

WaveLine[®]

Line-Array-System

Safety Instructions

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GAE

(1) General safety

The precautions below are intended to prevent personal injury and damage caused by improper use or installation of GAE WaveLine speaker systems and the prevention of damage and defects on the speaker system.

Especially in the identification of passages through



you should take special attention. Read the safety instructions carefully before setting up the system for the first time or taking it into operation. Make yourself and possibly your clients with compliance with your country's accident prevention regulations familiar. Pay particular attention to the applicable regulations concerning public events and presentations.

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- ⓘ The erection and the hanging, the so-called "rigging" or "flying" of the GAE WaveLine line-array system may only be performed by qualified personnel taking into account the above-mentioned regulations. In this area of responsibility, the decision whether to use suspension suitable for the appropriate use falls. Helping people should also be trained knowledgeable in their work. All the assembly and disassembly involved persons should be in the range of calling and hearing.
 - ⓘ Subjecting all components of a visual inspection ahead and during the build-up of the system. Defective parts must be replaced. If doubt about the functionality of components exists, the parts must not be used. Appropriate maintenance information can be found in chapter (5) of this Safety Instructions.
 - ⓘ In the operation of chain hoists, lifting equipment or the moving of loads nobody should be in the immediate danger area.
 - ⓘ An array must never be used as a climbing aid. All system components (flying-cradle, speaker, stack-cradle, possibly lower terminal fittings such as shackles, chains or the like may be used as system components in the narrowest sense of it's original intended purpose.

(3) Installation instructions

GAE WaveLine elements are usually transported in flight cases to 3 pieces each. These 3 elements are maintained upright within the flight case and are not pre-curved (0° angle). At other angle settings the flight case can not be closed.

Note that the hat of the flight case can be placed in only one direction. A marking device fitted to flight case base and cover facilitates correct choice of alignment.

The interior of the supporting flight case also allows a horizontal lying down on the back of the case. Placed at the left or right side the filled cases should not be transported.

 When transporting, rolling or tipping mind the heavy weight of the filled flight cases of about 200kgs. Provide adequate transportation safety and make sure that accidental breaking or unintentional tilting of the flight cases is avoided when moving on ramps or uneven surfaces. Risk of injury!

(3.1) Assembly of WaveLine elements with each other

The integrated flight mechanics allow a simple assembly of WaveLine elements with each other and the combination with flying and stand cradle. Take into account the following procedure codes:

The installation should be performed by **two** trained persons.

A single element is mounted in the following steps:



Load the first element to be mounted flush with the rear edge to the lower element.

A person uses the side handles to the orientation of the element, while a second person holds the element slightly raised at the front bar handles.



Now the front connection mechanism can be lowered without tilting. The mechanisms must be inserted precisely into each other. Make sure that the pins and forks are free of dirt.

⚠ Note that no helping hands or their fingers remain between the elements! Each item weights 50kgs and can cause serious injuries to limbs that are located between the elements due to the high accuracy of fit of the bearing surface when lowering.



Lock the front flight mechanics on both sides with the corresponding ball lock pins. By pressing the centric button the securing of balls is released and the pin fits into the bore.

The ball lock pins must be fully inserted and flush against the mechanics surface, the release button must be completely jumped back. The disengaging of the locking balls can be checked visually.



The elements are now at flush. Now remove the upper in the park position located ball lock pin of the lower element. You can store them in the handle of the upper element.

Now remove the upper in the park position located ball lock pin and lock the upper element swung out linking sword. This enables the mounting of the lower linking sword in the next step.



While the second person holds the element in the raised position, the first person can swing out the lower linking sword.

Make sure that the linking swords and mechanisms are free of dirt.



⚠ At this situation coordinate yourself with the helping person unmistakably. Accidental or premature lowering of the element can cause serious injury to hands and fingers of the adjusting person! Only when the ball lock pin is securely

locked on your side or the descent range is not touched, the second person may lower the element.

Now the linking sword can be inserted into the upper mechanism and locked in the desired angular position by inserting the ball lock pin.

