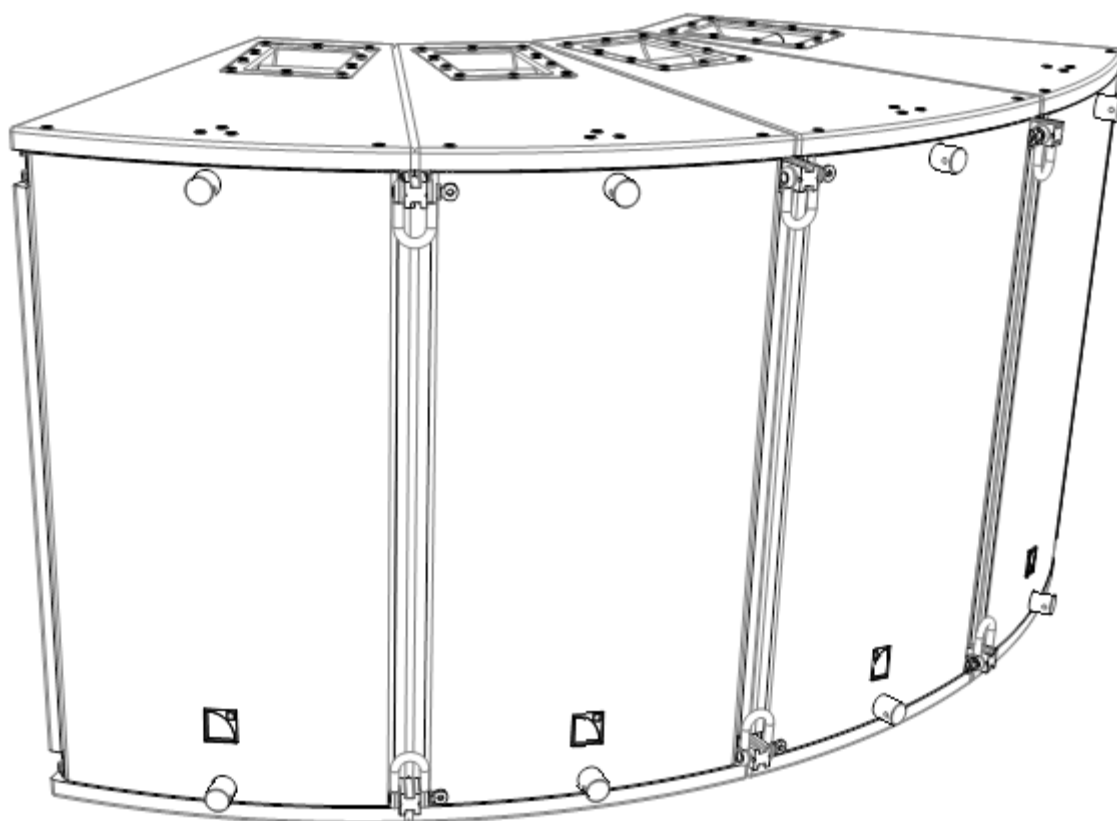


ARCS II



user manual (EN)



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SAFETY INSTRUCTIONS

1. **Read this manual**
2. **Follow all SAFETY INSTRUCTIONS as well as DANGER and OBLIGATION warnings**
3. **Never incorporate equipment or accessories not approved by L-ACOUSTICS®**
4. **Read all the related PRODUCT INFORMATION documents before exploiting the system**
The product information document is included in the shipping carton of the related system component.
5. **Read the RIGGING MANUAL before installing the system**
Use the rigging accessories described in the rigging manual and follow the associated procedures
6. **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).

SYMBOLS

The following symbols are used in this document:



DANGER

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.



OBLIGATION

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



INFORMATION

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

WELCOME TO L-ACOUSTICS®

Thank you for choosing the L-ACOUSTICS® **ARCS® II SYSTEM**.

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 the L-ACOUSTICS® web site on a regular basis to download the latest document and software updates:
www.l-acoustics.com.

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1 ARCS II SYSTEM

The ARCS®II (Arrayable Radial Coherent System, generation II) has benefited from a design exploiting the Wavefront Sculpture Technology® in a constant curvature line source solution. Intended for the medium to large rental productions, it delivers remarkable power, bandwidth and coherence, along with a flexible and predictable coverage. Besides, it offers the audience an incomparable listening experience featuring clarity, precision and impact.

The main system components are as follows:

- ARCS®II, full-range element, operating from 50 Hz to 20 kHz;
- SB28, low-frequency element, operating down to 25 Hz;
- LA-RAK, touring rack fitted with three LA8 amplified controllers;
- LA4X amplified controller

The ARCS®II enclosure offers a number of improvements over the previous generation, the major of them being the KI grade transducers for more resources and lower weight. It also features a new front grill for enhanced durability and cosmetics, and is driven by a single factory preset to accommodate any applications efficiently.

An ARCS®II line source can be deployed either horizontally or vertically, with a coverage angle that is proportional to the number of enclosures in the array ($N \times 22.5^\circ$). On the other plane, vertical or horizontal respectively, the ARCS®II line source provides an asymmetrical coverage angle of 60° ($20^\circ/40^\circ$). The orientation of the ARCS®II enclosures within the array determines the asymmetric distribution, allowing the use of a horizontal ARCS®II line source either for upward or downward coverage.

The ARCS®II can be quickly deployed as a tightly-packed front of house system for medium throw applications with high SPL, LF impact and excellent stereo imaging. Thanks to its precise and flexible coverage capability, other applications include distributed system, center cluster for theatrical work, sidefill monitoring, flown or stacked center fill, stereo front fill, offstage fill or delay system for concert audiences in stadia and arenas. Before installation, any system configuration can be acoustically and mechanically modeled with the SOUNDVISION 3D simulation software.

As a distribution platform for power, audio signals and network, the LA-RAK touring rack fitted with three LA8 amplified controllers is the heart of the system. Thanks to dedicated factory presets, it constitutes an extremely advanced and precise drive system for the enclosures. In high-end installation projects, the LA4X amplified controller can deliver maximum power headroom and the best possible performances. All L-ACOUSTICS amplified controllers feature the L-DRIVE, a thermal and over-excursion protection circuit.

Up to 253 amplified controllers can be connected together via the Ethernet-based L-NET protocol. The LA NETWORK MANAGER software allows online remote control and monitoring of all the connected units, via a user-friendly and intuitive graphic interface, and features the Array Morphing EQ. This exclusive tool allows the engineer to quickly adjust the tonal balance of the system to reach a reference curve or to ensure consistency of the sonic signature.

