



USER MANUAL

R1602



CE

2024-01 (6.1)

EN

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All serious incidents occurring in relation to the device must be reported to the manufacturer and to the competent authority of the Member State where the user and/or occupant is established.



WARNING

Failure to observe this user manual, in particular the safety instructions, can lead to defects in the SERVO and endanger the user and persons in the immediate vicinity of the SERVO. There is an increased risk of injury! In the event of an infringement, claims for warranty and liability are excluded!

The product is state of the art and complies with the associated technical safety requirements. Nevertheless, a low level of residual risks cannot be ruled out. Please observe the safety instructions to this end.

People with visual and reading impairments or intellectual disabilities should print out the user manual available on the website in enlarged letters or have this manual read to them, if necessary. You will also find all safety-relevant changes that have been made to the user manual on our homepage. All versions with details of the production period of the product are obtainable at: **www.aat-online.de/en**
> Service > Download area > Rehabilitation and ambulance transport > User manuals



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1 Symbols and safety instructions



DANGER - Immediately imminent danger

If not avoided, this will result in death or severe bodily injuries!



WARNING - Possibly imminent danger

If not avoided, this may result in death or severe bodily injuries!



CAUTION - Possibly imminent danger or harmful situation

If not avoided, this may result in minor bodily injuries or damage to property!



NOTE - Information by the manufacturer

General safety instructions



NOTE

If you have a visual disability, this user manual can be downloaded at: **www.aat-online.de/en**
> Service > Download area > Rehabilitation and ambulance transport > User manuals

Read the user manual prior to start-up and observe the warning notices and safety instructions.

In the event of reading disabilities, cover training content in more depth verbally.

The user manual must be kept in a safe place after reading through it.

It is not made exclusively of flame retardant materials. Keep the SERVO away from sources of ignition.

The SERVO may interfere with highly sensitive electromagnetic fields of other electronic devices (e.g. anti-theft devices).

Stability tests were performed under laboratory conditions. The SERVO may behave differently under real conditions compared to laboratory tests.

Training may only be carried out by the manufacturer, the AAT field staff or the qualified specialist shop.

The dimensions of the wheelchair may change due to the attachment.



CAUTION

External heat sources may cause the surface temperature to rise (e.g. sunlight)!
Do not touch the affected surfaces in this case to avoid burns!



WARNING

Never reach into rotating/moving parts to avoid crushing.



DANGER

The SERVO must not be operated in the case of severe visual impairment and/or blindness!

Do not exceed the total permissible weight and the maximum person weight, as this may lead to defects or an overloading of the SERVO.

Avoid driving in heavy rain, ice, snow and on unsurfaced ground (sand, mud, loose crushed rock) to prevent slipping!

Do not use on escalators or travellers to avoid injuries caused by a crash or the falling out of the occupant and the occurrence of damage to property!

The operational capability of the SERVO can be influenced by electromagnetic fields (e.g. by mobile phones, electric generators or high-voltage sources)!

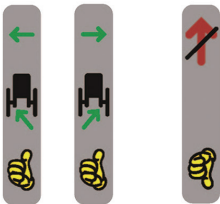
Do not store near medical devices, for example with a life support function, and diagnostic devices, as these may malfunction!

When switched off / deactivated, the SERVO behaves like a manual wheelchair, as there is no drive or braking effect in this state!

2 Explanation of the symbols on the packaging

Symbol	Explanation
	Handle with care The packaging including the product must be handled with special care.
	Protect from moisture Protect the packaging including the product from overly high air humidity. Cover during storage. If necessary, cover thoroughly with tarpaulins.
	Caution fragile Handle the packaging including the product carefully and never allow it to fall.
	This way up The packaging must be stored and transported in such a way that the arrows point upwards at all times. Any failure to comply with this rule, such as rolling or tilting the package, must be avoided.
	Temperature limit 0 to 40 °C Please do not store packaging incl. product and battery pack below/above the specified temperature limits.

3 Explanation of the symbols on the device

Symbol	Explanation
	CE marking Position: Type plate The product complies with the relevant provisions of the EC Regulation EC 2017/745 (MDR)
	Date of manufacture Position: Type plate Indicates the year the medical device was manufactured.
	Manufacturer Position: Type plate Shows the manufacturer of the medical device (AAT Alber Antriebstechnik GmbH)
	SN Position: Type plate Serial number of the SERVO, e.g. R1601XXXXXX
	Medical Device Position: Type plate
	Observe the user manual! Position: Type plate The user manual must be observed! (www.aat-online.de/en)
	Attention! Position: Typeplate Refers to the need for the user to review the user manual and important safety-related information.
	FCC compliance Position: Type plate Products with this logo comply with all American regulations on electromagnetic compatibility. It confirms the electromagnetic compatibility of the products marked with it.
	Barcode Position: Type plate Contains the AAT serial number
	Technical safety test badge Position: Inside wheel hub drive (refer to chapter Technical safety testing) Informs about the due date of the next technical safety test
	Information arrow Mounting pin on the wheel Position: Below mounting pin on both wheels (refer to chapter "Assembly - Drive wheels") Informs about the correct attachment procedure for the wheels.
	Note Positioning of the anti-tip supports (refer to chapter 5.3) Position: Anti-tip supports Informs about the correct insertion of the anti-tip supports. Incorrectly inserted anti-tip supports are indicated by the "thumbs down" symbol and a red crossed out arrow.

4 Product description

4.1 Device overview

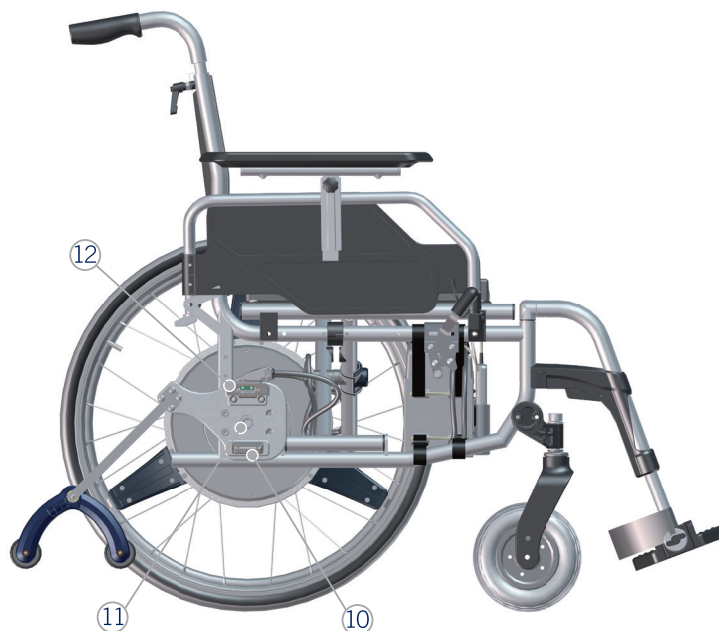


Manufacturer's information:

For a simplified assignment of the individual components, the numbers listed here are cited in full for the first time in the following chapters.

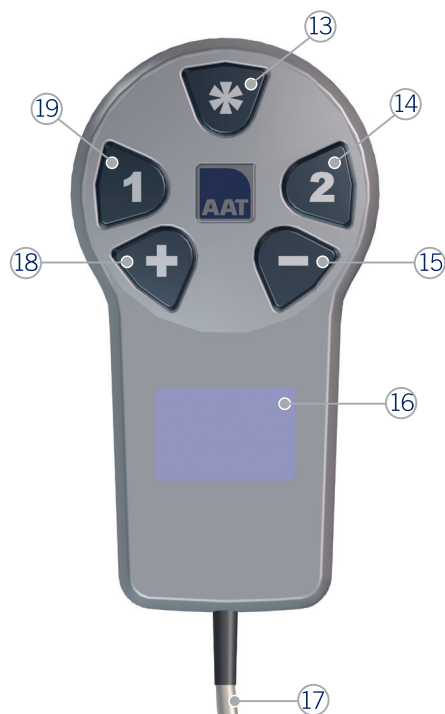


- ① Spiral cable
- ② Interface
- ③ Operating unit
- ④ Battery pack (lithium-ion)
- ⑤ Battery bag
- ⑥ Bracket
- ⑦ Anti-tip supports
- ⑧ Grip rings
- ⑨ Wheel hub drive
- ⑩ Release device
- ⑪ Adapter sleeve for quick-release axle wheels
- ⑫ Plug-in contact



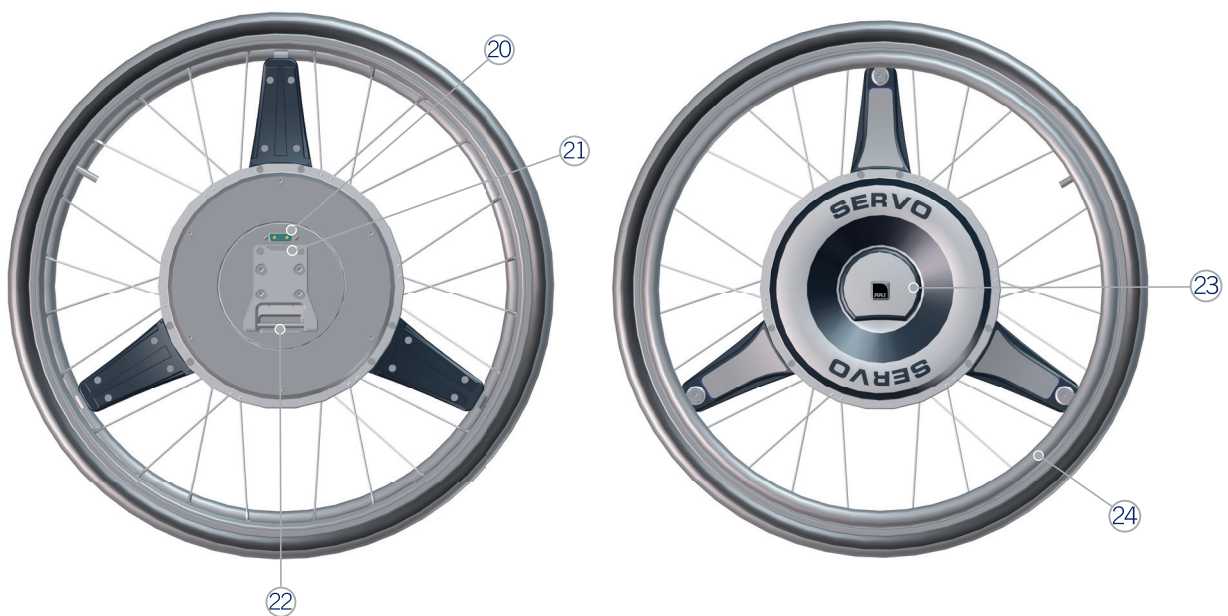
Type label incl. serial number (without figure)
on the back of the interface

