



HALO

COMPACT

System User Manual
v8 April 2024



emacoustics

liberating audio

Contents

DECLARATIONS OF CONFORMITY.....	5
1.0 - Introduction	6
Unpacking	6
2.0 - HALO Compact System Components	7
HALO-C.....	7
HALO-CS.....	7
FG-HALO-C	8
SM-HALO-C.....	8
FG-HALO-C.....	8
HM-HALO-C.....	8
3.0 - Safety.....	9
System Overview	9
Secondary Safeties.....	10
Safety Inspections.....	10
4.0 - Ease Focus 3.....	11
5.0 - Rigging Overview	12
5.1 - FG-HALO-C Overview.....	12
5.2 - FG-HALO-C Instruction Label.....	14
5.3 - Attaching Accessories to the FG-HALO-C.....	15
FG-HALO-C Extension Bar	15
HM-HALO-C.....	16
5.4 - SM-HALO-C Overview	17
5.5 - SM-HALO-C Stand Adapter.....	18
Attaching Stand Adapter to SM-HALO-C	18
6.0 - HALO-CS Flying System	19
HALO-CS Overview	19
6.1 - Flying HALO-CS with the FG-HALO-C master grid	20
6.2 - Linking two HALO-CS together.....	22
7.0 - HALO-C Flying System.....	24
HALO-C Overview.....	24
7.1 - Flying HALO-C using the FG-HALO-C master grid.....	26
7.2 - Flying HALO-C using the SM-HALO-C simple frame	28

7.3 - Linking HALO-C together	30
7.4 - Flying HALO-CS and HALO-C together.....	31
8.0 - Ground-stacking HALO-C	32
8.1 - Ground-stacking HALO-C on the FG-HALO-C master grid	32
8.2 - Ground-stacking HALO-C on HALO-CS.....	33
9.0 - Flying HALO-C - using CASE-HALO-C flightcases.....	34
10 - Maximum Element System Configurations.....	35
10.1 - HALO-C & HALO-CS Flown - FG-HALO-C	35
10.2 - HALO-C Flown - SM-HALO-C.....	36
10.3 - HALO-C Ground Stacked - FG-HALO-C	37
10.4 - HALO-C Ground Stacked - HALO-CS.....	37
11.0 - Connecting Elements.....	38
11.1 - Connecting HALO-C	38
11.2 - Connecting HALO-CS.....	38
12.0 - Powering the System.....	39
12.1 - Amplifier and Processing Requirements	39
12.1.1 - Amplifier Requirements.....	39
12.1.2 - Connections	40
12.1.3 - Connector Options.....	40
12.2 - Presets and Settings	41
12.2.1 - Preset Description	41
12.2.2 - Geometric Delay	43
12.2.3 - Applying EQ.....	43
12.3 - Use with the DQ & Di Series Advanced System Amplifiers.....	44
12.3.1 - Connections	44
12.3.2 - Preset Recall.....	45
12.4 - Use with the DSC48 Controller	45
12.5 - System Connectivity	46
12.5.1 - Cable Length and Specification	46
13.0 - Splay Angles - Above 10 degrees.....	47
14.0 - Servicing Information.....	48
HALO-C: Removing the AMT high frequency drive unit.....	48
HALO-C: Removing the LF Drive Unit	49
HALO-CS Subwoofer - Removing the LF drive unit	50

Appendix A - Technical Specifications..... 51

 HALO-C 2-way passive compact line array element 51

 HALO-CS compact flyable reflex subwoofer 52

Appendix B - Technical Drawings 53

Appendix C - Spare Parts List..... 60

 Limited Warranty 61

 Warranty Coverage 61

 Returning your EM Acoustics loudspeaker 61

DECLARATIONS OF CONFORMITY



This declaration applies to:

10M203 - HALO-C compact passive line array element

10M205 - HALO-CS compact flyable subwoofer

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 Compact 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 Compact system is one of the only line array loudspeaker systems in the world to utilize genuine ribbon transducers for high frequency reproduction, resulting in incredible detail and clarity as well as superior feedback rejection. The ribbon driver, coupled with the patent-pending diffraction manifold means HALO Compact offers a vastly superior consistent 95-degree horizontal coverage pattern. Added to this is the incredibly intuitive flying system, renowned EM Acoustics passive crossover technology and the one-to-one customer support that EM Acoustics is known for.

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

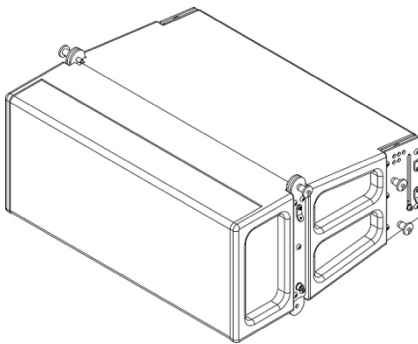
Please take care when unpacking your loudspeaker system. Once unpacked, please inspect each enclosure thoroughly for any transit damage and in the case of any damage please notify your carrier immediately. It is the responsibility of you, the consignee, to instigate any claim. Please retain all original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

2.0 - HALO Compact System Components

The HALO Compact system comprises two loudspeaker models and associated flying hardware. 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-C

2-way passive line array element



FEATURES & BENEFITS

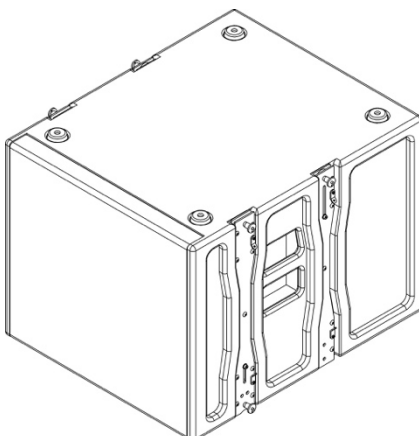
- Signature EM Acoustics passive crossover for unmatched frequency and phase response
- Extremely consistent 95-degree horizontal dispersion for predictable results in use
- Small footprint and low weight ensure a discreet system that is easy to rig
- High power-to-size ratio
- Passive design reduces amplifier channel count and minimises processing requirement
- Lightweight plywood enclosure offers significantly less panel flexure than plastic designs
- Intuitive, safe rigging system for both flown and groundstacked systems
- Full data for EASE and EASE Focus prediction packages

KEY SPECIFICATIONS

ENCLOSURE TYPE:	2-way passive line array element
DRIVE UNITS:	8" LF, 8" AMT HF (all neodymium)
FREQUENCY RESPONSE:	75Hz - 20kHz +/-3dB
NOMINAL DISPERSION1:	95 horizontal, vertical dependent on array config
MAXIMUM SPL2:	124dB continuous, 130dB peak
NOMINAL IMPEDANCE:	8 ohms
DIMENSIONS (HxWxD):	216 (8.5) x 492 (19.4) x 400 (15.7) mm/(ins) - enclosure only 252 (9.9) x 524 (20.6) x 400 (15.7) mm/(ins) - extremities
NET/SHIPPING WEIGHT:	17/19kg (37.4/41.8lbs)

HALO-CS

compact flyable subwoofer



FEATURES & BENEFITS

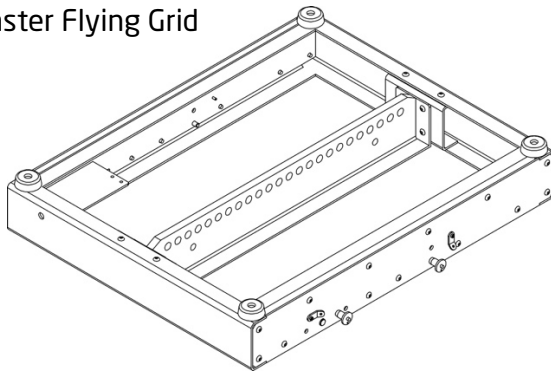
- High power 15" drive unit offers useable LF performance from a compact enclosure
- Small footprint and low weight ensure a discreet system that is easy to rig
- High power-to-size ratio
- Lightweight plywood enclosure offers significantly less panel flexure than plastic designs
- Intuitive, safe rigging system for both flown and groundstacked systems
- Full data for EASE and EASE Focus prediction packages
- Represents 2 x HALO-C element in an array, both for weight and physical size
- Useable for ground stacks without flying grid

KEY SPECIFICATIONS

ENCLOSURE TYPE:	Compact flyable reflex subwoofer
DRIVE UNITS:	15" neodymium LF drive unit
FREQUENCY RESPONSE:	40Hz - 120Hz +/-3dB
NOMINAL DISPERSION1:	omnidirectional
MAXIMUM SPL2:	126dB continuous, 132dB peak
NOMINAL IMPEDANCE:	8 ohms
DIMENSIONS (HxWxD):	438 (17.2) x 492 (19.4) x 600 (23.6) mm/(ins) - enclosure only 438 (17.2) x 524 (20.6) x 600 (23.6) mm/(ins) - extremities
NET/SHIPPING WEIGHT:	36/38kg (79.2/83.6lbs)

FG-HALO-C

Master Flying Grid

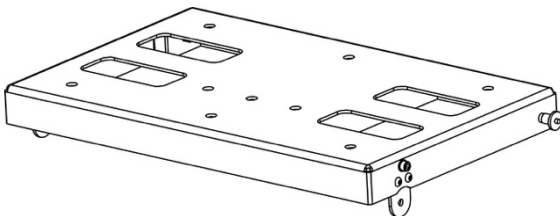


The FG-HALO-C is the master flying grid for the system, and provides a means of safely and swiftly flying arrays of HALO-C elements, HALO-CS subwoofers or a combination of both. Up to 24 HALO-C elements, or a combination of HALO-C and HALO-CS subwoofers (where one HALO-CS would replace two HALO-C elements) can be safely flown with a 10:1 safety factor.

When inverted, the FG-HALO-C grid provides a means of ground stacking HALO-C elements direct onto stages or onto larger subwoofer systems if required, with rubber feet to provide grip. A mounting plate for the TEQSAS LAP-TEQ laser inclinometer system is also included as standard to assist with array aiming when in use. (LAP-TEQ system not included).

SM-HALO-C

Simple Flying Frame

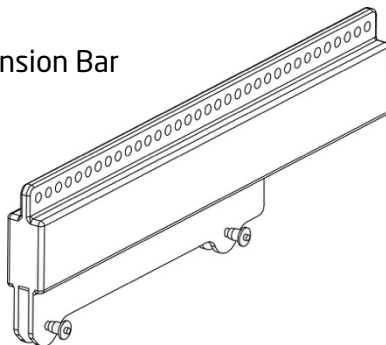


The SM-HALO-C flying frame serves two purposes - first as a low-cost solution for flying small numbers of HALO-C elements in both temporary and fixed installations, and secondly as a means of mounting up to three HALO-C enclosures from a distance pole or loudspeaker stand.

The SM-HALO-C is supplied with a 35mm loudspeaker stand adapter, and has a variety of 11mm diameter holes to either bolt directly in fixed installations, or to attach hook clamps for swift suspension of small arrays from boom arms or trusses.

FG-HALO-C

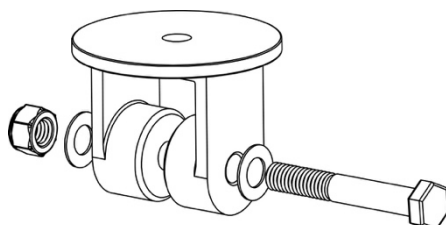
Extension Bar



The extension bar provides additional pickup points to the front or rear of the array for more severe down or up-tilt angles. Secured to the FG-HALO-C grid by two 3/8" ball lock pins, the extension bar utilises the same 1-ton shackles for array pickup and safety points. The extension bar is symmetrical so can be used to provide extension to the pickup points either at the front or the rear of the grid.

HM-HALO-C

Hook Clamp Adapter



The HM-HALO-C adapter allows the FG-HALO-C flying grid to be suspended from a single point using standard half-couplers or trigger clamps. A high-tensile bolt secures the HM-HALO-C into the desired position on the FG-HALO-C central spine, and a 13mm diameter hole in the top of the mount allows attachment of the desired clamping device.

3.0 - Safety

System Overview

The flying system for HALO Compact 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 Compact 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 Compact flying hardware for any other loudspeaker system - the components are specifically designed to work with the HALO Compact system and are not interchangeable with any other EM Acoustics loudspeaker product or any other loudspeaker system. The use of HALO Compact flying hardware with other manufacturers' systems may compromise the safety standards and EM Acoustics, and its parent company, are in no way liable for any loss, damage or injury caused by such practice.

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

The component parts of the HALO Compact 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 Compact 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.

When mounting components on walls, floors or ceilings ensure that all fixings and fasteners used are of an appropriate size and load rating. Wall and ceiling claddings, and the construction/composition of walls and ceilings also need to be taken into consideration when determining if a given suspension method is safe.

Secondary Safeties

It is best practice to ensure 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 Compact 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.

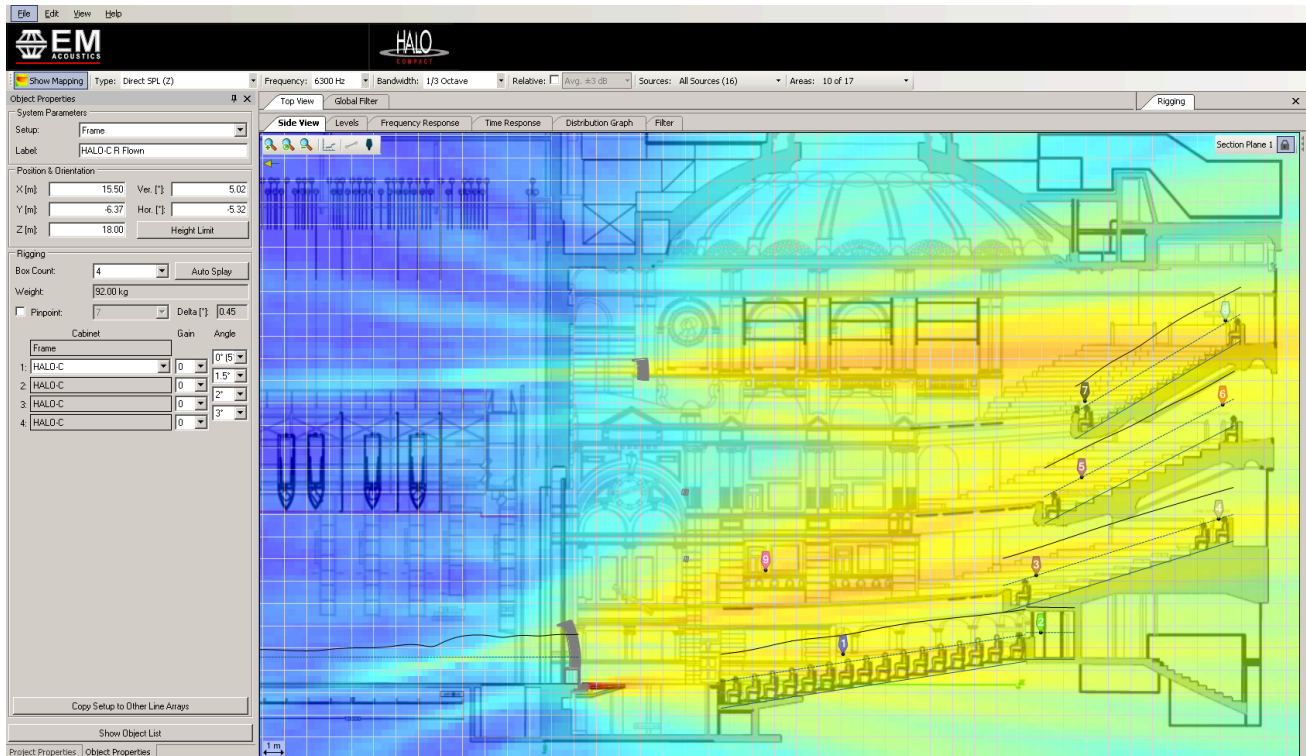
EM Acoustics recommends detailed logbooks be kept of all inspections and load tests to ensure an accurate record is kept of the testing for each EM Acoustics rigging accessory.

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

The AMT drive unit has a very powerful magnetic field and as such, care should be taken to avoid items becoming magnetized to the outside of the enclosure.

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 - 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 Compact, it also provides importing safety information with regards to load limits.

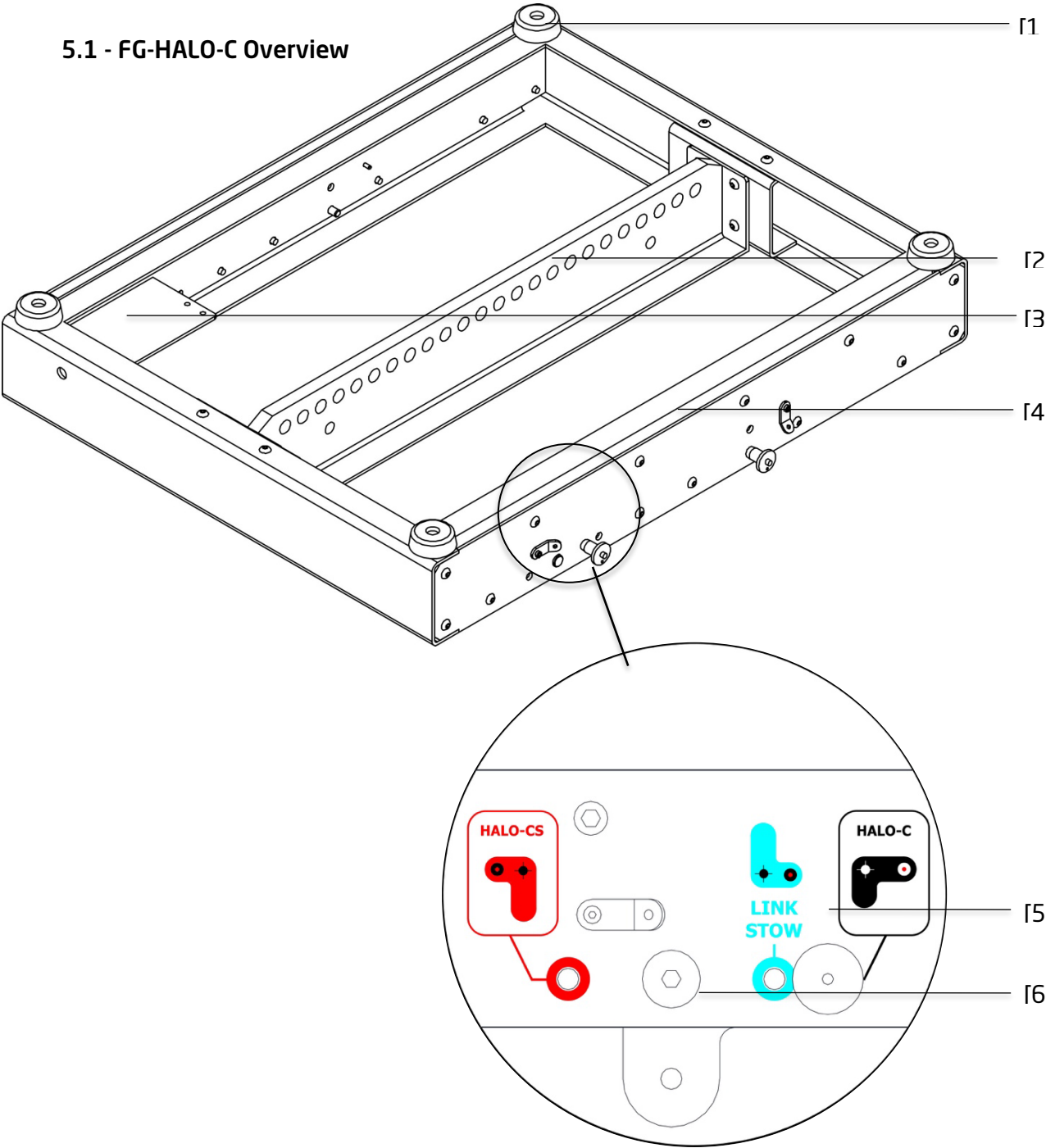
Ease Focus 3 can be downloaded for free from the AFMG website at <http://focus.afmg.eu> and is currently available as a stand-alone application for Windows (XP or Higher) only. It can also be downloaded directly from the EM Acoustics website with all the current product files embedded.