The value of the desired angle can be selected visually by the attached numbers of degrees.



If the upper linking sword is not swung out, only the 0° position can be chosen. This can simplify and accelerate the dismantling within the flight case.

Lock the back flight mechanics on both sides with the corresponding ball lock pins. By pressing the centric button the securing of balls is released and the pin fits into the bore.

The ball lock pins must be fully inserted and flush against the mechanics surface, the release button must be completely jumped back. The disengaging of the locking balls can be checked visually.

Finally check that all 4 ball lock pins are inserted correctly and activated.

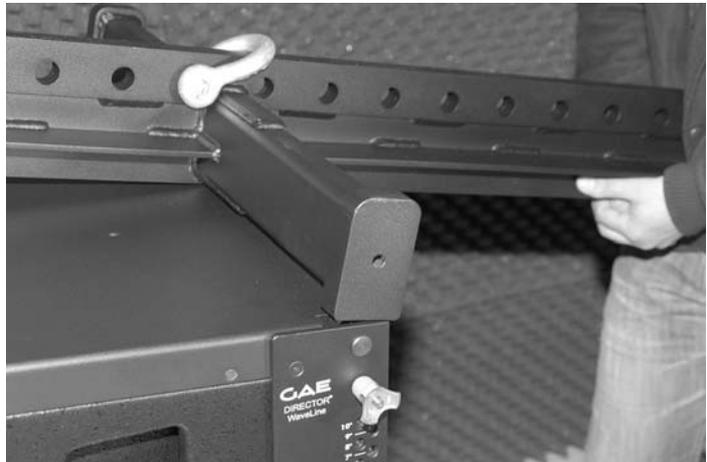
i Raising of WaveLine elements with less than 4 locked ball lock pins poses a significant security risk and should definitely be avoided. If a lift is done with missing ball lock pin(s), immediately the load must be lowered down and the mechanics have to be checked for damage such as expansion, bending or cracking. In case of doubt, the affected elements must not be used! (See also Chapter (5).)

(3.2) Installation of the Flying Cradle

The integrated flight mechanics allow a simple assembly of WaveLine elements to the flying cradle. Take into account the following procedure codes:

Again, the installation should be performed by **two** trained persons.

The flying cradle is first applied with the rear traverse to the rear mechanics of the upper to be flown element. The second person holds the front traverse of the flying cradle slightly up.



Now the front connection mechanism can be lowered without tilting. The mechanisms must be inserted precisely into each other. Make sure that the pins and forks are free of dirt.



Lock the front flight mechanics on both sides with the corresponding ball lock pins. By pressing the centric button the securing of balls is released and the pin fits into the bore.



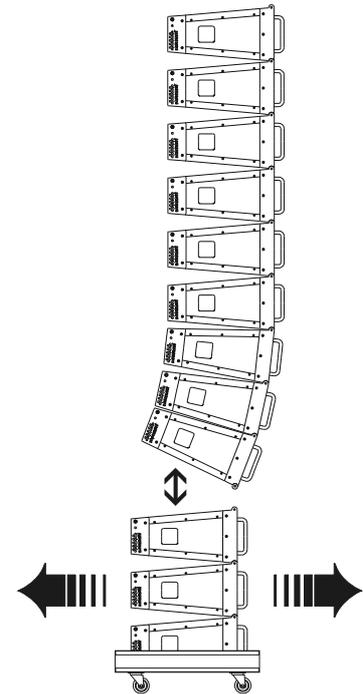
The ball lock pins must be fully inserted and flush against the mechanics surface, the release button must be completely jumped back. The disengaging of the locking balls can be checked visually.

