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Service manual

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1 Introduction

INFORMATION

Date of last update: 2024-07-11

INFORMATION

- ► New information regarding product safety and product recalls as well as the declaration of conformity can be obtained at ccc@ottobock.com or from the manufacturer's service department (visit www.ottobock.com for addresses).
- ► You can request this document as a PDF file at ccc@ottobock.com or from the manufacturer's service department. The PDF file can also be displayed in a larger size.

1.1 Foreword

- Regular maintenance is important. It increases safety and ensures the the product reaches its intended lifetime.
- This product should be inspected and serviced **at least once a year**.
- The manufacturer recommends 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.
- The assembly tasks described here relate to the use of spare parts. The service personnel bear sole responsibility for retrofitting or converting the product.
- Only use original spare parts for all service and maintenance work. The service, maintenance and adjustments described here must only be completed by trained, qualified personnel and not by the user of the product.
- This service manual refers to the respective spare parts catalogues and the instructions for use of the described products.
- Use the maintenance plan (checklist) as a template for making copies. Retain completed maintenance plans and provide the user with a copy.

	Instructions for use (qualified personnel)	Instructions for use (user)
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1.2 Support

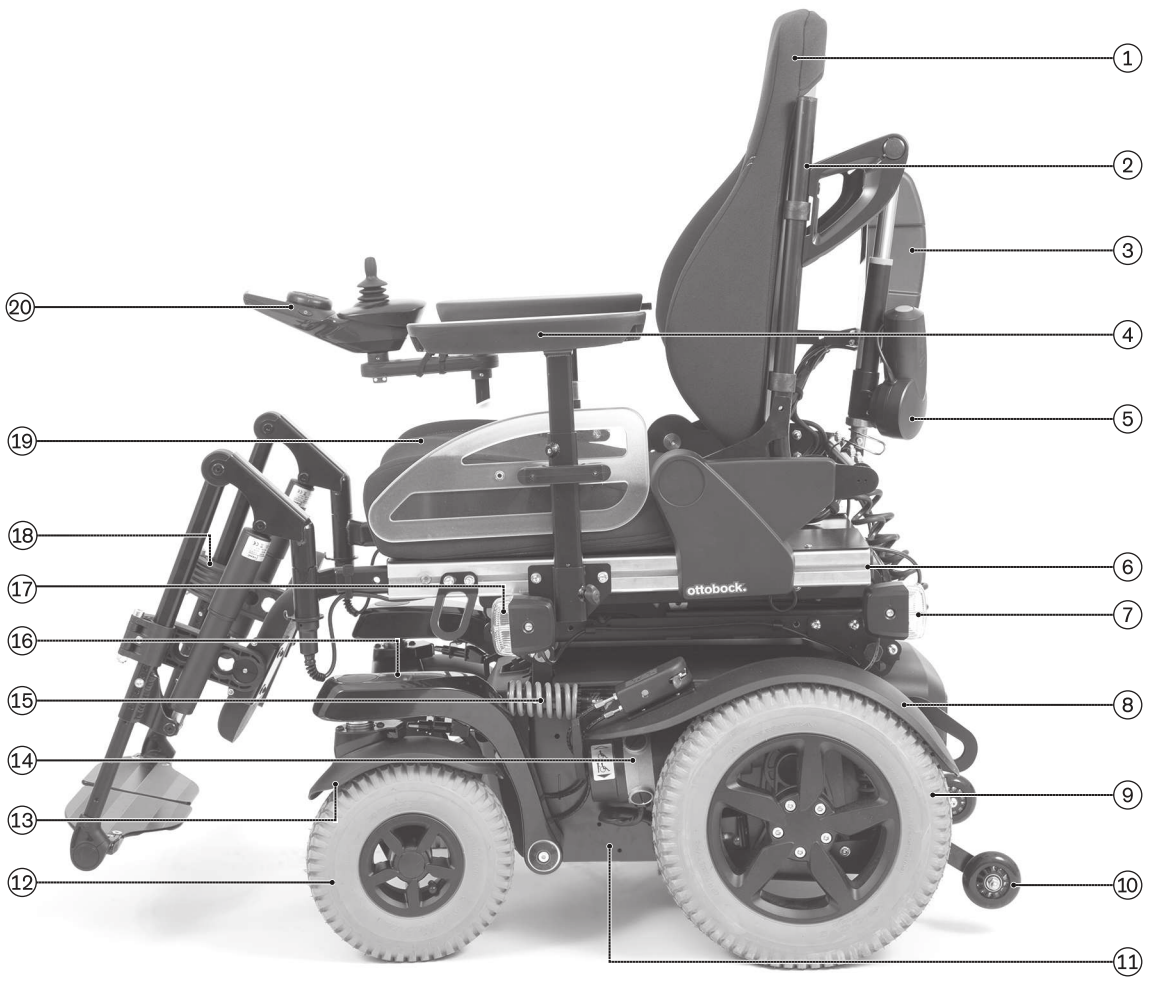
Your national Ottobock team will be happy to answer any technical questions.

1.3 Product Overview

1.3.1 Rear-wheel drive RWD/front-wheel drive FWD

Fig. 1 shows a power wheelchair with rear-wheel drive. On a power wheelchair with front-wheel drive, the mobility base is rotated accordingly by 180°.

1



1	Back support pad	11	Mobility base (drive unit bracket)
2	Back	12	Caster wheel
3	Seat module	13	Caster wheel splash guard
4	Side panel with arm support and clothing guard	14	Drive motor with brake release
5	Actuator for power back support angle adjustment	15	Suspension for caster wheel swing arm
6	Seat frame	16	Caster wheel swing arm
7	Rear lighting	17	Front lighting
8	Drive wheel splash guard	18	Leg support
9	Drive wheel	19	Seat cushion
10	Anti-tipper	20	Control panel

1.3.2 Mid-wheel drive MWD

2

1 Back support pad
2 Back
3 Seat frame
4 Rear lighting
5 Drive wheel splash guard
6 Stabilising wheel swing arm
7 Caster wheel splash guard
8 Caster wheel
9 Drive wheel
10 Drive motor with brake release
11 Caster wheel swing arm
12 Suspension for caster wheel swing arm
13 Front lighting
14 Leg support
15 Seat cushion
16 Control panel
17 Side panel with arm support and clothing guard

2 Safety

2.1 Explanation of warning symbols

⚠ WARNING	Warning regarding possible serious risks of accident or injury.
⚠ CAUTION	Warning regarding possible risks of accident or injury.
NOTICE	Warning regarding possible technical damage.

2.2 General safety instructions

⚠ WARNING

Risk of suffocation

► Packaging materials must be kept out of the reach of children.

⚠ WARNING

Use of the wheelchair during service work

Severe injuries if the wheelchair tips over due to loosened components

► No person is permitted to be in or on the wheelchair during any service work.

► Support the product so it cannot tip over during all service work.

⚠ WARNING

Overloading

Severe injuries if the product tips over due to overloading, damage to the product

► Do not exceed the maximum load (see the nameplate and “Technical data” section).

► Please note that certain accessories and add-on components will reduce the remaining load capacity.

► We assume no liability if the maximum allowable user weight is exceeded.

► Refitting and retrofitting accessories changes the weight of the wheelchair. This can lead to changes in driving characteristics and increased loads on the drives, the suspensions and other components of the wheelchair. Before refitting or retrofitting any accessories, check whether the selected configuration and the overall weight of the wheelchair are permitted. For further information, please contact your national Ottobock team.

2.3 Safety instructions for the use of tools and appliances

⚠ CAUTION

Use of unsuitable tools

Pinching, crushing or damaging the product due to use of unsuitable 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.

► Observe the specifications in the section "Required Tools".

⚠ CAUTION

Wearing unsuitable work clothing

Chemical burns due to insufficient protection

► Wear suitable work clothing (for example, gloves and protective goggles) when working on the batteries.

⚠ CAUTION

Improper lifting

Crushing, pinching, blows due to failure to observe safety notes

► Some parts of the power wheelchair, such as the batteries, frame, seat and motors, are very heavy. Ensure ergonomically correct lifting of these parts. Use sufficiently large hoisting devices or perform this work with the assistance of a helper.

► If it is necessary to work underneath raised parts or equipment, make sure they are secured by suitable means so that they cannot come loose, shift or fall down.

► When using lifting platforms or an assembly stand, ensure that the power wheelchair is centred on the platform and that no parts protrude into the danger zone.

2.4 Safety instructions for service and maintenance tasks

⚠ WARNING

Exposed pinch points

Pinching, crushing of limbs (e.g. fingers) due to lack of caution in danger areas, damage to the product

- ► Note that when seat functions are used, inherent pinch and shear points are located between the seat frame and the power wheelchair frame.
- ► Ensure that no body parts, such as hands or feet, are in the danger area while the seat functions are used.
- ► Ensure that no interfering objects, such as clothing or other obstacles, are in the danger area while the seat functions are used.

⚠ WARNING

Exposed pinch points when seat is folded up

Pinching, crushing of limbs (e.g. fingers), tipping over due to lack of caution when folding the seat up and down

- ► To safely fold the seat up and down, grasp the seat frame, back support or leg support adapters. Never use the leg supports themselves for folding up and down since they do not offer a secure grip.
- ► After folding up the seat, shake it to verify that it is firmly fixed in place. A seat that is not firmly locked could fall back to its starting position and result in severe crushing injuries.
- ► Always secure the wheelchair against tipping over with the active support of a helper when the seat is folded up. Always fold down the seat before jacking the wheelchair up or down.
- ► Move the seat to the lowest seat height before folding it up. If this is not possible (e.g. due to a defect in the seat height adjustment actuator), then secure the seat during all work with the active support of a helper.

⚠ WARNING

Uncontrolled movement of components following loosening of plug and screw connections

Pinching, crushing and shearing of body parts

- ► Ensure that body parts, such as hands and feet, are never in the danger zone.
- ► Ensure that no interfering objects, such as clothing or other obstacles, are in the danger area.
- ► Perform the work with the aid of a helper for support.

⚠ WARNING

Incorrect cable routing

Tipping over, falling out, burns due to assembly errors during cable installation

- ► Improper cable installation can lead to a loss of cable insulation and consequently to short circuits and even fires. Always install the cables so the cable insulation cannot chafe.
- ► Severing cables or unintentionally disconnecting plug connections while driving can cause an emergency stop of the wheelchair. This can lead to dangerous situations in road traffic. Always install the cables and plug connections so they cannot be damaged and cannot disconnect.

⚠ CAUTION

Failure to observe installation instructions

Pinching, crushing due to installation errors

- ► Do not reach between force-actuated surfaces during installation work (e.g. when tightening screw connections).

⚠ CAUTION

Improper use of self-locking nuts

Tipping, falling over of the user due to screw connections coming loose

- ► Always replace self-locking nuts with new self-locking nuts after disassembly.

⚠ CAUTION

Unsecured screw connections

Pinching, crushing, tipping over, falling of user due to assembly errors

- ► Always firmly re-tighten the mounting screws and nuts after changing settings. Observe the specified tightening torques in doing so.
- ► Any time you loosen a screw connection with thread lock, replace it with a new screw connection with thread lock or secure the old screw connection with medium strength thread locker (e.g. Loctite 241).
- ► Always replace self-locking screws and nuts with new self-locking screws and nuts after disassembly.

⚠ CAUTION

Short circuit of the battery

Burns, injuries; damage to electrical/electronic components due to improper battery handling

- ► Deactivate the main fuse before performing any work on the battery.
- ► Disconnect the battery cable from the controller before performing any work on the battery.
- ► Use only insulated tools to perform maintenance work on the batteries.
- ► Never connect the two poles of a battery with metal conductors or tools.
- ► Ensure correct polarity when connecting the battery cable. Please refer to the battery circuit diagram on the inside of the battery cover.

⚠ CAUTION

Lack of or improper cleaning

Health hazard due to infections, damage to the product due to user error

- ► Clean the product at regular intervals.
- ► Water must not come into direct contact with the electronics, motor or batteries under any circumstances during cleaning. Never use a water jet or high-pressure cleaning apparatus to clean the product.
- ► To avoid contamination with germs, clean seat cushions and back support upholstery whenever they get soiled.
- ► Check the driving behaviour of the product after cleaning it.

NOTICE

Tipping or falling of the product

Damage to product due to lack of attachment

- ► When you work on the product, secure it so that it cannot tip over or fall over.
- ► Use a clamping fixture to secure the product whenever you work on it at a workbench.

NOTICE

Worn or loose bushings

Damage to product due to incorrect assembly

- ► Verify that the pressed-in bushings fit firmly during all assembly work.
- ► If bushings are worn or loose, the entire component in question has to be replaced. Replacing individual bushings is not permitted.

NOTICE

Incorrect cable routing

Plug connections coming loose or damage to the cables due to installation errors

- ► Take note of the cables attached to the product with cable ties during all installation work.
- ► Carefully cut the cable ties with suitable side-cutting pliers if necessary. Ensure that you do not damage the cables during this process.
- ► Install the cables in such a way that they cannot be damaged. Leave an appropriate cable loop on moveable components so they can move without tension.
- ► Only use suitable fasteners (such as cable ties). Also use cable ties to secure the plug connections to the product so they cannot be disconnected unintentionally.

NOTICE

Incorrect lifting

Damage to the product, tearing off of side panels due to user error

► Do not use the side panels to lift the wheelchair.

3 Transport and storage

3.1 Transport

NOTICE

Improper transport

Damage to the product due to collision and falling down

► Only use hoisting devices that have a sufficient capacity and the designated carry handles.

► The power wheelchair must be secured in accordance with the regulations for the transport device.

► During transportation on lifting platforms or in lifts, the control unit of the power wheelchair must be turned off. Engage the brake.

► Ensure that the power wheelchair is centred on the lifting platform. None of the power wheelchair's components, such as its anti-tippers or other components, may be in the danger area.

The size of the wheelchair can be reduced for transport (see fig. 3 and see fig. 4).

For this purpose, the seat bottom must be moved into the lowest position and the back support folded down onto the seat. The caster wheel is swivelled under the caster wheel swing arm.

The following accessories can be optionally dismantled or removed for transport:

- Head support
- Leg supports
- Side panels
- Back support pad and seat cushion

All instructions for reducing the transportation size are included in the instructions for use (user).

3

4

Prior to transport, turn the control device of the wheelchair off, engage the brake and deactivate the main fuse (see page 16).

Secure the wheelchair with straps to the 4 eyebolts on the mobility base during transport. The angle at which the straps are tightened must be as flat as possible.

3.2 Storage

Switch off the wheelchair control device and deactivate the main fuse prior to storage (see page 16).

Store the product in a dry, enclosed room with sufficient air circulation and protection from external influences.

Maintain an ambient temperature from **-15 °C to +40 °C [5 °F to 104 °F]** and relative humidity of **45% to 85%**.

4 Service Work

4.1 General Information

INFORMATION

Read the service manual before starting work. Familiarise yourself with the functions of the product prior to inspection and use. In order to do so, you can request this service manual and other documentation from the manufacturer.

INFORMATION

Clean and disinfect the product before commencing service work.

Observe all product care and product-specific inspection instructions in the instructions for use.

INFORMATION

Many screw connections utilise screws and nuts equipped with a thread lock. If you loosen screw connections, be sure to replace the respective nut or screw with one equipped with a new thread lock. If new screws or nuts with thread lock are not available, use a medium strength liquid thread locking compound (e.g. Loctite® 241 or Euro Lock A24.20).

INFORMATION

For adjustment or assembly work, you are referred to the instructions for use (user or qualified personnel). Due to changes in the configuration, new components may be missing in the available instructions for use (user or qualified personnel). You can request the updated instructions for use for your new configuration from the manufacturer.

4.2 Instructions for adjustment

⚠ WARNING

Lack of stability against tipping

User may fall or tip over due to lack of inspection

► Changing the settings can lead to instability of the system as a whole. Verify tipping resistance after any changes to the settings.

The sections that follow describe the replacement and installation of standard and optional parts on the product shown on the cover.

All instructions concerning the adjustment of the installed parts are included in the instructions for use (qualified personnel) – see the "Foreword" section for the order number.

4.3 Maintenance Schedule

The maintenance schedule as a copy template is found in the appendix: see page 216.

4.4 Required tools

INFORMATION

Please note: Always use insulated tools for work on current-carrying components.

The following tools are required in order to perform the service work:

- Phillips head screwdriver (size: 3)
- Flat head screwdriver (small and medium size)
- Allen keys in sizes 2 – 8 mm
- Torx key (size T10)
- Pin wrench or screwdriver with Torx Plus 20IP
- Ring and open-ended wrenches in sizes 10, 13, 17, 30
- Reversible ratchet handle wrench and sockets (size: 8 – 30)
- Torque wrench (measurement ranges 0.5 – 25 Nm)
- Socket wrench extension
- Hammer (approx. 300 g); soft-faced hammer
- Cotter pin drive Ø 8 mm

- Assembly stand (rectangular supporting surface corresponding to the footprint of the product; load capacity at least equal to the overall weight of the wheelchair; see technical data)
- Tyre mounting levers and inner tube repair kit
- Liquid thread lock, "medium" and "strong"
- Side cutting pliers
- Drill; twist drill Ø 5.2 mm

4.5 Basic work

4.5.1 Jacking up the wheelchair

⚠ CAUTION

Improper lifting

Crushing, pinching, blows due to failure to observe safety notes

- ► Some parts of the power wheelchair, such as the batteries, frame, seat and motors, are very heavy. Ensure ergonomically correct lifting of these parts. Use sufficiently large hoisting devices or perform this work with the assistance of a helper.
- ► If it is necessary to work underneath raised parts or equipment, make sure they are secured by suitable means so that they cannot come loose, shift or fall down.
- ► Always use an assembly stand with a load capacity that is at least equal to the overall weight of the wheelchair.
- ► When using lifting platforms or an assembly stand, ensure that the power wheelchair is centred on the platform and that no parts protrude into the danger zone.
- ► Always secure a jacked up wheelchair against tipping over with the active support of a helper when the seat is folded up. Always fold down the seat before jacking the wheelchair up or down.

NOTICE

Incorrect lifting

Damage to the product, tearing off of side panels due to user error

- ► Do not use the side panels to lift the wheelchair.

Jacking up is required for work on the following components:

- Drive wheels
- Drive wheel swing arms and suspension
- Caster wheels
- Caster wheel swing arms and suspension / rigid elements
- Drive motors

Jacking up with an assembly stand

1) Activate (lock) the brakes on both drive motors.
2) Tip the wheelchair with the active support of a helper.
   INFORMATION: A wheelchair with mid-wheel drive MWD can be tilted sideways to jack it up. Grasp the seat frame for tipping. Do not use the side panels to lift the wheelchair. Do not pull or push on the side panels or arm supports!
3) Place an assembly stand of sufficient load capacity and size under the mobility base of the wheelchair so it is centred.
4) Carefully lower the wheelchair, centring it on the assembly stand. The mobility base has to lie evenly on the supporting surface of the assembly stand.
5) Check that the wheelchair is securely positioned on the assembly stand.

4.5.2 Operating the seat height and seat tilt

All instructions for power operation of the seat height (optional) and seat tilt (optional) are included in the instructions for use (user).

INFORMATION

If there is a defect in the seat height adjustment actuator, the seat height cannot be power operated. In this case, please observe the following instructions:

- **If the seat is fixed in an upper position:**
  Actively secure the seat and the wheelchair against falling and tipping during all work. Perform the work only with the active support and assistance of a helper, especially when the seat is folded up.
- **If the seat is fixed in the lowered position:**
  Check whether the seat can be pulled up manually for work on the seat height adjustment actuator. Actively secure the manually raised seat and the wheelchair against falling and tipping. Perform the work only with the active support and assistance of a helper, especially when the seat is folded up.
- **If the seat cannot be pulled up manually:**
  Carefully fold up the seat for the required work. Actively secure the seat and the wheelchair against falling and tipping during all work. Perform all work only with the active support and assistance of a helper.

4.5.3 Activating/deactivating the main fuse

Activating the main fuse

- ► Push the reset lever, which is at an angle, into the notch until it engages (see fig. 5, see fig. 6, item 1).

→ The main fuse is activated (see fig. 5). The internal power supply is connected and activated.

Deactivating the main fuse

- ► Press the push-button until the reset lever flips up at an angle (see fig. 5, see fig. 6, item 2).

→ The main fuse is deactivated (see fig. 6). The internal power supply is disconnected.

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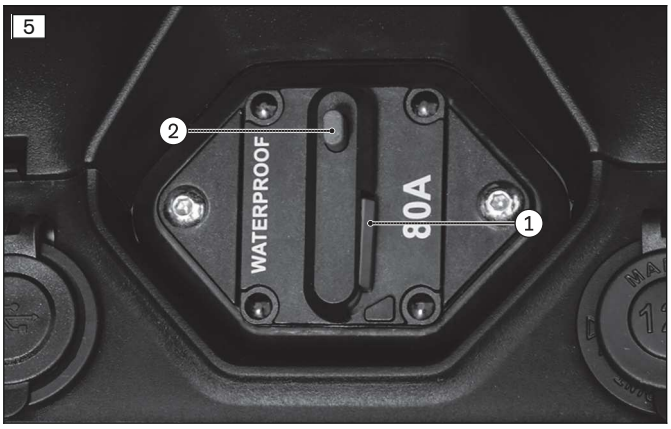

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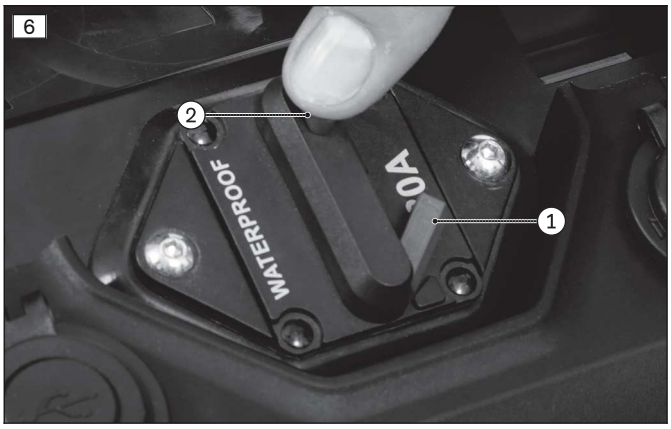

4.5.4 Folding the seat up and down

⚠ WARNING

Exposed pinch points when seat is folded up

Pinching, crushing of limbs (e.g. fingers), tipping over due to lack of caution when folding the seat up and down

- ► To safely fold the seat up and down, grasp the seat frame, back support or leg support adapters. Never use the leg supports themselves for folding up and down since they do not offer a secure grip.
- ► After folding up the seat, shake it to verify that it is firmly fixed in place. A seat that is not firmly locked could fall back to its starting position and result in severe crushing injuries.
- ► Always secure the wheelchair against tipping over with the active support of a helper when the seat is folded up. Always fold down the seat before jacking the wheelchair up or down.
- ► Move the seat to the lowest seat height before folding it up. If this is not possible (e.g. due to a defect in the seat height adjustment actuator), then secure the seat during all work with the active support of a helper.

Folding up the seat

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

> **Tools:** hexagon key, size 6; open-ended wrench, size 17; torque wrench with socket wrench insert, size 17

1) Loosen the support bolts on both sides of the front frame on the mobility base and unscrew them **approx. 5 mm** (see fig. 7, item 1).
INFORMATION: Use the Allen head for loosening and the Allen wrench to further unscrew the support bolts.
2) Fold the seat up and back until it engages in the 1st locking position (see fig. 8, see fig. 9, item 1).
NOTICE! Risk of material damage due to collision of the seat with other components of the wheelchair. Make sure that no parts of the seat collide with other components. Use special caution with the rear-most ratchet position.
3) Push the locking bolt against the spring force from the inside to the outside (see fig. 9, item 2). Fold the seat up further until the locking bolt automatically engages in the 2nd locking position (see fig. 9, item 3).
INFORMATION: The seat can be folded up in two locking positions. When carrying out service work with the seat folded up, always use the front, flatter locking position if possible (not illustrated). Only use the rear, steeper locking position for work where access is otherwise not possible (see fig. 8). In any case, secure the wheelchair against tipping and falling with the active support of a helper.
4) Shake the seat to verify that it is firmly fixed in place.

Folding down the seat

1) **WARNING! Risk of pinching and crushing due to sudden lowering of the seat. Actively secure the seat against falling before pushing the locking bolt from the inside to the outside. Take note of and correct the cable routes in the frame area when folding down the seat to prevent damage.**
Push the locking bolt against the spring force from the inside to the outside (see fig. 9, item 2). Carefully and slowly fold the seat down towards the front.
2) Carefully lower the seat onto the support bolts on the front frame of the mobility base.
3) Screw in the support bolts on both sides and firmly tighten them (see fig. 7, item 1).
INFORMATION: Use the Allen wrench for screwing in and the Allen head of the support bolts for tightening.

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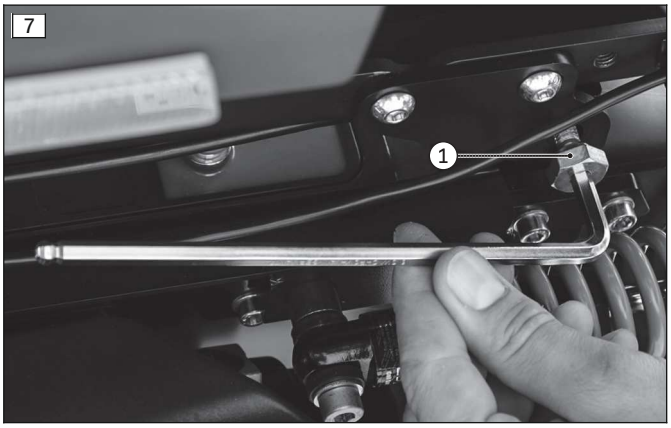

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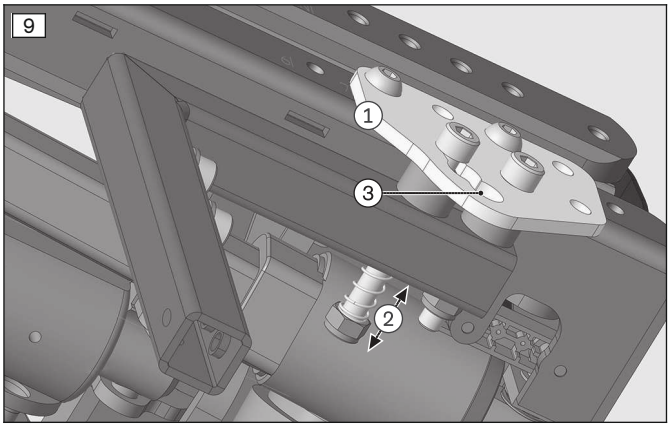

4.6 Cover parts

4.6.1 Replacing the battery cover

Removing the battery cover

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.

1) Fold up the seat (see page 16).
2) Push in the 2 mounting clips on the battery cover and lift the battery cover up and off (see fig. 10).

Installing the battery cover

1) Put on the battery cover (see fig. 10). The 2 mounting clips on the battery cover engage securely in the cover when positioned correctly.
2) Fold down the seat (see page 16).

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4.6.2 Replacing the front cover

Removing the front cover with external power supply receptacles

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.

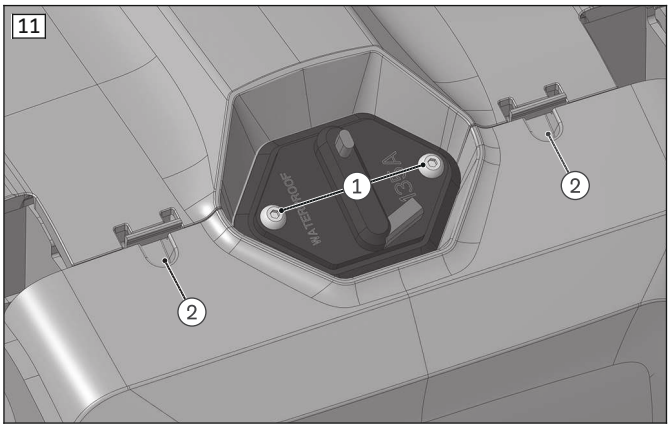
> **Tools:** hexagon key, size 3

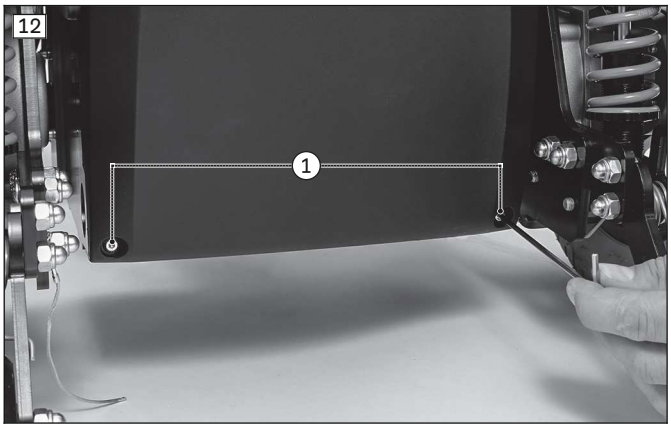
1) Fold up the seat (see page 16).
2) Remove the battery cover (see page 18).
3) Loosen the hexagon socket screws on the automatic circuit breaker, but do not remove them (see fig. 11, item 1).
4) Loosen and remove the 2 screws in the lower area of the front cover (see fig. 12, item 1).

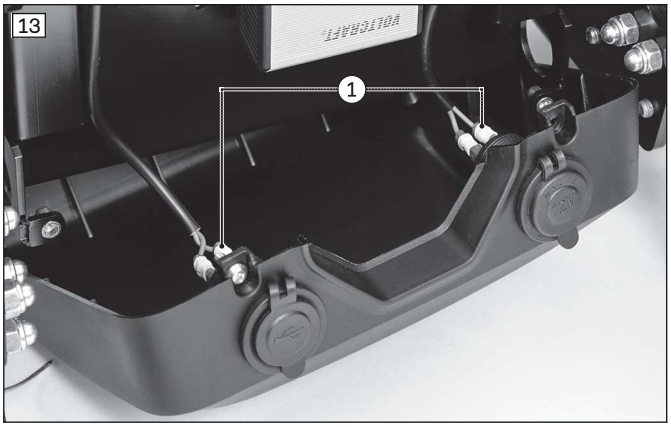
5) **NOTICE! Damage to the receptacles, the cables or the voltage converter due to improper removal of the cover.**
   Carefully lift off the front cover at the top and bottom and disconnect the cables from the receptacles (see fig. 13, item 1).
   NOTICE! The front cover must be lifted carefully at the top so that the two concealed plastic nipples do not break off during removal (see fig. 11, item 2).
6) Remove the front cover with the receptacles.

Installing the front cover with external power supply receptacles

1) **NOTICE! Risk of material damage due to incorrect polarity. Note the labelling “+” and “-” on the cables and receptacles, and reconnect with correct polarity.**
   Connect the cables for the external power supply to the receptacles on the front cover (see fig. 13, item 1).
2) Carefully place the front panel on the top and bottom.
3) Insert and firmly tighten the 2 screws in the lower area of the front panel (see fig. 12, item 1).
4) Firmly tighten the hexagon socket screws on the automatic circuit breaker (see fig. 11, item 1).
5) Attach the battery cover (see page 18).
6) Fold down the seat (see page 16).







4.6.3 Replacing the rear cover

Removing the rear cover

> **Prerequisites:**
  Optional: Move the seat to the lowest seat height (see page 15).
  Switch off the control device and deactivate the main fuse (see page 16).
  If necessary: Remove the leg supports.
> **Tools:** hexagon key, size 3

1) Fold up the seat (see page 16).
2) Remove the battery cover (see page 18).
3) Loosen and remove the 2 screws in the rear cover (see fig. 14, item 1).
4) Loosen the upper edge of the rear cover from the mounting clips on the frame and remove the rear cover (see fig. 15).

5) **If necessary:** Pop out the 2 reflectors with 2 mounting clips each from the rear cover (see fig. 16, item 1).

Installing the rear cover

1) **If necessary:** Press the 2 reflectors with 2 mounting clips each into the rear cover (see fig. 16, item 1). The reflectors audibly engage when positioned correctly.
2) **If necessary:** Fold down the seat (see page 16).
3) Put on the rear cover and engage it on the mounting clips on the frame (see fig. 15).
4) Insert and firmly tighten the 2 screws in the rear cover (see fig. 14, item 1).
5) Fold up the seat (see page 16).
6) Attach the battery cover (see page 18).
7) Fold down the seat (see page 16).

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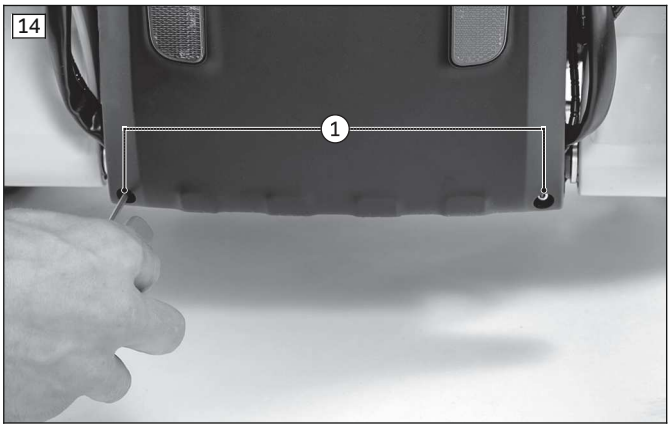

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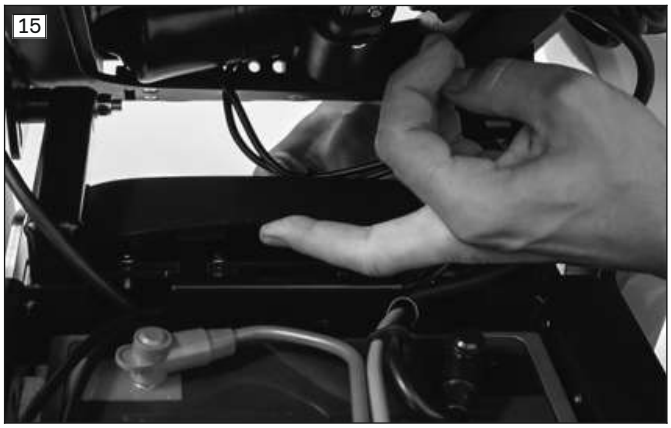

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4.7 Batteries and power supply

⚠ CAUTION

Short circuit of the battery

Burns, injuries; damage to electrical/electronic components due to improper battery handling

- ► Deactivate the main fuse before performing any work on the battery.
- ► Disconnect the battery cable from the controller before performing any work on the battery.
- ► Use only insulated tools to perform maintenance work on the batteries.
- ► Never connect the two poles of a battery with metal conductors or tools.
- ► Ensure correct polarity when connecting the battery cable. Please refer to the battery circuit diagram on the inside of the battery cover.

4.7.1 Replacing the automatic circuit breaker

Removing the automatic circuit breaker

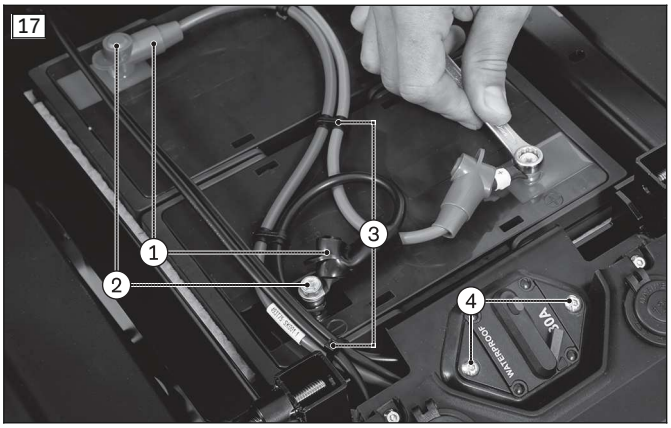
> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.

> **Tools:** hexagon key, size 3; ring and open-ended wrench, size 10; torque wrench with socket wrench insert, size 10

1) Fold up the seat (see page 16).
2) Remove the battery cover (see page 18).
3) Remove the insulator caps from the battery poles (see fig. 17, item 1).
4) **INFORMATION: Note the installed position of the battery cables and cable attachments.**
   Unscrew the battery cables of the automatic circuit breaker from the battery poles (see fig. 17, item 2).
5) Remove the cable attachments on the battery cables of the automatic circuit breaker (see fig. 17, item 3).
6) Loosen and remove the 2 screws on the automatic circuit breaker (see fig. 17, item 4).
7) Remove the automatic circuit breaker and 2 battery cables from the cover (see fig. 18).

Installing the automatic circuit breaker

1) Route the 2 battery cables through the cover and insert the automatic circuit breaker into the cover (see fig. 18).
2) Insert and firmly tighten the 2 screws in the automatic circuit breaker (see fig. 17, item 4).
3) Connect the battery cables of the automatic circuit breaker to the battery poles according to their original installed position (see fig. 17, item 2). Tighten the screws on the battery poles to **6 Nm**.
4) Place the insulator caps onto the battery poles (see fig. 17, item 1).
5) Lay the battery cables of the automatic circuit breaker along the other battery cables and secure them with cable attachments (see fig. 17, item 3).
6) Attach the battery cover (see page 18).
7) Fold down the seat (see page 16).



4.7.2 Replacing the batteries

⚠ WARNING

Accumulation of explosive gases in the battery compartment due to use of incorrect batteries

Severe injuries due to explosion in battery compartment

► Use only AGM or gel batteries which have been approved for this product by the manufacturer. Please contact Ottobock regarding the purchase of replacement batteries.

NOTICE

Unauthorised battery replacement

Battery damage due to improper changes to the product

- ► Replacing the battery or modifying the battery installation position may only be performed by qualified personnel trained by the manufacturer.
- ► The charging profile of the battery charger established at the factory is adapted for the batteries included in the scope of delivery and may not be altered independently.

INFORMATION

- ► Always replace batteries in pairs.
- ► The 56 Ah batteries (493U75=ST031) have a smaller connection diameter of the battery terminals (M5). When retrofitting in existing products, a washer 507U15=M5 must be used to compensate for the size difference between the M5 screw and the M6 cable lug in each case.

Removing the batteries

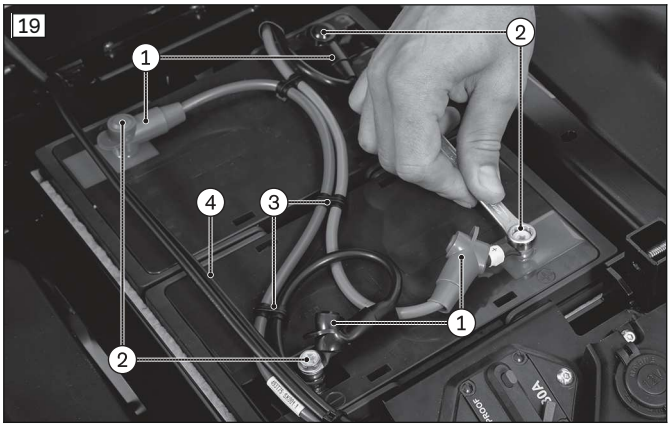
> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.

> **Tools:** ring and open-ended wrench, size 10

1) Fold up the seat (see page 16).
2) Remove the battery cover (see page 18).
3) Remove the insulator caps from the battery poles (see fig. 19, item 1).
4) **INFORMATION: Note the installed position of the batteries, battery cables and cable attachments.**
   Unscrew all battery cables from the battery poles (see fig. 19, item 2).
5) **If necessary:** Remove the cable attachments on the battery cables (see fig. 19, item 3).
6) **If necessary:** Carefully move transverse cables aside (see fig. 19, item 4). Remove additional cable attachments if necessary.
7) **WARNING! Risk of tipping due to changed centre of gravity. Secure the seat and the wheelchair against tipping and falling with the active support of a helper.**
   Lift the batteries up and out by the handle (see fig. 20).

Installing the batteries

1) Use the handles to carefully set the batteries into the battery tray in the mobility base.
   INFORMATION: Reestablish the original, crosswise placement of the battery poles (see battery circuit diagram in the battery cover and see page 214).
2) Connect all battery cables to the battery poles according to their original installed position (see fig. 19, item 2). Use the washers with 56 Ah batteries. Tighten the screws on the battery poles to **6 Nm**.
3) Place the insulator caps onto the battery poles (see fig. 19, item 1).
4) Fasten the cable attachments between the battery cables (see fig. 19, item 3).
5) **If necessary:** Move transverse cables to their original installed position and secure with cable attachments if necessary (see fig. 19, item 4).
6) Attach the battery cover (see page 18).
7) Fold down the seat (see page 16).



4.7.3 Charging the batteries

All instructions for charging the batteries are included in the instructions for use.

4.7.4 Replacing the external charging receptacle

Removing the external charging receptacle

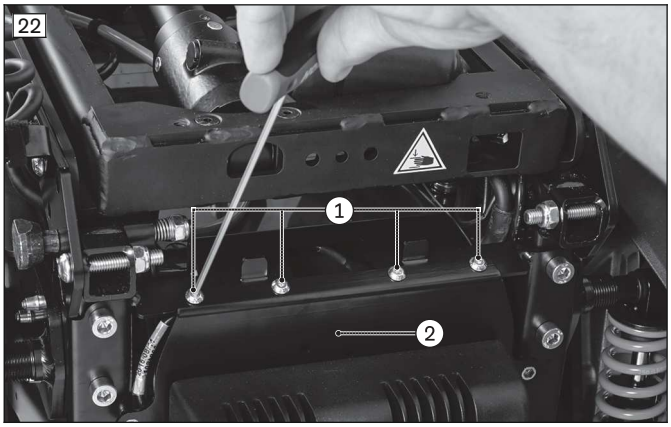
> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).

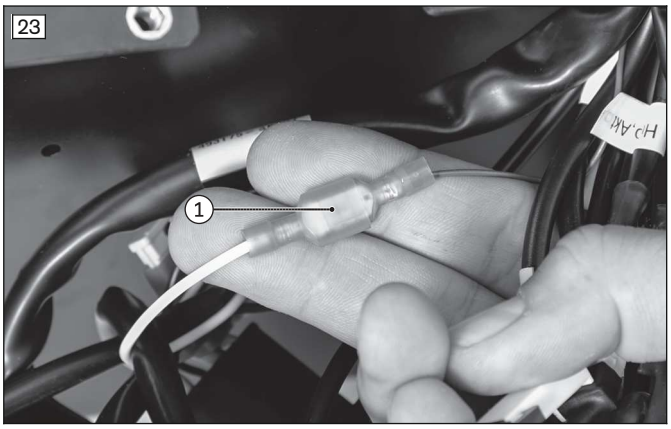
> **Tools:** hexagon key, size 3, 5; ring spanner and open-ended wrench, size 10

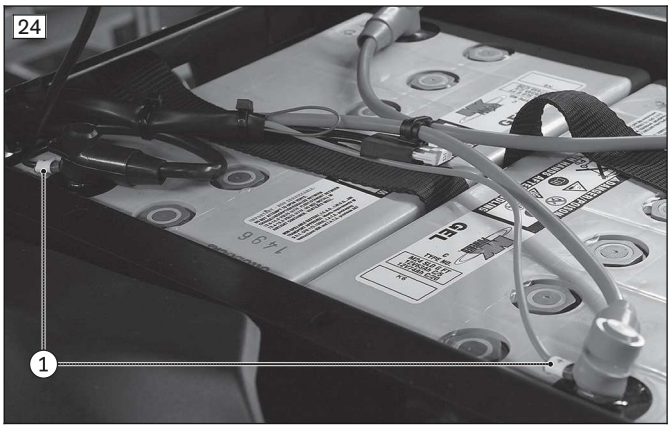
1) Fold up the seat (see page 16).
2) Remove the battery cover (see page 18).
3) Remove the rear cover (see page 19).
4) Check the fuse of the external charging receptacle and replace if necessary (see fig. 21).
5) **If necessary:** Fold down the seat (see page 16).
6) Loosen and remove the 4 screws on the module carrier (see fig. 22, item 1).
7) Carefully lift the module carrier and controller off the frame (see fig. 22, item 2).
8) Disconnect the controller cable of the external charging receptacle (red plug) from the controller (see fig. 23, item 1).
9) Remove the insulator caps from the battery poles.
10) **INFORMATION: Note the installed position of the battery cables and cable attachments.**
    Unscrew the battery cables of the external charging receptacle from the battery poles (see fig. 24, item 1).
11) Loosen and remove the screw between the external charging receptacle and frame (see fig. 25).
12) Remove the external charging receptacle with the cables. Remove additional cable attachments if necessary.

Installing the external charging receptacle

1) Position the external charging receptacle with the cables according to the original installed position. Reattach the loosened cable attachments.
2) Insert the screw between the external charging receptacle and frame and firmly tighten it (see fig. 25).
3) Connect the battery cables of the external charging receptacle to the battery poles according to their original installed position (see fig. 24, item 1). Tighten the screws on the battery poles to **6 Nm**.
4) Place the insulator caps onto the battery poles.
5) Connect the controller cable of the external charging receptacle (red plug) to the controller (see fig. 23, item 1).
6) Carefully position the module carrier and controller on the frame (see fig. 22, item 2).
7) Insert the 4 screws of the module carrier and firmly tighten them (see fig. 22, item 1).
8) Attach the rear cover (see page 19).
9) Fold up the seat (see page 16).
10) Check the fuse of the external charging receptacle and insert it in the fuse holder (see fig. 21).
11) Attach the battery cover (see page 18).
12) Fold down the seat (see page 16).







4.7.5 Replacing the external power supply receptacle

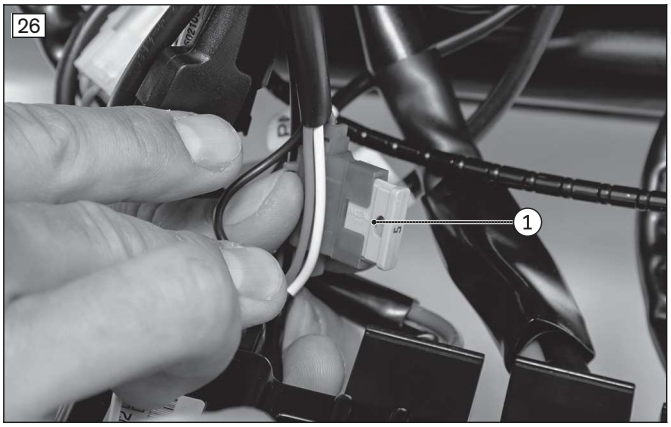
The external power supply receptacles are permanently integrated into the front cover and are replaced together with the front cover (see page 18).

4.7.6 Replacing the fuse for lighting and external power supply

Replacing the fuse

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Remove the controller (see page 25).

1) Pull out the fuse from the fuse holder (blue) (see fig. 26, item 1).
2) Check the fuse and replace if necessary.
3) Insert the fuse in its original installed position in the fuse holder (blue) (see fig. 26, item 1).



4.8 Control unit

4.8.1 Replacing the controller

INFORMATION

Depending on the installed control device and configuration, additional control modules work closely with the controller.

► When replacing the controller, also check the connected control modules and replace them if needed (see page 31).

Removing the controller

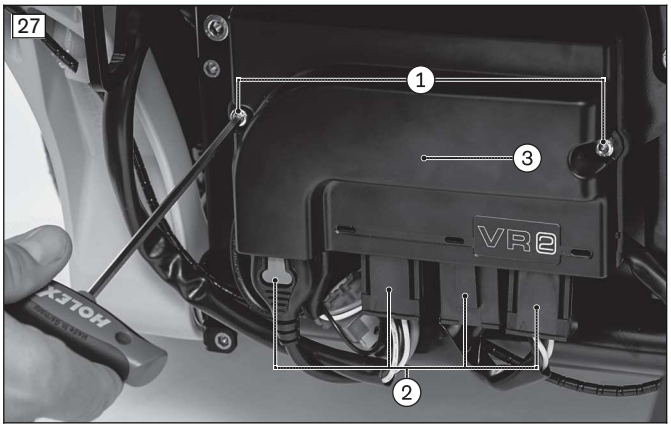
> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

> **Tools:** hexagon key, size 3

1) Fold up the seat (see page 16).
2) Remove the rear cover (see page 19).
3) Fold down the seat (see page 16).
4) Loosen and remove the 2 screws on the controller (see fig. 27, item 1).
5) **INFORMATION: Note the installed position of the cable connections and cable attachments to be loosened on the controller (see page 144 ff.).**
Disconnect all cables from the controller (see fig. 27, item 2).
6) Remove the controller (see fig. 27, item 3).

Installing the controller

1) Connect the cables to the controller according to their original installed position (see fig. 27, item 2).
2) Carefully position the controller (see fig. 27, item 3).
3) Insert and firmly tighten the 2 controller screws to **1 Nm** (see fig. 27, item 1).
4) Attach the rear cover (see page 19).



4.8.2 Replacing the seat module with cover (standard seat)

Removing the seat module with module carrier (standard seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** hexagon key, size 3, 4

1) Carefully swing the seat module with module carrier on the back support tube to the side (see fig. 28, item 1).
2) Loosen and remove the screws between the module carrier and seat module cover.
3) Carefully lift off the cover of the seat module (see fig. 28, item 2).
4) **INFORMATION: Note the installed position of the cable connections being loosened.**
Disconnect all cables from the seat module (see fig. 28, item 3).
5) Loosen and remove the screws between the module carrier and clamps on the back support tube (see fig. 28, item 4).
6) Remove the seat module with module carrier.
7) **If necessary:** Remove the seat module from the module carrier. To do so, loosen and remove the screws between the module carrier and seat module.

Installing the seat module with module carrier (standard seat)

1) **If necessary:** Mount the seat module on the module carrier. To do so, insert the screws between the module carrier and seat module and firmly tighten them to **1 Nm**.
2) Place the seat module with module carrier onto the back tube.
3) Insert the screws between the module carrier and clamps on the back support tube and firmly tighten them (see fig. 28, item 4).
4) Connect the cables to the seat module according to their original installed position (see fig. 28, item 3).
5) Put on the cover of the seat module (see fig. 28, item 2).
6) Insert the screws between the module carrier and seat module cover and firmly tighten them.
7) Carefully swing the seat module with the module carrier on the back support tube in behind the back support frame (see fig. 28, item 1).

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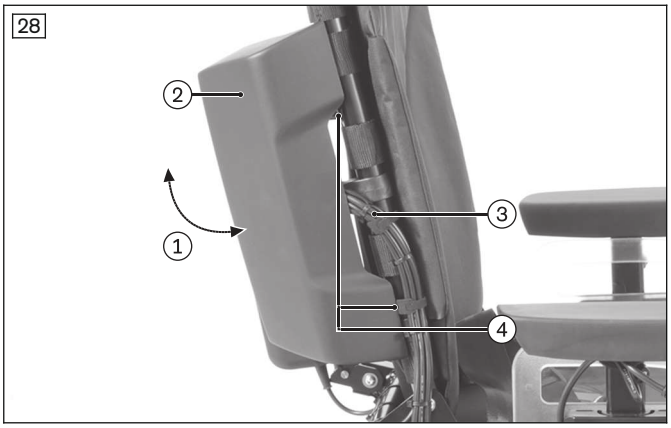


4.8.3 Replacing the seat module with cover (VAS seat)

Removing the seat module with module carrier (VAS seat)

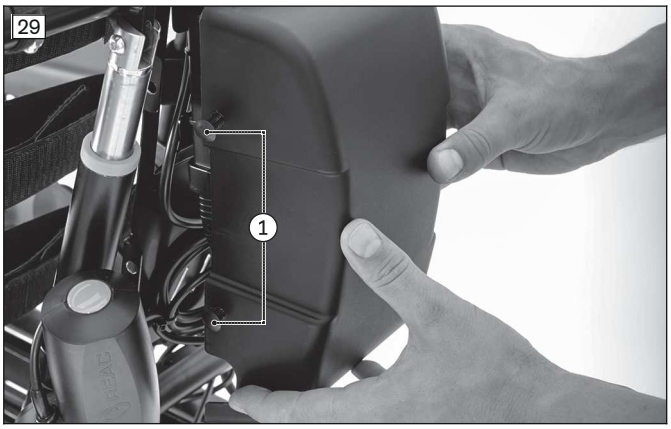
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

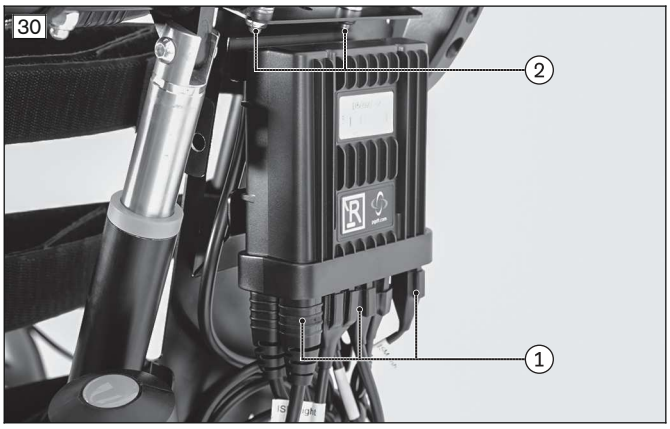
> **Tools:** hexagon key, size 5; open-ended wrench, size 10; torque wrench with socket wrench insert, size 5

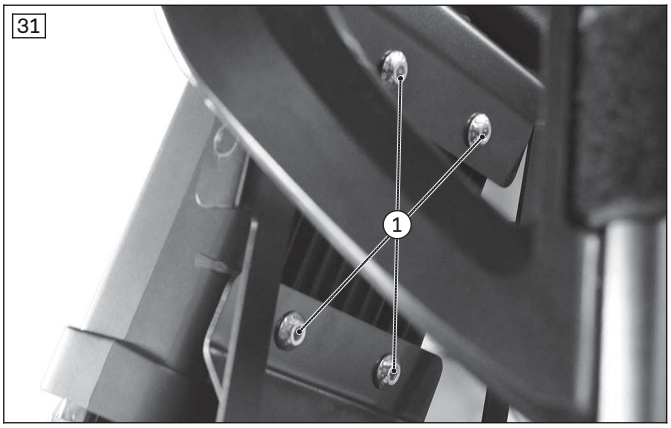
1) Pull out the 4 locking pins on both sides of the cover of the seat module (see fig. 29, item 1).
2) Carefully lift off the cover of the seat module (see fig. 29).
3) **INFORMATION: Note the installed position of the cable connections being loosened.**
Disconnect all cables from the seat module (see fig. 30, item 1).
4) Loosen and remove the 2 screws and nuts between the seat module and upper connecting tube (see fig. 30, item 2).
5) Remove the seat module with module carrier.
6) **If necessary:** Remove the seat module from the module carrier. To do so, loosen and remove the 4 screws between the module carrier and seat module (see fig. 31, item 1).

Installing the seat module with module carrier (VAS seat)

1) **If necessary:** Mount the seat module on the module carrier. To do so, insert the 4 screws between the module carrier and seat module and firmly tighten them to **1 Nm** (see fig. 31, item 1).
2) Place the seat module with module carrier onto the upper connecting tube of the back support.
3) Insert the 2 screws and nuts between the seat module and upper connecting tube and firmly tighten them to **10 Nm** (see fig. 30, item 2).
4) Connect the cables to the seat module according to their original installed position (see fig. 30, item 1).
5) Put on the cover of the seat module (see fig. 29).
6) Press in and engage the 4 locking pins on both sides of the cover of the seat module (see fig. 29, item 1).







4.8.4 Replacing the inclination sensor

Removing the inclination sensor

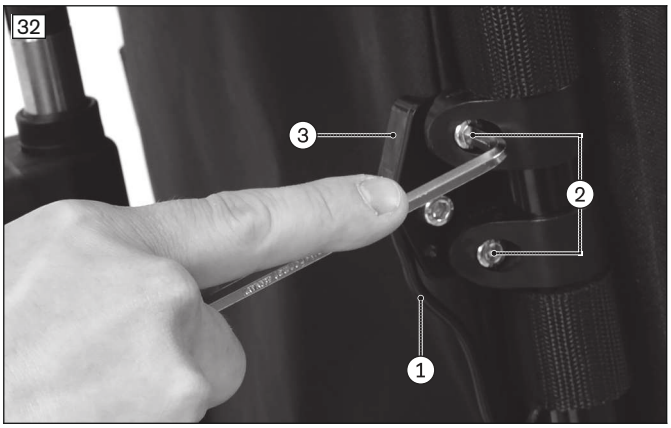
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
> **Tools:** hexagon key, size 5; open-ended wrench, size 10; torque wrench with socket wrench insert, size 5

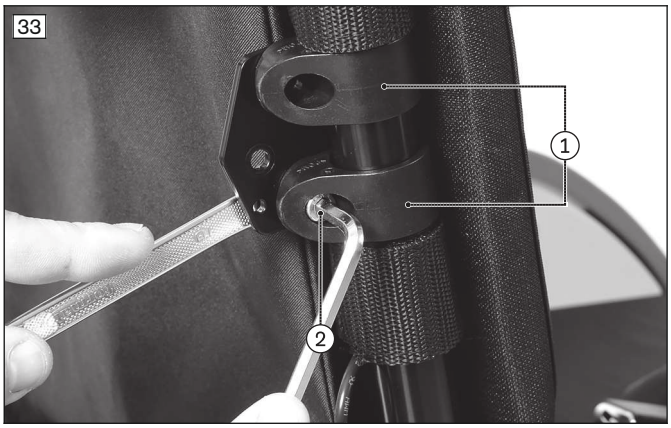
1) **INFORMATION: Note the installed position of the cable connections being loosened.**
Follow the inclination sensor cable and disconnect it at the appropriate place (see fig. 32, item 1). Remove additional cable attachments if necessary.
2) Loosen and remove the 2 screws of the inclination sensor (see fig. 32, item 2).
3) Remove the inclination sensor (see fig. 32, item 3).
4) **If necessary: Remove** the 2 tube clamps (see fig. 33, item1). To do so, loosen and remove the screw with cap nut between the holder and lower tube clamp (see fig. 33, item 2).

Installing the inclination sensor

1) Put the 2 tube clamps around the back support tube on the right (see fig. 33, item 1).
INFORMATION: Align the tube clamps so that their mounting surfaces face inwards and are at a 90° angle to the back support.
2) Attach the holder with screw with cap nut on the lower tube clamp (see fig. 33, item 2).

3) Set the inclination sensor onto the holder (see fig. 32, item 3).
   INFORMATION: Align the inclination sensor so that the cable outlet is at the rear and the cable points down (see fig. 32, item 1).
4) Insert and firmly tighten the 2 inclination sensor screws to **1 Nm** (see fig. 32, item 2). In doing so, put the longer screw through the upper tube clamp and the holder.
5) Position and connect the inclination sensor cable according to its original installed position (see fig. 32, item 1).
6) Reattach the loosened cable attachments. In doing so, attach the cable to the holder with a cable tie.
7) Check that the sensor is working.
   INFORMATION: When moving the seat tilt and back support angle adjustment, the angle of the back support must be limited to a maximum of 45° and the driving speed must be reduced.
   INFORMATION: Only use the parameter file intended for the existing configuration.





4.8.5 Replacing the memory function

INFORMATION

The single memory function (back support angle adjustment or seat tilt) requires one available actuator output on the seat module. The combined memory function (back support angle adjustment and seat tilt) requires two available actuator outputs on the seat module.

INFORMATION

The angles of the memory function can be adjusted by authorised, qualified personnel. When installing a memory function, a new set of parameters must be input in the control device. For further information, please contact your national Ottobock team.

Removing the single memory function for back support angle adjustment

> **Prerequisites:**
  Switch off the control device and deactivate the main fuse (see page 16).
  If necessary: Remove the seat cushion.
> **Tools:** hexagon key, size 3; open-ended wrench, size 8; drill; twist drill Ø 5.2 mm

1) Remove the seat module cover (see page 26 ff.).
2) **INFORMATION: Note the installed position of the cable connections being loosened.**
   Disconnect the distributor relay cables and remove the distributor relay (see fig. 34, item 1).
3) Disconnect the cables from the tilt module (see fig. 34, item 2).
4) Loosen and remove the 2 screws with nuts from the tilt module (see fig. 34, item 3).
5) Remove the tilt module (see fig. 34, item 4).
6) **If a new memory function is not being installed:** Connect the back support angle adjustment actuator to the seat module. Reconnect other disconnected components to the bus system.

Installing the single memory function for back support angle adjustment

1) Position the tilt module on the module carrier (see fig. 34, item 4).
2) Insert the 2 tilt module screws with nuts and hand-tighten them (see fig. 34, item 3).
3) Connect the tilt module to the bus system (see fig. 34, item 2).

4) Connect the distributor relay to the back support angle adjustment actuator and the seat module (see fig. 34, item 1; see fig. 37).
   INFORMATION: The channel assignment depends on the remaining configuration of the wheelchair (see page 30).
5) Attach the seat module cover (see page 26 ff.).

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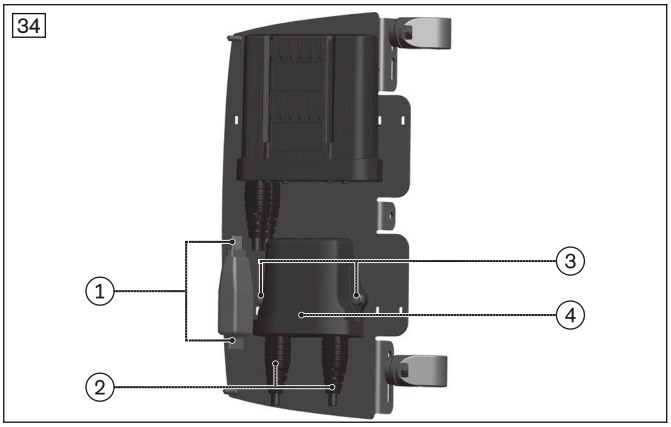

Removing the single memory function for the seat tilt

1) Remove the seat module cover (see page 26 ff.).
2) **INFORMATION: Note the installed position of the cable connections being loosened.**
   Disconnect the distributor relay cables and remove the distributor relay (see fig. 35, item 1).
3) Disconnect the tilt module cables underneath the seat plate (see fig. 36, item 1).
4) Loosen and remove the 2 screws with nuts from the tilt module (see fig. 36, item 2).
5) Remove the tilt module (see fig. 36, item 3).
6) **If a new memory function is not being installed:** Connect the seat tilt actuator to the seat module. Reconnect other disconnected components to the bus system.

Installing the single memory function for the seat tilt

1) **If necessary:** Drill 2 holes (Ø 5.2 mm, distance 74.0 mm) through the seat plate at the rear (see fig. 36, item 2).
   INFORMATION: The position of the holes depends on the configuration of the wheelchair. Choose an available installation space for the module so that collisions cannot occur.
2) Set the tilt module onto the seat plate from below so that the bus connections face to the rear (see fig. 36, item 3).
3) Insert the 2 tilt module screws with nuts and hand-tighten them (see fig. 36, item 2).
4) Connect the tilt module to the bus system (see fig. 36, item 1).
5) Connect the distributor relay to the seat tilt actuator and the seat module (see fig. 35, item 1; see fig. 37).
   INFORMATION: The channel assignment depends on the remaining configuration of the wheelchair (see page 30).
6) Attach the seat module cover (see page 26 ff.).

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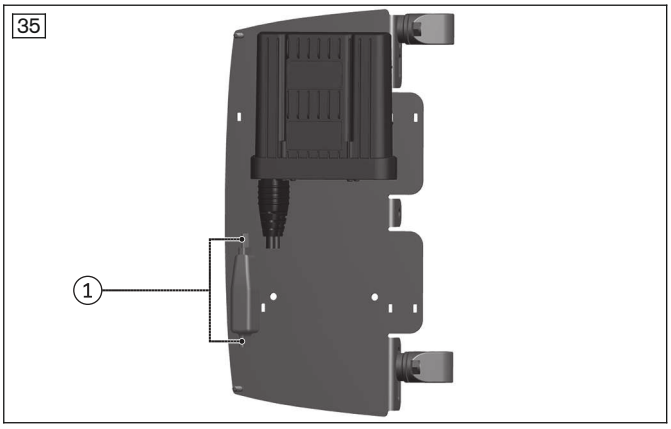

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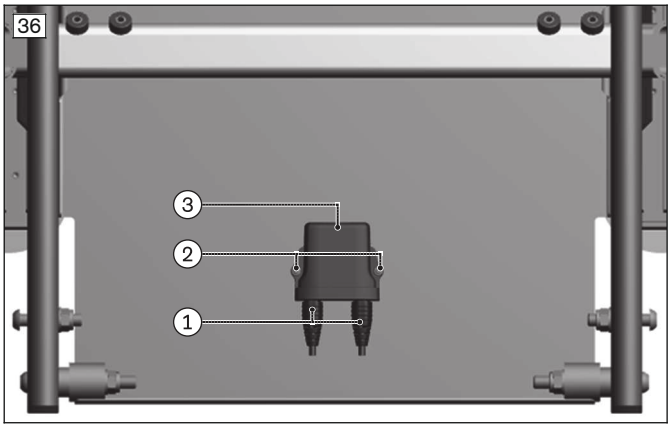

Removing/installing the combined memory function

The combined memory function encompasses a tilt module, an ASM module and two distributor relays. The individual components are respectively removed and installed the same way as for the single memory function. Observe the following instructions:

- Attach the tilt module to the module carrier of the seat module (see fig. 34, item 4). It is used for the back support angle adjustment memory function.
- Attach the ASM module underneath the seat plate (see fig. 36, item 3). It is used for the seat tilt memory function.
- Connect both distributor relays to the respective actuator and the seat module.
- The channel assignment depends on the remaining configuration of the wheelchair (see page 30).

4.8.5.1 Channel assignment

Channel assignment (single memory function)

With a single memory function, the channels are assigned as follows by default:

- Configuration without chin control: memory function on channel 6
- Configuration with chin control and without power leg supports: memory function on channel 4
- Other configurations: memory function only by request to Ottobock as custom fabrication

Channel assignment (combined memory function)

With a combined memory function, the default channel assignment is as follows:

- Configuration without power leg supports: memory functions on channels 4 and 5
- Configuration without chin control and without seat height adjustment: memory functions on channels 3 and 6
- Other configurations: memory function only by request to Ottobock as custom fabrication

Connection schematics

The following actuator connection schematics apply for the various configurations:

Configuration	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Distributor relay
Back support angle adjustment, without chin control	Seat tilt	Distributor relay ISM, standard actuator	Seat height adjustment	Leg support left	Leg support right	Distributor relay ISM, memory function actuator	Back support angle adjustment
Back support angle adjustment, with chin control	Seat tilt	Distributor relay ISM, standard actuator	Seat height adjustment	Distributor relay ISM, memory function actuator	–	Chin control swivel arm	Back support angle adjustment
Seat tilt, without chin control	Distributor relay ISM, standard actuator	Back support angle adjustment	Seat height adjustment	Leg support left	Leg support right	Distributor relay ISM, memory function actuator	Seat tilt
Seat tilt, with chin control	Distributor relay ISM, standard actuator	Back support angle adjustment	Seat height adjustment	Distributor relay ISM, memory function actuator	–	Chin control swivel arm	Seat tilt
Combined, without power leg supports	Distributor relay 1 ISM, standard actuator	Distributor relay 2 ISM, standard actuator	Seat height adjustment	Distributor relay 2 ISM, memory function actuator	Distributor relay 1 ISM, memory function actuator	Chin control swivel arm	Distributor relay 1: seat tilt Distributor relay 2: back support
Combined, without chin control and without seat	Distributor relay 1 ISM, standard actuator	Distributor relay 2 ISM, standard actuator	Distributor relay 2 ISM, memory	Leg support left	Leg support right	Distributor relay 1 ISM, memory	Distributor relay 1: seat tilt

Configura-tion	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Distributor relay
height adjustment			function actuator			function actuator	Distributor relay 2: back support

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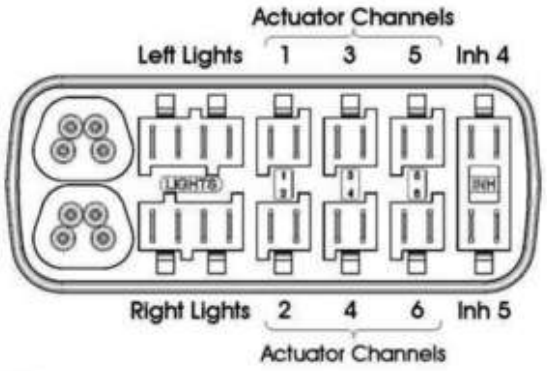

4.8.6 Replacing additional control modules

Overview of additional control modules

The following control modules may be connected to the controller depending on the installed control device and configuration:

- Lighting module for VR2 control device (see fig. 38)
- Gyro module for R-Net control device (see fig. 39)
- Seat module for R-Net control device (see page 26 ff.)
- Input/output module for R-Net control device (see fig. 40)
- Inclination sensor (see fig. 41; see page 27)

Removing the control module

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.

> **Tools:** hexagon key, size 3

1) **INFORMATION: Note the installed position of the cable connections being loosened.**
   Disconnect all cables from the control module connection sockets (see item 1).
2) Loosen and remove all screws between the control module and module carrier (see item 2).
3) Remove the control module.

Installing the control module

1) Connect the cables to the control module according to their original installed position (see item 1).
2) Carefully put on the control module.
3) Insert all screws between the control module and module carrier and firmly tighten them to 1 Nm (see item 2).

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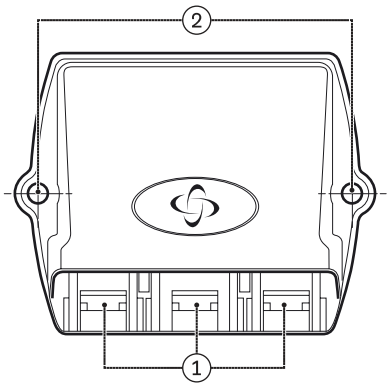

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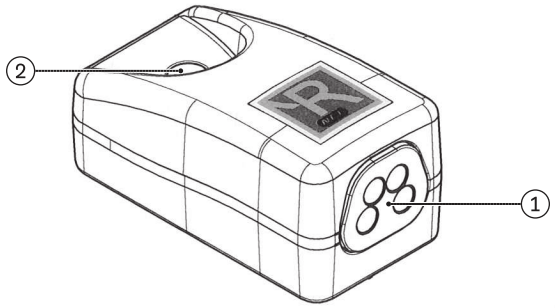

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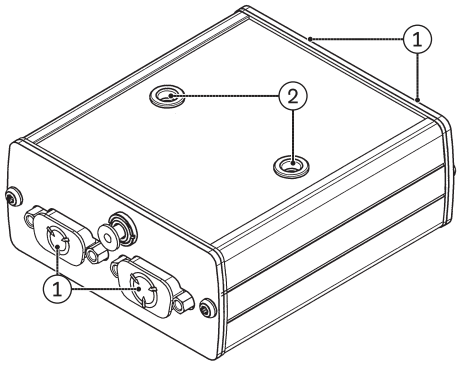

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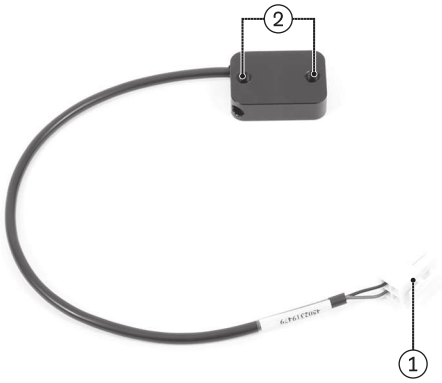

4.8.7 Replacing the actuator blocking relay

The blocking relay short-circuits the tilt actuator when it is not in operation and therefore not supplied with current. Short-circuiting the actuator motor prevents sagging of the tilt mechanism and unwanted retraction of the actuator.

Removing the relay

1) **INFORMATION: Note the installed position of the cable connections being loosened (see fig. 42).** Disconnect all cables from the relay connection sockets.
2) Remove the relay.

Installing the relay

1) Position the relay between the seat module (ISM module) and actuator.
2) Connect the cables to the relay according to their original installed position (see fig. 42).

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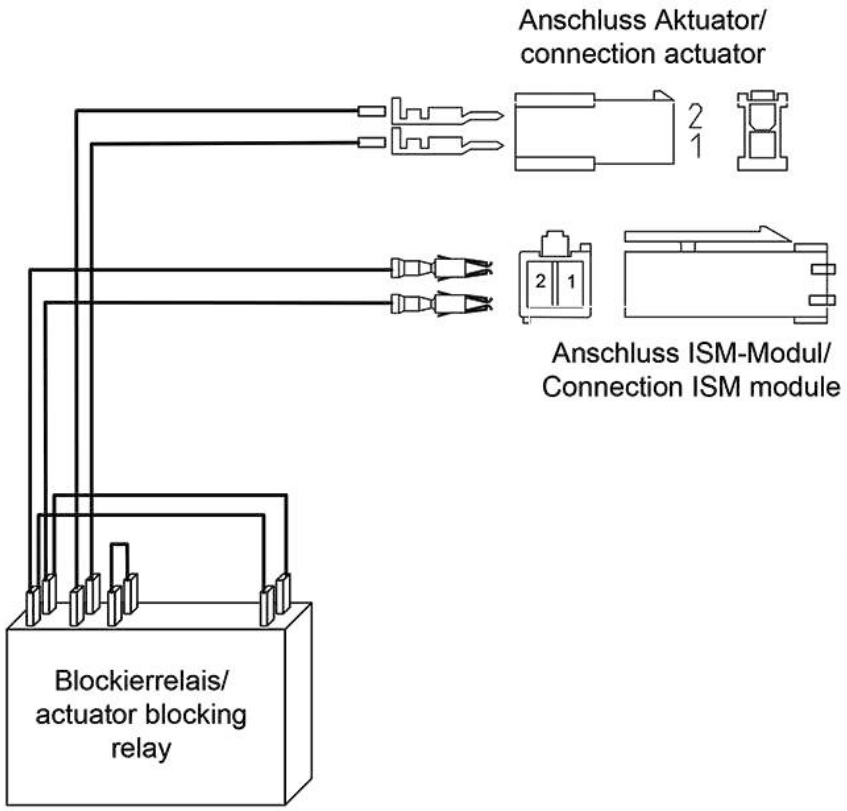


4.8.8 Replacing the TEN° control panel with swivel arm

INFORMATION

► Recalibrate the joystick after replacing a module (see page 34). Otherwise the directional stability of the wheelchair may be affected, or it may not be possible to reach the maximum speed.

