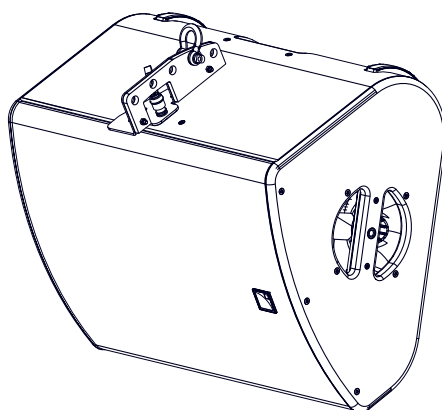
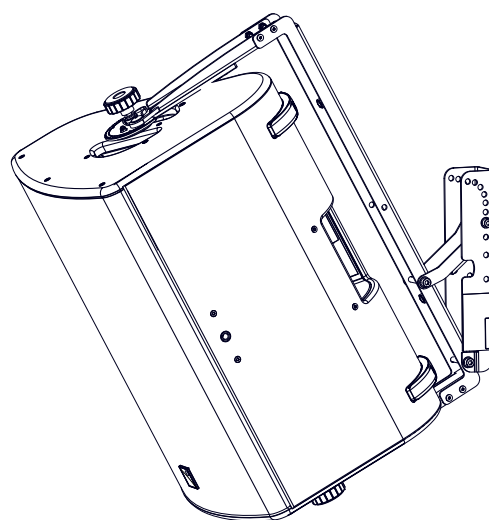
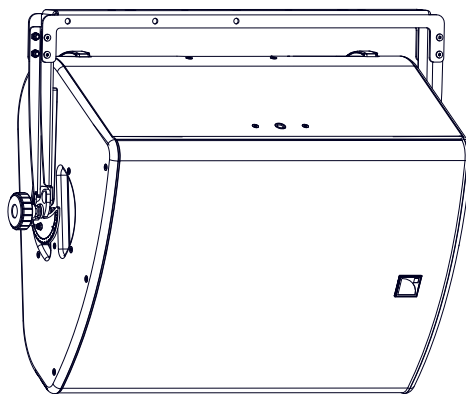
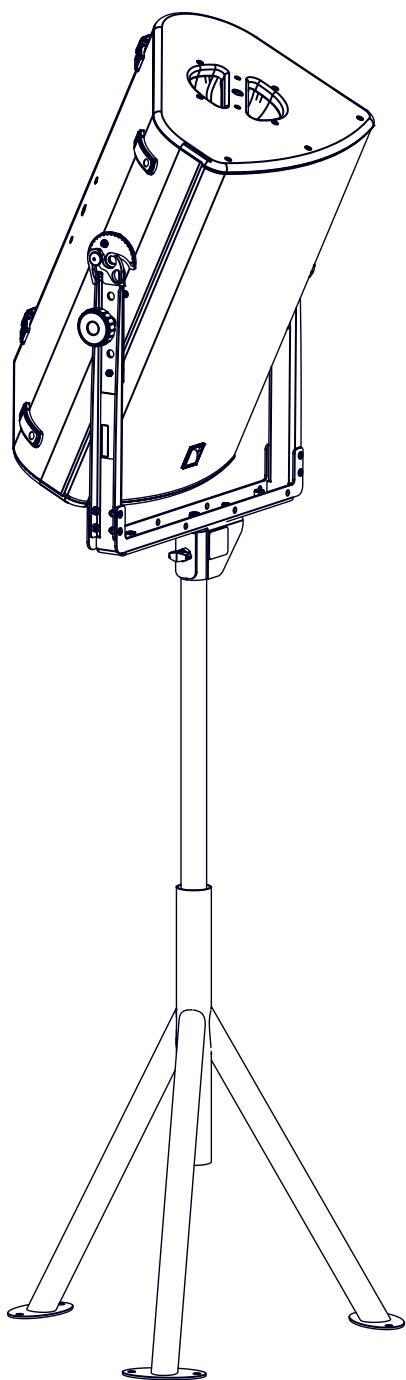


X 15 HiQ



owner's manual (EN)



Document reference: X15 HiQ owner's manual (EN) version 1.0

Distribution date: March 15, 2021

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Safety

Instructions



Inspect the system before any deployment.

Perform safety related checks and inspections before any deployment.

Perform preventive maintenance at least once a year.

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

Insufficient upkeep of the product can void the warranty.

If any safety issue is detected during inspection, do not use the product before performing corrective maintenance.

Check for issues. A rigging system part or fastener is missing or loose. A rigging system part exhibits: bends, breaks, broken parts, corrosion, cracks, cracks in welded joints, deformation, denting, wear, holes. A safety cue or label is missing. A loose part is not adequately secured.



Never incorporate equipment or accessories not approved by L-Acoustics.

Read all the related PRODUCT INFORMATION documents shipped with the products before exploiting the system.



Do not store the product on an unstable cart, stand, tripod, bracket, or table.



Beware of sound levels.

Do not stay within close proximity of loudspeakers in operation.

Loudspeaker systems are capable of producing very high sound pressure levels (SPL) which can instantaneously lead to permanent hearing damage to performers, production crew and audience members. Hearing damage can also occur at moderate level with prolonged exposure to sound.

Check the applicable laws and regulations relating to maximum sound levels and exposure times.



Work with qualified personnel for rigging the system

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

Ensure personnel health and safety

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

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

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

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

Respect the maximum configurations and the recommended safety precautions.

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

Be cautious when flying a loudspeaker configuration.

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

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

Be cautious when ground-stacking a loudspeaker array.

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

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

Risk of falling objects

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

Risk of tipping

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

Take into account the wind effects on dynamic load.

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

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

**Intended use**

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



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

X15 HiQ reference stage monitor

The X15 HiQ is an active coaxial system designed as a reference stage monitor. The enclosure features a 3" diaphragm compression driver coaxially-loaded by a 15" low frequency transducer in a bass-reflex cabinet. The L-Vents laminar vented ports reduce turbulence and port noise at high levels to increase LF efficiency.

The X15 HiQ operates from 55 Hz to 20 kHz. The coaxial transducer arrangement and its ellipsoid waveguide produce a 40° x 60° directivity pattern with a smooth tonal response free of secondary lobes over the entire frequency range. As a result, X15 HiQ boasts an exceptional immunity to feedback.

The L-Acoustics amplified controllers ensure the advanced crossover functions, time alignment, linearization and L-Drive protection of the transducers.

How to use this manual

The X15 HiQ owner's manual is intended for all actors involved in the system design, implementation, preventive and corrective maintenance of the X15 HiQ 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.14)
2. Prepare the system configuration. Consider the mechanical limits and the available acoustical configurations.
 - [Mechanical safety](#) (p.23)
 - [Loudspeaker configurations](#) (p.25)
3. Before rigging the system, perform mandatory inspections and functional checks.
 - [Inspection and preventive maintenance](#) (p.32)
4. To deploy the system, follow the step-by-step rigging instructions and refer to the cabling schemes.
 - [Rigging procedures](#) (p.44)
 - [Connection to LA amplified controllers](#) (p.69)



The [Corrective maintenance](#) (p.70) 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

Symbols

The following symbols are used in this document:



This symbol indicates a potential risk of harm to an individual or damage to the product.

It can also notify the user about instructions that must be strictly followed to ensure safe installation or operation of the product.



This symbol notifies the user about instructions that must be strictly followed to ensure proper installation or operation of the product.



This symbol notifies the user about complementary information or optional instructions.

System components

Loudspeaker enclosures

X15 HiQ	2-way active coaxial enclosure: 15" LF + 3" HF diaphragm
SB18	High power compact subwoofer: 1 x 18"
SB18 Ili	High power compact subwoofer: 1 x 18" (installation version)
KS21	High power compact subwoofer: 1x21"
KS21i	High power compact subwoofer: 1 x 21" (installation version)

Powering and driving system

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



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

Racks

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

Cables

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



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

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

Rigging elements

EMBi	Pole mount socket: 8XTi/12XTi and X series
X-UTILT	U-bracket wallmount for X series with tilt adjustment
X-BAR	Rigging bar for 1 enclosure
X-UL15	Long U-bracket for X15 HiQ
X-US1215	Short U-bracket for X12 and X15 HiQ
CLAMP250	Clamp certified for 250 kg

Software applications

Soundvision 3D acoustical and mechanical modeling software

LA Network Manager Software for remote control and monitoring of amplified controllers

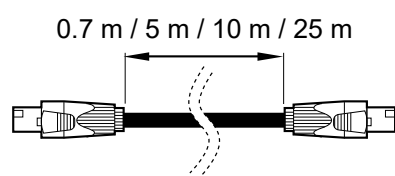


Refer to the **Soundvision** help.

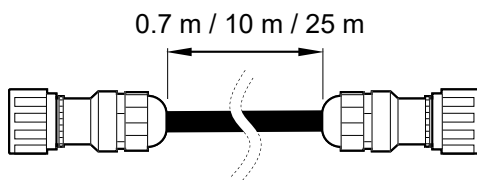
Refer to the **LA Network Manager** help.

System component illustrations

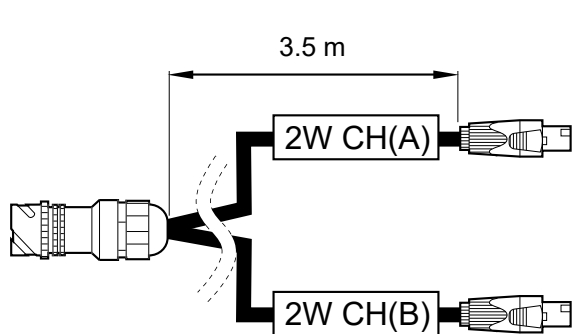
Cables



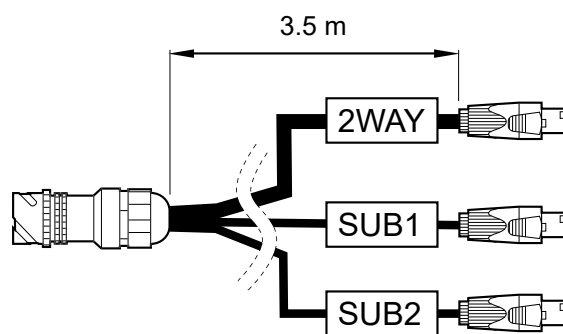
SP.7 / SP.5 / SP10 / SP25



DO.7 / DO10 / DO25

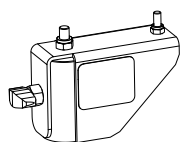


DOFILL-LA8

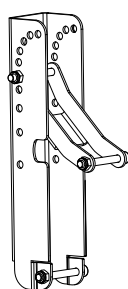


DO3WFILL

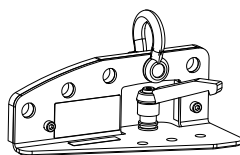
Rigging accessories



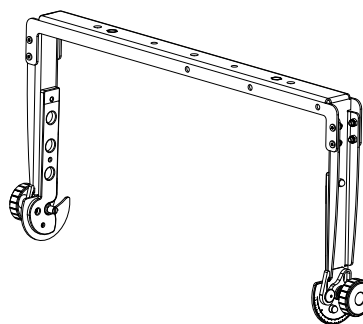
EMBi



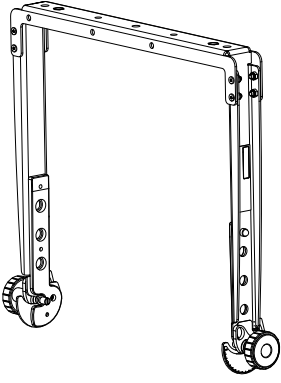
X-UTILT



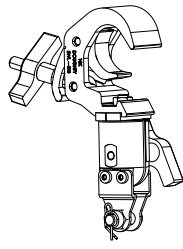
X-BAR



X-UL15



X-US1215

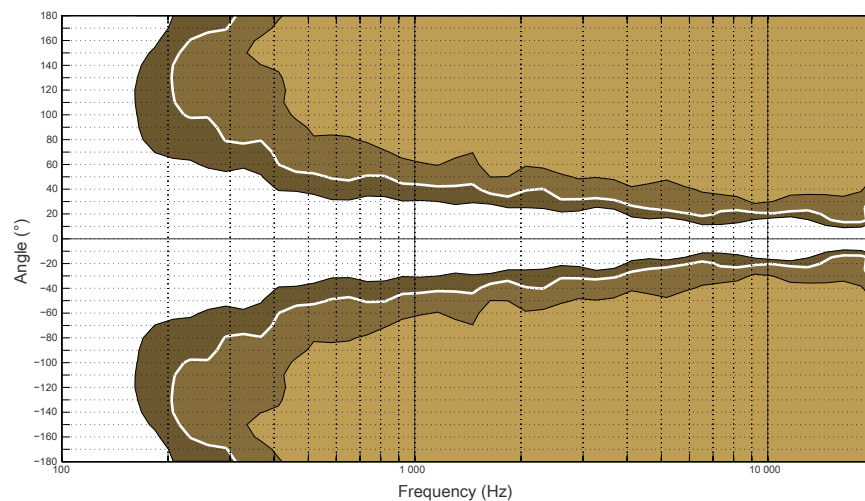
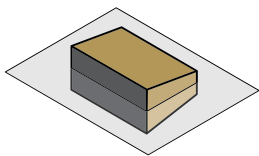
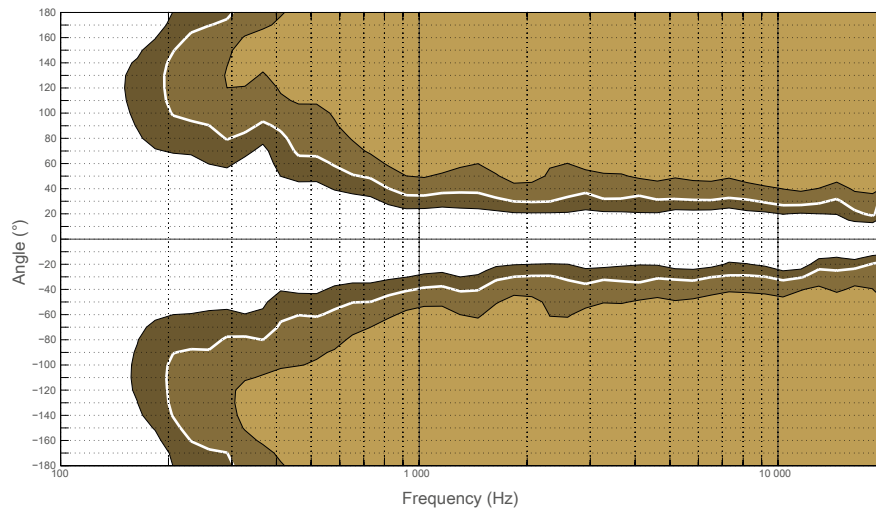
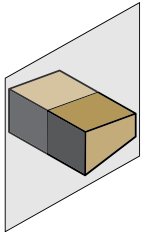


CLAMP250

Electro-acoustical description

Directivity

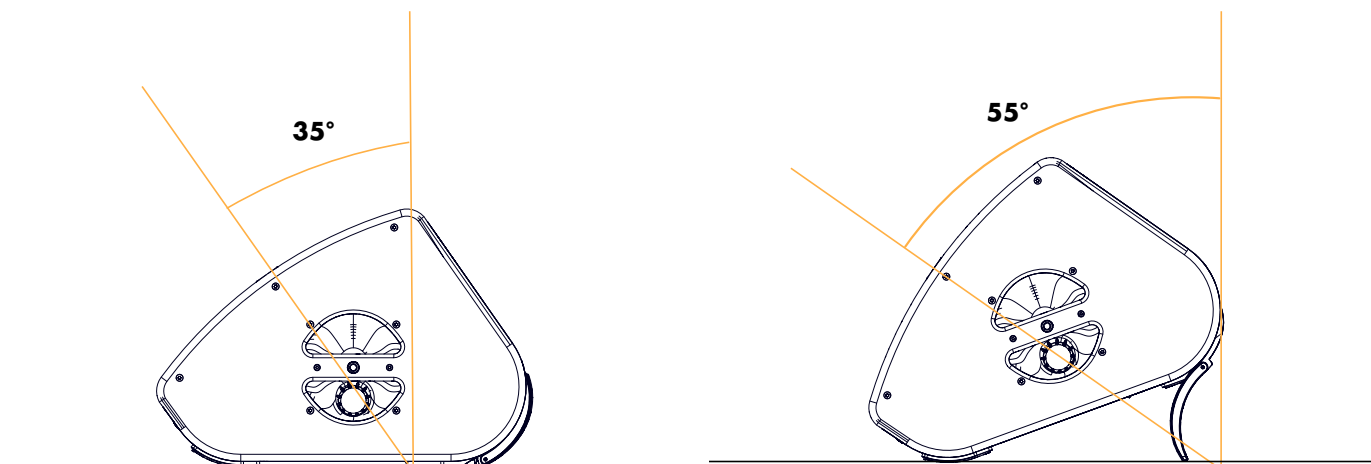
X15 HiQ features a coaxial transducer arrangement coupled with an ellipsoid waveguide that generates an H/V directivity pattern of $40^\circ \times 60^\circ$.



Dispersion angle diagram of a single X15 HiQ using lines of equal sound pressure at -3 dB, -6 dB, -12 dB.

Monitor angles

X15 HiQ features risers that allow to change the monitor angle from 35° to 55°.



Preset description

[X15] [X15_MO]

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

[KS21_60] [KS21_100] [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

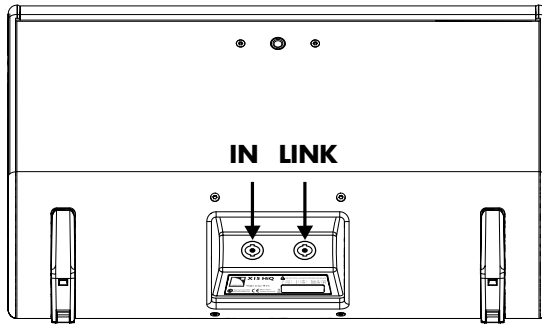
[KS21_60_C] [KS21_100_C] [KS21_60_Cx] [KS21_100_Cx] [SB18_100_C] [SB18_100_Cx]

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



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



X15 HiQ

2 × 4-point speakON

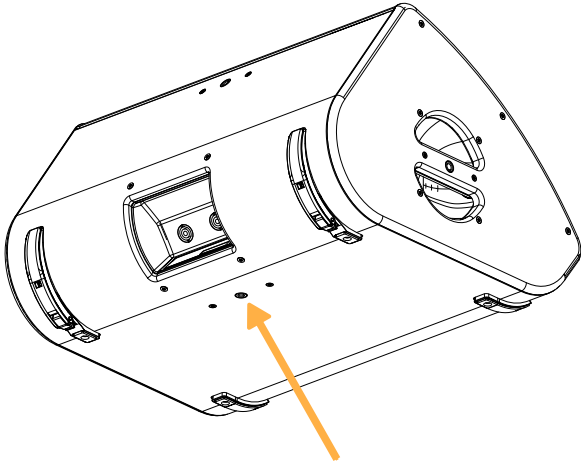
Internal pinout for L-Acoustics 2-way active enclosures

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

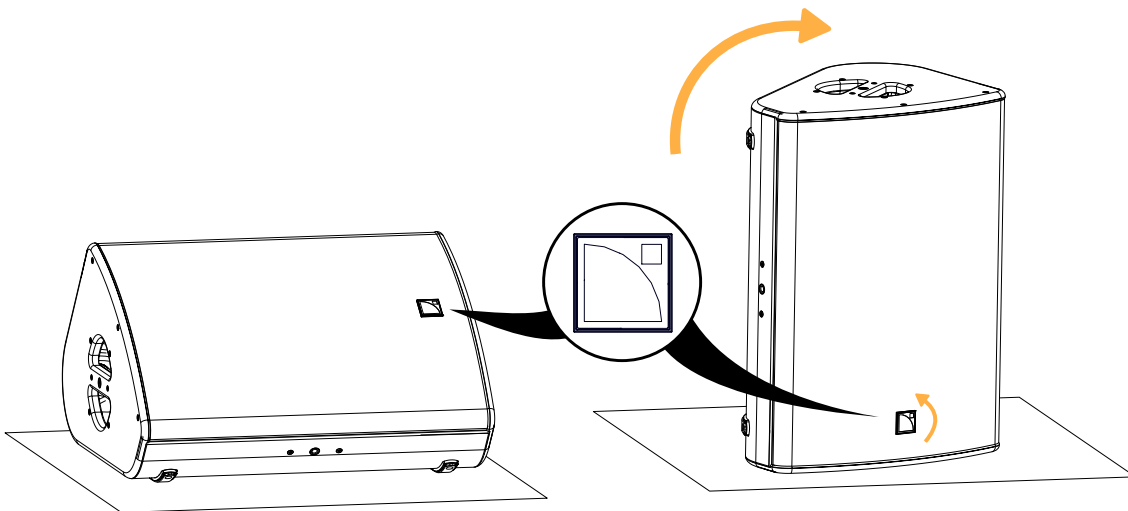
Rigging system description

X15 HiQ

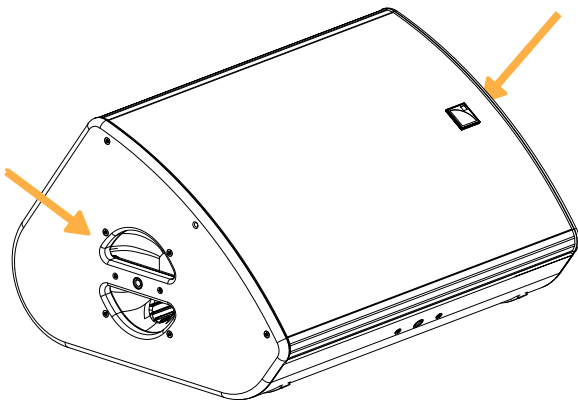
X15 HiQ features a M8 DIN580 threaded insert designed to implement a secondary safety.



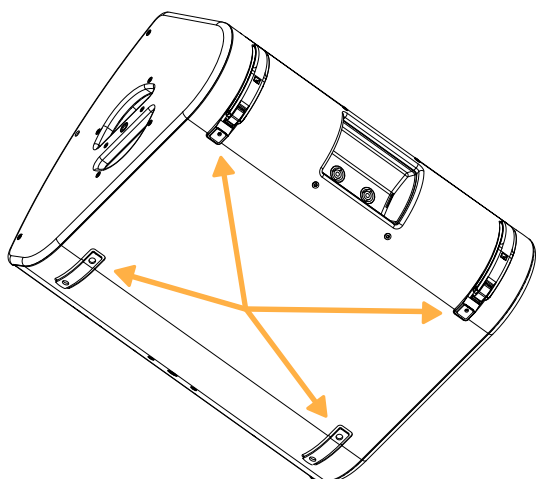
The logo on the enclosure front can be rotated to adapt to every configuration.



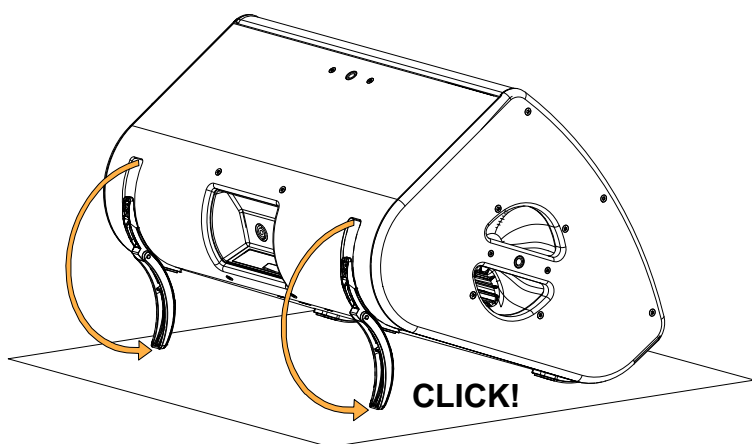
X15 HiQ features ergonomic handles on both sides for easy transportation.



X15 HiQ features four runners on the bottom to protect the enclosure.



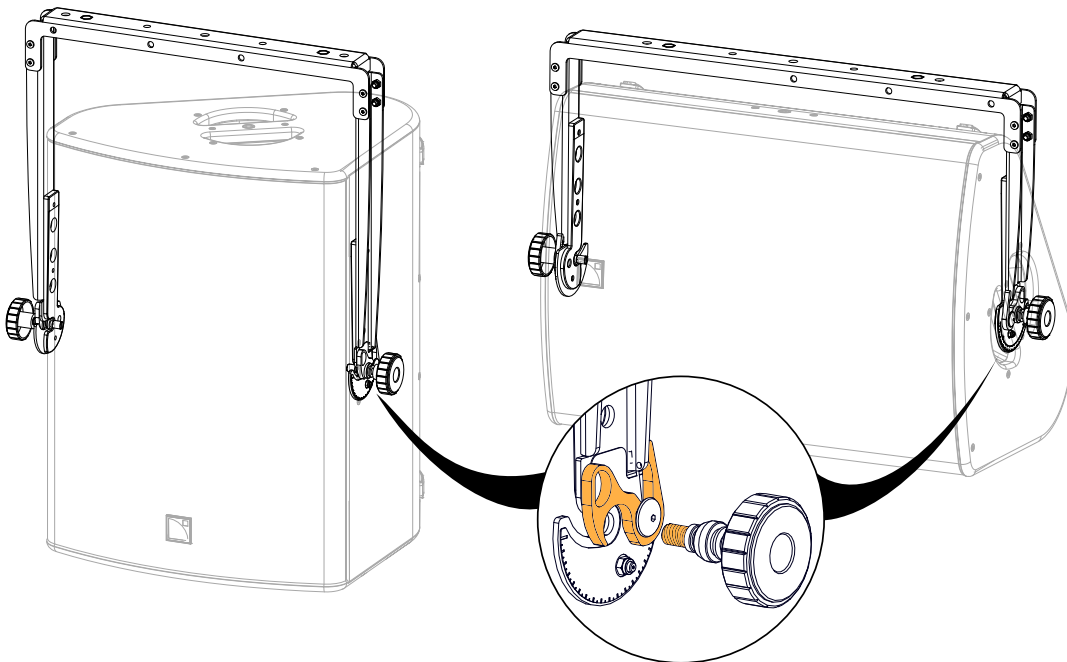
X15 HiQ features risers that allow to change the monitor angle from 35° to 55° relative to the vertical.



