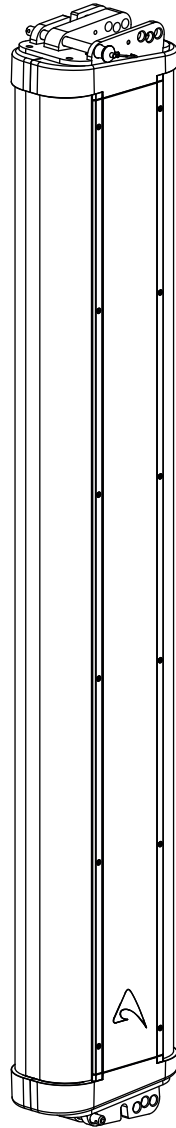




AX12C

High Output Column Array



USER MANUAL

revision 2023-08-03





IMPORTANT SAFETY INSTRUCTIONS

Watch for these symbols:



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Warning: to reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
16. Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.
17. To completely disconnect this apparatus from the ac mains, disconnect the power supply cord plug from the ac receptacle.
18. The mains plug of the power supply cord shall remain readily operable.
19. This apparatus contains potentially lethal voltages. To prevent electric shock or hazard, do not remove the chassis, input module or ac input covers. No user serviceable parts inside. Refer servicing to qualified service personnel.
20. The loudspeakers covered by this manual are not intended for high moisture outdoor environments. Moisture can damage the speaker cone and surround and cause corrosion of electrical contacts and metal parts. Avoid exposing the speakers to direct moisture.
21. Keep loudspeakers out of extended or intense direct sunlight. The driver suspension will prematurely dry out and finished surfaces may be degraded by long-term exposure to intense ultra-violet (UV) light.
22. The loudspeakers can generate considerable energy. When placed on a slippery surface such as polished wood or linoleum, the speaker may move due to its acoustical energy output.
23. Precautions should be taken to assure that the speaker does not fall off a stage or table on which it is placed.
24. The loudspeakers are easily capable of generating sound pressure levels (SPL) sufficient to cause permanent hearing damage to performers, production crew and audience members. Caution should be taken to avoid prolonged exposure to SPL in excess of 90 dB.



This marking shown on the product or its literature, indicates that it should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources. Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take this item for environmentally safe recycling. Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial wastes for disposal.



DECLARATION OF CONFORMITY



The product is in compliance with:

RoHS Directive 2011/65/EU and 2015/863/EU, WEEE Directive 2012/19/EU.



The product is in compliance with:

S.I. 2012/3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

LIMITED WARRANTY

Proel warrants all materials, workmanship and proper operation of this product for a period of two years from the original date of purchase. If any defects are found in the materials or workmanship or if the product fails to function properly during the applicable warranty period, the owner should inform about these defects the dealer or the distributor, providing receipt or invoice of date of purchase and defect detailed description. This warranty does not extend to damage resulting from improper installation, misuse, neglect or abuse. Proel S.p.A. will verify damage on returned units, and when the unit has been properly used and warranty is still valid, then the unit will be replaced or repaired. Proel S.p.A. is not responsible for any "direct damage" or "indirect damage" caused by product defectiveness.

- This unit package has been submitted to ISTA 1A integrity tests. We suggest you control the unit conditions immediately after unpacking it.
- If any damage is found, immediately advise the dealer. Keep all unit packaging parts to allow inspection.
- Proel is not responsible for any damage that occurs during shipment.
- Products are sold "delivered ex warehouse" and shipment is at charge and risk of the buyer.
- Possible damages to unit should be immediately notified to forwarder. Each complaint for package tampered with should be done within eight days from product receipt.

CONDITIONS OF USE

Proel do not accept any liability for damage caused to third parties due to improper installation, use of non-original spare parts, lack of maintenance, tampering or improper use of this product, including disregard of acceptable and applicable safety standards. Proel strongly recommends that this loudspeaker cabinet be suspended taking into consideration all current National, Federal, State and Local regulations. The product must be installed by qualified personal. Please contact the manufacturer for further information.



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INTRODUCTION

The AX12C Line Array is a passive system equipped with twelve 3.5" neodymium transducers with waterproof cones, designed for portable and permanently installed applications where high power and clarity are needed. The aluminum frame box structure ensures lightweight and strength, while the shape features a back-loaded transmission line design with clean mid-bass reproduction and natural cardioid behaviour. A Front Diffraction Waveguide (FDW) delivers wide horizontal dispersion, making the system flexible and adaptable to many different applications.

The AX12C line array module has been designed to be combined with the SW2100A, a compact and lightweight 21" and-Pass/Bass-Reflex subwoofer, powered by a high efficient CLASS D amplifier module with a new design of the power supply equipped with PFC, and PROEL's proprietary 96kHz / 40bit floating point CORE DSP. Up to four AX12C modules can be driven by one amplifier channel of the SW2100A subwoofer. The built-in CORE DSP, which can be also remotely controlled using PRONET AX software, provides 4 presets for different combinations: 2, 4 or 1 columns plus 1 user preset.

The standard system, composed of four AX12C line array modules and two SW2100A subwoofers, features 8000W of total power and a line-array dispersion pattern, making it the perfect solution for high-performance portable sound reinforcement applications. Thanks to the elegant mechanical design the AX12C can be easily transported, while the integrated suspension system makes its deployment very fast and simple. Each unit comes with two aluminum brackets and four pins that allows multiple array elements to be easily combined either together or with the matching SW2100A subwoofer, or also in combination with the complete range of mounting hardware available, including flybar and several brackets and stands.