Removing the TEN° control panel

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

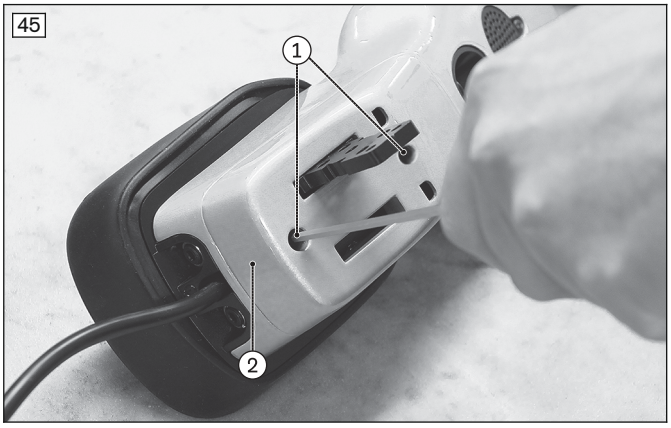
> **Tools:** Phillips screwdriver, size 3; Torx key, size T10; hexagon key, size 3

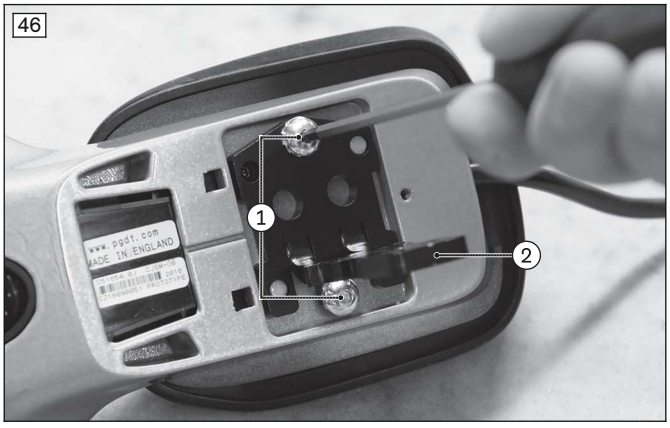
1) Disconnect the cable of the control panel from the cable extension (see fig. 43, item 1). Remove the cable attachments if necessary (see fig. 43, item 2).
2) Loosen the two set screws on the swivel arm under the control panel (see fig. 44, item 1).
3) Pull the control panel up and out of the swivel arm.
4) Loosen and remove the 2 Torx screws in the cover under the control panel (see fig. 45, item 1).
5) Remove the cover under the control panel (see fig. 45, item 2).
6) Loosen and remove the two screws on the bottom of the control panel (see fig. 46, item 1).
7) Remove the retaining plate from the bottom of the control panel (see fig. 46, item 2).
8) **If necessary:** Remove and replace the swivel arm. To do so, loosen and remove the retainer (see fig. 43, item 4). Loosen the set screw under the arm support and pull the swivel arm down and off (see fig. 43, item 3).
9) **If necessary:** Remove the joystick module and LCD module (see page 34).

Installing the TEN° control panel

1) **If necessary:** Install the joystick module and LCD module (see page 34).
2) **If necessary:** Attach the swivel arm. Do this by sliding the swivel arm onto the arm support from below and firmly tightening the set screw under the arm support to **3 Nm** (see fig. 43, item 3).

3) Place the retaining plate on the bottom of the control panel (see fig. 46, item 2).
INFORMATION: Align the retaining plate according to the control panel installation position: alignment of the retaining plate for installation on the right side of the wheelchair (see fig. 46). For installation on the left side of the wheelchair, rotate the retaining plate by 180°.
4) Insert and firmly tighten the 2 screws in the retaining plate and the bottom of the control panel (see fig. 46, item 1).
5) Place the cover on the bottom of the control panel (see fig. 45, item 2).
6) Insert and firmly tighten the 2 Torx screws in the cover under the control panel (see fig. 45, item 1).
7) Insert the control panel into the swivel arm from above.
8) Firmly tighten the 2 set screws on the swivel arm under the control panel to **3 Nm** (see fig. 44, item 1).
9) Connect the cable of the control panel to the cable extension (see fig. 43, item 1). In doing so, reattach the loosened cable attachments (see fig. 43, item 2).





4.8.8.1 Replacing the joystick module and LCD module

Removing the joystick module and LCD module

1) Remove the control panel and take out the retaining plate (see page 33).
2) Loosen and remove the 2 screws between the housing and joystick module (see fig. 47, item 1).
3) Pull the joystick module upward out of the housing (see fig. 47, item 2).
4) Loosen and remove the screw between the housing and LCD module (see fig. 47, item 3).
5) Pull the LCD module forward out of the housing (see fig. 47, item 4).
INFORMATION: In doing so, carefully thread the control panel cable through the opening in the centre of the housing (see fig. 47, item 5).

Installing the joystick module and LCD module

1) Insert the LCD module into the housing from the front (see fig. 47, item 4).
INFORMATION: In doing so, carefully thread the control panel cable through the opening in the centre of the housing (see fig. 47, item 5).
2) Insert the screw between the housing and LCD module and firmly tighten it to **0.75 Nm** (see fig. 47, item 3).
3) Carefully set the joystick module into the housing and onto the LCD module from above (see fig. 47, item 2).

4) Insert the 2 screws between the housing and joystick module and firmly tighten them to **0.75 Nm** (see fig. 47, item 1).
5) Attach the retaining plate and install the control panel (see page 33).
6) Recalibrate the joystick.

Recalibrating the joystick

1) Switch the wheelchair control device off.
2) Connect the programming dongle, turn the wheelchair back on and start on-board programming (On-board programming with programming dongle (TEN° or CJSM control panel only)).
   INFORMATION: On-board programming is not activated on delivery of the control device. In this case, first carry out PC programming, back up the parameters and activate on-board programming if necessary.
3) Select the "System" menu by scrolling (joystick front/back) and confirm your selection by moving the joystick to the right.
4) Select the "Joystick calib." menu by scrolling (joystick front/back) and confirm your selection by moving the joystick to the right.
5) The procedure is carried out automatically. Follow the instructions on the LCD monitor. Values for forward/reverse and left/right axes are displayed. A symbol appears next to each value (X or check mark):
   X: The axis value is outside the permitted calibration range for this direction.
   Check mark: The axis value is within the permitted calibration range for this direction.
6) Deflect the joystick in the corresponding direction until both values are in the permitted range. Repeat for all 4 directions.
7) The LCD monitor shows when the calibration has been completed successfully. The display then returns to the system menu.
8) End on-board programming and remove the programming dongle.
   INFORMATION: If you have activated on-board programming, deactivate it again using PC programming and back up the parameters.

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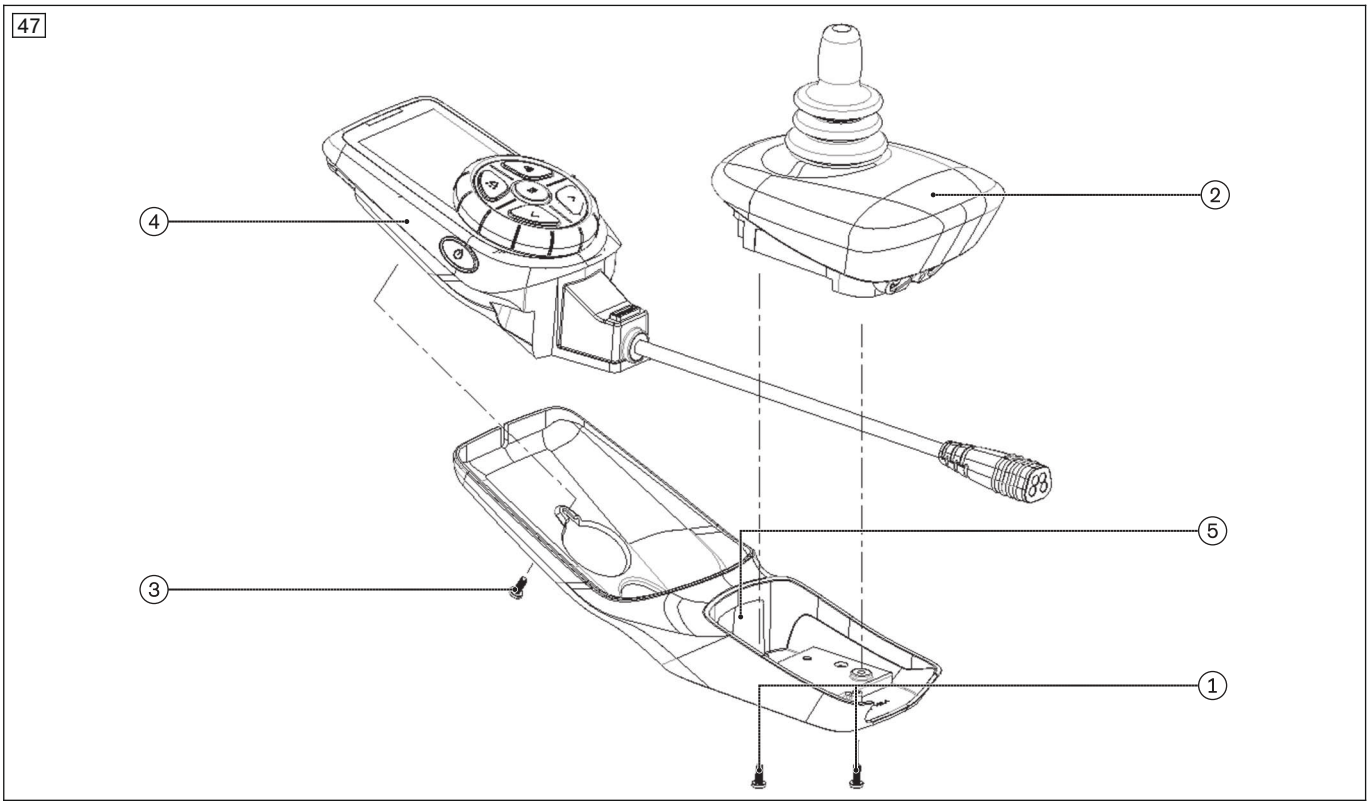


4.8.9 Replacing the control panel with swivel arm (JSM-LED-L, VR2)

Removing the control panel with swivel arm

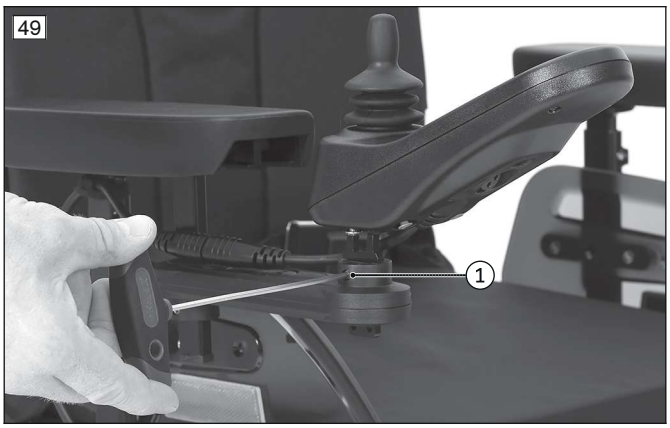
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

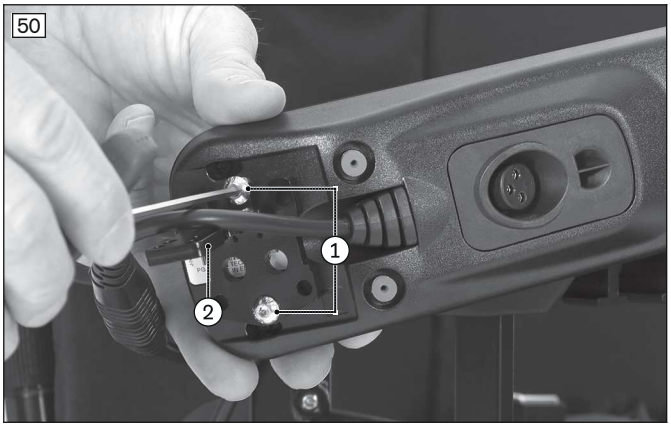
> **Tools:** hexagon key, size 3

1) Disconnect the cable of the control panel from the cable extension (see fig. 48, item 1). Remove the cable attachments if necessary (see fig. 48, item 2).
2) Loosen the two set screws on the swivel arm under the control panel (see fig. 49, item 1).
3) Pull the control panel up and out of the swivel arm.
4) Loosen and remove the 2 screws on the bottom of the control panel (see fig. 50, item 1).
5) Remove the retaining plate from the bottom of the control panel (see fig. 50, item 2).
6) **If necessary:** Remove and replace the swivel arm. To do so, loosen and remove the mechanical locking device (see fig. 48, item 4). Loosen the set screw under the arm support and pull the swivel arm down and off (see fig. 48, item 3).

Installing the control panel with swivel arm

1) **If necessary:** Attach the swivel arm. Do this by sliding the swivel arm onto the arm support from below and firmly tightening the set screw under the arm support to **3 Nm** (see fig. 48, item 3). Reinstall the mechanical locking device (see fig. 48, item 4).
2) Place the retaining plate on the bottom of the control panel (see fig. 50, item 2).
INFORMATION: Align the retaining plate according to the control panel installation position: alignment of the retaining plate for installation on the right side of the wheelchair (see fig. 50). For installation on the left side of the wheelchair, rotate the retaining plate by 180°.
3) Insert and firmly tighten the 2 screws in the retaining plate and the bottom of the control panel (see fig. 50, item 1).
4) Insert the control panel into the swivel arm from above.
5) Firmly tighten the 2 set screws on the swivel arm under the control panel to **3 Nm** (see fig. 49, item 1).
6) Connect the cable of the control panel to the cable extension (see fig. 48, item 1). In doing so, reattach the loosened cable attachments (see fig. 48, item 2).





4.8.10 Replacing the control panel with rigid control panel rail (JSM-LED-L, VR2)

Removing the control panel with rigid control panel rail

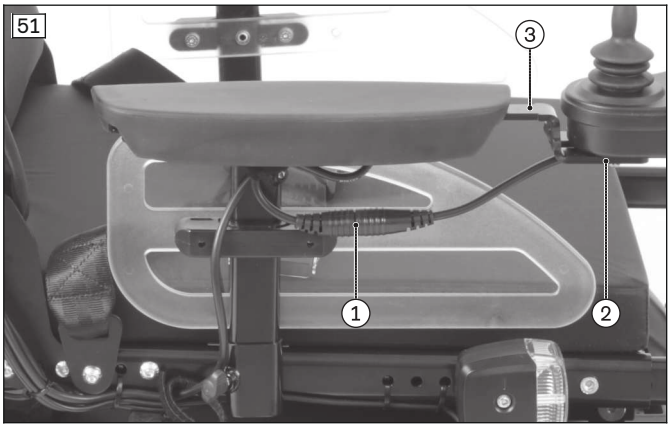
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** hexagon key, size 3

1) Disconnect the cable of the control panel from the cable extension (see fig. 51, item 1).
2) Loosen and remove the screws between the control panel rail and control panel (see fig. 51, item 2).
3) Remove the control panel from the control panel rail.
4) **If necessary:** Remove and replace the control panel rail (see fig. 51, item 3).
INFORMATION: All instructions for the control panel rail are included in the instructions for use (user).

Installing the control panel with rigid control panel rail

1) **If necessary:** Attach the control panel rail in the desired position (see fig. 51, item 3).
INFORMATION: All instructions for the control panel rail are included in the instructions for use (user).
2) Set the control panel onto the control panel rail.
3) Insert and firmly tighten the screws between the control panel rail and control panel (see fig. 51, item 2).
4) Connect the cable of the control panel to the cable extension (see fig. 51, item 1).



4.8.11 Replacing the attendant control

INFORMATION

For mounting and adjusting the tray: see page 132

Removing the attendant control

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the back support pad.

> **Tools:** hexagon key, size 5

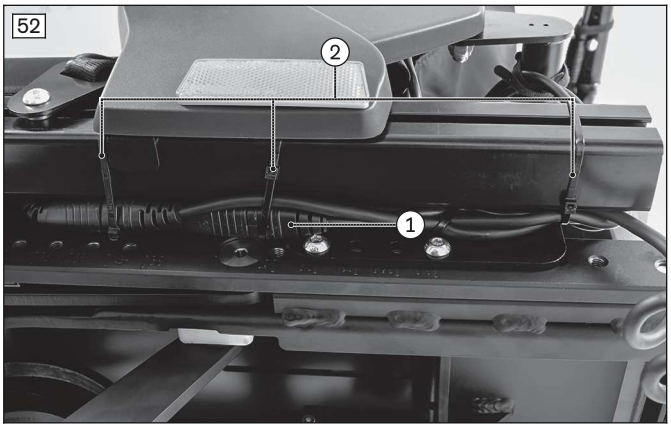
1) **INFORMATION: Note the installed position of the cable connections being loosened.**
Follow the attendant control cable and disconnect it at the appropriate place (see fig. 52, item 1). Remove additional cable attachments if necessary (see fig. 52, item 2).
2) Loosen and remove the screw in the bracket on the back support tube (see fig. 53, item 1).
3) Loosen and remove the clamping lever for the bracket on the back support tube (see fig. 53, item 2).
4) Remove the attendant control with the bracket.

Installing the attendant control

1) Position the attendant control with the bracket on the back tube.
2) Insert and firmly tighten the clamping lever for the bracket on the back support tube (see fig. 53, item 2).
3) Insert the screw in the bracket on the back support tube and firmly tighten it (see fig. 53, item 1).
4) Position and connect the cable for the attendant control according to its original installed position (see fig. 52, item 1).

5) Reattach the loosened cable attachments (see fig. 52, item 2).

52



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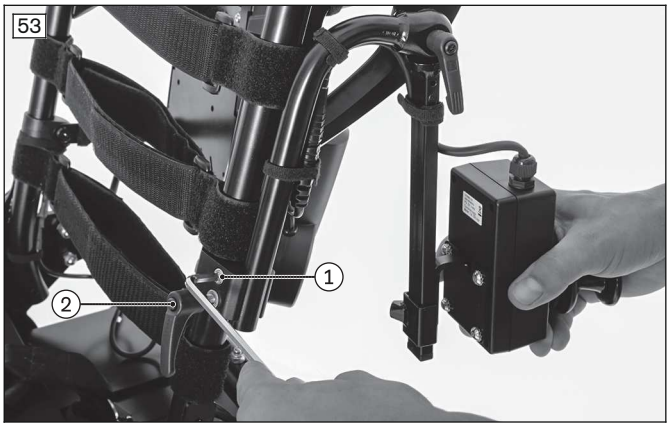

4.8.12 Replacing the manual mid-tray control

INFORMATION

For mounting and adjusting the tray: see page 132

Removing the control panel of the mid-tray control

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** Phillips screwdriver, size 3; hexagon key, size 3, 4; ring and open-ended wrench, size 10

1) Disconnect the cable of the control panel from the cable extension. Remove the cable attachments if necessary.
2) Loosen and remove the tray, and set it aside.
3) Swing the control panel to the bottom of the tray (see fig. 54).
4) Loosen and remove the 2 screws with 1 washer each on the bottom of the control panel (see fig. 54, item 1).
5) Disconnect the charging receptacle cable from the control panel (see fig. 55, item 1).
6) Remove the control panel (see fig. 55, item 2).
7) **If necessary:** Remove the swivel mechanism and charging receptacle (see page 39).

Installing the control panel for the mid-tray control

1) **If necessary:** Install the swivel mechanism and charging receptacle (see page 39).
2) Connect the charging receptacle cable to the control panel (see fig. 55, item 1).
3) Set the control panel onto the swivel mechanism (see fig. 55, item 2).
4) Insert the 2 screws with 1 washer each on the bottom of the control panel and firmly tighten them (see fig. 54, item 1).
5) Attach the tray to the wheelchair.
6) Connect the cable of the control panel to the cable extension. In doing so, reattach the loosened cable attachments.

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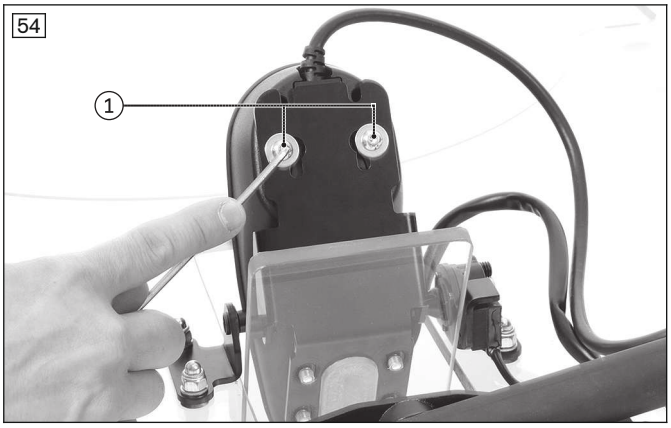

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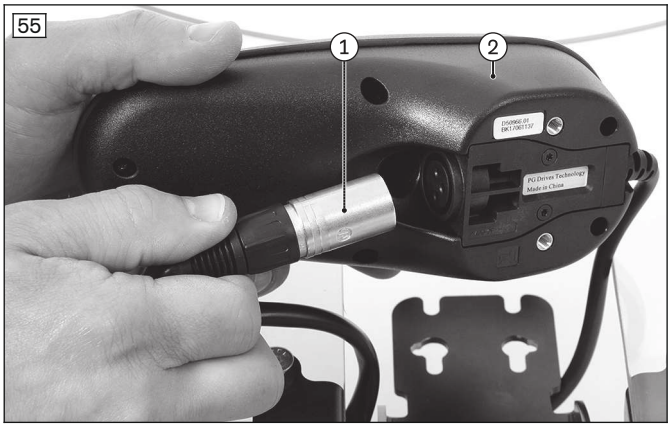

4.8.12.1 Replacing the swivel mechanism and charging receptacle

Removing the swivel mechanism and charging receptacle

1) Remove the control panel of the mid-tray control (see page 38).
2) Loosen and remove the 2 charging receptacle screws (see fig. 56, item 1).
3) Loosen and remove the 4 screws of the swivel mechanism (see fig. 57, tem 1).
4) Remove the swivel mechanism and charging receptacle (see fig. 57, item 2).
5) **If necessary:** Remove the stop (see fig. 57, item 3). To do so, loosen and remove the 2 screws of the stop (see fig. 57, item 4).

Installing the swivel mechanism and charging receptacle

1) **If necessary:** Attach the stop (see fig. 57, item 3). Insert and hand-tighten the 2 screws of the stop (see fig. 57, item 4).
2) Set the swivel mechanism and charging receptacle onto the tray from below (see fig. 57, item 2).
3) Insert and hand-tighten the 4 screws of the swivel mechanism (see fig. 57, item 1).
4) Insert and hand-tighten the 2 screws of the charging receptacle (see fig. 56, item 1).
5) Install the control panel of the mid-tray control (see page 38).

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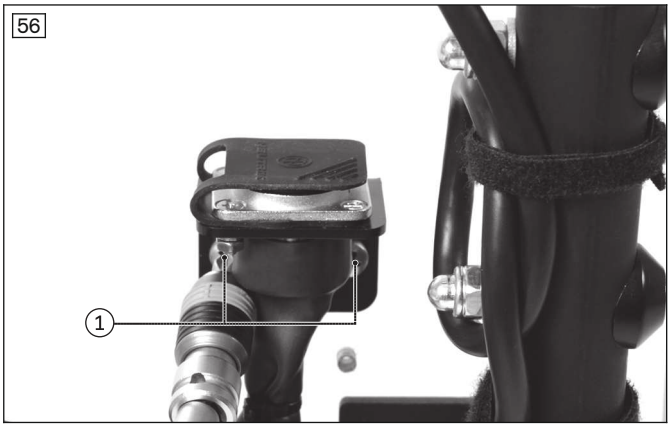

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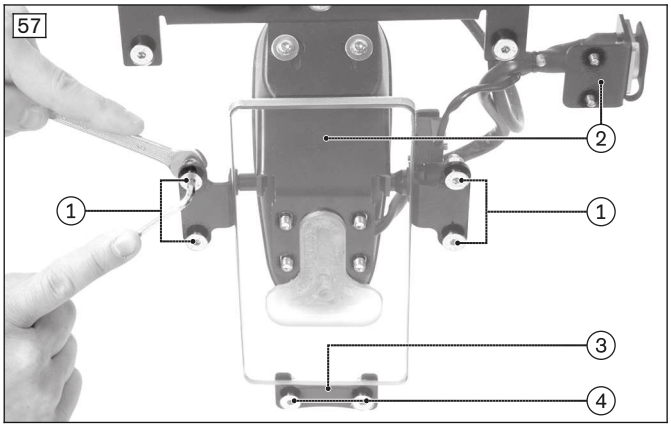

4.8.13 Replacing the push-button module

Removing the push-button module

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
> **Tools:** hexagon key, size 3, 5

1) Disconnect the stereo jack from the control panel (see fig. 58, item 1). Remove the cable attachments if necessary (see fig. 58, item 2).
2) Pull the terminal box off the hook-and-loop fastener on the bottom of the seat plate (see fig. 59).
3) Disconnect the 12 V and signal lines from the terminal box (see fig. 60, item 1).
4) Disconnect the 24 V connection from the terminal box (see fig. 61, item 1).
5) Remove the rear cover (see page 19).
6) Disconnect the 24 V connection from the controller and remove it (see fig. 62, item 1).
7) Remove the push-button module (see fig. 63, item 1).
8) Loosen the set screw and square nut under the arm support and remove the holder from the arm support (see fig. 64, item 1).
9) Attach the rear cover (see page 19).

Installing the push-button module

1) **If necessary:** Seal the holder with a ribbed plug (see fig. 65, item 1).
2) **If necessary:** Join the 2 parts of the holder using a screw and clamping nut (see fig. 66, item 1).
3) Align the 2 parts of the holder and secure them with the set screw (see fig. 67, item 1).
4) Slide the holder into the arm support and secure it with the set screw and square nut under the arm support (see fig. 64, item 1).
INFORMATION: Attach the holder on the arm support opposite the control panel.
5) Attach the push-button module to the holder with the magnet (see fig. 63, item 1).

6) Apply the symbols according to the assignment (see fig. 63, item 2).
7) Remove the rear cover (see page 19).
8) Connect the 24 V connection to the internal charging connection (OBC) of the controller (see fig. 62, item 1).
9) Connect the 24 V connection to the terminal box (see fig. 61, item 1).
10) Connect the 12 V and signal lines to the terminal box (see fig. 60, item 1).
11) Attach the terminal box to the bottom of the seat plate using a hook-and-loop fastener (see fig. 59).
12) Connect the stereo jack to the "Mode" connection on the control panel (see fig. 58, item 1). Secure the cables with the cable attachments in doing so (see fig. 58, item 2).
13) **Optional:** In combination with a chin control, also connect an actuator switch (493T75=SK076) to the terminal box (see fig. 68, item 1).
14) Attach the rear cover (see page 19).
15) **If necessary:** Program the push-button module.
INFORMATION: After installing the push-button module, the parameter set has to be adapted. The programming of the push-button module (changing the assignment) can only be adapted by authorised, qualified personnel. For further information, please contact your national Ottobock team.

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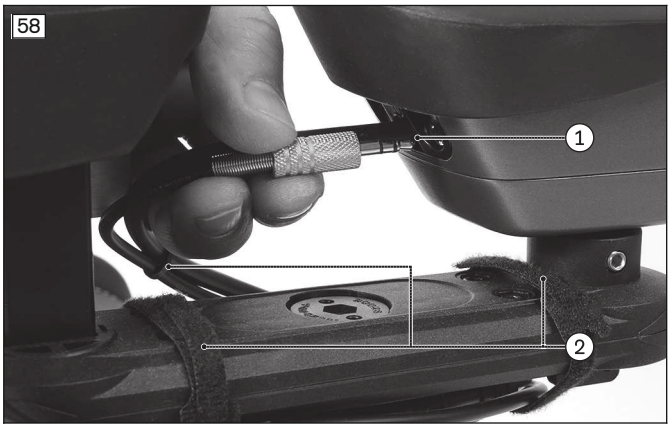

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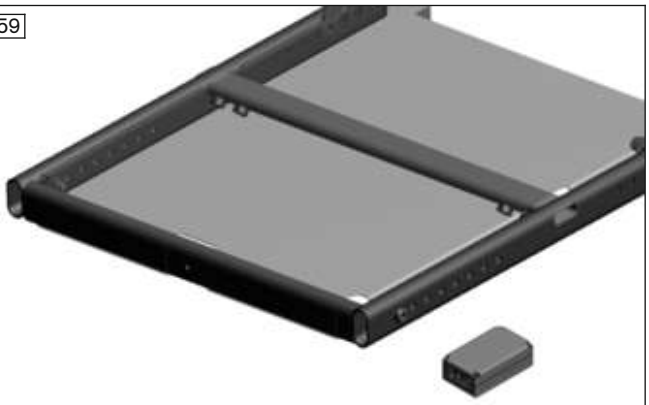

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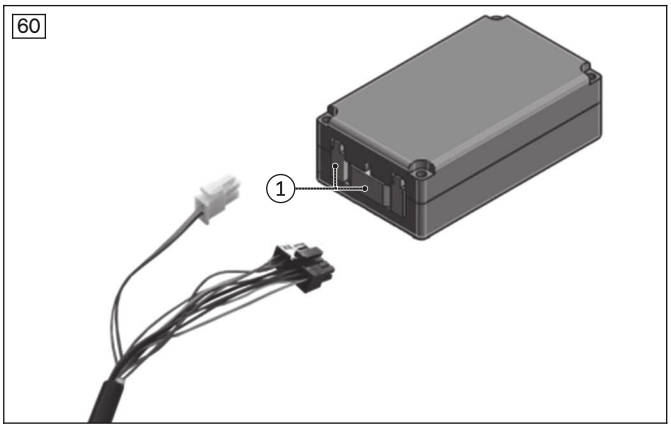

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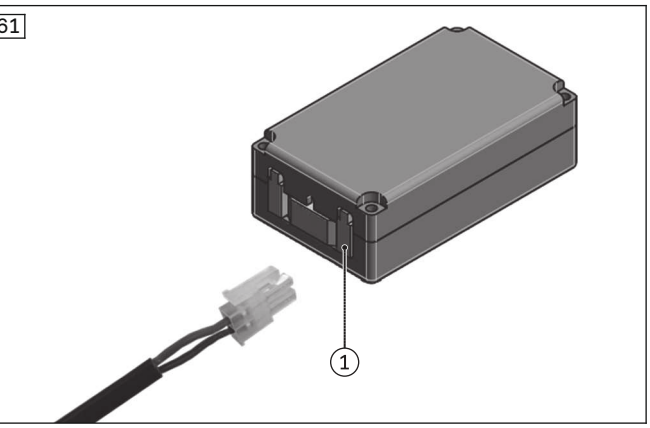

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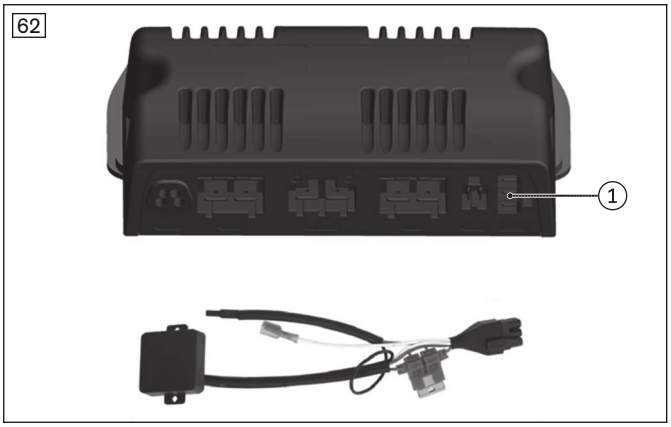

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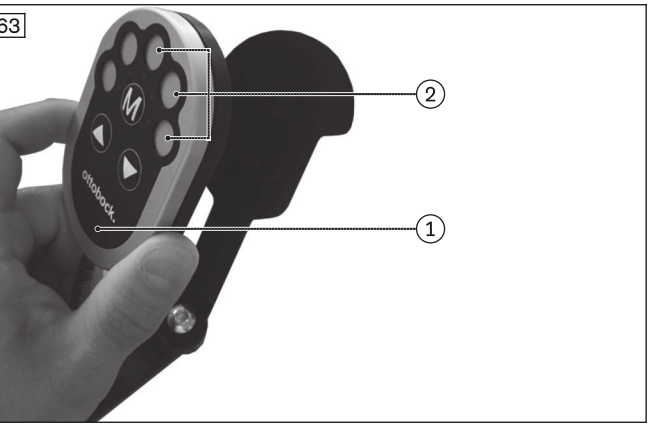

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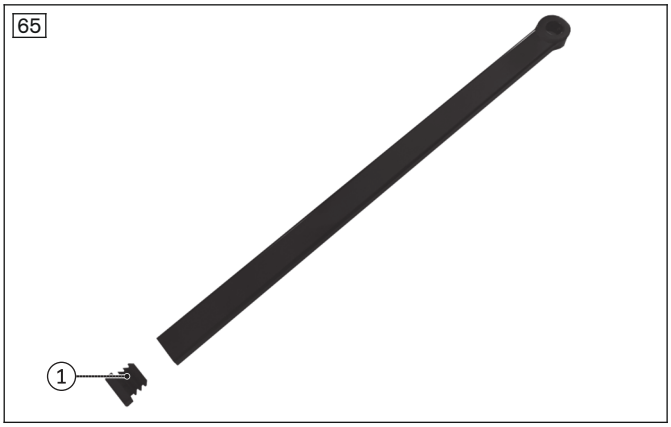

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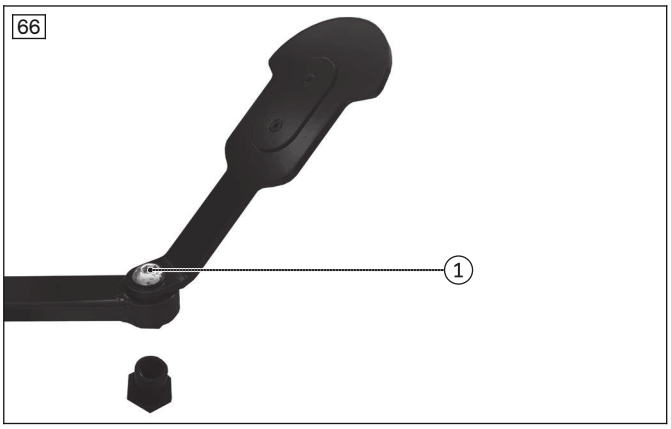

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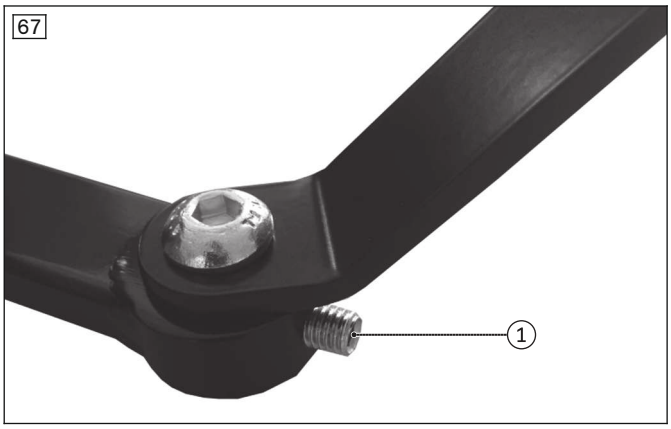

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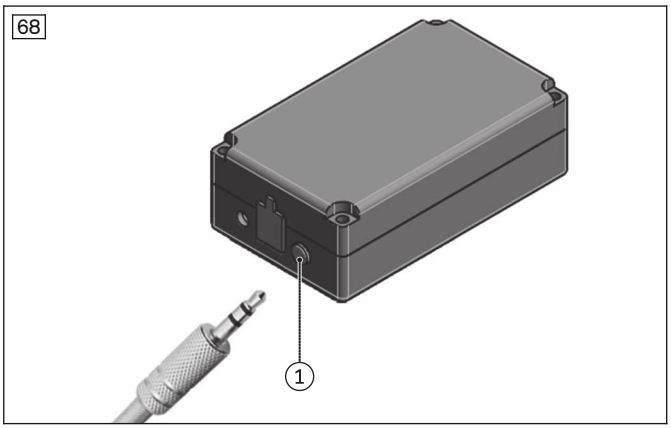

Additional installation versions

- The push-button module can be attached to a tray (see fig. 69). To do so, drill corresponding holes in the tray and screw the holder to the tray.
- The push-button module can be used in combination with a display module. To do so, attach the push-button module to the LCD holder using a mirror support (see fig. 70).

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4.8.14 Replacing the display and connection module

Removing the display and connection module

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

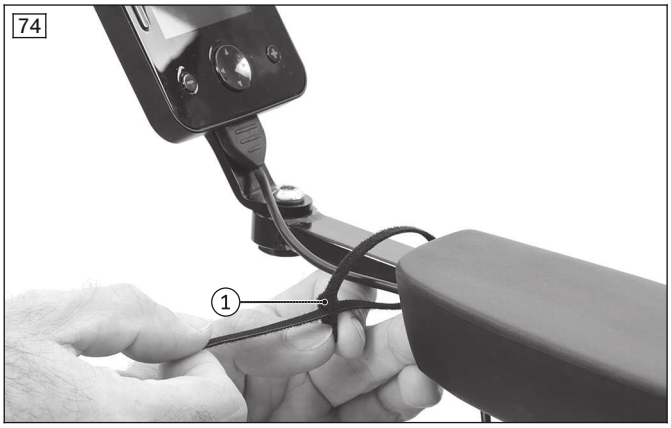
> **Tools:** hexagon key, size 2.5, 3, 4, 5; open-ended wrench, size 10; torque wrench with socket wrench insert, size 5

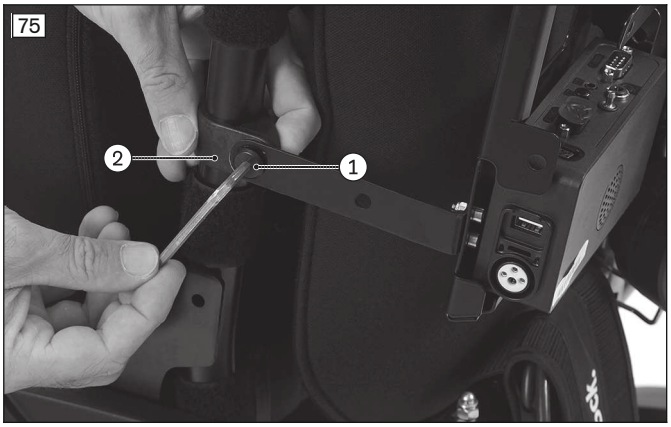
1) Pull out the 4 locking pins on both sides of the cover (see fig. 71, item 1).
2) Carefully lift off the cover of the module carrier (see fig. 71).
3) **INFORMATION: Note the installed position of the cable connections being loosened.**
Disconnect all cables from the connection module (see fig. 73, see fig. 72). Remove or open additional cable attachments if necessary (see fig. 74).
4) **INFORMATION: Depending on the configuration, there may be additional control modules on the module carrier. In this case, do not loosen the module carrier from the back support and continue with step 8.**
Loosen and remove the screw and nut between the module carrier and tube clamp (see fig. 75, item 1). In doing so, remove the tube clamp (see fig. 75, item 2).
5) Loosen and remove the 2 screws and nuts between the retaining plate and module carrier (see fig. 76, item 1).
6) Loosen and remove the 2 screws and nuts between the retaining plate and upper connecting tube (see fig. 77, item 2).
7) Remove the retaining plate (see fig. 77, item 1). Then reinsert the screws into the upper connecting tube and firmly tighten them.
8) **If necessary:** Remove the connection module from the module carrier. To do so, loosen and remove the 2 screws between the module carrier and connection module (see fig. 78, item 1).
9) Loosen and remove the 2 screws between the holder and display module (see fig. 79).
10) Disconnect the cable from the display module (see fig. 80, item 1).
11) Loosen the set screw and square nut under the arm support and remove the holder from the arm support (see fig. 81, item 1).

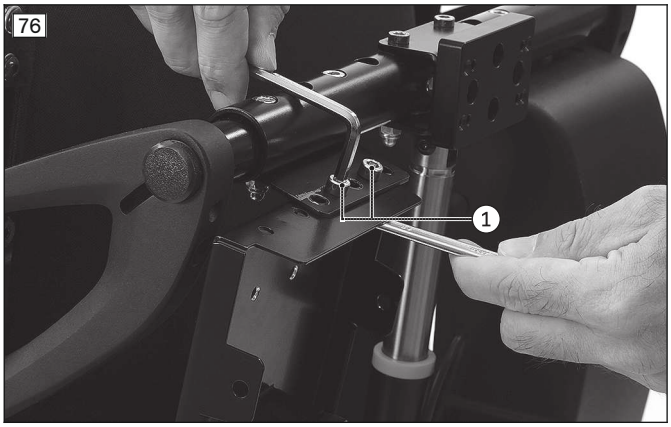
Installing the display and connection module

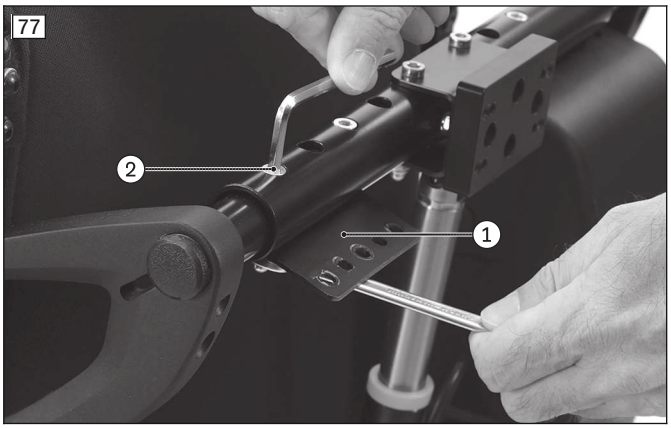
1) Slide the holder into the arm support and secure it with the set screw and square nut under the arm support (see fig. 81, item 1).
INFORMATION: All instructions for adjusting rails on arm supports are included in the instructions for use (user).
2) Connect the cable to the display module (see fig. 80, item 1).
3) Insert the 2 screws between the holder and display module and firmly tighten them (see fig. 79).
4) Place the retaining plate onto the upper connecting tube of the back support as far out as possible (see fig. 77, item 1).
INFORMATION: A suitable module carrier is already installed on the back support depending on the configuration. In this case, attach the connection module to the existing module carrier and continue with step 7.
5) Insert the 2 screws and nuts between the retaining plate and upper connecting tube and firmly tighten them to **10 Nm** (see fig. 77, item 2).

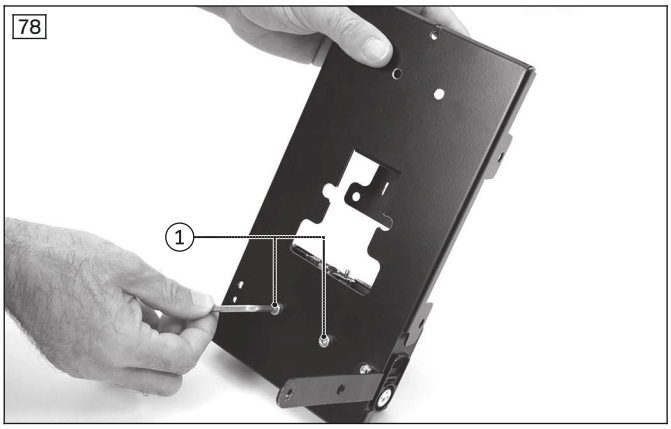
6) Insert the 2 screws between the connection module and module carrier, and firmly tighten them (see fig. 78, item 1).
7) Insert the 2 screws and nuts between the retaining plate and module carrier, and tighten them slightly (see fig. 76, item 1).
   INFORMATION: Set the module carrier onto the retaining plate as far to the outside as possible.
8) Put the clamp around the back support tube (see fig. 75, item 2).
9) Insert the screw and nut between the module carrier and tube clamp, and firmly tighten it to **1 Nm** (see fig. 75, item 1).
10) Firmly tighten all module carrier screws.
11) Install the cable along the holder, arm support holder and seat frame. Secure the cable with the cable attachments in doing so (see fig. 74, item 1).
    INFORMATION: Make sure that cables cannot get stretched, pinched or caught when the wheelchair is operated. For moving parts in particular, check whether all movements are possible without putting strain on the cables or causing them to stick out. Do not route cables over sharp edges.
12) Thread the cable through the module carrier and connect it to the connection module (see fig. 73).
13) Connect the connection module to the bus system (see fig. 72). Secure the cable with the cable attachments in doing so.
    INFORMATION: Connect the angled end of the cable to the connection module. Maintain sufficient distance to adjacent components and actuators. The connection module is connected to the seat module or the controller depending on the configuration.
14) **If necessary:** Connect additional special controls to the connection module.
15) Put on the cover of the module carrier (see fig. 71).
16) Press in and engage the 4 locking pins on both sides of the cover (see fig. 71, item 1).

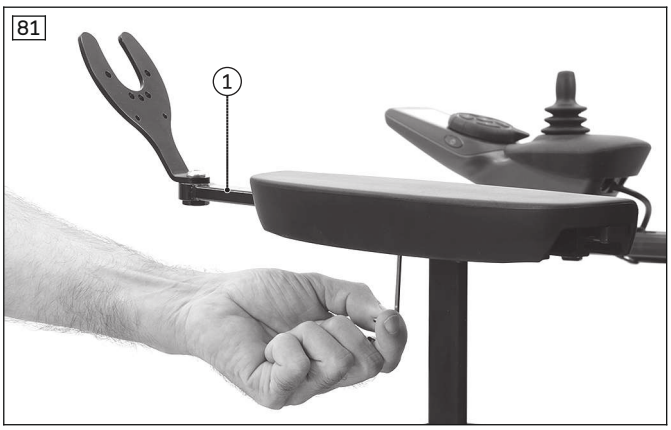












4.8.15 Installing the switch box

The 493T65=SK012 switch box for power options is a switchable Y-cable that makes it possible to connect 2 add-on power functions on a single actuator input. The switch box is required to control a third additional power function.

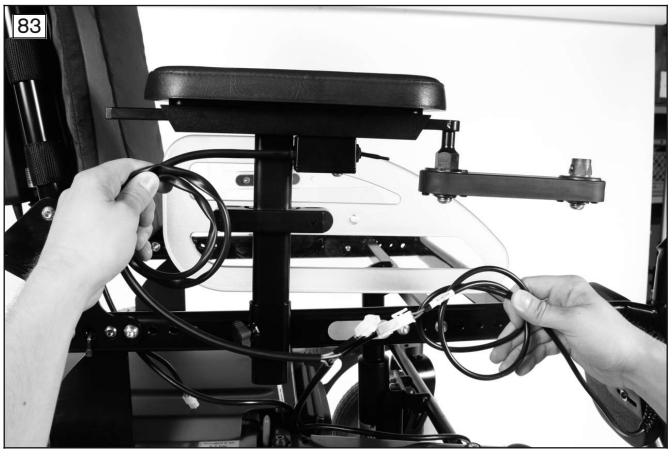
Depending on the position of the switch on the Y-cable, the first or another additional power function can be controlled via the control panel.

> **Prerequisites:**
Remove the control panel and set it aside (see page 33 ff.).

> **Tools:** hexagon key, size 3

1) Take the side panel out of the adapter on the control panel side.
2) Loosen the set screws on the slide blocks of the control panel holder.
3) Slide the switch box onto the profile rail of the forearm support and secure the slide block (see fig. 82).
4) Reinstall the control panel holder.
5) Connect the Y-cable to input A1 (see fig. 83).
6) Check the power functions.

An additional power function (e.g. power leg support, power seat tilt) can now be connected to each connector on the Y-cable and controlled separately.



4.8.16 Replacing the mo-Vis joystick control on the tray

Removing the mo-Vis joystick control on the tray

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** hexagon key, size 4, 5

1) **INFORMATION: Note the installed position of the cables and cable attachments.**
Disconnect the cable of the mo-Vis controller from the cable extension (see fig. 85, item 5). Remove the cable attachments if necessary.
2) Loosen and remove the tray, and set it aside.
3) Loosen and remove the 2 screws between the holder and tray (see fig. 84, see fig. 85, item 1).
4) Remove the holder with the joystick (see fig. 84, see fig. 85, item 2).
INFORMATION: There is a plate and a compression spring between the holder and tray (see fig. 84, see fig. 85, item 3). Safely store these components together with the holder.
5) Loosen the thumb screw of the holder and take off the joystick with the mo-Vis controller (see fig. 84, see fig. 85, item 4).

Installing the mo-Vis joystick control on the tray

1) Set the holder onto the tray from below.
INFORMATION: Insert the plate and the compression spring between the holder and tray (see fig. 84, see fig. 85, item 3).
2) Insert and hand-tighten the 2 screws between the holder and tray (see fig. 84, see fig. 85, item 1).
3) Slide the joystick into the holder and firmly tighten all screws of the holder.
INFORMATION: If necessary, fold the holder down first. Adjust the height of the joystick with the thumb screw (see fig. 84, item 4) and the centre position with the clamping screw, as needed (see fig. 84, item 5).
4) Attach the tray to the wheelchair.
5) Attach the mo-Vis controller under the seat according to the original installed position.

6) Position and connect the cables according to their original installed position. In doing so, reattach the loosened cable attachments.
   INFORMATION: Make sure that cables cannot get stretched, pinched or caught when the wheelchair is operated.
7) Verify the functionality of the holder and the firm fit of the joystick.
8) **If necessary:** Recalibrate the joystick.

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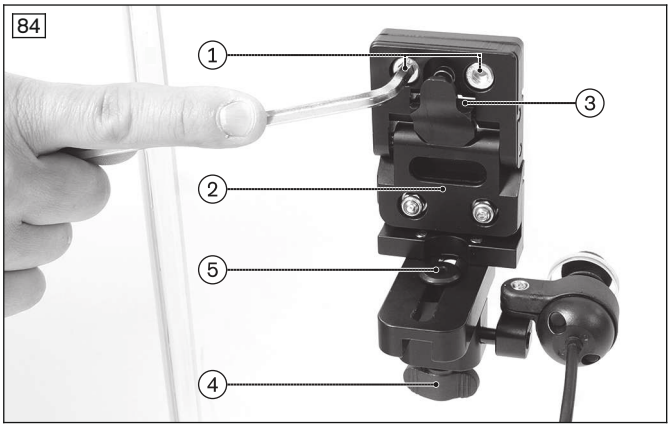

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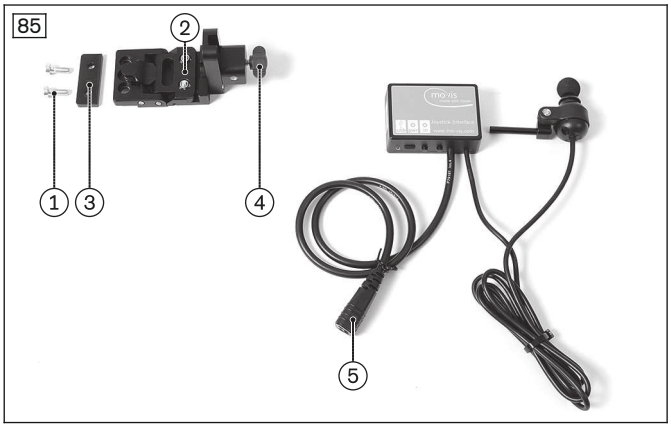


Recalibrating the joystick

INFORMATION

The described calibration applies for a mo-Vis joystick control connected to a separate display and connection module. The calibration is started with the help of the display module.

If the mo-Vis joystick control is connected directly to the bus system, contact the manufacturer for additional information regarding the calibration.

1) Open the "Settings" menu on the display module (gear wheel symbol).
2) Select the "Programming" menu with the up/down arrows and confirm your selection with the right arrow.
   INFORMATION: On-board programming is not activated on delivery of the control device. In this case, first carry out PC programming, back up the parameters and activate on-board programming if necessary.
3) Select the "System" menu with the up/down arrows and confirm your selection with the right arrow.
4) Select the "Joystick calibration" menu with the up/down arrows and confirm your selection with the right arrow.
5) Follow the instructions on the display module.
   INFORMATION: Further information regarding the calibration can be found in the SK81935 user manual from the control device manufacturer.
6) The display module shows when the calibration has been completed successfully. The display then returns to the system menu.
   INFORMATION: If you have activated on-board programming, deactivate it again using PC programming and back up the parameters.

4.8.17 Replacing the mo-Vis joystick control on the arm support

Removing the mo-Vis joystick control on the arm support

INFORMATION

To make them easier to see, the black joystick control components are shown in silver in the illustrations that follow.

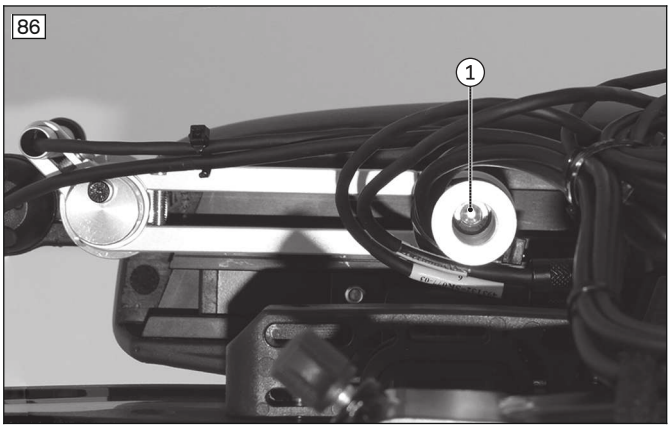
> **Prerequisites:**
  Switch off the control device and deactivate the main fuse (see page 16).
> **Tools:** hexagon key, size 4, 5

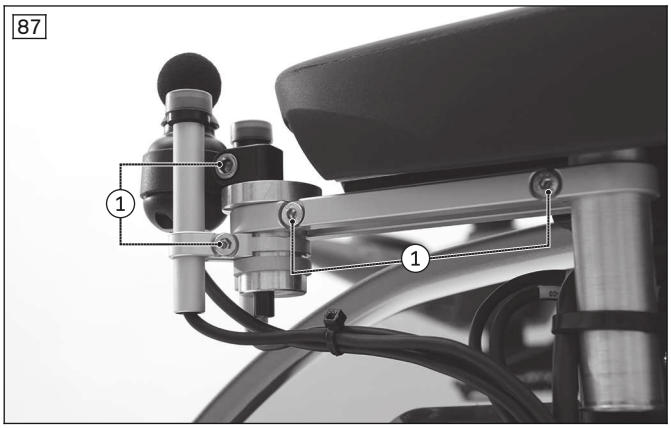
1) **INFORMATION: Note the installed position of the cables and cable attachments. The mo-Vis controller is mounted under the seat or in the module carrier on the back support by default.**
   Disconnect the cable of the mo-Vis controller from the cable extension (not illustrated). Remove the cable attachments if necessary.

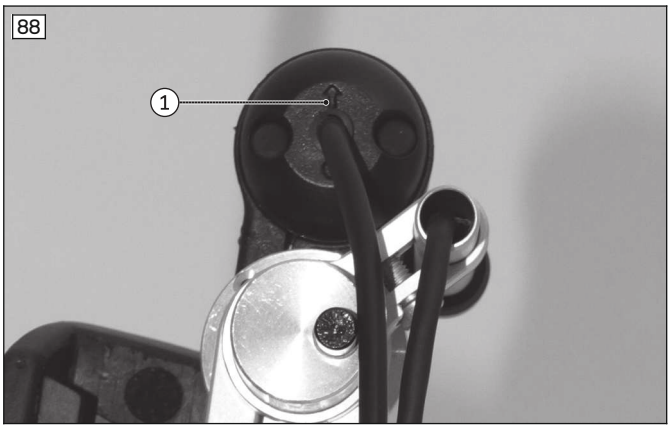
2) Loosen and remove the screw and square nut under the arm support and remove the holder from the arm support (see fig. 86, item 1).
3) **If necessary:** Remove the individual components of the joystick control. Loosen the respective clamping screws to do so (see fig. 87, item 1).
4) Remove the joystick with the mo-Vis controller.

Installing the mo-Vis joystick control on the arm support

1) Slide the holder into the arm support and secure it with the screw and square nut under the arm support (see fig. 86, item 1).
2) Assemble the individual joystick control components, align them and firmly tighten the respective clamping screws (see fig. 87, item 1).
   INFORMATION: Align the joystick according to the arrow at the bottom (see fig. 88, item 1). The arrow has to point forward in the direction of travel.
3) Attach the mo-Vis controller according to the original installed position.
4) Position and connect the cables according to their original installed position. In doing so, reattach the loosened cable attachments.
   INFORMATION: Make sure that cables cannot get stretched, pinched or caught when the wheelchair is operated. For moving parts in particular, check whether all movements are possible without putting strain on the cables or causing them to stick out. Do not route cables over sharp edges.
5) Verify that the joystick is securely positioned.
6) **If necessary:** Recalibrate the joystick.







Recalibrating the joystick

INFORMATION

The described calibration applies for a mo-Vis joystick control connected to a separate display and connection module. The calibration is started with the help of the display module.

If the mo-Vis joystick control is connected directly to the bus system, contact the manufacturer for additional information regarding the calibration.

1) Open the "Settings" menu on the display module (gear wheel symbol).

2) Select the "Programming" menu with the up/down arrows and confirm your selection with the right arrow.
   INFORMATION: On-board programming is not activated on delivery of the control device. In this case, first carry out PC programming, back up the parameters and activate on-board programming if necessary.
3) Select the "System" menu with the up/down arrows and confirm your selection with the right arrow.
4) Select the "Joystick calibration" menu with the up/down arrows and confirm your selection with the right arrow.
5) Follow the instructions on the display module.
   INFORMATION: Further information regarding the calibration can be found in the SK81935 user manual from the control device manufacturer.
6) The display module shows when the calibration has been completed successfully. The display then returns to the system menu.
   INFORMATION: If you have activated on-board programming, deactivate it again using PC programming and back up the parameters.

4.9 Drive unit

4.9.1 Replacing the drive wheel

INFORMATION

- ► When replacing the wheels, check the tyres on both sides to ensure the tread is even and sufficient.
- ► Replace both wheels when needed.

Removing the drive wheel

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Loosen and remove the 5 screws of the drive wheel (see fig. 89, item 1).
2) Remove the drive wheel from the drive flange.
3) **If needed:** Change the tyre (see page 77).

Installing the drive wheel

1) Place the drive wheel on the drive flange.
2) Insert the 5 screws into the drive wheel and tighten them crosswise to **25 Nm** (see fig. 89, item 1).

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4.9.2 Replacing the drive unit (rear-wheel drive RWD/front-wheel drive FWD)

4.9.2.1 Replacing the drive wheel splash guard

Removing the drive wheel splash guard

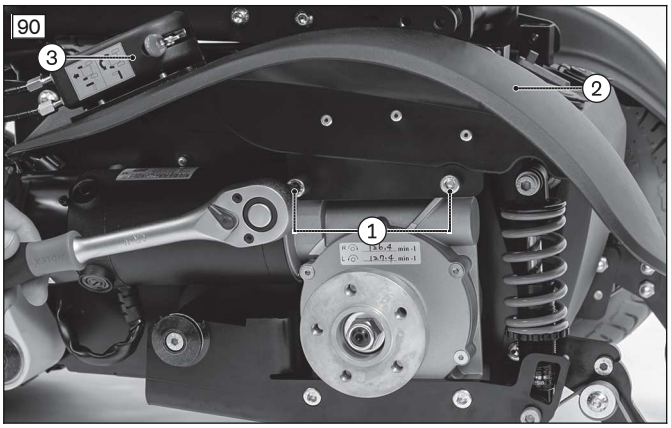
> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Remove the drive wheel (see page 48).
2) Loosen and remove the 2 upper screws on the drive motor (see fig. 90, item 1).
3) Remove the drive wheel splash guard (see fig. 90, item 2).
4) **Optional:** Remove the control panel for the caster wheel swivel lock from the splash guard (see fig. 90, item 3; see page 67).

Installing the drive wheel splash guard

1) **Optional:** Attach the control panel for the caster wheel swivel lock to the splash guard (see fig. 90, item 3; see page 67).
2) Place the drive wheel splash guard on the drive wheel swing arm (see fig. 90, item 2).
3) Insert the 2 upper screws in the drive motor and tighten them to **25 Nm** (see fig. 90, item 1).
4) Attach the drive wheel (see page 48).



4.9.2.2 Replacing the drive wheel suspension

⚠ CAUTION

Incorrect settings or dimensioning of the suspensions

Injuries to the user due to changed driving characteristics and insufficient tipping resistance

► The spring elements must be matched to the weight of the user and the overall weight of the wheelchair. Check whether the type and positions of the selected spring elements are permissible for the new configuration (see page 78). For further information, please contact your national Ottobock team.

Removing the drive wheel suspension

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6, ring and open-ended wrench, size 13

1) Remove the drive wheel (see page 48).

2) **CAUTION! Pinching, crushing and blows due to loosened drive wheel swing arm. Actively secure the drive wheel swing arm against falling.**
   Loosen and remove the screw with 1 washer between the suspension and drive unit bracket (see fig. 91, see fig. 92, item 1).
3) Carefully and slowly guide the loosened drive wheel swing arm downwards.
4) **INFORMATION: Note the installed position of the 2 spacer sleeves on the suspension. The installed position of the spacer sleeves depends on the installed drive motor (see page 53).**
   Loosen and remove the screw with 2 spacer sleeves and nut between the suspension and the drive wheel swing arm (see fig. 91, see fig. 92, item 2).
   INFORMATION: A grounding cable with grounding washer is also mounted on one of the two drive wheel swing arms. Remove this grounding together with the screw connection (see fig. 92, item 4).
5) Remove the suspension (see fig. 91, see fig. 92, item 3).

Installing the drive wheel suspension

1) Insert the suspension into the drive wheel swing arm (see fig. 91, see fig. 92, item 3).
   INFORMATION: The anti-tipper is spring loaded on a wheelchair with front-wheel drive. In this case, tension the spring of the anti-tipper when installing the drive wheel suspension (see fig. 106, item 1).
2) Insert the screw with 2 spacer sleeves and nut according to its original installed position between the suspension and drive wheel swing arm and firmly tighten it (see fig. 91, see fig. 92, item 2).
   INFORMATION: A grounding cable with grounding washer is also mounted on one of the two drive wheel swing arms. Attach this grounding together with the screw connection (see fig. 92, item 4). Arrange the grounding cable such that it can drag against the floor.
3) Carefully guide the drive wheel swing arm upwards.
4) Insert the screw between the suspension and drive unit bracket with 1 washer and firmly tighten it to **25 Nm** (see fig. 91, see fig. 92, item 1).
5) Attach the drive wheel (see page 48).
6) Adjust the drive wheel suspension equally on both sides (see page 78).

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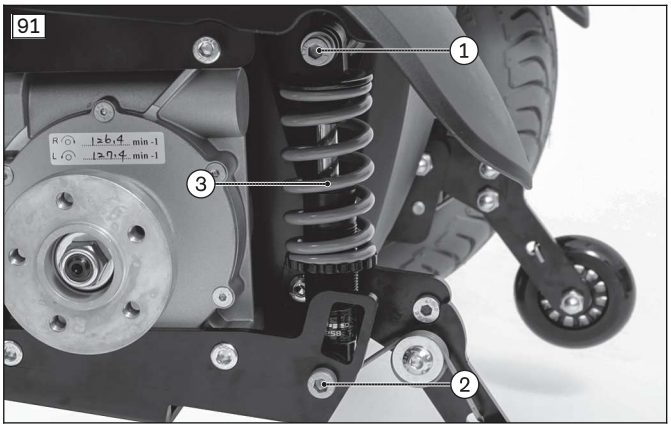

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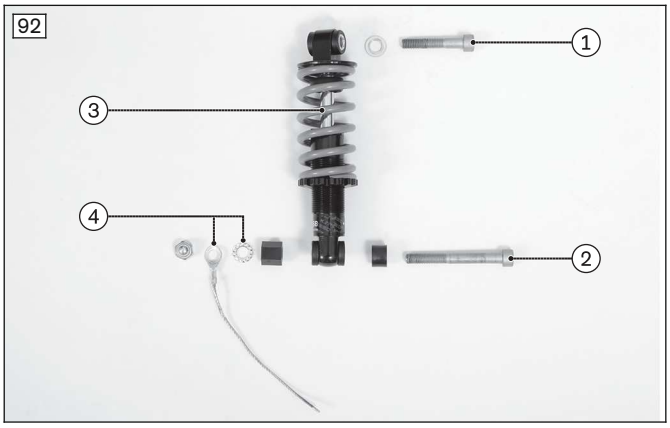

4.9.2.3 Replacing the drive motor

INFORMATION

- Always replace drive motors in pairs.

INFORMATION

- If you change the type of drive motors, check the installed position of the spacers on the drive wheel swing arm and suspension and replace them if necessary (see page 53).
- When changing the type of drive motors, a new set of parameters must be input in the control device. In this case, reprogram the control device after replacing the motors (see page 144, see page 152 ff.).

Removing the drive motor

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Remove the drive wheel (see page 48).
2) Remove the rear cover (see page 19).
3) **If necessary:** Remove the controller (see page 25).
4) Disconnect the motor cable from the controller (see fig. 93, item 1: right motor, item 2: left motor).
5) Loosen and remove the 2 upper screws between the drive motor and drive wheel swing arm with 1 washer (optional) each (see fig. 94, item 1).
INFORMATION: If a splash guard is installed, there are no washers under the screws. In this case, remove the splash guard after loosening the screws (see page 49).
6) Loosen the cable attachment of the motor cable (see fig. 95).
7) Loosen and remove the 2 lower screws between the drive motor and drive wheel swing arm (see fig. 96, item 1).
8) **INFORMATION: Note the installed position of the motor cable.**
Remove the drive motor with the motor cable. Remove additional cable attachments if necessary.

Installing the drive motor

1) Insert the drive motor and position the motor cable according to the original installed position. Reattach the loosened cable attachments (see fig. 95).
2) Insert the 2 lower screws between the drive motor and drive wheel swing arm and firmly tighten them with **25 Nm** (see fig. 96, item 1).
3) Insert the 2 upper screws between the drive motor and drive wheel swing arm with 1 washer (optional) each and firmly tighten them to **25 Nm** (see fig. 94, item 1).
INFORMATION: If a splash guard is installed, the washers are omitted and replaced by the splash guard (see page 49).
4) Connect the motor cable to the controller (see fig. 93, item 1: right motor, item 2: left motor).
5) **If necessary:** Attach the controller (see page 25).
6) Attach the rear cover (see page 19).
7) Attach the drive wheel (see page 48).
8) **If the type of drive motors has been changed:** Reprogram the control device (see page 144, see page 152 ff.).

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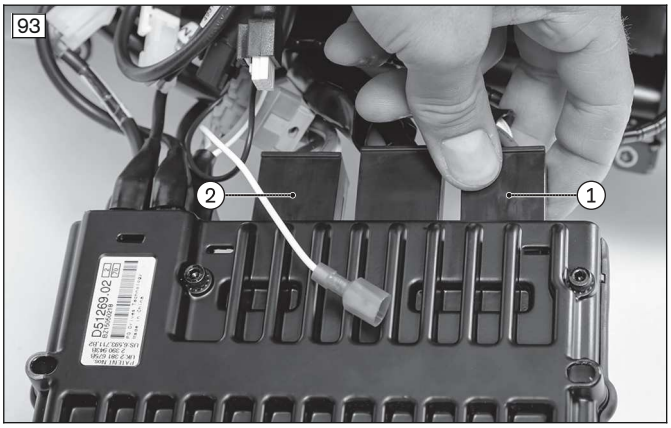

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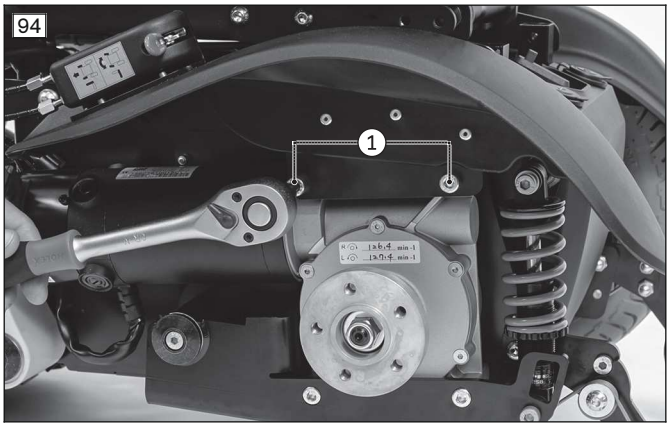


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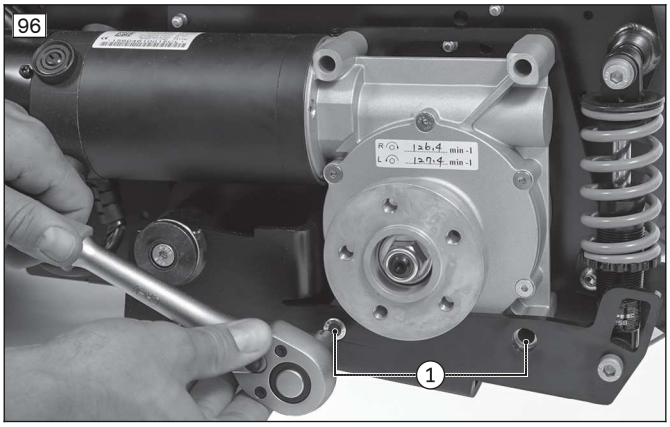

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4.9.2.4 Replacing the carbon brush

Removing the carbon brush

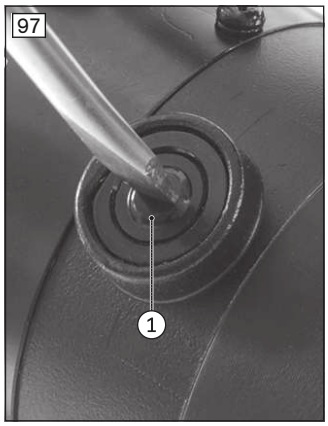
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** Flat head screwdriver

1) Loosen and remove the slotted screw on the brush cover (see fig. 97, item 1).
2) Remove the cover (see fig. 97, item 2).
   → The carbon brush is now exposed.
3) Remove and replace the carbon brush (see fig. 98, item 1).

Installing the carbon brush

1) Insert the carbon brush (see fig. 98, item 1). In doing so, make sure that the guides fit properly into the slots (see fig. 98, item 2).
2) Put on the cover (see fig. 97, item 2).
3) Insert and firmly tighten the slotted screw on the brush cover (see fig. 97, item 1).



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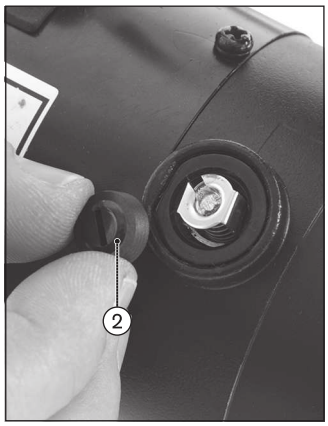

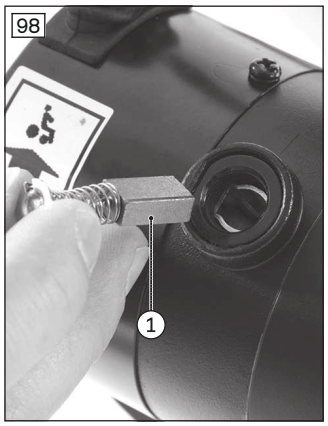

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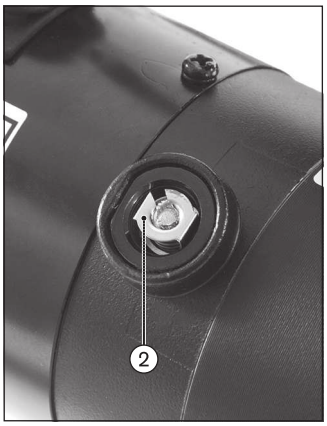


4.9.2.5 Replacing the drive wheel swing arm

Removing the drive wheel swing arm

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

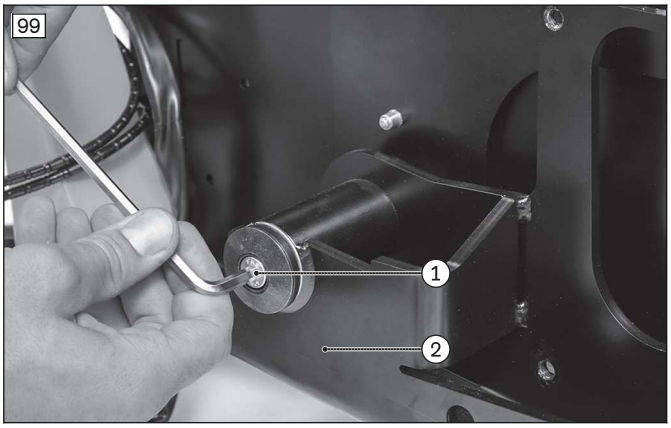
> **Tools:** hexagon key, size 5; torque wrench with socket wrench insert, size 5

1) Remove the drive wheel (see page 48).
2) Remove the drive motor with splash guard (optional) (see page 50).
3) Remove the drive wheel suspension (see page 49).
4) Remove the anti-tipper (see page 54).
5) Loosen and remove the screw with fixing washer on the axle (see fig. 99, item 1).

6) **INFORMATION: Note the installed position of the spacer washer on the axle. The installed position of the spacer washer depends on the installed drive motor (see page 53).**
Pull the drive wheel swing arm with spacer washer down and off the axle (see fig. 99, item 2).

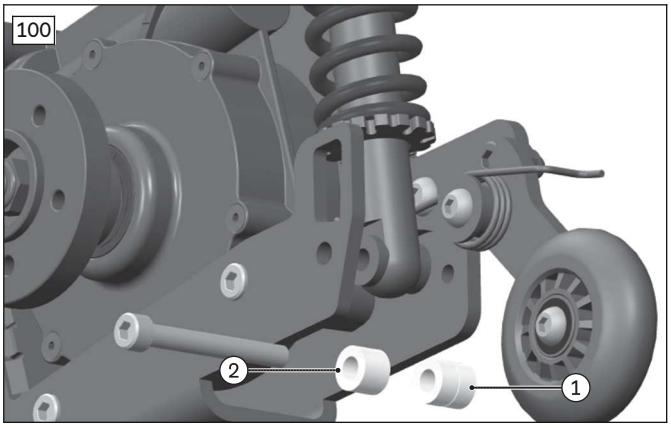
Installing the drive wheel swing arm

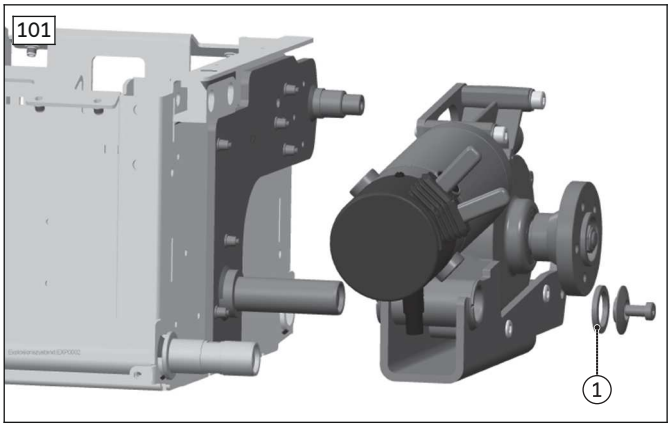
1) Slide the drive wheel swing arm with spacer washer onto the axle according to the original installed position (see fig. 99, item 2).
2) Insert the screw with fixing washer into the axle and firmly tighten it to **15 Nm** (see fig. 99, item 1).
3) Install the anti-tipper (see page 54).
4) Install the drive wheel suspension between the drive wheel swing arm and drive unit bracket (see page 49).
5) Install the drive motor with splash guard (optional) (see page 50).
6) Attach the drive wheel (see page 48).

