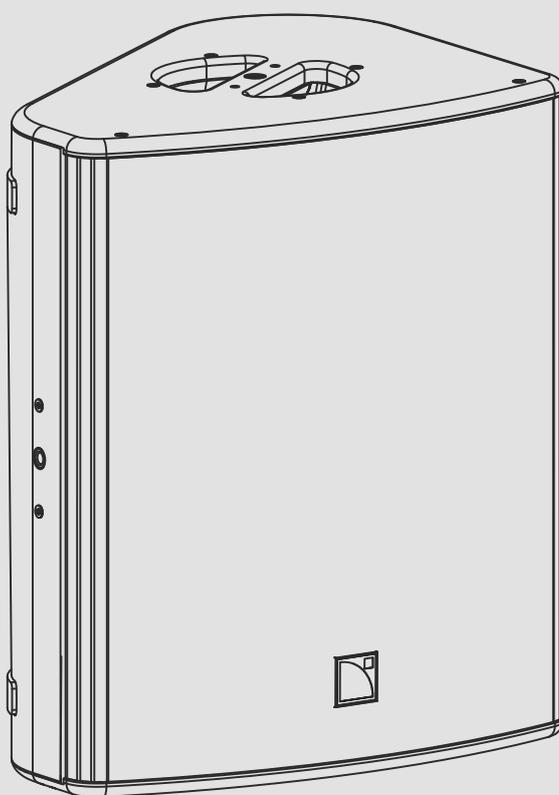


X12

user manual 2.1 (EN)



Document reference: X12 user manual (EN) version 2.1

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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.

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.



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 X12.

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, 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.

X12 multi-purpose enclosure

The X12 is a multipurpose coaxial system perfectly suited to all short throw sound reinforcement applications. The enclosure features a 3" diaphragm compression driver coaxially loaded by a 12" 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 X12 operates from 59 Hz to 20 kHz. The coaxial transducer arrangement and its ellipsoid acoustic design produce a 90° x 60° directivity pattern with a smooth tonal response free of secondary lobes over the entire frequency range.

The internal passive crossover network uses custom filters. The L-Acoustics amplified controllers L-Drive parameters ensure the linearization and protection of the transducers.

With a cabinet combining the properties of birch and beech plywood, X12 weighs 20 kg and its elegance makes for an easy integration in any situation. Ergonomic handles provide a solid grip and efficient handling. An optional white or RAL color program means that it can melt into any architecture. The X12 provides a stage monitoring angle setting of 35° with regard to vertical or 55° thanks to its built-in risers.

The ellipsoid directivity of 90° x 60° gives optimized coverage for FOH and fill applications, distributed systems, stage monitoring and more. The compact footprint allows for discreet integration, preserving sightlines. The passive design reduces the need for amplified controller.

The X12 can be pole-mounted using the integrated socket. Other deployments such as wall-mounted, ceiling-mounted or flown are quick and easy, with a complete range of rigging accessories that offer multiple set-up options and various orientations.

System components

Loudspeaker enclosures

X12	passive 2-way coaxial enclosure
SB15m	high power compact subwoofer
SB18	high power compact subwoofer

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
L-Case	protection case for L-Acoustics 2U electronics

 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

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 X12 rigging manual.

Software applications

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

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

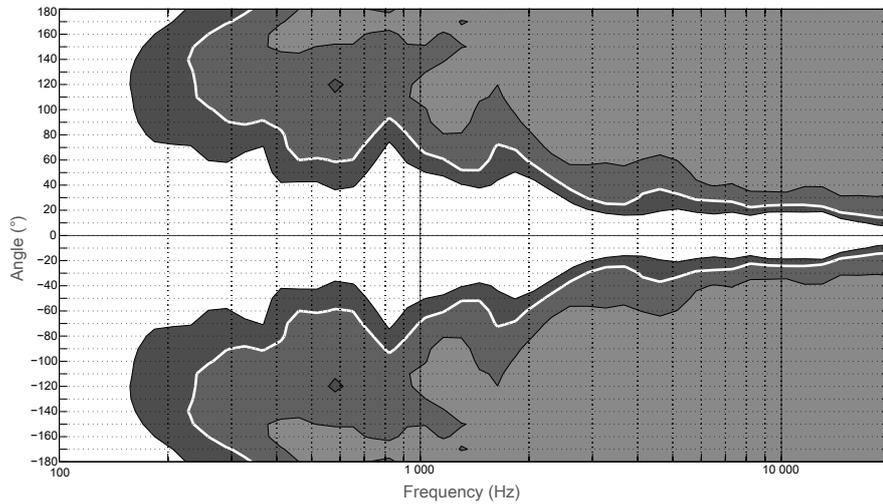
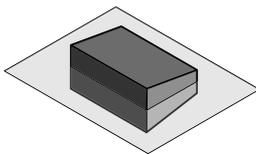
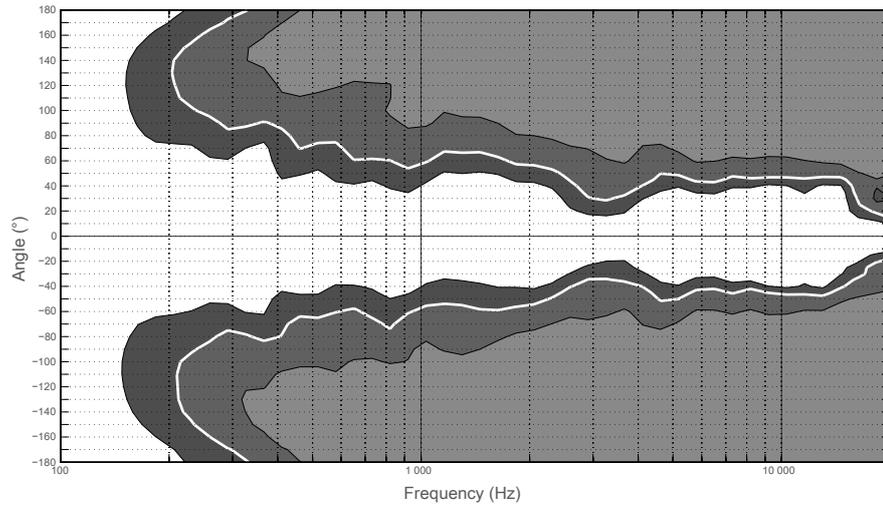
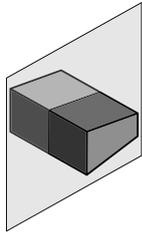
Technical description

Low-latency preset

A low-latency preset is available for the X12 enclosure used as a monitor ([X12_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.

Directivity

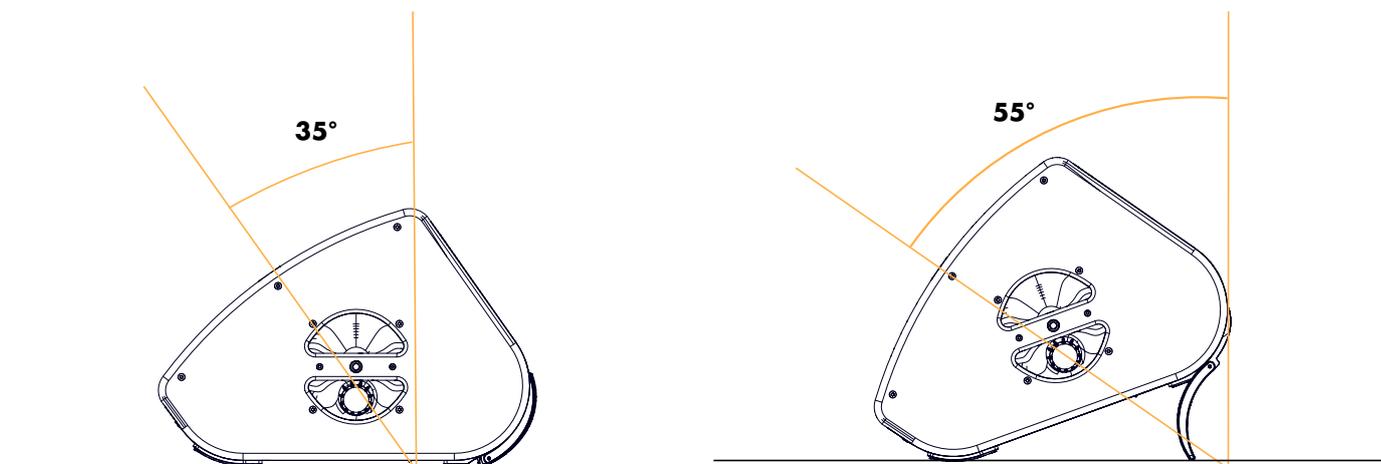
X12 features a coaxial transducer arrangement coupled with an ellipsoid waveguide that generates an H/V directivity pattern of 60° x 90°.



Dispersion angle diagram of a single X12 using lines of equal sound pressure at -3 dB, -6 dB, -12 dB.

Monitor angles

X12 features risers that allow to change the monitor angle from 35° to 55°.



