



HALO

A R E N A

System User Manual
v2.1 April 2024



emacoustics

liberating audio

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DECLARATIONS OF CONFORMITY



This declaration applies to:

10M201 - HALO Arena large format line array element

This declaration also applies to all product variants, provided that they conform to the original technical specification and have not been subject to any non-factory modifications.

We herewith declare that the products listed above are in conformity with the provisions of the respective directives including all applicable amendments.

Details of the applicable declarations can be downloaded from our website www.emacoustics.co.uk on the individual product pages.

WEEE Declaration



This product and its packaging constitute the applicable product according to the WEEE directive. Please ensure that at the end of the working life of this product, it is disposed of sensibly in accordance with local and national recycling regulations.

The packaging supplied with this product is recyclable.

Please retain all packaging, however if disposing of this packaging please ensure that you comply with local recycling regulations.

WEEE Producer Registration Number WEE/HH0101WU.

1.0 - Introduction

Thank you for purchasing the revolutionary HALO Arena line array system from EM Acoustics. The entire HALO system family has been designed and rigorously tested to give you the utmost in sonic performance and many years of reliable, trouble-free operation. Please take the time to read this user manual thoroughly to ensure you get the best performance from your system and to ensure you set it up correctly and safely. If you have any questions or are in any doubt whatsoever about any aspect of your HALO system, please do not hesitate to contact us directly or your local EM Acoustics representative.

The HALO Arena system utilises our patent-pending multi-drive unit plan wave simulation manifold. This device combines the energy of four 3.4" diaphragm compression drivers, via geometrically-identical acoustic paths, into one plane wavefront. The end result is not only a very accurate plane wave representation, but also significantly higher headroom than comparable systems to HALO Arena. The high frequency section is married to two state-of-the-art 12" neodymium low frequency transducers, in an optimally tuned and intelligently braced enclosure. The acoustic package is combined with an intuitive and flexible rigging and flying system, and the DQ Series of advanced system amplifiers for a complete turnkey large format line array solution.

This manual contains all the information you should need on topics of set up, amplifier connection, flying & stacking and basic service. If you feel we have missed anything, or you have a question not covered by this manual, please visit our website www.emacoustics.co.uk and send us a message or give us a call - we're only too happy to help.

Unpacking

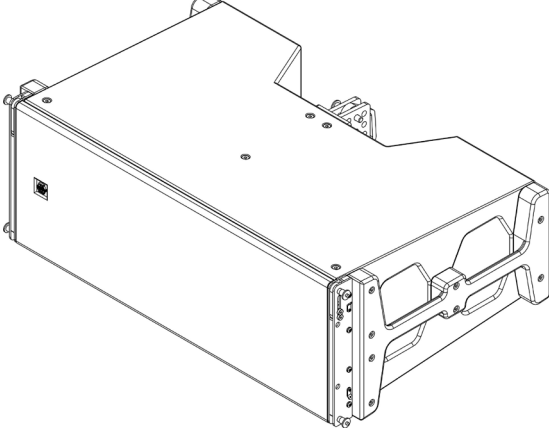
Please take care when unpacking your loudspeaker system. Once unpacked, please inspect each enclosure thoroughly for any transit damage and in the case of any damage please notify your carrier immediately. It is the responsibility of you, the consignee, to instigate any claim. Please retain all original packaging in case of future re-shipment.

2.0 - HALO-A System Components

The HALO Arena system comprises two loudspeaker models, associated flying hardware and accessories. Details of the different components are given below - all enclosures and flying grids work on the same principles and use similar if not identical hardware.

HALO-A

2-way large format line array element



FEATURES & BENEFITS

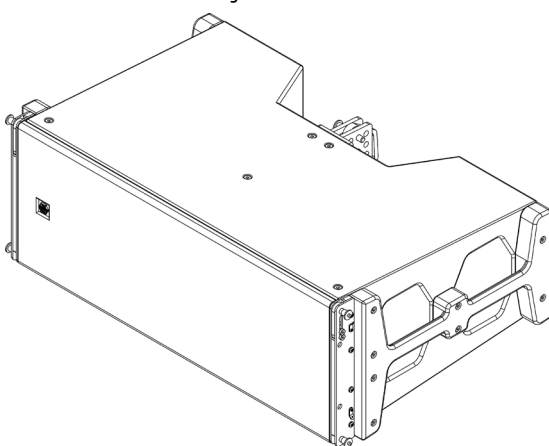
- Signature EM Acoustics "maximum headroom" design approach ensures consistency of performance regardless of SPL level.
- Extremely consistent horizontal dispersion pattern across the operating frequency band nominal 80-degree pattern is maintained down to 250Hz.
- Compact enclosure with low weight means less truck space used and smaller motors required.
- Enclosure coated with 3-step polyurethane process - ensuring the cabinets are not only weather resistant but more resilient to impact damage.
- Intuitive, simple 3-point flying system, assembled from ultra-high tensile strength steel with Xylan™ coating for enhanced durability.
- Bi-amplified design for maximum efficiency with amplifier channel count.

KEY SPECIFICATIONS

ENCLOSURE TYPE:	2-way reflex loaded line array element
DRIVE UNITS:	LF: 2 x 12" / HF: 4 x 3.4"
FREQUENCY RESPONSE:	48Hz - 19kHz +/-3dB
NOMINAL DISPERSION1:	80 horizontal, vertical dependent on array config
MAXIMUM SPL:	143dB continuous, 149 dB peak
NOMINAL IMPEDANCE:	LF - 8 ohms / HF - 16 ohms
DIMENSIONS (HxWxD):	362 (14.3) x 1020 (40.2) x 619 (24.4) mm/(ins)
NET/SHIPPING WEIGHT:	66/70kg (145.2/154lbs)

HALO-A Wide

2-way, wide dispersion large format line array element

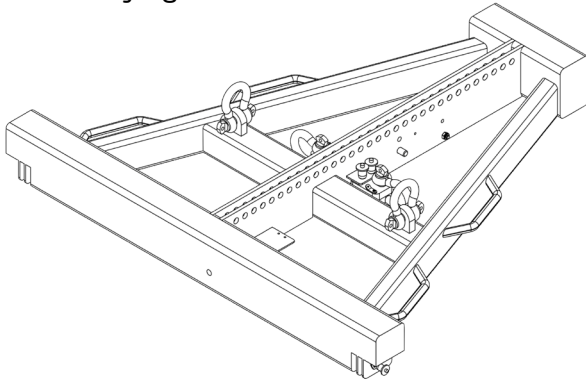


FEATURES & BENEFITS

- Signature EM Acoustics "maximum headroom" design approach ensures consistency of performance regardless of SPL level.
- Extremely consistent horizontal dispersion pattern across the operating frequency band nominal 110-degree pattern is maintained down to 250Hz.
- Compact enclosure with low weight means less truck space used and smaller motors required.
- Enclosure coated with 3-step polyurethane process - ensuring the cabinets are not only weather resistant but more resilient to impact damage.
- Intuitive, simple 3-point flying system, assembled from ultra-high tensile strength steel with Xylan™ coating for enhanced durability.
- Bi-amplified design for maximum efficiency with amplifier channel count.

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ENCLOSURE TYPE:	2-way reflex loaded line array element
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DIMENSIONS (HxWxD):	362 (14.3) x 1020 (40.2) x 619 (24.4) mm/(ins)
NET/SHIPPING WEIGHT:	66/70kg (145.2/154lbs)

FG-HALO-A**Master Flying Grid**

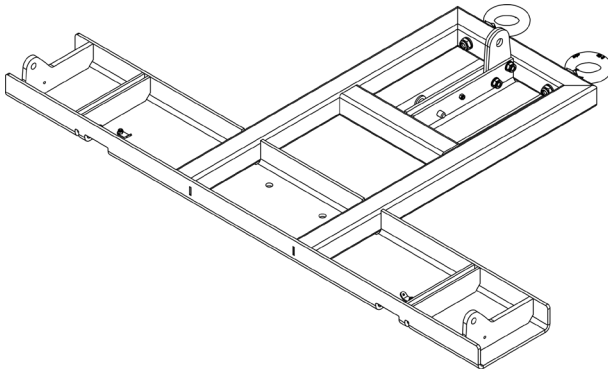
The FG-HALO-A is the master flying grid for the system, and provides a means of safely and swiftly flying arrays of HALO-A elements. Up to twenty four HALO-A elements can be safely flown in any configuration with a safety factor in excess of 5:1. The FG-HALO-A is supplied with two pickup links to use as suspension points - it is strongly recommended that arrays larger than twelve elements use two lifting points for control and ease of use.

The FG-HALO-A can also be used as a means of ground stacking HALO-A systems by inverting the grid. Ground stacks of up to 6 HALO-A elements can be assembled in this way.

The FG-HALO-A is supplied with four 3.25t WLL bow shackles.

Weight (without shackles) 52.5kg / 115.5lbs

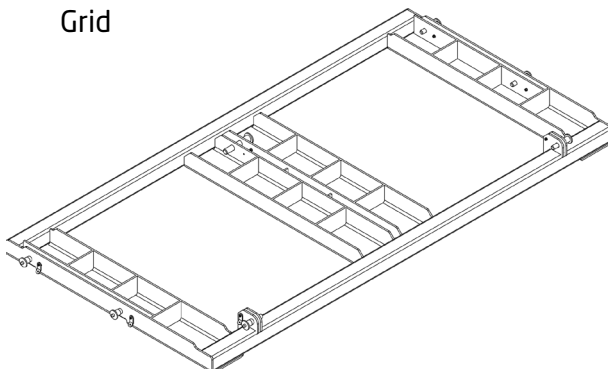
Weight (including supplied shackles) 55.1kg / 121.2lbs

PB-HALO-A**Pull Back Frame**

The PB-HALO-A can be used at the bottom of a HALO-A array as a pull-back to apply more downtilt, or as an interface grid to sub-hang HALO-B enclosures underneath as downfill. A maximum of six HALO-B enclosures can be sub-hung in this way.

The PB-HALO-A should not be used as a pull-back for arrays larger than eight HALO-A elements.

Weight 18.5kg / 40.7lbs

GS-HALO-A**Ground-Stack
Grid**

The GS-HALO-A allows for HALO-A enclosures to be safely rigged on top of ST-218 subwoofers, and can also be used as a stand-alone ground stacking base plate.

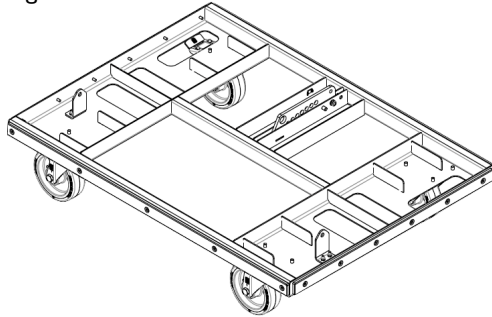
HALO-A enclosures need to be inverted to mount on to the GS-HALO-A, and a maximum of six HALO-A enclosures can be stacked on the GS-HALO-A in this way.

When using the GS-HALO-A without attaching to ST-218 subwoofers, the GS-HALO-A must be secured using ratchet straps or similar for arrays larger than two elements.

Weight 26kg / 57.2lbs

WC-HALO-A

Touring Wheel Board



The WC-HALO-A is a wheelcart for transporting up to four HALO-A elements safely & securely. An optional TC-HALO-A padded transit cover can be used to protect full wheelcarts of four elements.

Dimensions of the WC-HALO-A are optimised for truck packing, so the carts fit three wide in a standard truck.

WC-HALO-A carts stack neatly for storage when not in use.

Weight 44.6kg / 98.1lbs

CHAIN-HALO-A

Extension Lift Chain

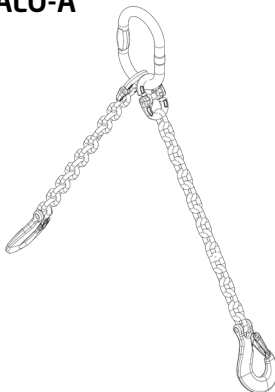


The CHAIN-HALO-A assembly is intended to go between a motor and the FG-HALO-A pickup link. It is a variable length chain, intended to give extra vertical clearance to accommodate motor lift chain bags. It has a SWL of 2.5 tonne and an effective maximum working length of 1000mm.

Weight 3kg / 6.6lbs

SAFETY-HALO-A

Chainset



The SAFETY-HALO-A assembly is a 2-leg bridle chain assembly, intended to connect the two safety points on the FG-HALO-A to a single point for application of a secondary safety. It has an effective working length of 530mm and the following SWL:

3.55 tonne 0-45 degrees

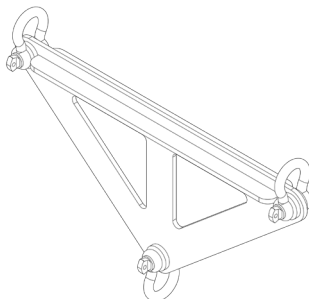
2.5 tonne 45-60 degrees

The angle between the chain legs must not exceed 60 degrees.

Weight 3.4kg / 7.5lbs

Halo-A-DELTA

Delta Frame



The HALO-A-DELTA can be used at the rear of an array to give azimuth control. The HALO-A-DELTA gives +/- 10 degrees of adjustment to the direction of a flown array.

It must not be used as the primary suspension point and should only be used for angle adjustment.

Weight (without shackles) 8.2kg / 18lbs

Weight (including supplied shackles) 10.2kg / 22.5lbs

3.0 - Safety Considerations

System Overview

The flying system for HALO Arena has been specifically designed to be flexible, intuitive and reliable. Please read this section of the user manual **extremely carefully** as the rigging of loudspeakers is a very serious matter with potentially fatal consequences should anything go wrong. If you are in **ANY DOUBT WHATSOEVER**, contact a reputable rigging company or your local EM Acoustics representative.

IMPORTANT SAFETY CONSIDERATIONS

The HALO Arena rigging system has been designed and constructed to a very high standard of safety and tested to demanding specifications. To ensure the highest standards of safety, the following information on array assembly must be exactly followed and understood.

Only use EM Acoustics recommended rigging hardware and accessories, which are specifically designed for the purpose. Do not use HALO Arena flying hardware for any other loudspeaker system - the components are specifically designed to work with the HALO Arena system and are not interchangeable with any other EM Acoustics loudspeaker product or any other loudspeaker system. The use of HALO Arena flying hardware with other manufacturers' systems may compromise the safety standards and EM Acoustics is in no way liable for any loss, damage or injury caused by such practice.

Do not modify or alter the HALO Arena hardware or accessories, nor use them in any way other than that described in this manual. Rigging components supplied as part of the HALO Arena system are in no way interchangeable and should not be used as such.

The component parts of the HALO Arena rigging assembly should only be assembled in the manner described in this manual, using the fasteners and fixings stated herein. The use of fasteners and methods of assembly not described in this manual may result in an unsafe assembly and as such EM Acoustics will not be responsible for any loss, damage or injury caused by such practice. Welding, drilling or any other means of modifying any part of the flying hardware or permanently fixing components to each other is strictly forbidden.

Rigging assemblies must only be assembled using the appropriate parts and fixings as described in this manual, explicitly following the assembly instructions given herein. Rigging components must only be fixed to EM Acoustics HALO Arena loudspeaker systems, using the correct cabinet location points, assembly methods and fasteners specifically described within this manual.

Walls, floors and ceilings must be capable of supporting the actual load placed upon them. The rigging hardware must be safely and securely fixed to both the loudspeaker system and the supporting structure.

Secondary Safeties

It is imperative that all loudspeakers flown in any given environment should be provided with a second, independent and properly rated safety suspension point in addition to the principle load bearing means of suspension. Steel wire ropes or steel chains of an approved construction and load rating only may be used as secondary safeties. Plastic covered steel chains may not be used as secondary safeties under any circumstances. Also ensure that all local and national laws are complied with when determining your primary and secondary suspension points.

Safety Inspections

Carefully inspect all flying system components prior to use for defects or signs of damage prior to assembling a HALO Arena array. If any components damaged or **you suspect them to be damaged, DO NOT USE THEM.**

Regular scheduled tests - which are much more rigorous than visual inspections - of all rigging components must also be carried out. Safety legislation, and test/inspection requirements, will vary from country to country and as such it is the user's responsibility to ensure that local regulations are adhered to. In most cases, annual independent tests & inspections carried out by a suitably approved and qualified inspector will be required.

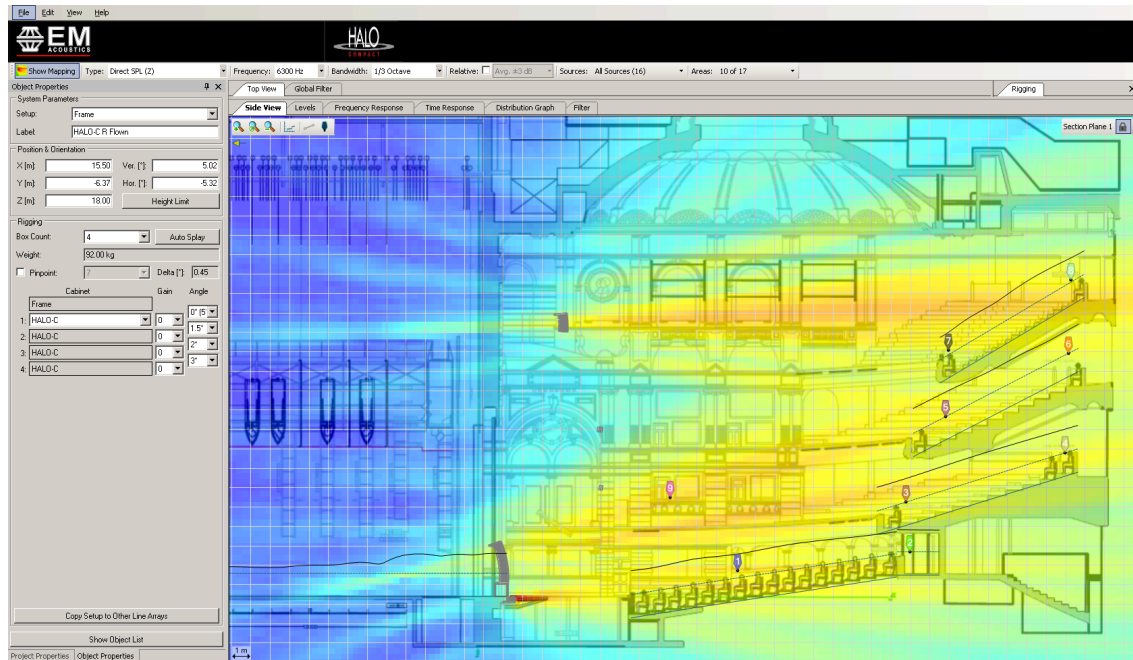
EM Acoustics recommends detailed logbooks be kept of all inspections and load tests to ensure an accurate record is kept of the testing for each EM Acoustics rigging accessory.

When flying any loudspeaker system, always wear protective headwear, footwear and eye protection in accordance with local regulations.

The rigging of a flown loudspeaker system may be dangerous if not undertaken by a suitably experienced and qualified rigger. Installation & fixing of all hanging points should only be carried out by a professional rigger in accordance with local legislation as well as the rules of the venue. The house rigger and/or venue manager must always be consulted.

4.0 - Simulation

Ease Focus 3



For safety and acoustic reasons, it is advised that users familiarize themselves with Ease Focus 3. Along with providing the user with accurate simulations for setting up HALO Arena, it also provides importing safety information with regards to load limits.

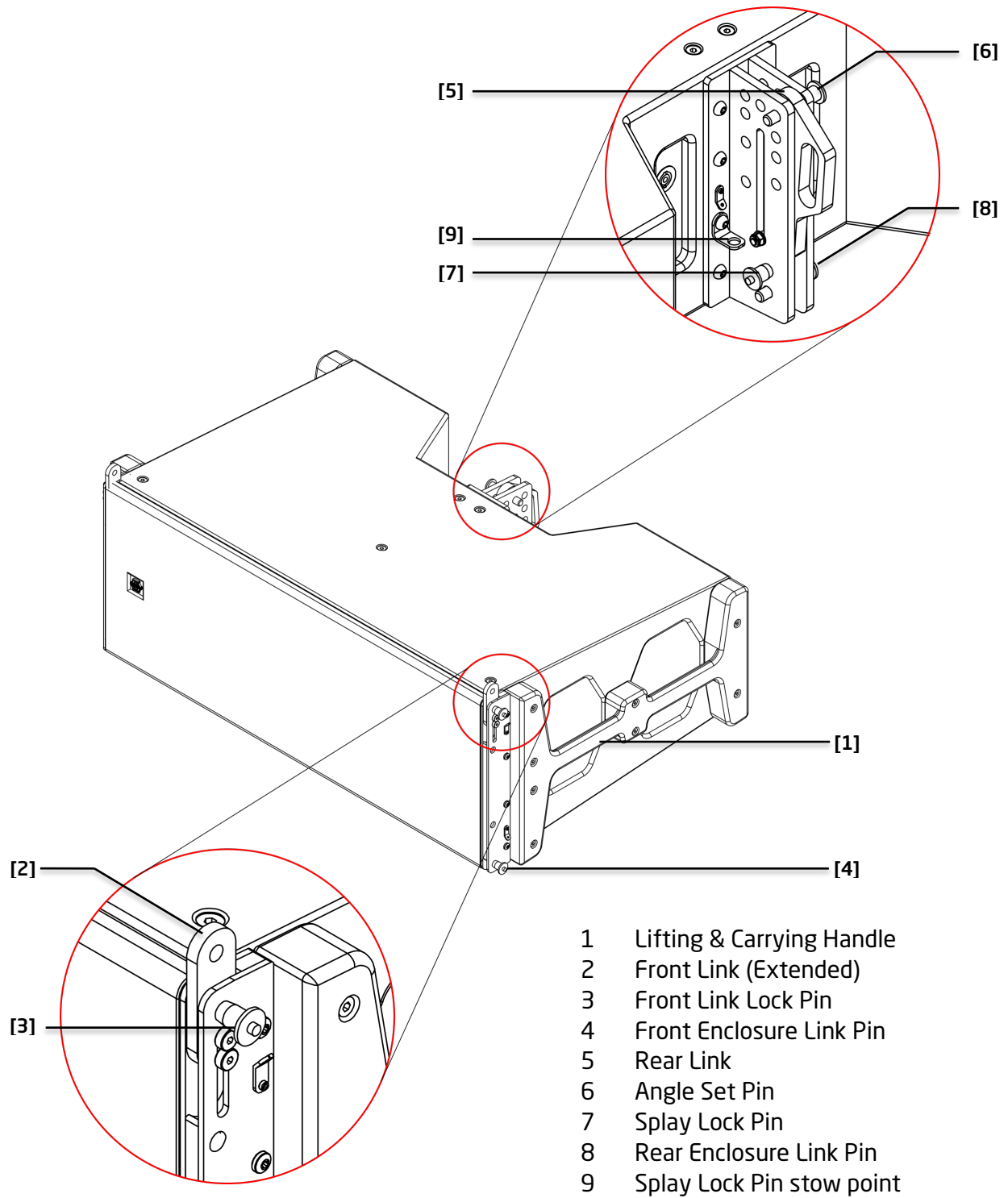
Ease Focus 3 can be downloaded for free from the AFMG website at <http://focus.afmg.eu> and is currently available as a stand-alone application for Windows (XP or Higher) only. It can also be downloaded directly from the [EM Acoustics website](#) with all the current product files embedded.

Tutorials for Ease Focus 3 are available from with the application itself.

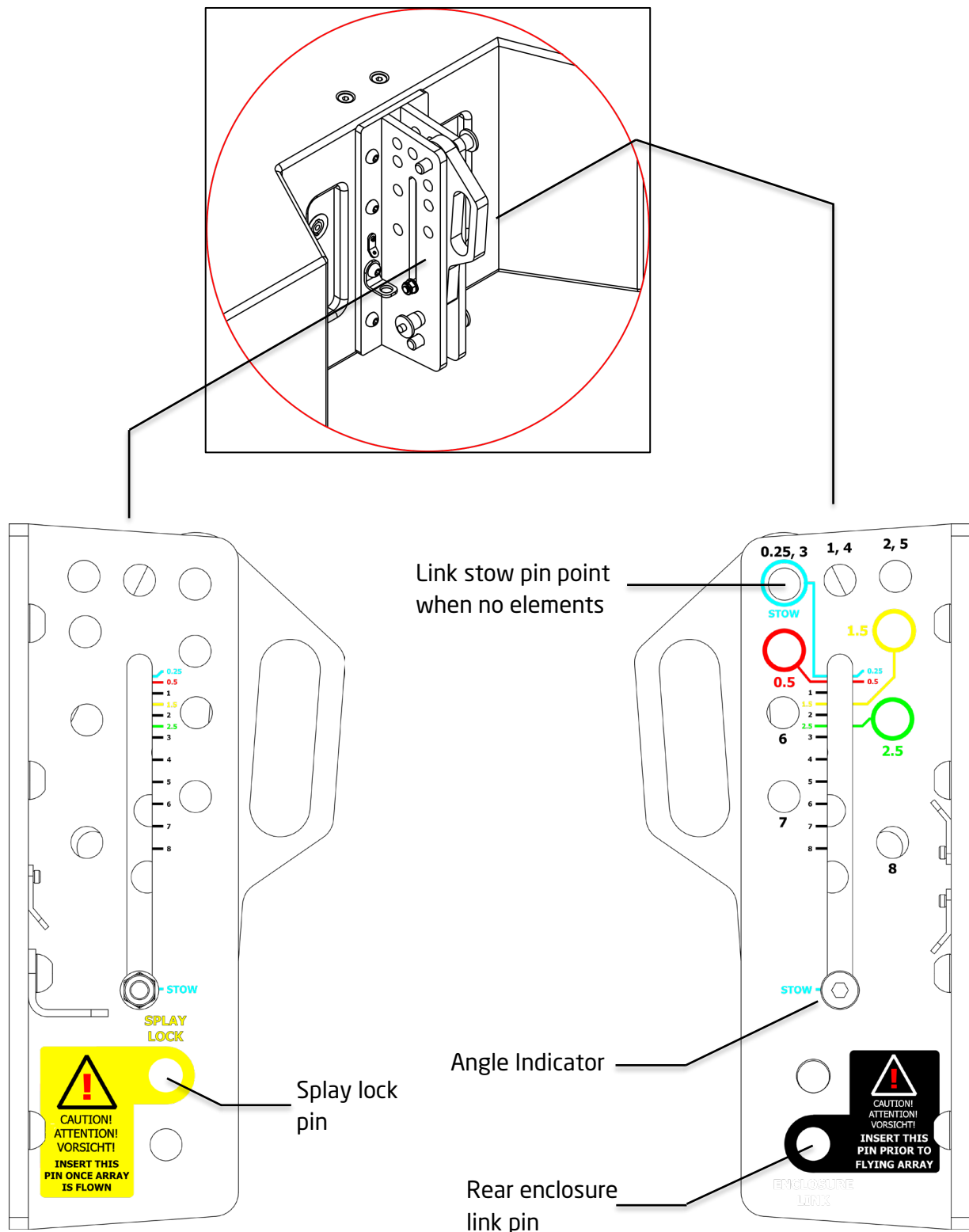
For training on the design and implementation of HALO Arena including the specific use of Ease Focus 3, please contact your local distributor.