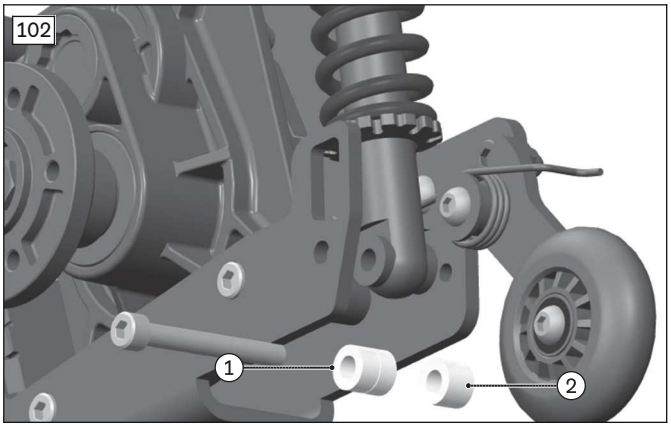


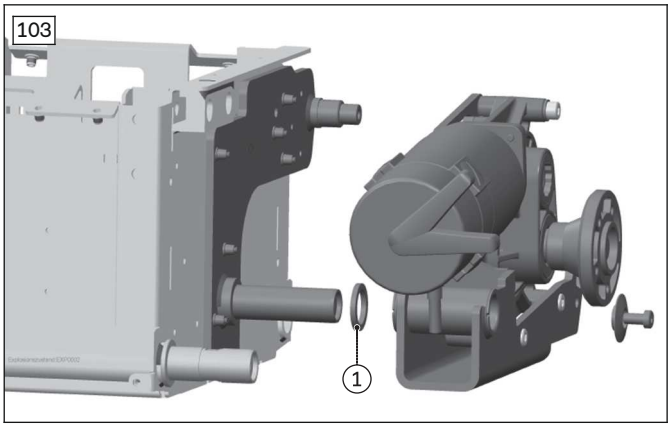
4.9.2.6 Installed position of the spacers on the drive

Drive motor type	Spacer sleeves for drive suspension (see page 49)	Spacer washer for drive wheel swing arm (see page 52)
493T75=PK117/118 (Small diameter; red release lever)	long sleeve inside (see fig. 100, item 1), short sleeve outside (see fig. 100, item 2)	on the outside of the drive wheel swing arm (see fig. 101, item 1)
493T75=PK107/110/114 (large diameter, grey release lever)	long sleeve outside (see fig. 102, item 1), short sleeve inside (see fig. 102, item 2)	between mobility base and drive wheel swing arm (see fig. 103, item 1)









4.9.2.7 Replacing the anti-tipper wheel

Removing the anti-tipper wheel

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.

> **Tools:** hexagon key, size 5; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5

1) Loosen and remove the screw and nut on the anti-tipper wheel (see fig. 104).
2) Remove the anti-tipper wheel with 1 adjusting washer from the anti-tipper bracket.

Installing the anti-tipper wheel

1) Position the anti-tipper wheel with 1 adjusting washer on the anti-tipper bracket.
2) Insert the screw and nut into the anti-tipper wheel and firmly tighten it (see fig. 104).

4.9.2.8 Replacing the anti-tipper

Removing the anti-tipper

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 5; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5

1) Remove the drive wheel (see page 48).

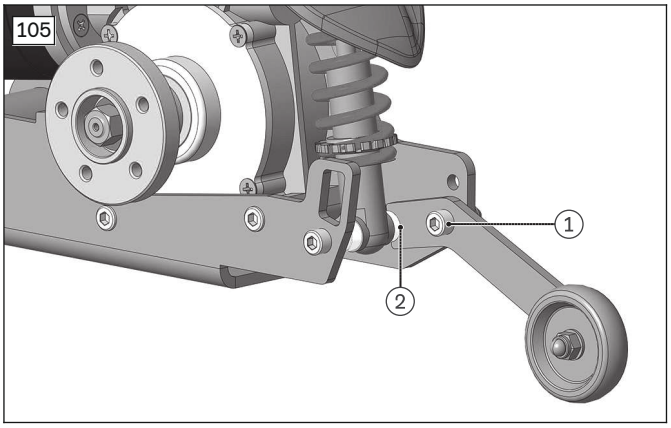
2) Unscrew the anti-tipper:
   Variant 1 (rear-wheel drive): Loosen and remove the mounting screw with counter nut on the anti-tipper (see fig. 105, item 1).
   Variant 2 (front-wheel drive): Loosen and remove the mounting screw with counter nut on the anti-tipper (see fig. 106, item 1). At the same time, carefully relax the spring and remove it together with the washer (see fig. 106, item 2 – 3).
3) Remove the anti-tipper from the drive wheel swing arm.

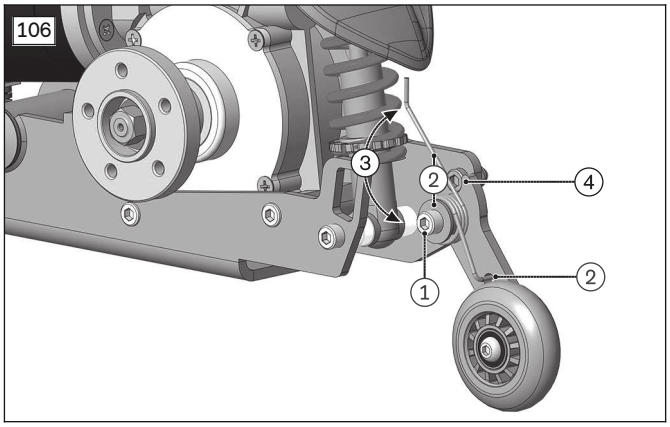
Installing the anti-tipper – variant 1 (rear-wheel drive)

1) Guide the anti-tipper to the bearing of the drive wheel swing arm (see fig. 105, item 2).
2) Guide the mounting screw through the anti-tipper and tighten it firmly using the counter nut (see fig. 105, item 1).
3) Attach the drive wheel (see page 48).

Installing the anti-tipper – variant 2 (front-wheel drive)

1) Guide the anti-tipper to the stop screw (see fig. 106, item 4).
2) Set the mounting screw together with the washer and spring (see fig. 106, item 1 – 2) and loosely secure with the counter nut.
3) Tension the spring behind the screw connection of the drive wheel swing arm (see fig. 106, item 2 – 3).
4) Firmly tighten the screw on the anti-tipper (see fig. 106, item 1).
5) Attach the drive wheel (see page 48).





4.9.3 Replacing the drive unit (mid-wheel drive MWD)

4.9.3.1 Replacing the drive wheel splash guard

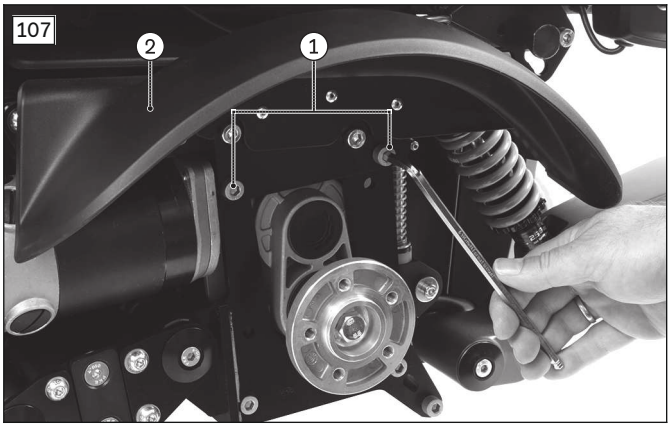
Removing the drive wheel splash guard

> **Prerequisites:**
  Optional: Move the seat to the lowest seat height (see page 15).
  Switch off the control device and deactivate the main fuse (see page 16).
  If necessary: Remove the leg supports.
  Jack up the wheelchair (see page 15).
> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Remove the drive wheel (see page 48).
2) Loosen and remove the 2 upper screws on the drive motor (see fig. 107, item 1).
3) Remove the drive wheel splash guard (see fig. 107, item 2).

Installing the drive wheel splash guard

1) Place the drive wheel splash guard on the drive wheel swing arm (see fig. 107, item 2).
2) Insert the 2 upper screws in the drive motor and tighten them to **25 Nm** (see fig. 107, item 1).
3) Attach the drive wheel (see page 48).



4.9.3.2 Replacing the drive wheel suspension system

NOTICE

Incorrect dimensioning of the suspensions

Damage to the suspensions and the product

► Only replace the suspensions with approved suspensions of the same type (see page 78).

INFORMATION

The drive wheel swing arm is connected to the caster wheel swing arm suspension (MWD-R: no connection between the caster wheel swing arm and the drive wheel swing arm).

► To replace this suspension, observe the instructions (see page 72).

Removing the drive wheel suspension system

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

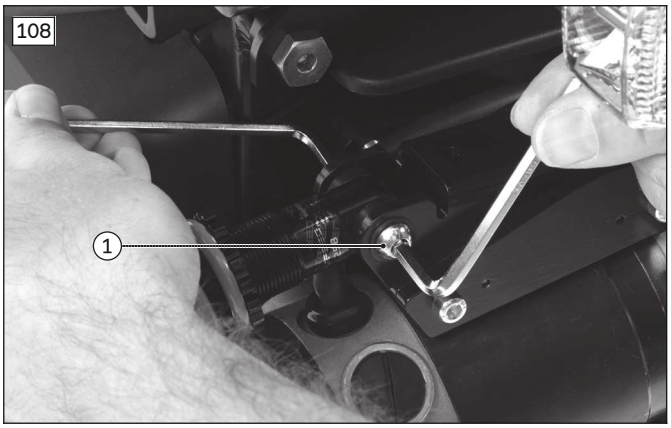
> **Tools:** 2 x hexagon key, size 5; hexagon key, size 6; torque wrench with socket wrench insert, size 5, 6

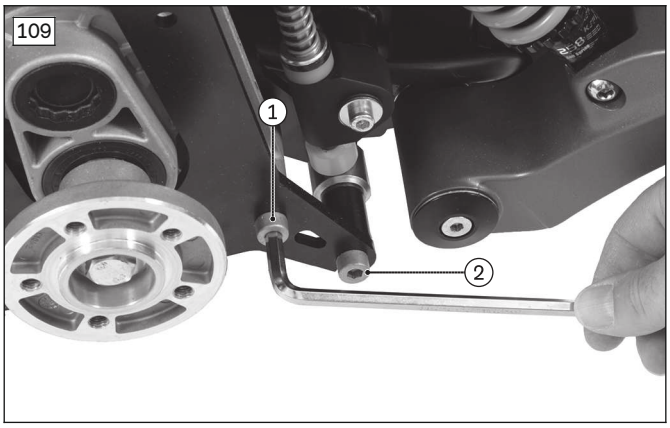
1) Remove the drive wheel (see page 48).
2) Remove the drive wheel splash guard (see page 55).
3) Loosen and remove the screw with sleeve nut and Belleville spring washer between the drive wheel swing arm and caster wheel swing arm suspension (see fig. 108, item 1).
4) Carefully and slowly guide the caster wheel swing arm and drive wheel swing arm downwards.
5) Loosen the screw next to the suspension to release the suspension axle (see fig. 109, item 1).
6) Loosen and remove the screw with 1 spacer sleeve between the suspension and the drive wheel swing arm (see fig. 109, item 2).
7) Loosen and remove the screw with 1 washer on the axle of the suspension (see fig. 110, see fig. 111, item 1).
8) **INFORMATION: Note the installed position of the spacer washer on the axle (see fig. 111, item 2). The installed position of the spacer washer depends on the installed drive motor (see page 61).**
   Pull the suspension with spacer washer down and off the axle.

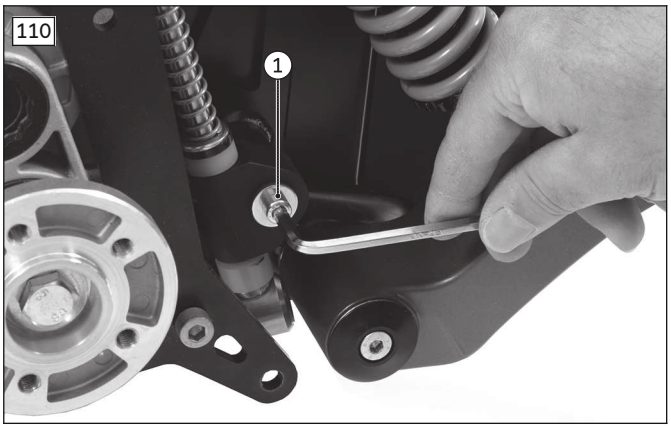
Installing the drive wheel suspension system

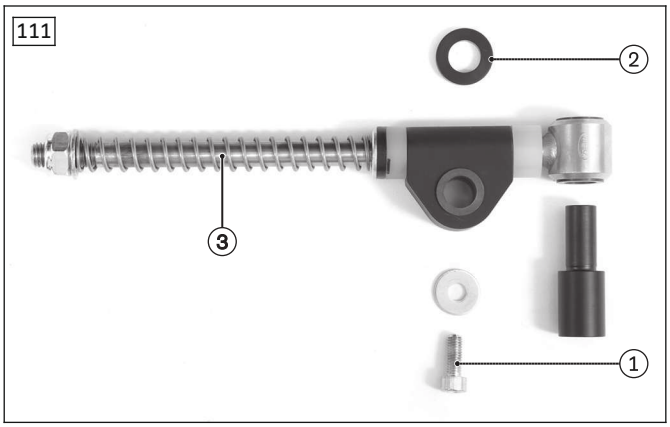
1) Slide the suspension with spacer washer onto the axle according to the original installed position (see fig. 111, item 2).
2) Insert the screw with 1 washer on the axle of the suspension and firmly tighten it to **12 Nm** (see fig. 110, see fig. 111, item 1).
3) Insert the screw with 1 spacer sleeve between the suspension and drive wheel swing arm and firmly tighten it to **25 Nm** (see fig. 109, item 2).
4) Replace the screw next to the suspension with a new screw connection with thread lock and firmly tighten it to **25 Nm** (see fig. 109, item 1).
5) Carefully guide the caster wheel swing arm and drive wheel swing arm upwards.

6) Insert the screw with sleeve nut and Belleville spring washer between the drive wheel swing arm and caster wheel swing arm suspension and firmly tighten it to **15 Nm** (see fig. 108, item 1).
7) Attach the drive wheel splash guard (see page 55).
8) Attach the drive wheel (see page 48).
9) Adjust the drive wheel suspension equally on both sides (see page 78).
10) **INFORMATION: If necessary, lightly spray the piston rod of the cross guide (see fig. 111, item 3) with a PTFE lubricant to prevent possible squeaking in case of moisture.**







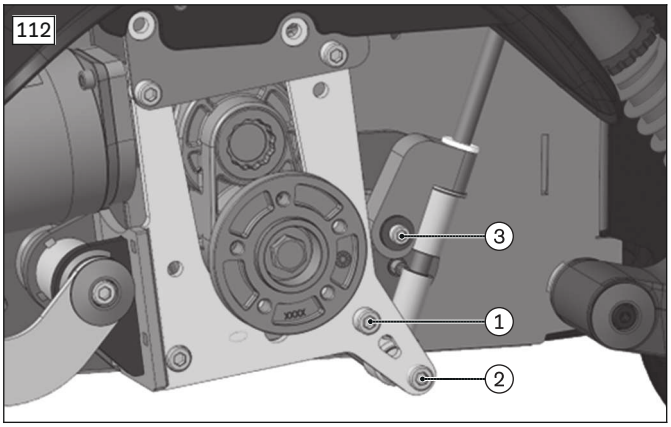


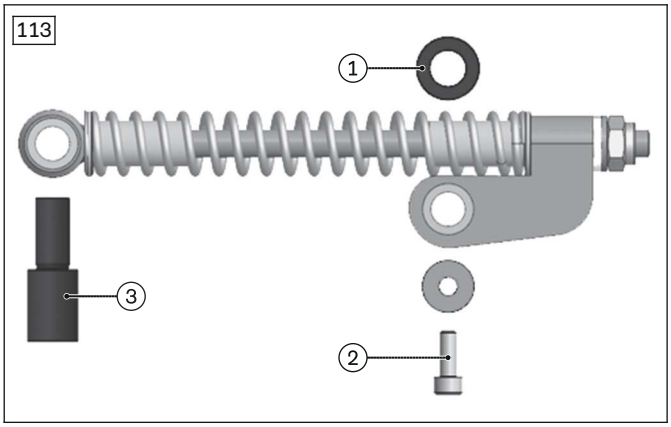
Removing the drive wheel suspension system (MWD-R)

1) Loosen the screw next to the suspension to release the suspension axle (see fig. 112, item 1).
2) Loosen and remove the screw with 1 spacer sleeve between the suspension and the drive wheel swing arm (see fig. 112, item 2).
3) **INFORMATION: Note the installed position of the spacer washer on the axle (see fig. 113, item 1). The installed position of the spacer washer depends on the installed drive motor (see page 61).**
   Loosen and remove the screw with 1 washer on the axle of the suspension (see fig. 112, item 3).
4) Pull the suspension with spacer washer down and off the axle.

Installing the drive wheel suspension system (MWD-R)

1) Slide the suspension with spacer washer onto the axle according to the original installed position (see fig. 113, item 2).
2) Insert the screw with 1 washer on the axle of the suspension and tighten it to **12 Nm** (see fig. 113, item 1).
3) Insert the screw with 1 spacer sleeve between the suspension and drive wheel swing arm and tighten it to **25 Nm** (see fig. 113, item 3).
4) Replace the screw next to the suspension with a new screw connection with thread lock and tighten it to **25 Nm** (see fig. 112, item 1).





4.9.3.3 Replacing the drive wheel swing arm and drive motor

INFORMATION

► Always replace drive motors in pairs.

INFORMATION

► If you change the type of drive motors, check the installed position of the spacers on the drive wheel swing arm and suspension and replace them if necessary (see page 61).

► When changing the type of drive motors, a new set of parameters must be input in the control device. In this case, reprogram the control device after replacing the motors (see page 144, see page 152 ff.).

Removing the drive wheel swing arm and drive motor

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

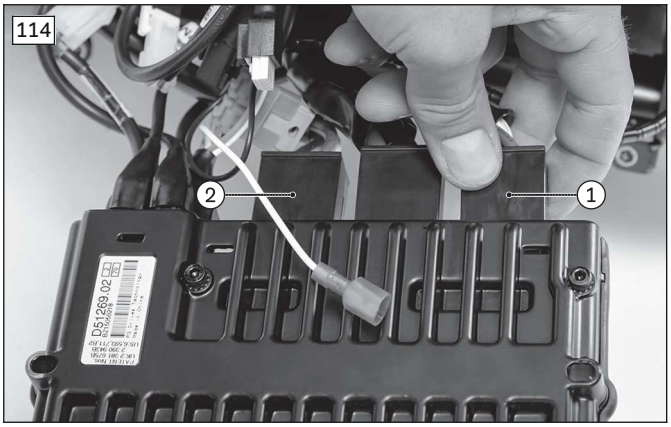
> **Tools:** hexagon key, size 5, 6; torque wrench with socket wrench insert, size 5, 6

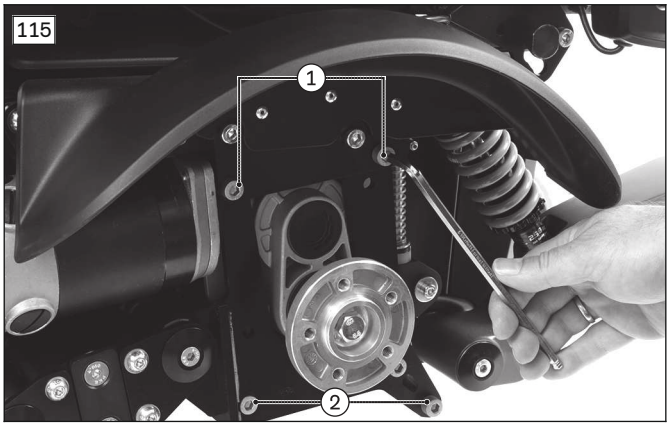
1) Remove the drive wheel (see page 48).
2) Remove the rear cover (see page 19).
3) **If necessary:** Remove the controller (see page 25).
4) Disconnect the motor cable from the controller (see fig. 114, item 1: right motor, item 2: left motor).
5) Remove the drive wheel splash guard (see page 55).
6) Remove the drive wheel suspension system (see page 56).
7) **INFORMATION: Note the installed position of the motor cable (S-shape, see fig. 120).**
Loosen the cable attachment of the motor cable on the suspension axle (see fig. 116, item 1).
8) Loosen and remove the screw with fixing washer on the drive wheel swing arm axle (see fig. 117, item 1).
9) Loosen and remove the 2 screws with 1 washer each next to the drive wheel swing arm axle (see fig. 117, item 2).
10) Carefully remove the plate from the Torsion Drive system (see fig. 118, item 1).
11) Reinstall the 2 screws with 1 washer each (see fig. 119, item 1).
12) **INFORMATION: Note the installed position of the spacer washer on the axle. The installed position of the spacer washer depends on the installed drive motor (see page 61).**
Pull the drive wheel swing arm with spacer washer down and off the axle (see fig. 119).
13) Loosen the cable attachment of the motor cable on the drive wheel swing arm (see fig. 121, item 1).
14) Loosen and remove the 4 upper screws of the drive wheel swing arm (see fig. 122, item 1).
15) **INFORMATION: Note the installed position of the spring connection with spacer plate (see fig. 122, item 2). The installed position of the spring connection depends on the installed drive motor (see page 61).**
Remove the spring connection from the drive wheel swing arm (see fig. 122, item 2).
16) Loosen and remove the 2 lower screws between the drive motor and drive wheel swing arm (see fig. 123, item 1).
17) Remove the drive wheel swing arm (see fig. 123, item 2).

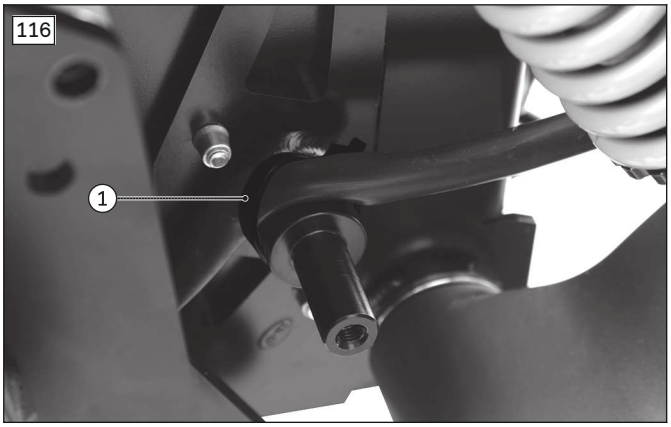
18) Remove the drive motor with the motor cable (see fig. 123, item 3).

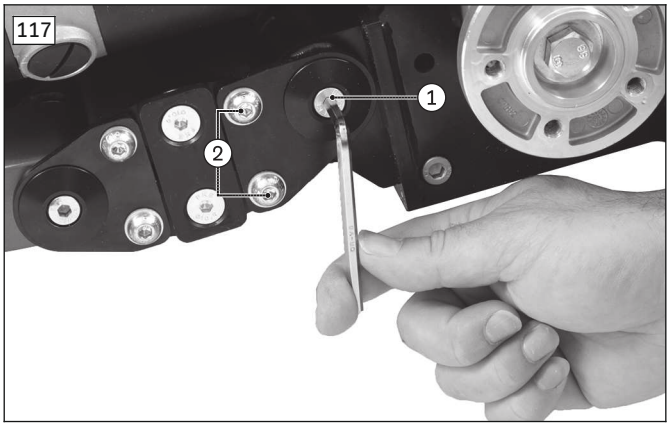
Installing the drive wheel swing arm and drive motor

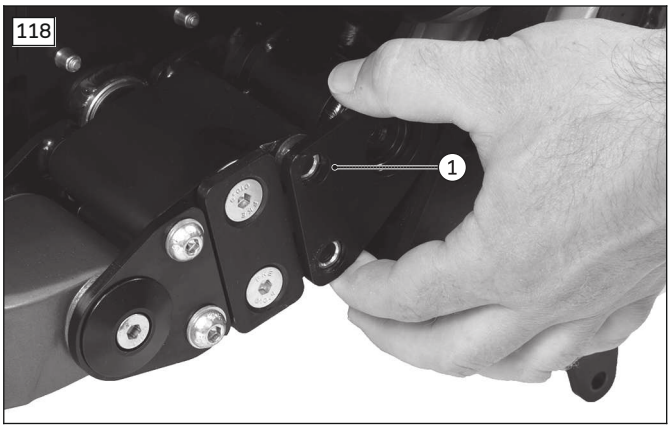
1) Insert the drive motor into the drive wheel swing arm (see fig. 123, item 2 – 3).
2) Insert the 2 lower screws between the drive motor and drive wheel swing arm and slightly tighten them (see fig. 123, item 1).
3) Set the spring connection onto the drive wheel swing arm (see fig. 122, item 2).
   INFORMATION: The installed position of the spring connection depends on the installed drive motor (see page 61). If necessary, replace the left and right spring connections to change the installed position.
4) Insert the 4 upper screws of the drive wheel swing arm and firmly tighten them to **20 Nm** (see fig. 122, item 1).
5) Attach the motor cable to the drive wheel swing arm (see fig. 121, item 1).
6) Slide the drive wheel swing arm with spacer washer onto the axle (see fig. 119).
   INFORMATION: The installed position of the spacer washer depends on the installed drive motor (see page 61).
7) Loosen and remove the 2 screws with 1 washer each next to the drive wheel swing arm axle (see fig. 119, item 1).
8) Slide the plate onto the Torsion Drive system and axle (see fig. 118, item 1).
9) Insert the 2 screws with 1 washer each next to the drive wheel swing arm axle and firmly tighten them to **15 Nm** (see fig. 117, item 2).
10) Insert the screw with fixing washer into the axle and firmly tighten it to **15 Nm** (see fig. 117, item 1).
11) Position the motor cable according to its original installed position (S-shape, see fig. 120). To do so, attach the motor cable to the suspension axle (see fig. 116, item 1).
12) Install the drive wheel suspension system (see page 56).
13) Insert the 2 lower screws between the drive motor and drive wheel swing arm and firmly tighten them to **25 Nm** (see fig. 115, item 2).
14) Attach the drive wheel splash guard (see page 55).
15) Connect the motor cable to the controller (see fig. 114, item 1: right motor, item 2: left motor).
16) **If necessary:** Attach the controller (see page 25).
17) Attach the rear cover (see page 19).
18) Attach the drive wheel (see page 48).
19) **If the type of drive motors has been changed:** Reprogram the control device (see page 144, see page 152 ff.).

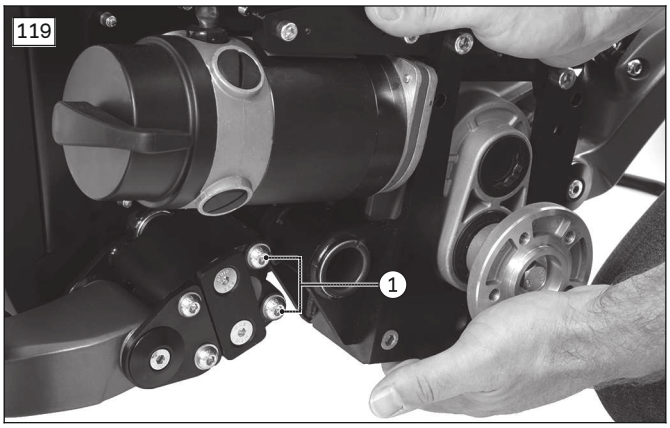


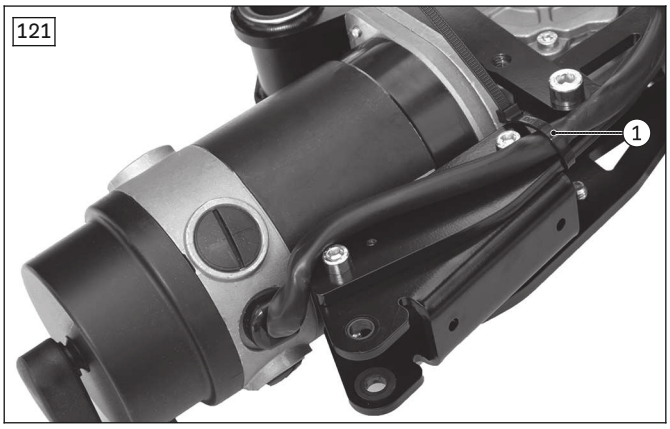


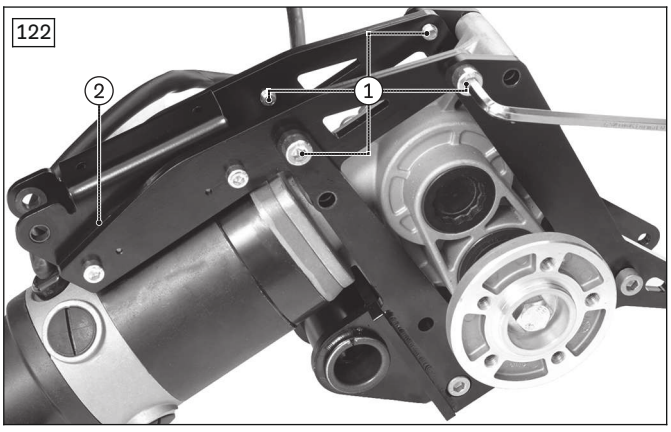


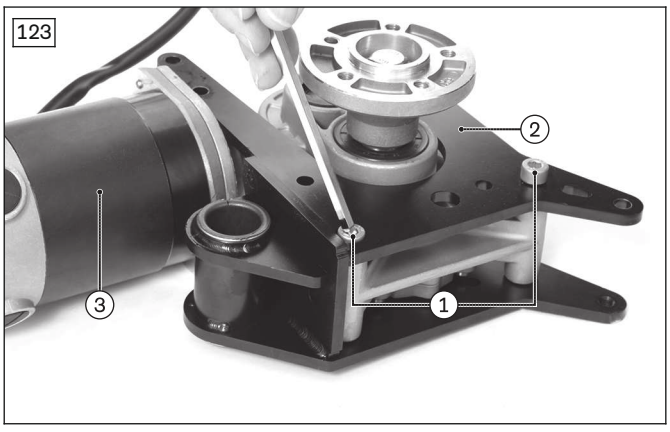












Removing the drive motor (MWD-R)

1) Loosen and remove the screws with fixing washers (see fig. 124, item 1).
2) Remove the connecting plate (see fig. 124, item 2).

3) Loosen the screws and remove the drive wheel splash guard (see fig. 125, item 1).
4) Loosen and remove the screw with washer on the axle of the suspension (see fig. 125, item 2).
5) Remove the drive wheel swing arm with the drive motor and the cross guide.
6) Loosen and remove the screws between the drive motor, drive wheel swing arm and cross guide (see fig. 126, item 1).
7) Remove the drive motor (see fig. 127, item 1) and the cross guide (see fig. 127, item 2) from the drive wheel swing arm (see fig. 127, item 3).

Installing the drive motor (MWD-R)

1) Insert the drive motor (see fig. 127, item 1) and the cross guide (see fig. 127, item 2) into the drive wheel swing arm (see fig. 127, item 3).
2) Insert the screws between the drive motor, drive wheel swing arm and cross guide and slightly tighten them (see fig. 126, item 1).
3) Insert the screw with washer on the axle of the suspension and tighten it to **12 Nm** (see fig. 125, item 2).
4) Attach the drive wheel splash guard.
5) Insert the connecting plate (see fig. 124, item 2). Tighten the screws with fixing washers to **15 Nm** (see fig. 124, item 1).

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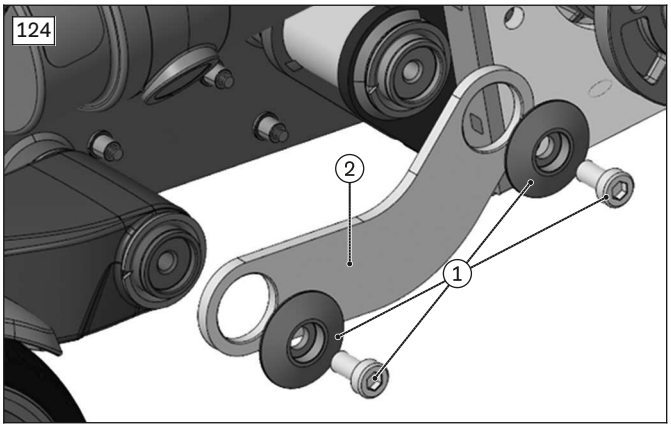

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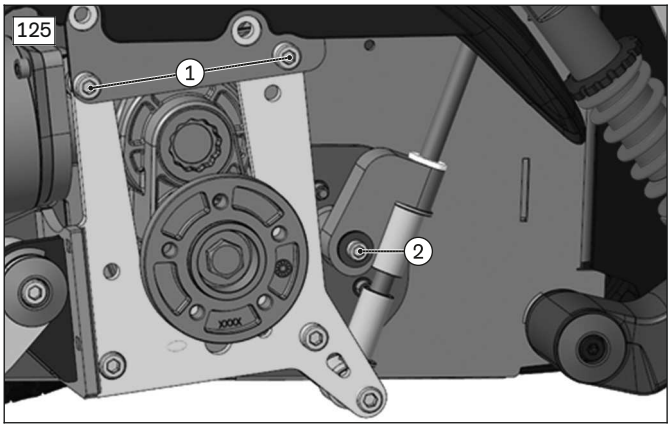

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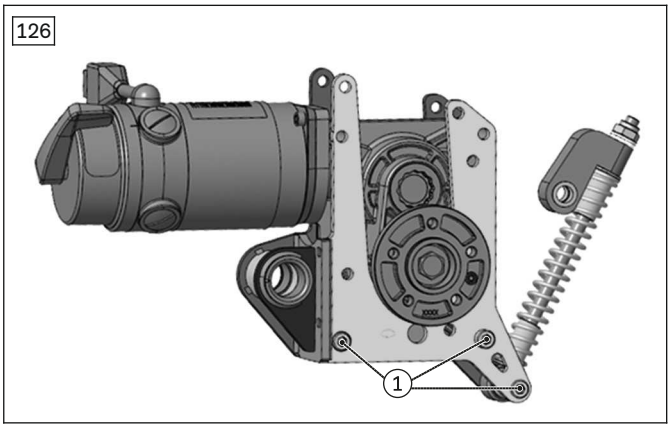

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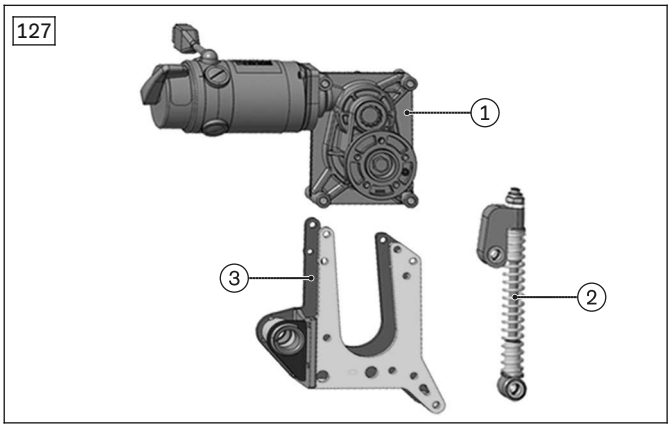
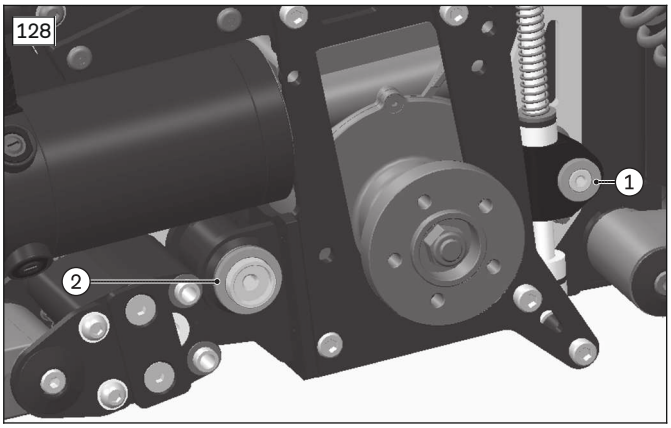


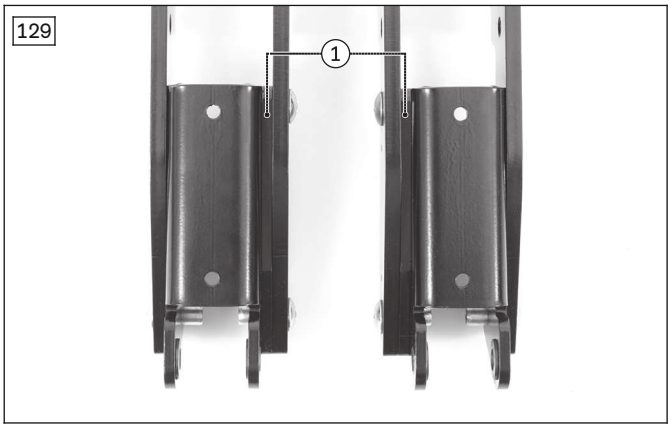
4.9.3.4 Installed position of the spacers on the drive

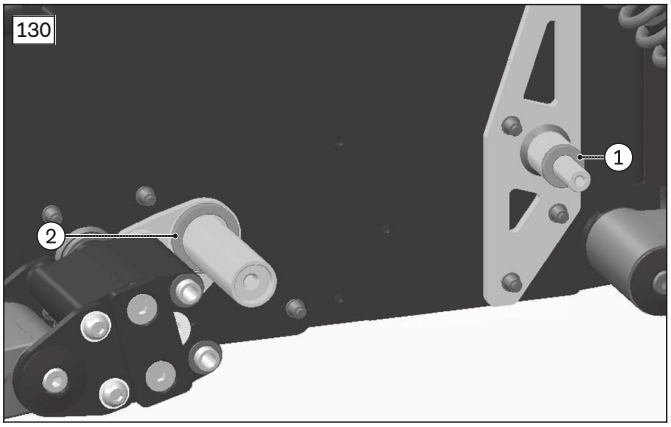
Drive motor type	**Spacer washer for drive wheel suspension system (replacement** see page 56**)** **Spacer washer for drive wheel swing arm (replacement** see page 58**)**	**Spring connection for drive wheel swing arm (replacement[1])see page 58)**
493T75=PK217/218 (Small diameter; red release lever)	on the outside of the suspension (see fig. 128, item 1) on the outside of the drive wheel swing arm (see fig. 128, item 2)	Spacer plates aligned to the inside (see fig. 129, item 1)
	between mobility base and suspen-	

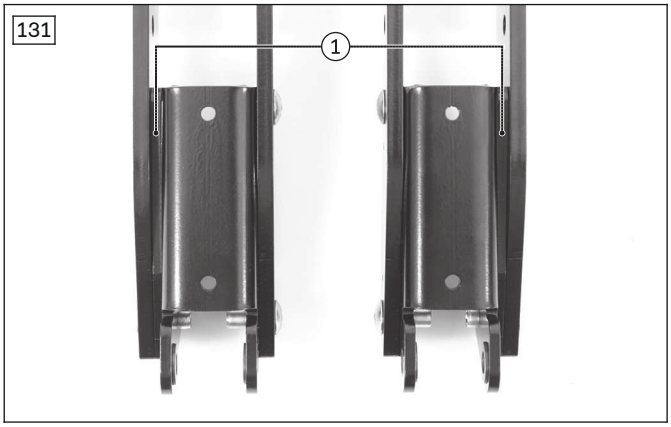
Drive motor type	**Spacer washer for drive wheel suspension system (replacement** see page 56**)** **Spacer washer for drive wheel swing arm (replacement** see page 58**)**	**Spring connection for drive wheel swing arm (replacement[1]see page 58)**
493T75=PK207/210/220 (Large diameter; grey or black/blue release lever)	sion (see fig. 130, item 1), between mobility base and drive wheel swing arm (see fig. 130, item 2)	Spacer plates aligned to the outside (see fig. 131, item 1)

[1] The spring connections are installed alternately to the right or left depending on the motor type.



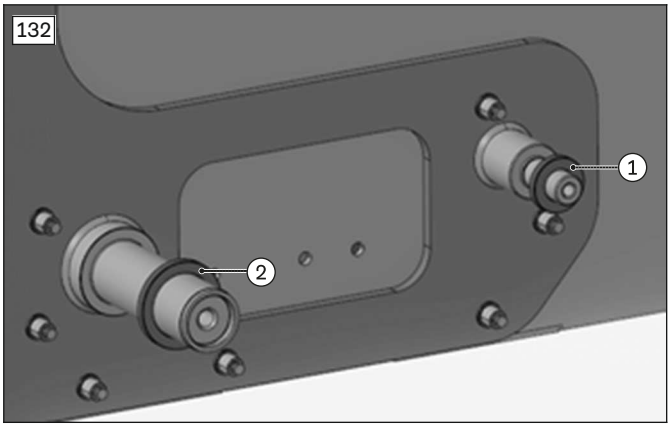


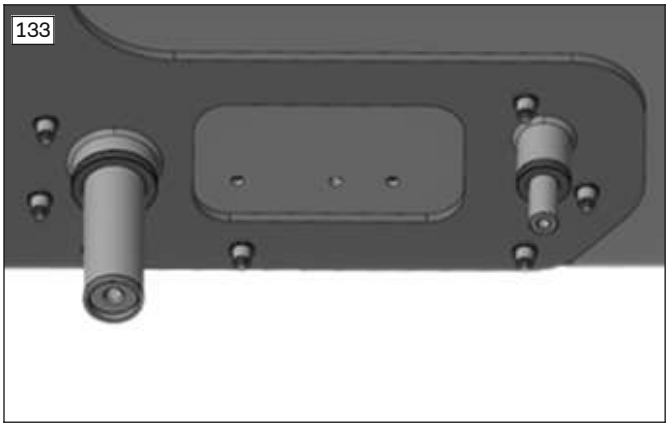




Installed position of the spacers on the drive (MWD-R)

Drive motor type	**Spacer washer for drive wheel suspension system (replacement** see page 56**)** **Spacer washer for drive wheel swing arm (replacement** see page 58**)**	**Spring connection for drive wheel swing arm (replacement see page 58)**
493T75=LK/RK227 Performance (linix) 493T75=PK220 Performance (Linix) 493T75=PK207 High performance (AMT Schmid)	Install the spacer washers of the cross guide (see fig. 132, item 1) and drive wheel swing arm (see fig. 132, item 2) inside	Spacer plates aligned to the inside (see fig. 133)





4.9.3.5 Replacing the carbon brush

Removing the carbon brush

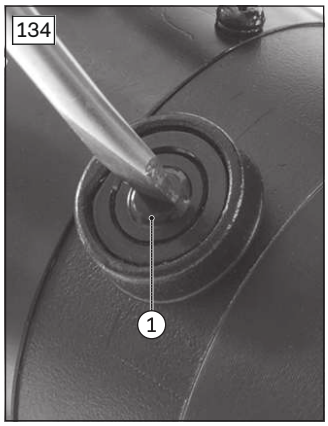
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

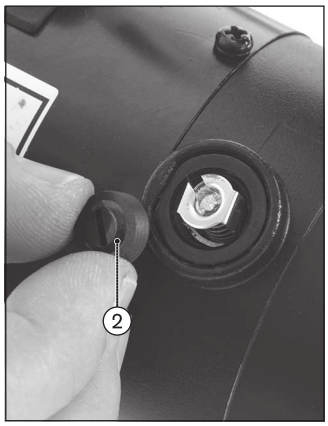
> **Tools:** Flat head screwdriver

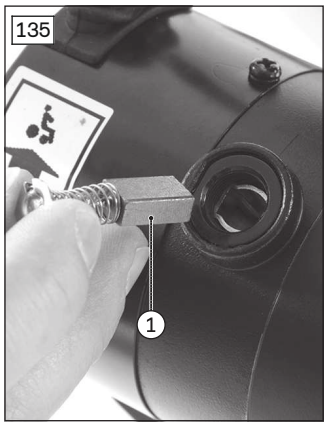
1) Loosen and remove the slotted screw on the brush cover (see fig. 134, item 1).
2) Remove the cover (see fig. 134, item 2).
   → The carbon brush is now exposed.
3) Remove and replace the carbon brush (see fig. 135, item 1).

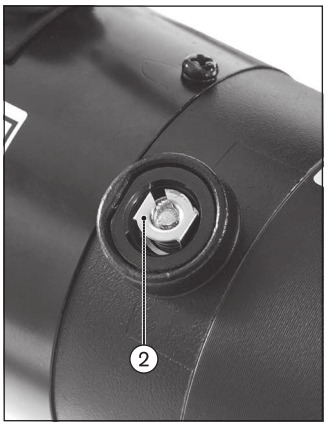
Installing the carbon brush

1) Insert the carbon brush (see fig. 135, item 1). In doing so, make sure that the guides fit properly into the slots (see fig. 135, item 2).
2) Put on the cover (see fig. 134, item 2).
3) Insert and firmly tighten the slotted screw on the brush cover (see fig. 134, item 1).









4.10 Caster wheels

4.10.1 Replacing the cover cap sets

The cover cap set on both caster wheels consists of 3 cover caps each (see fig. 136).

Removing the cover caps

> **Tools:** Small flat head screwdriver

1) Carefully guide the flat head screwdriver under the edge of the cover cap (see fig. 137).
2) Use a slight levering motion to carefully pry out and remove the cover cap.

Installing the cover caps

1) Clean and check the cover cap and the cover cap attachment for damage.
2) Push the cover cap gently into the attachment and check to ensure it is securely in place.

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4.10.2 Replacing the caster wheel

INFORMATION

- ▶ When replacing the wheels, check the tyres on both sides to ensure the tread is even and sufficient.
- ▶ Replace both wheels when needed.

Removing the caster wheel

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** Small flat screwdriver; hexagon key, size 8; torque wrench with socket wrench insert, size 8; socket wrench, size 19

1) Pry out and remove the 2 cover caps on the ends of the caster wheel axle (see page 63).
2) Loosen and remove the screw on the caster wheel with its nut and 2 washers (see fig. 138, see fig. 139).
3) Remove the caster wheel with 1 washer.
4) **If needed:** Change the tyre (see page 77).

Installing the caster wheel

1) Position the caster wheel with 1 washer on the caster fork.
2) Insert the caster wheel screw with its nut and 2 washers and firmly tighten it (see fig. 138, see fig. 139).
3) Close the ends of the caster wheel axle with the 2 cover caps (see page 63).

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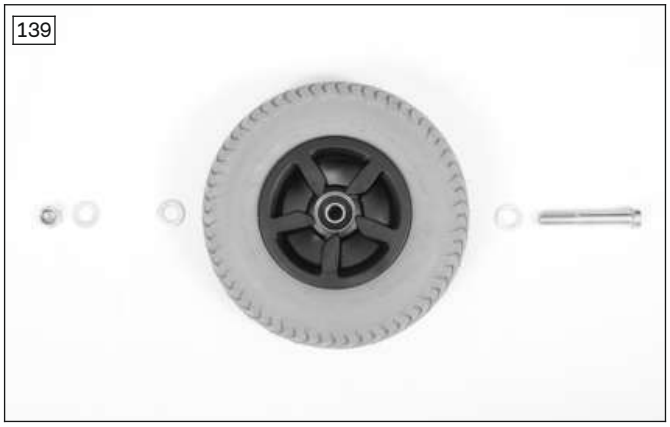

4.10.3 Replacing the caster wheel splash guard

Removing the caster wheel splash guard

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 4; torque wrench with socket wrench insert, size 4

1) Remove the caster wheel (see page 64).
2) Loosen and remove the 2 screws on the splash guard (see fig. 140, item 1).
INFORMATION: A wheelchair with mid-wheel drive MWD has caster wheels with a small splash guard. This splash guard is attached with only 1 screw and 1 washer (see fig. 141, item 1).
3) Remove the caster wheel splash guard.

Installing the caster wheel splash guard

1) Position the caster wheel splash guard on the caster fork from below.
2) Insert the 2 screws into the splash guard and firmly tighten them (see fig. 140, item 1).
INFORMATION: A wheelchair with mid-wheel drive MWD has caster wheels with a small splash guard. This splash guard is attached with only 1 screw and 1 washer (see fig. 141, item 1).
3) Attach the caster wheel (see page 64).

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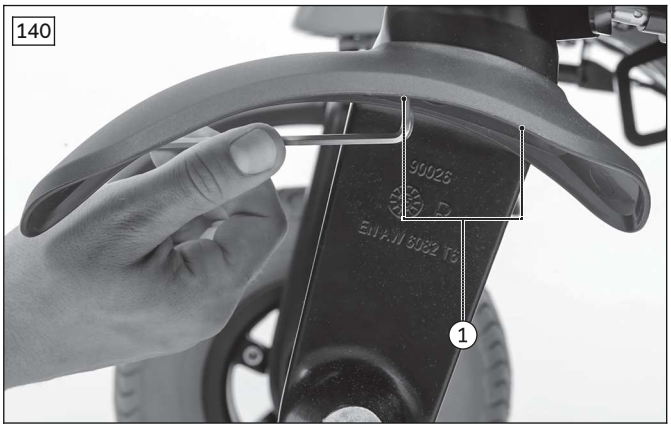

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4.10.4 Replacing the caster fork

Removing the caster fork

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

> **Tools:** small and medium flat screwdriver; hexagon key, size 5; torque wrench with socket wrench set, size 5

1) Remove the caster wheel (see page 64).
2) **Optional:** Remove the caster wheel splash guard (see page 65).
3) Pry out and remove the cover cap on the caster wheel swing arm (see fig. 142, item 1; see page 63).
4) **CAUTION! Pinching, crushing, blows due to loosened caster fork. Actively secure the caster fork against falling. Note the installed position of the screw connection and washers.**
Loosen and remove the screw of the caster fork with 1 friction washer, 1 washer and 1 Belleville spring washer (see fig. 142, see fig. 143, item 2).
5) Carefully pull the caster fork out of the caster wheel swing arm and set it aside in a safe place.
INFORMATION: The caster wheel bearings remain in the caster wheel swing arm. To replace the bearing set (see page 66).
6) **Optional:** Remove the sleeves of the track stabiliser from the caster fork (see fig. 143, item 3).
7) **Optional:** Remove the stopper of the caster wheel swivel lock from the caster fork (see fig. 143, item 4).

Installing the caster fork

1) **Optional:** Attach the stopper of the caster wheel swivel lock to the caster fork (see fig. 143, item 4).
2) **Optional:** Attach the sleeves of the track stabiliser to the caster fork (see fig. 143, item 3).
3) Carefully insert the caster fork into the caster wheel swing arm with the bearing set.
4) Position 1 friction washer, 1 washer and 1 Belleville spring washer on the caster fork according to their original installed position.
   INFORMATION: Position the friction washer on the caster fork such that the 2 brackets of the friction washer extend down into the axle of the caster fork.
5) Insert the screw into the caster fork and firmly tighten it to a torque of **1.1 Nm** (see fig. 142, item 2).
   INFORMATION: The caster wheel (without track stabiliser) may turn freely by no more than 180° when pushed.
6) Close the caster wheel swing arm with the cover cap (see fig. 142, item 1; see page 63).
7) **Optional:** Install the caster wheel splash guard (see page 65).
8) Attach the caster wheel (see page 64).

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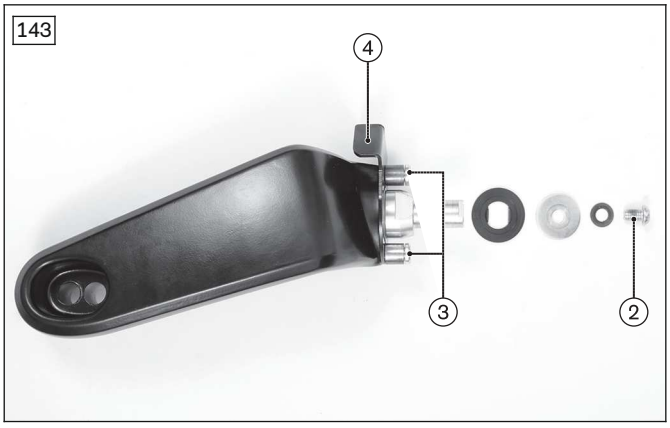

4.10.5 Replacing the caster wheel bearing set

Removing the caster wheel bearing set

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

1) Remove the caster wheel (see page 64).
2) Remove the caster fork with splash guard (optional) (see page 65).
3) **INFORMATION: Note the installed position of the bearings and bearing sleeve within the caster wheel swing arm.**
   Pull the bearing set (2 ball bearings and 1 bearing sleeve) out of the caster wheel swing arm and replace it (see fig. 144, item 1).
   INFORMATION: If a track stabiliser (optional) is installed, spread the clamps of the track stabiliser a bit in order to remove the lower ball bearing.

Installing the caster wheel bearing set

1) Press the bearing set (1 bearing sleeve and 2 ball bearings) into the caster wheel swing arm according to the original installed position (see fig. 144, item 1).
2) Install the caster fork with splash guard (optional) (see page 65).
3) Attach the caster wheel (see page 64).
   INFORMATION: If a track stabiliser (optional) is installed, spread the clamps of the track stabiliser a bit in order to insert the lower ball bearing.

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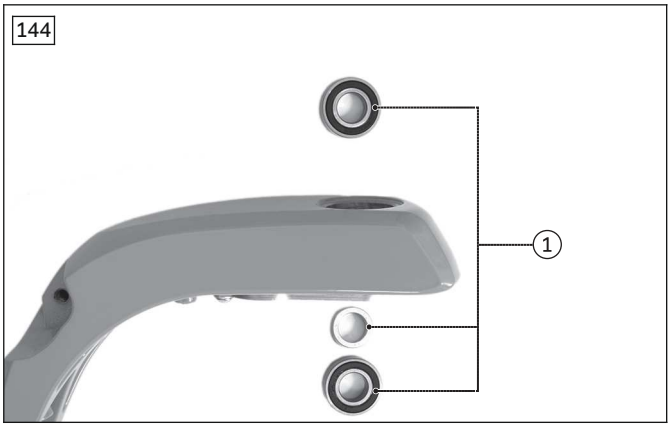

4.10.6 Replacing the caster wheel swing arm (rear-wheel drive RWD/front-wheel drive FWD)

4.10.6.1 Replacing the caster wheel swivel lock

INFORMATION

- The track stabiliser and caster wheel swivel lock use some of the same screw connections. Properly reattach the shared screw connections immediately after completing any necessary replacement.
- Always observe the instructions in both sections when replacing components.

Removing the caster wheel swivel lock

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** medium flat screwdriver, hexagon key, size 4; torque wrench with socket wrench insert, size 4

1) Remove the caster wheel (see page 64).
2) Remove the caster fork with splash guard (optional) (see page 65).
3) Loosen and remove the 2 screws on the bolt of the caster wheel swivel lock (see fig. 145, item 1).
4) Loosen and remove the Bowden cable mounting with 1 screw on the caster wheel swing arm (see fig. 145, item 2).
5) Remove the drive wheel (see page 48).
6) **If necessary:** Remove the drive wheel splash guard (see page 49).
7) Loosen and remove the 2 screws of the control panel with 1 washer each (see fig. 146, item 1).
8) Remove the control panel for the caster wheel swivel lock from the drive wheel splash guard (see fig. 146, item 2).
9) **INFORMATION: Note the installed position of the Bowden cables and Bowden cable mountings.**
   Remove the caster wheel swivel lock with the Bowden cables. Remove additional Bowden cable mountings and covers if necessary (see page 18 ff.).
10) Loosen and remove the 2 screws on the stopper of the caster wheel swivel lock (see fig. 147, see fig. 148, item 1).
    INFORMATION: If a track stabiliser (optional) is installed, the stopper is attached with 2 slotted screws and sleeves (see fig. 150, item 1).
11) Remove the stopper of the caster wheel swivel lock from the caster fork (see fig. 147, see fig. 148, item 2).

Installing the caster wheel swivel lock

1) Position the stopper of the caster wheel swivel lock on the caster fork (see fig. 147, see fig. 148, item 2).
2) Insert the 2 screws into the stopper of the caster wheel swivel lock and firmly tighten them (see fig. 147, see fig. 148, item 1).
   INFORMATION: If a track stabiliser (optional) is installed, attach the stopper with 2 slotted screws and sleeves (see fig. 150, item 1).
3) Position the control panel for the caster wheel swivel lock on the drive wheel splash guard (see fig. 146, item 2).
4) Insert the 2 screws of the control panel with 1 washer each and firmly tighten them (see fig. 146, item 1).

5) **If necessary:** Attach the drive wheel splash guard (see page 49).
6) Attach the drive wheel (see page 48).
7) Position the Bowden cables with the bolt for the caster wheel swivel lock according to their original installed position. Attach the loosened Bowden cable mountings and covers (see page 18 ff).
8) Insert the 2 screws of the bolt of the caster wheel swivel lock and firmly tighten them (see fig. 145, item 1).
9) Insert the Bowden cable mounting with 1 screw into the caster wheel swing arm and firmly tighten it (see fig. 145, item 2).
10) Install the caster fork with splash guard (optional) (see page 65).
11) Attach the caster wheel (see page 64).

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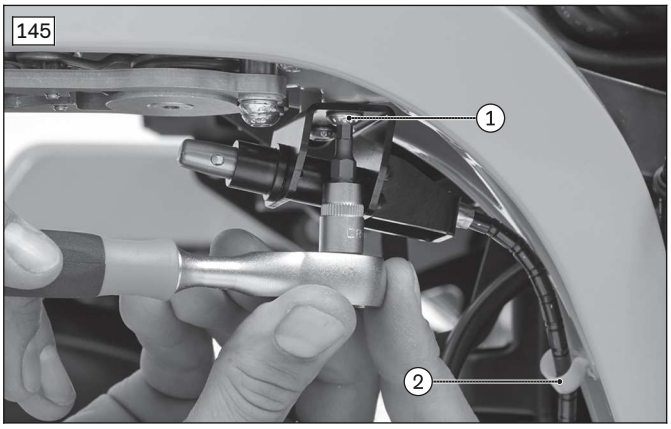

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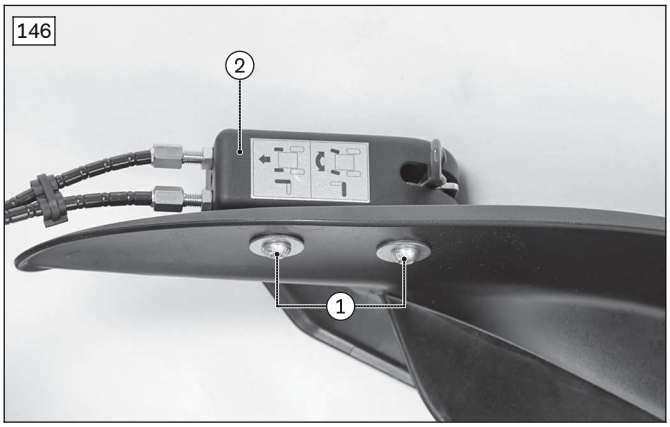

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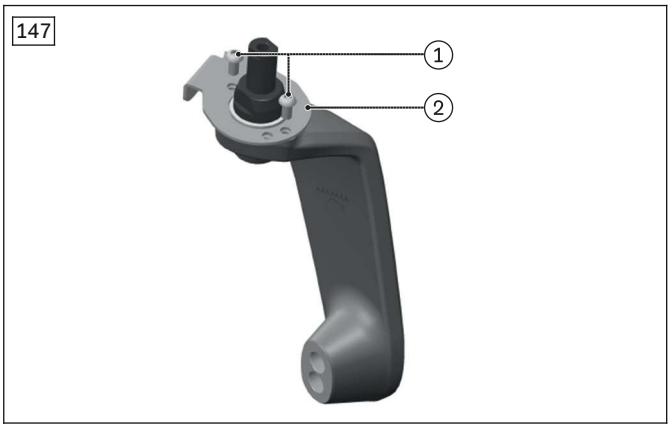

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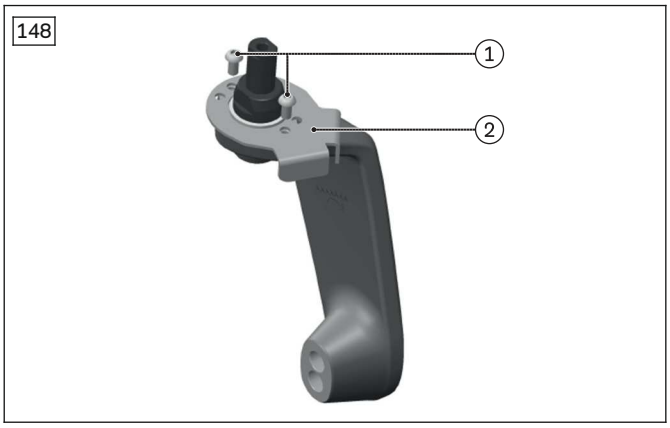

4.10.6.2 Replacing the track stabiliser

INFORMATION

- The track stabiliser and caster wheel swivel lock use some of the same screw connections. Properly reattach the shared screw connections immediately after completing any necessary replacement.
- Always observe the instructions in both sections when replacing components.

Removing the track stabiliser

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).
> **Tools:** medium flat screwdriver; hexagon key,size 4; torque wrench with socket wrench insert, size 4

1) Remove the caster wheel (see page 64).
2) Remove the caster fork with splash guard (optional) (see page 65).
3) **If necessary:** Remove the bearing set (see page 66).
4) **Optional:** Remove the bolt of the caster wheel swivel lock from the caster wheel swing arm (see fig. 145; see page 67).

5) **CAUTION! Pinching, crushing, blows due to tensioned springs. Secure the components of the track stabiliser against popping out.**
Loosen and remove the 2 screws from the track stabiliser and caster wheel swing arm (see fig. 149, item 1).
6) Carefully remove the track stabiliser with its clamps and springs and set it aside in a safe place.
7) Loosen and remove the 2 slotted screws with 1 sleeve and 1 washer (optional) each on the caster fork (see fig. 150, item 1).
INFORMATION: If a caster wheel swivel lock is installed, there are no washers under the sleeves.

Installing the track stabiliser

1) Position the 2 slotted screws with 1 sleeve and 1 washer (optional) each on the caster fork and firmly tighten them (see fig. 150, item 1).
INFORMATION: If a caster wheel swivel lock is installed, the washers are omitted and are replaced by the stopper of the caster wheel swivel lock (see fig. 150, item 2).
2) Carefully insert the track stabiliser with its clamps and springs into the caster wheel swing arm.
INFORMATION: In doing so, tension the spring by placing the spring ends around the sliding bushings of the clamps from the outside (see fig. 149, item 2).
3) Insert the 2 screws into the track stabiliser and caster wheel swing arm and firmly tighten them (see fig. 149, item 1).
4) **Optional:** Attach the bolt of the caster wheel swivel lock to the caster wheel swing arm (see fig. 145; see page 67).
5) **If necessary:** Install the bearing set (see page 66).
6) Install the caster fork with splash guard (optional) (see page 65).
7) Attach the caster wheel (see page 64).

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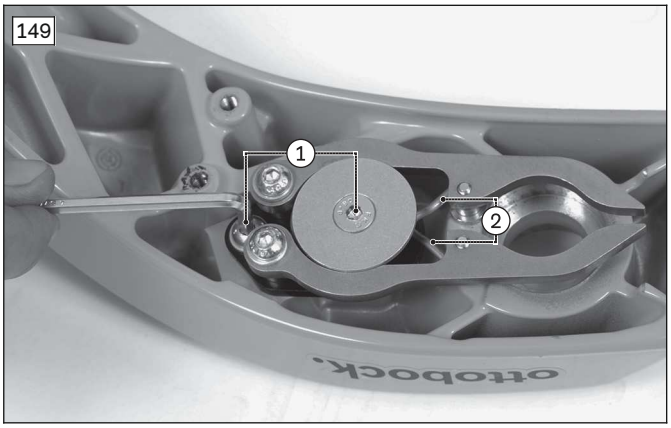

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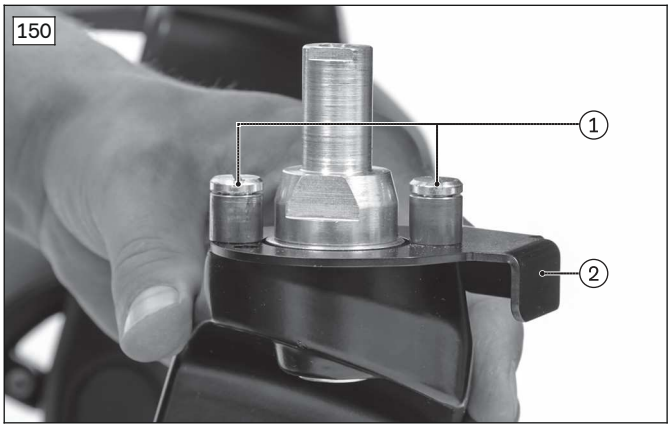


4.10.6.3 Replacing the suspension for the caster wheel swing arm

NOTICE

Incorrect dimensioning of the suspensions

Damage to the suspensions and the product

► The suspensions must be matched to the weight of the user and the total weight of the wheelchair. Check whether the selected suspension types (spring stiffness) are permissible for the new configuration (see page 78). For further information, please contact your national Ottobock team.

Removing the suspension for the caster wheel swing arm

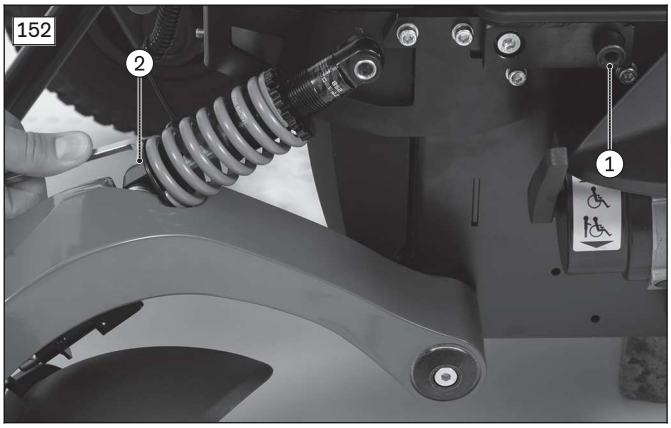
> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair so there is a clearance of at least **10 cm** under the wheels (see page 15).
> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6; socket wrench extension

1) Loosen and remove the screw between the suspension and drive unit bracket with 1 washer (see fig. 151).
2) Lower the caster wheel swing arm and remove 1 spacer sleeve from the drive unit bracket (see fig. 152, item 1).

3) **INFORMATION: Note the installed position of the 2 washers on the suspension.**
Loosen and remove the screw with 2 washers between the suspension and caster wheel swing arm (see fig. 152, item 2).
4) Remove the suspension.

Installing the suspension for the caster wheel swing arm

1) Position the suspension with 2 washers according to the original installed position on the caster wheel swing arm.
2) Insert the screw between the suspension and caster wheel swing arm and firmly tighten it to **25 Nm** (see fig. 152, item 2).
3) Insert the spacer sleeve into the drive unit bracket (see fig. 152, item 1) and swivel the caster wheel swing arm upwards until the bearing eye of the suspension comes to rest against the spacer sleeve.
4) Insert the screw between the suspension and drive unit bracket with 1 washer and firmly tighten it to **25 Nm** (see fig. 151).
5) Adjust the suspension of the caster wheel swing arms equally on both sides (see page 78).



4.10.6.4 Replacing rigid elements of the caster wheel swing arm

Removing the rigid elements of the caster wheel swing arm

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).
> **Tools:** hexagon key, size 5; torque wrench with socket wrench insert, size 5; socket wrench extension

1) Loosen and remove the screw between the rigid element and caster wheel swing arm (see fig. 153).
2) Lower the caster wheel swing arm.
3) Loosen and remove the 2 screws between the rigid element and frame (see fig. 154, item 1).
4) Remove the rigid element.

Installing the rigid elements of the caster wheel swing arm

1) Position the rigid element on the frame.
2) Insert the 2 screws between the rigid element and the frame and firmly tighten them to **25 Nm** (see fig. 154, item 1).
3) Swivel the caster wheel swing arm upwards until it is lying against the rigid element.
4) Insert the screw between the rigid element and caster wheel swing arm and firmly tighten it to **25 Nm** (see fig. 153).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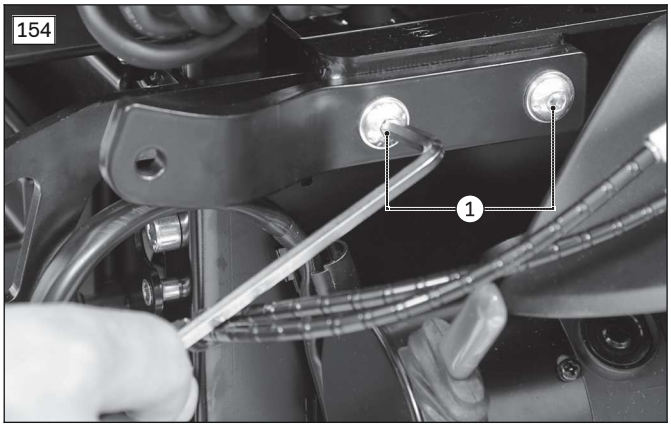

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4.10.6.5 Replacing the caster wheel swing arm

Removing the caster wheel swing arm

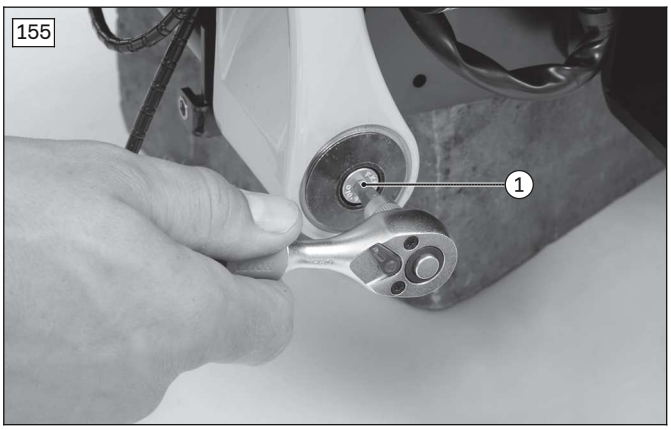
> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair so there is a clearance of at least **10 cm** under the wheels (see page 15).

> **Tools:** hexagon key, size 5; torque wrench with socket wrench insert, size 5; socket wrench extension

1) Remove the caster wheel (see page 64).
2) Remove the caster fork with splash guard (optional) (see page 65).
3) **Optional:** Remove the caster wheel swivel lock from the caster wheel swing arm (see page 67).
4) **Optional:** Remove the track stabiliser from the caster wheel swing arm (see page 68).
5) Loosen the caster wheel swing arm from the suspension / rigid element (see page 69 ff.).
6) Loosen and remove the screw with fixing washer on the axle (see fig. 155, item 1).
7) Pull the caster wheel swing arm down and off the axle.

Installing the caster wheel swing arm

1) Slide the caster wheel swing arm onto the axle.
2) Insert the screw with fixing washer into the axle and firmly tighten it to **15 Nm** (see fig. 155, item 1).
3) Attach the caster wheel swing arm to the suspension / rigid element (see page 69 ff.).
4) **Optional:** Attach the track stabiliser to the caster wheel swing arm (see page 68).
5) **Optional:** Attach the caster wheel swivel lock to the caster wheel swing arm (see page 67).
6) Install the caster fork with splash guard (optional) (see page 65).
7) Attach the caster wheel (see page 64).



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4.10.7 Replacing the caster wheel and stabilising wheel swing arm (mid-wheel drive MWD)

4.10.7.1 Replacing the suspension for the caster wheel swing arm

NOTICE

Incorrect dimensioning of the suspensions

Damage to the suspensions and the product

► Only replace the suspensions with approved suspensions of the same type (see page 78).

Removing the suspension for the caster wheel swing arm

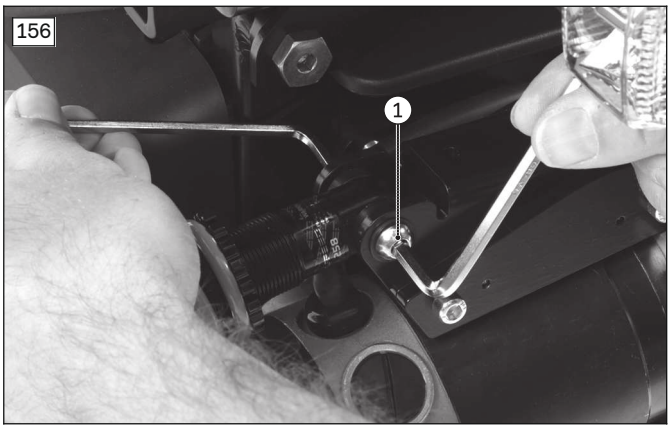
> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** 2 x hexagon key, size 5; hexagon key, size 6; torque wrench with socket wrench insert, size 5, 6

1) Remove the drive wheel (see page 48).
2) Remove the drive wheel splash guard (see page 55).
3) Loosen and remove the screw with sleeve nut and Belleville spring washer between the drive wheel swing arm and caster wheel swing arm suspension (see fig. 156, item 1).
4) Carefully and slowly guide the caster wheel swing arm and drive wheel swing arm downwards.
5) **INFORMATION: Note the installed position of the 2 washers on the suspension.**
   Loosen and remove the screw with 2 washers between the suspension and caster wheel swing arm (see fig. 157, item 1).
6) Remove the caster wheel swing arm suspension.

Installing the suspension for the caster wheel swing arm

1) Position the suspension with 2 washers according to the original installed position on the caster wheel swing arm.
2) Insert the screw between the suspension and caster wheel swing arm and firmly tighten it to **25 Nm** (see fig. 157, item 1).
3) Carefully guide the caster wheel swing arm and drive wheel swing arm upwards.
4) Insert the screw with sleeve nut and Belleville spring washer between the drive wheel swing arm and caster wheel swing arm suspension and firmly tighten it to **15 Nm** (see fig. 156, item 1).
5) Attach the drive wheel splash guard (see page 55).
6) Attach the drive wheel (see page 48).
7) Adjust the suspension of the caster wheel swing arms equally on both sides (see page 78).



Removing the suspension for the caster wheel swing arm (MWD-R)

1) Loosen the screw with sleeve nut and Belleville spring washer between the plate adapter and caster wheel swing arm suspension (see fig. 158, item 1) and remove it together with the spacer (see fig. 158, item 2).
2) Carefully and slowly guide the caster wheel swing arm and drive wheel swing arm downwards.

3) **INFORMATION: Note the installed position of the 2 washers on the suspension.**
Loosen and remove the screw (see fig. 159, item 1) with 2 washers (see fig. 159, item 2) between the suspension and caster wheel swing arm.
4) Remove the suspension.

