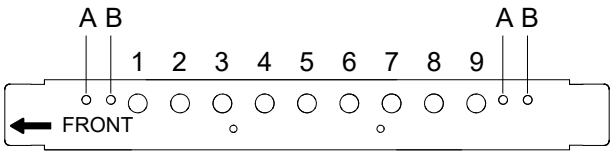
0-5 = -5° Kara IIi site angle

In **Soundvision**, the splay angles are labeled as follows (**Elements** panel) :

angle in Soundvision	**splay angle**
5°	0°
7.5°	+2.5°
10°	+5°

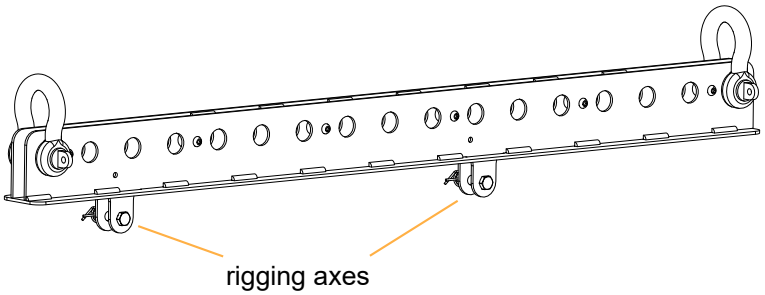
It is recommended to set a 0° splay angle (5° in Soundvision) between the first Kara IIi and KARAIIi-BUMP. By doing this, the Kara IIi axis is parallel to KARAIIi-BUMP.

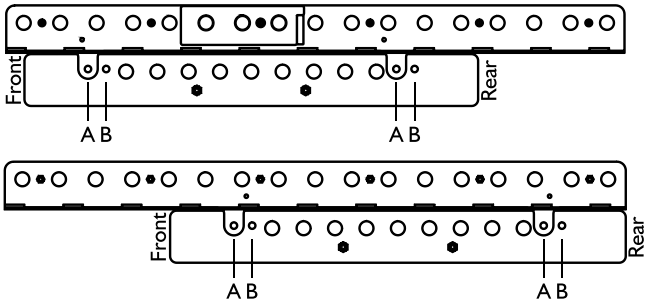
Nine pickup points are available on the central bar for site angle adjustment. They are compatible with Ø19 mm shackles WLL 3.25 t (two provided). Four holes are available to secure M-BARi in position A or B, to provide additional pickup points. Refer to M-BARi (p.24).

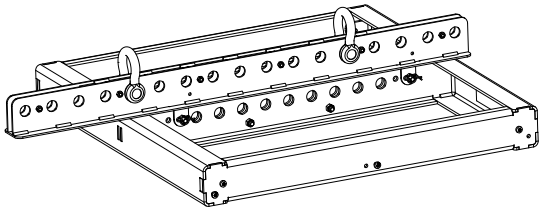


M-BARi

The M-BARi extension bar can be secured on KARAIIi-BUMP to extend the site angle capability of Kara IIi and SB18 IIi arrays. It can be used as a front or rear extension, with two possible positions each (A or B).

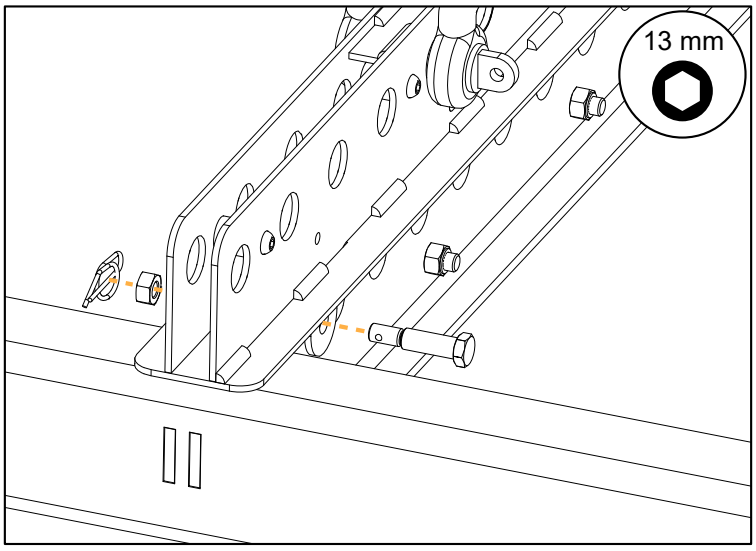




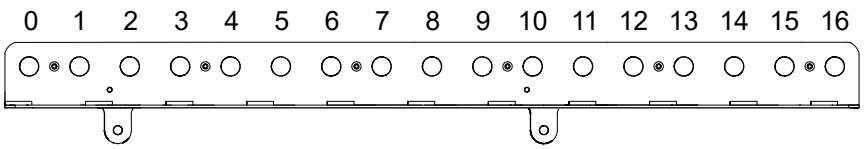


front extension in position B

M-BARi is secured to the rigging frame with two M8 bolts, nuts, and safety pins.

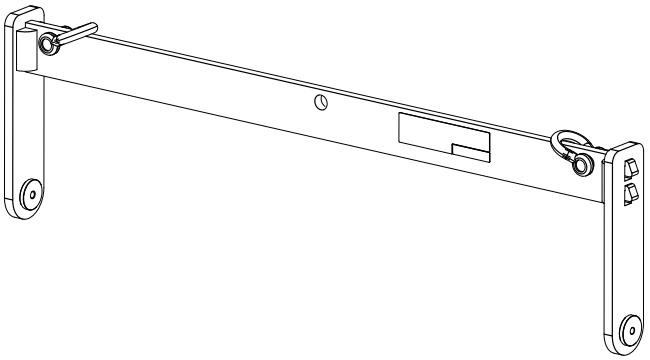


Seventeen (17) pickup points are available. They are compatible with Ø19 mm shackles WLL 3.25 t (two provided).



KARAIIi-RIGBAR

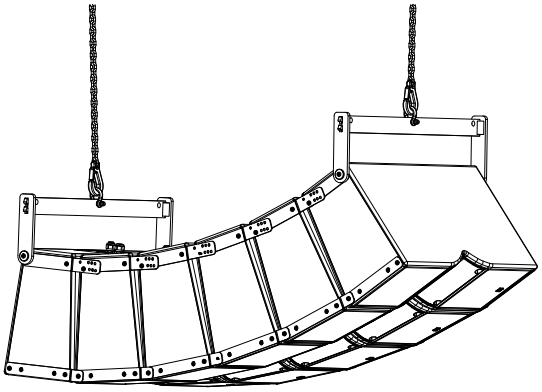
KARAIIi-RIGBAR is a rigging bar for pullback configurations of Kara IIi or SB18 IIi arrays.

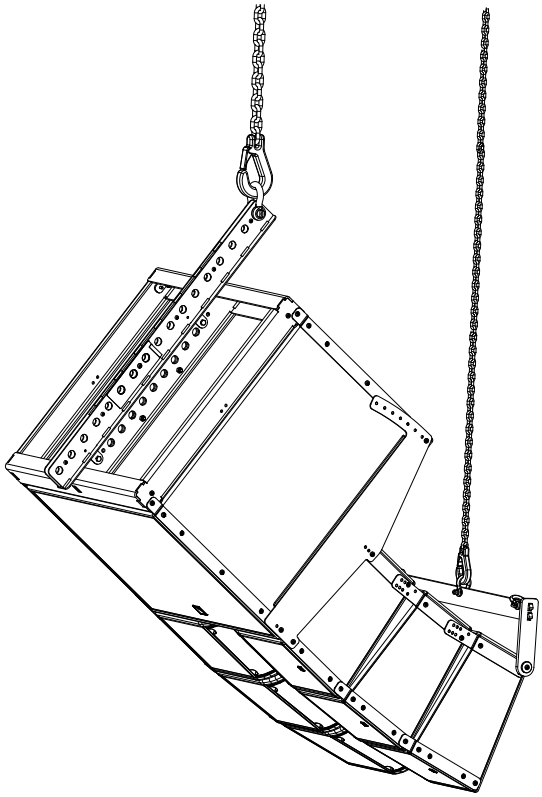


Secured at the bottom of the array, KARAIIi-RIGBAR can be used as a pullback either with KARAIIi-BUMP combined with M-BARi or with another KARAIIi-RIGBAR as the main lifting accessory. With KARAIIi-RIGBAR as the main lifting accessory, KARAIIi-ENDLINK or SB18IIi-ENDLINK is required on the top enclosure.

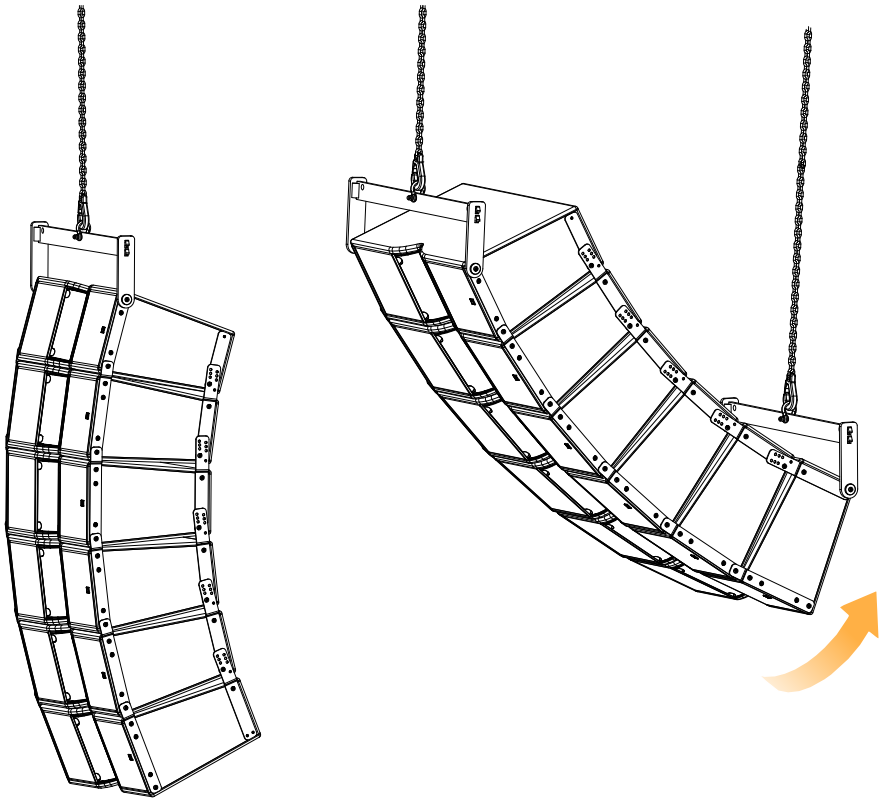
Risk of collision between shackle and rigging frame

When using KARAIIi-BUMP as the main lifting accessory for a pullback configuration, make sure that the shackle does not collide with KARAIIi-BUMP. If necessary, secure M-BARi on KARAIIi-BUMP and use the rear pickup point (N°16).

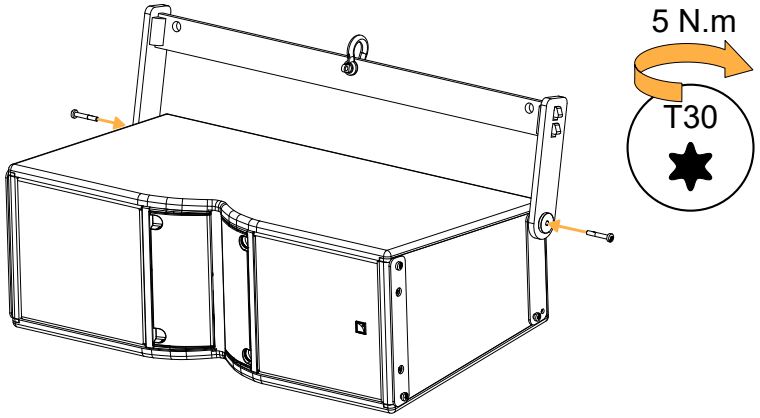


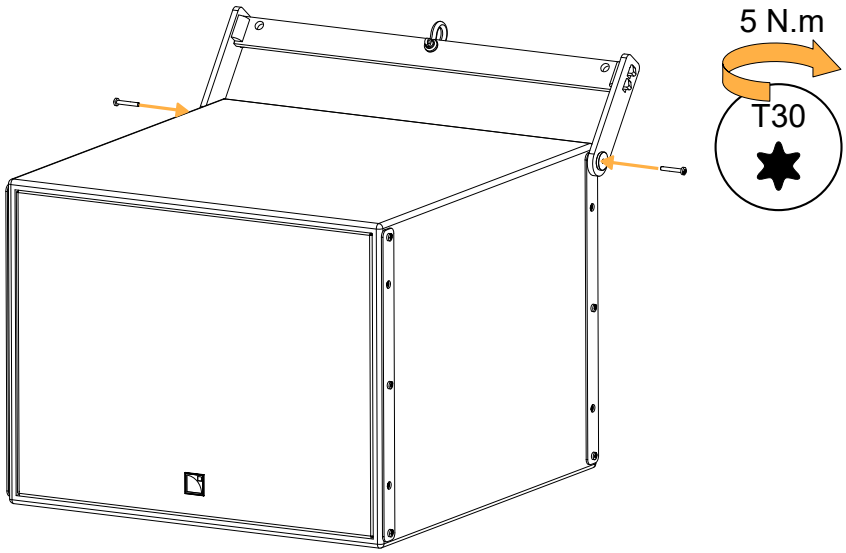


When used at the top of the array as the main lifting accessory, KARAIIi-RIGBAR can be secured at the front for an initial positive site angle.



KARAIIi-RIGBAR is secured to the enclosure with two M6×40 screws (provided).





The pickup points are compatible with Ø12 mm shackles WLL 1 t (two provided) and CLAMP250.

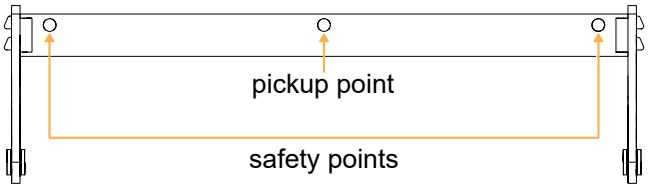
Maximum limit with CLAMP250.

CLAMP250 has a WLL (Working Load Limit) of 250 kg / 550 lb. It can support an array of up to 11 Kara IIi or 5 SB18 IIi. For an hybrid array, check the total weight of the array in Soundvision.

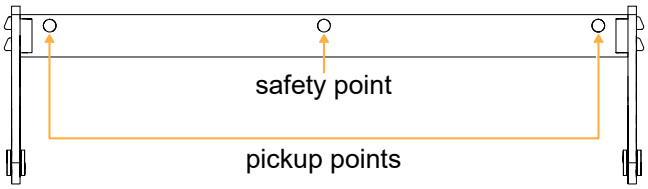
For more information, refer to the **CLAMP250 owner's manual**.

When using KARAIIi-RIGBAR as the main lifting accessory, always implement a secondary safety using available holes.

One pickup point

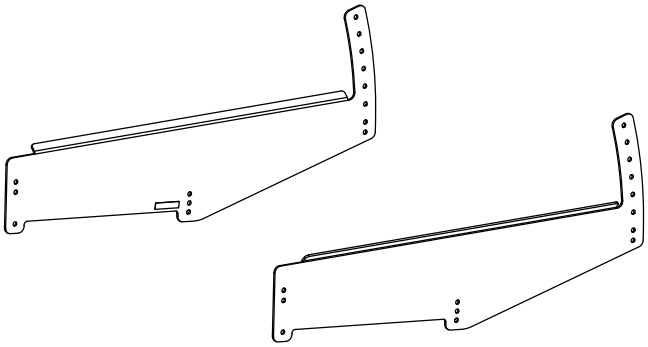


Two pickup points



KARAIIi-TILT

KARAIIi-TILT is a site angle adjustment accessory for linking SB18 IIi and Kara IIi in a stacked or flown array.

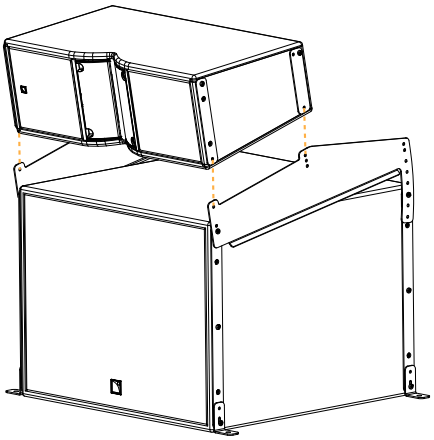


Stacking Kara IIi on SB18 IIi

When stacking Kara IIi on SB18 IIi with KARAIIi-TILT, Kara IIi must be turned **upside-down** (logo on the left-hand side).

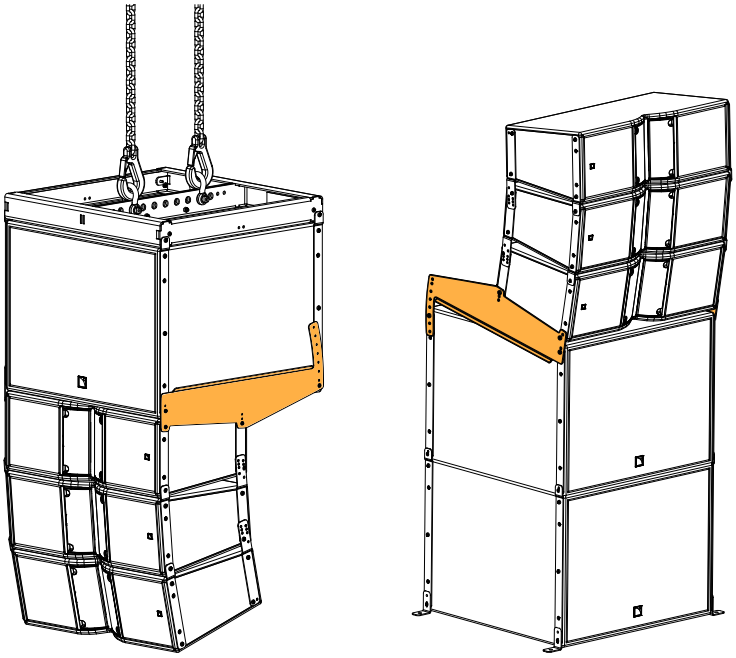
Otherwise, it is not possible to secure Kara IIi to KARAIIi-TILT.

For aesthetic purposes, the front grills can be removed and exchanged when the enclosures are assembled. Refer to Exchanging Kara IIi grills (p.100).

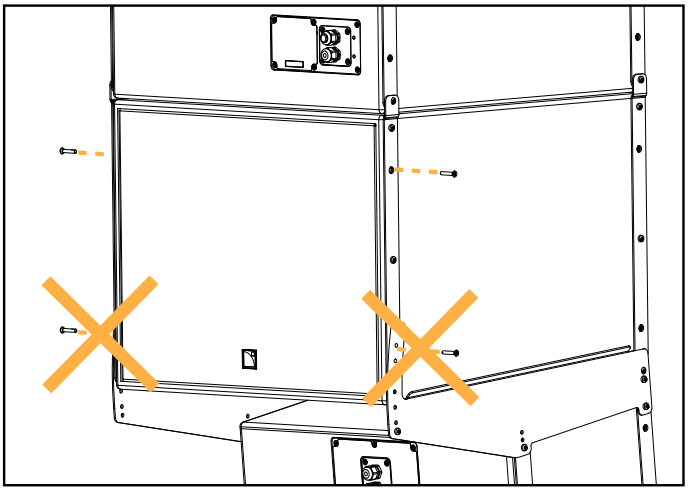


KARAIIi-TILT can be used in two orientations:

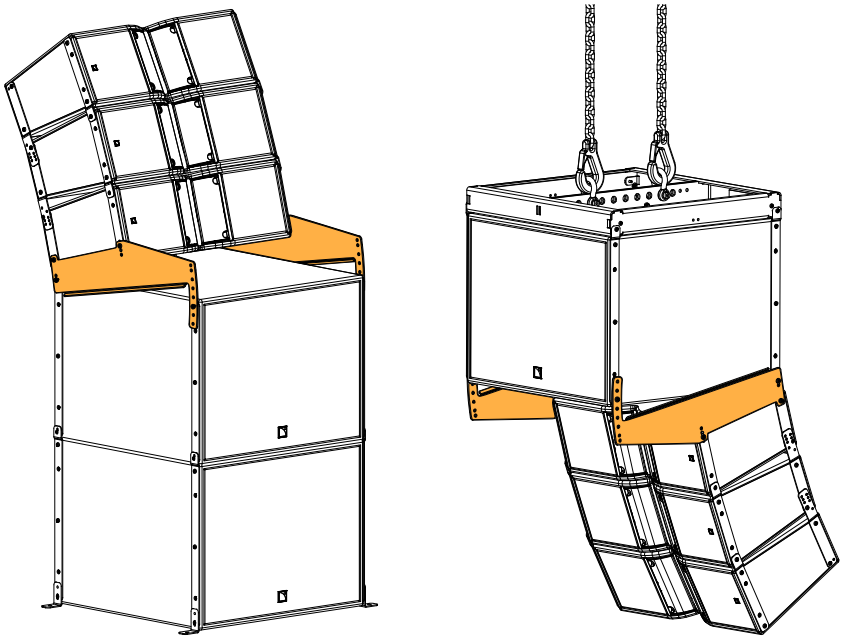
- **standard orientation (KARAIIi-TILT in Soundvision)**
  - enclosures aligned at the front
  - inter-element angles from +5° to -15° in 2.5° steps



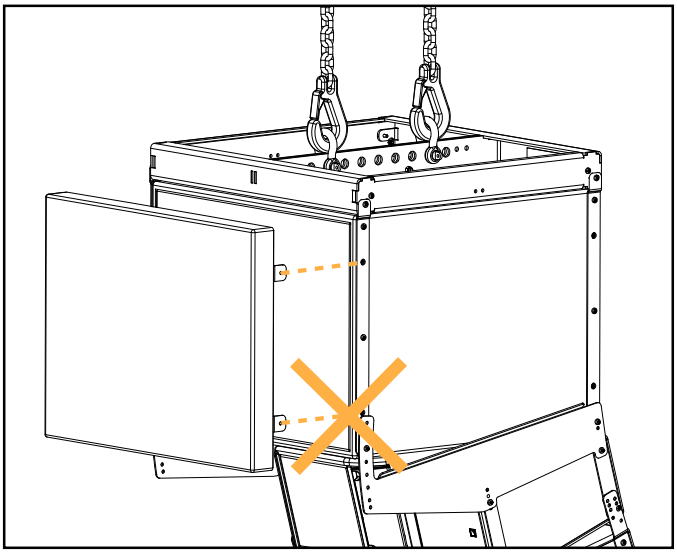
When KARAIIi-TILT is secured in standard orientation to a reversed SB18 IIi in a cardioid configuration, the SB18 IIi grill cannot be removed.



- **reversed orientation (KARAIIi-TILT Inv in Soundvision)**
  - enclosures aligned at the rear
  - inter-element angles from +5° to +25° in 2.5° steps



When KARAIIi-TILT is secured to SB18 IIi in reversed orientation, the SB18 IIi grill cannot be removed and SB18IIi-SCREEN cannot be secured on the enclosure.



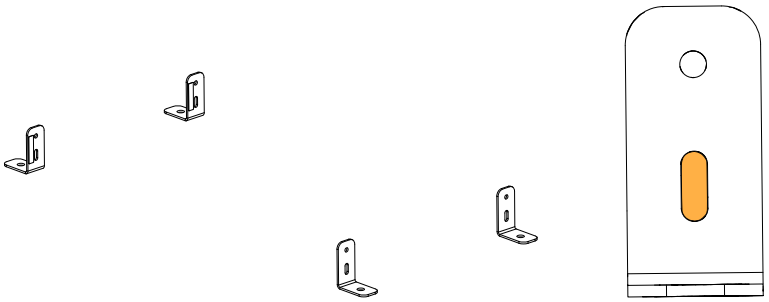
Geometric delay with reversed KARAIIi-TILT

In an SB18 IIi / Kara IIi array where KARAIIi-TILT is reversed, add 1 ms geometric delay to Kara IIi.

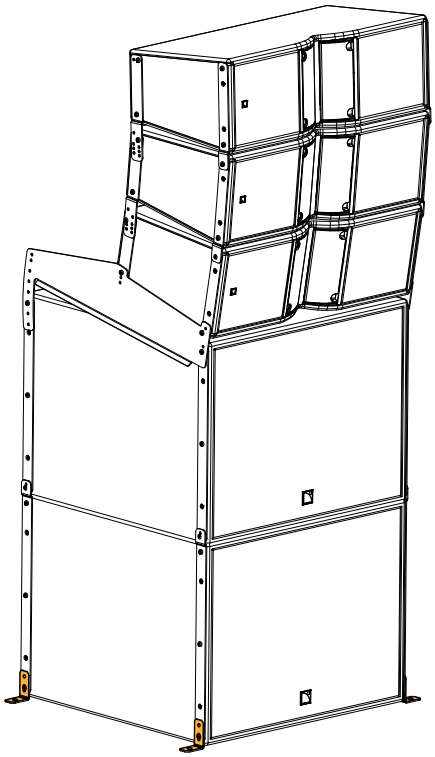
For more details about angle settings with KARAIIi-TILT, refer to APPENDIX A: Angle settings with KARAIIi-TILT (p.149).

KARAIIi-FIXBRACKET / KARAIIi-TILTBRACKET

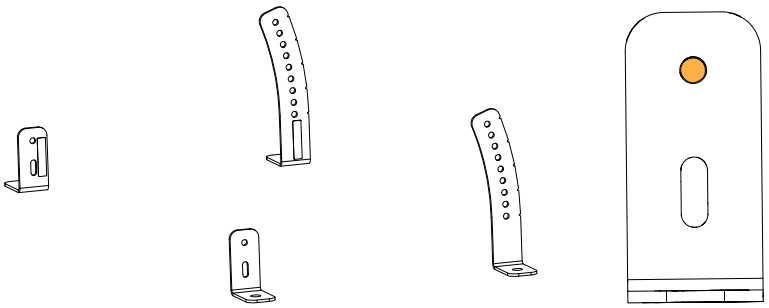
KARAIIi-FIXBRACKET is a set of four fastening brackets for Kara IIi and SB18 IIi. The enclosure is secured to KARAIIi-FIXBRACKET using the slotted hole.



Secure KARAIIi-FIXBRACKET at the bottom of an array to improve stability and to anchor it to the ground.



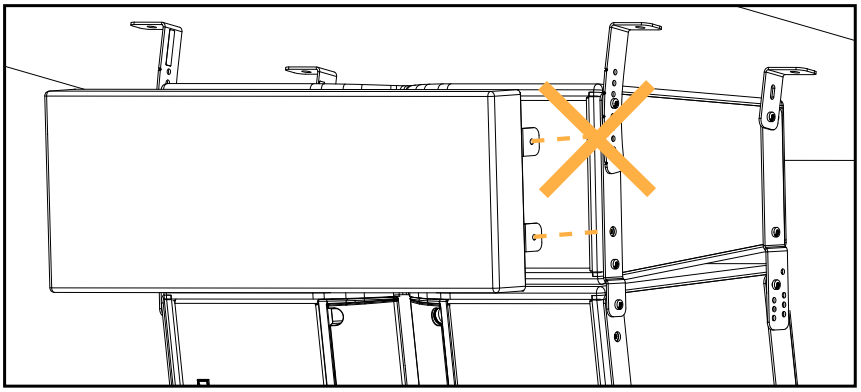
KARAIIi-TILTBRACKET is a set of four fastening brackets with site angle adjustment for a stack of up to three Kara IIi. The enclosure is secured to KARAIIi-TILTBRACKET using the round hole. The site angle adjustment bracket can be secured at the front or at the rear of the enclosure.

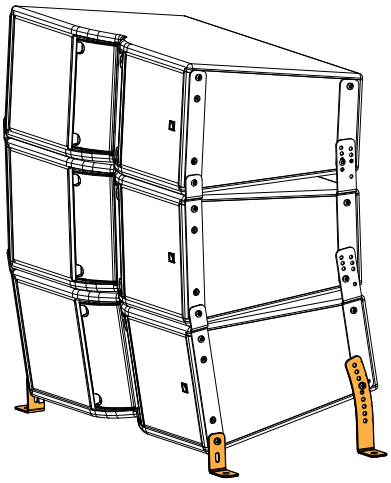


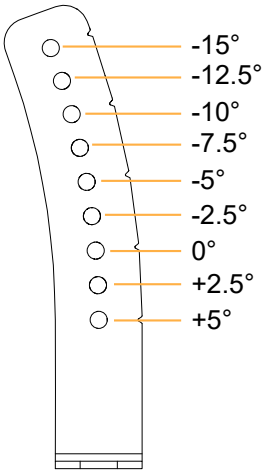
The site angle can be set between +5° and -15° with the angle bracket at the rear, or between +5° and +25° with the angle bracket at the front.

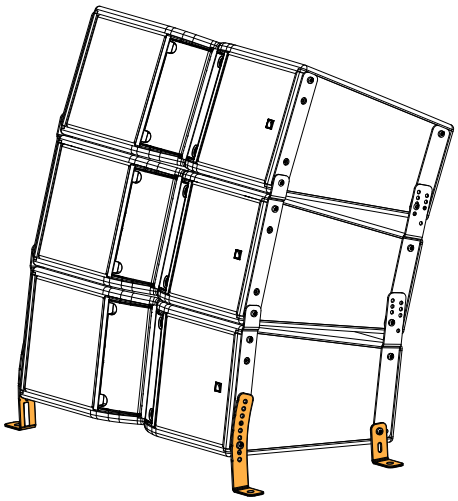
When KARAIIi-TILTBRACKET is secured to Kara IIi with the angle bracket at the front, the grills cannot be removed and KARAIIi-SCREEN cannot be secured on the enclosure.

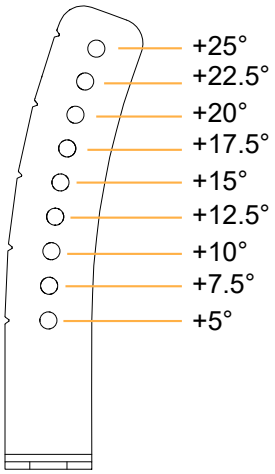
The grills on the first enclosure can be exchanged before rigging. Refer to Exchanging Kara IIi grills (p.100).





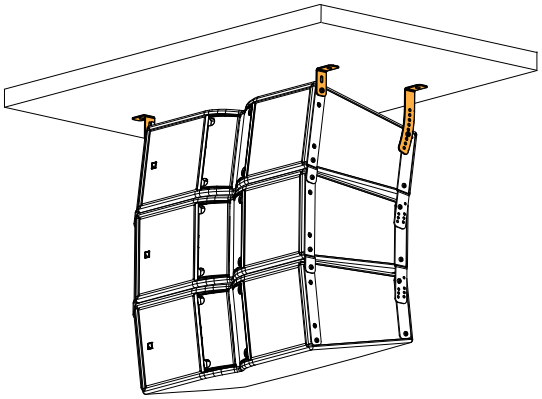


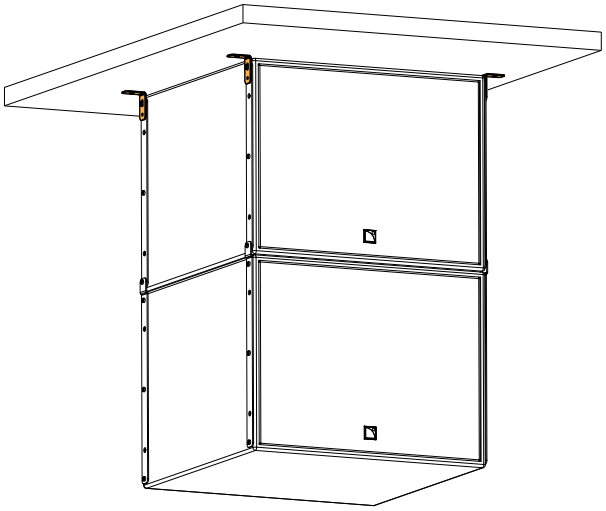




KARAIIi-FIXBRACKET and KARAIIi-TILTBRACKET can also be used to mount up to three Kara IIi or two SB18 IIi under the ceiling.

The site angle with KARAIIi-FIXBRACKET can be set between -5° and +15° with the angle bracket at the rear, or between -5° and -25° with the angle bracket at the front.



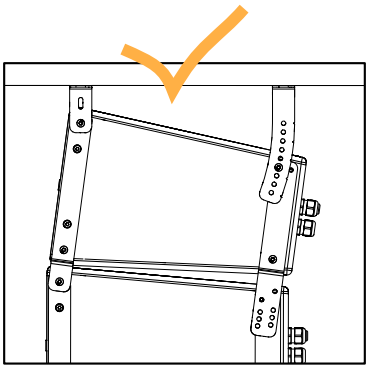


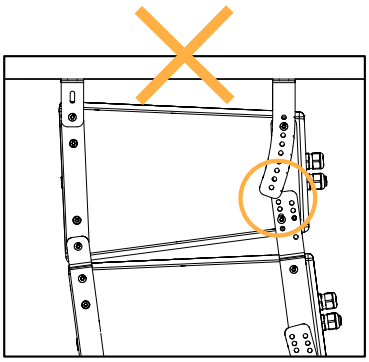
Mounting KARAIIi-TILTBRACKET to the ceiling

When mounting Kara IIi to the ceiling with KARAIIi-TILTBRACKET, Kara IIi must be turned **upside-down** (logo on the left-hand side).

Otherwise, it is not possible to mount additional Kara IIi under the first one, and the site angle is not accurate.

For aesthetic purposes, the front grills can be removed and exchanged when the enclosures are assembled. Refer to Exchanging Kara IIi grills (p.100).





KARAIIi-FIXBRACKET and KARAIIi-TILTBRACKET must be secured to the supporting fixture with four M10 screws.

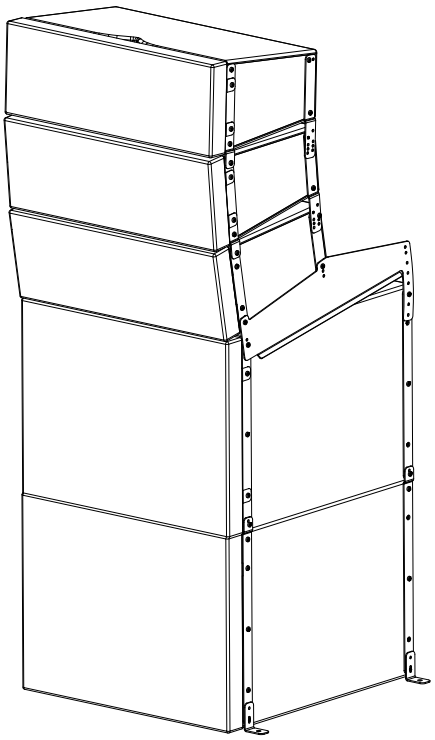
Fasteners for ceiling-mounting

Select screw length and anchors applicable to the ceiling properties.

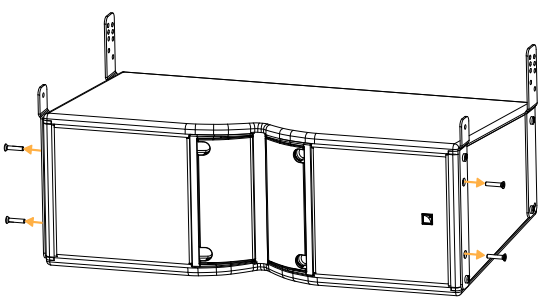
Model the array in Soundvision and check the loads on rigging in the **Mechanics view**.

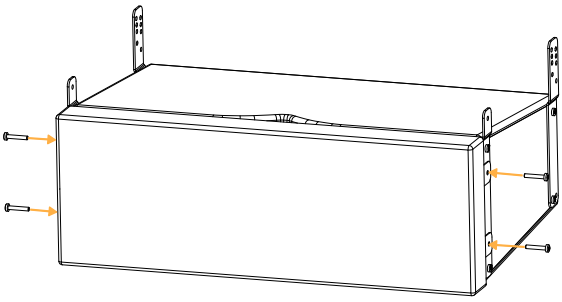
Front screens

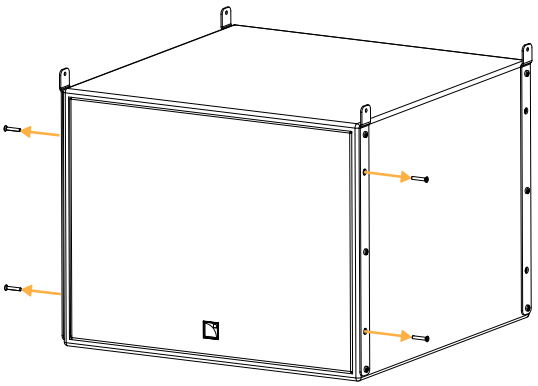
KARAIIi-SCREEN and SB18IIi-SCREEN are acoustically transparent front screens for Kara IIi and SB18 IIi.

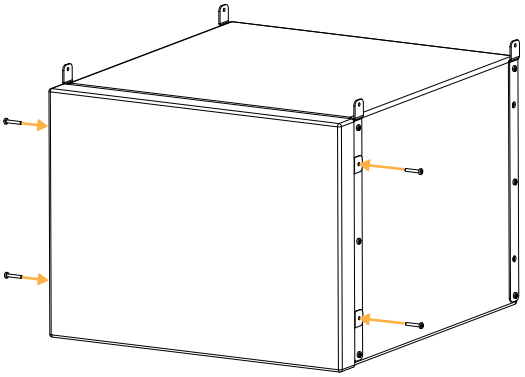


The screens are secured on top of the rigging plates with four M6×35 Torx screws which replace the grill screws. The grill screws can be removed through the rigging plates.

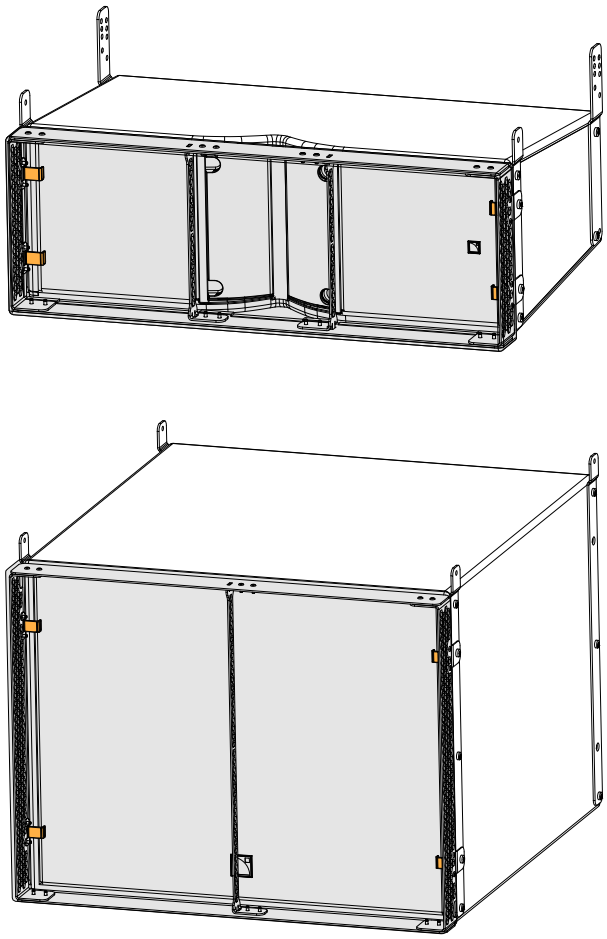




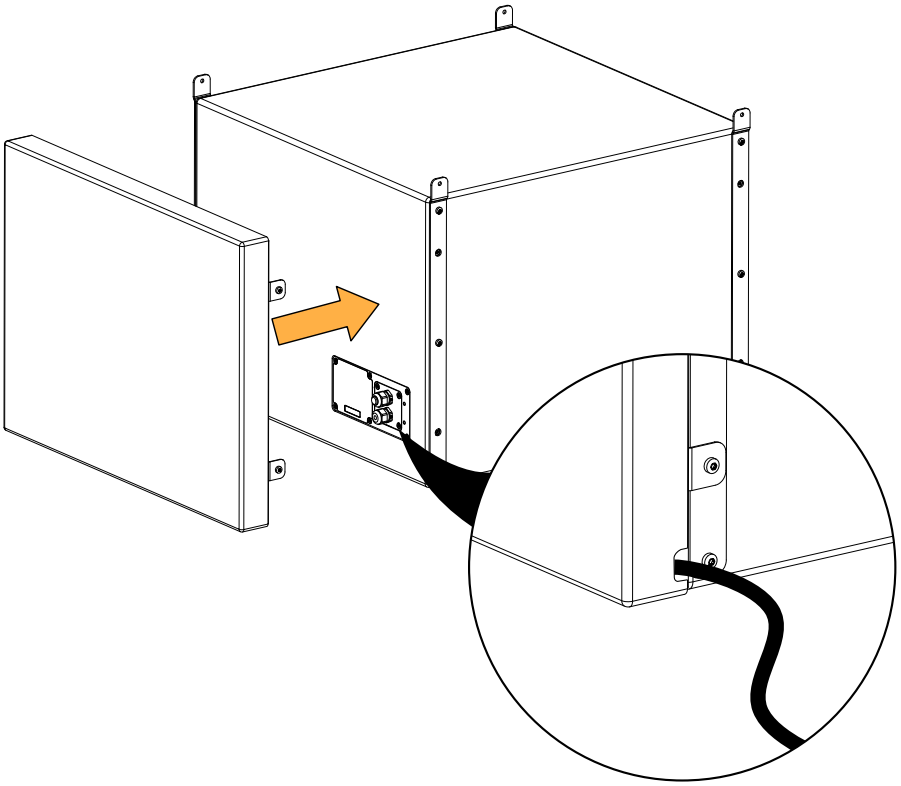




The screens are equipped with tabs to hold the grill in place when securing the screen on the enclosure.



