El colgado del equipo sólo debe realizarse utilizando los herrajes de colgado recomendados y por personal cualificado. No cuelgue la caja de las asas.

The appliance should be flown only from the rigging points and by qualified personnel. Do not suspend the box from the handles.
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**Warning**

This manual offers all the necessary information for flying DAS Audio systems. To any operations related to flying a system, read the present document first and act on the warnings and advice given. The goal is to allow the user to become familiar with the mechanical elements required to fly the acoustic system, as well as the safety measures to be taken during set-up and teardown.

Only experienced installers with adequate knowledge of the equipment and local safety regulations should fly speaker boxes. It is the user’s responsibility to ensure that the systems to be flown (including flying accessories) comply with state and local regulations.

The working load limits in this manual are the results of tests by independent laboratories. It is the user’s responsibility to follow and comply with safety factors, resistance values, periodical supervisions and warnings given in this manual. Product improvement by means of research and development is on going at DAS Audio Specifications are subject to change without notice.

It is common practice to apply 5:1 safety factors for enclosures and static elements. For slings and elements exposed to material fatigue due to friction and load variation the following ratios must be met; 5:1 for steel cable slings; 4:1 for steel chain slings and 7:1 for polyester slings. Thus, an element with a breaking load limit of 1000 kg may be statically loaded with 200 kg (5:1 safety factor) and dynamically loaded with 142 kg (7:1 safety factor).

When a system is flying, the working load must be lower than the resistance of each individual flying point in the enclosure, as well as each box. Hanging hardware should be regularly inspected and suspect units replaced if in doubt. This is important to avoid injury and absolutely no risks should be taken in this respect. It is highly recommended that you implement an inspection and maintenance program on flying elements, including reports to be filled out by the personnel that will carry out the inspections. Local regulations may exist that, in case of accident, may require you to prevent evidence of inspection reports and corrective actions after defects were found.

**Absolutely no risks should be taken with regards to public safety.**

When flying enclosures from ceiling support structures, extreme care should be taken to assure the load bearing capabilities of the structures so that the installation is absolutely safe. Do not fly enclosures from unsafe structures. Consult a certified professional if needed. All flying accessories that are not supplied by DAS Audio are the user’s responsibility. Use at your own risk.
Three or four units groups are easy to transport by truck as we will see in this section. We will also see the preparation.

Remove the front **PL-40** pushing the triggers at the same time. **Hold the carriage before acting on the triggers.** The triggers are situated on both sides of the enclosure.

This will be the first enclosure that we will stack onto the **PL-40S**.

If we look at the platform we will see the two security pins on the sides (see figure).

These pins allow to hold the first enclosure to the platform.

---

**PL-40S**

Security pins on the **PL-40S** platform side.

Rear part of the **PL-40S** platform.

Front part of the **PL-40S** platform.

Side view of the **PL-40S** platform.

Security pins of the **PL-40S** platform.

Front view of the **PL-40S** platform.
Lift the enclosure by the handles and sit it gently over the platform.

Remove the security pins and hold with them the enclosure.

Warning: For transport, introduce the pin in hole 0° at “Rear Link”.

Check that the four security pins are well positioned.

Final mounting of one enclosure on a PL-40S platform.
Let's add another enclosure over the previous.

We need to look at the side controls of the enclosure and act on them like in the figure.

The hidden front and the rear rods on the side will appear.

The front rod will fix in its position while the rear one can move freely.

To fix its position in 0° (position for transport), we will put one of the security pins in the hole "FIX ANGLE" like in the figure.

The side control has arrows which mark the selected angle, in this case 0°.

The result, platform included, can be seen in the figures below.

Figure of the enclosure on the platform PL-405 with the rods ready to add another enclosure over it.
Lift the second enclosure and place it over the first enclosure gently.

Remove the security pins on the sides of the enclosure and hold the enclosure with them.

**Warning:** For transport, introduce the pin in hole 0° at “Rear Link”.

Check that the four security pins are well positioned.