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

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

5.0 - Rigging Overview

5.1 - FG-HALO-C Overview



[1] - Rubber Feet

The rubber feet are used when the FG-HALO-C grid is inverted for ground stack use to provide a high friction contact between the grid and the ground surface.

[2] - Hanging Point

24 x 12mm diameter pickup points are provided on the center spine of the grid to allow for varied vertical angles when using a single flying point. The correct point for a desired angle can be determined by using Ease Focus 3. When using a fixed pick point, Ease Focus 3 will issue a Delta figure to show the difference between the desired angle and the achievable angle from this point taking the center of gravity from the array shape into account.

[3] - Laser Mounting Plate

A mounting plate for the TEQSAS LAP-TEQ laser inclinometer system is also included as standard to assist with array aiming when in use. (LAP-TEQ system not included).

[4] - FG-HALO-C Instruction Label

The Instruction labels on each side of the grid provide information for the pin points for various array configurations as well as up and down tilt options and a quick reference for the grid's safe working loads. See page 14 for a detailed view and description.

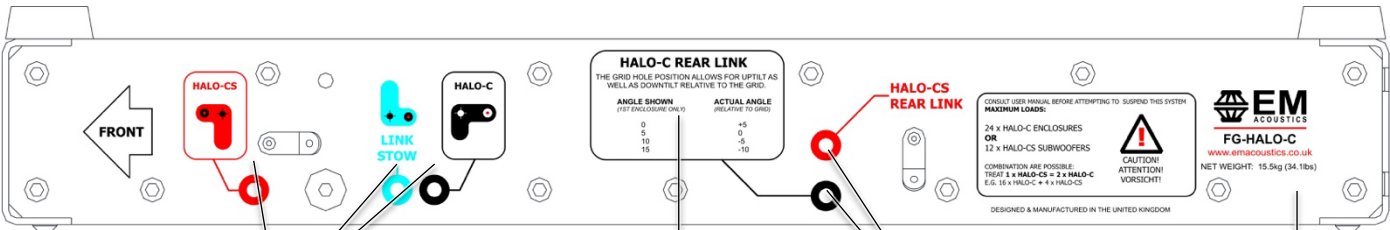
[5] - Quick Release Pin

Quick release pin shown locking the front link in the HALO-C position.

[6] - Captive Front Link

The captive front link allows for easy selection between flying a HALO-CS or a HALO-C to the flying frame. The link can also be stowed within the frame to protect it when not attached to a loudspeaker.

5.2 - FG-HALO-C Instruction Label



Colour identified holes denote captive link pin points for flying the HALO-CS, HALO-C or the stow position.

Colour identified holes denote rear pin points for flying the HALO-CS or HALO-C.

HALO-C REAR LINK

THE GRID HOLE POSITION ALLOWS FOR UPTILT AS WELL AS DOWNTILT RELATIVE TO THE GRID.

ANGLE SHOWN (1ST ENCLOSURE ONLY)	ACTUAL ANGLE (RELATIVE TO GRID)
0	+5
5	0
10	-5
15	-10

Rear Link information box gives a quick reference to the uptilt and downtilt angles relative to the grid.

Information box at the rear of the grid gives a quick reference to maximum loads possible on the FG-HALO-C with various combinations of boxes

CONSULT USER MANUAL BEFORE ATTEMPTING TO SUSPEND THIS SYSTEM

MAXIMUM LOADS:

24 x HALO-C ENCLOSURES
OR
12 x HALO-CS SUBWOOFERS

COMBINATION ARE POSSIBLE:
TREAT **1 x HALO-CS = 2 x HALO-C**
E.G. 16 x HALO-C + 4 x HALO-CS

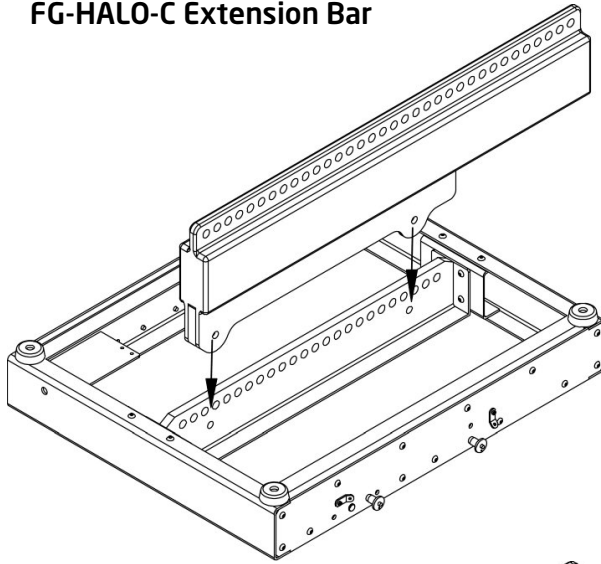
CAUTION!
ATTENTION!
VORSICHT!

EM ACOUSTICS
FG-HALO-C
www.emacoustics.co.uk
NET WEIGHT: 15.5kg (34.1lbs)

DESIGNED & MANUFACTURED IN THE UNITED KINGDOM

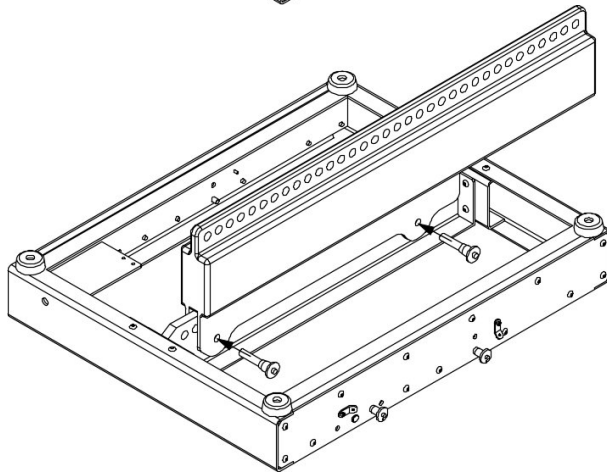
5.3 - Attaching Accessories to the FG-HALO-C

FG-HALO-C Extension Bar

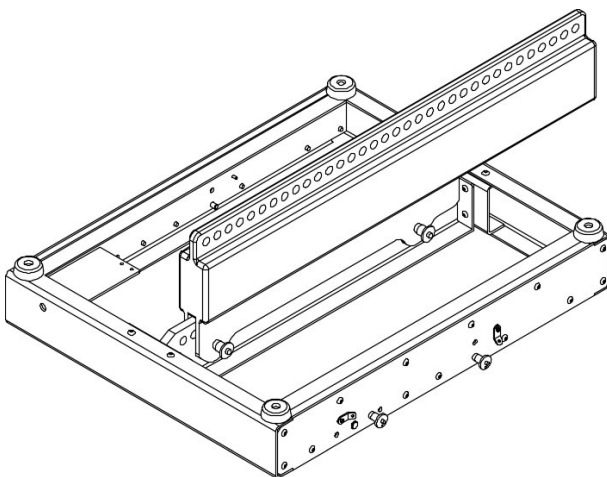


Lower the Extension Bar over the center spine of the FG-HALO-C and locate the two lower holes on the Extension Bar with the two lower holes on the center spine.

NOTE: Do not attempt to attach the Extension Bar to the upper holes on the FG-HALO-C Spine

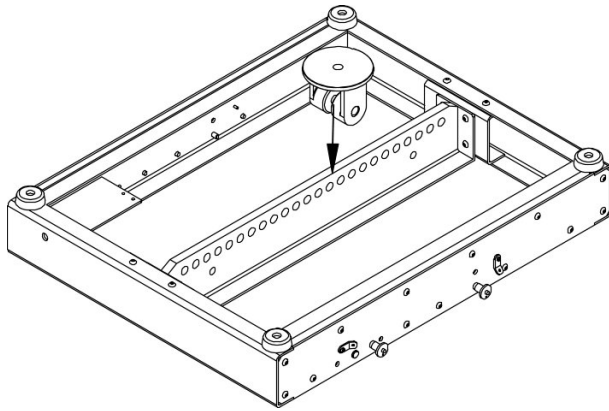


Attach the Extension Bar in place by using the quick release pins attached to it.

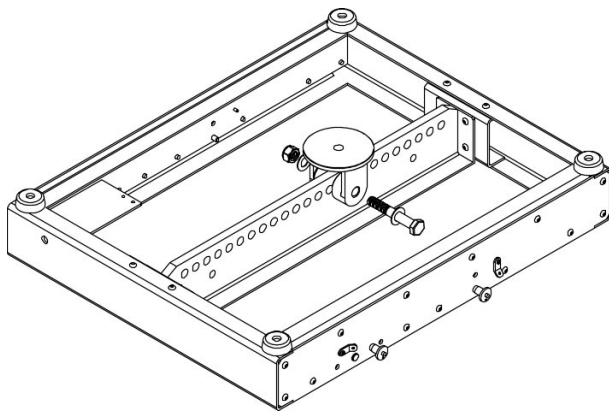


The Extension Bar can also be fitted in reverse with the extension to the front of the FG-HALO-C to allow for extra up tilt if required

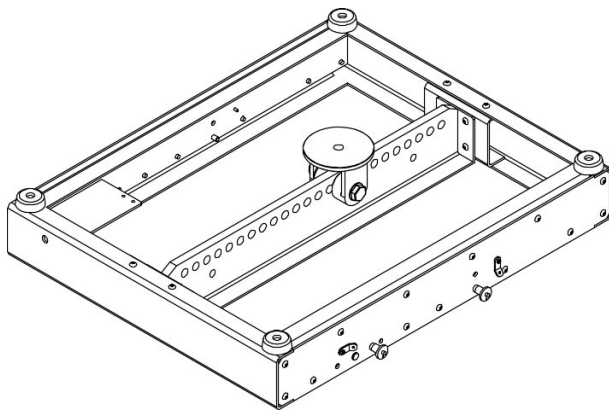
HM-HALO-C



Use Ease Focus 3 to select the correct pickup point for the desired vertical angle of the FG-HALO-C

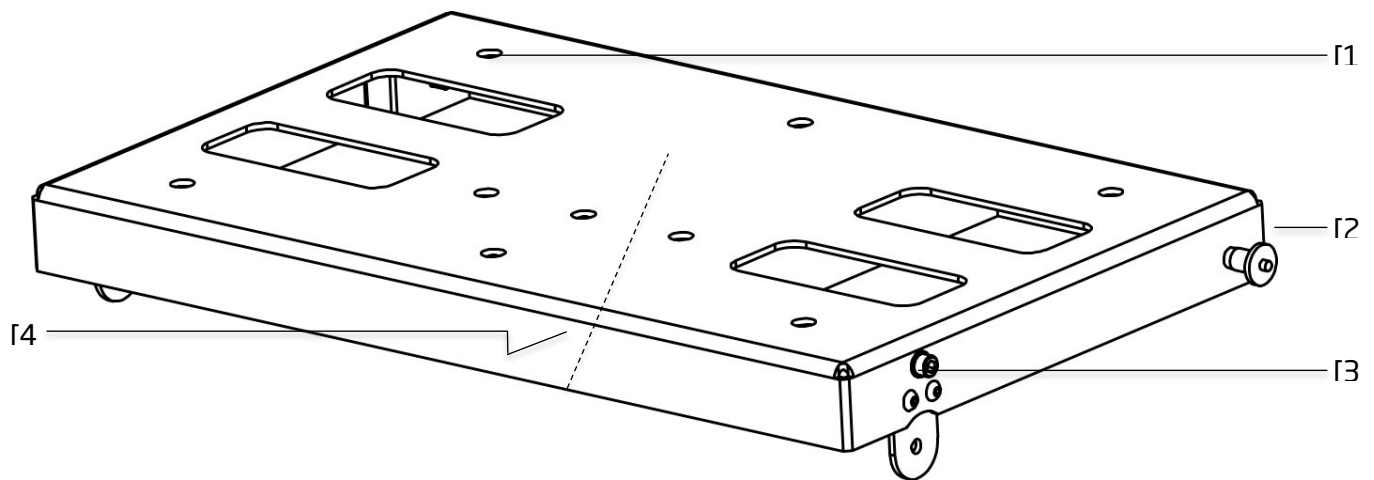


Use the M12 bolt and washers supplied with the HM-HALO-C to secure the adapter in place



Adapters such as rigging eyes or clamps can be attached to the HM-HALO-C to give the desired method of flying.

5.4 - SM-HALO-C Overview



[1] - Fixing Points

9 x 11mm fixing holes for attaching various industry standard attachments such as speaker stand mount, hook clamps and half couplers. Holes can also be used to bolt the SM-HALO-C grid to another surface.

[2] - Rear Pin Point

Quick release pin point for rear of HALO-C

[3] - Front Pin Point

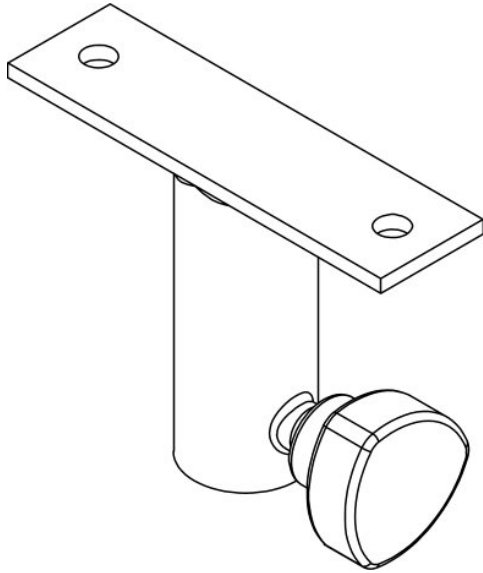
Quick release pin point for front of HALO-C

[4] - Safety Information Label

A Manufacturers safety information label is attached to the inside of the SM-HALO-C to identify the Serial Number, Date of Manufacture and SWL.

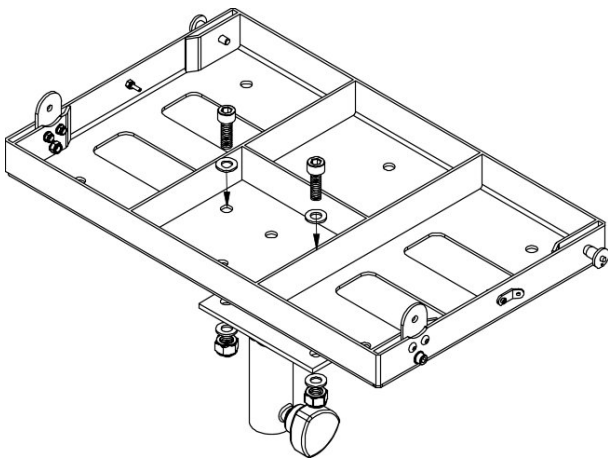


5.5 - SM-HALO-C Stand Adapter

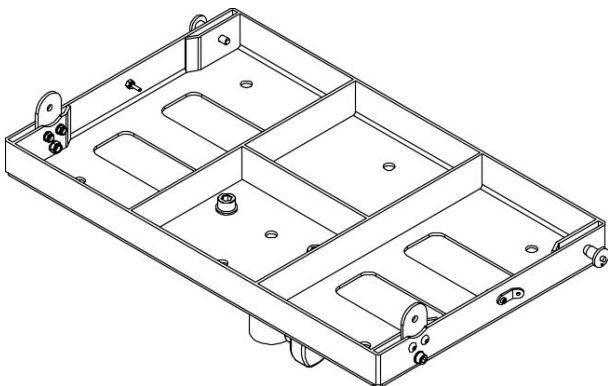


The SM-HALO-C is supplied with a 35mm speaker stand adapter. In this combination, the SM-HALO-C will safely support up to 3 x HALO-C on a speaker stand **dependent on the SWL of the stand used**. Please refer to the speaker stand manufacturer's documentation for SWLs.

Attaching Stand Adapter to SM-HALO-C

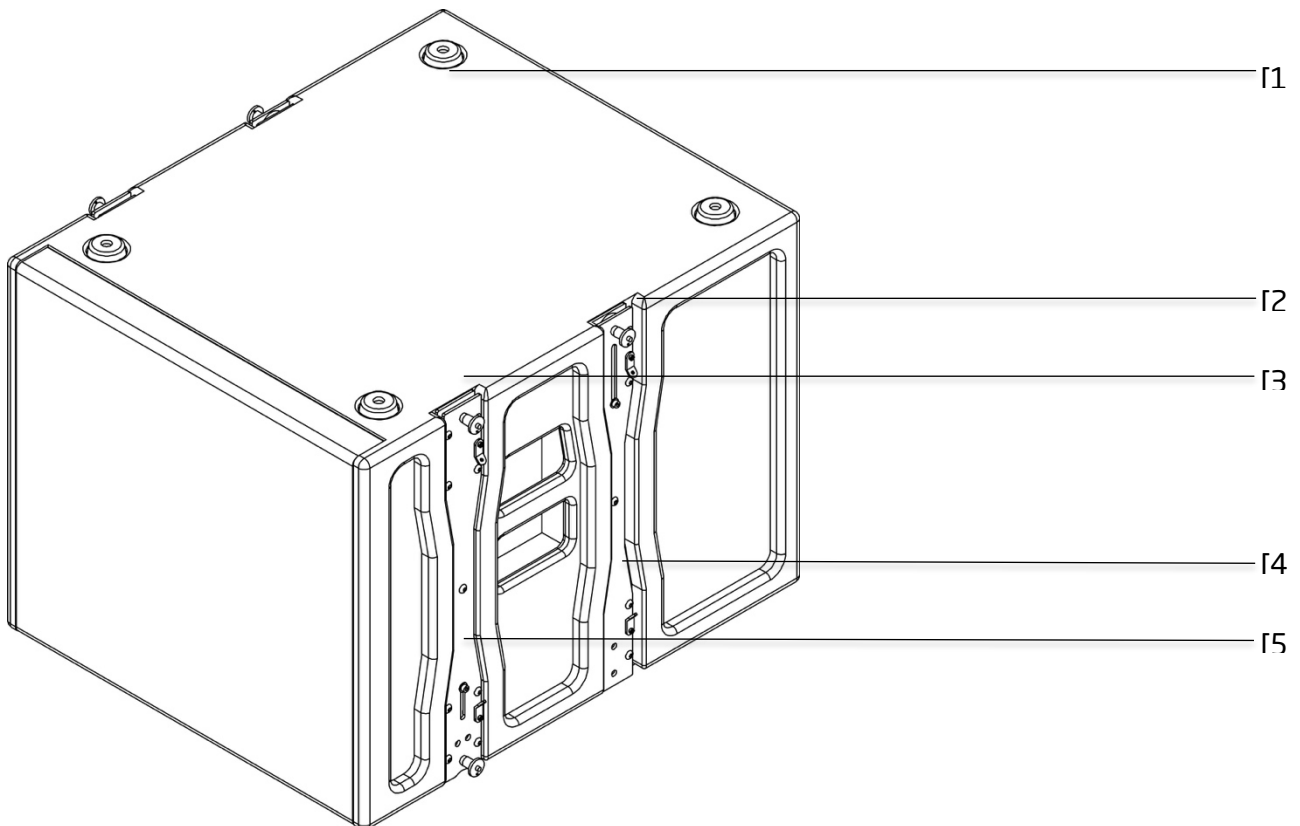


Use the M10 bolts and washers supplied with the SM-HALO-C to attach the Stand Adapter through the holes shown in the diagram.