(3.3) Assembly of WaveLine clusters

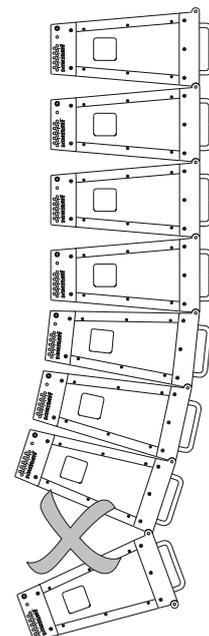
In the manner as described in Section 3.1 clusters of 3 elements can be prepared within a flight cases for instant rigging. When connecting such clusters of elements be prepared to proceed as follows:

The pre-adjusted cluster in a flight case base is moved under an already raised grouping. Now the flown grouping is lowered slowly and with great care until the front pins of the lowest flown element can be inserted. Avoid tilting the forks of the flight mechanics of the upper stationary cluster element. After locking the front ball lock pins the flying grouping can be lowered with utmost caution furthermore until the rear linking swords corresponding to the desired angular position can be locked.

 When the complete cluster starts to be raised, exercise extreme caution since the entire unit can swing to an unforeseen direction by the change of the load spreading. Such an uncontrolled movement may be suppressed in fixing the **lateral** handles by 2 assisting persons. If the unit is stabilized by the side, the assisting persons will not be within a straight danger area of a pendulum motion. A stay in the immediate vicinity in front or behind the entire unit is to be avoided. Particular attention should be paid to a preferably slow and smooth raising of the total load.



At a large number of elements and a sharply adjusted curving angle, it may be necessary to assemble further elements individually. In this case, sufficient helping persons must be available to support these mounting activities and to provide a safe holding and adjustment process. In case elements should be added to an already sharply curved line-array cluster in this way, do definitely avoid any overstretching of the front mechanics into a negative angle sector.



(3.4) Assembly of WaveLine elements on the Stack-Cradle

ⓘ Preparing the WaveLine stack-cradle ensure a stable and level ground that is suitable for a corresponding load. Small irregularities can be compensated by the to the rear ends attached spindles. If necessary a suitable water level adjustment should be used. The finally leveled spindles should be countered by using the wing nuts to prevent misalignment due to vibration.

The bottom outrigger can be removed from the inner frames of the stack-cradle by loosening the side hex screws. Now, the inner support frame can be placed on bass systems. An adaptation of the frame to different housing shapes can be made by two threaded rods, which can be turned to a suitable length and fixed by means of lock nuts. If GAE-bass systems are used, the mounting frame can be additionally secured with attached rubber feet into recesses (footprints) provided on the top of the bass housing. These rubber feet can be positioned at different positions. Check to see which position the rubber feet allow a secure and level support for your application.

ⓘ The number of possible erected WaveLine elements on a stack-cradle depends on a stable base and a secured environment situation. Thus, for extreme "curving" of several elements, the overall center of gravity is precisely to be determined in order to avoid a tilting over safely. When setting up the stack-cradle on a bass system, the number of elements mounted should be limited to **3** units.

The integrated flight mechanics allow a simple assembly of WaveLine elements on the stack-cradle. Take into account the following procedure codes:

Again, the installation should be performed by **two** trained persons.

Swing out the linking swords of the stack-cradle to the back. Load the first element to be mounted flush with the rear edge to the stack-cradle.



Now the front connection mechanism can be lowered without tilting. The mechanisms must be inserted precisely into each other. Make sure that the pins and forks are free of dirt.

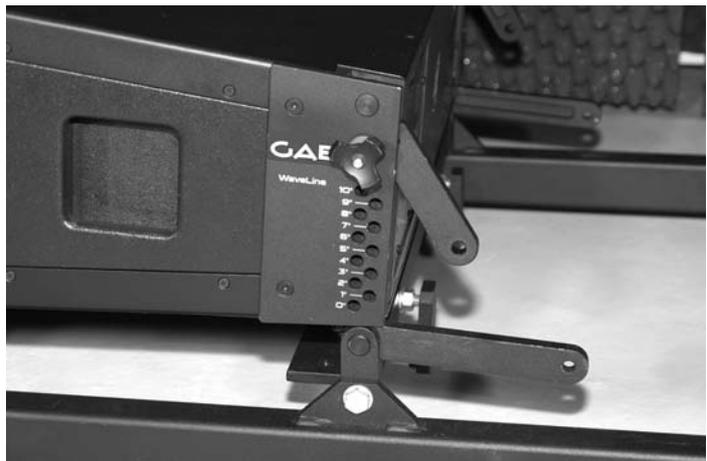


Lock the front flight mechanics on both sides with the corresponding ball lock pins. By pressing the centric button the securing of balls is released and the pin fits into the bore.