5.0 - Rigging System Overview

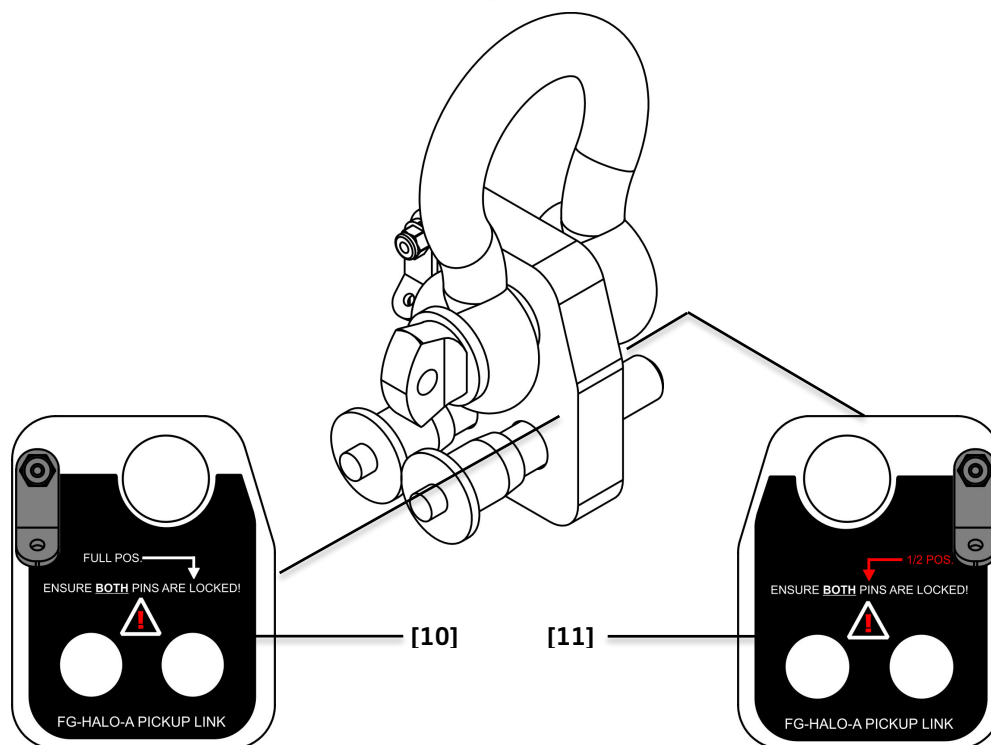
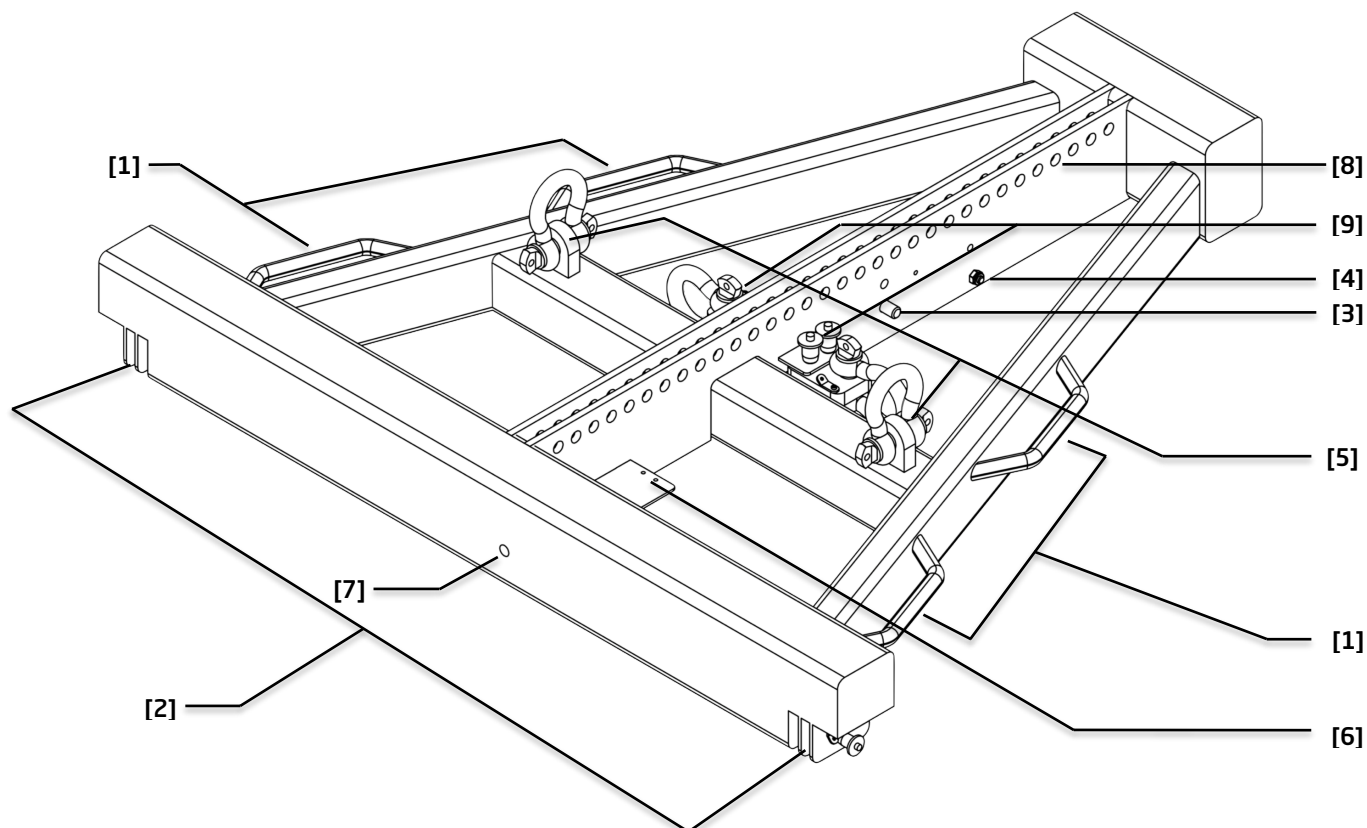
5.1 - Halo-A Cabinet Rigging Hardware



HALO-A Rear Link Labels

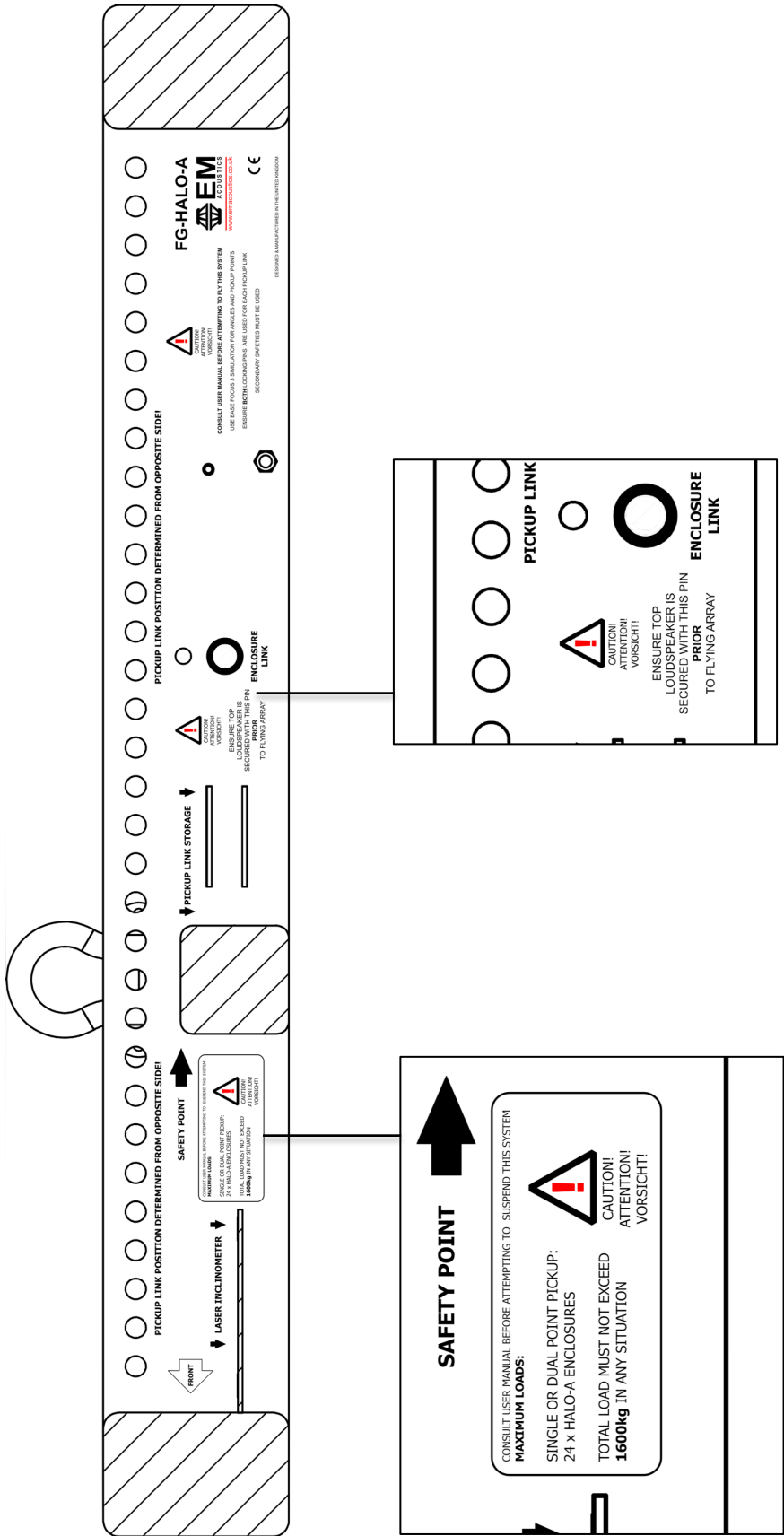


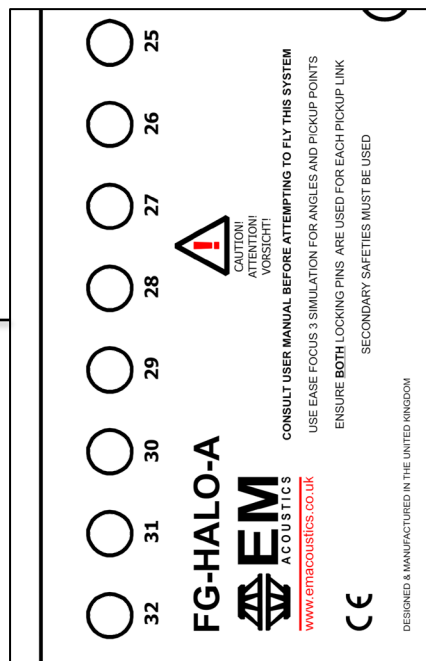
5.2 - FG-HALO-A



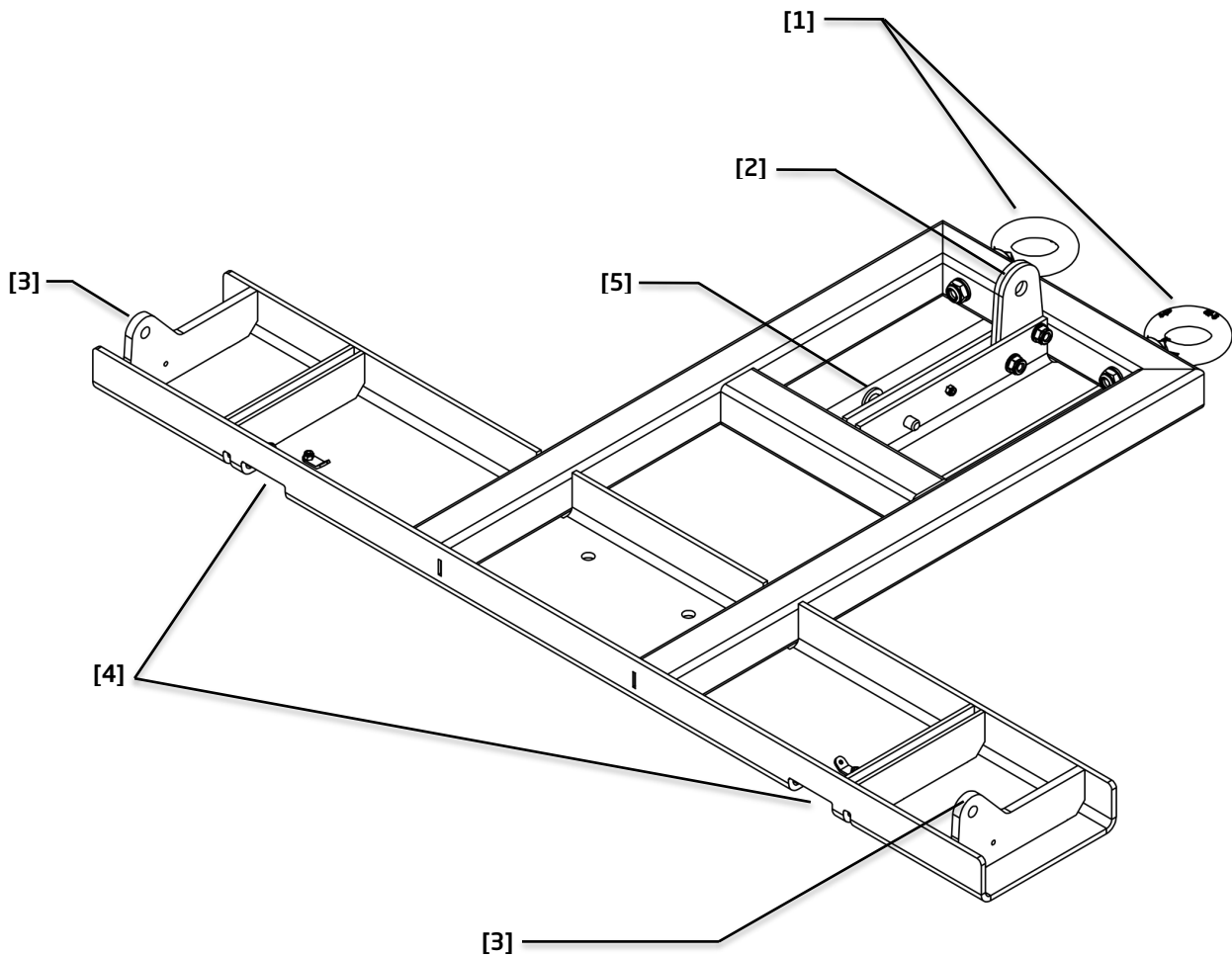
- | | |
|---|--|
| [1] - Lifting & Carrying Handles | Lifting Handles are only to be used for manual lifting and manoeuvring of the FG-Halo-A. Not to be used as rigging points |
| [2] - Front Link Attachment Point | This clevis forms the area where HALO-A enclosure front links should be engaged. A 0.375" ball-lock pin secures each link in place. |
| [3] - Splay Link Attachment Point | The splay link of the first HALO-A enclosure should engage in this slot in the spine. Pay attention to the label details with regards the indicated angle compared to actual angle for the first element in the array. |
| [4] - Cable Pick | The retractable cable pick gives a location to safely secure the array cables at the back of the FG-HALO-A grid. It can be stowed away when not being used. |
| [5] - Safety Points | A secondary safety must always be used on flown arrays. Both safety points should be connected to avoid the array swinging in the event of a primary lift failure. The SAFETY-HALO-A 2-leg bridle is designed |
| [6] - Inclinometer Mounting Point | A range of laser inclinometers can be fitted to the FG-HALO-A including TEQSAS devices. An aperture is provided in the front beam for the laser to pass through. |
| [7] - Inclinometer Laser Aperture | Opening in the front grid load member for the inclinometer laser beam to pass through. |
| [8] - Pickup Link Location Holes | Holes are numbered 1 to 39, the appropriate locations are determined by your EASE Focus simulation. Links must be secured with the two 0.5" ball-lock pins attached. |
| [9] - Pickup Links (Stowed) | Stow locations for the two pickup links when the FG-HALO-A is being used for ground stack, or being stored or transported. |
| [10] - Pickup Links (Full Position) | When using a single pick point, reference Ease Focus 3 for the pick point for the desired angle. For a full position, line up the white arrow with the number on the spine |
| [11] - Pickup Links (Half Position) | When using a single pick point, reference Ease Focus 3 for the pick point for the desired angle. For a half position, line up the red arrow between the appropriate numbers on the spine |

FG-HALO-A Instruction Label



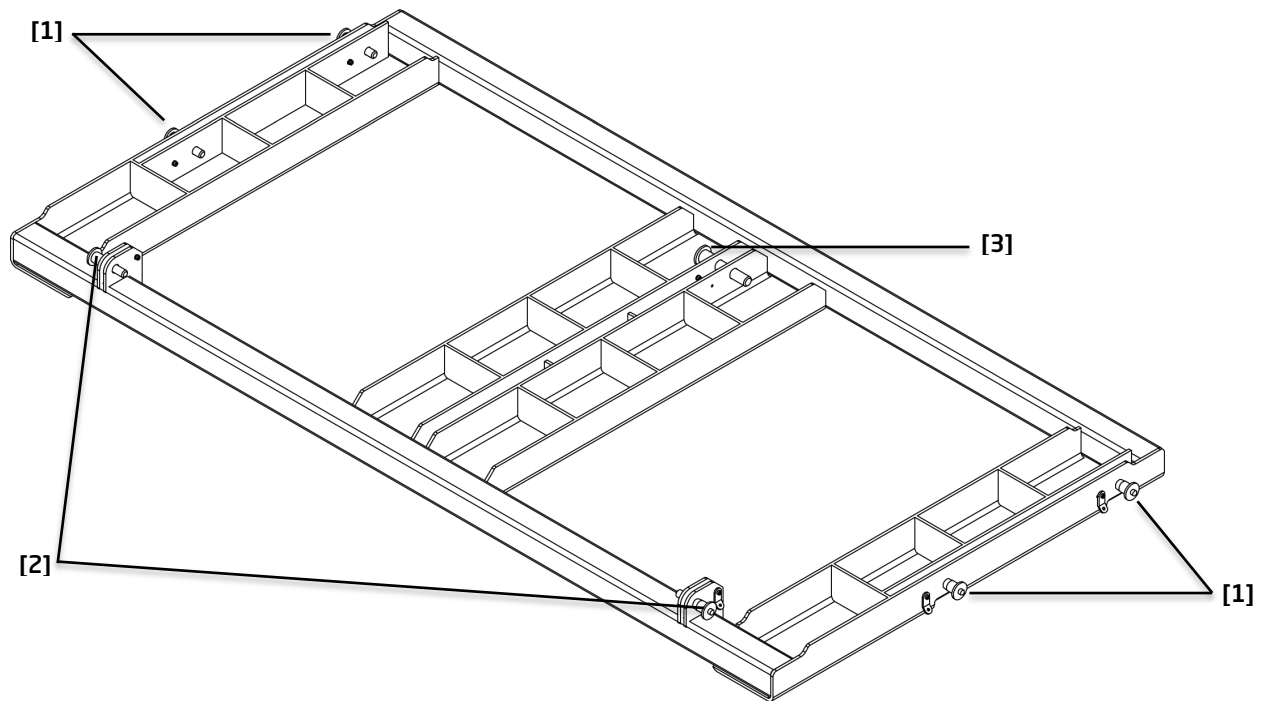


5.3 - PB-HALO-A



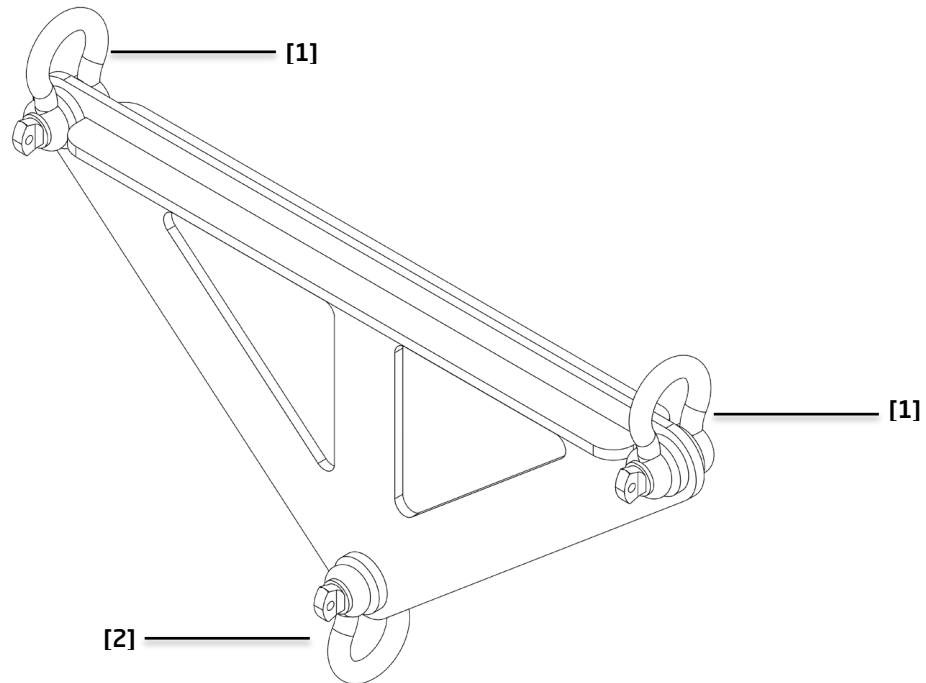
- 1 Pullback Connection Eyes
- 2 HALO-A Splay Link Attachment point
- 3 HALO-A Front Link Attachment point
- 4 HALO-B Front Link Attachment point
- 5 HALO-B Splay Link Attachment point

5.4 - GS-HALO-A



- 1 ST-218 Link Attachment point
- 2 HALO-A Front Link Attachment point
- 3 HALO-A Splay Link Attachment point

5.5 - HALO-A-DELTA

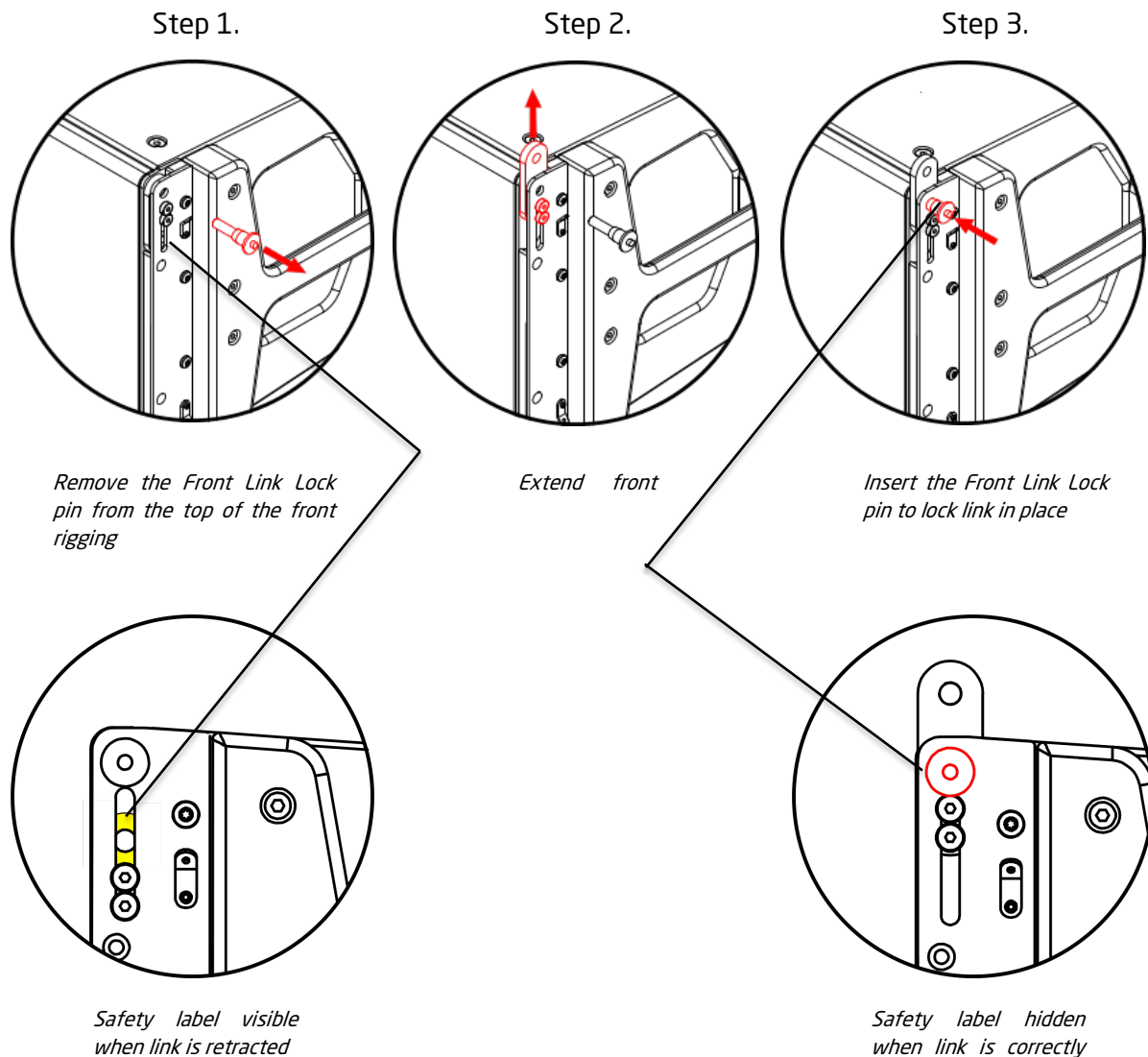


- 1 Motor Pickup Point
- 2 FG-HALO-A Connection Point

6.0 - System Setup

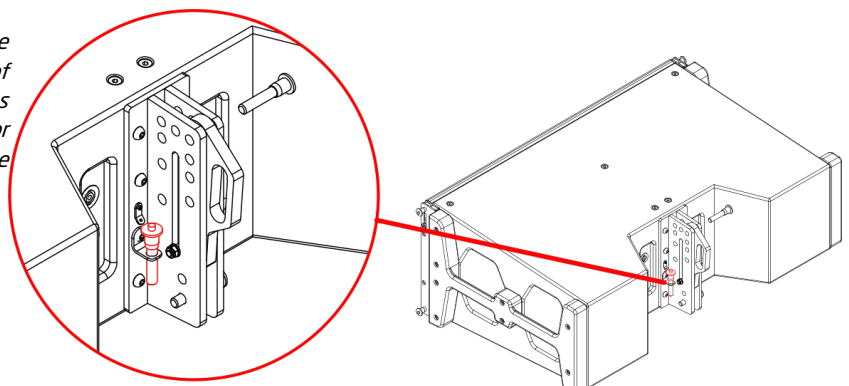
6.1 - Flying HALO-A systems

6.1.1 - Linking the front Rigging System



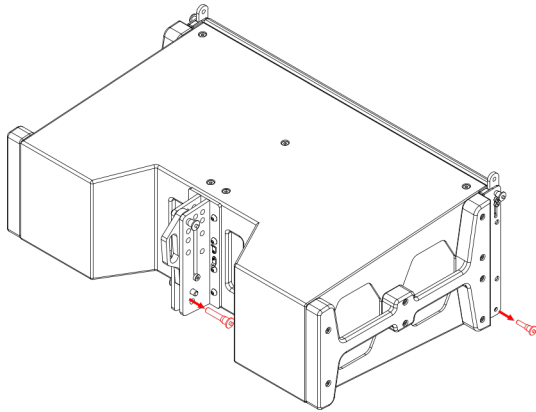
6.1.2 - Splay lock pin storage

When removing the Splay Lock Pin, be sure to use the storage lug on the left side of the splay rigging assembly. This ensures that the pin does not get in the way, or get trapped between elements as the array moves.



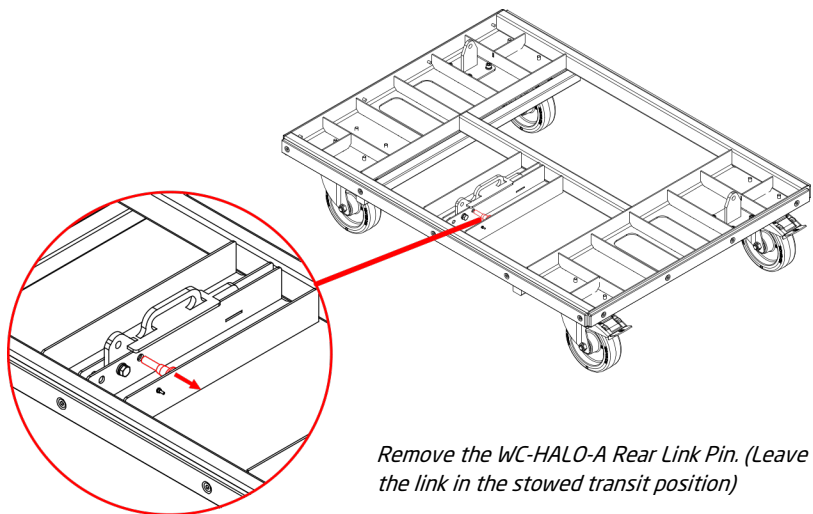
6.2.1 - Prepping HALO-A on WC-HALO-A

Step 1.



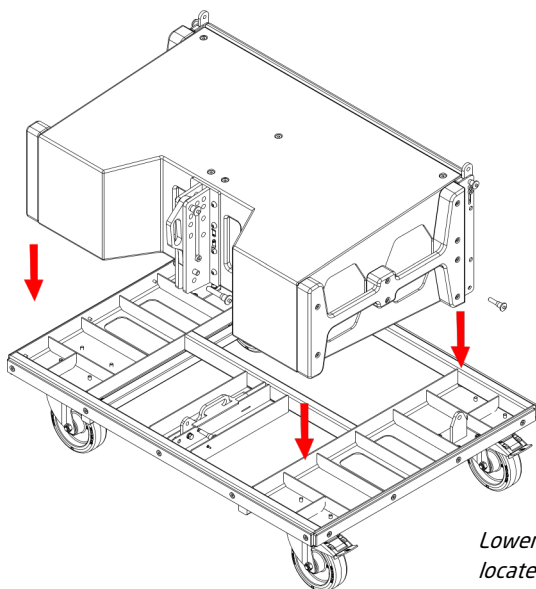
Remove the Front and Rear Enclosure Link Pins

Step 2.



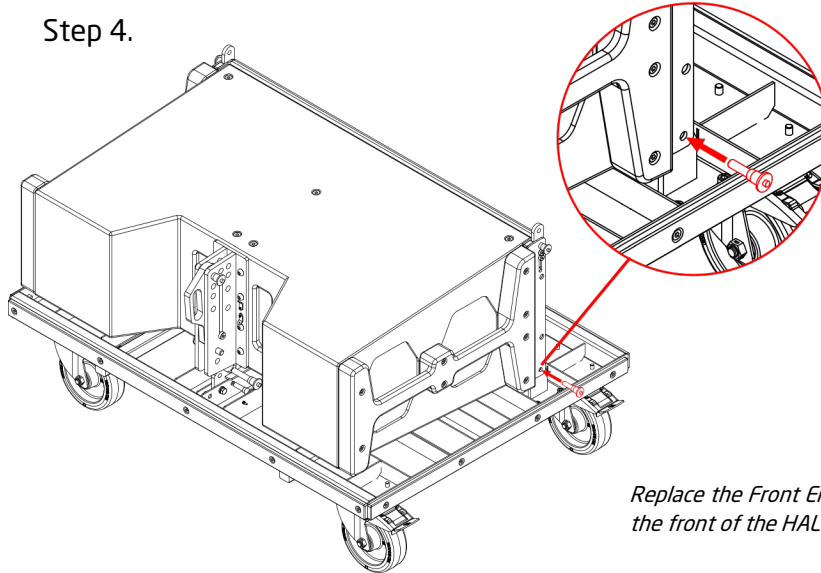
Remove the WC-HALO-A Rear Link Pin. (Leave the link in the stowed transit position)

Step 3.



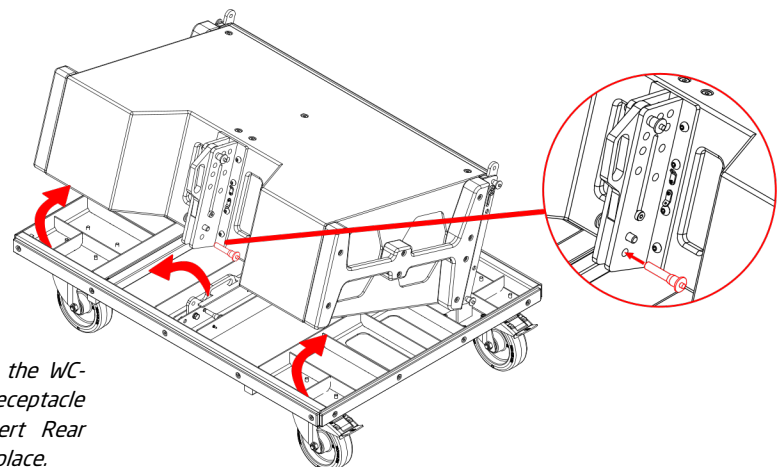
Lower first enclosure onto WC-HALO-A and locate on the front links.

Step 4.



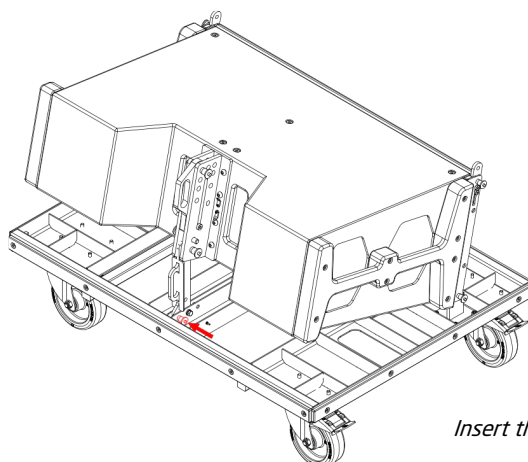
Replace the Front Enclosure Link Pin to secure the front of the HALO-A to the WC-HALO-A

Step 5.



