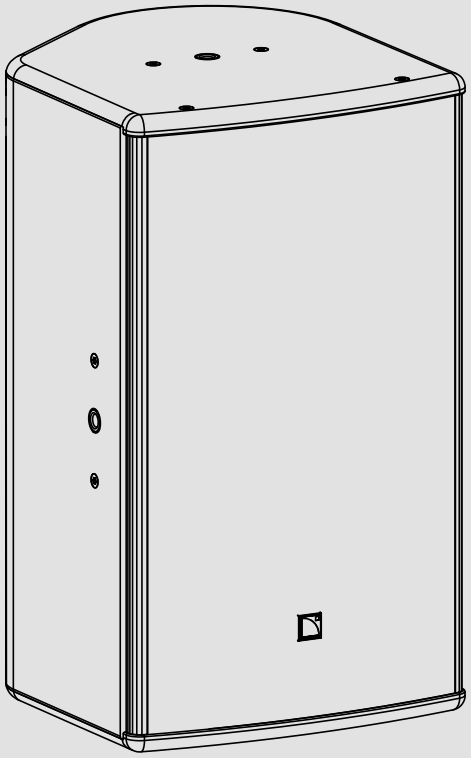
X8

user manual 2.1 (EN)



Document reference: X8 user manual (EN) version 2.1
Distribution date: December 28, 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.

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 X8.

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.

X8 live monitoring enclosure

The X8 is a coaxial system designed for live monitoring and short throw sound reinforcement applications with minimum visual impact. The X8 features a 1.5'' diaphragm compression driver coaxially loaded by an 8'' 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 X8 operates from 60 Hz to 20 kHz. The coaxial transducer arrangement and its partial horn produce a 100° axisymmetric directivity output 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, X8 weighs 12 kg and its elegance makes for an easy integration in any situation. It provides an angle setting of 35° with regard to vertical for stage monitoring. An optional white or RAL color program means that it can melt into any architecture.

The X8 is an ideal live monitor capable of accurately translating the signature of large systems at FOH position or in control rooms. The X8 features a pristine L-Acoustics sonic signature, a high SPL capability and extended LF resources in a compact format. Its coaxial design generates a wide conical directivity pattern with excellent spatialization and no minimum listening distance. Sound designers can also take advantage of its sleek design for discreet fill applications requiring a high SPL.

The X8 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

X8	passive 2-way coaxial enclosure
SB15m	high power compact subwoofer

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 X8 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.

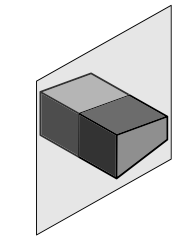
Technical description

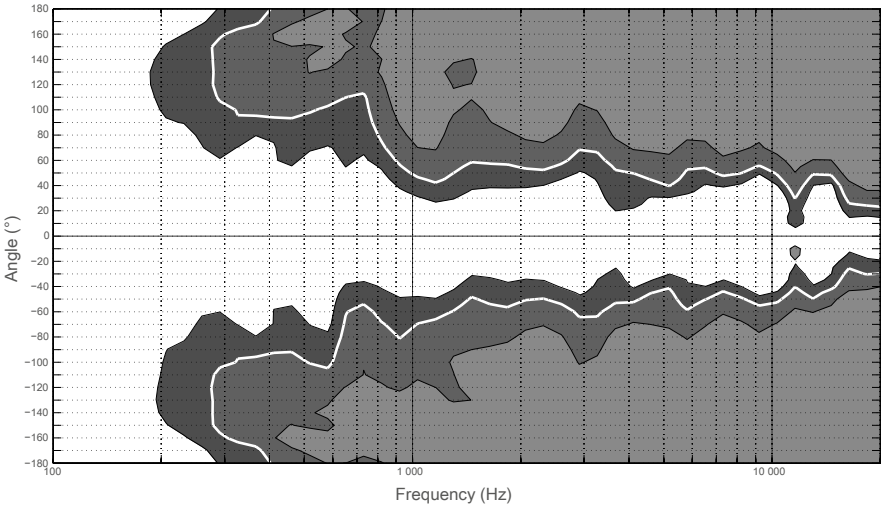
Low-latency preset

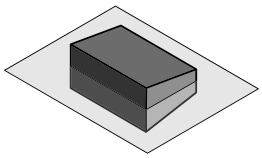
A low-latency preset is available for the X8 enclosure used as a monitor ([X8_MO]). It reduces latency from 3.84 ms down to 1.19 ms (LA8) and 0.76 ms (LA4X). If the monitor is combined with a subwoofer, a custom preset must be used.

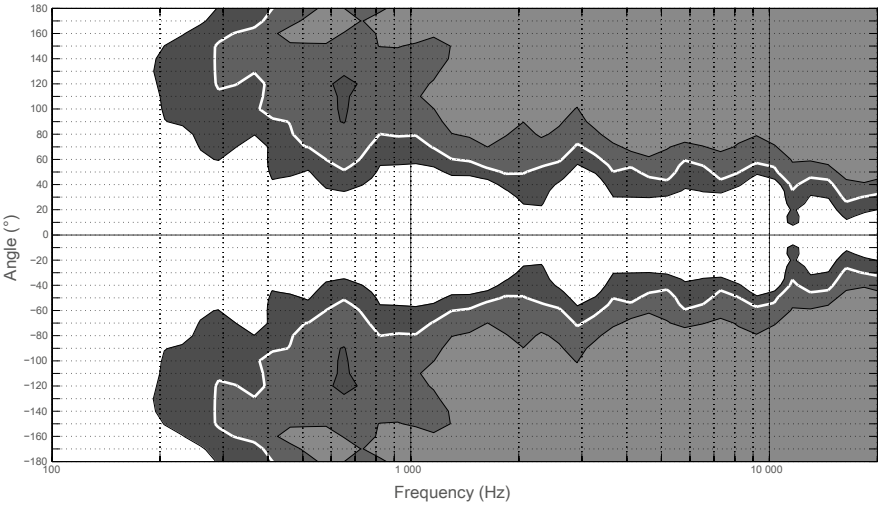
Directivity

X8 features a coaxial transducer arrangement that generates an axisymmetric directivity pattern of 100°.









Dispersion angle diagram of a single X8 using lines of equal sound pressure at -3 dB, -6 dB, -12 dB.