2 SYSTEM COMPONENTS

The system approach developed by L-ACOUSTICS® consists in offering a global solution that guarantees the highest and most predictable level of performance at any step of loudspeaker system deployment: modeling, installation, and operation. A complete L-ACOUSTICS® system includes enclosures, amplified controllers, cables, rigging system and software applications.

2.1 Loudspeaker enclosures

ARCS®II	Full-range enclosure (50 Hz – 20 kHz), 2-way active, constant curvature WST® line source
SB28	High power subwoofer (down to 25 Hz)



Loudspeaker system design

Sound design aspects are beyond the scope of this document. However, the various applications of the system will be based on the loudspeaker configurations presented in this document.

2.2 Powering and driving system

LA4X or LA8 Amplified controllers with DSP, preset library and networking capabilities



Operating instructions

Refer to the **LA4X, LA8 and LA-RAK user manual**.

2.3 Loudspeaker cables

DO cables (DO.7, DO10, DO25)	8-point PA-COM® loudspeaker cables (4 mm ² section). Respective lengths of 0.7 m/2.3 ft, 10 m/32.8 ft, and 25 m/82 ft.
DOFILL-LA8	Breakout cable for two 2-way active enclosures. PA-COM® < 2 x 4-point SpeakON® (4 mm ² section).
DO3WFILL	Breakout cable for one 2-way active enclosure and two passive enclosures PA-COM® < 3 x SpeakON® 1 x 4-point and 2 x 2-point (4 mm ² section).
DOSUB-LA8	Breakout cable for four passive enclosures. 8-point PA-COM® to 4 x 2-point SpeakON® (4 mm ² section).
SP cables (SP.7, SP5, SP10, SP25)	4-point SpeakON® loudspeaker cables (4 mm ² section). Respective lengths of 0.7 m/2.3 ft, 5 m/16.4 ft, 10 m/32.8 ft and 25 m/82 ft.
SP-YI	Breakout cable for two passive enclosures. 4-point SpeakON® to 2 x 2-point SpeakON® (2.5 mm ² section). Provided with CC4FP adapter.



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

2.4 Rigging elements



Rigging elements or procedures are not presented in this document. Refer to the **ARCS®II rigging manual**.

2.5 Software applications

SOUNDVISION Proprietary acoustical and mechanical 3D modeling software.

LA NETWORK MANAGER Remote control and monitoring of amplified controllers



Using L-ACOUSTICS® software

Refer to the **SOUNDVISION user manual** and the **LA NETWORK MANAGER tutorial**.



ARCS®II



SB28



LA-RAK



DO3WFILL



DOFILL-LA8



DOSUB-LA8



SPY1



DO.7



SP7



LA8



DO10



SP5



LA4X



DO25



SP10



SP25



Soundvision



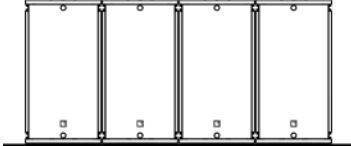
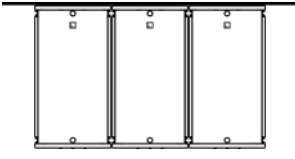
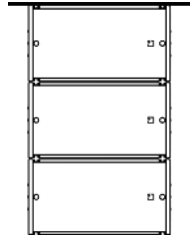
LA Network Manager

ARCS®II system components (excluding rigging elements and modulation cables)

3 LOUDSPEAKER CONFIGURATIONS

3.1 Line source

Deployed as a standalone line source, an ARCS®II system operates over the nominal bandwidth of the ARCS®II enclosure. The [ARCS II] preset allows for a reference frequency response in medium throw applications. The ARCS II enclosure can be driven by the LA4X or LA8 amplified controller.

Standalone ARCS®II line source								
<p>Horizontal array (40°up/ 20°down)</p> 	<p>Flown horizontal array (40°down/20°up)</p> 	<p>Flown vertical array (40°right/20°left)</p> 						
<table style="width: 100%; border: none;"> <tr> <td style="border: none; padding: 0 10px;"><u>Enclosure</u></td> <td style="border: none; padding: 0 10px;"> </td> <td style="border: none; padding: 0 10px;">[PRESET]</td> </tr> <tr> <td style="border: none; padding: 0 10px;">ARCS®II</td> <td style="border: none; padding: 0 10px;"> </td> <td style="border: none; padding: 0 10px;">▶ [ARCS II]</td> </tr> </table>			<u>Enclosure</u>		[PRESET]	ARCS®II		▶ [ARCS II]
<u>Enclosure</u>		[PRESET]						
ARCS®II		▶ [ARCS II]						
<p><u>Frequency range (-10 dB)</u> 50 Hz – 20 kHz</p>		<p><u>Directivity pattern</u> Asymmetrical 40°/20° 40° toward connector side</p>						

3.2 Line source with low-frequency element

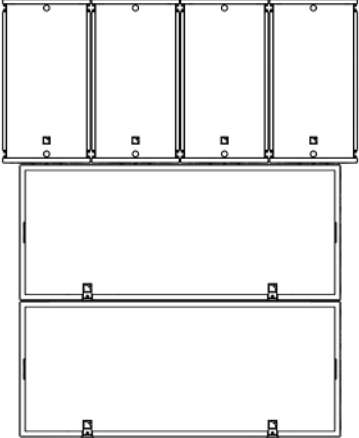
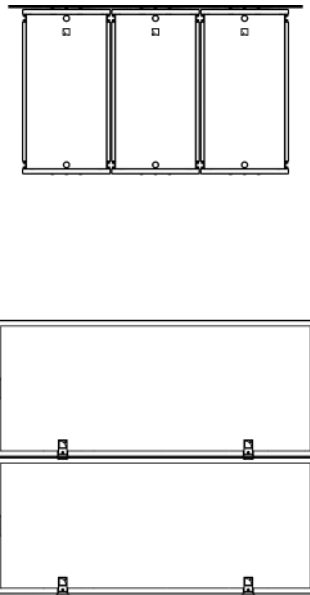
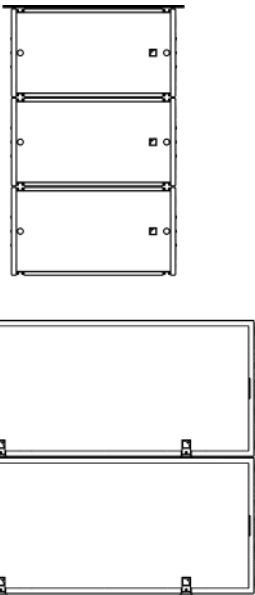
In this configuration, an ARCS®II line source deployed with SB28 subwoofers, the system bandwidth is extended in the low end.