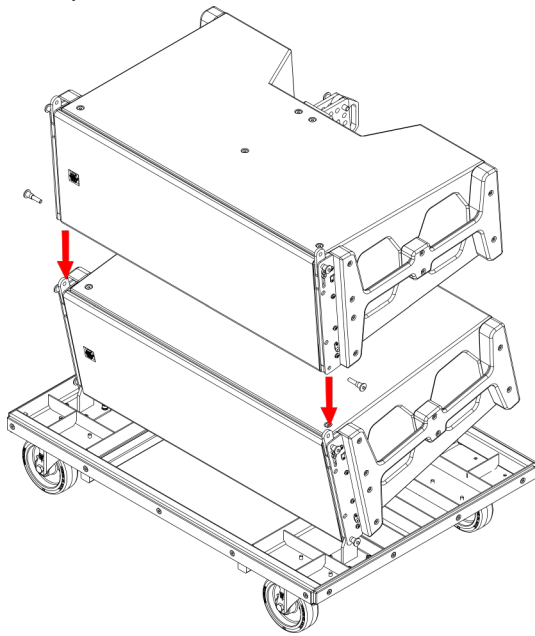
Lift the rear of the enclosure. Rotate the WC-HALO-A Rear link so it inserts into the receptacle on the HALO-A splay rigging. Insert Rear Enclosure Link pin on HALO-A to lock in place.

Step 6.



Insert the WC-HALO-A Link Pin to lock in the upright position.

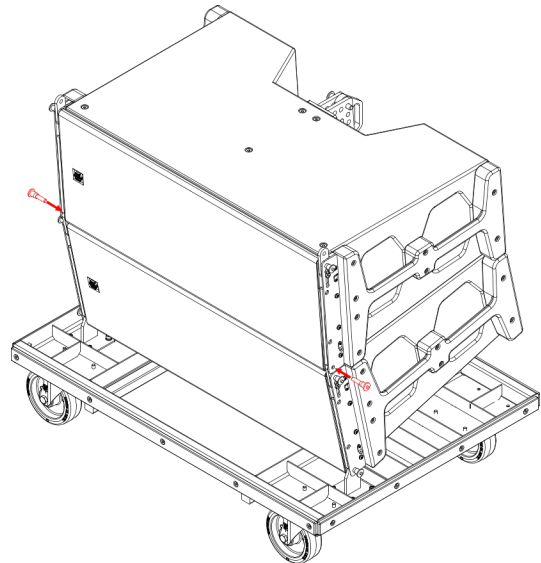
Step 7.



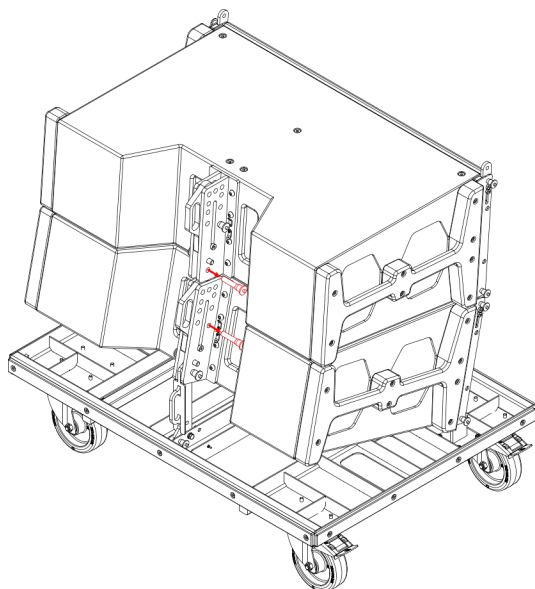
Prepare the next enclosure as above. Position the second HALO-A above the first, and lower into position so that the front links fit into the receptacles on the second (upper) HALO-A enclosure.

Step 8.

Insert the Front Enclosure Link pins on both sides to secure the fronts of the enclosures together.



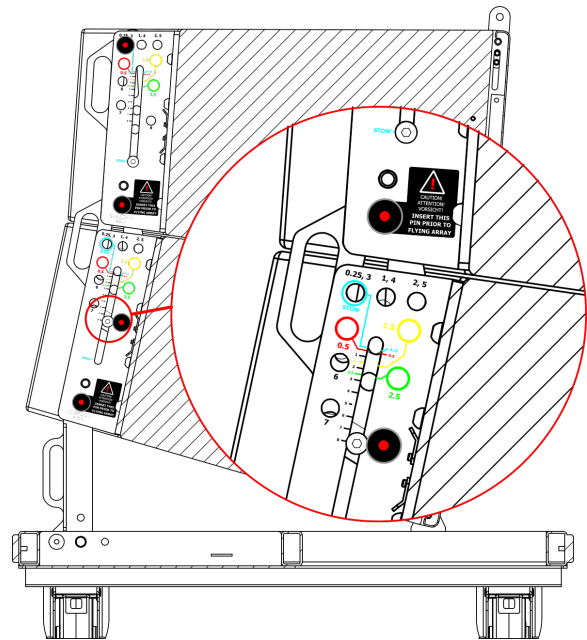
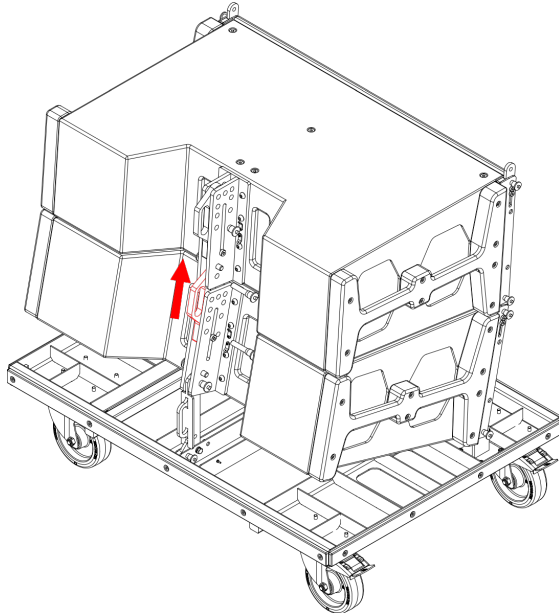
Step 9.



Remove the Rear Enclosure Link pin from the upper HALO-A and the Angle Set pin from the lower HALO-A.

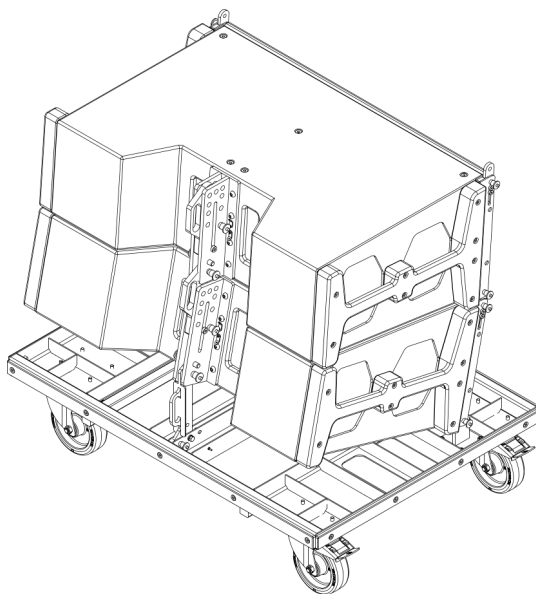
Step 10.

Slide the Splay Link on the lower HALO-A to the 8-degree position, and re-insert the Angle Set pin and the Rear Enclosure Link pin to lock the enclosures firmly together for transit.



Ensure angle set pin is engaged in the 8-degree hole to prevent the stack opening up in transit.

Step 11.

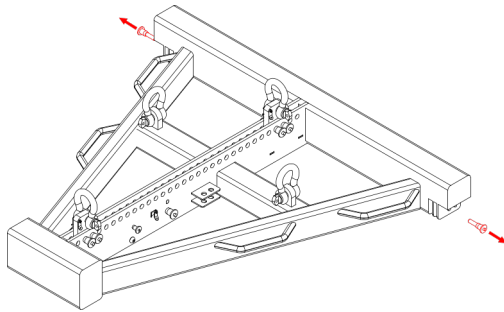


Repeat steps 7-10 to add further HALO-A enclosures up to a maximum of four per WC-HALO-A.

The optional TC-HALO-A padded transit cover fits over completed WC-HALO-A with four enclosures to add additional protection during transit.

6.2.2 - Flying From WC-HALO-A

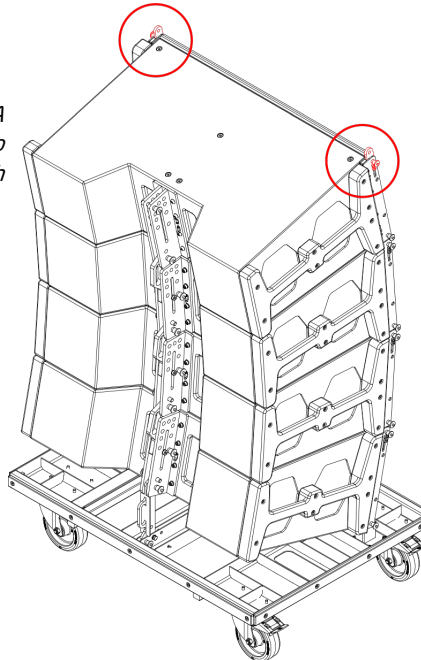
Step 1.



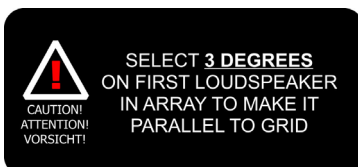
Prepare an FG-HALO-A master grid by positioning the pickup links at the desired locations (according to your EASE Focus simulation) and removing the Front Link Attachment pins.

Step 2.

Prepare the first WC-HALO-A of four HALO-A enclosures. Extend the front links of the top element - ensure to lock them in place with the Front Link Lock pins on both sides.



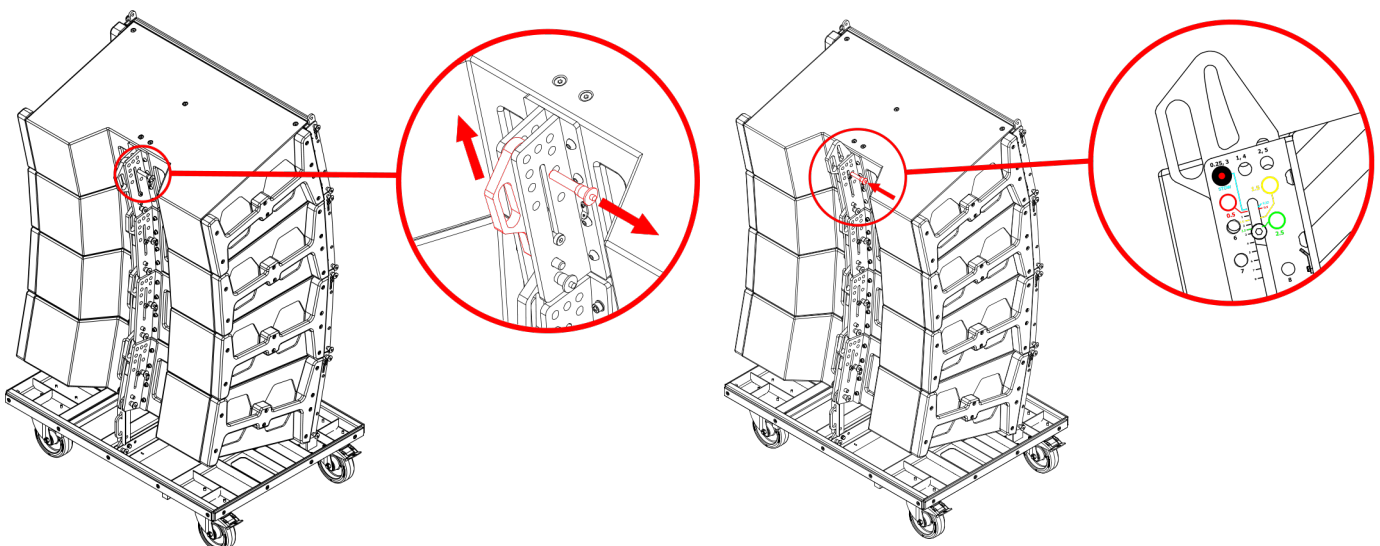
Step 3.



SELECT 3 DEGREES
ON FIRST LOUDSPEAKER
IN ARRAY TO MAKE IT
PARALLEL TO GRID

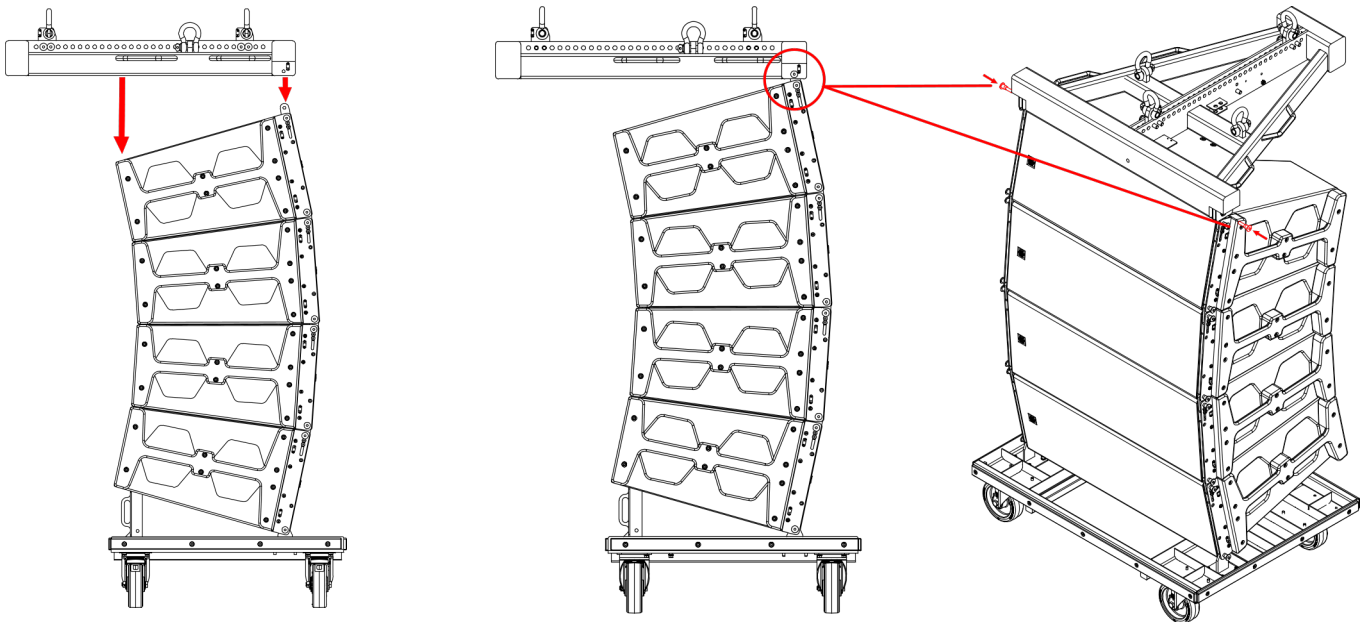
Remove the Angle Set pin on the first HALO-A element and extend the rear link to select the desired angle according to your EASE Focus simulation. Pay particular attention to the grid label legend which describes the difference between indicated angle and actual angle of the first element in the array.

Remove the Splay Link Attachment pin from its location in the spine of the FG-HALO-A.



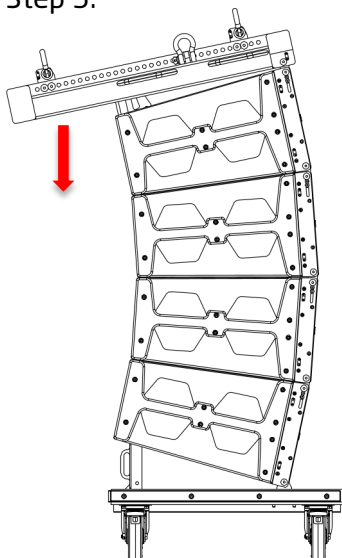
Step 4.

Position the FG-HALO-A correctly above the HALO-A enclosures, and lower into place.

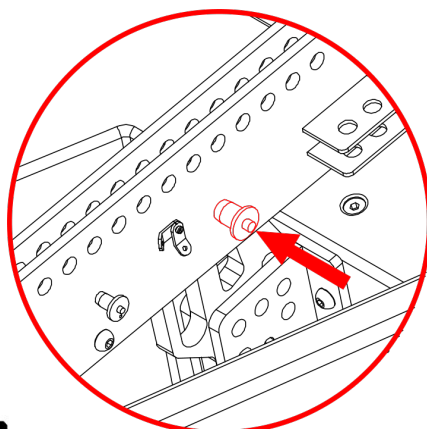
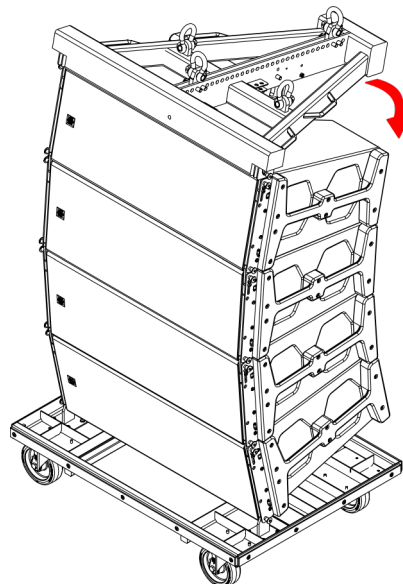


Ensure the front links are engaged in the clevis on each side of the FG-HALO-A, and securely connect the grid to the first element by reinstating the Front Link Attachment pins on both sides

Step 5.



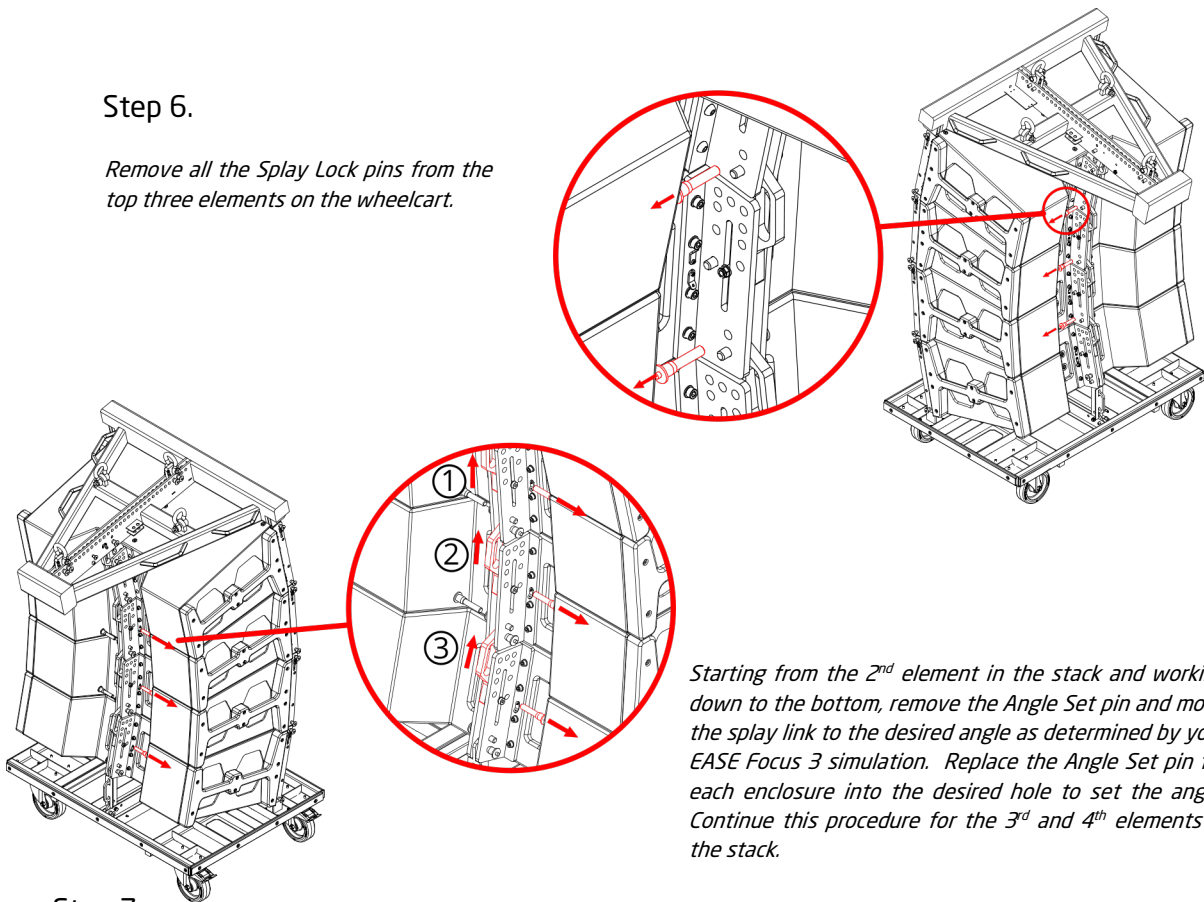
Lower the rear of the FG-HALO-A grid so that the enclosure link hole lines up with the splay link on the first HALO-A element. There is a stop inside the FG-HALO-A spine to prevent you lowering too far.



Insert the Splay Link Attachment pin back into its location on the grid spine, thereby securely attaching the FG-HALO-A to the stack of HALO-A elements.

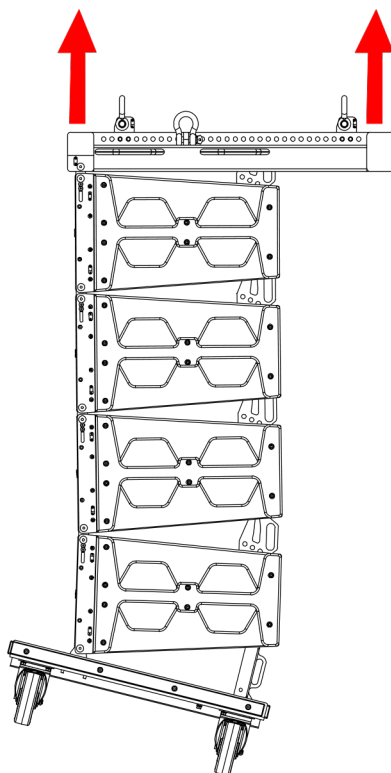
Step 6.

Remove all the Splay Lock pins from the top three elements on the wheelcart.

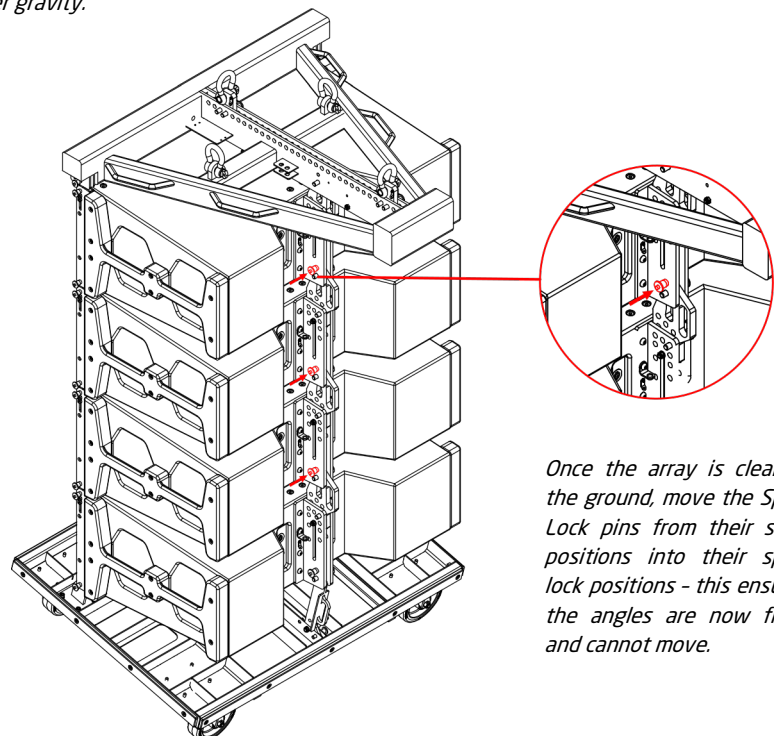


Starting from the 2nd element in the stack and working down to the bottom, remove the Angle Set pin and move the splay link to the desired angle as determined by your EASE Focus 3 simulation. Replace the Angle Set pin for each enclosure into the desired hole to set the angle. Continue this procedure for the 3rd and 4th elements in the stack.

Step 7.

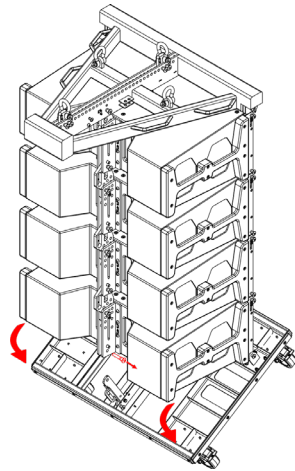


Lift the array, and this will allow the rear angles to open up to their settings under gravity.



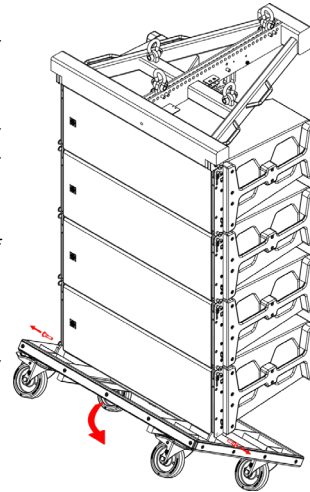
Once the array is clear of the ground, move the Splay Lock pins from their stow positions into their splay lock positions - this ensures the angles are now fixed and cannot move.

Step 8.

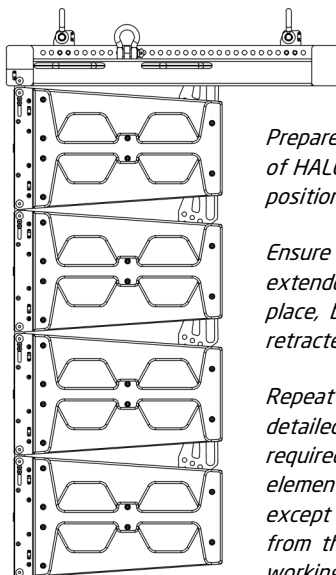


Holding the rear of the wheelcart, remove the Rear Enclosure Link pin from the bottom element of the array so that the wheelcart is released. Gently lower it to the floor.

Now, holding the front of the wheelcart, remove the Front Enclosure Link pins on both sides to remove the wheelcart entirely. Lower it to the floor and set aside.



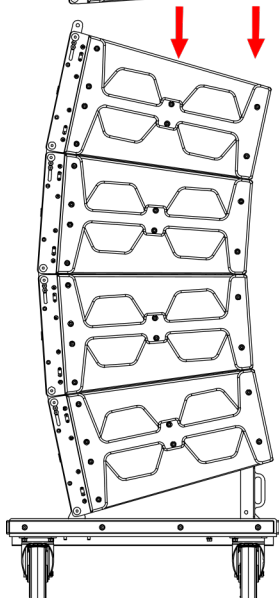
Step 9.



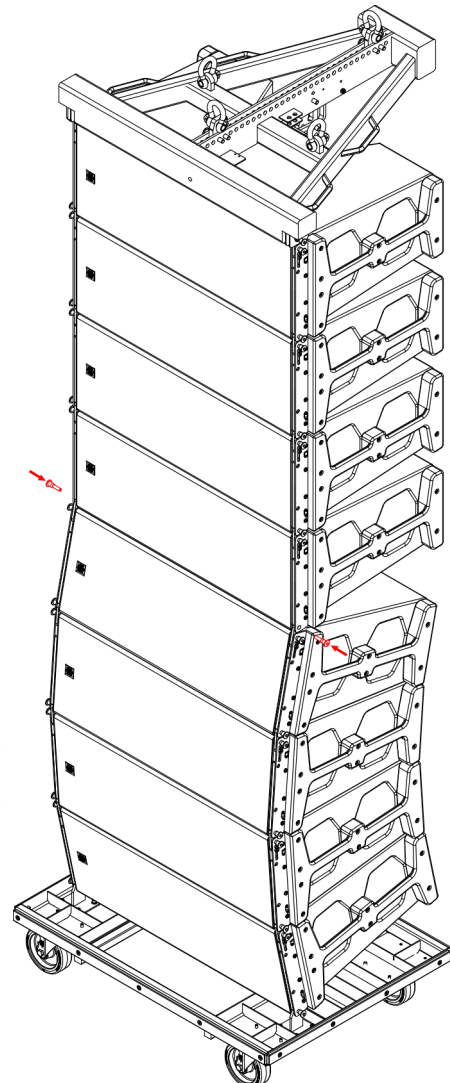
Prepare a second wheelcart of HALO-A and move it into position under the first four.

Ensure front links are extended and locked in place, but the splay link is retracted for the time being.

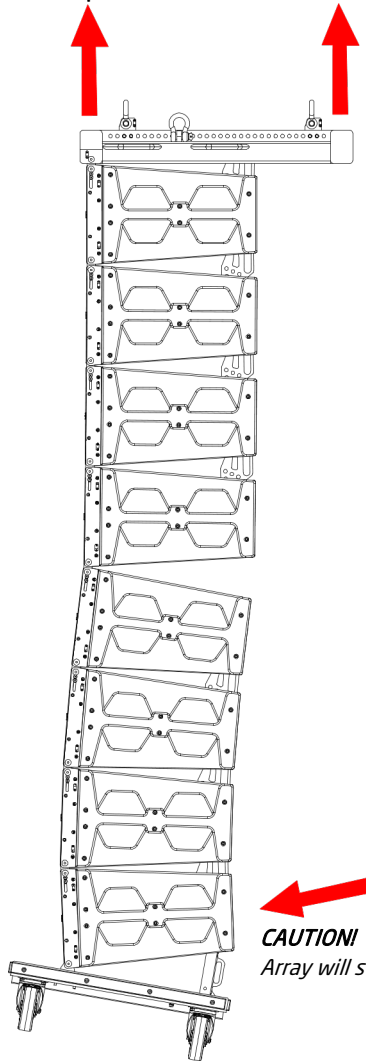
Repeat the procedure detailed above to set the required angles on the elements of the new stack except the top one, starting from the 2nd element and working down.