Installing the suspension for the caster wheel swing arm (MWD-R)

1) **INFORMATION: Note the alignment of the caster wheel swing arm suspension.**
The rotary knob for adjusting the rebound is located on the upper attachment point (see fig. 160, see fig. 161, item 1).
2) Position the suspension with 2 washers according to the original installed position on the caster wheel swing arm.
3) Insert the screw with two washers between the suspension and caster wheel swing arm and tighten it to **25 Nm** (see fig. 159, item 1).
4) Carefully guide the caster wheel swing arm and drive wheel swing arm upwards.
5) Insert the screw with sleeve nut and Belleville spring washer together with the spacer between the plate adapter and caster wheel swing arm suspension and tighten it to **15 Nm** (see fig. 158, item 1).

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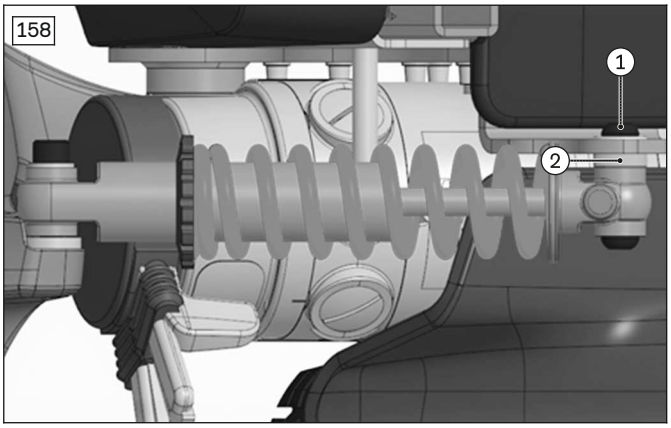

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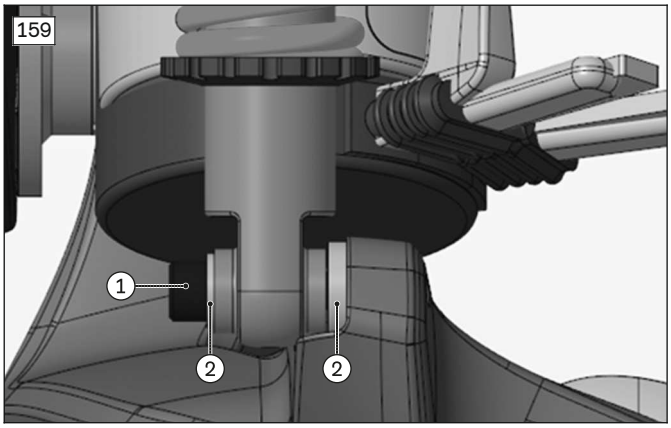

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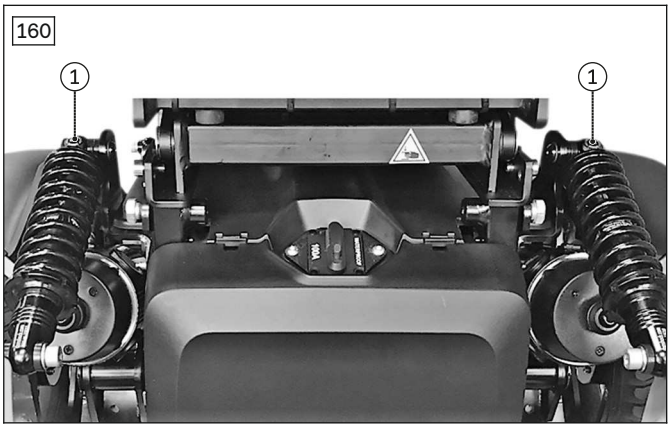

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4.10.7.2 Replacing the stabilising wheel swing arm suspension

NOTICE

Incorrect dimensioning of the suspensions

Damage to the suspensions and the product

► Only replace the suspensions with approved suspensions of the same type (see page 78).

Removing the stabilising wheel swing arm suspension

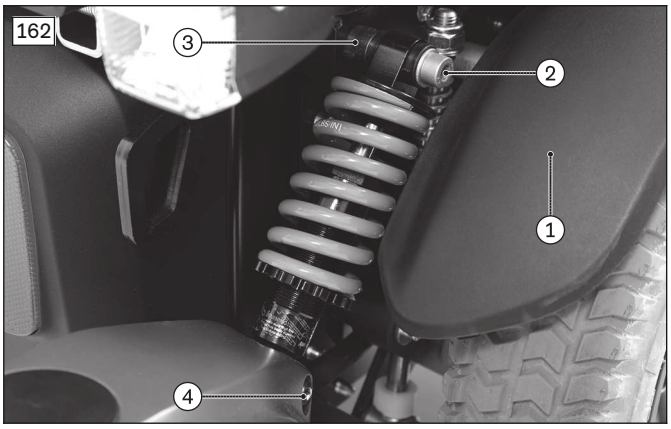
> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

> **Tools:** 2 x hexagon key, size 5; hexagon key, size 6; torque wrench with socket wrench insert, size 5, 6

1) **For mobility base size 1:** Remove the drive wheel (see page 48).
2) **For mobility base size 1:** Remove the drive wheel splash guard (see fig. 162, item 1; see page 55).
3) Loosen and remove the screw between the suspension and drive unit bracket with 1 washer (see fig. 162, item 2).
4) Lower the stabilising wheel swing arm and remove 1 spacer sleeve from the drive unit bracket (see fig. 162, item 3).
5) Loosen and remove the screw with sleeve nut between the stabilising wheel swing arm and suspension (see fig. 162, item 4).
6) Remove the stabilising wheel swing arm suspension.

Installing the stabilising wheel swing arm suspension

1) Insert the screw with sleeve nut between the stabilising wheel swing arm and suspension and firmly tighten it to **15 Nm** (see fig. 162, item 4).
2) Insert the spacer sleeve into the drive unit bracket (see fig. 162, item 3) and swivel the stabilising wheel swing arm upwards until the bearing eye of the suspension comes to rest against the spacer sleeve.
3) Insert the screw between the suspension and drive unit bracket with 1 washer and firmly tighten it to **25 Nm** (see fig. 162, item 2).
4) **For mobility base size 1:** Attach the drive wheel splash guard (see fig. 162, item 1; see page 55).
5) **For mobility base size 1:** Attach the drive wheel (see page 48).
6) Adjust the suspension of the stabilising wheel swing arms equally on both sides (see page 78).



Removing the stabilising wheel swing arm suspension (MWD-R)

1) Loosen and remove the screw between the suspension and drive unit bracket with 1 washer (see fig. 163, item 1).
2) Lower the stabilising wheel swing arm and remove 1 spacer sleeve from the drive unit bracket (see fig. 163, item 2).
3) Loosen and remove the screw with sleeve nut between the stabilising wheel swing arm and suspension (see fig. 163, item 3).
4) Remove the suspension.

Installing the stabilising wheel swing arm suspension (MWD-R)

1) **INFORMATION: Note the alignment of the stabilising wheel swing arm suspension.**
The rotary knob for adjusting the rebound is located on the lower attachment point (see fig. 164, see fig. 165, item 1).
2) Insert the screw with sleeve nut between the stabilising wheel swing arm and suspension and tighten it to **15 Nm** (see fig. 163, item 3).

3) Insert the spacer sleeve into the drive unit bracket (see fig. 163, item 2) and swivel the stabilising wheel swing arm upwards until the bearing eye of the suspension comes to rest against the spacer sleeve.
4) Insert the screw between the suspension and drive unit bracket with 1 washer and tighten it to **25 Nm** (see fig. 163, item 1)

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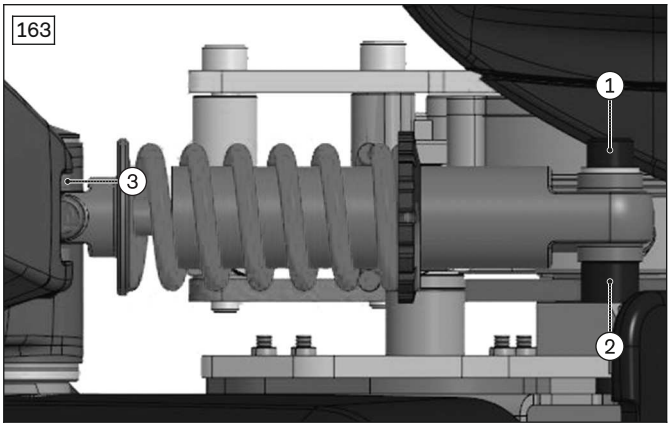

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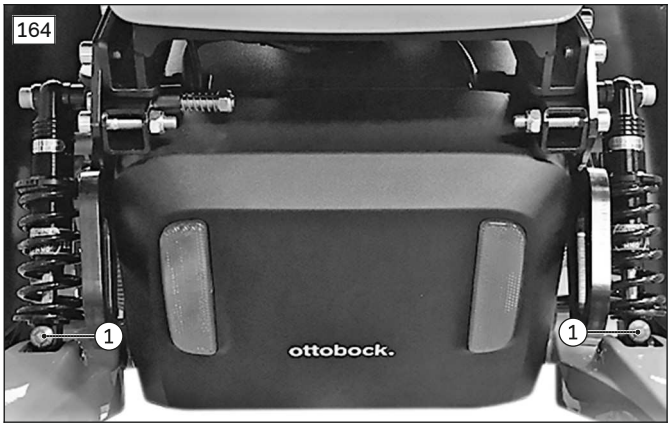

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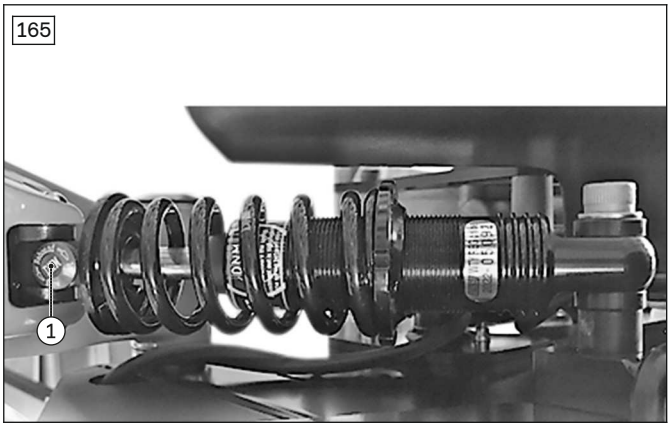


4.10.7.3 Replacing the caster wheel swing arm

Removing the caster wheel swing arm

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

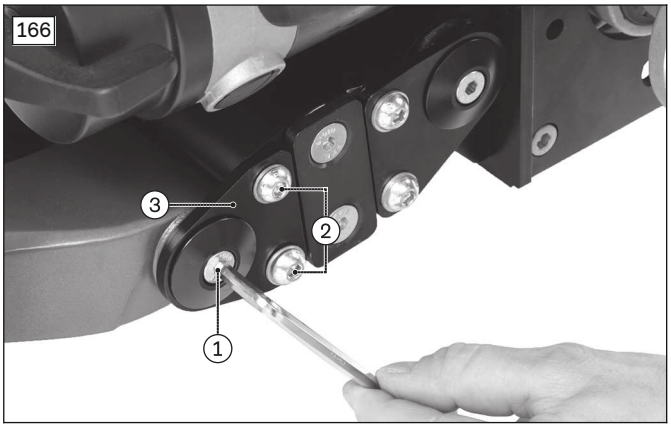
> **Tools:** hexagon key, size 5; torque wrench with socket wrench insert, size 5; socket wrench extension

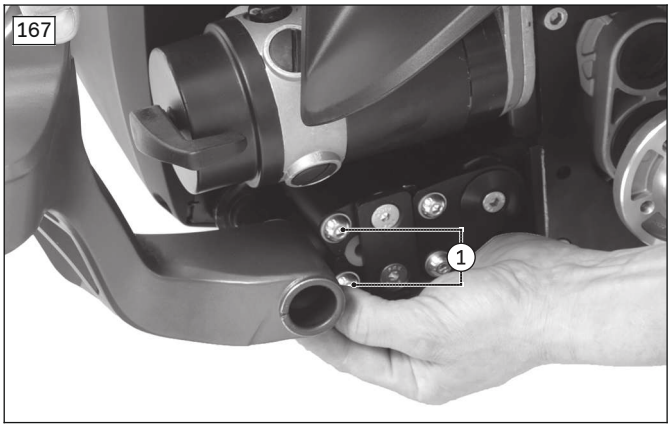
1) Remove the drive wheel (see page 48).
2) Remove the caster wheel (see page 64).
3) Remove the caster fork with splash guard (optional) (see page 65).
4) Loosen the caster wheel swing arm from the suspension (see page 72).
5) Loosen and remove the screw with fixing washer on the caster wheel swing arm axle (see fig. 166, item 1).
6) Loosen and remove the 2 screws with 1 washer each next to the caster wheel swing arm axle (see fig. 166, item 2).
7) Carefully remove the plate from the Torsion Drive system (see fig. 166, item 3).
8) Reinstall the 2 screws with 1 washer each (see fig. 167, item 1).
9) Pull the caster wheel swing arm down and off the axle (see fig. 167).

Installing the caster wheel swing arm

1) Slide the caster wheel swing arm onto the axle (see fig. 167).
2) Loosen and remove the 2 screws with 1 washer each next to the caster wheel swing arm axle (see fig. 167, item 1).
3) Slide the plate onto the Torsion Drive system and axle (see fig. 166, item 3).

4) Insert the 2 screws with 1 washer each next to the caster wheel swing arm axle and firmly tighten them to **15 Nm** (see fig. 166, item 2).
5) Insert the screw with fixing washer into the axle and firmly tighten it to **15 Nm** (see fig. 166, item 1).
6) Attach the caster wheel swing arm to the suspension (see page 72).
7) Install the caster fork with splash guard (optional) (see page 65).
8) Attach the caster wheel (see page 64).
9) Attach the drive wheel (see page 48).





4.10.7.4 Replacing the stabilising wheel swing arm

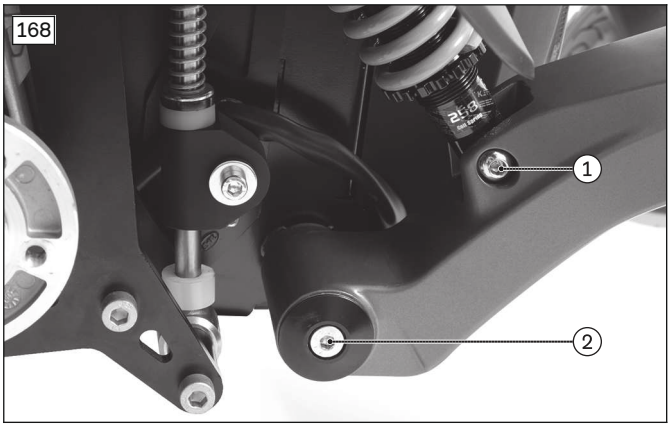
Removing the stabilising wheel swing arm

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).
> **Tools:** hexagon key, size 5; torque wrench with socket wrench insert, size 5; socket wrench extension

1) **For mobility base size 1:** Remove the drive wheel (see page 48).
2) Remove the caster wheel (see page 64).
3) Remove the caster fork with splash guard (optional) (see page 65).
4) Loosen the stabilising wheel swing arm from the suspension (see fig. 168, item 1; see page 73).
5) Loosen and remove the screw with fixing washer on the axle (see fig. 168, item 2).
6) Pull the stabilising wheel swing arm down and off the axle.

Installing the stabilising wheel swing arm

1) Slide the stabilising wheel swing arm onto the axle.
2) Insert the screw with fixing washer into the axle and firmly tighten it to **15 Nm** (see fig. 168, item 2).
3) Attach the stabilising wheel swing arm to the suspension (see fig. 168, item 1; see page 73).
4) Install the caster fork with splash guard (optional) (see page 65).
5) Attach the caster wheel (see page 64).
6) **For mobility base size 1:** Attach the drive wheel (see page 48).



4.10.7.5 Replacing the Torsion Drive system

NOTICE

Improper removal of the Torsion Drive system

Damage to product and loss of functionality due to incorrect installation

- ► Do not attempt to remove, replace or open the Torsion Drive system.
- ► Make sure that the Torsion Drive system does not slip off its axle and that all sleeves remain in the Torsion Drive system.

The Torsion Drive system is maintenance-free when used as intended and provided the environmental conditions are observed. Currently, a replacement and change to the damping characteristics (e.g. for sports, comfort) may only be carried out by Ottobock.

4.11 Changing tyres

⚠ CAUTION

Improper tyre replacement

Injuries to the user due to incorrect assembly, product damage

- ► No person is permitted to sit in the wheelchair during tyre replacement.
- ► Before removing a wheel, support the product so it cannot tip over.
- ► Always replace the tyres in pairs. Two tyres with different wear patterns affect the directional stability of the wheelchair.

Removing the tyres

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 5, 6; torque wrench with socket wrench insert, size 5, 6; **Optional:** plastic tyre mounting levers; inner tube repair kit

1) Remove the wheel (see page 48, see page 64).
2) **Optional for pneumatic tyres:** Let all the air out of the tyre.
3) Loosen and remove the 5 screws on the inside of the rim (see fig. 169, see fig. 170, see fig. 171).
4) Separate the 2 pieces of the rim (see fig. 172).
5) Remove the tyre from the rim and replace if necessary.
6) **Optional for pneumatic tyres:** Pull the inner tube out of the casing and repair or replace if necessary.

Installing the tyres

1) **Optional for pneumatic tyres:** Inflate the inner tube slightly and insert it into the casing.
2) Pull the tyre onto the rim. **Optional for pneumatic tyres:** Insert the valve of the inner tube into the notch in the rim (see fig. 169, item 1).
3) Join the 2 pieces of the rim. Precisely align the notches for the valve one on top of the other (see fig. 169, item 1).

4) Insert the 5 screws on the inside of the rim and firmly tighten them in a crosswise sequence (see fig. 169, see fig. 170, see fig. 171).
5) Attach the wheel (see page 48, see page 64).

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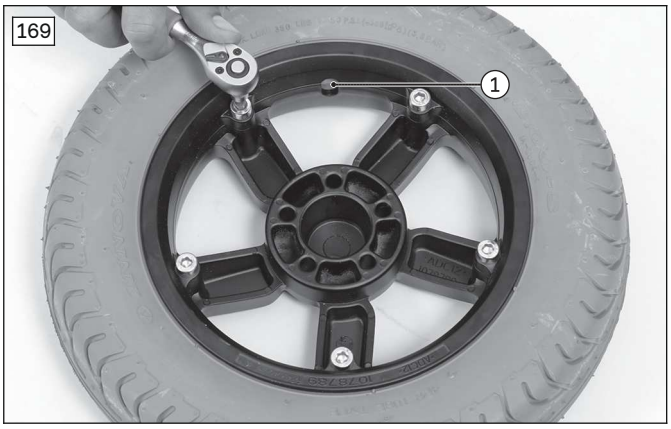

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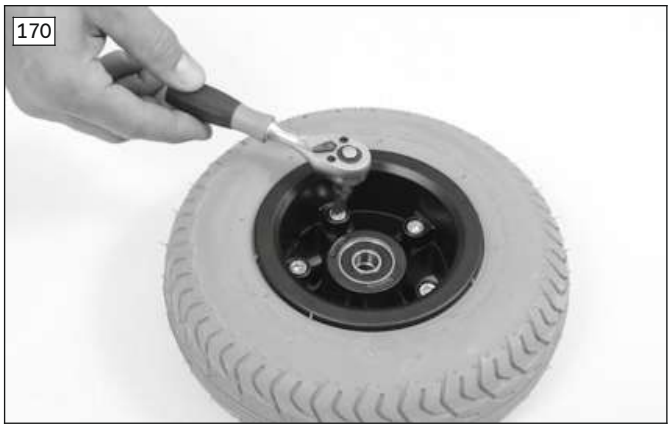

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4.12 Selecting and adjusting the suspensions

⚠ CAUTION

Incorrect settings or dimensioning of the suspensions

Injuries to the user due to changed driving characteristics and insufficient tipping resistance

- ► Check whether the selected suspension types are permissible for the new configuration. Replace the suspensions if necessary.
- ► Adjust the suspensions to the total weight of the wheelchair. Incorrect settings can lead to an incorrect seat height, insufficient ground clearance and changed braking and driving characteristics. The motors can be damaged and the wheelchair may tip.
- ► Do not attempt to compensate for insufficient spring stiffness by adjusting the spring tension.

4.12.1 Overview of suitable suspensions

Damper length

	Front-wheel drive (FWD) [mm]	Rear-wheel drive (RWD) [mm]	Mid-wheel drive (MWD) [mm]
Drive wheel suspension	150	150	Stop system
Suspension for caster wheel swing arm	140	140	front 150/rear 150

Spring stiffness of the suspensions

Mobility base	Overall weight* of the wheelchair [kg]	Front-wheel drive (FWD)		Rear-wheel drive (RWD)	
		Drive wheel spring stiffness [lbs/inch]	Caster wheel swing arm spring stiffness [lbs/inch]	Drive wheel spring stiffness [lbs/inch]	Caster wheel swing arm spring stiffness [lbs/inch]
Size 1 (small)	Up to 215	170	300	170	250
	Over 215 up to 239	250	300	170	300
	Over 239	250	350	250	300
Size 2 (medium)	Up to 249	250	300	170	300
	Over 249	250	350	250	350

* The total weight is comprised of the wheelchair weight and maximum user weight.

Mobility base	Overall weight* of the wheelchair [kg]	Mid-wheel drive (MWD)		
		Caster wheel swing arm spring stiffness [lbs/inch]	Stabilising wheel swing arm spring stiffness [lbs/inch]	Drive wheel spring stiffness
Size 1 (small)	Up to 239	250	350	2 N/mm [11.4 lbs/inch]
	Over 239	350	450	2 N/mm [11.4 lbs/inch]
Size 2 (medium)	Up to 249	250	350	2 N/mm [11.4 lbs/inch]
	Over 249	350	450	2 N/mm [11.4 lbs/inch]

* The total weight is comprised of the wheelchair weight and maximum user weight.

Damper length (MWD-R)

	Mid-wheel drive (MWD-R) [mm]
Drive wheel suspension	Stop system
Suspension for caster wheel swing arm	front 200/rear 165

Spring stiffness of the suspensions (MWD-R)

Mobility base	Overall weight* of the wheelchair [kg]	Caster wheel swing arm spring stiffness [lbs/inch]	Stabilising wheel swing arm spring stiffness [lbs/inch]
Size 2	Up to 279	170	170
	Over 279	170	220

* The total weight is comprised of the wheelchair weight and maximum user weight.

4.12.2 Adjusting the suspensions

INFORMATION

► For fine-tuning according to the overall weight of the wheelchair, the spring tension can be increased or decreased slightly. Always adjust the left and right suspension equally and in pairs.

INFORMATION

The suspensions can be adjusted both when installed and when removed.

► For replacing the suspension on a front- or rear-wheel drive (FWD/RWD) (see page 49, see page 69).

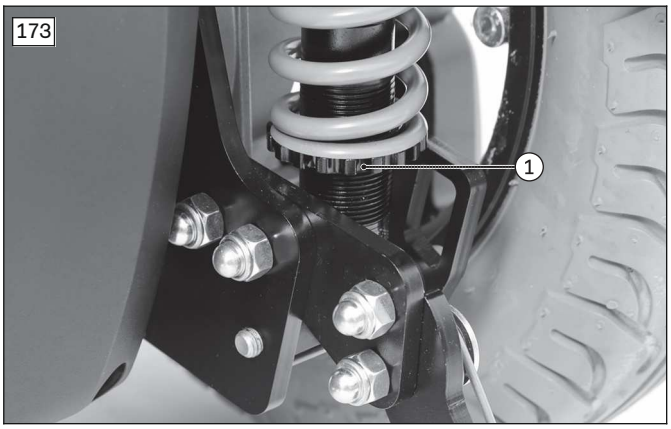
► For replacing the suspensions on a mid-wheel drive (MWD) (see page 56, see page 72, see page 73).

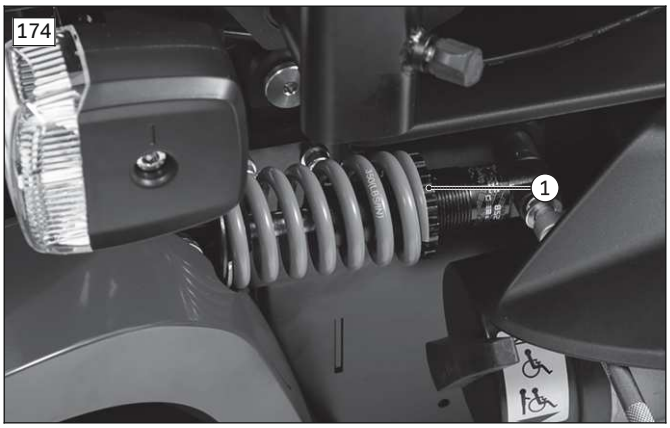
► For replacing the suspensions on a mid-wheel drive (MWD-R) (see page 56, see page 72, see page 73).

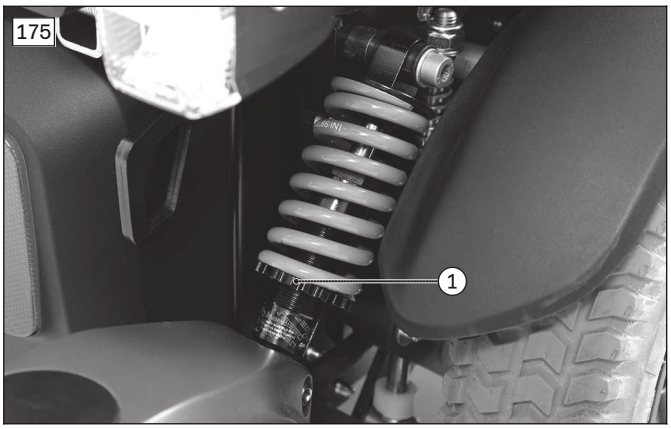
Adjusting the suspension (RWD/FWD (see fig. 173**,** see fig. 174**), MWD (**see fig. 175**,** see fig. 176**))**

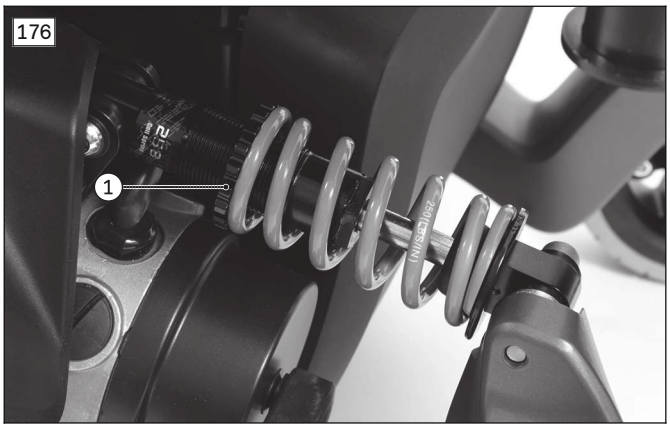
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

1) Remove the suspension.
2) Turn the adjustment element (item 1) to the left (counter-clockwise) until the spring tension is fully released.
3) Turn the adjustment element to the right (clockwise) until it is up against the spring.
4) Turn the adjustment element further to the right until the spring pre-tension is **max. 1 – 1.5 mm**.
INFORMATION: This pre-tension corresponds to approx. 1 – 1.5 turns of the adjustment element. The spring must be free of play and is not permitted to rattle.
5) Install the suspension.



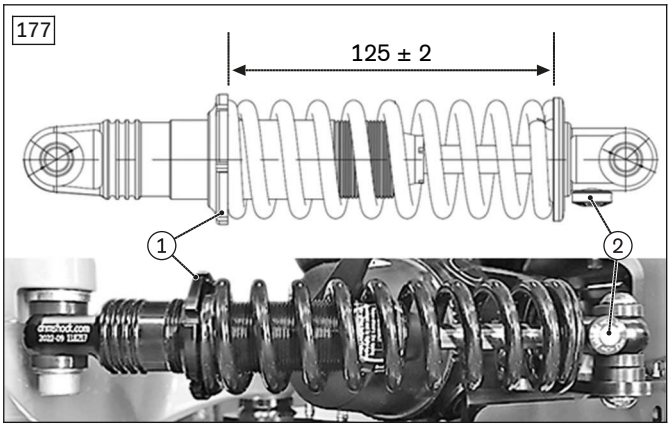


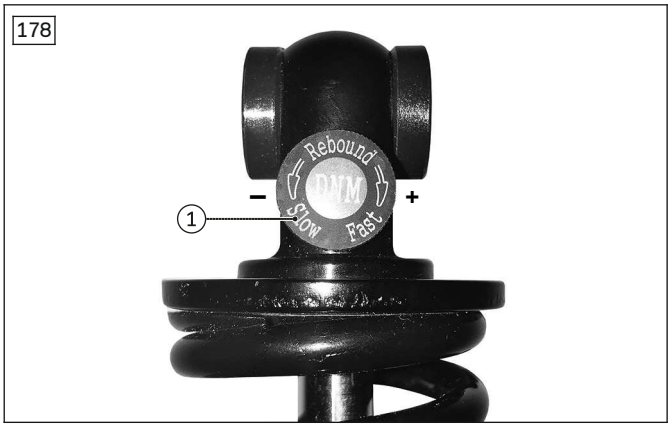




Adjusting the caster wheel swing arm suspension (MWD-R)

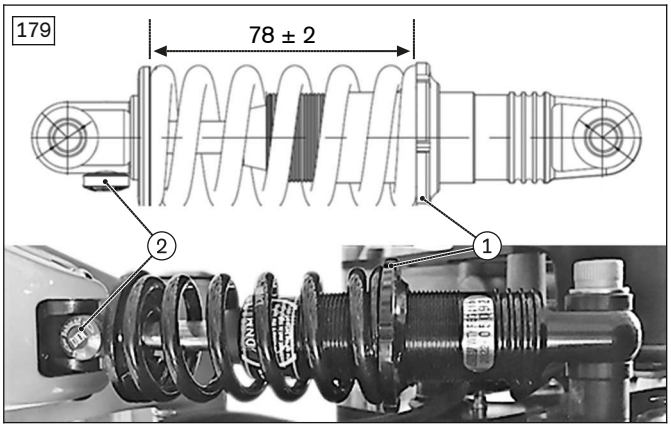
1) **INFORMATION: Always adjust the left and right suspension equally and in pairs.**
Turn the adjustment element to the right (clockwise) until the pre-tension length reaches **125 mm** (see fig. 177, item 1).
2) Turn the knob clockwise or counterclockwise to adjust the rebound according to the needs and weight of the user (see fig. 177, item 2, see fig. 178, item 1).

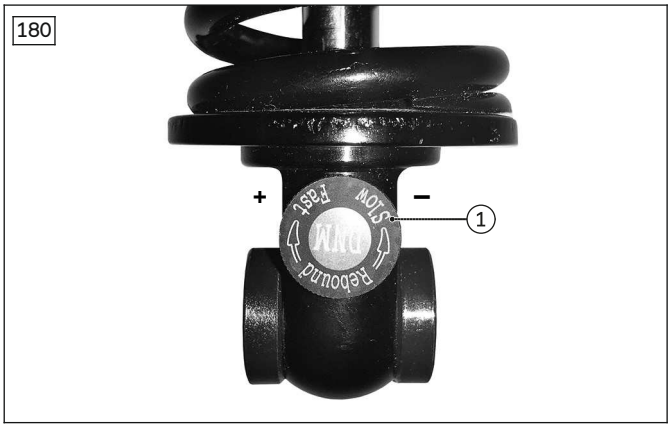




Adjusting the stabilising wheel swing arm suspension (MWD-R)

1) **INFORMATION: Always adjust the left and right suspension equally and in pairs.**
   Turn the adjustment element to the left (counter-clockwise) until the pre-tension length of **78 mm** is reached (see fig. 179, item 1).
2) Turn the knob clockwise or counterclockwise to adjust the rebound according to the needs and weight of the user (see fig. 179, item 2, see fig. 180, item 1).





4.13 Seat

4.13.1 Replacing the seat plate (standard seat)

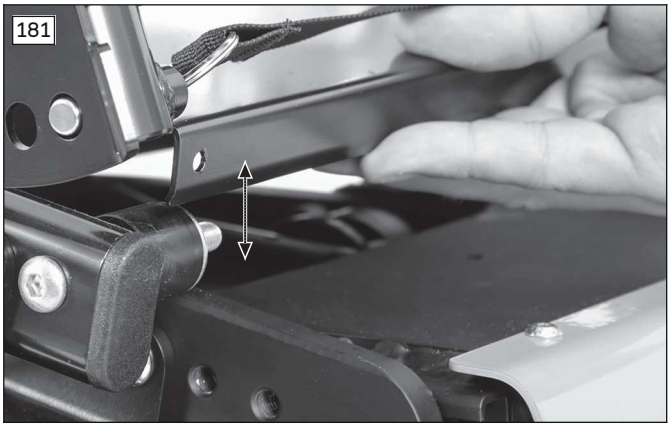
Removing the seat plate (standard seat)

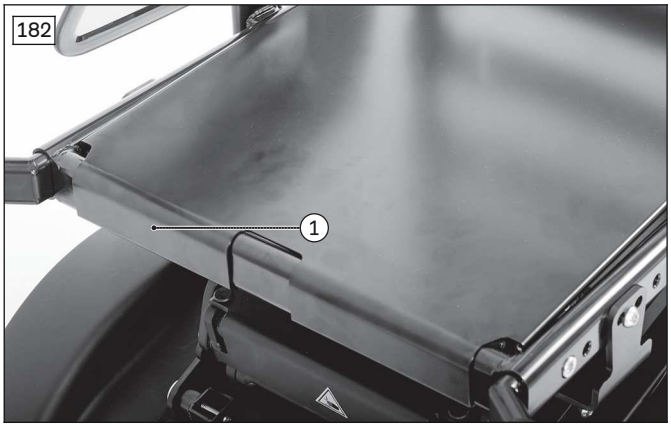
> **Prerequisites:**
  Switch off the control device and deactivate the main fuse (see page 16).
  Remove the seat cushion and back support pad.

1) Pull the back edge of the seat plate upwards (see fig. 181).
2) Unhook the seat plate from the front edge and remove it (see fig. 182, item 1).
   NOTICE! Damage to components or cables due to improper removal of the seat plate. Control modules may be attached to the seat plate. Make sure the modules and cables are not damaged, and remove them if necessary.

Attaching the seat plate (standard seat)

1) Hook the seat plate onto the front edge (see fig. 182, item 1).
2) Push the rear edge of the seat plate downwards and engage it securely (see fig. 181).





4.13.2 Replacing the seat plate (VAS seat)

Removing the seat plate (VAS seat)

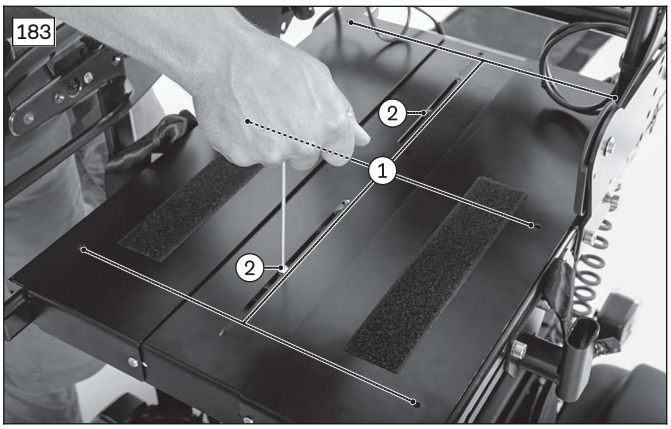
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

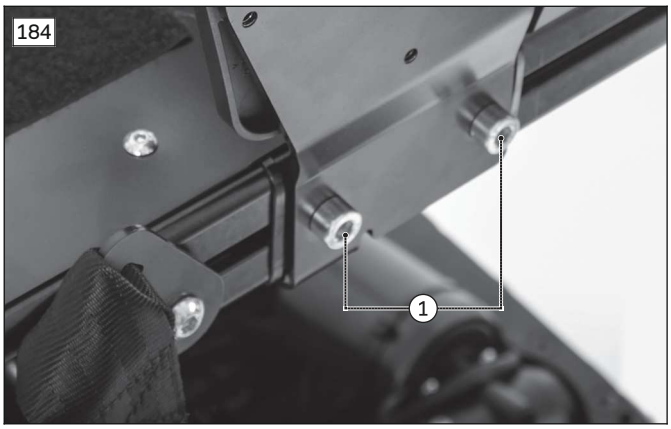
> **Tools:** hexagon key, size 3, 6; torque wrench with socket wrench insert, size 3, 6

1) Loosen and remove the 6 outer screws (short) on the seat plate (see fig. 183, item 1).
2) Loosen and remove the 2 inner screws (long) in the slotted holes of the seat plate (see fig. 183, item 2).
3) Remove the cover on both bearing plates (see page 98).
4) Loosen the 2 screws in the bearing plates on both sides (see fig. 184, item 1).
5) Pull the seat plate forwards and out to remove it. Lift the back support slightly if necessary.
NOTICE! Damage to components or cables due to improper removal of the seat plate. Control modules may be attached to the seat plate. Make sure the modules and cables are not damaged, and remove them if necessary.

Attaching the seat plate (VAS seat)

1) Slide the seat plate onto the seat frame from the front. Slide the seat plate carefully under the bearing plates as you do so.
2) Insert the 2 inner screws (long) into the slotted holes of the seat plate and firmly tighten them to **4 Nm** (see fig. 183, item 2).
3) Insert the 6 outer screws (short) into the seat plate and firmly tighten them to **4 Nm** (see fig. 183, item 1).
4) Position the back support evenly using the markings on the seat plate (see page 100).
5) Firmly tighten the 2 screws in the bearing plates on both sides to **25 Nm** (see fig. 184, item 1).
6) Install the cover on both bearing plates (see page 98).





4.13.3 Adjusting the seat width (VAS seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

> **Tools:** hexagon key, size 3, 6; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 3, 6

1) Loosen the back support upholstery (see page 106).
2) Removing the seat plate (see page 82).
3) Loosen and remove the 4 screws on the adjustment tubes (see fig. 185, item 1).
4) Loosen and remove the 8 screws and nuts on both connecting tubes on the back support (see fig. 186, item 1).
5) Adjust the seat and back support width as desired. To do so, slide the seat bars symmetrically in the adjustment tubes.
6) Insert the 8 screws and nuts into the appropriate slots in both adjustment tubes on the back support and firmly tighten them (see fig. 186, item 1).
7) Insert the 4 screws into the appropriate slots on the adjustment tubes and firmly tighten them to **10 Nm** (see fig. 185, item 1).
8) Loosen the 2 screws in the seat plate segments and adjust the seat plate to the new seat width (see fig. 187, item 1).
9) Insert the 2 screws for the seat plate segments into the appropriate slots and firmly tighten them to **4 Nm** (see fig. 187, item 1).
10) Install the seat plate (see page 82).
11) Adjust the back support upholstery (see page 106).

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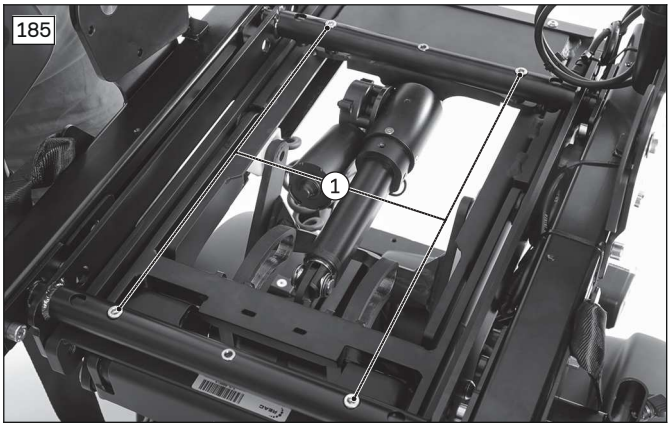

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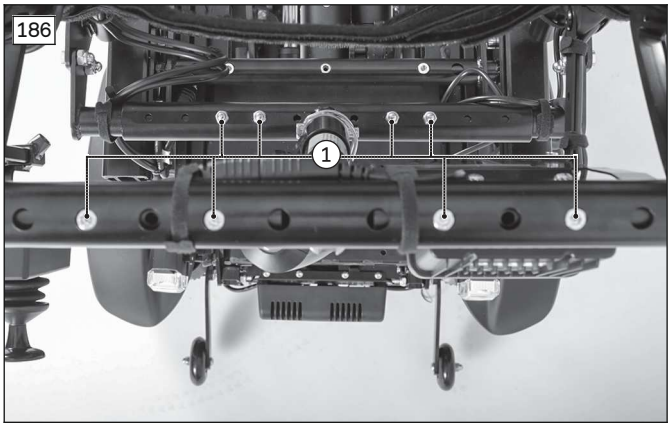

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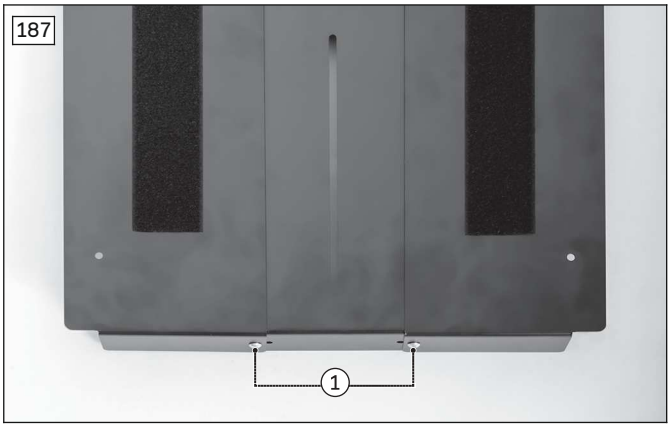

4.13.4 Setting the pre-tilt / replacing the seat height adapter

Setting the pre-tilt / replacing the front seat height adapter

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

> **Tools:** hexagon key, size 5, 6; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5, 6

1) Fold up the seat (see page 16).
2) Remove the battery cover (see page 18).
3) Remove the front cover with the external power supply receptacles (see page 18).
4) **INFORMATION: Note the installed position of the seat height adapter. The alignment of the seat height adapter depends on the size of the mobility base.**
Loosen and remove the 2 screws on the seat height adapter (see fig. 188, item 1).
5) Replace the seat height adapter if necessary and move it to the desired position (see fig. 188, item 2).
NOTICE! Damage to the product due to adjustments outside the permissible ranges. Only set seat height adapter positions which are listed in the table showing permissible combinations. Position the left and right seat height adapters evenly using the applied markings (see fig. 188, see fig. 189, item 3).
6) Insert the 2 screws into the seat height adapter and firmly tighten them to **25 Nm** (see fig. 188, item 1).
7) Connect the external power supply receptacles and attach the front cover (see page 18).
8) Attach the battery cover (see page 18).
9) Fold down the seat (see page 16).

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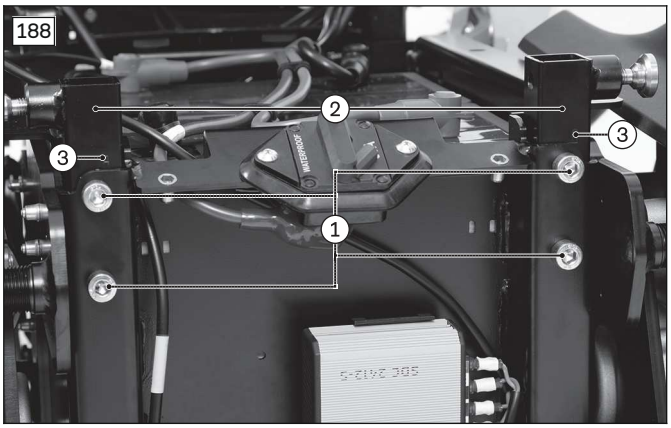

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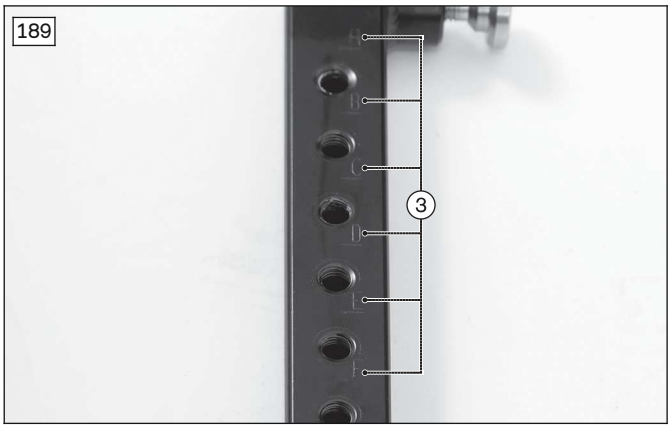


Replacing the rear seat height adapter

⚠ CAUTION

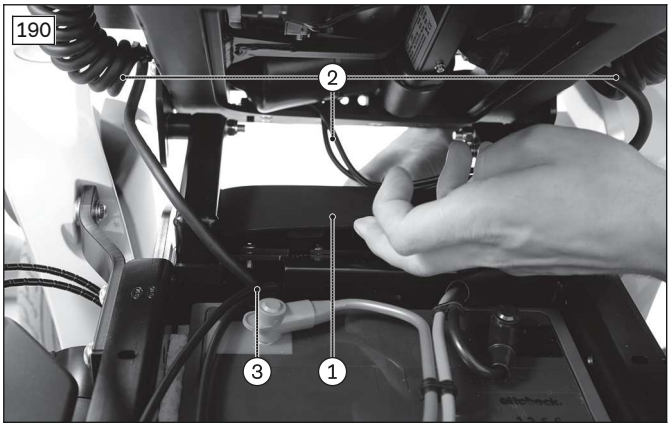
Improper lifting

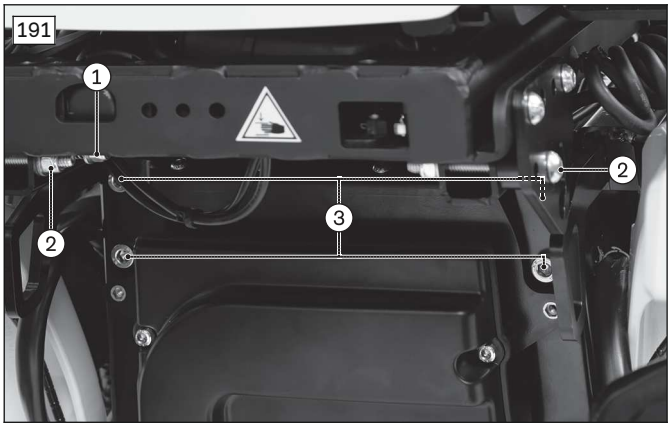
Crushing, pinching, blows due to failure to observe safety notes, product damage

- ► The seat of the power wheelchair is very heavy. Ensure ergonomically correct lifting. Use sufficiently large hoisting devices and perform this work with a helper.
- ► Take care to prevent crushing of limbs while raising or lowering the seat.
- ► Before raising or lowering the seat, disconnect all cable connections and cable attachments between the seat and mobility base. Make sure that no cables, cable attachments or other components are torn off, crushed or damaged while raising or lowering the seat.

1) Fold up the seat (see page 16).
2) Remove the battery cover (see page 18).
3) Remove the rear cover (see fig. 190, item 1; see page 19).
4) **INFORMATION: Note the installed position of the cables and cable attachments.**
Disconnect all cables and cable attachments between the seat and mobility base (see fig. 190, item 2). Carefully pull all seat cables out of the mobility base (see fig. 190, item 3).

5) Carefully fold down the seat (see page 16) and set it down on the support bolts. Do not tighten the support bolts.
6) **INFORMATION: Take note of the installed position of the ratchet bolt with seat bracket spacer, compression spring and nut.**
   On the left side of the seat frame, loosen and remove the ratchet bolt with seat bracket spacer, compression spring and nut (see fig. 191, item 1).
7) **WARNING! Severe injuries due to pinching, crushing if the seat falls down. Secure the seat against falling down with the active support of a helper.**
   INFORMATION: Note the installed position of the screw with bushing, seat bracket spacer (optional) and nut. Depending on the size of the mobility base, there is no seat bracket spacer installed on this screw connection. Bilateral
   Loosen and remove the screw with bushing, seat bracket spacer (optional) and nut on both sides (see fig. 191, item 2).
8) Carefully pull the seat upwards off the mobility base and set it safely aside with the support of a helper.
9) **INFORMATION: Note the installed position of the seat height adapter. The alignment and type of the seat height adapter depends on the size of the mobility base and the drive unit type.**
   Loosen and remove the 2 screws on the seat height adapter (see fig. 191, item 3).
10) Replace the seat height adapter and move it to the desired position.
    NOTICE! Damage to the product due to adjustments outside the permissible ranges. Only set seat height adapter positions which are listed in the table showing permissible combinations. Position the left and right seat height adapters evenly using the applied markings.
11) Insert the 2 screws into the seat height adapter and firmly tighten them to **25 Nm** (see fig. 191, item 3).
12) With the support of a helper, set the seat onto the seat height adapters from above.
13) Insert the screw with bushing, seat bracket spacer (optional) and nut on both sides according to its original installed position (see fig. 191, item 2).
    INFORMATION: Depending on the size of the mobility base, there is no seat bracket spacer installed on this screw connection.
14) On the left side of the seat frame, insert the ratchet bolt with seat bracket spacer, compression spring and nut according to its original installed position and firmly tighten (see fig. 191, item 1).
15) **WARNING! Severe injuries due to pinching, crushing if the seat falls down. Verify correct functionality of the ratchet bolt.**
    Carefully fold up the seat (see page 16). Shake the seat to verify that it is firmly fixed in place.
16) Position and connect all cable connections and cable attachments according to the original installed position (see fig. 190, item 2, 3).
17) Attach the rear cover (see page 19).
18) Attach the battery cover (see page 18).
19) Fold down the seat (see page 16).
20) Check all seat functions.





Permissible combinations of front and rear seat height adapter positions

Rear marking	Front marking							
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
A	0°	3°	6°	9°	*	*	*	*

Rear marking	Front marking							
B	-3°	0°	3°	6°	9°	*	*	*
C	*	-3°	0°	3°	6°	9°	*	*
D	*	*	-3°	0°	3°	6°	9°	*
E	*	*	*	-3°	0°	3°	6°	9°
F	*	*	*	*	-3°	0°	3°	6°
G	*	*	*	*	*	-3°	0°	3°
H	*	*	*	*	*	*	-3°	0°

* Combination is **not** permissible

Specifications in degrees correspond to the pre-tilt of a permissible combination.

4.13.5 Adjusting the centre of gravity (standard seat with module for combination of seat height adjustment and seat tilt)

⚠ WARNING

Centre or gravity shifts

Severe injuries due to the power wheelchair tipping over and falling

- ► Only choose positions that are permissible for the new configuration. Contact Ottobock Customer Service for more information. Have the serial number of the power wheelchair ready. It is used to determine the permissible positions.
- ► Prior to initial use, test how changes in the centre of gravity affect the behaviour of the power wheelchair on inclines, slopes, side hills or when crossing obstacles with the secure support of an attendant.

⚠ CAUTION

Failure to observe installation instructions

Pinching, crushing due to falling parts

- ► The seat and its individual parts have a substantial weight. Secure the parts against falling before loosening them.

Dependencies

The seat's centre of gravity can be adjusted by sliding the seat frame and combination seat height and seat tilt adjustment module relative to the mobility base. Among other things, the permissible centre of gravity depends on:

- Type and size of the mobility base (front-wheel drive FWD see fig. 192, mid-wheel drive MWD see fig. 193, rear-wheel drive RWD see fig. 194)
- Seat depth
- User weight

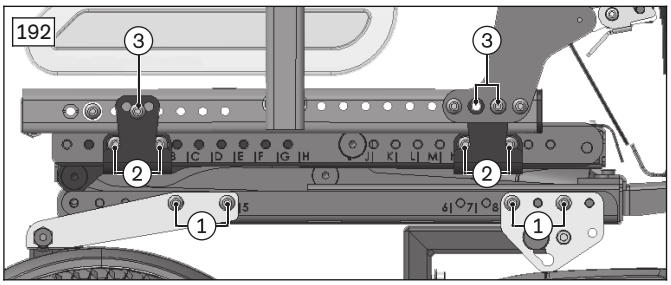
Adjusting the centre of gravity

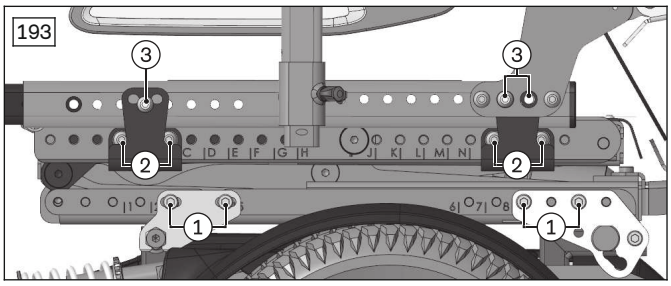
> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.

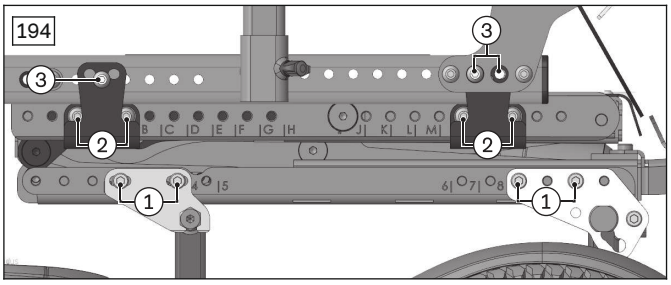
> **Tools:** hexagon key, size 5, 6; open-ended wrench size 13; torque wrench with socket wrench insert, size 5, 6

1) Loosen and remove the 4 screws between the mobility base and module on both sides (see item 1).
2) Slide the module to a position that is permissible for the new configuration.
3) Insert the 4 screws between the mobility base and module on both sides, and firmly tighten them to **25 Nm** (see item 1).
4) Loosen the 4 screws between the seat brackets and module on both sides (see item 2).
5) Slide the seat frame to a position that is permissible for the new configuration.
6) Insert the 4 screws between the seat brackets and module on both sides, and firmly tighten them to **25 Nm** (see item 2).
7) Loosen and remove the screws between the seat frame and seat brackets on both sides (see item 3).
8) Slide the seat frame to a position that is permissible for the new configuration.
9) Insert the screws between the seat frame and seat brackets on both sides, and firmly tighten them (see item 3).

10) Check the control measurement of the seat.
INFORMATION: The control measurement is measured from the front edge of the front seat height adapter to the front edge of the seat, and varies depending on the configuration.







4.13.6 Adjusting the centre of gravity (standard seat without module for combination of seat height adjustment and seat tilt)

⚠ WARNING

Centre or gravity shifts

Severe injuries due to the power wheelchair tipping over and falling

- ► Only choose positions that are permissible for the new configuration. Contact Ottobock Customer Service for more information. Have the serial number of the power wheelchair ready. It is used to determine the permissible positions.
- ► Prior to initial use, test how changes in the centre of gravity affect the behaviour of the power wheelchair on inclines, slopes, side hills or when crossing obstacles with the secure support of an attendant.

⚠ CAUTION

Failure to observe installation instructions

Pinching, crushing due to falling parts

- ► The seat and its individual parts have a substantial weight. Secure the parts against falling before loosening them.

Dependencies

The seat's centre of gravity can be adjusted by sliding the seat frame relative to the mobility base. Among other things, the permissible centre of gravity depends on:

- Type and size of the mobility base (front-wheel drive FWD see fig. 195, mid-wheel drive MWD see fig. 196, rear-wheel drive RWD see fig. 197)
- Seat depth
- User weight

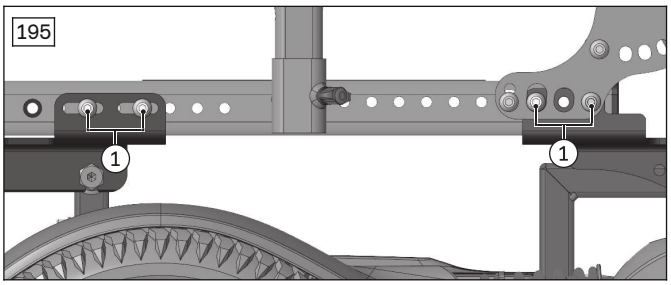
Adjusting the centre of gravity

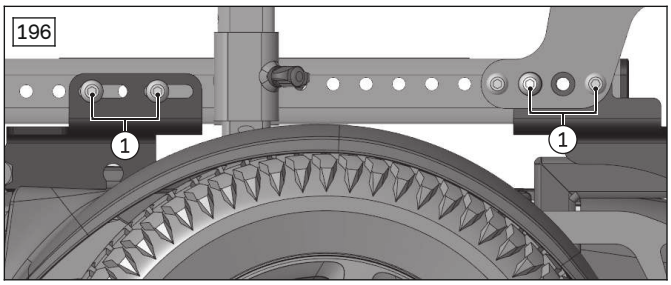
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

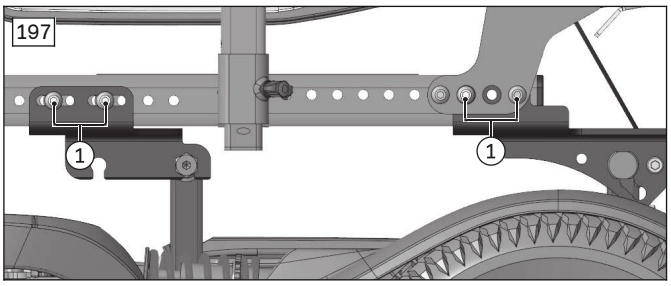
> **Tools:** hexagon key, size 5; open-ended wrench, size 13; torque wrench with socket wrench insert, size 5

1) Loosen and remove the screws between the seat frame and mobility base on both sides (see item 1).
2) Slide the seat frame to a position that is permissible for the new configuration.
3) Insert the screws between the seat frame and mobility base on both sides, and firmly tighten them (see item 1).

4) Check the control measurement of the seat.
INFORMATION: The control measurement is measured from the front edge of the front seat height adapter to the front edge of the seat, and varies depending on the configuration.







4.13.7 Adjusting the centre of gravity (VAS seat with module for combination of seat height adjustment and seat tilt)

⚠ WARNING

Centre or gravity shifts

Severe injuries due to the power wheelchair tipping over and falling

- ► Only choose positions that are permissible for the new configuration. Contact Ottobock Customer Service for more information. Have the serial number of the power wheelchair ready. It is used to determine the permissible positions.
- ► Prior to initial use, test how changes in the centre of gravity affect the behaviour of the power wheelchair on inclines, slopes, side hills or when crossing obstacles with the secure support of an attendant.

⚠ CAUTION

Failure to observe installation instructions

Pinching, crushing due to falling parts

- ► The seat and its individual parts have a substantial weight. Secure the parts against falling before loosening them.

Dependencies

The seat's centre of gravity can be adjusted by sliding the seat frame and combination seat height and seat tilt adjustment module relative to the mobility base. Among other things, the permissible centre of gravity depends on:

- Type and size of the mobility base (front-wheel drive FWD see fig. 199, mid-wheel drive MWD see fig. 200, rear-wheel drive RWD see fig. 201)
- Seat depth
- User weight

Adjusting the centre of gravity

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Check the frame measurement of the VAS seat.
INFORMATION: The distance from the front seat bracket to the front edge of the seat must be 110 mm (see fig. 198, item 1). If necessary, correct the frame measurement to 110 mm by sliding the seat bars on the seat brackets and firmly re-tightening the screws.
2) Loosen and remove the 4 screws between the mobility base and module on both sides (see item 2).
3) Slide the module to a position that is permissible for the new configuration.
4) Insert the 4 screws between the mobility base and module on both sides, and firmly tighten them to **25 Nm** (see item 2).
5) Loosen and remove the 4 screws between the seat frame and module on both sides (see item 3).
6) Slide the seat frame to a position that is permissible for the new configuration.
7) Insert the 4 screws between the seat frame and module on both sides, and firmly tighten them to **25 Nm** (see item 3).
8) Check the control measurement of the seat.
INFORMATION: The control measurement is measured from the front edge of the front seat height adapter to the front edge of the seat, and varies depending on the configuration.

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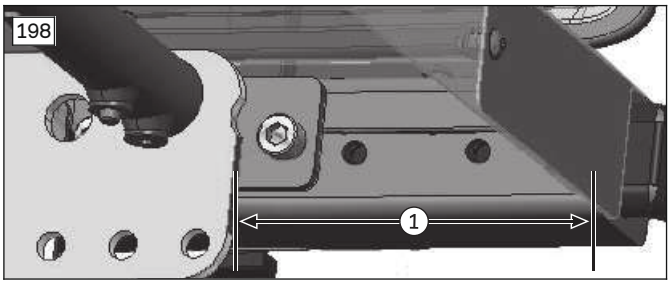

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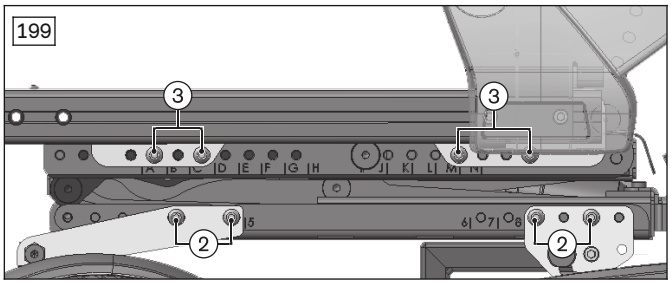

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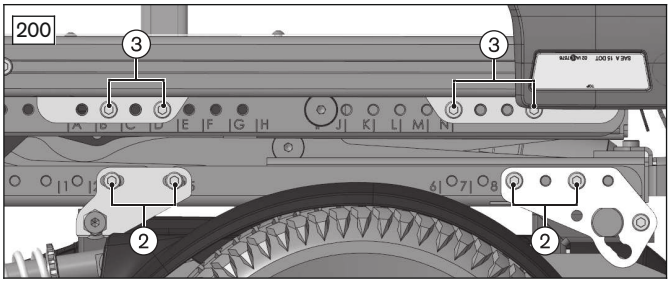

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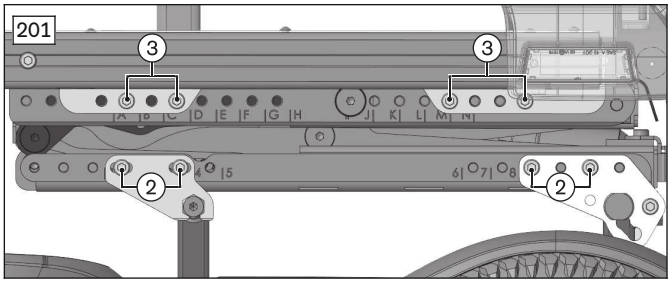


4.13.8 Adjusting the centre of gravity (VAS seat without module for combination of seat height adjustment and seat tilt)

⚠ WARNING

Centre or gravity shifts

Severe injuries due to the power wheelchair tipping over and falling

- ► Only choose positions that are permissible for the new configuration. Contact Ottobock Customer Service for more information. Have the serial number of the power wheelchair ready. It is used to determine the permissible positions.
- ► Prior to initial use, test how changes in the centre of gravity affect the behaviour of the power wheelchair on inclines, slopes, side hills or when crossing obstacles with the secure support of an attendant.

⚠ CAUTION

Failure to observe installation instructions

Pinching, crushing due to falling parts

- ► The seat and its individual parts have a substantial weight. Secure the parts against falling before loosening them.

Dependencies

The seat's centre of gravity can be adjusted by sliding the seat frame relative to the mobility base. Among other things, the permissible centre of gravity depends on:

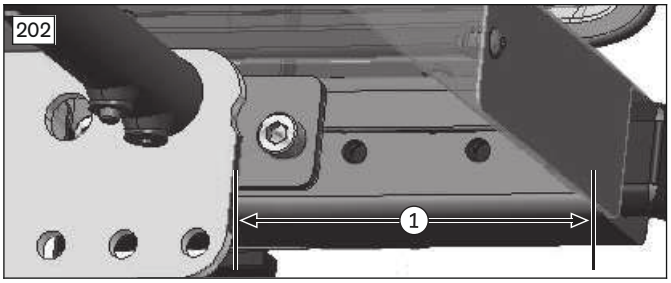
- Type and size of the mobility base (front-wheel drive FWD see fig. 203, mid-wheel drive MWD see fig. 204, rear-wheel drive RWD see fig. 205)
- Seat depth
- User weight

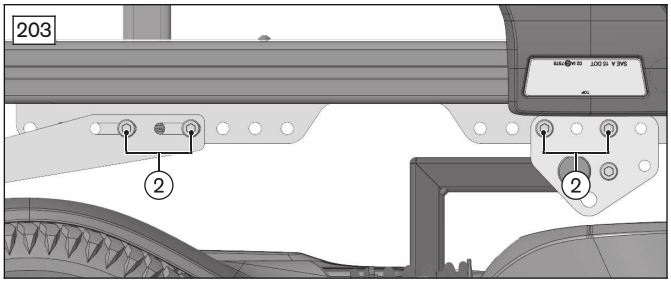
Adjusting the centre of gravity

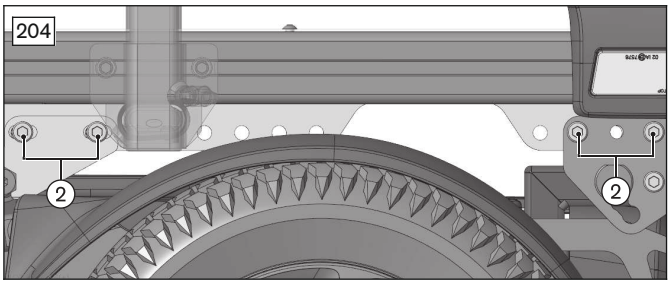
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

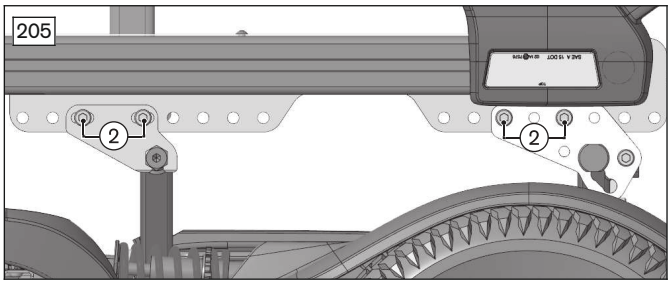
> **Tools:** hexagon key, size 6; open-ended wrench, size 13; torque wrench with socket wrench insert, size 6

1) Check the frame measurement of the VAS seat.
INFORMATION: The distance from the front seat bracket to the front edge of the seat must be 110 mm (see fig. 202, item 1). If necessary, correct the frame measurement to 110 mm by sliding the seat bars on the seat brackets and firmly re-tightening the screws.
2) Loosen and remove the 4 screws between the seat frame and mobility base on both sides (see item 2).
3) Slide the seat frame to a position that is permissible for the new configuration.
4) Insert the 4 screws between the seat frame and mobility base on both sides, and firmly tighten them to **25 Nm** (see item 2).
5) Check the control measurement of the seat.
INFORMATION: The control measurement is measured from the front edge of the front seat height adapter to the front edge of the seat, and varies depending on the configuration.









4.13.9 Replacing the seat frame with seat brackets (standard seat)

Removing the seat frame and seat brackets (standard seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the leg supports.
Remove the seat cushion and back support pad.

> **Tools:** hexagon key, size 5; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5

1) Remove the leg support holder (see page 116).
2) Remove the back support (see page 99).
3) Removing the seat plate (see page 81).
4) Remove the side panels and side panel holders (see page 107).
5) **NOTICE! Note the installed position of the cables and cable attachments.**
Remove or open the cable attachments along the seat frame (see fig. 206, item 1).

6) Loosen and remove the 3 screws and nuts between the seat frame and seat brackets on both sides (see fig. 207, item 1).
7) Remove the seat frame. Remove or open additional cable attachments if necessary.
8) **If necessary:** Remove the seat brackets (see fig. 207, item 2). To do so, loosen and remove 2 screws each on all 4 seat brackets (see fig. 207, item 3).

Installing the seat frame and seat brackets (standard seat)

1) Attach the 4 seat brackets to the frame according to their original installed position (see fig. 207, item 2). To do so, insert 2 screws each on all 4 seat brackets and firmly tighten them (see fig. 207, item 3).
   INFORMATION: Check whether the chosen types and positions of the seat brackets are permissible for the new configuration (see page 212). Replace the seat brackets if necessary.
2) Carefully insert the seat frame into the seat brackets.
3) Insert the 3 screws with nuts between the seat frame and seat brackets on both sides and firmly tighten them (see fig. 207, item 1).
4) Position the cables according to their original installed position. To do so, attach or close the loosened cable attachments along the seat frame.
5) Install the side panel holders and side panels (see page 107).
6) Install the seat plate (see page 81).
7) Install the back support (see page 99).
8) Install the leg support holder (see page 116).
9) Check and adjust the seat's centre of gravity (see page 86 ff.).

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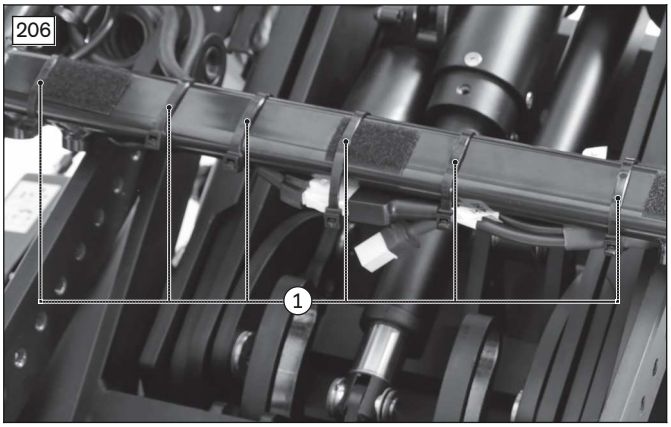

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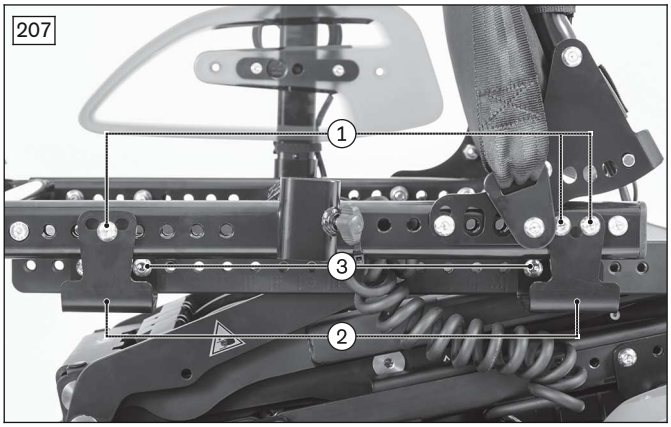


4.13.10 Replacing the seat frame (VAS seat)

Removing the seat frame (VAS seat)

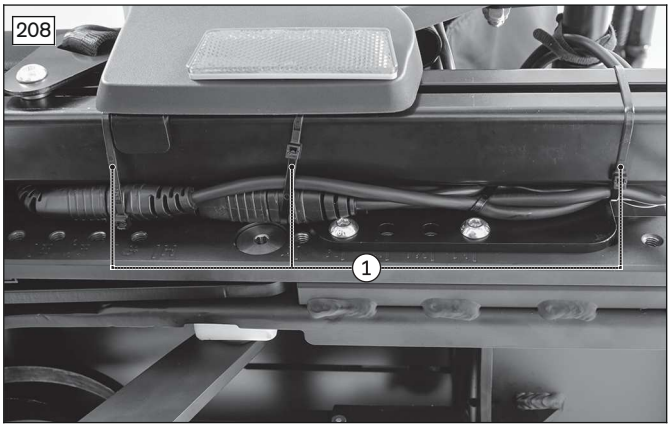
> **Prerequisites:**
  Switch off the control device and deactivate the main fuse (see page 16).
  Remove the leg supports.
  Remove the seat cushion and back support pad.
> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

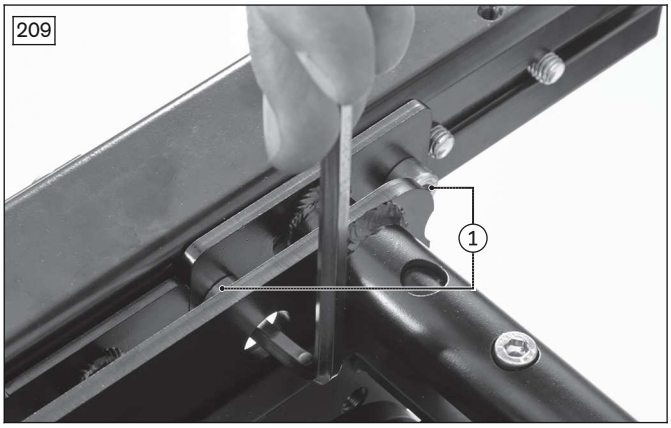
1) Remove the leg support holder (see page 116).
2) Remove the back support (see page 100).
3) Removing the seat plate (see page 82).
4) Remove the side panels and side panel holders (see page 108).
5) **INFORMATION: Note the installed position of the cables and cable attachments.**
   Remove or open the cable attachments along the seat frame (see fig. 208, item 1).
6) Loosen and remove 2 screws on each of the 4 mounting points of the seat frame (see fig. 209, item 1).
7) Remove the seat frame. Remove or open additional cable attachments if necessary.

Installing the seat frame (VAS seat)

1) Carefully insert the seat frame.
2) Insert 2 screws on each of the 4 mounting points of the seat frame and firmly tighten them (see fig. 209, item 1).

3) Position the cables according to their original installed position. To do so, attach or close the loosened cable attachments along the seat frame.
4) Install the side panel holders and side panels (see page 108).
5) Install the seat plate (see page 82).
6) Install the back support (see page 100).
7) Install the leg support holder (see page 116).
8) Check and adjust the seat's centre of gravity (see page 88 ff.).





4.13.11 Replacing the power seat height adjustment actuator

⚠ WARNING

Shifted centre of gravity, increased risk of wheelchair tipping over when seat is raised

Severe injuries due to pinching, crushing if the wheelchair tips over

- ► Activate (lock) the brakes on both drive motors before carrying out any work.
- ► Secure the seat and the wheelchair against tipping and falling during all work with the active support of a helper.
- ► Only fold up the raised seat for the work described below and only with the active support of a helper.
- ► Immediately fold the raised seat back down after completing the work.

