Stair Climbing System

User's Manual
CE Declaration of conformity

The company AAT Alber Antriebstechnik GmbH herewith declares that the products of the stair climbing system c-max were developed and manufactured in concordance with the current regulations of the European Union, EEC Guidelines 93/42/EWG.

This declaration becomes void if the above mentioned devices have been altered without the consent of AAT Alber Antriebstechnik GmbH.

Signature of the manufacturer:

Markus Alber
Managing shareholder
AAT Alber Antriebstechnik GmbH

The stair climbing system c-max has been tested successfully according to the ISO/FDIS 7176-23 by the Technical University Berlin.
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1 General information

Congratulations! With the acquisition of this stair climbing system you have a device that will quickly become a reliable and indispensable partner in transporting physically disabled people.

With the c-max you are able to transport persons safely and effortlessly up- and downstairs; even winding stairs are no problem for the c-max.

Driving on slopes is also possible. The safety brakes on both sides of the c-max ensure your safety.

Naturally the c-max is also suitable to drive on level ground. The device is lightweight, flexible and does not take up much space.

1.1 Instruction

This user’s manual will instruct you step by step about the safe and adequate use of the c-max.

Operating the c-max takes a certain skill. In the interest of your safety only trained personnel may use the c-max.

Please read this user’s manual carefully and particularly take note of the safety instructions before you use the c-max for the first time.

1.2 Care and maintenance

One of the most important aspects concerning the maintenance of the c-max is charging the sealed lead acid batteries. They are part of the battery pack and must be charged every time after using the device.

Other than that your c-max does not need much care or maintenance. More extensive instructions you find in chapter 8.

1.3 Warranty and liability

For damage that was caused by inadequate use disregarding this manual we assume no liability whatsoever. (Please read chapter 9 for more detailed information concerning warranty and liability).
2 Description of the product

2.1 Adequate use

Please use the c-max exclusively for the transportation of physically disabled persons.

Said persons should be able to sit properly without help, otherwise you should secure them with a safety belt. The latter is an accessory available at AAT Alber Antriebstechnik GmbH.

In addition, the arms of the person to be transported should not protrude over the arm rests during the transportation process.

In the interest of your safety you may not use the stair climbing device c-max on escalators or moving belts! Transporting other kinds of loads is explicitly prohibited!

Mastering stairs

Driving on level ground

Driving on slopes
2.2 Features of the c-max

1 = control unit
2 = handles, adjustable
3 = back rest
4 = arm rest, swivels out
5 = C-part plus seat
6 = climbing frame
7 = foot rest, folds in
8 = main wheel
9 = lever with chain drive
10 = climber and climbing foot
11 = safety brake
12 = power unit
13 = battery pack
14 = tightening knobs for the back rest
15 = single step switch
16 = tightening knob for the handle

2.3 Technical data

<table>
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<th>Details</th>
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<tr>
<td>height</td>
<td>1090 mm</td>
</tr>
<tr>
<td>width without arm rests</td>
<td>440 mm</td>
</tr>
<tr>
<td>width with arm rests attached</td>
<td>485 mm</td>
</tr>
<tr>
<td>depth with the foot rest folded in</td>
<td>730 mm</td>
</tr>
<tr>
<td>depth with the foot rest folded out</td>
<td>915 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>climbing frame = 17.2 kg, C part plus seat = 4.6 kg, back rest = 4.3 kg, both arm rests = 1.2 kg, battery pack = 4.4 kg, total weight = 31.7 kg</td>
</tr>
<tr>
<td>Maximum lifting capacity</td>
<td>120 kg</td>
</tr>
<tr>
<td>Batteries</td>
<td>2 x 12 V / 5 Ah sealed lead acid</td>
</tr>
<tr>
<td>Direct current motor</td>
<td>24 V</td>
</tr>
<tr>
<td>Climbing speed</td>
<td>8 - 23 steps / minute, continually adjustable</td>
</tr>
<tr>
<td>Capacity with one battery pack</td>
<td>15 - 30 floors, depending on the load</td>
</tr>
<tr>
<td>Maximum height of step</td>
<td>21 cm</td>
</tr>
<tr>
<td>Noise level</td>
<td>the device’s A weighted noise level lies typically below 70 dB (A)</td>
</tr>
<tr>
<td>Vibrations</td>
<td>the weighted RMS value of acceleration the upper body is exposed to lies typically below 2.5 m/s²</td>
</tr>
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3 Assembly

With a few movements you can assemble the c-max by means of several fixtures and tightening knobs. Disassembly is just as easy.