Lower the hanging array until the front links of the additional stack engage in the receptacles on either side of the flown array. Reinsert the Front Enclosure Link pins to lock the two blocks together at the front.



Step 10.



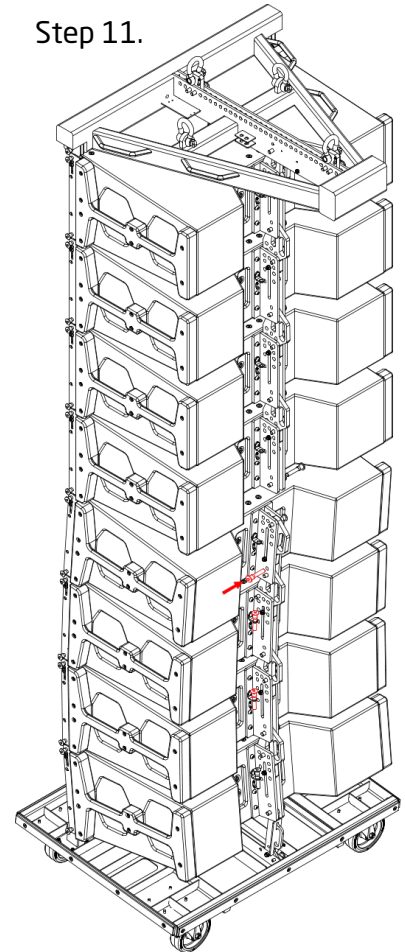
Lift the array.

The lower four enclosures will swing forwards, so pay close attention to where other team members are located when lifting.

As the lower four leave the ground, their angles will open out as before.

CAUTION!
Array will swing forwards

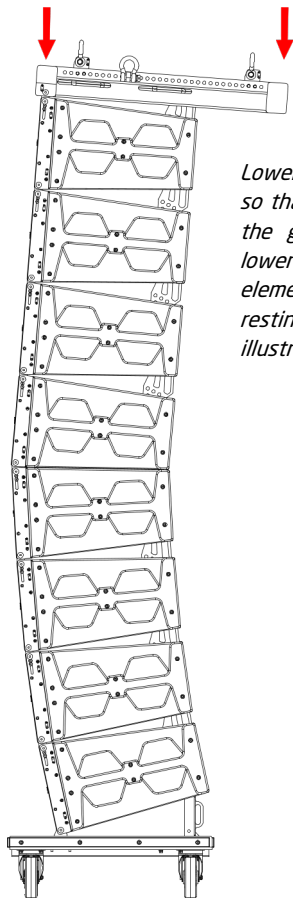
Step 11.



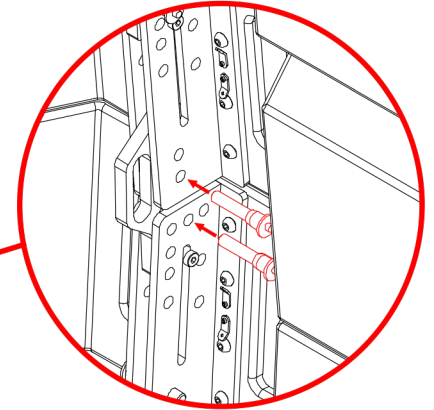
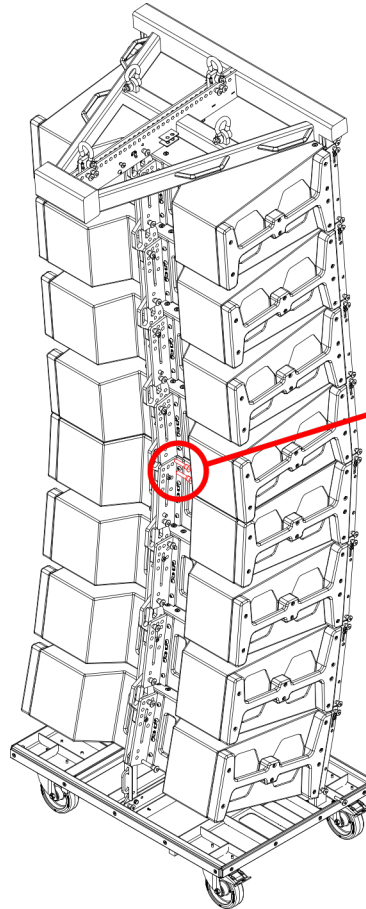
Once the lower four elements are clear of the ground and are hanging, move the Splay Lock pins from their stow locations into their use locations as above. This will lock the angles of the bottom four enclosures.

Be aware, the splay link on the first element of the lower four should remain retracted at this point.

Step 12.



Lower the array once more so that the wheelcart is on the ground. Continue to lower until the 4th & 5th elements in the array are resting on each other as illustrated.

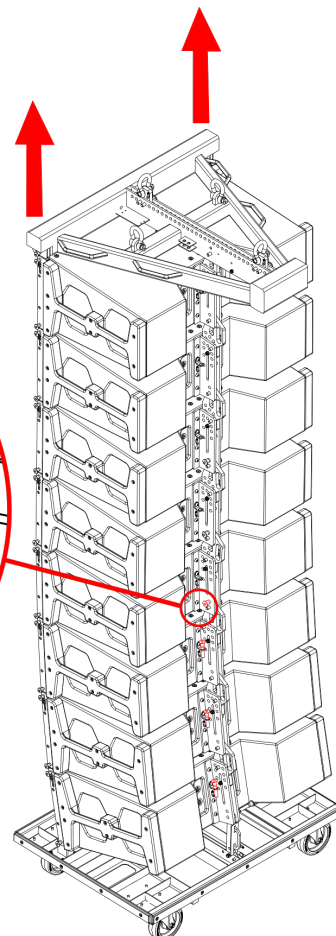
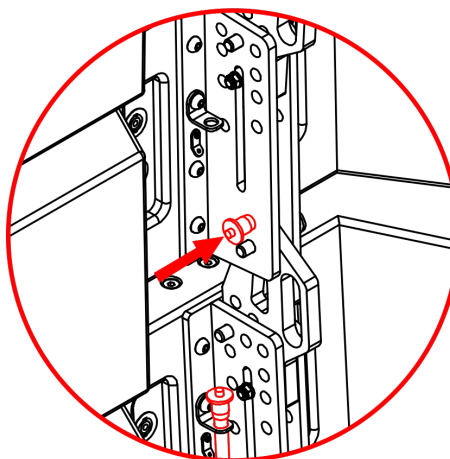


Remove the Rear Enclosure Link pin from the 4th element, and the Angle Set pin from the 5th element. Slide the splay link to the correct angle as per your EASE Focus simulation, and reinstate the Angle Set and Rear Enclosure Link pins.

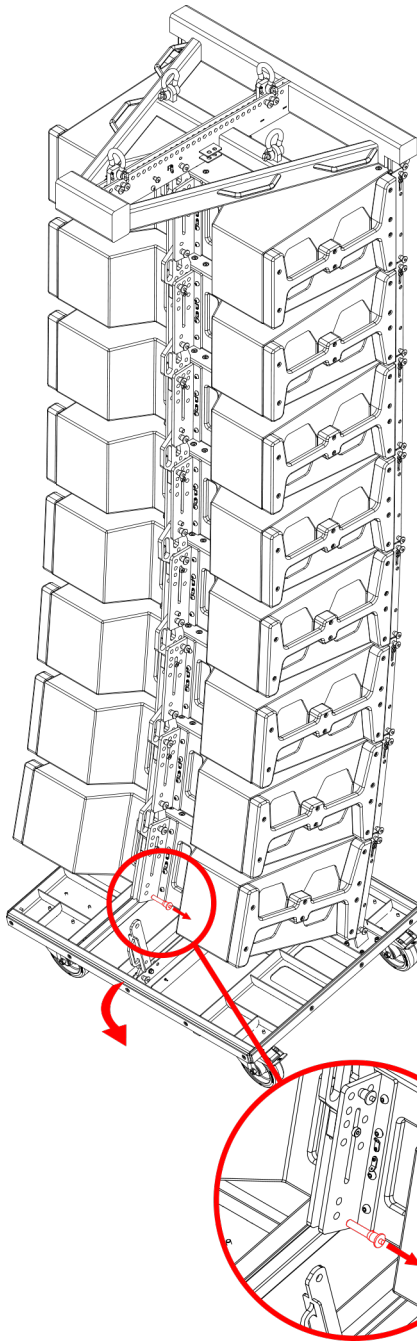
Step 13.

Lift the array clear of the floor once again. The angle between the 4th and 5th elements will now open up, and the array will hang as intended by the angles you have set.

Once it is hanging, move the Splay Lock pin on the 4th element from its stow location to its use location to secure the whole array.

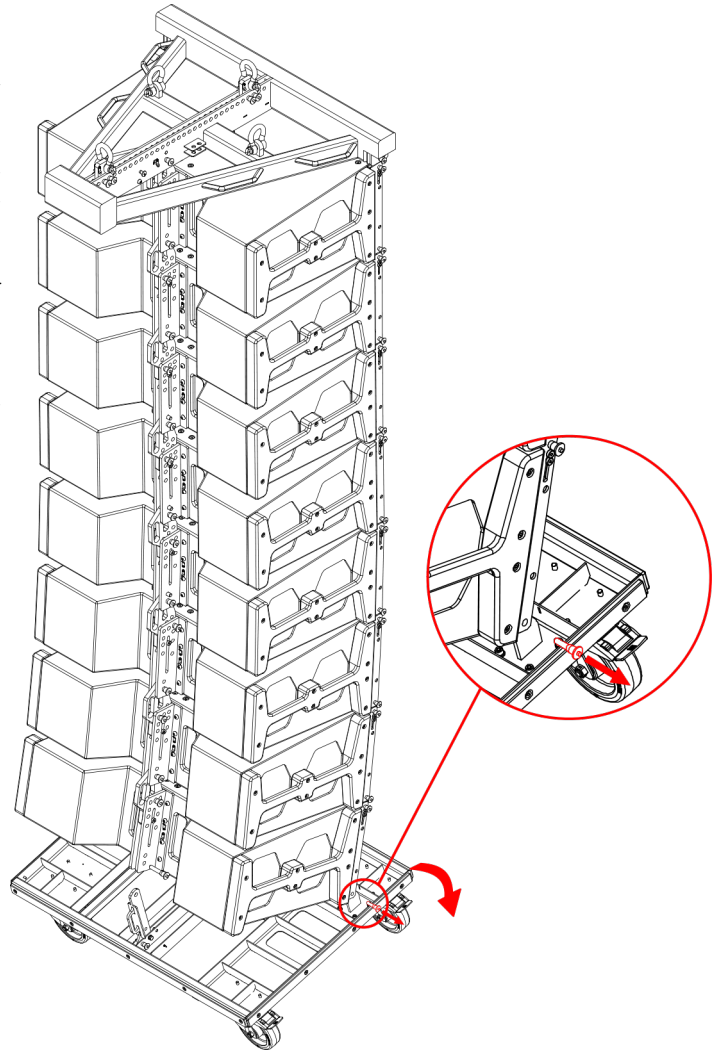


Step 14.



Holding the rear of the wheelcart, remove the Rear Enclosure Link pin from the bottom element of the array so that the wheelcart is released. Gently lower it to the floor.

Now, holding the front of the wheelcart, remove the Front Enclosure Link pins on both sides to remove the wheelcart entirely. Lower it to the floor and set aside.



Step 15.

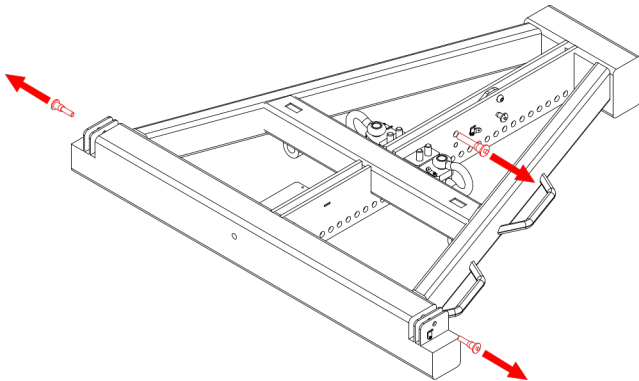
Repeat steps 9 to 14 again to continue to assemble the array according to your simulation - up to a maximum of 24 elements.

6.3 - Ground stacking with FG-HALO-A

Step 1.

Prepare the FG-HALO-A by inverting it and removing the Front Link Attachment pins and the Splay Link Attachment pin.

Ensure that the FG-HALO-A is on a flat surface and is stable before proceeding any further.

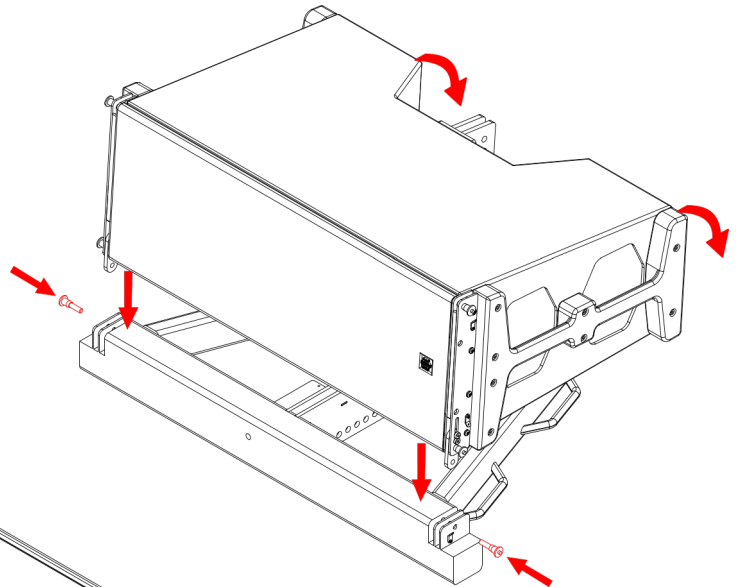


Step 2.

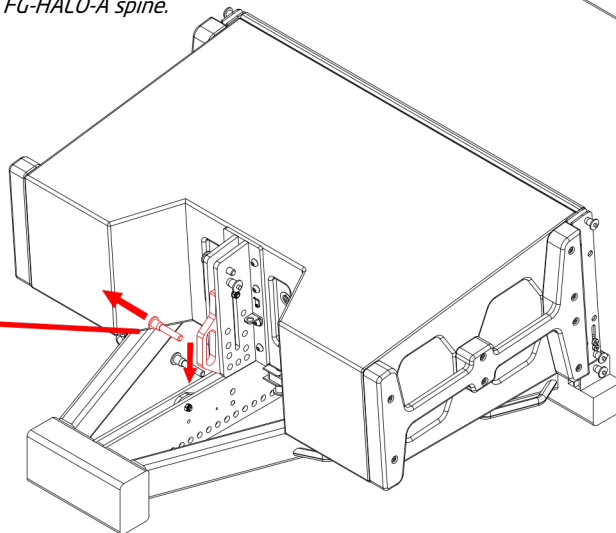
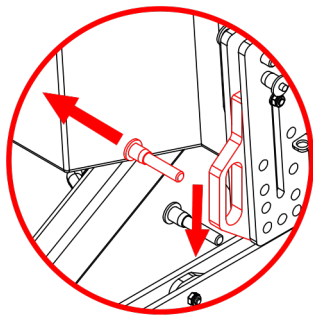
Prepare the first HALO-A enclosure by extending the front rigging links as described in 6.1.1 above.

Invert the HALO-A and lower it into position so that the front links engage in their receptacles on the FG-HALO-A.

Engage the Front Link Attachment pins to secure the HALO-A to the FG-HALO-A and then lower the rear of the enclosure to rest on the FG-HALO-A spine.



Step 3.

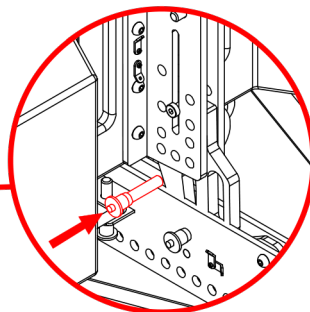
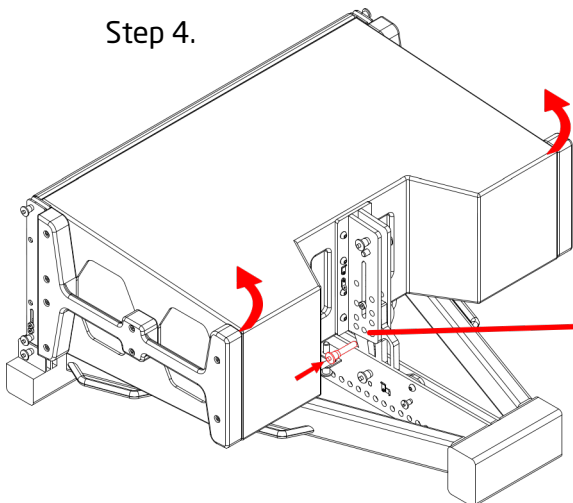


Remove the Angle Set pin from the rear of the HALO-A, which will allow the splay link to drop down into the spine slot under gravity.

There is a metal stop welded to the spine which prevents the link from falling too far.

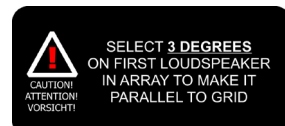
Re-insert the Splay Link Attachment pin into the spine of the FG-HALO-A to secure the enclosure to the grid.

Step 4.

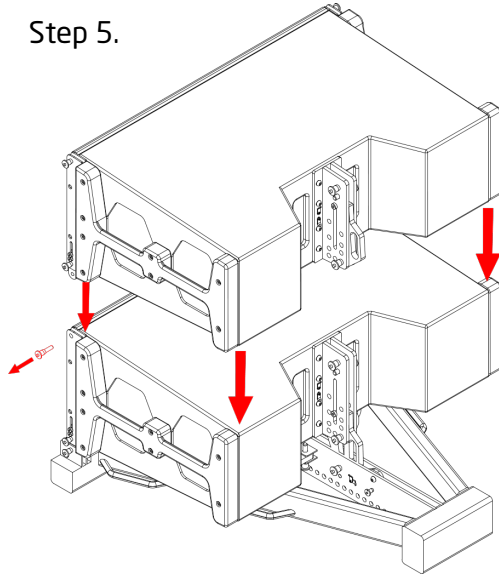


Lift the rear of the HALO-A enclosure to allow the splay link to move within the splay rigging assembly. Select the appropriate angle as determined by your EASE Focus simulation, and insert the Angle Set pin into the appropriate hole.

Pay close attention to the label on the FG-HALO-A which illustrates the difference between indicated angle and achieved angle on the FG-HALO-A.



Step 5.



Remove the Front Enclosure Link pins from the attached HALO-A enclosure.

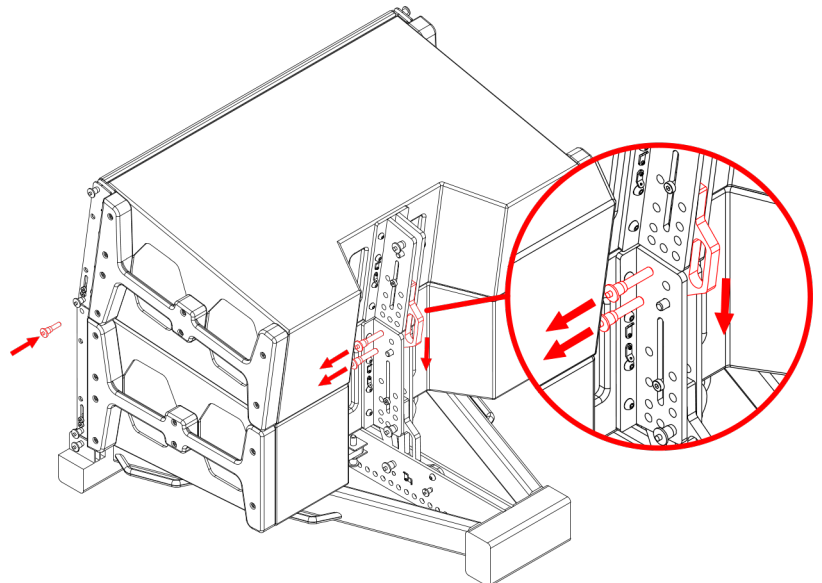
Prepare a second HALO-A enclosure as described in 6.1.1 above. Invert the enclosure and lower it into place on the first.

Engage the Front Enclosure Link pins to lock the two enclosures together, and lower the rear of the enclosure so they rest on each other.

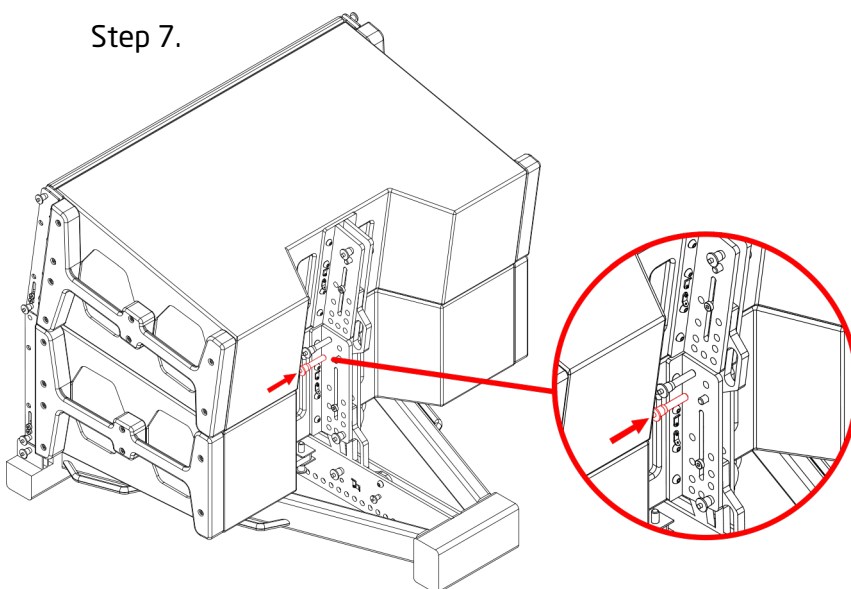
Step 6.

Remove the Rear Enclosure Link pin from the lower enclosure, and the Angle Set pin from the upper enclosure. This will allow the splay link to drop under gravity into the enclosure link receptacle on the lower enclosure.

It will rest on the splay lock pin of the lower enclosure, preventing it from falling too far.

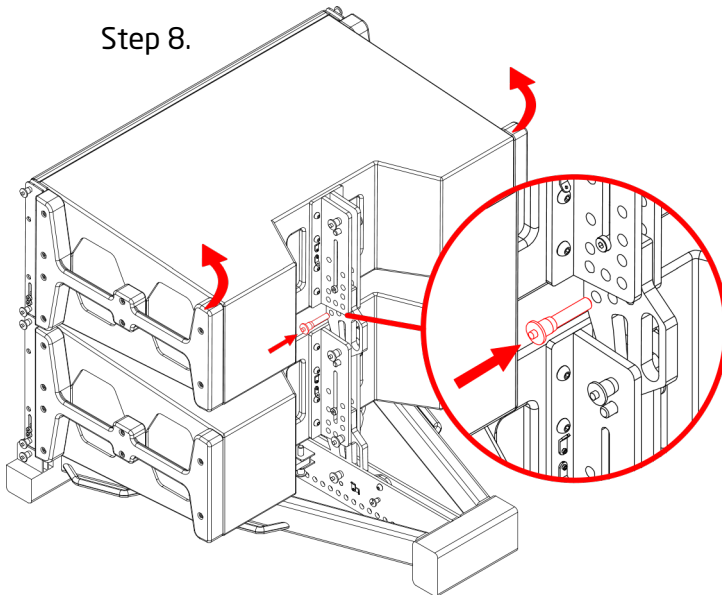


Step 7.



Insert the Rear Enclosure Link pin which will join the two enclosures together.

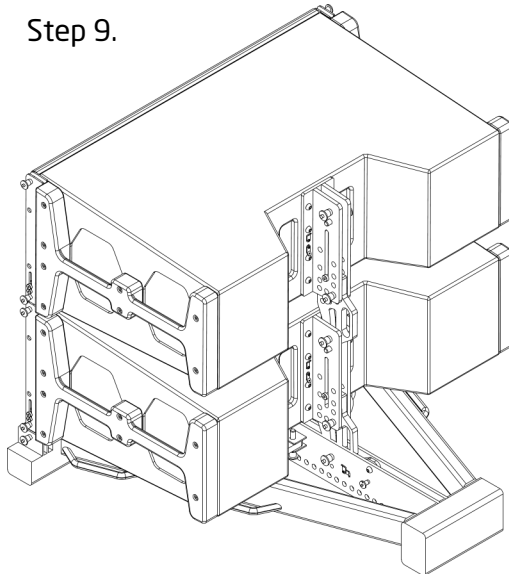
Step 8.



Lift the rear of the upper enclosure, allowing the splay link to move within the splay rigging assembly.

Select the desired angle from your EASE Focus simulation, and insert the Angle Set pin into the corresponding location hole.

Step 9.

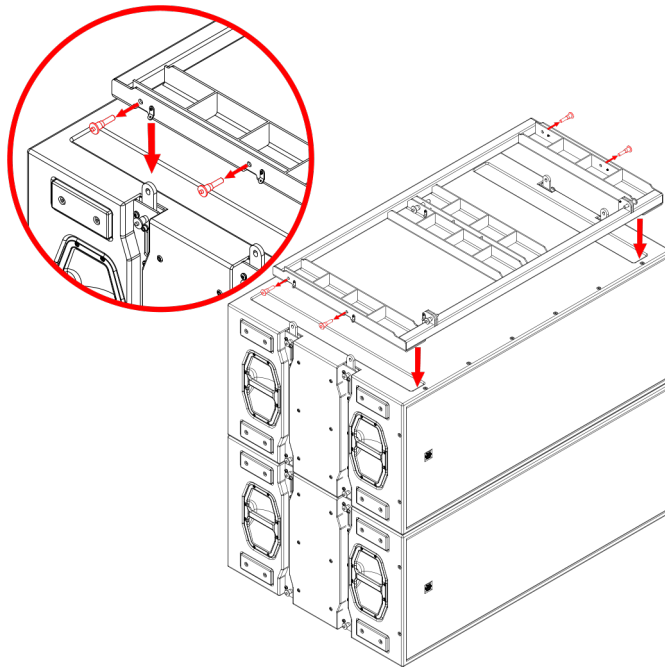


Repeat steps 5-8 with further HALO-A enclosures to complete your ground stack, up to a maximum of 8 HALO-A elements.

FOR GROUND STACKS GREATER THAN TWO HALO-A ELEMENTS, THE FG-HALO-A MUST BE SECURED TO THE SURFACE IT IS RESTING ON BY RATCHET STRAPS OR SIMILAR.

6.4 - Ground Stacking with GS-HALO-A

Step 1.



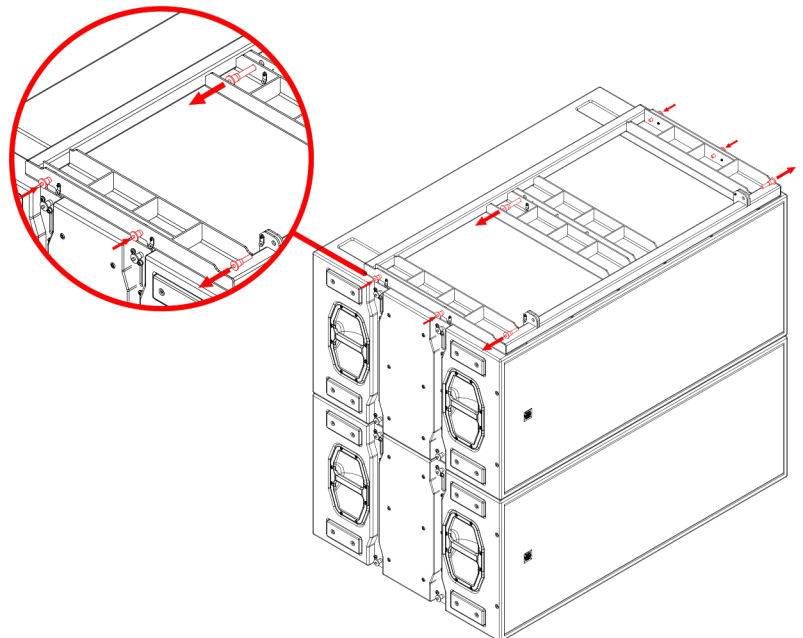
Prepare the ST-218 subwoofer stack as required, and ensure the rigging links are extended on the top subwoofer.

Prepare the GS-HALO-A by removing the four ST-218 link pins and lower the GS-HALO-A into position, ensuring that the ST-218 links engage into the slots in the outer edges of the GS-HALO-A.

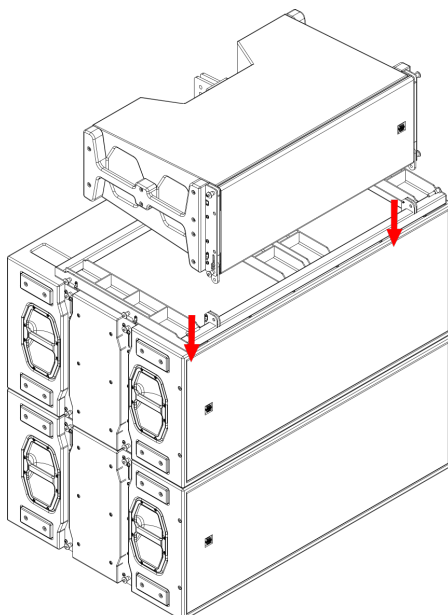
Step 2.

Engage the four ST-218 link pins to securely lock the GS-HALO-A to the subwoofer stack.

Remove the HALO-A Front Link and Splay Link Attachment point pins ready to receive the first HALO-A enclosure.



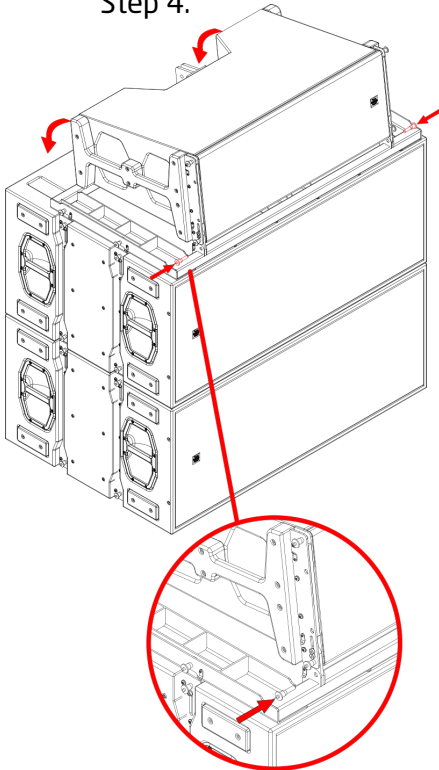
Step 3.