6.0 - HALO-CS Flying System

HALO-CS Overview



[1] - Rubber Feet

The rubber feet are used when the HALO-CS is inverted for ground stack use to provide a high friction contact between the speaker and the ground surface.

[2] - Upper Rear Link

Upper rear link has options for attaching to FG-HALO-C, to the underside of another HALO-CS, or to be stowed when not in use.

[3] - Upper Front Pin Point

Quick release front pin point to receive link from either FG-HALO-C or from underside of another HALO-CS.

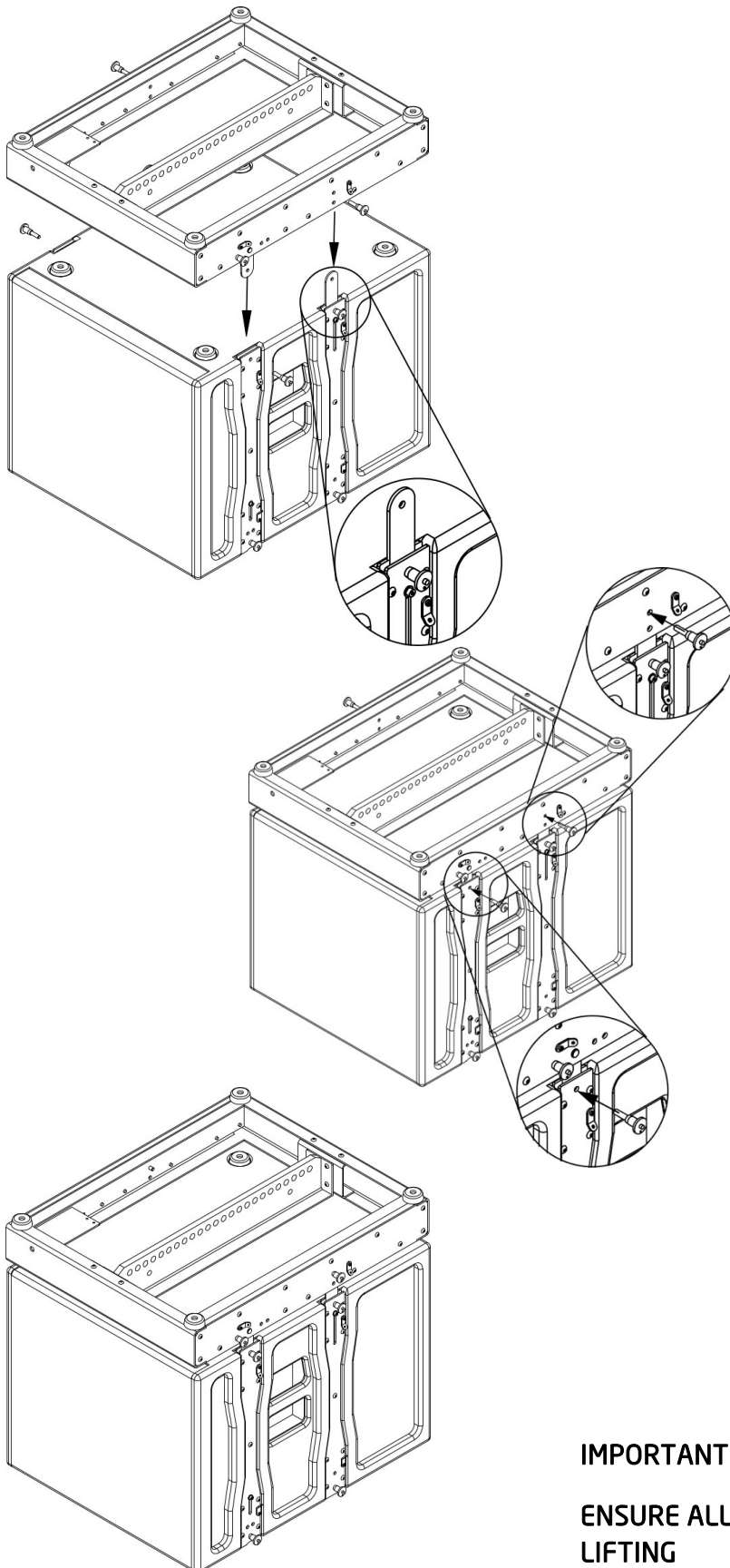
[4] - Lower Rear Pin Point

Quick release rear pin point to receive link from either HALO-C or another HALO-CS.

[5] - Lower Front Link

Lower from link has options for attaching another HALO-CS, a HALO-C, or to be stowed when not in use.

6.1 - Flying HALO-CS with the FG-HALO-C master grid



Pin the captive front link on the FG-HALO-C to the HALO-CS position and remove the quick release pin from the rear of the FG-HALO-C.

Set the rear captive link of the HALO-CS to the extended position.

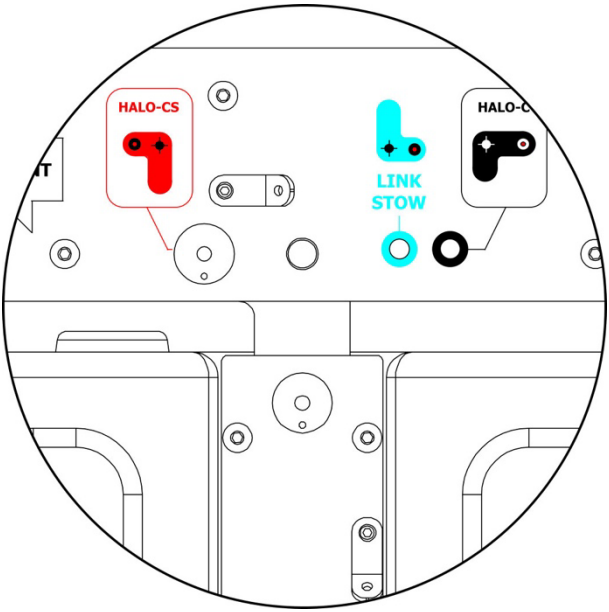
Locate the front link of the FG-HALO-C into the HALO-CS and replace the quick release pin.

Locate the rear link of the HALO-CS into the FG-HALO-C and re-insert the the quick release pin into the HALO-CS rear link pin point.

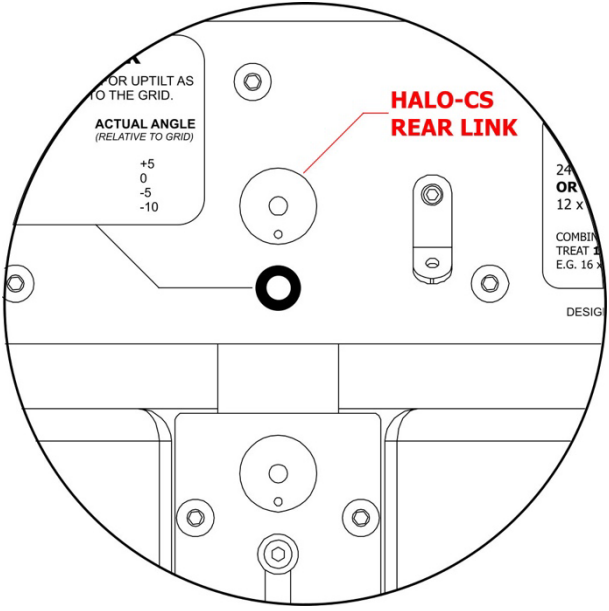
Detailed views of these pin positions are shown on the following page.

IMPORTANT NOTE: -

ENSURE ALL PINS ARE SECURED BEFORE LIFTING

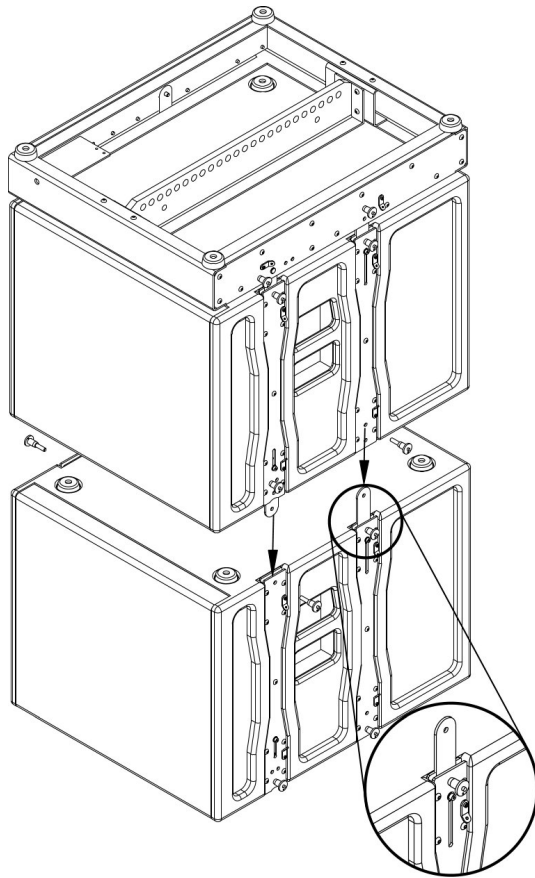


Detailed view showing front link position between the FG-HALO-C and a HALO-CS.



Detailed view showing rear link position between the FG-HALO-C and a HALO-CS.

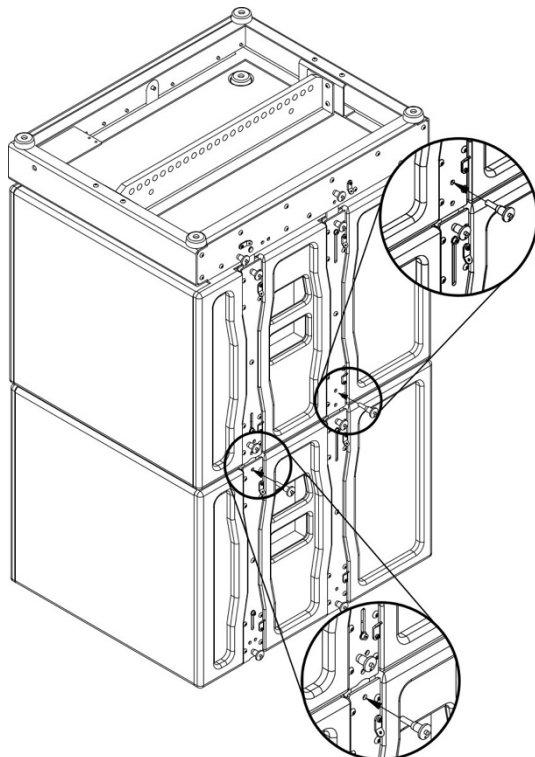
6.2 - Linking two HALO-CS together



Place the two HALO-CS' on top of each other. The rubber feet will help line them up approximately.

Lower the two front captive links in the upper HALO-CS and lock in place using the quick release pins

Extend the rear captive link in the lower HALO-CS and lock in place using the quick release pins

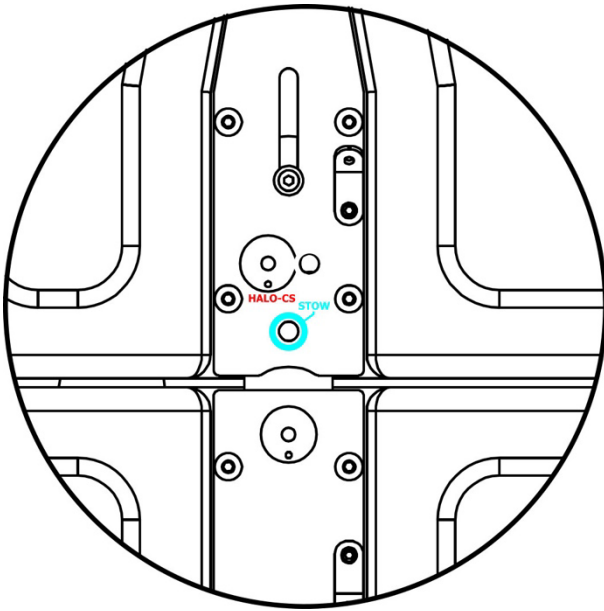


Lock the two HALO-CS together by pinning the captive links to their opposite speakers

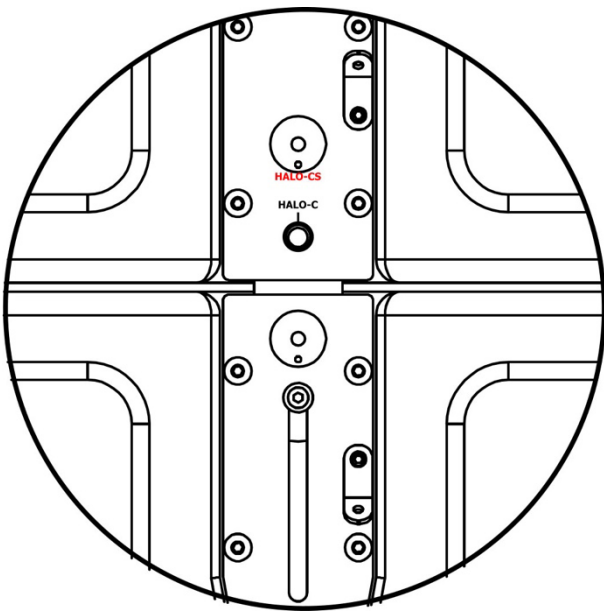
Detailed views of these pin positions are shown on the following page.

IMPORTANT NOTE: -

ENSURE ALL PINS ARE SECURED BEFORE LIFTING



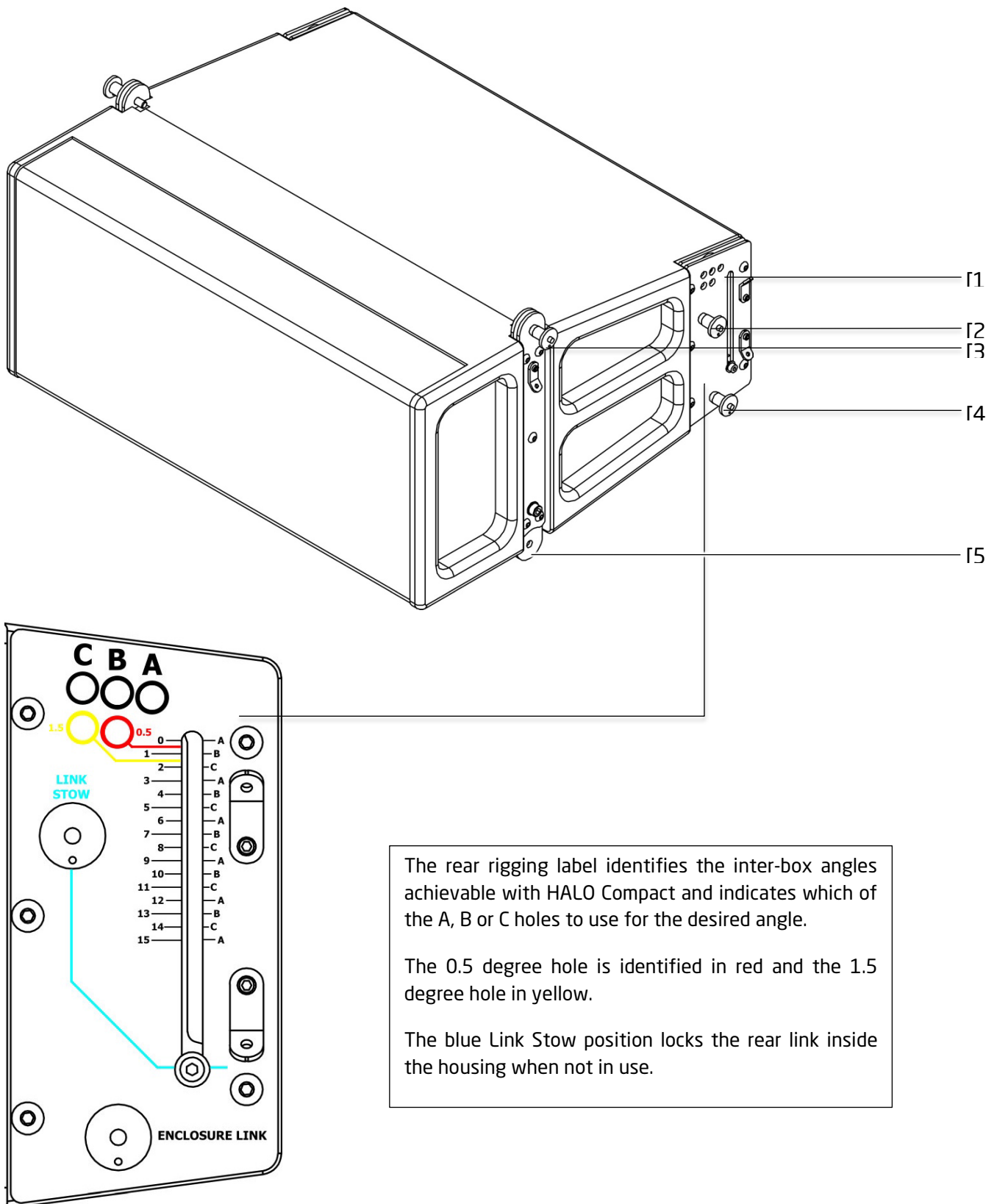
Detailed view showing front link position between two HALO-CS.



Detailed view showing rear link position between two HALO-CS

7.0 - HALO-C Flying System

HALO-C Overview



[1] - Upper Rear Pin Points

The upper rear pin points are where the inter-box angles are set. Options are for 0 - 15 degrees in 1 degree increments. Additionally, there are 2 colour identified holes for 0.5 degrees and 1.5 degrees.

