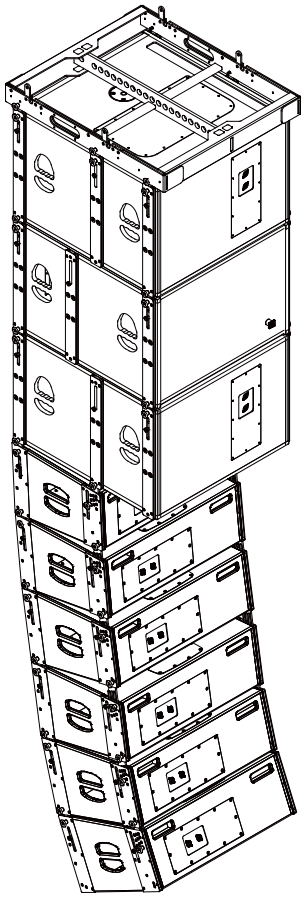
CLa21/SW-18VR

Rigging Assembly Guide

Version 1.0



ARRAY Series

Keep these important operating instructions.
Check www.tecnare.com for updates.

General Information
CLa21 / SW-18VR Rigging Assembly
Ver.: 1.0_UK 04/2017
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The information contained in this manual has been carefully checked for accuracy, at the time of going to press, however no guarantee is given with respect to the correctness.

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IMPORTANT SAFE INSTRUCTIONS

Before using our product, be sure to carefully read the manual and safe Instructions. Keep this document with the device all time.

1 Read these instructions.

2 Keep these instructions.

3 Heed all warnings.

4 Follow all SAFETY INSTRUCTIONS as well DANGER and OBLIGATION warnings.

5 Only use attachments / accessories specified by the manufacturer.

6 **SAFETY STATEMENT FOR RIGGING.** This Statement assumes that the owners and/or users are familiar with the rigging techniques and safety recommendations outlined in this manual. Many issues of crucial concern, such as the determination of appropriateness and condition of venue rigging points, cannot be addressed here. Therefore, the user must assume all responsibility for the appropriate use of Rigging systems in any particular location or circumstance.

7 **PERSONNEL HEALTH AND SAFETY.** During installation and set-up personnel should wear protective headgear and footwear at all times. Under no circumstances personnel should climb on the loudspeaker assembly.

8 I**NSPECTION AND MAINTENANCE**. The rigging systems are an assembly of mechanical devices, and are therefore subject to wear and tear over prolonged use, as well as damage from corrosive agents, extreme impact, or inappropriate use. Because of the safety issues involved, all system components must be inspected before use in order to detect any possible defects.

9 **LOAD RATING AND SPECIFICATIONS**. Load capacity and setup safety limits when flying or stacking a loudspeaker assembly should be strictly followed according to the instructions outlined in this manual.

10 **LOCAL REGULATIONS.** The suspension of large, heavy objects in public places is subject to numerous laws and regulations at the national/federal, state/provincial, and local levels. It is the user's responsibility to verify that any overhead suspension of TECNARE systems has been made in accordance with all applicable local regulations in any particular circumstance or venue conforms to all applicable laws and regulations in force at the time.

11 **FLYING A LOUDSPEAKER SYSTEM** Always verify that nobody is standing underneath the loudspeaker assembly when it is being raised. As the system is being raised check each individual component to make sure that it is securely fastened to the component above. Never leave the system unattended during the installation process. As a general rule, EXEL ACOUSTICS recommends the use of safety slings at all times.

12 **STACKING A LOUDSPEAKER SYSTEM.** Do not ground stack the system on unstable ground or platform. If the system is ground stacked on a structure, platform, or stage always check that the latter can support the total weight of the system. As a general rule, EXEL ACOUSTICS recommends the use of safety straps at all times

13 When a loudspeaker assembly is deployed in an open air environment, wind effects should be taken into account. Wind can produce dynamic stress to the rigging components and suspension points. If the wind force exceeds 6 B (Beaufort scale) it is highly recommended to lower down and/or secure the loudspeaker assembly.

14 **REPLACEMENT PARTS.** Any component found to be defective, or any safety-related component you even suspect might be defective, should be replaced with the equivalent, approved part. Parts specific to a rigging system should be ordered directly from Exel Acoustics. No attempt should be made to substitute what appears to be equivalent or "mostly the same" generic replacements. Therefore, EXEL ACOUSTICS is not responsible for problems caused by components that were not supplied by EXEL ACOUSTICS.

SYMBOLS USED

Important operating instructions	Additional information	OBLIGATION.This instructions must be strictly followed
Pour indequer important Instructions	Information complémentaire	Obligation. Cela doit être strictement instructions Suivi
Wichtige Betriebsanweisung oder Gebrauchsanleitung sanleitung	Informationen. Zusätzliche Informationen	Pflicht. Diese Anweisungen müssen strikt befolgt
Importantes instrucciones operativas	Información complementaria	Obligación. Estas instrucciones deben ser estrictamente seguidas

DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY

EXEL ACOUSTICS SL

CL Encinar, 282. Polígono Industrial Monte Boyal. 45950 – Casarrubios del Monte (Toledo), España (Spain).

Declara que los siguientes productos:

- *Multipurpose grid* THV21-18VR
- *Angle arm extensions* CLa21-ANGEXT
- *Pull-back frame* CLa21 Pull-Back
- *Rigging Kit* TRK-18VR

cumplen con las directivas:

Declare under our sole responsibility that devices

- *Multipurpose grid* THV21-18VR
- *Angle arm extensions* CLa21-ANGEXT
- *Pull-back frame* CLa21 Pull-Back
- *Rigging Kit* TRK-18VR

comply with relating Directives:

(1) Directiva 2006/42/CE relativa a las máquinas.
(2) Norma UNE-EN ISO 12100:2012 Relatíva a la seguridad de las máquinas.
(3) RD 1644/2008

(1) Machinery Directive 2006/42/EC
(2) Mechanical Safety UNE-EN ISO 12100:2012 (Applied in Spain)
(3) RD 1644/2008 (applied in Spain)

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1 Introduction

1.1 Welcome to Tecnare®

Thank you for choosing the high-quality Tecnare® **Sound System "Made in Spain"** from **EXEL ACOUSTICS SL**.

Please spare a little time to study the contents of this manual, so that you obtain the best possible performance from this unit.

All Tecnare® products are carefully engineered for world-class performance and reliability.

If you would like further information about this or any other Tecnare® product, please contact us. We look forward to helping you in the near future.

As part of a continuous evolution of techniques and standards, Exel Acoustics SL as manufacturer of Tecnare® products reserve the right to change the specifications of its products and the content of its documents without prior notice.

Updates and supplementary information are available on the Tecnare® website:

http://www.tecnare.com

Tecnare Technical Support is available at:

- (T): +34 918 170 110 - +34 918 171 001
- (e-mail): support@tecnare.com

Thank you again for placing your confidence in Tecnare® products.

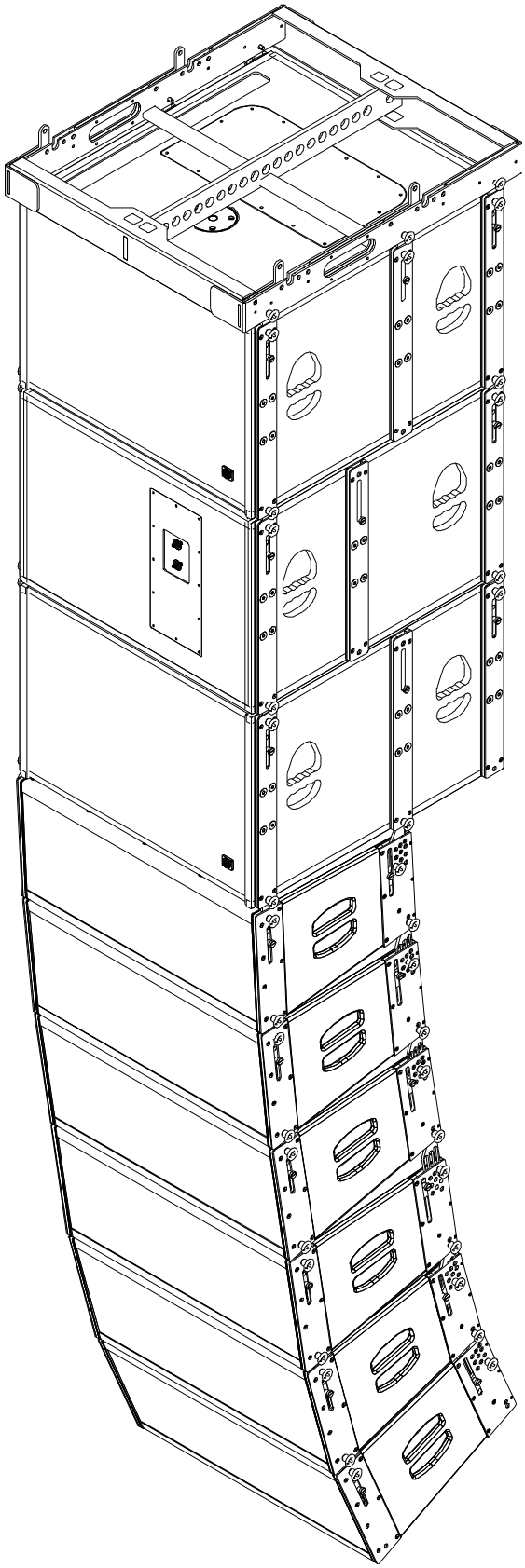
1.2 CLa21 and SW-18VR System

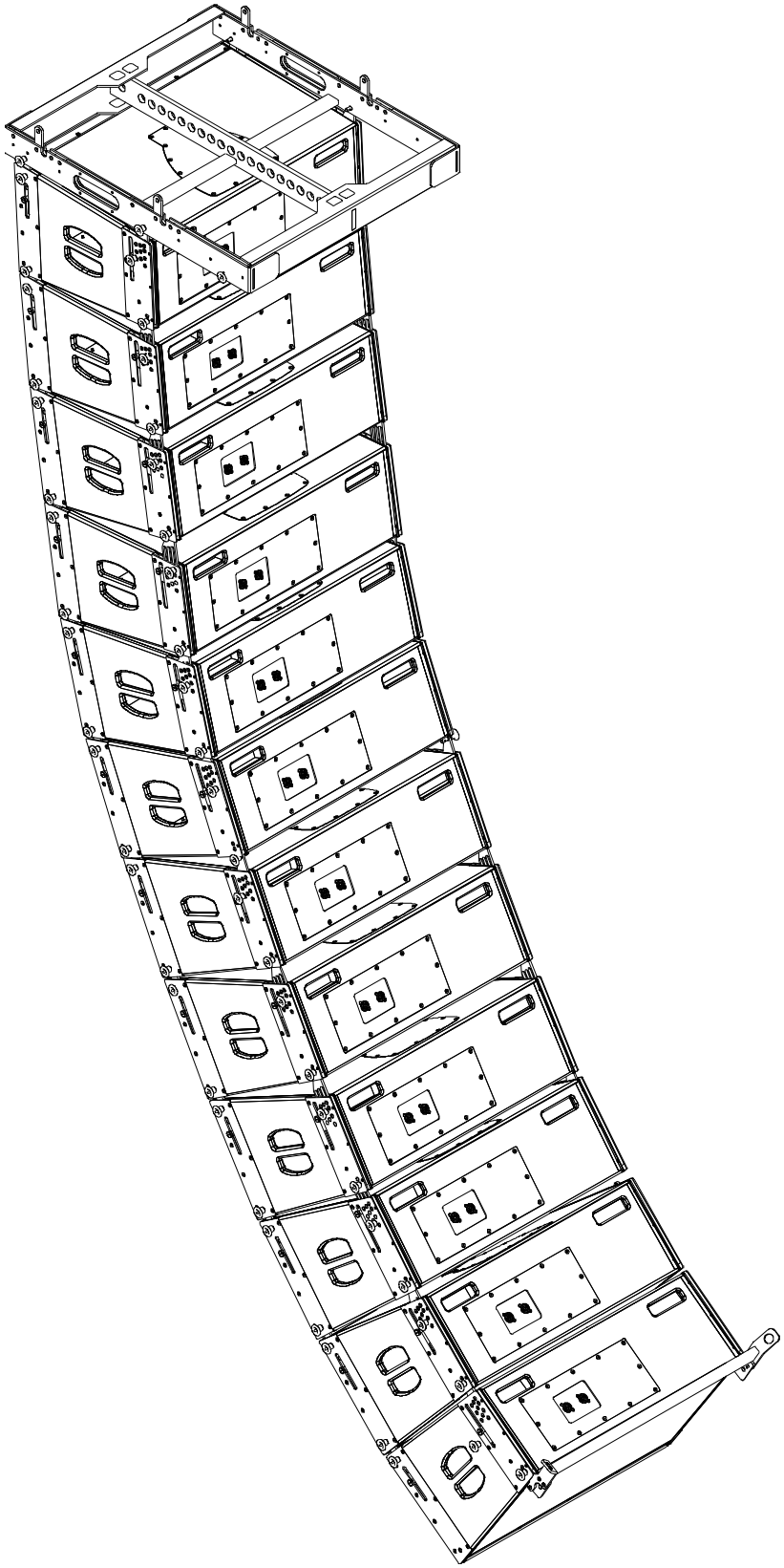
This assembly guide document the rigging and transport options **THV21, CLA21_ANGEXT, CLA21 PULLBACK**, **TTF-208-18VR-21, TWD-21** and **TWD-18VR** available for CLa21 and SW18VR in the form of flown or stacked vertical arrays.

The system approach developed by EXEL ACOUSTICS for CLa21 and SW-18VR consists of the elements needed to fully take advantage of the possible configurations and optimize the system. The main components of the system are:

- **CLa21:** *Compact Curvilinear Array loudspeaker*
- **SW-18VR:** *Compact High-Power Bass Module*
- **THV21-18VR:** *Multipurpose grid*
- **CLA21_ANGEXT:** *Angle arm extensions for stacked CLa21 and/or SW18VR*
- **CLA21 PULLBACK:** *Pull-back frame accessory for CLa21 array pull-back configuration*
- **TTF-208-18VR-21:** *Transition frame that allows CLa208s to be flown below CLa21/SW-18VR arrays.*
- **TWD-21:** *Wooden transport dolly from CLa21. Will transport up to 4 CLa21*
- **TWD-18VR:** *Wooden transport dolly from SW-18VR. Will transport up to 3 SW-18VR*
- **TRK-18VR:** *Rigging hardware kit from SW-18VR*
- **T-44/48:** *Advanced System Amplifier*
- **System Engineer:** *Remote control software for amplifier*

Rigging Example





2 THV21-18VR MULTIPURPOSE GRID

The THV21-18VR grid is made of steel and has been designed to fly or stack mixed arrays of CLa21s and SW18VRs enclosures without transition hardware.