Loudspeaker configurations

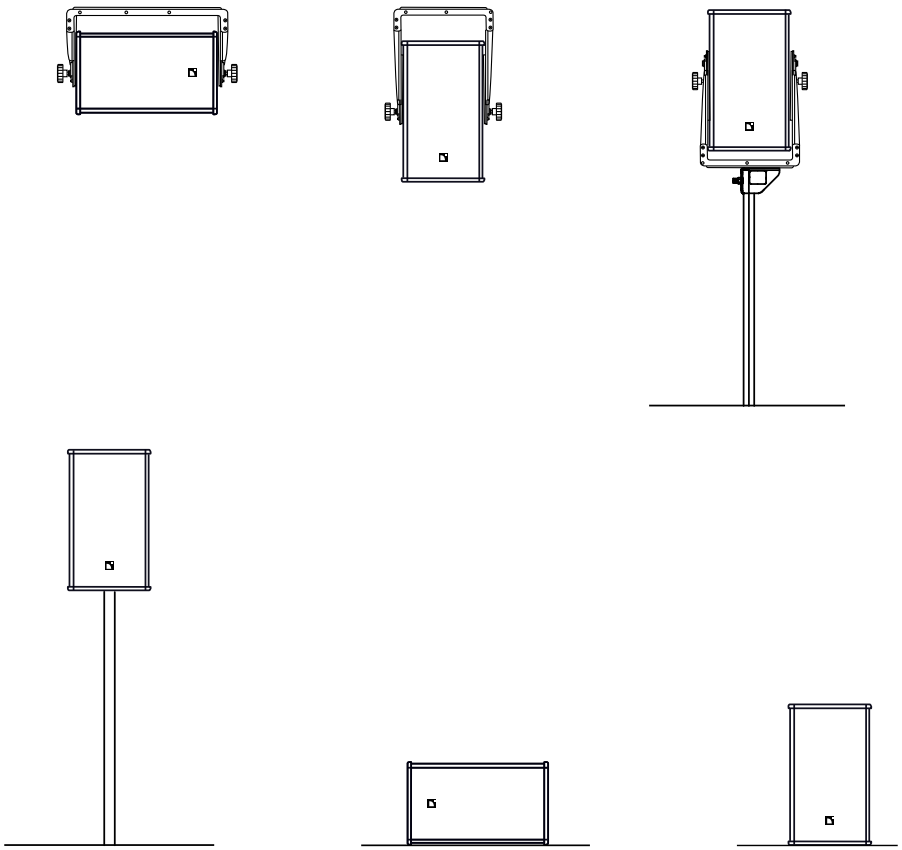
X8 point source

Deployed as a standalone point source, a X8 system operates over the nominal bandwidth of the X8 enclosure.

The [X8] preset allows for a reference frequency response in short throw applications.

The X8 enclosure is driven by the LA4X / LA8 amplified controllers.

Standalone X8



Enclosure	Preset
X8	[X8]
Frequency range (-10 dB)	60 Hz - 20 kHz

X8 point source with LF

Deployed as a point source with SB15m subwoofers, an X8 system operates with augmented LF resources.

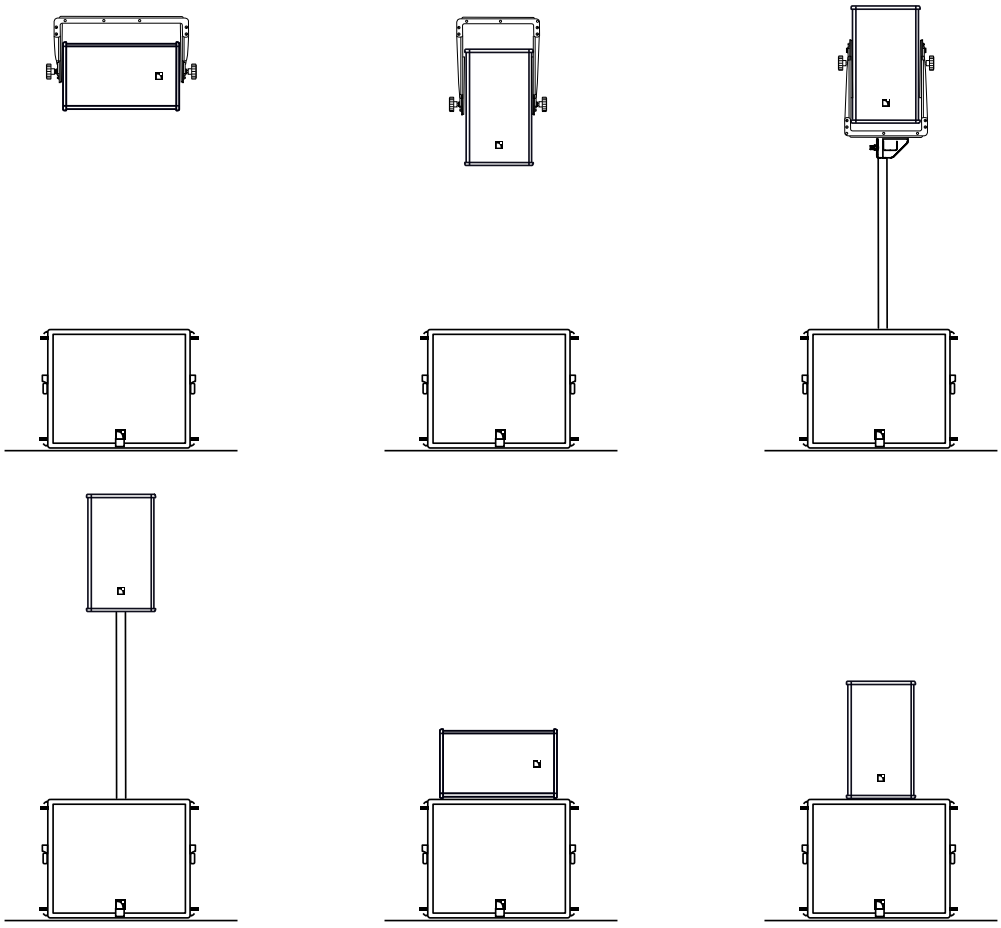
The [X8] preset allows for a reference frequency response in short throw applications.

The [SB15_100] preset provides the SB15m with an upper frequency limit at 100 Hz for an optimal frequency coupling with X8.

The X8 and SB15m enclosures are driven by the LA4X / LA8 amplified controllers.

X8 with SB15m

With SB15m, the X8 system contour is reinforced by 8 dB at 100 Hz and the bandwidth is extended down to 40 Hz.



Enclosure	Preset
X8	[X8]
SB15m	[SB15_100]
Frequency range (-10 dB)	40 Hz - 20 kHz
Enclosure ratio	1 X8 : 1 SB15m

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

[X8] + [SB15_100]	X8 = 0	SB15m = 2.6

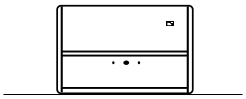
X8 stage monitor

Deployed as a stage monitor, an X8 system operates over the nominal bandwidth of the X8 enclosure.

The [X8_MO] preset allows for a reference frequency response in stage monitoring applications.

The X8 enclosure is driven by the LA4X / LA8.

Standalone X8

35° 	
Enclosure	Preset
X8	[X8_MO]
Frequency range (-10 dB)	55 Hz - 20 kHz

X8 stage monitor with LF

Deployed as a stage monitor with SB15m subwoofers, an X8 system operates with augmented LF resources.

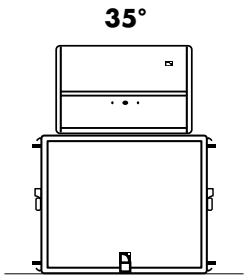
The [X8_MO] preset allows for a reference frequency response in stage monitoring applications.

The [SB15_100] preset provides the SB15m with an upper frequency limit at 100 Hz for an optimal frequency coupling with the X8.

The X8 and the SB15m enclosures are driven by the LA4X / LA8 amplified controllers.

X8 with SB15m

With SB15m, the X8 system contour is reinforced by 8 dB at 100 Hz and the system bandwidth is extended down to 40 Hz.