SB18Ili-SCREEN can be secured to the back of SB18 Ili when used in cardioid configuration. The cable(s) can be passed through a cutout on the screen side.



Mechanical safety

Flown configurations

The Kara Ili 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-element 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.

Risk of collision between shackle and rigging frame

When using KARAIli-BUMP as the main lifting accessory for a pullback configuration, make sure that the shackle does not collide with KARAIli-BUMP. If necessary, secure M-BARi on KARAIli-BUMP and use the rear pickup point (N°16).

Kara Ili

configuration	rigging accessory	safe limit	maximum limit
Flown	KARAIli-BUMP + M-BARi (optional) + rigging plates	12	24
Flown with pullback	KARAIli-BUMP + M-BARi + KARAIli-RIGBAR + rigging plates	16	
	KARAIli-RIGBAR × 2 + rigging plates	16	
Ceiling-mounted	KARAIli-FIXBRACKET / KARAIli-TILTBRACKET + rigging plates	3	

SB18 Ili

configuration	rigging accessory	safe limit	maximum limit
Flown	KARAIli-BUMP + rigging plates	12	16
	KARAIli-BUMP + M-BARi + rigging plates	8	16
Flown with pullback	KARAIli-BUMP + M-BARi + KARAIli-RIGBAR + rigging plates	8	12
	KARAIli-RIGBAR × 2 + rigging plates	4	6
Ceiling-mounted	KARAIli-FIXBRACKET + rigging plates	2	

SB18 Ili + Kara Ili

configuration	rigging accessory	safe/maximum limit
Flown with pullback	KARAIli-BUMP + M-BARi + KARAIli-RIGBAR + rigging plates	3 SB18 Ili + 9 Kara Ili
	KARAIli-RIGBAR × 2 + rigging plates	
Ceiling-mounted	KARAIli-TILT + KARAIli-FIXBRACKET + rigging plates	1 SB18 Ili + 3 Kara Ili

Other configurations

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

Kara Ili

configuration	rigging accessory	safe limit	maximum limit
Stacked	KARAIli-FIXBRACKET + rigging plates	6	9
Stacked with angle adjustment	KARAIli-TILTBRACKET + rigging plates	6	9

SB18 Ili

configuration	rigging accessory	safe/maximum limit
Stacked	KARAIli-FIXBRACKET (optional) + rigging plates	4

Kara Ili + SB18 Ili

configuration	rigging accessory	safe limit	maximum limit
Kara Ili stacked on SB18 Ili	KARAIli-TILT + KARAIli-FIXBRACKET + rigging plates	6 Kara Ili 2 SB18 Ili	9 Kara Ili 3 SB18 Ili

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

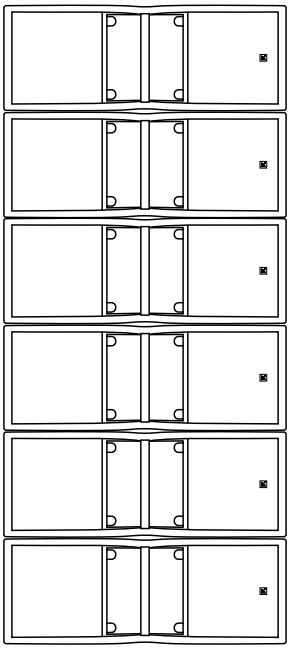
Line source

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

The [KARA II 70], [KARA II 90], and [KARA II 110] presets deliver a reference frequency response in long throw applications. Each preset is dedicated to a horizontal directivity setting (see Adjustable fins (p.11)).

The Kara IIi enclosure is driven by the LA2Xi / LA4X / LA8 / LA12X amplified controllers.

Reduced maximum SPL or drive capacity with LA2Xi: refer to the **LA2Xi owner's manual**.



Enclosure	Kara IIi
Preset	[KARA II 70] [KARA II 90] [KARA II 110]
Frequency range (-10 dB)	55 Hz - 20 kHz

Line source with low-frequency element

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

Three configurations are available:

- Coupled SB18 IIi or KS21i - ratio 3:1
- Separated SB18 IIi or KS21i - ratio 3:2
- Coupled SB18 IIi or KS21i with KS28 or SB28 - ratio 3:1:1

KS21i cannot be mechanically coupled with a Kara IIi line source in an array. The KS21i and Kara IIi arrays must be flown side by side.

Refer to the **KS21i owner's manual** for more information on how to set up a KS21i array.

The [xxxx_60] or [xxxx_100] presets provide the subwoofers with an upper frequency limit at 60 Hz in separated configuration, or 100 Hz in closely coupled configuration, for an optimal frequency coupling with the Kara IIi line source.

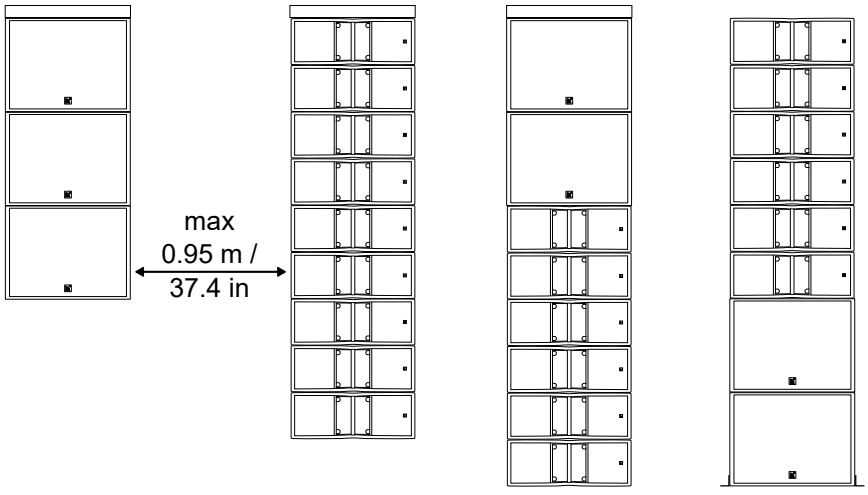
Amplified controllers compatibility

	LA2Xi	LA4X	LA8	LA12X
Kara IIi	✓	✓	✓	✓
SB18 IIi	✓	✓	✓	✓
KS21i	✓	✓	✓	✓
SB28	✓	—	✓	✓
KS28	✓	—	—	✓

Reduced maximum SPL or drive capacity with LA2Xi: refer to the **LA2Xi owner's manual**.

Coupled SB18 IIi or KS21i

3 Kara IIi : 1 SB18 IIi or KS21i



Maximum number of enclosures in mixed lines for optimal acoustic coupling:
9 Kara IIi + 3 SB18 IIi

Enclosure	Kara IIi	SB18 IIi or KS21i
Preset	[KARA II 70] [KARA II 90] [KARA II 110]	[xxxx_100]
Frequency range (-10 dB)	32 Hz - 20 kHz with SB18 IIi 31 Hz - 20 kHz with KS21i	

Grouping subwoofers

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

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

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

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

Delay values

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

Geometric delay with reversed KARAIIi-TILT

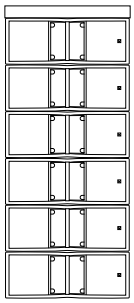
In an SB18 IIi / Kara IIi array where KARAIIi-TILT is reversed, add 1 ms geometric delay to Kara IIi.

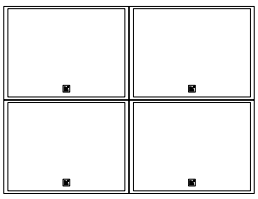
Pre-alignment delays

presets	**pre-alignment delay values and polarity settings**			
[KARA II] + [SB18_100]	Kara II = 0 ms	+	SB18 = 0 ms	+
[KARA II] + [SB18_100_C]	Kara II = 5.5 ms	+	SB18 = 0 ms	+
[KARA II] + [SB18_100_Cx]	Kara II = 4 ms	+	SB18 = 0 ms	-
[KARA II] + [KS21_100]	Kara II = 0 ms	+	KS21 = 0.5 ms	+
[KARA II] + [KS21_100_C]	Kara II = 5 ms	+	KS21 = 0 ms	+
[KARA II] + [KS21_100_Cx]	Kara II = 4 ms	+	KS21 = 0 ms	-

Separated SB18 IIi or KS21i

3 Kara IIi : 2 SB18 IIi or KS21i





Enclosure	Kara IIi	SB18 IIi or KS21i
Preset	[KARA II 70] [KARA II 90] [KARA II 110]	[xxxx_60]
Frequency range (-10 dB)	32 Hz - 20 kHz with SB18 IIi 29 Hz - 20 kHz with KS21i	

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 if the upper frequency limit of the subwoofer system is at 60 Hz.

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

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

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

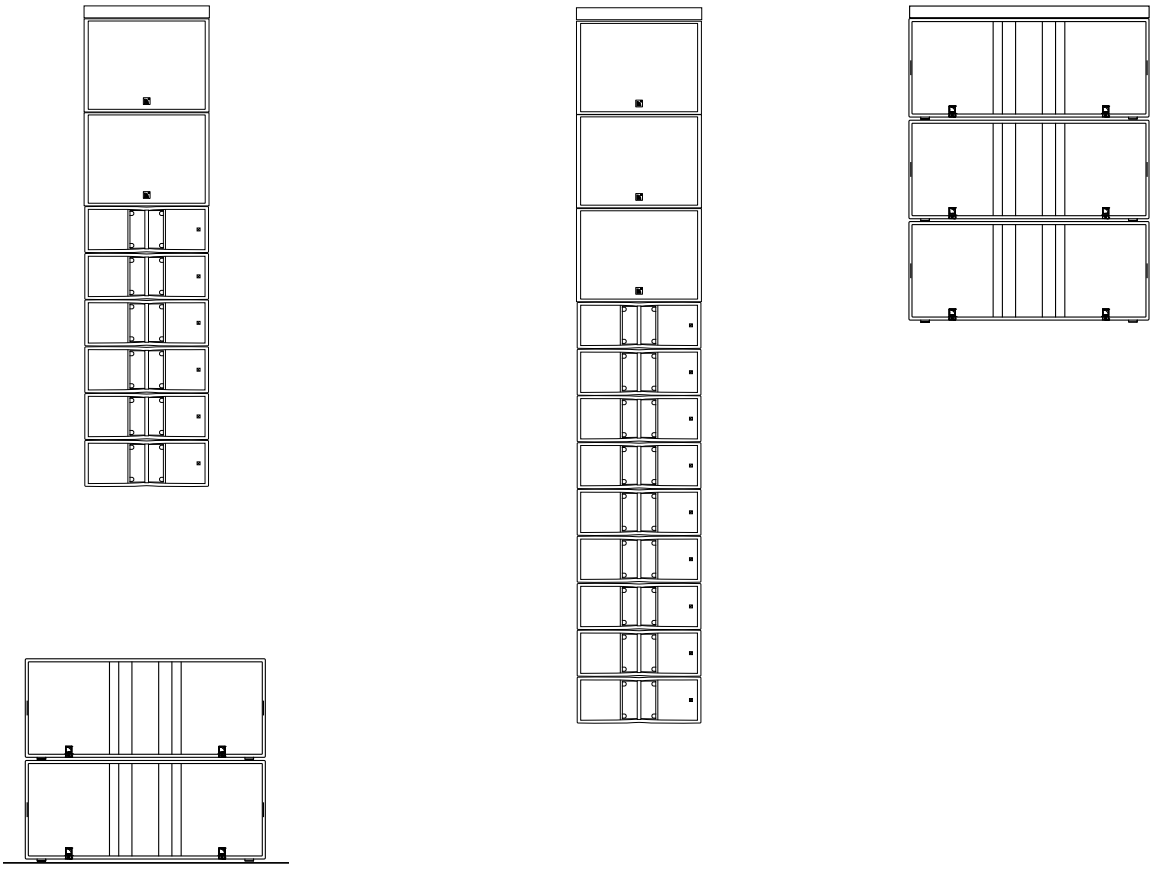
Delay values
Do not forget to add the pre-alignment and geometric delays depending on the configuration.

Pre-alignment delays

presets	pre-alignment delay values and polarity settings			
[KARA II] + [SB18_60]	Kara II = 2.5 ms	+	SB18 = 0 ms	+
[KARA II] + [SB18_60_C]	Kara II = 8 ms	+	SB18 = 0 ms	+
[KARA II] + [SB18_60_Cx]	Kara II = 6.5 ms	+	SB18 = 0 ms	-
[KARA II] + [KS21_60]	Kara II = 0.5 ms	+	KS21 = 0 ms	+
[KARA II] + [KS21_60_C]	Kara II = 6 ms	+	KS21 = 0 ms	+
[KARA II] + [KS21_60_Cx]	Kara II = 5.5 ms	+	KS21 = 0 ms	-

Coupled SB18 IIi or KS21i with KS28 or SB28

3 Kara IIi : 1 SB18 IIi or KS21i : 1 SB28 or KS28



Maximum number of enclosures in mixed lines for optimal acoustic coupling:
9 Kara IIi + 3 SB18 IIi

Enclosure	Kara IIi	SB18 IIi or KS21i	SB28 or KS28
Preset	[KARA II 70] [KARA II 90] [KARA II 110]	[xxxx_100]	[xx28_60]
Frequency range (-10 dB)	25 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 if the upper frequency limit of the subwoofer system is at 60 Hz.

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

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

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

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

Geometric delay with reversed KARAIIi-TILT
In an SB18 IIi / Kara IIi array where KARAIIi-TILT is reversed, add 1 ms geometric delay to Kara IIi.

Pre-alignment delays

preset	pre-alignment delay values and polarity settings		
[KARA II] + [SB18_100] + [SB28_60]	Kara II = 0 ms +	SB18 = 0 ms +	SB28 = 5.5 ms -
[KARA II] + [SB18_100] + [SB28_60_C]	Kara II = 0 ms +	SB18 = 0 ms +	SB28 = 0 ms -
[KARA II] + [SB18_100] + [SB28_60_Cx]	Kara II = 5.5 ms +	SB18 = 5.5 ms +	SB28 = 0 ms +
[KARA II] + [SB18_100] + [KS28_60]	Kara II = 0 ms +	SB18 = 0 ms +	KS28 = 5.5 ms -
[KARA II] + [SB18_100] + [KS28_60_C]	Kara II = 0 ms +	SB18 = 0 ms +	KS28 = 0 ms -
[KARA II] + [SB18_100] + [KS28_60_Cx]	Kara II = 5.5 ms +	SB18 = 5.5 ms +	KS28 = 0 ms +
[KARA II] + [KS21_100] + [SB28_60]	Kara II = 0 ms +	KS21 = 0.5 ms +	SB28 = 5.5 ms -
[KARA II] + [KS21_100] + [SB28_60_C]	Kara II = 0 ms +	KS21 = 0.5 ms +	SB28 = 0 ms -
[KARA II] + [KS21_100] + [SB28_60_Cx]	Kara II = 5.5 ms +	KS21 = 6 ms +	SB28 = 0 ms +
[KARA II] + [KS21_100] + [KS28_60]	Kara II = 0 ms +	KS21 = 0 ms +	KS28 = 5.5 ms -
[KARA II] + [KS21_100] + [KS28_60_C]	Kara II = 0 ms +	KS21 = 0.5 ms +	KS28 = 0 ms -
[KARA II] + [KS21_100] + [KS28_60_Cx]	Kara II = 5.5 ms +	KS21 = 6 ms +	KS28 = 0 ms +

Line source element

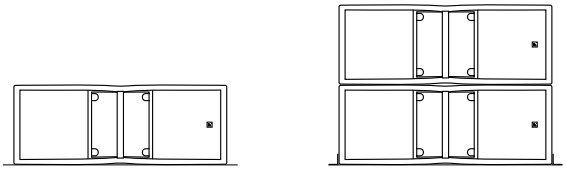
One or two Kara IIi can be used as a line source element. In this configuration, the system operates without the low-end of the bandwidth.

The [KARA II_FI] presets delivers a flat frequency response for short throw applications and a high-pass filter at 100 Hz.

The [KARA II_FI] preset is optimized for a **110°** fins setting (see Adjustable fins (p.11)).

The Kara IIi enclosure is driven by the LA2Xi / LA4X / LA8 / LA12X amplified controllers

Reduced maximum SPL or drive capacity with LA2Xi: refer to the **LA2Xi owner's manual**.



Enclosure	Kara IIi
Preset	[KARA II_FI]
Frequency range (-10 dB)	85 Hz - 20 kHz

Inspection and preventive maintenance

How to do preventive maintenance

Inspect the system after any corrective maintenance operation.

Perform preventive maintenance at least once a year.

Rigging and hardware

Perform the Rigging part inspection (p.48) on each rigging part.

Use the Mechanical system overview (p.48) to identify critical parts of the system.

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

Acoustics

Perform the Enclosure check (p.51).

Perform the Listening test (p.53) to detect any degradation in sound quality.

If necessary, refer to the Corrective maintenance (p.112) section for speaker repair kits and maintenance instructions.

Rigging part inspection

About this task

The term "rigging part" comprises:

- lifting accessories such as clamps and shackles
- rigging accessories such as rigging frames, rigging interfaces, and brackets
- fasteners used for assembling two products together such as ball-locking pins, rigging axes, and safety pins
- rigging plates mounted on enclosures and their rigging screws
- screens mounted on enclosures

This inspection procedure covers only L-Acoustics products. To inspect other products that are part of the lifting chain, refer to the manufacturer's instructions.

Prerequisite

Perform the inspection in a well-lit environment.

Procedure

1. Check that the rigging part is present.
2. 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.
3. Check the geometry of the part to identify critical deformations.

What to do next

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

Mechanical system overview

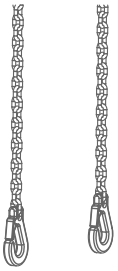
Critical parts of the lifting chains are highlighted.

The  indicates a visual inspection.

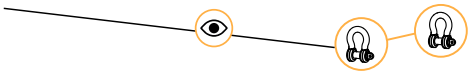
Perform the Rigging part inspection (p.48) on critical parts.

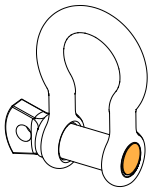
Replacing screws
If a screw is loose, remove and replace it.
Always use the new screws provided in the repair kit.
If no new screw is available, add blue threadlocker before reusing the screw.
Do not apply more than the indicated torque.

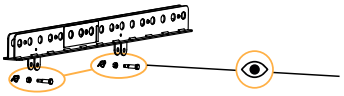
Kara Ili and SB18 Ili array with KARAIli-BUMP and M-BARi



shackle axis end is flush with the shackle

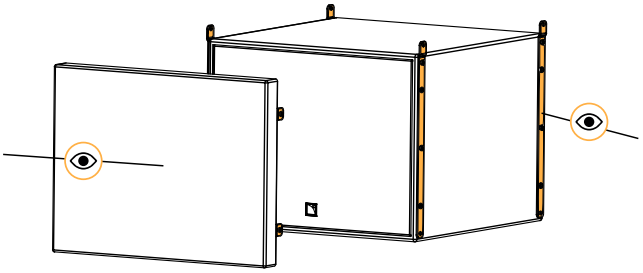






rigging axes are secured with nuts and safety pins

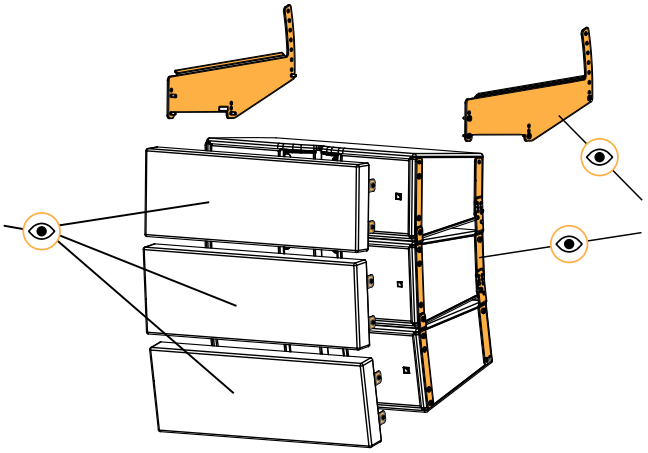
nuts are secured and tightened



Rigging part inspection (p.48)

rigging screws are tightened

Rigging part inspection (p.48)



Rigging part inspection (p.48)

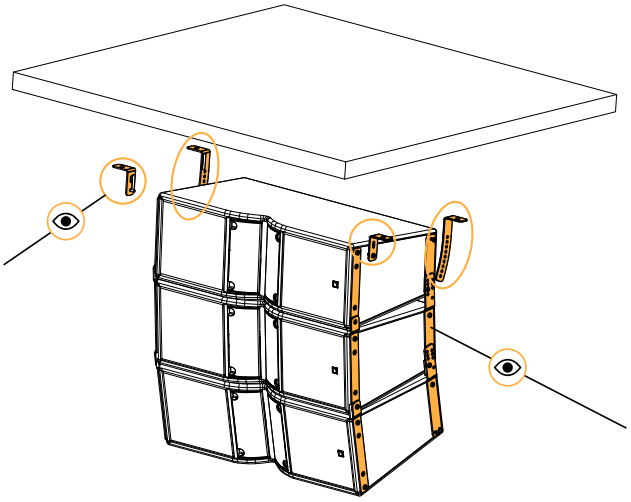
the plates are not bent

rigging screws are tightened

Rigging part inspection (p.48)

Kara Ili ceiling-mounted with KARAIli-TILTBRACKET

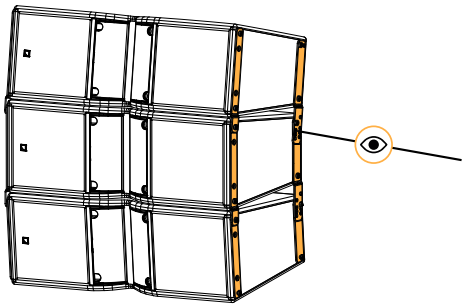
the supporting screws are tightened



rigging screws are tightened

Rigging part inspection (p.48)

Kara Ili stacked on SB18 Ili

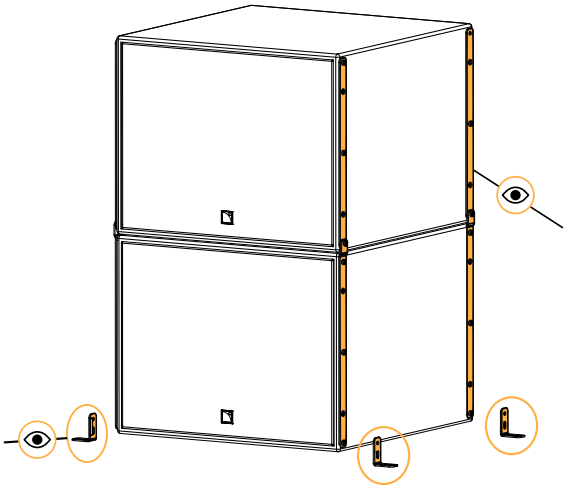


rigging screws are tightened

Rigging part inspection (p.48)

the plates are not bent

Rigging part inspection (p.48)



rigging screws are tightened

Rigging part inspection (p.48)

the fixing brackets are present and tightened to the ground

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 mm^2 / 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.52)
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.52)
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

i 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
Kara IIi	[KARA II 70]	55 Hz - 20 kHz
SB18 IIi	[SB18_100]	32 Hz - 110 Hz

Procedure

1. Load the preset on an LA2Xi / 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.
4. Focus on the 35 Hz frequency.
   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.
- The number of shims is wrong.

Procedure

1. Perform the diaphragm disassembly procedure.

2. Visually inspect the diaphragm and the voice coil.
   If any damage is visible, replace the diaphragm.
3. Clean the air gap thoroughly.
   Use double-face adhesive tape to remove any particles.
4. Perform the diaphragm reassembly procedure.
   Pay close attention to the number of shims and the position of the diaphragm.
   Apply the recommended torque.
5. Repeat the listening test.

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

   If the problem persists, replace the driver.

Troubleshooting for installation enclosures

One or more enclosure produces a high-pitched, leaking air sound.

Possible cause

- Placeholder screws are missing.

Procedure

Visually inspect the screws on both sides of the enclosures.
Secure placeholder screws in the empty inserts.

Rigging procedures

General principles

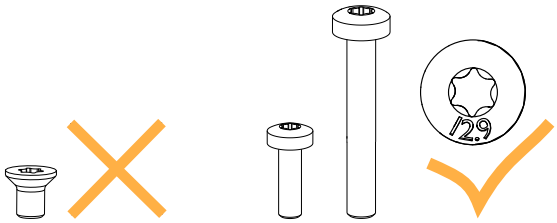
This introduction provides general principles applicable for all configurations.

Safety

Rigging screws

Only use the rigging screws provided by L-Acoustics.

Do not use the placeholder screws for rigging.

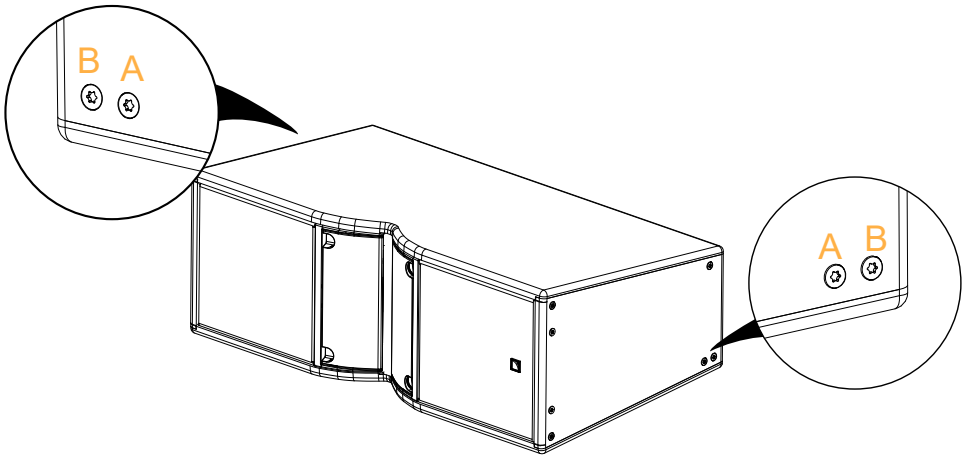


Preparing the enclosures

Enclosures must be equipped with rigging plates before assembling them. It is recommended to use the rigging report from Soundvision to prepare the enclosures. Identify which inserts (A or B) will be used on each Kara II depending on the inter-element angles.

Risk of acoustic leaks

Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.



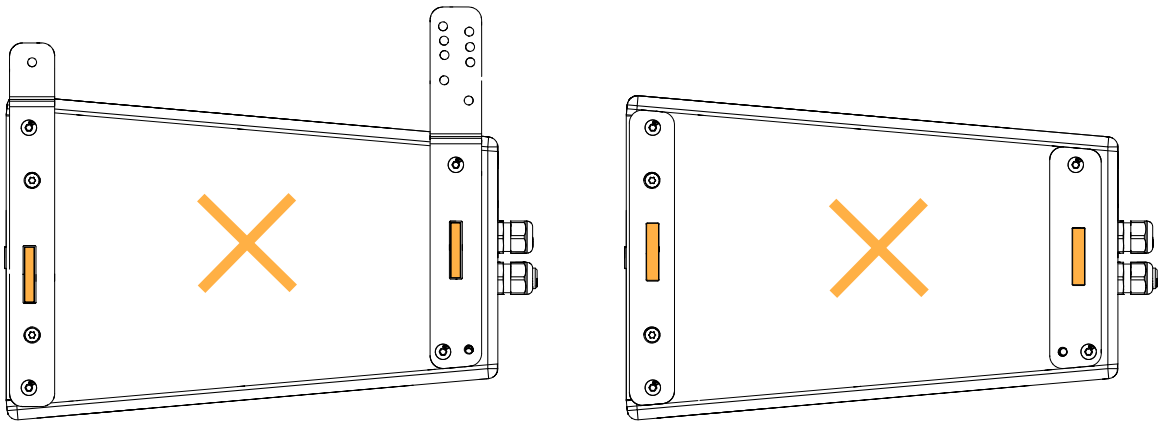
Kara II rear linking points

rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

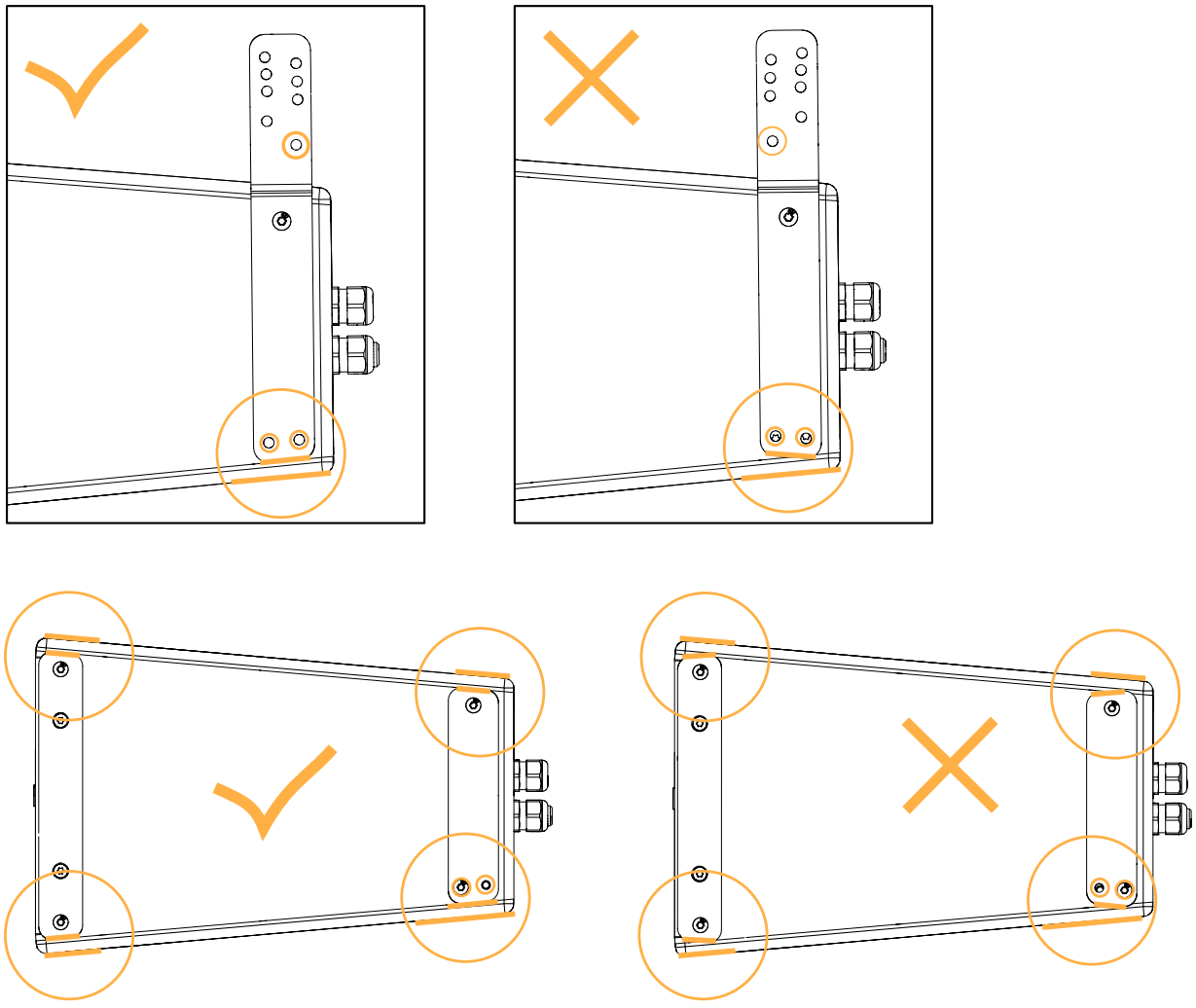
Left and right rigging plates

The KARAIIi-LINK and KARAIIi-ENDLINK left and right rigging plates are different. Use the visual cues to differentiate them:

- Place the rigging plate side with the label towards the enclosure.



- At the top of KARAIIi-LINK rear: the bottom hole on the linking section is positioned towards the rear of the enclosure.
- KARAIIi-LINK rear and KARAIIi-ENDLINK front and rear: The shape of the rigging plate is parallel to the edge of the enclosure and the holes and inserts are aligned.



The front KARAIIi-LINK left and right plates are identical. For SB18IIi-LINK and SB18IIi-ENDLINK, the four rigging plates are identical. Always place the rigging plate side with the label towards the enclosure.

Tightening screws

Do not fully tighten the screws unless instructed to do so.

After securing an enclosure to another enclosure, tighten all the screws on the supporting enclosure. Apply a torque of 5 N.m.

Stacking enclosures

When stacking two enclosures, the top enclosure must be slightly lifted to align the inserts with the rigging plate holes. Use an accessory like a wedge or a lever to adjust the height of the enclosure. Be careful not to scratch the paint.

Configurations with upside-down Kara II

Use Kara II upside-down in the following configurations:

- Mounting a Kara II array with KARAII-TILTBRACKET (p.75).
- Stacking Kara II on top of SB18 II with KARAII-TILT (p.89).

For aesthetic purposes, the front grills can be removed and exchanged when the enclosures are assembled. Refer to Exchanging Kara II grills (p.100).

Tools

Before performing rigging procedures on this product, make sure all the tools listed are available. References are given for FACOM® products in this table. Other manufacturers can be used.

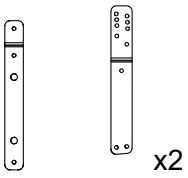
Name	Reference	Distributor
set of 6-point 1/4" sockets	RL.NANO1 / R.360NANO	FACOM
electric screwdriver with torque selector	-	-
torque screwdriver (2 - 10 N.m)	A.404	FACOM
10 mm wrench	-	-
13 mm wrench	-	-

Flying

Flying an array with KARAIIi-BUMP

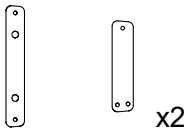
Type of deployment	flown array
Rigging accessories	KARAIIi-BUMP
	M-BARi (optional)
	KARAIIi-TILT (for a Kara IIi / SB18 IIi array)
	Kara IIi / SB18 IIi rigging plates
Screws and fasteners	M6×18 Torx rigging screws (provided)
	M6 hex lock nuts (provided)
Tools	torque screwdriver
	T30 Torx bit
	10 mm wrench or 10 mm hex socket
	13 mm hex socket and 13 mm wrench (for M-BARi)
Min. number of operators	3

Rigging plates



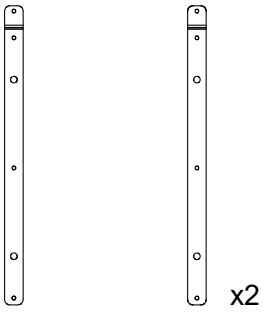
KARAIIi-LINK

Rigging plates for Kara IIi



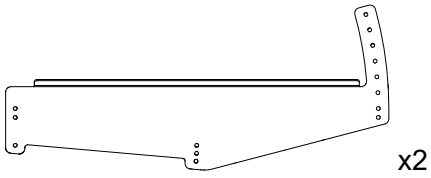
KARAIIi-ENDLINK

End rigging plates for Kara IIi



SB18IIi-LINK

Rigging plates for SB18 IIi



KARAIIi-TILT

Rigging elements with angles for Kara IIi above or under SB18 IIi

Risk of falling objects

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

Secondary safety

Use available holes on the rigging accessories to implement a secondary safety.

Risk of collision between shackle and rigging frame

When using KARAIIi-BUMP as the main lifting accessory for a pullback configuration, make sure that the shackle does not collide with KARAIIi-BUMP. If necessary, secure M-BARi on KARAIIi-BUMP and use the rear pickup point (N°16).

Kara III array assembly

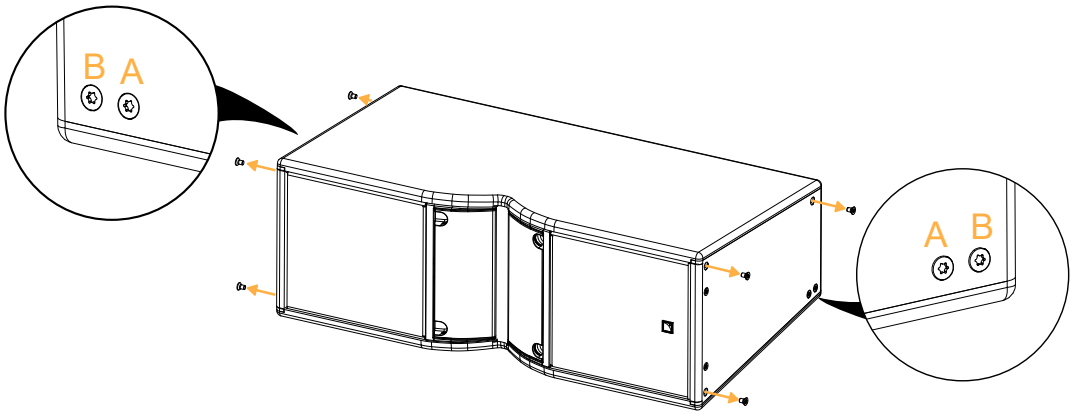
Procedure

1. Prepare all Kara III needed for the array.

   a) **Risk of acoustic leaks**

   Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

   Remove the relevant placeholder screws.

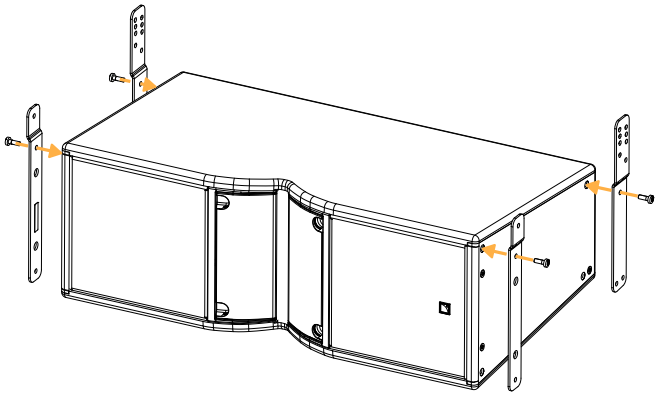


Kara III rear linking points

rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

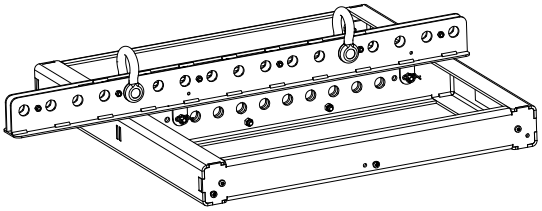
   b) Secure KARAIIi-LINK on the enclosures.

   Do not secure the bottom rigging screws, except on the last enclosure of the array.



2. Secure KARAIIi-BUMP on top of Kara IIi with rigging screws and M6 hex lock nuts.

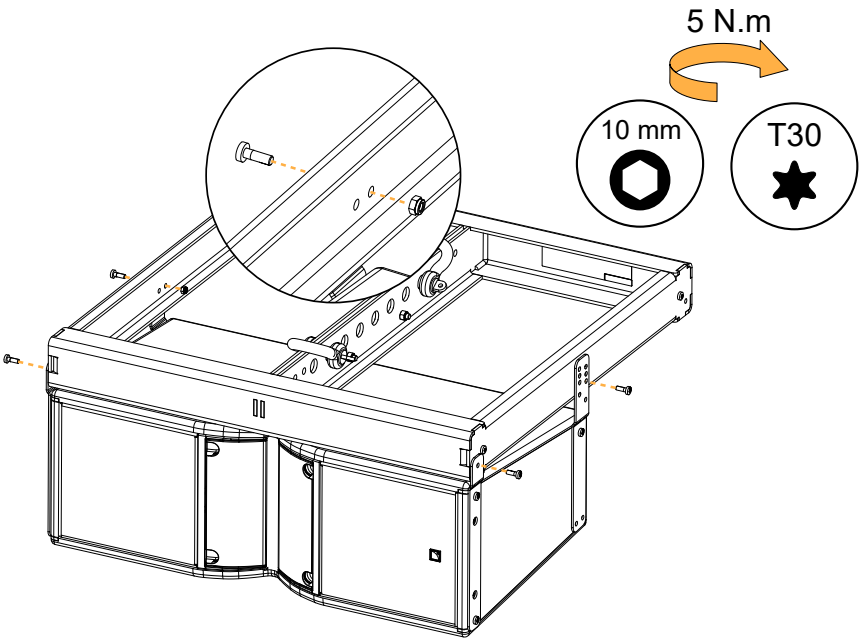
Optionally, secure M-BARi on KARAIIi-BUMP to extend the site angle capability.
Use the provided rigging axes, nuts, and safety pins.

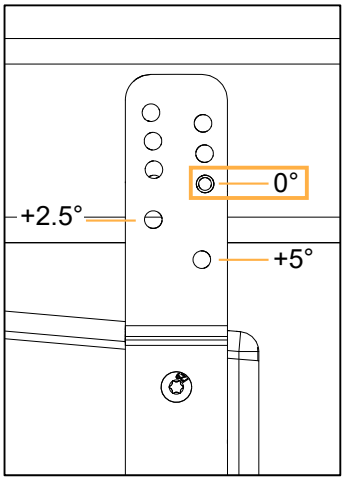


Select the holes on KARAIIi-LINK, depending on the splay angle.

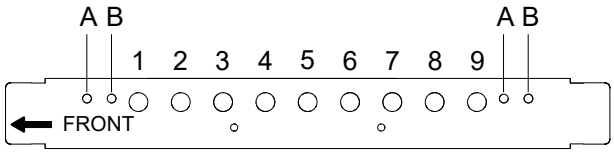
It is recommended to set a 0° splay angle (5° in Soundvision) between the first Kara IIi and KARAIIi-BUMP. By doing this, the Kara IIi axis is parallel to KARAIIi-BUMP.

Tighten the screws. Apply a torque of 5 N.m.

