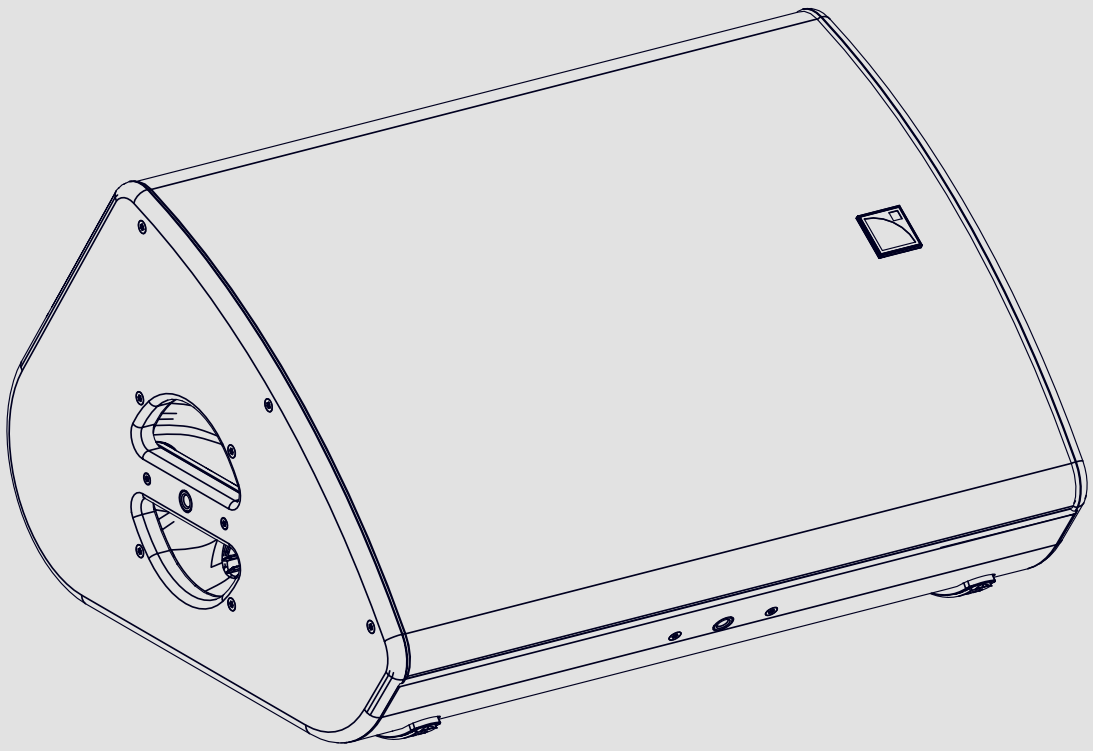
X15 HiQ

user manual 1.0 (EN)



Document reference: X15 HiQ user manual (EN) version 1.0
Distribution date: September 24, 2015

Contents

Safety

Instructions

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.

Beware of sound levels.

Do not stay within close proximity of loudspeakers in operation and consider wearing earplugs.

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 with prolonged exposure to sound: 8 h at 90 dB(A), 30 min at 110 dB(A), less than 4 min at 130 dB(A).

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

Read the RIGGING MANUAL before installing the system.

Use the rigging accessories described in the rigging manual and follow the associated procedures.

Do not expose the product to extreme conditions.

Do not expose the product to rain or sea spray.

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

Symbols

The following symbols are used in this document:

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

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

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

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

Welcome

Thank you for purchasing the L-Acoustics X15 HiQ.

This document contains essential information on using the system properly. Carefully read this document in order to become familiar with the system.

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

System components

Loudspeaker enclosures

X15 HiQ	Active 2-way coaxial enclosure
SB18	Subwoofer enclosure

SB18 / SB18i / SB18m
In this document, the SB18 term and illustrations refer equally to SB18, SB18i or SB18m.

Powering and driving system

LA4X / LA8	Amplified controller with DSP, preset library and networking capabilities
LA-RAK	Touring rack containing three LA8, for power, audio and network distribution

Refer to the LA4X / LA8 user manual for operating instructions.

Loudspeaker cables

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

Information about the connection of the enclosures to the LA amplifiers is given in this document.
Refer to the LA4X / LA8 user manual for detailed instructions about the whole cabling scheme, including modulation cables and network.

Rigging elements

Rigging elements or procedures are not presented in this document.
Refer to the X15 HiQ rigging manual.

Software applications

Soundvision	3D acoustical and mechanical modeling software.
LA Network Manager	Remote control and monitoring of amplified controllers

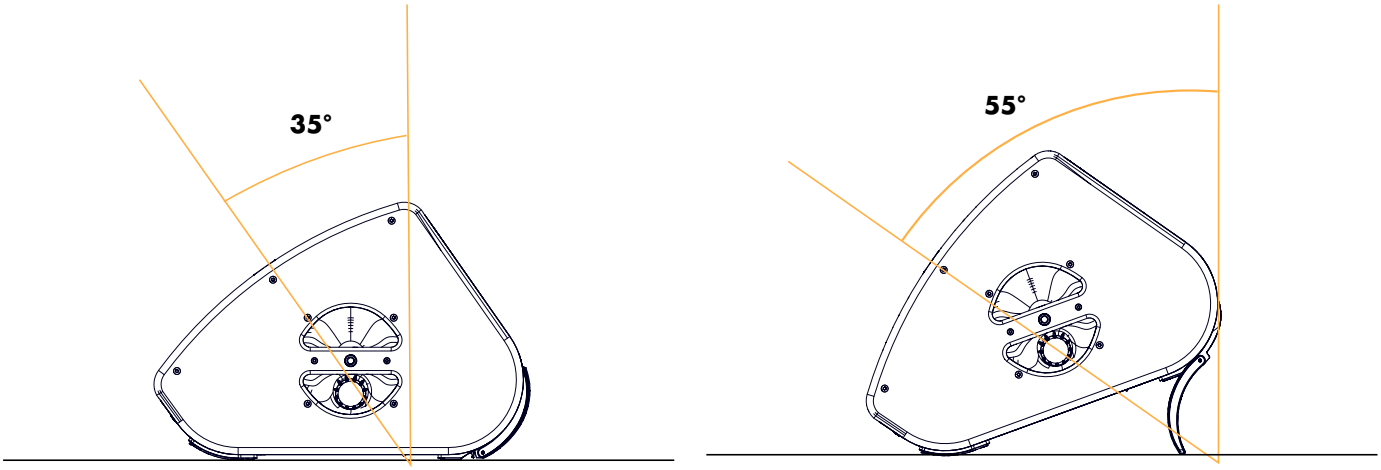
Technical description

Low-latency preset

A low latency preset is available for the X15 HiQ enclosure used as a monitor ([X15 HiQ_MO]). It reduces latency from 3.84 ms down to 1.19 ms (LA8) and 0.76 ms (LA4X). If the monitor is combined with a subwoofer, a custom preset must be used.

Monitor angles

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



Loudspeaker configurations

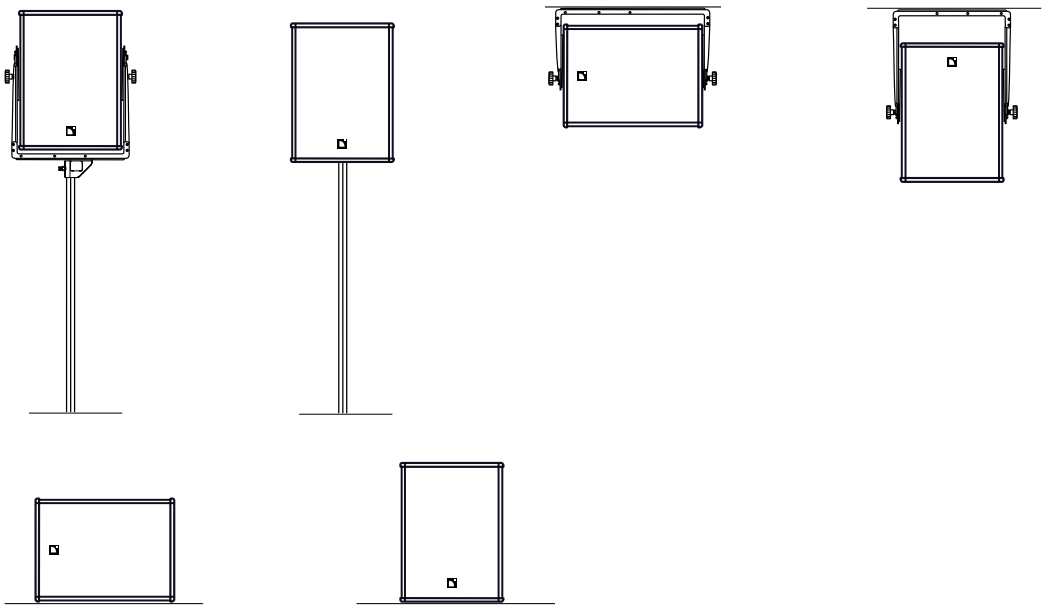
X15 HiQ point source

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 amplified controllers.

Standalone X15 HiQ



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

X15 HiQ point source with LF

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

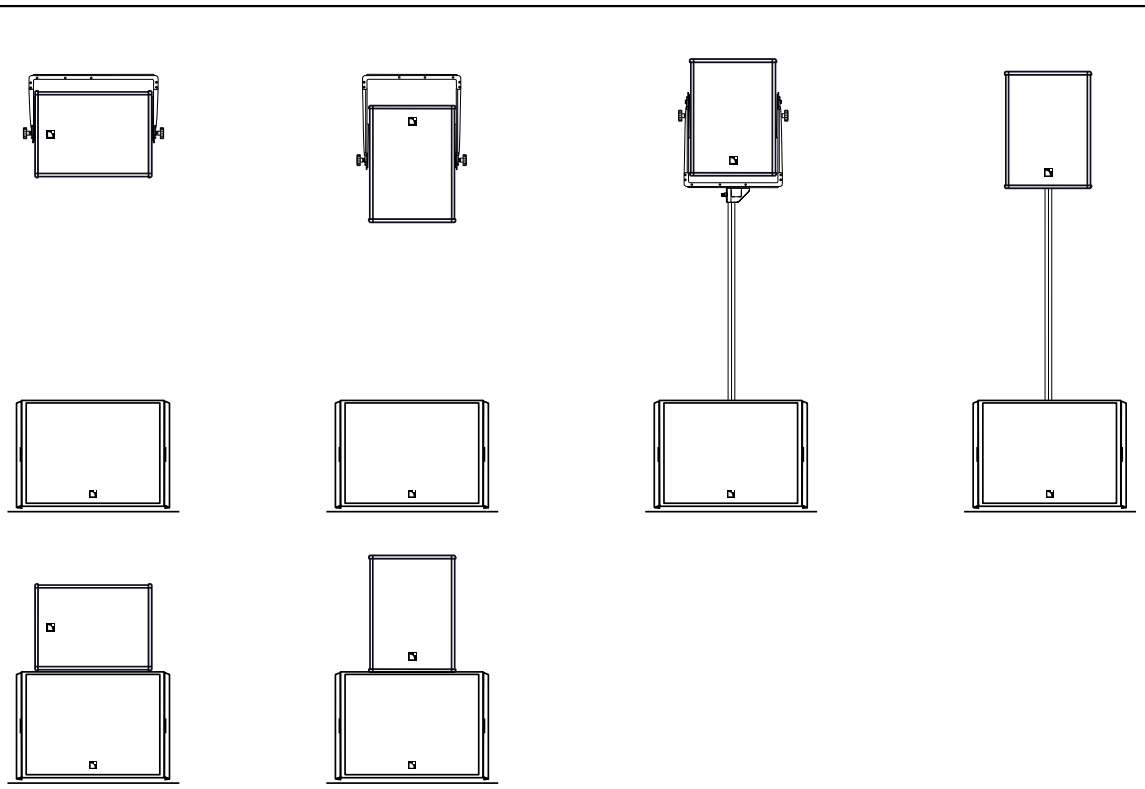
The [X15] preset allows for a reference frequency response in short throw applications.

