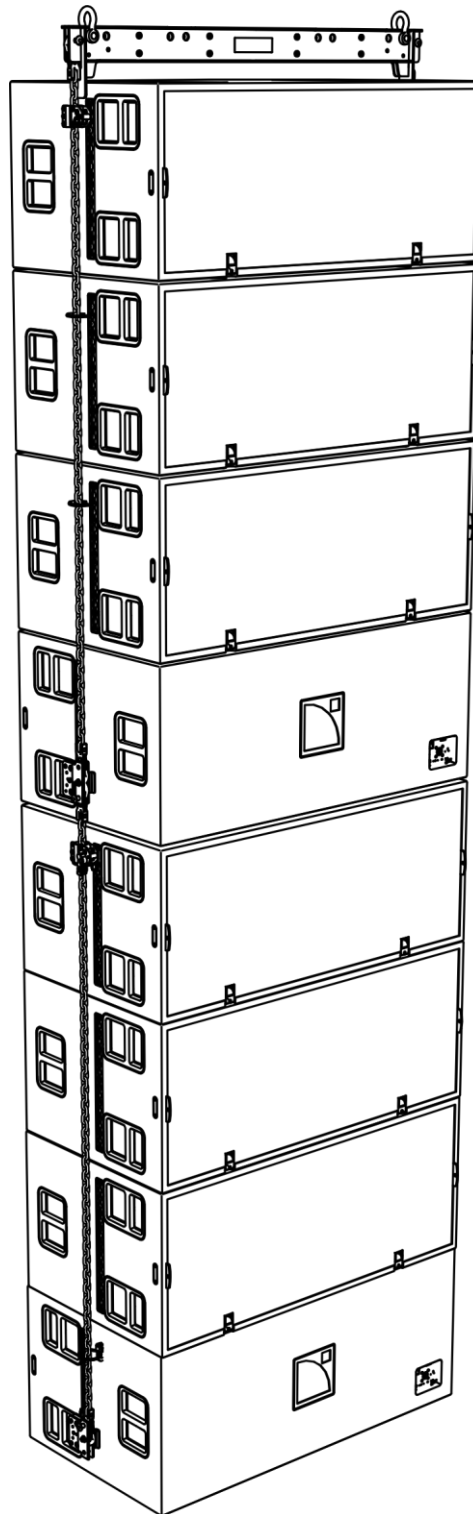


SB28 SUBWOOFER

RIGGING MANUAL

VERSION 1.0



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. **Work with qualified personnel for rigging the system**
Installation should only be carried out by qualified personnel that are familiar with the rigging techniques and safety recommendations outlined in this manual.
6. **Ensure personnel health and safety**
During installation and set-up personnel must wear protective headgear and footwear at all times. Under no circumstances personnel is allowed to climb on a loudspeaker assembly.
7. **Respect the Working Load Limit (WLL) of third party equipment**
L-ACOUSTICS® is not responsible for any rigging equipment and accessories provided by third party manufacturers. Verify that the Working Load Limit (WLL) of the suspension points, chain hoists and all additional hardware rigging accessories is respected.
8. **Respect the maximum configurations and the recommended safety level**
For safety issue, respect the maximum configurations outlined in this manual. To check the conformity of any configuration in regards with the safety level recommended by L-ACOUSTICS®, model the system in SOUNDVISION and refer to the warnings in **Mechanical Data** section.
9. **Be cautious when flying a loudspeaker array**
Always verify that no one is standing underneath the loudspeaker array when it is being raised. As the array is being raised, check each individual element to make sure that it is securely fastened to the adjacent element. Never leave the array unattended during the installation process. As a general rule, L-ACOUSTICS® recommends the use of safety slings at all times.
10. **Be cautious when ground-stacking a loudspeaker array**
Do not stack the loudspeaker array on unstable ground or surface. If the array is stacked on a structure, platform, or stage, always check that the latter can support the total weight of the array. As a general rule, L-ACOUSTICS® recommends the use of safety straps at all times.
11. **Take into account the wind effects on dynamic load**
When a loudspeaker assembly is deployed in an open air environment, wind can produce dynamic stress to the rigging components and suspension points. If the wind force exceeds 6 bft (Beaufort scale), lower down and/or secure the loudspeaker array.

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® **SB28** subwoofer enclosure.

This document contains essential information on rigging the system properly and safely. Carefully read this document in order to become familiar with these procedures.

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 documents 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 RIGGING SYSTEM

The system approach developed by L-ACOUSTICS® consists in providing packaged solutions for loudspeaker systems in order to guarantee the highest and most predictable level of performance at any step: modeling, installation, and operation. An L-ACOUSTICS® loudspeaker system is the set of components available to form any loudspeaker system based on one of the full-range loudspeaker enclosures afforded by L-ACOUSTICS®. It includes enclosures, rigging accessories, loudspeaker cables, amplified controllers and software applications.

The **SB28** is a subwoofer L-ACOUSTICS®, it extends the low frequency response of a loudspeaker system down to 25 Hz.

The rigging components of the **SB28** system are the following.

1.1 Loudspeaker enclosure

SB28 Subwoofer enclosure.



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.

1.2 Rigging elements

BUMPSUB-2 Lifting beam.
Provided with two bow shackles WLL 3.25 t

SB28CHAIN Pair of lifting chains.

1.3 Software application

SOUNDVISION Proprietary 3D acoustical and mechanical modeling software.

1.4 Accessories

SB28PLA Removable front dolly



Other **SB28 SYSTEM** components

All the other components of the system are presented in the **SB28 user manual**, document intended to describe the enclosures configurations and connection.



SB28



SB28CHAIN



BUMPSUB-2



SOUNDVISION

Main components involved in the SB28 rigging process

2 MECHANICAL SAFETY

2.1 Maximum configurations

The SB28 rigging system complies with 2006/42/EC: Machinery Directive. It has been designed following the guidelines of BGV-C1.