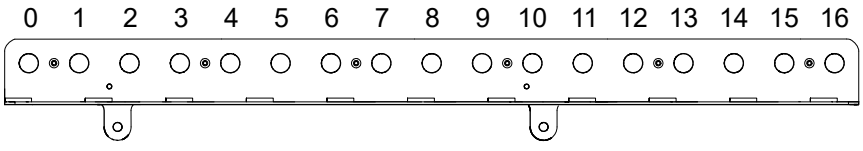




3. Select the pickup point(s) and raise the array until the bottom of the enclosure is accessible.



KARAIIi-BUMP pickup points



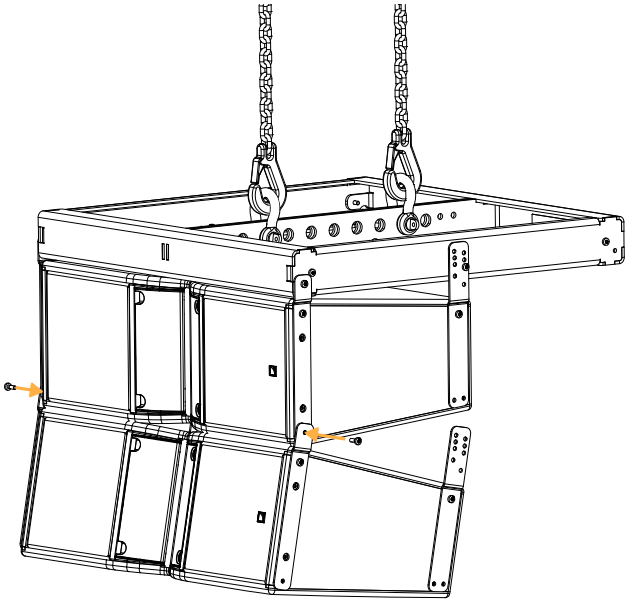
M-BARi pickup points

This step requires three operators.
Hold the enclosure at the bottom until the rigging plates are secured.

4. Secure the second Kara II under the array.

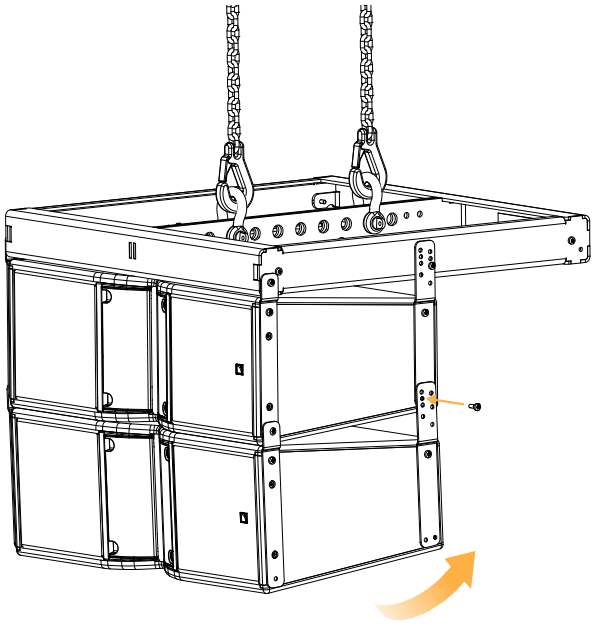
a) Lift Kara II and link the enclosures at the front with rigging screws.

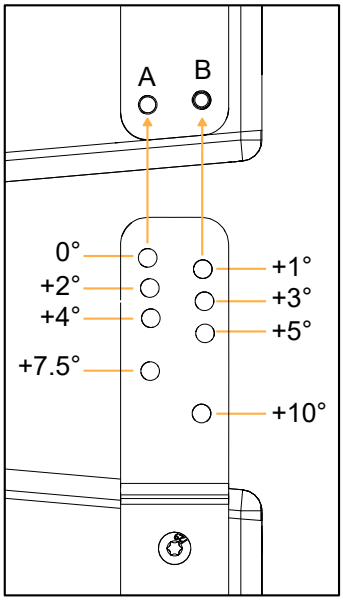
Do not fully tighten the screws.



b) Link the enclosures at the rear with the rigging screws.

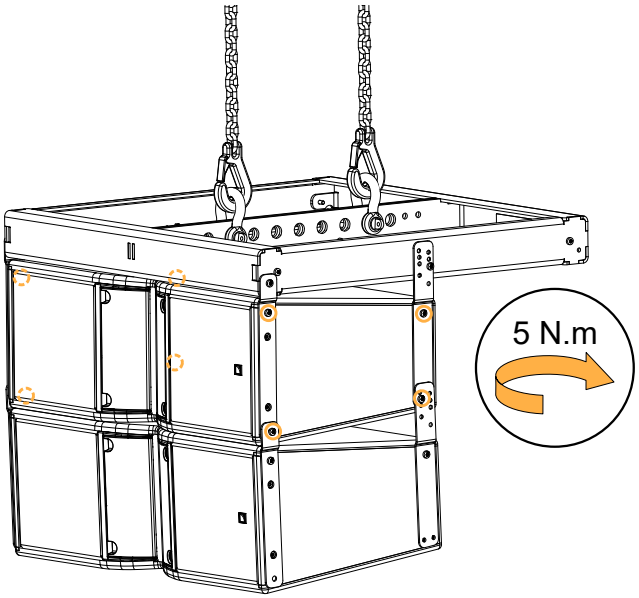
Select the holes and inserts depending on the inter-element angle.





c) Tighten all the screws on the supporting enclosure.

Apply a torque of 5 N.m.



5. Repeat step 4 (p.61) until the array is completed.
6. Tighten all the screws on the last enclosure.

   Apply a torque of 5 N.m.
7. Check that all the screws are secured and tightened and raise the array.

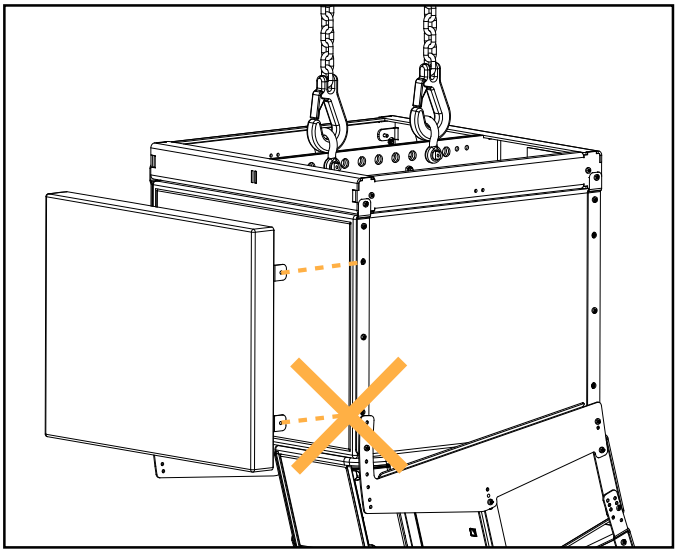
What to do next

- Adding a pullback with KARAlli-RIGBAR (p.73)
- Securing a screen (p.102)

SB18 IIi / Kara IIi array assembly

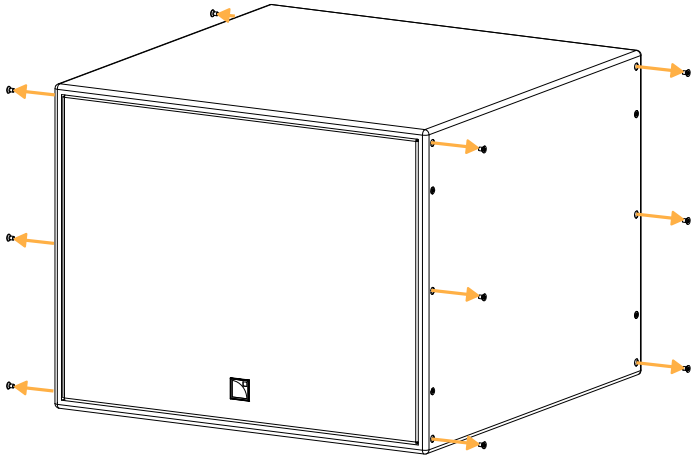
About this task

When KARAIIi-TILT is secured to SB18 IIi in reversed orientation, the SB18 IIi grill cannot be removed and SB18IIi-SCREEN cannot be secured on the enclosure.



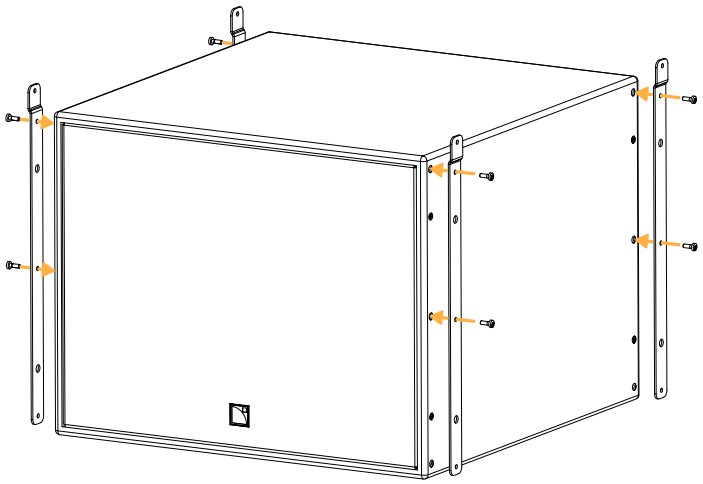
Procedure

1. Prepare all SB18 IIi needed for the array.
   a) Remove the placeholder screws.



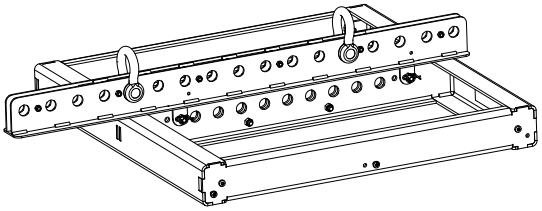
   b) Secure SB18IIi-LINK on the enclosures.

      Do not secure the bottom screws.

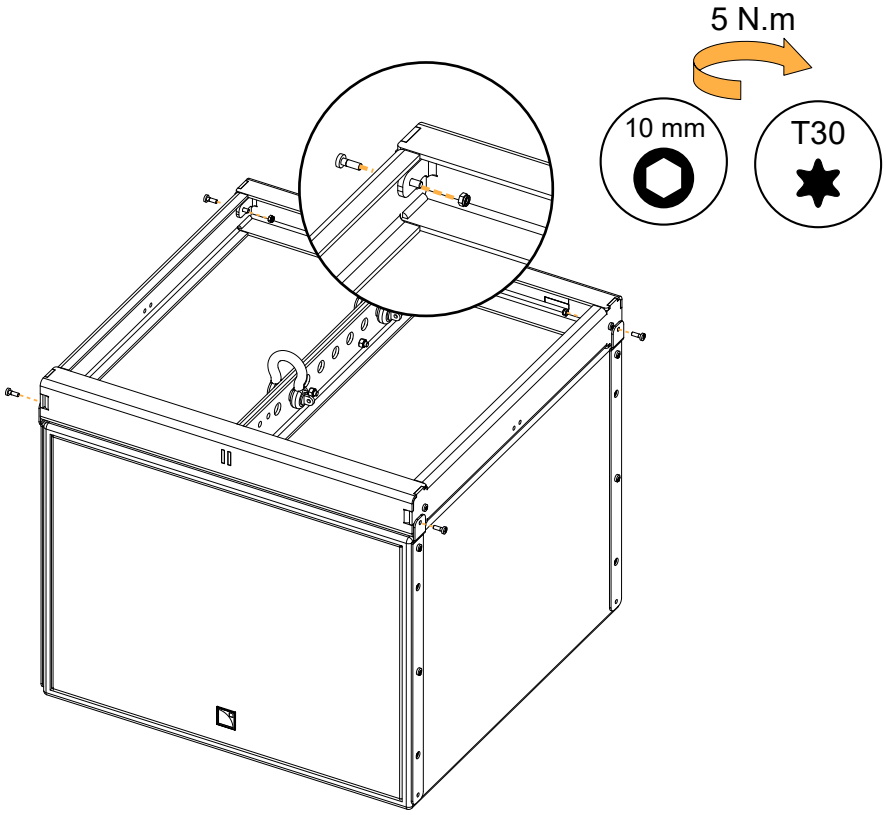


2. Secure KARAIIi-BUMP on top of a first SB18 IIi.

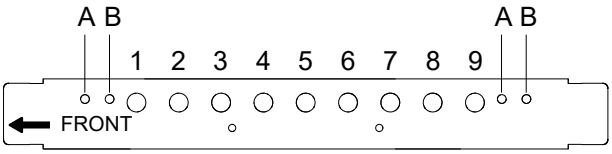
Optionally, secure M-BARi on KARAIIi-BUMP to extend the site angle capability. Use the provided rigging axes, nuts, and safety pins.



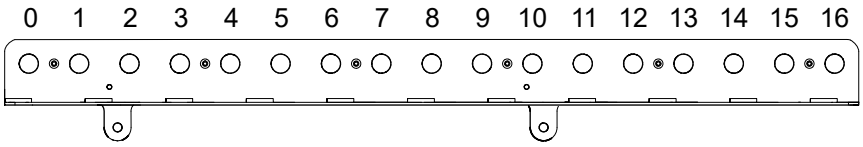
Tighten all the screws on KARAIIi-BUMP. Apply a torque of 5 N.m.



3. Select the pickup point and raise the array.



KARAIIi-BUMP pickup points



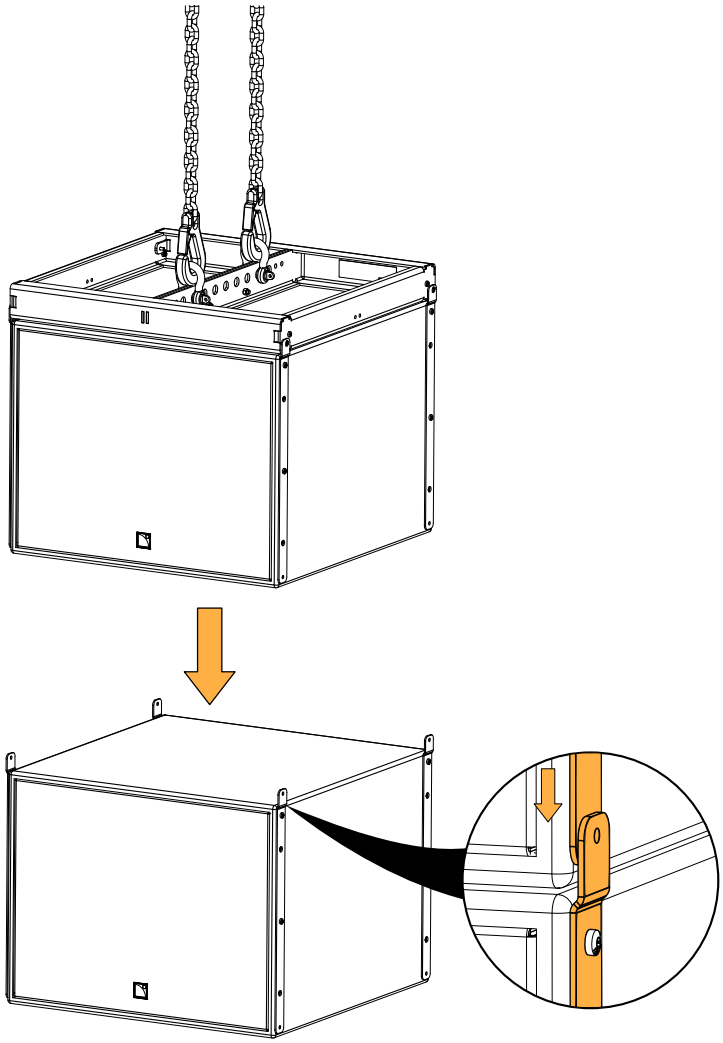
M-BARi pickup points

4. Secure a second SB18 IIi under the array.

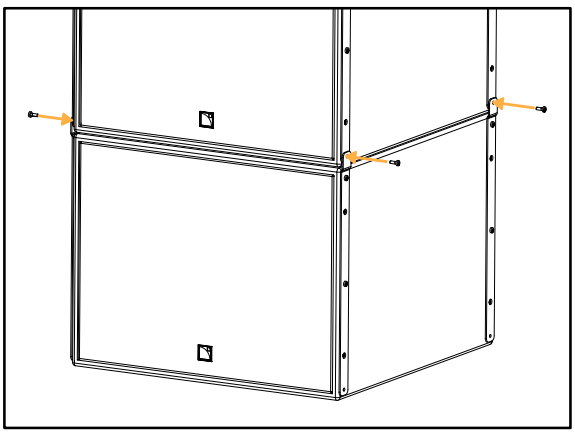
a) Place SB18 IIi (equipped with SB18IIi-LINK) under the array.

b) Lower the array until the enclosures can be assembled.

The rigging plates of the bottom enclosure overlap the rigging plates of the top enclosure.

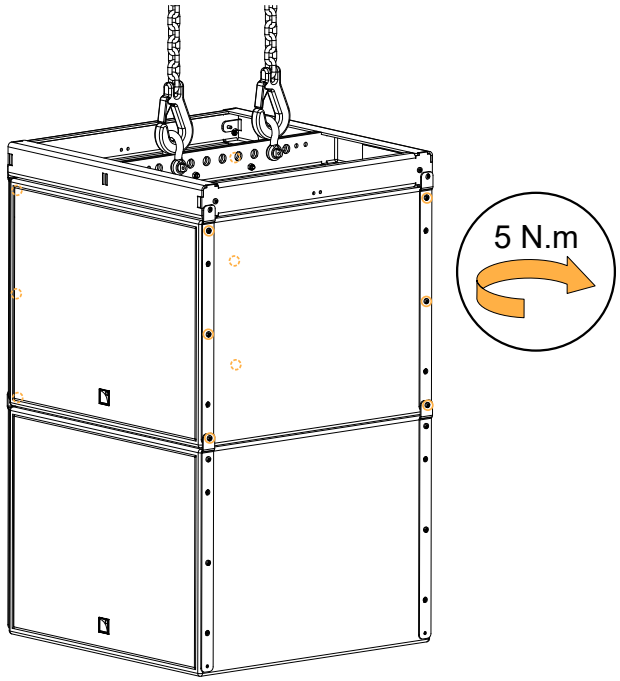


c) Link the enclosures with rigging screws.



d) Tighten all the screws on the supporting enclosure.

Apply a torque of 5 N.m.



e) Raise the array.

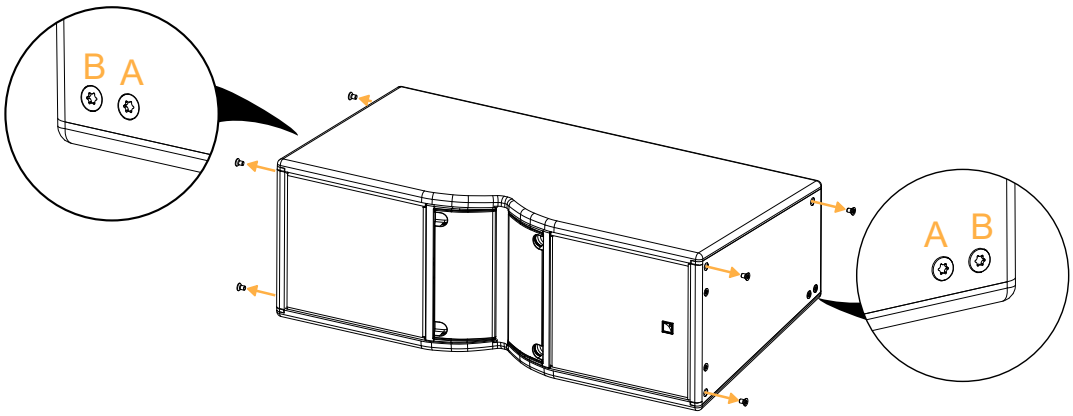
5. Repeat step 4 (p.64) until all SB18 IIi are assembled.

6. Prepare a Kara IIi with KARAIIi-ENDLINK and KARAIIi-TILT.

a) **Risk of acoustic leaks**

Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

Remove the relevant placeholder screws.

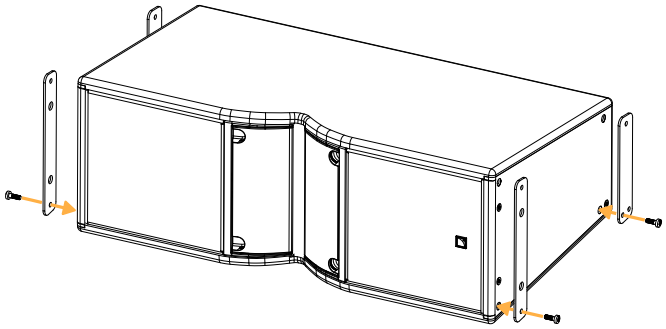


Kara IIi rear linking points

rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

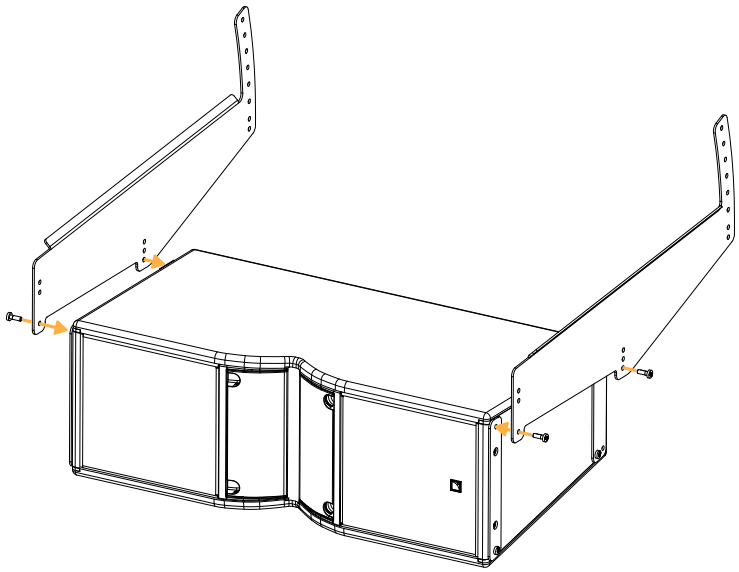
b) Secure KARAIIi-ENDLINK on the enclosure.

Do not secure the top rigging screws.



c) Secure KARAIIi-TILT on the enclosure.

Select the holes on KARAIIi-TILT depending on the inter-element angle with SB18 IIi. Refer to APPENDIX A: Angle settings with KARAIIi-TILT (p.149).



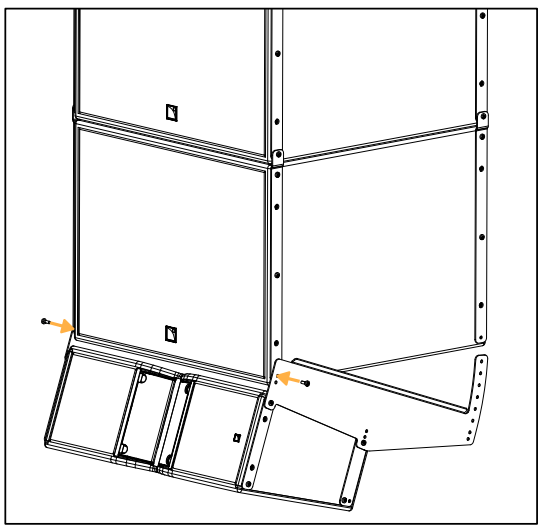
This step requires three operators.

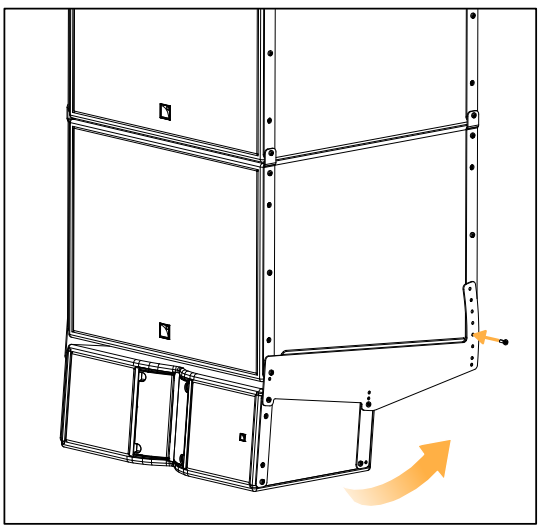
Hold the enclosure at the bottom until the rigging plates are secured.

7. Secure the Kara IIi / KARAIIi-TILT assembly under the array.

a) Lift the assembly and secure KARAIIi-TILT to SB18 IIi with rigging screws.

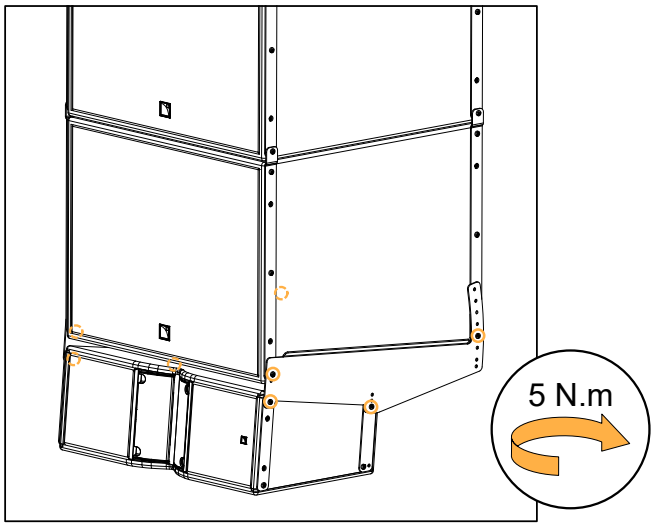
Select the holes on KARAIIi-TILT depending on the inter-element angle. Refer to APPENDIX A: Angle settings with KARAIIi-TILT (p.149).



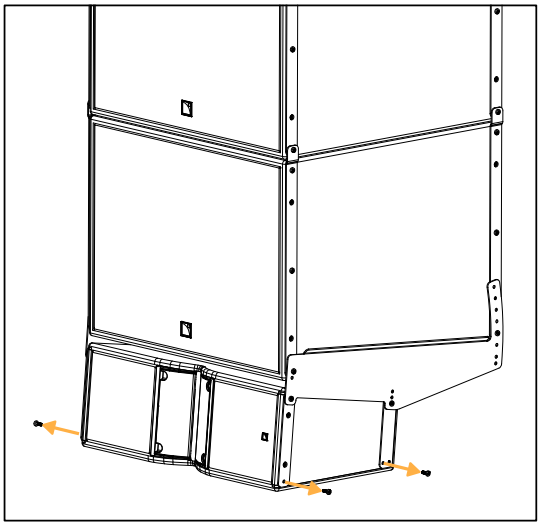


b) Tighten all the screws on KARAIIi-TILT.

Apply a torque of 5 N.m.



c) Remove the bottom screws from the Kara IIi rigging plates.



8. To add additional Kara IIi under the array, follow the procedure in Kara IIi array assembly (p.59).

9. Check that all screws are present and tightened, and raise the array.

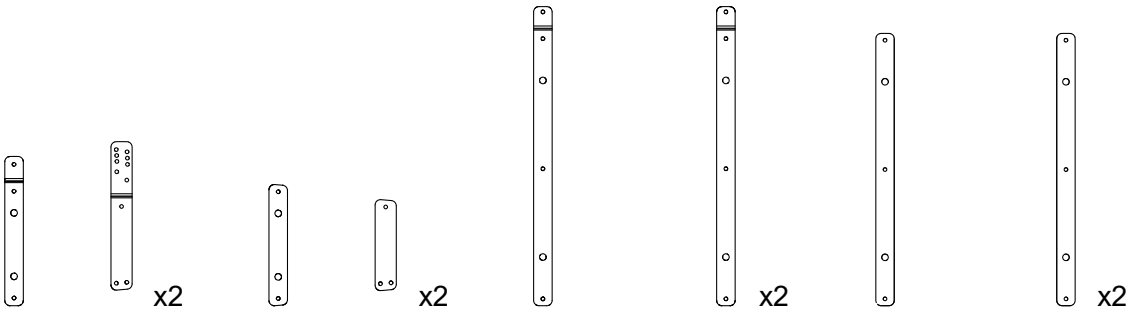
What to do next

- Adding a pullback with KARAIIi-RIGBAR (p.73)
- Securing a screen (p.102)

Flying an array with KARAIIi-RIGBAR

Type of deployment	flown
Rigging accessories	KARAIIi-RIGBAR
	Kara IIi / SB18 IIi rigging plates
Screws and fasteners	M6×40 Torx rigging screws (provided)
	M6×18 Torx rigging screws (provided)
Tools	torque screwdriver
	T30 Torx bit
Min. number of operators	3

Rigging plates



KARAIIi-LINK

Rigging plates for Kara IIi

KARAIIi-ENDLINK

End rigging plates for Kara IIi

SB18IIi-LINK

Rigging plates for SB18 IIi

SB18IIi-ENDLINK

End rigging plates for SB18 IIi

Risk of falling objects

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

Secondary safety

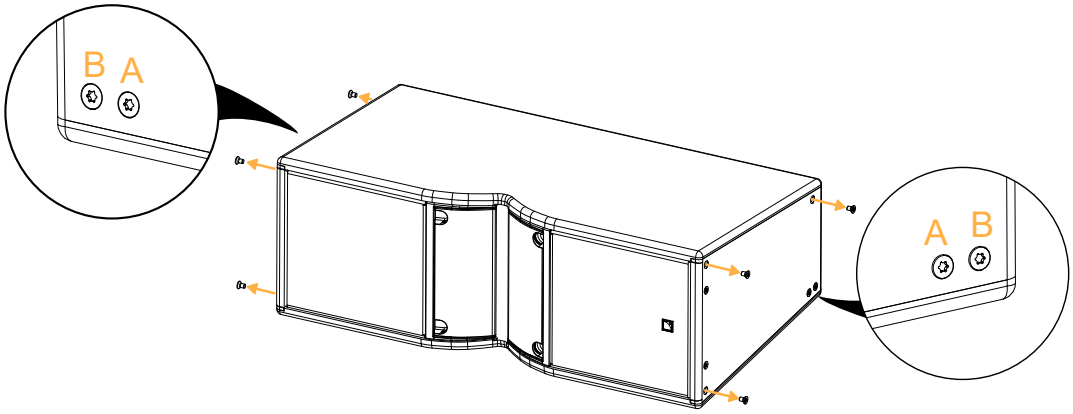
Use available holes on the rigging accessories to implement a secondary safety.

Assembly

Procedure

1. Prepare the first enclosure.
   a) Remove the relevant placeholder screws.

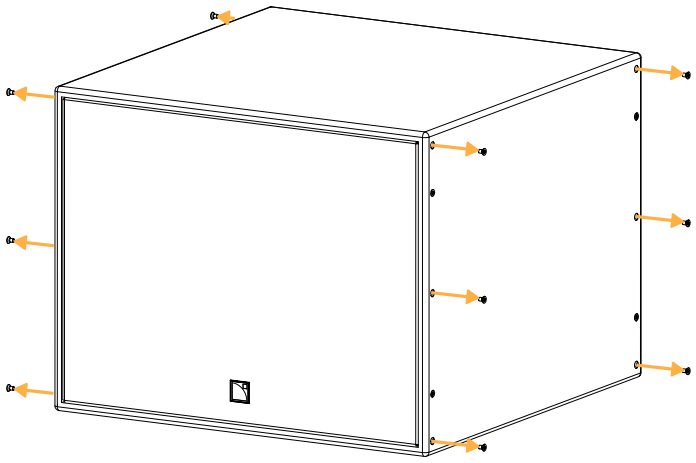
On Kara II



Kara II rear linking points

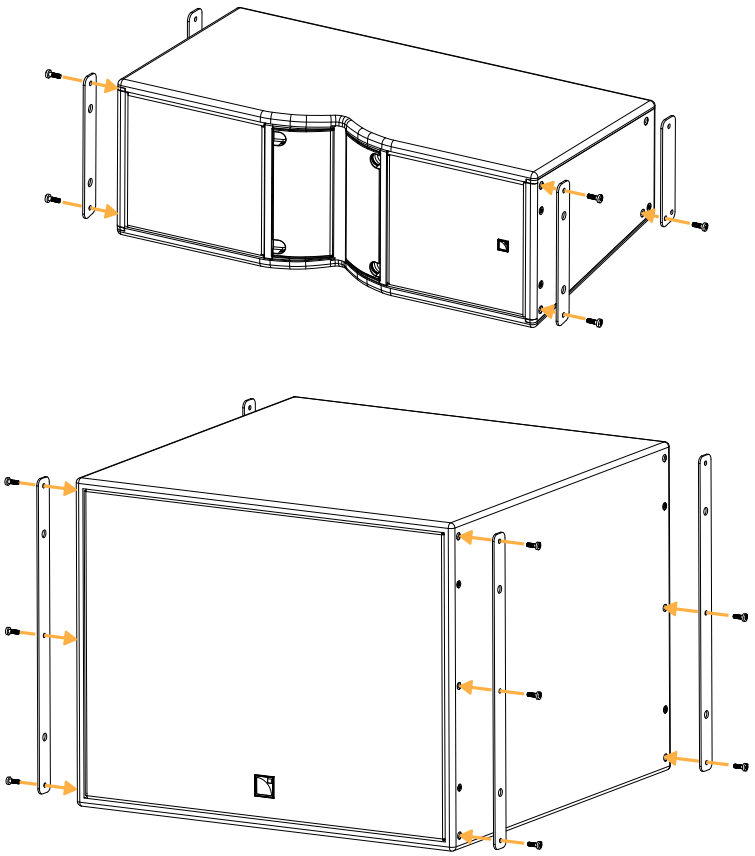
rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

On SB18 II



b) Secure end rigging plates on the enclosure.
   - KARAIIi-ENDLINK on Kara IIi
   - SB18IIi-ENDLINK on SB18 IIi

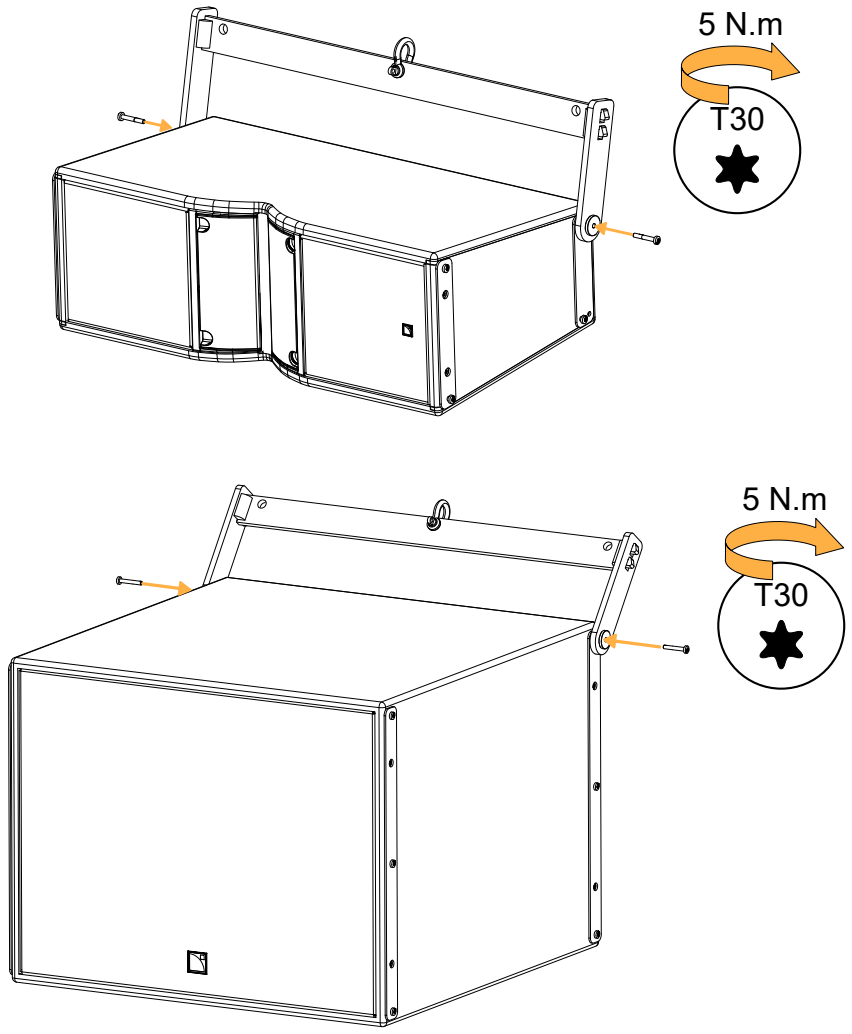
   Do not secure the rear top screws on each side.



2. Secure KARAIIi-RIGBAR at the rear of the enclosure with M6×40 Torx rigging screws.

Secure KARAIIi-RIGBAR at the front for a positive initial site angle.

Tighten the screws with a 5 N.m. torque.



3. Secure a shackle or CLAMP250 to KARAIIi-RIGBAR and raise the array.

Maximum limit with CLAMP250.

CLAMP250 has a WLL (Working Load Limit) of 250 kg / 550 lb. It can support an array of up to 11 Kara IIi or 5 SB18 IIi. For an hybrid array, check the total weight of the array in Soundvision.

For more information, refer to the **CLAMP250 owner's manual**.

4. To complete the array, follow the procedure in Flying an array with KARAIIi-BUMP (p.58).

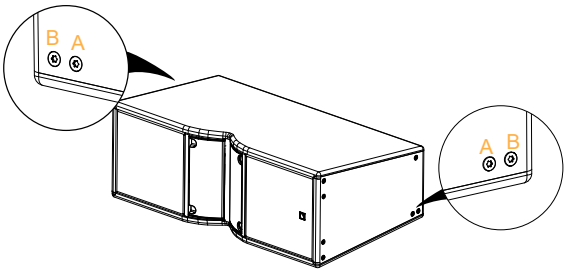
What to do next

- Adding a pullback with KARAIIi-RIGBAR (p.73)
- Securing a screen (p.102)

Adding a pullback with KARAIIi-RIGBAR

Type of deployment	flown with pullback
Rigging accessories	KARAIIi-RIGBAR
Screws and fasteners	M6×40 Torx screws (provided)
Tools	torque screwdriver
	T30 Torx bit
Min. number of operators	1

KARAIIi-RIGBAR uses rear linking points B on Kara IIi.



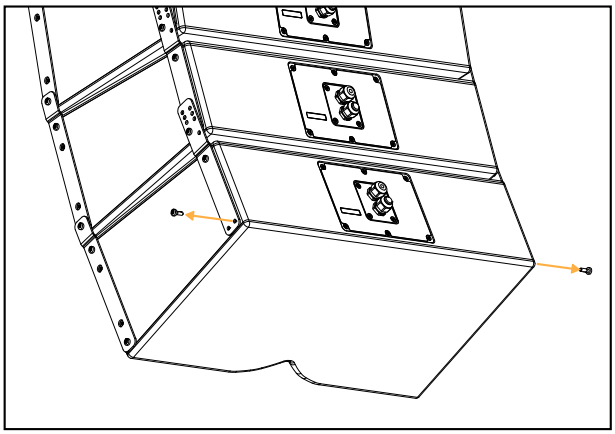
Assembly

Prerequisite

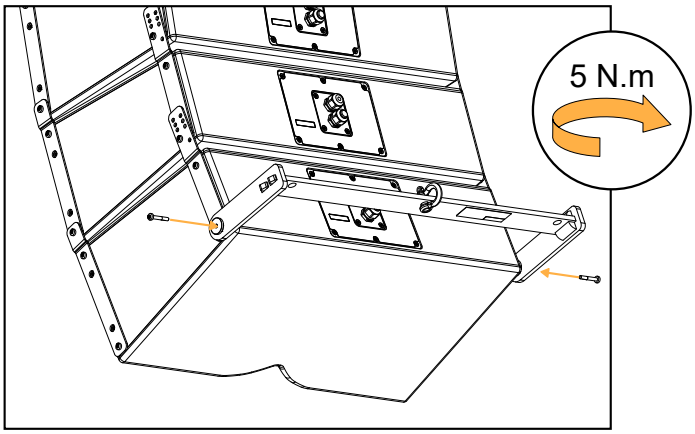
Prepare the array as described in Flying an array with KARAIIi-BUMP (p.58) or Flying an array with KARAIIi-RIGBAR (p.69).

Procedure

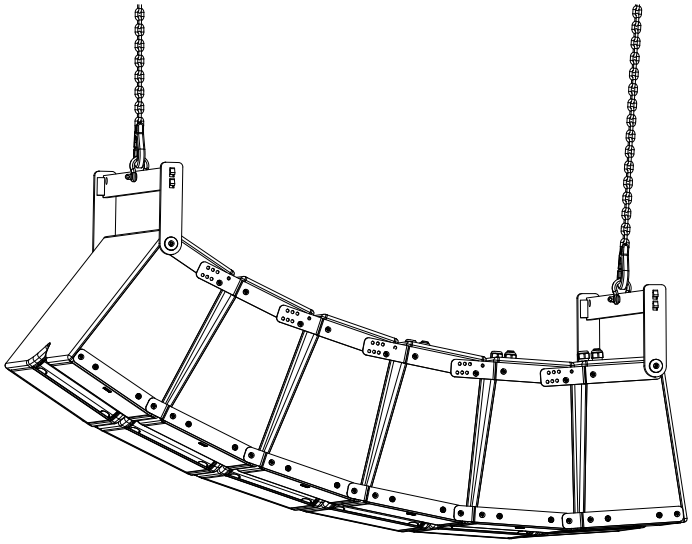
1. Raise the array until the bottom enclosure is accessible.
2. Remove the bottom screw from the rear rigging plates on each side.