Operating unit



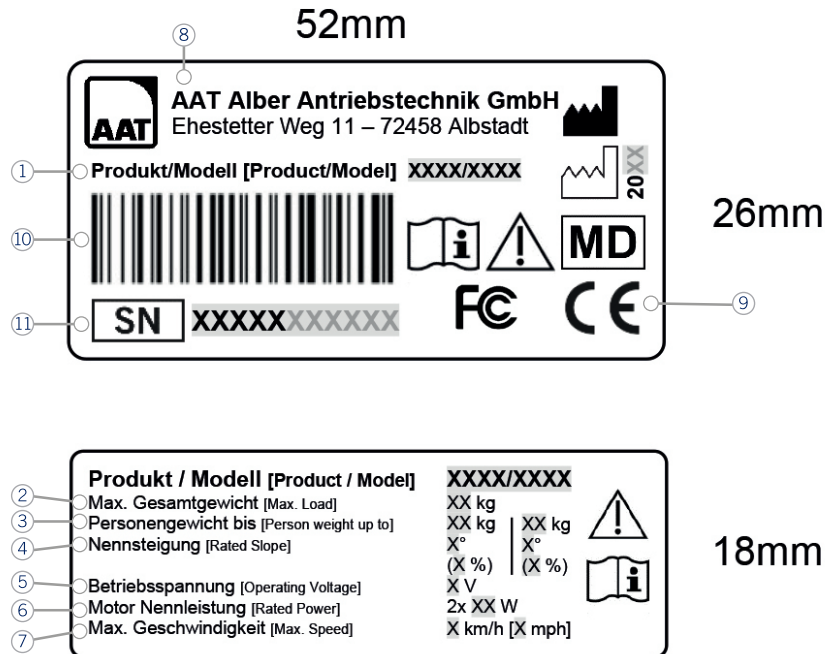
- ⑬ Hill assist
- ⑭ Driving program 2
- ⑮ Assistance level (reduce)
- ⑯ Display
- ⑰ Spiral cable
- ⑱ Assistance level (increase)
- ⑲ Driving program 1

Drive wheels



- ⑳ Plug-in contact
- ㉑ Catch
- ㉒ Mounting pin
- ㉓ Release device
- ㉔ Grip rings

4.2 Type plate incl. serial number



- | | |
|------------------------|--------------------------------------|
| ① Product / Model | ⑦ Max. speed |
| ② Max. total weight | ⑧ Manufacturer address |
| ③ Person weight up to | ⑨ Symbols (refer to chapter 3) |
| ④ Rated slope | ⑩ Barcode (refer to chapter 3) |
| ⑤ Operating voltage | ⑪ Serial number (refer to chapter 3) |
| ⑥ Rated power of motor | |

4.3 Intended purpose

A travel drive is an electrical transport device and is attached to a manual wheelchair. The objective of the electrical transport device is to make movement with a manual wheelchair easier for a self-propelled person and to increase or fully take over the force generation for the movement of the wheelchair. This shall maintain autonomous movement and increase mobility and flexibility for the patient.

The travel drives can be used indoors and outdoors on level surfaces and upward and downward slopes. The devices are controlled by the patients themselves.

4.4 Intended patient population

The intended patient population includes all persons who are able to sit independently. Users of the SERVO may have a maximum total weight of 200 kg together with their wheelchair and the SERVO travel drive.

4.5 Medical requirements and indication

The operator must be physically and mentally able to operate the product.

The SERVO is intended for patients who use or rather ride a manual wheelchair but do not have enough strength to propel the wheelchair continuously by the grip tires on their own.

4.6 Contraindications and restrictions

The travel drives must not be used if:

- the operator has obtained no training/instruction for the product!
- the operator is not physically and mentally able to operate the travel drive safely!
- more than one person shall be transported simultaneously!
- the operator does not have adequate eyesight!
- the braking effect is lost due to rain, wet conditions, snow or black ice!
- the braking effect of the travel drive does not set in!
- escalators or travelators shall be overcome!
- medical devices with e.g. a life support function, and diagnostic devices are in the proximity!
- it is not used according to the intended use!
- objects shall be transported!

4.7 User group

The travel drives are intended for their use by patients and lay operators.

Users are trained in the use of the device by means of a training course.

4.8 Technical data SERVO



WARNING - Do not exceed the total permissible weight and the maximum person weight, as this may lead to defects or overloading the SERVO.



NOTE - Observe the technical data.

Technology	SERVO
	Lithium-ion (ALPHA box)
Dimensions, battery pack	Refer to chapter "Dimensional drawing"
Own weight	Both drive wheels = 21.2 kg; battery bag = 0.2 kg; Interface incl. cable = 0.8 kg
	Battery pack = 4.2 kg
	Total weight (without wheelchair) = 26.4 kg
Total permissible weight	200 kg (person, wheelchair, SERVO) ⁽¹⁾
Maximum person weight	153 kg ⁽⁵⁾
Widening of wheelchair by attachment	Approx. 10 mm ⁽²⁾
Max. attachment width	No limitation, because of wheel hub drive
Possible wheel sizes	24"
Speed forward backward	6 km/h 3 km/h
Range with one charge of the batteries for a total weight of up to 200 kg	Up to 55 km ⁽³⁾
Braking capacity / rated slope for a person weight of up to 100 kg	Max. 20 % (11.3°) ⁽³⁾
Braking capacity / rated slope from a person weight of 101 kg up to 153 / 152 kg	Max. 14 % (8°) ⁽³⁾
Batteries	28.8 V / 16 Ah
Direct current motor	2 x 28.8 V / 70 W
Noise information	The A-weighted sound pressure level is typically below 40 dB(A)
Switching/actuating forces	Buttons (hill assist, driving programs, assistance levels): 0.74 N
Static stability downhill / sideways	Observe the wheelchair manufacturer's information
Maximum surmountable obstacle height	Observe the wheelchair manufacturer's information and chapter 7.2
Turning circle diameter	Observe the wheelchair manufacturer's information
Tyre pressure	7 bar
Grip ring tube diameter	19 mm
Grip ring outer diameter	540 mm
Storing/operating temperature: Device	-40 °C to +65 °C / -25 °C to +50 °C
Storing/operating temperature: Battery pack	-20 °C to +65 °C ⁽⁴⁾ / -25 °C to +50 °C ⁽⁴⁾
Charging temperature: Battery pack	0 °C to +40 °C
Vibration information	The weighted RMS value of acceleration, to which the upper body is subjected, is typically below 2.5 m/s ² .
Degrees of protection, IP class	IPX4
Adhesive label with serial number	Interface

(1) Observe the maximum load according to the wheelchair manufacturer's information.

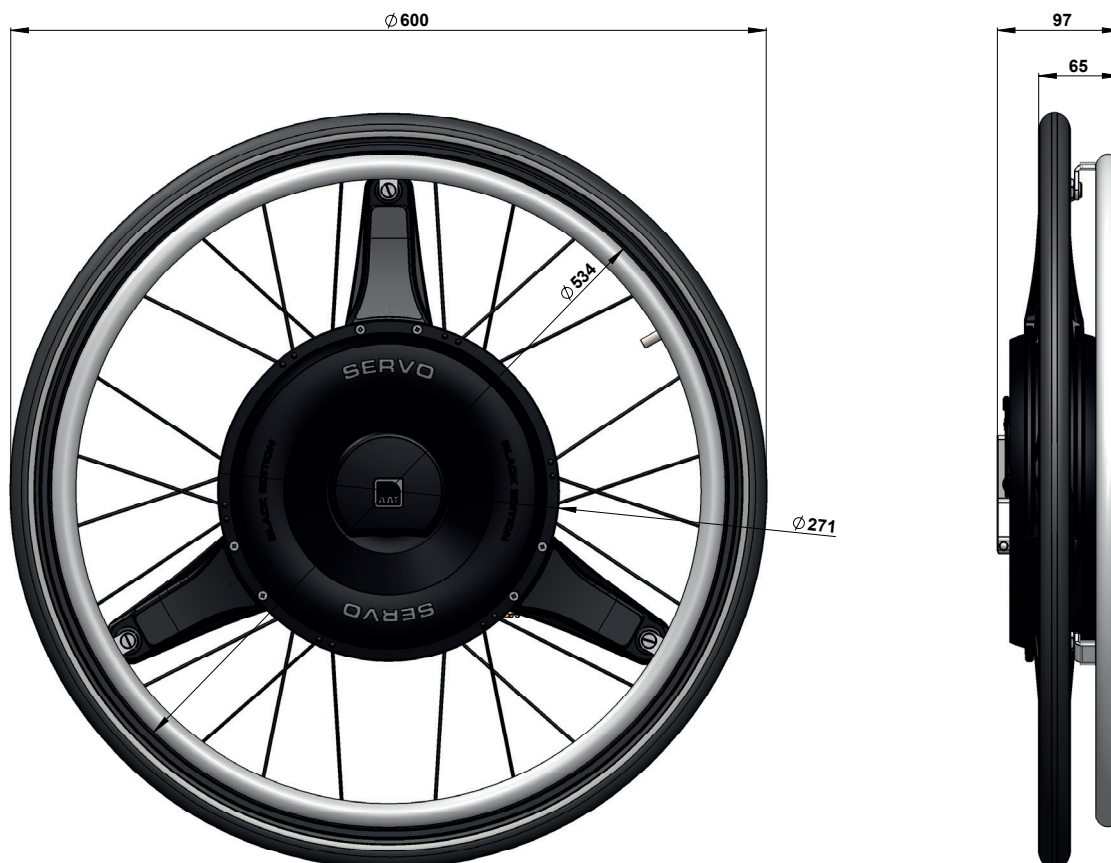
(2) The attachment width can vary further depending on the wheelchair model.

(3) The braking capacity / rated slope as well as the range according to ISO 7176-4 depend, among other things, on the weight of the person being transported, the ground, the terrain profile, the ambient temperature, etc. Attention: The values may vary depending on your own muscle strength!