[2] - Link Stow

Hole for locking the rear link in a stowed position

[3] - Upper Front Pin Point

The upper front pin point can attach directly to either the front cam of the FG-HALO-C, The fixed front point of the SM-HALO-C or the underside of either a HALO-CS or another HALO-C

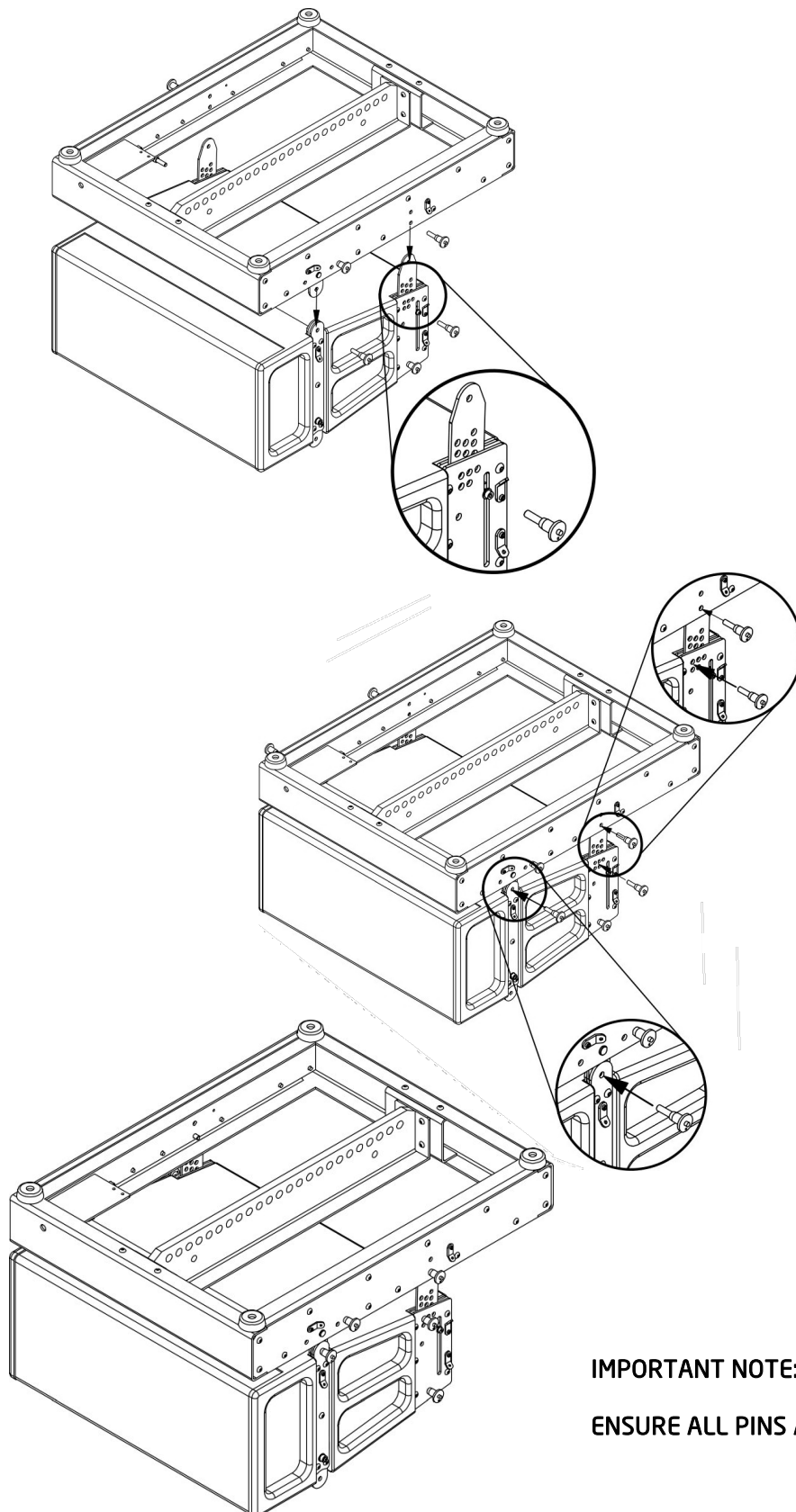
[4] - Lower Rear Pin Point

The lower rear pin point will mate with the rear link from an additional HALO-C rigged below.

[5] - Lower Front Pin Point

The lower front pin point will mate directly with the upper front pin point of an additional HALO-C rigged below.

7.1 - Flying HALO-C using the FG-HALO-C master grid



Pin the captive front link on the FG-HALO-C to the HALO-C position and remove the quick release pin from the rear of the FG-HALO-C.

Set the rear captive link of the HALO-C to the extended position.

To set the HALO-C parallel to the grid, select the 5-degree hole. Positions lower than 5-degrees will produce up-tilt when required.

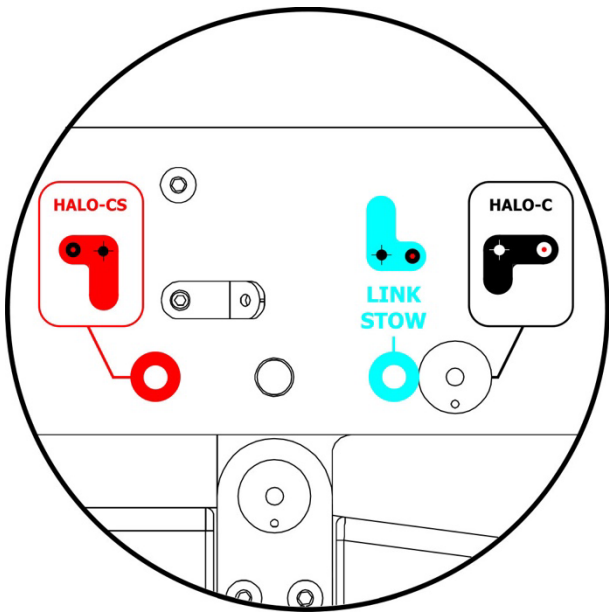
Locate the front link of the FG-HALO-C into the HALO-C and replace the quick release pin.

Locate the rear link of the HALO-C into the FG-HALO-C and re-insert the the quick release pin into the HALO-C rear link pin point.

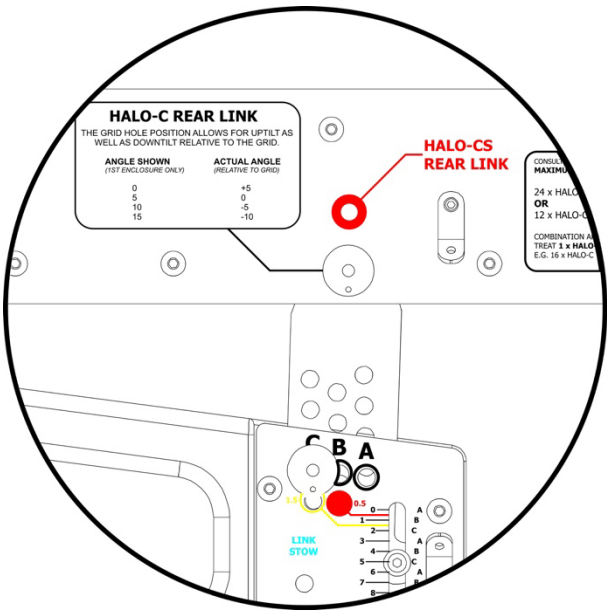
Detailed views of these pin positions are shown on the following page.

IMPORTANT NOTE: -

ENSURE ALL PINS ARE SECURED BEFORE LIFTING

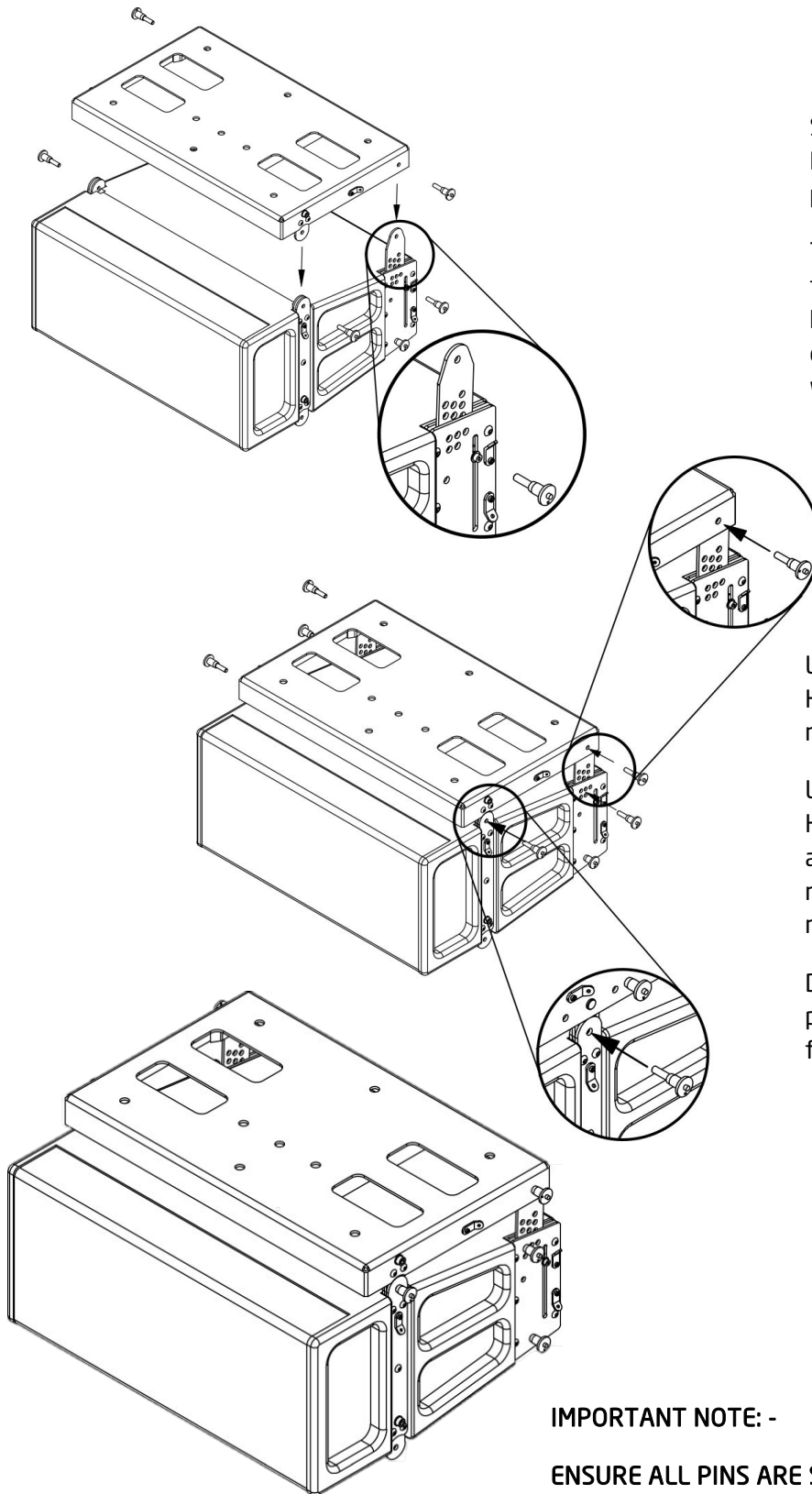


Detailed view showing front link position between the FG-HALO-C and a HALO-C.



Detailed view showing rear link position between the FG-HALO-C and a HALO-C.

7.2 - Flying HALO-C using the SM-HALO-C simple frame



Set the rear captive link of the HALO-C to the extended position.

To set the HALO-C parallel to the grid, select the 5-degree hole. Positions lower than 5-degrees will produce up-tilt when required.

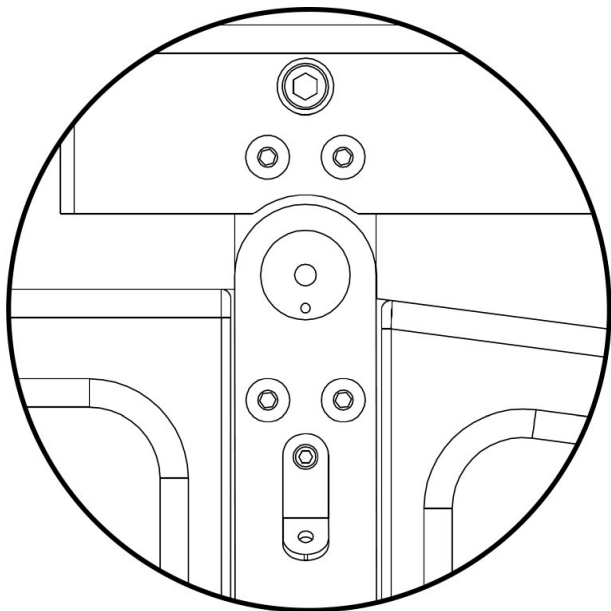
Locate the front link of the SM-HALO-C into the HALO-C and replace the quick release pin.

Locate the rear link of the HALO-C into the SM-HALO-C and re-insert the the quick release pin into the HALO-C rear link pin point.

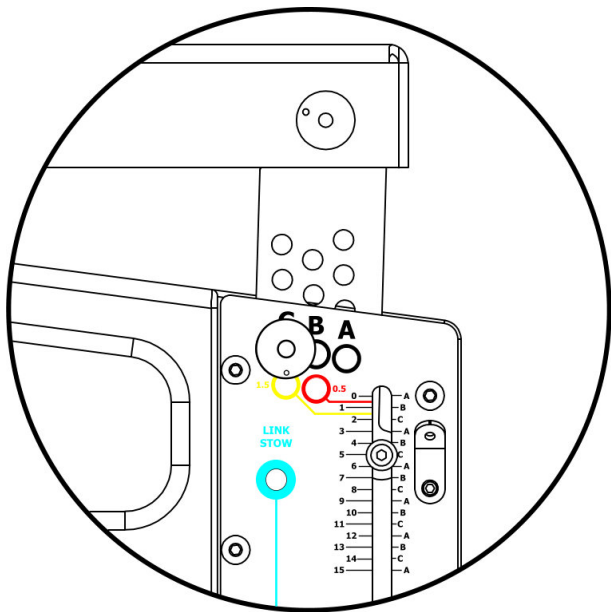
Detailed views of these pin positions are shown on the following page.

IMPORTANT NOTE: -

ENSURE ALL PINS ARE SECURED BEFORE LIFTING

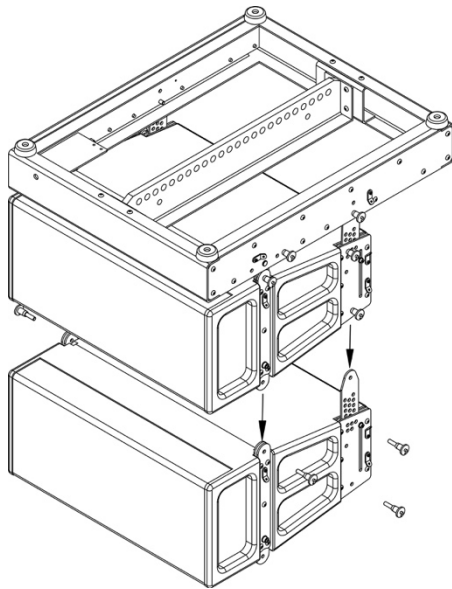


Detailed view showing front link position between the SM-HALO-C and a HALO-C.



Detailed view showing rear link position between the SM-HALO-C and a HALO-C.

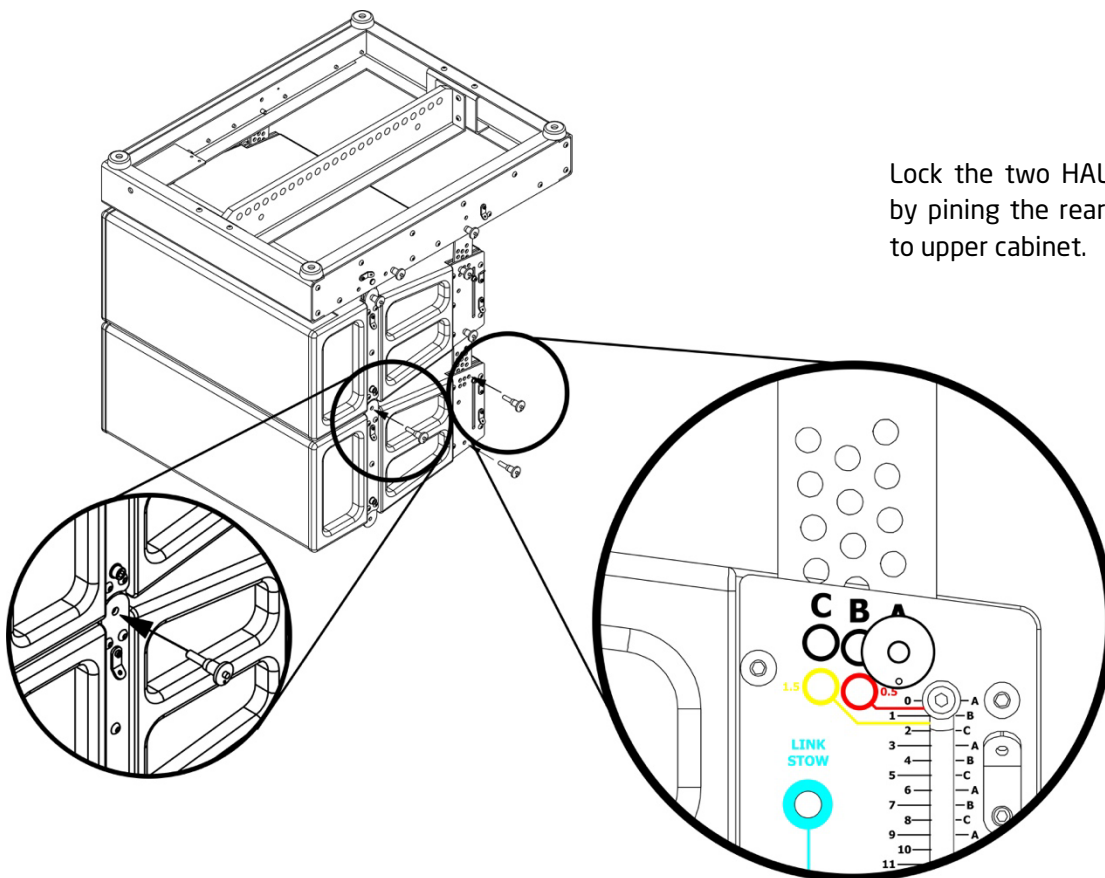
7.3 - Linking HALO-C together



Locate the two HALO-C cabinets together by the front links and lock together using the quick release pins.

Then extend the rear captive link of the lower cabinet to the desired angle.

The drawing shows the first element parallel to the grid (5-degree hole selected) and the lower element also at 0-degrees.

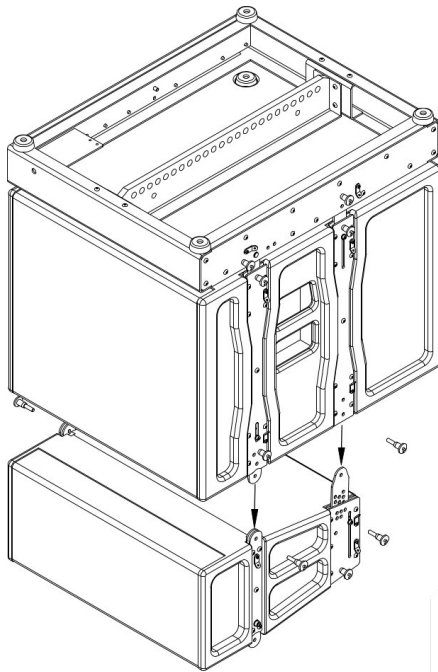


Lock the two HALO-C together by pinning the rear captive links to upper cabinet.