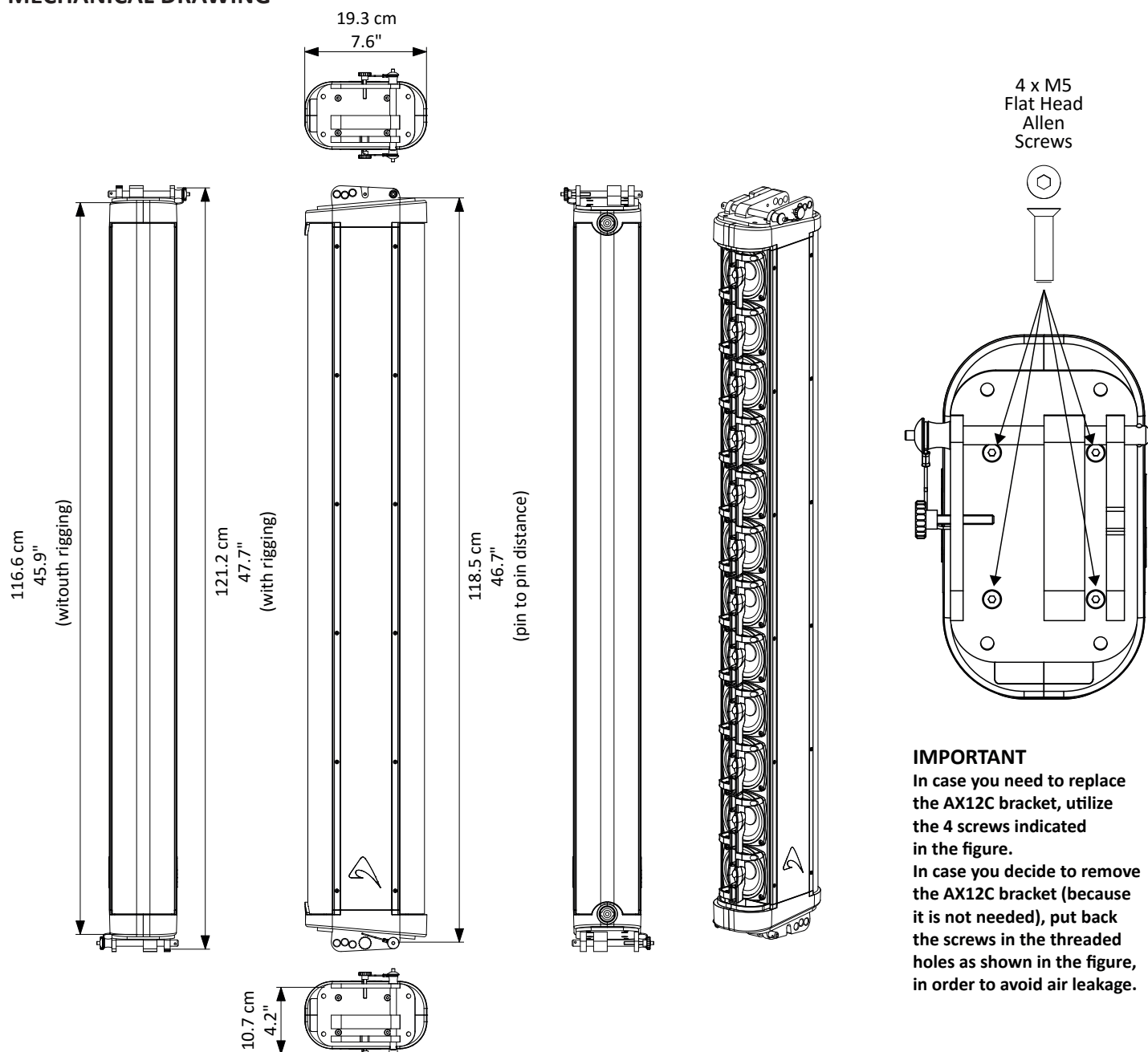
TECHNICAL SPECIFICATION

SYSTEM		INPUT CONNECTIONS	
System's Acoustic Principle	Line Array Element Short Transmission Line Back Loading Front Diffraction Waveguide	Connector Type	Neutrik® Speakon® NL4 x 2 (1+/1- signal IN & LINK ; 2+/2- thru)
Frequency Response (±3dB)	180 Hz - 16 KHz (Processed)	POWER HANDLING	
Nominal Impedance	16 Ohm	Continuous AES Pink Noise Power	360 W
Minimum Impedance	12.5 Ohm	Program Power	720 W
Horizontal Coverage Angle	100° (-6 dB)	ENCLOSURE & CONSTRUCTION	
Sensitivity (4V)	105 dB SPL @ 1m*	Width	107 mm (4.2")
Maximum (peak) SPL	130 dB SPL @ 1m*	Height	1166 mm (45.9") - without flying system 1212 mm (47.7") - with flying system
TRANSDUCERS		Depth	193 mm (7.6")
Type	12 x 3.5" (88mm) Neodymium magnet woofers, 1" (25mm) VC	Enclosure Material	Aluminum
Cone	Waterproof Cone	Paint	High resistance, water based paint, black or white finish
Voice Coil Type	Ventilated voice coil	Flying system	Aluminum Fast Link structure with dedicated pins
		Net Weight	10.9 kg / 24.0 lbs. (without flying system) 13 kg / 28.6 lbs. (with flying system)

*measured @4 m and scaled @1 m



MECHANICAL DRAWING



IMPORTANT

In case you need to replace the AX12C bracket, utilize the 4 screws indicated in the figure.

In case you decide to remove the AX12C bracket (because it is not needed), put back the screws in the threaded holes as shown in the figure, in order to avoid air leakage.

OPTIONAL ACCESSORIES

COVERAX12C	Cover / carry bag for single AX12C/AX12LF
AXCASE09	Flight case for two AX12C/AX12LF and accessories
AXCASE10	Flight case for four AX12C/AX12LF and accessories
ESO2500LU025	25 cm SPEAKON linking cable 4x4mm
NL4FXX-W-L	Neutrik Speakon® PLUG for OD 10-16mm
KPTWAX12C	Wall bracket for up to 2 units
KPTFAXC	Foam adapters for stage monitor or frontfill application

KPTFAX12C	Floor stand
KPTPOLEAX12C	Pole adapter
DHSS10M20	Sub-Speaker ø35mm 1-1.7m Pole with Handle and M20 screw
KP210S	Sub-Speaker ø35mm 0.7-1.2m Pole with M20 screw
KPTAX12C	Flybar for suspending up to 4 units
PLG716	Straight Shackle 16 mm for Fly bar

see <http://www.axiomproaudio.com> for detailed description and other available accessories.

SPARE PARTS

NL4MP	Neutrik Speakon® panel socket
94SPI10100	Locking Pin for AX12C
98TDS3WZ22	3.5" speaker - 1" VC - 22 ohm

95MET300023	AX12C front speaker net colour black
95MET300024	AX12C rear speaker net colour black
95MET300023WH	AX12C front speaker net colour white
95MET300024WH	AX12C rear speaker net colour white



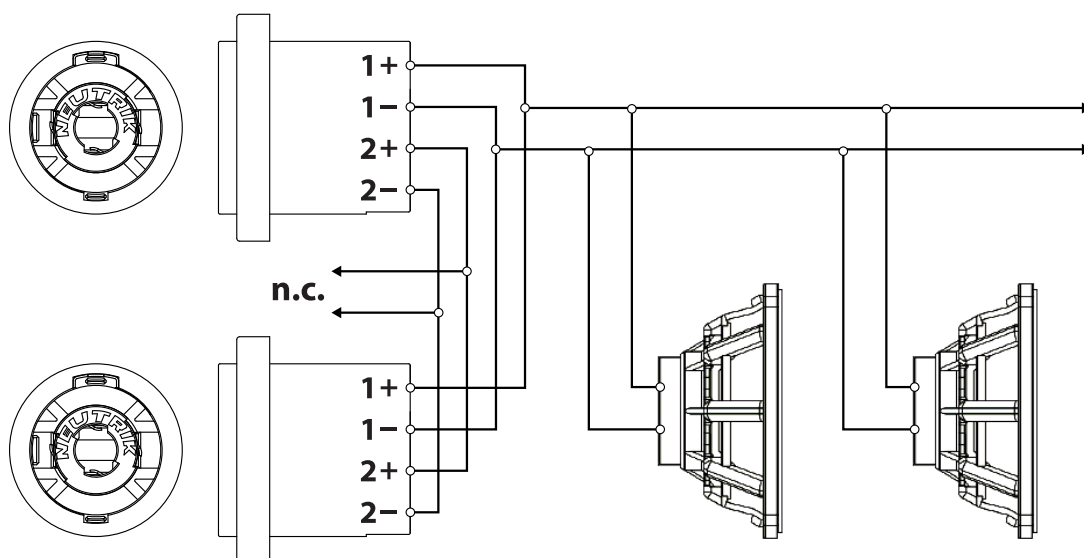
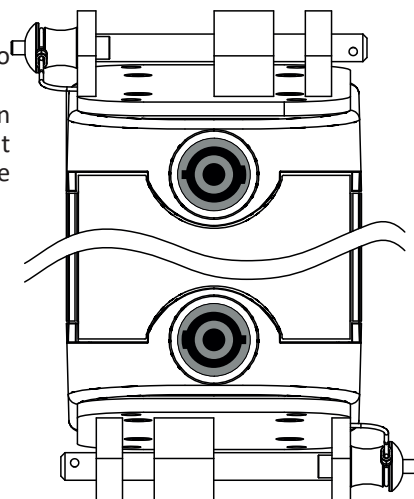


REAR PANEL - INPUT & LINK

Both connectors at the top and the bottom of the AX12C can operate as input or link, to connect an appropriated processed amplifier or to link the column to a second one.

