LINE ARRAY SELENIUM

Operation Manual

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Contents

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VERY IMPORTANT – Safety Warnings – Read thoroughly

The SLA2P rigging frame was carefully dimensioned to provide extreme safety. For a reliable and safe operation some steps should be mandatory followed:

1 – Never lift a number of line array elements higher than the specification.

2 – Whenever mounting, always check connecting fittings (pins, angle bars, connecting bars, side sections, rigging frames, belts, shackles, hoist, chains, lifting pole, etc.) for integrity Always check for possible failures of these fittings when supporting the system weight (cracks, distorted holes, opened chain links, rusted pieces, etc.)

3 – In open-air shows, always pull down the system when wind makes it tilt.

4 – The systems shall be mandatory lifted through the central bar of the rigging frame; never lift it by the cast eyelets at the frame corners.

5 – Always check if the whole structure where the system will be rigged is able to support the weight with the same safety rate of the system, if it is stable and correctly stayed.

6 – Verify if the lifting pole is correctly dimensioned to support the system weight (we strongly recommend to keep a 7:1 rate).

7 – In stacked mounting (from the ground), verify if the column gravitational center is according to the rigging frame length (calculated by the software).

8 – In temporary mountings, always keep people away from the area under the line array elements. For fixed mountings, prefer areas where people will not be around under the line array elements.

9 – Always observe load and safety specifications provided by hoists, belts and shackle manufacturers strictly.

10 – When tilting the system is necessary to give the correct direction, the rigging frame shall be used rather than tilting line array element.

11 – Only skilled personnel should mount the system.

12 – Make sure mounting personnel is always using the PPE's (personal protection equipment) necessary for their safety, such as: safety gloves, helmet, belts, etc.

13 – All system mounting accessories not supplied by Selenium are under the user's full responsibility.
14 - The user is completely responsible for sticking to load and angle allowances provided by Selenium.

15 – Never replace any of the rigging system elements by another not supplied by Selenium (quick pins, coupling bars, rigging frames, etc.) This will be under the user's entire responsibility.

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1 - Glossary

Adjusted angle – the angle between two line array elements. A 4-degree angle means the total angle between both line array elements is 4º.

Audio Processor – Digital equipment managing the loudspeakers including graphic and parametric equalizers, limiters, delays, crossovers, multichannels and output and input gain controls.

Bumper – Rigging frame (Fig. 1).

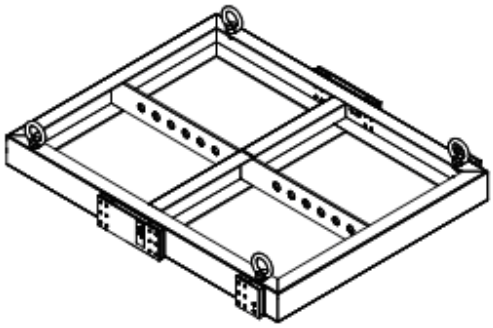


Fig 1

Front linking bar – steel bar used to couple line array element front parts to each other (Fig. 2)

Fig.2

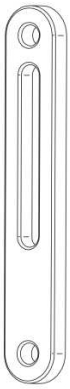


Fig. 3

Fly – hanging system mounting

Gravitational Center – the hypothetic point where all the system mass is applied. If the system is lifted from a point aligned to the gravitational center, it will remain aligned and stable.

Quick pin – fast-linking pin used to connect line array elements to each other and/or to the rigging frame (Fig. 4)

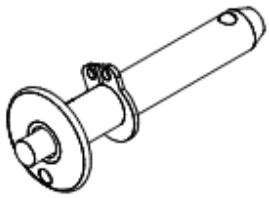


Fig. 4

Rear angle bar – steel bar used to attach the line array element rear parts to each other and adjust the angle between them. (Fig.3)

Total Angle – Is the sum of all the adjusted angles plus the rigging frame angle.

Safety rate – the number by which the nominal load should be multiplied in order to correctly dimension the system. For example, a 7:1 rate means all the structure supports 7 times the specified weight.

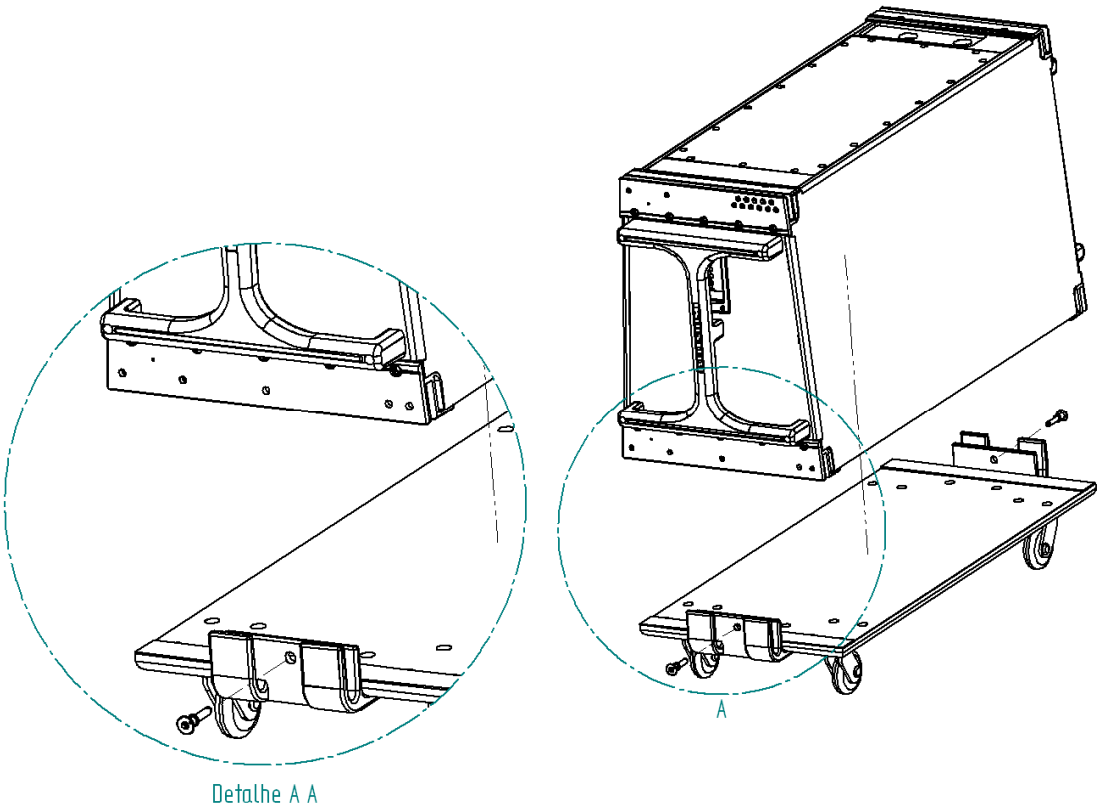
Stacked – system mounting from the ground