3.1 Attach the back rest to the climbing frame

Put the back rest onto the guide pins on top of the climbing frame.

3.2 Affix the back rest

Fix the back rest tightly to the climbing frame with the two tightening knobs.

Always make sure that the back rest is securely fastened to the climbing frame.

3.3 Attach the C-part plus seat to the climbing frame

Put the C-part plus seat onto the climbing frame; the locating bolts of the C-part fit into the corresponding holes in the frame.

3.4 Affix the C-part

Fix the C-part tightly to the climbing frame with the two tightening knobs.

Always make sure that the C-part plus seat is securely fastened to the climbing frame.
3.5 Helix cable

Put the connector of the helix cable into its socket located on the power unit's housing. Lock the connector by pushing up the latching.

Be cautious that neither connector nor socket become wet by e.g. water or snow - this may cause a short circuit between pins and result in severe malfunction of the system.

3.6 Attach the battery pack

Push the battery pack into its fixture by means of the guiding pins on top of the power unit’s housing. This establishes the power connection and locks the battery pack.

3.7 Detach the battery pack

Unlock the battery pack by pressing the release button on top of the battery pack until it engages. Then lift out the battery pack.
3.8 Arm rests
Insert arm rests on both sides.

Please always make sure that the stop bolts snap in their appropriate notches.

3.9 Handles
Adjust handles to the appropriate height on both sides (see chapter 6.7) then fasten them with the tightening knobs.

After adjusting the handles, always make sure that they are securely fastened.
4 Safety instructions

For the safe operation of the c-max it is highly important that you pay close attention to all instructions regarding operation and safety stressed in this user’s manual.

**Instruction:** The c-max may only be operated by trained personnel. In addition, the operator should be capable of lifting 1/3 of his or her own weight. Minors are not allowed to use the c-max; exempt from the above are adolescents over 16 years of age who have been trained under supervision to operate the c-max. While using the c-max you should always wear good shoes that do not slip.

**Safety brakes:** Please check the safety brakes each time before using the c-max (see also chapter 6.4 and 8.7). The safety brakes, particularly the knurled surface of the brake drums in the wheel rims, must be cleaned weekly with alcohol to ensure the optimum braking effect.

Never use suds or greasy cleaners.

After cleaning the safety brakes must be checked as described in chapter 6.4

**Lining of the climbing foot:** Please check regularly whether the lining of each climbing foot is still sufficient (see chapter 8.8).

**Lifting capacity:** The stated maximum lifting capacity may not be exceeded. Please also read chapter 5.1. You may under no circumstances use the c-max to transport goods.

**Care and maintenance:** Please make sure that you charge the battery pack after each use of the c-max. When the c-max is at a standstill for a while, please turn the device off, i.e. the ON/Off switch needs to be on 0. If the working elements of the device block, turn the c-max off immediately.

Repairs may be done by authorized dealers or the manufacturer only. Please exclusively use AAT Alber parts and accessories.

Please note the extensive care and maintenance instructions in chapter 8.

**Condition of paths, walkways etc.:** Please make sure that the paths and walkways you use with the c-max are free of obstacles and not slippery. Avoid operation on damaged stair linings, snow, ice, etc.

The c-max may not be used in wet and rainy conditions.

**Charge of the batteries:** You should only use the c-max with fully charged batteries. In case the batteries run low on the stairs (a sequence of 3 flashes repeated every 2.5 seconds) the available charge of the batteries is sufficient to transport the person safely to the bottom of the stairs. Driving downstairs the motor works as a generator, thus recharging the batteries. The potential steps downward, therefore, are not limited.
5 Operation

5.1 Maximum lifting capacity
Please make sure that the maximum lifting capacity is not exceeded.

5.2 Control light
After turning on the device, the control light should light up and stay on. Flashing of the control light indicates malfunction.
Further information on malfunction you find in chapter 6.1.4

5.3 Helix cable connector
Check whether the connector of the helix cable is plugged into the housing of the power unit and locked each time before you use the C-max.

5.4 Battery pack
Please make sure that the sealed lead acid batteries are fully charged before you use the C-max for the first time.
Extensive instructions you find in chapter 8.2.