Enclosure	Preset
X8	[X8_MO]
SB15m	[SB15_100]
Frequency range (-10 dB)	40 Hz - 20 kHz
Enclosure ratio	1 X8 : 1 SB15m

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

[X8_MO] + [SB15_100]	X8 = 0	SB15m = 2.6

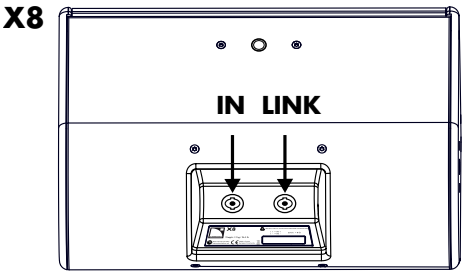
[xx_MO] presets for the X series use the amplified controller low latency operating mode. When used along with subwoofers, it is recommended to use the subwoofers in low latency operating mode. To achieve this, create custom presets combining low latency channel sets and subwoofer channel sets.

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.

Loudspeaker connection

Connectors

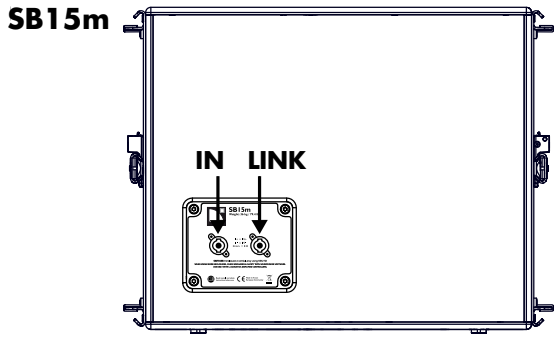
The X8 is equipped with two 4-point speakON connectors.



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.



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
X8	2	8
SB15m	1	4

Impedance load

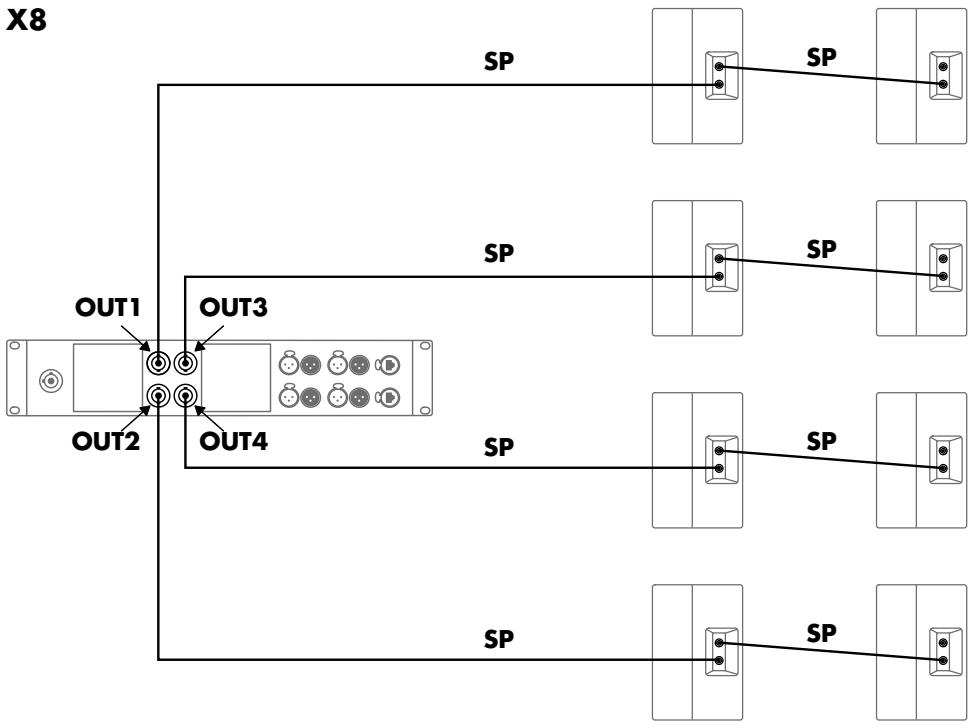
SB15m X8

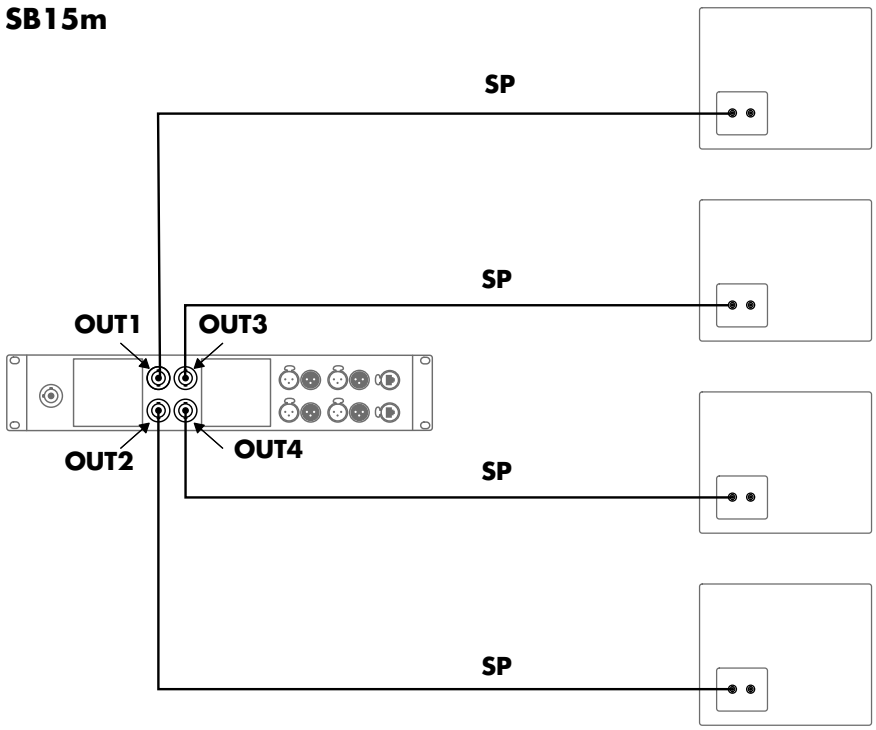
1 enclosure: 8 Ω
2 enclosures in parallel: 4 Ω

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.

