

Skippi

Service Manual





Skippi power wheelchair service manual

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1 General information

1.1 Foreword

- Regular maintenance is important - it improves safety and increases the lifespan of the product.
- All Mobility products should be inspected and serviced **once a year**.
- However, we recommend inspecting, readjusting, and if necessary servicing the product every **6 months** if the product is used frequently, by growing children or by users with changing clinical conditions.
- Only use original spare parts for all service and maintenance work. The service and maintenance tasks described here should only be completed by trained, qualified personnel and not by the user of the device.
- This service and maintenance manual refers to the respective spare parts catalogues and the instructions for use of the described products. Please use these documents together.
- Use the maintenance schedule (checklist) as a template for making copies. Retain completed maintenance schedules and provide the customer with a copy.

	Instructions for use
Skippi	647G57=*

1.2 Overview





Fig. 1 Overview

- | | |
|-----------------|------------------|
| 1 Standard back | 6 Caster wheel |
| 2 Side panel | 7 Motor |
| 3 Standard seat | 8 Drive wheel |
| 4 Brake lever | 9 Frame |
| 5 Footrest | 10 Control panel |

2 Safety instructions

2.1 Explanation of symbols

 WARNING	Warnings regarding possible risks of severe accident or injury.
 CAUTION	Warnings regarding possible risks of accident or injury.
NOTICE	Warnings regarding possible technical damage.
INFORMATION	Information regarding operation. Information for service personnel.

2.2 Standards and directives

All safety information contained in this service manual refers to the currently valid national laws and regulations of the European Union. In other countries, compliance with the applicable laws and national regulations is required.

The power wheelchair has been constructed using state-of-the-art technology and is safe to operate. The safety of the Skippi power wheelchair has been confirmed by CE certification and the declaration of conformity.

2.3 General safety instructions

INFORMATION

Regular maintenance is important. It increases safety and prolongs the service life of the product.

CAUTION

Risk of suffocation. Packaging materials must be kept out of reach of children.

NOTICE

Risk of damage due to unauthorised service. Service and maintenance work may only be completed by qualified personnel. Only original spare parts may be used for all service and maintenance tasks.

NOTICE

Risk of damage caused by not adhering to maintenance intervals. The manufacturer recommends having the power wheelchair inspected and maintained for functionality and operational safety by authorised, qualified personnel once a year. In case of frequent user changes (growing children or youths) or users with changing clinical pictures, the wheelchair should be inspected, adjusted and maintained twice a year.

NOTICE

Risk of damage caused by failure to comply with the service documentation. Knowledge of the service instructions and the instructions for use is a prerequisite for proper service.

The service and maintenance instructions must be read carefully before commencing work. The service manual applies in conjunction with the instructions for use and the spare parts catalogue. All documents must be used together.

All safety instructions contained in this service manual and all other applicable documents must be observed and complied with. They must be available to service and maintenance personnel at all times.

NOTICE

Risk of damage due to excessive heat or cold. The power wheelchair is only functional in a temperature range from -15 °C to +40 °C/+5 °F to +104 °F. It must not be operated at temperatures outside this range.

NOTICE

Damage due to overloading. The maximum load capacity for the power wheelchair is 50 kg/ 110,2 lbs.

INFORMATION

Familiarise yourself with the functions of the product. If you are not familiar with the product, read the instructions for use before testing it. The instructions for use are available from the manufacturer (see overview of all Ottobock subsidiaries under "Ottobock Worldwide"). Additional documentation can be downloaded from the manufacturer's website at www.ottobock.de or www.ottobock.com.

2.4 Safety instructions for the use of tools and accessories

⚠ CAUTION

Risk of health impairment due to the use of incorrect tools. When completing the tasks, only use tools that are suitable for the conditions at the place of work and for which safety and the protection of health are assured with proper use.

Verify proper functionality before use. For use of the work equipment, the ergonomic relations between the workplace, work equipment, work organisation, workflow and task must be taken into consideration; this especially applies to the body posture assumed when using the work equipment.

⚠ CAUTION

Health risks due to the use of improper work clothing. Ensure that legally prescribed protective work clothing is worn.

⚠ CAUTION

Risk of injury during tasks that involve lifting. When repair and maintenance tasks must be completed under raised parts or equipment, ensure suitable precautions are taken to secure the applicable components against falling. Equipment used to raise loads must prevent the load from accidentally shifting in a dangerous manner, dropping in free fall or being accidentally released.

When using a lifting platform, make sure the power wheelchair is centred on the platform and no parts (e.g. anti-tipper) are protruding into the danger zone.

⚠ CAUTION

Risk due to hazardous materials. Hazardous materials may only be kept at the place of work in quantities required for ongoing tasks. Regularly and safely remove waste and residue. Clean up spilled substances immediately.

2.5 Safety instructions for maintenance work

⚠ CAUTION

Risk of injury due to pinch points. For design reasons, there are pinch points between the seat and frame of the power wheelchair. Special caution is required during all work on the corresponding components.

⚠ CAUTION

Hazards while working on the brake system. Note that there is no braking functionality when the brake is unlocked. The brake must only be unlocked in hazardous situations and for maintenance or repairs. The corresponding force required for acceleration and deceleration must come from the person pushing. Once push mode is no longer needed, the brake release lever must be locked immediately.

NOTICE

Risk of damage due to improper preparation for maintenance work.

- The power wheelchair must be turned off and the fuse must be removed for all maintenance tasks. Functional tests of the electrical components are excepted from this rule.
- Secure the product to prevent it from tipping over or falling, e.g. off the workbench.
- Some components of the power wheelchair, e.g. the batteries, frame, seat and motors, are very heavy. Hoisting devices of sufficient capacity must be used where applicable.
- Clean/disinfect the product before you start testing it. Consult the instructions for use regarding product care and product-specific testing instructions.

NOTICE

Risk of damage due to unsecured screw connections. Unsecured screw connections can become loose while using the product. Secure screws and nuts. The screw connections must be tightened properly after all installation tasks. Defined torque specifications must be followed.

Many screw connections utilise screws and nuts equipped with a thread lock. If such screw connections need to be loosened, the nuts or screws must be replaced with nuts/screws supplied with a new thread lock. If new screws or nuts with a thread lock are not available, apply a medium-strength liquid thread locking compound (such as Loctite® 241 or Euro Lock A24.20) to the existing screws.

NOTICE

Risk of damage to the padding. The upholstery must be adequately protected against mechanical and chemical damage during all work on the seat. The backrest and seat bottom are flame retardant but nevertheless flammable. They must not come into contact with open flames or embers.

NOTICE

Damage due to improper cleaning after completion of the maintenance tasks. The power wheelchair may not be cleaned with a jet of water or a pressure washer under any circumstances. A cloth or sponge may be used for cleaning. Water must not come into direct contact with the motor under any circumstances.
Check the driving behaviour of the power wheelchair after cleaning it.

INFORMATION

The tyres of the power wheelchair contain chemical substances that may react with other chemical substances (e.g. cleaning agents, acids, etc.).

2.6 Safety instructions for maintenance work on electrical components

NOTICE

Risk of damage due to improper preparation for maintenance work.

- If the driving function is not required, turn off the control unit or jack up the drive wheels in order to prevent uncontrolled operation through accidental joystick activation.
- When carrying out maintenance work make sure water does not come into direct contact with the electronics or the battery.
- When attaching plug connectors on the controller make sure the contacts are assigned correctly.

⚠ CAUTION

Risk of injury while working on the battery. Only use Ottobock battery chargers which have been tested and approved for use with the given batteries by the manufacturer (observe information on battery charger). Failure to do so can result in a battery explosion and endangerment to health due to contact with battery acid.

Smoking and open flames are prohibited while working on the batteries. Sparks must be avoided. Drive batteries can supply very large amounts of energy and may arc if they are short-circuited. Therefore, always disconnect the batteries when working on the motor control or wiring.

NOTICE

Risk of battery damage. In order to prevent short circuits, always use insulated tools when working on the batteries.

Prevent deep discharge of the batteries in order to avoid loss of functionality and permanent battery damage. Ensure correct polarity when connecting the batteries.

NOTICE

Damage to the battery charger. Prevent overheating of the charger during the charging process. Ensure that the cooling fins on the back of the device are not covered.

INFORMATION

During extended periods of disuse or shipment of the power wheelchair, remove the fuse from the fuse holder to prevent deep discharge of the batteries due to standby consumption.

2.7 Effects of electromagnetic interference

WARNING

Risks of injury and product damage due to electromagnetic interference. It is very important that you read the information pertaining to the possible effects of electromagnetic interference on your power wheelchair.

2.7.1 General information on electromagnetic interference

- Power wheelchairs may be susceptible to electromagnetic interference. This is the interfering electromagnetic energy emitted by radio equipment such as radio and television stations, amateur radio transmitters (HAM), two-way radios, and cellular phones.
- The interference (from radio wave sources) can cause the power wheelchair to release its brakes, move by itself, or move in unintended directions.
- It can also permanently damage the power wheelchair control system.
- The intensity of the interfering EM energy can be measured in volts per meter (V/m). Each power wheelchair can resist EMI up to a certain intensity. This is called its "immunity level". The higher the immunity level, the greater the protection. At this time, current technology is capable of achieving at least a 20 V/m immunity level, which provides effective protection from the more common sources of radiated EMI.
- There are a number of sources of relatively intense electromagnetic fields in the everyday environment. Some of these sources are obvious and easy to avoid. Others are not apparent and exposure is unavoidable. However, we believe that by following the warnings listed below, your risk to EMI will be minimized.
- The sources of radiated EMI can be broadly classified into three types:
 - Handheld portable transceivers (transmitters-receivers) with the antenna mounted directly on the transmitting unit. Examples include: citizens band (CB) radios, "walkie talkie," security, fire, and police transceivers, cellular telephones, and other personal communication devices.

INFORMATION

Some cellular telephones and similar devices transmit and receive signals while they are ON, even when not being used;

- Medium-range mobile transceivers, such as those used in police cars, fire trucks, ambulances, and taxis. These usually have the antenna mounted on the outside of the vehicle;
 - Long-range transmitters and transceivers, such as commercial broadcast transmitters (radio and TV broadcast antenna towers) and amateur (HAM) radios.
- Because EM energy rapidly becomes more intense as one moves closer to the transmitting antenna (source), the EM fields from handheld radio wave sources (transceivers) are of special concern. It is possible to unintentionally bring high levels of EM energy very close to the power wheelchair's control system while using these devices. This can affect power wheelchair operation and braking.

- Other types of handheld devices, such as cordless phones, laptop computers, AM/FM radios, TV sets, CD and cassette players as well as small appliances such as electric shavers and hair dryers, as far as we know, are not likely to cause EMI problems with your power wheelchair.

2.7.2 Warnings regarding effects of electromagnetic interference

⚠ WARNING

Risk of accidents due to uncontrolled driving behaviour. Electromagnetic interference (EMI) from sources such as radio and TV stations, amateur radio (HAM) transmitters, two-way radios, and cellular phones can affect power wheelchairs and motorized scooters. Following the warnings listed below should reduce the chance of unintended brake release or power wheelchair movement which could result in serious injury.

INFORMATION

The warnings listed below are provided to prevent possible interference with the control system of the power wheelchair.

- Do not turn ON handheld personal communication devices, such as citizens band (CB) radios and cellular phones, while the power wheelchair is turned ON.
- Be aware of nearby transmitters, such as radio or TV stations, and try to avoid coming close to them;
- If unintended movement or brake release occurs, turn the power wheelchair OFF as soon as it is safe.
- Be aware that adding accessories or components, or modifying the power wheelchair, may make it more susceptible to interference from radio wave sources. (Note: There is no easy way to evaluate the effect of radio waves on the overall immunity of the power wheelchair.)
- Report all incidents of unintended movement or brake release to the power wheelchair manufacturer, and note whether there is a radio wave source nearby.

NOTICE

Interference from electromagnetic fields. The power wheelchair has been tested according to EMC regulations. The following particularities must be observed during operation:

The power wheelchair can generate electromagnetic fields that can cause interference with other devices. Therefore the controls should be switched off when no function is required.

Despite of compliance with all applicable EMC directives and standards, the power wheelchair can be affected by interference from other electric devices (e.g. department store EAS systems) or cause interference to such devices. If you notice such behaviour, move your power wheelchair outside the interference range.

2.7.3 Interference resistance of this power wheelchair

INFORMATION

20 volts per meter (V/m) is a generally achievable and effective immunity level against interference from radio wave sources (as of May 1994) (the higher the level, the greater the protection);

INFORMATION

This power wheelchair model as shipped, with no further modification, has an immunity level of 20 V/m.

2.8 Safety instructions for disposal

INFORMATION

If the power wheelchair is no longer in use, it must be disposed of properly in accordance with national regulations.

In case of disposal, all components and materials of the power wheelchair must be recycled or disposed of properly.

CAUTION

Risk of polluting the environment with battery acid. The batteries of the power wheelchair contain a toxic acid. They must not be disposed of with regular domestic waste and the battery acid must not enter the sewage system or penetrate into the ground. The instructions of the battery manufacturer printed on the batteries must be observed.

3 Transportation and storage

The following environmental conditions apply to transportation and storage:

Ambient temperature -15 °C to +40 °C/+5 °F to +104 °F

3.1 Transportation

⚠ CAUTION

Risk of accidents due to insufficient fastening. Properly fasten the power wheelchair to the transport vehicle, e.g. with tensioning straps, to secure it against shifting.

NOTICE

Risk of damage due to falling. The maximum weight of the power wheelchair when empty is 68 kg/ 150 lbs. Only use hoists and transport means of sufficient capacity for transport.

Secure the power wheelchair to the means of transport, e.g. with tensioning straps. Use the eyebolts at the front and back of the power wheelchair and the defined anchor points in the transport vehicle.

Before transporting the power wheelchair, switch off the control unit and engage the brake.

You can reduce the size of the power wheelchair for transport by folding down the backrest and removing the side panels and footrests.