2006/42/EC: Machinery Directive specifies a safety factor of 4:1 against the rupture. The limits specified in the tables below correspond to deployments with a safety factor of **4:1 or higher**. Refer to SOUNDVISION for the safety factor of a specific deployment.

The **safe limit** gives the maximum number of elements for which the safety factor is always compliant with the 2006/42/EC: Machinery Directive, regardless of the other deployment parameters (site angles, inter-enclosure angles, etc.).

The **maximum limit** gives the maximum number of elements for which the safety factor can be compliant with the 2006/42/EC: Machinery Directive, when the other deployment parameters provide the best mechanical conditions.

Ground-stacked	Maximum / Safe limit
No rigging accessory	4 SB28
Flown	Maximum / Safe limit
BUMPSUB-2 + SB28CHAIN	16 SB28



Mechanical safety of the rigging system

Before any installation, always model the system in SOUNDVISION and check the **Mechanical Data** section for any *stress warning* or *stability warning*.

2.2 Assessing mechanical safety

In order to assess the actual safety of any array configuration before implementation, refer to the following warnings:



Rated working load limit (WLL) is not enough

The rated WLL is an indication of the element resistance to tensile stress. For complex mechanical systems such as loudspeaker arrays, WLLs cannot be used per se to determine the maximum number of enclosures within an array or to assess the safety of a specific array configuration.



Mechanical modeling with SOUNDVISION

The working load applied to each linking point, along with the corresponding safety factor, will depend on numerous variables linked to the composition of the array (type and number of enclosures, splay angles) and the implementation of the flying or stacking structure (number and location of flying points, site angle). This cannot be determined without the complex mechanical modeling and calculation offered by SOUNDVISION



Assessing the safety with SOUNDVISION

The overall safety factor of a specific mechanical configuration always corresponds to the lowest safety factor among all the linking points. Always model the system configuration with the SOUNDVISION software and check the Mechanical Data section to identify the weakest link and its corresponding working load. By default, a *stress warning* will appear when the mechanical safety goes beyond the recommended safety level.



Safety of ground-stacked arrays in SOUNDVISION

For ground-stacked arrays, a distinct *stability warning* is implemented in SOUNDVISION. It indicates a tipping hazard when the array is not secured to the ground, stage or platform. It is user responsibility to secure the array and to ignore this warning.



Consideration must be given to unusual conditions

SOUNDVISION calculations are based on usual environmental conditions. A higher safety factor is recommended with factors such as extreme high or low temperatures, strong wind, prolonged exposition to salt water, etc. Always consult a rigging specialist to adopt safety practices adapted to such a situation.

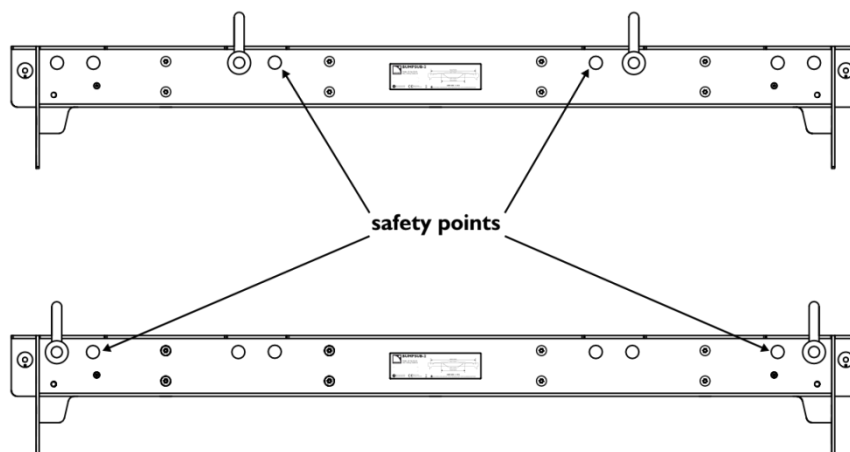
3 SYSTEM DESCRIPTION

The SB28 can be ground-stacked or flown.