Figures show final mounting of two enclosures on a PL-40S platform (side views).
Lift the third enclosure and place it over the second one gently.

Repeat the process described before.

**Warning:** For transport, introduce the pin in hole 0º at “Rear Link”.

Check that the four security pins are well positioned.

You can see the final result in the next figure.
Lift the fourth enclosure and place it gently over the third enclosure.

Repeat the process described before.

**Warning:** For transport, introduce the pin in hole 0º at “Rear Link”.

Never carry more than four enclosures on the platform.

Check that the four security pins are well positioned.

You can see the result in the next figure.
ARRAY MOUNTING OF GROUPS OF 4 UNITS ON A PL-40S

The groups of 3 or 4 units are easy to transport by truck.

Let's see in this section how to mount an array of four units.

Firstly, mount the AX-AE40S3 onto the top box.

To mount the AX-AE40S3 take out the rods of the top unit.
See the result in the right figure.

Next, place the side pieces of the AX-AE40S3 introducing the security pin like in the figure below.

Check that the security pins are well positioned because they will support the weight of the rest of the enclosures.
With the help of the *Ease Focus* program we can determine which point is the correct one to join the side pieces with the bar of *AX-AE40S3*, with the help of the security pins.

If we use two lift motors, we will use a second *PICKUP-AX-AE40S3* which joins through the same way to the pinpoint marked by *Ease Focus*.

Check that the security pins are well positioned.
At last, hook the lift motor. In case two lift motors are needed, hook each one to each PICKUP-AX-AE4053. 
Like in every security operation, use adequate security elements.
Proceed to assign the angles to each enclosure.

Note that the first enclosure is 0°. This is the right position for it.

With the help of the Ease Focus program we will know the correct angle to each enclosure. This process is similar for all the enclosures.

1.- Take out the security pin “REAR LINK” of the first enclosure.

2.- Slightly elevate the lift motor to free the rod.
3. Remove the security pin “FIX ANGLE” of the second enclosure. Choose the right angle with the side control and introduce again the security pin on “FIX ANGLE” to fix it (2° in this example).

4. Lower carefully and introduce the security pin in “REAR LINK” and the enclosures will be joined again.
We learned to assign an angle (2°) to an enclosure on pages 13 and 14.

Now, let’s see another example for more closed angles: 0°, 0.5°, 1 y 1.5°.

After assigning the angles to the enclosures remove the platform to add more enclosures.

Remove the security pins and lift the group to add another group of enclosures.
After repeating the process this will be the result of this example, once the platform is removed.
We proceed in the same way with the next group of 4 units.

1.- Take out the rods of the top unit. Assign the angle to the top enclosure of the new group and fix it introducing the security pin in FIX ANGLE.

2.- We go down the group over the enclosure 5.

3.- Align the front rods and introduce the security pins in FRONT LINK.

4.- Place the top group of 4 cabinets over the bottom group. Finally, introduce the security pins in REAR LINK of enclosure 4.
When the new group is joined to the top group assign the angles following the *Ease Focus* instructions.

The assignment of the angles and to remove the platform is the same as described before with the first group.
Here you can see the final result for this example with 8 enclosures.
The groups of 4 units are easy to transport by truck. In this section you will see how to disassemble an array of 4 units.

Firstly, go down the array and align with the PL-405 platform as the figures show.
Next, turn the two side pins of the platform (see figure 1).

It allows to lift the plate of the platform. (Figure 2).

Introduce the security pins in “FRONT LINK.” (Figure 3).

Support the array over the platform (4). Be careful and avoid accidents. Use security gloves and take care with the hands.

Use the side pins to fix the plate.

At last, introduce the security pins in “REAR LINK.” Figure (5).
After placing the group over the platform proceed to reset the angles to 0º because is the safest way to transport.

As we saw in pages 13 and 14, start to assign the angles from the top.

When you complete the group of 4 units remove from the rest (see side figure).