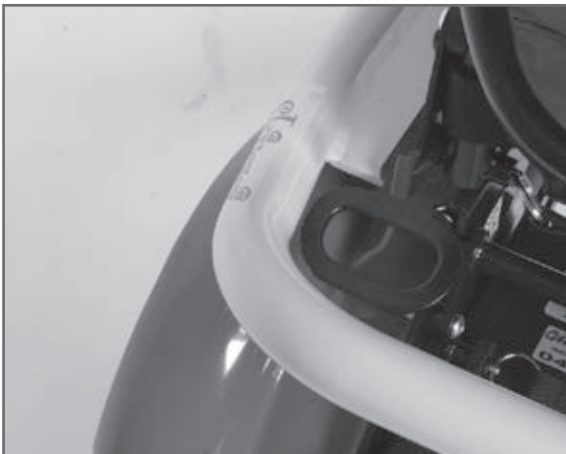


Fig. 2 Eyebolts, front and rear

3.2 Storage

INFORMATION

If the power wheelchair is not moved for several days, permanent colour changes may occur in the regions where the wheelchair is in contact with the support surface. The manufacturer therefore recommends parking the wheelchair on a suitable surface during extended periods of disuse.

The power wheelchair must be stored in an enclosed area. Remove the main fuse as otherwise there is a risk of deep discharge.

The storage location must be dry and have sufficient air circulation. Humidity must not build up. The power wheelchair must not be subjected to any damaging exterior influences, e.g. rain, snow, or strong solar radiation during storage.

The manufacturer recommends storing the power wheelchair with slightly elevated tyre pressure and using assembly stands or wooden blocks in order to raise the tyres (completely) off the ground in order to protect them from ground frost. Regularly rotating the wheels helps to prevent flat spots.

4 Required tools and accessories

Suitable tools and aids for the completion of service tasks are listed below:

- Flat screwdrivers, blade widths: 2.5/3.5/5.5 mm
- Phillips head screwdriver, size: 2
- Reversible ratchet handle wrench and sockets, sizes: 8–20
- Ring or open-end wrenches, sizes: 8–24
- Allen wrenches, sizes: 2–8
- Torque wrench (5–50 Nm)
- Puller
- Pin punch, Ø 3 mm
- Plastic hammer
- Metal rod, Ø approx. 10 mm, length approx. 400 mm
- Hand drill
- 4 mm drill bit
- Tyre iron
- Tyre lever
- Inner tube repair kit
- Side-cutting pliers
- Water pump pliers, gripping width up to 32 mm
- Liquid thread lock, “medium strength”
- Handheld programming device
- Hoisting device of sufficient capacity
- Jack



Fig. 3 Tools








Fig. 4 Handheld programming device





5 Information display

INFORMATION

For information on errors displayed please see sections 7 and 8.

Messages are shown on the control panel display monitor:

Display symbol	Information
	Driving menu with speed level and battery capacity
	Low battery capacity
	Charging process with drive-away lock
	Electric back adjustment
	Electric seat tilt

	Coupled electric seat adjustment Backrest and seat tilt
	Drive-away lock
	Creep speed
	Attendant control

6 Service Work

6.1 Checking the general condition

- Check all safety-related components for corrosion, repair if required and reapply corrosion protection.
- Check weld seams.
- Check tightness of screw connections; replace thread-locking compound if required; observe any defined torque specifications; replace defective screws (e.g. in case of corrosion).
- Check cables for ruptures, signs of wear and proper attachment; replace defective components.
- Check cable connections and plug connections.

6.2 Control unit

Via the enAble 40 control, the Skippi can show causes of error messages on the display. Error sources in the drive section and in the electric options are indicated by flashing of the corresponding sections in the display's pictograph.

The handheld programming device can be used to change the parameters.

Control panel holder

There is only one control panel variant available for the Skippi power wheelchair for children. Four screws fasten the control panel to a holding element with spring sheet metal. You need an Allen wrench to loosen these screws. Now the control panel can be easily inserted in and removed from the control panel holder.

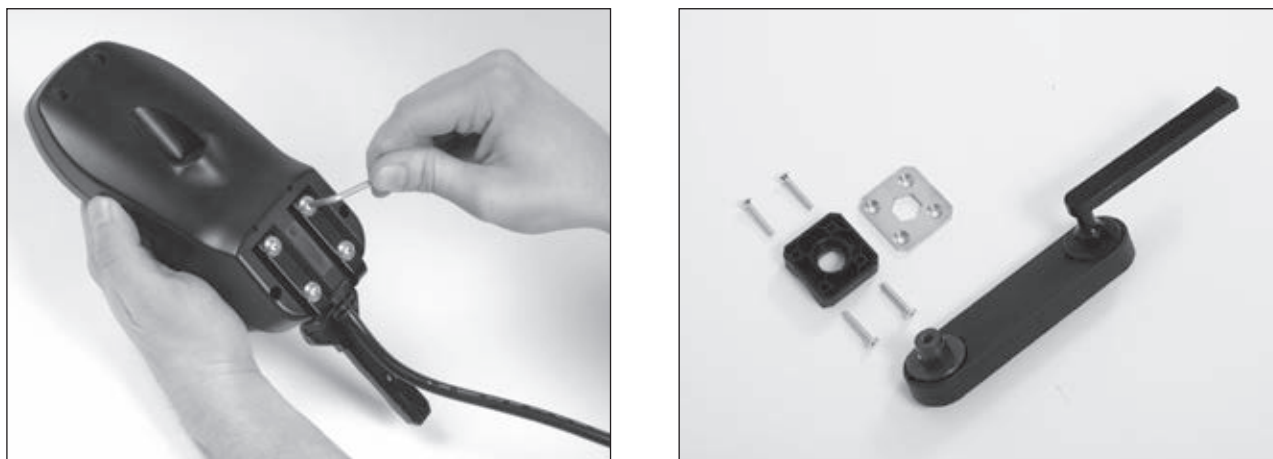


Fig. 5 Standard holder and Swing-away in parallel

The control panel holders for the Skippi are attached to the armrest, beneath the armrest pad. To mount or replace a control panel holder, first remove the control panel and deposit it on the floor. Next, take the side panel out of its holding device. After loosening the three set screws, you can either change the position of the control panel holder or completely remove it.

The two control panel holders are attached in the same way to the side panel of the Skippi. They are clamped to the underside of the armrest pad with an iron rail.

Attendant control

The attendant control for the Skippi can only be mounted in combination with the height-adjustable push handles.

The control is attached to the upper end of the push handle: cut a hole in the end of the rubber hand grip and insert the holder for the attendant control into this hole.

Then tighten the screw connection on the holder using a size 5 Allen wrench.

Lead the cable of the control along the push handle downwards to the control box. Use cable ties to fix the cable at certain intervals.



Fig. 6 Attendant control on the push handle

6.3 Battery pack/fuse

⚠ CAUTION

Hazards due to explosive gases. Smoking and open flames are prohibited while working on the batteries. Sparks must be avoided.

Follow the battery manufacturer safety instructions. Wear protective goggles. Ensure sufficient ventilation when charging the batteries in an enclosed room.

Drive batteries can supply very large amounts of energy and may arc if they are short-circuited. Therefore, always disconnect the batteries when working on the motor control or wiring.

NOTICE

Damage due to improper handling. In order to prevent short circuits, always use insulated tools when working on the batteries.

Prevent deep discharge of the batteries in order to avoid loss of functionality and permanent battery damage.

Ensure correct polarity when connecting the batteries and state of charge meter.

Battery

⚠ CAUTION

Risk of injury if the locking mechanism is not properly engaged. Check that the bolts are properly engaged at both sides on the outside of the base support. The bolts must be clearly visible so that the frame cannot unexpectedly disengage from the drive unit bracket.

The standard version of the Skippi is equipped with a 12V/28Ah (C5) AGM battery. The advantage of this battery is that it requires no servicing other than charging.

Make sure to have the contacts correctly snap in place when hanging in the battery packs. The contacts are on the underside of the battery packs.

The battery packs of the Skippi can be removed easily. Undo the lock, hold the battery packs by the handle and pull up to remove them.

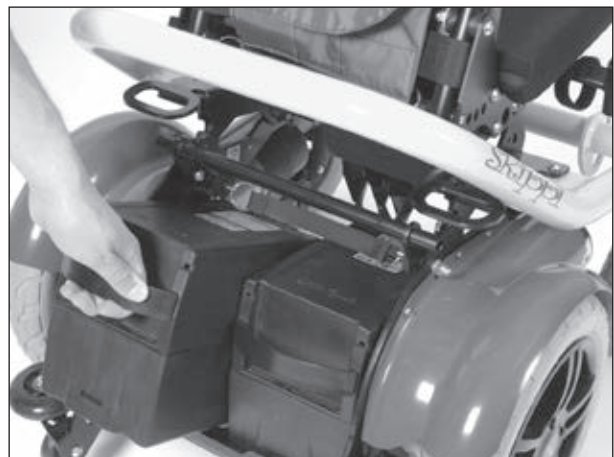
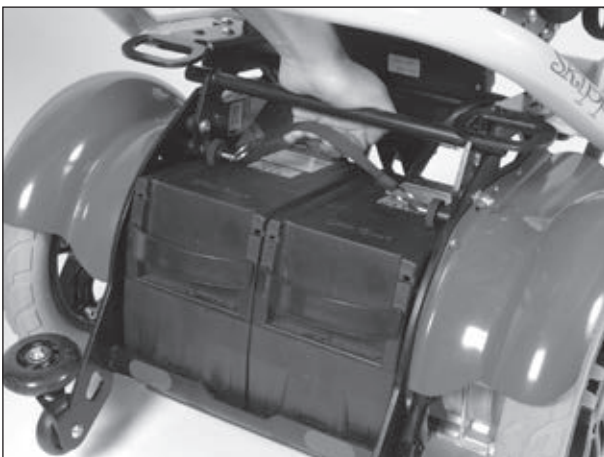


Fig. 7 Releasing the lock and Removing the battery pack

Charging the batteries

NOTICE

Risk of damage due to incorrect battery handling. Please note the following when handling the batteries:

- Charge the batteries as soon as possible if only one LED is flashing on the "battery capacity" LED indicator.
- Pull out the fuse for lengthy storage.
- The manufacturer does not assume any liability for damage due to deep discharge.

NOTICE

Risk of damage to the battery charger / risk of damage caused by the battery charger. Please note the following when using the charger:

- Only use Ottobock battery chargers which have been tested and approved for use with the given batteries by the manufacturer (observe information on battery charger).
- The indications on the nameplate of the battery charger must be identical to the voltage of the mains supply of your country.
- Only use the battery charger within the specified temperature and humidity limits.
- Place the battery charger on a level surface.
- If you position the battery charger near a window, protect it from direct sunlight.
- Keep the battery charger from overheating. The vent openings of the charger must not be covered.
- Turn off the control unit during the charging process so that the entire charging current flows to the battery.
- Avoid dust and dirt. Only clean with a dry cloth.

The charge level of the batteries determines the range of the power wheelchair. The following factors influence battery capacity:

- Ambient temperature
- Age of the batteries
- Driving load
- Charging method

Prolonged driving at the lower end of the battery indicator results in deep discharge which causes battery damage. In addition, there is the risk that the power wheelchair may stop due to zero battery capacity and put the user in a dangerous situation.

The indications on the nameplate of the battery charger must be identical to the voltage of the mains supply of your country.

The charging receptacle of the power wheelchair is located on the underside of the control panel.

Tools:

- Battery charger provided by Ottobock

Steps:

1. Insert the 3-pin charger plug into the charging receptacle on the control panel.
2. Connect the charger to the power supply network. Charging starts automatically.
3. Disconnect the power supply plug after the charging process is complete.

4. Disconnect the charging plug.
5. Turn the control unit of the power wheelchair on and off. The power wheelchair is ready for operation.

The current battery charge level is displayed by LEDs. The charging process is displayed by means of a 7-segment vertical progress bar on the control panel.

The battery charger features a programmed recharging phase. Once a discharged battery is completely charged (after approximately 8 hours), the battery charger can remain connected with no risk of overcharging or damaging the battery.

Please see the instructions for use supplied with the battery charger for further details on use and on the LED displays.

6.4 Replacing the controller

NOTICE

Damage due to connection errors. When connecting the cables, ensure correct assignment. For information on connecting the controller, please see section 8.2.

Prior to installing, the following preparatory work is required:

- Remove the battery packs (see section 6.3).

For installation proceed as follows:

1. Disconnect all connections on the controller (see also section 8.2).
2. Loosen the two Allen head screws (size 3) on the controller (see item A).
3. Remove the controller and replace it.
4. Properly reassemble all components upon completion of the work.

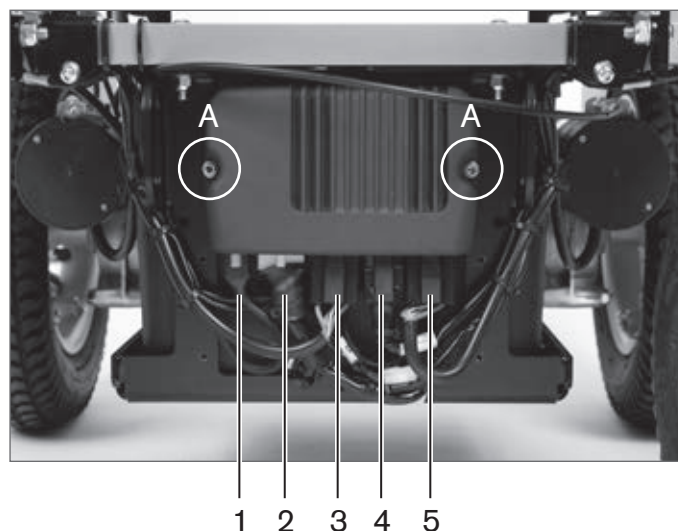


Fig. 8 Controller

- 1 Connection for control unit
- 2 Lighting / actuator connector
- 3 Motor 1 connector
- 4 Connection for lights
- 5 Motor 2 connector

6.5 Side panel

To replace the whole side panel, loosen the thumb screw located on the bottom side of the panel attachment device.



Fig. 9 Loosening the thumb screw

Above this thumb screw, there is a set screw for setting the armrest height. Loosen this set screw using a size 3 Allen wrench. Set the desired armrest height and retighten the set screw.



Fig. 10 Setting the height of the side panel

Changing the position of the side panels

Side panel mounting brackets are located on the left and right sides of the seat frame. By loosening the two set screws which are located on the underside, you can change the position of the side panel.

Afterwards, retighten the set screws using a size 3 Allen wrench.