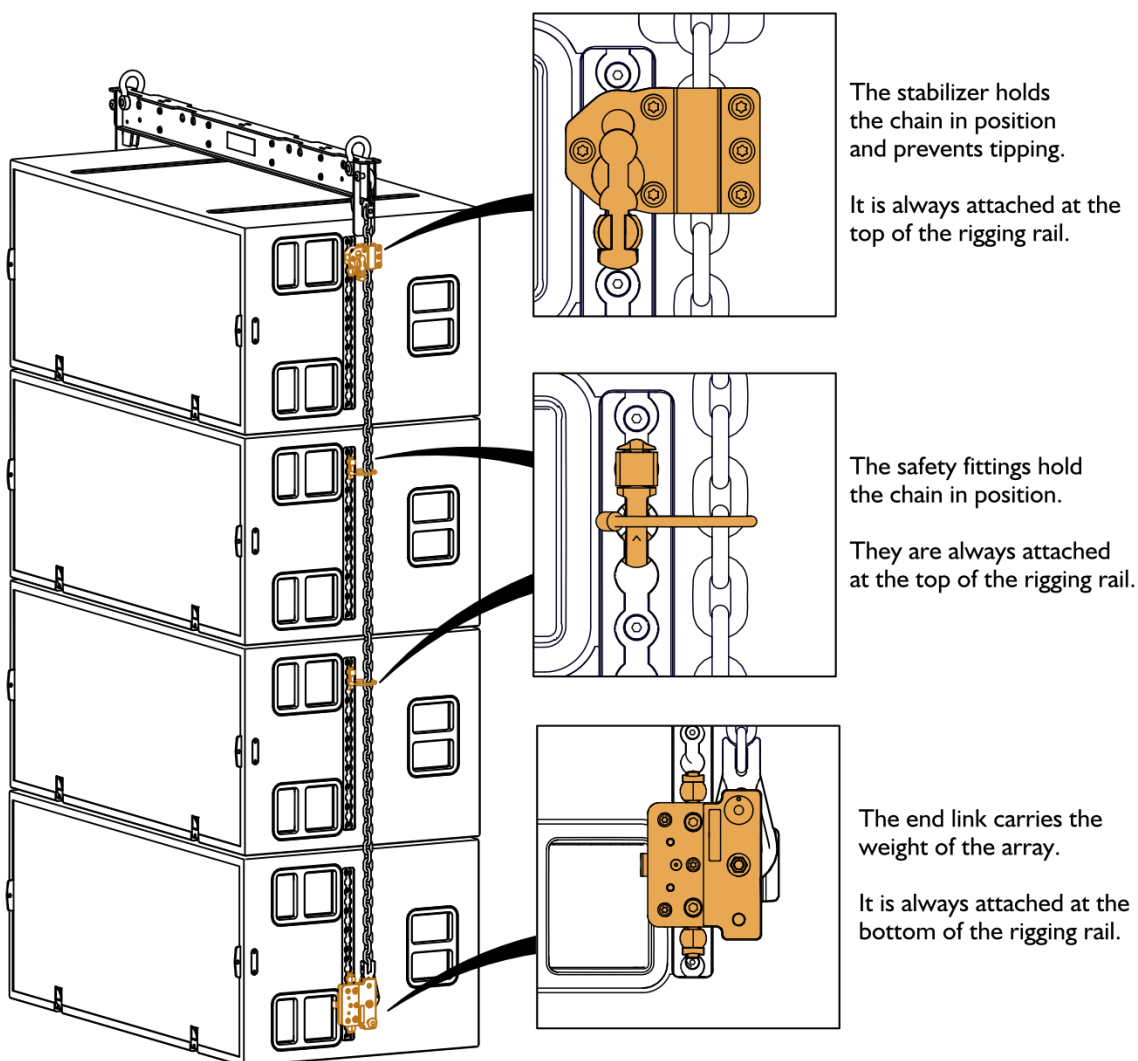
An SB28 system can be flown using a BUMPSUB-2 (lifting beam) and one pair of SB28CHAIN for each group of four SB28.

The BUMPSUB-2 provides two pickup points to adapt to the position of the lifting points in your configuration. In addition to these pickup points, safety points are available to attach a sling next to the shackles.

L-ACOUSTICS recommends using safety slings at all times.



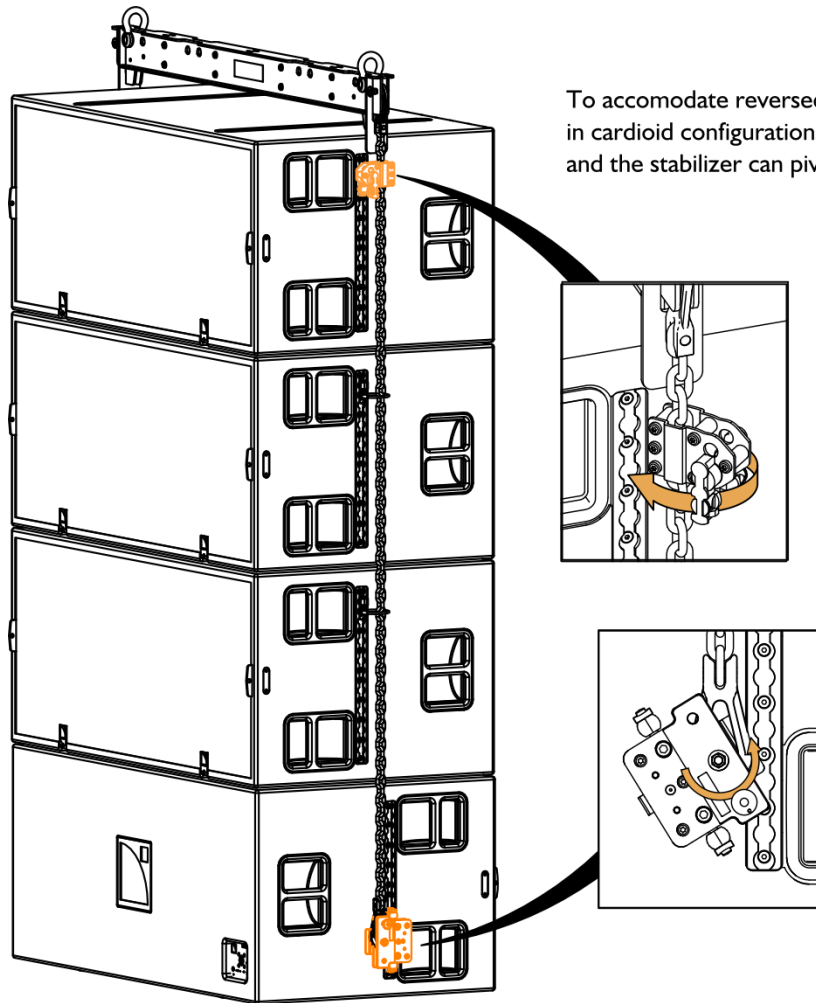
The SB28CHAIN integrates three fittings to secure and hold the enclosures.