5.5 Safety brakes
Before operating the C-max check the safety brakes every single time. Extensive instructions you find in chapter 6.4.

5.6 Lining of the climbing foot’s lining
Please check regularly whether the lining on each climbing foot is still sufficient.
Further instructions you find in chapter 8.8.
6 Instructions for operation

Before we get to the actual instructions for operation, we would like to introduce the c-max’s most important components to you:

6.1 Operational components

The control unit is situated on the right handle and consists of an ON/OFF switch 3, an UP/DOWN switch 1, and a speed control 2.

6.1.1 ON/OFF switch

During a longer standstill, please turn the c-max off by pushing the rocker switch 3 on “0”.

The c-max is equipped with an electronic turn-off mechanism, i.e. if the device is on and not in use for about 5 minutes, it turns itself off automatically.

In such case you need to turn the device first OFF and then ON again.

6.1.2 UP/DOWN switch

With the UP/DOWN switch 1 you activate the climbing mechanism up- or downstairs.

6.1.3 Speed control

The speed control enables you to adjust the speed continuously.

When you use the c-max for the first time, please choose the lowest speed.
6.1.4 Control light to indicate malfunction

After turning on the c-max the green control light (LED) lights up and remains lit, which indicates that the stair climbing system is in order and ready to use.

Potential malfunction is indicated by a light diode. After a period of 3 seconds each time a blinking signal is repeated.

In case of malfunction, turn the device first off and then on again. If there is still an indication of malfunction, charge the batteries in case of low battery charge. For all other cases of malfunction, please call your local dealer.

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<thead>
<tr>
<th>Number of flashes</th>
<th>Indicated malfunction</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>overload of the device</td>
</tr>
<tr>
<td>2</td>
<td>battery pack, undervoltage</td>
</tr>
<tr>
<td>3</td>
<td>overvoltage</td>
</tr>
<tr>
<td>4</td>
<td>UP/DOWN switch or its supply line is damaged</td>
</tr>
<tr>
<td>5</td>
<td>defective electromagnetic brake</td>
</tr>
<tr>
<td>6</td>
<td>malfunction of electronics</td>
</tr>
</tbody>
</table>

6.2 Single step control

The single step switch is located on the climbing frame (see pictures).

Please activate the single step mode to practise and in particular to climb winding stairs.

If you activate the ON/OFF switch in that mode, the device will climb only one step at a time. The climbing system stops in the correct position, even if you press the ON/OFF switch continuously.

The climbing mechanism cannot unintentionally be activated. You can take your time to move the main wheels to the next step’s edge.

To continue climbing you simply release the UP/DOWN switch and then press it again.

The arrows with the dotted line symbolize the interruption of the climbing process, i.e. the single step mode is activated. To do that you press the rocker switch on I. By contrast, if you press the rocker switch on O it signifies the uninterrupted climbing process, i.e. the single step mode is OFF.
6.3 Climbers

The climbers (see picture) must be pulled in to topmost position by means of the UP/DOWN switch if you want to:

- drive on level ground and on slopes
- check the safety brakes
- begin climbing upstairs or downstairs

Before a person sits down on the chair activate the UP/DOWN switch direction UP to move the climbers down until they touch the ground. When the climbers touch the ground they serve as brakes preventing the device from rolling away (also see chapter 6.5.1).

6.4 Check safety brakes

There are safety brakes located on the climbing frame on both sides.

Please check the safety brakes each time before you use the c-max.

You may check the brake effect either on top of the stairs or on level ground as described in 6.4.1 and 6.4.2.

6.4.1 Test the required brake effect

Tilt the c-max backwards until the back rest is in an almost horizontal position (see picture).

If the c-max cannot be pushed forward by the handles in said position, but merely rolls backwards, then the required brake effect for the safe operation of the c-max is granted (see picture).

6.4.2 Test the required brake effect at the top edge of the stairs

Please make this test without a person sitting in the chair.

Tilt the device backwards to its regular climbing position (see chapter 6.8) and drive forward to the first step’s edge. If you cannot push the device over the edge of the step, the required braking effect for a safe operation of the c-max is granted.

Important: If the required brake effect is not guaranteed, you may, under no circumstances, use the c-max any more. Please contact your local AAT Alber dealer or the manufacturer immediately.
6.5 Transportation of people with the c-max

Please note that the c-max was developed to be operated by one person. Always use both hands when using the device.