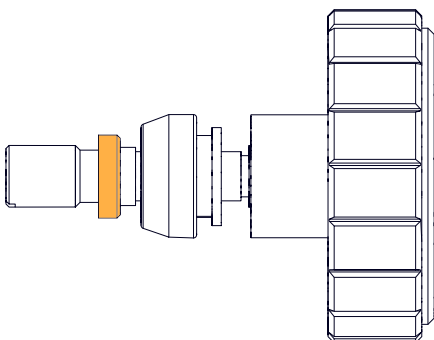
Elements for flying and wall-mounting

X-US1215 and X-UL15

X15 HiQ can be fitted with a short U-bracket, X-US1215, or a long U-bracket, X-UL15. The brackets are secured in the enclosure inserts with two threaded knobs. A spring-lock safety mechanism secures the knobs in the U-brackets.



The threaded knobs feature a washer as a safety to avoid the accidental loosening of the knob.

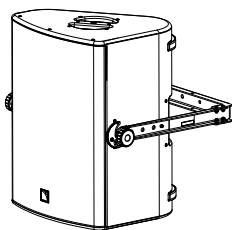


X-US1215 and X-UL15 can be used for wall-mounting, ceiling-mounting or flying X15 HiQ.



Short U-bracket in horizontal position

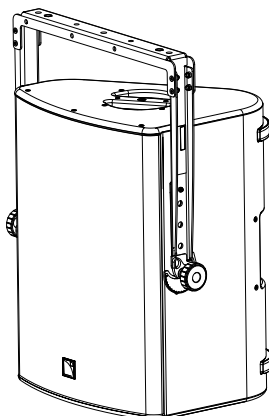
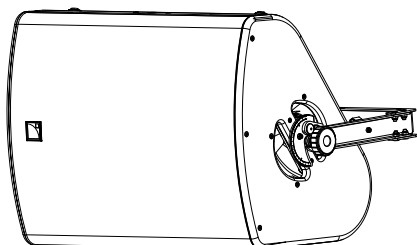
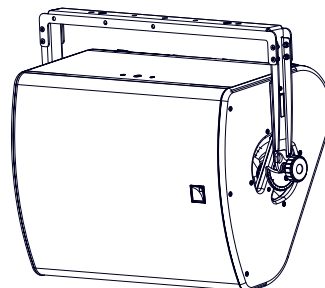
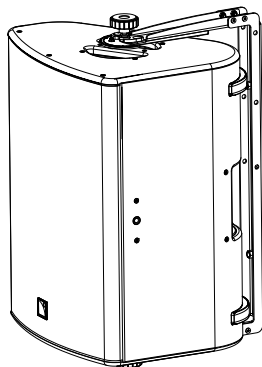
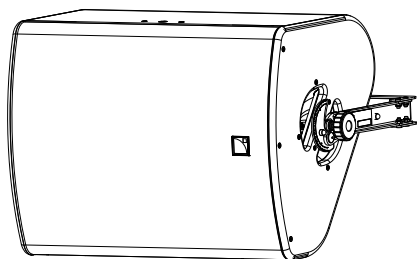
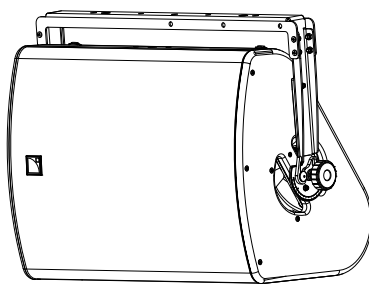
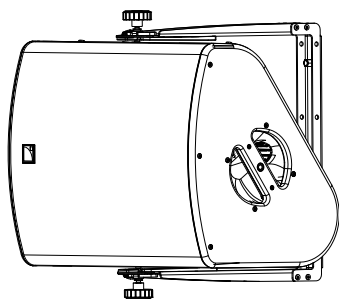
In this position, the enclosure applies a diagonal force of **419 daN** on the anchoring points.



Fasteners for wall-mounting or ceiling-mounting

Secure the bracket with three M10 screws.

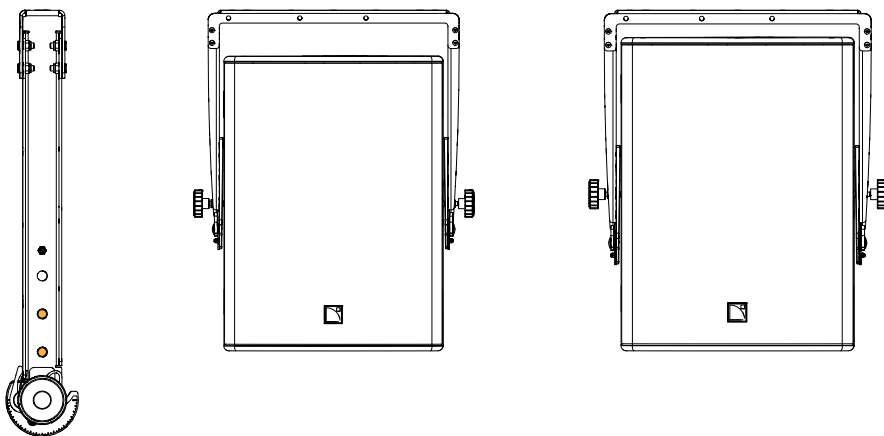
Select screw length and anchors applicable to the wall or ceiling properties.



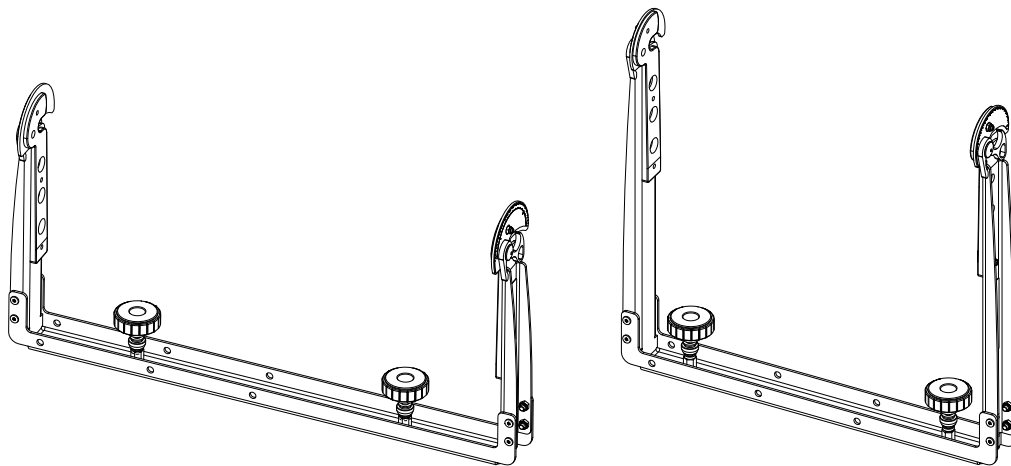
i When using the additional holes, consider the maximum site angle available.

See [Maximum angles](#) (p.57).

X-US1215 features additional holes on the sides to closely fit the enclosure and to optimize visual impact.



The knobs shall be stored in the U-brackets.



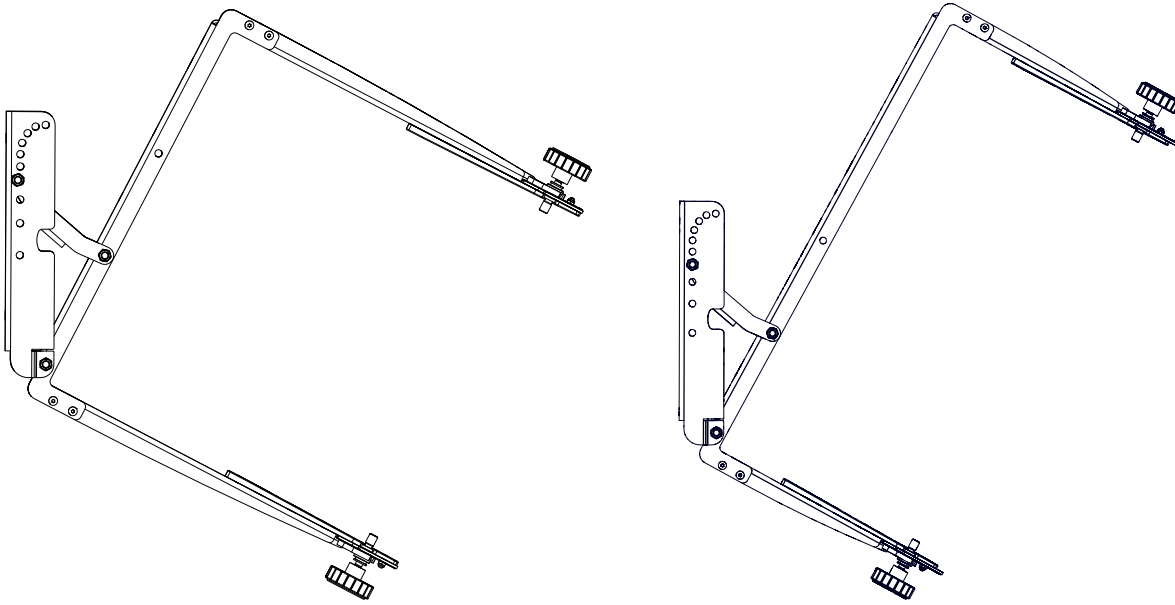
X-UTILT

X-UTILT is a tilt adjustment accessory compatible with X-US1215 and X-UL15. X-UTILT provides negative site angle setting combined with azimuth angle setting capabilities in a wall-mount configuration. The site angle can be set from 0° to -45° in 5° steps. The azimuth angle can be adjusted with the U-bracket.

! X-UTILT shall only be used vertically.

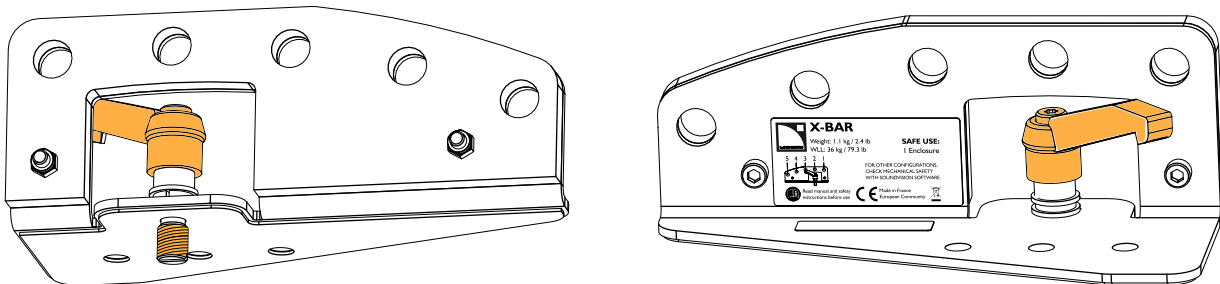
! Fasteners for wall-mounting
Secure the X-UTILT with two M10 screws.

Select screw length and anchors applicable to the wall properties.

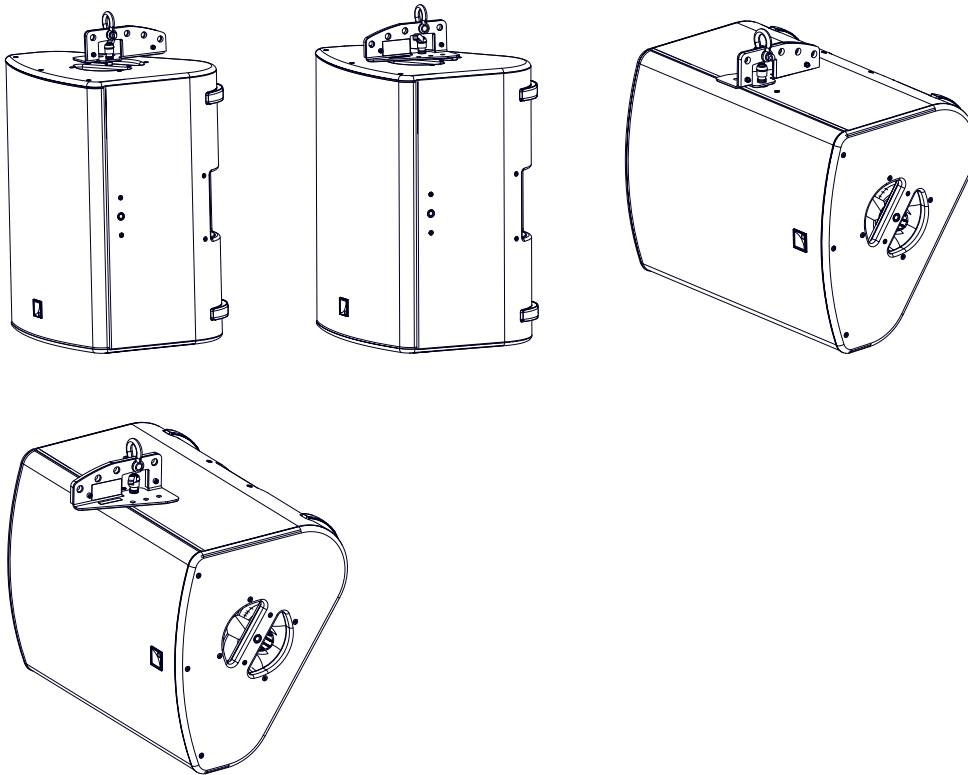


X-BAR

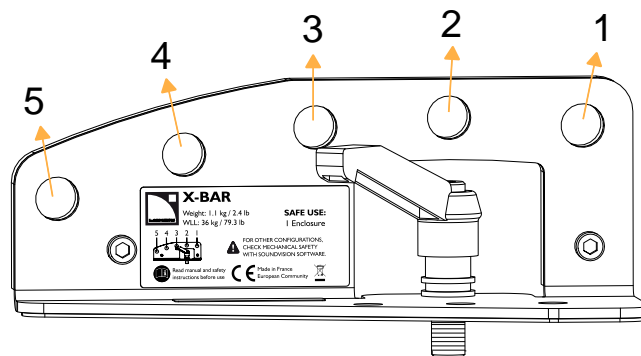
X-BAR is a rigging bar for flying . The rigging system consists of a threaded axis with a cam lever.



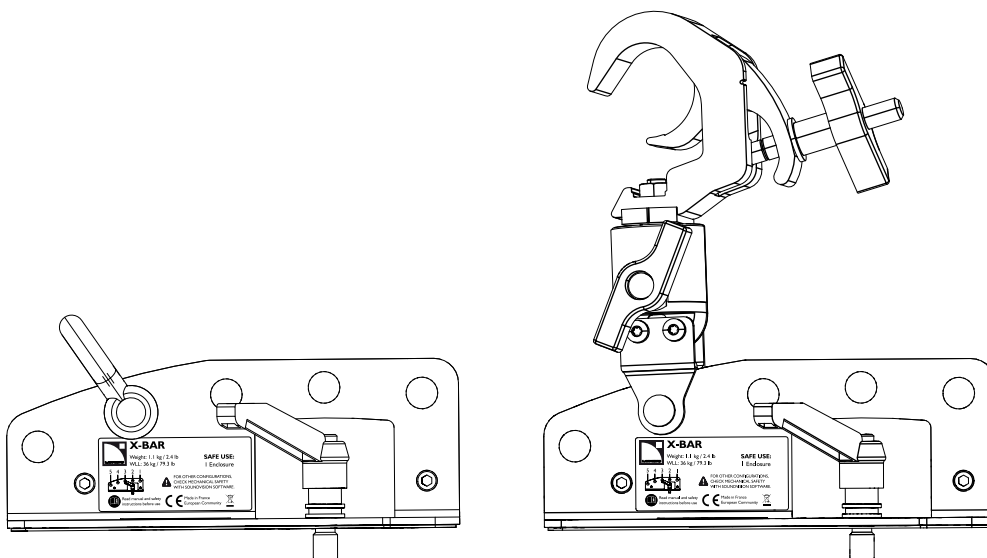
X-BAR is secured to the dedicated inserts on the enclosure, in front or rear extension position.



Five angulation holes are available.



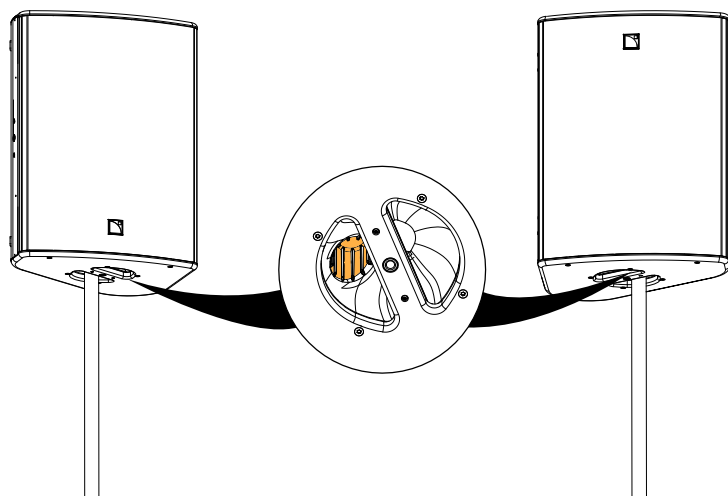
X-BAR is compatible with a Ø12 mm shackle WLL 1 t (provided) and with CLAMP250.



Elements for pole-mounting

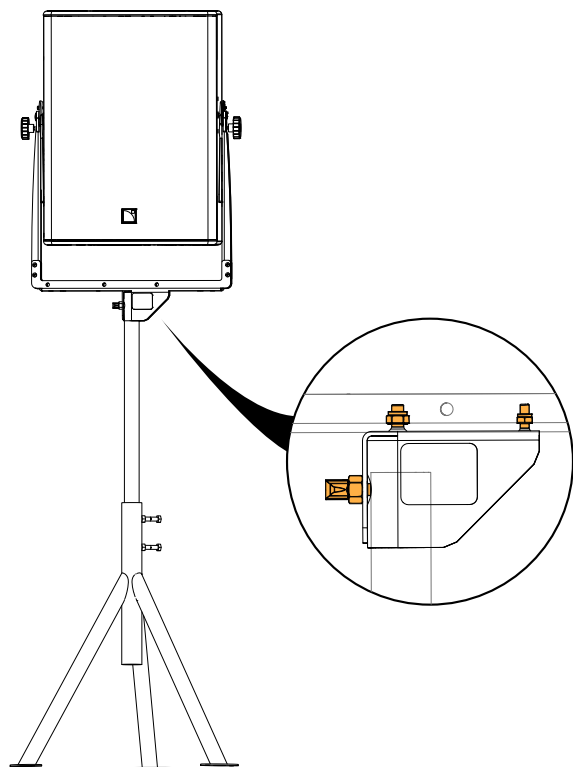
Pole sockets

X15 HiQ features two 35 mm pole sockets integrated in the handles.



EMBi

EMBi is a pole-mount adapter for X-US1215 (35 mm pole). The site angle can be adjusted with the U-bracket.



Subwoofers

KS21, SB18 feature a 35 mm pole socket.

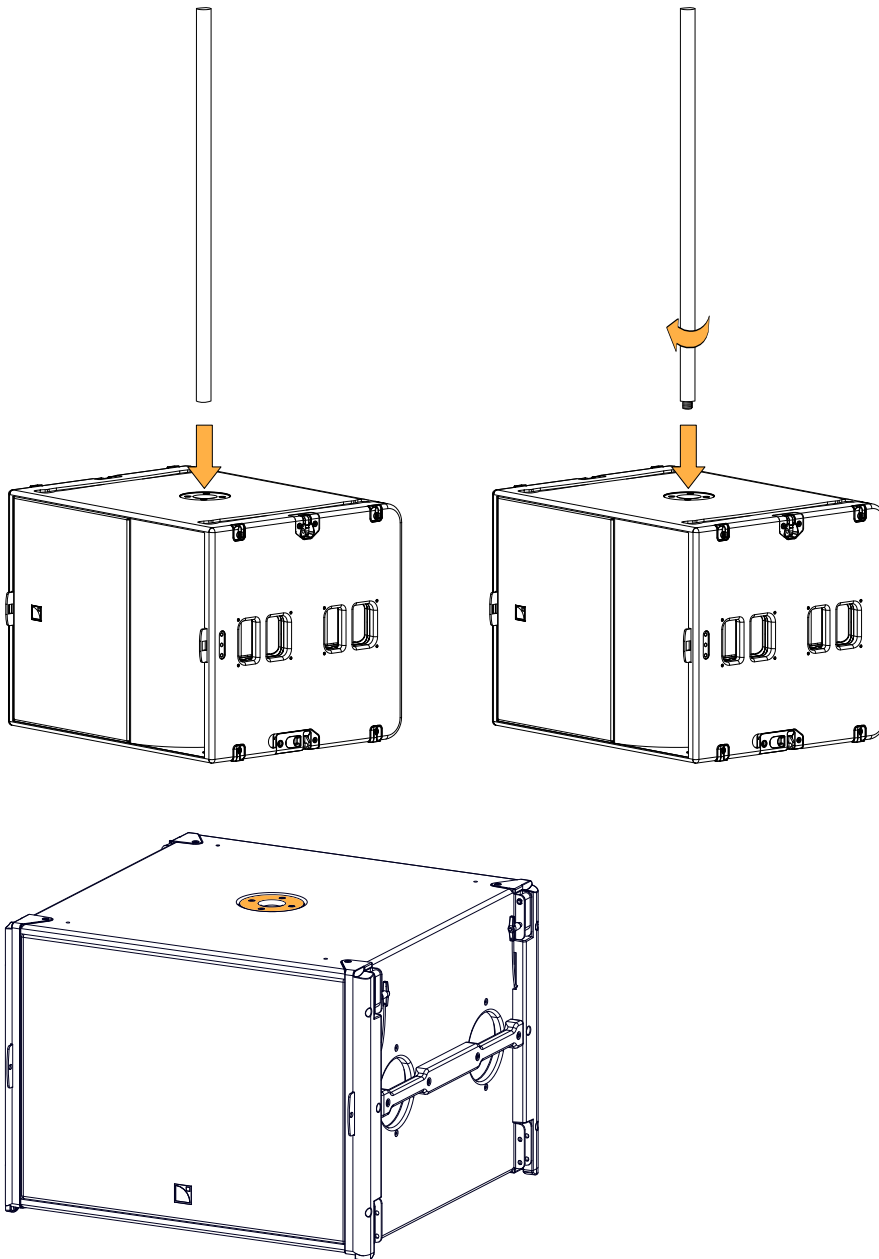
KS21 features a 35 mm pole-socket which contains an M20×150 insert.



Use a 35 mm diameter pole

The pole can be non-threaded or with M20 thread.

Use an adapter for poles with other dimensions, for example the 21329 adapter by K&M, available on www.k-m.de/en.



Mechanical safety

Flown configurations

The X15 HiQ 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 **5 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.

X15 HiQ

Configuration	Rigging accessory	Maximum / Safe limit
Flown	X-UTILT / X-US1215 / X-JL15 / X-BAR	1


Other configurations

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


X15 HiQ

Configuration	Rigging accessory	Maximum / Safe limit
Ground-stacked	No rigging accessory	1
Pole-mounted	35 mm pole / EMBi and X-US1215	1

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

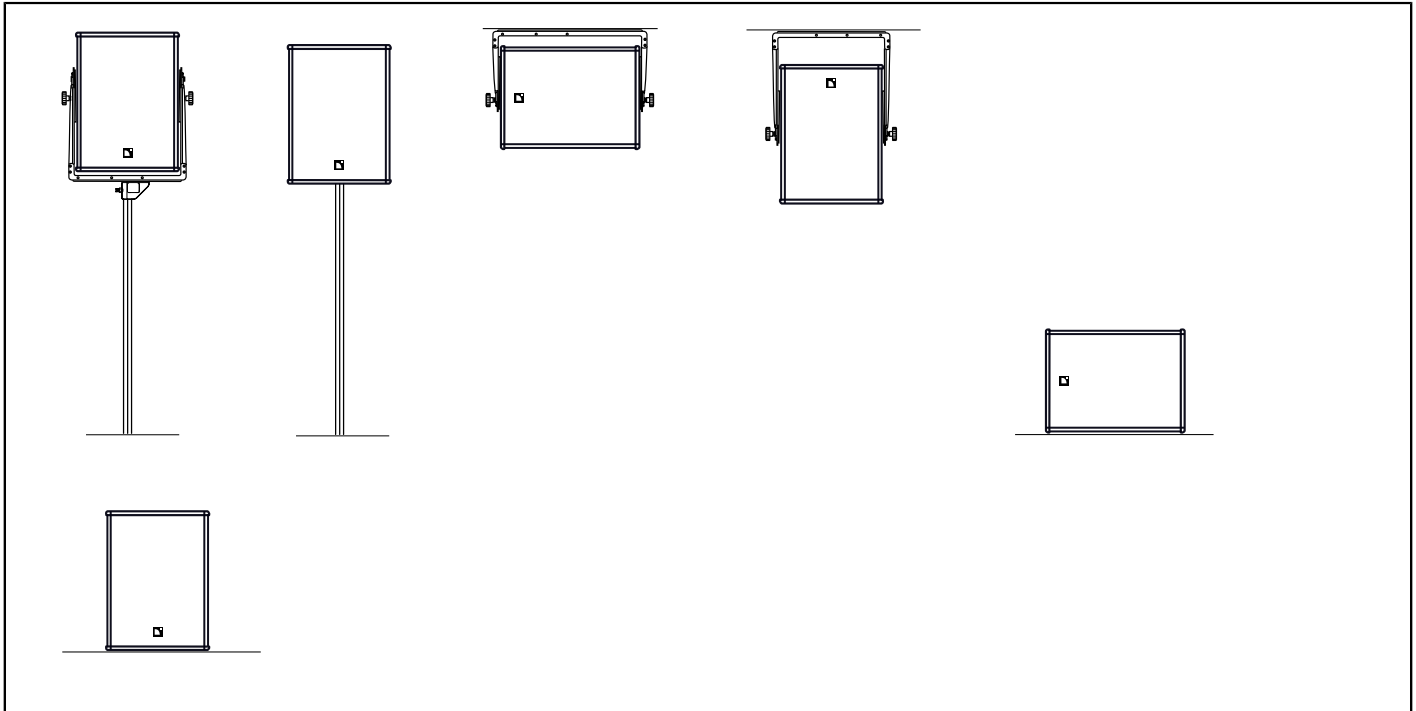
X15 HiQ point source

Deployed as a standalone point source, a X15 HiQ system operates over the nominal bandwidth of the X15 HiQ enclosure.