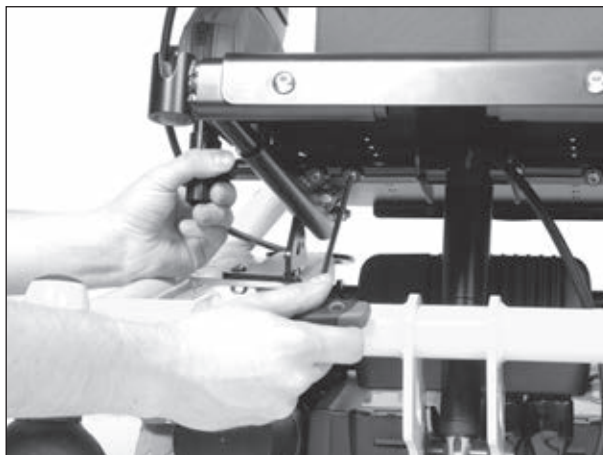


Fig. 11 Changing the position of the side panel

Setting and replacing the armrest pad

The arm pad of the side panel is attached with two set screws. After loosening these two set screws, you can either change the position of the pad or completely remove it. The third set screw is used for additionally clamping the armrest pad.



Fig. 12 Underside of the armrest and Changing the position

Lateral pads

The lateral pad is attached to the side panel with a hook and loop closure.

6.6 Seat

Both, the seat depth and seat width of the Skippi seat can be individually adapted to the child.

Adjusting the seat width

The side panels are used to set the seat width (see section 6.5 Side Panel). There are two countersunk head screws on each side panel attachment device, below the seat surface. Loosen these two screws using an Allen wrench. Set the appropriate seat width. The adjustment is continuous. After adjustment, snugly retighten the two countersunk head screws.

Adjusting the seat depth

The seat depth of the Skippi is continuously adjustable from 300 mm to 370 mm/11,8" to 14,6". To adjust the seat depth, loosen the two individual screws on the left and right of the seat frame's front end. For loosening these screws you need an Allen wrench. Once you have loosened these two screws, you can pull out the front part of the seat frame to the front and fix it in the desired seat depth position. The adjustment is continuous. Only the first bore hole is used for fixing the frame part.

Make sure that the square nut inside the tube remains in position.

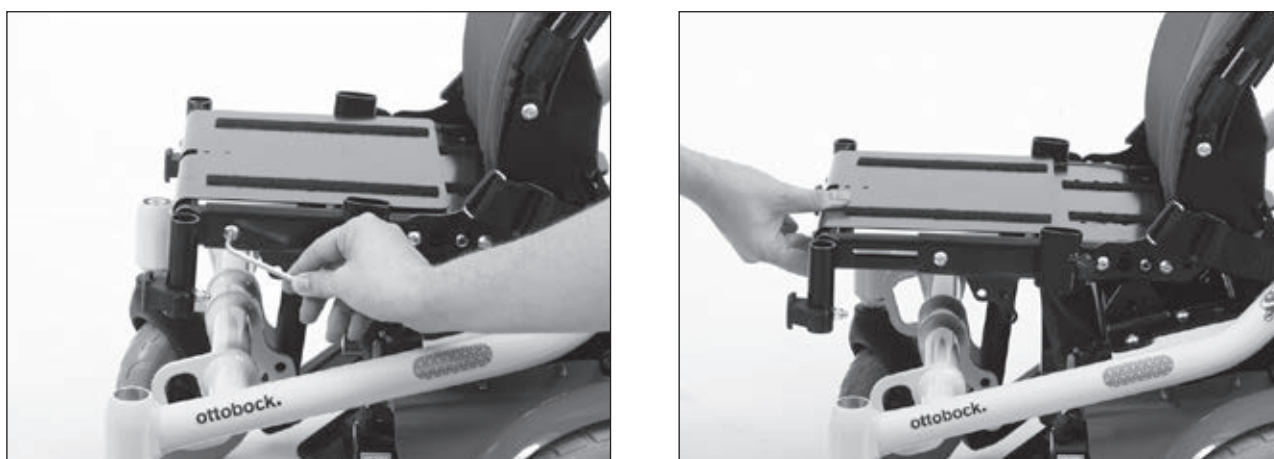


Fig. 13 Loosening the screw and Adjusting the seat depth

Replacing the seat

The entire seat of the Skippi can easily be disassembled for removal or replacement. Make sure to first disconnect the control cable to avoid damaging the cables and plug connections. At the rear, the seat is secured with one screw connection on each side, left and right. Use two size 5 Allen wrenches to loosen these screw connections.



Fig. 14 Loosening the rear screw connection of the seat

At the front, the seat is attached with the seat angle adjustment mechanism. Here, loosen the seat at the bottom of the angle adjustment mechanism, which is attached to the frame. Loosen the screw using a size 5 Allen wrench.

Once you have loosened all connections, you can remove the seat.

Lap belt

The lap belt of the Skippi is/must be attached to the bearing plate. For attachment, an attachment plate with eyelet is used. The mounting kit of the lap belt also includes spacer bushings. Place these bushings between the eyelet and bearing plate. For tightening the screw use a size 5 Allen wrench and a size 13 open-end wrench.



Fig. 15 Attaching the lap belt

6.7 Back

The back of the Skippi is attached to the seat frame with two bearing plates on the left and right. Each of the two bearing plates is attached to the seat frame with two screws and to the back with one screw. For loosening these three screws, use a size 5 Allen wrench and a size 13 open-end wrench. Loosen the two screws on the seat frame on the left and right to remove the back. The fourth screw on the bearing plate serves as stop for the back angle adjustment.

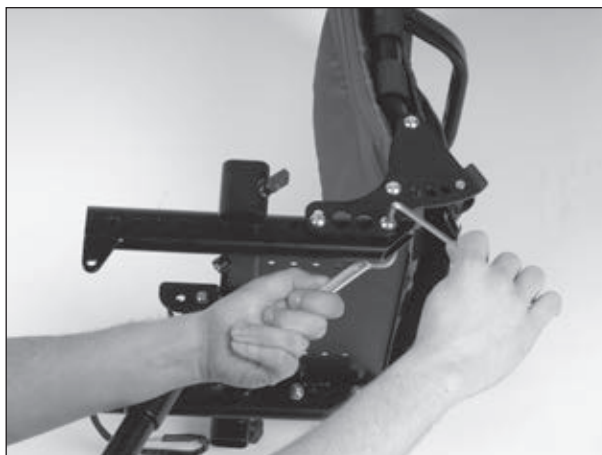


Fig. 16 Loosening the bearing plate

Back upholstery

For replacing the back upholstery of the Skippi, simply pull it off the hook-and-loop straps and reattach the new upholstery to the straps.

For readjusting the back upholstery, remove the upholstery and readjust the hook and loop straps on the frame.



Fig. 17 Adjusting the back upholstery

6.8 Footrests

The footrests are easy to remove. To remove the footrest, pull the release lever towards the footrest. Now pull the footrest up out of the holding device.

For mounting, slide the footrest into the holder from above, pull the lever and turn the footrest until the centrings engage with positive locking.

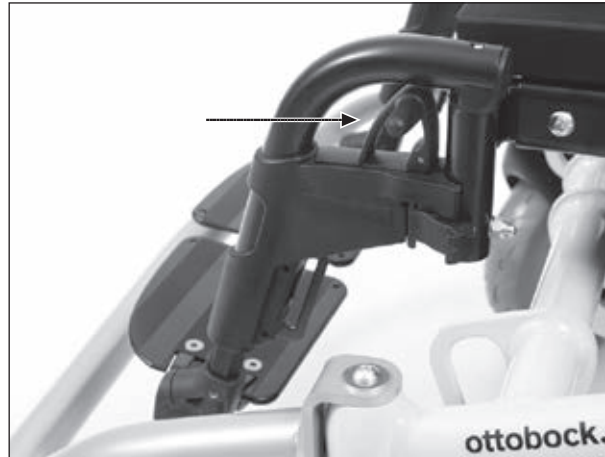


Fig. 18 Footrest with unlock lever

By loosening the screws on the telescoping footrest tube at the top and bottom, the footplate can be adapted to the lower leg length and to the thickness of the child's seat cushion.

To set the lower leg length you need a size 5 Allen wrench.



Fig. 19 Adjusting the lower leg length

Ensure that the telescoping tubes of both footrests are set equally. Use a folding ruler, if necessary.

The angle of the footplate can be changed by loosening the attachment screw on the front of the footrest bar. Again, you need a size 5 Allen wrench.



Fig. 20 Setting the angle

Make sure to firmly retighten the screw connections after all adjustments.

Telescoping the footrest receivers

The footrest receivers of the Skippi can be telescoped in transverse direction independently from each other. Each side can be telescoped outwards continuously by 60 mm/2,4". For setting the footrest receivers, you first have to loosen one of the two screws at the front of the seat frame using a size 5 Allen wrench.



Fig. 21 Telescoping the footrest receiver and Telescoping the footrest receiver

6.9 Electric seat tilt

The electric seat tilt can be added to the Skippi at any time.

First remove the manual seat tilt mechanism. Fold away the securing bow and pull the bolt out of the respective bore hole (see section 6.6). Then unscrew the seat angle adjustment mechanism from the upper attachment, below the seat plate, using two size 5 Allen wrenches.

Apply the actuator of the electric seat tilt so that the upper end with the cables fits the attachment below the seat plate and tighten the screw connection.

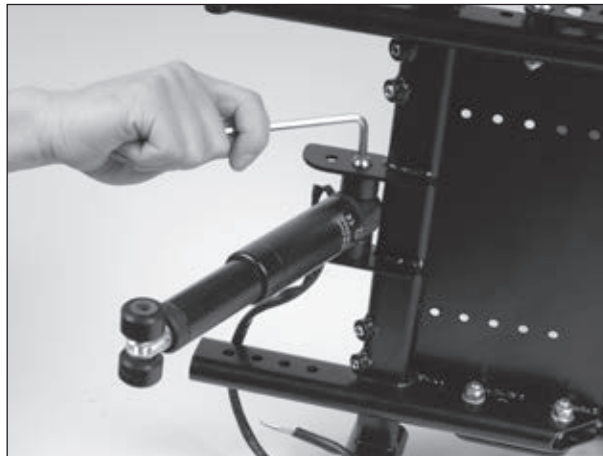


Fig. 22 Electric seat tilt

6.10 Electric back angle adjustment

For the electric back angle adjustment, a bracket is attached to the seat frame on the left side. This bracket is part of the seat frame.



Fig. 23 Electric back angle adjustment

The actuator is pushed onto a bearing bolt with a diameter of 8 mm/0,3" on the left, front side of the power wheelchair, below the seat plate. The bearing bolt is normally screwed into the rear bore. Beforehand, two collar bushings are inserted into the bore hole to which the actuator will be attached. These bushings reduce the diameter from 10 mm/0,4" to 8 mm/0,3" and at the same time improve the bearing qualities. A self-locking nut M8 serves to secure this connection. However, this nut may only be tightened to the extent that the actuator is still able to rotate on the bolt.



Fig. 24 Electric back angle adjustment

The bracket of the back is inserted into the slot of the actuator attachment and secured with a bolt.

In case of the smallest seat depth setting, in which the back is attached more to the front by 20 mm/0,8", the bearing bolt for the actuator must be mounted in the front bore hole of the actuator bracket.

6.11 Retrofitting the seat height adjustment (optional)

⚠ WARNING

Risk of accidents and injury due to improper use of the seat height adjustment function. The seat height adjustment function may only be used on a level surface.

No unauthorised persons may be present in the danger zone when the seat height adjustment function is used. No objects or obstacles which might cause interference may be in the adjustment range. All attendants must be informed that, due to the construction, pinch points exist in the area between the seat frame and wheelchair frame.

Users and attendants must not reach into the danger area.

⚠ WARNING

Risk of pinching or crushing in the electric seat adjustment area. The seat height adjustment function may only be used on a level surface. When activating the seat height adjustment (optional), back angle adjustment (optional) and seat tilt (optional), there are pinch and shear points in the area between the seat frame and wheelchair frame due to the construction. Inform all attendants about this.

In order to prevent injuries, ensure that body parts such as the hands and feet are always kept out of the danger zone, that no interfering objects such as clothing or obstacles are in the danger zone and that no unauthorised persons are present there.

It is possible at any time to add a seat height adjustment (lift seat) or a combination of seat height adjustment/ seat tilt or seat height adjustment/ back angle adjustment to the Skippi power wheelchair.

The seat height adjustment is supplied as assembly unit. Prior to installing, the following preparatory work is required:

- Turn the control unit off.
- Remove the battery packs (see section 6.3).

- ❑ Remove the footrest / side panels (see section 6.8/6.5).
- ❑ Unplug the controller cabling, unscrew the controller.
- ❑ Remove the old seat (including the seat plate and seat frame; see Section 6.6).
- ❑ Remove the bearing plates with back part (see Section 6.7).

For installation proceed as follows:

1. Push the assembly unit from the rear onto the base frame (see item A).
2. Screw the assembly unit to the base frame (see item B). For tightening you need a 5 mm Allen wrench and a 13 mm open-end wrench.
3. Move / pull the lift seat up to make room for the installation (see item C).

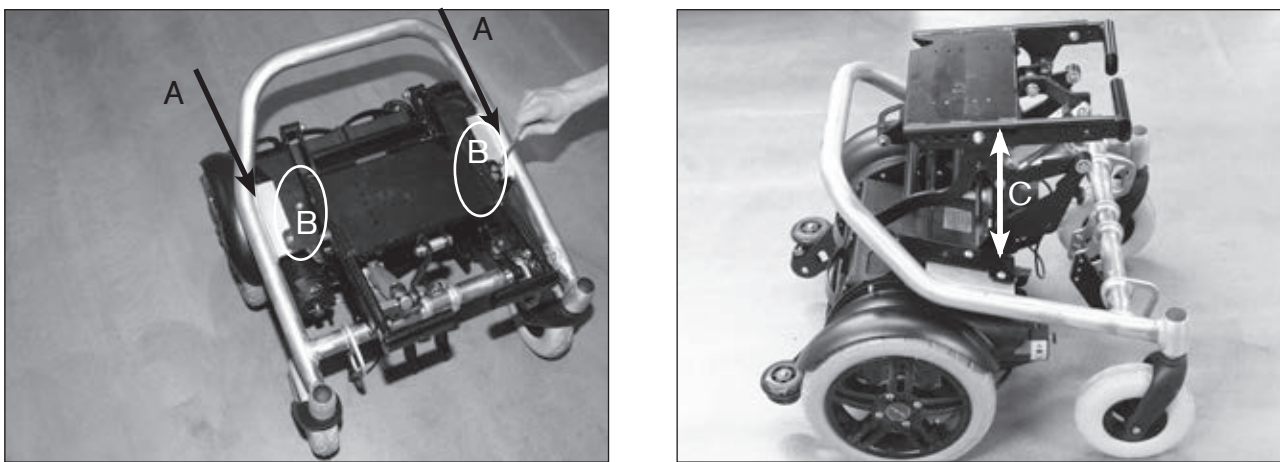


Fig. 25 Attaching the assembly unit to the base frame and Installed/lifted seat height adjustment

4. Remove the retaining bar for the controller and install the alternative retaining bar (see item D). Here you need a size 6 Allen wrench.
5. Before you are able to install the adjustment motor, you have to fix the holding device to the base frame with six oval head screws with Allen head (see item E). Here you need a size 5 Allen wrench.