Removing the seat height adjustment actuator

> **Prerequisites:**
Activate (lock) the brakes on both drive motors.
Move the seat to the highest seat height (see page 15). If it is not possible to move the seat height from the lowest position, fold up the seat for the required work.
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

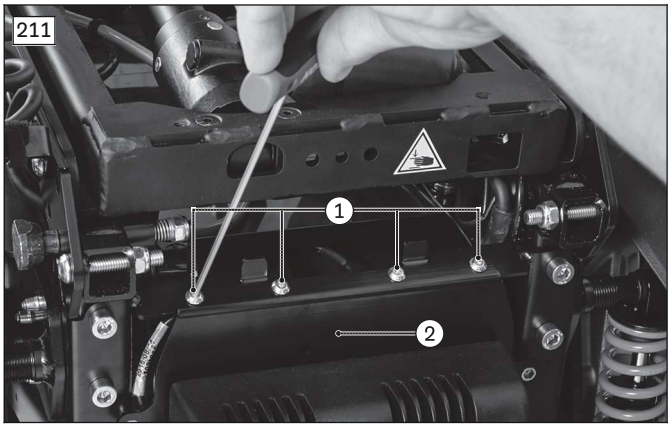
> **Tools:** hexagon key, size 3, 4; torque wrench with socket wrench insert, size 3, 4; pin punch Ø 8 mm; hammer; soft-face mallet

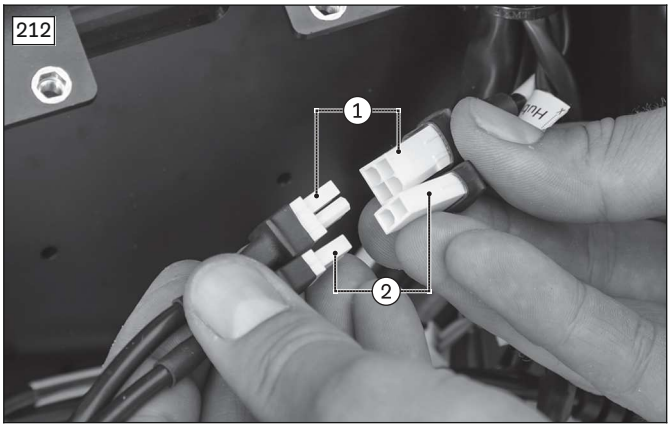
1) Fold up the seat (see page 16).
2) Remove the rear cover (see page 19).
3) Loosen and remove the 2 screws between the bottom of the frame and the seat height adjustment actuator (see fig. 210, item 1).
4) Fold down the seat (see page 16).
5) Loosen and remove the 4 screws on the module carrier (see fig. 211, item 1).
6) Carefully lift the module carrier and controller off the frame (see fig. 211, item 2).
7) **INFORMATION: Note the installed position of the cable connections being loosened.**
Disconnect the actuator cable for the seat height adjustment (see fig. 212, item 1).
8) Loosen and remove the set screw on the eccentric of the seat height adjustment (see fig. 213, item 1).
9) **WARNING! Severe injuries due to pinching, crushing if the seat falls down. Secure the seat against falling down with the active support of a helper.**
Knock the bolt out of the eccentric of the seat height adjustment with a pin punch (see fig. 214).
10) Loosen and remove the 2 screws between the top of the frame and the seat height adjustment actuator (see fig. 215, item 1).

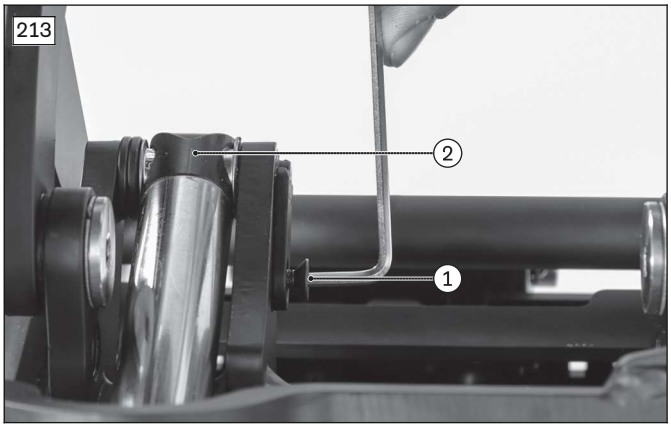
11) **INFORMATION: Note the installed position of the actuator cable.**
Remove the seat height adjustment actuator with the actuator cable. Remove or open additional cable attachments if necessary.
12) Carefully lower the seat with the active support of a helper and rest it securely on the frame.

Installing the seat height adjustment actuator

1) **WARNING! Severe injuries due to pinching, crushing if the seat falls down. Secure the seat against falling down with the active support of a helper.**
Carefully pull the seat upwards with the active support of a helper.
2) Insert the seat height adjustment actuator and position the actuator cable according to the original installed position. Reattach or close the loosened cable attachments.
3) Insert the 2 screws between the top of the frame and the seat height adjustment actuator and firmly tighten them (see fig. 215, item 1).
4) Carefully insert the bearing eye of the seat height adjustment actuator into the eccentric (see fig. 213, item 2).
5) Press the bolt into the eccentric and the bearing eye of the seat height adjustment actuator.
6) Insert the set screw into the eccentric of the seat height adjustment and firmly tighten it (see fig. 213, item 1).
7) Connect the actuator cable of the seat height adjustment according to the original installed position (see fig. 212, item 1).
8) Carefully position the module carrier and controller on the frame (see fig. 211, item 2).
9) Insert the 4 screws of the module carrier and firmly tighten them (see fig. 211, item 1).
10) Attach the rear cover (see page 19).
11) Fold up the seat (see page 16).
12) Insert the 2 screws between the bottom of the frame and the seat height adjustment actuator and firmly tighten them (see fig. 210, item 1).
13) Fold down the seat (see page 16).





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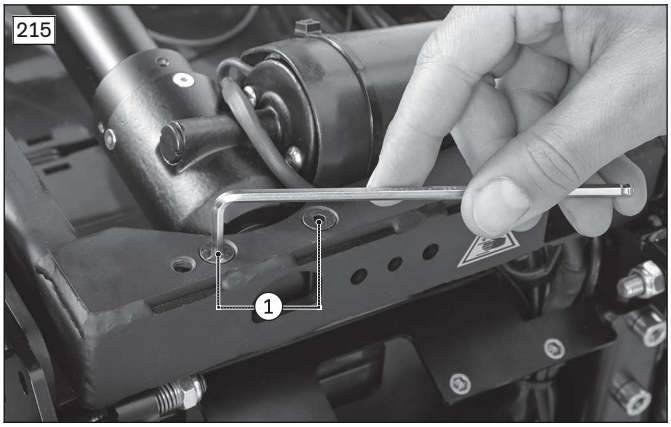

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4.13.12 Replacing and adjusting the seat height adjustment sensor

⚠ WARNING

Shifted centre of gravity, unstable driving characteristics of the wheelchair

Tipping over of the wheelchair, pinching, crushing, severe injuries of the user

- ► Adjust and verify the function of the seat height adjustment sensor after each replacement.
- ► Attach the seat height adjustment sensor according to the original installed position so that the driving speed is reduced when raising the seat, as it was on delivery.
- ► After each replacement, verify the stable driving characteristics of the wheelchair on all slopes the wheelchair is approved for.

Removing the seat height adjustment sensor

> **Prerequisites:**
Activate (lock) the brakes on both drive motors.
Move the seat to the highest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

> **Tools:** Phillips screwdriver, size 3; hexagon key, size 3, 4; torque wrench with socket wrench insert, size 3, 4

1) Fold up the seat (see page 16).
2) Remove the battery cover (see page 18).
3) Remove the rear cover (see page 19).
4) **If necessary:** Fold down the seat (see page 16).
5) Loosen and remove the 4 screws on the module carrier (see fig. 211, item 1).
6) Carefully lift the module carrier and controller off the frame (see fig. 211, item 2).
7) **INFORMATION: Note the installed position of the cable connections being loosened.**
Disconnect the cable for the seat height adjustment sensor (see fig. 212, item 2).
8) Fold up the seat (see page 16).
9) Loosen and remove the 2 screws between the bottom of the frame and the sensor bracket (see fig. 216, item 1).
10) **INFORMATION: Note the installed position of the cable.**
Remove the seat height adjustment sensor with its cable. Remove or open additional cable attachments if necessary (see fig. 216, item 2).
11) Fold down the seat (see page 16).
12) **If necessary:** Remove the seat height adjustment sensor from the sensor bracket (see fig. 217, item 2). Do so by loosening and removing 2 Phillips head screws (see fig. 217, see fig. 218, item 1).

Installing the seat height adjustment sensor

1) **If necessary:** Attach the seat height adjustment sensor to the sensor bracket. To do so, insert and firmly tighten the 2 Phillips screws (see fig. 217, see fig. 218, item 1).
2) Fold up the seat (see page 16).
3) Carefully insert the seat height adjustment sensor and position the cable according to its original installed position. Reattach or close the loosened cable attachments (see fig. 216, item 2).

4) Insert the 2 screws between the bottom of the frame and the sensor bracket and firmly tighten them (see fig. 216, item 1).
5) **If necessary:** Fold down the seat (see page 16).
6) Connect the cable for the seat height adjustment sensor according to the original installed position (see fig. 212, item 2).
7) Carefully position the module carrier and controller on the frame (see fig. 211, item 2).
8) Insert the 4 screws of the module carrier and firmly tighten them (see fig. 211, item 1).
9) Attach the rear cover (see page 19).
10) Fold up the seat (see page 16).
11) Attach the battery cover (see page 18).
12) Fold down the seat (see page 16).
13) Verify the functionality of the sensor and adjust it as needed.

Checking the seat height adjustment sensor

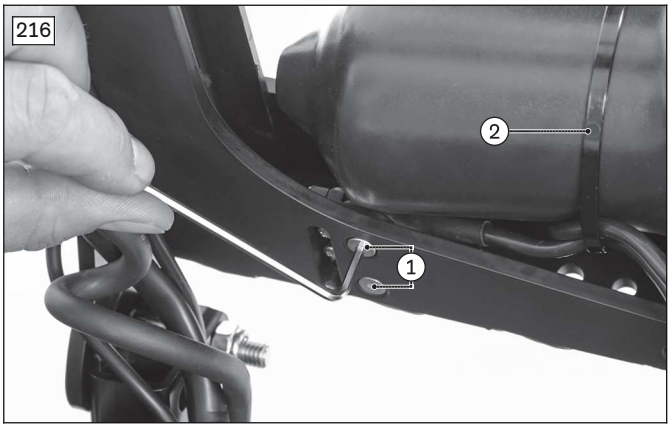
INFORMATION

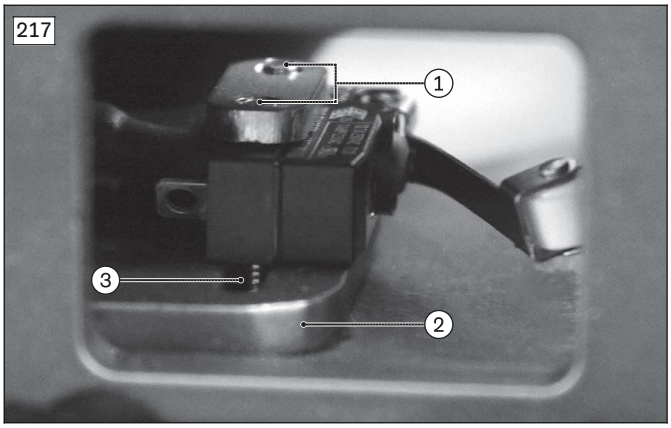
► With each of the tests, observe the seat height at which the driving speed starts to be reduced. The driving speed must be reduced by the sensor no later than at a seat height adjustment of **max. 10 cm**. If the driving speed is reduced too soon, too late or not at all during the tests, adjust the seat height adjustment sensor.

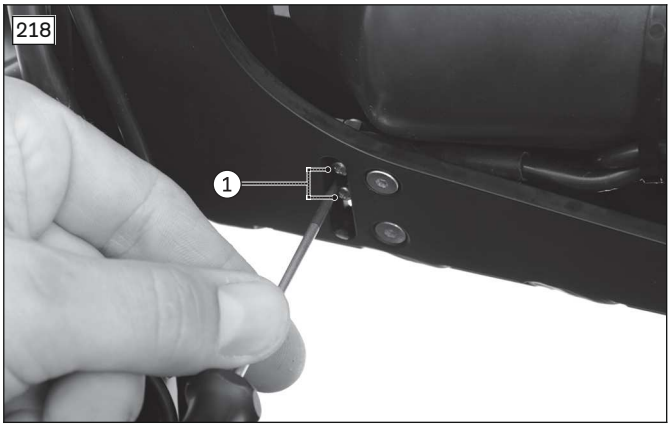
1) Activate the main fuse and turn the control device on (see page 16).
2) Move the seat to an upper position and carefully test the driving characteristics. The control device must reduce the speed in this case.
3) Move the seat to the lowest position and carefully test the driving characteristics. The control device must permit travel at full speed in this case.
4) Switch off the control device and deactivate the main fuse (see page 16).
5) If the driving speed is reduced too soon, too late or not at all, readjust the sensor.

Adjusting the seat height adjustment sensor

1) Switch off the control device and deactivate the main fuse (see page 16).
2) Fold up the seat (see page 16).
3) Loosen the 2 Phillips screws on the seat height adjustment sensor (see fig. 217, see fig. 218, item 1).
4) Slide the seat height adjustment sensor in the slotted hole of the sensor bracket (see fig. 217, item 3).
   → Slide forward: Increase the seat height at which the driving speed is reduced.
   → Slide backward: Decrease the seat height at which the driving speed is reduced.
5) Firmly tighten the 2 Phillips screws on the seat height adjustment sensor (see fig. 217, see fig. 218, item 1).
6) Fold down the seat (see page 16).
7) Verify the functionality of the sensor and readjust it if required.







4.13.13 Replacing the seat tilt actuator

Removing the seat tilt actuator

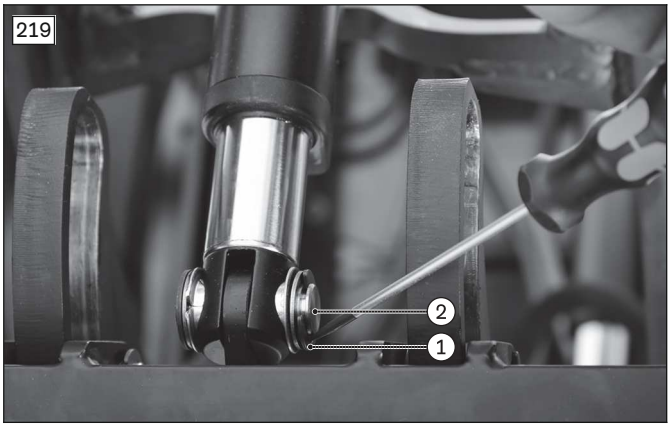
> **Prerequisites:**
Activate (lock) the brakes on both drive motors.
Optional: Move the seat to the highest seat height (see page 15). If seat height adjustment is not installed, fold up the seat and secure it against falling down and tipping over while being actively supported by a helper (see page 16).
Move the seat tilt to the lower end position. If you are unable to adjust the seat tilt, the seat should also be secured against falling down with the active support of a helper.
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

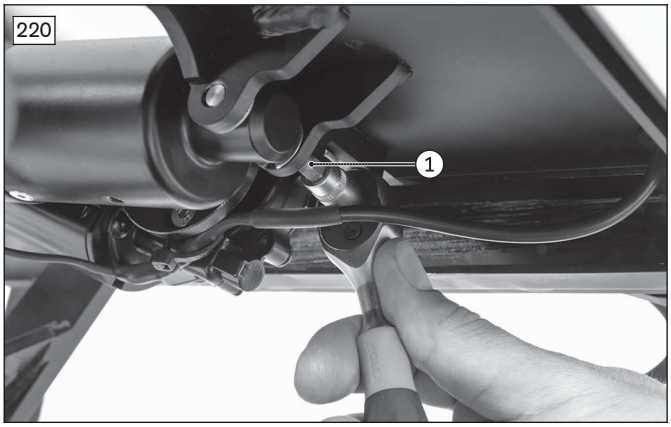
> **Tools:** small flat screwdriver; hexagon key, size 5; torque wrench with socket wrench insert, size 5; pin punch Ø 8 mm; hammer; soft-face mallet

1) Remove the seat plate (see page 81 ff.).
2) **INFORMATION: Note the installed position of the cable connections being loosened. The actuator cable is connected to the seat module or the controller depending on the configuration.**
Follow the actuator cable and disconnect it from the seat module/controller. To do so, remove the cover from the seat module/controller (see page 26 ff., see page 19).
3) Remove the lock ring on the bolt of the seat tilt (see fig. 219, item 1).
4) **CAUTION! Injuries due to pinching, crushing if the seat falls down. Secure the seat against falling down with the active support of a helper.**
Use a pin punch to knock the bolt out of the seat frame and bearing eye of the seat tilt actuator (see fig. 219, item 2).
5) Hold the seat tilt actuator firmly and loosen and remove the screw between the seat frame and actuator mounting (see fig. 220, item 1).
6) **INFORMATION: Note the installed position of the actuator cable.**
Remove the seat tilt actuator with the actuator cable. Remove additional cable attachments if necessary.
7) Lower the seat carefully and securely onto the seat frame.

Installing the seat tilt actuator

1) Insert the seat tilt actuator into the seat frame and hold it firmly.
2) Insert the screw between the seat frame and actuator mounting and firmly tighten it (see fig. 220, item 1).
3) Press the bolt into the seat frame and the bearing eye of the seat tilt actuator (see fig. 219, item 2).
4) Secure the bolt with the lock ring (see fig. 219, item 1).
5) Position and connect the actuator cable according to its original installed position.
INFORMATION: The actuator cable is connected to the seat module or the controller depending on the configuration.
6) Reattach the loosened cable attachments and covers.
7) Attach the seat plate (see page 81 ff.).





4.13.14 Replacing the stabiliser for power seat height adjustment

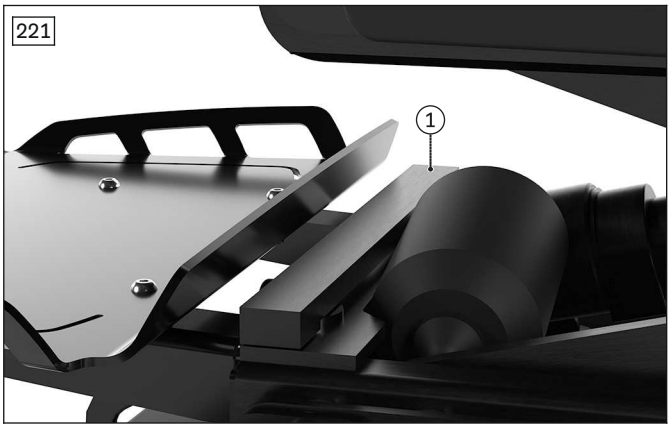
Removing the stabiliser device for power seat height adjustment

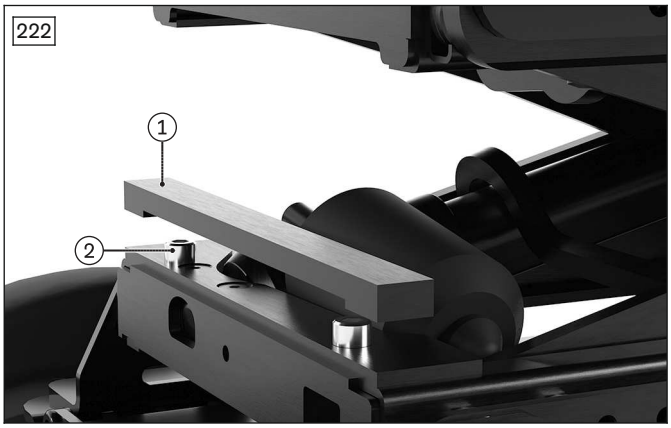
> **Prerequisites:**
> Move the seat to the upper seat height (see page 15).

1) Lift the stabiliser up to remove it and replace it (see fig. 221, see fig. 222, item 1).
2) **Without luggage carrier:** Loosen and remove the 2 hexagon socket screws on the module (see fig. 222, item 2).

Installing the stabiliser for power seat height adjustment

1) **Without luggage carrier:** Screw in the 2 hexagon socket screws on the module and firmly tighten them (see fig. 222, item 2).
2) Set the stabiliser downwards onto the 2 hexagon socket screws (see fig. 221, see fig. 222, item 1). The stabiliser is attached magnetically.





4.14 Back

NOTICE

Incorrect cable routing

Plug connections coming loose or damage to the cables due to installation errors

- ► Take note of the cables attached to the product with cable ties during all installation work.
- ► Carefully cut the cable ties with suitable side-cutting pliers if necessary. Ensure that you do not damage the cables during this process.
- ► Install the cables in such a way that they cannot be damaged. Leave an appropriate cable loop on moveable components so they can move without tension.
- ► Only use suitable fasteners (such as cable ties). Also use cable ties to secure the plug connections to the product so they cannot be disconnected unintentionally.

4.14.1 Replacing the bearing plates (standard seat)

Removing the bearing plate (standard seat)

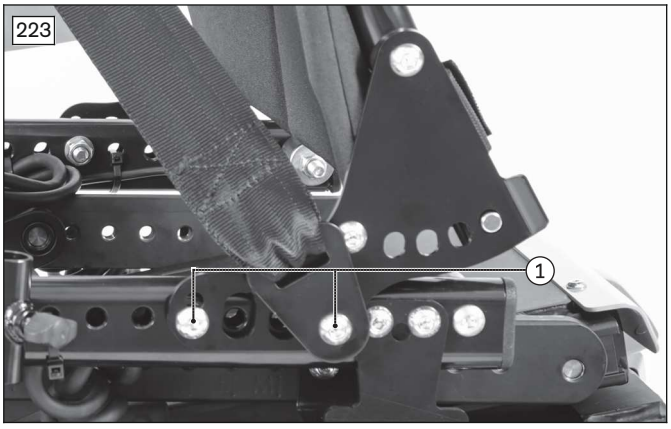
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

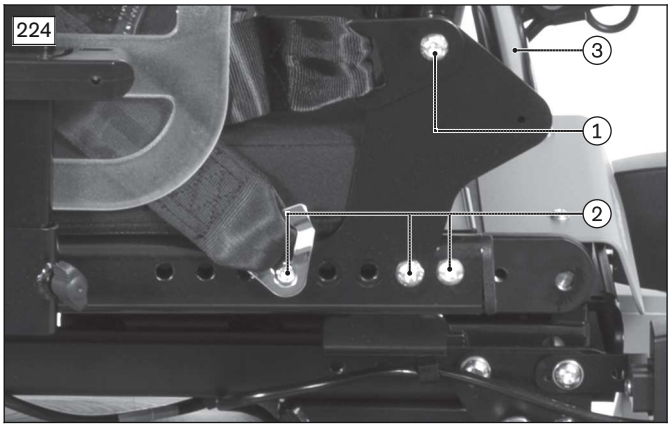
> **Tools:** hexagon key, size 5; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5

1) **Optional:** Remove the actuator for the power back support angle adjustment (see page 101).
2) Fold the back support forwards onto the seat.
3) Loosen and remove the bearing screw (see fig. 223, see fig. 224, item 1).
4) Loosen and remove the screws and nuts between the bearing plate and seat bar (see fig. 223, see fig. 224, item 2).
5) Remove the bearing plate.
INFORMATION: If a power back support angle adjustment is installed, both bearing plates are firmly attached to a connecting tube (see fig. 224, item 3). Remove and replace both bearing plates together in this case.

Installing the bearing plate (standard seat)

1) Position the bearing plate on the seat bar.
INFORMATION: If a power back support angle adjustment is installed, both bearing plates are firmly attached to a connecting tube (see fig. 224, item 3). Install both bearing plates together in this case.
2) Insert the screws and nuts between the bearing plate and seat bar and firmly tighten them (see fig. 223, see fig. 224, item 2).
3) Insert the bearing screw into the bearing plate and the back support and firmly tighten it (see fig. 223, see fig. 224, item 1).
4) Fold the back support to the rear.
5) **Optional:** Install the actuator for the power back support angle adjustment (see page 101).





4.14.2 Replacing the cover for the bearing plates (VAS seat)

Removing the cover for the bearing plate (VAS seat)

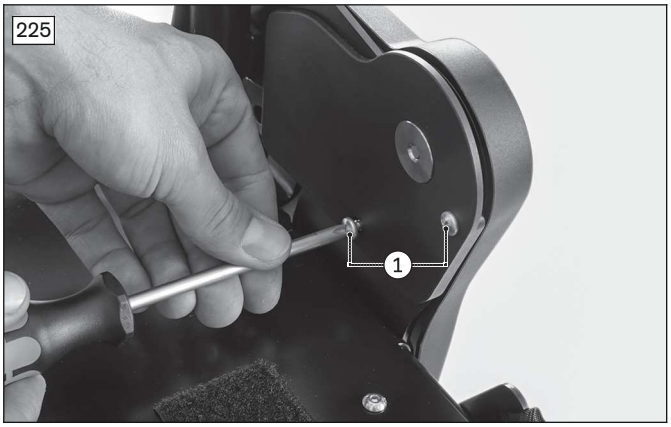
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

> **Tools:** pin wrench or screwdriver with Torx Plus 20IP

1) Loosen and remove the 3 screws on the inside of the bearing plate (see fig. 225, item 1).
2) Remove the cover for the bearing plate (see fig. 226).

Installing the cover for the bearing plate (VAS seat)

1) Position the cover on the bearing plate (see fig. 226).
2) Insert the 3 screws on the inside of the bearing plate and firmly tighten them (see fig. 225, item 1).



4.14.3 Replacing the bearing plates (VAS seat)

Removing the bearing plate (VAS seat)

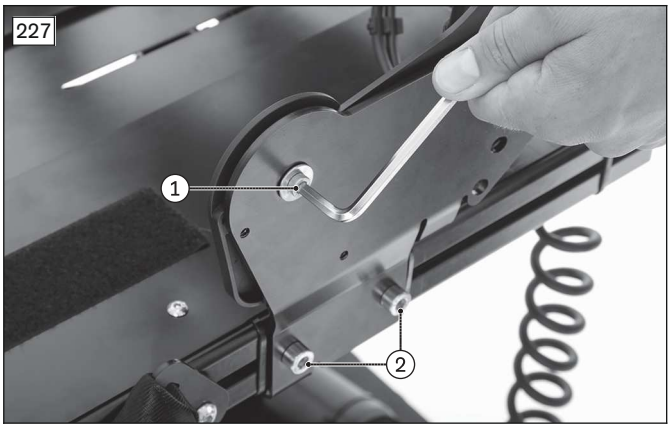
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

> **Tools:** hexagon key, size 5, 6; torque wrench with socket wrench insert, size 5, 6

1) Remove the cover on both bearing plates (see page 98).
2) **Optional:** Remove the actuator for the power back support angle adjustment (see page 104).
3) Fold the back support forwards onto the seat.
4) Loosen and remove the bearing screw (see fig. 227, item 1).
5) Loosen and remove the 2 screws between the bearing plate and seat bar (see fig. 227, item 2).
6) Remove the bearing plate.

Installing the bearing plate (VAS seat)

1) Position the bearing plate on the seat bar.
2) Insert the 2 screws between the bearing plate and seat bar and firmly tighten them (see fig. 227, item 2).
3) Insert the bearing screw into the bearing plate and the back support and firmly tighten it (see fig. 227, item 1).
4) Fold the back support to the rear.
5) **Optional:** Install the actuator for the power back support angle adjustment (see page 104).
6) Install the cover on both bearing plates (see page 98).



4.14.4 Adjusting and replacing the back support (standard seat)

INFORMATION

Please note that adjusting the seat depth changes the centre of gravity. To ensure that the driving characteristics are maintained, the seat depth after delivery of the power wheelchair may only be adjusted by **20 mm** respectively to the front or rear without additional conversion measures. For larger adjustments, the seat's centre of gravity must be adjusted by sliding the seat frame and combination seat height and seat tilt adjustment module relative to the drive platform. For further information, see page 86 ff.

Adjusting/removing the back support (standard seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

> **Tools:** hexagon key, size 5; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5

1) Loosen and remove the screws in the bearing plates on both sides (see fig. 223, see fig. 224, item 2).
2) Adjust the back support.
3) **INFORMATION: Note the installed position of the cables, cable attachments and add-on components of the back support.**
If necessary: Pull the back support down and off the seat frame. Loosen and remove all add-on components for the back support and cables with cable attachments.

Positioning/installing the back support (standard seat)

1) Position the back support on the seat frame and in the desired position.
2) Insert the screws for the bearing plates into the appropriate slots on both sides and firmly tighten them (see fig. 223, see fig. 224, item 2).
INFORMATION: Note that changing the seat depth may also change the installation positions of other components (e.g. elevating side panels). Additional or different mounting elements may be needed depending on the seat depth. Only choose positions that are permissible for the respective components.
3) Reattach all loosened cables, cable attachments and add-on components for the back support.
4) Check and adjust the seat's centre of gravity (see page 86 ff.).

4.14.5 Adjusting and replacing the back support (VAS seat)

INFORMATION

Please note that adjusting the seat depth changes the centre of gravity. To ensure that the driving characteristics are maintained, the seat depth after delivery of the power wheelchair may only be adjusted by **20 mm** respectively to the front or rear without additional conversion measures. For larger adjustments, the seat's centre of gravity must be adjusted by sliding the seat frame and combination seat height and seat tilt adjustment module relative to the drive platform. For further information, see page 88 ff.

Adjusting/removing the back support (VAS seat)

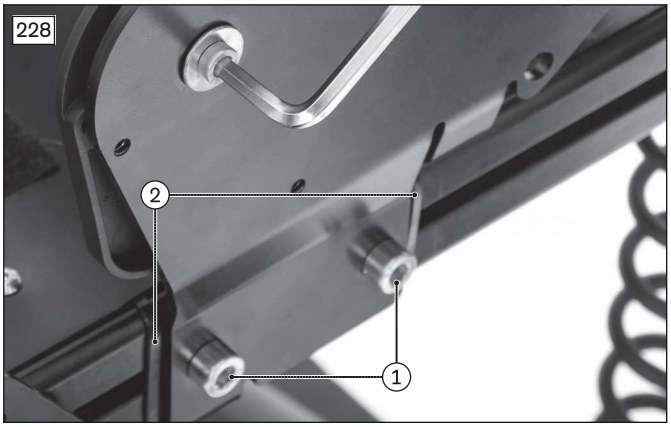
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Remove the cover on both bearing plates (see page 98).
2) Loosen the 2 screws in the bearing plates on both sides (see fig. 228, item 1).
3) Adjust the back support. If necessary, remove the cable attachments along the seat bars (see fig. 228, item 2).
4) **INFORMATION: Note the installed position of the cables, cable attachments and add-on components of the back support.**
If necessary: Pull the back support with the slide block down and off the seat bars. Loosen and remove all add-on components for the back support and cables with cable attachments.

Positioning/installing the back support (VAS seat)

1) Position the back support with the slide block on the seat bars and slide it to the desired position.
INFORMATION: Position the back support evenly using the markings on the seat plate (see fig. 229).
2) Firmly tighten the 2 screws in the bearing plates on both sides (see fig. 228, item 1).
3) Reattach the cable attachments along the seat bars (see fig. 228, item 2).
4) Reattach all loosened cables, cable attachments and add-on components for the back support.
5) Install the cover on both bearing plates (see page 98).
6) Check and adjust the seat's centre of gravity (see page 88 ff.).



4.14.6 Replacing the power back support angle adjustment (standard seat)

INFORMATION

Power back support angle adjustment (standard seat) requires a special back support frame and bearing plates, and is replaced together with these (see page 99). The back support angle adjustment actuator can be replaced separately (see page 101).
When changing the back support angle adjustment type (mechanical or power back support angle adjustment), additional adjustments such as additional control modules, new cabling or reprogramming the control device may be required. Contact your national Ottobock team before changing the back support angle adjustment type.

Removing the power back support angle adjustment (standard seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

> **Tools:** hexagon key, size 6; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 6

1) Remove the actuator for the power back support angle adjustment (see page 101) and fold the back support forwards onto the seat.
2) **If necessary:** Remove and replace the back support (see page 99).
3) **Optional:** Install the manual back support angle adjustment (see page 102).

Installing the power back support angle adjustment (standard seat)

1) **Optional:** Remove the manual back support angle adjustment (see page 102).
2) **If necessary:** Install the back support for the power back support angle adjustment (see page 99).
3) Install the actuator for the power back support angle adjustment (see page 101).

4.14.7 Replacing the actuator for the power back support angle adjustment (standard seat)

Removing the actuator for the power back support angle adjustment (standard seat)

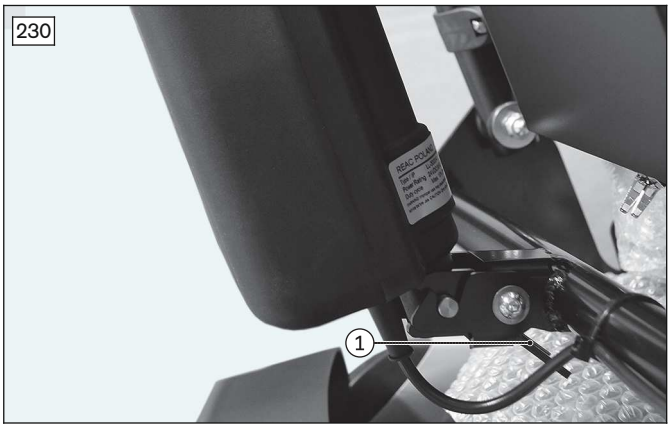
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** hexagon key, size 4; torque wrench with socket wrench insert, size 4

1) **INFORMATION: Note the installed position of the cable connections being loosened. The actuator cable is connected to the seat module or the controller depending on the configuration.**
Follow the actuator cable and disconnect it from the seat module/controller. To do so, remove the cover from the seat module / controller (see page 26, see page 19).
2) Pull the retaining claw on the lower back support connection tube (see fig. 230, item 1).
3) Fold the back support forwards onto the seat.
4) Loosen and remove the screw between the back and the bearing eye of the power back angle adjustment actuator (see fig. 231, item 1).
5) **INFORMATION: Note the installed position of the actuator cable.**
Remove the actuator for the power back support angle adjustment with the actuator cable. Remove additional cable attachments if necessary.

Installing the actuator for the power back support angle adjustment (standard seat)

1) Insert the actuator for the power back support angle adjustment into the back support and hold it firmly.
2) Insert the screw into the back and the bearing eye of the power back angle adjustment actuator and firmly tighten it (see fig. 231, item 1).
3) Carefully fold the back support to the rear.
4) Pull the retaining claw on the lower back support connecting tube and engage the actuator (see fig. 230, item 1).
5) Check that the actuator is securely engaged in the retaining claw.
6) Position and connect the actuator cable according to its original installed position.
   INFORMATION: The actuator cable is connected to the seat module or the controller depending on the configuration.
7) Reattach the loosened cable attachments and covers.



4.14.8 Replacing the manual back support angle adjustment (standard seat)

INFORMATION

The manual back support angle adjustment (standard seat) is replaced together with the back support frame and bearing plates (see page 99). The release strap with locking bolts can be replaced separately.
When changing the back support angle adjustment type (mechanical or power back support angle adjustment), additional adjustments such as additional control modules, new cabling or reprogramming the control device may be required. Contact your national Ottobock team before changing the back support angle adjustment type.

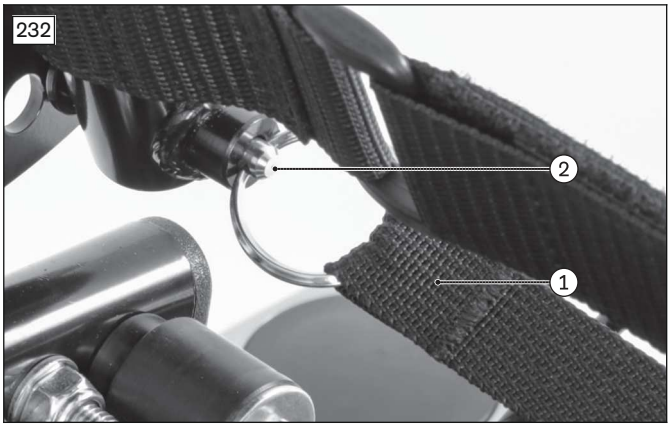
Removing the manual back support angle adjustment (standard seat)

> **Prerequisites:**
  Switch off the control device and deactivate the main fuse (see page 16).
  Remove the seat cushion and back support pad.

1) Pull the release strap (see fig. 232, item 1) and fold the back support forwards onto the seat.
2) Rotate the key ring on the release strap out of the eyelet of the locking bolt on both sides (see fig. 232, item 2).
3) Remove the locking bolt with compression spring from the back support tube on both sides.
4) **Optional:** Install the power back support angle adjustment (see page 101).

Installing the manual back support angle adjustment (standard seat)

1) **Optional:** Remove the power back support angle adjustment (see page 101).
2) **Optional:** Replace the bearing plates for the power back support angle adjustment with bearing plates for the manual back support angle adjustment (see page 98).
3) Insert the locking bolt with compression spring into the back support tube on both sides.
4) Turn the key ring on the release strap into the eyelet of the locking bolt on both sides (see fig. 232, item 2).
5) Pull the release strap (see fig. 232, item 1) and fold the back support to the rear and engage it.



4.14.9 Replacing the power back support angle adjustment (VAS seat)

INFORMATION

The power back support angle adjustment (VAS seat) requires a lower and a special upper connecting tube, and is replaced together with these. The back support angle adjustment actuator can be replaced separately (see page 104).
When changing the back support angle adjustment type (mechanical or power back support angle adjustment), additional adjustments such as additional control modules, new cabling or reprogramming the control device may be required. Contact your national Ottobock team before changing the back support angle adjustment type.

Removing the power back support angle adjustment (VAS seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

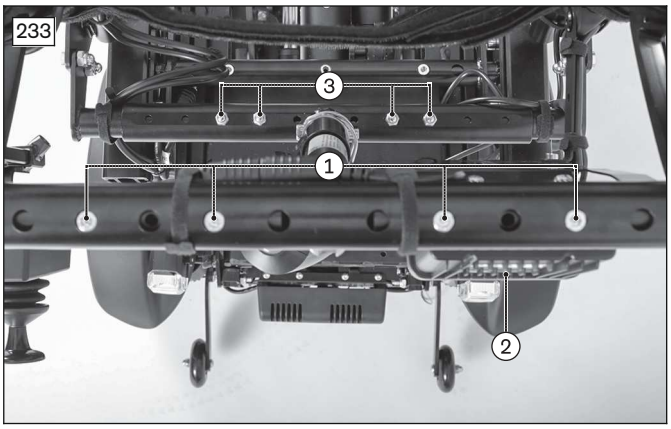
> **Tools:** hexagon key, size 6; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 6

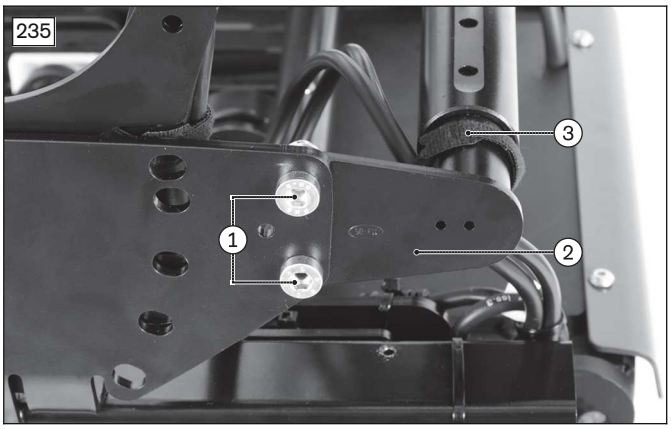
1) Remove the cover from both bearing plates (see page 98).
2) Remove the actuator for the power back support angle adjustment (see page 104).
3) Fold the back support forwards onto the seat.
4) Loosen and remove the 4 screws and nuts on the upper connecting tube (see fig. 233, item 1). Remove the seat module (optional) as you do so (see fig. 233, item 2; see page 26).
5) Loosen the upper connecting tube from the brackets on both sides. To do this, remove the set screws (see fig. 234, item 1, top) and the clamping screws (see fig. 234, item 1, bottom) and replace them.
6) Pull the inner tubes out of the upper connecting tube on both sides (see fig. 234, item 2).
7) Remove the upper connecting tube. Remove the cable attachments if necessary (see fig. 234, item 3).
8) Loosen and remove the 2 screws and nuts on the lower connecting tube on both sides (see fig. 235, item 1).
9) Remove the lower connecting tube (see fig. 235, item 2). Remove the cable attachments if necessary (see fig. 235, item 3).
10) **Optional:** Install the manual back support angle adjustment (see page 105).

Installing the power back support angle adjustment (VAS seat)

1) **Optional:** Remove the manual back support angle adjustment (see page 105).
2) Position the lower connecting tube on the bearing plates (see fig. 235, item 2).
INFORMATION: If necessary, adapt the lower connecting tube to the frame width. To do so, use the 4 screws of the lower connecting tube and firmly tighten them again after making the adjustment (see fig. 233, item 3).
3) Insert the 2 screws with nuts into the lower connecting tube and bearing plate on both sides and firmly tighten them (see fig. 235, item 1).
4) Insert the upper connecting tube and slide the inner tubes (see fig. 234, item 3) into the upper connecting tube on both sides (see fig. 234, item 2).
5) Insert the 4 screws and nuts into the appropriate slots in the upper connecting tube and firmly tighten them (see fig. 233, item 1). Attach the seat module (optional) as you do so (see fig. 233, item 2; see page 26).
6) Attach the upper connecting tube to the brackets. To do so, coat the set screws with Loctite 241 and screw them in (see fig. 234, item 1, top). Tighten the clamping screws to **10 Nm** (see fig. 234, item 1, bottom).

7) Reattach the loosened cable attachments (see fig. 234, see fig. 235, item 3).
8) Install the actuator for the power back support angle adjustment (see page 104).
9) Attach the cover for both bearing plates (see page 98).





4.14.10 Replacing the actuator for the power back support angle adjustment (VAS seat)

Removing the actuator for the power back support angle adjustment (VAS seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

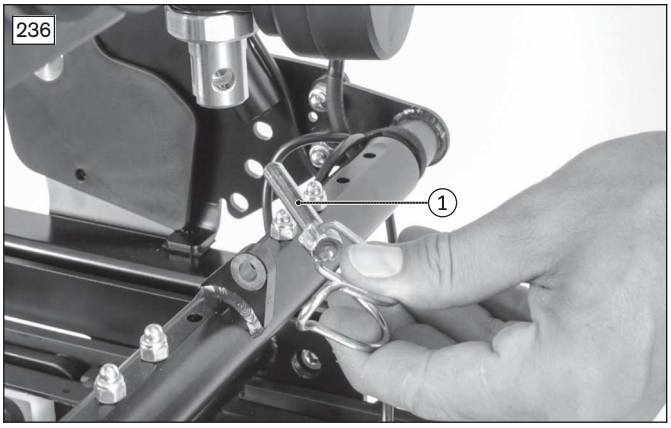
> **Tools:** 2 x hexagon key, size 4; torque wrench with socket wrench insert, size 4

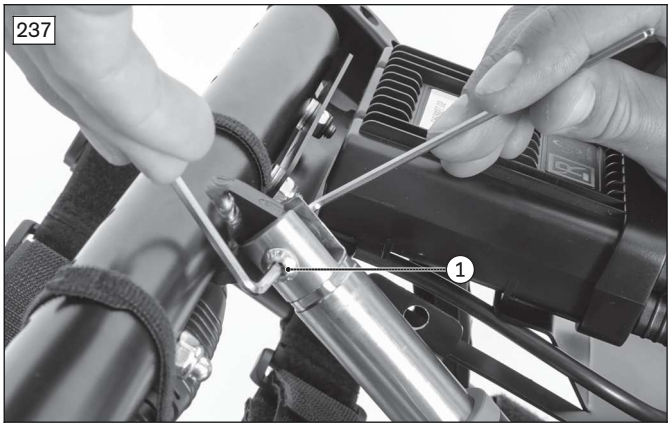
1) **INFORMATION: Note the installed position of the cable connections being loosened. The actuator cable is connected to the seat module or the controller depending on the configuration.**
Follow the actuator cable and disconnect it from the seat module/controller. To do so, remove the cover from the seat module/controller (see page 26, see page 19).
2) Disengage and pull out the quick release turnbuckle (see fig. 236, item 1).
3) Fold the back support forwards onto the seat.
4) Loosen and remove the screw with sleeve nut between the back support and the bearing eye of the power back support angle adjustment actuator (see fig. 237, item 1).
5) **INFORMATION: Note the installed position of the actuator cable.**
Remove the actuator for the power back support angle adjustment with the actuator cable. Remove additional cable attachments if necessary.

Installing the actuator for the power back support angle adjustment (VAS seat)

1) Insert the actuator for the power back support angle adjustment into the back support and hold it firmly.
2) Insert the screw with sleeve nut into the back support and the bearing eye of the power back support angle adjustment actuator and firmly tighten it (see fig. 237, item 1).
3) Carefully fold the back support to the rear and position the actuator on the lower connecting tube.
4) Insert the quick release turnbuckle into the back support and the actuator mounting and engage it (see fig. 236, item 1).

5) Position and connect the actuator cable according to its original installed position.
INFORMATION: The actuator cable is connected to the seat module or the controller depending on the configuration.
6) Reattach the loosened cable attachments and covers.





4.14.11 Replacing the manual back support angle adjustment (VAS seat)

INFORMATION

The manual back support angle adjustment (VAS seat) is replaced together with the upper connecting tube. The release strap with locking bolts can be replaced separately.
When changing the back support angle adjustment type (mechanical or power back support angle adjustment), additional adjustments such as additional control modules, new cabling or reprogramming the control device may be required. Contact your national Ottobock team before changing the back support angle adjustment type.

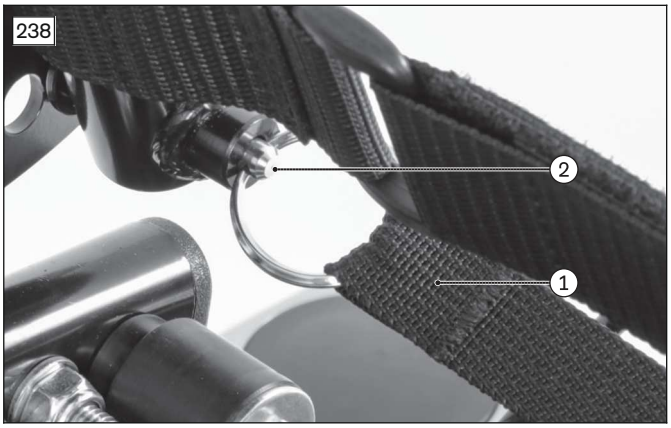
Removing the manual back support angle adjustment (VAS seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.
> **Tools:** hexagon key, size 6; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 6
1) Remove the cover from both bearing plates (see page 98).
2) Pull the release strap (see fig. 238, item 1) and fold the back support forwards onto the seat.
3) Loosen and remove the 4 screws and nuts on the upper connecting tube (see fig. 233, item 1). Remove the seat module (optional) as you do so (see fig. 233, item 2; see page 26).
4) Loosen the upper connecting tube from the brackets on both sides. To do this, remove the set screws (see fig. 234, item 1, top) and the clamping screws (see fig. 234, item 1, bottom) and replace them.
5) Pull the inner tubes out of the upper connecting tube on both sides (see fig. 234, item 2).
6) Remove the upper connecting tube. Remove the cable attachments if necessary (see fig. 234, item 3).
7) Rotate the key ring on the release strap out of the eyelet of the locking bolt on both sides (see fig. 238, item 2).
8) Remove the locking bolt with compression spring from the back support tube on both sides.
9) **Optional:** Install the power back support angle adjustment (see page 103).

Installing the manual back support angle adjustment (VAS seat)

1) **Optional:** Remove the power back support angle adjustment (see page 103).
2) Insert the locking bolt with compression spring into the back support tube on both sides.
3) Turn the key ring on the release strap into the eyelet of the locking bolt on both sides (see fig. 238, item 2).
4) Insert the upper connecting tube (see fig. 234, item 3). To do this, push the inner tubes into the upper connecting tube on both sides (see fig. 234, item 2).
5) Insert the 4 screws and nuts into the appropriate slots in the upper connecting tube and firmly tighten them (see fig. 233, item 1). Attach the seat module (optional) as you do so (see fig. 233, item 2; see page 26).
6) Attach the upper connecting tube to the brackets. To do so, coat the set screws with Loctite 241 and screw them in (see fig. 234, item 1, top). Tighten the clamping screws to **10 Nm** (see fig. 234, item 1, bottom).
7) Reattach the loosened cable attachments (see fig. 234, see fig. 235, item 3).
8) Pull the release strap (see fig. 238, item 1) and fold the back support to the rear and engage it.

9) Attach the cover for both bearing plates (see page 98).

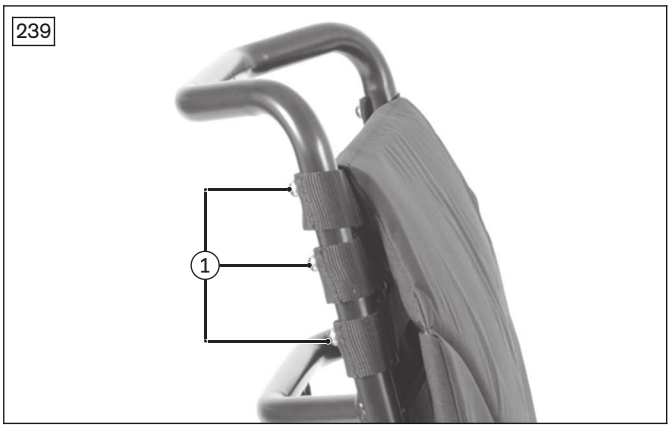


4.14.12 Replacing and adjusting the back support upholstery (standard seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

> **Tools:** hexagon key, size 4

1) Loosen and remove the 3 screws on the upper 3 hook-and-loop straps on both sides (see fig. 239, item 1).
2) Open all the hook-and-loop straps on the back support upholstery and replace if necessary (see fig. 240).
3) Working from the bottom to the top, adjust the tension of the hook-and-loop straps to the weight and anatomical condition of the user and fasten the straps one after the other.
INFORMATION: The two ends of the hook-and-loop strap have to overlap by at least 100 mm in each case.
INFORMATION: Adjust the respective lower hook-and-loop straps somewhat tighter. Deviating adjustments may be required in specific cases; this is the responsibility of the attending therapist.
4) Insert and firmly tighten the 3 screws on the upper 3 hook and loop straps on both sides (see fig. 239, item 1).



4.14.13 Replacing and adjusting the back support upholstery (VAS seat)

Removing the back straps

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion and back support pad.

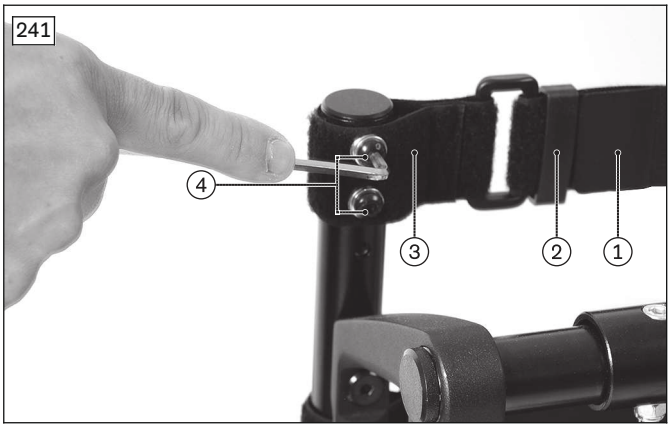
> **Tools:** hexagon key, size 4, 5

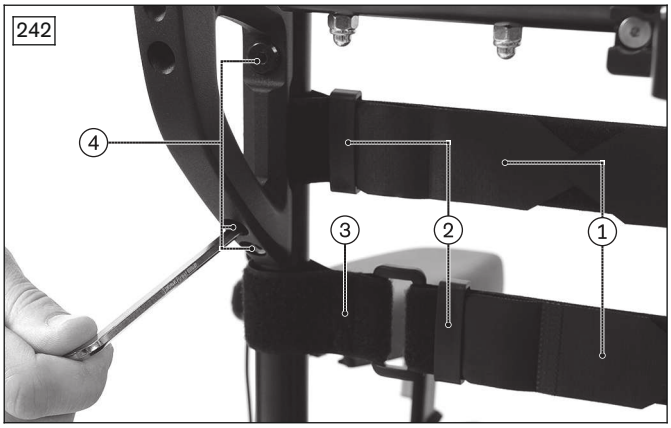
1) Open the hook-and-loop closures on both ends of the back straps (see fig. 241, see fig. 242, item 1).
2) Open and remove the Y hook-and-loop buckles on both ends of the back straps (see fig. 243).
3) Pull the free ends of the back straps out of the plastic clamps (see fig. 241, see fig. 242, item 2).
4) **If necessary:** Remove the top eyelets (see fig. 241, item 3). To do so, loosen and remove the 2 screws on the top hook-and-loop strap on both sides (see fig. 241, item 4).

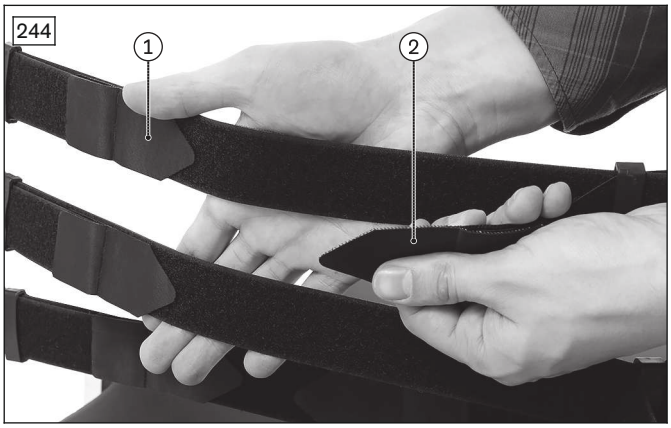
5) **CAUTION! Pinching, crushing due to falling frame components. Actively secure the back support frame and associated components against falling.**
If necessary: Remove the lower eyelets (see fig. 242, item 3). To do so, loosen and remove the 3 screws on the grip bars on both sides (see fig. 242, item 4).

Attaching and adjusting the back straps

1) **If necessary:** Attach the bottom eyelets (see fig. 242, item 3). Then reinsert and firmly tighten the 3 screws on the grip bars on both sides (see fig. 242, item 4).
2) **If necessary:** Attach the top eyelets (see fig. 241, item 3). To do so, insert and firmly tighten the 2 screws on the top hook-and-loop strap on both sides (see fig. 241, item 4).
3) Pull the free ends of the back straps through the eyelets and plastic clamps (see fig. 241, see fig. 242, item 2).
INFORMATION: The strap is passed directly around the back support tube in the area of the grip bars.
4) Place the Y hook-and-loop buckles around both ends of the back straps and fasten them (see fig. 243).
5) Fasten one end of each of the back straps (see fig. 244, item 1).
6) Pre-tension the back straps according to the needs of the user and fasten the loose end of the back straps (see fig. 244, item 2).
INFORMATION: The two ends of the back straps should not overlap. If necessary, shorten the back straps (without Y hook-and-loop buckles) until they can no longer overlap.







4.15 Side panels

4.15.1 Replacing the side panel holder (standard seat)

Removing the side panel holder (standard seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion.
> **Tools:** hexagon key, size 4; torque wrench with socket wrench insert, size 4

1) Removing the seat plate (see page 81).
2) Loosen the thumb screw on the side panel holder (see fig. 245, see fig. 246, item 1).
3) Pull the side panel up and out of the side panel holder. If necessary, remove or open the cable attachments along the side panel (see fig. 245, item 2).

4) Loosen the 2 clamping screws on the side panel holder (see fig. 246, item 2).
5) Pull the side panel holder out of the seat frame (see fig. 246, item 3).

Installing the side panel holder (standard seat)

1) Slide the side panel holder into the seat frame (see fig. 246, item 3).
   INFORMATION: Evenly slide the side panel holders into the seat frame according to the original seat width.
2) Firmly tighten the 2 clamping screws on the side panel holder (see fig. 246, item 2).
3) Slide the side panel into the side panel holder from above.
4) **If necessary:** Route the cable along the side panel according to its original installed position and reattach or close the loosened cable attachments (see fig. 245, item 2).
5) Firmly tighten the thumb screw on the side panel holder (see fig. 245, see fig. 246, item 1).
6) Install the seat plate (see page 81).

245

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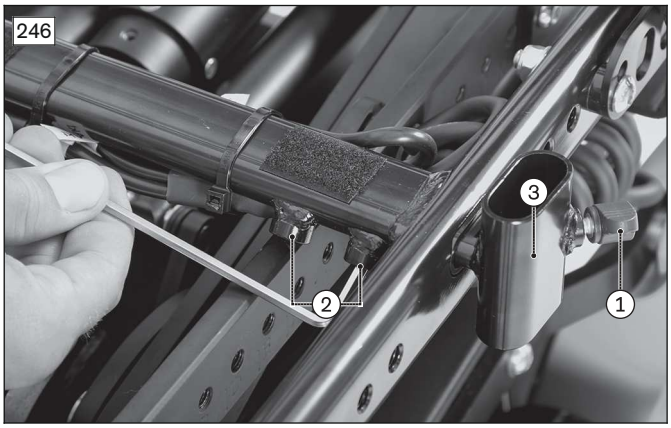


4.15.2 Replacing the side panel holder (VAS seat)

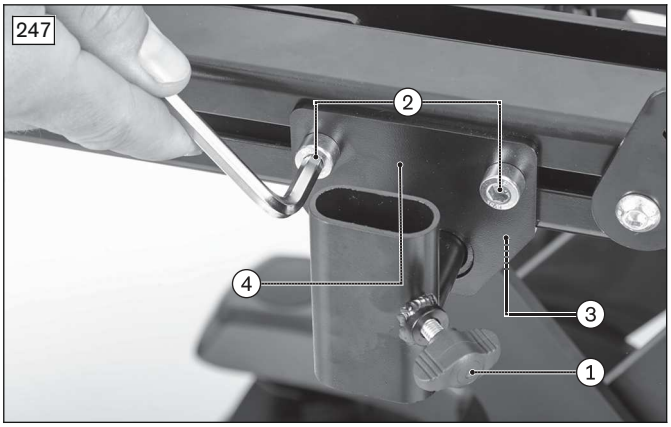
Removing the side panel holder (VAS seat)

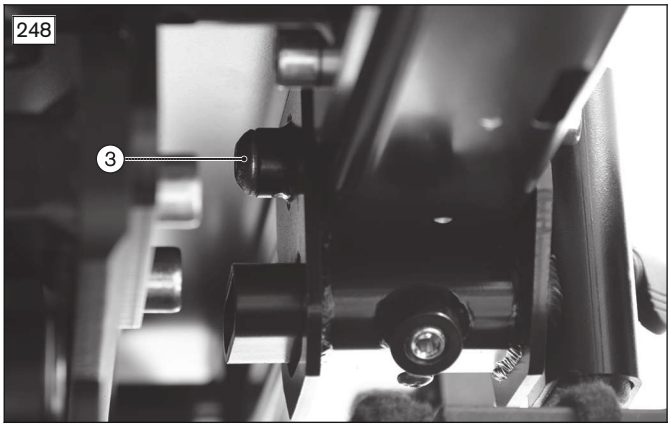
> **Prerequisites:**
  Switch off the control device and deactivate the main fuse (see page 16).
  If necessary: Remove the seat cushion.
> **Tools:** hexagon key, size 5, 6; torque wrench with socket wrench insert, size 5, 6

1) Pull the side panel up and out of the side panel holder. To do so, loosen the thumb screw on the side panel holder (see fig. 247, item 1).
2) Loosen and remove the 2 screws on the side panel holder (see fig. 247, item 2).
3) Loosen and remove the clamping screw on the back of the side panel holder (see fig. 247, see fig. 248, item 3).
   INFORMATION: Depending on the seat width, this screw may not be directly accessible. If necessary, first remove the seat plate and increase the seat width until the screw is accessible (see page 83).
4) Remove the side panel holder (see fig. 247, item 4).

Installing the side panel holder (VAS seat)

1) Place the side panel holder on the seat bar in its original position (see fig. 247, item 4).
2) Firmly tighten the clamping screw on the back of the side panel holder (see fig. 247, see fig. 248, item 3).
   INFORMATION: If the seat width was changed during removal, restore the original seat width and reinstall the seat plate (see page 83).
3) Insert and firmly tighten the 2 screws on the side panel holder (see fig. 247, item 2).
4) Slide the side panel into the side panel holder from above and firmly tighten the thumb screw on the side panel holder (see fig. 247, item 1).
5) Adjust both side panel holders evenly.
   INFORMATION: All instructions concerning the adjustment of the side panel holders are included in the instructions for use (qualified personnel). Sideways adjustment of the side panel holder may not be possible depending on the configuration and seat width.





4.15.3 Replacing the elevating side panel (standard seat)

NOTICE

Improper assembly work

Damage to product due to overloading

- ► Always insert a supporting profile into the frame tube before mounting an elevating side panel. Without the supporting profile, the standard seat cannot be sufficiently loaded.
- ► Always screw the axle and rotation lock (see fig. 250, item 1) to the supporting profile (see fig. 252, item 1).

INFORMATION

Additional or different mounting elements may be required, depending on the seat depth.

- ► Note the instructions regarding the required spacer washers (see page 112).
- ► Only choose positions that are permissible for the respective components.

Removing the elevating side panel (standard seat)

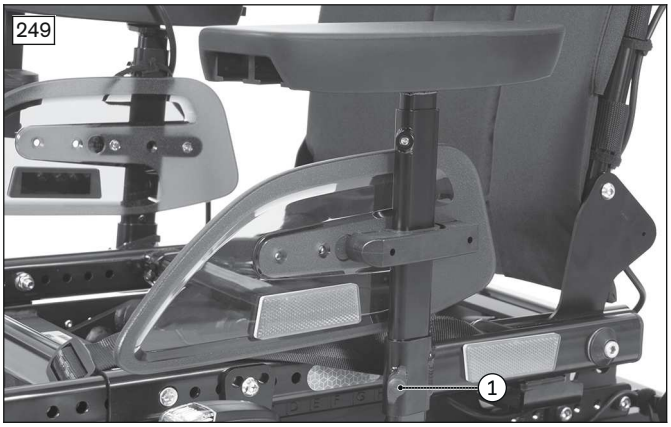
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion.

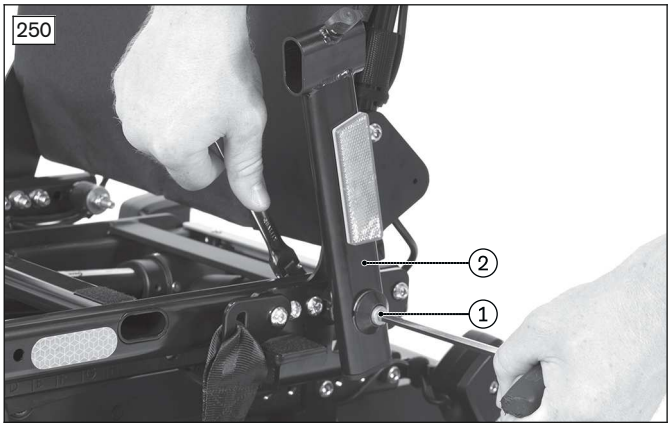
> **Tools:** hexagon key, size 5, 6; open-ended wrench size 13; torque wrench with socket wrench insert, size 5, 6

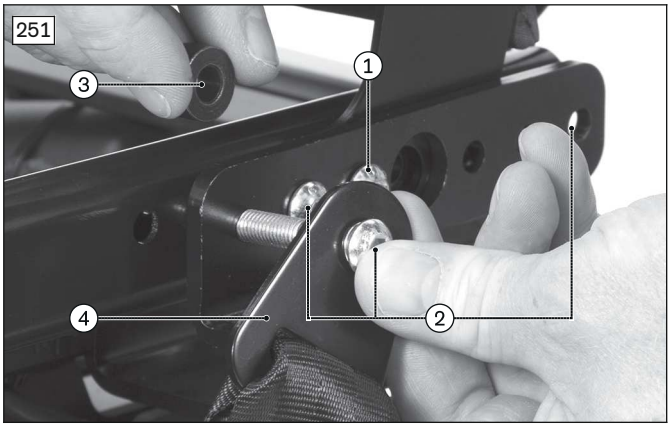
1) Remove the seat plate (see page 81).
2) Loosen the thumb screw on the arm support holder (see fig. 249, item 1).
3) Pull the side panel up and out of the arm support holder and safely set it aside. Remove or open additional cable attachments if necessary.
4) **INFORMATION: Note the installed position of the screw connections, spacer washers and accessories. Never loosen the back support on both sides of the seat frame at the same time.**
Loosen and remove the screw with thrust washer, washer and nut (see fig. 250, item 1).
INFORMATION: The washer is not present with the standard seat (small).
5) Loosen and remove the arm support holder with the axle (see fig. 250, item 2).
6) Loosen and remove the rotation lock with washer and nut (see fig. 251, item 1).
7) **INFORMATION: Note the installed position of the screw connections, spacer washers and accessories. Never loosen the back support on both sides of the seat frame at the same time.**
Loosen and remove the rear screws of the seat frame (see fig. 251, item 2).
8) Remove the adaption.
9) Remove the supporting profile from the frame tube (see fig. 252, item 1). To do so, remove the rear ribbed plug from the frame tube.
10) Insert the rear screws of the seat frame with washers and nuts and firmly tighten them (see fig. 253, item 1).
INFORMATION: Additional accessory components, such as a lap belt, may be attached with these screws (see fig. 251, item 4). Restore the original installed position.
11) Seal the frame tube with a ribbed plug (see fig. 253, item 2).
12) Attach a standard side panel holder (see page 107).
13) Attach the seat plate (see page 81).

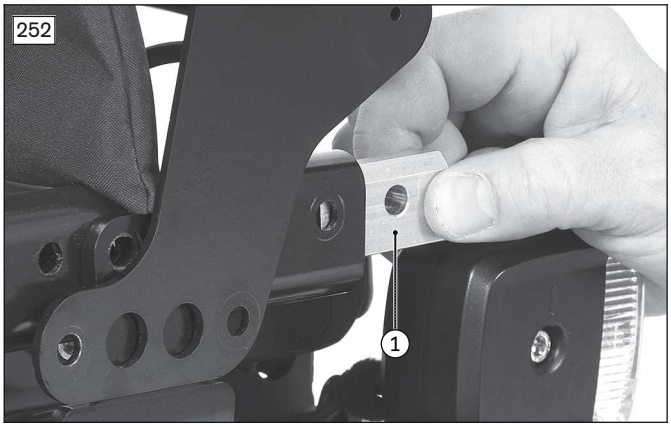
Installing the elevating side panel (standard seat)

1) Remove the seat plate (see page 81).
2) Remove the standard side panel holder (see page 107).
3) **INFORMATION: Note the installed position of the screw connections, spacer washers and accessories. Never loosen the back support on both sides of the seat frame at the same time.**
   Loosen and remove the rear screws of the seat frame (see fig. 253, item 1).
4) Remove the rear ribbed plug from the frame tube (see fig. 253, item 2).
5) Insert the supporting profile into the frame tube (see fig. 252, item 1).
   INFORMATION: Check whether the supporting profile fits properly and can be subsequently moved. Adapt the supporting profile to the frame tube if necessary.
6) Position the adaption on the seat frame and align the supporting profile so it is centred relative to the adaption.
   INFORMATION: The position of the adaption depends on the seat depth. Only set positions that are listed in the following table (see page 111). Make sure that the rotation lock and axle are subsequently screwed securely to the supporting profile.
7) Insert the rotation lock with washer (under the screw head) and nut, and firmly tighten it to **25 Nm** (see fig. 251, item 1).
8) Insert the rear screws of the seat frame and adaption with washers and nuts and firmly tighten them (see fig. 251, item 2).
   INFORMATION: Depending on the size of the seat frame, insert additional spacer washers so that the adaption is not canted or bent (see fig. 251, item 3; see page 112).
   INFORMATION: Additional accessory components, such as a lap belt, may be attached with these screws (see fig. 251, item 4). Attach these components together with the adaption and restore the original installed position.
9) Position the arm support holder and the axle on the adaption (see fig. 250, item 2).
   INFORMATION: Position the axle so that the rotation lock engages securely in the recess. Align the arm support holder so that the thumb screw faces out.
10) Insert the screw with thrust washer, washer and nut, and firmly tighten it to **25 Nm** (see fig. 250, item 1).
    INFORMATION: Do not insert the washer with the standard seat (small).
11) Seal the frame tube with a ribbed plug.
12) Slide the side panel into the arm support holder from above.
13) Firmly tighten the thumb screw on the arm support holder (see fig. 249, item 1).
14) **If necessary:** Install the cables along the arm support holder above the pivot point. Do so by attaching or closing the loosened cable attachments along the frame.
    INFORMATION: Swivel the side panel and make sure that cables cannot get stretched, pinched or caught when the wheelchair is operated.
15) Check the motion of the arm support holder and the length of the cables.
16) Attach the seat plate (see page 81).









4.15.3.1 Permissible positions of the adaption

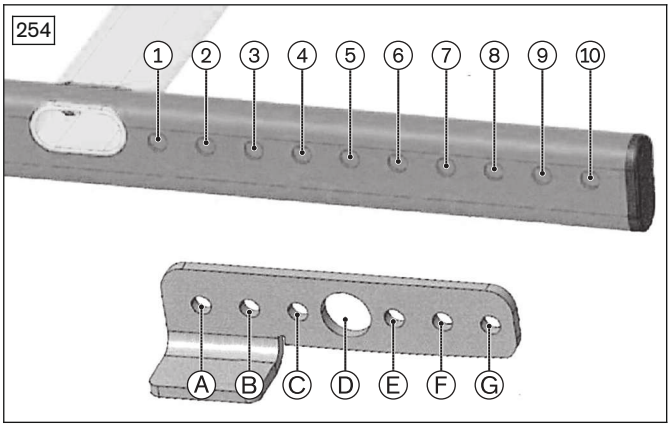
INFORMATION

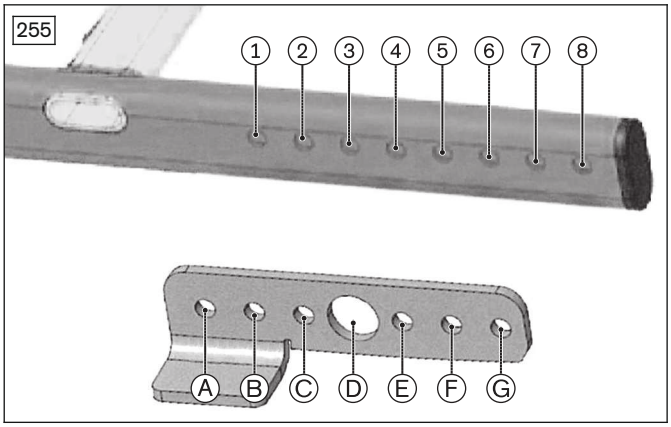
The version of the frame tubes may differ depending on the configuration.

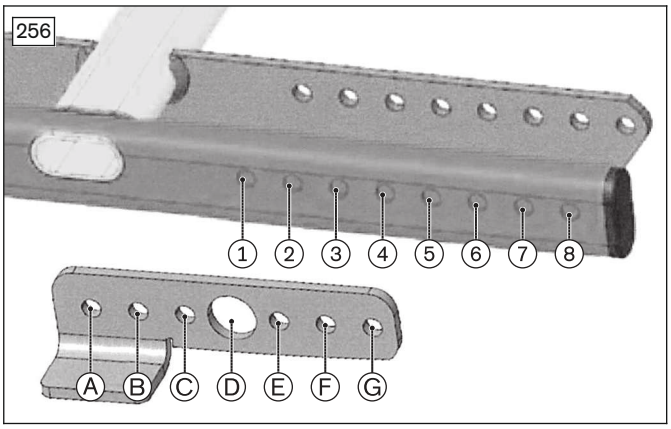
► Contact your national Ottobock team if you find an installed position or version that deviates from the following tables or illustrations.

Seat depth [cm]	Standard seat (small) (see fig. 254)	Standard seat (large) (see fig. 255)	Standard seat (XL) (see fig. 256)
38	A1 and G7	Not allowed	Not allowed
40	A1 and G7	Not allowed	Not allowed
42	A2 and G8	B1 and G6*	B1 and G6*
44	A3 and G9	B1 and G6*	B1 and G6*
46	A3 and G9	A1 and G7	A1 and G7
48	Not allowed	A1 and G7	A1 and G7
50	Not allowed	A1 and G7	A1 and G7

* Rotation lock on E4







4.15.3.2 Required spacer washers

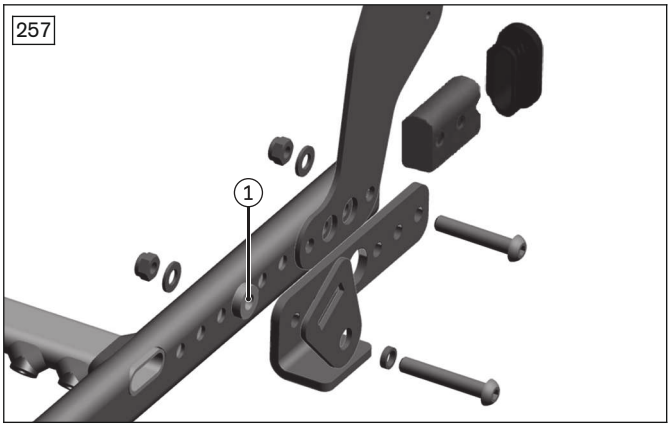
INFORMATION

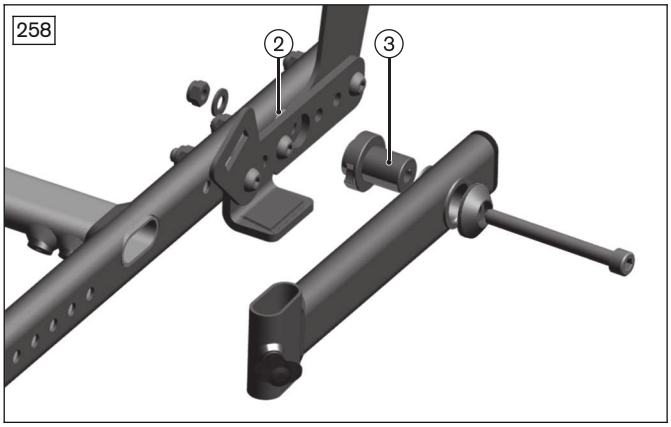
- ► Always use metal spacer washers if possible. The information in the table refers to the respective spacer washer thickness. If additional components are attached to the seat, additional or different mounting elements may be needed.
- ► Always choose the spacer washers so that no parts are canted or bent. For further information, please contact your national Ottobock team.