The THV21-18VR is a square frame fitted with the following elements:

- Four quick-release pins
- Four rotating Guide-link

The THV21-18VR grid accommodates a variety of pickup configurations with its 21 center pickup points and . To add tilt to the array, attach motors to the front and rear of the center point plate. If just one motor is available, attach it to one of the 19 center pickup points offset from the center of the grid to achieve the desired tilt. The grid can also be oriented to provide either maximum array downtilt or maximum array uptilt

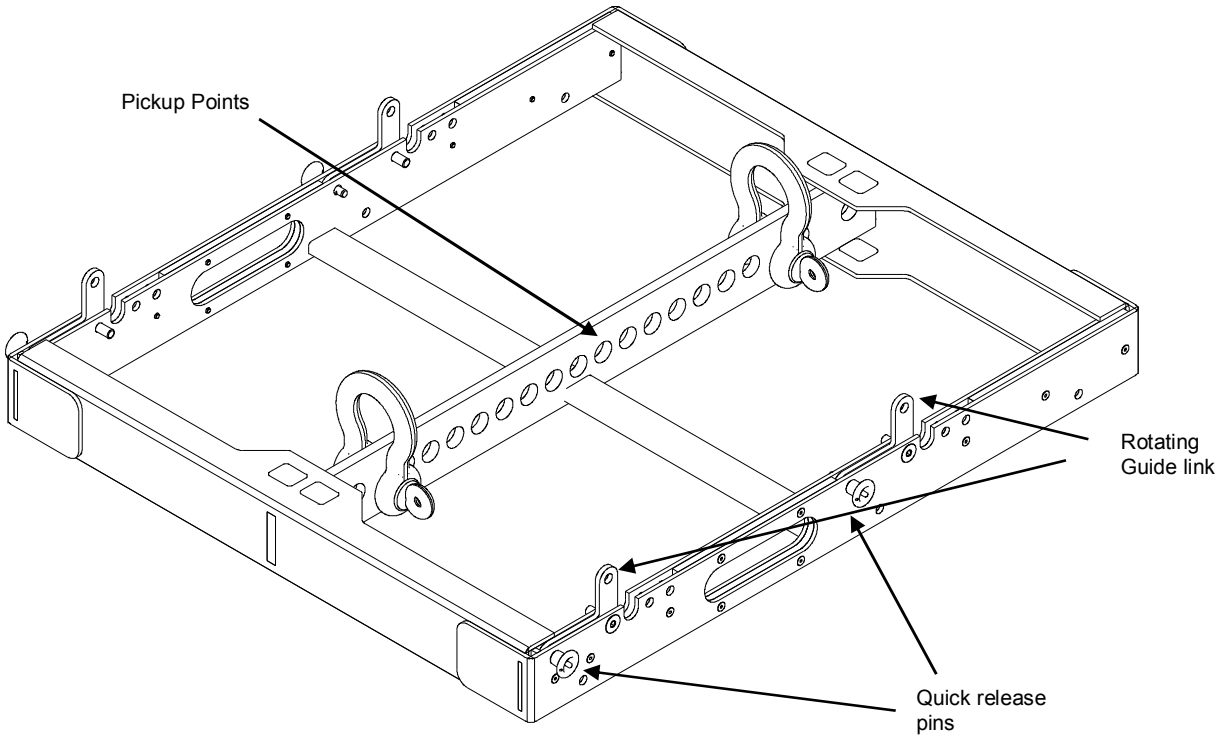


Fig.1 THV21-18VR grid

⚠ **CAUTION:** Always use the quick-release pins included with the THV21-18VR grid to secure the attached CLa21 or SW18VR. Do not use the magnetic quick-release pins included with CLa21 or the SW-18VR in the grid as they are shorter and will not lock in place.

⚠ **CAUTION:** Always use properly rated rigging hardware. The THV21-18VR have holes in the center pickup point plate of 24mm diameter and you should use an adequate shackles for its pickup points with enough load capacity.

2.1 THV21-18VR GRID DIMENSIONS

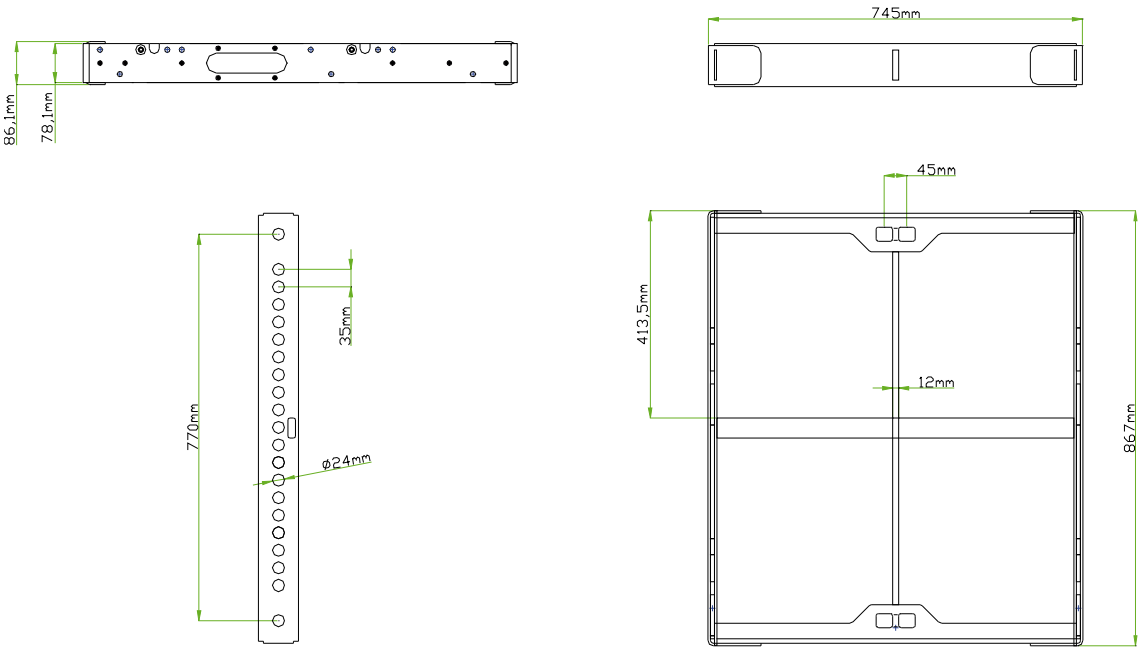


Fig.2 THV21-18VR Grid Dimensions

3 ASSEMBLING AN ARRAY

3.1 Modelling and inspection

Before installing the systems it is a good idea to run a simulation with EASE Focus software which will assist the user to:

- Determinate the number of CLa21 enclosure
- Calculate the THV21-18VR site angle and the splay angles
- Check the mechanical conformity of the system.

It is extremely important to assure that each and every one of the structures involved in the process hanging are capable of supporting a superior load than that of the complete system. As an extra precaution, careful inspection of the attachment points is advised before flying, particularly in older venues or those hosting frequent events using large sound and lighting systems.

Inspection is the next step. Key components must be inspected before each use. Such inspection includes examination of all load-bearing components for any sign of undue wear, twisting, buckling, cracking, rusting, or other corrosion.

Particular attention should be given to screws, bolts, and other fasteners to make certain the fittings are tight and secure. Metal seams and welds should be examined for any sign of separation or deformation.

Rigging should be carried out by expert familiar with the way the system function and their characteristics.

3.2 Grid orientation for Flown Arrays

The THV21-18VR grid can be oriented to locate the array's center of gravity closer to the front or rear of the grid, to achieve a few more degrees of downtilt or uptilt for flown arrays. The grid's orientation is also important when accommodating groundstacks with downtilt or uptilt (**see "Grid Orientation and Groundstacks" on page 32).**

To add tilt to the grid, you can attach two motors to the front and rear of the centre pickup point plate. If just one motor is available, attach it to one of the 19 centre pickup points offset from the centre of the grid to achieve the desired tilt.

THV21-18VH GRID ORIENTED FOR MAXIMUM ARRAY DOWNTILT

When the THV21-18VR grid is oriented forward with the attached loudspeaker near the front of the grid, the array's centre of gravity is located closer to the front of the grid, thereby allowing the rear pickup points to achieve maximum array down-tilt.

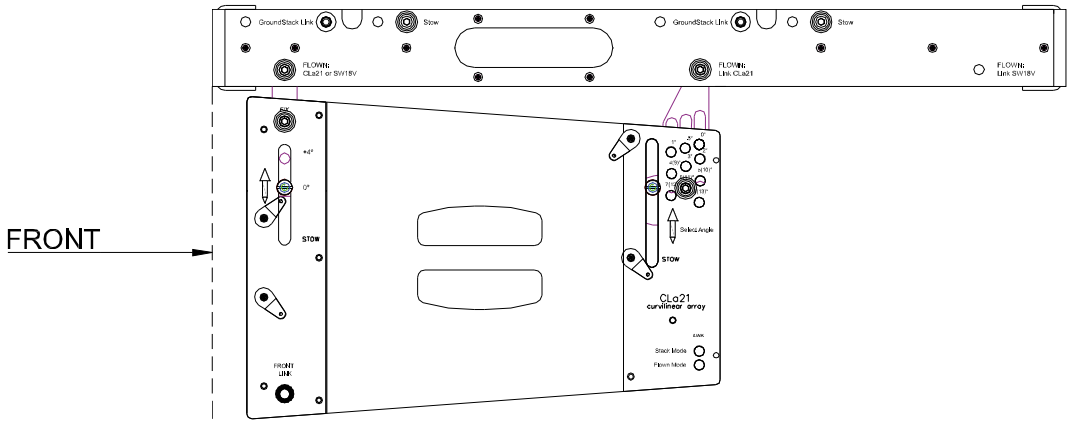


Fig. 3 THV21-18VR Grid oriented for maximum array downtil

THV21-18VH GRID ORIENTED FOR MAXIMUM ARRAY UPTILT

When the THV21-18VR grid is oriented rearward with the attached loudspeaker near the rear of the grid, the array's center of gravity is located closer to the rear of the grid, thereby allowing the front pickup points to achieve maximum array uptilt.

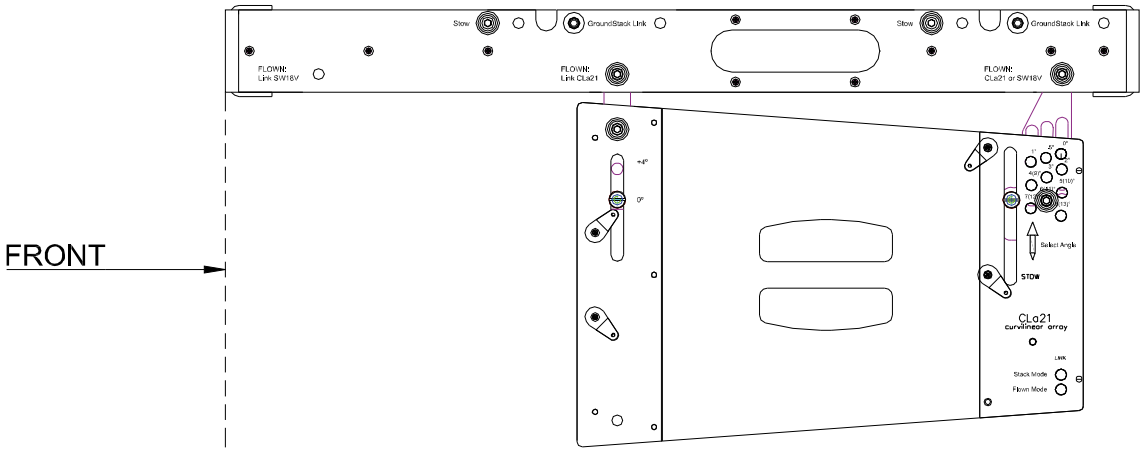


Fig. 4 THV21-18VR Grid oriented for maximum array Uptilt

3.3 Guide links

CLA21 GUIDE LINKS ARM

CLa21 is equipped with four captive guide links arms that link to adjacent units of CLa21 or SW-18VR in flown and groundstacked arrays. Located at the top corners of the cabinet, the guide links arms extend up and into the link slots of the cabinet above it (or into the link slots of the THV21-18VR). The links extend and retract with recessed knobs and are secured with quick-release pins: one each in the top and bottom cabinet.

CLa21 loudspeaker ships with eight quick-release magnets pins.

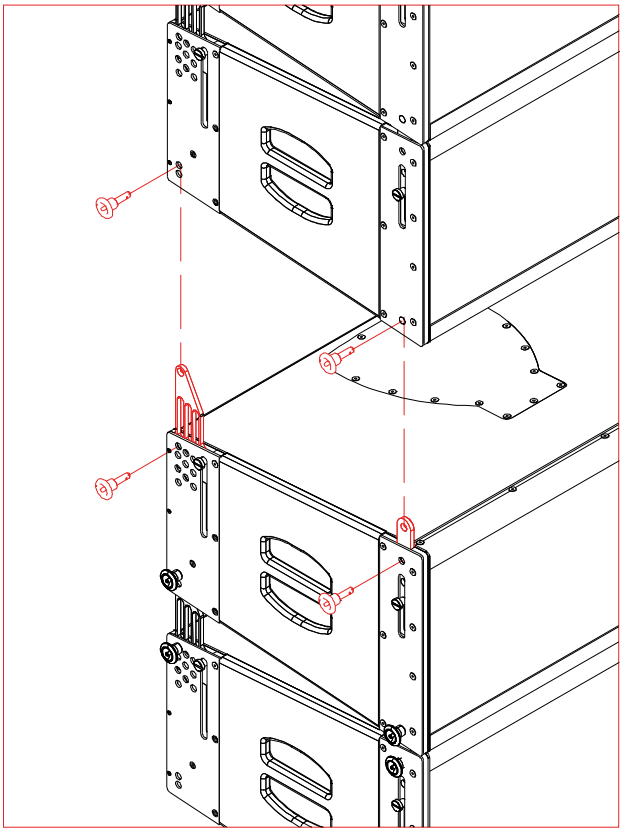


Fig 5 CLa21 Guide link arms with quick release pins

⚠ *CAUTION: CLa21 guide links arms must be secured with the included quick-release magnets pins. At not time should the weight of the enclosure rest on the knobs when the link are fully extended (without the pins inserted). The purpose of Knobs of guide links arms is only extend and retract the guide links arms.*

CLA21 SPLAY ANGLES

Front guide links arms attach at splay angles of 0 or +4 degrees. However, the front guide links should almost always be attached at 0 degrees, to ensure that coverage between linked cabinets is continuous. When attached at 0 degrees, the front guide links arms act as a pivot point between the linked CLa21s, with the splay angle between the units determined by the rear guide link positions. In this way have angles available from 0 to 8 degrees.

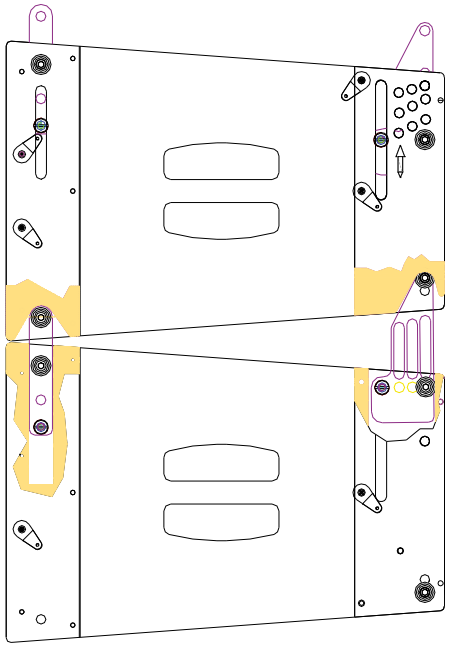
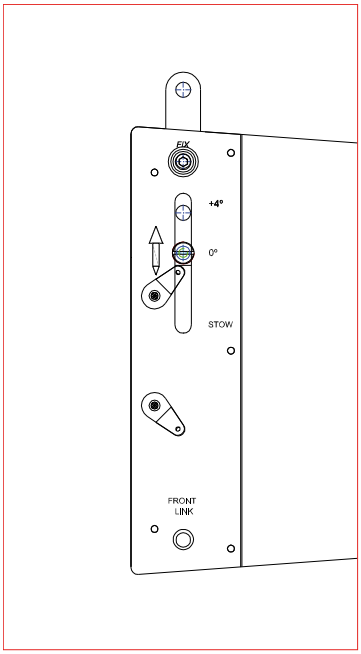


Fig 6 CLa21 Guide link arms setting at 0 degrees

When attached at +4 degrees, the front guide links arms add 4 degrees to the splay angle configured with the rear guide links, making it possible to achieve splay angles of 9 to 13 degrees. To stow the front guide Links, move them all the way down to STOW and pin them.