Prepare the first HALO-A enclosure by extending the front rigging links as described in 6.1.1 above.

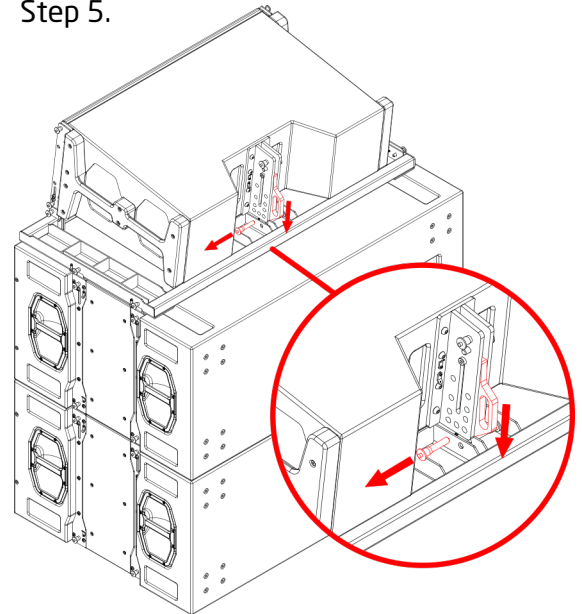
Invert the HALO-A and lower it into position so that the front links engage in their receptacles on the GS-HALO-A.

Step 4.



Insert the Front Link Attachment pins on both sides to secure the HALO-A to the GS-HALO-A, and lower the rear of the enclosure to rest on the GS-HALO-A spine.

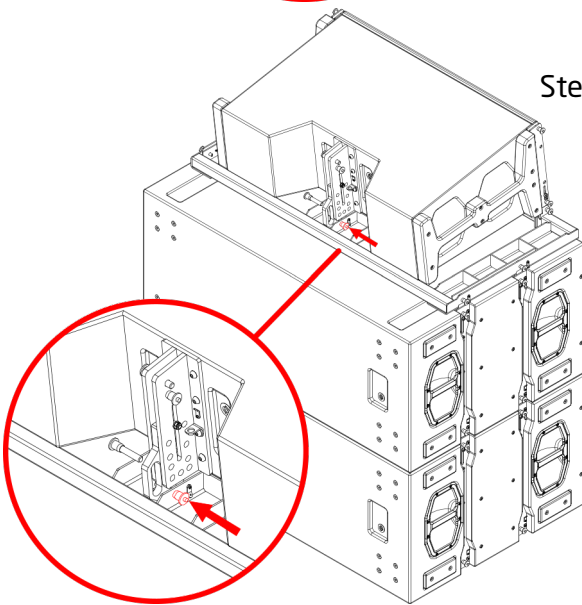
Step 5.



Remove the Angle Set pin from the rear of the HALO-A, which will allow the splay link to drop down into the spine slot under gravity.

There is a metal stop welded to the spine which prevents the link from falling too far and damaging the subwoofer beneath.

Step 6.



Insert the Splay Link Attachment pin in the GS-HALO-A spine, thereby locking the splay link in place within the GS-HALO-A.

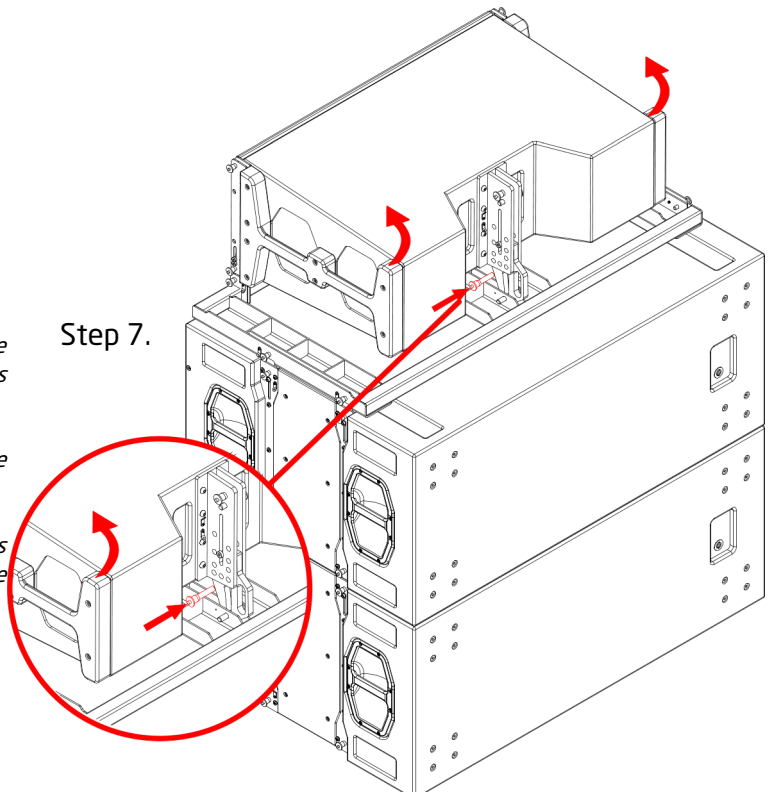
Lift the rear of the HALO-A enclosure to allow the splay link to move within the splay rigging assembly. Select the appropriate angle as determined by your EASE Focus simulation.

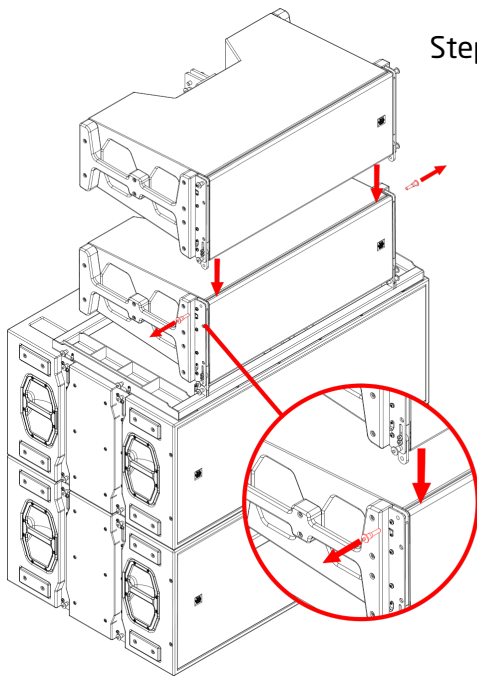
Insert the Angle Set pin on the HALO-A to select the desired angle and lock it in place.

Pay close attention to the label on the GS-HALO-A which illustrates the difference between indicated angle and achieved angle on the GS-HALO-A.

	MODEL: GS-HALO-A SERIAL: R510.04 WEIGHT: 25.7KG	
	ANGLE SETTING:	
1ST HALO-A ANGLE	ACTUAL ANGLE	
0.25 DEGREES	-2.75 DEGREES	
3 DEGREES	HORIZONTAL	
5 DEGREES	+2 DEGREES	
8 DEGREES	+5 DEGREES	

Step 7.

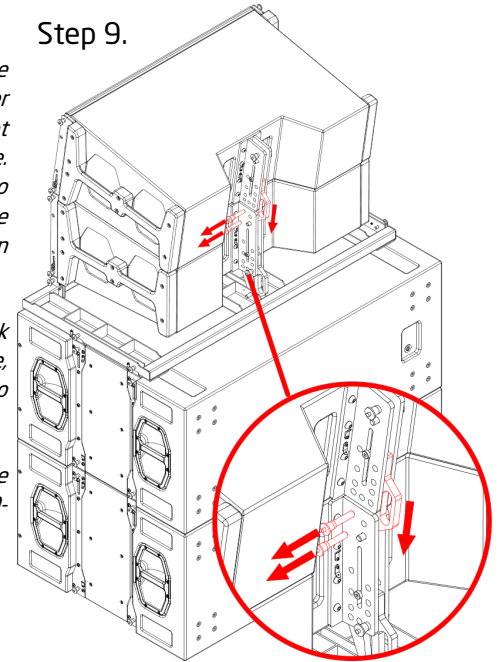


Step 8.

Remove the Front Enclosure Link pins from the attached HALO-A enclosure.

Prepare a second HALO-A enclosure as described in 6.1.1 above. Invert the enclosure and lower it into place on the first.

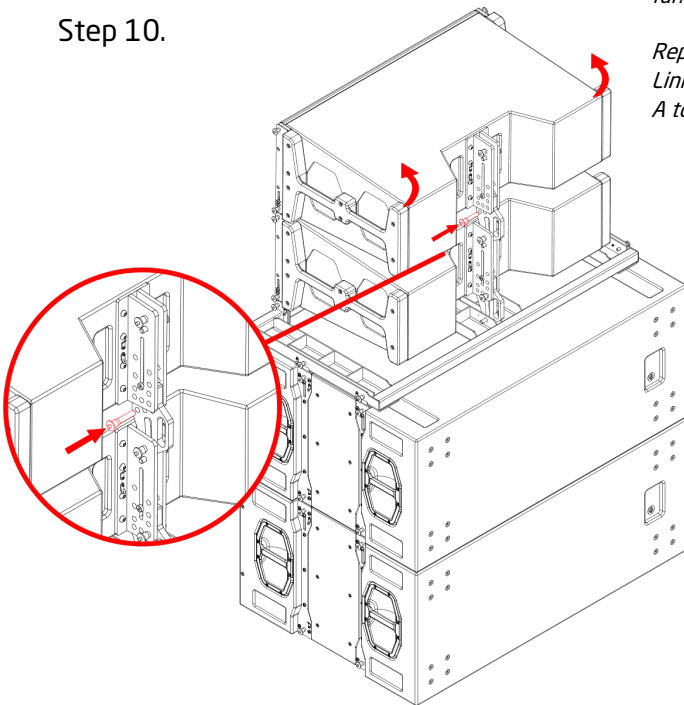
Engage the Front Enclosure Link pins to lock the two enclosures together, and lower the rear of the enclosure so they rest on each other.

Step 9.

Remove the Rear Enclosure Link pin from the lower enclosure, and the Angle Set pin from the upper enclosure. This will allow the splay link to drop under gravity into the enclosure link receptacle on the lower enclosure.

It will rest on the splay lock pin of the lower enclosure, preventing it from falling too far.

Replace the Rear Enclosure Link pin to join the two HALO-A together.

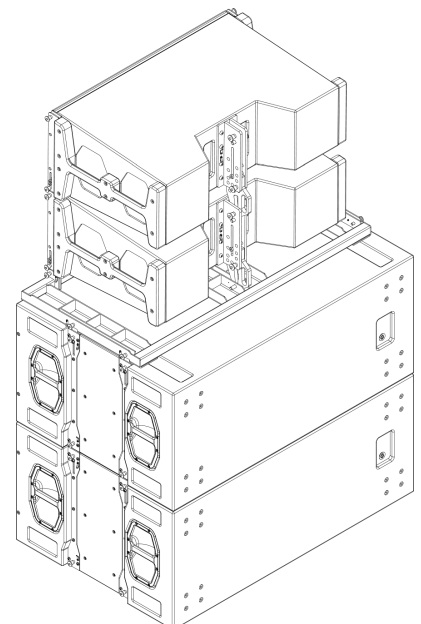
Step 10.

Lift the rear of the upper enclosure, allowing the splay link to move within the splay rigging assembly.

Select the desired angle from your EASE Focus simulation, and insert the Angle Set pin into the corresponding location hole.

Step 11.

Repeat steps 8-10 until your ground stack is complete, up to a maximum of 6 HALO-A elements.

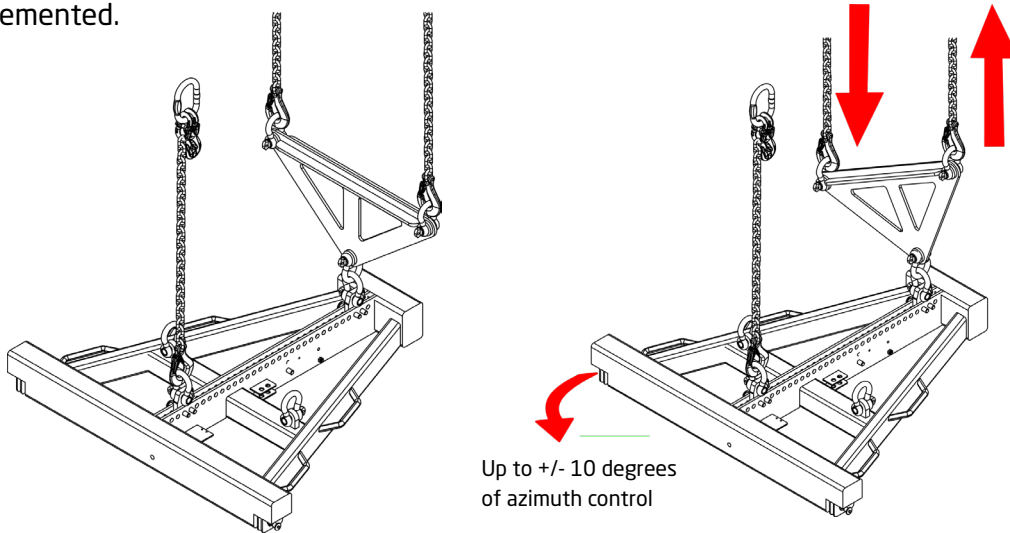


6.5 - Using the HALO-A-DELTA

The HALO-A-DELTA provides a means of adjusting the azimuth of a flown array remotely, using a 3rd motor.

The primary load must always be on the front pickup point, so the array should be designed as a single point hang with the rear motors provided purely for azimuth adjustment.

By lifting and lowering the rear motors, up to +/- 10 degrees of azimuth control can be implemented.



6.6 Using the CHAIN-HALO-A lifting chain

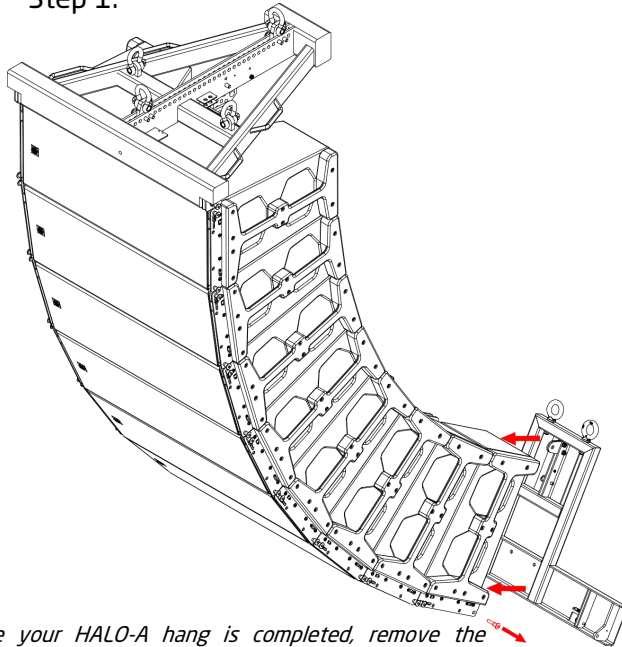
Self-climbing motors have chain bags, which hang below the motor and can foul the correct position of the FG-HALO-A. The CHAIN-HALO-A is a 1m effective length lifting chain with a SWL of 2500kg which is intended to sit between the motor hook and the FG-HALO-A pickup link. The CHAIN-HALO-A has a chain hook included so that the chain length can be adjusted as necessary.

Using the CHAIN-HALO-A allows you to create sufficient space below the motor for the chain bag to sit safely.

6.7 - Using the PB-HALO-A

6.7.1 - As A Pull Back

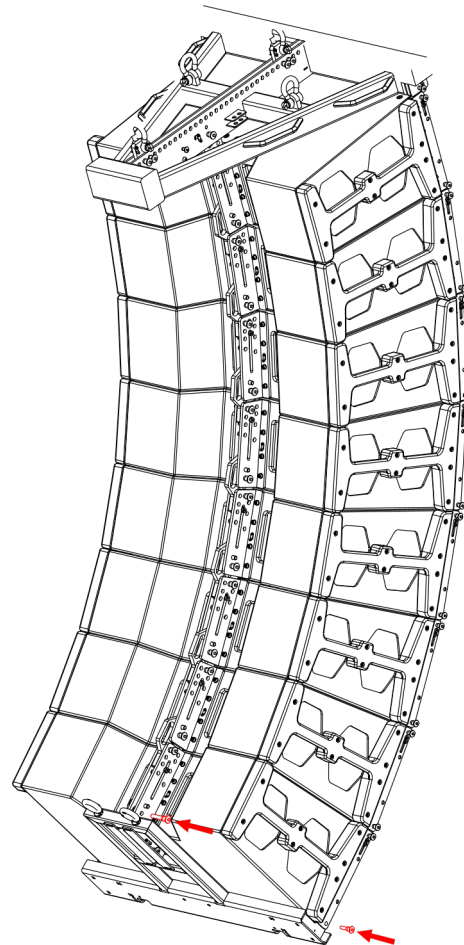
Step 1.



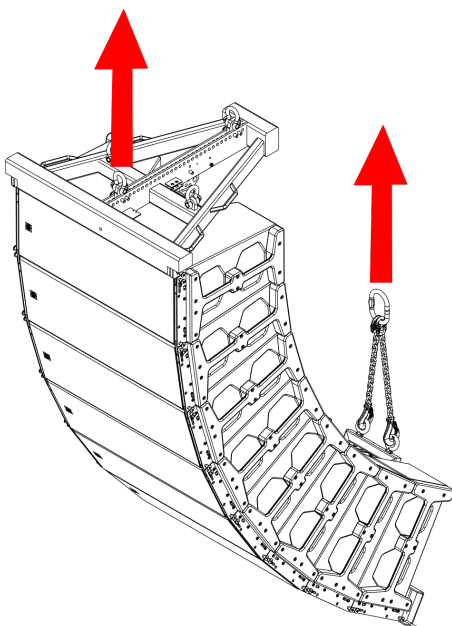
Once your HALO-A hang is completed, remove the Enclosure Link pins and the Rear Enclosure Link pin from the bottom HALO-A enclosure.

Lift the PB-HALO-A frame up and engage the lugs into the receptacles on the bottom HALO-A.

Replace the Front & Rear Enclosure Link pins to securely attach the PB-HALO-A frame to the underside of the bottom HALO-A.



Step 2.

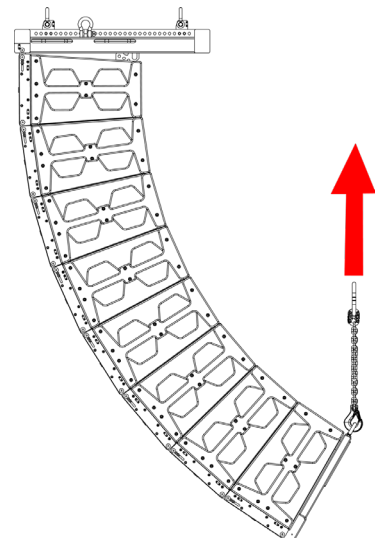


Use a 2-leg bridle such as the SAFETY-HALO-A to connect to the two pull-back eyes on the rear of the PB-HALO-A.

By attaching this bridle to a second motor, pull-back can be implemented to increase the down-angle of the flown array.

Motors should be positioned to ensure they are as vertical as possible when the array is in its final position.

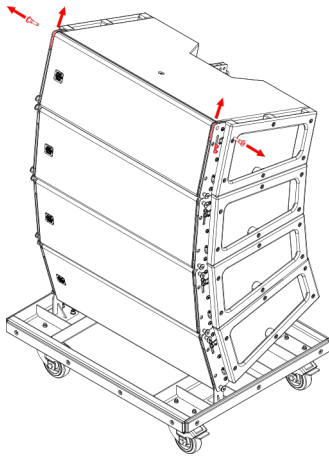
PB-HALO-A SHOULD ONLY BE USED AS A PULL-BACK ON ARRAYS OF 8 ELEMENTS OR FEWER.



6.7.2 - To Underhang HALO-B as a downfill system

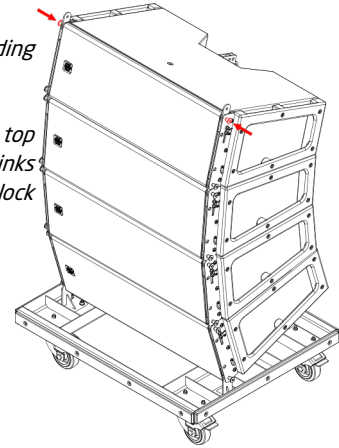
Step 1. *Assemble your HALO-A array as detailed in section 6.2.2 above*

Step 2.

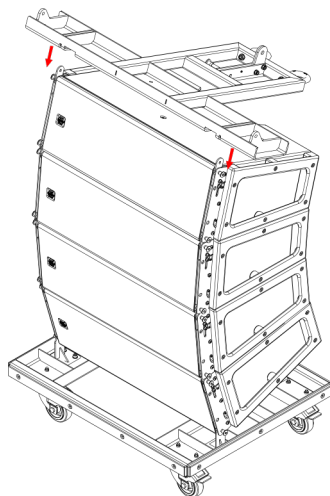


Prepare the first WC-HALO-B by extending the HALO-B front links.

Remove the Front Link Lock pins on the top HALO-B enclosure, extend the front links and replace the Front Link Lock pins to lock the links in place.



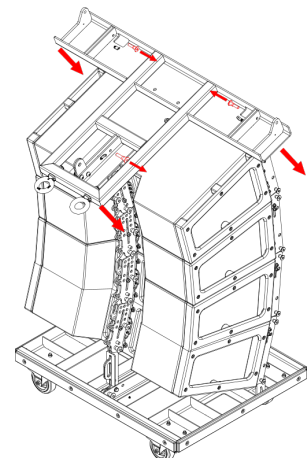
Step 3.



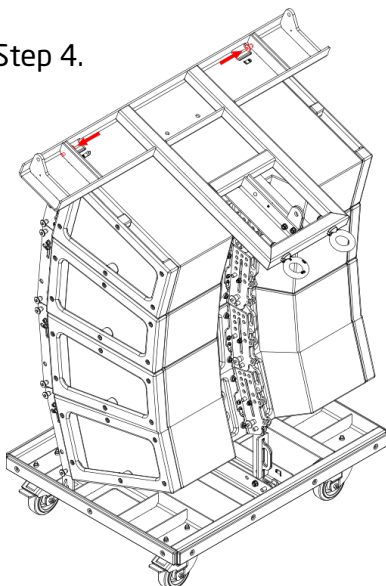
Position the PB-HALO-B above the WC-HALO-B.

Remove the HALO-B Front Link Attachment pins on both sides, and the HALO-B Rear Link Attachment pin from the PB-HALO-A spine.

Lower the PB-HALO-A on to the top HALO-B enclosure, ensuring that the HALO-B front enclosure links engage in the receptacle on

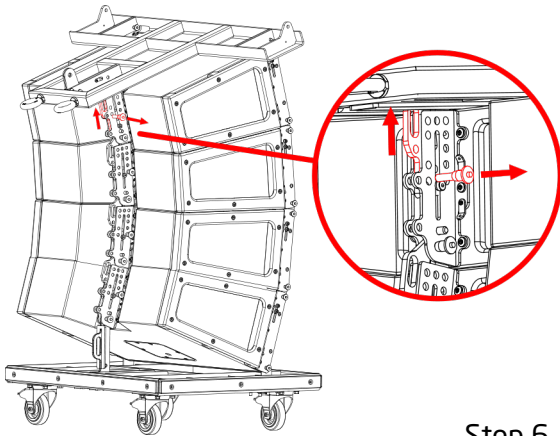


Step 4.



Insert the HALO-B Front Link Attachment pins back in place to secure the front of the PB-HALO-B to the top HALO-B enclosure.

Step 5.



Remove the Angle Set pin from the first HALO-B enclosure, and slide the Splay Link upwards into the slot in the spine of the PB-HALO-A.

Slide the link upwards to select the angle required as per your EASE Focus simulation.

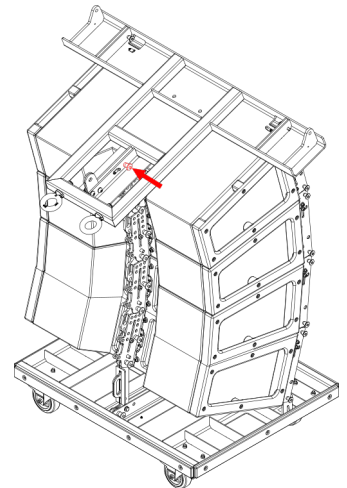
Note the label artwork on the PB-HALO-A which details the difference between indicated angle and actual angle on the HALO-B enclosure.

		MODEL: PB-HALO-A SERIAL: R511.01 WEIGHT: 16KG
ANGLE SETTING:		
1ST HALO-B ANGLE	ACTUAL ANGLE	
1 DEGREE	PARALLEL TO HALO-A	
3 DEGREES	-2 DEGREES	
5 DEGREES	-4 DEGREES	
10 DEGREES	-9 DEGREES	
DO NOT SET HALO-B AT LESS THAN 1 DEGREE		

Step 6.

Lift the rear of the PB-HALO-A so that the Rear Link Attachment pin hole lines up with the slot in the splay link of the HALO-B enclosure. Insert the Rear Link Attachment pin in the PB-HALO-A to secure them.

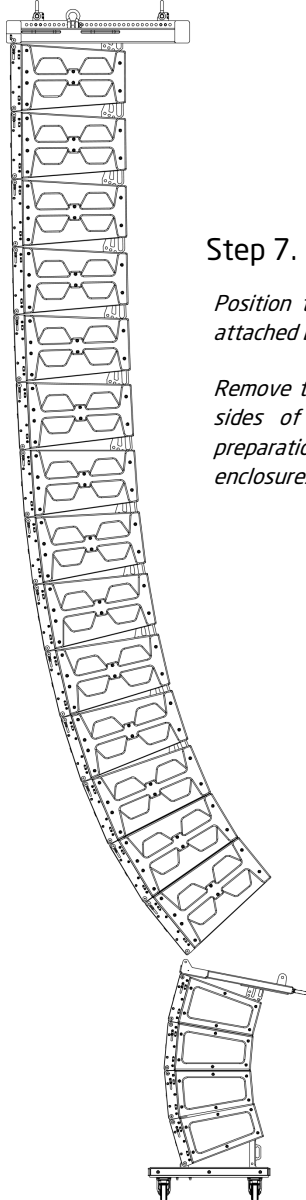
TAKE NOTE: The splay link on a HALO-B is a slot, not a hole - and therefore the PB-HALO-A will drop down to rest on the HALO-B enclosure when released. Take care!



Step 7.

Position the WC-HALO-B with the PB-HALO-A attached below your flown HALO-A system.

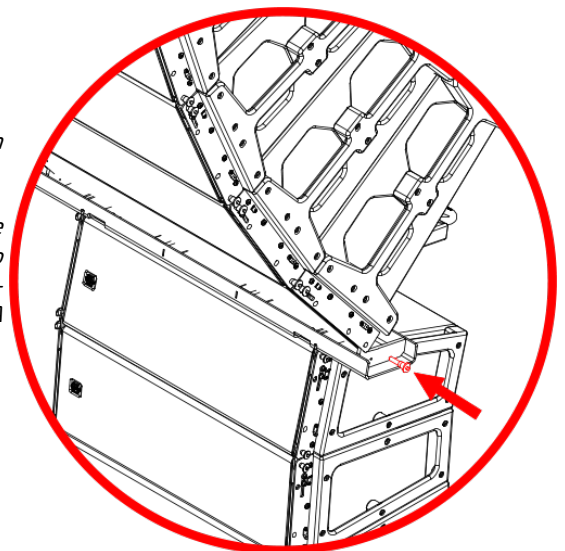
Remove the Front Enclosure Link pins on both sides of the bottom HALO-A enclosure in preparation for attaching the HALO-B enclosures.



Step 8.

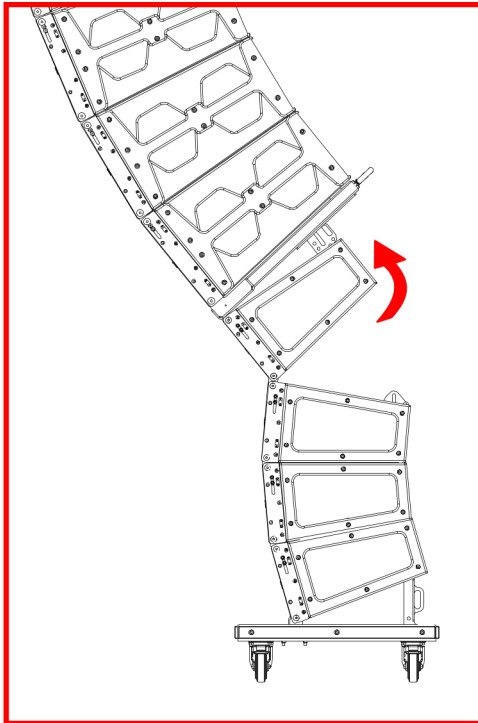
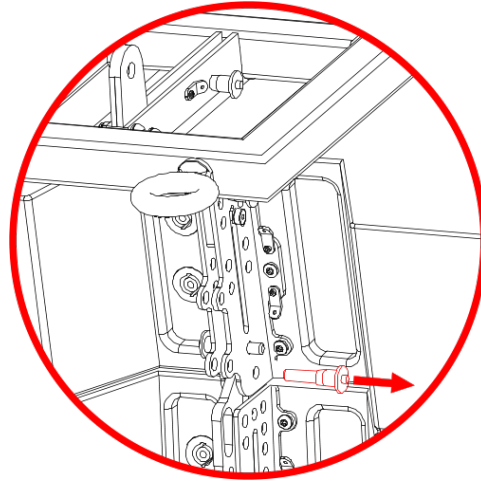
Line the HALO-A hang up with the PB-HALO-A front links.

Once completely lined up, replace the Front Enclosure Link pins to secure the front of the PB-HALO-A to the bottom HALO-A enclosure.



Step 9.