The AX12C does not include an internal passive crossover for filtering the signal, but only an internal protection that excludes the internal speaker to protect them from excessive input power. The protection should not trip with a typical music program, but only with a massive and constant power signal, like a feedback. The connections are the following:

INPUT - LINK	
NL4 pin number	internal connection
1+	+ speakers (pass thru link speakon)
1-	- speakers (pass thru link speakon)
2+	+ no connection (pass thru link speakon)
2-	- no connection (pass thru link speakon)



WARNING: the maximum quantity of AX12C that can be linked together depends by the load capacity of the appropriate processed amplifier. When powered from the SW2100A subwoofer or from the QC2.4 suggested amplifier, a maximum of four AX12C can be connected to each power output.

TOOLS

This is a list of tools that can be useful to set properly a vertical column array system.

CABLE TESTER

It is a good practice to check all cables before each installation, because even one faulty cable can compromise heavily the system performance.

INCLINOMETER WITH LEVER

This tool can be used to verify the vertical array angle. It can be used at the top or at the bottom of the array. In this case you have to sum all splay angles, so the maximum precision is needed for aiming the vertical array, particularly for long throw applications.

LASER DISTANCE METER

This instrument can be useful to measure the height of the vertical array and to know the distance between FOH-Subs and FOH-Array for setting the delay time.

ACOUSTIC MEASUREMENT SYSTEM (SMAART, SATlive or similar)

These are useful to measure delays, phase and response of the system.



PREDICTION SOFTWARE: EASE Focus 3

To aim correctly a complete system we suggest to use always the Aiming Software - EASE Focus 3.

The EASE Focus 3 Aiming Software is a 3D Acoustic Modelling Software that serves for the configuration and modelling of Line Arrays and conventional speakers close to reality. It only considers the direct field, created by the complex addition of the sound contributions of the individual loudspeakers or array components.

The design of EASE Focus is targeted at the end user. It allows the easy and quick prediction of the array performance in a given venue. The scientific base of EASE Focus stems from EASE, the professional electro and room acoustic simulation software developed by AFMG Technologies GmbH. It is based on the EASE GLL loudspeaker data file required for its use: **AXIOM_Column_vX_X**. The GLL file contains the data that defines the Line Array with regard to its possible configurations as well as to its geometrical and acoustical properties.

Download the EASE Focus 3 app from the AXIOM website at <http://www.axiomproaudio.com/> clicking on downloads section of the product.

Use the menu option **Edit / Import System Definition File** to import the file **AXIOM_Column_vX_X** from the installation Data folder, the detailed instructions to use the program are located in the menu option **Help / User's Guide**.

Note: Some windows system can require the .NET Framework 4 that can be download from microsoft website at <http://www.microsoft.com/en-us/download/default.aspx>.



WARNING! CAREFULLY READ THE FOLLOWING INSTRUCTIONS AND CONDITION OF USE:

- This loudspeaker is designed exclusively for Professional audio applications. **The product must be installed by qualified personal only.**
- Proel strongly recommends that this loudspeaker cabinet be suspended taking into consideration all current National, Federal, State and Local regulations. Please contact the manufacturer for further information.
- Proel do not accept any liability for damage caused to third parties due to improper installation, lack of maintenance, tampering or improper use of this product, including disregard of acceptable and applicable safety standards.
- During assembly pay attention to the possible risk of crushing. Wear suitable protective clothing. Observe all instructions given on the rigging components and the loudspeaker cabinets. When chain hoists are in operation ensure that there is nobody directly underneath or in the vicinity of the load. Do not under any circumstances climb on the array.

BASIC INSTALLATION INSTRUCTIONS

Pin locking and splay angles set up

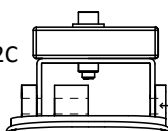
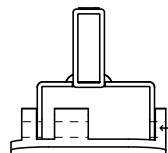
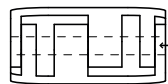
The figure below shows how to insert correctly the locking pin and how to set up the splay angle between loudspeakers.

LOCKING PIN INSERTION

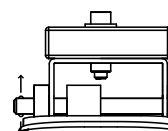
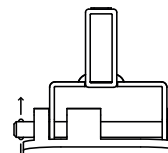
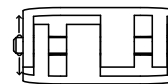
SW2100A-AX12C
and
AX12C-AX12C
locking pin

KPTAX12C-AX12C
locking pin

KPTWAX12C-AX12C
locking pin



press and
insert



release
and lock

AX12C SPLAY ANGLE SET UP

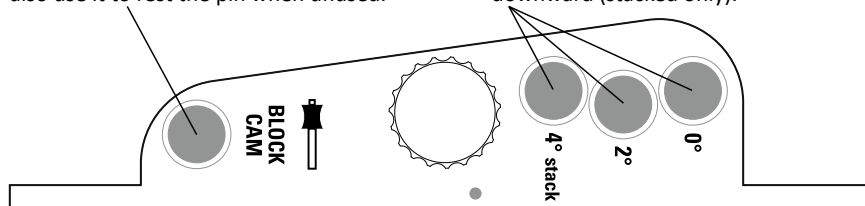
When connecting two speakers together or one speaker to an installation accessory, insert the pin in this hole first, also use it to rest the pin when unused.

Use these holes for the splay angle:

0° as no splay.

2° as normal splay angle to obtain a curved vertical array.

4° as splay angle to aim the first speaker downward (stacked only).





STACKED INSTALLATION OF AX12C USING SW2100A SUBWOOFER AS BASE



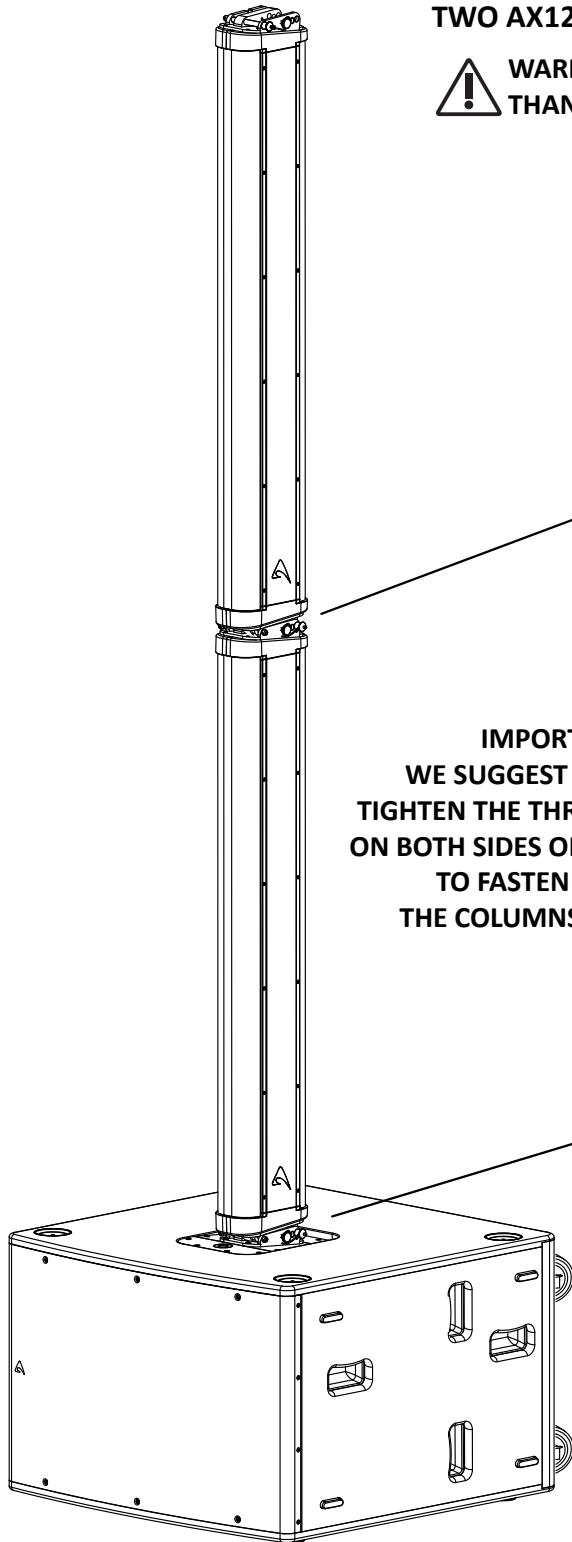
WARNING!