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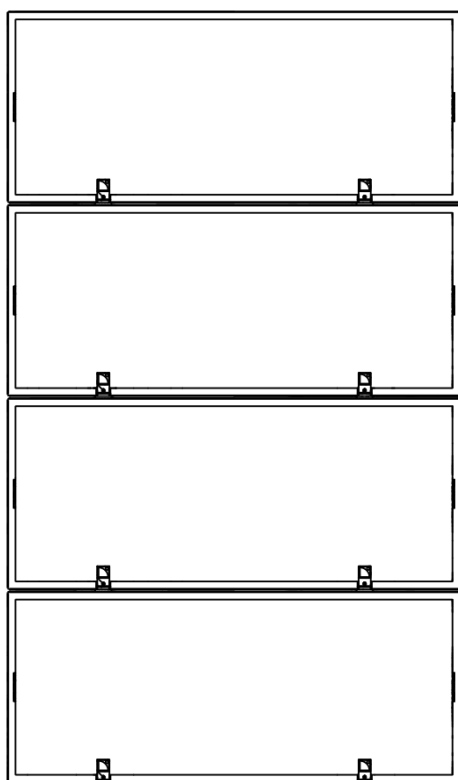


4 SYSTEM SET-UP

4.1 Ground-stacking



Use safety straps at all times when SB28 enclosures are ground-stacked.



- ▶ Stack up to eight SB28.
- ❗ Refer to **PROCEDURE A**.

4.2 Flying

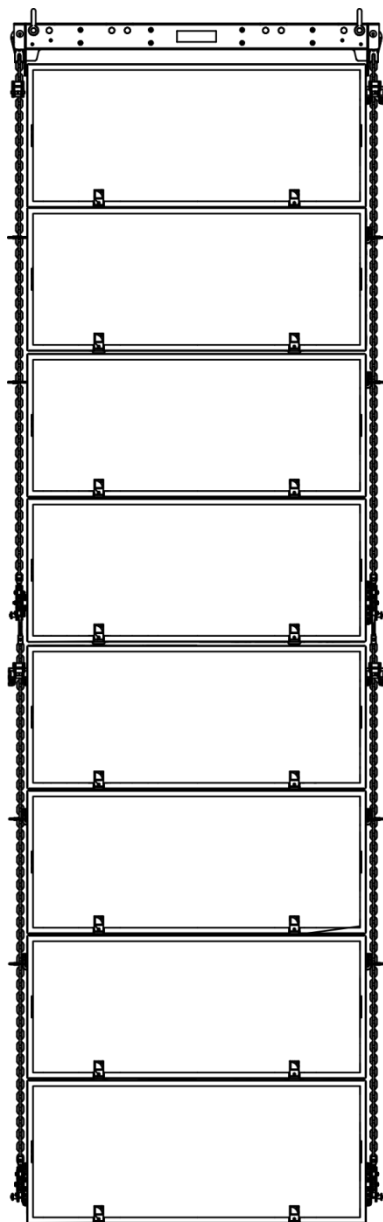


Additional sling when flying an SB28 array.

In addition to the provided rigging accessories, L-ACOUSTICS® recommends the use of safety slings at all times.

Next to its pickup points, the BUMPSUB-2 provides safety points to attach a sling next to the shackles.

Vertical with BUMPSUB-2



Flying a four enclosure array

- ▶ Prepare the BUMPSUB-2 / SB28CHAIN assembly.
- ❶ Refer to **PROCEDURE B**.
- ▶ Lift the assembly.
- ▶ Stack two enclosures under the assembly.
- ❶ Refer to **PROCEDURE A**.
- ▶ Attach SB28 enclosures under the assembly.
- ❶ Refer to **PROCEDURE C**.

Flying additional enclosures

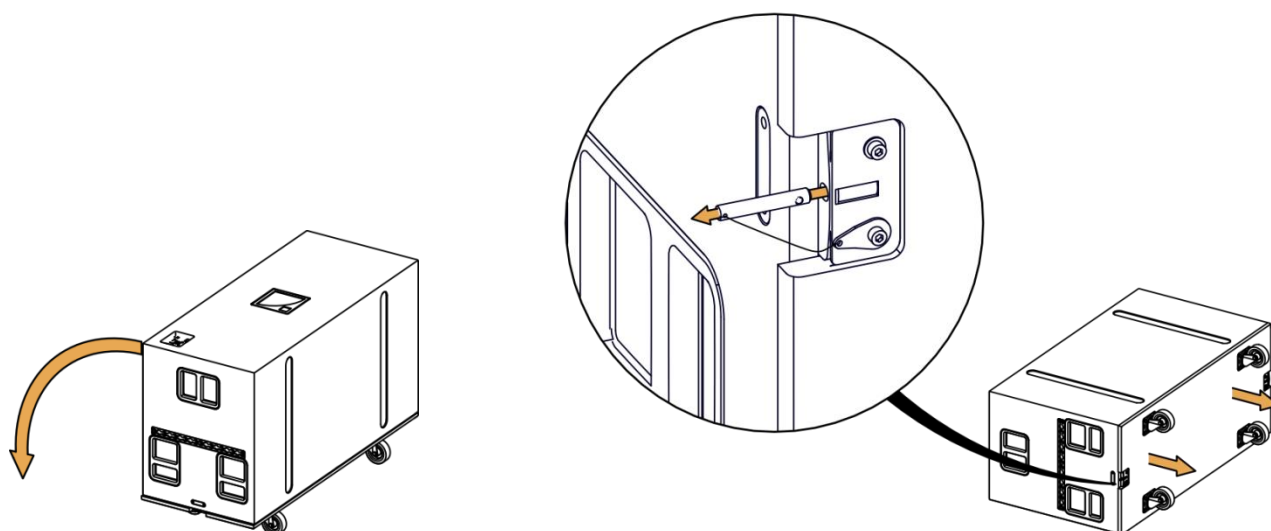
- ❶ Do not rest the top array completely on the stacked enclosures during this procedure.
The lifting motors should always support part of the load.
- ▶ On both sides attach a SB28CHAIN to the end links of the first chains.
- ❶ Refer to **PROCEDURE B**.
- ▶ Lift the array.
- ▶ Stack two enclosures under the assembly.
- ❶ Refer to **PROCEDURE A**.
- ▶ Attach SB28 enclosures under the assembly.
- ❶ Refer to **PROCEDURE C**.