CLa21 Front guide link label with angle

Wide splayed angles of 9 to 15 degrees should only be used for downfill coverage, or for steering coverage away from structures like balconies.

The rear guide links arms determines the vertical splay angle (whether stacked or flown), as a function of the hole where the pin is attached. Rear guide links arms attach at splay angles of 0 to 9 degrees

Stack or flown mode is determined by the position in which the guide arm is attached to the upper cabinet.

For flying the boxes and defining the splay angle, the pin must be inserted in the sliding slot of guide links arms whereas for stacking, the pin goes through the fixed hole of the guide links arms. For flown, after the stack is lifted, the loudspeakers rotate on the axis of the front link arms and the rear guide link arms slide into position as the weight of the of the loudspeakers causes the cabinets to shift

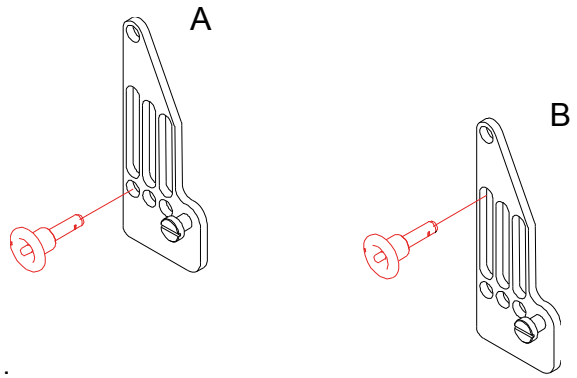


Fig. 8 Rear guide link arms (A) Stack Mode (B) Flown Mode

To aid the setting of guide links arms, each hole is labelled with the splay angle between cabinets. As the links are moved down, the splay angle increases. To fit the guide links arms into the hole, highly resistant 10mm quick-release magnet pins are used.

To stow the rear guide links arms, move them all the way down to **STOW** and pin them to the 0 degree pin position.

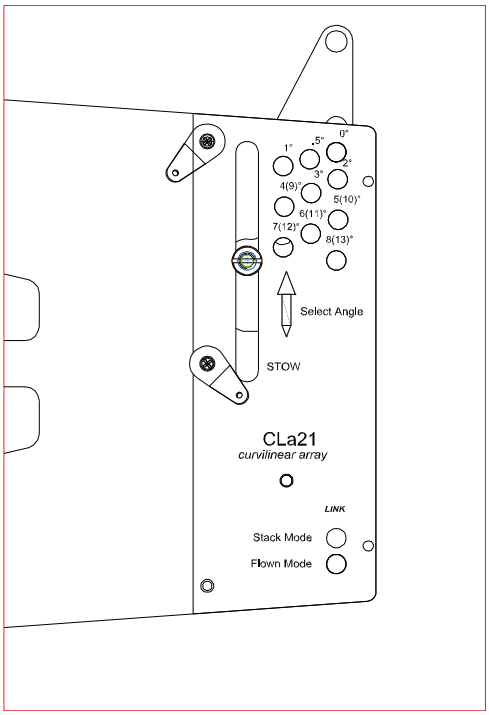


Fig. 9 Rear guide link label and pinning position

When the front links guide are attached at +4 degrees, the pins must be inserted in the holes which the splay angles are labeled in brackets.

The splay angles listed on the guide link labels are for relative angles between the center axes of the linked units. For example, setting the guide links to 5 degrees yields a 5-degree downtilt of the lower unit to the upper unit. How the loudspeakers relate to the floor, stage, and seating angles in the venue depends on the orientation of the grid, the angles of the loudspeakers in the array above them, and other factors. EASE Focus prediction software should be used to calculate optimum splay angles for loudspeakers and to predict coverage patterns for arrays.

CAUTION: CLa21 guide links arms must be secured with the included quick-release magnets pins. At not time should the weight of the enclosure rest on the knobs when the link are fully extended (without the pins inserted). The purpose of Knobs of guide links arms is only extend and retract the guide links arms.

CLA21 SPLAY ANGLES FOR TOP FLOWN CABINETS

When flying CLa21 below THV21-18VR grid, splay angles of -6 to 7 are possible for top cabinet with the following guide links arms configurations.

The holes which the splay angles are labeled in brackets.

When flying CLa21s from the THV21-18VR It is recommended to select the 6º angle on the Cla21 intended to be linked to the THV21-18VR. In this way the Cla21 axis will be parallel to the THV21-18VR

***CAUTION:** To link the THV21-18VR and Cla21 the quick-release pin-lock must always be done by placing it on the rear guide arm in stack mode (fixed) position.*

REAR GUIDE LINK TO	FRONT GUIDE LINK TO	RESULTING ANGLE
0	0	-6
0.5	0	-5.5
1	0	-5
2	0	-4
3	0	-3
4	0	-2
5	0	-1
6	0	0
7	0	1
8	0	2
4(9)	+4	3
5(10)	+4	4
6(11)	+4	5
7(12)	+4	6
8(13)	+4	7

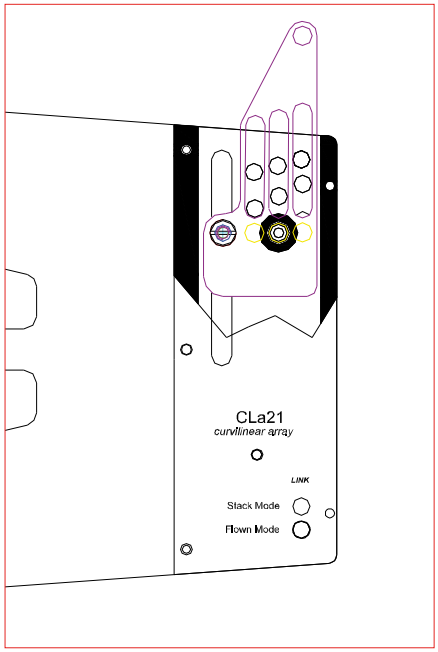


Fig. 10 Guide link arm (Exposes) attached at 6 degrees, fixed position.

SW-18VR GUIDE LINKS ARM

When the SW-18VR is equipped with the TRK-18VR rigging kit, it includes six captive guide links arms and six mating link slots that link to adjacent units in flown and groundstacked arrays. Located at the top of the cabinet, links arms extend up and into the link slots of the cabinet above it, or into the link slots of the THV21-18VR grid, making it easy to link cabinets once they are stacked.

Guide links arms extend and retract with knobs and are secured with two quick-release pins: one each in the top and bottom cabinets. Guide links get to accommodate reversed units for cardioid arrays.

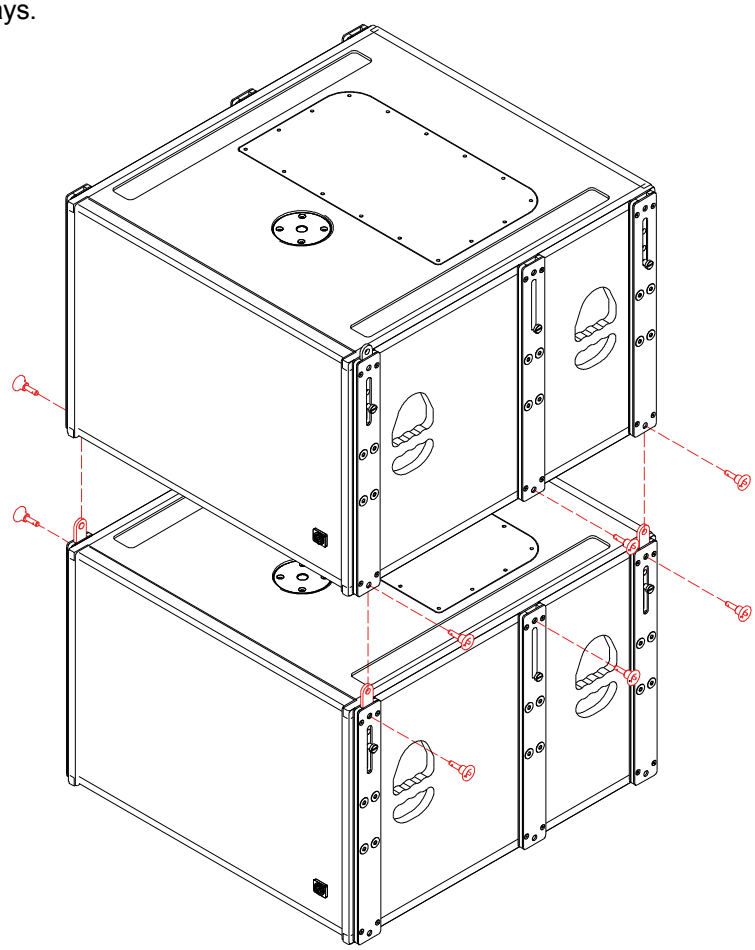


Fig. 11 SW-18VR with TRK-18VR rigging kit, Exploded View.

The rigging hardware kit allows fixing both SW-18VR and CLa21s without transition frame hardware.

The front and rear guide links arms are used when flying the SW-18VR with the THV21-18VR grid, or when flying it below another SW-18VR. The configuration of the SW-18VR's Guide links arms, front and rear, determines its splay angle.

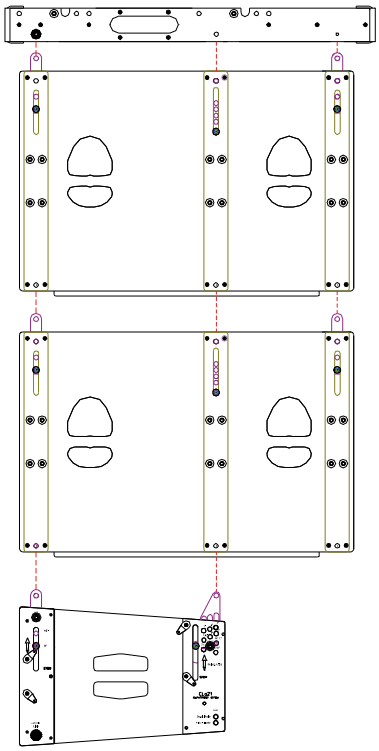


Fig. 12 Flown SW-18VR with CLa21 at the bottom.

The SW-18VR's four corner link slots on the bottom of the cabinet must be use to link with another flown SW-18VRs. The front and middle link slots must be use lo link with a CLa21 loudspeakers when flying CLa21s below the SW-18VR.

The configuration of CLa21's links arms, front and rear, determines its splay angle.

The SW-18VR's front and middle link slots also are compatible with the THV21-18VR grid when groundstacking the SW-18VR. The configuration of the grid's links, whether set to A or B, determines the angle of attachment for the groundstacked SW-18VR (see CONFIGURATION).

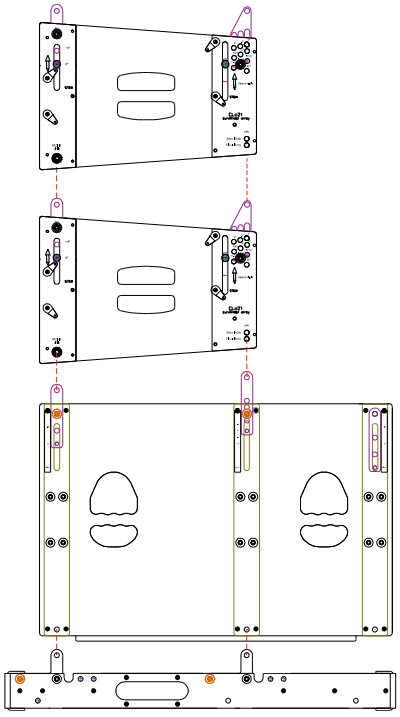


Fig. 13 Ground stacked SW-18VR with THV21-18VR

SW-18VR SPLAY ANGLES

Front and rear Guide links arms attach at angles of 0 and 3 degrees, thereby allowing curved arrays for the SW-18VR. Because the SW-18VR Guide links arms are symmetrical, curved arrays can also include cardioid configurations.

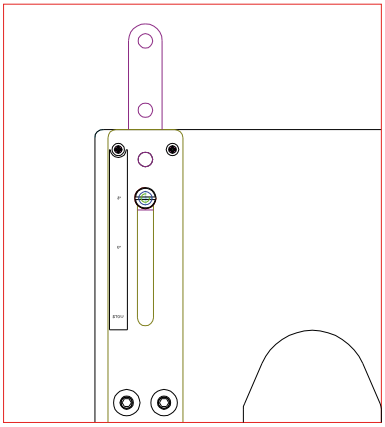


Fig. 14 SW-18VR front guide link arm and label

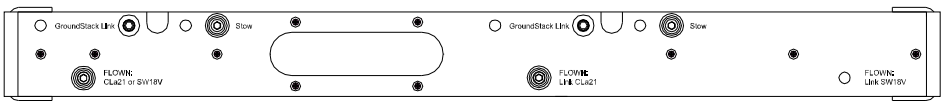
The labels next to the front and rear Guide links arms indicate the splay angle between cabinets. To stow the Guide links arms, move them all the way down to STOW and pin them.

When flying SW-18VRs from the THV21-18VR grid It is recommended to select the 0º angle for the top cabinet to ensure that the cabinet aligns with any laser or inclinometers. In this way the SW-18VR axis will be parallel to the THV21-18VR. To add tilt to the top cabinet, the gid should be tilted with motors attached to the front and rear of the grid. If just one motor is available, attach it to one of the 21 center picup points offset from the center of the grid to achieve the desired tilt.

Curved SW-18VR arrays do not provide directionality for low-frequency content.

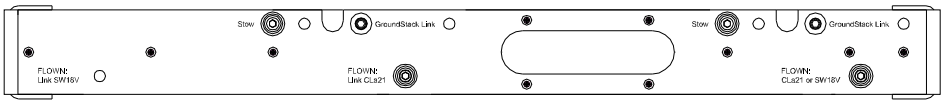
3.4 Flying a CLa21 standalone array

1. Place a THV21-18VR at the rigging location. Turn it according to the desired configuration and directed towards the audience. Attach the shackle(s) to the desired pick-up point.



Towards audience

THV21-18VR oriented for Maximum Array Downtilt



THV21-18VR oriented for Maximum Array Uptilt

Fig. 15 THV21-18VR Grid Rigging Option

CAUTION: Always use the quick-release pins included with the THV-21/18 grid to secure the attached CLa21 or SW-18VR.

2. Place a full dolly of CLa21 loudspeakers at the rigging location and remove the soft cover.
3. Check the inter-enclosure connections (repeat for each side):

    a. For both front rigging points, verify that the front guide link arm is extended and pinned in fixed positions and the quick-release magnets pins are secured.
    b. For both rear rigging points, verify that the angle of guide link arm is aligned with quick-release magnets pin in the desired angle value and these one are secured.