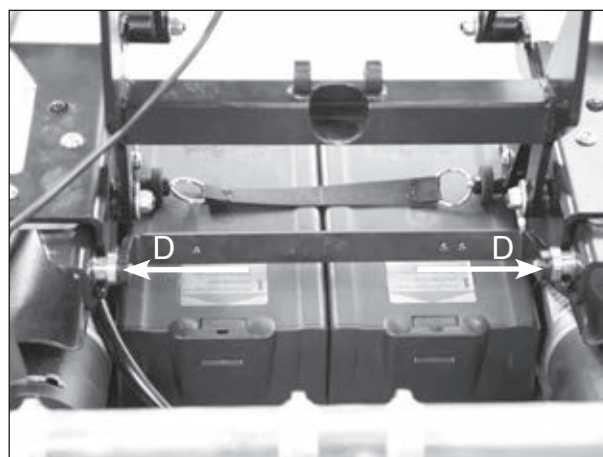


Fig. 26 Installed retaining bar for the controller

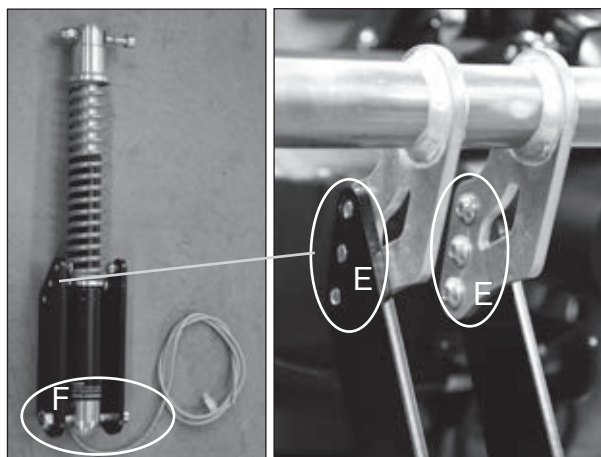


Fig. 27 Adjustment motor (actuator), complete / Installed holding device

6. Attach the adjustment motor (actuator) to the holding device on the base frame using the provided retaining bolts / locking washers (see item F) as well as to the lift seat (see item G). For tightening you need a 5 mm Allen wrench.
7. Mount the controller to the retaining bar (see item H) using a size 4 Allen wrench.

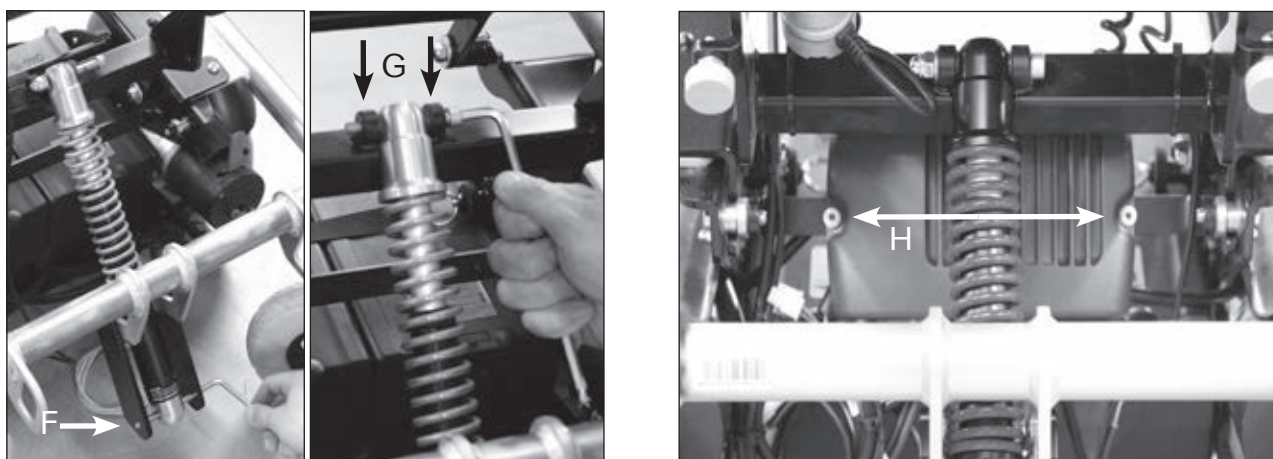


Fig. 28 Installing the adjustment motor (actuator) and Installed controller

8. Attach the provided new main cable (see item I) to the frame using cable ties so that it is not possible for the cable to protrude into the adjustment area.

NOTICE

Damage if the connecting cable is too short. It is very important to make sure that the cable of the adjustment motor is sufficiently long when activating the lift seat and that cables are not at risk of getting pinched.

9. A micro-switch (see item J) activated by a magnetic pin (see item K) is located near the front of the lift seat. It reduces the driving speed as soon as the lift seat moves from the lower end position. Check the distance between the magnetic pin and magnetic transmitter. The distance between the magnetic transmitter and magnetic pin is pre-set. It must not be less than **1 mm/0,04"**. A distance of **1 – 3 mm/0,04" – 0,12"** is ideal. It is adjusted by turning the set screw on the magnetic pin. Connect the cable of the magnetic transmitter to the main cable (see item L).

10. Connect the new main cable to the actuators.
11. Connect the 14-pin plug of the main cable to the controller (see item M).
12. Install the bearing plate with the back and finish the seat with side panels, footrests etc.

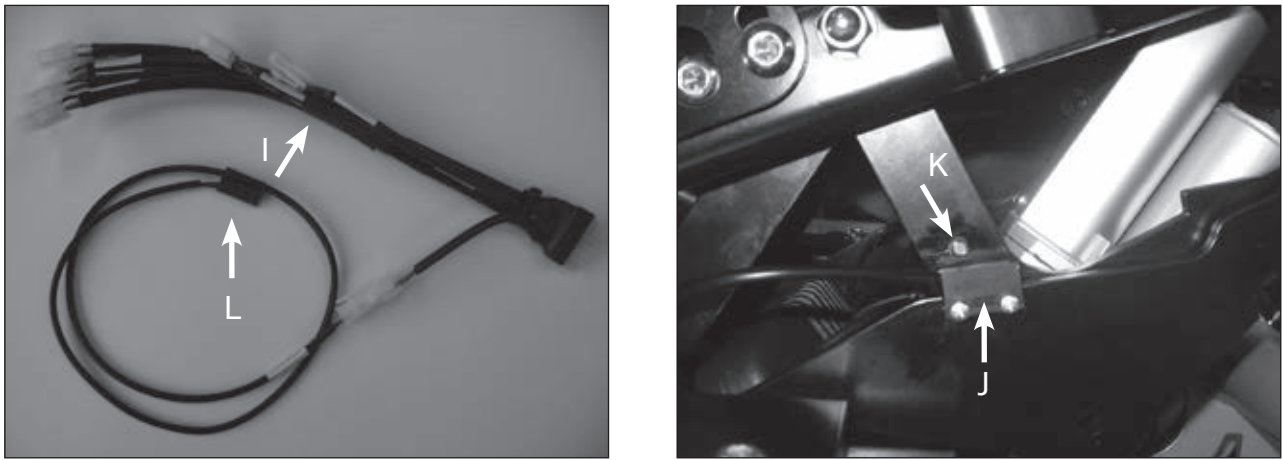


Fig. 29 Main cable with connected micro-switch and Installed micro-switch

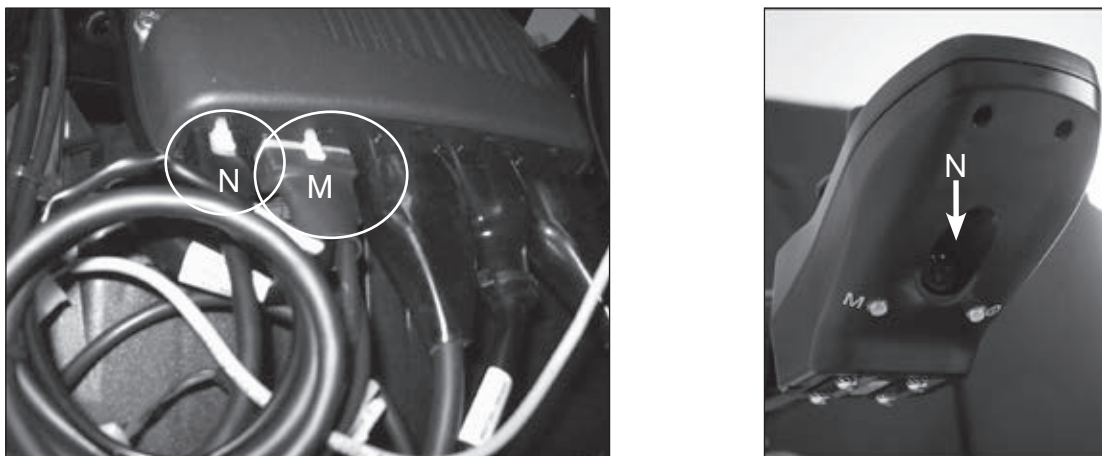


Fig. 30 Controller with connected main cable and Charging and programming receptacle

6.11.1 Programming

To be able to use the lift seat, it is first necessary to programme the control unit:

1. Connect the handheld programming device to the charging and programming receptacle of the hand control device (see item N).
2. Follow the menu tree: Program > Motor Controller > Multi-Function Input 3
3. Here make the following speed limit settings (speed with raised lift seat):

Parameter	Range	Setting
Off/Swvl/Seat Unscrew seat	0-2	Set value to 2. Significance: Sets the speed limit stated below to active.
Active Low Minus-Active	On/Off On/Off	Set value to Off. Significance: Sets the speed limit to active, when the magnetic switch is open.
Speed Limit Speed Limit	0-100%	Set value to 15%. Significance: Limits the speed to the above percentage.

4. Follow the menu tree: Program > Seat

5. To programme the actuator (adjustment drive), make the following settings:

Parameter	Range	Setting
Simultaneous Mode Simultaneous Mode	On/Off On/Off	Set value to Off. Significance: Separate control of the actuators is possible.
Actuator 1 Function Actuator 1 Function	0-5	Set value to 5. Significance: Selection of the lift seat component.
Actuator 1 Speed Actuator 1 Speed	0-100%	Set value to 100%. Significance: Varies speed of actuator 1 (lift seat adjustment drive).
Actuator 1 Stop Current Actuator 1 Stop Current	0-12 A	Set value to 2 A. Significance: The driver turns off if the current exceeds this value.
Actuator 2 Function Actuator 2 Function	0-5	Set value to 1. Significance: Selection of other components integrated into the lift seat (e.g. back angle adjustment, seat tilt).
Actuator 2 Speed Actuator 2 Speed	0-100%	Set value to 100%. Significance: Varies the speed (PWM) of actuator 2 (back angle adjustment, seat tilt).
Actuator 2 Stop Current Actuator 2 Stop Current	0-12 A	Set value to 2 A. Significance: The driver turns off if the current exceeds this value.

6.12 Drive unit

Fenders

The coloured fenders are attached to the drive unit sustainer with three Allen head screws. For tightening or loosening the screws use a size 3 Allen wrench.

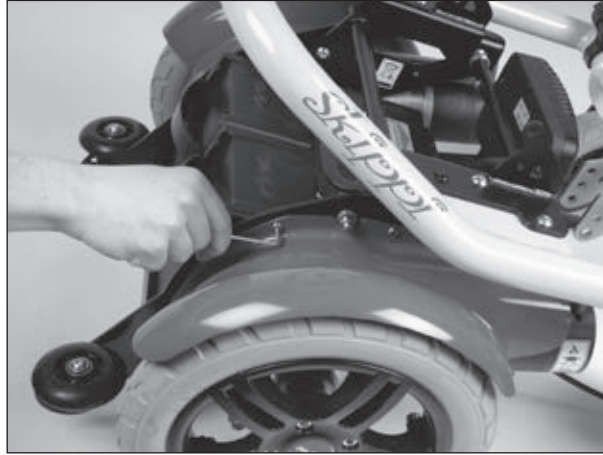


Fig. 31 Remove the fender

Drive unit

To make the drive unit of the Skippi accessible first disconnect the cable from the control panel and the cables of the front lights. Take care not to damage any cables when removing the seat.

6.13 Motors

Each motor of the Skippi has a red brake lever. To unlock the brakes, these have to be pushed outwards which means that the brakes are released and that the Skippi can be pushed. This is also indicated on the display when switching on the wheelchair control.

After pressing the two brake levers inwards, the motors are ready for driving again.



Fig. 32 Symbol display and Motor with brake lever

Disassembling the motors

CAUTION

Risk of injury. Turn off the power wheelchair prior to performing any work on the motors. If possible, always remove the battery packs from the drive unit sustainer as well.

For disassembling the motors, first disconnect the motor plugs from the control unit and separate the drive unit sustainer from the rest of the wheelchair for better accessibility. Remove the battery packs from the drive unit sustainer and remove the fender using a size 3 Allen wrench. Support the drive unit sustainer to protect it from wobbling and tilting to the side. Use suitable materials such as wooden blocks to do so. Remove the drive wheel using a size 6 Allen wrench. The motor is attached to the drive unit sustainer with four carriage screws. For disassembling you need a size 13 open-end wrench.