3. Secure KARAIIi-RIGBAR at the rear of the enclosure with M6×40 Torx screws.
Apply a torque of 5 N.m.



4. Secure a shackle to KARAIIi-RIGBAR and lift it with an additional motor.

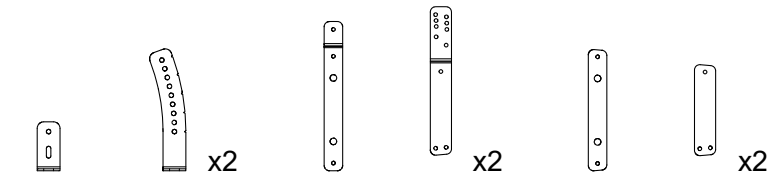


Ceiling-mounting

Mounting a Kara IIi array with KARAIIi-TILTBRACKET

Type of deployment	ceiling-mounted
Rigging accessories	KARAIIi-TILTBRACKET
	Kara IIi rigging plates
Screws and fasteners	M6×18 Torx rigging screws (provided)
	4 × M10 screws and anchors
Tools	torque screwdriver
	T30 Torx bit
Min. number of operators	3

Rigging plates



KARAIIi-TILTBRACKET

Fastening brackets with angles for Kara IIi

KARAIIi-LINK

Rigging plates for Kara IIi

KARAIIi-ENDLINK

End rigging plates for Kara IIi

Fasteners for ceiling-mounting

Select screw length and anchors applicable to the ceiling properties.

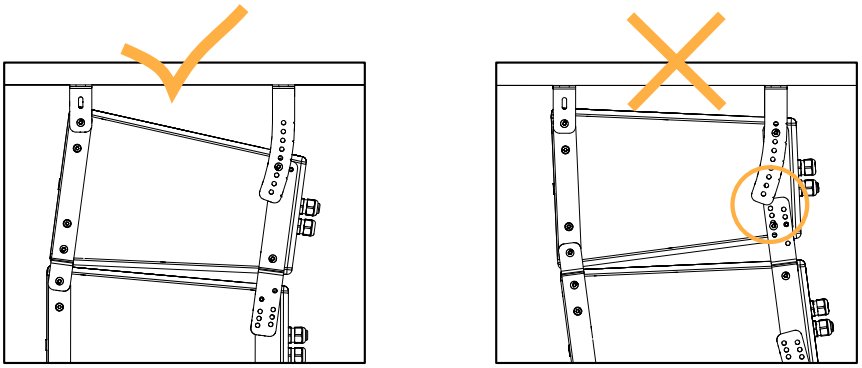
Model the array in Soundvision and check the loads on rigging in the **Mechanics view**.

Mounting KARAIIi-TILTBRACKET to the ceiling

When mounting Kara IIi to the ceiling with KARAIIi-TILTBRACKET, Kara IIi must be turned **upside-down** (logo on the left-hand side).

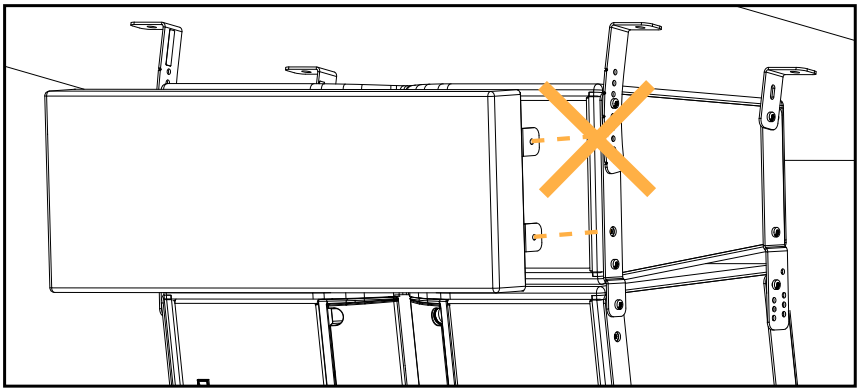
Otherwise, it is not possible to mount additional Kara IIi under the first one, and the site angle is not accurate.

For aesthetic purposes, the front grills can be removed and exchanged when the enclosures are assembled. Refer to Exchanging Kara IIi grills (p.100).



When KARAIIi-TILTBRACKET is secured to Kara IIi with the angle bracket at the front, the grills cannot be removed and KARAIIi-SCREEN cannot be secured on the enclosure.

The grills on the first enclosure can be exchanged before rigging. Refer to Exchanging Kara IIi grills (p.100).



Assembly

Procedure

1. Secure KARAIIi-TILTBRACKET to the ceiling using M10 screws and fasteners.

Fasteners for ceiling-mounting

Select screw length and anchors applicable to the ceiling properties.

Model the array in Soundvision and check the loads on rigging in the **Mechanics view**.

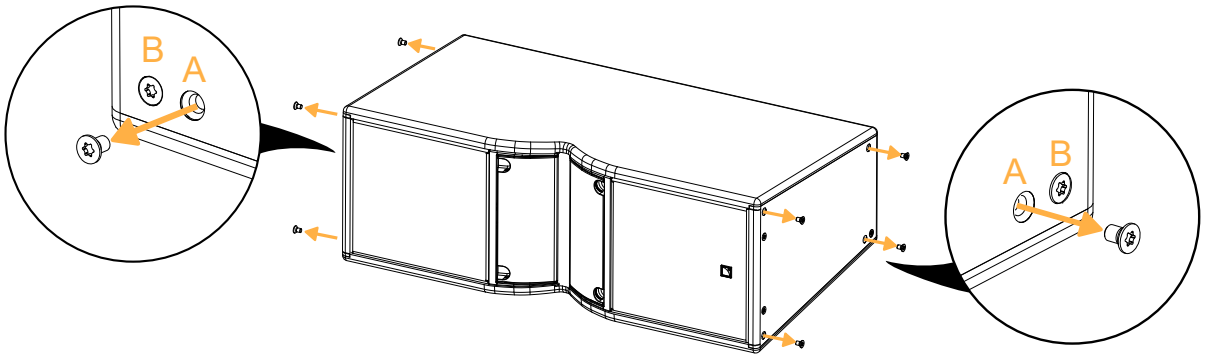
2. Prepare a Kara IIi.

a) **Risk of acoustic leaks**

Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

Remove the relevant placeholder screws.

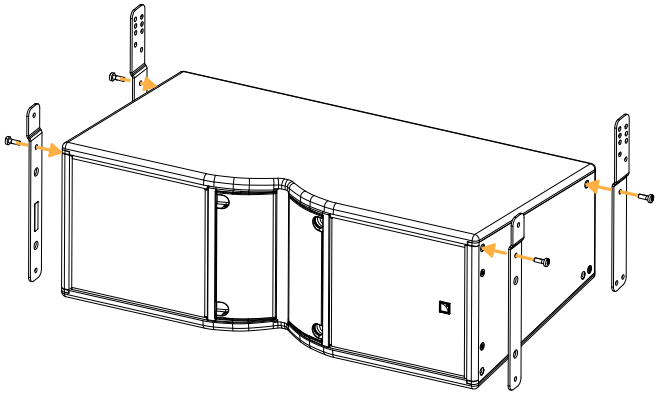
At the bottom rear, remove placeholder screws "A".



b) Secure KARAIIi-LINK on the enclosure.

For an array of one enclosure, secure KARAIIi-ENDLINK instead.

Do not secure the bottom screws.

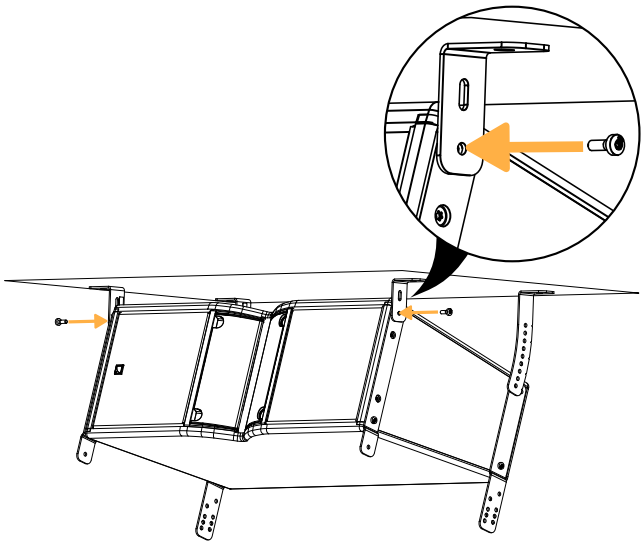


This step requires three operators.
Hold the enclosure at the bottom until the rigging plates are secured.

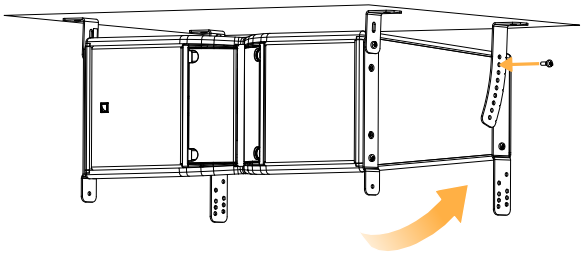
3. Turn Kara II upside-down and secure it to KARAIIi-TILTBRACKET with rigging screws.

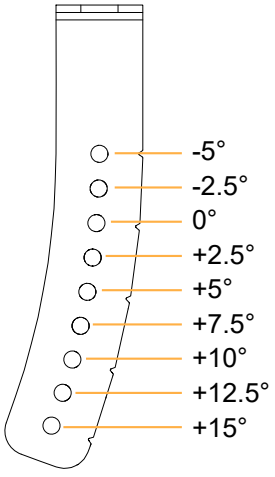
a) Secure the enclosure to the round hole on the short bracket.

Do not fully tighten the screws.

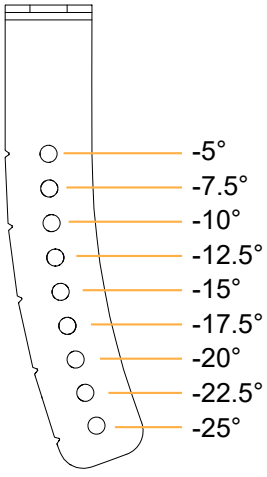


b) Secure the enclosure to the long bracket at the chosen angle.





angles at the rear



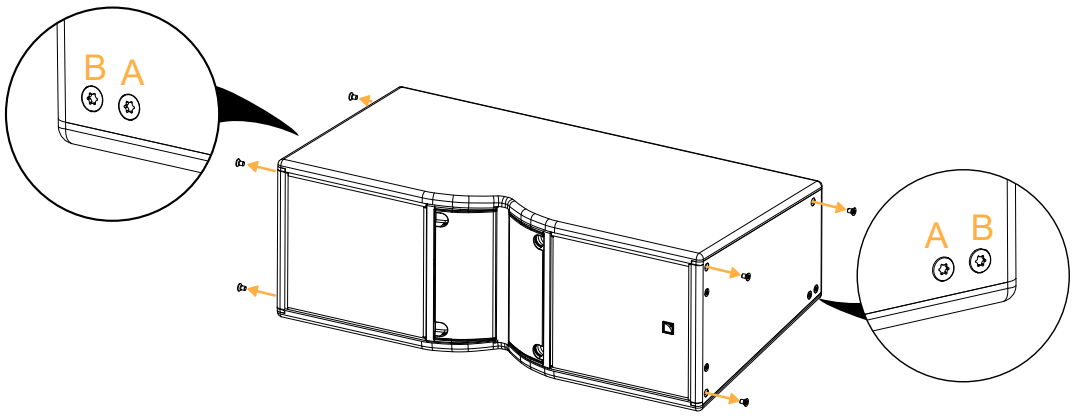
angles at the front

4. Prepare one or two additional Kara II.

a) **Risk of acoustic leaks**

Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

Remove the relevant placeholder screws.



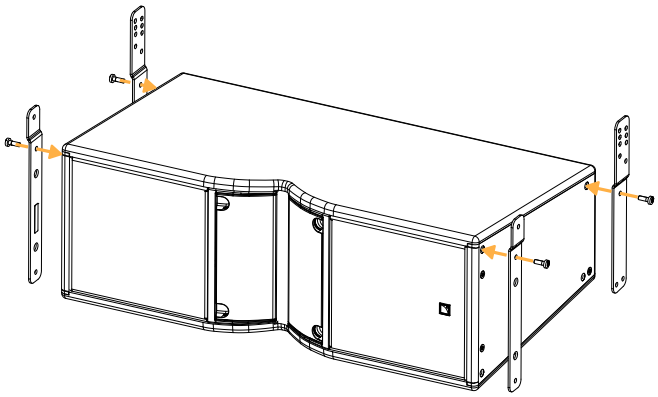
Kara II rear linking points

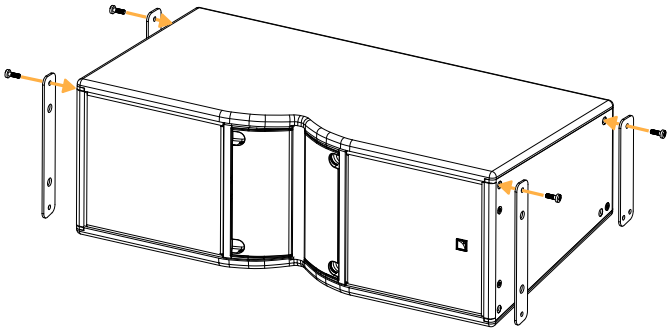
rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

b) Secure the rigging plates on the enclosure:

- KARAIIi-LINK on the second to last enclosure,
- or KARAIIi-ENDLINK on the last enclosure.

Do not secure the bottom screws.



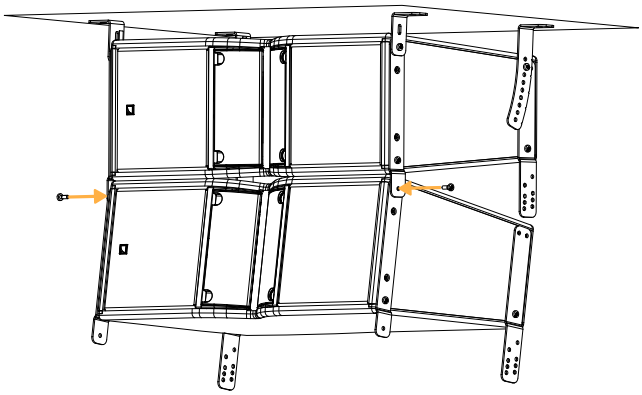


This step requires three operators.
Hold the enclosure at the bottom until the rigging plates are secured.

5. Secure an additional enclosure under the array.

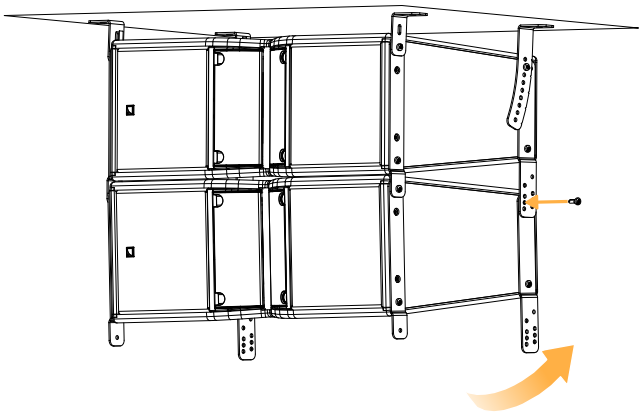
a) Turn the next Kara II upside-down and link the enclosures at the front with rigging screws.

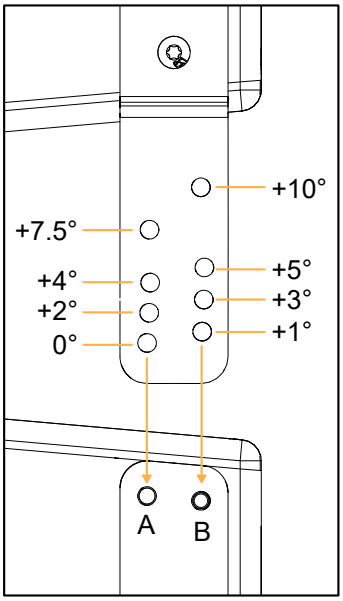
Do not fully tighten the screws.



b) Link the enclosures at the rear with rigging screws.

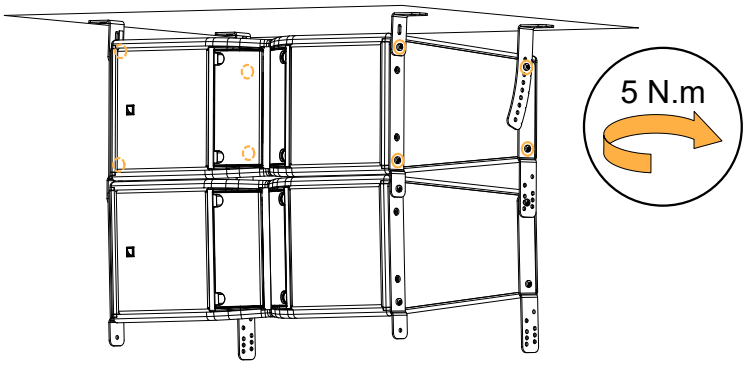
Select the holes and inserts depending on the inter-element angle.





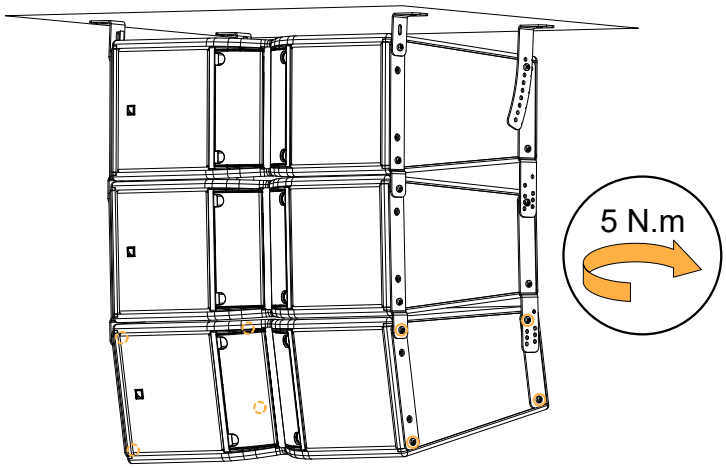
c) Tighten all the screws on the supporting enclosure.

Apply a torque of 5 N.m.



6. If necessary, repeat step 5 (p.79) for the last enclosure.

7. Tighten all the screws on the last enclosure.



8. Check that all the screws are secured and tightened.

What to do next

- Exchange the Kara IIi grills so that the logo is positionned on the right-hand side: Exchanging Kara IIi grills (p.100),
- or secure a screen: Securing a screen (p.102)

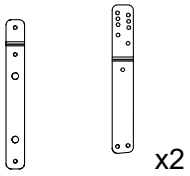
Mounting an SB18 Ili / Kara Ili array with KARAIIi-FIXBRACKET

Type of deployment	ceiling-mounted
Rigging accessories	KARAIIi-FIXBRACKET
	KARAIIi-TILT
	SB18IIi-ENDLINK
	Kara Ili rigging plates
Screws and fasteners	M6×18 Torx rigging screws (provided)
	4 × M10 screws and anchors
Tools	torque screwdriver
	T30 Torx bit
Min. number of operators	3

Rigging plates

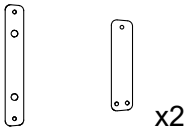
KARAIIi-FIXBRACKET

Fastening brackets for Kara Ili and SB18 Ili



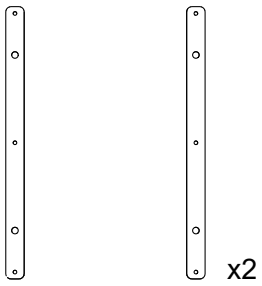
KARAIIi-LINK

Rigging plates for Kara Ili



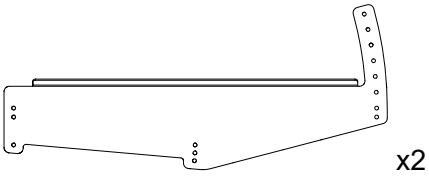
KARAIIi-ENDLINK

End rigging plates for Kara Ili



SB18IIi-ENDLINK

End rigging plates for SB18 Ili



KARAIIi-TILT

Rigging elements with angles for Kara Ili above or under SB18 Ili

Fasteners for ceiling-mounting

Select screw length and anchors applicable to the ceiling properties.

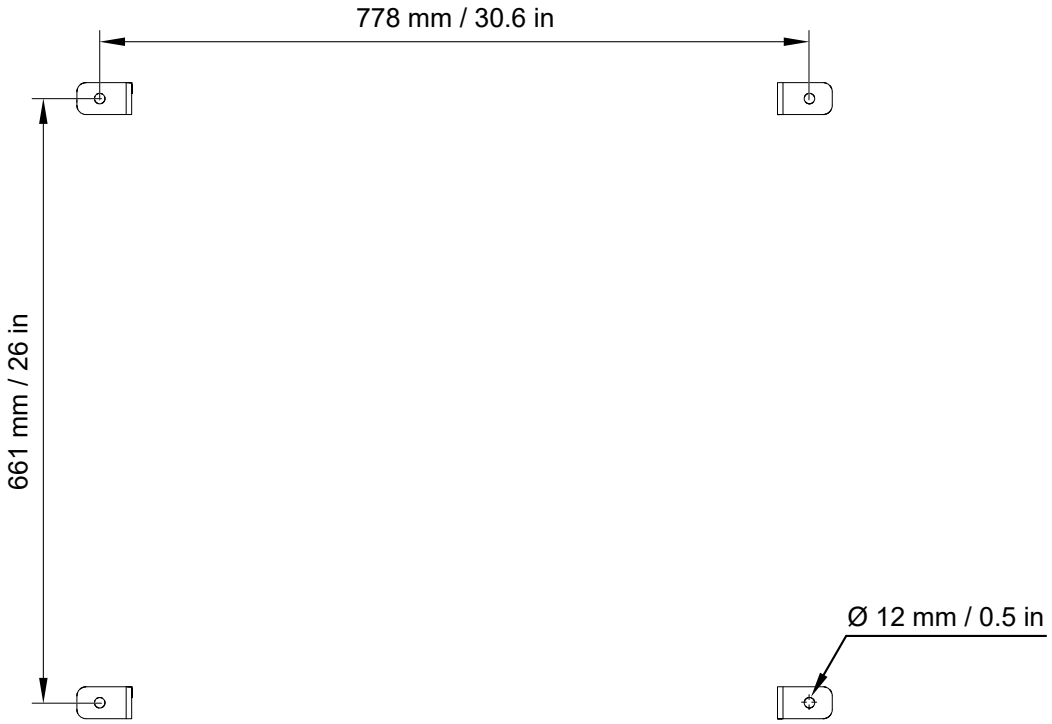
Model the array in Soundvision and check the loads on rigging in the **Mechanics view**.

Assembly

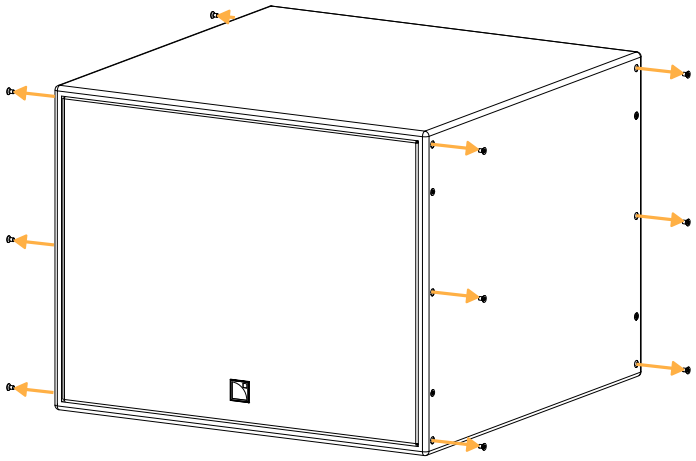
Procedure

1. Secure KARAIIi-FIXBRACKET to the ceiling using M10 screws.

Fasteners for ceiling-mounting
Select screw length and anchors applicable to the ceiling properties.
Model the array in Soundvision and check the loads on rigging in the **Mechanics view**.

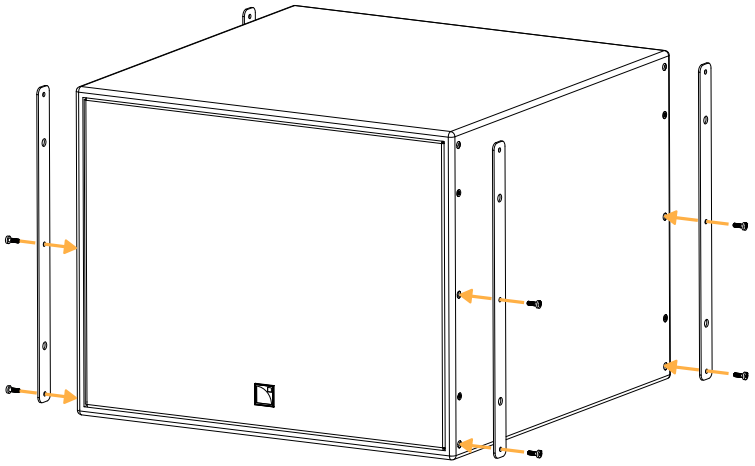


2. Prepare an SB18 IIi.
   a) Remove the placeholder screws.



b) Secure SB18Ili-ENDLINK on the enclosure.

Do not secure the top screws.

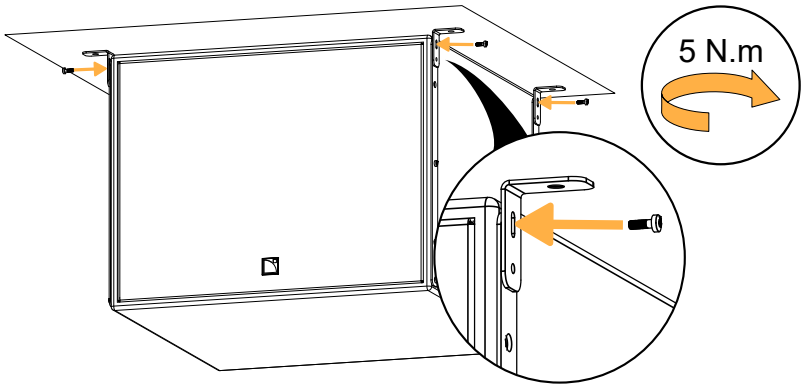


This step requires three operators.

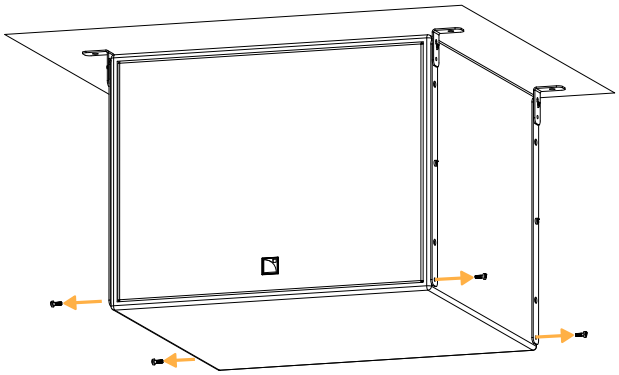
Hold the enclosure at the bottom until the rigging plates are secured.

3. Lift SB18 Ili and secure it to the slotted holes on KARAIli-FIXBRACKET with rigging screws.

Apply a 5 N.m. torque.



4. Remove the bottom rigging screws from SB18 Ili.



5. Secure up to two Kara Ili under the array with KARAIli-TILT. Refer to SB18 Ili / Kara Ili array assembly (p.63).

6. Check that all the screws are secured and tightened.

What to do next

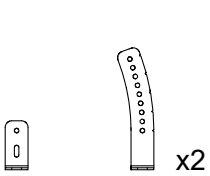
- Securing a screen (p.102)

Stacking

Stacking a Kara IIi array with KARAIIi-TILTBRACKET

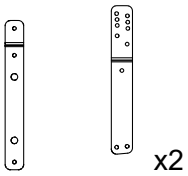
Type of deployment	stacked
Rigging accessories	KARAIIi-TILTBRACKET
Screws and fasteners	M6×18 Torx rigging screws (provided)
	4 × M10 screws and anchors
Tools	torque screwdriver
	T30 Torx bit
Min. number of operators	2

Rigging plates



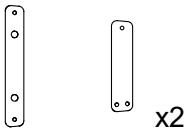
KARAIIi-TILTBRACKET

Fastening brackets with angles for Kara IIi



KARAIIi-LINK

Rigging plates for Kara IIi

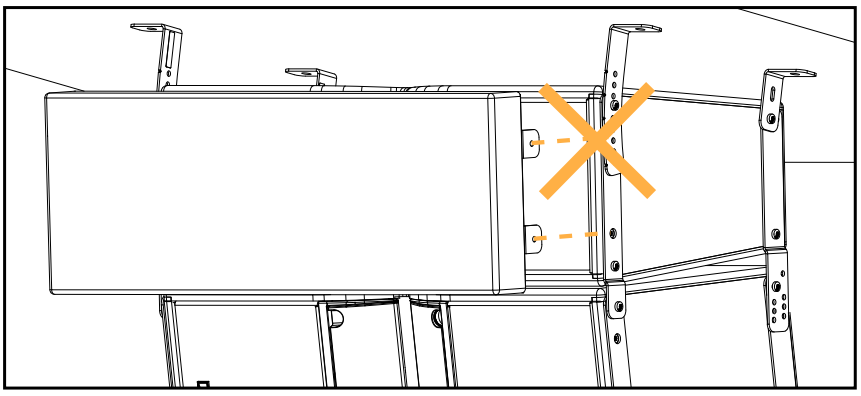


KARAIIi-ENDLINK

End rigging plates for Kara IIi

When KARAIIi-TILTBRACKET is secured to Kara IIi with the angle bracket at the front, the grills cannot be removed and KARAIIi-SCREEN cannot be secured on the enclosure.

The grills on the first enclosure can be exchanged before rigging. Refer to Exchanging Kara IIi grills (p.100).



Assembly

Procedure

1. Secure KARAIIi-TILTBRACKET to the ground using M10 screws and fasteners.

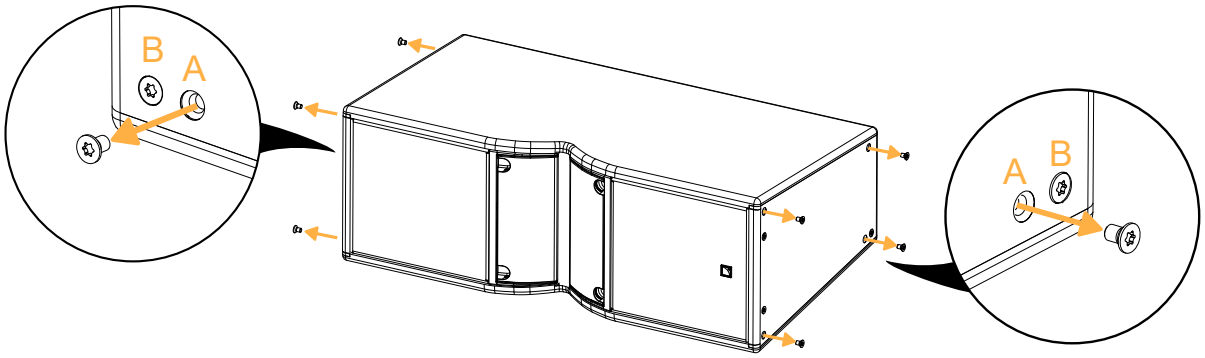
2. Prepare a Kara IIi.

a) **Risk of acoustic leaks**

Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

Remove the relevant placeholder screws.

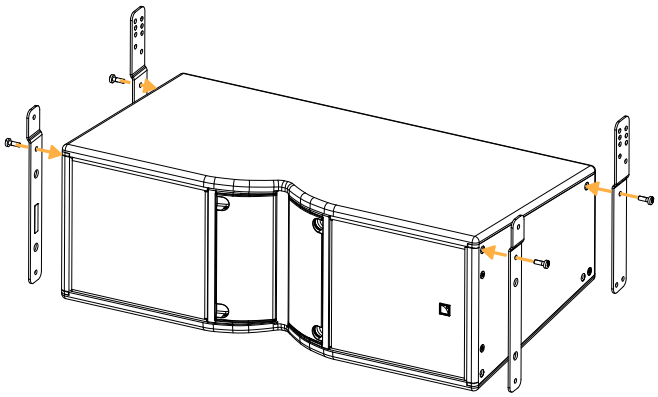
At the bottom rear, remove placeholder screws "A".



b) Secure KARAIIi-LINK on the enclosure.

For an array of one enclosure, secure KARAIIi-ENDLINK instead.

Do not secure the bottom screws.

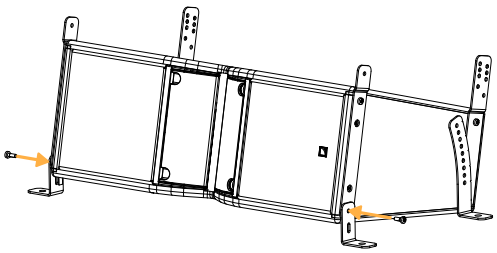


Risk of crushing injury
Keep fingers away from underneath the enclosure.

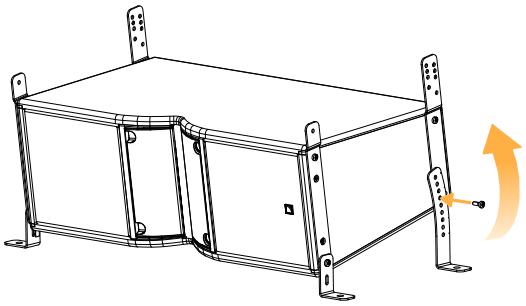
3. Secure Kara IIi to KARAIIi-TILTBRACKET with rigging screws.

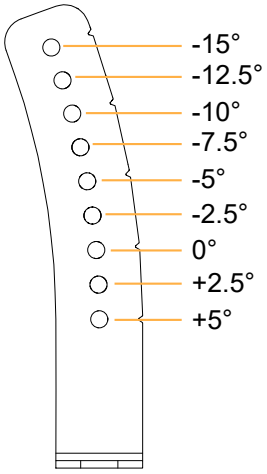
a) Secure the enclosure to the round hole on the short bracket.

Do not fully tighten the screws.

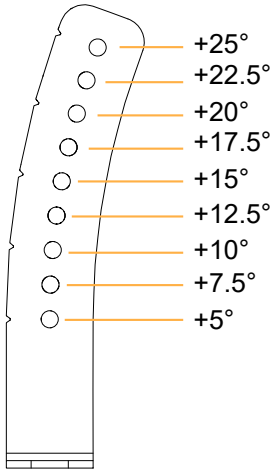


b) Secure the enclosure to the long bracket at the chosen angle.





angles at the rear

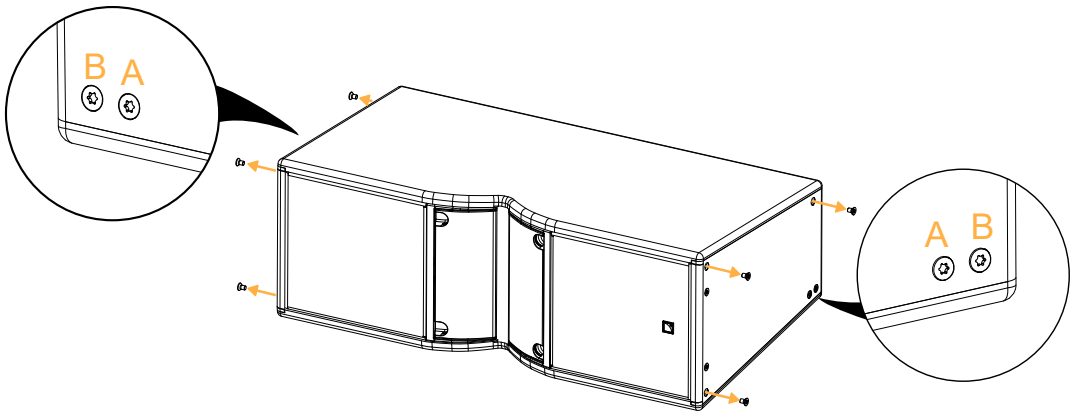


angles at the front

4. Prepare additional Kara IIi.

a) **Risk of acoustic leaks**
Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

Remove the relevant placeholder screws.



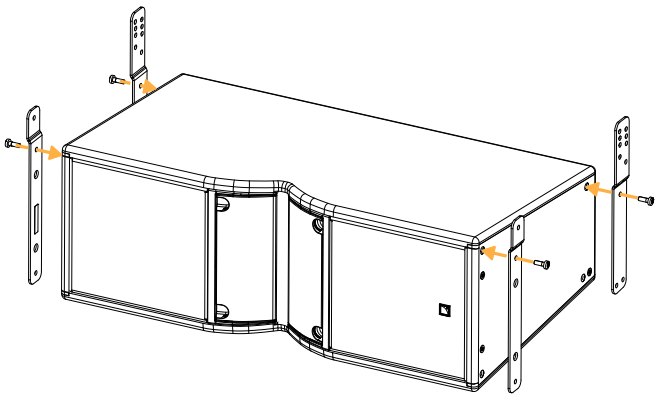
Kara II rear linking points

rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

b) Secure KARAIIi-LINK on the enclosure.

On the last enclosure of the array, secure KARAIIi-ENDLINK instead.

Do not secure the bottom screws.



Risk of crushing injury

Keep fingers away from underneath the enclosure.

5. Secure the next Kara II on top of the array.

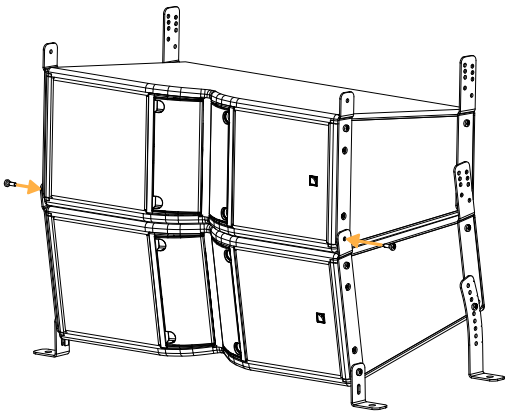
a) Link the enclosures at the front with rigging screws.

Adjusting the gap between stacked enclosures

Place a wedge or a lever between the two enclosures to align the rigging with the inserts.

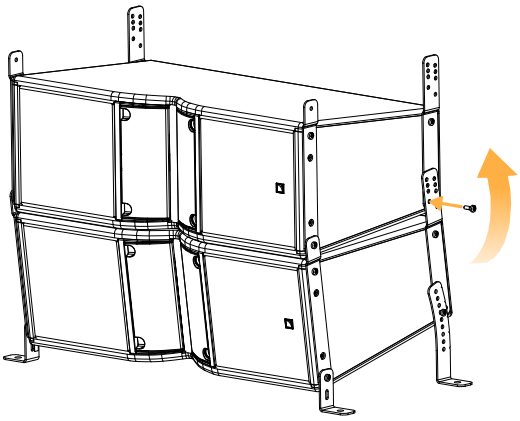
Be careful not to scratch the paint.

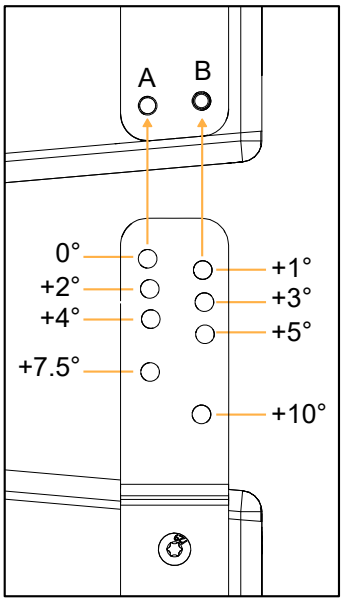
Do not fully tighten the screws.



b) Link the enclosures at the rear with rigging screws.

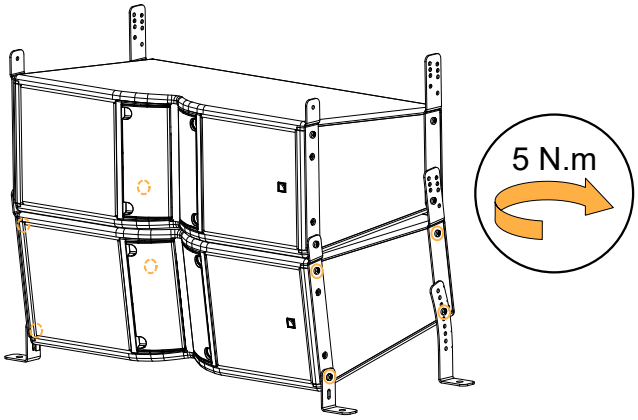
Select the holes and inserts depending on the inter-element angle.





c) Tighten all the screws on the supporting enclosure.

Apply a torque of 5 N.m.



6. Repeat step 5 (p.87) until the array is complete.
7. Tighten the screws on the last enclosure.

   Apply a torque of 5 N.m.
8. Check that all the screws are secured and tightened.