The [SB18_100] preset provides the SB18 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 amplified controllers.

X15 HiQ with SB18

With SB18, the X15 HiQ system contour is reinforced by 8 dB contour at 100 Hz and the system bandwidth is extended down to 32 Hz.



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

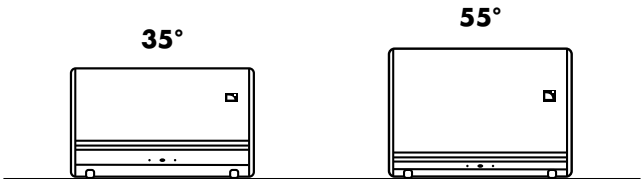
Delay values
Do not forget to add the pre-alignment and geometric delays depending on the configuration.

[X15] + [SB18_100]	X15 HiQ = 0	SB18 = 0

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.

Standalone X15 HiQ



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

X15 HiQ stage monitor with LF

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

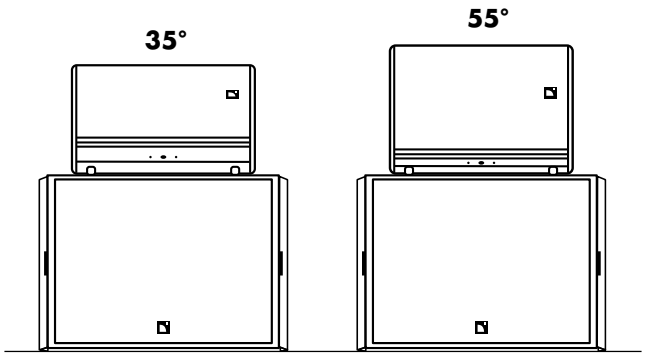
The [X15_MO] preset allows for a reference frequency response in stage monitoring applications.

The [SB18_100] preset provides the SB18 with an upper frequency limit at100 Hz for an optimal frequency coupling with the X15 HiQ.

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

X15 HiQ with SB18

With SB18, the X15 HiQ system contour is reinforced by 8 dB contour at 100 Hz, and the system bandwidth is extended down to 32 Hz.



Enclosure	Preset
X15 HiQ	[X15_MO]
SB18	[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.

[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.

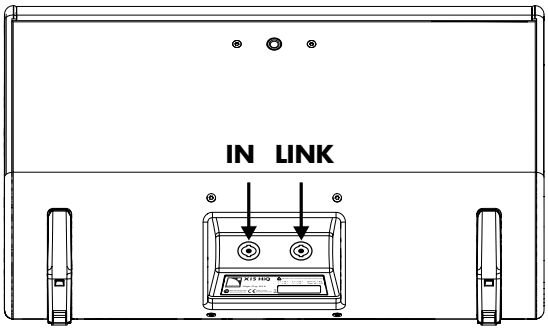
If the subwoofers are driven from a dedicated amplified controller using a subwoofer factory preset, they are operated in normal latency mode. Therefore, an additional delay should be set to the [xx_MO] low latency channels to align them: 2.65 ms on LA4 and LA8 or 3.08 ms on LA4X.

[X15_MO] + [SB18_100]	X15 HiQ = 0	SB18 = 0

Loudspeaker connection

Connectors

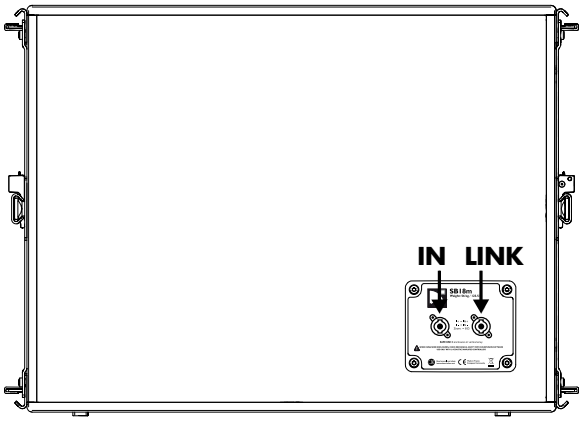
X15 HiQ



Internal pinout for L-ACOUSTICS 2-way active enclosures

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

SB18



Internal pinout for L-ACOUSTICS subwoofers

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

Connection to LA4X

Maximum number of coaxial enclosures per LA4X

loudspeaker enclosure	max number of connections per output*	max number of enclosures per controller
X15 HiQ	1	2

Maximum number of subwoofer enclosures per LA4X

loudspeaker enclosure	max number of connections per output*	max number of enclosures per controller
SB18	1	4

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

Impedance load for:

— SB18

number of enclosures in parallel	nominal impedance
1	8 Ω

Impedance load for:

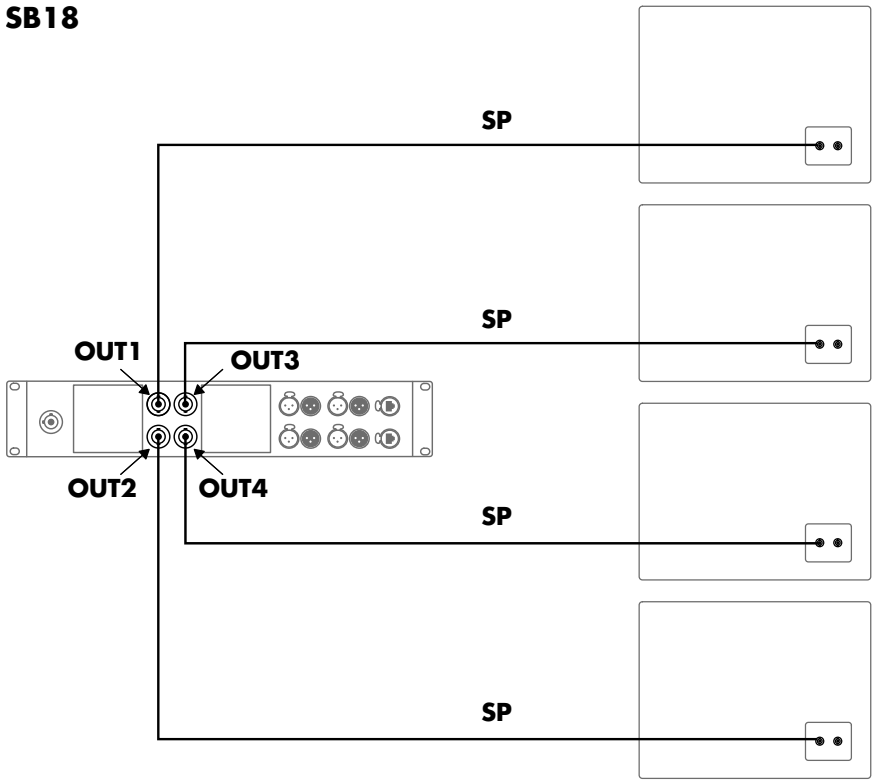
— X15 HiQ

number of enclosures in parallel	LF	HF
1	8 Ω	8 Ω

Using SP cables with passive enclosures

— Use SP cables (SP.7, SP5, SP10 or SP25) to connect one enclosure to each of the four SpeakON® connectors of the amplified controller.
— If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

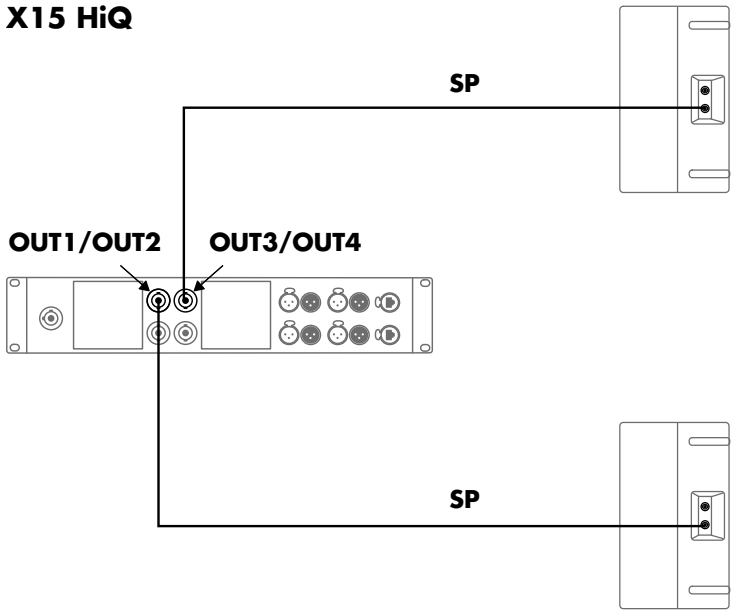
Refer to the cabling schemes below for more instructions.



Using SP cables with active enclosures

— Use SP cables (SP.7, SP5, SP10 or SP25) to connect one enclosure to the OUT1/OUT2 and OUT3/OUT4 SpeakON® connectors of the amplified controller.
— If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

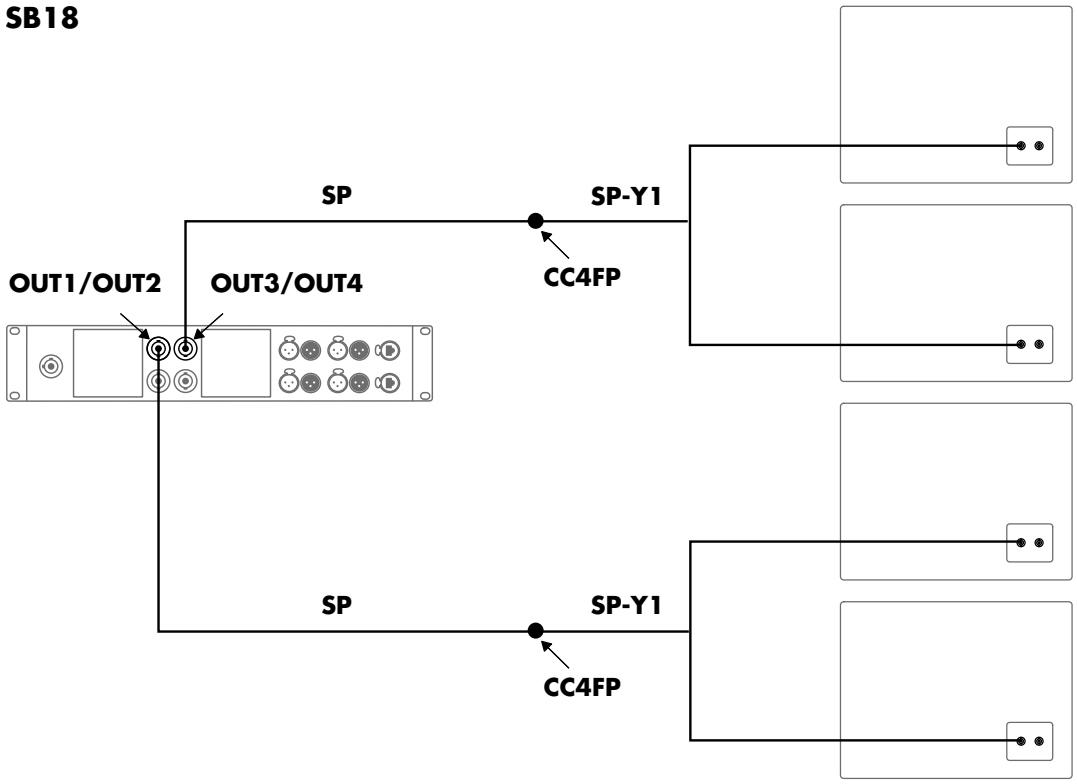
Refer to the cabling schemes below for more instructions.



Using SP-Y1 cables

- Connect an SP cable (SP.7, SP5, SP10 or SP25) to the OUT1/OUT2 and OUT3/OUT4 SpeakON® connectors of the amplified controller.
- Use the CC4FP adapter of an SP-Y1 cable to split the signal into two channels, each feeding one enclosure.
- If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

Refer to the cabling schemes below for more instructions.



Connection to LA8

Maximum number of coaxial enclosures per LA8

loudspeaker enclosure	max number of connections per output*	max number of enclosures per controller
X15 HiQ	2	4

Maximum number of subwoofer enclosures per LA8

loudspeaker enclosure	max number of connections per output*	max number of enclosures per controller
SB18	2	8

* 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.