This group, with 0º angulation, is easy to transport.

**Note: Push the group from the sides.**

Before transport, don’t forget to hide the top rods.

Remove the security pin from “FIX ANGLE” and place it in “STORE”.

Referring to the front rod, move up the side control and, holding it, push the rod (as you see in the right figure). The control will come back automatically to its position.

Similarly we proceed to remove the rest of the groups and, at last, remove the AX.
In this section we will mount an array from individual units and join them to form the array and rig it.

In this case, the units will rest over the front platform, PL-40, while we join them.

Add the second enclosure at the desired angle. (for example, 3°).

Just introduce the security pin in FRONT LINK to join them.
Add the third enclosure at the desired angle. (for example, 4º).

Just introduce the security pin in FRONT LINK to join them.

Repeat the process with the rest of the enclosures. In this example, we have six enclosures with the following angles:
- 3º for second
- 4º for third
- 5º for fourth
- 6º for fifth
- 7º for sixth
Once all the enclosures are joined, assign 0° to the first enclosure and mount the side pieces of AX-AE40S3.  
Make sure the security pins are well placed.

Join the lift motor with AX-AE40S3. You will need another PICKUP-AX-AE40S3 if another lift motor is used.
Place the AX-AE403 and join it (with the security pins) to the side pieces of the AX (mounted before). After checking that security pins are well placed, start to lift up the array system slowly.
While you lift the array, introduce the security pins in REAR LINK while the holes are aligned at the desired angles. Do this from the first to the last enclosure.
While the enclosures lift from the floor, remove the front PL-40 acting over the handles.

For disassembling follow the instructions described earlier but in a reverse way.
This section describes aero unit transport recommendations. We will start with two examples of configurations and we will recommend different ways of loading them inside a truck.
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<tr>
<td>DASnet-Rack 49</td>
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<tr>
<td>eCPK-20 CAT7 Integrated EtherCON (Data + Audio + Power) TRUE 1 cable</td>
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</tr>
<tr>
<td>eCPK-1 CAT7 Integrated EtherCON (Data + Audio + Power) TRUE 1 cable link</td>
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<tr>
<td>DASnet-Rack 99 Connections</td>
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<td>4</td>
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<tr>
<td>4 x aero40</td>
<td>4</td>
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<td>4 x aero40</td>
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<td>4 x aero40</td>
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<tr>
<td><strong>Rigging frames</strong></td>
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<tr>
<td>AX-AE40S3 Rigging Bumper for AERO-40A (max 20 units)</td>
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<tr>
<td><strong>Dollies</strong></td>
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</tr>
<tr>
<td>PL-UX218S Caster frame for stacking UX-218/UX-218A (max 3 units)</td>
<td>4</td>
</tr>
<tr>
<td>PL-40S Metallic caster frame for stacking AERO-40A (max 4 units)</td>
<td>4</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td>DSP-4080A 4 In/8 Out fully configurable DSP, 9 full bandwidth parametric band EQ on each channel, AudioCore equipped</td>
<td>1</td>
</tr>
<tr>
<td><strong>USB-485 KK Systems USB to RS-485 convertor</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>DASnet-Rack</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>Covers</strong></td>
<td><strong>4</strong></td>
</tr>
<tr>
<td>FUN-4-AE40 Black protective transport cover for 4 units of AERO-40A on PL-40S</td>
<td>4</td>
</tr>
<tr>
<td>FUN-3-UX218 Black protective transport cover for 3 UX-218/UX-218A on PL-UX218S</td>
<td>4</td>
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<td><strong>Truck Configurations</strong></td>
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</table>

**DASNET-RACK99 Connections**

**Manual de Colgado / aero series / Rigging Manual**

**Speaker Cabling**

**Units**

**Rigging frames**

**Dollies**

**Processors**

**USB-485 KK Systems USB to RS-485 convertor**

**DASnet-Rack**

**Covers**

**Truck Configurations**
Here is the second example:

Example 2: 24 AERO-40A +18 LX-218CA

FI40 30mA 4pol.
FI-Schalter
6 x MCB 16A "C" 1pol.
1 x RCD 40A 30mA 4pol.
### Processors