The [ARCS II] preset allows for a reference frequency response in medium throw applications.

The [SB28_60] preset provides the subwoofer enclosures with an upper frequency limit at 60 Hz for an optimal frequency coupling with the ARCS®II line source.

This configuration is driven by the LA4X (only for ARCS®II enclosures) or LA8 amplified controller.

ARCS®II line source + SB28

<p>Horizontal array (40°up/ 20°down) stacked on SB28</p> 	<p>Flown horizontal array (40°down/20°up) with ground-stacked SB28</p> 	<p>Flown vertical array (40°right/20°left) with ground-stacked SB28</p> 					
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 5px;"><u>Enclosure</u></td> <td style="padding: 5px;">[PRESET]</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">ARCS®II</td> <td style="padding: 5px;">▶ [ARCS II]</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">SB28</td> <td style="padding: 5px;">▶ [SB28_60]</td> </tr> </table>	<u>Enclosure</u>	[PRESET]	ARCS®II	▶ [ARCS II]	SB28	▶ [SB28_60]	<p style="text-align: center;"><u>Recommended ratios</u></p> <p style="text-align: center;">1 SB28 : 2 ARCS®II or 2 SB28 : 3 ARCS®II</p>
<u>Enclosure</u>	[PRESET]						
ARCS®II	▶ [ARCS II]						
SB28	▶ [SB28_60]						
<p style="text-align: center;"><u>Frequency range (-10 dB)</u></p> <p style="text-align: center;">25 Hz – 20 kHz</p>	<p style="text-align: center;"><u>Directivity pattern</u></p> <p style="text-align: center;">Asymmetrical 40°/20° 40° toward connector side</p>						
<p>Pre-alignment values</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">[ARCS_II] + [SB28_60]</td> <td style="width: 35%;">ARCS II = 0</td> <td style="width: 35%;">SB28 = 2.6</td> </tr> <tr> <td>[ARCS_II] + [SB28_60_C]</td> <td>ARCS II = 2.9</td> <td>SB28 = 0</td> </tr> </table>		[ARCS_II] + [SB28_60]	ARCS II = 0	SB28 = 2.6	[ARCS_II] + [SB28_60_C]	ARCS II = 2.9	SB28 = 0
[ARCS_II] + [SB28_60]	ARCS II = 0	SB28 = 2.6					
[ARCS_II] + [SB28_60_C]	ARCS II = 2.9	SB28 = 0					



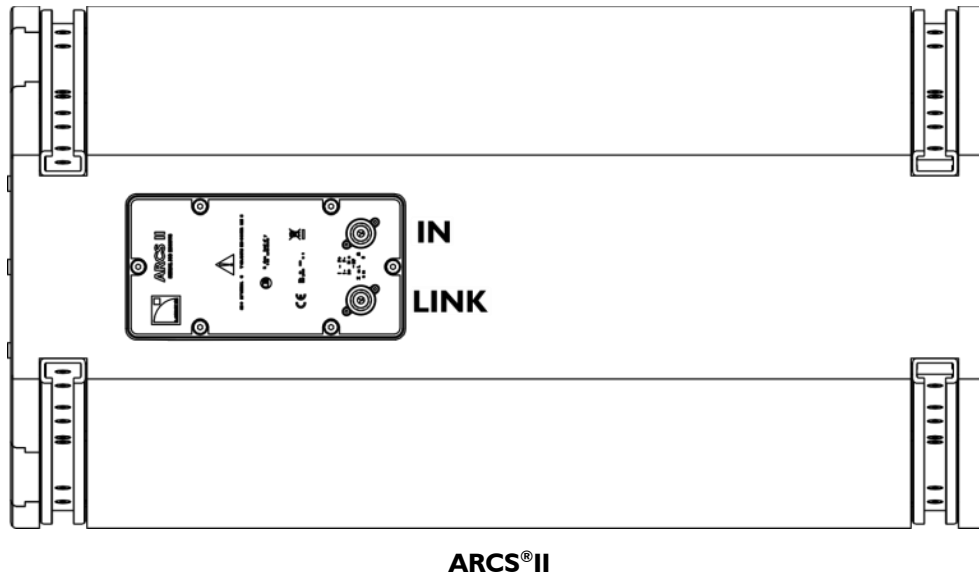
Use [SB28_60_C] with an SB28 subwoofer array in cardioid configuration

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

Refer to the **SB28 user manual** for details about the CARDIOID configuration.

4 LOUDSPEAKER CONNECTION

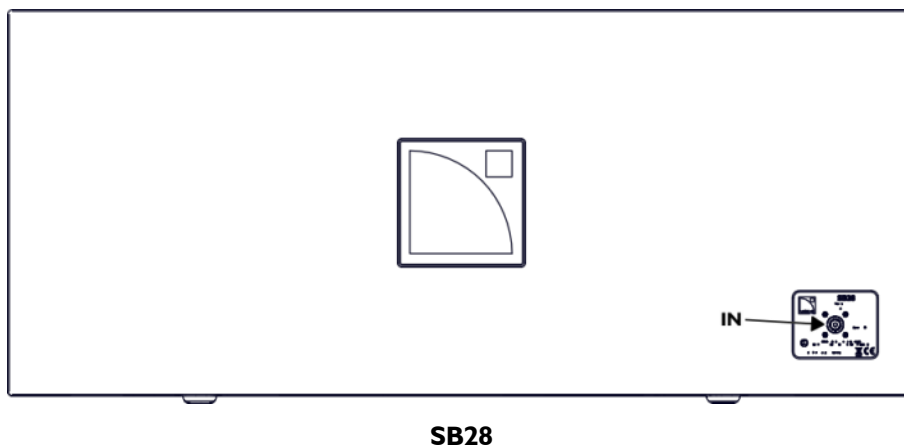
4.1 Connectors



i Internal pinout for L-ACOUSTICS® 2-way active enclosures

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

The ARCS® II is bi-amplified by the L-ACOUSTICS® LA4X or LA8 amplified controllers.