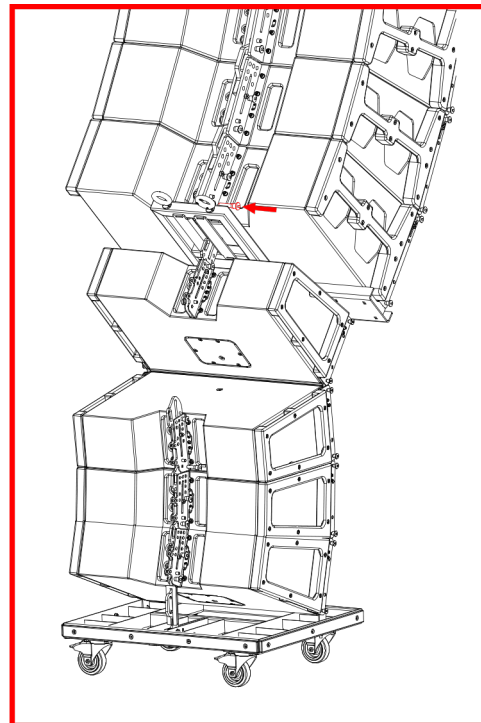
Remove the Rear Enclosure Link pin on the first HALO-B enclosure - this separates this enclosure at the rear from the 2nd in the stack on the WC-HALO-B



Step 10.

Lift the rear of the first HALO-B enclosure, pivoting it around the front rigging between the 1st and 2nd HALO-B elements. Continue to lift until the PB-HALO-A rear link engages in the receptacle for the Rear Link Attachment of the bottom HALO-A enclosure.

Insert the Rear Enclosure Link pin in the bottom HALO-A to secure the PB-HALO-A in place.

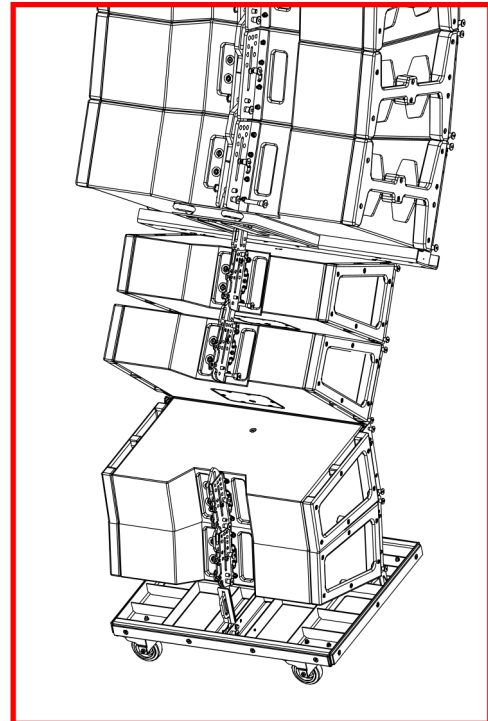
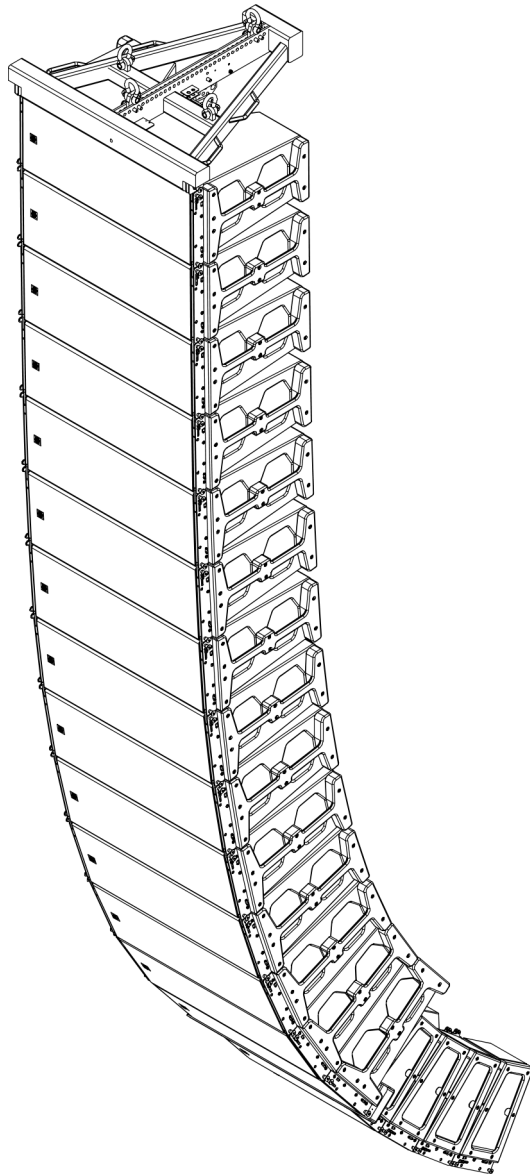


Step 11.

Repeat step 10 for the remaining enclosures on the WC-HALO-B cart.

As each enclosure is locked in place, use the Angle Set pin to ensure each element is correctly angled as per your EASE Focus simulation.

*Continue to repeat Step 10 up to a maximum of **six** HALO-B enclosures in the underhang.*



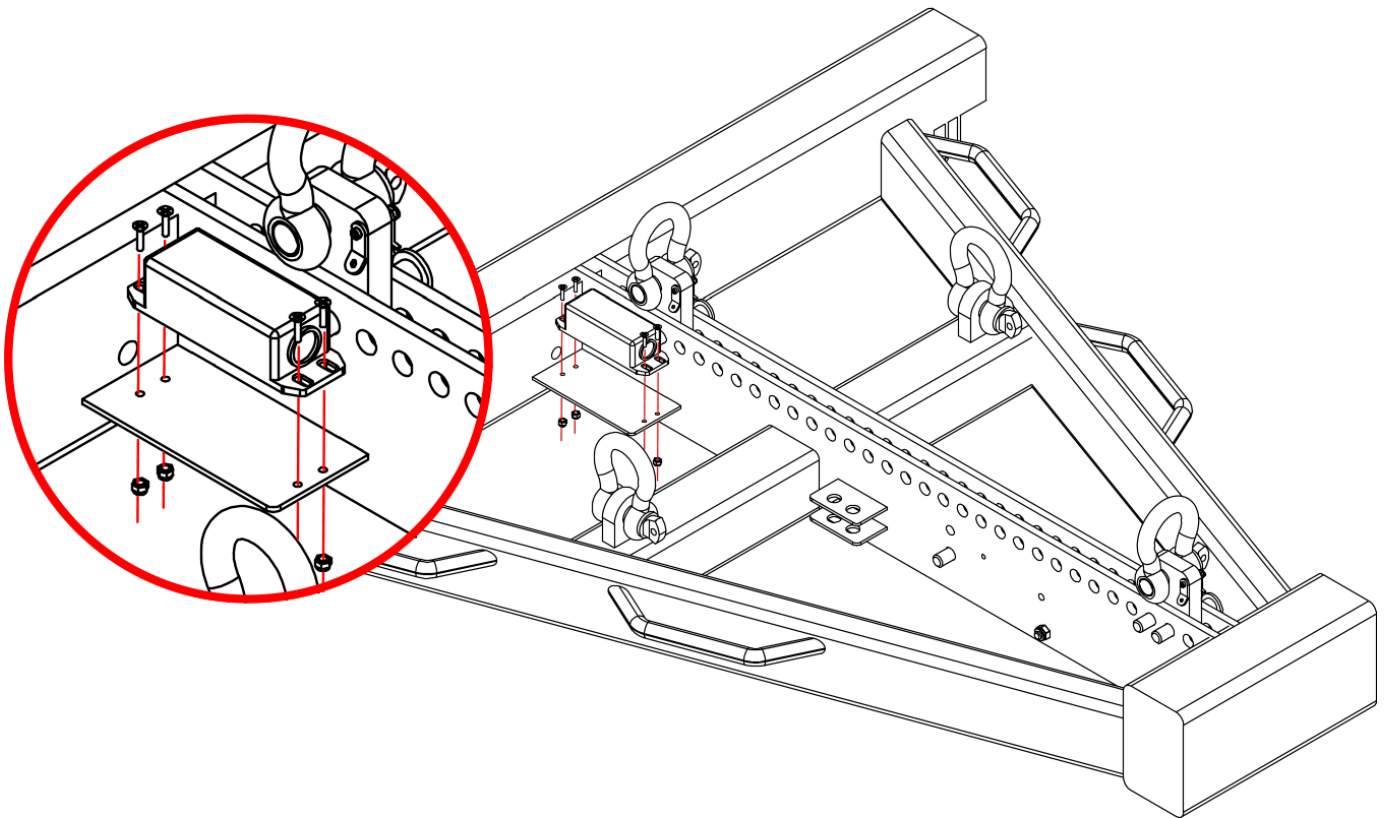
6.7 - Fitting an Inclinometer

TOOLS REQUIRED:

PZ1 screwdriver
7mm ring spanner

To fit an inclinometer - such as the LAP-TEQ system by TEQSAS - to the FG-HALO-B you will require the four M4 countersunk machine screws and Nyloc nuts supplied with the FG-HALO-A.

Locate the inclinometer on the mounting plate, and insert the four screws as indicated. Secure them underneath with M4 Nyloc nuts, and tighten them accordingly.



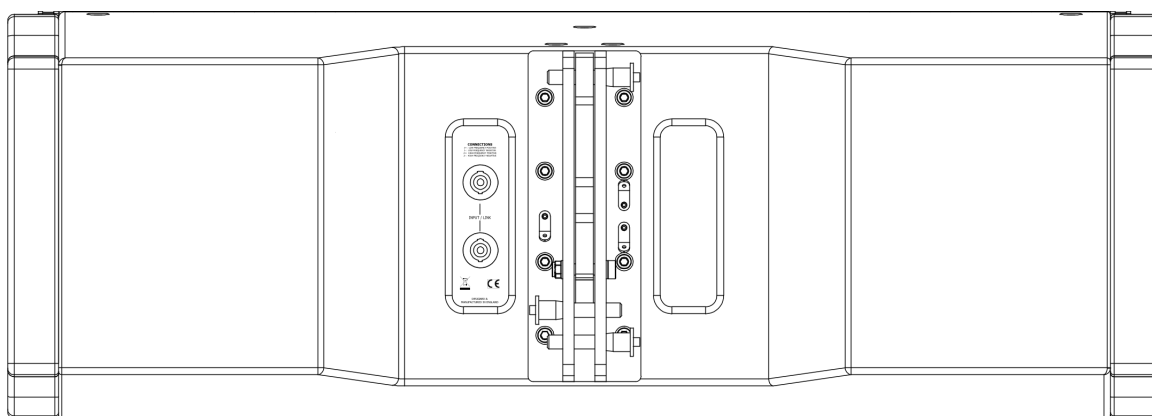
7.0 - Powering the System

HALO Arena is not just the loudspeakers, but the amplification and control package forms a vital part of the system for it to function as intended. The use of DQ or Di Series amplifiers provides a neat and flexible system that will encompass all requirements for the system to function correctly, as well as providing user control for room EQ and system alignment.

7.1 - Amplifier and Processing Requirements

7.1.1 - Connections

HALO Arena is a bi-amplified system - requiring two amplifier channels to drive it correctly and active processing on both channels to ensure the system performs as intended. Inputs to the HALO-A enclosure are on Neutrik SpeakON NL4 as illustrated below.



Four-core cable should be used for connecting HALO-A loudspeakers, and the connections are as follows:

SpeakON connection	1+	1-	2+	2-
Drive unit connection	LF +	LF -	HF +	HF -

7.1.2 - Connector Options

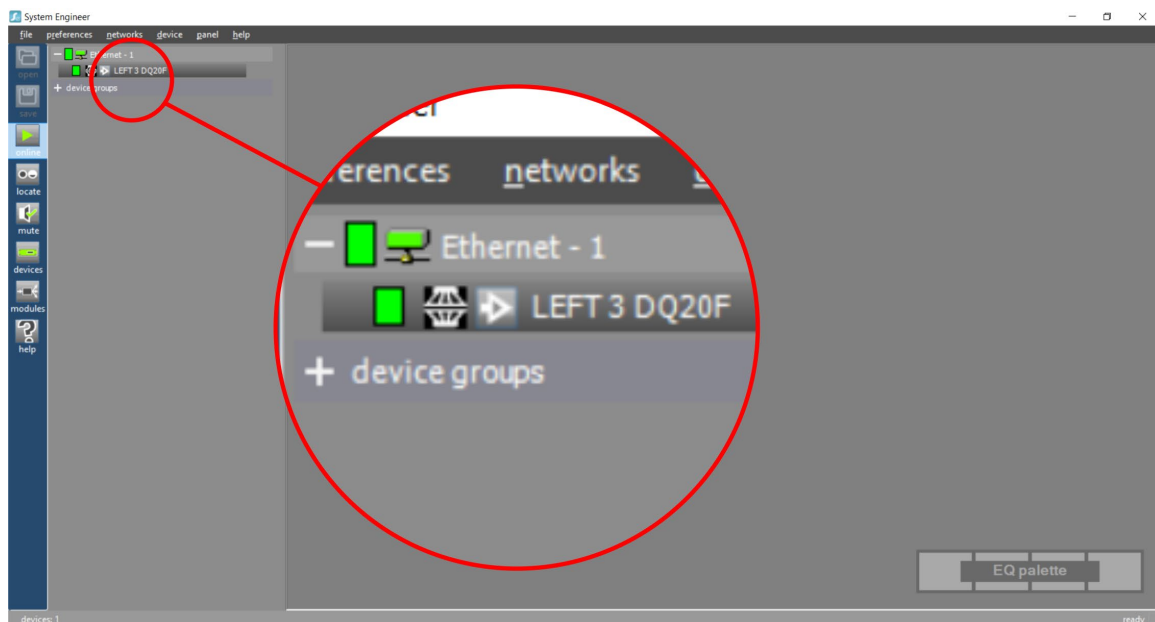
HALO Arena is supplied as standard with NL4TMP connectors, which form an IP54 rated connection when used with the STX series of SpeakON cable connectors. For more demanding environments, HALO Arena can be supplied with Van Damme PA-CON connectors (male/female) which provide an IP65 connection rating when mated.

Other options may be possible by special order - please contact EM Acoustics to discuss your requirement.

7.1.3 - Amplifier Requirements

HALO Arena makes ingenious use of FIR (Finite Impulse Response) filtering, allowing perfect alignment of the low and high frequency sections to ensure uniform coverage, near-perfect impulse & phase response and a significant reduction of off-axis parallax effects. As it is a turnkey system, HALO Arena must be used with DQ or Di Series amplifiers, however these must be the 2nd generation units equipped with FIR technology. Any amplifier supplied with your HALO Arena system will be FIR-enabled, however for older units please check with EM Acoustics directly referencing the unit's serial number.

Alternatively, by connecting any DQ Series amplifier to the System Engineer software the FIR status can be determined - the device window on the left of the screen will display an "F" after the device name if they are FIR enabled - see example below.

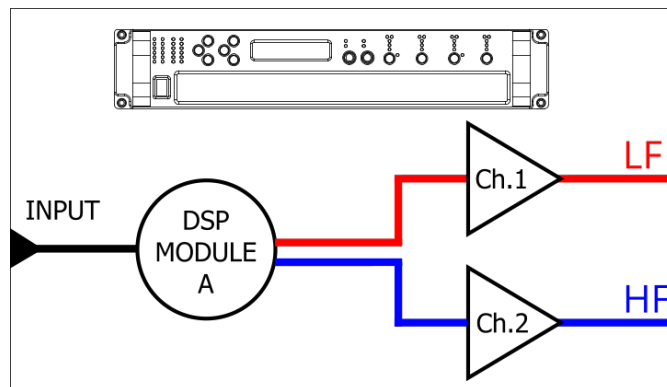


7.2 - Presets and Settings

7.2.1 - Preset Description

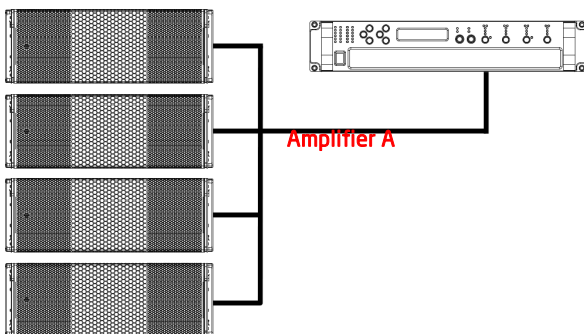
A variety of presets are provided within the DQ & Di Series amplifiers to present a starting point for your system depending on the array size. Scope is available within the amplifier processing for room EQ and system alignment, or alternatively a front-end processor could also be used to perform these duties.

These presets are two-channel presets, referred to as **module** presets. The diagram below illustrates how those presets work.



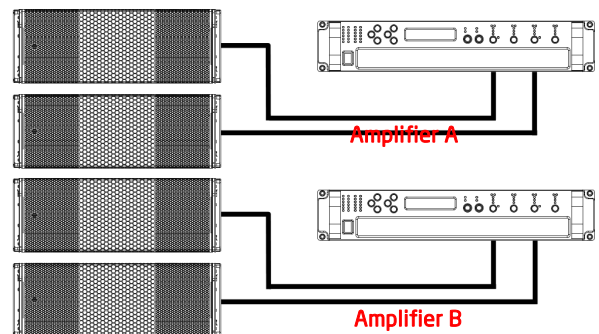
When selecting a preset, it is extremely important that the right preset is selected otherwise the system will not perform as expected. The presets are based around the **TOTAL NUMBER OF ELEMENTS IN THE ARRAY** - not the number of elements connected to each amplifier channel.

To illustrate below, both the system wiring configurations below of using four HALO-A would have the same preset recalled onto the DQ20 amplifier driving them.



*Four HALO-A, wired in parallel
Driven from one biamp output of a DQ20 amplifier (2 channels)*

Recall preset HALO-A.1-4 - preset for 1 to 4 enclosures - on one module of amplifier A

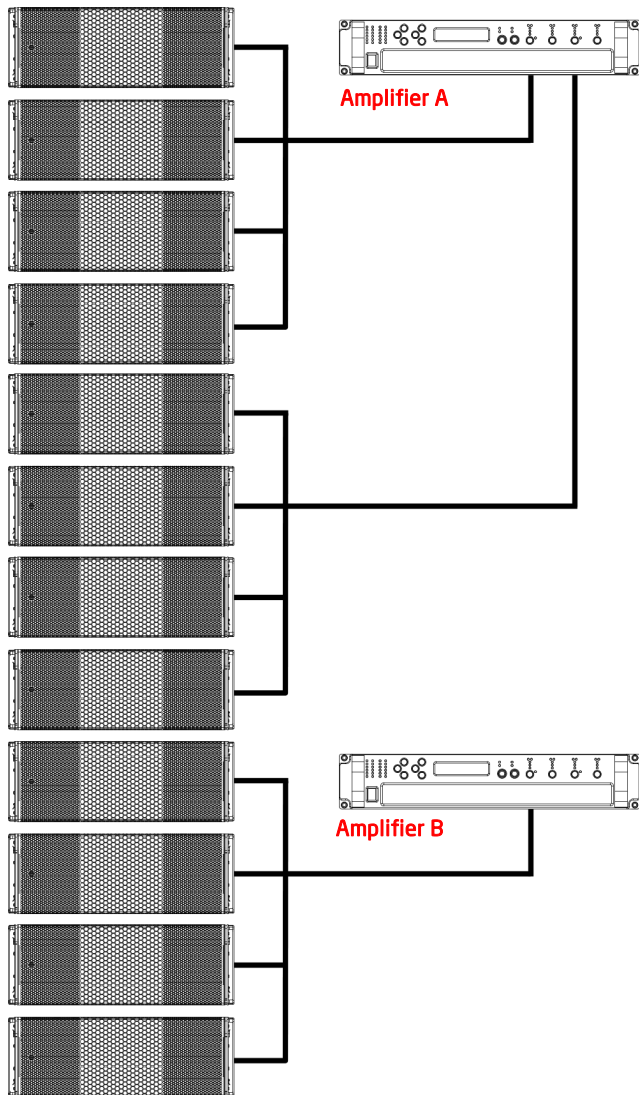


*Four HALO-A, wired individually
Driven from four biamp outputs of two DQ20 amplifiers (4 x 2 channels)*

Recall preset HALO-A.1-4 - preset for 1 to 4 enclosures - on one module of amplifier A and one module of amplifier B

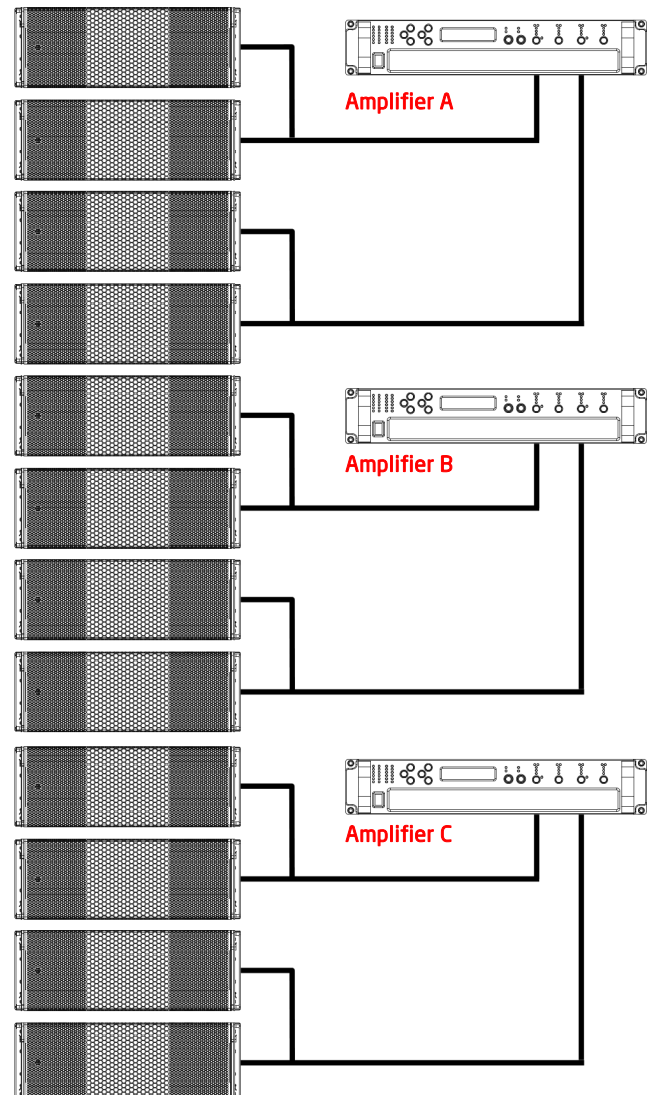
As illustrated, both examples above would use the same preset file recalled into the amplifier, all that is different is the number of amplifier channel pairs required - all of which require the same preset recalled.

The system example below is also intended to illustrate how the preset relates to the length of the array, not the number of enclosures connected to the amplifier channel.



*Twelve HALO-A, wired as three groups of four in parallel
Driven from three biamp outputs of two DQ20 amplifiers
(3 x 2 channels)*

Recall preset HALO-A.9-16 - preset for 9 to 16 enclosures - on two modules of amplifier A, and one module of amplifier B



*Twelve HALO-A, wired as six groups of two in parallel
Driven from six biamp outputs of three DQ20 amplifiers (6 x 2 channels)*

Recall preset HALO-A.9-16 - preset for 9 to 16 enclosures - on all modules of amplifiers A, B & C

As illustrated, regardless of the combination of amplifiers used, or how the loudspeakers are wired, the preset to be recalled is determined by the number of elements in the array.

7.2.2 - FIR Latency

FIR processing, like any digital processing system introduces latency due to the processing time. The latency imposed by the FIR processing is **4 milliseconds**, and this should be taken into account when determining geometric delays based on your system configuration.

7.2.3 - Geometric Delay

To ensure your system performs as intended, appropriate delay will need to be added to different elements to ensure everything is correctly time-aligned - for example aligning subwoofers to the main array hangs. This delay is determined by both geometric position and filter slopes applied. Use of a measurement tool such as SMAART will help to align your system.

It is of paramount importance that any delay applied to a line array hang, is applied to the *entire* hang - if delay is only applied to one part of the array (for example only on amplifier A in the example on the previous page) then the array would not perform acoustically as it should, and performance will be wildly different to what was simulated. As such it is always best to apply this delay on the input side of the amplifier (for example in the FOH desk, overall system processor if present, or in the input DSP of the DQ Series unit), or if using multiple amplifiers then to group Modules together in System Engineer software so the delay can be applied and adjusted identically on all relevant modules.

7.2.4 - Applying EQ

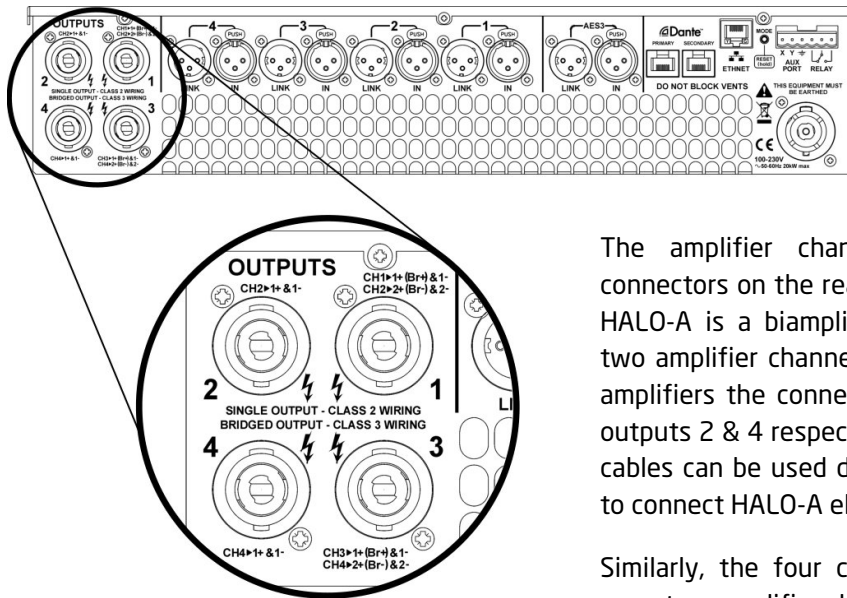
The presets are intended to be a starting point for your system, and will almost certainly require tuning on-site dependent on room characteristics, the rest of your system design and the system voicing you are aiming for. HALO-A is designed with a significant amount of system headroom, so applying EQ is perfectly acceptable.

EQ filters add group delay into a system, and as such just as with delay above, it is imperative that the same EQ filter is applied across the entire array to ensure that the system still performs as a line array. EQ filters applied to only one section of an array will impose a group delay on that part of the system, which will bring further acoustical issues.

7.3 - Use with the DQ & Di Series Advanced System Amplifiers

HALO Arena requires the proprietary EM Acoustics Advanced System Amplifiers (DQ or Di Series), or the DSC48 Digital System Controller to function correctly and should not be used with any other amplifier or processor combination. The information below details configuring a DQ or Di Series amplifiers for HALO-A enclosures specifically. Please refer to the relevant amplifier User Manual for detailed information on using the amplifiers and the System Engineer software.

7.3.1 - Connections



The amplifier channels appear on four speakON connectors on the rear of the DQ or Di Series amplifiers. HALO-A is a biamplified system and as such requires two amplifier channels. For convenience, on DQ Series amplifiers the connectors for outputs 1 & 3 also carry outputs 2 & 4 respectively on the 2+/2- pins. So, 4-core cables can be used directly from connectors 1 and/or 3 to connect HALO-A elements.

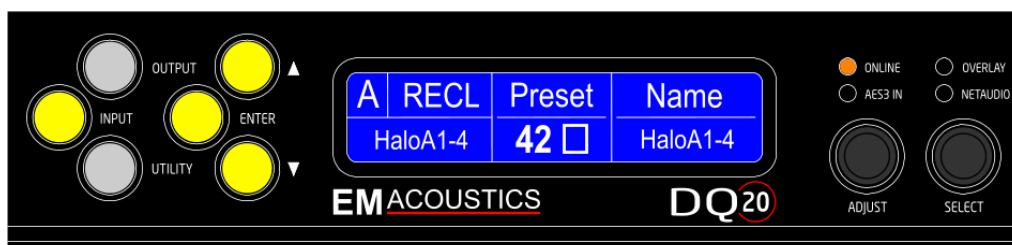
Similarly, the four connectors on Di Series amplifiers carry two amplifier channels each.

7.3.2 - Preset Recall

The family of HALO-A presets are pre-installed on the DQ & Di Series amplifiers, and as such they can be used following the normal preset recall procedure. As detailed above, recall the preset that relates to the size of the array hang, not the number of elements per channel. The presets available are:

HALOA.1-4	1-4 element array size
HALOA.5-8	5-8 element array size
HALOA.9-16	9-16 element array size
HALOA.17-24	17-24 element array size.

As mentioned above, these presets are intended to be a starting point and additional work may be required depending on the venue, the style of content and the end result you are looking for.



7.4 - System Connectivity

7.4.1 - Maximum number of elements per amplifier

In order to achieve the designed headroom and output from your HALO-A system, sufficient amplifier power must be available. Most EM Acoustics amplifier models can be used to drive HALO-A, however due to their available output power, the number of elements that can be driven per amplifier varies.

HALO-A/HALO-A Wide

Amplifier	Recommended HALO-A/amplifier (for full headroom)	Max HALO-A/amplifier (*at reduced max SPL)
DQ6	Not recommended	2*
DQ10	2	4*
DQ20	4	8*
Di06	Not recommended	Not recommended
Di10	Not recommended	4*
Di20	4	8*

It is strongly advised not to mix amplifier types within a single array. HALO-A is intended for use primarily with the DQ20 advanced system amplifier, however other models can be used if required.