Impedance load for:

— SB18

number of enclosures in parallel	nominal impedance
1	8 Ω
2	4 Ω

Impedance load for:

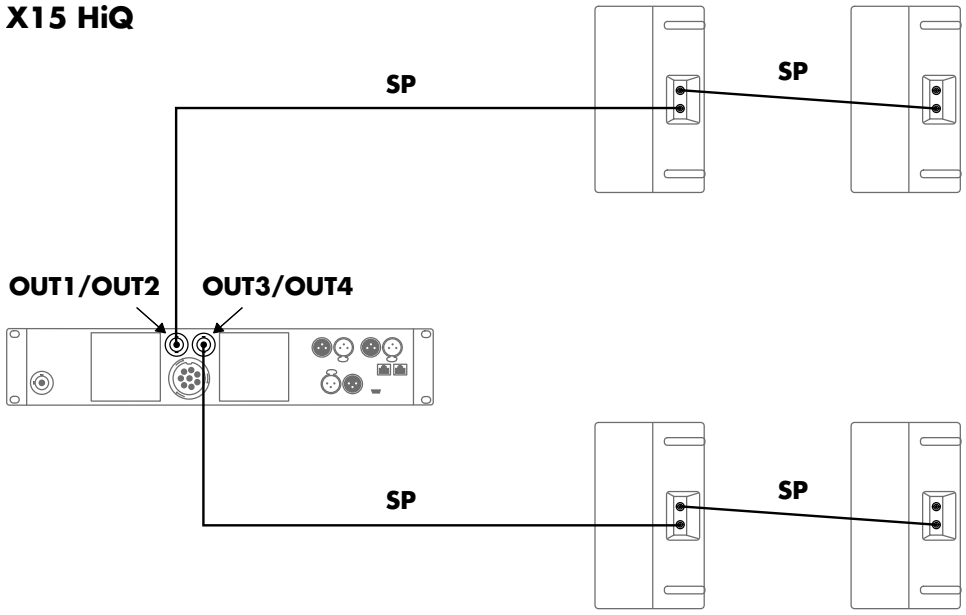
— X15 HiQ

number of enclosures in parallel	LF	HF
1	8 Ω	8 Ω
2	4 Ω	4 Ω

Using SP cables with active enclosures

— Use SP cables (SP.7, SP5, SP10 or SP25) to connect one enclosure to the OUT1/OUT2 and OUT3/OUT4 SpeakON® connectors of the amplified controller.
— If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

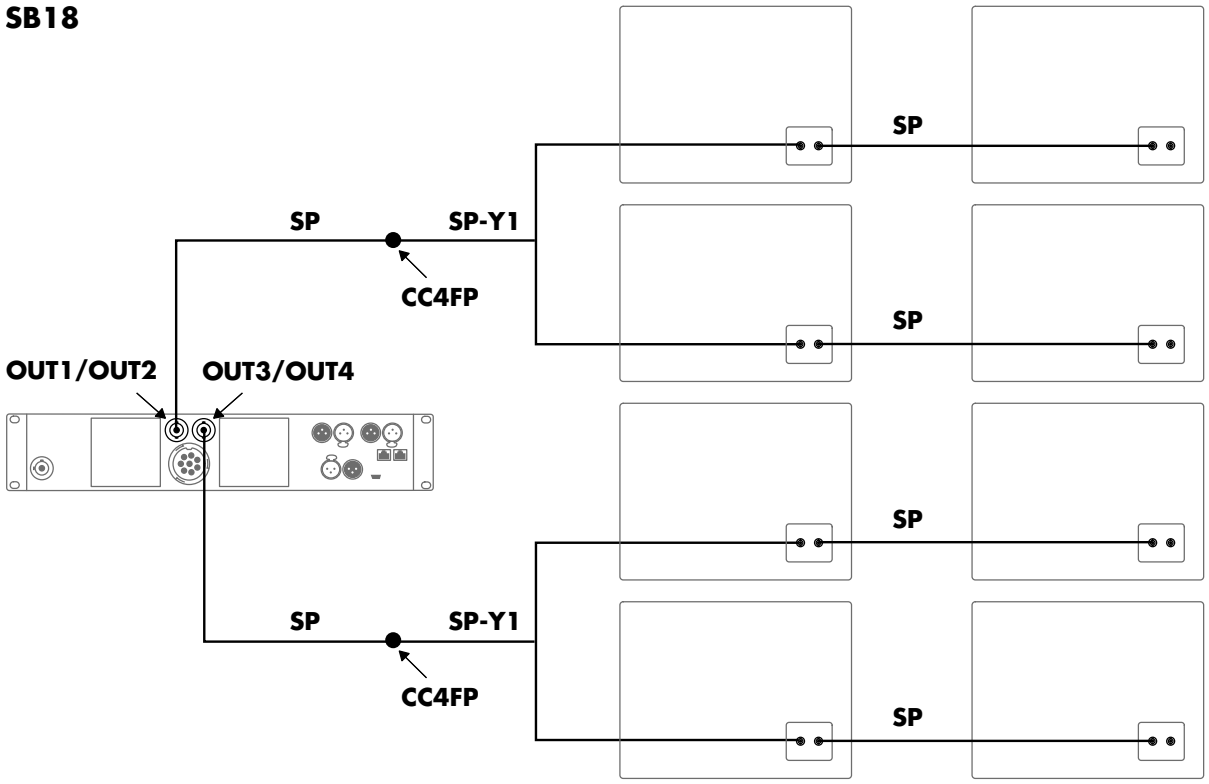
Refer to the cabling schemes below for more instructions.



Using SP-Y1 cables

- Connect SP cables (SP.7, SP5, SP10 or SP25) to the OUT1/OUT2 and OUT3/OUT4 SpeakON® connectors of the amplified controller.
- Use the CC4FP adapter of an SP-Y1 cable to split the signal into two channels, each feeding one enclosure.
- If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

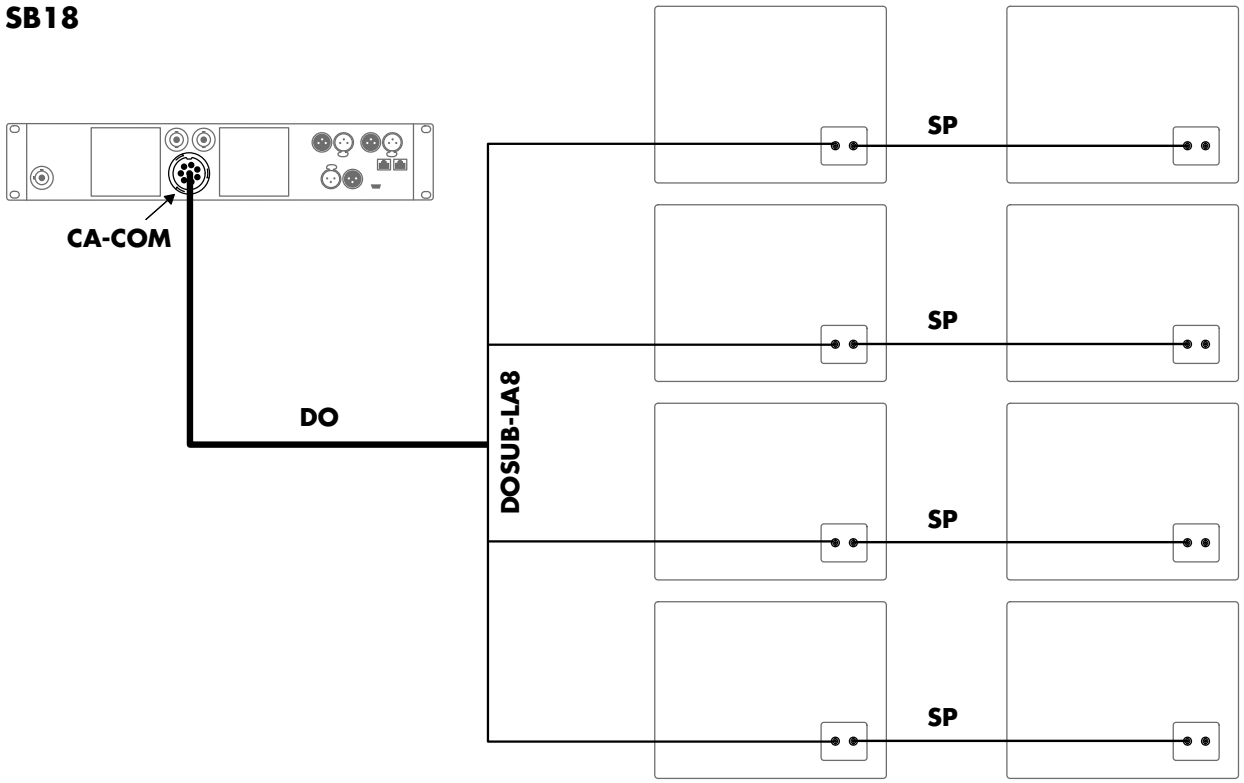
Refer to the cabling schemes below for more instructions.



Using a DO cable with a DOSUB-LA8

— Connect a DO cable (DO.7,DO10 or DO25) to the CA-COM® connector of the amplified controller.
— Use a DOSUB-LA8 to split the signal into four channels, each feeding one enclosure.
— If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

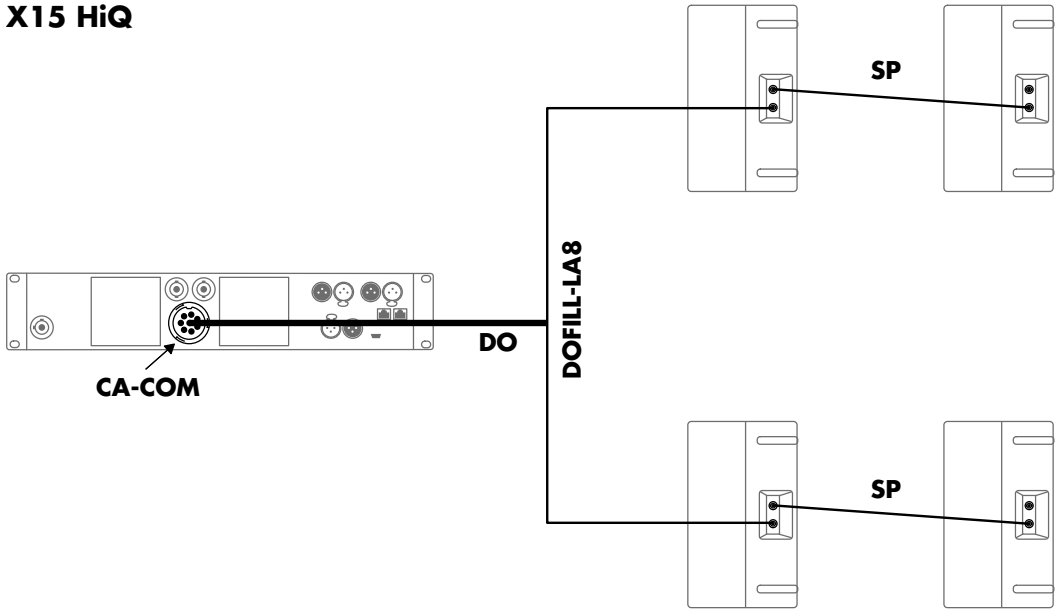
Refer to the cabling schemes below for more instructions.



Using a DO cable with a DOFILL-LA8

- Connect a DO cable (DO.7, DO10 or DO25) to the CA-COM® connector of the amplified controller.
- Use a DOFILL-LA8 to split the signal into two channels pairs, each feeding one enclosure.
- If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

Refer to the cabling schemes below for more instructions.