Loudspeaker configurations

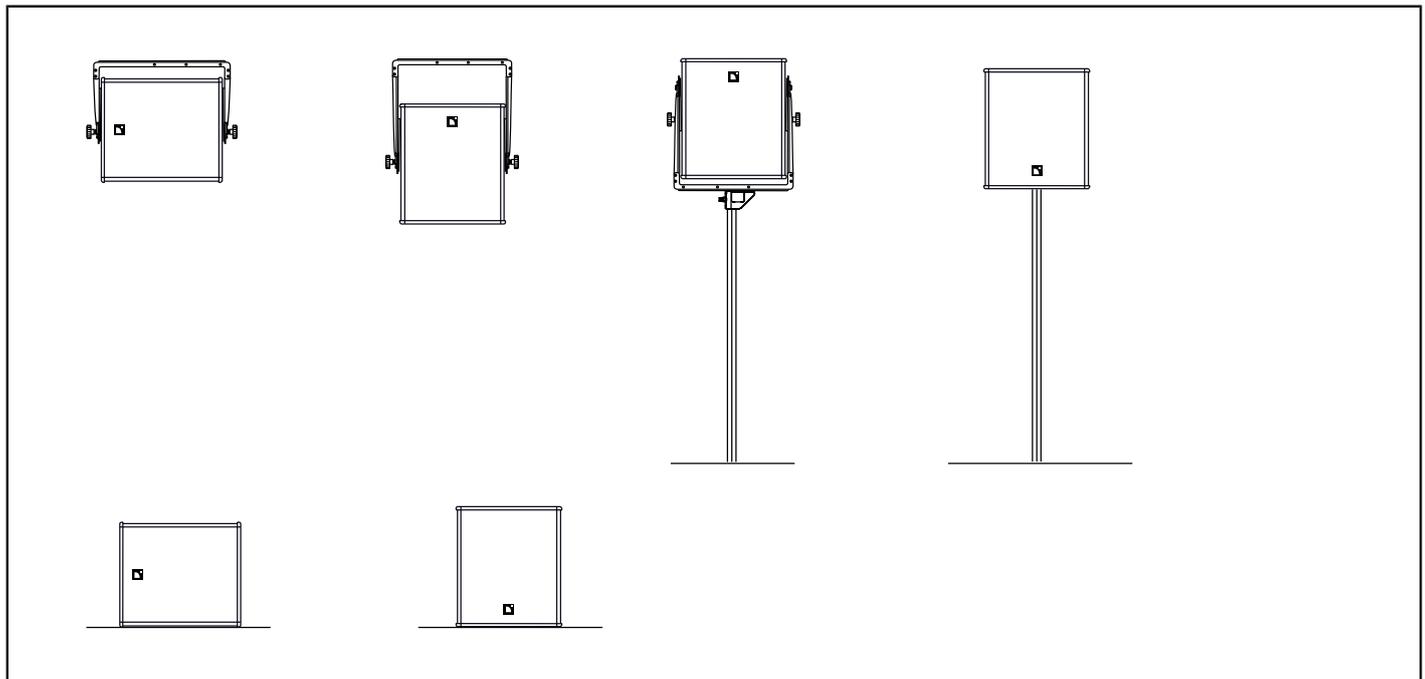
X12 point source

Deployed as a standalone point source, an X12 system operates over the nominal bandwidth of the X12 enclosure.

The [X12] preset allows for a reference frequency response in short throw applications.

The X12 enclosure is driven by the LA4X / LA8 amplified controllers.

Standalone X12



Enclosure	Preset
X12	[X12]
Frequency range (-10 dB)	59 Hz - 20 kHz

X12 point source with LF

Deployed as a point source with SB15m or SB18 subwoofers, an X12 system operates with augmented LF resources.

The [X12] preset allows for a reference frequency response in short throw applications.

The [SB15_100] and [SB18_100] presets provide the SB15m and SB18 with an upper frequency limit at 100 Hz for an optimal frequency coupling with the X12.

The X12, SB15m and SB18 enclosures are driven by the LA4X / LA8 amplified controllers.

X12 with SB15m

With SB15m, the X12 system contour is reinforced by 8 dB at 100 Hz and the system bandwidth is extended down to 40 Hz.

Enclosure	Preset
X12	[X12]
SB15m	[SB15_100]
Frequency range (-10 dB)	40 Hz - 20 kHz
Enclosure ratio	1 X12 : 1 SB15m



Delay values

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

[X12] + [SB15_100]	X12 = 0	SB15m = 2.8
--------------------	---------	-------------

X12 with SB18

With SB18, the X12 system contour is reinforced by 8 dB at 100 Hz, and the system bandwidth is extended down to 32 Hz.

Enclosure	Preset
X12	[X12]
SB18	[SB18_100]
Frequency range (-10 dB)	32 Hz - 20 kHz
Enclosure ratio	1 X12 : 1 SB18

Delay values

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

[X12] + [SB18_100]	X12 = 0	SB18 = 0
--------------------	---------	----------

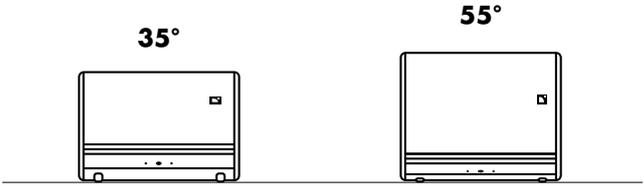
X12 stage monitor

Deployed as a stage monitor, an X12 system operates over the nominal bandwidth of the X12 enclosure.

The [X12_MO] preset allows for a reference frequency response in stage monitoring applications.

The X12 enclosure is driven by LA4X / LA8.

Standalone X12

	
Enclosure	Preset
X12	[X12_MO]
Frequency range (-10 dB)	57 Hz - 20 kHz

X12 stage monitor with LF

Deployed as a stage monitor with SB15m or SB18 subwoofers, an X12 system operates with augmented LF resources. The [X12_MO] preset allows for a reference frequency response in stage monitoring applications.

The [SB15_100] and [SB18_100] presets provide the SB15m and SB18 with an upper frequency limit at 100 Hz for an optimal frequency coupling with the X12.

The X12, SB15m and SB18 enclosures are driven by the LA4X / LA8 amplified controllers.

X12 with SB15m

With SB15m, the X12 system contour is reinforced by 8 dB at 100 Hz and the system bandwidth is extended down to 40 Hz.

Enclosure	Preset
X12	[X12_MO]
SB15m	[SB15_100]
Frequency range (-10 dB)	40 Hz - 20 kHz
Enclosure ratio	1 X12 : 1 SB15m

! Delay values

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

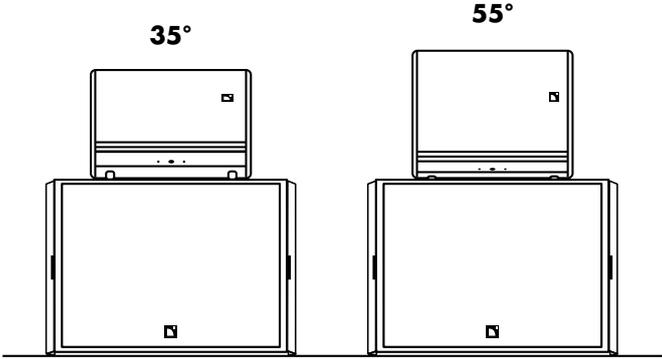
! [xx_MO] presets for the X series use the amplified controller low latency operating mode. When used along with subwoofers, it is recommended to use the subwoofers in low latency operating mode. To achieve this, create custom presets combining low latency channel sets and subwoofer channel sets.

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.

[X12_MO] + [SB15_100]	X12 = 0	SB15m = 2.8
-----------------------	---------	-------------

X12 with SB18

With SB18, the X12 system contour is reinforced by 8 dB at 100 Hz, and the system bandwidth is extended down to 32 Hz.

	
Enclosure	Preset
X12	[X12_MO]
SB18	[SB18_100]
Frequency range (-10 dB)	32 Hz - 20 kHz
Enclosure ratio	1 X12 : 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.

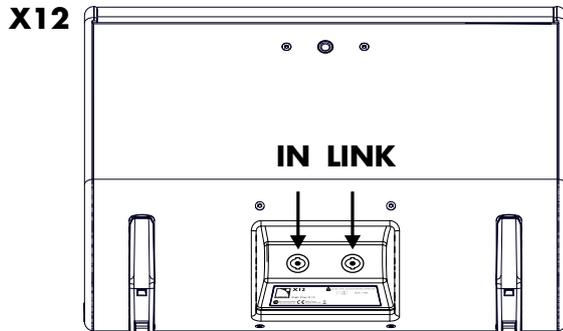
If the subwoofers are driven from a dedicated amplified controller using a subwoofer factory preset, they are operated in normal latency mode. Therefore, an additional delay should be set to the [xx_MO] low latency channels to align them: 2.65 ms on LA4 and LA8 or 3.08 ms on LA4X.