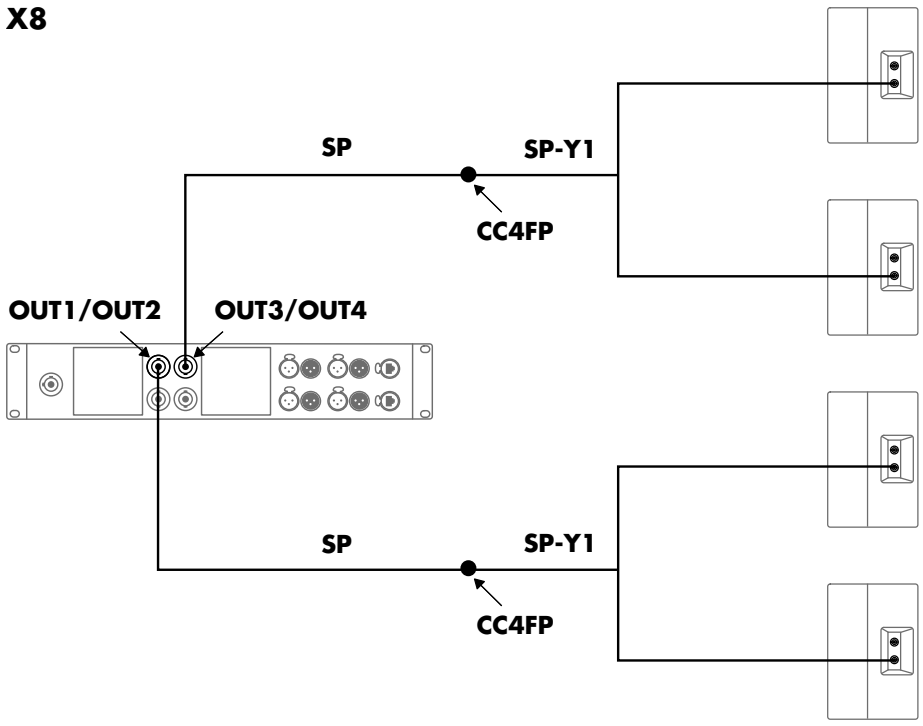


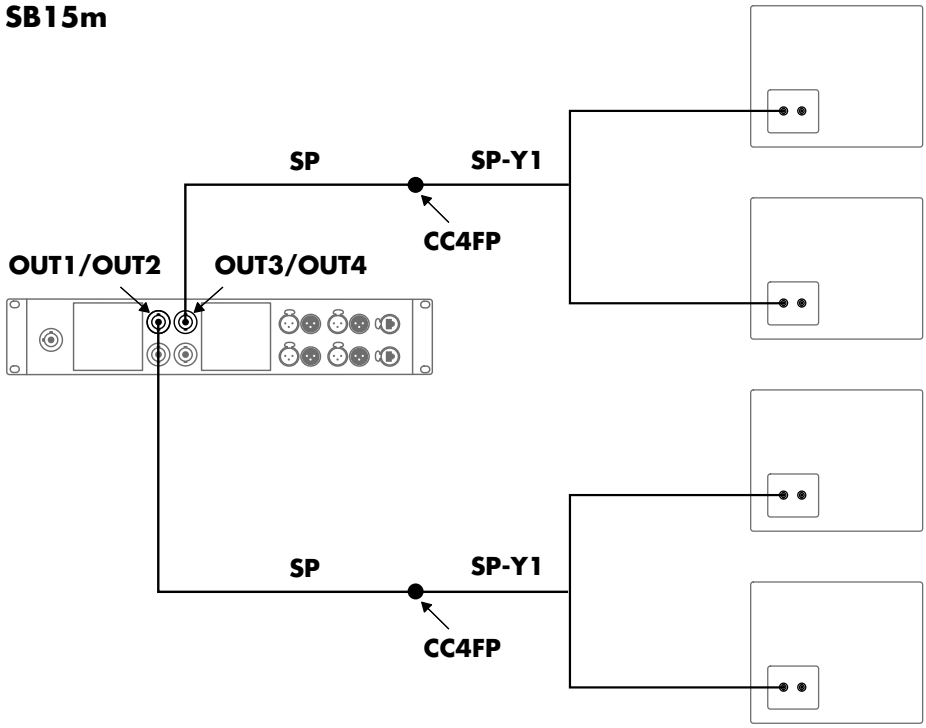


Using SP-Y1 cables

— 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.




SB15m
SP
SP-Y1
CC4FP
OUT1/OUT2
OUT3/OUT4
SP
SP-Y1
CC4FP

Connection to LA8

Maximum number of enclosures per LA8

enclosure	max enclosures in parallel	max enclosures per controller
X8	3	12
SB15m	2	8