The [X15] preset allows for a reference frequency response in short throw applications.

The X15 HiQ enclosure is driven by the LA4X / LA8 / LA12X amplified controllers.

Standalone X15 HiQ



Enclosure	X15 HiQ
Preset	[X15]
Frequency range (-10 dB)	55 Hz - 20 kHz

X15 HiQ point source with LF

Deployed as a point source with SB18 and KS21 subwoofers, an X15 HiQ system operates with augmented LF resources.

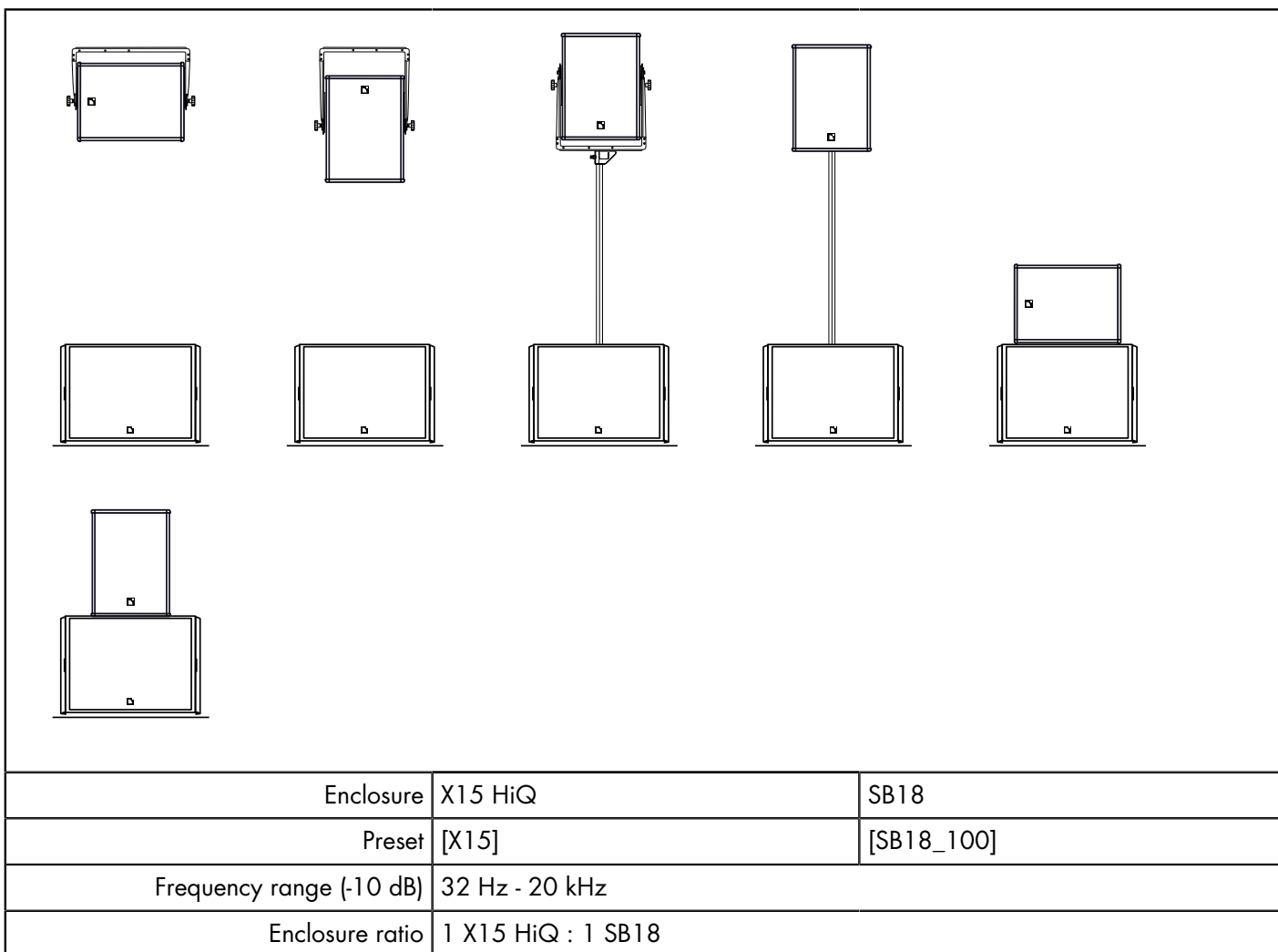
The [X15] preset allows for a reference frequency response in short throw applications.

The [SB18_100] and [KS21_100] presets provide the SB18 and KS21 with an upper frequency limit at 100 Hz for an optimal frequency coupling with the X15 HiQ.

The X15 HiQ, SB18, and KS21 enclosures are driven by the LA4X / LA8 / LA12X amplified controllers.

X15 HiQ with SB18

With SB18, the X15 HiQ system contour is reinforced by 4 dB at 60 Hz and 5 dB at 100 Hz, and the system bandwidth is extended down to 32 Hz.



! Delay values

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

! SB18 Ili is not mechanically compatible with pole-mounted configurations.

i Values and ratios are the same for SB18 Ili.

Pre-alignment delays

presets	pre-alignment delay values and polarity settings	
[X15] + [SB18_100]	X15 HiQ = 4 ms <input data-bbox="970 237 1018 282" type="checkbox"/>	SB18 = 0 ms <input data-bbox="1445 237 1493 282" type="checkbox"/>

X15 HiQ with KS21

With KS21, the X15 HiQ system contour is reinforced by 6 dB at 60 Hz and 2 dB at 100 Hz, and the system bandwidth is extended down to 31 Hz.

Enclosure	X15 HiQ	SB18
Preset	[X15]	[KS21_100]
Frequency range (-10 dB)	31 Hz - 20 kHz ([KS21_100])	
Enclosure ratio	1 X15 HiQ : 1 KS21	

! Delay values

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



KS21i is not mechanically compatible with pole-mounted configurations.



Values and ratios are the same for KS21i.

Pre-alignment delays

presets	pre-alignment delay values and polarity settings	
[X15] + [KS21_100]	X15 HiQ = 0 ms <input style="float: right;" type="button" value="+"/>	KS21 = 1.5 ms <input style="float: right;" type="button" value="+"/>

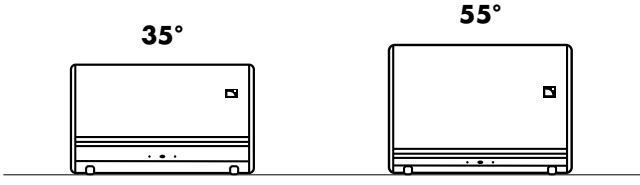
X15 HiQ stage monitor

Deployed as a stage monitor, an X15 HiQ system operates over the nominal bandwidth of the X15 HiQ enclosure.

The [X15_MO] preset allows for a reference frequency response in stage monitoring applications.

The X15 HiQ enclosure is driven by LA4X / LA8 / LA12X.

Standalone X15 HiQ


Enclosure X15 HiQ
Preset [X15_MO]
Frequency range (-10 dB) 52 Hz - 20 kHz

Low-latency preset

A low-latency preset is available for the X15 HiQ enclosure used as a monitor ([X15_MO]). It reduces latency from 3.84 ms down to 1.18 ms (LA8) and 0.84 ms (LA4X / LA12X). If the monitor is combined with a subwoofer, a custom preset must be used.

Paired X15 HiQ monitors with LFC

The Low Frequency Contour (LFC) tool implemented in LA Network Manager can compensate for coupling effects between closely operating monitors. LFC allows to adjust the frequency response curve to obtain the desired low frequency contour.

For paired X15 HiQ monitors, enter the following parameters to obtain the reference response curve of a single enclosure:

	LF Contour	
FREQ/RATIO	180	N/A
GAIN	-3.0	

For more information about LFC, refer to the **LA Network Manager Help** (section: Group Control Panel) and to the **Array Morphing** white paper, available on www.l-acoustics.com (Download Center).

X15 HiQ stage monitor with LF

Deployed as a stage monitor with SB18 and KS21 subwoofers, an X15 HiQ system operates with augmented LF resources.

The [X15_MO] preset allows for a reference frequency response in stage monitoring applications.

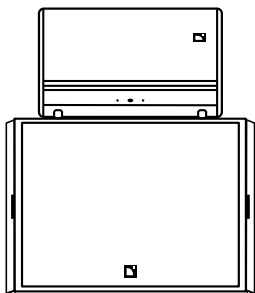
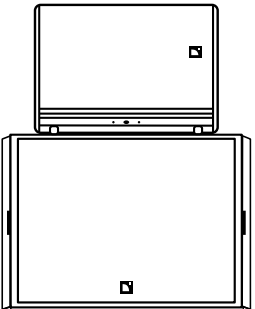
The [SB18_100] preset provides the SB18 with an upper frequency limit at 100 Hz for an optimal frequency coupling with the X15 HiQ.

The [KS21_100] preset provides the KS21 with an upper frequency limit at 100 Hz for an optimal frequency coupling with the X15 HiQ.

The X15 HiQ and SB18 enclosures are driven by the LA4X / LA8 / LA12X amplified controllers.

X15 HiQ with SB18



With SB18, the X15 HiQ system contour is reinforced by 5 dB at 100 Hz, and the system bandwidth is extended down to 32 Hz.


	35°	55°
		
Enclosure	X15 HiQ	SB18
Preset	[X15_MO]	[SB18_100]
Frequency range (-10 dB)	32 Hz - 20 kHz	
Enclosure ratio	1 X15 HiQ : 1 SB18	

Delay values

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

Pre-alignment delays

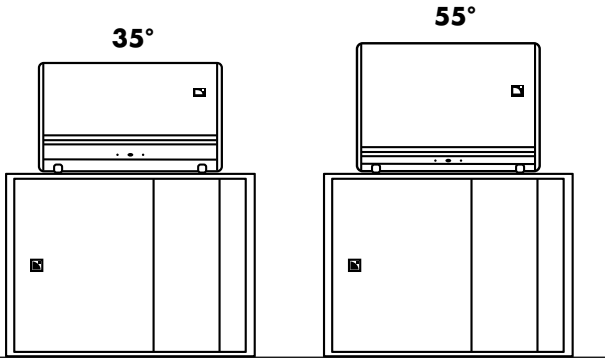
presets	pre-alignment delay values and polarity settings	
[X15_MO] + [SB18_100]	X15 HiQ = 0 ms 	SB18 = 1 ms 

 [xx_MO] presets for the X series use the amplified controller low latency operating mode. When used along with subwoofers, it is recommended to use the subwoofers in low latency operating mode. To achieve this, create custom presets combining low latency channel sets and subwoofer channel sets.

If the subwoofers are driven from a dedicated amplified controller using a subwoofer factory preset, they are operated in normal latency mode. Therefore, an additional delay should be set to the [xx_MO] low latency channels to align them: 2.66 ms on LA8 or 3.00 ms on LA4X and LA12X.

X15 HiQ with KS21



With KS21, the X15 HiQ system contour is reinforced by 6 dB at 60 Hz and 2 dB at 100 Hz, and the system bandwidth is extended down to 31 Hz.


		
Enclosure	X15 HiQ	KS21
Preset	[X15_MO]	[KS21_60] [KS21_100]
Frequency range (-10 dB)	29 Hz - 20 kHz ([KS21_60]) 31 Hz - 20 kHz ([KS21_100])	
Enclosure ratio	1 X15 HiQ : 1 KS21	

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	
[X15_MO] + [KS21_100]	X15 HiQ = 0 ms 	KS21 = 1.5 ms 

 [xx_MO] presets for the X series use the amplified controller low latency operating mode. When used along with subwoofers, it is recommended to use the subwoofers in low latency operating mode. To achieve this, create custom presets combining low latency channel sets and subwoofer channel sets.

If the subwoofers are driven from a dedicated amplified controller using a subwoofer factory preset, they are operated in normal latency mode. Therefore, an additional delay should be set to the [xx_MO] low latency channels to align them: 2.66 ms on LA8 or 3.00 ms on LA4X and LA12X.

Inspection and preventive maintenance

How to do preventive maintenance

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

Perform preventive maintenance at least once a year.

Refer to the maintenance manuals for advanced maintenance.

Rigging and hardware

Perform the [Rigging part inspection](#) (p.33) on each rigging part.

Use the [Mechanical system overview](#) (p.33) to identify critical parts of the system and apply the specific checks described in the [Inspection references](#) (p.38).

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

Acoustics

Perform the [Enclosure check](#) (p.40).

Perform the [Listening test](#) (p.42) to detect any degradation in sound quality.

If necessary, refer to the [Corrective maintenance](#) (p.70) section for speaker repair kits and maintenance instructions.

Rigging part inspection

About this task

For critical rigging parts, use the [Inspection references](#) (p.38) for comparison and specific manipulations.

Prerequisite

Perform the inspection in a well-lit environment.

Procedure

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

Check that the tethers are intact and safely secured.

3. Inspect the part from every side.

Compare with the **reference pictures**.

Check for:

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



Replacing screws

If a screw is loose, remove and replace it.

Always use the new screws provided in the repair kit.

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

Do not apply more than the indicated torque.

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

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

5. Check the **moving parts**.

Make sure that the mechanism engages correctly.



What to do next

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

Mechanical system overview

Critical parts of the lifting chains are highlighted.



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



Perform the [Rigging part inspection](#) (p.33) on critical parts.

For each part, refer to the [Inspection references](#) (p.38).



Replacing screws

If a screw is loose, remove and replace it.

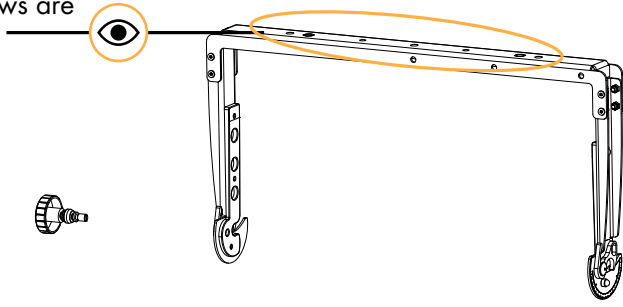
Always use the new screws provided in the repair kit.

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

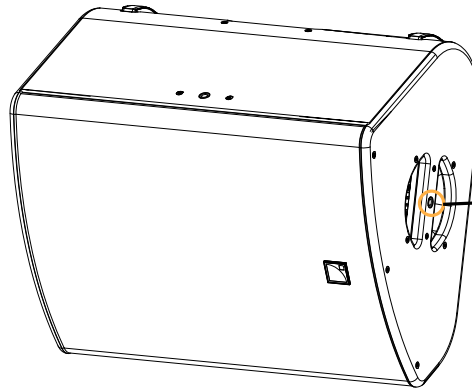
Do not apply more than the indicated torque.

X15 HiQ with X-UL15

the supporting screws are tightened



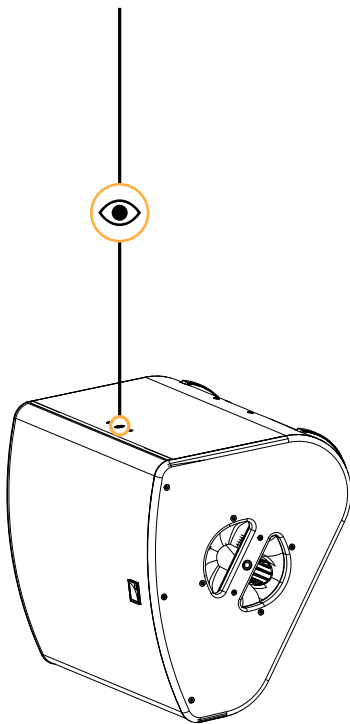
Threaded knobs (p.38)



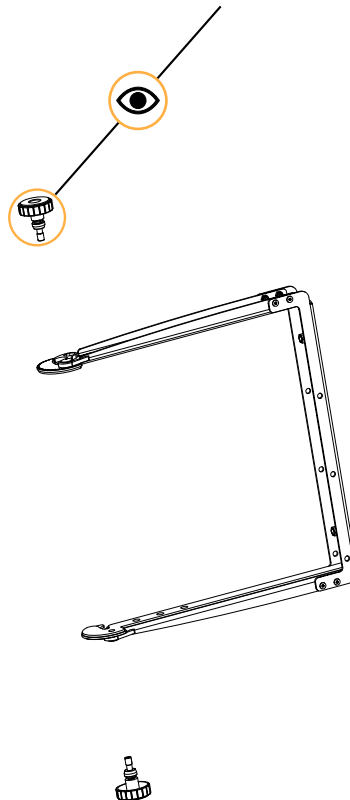
the inserts are not damaged

X15 HiQ with X-US1215 and X-UTILT

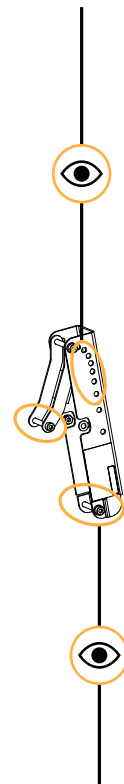
the inserts are not damaged



Threaded knobs (p.38)

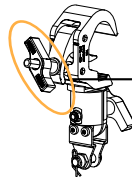


the supporting screws are tightened



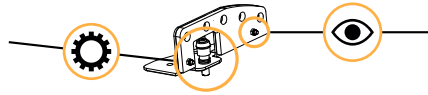
the axes are tightened and not bent

X15 HiQ with X-BAR and CLAMP250



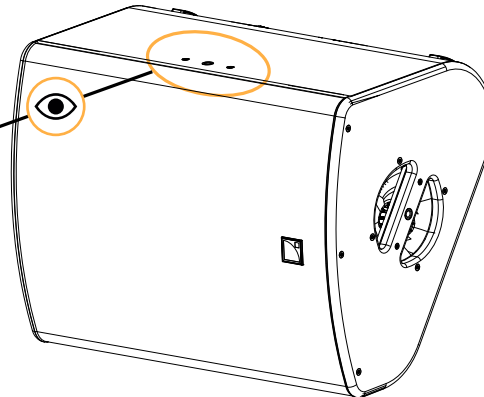
the wing knobs can be tightened and loosened by hand

pull up the lever and release it:
the lever returns to its initial position

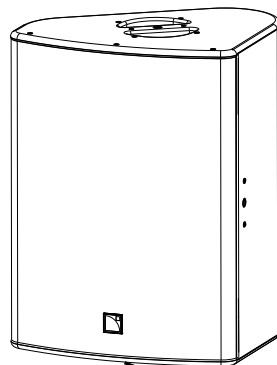


all screws are tightened

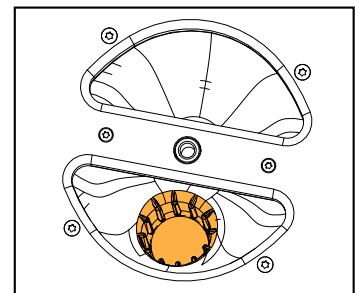
the top inserts are not damaged



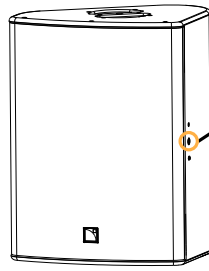
X15 HiQ pole-mounted



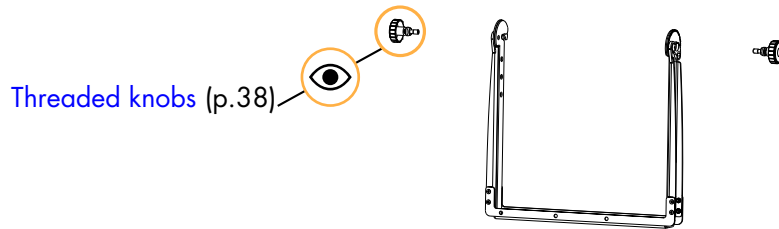
the pole-socket is not damaged



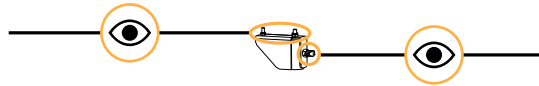
X15 HiQ pole-mounted with X-US1215 and EMBi on SB18



the inserts are not damaged



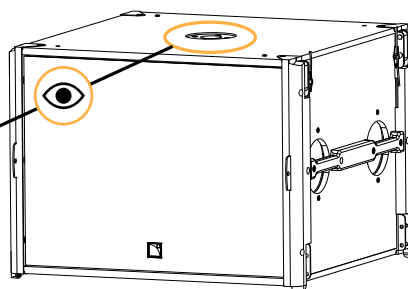
the screws are tightened



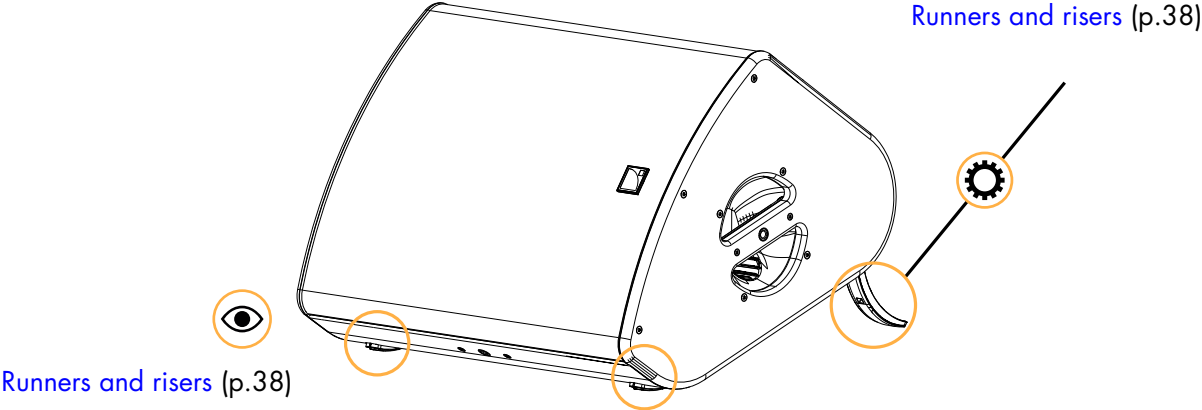
the wing knob is tightened



Pole-mount socket (p.39)



X15 HiQ on the ground

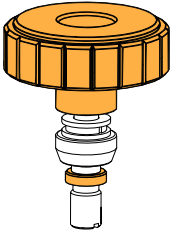


Inspection references

Threaded knobs

- Head part does not have cracks.
- Head part is tightly secured to the body part.
- All washers are present.

Reference pictures



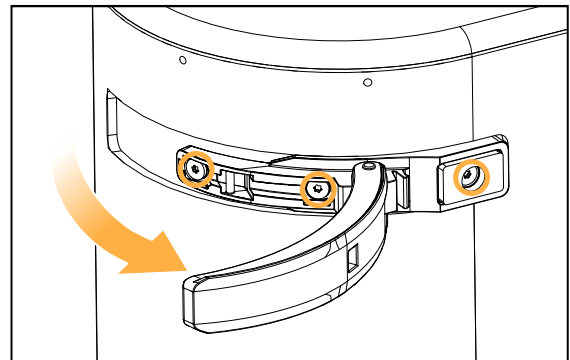
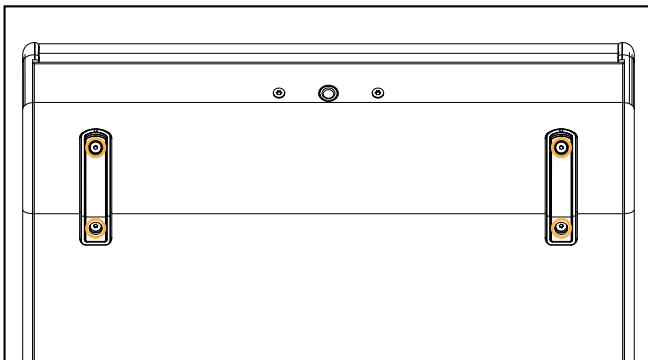
Related tasks

[Rigging part inspection](#) (p.33)

Runners and risers

- Runners are not worn out.
- Risers are not damaged and move correctly.
- Screws are tightened.

Reference pictures



! Contact your L-Acoustics representative for repair instructions.

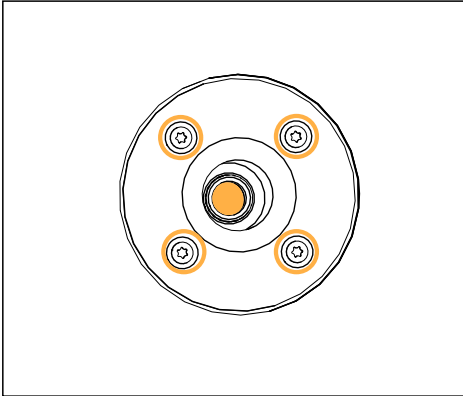
Related tasks

[Rigging part inspection](#) (p.33)

Pole-mount socket

- Pole-mount socket is not damaged or bent.
- Screws are tightened.
- Socket plug is present.

Reference pictures



! Contact your L-Acoustics representative for repair instructions.

Related tasks

[Rigging part inspection](#) (p.33)

Acoustical check

Enclosure check



This feature is available on:

LA4X
LA12X

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



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

Prerequisite



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

Environment and temperature:

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

Enclosures:

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

Connection:

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

Amplified controllers:

- LA4X must run at least firmware version 1.1.0.
- LA4X load sensors must be calibrated. Refer to the **Load Sensor Calibration Tool** technical bulletin for more information.
- LA4X must warm up for at least 10 minutes after power up. Do not power off, reboot or switch to standby mode to avoid resetting the countdown.
- Load a preset corresponding to the connected loudspeaker's family. Presets from the user memories may be used on condition they are made of presets supported in the embedded factory preset library.

Procedure

1. Power up the amplified controller. Let LA4X warm up for at least 10 minutes.
2. Connect the loudspeaker enclosures to the amplified controller.
3. Load a preset from or built from the embedded library corresponding to the connected loudspeaker family.
4. On the amplified controller, use the encoder wheel to select **MONITORING & INFO**. Press the OK key or the encoder wheel to validate.
5. Use the encoder wheel to select **ENCLOSURE CHECK**.



Beware of sound levels.

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

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

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

The amplified controller displays the results for each output.