IMPORTANT NOTE: -

ENSURE ALL PINS ARE SECURED BEFORE LIFTING

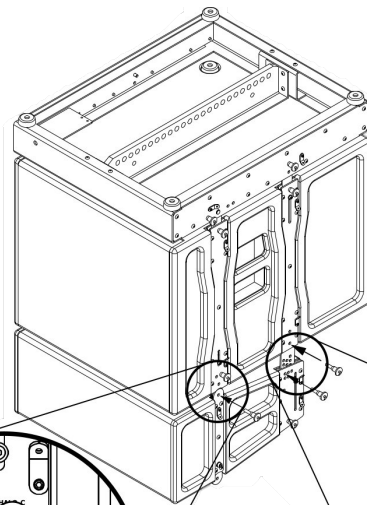
7.4 - Flying HALO-CS and HALO-C together



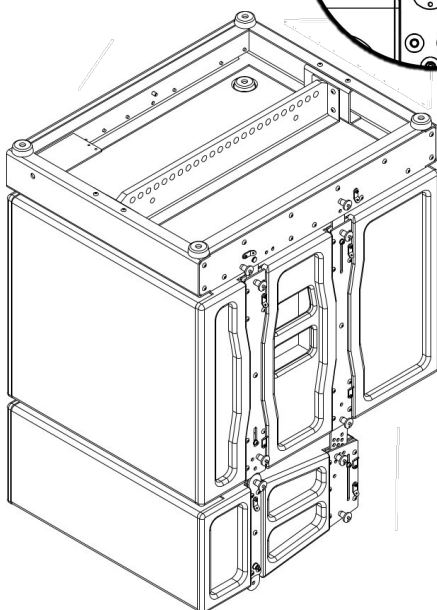
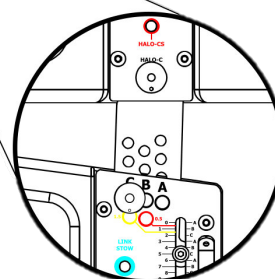
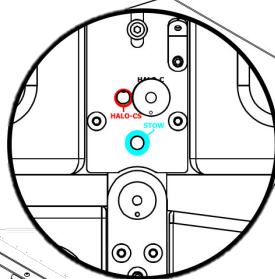
Locate the two cabinets together by the front links and lock together using the quick release pins.

Then extend the rear captive link of the lower cabinet to the desired angle.

To set the HALO-C parallel to the grid, select the 5-degree hole. Positions lower than 5-degrees will produce up-tilt when required.



Lock the two cabinets together by pinning the rear captive links to upper cabinet.

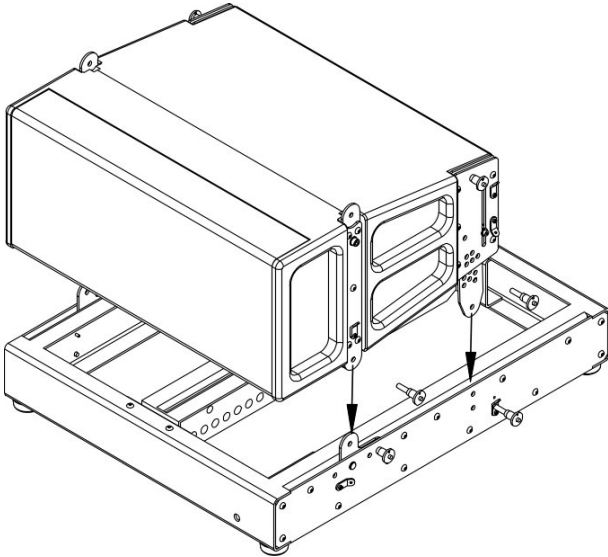


IMPORTANT NOTE: -

ENSURE ALL PINS ARE SECURED BEFORE LIFTING

8.0 - Ground-stacking HALO-C

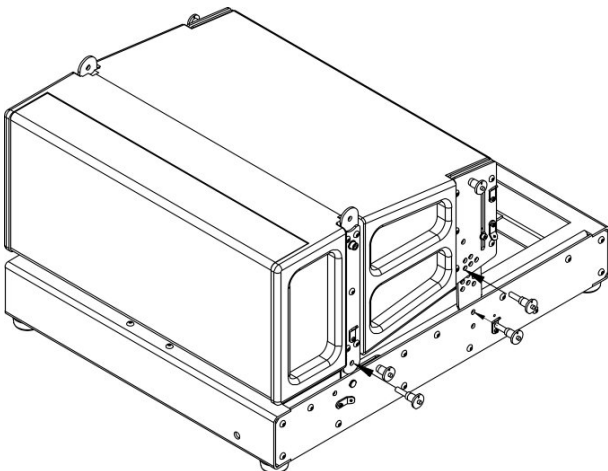
8.1 - Ground-stacking HALO-C on the FG-HALO-C master grid



Place the FG-HALO-C with the rubber feet on the ground.

Turn the HALO-C upside-down so its rear captive link extends downwards.

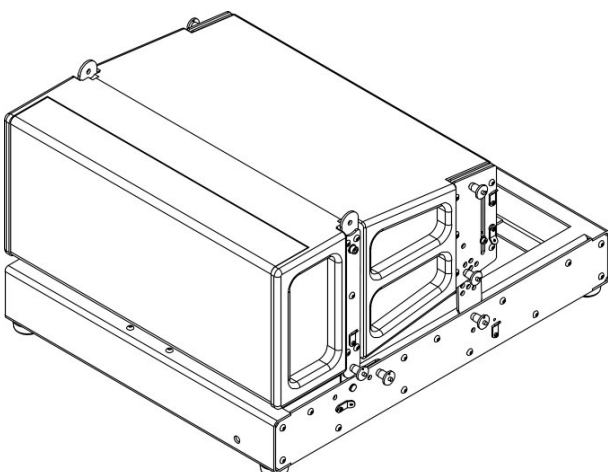
Locate the front links of the HALO-C and FG-HALO-C together and lock in place using the quick release pins.



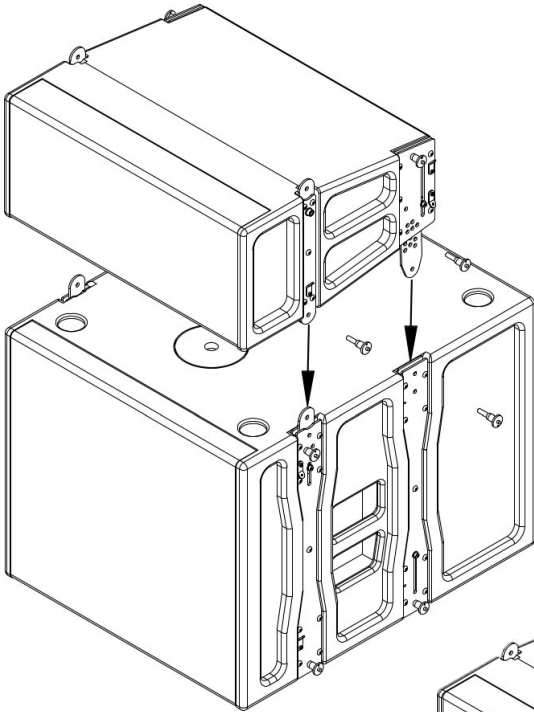
Select the required angle for the HALO-C rear captive link and re-insert the quick release pin.

Use the 5 degree option to mount the HALO-C at 0 degrees to the FG-HALO-C.

Use the quick release pins to lock the HALO-C captive link to the FG-HALO-C



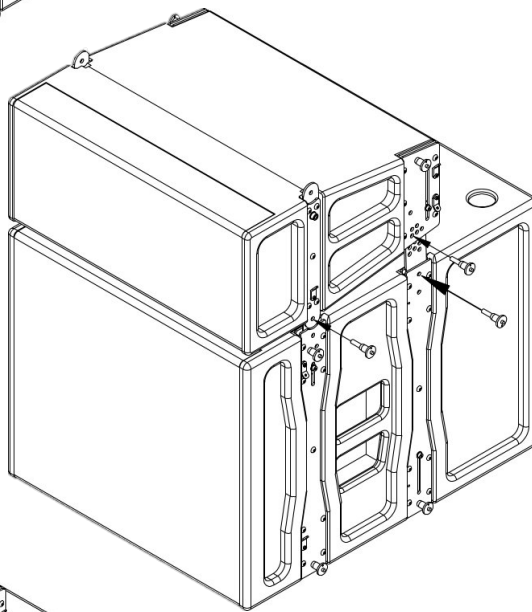
8.2 - Ground-stacking HALO-C on HALO-CS



Place the HALO-CS with the rubber feet on the ground.

Turn the HALO-C upside-down so its rear captive link extends downwards.

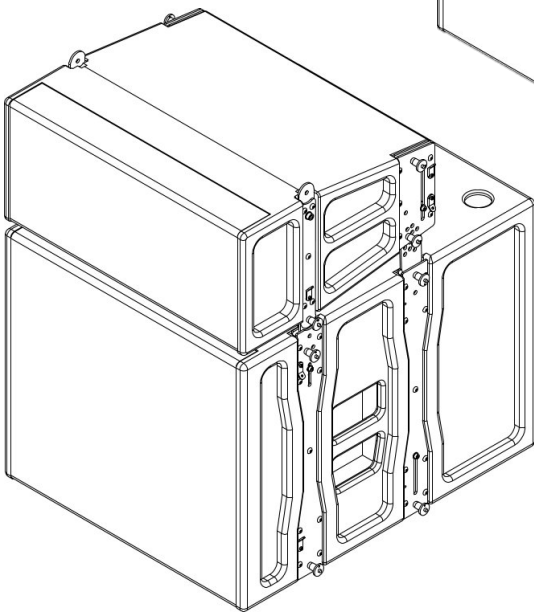
Locate the front links of the HALO-C and HALO-CS together and lock in place using the quick release pins.



Select the required angle for the HALO-C rear captive link and re-insert the quick release pin.

Use the 5 degree option to mount the HALO-C at 0 degrees to the HALO-CS.

Use the quick release pins to lock the HALO-C captive link to the HALO-CS.



9.0 - Flying HALO-C - using CASE-HALO-C flightcases

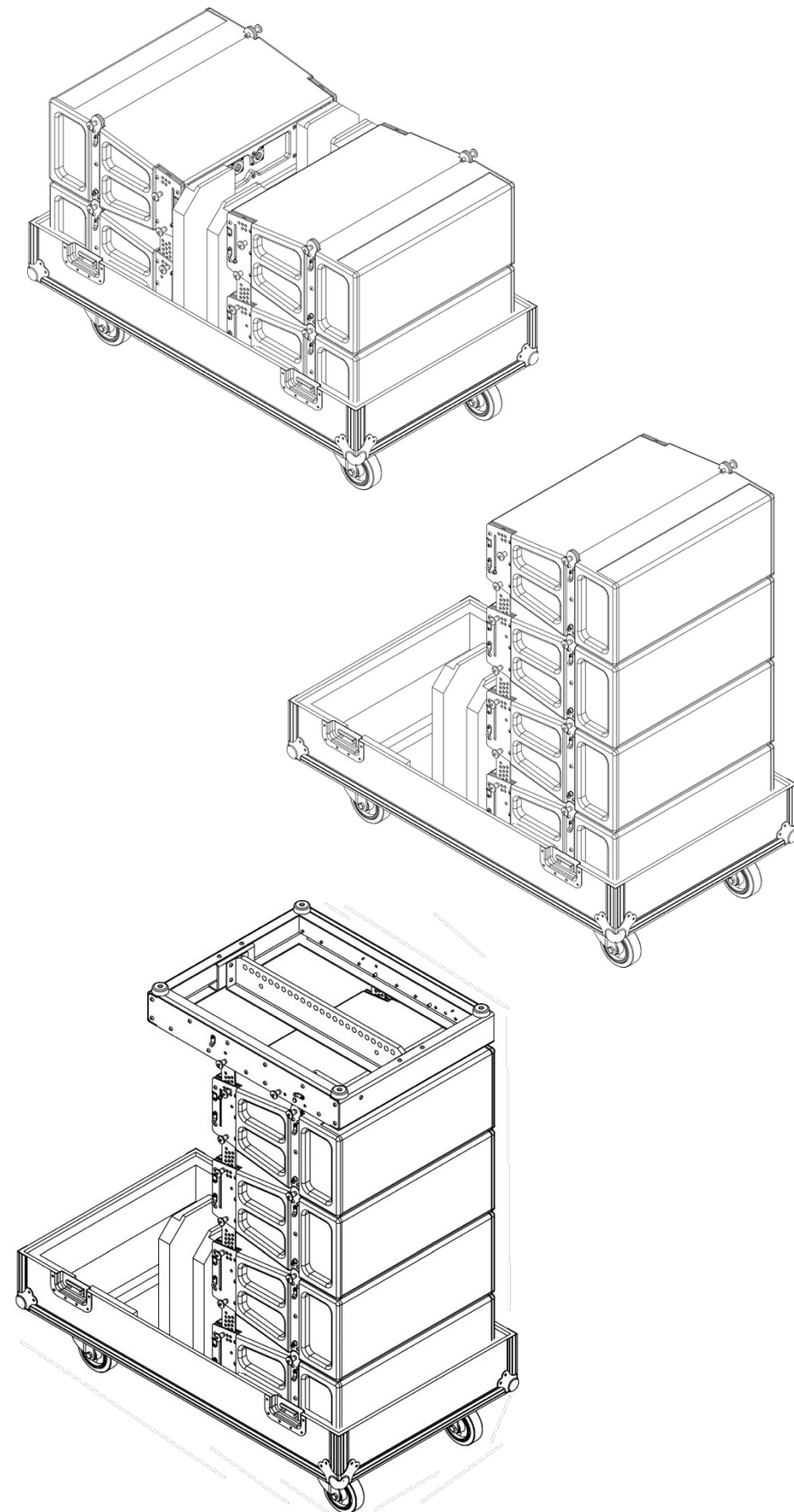
As a factory option, HALO-C can be supplied in an appropriately sized flightcase that fits 4 across most trucks, or 3 across most vans.

As HALO-C is a compact and lightweight line-array, the case has been designed to minimize wasted space, whilst offering functionality to enable quick rigging and testing of the contents.

Take one pair of the HALO-C and place on top of the second pair using the correct method of joining HALO-C together. **(See Page 29 for details on this).**

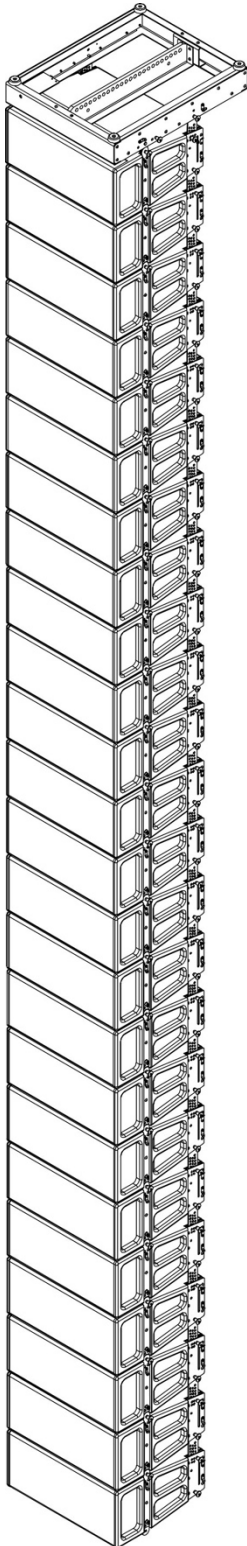
The space in the rear baffle behind each pair allows for link cables to remain in place during transit and for sections of the array to be cabled prior to rigging. It also allows for an easy method of testing the speakers without removing them from the case.

For the top section of an array, the FG-HALO-C can be attached using the method shown on page 25 and can be configured with the desired flying accessories ready to be attached to a motor or rigging point.



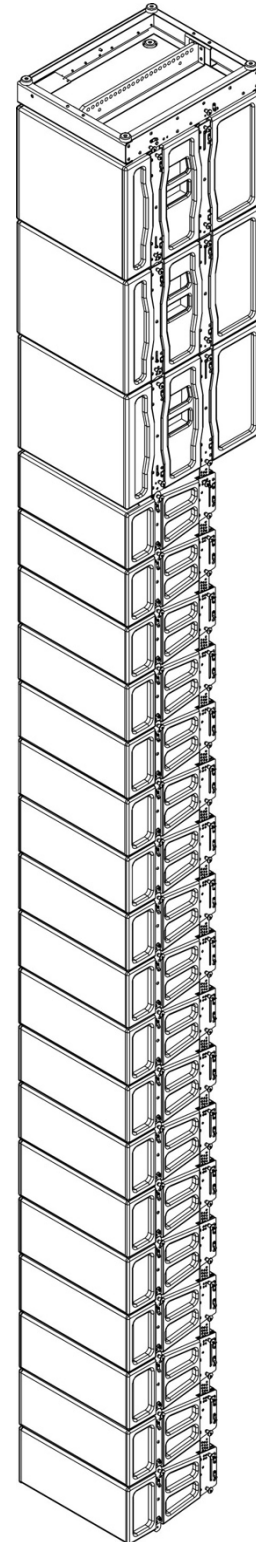
10 - Maximum Element System Configurations

10.1 - HALO-C & HALO-CS Flown - FG-HALO-C

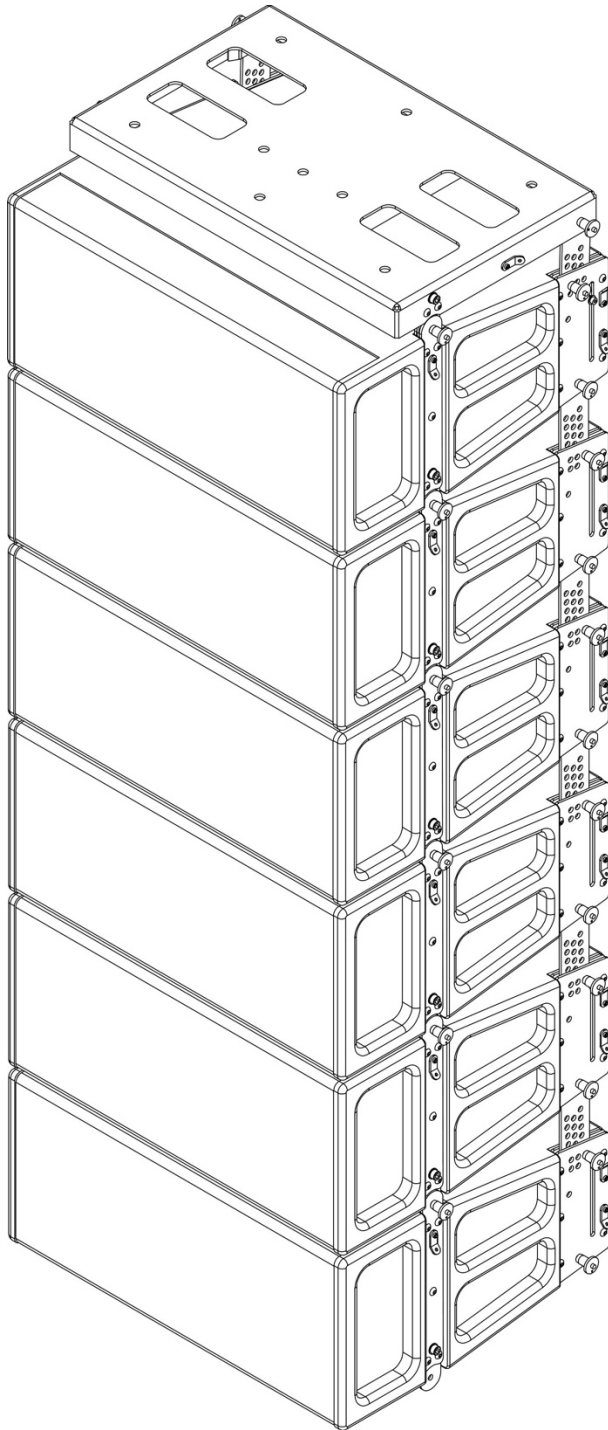


The Maximum number of HALO-C that can be flown from the FG-HALO-C is 24 cabinets as per the drawing on the left.