[X12_MO] + [SB18_100]	X12 = 0	SB18 = 0
-----------------------	---------	----------

Loudspeaker connection

Connectors

The X12 is equipped with two 4-point speakON connectors.

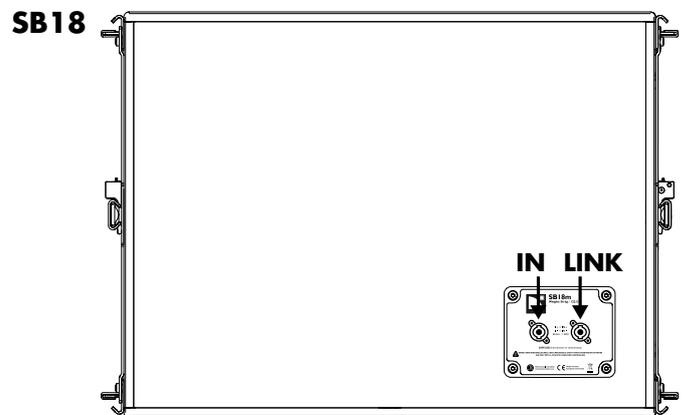
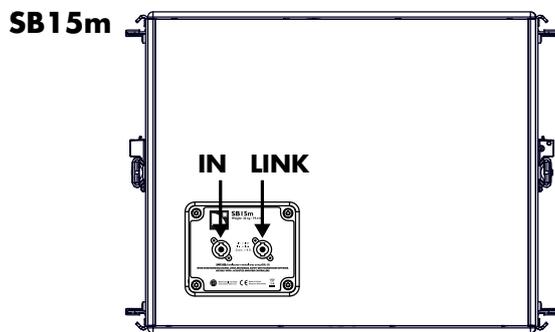


Internal pinout for L-ACOUSTICS 2-way passive enclosures

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

The SB15m is equipped with two 4-point speakON connectors.

The SB18 is equipped with two 4-point speakON connectors.



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 enclosures per LA4X

enclosure	max enclosures in parallel	max enclosures per controller
X12	1	4
SB15m	1	4
SB18	1	4

Impedance load

X12 SB15m SB18

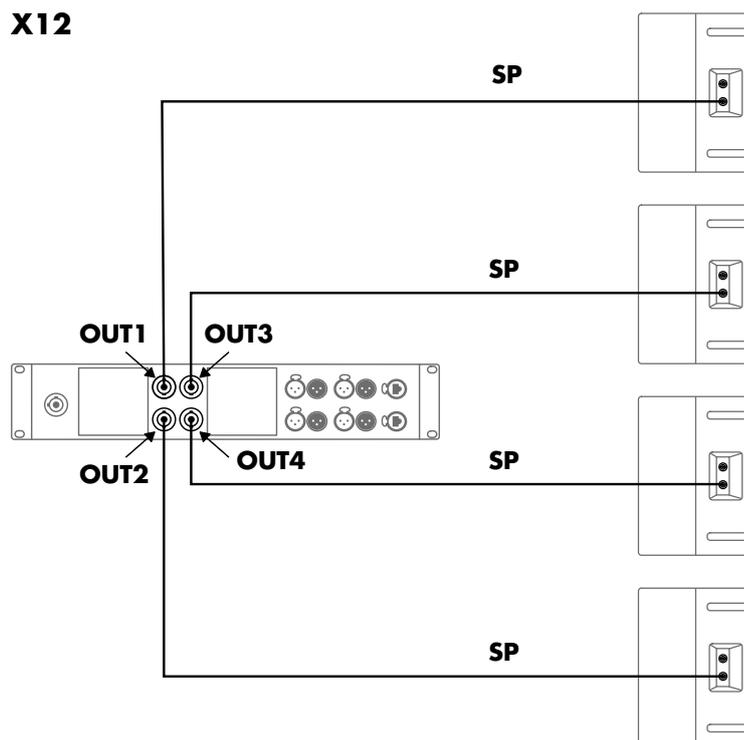
1 enclosure: 8 Ω

Using SP cables with passive enclosures

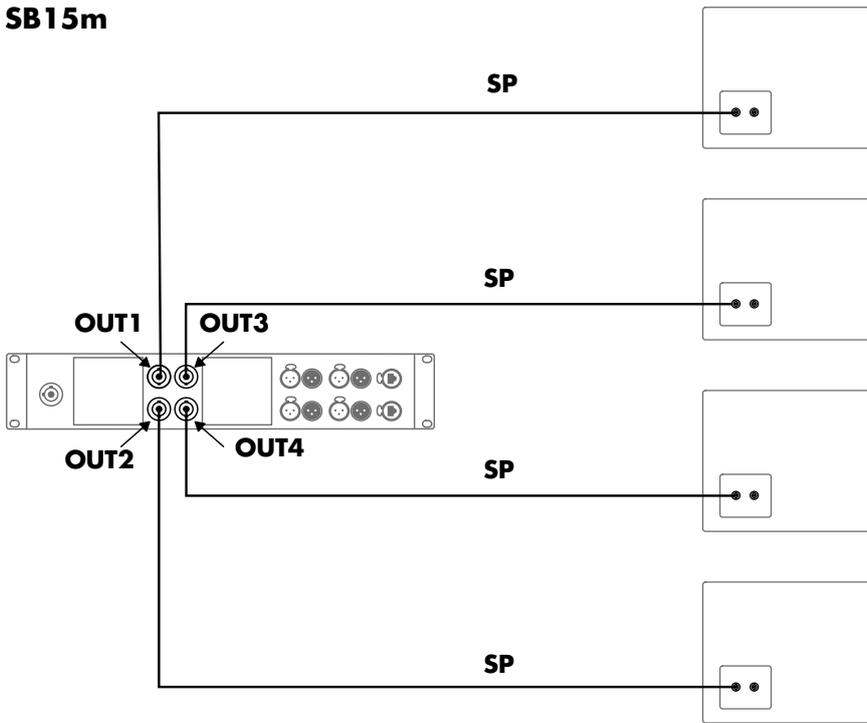
- Use SP cables (SP.7, SP5, SP10 or SP25) to connect one enclosure to each of the four speakON connectors of the amplified controller.
- If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

Refer to the cabling schemes below for more instructions.