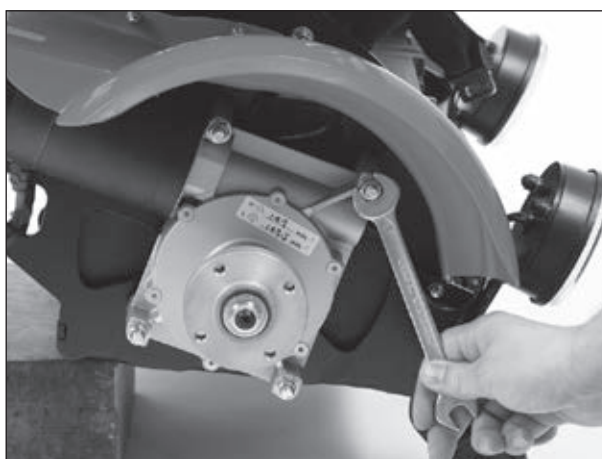


Fig. 33 Loosening the motor screws

For reassembling the motors, please proceed in reverse order.

Please observe the following torque values for installing the components:

- Tighten the motor mounting carriage screws to a torque of 8.4 Nm.
- Tighten the screw that attaches the drive wheel with a torque of 25 Nm.

NOTICE

Damage to the cables. Make sure that cables will not be pinched or damaged during mounting and disassembly.

6.14 Tyres

NOTICE

Damage to the tyres. Replace the tyres when they are bald or show cracking or other damage. Always change the tyres in pairs. Tyres with differently worn treads can negatively affect the driving characteristics of the wheelchair.

For changing tyres, place the Skippi on a level surface and support it to prevent it tilting or falling over.

The front wheels are puncture-proof ones and can only be changed as a whole. A puncture-proof insert or the casing are not available as spare parts. For disassembling the front wheels you need a size 6 Allen wrench.

Loosen the screw and remove the wheel. Inspect the axle to see if it can be reused.



Fig. 34 Removing the wheel

For mounting the new wheel, position the metal bushing between the wheel and caster fork and insert the axle screw from the outside. Make sure that the locknut on the other side of the fork is in position. Hand tighten the screw.

Drive wheels

Two drive wheel versions are available for the Skippi: with pneumatic tyres (standard equipment) and with puncture-proof tyres. For working on the drive wheels, you need a size 6 Allen wrench and tyre iron.

First loosen the 4 Allen head screws on the front side to disassemble the drive wheels from the drive unit sustainer (Fig. 34, left). The drive wheels have two-piece rims so that the casing or inner tube are easy to replace. For separating the rim, loosen the 5 Allen head screws on the rear side of the wheel (Fig. 34, right). For pneumatic tyres only: pull out and replace the defective inner tube. Use a standard inner tube repair kit for bicycles for repairing the inner tube.

Proceed in the reverse order to assemble the drive wheels. Firmly tighten the screw connection on each drive wheel hub to 25 Nm (Fig. 34, left). For pneumatic tyres only: reinflate the inner tube (2.4 bar/240 kPa/35 PSI).

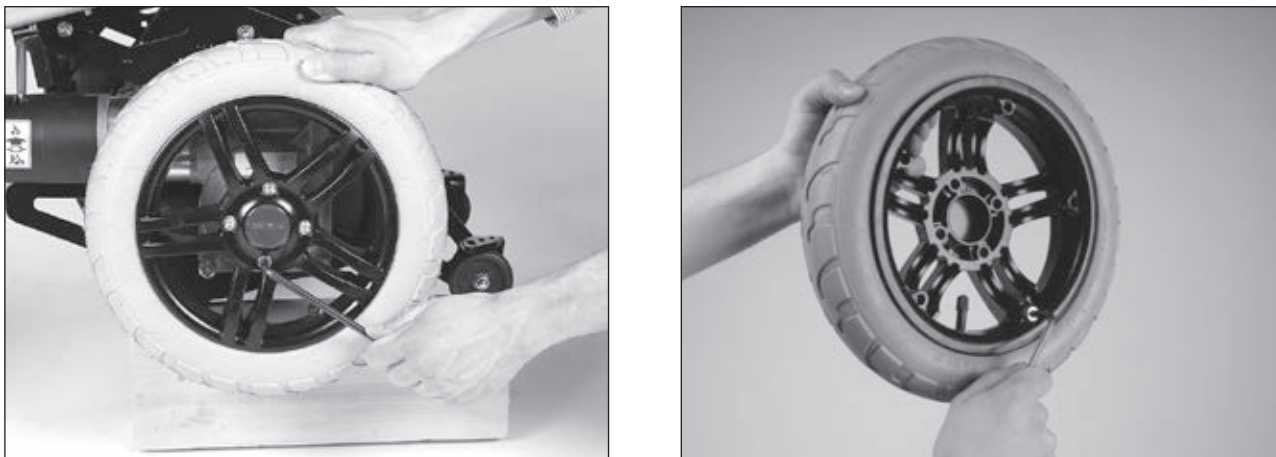


Fig. 35 Loosening the screws

6.15 Options

Lighting

The power wheelchair can be equipped with a light set.

The warning flashers, the right and left direction indicators and the light are operated via the control panel.

The light kit consists of 2 LED rear lights with integrated direction indicators and 2 front lights, each consisting of a front LED light and a direction indicator.

The front lights are fastened to the self-contacting side panels. When the side panels are inserted into the side panel holders, the contacts touch each other and current can flow.

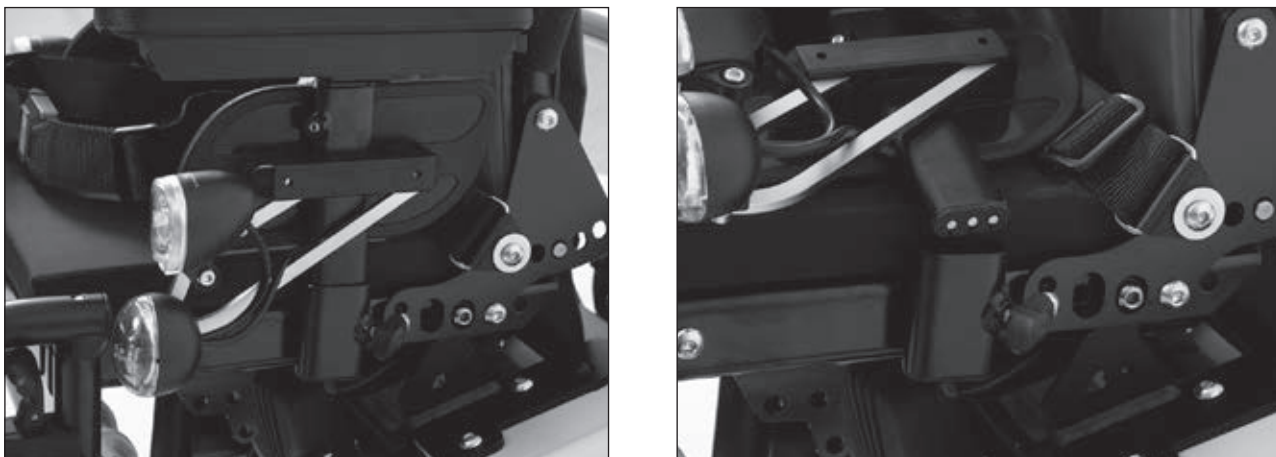


Fig. 36 Installed side panel and Contacts

Rear lights

The rear lights are attached to the rear side of the drive unit sustainer with two holders.

The holders are attached with two oval head screws.

These screws are put through from the inside to the outside and secured with two lock nuts.

Replacing defective lamps

NOTICE

Damage to the bulb. If possible, use a piece of cloth when inserting the bulb to avoid direct contact.

Replacing the LED headlight

The LED headlight has to be disconnected from the wiring and removed from the holder as a complete unit. All components must be properly reassembled after replacement.

Replacing the front direction indicator

For replacing the front direction indicators, it is best to use a small flathead screwdriver.

Slightly press into the notch on top of the housing until the nose jumps out.

Turn the bulb a quarter turn counter-clockwise and remove it. If possible, use a piece of cloth when inserting the bulb to avoid direct contact.



Fig. 37 Loosening the protective glass of the direction indicator; replacing the front direction indicator

When installing the lamp, make sure that the lamp's noses engage in the socket's notches and turn the lamp a quarter turn clockwise to fix it in place.

Now remount the protective glass: Insert the lower nose in the notch and let the upper nose engage with light pressure.

Replacing the rear light with direction indicator

Loosen the 2 Phillips head screws and remove the glass cover. Now you can pull the respective lamp forward out of the socket and replace it.

Properly reassemble all components upon termination of the work. During installation of the lamps, ensure that the lug on the lamp engages in the notch on the socket. Ensure the glass covers are seated properly in the housing when installing them. Tighten the screws on the glass cover firmly so that moisture cannot penetrate into the lamp.

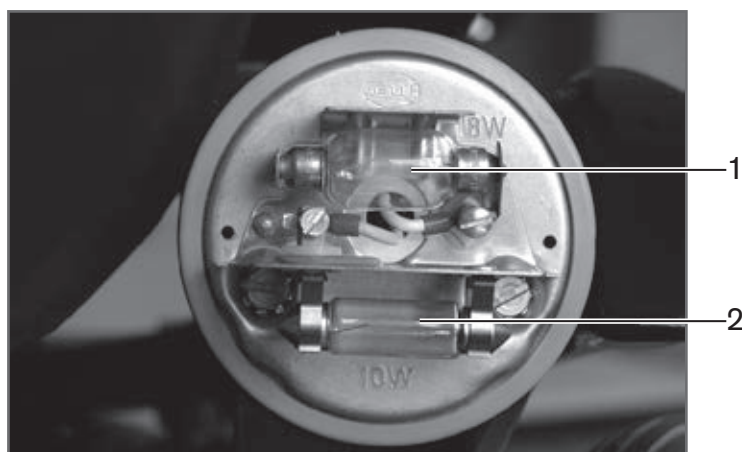


Fig. 38 Inserting the lamp

- 1 Direction indicator lamp
- 2 Tail light lamp

Replacing the LED rear light with integrated direction indicator

The LED rear light has to be disconnected from the wiring and removed from the holder as a complete unit. All components must be properly reassembled after replacement.

Height adjustable push handles

The height adjustable push handles are attached at the upper end of the back tubes. Tube clamps for attachment are included in the delivery. First loosen the screws on the left and right of the uppermost back strap. Now put the tube clamps onto the upper ends and attach them with two screws each, inserted through the rear side of the back tube. Finally screw the uppermost strap to the bore holes provided on the tube clamps.

You need a size 6 Allen wrench for this work.



Fig. 39 Fastening the tube clamps to the back tube and Fastening the back strap

Now you can insert the push handles into the clamp holders while pressing the securing pin. Set the push handles to the desired height and fix them with the quick clamping levers.



Fig. 40 Pressing the securing pin

Pennant

The pennant is attached to the top of the back tubes, no matter on which side.

Using a size 6 Allen wrench, loosen the two screws on one side of the uppermost back strap and attach the pennant holder between the back strap and screws.



Fig. 41 Installing the pennant

Bumper bar

The bumper bar is attached at the front to the caster attachment devices.

First remove the two protective caps from the caster attachment devices. Now replace the mounting nut with the threaded rod and screw it in place.

Position the eyelet of the bumper bar on the caster attachment device as shown on the photo.

Attach the bumper bar with the supplied screws.

Reattach the plastic protective caps to the caster attachment devices.



Fig. 42 Removing the protective cap



Fig. 43 Inserting the threaded rod

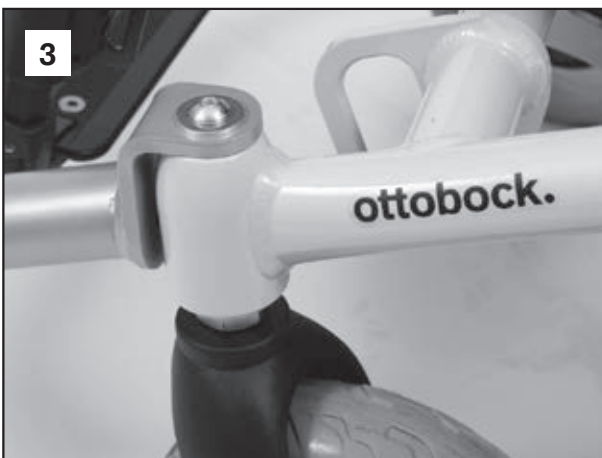


Fig. 44 Positioning and attaching the bumper bar



Fig. 45 Mounted bumper bar

Joystick accessories

To mount joystick accessories, first pull off the upper end of the joystick. A pin is exposed. Here you can mount accessories such as a fork for tetraplegics, a golf ball or a stick etc. Once you have set the accessory onto the pin, secure it by tightening the set screw.

7 Diagnostics

NOTICE

Risk of damage due to unauthorised service. Improper or poorly executed repairs may result in the unsafe operation of the power wheelchair. The error diagnosis may therefore only be carried out by authorised dealers who have established knowledge of electronic controllers from Ottobock. Ottobock will not assume any liability for damages that are due to improperly or poorly executed repairs.

INFORMATION

Experience has shown that problems with the wheelchair electrical system are frequently caused by errors and defects in the plug connections and cabling. They should be inspected first for this reason.

INFORMATION

Should you encounter problems while troubleshooting or if you do not manage to completely eliminate a problem by following the measures described here, please contact Ottobock.

Errors are either shown on the control panel display / LCD monitor (see Section 7.2) or displayed using the handheld programming device. The handheld programming device (see Section 8.4) can capture errors more precisely with the help of error codes.

7.1 Diagnostic steps

For troubleshooting purposes, the control unit of the power wheelchair identifies the following categories depending on the effect of the malfunction on the system:











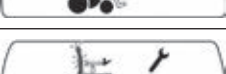



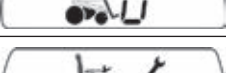

- Error
- Warning
- Defect

A warning indicates a status or malfunction of one or several individual components of the power wheelchair.

All problems that have ever occurred are saved in a list and can be retrieved, e.g. in case of a general overhaul of the power wheelchair. The saved data can be used to determine future service and maintenance intervals, for example.

The following tables shows the different error messages on the control panel display or separate LCD monitor.