Seat depth [cm]	Standard seat (small)		Standard seat (large/XL)	
	Front spacer (see fig. 257, item 1)	Rear spacer* (see fig. 258, item 2)	Front spacer (see fig. 257, item 1)	Rear spacer* (see fig. 258, item 2)
38	8.5 mm	5.0 mm	Seat depth not allowed	Seat depth not allowed
40	8.5 mm	5.0 mm	Seat depth not allowed	Seat depth not allowed
42	8.5 mm	5.0 mm	None	3.0 mm**
44	8.5 mm	5.0 mm	None	None
46	8.5 mm	8.5 mm	3.0 mm	None
48	Seat depth not allowed	Seat depth not allowed	3.0 mm	None
50	Seat depth not allowed	Seat depth not allowed	3.0 mm	3.0 mm

* Installation under the axle (see fig. 258, item 3)

** Installation under the farthest rear bore of the adaption (see fig. 258, item 2)





4.15.4 Replacing the elevating side panel (VAS seat)

Removing the elevating side panel (VAS seat)

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the seat cushion.

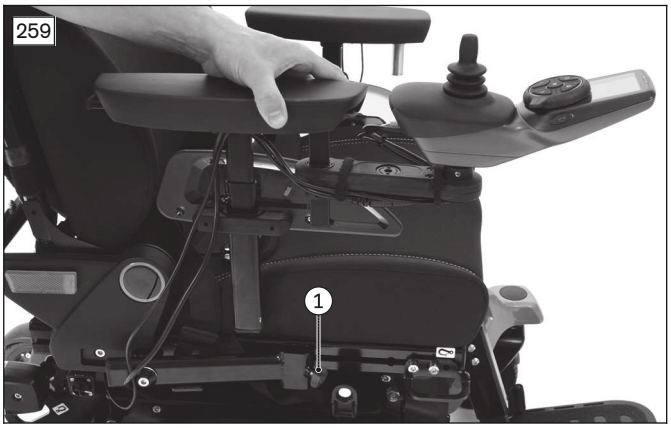
> **Tools:** hexagon key, size 5, 6; torque wrench with socket wrench insert, size 5, 6

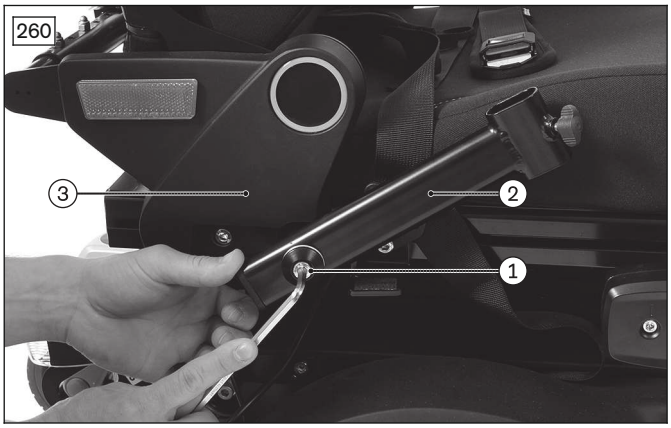
1) Loosen the thumb screw on the arm support holder (see fig. 259, item 1).
2) Pull the side panel up and out of the arm support holder and safely set it aside (see fig. 259). Remove or open additional cable attachments if necessary.
3) Loosen and remove the screw with thrust washer (see fig. 260, see fig. 261, item 1).
INFORMATION: Alternatively, the arm support holder can remain on the axle when the entire elevating side panel is replaced. To do so, swing the arm support holder up by 90° and proceed with step 5).
4) Pull the arm support holder off the axle (see fig. 260, see fig. 261, item 2).
5) Remove the cover for the bearing plate (see fig. 260, item 3; see page 98).
6) **INFORMATION: Note the installed position of the screw connections and accessories. Never loosen the back support on both sides of the seat frame at the same time.**
Loosen and remove the 2 screws of the adaption (see fig. 262, item 1).
7) Remove the adaption (see fig. 262, item 2).
8) **If necessary:** Remove slide blocks that are not needed from the seat bar. To do so, push the slide block through the opening on the bottom of the seat bar (see fig. 263, item 1).
9) Insert the rear screw of the back support and tighten firmly to **25 Nm** (see fig. 264, item 1). If necessary, insert and firmly tighten the screws of the additional accessories (see fig. 264, item 2).
INFORMATION: Restore the original installed position.
10) Attach a standard side panel holder (see page 108).
11) Install the cover for the bearing plate (see page 98).

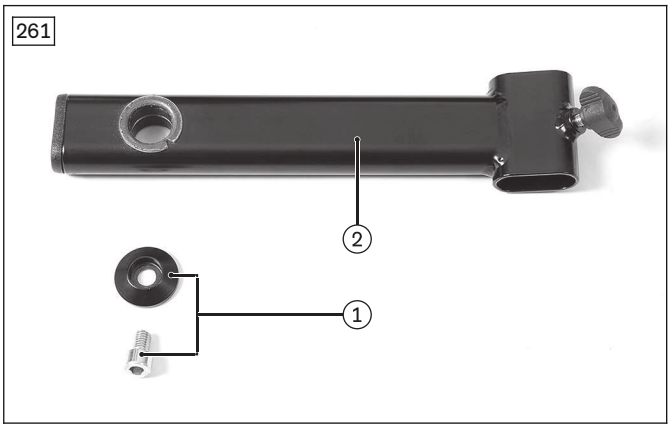
Installing the elevating side panel (VAS seat)

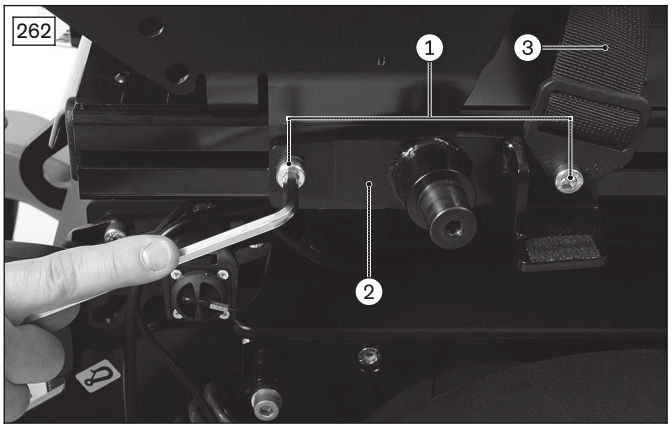
1) Remove the standard side panel holder (see page 108).
2) Remove the cover for the bearing plate (see page 98).
3) **INFORMATION: Note the installed position of the screw connections and accessories. Never loosen the back support on both sides of the seat frame at the same time.**
Loosen and remove the rear screw of the back support (see fig. 264, item 1). If necessary, loosen and remove the screws of the additional accessories (see fig. 264, item 2).
4) **If necessary:** Insert a slide block into the seat bar and slide it to the desired position. To do so, push the slide block through the opening on the bottom of the seat bar (see fig. 263, item 1).
5) Position the adaption on the seat bar (see fig. 262, item 2).
6) Insert the 2 screws of the adaption and firmly tighten them to **25 Nm** (see fig. 262, item 1).
INFORMATION: Additional accessory components, such as a lap belt, may be attached with these screws (see fig. 262, item 3). Attach these components together with the adaption and restore the original installed position.

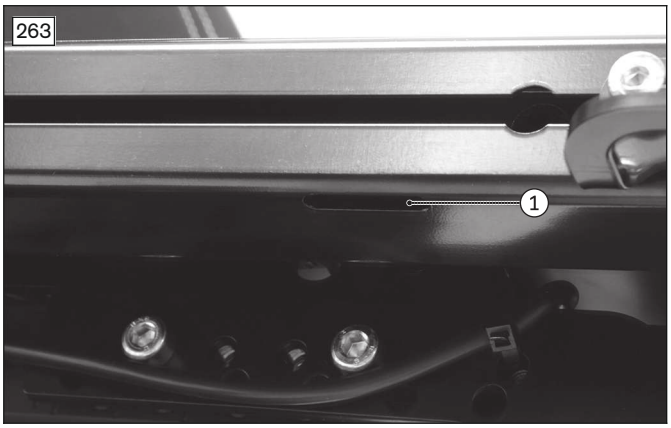
7) Slide the arm support holder onto the axle so that the thumb screw faces out (see fig. 260, see fig. 261, item 2).
   INFORMATION: Steps 7) and 8) are only required if the arm support holder was disconnected from the axle.
8) Insert the screw with thrust washer, and firmly tighten it to **25 Nm** (see fig. 260, see fig. 261, item 1).
9) Install the cover for the bearing plate (see fig. 260, item 3; see page 98).
   INFORMATION: The elevating side panel requires a special cover with a recess.
10) Slide the side panel into the arm support holder from above (see fig. 259).
11) Firmly tighten the thumb screw on the arm support holder (see fig. 259, item 1).
12) **If necessary:** Install the cables along the arm support holder above the pivot point. Do so by attaching or closing the loosened cable attachments along the frame.
    INFORMATION: Swivel the side panel and make sure that cables cannot get stretched, pinched or caught when the wheelchair is operated.
13) Check the motion of the arm support holder and the length of the cables.

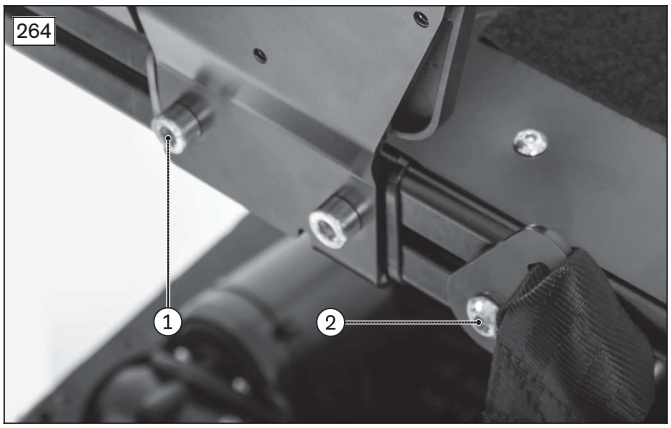












4.15.5 Replacing the forearm support

Removing the forearm support

> **Tools:** hexagon key, size 3; torque wrench with socket wrench insert, size 3

1) **Optional:** Remove the control panel with swivel arm (see page 33).
2) Pull the side panel up and out of the side panel holder. To do so, loosen the thumb screw on the side panel holder (see fig. 246, see fig. 247, item 1).
3) Loosen the 2 set screws on the bottom of the forearm support (see fig. 265, item 1).
4) Slide the forearm support down and off the side panel.

Attaching the forearm support

1) Slide the forearm support onto the side panel and into the desired position.
2) Firmly tighten the 2 set screws on the bottom of the forearm support (see fig. 265, item 1).
3) Slide the side panel into the side panel holder from above and firmly tighten the thumb screw on the side panel holder (see fig. 246, see fig. 247, item 1).
4) **Optional:** Install the control panel with swivel arm (see page 33).

4.15.6 Replacing the clothing guard

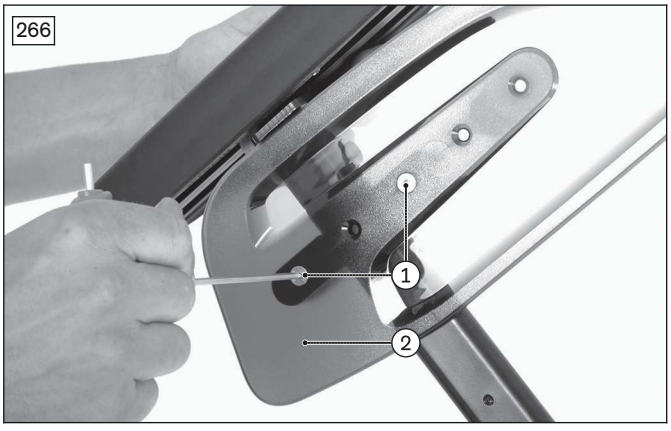
Removing the clothing guard

> **Tools:** hexagon key, size 3; torque wrench with socket wrench insert, size 3

1) Pull the side panel up and out of the side panel holder. To do so, loosen the thumb screw on the side panel holder (see fig. 246, see fig. 247, item 1).
2) Loosen and remove the 2 screws on the clothing guard (see fig. 266, item 1).
3) Remove the clothing guard from the side panel (see fig. 266, item 2).

Attaching the clothing guard

1) Position the clothing guard on the side panel (see fig. 266, item 2).
2) Insert the 2 screws into the clothing guard and firmly tighten them (see fig. 266, item 1).
3) Slide the side panel into the side panel holder from above and firmly tighten the thumb screw on the side panel holder (see fig. 246, see fig. 247, item 1).



4.16 Legrests

4.16.1 Replacing the leg support holder

Removing the leg support holder

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the leg supports.
If necessary: Remove the seat cushion.

> **Tools:** hexagon key, size 5, 6; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5, 6

1) **If necessary:** Remove the seat plate (see page 81 ff).
2) Loosen the leg support holder:
   → **Standard seat:** Loosen and remove the screw and nut between the leg support holder and seat bar (see fig. 267, item 1).
   → **VAS seat:** Loosen and remove the 2 screws between the leg support holder and seat bar (see fig. 268, item 1). As you do so, remove the slide block on the inside of the seat bar as well (see fig. 268, item 2).
3) **Optional:** Follow and disconnect the cable for the power leg support holder. Remove or open additional cable attachments if necessary.
4) Pull the leg support holder out of the seat bar.

Installing the leg support holder

1) Slide the leg support holder into the seat bar to the desired depth.
2) Attach the leg support holder:
   → **Standard seat:** Insert the screw and nut into the appropriate slot between the leg support holder and seat bar and firmly tighten it (see fig. 267, item 1).
   → **VAS seat:** Insert the slide block on the inside of the seat bar (see fig. 268, item 2). Insert the 2 screws between the leg support holder and slide block and firmly tighten them (see fig. 268, item 1).
3) **Optional:** Position and connect the cable for the power leg support holder according to its original installed position. Attach or close additional cable attachments along the seat frame if necessary.
4) Install the seat plate (see page 81 ff.).

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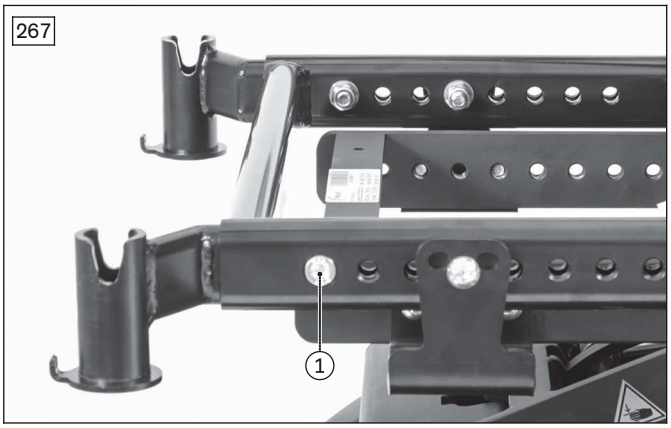

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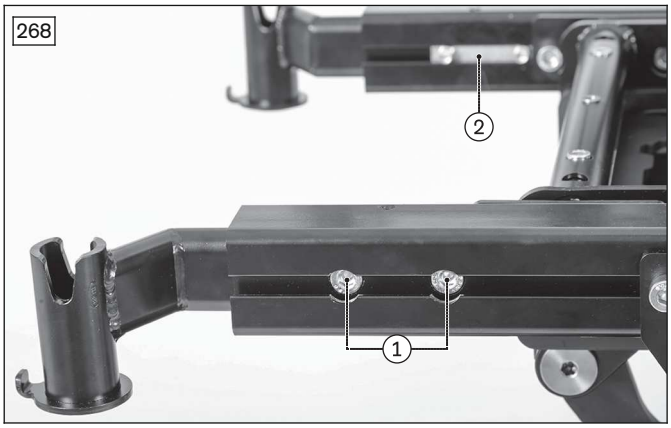


4.16.2 Replacing the central leg support

⚠ CAUTION

Failure to observe installation instructions

Pinching, crushing due to falling parts

► The central leg support and its individual parts have a substantial weight. Secure the parts against falling before loosening them.

Removing the central leg support

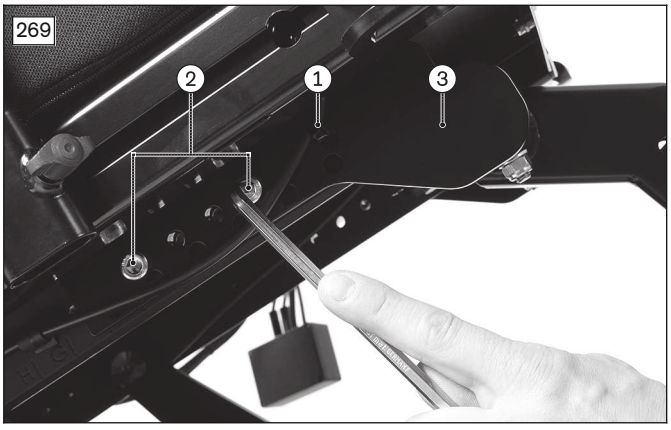
> **Prerequisites:**
If necessary: Move the seat tilt into the top position.
Switch off the control device and deactivate the main fuse (see page 16).

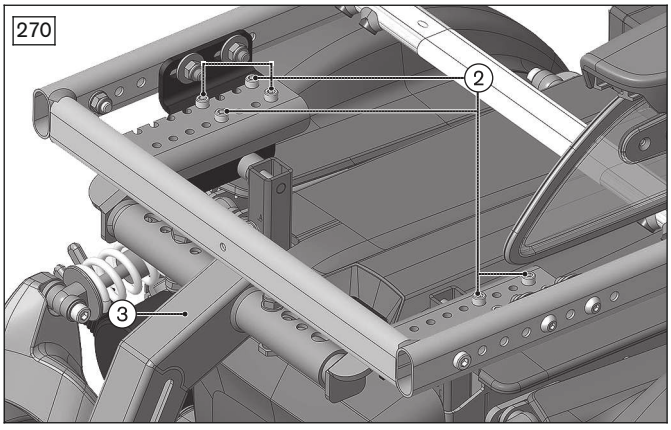
> **Tools:** hexagon key, size 5, 6; ring and open-ended wrench, size 13, 17; torque wrench with socket wrench insert, size 5, 6 and socket wrench insert, size 13

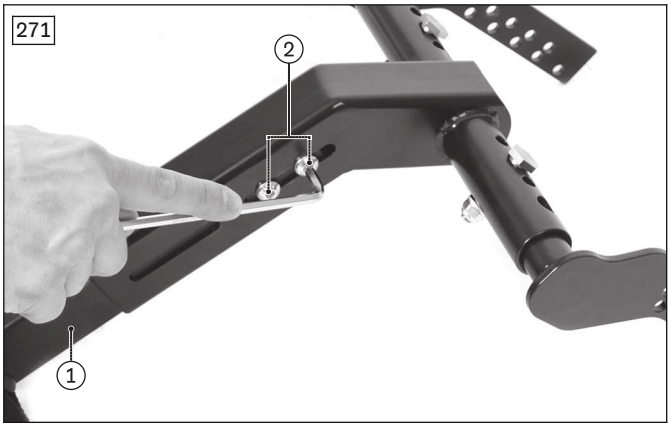
1) **If necessary:** Remove the seat plate (see page 81 ff.).
2) **If necessary:** Remove or open the cable attachments along the seat frame (see fig. 269, item 1).
3) Loosen and remove the screws between the seat and central leg support on both sides (see fig. 269, see fig. 270, item 2).
INFORMATION: Parts of the seat may be attached to these screws. Secure and fasten these parts again immediately using the screws.
INFORMATION: Depending on the configuration, the central leg support is attached to the combination seat height adjustment and seat tilt module, seat frame, or seat brackets (see fig. 269 or see fig. 270).
4) Remove the complete central leg support and safely set it aside (see fig. 269, see fig. 270, item 3).
5) **If necessary:** Remove the individual leg supports from the centre insertion (see fig. 271, item 1). To do so, loosen and remove the 2 screws of the leg support (see fig. 271, item 2).
6) **If necessary:** Remove the individual foot plates (see fig. 272, item 1). To do so, loosen and remove the 4 screws of the foot plate (see fig. 272, item 2).

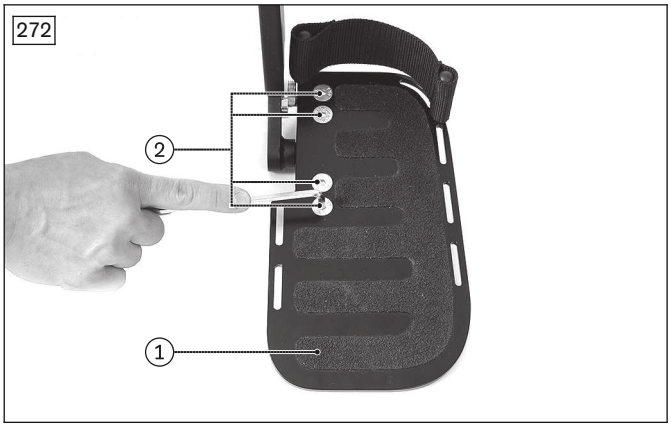
Installing the central leg support

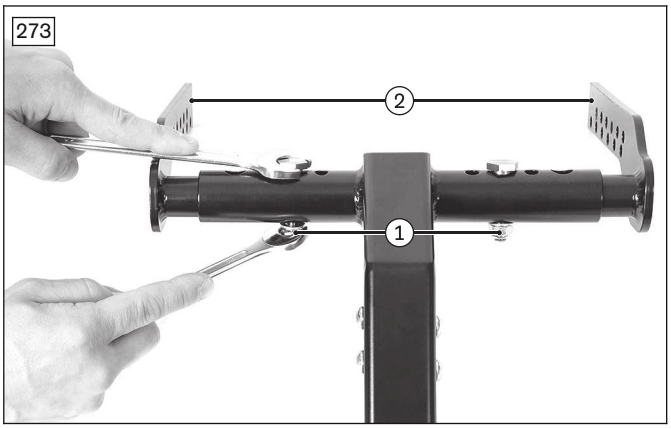
1) **If necessary:** Attach the individual foot plates (see fig. 272, item 1). To do so, insert the 4 screws of the foot plate and firmly tighten them to **25 Nm** (see fig. 272, item 2).
2) **If necessary:** Attach the individual leg supports in the centre insertion (see fig. 271, item 1). To do so, insert the 2 screws of the leg support and firmly tighten them to **25 Nm** (see fig. 271, item 2).
3) Loosen and remove the 2 screws with nut and washer on the central leg support (see fig. 273, item 1).
4) Adapt the left and right holders of the central leg support to the width of the seat (see fig. 273, item 2).
INFORMATION: Depending on the configuration, the central leg support is attached to the combination seat height adjustment and seat tilt module, seat frame, or seat brackets. Reposition the left and right holders symmetrically.
5) Insert the 2 screws with nut and washer into the suitable recesses in the central leg support, and firmly tighten them to **25 Nm** (see fig. 273, item 1).
6) Set the complete central leg support against the seat (see fig. 269, see fig. 270, item 3).
INFORMATION: Make sure that the wheels cannot collide with the leg supports.
7) Insert the 2 screws between the seat and central leg support on both sides and firmly tighten them.
INFORMATION: If you are attaching the central leg support to the seat brackets of a standard seat, tighten the screws to 10 Nm (see fig. 270, item 2). On a VAS seat or combination seat height adjustment and seat tilt module, tighten the screws to 25 Nm (see fig. 269, item 2).
8) **If necessary:** Attach or close the loosened cable attachments along the seat frame (see fig. 269, item 1).
9) Attach the seat plate (see page 81 ff.).
10) Adjust the leg supports according to the needs of the user and check them for firm fit.











4.16.3 Replacing the foot plate (for all leg supports)

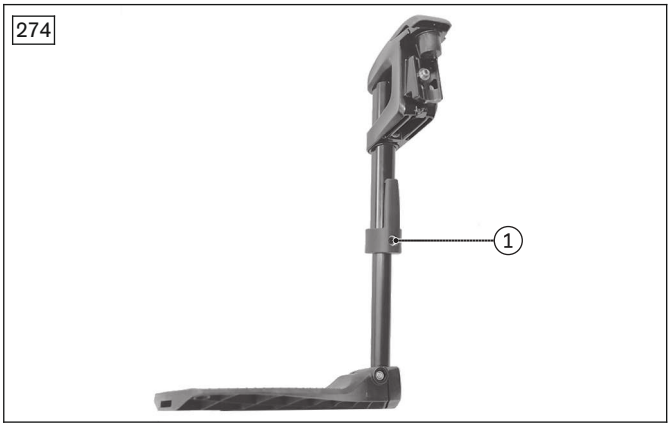
Removing/installing the plastic foot plate

The foot plate can only be ordered together with the foot plate bar.

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
Remove the leg supports.

> **Tools:** hexagon key, size 4

1) Loosen the set screw on the inside of the foot plate bar (see fig. 274, item 1).
2) Remove and replace the foot plate bar.
3) Adjust the new foot plate bar to match the user's lower leg length (not illustrated).
INFORMATION: Ensure that the foot plate bar is inserted into the swivel segment or the leg support holder to the marking (= 50 mm).
4) Retighten the set screw on the foot plate bar.
INFORMATION: Always adjust the leg supports in pairs.



Removing/installing the segmented aluminium foot plate

1) Loosen the hexagon socket screws in the mounting holes on the foot plate (see fig. 275, item 1).
2) Remove the foot plate from the bearing segment and replace it.
3) **If necessary:** Replace the bearing segment (see fig. 275, item 2).
4) Put on the foot plate.
5) Tighten the hexagon socket screws in the mounting holes on the foot plate (see fig. 275, item 1).

Removing/installing the single-panel aluminium foot plate

1) Loosen the hexagon socket screws in the mounting holes on the foot plate (see fig. 276, items 1, 2).
2) Remove the foot plate from the bearing segment and from the support; replace the foot plate.
3) **If necessary:** Replace the support or the bearing segment. To do this, loosen the mounting screw for the support or bearing segment, replace the parts and mount the new support or bearing segment using the mounting screw (see fig. 276, item 3). Tighten the hexagon socket screw.
4) Put on the foot plate.
5) Tighten the hexagon socket screws in the mounting holes on the foot plate (see fig. 276, item 1, 2).

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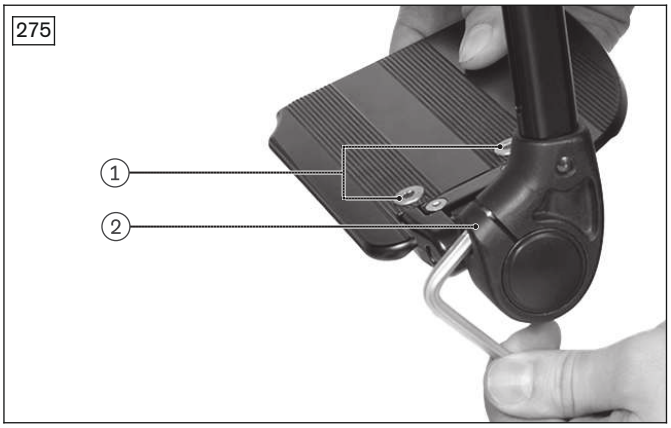

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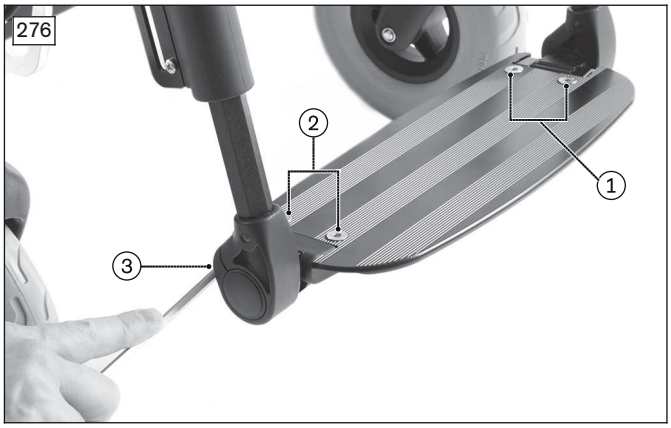

Removing/installing the foot plate of the central leg support

Further information (see page 116).

4.16.4 Replacement work on the standard leg support

Removing/installing the leg support holders 491B75=SK010

> **Prerequisites:**
> Switch off the control device and deactivate the main fuse (see page 16).
> Remove the leg supports.

> **Tools:** hexagon key, size 4

1) Loosen the set screw on the inside of the leg support holder (see fig. 274, item 1).
2) Remove and replace the leg support holder.
3) Slide the foot plate bar into the leg support holder and adjust it according to the user's lower leg length (not illustrated).
   INFORMATION: Ensure that the foot plate bar is inserted into the leg support holder to the marking (= 50 mm).
4) Retighten the set screw on the foot plate bar.
   INFORMATION: Always adjust the leg supports in pairs.

4.16.5 Replacing the amputation leg support

The amputation leg support (see fig. 277, item 1) is installed to the wheelchair on the right or left with a corresponding leg support adapter (see fig. 277, item 2).
Detailed information on replacing the amputation leg support can be found in the separate instructions for use.

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4.16.6 Replacing the lateral support for the thigh

Removing the lateral support for the thigh

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** hexagon key, size 4, 5, 6; torque wrench with socket wrench insert, size 5, 6; socket wrench insert, size 13

1) **Optional:** Remove the cover plug on the seat side profile.
2) **Optional:** Remove the front eyelets intended for vehicles for transporting persons with reduced mobility (see page 128).
3) **Optional:** Loosen and remove the 2 screws between the leg support holder and seat bar (see fig. 278, item 1).
4) Loosen the 2 screws on the pad holder (see fig. 278, item 2).
5) Pull the thigh lateral support with 1 slide block out of the guide of the seat side profile and replace it (see fig. 278, item 3).

Installing the lateral support for the thigh

1) Insert the slide block into the guide of the seat side profile.
2) Use the 2 screws to position the thigh lateral support in the desired position on the slide block in the side profile and fasten it. Firmly tighten the 2 screws (see fig. 278, item 2).
3) **Optional:** Insert the 2 screws between the leg support holder, slide block and seat bar and firmly tighten them (see fig. 278, item 1).
4) **Optional:** Attach the front eyelets intended for vehicles for transporting persons with reduced mobility (see page 128).
5) **Optional:** Close the seat side profile with the cover plugs.

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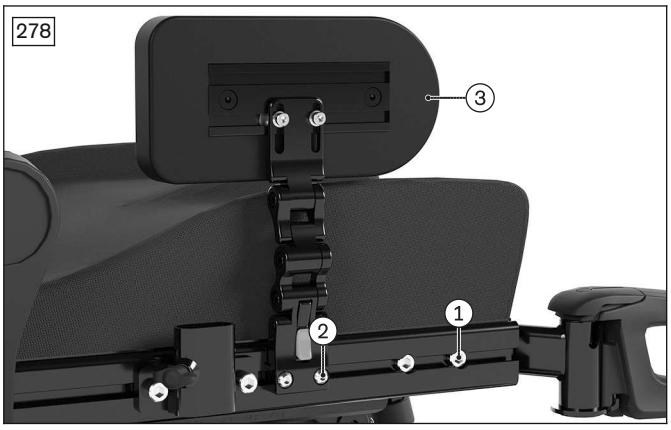

4.17 Lighting

4.17.1 Replacing the lighting

Removing the lighting

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** hexagon key, size 3, 5

1) Fold up the seat (see page 16).
2) Remove the rear cover (see page 19).
3) Fold down the seat (see page 16).
4) Loosen and remove the 4 screws on the module carrier (see fig. 279, item 1).
5) Carefully lift the module carrier and controller off the frame (see fig. 279, item 2).
6) **INFORMATION: Note the installed position of the cable connections being loosened.**
Disconnect the cable for the lighting (optional):
   → **Lighting in accordance with German motor vehicle safety standards (StVZO):** Disconnect 2 cable connections each for the left and right lighting (see fig. 280).
   → **Lighting without German motor vehicle safety standards (StVZO):** Disconnect 1 cable connection for the single front light.
7) Loosen and remove the screws on the holders (see fig. 281, see fig. 282, item 1).
8) Remove the lighting with the cables. If necessary, remove or open the cable attachments along the frame.
9) **If necessary:** Remove the light from the holder:
   → **Lighting, front:** Pull the light off the magnet on the holder.
   → **Lighting, rear:** Loosen the screw between the light and the holder and remove the light (see fig. 282, item 2).

Installing the lighting

1) Attach the light to the holder:
   → **Lighting, front:** Affix the light to the magnet on the holder.
   → **Lighting, rear:** Insert the screw between the light and the holder and firmly tighten it (see fig. 282, item 2).
2) Insert the lighting and position the cable according to its original installed position. Do so by attaching or closing the loosened cable attachments along the frame.
3) Insert the screws in the holders and firmly tighten them (see fig. 281, see fig. 282, item 1).
4) Connect the cable for the lighting (optional) according to its original installed position:
   → **Lighting in accordance with German motor vehicle safety standards (StVZO):** Connect 2 cable connections each for the left and right lighting (see fig. 280).
   → **Lighting without German motor vehicle safety standards (StVZO):** Connect 1 cable connection for the single front light.
5) Carefully position the module carrier and controller on the frame (see fig. 279, item 2).
6) Insert the 4 screws of the module carrier and firmly tighten them (see fig. 279, item 1).
7) Attach the rear cover (see page 19).

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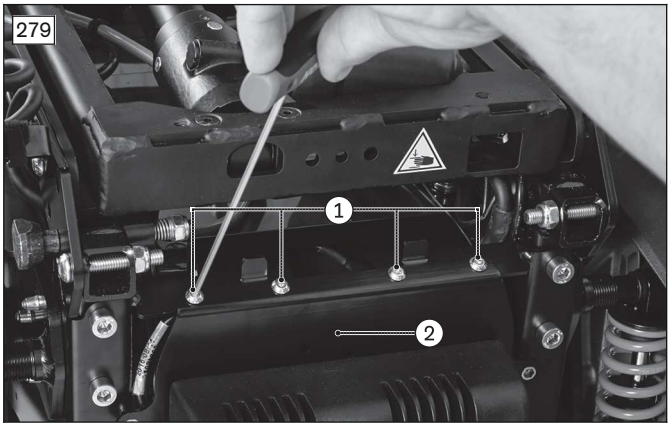

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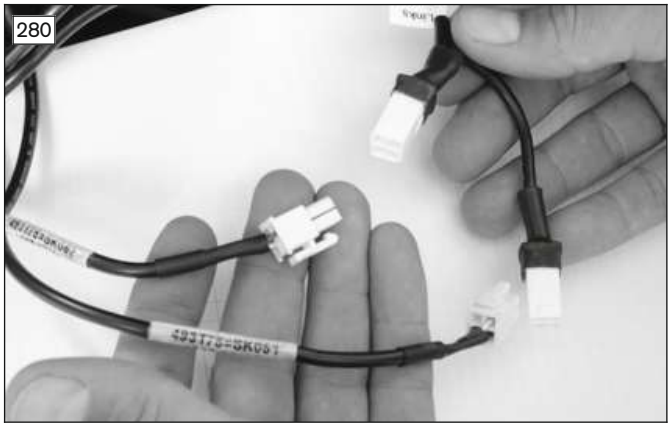
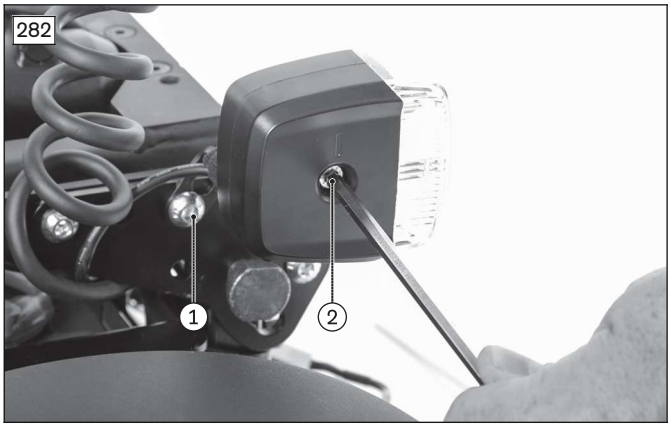




4.17.2 Replacing the fuse for the lighting

The fuse for the lighting **without StVZO** is also the fuse for the external power supply (optional). For replacing the fuse, see page 24.
There is no replaceable fuse for the lighting **according to StVZO**.

4.18 Safety accessories

4.18.1 Replacing the curb climbing assist

Removing the curb climbing assist

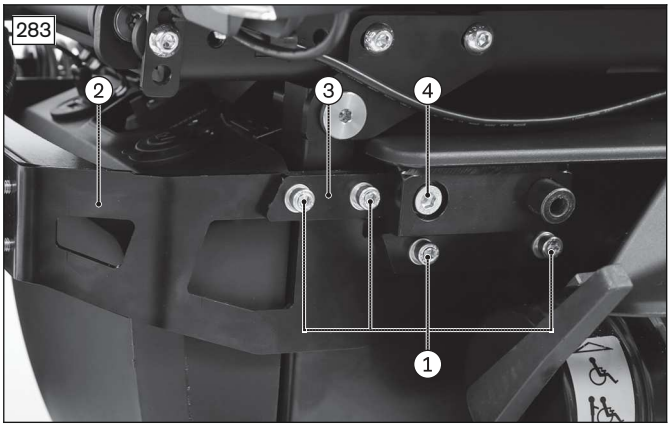
> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 5, 6; torque wrench with socket wrench insert, size 5, 6; socket wrench extension

1) Remove both caster wheels (see page 64).
2) Remove both suspensions / rigid elements and lower the caster wheel swing arms (see page 69 ff.).
3) Loosen and remove the 4 screws between the curb climbing assist and adapter plate with 1 washer each (see fig. 283, item 1).
4) Pull the curb climbing assist forwards and remove it (see fig. 283,item 2).
5) **If necessary:** Pull the adapter plate of the curb climbing assist backward and remove it (see fig. 283, item 3).
INFORMATION: When rigid elements are used, the adapter plate is already loosened. When using suspensions on the caster wheel swing arm, loosen and remove the front screw between the mobility base and adapter plate (see fig. 283, item 4).

Installing the curb climbing assist

1) **If necessary:** Insert the adapter plate of the curb climbing assist on the mobility base from the rear (see fig. 283, item 3).
INFORMATION: When using suspensions on the caster wheel swing arm, insert the front screw between the mobility base and adapter plate and firmly tighten it (see fig. 283, item 4). When using rigid elements, the adapter plate is screwed on together with the rigid elements.
2) Set the curb climbing assist onto the adapter plate from the front (see fig. 283, item 2).
3) Insert the 4 screws between the curb climbing assist and adapter plate with 1 washer each and firmly tighten them (see fig. 283, item 1).
4) Swivel the caster wheel swing arms upwards and install both suspensions/rigid elements (see page 69 ff.).
5) Attach both caster wheels (see page 64).



4.18.2 Replacing transport brackets (rear-wheel drive RWD/front-wheel drive FWD)

INFORMATION

The transport brackets with eyebolts are located on the caster wheel side of the wheelchair. If a curb climbing assist is installed, the eyebolts are integrated into the curb climbing assist and are replaced together with it (see page 122).
The eyebolts on the drive wheel side are integrated into the drive wheel swing arms and are replaced together with them (see page 52).
Transport brackets are not appropriate for transport in vehicles for transporting persons with reduced mobility. The product must be equipped with a vehicle transport set (ISO 7176-19) to use the product for transporting people with reduced mobility in motor vehicles (see page 125 ff.).

Removing the transport brackets

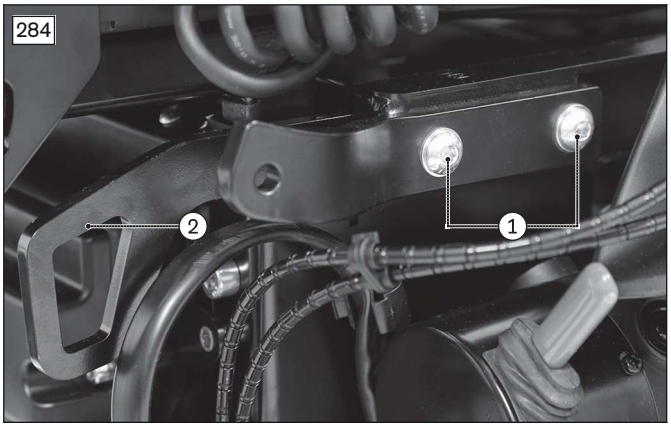
> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

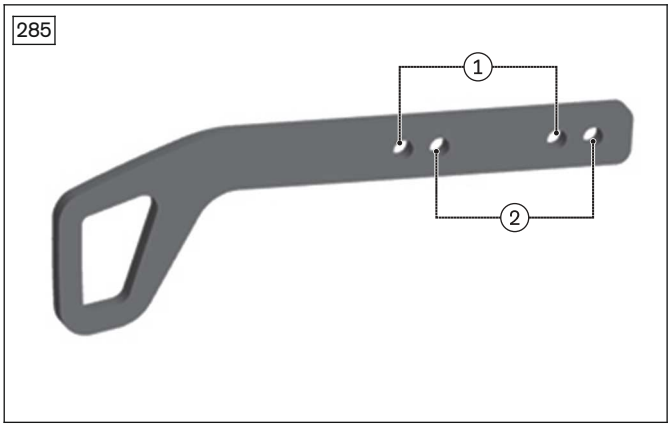
> **Tools:** hexagon key, size 5, 6; torque wrench with socket wrench insert, size 5, 6; socket wrench extension

1) Remove the caster wheel (see page 64).
2) Loosen and remove the 2 screws on the transport bracket (see fig. 284, item 1). To do so, remove the suspension/rigid element and lower the caster wheel swing arm (see page 69 ff.).
3) Pull the transport bracket out of the frame and remove it (see fig. 284, item 2).

Installing the transport brackets

1) Insert the transport bracket into the frame (see fig. 284, item 2).
2) Insert the 2 screws into the transport bracket and firmly tighten them to **25 Nm** (see fig. 284, item 1). To do so, swivel the caster wheel swing arm upwards and install the suspension/rigid element (see page 69 ff.).
INFORMATION: With rear-wheel drive, insert the screws into the front holes of the transport bracket (see fig. 285, item 1). With front-wheel drive, insert the screws into the rear holes of the transport bracket (see fig. 285, item 2).
3) Attach the caster wheel (see page 64).





4.18.3 Replacing the transport brackets (mid-wheel drive MWD)

INFORMATION

The transport brackets with eyebolts are located on the rear of the wheelchair. The drive wheel swing arms do not have integrated eyebolts.

Transport brackets are not appropriate for transport in vehicles for transporting persons with reduced mobility. The product must be equipped with a vehicle transport set (ISO 7176-19) to use the product for transporting people with reduced mobility in motor vehicles (see page 125 ff.).

Removing the transport brackets

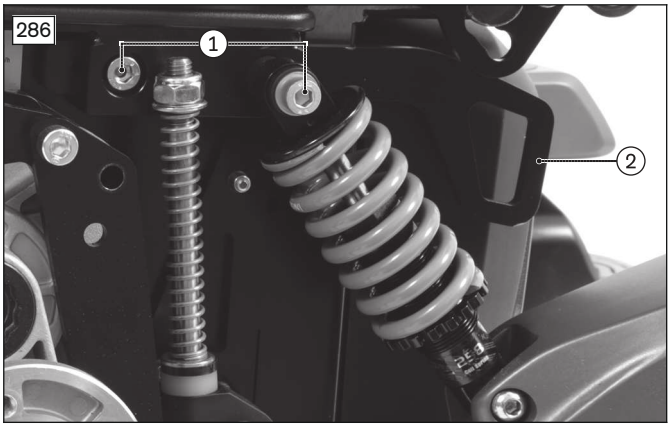
> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Remove the drive wheel (see page 48).
2) Remove the drive wheel splash guard (see page 55).
3) Loosen and remove the 2 screws on the transport bracket (see fig. 286, item 1). To do so, loosen and lower the stabilising wheel swing arm suspension (see page 73).
   INFORMATION: If the front screw is concealed, lift the front caster wheel slightly and support it. This shifts the drive wheel swing arm to the front of the screw.
4) Pull the transport bracket out of the frame and remove it (see fig. 286, item 2).

Installing the transport brackets

1) Insert the transport bracket into the frame (see fig. 286, item 2).
2) Insert the 2 screws into the transport bracket and firmly tighten them to **25 Nm** (see fig. 286, item 1). To do so, swivel the stabilising wheel swing arm upwards and attach the suspension (see page 73).
   INFORMATION: Insert the screws into the rear holes of the transport bracket (see fig. 285, item 2).
3) Attach the drive wheel splash guard (see page 55).
4) Attach the drive wheel (see page 48).



4.18.4 Replacing the vehicle transport set (ISO 7176-19)

INFORMATION

The product must be equipped with a vehicle transport set (ISO 7176-19) for use in vehicles for transporting persons with reduced mobility.

The transport eyelet version depends on the configuration of the mobility base (front-wheel drive FWD, mid-wheel drive MWD or rear-wheel drive RWD) and the seat (standard or VAS seat).

Always install both front and both rear eyelets for vehicles for transporting persons with reduced mobility according to the respective configuration.

4.18.4.1 Mounting the rear eyelets for vehicles for transporting persons with reduced mobility (set for vehicles for transporting persons with reduced mobility for front-wheel drive FWD/mid-wheel drive MWD)

INFORMATION

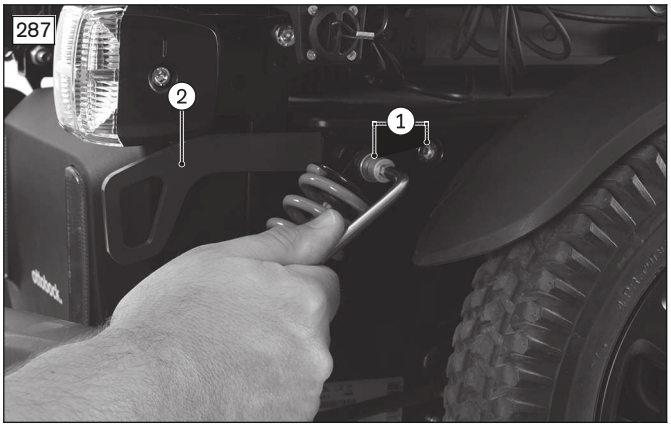
► Apply medium-strength thread locking compound to all screw connections of the rear eyelets for vehicles for transporting persons with reduced mobility.

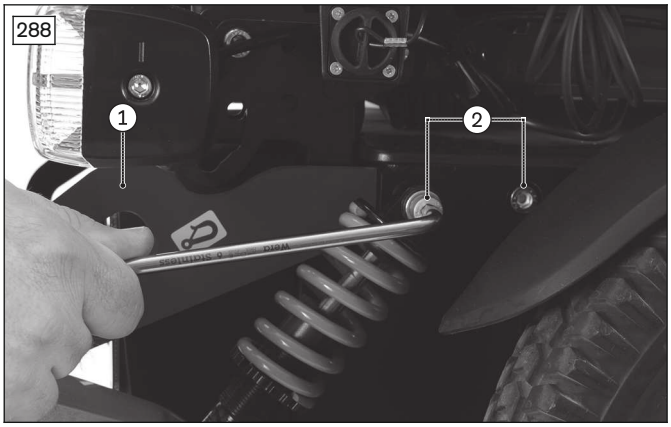
Installing rear eyelets for vehicles for transporting persons with reduced mobility

> **Prerequisites:**
Optional: Move the seat to the lowest seat height (see page 15).
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.
Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 5, 6; torque wrench with socket wrench insert, size 5, 6; socket wrench extension

1) Loosen and remove the 2 screws on the transport bracket (see fig. 287, item 1). Lower the caster wheel swing arm/stabilising wheel swing arm while doing so.
INFORMATION: These screws may be covered by other components depending on the configuration (see page 123 ff.). Remove the drive wheel and splash guard if necessary.
2) Pull the transport bracket out of the frame and remove it (see fig. 287, item 2).
3) Insert the eyelet for vehicles for transporting persons with reduced mobility into the frame (see fig. 288, item 1).
4) Insert and firmly tighten the 2 screws of the eyelet for vehicles for transporting persons with reduced mobility (see fig. 288, item 2). As you do so, swivel the caster wheel swing arm/stabilising wheel swing arm upwards and attach it to the suspension/rigid element.
INFORMATION: The mid-wheel drive MWD suspension is mounted on the rear screw (see fig. 288). The front-wheel drive FWD suspension is mounted on the front screw (not illustrated).





4.18.4.2 Mounting the rear eyelets for vehicles for transporting persons with reduced mobility (set for vehicles for transporting persons with reduced mobility for rear-wheel drive RWD)

INFORMATION

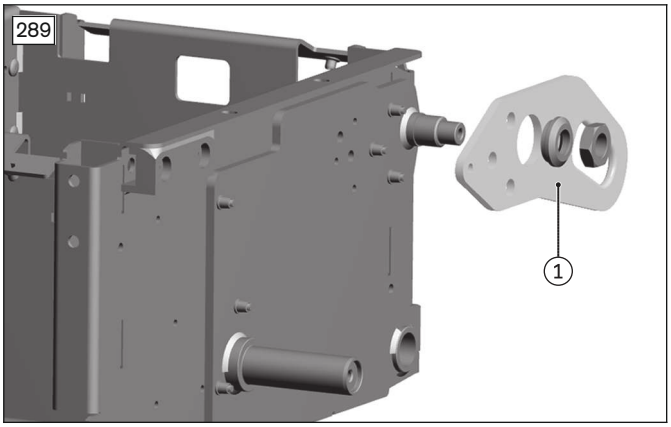
► Apply medium-strength thread locking compound to all screw connections of the rear eyelets for vehicles for transporting persons with reduced mobility.

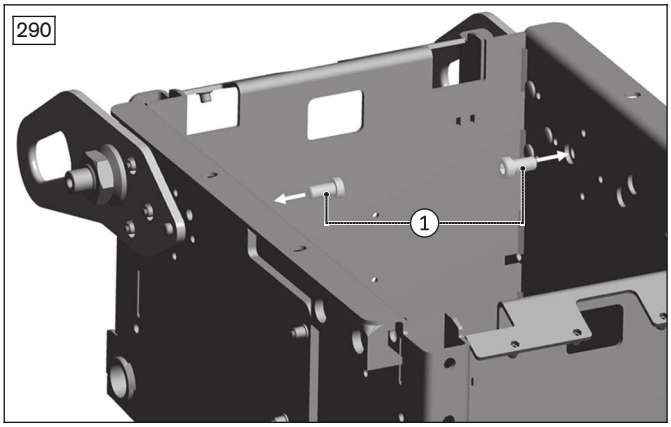
Installing rear eyelets for vehicles for transporting persons with reduced mobility

> **Prerequisites:**
> **Optional:** Move the seat to the lowest seat height (see page 15).
> Switch off the control device and deactivate the main fuse (see page 16).
> **If necessary:** Remove the leg supports.
> Jack up the wheelchair (see page 15).

> **Tools:** hexagon key, size 5, 6; ring and open-ended wrench, size 30; torque wrench with socket wrench insert, size 5, 6 and socket wrench insert, size 30; socket wrench extension

1) Remove the drive wheel (see page 48).
2) **Optional:** Remove the drive wheel splash guard (see page 49).
3) Remove the drive wheel suspension and carefully and slowly guide the loosened drive wheel swing arm downwards (see page 49).
4) Fold up the seat (see page 16).
5) Remove the battery cover (see page 18).
6) **WARNING! Risk of tipping due to changed centre of gravity. Secure the seat and the wheelchair against tipping and falling with the active support of a helper.**
   Remove both batteries (see page 21).
7) Set the eyelet for vehicles for transporting persons with reduced mobility as well as the mounting washer and nut onto the suspension axle and firmly tighten (see fig. 289, item 1).
8) Insert 1 screw each between the mobility base and eyelet for vehicles for transporting persons with reduced mobility from the inside and firmly tighten it (see fig. 290, item 1).
9) Install both batteries (see page 21).
10) Attach the battery cover (see page 18).
11) Fold down the seat (see page 16).
12) Carefully guide the drive wheel swing arm upwards and install the drive wheel suspension (see page 49).
13) **Optional:** Attach the drive wheel splash guard (see page 49).
14) Attach the drive wheel (see page 48).





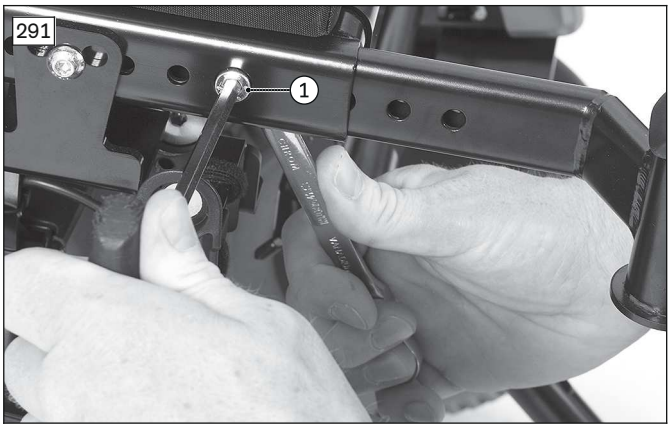
4.18.4.3 Mounting the front eyelets for vehicles for transporting persons with reduced mobility (set for vehicles for transporting persons with reduced mobility for standard seat)

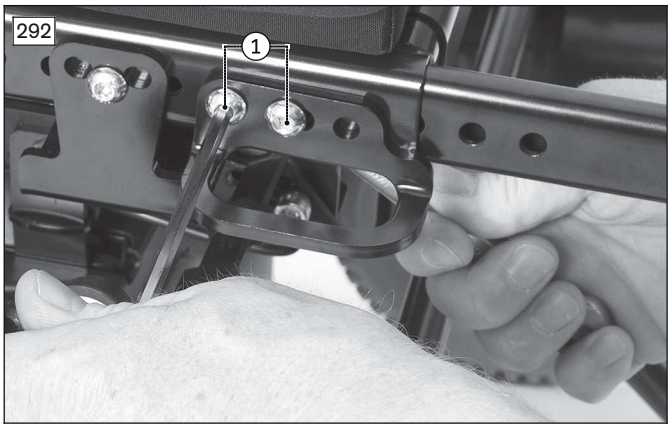
Installing front eyelets for vehicles for transporting persons with reduced mobility

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

> **Tools:** hexagon key, size 5, 6; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5, 6 and socket wrench insert, size 13

1) **Optional:** Loosen and remove the screw with nut between the leg support holder and seat frame (see fig. 291, item 1).
2) Insert 2 screws respectively between the front eyelet for vehicles for transporting persons with reduced mobility and seat frame and firmly tighten them (see fig. 292, item 1). **Optional:** Also attach the leg support holder with these screws.
3) Mark the eyelets for vehicles for transporting persons with reduced mobility with 1 sticker each (see fig. 293).





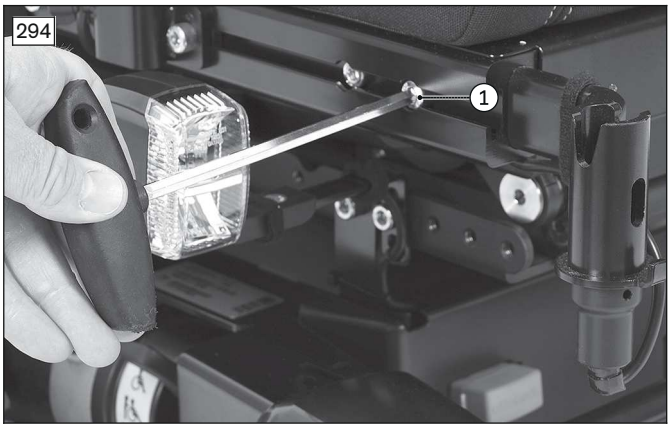
4.18.4.4 Mounting the front eyelets for vehicles for transporting persons with reduced mobility (set for vehicles for transporting persons with reduced mobility for VAS seat)

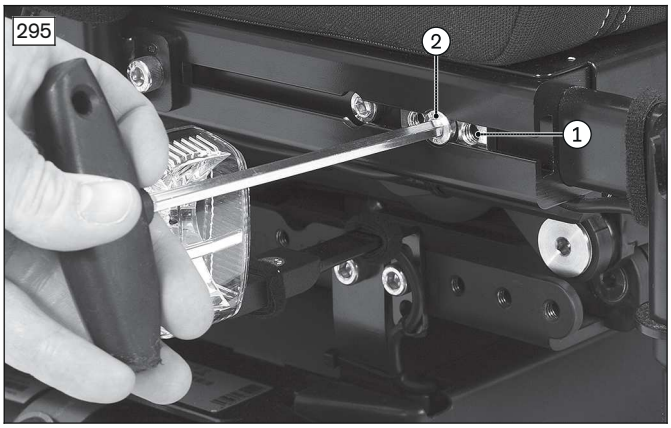
Installing front eyelets for vehicles for transporting persons with reduced mobility

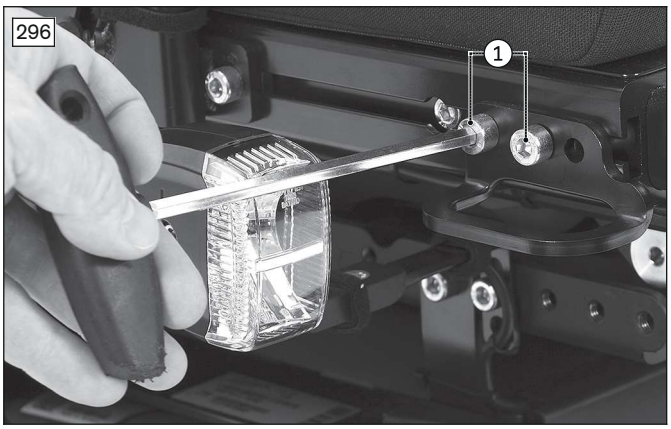
> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the leg supports.

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Loosen and remove the screw between the leg support holder and seat bar (see fig. 294, item 1).
2) Insert the slide block into the seat bar (see fig. 295, item 1).
3) Insert the screw between the slide block, leg support holder and seat bar and firmly tighten it (see fig. 295, item 2).
4) Insert 2 screws respectively between the front eyelet for vehicles for transporting persons with reduced mobility and slide block and firmly tighten them (see fig. 296, item 1).
5) Mark the eyelets for vehicles for transporting persons with reduced mobility with 1 sticker each (see fig. 297).
6) **Optional with mechanical back support angle adjustment:** Install the lower connecting tube on the back frame (see page 128).



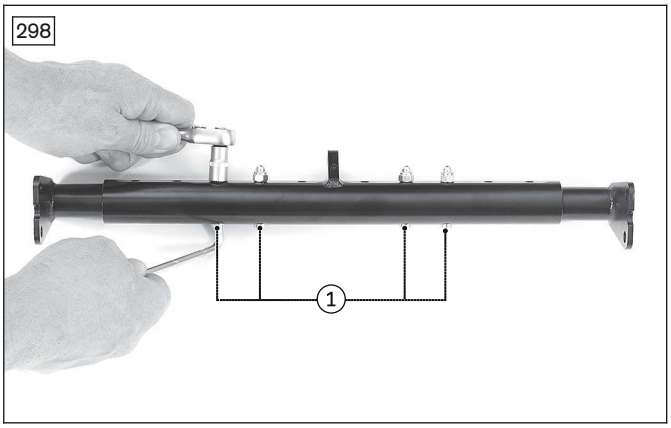


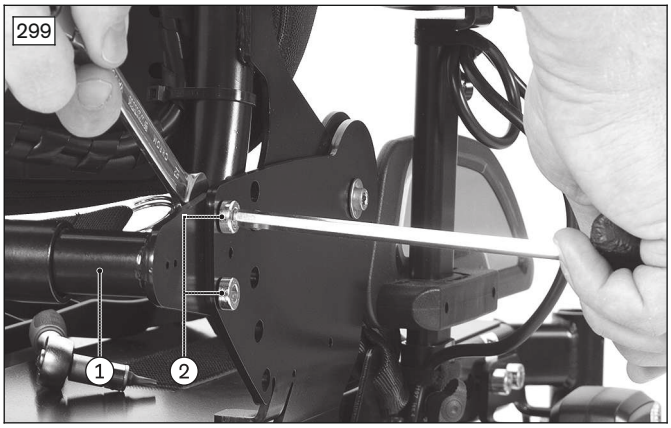


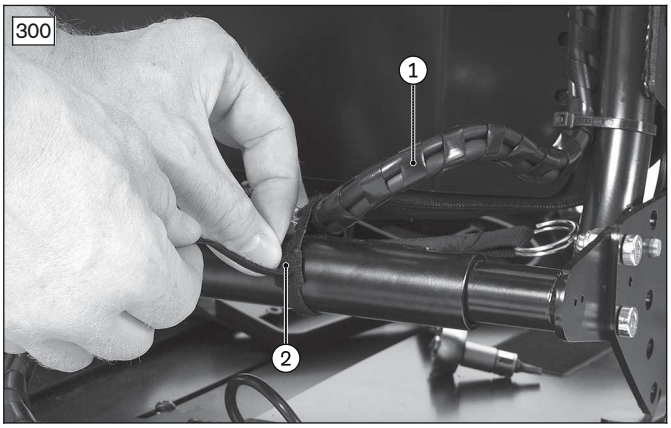
4.18.4.4.1 Installing the lower connecting tube for manual back support angle adjustment (VAS seat)

1) Remove the cover on both bearing plates (see page 98).
2) Position the lower connecting tube on the bearing plates (see fig. 299, item 1).
INFORMATION: If necessary, adapt the lower connecting tube to the frame width. To do so, use the 4 screws of the lower connecting tube and firmly tighten them again after making the adjustment (see fig. 298, item 1).
3) Insert the 2 screws with nuts into the lower connecting tube and bearing plate on both sides and firmly tighten them (see fig. 299, item 2).
4) Install the cables along the lower connecting tube (see fig. 300, item 1). Attach or close additional cable attachments along the connecting tube if necessary (see fig. 300, item 2).
INFORMATION: Adjust the back support angle and make sure that cables cannot get stretched, pinched or caught while driving.
5) Check the motion of the back support frame and the length of the cables.

6) Install the cover on both bearing plates (see page 98).







4.19 Accessories

4.19.1 Replacing the lap belt (standard seat)

⚠ CAUTION

Improper adjustments

Injuries, malpositions, user discomfort due to adjustment changes

► The belt system is an important part of an individual seating unit/seating solution. Do not modify the installation position and basic settings.

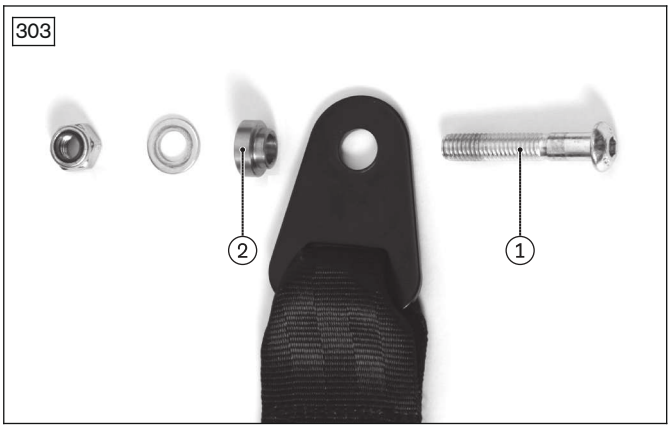
Removing the lap belt (standard seat)

> **Tools:** hexagon key, size 5; ring and open-ended wrench, size 13; torque wrench with socket wrench insert, size 5

1) Remove the seat plate (see fig. 301; see page 81).
2) Loosen and remove the screw with nut, washer and bushing between the lap belt and seat frame (see fig. 302, see fig. 303, item 1, 2).
3) Remove the lap belt.

Installing the lap belt (standard seat)

1) Position the lap belt with bushing on the seat frame on both sides (see fig. 302, see fig. 303, item 2).
2) Insert the screw with nut and washer between the lap belt, bushing and seat frame on both sides see fig. 302, see fig. 303, item 1).
3) Align the lap belt. The lap belt should be at an angle of about **60°** to **90°** to the seat surface.
4) Firmly tighten the screw with nut between the lap belt and seat frame on both sides (see fig. 302, see fig. 303, item 1).
5) Attach the seat plate (see fig. 301; see page 81).



4.19.2 Replacing the lap belt (VAS seat)

⚠ CAUTION

Improper adjustments

Injuries, malpositions, user discomfort due to adjustment changes

► The belt system is an important part of an individual seating unit/seating solution. Do not modify the installation position and basic settings.

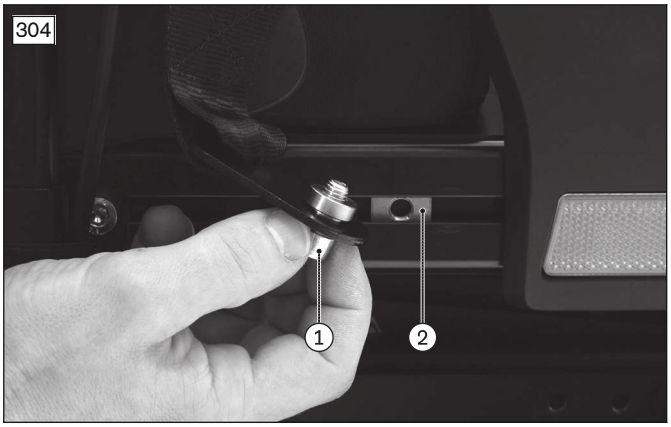
Removing the lap belt (VAS seat)

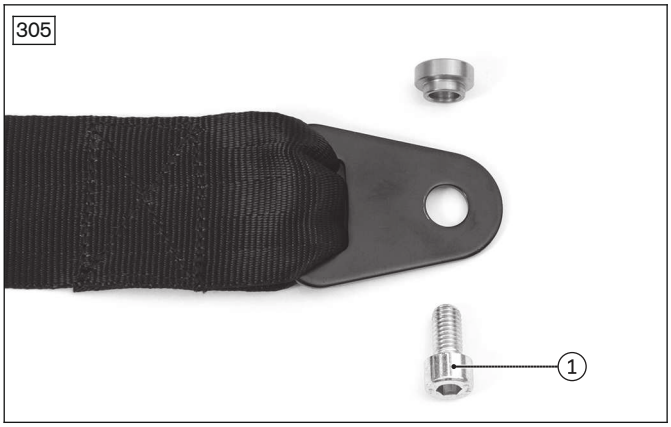
> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Loosen and remove the screw with bushing between the lap belt and seat frame on both sides (see fig. 304, see fig. 305, item 1).
   INFORMATION: The slide block remains in the seat bar when the lap belt is replaced (see fig. 304, item 2).
2) Remove the lap belt.

Installing the lap belt (VAS seat)

1) Position the lap belt with screw and bushing on the slide block in the seat bar on both sides (see fig. 304, see fig. 305, item 1, 2).
2) Align the lap belt. The lap belt should be at an angle of about **60°** to **90°** to the seat surface.
3) Firmly tighten the screw with nut between the lap belt and seat frame on both sides (see fig. 304, see fig. 305, item 1).





4.19.3 Replacing the lap belt with rewinder

⚠ CAUTION

Improper adjustments

Injuries, malpositions, user discomfort due to adjustment changes

- ► The belt system is an important part of an individual seating unit/seating solution. Do not modify the installation position and basic settings.
- ► Assembly of the lap belt with rewinder on a standard seat is the same in principle. Note the respective assembly situation.

Removing the rewinding belt

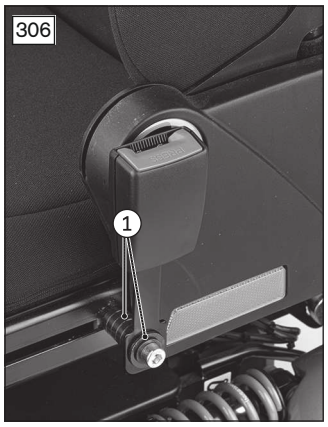
> **Prerequisites:**
> Switch off the control device and deactivate the main fuse (see page 16).
> Remove the seat plate (see page 81).

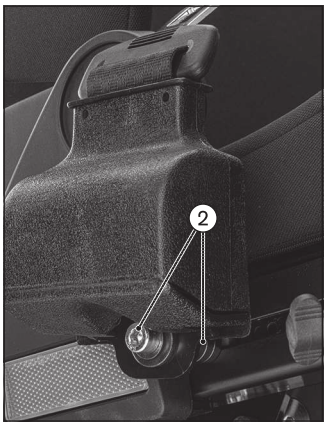
> **Tools:** hexagon key, size 5; ring spanner and open-ended wrench, size 13

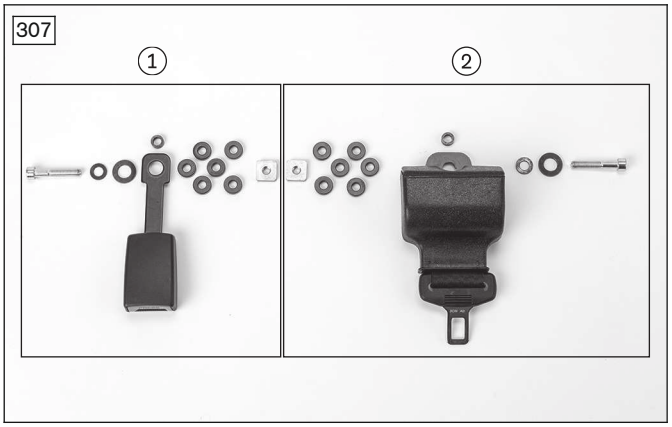
1) Loosen and remove the hexagon socket screw with washers and bushings between the unlocking mechanism and seat frame (see fig. 306, item 1).
   INFORMATION: The slide block can remain in the seat bar when the unlocking mechanism is replaced (not illustrated).
2) Remove and replace the unlocking mechanism of the rewinding belt.
3) Loosen and remove the hexagon socket screw with washers and bushings between the housing and seat frame (see fig. 306, item 2).
   INFORMATION: The slide block can remain in the seat bar when the unlocking mechanism is replaced (not illustrated).
4) Remove and replace the housing of the rewinding belt.

Installing the rewinding belt

1) Hold the unlocking mechanism of the rewinding belt against the mounting point (slide block in the seat bar) and initially align it vertically (see fig. 306, item 1).
2) Attach the unlocking mechanism using the mounting materials (see fig. 307, item 1). Before final attachment, position the unlocking mechanism so that the lap belt is at an angle of approx. **60° to 90°** to the seat surface and can run in front of the user's hip bones.
3) Tighten the hexagon socket screw so the unlocking mechanism can still be moved around the mounting point.
4) Hold the housing of the rewinding belt against the mounting point (slide block in the seat bar) and initially align it vertically (see fig. 306, item 2).
5) Attach the housing using the mounting materials (see fig. 307, item 2). Before final attachment, position the unlocking mechanism so that the lap belt is at an angle of approx. **60° to 90°** to the seat surface and can run in front of the user's hip bones.
6) Tighten the hexagon socket screw so the housing can still be moved around the mounting point.
7) Perform a closure test. The tongue piece of the rewinding belt must be easy to slide into the slot of the unlocking mechanism and has to engage.







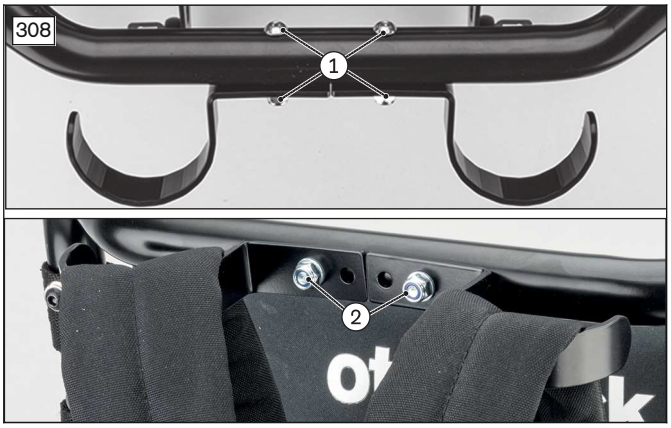
4.19.4 Replacing the backpack hooks

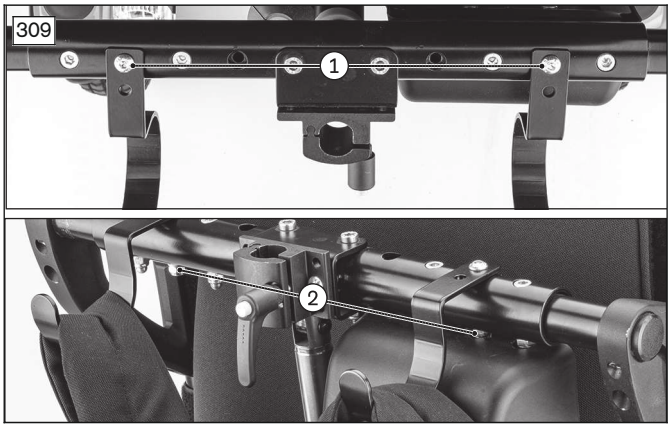
Removing/installing the backpack hooks

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).

> **Tools:** hexagon key, size 4; ring spanner and open-ended wrench, size 13

1) Loosen the hexagon socket screw from the self-locking hexagon nut (standard seat: see fig. 308; item 1, 2; VAS seat: see fig. 309, item 1, 2). Remove and replace the mounting materials.
2) Remove and replace the backpack hooks.
3) Attach the new backpack hooks with correct alignment using the hexagon socket screw, washer and self-locking hexagon nut.
4) Firmly tighten the respective hexagon socket screw.





4.19.5 Replacing and adjusting the tray

INFORMATION

The following information also applies when adjusting the tray of the centre tray control.

Scope of delivery

- Tray size 1 to 5
- Complete swivel mechanism (including holder with clamping lever)
- Complete tray adapter (clamping profile)

Removing the tray

> **Prerequisites:**
Switch off the control device and deactivate the main fuse (see page 16).
If necessary: Remove the control panel (see page 33, see page 36, see page 37).

> **Tools:** hexagon key, size 6; torque wrench with socket wrench insert, size 6

1) Pull the pin and swing the tray away to the side (see fig. 310).
2) Open the quick-release lever (see fig. 311, item 1) and pull the tray with swivel mechanism out of the holder.

3) **If necessary:** Unscrew the tray from the swivel mechanism at the 3 holes (not illustrated).
4) **If necessary:** Unscrew the supports from the tray (not illustrated).
5) **If necessary:** Loosen and remove the adapter with clamping lever from the bottom of the forearm support (see fig. 311, item 1, see fig. 312).
6) **If necessary:** Loosen and remove the tray adapter under the arm support on the control panel side (see fig. 311, item 2).

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Installing the tray

⚠ CAUTION

Incorrect adjustment

Crushing, pinching due to excessively tight adjustment

► Do not pinch the user when sliding the product in.

INFORMATION

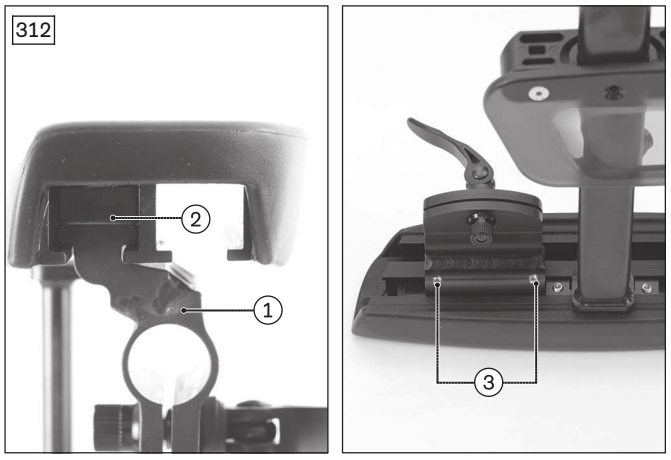
The tray can only be ordered with a swing-away control panel holder. Swing the control panel to the side during assembly.