- The ground where the SW2100A is placed needs to be absolutely stable and compact.
- Adjust the feet so to put the SW2100A perfectly horizontal to ground. Use a spirit level to obtain the best results.
- Always secure ground stacked setups against movement and possible tipping over.
- A maximum of 2x AX12C or 4x AX6C or 1x AX12C + 2x AX6C speakers are allowed to be installed over a SW2100A serving as ground support.
- The optimal splay angles can be simulated using the EASE Focus 3 software (use KPTFAX12C as support with Z=0.51m that is the subwoofer height, note subwoofer response is not included in the simulation).

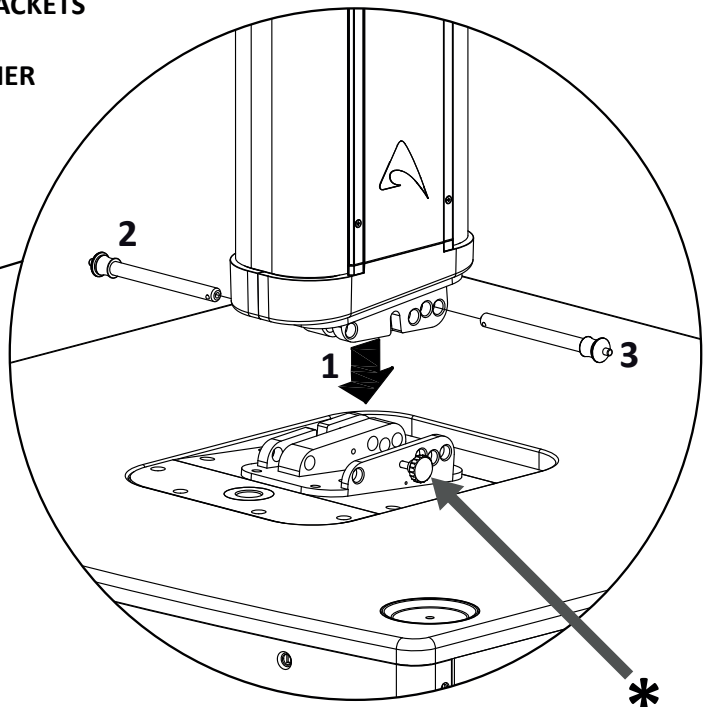
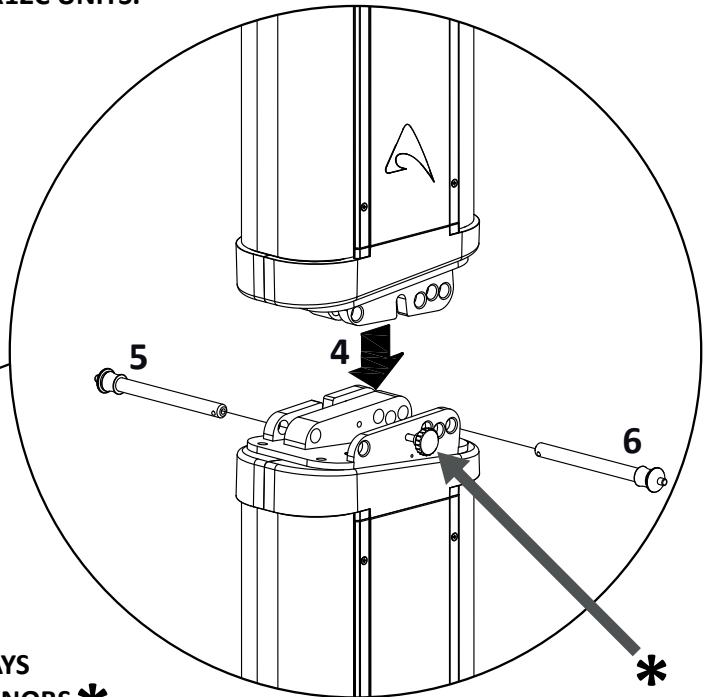
TWO AX12C STACKED ON A SW2100A



WARNING: DO NOT STACK MORE THAN TWO AX12C UNITS.

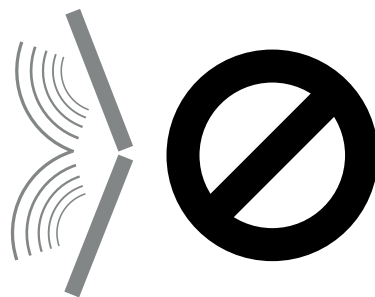
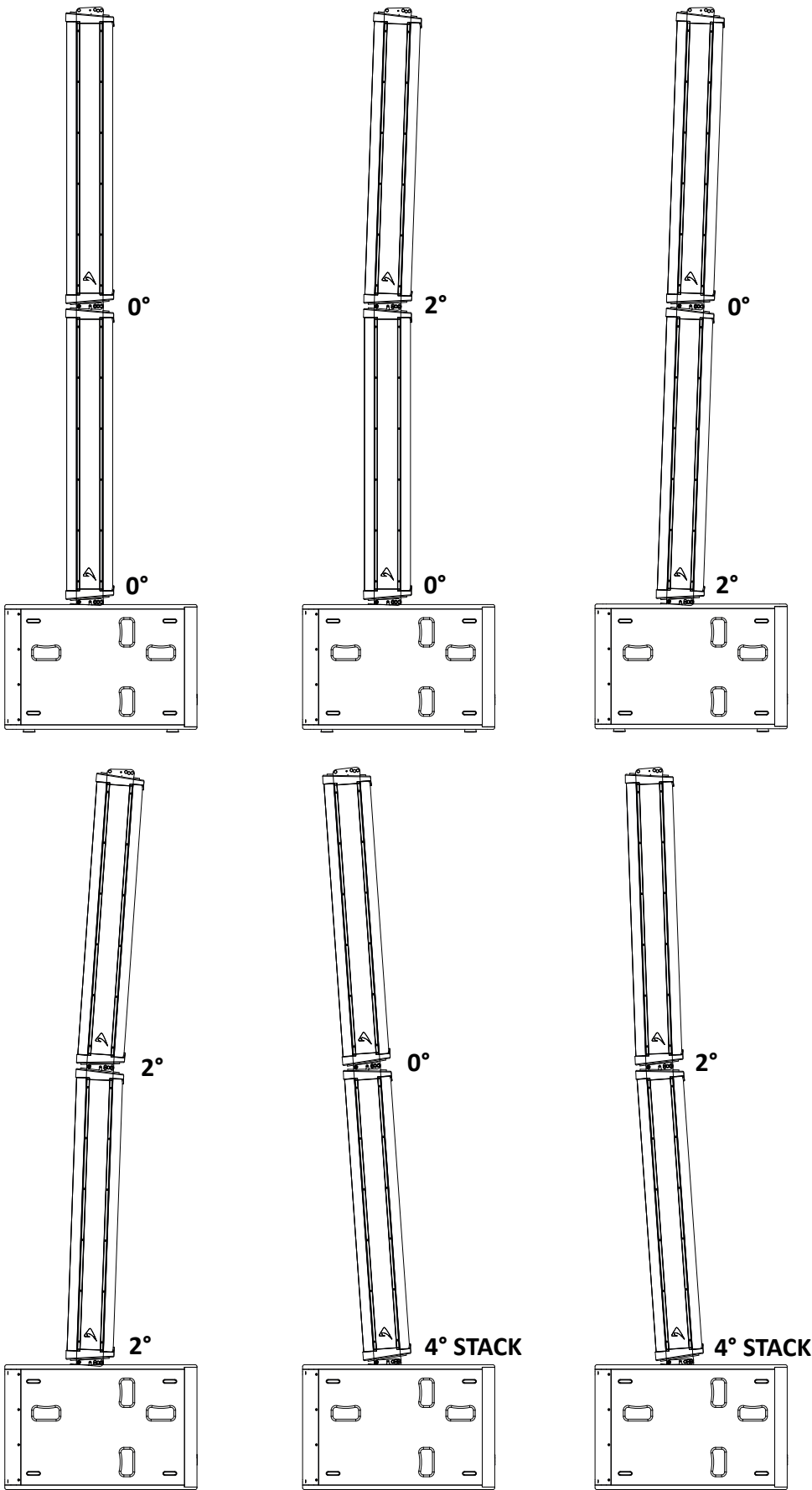


