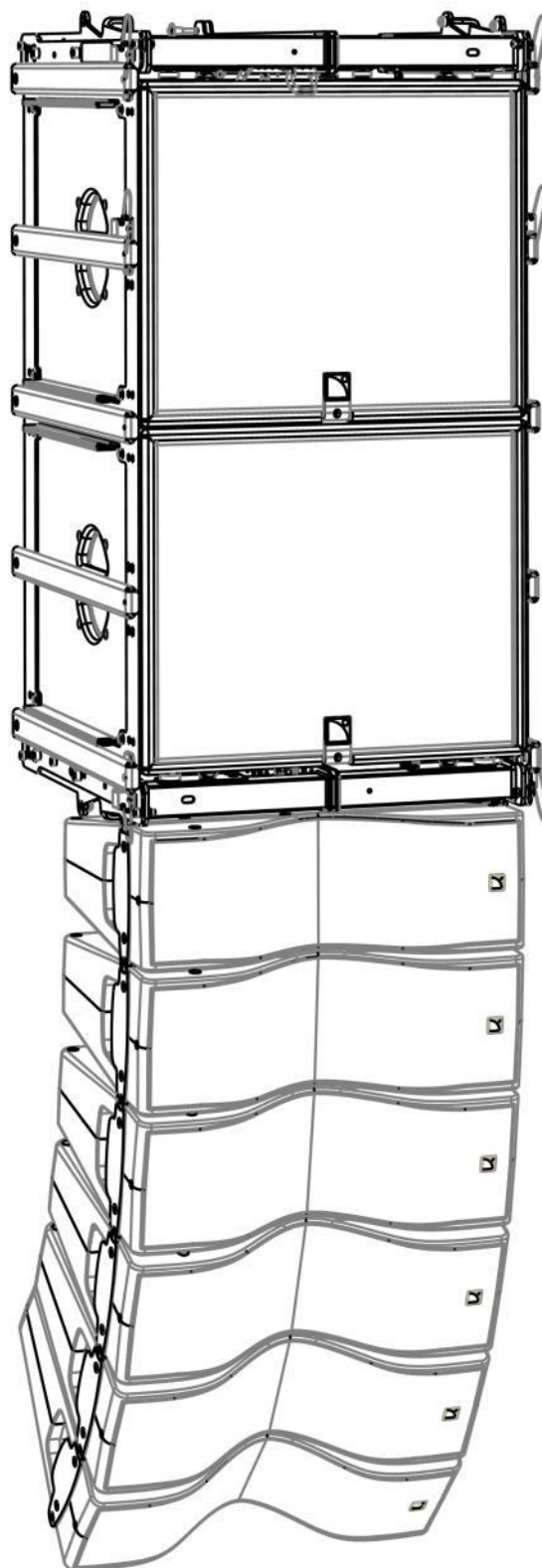# KIVA SYSTEM KIVA SB15m
USER MANUAL

VERSION 1.2

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® **KIVA** coaxial enclosure.

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.

CONTENTS

1 KIVA SYSTEM

The KIVA-SB15m system is based on an ultra-compact WST® enclosure and a complementary subwoofer offering extended bandwidth and LF resources. Intended for rental productions and fixed installations, the KIVA-SB15m modular line source delivers remarkable acoustic properties in an unobtrusive and lightweight package and is suited to various long-throw applications, including FOH L/R systems, central clusters, distributed systems and complementary fills.

The main system components are as follows:

- KIVA, full range element, operating from 80 Hz to 20 kHz;
- SB15m, low-frequency element, operating down to 40 Hz;
- LA4 or LA8 amplified controllers.

Utilizing the unrivalled characteristics of a variable curvature WST® line source, KIVA offers a long throw capability in spite of its compact format. The sonic result is clarity, precision and a unique sensation of proximity for an incomparable listening experience.

KIVA's transducer arrangement delivers a 100°, smooth and controlled horizontal directivity pattern with a homogeneous tonal balance, a feature particularly valuable since most of a given audience is located off-axis. With variable inter-element angles from 0° to 15°, a KIVA line source allows matching any audience geometry, from narrow sectors to an extensive vertical coverage.

In standalone configuration, KIVA is particularly suited to distributed applications, as a main or complementary system. Its ultra-compact size and low weight complies with rigging and visual constraints found in historical buildings, theatres, broadcast productions and corporate events.

By adjusting the number of SB15m subwoofers, the LF resources are fully scalable and KIVA can be deployed as a FOH system with an extended operating bandwidth and an LF impact typical of today's music. The various system configurations offered to the sound designer and system engineer allow a high level of creative freedom. Before installation, these configurations can be acoustically and mechanically modeled with the SOUNDVISION 3D simulation software.

The amplified controllers offer an advanced and precise drive system for the enclosures. A factory preset library allows accommodating any application. 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

KIVA   Main enclosure (80 Hz – 20 kHz), 2-way passive , variable curvature WST® line source element.

SB15m   Subwoofer enclosure (down to 40 Hz).

SB18   Subwoofer enclosure (down to 32 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.
>
> **SB18 / SB18i / SB18m**
> In this document, the SB18 term and illustration refer equally to SB18, SB18i or SB18m.

2.2 Powering and driving system

LA4 or LA8   Amplified controller with DSP, preset library and networking capabilities

> **Operating instructions**
> Refer to the **LA4 and LA8 user manuals.**

2.3 Loudspeaker cables

DO cables (DO.7, DO10, DO25)	8-point PA-COM® loudspeaker cables. Respective lengths of 0.7 m/2.3 ft, 10 m/32.8 ft, and 25 m/82 ft.
DOSUB-LA8	Breakout cable for four passive enclosures. 8-point PA-COM® to 4 × 2-point SpeakON®.
SP cables (SP.7, SP5, SP10, SP25)	4-point SpeakON® loudspeaker cables. 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-Y1	Breakout cable for two passive enclosures. 4-point SpeakON® to 2 × 2-point SpeakON®. Provided with CC4FP adapter.

> Information about the connection of the enclosures to the LA amplifiers is given in this document.
> Refer to the **LA4** and **LA8 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 **KIVA system rigging manual**.

2.5 Software application

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**.

KIVA

SB15m

LA4

DO25

SP7

LA8

DOSUB-LA8

SP5

DO.7

SPY1

SP10

DO10

CC4FP

SP25

Soundvision

LA Network Manager

KIVA system components (excluding rigging elements and modulation cables)

3 LOUDSPEAKER CONFIGURATIONS

3.1   Line source

In this configuration – where a KIVA line source is used without complementary subwoofers – the system operates over the nominal bandwidth of the enclosure.

The [KIVA] preset allows for a reference frequency response in medium to long throw applications.

This configuration is driven by the LA4 or LA8 amplified controller.

Standalone KIVA line source

Enclosure	[PRESET]
KIVA	▶ [KIVA]

Frequency range (-10 dB)