Assembly is illustrated without the control panel for a better overview.

Mounting the adapter for the swivel mechanism

1) Remove the side panel.
2) Loosen the set screws on the bottom of the forearm support (not illustrated).
3) Insert the adapter for the swivel mechanism (see fig. 312, item 1) into the mounting rail below the gap (see fig. 312, item 2).
4) Secure the adapter in the mounting rail using the set screws (see fig. 312, item 3).
5) Replace and fasten the side panel.

312



Positioning and attaching the tray

1) Insert the swivel mechanism into the retainer and secure it slightly with the clamping lever (see fig. 313).
2) Put on and align the tray top. In doing so, check to ensure the tray retainer is centred.
3) Line up the 3 holes in the tray top with the 3 holes in the tray retainer (see fig. 314).
4) Secure the tray retainer in this position with 2 screws (see fig. 315).
5) Attach the tray top to the tray retainer with 3 screws (see fig. 316). Carefully tighten the screws.

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Mounting the supports

1) Slide the 1st support onto the clamping profile on the control panel side (see fig. 317).
2) Place the 2nd support onto the tube on the swivel side (see fig. 318).
3) Provisionally set the depth of the tray top. Clamp the swivel mechanism into place.
4) Position the supports so they can be mounted at the front and with a safety distance on the outside.
5) Mount the supports on the tray. To do so, drill 2holes in the tray top with Ø 6.4 mm, respectively at the appropriate positions.
6) Countersink the holes with a 90° spherical countersink.
7) Attach each support with 2 of the supplied countersunk head screws. If necessary, compensate for the distance between the supports and tray top with washers.

4.19.6 Adjusting the depth of the tray

INFORMATION

The tray should be adjusted to the user's body size in the presence of the user. Assembly is illustrated without the control panel for a better overview.

Adjusting the tray

1) Open the clamping lever on the swivel mechanism and pull the tray forward slightly (see fig. 319).
2) Pull the pin and swing the tray away to the side (see fig. 320).
3) Place the user in the seat.
4) Fold the tray down and lock it with the pin.
5) Adjust the depth.
   CAUTION! The user must not get pinched by the tray. Make sure that the user's arms rest on the tray and that the round cutout at the front does not press against the user's body.
6) Firmly engage the clamping lever on the swivel mechanism.

4.19.7 Replacing the luggage carrier

Removing/installing the luggage carrier

> **Prerequisites:**
  Switch off the control device and deactivate the main fuse (see page 16).
  If necessary: Remove the control panel (see page 33, see page 36, see page 37).
> **Tools:** hexagon key, size 6; open-ended wrench, size 13

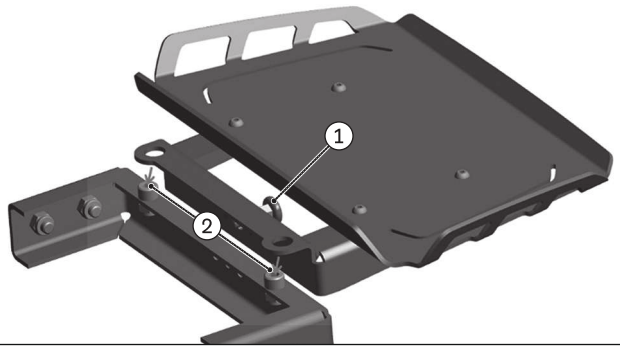
1) Pull out the indexing plunger under the tray (see fig. 321, item 1).
2) Lift the luggage carrier slightly, remove it from the adapter and replace if required (see fig. 321, item 2).
3) Guide the luggage carrier over the screw heads and place on the adapter (see fig. 321, item 2).
4) Push the luggage carrier down until the indexing plunger (see fig. 321, item 1) engages.

Removing/installing the luggage carrier on the module for combined seat height adjustment and seat tilt

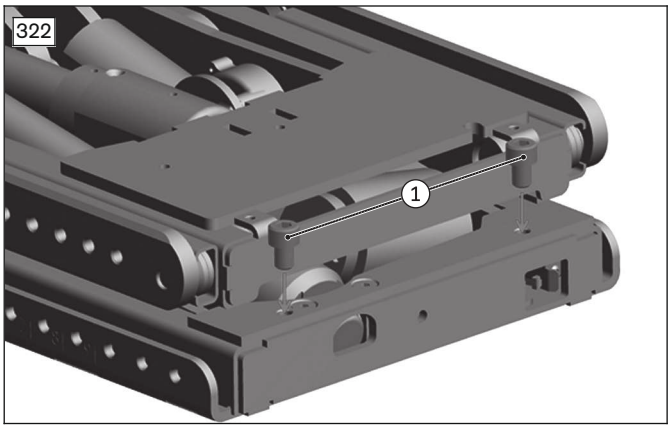
1) Remove the luggage carrier (see above).

2) Loosen and replace the hexagon socket screws on the module (see fig. 322, item 1).
3) Screw in and firmly tighten the hexagon socket screws to the module (see fig. 322, item 1).
4) Attach the luggage carrier to the module (see above).

321



322

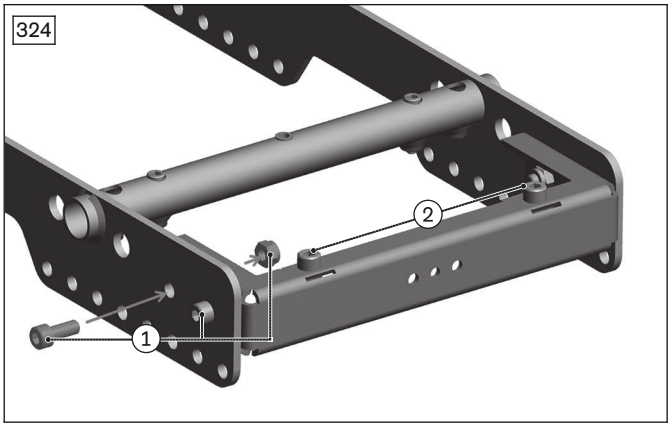


Removing/installing the adapter for VAS/Recaro luggage carrier (see fig. 323**)**

1) Remove the luggage carrier (see above).
2) Loosen and remove the 2 x 2 hexagon socket screws on both sides of the adapter on the VAS seat frame (see fig. 324, item 1).
3) Remove and replace the adapter.
4) Fit the adapter with 2 hexagon socket screws. Tighten the hexagon socket screws (see fig. 324, item 2).
5) Screw the adapter to the VAS seat frame using 2 x 2 hexagon socket screws. Firmly tighten the hexagon socket screws (see fig. 324, item 1).
6) Attach the luggage carrier to the adapter (see above).

323

324

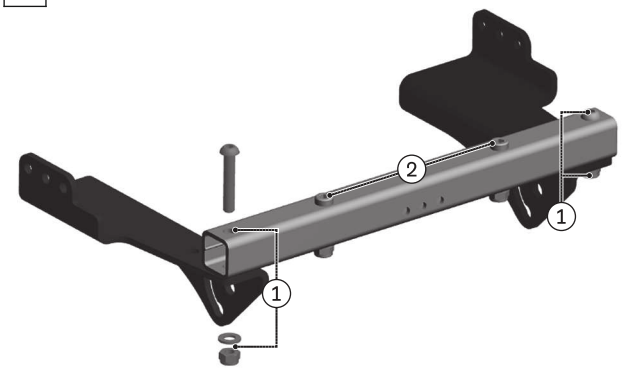


Removing/installing the adapter for standard seat luggage carrier (see fig. 325**)**

1) Remove the luggage carrier (see above).
2) Unscrew and remove the 2 x 2 hexagon socket screws on both sides of the adapter from the seat brackets of the standard seat (see fig. 326, item 1).
3) Remove and replace the adapter.
4) Fit the adapter with 2 hexagon socket screws. Tighten the hexagon socket screws (see fig. 326, item 2).
5) Screw the adapter to the rear seat brackets of the standard seat using 2 x 2 hexagon socket screws. Firmly tighten the hexagon socket screws (see fig. 326, item 1).
6) Attach the luggage carrier to the adapter (see above).

325

326



5 Troubleshooting

NOTICE

Damages due to unauthorised service

Unsafe operation of the power wheelchair

- ► Troubleshooting may thus only be carried out by authorised specialist dealers possessing solid knowledge of electronic controllers from Ottobock.
- ► Ottobock assumes no liability for any damages originating from improper or poorly performed repairs.

INFORMATION

Experience has shown that electrical problems are frequently associated with errors and defects in the plug connectors and cabling. These areas should therefore always be examined first.

Faults that occur are displayed on the control panel or a connected handheld programming device.

All faults 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.

5.1 Diagnostic steps

To ensure efficient and successful troubleshooting, proceed as follows:

- Ascertain whether there is a specific error trigger or a sporadic error message.
- If applicable, read and note down the error text displayed on the control panel.
- Look up the potential cause in the error table and carry out the recommended tests and corrective actions (see page 137 ff., see page 140 ff.).

5.2 Display of errors/faults (R-net control device)

5.2.1 Graphical displays (R-net control device)

Warnings and errors that occur are shown on the LCD screen of the TEN control panel.

LCD screen	Error/warning	Cause	Possible action
	Emergency stop	Serious controller/handheld control device and/or drive motor malfunction	Check cabling/plug contacts. Contact specialist dealer.
	Joystick warning (Center Joystick)	Joystick not in neutral position when the unit is turned on	Move joystick to neutral position prior to switch-on.
		Drive-away lock activated	Eliminate the cause of the drive-away lock (e.g. reset seat function, disconnect battery charger).

LCD screen	Error/warning	Cause	Possible action
	Defective joystick (Joystick Error)	If the message continues to be displayed even though the joystick is centred: Defective joystick	Contact the manufacturer. Replace the joystick/control panel.
	Message window for serious errors	According to the displayed error code (see page 138)	
	Message window for warnings; examples of error messages, see next 2 lines	According to the displayed error code (see page 138)	
	Controller temperature warning (red symbol)	Overheating due to excessive load	Cool down phase
	Motor temperature warning (red symbol)	Overheating due to excessive load	Cool down phase

5.2.2 Error messages/error codes (R-Net control device)

To indicate the cause of warnings or errors that occur, error messages with error codes are output via the LCD screen of the TEN° control panel or a connected handheld programming device. The DTT handheld programming device can be connected for diagnosis (see page 159).

Error message; error code	Contents	Cause	Possible action
Center Joystick	Joystick warning	Joystick not in neutral position when the unit is turned on	Move joystick to neutral position prior to switch-on.
Joystick Error	Defective joystick	If the message continues to be displayed even though the joystick is centred: Defective joystick	Replace the joystick/control panel.
Low Battery	Battery undervoltage	Battery deep discharge	Charge as soon as possible.
High Battery	Battery overvoltage	Voltage too high Loose battery contacts	Drive the wheelchair only at low speed. Check cabling/plug contacts. If error persists: Contact the manufacturer.
M1 Brake Error; 1505	Brake error on left motor	e.g. defective plug connection, cable break Defective brake	Check plug connections and cable to the brake. Replace motor and brake.
M2 Brake Error; 1506	Brake error on right motor		
M1 Motor Error; 3B00	Left motor not connected	e.g. defective plug connection, cable break	Check plug connections and cable to left motor.
		Defective motor	Check left motor.
M2 Motor Error; 3C00	Right motor not connected	e.g. defective plug connection, cable break	Check plug connections and cable to right motor.
		Defective motor	Check right motor.
Inhibit Active; 1E01, 1E20,	Driving function blocked due to external factors	Battery charger may be connected	Disconnect battery charger.

Error message; error code	Contents	Cause	Possible action
1E21, 1E22, 1E23			
Brake Lamp Short	Short circuit in brake lamp electrical circuit	e.g. defective plug connection, cable break Defective brake lamp	Check plug connections and cable to brake lamp. Replace lamp.
Left Lamp Short; 7205	Short circuit in electrical circuit of left front/rear lamp	e.g. defective plug connection, cable break Defective front/rear lamp	Check plug connections and cable to front/rear lamp. Replace lamp.
Right Lamp Short; 7209	Short circuit in electrical circuit of right front/rear lamp		
L Ind Lamp Short; 7206	Short circuit in electrical circuit of left direction indicator	e.g. defective plug connection, cable break Defective direction indicator signal	Check plug connections and cable to direction indicator. Replace lamp.
R Ind Lamp Short; 720 A	Short circuit in electrical circuit of right direction indicator		
L Ind Lamp Failed; 7207	Error in electrical circuit of left direction indicator	e.g. defective plug connection, cable break Defective lamp	Check plug connections and cable to direction indicator. Replace lamp.
R Ind Lamp Failed; 7208	Error in electrical circuit of right direction indicator		
Overcurrent	Current in an actuator circuit too great	e.g. defective plug connection, cable break Defective actuator or controller	Check plug connections and cable to actuator. Verify that actuating drive can move freely. Replace actuator or controller.
Overtemp. (Acts)	Temperature on actuator switch on controller too high	e.g. defective plug connections Defective actuator	Cool down phase Check plug connections and cable to actuator. In case of recurrence: replace actuator.
Overtemp. (Lamps)	Temperature on the light circuit on the controller too high	e.g. defective plug connections Defective lamp	Cool down phase Check plug connections and cable to lamp. In case of recurrence: replace lamp.
Memory Error	Unspecified memory error in control modules	e.g. defective plug connections Defective control module	Check and replace controller with modules.
PM Memory Error	Memory error in controller	e.g. defective plug connection, cable break Defective controller	Check all plug connections and cables on controller. Replace controller.
Bad Cable	Error on the communication cables between control modules	e.g. defective plug connection, cable break	Check all plug connections and cables on the control modules (incl. controller). Replace cables.
Module Error	Error in control modules	e.g. unspecified error in displayed control module Displayed control module defective	Check all plug connections and cables. Replace controller.
System Error	System error	Non-attributable error in control modules (primarily from third-party providers)	Check all plug connections and cables. Disconnect/test any modules from third-party

Error message; error code	Contents	Cause	Possible action
			providers in succession if applicable. Replace controller.
SID Detached	Special control disconnected	Special control (sip and puff control) disconnected from LCD monitor Special control connection to LCD monitor defective	Check all plug connections and cables between special control connection and sip and puff control. Check programming parameters. Replace control panel.
Switch Detached; 1E07	External on/off switch disconnected from control panel	e.g. defective cable connection to control panel Defective switch or control panel	Check cable connection and switching function of the external switch. Replace control panel.
Switch Detached; 1E08	External profile/mode switch disconnected from control panel		
Switch Short; 1E0D	Short circuit on external on/off switch		
Switch Short; 1E0C	Short circuit on external profile/mode switch		
Gone to Sleep	Control device switches to sleep mode	Extended inactivity while control device is switched on	Switch control device off/on.
Charging	Battery charger is connected	Battery charger is connected to charging receptacle	Disconnect battery charger prior to driving.
JS Static Timeout	Joystick holding time exceeded	Excessive joystick deflection detected (control device stops drive to prevent potential damage to the motors) Defective joystick	Switch control device off/on. Replace control panel/joystick.
Orientation Error	Orientation error on advanced stability module (ASM)	Defective advanced stability module (ASM)	Replace the advanced stability module (ASM).
ASM Disconnected	Advanced stability module (ASM) disconnected from controller	e.g. defective plug connection, cable break Defective advanced stability module (ASM)	Check cabling/plug contacts. Replace the advanced stability module (ASM).
Gyro Disconnected	Electronic track stabiliser (gyro module) disconnected from controller	e.g. defective cable connection to controller Defective gyro module	Replace gyro module.
Gyro Prf Active	Electronic track stabiliser (gyro module) is activated	Electronic track stabiliser (gyro module) is disrupted by the movement of a different means of transportation (e.g. train, ship) in standby Defective gyro module	To move the wheelchair, select the “No Assist” driving profile for safety reasons. Replace gyro module.

5.3 Display of errors/faults (VR2 control device)

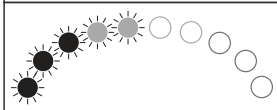
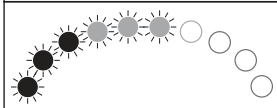
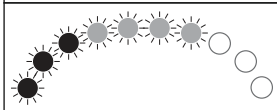
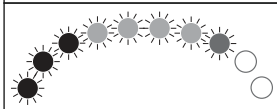
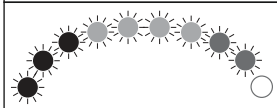
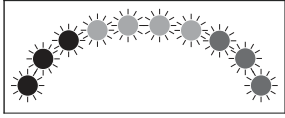
5.3.1 Visual displays (VR2 control device)

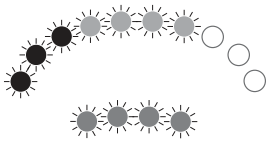
Error messages are displayed via the flashing signals of the “rated battery capacity” LED display on the control panel, as follows.

LED display	Meaning	Measure
Fast flashing	The control system detects an error.	Interpret the flashing signals (see page 141), connect the handheld programming device, determine the error code (see

LED display	Meaning	Measure
		page 142) and take the recommended actions.
Slow flashing	The control system does not register an error trigger, but an error was possibly triggered before. **INFORMATION: The fewer LEDs are flashing, the less battery capacity remains.**	Read the diagnostics report from the control system, determine the error code and take the recommended actions (see page 142). Charge the batteries.
Display continuously illuminated	The control system does not register an error trigger, but an error was possibly triggered before.	Read the diagnostics report from the control system, determine the error code and take the recommended actions (see page 142).
Display not illuminated	Problem with the power supply to the control system or defective controller.	Check battery charge level. Check all connections between the battery and the control system. Check and replace controller.

5.3.1.1 Meaning of flashing signals (VR2 control device)

Flashing LED	Error/warning	Cause	Possible action
	Battery undervoltage	Battery deep discharge Battery cable malfunctioning or faulty connection to the battery	Charge as soon as possible. Check the connection to the battery (charge the battery if the connection is good).
	Left motor not connected	e.g. defective plug connection, cable break	Check plug connections and cable to left motor.
		Defective motor	Check left motor.
	Defective cabling on the left motor	E.g. cable break, no connection to battery	Check cable connections to left motor. Check connection to battery terminal.
	Right motor not connected	e.g. defective plug connection, cable break	Check plug connections and cable to right motor.
		Defective motor	Check right motor.
	Defective cabling on the right motor	E.g. cable break, no connection to battery	Check cable connections to right motor. Check connection to battery terminal.
	Driving function blocked due to external factors	Battery charger may be connected	Disconnect battery charger.
	Joystick fault	Joystick not in neutral position when the unit is turned on	Move the joystick to the neutral position before switching the unit on.
	Controller fault	Defective controller	Check all connections.
	Brake release	Brake disabled	Check motor brakes. Check connections to the controller.
	Battery overvoltage	Voltage too high Loose battery contacts	Continue driving slowly. Check cabling/plug contacts.

Flashing LED	Error/warning	Cause	Possible action
	Communication error between control panel (joystick) and controller	Defective cable, loose plug connection	Check cabling/plug contacts.

5.3.2 Error messages/error codes (VR2 control device)

Error codes indicating the cause of warnings or errors that occur are output via a connected handheld programming device. The PP1 or DTT handheld programming devices can be connected for diagnosis (see page 148).

INFORMATION

► Connect the programming device to the control system only after the LED display flashes. Should the programming device be connected before flashing occurs, the error code will not be displayed.

Error message; error code	Contents	Cause	Possible action
1320	Current limit was exceeded	e.g. defective plug connection, cable break Defective actuator or controller	Check plug connections and cable to actuator. Verify that actuating drive can move freely. Replace actuator or controller.
1505	Brake error on left motor	e.g. defective plug connection, cable break Defective brake	Check plug connections and cable to the brake. Replace motor and brake.
1506	Brake error on right motor		
1600	Battery overvoltage	Voltage too high Loose battery contacts	Drive the wheelchair only at low speed. Check cabling/plug contacts. If error persists: Contact the manufacturer.
1E03	Battery charger is connected	Battery charger is connected to charging receptacle	Disconnect battery charger prior to driving.
1E04	Driving reduction/block due to switch input (seat height adjustment)	Seat in top position Seat functions active Defective seat height adjustment sensor	Move seat to lowest position. Check cabling/plug contacts. Replace and adjust seat height adjustment sensor.
1E05	Drive-away lock due to switch input (external charging receptacle)	Battery charger is connected to charging receptacle	Disconnect battery charger prior to driving.
2C00	Low battery voltage	Battery deep discharge Defective batteries	Charge as soon as possible. Check and replace batteries.
2C02	Switch-off due to low battery voltage		
2F00	Joystick warning	Joystick not in neutral position when the unit is turned on	Move joystick to neutral position prior to switch-on.
	Defective joystick	If the message continues to be displayed even though the joystick is centred: Defective joystick	Replace the joystick/control panel.
3B00	Left motor not connected	e.g. defective plug connection, cable break	Check plug connections and cable to left motor.
		Defective motor	Check left motor.
3C00	Right motor not connected	e.g. defective plug connection, cable break	Check plug connections and cable to right motor.
		Defective motor	Check right motor.
3D00		e.g. defective plug connection, cable break	
3D01	Error in the cabling of the left motor		Check plug connections and cable to left motor.

Error message; error code	Contents	Cause	Possible action
		Short circuit on the battery cable	
3E00 3E01	Error in the cabling of the right motor	e.g. defective plug connection, cable break Short circuit on the battery cable	Check plug connections and cable to left motor.
4401	Error in the control system	Non-specific problem in the control device	Contact the manufacturer.
5400 and flashing LEDs on speed display	Communication error	e.g. defective plug connection, cable break Defective controller	Check plug connections and cables on controller. Replace controller.
7100 7101	Joystick error	Joystick communication problem	Check joystick cable, ribbon cable on the joystick, connections and associated sockets.
7102	Joystick error	Loss of power supply to the joystick	Check joystick cable, ribbon cable on the joystick, connections and associated sockets.
7103 7104	Joystick error	Internal error trigger Defective joystick	Check joystick cable, ribbon cable on the joystick, connections and associated sockets. Replace the joystick/control panel.
7147	Joystick warning	Joystick not in neutral position when the unit is turned on	Move joystick to neutral position prior to switch-on.
7902	The control system has overheated	Maximum allowable temperature of the controller exceeded	Turn the control device off and let the controller cool down. Replace controller. If error persists: Contact the manufacturer.
Other codes	Possible errors in control system	Problem in the control device	Contact the manufacturer.

5.4 Other errors (not displayed)

This category includes errors that are not shown on the control panel or handheld programming device. Reasons for this can be that the control device cannot be switched on, the error is not severe enough or the control system cannot recognise the error for other reasons.

Error	Possible cause	Measure
Control system does not switch on	No connection between the battery and the control system	Check plug connections and battery cables.
	Defective cable connection between the controller and modules	Check plug connections and cables.
	Defective controller or modules	Check and replace controller with modules.
Wheelchair not driving straight	Incorrect programming	Adjust straight compensation in the software.
	Motor or brake error	Check and replace motors with brakes.
Motor or one brake is hot	Motor or brake error	Check and replace motors with brakes.
Battery is discharging too quickly	Dead or damaged batteries	Check and replace battery.
	Defective or unsuitable battery charger	Check operation of the battery charger. Replace battery charger.
	Use of incorrect batteries	Select an appropriate battery type by referring to the instructions for use.
	Motor is blocked or a brake is jammed	Replace motor and brake.

In case of errors that are not listed in this service manual, or if the prescribed actions have no effect, deactivate the main fuse and contact the manufacturer.

6 VR2 wheelchair control device

6.1 Installation and wiring

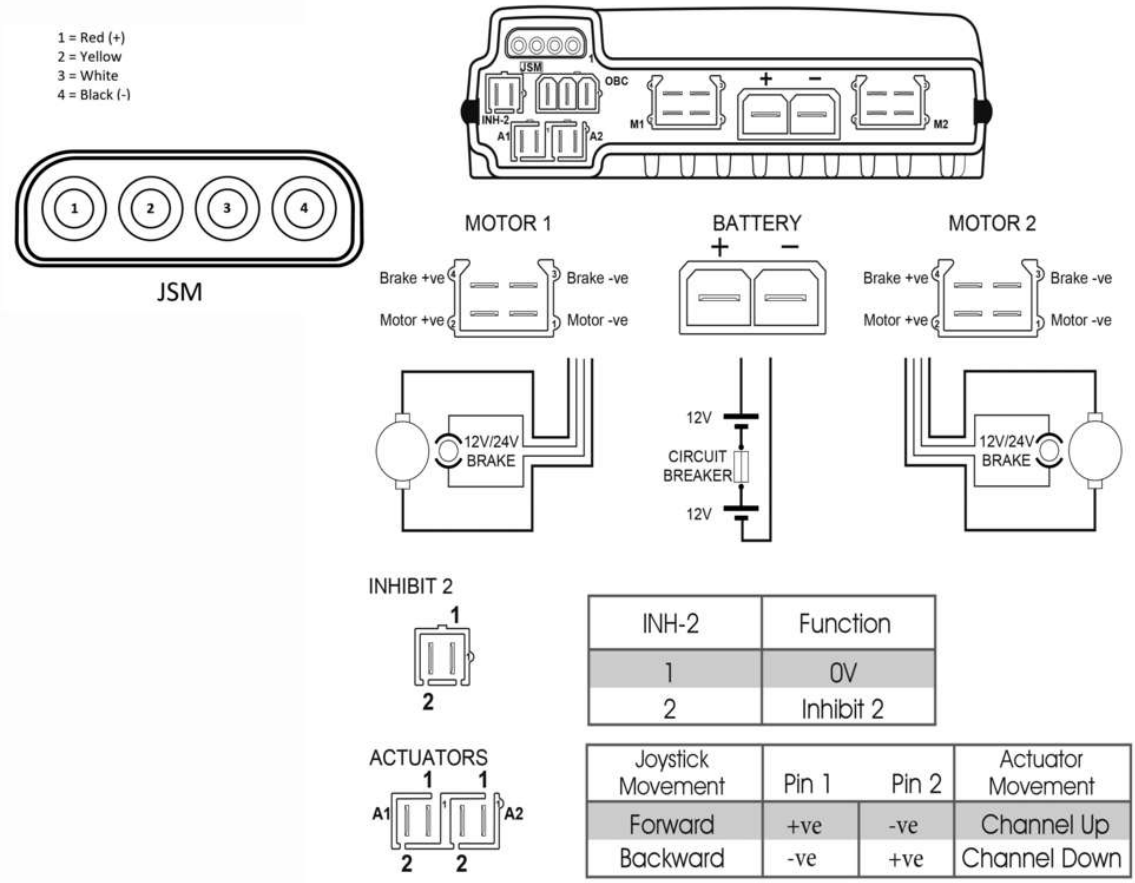
INFORMATION

For clear assignment of the cabling, the cable ends are marked with abbreviated designations of the components being connected. The following designations apply, among others:

- PM = controller/power module
- LM = light module
- JSM = joystick module/control panel
- Akt. = actuator
- Inh. = switch

Controller pin assignment

327

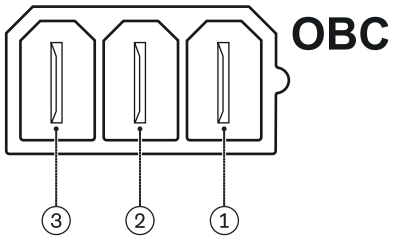


INH-2	Function
1	0V
2	Inhibit 2

Joystick Movement	Pin 1	Pin 2	Actuator Movement
Forward	+ve	-ve	Channel Up
Backward	-ve	+ve	Channel Down

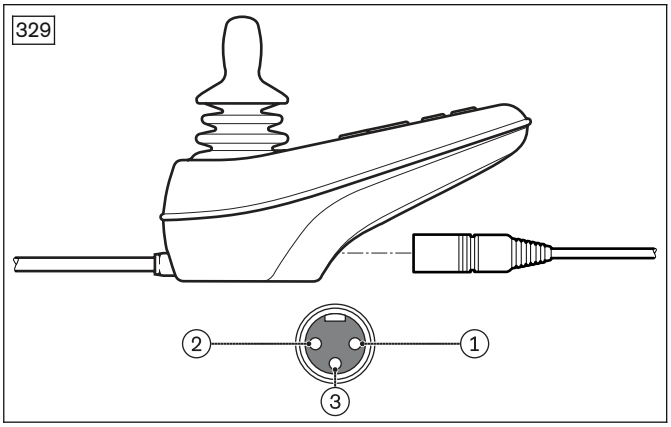
Pin assignment on the internal charging connection (OBC) of the controller

328



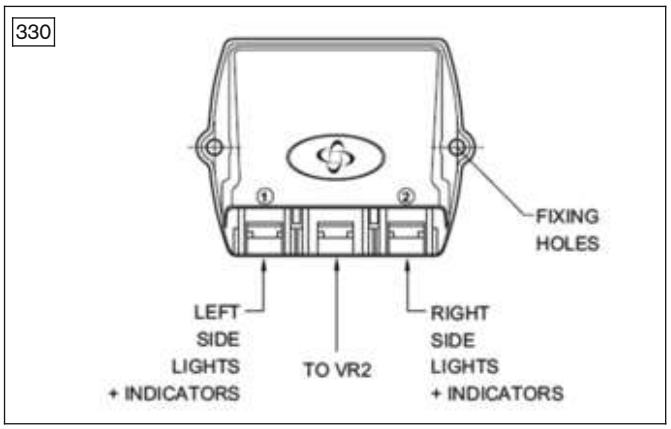
1 Battery, positive
2 Switch for drive-away lock (Inhibit 3)
3 0 V

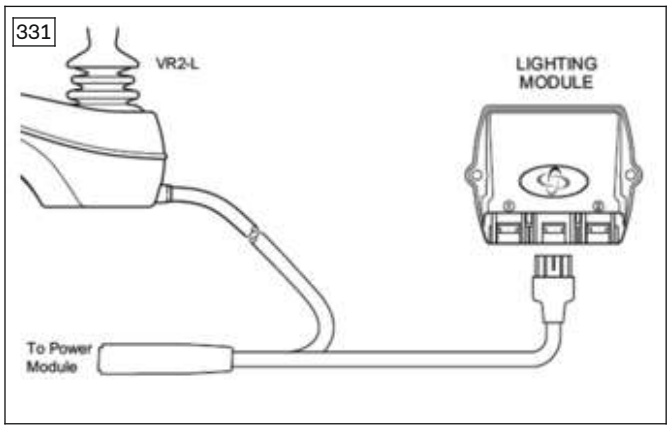
Pin assignment on the charging receptacle of the control panel



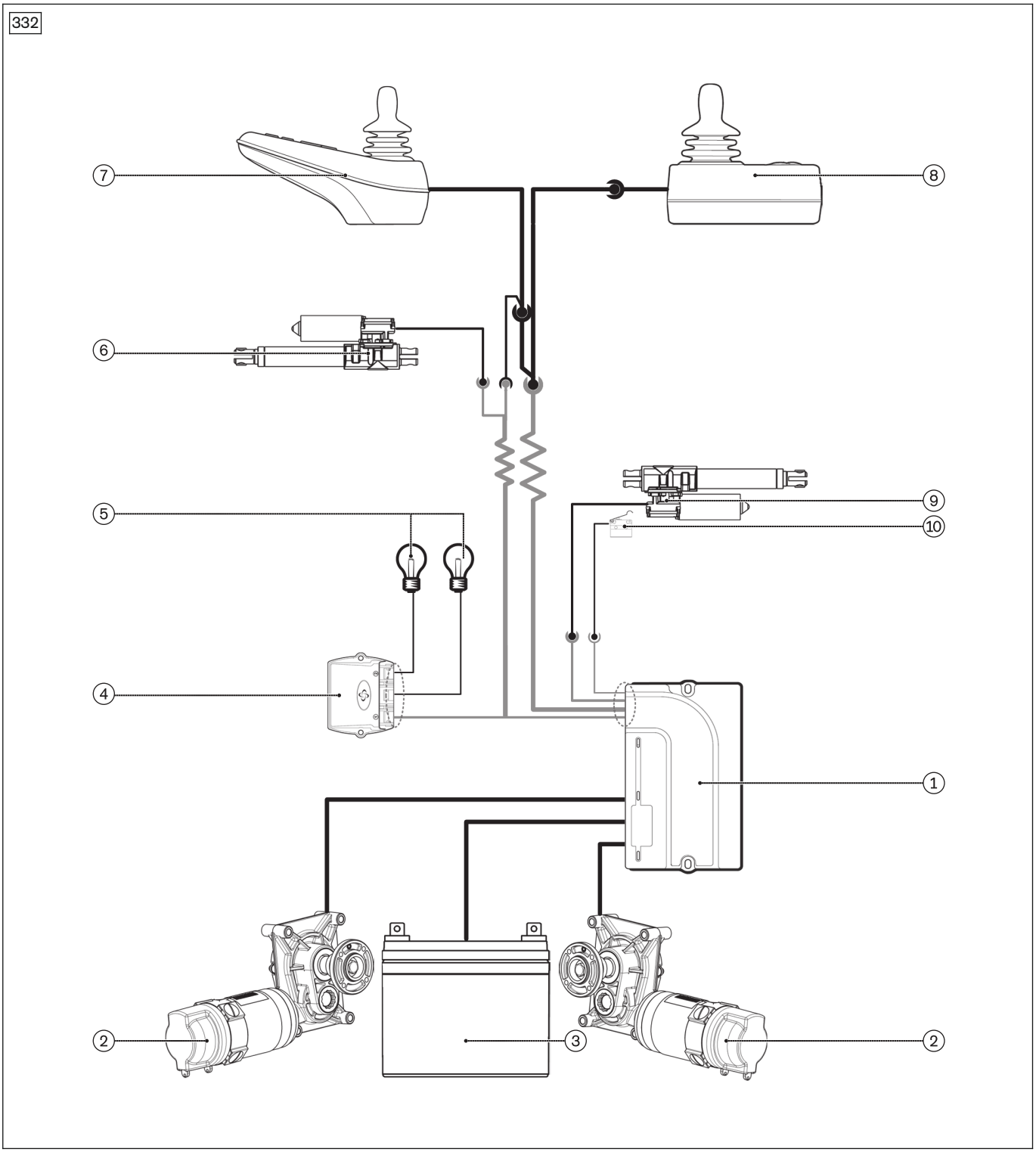
1 Battery, positive
2 Battery, negative
3 Switch for drive-away lock

Light module pin assignment





Cabling of the modules and components



1 Controller (see page 25)
2 Drive motor (see page 50)
3 Batteries (see page 21)
4 Light module (see page 31)
5 Lighting (see page 121)
6 Seat tilt actuator (see page 96)
7 Control panel (see page 33)
8 Attendant control (see page 37)
9 Seat height adjustment actuator (see page 92)
10 Seat height adjustment sensor (see page 94)

Not all of the components shown may be installed on the respective wheelchair, depending on the configuration.

6.2 Programming tools

INFORMATION

- ► Read and ensure you understand the user manual for the programming devices in full before using such a device.
- ► If you reprogram the control system, make sure that you observe any restrictions described in the wheelchair instructions for use (user).
- ► Document all modifications for further reference.

6.2.1 PC programming with Wi-Fi dongle

For programming the VR2 control device using a device with an Internet browser, a wireless Wi-Fi dongle can be connected between the controller and control panel.

Connecting the Wi-Fi dongle

1) Switch the wheelchair control device off.
2) Connect the Wi-Fi dongle to the control panel with the XLR plug socket (not illustrated).
3) Turn on the wheelchair control device.
4) Make sure Wi-Fi is enabled on the device you want to use for programming.
5) Search for the Wi-Fi dongle in the network settings. This is indicated by the SSID on the dongle label.
6) Connect to the Wi-Fi dongle and enter the password printed on the dongle label.
7) Open an Internet browser (recommended Google Chrome, Mozilla Firefox, Microsoft Edge and Safari) and enter http://powerchair.net in the address bar.
8) Perform programming using the web application displayed.

For further information on the use of the Wi-Fi dongle, please see the document “Get-Started Guide Curtiss-Wright Wi-Fi Dongle – SK81993/02” from control device manufacturer Curtiss-Wright.

6.2.2 Handheld programming device

The PP1 (see fig. 333) or DTT (see fig. 334) handheld programming devices can be connected to program the VR2 control device.
A handheld programming device enables access to programmable parameters for adjusting the wheelchair settings to the individual requirements of the user and to read error reports and timer information.

Connecting the handheld programming device

1) Switch the wheelchair control device off.
2) **Optional for DTT handheld programming device:** Connect the connection cable for VR2 to the handheld programming device (2462765, item 1).
3) Connect the connection cable to the wheelchair control panel.
4) Switch on the control device on the wheelchair and initialise it.

Using the handheld programming device

Further information on the installation and use of the PP1 and DTT handheld programming devices is found in the user manuals "PROGRAMMER FOR PILOT & PILOT+CONTROL SYSTEMS SK73286" and "DIAGNOSTIC TEST TOOL TECHNICAL MANUAL SK79393" from control device manufacturer Curtiss-Wright.

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6.2.3 PC programming device

The PC programming device enables the same access as the handheld programming device and is connected the same way. For further details on how to use the software packages with the control device, refer to the user manual supplied with the software.

6.3 Programmable parameters

⚠ WARNING

Incorrect configuration settings

Falling, tipping over, collision due to programming errors

- ► Programming may be performed only by qualified personnel trained by the manufacturer. The manufacturer of the product and the control device manufacturer are not liable in case of damage caused by programming which was not performed properly and/or which was not adjusted properly according to the user's abilities.
- ► Note that 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 driving characteristics and cause an accident.
- ► Parameters not described in this service manual may not be changed, or only in consultation with Ottobock.
- ► After configuration/programming is complete, the user must test the driving characteristics of the product under the supervision of the qualified personnel.

The following description provides an overview of the programmable parameters. Detailed information regarding programming can be found in the document "VR2 SERIES WHEELCHAIR CONTROL SYSTEM; OPERATION, INSTALLATION & PROGRAMMING SK77898" from control device manufacturer Curtiss-Wright.

Additional parameters which may be accessible with a different version of the programming software may not be changed or may only be changed following consultation with Ottobock.

6.3.1 General parameters

Parameter	Setting range	Description
Sleep mode (Sleep Timer)	1-minute increments from 0 to 30 min	Setting of time period in which wheelchair is inactive before the control system switches off. If the time is set to 0, the system never switches off.
Joystick deflection (Joystick Throw)		Programming enables the maximum speed to be achieved even if the joystick is moved (deflected) only slightly. This is particularly useful for wheelchair drivers with restricted hand or arm mobility.
Reversible joystick function (Invert Joystick)	On, Off	Setting this parameter causes the wheelchair to be moved in the opposite direction to the direction of joystick deflection. On: If the joystick is moved forward, the wheelchair moves backwards. Off: If the joystick is moved forward, the wheelchair moves forward. Function of the joystick remains unchanged when deflected left or right.
Soft stop function (Soft Stop Rate)	Single steps from 0 to 200	Setting of deceleration value for soft braking of the wheelchair. Soft braking of the wheelchair occurs if the VR2 control device is switched off during travel.
Soft reverse deceleration (Soft Reverse Deceleration)	Single steps from 25 to 100 %	Setting of the deceleration rate when the wheelchair is stopped whilst moving backwards. This value can be set separately via the "Deceleration" parameter to prevent the wheelchair from tipping over when being driven backwards down a slope. This value is set as a percentage of the "Deceleration" parameter. A typical value is 70 %.
Reversing alarm (Reverse Driving Alarm)	On, Off	Sets whether the VR2 control device gives an audible warning while driving in reverse. On: An audible warning signal sounds. Off: The alarm is deactivated.
Activating the locking function (Lock Function Enabled))	On, Off	The locking sequence can be activated to prevent the wheelchair being driven by an unauthorised person. On: The lock function is available. Off: The lock function is deactivated.
	On, Off	Enables detection of defective power brakes or brake connections via the VR2 control device.

Parameter	Setting range	Description
Detection of brake defects (Brake Fault Detect)		On: Brake defects are detected. Off: Brake defects remain undetected.

6.3.2 Speed parameters

Parameter	Setting range	Description
Acceleration (Acceleration)	Single steps from 0 to 100	Setting of forward and backward acceleration of the wheelchair. A high value enables fast acceleration. This programmed acceleration value appears when a speed setting of 5 has been selected. Its value for other settings depends on the value of the “Minimum Acceleration” parameter.
Deceleration (Deceleration)	Single steps from 0 to 100	Setting of the forward and backward deceleration (or brake) of the wheelchair. A high value enables rapid deceleration. This programmed deceleration value appears when a speed setting of 5 has been selected. Its value for other settings depends on the value of the “Minimum Deceleration” parameter.
Turning acceleration (Turn Acceleration)	Single steps from 0 to 100	Setting of turn acceleration of the wheelchair. A high value enables fast acceleration. This programmed acceleration value appears when a speed setting of 5 has been selected. Its value for other settings depends on the value of the “Minimum Turn Acceleration” parameter.
Turning deceleration (Turn Deceleration)	Single steps from 0 to 100	Setting of the turn deceleration (or brake) of the wheelchair. A high value enables rapid deceleration. This programmed deceleration value appears when a speed setting of 5 has been selected. Its value for other settings depends on the value of the “Minimum Turn Deceleration” parameter.
Forward driving speed (Forward Speed)	Single steps from 0 to 100	Setting of the minimum and maximum forward speeds of the wheelchair. A high value enables a high speed. The minimum value appears when the speed setting 1 has been selected and the maximum value appears when the speed setting 5 has been selected.
Reverse driving speed (Reverse Speed)	Single steps from 0 to 100	Setting of the minimum and maximum reverse speeds of the wheelchair. A high value enables a high speed. The minimum value appears when the speed setting 1 has been selected and the maximum value appears when the speed setting 5 has been selected.
Turning speed (Turning Speed)	Single steps from 0 to 100	Setting of the minimum and maximum turning speeds of the wheelchair. A high value enables a high speed. If “Drive Profile 0” has been selected, the minimum value appears for speed setting 1 and the maximum value appears when speed setting 5 has been selected.
Performance (Power)	Single steps from 0 to 100 %	Setting of wheelchair power level. In this context, power is understood to be the ability to negotiate hills or overcome obstacles, for example. If the power is set to 100 %, the wheelchair can be operated at its full power. Values below 100 % will result in reduced power. Power settings are usually made to avoid damage to corridors and furniture when the wheelchair is being used indoors. The drive profiles can be set independently of each other, i.e. different profiles can be defined for inside and outside areas. Programming example: • Maximum current = 70 A • Power (profile 1) = 100 % • Power (profile 2) = 50 % (meaning that the VR2 control device has a power of 70 A in profile 1, but 50 % of 70 A = 35 A in profile 2).
Number of driving profiles (Number of Drive Profiles)	Profiles 0 – 5	The VR2 control device can be operated with a single or with multiple drive profiles. A drive profile consists of programmable parameters such as acceleration, deceleration, turn acceleration, turn deceleration, forward speed,

Parameter	Setting range	Description
		reverse speed and turning speed. The number of drive profiles is specified via the programmable “Number of Drive Profiles” parameter. If the “Number of Drive Profiles” parameter is set to 0, there is one setting for each of the parameters listed above. The maximum speed setting of the control system can be changed using the keys for maximum speed or extension/reduction of the profiles. If the parameter setting for “Number of Drive Profiles” has a value of 2 to 5, the corresponding number of drive profiles exists and each of the listed parameters can be set separately in each profile. Then the keys for maximum speed or extension/reduction of the profiles can be used to switch between the existing profiles. **INFORMATION: Although a number of drive profiles can be set to 1, the operation is the same as setting to 0 but without the ability to change maximum speed settings.**
Minimum acceleration (Minimum Acceleration)	1 % increments of “Acceleration” parameter	Setting of minimum forward and backward acceleration of the wheelchair. This percentage acceleration value appears if the speed has been set to 1. Programming example: • Acceleration = 80 and minimum acceleration = 25 % • Acceleration at level 1 = 25 % of 80 = 20 • Speed settings 2, 3 and 4 are interpolated linearly between 20 and 80 • Acceleration at level 2 = 35 • Acceleration at level 3 = 50 • Acceleration at level 4 = 65
Minimum deceleration (Minimum Deceleration)	1 % increments of “Deceleration” parameter	Setting of the minimum forward and backward deceleration of the wheelchair. This percentage deceleration value appears if the speed has been set to 1. Programming example: • Deceleration = 80 and minimum deceleration = 25 % • Deceleration at level 1 = 25 % of 80 = 20 • Speed settings 2, 3 and 4 are interpolated linearly between 20 and 80 • Deceleration at level 2 = 35 • Deceleration at level 3 = 50 • Deceleration at level 4 = 65
Minimum turn acceleration (Minimum Turn Acceleration)	1 % increments of “Turn Acceleration value” parameter	Setting of minimum turn acceleration of the wheelchair. This percentage turn acceleration value appears if the speed has been set to 1. Programming example: • Turn Acceleration = 80 and Minimum Turn Acceleration = 25 % • Turn Acceleration at level 1 = 25 % of 80 = 20 • Speed settings 2, 3 and 4 are interpolated linearly between 20 and 80 • Turn acceleration at level 2 = 35 • Turn acceleration at level 3 = 50 • Turn acceleration at level 4 = 65
Minimum turning deceleration (Minimum Turn Deceleration)	1 % increments of “Turn Deceleration value” parameter	Setting of the minimum turn deceleration of the wheelchair. This percentage turn deceleration value appears if the speed has been set to 1. Programming example: • Turn Deceleration = 80 and Minimum Turn Deceleration = 25 % • Turn Deceleration at level 1 = 25 % of 80 = 20 • Speed settings 2, 3 and 4 are interpolated linearly between 20 and 80 • Turn deceleration at level 2 = 35

Parameter	Setting range	Description
		• Turn deceleration at level 3 = 50 • Turn deceleration at level 4 = 65

6.3.3 Report functions

The following functions are logged by the VR2 control device and can be read with the corresponding hardware:

Function	Description
Memory functions (Memory Functions)	VR2 is equipped with a timer and troubleshooting report function. They can be read and deleted with the help of the DTT or PC programming device.
Timer (Read Timer)	VR2 is equipped with a timer that records the hours of operation of the wheelchair. The timer starts running as soon as the joystick is deflected from the home position and stops running when the joystick returns to the home position. The timer records the number of hours for which the wheelchair is in use.
Reset timer (Clear Timer)	This function resets the VR2 control device's timer. This function can only be used with the PCPb and PCPc versions of the PC programming device.
System log (Read System Log)	VR2 is equipped with a troubleshooting report system that stores the number of occurrences of the last eight detected system problems. This allows you to view the contents.
Delete system log (Erase System Log)	With this function, the troubleshooting report from the VR2 control device can be deleted. This function can only be used with the PCPb and PCPc versions of the PC programming device.

7 R-net wheelchair control device

7.1 Installation and wiring

INFORMATION

For clear assignment of the cabling, the cable ends are marked with abbreviated designations of the components being connected. The following designations apply, among others:

- ► PM = controller/power module
- ► ISM = seat module
- ► JSM = joystick module/control panel
- ► Akt. = actuator
- ► Inh. = switch

Controller pin assignment

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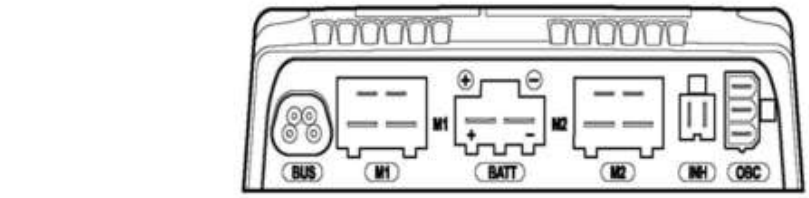

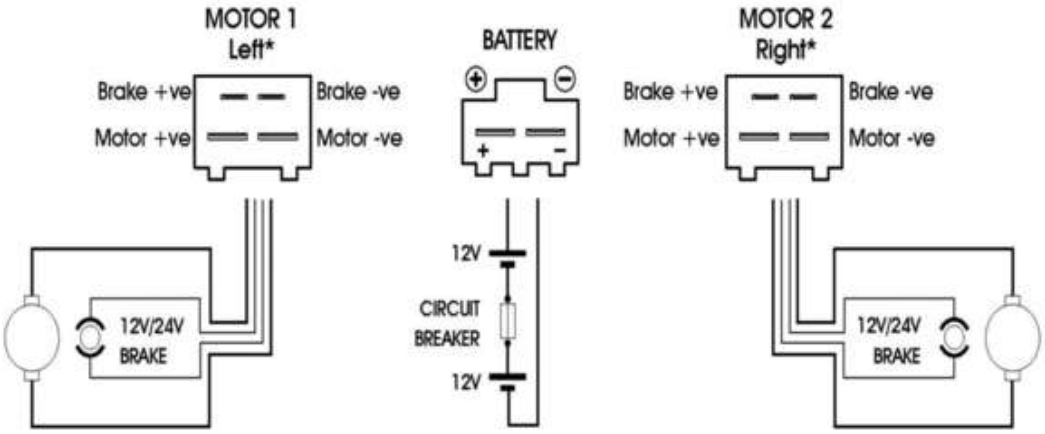

* Assumes no Motor Swap programming has been undertaken

Joystick Movement	M1		M 2		Actual Movement	
	Motor +ve	Motor -ve	Motor +ve	Motor -ve		
Forward	+ve	-ve	+ve	-ve	Forward	**
Backward	-ve	+ve	-ve	+ve	Backward	**

** Assumes no Joystick Orientation, Invert M1 Direction or Invert M2 Direction programming has been undertaken

INHIBIT 2

INH-2	Function
1	0V
2	Inhibit 2

Seat module pin assignment

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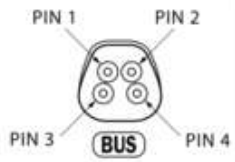
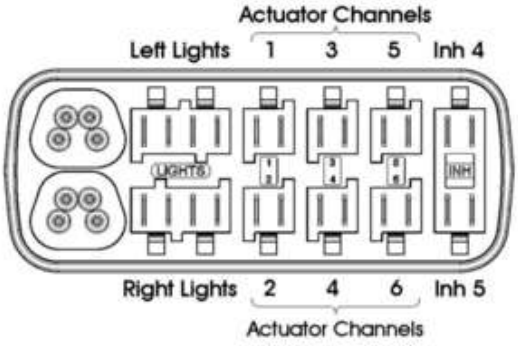
REBUS Verbindungsdetails

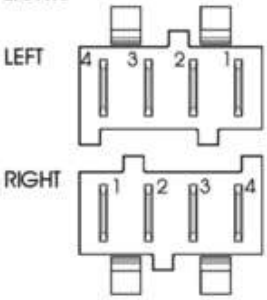


PIN	FARBE	LABEL
1	Weiß	CAN H
2	Blau	CAN L
3	Rot	POWER H
4	Schwarz	POWER L

Siehe Unterseite Kontroller

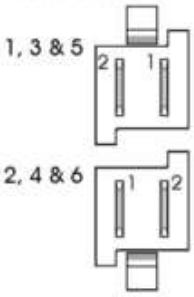


LIGHTS



Lights	Function
1	Gnd
2	Lights
3	Indicator
4	Brake/Horn

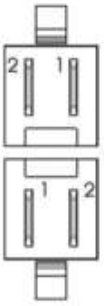
ACTUATORS



Joystick Movement	Pin 1	Pin 2	Actuator Movement	
Forward	-ve	+ve	Channel Up	*
Backward	+ve	-ve	Channel Down	*

* Assumes no Joystick Orientation or Invert Axis Direction programming has been undertaken

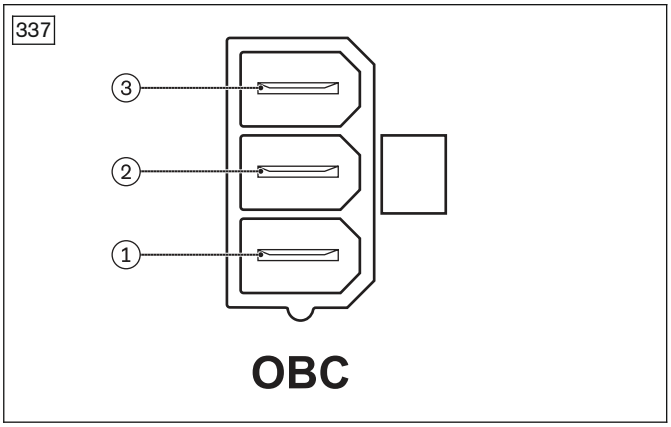
INHIBITS 4 & 5



INHIBIT - 4	Function
1	0V
2	Inhibit 4

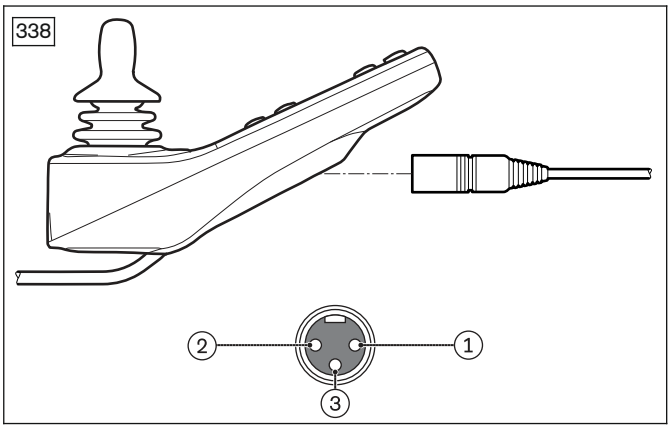
INHIBIT - 5	Function
1	0V
2	Inhibit 5

Pin assignment on the internal charging connection (OBC) of the controller



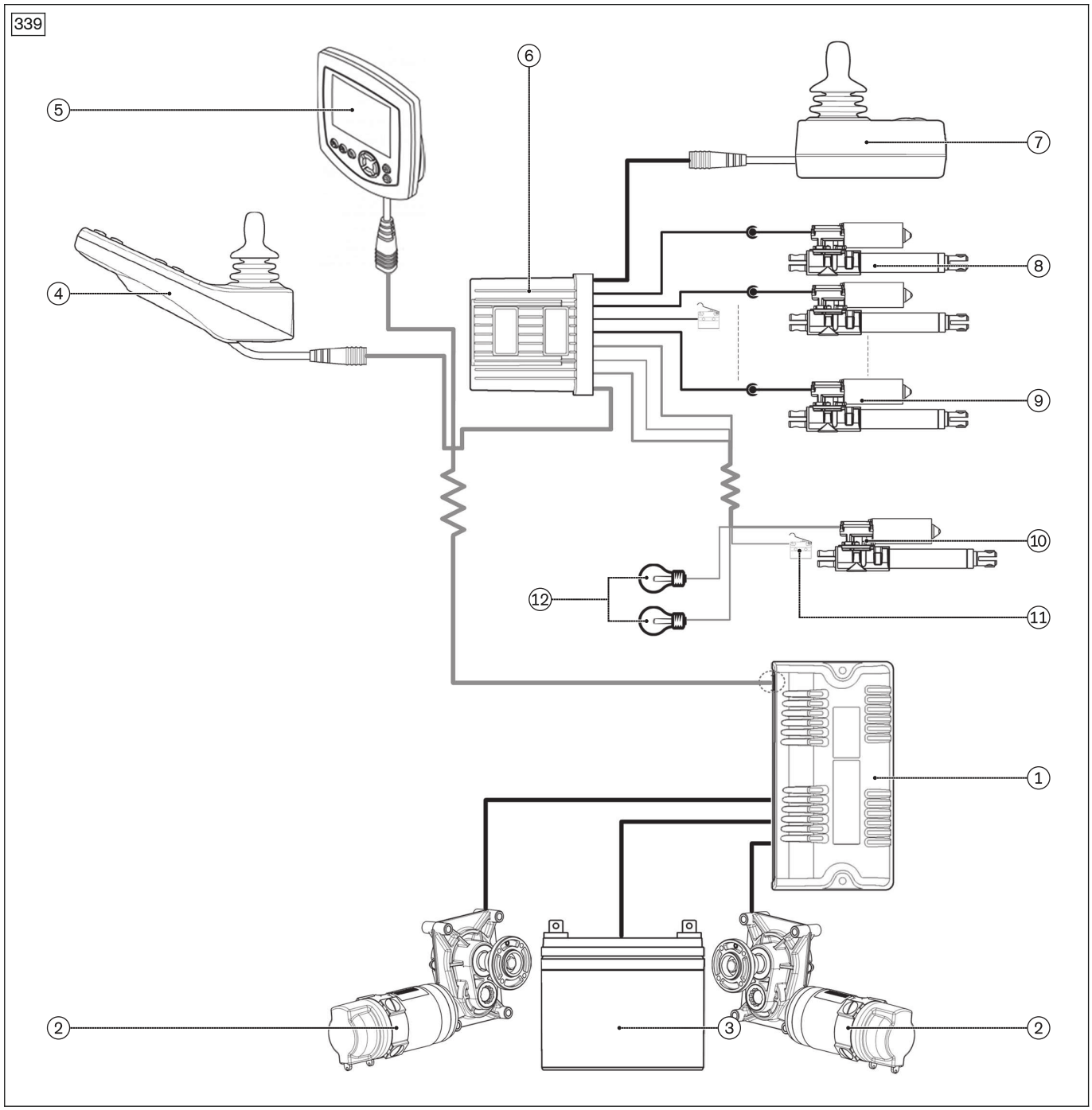
1 Battery, positive
2 Switch for drive-away lock (Inhibit 3)
3 0 V

Pin assignment on the charging receptacle of the control panel



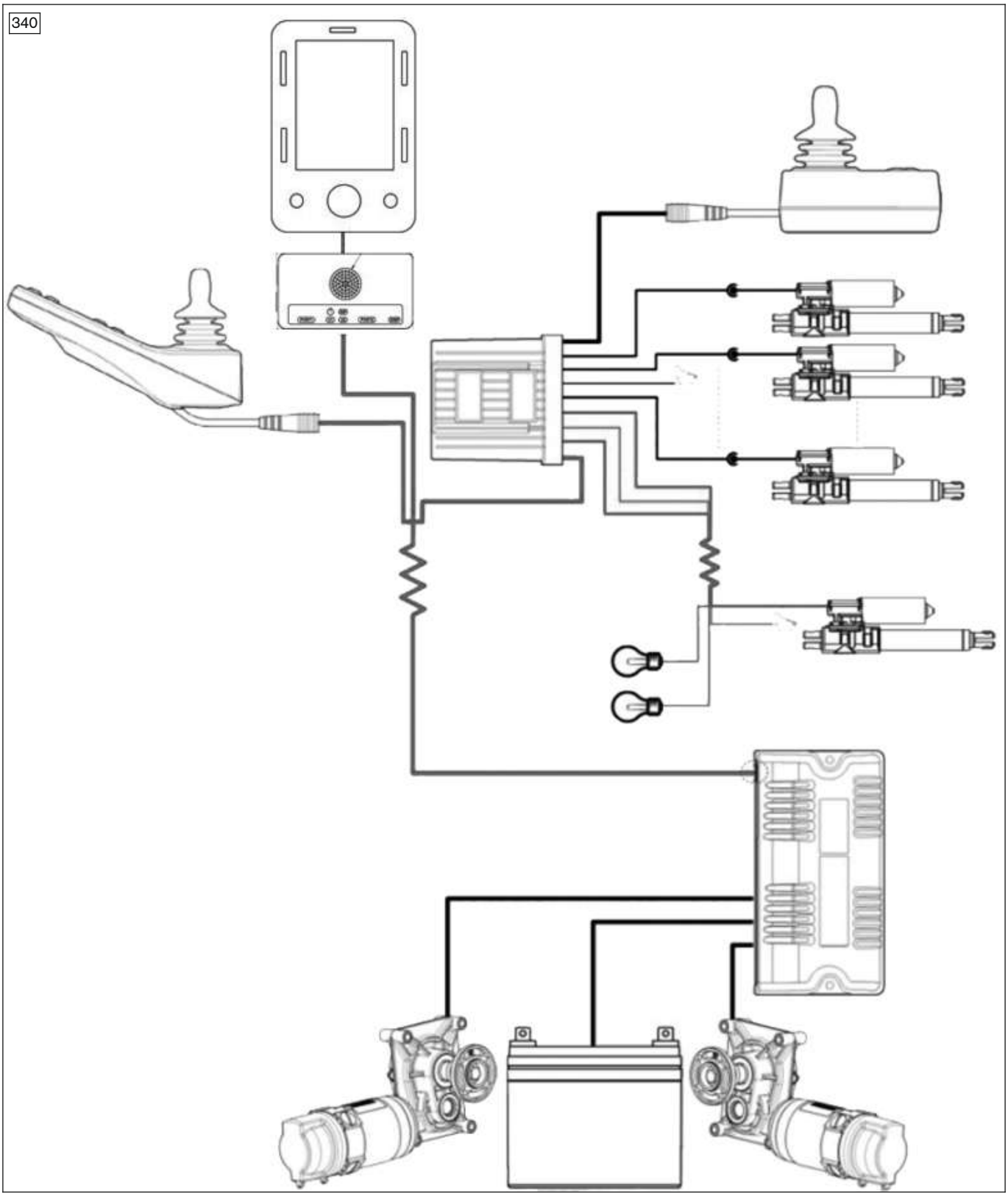
1 Battery, positive
2 Battery, negative
3 Switch for drive-away lock

Cabling of the modules and components



1	Controller (see page 25)	7	Attendant control (see page 37)
2	Drive motor (see page 50)	8	Actuator for power back support angle adjustment (see page 101, see page 104)
3	Batteries (see page 21)	9	Seat tilt actuator (see page 96)
4	Control panel (see page 33)	10	Seat height adjustment actuator (see page 92)
5	LCD monitor (Omni)	11	Seat height adjustment sensor (see page 94)
6	Seat module (see page 26)	12	Lighting (see page 121)

Not all of the components shown may be installed on the respective wheelchair, depending on the configuration.



7.2 Programming tools

INFORMATION

- ► Read and ensure you understand the user manual for the programming devices in full before using such a device.
- ► If you reprogram the control system, make sure that you observe any restrictions described in the wheelchair instructions for use (user).
- ► Document all modifications for further reference.

7.2.1 On-board programming with programming dongle

INFORMATION

On-board programming is not activated on delivery of the control device. In this case, first carry out PC programming, back up the parameters and activate on-board programming if necessary.

For programming the R-Net control device with the control panel, a programming dongle can be connected between the controller and control panel.

Connecting the programming dongle and starting on-board programming (see fig. 341**)**

1) Switch the wheelchair control device off.
2) Disconnect the cable between the control panel and controller, and interconnect the programming dongle.
   INFORMATION: Alternatively, the programming dongle can be connected to an unused bus slot.
3) Switch on the control device on the wheelchair and initialise it.
4) Press and hold the [Profile/Mode] button until the on-board programming start screen is displayed. For further information regarding the installation and application of on-board programming, please see the document "PG DRIVES TECHNOLOGY R-NET - TECHNICAL MANUAL SK77981" from control device manufacturer Curtiss-Wright.

7.2.2 PC programming with the programming dongle

For programming the R-Net control device with a PC programming device, a programming dongle can be connected between the controller and control panel.

Connecting the programming dongle and PC programming device (see fig. 342**)**

1) Switch the wheelchair control device off.
2) Disconnect the cable between the control panel and controller, and interconnect the programming dongle.
   INFORMATION: Alternatively, the programming dongle can be connected to an unused bus slot.
3) Connect the PC programming device to the programming dongle.
4) Switch on the control device on the wheelchair and initialise it.

For further information regarding the installation and application of the PC programming device, please see the document "PG DRIVES TECHNOLOGY R-NET - TECHNICAL MANUAL SK77981" from control device manufacturer Curtiss-Wright.

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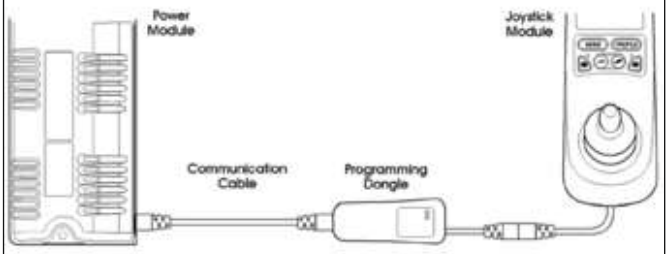

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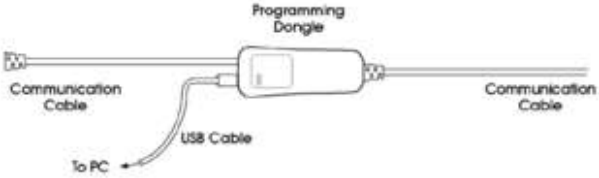


7.2.3 PC programming with Wi-Fi dongle

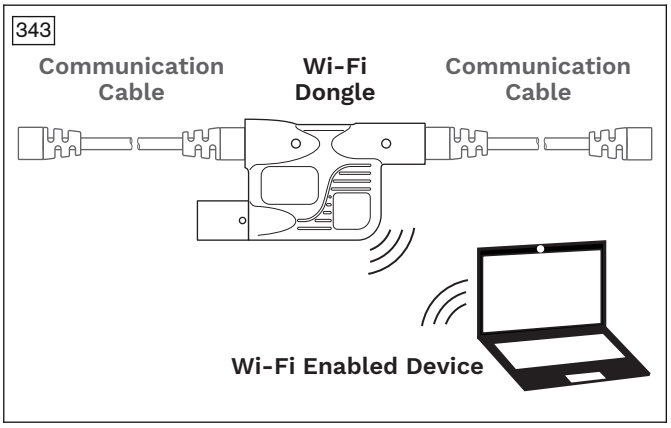
For programming the R-net control device using a device with an Internet browser, a wireless Wi-Fi dongle can be connected between the controller and control panel.

Connecting the Wi-Fi dongle (see fig. 343**)**

1) Switch the wheelchair control device off.
2) Disconnect the cable between the control panel and controller, and interconnect the Wi-Fi dongle.
   INFORMATION: Alternatively, the Wi-Fi dongle can be connected to an unused bus slot.
3) Turn on the wheelchair control device.
4) Make sure Wi-Fi is enabled on the device you want to use for programming.
5) Search for the Wi-Fi dongle in the network settings. This is indicated by the SSID on the dongle label.
6) Connect to the Wi-Fi dongle and enter the password printed on the dongle label.

7) Open an Internet browser (recommended Google Chrome, Mozilla Firefox, Microsoft Edge and Safari) and enter http://powerchair.net in the address bar.
8) Perform programming using the web application displayed.

For further information on the use of the Wi-Fi dongle, please see the document “Get-Started Guide Curtiss-Wright Wi-Fi Dongle – SK81993/02” from control device manufacturer Curtiss-Wright.



7.2.4 Handheld programming device

The DTT handheld programming device (see fig. 344, see fig. 345) can be connected for programming the R-Net control device.

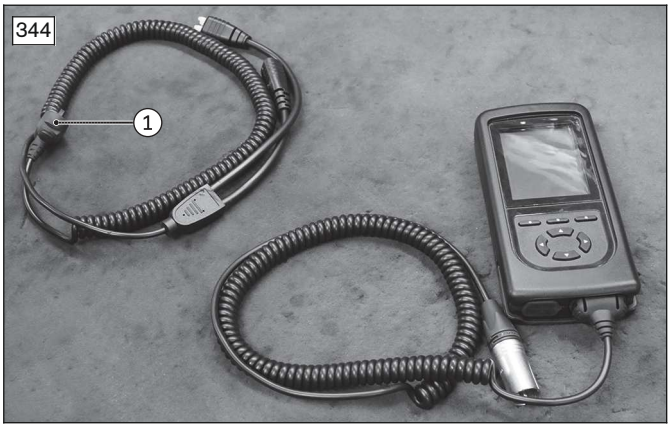
A handheld programming device enables access to programmable parameters for adjusting the wheelchair settings to the individual requirements of the user and to read error reports and timer information.

Connecting the handheld programming device

1) Switch the wheelchair control device off.
2) Connect the connecting cable for R-Net to the handheld programming device (see fig. 344, see fig. 345, item 1).
3) Disconnect the cable between the control panel and controller, and interconnect the handheld programming device (see fig. 345, item 2).
   INFORMATION: Alternatively, the handheld programming device can be connected to an unused bus slot.
4) Switch on the control device on the wheelchair and initialise it.

Using the handheld programming device

For further information regarding the installation and application of the handheld programming device, please see the user manual "DIAGNOSTIC TEST TOOL TECHNICAL MANUAL SK79393" from control device manufacturer Curtiss-Wright.



7.3 Programming philosophy

Profiles and operating modes

Operation of the R-Net control device is based on a concept of profiles and operating modes.

A profile is a collection of programmable parameters which influence the operation and performance of the wheelchair. There are typically five profiles, each of which includes different driving characteristics. Profile 1 can be configured for very low speeds and accelerations, for example, while profiles 2 through 5 contain progressively higher speed and acceleration values. In this way the user can determine the driving characteristics of the wheelchair by selecting the appropriate profile on the control panel. While the profiles are primarily used to modify the driving characteristics, they may also contain other parameters, e.g. for adjustment of the seat.

Typical examples of operating modes are **Drive** and **Seating**. The user can select the desired operating mode using the [Mode] button on the control panel.

Profile management

The R-net control device offers up to eight profiles. Five of these are typically used. The **Profile Enable** parameter under **Profile Management** is used to select whether a profile is visible to the user.

The LCD screen on the control panel shows the currently selected profile as a text string with up to 20 characters. The number of the profile is also shown.

Managing the operating modes

Seven different operating modes can be selected within every available profile. A standard wheelchair normally has just two operating modes: Drive (mode 1) and Seating (mode 2).

The **Mode Enable** parameter controls whether or not an operating mode is available.

7.4 Programmable parameters

⚠ WARNING

Incorrect configuration settings

Falling, tipping over, collision due to programming errors

- ► Programming may be performed only by qualified personnel trained by the manufacturer. The manufacturer of the product and the control device manufacturer are not liable in case of damage caused by programming which was not performed properly and/or which was not adjusted properly according to the user's abilities.
- ► Note that 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 driving characteristics and cause an accident.
- ► Parameters not described in this service manual may not be changed, or only in consultation with Ottobock.
- ► After configuration/programming is complete, the user must test the driving characteristics of the product under the supervision of the qualified personnel.

The following description provides an overview of the programmable parameters. Additional parameters can be programmed when using the TEN° control panel. For detailed information regarding programming, please see the online help for the PGDT R-net programming software and the following documents from control device manufacturer Curtiss-Wright:

- "PG DRIVES TECHNOLOGY R-NET – TECHNICAL MANUAL SK77981"
- "PG DRIVES TECHNOLOGY R-NET – TECHNICAL MANUAL SK81302"

Further information on the parameters of special controls is found in the instructions for use (qualified personnel) 647G2000.

Additional parameters which may be accessible with a different version of the programming software may not be changed or may only be changed following consultation with Ottobock.

7.4.1 General parameters

The following parameters can be set under **Controls/Global**:

Parameter	Setting range	Description
Brief display activated (Momentary Screens Enabled)	Yes, no	Used to set whether large, brief displays appear between changes in the profile and speed settings.
Change profile while driving (Change Profile while Driving)	Yes, no	Used to set whether profile changes are permitted while driving.
Change speed while driving	Yes, no	Used to set whether the [Faster] and [Slower] buttons are enabled while driving.

Parameter	Setting range	Description
(Change Speed while Driving)		
Adjusting the speed (Speed Adjust)	Yes, no	Used to set whether the [Faster] and [Slower] buttons are enabled on the joystick module.
Profile button (Profile Button)	Profiles, Profiles/modes	Used to set whether profiles only or profiles and modes are selected using the profile button on the control panel. When Profiles/modes is set, first the available profiles and then the available modes are selected using the profile button on the control panel. This means that it can be used to carry out the same procedure as a button that is connected to the socket for the external input device for the profile. If the system has a control panel LED joystick module, this parameter must be set to "Profiles".
Actuator end stop beep (Actuator Endstop Beep)	Yes, no	Used to set whether a short beep sounds when a variable motor mechanism reaches an end stop. The beep sounds only with variable motor mechanisms with automatic end stop recognition, i.e. when measuring the overcurrent.
Beeper volume (Sounder Volume)	0 – 10	Volume of the acoustic feedback provided when operating a button or a switch on the joystick module. When the parameter is set to 0 there is no acoustic feedback. The higher the value, the louder the beep.
Drive-away lock (Lock Function Enabled)	None, sequence, key, both	Used to set whether and how the R-net control device can be locked to prevent the wheelchair from being used by unauthorised persons. The programmable options are as follows: • None: Means that the R-net cannot be locked. • Sequence: Means that the R-net can be locked/unlocked by pressing a sequence of buttons. • Key: Means that a key provided by the manufacturer can be used to lock/unlock the R-net. • Both: Means that either a sequence of buttons or a key can be used to lock/unlock the R-net.
Reverse alarm signal (Reverse Driving Alarm)	Yes, no	Used to set whether an alarm signal sounds when the wheelchair is driving in reverse.
Emergency stop switch (Emergency Stop Switch)	Yes, no	Used to set whether an emergency stop switch must be used when operation in latched mode is programmed. When set to **Yes**, an emergency stop switch (break contact) must be connected to the socket for the input device for the external profile on the joystick module when latched driving or operation of the variable motor in latch mode is programmed. If no emergency stop switch is installed, operation of the wheelchair is blocked. When set to **No**, no emergency stop switch is required. This setting should be used only after an analysis of all the associated risks, i.e. no emergency stop can be performed when driving or operating a variable motor in latched mode. Ottobock shall not be liable for any losses etc. of any kind resulting from the use of a wheelchair which is programmed for driving or operation of a variable motor in latched mode and with no emergency stop switch installed.
Mode after switching on (Powerup Mode)	Last used, drive, seat, Bluetooth, external devices, mode 5, mode 6, IR mode, programming	Used to set the mode that is selected when the system is switched on. If **Last Used** is selected, the mode that was selected when the wheelchair was last switched off will be selected when it is next switched on. If a mode is selected but the corresponding output module is not available, the system automatically switches to driving mode when the wheelchair is switched on.