The SB28 is equipped with one 4-point SpeakON® connector.

i Internal pinout for L-ACOUSTICS® SB28 enclosures

SpeakON® points	1 +	1 -	2 +	2 -
Transducer connectors	LF+	LF-	Not used	Not used

4.2 Connecting ARCS®II to LA4X



Maximum of 2 enclosures per LA4X

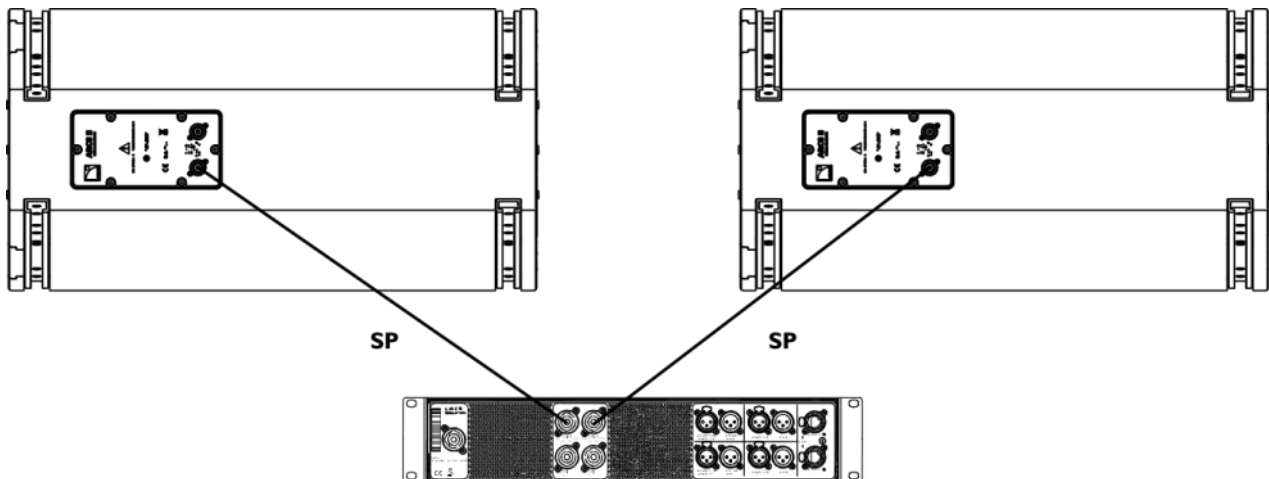
1 ARCS®II can be connected to each pair of output channels on the LA4X (1/2 and 3/4).



Impedance load

8 Ω

- ▶ Connect one **SP** cable (SP.7, SP5, SPI0 or SP25) to the OUT1/OUT2 and OUT3/OUT4 connectors of the LA4X.



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4.3 Connecting ARCS® II to LA8