80 Hz – 20 kHz
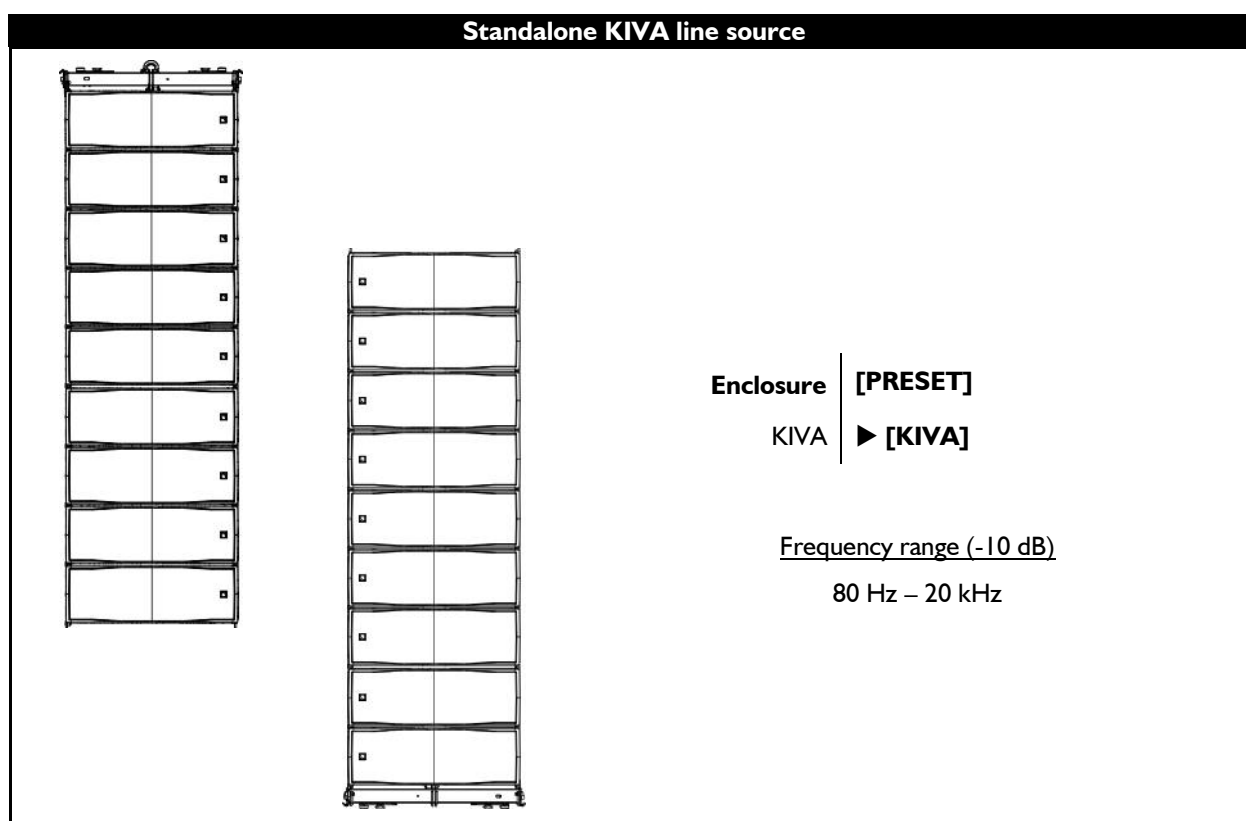
3.2   Line source with low-frequency element

In this configuration – where a KIVA line source is used with SB15m subwoofers and optional SB18 subwoofers – the bandwidth of the KIVA system is extended in the low-end and the LF contour is reinforced.
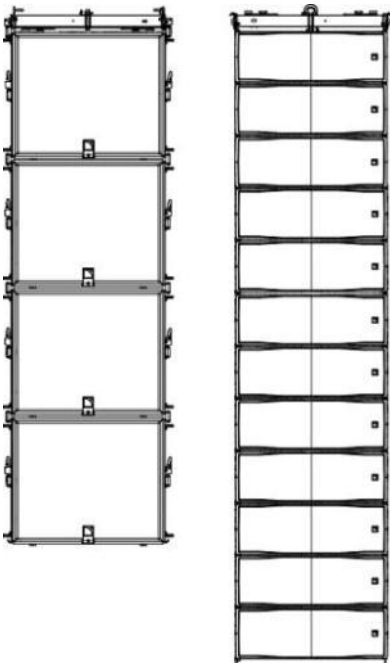
The [KIVA] preset allows for a reference frequency response in medium to long throw applications.

The [SB15_100] preset provides a 100 Hz upper frequency limit for the SB15m.

The [KIVA_SB15] preset combines the [KIVA] and [SB15_100] presets to facilitate the use of this configuration.

The [SB18_60] preset provides a 60 Hz upper frequency limit for the SB18.

This configuration is driven by the LA4 or LA8 amplified controller. When using the [KIVA_SB15] hybrid preset, additional SB18 subwoofers must be driven by another amplified controller.

KIVA line source + coupled SB15m

Frequency range (-10 dB)

40 Hz – 20 kHz

Recommended ratio

3 KIVA: 1 SB15m for a reinforced contour
or
6 KIVA: 1 SB15m for a flat contour

Limits for close coupling

Maximum for mixed main/sub line: 12 KIVA + 4 SB15m
Maximum distance between adjacent main/sub lines: 1.25 m

Enclosure	[PRESET]
KIVA	▶ **[KIVA]**
SB15m	▶ **[SB15_100]**
	or
KIVA +SB15m	▶ **[KIVA_SB15]**

❗ Delay settings
When combining a line source with subwoofers, delays may have to be added to the presets.
Refer to the **LA4** or **LA8 PRESET LIBRARY user manual** to obtain the pre-alignment delay values.

The [KIVA_SB15] hybrid preset does not allow the independent definition of parameters (gain, delay, etc.) for different output channels.

When different parameters need to be defined for different channels, it is necessary to build a custom preset with the [KIVA] and [SB15_100] presets.Refer to the **LA NETWORK MANAGER tutorial** for detailed instructions
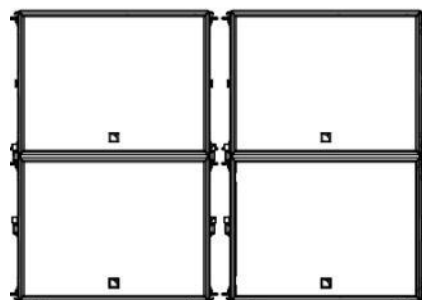
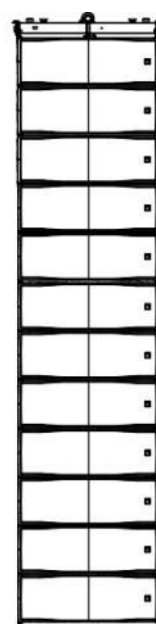**❗ Use [SB*xx_xx*_C] with a SB subwoofer array in cardioid configuration**
The cardioid configuration consists in reversing 1 element in an array of 4 subwoofers.
Refer to the SB*xx* **user manual** for details about the *Cardioid configuration*.

KIVA line source + coupled SB15m + SB18

Enclosure	[PRESET]	Frequency range (-10 dB)
KIVA	▶ [KIVA]	32 Hz – 20 kHz
SB15m	▶ [SB15_100]	**Recommended ratio**
SB18	▶ [SB18_60]	3 KIVA: 1 SB15m: 1 SB18
	or	
KIVA +SB15m	▶ [KIVA_SB15]	
SB18	▶ [SB18_60]	

! Delay settings

When combining a line source with subwoofers, delays may have to be added to the presets.

Refer to the **LA4** or **LA8 PRESET LIBRARY user manual** to obtain the pre-alignment delay values.

The [KIVA_SB15] hybrid preset does not allow the independent definition of parameters (gain, delay, etc.) for different output channels.

When different parameters need to be defined for different channels, it is necessary to build a custom preset with the [KIVA] and [SB15_100] presets.