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

result	interpretation	instructions
OK	measured impedance is within expected range	enclosure is in working order electrically
?	unsupported preset family	only supported enclosures should be tested
NC	Not Connected	if cables are connected: a. inspect the cables and connections b. go to step 8 (p.41)
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.41)
UNDEF	measured impedance is undefined	

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

The amplified controller displays:

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



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

Listening test

enclosure	preset	usable bandwidth
X15 HiQ	[X15]	55 Hz - 20 kHz

Procedure

1. Load the preset on an LA4X / LA8 / LA12X amplified controller.
2. Connect a sinus generator to the amplified controller.



Risk of hearing damage

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

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

Troubleshooting for LF speakers

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

Possible causes

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

Procedure

1. Perform the speaker disassembly procedure.
2. Visually inspect the cables and the connectors.
3. Visually inspect the speaker cone, the voice coil and the spider.

If any damage is visible, replace the speaker.

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

6. Repeat the listening test.

If the problem persists, replace the speaker.

Troubleshooting for HF drivers

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

Possible causes

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

Rigging procedures

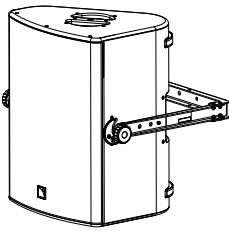
Mounting on a U-bracket

type of deployment	wall-mounting
	ceiling-mounting
rigging accessories	X-US1215 or X-UL15
additional material	3 x M10 screws
	electric screwdriver
min number of operators	1 or 2

! **Additional safety for flown arrays**
When flying an enclosure or an array, use the M8 DIN580 threaded insert to implement a secondary safety.

! **Ceiling-mounting**
Additional holes on the short U-bracket can be used for optimal visual impact.
In this case, the rigging procedure will require 2 operators.

! **Short U-bracket in horizontal position**
In this position, the enclosure applies a diagonal force of **419 daN** on the anchoring points.



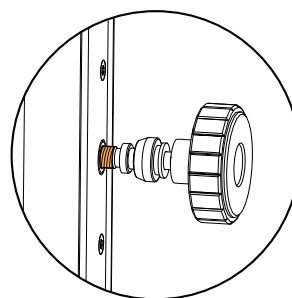
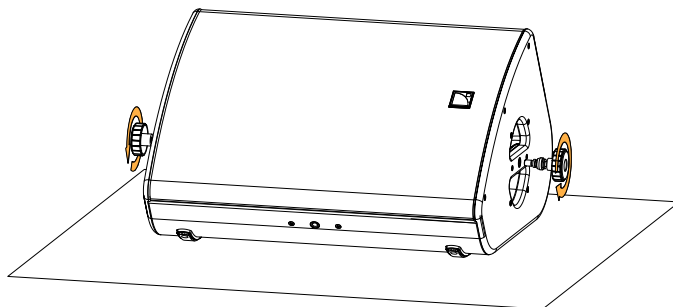
! **Fasteners for wall-mounting or ceiling-mounting**
Secure the bracket with three M10 screws.
Select screw length and anchors applicable to the wall or ceiling properties.

i **The procedure is shown with X-UL15 in horizontal position.**
The same procedure applies for X-UL15 in vertical position or in ceiling-mounting configuration and X-US1215 in horizontal or vertical position or in ceiling-mounting configuration.

Assembly

Procedure

1. Drive the knobs in the inserts on the enclosure.
Stop when the threading is halfway in.



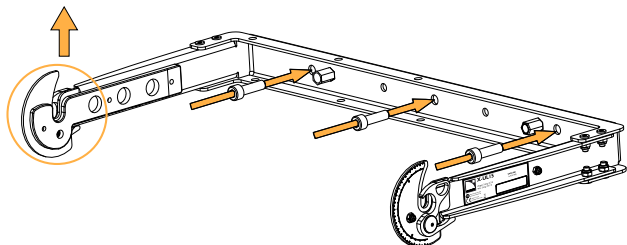
! When securing the U-bracket horizontally, make sure the hooks are oriented upwards.

! **Fasteners for wall-mounting or ceiling-mounting**

Secure the bracket with three M10 screws.

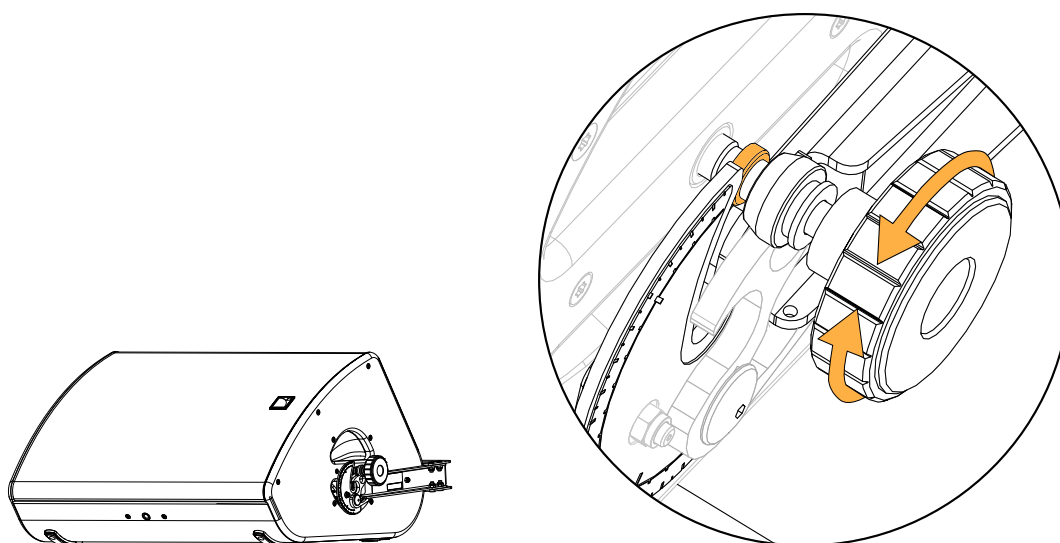
Select screw length and anchors applicable to the wall or ceiling properties.

- Secure the U-bracket to the wall using M10 screws.

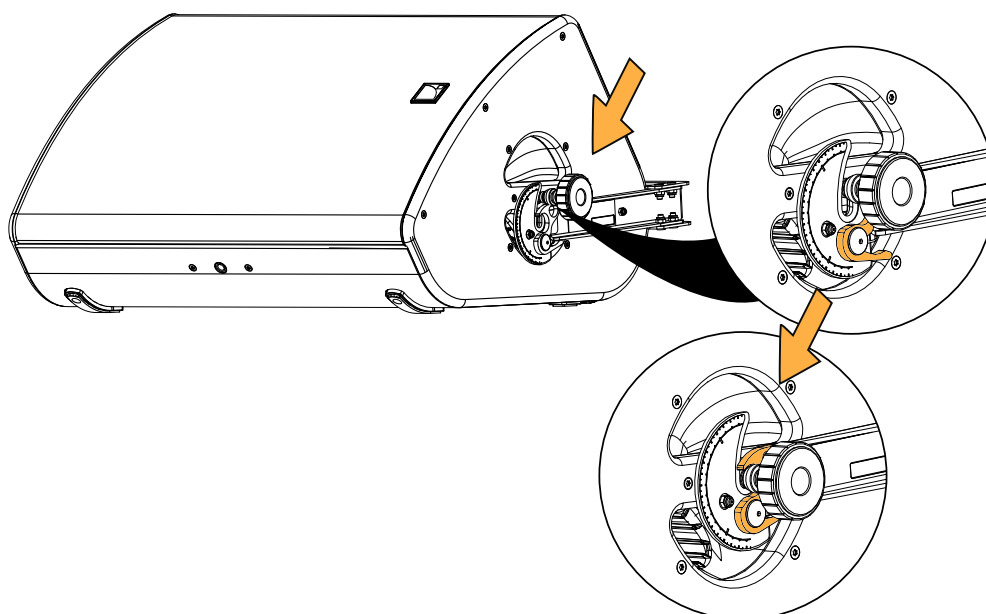


- Lift the enclosure by the knobs and place it inside the U-bracket.

Adjust the knobs on both sides so that the safety washer is between the hook and the enclosure.



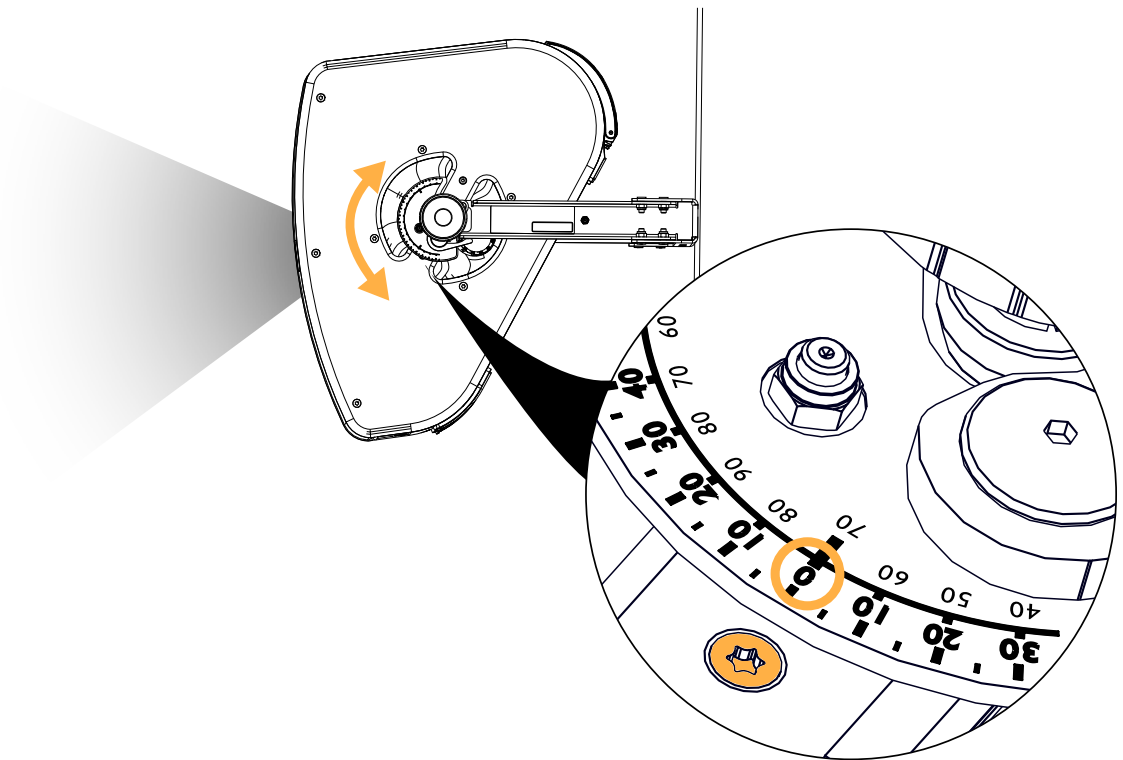
- Push until the knobs are locked inside the spring-lock safety mechanism.



SHLAK!

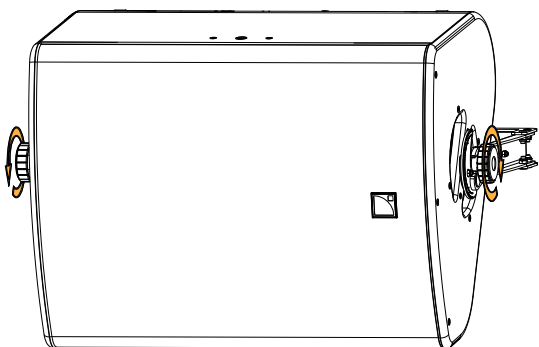
5. Set the site angle.

Use the screw as a reference point to read the label.



6. Tighten the knobs.

Make sure the enclosure is steady.



Disassembly

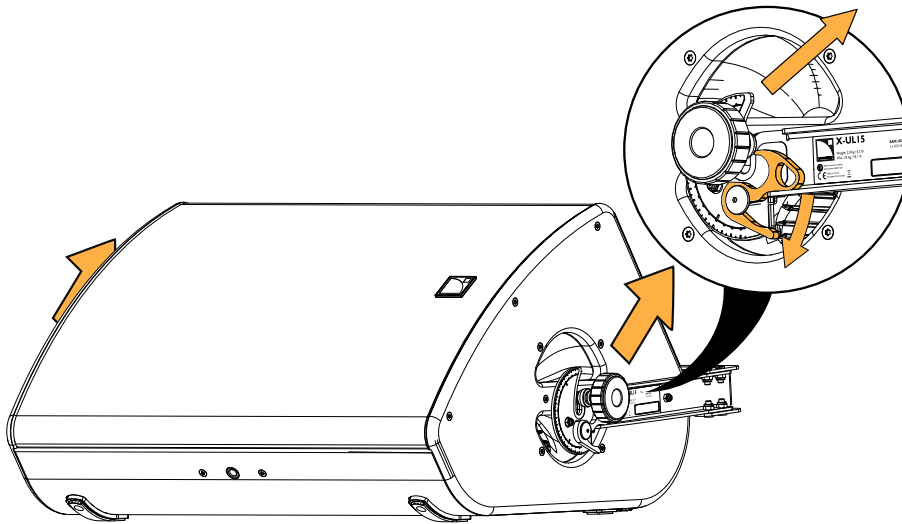
Procedure

1. Loosen the knobs until the enclosure can rotate freely.



Do not unscrew the knobs all the way.

2. On both sides, pull on the safety mechanism while lifting the enclosure by the knobs to release it.



3. Remove the U-bracket from the wall.

Using a U-bracket with X-UTILT

type of deployment	wall-mounting
rigging accessories	X-US1215 or X-UL15
	X-UTILT
additional material	2 x M10 screws
	electric screwdriver
min number of operators	1

⚠ Additional safety for flown arrays
When flying an enclosure or an array, use the M8 DIN580 threaded insert to implement a secondary safety.

⚠ Fasteners for wall-mounting
Secure the X-UTILT with two M10 screws.
Select screw length and anchors applicable to the wall properties.

i The procedure is shown with X-UL15
The same procedure applies for X-US1215.

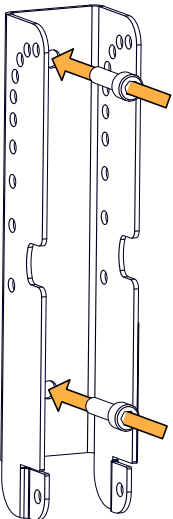
Assembly

Procedure

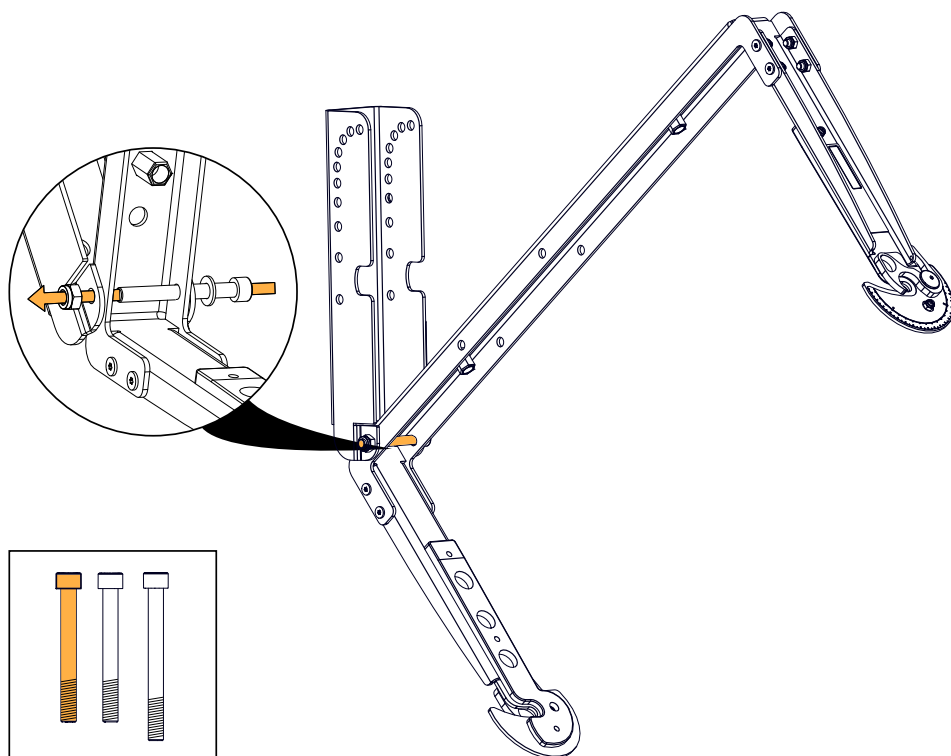
⚠ X-UTILT shall only be used vertically.

⚠ Fasteners for wall-mounting
Secure the X-UTILT with two M10 screws.
Select screw length and anchors applicable to the wall properties.

1. Secure X-UTILT to the wall using M10 screws.

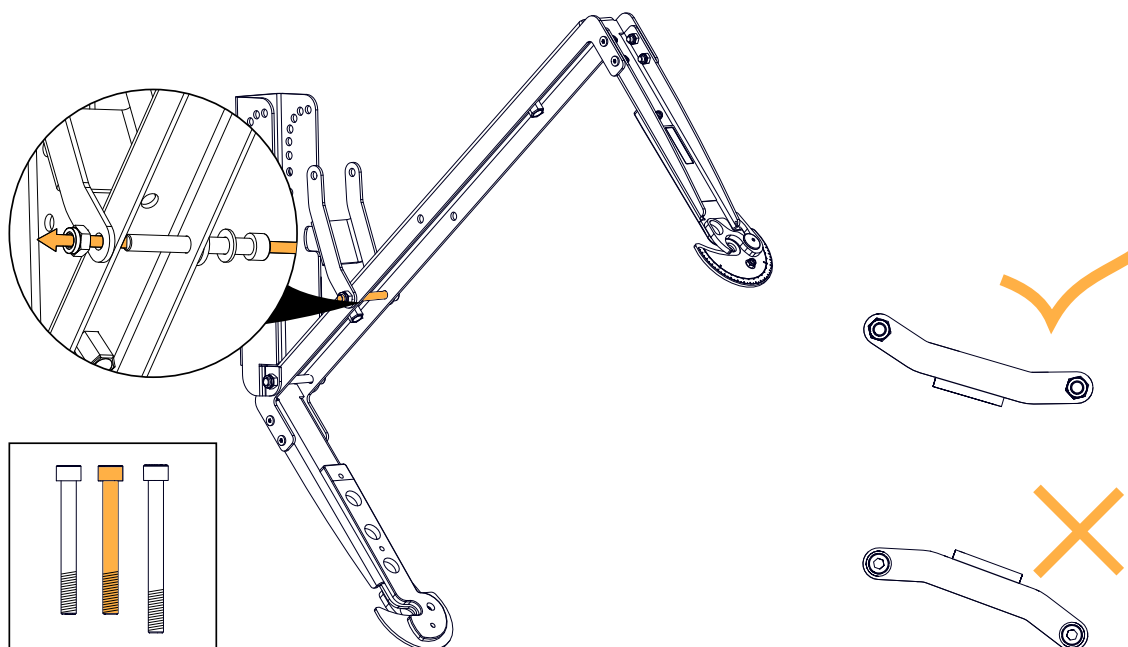


2. Secure the U-bracket to X-UTILT.

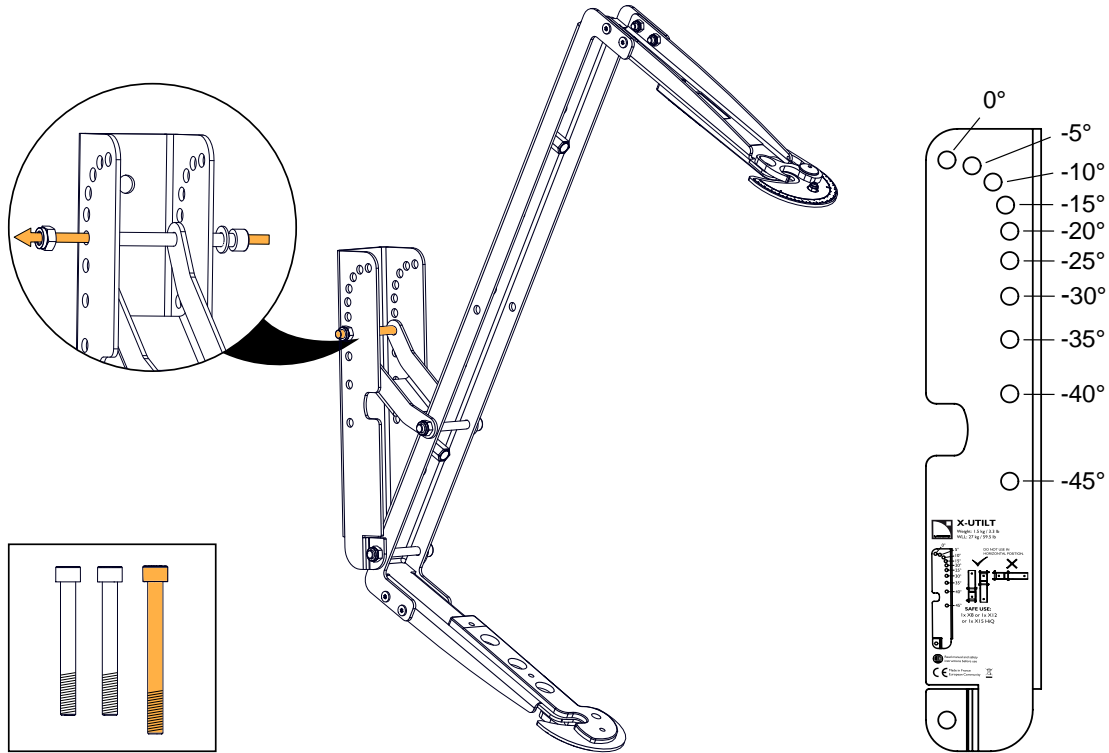


3. Secure the rigging arm to the U-bracket.

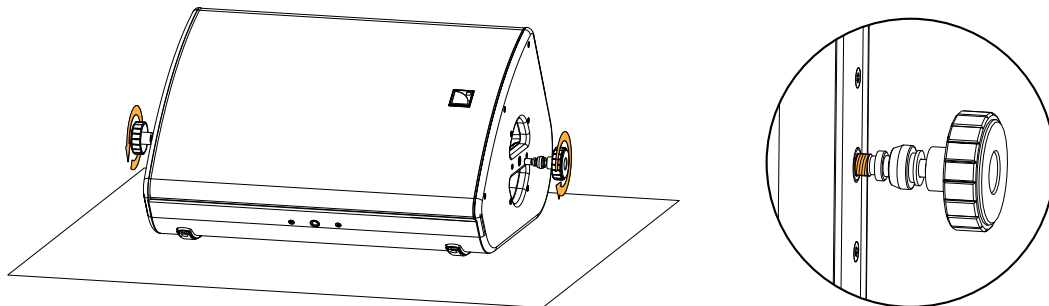
- !** Make sure the rigging arm is in the correct position.
- !** Always use the central insert.



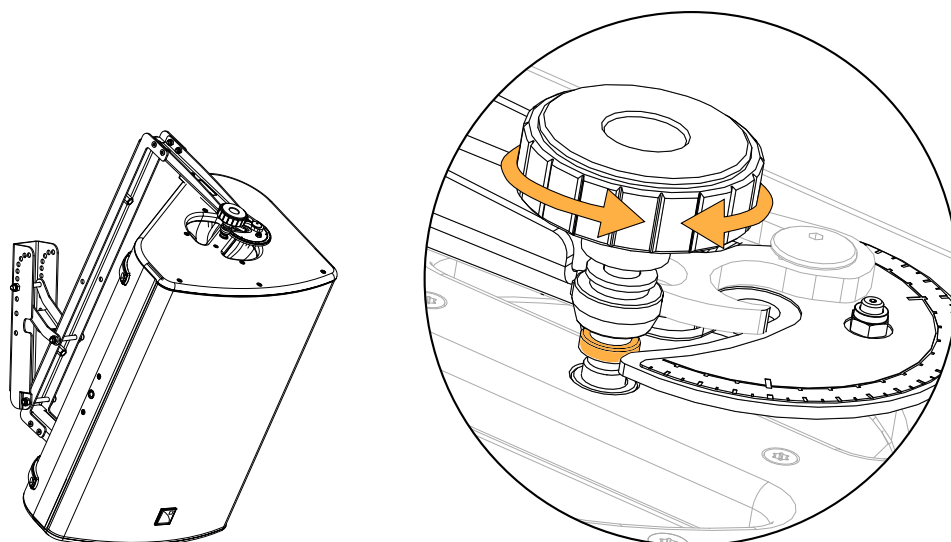
- 4.** Choose the site angle and secure the rigging arm to X-UTIL.
Refer to the angles on the label.



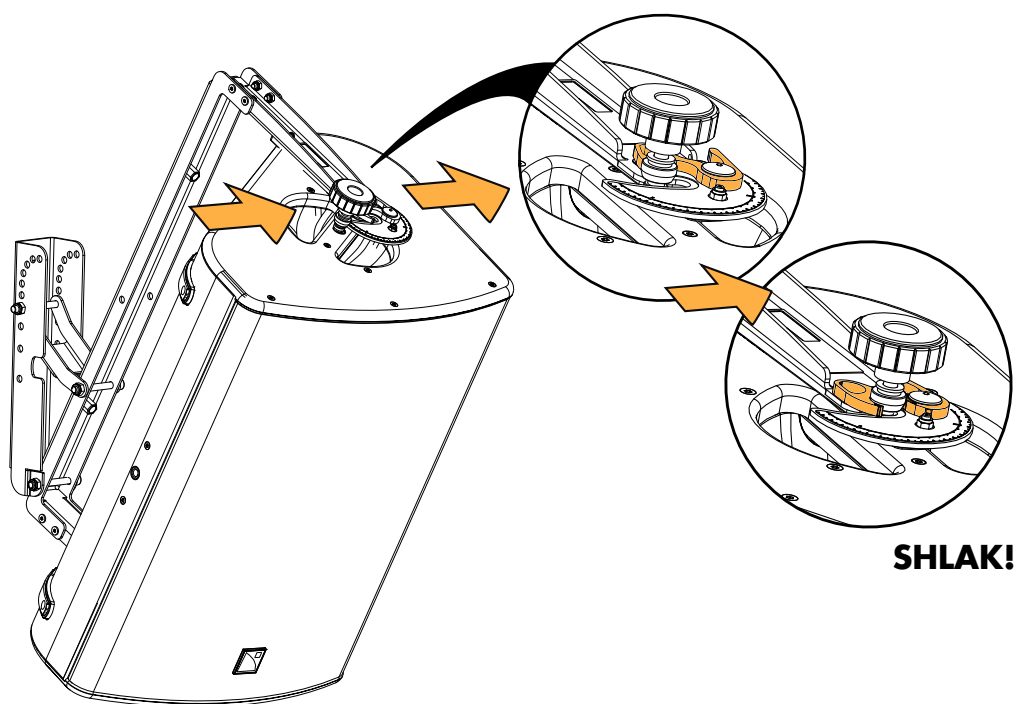
- 5.** Drive the knobs in the inserts on the enclosure.
Stop when the threading is halfway in.