7.2 Display of errors/faults

Display symbol(s)	Error / warning / defect	Cause	Action
	Controller temperature warning	Overheating due to excessive load	Cool down phase
	Motor temperature warning	Overheating due to excessive load	Cool down phase
	Motor temperature warning	Control unit has switched to creep speed due to overheating	Cool down phase
	Joystick warning	Joystick not in zero position when switching on	Bring joystick to zero position before switching on
	Hand control device fault	Defective joystick	
	Controller error	Defective controller	
	Communication error (alternating flashing signal)	Faulty connection between the hand control device and controller. Defective cabling, software or hardware	Check cabling / plug connections
	Battery under voltage	Battery deep discharge	Charge as soon as possible
	Battery over voltage	Voltage too high (after full charge and driving downhill)	Continue driving slowly
	Fault with seat tilt motor	Faulty cabling or plug connection, defective actuator	Check cabling / plug connections
	Back angle adjustment motor fault		
	Faulty cabling or plug connection, defective actuator	Check cabling / plug connections	Seat height adjustment motor fault
	Drive motor fault		
	Electric footrest motor fault		
	Wheel lock fault	Open wheel lock release / defective wheel lock	Close wheel lock release; check wheel lock (e.g. Bowden cable)
	Emergency stop	Severe fault caused by controller, hand control device and / or drive motor malfunction	

8 enAble40 wheelchair control – installation and programming

8.1 Overview

With the enAble40 control unit, the power wheelchair B500 (classic) can indicate the causes of error messages on the display.

Error sources in the drive section and in the electric options are indicated by flashing of the corresponding sections in the display's pictograph.

The hand programming device can be used to make parameter changes.



Fig. 46 Components of the enAble40 wheelchair control

- 1 Attendant control
- 2 Hand control device
- 3 Controller

8.2 Installation and Wiring

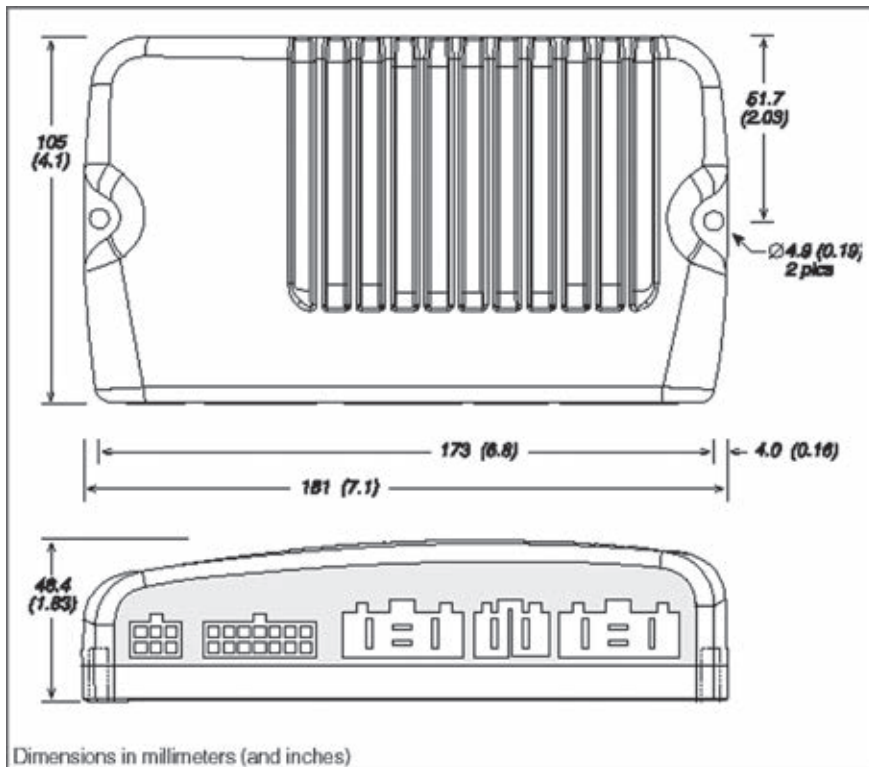


Fig. 47 Dimensions of the enAble40 wheelchair control

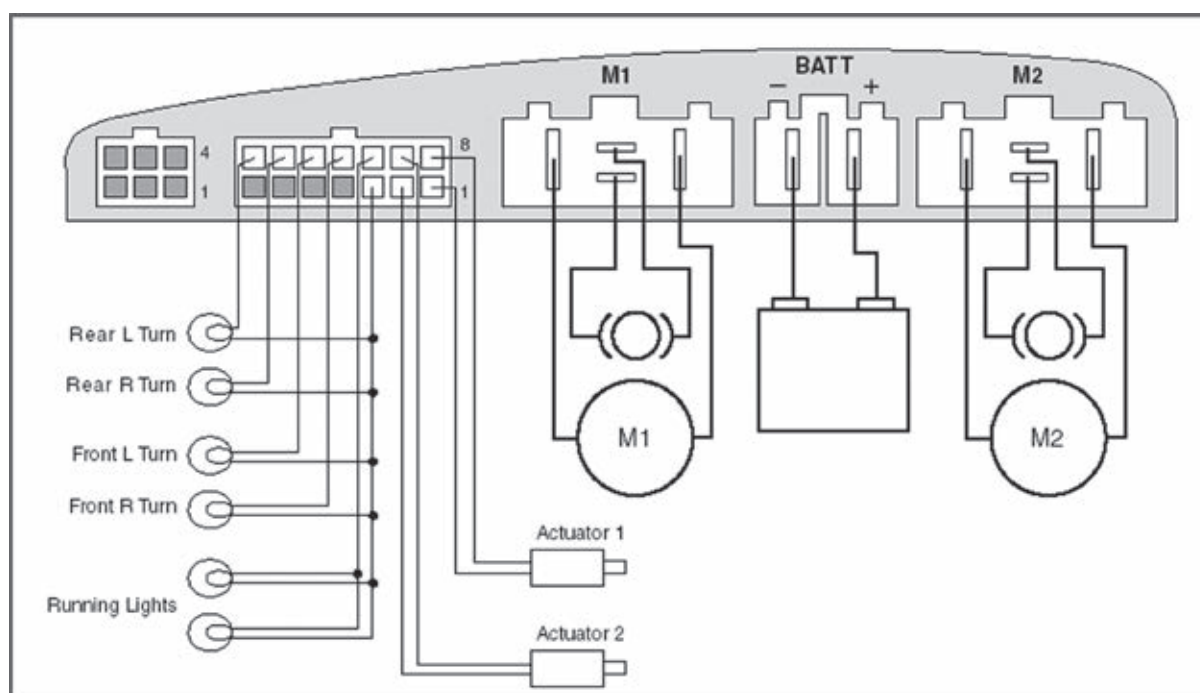


Fig. 48 Wiring of the enAble40 wheelchair control

14-pin controller plug

The pin assignment of the 14-pin controller plug is as follows:

Pin 1	Seat motor 1 +	Pin 8	Seat motor 1 -
Pin 2	Seat motor 2 +	Pin 9	Seat motor 2 -
Pin 3	B +	Pin 10	Headlights -
Pin 4	B -	Pin 11	Direction indicator light front right -
Pin 5	Multi-function input 1	Pin 12	Direction indicator light front left -
Pin 6	Multi-function input 2	Pin 13	Direction indicator light rear right -
Pin 7	Multi-function input 3	Pin 14	Direction indicator light rear left -

8.3 Programming devices

The enAble40 control unit is programmable, i.e. the settings for the various programmable parameters can be set using a programming device. Two programming devices are available: a handheld programming device and a PC programming station (PCPS). The PCPS has additional functions not offered by the handheld programming device. On the other hand, the handheld programming device is more portable. The PCPS is usually used to establish the initial parameter settings, while the handheld programming device is used for changes during practical use.

8.3.1 Handheld programming device

The 1313 handheld programming device is used to configure the connected enAble40 control system. With the programming device, you can adjust and save parameter settings, restore previous settings, perform diagnostics and troubleshooting, and update the system's software.



Fig. 49 Handheld programming device

8.3.1.1 Control and display elements

The handheld programming device offers the following control elements and functions:

- High-resolution colour LCD display
- Function keys
- Plus/minus keys (+/-)
- Help
- Main menu
- Favourites
- On/Off
- Arrow keys

8.3.1.2 Initial operation

1. Turn on the wheelchair control.
2. Ensure the cable is securely connected to the handheld programming device.
3. Connect the bus plug of the handheld programming device to a free bus receptacle (e.g. on the bottom of the display module).

8.3.1.3 Operation

Menu organisation

The main menu contains nine menus. Each of these is identified by a special symbol. Items are arranged hierarchically within the menus.

Menu structure

The menu name for each of the nine root menus is displayed in bold at the top of the screen next to the menu symbol. When navigating within a hierarchical menu, your menu path is shown at the top of the screen.

As shown on the main menu screen, the handheld programming device organises its dataset into nine menus:

- System info
- Parameters

- Monitor
- Diagnostics
- Programming
- Favourites
- HHP settings
- File manager
- Plot & log

INFORMATION

For more information on the handheld programming device, please see the corresponding instructions for use (reference number 647G915).

8.3.2 PC programming station (PCPS)

The enAble40 control unit can also be programmed with the 1314 PCPS programming station. In addition to the programming software, an interface is required to connect the computer and control unit. An adapter is required to programme the enAble40 wheelchair control unit. Article no. 493U32=SK185 includes the programming software, interface and adapter cable.

INFORMATION

For more information on using the software, please see the enAble50 instructions for use (reference number 647G490=D/GB). Note that only Section 5 of the document is used for an enable40 control unit.

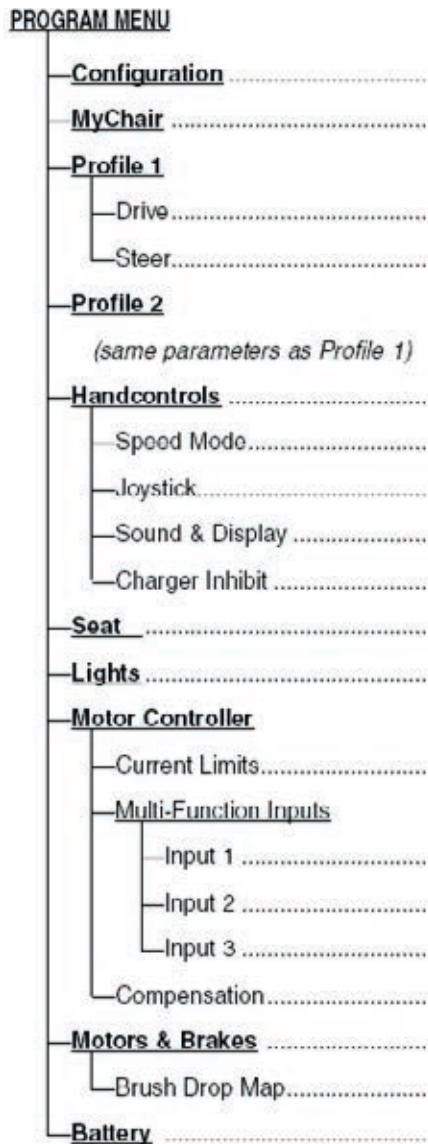
8.4 Programmable Parameters**⚠ WARNING**

Risk of accidents and injury due to incorrect configuration settings. Modified parameter settings in the configuration can lead to changes in driving characteristics. In particular, changes to the speed, acceleration, braking or joystick settings can lead to unexpected and therefore uncontrollable operating performance with a risk of accidents.

Always test the driving characteristics of the power wheelchair after configuration / programming is complete.

Programming must only be completed by authorised personnel. Neither Ottobock nor the control unit manufacturer are liable for damages (especially in combination with special controls) caused by programming that was not properly / professionally adapted to the abilities of the wheelchair user.

The enAble40 wheelchair control features a number of parameters that may be programmed using the hand programming device or 1314 PC programmer. These programmable parameters allow the driving characteristics and performance of the vehicle to be adapted to special deployment requirements. Information about the use of the hand programming device can be found in Section 8.1.4.



The controller for the enAble40 control unit contains four complete datasets for all programmable parameters. This allows the specialist dealer to stock a controller with four configurations that match up to four different wheelchair models. The “Configuration” parameter determines which of these four configurations is active.

8.4.1 “Configuration” Parameter

When the “Configuration” parameter is changed, Powerbase stores the parameters of this configuration but the hand programming device does not. This is why you should disconnect and then reconnect the hand programming device after changing the “Configuration” parameter, so that the hand programming device can download the new settings. The hand programming device only stores the data it downloads when it gets connected.

Parameter	Allowable Range	Description
Configuration	1 – 4	<p>Powerbase stores up to four configuration datasets or configurations. This parameter is used to select the active configuration.</p> <p>⚠ WARNING Risk of accidents and injury due to incorrect parameter selection. The enAble40 wheelchair control included in the scope of delivery is preconfigured by Ottobock. Incorrect selection of the “Configuration” parameter can lead to uncontrollable operating performance with a risk of accidents. Ensure that you have selected the correct configuration for your wheelchair model:</p> <ul style="list-style-type: none"> – Parameter 1 = A200 – Parameter 2 = B500 6 km/h – Parameter 3 = B500 10 km/h – Parameter 4 = Skippi

8.4.2 “MyChair” Parameter

The “MyChair” parameter allows the selection of Profile 1, Profile 2, or a blend of the profiles with settings that lie between the two profiles.

Parameter	Allowable Range	Description
MyChair	1.0 – 2.0	A setting of 1.0 selects Profile 1; a setting of 2.0 selects Profile 2. All other settings (1.1 – 1.9) select a blend or interpolation between the individual parameters in Profile 1 and 2.

Profile 1: Characterised by the settings in the Drive and Steer menus of Profile 1.

Profile 2: Characterised by the settings in the Drive and Steer menus of Profile 2.

The settings in Profile 2 are more “aggressive” than the settings in Profile 1.

The Drive and Steer menus of the two profiles allow the OEM to programme two different driving and steering characteristics for each configuration: This results in 8 combinations (4 configurations x 2 profiles). In practice, this means that many additional wheelchair characteristics are instantly available under these two parameters alone (Configuration and MyChair), since each profile can be set to each of the eleven points in the profile adjustment range. This results in tremendous flexibility without the need to change any other parameters.

8.4.3 Drive Menu

The Drive menu contains the key parameters for the forward and reverse speed, acceleration and operating feel of the wheelchair. There are separate Drive menus for Profile 1 and Profile 2.