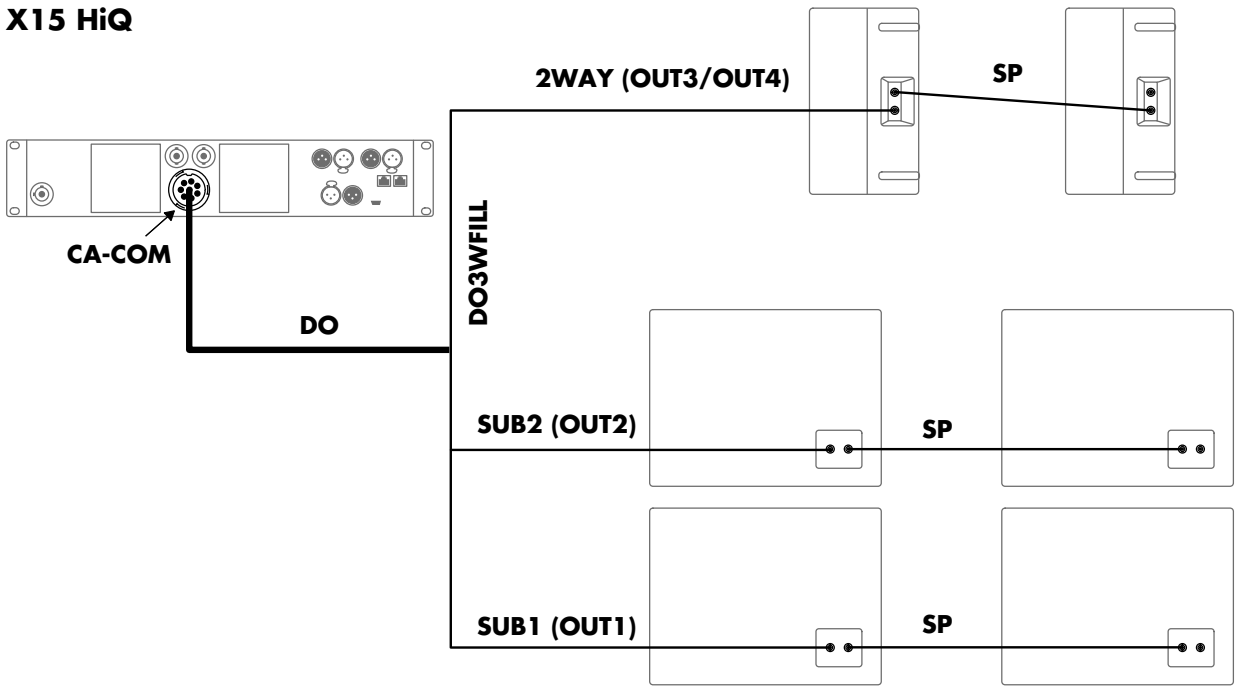


Using a DO cable with a DO3WFILL

This cabling scheme requires a custom preset.

- Connect a DO cable (DO.7, DO10 or DO25) to the CA-COM® connector of the amplified controller.
- Use a DO3WFILL to split the signal into one channel pair (2WAY) and two single channels (SUB1 and SUB2).
- Connect the 2WAY connector to the IN connector of the enclosure.
- Connect the SUB1 and SUB2 connectors to the IN connectors of the subwoofers.
- If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

Refer to the cabling schemes below for more instructions.



Preset description

[X15] [X15_MO]

enclosure	loudspeaker elements	outputs	channels	routing	gain	delay	polarity	mute
X15HiQ	LF	OUT 1	LF	IN A	0 dB	0 ms	+	ON
	HF	OUT 2	HF					ON
X15HiQ	LF	OUT 3	LF	IN B	0 dB	0 ms	+	ON
	HF	OUT 4	HF					ON

[SB18_100]

enclosure	outputs	channels	routing	gain	delay	polarity	mute
SB18	OUT 1	SB	IN A	0 dB	0 ms	+	ON
SB18	OUT 2	SB	IN A	0 dB	0 ms	+	ON
SB18	OUT 3	SB	IN A	0 dB	0 ms	+	ON
SB18	OUT 4	SB	IN A	0 dB	0 ms	+	ON

Recommendation for speaker cables

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

Cable quality and resistance

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

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

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

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

For your installation projects, you can 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:

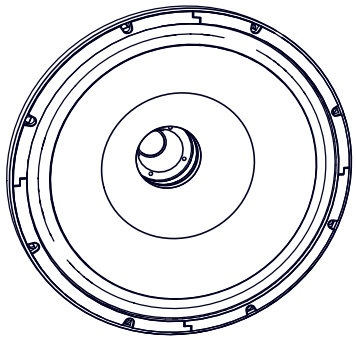
http://www.l-acoustics.com/installation-outils-de-calcul-1367.html

Maintenance

Repair kits

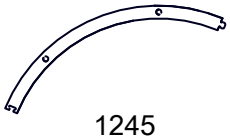
G03210

KR coaxial speaker X15 HiQ



1630

100286

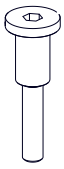


1245

S100054

100547

S100033



100546

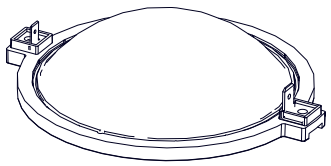
S100082

100214

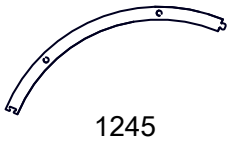
code	description	qty
1630	15" coaxial speaker - 8 ohms	1
100286	Lexan™ screw cover	2
1245	driver gasket	4
S100054	M6x30 Tuflok coated hex socket head cap screw	4
100547	M5x50 hexagon socket head shoulder screw	2
S100033	M5x25 Tuflok coated flat countersunk head machine screw	6
100546	M6x17 hexagon socket head shoulder screw	4
S100082	M4x14 hexagon socket head cap screw	4
100214	waveguide gasket	1

G03176

KR diaphragm X15 HiQ


17581

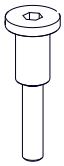

100286


1245


S100054


100547


S100033


100546


S100082

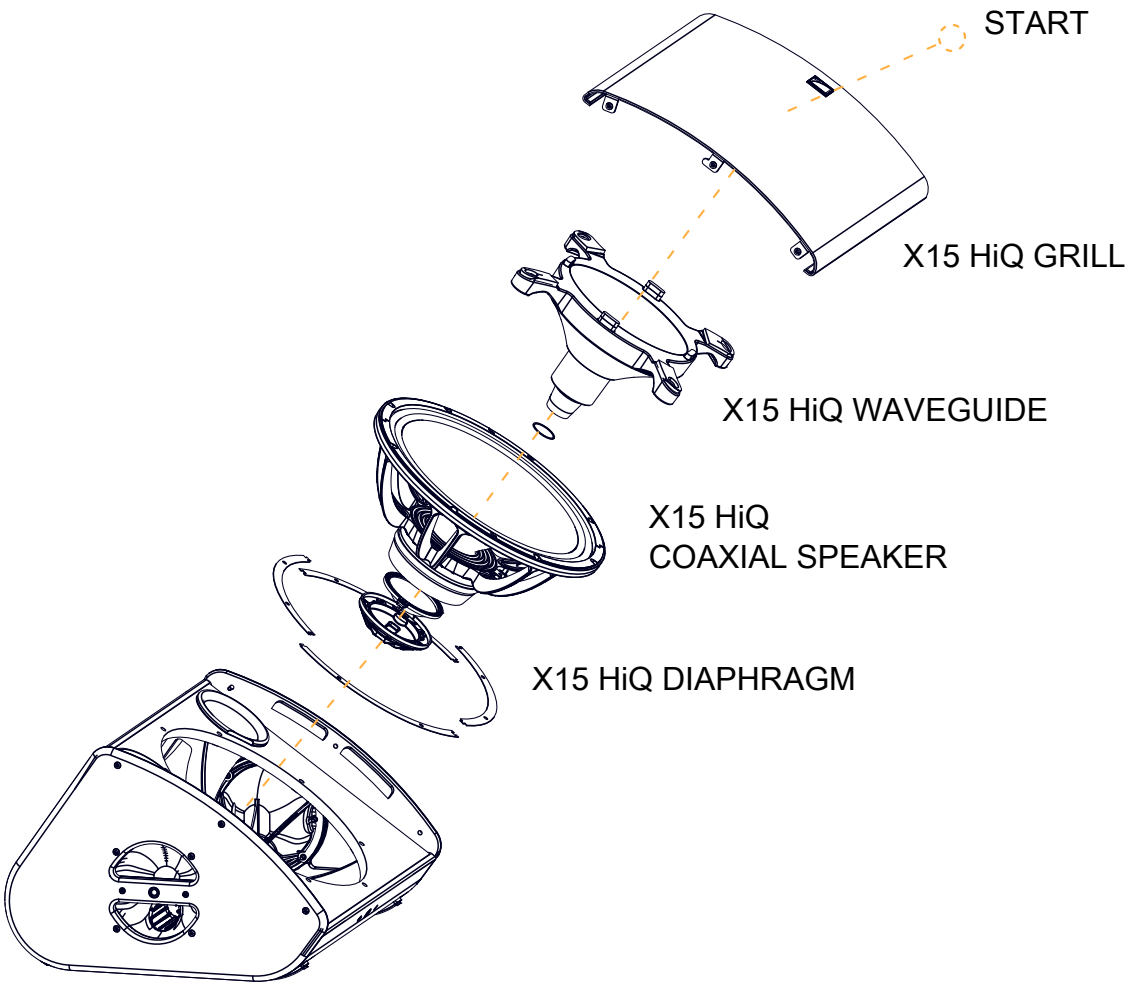

100214

2 shims are provided in this kit

code	description	qty
17581	diaphragm assembly	1
100286	Lexan™ screw cover	2
1245	driver gasket	4
S100054	M6x30 Tuflok coated hex socket head cap screw	4
100547	M5x50 hexagon socket head shoulder screw	2
S100033	M5x25 Tuflok coated flat countersunk head machine screw	6
100546	M6x17 hexagon socket head shoulder screw	4
S100082	M4x14 hexagon socket head cap screw	4
100214	waveguide gasket	1

Disassembly and Reassembly procedures

In order to operate follow the order outlined here.



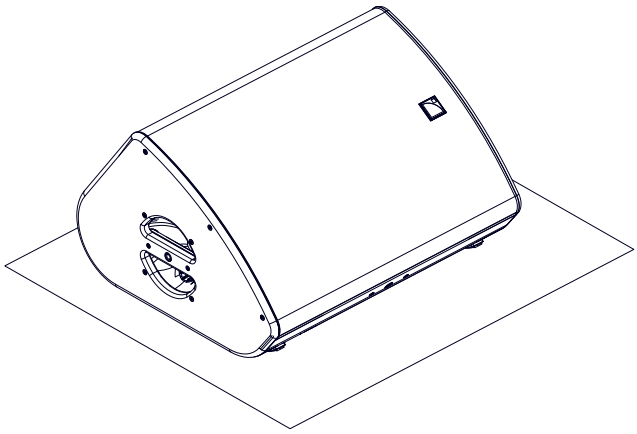
D/R - X15 HiQ GRILL

How to remove and reassemble the X15 HiQ grill.

Tools

Name	Reference	Distributor
electric screwdriver with torque selector	-	-
T25 Torx® bit	EX.625	FACOM

Pre-requisite

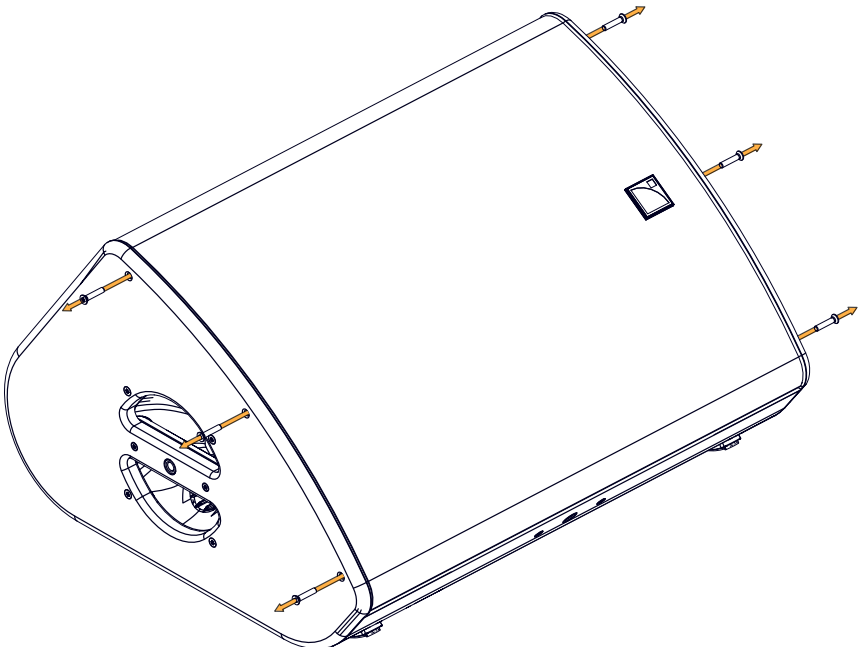
The enclosure is placed on its bottom face.	