What to do next

- Securing a screen (p.102)

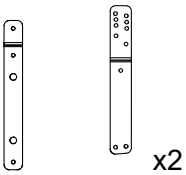
Stacking Kara IIi on top of SB18 IIi with KARAIIi-TILT

Type of deployment	stacked
Rigging accessories	KARAIIi-FIXBRACKET (recommended)
	KARAIIi-TILT
	Kara IIi / SB18 IIi rigging plates
Screws and fasteners	M6×18 Torx rigging screws (provided)
	4 × M10 screws and anchors
Tools	torque screwdriver
	T30 Torx bit
Min. number of operators	2

Rigging plates

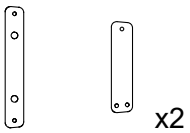
KARAIIi-FIXBRACKET

Fastening brackets for Kara IIi and SB18 IIi



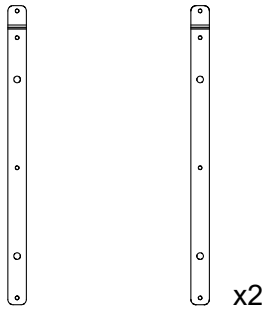
KARAIIi-LINK

Rigging plates for Kara IIi



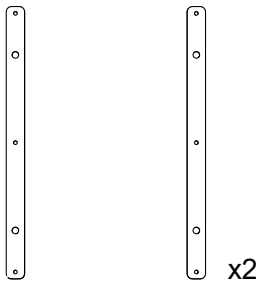
KARAIIi-ENDLINK

End rigging plates for Kara IIi



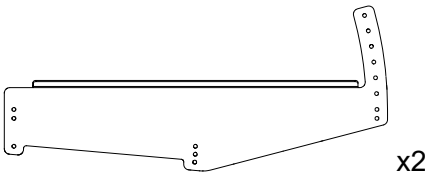
SB18IIi-LINK

Rigging plates for SB18 IIi



SB18IIi-ENDLINK

End rigging plates for SB18 IIi



KARAIIi-TILT

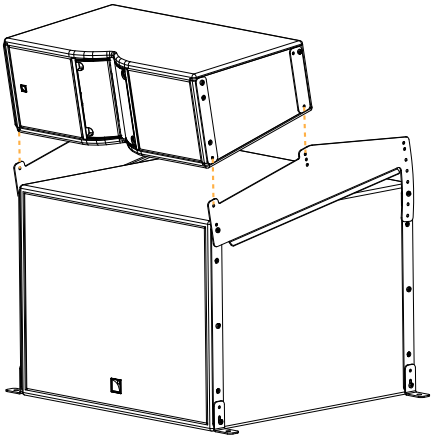
Rigging elements with angles for Kara IIi above or under SB18 IIi

Stacking Kara IIi on SB18 IIi

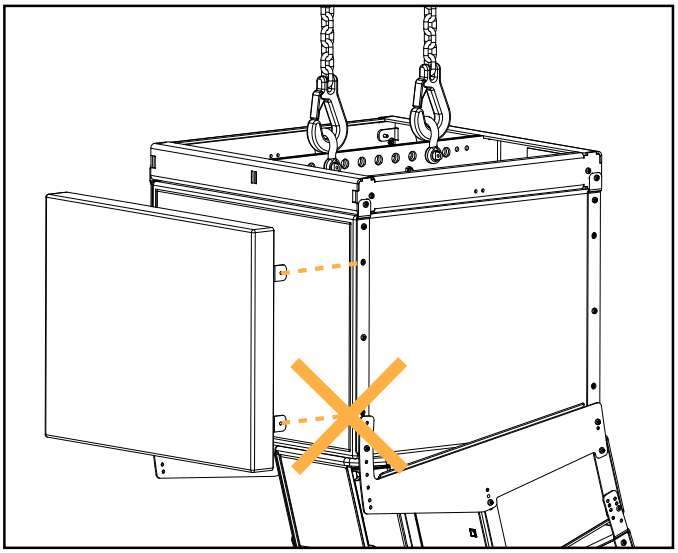
When stacking Kara IIi on SB18 IIi with KARAIIi-TILT, Kara IIi must be turned **upside-down** (logo on the left-hand side).

Otherwise, it is not possible to secure Kara IIi to KARAIIi-TILT.

For aesthetic purposes, the front grills can be removed and exchanged when the enclosures are assembled. Refer to Exchanging Kara IIi grills (p.100).



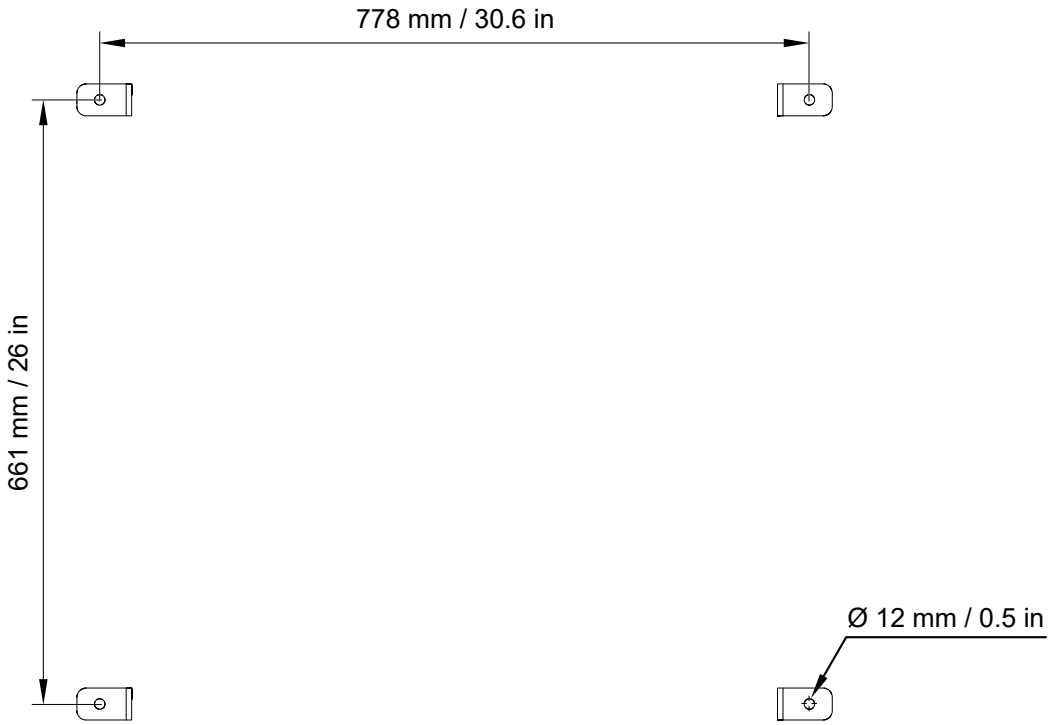
When KARAIIi-TILT is secured to SB18 IIi in reversed orientation, the SB18 IIi grill cannot be removed and SB18IIi-SCREEN cannot be secured on the enclosure.



Assembly

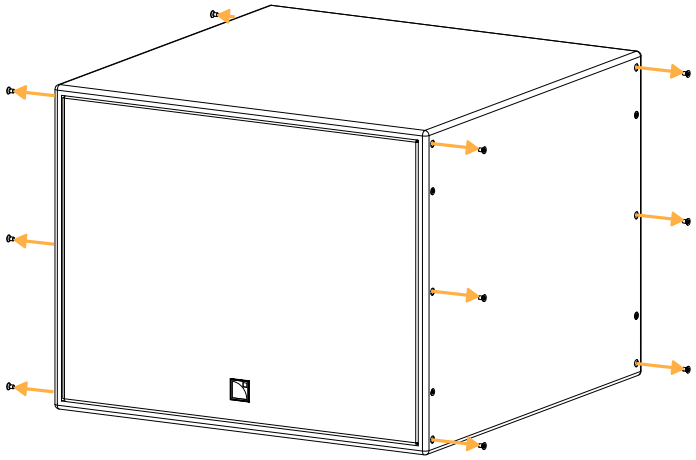
Procedure

1. Secure KARAIIi-FIXBRACKET to the ground using M10 screws.



2. Prepare up to three SB18 IIi.

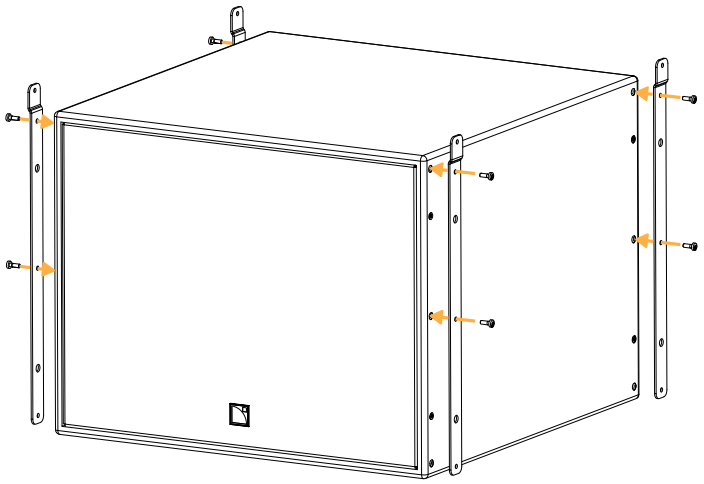
a) Remove the placeholder screws.



b) Secure SB18Ili-LINK on the enclosure.

Do not secure the bottom screws.

On the last enclosure of the array, secure SB18Ili-ENDLINK instead.

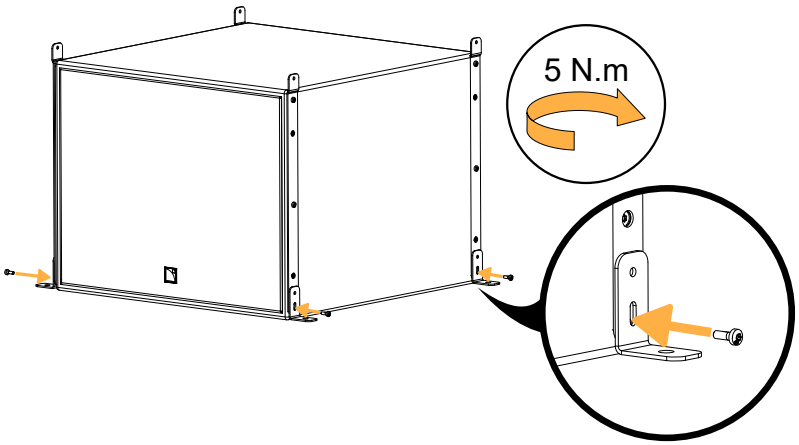


Risk of crushing injury

Keep fingers away from underneath the enclosure.

3. Secure SB18 Ili to the slotted holes on KARAIIi-FIXBRACKET.

Tighten the bottom screws. Apply a 5 N.m. torque.

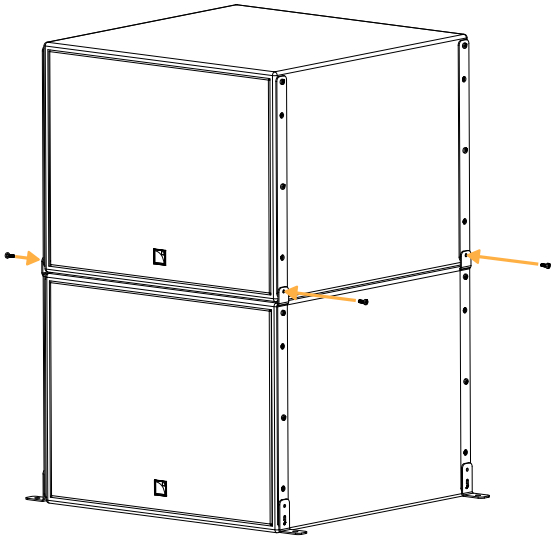


Risk of crushing injury
Keep fingers away from underneath the enclosure.

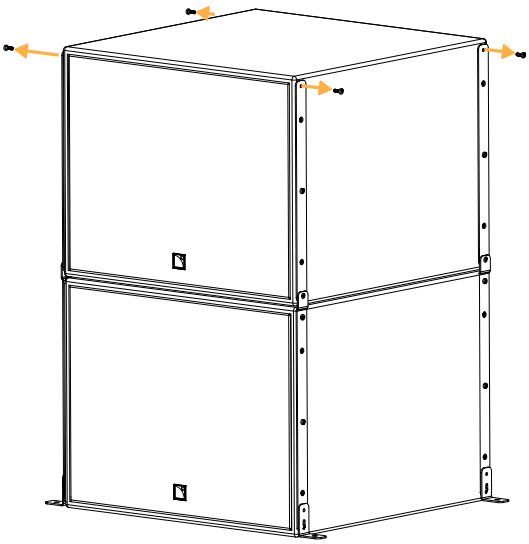
4. Secure additional SB18 IIi (equipped with rigging plates) on top of the first one.

Adjusting the gap between stacked enclosures
Place a wedge or a lever between the two enclosures to align the rigging with the inserts.
Be careful not to scratch the paint.

The last SB18 IIi must be equipped with SB18IIi-ENDLINK.



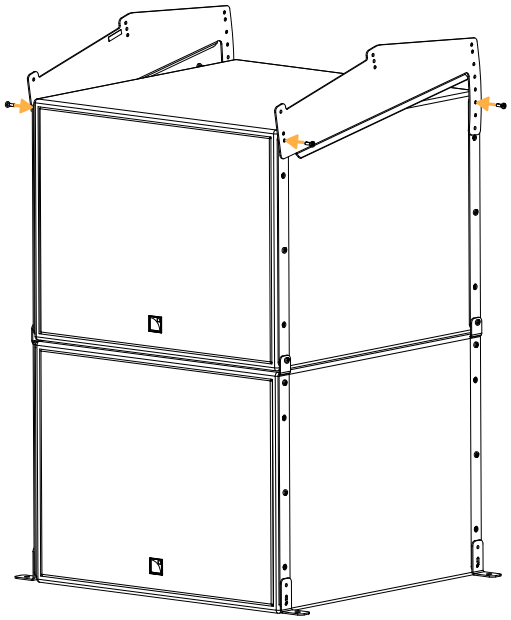
5. Remove the top rigging screws from the last SB18 IIi.



6. Tighten all the screws on the array.
Apply a torque of 5 N.m.

7. Secure KARAIIi-TILT on top of the array.

Select the holes on KARAIIi-TILT depending on the inter-element angle with Kara IIi. Refer to APPENDIX A: Angle settings with KARAIIi-TILT (p.149).

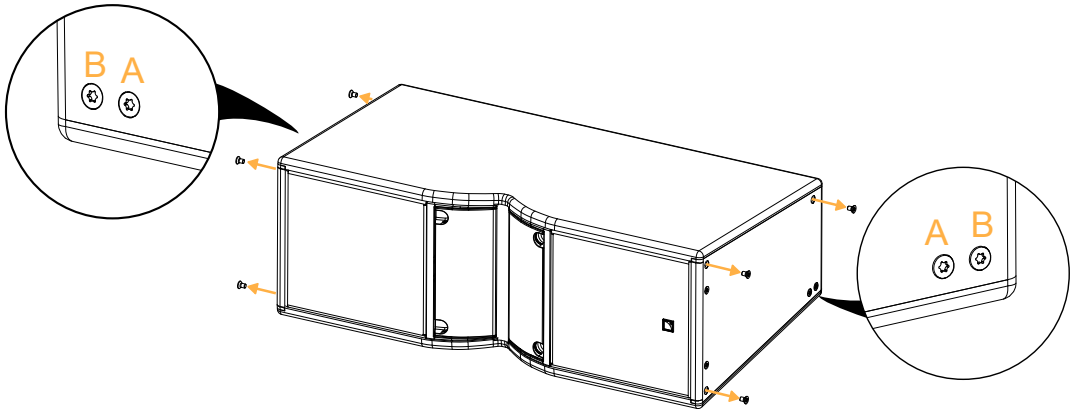


8. Prepare a Kara IIi.

a) **Risk of acoustic leaks**

Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

Remove the relevant placeholder screws.

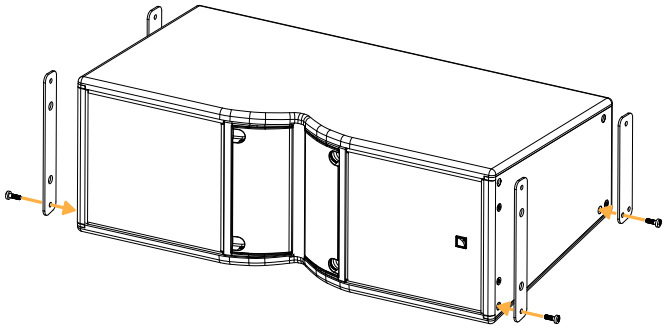


Kara IIi rear linking points

rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

b) Secure KARAIIi-ENDLINK on the enclosure.

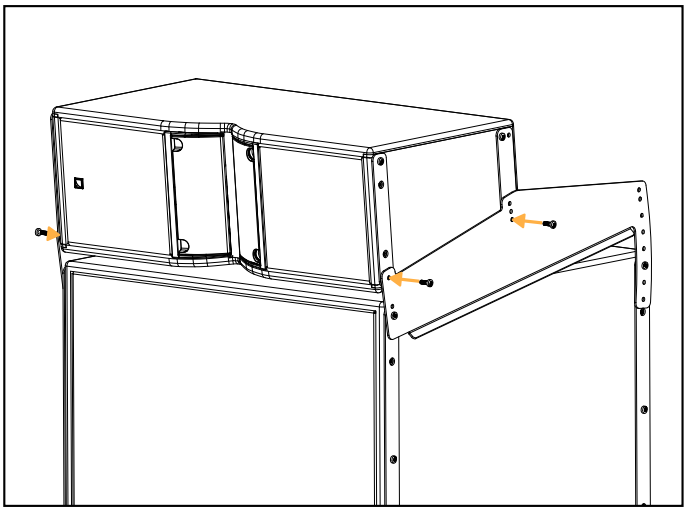
Do not secure the top rigging screws.



9. Turn Kara IIi upside-down and secure it on top of the array.

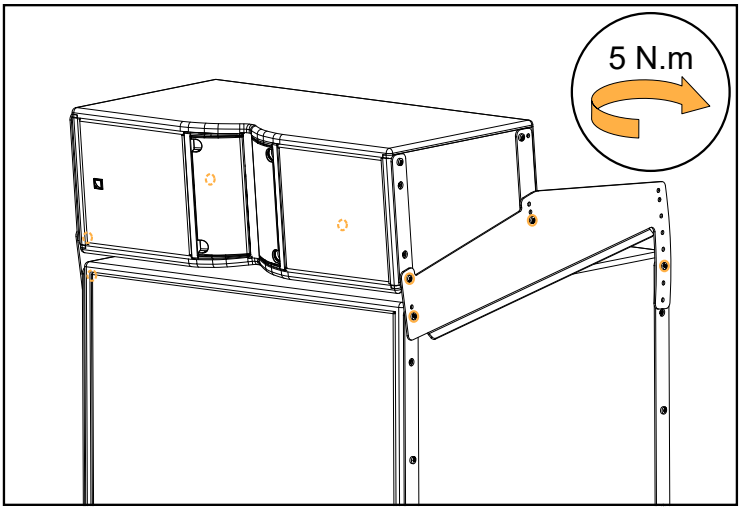
a) Secure Kara IIi to KARAIIi-TILT with rigging screws.

Select the holes on KARAIIi-TILT depending on the inter-element angle. Refer to APPENDIX A: Angle settings with KARAIIi-TILT (p.149).

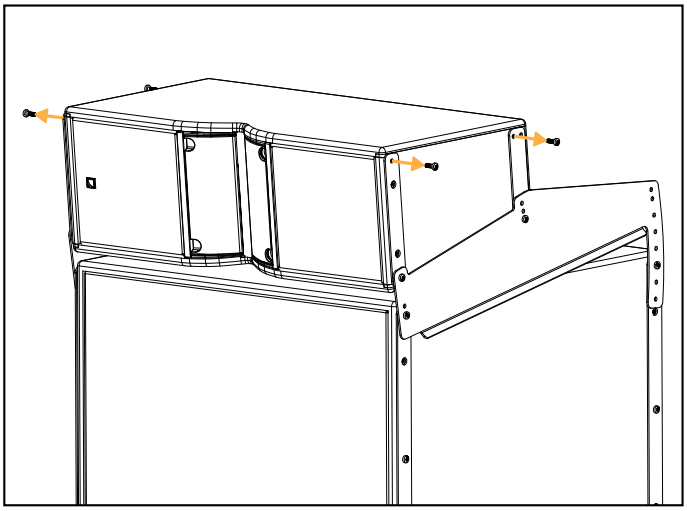


b) Tighten all the screws on KARAIIi-TILT.

Apply a torque of 5 N.m.



c) Remove the top rigging screws from Kara IIi.

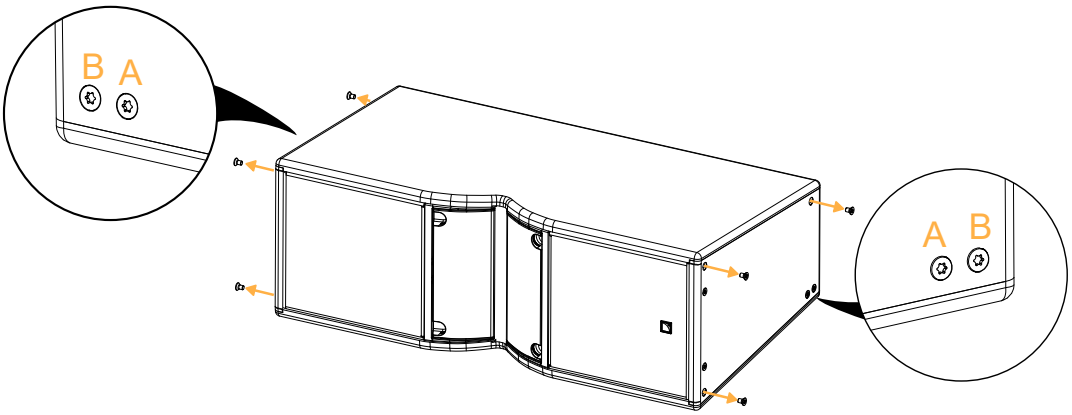


10. Prepare additional Kara IIi.

a) **Risk of acoustic leaks**

Do not remove the placeholder screws from the bottom rear inserts (A or B) that are not used.

Remove the relevant placeholder screws.

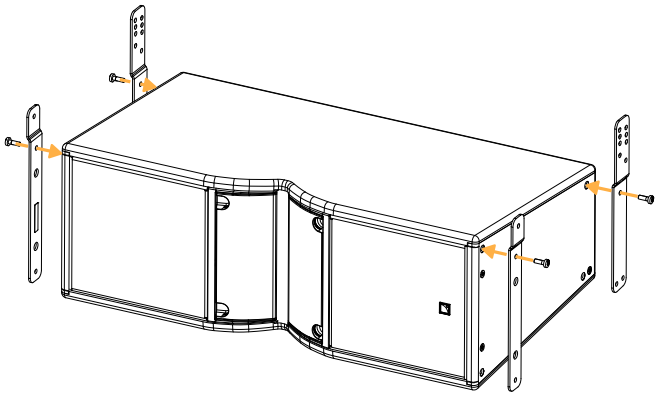


Kara IIi rear linking points

rigging accessory	inter-element angle	used inserts
KARAIIi-LINK (connecting from an enclosure below)	0°, 2°, 4°, 7.5°	A
	1°, 3°, 5°, 10°	B
KARAIIi-RIGBAR (last enclosure with pullback)	–	B
KARAIIi-TILTBRACKET	all angles	A
none (last enclosure in the array)	–	A

b) Secure KARAIIi-LINK on the enclosure.

Do not secure the bottom rigging screws, except on the last enclosure of the array.



Risk of crushing injury

Keep fingers away from underneath the enclosure.

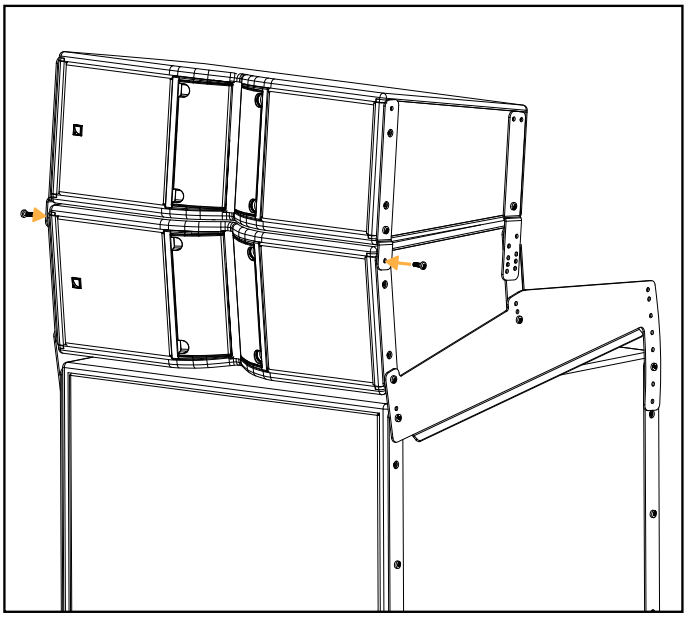
11. Secure each additional Kara Ili upside-down on top of the array.

a) **Adjusting the gap between stacked enclosures**

Place a wedge or a lever between the two enclosures to align the rigging with the inserts. Be careful not to scratch the paint.

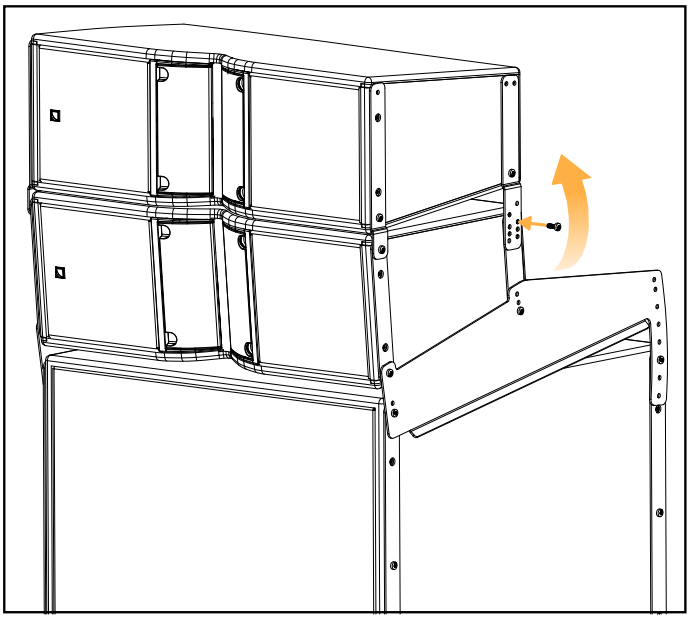
Link the enclosures at the front with rigging screws.

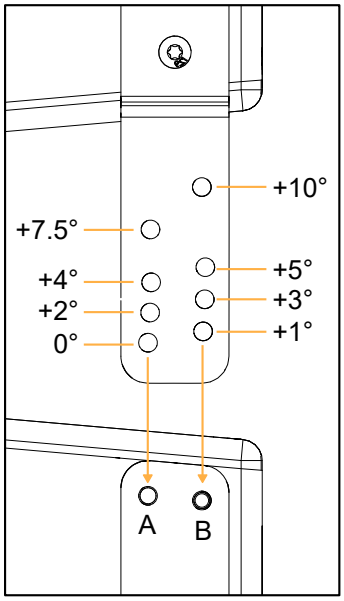
Do not fully tighten the screws.



b) Link the enclosures at the rear with rigging screws.

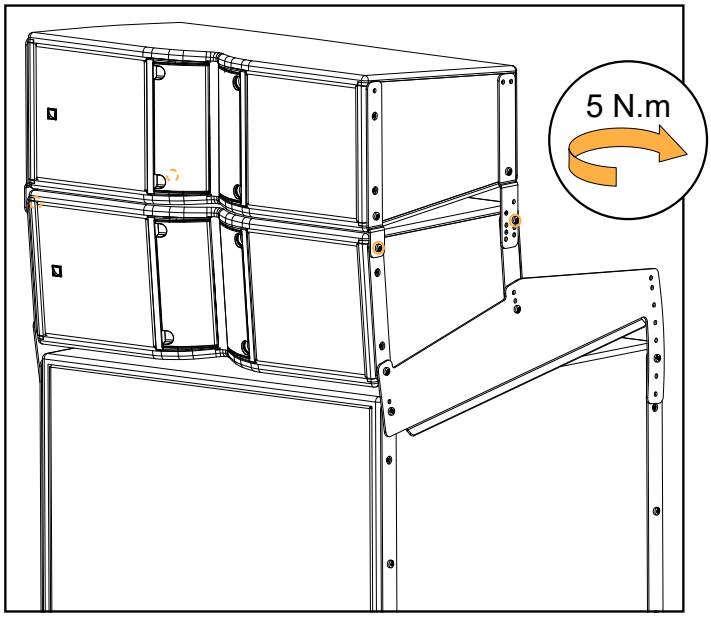
Select the holes and inserts depending on the inter-element angle.





c) Tighten all the screws on the supporting enclosure.

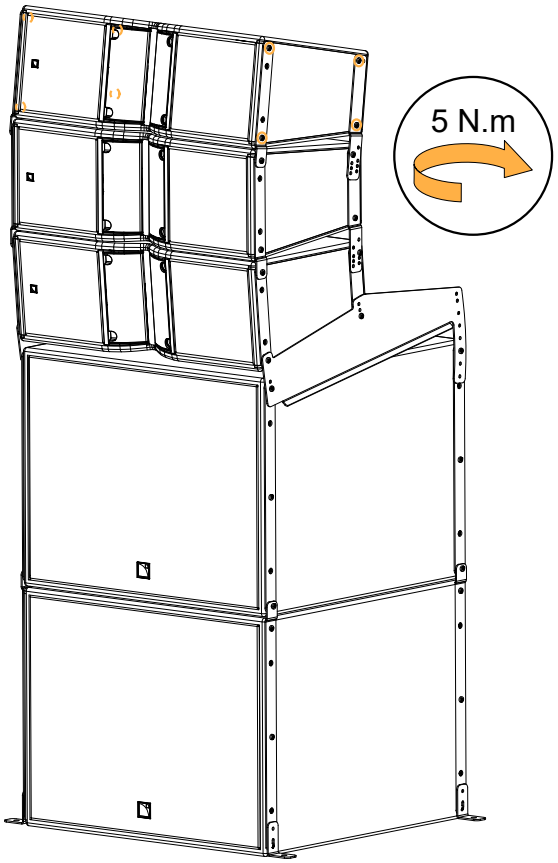
Apply a torque of 5 N.m.



12. Repeat step 11 (p.97) until the array is complete.

13. Tighten all the screws on the last enclosure.

Apply a torque of 5 N.m.



14. Check that all screws are secured and tightened.

What to do next

- Exchange the Kara IIi grills so that the logo is positioned on the right-hand side: Exchanging Kara IIi grills (p.100),
- or secure a screen: Securing a screen (p.102)

Exchanging Kara IIi grills

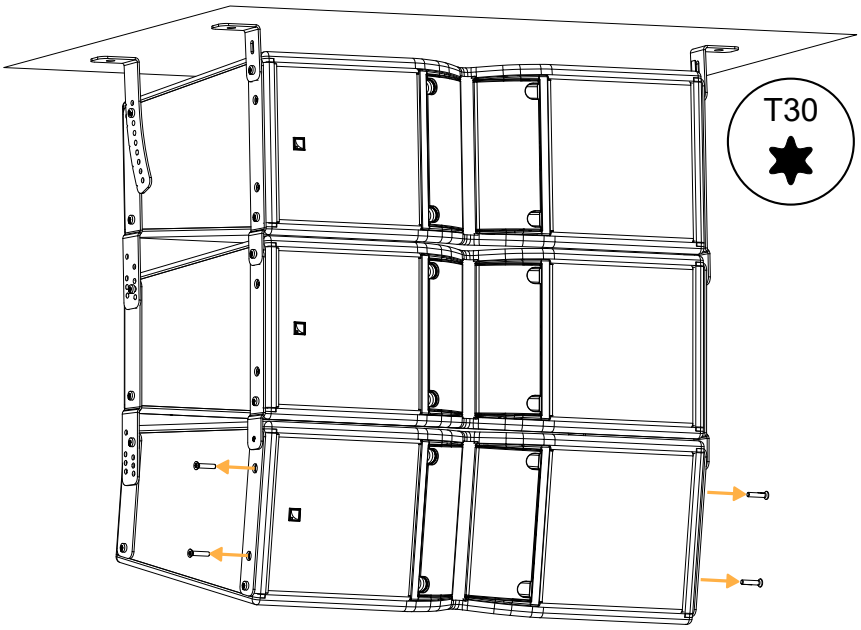
About this task

The Kara IIi front grills can be removed when the enclosure is within an array. This allows to:

- perform maintenance on the speakers without taking down the array
- exchange the Kara IIi grills when they are upside-down, so that the logo is always on the right-hand side

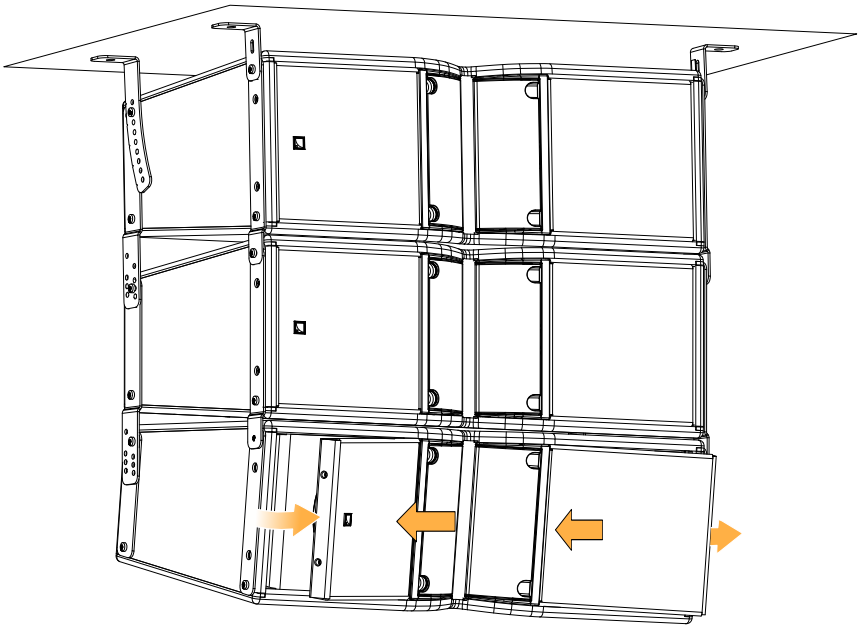
Procedure

1. Remove the grill screws through the rigging plates.

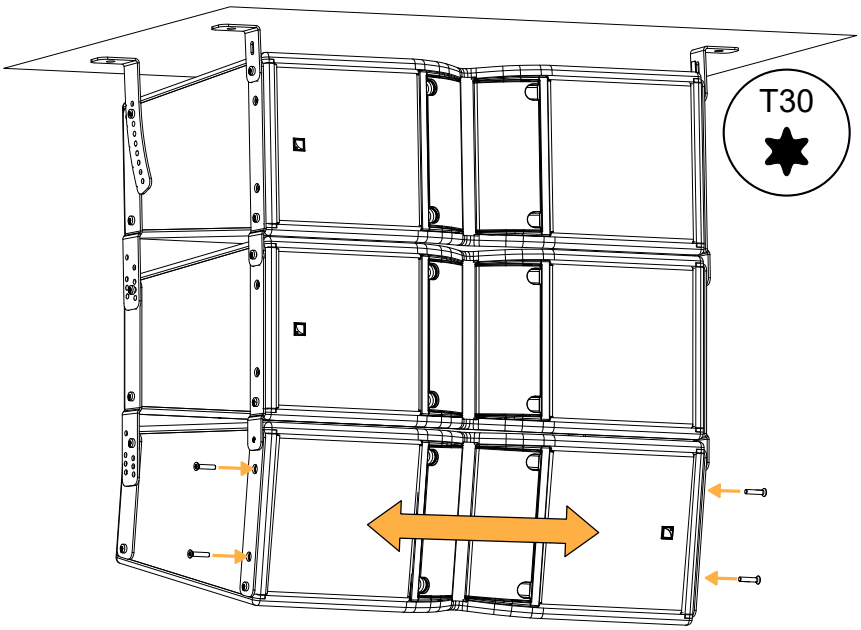


2. Push on the grills towards the center of the enclosure.

   The grills pivot and can be removed.



3. Exchange the position of the grills and secure them.



Securing a screen

Type of deployment	all deployments, except: • SB18 Ili secured to KARAIIi-TILT with the angle bracket at the front • Kara Ili secured to KARAIIi-TILTBRACKET with the angle bracket at the front
Accessories	SB18IIi-SCREEN for SB18 IIi KARAIIi-SCREEN for Kara IIi
Screws and fasteners	M6×35 Torx screws (provided) M6 self-sticking washers for configurations without rigging plates (provided)
Tools	torque screwdriver T30 Torx bit
Min. number of operators	1

Assembly

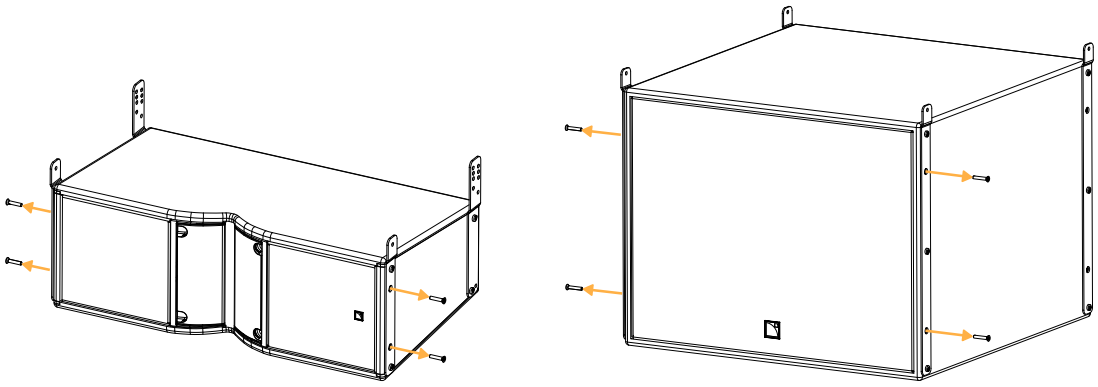
Prerequisite

Secure the screens on the enclosures after the array is fully assembled.

Procedure

1. Remove the grill screws.

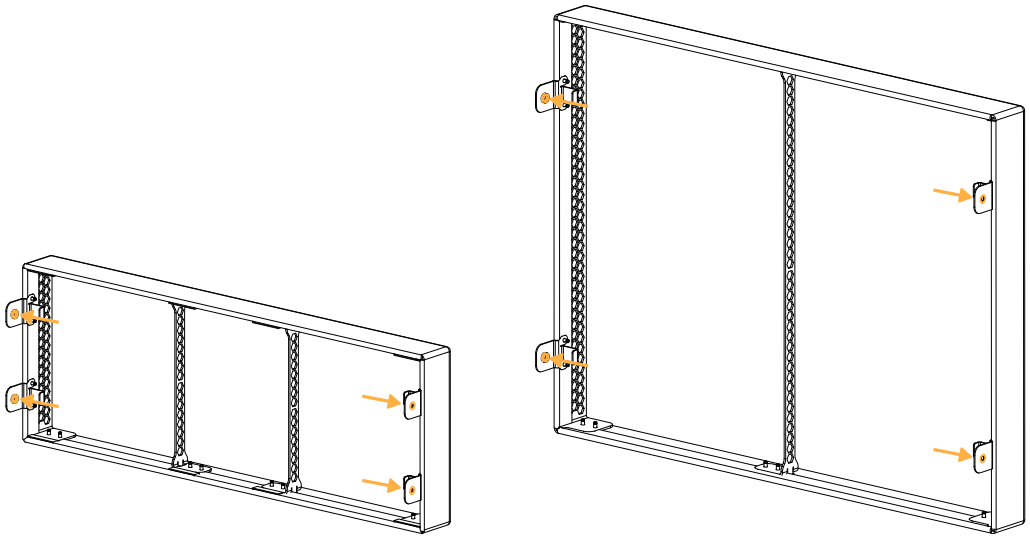
   Do not remove the enclosure grills.
   Hold the grills in place until the screens are secured.



2. If the enclosure is not equipped with rigging plates (standalone, ground-stacked enclosure), stick the washers on the screen fixing tabs.

Risk of bending fixing tabs

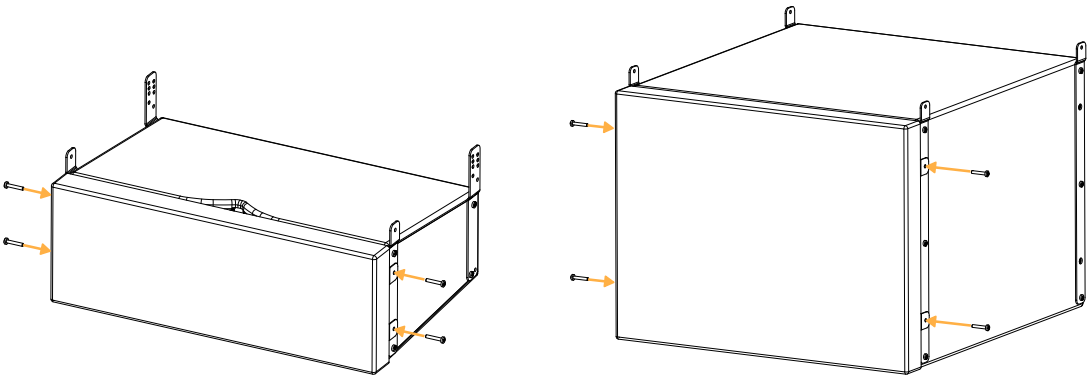
Always use the self-sticking washers for securing screens when there are no rigging plates on the enclosure.



Risk of falling objects

Only use the provided M6×35 Torx screws to secure the screens.

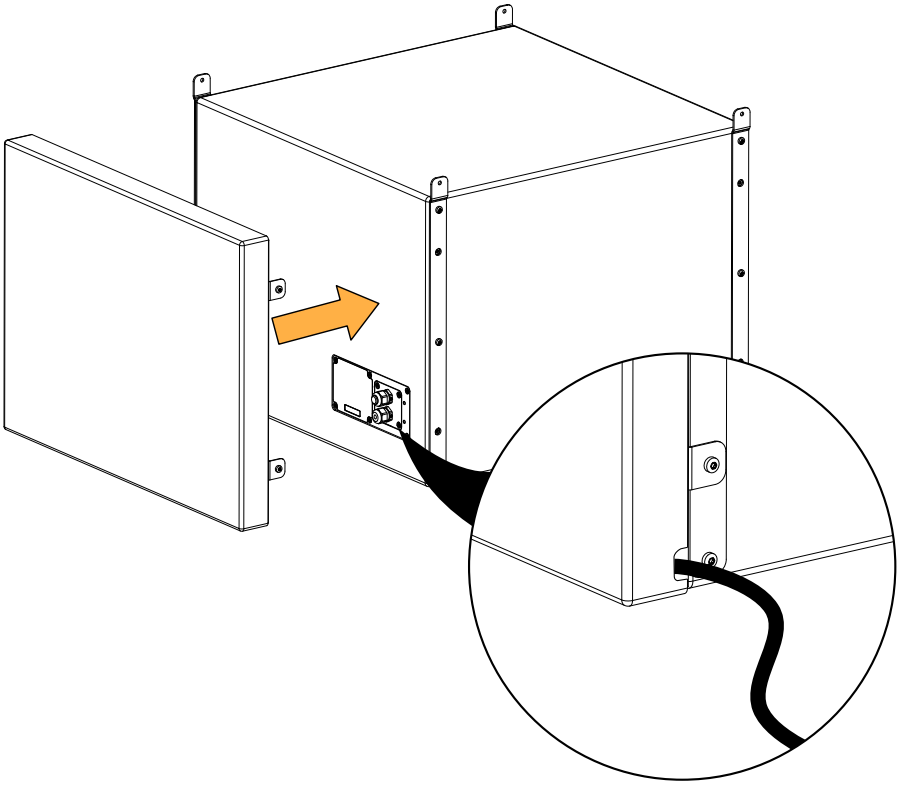
3. Secure the screen to the enclosure.