2 – CASTER FRAME ATTACHMENT AND REMOVAL

To attach the caster frame to the line array element, the quick pins into the aluminum structure center holes at the line array element front part should be removed, both for SLA2P and SLA2P-SW1.

With the line array element front part toward the caster frame, the front section slot should be fitted to the caster frame aluminum mount, matching the mount hole to that of the aluminum section. Then, the quick pins should be reinserted into the holes to keep the caster frame in the transportation position. See the figure below.

To remove the caster frame, perform the same procedure reversedly..



3 - LINE ARRAY ELEMENT ATTACHMENT

Both linking and angle bars are stored into the aluminum sections and pivoted by means of a fastening pin. During transportation, they are locked into the section by means of a quick pin which should be removed to release it and then used to attach the line array elements. (See Fig. 6)
Line array elements are attached to each other by means of front linking bars connected to the upper element by 2 quick pins. These two pins are necessary to avoid line array element “sliding out“ the others when working with angles different from 0º (Fig. 7) At the rear part, line array elements are attached by means of rear angle bars connected to the upper line array element only by means of one quick pin.

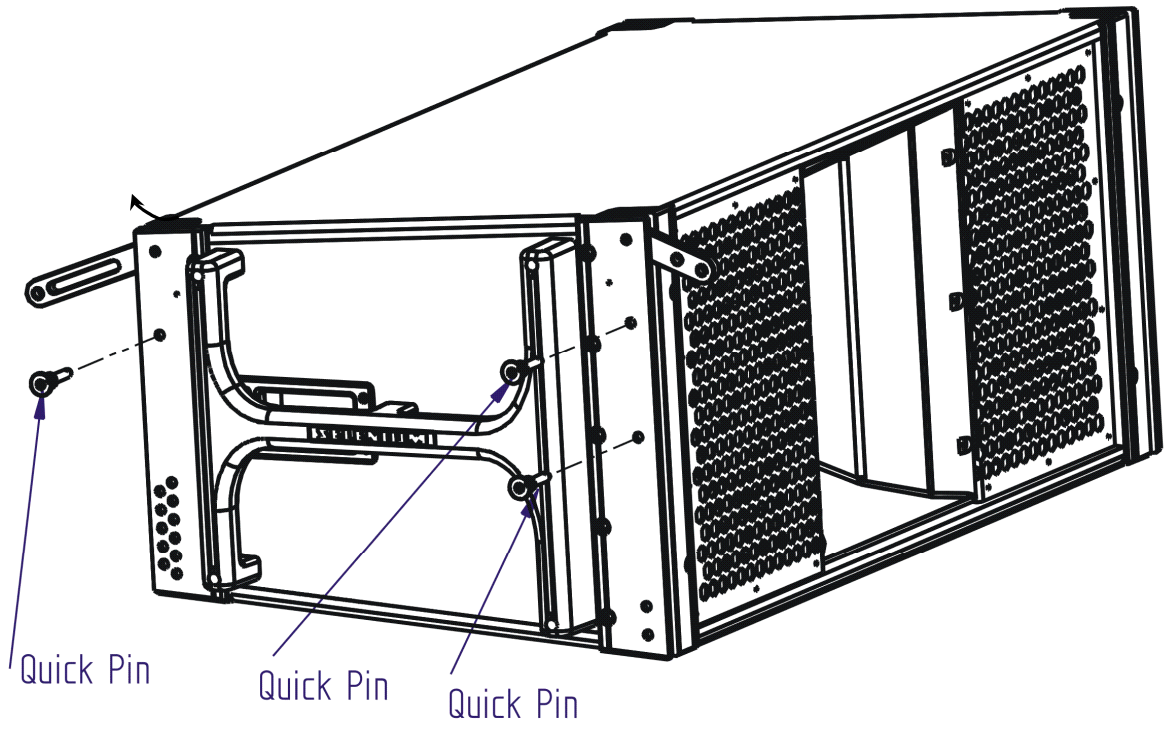