X15 HiQ grill disassembly procedure

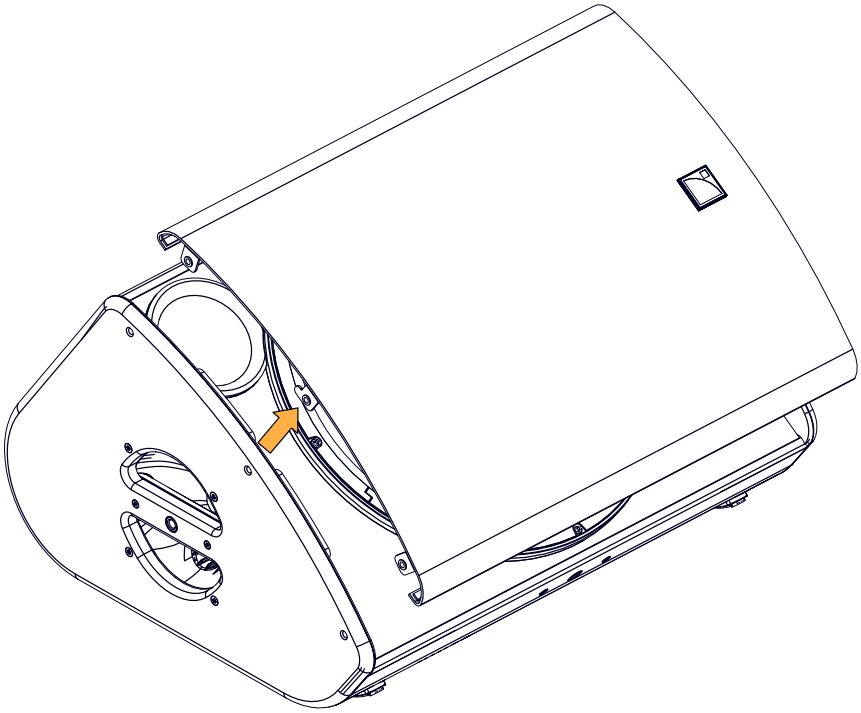
Procedure

1. Remove the screws securing the grill.

Use the electric screwdriver and the T25 Torx® bit



2. Carefully remove the grill from the enclosure.



X15 HiQ grill reassembly procedure

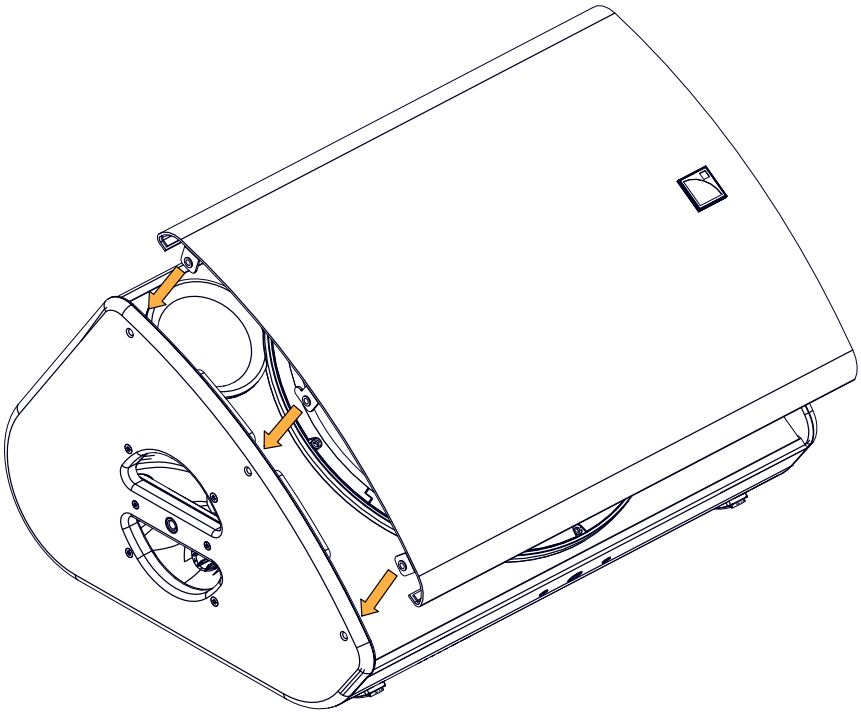
Pre-requisite

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

Procedure

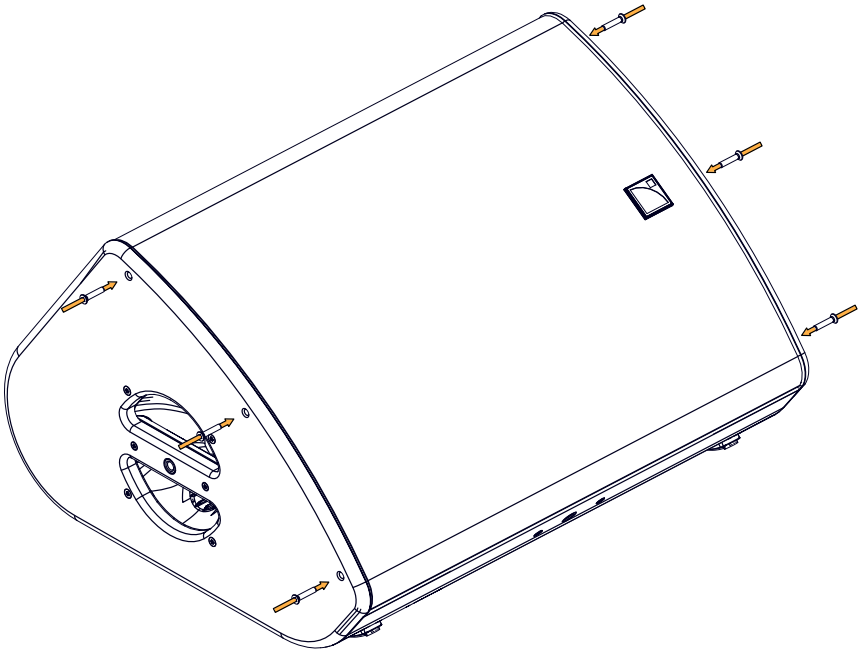
1. Position the grill.

Make sure the logo is in the right position.



2. Secure the grill with the provided S100033 screws

Use the electric screwdriver and the T25 Torx® bit. Set the torque to 7 N.m.



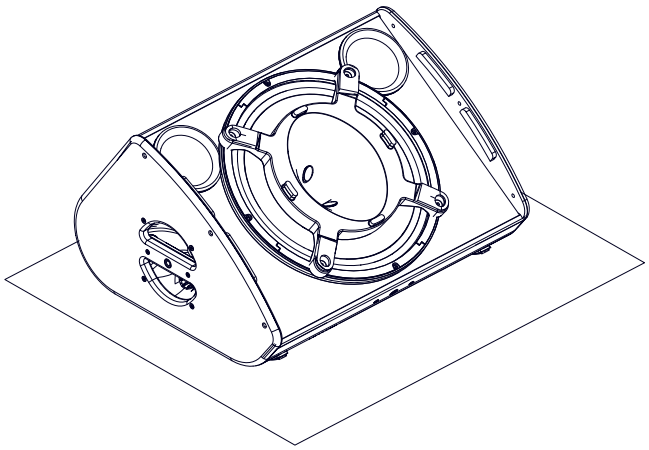
D/R - X15 HiQ WAVEGUIDE

How to remove and replace the waveguide in the X15 HiQ speaker assembly.

Tools

Name	Reference	Distributor
electric screwdriver with torque selector	-	-
4 mm hex bit	EH.604	FACOM
5 mm hex bit	EH.605	FACOM

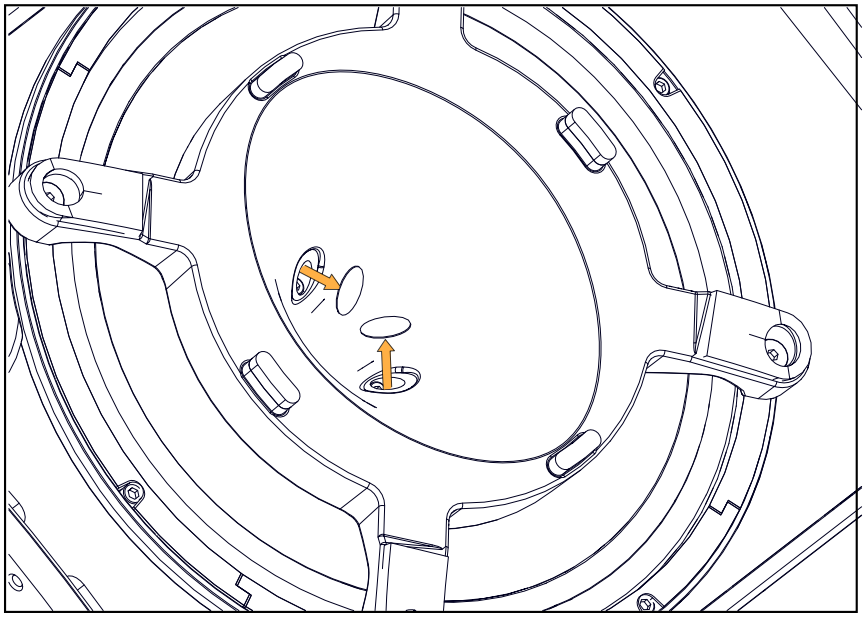
Pre-requisite

Grill disassembled.	See *X15 HiQ GRILL* (p.29).
The enclosure is placed on its bottom face.	