IMPORTANT:
WE SUGGEST TO ALWAYS
TIGHTEN THE THREADED KNOBS *
ON BOTH SIDES OF THE BRACKETS
TO FASTEN TIGHTLY
THE COLUMNS TOGETHER





AIMING OPTIONS OF TWO AX12C MOUNTED ON A SW2100A



IMPORTANT:
NEVER INSTALL
2 OR MORE AX12C
AIMING THE SPEAKERS
TO EACH OTHER
WITH CLOSED ANGLES.
In other words, **NEVER** use
the **4° STACK** position
between two speakers.



STACKED INSTALLATION USING KPTFAX12C FLOOR STAND



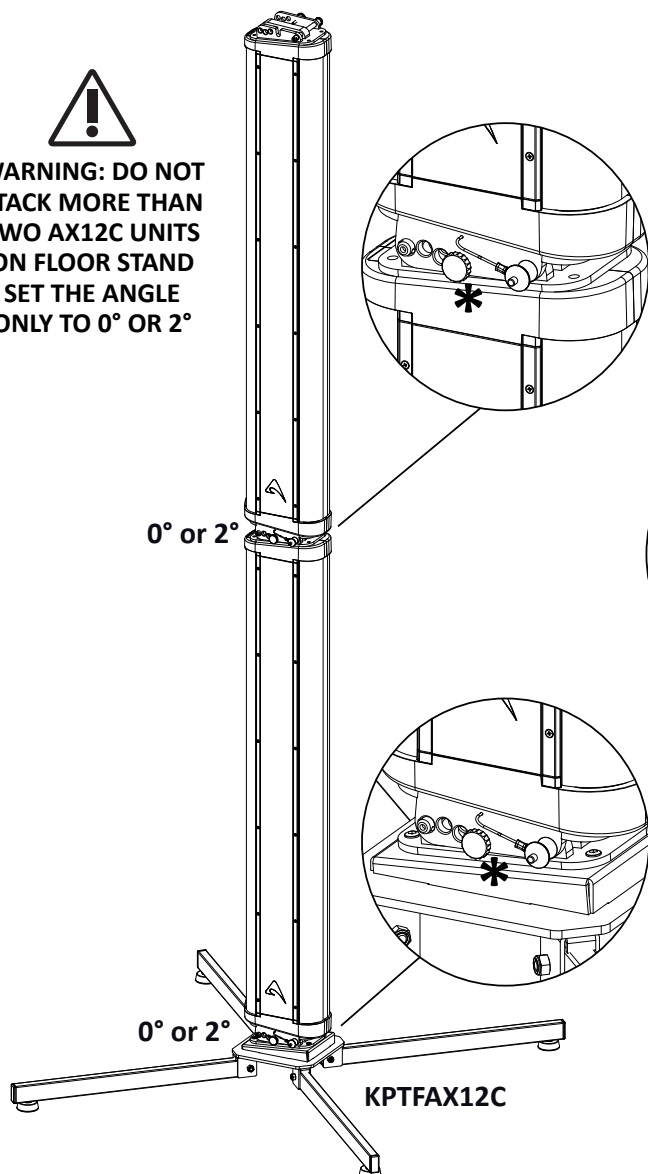
WARNING!

- The ground where the KPTFAX12C floor stand is placed needs to be absolutely stable and compact.
- Adjust the feet so to put the KPTFAX12C perfectly horizontal to ground. Use a spirit level to obtain the best result.
- Always secure ground stacked setups against movement and possible tipping over.
- A maximum of 2 x AX12C speakers are allowed to be installed over a KPTFAX12C serving as ground support.
- A maximum of 1 x AX12C cabinet is allowed to be installed over a pole.
- The optimal splay angles can be simulated using the EASE Focus 3 software.

AX12C STACKED USING KPTFAX12C FLOOR STAND



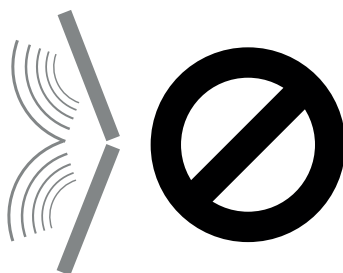
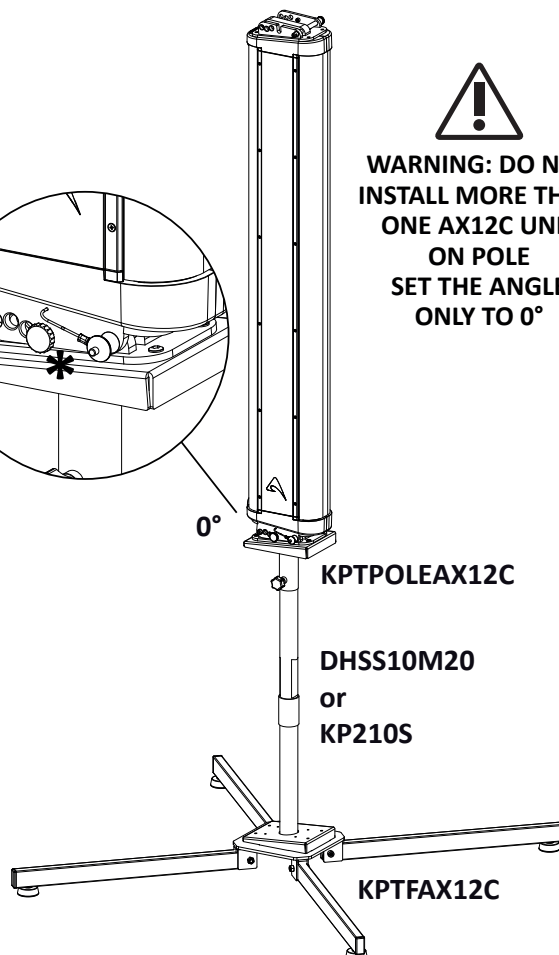
**WARNING: DO NOT
STACK MORE THAN
TWO AX12C UNITS
ON FLOOR STAND
SET THE ANGLE
ONLY TO 0° OR 2°**



**IMPORTANT: TIGHTEN TIGHT THE THREADED KNOB *
ON BOTH SIDES TO FASTEN THE BRACKETS TOGETHER**



**WARNING: DO NOT
INSTALL MORE THAN
ONE AX12C UNIT
ON POLE
SET THE ANGLE
ONLY TO 0°**



**IMPORTANT: NEVER INSTALL 2 OR MORE AX12C
AIMING THE SPEAKERS TO EACH OTHER
WITH CLOSED ANGLES.
In other words, NEVER use the 4° STACK position
between two speakers.**