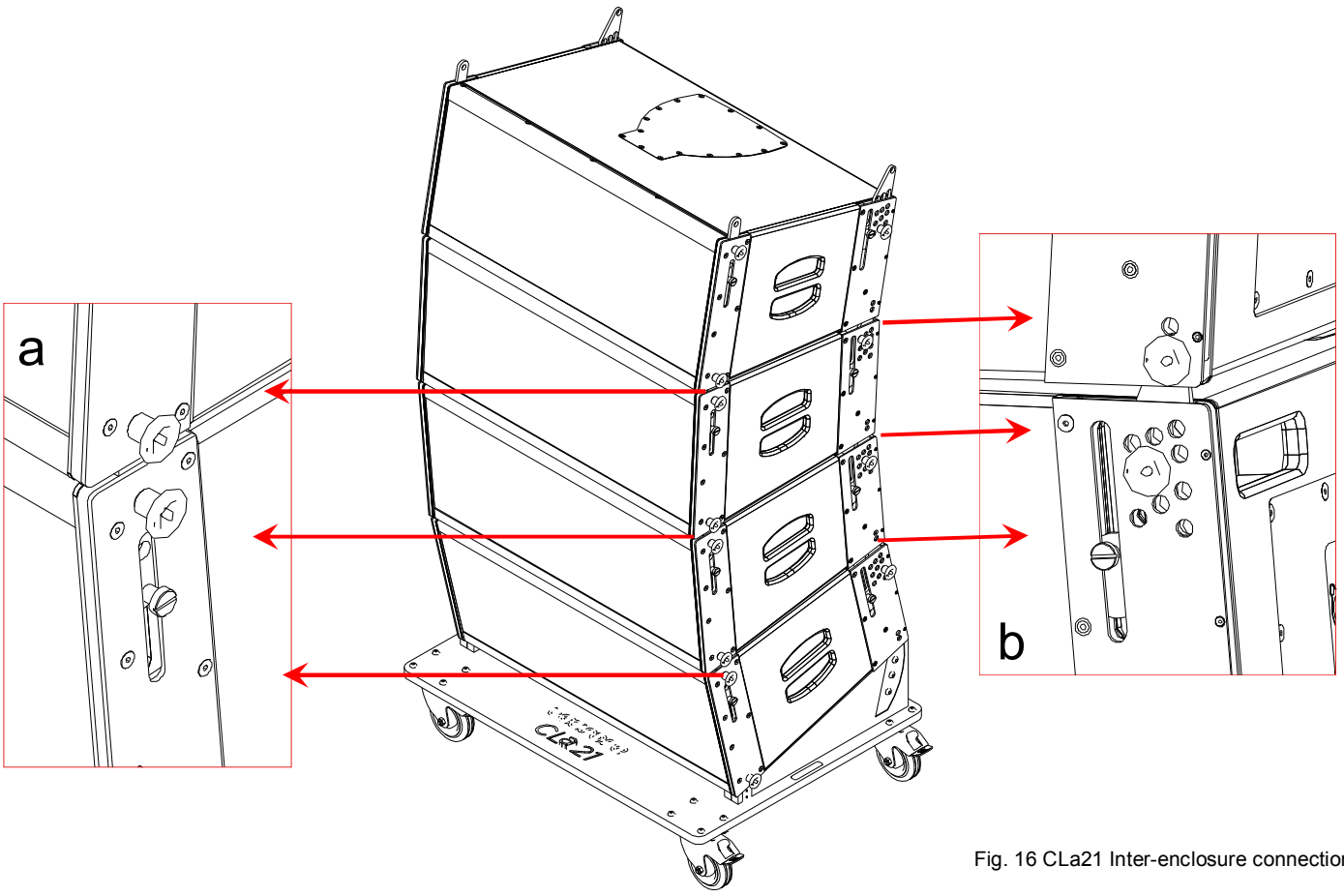


Fig. 16 CLa21 Inter-enclosure connection

4. Attaching the array to the THV21-18VR

    a. On the Top cabinet, remove the front top quick-release pins from stow position, slide and extend front arm up with the recessed knobs and secure by reinserting the magnetic quick-release pins into the link hole.

    b. Remove the rear top quick-release pins from 0º position, slide the angle arms with the recessed knobs so as to align the fixed hole (fixed mode) in the guide links arms with the 6° angle value, and secure by re-inserting the magnetic quick-release pins.

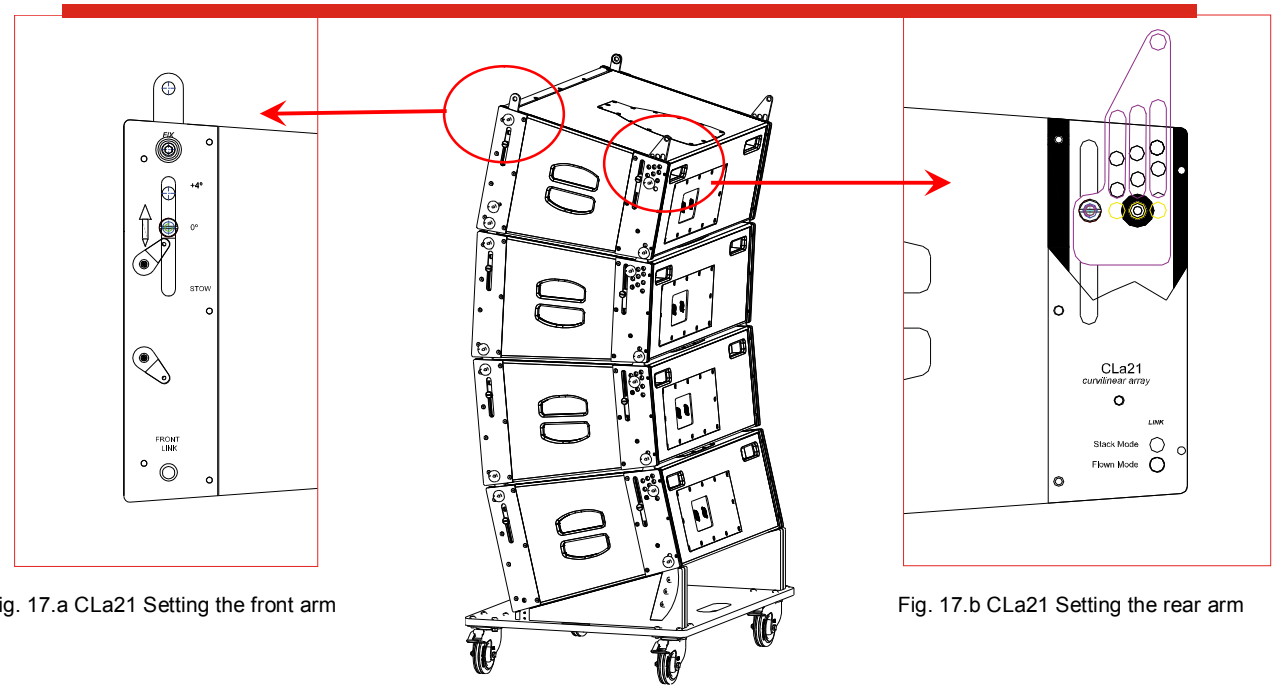


Fig. 17.a CLa21 Setting the front arm

Fig. 17.b CLa21 Setting the rear arm

c. Remove the four quick-release pins from the THV21-18VR, put the THV21-18VR over Array by aligning the four rigging points, and secure by re-inserting the 4 quick-release pins

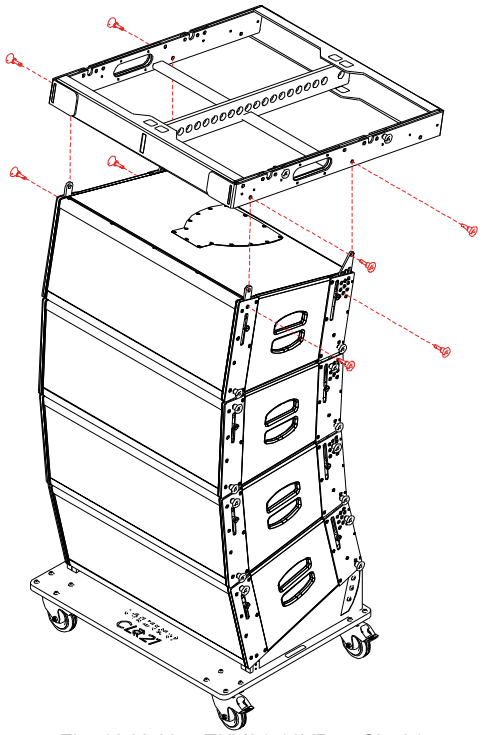


Fig. 18 Linking THV21-18VR to CLa21

5. Configuring rear guide link arm for 0, 0.5, 1, 2, 3, 4, 5, 6, 7 and 8 degrees. (Repeat for each side)
   a. Remove the rear magnetic quick-release pins and insert in the desired ANGLE position. For example, for a splay angle of 6 degrees, insert quickrelease pins in the 6-degree ANGLE position. This will allow splay angles to extend when the stack is lifted.
   b. Repeat the procedure for each block

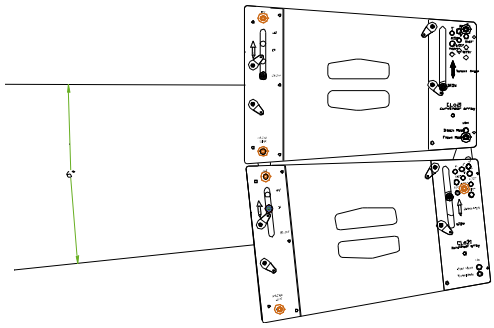


Fig. 19 CLa21 Fixed to 6 degree

6. Place another full dolly at the rigging location and direct the front face of the array towards the audience
7. On top cabinet repeat step 4a (repeat for each one)
8. Separate the dolly platform. Remove the quick-release that join the enclosure with the platform

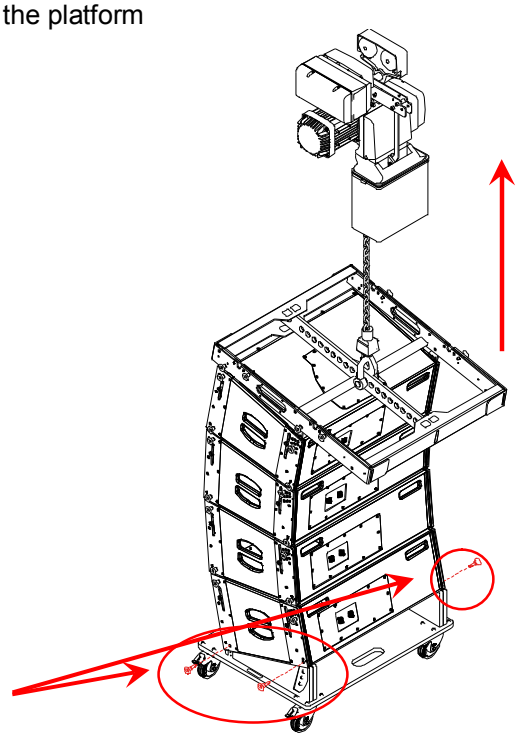


Fig. 20 Separation and elevation of the array.

9. Raise first array slightly higher than the front guide link arms of the second array, separate de platform and place the second array beneath first array
10. Connect both front rigging points between first and second array re-insert the magnetic quick-release pins
11. On the second array, remove the rear top quick-release pins from 0º position, slide the angle arms with the recessed knobs so as to align with the slot of the cabinet above and secure by re-inserting the magnetic quick-release pins
12. Move the quick-release pins according to the desired angle.
13. Repeat the step 5
14. Repeat steps 6 to 13 until all CLa21 enclosures composing the array are rigged.

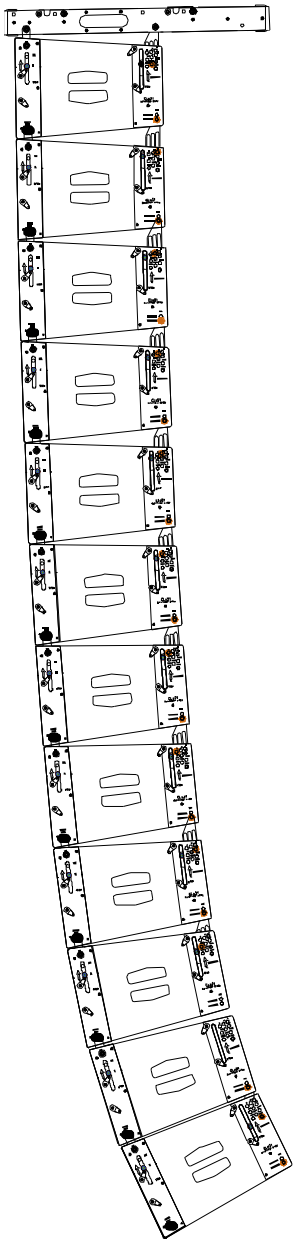


Fig 21 Example of CLa21 Standalone array.

3.5 Flying a SW-18VR/CLa21 mixed array or SW-18VR standalone array

1. Place a THV21-18VR at the rigging location. Placed directed towards the audience. Attach the shackle(s) to the desired pick-up point.

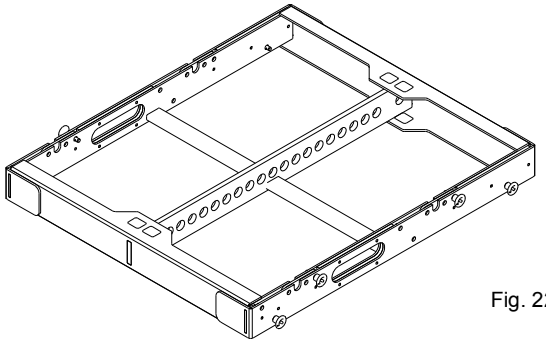
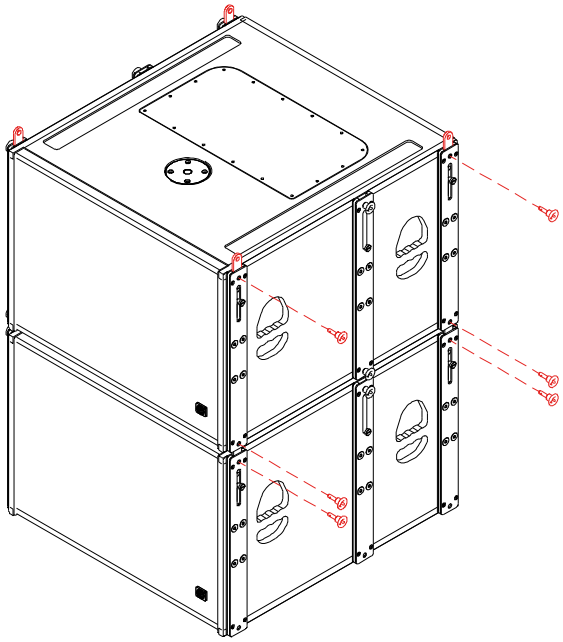


Fig. 22 THV21-18VR Grid

CAUTION: Always use the quick-release pins included with the THV-21/18 grid to secure the attached CLa21 or SW-18VR.

A 0,5 meters length of wire rope, or deck chain, placed between the shackles and the motor's chain hooks is recommended to prevent the chain bags from obstructing the output of the top loudspeakers.

2. Raise the grid slightly higher than the first stack of loudspeakers to be linked
3. Build a stack composed of two SW-18VR at the rigging location
4. Place two SW-18VR at the rigging location and remove the dolly boards. Put the subwoofer so that the front grills are facing the audience and the logos are placed at the bottom
5. Attach the front and rear guide link arms of SW-18VR to the cabinete above. Insert quick-release pins into the link hole of top cabinete



6. For splay angle of 0 degrees:
    a. For splay angle of 0 degrees, insert quick-release pins in the 0-degrees position into the four guide link arms of SW-18VB below.
7. For splay angles of 3 degrees:

   a. insert quick-release pins in the 0-degrees position into the rear guide link arms of SW-18VR below
   b. lift the stack and insert quick-release pins in the 3-degrees position into the front guide link arms of SW-18VR
8. Lower the grid THV21-18VR and put it onto top cabinete of SW-18VR by keeping the orientation and attach the front and rear rigging arms of SW-18VR to the THV21-VR
9. Insert the quick-release pins to the four TH21-VR rigging point and rigging arms

CAUTION: Do not use the SW-18VR's middle guide links arms when flying the loudspeaker below the THV21-18VR grid or when flying it below another SW-18VR. Always use front and rear guide link arms when flying the SW-18VR.