Please practice driving with the c-max on level ground, slopes and climbing up- and downstairs at first without a person sitting in the chair! Whenever you practice, please make sure that nobody is standing in the potentially dangerous spot directly below the c-max on a slope or stairs.

We suggest that you practice climbing up- and downstairs with the single step mode activated (see chapter 6.2). Also choose the lowest climbing speed for practicing (see chapter 6.1.3)

Please do not exceed the maximum lifting capacity (see chapter 5.1)

When seating a person on the c-max please be aware of:

6.5.1 Secure stand of the c-max

When a person is seated on the c-max, the device must stand securely on the ground. Therefore the climbers must be extended in such a way that they touch the ground and support the device (see picture).

Turn the c-max on by pressing the ON/OFF switch.

Now activate the UP/DOWN switch direction UP until the climbers touch the ground.

6.5.2 Swivel out or remove the arm rests

When a person is seated, the arm rests can be swivelled out or, if necessary, removed entirely. After the person is seated, please bring the arm rests into their original position.

6.5.3 Fold out the foot rest

When a person is transported, please fold out the foot rest (see picture), and, if necessary, help the person to place his/her feet on it.
6.6 Operation on level ground

After the person has been properly seated, you may transport him or her effortlessly on level ground (see picture)

- Passing over thresholds pulling the c-max backwards is much easier than pushing it forwards over them.

6.7 Adjust the handles

For climbing stairs or driving on slopes, comfortably and safely, adjust the height of the handles approximately to the level of the operator's shoulders.

- After adjusting the handles, always make sure that they are securely fastened.
6.8  Tilting the stair climbing system

To drive on slopes or to climb stairs you must tilt the c-max, which can be done easily by means of the climbers.

1. Turn on the c-max by pressing the ON/OFF switch.
2. Press the UP/DOWN switch direction DOWN until the climbers lift the main wheels at least 1-2 cm off the floor (see picture).
3. Put your foot on the power unit’s housing and tilt the c-max slightly toward you until you feel that the c-max is balanced.
4. The c-max is balanced if you feel neither pull nor push in the handles.
5. In order to drive on level ground, the climbers must be pulled in entirely

If you tilt the c-max further, or too much, the safety brakes engage and the c-max can’t be moved forward any more.

6.9  Operation on slopes

To drive on a slope, make sure the handles are adjusted appropriately (see chapter 6.7), then tilt the c-max slightly backwards (see chapter 6.8).

For safety reasons we recommend you to ask another person to assist when driving on a slope.

6.9.1  Downhill

Drive forward to the edge of the slope. In order to slow down you need to tilt the c-max a bit more.

6.9.2  Uphill

Please drive backwards up a slope. In order to slow down you need to tilt the c-max a bit more.
6.10 Climbing upstairs

Please always practice climbing stairs without a person and by activating the single step mode plus the lowest climbing speed.

The climbing process can be accomplished quickly and without problems if you adhere closely to the following instructions.

A tip before you start:

During the climbing process always pull the c-max slightly towards you, so that the device automatically moves to the next higher step.

1. Adjust the handles to the appropriate height (see chapter 6.7)
2. Turn the c-max on by pressing the ON/OFF switch.
3. Activate the single step mode if necessary (see chapter 6.2)
4. Pull in the climbers to their topmost position by pressing the UP/DOWN switch (see chapter 6.3).
5. Tilt the c-max slightly toward you (see chapter 6.8).
6. Drive backwards to the stairs ☛ and move up 2 to 3 steps ◊

Now the c-max is in its initial position for climbing upstairs.

Make sure that both main wheels touch the lowest step ◊
7. The climbing process takes place in two intervals.

The first interval starts by pressing the UP/DOWN switch, direction **UP**. The climbing process begins here with the power unit initiating the movement of the climbers downward.

8. After the climbers reach the floor, they assume the load of the main wheels while the main wheels and the frame are lifted at the same time.
9. The first interval is finished when the main wheels touch down on the next higher step and resume the load of the climbers.

10. The second interval begins by pulling in the climbers. It is finished when the climbers reach their topmost position.

If you activated the single step mode, the climbing process ends at this point. To resume climbing you need to press the UP/DOWN switch once again, direction **UP**.