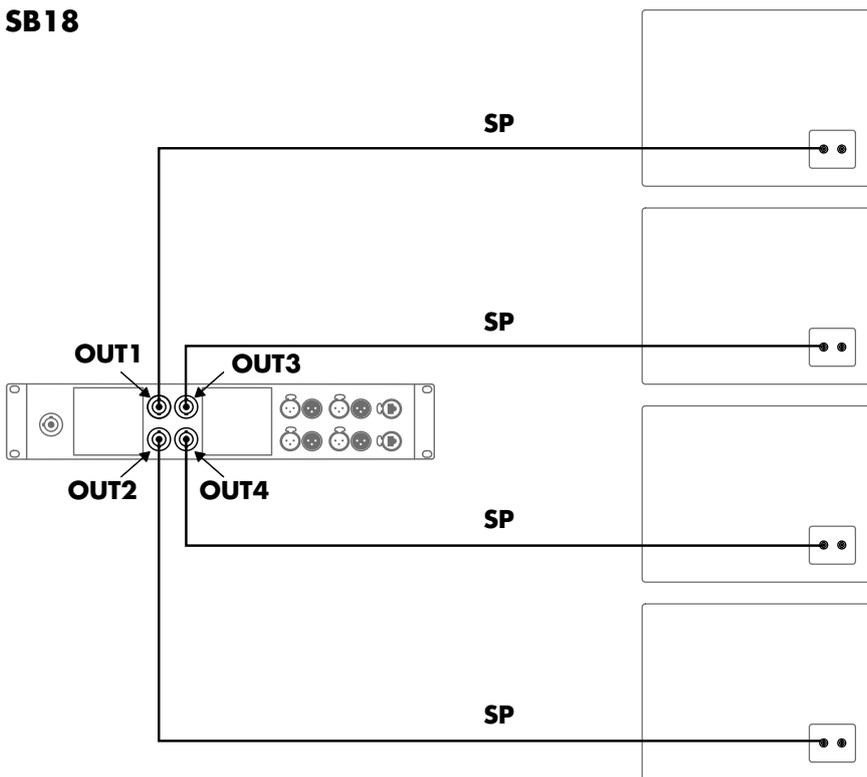
X12



SB15m



SB18

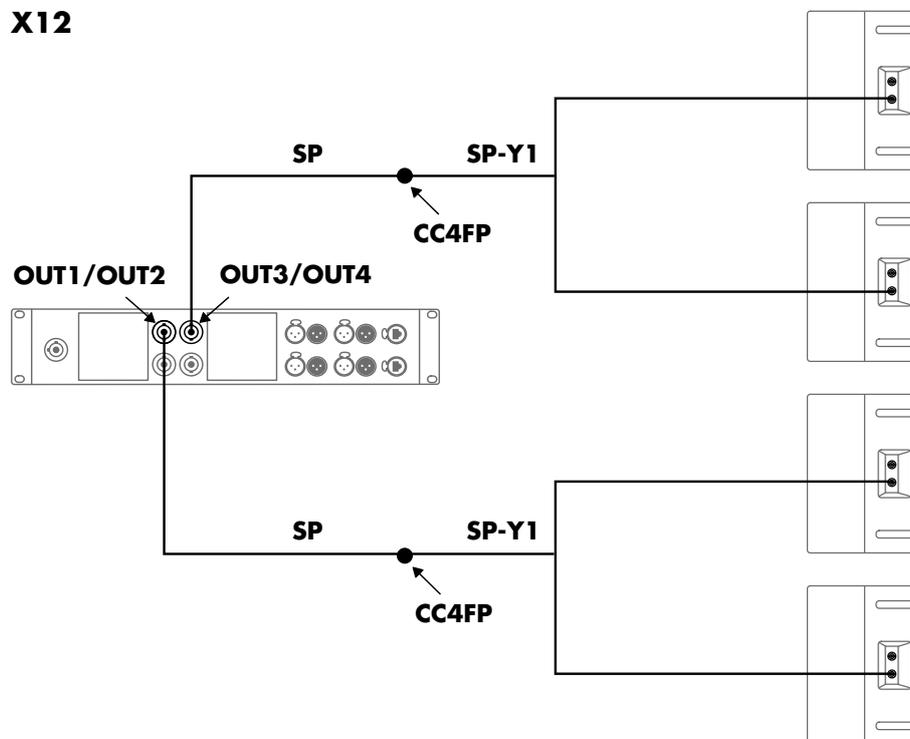


Using SP-Y1 cables

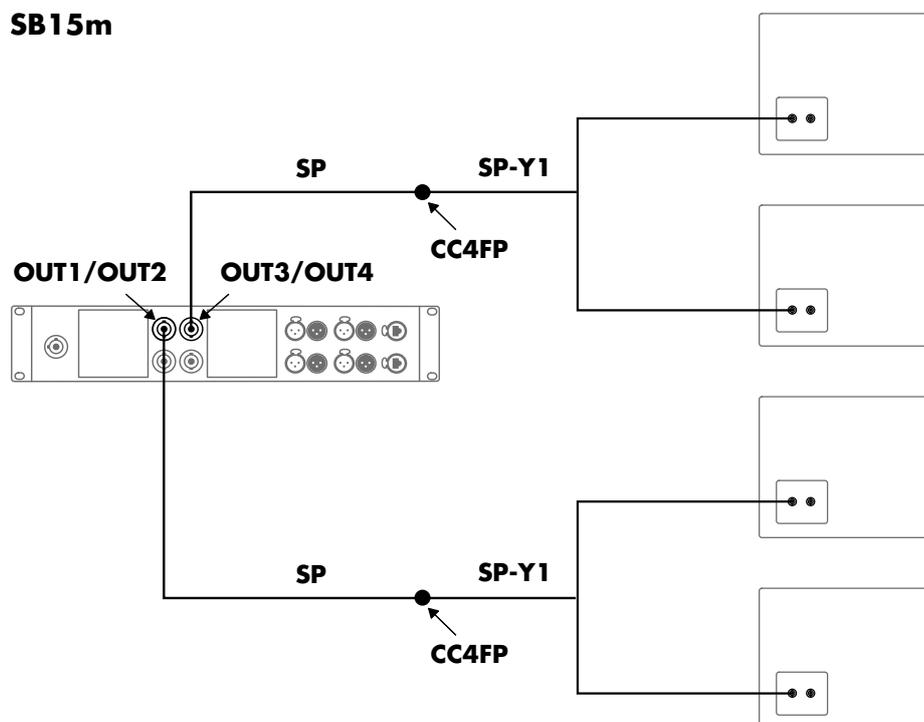
- Connect an SP cable (SP.7, SP5, SP10 or SP25) to the OUT1/OUT2 and OUT3/OUT4 speakON connectors of the amplified controller.
- Use the CC4FP adapter of an SP-Y1 cable to split the signal into two channels, each feeding one enclosure.
- If necessary, use SP cables to connect identical enclosures in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

Refer to the cabling schemes below for more instructions.

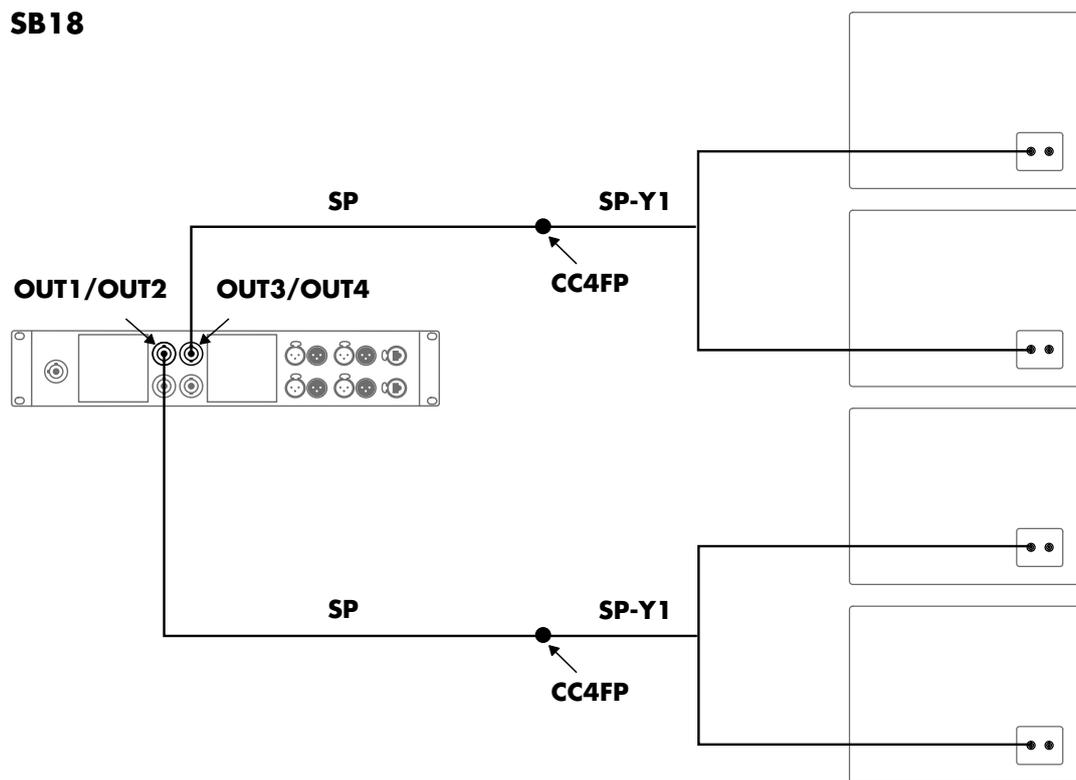
X12



SB15m



SB18



Connection to LA8

Maximum number of enclosures per LA8

enclosure	max enclosures in parallel	max enclosures per controller
X12	2	8
SB15m	2	8
SB18	2	8