Maximum of 4 enclosures per LA8

2 ARCS® II can be connected to each pair of output channels on the LA8 (1/2 and 3/4).



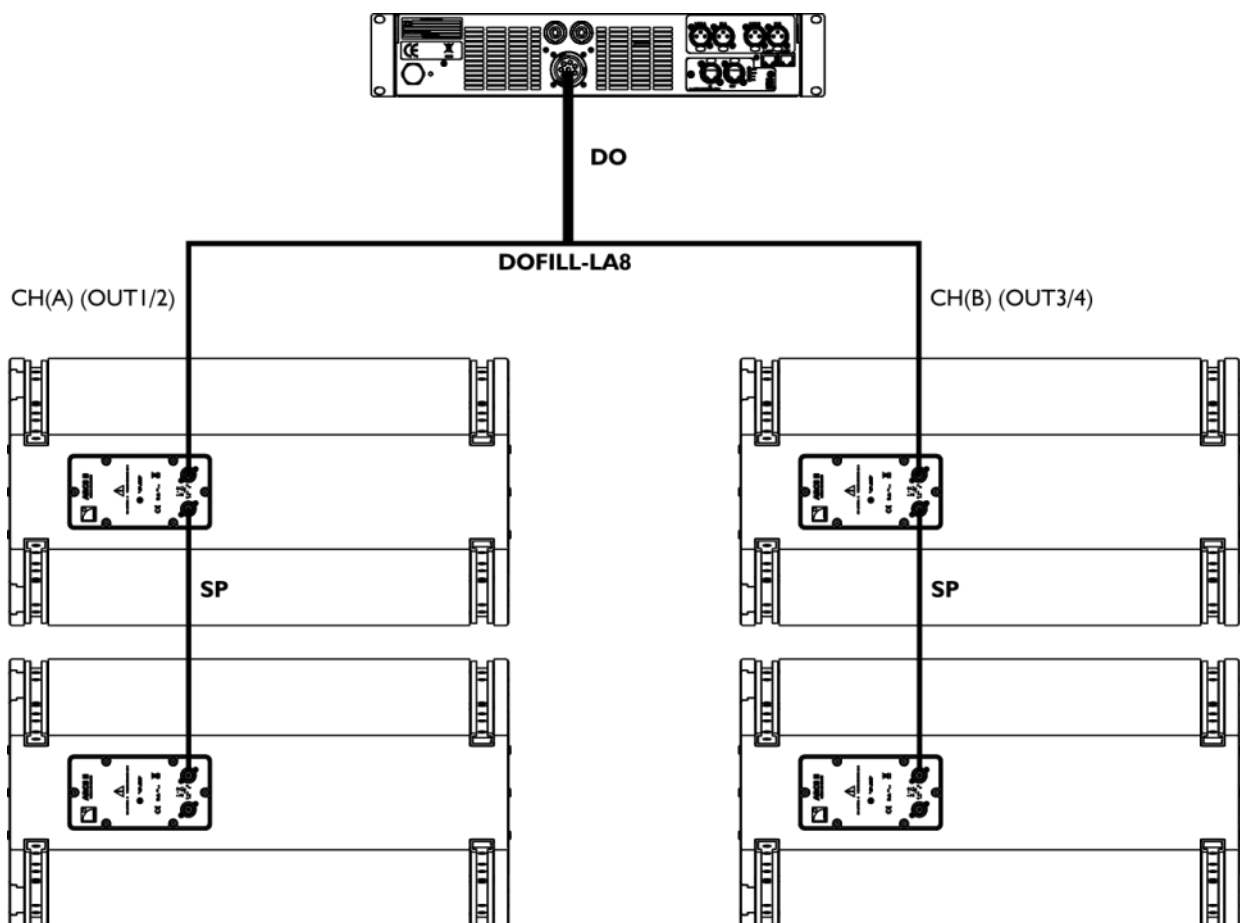
Impedance load

1 enclosure 8 Ω

2 enclosures 4 Ω

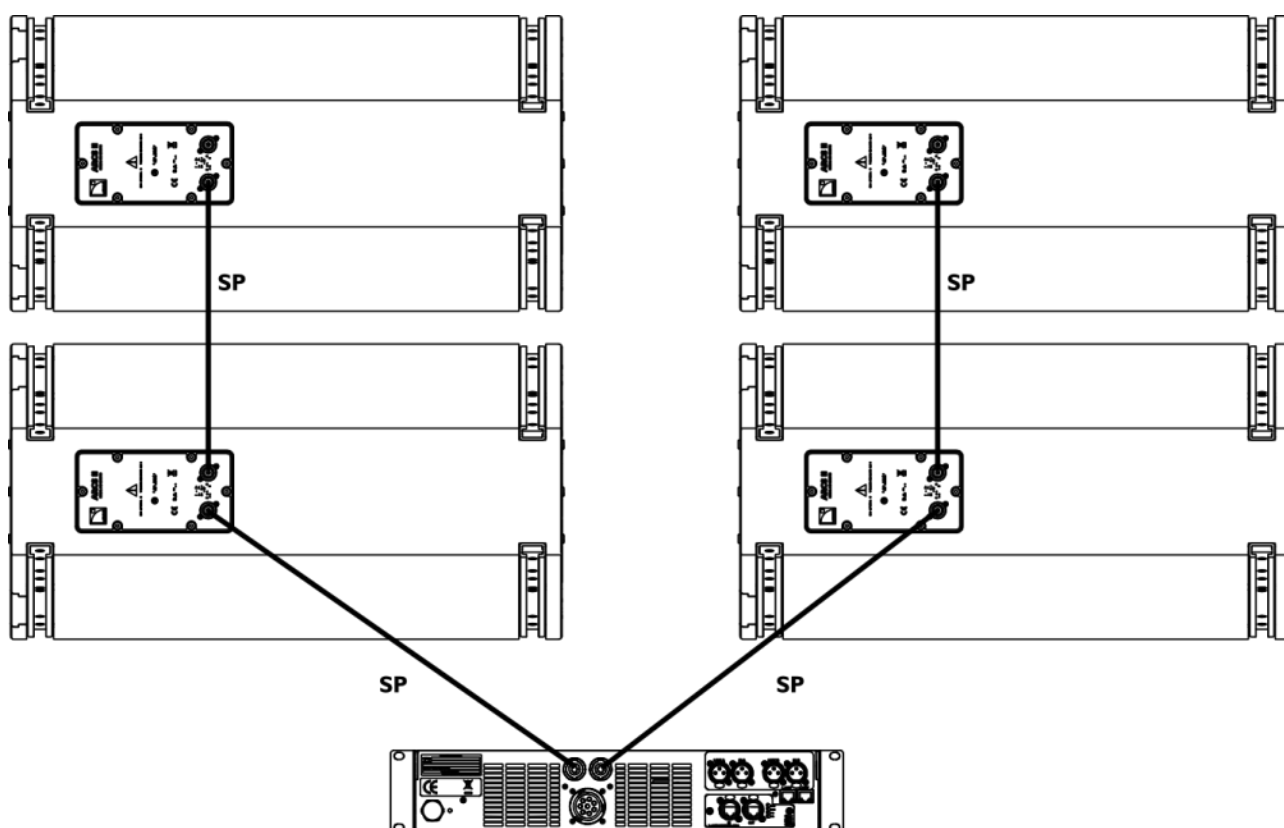
Option A

- ▶ Connect a **DO** cable (DO.7, DO10 or DO25) to the LA8 PA-COM® connector.
- ▶ Use a **DOFILL-LA8** to split the signal into two channel pairs each one feeding one enclosure.
- ▶ Use **SP** cables to connect additional similar enclosures in parallel with the first ones.



Option B

- ▶ Use an **SP** cable (SP5, SP10 or SP25) to connect one enclosure to each of the LA8 SpeakON® connectors.
- ▶ Use **SP** cables to connect additional similar enclosures in parallel with the first ones.



ARCS® II SYSTEM

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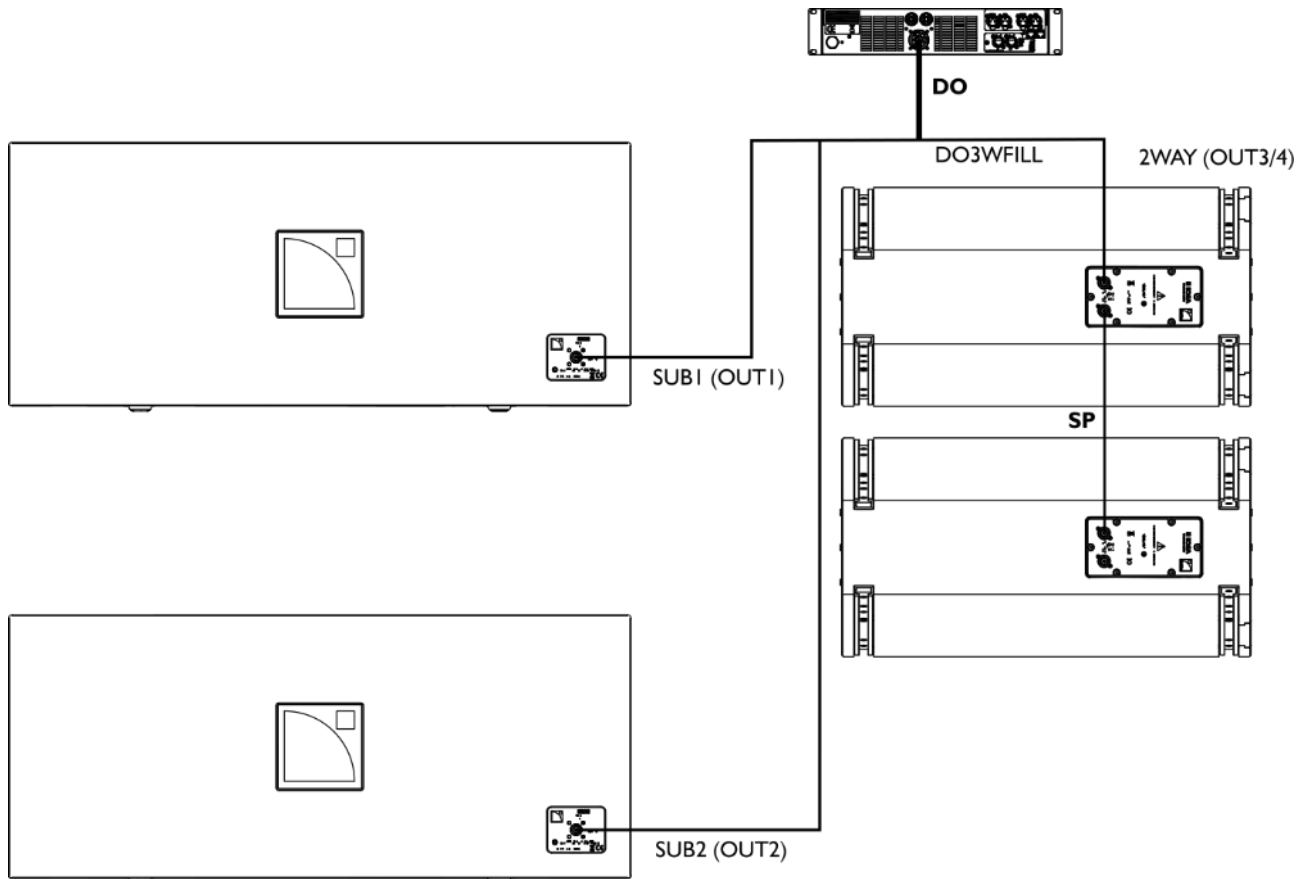
VERSION 3.0