SUBSET PROCEDURES

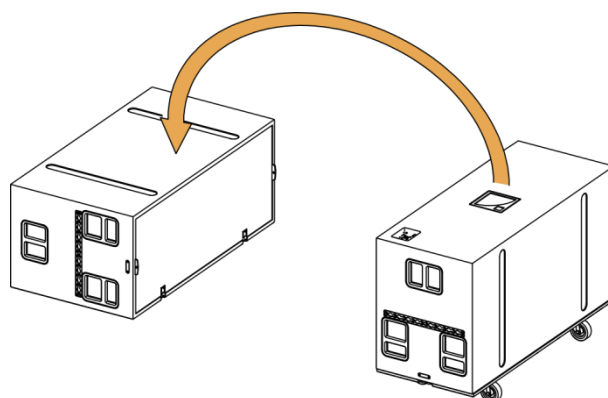
PROCEDURE A. Stacking SB28 enclosures

1. Tip the enclosure.

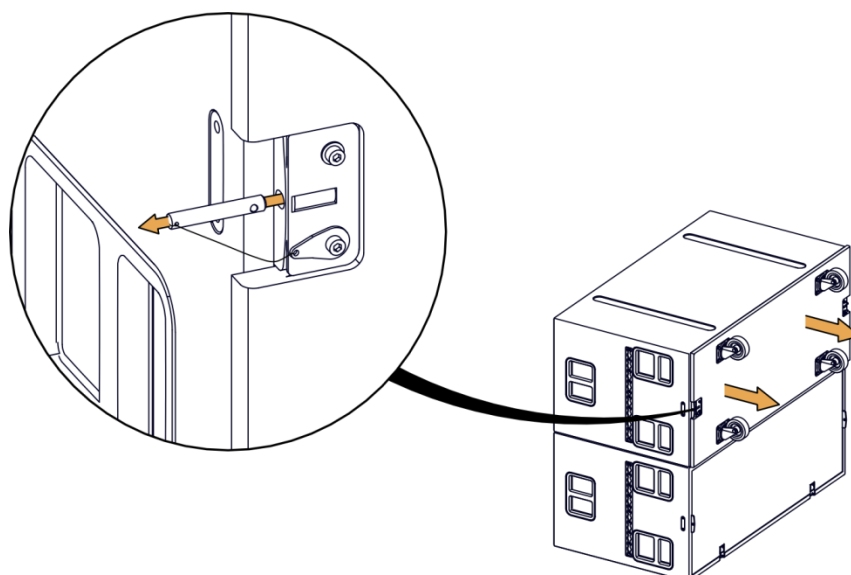
2. Remove the dolly.



3. Tip the next enclosure and place it on top of the previous enclosure.
Align the runners with the tracks.



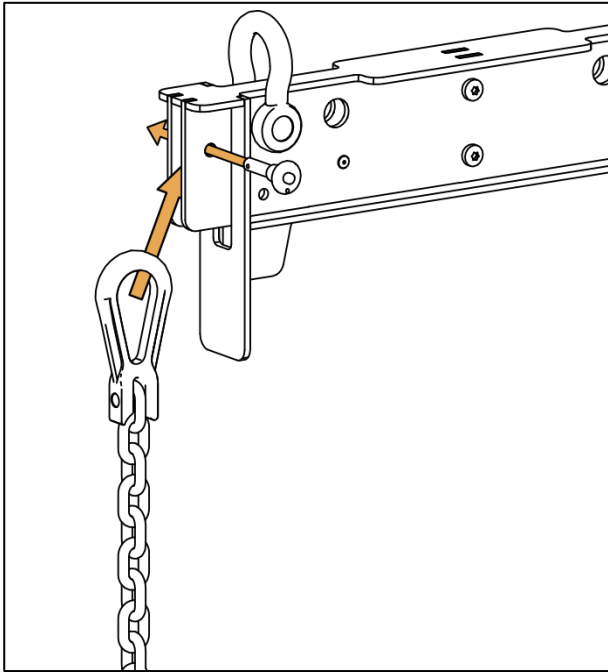
4. Remove the dolly.
Remove the pins on both sides.



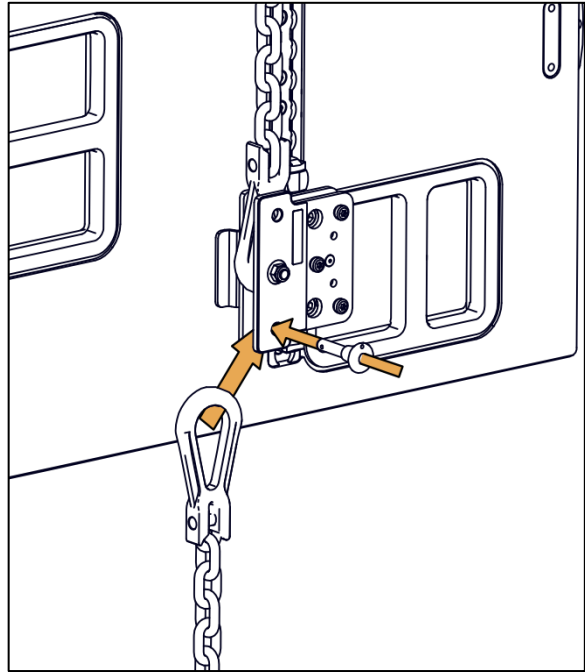
PROCEDURE B. Attaching SB28CHAIN to another element

Attach the SB28CHAIN top link:

to the BUMPSUB-2.