If SB18 Ili is reversed (cardioid configuration), connect the cables to the enclosure before securing SB18Ili-SCREEN.

Pass the cables through the cutout on the screen side.

See Connection to LA amplified controllers (p.105) for cabling instructions.



Connection to LA amplified controllers

Refer to the **Amplification reference** technical bulletin for the latest information on compatibility with amplified controllers and cabling schemes for all enclosure types.

Enclosure drive capacity per amplified controller

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

	LA2Xi	LA4X	LA8	LA12X
	per output [*] / total	**per output [*] / total**	**per output [*] / total**	**per output [*] / total**
Kara II	2 / 4 (SE)	2 / 4	3 / 6	3 / 6
SB18 II	1 / 4 (SE), 1 / 2 (BTL)	1 / 4	2 / 6[**]	3 / 12

Reduced maximum SPL or drive capacity with LA2Xi: refer to the **LA2Xi owner's manual**.

[*] 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.

[**] LA8 can drive up to two SB18 II per output, but no more than six per controller at high level.

Cabling schemes

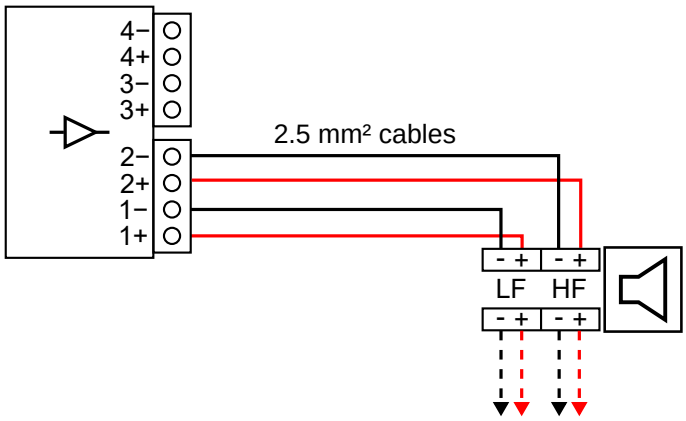
Refer to the cable manufacturer documentation for the wire color code.

Cabling schemes for Kara IIi

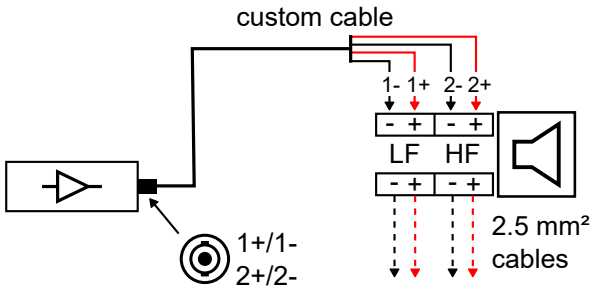
Refer to the cabling schemes to connect the enclosures to different types of output connectors and output configurations.

Refer to the **LA2Xi owner's manual** for more information on output configurations.

Terminal block output (SE)



Two-channel speakON output

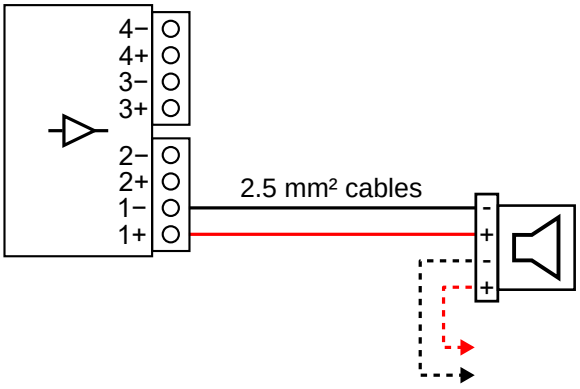


Cabling schemes for SB18 IIi

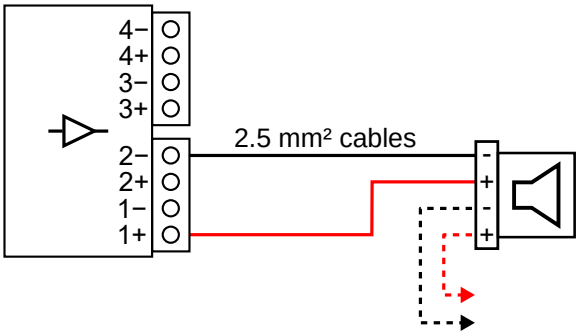
Refer to the cabling schemes to connect the enclosures to different types of connectors and output configurations.

Refer to the **LA2Xi owner's manual** for more information on output configurations.

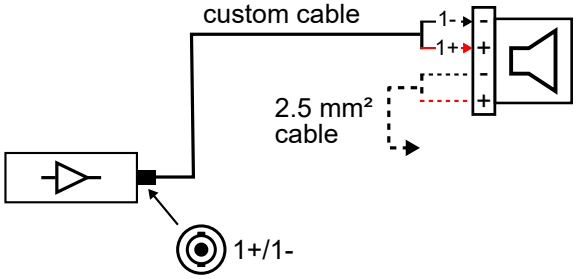
Terminal block output (SE)



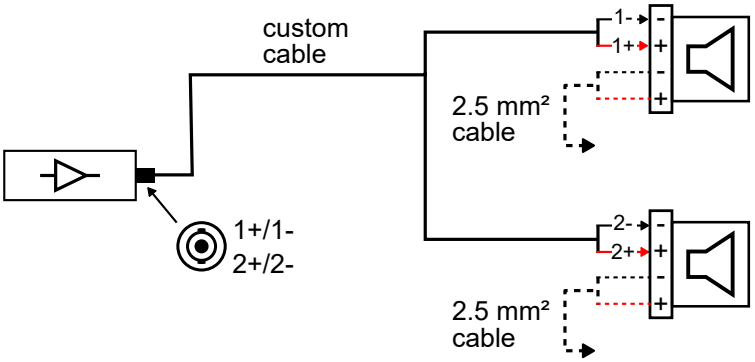
Terminal block output (BTL)



One-channel speakON output



Two-channel speakON output



Cabling Kara III and SB18 III

Accessories	connector sealing plates
Screws and fasteners	M5×16 Torx screws (provided)
Tools	torque screwdriver
	T25 Torx bit
	small tool or flat screwdriver (3 mm or less)
Min. number of operators	1

Assembly

Prerequisite

The cable glands on the connector sealing plates are compatible with cables up to 4 × 4 mm² gauge.

- Refer to Recommendation for speaker cables (p.151).
- Refer to Cabling schemes (p.106).

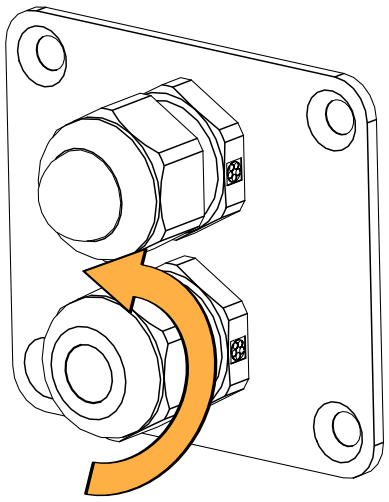
About this task

The connector sealing plates have two cable glands: one for the input cable and one for the cable connecting to the next enclosure in parallel. The second cable gland is equipped with a protective plug.

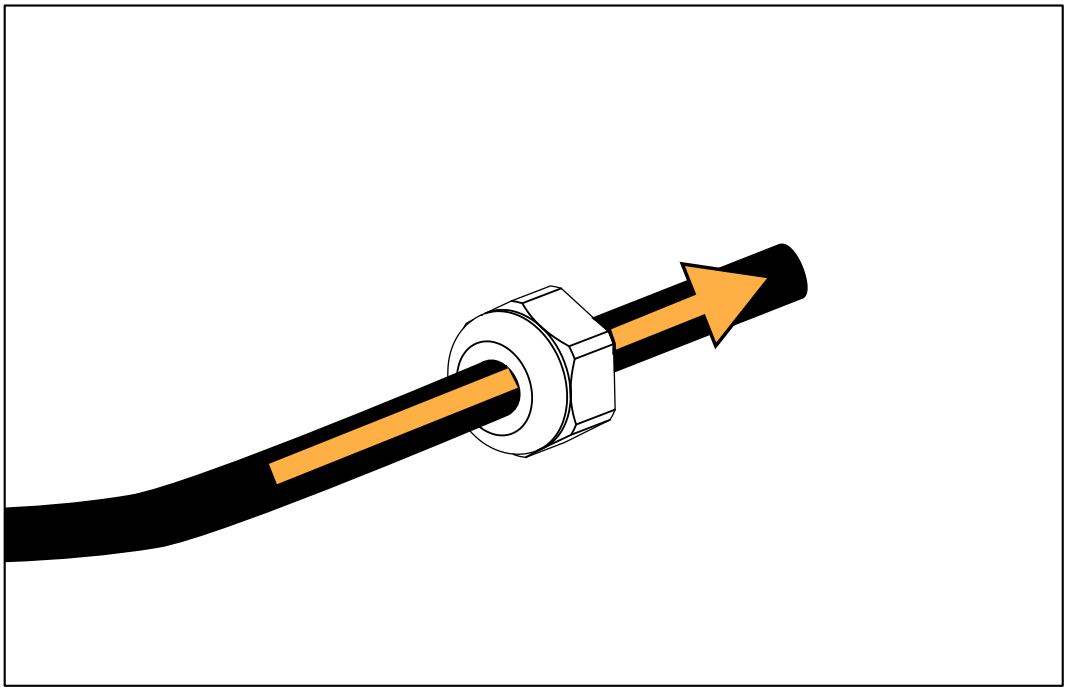
This procedure describes how to connect the input cable to the enclosure. If the enclosure must be connected in parallel, remove the protective plug from the second cable gland and proceed identically for both cables.

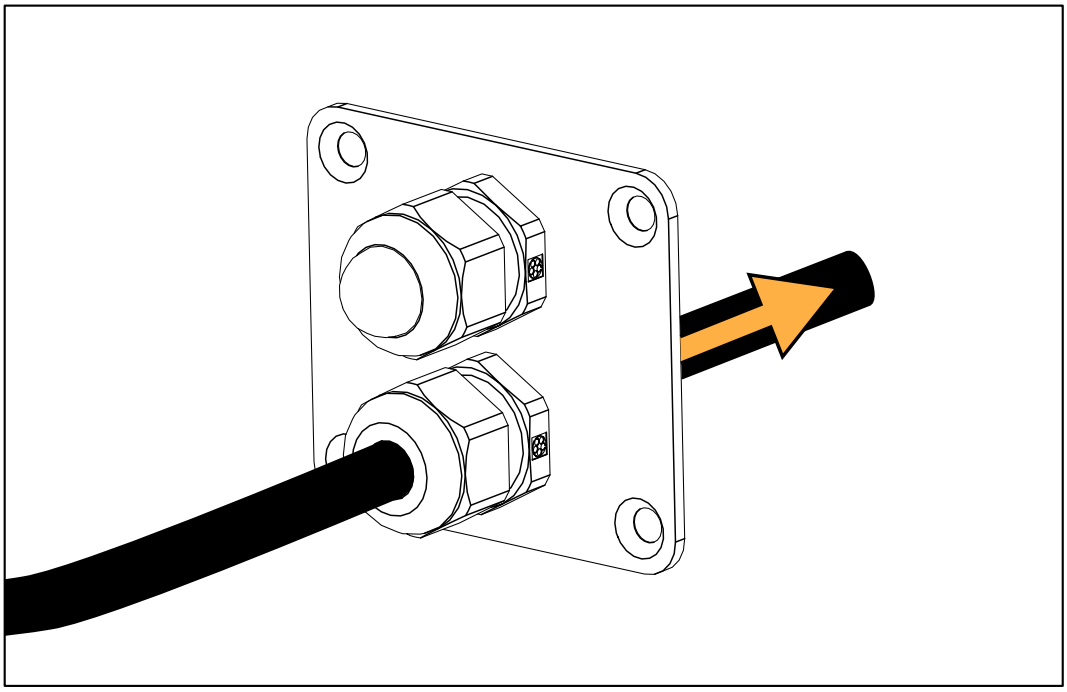
Procedure

1. On the connector sealing plate, remove the sealing nut from the cable gland.

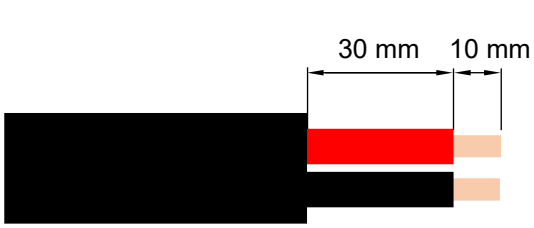


2. Insert the cable through the sealing nut and the cable gland.

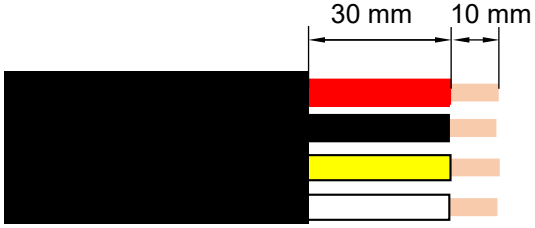




3. Strip the wires off the cable.



2 x 2.5 mm² cable (for SB18 IIi)

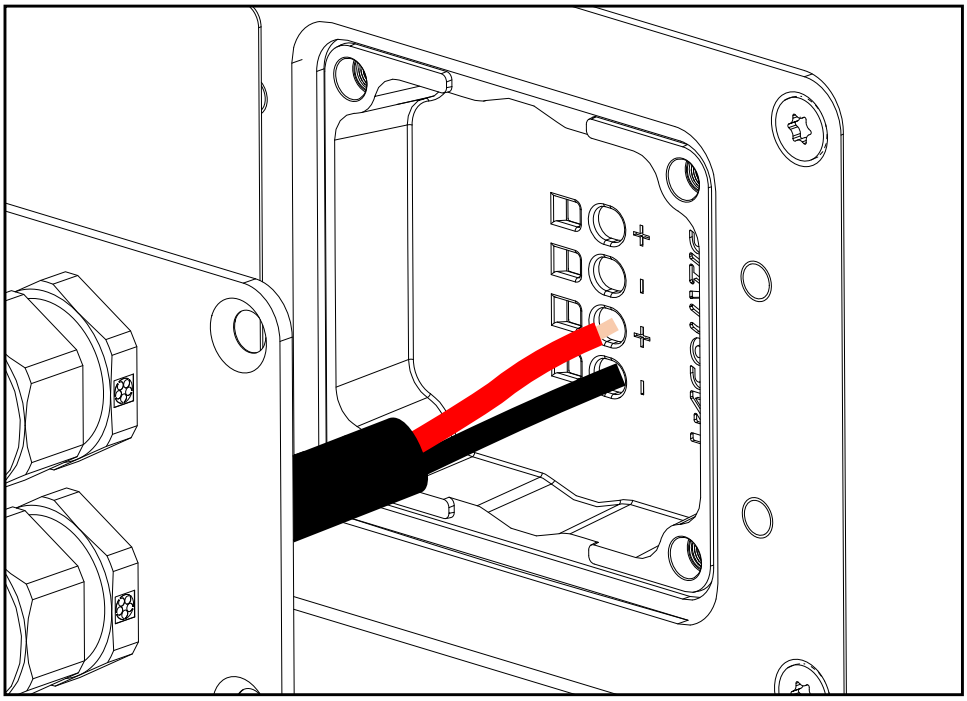


4 x 2.5 mm² cable (for Kara IIi)

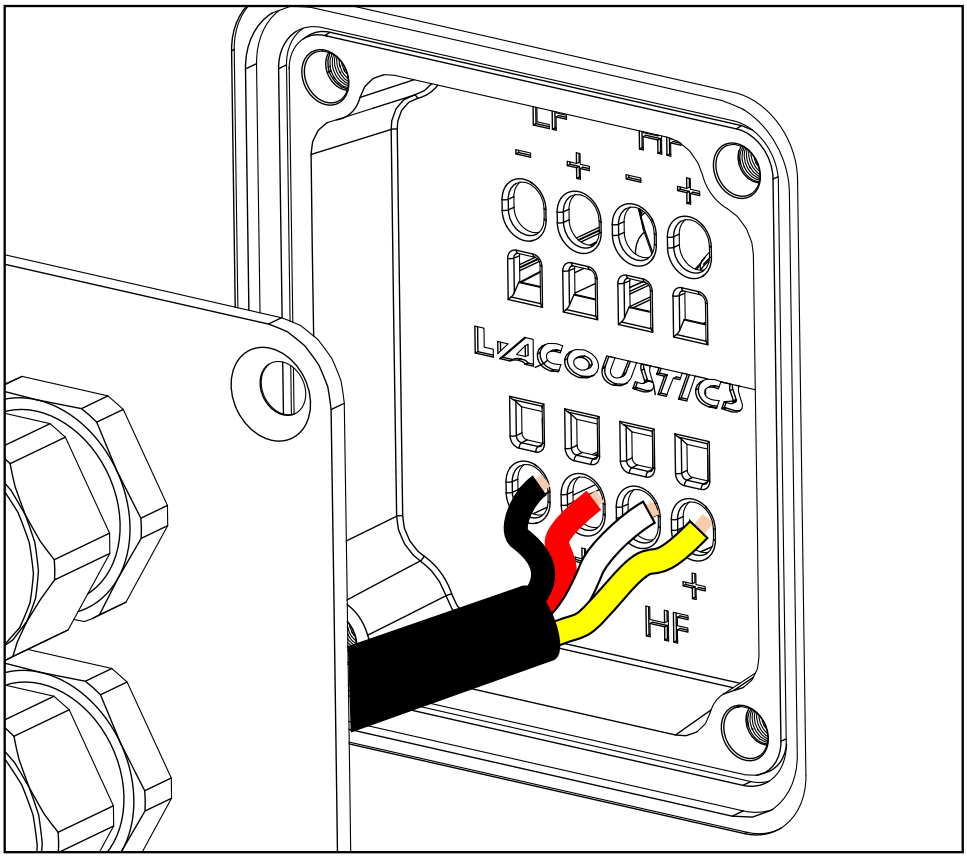
Refer to the cable manufacturer documentation for the wire color code.

4. Push the wires into the terminals.

If necessary, insert a small tool in the hole next to the terminal to unlock it.

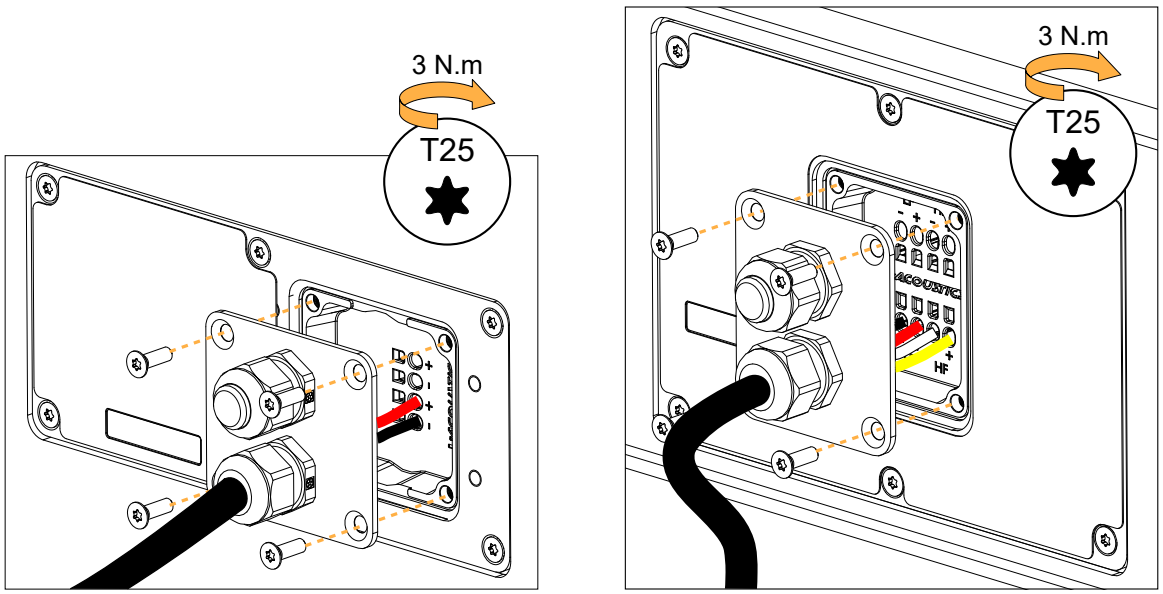


Connecting SB18 Ili

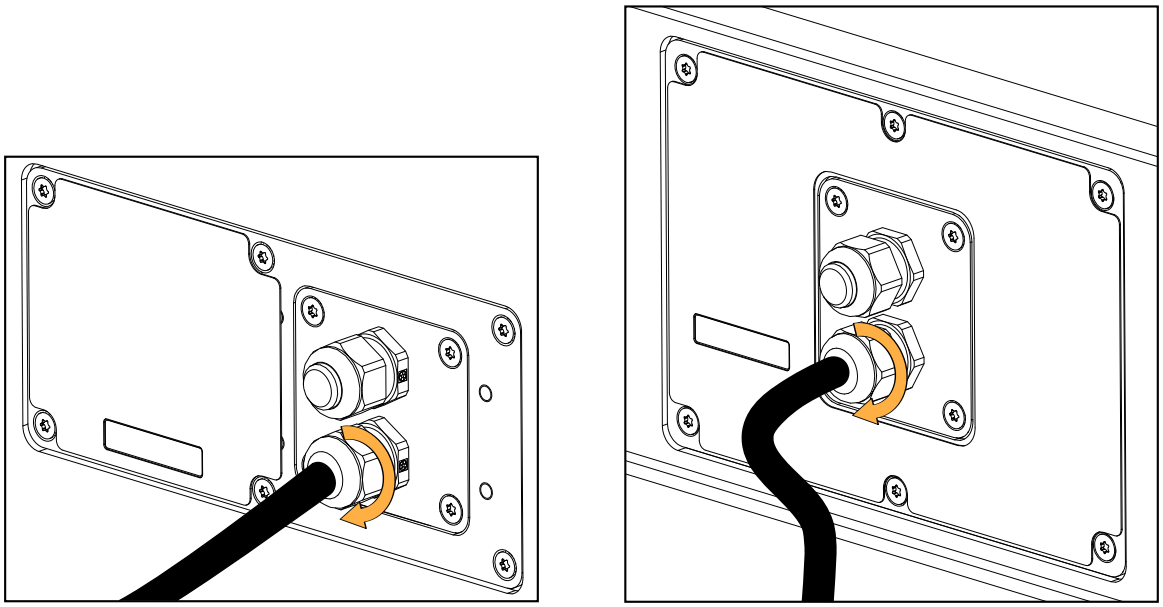


Connecting Kara Ili

5. Secure the connector sealing plate to the connector plate.

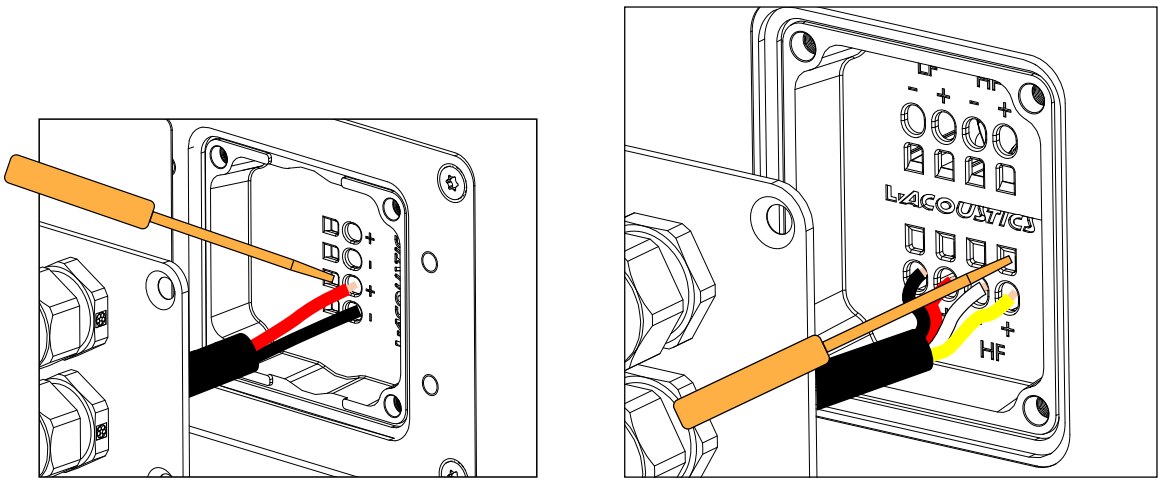


6. Tighten the sealing nut.



What to do next

To remove the cables, use the small tool to unlock the terminals and pull on the wires.



Corrective maintenance

Introduction

This section contains the following maintenance procedures:

Kara II

SB18 II

For advanced maintenance, contact your L-Acoustics representative.

Tools and consumables

Before performing maintenance on this product, make sure all the tools listed are available. References are given for FACOM® products in this table. Other manufacturers can be used.

name	reference	distributor
set of 6-point 1/4" sockets *	RL.NANO1 / R.360NANO	FACOM
torque screwdriver (2 - 10 N.m) *	A.404	FACOM
compressed air blower	–	–
flat plastic tool	–	–
double face adhesive tape	–	–

* included in the L-Acoustics Maintenance Toolcase.

Maintenance Toolcase

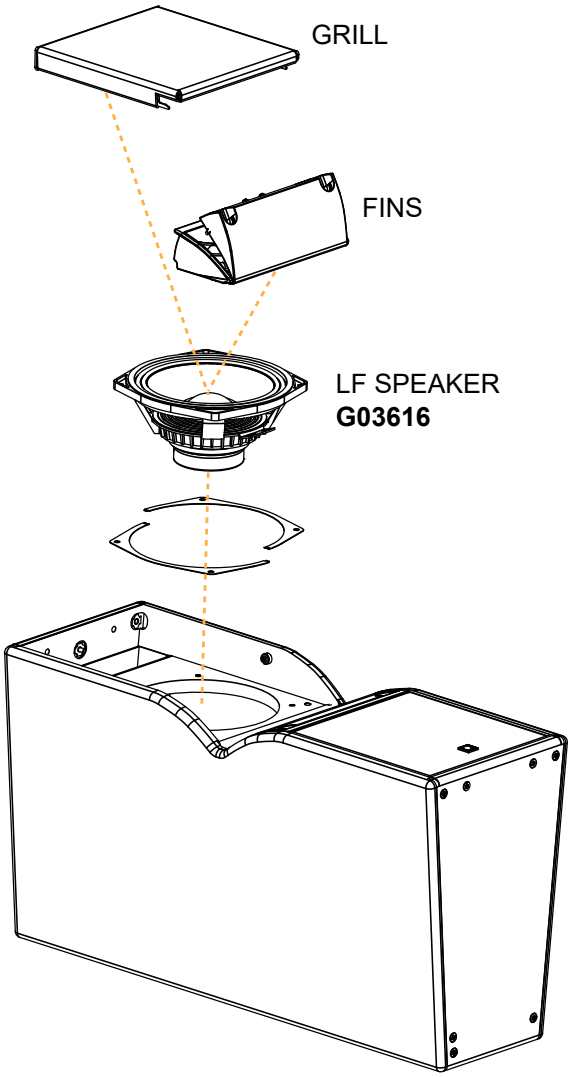
The Maintenance Toolcase is a carry-on suitcase that includes all the tools required to perform maintenance on L-Acoustics products. This toolcase is aimed at Certified Providers.

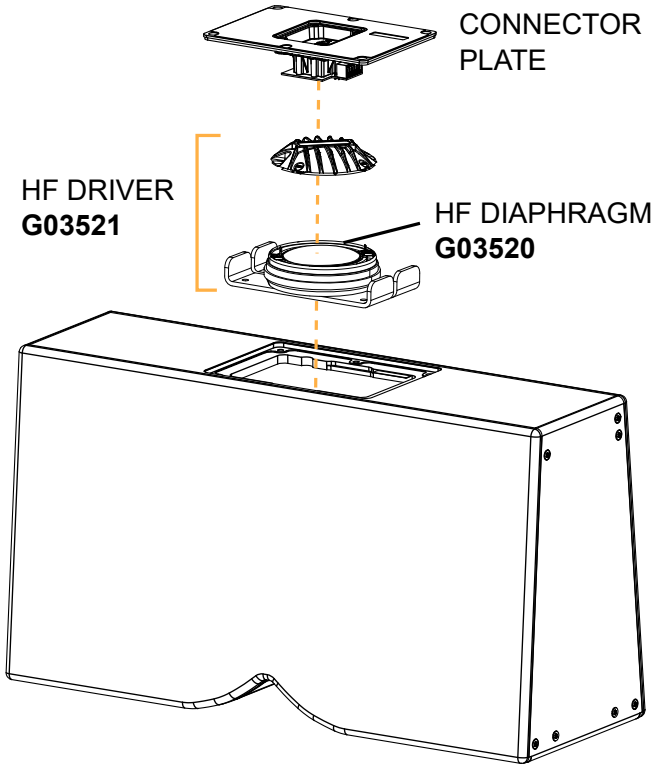
The Maintenance Toolcase uses a Peli™ 1510 Protector case that features three pre-cut layers of foam to safely fit the tools. The Maintenance Toolcase includes tools manufactured by FACOM®, Fluke®, Tohnichi, ABUS, and Würth.

Kara Ili

Kara Ili exploded views

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




CONNECTOR
PLATE
HF DRIVER
G03521
HF DIAPHRAGM
G03520

Disassembly and Reassembly procedures

D/R - Grill

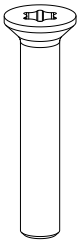
Tools

- torque screwdriver
- T30 Torx bit

Repair kit

G03616

KR loudspeaker 8" Kara(i) / Kara II(i)



×4

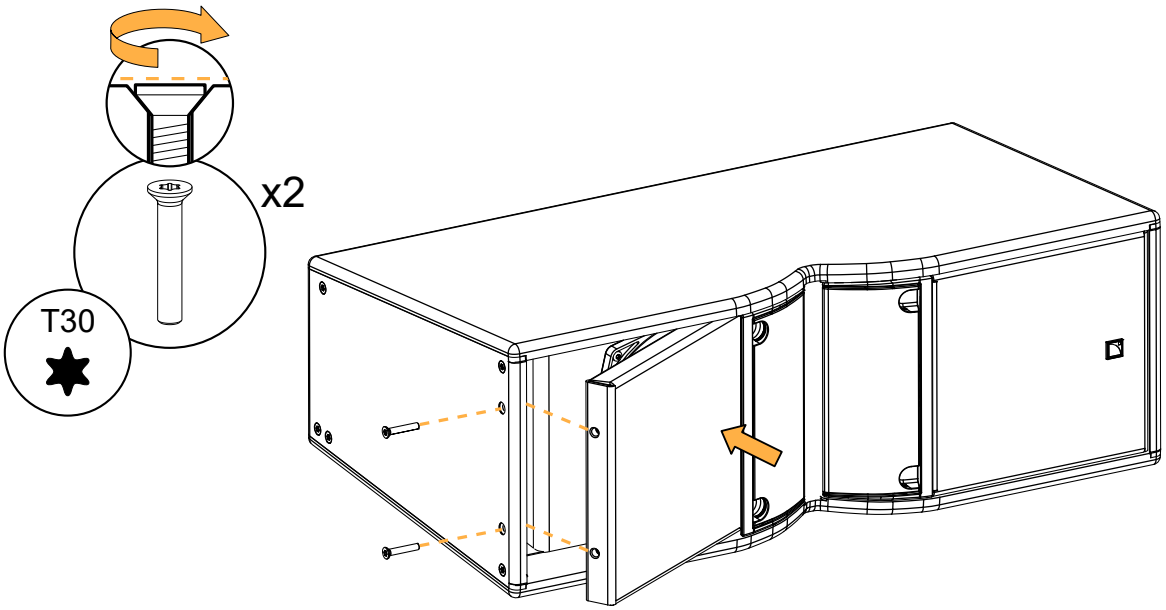
S221

M6×35 Torx

Exploded view

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

Push on the grill towards the center of the enclosure to remove it.



D/R - Fins

Tools

- torque screwdriver
- T30 Torx bit
- flat plastic tool

Repair kit

G03616

KR loudspeaker 8" Kara(i) / Kara II(i)

×2

S100143

M6×25 Torx

Prerequisite

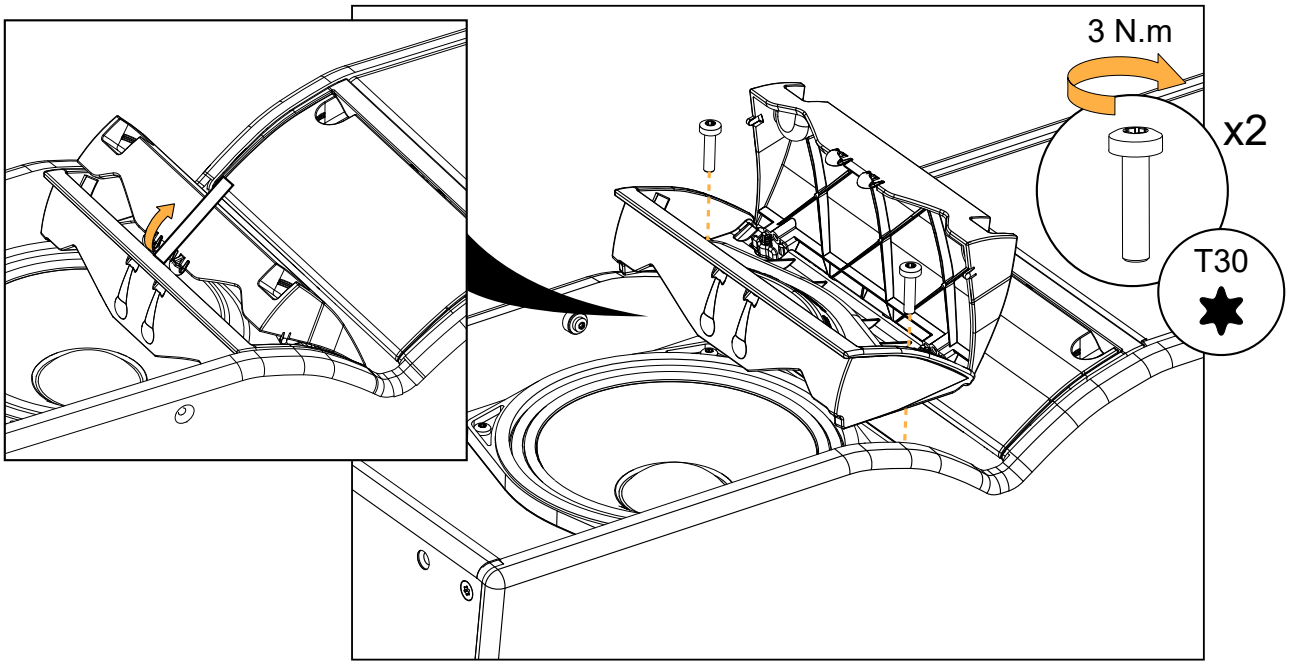
Grill removed. See D/R - Grill (p.115).

Exploded view

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

Use a flat tool made of **smooth plastic** to avoid scratching the fins.

Use the flat tool to unhook the fin clips.



D/R - LF speaker

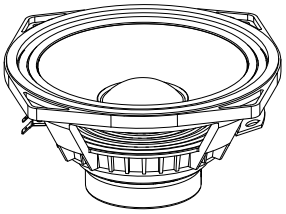
Tools

- torque screwdriver
- T25 Torx bit

Repair kit

G03616

KR loudspeaker 8" Kara(i) / Kara II(i)



×1

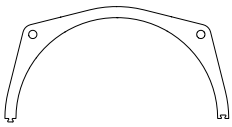
18178

8" LF/MF speaker - 16 Ω

×4

S100228

M5x25 Torx



×2

1707

8" speaker gasket

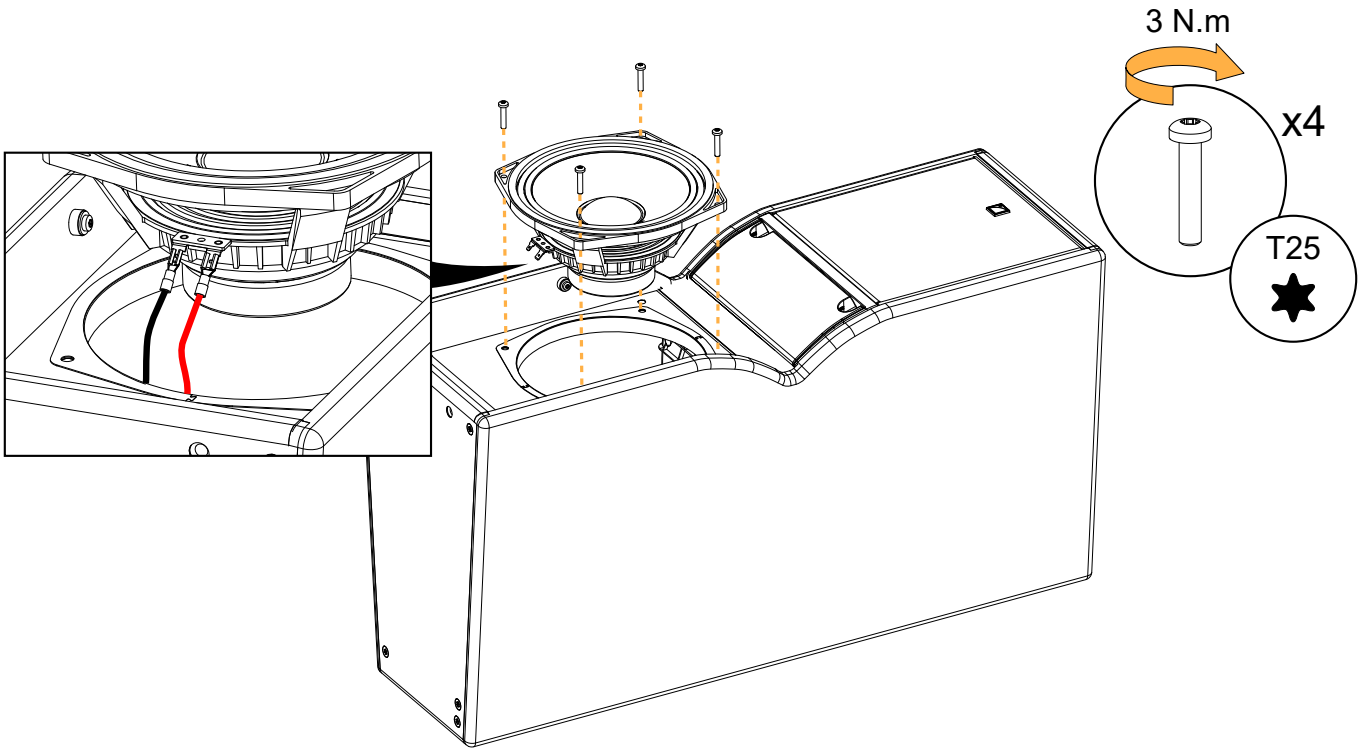
Prerequisite

Grill removed.	See D/R - Grill (p.115).
Fin removed.	See D/R - Fins (p.116).

Exploded view

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

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



What to do next

Perform the Acoustical check (p.51) procedures.

D/R - Connector plate

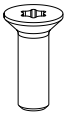
Tools

- torque screwdriver
- T25 Torx bit

Repair kit

G03520 – KR diaphragm for 3" driver Kara II(i), or

G03521 – KR compression driver 3" Kara II(i)



×6

S100086

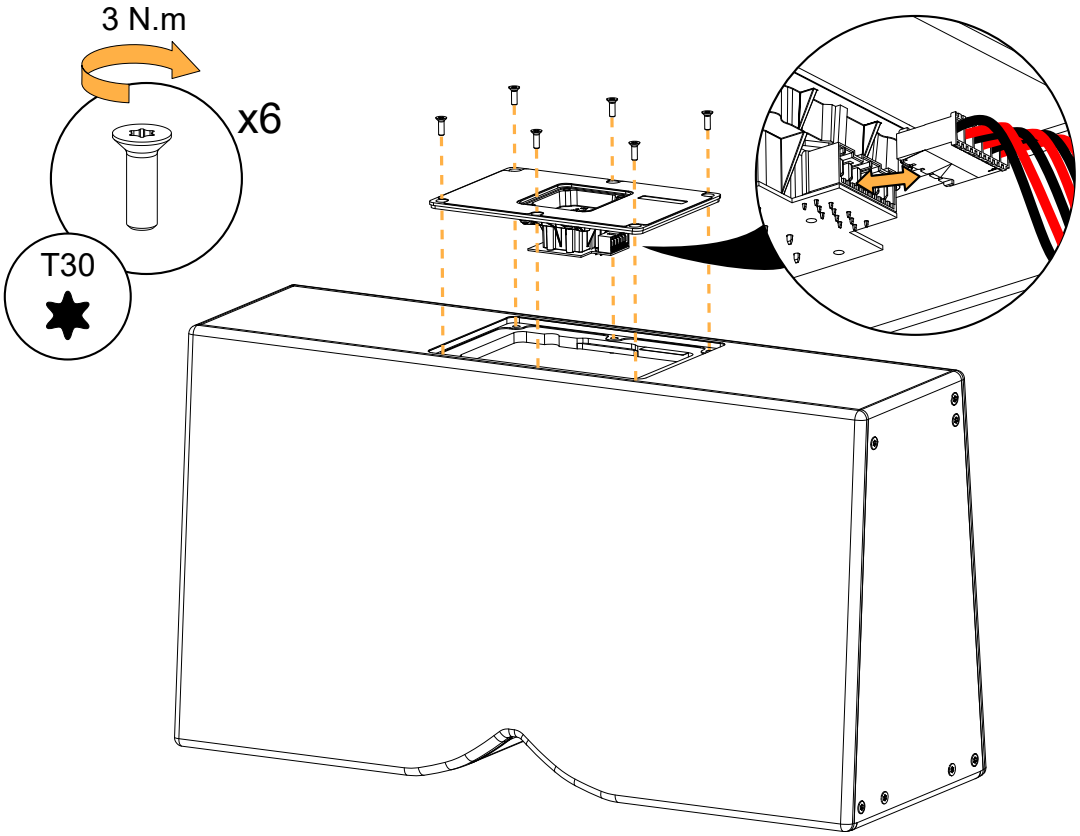
M5×16 Torx

Exploded view

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

Use a flat tool as a lever to remove the connector plate.