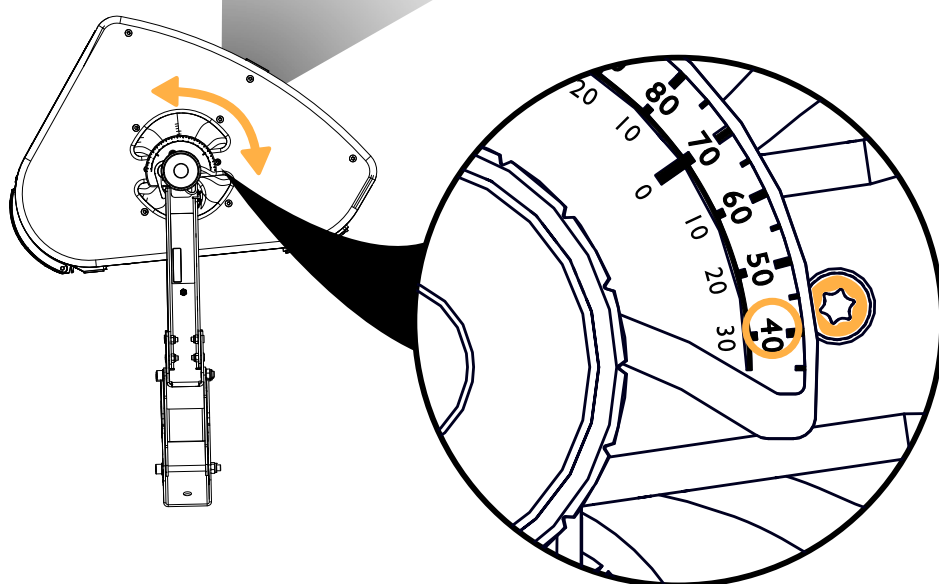
- 6.** Lift the enclosure by the knobs and place it inside the U-bracket.
Adjust the knobs on both sides so that the safety washer is between the hook and the enclosure.



7. Push until the knobs are locked inside the spring-lock safety mechanism.

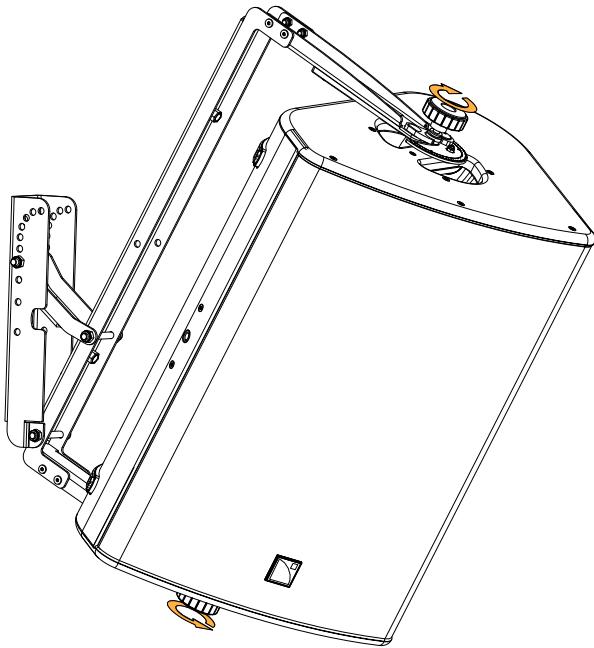


8. Set the azimuth angle.
Use the screw as a reference point to read the label.



9. Tighten the knobs.

Make sure the enclosure is steady.



Disassembly

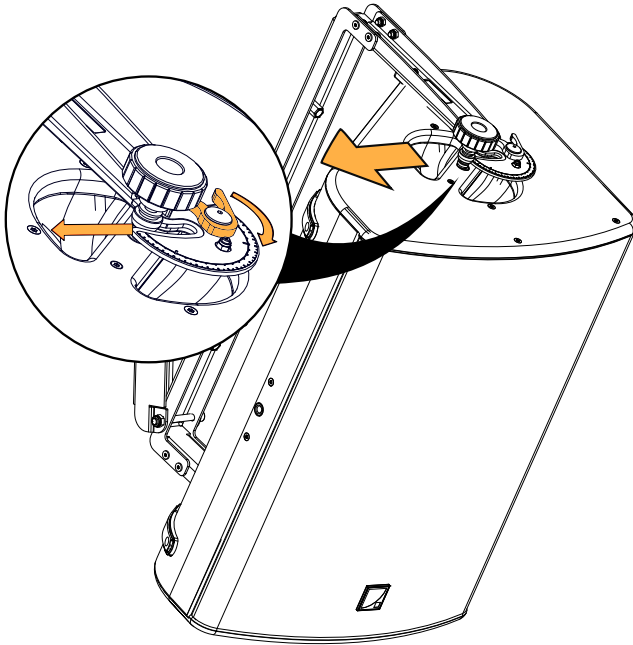
Procedure

1. Loosen the knobs until the enclosure can rotate freely.



Do not unscrew the knobs all the way.

2. On both sides, pull on the safety mechanism while sliding the enclosure out of the U-bracket.



3. Remove the U-bracket and X-UTILT from the wall.

Flying with a U-bracket

type of deployment	flying
rigging accessories	X-US1215 or X-UL15
additional material	truss clamp
min number of operators	1

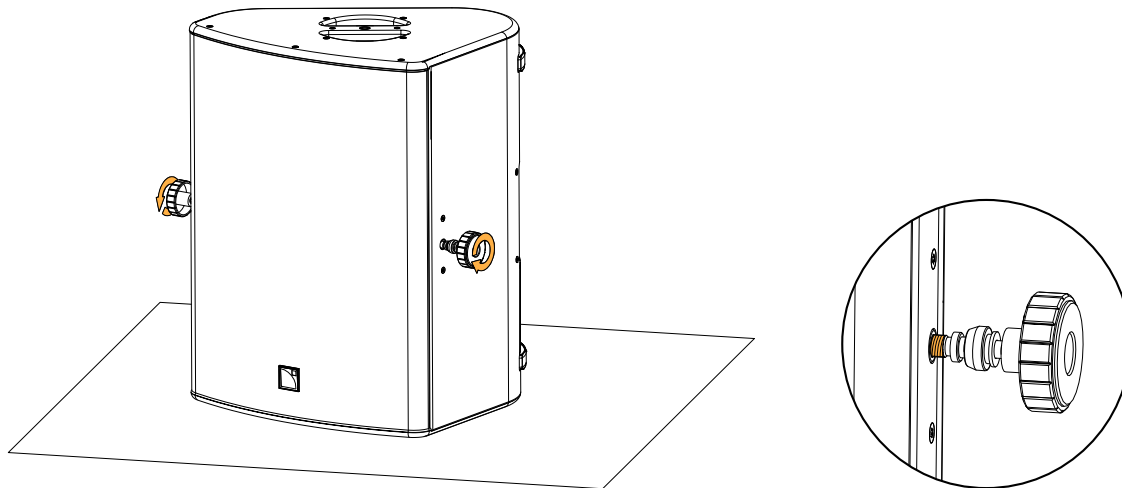
! **Additional safety for flown arrays**
When flying an enclosure or an array, use the M8 DIN580 threaded insert to implement a secondary safety.

i **The procedure is shown with X-US1215.**
The same procedure applies for X-UL15.

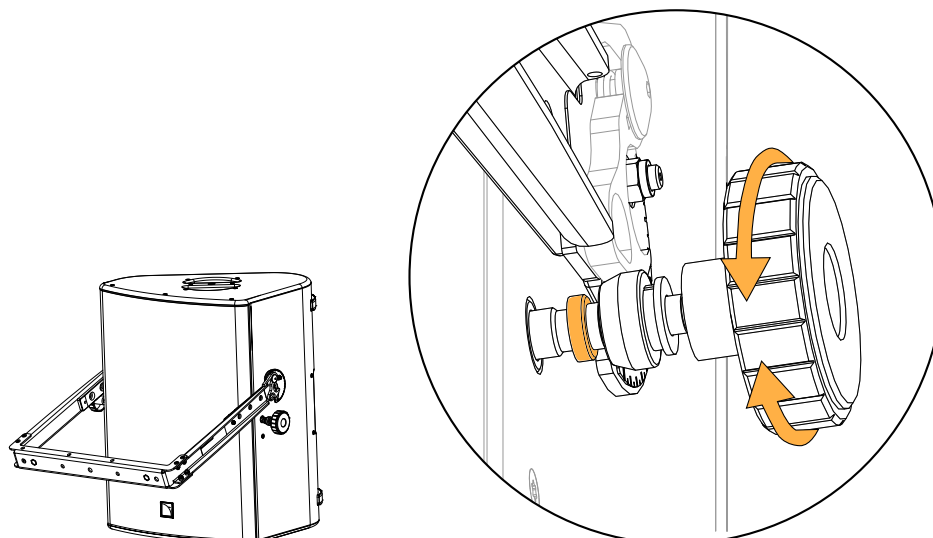
Assembly

Procedure

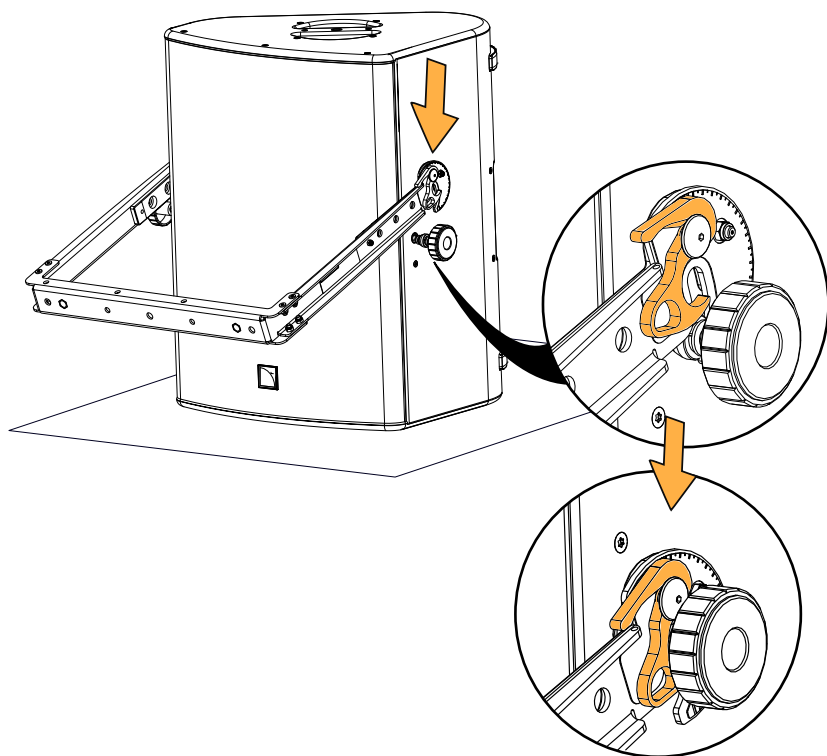
1. Drive the knobs in the inserts on the enclosure.
Stop when the threading is halfway in.



2. Place the U-bracket around the assembly.
Adjust the knobs on both sides so that the safety washer is between the hook and the enclosure.



3. Push down until the knobs are locked inside the spring-lock mechanism.

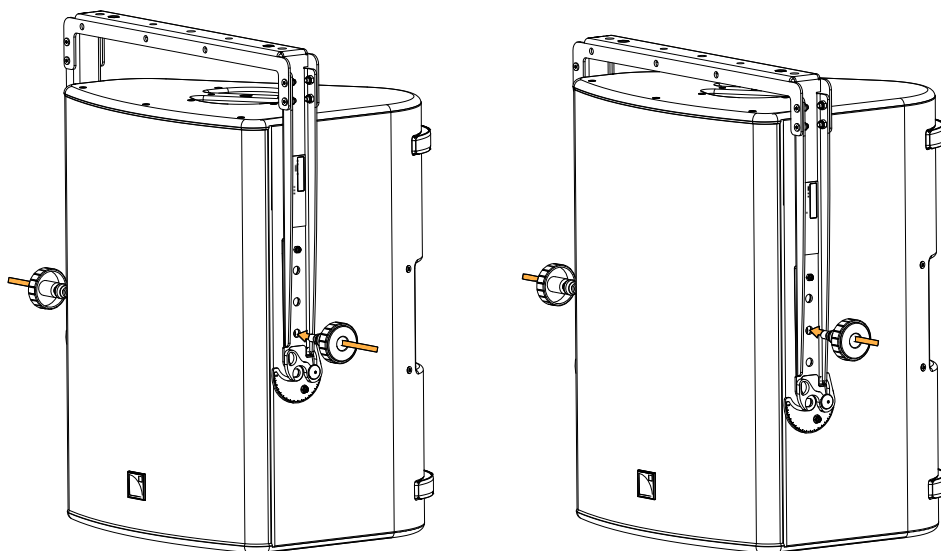


SHLAK!

Alternatively, use the additional holes on the U-bracket.

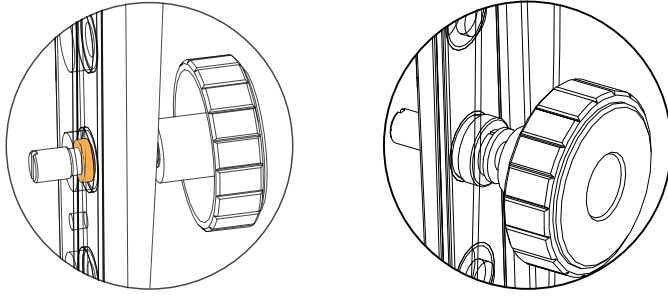


The hooks on the bracket must be oriented towards the front of the enclosure.

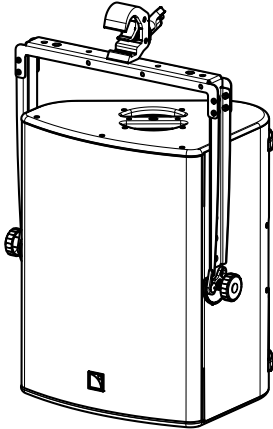




Make sure the safety washer goes through the hole on the bracket.

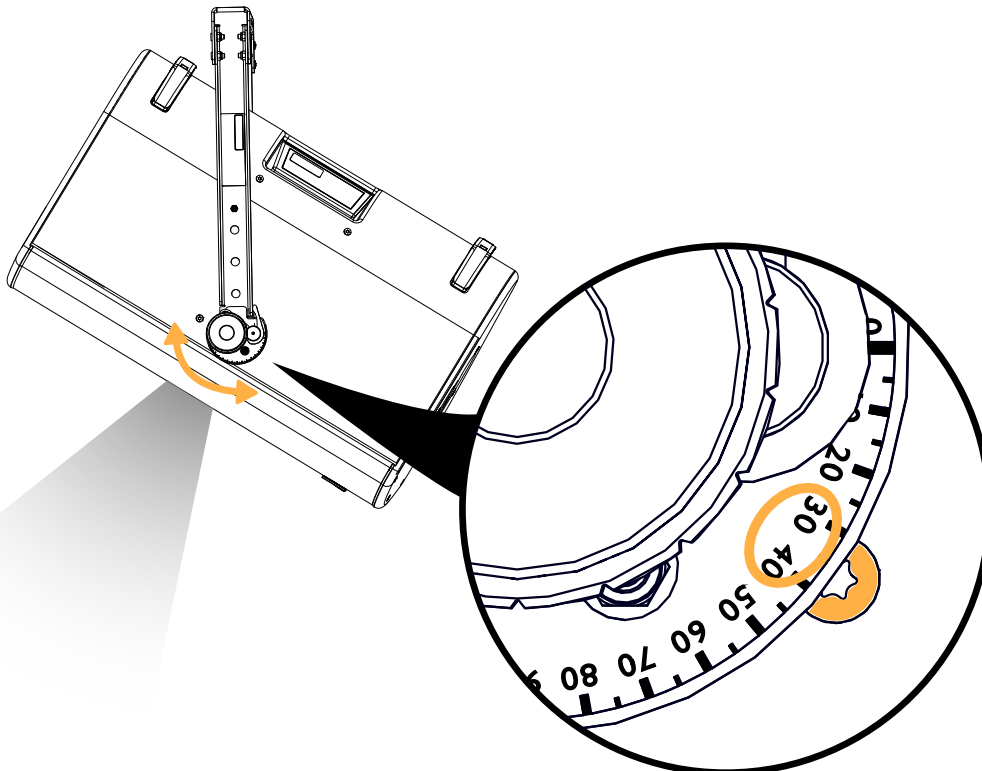


4. Tighten the knobs and fly the enclosure with a clamp.



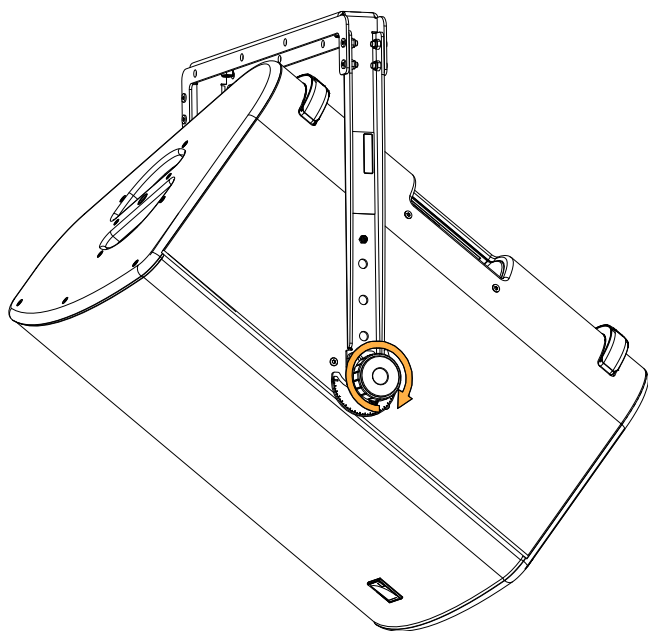
5. Loosen the knobs to set the site angle.

Use the screw as a reference point to read the label.

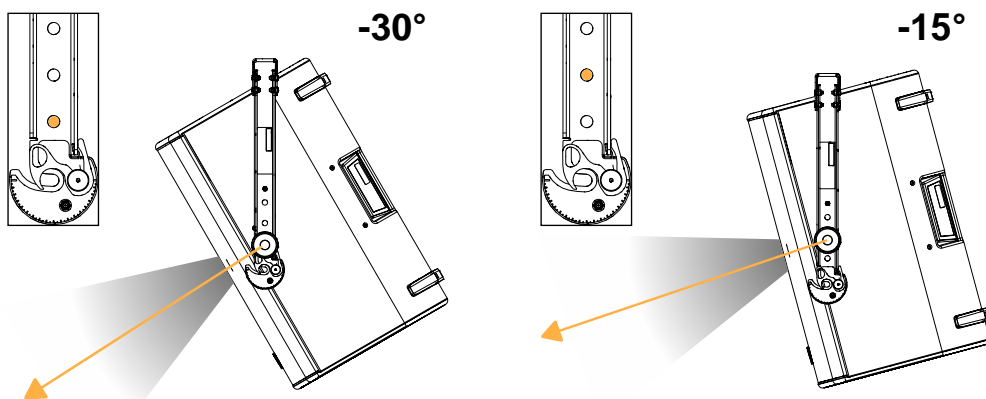


6. Tighten the knobs.

Make sure the enclosure is steady.

**Maximum angles**

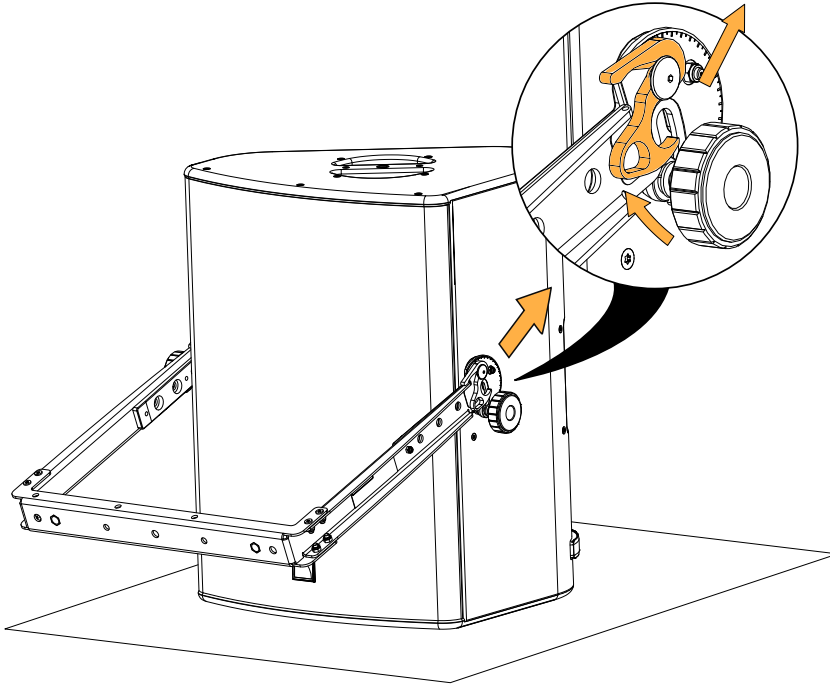
When using the additional holes on the U-bracket, consider the maximum negative site angle available.



Disassembly

Procedure

1. Place the enclosure on a flat surface.
2. Loosen the knobs.
3. Pull on the safety mechanism and remove the U-bracket from the enclosure.



Flying with X-BAR

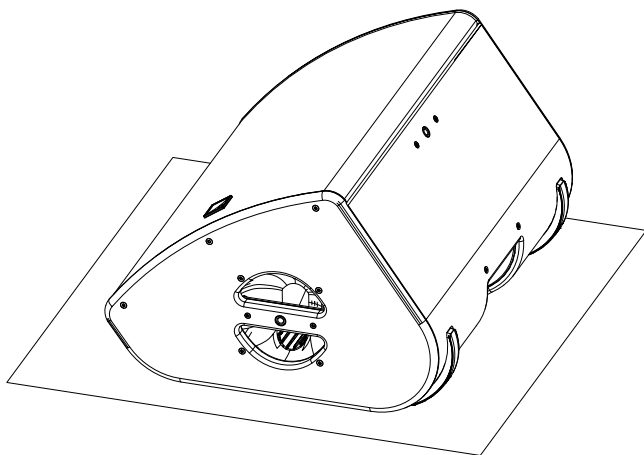
type of deployment	flying
rigging accessories	X-BAR
additional material	Ø12 mm shackles WLL 1 t (provided)
	CLAMP250 (optional)
min number of operators	1

! **Additional safety for flown arrays**
When flying an enclosure or an array, use the M8 DIN580 threaded insert to implement a secondary safety.

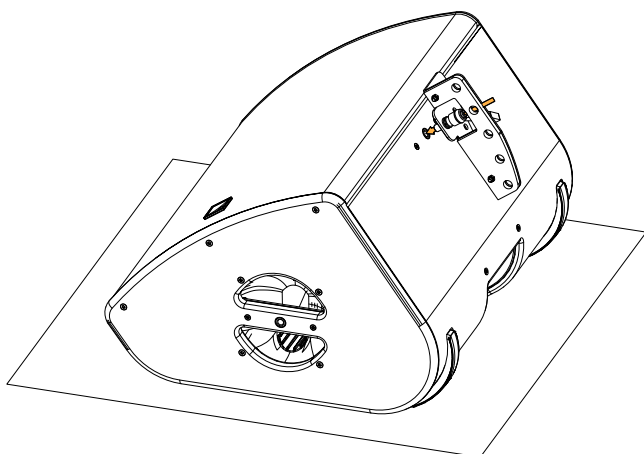
Assembly

Procedure

1. Lay the enclosure on a flat surface.

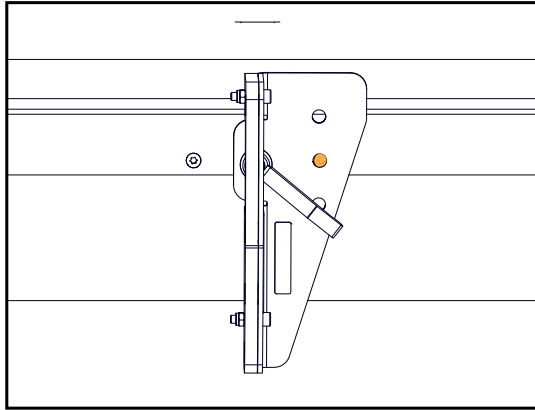
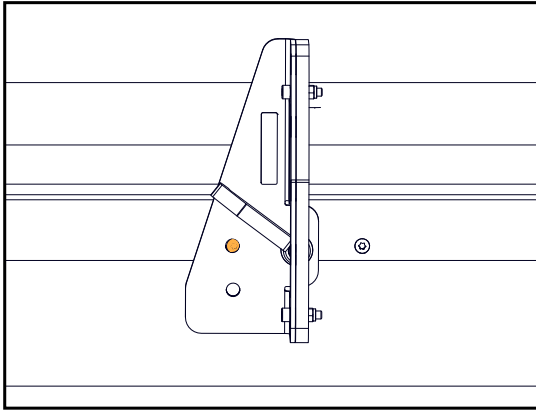


2. Drive the X-BAR in the insert.



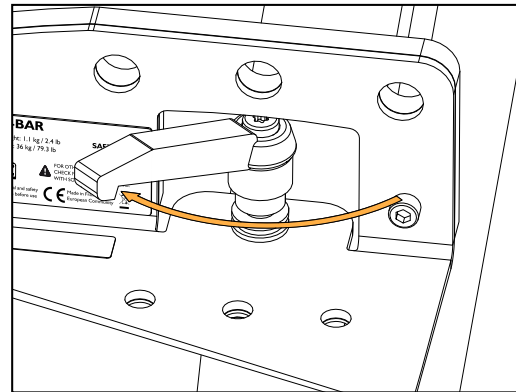
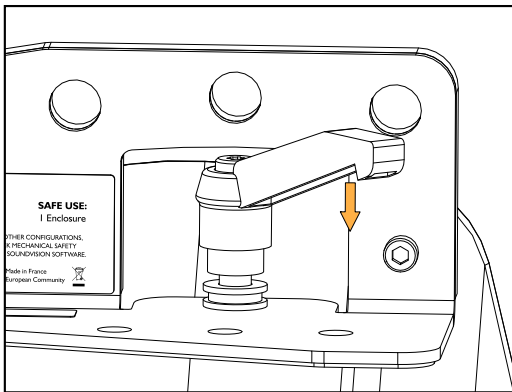
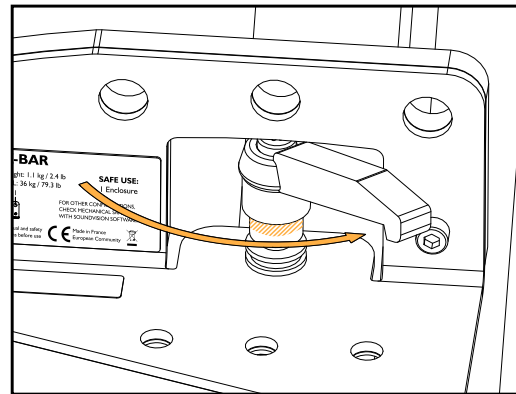
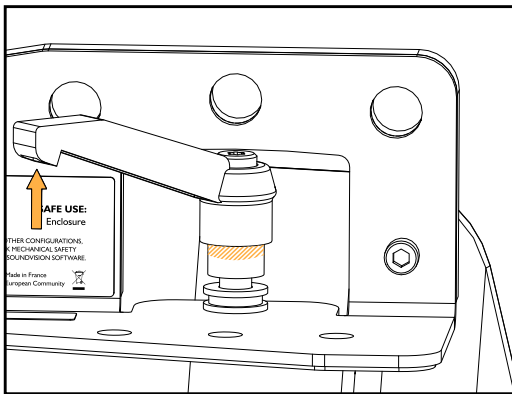
3. Rotate the X-BAR until perpendicular to the front grill.