Because the c-max is always pulled slightly backward, it rolls automatically to the next step and reaches the initial position again.

At this point the climbing process repeats itself as described in point 7.
6.11 Climbing downstairs

Please always practice climbing downstairs without a person, and by activating the single step mode plus the lowest speed. The descending process can be accomplished quickly and without problems, if you adhere carefully to the following instructions.

1. Adjust the handles to the appropriate height (see chapter 6.7)
2. Turn on the c-max by pressing the ON/OFF switch.
3. If appropriate, activate the single step mode (see chapter 6.2).
4. Pull in the climbers completely by means of the UP/DOWN switch (see chapter 6.3).
5. Tilt the c-max slightly (see chapter 6.8).
6. Drive the c-max forward to the edge of the stairs 1.

7. The sensitive rolls 2 of the brakes keep the c-max from rolling over the edge.
8. Press the UP/DOWN switch, direction **DOWN**, and the descending process begins.

9. The power unit moves the climbers down.

10. When the climbers reach the next lower step, they resume the load of the main wheels, while those plus the climbing frame are lifted off the higher step.
11. Now the main wheels and the climbing frame are moved forward.

Then the main wheels plus the climbing frame are lowered by pulling up the climbers until...

12. ...the main wheels touch down on the next step (see picture).

If you activated the single step mode, the climbers are pulled in entirely and then the descending process ends at this point.

13. Again push the c-max all the way to the edge of the step, i.e. until the sensitive rolls of the security brakes stop the c-max.

To continue descending you need to press the UP/DOWN switch again, direction DOWN, if you activated the single step mode.

Climbing downstairs now repeats itself as explained in point 7 and following.

6.12 Laying the c-max on the stairs

In an emergency you may lay down the c-max on the stairs. The security brakes prevent the c-max from rolling down (see picture).
7 Accessories

7.1 Battery pack
The c-max works with batteries and is delivered with one battery pack.

Additional battery packs, we call them quick release battery packs, are available as an accessory.

We recommend an additional battery pack if you use the c-max continuously, i.e. there are not sufficient breaks for the batteries to be recharged.

In such case one battery pack is in use while the other is being recharged at the same time.

7.2 Exchange battery pack
1. Turn off the c-max using the ON/OFF switch.
3. Push the other fully charged battery pack from the top into its fixture by means of the guiding pins on top of the power unit’s housing. This establishes the power connection and locks the battery pack.

The quick release battery pack should always be connected to the charger to extend its durability (see chapter 8.2).

Please exclusively use the AAT Alber charger to charge your battery pack.

7.3 Charging cable for your vehicle
A charging cable for your vehicle is recommended, if you transport the c-max frequently in your car. The charging cable is available as an accessory.

The charging cable’s plug [1] fits into the socket of the car’s cigarette lighter; connect the other plug [2] to the battery pack.
8 Care and maintenance

To guarantee the safety of the c-max the device must be inspected every two years, even if there are no outer signs of damage or malfunction.

In the interest of your safety repairs of any kind may only be done by personnel authorized by AAT Alber Antriebstechnik GmbH.

8.1 Charger

Please exclusively use the AAT Alber charger to charge your battery packs.

8.1.1 Automatic charger

The c-max comes with the automatic charger. The charging cable's plug 1 fits into the wall outlet socket; connect the other plug 2 to the battery pack.

This automatic charger recharges your batteries 100%. As soon as the charging process is completed, it switches to a retaining mode, thus overcharging is impossible.

8.1.2 Charging cable

A charging cable for your vehicle is available as an accessory. Approximately a recharge of 80% is possible by accessing your vehicle’s battery using a charging cable. Connector 1 fits to the cigarette lighter; plug in connector 2 at the battery pack.
8.2 Battery pack

The quick release battery pack, consisting of sealed lead acid batteries, should be recharged after each use. (Technical details for the sealed lead acid batteries you find in chapter 8.3)

Tip:

If the C-max is at a standstill for some time, please connect it to the charger to retain the charge. This does not damage the sealed lead acid batteries, on the contrary, it increases their durability.

8.3 Sealed lead acid batteries

There are 2 sealed lead acid batteries 12 V / 5Ah in the battery pack of the C-max. These batteries are sealed, maintenance free, rechargeable and of top quality.