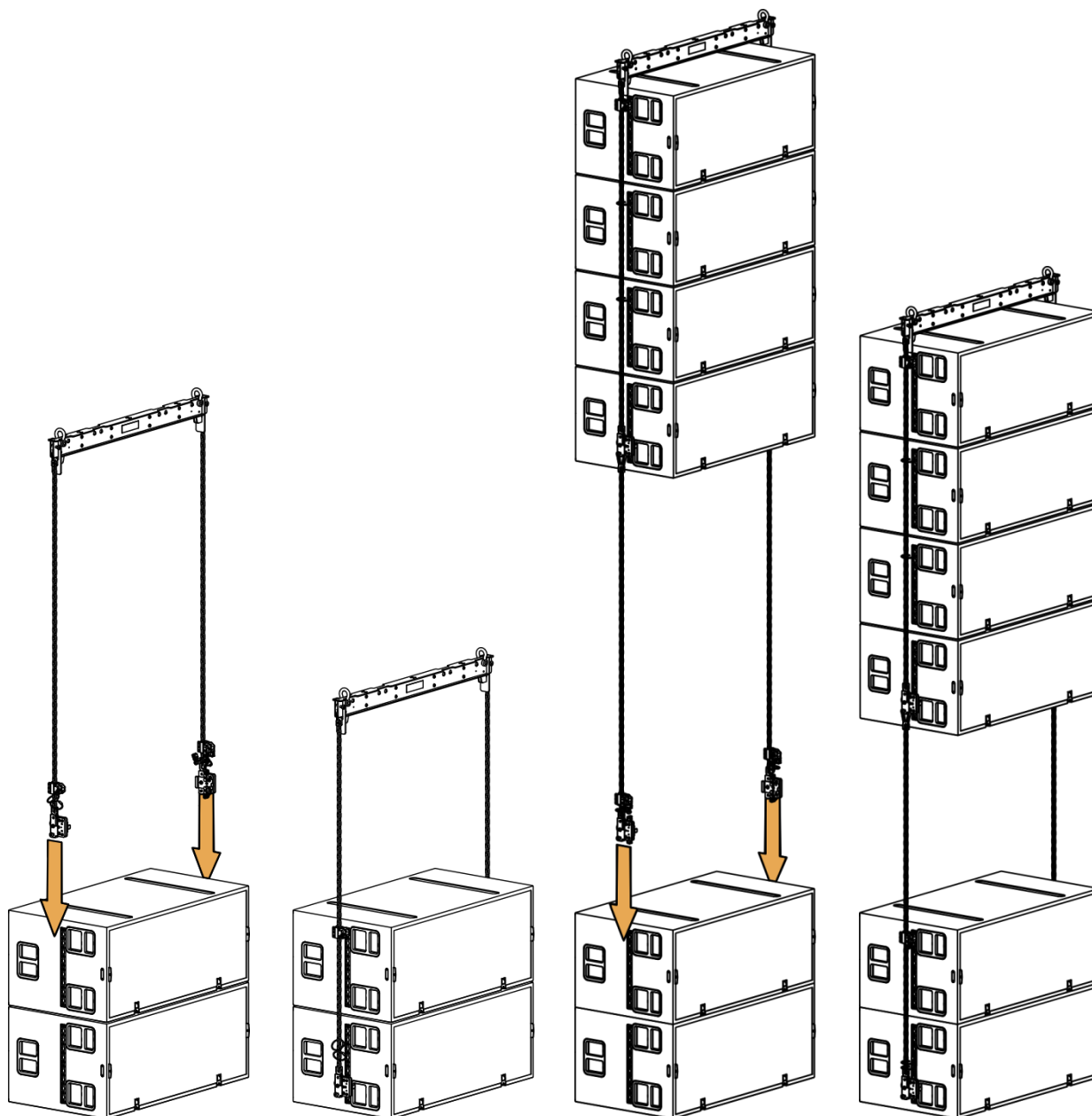


to the SB28CHAIN end link.

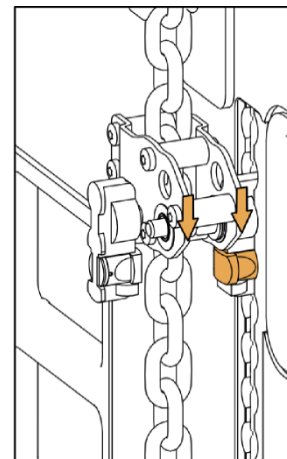
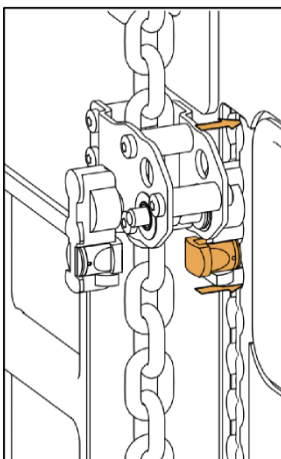
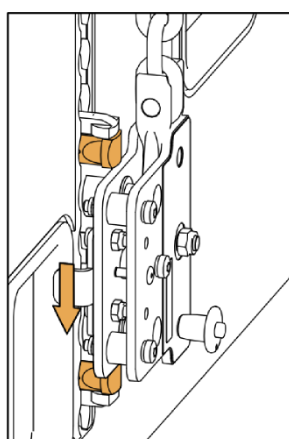
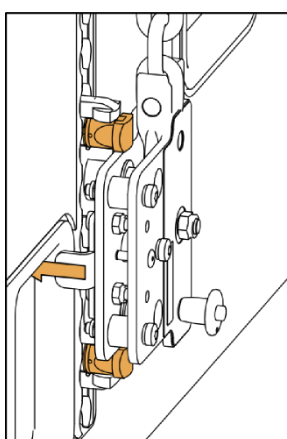


PROCEDURE C. Attaching four SB28 enclosures under another element

1. Lower the BUMPSUB-2 or SB28 array.

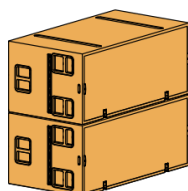
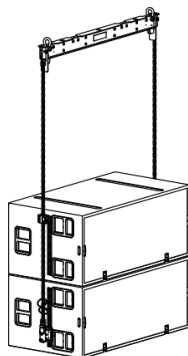


2. Attach the SB28CHAIN end link to the bottom SB28 enclosure.
3. Attach the SB28CHAIN stabilizer to the top SB28 enclosure.