<table>
<thead>
<tr>
<th>Processor Type</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASnet-Rack</td>
<td>1</td>
</tr>
</tbody>
</table>

### DASnet-Rack

<table>
<thead>
<tr>
<th>DASnet-Rack Description</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>DASnet-Rack w/ 1 x DASnet-Patch-99 + 1 x DASnet-Patch-PowerCon + 32A power distr</td>
<td>4</td>
</tr>
<tr>
<td>USB-485 9K Systems USB to RS-485 converter</td>
<td>1</td>
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</table>

### Speaker Cabling

<table>
<thead>
<tr>
<th>Cabling Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>eCPK-20 20m CAT7 integrated etherCON (Data + Audio) + powerCON TRUE1 cable</td>
<td>18</td>
</tr>
<tr>
<td>eC-09 0.9m CAT7 etherCON (Data + Audio) link cable</td>
<td>18</td>
</tr>
<tr>
<td>Plink-09 0.9m power CON TRUE1 link cable</td>
<td>18</td>
</tr>
</tbody>
</table>

### Rigging Frames

<table>
<thead>
<tr>
<th>Rigging Frame Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>AX-AE40S3 Rigging Bumper for AERO-40A (max 2 units)</td>
<td>2</td>
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</tbody>
</table>

### Dollies

<table>
<thead>
<tr>
<th>Dollie Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL-221S Carrier frame for stacking UX-221 (max 3 units)</td>
<td>6</td>
</tr>
<tr>
<td>PL-40S Metalic carrier frame for stacking AERO-40A (max 4 units)</td>
<td>6</td>
</tr>
</tbody>
</table>

### Covers

<table>
<thead>
<tr>
<th>Cover Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUN-4-AE40 Black protective transport cover for 4 units of AERO-40A on PL-40S</td>
<td>6</td>
</tr>
<tr>
<td>FUN-2-UX-221 Black protective transport cover for 3 UX-221 on PL-221S</td>
<td>6</td>
</tr>
</tbody>
</table>

### Truck Configurations

- **Euro Truck**
  - 230cm / 90"
  - 251cm / 99"

- **American Truck 90" x 232"**
  - 243cm / 96"

- **American Truck 99" x 232"**
  - 228cm / 90"
Annex I - Tools for rigging systems

For best results hanging aero series 2 systems, it is mandatory the use of Ease Focus 2 simulation software which can be downloaded for free from our website [www.dasaudio.com](http://www.dasaudio.com) within the support section. The download file contains the software and data files with gll files for acoustic systems.

The user should be aware that any deviation in the actual installation of the system with respect to the simulated data can affect the system’s coverage, especially in the long throw. Therefore DAS provides clinometers and laser meters to accurately perform the installation of the system:

- Leica Disto D5 Laser Meter
- Clinometer which is attached to the top cabinet of the array and sensor module. TEQSAS LAP-TEQ
AX-AE40S3 is comprised of two side panels of steel and aluminum and a central bar (PICKUP-AX-AE40S3). It is a modular flybar set.

The maximum load capacity is 20 units * (pick-up point dependent) with a 5:1 safety factor.

For systems of 12 units or more, an additional bar should be added and the array will hang from two lift motors for greater security and control over the angle of the system at all times.

AERO-40A load limitation: * On the side panels the maximum number of units that can be flown are screen printed depending on the pick-up point marked by the software (or vertical axis of the center of gravity of the system). Consulting the EASE Focus 2 software we will determine the number of units which can be flown each pick-up point.

These limitations depend on the load of the vertical axis position of the center of gravity of the system:

From points 1 to 13 regardless of whether you use a motor or two, a maximum of 20 AERO-40A units can be flown.
   - At point 14, 19 units of AERO-40A can be flown.
   - At point 15, 18 units of AERO-40A can be flown.
   - At point 16, 17 units of AERO-40A can be flown.
   - At point 17, 16 units of AERO-40A can be flown.