If using the HALO-CS as part of an array, count one HALO-CS as two HALO-C. For example, if using three HALO-CS, you can have a maximum of 18 HALO-C flown underneath as per the drawing on the right.



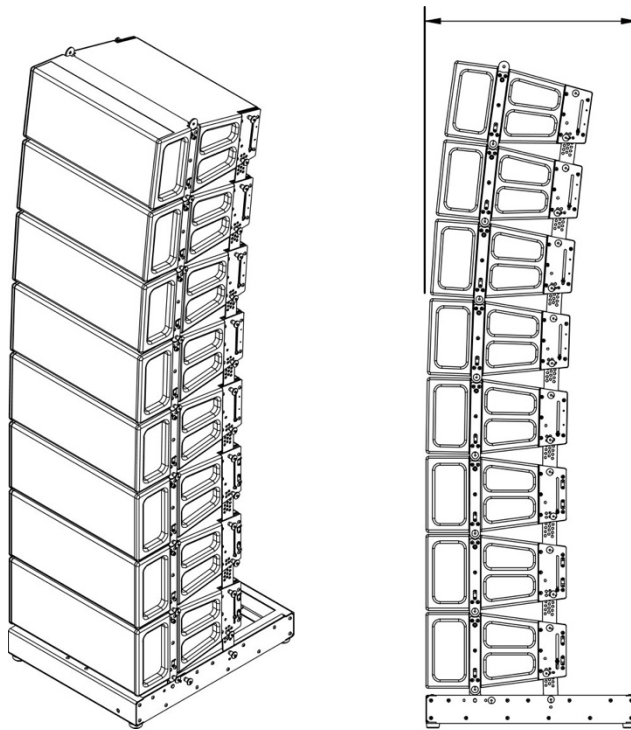
10.2 - HALO-C Flown - SM-HALO-C



A maximum of six HALO-C can be flown from the SM-HALO-C.

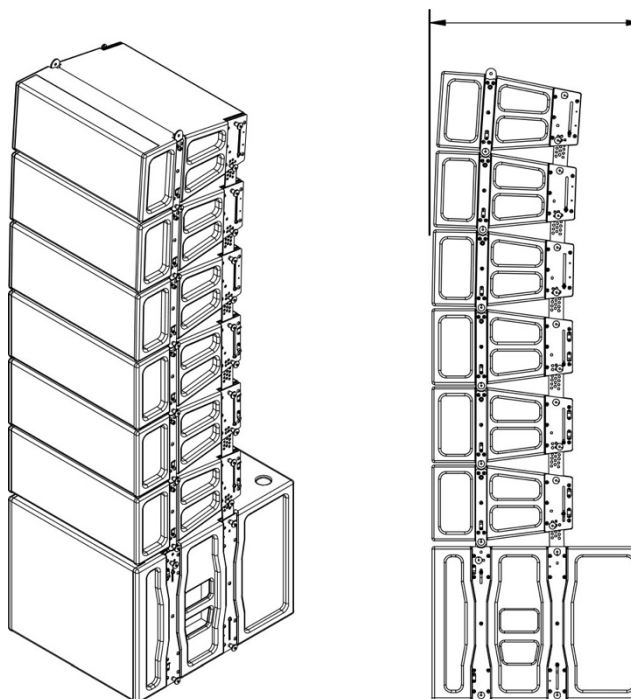
The HALO-CS cannot be flown from the SM-HALO-C.

10.3 - HALO-C Ground Stacked - FG-HALO-C



A recommended maximum of 8 HALO-C can be ground-stacked on the FG-HALO-C when the centre of gravity remains within the footprint of the grid

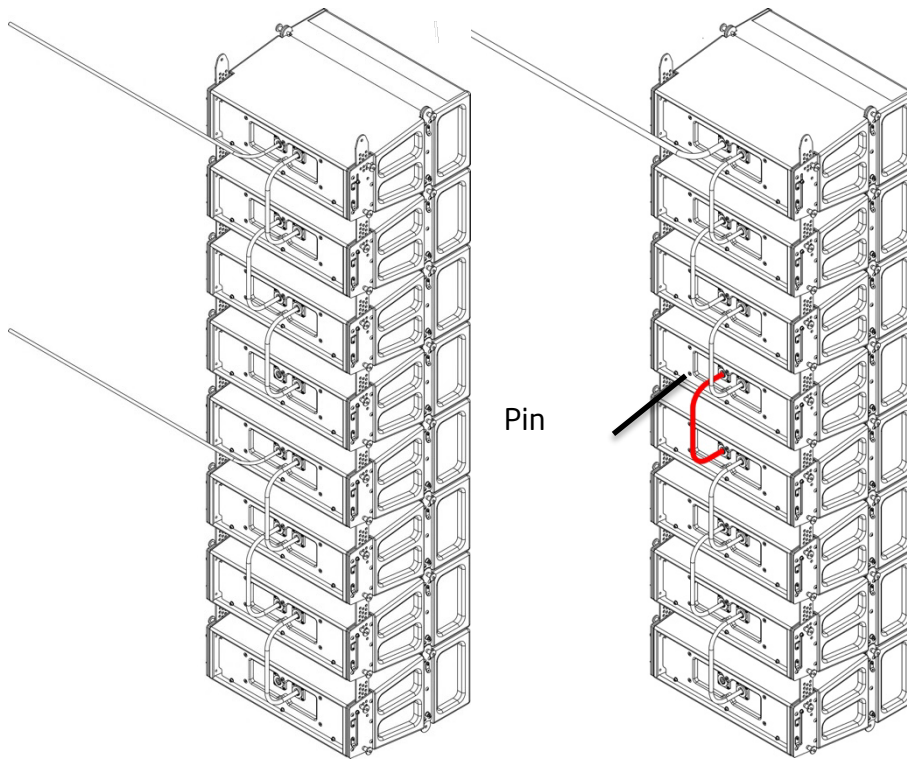
10.4 - HALO-C Ground Stacked - HALO-CS



A recommended maximum of 6 HALO-C can be ground-stacked on the HALO-CS when the centre of gravity remains within its footprint.

11.0 - Connecting Elements

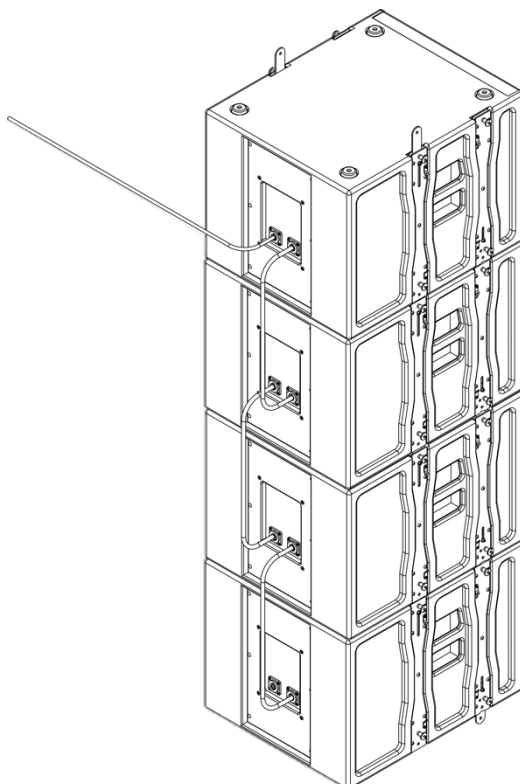
11.1 - Connecting HALO-C



A maximum of 4 x HALO-C can be connected to 1 amplifier channel. **If a non EM Acoustics amplifier is being used, check that the amplifier loads to 2 ohms** as well as being able to deliver the correct power.

As the HALO-C is a passive enclosure, it's possible to use a pin-swap link to reduce cabling using NL4 cable and connectors between sections of the array as per the drawing.

11.2 - Connecting HALO-CS



A maximum of 4 x HALO-CS can be connect to 1 amp channel. **If a non EM Acoustics amplifier is being used, check that the amplifier loads to 2 ohms** as well as being able to deliver the correct power.

12.0 - Powering the System

HALO-C and the HALO-CS subwoofer can be powered from any amplifier & DSP combination with the relevant high & low pass filter, and limiter settings. However, due to the self-contained nature of the package, the use of DQ or Di Series advanced system amplifiers is highly recommended. 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.

12.1 - Amplifier and Processing Requirements

12.1.1 - Amplifier Requirements

HALO-C and the HALO-CS are highly efficient loudspeakers, however appropriate available power is critical to ensure full system headroom. It is good practice to ensure that your amplifier can deliver at least double the RMS power handling of the loudspeaker to ensure full headroom, and as such the amplifier requirement is:

Product	RMS Power Handling	Recommended Min. Amplifier Power
HALO-C	500W @ 8 ohms	1000W @ 8 ohms
HALO-CS	1000W @ 8 ohms	2000W @ 8 ohms

A loudspeaker is far more likely to be damaged by an under-powered amplifier working too hard, than an over-powered amplifier working well within its limits.

All of the DQ and Di Series advanced system amplifiers can be used to power the HALO-C and HALO-CS.

The following table shows the maximum number of loudspeakers that can be connected per channel on the various different amplifiers:

HALO-C

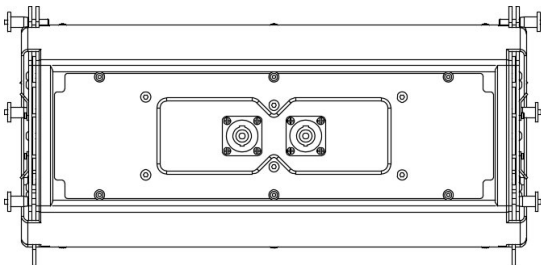
Amplifier	Recommended HALO-C/channel (for full headroom)	Max HALO-C per channel (*at reduced max SPL)
DQ6	2	3*
DQ10	4	4
DQ20	4	4
Di06	1	1
Di10	2	2
Di20	3	3

HALO-CS

Amplifier	Recommended HALO-CS/channel (for full headroom)	Max HALO-CS per channel (*at reduced max SPL)
DQ6	1	2*
DQ10	2	3*
DQ20	4	4
Di06	Not recommended	1*
Di10	1	2*
Di20	2	3*

12.1.2 - Connections

HALO C is a passive system - requiring only one amplifier channel to drive it correctly. It does however require active processing to take account of different array sizes, and to ensure the system performs as intended. HALO-CS subwoofers also require a single amplifier channel. Inputs to both HALO-C and HALO-CS are on Neutrik SpeakON NL4 as illustrated below.



Two-core cable should be used for connecting HALO-C or HALO-CS loudspeakers, and the connections are as follows:

SpeakON connection	1+	1-	2+	2-
Drive unit connection	Input +	Input -	Link Through	Link Through

12.1.3 - Connector Options

HALO-C and the HALO-CS are 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-C can be supplied with Van Damme PA-CON connectors (male/female) which provide an IP65 connection rating when mated.

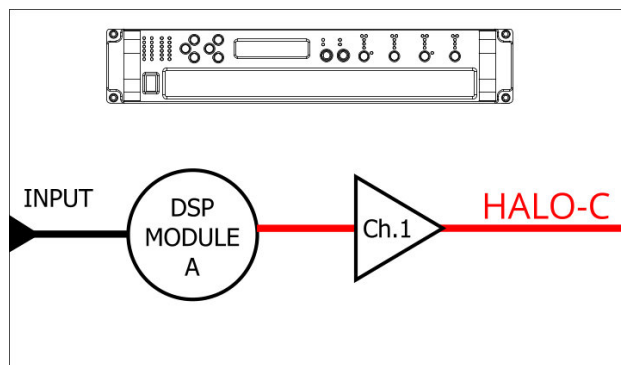
Other options may be possible by special order - please contact EM Acoustics to discuss your requirement.

12.2 - Presets and Settings

12.2.1 - Preset Description

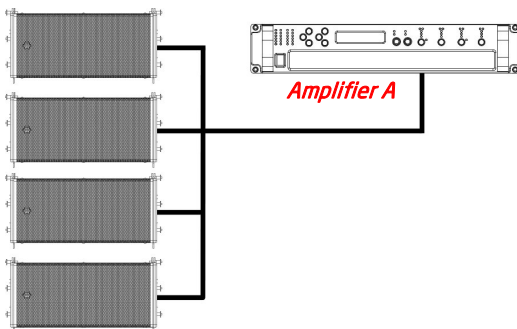
A variety of presets are provided within the DQ & Di Series amplifiers to present a starting point for your system depending on the array size. Scope is available within the amplifier processing for room EQ and system alignment, or alternatively a front-end processor could also be used to perform these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

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



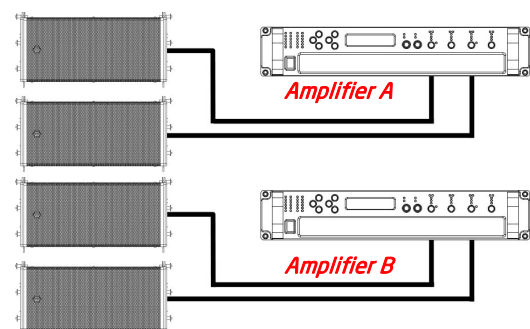
When selecting a preset, it is extremely important that the right preset is selected otherwise the system will not perform as expected. The presets are based around the **TOTAL NUMBER OF ELEMENTS IN THE ARRAY** - not the number of elements connected to each amplifier channel.

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



*Four HALO-C, wired in parallel
Driven from one output of a DQ20 amplifier (1 channel)*

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

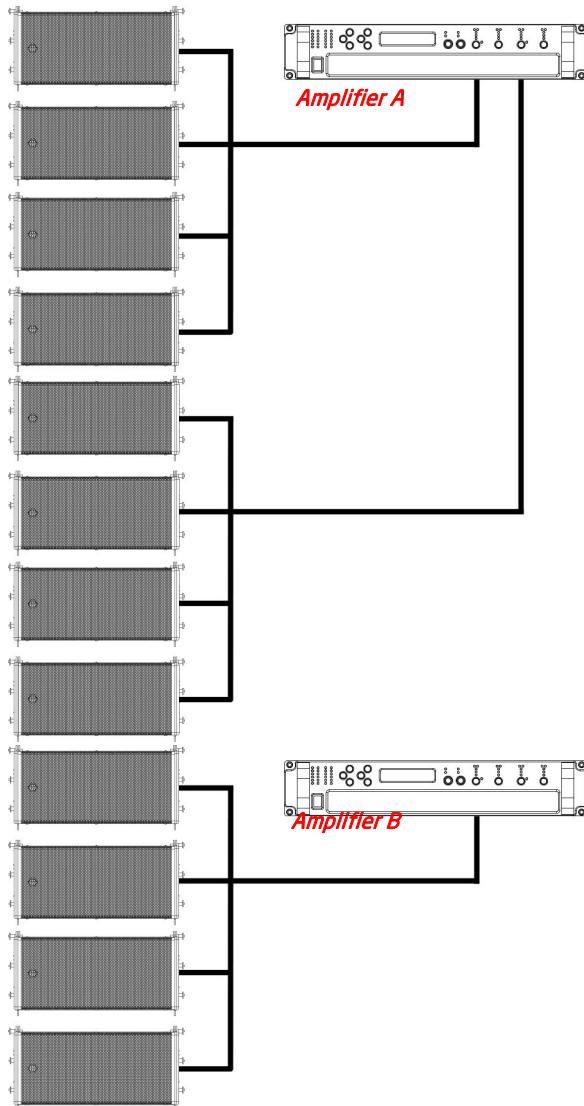


*Four HALO-C, wired individually
Driven from two outputs of two DQ20 amplifiers (4 channels)*

Recall preset HALO-C.1-4 - preset for 1 to 4 enclosures - on two modules of amplifier A and two modules of amplifier B

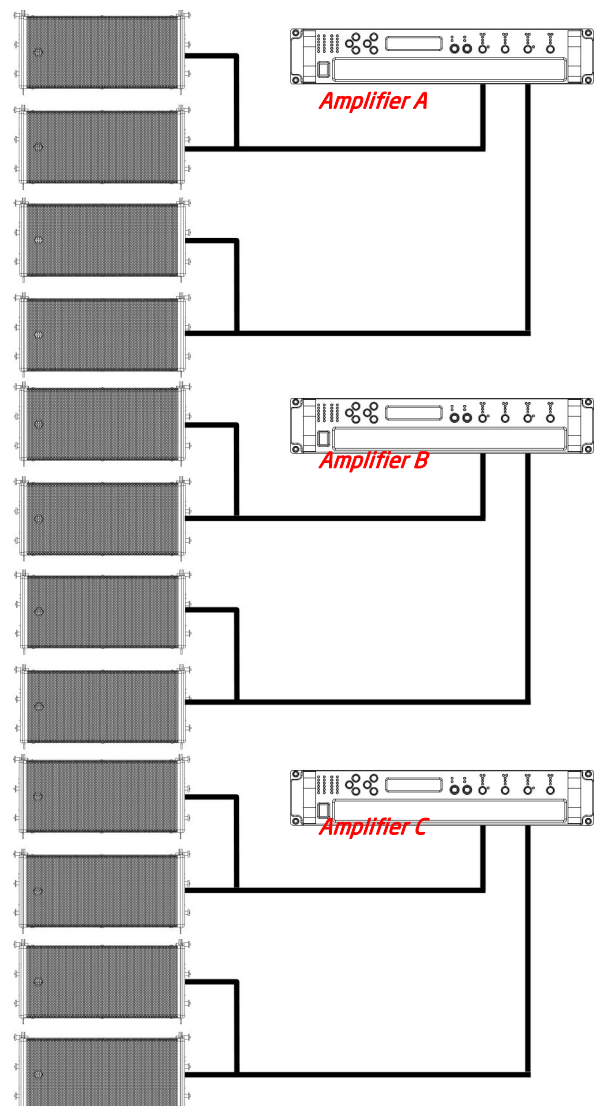
As illustrated, both examples above would use the same preset file recalled into the amplifier, all that is different is the number of amplifier channel pairs required - all of which require the same preset recalled.

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-C, wired as three groups of four in parallel
Driven from three outputs across two DQ20 amplifiers
(3 channels)*

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



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

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

12.2.2 - 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.