The batteries of your C-max can be discharged or recharged in any possible position.

Please avoid a total discharge: The durability of sealed lead acid batteries depends primarily on the charge/discharge cycle. For instance, you may discharge them partially more than 1000 times and use up the entire capacity more than 200 times, if you avoid a total discharge entirely.

A total discharge does not only lead to a loss of the batteries' capacity, but also shortens their durability. Thus, do avoid a total discharge, by recharging the batteries whenever possible!

Charging your batteries is taking good care of them.

Return dead batteries to AAT Alber Antriebstechnik GmbH or take them to particular recycling places where they can be recycled appropriately.
8.4 Charging the battery pack

1. Remove the battery pack from the power unit (see chapter 7.2)

2. Connect the charger's plug ² to the socket on the battery pack. Remember: The batteries of your c-max can be discharged or recharged in any possible position.

3. Depending of the type of charger used, insert the other plug ¹ into the wall outlet or plug it ³ into the cigarette lighter's socket in your vehicle.

8.5 Fuses

Two electrical 30 A fuses ¹ are located on the side of your battery pack. They are protected by a cover ².

You may not mend or by-pass defect fuses. Always replace them with identical ones of the same amperage.

To exchange the fuses, pull out the cover and the fuses, insert the new ones and replace the cover.
8.6 Tighten driving chain
Occasionally the chains of the climbing system - situated in the
chain’s housing 1 - have to be tightened.
1. Unscrew the screws 2 (4 mm) in the cover of the chain’s housing 3.
2. Turn the adjustment bolt 4 clockwise using a hexagon socket
screw driver (5 mm) until the chain is tight.
3. Retighten the cap screws on the cover.

8.7 Check brake lining
Please check the thickness of the safety brakes’ lining regularly. The
minimum thickness 1 is 1 mm. In case the lining is thinner than 1
mm, the lining must be exchanged on both sides. Please contact
AAT Alber Antriebstechnik GmbH or your local dealer.

The safety brakes, particularly the knurled surface of the brake
drums in the wheel rims, must be cleaned weekly with alcohol to en-
sure the optimum braking effect.

Never use suds or greasy cleaners.
After cleaning the safety brakes must be checked as described in
chapter 6.4.

8.8 Check the climbing foot’s lining
Please also check each climbing foot’s lining 2 on a regular basis.

If the lining 2 is worn down to the indicated line 3 or broken,
again, exchange both climbing feet.
1. Unscrew the screws 1 (5 mm) and remove the climbing foot.
2. Apply locktite to the screws before screwing the new clim-
bining foot on the climbing leg.
3. Tighten the cap screws securely (10 Nm).
4. Exchange the other climbing foot the same way following
steps 1 through 3.
8.9 Cleaning

For the seat’s cushion, the back and the arm rests, please use suds.

The other parts of the **c-max** - except the safety brakes (see chapter 8.7) - can be cleaned with a moist cloth; please use regular mild household cleaners.

⚠️ For safety reasons, please do not use a high-pressure cleaning device.
9 Warranty and liability

9.1 Warranty
AAT Alber Antriebstechnik GmbH grants a warranty of two years for all its products of type \textit{c-max} including all its accessory parts (with the exception of the sealed lead acid batteries). The warranty begins at the date of purchase and covers failure of material and errors in manufacturing.

For the sealed lead acid batteries, always assuming correct maintenance, AAT Alber Antriebstechnik GmbH grants a warranty of six months from the date of purchase.

The warranty of the \textit{c-max} does not cover damage or failure caused by:

\begin{itemize}
  \item inadequate and insufficient maintenance by the client
  \item inadmissible changes or improper use
  \item improper use extending the maximum loading capacity of the \textit{c-max}
  \item inappropriate charging of the sealed lead acid batteries batteries.
\end{itemize}

9.2 Liability
AAT Alber Antriebstechnik GmbH, manufacturer of the \textit{c-max}, is not responsible for eventual damage done by the following:

\begin{itemize}
  \item \textit{c-max} was used inappropriately
  \item repair work, assembly and the like was done by unauthorized personnel
  \item \textit{c-max} was not operated in accordance with this user’s manual
  \item extraneous parts were attached to or used with the \textit{c-max}
  \item parts of the \textit{c-max} were removed
  \item the \textit{c-max} was loaded extending the maximum loading capacity.
\end{itemize}