Care must be taken to differentiate between the parameters that are affected by the speed limits (speed mode settings) and the parameters affected by the actual current speed of the wheelchair.

Parameter	Allowable Range	Description
Fwd Max Speed	1 – 100 %	Maximum forward speed with speed limit set to 100%.
Fwd Min Speed	1 – 100 %	Maximum forward speed with speed limit set to 0%.
Fwd Accel High Speed	1 – 100 %	Forward acceleration with speed limit set to 100%.
Fwd Accel Low Speed	1 – 100 %	Forward acceleration with speed limit set to 0%.
Fwd Decel High Speed	1 – 100 %	Rate of deceleration when the wheelchair is driving forward at high speed.
Fwd Decel Low Speed	1 – 100 %	Rate of deceleration when the wheelchair is driving forward at low speed.
Rev Max Speed	1 – 100 %	Maximum reverse speed with speed limit set to 100%.
Rev Min Speed	1 – 100 %	Maximum reverse speed with speed limit set to 0%.
Rev Accel High Speed	1 – 100 %	Reverse acceleration with speed limit set to 100%.
Rev Accel Low Speed	1 – 100 %	Reverse acceleration with speed limit set to 0%.
Rev Decel High Speed	1 – 100 %	Rate of deceleration when the wheelchair is driving backward at high speed.
Rev Decel Low Speed	1 – 100 %	Rate of deceleration when the wheelchair is driving backward at low speed.
Tapered Decel Speed	1 – 100 %	Speed at which a second, more gradual rate of deceleration is calculated and activated for a gentler stop.
Drive Softening	0 – 40 %	Higher values result in gentler acceleration.
Tremor Suppression	1 – 100 %	Higher values result in more pronounced filtering to suppress fast hand movements.
Quick Stop Factor	1, 2, 3	Multiplier for the rate of deceleration when the joystick is quickly moved from the forward to the reverse position. A value of 2 makes deceleration 2 times as fast; a value of 3 makes deceleration 3 times as fast. The value 1 deactivates this parameter.
Emergency Stop	60 – 100 %	Rate of deceleration when turning off the key-operated switch or in case of an error.

8.4.4 Steer Menu

The Steer menu contains the key parameters for the turning speed, turning acceleration and operating feel of the wheelchair. There are separate Steer menus for Profile 1 and Profile 2. Care must be taken to differentiate between the parameters that are affected by the speed limits (speed mode settings) and the parameters affected by the actual current speed of the wheelchair.

Parameter	Allowable Range	Description
Turn Max Speed	1 – 100 %	Maximum turning speed with speed limit set to 100%.
Turn Accel High Speed	1 – 100 %	Rate of acceleration in a sharp turn when the power wheelchair is driving at high speed.
Turn Accel Low Speed	1 – 100 %	Rate of acceleration in a sharp turn when the power wheelchair is driving at low speed.
Turn Decel High Speed	1 – 100 %	Rate of deceleration from a turn when the power wheelchair is driving at high speed.
Turn Decel Low Speed	1 – 100 %	Rate of deceleration from a turn when the power wheelchair is driving at low speed.
Steer Sensitivity	1 – 100 %	Controls the steering sensitivity in the middle segment of the joystick range. This parameter determines how much joystick deflection is required in order to make small steering corrections at high speed. A value of 1% makes the control unit very unresponsive; extensive joystick deflection is required for small steering corrections. A value of 100% results in very high steering sensitivity in the middle segment of the joystick range.
Speed/Steer Map	20 – 80 %	Determines how far the speed is reduced as a function of the steering signal. Recommended initial values are 75% for front-wheel drive, 35% for centre drive and 20% for rear-wheel drive.
Rotate Enable Speed	1 – 100 %	Protection against tipping, prevents excessive steering angles before the wheelchair has decelerated below this value. A value of 100% deactivates this function.
Neutral Rotate Decel	1 – 100 %	Rate of deceleration with which the wheelchair decelerates back to neutral from a turn of the joystick.
Turn Softening	0 – 100 %	Desensitises the turning response (Turn Accel/Decel) as a function of the current vehicle speed.

8.4.5 Hand Controls Menu

The three parameters in the “Hand controls” menu refer to the hand control device and attendant controls. This menu is followed by four sub-menus that refer to the following control devices: Speed Mode, Joystick, Sound & Display and Charger.

Parameter	Allowable Range	Description
Auto Shutoff	0 – 60 min	After this period of inactivity, the power wheelchair is automatically turned off. A value of 0 deactivates this function.
Key Lock Function	0, 1, 2	<p>Establishes how a locked system can be reactivated. A value of 0 deactivates this function.</p> <p>Push and hold the On/Off button on one of the two control devices for at least 2 seconds. When the button is released, the system shuts off and the drive-away lock is activated.</p> <p>Cancelling the drive-away lock depends on the setting of the Key Lock Function parameter.</p> <p>When it is set to 1, you have to press the horn button during the activation test of the LCD. (The regular sound of the horn is replaced by a short beep.) If this process was not completed successfully, only the key symbol is shown on the display after the activation test is complete in order to indicate that the drive-away lock is still active. In order to cancel the drive-away lock, you have to turn off the system and carry out the start-up sequence again.</p> <p>If the parameter is set to 2, you have to move the joystick as follows during the activation test of the LCD: Push the joystick forward until you hear a beep, then backward until you hear a beep and finally to the centre until you hear a beep. If this process was not completed successfully, only the key symbol is shown on the display after the activation test is complete in order to indicate that the drive-away lock is still active. In order to cancel the drive-away lock, you have to turn off the system and carry out the start-up sequence again.</p>
Attendant Takeover	1, 2	<p>Determines if the hand controller can turn off the system when the attendant control unit is active.</p> <p>When the parameter is set to 1, the attendant control unit is the master and the hand controller cannot turn off the system.</p> <p>When the parameter is set to 2, the hand controller can turn off the system even if the attendant control unit is turned on.</p>

8.4.6 Speed Mode

The Speed Mode menu allows the therapist or dealer to determine the number of modes available for selection by the operator and to establish the maximum speed for each mode.

It is important to note that the maximum speed setting acts like a speed limit potentiometer. It adjusts the driving and steering speed and responses as a linear interpolation of the minimum and maximum parameter settings in the profiles (the parameter settings are found in the Drive and Steer menus). The speed, acceleration and deceleration are all affected by the speed mode.

Example:

Profile 1 is active and has the following settings:

- Fwd Max Speed = 100 %
- Fwd Min Speed = 20 %
- Turn Accel High Speed = 80 %
- Turn Accel Low Speed = 60 %
- Selected Speed Mode = 50 %

The resulting driving and steering characteristics are as follows:

Forward speed = $(100 \% - 20 \%) * 50 \% + 20 \% = 60 \%$

Steering acceleration = $(80 \% - 60 \%) * 50 \% + 60 \% = 70 \%$

Parameter	Allowable Range	Description
Number of Modes	1 – 5	Number of speed modes the driver can access.
Speed 1	0 – 100 %	Speed limit for Speed Mode 1.
Speed 2	0 – 100 %	Speed limit for Speed Mode 2.
Speed 3	0 – 100 %	Speed limit for Speed Mode 3.
Speed 4	0 – 100 %	Speed limit for Speed Mode 4.
Speed 5	0 – 100 %	Speed limit for Speed Mode 5.
Speed 6	0 – 100 %	Speed limit for Speed Mode 6.
Speed 7	0 – 100 %	Speed limit for Speed Mode 7.
Speed 8	0 – 100 %	Speed limit for Speed Mode 8.
Speed 9	0 – 100 %	Speed limit for Speed Mode 9.
Attendant Speed 1	0 – 100 %	Speed limit for attendant control, Speed Mode 1.
Attendant Speed 2	0 – 100 %	Speed limit for attendant control, Speed Mode 2.

8.4.7 Joystick Menu

Parameter	Allowable Range	Description
Perimeter Deadband	0 – 50 %	Determines how close to the stop (gate) the joystick has to be moved before it is recognised as fully deflected. At a value of 0%, it must be deflected all the way to the stop (gate).
Center Deadband	5 – 20 %	Determines how far the joystick must be deflected from the centre position so that the wheel lock is released and the power wheelchair starts moving. At the minimum value of 5%, only a small movement is required for the power wheelchair to start moving.
Throttle Hysteresis	5 – 10 %	Determines how far the joystick must be deflected past the centre deadband so that the wheel lock is released. The wheel lock is reactivated in the centre deadband. This prevents the wheel lock from being activated and deactivated in the vicinity of the centre deadband.
Rotate Deadband	80 – 100 %	Facilitates easier turns by establishing the steering signal above which the driving speed is reduced to zero. This value is usually set to 93 – 98%.
Quick Stop Pause	0.0 – 1.0 s	Determines the pause after which the wheelchair accelerates backwards following a quick stop. This allows the driver to release the joystick in the centre position without having the wheelchair move backwards.
Start Delay	0.0 – 1.0 s	Delay before the wheelchair starts moving after the joystick is moved from the centre position.
Throttle Calibrate	On/Off	This parameter is set to On in order to start the joystick auto-calibration procedure. After completing the procedure, the parameter must be set back to Off. Carrying out the procedure: Set the joystick to the centre position and set this parameter to On. The horn will sound once. Then fully turn the joystick twice at the stop, clockwise or counter-clockwise. Again, the horn will sound once. Release the joystick and set the calibration parameter back to Off.

8.4.8 Sound and Display Menu

Parameter	Allowable Range	Description
Reverse Beep	On/Off	Emits an audible alarm when the power wheelchair is driving backwards.
Command Beep	On/Off	Emits a short beep each time a button is pushed.
Error Beep	On/Off	Emits an audible alarm when an error is detected.
Backlight Day	0 – 100 %	Determines the brightness of the LCD backlight when the headlights are turned off.
Backlight Night	0 – 100 %	Determines the brightness of the LCD backlight when the headlights are turned on.

8.4.9 Charger Inhibit Menu

The parameters in the “Charger Inhibit” menu allow the actuator functions to remain active even when a charger is connected. One or both actuators can be locked in one direction, both directions or neither direction. Setting an inhibit parameter to Off allows the specified movement even when a charger is connected.

The wheelchair driving function is automatically deactivated when the inhibit input is set to ground (B-).

Parameter	Allowable Range	Description
Act 1 Dir + Inhibit	On/Off	Set to On, actuator 1 is locked in the positive direction.
Act 1 Dir – Inhibit	On/Off	Set to On, actuator 1 is locked in the negative direction.
Act 2 Dir + Inhibit	On/Off	Set to On, actuator 2 is locked in the positive direction.
Act 2 Dir – Inhibit	On/Off	Set to On, actuator 2 is locked in the negative direction.

8.4.10 Seat Menu

The parameters in the “Seat” menu establish which part of the seat is adjusted by an actuator, how fast it runs and how the end stop is recognised. Additional parameters permit simultaneous operation of two actuators and determine how the joystick controls the seat adjustments.

Parameter	Allowable Range	Description
Actuator Toggle Mode	On/Off	When set to On, the joystick can be used as a toggle switch. Pushing the joystick ahead or back switches the driver output to the next state (e.g. up>>down>>up>>down). When the actuator is started in a particular direction, it runs until the joystick is deflected, the mode button is pressed or the actuator reaches its end stop. When set to Off, the driver output supplies positive current to the actuator when the joystick is pushed ahead and negative current when the joystick is pushed back.
Simultaneous Mode	On/Off	Permits simultaneous operation of both drivers.
Actuator 1 Function	1 – 5	Indicates the component operated by actuator 1 on the display: 1 = Back Rest 2 = Seat 3 = Right Leg 4 = Left Leg 5 = Both Legs
Actuator 1 Speed	0 – 100 %	Determines the speed (PWM) of actuator 1.
Actuator 1 Stop Current	0 – 12 A	The driver turns off if the current exceeds this value.
Actuator 1 Stop Time	3 – 120 s	The driver turns off if it runs longer than this period of time.
Actuator 2 Function	1 – 5	Indicates the component operated by actuator 2 on the display (same choice of selections as actuator 1).

Parameter	Allowable Range	Description
Actuator 2 Speed	0 – 100 %	Determines the speed (PWM) of actuator 2.
Actuator 2 Stop Current	0 – 12 A	The driver turns off if the current exceeds this value.
Actuator 2 Stop Time	3 – 120 s	The driver turns off if it runs longer than this period of time.

8.4.11 Lights Menu

Parameter	Allowable Range	Description
Bulb Voltage	0 – 24 V	Determines the voltage of the bulbs. In accordance with the Road Traffic Licensing Regulations (StVZO), the bulbs are kept at a constant voltage for consistent brightness.
Light ½ Voltage	On/Off	Permits operating the headlights with half of the bulb voltage.
Min Light Current	0 – 3 A	Sets the minimum current for the headlights; an error is recognised below this current.
Indicator ½ Voltage	On/Off	Permits operating the direction indicator lights with half of the bulb voltage.
Min Indicator Current	0 – 3 A	Sets the minimum current for the direction indicator lights; an error is recognised below this current.
Indicator Time-out	0 – 30 s	Sets the maximum time a direction indicator remains active before it is turned off automatically. A value of 0 deactivates this function.

8.4.12 Current Limits Menu

Parameter	Allowable Range	Description
Peak Current Limit	5 – 75 A	Delivers a motor current boost. Sets the motor current limit effective for the Peak Current Time.
Peak Current Time	0 – 60 s	Sets the effective time for the Peak Current Limit motor current limit.
Drive Current Limit	5 – 60 A	Sets the motor current limit for normal driving.
Regen Current Limit	5 – 75 A	Sets the motor current limit for regenerative braking.

The Powerbase of the enAble40 control unit has three multi-function inputs that can be used for flexible seat adjustment and speed limit functions.

The speed limits using the multi-function inputs work in the same way as the speed modes; they create an interpolation between the respective minimum and maximum parameter pairs of the active profile (Profile 1 or 2). Note that the maximum speed of the power wheelchair is always the lowest of the respective applicable speed limits. Each of the three multi-function inputs has its own programme menu.

8.4.13 Multi-Function Input 1 Menu

Die Parameter im Menü „Multi-Function Input 1“ können zur Sperrung der Aktuatoren genutzt werden und/oder bieten eine variable Geschwindigkeitsbegrenzung über ein Potentiometer. Multi-Function Input 1 liegt auf Pin 5 des 14-poligen Steuersteckers.