Refer to the **LA NETWORK MANAGER tutorial** for detailed instructions
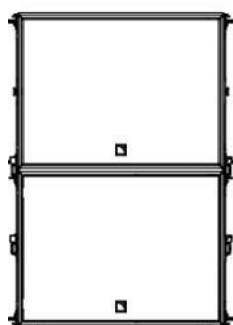
! Use [SB*xx_xx*_C] with a SB subwoofer array in cardioid configuration

The cardioid configuration consists in reversing 1 element in an array of 4 subwoofers.
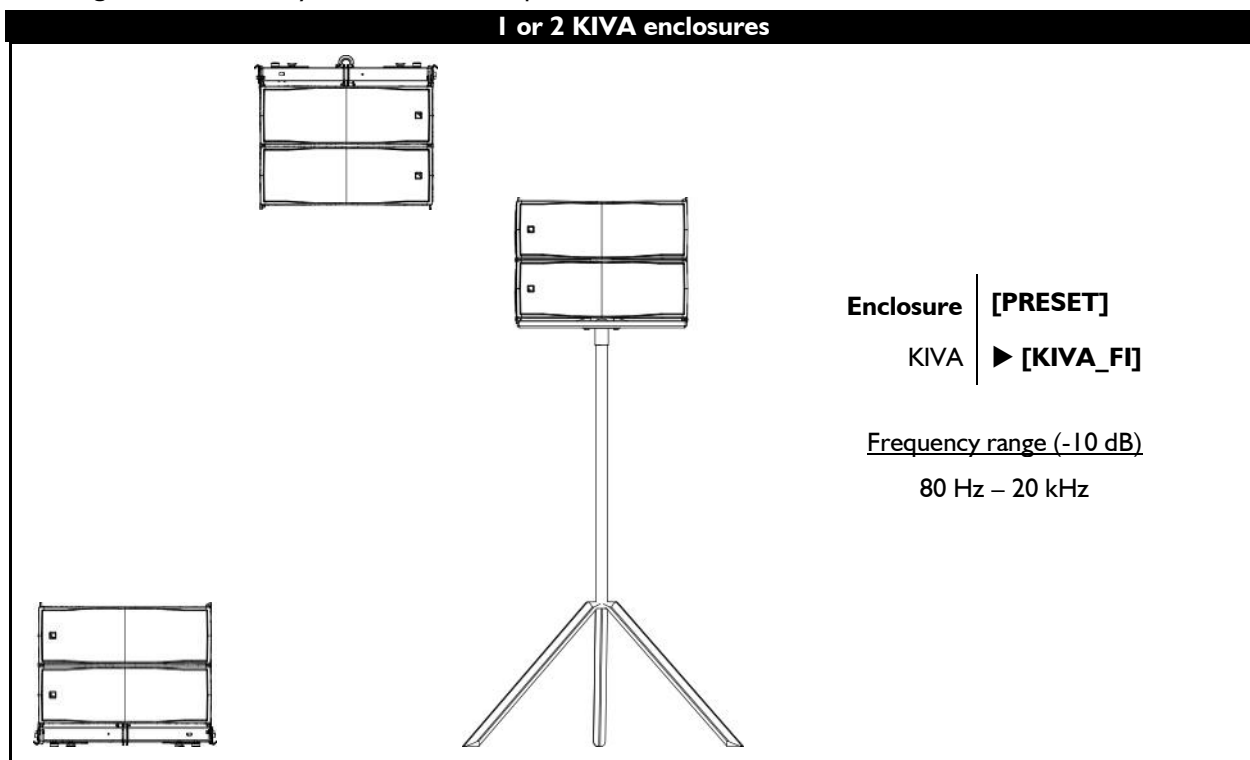
Refer to the SB*xx* **user manual** for details about the *Cardioid configuration*.

3.3   Line source element

In this configuration – where one or two KIVA enclosures are used without complementary subwoofers – the system operates over the nominal bandwidth of the enclosure.

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

This configuration is driven by the LA4 or LA8 amplified controller.

1 or 2 KIVA enclosures

Enclosure	[PRESET]
KIVA	▶ [KIVA_FI]

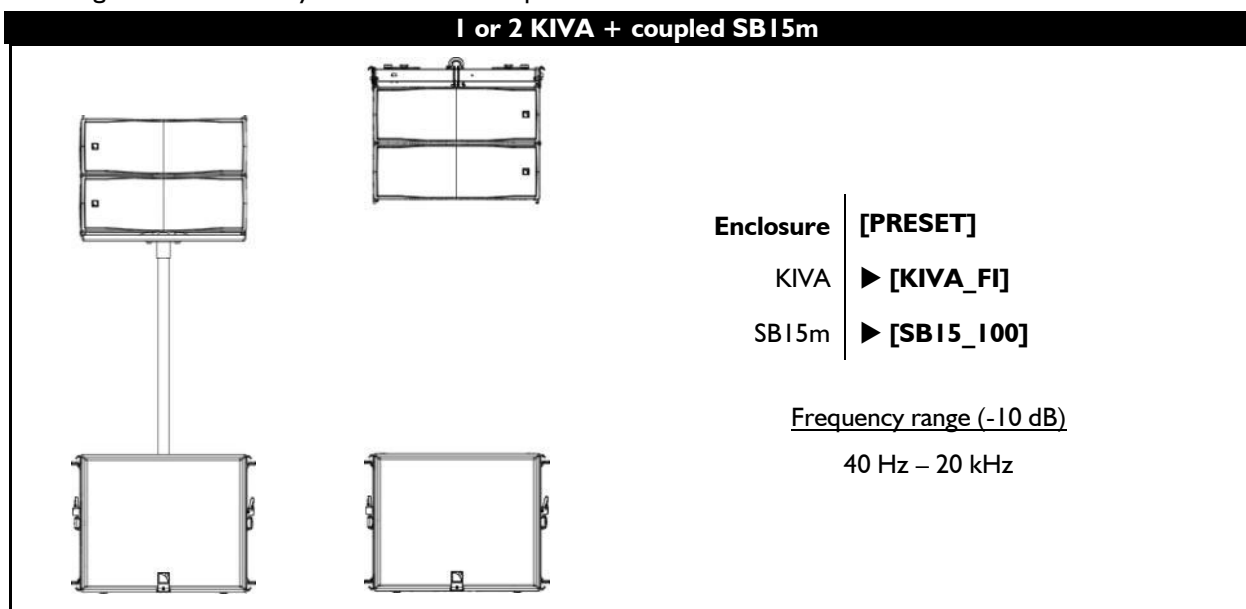Frequency range (-10 dB)

80 Hz – 20 kHz

3.4   Line source element with low-frequency element

In this configuration – where one or two KIVA enclosures are used with a complementary subwoofer – the bandwidth of the KIVA system is extended in the low-end and the LF contour is reinforced.

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

The [SB15_100] preset provides a 100 Hz upper frequency limit for the SB15m.

This configuration is driven by the LA4 or LA8 amplified controller.

<table>
<tr><td colspan="2">1 or 2 KIVA + coupled SB15m</td></tr>
<tr>
<td rowspan="3"></td>
<td>

Enclosure	[PRESET]
KIVA	▶ [KIVA_FI]
SB15m	▶ [SB15_100]

Frequency range (-10 dB)

40 Hz – 20 kHz
</td>
</tr>
</table>

> **Delay settings**
> When combining a line source with subwoofers, delays may have to be added to the presets.
>
> Refer to the **LA4** or **LA8 PRESET LIBRARY user manual** to obtain the pre-alignment delay values.
>
> Refer to the **LA NETWORK MANAGER tutorial** for detailed instructions
>
> **Use [SB*xx_xx*_C] with a SB subwoofer array in cardioid configuration**
> The cardioid configuration consists in reversing 1 element in an array of 4 subwoofers.
> Refer to the SB*xx* **user manual** for details about the *Cardioid configuration*.

4 LOUDSPEAKER CONNECTION

4.1 Connectors

The KIVA enclosure and SB15m subwoofer are equipped with two 4-point SpeakON® connectors wired in parallel. The IN connector allows receiving the audio signal and the LINK connector allows routing it to another similar enclosure in parallel.
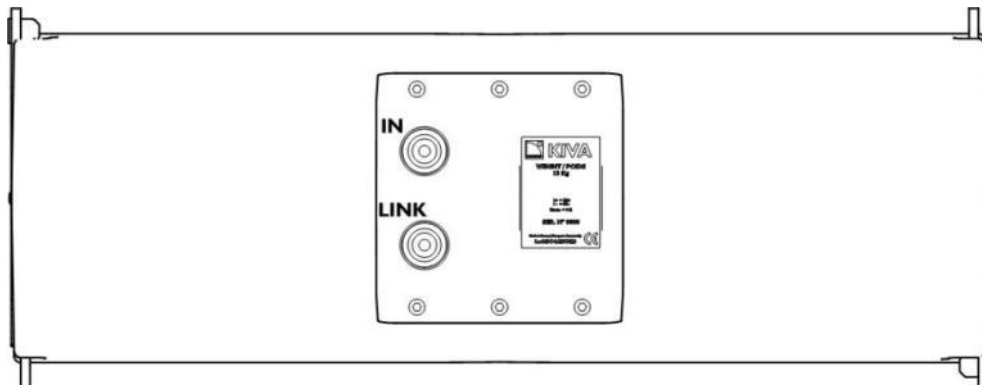
Internal pinout for L-ACOUSTICS® KIVA enclosures.