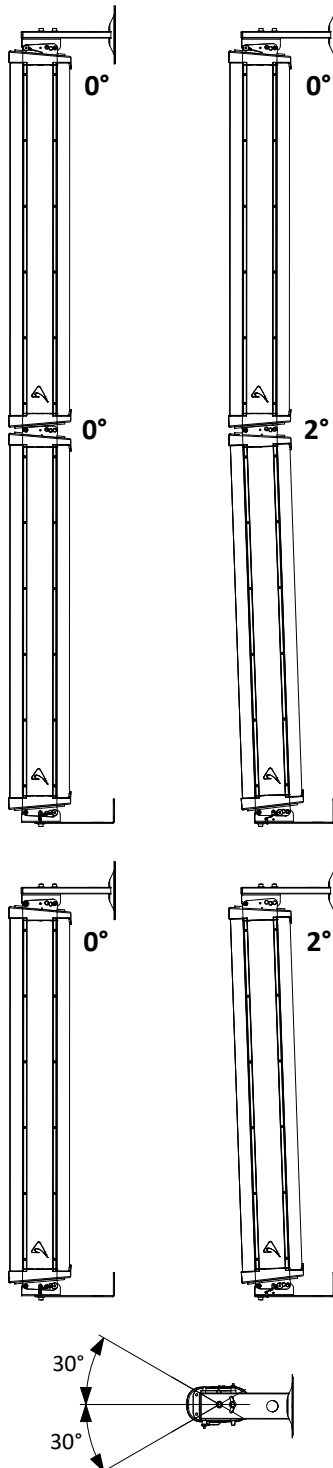
INSTALLATION USING KPTWAX12C WALL BRACKET



WARNING!

- No hardware is supplied to install the KPTWAX12C to the walls, this hardware depends on the wall structure. Use always the best hardware available taking in consideration the whole weight of loudspeakers and accessories.
- Brackets **MUST** be installed by qualified personnel in accordance with safe installation practices.
- A maximum of 2 x AX12C speakers can be installed using the KPTWAX12C wall bracket.
- The optimal splay angles can be simulated using the EASE Focus 3 software.

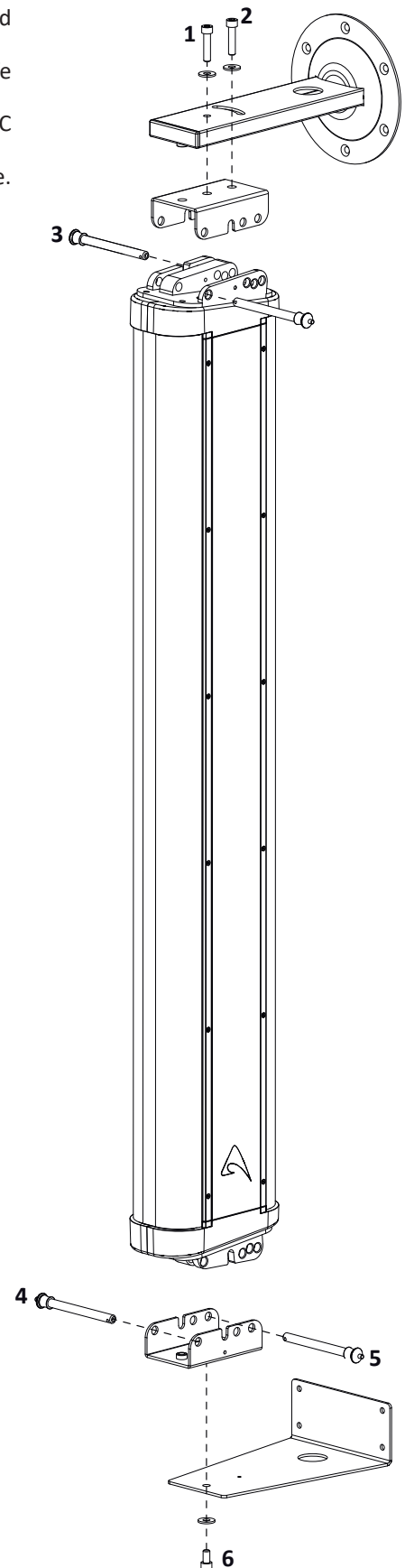
KPTWAX12C AIMING OPTIONS



KPTWAX12C MOUNTING OPERATIONS



WARNING: DO NOT INSTALL MORE THAN TWO AX12C UNITS





INSTALLATION USING KPTAX12C FLYBAR

Using the **KPTAX12C** fly bar it is possible to assemble a suspended and unobtrusive vertical array system with a variable size up to 4 elements of AX12C, or a combination of AX12C, AX6C and AX12LF without exceeding the 120Kg maximum load capacity. The loudspeakers are linked together in a column using the brackets integrated at each end of the enclosure. Each system can be set properly both acoustically and mechanically using the aiming software. Each loudspeaker box is fixed to the next one using the two locking pins. The locking pin in the front does not require any adjustment, while the locking pin in the back is used to adjust the splay angle between two adjacent loudspeakers in the array column at 0° or 2°.

Follow the sequence in the figure for fixing the flybar to the first box. Usually this is the first step before lifting up the system. Be careful to insert properly the shackle (1)(2) and the locking pins (3)(4) in the right holes specified by the aiming software.

When lifting the system always proceed gradually step by step, paying attention to secure the flybar to the box (and the box to the other boxes) before pulling up the system: this makes easier to insert properly the locking pins.

Also when the system is released down, unlock gradually the pins.

The centre of gravity of an AX12C/AX6C/AX12LF array depends on the number of units and on the splay angle between the units, when the units are arranged to make an arc for the best coverage of the audience. Use always the aiming software to define the correct suspension pinpoint where to fix the straight shackle and the optimal splay angle between units.

Note that the ideal aiming angle often doesn't correspond to the pinpoint: there is often a little difference between ideal aiming and real aiming and its value is the Delta angle: positive delta angle can be adjusted a little using two ropes, negative delta angle are self adjusted a little because the cables weights on the back of the array. With some experience it's possible to consider preventively these required little adjustments. Otherwise an additional KPTAX12C can be placed below the column array operating as a pullback bar.

During the flown set up you can connect the elements of the array to their cables. We suggest to discharge the weight of the cables from the flying pinpoint by tying them with a textile fibre rope, for this reason a ring is present at the end of the flybar that can be used to fix the cable instead of letting them hang freely: in this way the position of the array will be much more similar to the simulation produced by the software.

Wind loads

When planning an open-air event it is essential to obtain current weather and wind information. When loudspeaker arrays are flown in an open-air environment, possible wind effects must be taken into account. Wind load produces additional dynamic forces acting on the rigging components and the suspension, which may lead to a dangerous situation. If according to the forecast wind forces higher than 5 bft (29-38 Km/h) are possible, the following actions have to be taken:

- The actual on-site wind speed has to be monitored permanently. Be aware that wind speed typically increases with height above ground.
- Suspension and securing points of the array should be designed to support double the static load in order to withstand any additional dynamic forces.



WARNING!