Impedance load

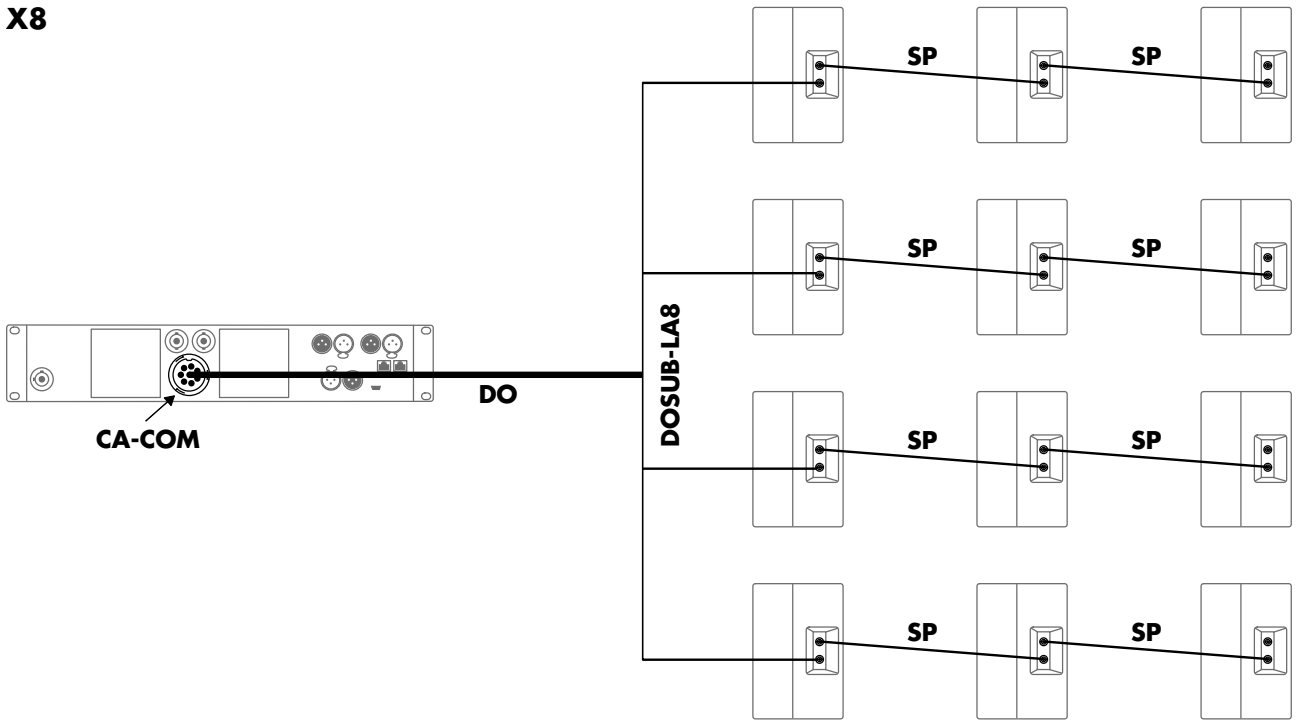
SB15m X8

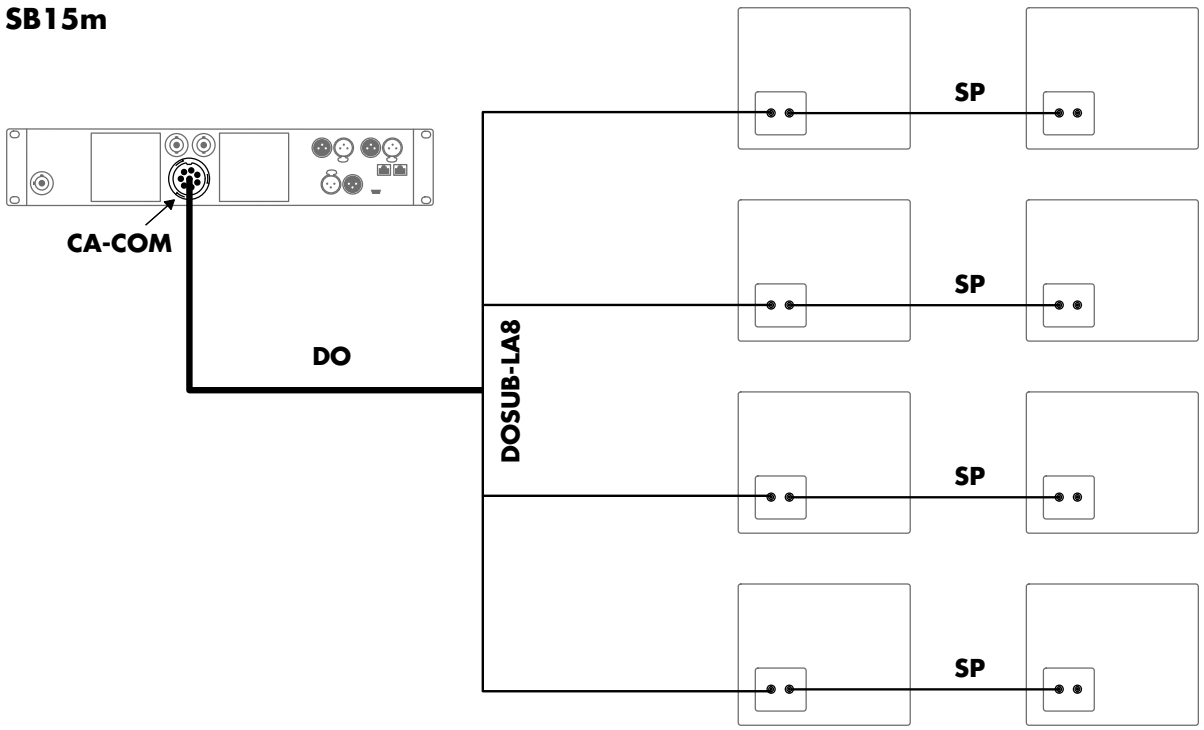
1 enclosure: 8 Ω
2 enclosures in parallel: 4 Ω
3 enclosures in parallel: 2.7 Ω

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.

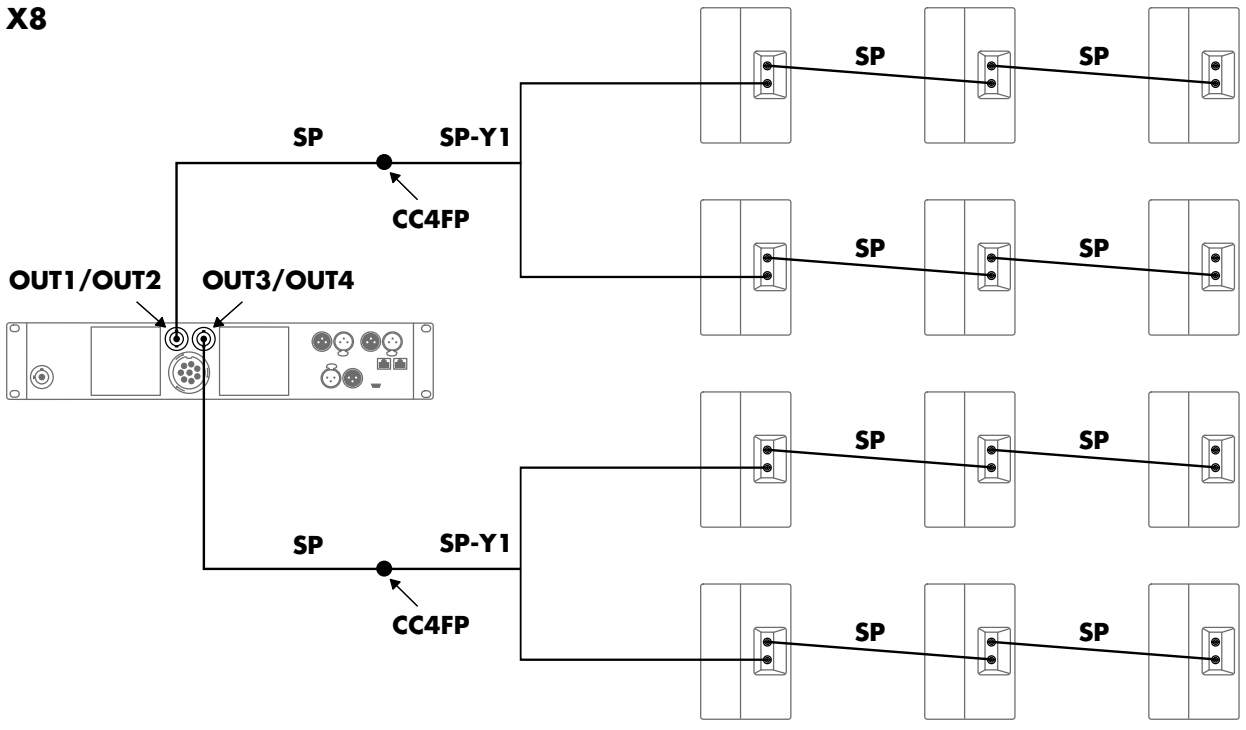




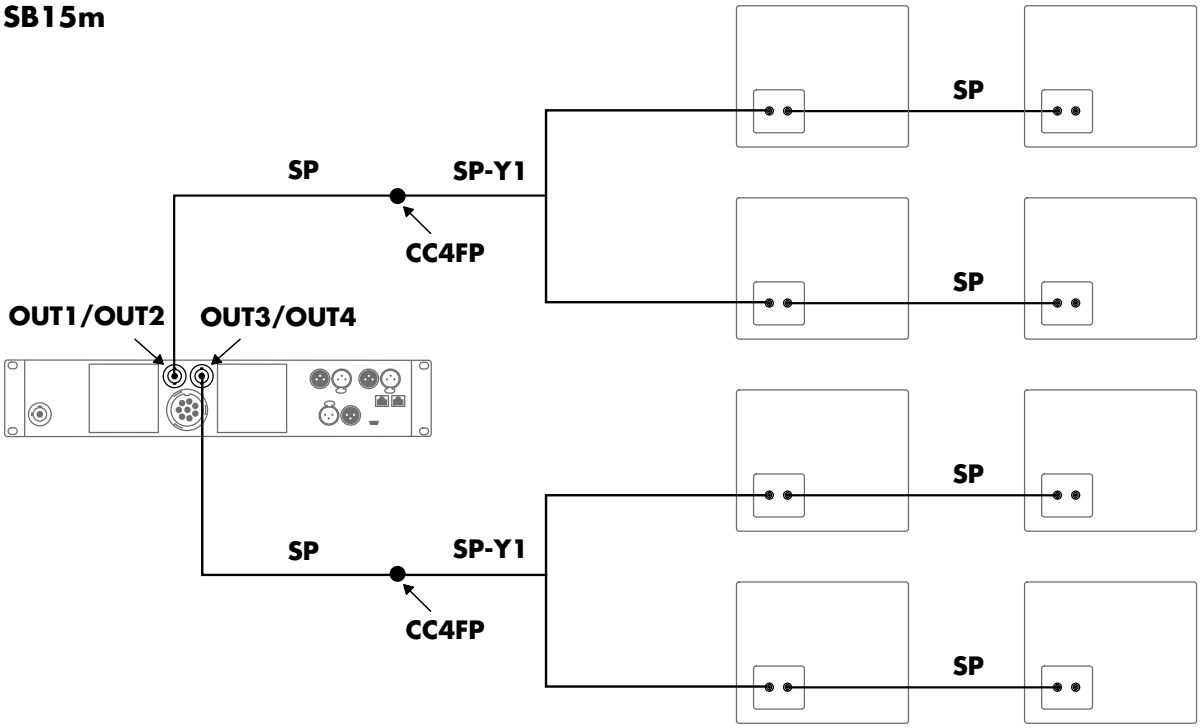
Using SP-Y1 cables

— 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.