12.2.3 - Applying EQ

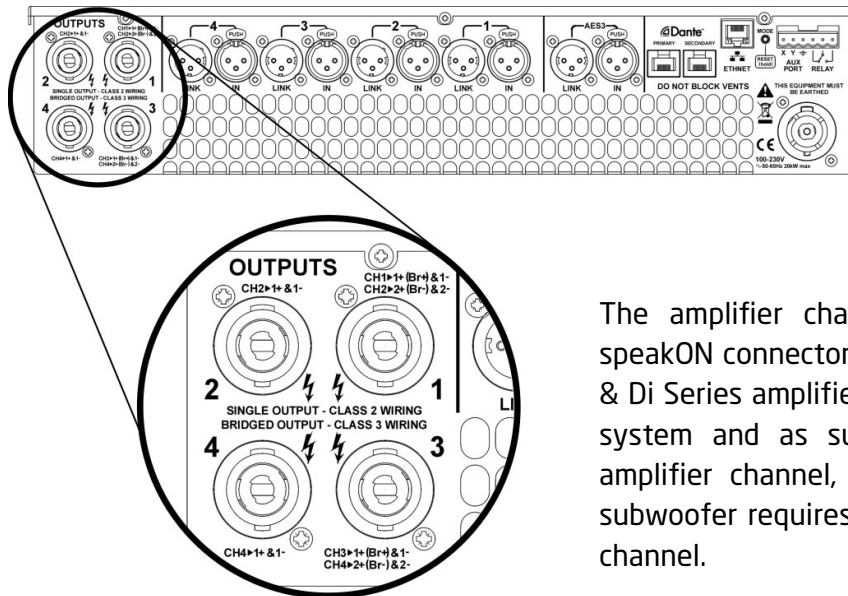
The presets are intended to be a starting point for your system, and will almost certainly require tuning on-site dependent on room characteristics, the rest of your system design and the system voicing you are aiming for. HALO-B is designed with a significant amount of system headroom, so applying EQ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

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

The HALO-C system will perform best when using DQ or Di Series advanced system amplifiers, as not only are they state-of-the-art amplifiers, but the onboard DSP provides appropriate high/low pass filter settings and limiters to get the best from your system. Please refer to the relevant amplifier User Manual for detailed information on using the amplifiers and the System Engineer software.

12.3.1 - Connections



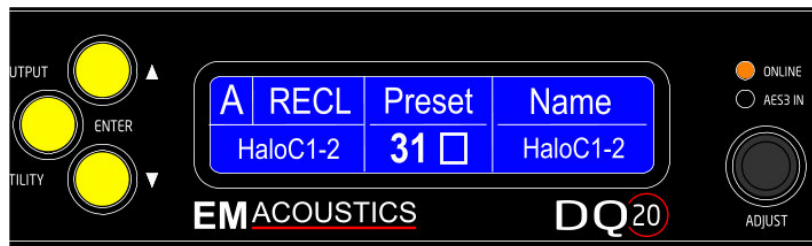
The amplifier channels appear on four speakON connectors on the rear of the DQ & Di Series amplifiers. HALO-C is a passive system and as such requires only one amplifier channel, similarly the HALO-CS subwoofer requires only a single amplifier channel.

12.3.2 - Preset Recall

The family of HALO-C 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:

HALOC.1-2	1-2 element array size
HALOC.3-4	3-4 element array size
HALOC.5-8	5-8 element array size
HALOC.9-12	9-12 element array size
HALOC.13-16	13-16 element array size
HALOC.17-24	17-24 element array size.

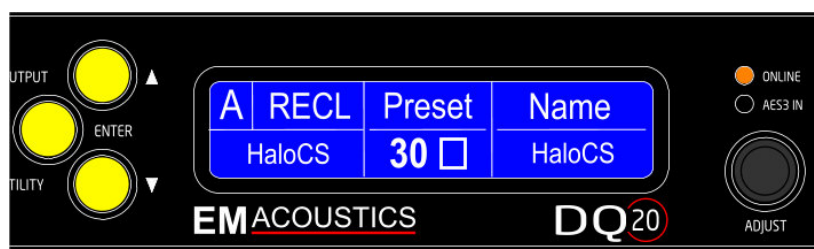
As mentioned above, these presets are intended to be a starting point and additional work may be required depending on the venue, the style of content and the end result you are looking for.



There is also a preset pre-installed for the HALO-CS subwoofer, which should be used regardless of the number of HALO-CS subwoofers being driven.

The presets available are:

HALOCS.Sub	Standard HALO-CS subwoofer preset
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12.4 - Use with the DSC48 Controller

The same family of presets are loaded onto the DSC48 system controller, and the recall procedure is exactly the same.

12.5 - System Connectivity

12.5.1 - 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

13.0 - Splay Angles - Above 10 degrees

It should be noted that the angles 10-15 degrees have been made accessible in order to allow 'breaking' of the system. This is used in situations such as balcony coverage in theatres. In order to avoid reflections from balcony fronts (especially in relatively short throw applications) it can be helpful to employ large array angles to keep some of the energy off the balcony front before resuming coverage. Essentially above around 10 degrees splay - a 'gap' in coverage will start to become far more noticeable - the higher angles have been included for just this reason - allowing greater flexibility should one need to 'break' the array. It is appreciated that whilst it is not acoustically ideal to break the array in some ways (slight loss of coupling for example) we at EM acoustics believe the benefits of being able to approach otherwise challenging venues makes the addition of this feature worthwhile.

14.0 - Servicing Information

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

HALO-C: Removing the AMT high frequency drive unit

1. Lie the enclosure on its' side and remove the three flange head screws securing the grille with a PoziDrive PZ2 screwdriver. Turn the enclosure over and repeat for the other side. Gently lift the grille off and set to one side.
2. Turn the enclosure on to its' front, and remove the six M4 socket cap bolts retaining the rear door - for this you will need a 3mm Allen bit. Ensure to collect both the flat and spring washers for each bolt. Gently ease the rear door from its location - be aware it is sealed in place with a gasket which can make it resistant to coming loose. If this is the case, either use an NL4 connector plugged into the loudspeaker as an aid, or gently lever the rear door up with a large flat-blade screwdriver. As soon as the door is free, disconnect the cables to the drive units which are at each end of the PCB attached to the inside of the door. Put the door to one side with its screws for reinstallation later.
3. Remove the wadding behind the AMT device. Behind the AMT device you will see four M5 Nyloc nuts, which secure the drive unit in place. Using a nut spinner (ideally one with a flexible drive shaft), socket or ring spanner undo and remove these nuts and collect the flat washers. The stud section will remain attached to the drive unit. You have now released the AMT unit, however it will not come free as it is retained at the front of the enclosure by part of the cabinet.
4. Gently turn the enclosure onto its back. You can now lift the AMT waveguide and it will come free, but is retained by another panel within the enclosure. Lift the waveguide as far as it will go, and tilt the AMT *away* from the 8" drive unit - you will then see three M5 socket cap bolts securing the retaining panel. Using a 4mm Allen bit, undo and remove these three bolts, and ensure to collect both the flat and spring washers for each one. The retaining panel can now be removed. Now, tilt the AMT *toward* the 8" drive unit - you will then see the cables connected to the terminal PCB on the AMT. Disconnect the cables and the AMT can now be lifted clear of the enclosure.
5. To remove the AMT from its waveguide, undo the six M6 socket cap bolts securing the AMT to the waveguide using a 5mm Allen key, and lift the waveguide clear. **Be aware the magnet on the AMT is very powerful! Steel tools will get attracted to it!**
6. To reinstate the AMT unit, insert it into the cavity and tilt toward the 8" drive unit to connect the cables. Note the polarity - white cable to positive terminal (red mark), yellow cable to negative terminal. Once connected, tilt the AMT *away* from the 8" drive unit to access the locating holes for the machine screws that secure the retaining panel. Reinstall the panel and the screws and retighten. Return the AMT to vertical, and locate the four studs on the back surface in their locating holes in the enclosure. Once located, turn the enclosure back onto its front, and

attach the washers and Nyloc nuts to the studs and retighten until firm. Check that the gasket around the rear door is complete, and replace if necessary. You can then reinstate the wadding (ensure it does not block the port) and reconnect the cables to the crossover PCB on the access door. Note the polarity: Brown cable to LF +, blue cable to LF -, white cable to HF +, yellow cable to HF -. Also note that the cables are an exact length, meaning the door only fits onto the enclosure one way round. Reinstall the six M4 socket cap bolts that secure the door, along with their flat and spring washers, and retighten. You can then lie the enclosure flat and reinstall the grille and grille screws to return to normal service - note that the badge on the grille goes over the 8" drive unit.

HALO-C: Removing the LF Drive Unit

1. Follow steps 1-4 above to remove the AMT drive unit. This then gives access to the four M5 socket cap bolts that secure the 8" drive unit into the enclosure (two of these are obscured by the AMT waveguide).
2. Remove the four socket cap bolts holding the LF drive unit in place using a 4mm Allen bit - ensure to collect both the flat and spring washers for each bolt. Do not undo the four dome head socket bolts - these secure the phase bung to the 8" drive unit! Gently lift the drive unit out of the enclosure - the cables have already been disconnected so will come free with the drive unit. Please make a note of drive unit polarity for future reinstatement (brown cable to positive, blue cable to negative). Note that the phase bung is attached to the 8" drive unit - this can be removed if required using a 3mm Allen key or bit, and an 8mm spanner. If you do remove this and need to reinstate it, ensure the axis of the phase bung is perpendicular to the drive unit terminals or the 8" drive unit will not fit back into the enclosure.
3. To reinstall the 8" drive unit, first check that the phase bung is in the correct orientation as described above, and that the sealing gasket around the flange of the drive unit is complete. Then, sit the 8" drive unit back in its location and reinstall the four M5 socket cap bolts (with flat and spring washers) and tighten until firm.
4. Now, follow step 6 above for reinstating the AMT drive unit to reassemble the HALO-C enclosure.

HALO-CS Subwoofer - Removing the LF drive unit

1. Lie the enclosure on its' feet and remove the three flange head screws securing the grille with a PoziDrive PZ2 screwdriver. Turn the enclosure over and repeat for the other side. Turn the enclosure on to its back and gently lift the grille off and set to one side.
2. Remove the eight M6 socket cap bolts holding the LF drive unit in place using a 5mm Allen bit - ensure to collect the spring washer for each machine screw. Gently lift the drive unit out of the enclosure - take care as it is heavy! Please make a note of drive unit polarity for future reinstatement (red cable to positive, black cable to negative).
3. To reinstate the drive unit, reconnect the cables and carefully seat the drive unit in the mounting hole. Ensure the bolt holes line up. It is advisable to ensure each bolt has started in its thread before tightening any. Once the position is correct, tighten all six bolts until firm.
4. Replace the grille (note the badge should be on the **left** of the enclosure when the enclosure is in the flying orientation, which is with the label text the right way up and the rubber feet pointing **upwards!!**) and reinstate the six screws. Note that two of the screws are shorter - these fit the central hole in the grille.

Appendix A - Technical Specifications

HALO-C 2-way passive compact line array element

Dimensions (HxWxD) :	216/(8.5) x 492/(19.4) x 400/(15.7) mm/(ins) - enclosure only 216/(8.5) x 524/(20.6) x 400/(15.7) mm/(ins) - extremities of rigging/pins		
Net/Shipping Weight:	17kg/19kg (37.4lbs/41.8lbs)		
Frequency Response (+/- 3dB) ¹ :	75Hz - 20kHz		
Sensitivity (1W/1m) ² :	94dB		
Dispersion ³ :	Horizontal (-6dB)	95 degrees	
	Vertical (-6dB)	Dependant on array settings	
Drive Units:	8" (203mm) neodymium LF cone drive unit 7.8" (197mm) AMT HF drive unit		
Power Handling:	325W RMS, 650W program		
Maximum SPL:	124dB continuous, 130dB peak		
Nominal Impedance:	8 ohms		
Crossover:	Asymmetric internal passive		
Enclosures/channel (full SPL):	DQ6:	2	Di06: 1
	DQ10:	4	Di10: 2
	DQ20:	4	Di20: 3
Connectors:	2 x Neutrik SpeakOM™ NLT4MP		
Enclosure:	12/18mm Baltic birch plywood, rebated, screwed and glued. Finished in impact and weather-resistant textured polyurethane		
Rigging & Hardware:	Four-point integral flying system, tested to 24 elements at 10:1 safety factor secured with aircraft-grade ball-lock pins. Splay angles 0, 0.5, 1, 1.5 and 2-15		
Grille:	Stainless steel backed with acoustically transparent fabric		
Options:	Colours/Weather Protection		
Accessories:	CASE-HALO-C four-element touring flightcase Various flying options - see flying hardware datasheet		

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.

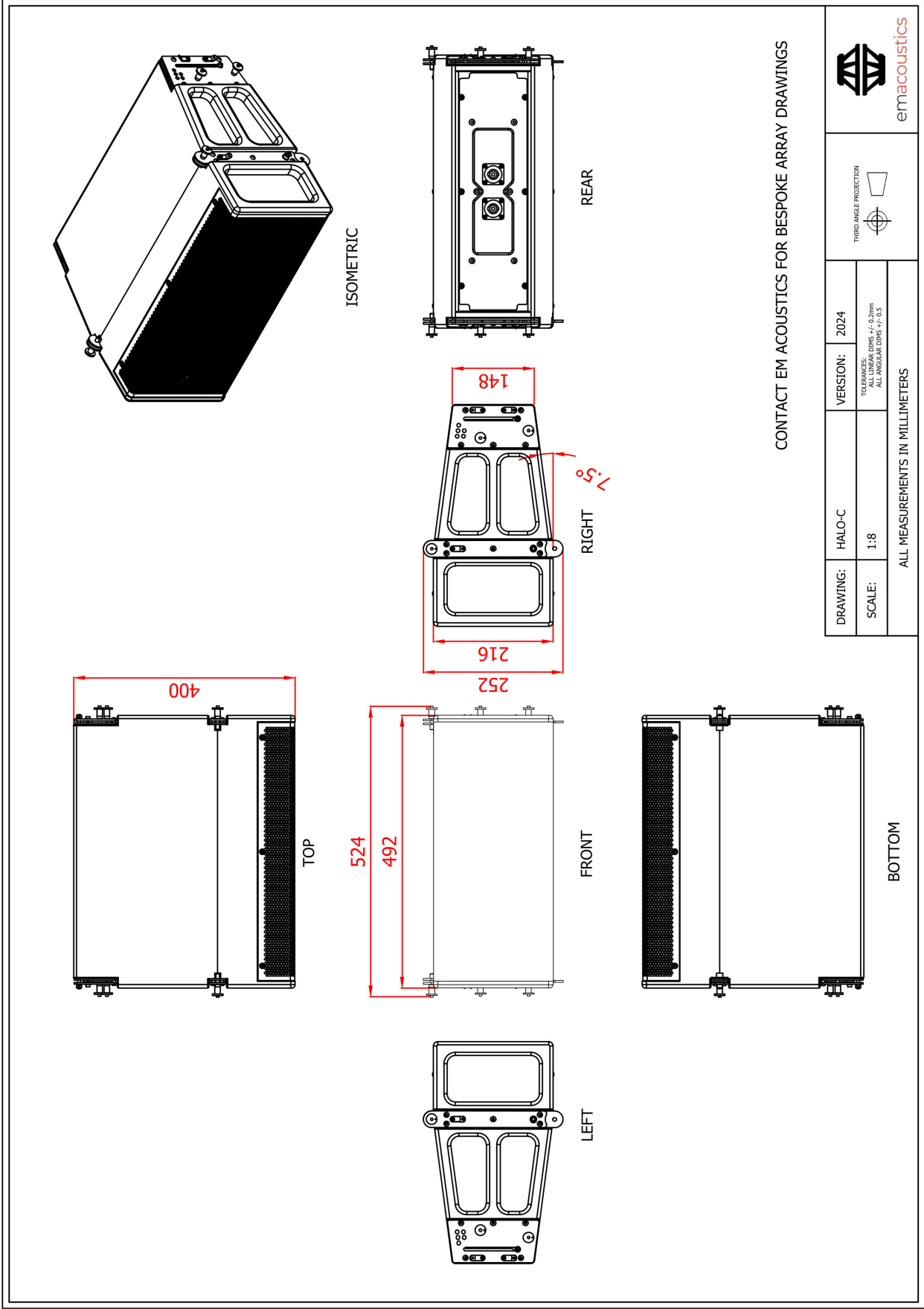
HALO-CS compact flyable reflex subwoofer

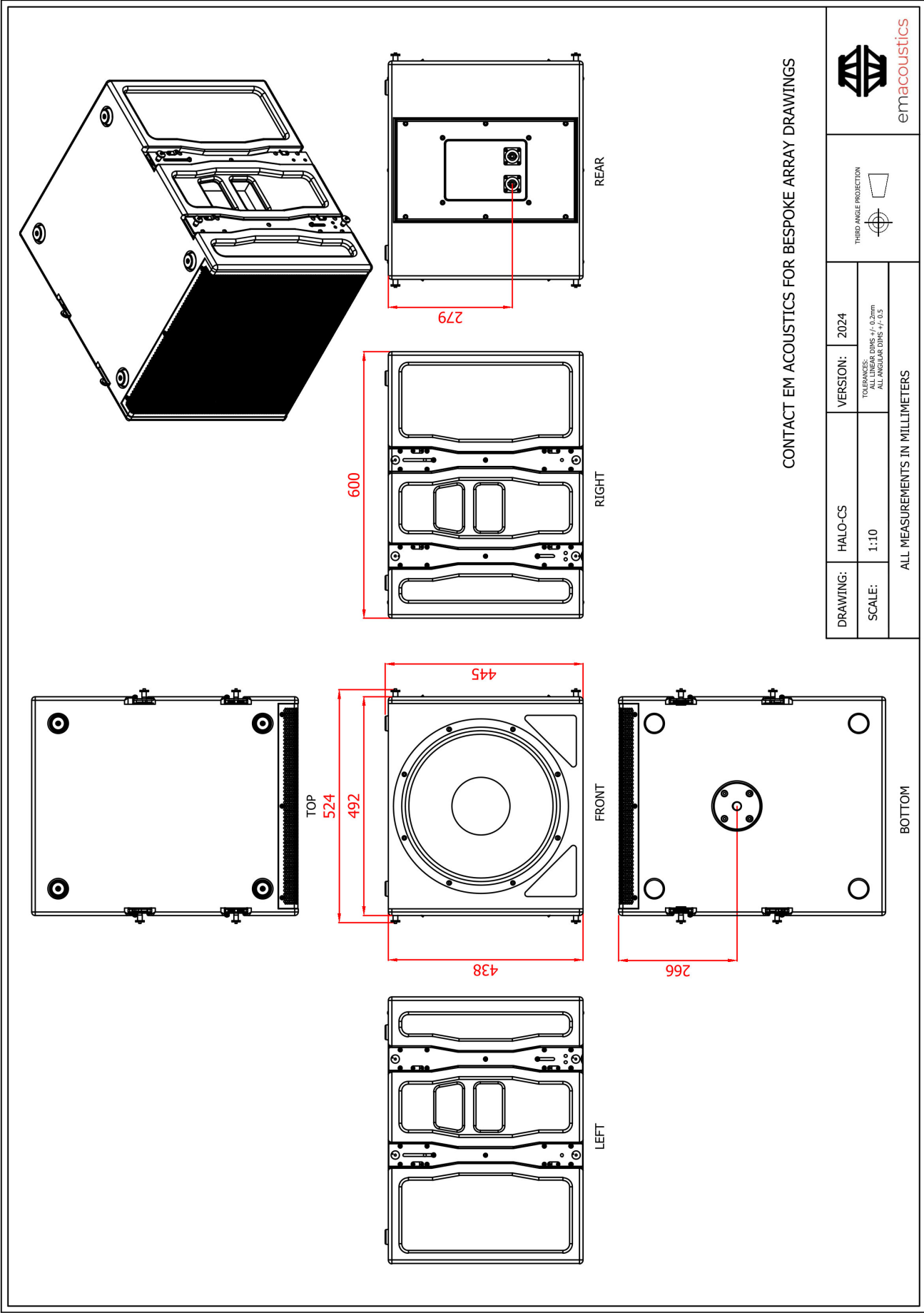
Dimensions (HxWxD) :	438/(17.2) x 492/(19.4) x 600/(23.6) mm/(ins) - enclosure only 438/(17.2) x 524/(20.6) x 600/(23.6) mm/(ins) - extremities of rigging/pins		
Net/Shipping Weight:	36kg/38kg (79.2lbs/83.6lbs)		
Frequency Response (+/- 3dB) ¹ :	40Hz - 120Hz		
Sensitivity (1W/1m) ² :	95dB		
Dispersion ³ :	Omnidirectional		
Drive Units:	15" (381mm) neodymium LF cone drive unit		
Power Handling:	600W RMS, 1200W program		
Maximum SPL:	126dB continuous, 132dB peak		
Nominal Impedance:	8 ohms		
Crossover:	External active, recommended below 100Hz		
Enclosures/channel (full SPL):	DQ6:	1	Di06: Not recommended
	DQ10:	2	Di10: 1
	DQ20:	4	Di20: 2
Connectors:	2 x Neutrik SpeakOM™ NLT4MP		
Enclosure:	15mm Baltic birch plywood, rebated, screwed and glued. Finished in impact and weather-resistant textured polyurethane		
Rigging & Hardware:	Four-point integral flying system, tested to 12 elements at 10:1 safety factor secured with aircraft-grade ball-lock pins. Direct interface to HALO-C enclosures either flown or ground stacked.		
Grille:	Stainless steel backed with acoustically transparent fabric		
Options:	Colours/Weather Protection		
Accessories:	CASE-HALO-CS single element touring flightcase Various flying options - see flying hardware datasheet		