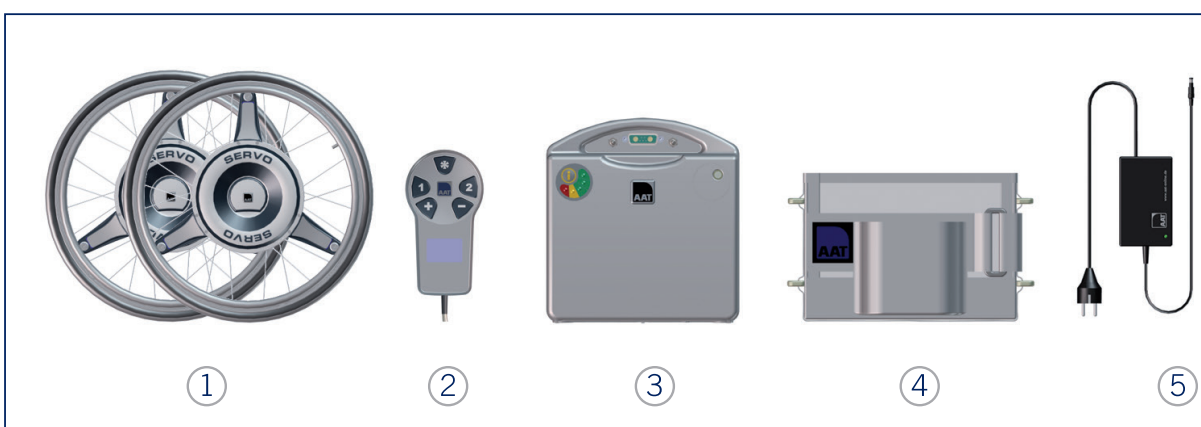
(4) At temperatures below 0 °C the performance of the battery pack will decrease; therefore we recommend a storage temperature of at least 0 °C.

(5) The person weight on the type plate and in the technical data were calculated using an assumed wheelchair weight of 20 kg.

4.9 Dimensional drawing



4.10 Scope of delivery



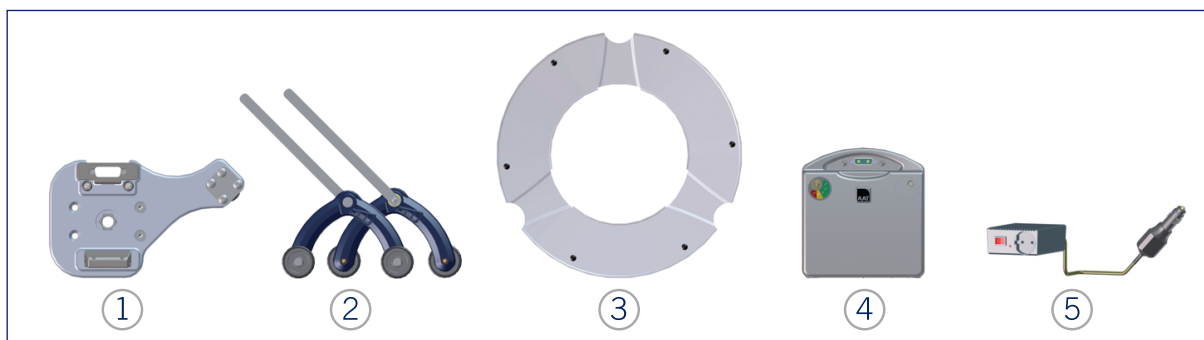
- ① Drive wheels
- ② Operating unit

- ③ Battery pack (lithium-ion)
- ④ Battery bag incl. Velcro tapes
- ⑤ Charger Lithium-ion battery

4.11 Accessories



NOTE - Only use AAT Alber Antriebstechnik GmbH accessories.



① Bracket

② Anti-tip supports

③ Spoke protector

④ Battery pack (additional)

⑤ Motor vehicle voltage converter 12 V / 230 V

5 Assembly

5.1 Drive wheels



CAUTION - Plug-in contacts must be dry!

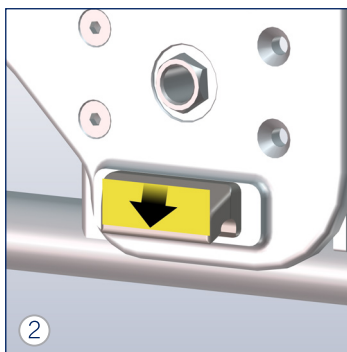


CAUTION - Do not lift or carry by the grip rings.

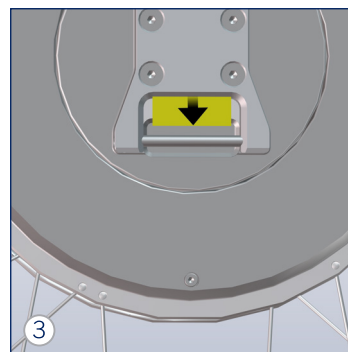
If the original wheelchair wheels are still on the wheelchair, remove them first.



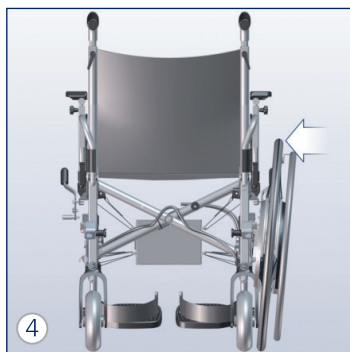
Lift the wheelchair and position the drive wheel.



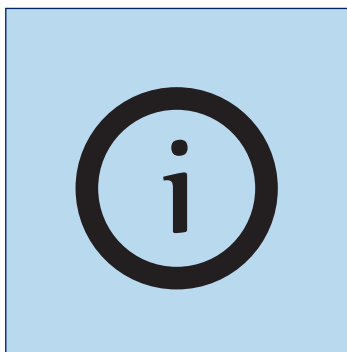
Attach the mount of the bracket to the mount on the wheel in the direction of the arrow.



Detail view:
Mounting pin on the wheel.



Lock the drive wheel.
» It must snap into place!



Repeat figures 1 - 4 on the other side.

5.2 Battery pack

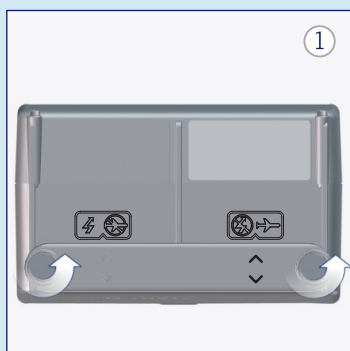


WARNING - Never short-circuit or connect the poles of the battery pack to avoid electric shocks!

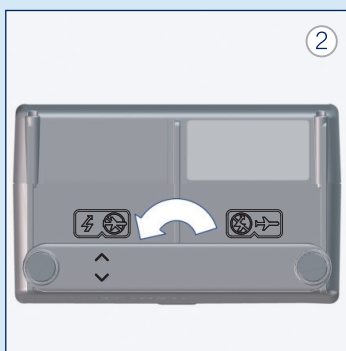


CAUTION - Plug-in contacts must be dry!

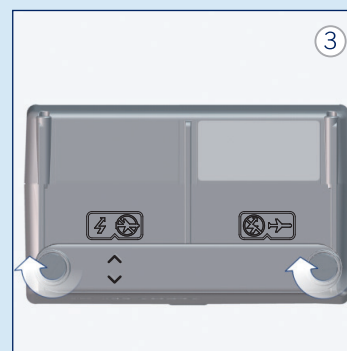
Establish driving mode (Fig. 1 - 3, only with lithium-ion battery pack)



Establish driving mode - Lithium-ion battery pack
Loosen the screws.



Turn and insert the switching strip. Observe the arrows - air plane crossed out.



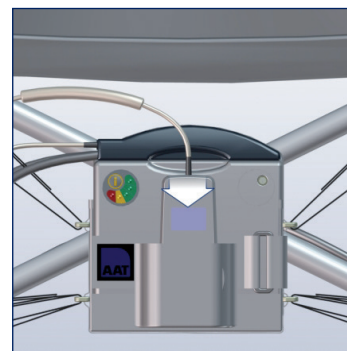
Tighten the screws.



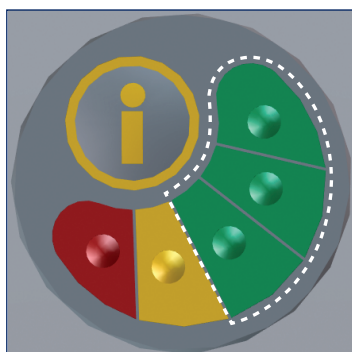
Place the battery pack in the battery bag and fix with Velcro.



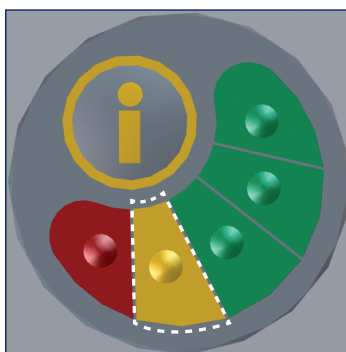
Plug in the interface ①.



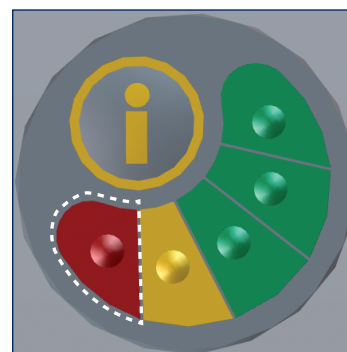
Insert the operating unit into the pocket.



Check the battery pack.
Press the info button. (Only for lithium-ion battery)
Green = full



Yellow = low
» Charge if necessary.



Red = empty
» Charge!

5.3 Anti-tip supports

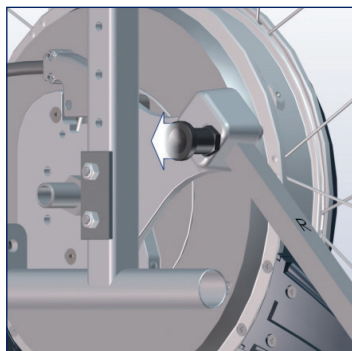


WARNING - Never use without both anti-tip supports to prevent the wheelchair from tipping backwards!

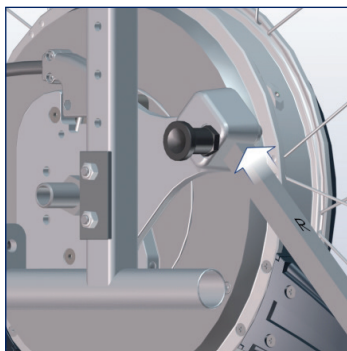


WARNING - Check the anti-tip supports before initial operation to ensure safety!