Impedance load

X12 SB15m SB18

1 enclosure: 8 Ω

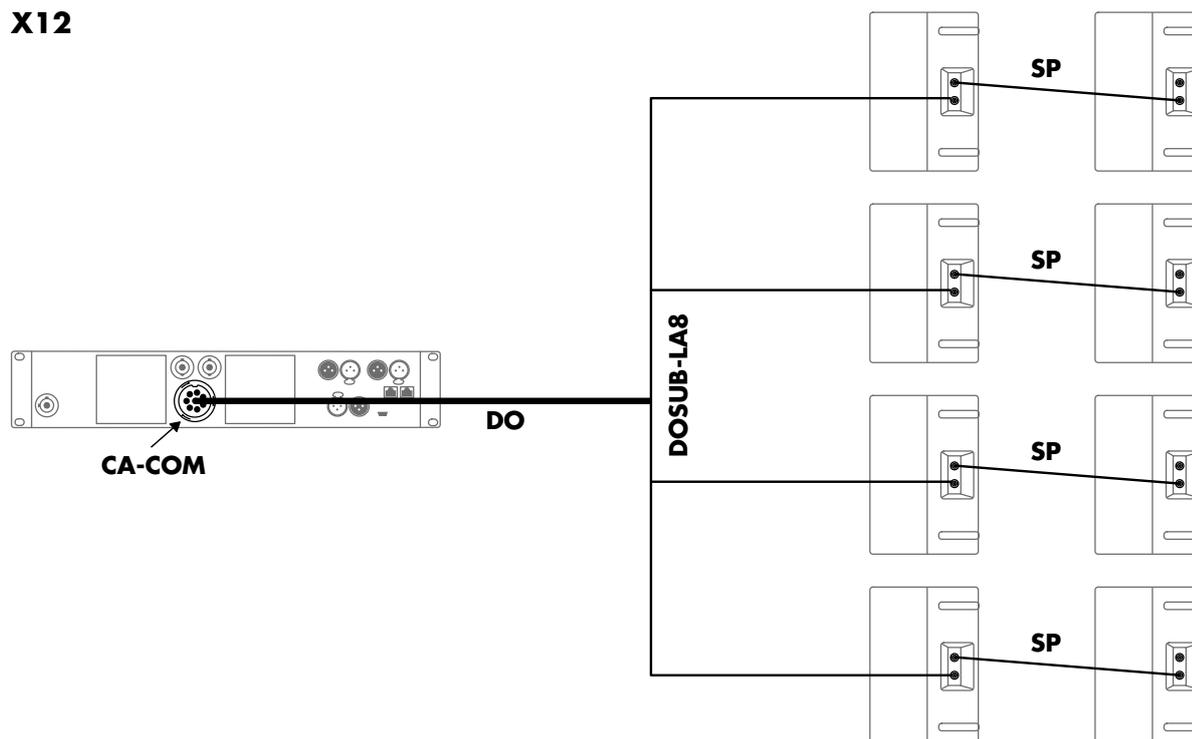
2 enclosures in parallel: 4 Ω

Using a DO cable with a DOSUB-LA8

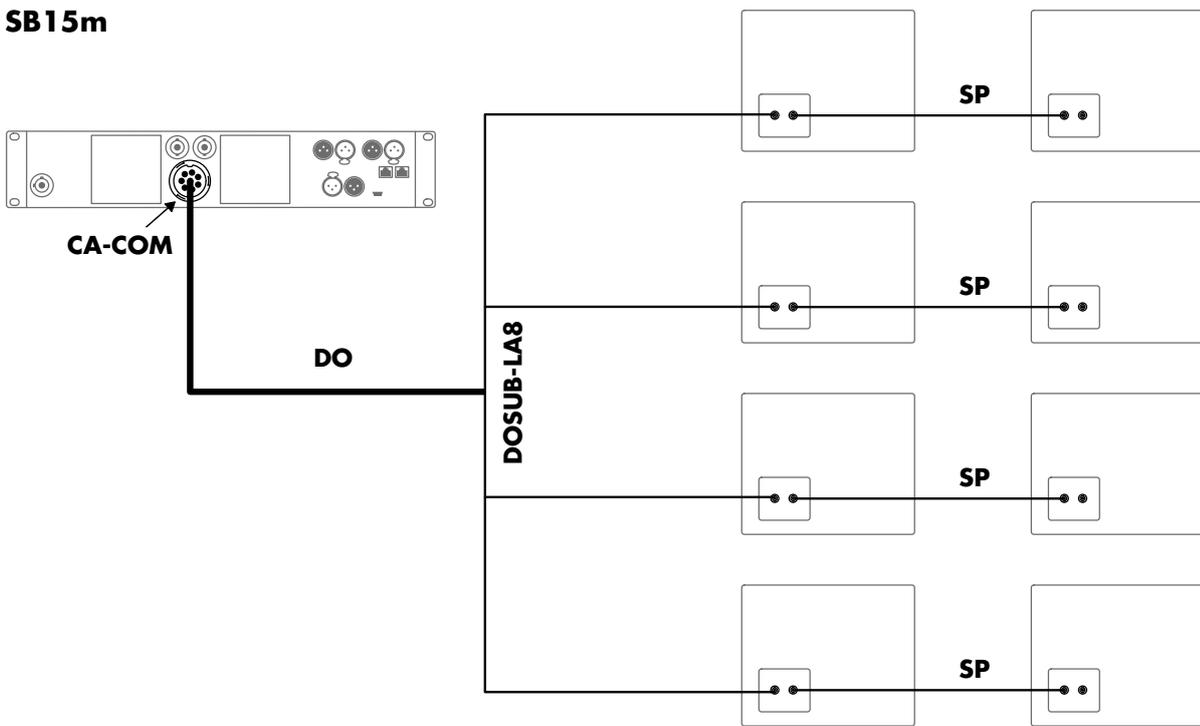
- Connect a DO cable (DO.7, DO10 or DO25) to the CA-COM[®] connector of the amplified controller.
- Use a DOSUB-LA8 to split the signal into four channels, each feeding one enclosure.
- If necessary, use SP cables to connect identical enclosures in parallel with the first ones.

Refer to the cabling schemes below for more instructions.