7.4.2 Cable Length and Specification

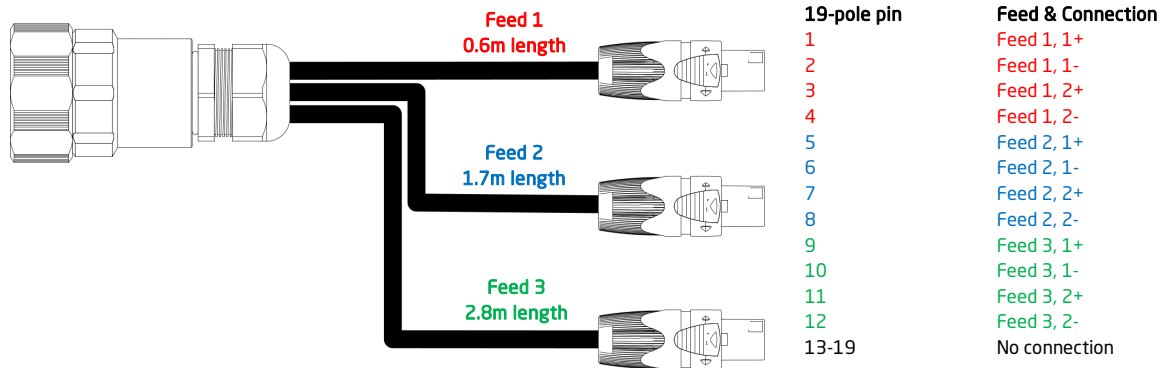
All cables add to the system impedance, and as such careful selection is required depending on your amplifier setup and overall system impedance. Cables with a cross sectional area of less than 2.5mm² should not be used. Recommended maximum cable lengths are given below:

Conductor Area	Maximum Recommended Cable Length		
	2 ohms	4 ohms	8 ohms
2.5mm ² (14 AWG)	15m	30m	60m
4.0mm ² (12 AWG)	20m	40m	80m
6.0mm ² (10 AWG)	30m	60m	120m

7.4.3 - Available Cable Accessories

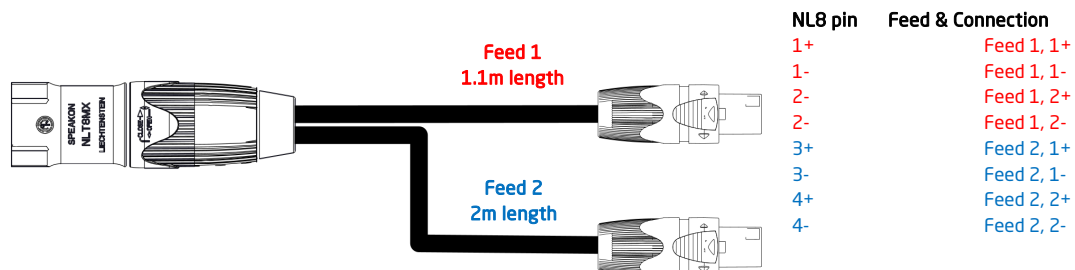
There are a number of bespoke cable assemblies which can be supplied by EM Acoustics to ensure correct wiring for your system, both using DQ Series amplifiers alone and also using the DQRack touring solution.

SPLIT-HALO-A-19P



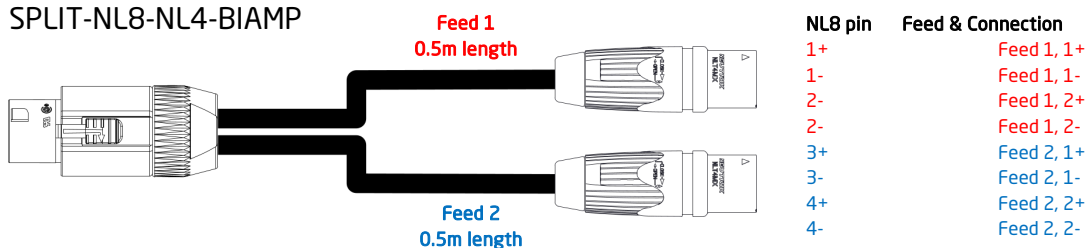
Intended for use with 19-pole circular connectors such as Socapex, the SPLIT-HALO-A-19P assembly gives three 4-core cable sends, on NL4 connectors, with appropriate cable lengths to allow each feed to connect to four HALO-A elements in parallel. This assembly is intended for use at the loudspeaker end of the cable run.

SPLIT-HALO-A-NL8



Intended as an array connector when using NL8 cables, the SPLIT-HALO-A-NL8 assembly gives two 4-core cable sends, on NL4 connectors, with appropriate cable lengths to allow each feed to connect to four HALO-A elements in parallel. This assembly is intended for use at the loudspeaker end of the cable run.

SPLIT-NL8-NL4-BIAMP



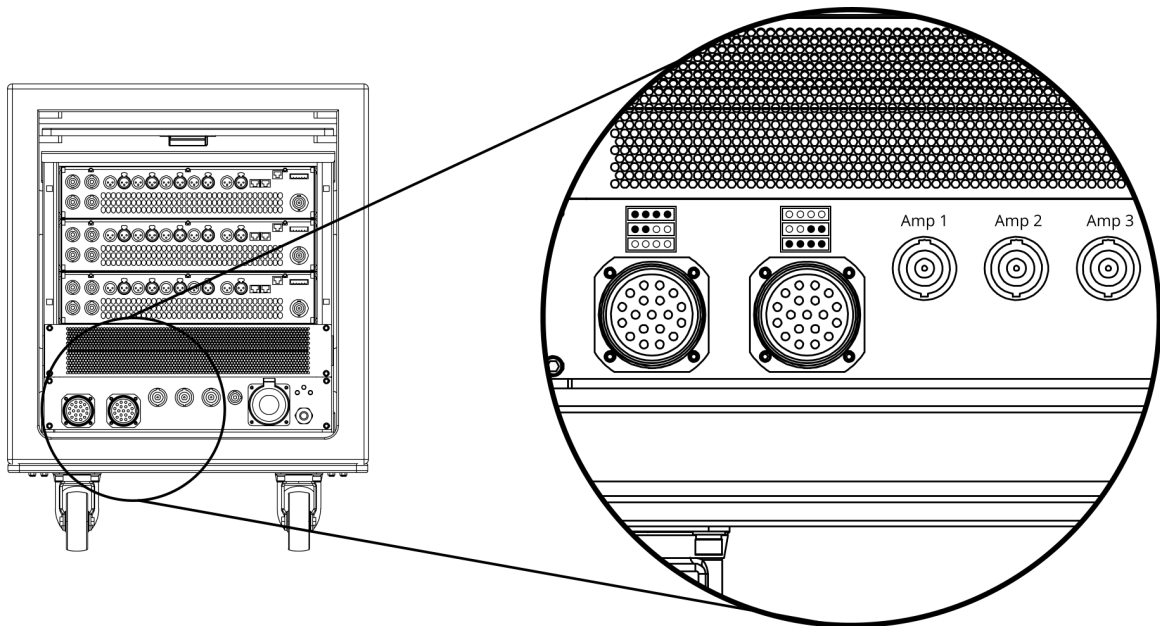
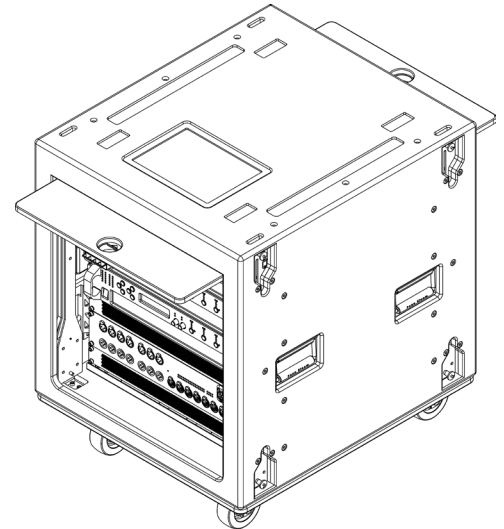
Intended to split NL8 connections into two biamplified feeds, SPLIT-NL8-NL4-BIAMP gives two 4-core cable sends, on male NL4 sockets. This assembly is intended for use at the amplifier end of the cable run.

7.5 - Use with the DQRack

7.5.1 - DQRack Overview

The DQRack is EM Acoustics' flagship touring amplification and control solution. 12 channels of premium quality Class D amplification with full onboard DSP and Dante connectivity, packaged with a bespoke I/O solution for signal, data, loudspeaker outputs and mains power. The DQRack is the optimum solution for touring environments and provides an optimum turnkey solution.

The DQRack has two loudspeaker output options, depending on your chosen cabling method.



Each of the two 19-pole connectors delivers 6 channels of amplifier power, as identified from the legend on the output panel.

The 19-pole connectors are wired in parallel to the three NL8 connectors, each of which delivers the four outputs from each amplifier.

Detailed below are some examples of how you can use the DQRack to power a system appropriately in a touring environment, and the various accessories and other parts that would be required.

7.5.2 - System Examples with the DQRack

The example below illustrates the maximum HALO-A capacity that can be run from a DQRack. Using the two 19-pole outputs, each of three feeds per connector drives four HALO-A in parallel. The two arrays shown in this image could be one large 24-element hang, the cabling principle would be the same.

Parts required:

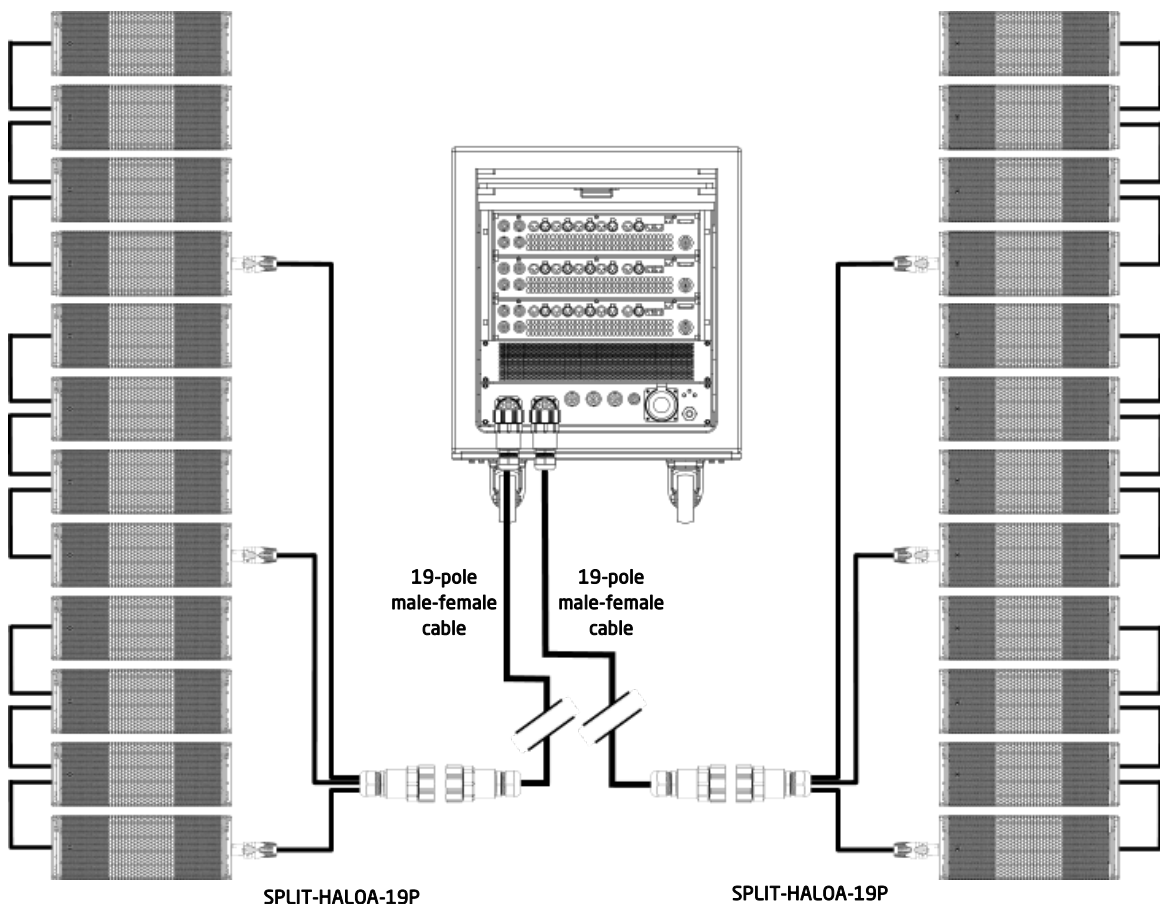
24 x HALO-A enclosure

1 x DQRack

2 x SPLIT-HALOA-19P

2 x male-female 19-pole connector cables (16 cores minimum) of suitable length

18 x NL4-NL4 (4-core cable) link cables - optimum length 0.5m



The example below shows the use of the SPLIT-HALOA-NL8. The example below loads amplifiers 1 and 3 to their maximum capacity, and leaves amplifier 2 spare for subwoofers, front fills or other loudspeakers.

Parts required:

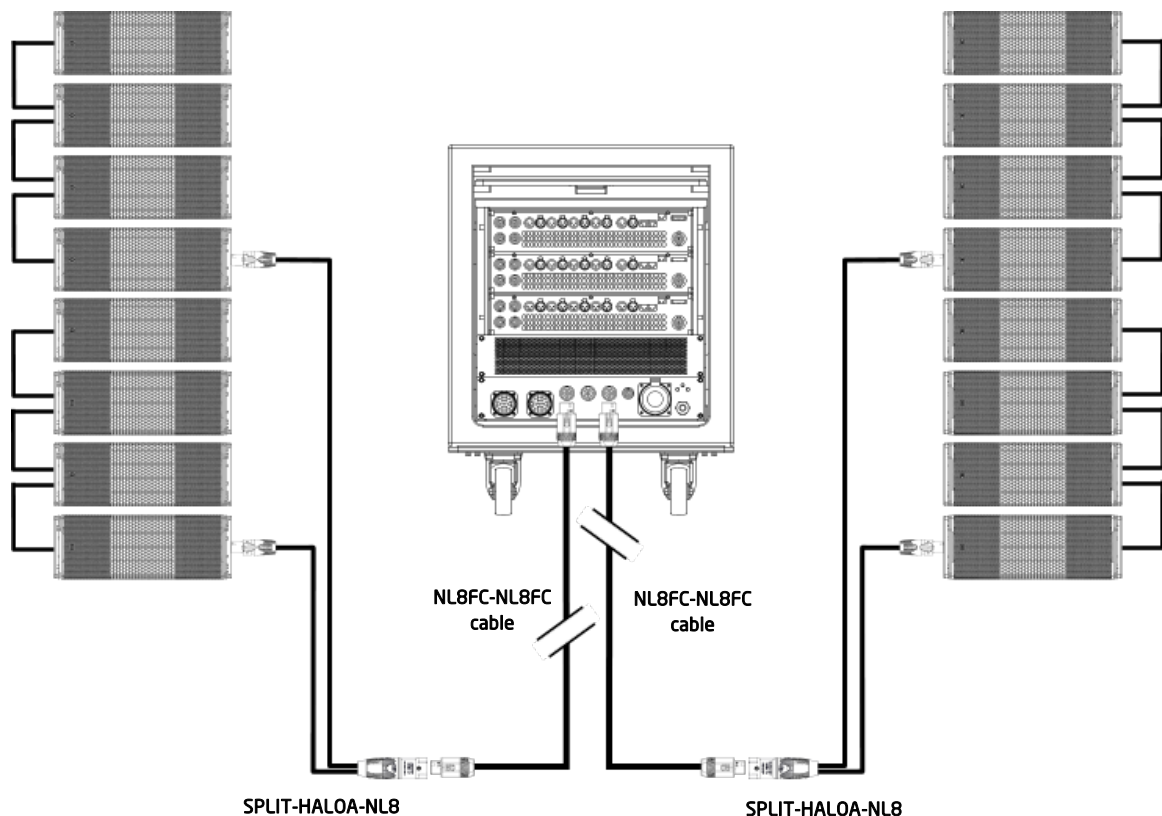
16 x HALO-A enclosure

1 x DQRack

2 x SPLIT-HALOA-NL8

2 x NL8FC-NL8FC cables (8-core cable) of suitable length

12 x NL4-NL4 (4-core cable) link cables - optimum length 0.5m



Many other combinations are possible, using the various adapters available – splits can be put in place either near the DQRack or near the loudspeakers, depending on what is required in your setup configuration.

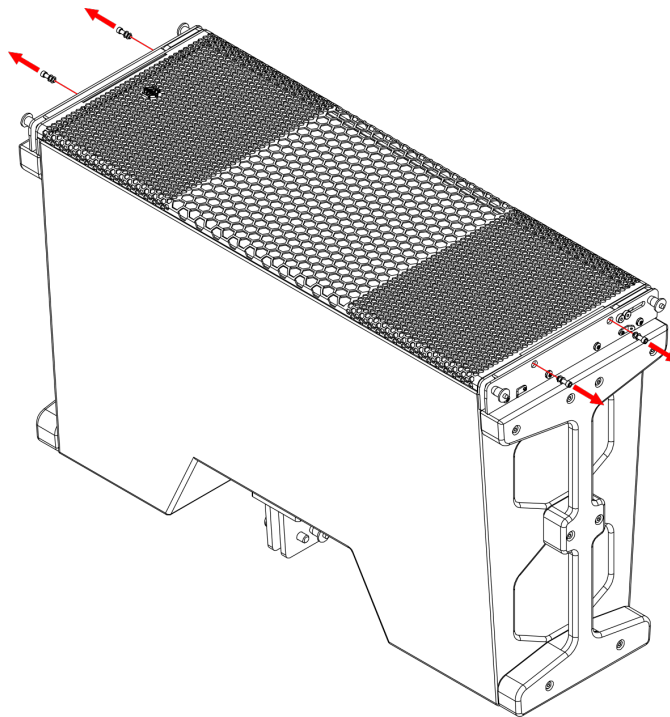
8.0 - Servicing Information

All HALO Arena components can be removed for service purposes if required, using the minimum of tools.

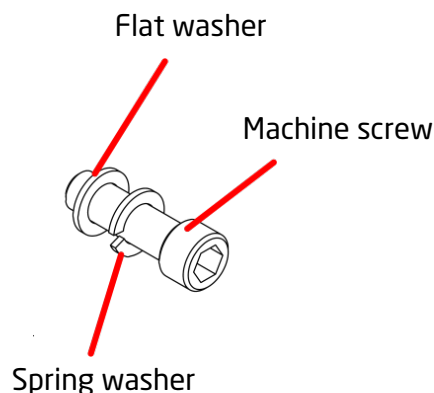
8.1 - HALO-A: Removing the grille

TOOLS REQUIRED: 5mm Allen key

1. Lie the enclosure on its' back and remove the two M6x20 socket cap screws in each end of the grille. Ensure to collect the washers (flat and spring) from the screw recess, and then lift the grille clear of the cabinet.



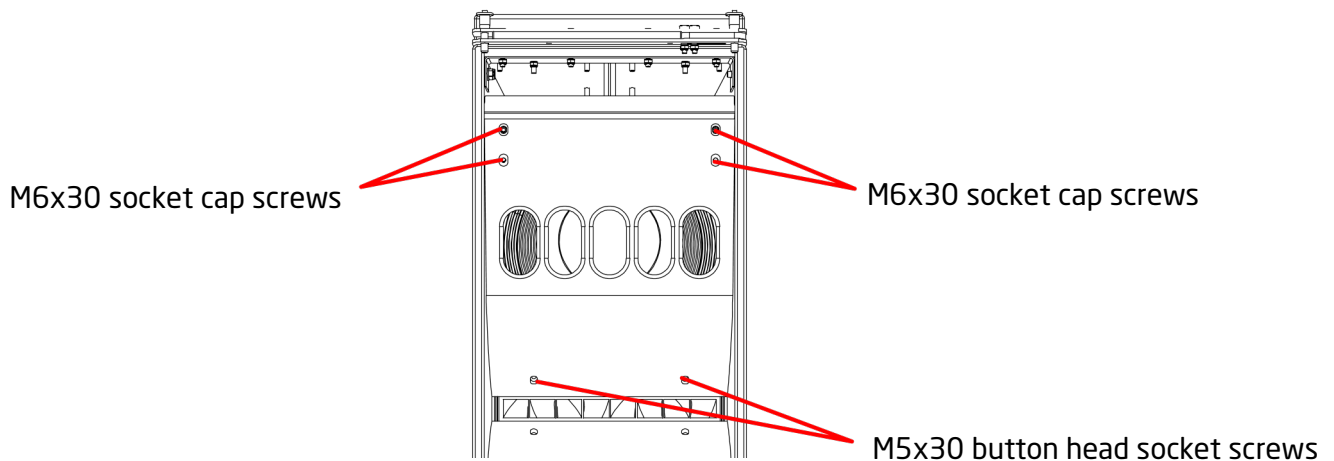
2. To replace the grille, first check that the foam gaskets on each end and on the long edges are complete and intact - replace these if necessary. Position the grille on the front of the HALO-A (logo badge should be on the left of the enclosure when in a flown configuration) and ensure the threaded fittings on the grille are lined up with the mounting holes. Replace each of the four M6x20 socket cap screws (with their washers - the spring washer should be sandwiched between the flat washer and the bolt head) and ensure all four machine screws are started in their threads before beginning to tighten. Ensure they are all tightened evenly so that the grille sits straight and flat and does not rattle.



8.2 - HALO-A: Removing waveguide/LF drive unit covers

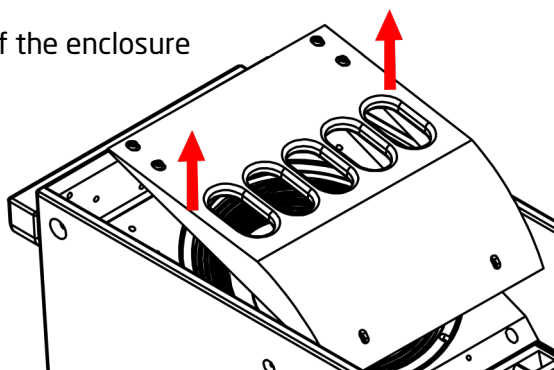
TOOLS REQUIRED: 5mm & 3mm Allen keys

1. Complete step 8.1 above to remove the grille.
2. Using a 5mm Allen key, remove the four M6x30 socket cap screws that secure the external edge of the waveguide/drive unit cover part. Ensure that you remove the washers from the recesses as well as the machine screws.



3. Using a 3mm Allen key, remove the M5x30 button head socket screws that secure the throat section of the waveguide/drive unit cover. Again, ensure that the washers are removed along with the machine screws and that they do not fall into the HF drive unit assembly.
4. Lift the waveguide/drive unit cover part clear of the enclosure. Be aware that there are self-adhesive gaskets on the mating surface, and these can help the part stick to the enclosure - remove carefully. Repeat the procedure to remove the other cover if necessary.

Lift the cover clear of the enclosure

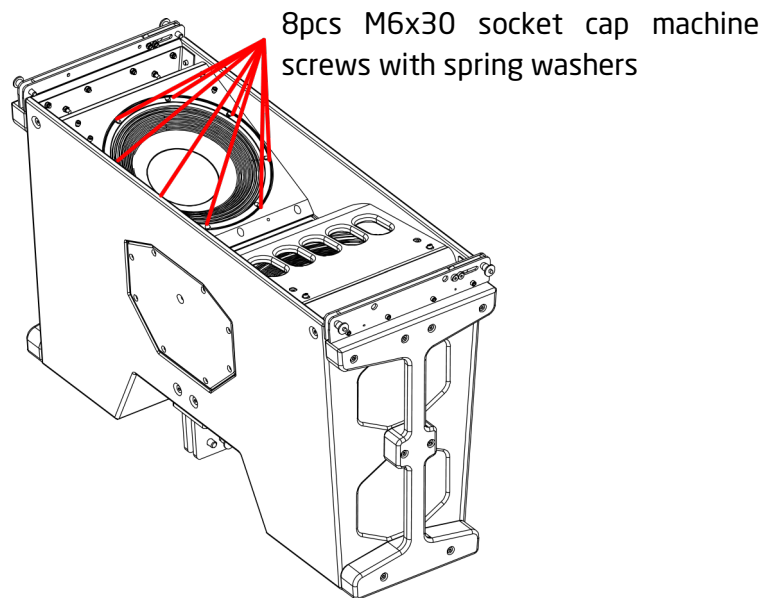


5. To replace the part, first check that the mating surface gaskets are complete and intact - replace these if necessary. Position the waveguide/drive unit cover over the LF drive unit, and check the mounting holes line up both at the throat and the external edge. Replace the relevant machine screws with their washers (M5 at the throat, M6 at the edge) and ensure every screw has started turning smoothly in its thread prior to tightening. Check that the throat edge is not overhanging the HF drive unit exits, and then begin to tighten. Start by tightening the M5x30 button head socket screws to secure the throat section, and then proceed to the outer edge.

8.3 - HALO-A: Removing the LF Drive Unit

TOOLS REQUIRED: 5mm Allen key, flat blade screwdriver

1. Follow steps 8.1 & 8.2 above to remove the grille, and the waveguide/drive unit cover over the drive unit you need to remove..
2. Using a 5mm Allen key, loosen and remove the eight M6x20 socket cap screws holding the drive unit in place. Be aware there is a spring washer with each bolt which needs to be retained.

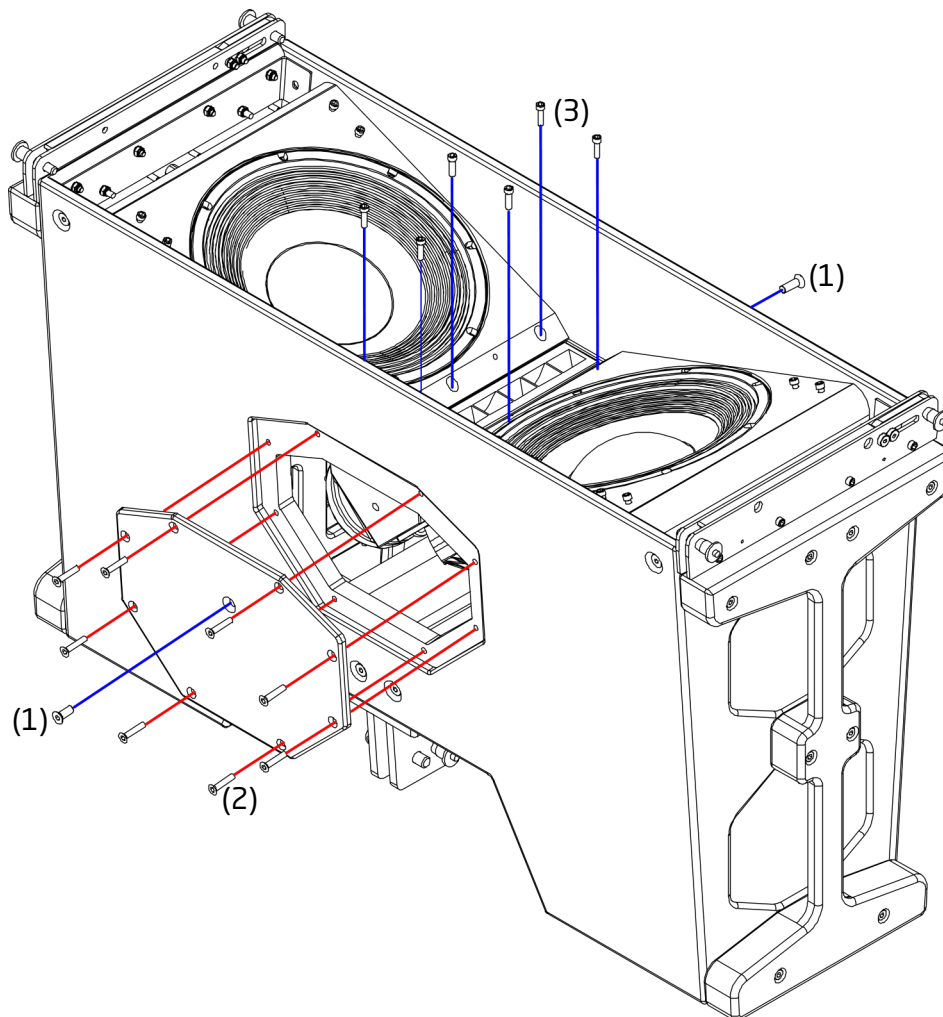


3. Using a flat-blade screwdriver, very carefully insert it between the chassis of the drive unit and the recess in the woodwork, and gently lever the drive unit out of the recess. Be extremely careful not to damage either the woodwork or the drive unit itself.
4. Lift the drive unit clear of the mounting hole and disconnect the two cables - note the polarity for reconnection.
5. To replace the drive unit, first sit a fresh gasket in the drive unit recess, ensuring that the holes line up with the cabinet mounting holes. Reconnect the cables to the drive unit (note the brown cable goes to the positive (red) terminal, and the blue cable goes to the negative (black) terminal on the drive unit) and then sit the drive unit in the recess, ensuring that the mounting holes line up.
6. Replace the M6x30 socket cap machine screws with their spring washers, and ensure all machine screws are started in their threads before tightening. Tighten opposing bolts, working around the drive unit until all bolts are appropriately tightened.
7. Replace the waveguide/drive unit cover parts and the grille as described above.

8.4 - HALO-A: Removing the HF assembly

TOOLS REQUIRED: 4mm & 5mm Allen key

1. Follow steps 8.1 & 8.2 above to remove the grille and both waveguide/drive unit cover parts.



2. Using a 5mm Allen key, remove the single M8x20 countersunk socket head machine screw on each side - one in the centre of the access door, and one on the opposite face (labelled (1) above). Then, using a 4mm Allen key, remove the eight M6x30 countersunk socket head screws so that the access door can be removed (labelled (2) above). Reach into the enclosure past the HF assembly and disconnect the white & yellow twist cable from the input circuit board on the back panel of the cabinet, leaving it attached to the HF assembly.
3. Lie the enclosure down on its side with the access door upwards. Using a 5mm Allen key, undo the six M6x30 socket cap machine screws through the front of the loudspeaker (labelled (3) above) to release the HF assembly. Once the HF assembly is completely released, it can be removed through the access door.
4. To replace the HF assembly, first check that all cables from the drive units are correctly connected, and the sealing gasket around the front face is intact - replace if necessary. Lower the HF assembly through the access door and locate it within the recess in the front of the enclosure. Replace the six M6x30 socket cap machine screws - with their flat and spring washers as detailed in 8.1 above -

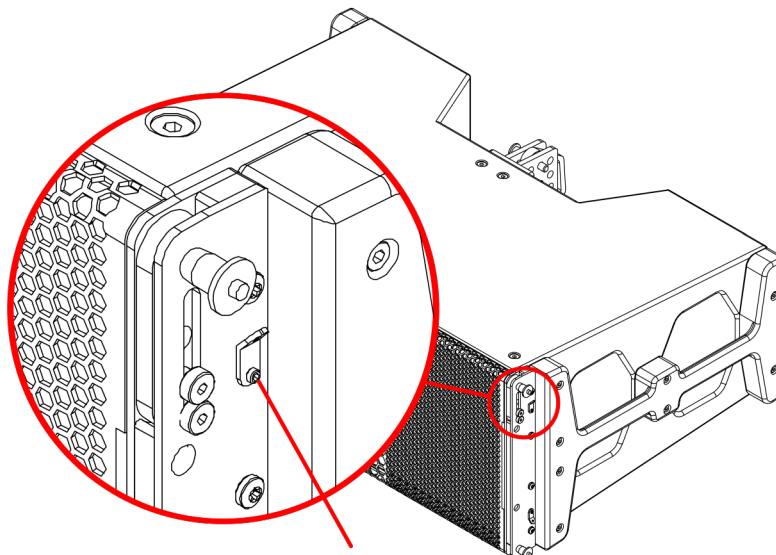
through the front location holes and tighten with a 5mm Allen key to pull the HF assembly tight into its recess.