Fig. 6 – Quick Pin position before mounting the line array elements

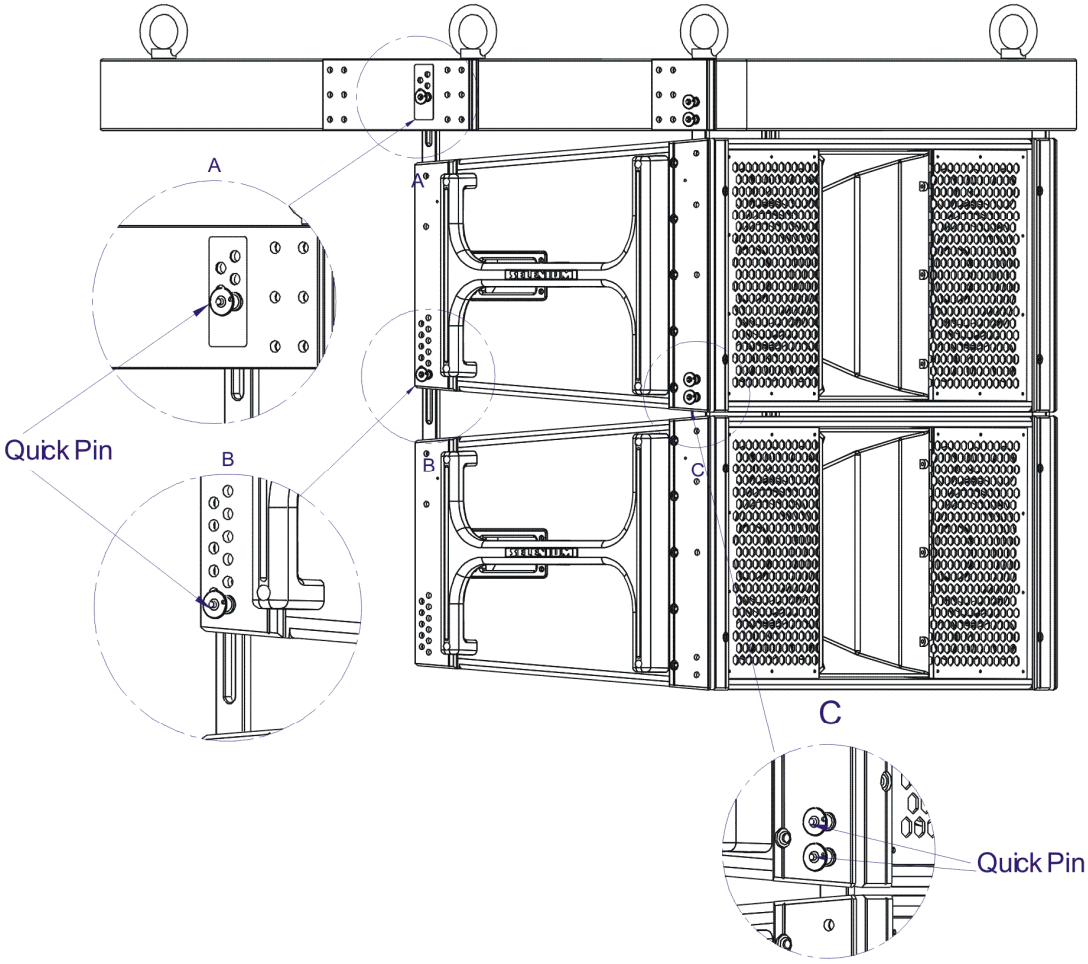


Fig. 7 – Quick pin locations after mounting the line array elements

4 - ANGLE SELECTION

Angle adjusting holes are located at the rear side part of SLA2P and SLA2P-SW1 line array elements. The desired angle between two line array elements is obtained by correctly selecting them on the gradient label showing each hole angle value. There are orange and white marks. Orange mark should be used when FLY is the selected mounting system (Fig. 12). Also in this kind of mounting system, the angle bar should be connected through its own ***slot***, ***not through the hole***. This is very important to assure the angle shown in the label is actually the one between the line array elements.

When mounting from the ground (STACKED), only the bar hole and the white marks (Fig. 10) should be used, ***not the slot***. In this kind of mounting, if the slot is used, all line array

elements will have the maximum angle (8º), no matter the pin position (See Fig. 8 and 9)

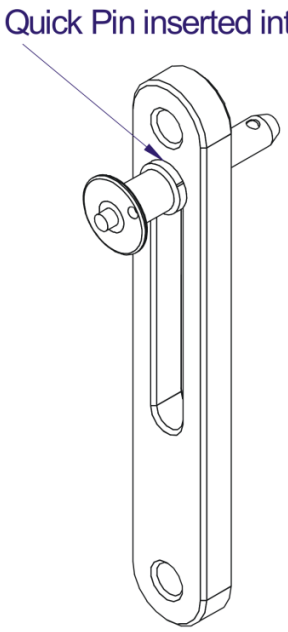


Fig. 8 - Fly mounting

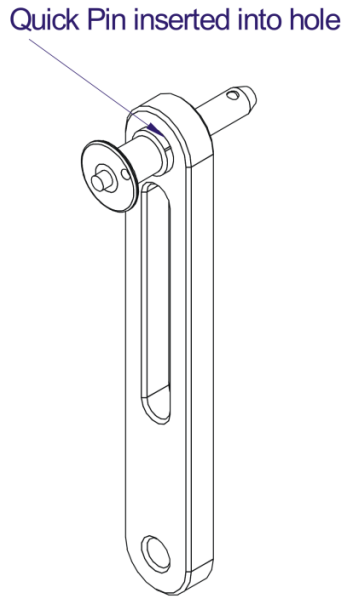
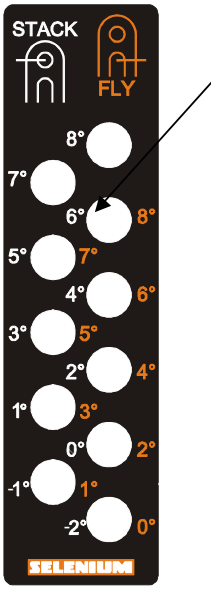
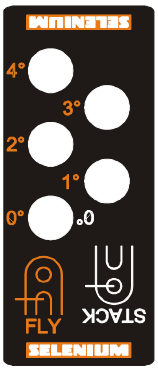


Fig. 9 - Stacked mounting

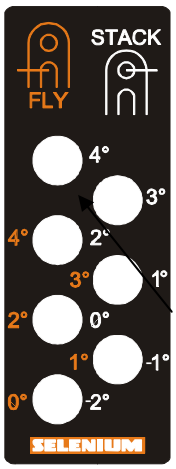


Use orange angles for FLY mounting

SLA2P



Bumper.