SpeakON® points	1 +	1 -	2 +	2 -
Transducer connectors	IN+	IN-	Not used	Not used
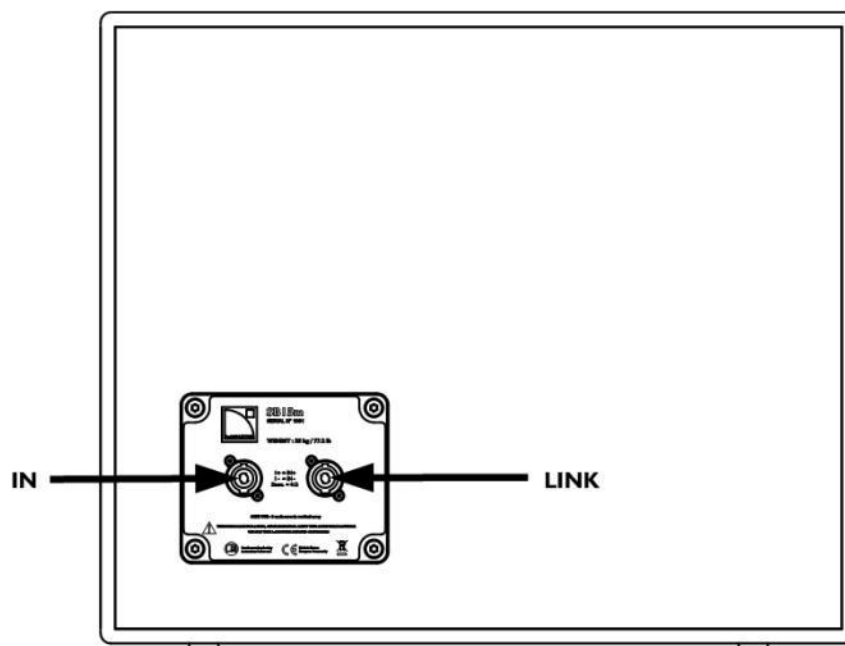
The SB15m connection in parallel is only possible with the LA8 amplified controller.

Internal pinout for L-ACOUSTICS® SB15m enclosures.

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

4.2   Connection to LA4

Maximum number of enclosures per LA4
Two KIVA or one SB15m can be connected to each output channel on the LA4. Therefore, a single LA4 amplified controller can drive up to:

- 8 × KIVA or
- 4 × SB15m or
- 6 × KIVA and 1 × SB15m.

Cardioid configuration
Connect the reversed subwoofer(s) to OUT 1 to use the cardioid preset.

SB15m subwoofer on OUT1 in hybrid configuration
Always connect the SB15m subwoofer to OUT1 when you use the [KIVA_SB15] preset.
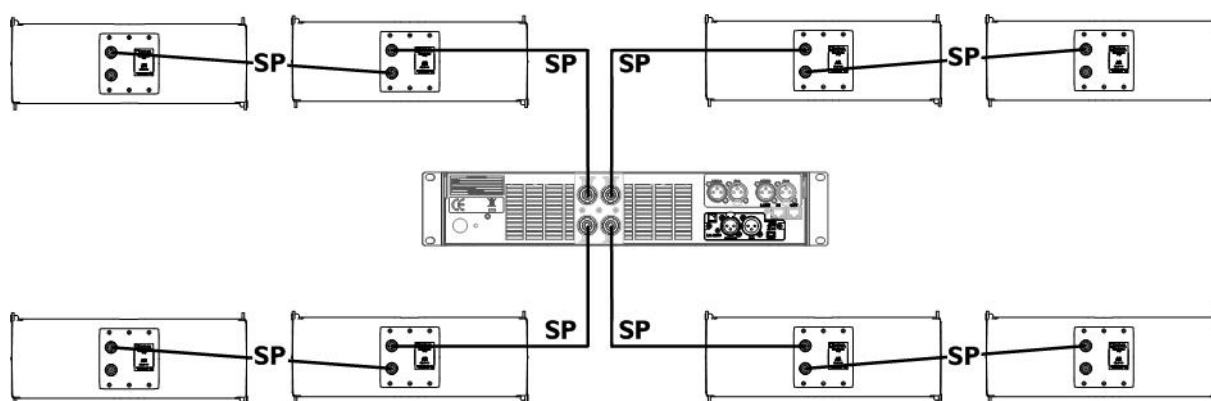
Impedance load
8 Ω for 1 enclosure, 4 Ω for 2 enclosures (only for KIVA).
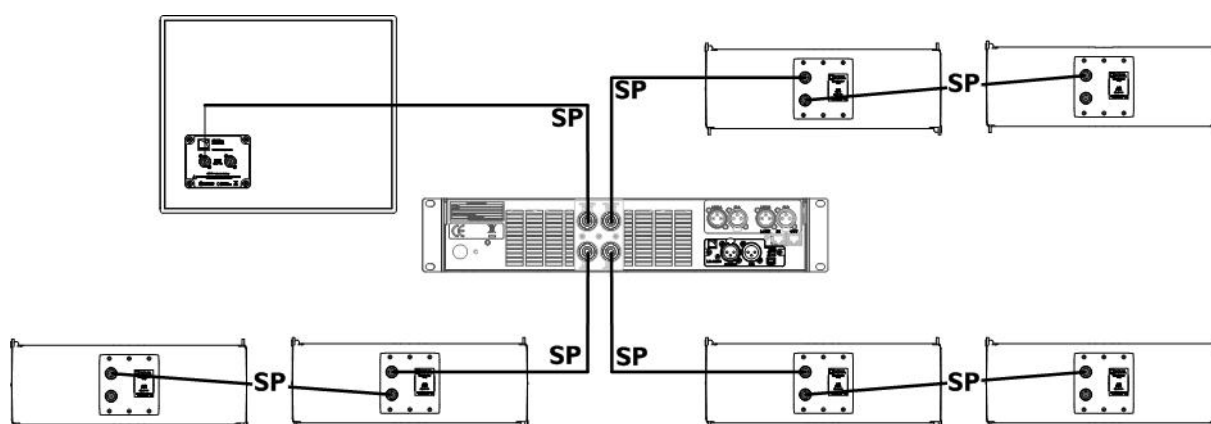
SB18 connection
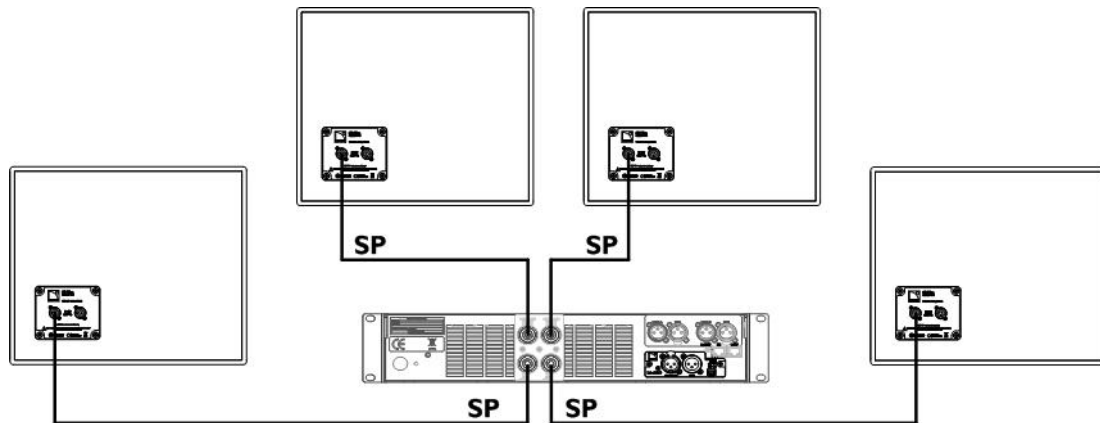SB15m and SB18 subwoofers follow the same cabling schemes.