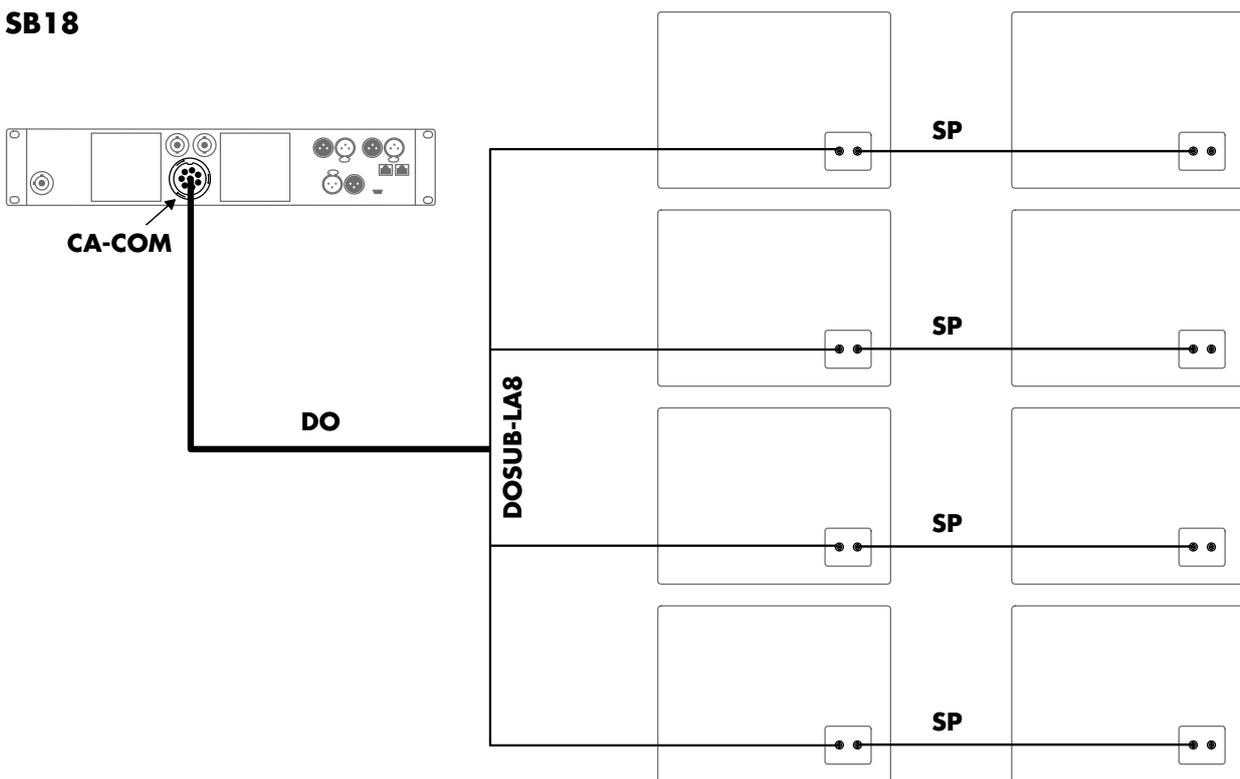
X12



SB15m



SB18

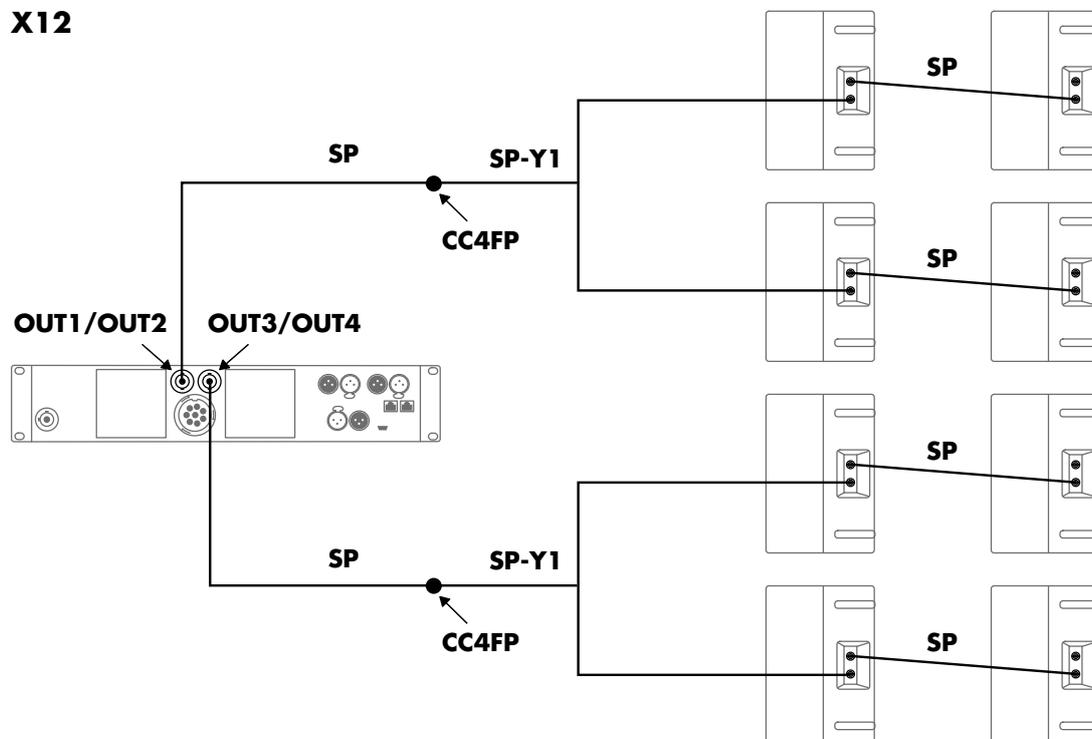


Using SP-Y1 cables

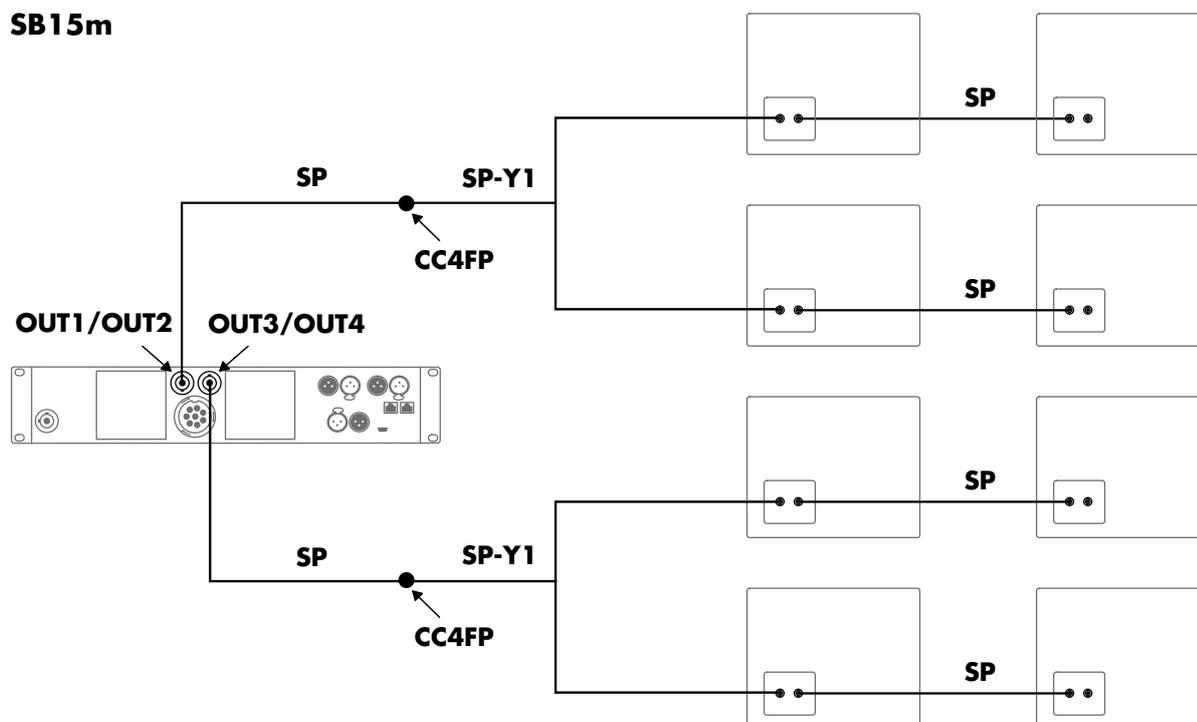
- Connect SP cables (SP.7, SP5, SP10 or SP25) to the OUT1/OUT2 and OUT3/OUT4 speakON connectors of the amplified controller.
- Use the CC4FP adapter of an SP-Y1 cable to split the signal into two channels, each feeding one enclosure.
- If necessary, use SP cables to connect identical enclosures in parallel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

Refer to the cabling schemes below for more instructions.

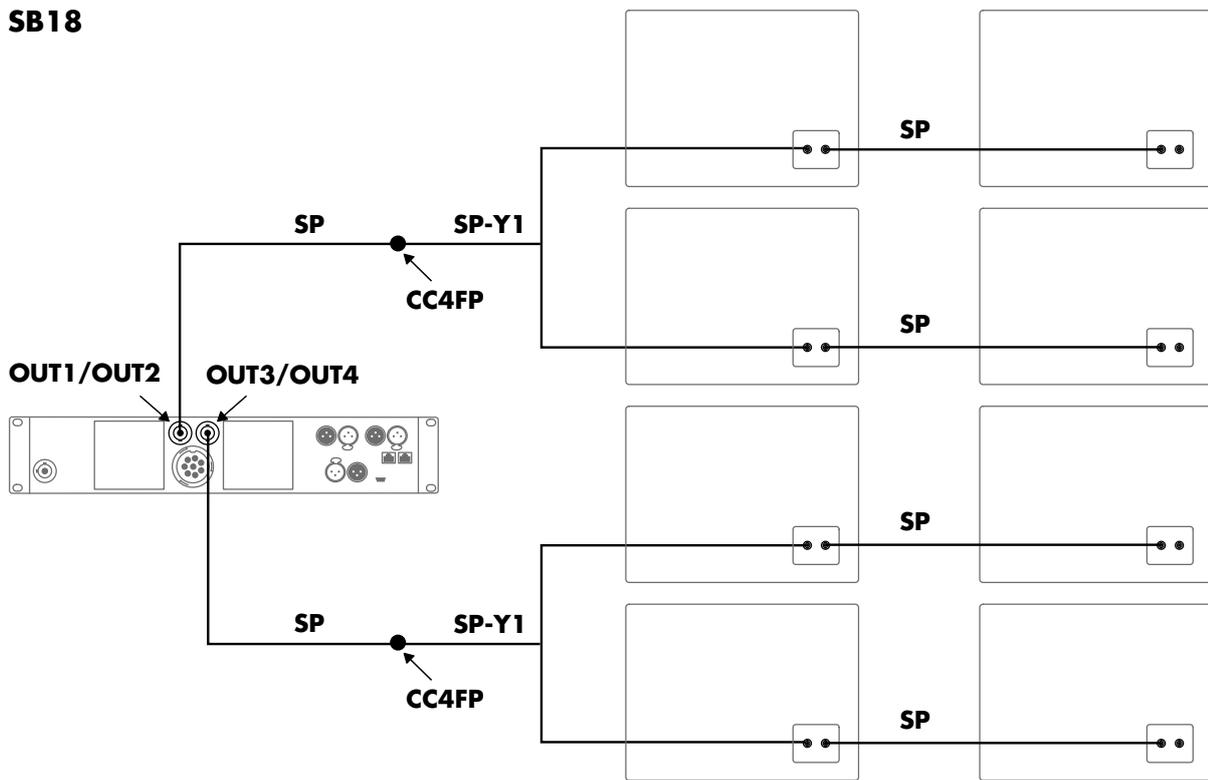
X12



SB15m



SB18



Preset description

[X12] [X12_MO]

enclosure	outputs	channels	routing	gain	delay	polarity	mute
X12	OUT 1	PA	IN A	0 dB	0 ms	+	ON
X12	OUT 2	PA	IN A	0 dB	0 ms	+	ON
X12	OUT 3	PA	IN B	0 dB	0 ms	+	ON
X12	OUT 4	PA	IN B	0 dB	0 ms	+	ON

[SB18_100] [SB15_100]

enclosure	outputs	channels	routing	gain	delay	polarity	mute
SB18 SB15m	OUT 1	SB	IN A	0 dB	0 ms	+	ON
SB18 SB15m	OUT 2	SB	IN A	0 dB	0 ms	+	ON
SB18 SB15m	OUT 3	SB	IN A	0 dB	0 ms	+	ON
SB18 SB15m	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:

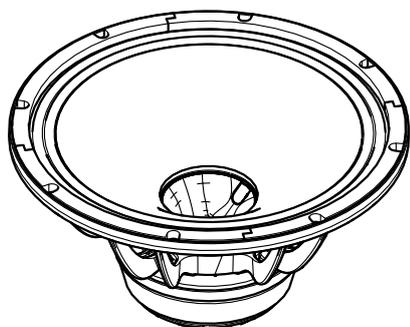
<http://www.l-acoustics.com/installation-outils-de-calcul-1367.html>