Use white angles for STACKED mounting

SLA2P-SW1

Fig. 10

5 - RIGGING FRAME (BUMPER)

The rigging frame has a central bar and 4 cast eyelets. The system rigging ***SHALL BE MANDATORY PERFORMED THROUGH THE CENTRAL BAR.*** The 4 cast eyelets (auxiliary fastening points) at the corners should be only used to position the line array column (vertical axis rotation) and to avoid the system tilting when weak winds blow.
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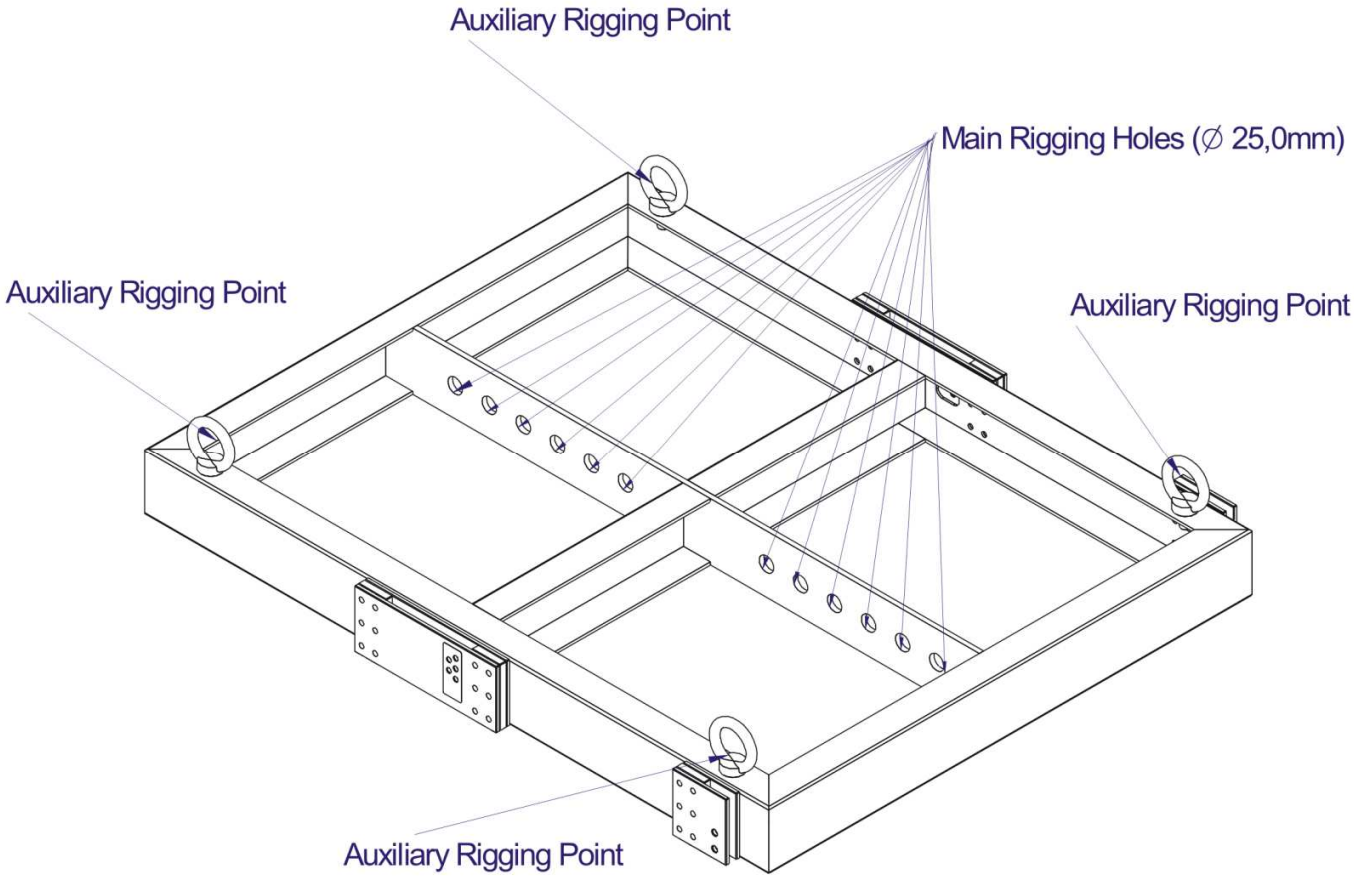

Fig. 11

6 - ELECTRICAL CONNECTION

SLA2P and SLA2P-SW1 line array elements are provided with 2 Neutrik NL8MPR and NLT4MP Speakon connectors, respectively for each model, one being for the sound input, and the other one, parallel to the first one, to connect a second line array element parallel to the first one.
These connectors have 8 and 4 pins, but not all of them are used. The use shall follow the table bellow:

Line Array Module Model	***SLA2P***	***SLA2P-SW1***
Connector	Neutrik NL8MPR	Neutrik NLT4MP
Pin		
+1	Positive Bass	Positive Sub-woofer
-1	Negative Bass	Negative Sub-woofer
+2	Positive Mid-bass	Unused
-2	Negative Mid-bass	Unused
+3	Positive Mid-high	-
-3	Negative Mid-high	-
+4	Unused	-
-4	Unused	-