Option A

▶ Use **SP cables** (SP.7, SP5, SP10 or SP25) to connect first enclosures to the four LA4 output channels.
▶ If necessary, use **SP cables** to connect additional KIVA enclosures in parallel with the first ones.

LA4 option A maximum configuration with KIVA

LA4 option A maximum configuration with KIVA + SB15m

LA4 option A maximum configuration with SB15m

Option B

▶ Connect an **SP cable** (SP.7, SP5, SP10 or SP25) to the OUT1/OUT2 connector of the LA4.
▶ Use a **CC4FP adapter** to connect an **SP-Y1 cable** and separate the two output channels.
▶ Apply the same cabling scheme for the OUT3/OUT4 connector of the LA4.
▶ If necessary, use **SP cables** to connect additional KIVA enclosures in parallel with the first ones.

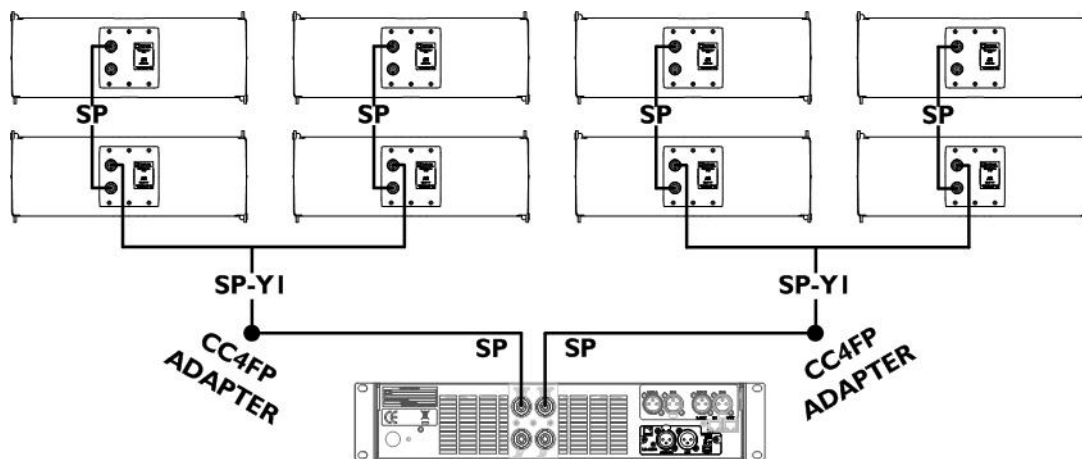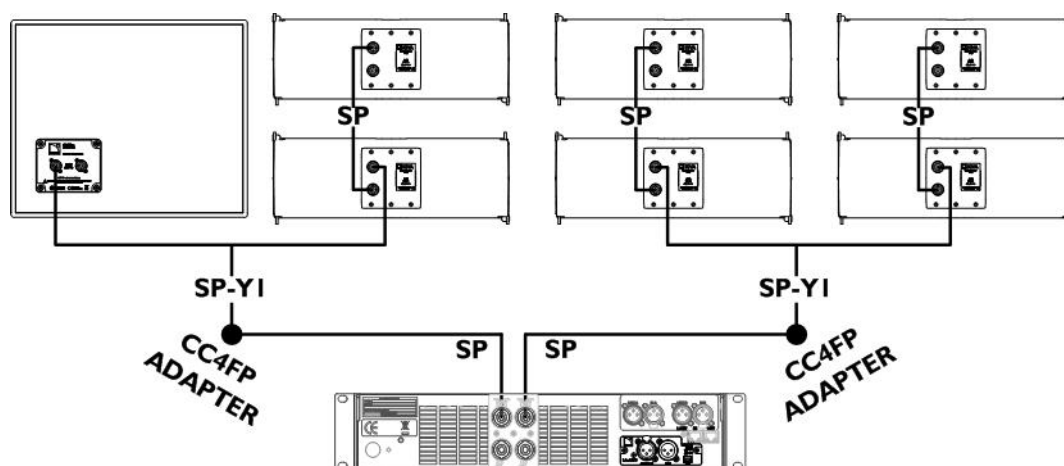**LA4 option B maximum configuration with KIVA**

LA4 option B maximum configuration with KIVA + SB15m
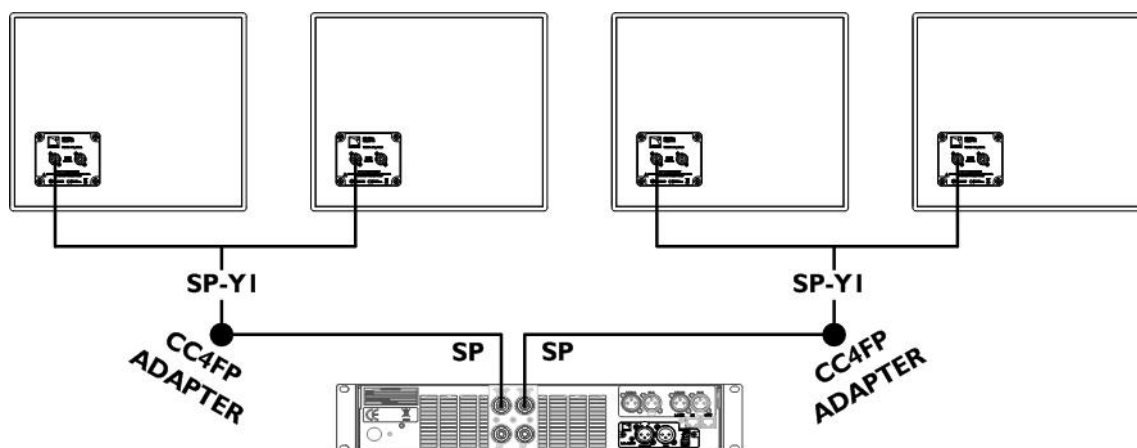
LA4 option B maximum configuration with SB15m

4.3   Connection to LA8

Maximum number of enclosures per LA8
Three KIVA or two SB15m can be connected in parallel to each output channel on the LA8.
Therefore, a single LA8 amplified controller can drive up to:
- 12 × KIVA or
- 8 × SB15m or
- 9 × KIVA and 2 × SB15m.

Cardioid configuration
Connect the reversed subwoofer(s) to OUT 1 to use the cardioid preset.

SB15m subwoofer on OUT1 in hybrid configuration
Always connect the SB15m subwoofer to OUT1 when you use the [KIVA_SB15] preset.

Impedance load
8 Ω for 1 enclosure, 4 Ω for 2 enclosures, 2.7 Ω for 3 enclosures (only for KIVA).

SB18 connection
SB15m and SB18 subwoofers follow the same cabling schemes.

Option A

▶ Connect a **DO cable** (DO.7, DO10 or DO25) to the LA8 PA-COM® connector
▶ Use the **DOSUB-LA8** to separate the four output channels.
▶ If necessary, use **SP cables** to connect additional similar enclosures in parallel with the first ones.