Use the screws as reference points.



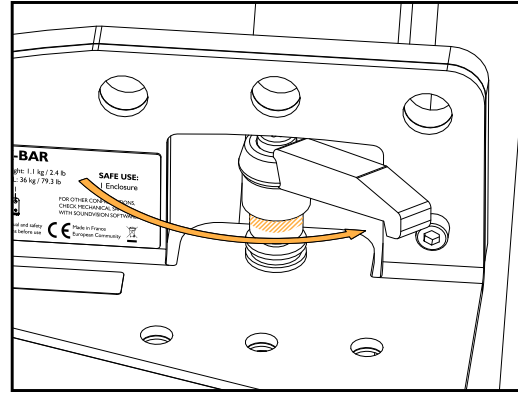
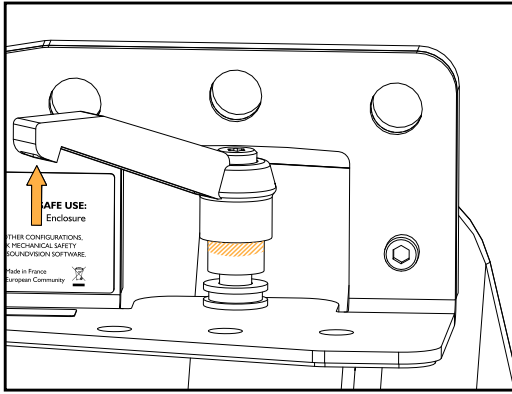
4. Tighten the X-BAR.

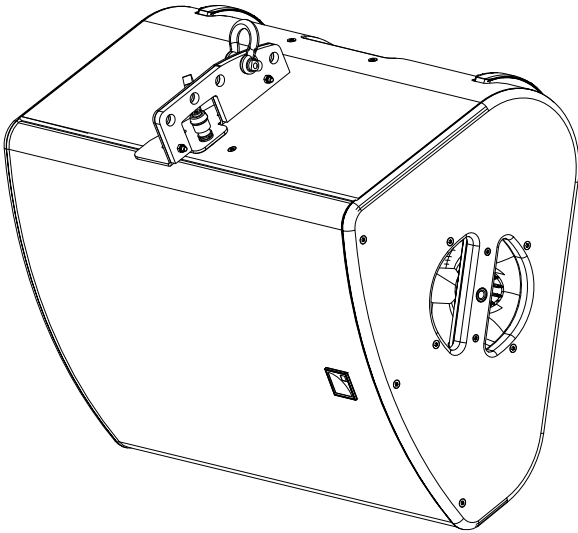
a) Lift the lever and rotate it counter-clockwise, release the lever and rotate it clockwise.



Repeat until the X-BAR is tightly secured.

b) Finally, store the lever on the right.

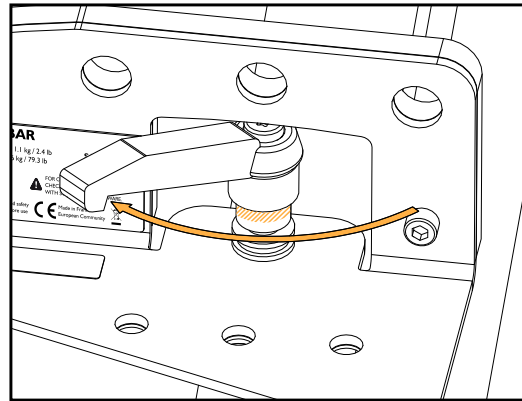
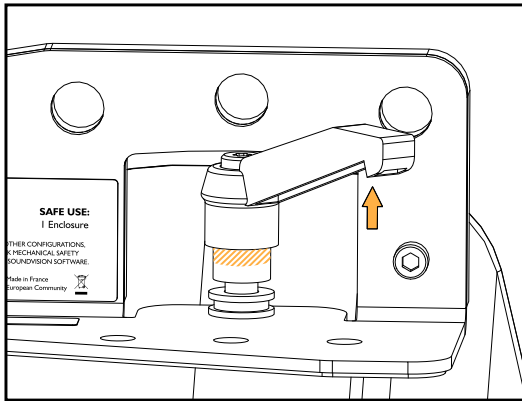


6. Lift the assembly.

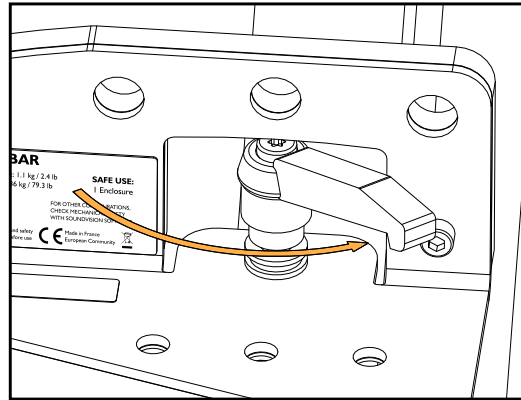
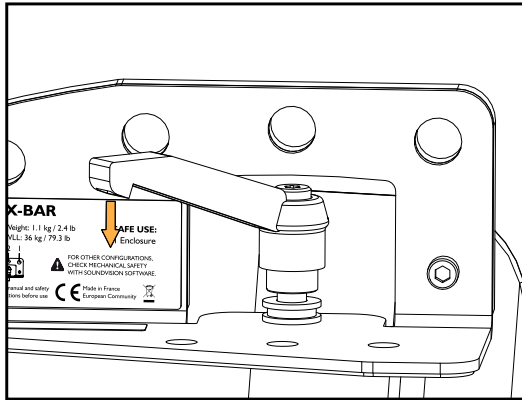
Disassembly

Procedure

1. Take down the assembly.
2. Lift the lever and rotate it clockwise.



3. Release the lever and rotate it counter-clockwise.



4. Repeat until the X-BAR can be removed.

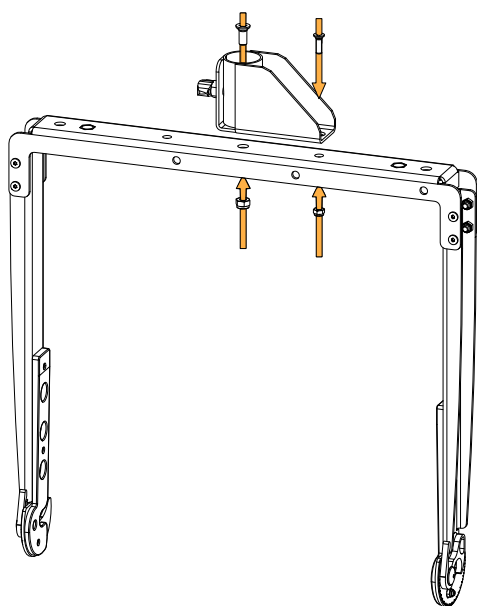
Pole-mounting with a U-bracket

type of deployment	pole-mounting
rigging accessories	X-US1215
	EMBi
additional material	35 mm pole
min number of operators	1

Assembly

Procedure

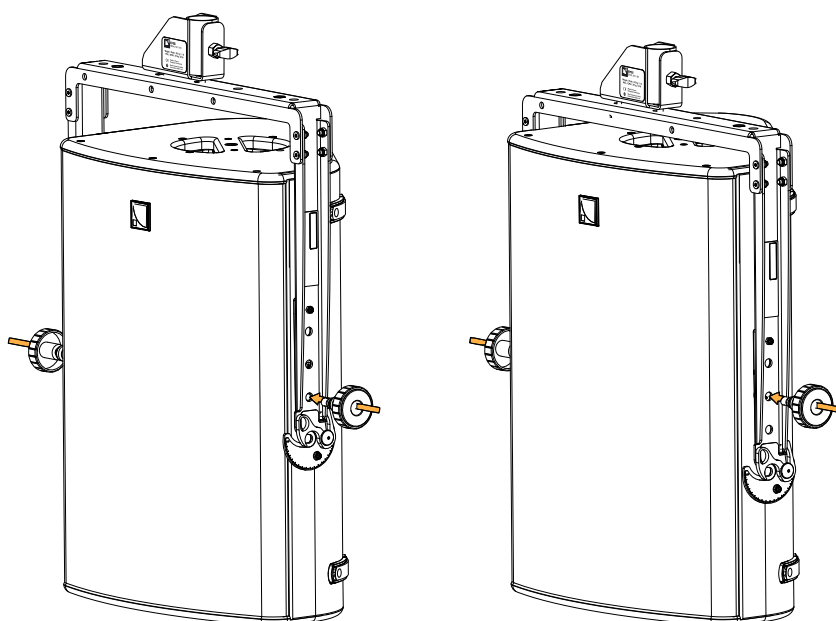
1. Secure EMBi to the U-bracket with the provided bolts and nuts.



2. Secure the U-bracket to the enclosure using the additional holes.

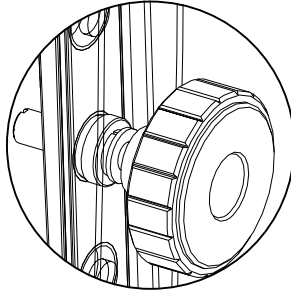
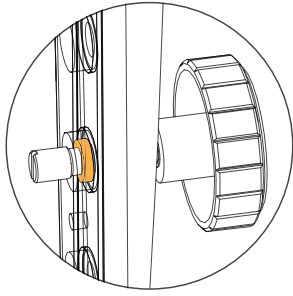


The hooks on the bracket must be oriented towards the front of the enclosure.

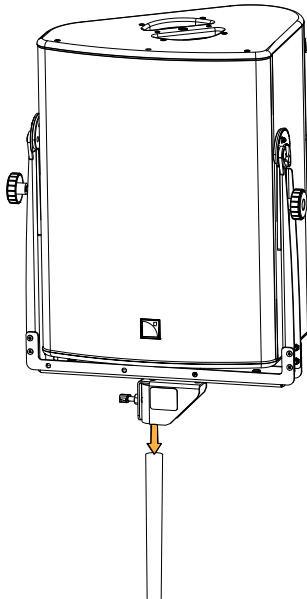




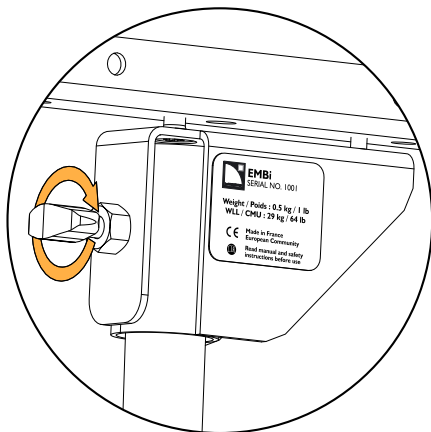
Make sure the safety washer goes through the hole on the bracket.



3. Tighten the knobs, reverse the assembly and mount it on a pole.



4. Tighten EMBi.

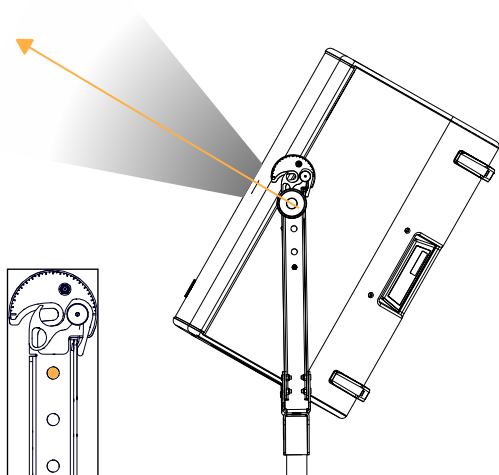
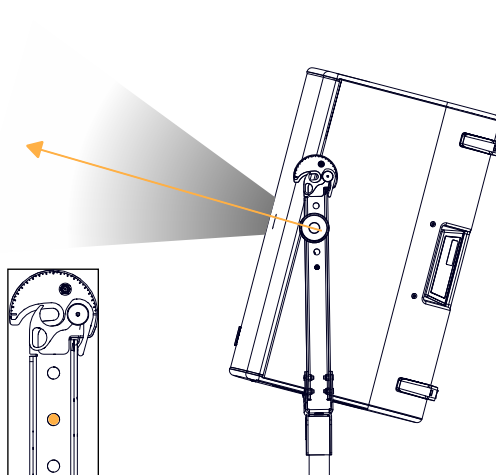


5. Loosen the knobs to set the site angle.



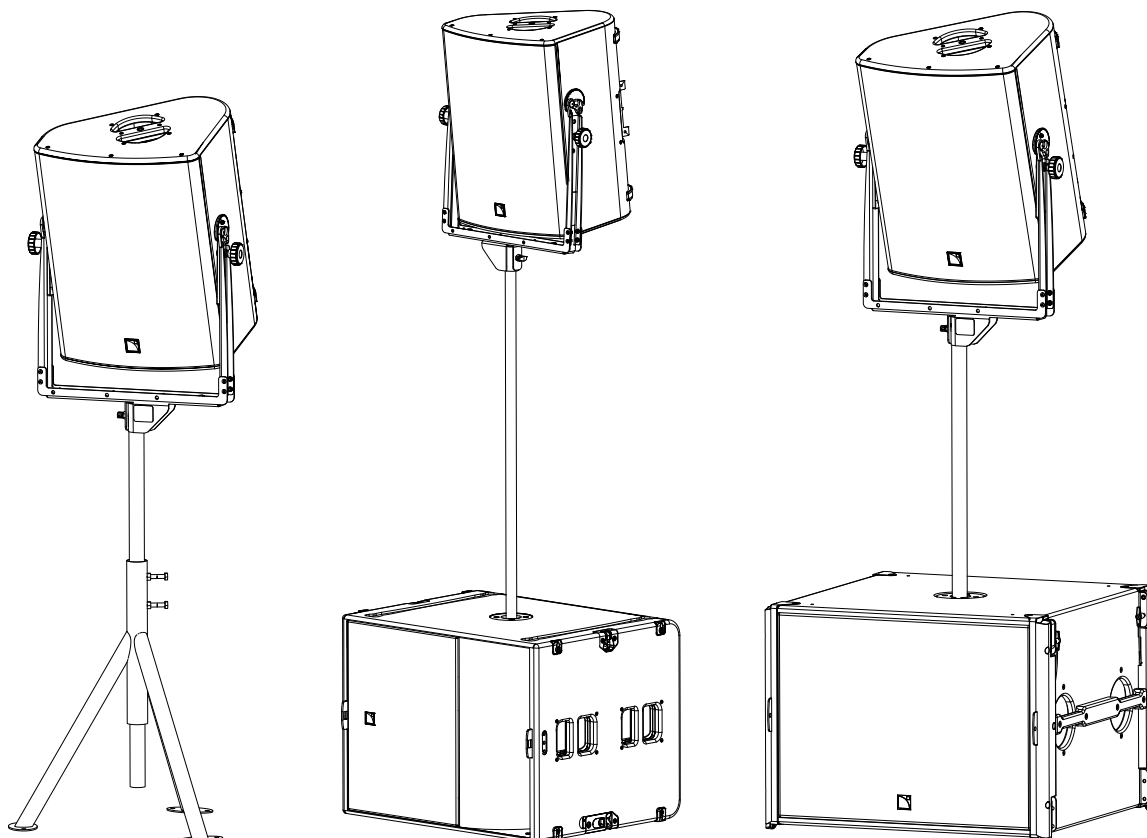
Consider the maximum positive site angle available.

Maximum angles

+30°**+15°****6. Tighten the knobs.**

Make sure the enclosure is steady.

The assembly can be mounted on a tripod or on a subwoofer.



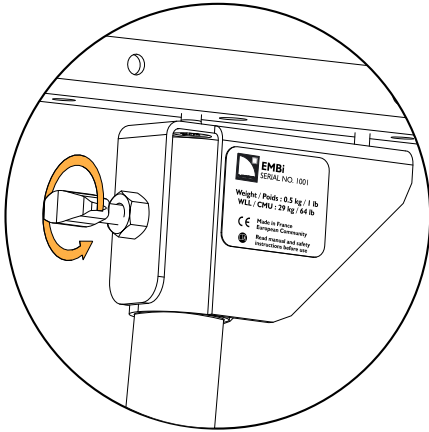
Disassembly

About this task

 Remove the assembly from the pole before disassembling the enclosure and the bracket.

Procedure

1. Loosen EMBi to remove the assembly from the pole.



2. Remove the bracket from the enclosure.

Connection to LA amplified controllers

Enclosure drive capacity per amplified controller

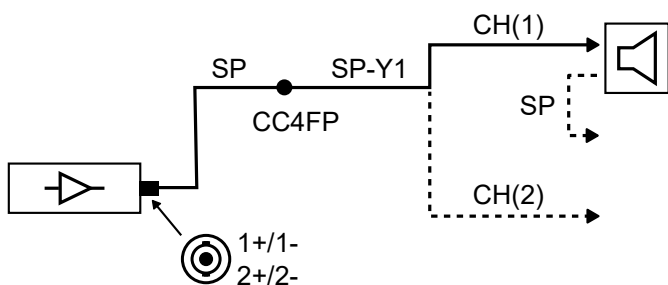
Make sure the total number of connected enclosures does not exceed the maximum number of enclosures per controller (refer to the footnotes).

	LA4X	LA8	LA12X
	per output [*] / total	per output [*] / total	per output [*] / total
X15 HiQ	1 / 2	2 / 4	3 / 6

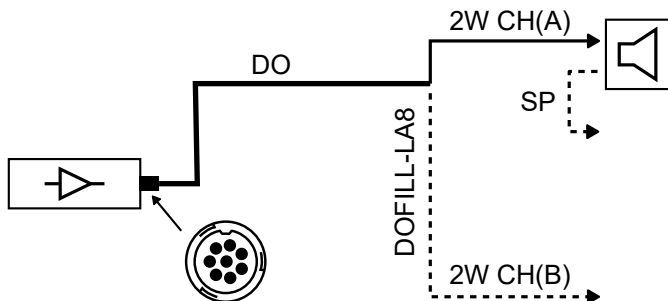
Cabling schemes for X15 HiQ

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

Two-channel speakON output



Four-channel CA-COM output



* 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.

Corrective maintenance

Introduction

This section contains the following maintenance procedures:

- [Grill](#) (p.72)
- [Waveguide](#) (p.73)
- [Coaxial loudspeaker](#) (p.77)
- [HF diaphragm](#) (p.78)

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
5 mm hex bit - spherical head *	ETS.105	FACOM
4 mm hex bit - spherical head *	ETS.104	FACOM
T10 Torx bit	EX.110	FACOM
3 mm hex bit	-	-
3 mm hex wrench	-	-
compressed air blower	-	-
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.

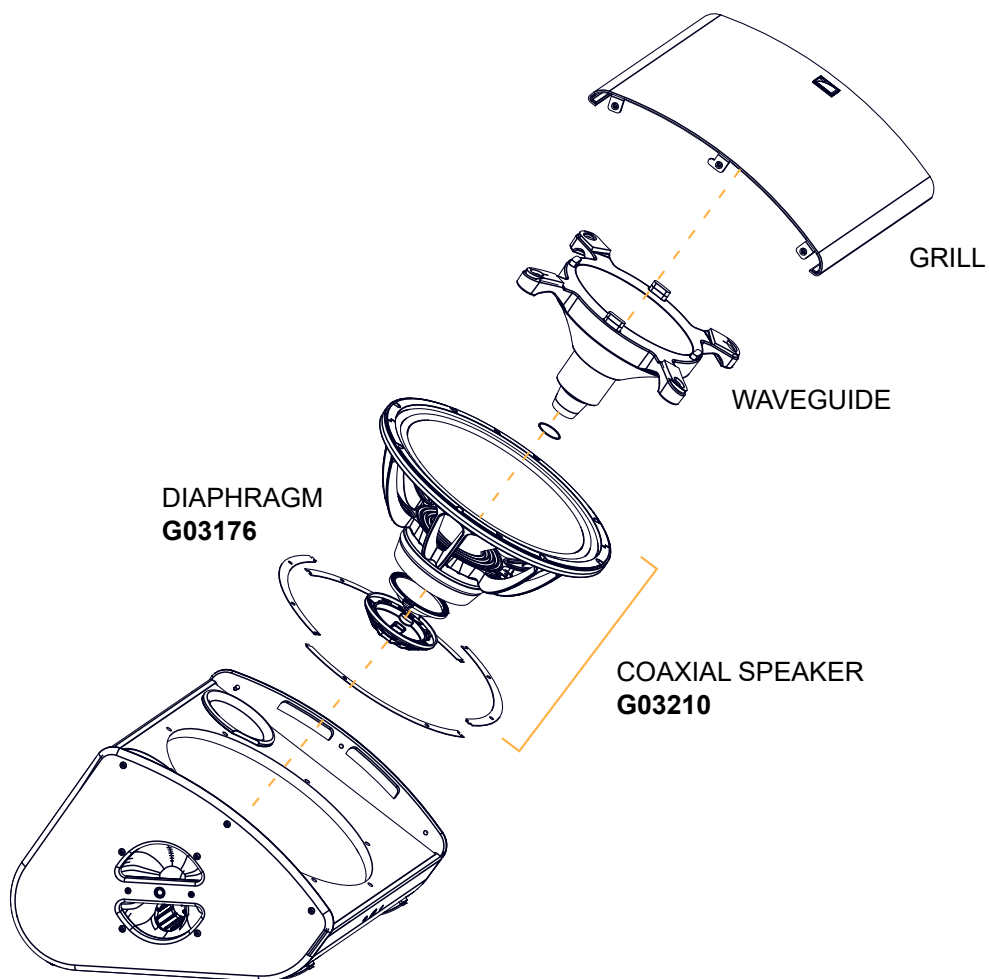
The Maintenance Toolcase uses a Peli™ 1510 Protector case that features three pre-cut layers of foam to safely fit the tools. The Maintenance Toolcase includes tools manufactured by FACOM®, Fluke®, Tohnichi, ABUS and Würth.



All third-party trademarks, registered trademarks, or product names are the property of their respective owners.

Disassembly and Reassembly procedures

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



D/R - Grill

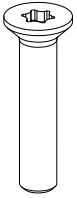
Tools

- torque screwdriver
- T25 Torx bit

Repair kit

G03210 - KR coaxial speaker X15 HiQ or

G03176 - KR diaphragm X15 HiQ





x6

S100033

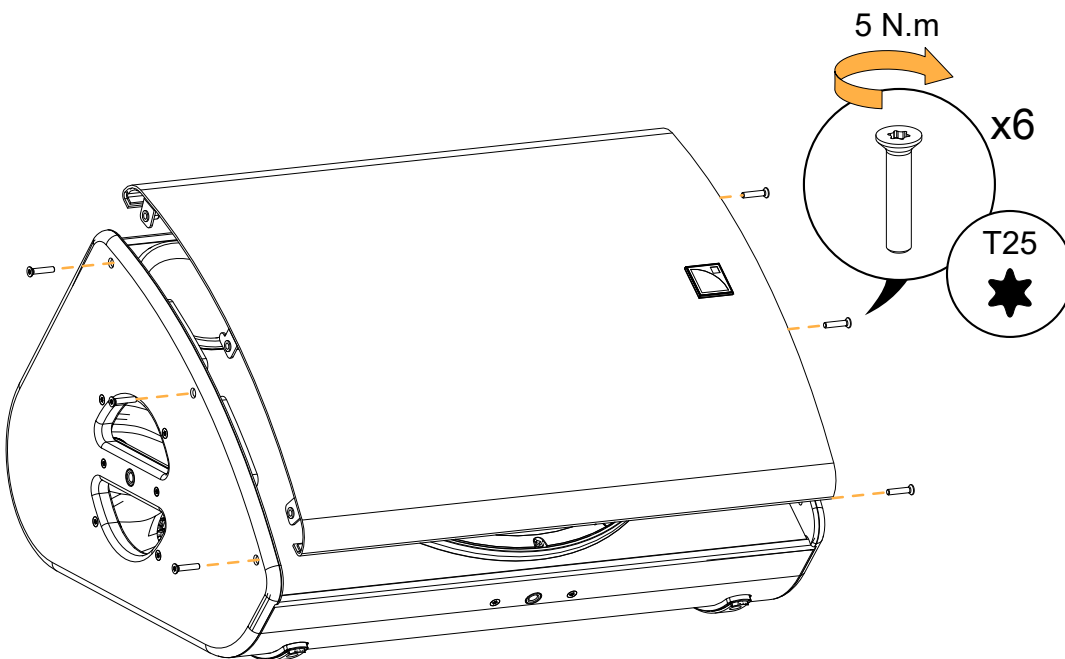
M5x25 Torx

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.