Option C






This cabling scheme requires a custom preset.

- ▶ Connect a **DO** cable (DO.7, DO10 or DO25) to the LA8 PA-COM® connector.
- ▶ 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 active enclosure.
- ▶ Connect the **SUB1** and **SUB2** connectors to the IN connector of the subwoofers.
- ▶ Use **SP** cables to connect additional ARCS II in parallel with the first ones.

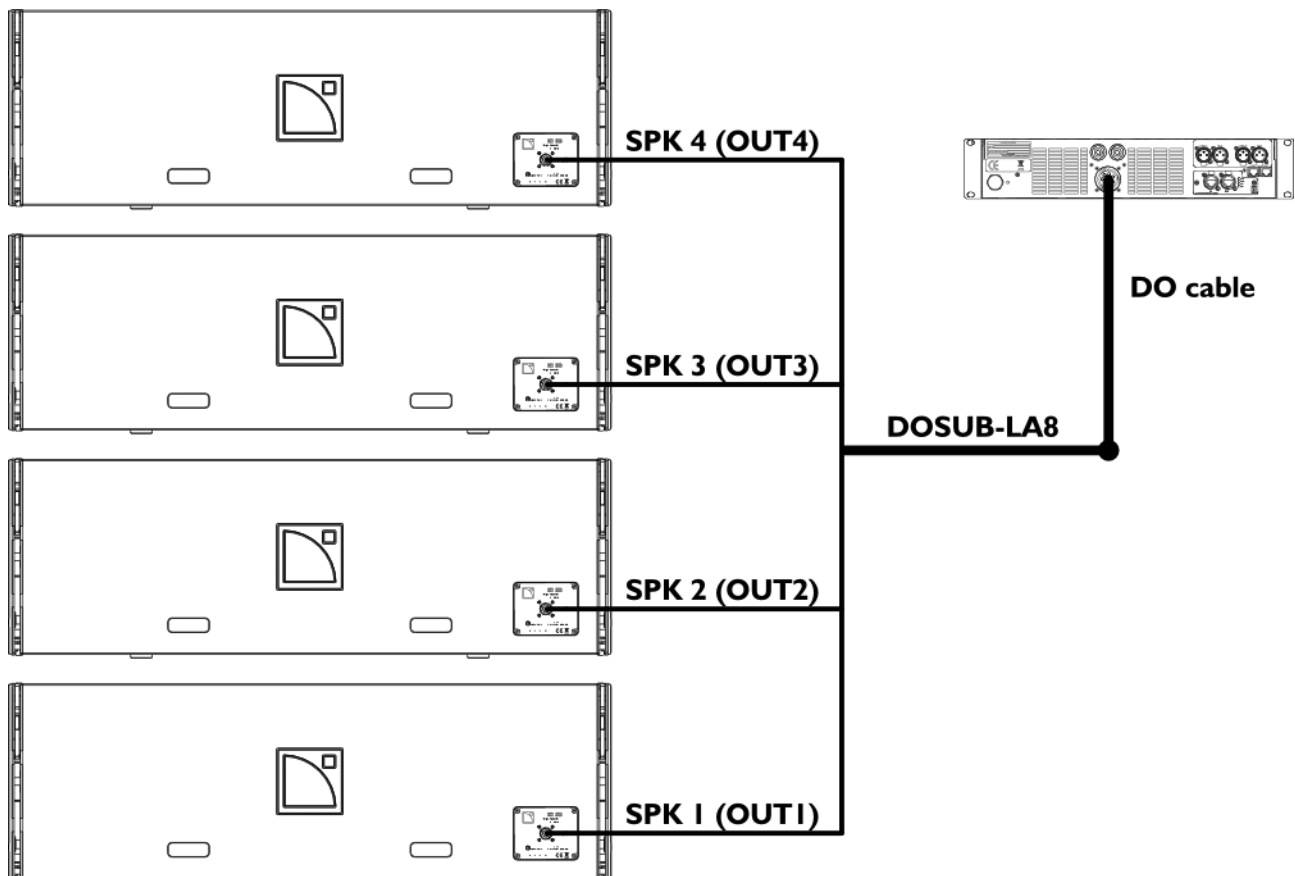


4.4 Connecting SB28 to LA8

-  **Maximum of 4 enclosures per LA8**
1 SB28 can be connected to each output channel on the LA8.
-  **CARDIOID configuration with SB28**
Connect the reversed subwoofer to OUT 1.
-  **Impedance load**
1 enclosure 4 Ω

Option A

- ▶ Connect a **DO** (DO.7, DO10 or DO25) cable to the LA8 PA-COM[®] connector.
- ▶ Use the **DOSUB-LA8** to split the audio signals into four channels, each one feeding one subwoofer.