Corresponding DOSUB-LA8 SpeakON® points and LA8 output channels:
SPK1 = OUT 1   SPK3 = OUT 3
SPK2 = OUT 2   SPK4 = OUT 4
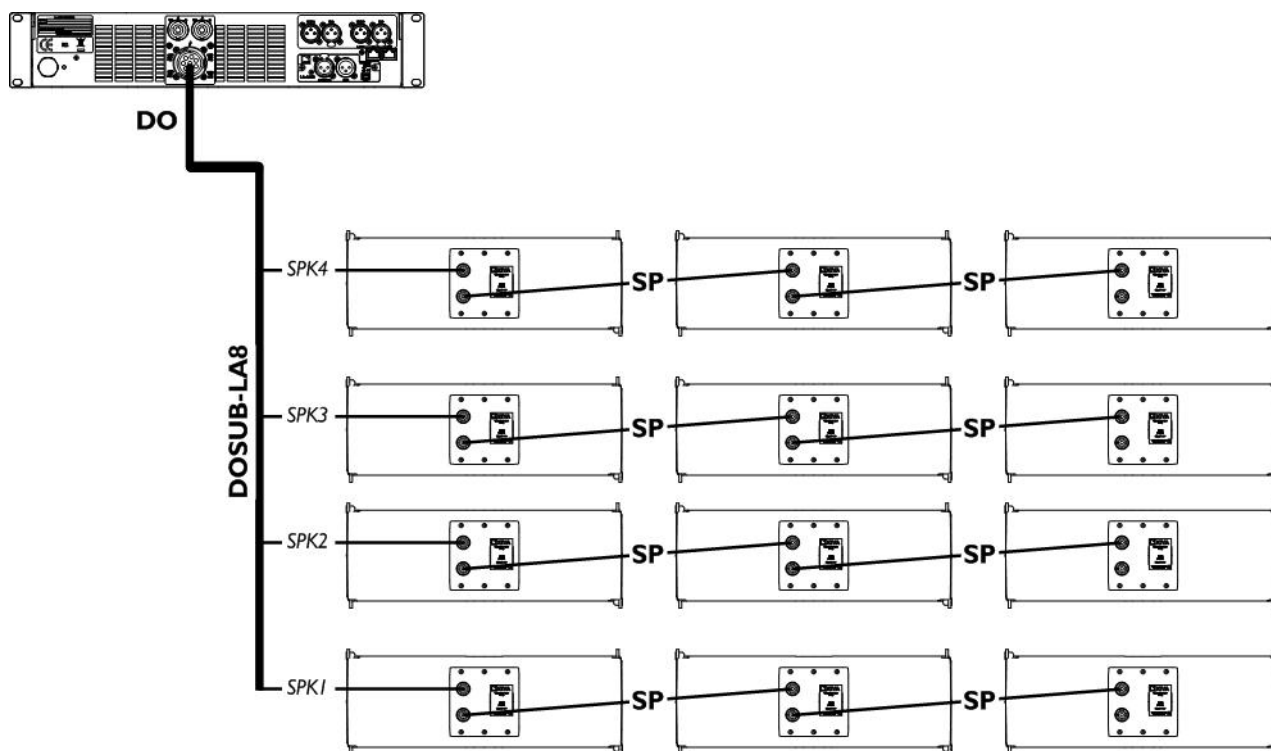
LA8 option A maximum configuration with KIVA

LA8 option A with KIVA + SB15m
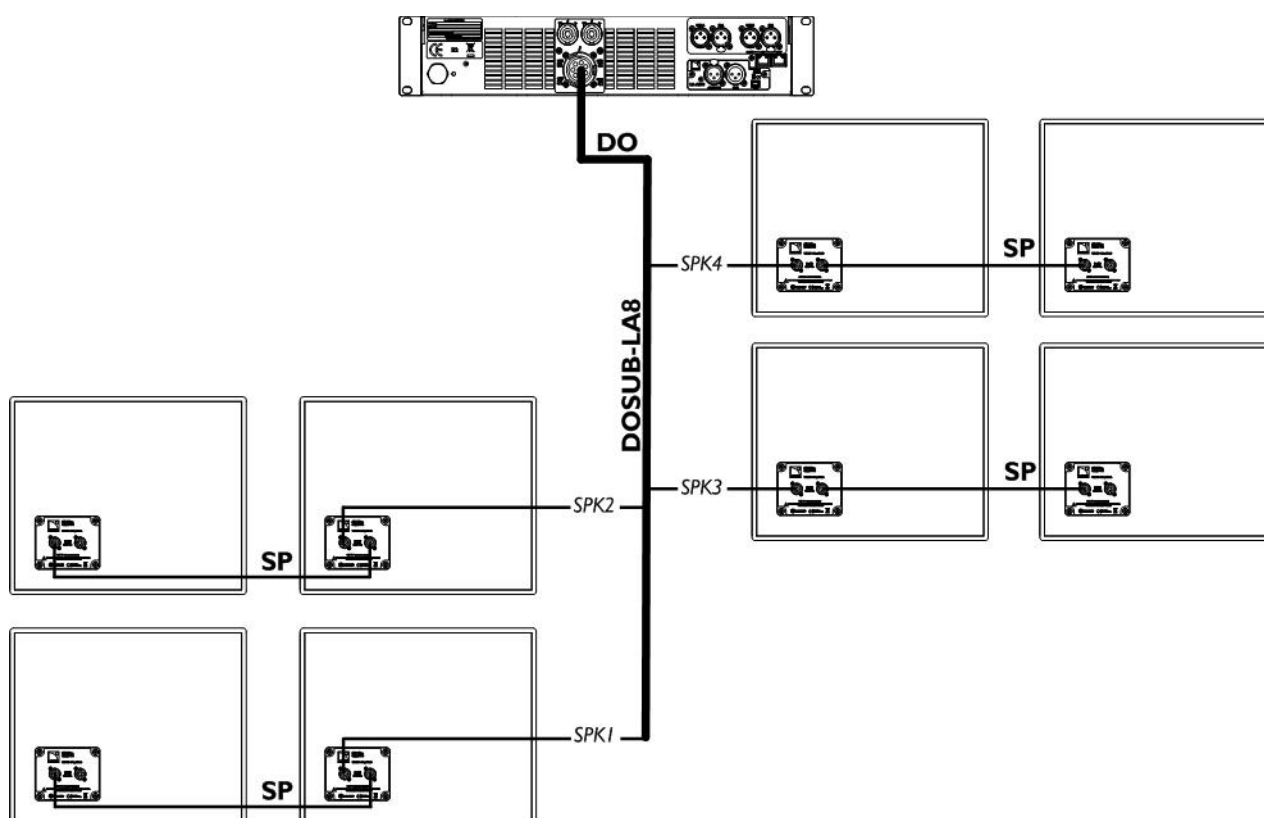
LA8 option A maximum configuration with SB15m