 Gradually tighten the screws following a star pattern.

Position the logo on the right side.



D/R - Waveguide

Tools

- torque screwdriver
- 4 mm hex bit
- 5 mm hex bit

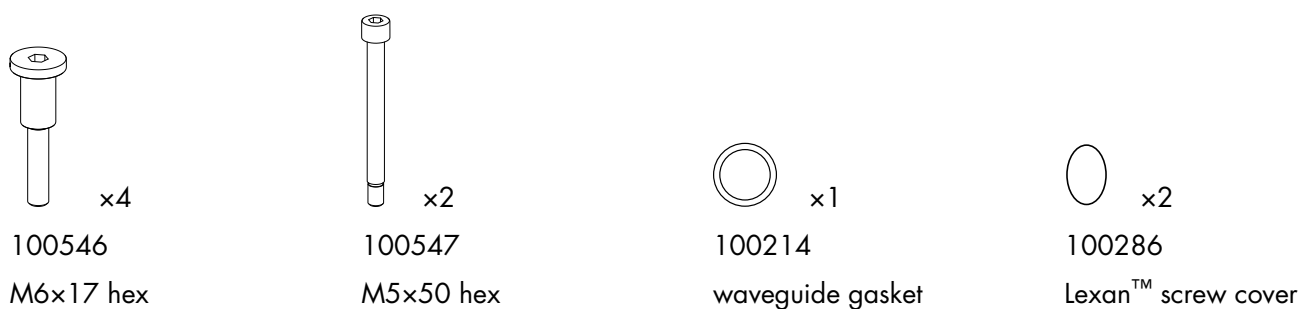
Consumables

- cyanoacrylate glue

Repair kit

G03210 - KR coaxial speaker X15 HiQ or

G03176 - KR diaphragm X15 HiQ



Prerequisite

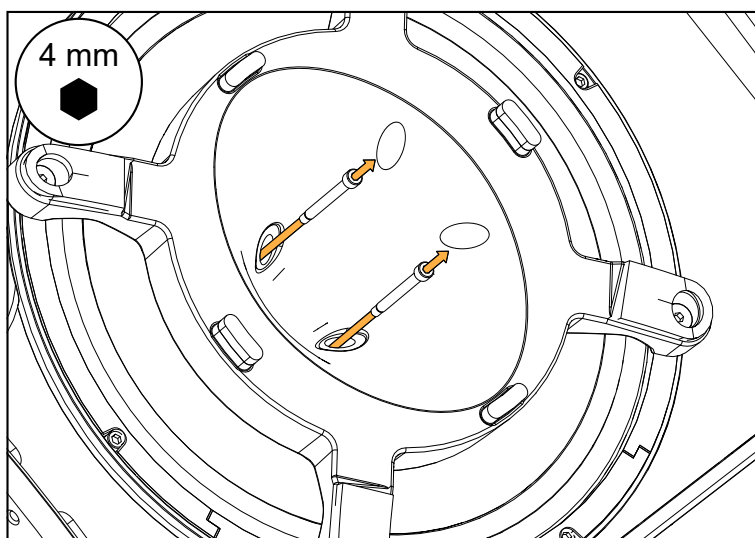
Grill disassembled.

See [Grill](#) (p.72).

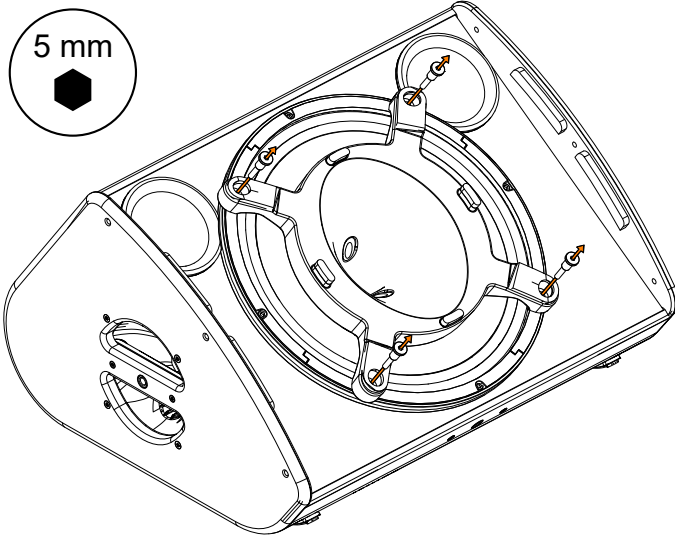
Disassembly

Procedure

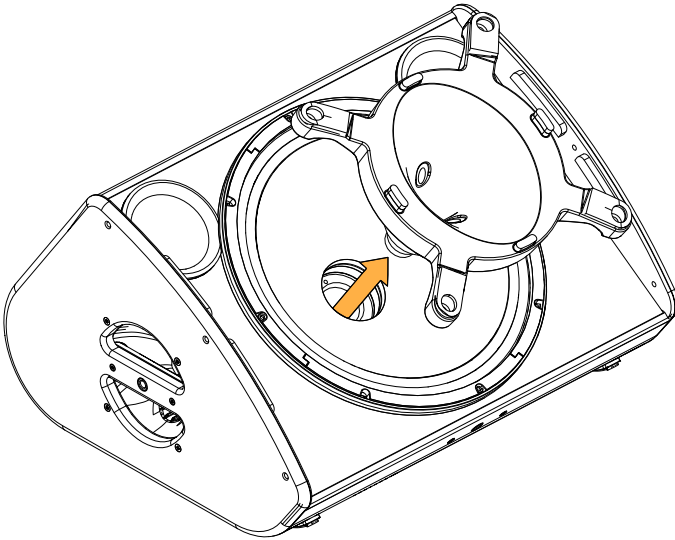
1. Remove the Lexan screw covers.
2. Remove the two screws securing the waveguide to the speaker.



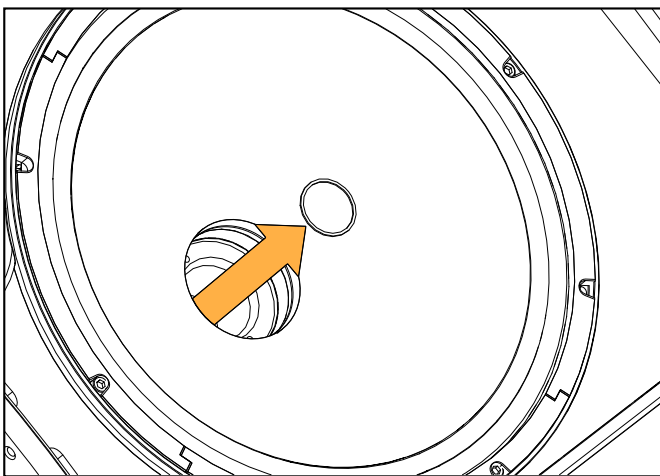
3. Remove the four remaining screws.



4. Carefully remove the waveguide.



5. Remove the waveguide gasket.



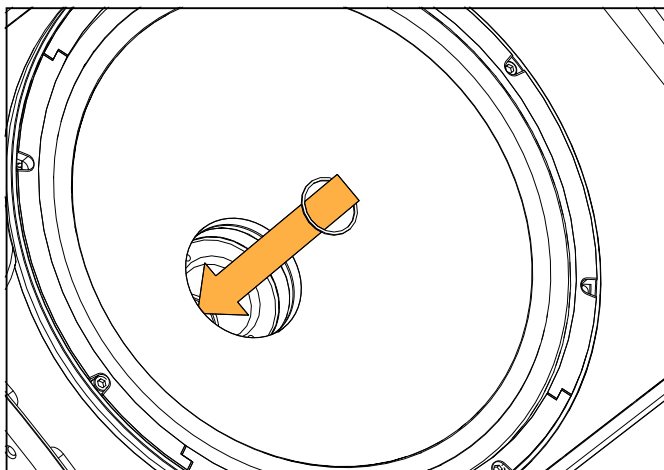
Reassembly

About this task

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

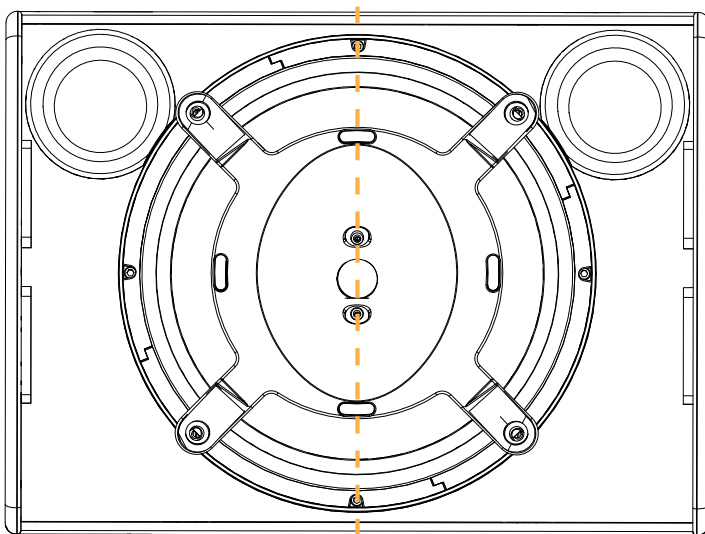
Procedure

1. Place the gasket inside the throat of the speaker.

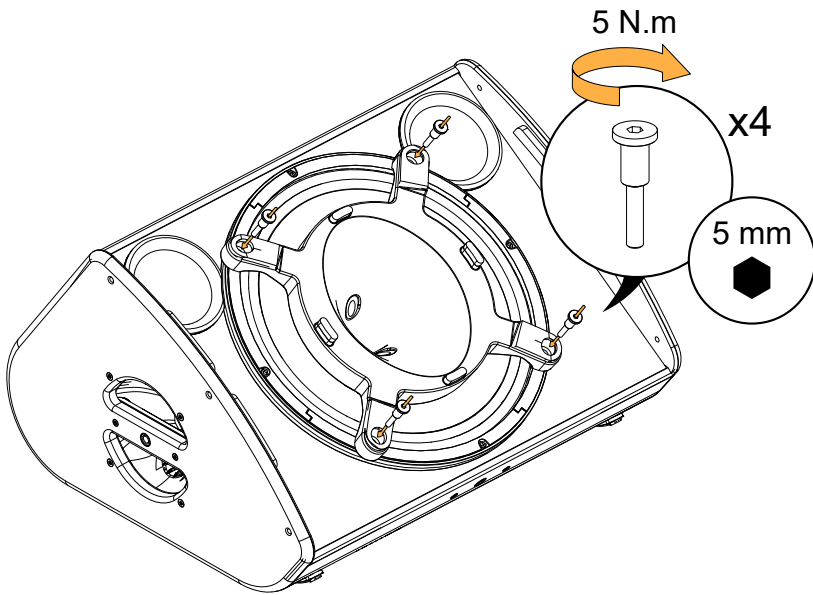


2. Position the waveguide.

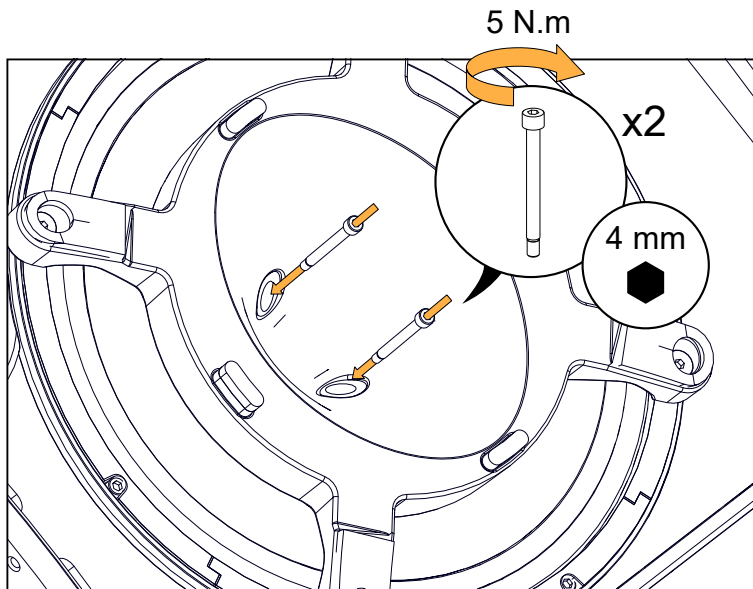
The center holes are aligned with the connectors.



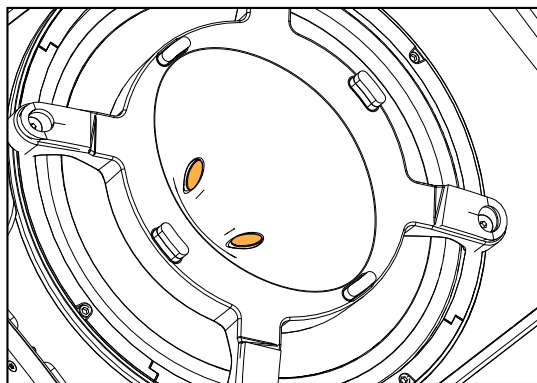
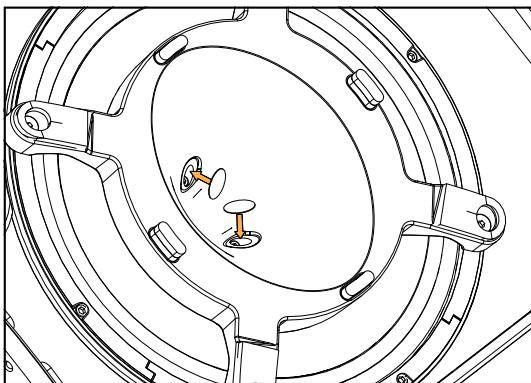
- 3.** Secure the waveguide to the cabinet with the provided 100546 screws.



- 4.** Secure the waveguide to the speaker with the provided 100547 screws.



- 5.** Stick the Lexan screw covers with the cyanoacrylate glue.



D/R - Coaxial loudspeaker

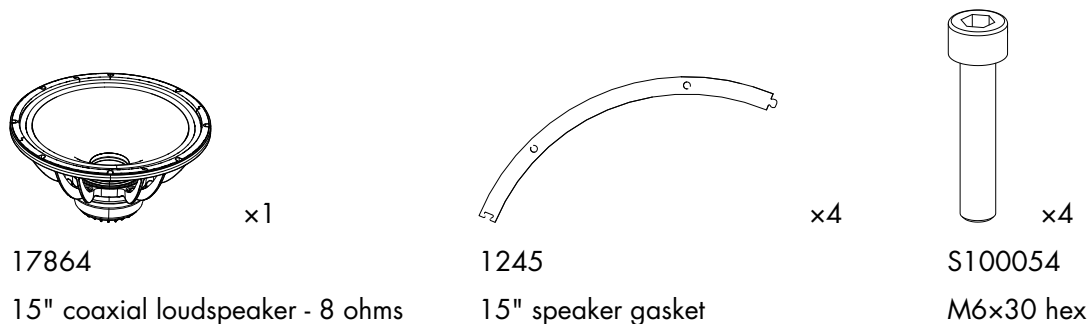
Tools

- torque screwdriver
- 5 mm hex bit

Repair kit

G03210

KR coaxial speaker X15 HiQ



Prerequisite




Grill disassembled.

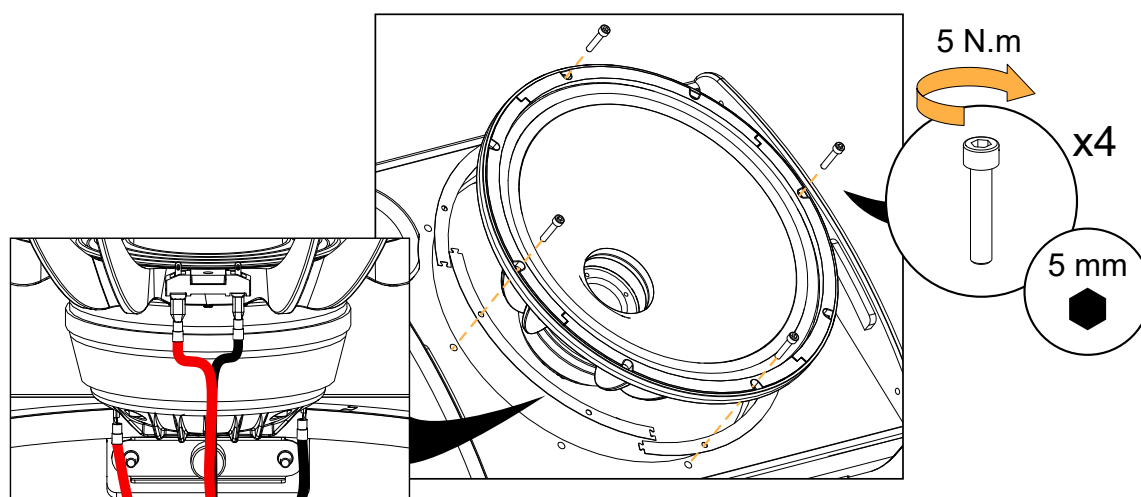
See [Grill](#) (p.72).

Waveguide removed.

See [Waveguide](#) (p.73).

Exploded view

-  For safety reasons, always use the new screws and spare parts provided in the KR.
-  Gradually tighten the screws following a star pattern.
-  If the speaker gasket is damaged, remove and replace it.



What to do next

Perform the [Acoustical check](#) (p.40) procedures.

D/R - HF diaphragm

Tools

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

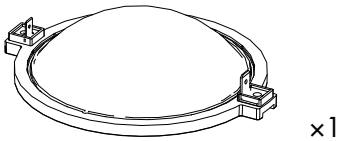
Consumables

- double face adhesive tape

Repair kit

G03176

KR diaphragm X15 HiQ



x1

17581

diaphragm assembly (with 2 shims)



x4

S100082

M4x14 hex

Prerequisite

Grill disassembled.

Waveguide removed.

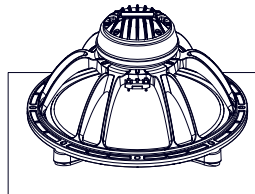
Coaxial speaker removed.

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

See [Grill](#) (p.72).

See [Waveguide](#) (p.73).

See [Coaxial loudspeaker](#) (p.77).



Disassembly

Procedure

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

Reassembly

About this task

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

Procedure

1. Clean the dome and the air gap.

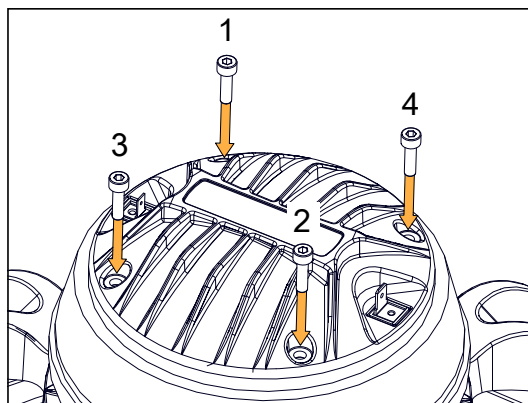
Use a blower or double face adhesive tape to remove any particle.



Make sure the air gap is perfectly clean before moving to the next step.

2. Place the same kind and number of shims that were initially present.
3. Carefully place the diaphragm.
4. Position the diaphragm using the LF cable connectors as reference points.
Place the small HF connector on the same side as the small LF connector.
5. Secure the cover to the speaker using four S100082 screws.
 - a) Gradually secure each screw manually with the 3 mm hex wrench.

Follow a cross scheme.



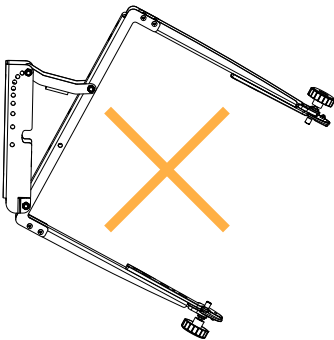
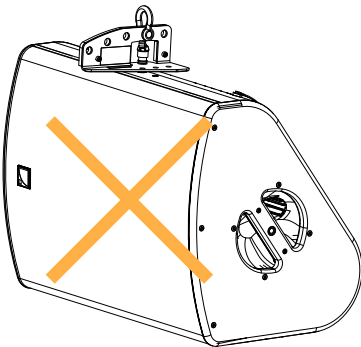
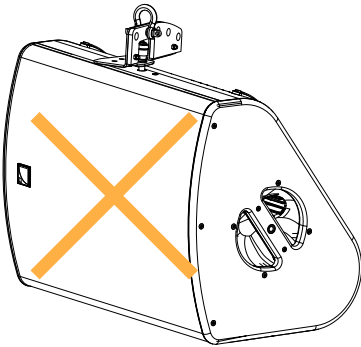
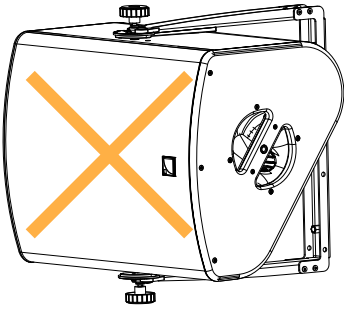
- b) Tighten the screws in the same order with the electric screwdriver.
Use the 3 mm hex bit. Set the torque to 3.5 Nm.

What to do next

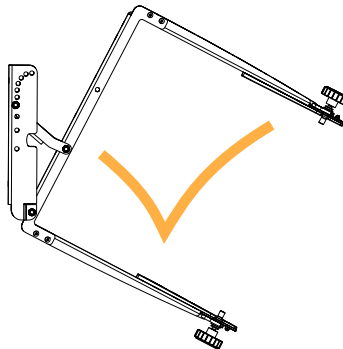
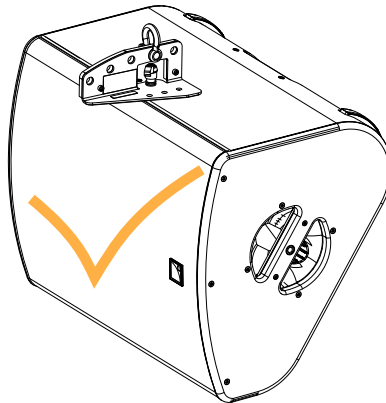
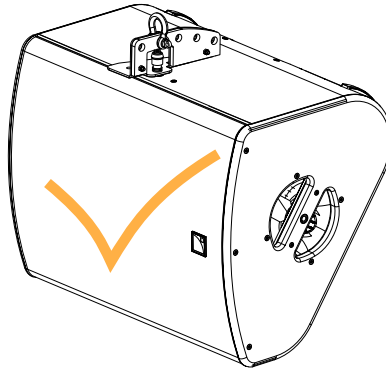
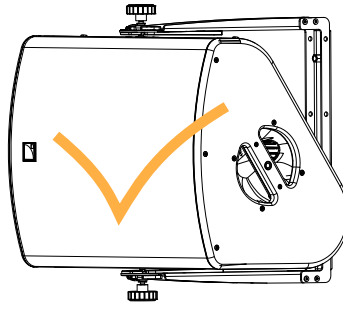
Perform the [Acoustical check](#) (p.40) procedures.