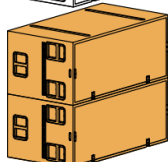
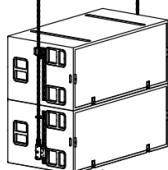
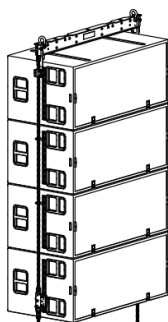


4. Lift the array and position a two SB28 stack under it.

Under BUMPSUB-2

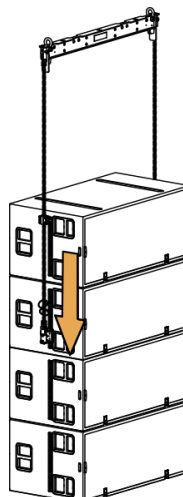


Under SB28

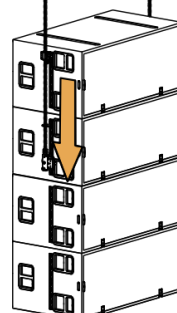
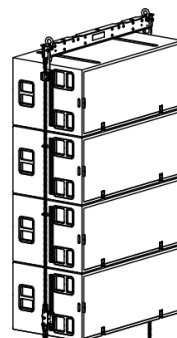


5. Lower the array so it rests on the stack.

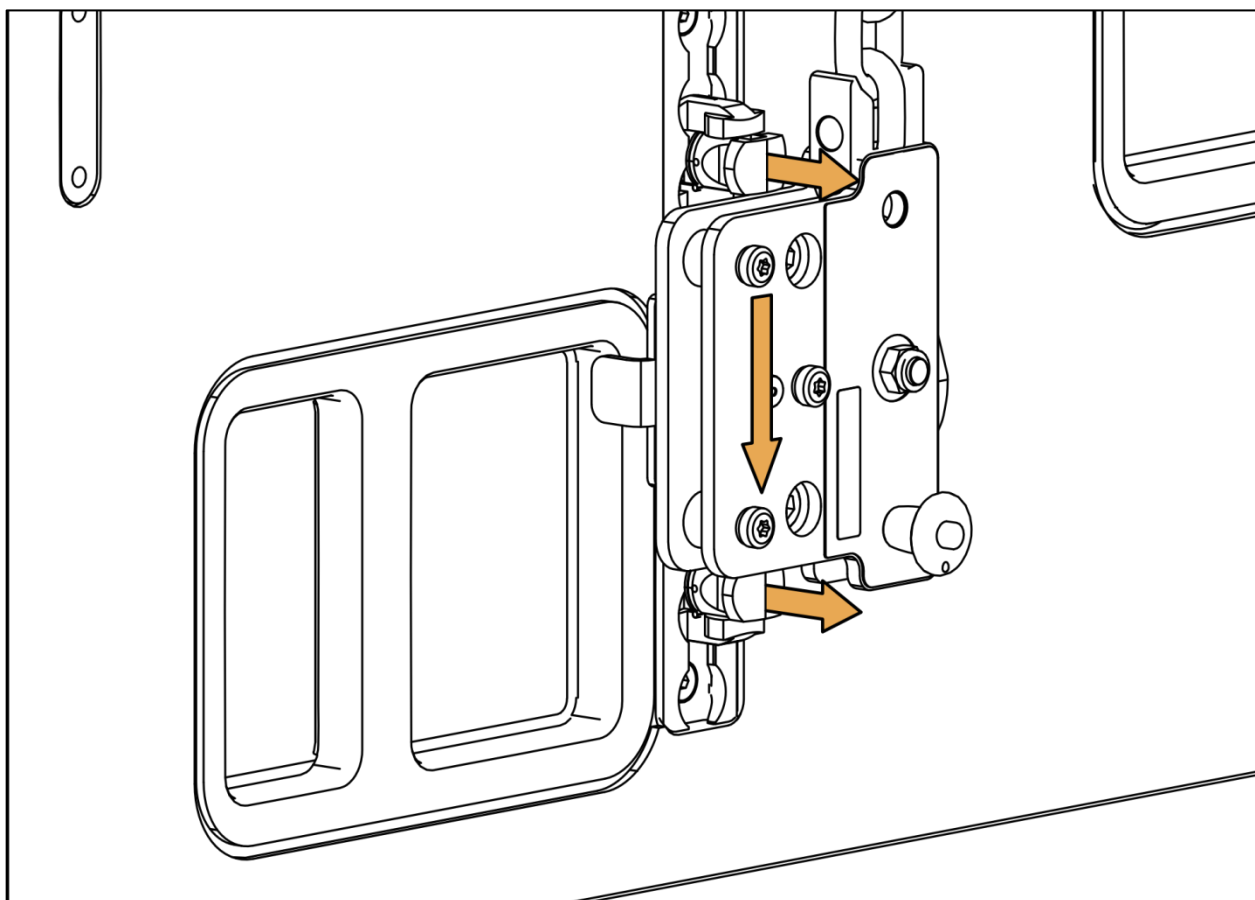
Under BUMPSUB-2