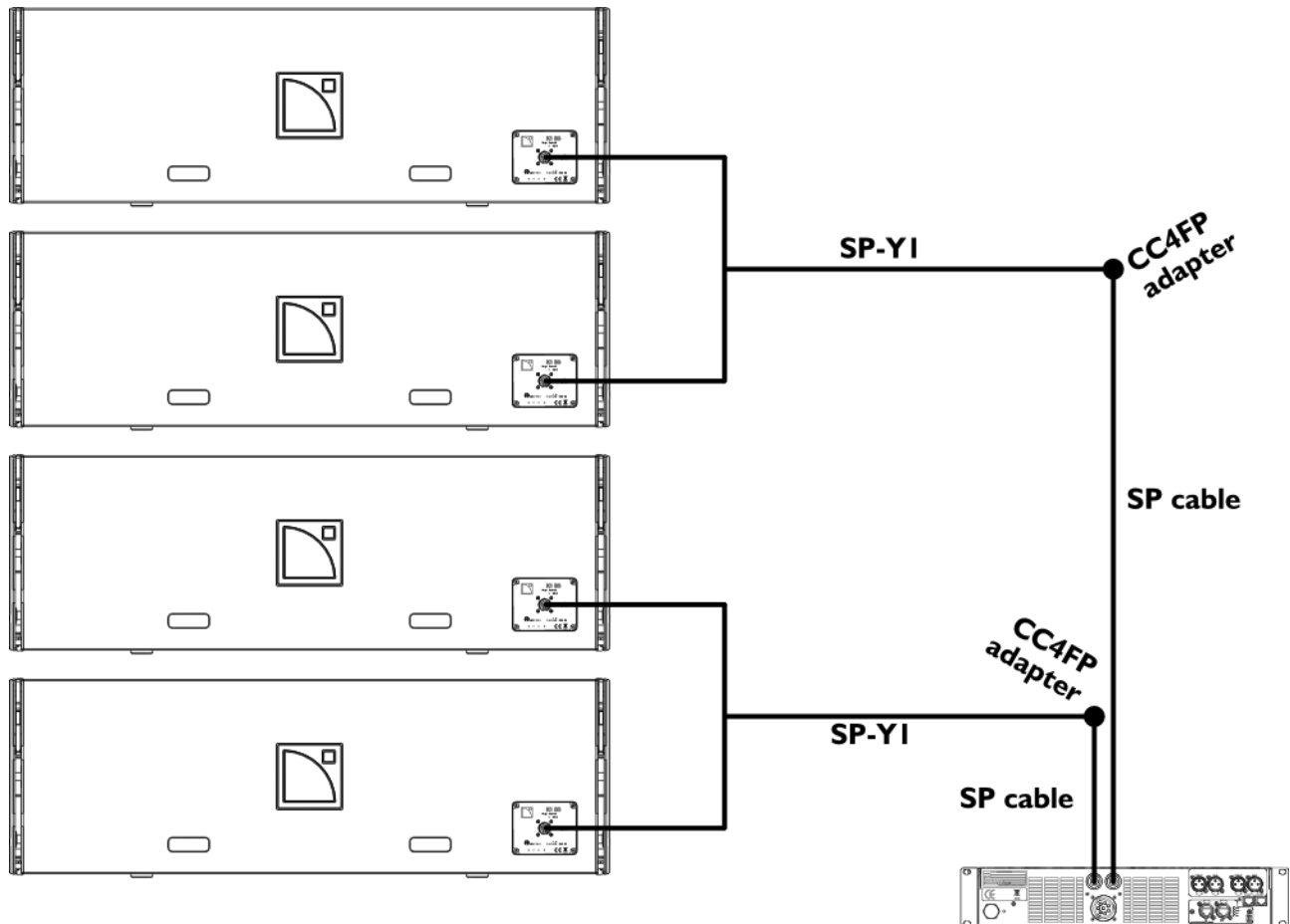
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Option B

- ▶ Connect an **SP** cable (SP.7, SP5, SP10 or SP25) to each of the SpeakON® connectors of the LA8.
- ▶ Use an **SP-YI** cable and a **CC4FP** adapter to split the audio signals into two channels, each one feeding one subwoofer.



APPENDIX A PRESET DESCRIPTION

[ARCS II]

The [ARCS II] preset allows for a reference frequency response in medium throw applications.

Loudspeaker elements		Amplifier outputs	Channels	Default parameters				
				Routing	Gain	Delay	Polarity	Mute
ARCS II	LF	OUT 1	LF	IN A	0 dB	0 ms	+	ON
	HF	OUT 2	HF					ON
ARCS II	LF	OUT 3	LF	IN B	0 dB	0 ms	+	ON
	HF	OUT 4	HF					ON

[SB28_60]

The [SB28_60] preset provides the SB28 enclosures with an upper frequency limit at 60 Hz, for an optimal frequency coupling with the ARCS®II line source.

Loudspeaker elements	Amplifier outputs	Channels	Default parameters				
			Routing	Gain	Delay	Polarity	Mute
SB28	OUT 1	SB	IN A	0 dB	0 ms	+	ON
SB28	OUT 2	SB	IN A	0 dB	0 ms	+	ON
SB28	OUT 3	SB	IN B	0 dB	0 ms	+	ON
SB28	OUT 4	SB	IN B	0 dB	0 ms	+	ON

[SB28_60_C]

The [SB28_60_C] preset provides the SB28 enclosures with an upper frequency limit at 60 Hz, for an optimal frequency coupling with the ARCS®II line source.

It features optimized delay settings for SB28 arrays in cardioid configuration.

Loudspeaker elements	Amplifier outputs	Channels	Default parameters				
			Routing	Gain	Delay	Polarity	Mute
Reversed SB28	OUT 1	SR*	IN A	0 dB	0 ms	+	ON
SB28	OUT 2	SB					ON
SB28	OUT 3	SB					ON
SB28	OUT 4	SB					ON