SB15m



Preset description

[X8]

enclosure	outputs	channels	routing	gain	delay	polarity	mute
X8	OUT 1	PA	IN A	0 dB	0 ms	+	ON
X8	OUT 2	PA	IN A	0 dB	0 ms	+	ON
X8	OUT 3	PA	IN B	0 dB	0 ms	+	ON
X8	OUT 4	PA	IN B	0 dB	0 ms	+	ON

[SB15_100]

enclosure	outputs	channels	routing	gain	delay	polarity	mute
SB15m	OUT 1	SB	IN A	0 dB	0 ms	+	ON
SB15m	OUT 2	SB	IN A	0 dB	0 ms	+	ON
SB15m	OUT 3	SB	IN A	0 dB	0 ms	+	ON
SB15m	OUT 4	SB	IN A	0 dB	0 ms	+	ON

[SB15_100_C]

enclosure	loudspeaker elements	outputs	channels	routing	gain	delay	polarity	mute
SB15m	SR	OUT 1	SR	IN A	0 dB	0 ms	+	ON
SB15m	SB	OUT 2	SB					ON
SB15m	SB	OUT 3	SB					ON
SB15m	SB	OUT 4	SB					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:

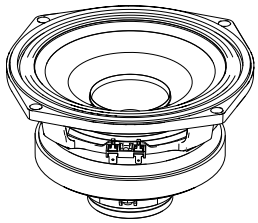
http://www.l-acoustics.com/installation-outils-de-calcul-1367.html

Maintenance

Repair kits

G03170

KR coaxial speaker X8



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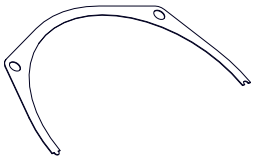


100604

S100033

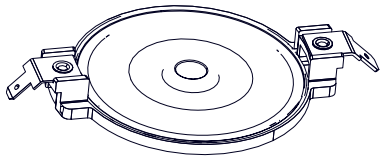
S342

S182

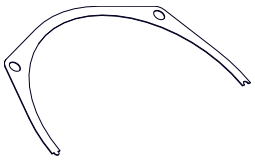
code	description	qty
03046	8" coaxial speaker - 8 ohms	1
100604	8" speaker gasket	2
S182	M4x12 hexagon socket head cap screw	4
S100033	M5x25 Tuflok coated flat countersunk head machine screw	4
S342	M5x20 Tuflok coated hexagon socket head cap screw	4

G03174

KR diaphragm X8



17704



100604

S100033

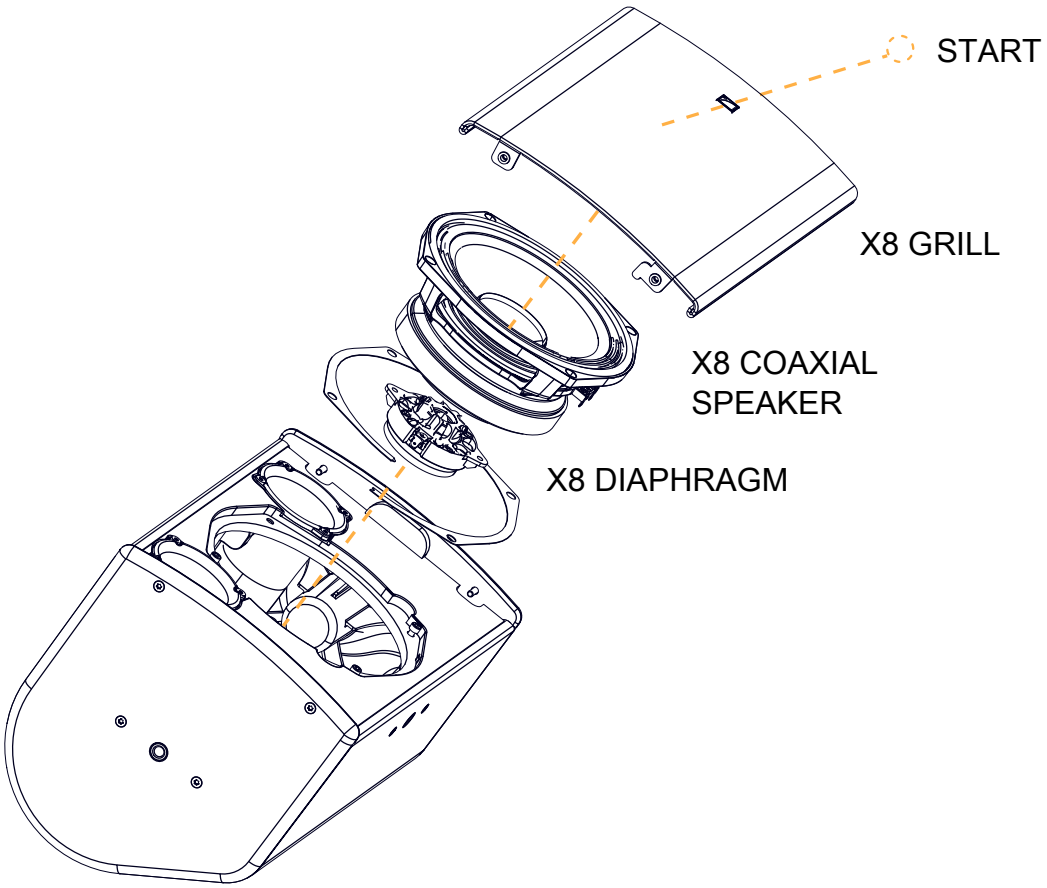
S342

S182

code	description	qty
17704	X8 diaphragm assembly	1
100604	8" speaker gasket	2
S182	M4x12 hexagon socket head cap screw	4
S100033	M5x25 Tuflok coated flat countersunk head machine screw	4
S342	M5x20 Tuflok coated hexagon socket head cap screw	4

Disassembly and Reassembly procedures

In order to operate, follow the order outlined here.



D/R - X8 GRILL

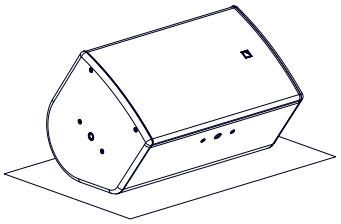
How to remove and reassemble the X8 grill.

Tools

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

Pre-requisite

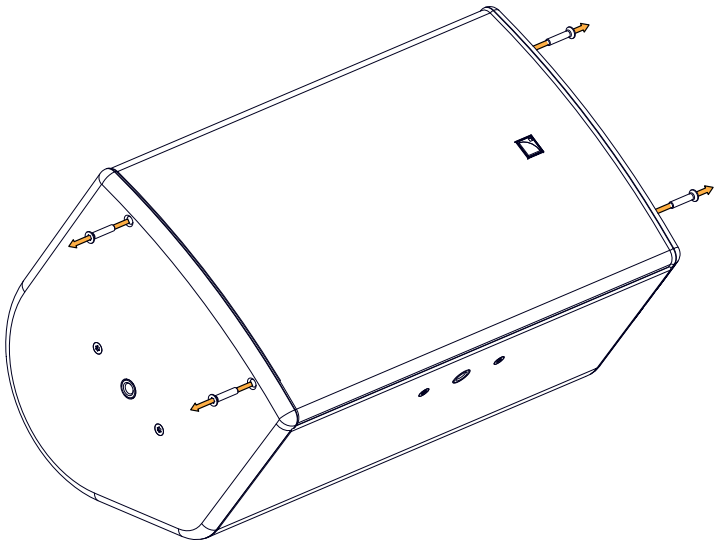
The enclosure is placed on its bottom face.