X15 HiQ waveguide disassembly procedure

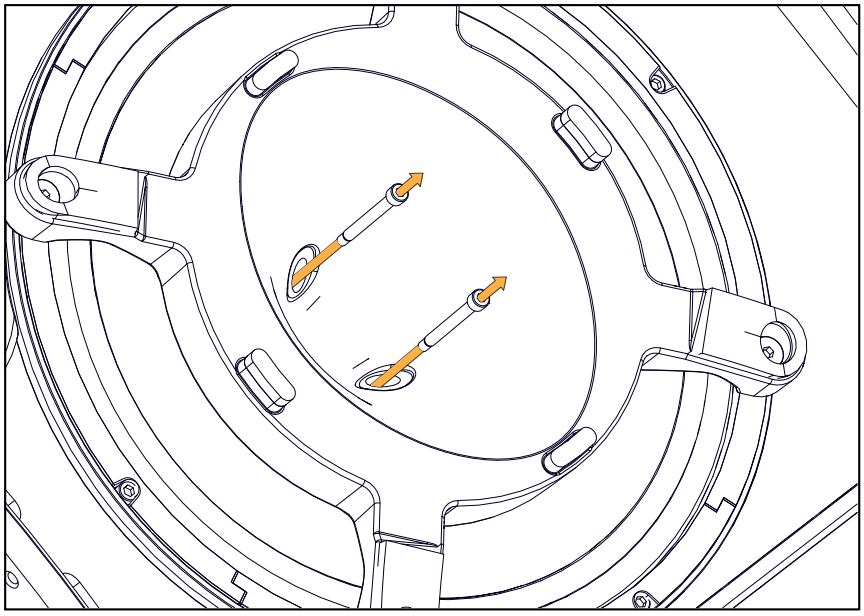
Procedure

1. Remove the screw covers.



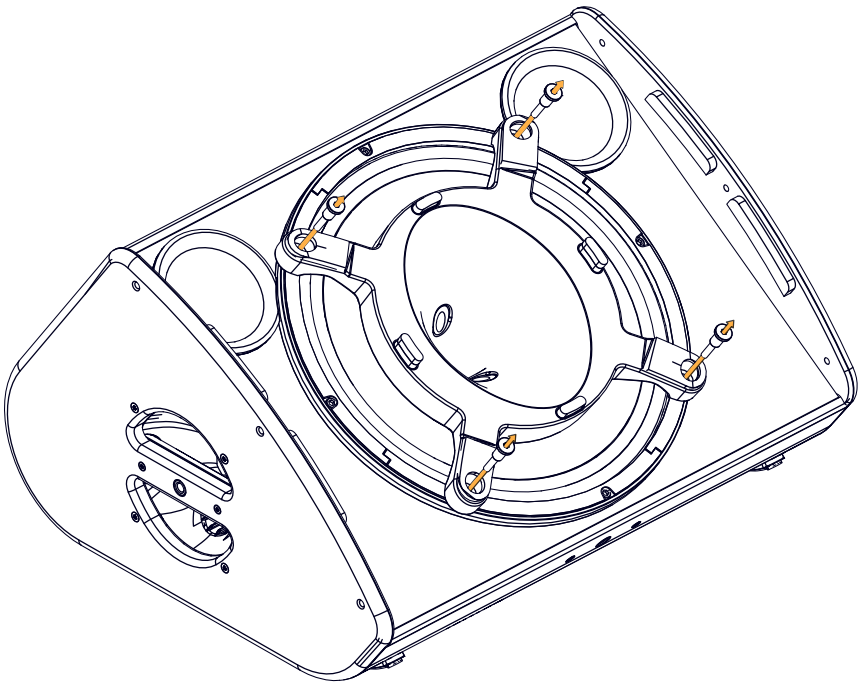
2. Remove the two screws securing the waveguide to the speaker.

Use the electric screwdriver and the 5 mm hex bit.

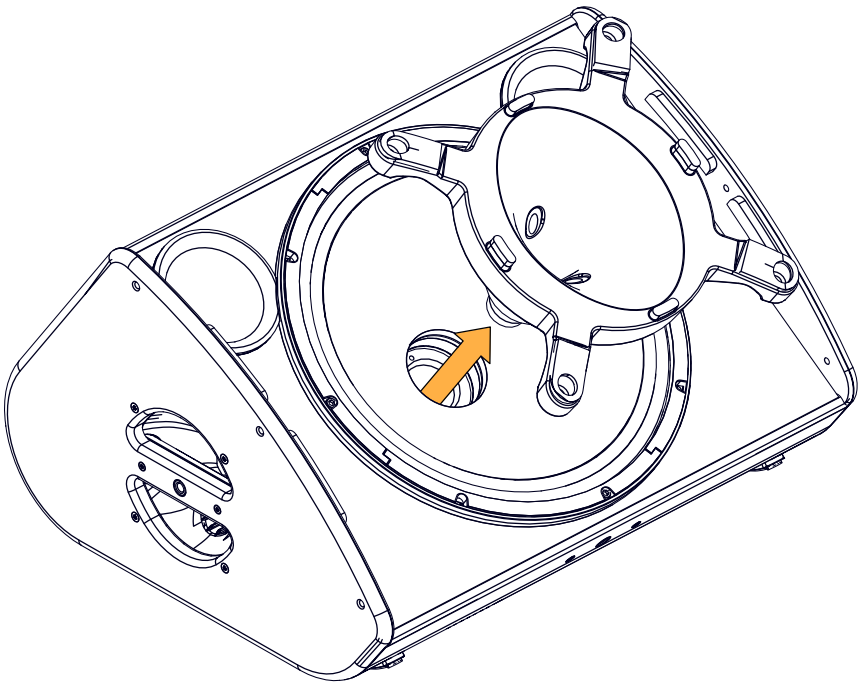


3. Remove the four remaining screws.

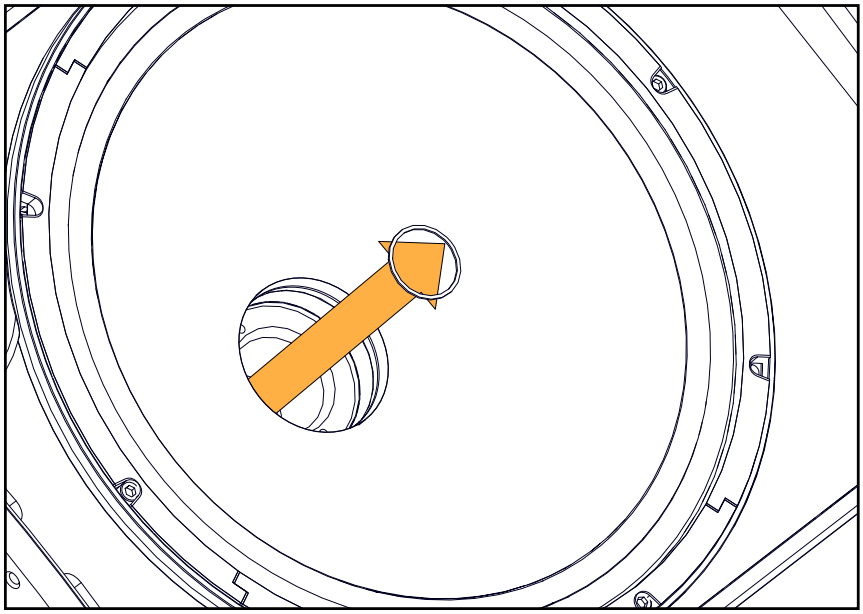
Use the electric screwdriver and the 4 mm hex bit.



4. Carefully remove the waveguide.



5. Remove the waveguide gasket.



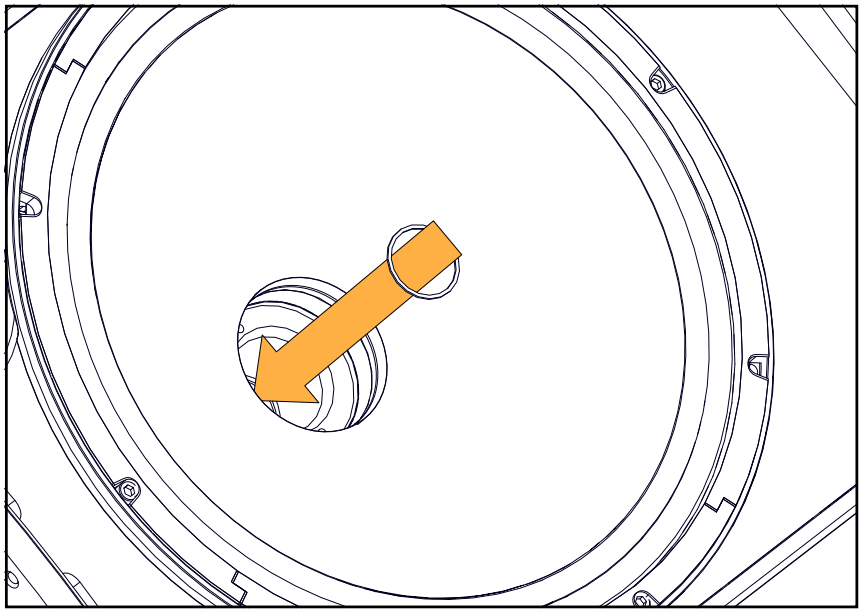
X15 HiQ waveguide reassembly procedure

Pre-requisite

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

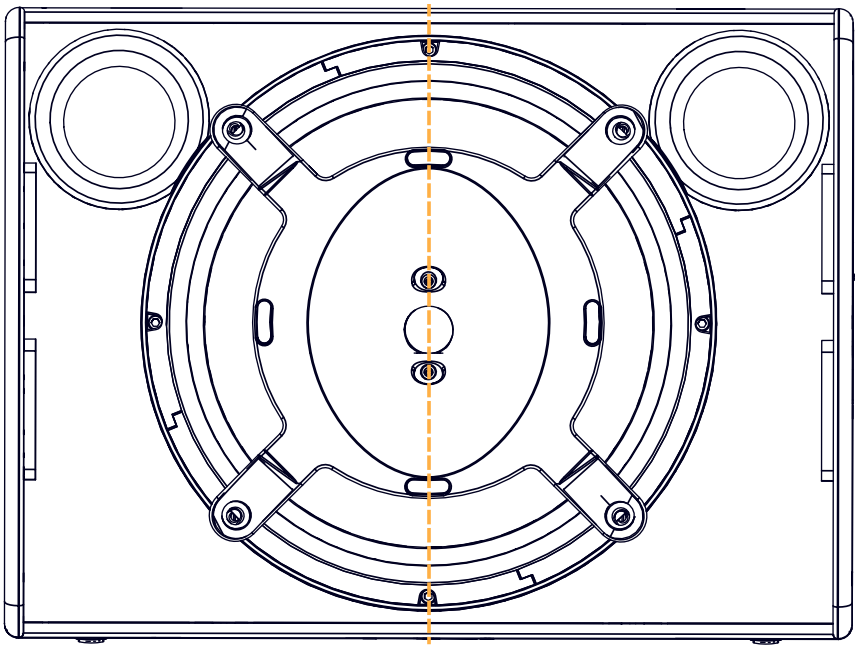
Procedure

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



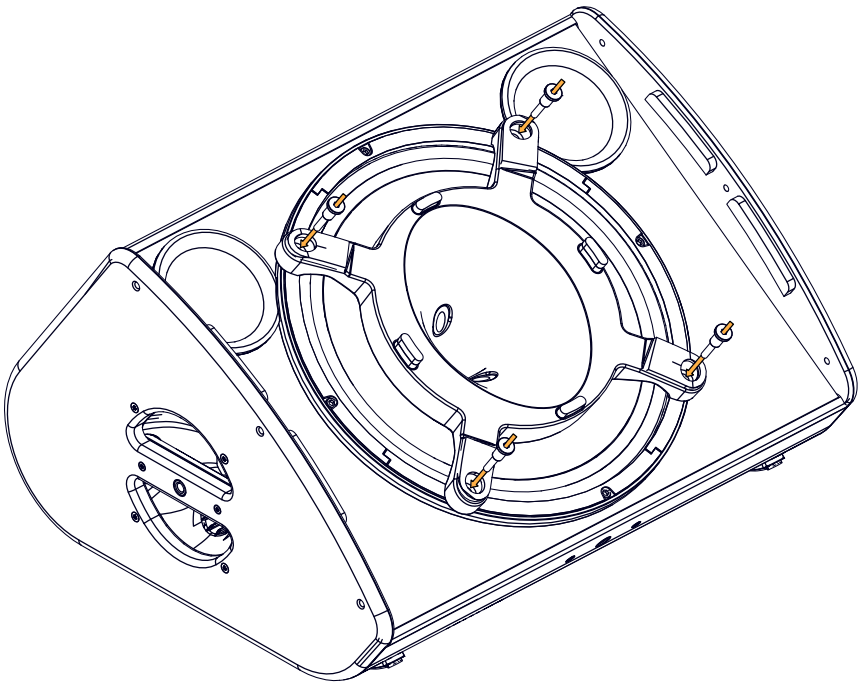
2. Position the waveguide.

The center holes are aligned with the connectors.