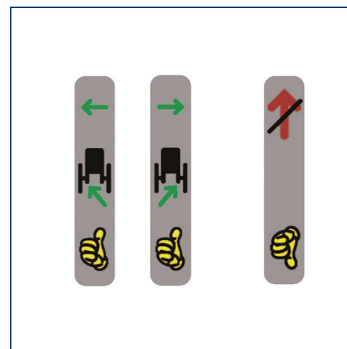
If there are no anti-tip supports on the wheelchair, use AAT anti-tip supports in pairs.



Pull out the locking pin of the bracket.



Push the anti-tip support into the bracket and secure with the locking pin.



Observe the markings.
Repeat process on the other side.

6 Starting up



DANGER - Operation only by a single, trained person. This person must be physically and mentally able to safely operate the SERVO and may not suffer from cognitive impairments!



DANGER - Never use without both anti-tip supports to prevent the wheelchair from tipping backwards!



DANGER - Avoid parallel journeys on steep hillsides or rails, to prevent the wheelchair from overturning!



DANGER - Cross over roads, crossroads and railway crossings with increased caution!



DANGER - Avoid driving on slopes with the SERVO deactivated, as there is no braking effect when doing so.



DANGER - Do not use on escalators or travellers to avoid injuries caused by a crash or the falling out of the occupant and the occurrence of damage to property!



DANGER - Never drive up slopes with too low a battery charge, as the drive can switch off abruptly.



WARNING - Do not drive up stairs or steps to prevent the wheelchair from overturning!



WARNING - Avoid driving in heavy rain, ice, snow and on unsurfaced ground (sand, mud, loose crushed rock) to prevent slipping!



WARNING - During driving breaks, when using local transport (buses, trams, etc.) and when transferring, switch the SERVO off and apply the parking brakes to prevent the wheelchair from rolling away.



WARNING - Drive down slopes at a low assistance level (driving program 1), to avoid dangerous situations.



WARNING - When driving on public roads, observe the road traffic regulations!



WARNING - Practise outdoors on level ground and with low assistance level (driving program 1).



WARNING - Never reach into rotating/moving parts to avoid crushing.



WARNING - If the drive elements become blocked or when the driving behaviour changes, switch off SERVO immediately and do not use it.



WARNING - Observe the maximum total permissible weight (refer to chapter 4.8)!



CAUTION - Always overcome kerbs/obstacles backwards (refer to chapter 7.2)!



CAUTION - Maintain sufficient distance to the edge of the kerb to avoid damage!



CAUTION - When using seat supports (cushions, etc.), ensure that the occupant is securely seated to prevent the occupant from falling out or slipping!



NOTE - Never drive backwards on walls with the anti-tip supports mounted so as not to damage the anti-tip supports.

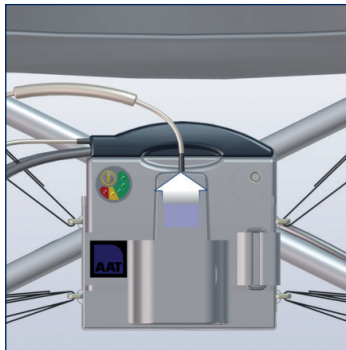


NOTE - Before first start-up, the battery pack must be fully charged!

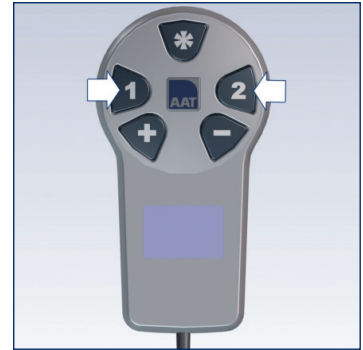
6.1 Switching on the device



Please, switch on the SERVO only after the occupant has taken his seat.



Take a seat in the wheelchair. Take the operating unit out of the pocket.

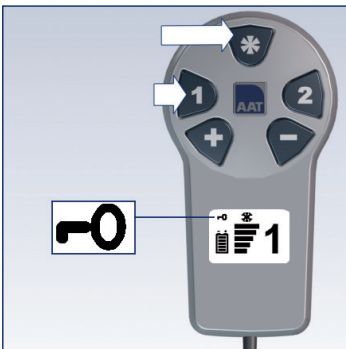


Switch on the SERVO - Press button 1 or 2. The last assistance level set is called up.

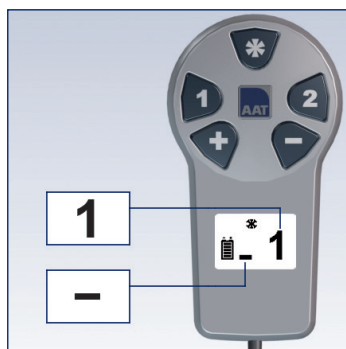
6.2 Tilt sensor calibration



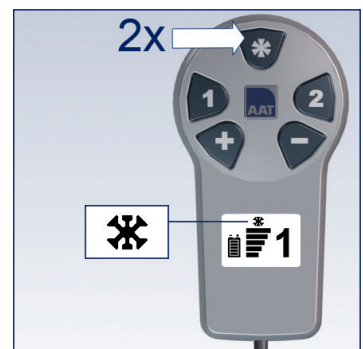
CAUTION - Always carry out calibration after changes to the wheelchair (replacement of castors / bracket / drive wheels) or when the user changes / reuses the wheelchair.



If necessary, deactivate the button lock. First press the * button, then press button 1.
» The symbol disappears!



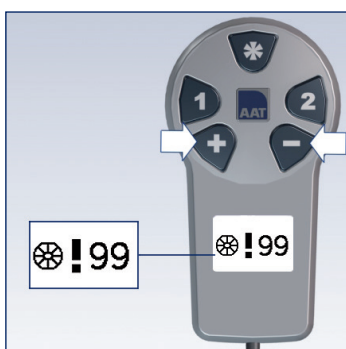
Set driving program 1 and the lowest assistance level.



Deactivate the hill assist.



Park the wheelchair on a horizontal level. Swivel the castors forward in the direction of travel.



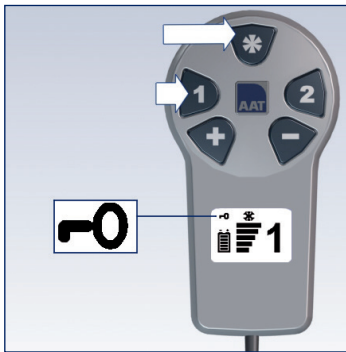
Press and hold the + and - buttons simultaneously until a message appears in the display.



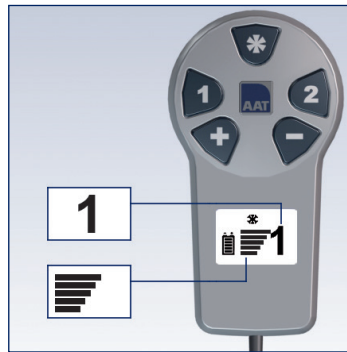
Switch off the SERVO - Keep button 1 or 2 pressed.

Remove the drive wheels, mount the right wheel on the left and mount the left wheel on the right. Switch on the SERVO - Press button 1. Repeat the sequence of this chapter.

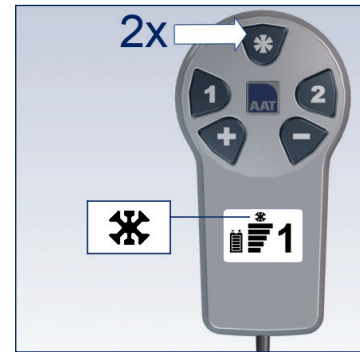
6.3 Driving profile selection



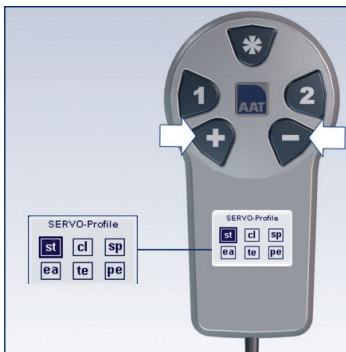
If necessary, deactivate the button lock. First press the * button, then press button 1.
» The symbol disappears!



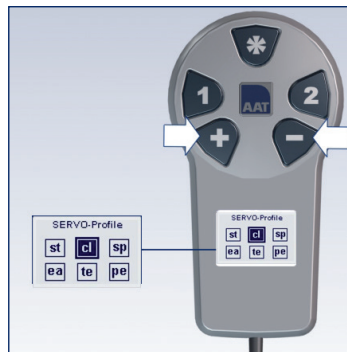
Set driving program 1 and assistance level 5.



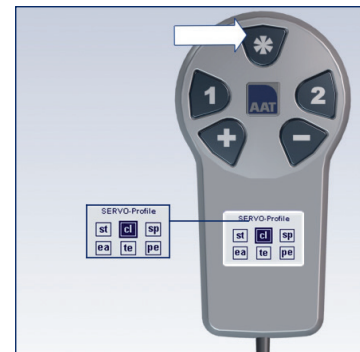
Deactivate the hill assist.



Press and hold the + and - buttons simultaneously until the driving profile selection appears in the display.



Use the + and - buttons to move the cursor in the display. The position is indicated by a dark frame around the driving profile.



A marked driving profile is selected with the * button.



Switch off the SERVO - Keep button 1 or 2 pressed.



Switch on the SERVO. The new driving profile is now active and is shown in the display.