X8 grill disassembly procedure

Procedure

1. Remove the screws securing the grill.
   Use the T25 Torx bit.



2. Carefully remove the grill from the enclosure.

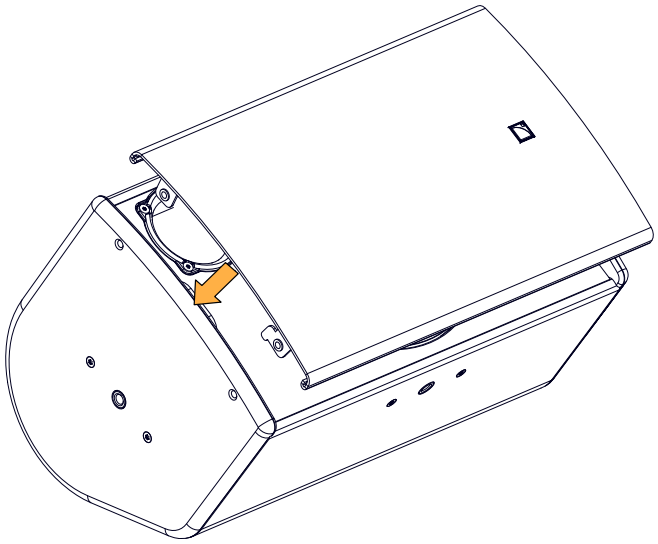
X8 grill reassembly procedure

Pre-requisite

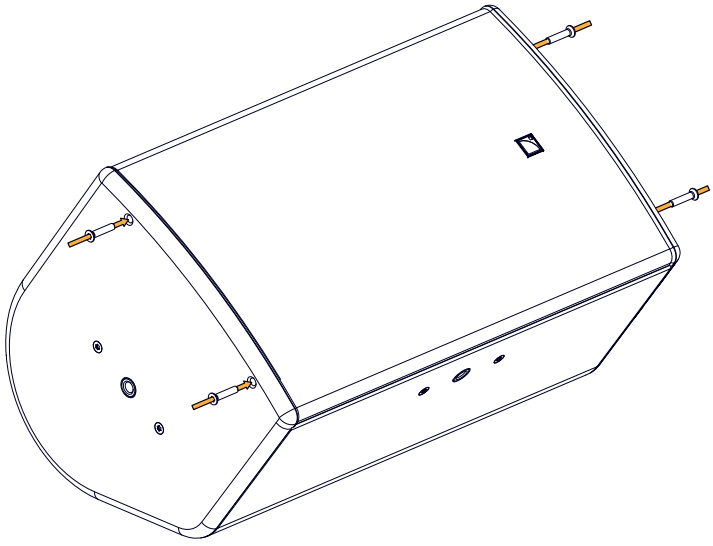
For safety reasons, always use the new screws and spare parts provided in the KR.

Procedure

1. Position the grill.
   Make sure the logo is on the same side as the handle.



2. Secure the grill with the S100033 screws.
   Use the T25 Torx bit. Set the torque to 3 N.m.



D/R - X8 COAXIAL LOUDSPEAKER

How to remove and replace a X8 coaxial speaker.

Tools

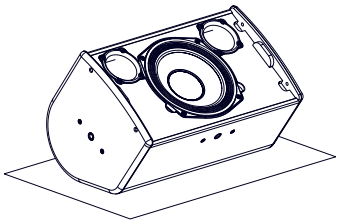
Name	Reference	Distributor
electric screwdriver with torque selector	-	-
4 mm hex bit	EH.604	FACOM

Pre-requisite

Grill disassembled.

See *X8 GRILL* (p.24).

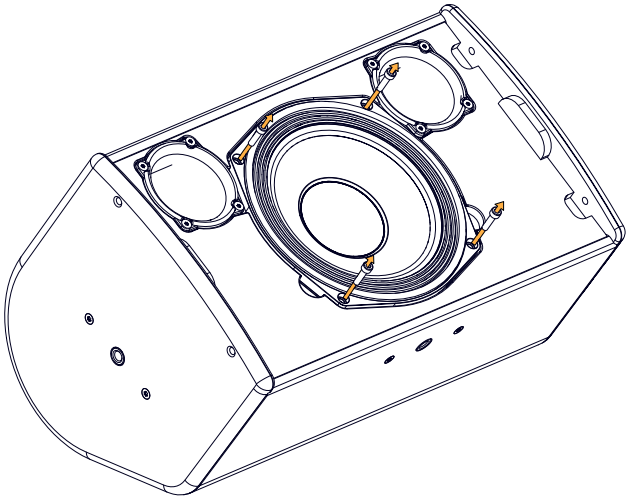
The enclosure is placed on its bottom face.



X8 speaker disassembly procedure

Procedure

1. Remove the screws securing the speaker.
   Use the 4 mm hex bit.



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

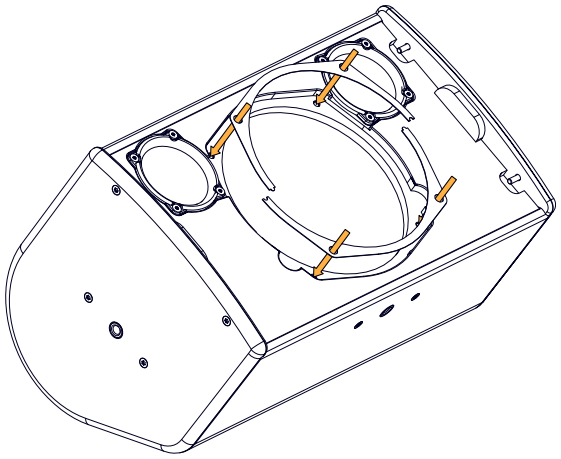
X8 speaker reassembly procedure

Pre-requisite

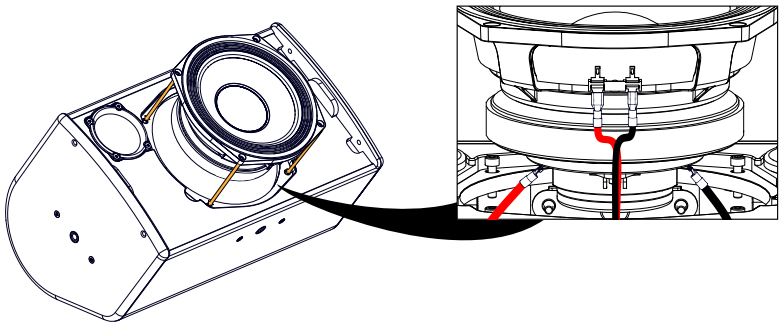
For safety reasons, always use the new screws and spare parts provided in the KR.