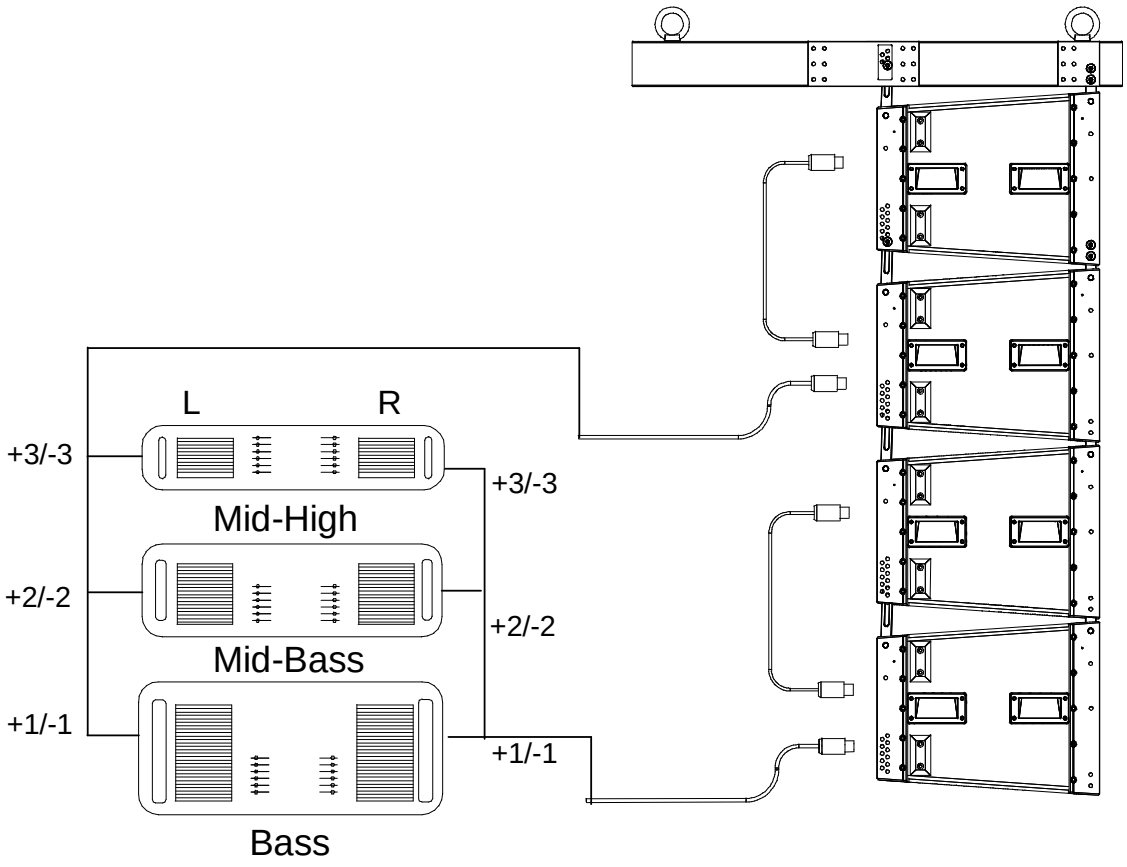

Fig. 12

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7 - SYSTEM MOUNTING:

SLA2P mounting may have two different configurations: FLY (when hanging) and STACKED (on the ground).
Both mounting ways are described below.

6.1 - FLY MOUNTING

The following steps should be followed to perform this mounting as fast as possible:

1 – Obtain main dimensions of the environment where the SLA2P will operate – distance from the line array mounting place and the last row of the seats. If there is an upper gallery, the distance from its first row to the line array, the height of the upper gallery and the final height. If there is a mezzanine, the distance from it to the line array, the initial height and the final height.