Maintenance

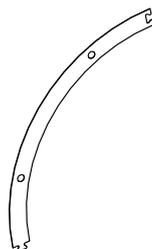
Repair kits

G03169

KR coaxial speaker X12



G100013



1250



100222



S100054



S100033

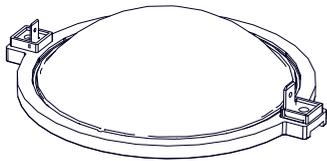


S100082

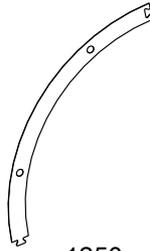
code	description	qty
G100013	12" coaxial speaker - 8 ohms	1
1250	12" speaker gasket	4
100222	X12 grill stop screw	4
S100054	M6x30 Tuflok coated hex socket head cap screw	4
S100033	M5x25 Tuflok coated flat countersunk head machine screw	6
S100082	M4x14 hexagon socket head cap screw	4

G03175

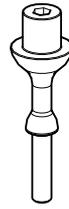
KR diaphragm X12



17581



1250



100222



S100054



S100033

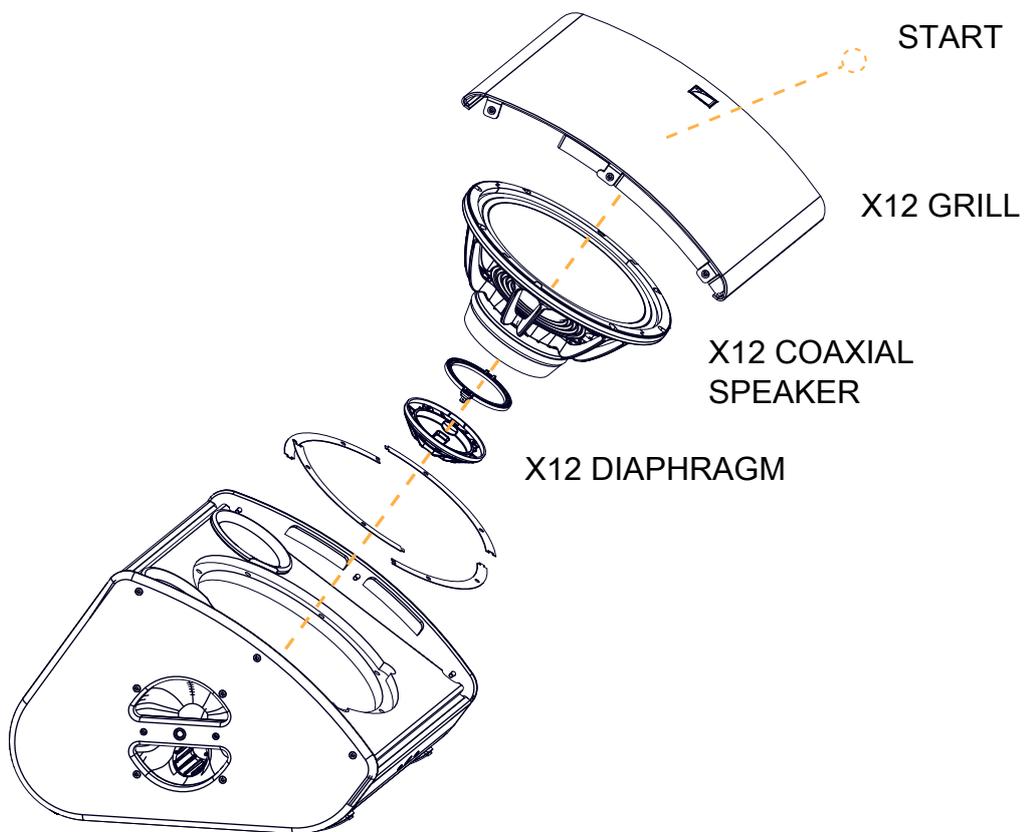


S100082

code	description	qty
17581	diaphragm assembly (with 2 shims)	1
1250	12" speaker gasket	4
100222	X12 grill stop screw	4
S100054	M6x30 Tuflok coated hex socket head cap screw	4
S100033	M5x25 Tuflok coated flat countersunk head machine screw	6
S100082	M4x14 hexagon socket head cap screw	4

Disassembly and Reassembly procedures

In order to operate, follow the order outlined here.



D/R - X12 GRILL

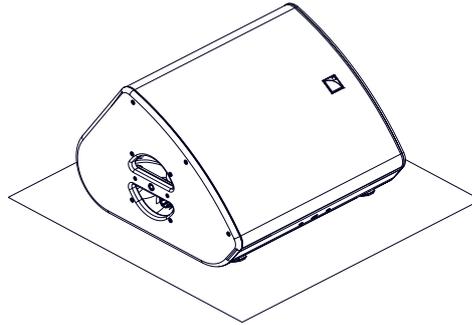
How to remove and reassemble the X12 grill.

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, as illustrated.

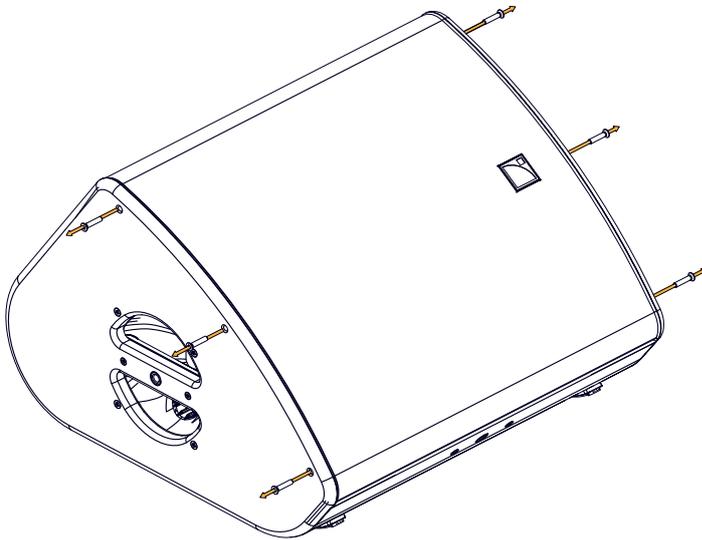


X12 grill disassembly procedure

Procedure

1. Remove the screws securing the grill.

Use the T25 Torx bit.



2. Remove the grill from the enclosure.

X12 grill reassembly procedure

Pre-requisite

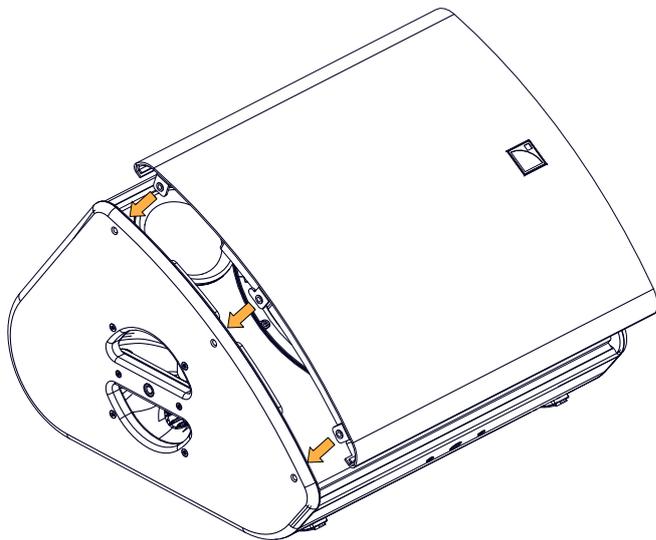


For safety reasons, always use the new screws and spare parts provided in the KR.

Procedure

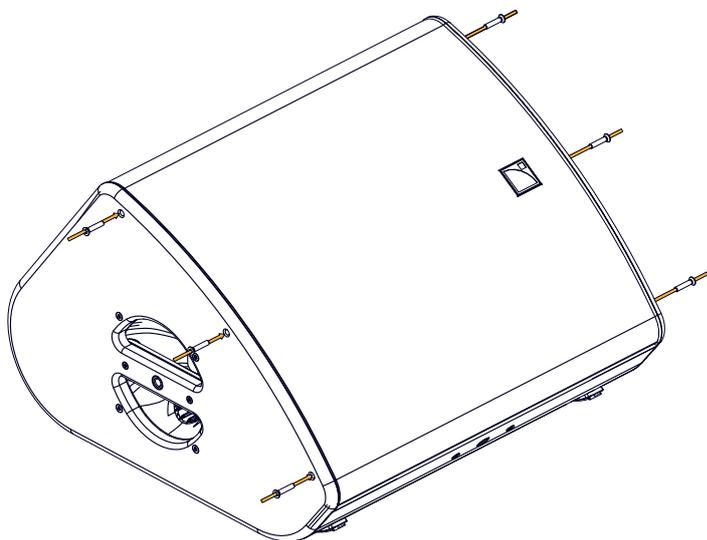
1. Position the grill.

Make sure the logo is on the right hand side.



2. Secure the grill with the S100033 screws.

Use the T25 Torx bit. Set the torque to 5 N.m.



D/R - X12 COAXIAL LOUDSPEAKER

How to remove and replace the X12 coaxial speaker.