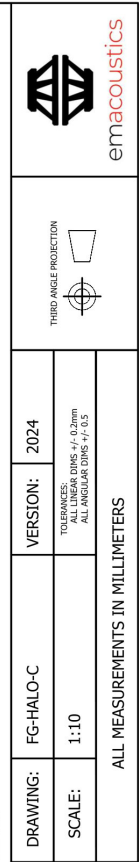
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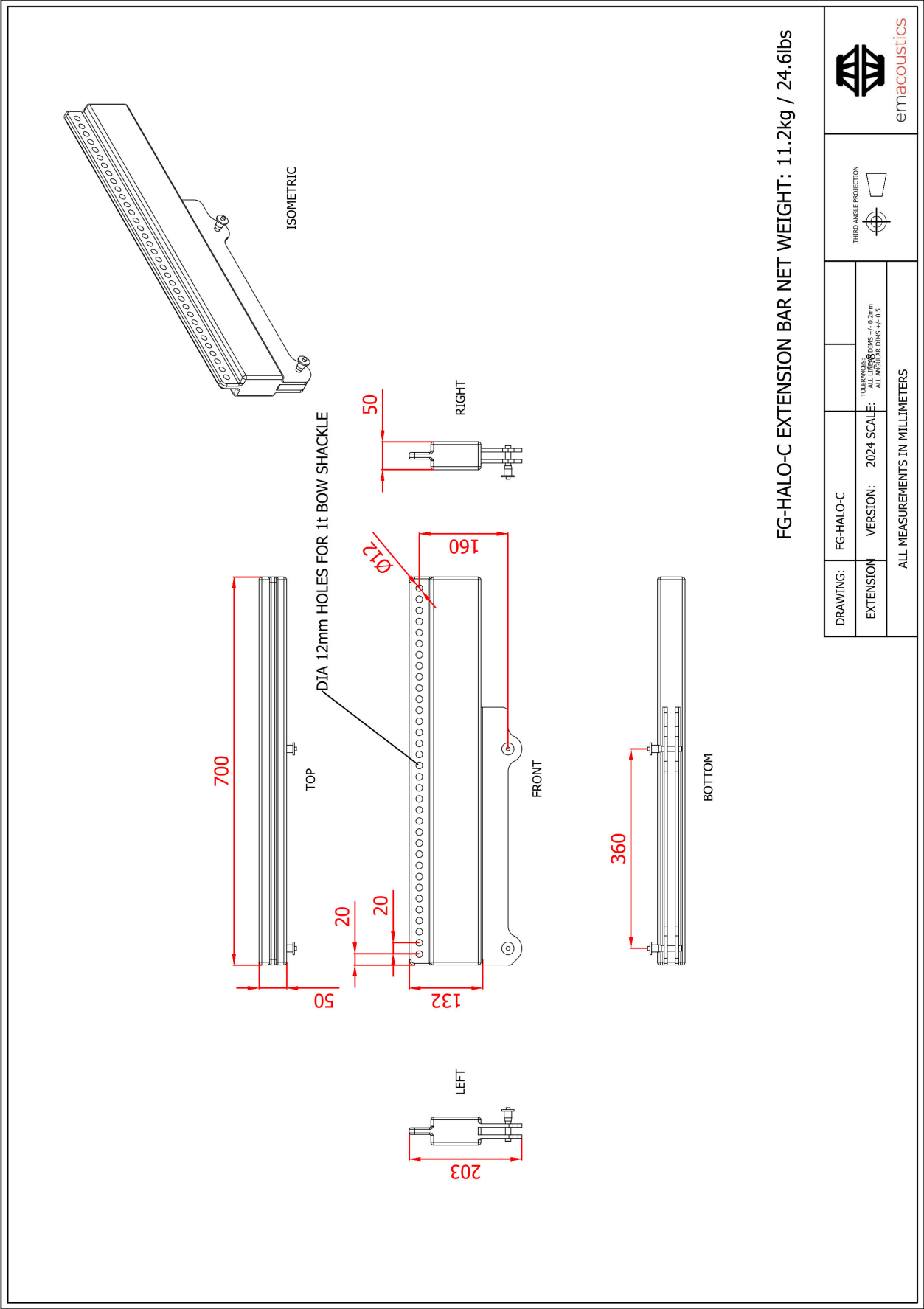
¹Measured on-axis at 2m in an anechoic environment and referenced to 1m. ²Measured in half-space at 2m with 4W sine wave input and referenced to 1m. ³Nominal dispersion, measured in an anechoic environment and averaged over stated bandwidth. ⁴Calculated and verified by subjective listening test of familiar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

Appendix B - Technical Drawings

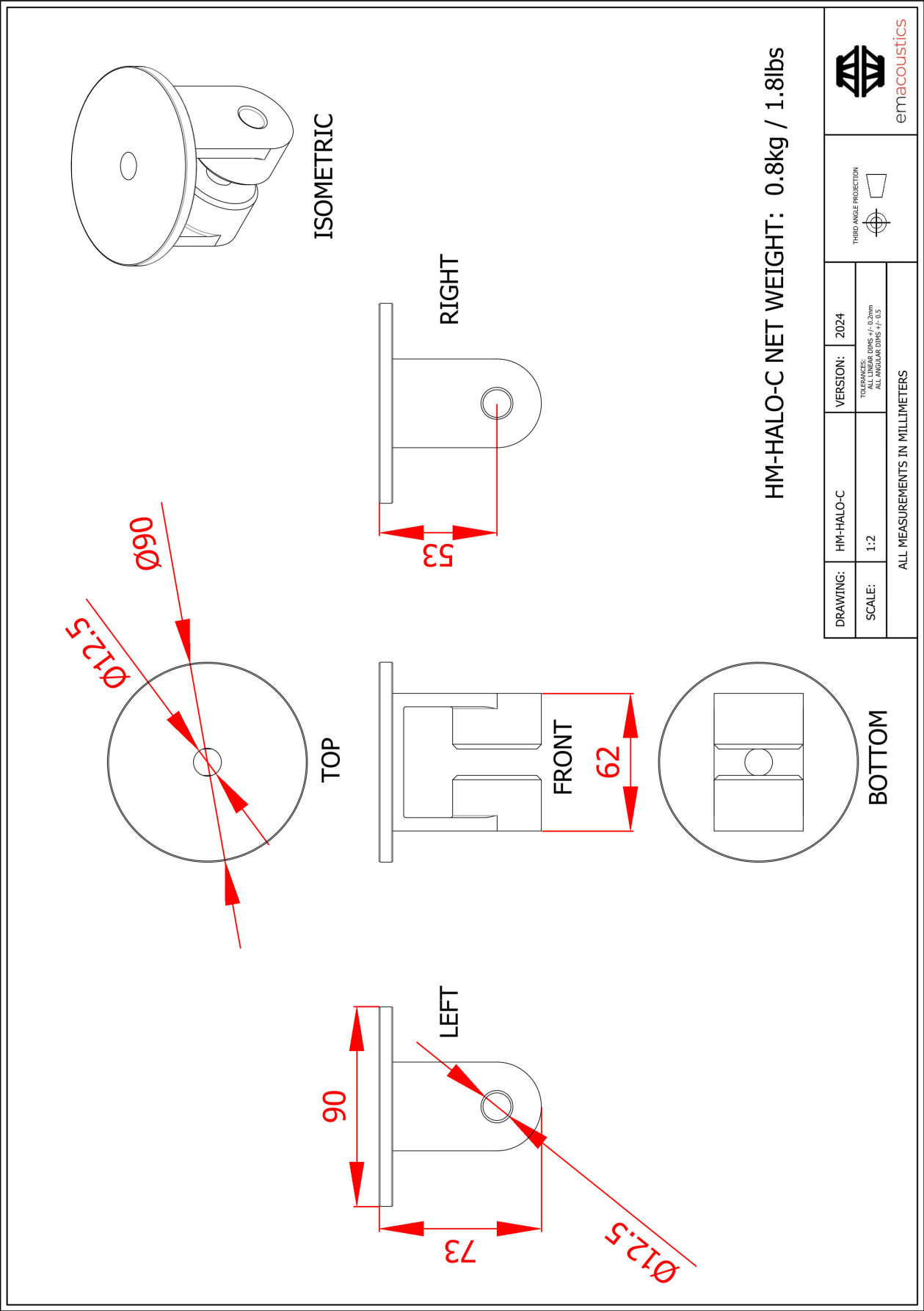


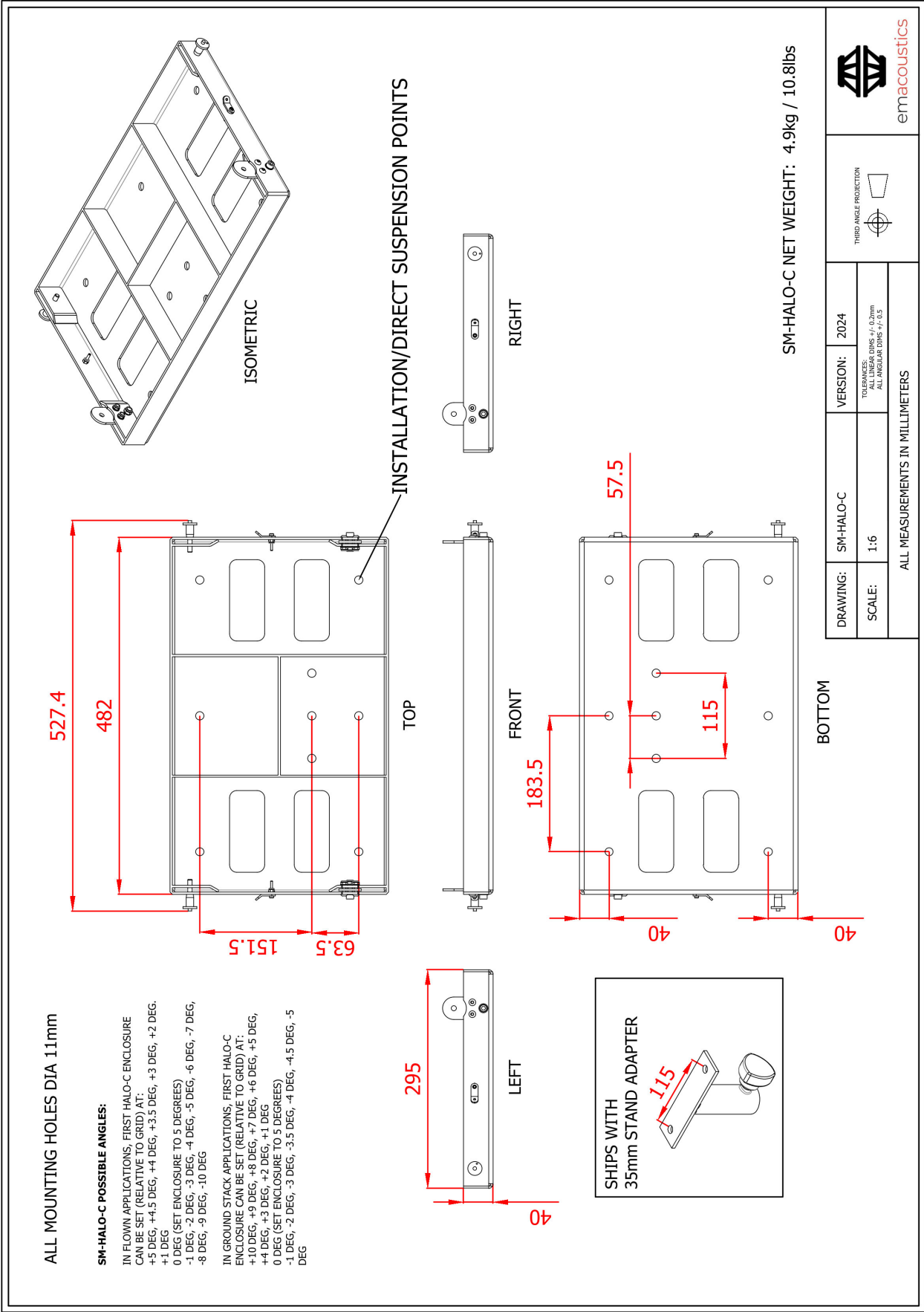


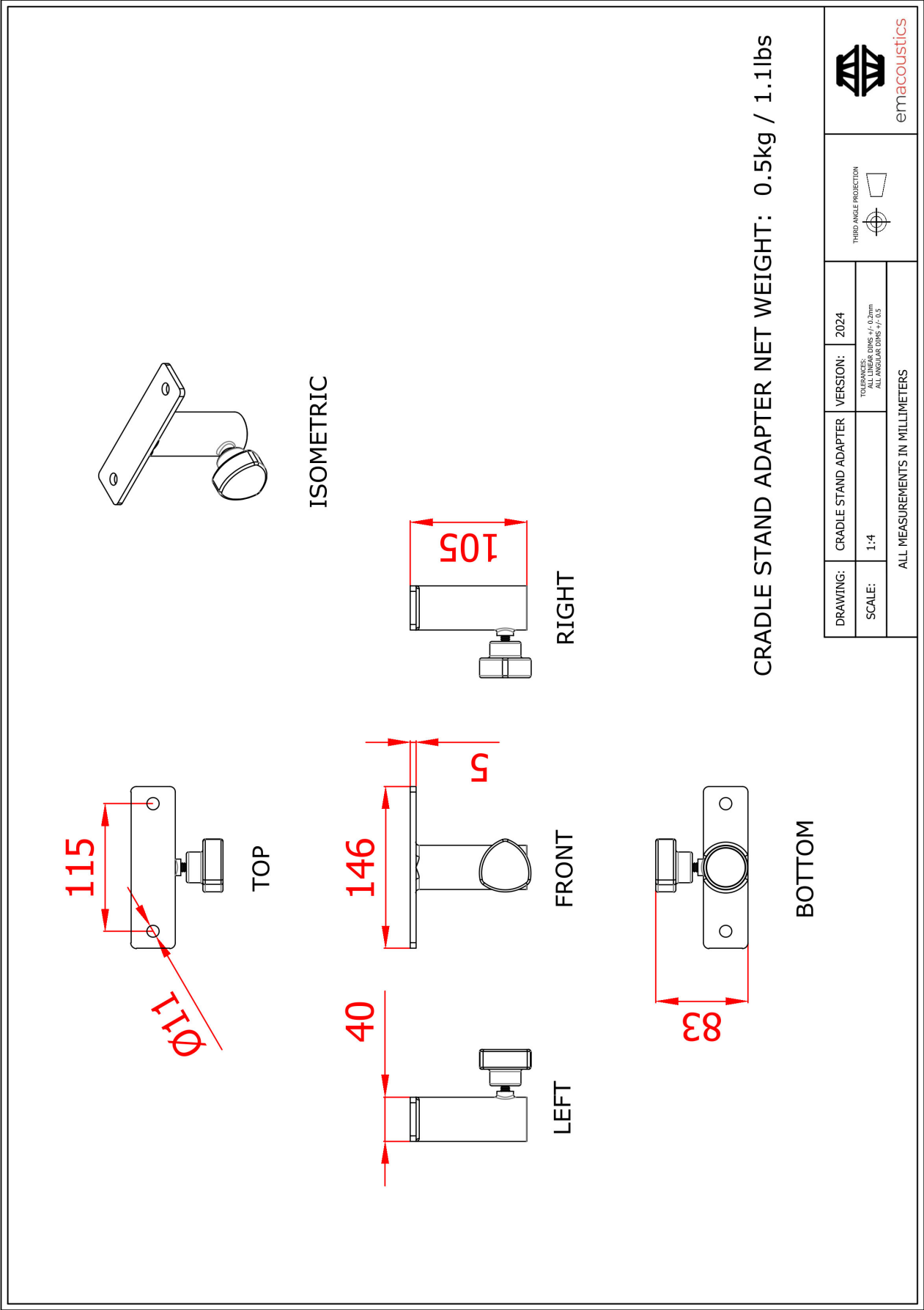




DRAWING:	FG-HALO-C		
EXTENSION	VERSION: 2024 SCALE:		
TOLERANCES: DIMENSIONS $\pm 0.2\text{mm}$ ALL ANGULAR DIMS ± 0.5			
ALL MEASUREMENTS IN MILLIMETERS			







Appendix C - Spare Parts List

01A023 DU-805	8" neodymium LF drive unit, 8 ohms
01A025 DU-1507	15" neodymium LF drive unit, 8 ohms
01B010 AMT-C	AMT drive unit
01D008 RD-AMT-C	Replacement AMT diaphragm
04A029 RFG-HALO-C	Replacement grille/fabric for HALO-C
04A029W RFG-HALO-CW	Replacement grille/fabric for HALO-C - WHITE
04A030 RFG-HALO-CS	Replacement grille/fabric for HALO-CS
04A030W RFG-HALO-CSW	Replacement grille/fabric for HALO-CS - WHITE
05A019 HALO_PIN	¼" x ½" ball-lock flying pin with 4" lanyard
07A027 PX-HALO-C	Replacement passive crossover assembly for HALO-C

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 three 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.