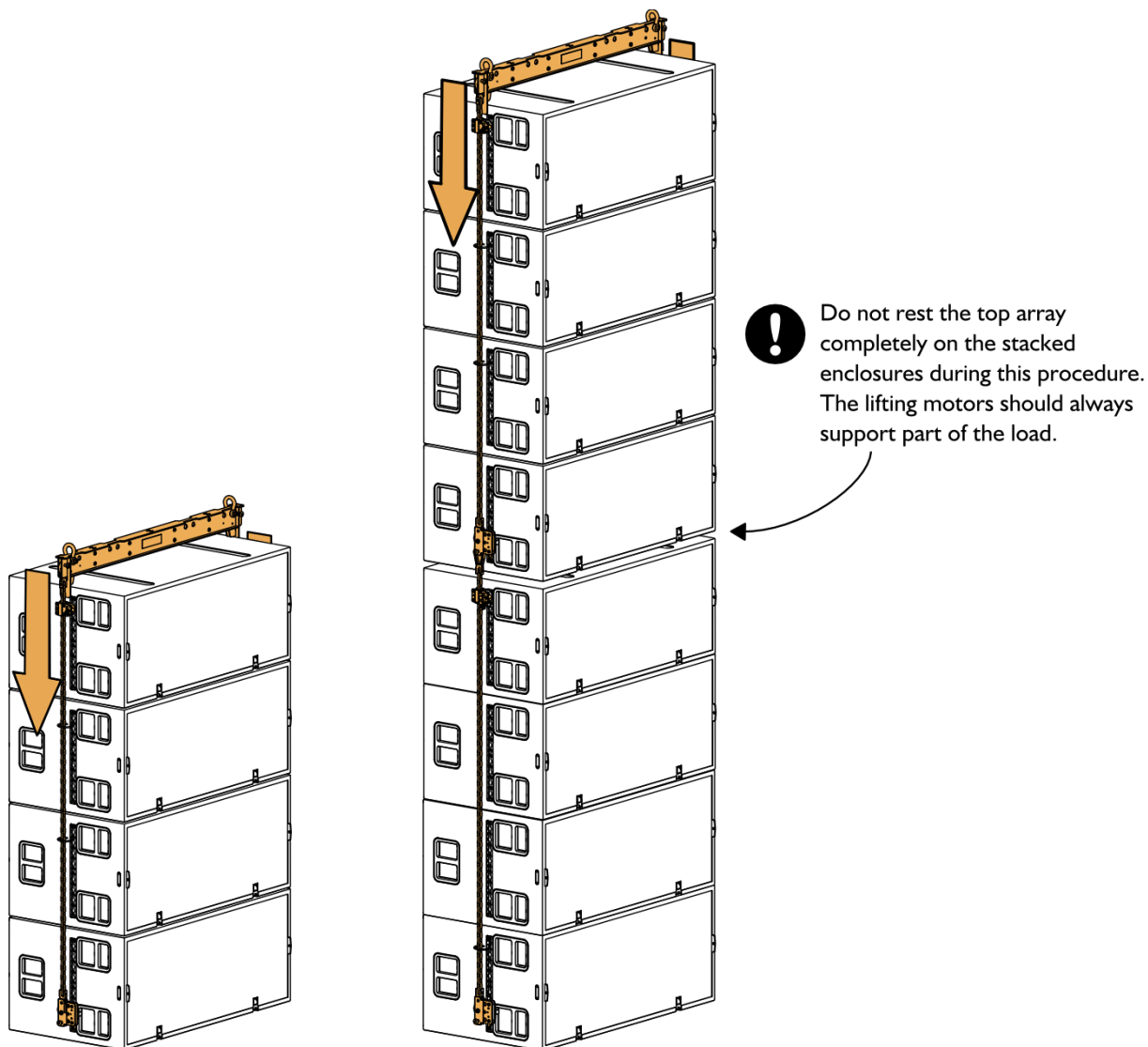
Under SB28



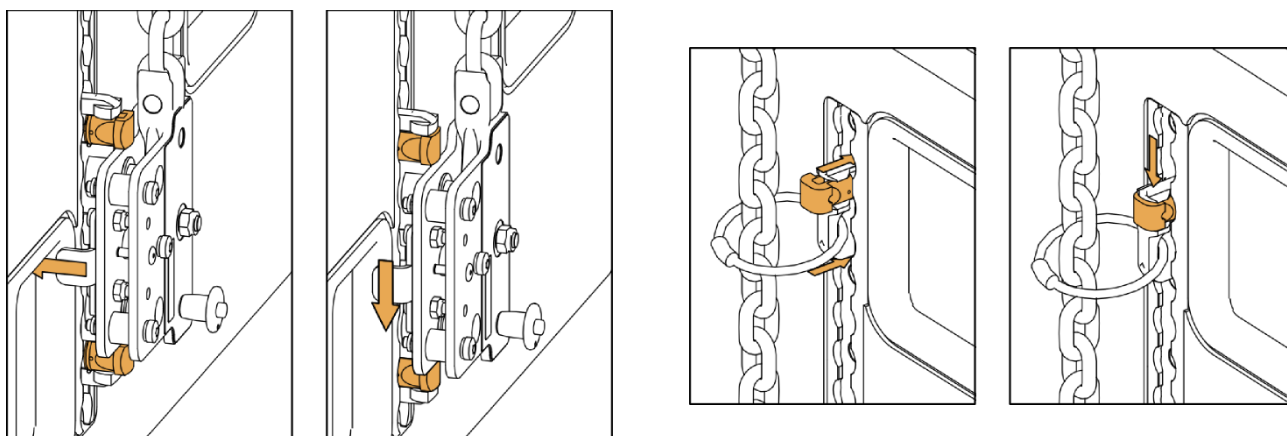
6. Detach the end link



7. Lower the flown elements to attach the end link to the bottom enclosure.



8. Attach the bottom end link to the bottom enclosure and the safety fittings to the middle enclosures.





Document reference: SB28_RM_EN_I.0

Distribution date: April 28, 2014

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