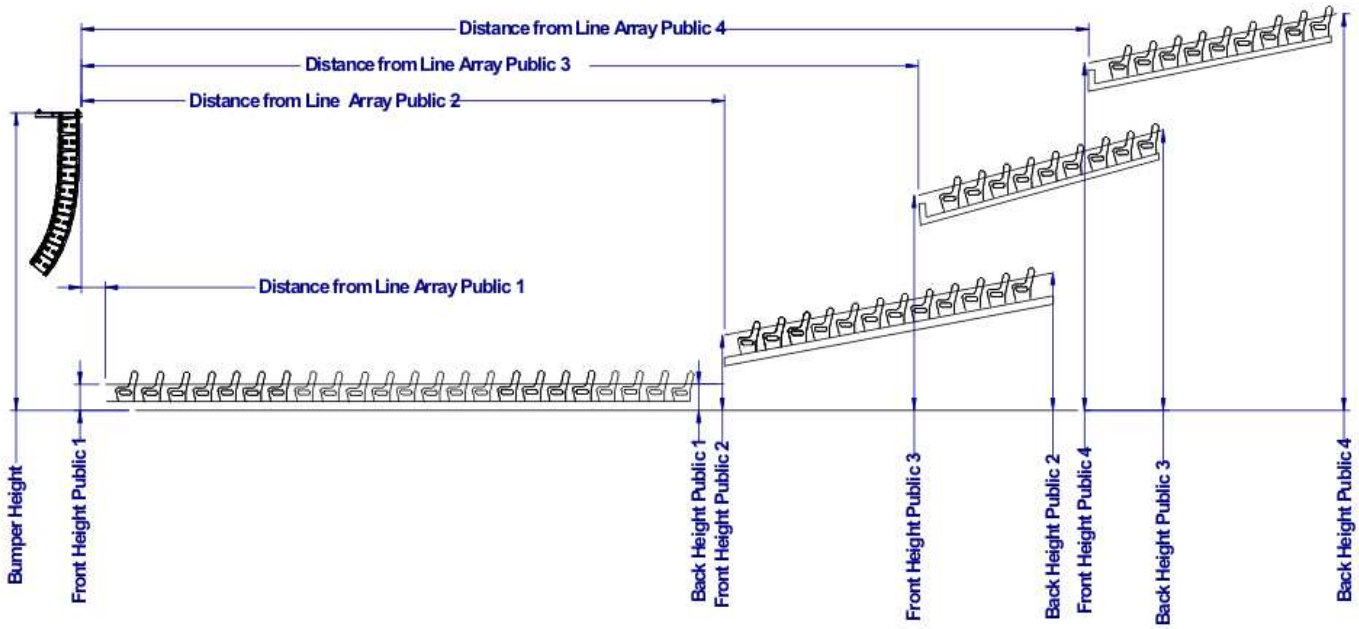

Fig. 13 Venue Dimension

2 – Enter dimensions to the software application, thus generating the simulated environment.

3 – With the software, determine the number of line array elements to be used and each line array element angle in order to cover the whole environment. The Software will also supply the system gravitational center and weight. Consult software manual.
4 – After knowing the angle to be adjusted in each line array element, the system gravitational center and weight, the mounting itself could be started. The hoist point should be strong enough to support the system weight with the same safety rate of

the system, i. e., it should be able to hold 7 times the weight supplied by the software.
5 - Mounting could be performed in two different ways:

1st Configuration

A – Place all the line array elements rowed onto the caster frames, connecting all front linking bars (Fig. 14). Completely connect the rigging frame to the first line array element of the column, attaching all front linking bars and rear angle bars, adjusting the correct angle of the first line array element (Fig. 15).

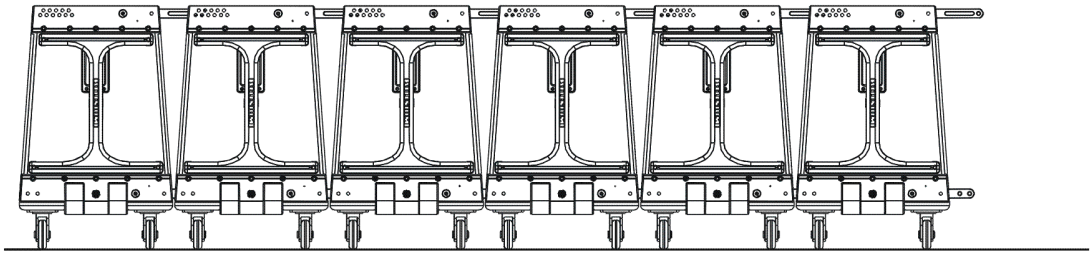

Fig. 14

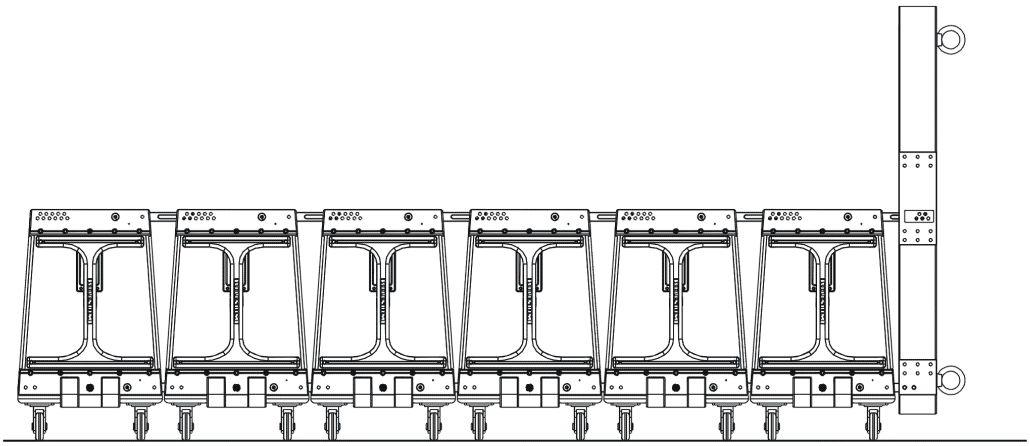

Fig.15

B – Connect the rigging belt to the frame by means of the steel shackles correctly dimensioned according to the system weight. Measure the distance from the frame front part to the point where the hoist hook should be positioned in order to keep it aligned to the gravitational center shown by the software.

C – Start lifting and, as line array elements are lifted, connect rear angle bars to their slots. This is very important to allow line array elements displacement during lifting, avoiding system overloading. The caster frame of the line array element being lifted should be simultaneously removed. (Fig. 16)