Procedure

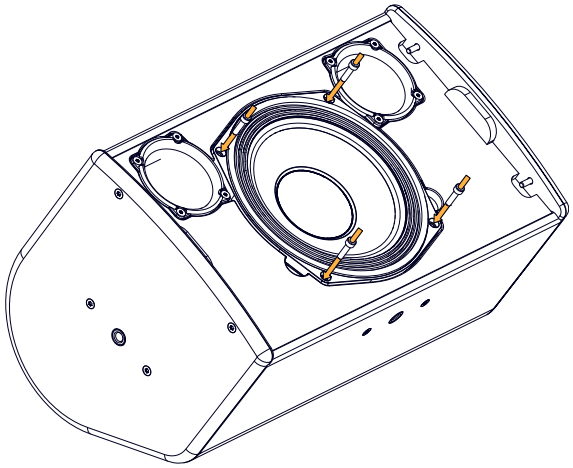
1. Stick the four gaskets to the cabinet.
   Use the inserts as a reference to position the gaskets.



2. Connect the speaker cables and position the speaker.
   The LF speaker connectors are oriented downwards.



3. Secure the speaker with the S342 screws.
   Use the 4 mm hex bit. Set the torque to 3 Nm.



D/R - X8 DIAPHRAGM

How to remove and replace a X8 speaker diaphragm.

Tools

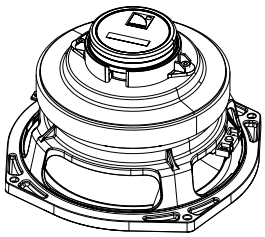
Name	Reference	Distributor
electric screwdriver with torque selector	-	-
3 mm hex bit	EH.603	FACOM
Allen wrench n°3	-	-

Pre-requisite

Grill disassembled. See *X8 GRILL* (p.24).

Coaxial speaker removed. See *X8 COAXIAL LOUDSPEAKER* (p.26).

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



X8 diaphragm disassembly procedure

Procedure

1. Remove the two screws securing the HF driver.
   Use the 3 mm hex bit.
2. Remove the HF driver and remove the gasket between the HF and LF driver.
3. Place the HF driver on a flat surface.
4. Remove the four screws securing the cover and remove the cover.
   Use the 3 mm hex bit.
5. Pierce the label and carefully remove the center screw while holding the cone in place.
   Use the 3 mm hex bit.

   Discard the paper disk to avoid parasitic vibrations.
6. Remove the cone.
7. Carefully remove the diaphragm holding it by the connectors.
8. If there are black spacers on the air gap, do not remove them.

X8 diaphragm reassembly procedure

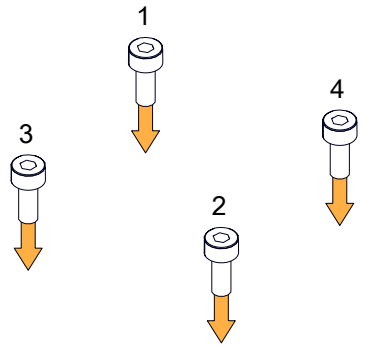
Procedure

1. Clean the driver and the air gap.
   Use a blower or double face adhesive tape to clean any particle.

   Make sure the air gap is perfectly clean before moving to the next step.
2. Carefully place the diaphragm.
   If there are black spacers, make sure they remain in place.
3. Position the diaphragm using the screw holes as reference points.
   The connectors must be positionned halfway between two screw holes.
4. Place the cone in the middle.

5. While holding the cone in place, drive the center screw manually using the Allen wrench.
6. Secure the cover with four S182 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.

      Use the 3 mm hex bit. Set the torque to 1.7 Nm.
7. While holding the cone in place, tighten the center screw with the electric screwdriver.

   Use the 3 mm hex bit. Set the torque to 1.7 Nm.
8. Place the gasket on the LF driver.
9. Carefully position the HF driver on the LF driver.

   Use the connectors as reference points. When facing the LF driver connectors, the small HF driver connector must be on the left, and the larger one on the right.
10. Secure the HF driver on the LF driver with the two screws.

    Use the 3 mm hex bit. Set the torque to 3 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

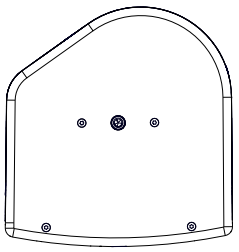
X8 specifications

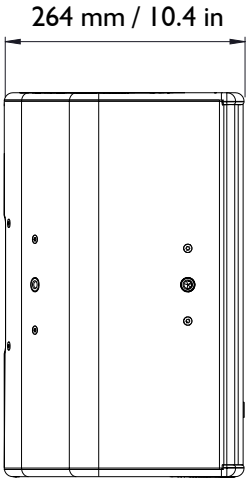
Description	passive 2-way coaxial enclosure, amplified by LA4X / LA8
Usable bandwidth (-10 dB)	60 Hz - 20 kHz ([X8])
Maximum SPL [1]	127 dB ([X8])
Nominal directivity	axisymmetric 100°
Monitoring angle	35°
Transducers	1 × 8" weather-resistant, bass-reflex laminar vents
	1 × 1.5" compression driver, neodymium, weather-resistant, conical waveguide
Nominal impedance	8 Ω
Connectors	IN: speakON
	LINK: speakON
Rigging and handling	1 × handle
	DIN580-compatible M8 threaded insert
	4 × M10 threaded inserts
	1 × 35 mm pole socket
Weight (net)	12 kg / 26.5 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

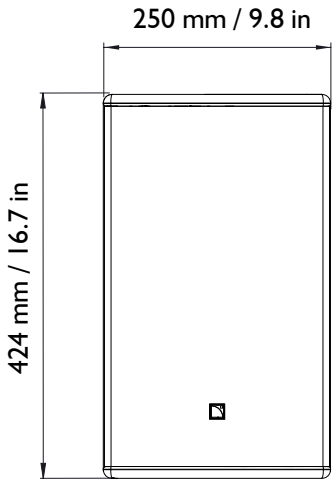
[1] Peak level at 1 m under free field conditions using 10 dB crest factor pink noise with specified preset.

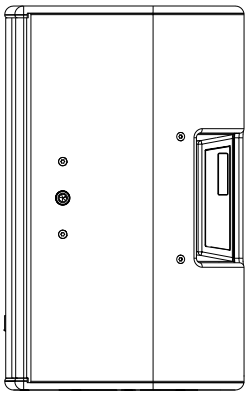
X8 dimensions

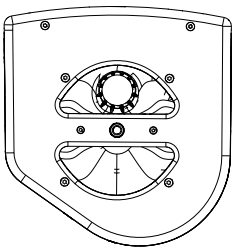
On-end H/W/D	424 mm / 250 mm / 264 mm 16.7 in / 9.8 in / 10.4 in
Monitor H/W/D	278 mm / 424 mm / 306 mm 10.9 in / 16.7 in / 12 in

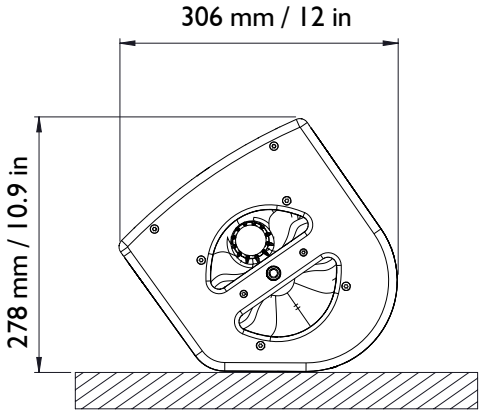













L-ACOUSTICS