Parameter	Allowable Range	Description
Off/InhL/InhH/Spd	0 – 3	0 = Multi-Function Input 1 is ignored. 1 = Locks actuators when input is low. 2 = Locks actuators when input is high. 3 = Speed limit depends on the input voltage.
Act 1 Dir + Inhibit	On/Off	Set to On, actuator 1 is locked in the positive direction.
Act 1 Dir - Inhibit	On/Off	Set to On, actuator 1 is locked in the negative direction.
Act 2 Dir + Inhibit	On/Off	Set to On, actuator 2 is locked in the positive direction.
Act 2 Dir - Inhibit	On/Off	Set to On, actuator 2 is locked in the negative direction.
Speed Limit Input Low	0 – 100 %	Sets the speed limit when the input is low or the potentiometer contact is set to B-. This parameter is ignored when InhH is selected (first parameter = 2).
Speed Limit Input High	0 – 100 %	Sets the speed limit when the input is high or the potentiometer 100 K has contact to B-. This parameter is ignored when InhL is selected (first parameter = 1).

8.4.14 Multi-Function Input 2 Menu

The parameters in the “Multi-Function Input 2” menu can be used to lock one or both actuators in order to set a speed limit. Multi-Function Input 2 is on pin 6 of the 14-pin control unit plug.

Parameter	Allowable Range	Description
Off/Seat	0, 1	0 = Multi-Function Input 2 is ignored. 1 = Inhibit and / or speed limit active, depending whether the input is high or low (see next parameter).
Active Low	On/Off	When set to On, the inhibit and speed limit are active when the contact is closed (set to B-). When set to Off, these functions are active when the contact is open.
Act 1 Dir + Inhibit	On/Off	Set to On, actuator 1 is locked in the positive direction.
Act 1 Dir – Inhibit	On/Off	Set to On, actuator 1 is locked in the negative direction.
Act 2 Dir + Inhibit	On/Off	Set to On, actuator 2 is locked in the positive direction.
Act 2 Dir – Inhibit	On/Off	Set to On, actuator 2 is locked in the negative direction.
Speed Limit	0-100 %	Sets the speed limit when input 2 is active.

8.4.15 Multi-Function Input 3 Menu

The parameters in the “Multi-Function Input 3” menu can be used for a swivel seat (= 1) and a related speed limit. Alternatively, they can be used for a speed limit activated by a switch. Multi-Function Input 3 is on pin 7 of the 14-pin control unit plug.

Parameter	Allowable Range	Description
Off/Swvl/Seat	0 – 2	0 = Multi-Function Input 3 is ignored. 1 = Offers a swivel seat function. This is used for wheelchairs that have a swivelling seat in order to switch between front-wheel drive and rear-wheel drive. Set to 1, the profile changes from Profile 1 to Profile 2 when input 3 is active (see next parameter). In addition, the motors are switched and the direction of rotation is reversed. The MyChair setting is ignored in the swivel seat function. 2 = Sets the speed limit described below when input 3 is active.
Active Low	On/Off	When set to On, the swivel seat and speed limit are active when the contact is closed (set to B-). When set to Off, these functions are active when the contact is open.
Act 1 Dir + Inhibit	On/Off	Set to On, actuator 1 is locked in the positive direction.
Act 1 Dir – Inhibit	On/Off	Set to On, actuator 1 is locked in the negative direction.
Act 2 Dir + Inhibit	On/Off	Set to On, actuator 2 is locked in the positive direction.
Act 2 Dir – Inhibit	On/Off	Set to On, actuator 2 is locked in the negative direction.
Speed Limit	0 – 100 %	Sets the speed limit when input 3 is active.

8.4.16 Compensation Menu

Parameter	Allowable Range	Description
High Speed Comp	0 – 100 %	Sets the motor load compensation at high speeds. Higher values mean greater suppression of load variations. Lower values offer smoother operation.
Low Speed Comp	0 – 100 %	Sets the motor load compensation at low speeds. Higher values mean greater suppression of load variations. Lower values offer smoother operation.
Anti Roll Comp	0 – 150 %	This parameter affects the ability to control the power wheelchair on inclines (ramps or hills). Motor torque is generated to prevent motion and hold a position until the electromagnetic brake engages. Higher values result in higher torque.
Comp Speed	0 – 100 %	Sets the speed below which Low Speed Comp is activated.
Max Motor Volts	20 – 28 V	Sets the maximum current that can be applied to the motor.

Parameter	Allowable Range	Description
Max Push Speed	0 – 100 %	Increases the speed accepted by the motor controller algorithm when the power wheelchair is turned off and being pushed manually. When the power wheelchair is pushed with the control unit turned off, the Powerbase is activated by the generator effect of the drive motor. In this case, the Powerbase limits the speed of the power wheelchair to the programmed value by short-circuiting the motors with PWM.
Brush Comp L/S	0 – 100 %	Determines the amount of additional compensation due to brush loss at low speeds for front-wheel drive power wheelchairs.
Brush Comp H/S	0 – 100 %	Determines the amount of additional compensation due to brush loss at high speeds for front-wheel drive power wheelchairs.

8.4.17 Motor and Brakes Menu

Parameter	Allowable Range	Description
Auto-Trim	On/Off	Activates the patented Auto-Trim function.
Motor-Trim	-50 – +50	Sets the motor trim for straight-ahead operation in spite of differences in motor characteristics. A value of 0 means there is no steering correction.
System Resistance	0 – 600 mΩ	Sets the actual system resistance (motor + brushes + cables + plugs) used for load compensation and speed limit evaluation. It is important to determine this value directly using the motor test described below.
Motor Current Rating	0 – 75 A	Sets the value to which the motor current is reduced if the excess motor temperature limit is exceeded.
Time at Max Current	0 – 255 s	Sets the estimated time for which the motor can be operated under maximum operating current before it overheats.
Single Brake Drive	On/Off	Allows only activating the M1 brake driver so that two 12 V wheel locks can be connected in series.
Brake Cutback Voltage	12 – 24 V	Sets the value to which the brake coil voltage is reduced after 250 ms at battery voltage. This function saves energy and prevents overheating.
EM Brake Delay	0 – 2 s	Determines the delay time after reaching a speed of zero, after which the EM brake is deactivated.
Motor Swap	0 – 7	Swaps and / or inverts the left and right motor.
Motor Test Mode	On/Off	Sets the system to a current limit of 25 A and allows the motors to be blocked so that the motor / system resistance can be measured precisely and displayed in the 1311 monitor menu. The measured value must be used for the System Resistance parameter described above. After measuring, the Motor Test Mode parameter has to be set back to Off.

8.4.18 Custom Battery

The “Custom Battery” parameter allows any lead acid battery to be installed and the BDI algorithm to be adapted accordingly. Actual use and the discharge profiles affect the settings and overall accuracy of the BDI algorithm. The output and type of battery charger also affect the BDI algorithm; it must be adapted to the charger by means of tests.

Note that all voltages are specified in volt per cell. The actual battery voltage is equal to 12 times these values.

Parameter	Allowable Range	Description
Full Voltage	0 – 3 V	Voltage above which 100% BDI (battery capacity) is displayed.
Empty Voltage	0 – 3 V	Voltage below which 0% BDI (battery capacity) is displayed.
Reset Voltage	0 – 3 V	Voltage at which the BDI (battery capacity) is reset to 100%.
Start Charge Voltage	0 – 3 V	Voltage above which the battery charging process is recognised.
Partial Charge Min %	10 – 100 %	The charge in % required in order to reset the BDI to a higher value in case of a partial charge. Rest Voltage overwrites this parameter.
Discharge Rate	0 – 30	Discharge rate for the battery. Higher values apply to larger batteries that discharge more slowly.
Charge Rate	0 – 30	Charge rate for the battery. Higher values apply to larger batteries that charge more slowly.

8.4.19 Monitor Menu

The Monitor menu is used by the hand programming device in order to access real-time data during wheelchair operation.

The Monitor menu has six sub-menus:



Display	Display Range	Description
Hand Controls		
Drive Command	-100 – +100 %	Requested, normalised (to 100%) Y-axis value of the joystick, including the deadband.
Turn Command	-100 – +100 %	Requested, normalised (to 100%) X-axis value of the joystick, including the deadband.

Display	Display Range	Description
Speed Mode	On/Off	Speed Mode parameter setting.
Speed Command	0 – 100 %	Value of the speed limit currently in effect.
Horn Button	On/Off	Status of the horn button.
Mode Button	On/Off	Status of the mode button.
Left Turn Button	On/Off	Status of the left direction indicator button.
Right Turn Button	On/Off	Status of the right direction indicator button.
Hazard Button	On/Off	Status of the hazard light button.
Headlight Button	On/Off	Status of the headlight button.
Charger Button	On/Off	Status of the Inhibit input.
Seat		
Actuator 1 Voltage	-24 – +24 V	Voltage on actuator motor 1.
Actuator 2 Voltage	-24 – +24 V	Voltage on actuator motor 2.
Actuator Current	-12 – +12 A	Current on actuator motors.
Lights		
Right Lamp Voltage	0 – 24 V	Voltage on the right-hand direction indicator lights.
Left Lamp Voltage	0 – 24 V	Voltage on the left-hand direction indicator lights.
Turn Signal Current	0 – 6 A	Current on the direction indicator lights.
Headlights Voltage	0 – 24 V	Voltage on the headlights.
Headlights Current	0 – 6 A	Current on the headlights.
Motor Controller		
Input 1	0 – 5 V	Voltage on Multi-Function Input 1.
Input 2	On/Off	Status of Multi-Function Input 2.
Input 3	On/Off	Status of Multi-Function Input 3.
M1 Bridge Temp	-40 – +150 °C	Temperature of the power module for drive motor 1.
M2 Bridge Temp	-40 – +150 °C	Temperature of the power module for drive motor 2.
Motors und Brakes		
M1 Current	-75 – +75 A	Current on drive motor 1.
M2 Current	-75 – +75 A	Current on drive motor 2.
M1 Voltage	-28 – +28 V	Voltage on drive motor 1.
M2 Voltage	-28 – +28 V	Voltage on drive motor 2.
M1 PWM	-100 – +100 %	PWM on drive motor 1.
M2 PWM	-100 – +100 %	PWM on drive motor 2.
M1 Brake	On/Off	Status of the EM brake on drive motor 1.
M2 Brake	On/Off	Status of the EM brake on drive motor 2.
System Resistance	0 – 600 mΩ	System resistance as measured by the Powerbase on terminals M1 and M2. This variable only supplies an accurate value if it was measured with the Motor Test Mode parameter set to On.

Display	Display Range	Description
Battery		
Battery Voltage	0 – 38 V	Battery voltage.
BDI %	0 – 100 %	Battery capacity estimated by the Powerbase.

9 Delivery

9.1 Final inspection

A final inspection must be performed before delivery of the power wheelchair. Complete the following checklist:

Activity	Status
Are all options installed according to the specifications?	<input type="checkbox"/>
Was the product fitted optimally to the physical and mental condition of the user (seat, armrests, footrests, control panel, additional controls)?	<input type="checkbox"/>
Are the batteries charged?	<input type="checkbox"/>
Are the tyres correctly inflated?	<input type="checkbox"/>
Do all manual and power functions work properly?	<input type="checkbox"/>
Do all control functions work properly?	<input type="checkbox"/>
Do the brakes work? Does the braking distance conform to the specifications?	<input type="checkbox"/>
If intended: Are all options required to take part in road traffic installed and fully functional (e.g. warning triangle, lights, warning flashers)?	<input type="checkbox"/>
Only for combination of the power wheelchair with products of other manufacturers: Was all information in the instructions for use and installation and service manuals of other manufacturers observed?	<input type="checkbox"/>
Only for combination of the power wheelchair with products of other manufacturers: Were the instructions for use for new add-ons provided to the user?	<input type="checkbox"/>

9.2 Record of delivery

INFORMATION

- Also observe the information in Section 10 for delivery.
- Retain the completed record of delivery. It may be requested by the manufacturer in case of complaints.
- Provide the user or attendant with a copy of the completed record of delivery.

The user or attendant has been instructed in the use of the product and was informed of the residual risks.

Customer:

Year of manufacture:	Serial no.:
----------------------	-------------

The product was delivered by:	Place / date:
Signature of specialist dealer:	Signature of user/attendant:

10 Maintenance schedule

INFORMATION

- Observe the information in Section 9 for delivery.
- Retain the completed maintenance report. It may be requested by the manufacturer in case of complaints.
- Provide the user or attendant with a copy of the completed maintenance report.

Customer:

Reuse

Yes	No
-----	----

Year of manufacture:	Serial no.:
----------------------	-------------

Skippi – general condition:

Driving report:

Areas

For all the components listed here check the functioning, setting and screw connections and look for signs of damage or deformation!

		In good condition	Damaged	Exchange/replace
1	Control unit			
	Control panel holder			
	Control unit cable			
2	Batteries			
	Battery packs			
	Cables			
3	Motors			
	Brake release			
4	Tyres			
	Drive wheels			
	Casters			
5	Frame			

	Drive unit sustainer			
	Wheel cover			
	Sticker			
6	Seat			
	Back			
	Upholstery/ cushions			
	Contour seat			
	Contoured back			
	Electric back adjust- ment			
	Electric seat tilt			
	Electric seat height adjustment			
	Mechanical seat tilt			
	Push handles			
7	Side panel			
	Brackets			
	Clothing protector			
8	Footrests			
	Brackets			
	Elevating footrest			
9	Options			
	Belt			
	Adapter for headrest			
	Heel straps			

Comments:

Maintenance performed by:	Place / Date:	Signature:
---------------------------	---------------	------------

11 Appendices

11.1 Technical data

All technical data are found in the 647G59=* instructions for use. You can request current instructions for use as a PDF file from the Customer Care Center (CCC) at oa@ottobock.com or from the manufacturer's service department (see inside back cover or back page for addresses).

11.2 Torque values of the screw connections

Unless otherwise specified, screw connections are tightened with the following torque values:

- Thread diameter M4: 3 Nm
- Thread diameter M5: 5 Nm
- Thread diameter M6: 10 Nm
- Thread diameter M8: 25 Nm



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A series of horizontal lines for writing, spanning the width of the page.

Kundenservice/Customer Service

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