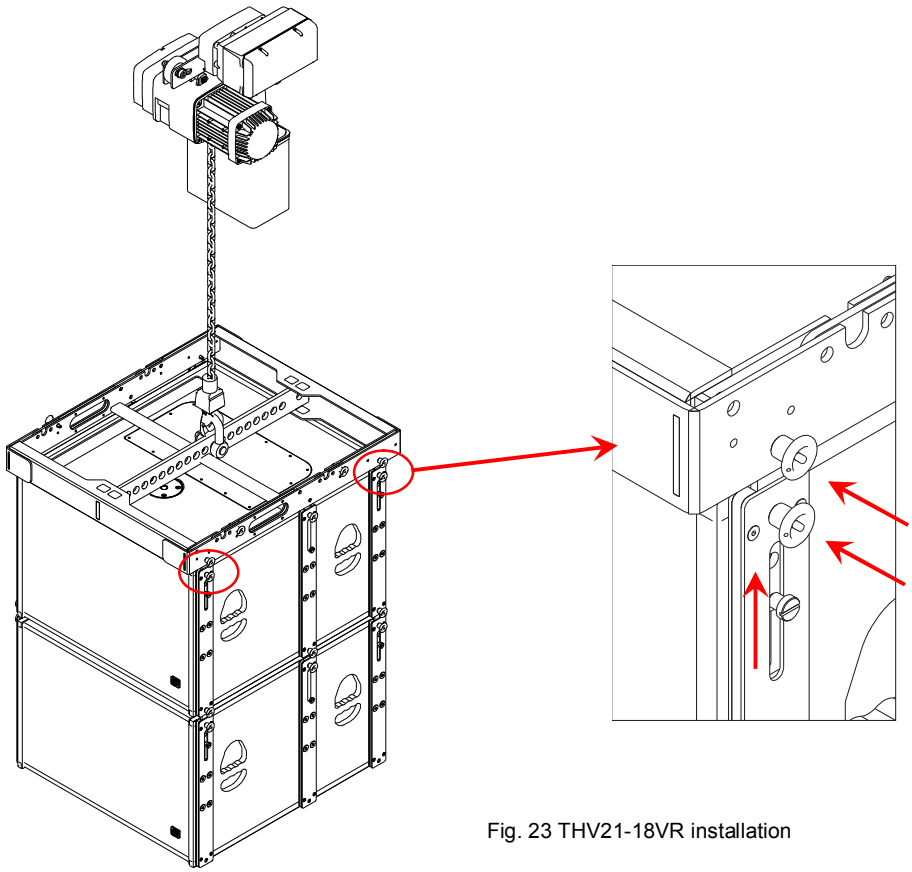


Fig. 23 THV21-18VR installation

10. Raise the array so that it is possible to place another stack of two SW-218VR
11. Build another stack of two SW-18VR enclosures or CLa21

Orient all SW-18VR composing the array towards the audience to obtain an omnidirectional acoustic pattern or turn one SW-18VR every three from front to rear to obtain a cardioid acoustic pattern.

12. Roll the stack into the position under flown loudspeaker.
13. Lower the flown loudspeakers so the bottom cabinet is around 50mm above the top cabinet on the floor. Adjust the placement of the loudspeaker stack on the floor so the top cabinet's guide link arms align with the link slots of the bottom flown cabinet.
14. Link the top cabinet on the floor to the bottom flown cabinet:
   a. Disconnect the quick-release pins from its front and rear link slot for the bottom flown cabinet.

b. For the top cabinet on the floor, remove the stowed front guide link arms and re-connect them to the desired angel attachment, so they extend up and into the flown cabinet's front link slots. Pin the front guide link arms to the flown cabinet with the previously removed quick-release pins.
c. For the top cabinet on the floor, disconnect the stowed rear guide link arms and re-connect them to the desired angle of attachment, so they extend up and into the flown cabinet's rear link slots. Pin the rear guide link arms to the flown cabinet with the previously removed quick-release pins.
d. For CLa21 cabinets, remove the bottom rear quick-release pins and insert them to the desired splay angle. Re-pin the bottom rear of the cabinet, securing it to the top cabinet it, with the quick-release pins. If necessary, lift the rear of the loudspeaker to align the cabinet.

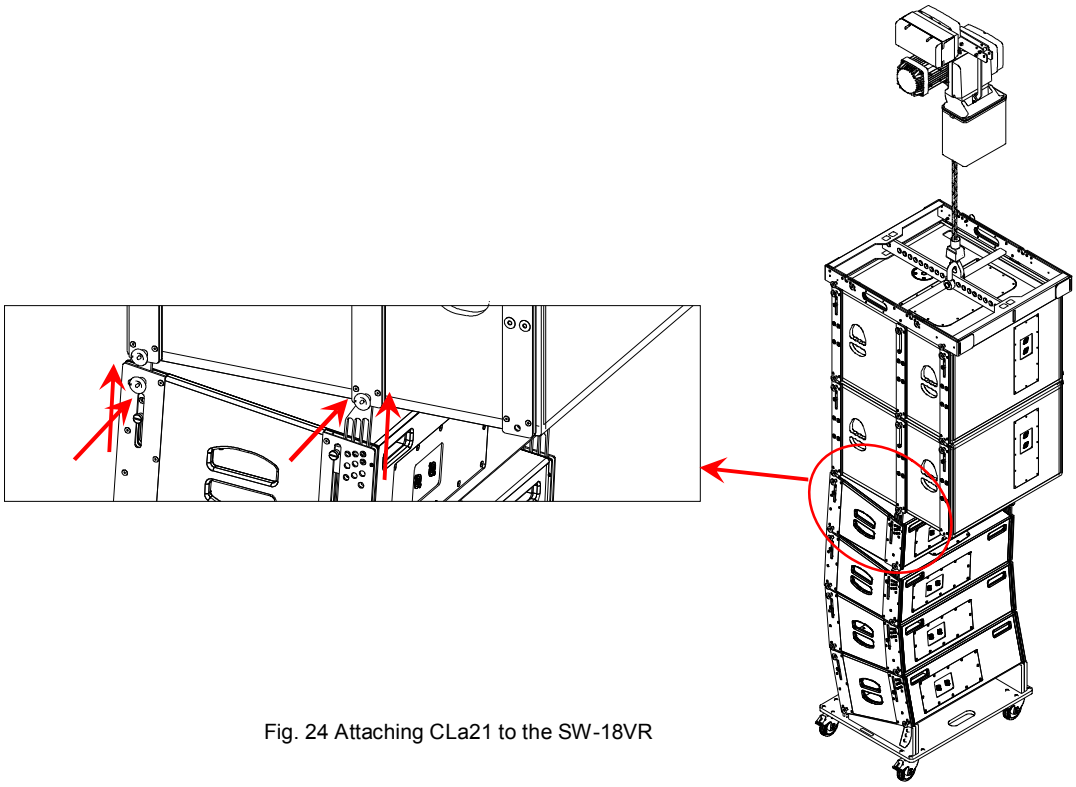


Fig. 24 Attaching CLa21 to the SW-18VR

15. Set the rear splay angles between cabinet (for the stack on the floor) as necessary. Available CLa21 0 to 8 (13 with the front extension) degrees.
16. Raise the grid so the loudspeaker stack is suspended slightly off the floor and remove the four quick-release pins securing the dolly frame to the bottom cabinet. Rest the wheels of the dolly on the floor to detach the dolly from the bottom cabinet. Return the four quick-release pins to the bottom cabinet. Roll away the empty dolly board.
17. Raise the grid so the flown loudspeakers are slightly higher than the next stack of loudspeakers to be linked.
18. Repeat the previous steps until the entire array has been assembled.

As loudspeakers are added to the suspended array, try to keep the bottom cabinet parallel to the stage, by lowering the rear motors, to ease the process of adding more loudspeakers to the array. In some cases, when the array length is longer than 10–12 loudspeakers, it may be necessary to push the suspended array downstage and lower the array to close the gap between the rear of the flown and stacked loudspeakers.

4 Groundstacking with the THV21-18VR Grid

A CLa21 array must be stacked onto an THV21-18VR grid. The grid increases the array stability.

With some restrictions, the THV21-18VR grid safely groundstacks up to:

A grid stacked array can be composed of a maximum of 8 CLa21 enclosures along with all loudspeakers cables.

A ground stacked array requires to be installed on a perfectly horizontal and regular surface. It can be composed of a maximum of 4 SW-18VR / 8 CLa21 or 8 SW-18VR enclosures along with all loudspeakers cables.

CAUTION: Potential risk of personal injury and damage to equipment. Groundstacks with extreme splay angles that locate the stack's center of gravity outside the grid (for example, eight CLa21, each with 13- degree splay angles) are not supported.

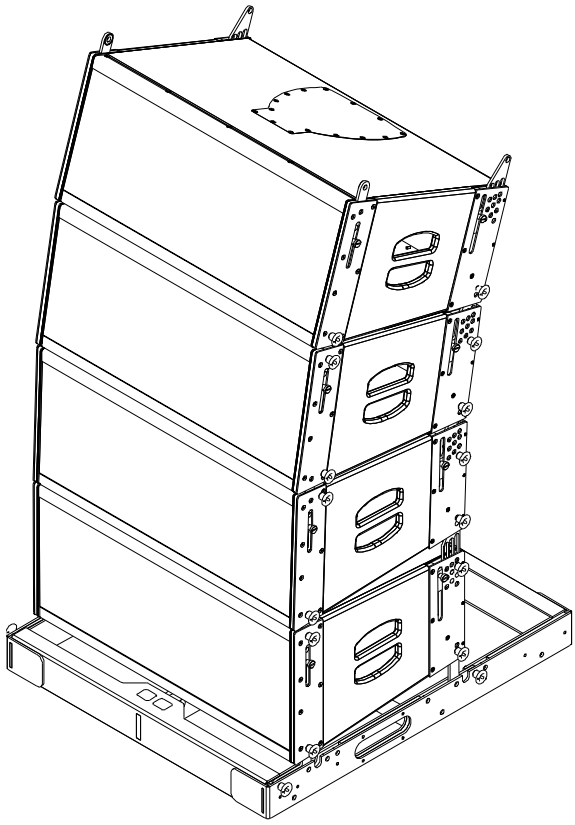


Fig.25 THV21-18VR with groundstacked CLa21s

The loudspeaker at the bottom of the groundstack is secured to the grid's four captive guide links arms (two per side) with the quick-release pins included with the loudspeaker.

To groundstack SW-18VR with THV21-18VR grid, the SW-18VR must be equipped with the TRK-18VR rigging kit.

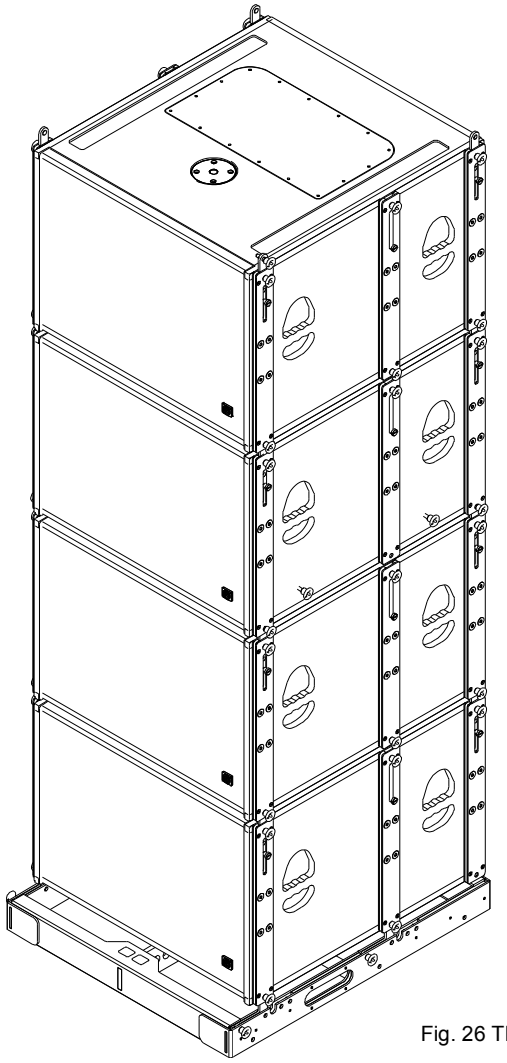
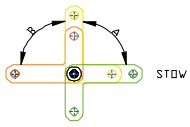


Fig. 26 THV21-18VR with SW-18VRs

4.1 Configuring guide link arms for THV21-18VR

The configuration of the THV21-18VR grid's guide link arms, which can be set to A, B, or STOW, determines the angle of attachment for the loudspeaker at the bottom of the groundstack.



Guide link arms configuration

1. Remove quick-release pin.
2. Rotate arm to A, B or Stow
3. Insert quick-release pin.

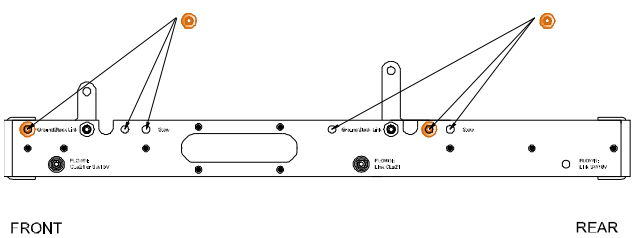


Fig. 27 THV21-18VR grid guide link arms configuration

Table list the available angles of attachment for groundstacked CLa21 and SW-18VR

Front arm set to	Rear arm set to	Resulting Angle of Attachment for Groundstacked			
		CLa21	SW-18VR	CLa21+ANGEXT	CLa21+PullBack
B	A	0º	-4º	-10,7º/-14,7º	-7,7º
B	B	+4º	0º	-6,7º/-10,7º	-3,7º
A	A	+4º	0º	-6,7º/-10,7º	-3,7º
A	B	+8º	+4º	-2,7º/-6,7º	0,3º

4.2 Grid Orientation and Groundstacks

When groundstacking with the THV21-18VR grid, to ensure the greatest stability, the grid should be oriented so the center of gravity for the groundstack is near the center of the grid. For groundstacks with uptilt, the grid should be oriented forward. For groundstacks with downtilt, the grid should be oriented rearward. The grid's orientation also determines whether downtilt or uptilt can be applied to the groundstack with the optional pull-back rigging accessory or ANGEXT angle arm extensions.

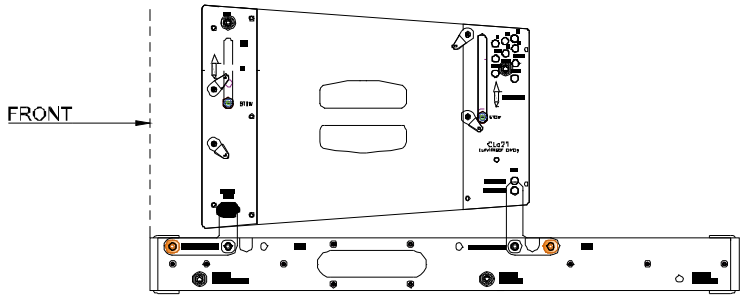


Fig. 28 THV21-18VR Grid oriented for Groundstack with maximum Uptil

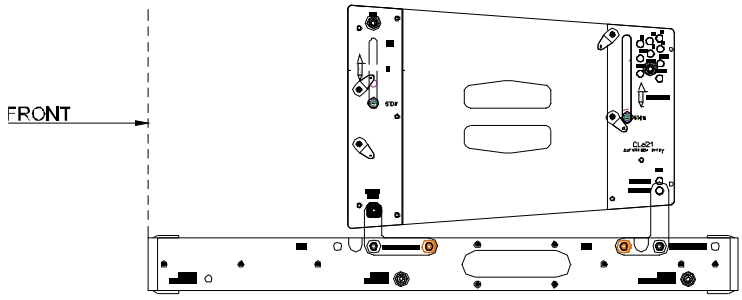


Fig. 29 THV21-18VR Grid oriented for Groundstack with maximum Downtil

CAUTION: Potential risk of personal injury and damage to equipment. Groundstacks with extreme splay angles that locate the stack's center of gravity outside the grid (for example, eight CLa21, each with 13- degree splay angles) are not supported.