Position the connector plate with the connectors towards the right-hand (logo) side of the enclosure.



D/R - HF driver

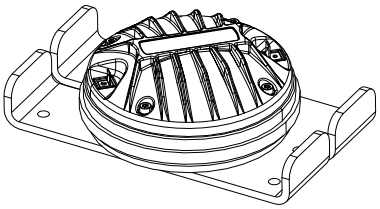
Tools

- torque screwdriver
- T30 Torx bit

Repair kit

G03521 *

KR compression driver 3" Kara II(i)



×1

D17986

3" HF driver - 8 ohms assembly

×2

S247

M6×35 Torx

* The screws and fasteners are also provided in G03520 (KR diaphragm for 3" driver Kara II(i)).

Prerequisite

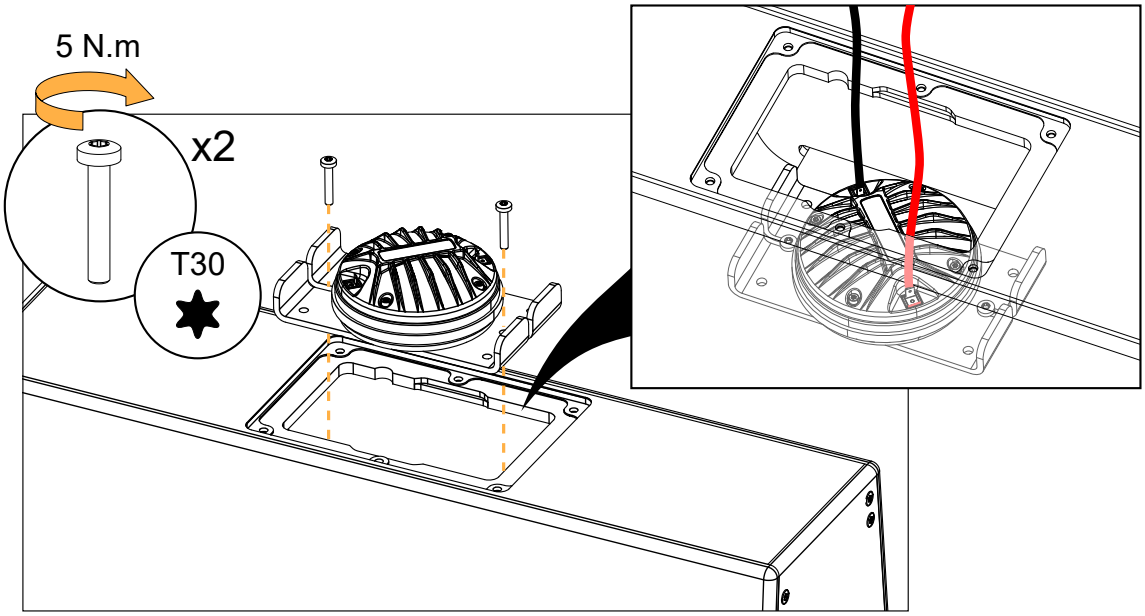
Connector plate removed. See D/R - Connector plate (p.118).

Exploded view

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

Carefully disconnect the cables before removing the driver assembly.

Use the positive (red) connector as a reference point to position the driver assembly.



D/R - HF diaphragm

Tools

- torque screwdriver
- T20 Torx bit
- 3 mm hex bit
- compressed air blower

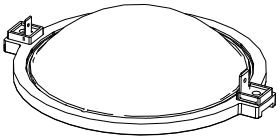
Consumables

- double face adhesive tape

Repair kit

G03520

KR diaphragm for 3" driver Kara II(i)



×1

17581

diaphragm assembly (with 2 shims)

×4

S100082

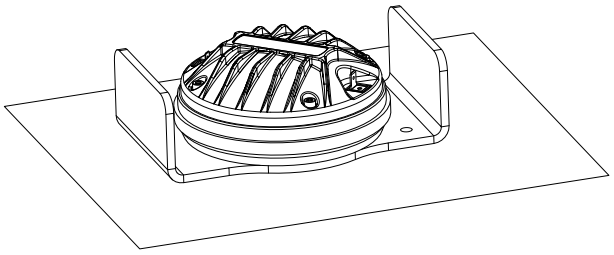
M4×14 hex

Prerequisite

Connector plate removed. See D/R - Connector plate (p.118).

HF driver removed from the cabinet. See D/R - HF driver (p.119).

The driver is placed on a flat surface in a dust-free environment.



Disassembly

Procedure

1. Remove the four screws securing the cover.
   Use the T20 Torx bit.
2. Remove the cover.
3. Carefully remove the diaphragm.
4. If there are shims on the dome, carefully remove them.
   Take note of how many and what kind of shims are present.

Reassembly

About this task

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

Procedure

1. Clean the dome and the air gap.

   Make sure the air gap is perfectly clean before reassembly.
   Use a blower or double face adhesive to remove any particle.
2. Place the same kind and number of shims that were initially present.
3. Carefully place the diaphragm, using the positive (red) connector as reference point.
4. Position the cover and turn it to align it with the screw holes.

   Gradually tighten the screws following a star pattern.
5. Secure the cover using four S100082 screws.
   Use the 3 mm hex bit. Set the torque to 3 Nm.

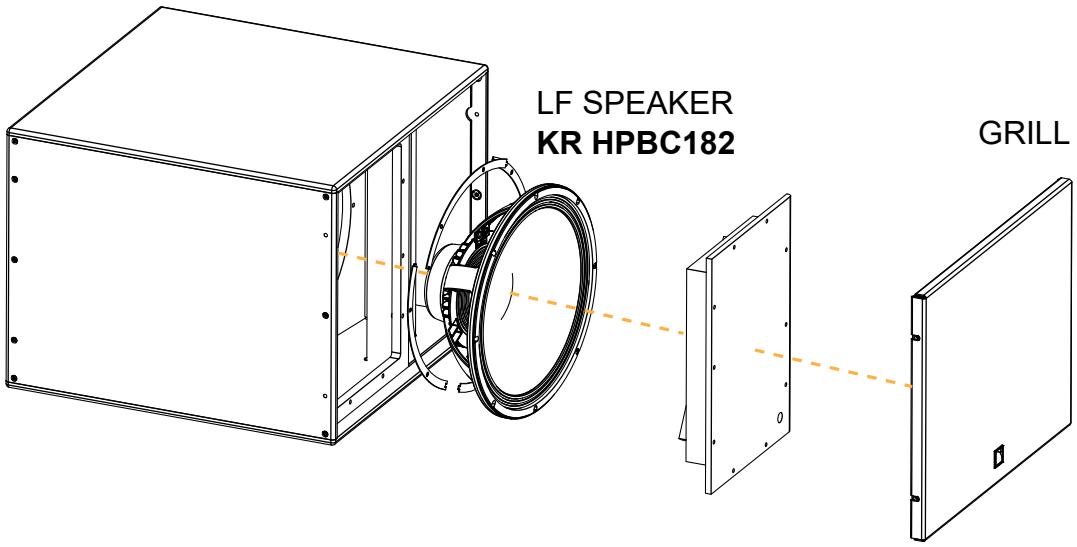
What to do next

Perform the Acoustical check (p.51) procedures.

SB18 IIi

SB18 Ili exploded view

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



Disassembly and Reassembly procedures

D/R - Grill

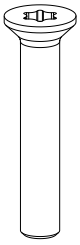
Tools

- torque screwdriver
- T30 Torx bit

Repair kit

KR HPBC182

KR 18" loudspeaker SB18(i) / SB18 IIi



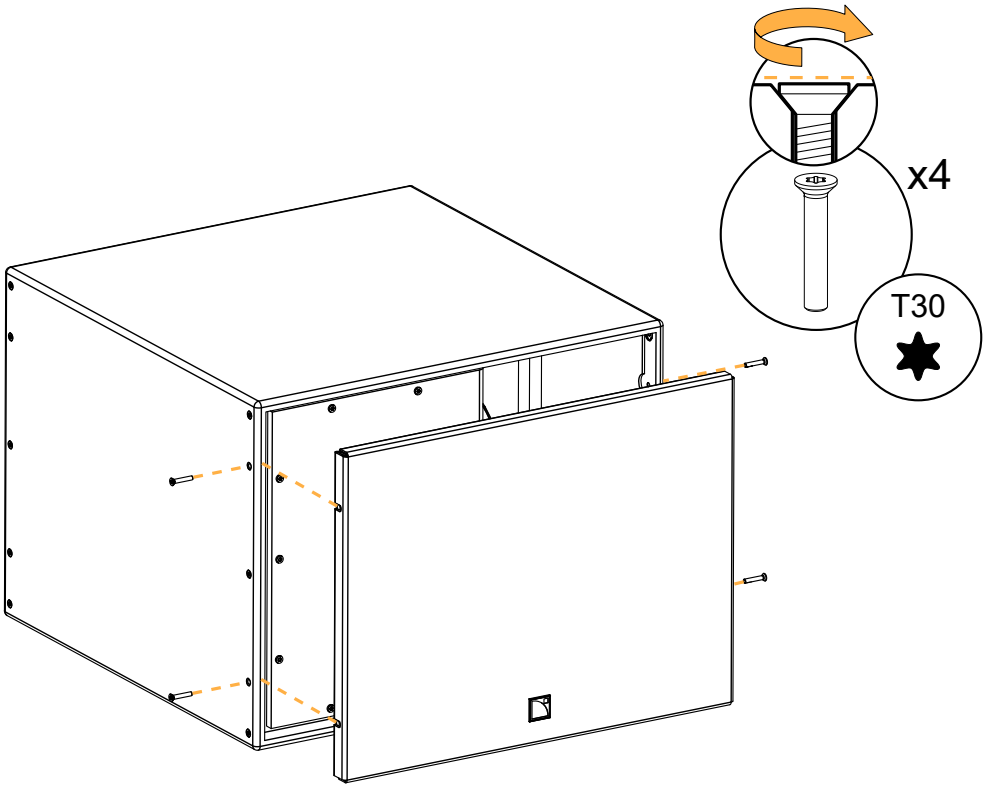
×14

S221

M6×35 Torx

Exploded view

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



D/R - LF speaker

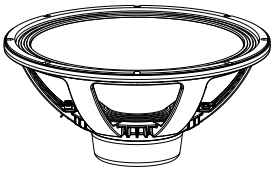
Tools

- torque screwdriver
- T30 Torx bit
- 5 mm hex bit

Repair kit

KR HPBC182

KR 18" loudspeaker SB18(i) / SB18 IIi



×1

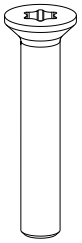
627

18" speaker - 8 ohms

×8

S100054

M6×30 hex



×14

S221

M6×35 Torx

×4

100689

18" speaker gasket

Prerequisite

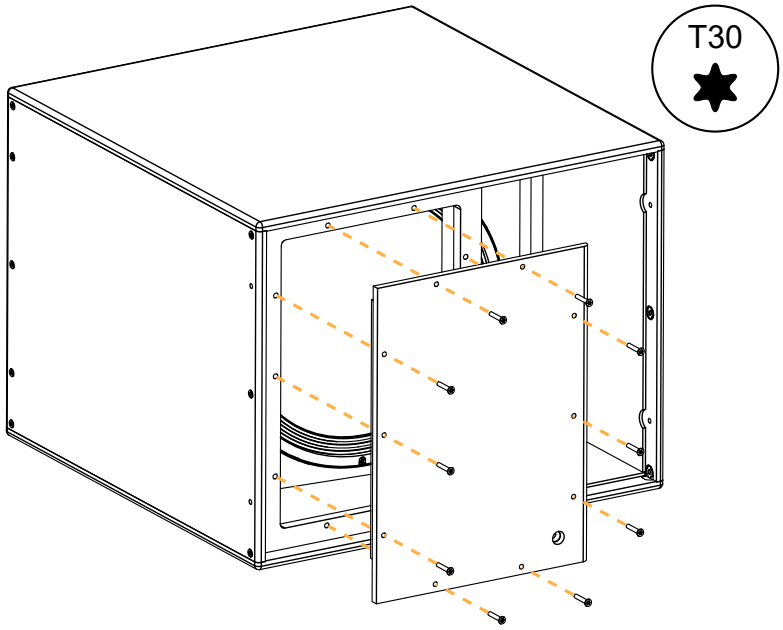
Grill removed.

See D/R - Grill (p.124).

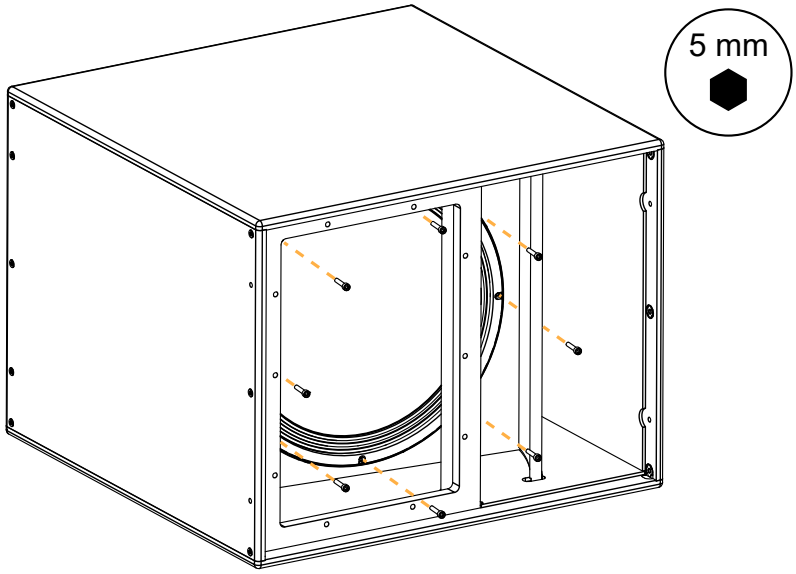
Disassembly

Procedure

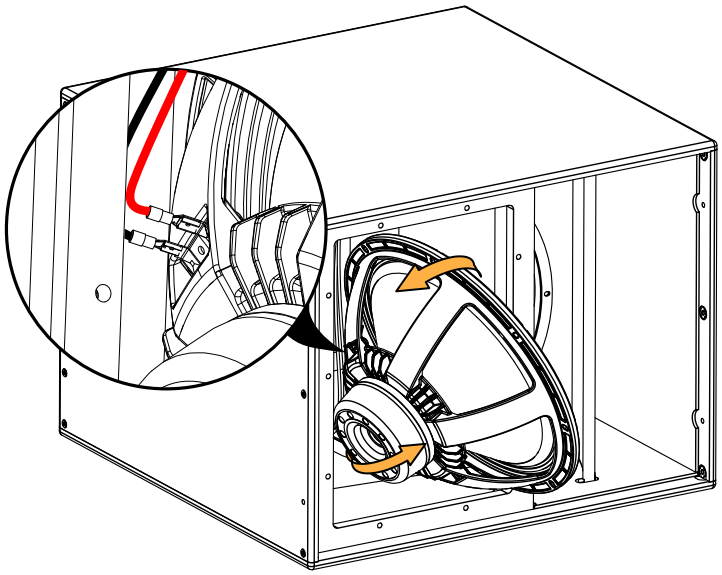
1. Remove the plate.



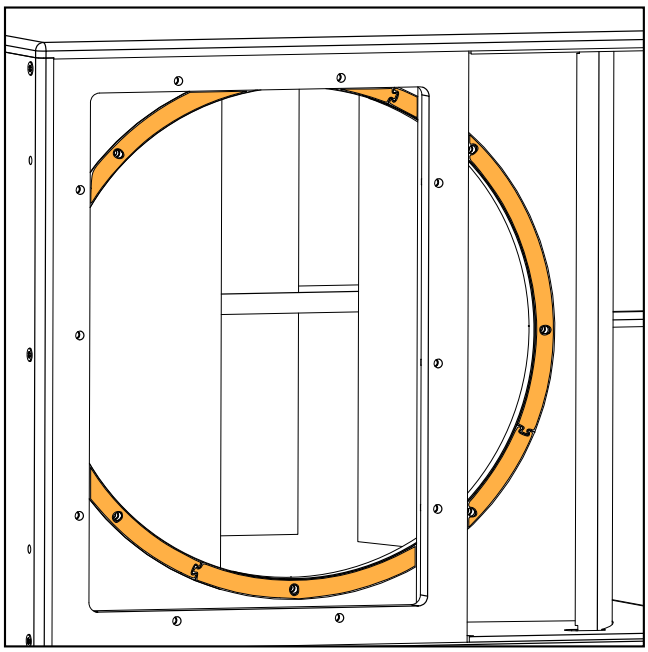
2. Remove the speaker screws.



3. Remove the speaker from the enclosure and disconnect the speaker cables.



4. If the speaker gaskets are damaged, remove and replace them.



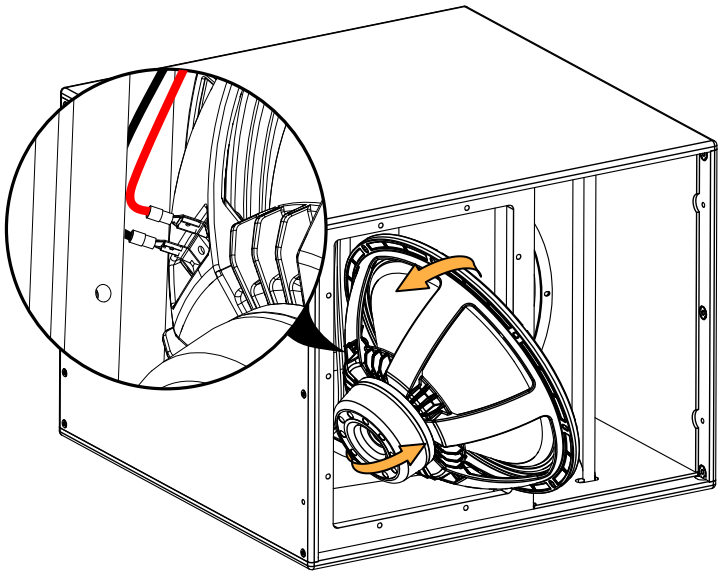
Reassembly

About this task

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

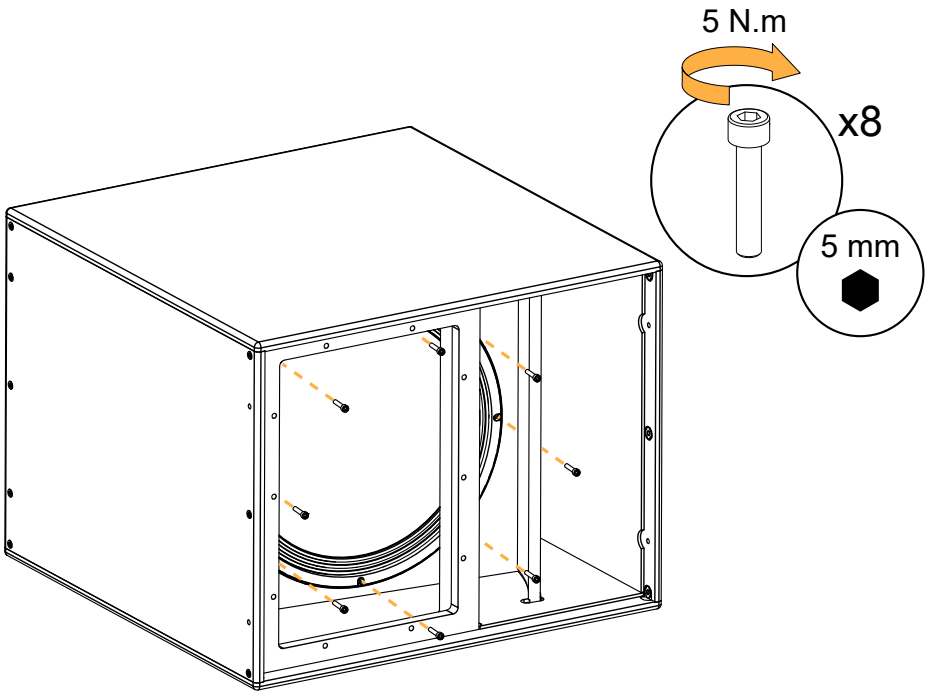
Procedure

1. Connect the speaker cables and position the speaker in the enclosure.



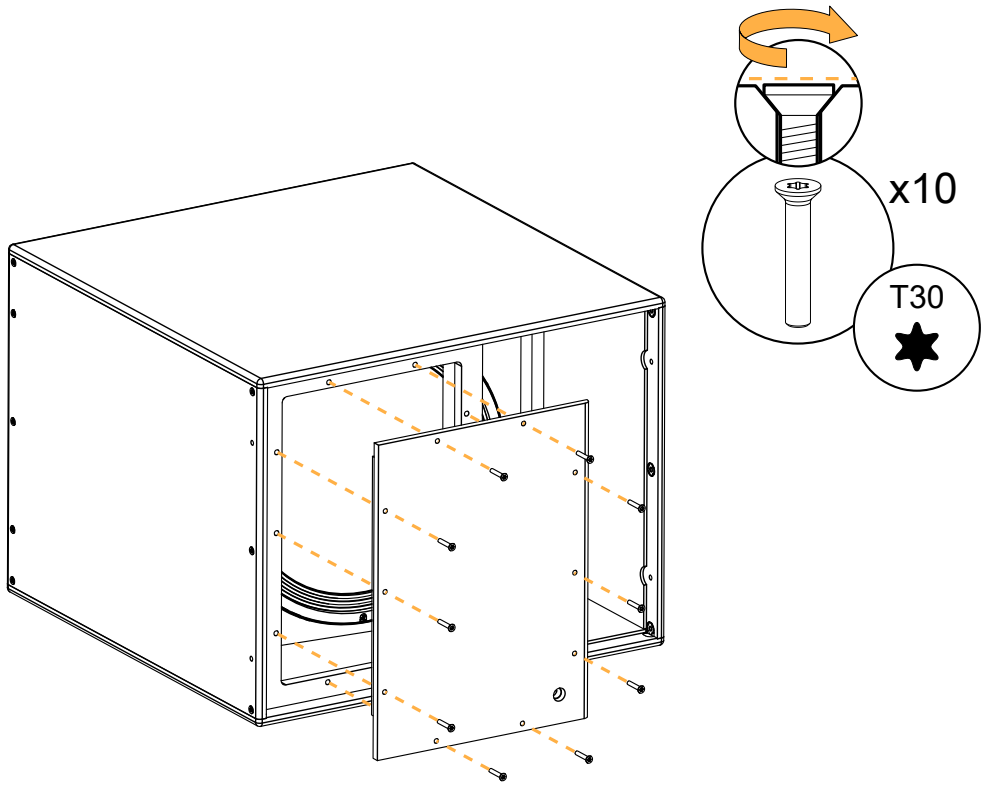
2. Secure the speaker.

   Gradually tighten the screws following a star pattern.



3. Secure the plate.

Gradually tighten the screws following a star pattern.



What to do next

Perform the Acoustical check (p.51) procedures.

D/R - Connector sealing plate

Tools

- torque screwdriver
- T25 Torx bit
- small tool or flat screwdriver (3 mm or less)

Repair kit

Prerequisite

The cable glands on the connector sealing plates are compatible with cables up to 4 × 4 mm^2 gauge.

Refer to the owner's manual for more information on cabling schemes.

Exploded view

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

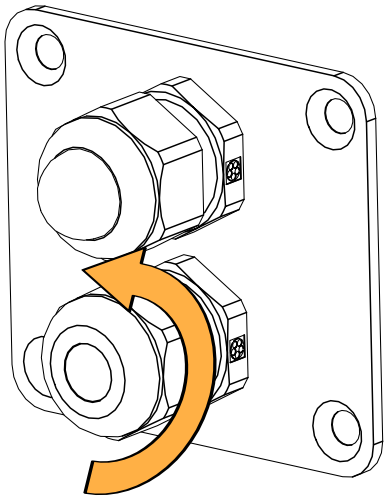
About this task

The connector sealing plates have two cable glands: one for the input cable and one for the cable connecting to the next enclosure in parallel. The second cable gland is equipped with a protective plug.

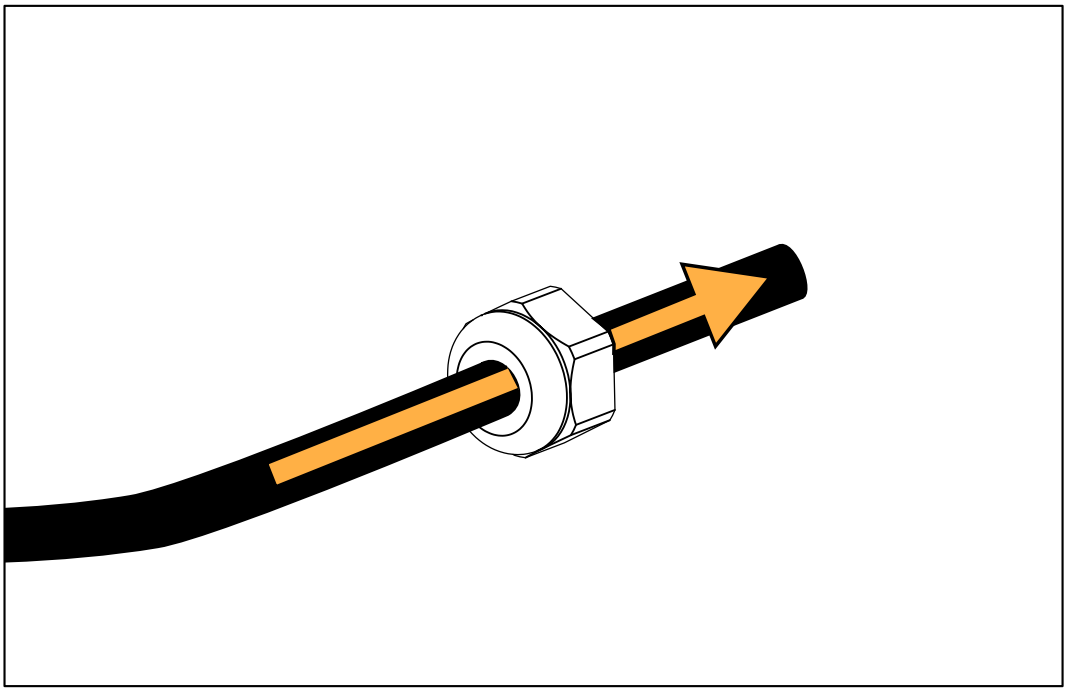
This procedure describes how to connect the input cable to the enclosure. If the enclosure must be connected in parallel, remove the protective plug from the second cable gland and proceed identically for both cables.

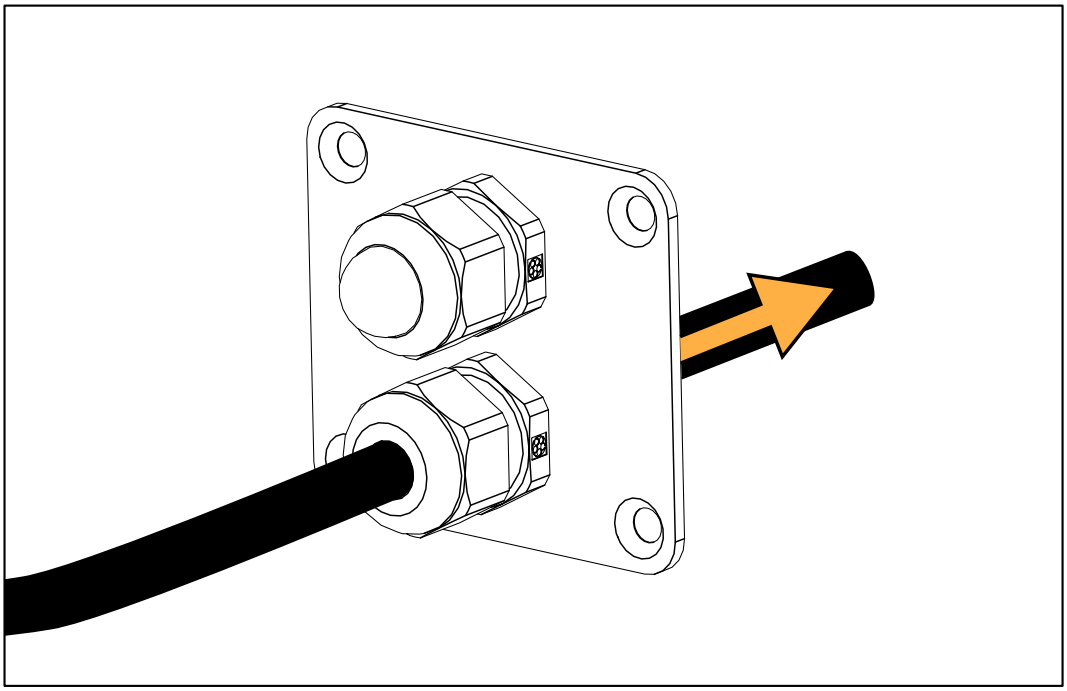
Procedure

1. On the connector sealing plate, remove the sealing nut from the cable gland.



2. Insert the cable through the sealing nut and the cable gland.



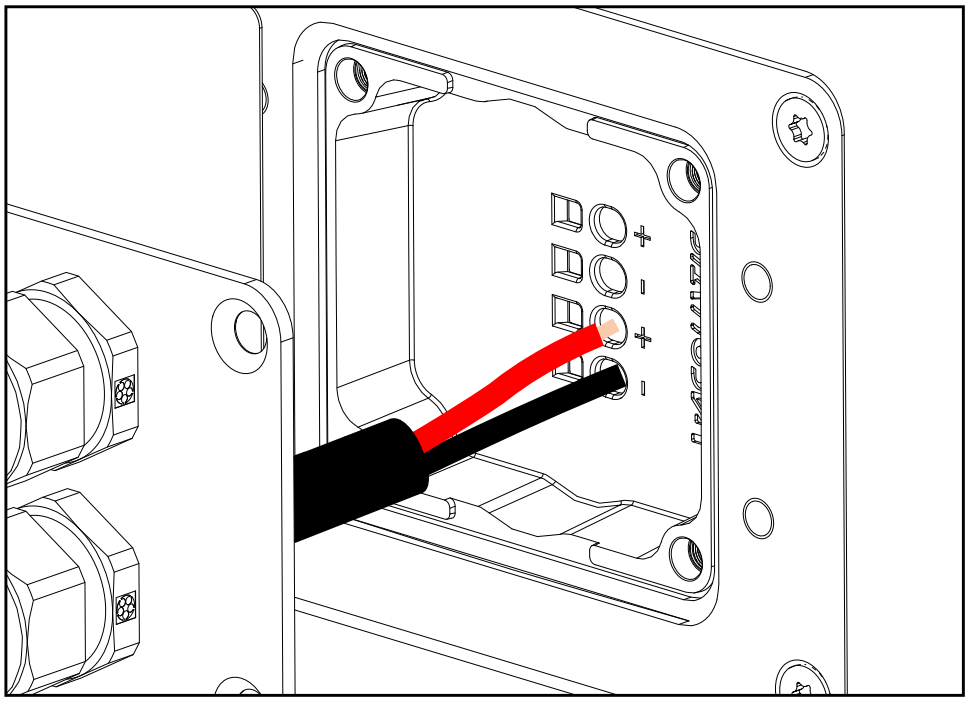


3. Strip the wires of the cable.

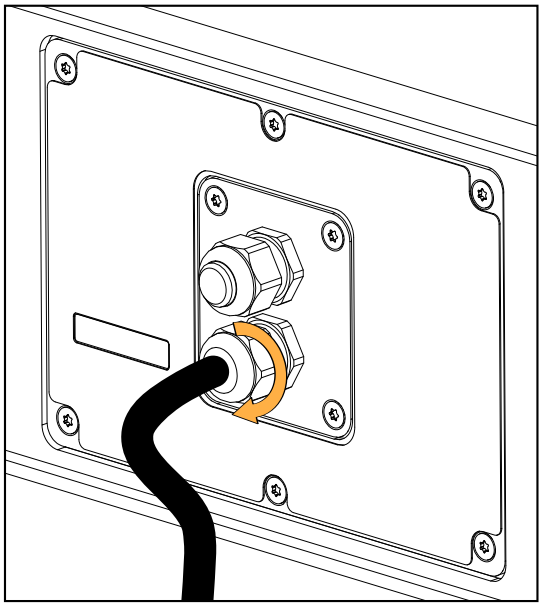
Refer to the cable manufacturer documentation for the wire color code.

4. Push the wires into the terminals.

   If necessary, use a small tool in the hole next to the terminal to unlock it.



5. Secure the connector sealing plate to the connector plate.
6. Tighten the sealing nut.



What to do next

To remove the cables use the small tool to unlock the terminals and pull on the wires.

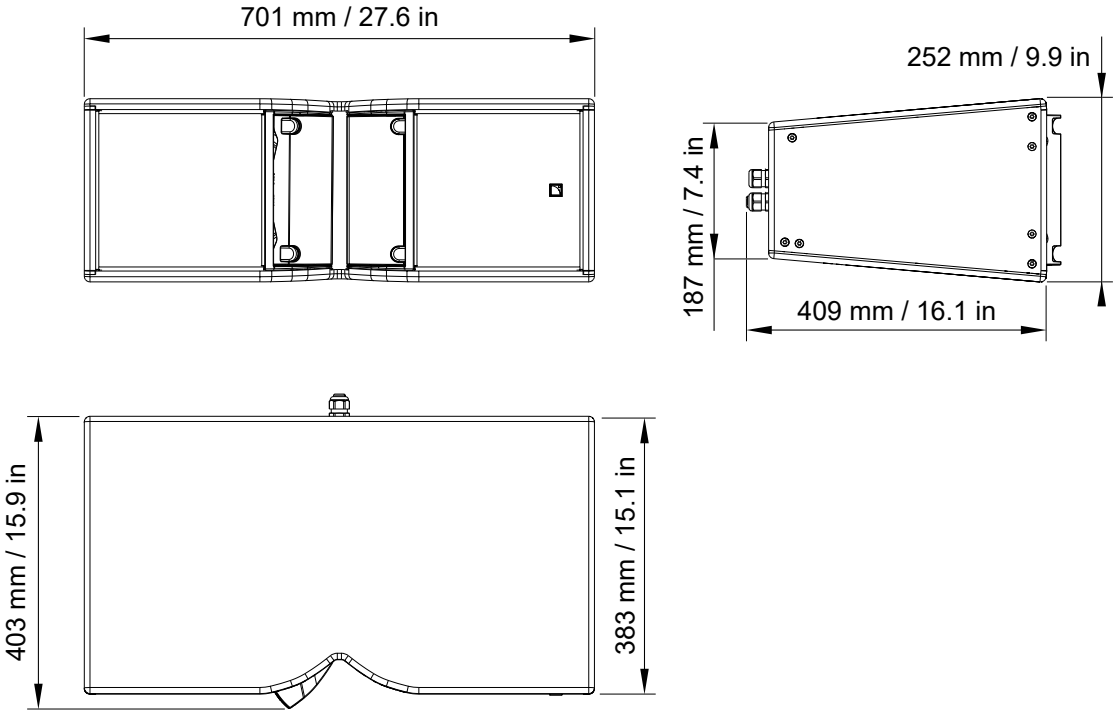
Specifications

Kara II specifications

Description	2-way active WST® enclosure: 2 × 8" LF + 3" HF diaphragm (installation version), amplified by LA2Xi / LA4X / LA8 / LA12X
Usable bandwidth (-10 dB)	55 Hz - 20 kHz ([KARA II 70])
Maximum SPL[1]	142 dB ([KARA II 70]) with LA4X / LA8 / LA12X
	137 dB ([KARA II 70]) with LA2Xi
Nominal directivity (-6 dB)	horizontal: 70° / 110° symmetric or 90° asymmetric (35°/90°)
	vertical: dependent upon the number of elements and the line source curvature
Transducers	LF: 2 × 8" neodymium cone drivers
	HF: 1 × 3" neodymium diaphragm compression driver
Acoustical load	LF: bass-reflex
	HF: DOSC waveguide, L-Fins
Nominal impedance	LF: 8 Ω
	HF: 8 Ω
Connectors	IN: 1 × 4-point terminal block with push-in connection
	LINK: 1 × 4-point terminal block with push-in connection
Rigging and handling	external rigging kits
	10 M6 inserts for rigging
	4 M6 inserts for screens
	inter-element angles: 0°, 1°, 2°, 3°, 4°, 5°, 7.5° or 10°
Weight (net)	21 kg / 46 lb
Cabinet	premium grade Baltic birch plywood
Front	coated steel grill
	acoustically neutral 3D fabric
Finish	dark grey brown Pantone 426 C
	pure white RAL 9010
	custom RAL code on special order
IP	IP55

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

Kara Ili dimensions

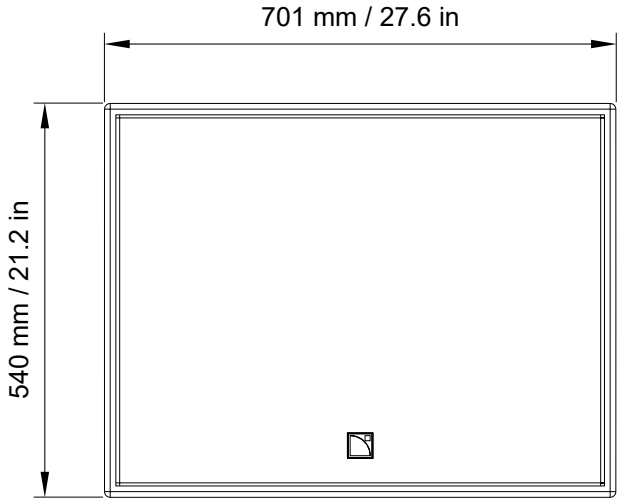


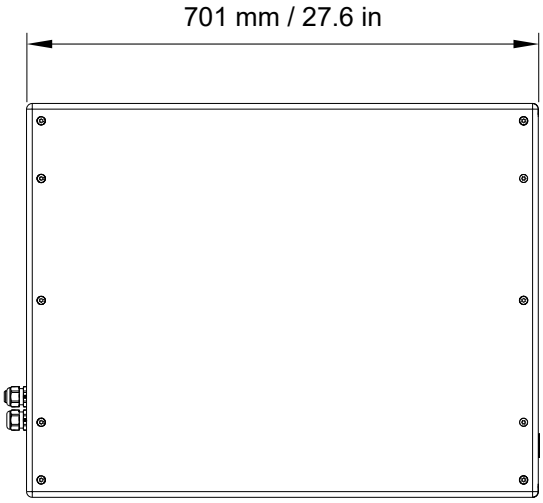
SB18 Ili specifications

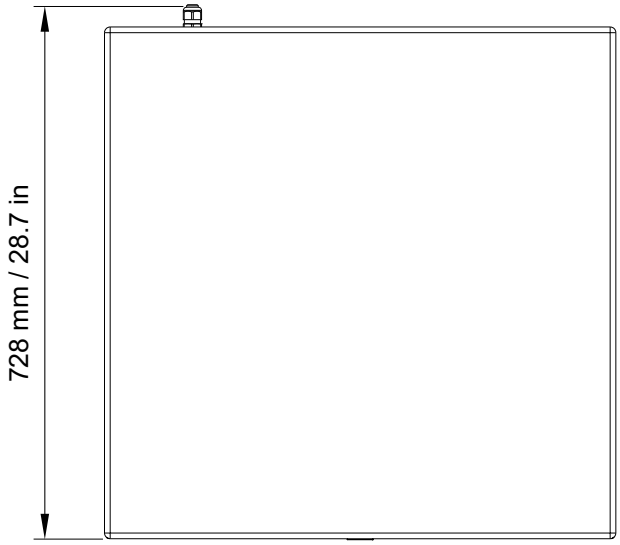
Description	High power compact subwoofer: 1 x 18" (installation version), amplified by LA2Xi / LA4X / LA8 / LA12X
Low frequency limit (-10 dB)	32 Hz ([SB18_100])
Maximum SPL[1]	138 dB ([SB18_100]) with LA2Xi (bridge mode) / LA4X / LA8 / LA12X
	133 dB ([SB18_100]) with LA2Xi
Directivity	standard or cardioid
Transducers	1 × 18" cone driver
Acoustical load	dual bass-reflex
Nominal impedance	8 Ω
Connectors	1 × 4-point terminal block with push-in connection
Rigging and handling	external rigging kits
	12 M6 inserts for rigging
	8 M6 inserts for screens
Weight (net)	48 kg / 106 lb
Cabinet	premium grade Baltic birch plywood
Front	coated steel grill
	acoustically neutral 3D fabric
Finish	dark grey brown Pantone 426 C
	pure white RAL 9010
	custom RAL code on special order
IP	IP55