<u>**Option B**</u>

▶ Connect an **SP** cable (SP.7, SP5, SP10 or SP25) to the OUT1/OUT2 LA8 SpeakON® connector.
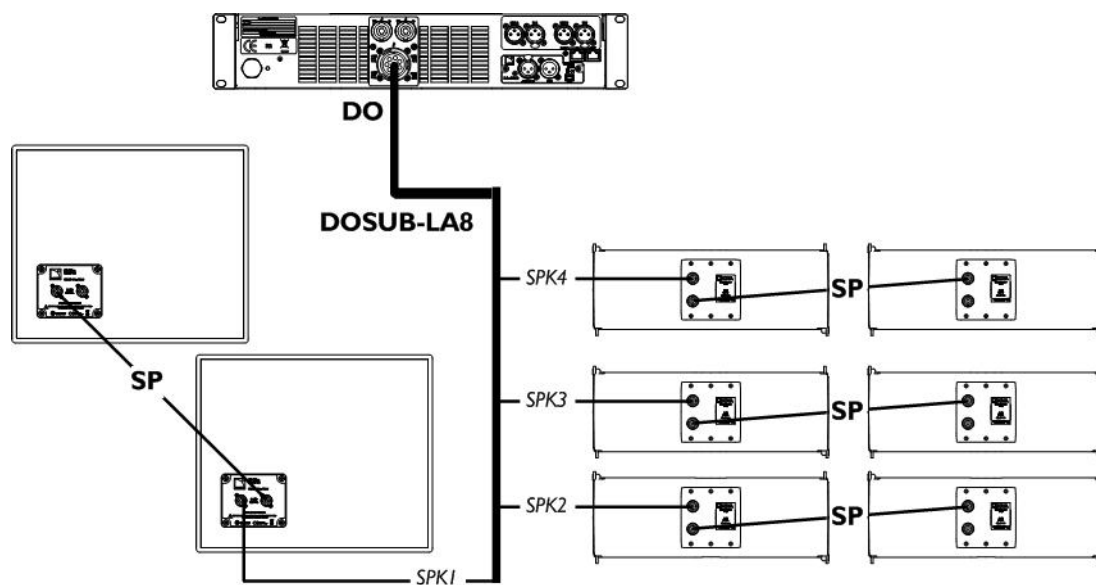▶ Use a **CC4FP adaptor** to connect an **SP-YI** cable and separate the two output channels.
▶ Apply the same cabling scheme for the OUT3/OUT4 LA8 SpeakON® connector.
▶ If necessary, use **SP cables** to connect additional similar enclosures in parallel with the first ones.
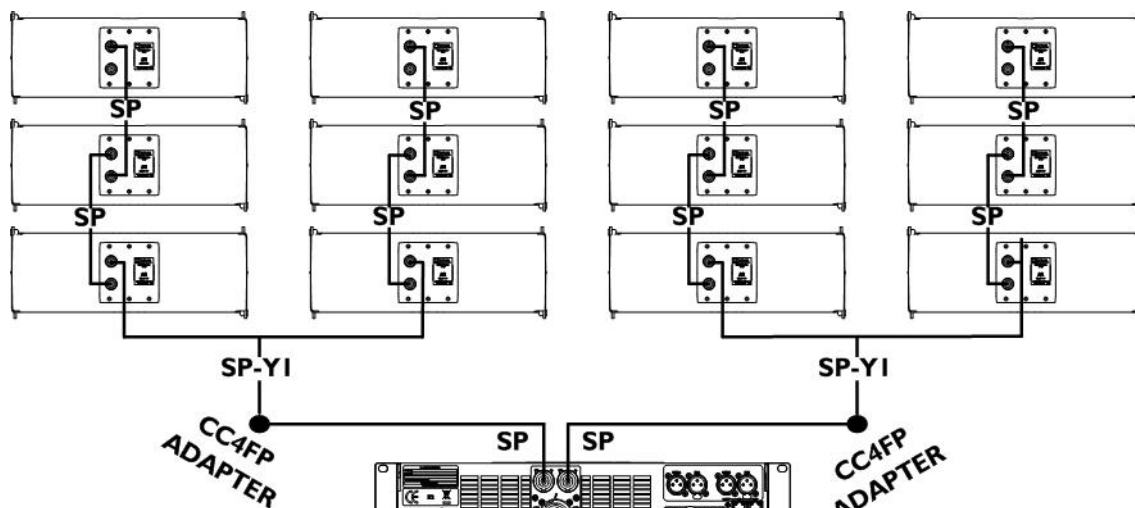
LA8 option B maximum configuration with KIVA
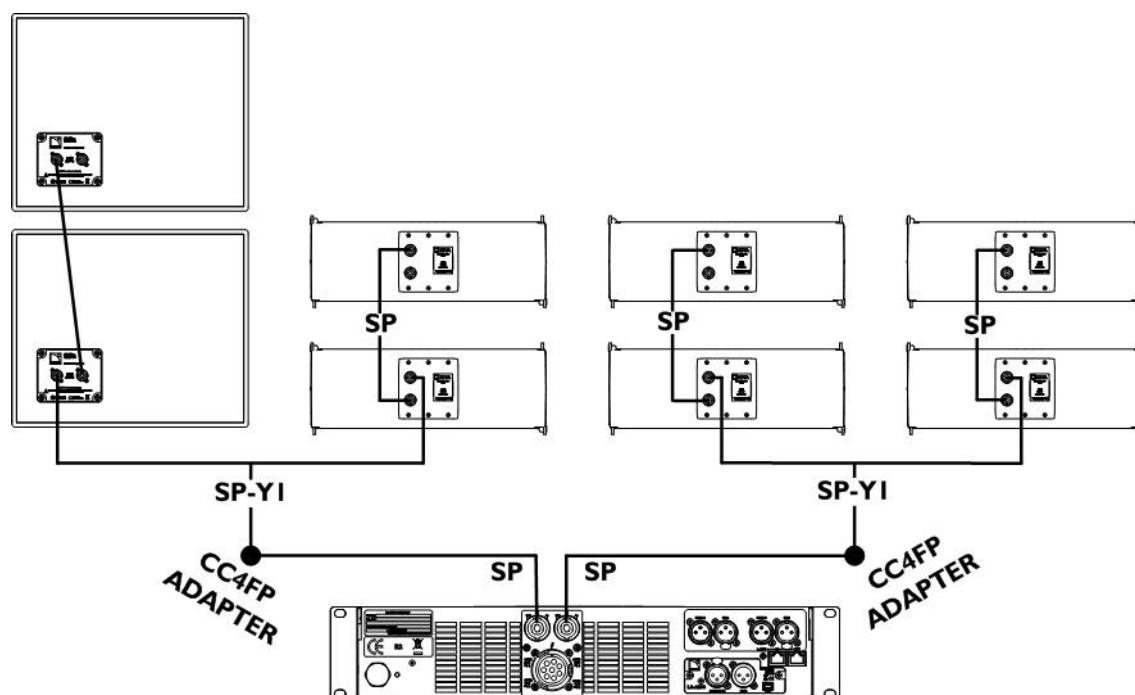
LA8 option B with KIVA + SB15m

LA8 option A maximum configuration with SB15m

APPENDIX A   PRESET DESCRIPTION

[KIVA]: full-range

To use the KIVA enclosures within a line source.

Inputs/Outputs	Elements to connect	Routing *	Accessible (O) and blocked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input signal A	IN_A	X	O	O	O
IN B	Input signal B	IN_B	X	O	O	O
OUT 1	KIVA enclosure	PA_A	O	O	X	X
OUT 2	KIVA enclosure	PA_A	O	O	X	X
OUT 3	KIVA enclosure	PA_A	O	O	X	X
OUT 4	KIVA enclosure	PA_A	O	O	X	X

* A, B: channel A or B   IN: input   PA: passive output

[KIVA_FI]: full-range

To use KIVA enclosures as line-source elements.

Inputs/Outputs	Elements to connect	Routing *	Accessible (O) and blocked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input signal A	IN_A	X	O	O	O
IN B	Input signal B	IN_B	X	O	O	O
OUT 1	KIVA enclosure	PA_A	O	O	O	O
OUT 2	KIVA enclosure	PA_A	O	O	O	O
OUT 3	KIVA enclosure	PA_B	O	O	O	O
OUT 4	KIVA enclosure	PA_B	O	O	O	O

* A, B: channel A or B   IN: input   PA: passive output

[KIVA_SB15]: hybrid preset

To facilitate the use of a KIVA line source with coupled SB15m.

Inputs/Outputs	Elements to connect	Routing *	Accessible (O) and blocked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input signal A	IN_A	X	O	O	O
IN B	Input signal B	IN_B	X	O	O	O
OUT 1	SB15m subwoofer	LF_A	O	O	X	X
OUT 2	KIVA enclosure	PA_A	O	O	X	X
OUT 3	KIVA enclosure	PA_A	O	O	X	X
OUT 4	KIVA enclosure	PA_A	O	O	X	X

* A, B: channel A or B   IN: input   PA: passive output   SB: subwoofer output

[SB15_100] and [SB18_60]: standard

To use SB15m or SB18 subwoofers in standard configuration.

Inputs/Outputs	Elements to connect	Routing *	Accessible (O) and blocked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input signal A	IN_A	X	O	O	O
IN B	Input signal B	IN_B	X	O	O	O
OUT 1	Subwoofer	SB_A	O	O	O	O
OUT 2	Subwoofer	SB_A	O	O	O	O
OUT 3	Subwoofer	SB_B	O	O	O	O
OUT 4	Subwoofer	SB_B	O	O	O	O

* A, B: channel A or B   IN: input   SB: subwoofer output

[SB15_100_C] and [SB18_60_C]: cardioid

To use SB15m or SB18 subwoofers in cardioid configuration.