CAUTION: To further secure large groundstacks, particularly in outdoor installations with severe wind conditions, attach tie-downs or weights to the grid along with a safety system directly to the groundstack.

When groundstacking with the THV21-18VR grid, the bottom loudspeaker's rear slot link should be fixed to the grid in the flown mode position.

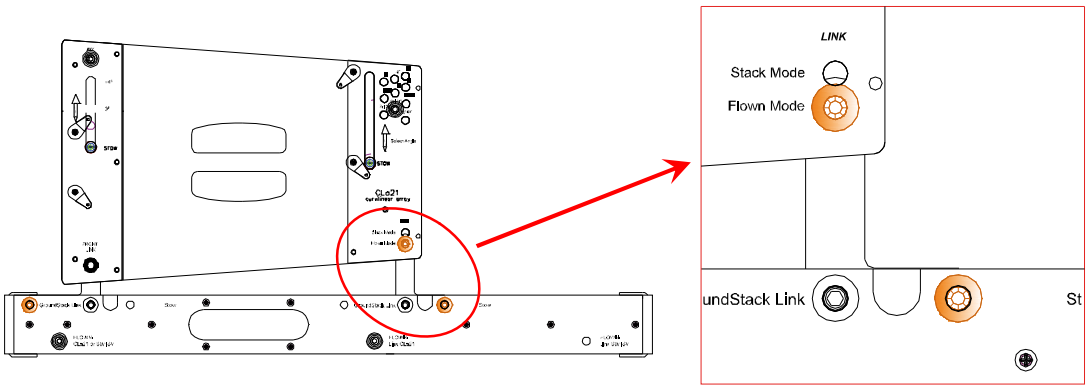


Fig. 30 THV21-18VR grid for groundstack with CLa21

4.3 Adding Groundstack tilt with the optional ANGEXT arm

The Tecnare® CLa21 – ANGEXT are two angle arm extensions providing extra 10,7° or 14,7º downwards site angle for the bottom CLa21 in stacked configurations.

1. Mount both CLa21 ANGEXT to the THV21-18VR as follows (repeat for each one):
   a. Insert the dual part of the ANGEXT into the guide link arm of THV21-18VR by putting it vertically as it is showed on the picture.

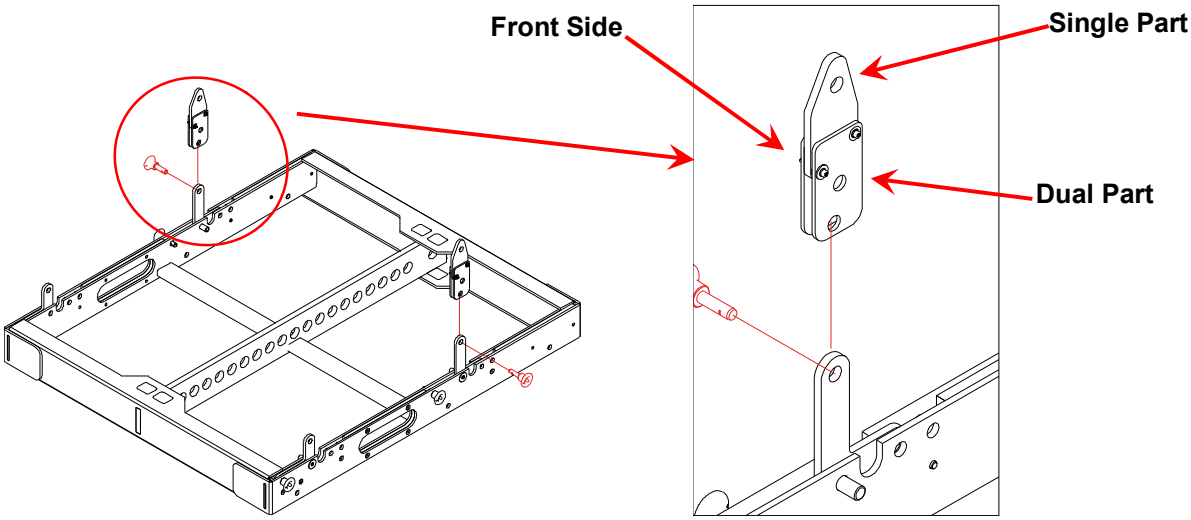
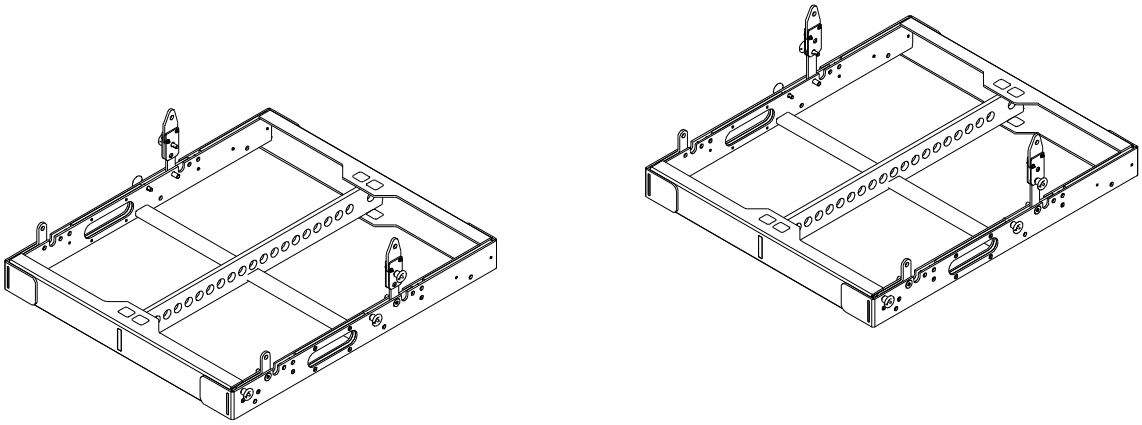


Fig. 31 CLa21 ANGEXT attached to THV21-18VR

   b. Align the ANGEXT and guide link arm with desired hole. Insert the quick-release pin.



2. Link CLa21 to THV21-18VR:
    a. Lift up CLa21 and turn its guide link arms downwards and front face towards the audience.
    b. Insert the two front link slot of CLa21 into the guide links arms of THV21-18VR. Insert the two rear link slot of CLa21 into the rear rigging point. Now becouse the THV21-18VR has been configured with ANGEXT, the rear rigging points become those of the CLa21-ANGEXT.
    c. Secure both front and rear rigging points by inserting the quick-release pins.

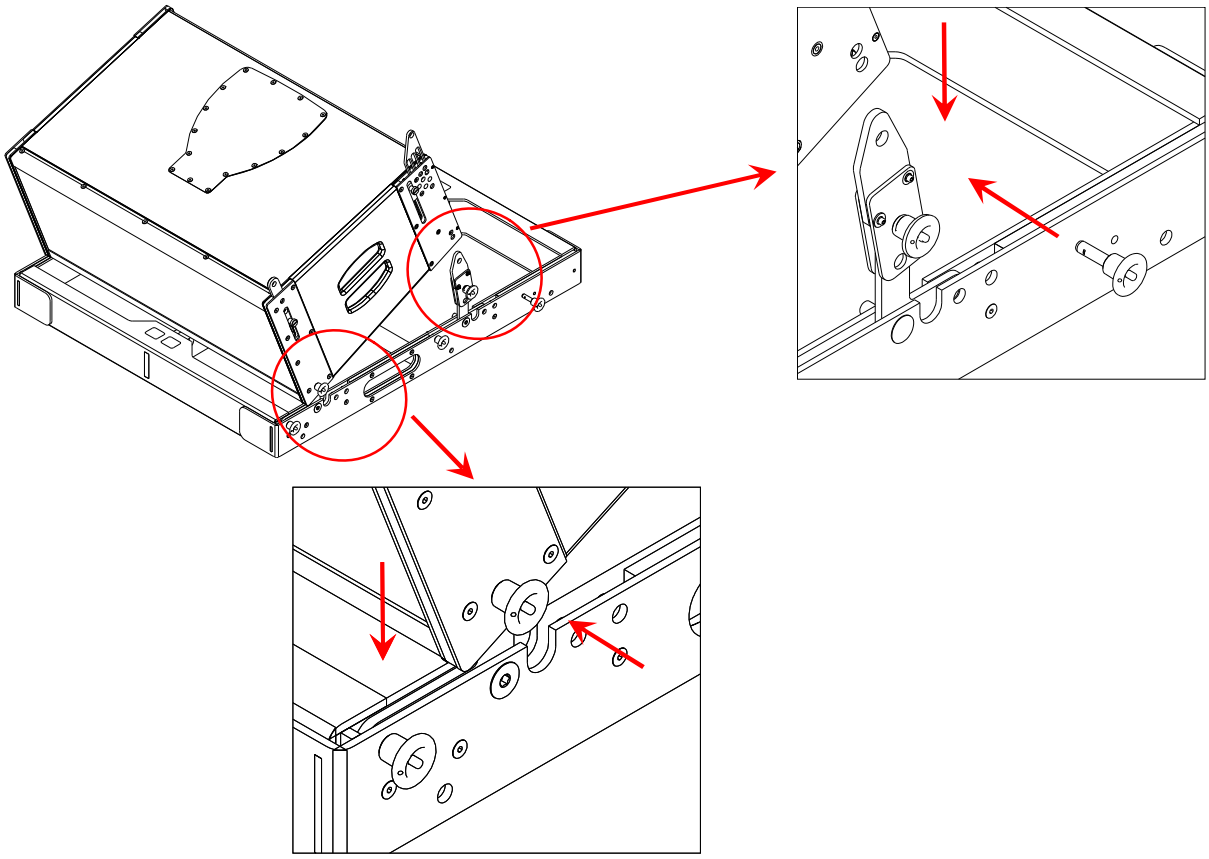


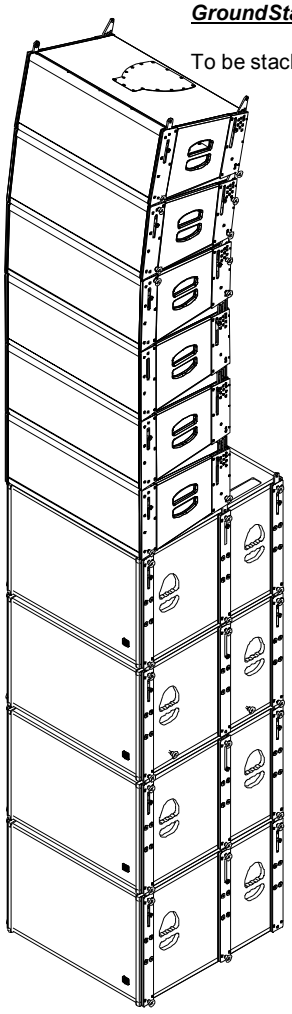
Fig. 32 Linking CLa21 to THV21-18VR with ANGEXT.

4.4 Groundstacking CLa21 on SW-18VR

A SW18-VR/CLa21 mixed array or a SW-18VR standalone array can be stacked directly on the ground (ground stacked array) or onto an THV21-18VR Grid. Figure 62 shows a mixed array of each type.

GroundStacking array:

To be stacked on a perfectly horizontal and regular surface ONLY



THV21-18VR Stacked array:

Increases CLa21 array site angle Range

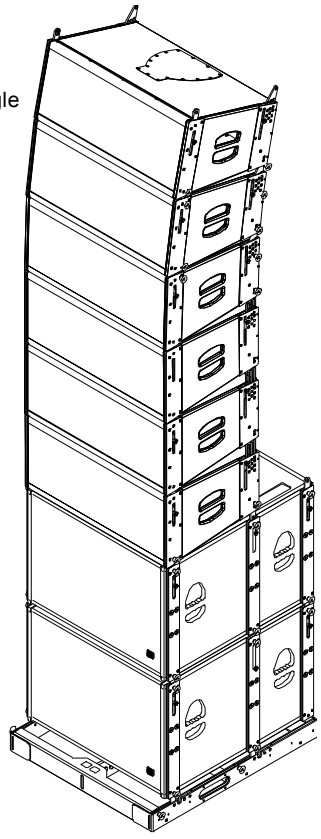


Fig. 33 Examples of SW-18VR/CLa21 groundstacked arrays

1. Place a THV21-18VR grid at the rigging location and directed towards the audience.
2. Link a first SW-18VR to the THV21-18VR as follows:
    a. Place a SW-18VR at the rigging location and remove the dolly board.
    b. Orient the front grill towards the audience or backwards.

Orient all SW-18VR composing the array towards the audience to obtain an omnidirectional acoustic pattern. Orient one SW-18VR every three backwards to obtain a cardioid acoustic pattern (refer to the SW-18VR User manual)

3. Set-up the THV21-18VR guide link arms on the desired angle position.
4. Place SW-18VR on the THV21-18VR grid by aligning the four guide link slot with the THV21-18VR guide link arms.
5. Connect the magnetic quick-locks pins to the THV21-18VR rigging point.