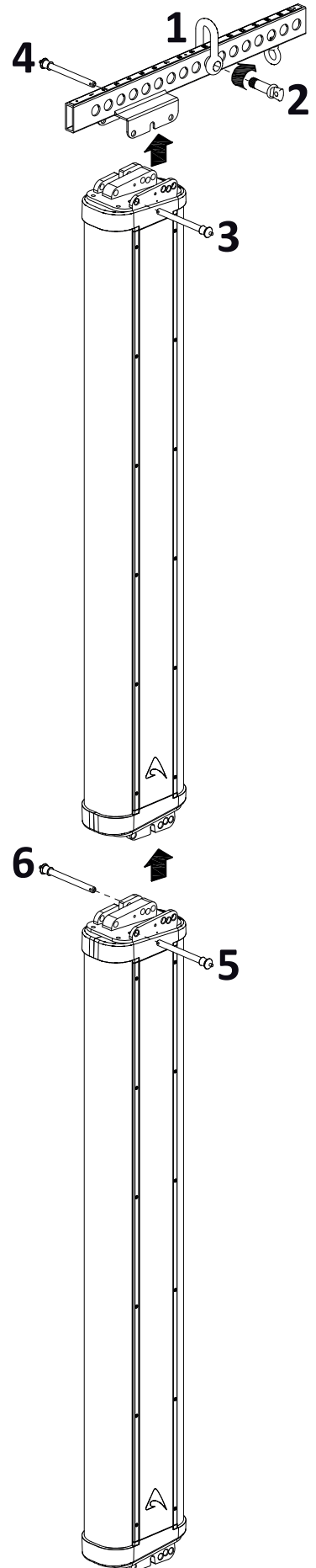
Flying loudspeakers overhead at wind forces higher than 6 bft (39-49 Km/h) is not recommended. If the wind force exceeds 7 bft (50-61 Km/h) there is a risk of mechanical damage to the components which may lead to a dangerous situation for persons in the vicinity of the flown array.

- **Stop the event and make sure that no person remains in the vicinity of the array.**
- **Lower and secure the array.**



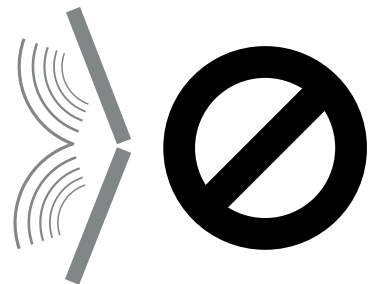
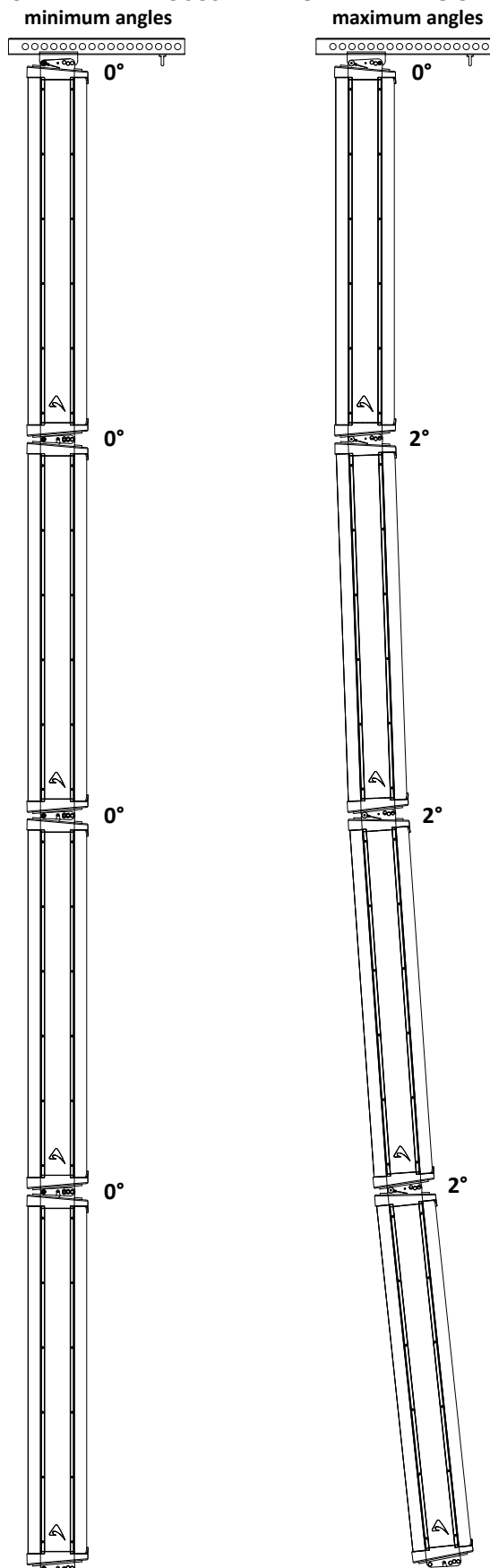
WARNING!

AX6C, AX12C and AX12LF must be suspended only using the flying bar KPTAX12C, with a maximum of 120Kg per flying bar.





AX12C AND KPTAX12C SUSPENDING AND AIMING OPTIONS



IMPORTANT:
NEVER INSTALL
2 OR MORE AX12C
AIMING THE SPEAKERS
TO EACH OTHER
WITH CLOSED ANGLES.
In other words, **NEVER** use
the 4° STACK position
between two speakers.



SYSTEM PROCESSING BASIC INSTRUCTIONS

The AX12C needs an external processor to take care of the filtering, the time alignment and the speaker protection.

USING SW1200A

When powered from the SW2100A amplifier output, the sub-woofer's CORE DSP takes care of all the processing and three different presets are available:

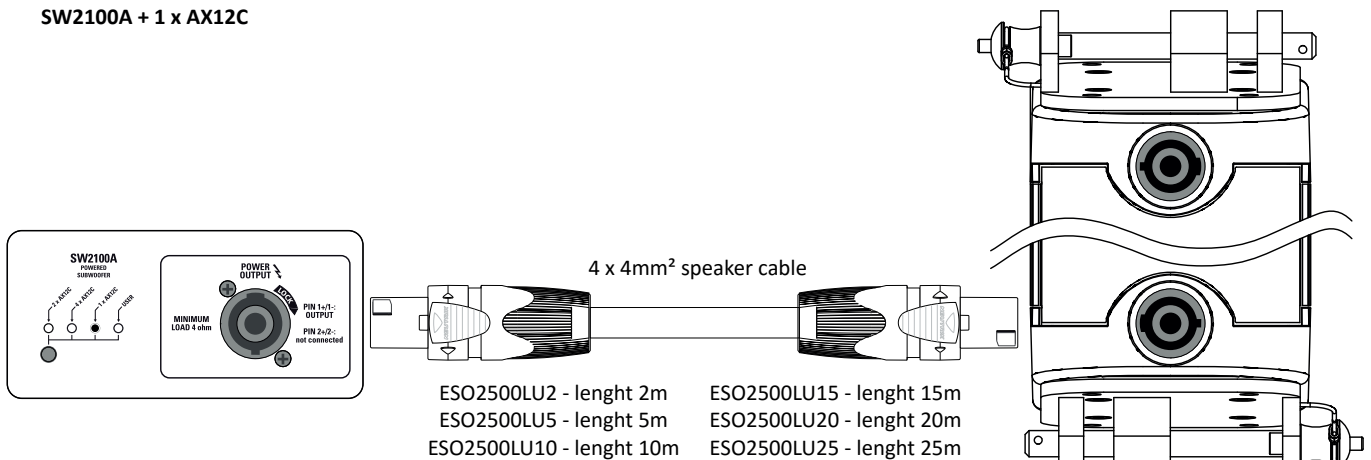
- **2 x AX12C** this PRESET should be used for: 2x AX12C, 1x AX12C + 1x AX6C, 3x AX6C, 4x AX6C column array elements.
- **4 x AX12C** this PRESET should be used for: 3x or 4x AX12C, 6x 7x or 8x AX6C, 3x AX12C + 1 or 2 AX6C column array elements.
- **1 x AX12C** this PRESET should be used for: 1x AX12C, 1x AX12C + 1x AX6C, 2x AX6C column array elements.
- **Using the PRONET AX software**, additional EQ, LEVEL and DELAY adjustment can be added to the basic presets and new presets can be saved in the SW2100A user memories.