The ball lock pins must be fully inserted and flush against the mechanics surface, the release button must be completely jumped back. The disengaging of the locking balls can be checked visually.

Now remove the upper in the park position located ball lock pin and lock the upper element swung out linking sword. This enables the mounting of the lower linking sword in the next step.



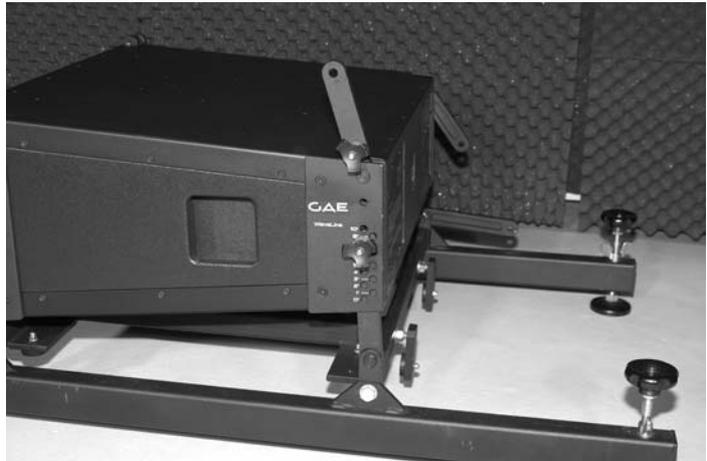
Make sure that the linking swords and mechanisms are free of dirt.

While the second person holds the element in the raised position, the first person can lock the linking sword at the desired angular position by inserting the ball lock pin. The value of the desired angle can be selected visually by the attached numbers of degrees.



Lock the rear flight mechanics on both sides with the corresponding ball lock pins. By pressing the centric button the securing of balls is released and the pin fits into the bore.

If it is not possible to insert a last rear bolt, the stack-cradle may be leveled by means of the adjusting spindle at the end of the outrigger, so that a deformation is compensated for and the bolt can be finally fixed.

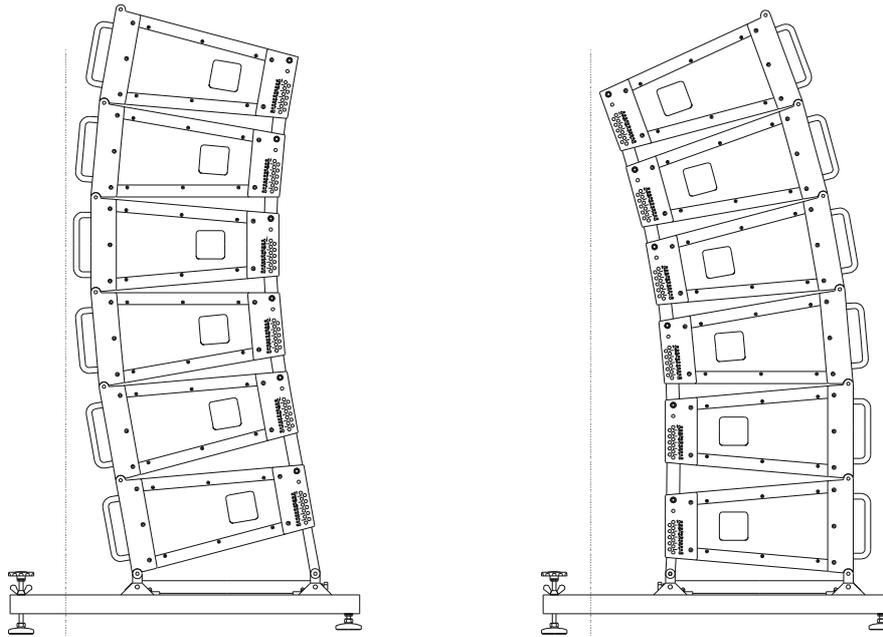


The ball lock pins must be fully inserted and flush against the mechanics surface, the release button must be completely jumped back. The disengaging of the locking balls can be checked visually.