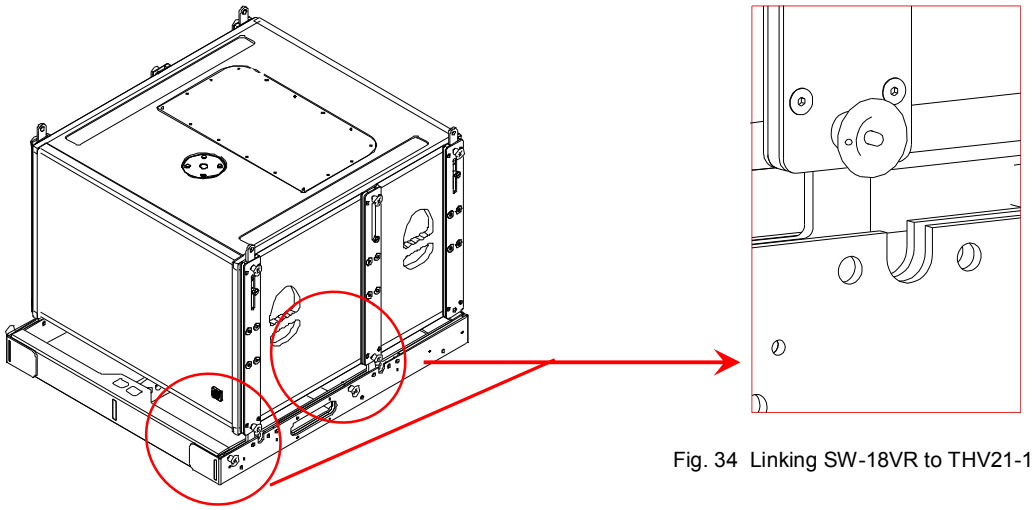
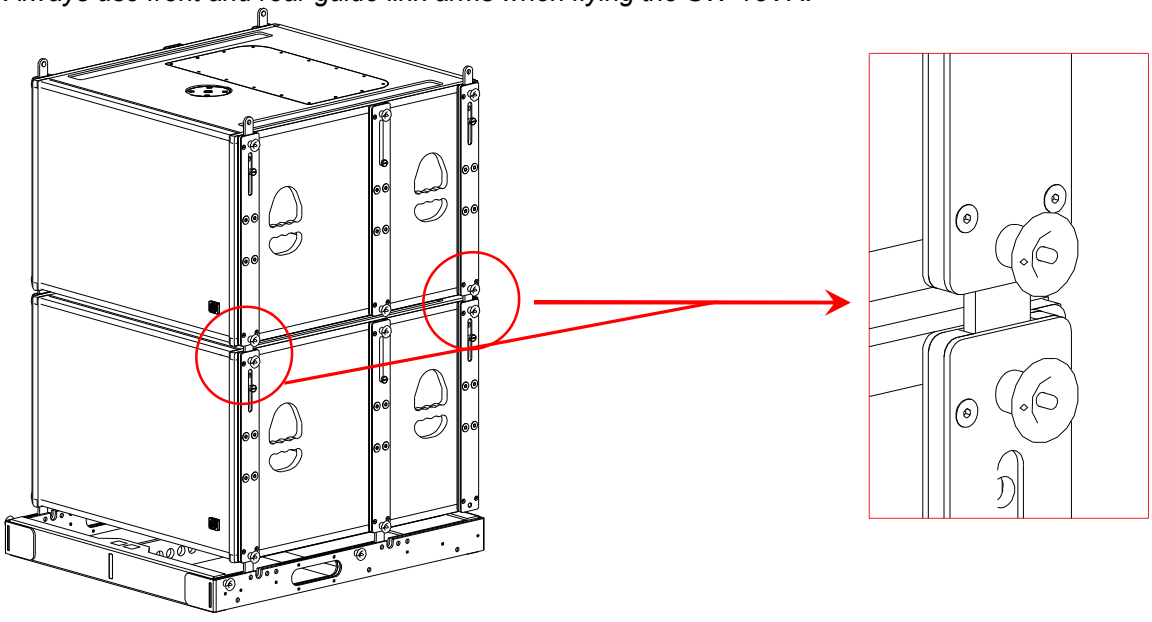


Fig. 34 Linking SW-18VR to THV21-18VR

6. Connect the magnetic quick-locks pins to the THV21-18VR rigging point.
7. Attach a second SW-18VR to the first SW-18VR as follows:
    a. Place SW-18VR at the rigging location.
    b. Orient the front grill towards the audience or backwards.
    c. Place the second SW-18VR on first SW-18VR by aligning the four rigging points, unpin the quick-release pins from its front and rear link slots.
    d. Remove the stowed front and rear quick-release pins of guide link arms from the first SW-18VR.
    e. Move up the front and rear guide link arms of first SW-18VR to the front and rear guide link slot of the second SW-18VR and reconect the previously quick-release pins.

CAUTION: Do not use the SW-18VR's middle guide links arms when flying the loudspeaker below the THV21-18VR grid or when flying it below another SW-18VR. Always use front and rear guide link arms when flying the SW-18VR.



8. Repeat step 7 until all SW-18VR enclosures composing the array are rigged.

9. If the array is intended to be a SW-18VR standalone array, check if the stacking platform is still horizontal and secure the system to a fixed point using a ratchet strap or any other applicable material (not provided).

5 Pull-back PB-CLa21

For applications requiring extreme array downtilt that are not possible with adjustments to the motors attached to the grid, the optional PB-CLa21 pull-back frame can be connects to the bottom enclosure of the array and to the hook or stinger of an additional motor.

The pull-back frame is secured to the bottom cabinet with a quick-release pins included with CLa21. The PB-CLa21 pull-back frame requires 22mm shackles for its two pickup points.

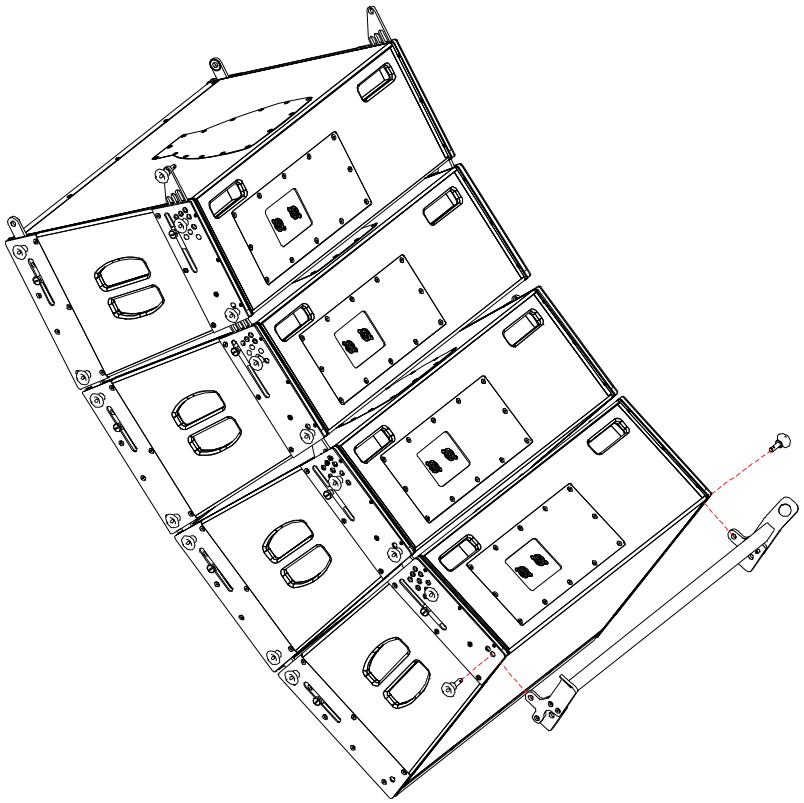


Fig. 35 Pull-Back Frame attached to Bottom CLa21

CAUTION: When flying arrays, the total weight of the array, including any pull-back and pull-up hardware, should be calculated before the array is flown to verify its weight does not exceed the load ratings for the THV21-18VR grid.

CAUTION: Always use properly rated rigging hardware. The CLa21 pull-back frame requires 22mm shackles for its pickup points.

The CLa21 pull-back frame can also be used to add downtilt to Cla21s groundstacked on top of the SW-18VR. For more information, see the next section "Adding Groundstack Tilt with the Cla21 Pull-back frame"

5.1 Groundstacking CLa21 on SW-18VR

The CLa21 pull-back frame can be used to add 3 degrees of downtilt to CLa21s groundstacked on top of the SW-18VR. To achieve the downtilt, the pull-back is placed between the bottom CLa21 and the SW-18VR's middle guide links. The downtilt from the pull-back is added to the tilt achieved with the SW-18VR's middle guide links (see next table).

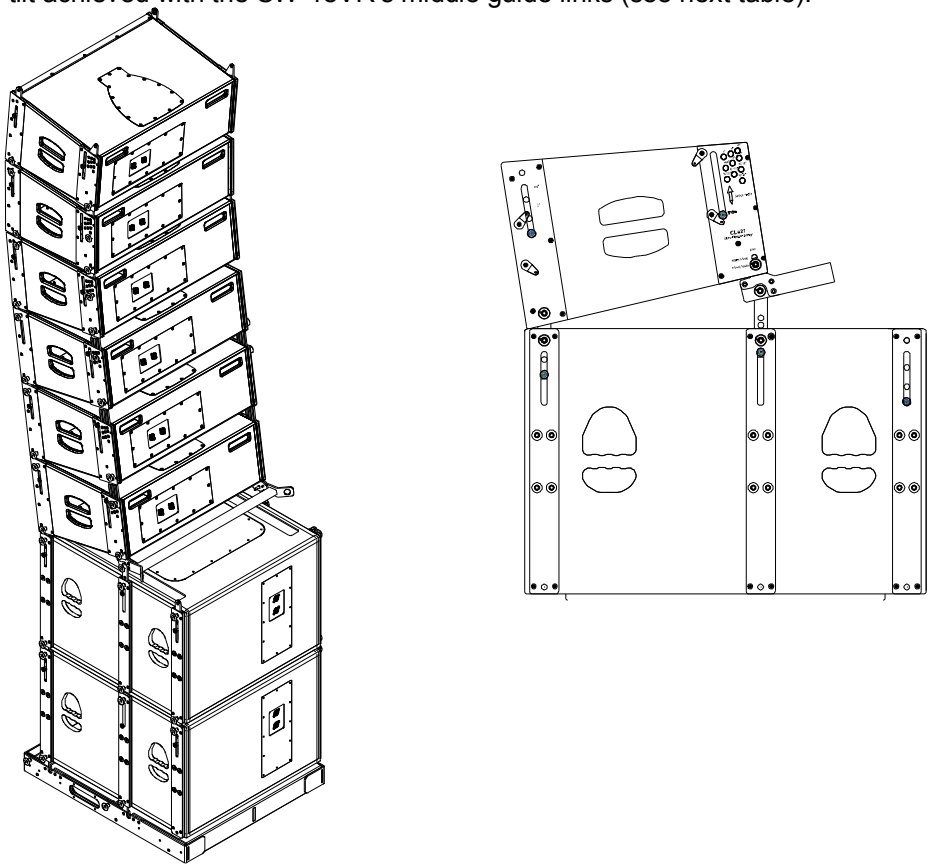


Fig. 36 Examples pull-back frame attaching to SW-18VR/CLa21 on groundstacked arrays

6 TWD21 Wooden transport Dolly

The TWD-21 touring carts safely transports up to four CLa21s, making it easy to assemble and disassemble arrays in blocks of four cabinets.

The entire cabinet assembly stored in the cart can be directly connected to the THV21-18VR grid or mounted below already suspended CLa21 or SW-18VR cabinets.

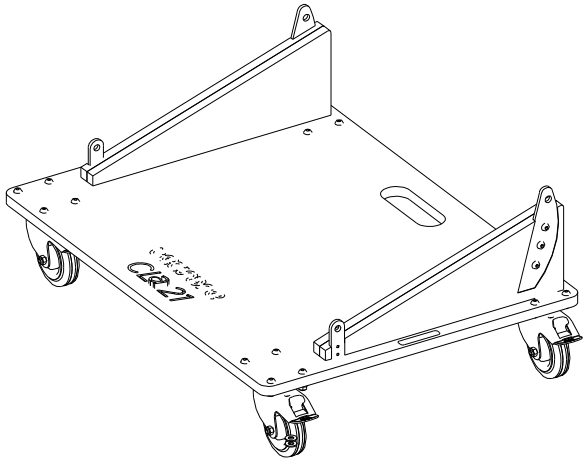


Fig. 37 TWD21 Wooden Dolly

The TWD21 wooden dolly includes four fixed links that attach to the cabinet at the bottom of the stack and tilt it 17.18-degree and are secured with four magnetic quick-release pins included with CLa21. Make sure to orient the dolly so the taller links attach to the rear of the loudspeaker.

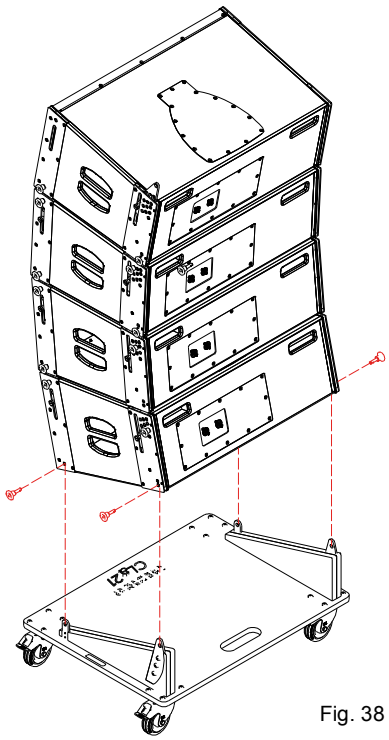


Fig. 38 TWD21 Wooden Dolly with CLa21 stack

Durable nylon pullover covers, sized for stacks of 3 or 4 units, are available to protect CLa21 cabinets during transport.

6.1 TWD21 wooden dolly dimensions

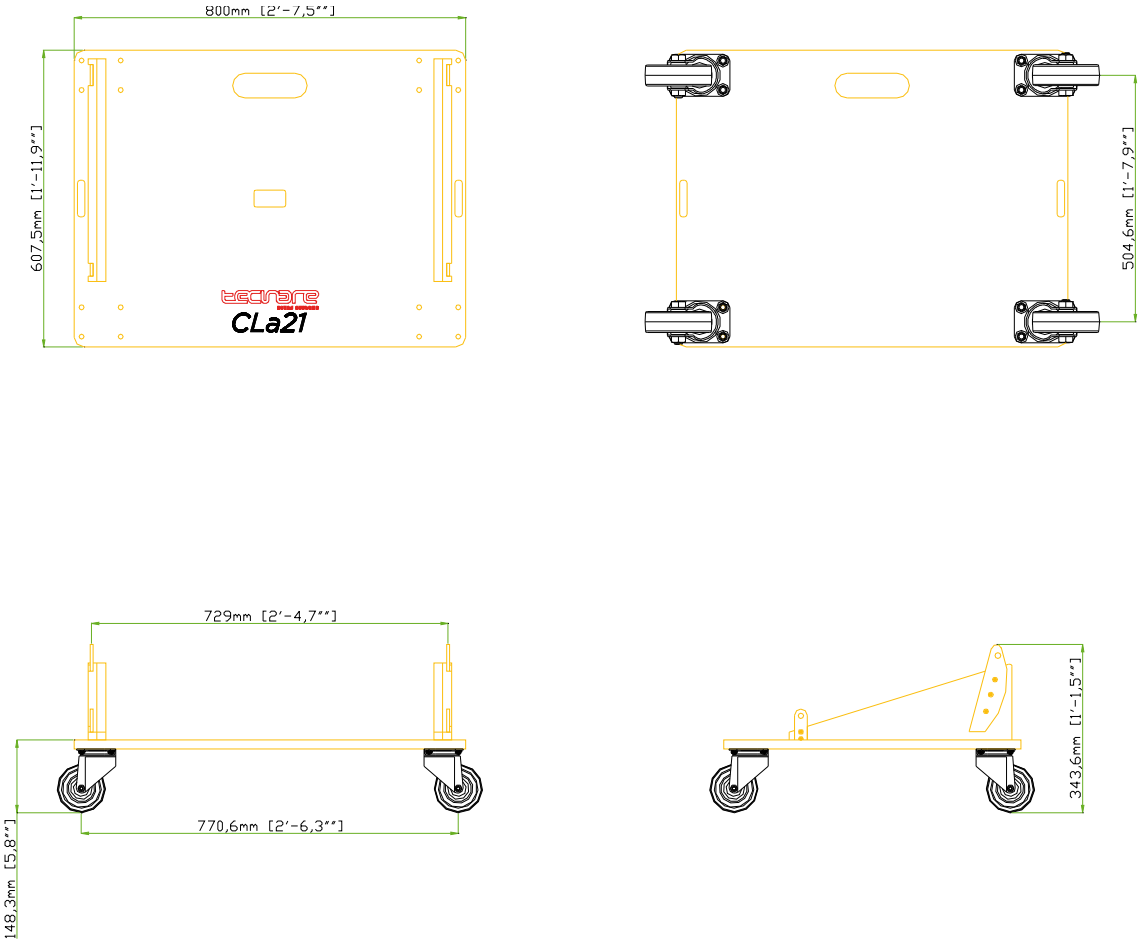
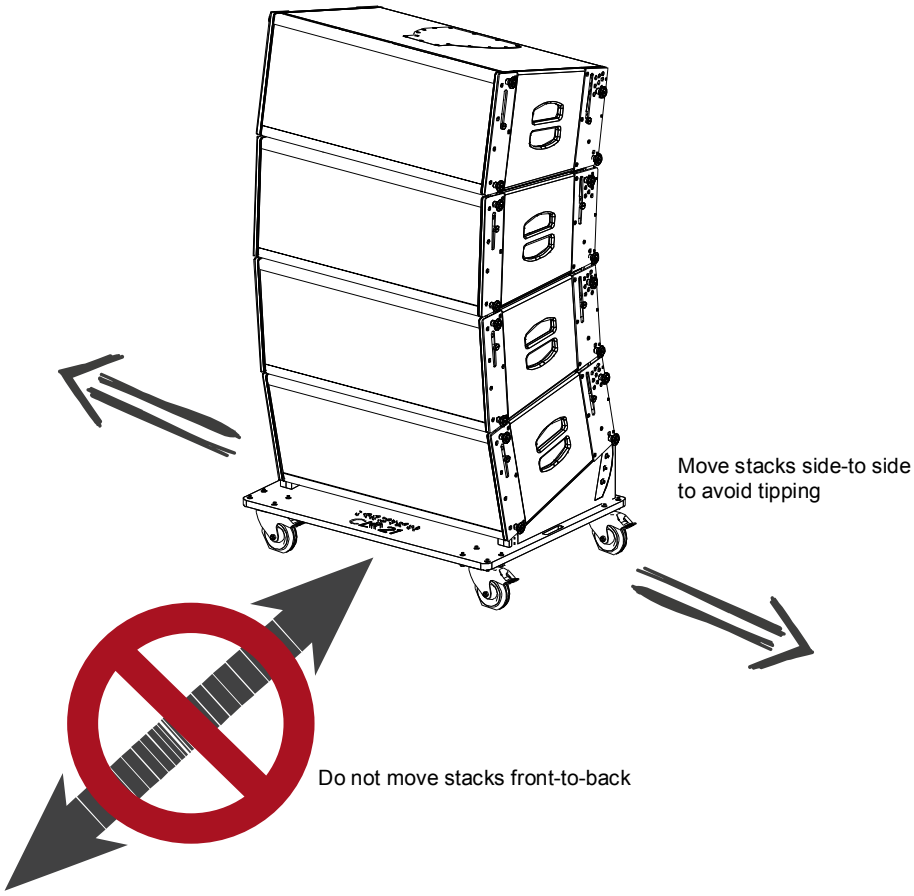


Fig. 39 TWD21 Wooden dolly Dimensions

TWD21 Wooden dolly Weight: 5.5 kg. (12.12lbs.)