Tools

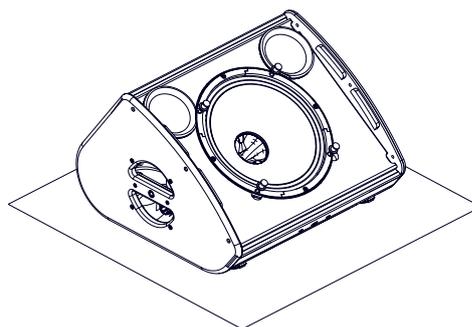
Name	Reference	Distributor
electric screwdriver with torque selector	-	-
5 mm hex bit	EH.605	FACOM

Pre-requisite

Grill disassembled.

See [X12 GRILL](#) (p.30).

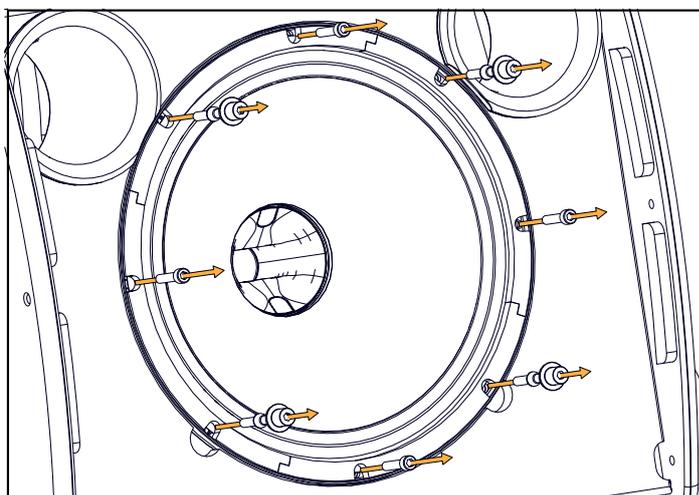
The enclosure is placed on its bottom face, as illustrated.



X12 speaker disassembly procedure

Procedure

1. Remove the screws securing the speaker.
Use the 5 mm hex bit.



2. Carefully remove the speaker assembly and disconnect the speaker cables.
3. Remove the speaker gasket.
4. Clean any remaining glue from the cabinet.

X12 speaker reassembly procedure

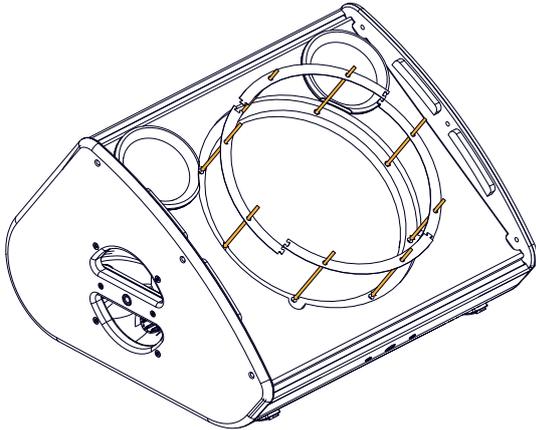
Pre-requisite

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

Procedure

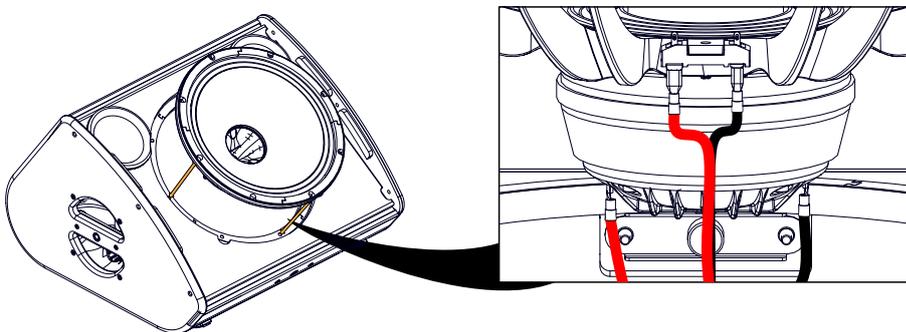
1. Stick the four gaskets on the cabinet.

Use the inserts as a reference to position the gaskets.



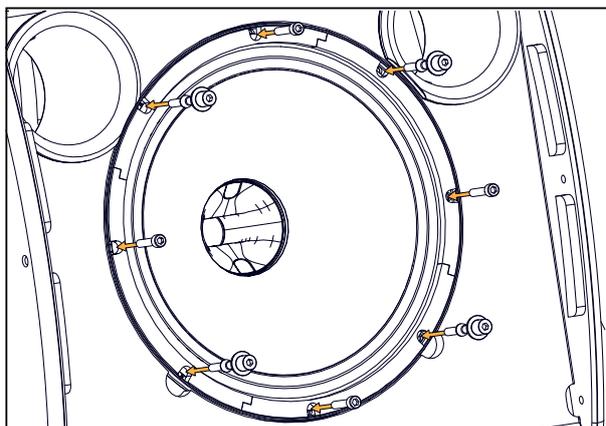
2. Connect the speaker cables and position the speaker.

The LF speaker connectors are positioned downwards.



3. Secure the speaker with the provided 100222 screws and S100054 screws.

Use the 5 mm hex bit. Set the torque to 5 Nm.



D/R - X12 DIAPHRAGM

How to remove and replace the X12 speaker diaphragm.

Tools

Name	Reference	Distributor
electric screwdriver with torque selector	-	-
3 mm hex bit	EH.603	FACOM
Allen wrench n°3	-	-

Pre-requisite

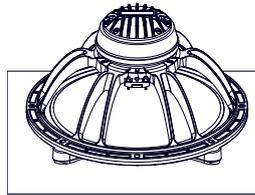
Grill disassembled.

Coaxial speaker removed.

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

See [X12 GRILL](#) (p.30).

See [X12 COAXIAL LOUDSPEAKER](#) (p.32).



X12 diaphragm disassembly procedure

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.

X12 diaphragm reassembly procedure

Pre-requisite

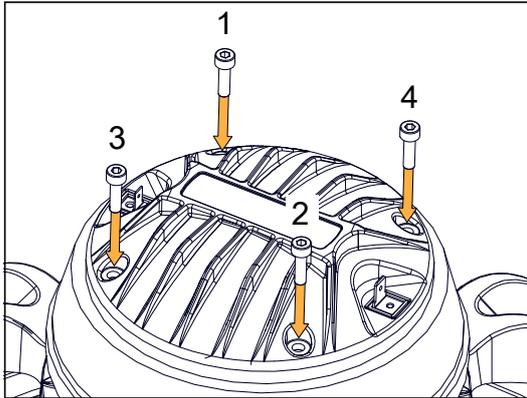


For safety reasons, always use the new screws and spare parts provided in the KR.

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 cable connectors as reference points.
Facing the LF cable connectors, the small HF cable connector must be on the left, and the larger one on the right.

- 5.** Secure the cover to the speaker using four S100082 screws.
- a) Gradually secure each screw manually with the Allen wrench n°3.
Follow a cross scheme.



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

Acoustical check

It is necessary to do an acoustical check to verify the correct installation of the diaphragm.

Procedure

1. Load a FLAT preset on an LA4X / LA8 amplified controller.
2. Connect a low frequency generator to the active input of the amplified controller.
3. Connect a voltmeter to the output of the amplified controller and check the output voltage.



Risk of damaging the HF driver

The output voltage must not exceed 1 Vrms.

4. Connect the HF driver to the output of the amplified controller.



Use ear protection to set the sound level before testing.

5. Send a test signal of 1.5 kHz at 1 Vrms for 5 seconds.
The sound should remain pure and free of unwanted noise.

Troubleshooting

The sound resulting from the test is not pure and high-frequency harmonic distortions or strange vibrations are audible.

Possible causes

- There are foreign particles on the air gap.
- The number of shims is wrong.
- The screws used for reassembly are too loose.

Procedure

1. Repeat the disassembly procedure.
2. Clean the air gap thoroughly.
3. Repeat the reassembly procedure.
Pay close attention to the number of shims and the position of the diaphragm.
Apply the recommended torque.
4. Repeat the acoustical check.



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

Illustrations

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)



DOSUB-LA8

breakout cable for four passive enclosures



SP-Y1

breakout cable for two passive enclosures

X12 specifications

Description	passive 2-way coaxial enclosure, amplified by
Usable bandwidth (-10 dB)	59 Hz - 20 kHz ([X12])
Maximum SPL¹	134 dB ([X12])
Nominal directivity	vertical: 90° horizontal: 60°
Monitoring angle	35° without raisers 55° with raisers
Transducers	LF: 1 × 12" bass-reflex, laminar vents HF: 1 × 3" compression driver, neodymium, ellipsoidal waveguide
Nominal impedance	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)	20 kg / 44.1 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.

X12 dimensions

On-end H/W/D

496 mm / 430 mm / 375 mm
 19.5 in / 16.9 in / 14.8 in

Monitor H/W/D

341 mm / 496 mm / 500 mm
 13.4 in / 19.5 in / 19.7 in

Monitor with risers H/W/D

403 mm / 496 mm / 471 mm
 15.9 in / 19.5 in / 18.5 in