Finally check that all 4 ball lock pins are inserted correctly and activated.

i Note that the desired angle selection is inverted to the printed numbers of degrees during assembly on the stack-cradle. At a setting of 10° , the first element is perpendicular to the stack-cradle, at a setting of 0° , the front element tends to 10° forward.

The ability to tilt forward requires an important consideration in the overall center of gravity! If necessary the outriggers must be mounted rotated by 180° , so that the center of gravity is certainly supported.



The further assembly of elements is as in (3.1).

(3.5) General installation instructions

To ensure that all mounting elements can be put together precisely, a compromise between tolerance and clearance was disposed for the construction of the components. It is found in practice that this compromise is suitable for easy handling.

In case it occurs as very difficult to move the ball lock pin as locking element at the assembly and disassembly of the components, it is usually sufficient to lift slightly the opposite corner of the element by hand to exploit the clearance and tolerance for an easy mounting or demounting.

 It is strongly discouraged from a single-person operation in assembly and disassembly of the WaveLine system. Do not underestimate the total weight and the force moments occurring while lifting or erecting the system.

(4) Safety at outdoor events („Open-Air“)

i If the Waveline system is used at an outdoor event, you should remind additional dynamic loads expected by wind influence. Strong wind situation can lead to dangerous situations. Current wind and weather data must therefore be carefully taken into account when planning an outdoor event. An evaluation of the wind speed is possible in first approximation on the Beaufort scale [bft].

- An evaluation of the wind situation should be done based on reliable and authorized weather data of your country. In case of expected wind speeds of more than 5bft (8 to 10.7 m/s or 28.6 to 38.8 km/h "fresh breeze") the prevailing local wind speed must be continuously monitored. It should be noted that the wind speed increases with height. Rigging and safety points must be such that these can be able to resist unpredictable occurring forces, but at least withstand twice of the static load.
- At wind speeds equal or more than 6bft (10.8-13.8 m/s or 38.9 to 49.8 km/h "strong breeze") it is generally not recommended to use a line-array flown over the audience.
- If a wind speed of 8bft (17.2 to 20.7 m/s or 61.8 to 74.6 km/h "gale, fresh gale") is reached or exceeded, there is immediate danger to persons, who are in the vicinity of the flown line-array. Cancel the event and make sure that there are no persons in the immediate vicinity of the array. Take the array down to the ground.

Beaufort-Scale [bft]

bft	m/s	km/h	description	effect
0	0-0,2	0-0,8	calm	Calm. Smoke rises vertically.
1	0,3-1,5	0,9-5,5	light air	Smoke drift indicates wind direction. Leaves and wind vanes are stationary.
2	1,6-3,3	5,6-12,1	light breeze	Wind felt on exposed skin. Leaves rustle. Wind vanes begin to move.
3	3,4-5,4	12,2-19,6	gentle breeze	Leaves and small twigs constantly moving, light flags extended.
4	5,5-7,9	19,7-28,5	moderate breeze	Dust and loose paper raised. Small branches begin to move.
5	8,0-10,7	28,6-38,8	fresh breeze	Branches of a moderate size move. Small trees in leaf begin to sway.
6	10,8-13,8	38,9-49,8	strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic bins tip over.
7	13,9-17,1	49,9-61,7	high wind, moderate gale, near gale	Whole trees in motion. Effort needed to walk against the wind.
8	17,2-20,7	61,8-74,6	gale, fresh gale	Some twigs broken from trees. Cars veer on road. Progress on foot is seriously impeded.
9	20,8-24,4	74,7-88,0	strong gale	Some branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over.
10	24,5-28,4	88,1-102,4	storm, whole gale	Trees are broken off or uprooted, structural damage likely.
11	28,5-32,6	102,5-117,0	violent storm	Widespread vegetation and structural damage likely.
12	> 32,6	>117,0	hurricane force	Severe widespread damage to vegetation and structures. Debris and unsecured objects are hurled about.