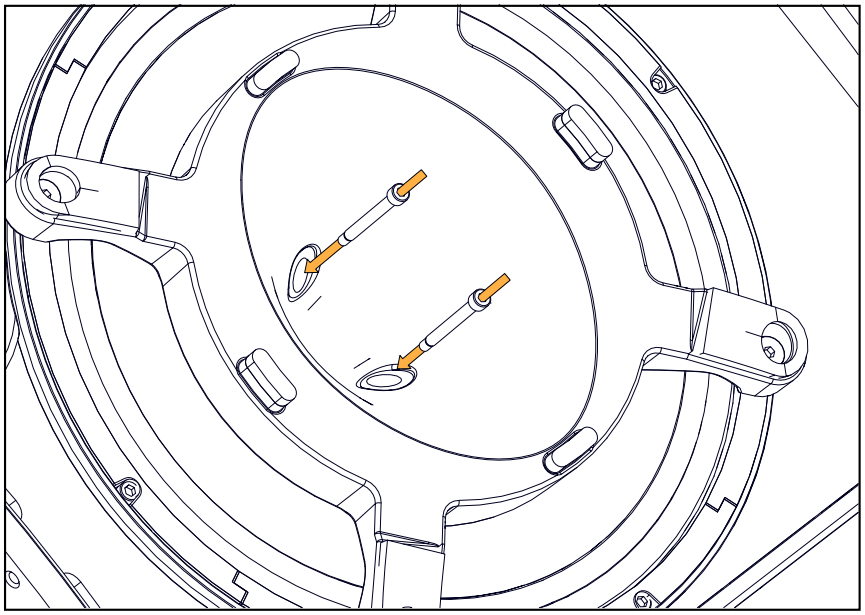
3. Secure the waveguide to the cabinet with the provided 100546s

Use the electric screwdriver and the 4 mm hex bit. Set the torque to 5 N.m.

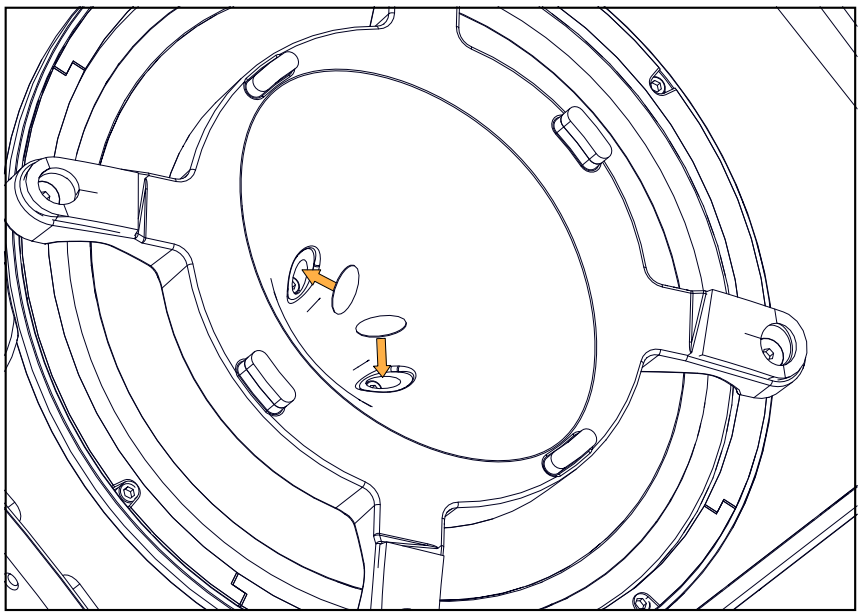


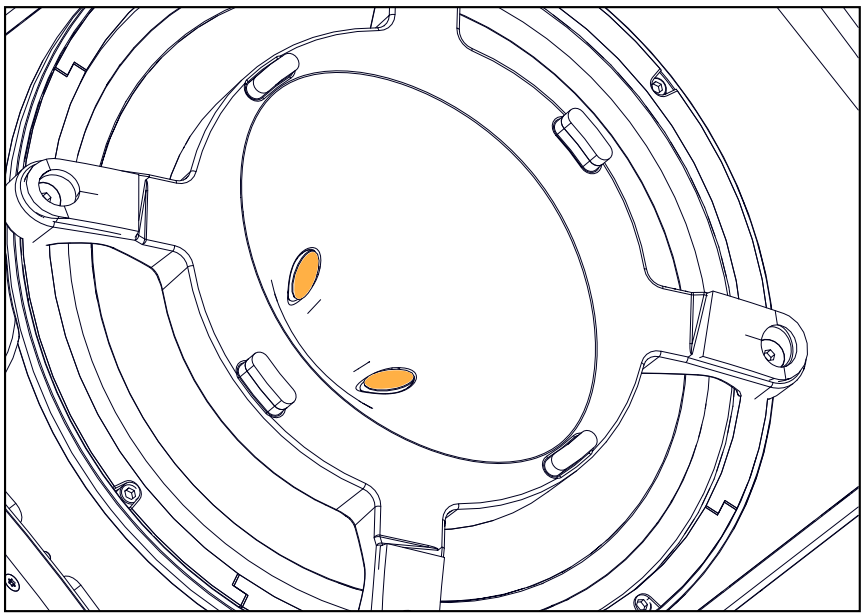
4. Secure the waveguide to the speaker with the provided 100547s

Use the electric screwdriver and the 5 mm hex bit. Set the torque to 5 N.m.



5. Stick the screw covers in place.





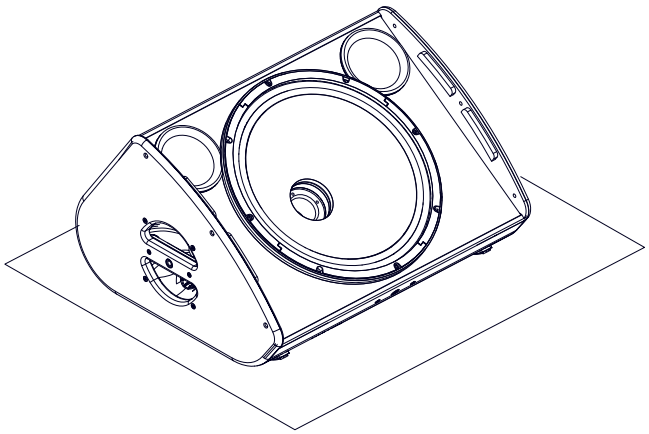
D/R - X15 HiQ COAXIAL SPEAKER

How to remove and replace a X15 HiQ coaxial speaker.

Tools

Name	Reference	Distributor
electric screwdriver with torque selector	-	-
5 mm hex bit	EH.605	FACOM

Pre-requisite

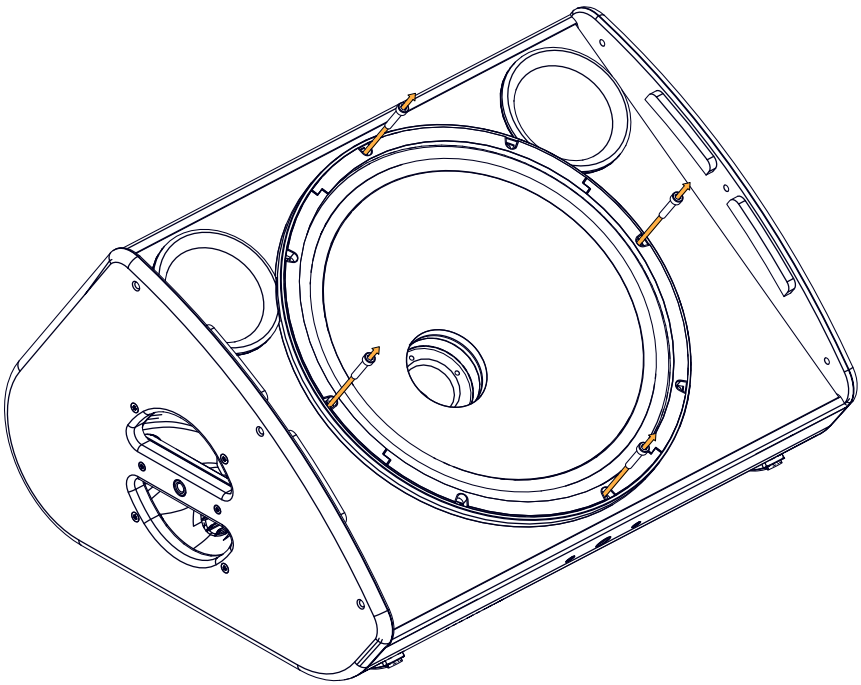
Grill disassembled.	See *X15 HiQ GRILL* (p.29).
Waveguide removed.	See *X15 HiQ WAVEGUIDE* (p.32).
The enclosure is placed on its bottom face.	

X15 HiQ speaker disassembly procedure

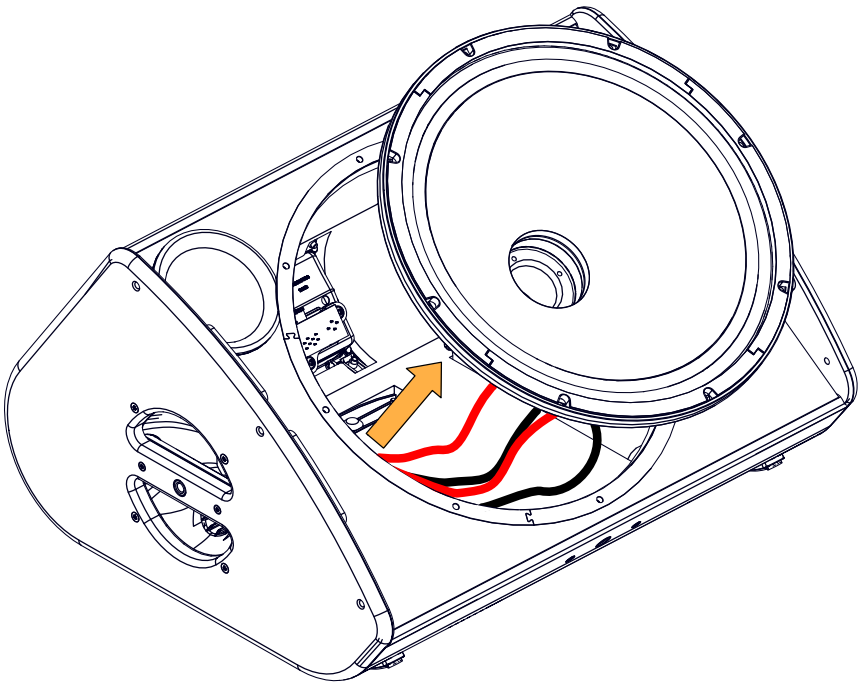
Procedure

1. Remove the screws securing the speaker.

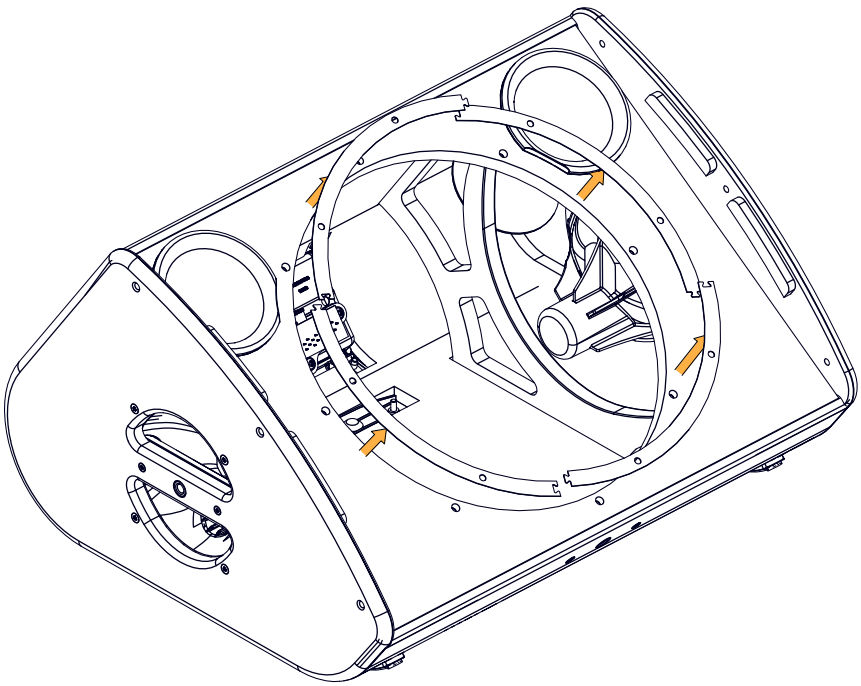
Use the electric screwdriver and the 5 mm hex bit.