5. Stand the enclosure on its back. Check the gasket on the access door is complete and intact, and replace if necessary. Locate the access door back in position, and replace all the machine screws. Ensure that all machine screws (M6 **and** M8) are started in their threads before tightening any. Once all the screws are started, tighten them all to complete the process.
6. Replace the waveguide/drive unit cover parts, and the grille as described above.

8.5 - HALO-A: Replacing a Front Rigging flying pin

TOOLS REQUIRED: 2.5mm Allen key

1. The front rigging flying pins are held in place by M3 socket cap machine screws, with captive Nyloc nuts within the assembly. As such, they can be easily removed and replaced in the field. Using a 2.5mm Allen key, undo the machine screw to remove it.



M3 socket cap screw securing pin lanyard tab

2. To replace, simply reverse the procedure and tighten the machine screw appropriately.

8.6 HALO-A: Replacing a Splay Rigging flying pin

1. The nuts that secure the pin lanyard tabs on the splay rigging assembly are **not** captive - and as such the splay rigging assembly needs to be removed from the enclosure to replace these pins.

It is imperative that you contact EM Acoustics before attempting this for detailed instructions and relevant replacement machine screws, as removing the rear rigging assembly is a potential safety issue.

Appendix A - Technical Specifications

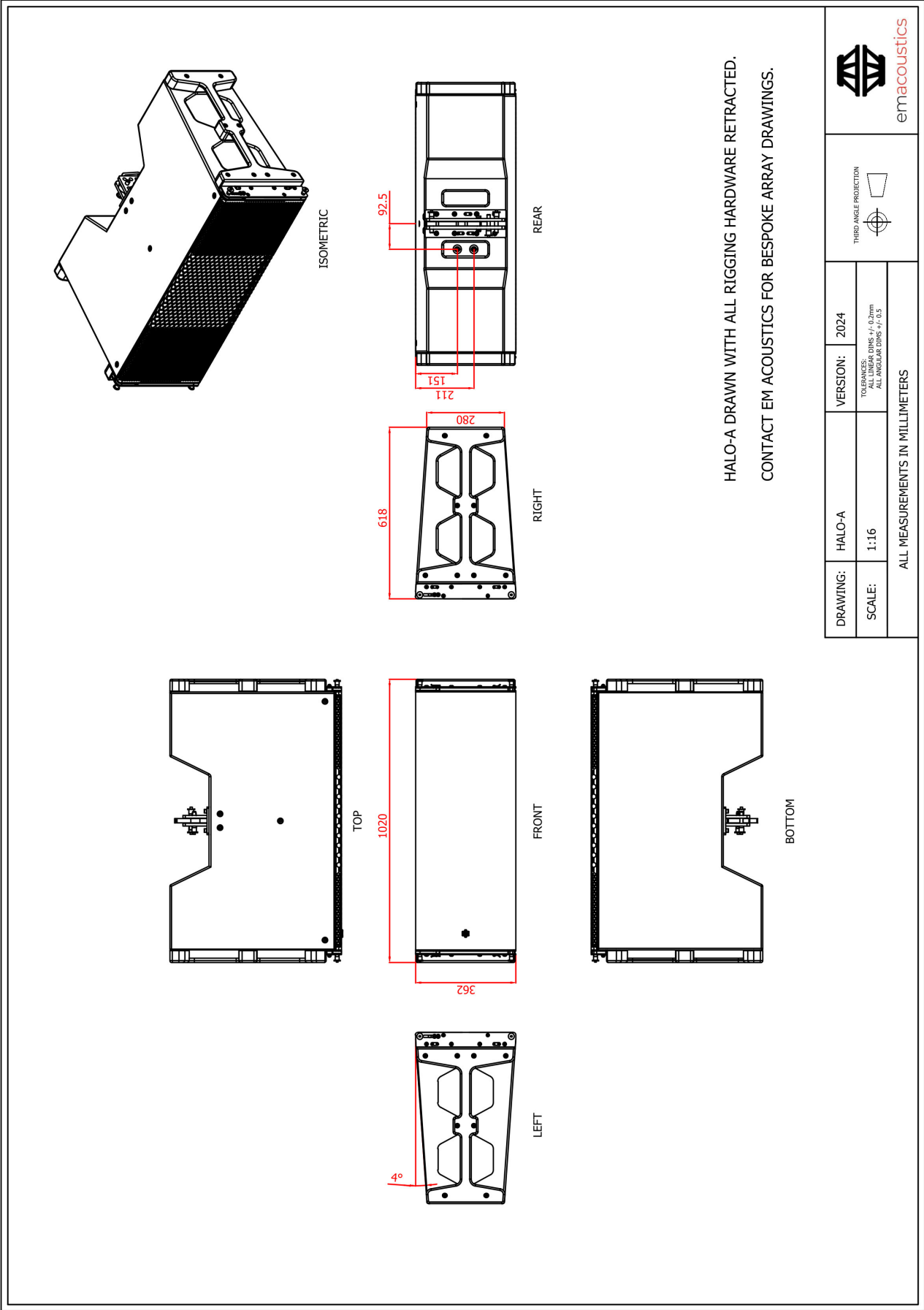
HALO-A 2-way large format line array element

Dimensions (HxWxD) :	362 x 1020 x 619mm (14.3" x 40.2" x 24.4")			
Net/Shipping Weight:	66kg/70kg (145.2lbs/154lbs)			
Frequency Response (+/- 3dB) ¹ :	48Hz - 19kHz			
Dispersion ³ :	Horizontal (-6dB)	80 degrees (HALO-A)		
	Horizontal (-6dB)	110 degrees (HALO-A Wide)		
	Vertical (-6dB)	Dependant on array settings		
Drive Units:	2 x 3.5" (88mm) voice coil 12" (305mm) neodymium LF drive unit 4 x 3.4" (86mm) diaphragm, 1.4" (36mm) exit neodymium HF drive unit on bespoke plane-wave manifold			
Power Handling:	LF: 1400W RMS, 2800W program HF: 400W RMS, 800W program			
Maximum SPL:	143dB continuous, 149dB peak			
Nominal Impedance:	LF: 8 ohms HF: 16 ohms			
Crossover:	External active			
Enclosures/amplifier (full SPL):	DQ6:	Not recommended	Di06:	Not recommended
	DQ10:	2	Di10:	Not recommended
	DQ20:	4	Di20:	4
Connectors:	2 x Neutrik SpeakOM™ NLT4MP			
Enclosure:	15/30mm (5/8" & 1 3/16") multi-laminate birch plywood, rebated, screwed and glued. Finished in impact and weather-resistant textured polyurethane			
Rigging & Hardware:	3-point system, ultra-high tensile steel. Finished in Xylan™ protective coating. Rated to 24 elements at 10:1 safety factor. Splay angles 0.25, 0.5, 1, 1.5, 2.5 and 3-8 degrees			
Grille:	Hex-punched stainless steel backed with acoustically transparent fabric			
Options:	Colours/Connectors			
Accessories:	FG-HALO-A master flying grid			
	PB-HALO-A pullback/underhang frame			
	GS-HALO-A ground stacking adapter frame			
	WC-HALO-A quad enclosure transit wheelcart			
	TC-HALO-A quad enclosure padded transit cover			

Notes on measurement conditions:

¹Measured on-axis at 2m in an anechoic environment and referenced to 1m. ²Measured in half-space at 2m with 4W sine wave input and referenced to 1m. ³Nominal dispersion, measured in an anechoic environment and averaged over stated bandwidth. ⁴Calculated and verified by subjective listening test of familiar program material.

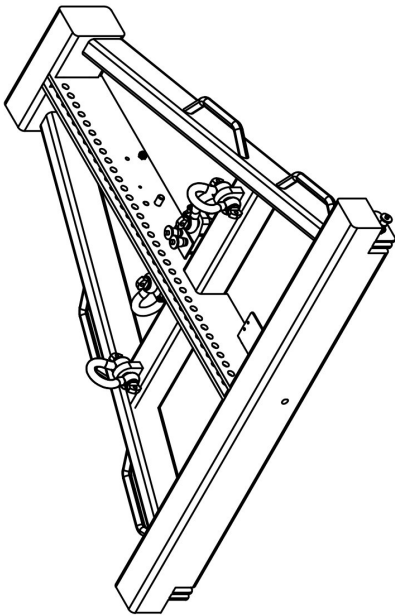
Appendix B - Technical Drawings



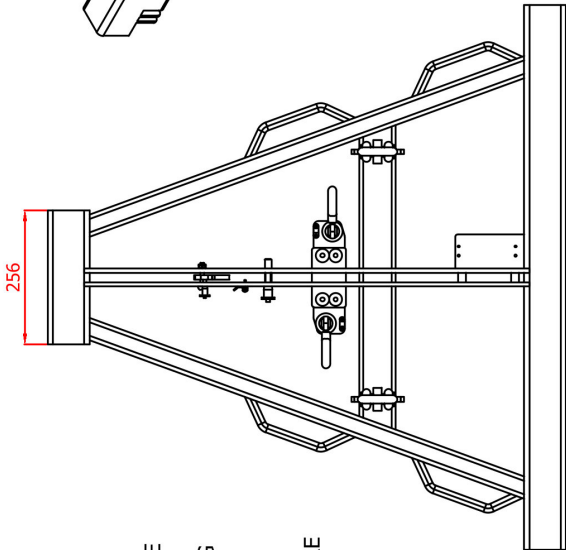
FG-HALO-A POSSIBLE ANGLES:

IN FLOWN APPLICATIONS, FIRST HALO-A ENCLOSURE CAN BE SET (RELATIVE TO GRID) AT:
+2.75 DEG, +2.5 DEG, +2 DEG, +1.5 DEG, +1 DEG, +0.5 DEG
0 DEG (SET ENCLOSURE TO 3 DEGREES)
-1 DEG, -2 DEG, -3 DEG, -4 DEG, -5 DEG

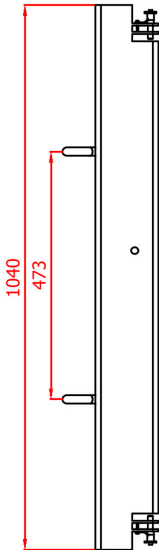
IN GROUND STACK APPLICATIONS, FIRST HALO-A ENCLOSURE CAN BE SET (RELATIVE TO GRID) AT:
+5 DEG, +4 DEG, +3 DEG, +2 DEG, +1 DEG
0 DEG (SET ENCLOSURE TO 3 DEGREES)
-0.5 DEG, -1 DEG, -1.5 DEG, -2 DEG, -2.5 DEG, -2.75 DEG



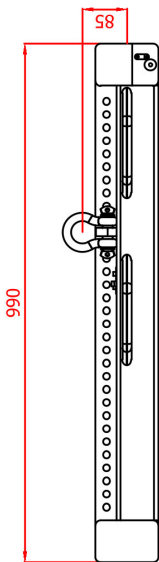
ISOMETRIC



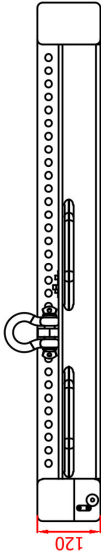
TOP



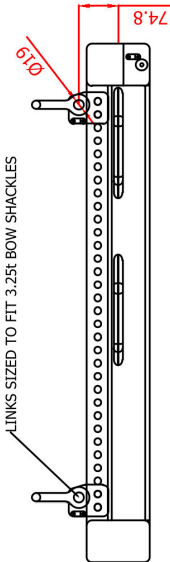
FRONT



LEFT



RIGHT



LINKS SIZED TO FIT 3.25t BOW SHACKLES

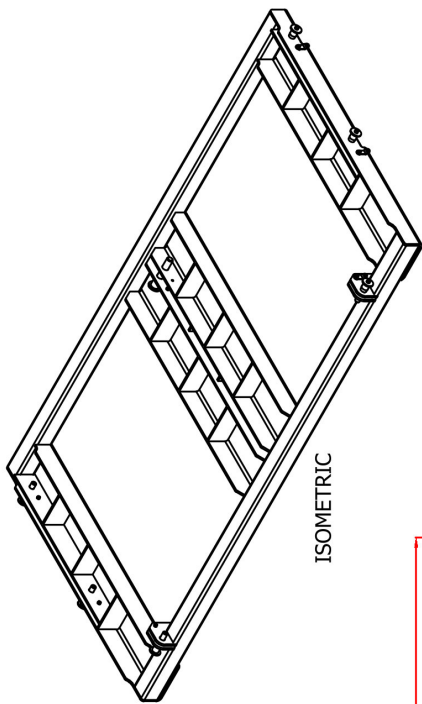
LEFT - FG-HALO-A SPINE WITH PICKUP LINKS
(links drawn in extremes of "whole" positions)

FG-HALO-A NET WEIGHT: 52.5kg / 115.5lbs (without supplied shackles)
FG-HALO-A NET WEIGHT: 55.1kg / 121.2lbs (with supplied shackles)

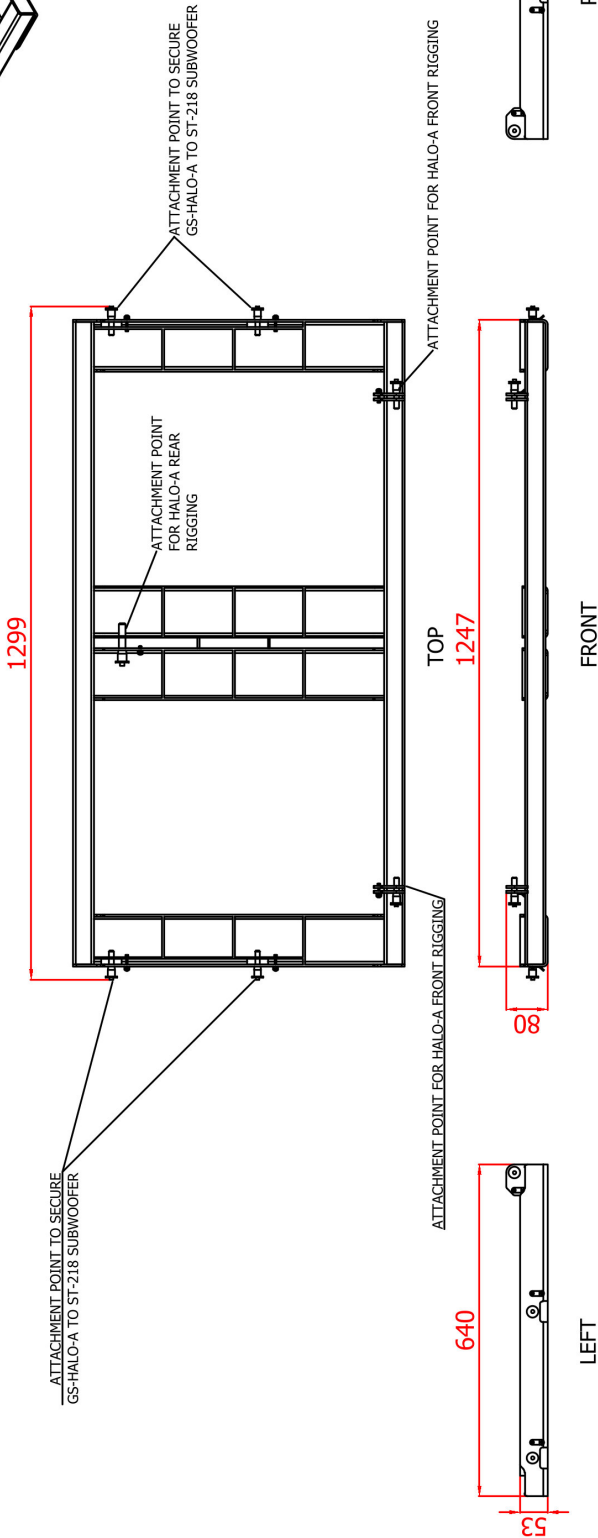
DRAWING:		FG-HALO-A	VERSION:	2024	THIRD ANGLE PROJECTION 		emacoustics
SCALE:		1:12	TOLERANCES: ALL LINEAR DIMS $\pm 0.2mm$ ALL ANGULAR DIMS ± 0.5				
ALL MEASUREMENTS IN MILLIMETERS							

GS-HALO-A POSSIBLE ANGLES:

GROUND STACK APPLICATIONS ONLY!
FIRST HALO-A ENCLOSURE CAN BE SET (RELATIVE TO GRID) AT:
+5 DEG, +4 DEG, +3 DEG, +2 DEG, +1 DEG
0 DEG (SET ENCLOSURE TO 3 DEGREES)
-0.5 DEG, -1 DEG, -1.5 DEG, -2 DEG, -2.5 DEG, -2.75 DEG



ISOMETRIC



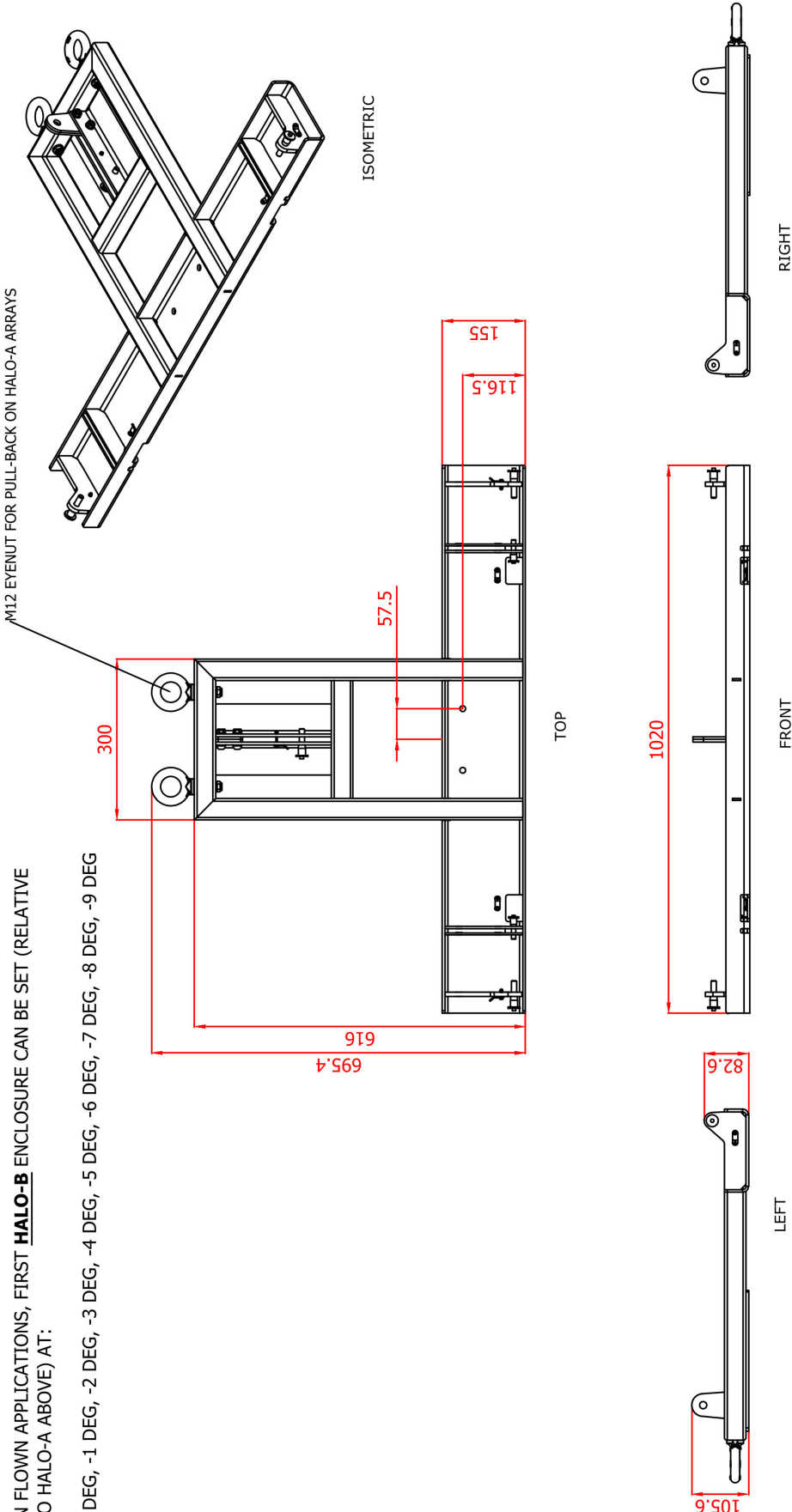
GS-HALO-A NET WEIGHT: 26kg / 40.7lbs

DRAWING:		GS-HALO-A	VERSION:	2024
SCALE:		1:12	TOLERANCES: ALL DIMS $\pm 0.2\text{mm}$ ALL ANGULAR DIMS $\pm 0.5^\circ$	
ALL MEASUREMENTS IN MILLIMETERS				
			THIRD ANGLE PROJECTION	
			 emacoustics	

PB-HALO-A POSSIBLE ANGLES:

IN FLOWN APPLICATIONS, FIRST **HALO-B** ENCLOSURE CAN BE SET (RELATIVE TO HALO-A ABOVE) AT:

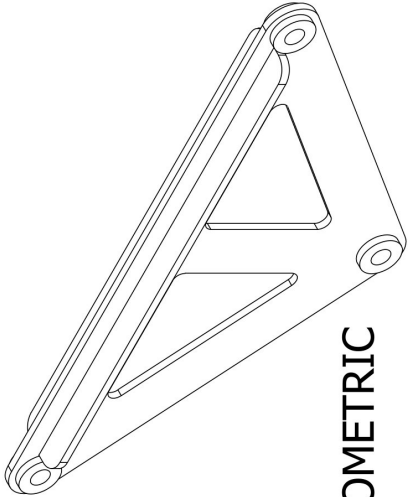
0 DEG, -1 DEG, -2 DEG, -3 DEG, -4 DEG, -5 DEG, -6 DEG, -7 DEG, -8 DEG, -9 DEG



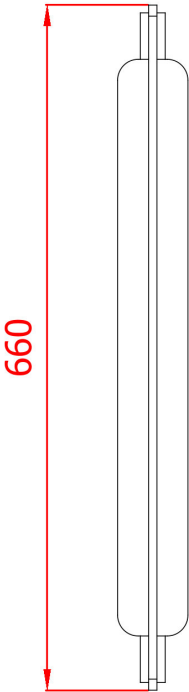
PB-HALO-A NET WEIGHT: 18.5kg / 40.7lbs

DRAWING:	PB-HALO-A	VERSION:	2024
SCALE:	1:10	TOLERANCES: ALL LINEAR DIMS +/- 0.2mm ALL ANGULAR DIMS +/- 0.5	
ALL MEASUREMENTS IN MILLIMETERS			
		THIRD ANGLE PROJECTION	
		 emacoustics	

ALL HOLES SIZED FOR 3.25t BOW SHACKLES

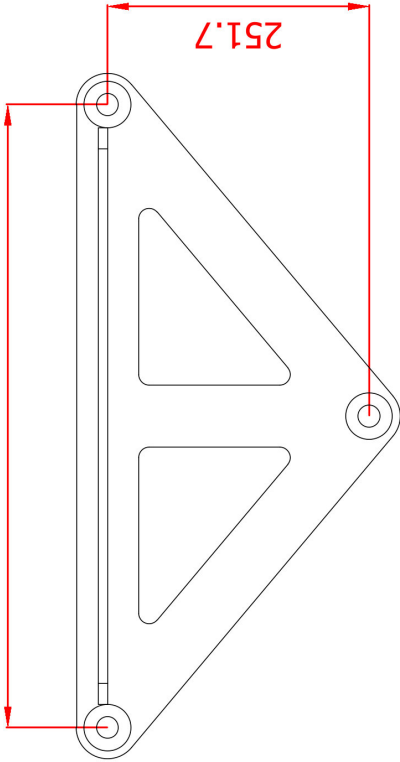


ISOMETRIC

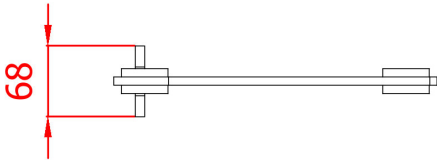


TOP

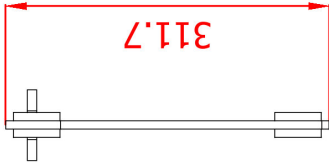
600



FRONT



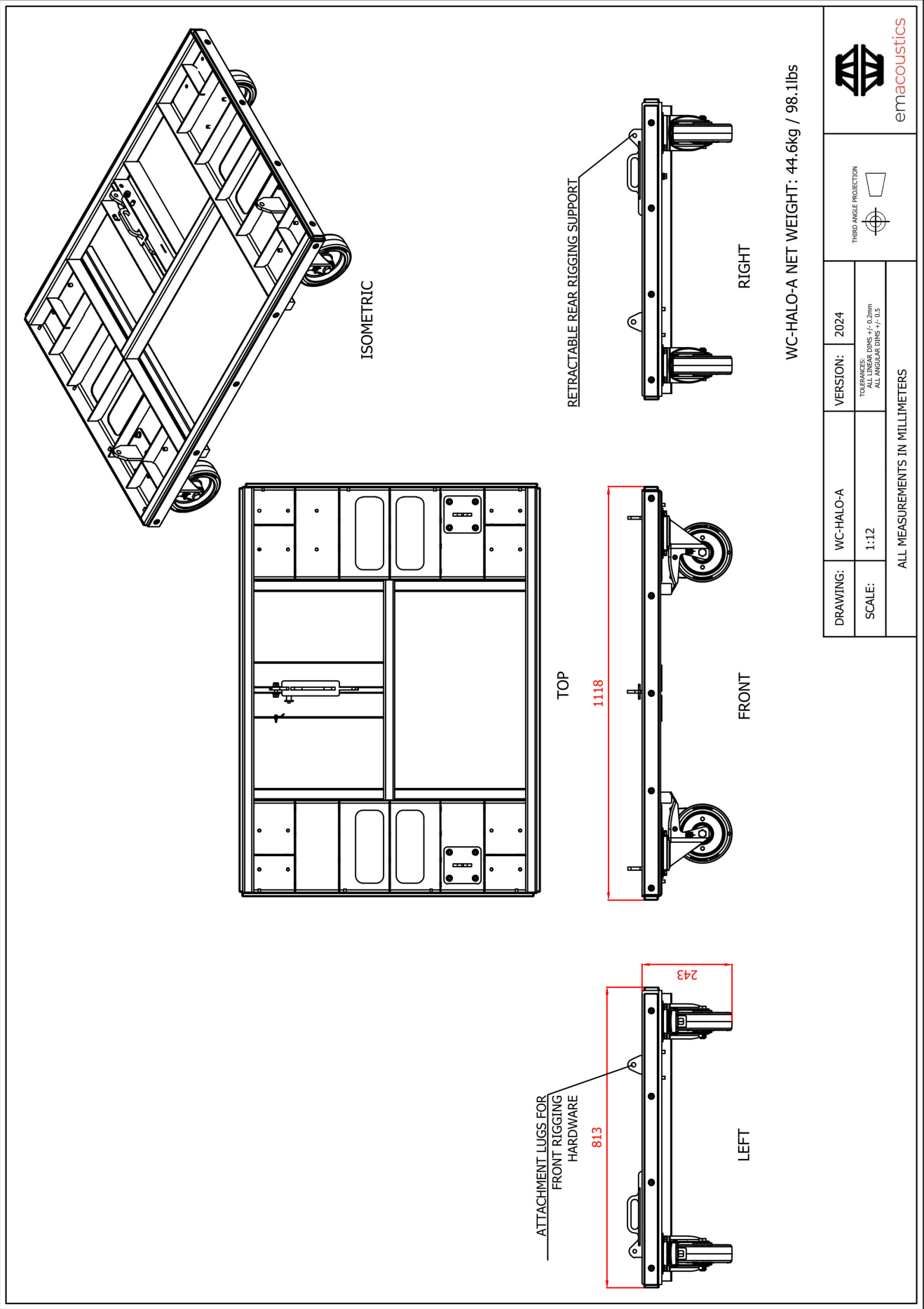
LEFT



RIGHT

HALO-A DELTA NET WEIGHT: 8.2kg / 18lbs (without supplied shackles)
HALO-A DELTA NET WEIGHT: 10.2kg / 22.5lbs (**with** supplied shackles)

DRAWING:	HALO-A DELTA	VERSION:	2024	THIRD ANGLE PROJECTION		
SCALE:	1:6	TOLERANCES: ALL LINEAR DIMS ± 0.2mm ALL ANGULAR DIMS ± 1.0°				
ALL MEASUREMENTS IN MILLIMETERS						



Appendix C - Spare Parts List

Order Code	Description
01A029	DU-1210 replacement 16 ohm 12" LF drive unit
01B016	CDU-1405 replacement 16 ohm 1.4" exit HF drive unit
04A044	RFG-HALO-A replacement grille/fabric for HALO-A
05A087	PIN-0.375/0.813 ball-lock flying pin - HALO-A front rigging
05A088	PIN-0.5/1.625 grip ball-lock flying pin - HALO-A splay rigging

Appendix D - Warranty Information

Limited Warranty

This EM Acoustics loudspeaker product is warranted to the original end-user purchaser and all subsequent owners for a period of **five (5) years** from the original date of purchase.

Warranty Coverage

This warranty covers defects in materials and workmanship. It does not include:

- Damage or failure caused by accident, misuse, neglect, abuse or modification by any person other than an authorised EM Acoustics representative.
- Damage or failure caused by operating the loudspeaker product contrary to the instructions contained within this manual.
- Damage caused during shipment.
- Claims based on any misrepresentation by the seller.
- Products which contain anything other than the original components (or EM Acoustics factory supplied spare parts).
- Products on which the serial number has been removed, altered or defaced.

Returning your EM Acoustics loudspeaker

Should your EM Acoustics loudspeaker develop a fault, please return it (freight prepaid) in its original packaging, along with proof of purchase to your local dealer or to:

EM Acoustics (Returns Department), Building 19.11, Dunsfold Park, Cranleigh, Surrey, GU6 8TB, UK

including a description of the suspected fault. Serial numbers must be quoted in all correspondence relating to the claim. EM Acoustics or its representatives are in no way liable for any loss or damage in transit, and hence it is recommended that the sender insure the shipment. EM Acoustics will pay for return freight should the repair be covered under warranty.

EM Acoustics' liability is to the replacement or repair (at our discretion) of any defective components, and as such are not liable for any incidental and consequential damages including (without limitation) injury to persons, damage to property or loss of use.

This warranty is exclusive and no other warranty is expressed or implied. This warranty is also in addition to - and in no way detracts from - your statutory rights as a consumer.