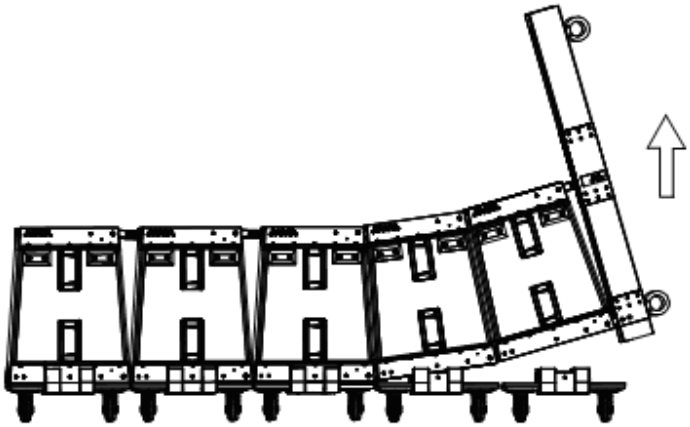

Fig. 16

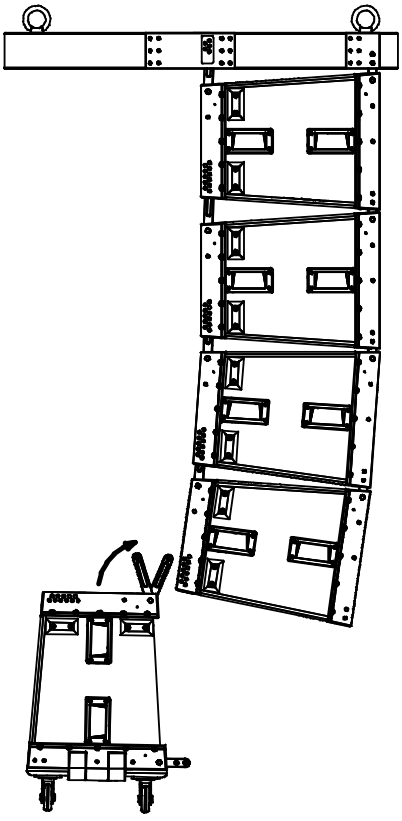

Fig. 17

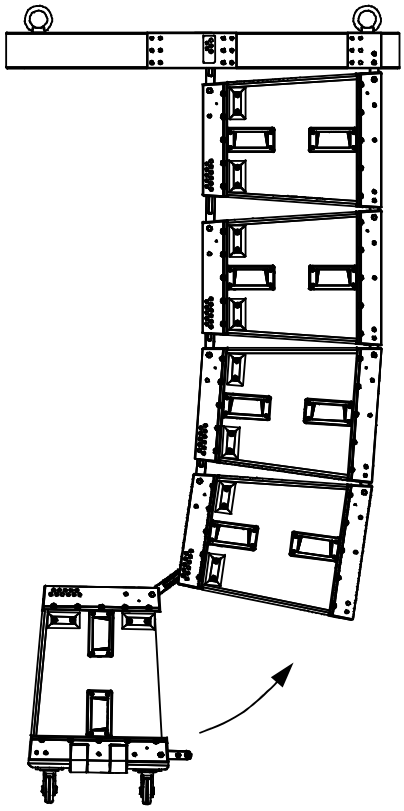

Fig. 18

2nd Configuration

A – Locate the rigging frame onto the ground and connect the belt to the shackle and the hoist hook at the point aligned to the system gravitational center.

B – Hang the frame high enough to completely attach the first line array element; connect this line array element and hang the frame +1st line array element assembly high enough to attach the rear angle bars of the second line array element to the holes corresponding to the chosen angle (Fig. 17)

C – rotate the line array element toward the column and attach the front linking bars to line array element # 1 (Fig. 18).

D – continue this process until the last line array element is attached..

6.2 - Stacked Mounting

When mounting from the ground (Stacked), the system should be mounted in a reversed order. The rigging frame is used as a supporting base, the steel eyelets being the base feet. (Fig. 19)

Angle adjustment is made using the holes marked in white on the labels of the line array element rear sides.
Angle adjustment of the first line array element allows a gradient up to - 2º, i. e., it will be directed to the floor or, when the system is placed onto a stage higher than the audience, it will allow sound distribution from the front public seats first row.