2. Remove the speaker carefully and disconnect the speaker cables.



3. Remove the speaker gasket.



4. Clean any remaining glue from the cabinet.

X15 HiQ speaker reassembly procedure

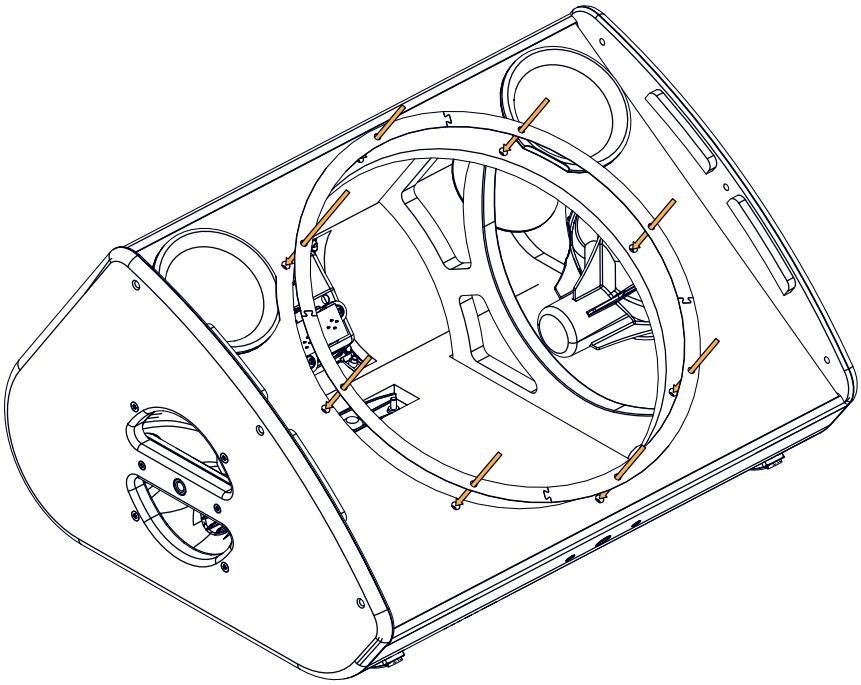
Pre-requisite

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

Procedure

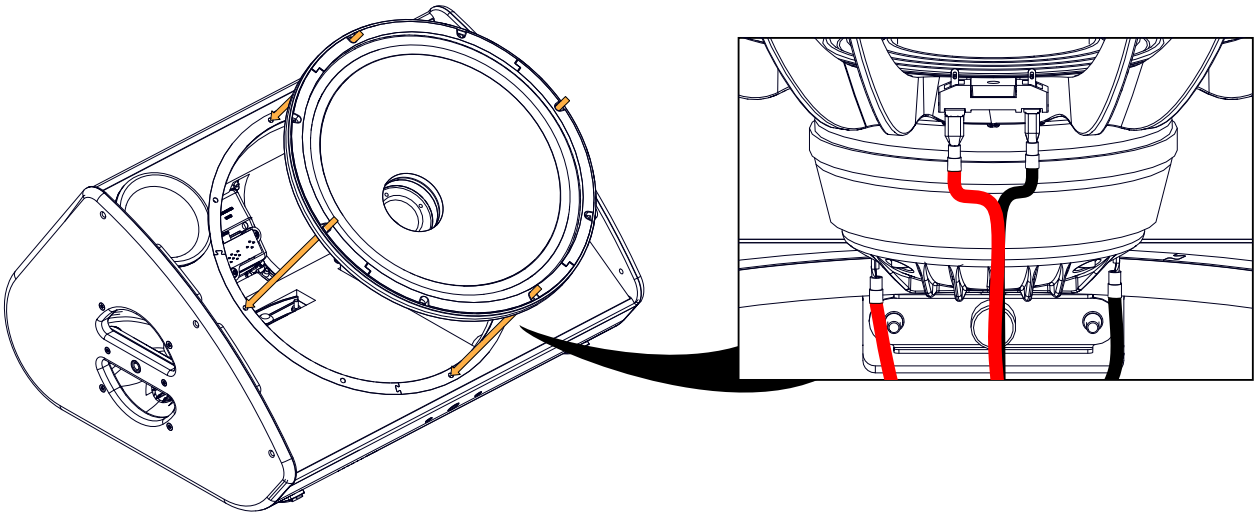
1. Stick the four gaskets to the cabinet.

Use the inserts as a reference to position the gaskets.



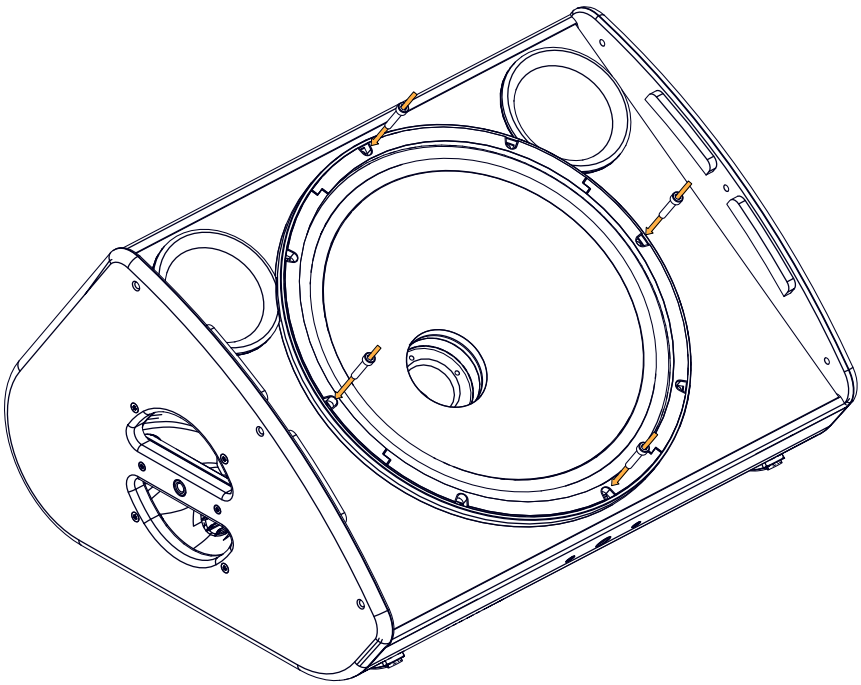
2. Connect the speaker cables and position the speaker.

The LF speaker connectors are oriented downward.



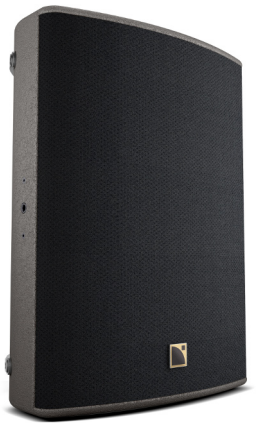
3. Secure the speaker with the provided S100054

Use the electric screwdriver and the 5 mm hex bit. Set the torque to 5 N.m.



Illustrations

Loudspeaker enclosures



X15 HiQ active 2-way coaxial enclosure

SB18 high power compact subwoofer

Powering and driving system

LA4X amplified controller with DSP, preset library and networking capabilities

LA8 amplified controller with DSP, preset library and networking capabilities

LA-RAK

touring rack containing three LA8, for power, audio and network distribution

Loudspeaker cables

SP.7

4-point SpeakON loudspeaker cable (0.7 m / 2.3 ft)

SP5

4-point SpeakON loudspeaker cable (5 m / 16.4 ft)

SP10

4-point SpeakON loudspeaker cable (10 m / 32.8 ft)

SP25

4-point SpeakON loudspeaker cable (25 m / 82 ft)

DO.7

8-point PA-COM loudspeaker cable (0.7 m / 2.3 ft)

DO10

8-point PA-COM loudspeaker cable (10 m / 32.8 ft)

DO25

8-point PA-COM loudspeaker cable (25 m / 82 ft)

DO3WFILL

breakout cable for one 2-way active enclosure and two passive enclosures

DOFILL-LA8

breakout cable for two 2-way active enclosures

DOSUB-LA8

breakout cable for four passive enclosures

SP-Y1

breakout cable for two passive enclosures

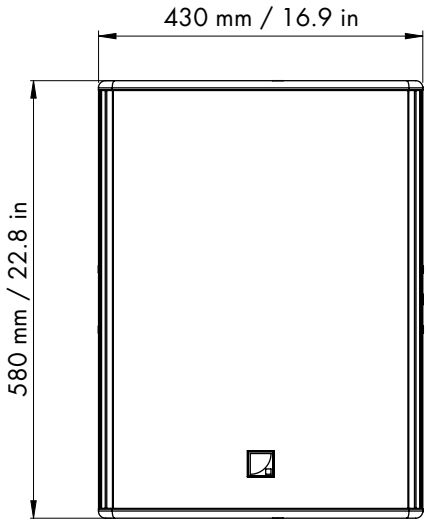
X15 HiQ Specifications

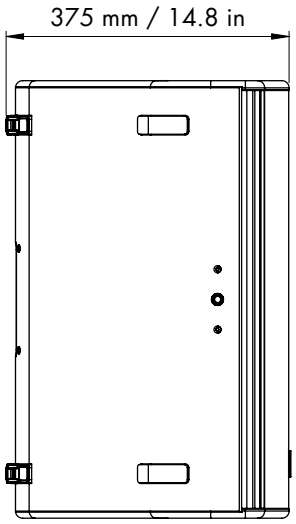
Description	active 2-way coaxial enclosure, amplified by LA4X / LA8.
Usable bandwidth (-10 dB)	55 Hz - 20 kHz
Maximum SPL[1]	136 dB ([X15])
Nominal directivity	Vertical: 60°
	Horizontal: 40°
Monitoring angle	35° without risers
	55° with risers
Transducers	LF: 1 × 15" weather-resistant, bass-reflex laminar vents.
	HF: 1 × 3" compression driver neodymium, weather-resistant, horn.
Nominal impedance	LF: 8 Ω
	HF: 8 Ω
Connectors	IN: SpeakON
	LINK: SpeakON
Rigging and handling	2 × handles
	DIN580-compatible M8 threaded insert
	4 × M10 threaded inserts
	2 × 35 mm pole sockets
Weight (net)	21 kg / 46.3 lb
Cabinet	First grade Baltic beech and birch plywood
Finish	Dark Grey brown PANTONE 426C
	Pure white RAL 9010
	Custom RAL code on special order
IP	IP43

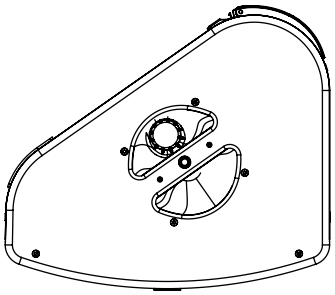
[1] Peak level at 1 m under free field conditions using 10 dB crest factor pink noise with specified preset.

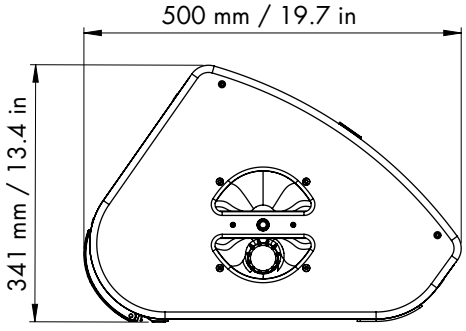
X15 HiQ dimensions

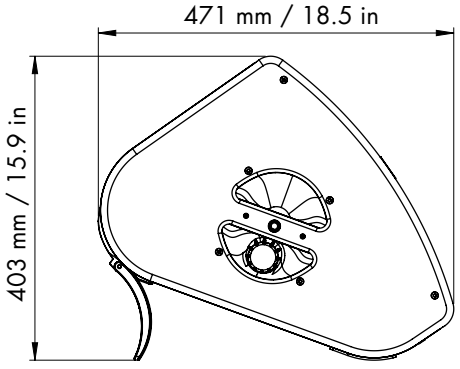
On-end H/W/D	580 mm / 375 mm / 430 mm 22.8 in / 14.8 in / 16.9 in
Monitor H/W/D	341 mm / 500 mm / 580 mm 13.4 in / 19.7 in / 22.8 in
Monitor with risers H/W/D	403 mm / 471 mm / 580 mm 15.9 in / 18.5 in / 22.8 in












L-ACOUSTICS