Driving profiles

- » **Standard (ST):** SERVO basic setting for optimum assistance.
- » **Classic (CL):** Driving behaviour with stronger acceleration and lower overrun.
- » **Easy (ES):** Entry-level profile with smooth driving behaviour.
- » **Tetra (TE):** Profile adapted to tetraplegics.
- » **Personnel (PS):** Driving profile programmable specifically for the customer.
- » **Dynamics (D):** Active, significantly more dynamic driving behaviour. (optional - available as accessory)

6.4 Display indicators



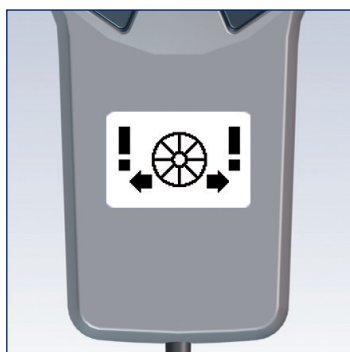
Start display



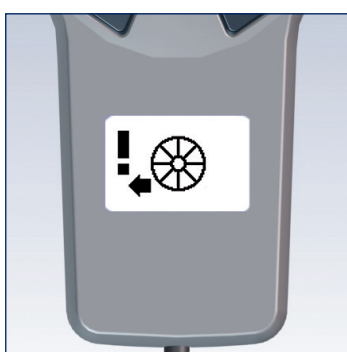
Standard display (when switched on with button 1)
» Hill assist
» Driving program 1
» Assistance level
» Battery capacity



Standard display (when switched on with button 2)
» Hill assist
» Driving program 2
» Assistance level
» Battery capacity



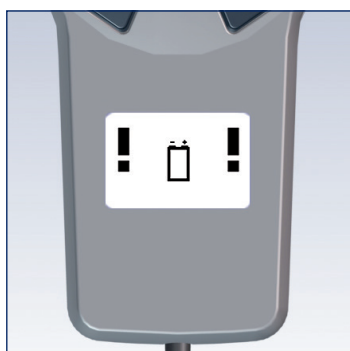
Warning notice
Wheel lock
Both wheels



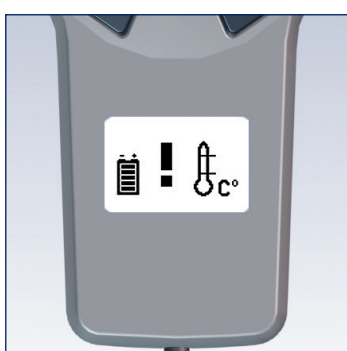
Warning notice
Wheel lock
Left wheel



Warning notice
Wheel lock
Right wheel



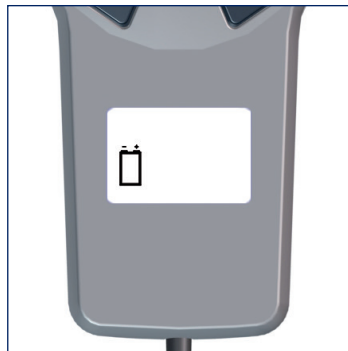
Warning notice
Undervoltage
Battery pack



Warning notice
Temperature
Battery pack

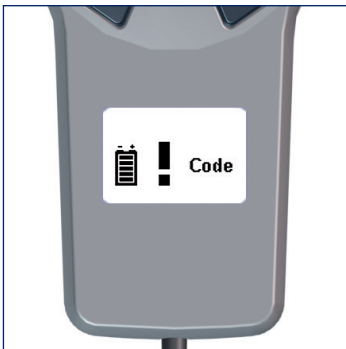


Parameterisation

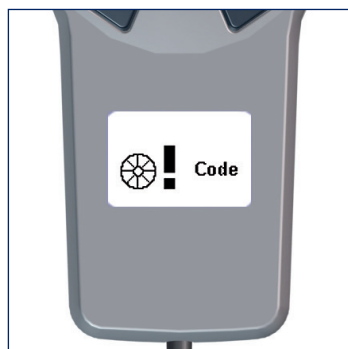


Battery pack is being charged

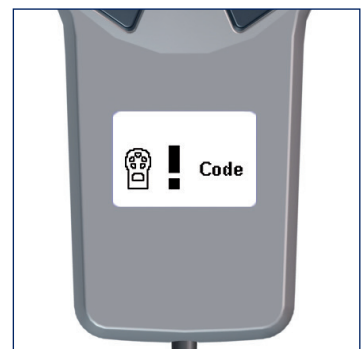
Error messages (refer to chapter 11.2)



Battery pack



Drive wheels



Operating unit

7 Operation

7.1 Driving with the SERVO



DANGER - To start off on a hill, start with low assistance (driving program 1) to avoid tipping backwards.



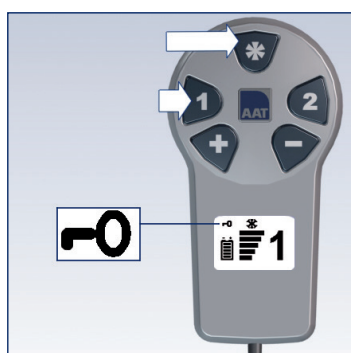
NOTE - Please refer to the chapter on warning notices, error messages and troubleshooting!



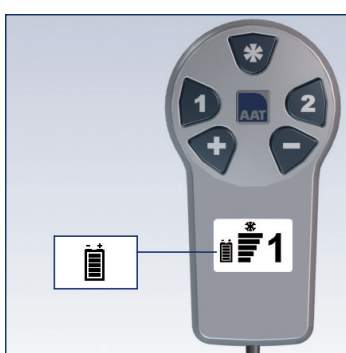
NOTE - Display lighting switches off if the operating unit has not been used for 12 seconds.



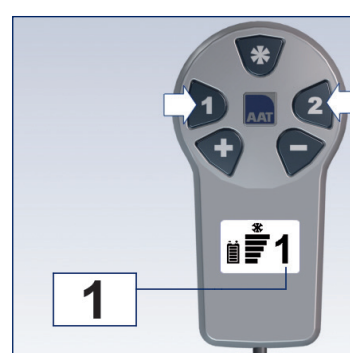
NOTE - In the event of longer breaks, the automatic switch-off switches off the SERVO after 10 min.



If necessary, deactivate the button lock. First, press the * button, then button 1.
» The symbol disappears!



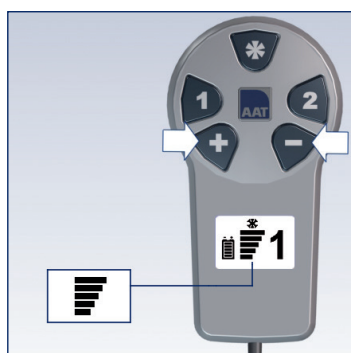
Check the battery capacity.
» 5 bars = full
» 3 bars = half-full
» 1 bar = empty > charge.



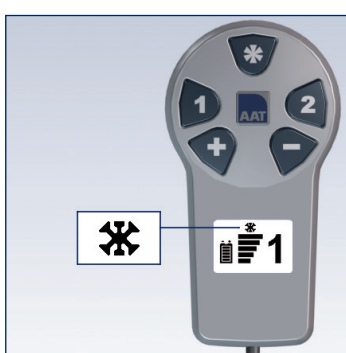
Select driving program 1 or 2.

We recommend 1 for indoors and 2 for outdoors!

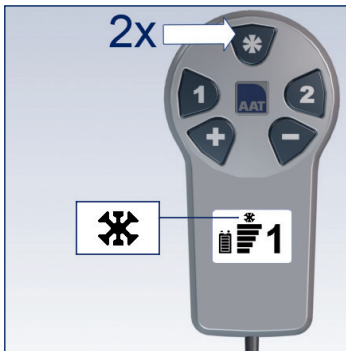
- » With driving program 1 > little assistance.
- » With driving program 2 > more support.



Select assistance level.

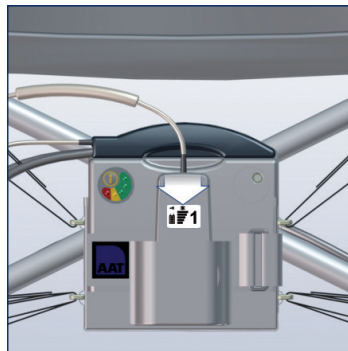


The hill assist is always active when switched on!



If desired, deactivate the hill assist. Press the * button twice.

» The symbol disappears!



Insert the operating unit into the pocket.



Move both grip rings in the desired direction of travel.

7.2 Overcoming obstacles



NOTE - Observe the wheelchair manufacturer's information on the maximum obstacle height in the user manual without fail!



NOTE - Be mindful of the anti-tip supports if you need to climb edges or obstacles as they can otherwise be damaged.

7.3 Manual driving with drive wheels

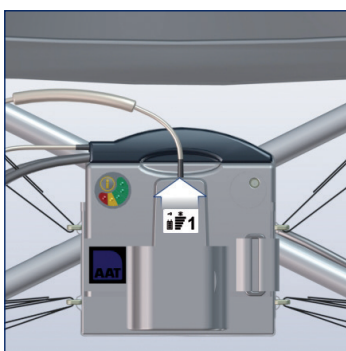


WARNING - Avoid driving on slopes with the drive wheels in manual mode.

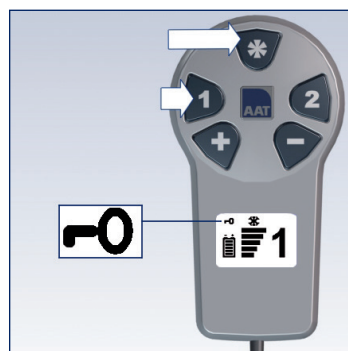


CAUTION - Risk of crushing between tyre and side part / armrest!

The SERVO regulates the speed during manual driving - solely to protect the electronics.



Take the operating unit out of the pocket.



Deactivate the button lock

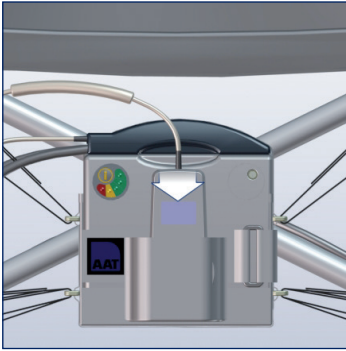
First press the * button, then press button 1.

» The symbol disappears!



Switch off the SERVO - Keep button 1 or 2 pressed.

» The last assistance level set is saved!



Insert the operating unit into the pocket.

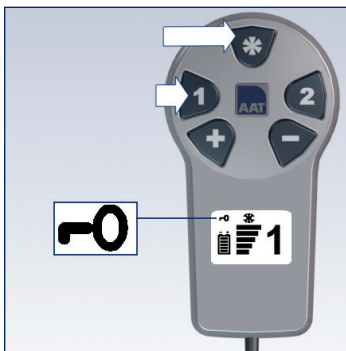


Drive manually.

7.4 Manual driving with quick-release axle wheels



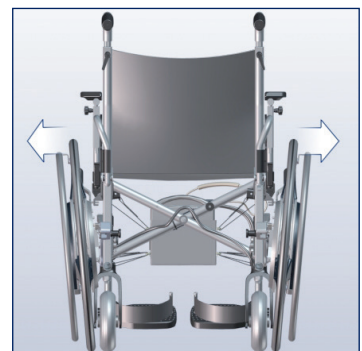
CAUTION - Risk of crushing between tyre and side part / armrest!