(5) Maintenance information

(5.1) Steel, Mechanics, Rust (corrosion)

WaveLine flight mechanics are made of a special steel and coated against corrosion. Provided by rough usage bare spots occur on the mechanics, scratches can be covered by some black paint. In the area of all holes first signs of flash rust should be discouraged from corrosion at regular intervals by suitable spray oil.

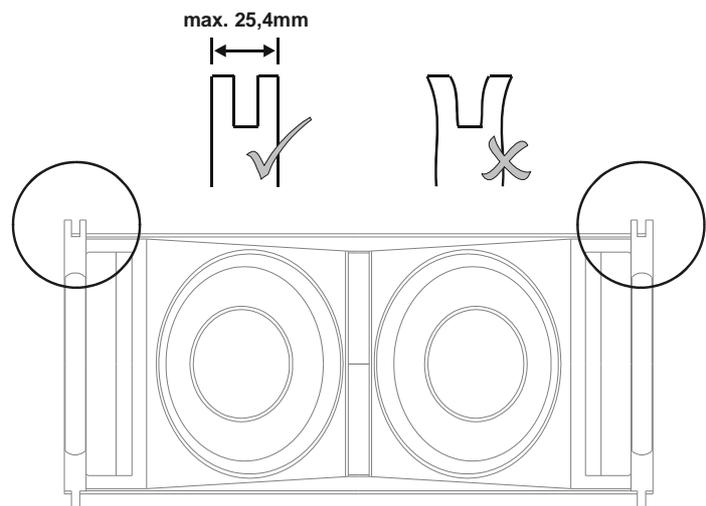
❗ No defective mechanism may be replaced by non-GAE-shared mechanics! This also applies to the linking swords.

(5.2) Bending, expansion of forks, twisting of linking swords

Bending the forks and pins of the flight mechanics must be avoided, otherwise the secure position of the ball lock pin is no longer guaranteed. Provided that the locking balls of the ball lock pin are not disengaged, this may possibly involve an expansion of the upper fork.

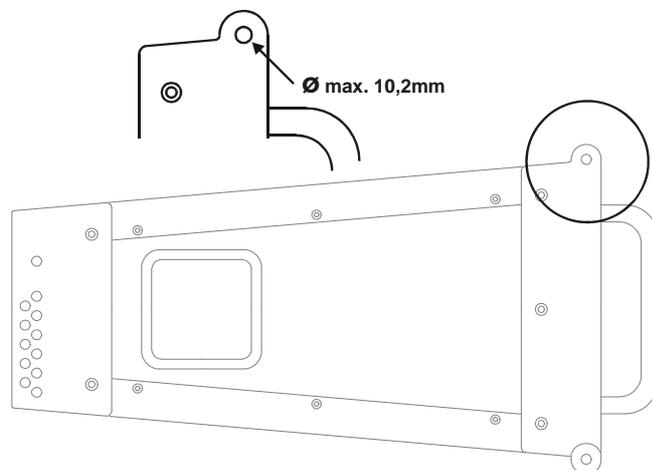
If the linking swords of the rear flight mechanics can not be folded into the guard position, they may be distorted by unbalanced load or twisted.

Bent mechanics may not be straightened, but must be replaced with new original parts.



(5.3) Hole diameter

The hole diameter of the upper fork is particularly crucial for the safe interlocking of ball lock pins. This must not exceed 10.2 mm.



(5.4) Exchange of linking swords, locking rings

i In case of damage or loss of the bolts used for the fixed assembly of linking swords, these must be replaced only by GAE bolts. The applied locking rings are not allowed to be used a second time. It is basically to use a new locking ring when refitting.

(5.5) Ball lock pins

i Defective ball lock pin, whose release mechanism jams or its visual appearance indicates significant wear or defect (cracks, dents, bending), must be replaced by ball lock pins of the same type! These can be obtained from GAE.

✶ In case of defect or loss ball lock pins must never be replaced by screws or other bolts of unknown quality or firmness!