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

SB18 IIi dimensions





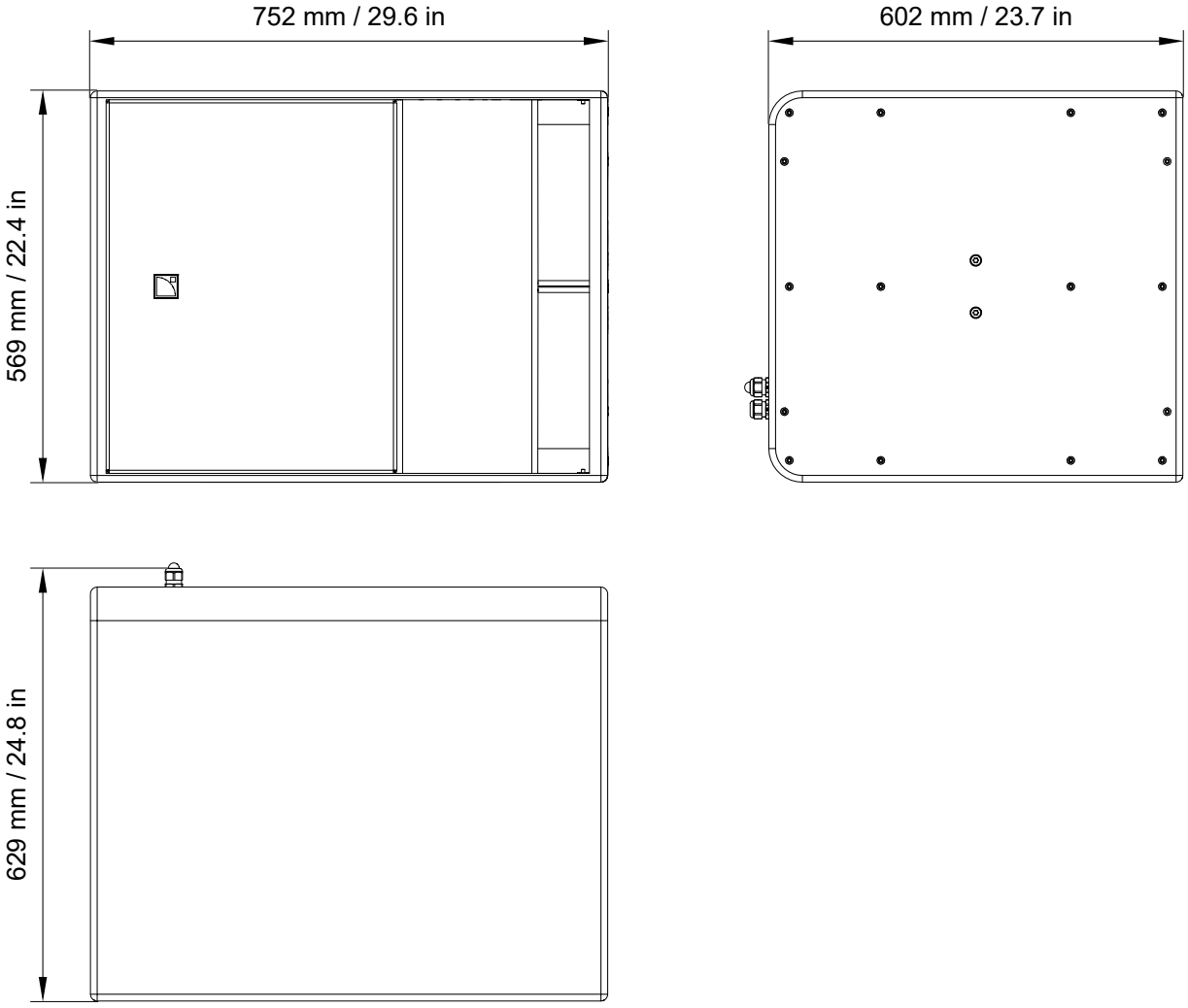


KS21i specifications

Description	High power compact subwoofer: 1 x 21" (installation version), amplified by LA2Xi / LA4X / LA8 / LA12X
Low frequency limit (-10 dB)	31 Hz ([KS21_100])
Maximum SPL [1]	138 dB ([KS21_100]) with LA2Xi (bridge mode) / LA4X / LA8 / LA12X
	131 dB ([KS21_100]) with LA2Xi
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	1 × 4-point terminal block with push-in connection
Rigging and handling	external rigging kits
	M6 inserts for rigging plates
	M8 inserts for A-U15i
	1 DIN580-compatible M8 threaded insert
Weight (net)	46 kg / 101 lb
Cabinet	premium grade Baltic beech and birch plywood
Front	coated steel grill
	acoustically neutral 3D fabric
Finish	dark grey brown Pantone 426 C
	pure white RAL 9010
	custom RAL code on special order
IP	IP55

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

KS21i dimensions

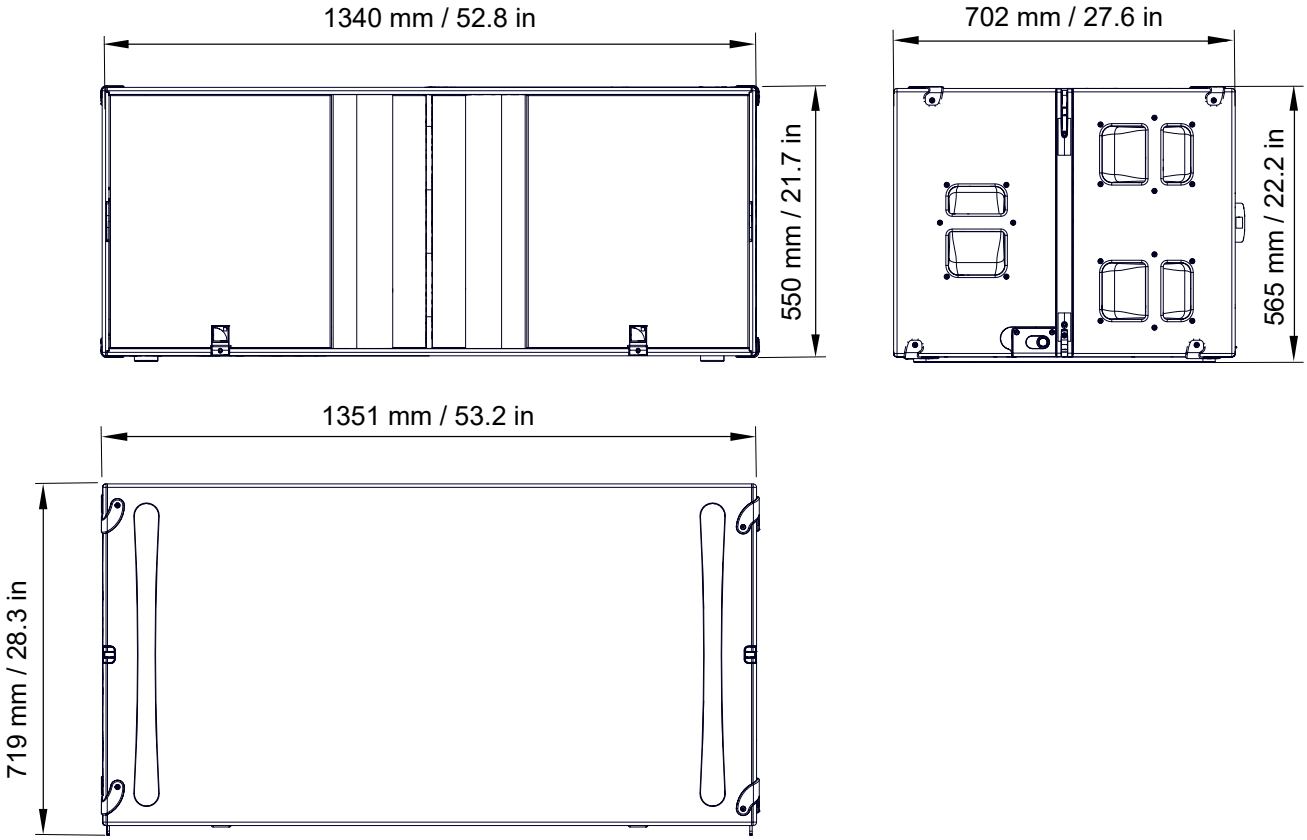


KS28 specifications

Description	Flyable subwoofer 2 x 18'' , amplified by LA2Xi / LA12X
Low frequency limit (-10 dB)	25 Hz ([KS28_100])
Maximum SPL[1]	143 dB ([KS28_100]) with LA2Xi (bridge mode) / LA12X
	136 dB ([KS28_100]) with LA2Xi
Directivity	standard or cardioid
Transducers	2 × 18" neodymium cone drivers
Acoustical load	bass-reflex, L-Vents
Nominal impedance	4 Ω
Connectors	IN: 1 × 4-point speakON
Rigging and handling	flush-fitting 2-point rigging system
	6 ergonomic handles
	2 ground runners
	8 side runners
Weight (net)	79 kg / 174 lb
Cabinet	premium grade Baltic beech and birch plywood
Front	coated steel grill
	acoustically neutral 3D fabric
Rigging components	high grade steel
Finish	dark grey brown Pantone 426 C

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

KS28 dimensions

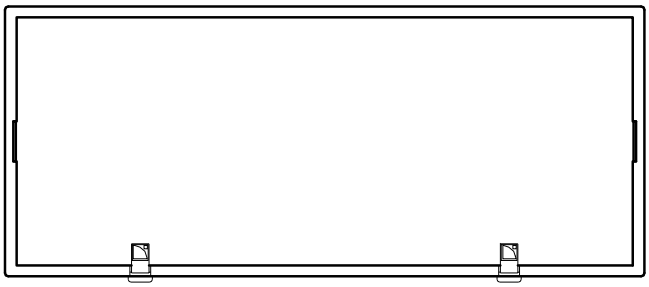


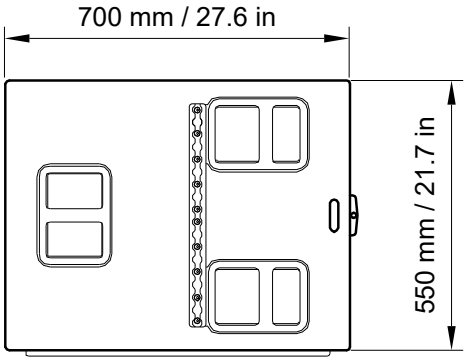
SB28 specifications

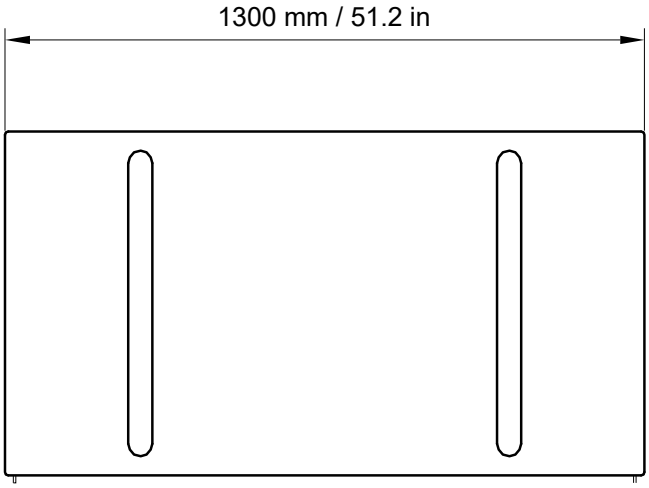
Description	High power subwoofer: 2 x 18'' , amplified by LA2Xi / LA8 / LA12X
Low frequency limit (-10 dB)	25 Hz ([SB28_100])
Maximum SPL[1]	142 dB ([SB28_100]) with LA2Xi (bridge mode) / LA8 / LA12X
	136 dB ([SB28_100]) with LA2Xi
Directivity	standard or cardioid
Transducers	2 × 18" neodymium direct-radiating
Acoustical load	bass-reflex, L-Vents
Nominal impedance	4 Ω
Connectors	IN: 1 × 4-point speakON
Rigging and handling	integrated rigging system
	handles integrated into the cabinet
Weight (net)	93 kg / 205 lb
Cabinet	premium grade Baltic birch plywood
Front	coated steel grill
	acoustically neutral 3D fabric
Rigging components	high grade steel with anti-corrosion coating
Finish	dark grey brown Pantone 426 C
IP	55

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

SB28 dimensions



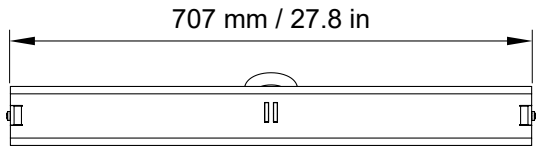


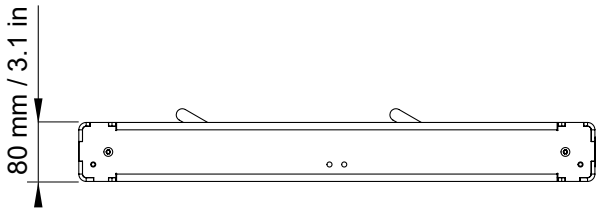


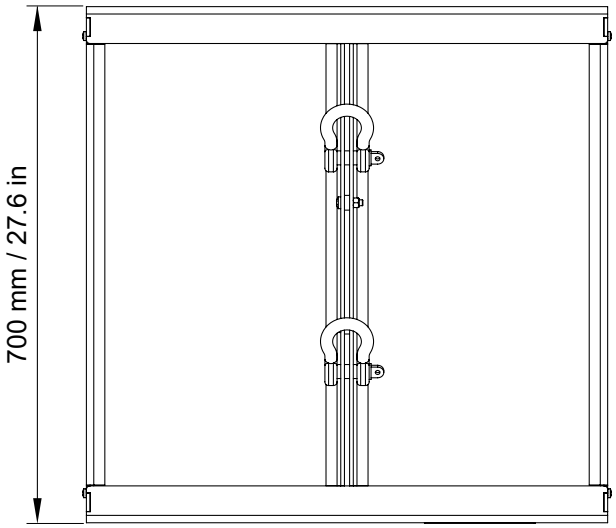
KARAIIi-BUMP specifications

Description	Flying frame for vertical deployment of Kara IIi and SB18 IIi
	2 × Ø19 mm shackles WLL 3.25 t
Weight (net)	21 kg / 46 lb
Material	high grade steel with anti-corrosion coating

KARAIIi-BUMP dimensions



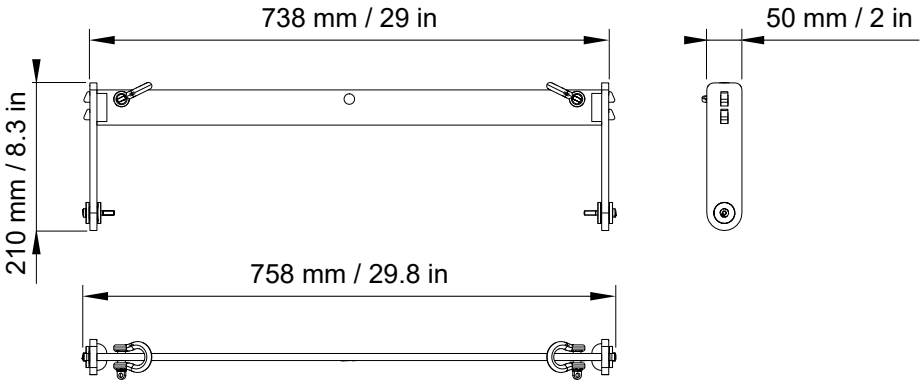




KARAIIi-RIGBAR specifications

Description	Rigging bar and pullback for Kara IIi and SB18 IIi 2 × Ø12 mm shackles WLL 1 t
Weight (net)	4.8 kg / 11 lb
Material	high grade steel with anti-corrosion coating

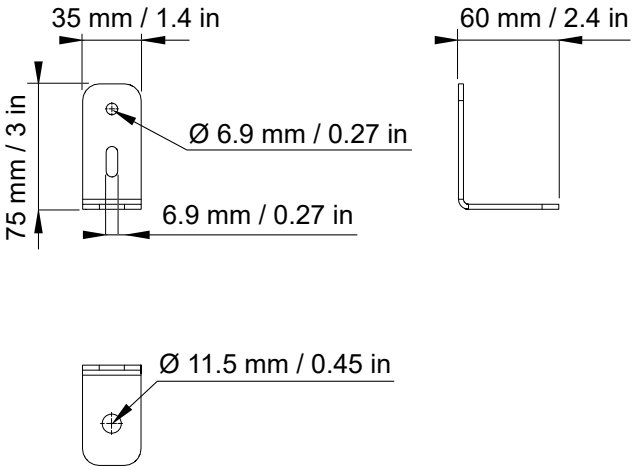
KARAIIi-RIGBAR dimensions



KARAIIi-FIXBRACKET specifications

Description	Fastening brackets for Kara IIi and SB18 IIi
Weight (net)	0.5 kg / 1.1 lb
Material	high grade steel with anti-corrosion coating

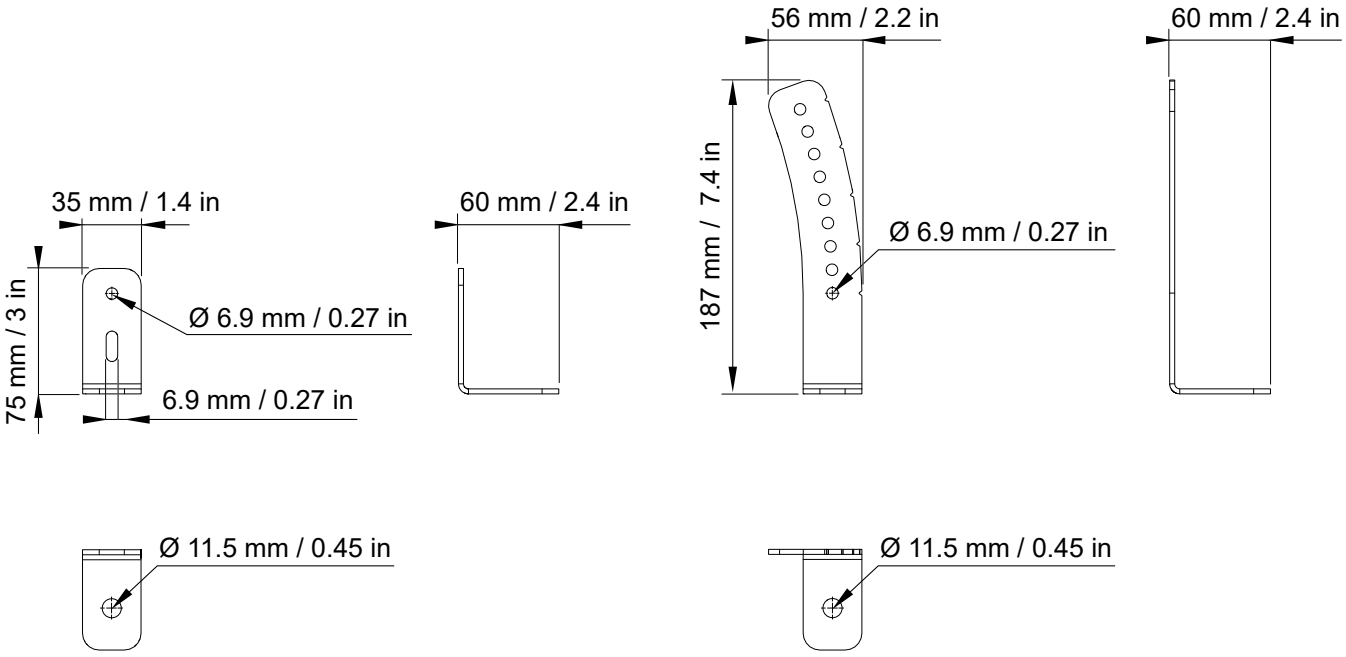
KARAIIi-FIXBRACKET dimensions



KARAIIi-TILTBRACKET specifications

Description	Fastening brackets with angles for Kara IIi
Weight (net)	0.6 kg / 1.3 lb
Material	high grade steel with anti-corrosion coating

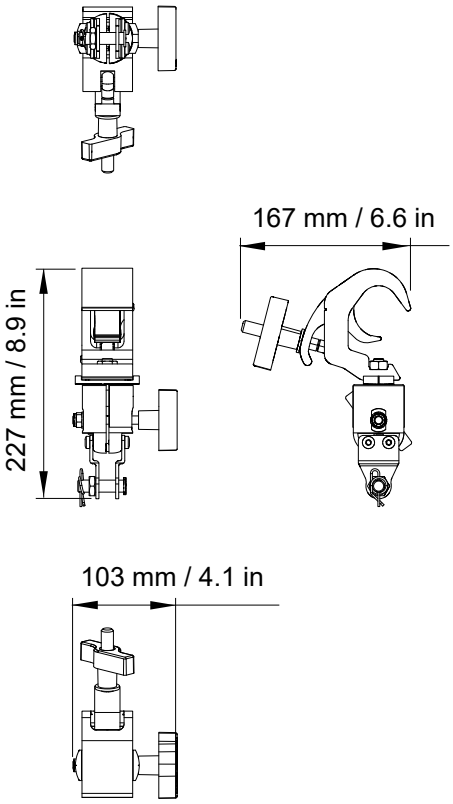
KARAIIi-TILTBRACKET dimensions



CLAMP250 specifications

Description	Clamp certified for 250 kg
Weight (net)	1.8 kg / 4 lb
Material	high grade steel with anti-corrosion coating

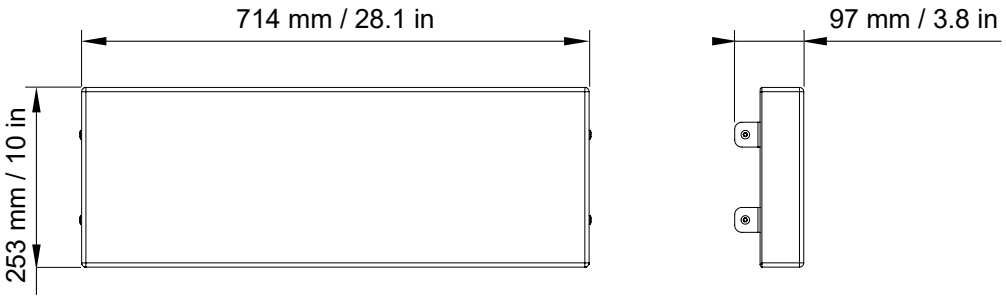
CLAMP250 dimensions



KARAIIi-SCREEN specifications

Description	Acoustically transparent front screen for Kara IIi
Weight (net)	2.4 kg / 5.3 lb

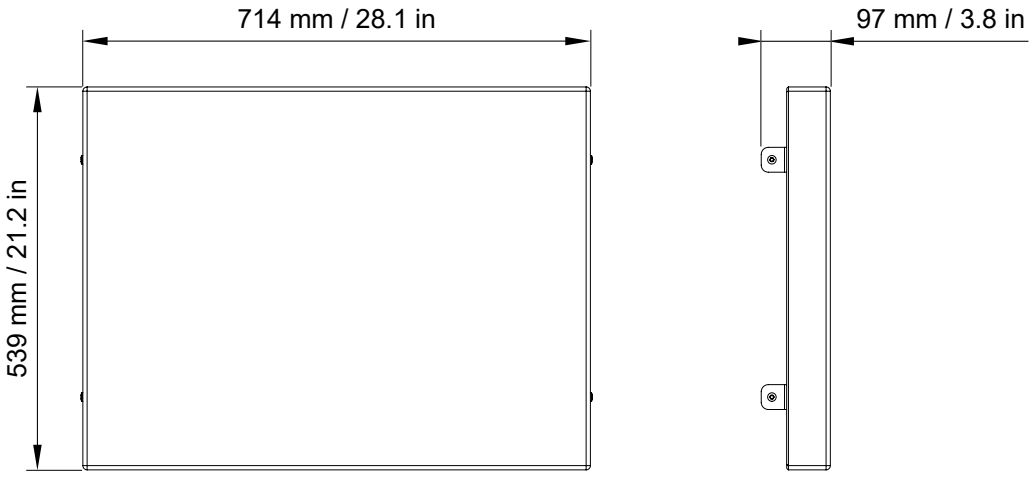
KARAIIi-SCREEN dimensions



SB18Ili-SCREEN specifications

Description	Acoustically transparent front screen for SB18 Ili
Weight (net)	2.7 kg / 6 lb

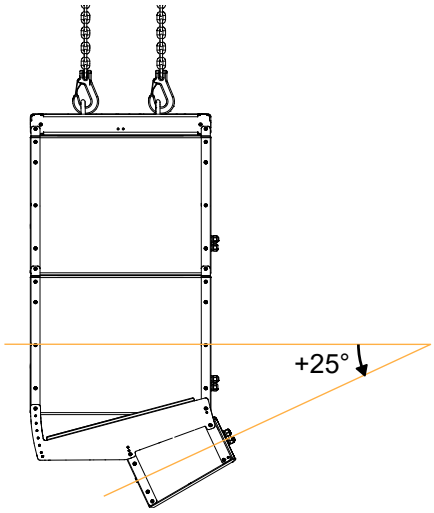
SB18Ili-SCREEN dimensions



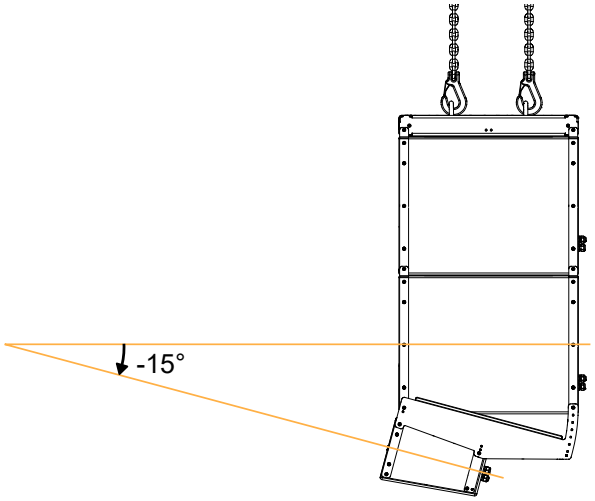
Angle settings with KARAIIi-TILT

About inter-element angles

An **inter-element angle** is the splay angle between two elements of a line array.



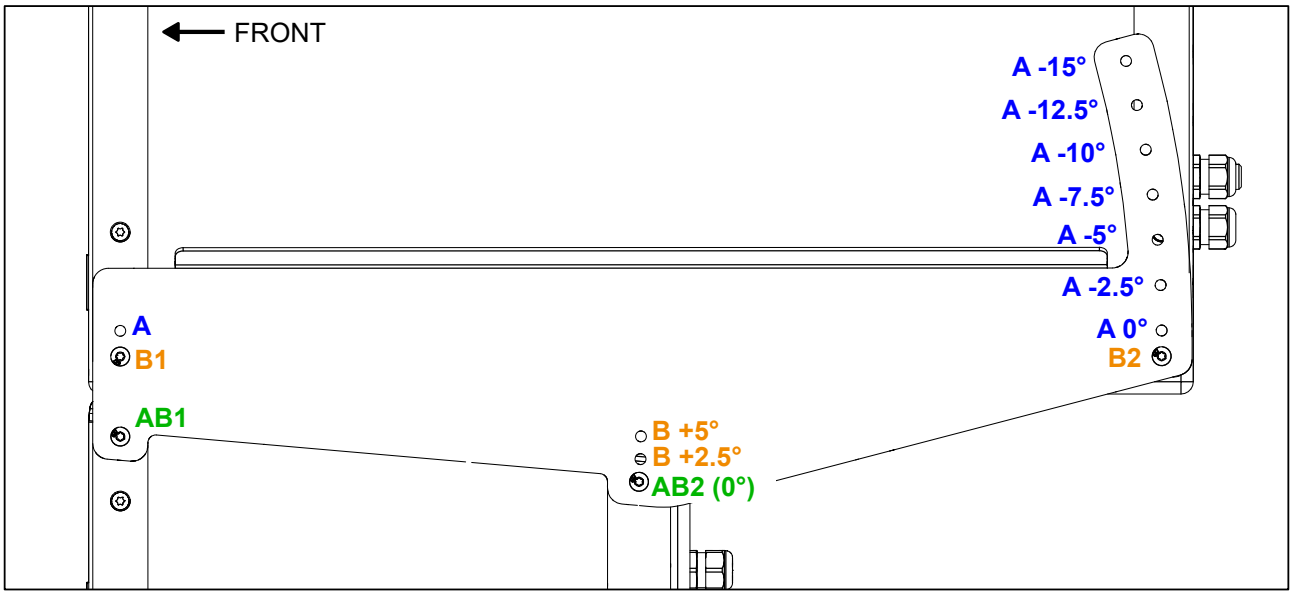
positive inter-element angle



negative inter-element angle

Angles in standard orientation

In standard orientation, the inter-element angle can be set between +5° and -15° in 2.5° steps.

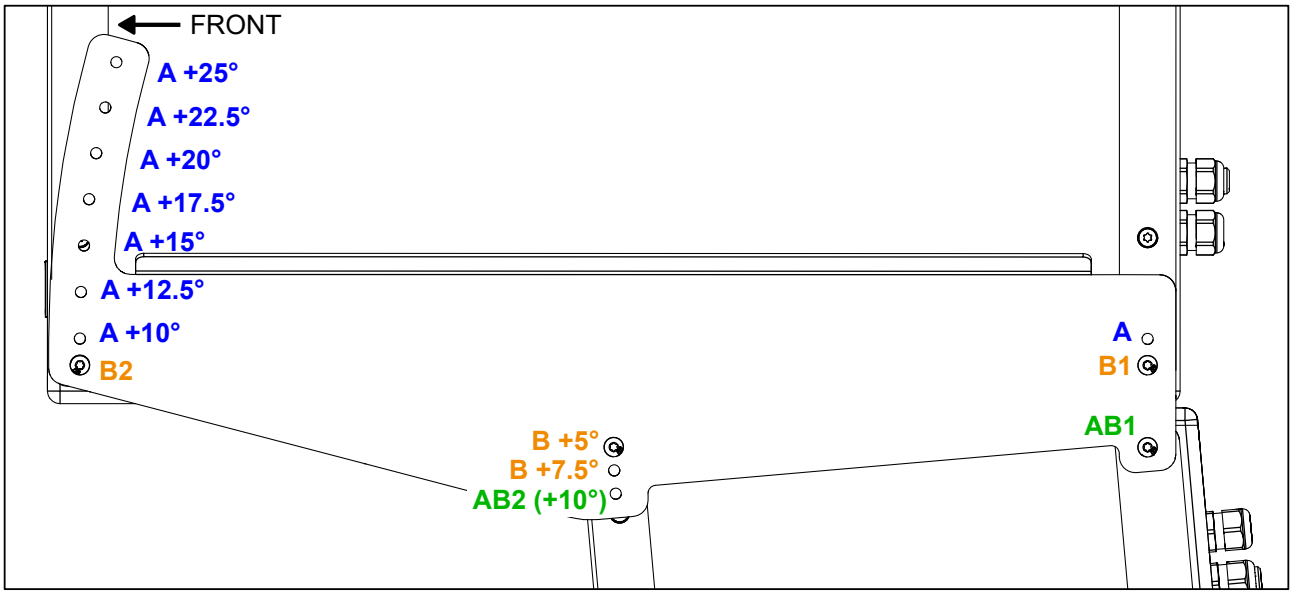


KARAIIi-TILT holes used in standard position

Linking points		inter-element angle		
		0°, -2.5°, -5°, -7.5°, -10°, -12.5°, -15°	**0° with reduced space between enclosures**	**+2.5°, +5°**
On SB18 IIi	front	A	B1	B1
	rear	A angle set	B2	B2
On Kara IIi	front	AB1	AB1	AB1
	rear	AB2	AB2	B angle set

Angles in reversed orientation

In reversed orientation, the inter-element angle can be set between +5° and +25° in 2.5° steps.



KARAIIi-TILT holes used in reversed position

Linking points		inter-element angle	
		+5°, +7.5°, +10°	**+12.5°, +15°, +17.5°, +20°, +22.5°, +25°**
On SB18 IIi	front	B2	A angle set
	rear	B1	A
On Kara IIi	front	B angle set or AB2 (+10°)	AB1
	rear	AB1	AB1

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.

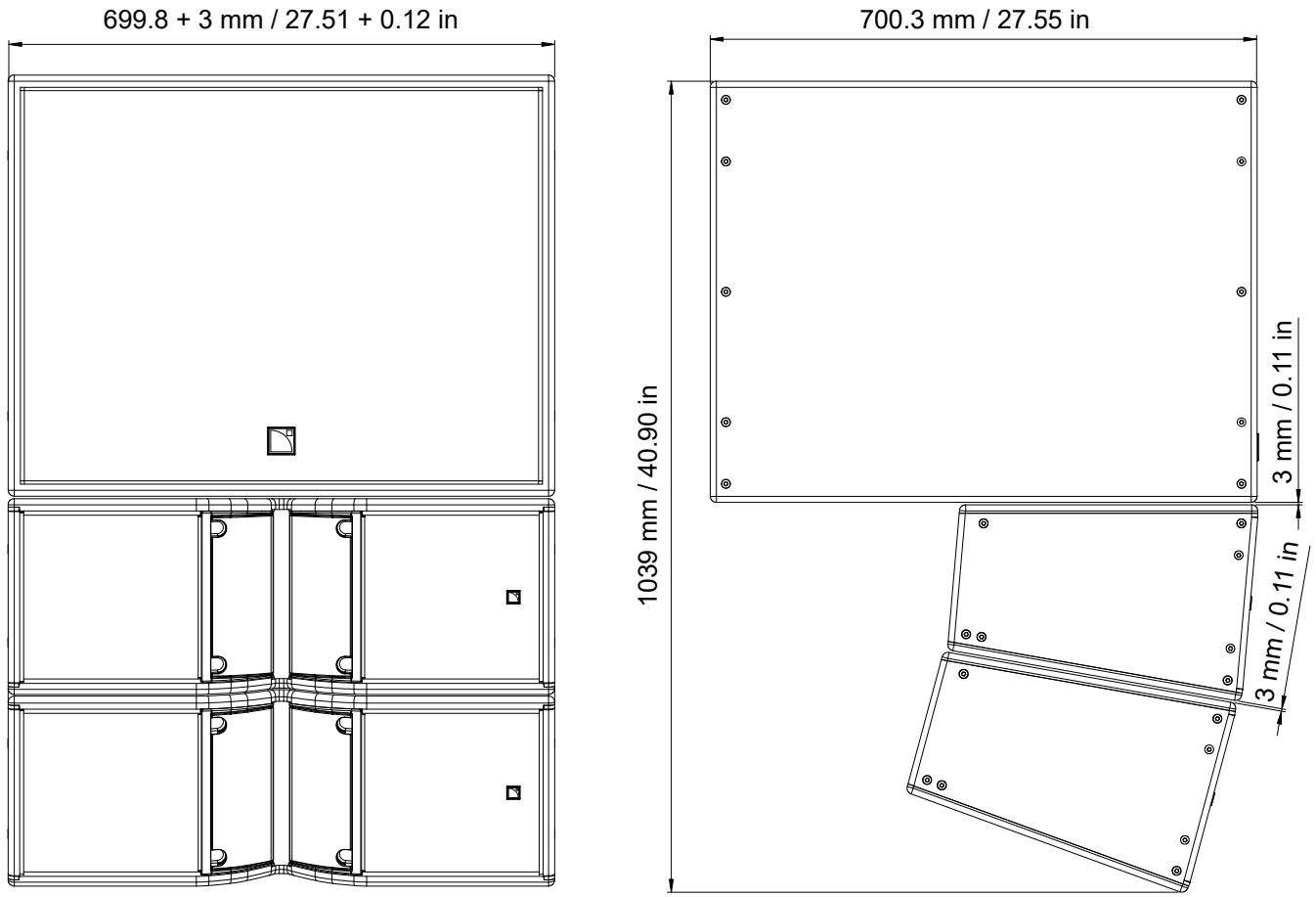
cable gauge			**recommended maximum length**					
			8 Ω load		**4 Ω load**		**2.7 Ω load**	
mm ^{2}	SWG	AWG	m	ft	m	ft	m	ft
2.5	15	13	30	100	15	50	10	33
4	13	11	50	160	25	80	17	53
6	11	9	74	240	37	120	25	80

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/installation-tools/

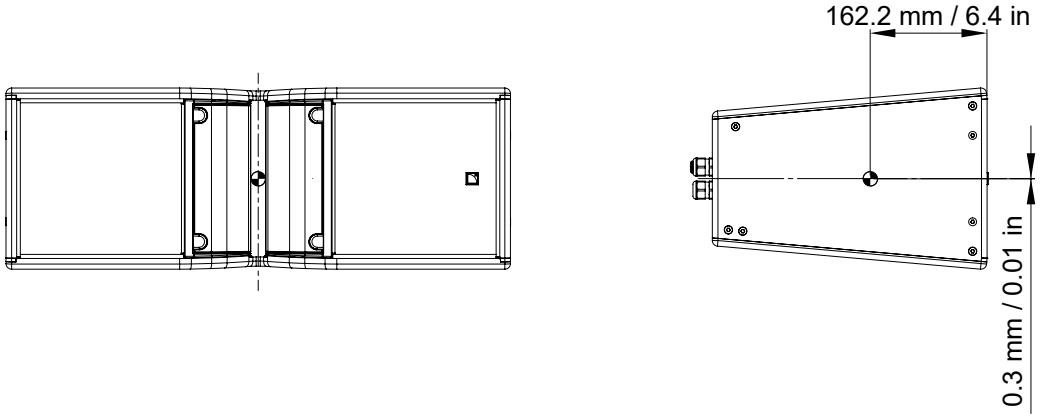
Specifications for custom rigging systems

Dimensions

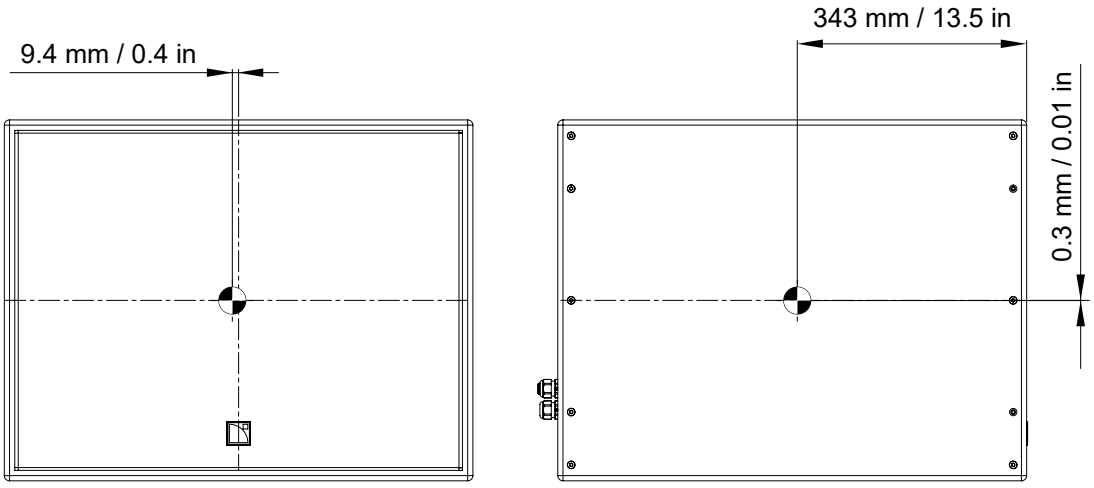


SB18 Ili with Kara Ili

Center of gravity



Kara Ili



SB18 Ili

Threaded inserts and screws

Use only rigging inserts to implement a custom rigging

Inserts marked with ○ can be used for rigging.

Inserts marked with ✕ must not be used for custom rigging (reserved for screen mounting, maintenance purposes, L-Acoustics accessories, etc.).

Grade of screws must be defined by a qualified person

Take into consideration the number of inserts used, weight and center of gravity of enclosure(s), and resulting action forces.

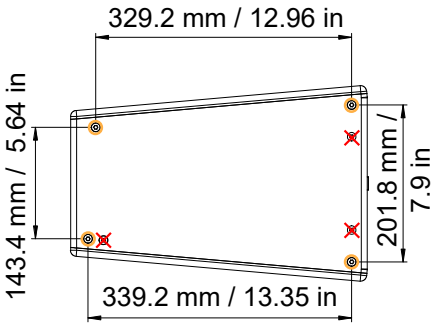
Prevent screws from loosening (threadlocker, spring washer...).

Kara Ili has **8 threaded M6 inserts** available for rigging.

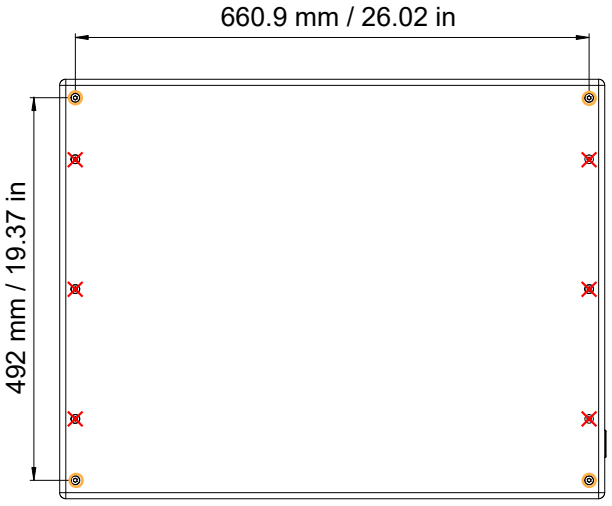
SB18 Ili has **8 threaded M6 inserts** available for rigging.

	M6 standard inserts
Ultimate Tensile Strength	1160 N
Ultimate Shear Strength	4250 N
Recommended screw length*	min 18 mm / 0.7 in.
Recommended torque	5 N.m

*Recommended screw length for a metal sheet with a thickness of 3 mm / 0.1 in. Adapt the length to the custom rigging design.



Kara Ili



SB18 Ili

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

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GROUP