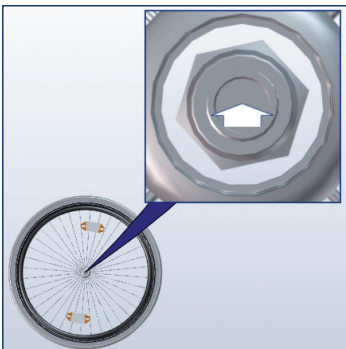
Deactivate the button lock
First press the * button,
then press button 1.
» The symbol disappears!



Switch off the SERVO - Keep
button 1 or 2 pressed.



Remove the drive wheels
(refer to chapter 8).



**Mount the quick-release
axle wheels.**
Press the quick-release axle
release button.



Adapt wheel.



Release the release button.
Repeat on the other side.

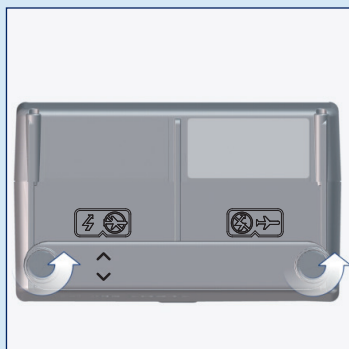
8 Removal



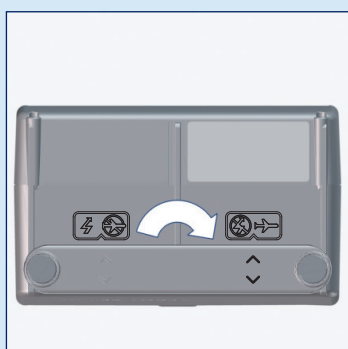
NOTE - To ensure that all individual switches have been activated by the switching strip, we recommend conducting a brief visual inspection before securing the cover in place.

Removing the battery pack

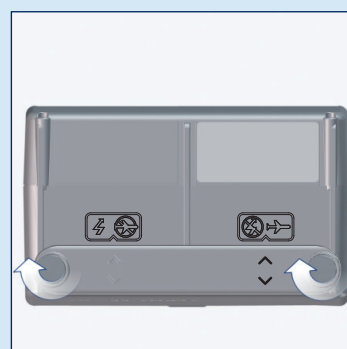
Carry out the steps listed in chapter 5.2 in reverse order. Please note that the flight mode (crossed out lightning) must be established for the lithium-ion battery pack if it is being transported.



Loosen the screws.



Turn and insert the switching strip. Observe the arrows.

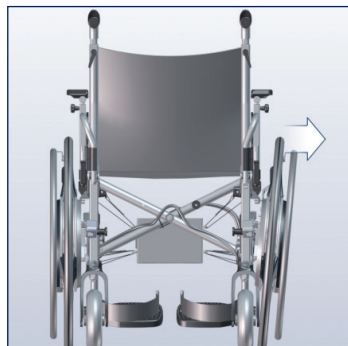


Tighten the screws.

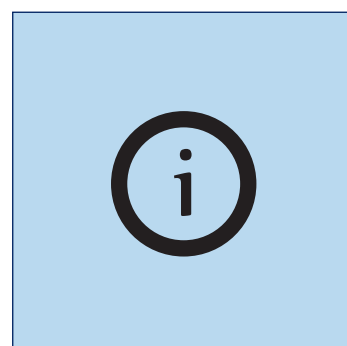
Removing the drive wheels



Pull and turn the release device.



Remove the drive wheel.
Grip the drive wheel by the tyre.

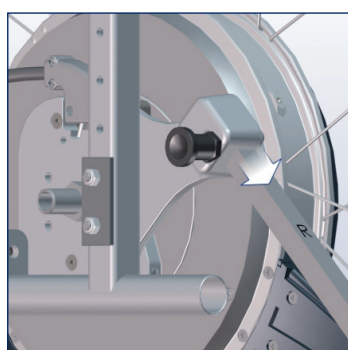


Repeat process on the other side.

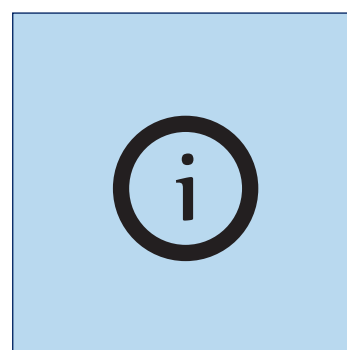
Removing the anti-tip supports



Pull the locking pin.



Remove the anti-tip support.



Repeat process on the other side.

9 Transportation



WARNING - Do not use the SERVO with wheelchair as a seat in a vehicle.



WARNING - Secure according to valid statutory provisions during transport in vehicles/aeroplanes!



CAUTION - Switch off during transport!



CAUTION - Observe the vehicle's weight specifications!



NOTE - Store in a frost-free environment at least one hour prior to start-up to avoid malfunctions!



NOTE - Disconnect the battery pack from the device when transporting or shipping. This also applies to returns to the specialist trade or the manufacturer.



Information by the manufacturer:

Lithium-ion batteries (28.8 V / 16 Ah) are considered dangerous goods, but are approved for air freight transport according to DOT + IATA (the flight mode must be activated). Nevertheless, in both cases, contact the airline in advance before taking a flight.

Flight mode: 8 x 56.7 Wh - de-energised single batteries.

If you need transport certificates for the airline, you will find them on our homepage at: <https://www.aat-online.de/en> > Service > Download area > General > Declaration of harmlessness

Switch off and remove the SERVO (refer to chapter 8).

If not already done (chapter 8), establish flight mode of the lithium-ion battery pack.

Stow securely in the vehicle boot.

10 Care and maintenance



WARNING - Repairs and technical safety tests are performed by the manufacturer, the AAT field staff or the authorised specialist shop!



NOTE - Perform a visual inspection prior to each start-up! If parts are visibly defective or missing, contact the authorised specialist shop or the manufacturer!



NOTE - It is recommended to perform a technical safety test every two years. The inspection plate provides information about the latest date. Tip: After a change in operator/reuse.

10.1 Battery pack and charger



DANGER - Before shipping lithium-ion batteries (repair, disposal, etc.), it is mandatory to inform your specialist dealer or the manufacturer, as there is increased danger! Special shipping conditions may require specific packaging, among other things! Your specialised dealer will receive approved transport containers on request - shipping may only be carried out via the specialised dealer! (The regulation only applies to the lithium-Ion battery pack)



WARNING - Never short-circuit or connect the poles of the battery pack to avoid electric shocks!



CAUTION - During the charging procedure, ensure that cables are laid safely to avoid tripping over them!



CAUTION - Do not attempt to repair or bypass defective fuses to avoid electric shocks!



CAUTION - Protect against moisture to avoid electric shocks!



NOTE - Never carry the charger by the charging cable/charging line.



NOTE - Charge the battery pack after each use! Exhaustive discharge results in a loss in capacity and shortens the service life.



NOTE - Protect the charger and the motor vehicle voltage converter against oils, greases, aggressive cleaning agents, thinning agents or damage.



NOTE - Observe the user manual for the charger/voltage converter.



NOTE - Store the battery pack in a frost-free environment at least one hour prior to start-up to avoid malfunctions.

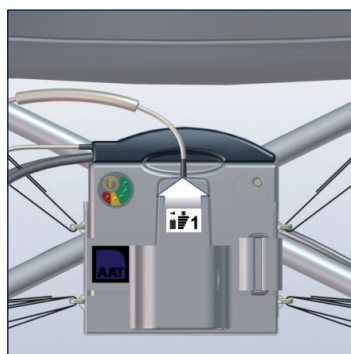


NOTE - Do not charge the battery near heat-sensitive or flammable materials.

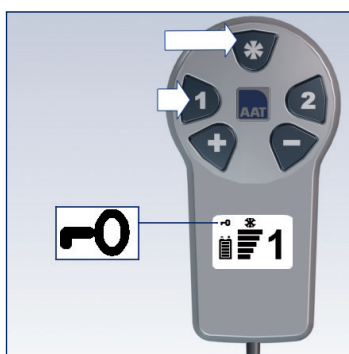
Recommendation: Remove the battery from the charger for long-term storage (or non-use). Carry out regular trickle charges at intervals of 1 month, then remove the battery from the charger again.



Information by the manufacturer: The battery pack is maintenance-free and rechargeable. New batteries only reach their full capacity after several charging cycles. During the charging process, SERVO cannot be operated.



Remove the operating unit from the pocket.

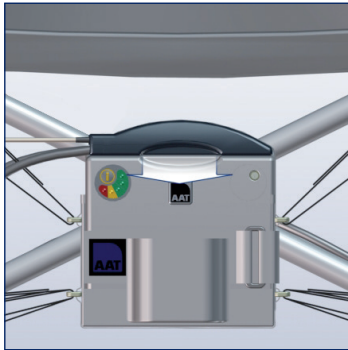


Deactivate the button lock. First press the * button, then press button 1.
» The symbol disappears!

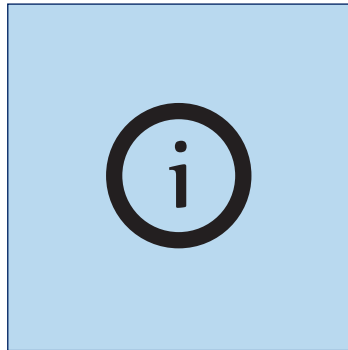


Switch off the SERVO.
» Keep button 1 or 2 pressed.

Charging the lithium-ion battery pack



If necessary, unplug the interface.



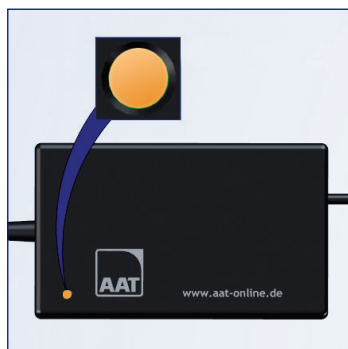
The battery pack can stay in the battery bag when being charged.



Connect the charger.
» Plug the charger connector into the charging port of the battery pack.