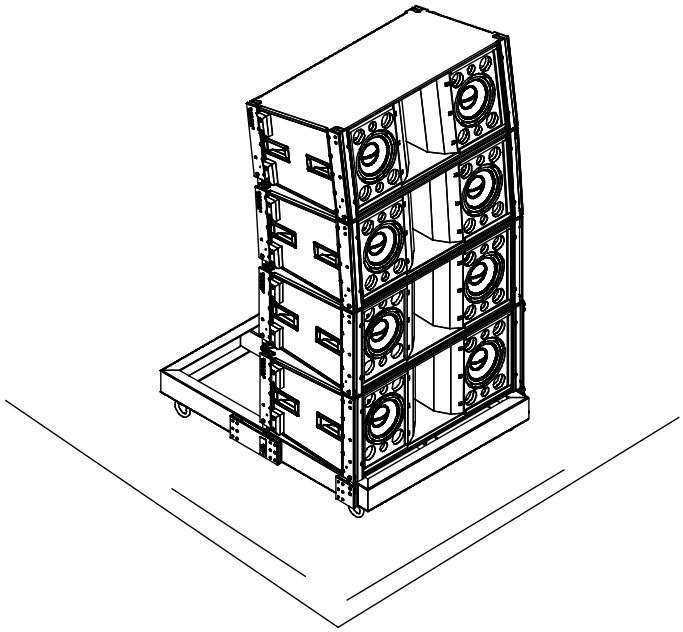

Fig. 19

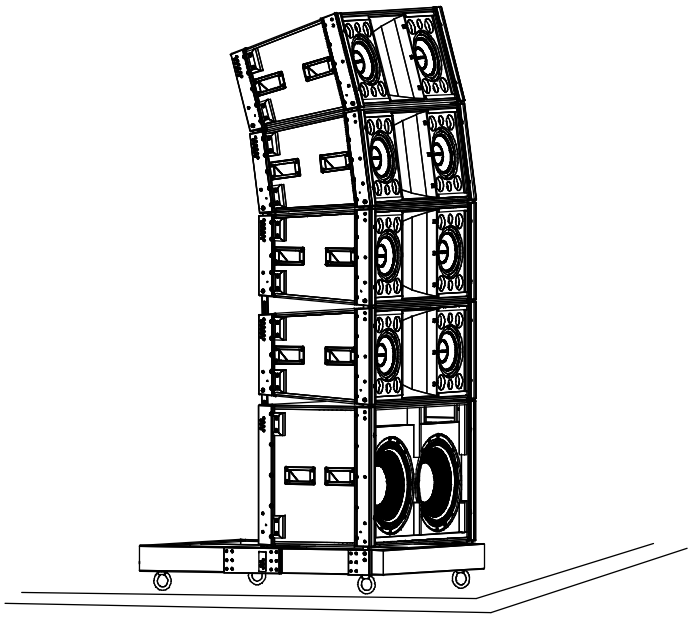

Fig. 20

8- TECHNICAL SPECIFICATIONS

Model		***SLA2P***	***SLA2P-SW1***
Number of channels		3	1
Loudspeaker and RMS per channel (W)	Mid-High	2x D3500Ti Nd 150 (total)	-
	Mid-bass	2x 8MB3P 300(total)	-
	Bass	2x WPU1209 900(total)	-
	Sub-woofer	-	2x15SW1P 1600(total)
Channel Impedances (Ohms)		4	4
Frequency Response (@-10 dB) Hz		60-16000	40-150
Horizontal coverage (º)		90 (@16 kHz)	-
Vertical Coverage (º)		Depending on the number of line array elements and configuration	-
Maximum SPL (@ nominal RMS) dB		125	125
Connectors		2x Speakon Neutrik NL8MPR	2x Speakon Neutrik NLT4MP
Safety rate (10 line array elements)		7:1	7:1
Weight per line array element (kg)		67	60
Basic dimensions (L x H x D) mm		948 x 390 x 500	948 x 560 x 500
Rigging System		6061 T6 aluminum, SAE 4340 steel linking and angle bars, quick pins, 0º - 8º angle with 1º increments	6061 T6 aluminum, SAE4340 steel linking and angle bars, quick pins

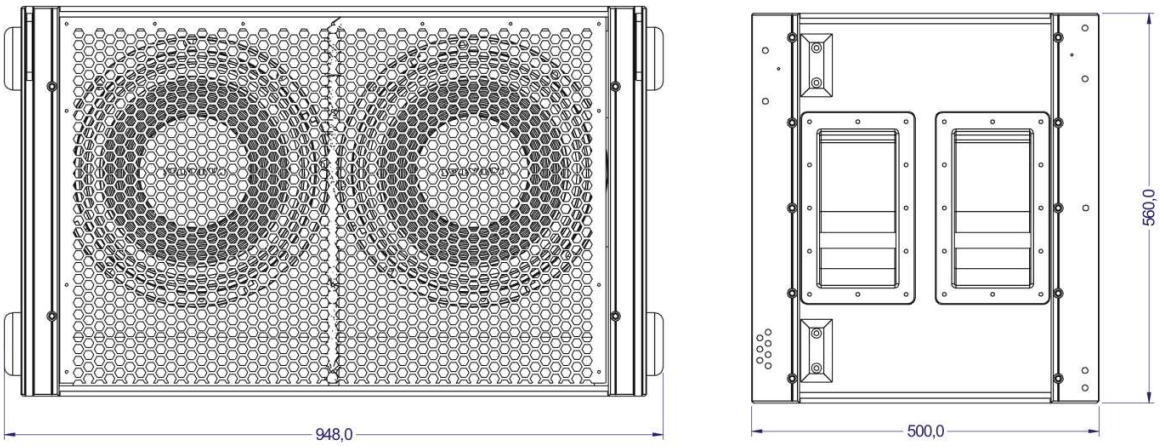

Fig 21 – Basic Dimensions SLAP1P-SW1

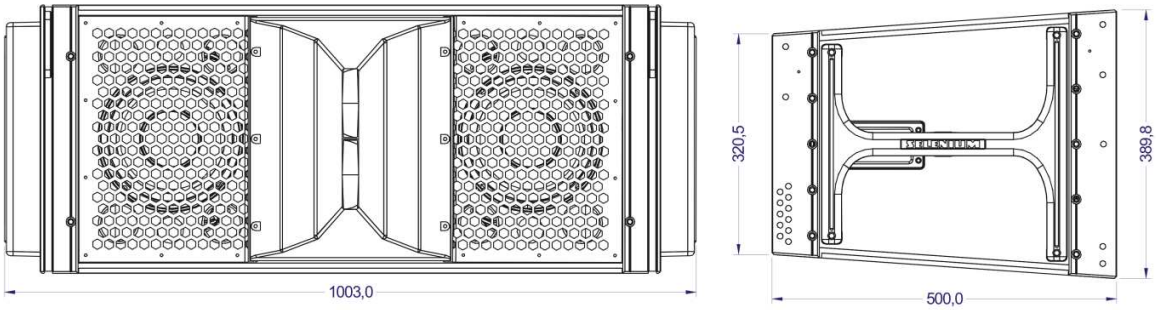

Fig. 22 – Basic Dimensions SLA2P

9- RECOMMENDATIONS TO SELECT POWER AMPLIFIERS

Selenium strongly recommends the use of at least 3dB of headroom, i. e., the amplifier having at least twice the loudspeakers nominal RMS.
Thus, the minimum recommended power rates are:(considering a 4 SLA2P/2 SLA2P-SW1 assembly)
Mid-High: 500 Wrms @ 2 Ohms per channel

Mid-bass: 1,000 Wrms @ 2 Ohms per channel

Bass: 2,500 Wrms @ 2 Ohms per channel

Sub-Woofer: 3,200 Wrms @ 4 Ohms per channel

Thus, each amplifying channel will feed 2 line array elements (4 speakers), except for sub-basses, where each channel will feed 1 line array element (2 speakers)

It should be also remembered that when working with such power rates, the processor limiters should be correctly adjusted in order to avoid the system overload for full improvement.