Inputs/Outputs	Elements to connect	Routing *	Accessible (O) and blocked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input signal A	IN_A	X	O	O	O
IN B	Input signal B	IN_B	X	O	O	O
OUT 1	Reversed subwoofer	SR_A	O	X	X	X
OUT 2	Subwoofer	SB_A	O	X	X	X
OUT 3	Subwoofer	SB_B	O	X	X	X
OUT 4	Subwoofer	SB_B	O	X	X	X

* A, B: channel A or B   IN: input   SB: subwoofer output   SR: reversed subwoofer output

APPENDIX B   RECOMMENDATION FOR SPEAKER CABLES

Cable quality and resistance
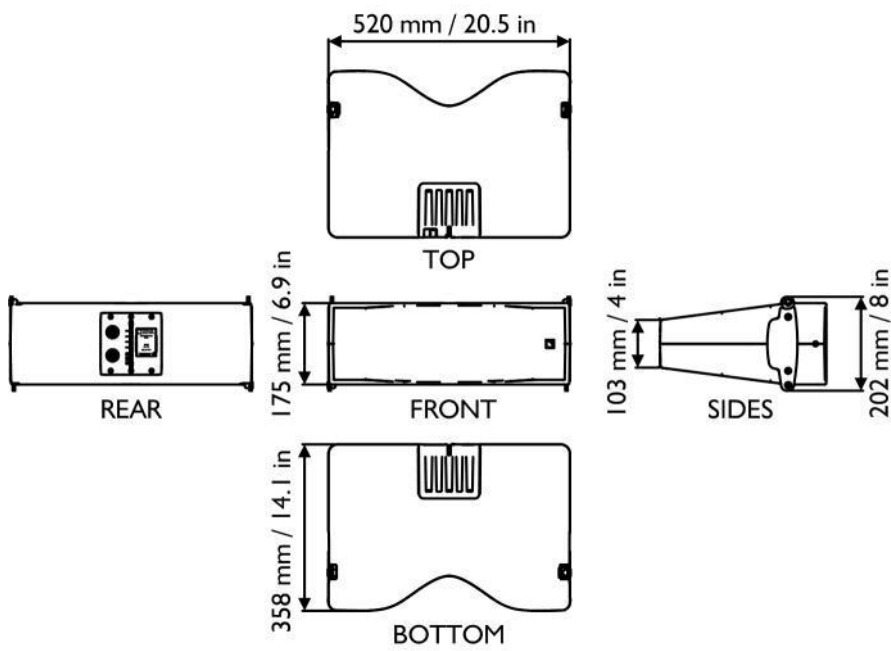Only use high-quality fully insulated speaker cables made of stranded copper wire.
Use cables of gauge offering low resistance per unit length and keep the cables as short as possible.

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

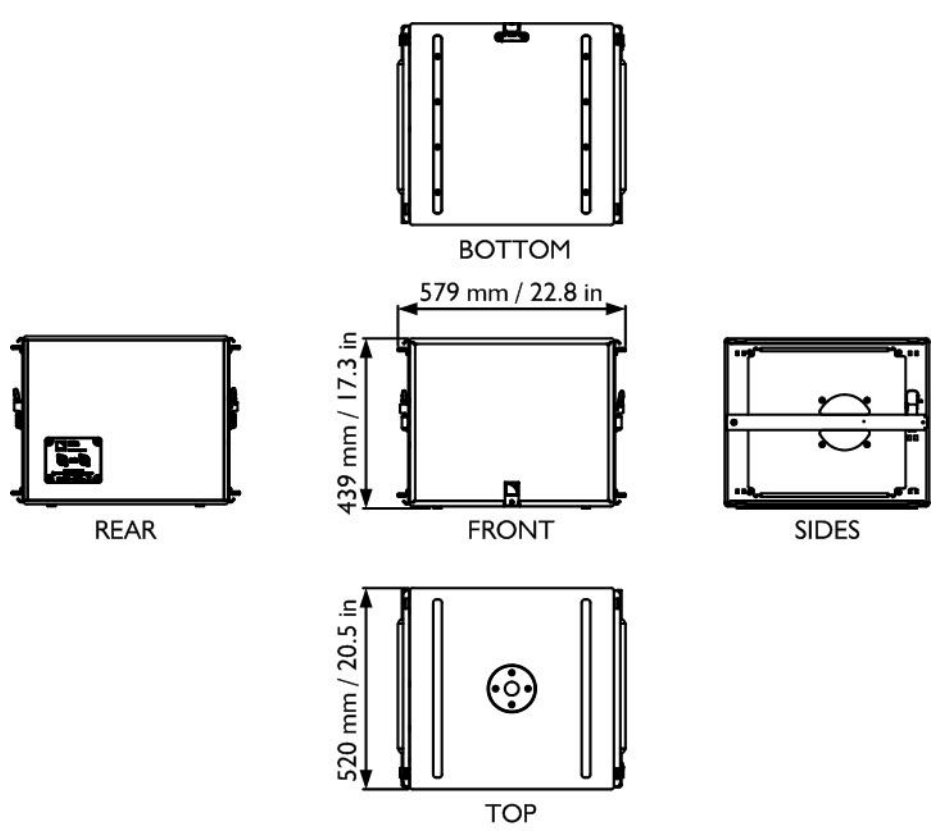| Cable cross-section			Recommended maximum length					
			8 Ω load		4 Ω load		2.7 Ω load	
mm²	SWG	AWG	m	ft	m	ft	m	ft
2.5	15	13	30	100	15	50	10	33
4	13	11	50	160	25	80	17	53
6	11	9	74	240	37	120	25	80
10	9	7	120	390	60	195	40	130

APPENDIX C   SPECIFICATIONS

KIVA

Description	2-way passive enclosure, amplified by LA4 or LA8
Usable bandwidth (-10 dB)	80 Hz - 20 kHz ([KIVA] preset)
Maximum SPL[1]	130 dB ([KIVA] preset)
Coverage angle (-6 dB)	Horizontal: 100° (from 500 Hz)
	Vertical: depends on the number of elements and array curvature
Transducers	LF: 2 × 6.5'', weather-resistant , bass-reflex
	HF: 1 × 1.5", diaphragm compression driver, DOSC® waveguide
Nominal impedance	8 Ω
RMS power handling	120 W
Connectors	IN: 1 × 4-point SpeakON® · LINK: 1 × 4-point SpeakON®
Rigging components	Captive 3-point rigging system Inter-enclosure angles: 0, 1, 2, 3, 4, 5, 7.5, 10, 12.5 or 15°
Dimensions	

Physical data	Weight (net):	13 kg / 28.7 lb
	Cabinet: Back plate:	Composite sandwich structure ZAMAC
	Finish:	Grey brown, RAL 8019® or Pure white RAL 9010® Custom RAL code on special order
	Front:	Plastic grill Airnet® acoustically neutral fabric
	Rigging components:	High strength steel with anti-corrosion coating

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

[2] Mechanical data and limits for installation are specified in SOUNDVISION software which is designed to help with L-ACOUSTICS® product implementation.

SB15m subwoofer

Description	Subwoofer enclosure, amplified by LA4 or LA8	
Low frequency limit (−10 dB)	40 Hz ([SB15_100] preset)	
Maximum SPL[1]	135 dB ([SB15_100] preset)	
RMS power handling	600 W	
Transducer	1 × 15" weather-resistant, bass-reflex	
Nominal impedance	8 Ω	
Connectors	IN: 1 × 4-point SpeakON®	LINK: 1 × 4-point SpeakON®
Rigging components	Integrated pole-mount socket Coupling bars stored at handle position	
Dimensions		

579 mm / 22.8 in
439 mm / 17.3 in
520 mm / 20.5 in

BOTTOM REAR FRONT SIDES TOP

Physical data	Weight (net):	36 kg / 79.4 lb
	Cabinet:	Baltic birch plywood
	Finish:	Grey brown RAL 8019® or Pure white RAL 9010® Custom RAL code on order
	Front:	Steel grill with anti-corrosion coating Airnet® acoustically neutral fabric
	Protection Rating:	IP45
	Rigging component:	High strength steel with anti-corrosion coating

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

[2] Mechanical data and limits for installation are specified in SOUNDVISION software which is designed to help with L-ACOUSTICS® product implementation.

Document reference: KIVA-SB15m_UM_EN_1.2

Distribution date: February 22, 2013