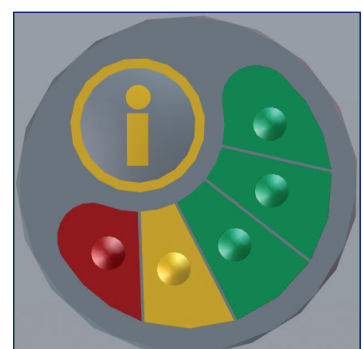


LED green = battery full
approx. 8 hours



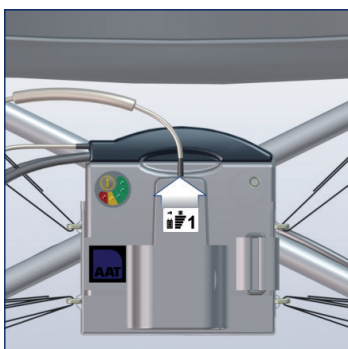
LED orange = battery is
being charged

LED red = battery empty
> please charge

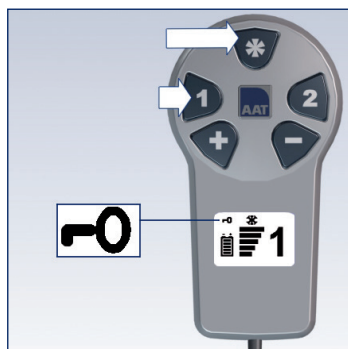


Check the capacity of
the battery pack (refer to
chapter 5.2)

Charging the lithium-ion battery pack in a motor vehicle



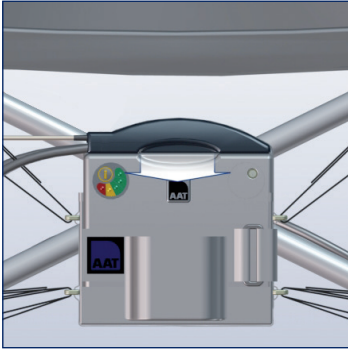
Take the operating unit out of
the pocket.



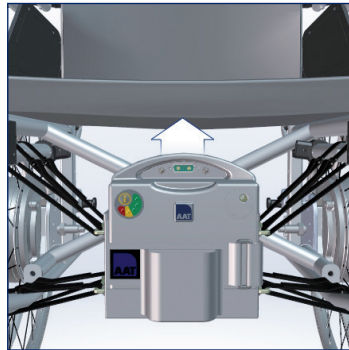
Deactivate the button lock.
» The symbol disappears!



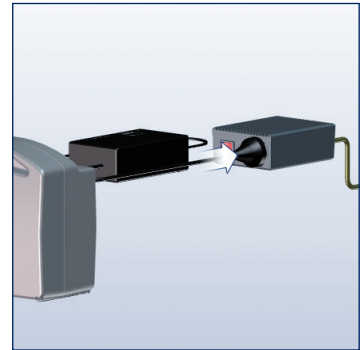
Switch off the SERVO.
» Keep button 1 or 2 pressed.



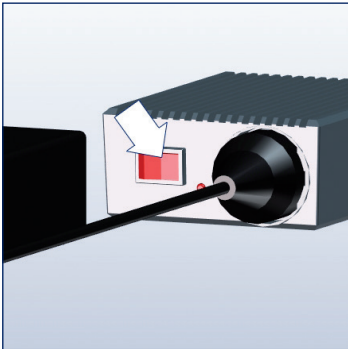
Unplug the interface.



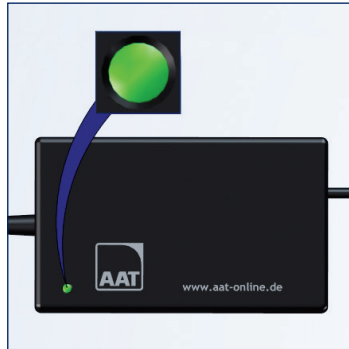
Remove the battery pack.
 » Open Velcro and remove battery pack.
 » Connect charger to battery pack.



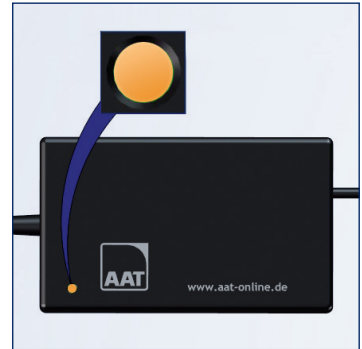
Connect voltage transformer and charger.



Switch on the voltage converter.
 Warning tone = low voltage!



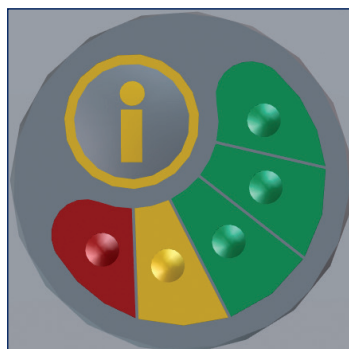
LED green = battery full
 approx. 8 hours



LED orange = battery is being charged.



LED red = battery empty
 > please charge



Check the capacity of the battery pack (refer to chapter 5.2)

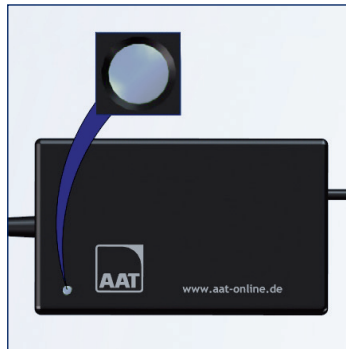
Information on the charger

 Note - Observe the manufacturer's information in the charger's user manual!



Charger SERVO L

- » Lithium-ion battery pack
- » Battery capacity 16 Ah.



Possible error

LED does not light up.
Contact the manufacturer!

10.2 Cleaning and disinfection



WARNING - No moisture must be allowed to enter the interior of the device!
This may result in electric shocks! Use only damp cloths for cleaning the device's surface!
Never use wet cloths!



WARNING - Test all safety-relevant functions after cleaning!



WARNING - Do not smoke during cleaning!



NOTE - Keep the **SERVO** away from sources of ignition.



NOTE - Clean the drive wheels in the event of dirt/deposits.



NOTE - Clean the wheelchair according to the manufacturer's information!



NOTE - Do not use a high-pressure cleaner!



NOTE - Do not use abrasive or aggressive agents (if necessary, test on an inconspicuous area first)!



NOTE - Do not use substances containing alcohol!



NOTE - Do not use acidic substances such as orange cleaner!

Wipe the surfaces of the **SERVO** with mild household cleaning agents.
» Observe the manufacturer's information.

If you want to disinfect the **SERVO**, carry out a wipe disinfection.

Use household disinfectants.
» Observe the manufacturer's information.

Possible disinfectants:

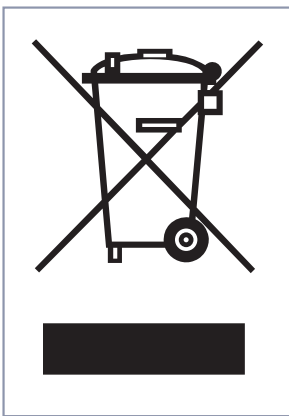
- Ecolab Oxy Wipe disinfectant wipes
- B15 disinfectant wipes orochemie
- Schülke mikrozid sensitive wipes
- Sagrotan disinfection cleaner

10.3 Disposal



DANGER - Before shipping lithium-ion batteries (repair, disposal, etc.), it is mandatory to inform your specialist dealer or the manufacturer, as there is increased danger! Special shipping conditions may require specific packaging, among other things! Your specialised dealer will receive approved transport containers on request - shipping may only be carried out via the specialised dealer! (The regulation only applies to the lithium-Ion battery pack)

Your SERVO and its batteries are durable products. After expiry of the natural service life, you can return these components to AAT Alber Antriebstechnik GmbH or their specialist dealers for disposal.



On this product you will find the symbol of the "crossed out dustbin" according to the WEEE Directive. This marking indicates that these products must be brought to a regional recycling facility when they have reached the end of their useful life.

Please check the applicable legislation in your country for the disposal of this product as the implementation of the WEEE Directive differs in the respective countries and/or does not apply outside of Europe.

Alternatively, you can also return these products to AAT or the competent specialized dealers, where they are collected for correct disposal.

10.4 Long-term storage

If the SERVO is not used for an extended period of time (e.g. over several months), observe the following information:

- Observe the wheelchair manufacturer's information if the wheelchair is to be stored!
- No moisture shall reach the inner parts of the device.
- Store in dry rooms and avoid excessive air humidity. Cover with film, if necessary!
- Protect against permanent exposure to sunlight!
- Unauthorised persons, particularly children, should not have unsupervised access to the storage location of the SERVO!
- Remove the battery back before placing in storage!
- Observe the safety instructions in chapter 10.1 for placing the battery pack in storage!

If the SERVO is to be put into operation again, clean the wheelchair and the product (chapter 10.2).

Check whether a technical safety test must be carried out (refer to chapter 10.5).

If a technical safety test is not necessary, electrical function, anti-tip supports, brackets and, if necessary, the air pressure of the castors must be checked prior to start-up!

10.5 Technical safety testing



NOTE - Technical safety tests may only be performed by the manufacturer, the AAT field staff or the authorised specialist shop.



NOTE - It is recommended to perform a technical safety test every two years. The inspection plate provides information about the latest date. Tip: After a change in operator/reuse.



The test badge shows when the test is to be carried out at the latest!

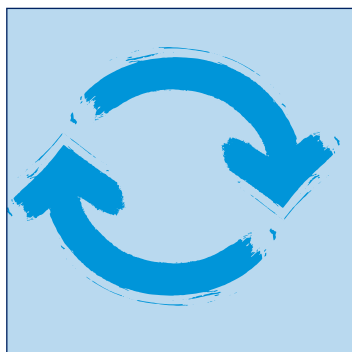
To ensure flawless device function, we recommend carrying out a safety check every 2 years. We also recommend the technical safety test before each reuse.

Training is required in order to be able to perform the technical safety testing. For more information, please visit:
www.aat-online.de/en

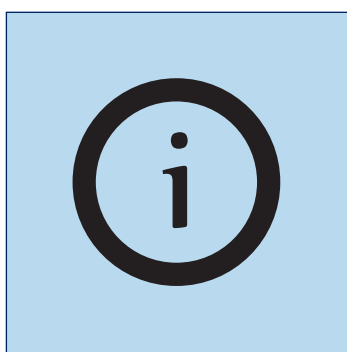
10.6 Reuse (change in operator)

The term reuse is used when the AAT product of patient X is to be used for another patient Y. In addition, there is a reuse when a patient receives a different wheelchair and therefore requires new add-on parts.