USING QC AMPLIFIERS

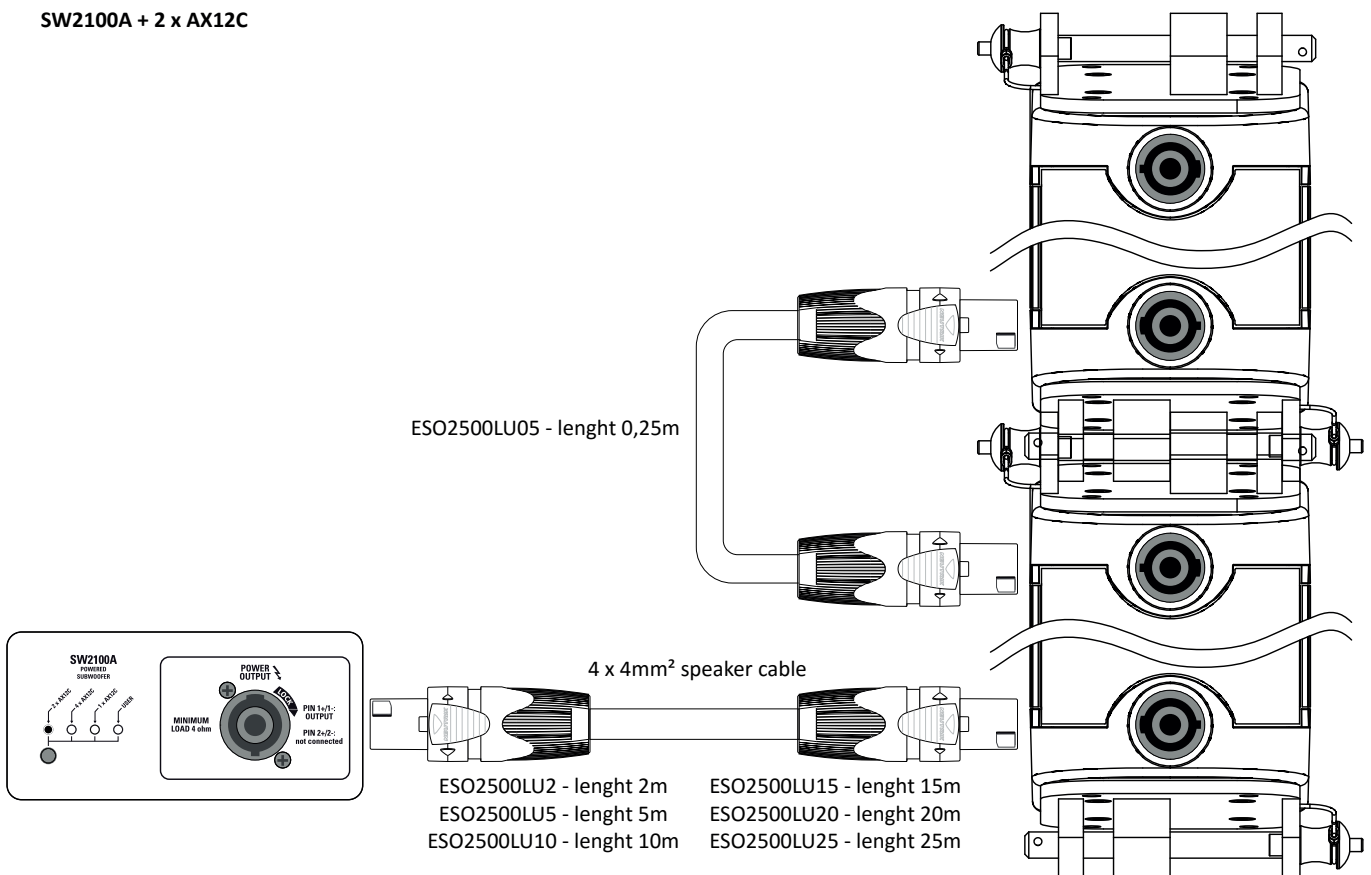
When using the QC amplifiers to power the AX6C/AX12C, the correct presets must be loaded into the amplifier's DSP memory according to the number of columns connected.

CONNECTION EXAMPLES

SW2100A + 1 x AX12C

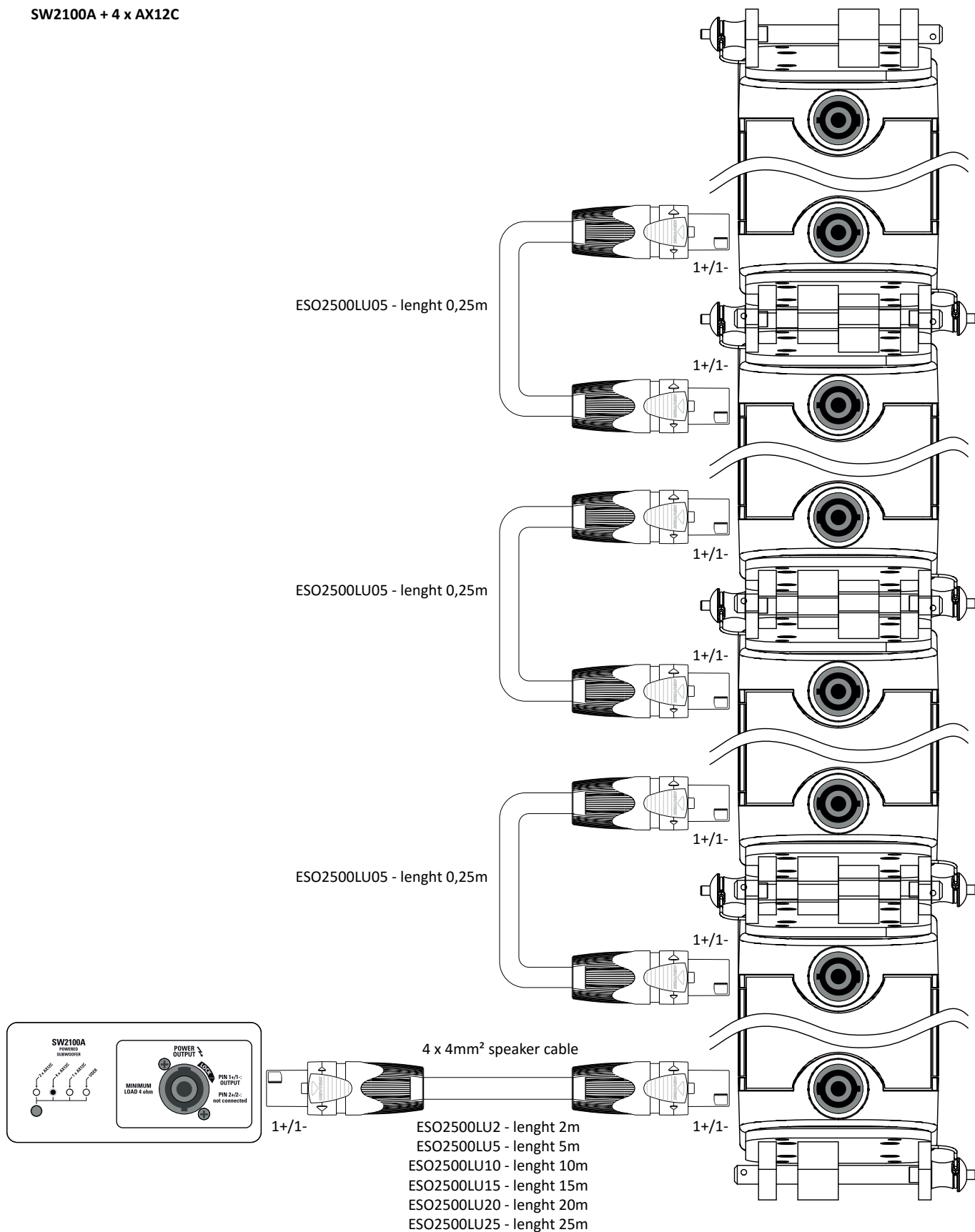


SW2100A + 2 x AX12C





SW2100A + 4 x AX12C





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