Forbidden configurations

Forbidden

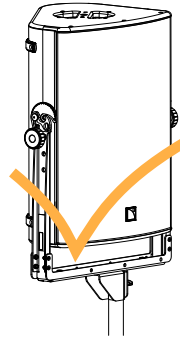
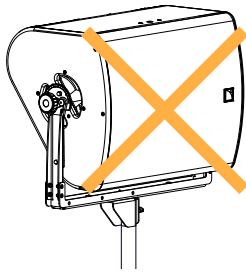
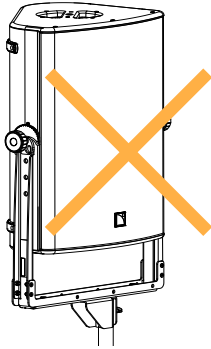
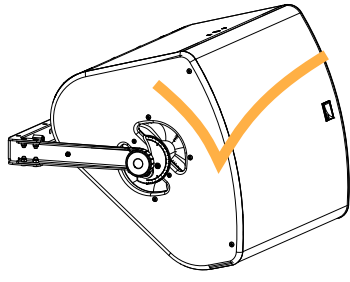
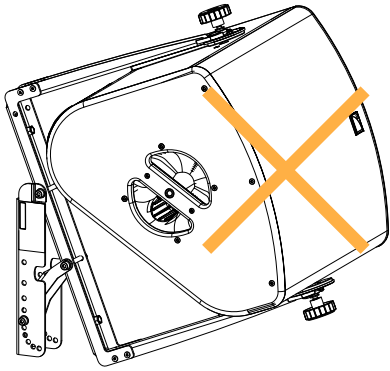


Authorized



Forbidden

Authorized



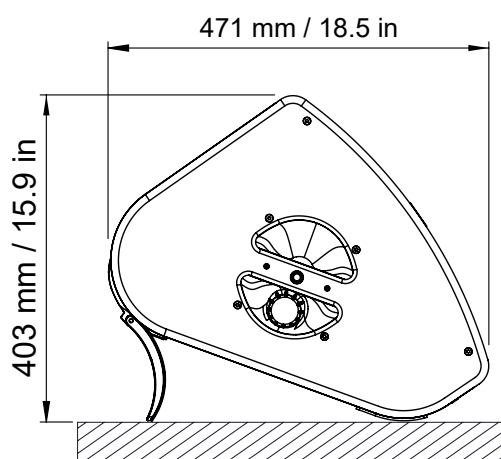
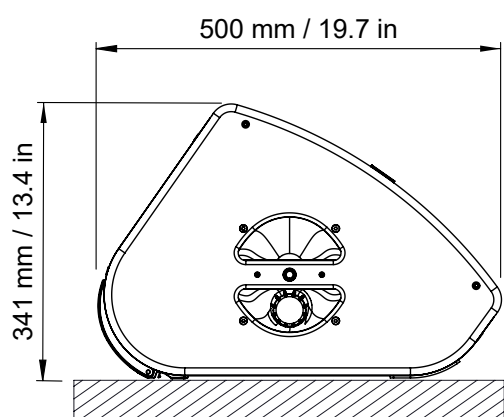
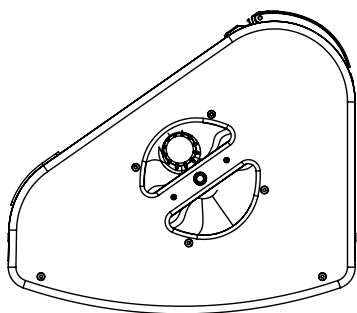
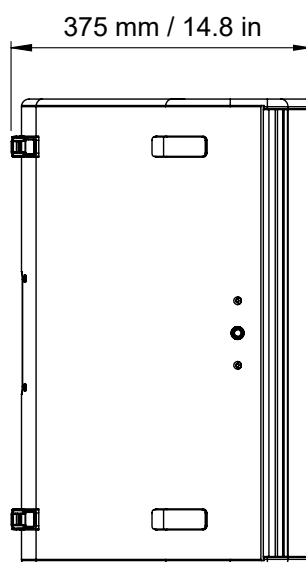
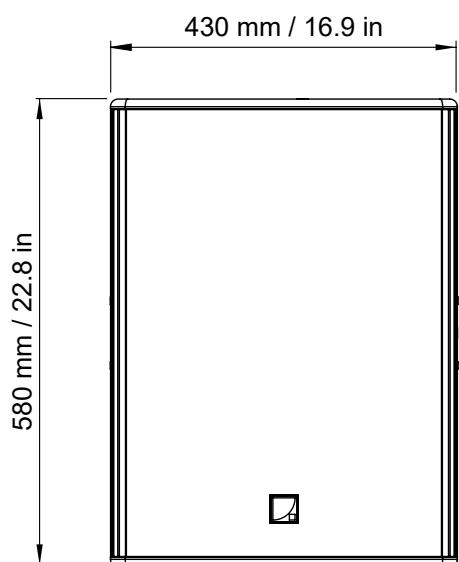
Specifications

X15 HiQ specifications

Description	2-way active coaxial enclosure: 15" LF + 3" HF diaphragm, amplified by LA4X / LA8 / LA12X
Usable bandwidth (-10 dB)	55 Hz - 20 kHz ([X15])
Maximum SPL¹	138 dB ([X15])
Nominal directivity (-6 dB)	vertical: 60° horizontal: 40°
Monitoring angle	without risers: 35° with risers: 55°
Transducers	LF: 1 × 15" cone driver HF: 1 × 3" diaphragm compression driver, neodymium
Acoustical load	bass-reflex, L-Vents, ellipsoidal waveguide
Nominal impedance	LF: 8 Ω HF: 8 Ω
Connectors	IN: 1 × 4-point speakON LINK: 1 × 4-point speakON
Rigging and handling	2 handles 1 DIN580-compatible M8 threaded insert 4 M10 threaded inserts 2 × 35 mm pole sockets
Weight (net)	21 kg / 46.3 lb
Cabinet	premium grade Baltic beech and birch plywood
Front	steel with anti-corrosion coating acoustically neutral 3D fabric
Finish	dark grey brown Pantone 426 C custom RAL code on special order
IP	IP43

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

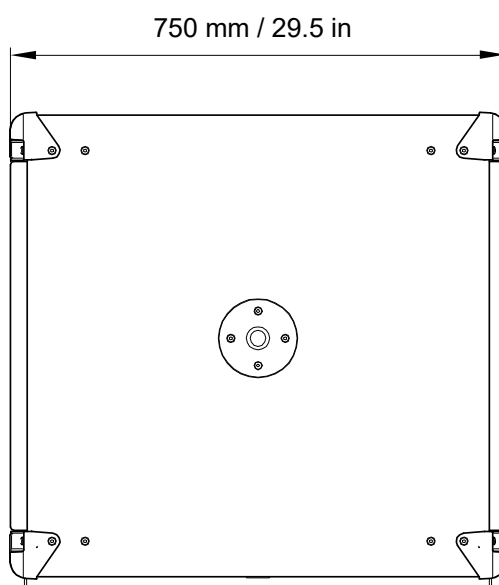
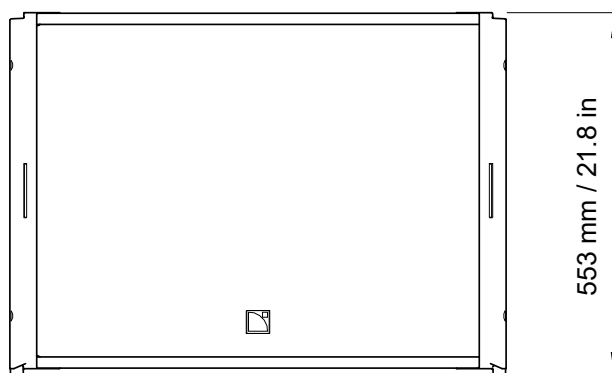
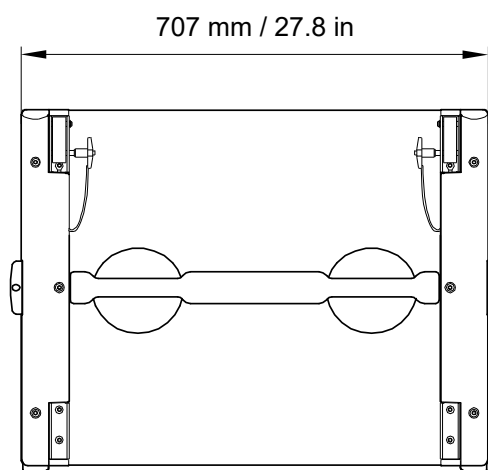
X15 HiQ dimensions



SB18 specifications

Description	High power compact subwoofer: 1 x 18" , amplified by LA4X / LA8 / LA12X
Low frequency limit (-10 dB)	32 Hz ([SB18_100])
Maximum SPL¹	138 dB ([SB18_100])
Nominal directivity (-6 dB)	standard or cardioid
Transducers	1 x 18"
Acoustical load	dual bass-reflex, L-Vents
Nominal impedance	8 Ω
Connectors	IN: 1 x 4-point speakON LINK: 1 x 4-point speakON
Rigging and handling	4 handles integrated into the cabinet captive rigging system 1 x 35 mm pole socket
Weight (net)	52 kg / 115 lb
Cabinet	premium grade Baltic birch plywood
Front	coated steel grill acoustically neutral 3D fabric
Rigging components	steel with anti-corrosion coating
Finish	dark grey brown Pantone 426 C
IP	IP55

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

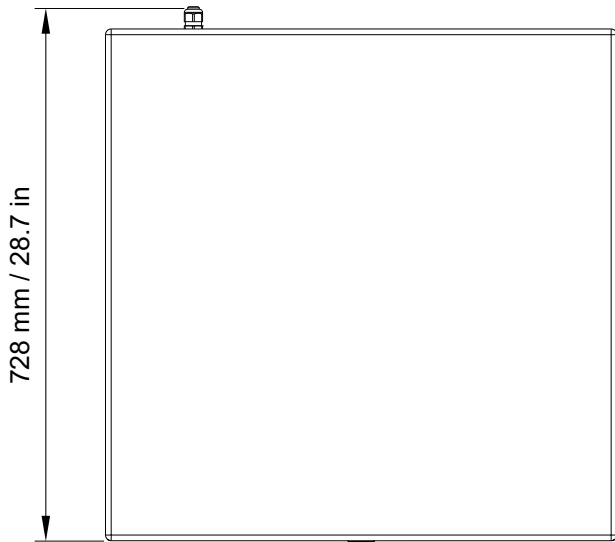
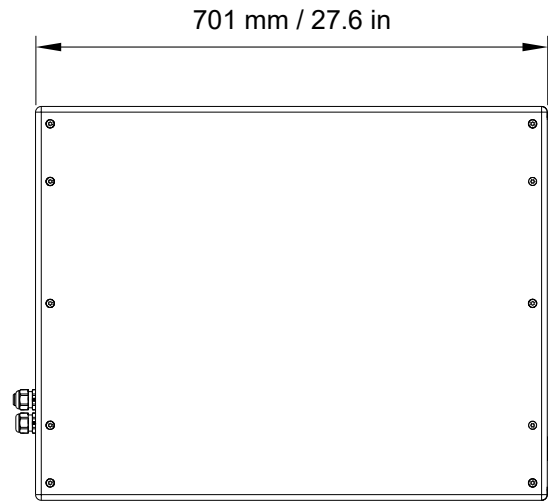
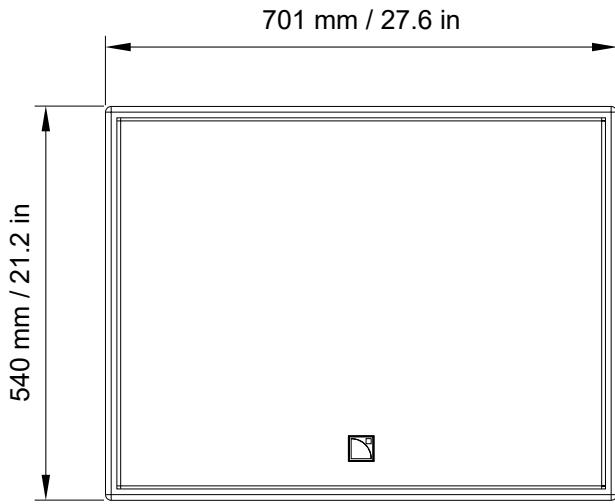
SB18 dimensions

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 SPL¹	138 dB ([SB18_100]) 133 dB ([SB18_100]) with LA2Xi
Directivity	standard or cardioid
Transducers	1 x 18" cone driver
Acoustical load	dual bass-reflex
Nominal impedance	8 Ω
Connectors	1 x 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 Ili dimensions

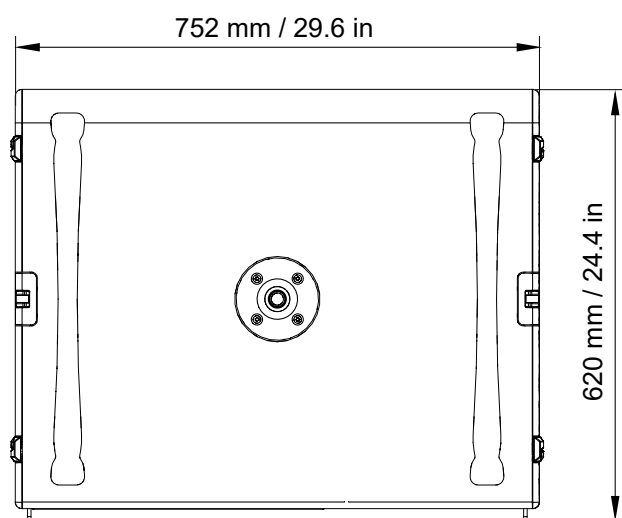
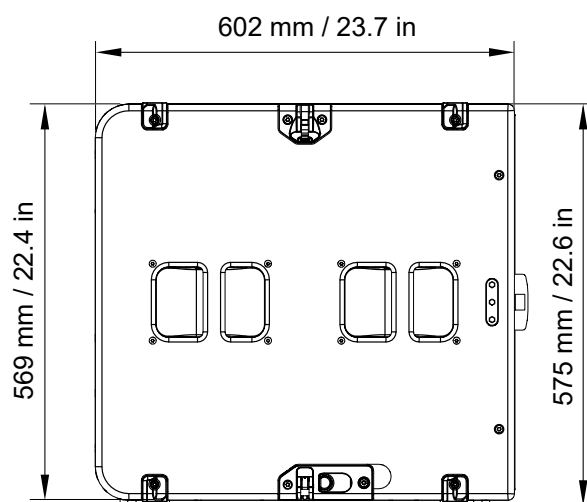
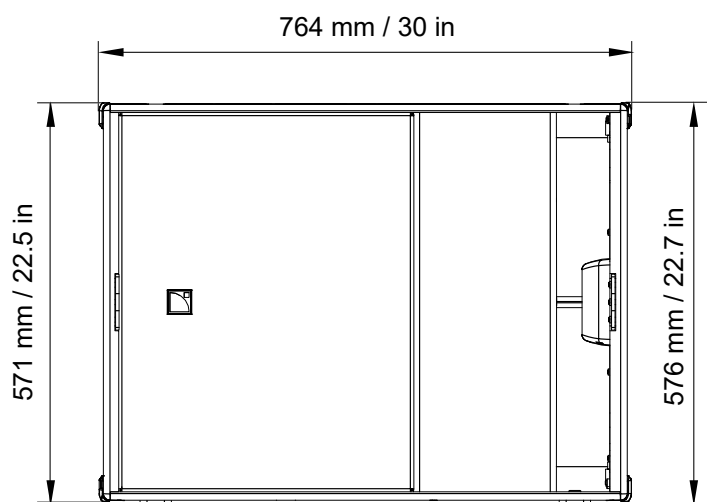


KS21 specifications

Description	High power compact subwoofer: 1x21" , amplified by LA4X / LA8 / LA12X
Low frequency limit (-10 dB)	31 Hz ([KS21_100])
Maximum SPL¹	138 dB ([KS21_100])
Nominal directivity (-6 dB)	standard or cardioid configuration
Transducers	1 × 21" neodymium cone driver
Acoustical load	bass-reflex, L-Vents
Nominal impedance	8 Ω
Connectors	IN: 1 × 4-point speakON LINK: 1 × 4-point speakON
Rigging and handling	flush-fitting 2-point rigging system 4 handles 8 corner stops 2 ground runners 1 pole mount with M20×150 insert
Weight (net)	49 kg / 108 lb
Cabinet	premium grade Baltic beech and birch plywood
Front	coated steel grill acoustically neutral 3D fabric
Rigging components	high grade steel with anti-corrosion coating
Finish	dark grey brown Pantone 426 C
IP	IP55

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

KS21 dimensions

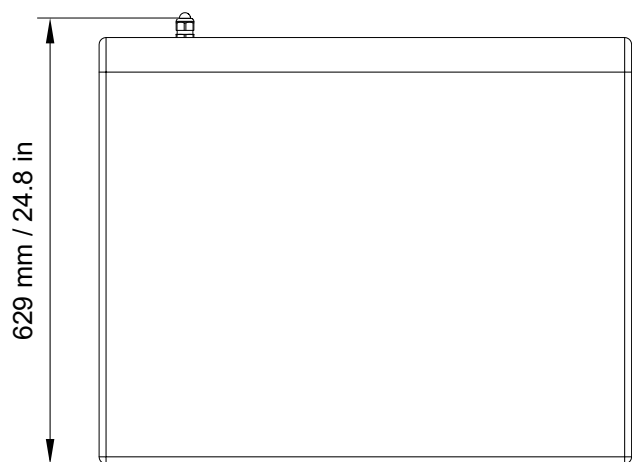
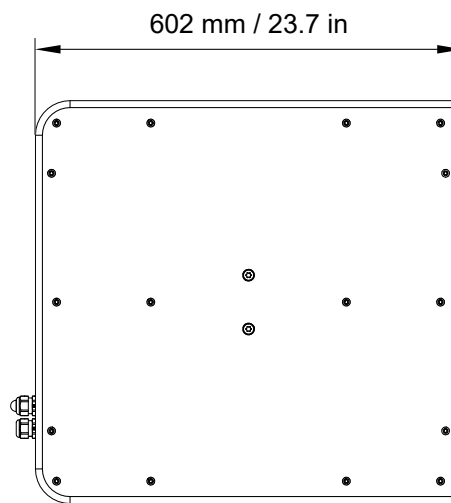
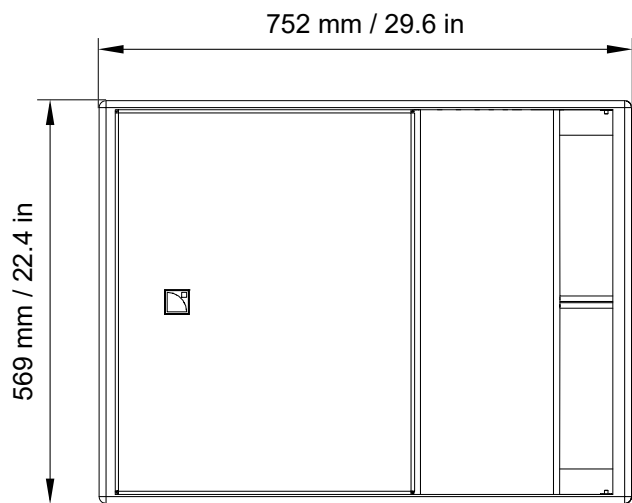


KS21i specifications

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]) 131 dB ([KS21_100]) with LA2Xi
Nominal directivity (-6 dB)	standard or cardioid configuration
Transducers	1 x 21" neodymium cone driver
Acoustical load	bass-reflex, L-Vents
Nominal impedance	8 Ω
Connectors	1 x 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).

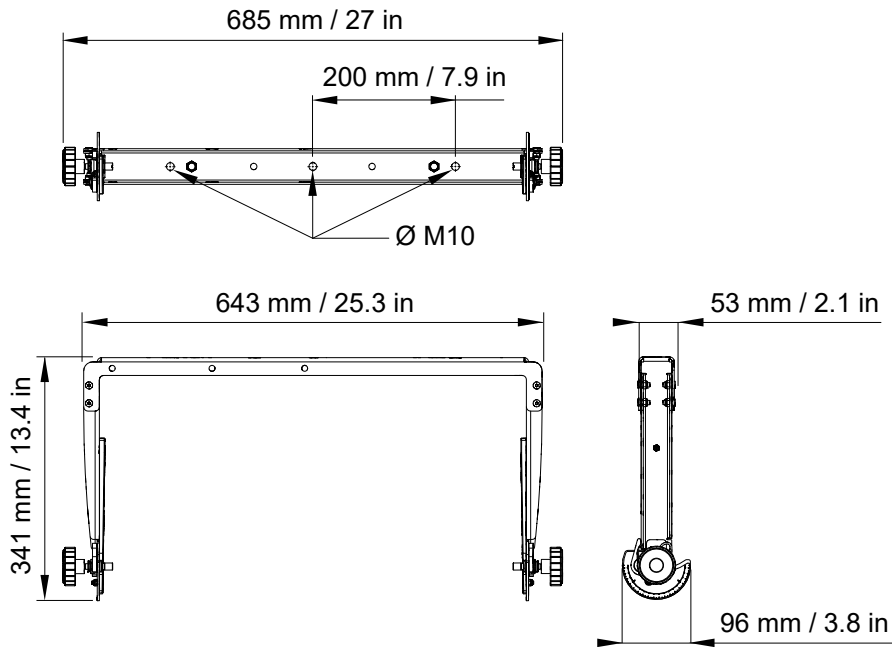
KS21i dimensions



X-UL15 specifications

Description	Long U-bracket for X15 HiQ
Weight (net)	2.9 kg / 6.4 lb
Material	high grade steel with anti-corrosion coating

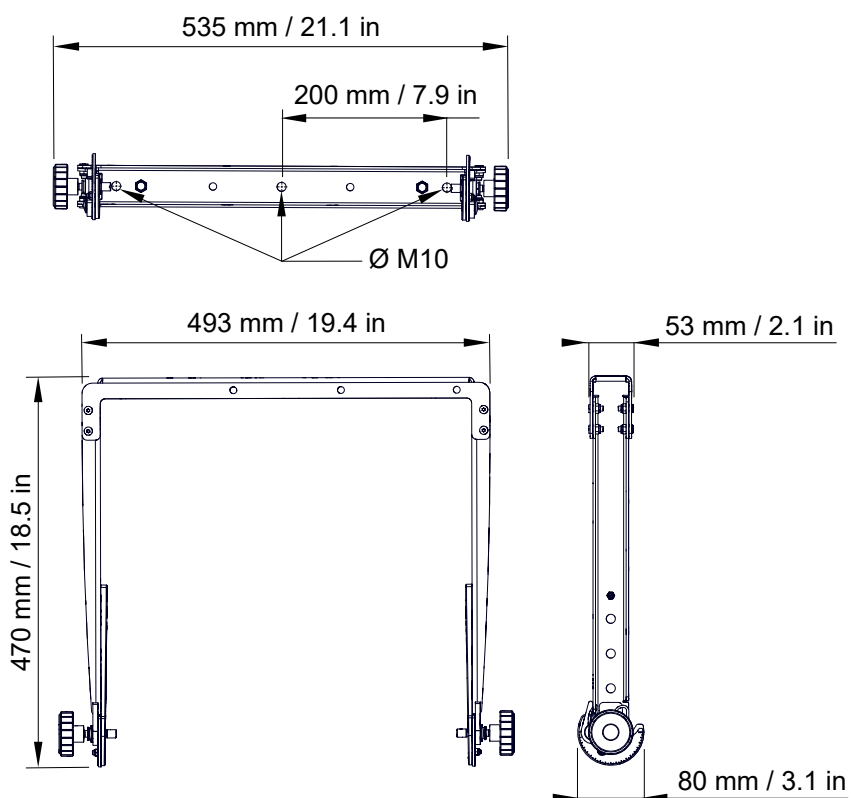
X-UL15 dimensions



X-US1215 specifications

Description	Short U-bracket for X12 and X15 HiQ
Weight (net)	3 kg / 6.6 lb
Material	high grade steel with anti-corrosion coating

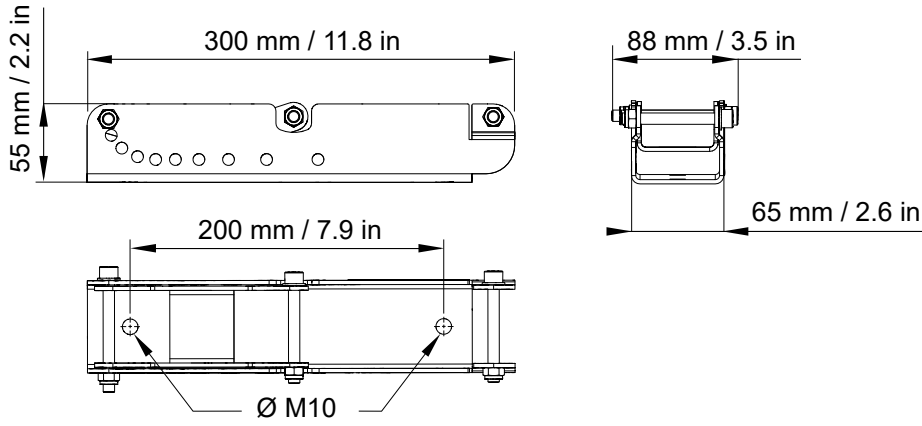
X-US1215 dimensions



X-UTILT specifications

Description	U-bracket wallmount for X series with tilt adjustment
Weight (net)	1.5 kg / 3.3 lb
Material	high grade steel with anti-corrosion coating

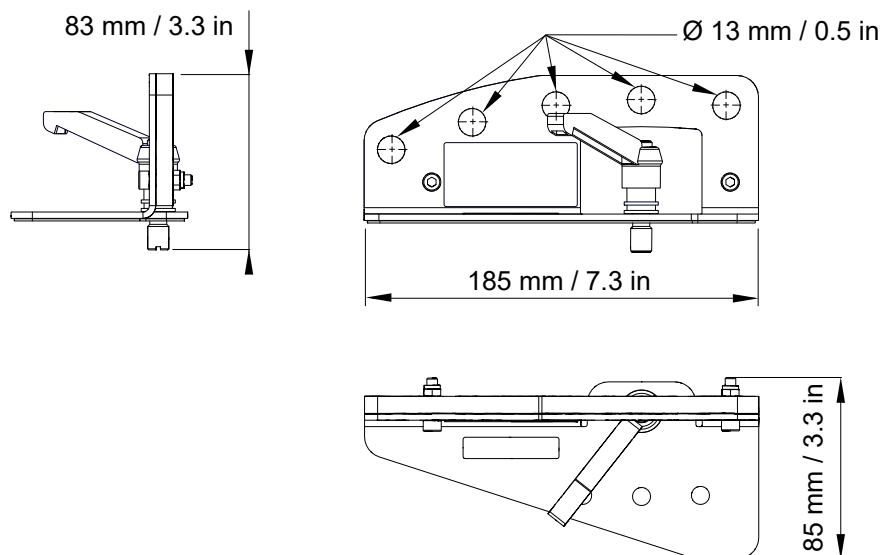
X-UTILT dimensions



X-BAR specifications

Description	Rigging bar for 1 enclosure 1 x Ø12 mm shackle WLL 1 t
Weight (net)	1.1 kg / 2.4 lb
Material	high grade steel with anti-corrosion coating

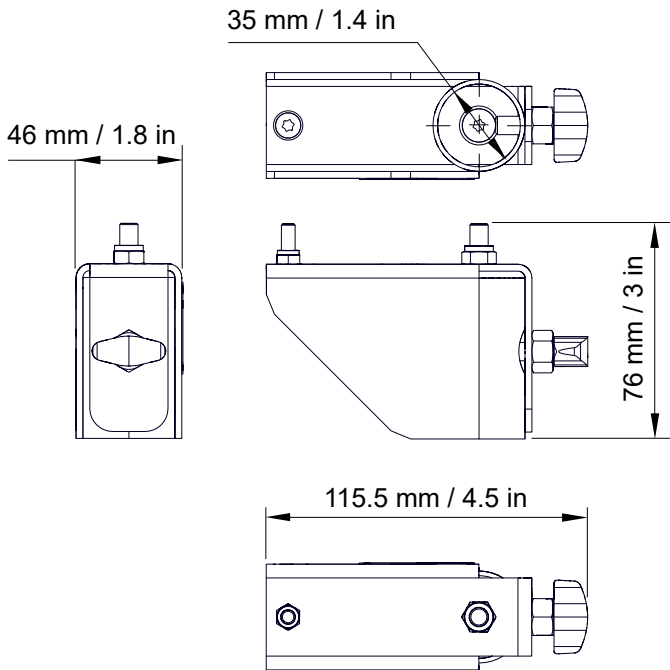
X-BAR dimensions



EMBi specifications

Description	Pole mount socket: 8XTi/12XTi and X series
Weight (net)	0.5 kg / 1 lb
Material	high grade steel with anti-corrosion coating

EMBi dimensions



Recommendation for speaker cables

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



Cable quality and resistance

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

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

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

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

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

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



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