Please contact the manufacturer, the AAT field service or the authorised specialist shop.



The SERVO is suitable for reuse.



A technical safety test and cleaning/disinfection work should be performed prior to each reuse. (Refer to chapter 10.5 and 10.2)

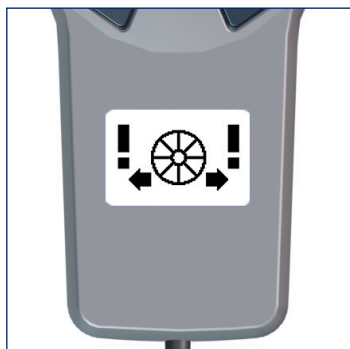
10.7 Corrective action/recall

If new important safety information regarding the handling of your product is available, we will inform you about this. As already stated at the beginning, you will always find the latest version of this user manual on our homepage.

Should any subsequent changes be made to the product or corrective action be taken, we will inform our authorised dealers in writing about all the affected serial numbers. If your product is affected by a recall, you will subsequently be informed about all further steps to be taken.

11 Warning notices, error messages and troubleshooting

11.1 Warning notices



Wheel lock

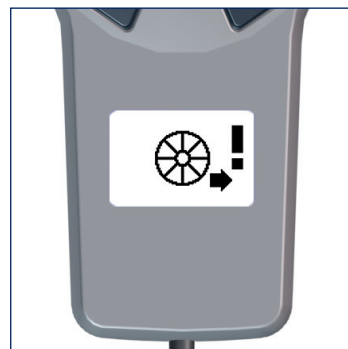
Both drive wheels

- » Wheel and both arrows are flashing!
- » Adapt the wheels correctly (refer to chapter 5.1)



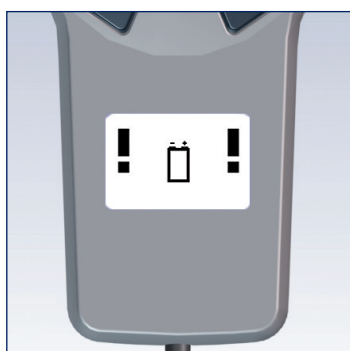
Left drive wheel

- » Wheel and left arrow are flashing!
- » Adapt the wheel correctly (refer to chapter 5.1)



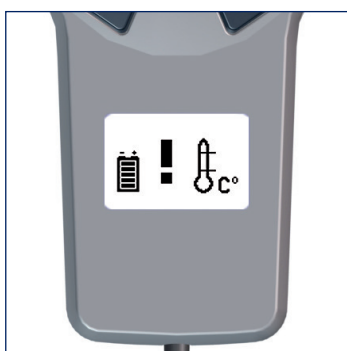
Right drive wheel

- » Wheel and right arrow are flashing!
- » Adapt the wheel correctly (refer to chapter 5.1)



Undervoltage

- » Battery is flashing!
- » Charge the battery pack (refer to chapter 10.1)



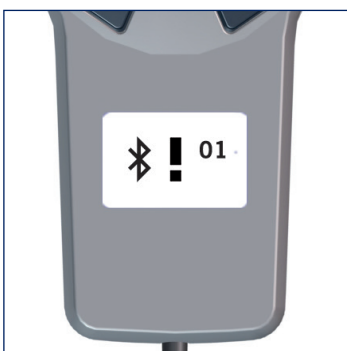
Battery pack temperature

- » Battery is flashing!
- » End the ride with the SERVO and allow to cool down.



Connectivity

- » Bar is running through the display!
- » Check the version of the SERVO components. (refer to chapter 11.3.)



Bluetooth

- » Bluetooth sign is flashing!
- » Check the connection. (refer to chapter 11.3)

11.2 Error messages

Refer to chapter 6.4 Display indicators - Error messages.

The display symbol indicates which component is affected by a fault (battery pack, drive wheels or operating unit)

Battery pack fault

Code	Error message	Error correction
01	No connection to the battery	Notify the manufacturer!
02	Cell error	Notify the manufacturer!
03	Communication	Notify the manufacturer!
04	Parameter data	Establish flight mode, wait 10 sec, establish driving mode. Error still present? Yes: Notify the manufacturer!
05	Software sequence	Establish flight mode, wait 10 sec, establish driving mode. Error still present? Yes: Notify the manufacturer!
06	Wrong command	Establish flight mode, wait 10 sec, establish driving mode. Error still present? Yes: Notify the manufacturer!

Drive wheels fault

Code	Error message	Error correction
01	Not assigned	Notify the manufacturer!
02	Motor controller	Notify the manufacturer!
03	Electronics	Notify the manufacturer!
04	Parameter data	Notify the manufacturer, the AAT field service, the authorised specialist dealer.
05	Software sequence	Switch off the SERVO, wait 10 sec., switch on the SERVO. Error still present? Yes: Notify the manufacturer!
06	Wrong command	Switch off the SERVO, wait 10 sec., switch on the SERVO. Error still present? Yes: Notify the manufacturer!

Operating unit error

Code	Error message	Error correction
01	Keyboard	Notify the manufacturer, the AAT field service, the authorised specialist dealer.
02	Not assigned	Notify the manufacturer, the AAT field service, the authorised specialist dealer.
03	Serial number	Notify the manufacturer, the AAT field service, the authorised specialist dealer.
04	Parameter data	Switch off the SERVO, wait 10 sec., switch on the SERVO. Error still present? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.
05	Software sequence	Switch off the SERVO, wait 10 sec., switch on the SERVO. Error still present? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.
06	Wrong command	Switch off the SERVO, wait 10 sec., switch on the SERVO. Error still present? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.
BT01	Bluetooth 01	Switch off the SERVO, wait 10 sec., switch on the SERVO. Error still present? Yes: Notify the manufacturer!
BT02	Bluetooth 02	Notify the manufacturer, the AAT field service, the authorised specialist dealer.

11.3 Troubleshooting

Problem	Check and possible remedy
Unable to switch on the SERVO	Interface plugged in? No: Plug it in!
	Is the battery pack empty? Yes: Charge!
	Battery pack in driving mode? No: Establish driving mode.
	Does the problem persist? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.
The SERVO does not move	Charger still plugged in? Yes: Unplug.
	SERVO switched on? No: Switch it on.
	Drive wheels locked? No: Lock.
	Does the problem persist? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.
Unable to load the battery pack	Is the charger connected? No: Connect it correctly!
	Does the problem persist? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.
Impairment of driving behaviour (e.g. increased rolling resistance)	Air pressure checked? No: Check and top up with air if necessary.
	Does the problem persist? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.
Damage on the wheelchair tyres	 WARNING - While changing a wheel, no person may be sitting in the wheelchair!
	 NOTE - Always replace tyres in pairs.
	1. The wheelchair must be standing on a level and solid surface. Before removing a wheel, support the chassis so that it cannot tip over, and secure the wheelchair against tipping over and rolling away. 2. Before repairing the tyre, open the compressed air valve to release the remaining compressed air.
	Change of tyres: Lifting and fitting the tyre cover must be carried out using the appropriate mounting levers (bicycle accessories). Do not use screwdrivers or other pointed objects as levers.  NOTE - The tyre pressure is indicated on both sides of the tyre. For queries, notify the manufacturer, the AAT field service, the authorised specialist dealer.
Connectivity problem	Wheels correctly locked? No: Lock the wheels correctly.
	Interface and operating unit connected correctly? No: Connect interface and operating unit correctly.
	Check whether the connections are soiled or damaged. If soiled, clean.
	Problem still present or connection damaged? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.
Bluetooth error	Battery interface plugged in correctly? No: Plug it in correctly.
	Does the problem persist? Yes: Notify the manufacturer, the AAT field service, the authorised specialist dealer.

12 Warranty and liability

Warranty

AAT Alber Antriebstechnik GmbH assumes the guarantee for the SERVO (except the battery pack) and all accessories, for a period of two years from the date of receipt, that these are free of material and processing defects.

For the lithium-Ion battery pack, always assuming correct care and maintenance, AAT Alber Antriebstechnik GmbH grants a warranty of twelve months from the date of purchase.

The SERVO guarantee does not cover defects that are attributable to:

- damage as a result of excessive strain.
- any damage resulting from careless handling.
- violent damage.
- natural wear parts (driving wheels, wheelchair tyres).
- improper or inadequate maintenance by the customer.
- unauthorised structural alterations or improper use of the SERVO or the accessories.
- use of the SERVO beyond the total permissible weight.
- improper charging of the battery pack.

Liability

As the manufacturer of the SERVO, AAT Alber Antriebstechnik GmbH is not responsible for any damages that may result if:

- The SERVO was improperly handled.
- Repairs, assembly or other work were performed by unauthorised personnel.
- The SERVO was not used in accordance with the user manual.
- No original AAT spare parts or accessories have been fitted or connected to the SERVO
- Parts of the SERVO were removed.
- Loads were applied to the SERVO beyond the permissible total weight.
- The SERVO was not serviced periodically (in a regular 2-year cycle) by the manufacturer, the AAT field service or an authorised specialist dealer.
- The SERVO has been operated with insufficiently charged batteries.

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[illegible]

[illegible]



TRANSLATION OF THE ORIGINAL

EU DECLARATION OF CONFORMITY

We hereby declare under our sole responsibility

AAT Alber Antriebstechnik GmbH

Ehestetter Weg 11

72458 Albstadt / Germany

SRN: DE-MF-000007581

that the pushing and braking aids as described in the following for manual wheelchairs as of serial number R1602240014

Risk class: Class I

(in accordance with Annex VIII, Rule 1 and 13)

Power assist transport device

SERVO L BLACK EDITION R1602

Article no. 333225

(Basis-UDI-DI) 4054959R1602NN

complies with the basic safety and performance requirements and applicable parts of the following regulations and standards.

2017/745/EU (Medical Device Regulation)	ISO 7176-21; ISO 7176-14; EN 12184; EN ISO 21856; EN ISO 10993-1 IEC 60335-2-29; IEC 60335-1
2011/65/EU (Restriction of Hazardous Substances)	EN IEC 63000

The products are marked with **CE** in compliance with the regulations. This declaration is only valid for the products with the article numbers indicated above. This declaration is replaced whenever there is a significant change to the product, product family, standards and laws.

16/02/2023, Albstadt

Date, place

Daniel Mohr, PRRC (MDR 2017/745 Art.15)



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