**Pick-up point - vertical axis of the center of gravity**

In the image at the right you can see the vertical axis of the center of gravity for the system passing through the pick-up point number 11.

The pick-up point shown in the software is placed in alignment with the vertical axis of the center of gravity for the system. The position of this vertical axis obviously depends on the number of boxes, the angle between them and full vertical angle. The loading limitations are displayed by the software and depend on the vertical axis that position the center of gravity.
For example, let’s take a system of 16 AERO-40A units. If we consult the panel lettering of the AX-AE40S3, we observe that 16 units can be flown when the vertical axis of the center of gravity is aligned with any of the 17 hanging positions.

In the simulation attached, the system is flown at 11 meters with -6.37° of inclination. No warning of maximum load appears.

The warnings of maximum load appear ONLY if the number of cabinets is greater than 16 units. For more than 16 units, the warnings of load appear and we should check where the vertical axis of the center of gravity for the system is situated.

See what happens if we add one more box. Now we have a total of 17 AERO-40A units and the software warns us that only 17 units at point 16 or lower can be flown.

In this case, we have -5.57° of inclination, the vertical axis of the center of gravity of the system is positioned in alignment with the pick-up point number 14. In this case, we are within the safety margins. Remember that from point 14 and above, 19 units can be flown (see above panel drawing AX-AE40S3).

17 AERO-40A units - As the axis of the vertical center of gravity coincides with the point 14, we can fly 17 units with that configuration.
Annex III - Advice for EASE Focus 2 use

**SYSTEM angles (cluster):**
It's important to understand the signs of the system's total angles in the EASE Focus 2 software program.
A cluster can be flown at different angles, depending on the number of cabinets, the angle between them and the pick-up point. The angle in the software is defined in section View [º]

Inclining systems forwards (downwards) result in a negative angle (-). The systems inclined upwards result in a positive angle (+).

Angle criteria of the cluster

![Diagram showing angle criteria for clusters with -5º and +10º inclinations]
Meaning of parameter DELTA EASE Focus 2:

The *delta* parameter marks the angle NEEDED to reach the desired angle in our system (View [°]). This information is useful ONLY when the system is flown from a single POINT.

Imagine a system of 8 units hanging 11 meters high.

The desired angle is: View [°] -15°
As shown in the image, Delta [º] -0.46°

This means that to reach the desired -15 °, we are lacking 0.46° when the system is flown at the point 15.

If the delta sign is negative (-), this indicates that we are lacking 0.46 downwards.
If the delta sign is positive (+), this means that we are lacking degrees upwards.

Now, we consider the opposite case.
This is the same system hanging from a single point. 8 AERO-40A units.

The desired angle: View [°] -14°
In this case Delta [º] is 0.54

This means that if we hang the system from point 15 we lack tilt up 0.54° to reach the desired -14°.
**DELTA parameter in EASE Focus 2 software and maximum angles:**

As seen before the DELTA parameter makes a difference (in excess or in lack of) between the desired angle and the obtained angle to hang the system from a single point.

When we fly the system from TWO points, this parameter is very useful because we also determine the maximum angles with which we can install it.

For example, suppose a set of 12 AERO-40A units:

The system is inclined -6.74 °. Vertical axis position of center of gravity is aligned with the pick-up point number 13.

To what maximum angle could we tilt down the system? Suppose we want to hang the system at -17°. Let's see what happens in the software:

Observe how Delta: -5.68°
This means that we lack to reach the desired 5.68°, -17°. In this case the system could only have a maximum tilt: 17-5.68 = 11.32° since no further pick-up points are available on the AX-AE40S3.

Indeed if we change the angle of the system to -11.32°, we see that the pick-up point (vertical axis of center of gravity) is number 17 and delta is zero. This indicates that if two lift motors are used the system could be angled at -11.32°.