6.2 Safety guideline for the TWD21 wooden dolly

- Do not stack more than four cabinets on the TWD21 wooden dolly.
- When transporting CLa21 stacks, pack them front-to-front or back-to-back so the rear plates do not face toward grille frames in neighboring stacks. While the CLa21 rear plate do not extend beyond the edge of the wooden dolly, rapid accelerations and stops could cause stacks to tip toward neighboring stacks, potentially damaging grille frames.
- Do not move stacks in the front-to-back direction of the loudspeakers (the long side); always move stacks sideways to avoid tipping.



7 TWD-18VR Wooden transport Dolly

The TWD-18VR wooden dolly safely transports up to three SW-18VRs, making it easy to assemble and disassemble arrays in blocks of three cabinets. The TWD-18VR can also be used to support SW-18VRs in groundstacked configurations.

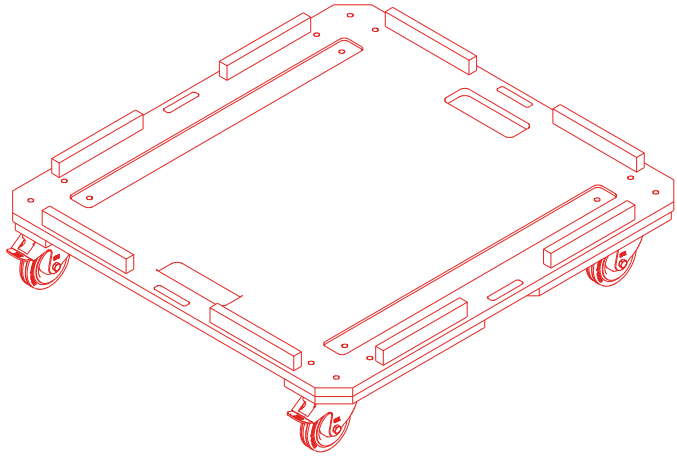


Fig. 40 TWD-18VR Wooden Dolly

The TWD-18VR wooden dolly includes two rails that fit at the skids of the bottom SW-18VR cabinet of the stack.

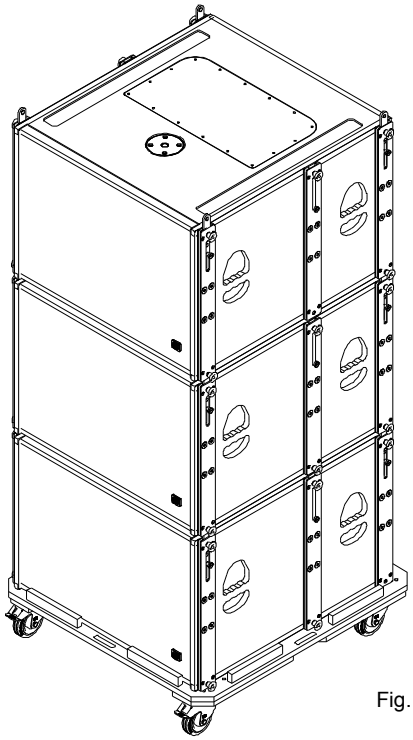


Fig. 41 TWD-18VR Wooden Dolly with SW-18VR stack

The TWD wooden dolly can be used for cabinet with or without the TRK-18VR rigging kit.

SW-18VR cabinets need not be equipped with the TRK-18VR rigging kit for transport with the wooden dolly. The loudspeaker skids ensure that cabinets stack cleanly on the caster frame. However, to avoid tipping, straps (not included) should be used when transporting cabinets.

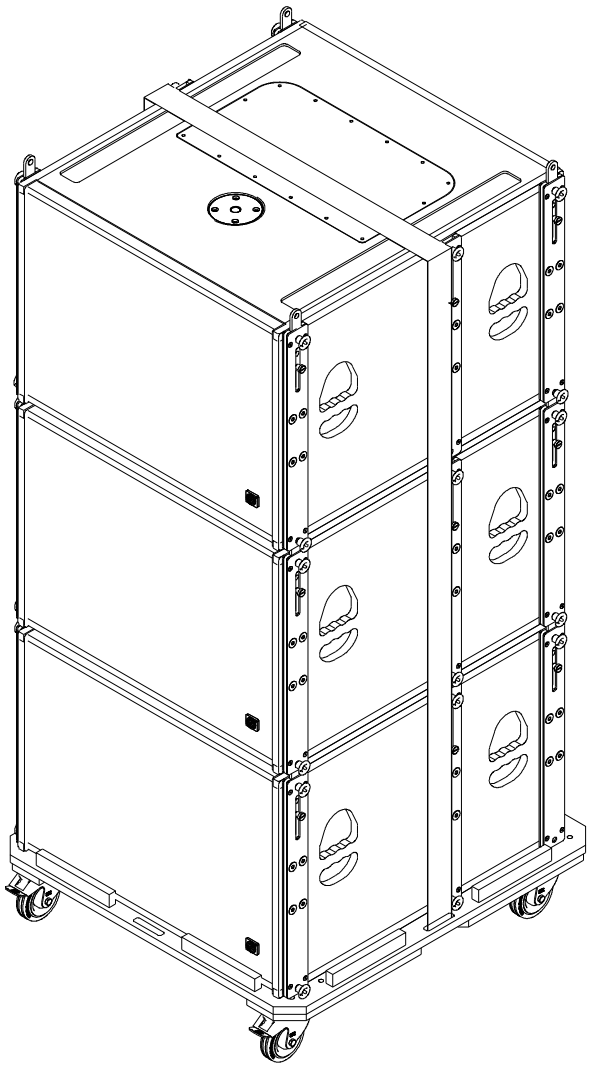


Fig. 42 TWD-18VR Wooden Dolly, 3xSW-18VR and Straps (Not Included)

Durable nylon pullover covers, sized for stacks of 2 or 3 units, are available to protect SW-18VR cabinets during transport.

The THV21-18VR grid can travel installed on top of SW18VR stacks on the TWD-18VR wooden dolly.

When transporting the THV-18VR grid on top of SW-18VR stacks on the TWD-18VR wooden dolly, to avoid colliding the grid with other SW-18VR stacks, attach the grid to the top SW-18VR cabinet with the cabinet's front and rear guid links arms set to 3 degrees, so the grid is effectively raised 13mm (½") above the stack.

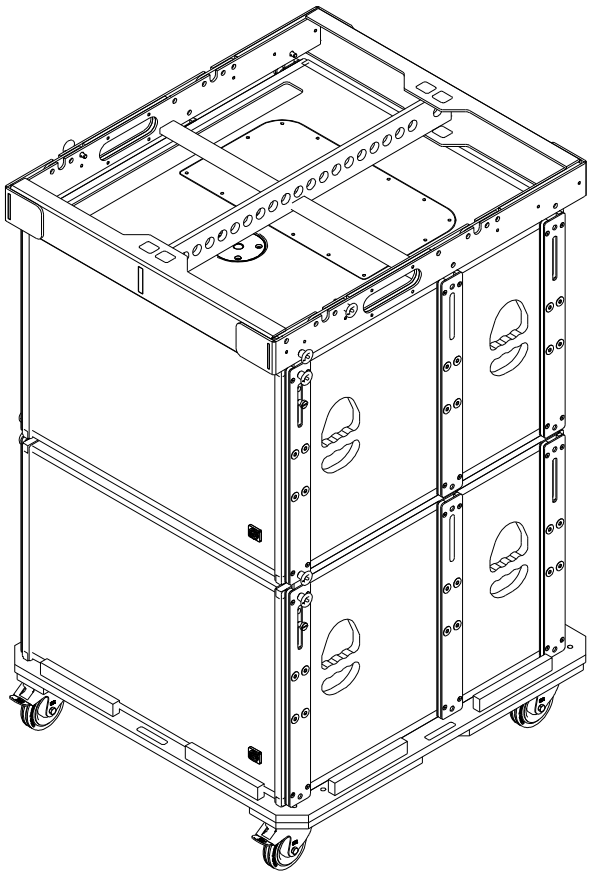


Fig. 43 TWD-18VR Wooden Dolly, 2xSW18VR and THV21-18VR grid

7.1 TWD-18VR wooden dolly dimensions

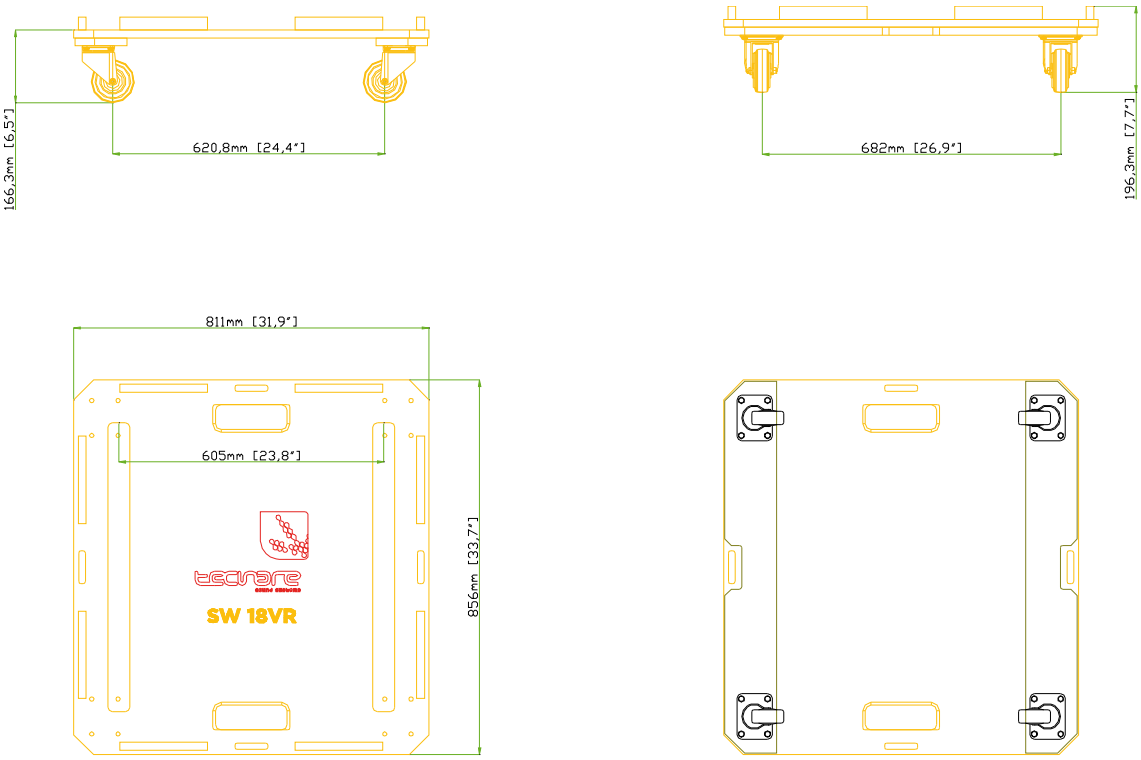


Fig. 44 TWD-18 VR Wooden Dolly dimensions

TWD-18VR Wooden Dolly Weight: 5.8 kg. (12.78lbs)

7.2 Safety guideline for the TWD21 wooden dolly

- Do not stack more than three cabinets on the TWD-18VR Wooden Dolly.
- When transporting SW-18VR stacks, pack them front-to-front or back-to-back so the rear plates do not face toward grille frames in neighboring stacks. While the CLa21 rear plate do not extend beyond the edge of the wooden dolly, rapid accelerations and stops could cause stacks to tip toward neighboring stacks, potentially damaging grille frames.
- Use straps when transporting SW-18VR and set it with loudspeakers linked and locked at 0-degree splay angles to avoid tipping.
- When groundstacking SW-18VR with the wooden dolly, make sure that all four wheels are locked to prevent the stack from rolling away.
- The wooden dolly must be removed before flying a loudspeaker array.

8 Service, Inspection & Maintenance

8.1 General Service

If all components in the Tecnare® system are used as it is described in this manual they will remain fully operational over the enclosures' life. These has been designed to withstand the most rigorous and demanding environments. However, through regular operation it may still be necessary to replace acoustical, electronic and mechanical components.

It is necessary to regularly check the following points in order to guarantee the system durability:

- The THV21-18VR, CLa21-ANGEXT, and CLa21-PULL-BACK elements (including shackles and pins) should not show any deformation, fissure, or oxidation.
- Any component incorporating a part showing signs of defect must immediately be replaced.
- The metal components of the CLa21 and SW-18VR enclosures should not show any signs of deformation, fissure, or oxidation. They must be securely fixed to the enclosures.
- Any enclosure incorporating a part showing signs of defect must immediately be put aside and withdrawn from use to be inspected by qualified service personnel.
- Verify that each pin and guide link arm operates normally by moving its mechanism and checking that it returns to nominal position.
- Verify the screwing mechanism on each shackle.

8.2 Replacement components

Service and repair work must be carried out by a Tecnare® authorized representative. Otherwise, the customer may be exposed to dangerous situations and the loss of warranty.

8.3 Contacting Tecnare

We have attempted to make this manual as thorough as possible. However, feel free to contact us with any further questions or comments for topics not covered.

Operation Questions
Tecnare Applications Support Departament
Telf: +34 91 817 01 10 – +34 91 817 10 01
E-mail: support@tecnare.com

Application information is presented for guidance only. Exel Acoustics SL reserves the right to make any necessary changes to the products and the published specifications. As part of the ongoing development program Exel Acoustics SL tries to maintain the highest degree of product compatibility.

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CLa21/SW-18VR Rigging Assembly Guide

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