* reversed subwoofer

APPENDIX B RECOMMENDATION FOR SPEAKER CABLES**Cable quality and resistance**

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

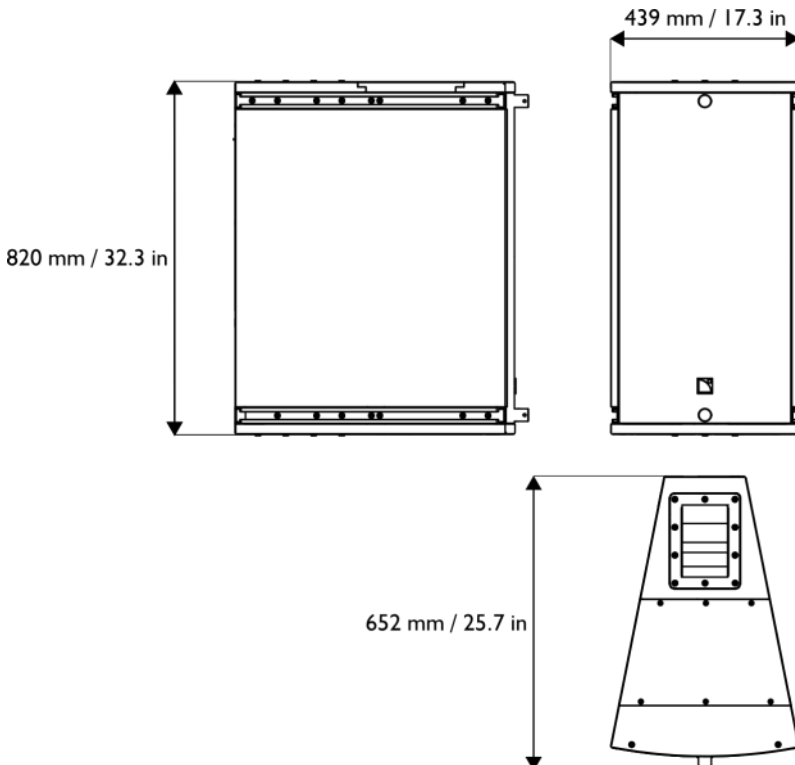
Use cables of gauge offering low resistance per unit length and keep the cables as short as possible.

The following table provides the recommended maximum length depending on the cable cross-section and on the impedance load connected to the amplifier.

Cable cross-section			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
10	9	7	120	390	60	195	40	130

APPENDIX C SPECIFICATIONS

ARCS®II

Description	2-way active enclosure, amplified by LA4X / LA8 / LA12X
Usable bandwidth (-10 dB)	50 Hz - 20 kHz ([ARCS II] preset)
Maximum SPL¹	142 dB ([ARCS II] preset)
Coverage angle (-6 dB)	22.5° symmetric x 60° asymmetric (-20°/+40°)
Transducers	LF 1 x 15" neodymium, weather-resistant, bass-reflex
	HF 1 x 3", neodymium, diaphragm compression driver, DOISC® waveguide
Nominal impedance	LF = 8 Ω, HF = 8 Ω
RMS power handling	LF: 600 W
	HF: 100 W
Connectors	IN: 1 x 4-point SpeakON® LINK: 1 x 4-point SpeakON®
Rigging components	Captive coupling bars
Dimensions	
	<p>Weight (net): 50 kg / 110 lb</p> <p>Cabinet: Baltic birch plywood</p> <p>Finish: Dark Grey brown (Pantone 426C) Pure white (RAL 9010®)</p> <p>Front: Steel grill with anti-corrosion coating, Airtel® fabric</p> <p>Protection Rating: IP55</p> <p>Rigging components: Steel with anti-corrosion coating</p>

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

ARCS® II SYSTEM

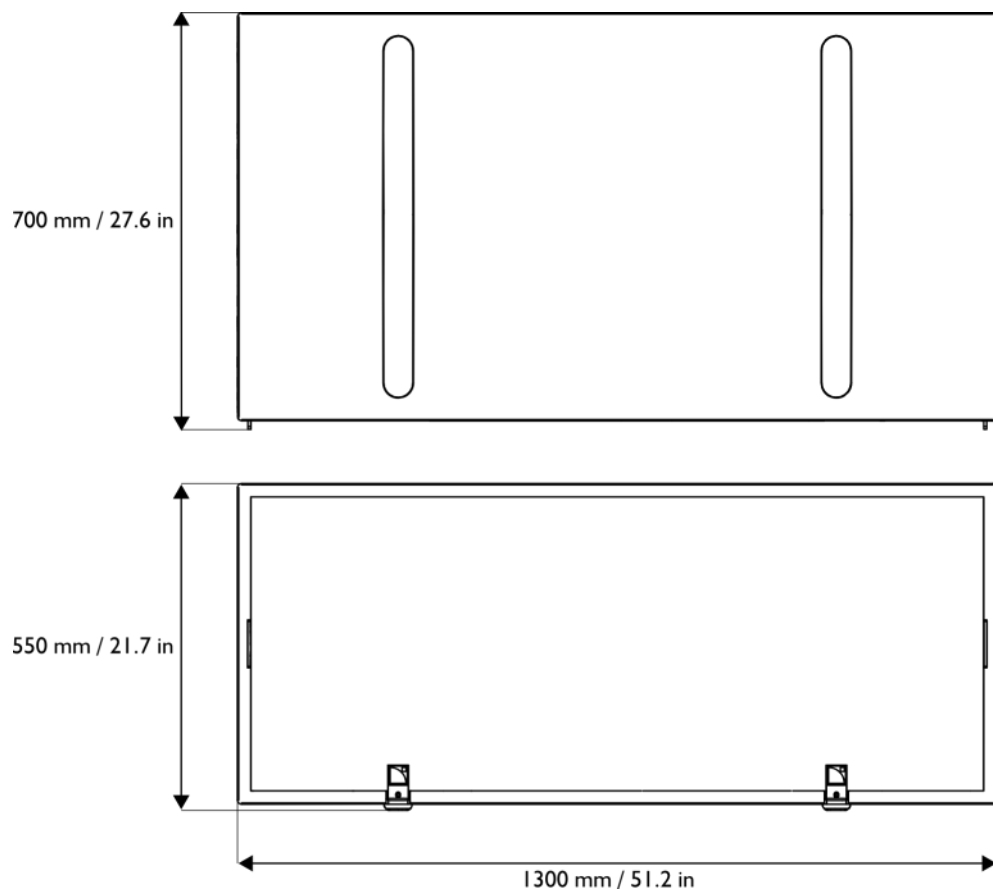
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SB28

Description	Subwoofer enclosure, amplified by LA8 / LA12X
Low frequency limit (-10 dB)	25 Hz ([SB28_100] preset)
Maximum SPL¹	142 dB ([SB28_100] preset)
RMS power handling	1255 W
Transducers	2 × 18" neodymium, weather-resistant, direct radiation, bass-reflex
Nominal impedance	4 Ω
Connectors	IN: 1 × 4-point SpeakON®
Rigging components	Integrated rigging system Handles integrated in the cabinet

Dimensions



Physical data	Weight (net):	93 kg / 205 lb
	Cabinet:	Baltic birch plywood
	Finish:	Dark Grey brown (Pantone 426C) Pure white (RAL 9010®)
	Front:	Steel grill with anti-corrosion coating Airnet® acoustically neutral fabric
	Rigging components:	Aluminium

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



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