7.4.2 Speed parameters

The following parameters can be set under **Speeds**:

Parameter	Setting range	Description
Maximum forward speed (Maximum Forward Speed)	Single steps from 0 to 100 %	Speed for forward driving of the wheelchair when the joystick is pushed completely forwards and the highest speed level is set (all 5 bars illuminated).
Minimum forward speed (Minimum Forward Speed)	Single steps from 0 to 100 %	Speed for forward driving of the wheelchair when the joystick is pushed completely forwards and the lowest speed level is set (only 1 bar illuminated). The value of the minimum forward speed cannot be set higher than the value for the maximum forward speed.
Maximum reverse speed (Maximum Reverse Speed)	Single steps from 0 to 100 %	Speed for reverse driving of the wheelchair when the joystick is pushed completely back and the highest speed level is set (all five bars illuminated).
Minimum reverse speed (Minimum Reverse Speed)	Single steps from 0 to 100 %	Speed for reverse driving of the wheelchair when the joystick is pushed completely back and the lowest speed level is set (only 1 bar illuminated). The value of the minimum reverse speed cannot be set higher than the value for the maximum reverse speed.
Maximum turning speed (Maximum Turning Speed)	Single steps from 0 to 100 %	Speed for turning and rotating the wheelchair when the joystick is pushed completely to the left or right and the highest speed level is set (all 5 bars illuminated).
Minimum turning speed (Minimum Turning Speed)	Single steps from 0 to 100 %	Speed for turning and rotating the wheelchair when the joystick is pushed completely to the left or right and the lowest speed level is set (only 1 bar illuminated). The value of the minimum turning speed cannot be set higher than the value for the maximum turning speed.
Maximum forward acceleration rate (Maximum Forward Acceleration)	Single steps from 0 to 100 %	Rate of acceleration of the wheelchair during forward driving when the highest speed level is set (all 5 bars illuminated).
Minimum forward acceleration rate (Minimum Forward Acceleration)	Single steps from 0 to 100 %	Rate of acceleration of the wheelchair during forward driving when the lowest speed level is set (only 1 bar illuminated). The value of the minimum forward acceleration rate cannot be set higher than the value for the maximum forward acceleration rate.
Maximum forward deceleration rate (Maximum Forward Deceleration)	Single steps from 0 to 100 %	Rate of deceleration of the wheelchair during forward driving when the highest speed level is set (all 5 bars illuminated).
Minimum forward deceleration rate (Minimum Forward Deceleration)	Single steps from 0 to 100 %	Rate of deceleration of the wheelchair during forward driving when the lowest speed level is set (only 1 bar illuminated). The value of the minimum forward deceleration rate cannot be set higher than the maximum forward deceleration rate.
Maximum reverse acceleration rate (Maximum Reverse Acceleration)	Single steps from 0 to 100 %	Rate of acceleration of the wheelchair during reverse driving when the highest speed level is set (all 5 bars illuminated).
Minimum reverse acceleration rate (Minimum Reverse Acceleration)	Single steps from 0 to 100 %	Rate of acceleration of the wheelchair during reverse driving when the lowest speed level is set (only 1 bar illuminated). The value of the minimum reverse acceleration rate cannot be set higher than the value for the maximum reverse acceleration rate.
Maximum reverse deceleration rate (Maximum Reverse Deceleration)	Single steps from 0 to 100 %	Rate of deceleration of the wheelchair during reverse driving when the highest speed level is set (all 5 bars illuminated).

Parameter	Setting range	Description
Minimum reverse deceleration rate (Minimum Reverse Deceleration)	Single steps from 0 to 100 %	Rate of deceleration of the wheelchair during reverse driving when the lowest speed level is set (only 1 bar illuminated). The value of the minimum reverse deceleration rate cannot be set higher than the maximum reverse deceleration rate.
Maximum turning acceleration rate (Maximum Turn Acceleration)	Single steps from 0 to 100 %	Rate of acceleration of the wheelchair when turning and negotiating curves when the highest speed level is set (all 5 bars illuminated).
Minimum turning acceleration rate (Minimum Turn Acceleration)	Single steps from 0 to 100 %	Rate of acceleration of the wheelchair during when and negotiating curves when the lowest speed level is set (only 1 bar illuminated). The value of the minimum turn acceleration rate cannot be set higher than the value for the maximum turn acceleration rate.
Maximum turning deceleration rate (Maximum Turn Deceleration)	Single steps from 0 to 100 %	Rate of deceleration of the wheelchair when turning and negotiating curves when the highest speed level is set (all 5 bars illuminated).
Minimum turning deceleration rate (Minimum Turn Deceleration)	Single steps from 0 to 100 %	Rate of deceleration of the wheelchair when turning and negotiating curves when the lowest speed level is set (only 1 bar illuminated). The value of the minimum turn deceleration rate cannot be set higher than the maximum turn deceleration rate.
Performance (Power)	Single steps from 0 to 100 %	Reduction of wheelchair power. Power indicates here the capacity of a wheelchair to drive up a hill or to overcome an obstacle. When the value is set to 100 %, the wheelchair delivers full power. Values under 100 % result in a power reduction. This can be applied to prevent damage to doors or furniture when the wheelchair is used indoors, for example. The values can be set independently of one another in the driving profiles, i.e. separate profiles can be defined for indoor and outdoor use. If the value is set to less than 100 %, the Boost function is automatically disabled. This means that the power reduction is applied to the maximum current limit. **Programming example:** Current limit = 80 amperes Boost = 120 amperes Boost duration = 5 seconds Power (profile 1) = 100 % Power (profile 2) = 50 % This means that the R-Net control device delivers a current of 120 A for 5 s in profile 1, then 80 A on a continual basis. In profile 2, 50 % of 80 A = 40 A is attained without a boost.
Torque (Torque)	Single steps from 0 to 100 %	This parameter can be used to increase the current for the motors at low driving speeds. This is useful for overcoming obstacles such as doorsteps or thick carpets or when the wheelchair rolls backwards. The parameter has no effect at 0 %. The recommended value is 80 %, but this value should be reduced if the wheelchair becomes too jerky.
Tremor suppression (Tremor Damping)	Single steps from 0 to 100 %	This parameter can be used to reduce the impact of a user's hand tremor on joystick operation. The higher the set value, the greater the damping effect. **CAUTION!** **When high values are entered to suppress tremors, pay particular attention to the longer braking distance of the wheelchair.**

7.4.3 Joystick parameters

The following parameters can be set under **Controls/Joystick**:

Parameter	Setting range	Description
Joystick forward throw	25 % – 100 % in single steps	Used to set how far forwards the joystick must be moved before full forward speed is reached. This is particularly useful for users who do not

Parameter	Setting range	Description
(Joystick Forward Throw)		have full movement of their hands. The percentage corresponds to the joystick movement required to reach full forward speed. If it is set to 50 %, for example, the joystick only needs to be moved halfway to reach full speed. Forward throw can also be set interactively, i.e. with the user moving the joystick (please see information following the table for details).
Joystick backward throw (Joystick Backward Throw)	25 % – 100 % in single steps	Used to set how far backwards the joystick must be moved before full reverse speed is reached. This is particularly useful for users who do not have full movement of their hands. The percentage corresponds to the joystick movement required to reach full reverse speed. If it is set to 50 %, for example, the joystick only needs to be moved halfway to reach full speed. Backward throw can also be set interactively, i.e. with the user moving the joystick (please see information following the table for details).
Joystick left throw (Joystick Left Throw)	25 % – 100 % in single steps	Used to set how far the joystick must be moved to the left before full turning speed to the left is reached. This is particularly useful for users who do not have full movement of their hands. The percentage corresponds to the joystick movement required to reach full turning speed towards the left. If it is set to 50 %, for example, the joystick only needs to be moved halfway to reach full turning speed. Left throw can also be set interactively, i.e. with the user moving the joystick (please see information following the table for details).
Joystick right throw (Joystick Right Throw)	25 % – 100 % in single steps	Used to set how far the joystick must be moved to the right before full turning speed to the right is reached. This is particularly useful for users who do not have full movement of their hands. The percentage corresponds to the joystick movement required to reach full turning speed towards the right. If it is set to 50 %, for example, the joystick only needs to be moved halfway to reach full turning speed. Right throw can also be set interactively, i.e., with the user moving the joystick (please see information following the table for details).
Joystick deadband (Joystick Deadband)	10 % – 50 % in single steps	Used to set the size of the neutral area of the joystick. This setting specifies how far the joystick must be moved before the brakes are released and driving begins. The default value is 10 %.
Invert Fwd Rev JS Axis Invert Left Right JS Axis Swap Joystick Axis (Invert Left Right JS Axis, Invert Fwd Rev JS Axis, Swap Joystick Axis)	Yes, no	The direction and orientation of the joystick axes can be swapped to adapt to the needs of the user. Eight different configurations for the joystick direction or orientations are possible using these parameters (see following table).

Interactive setting of the joystick throw

Interactive setting of the joystick throw can only be carried out via on-board programming (OBP) (On-board programming with programming dongle (TEN° or CJSM control panel only)).

Invert Fwd Rev JS Axis, Invert Left Right JS Axis, Swap Joystick Axis

Required orientation				Required programming		
Forward	**Reverse**	**Left**	**Right**	**Invert F/R**	**Invert L/R**	**Swap axis**
Forward	Reverse	Left	Right	No	No	No
Reverse	Forward	Left	Right	Yes	No	No
Forward	Reverse	Right	Left	No	Yes	No
Reverse	Forward	Right	Left	Yes	Yes	No
Left	Right	Reverse	Forward	No	No	Yes
Left	Right	Forward	Reverse	Yes	No	Yes

Required orientation				Required programming		
Forward	**Reverse**	**Left**	**Right**	**Invert F/R**	**Invert L/R**	**Swap axis**
Right	Left	Reverse	Forward	No	Yes	Yes
Right	Left	Forward	Reverse	Yes	Yes	Yes

7.4.4 Profile-specific control parameters

The following parameters can be set under **Controls/Profile**:

Parameter	Setting range	Description
Change Mode while Driving	Yes, no	Used to set whether the mode can be changed while driving.
Sleep Timer	0 to 30 min in single steps	Period for which the joystick (or a different type of input device) must be inactive before the system automatically switches itself off. When the value is set to 0, the system never switches off automatically.
Standby operation With standby mode, the user can select profiles and modes without switches or buttons. This is done using joystick movements to select and input profiles and/or modes. There are two options for starting standby mode. The options are set using the Standby Time and Switch to Standby parameters and are explained here. The function of the joystick in standby mode is set using the following parameters:		
Standby Time	0 to 200 s	Period for which the joystick must be inactive before the wheelchair switches to standby mode. A value of 0 means that the wheelchair never switches to standby mode.
Switch To Standby	Yes, no	Used to set whether an input device (switch) connected to the external profile socket can be used to switch to standby mode.
Mode Selection in Standby	Yes, no	Used to set whether the joystick can be used to input various operating modes while the system is in standby mode or whether standby mode is effectively a sleep mode.
Standby in Modes	Drive, seat, Bluetooth, external devices, mode 5, mode 6, IR mode, programming	This parameter can be used to deactivate the standby function in certain operating modes. A typical example is using R-net to control a PC mouse. Standby would not be desirable in this case as the joystick is likely to often remain in the centre position for longer than the period set for the standby time.
Standby Forward	Drive, seat, Bluetooth, external devices, mode 5, mode 6, IR mode, programming	Used to set which mode is switched to if the joystick is moved forwards when the system is in standby mode. Please note that Mode Select in Standby must be set to Yes in order for this function to be active.
Standby Reverse	Drive, seat, Bluetooth, external devices, mode 5, mode 6, IR mode, programming	Used to set which mode is switched to if the joystick is moved backwards when the system is in standby mode. Please note that Mode Select in Standby must be set to Yes in order for this function to be active.
Standby Left	Drive, seat, Bluetooth, external devices, mode 5, mode 6, IR mode, programming	Used to set which mode is switched to if the joystick is moved to the left when the system is in standby mode. Please note that Mode Select in Standby must be set to Yes in order for this function to be active.
Standby Right	Drive, seat, Bluetooth,	Used to set which mode is switched to if the joystick is moved to the right when the system is in standby mode. Please note that

Parameter	Setting range	Description
	external devices, mode 5, mode 6, IR mode, programming	Mode select in standby must be set to Yes in order for this function to be active.
Remote Selection	Yes, no	Used to set whether profiles or modes can be selected and input using joystick movements. Setting the parameter to Yes makes it possible to switch from a profile into the remote selection mode. The remote selection mode can be reached via standby mode, the profile button or an external input device for the profile. The profile can also be selected from the remote selection mode. If the parameter is set to No, it is not possible to access the remote selection mode from the profile and the profile cannot be selected from the remote selection mode either.
Background	Blue, white	Background colour of the LCD screen for the individual profiles. Standard setting is blue.

7.4.5 Latched drive parameters

The following parameters can be set under **Latched**:

Parameter	Setting range	Description
Latched drive (Latched Drive)	Off, Step, Step reverse, Cruise, Cruise reverse	Type of latched drive mode: • **Off**: Latched drive mode is switched off. • **Step**: Step mode in the forward direction only. Driving in step mode means that the latched speed of the wheelchair is increased or decreased using short joystick movements. • **Step reverse**: Step mode in both the forward and reverse direction • **Cruise**: Cruise mode in the forward direction only. Joystick movement accelerates the wheelchair and driving continues at the speed reached when the joystick is released. • **Cruise reverse**: Cruise mode in both the forward and reverse direction. If **Latched drive** is set in a profile, an emergency stop switch must be connected to the socket for the external input device for the profile on the joystick module.
Latched actuators (Latched Actuators)	Yes, no	Operation of seat functions in latched mode, i.e. the seat function is triggered with a short joystick movement. A brief movement in the opposite direction stops the actuator. If **Latched actuators** is set in a profile, an emergency stop switch must be connected to the socket for the external input device for the profile on the joystick module.
Latched timeout (Latched Timeout)	0 to 250 s in single steps	Timeout for driving and operation of the variable motors in latched mode. The timeout period is the maximum period of time for which the joystick can remain in the neutral position before movement in latched mode is ended. If the period of time is exceeded, movement in latched mode stops. Timeout is therefore an important safety function with which driving or movement of a variable motor is stopped when the user is unable to stop the functions as usual. It is important that the correct duration is set for the timeout. When a value of 2 or lower is set, the timeout function is disabled. This should be set only in exceptional cases and following a comprehensive risk analysis.
Latched timeout beep (Latched Timeout Beep)	Yes, no	A beep is emitted shortly before the end of the timeout period.

7.4.6 Seat parameters

An actuator function is a seat control function. An actuator function can comprise one actuator motor, e.g. a simple seat height adjustment or more actuator motors, e.g. adjustment of both leg supports at the same time or an anti-shear seat setting. There are six motor channels on the intelligent seat module (ISM) and one function can be assigned to any number of these channels.

The R-net control device can support up to 12 actuator functions. Each of these can be programmed to define which actuator motor moves as well as what is shown on the display for the user. The relevant parameters are "**Function channels**" and "**Function display**", and are set under **Seating/Intelligent Seating Module/Axis Settings**.

The following parameters can be set under **Seating/Intelligent Seating Module/Global**:

Parameter	Setting range	Description
Actuator start function (Actuator Mode Entry Axis)	Last used, function 1 to n	The desired function can be selected here. If “Last used” is selected, this means that the function that was last processed in the program is automatically selected when the seat settings are retrieved.

The following parameters can be set for each ISM channel under **Seating/Intelligent Seating Module/Channels**:

Parameter	Setting range	Description
Acceleration (Acceleration)	1 to 100 in single steps	Acceleration rate for a specific ISM channel.
Deceleration (Deceleration)	1 to 100 in single steps	Deceleration rate for a specific ISM channel.
Upward speed (Up Speed)	25 % – 100 % in single steps	Sets the speed of an ISM channel in the upward direction.
Downward seat speed (Down Speed)	25 % – 100 % in single steps	Sets the speed of an ISM channel in the downward direction.

8 Special controls

8.1 General

8.1.1 Indications for use

The special controls and environmental control shown are to be used exclusively as options for an Ottobock power wheelchair with an R-Net control unit.

The manufacturer assumes no liability for combinations with third-party medical devices and/or accessories not included in the modular system.

Operational safety of the Ottobock power wheelchair can only be ensured with proper use in accordance with the information contained in these instructions for use.

The user is responsible for accident-free operation.

8.1.2 Safety notes for assembly and programming

⚠ WARNING

User switch and on/off switch not accessible in emergency situations

Severe injuries to the user due to falling, tipping over, collision of the wheelchair

► The user switch and on/off switch serve as an EMERGENCY STOP. Install the switches so they are readily accessible by the user in emergency situations, for example in case of uncontrolled driving behaviour of the wheelchair.

NOTICE

Connection work on equipment that is switched on

Damage to electrical components

► Any connection work on the special controls and the environment control must be carried out only when the equipment is switched off.

INFORMATION

Prior to using the respective special control, all necessary mechanical adaptations and software settings must be completed according to the individual requirements and abilities of the user. Settings may only be changed by qualified personnel.

8.1.3 Switching on/off

Depending on the configuration, the special control can be switched on or off using the following methods:

- On/off switch on the control panel
- On/Off switch on the TEN° LCD module
- External on/off switch

A switch-off time can be set by the qualified personnel. This can automatically switch off the control unit after a specified period of time. The switch-off time can be deactivated.

8.1.4 LCD monitor

Depending on the version, using and programming a special control requires the use of an LCD monitor (Omni).

Special control types with LCD monitor

- Sip and puff control (LCD monitor mandatory)
- Push-button control (an I/O module (IOM) can be used as an alternative in this case).
- Joystick controls (implementation without an LCD monitor is also possible here as an alternative).

The on/off switch for the special control is located on the LCD monitor. An external on/off switch can be connected alternatively or in addition.

Special control types without LCD monitor

- Joystick controls (joysticks available in various versions with graduated activation forces)
- Environmental control (IR, Bluetooth and wireless)

The TEN° control panel is used for the setup and programming of the special control in this case. If a swivel arm is used, for example for a chin control, then a TEN° control panel is required in order to connect it.

8.1.4.1 Dimensions and installation

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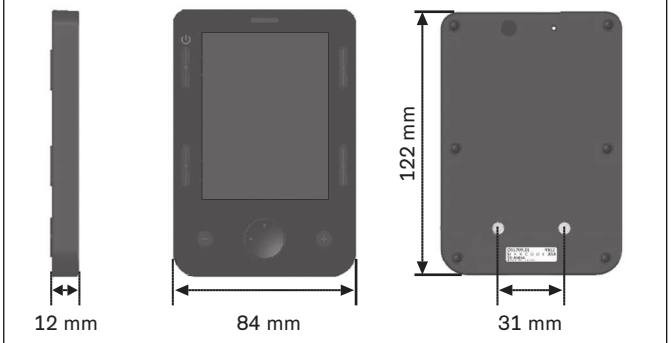

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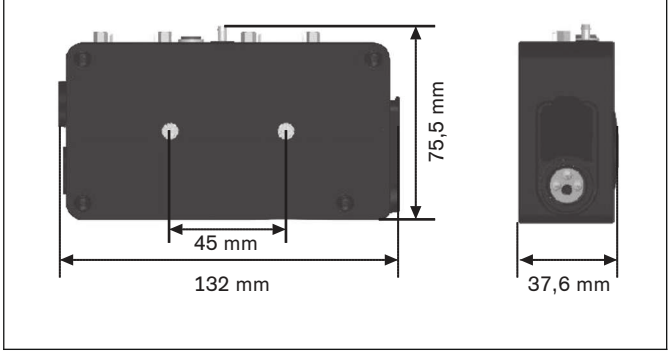


The TEN° LCD module consists of the display module (top) and connection module (bottom).

The dimensions of the TEN° LCD module are shown in the illustrations.

If installation is required: Various holders on the order form can be used for optimal positioning of the display module.

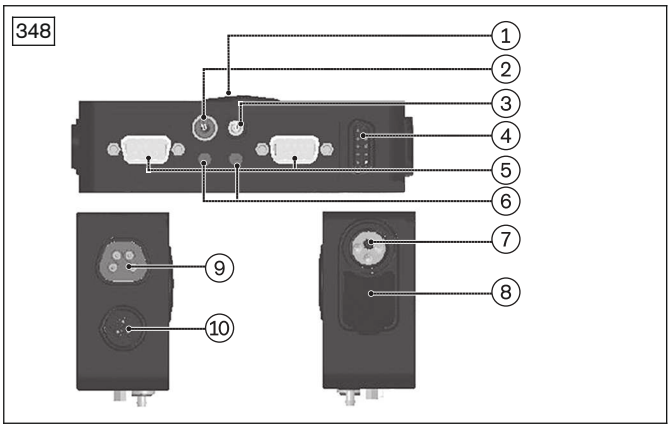
Mount the display module as follows:

1) Slide the holder (standard holder, holder with height and lateral adjustment, holder with gooseneck) onto the attachment rail located beneath the forearm support and attach it with two set screws.
2) Fasten the display module to the holder with 2x M4 Allen head screws.
3) Connect the display module to the connection module.

   INFORMATION: For detailed information on installing the display module and connection module, see the service manual for the power wheelchair.

8.1.4.2 Cables

Connections on the connection module



1 Speaker
2 On/off switch jack
3 Connection for sip and puff control
4 Display module/connection module connection jack
5 D-SUB input port 1/2:
6 U1/U2 jacks
7 Charging receptacle
8 USB connection
9 Connection jack (reserved for future use)
10 Communication jack (input for connecting cable)

Speaker
For certain command inputs, audible feedback is generated using the speaker.

On/off switch jack
When a special input device (such as a chin control or sip and puff control) is used, an external on/off switch has to be connected here. It is connected with a 3.5 mm jack plug.

Connection for sip and puff control
A 3.5 mm/1/8" diameter hose equipped with a mouthpiece can be connected to this port. The sip and puff control is assigned to port 1.

Display module/connection module connection jack
The display module is connected to the connection module here using the display cable.

D-SUB input port 1/2
The input devices for the special controls (such as joysticks or button adapters) are connected to the D-SUB port. The connector is a 9-pin D-SUB plug with socket contacts. If only one input device is used, it always has to be connected to port 1.

U1/U2 jacks
The user switches for port 1/port 2 are connected to the U1/U2 jacks. A 3.5 mm jack plug is used for the connection.

Charging receptacle
The charging receptacle can be used to connect the charging cable or for the connection to the external charging receptacle.

USB connection (type A)
The connection can be used to charge devices with a standard USB battery charger.

Connection jack
This connection is reserved for future use.

Communication jack
The connection module is connected to the R-Net system (e.g. bus distributor, controller) here using the connecting cable.

8.1.4.3 Technical data

Control device accessories	
Model	TEN° LCD module
Nominal input voltage	24 V
Operating voltage range	16 – 33 V

Control device accessories	
Absolute maximum voltage	35 V
Weight	Display module: 120 g Connection module: 200 g
Case material	Plastic
Protection rating	IPX4
IR frequency range	10 – 455 kHz
Sip and puff control port	Full puff pressure: approx. 69 mbar Full sip pressure: approx. - 83 mbar

8.1.5 Programming

⚠ WARNING

Incorrect configuration of the control device

Falling, tipping over, collision due to incorrect parameter settings

- ► Please note that modified parameter settings lead to changes in driving characteristics. In particular, changes to the speed, acceleration, braking or joystick settings can lead to unexpected and therefore uncontrollable driving characteristics and cause an accident.
- ► The parameter settings of the control device may only be changed by qualified personnel. The manufacturer of the product and the control device manufacturer are not liable in case of damage caused by parameter settings that were incorrectly configured or not adjusted properly according to the user's abilities.
- ► The user must test the driving characteristics of the product under the supervision of qualified personnel each time parameter settings are changed.

8.1.5.1 Activating programming mode (OBP)

INFORMATION

Always back up the current configuration state before changing the programming. This can only be done by connecting a PC. On-board programming mode (OBP) is deactivated in the standard settings to ensure that the PC must first be connected in order to back up the configuration before making any changes.

1) Activate OBP mode through the PC programming interface using the parameter **Profile Management/Mode Enable** to enable Mode 8 (Programming).
2) Remove the connecting cable to the PC.
3) Turn the R-Net control device off.
4) Connect the dongle either between two components of the control system (such as the controller and control panel) or to an available communication port.
5) Turn the R-Net control device on
6) On the TEN° LCD module, use the [Mode] button to reach OBP mode.
7) After all changes have been made, deactivate Mode 8 (Programming) again using the PC via the parameter **Profile Management/Mode Enable** and back up the configuration once more.

8.1.5.2 Using the PC programming interface

The R-Net control unit can be programmed with the PGDT R-Net programming software using a conventional PC.

The following description provides an overview of the programmable parameters.

For detailed information regarding programming, please see the document "PG DRIVES TECHNOLOGY R-NET - TECHNICAL MANUAL SK77981/11" from the control unit manufacturer Curtiss-Wright as well as the online help for the PGDT R-Net programming software.

8.1.5.3 Creating the profile for special controls

First, the profile for the special control is created under **Profile Management**. To change the parameters, double-click the respective field with the mouse. Profiles for various configurations of special controls are predefined at the factory and need only be activated.

Example 1: special control operated on port 1 of the TEN° LCD module

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Parameter	Profile 1	Profile 2
Profile Management		
Profile Name	Drive	Specialty Control 1
Profile Enable	Yes	Yes
Mode Enable	[1234567]	[1234567]
Input Device Type	JSM	Omni
Input Device Subtype	All	All
Seat Reversal Profile	No	No
Allow Grab	Yes	Yes

1) Profile 2 is predefined for connecting a special control to the port 1.
2) Set the **Profile Enable** parameter to **Yes**.

Example 2: special control operated on port 2 of the TEN° LCD module

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Parameter	Profile 1	Profile 2	Profile 3
Profile Management			
Profile Name	Drive		Specialty Control 2
Profile Enable	Yes		Yes
Mode Enable	[1234567]		[1234567]
Input Device Type	JSM		Omni
Input Device Subtype	All		All
Seat Reversal Profile	No		No
Allow Grab	Yes		Yes

1) Profile 3 is predefined for connecting a special control to the port 2.
2) Set the **Profile Enable** parameter to **Yes**.

Example 3: special control connected directly to the bus system (without TEN° LCD module)

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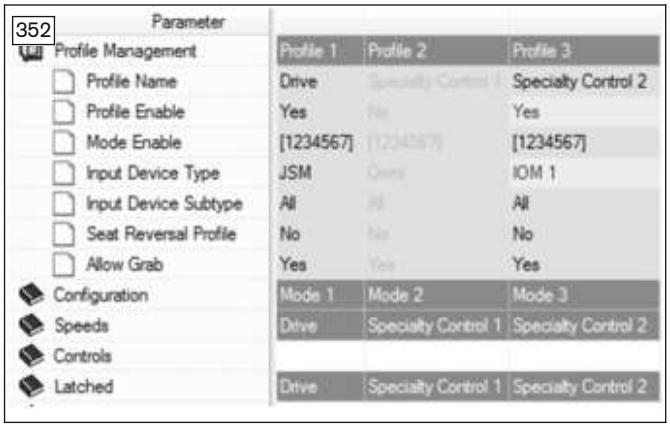
Parameter	Profile 1	Profile 2	Profile 3	Profile 4
Profile Management				
Profile Name	Drive			Specialty Control
Profile Enable	Yes			Yes
Mode Enable	[1234567]			[1234567]
Input Device Type	JSM			JSM
Input Device Subtype	1			2
Seat Reversal Profile	No			No
Allow Grab	Yes			Yes

1) Profile 4 is predefined for connecting a special control directly to the bus system.
2) Set the **Profile Enable** parameter to **Yes**.
3) In profile 1, set the **Input Device Subtype** parameter to 1.

Example 4: special control operated via an input/output module (IOM)

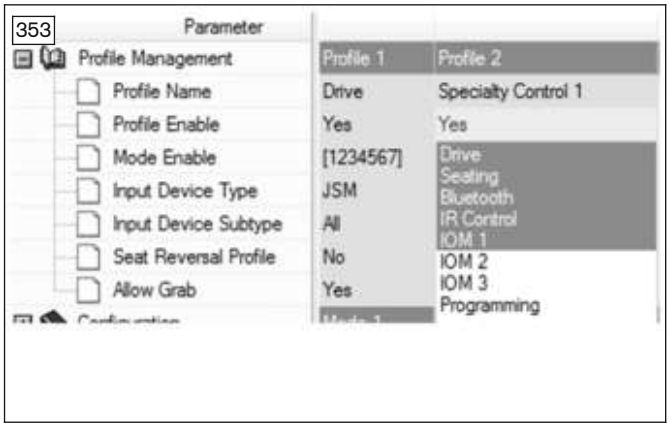


1) No specific profile is predefined for using an input/output module (IOM) in the special control (e.g. with push-button control). Profile 3 is configured for this in the example.
2) In Profile 3, set the **Profile Enable** parameter to **Yes**.
3) In profile 3, set the **Input Device Type** parameter to **IOM 1**.
4) The rotary switch (DIP switch) in the IOM must be set to "0". For further information, see the corresponding section for button control or wireless environmental control. For further information, please see the document "R-NET INPUT/OUTPUT MODULE – TECHNICAL MANUAL SK78814" from the control device manufacturer Curtiss-Wright.

Adjustable parameters

The parameters that can be adjusted under **Profile Management** are described in the following table:

Parameter	Setting range	Description
Profile Name	Text	Text string of 20 characters displayed on the LCD screen of the control panel or TEN° LCD-module indicating that the profile is selected.
Profile Enable	Yes, No	Setting that defines whether the profile can be selected by the user.
Mode Enable	Displayed drop-down list	Setting that defines which operating modes are available in each profile. Select the corresponding menu item to activate the mode. Selected modes are displayed with a blue background. Any desired combination of modes can be selected (illustration to the left below the table). After closing the drop-down menu, the selected modes are shown as numbers.
Input Device Type	Displayed drop-down list	All profiles can be configured so that they work with any type of input device or only with a certain type of input device. For special controls that use the TEN° LCD module,**Omni** must be set here, for example (illustration to the right below the table). This is also where the parameters **Input Device Subtype** and **Allow Grab** (see below) can be configured.
Input Device Subtype	All, 1, 2	This parameter is relevant only when two identical input devices have to be connected, otherwise it is ignored. When the parameter is set to **All**, the profile can be controlled with all input devices of this type.
Seat Reversal Profile	Yes, No	This parameter is not used with Ottobock wheelchairs.
Allow Grab	Yes, No	This parameter specifies whether an input device will allow another input device type to assume control. When this parameter is selected by double-clicking, the dialogue field shown in the illustration to the right below the table is displayed. The **Allow Grab** checkbox there can either be checked or not.



8.1.5.4 Adapting the special control type

The TEN° LCD module is compatible with the following types of special controls:

- Joystick control (4 directions) and user switch
- Joystick control (3 directions) and user switch
- 4-button control and user switch
- 3-button control and user switch
- 1-button control (scanner)
- Sip and puff control and user switch.

The user switch serves as the emergency stop and for switching to the user menu and standby mode. While operation without a user switch is also possible in principle, using a user switch is highly recommended for safety reasons.

The type being used is set in the programming software under Omni/Ports/SID in the SID parameter.

Parameter	Setting range	Description
SID	Proportional, 4-button control (Switch), 3-axis proportional, 3-axis switch, Sip and puff, Scanners	Type of connected special control (Specialty Input Device, SID), see below for explanations.

INFORMATION

Alternatively certain special control versions can also be connected to the input/output module (IOM): proportional: joystick control (4 directions); switch: 4-button control.

To adjust the parameters when using the input/output module (IOM), configure the following settings in the programming software: "Input Output Module" --> "Input Module" --> "Input Type" --> under "Input 1" --> "Switch" (4-button control) or "Proportional" (joystick control).

Proportional: joystick control (4 directions) and user switch

Typical applications are chin controls and joysticks, with operation adapted to the force the user is able to generate. The joystick is connected to the 9-pin D-Sub plug connector on the TEN° LCD module (see page 169). In addition, a user switch configured as normally open should be connected to the 3.5 mm jack.

Switch: 4-button control and user switch

The application includes 4 direction switches and a user switch connected via the adapter box on the 9-pin D-Sub plug connector of the TEN° LCD module (see page 169). In addition, a user switch configured as normally open can be connected to the 3.5 mm jack.

3-axis proportional: joystick control (3 directions) and user switch

Typical applications are chin controls equipped with a joystick.

The joystick is connected to the 9-pin D-Sub plug connector on the TEN° LCD module (see page 169). In addition, a user switch configured as normally open should be connected to the 3.5 mm jack.

3-axis switch: 3-button control and user switch

Button-based head control is a typical application.

The application includes 3 direction switches and a user switch connected to the 9-pin D-Sub plug connector on the TEN° LCD module (see page 169).

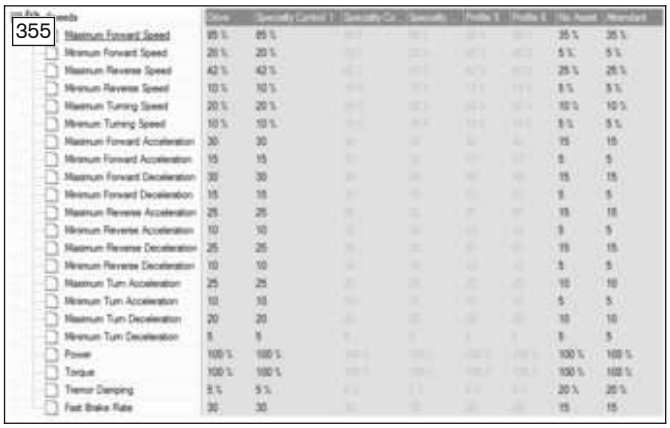
Sip and puff: sip and puff control and user switch

A sip and puff mouthpiece is connected to the pneumatic port of the TEN° LCD module (see page 169). In addition, a user switch configured as normally open should be connected to the 3.5 mm jack.

Scanner: 1-button control

With 1-button control, also known as LED control, the driving directions and menu functions are selected using a button. For this purpose, the display runs through a frequency that can be programmed, and the function that is displayed when the button is pressed is executed.

8.1.5.5 Adapting the driving characteristics



After programming to specify the type of special control (SID) is complete, the driving characteristics need to be adapted to the user.

In order to allow the user to become accustomed to the elements of the special control, we recommend starting with the lowest speed level before increasing the speed settings.

The speed settings are also configured via the R-Net programming interface.

Parameter	Setting range	Description
Maximum Forward Speed (Maximum Forward Speed)	Single steps from 0 – 100 %	Speed for forward driving of the wheelchair when the joystick is pushed completely forwards and the highest speed level is set (all 5 bars illuminated).
Minimum Forward Speed (Minimum Forward Speed)	Single steps from 0 – 100 %	Speed for forward driving of the wheelchair when the joystick is pushed completely forwards and the lowest speed level is set (only 1 bar illuminated). The value of the minimum forward speed cannot be set higher than the value for the maximum forward speed.
Maximum Reverse Speed (Maximum Reverse Speed)	Single steps from 0 – 100 %	Speed for reverse driving of the wheelchair when the joystick is pushed completely back and the highest speed level is set (all five bars illuminated).
Minimum Reverse Speed (Minimum Reverse Speed)	Single steps from 0 – 100 %	Speed for reverse driving of the wheelchair when the joystick is pushed completely back and the lowest speed level is set (only 1 bar illuminated).
Maximum Turning Speed (Maximum Turning Speed)	Single steps from 0 – 100 %	Speed for turning and rotating the wheelchair when the joystick is pushed completely to the left or right and the highest speed level is set (all five bars illuminated).
Minimum Turning Speed (Minimum Turning Speed)	Single steps from 0 – 100 %	Speed for turning and rotating the wheelchair when the joystick is pushed completely to the left or right and the lowest speed level is set (only 1 bar illuminated). The value of the minimum turning speed cannot be set higher than the value for the maximum turning speed.
Maximum Forward Acceleration (Maximum Forward Acceleration)	Single steps from 0 – 100 %	Rate of acceleration of the wheelchair during forward driving when the highest speed level is set (all five bars illuminated).

Parameter	Setting range	Description
Minimum Forward Acceleration (Minimum Forward Acceleration)	Single steps from 0 – 100 %	Rate of acceleration of the wheelchair during forward driving when the lowest speed level is set (only 1 bar illuminated). The value of the minimum forward acceleration rate cannot be set higher than the value for the maximum forward acceleration rate.
Maximum Forward Deceleration (Maximum Forward Deceleration)	Single steps from 0 – 100 %	Rate of deceleration of the wheelchair during forward driving when the highest speed level is set (all five bars illuminated).
Minimum Forward Deceleration (Minimum Forward Deceleration)	Single steps from 0 – 100 %	Rate of deceleration of the wheelchair during forward driving when the lowest speed level is set (only 1 bar illuminated). The value of the minimum forward deceleration rate cannot be set higher than the maximum forward deceleration rate.
Maximum Reverse Acceleration (Maximum Reverse Acceleration)	Single steps from 0 – 100 %	Rate of acceleration of the wheelchair during reverse driving when the highest speed level is set (all five bars illuminated).
Minimum Reverse Acceleration (Minimum Reverse Acceleration)	Single steps from 0 – 100 %	Rate of acceleration of the wheelchair during reverse driving when the lowest speed level is set (only 1 bar illuminated). The value of the minimum reverse acceleration rate cannot be set higher than the value for the maximum reverse acceleration rate.
Maximum Reverse Deceleration (Maximum Reverse Deceleration)	Single steps from 0 – 100 %	Rate of deceleration of the wheelchair during reverse driving when the highest speed level is set (all five bars illuminated).
Minimum Reverse Deceleration (Minimum Reverse Deceleration)	Single steps from 0 – 100 %	Rate of deceleration of the wheelchair during reverse driving when the lowest speed level is set (only 1 bar illuminated). The value of the minimum reverse deceleration rate cannot be set higher than the maximum reverse deceleration rate.
Maximum Turn Acceleration (Maximum Turn Acceleration)	Single steps from 0 – 100 %	Rate of acceleration of the wheelchair when turning and negotiating curves when the highest speed level is set (all five bars illuminated).
Minimum Turn Acceleration (Minimum Turn Acceleration)	Single steps from 0 – 100 %	Rate of acceleration of the wheelchair during when and negotiating curves when the lowest speed level is set (only 1 bar illuminated). The value of the minimum turn acceleration rate cannot be set higher than the value for the maximum turn acceleration rate.
Maximum Turn Deceleration (Maximum Turn Deceleration)	Single steps from 0 – 100 %	Rate of deceleration of the wheelchair when turning and negotiating curves when the highest speed level is set (all five bars illuminated).
Minimum Turn Deceleration (Minimum Turn Deceleration)	Single steps from 0 – 100 %	Rate of deceleration of the wheelchair when turning and negotiating curves when the lowest speed level is set (only 1 bar illuminated). The value of the minimum turn deceleration rate cannot be set higher than the maximum turn deceleration rate.
Power (Power)	Single steps from 0 – 100 %	Reduction of wheelchair power. Power indicates here the capacity of a wheelchair to drive up a hill or to overcome an obstacle. When the value is set to 100 %, the wheelchair delivers full power. Values under 100 % result in a power reduction. This can be applied to prevent damage to doors or furniture when the wheelchair is used indoors, for example. The values can be set independently of one another in the driving profiles, i.e. separate profiles can be defined for indoor and outdoor use.
Torque (Torque)	Single steps from 0 – 100 %	This parameter can be used to increase the current for the motors at low driving speeds. This is useful for overcoming obstacles such as doorsteps or thick carpets or when the wheelchair rolls backwards. The parameter has no effect at 0 %. The recommended value is 80 %, but this value should be reduced if the wheelchair becomes too jerky.

Parameter	Setting range	Description
Tremor Damping (Tremor Damping)	Single steps from 0 – 100 %	This parameter can be used to reduce the impact of a user's hand tremor on joystick operation. The higher the set value, the greater the damping effect. **CAUTION!** **When high values are entered to suppress tremors, pay particular attention to the longer braking distance of the wheelchair.**

8.1.5.6 LCD monitor

8.1.5.6.1 General behaviour of the TEN° LCD module

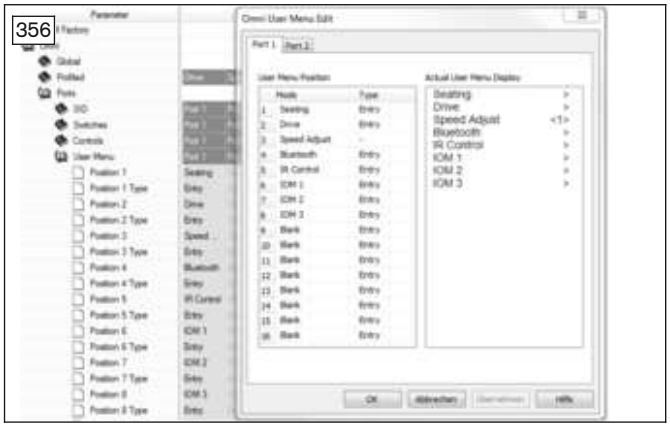
The way in which input via the peripherals of the special controls is interpreted and processed in the controller is configured under **Omni/Ports/Controls**.

Parameter	Setting range	Description
User control/menu navigation (User Control)	Sequence, Menu	Use of the special controls and/or the input device to select the available profiles and modes. • **Sequence**: Operating the input device switches to the next available profile or the next mode. The sequence is then programmable (see page 177). • **Menu**: Operating the input device displays a user menu with all available profiles and modes. The special control is then used to navigate in the menu. The sequence of menu items in the user menu is programmable (see page 177).
Return To (Return To)	Drive, Menu	Effects of briefly operating the input device (user switch) in a mode other than driving mode when the user control parameter is set to **Menu**. • **Drive**: When the input device (user switch) is operated briefly in a mode other than driving mode, this switches back to driving mode. • **Menu**: Briefly operating the input device (user switch) displays the user menu. When using special controls with 1-button scan, this parameter is used to set where the system returns to when the **Exit** option is selected, the input device is operated and the user does not have driving mode selected.
Timeout to Menu (Timeout to Menu)	0 to 60 s in increments of 1 s	Length of time the special control must be inactive before the user menu is displayed. When it is set to 0, this method does not display the user menu.
Menu Navigation (Menu Navigation)	Normal, Invert	Inverts the navigation direction for the user menu. This parameter cannot be changed for special controls with 3 axes. • **Normal**: Moving the special control forwards navigates up in the user menu. • **Invert**: Moving the special control forwards navigates down in the user menu.
Menu Scan Rate (Menu Scan Rate)	0 s to 10 s in increments of 0.25 s	Scan rate for the user menu and for the lighting and settings menus. If user control is set to Sequence, the scan rate applies for the lighting and settings menus. **0**: Scanning in the menus is not possible.
Auto. repeat (Auto-repeat)	On, Off	Automatic repeat function for the direction commands of various input devices. Auto-repeat means that sequential commands are issued when the input device is activated continuously. This is useful for navigation in the user menu.
Fwd/Rev. Auto Toggle (Fwd/Rev. Auto Toggle)	On, Off	Method for changing direction in special controls with 3 directions or 3 switches. This parameter has no effect on other types of special controls. It is intended primarily for the use of head controls.

Parameter	Setting range	Description
		• **On**: The Forward/Reverse direction command of the special control can be used to change the selected driving direction. This is done by executing and confirming the Forward/Reverse direction command within the time defined in the **Auto Toggle Time** parameter. This changes the previously selected driving direction. To drive in the new driving direction, the Forward/Reverse direction command must be executed again within the **Auto Toggle Time**. If the defined time passes without a Forward/Reverse direction command, the selected driving direction returns to the original setting. • **Off**: Briefly operating the input device (user switch) selects a new driving direction. Double-clicking on the input device changes the profile or mode. **INFORMATION: The Fwd/Rev Auto Toggle function cannot be used when latched driving is required, since this causes a conflict with the logic of the user commands. If the parameter is set to On and latched driving has been activated in the programming, the "Invalid settings" error message is displayed.**
Auto Toggle Time (Auto Toggle Time)	0.5 s to 5 s in increments of 0.25 s	Time limit for the user to execute the Forward/Reverse direction command in order for the command to take effect.
Actuator Selection (Actuator Selection)	SID, Switch	Setting that defines whether the adjustment functions are selected using commands with the special control (SID) or with the user switch.
Actuator Axes (Actuator Axes)	Normal, Swap, Left/Right, Right/Left	Setting that defines which direction commands of the special control (SID) are used to select the available functions. This parameter does not apply when special controls with 1-button scan are used. • **Normal**: The SID commands Left and Right are used to select the available adjustment functions and the Forward/Reverse commands execute the selected function. • **Swap**: The Forward/Reverse SID commands are used to select the available adjustment functions and the Left and Right commands execute the selected function. • **Left/Right**: The SID command "Left" is used to select the available adjustment functions and the SID command "Right" executes the selected function. The execution direction is changed by briefly issuing the SID command "Right". • **Right/Left**: The SID command "Right" is used to select the available adjustment functions and the SID command "Left" executes the selected function. The execution direction is changed by briefly issuing the SID command "Left".

8.1.5.6.2 Adapting the user menu

The position of the menu items in the user menu on the LCD monitor is set using the programmable parameters position 1 through position 16.



1) Under Omni, open the subfolder Ports/User Menu.
2) Double-clicking any entry in the column for the corresponding port (usually port 1) opens the Omni User Menu Edit window, illustrated to the left, where the individual positions and position types can then be edited by double-clicking.
3) There are 3 programmable options: Entry, List and Select. The effects of these options are shown in the following table:

Position 1	Position 1 type	Representation on LCD	Comments
Drive	Entry	Drive >	A switch movement to the right activates the Drive menu.
Drive	List	1: Profile 1 > 2: Profile 2 > 3: Profile 3 >	All available profiles for the mode are listed.
Drive	Select	Profile < 3 >	A new profile can be selected, but only takes effect after an additional operating action

8.1.5.6.3 User switch settings

The types of switches which are connected to the special control and how their operation is interpreted is configured under **Omni/Ports/Switches**.

Parameter	Setting range	Description
User Switch (User Switch)	Normally Open, Normally Closed	Setting for whether the TEN° LCD module expects a user switch as a normally open contact or a normally closed contact.
Switch Detect (Switch Detect)	On, Off, Limp	Behaviour of the TEN° LCD module when the connection to the user switch is interrupted: **On**: Driving mode is not available. This standard setting should be kept. **Off**: The TEN° LCD module attempts to maintain normal operation even though an input device is no longer connected. **Limp**: The TEN° LCD module permits driving mode, but at a reduced speed. Visible and audible warning signals are generated.
9-Way Detect (9-Way Detect)	On, Off	Setting for whether the TEN° LCD module expects a "detection link" in a special control connected to the 9-pin D-Sub plug connection. **On:** the TEN° LCD module expects a "detection link". If none is found, driving mode is not available. **Off:** No "detection link" is needed.
Switch Long (Switch Long)	0.5 s to 5 s in increments of 0.25 s	Period of time that the user switch must be activated to put the TEN° LCD module in standby mode. **INFORMATION: When using special controls with 1-button scan, the TEN° LCD module can be put into standby mode via the user menu or Sequence.**
Switch Medium (Switch Medium)	0.5 s to 5 s in increments of 0.25 s	This parameter is intended only for 3-axis proportional special controls and special controls with a switch. A change in direction occurs immediately when the input device (user switch) is operated, provided the Double Click parameter has been set to 0. When the input device is no longer operated and the Forward/Reverse command is issued, driving begins in the newly selected direction. When the input device continues to be operated and held for the time period set using the programmable parameter, this is interpreted as normal operation of the input device, which means that switching to the user menu or the other wheelchair functions follows in sequence. There is no switching of directions in this case. As with the other two methods, the TEN° LCD module switches to standby mode when the input device is operated longer than the time period set using the Switch Long programmable parameter.
Switch Debounce (Switch Debounce)	30 ms to 500 ms in increments of 10 ms	Time period for continuous operation of the input device (user switch) before a new state is registered.
Double Click (Double Click)	0 to 2.5 s in increments of 0.1 s	Duration within which two actuations of the input device (user switch) must be detected in order to be recognized as double-clicking. **0:** double-click function is not supported. This setting should be used if accidental double-clicking can cause problems.

8.1.5.6.4 Beeps

Beeps can be assigned to the individual operating processes of the special control under **Omni/Ports/Beeps**.

Parameter	Setting range	Description
Profile Change Mode Change User Menu Entry User Menu Scroll	Off, Short, Long	• Off: no beep • Short: short beep • Long: long beep
Profile Identifier Axis Identifier	On, Off	Setting of beeps corresponding to the number of the profile. These beeps have a somewhat lower tone than the beeps for Profile Change, Mode Change and so on.
Position 1 to Position 16	0 to 16 in single steps	Number of beeps that sound when the individual rows of the user menu are selected. Since the same menu item can appear on more than one row, the number of beeps is independent of the position number.

8.1.6 Maintenance intervals

INFORMATION

The respective special control must be inspected for the functionality and operating safety by qualified personnel at least once a year.

The activities described in the table below must be carried out annually by an authorised specialist dealer.

Component	Activity	Annually
Control device	Examine all settings necessary for performing the control function (e.g. calibration, switch functions, switching times, etc.) including function tests	X
Mechanical components	Examine all safety-relevant movable parts to ensure that they are properly mounted and check for wear – parts that are worn and questions with respect to safety are to be replaced	X

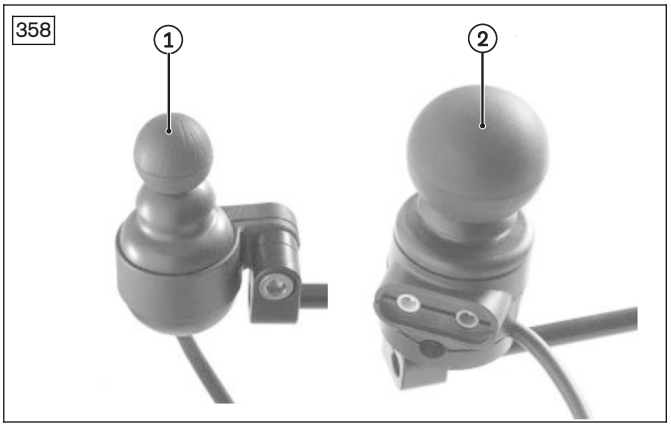
8.2 Joystick controls

The following joysticks are available as special controls according to the individual abilities of the user:

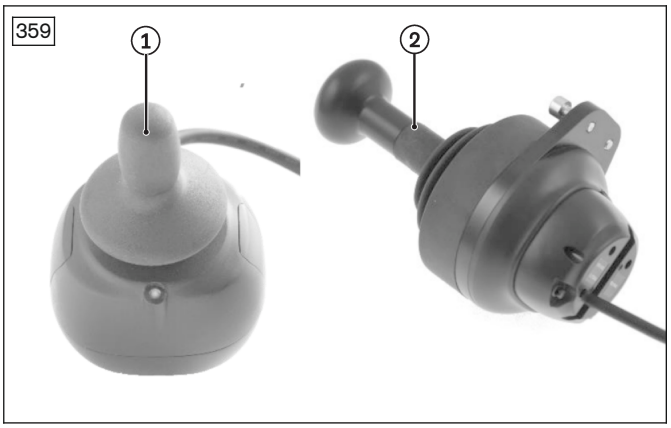
The power wheelchair has been equipped with a calibratable mini joystick for special control functions.

It can be operated with little force and – depending on the installation situation – by hand or chin, for example.

Various joystick attachments with different degrees of grip and stiffness are available for the mini joystick.



- **mo-Vis Micro joystick:** very small joystick, minimum force required (approx. 10 g), operated using e.g. fingers, chin, tongue, lip (see fig. 358, item 1).
- **mo-Vis Multi joystick:** smaller joystick, limited force required (approx. 50 g), operated using e.g. fingers, chin, lip (see fig. 358, item 2).



- **mo-Vis Allround light:** standard sized joystick, moderate force required (approx. 120 g, see fig. 359, item 1)
- **mo-Vis Allround:** standard sized joystick, normal force required (approx. 250 g). Developed for comprehensive use, this joystick is suitable for most wheelchair users. It can be used as a standard joystick, chin joystick or joystick for attendants (see fig. 359, item 1).
- **mo-Vis Heavy Duty:** large joystick, very high force required (approx. 650 g). Operated by hand or foot. Developed for users who operate their joystick with a high level of force (see fig. 359, item 2).

Special features of the joystick controls:

- Intuitive operation
- Simple menu navigation
- Individual settings for amplification
- Modular concept for individual adaptation
- Service-friendliness thanks to simple design
- Adjustment of speed, acceleration and deceleration values to the user's individual needs.

Detailed information on the technical data, configuration and installation of the individual joysticks can be found in the user and installation manual supplied with the joystick.

8.2.1 Installation

The controls can be realised without an LCD monitor for all of the mentioned joystick types, which means the joystick is connected directly to the R-Net bus. The LCD monitor can be optionally used as a display element.

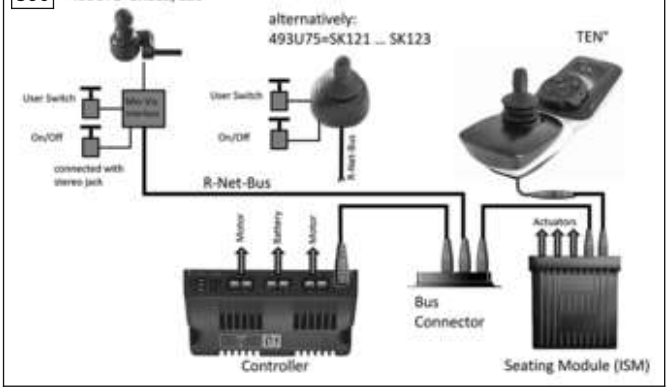
For the controls with Micro joystick, Multi joystick and Allround light joystick, additional realisation versions that require the use of an LCD monitor are possible. In this case, the joystick is connected to the LCD monitor.

8.2.1.1 Configuration example

Joystick control without TEN° LCD module

The illustration that follows shows a configuration example for a special control with a joystick directly on the R-Net bus.

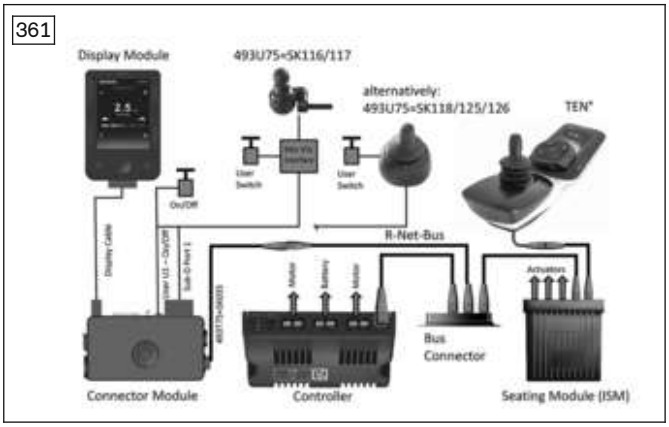
360 493U75=SK119/120



Joystick control with TEN° LCD module

The illustration that follows shows a configuration example for a special control with a joystick and TEN° LCD module including connection module.

361



Note: If the special control has a swivel arm, the user switch and on/off switch functions are integrated into the satellite switch (see page 200).

Piko buttons or push buttons

⚠ CAUTION

Incorrect positioning of the emergency stop

Risk of injury due to unreachable user switch

- ► Position the user switch with the emergency stop function (switch or Piko button) in such a way that it is easy for the user to reach at any time, but is not pressed accidentally (through uncontrolled motions while driving).

The joystick control is normally combined with 1 or 2 freely positionable Piko buttons.

Alternatively, the joystick control can be combined with 1 or 2 freely positionable push buttons. Ottobock offers the option of integrating the push buttons directly into the joystick attachment (see page 183).

Variant with a Piko button/push button

Piko button 1 function; push button 1 function	**Variant 1:** On/off switch for the control device; emergency stop function when actuated while driving **Variant 2:** Profile/mode switch; briefly pressing it (approx. 1 s) retrieves the available driving profiles and operating modes of the control system in succession (dependent on programming and connected devices); Only with programmed sequence mode: scrolling through the menu items
Joystick function*	In the driving profile (e.g. "Drive"): controlling the speed and driving direction In "Seating" mode: adjusting the seat option; switching to the next seat option In an operating mode: navigates/operates the mode; scrolls through the menu items

Variant with two Piko buttons/push buttons

Piko button 1 function; push button 1 function	On/off switch for the control device; emergency stop function when actuated while driving
Piko button 2 function; push button 2 function	Profile/mode switch; briefly pressing it (approx. 1 s) retrieves the available driving profiles and operating modes of the control system in succession (dependent on programming and connected devices)
Joystick function*	In the driving profile (e.g. "Drive"): controlling the speed and driving direction In "Seating" mode: adjusting the seat option; switching to the next seat option In an operating mode (e.g. "Bluetooth Device" mode): navigating/operating the mode; scrolling through the menu items

* For more detailed information on the function of a joystick, see the instructions for use (user)

8.2.1.2 Installing joystick controls

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Installation of the joystick controls (except the Allround Heavy Duty) is universal on a round rod with a diameter of 6 mm.

Allround Heavy Duty joystick

The Allround Heavy Duty joystick comes standard equipped with two M6x12 connecting bolts. Installation on a level surface such as a tabletop is also possible with an optional mounting ring assembly.

8.2.1.3 Installation on a tray

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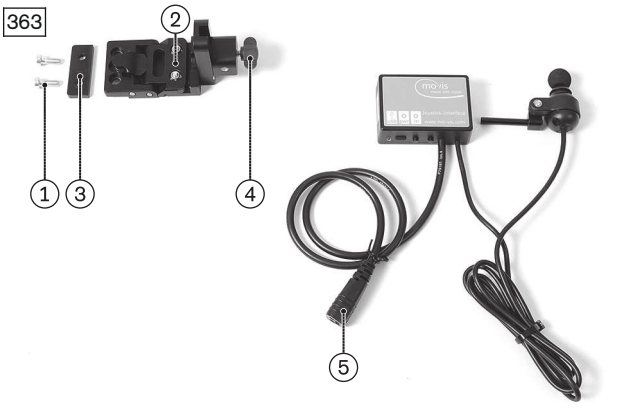

Installation is described using the mo-Vis Multi-joystick as an example, but also applies to the other compatible joystick types with a round rod.

Components for installing the joystick control on the tray (see fig. 363):

1. Mounting screws
2. Bracket
3. Plate and compression spring
4. Thumb screw for the holder
5. Joystick with round rod 6 mm, mo-Vis connection module and connecting cables

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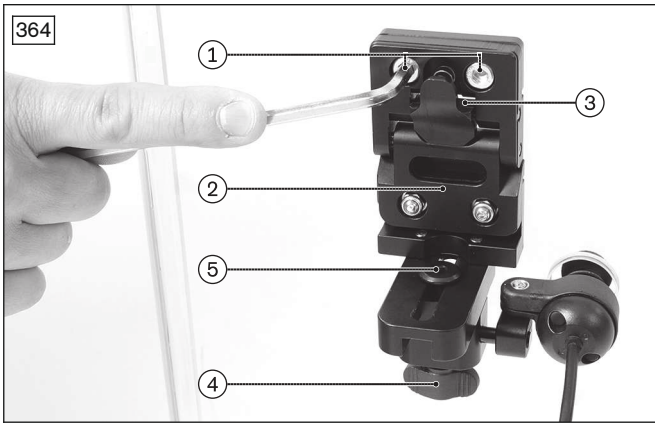


1) Drill the holes for the joystick and for the mounting screws in the tray (not illustrated).
   INFORMATION: Position the holes in the tray so that the user can easily operate the joystick to be installed.
2) Set the holder onto the tray from below (see fig. 364, item 2).
   INFORMATION: Insert the plate and compression spring between the holder and tray (see fig. 364, item 3).
3) Insert and hand-tighten the 2 screws between the holder and tray (see fig. 364, item 1).

4) Slide the joystick into the holder and firmly tighten all screws of the holder.
   INFORMATION: If necessary, fold the holder down first. Adjust the height of the joystick with the thumb screw (see fig. 364, item 4) and the centre position with the clamping screw, as needed (see fig. 364, item 5).
5) Attach the tray to the power wheelchair.
6) Attach the mo-Vis connection module under the seat.
7) Install and connect the cable according to the configuration example.
   INFORMATION: Make sure that cables cannot get stretched, pinched or caught when the wheelchair is operated.

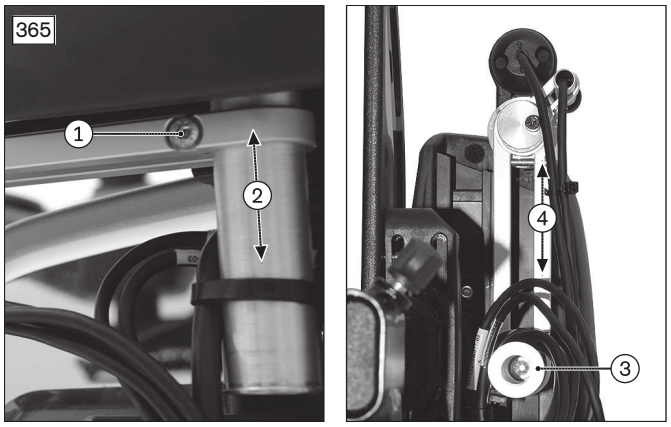
8.2.1.4 Mechanical settings for joystick control (tray)

INFORMATION

When the joystick is installed, the arrow on the joystick should point straight ahead. The setting for the straight-ahead joystick direction can also be adjusted by programming the directional assignment: see page 185.

Subsection "Adjusting straight-ahead movement" of the following section contains more information on the correct orientation of the joystick.

8.2.1.5 Mechanical settings for joystick control (forearm support)

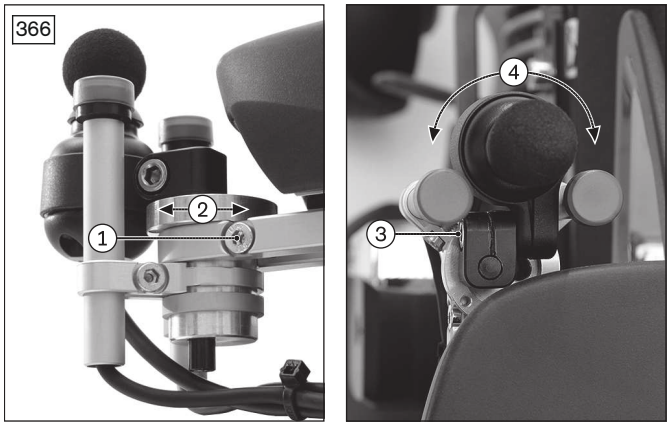


Adjusting the height/angle of the holding arm

1) Loosen the hexagon socket screw on the holding arm (see fig. 365, item 1).
2) Move the holding arm to the desired height (see fig. 365, item 2) and the desired angle (not pictured).
3) Retighten the hexagon socket screw.

Adjusting the holding arm to match the user's arm length

1) Loosen the hexagon socket screw in the adaptation bushing (see fig. 365, item 3).
2) Slide the holding arm to the desired length position (see fig. 365, item 4).
3) Retighten the hexagon socket screw in the adaptation bushing.

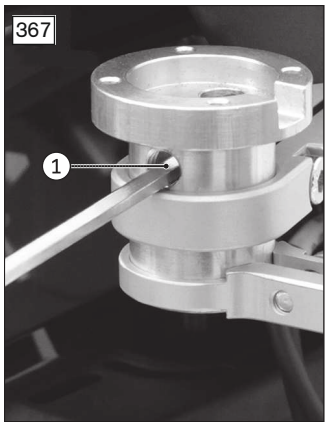


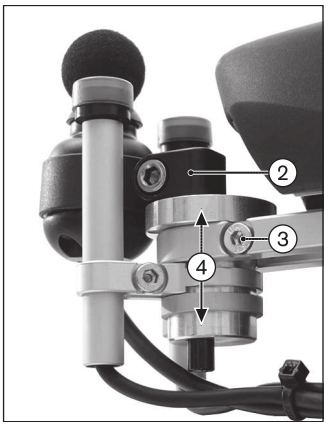
Adjusting the angle of the joystick position – variant 1

1) Loosen the hexagon socket screw on the holding arm (see fig. 366, item 1).
2) Rotate the joystick attachment to the desired position (see fig. 366, item 2).
3) Retighten the hexagon socket screw.

Adjusting the angle of the joystick position – variant 2

1) Loosen the hexagon socket screw on the joystick (see fig. 366, item 3).
2) Rotate the joystick to the desired position (see fig. 366, item 4).
3) Retighten the hexagon socket screw.



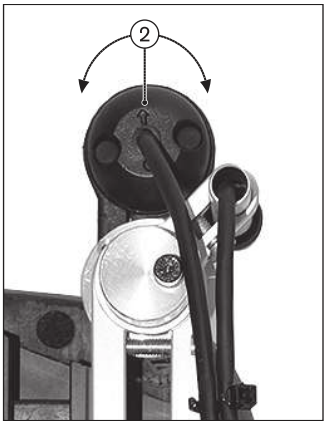


Adjusting the height of the joystick position – variant 1

1) **If necessary:** remove the joystick from the holder. To do this, loosen the hexagon socket screw on the joystick (see fig. 366, item 3), pull the joystick upwards and remove it.
2) Loosen the hexagon socket screw on the joystick attachment (see fig. 367, item 1).
3) Slide the joystick with the holding pin to the desired position (see fig. 367, item 2).
4) Retighten the hexagon socket screw.

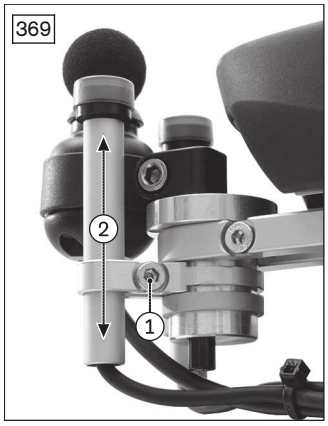
Adjusting the height of the joystick position – variant 2

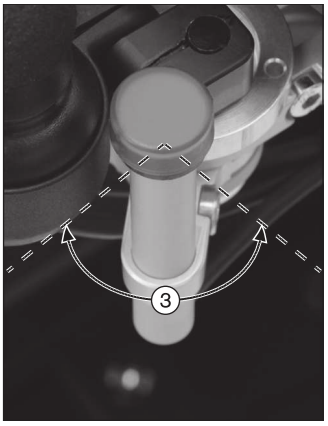
1) Loosen the hexagon socket screw on the holding arm (see fig. 367, item 3).
2) Slide the entire joystick attachment to the desired height (see fig. 367, item 4).
3) Retighten the hexagon socket screw.



Adjusting the straight-ahead movement

1) Loosen the hexagon socket screw on the holding arm of the joystick (see fig. 368, item 1).
2) Rotate the arrow on the joystick to the straight-ahead direction (see fig. 368, item 2).
3) Retighten the hexagon socket screw on the holding arm of the joystick.
   INFORMATION: The fine-tuning for the forward joystick direction can be subsequently adjusted by programming the directional assignment: see page 185.





Adjusting the height of a button

1) **CAUTION! The button serves as an emergency stop. It must be positioned on the power wheelchair in such a manner that it can be easily accessed by the user at all times.**
   Loosen the hexagon socket screw on the button (see fig. 369, item 1).
2) Slide the button to the desired height (see fig. 369, item 2).
3) Retighten the hexagon socket screw.

Adjusting the angle of a button

1) **CAUTION! The button serves as an emergency stop. It must be positioned on the power wheelchair in such a manner that it can be easily accessed by the user at all times.**
   Loosen the hexagon socket screw on the button (see fig. 369, item 1).
2) Move the button to the desired angle (see fig. 369, item 3).
3) Retighten the hexagon socket screw.

8.2.2 Programming

8.2.2.1 Joystick settings

The following parameters can be set under Controls/Joystick (see fig. 370):

Parameter	Setting range	Description
Joystick Forward Throw (Joystick Forward Throw)	25 % – 100 % in single steps	Used to set how far forwards the joystick must be moved before full forward speed is reached. This is particularly useful for users who do not have full movement of their hands. The percentage corresponds to the joystick movement required to reach full forward speed. If it is set to 50 %, for example, the joystick only needs to be moved halfway to reach full speed. Forward throw can also be set interactively, i.e. with the user moving the joystick (please see information following the table for details).
Joystick Backward Throw (Joystick Backward Throw)	25 % – 100 % in single steps	Used to set how far backwards the joystick must be moved before full reverse speed is reached. This is particularly useful for users who do not have full movement of their hands. The percentage corresponds to the joystick movement required to reach full reverse speed. If it is set to 50 %, for example, the joystick only needs to be moved halfway to reach full speed. Backward throw can also be set interactively, i.e. with the user moving the joystick (please see information following the table for details).
Joystick Left Throw (Joystick Left Throw)	25 % – 100 % in single steps	Used to set how far the joystick must be moved to the left before full turning speed to the left is reached. This is particularly useful for users who do not have full movement of their hands. The percentage corresponds to the joystick movement required to reach full turning speed towards the left. If it is set to 50 %, for example, the joystick only needs to be moved halfway to reach full turning speed. Left throw can also be set interactively, i.e. with the user moving the joystick (please see information following the table for details).
Joystick Right Throw (Joystick Right Throw)	25 % – 100 % in single steps	Used to set how far the joystick must be moved to the right before full turning speed to the right is reached. This is particularly useful for users who do not have full movement of their hands. The percentage corresponds to the joystick movement required to reach full turning speed towards the right. If it is set to 50 %, for example, the joystick only needs to be moved halfway to reach full turning speed. Right throw can also be set interactively, i.e., with the user moving the joystick (please see information following the table for details).
Joystick Deadband (Joystick Deadband)	10 % – 50 % in single steps	Used to set the size of the neutral area of the joystick. This setting specifies how far the joystick must be moved before the brakes are released and driving begins. The default value is 10 %.
Invert Fwd Rev JS Axis Invert Left Right JS Axis Swap Joystick Axis	Yes, no	These three parameters are described in a single section as they are closely linked. Eight different configurations for the joystick direction or orientations are possible using the parameters. For example, it may be necessary to have to move the joystick backwards in order to drive forwards.

Parameter	Setting range	Description
(Invert Left Right JS Axis, Invert Fwd Rev JS Axis, Swap Joystick Axis)		In this case, **Invert Fwd Rev JS Axis** can simply be set to **Yes**. However, there are many other combinations which are best explained in the form of a table (see below for details).

Interactive setting of the joystick throw

Interactive setting of the joystick throw can only be carried out via on-board programming (OBP) (see page 158).

Invert Fwd Rev JS Axis, Invert Left Right JS Axis, Swap Joystick Axis

Required orientation				Required programming		
Forward	**Reverse**	**Left**	**Right**	**Invert F/R**	**Invert L/R**	**Swap axis**
Forward	Reverse	Left	Right	No	No	No
Reverse	Forward	Left	Right	Yes	No	No
Forward	Reverse	Right	Left	No	Yes	No
Reverse	Forward	Right	Left	Yes	Yes	No
Left	Right	Reverse	Forward	No	No	Yes
Left	Right	Forward	Reverse	Yes	No	Yes
Right	Left	Reverse	Forward	No	Yes	Yes
Right	Left	Forward	Reverse	Yes	Yes	Yes

8.2.2.2 Calibration

The movement of the joystick can be individually adapted to the movement possibilities of the user. This calibration can be carried out once and modified as required.

> **Prerequisite:** On-board programming mode is activated (see page 170).

1) Select **Omni > System > Joystick > Calibrate**.
2) The procedure is carried out automatically. Follow the instructions on the LCD monitor. Values for forward/reverse and left/right axes are displayed. A symbol appears next to each value (X or check mark):
   X: the axis value is outside the permitted calibration range for this direction
   Check mark: The axis value is within the permitted calibration range for this direction.
3) Deflect the joystick in the corresponding direction until both values are in the permitted range. Repeat for all 4 directions.
4) The LCD monitor shows when the calibration has been completed successfully. The display then returns to the system menu.

INFORMATION

The calibration may be lost if there is a drop in voltage or the battery capacity is low.

8.2.2.3 Configuring latched drive mode

The following parameters can be set under **Latched**:

Parameter	Setting range	Description
Latched drive (Latched Drive)	Off, Step, Step reverse, Cruise, Cruise reverse	Type of latched drive mode: • **Off**: Latched drive mode is switched off. • **Step**: Step mode in the forward direction only. Driving in step mode means that the latched speed of the wheelchair is increased or decreased using short joystick movements. • **Step reverse**: Step mode in both the forward and reverse direction • **Cruise**: Cruise mode in the forward direction only. Joystick movement accelerates the wheelchair and driving continues at the speed reached when the joystick is released. • **Cruise reverse**: Cruise mode in both the forward and reverse direction. If **Latched drive** is set in a profile, an emergency stop switch must be connected to the socket for the external input device for the profile on the joystick module.

Parameter	Setting range	Description
Latched actuators (Latched Actuators)	Yes, no	Operation of seat functions in latched mode, i.e. the seat function is triggered with a short joystick movement. A brief movement in the opposite direction stops the actuator. If **Latched actuators** is set in a profile, an emergency stop switch must be connected to the socket for the external input device for the profile on the joystick module.
Latched timeout (Latched Timeout)	0 to 250 s in single steps	Timeout for driving and operation of the variable motors in latched mode. The timeout period is the maximum period of time for which the joystick can remain in the neutral position before movement in latched mode is ended. If the period of time is exceeded, movement in latched mode stops. Timeout is therefore an important safety function with which driving or movement of a variable motor is stopped when the user is unable to stop the functions as usual. It is important that the correct duration is set for the timeout. When a value of 2 or lower is set, the timeout function is disabled. This should be set only in exceptional cases and following a comprehensive risk analysis.
Latched timeout beep (Latched Timeout Beep)	Yes, no	A beep is emitted shortly before the end of the timeout period.

8.3 Push-button controls

The push-button controls are available in versions with 1 button (scan function, also called scan-light control) or 3 or 4 buttons.

1 button (scan function or scan-light control)

All functions including the driving function can be controlled using one button (exception: Bluetooth functions). The system automatically moves through the driving directions display and the menu display at a configurable speed. Pressing the button implements the currently displayed driving direction or function.

3 buttons

Three buttons are used with the following functions:

- Front/back
- Right
- Left

4 buttons

Four buttons are used with the following functions:

- Front
- Back
- Right
- Left

8.3.1 1-button control (scan function)

8.3.1.1 Installation

INFORMATION

The user switch serves as an EMERGENCY STOP. It must be positioned on the wheelchair in such a manner that it can be easily accessed by the user at all times.

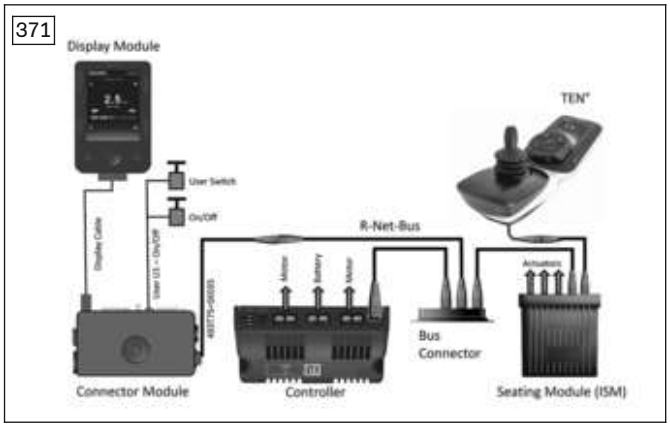
With 1-button control, one switch is required to drive the wheelchair and to operate all of the functions.

Switches may include, for example:

- Button with gooseneck
- Piko button
- Other suitable switches.

8.3.1.1.1 Configuration example

The 1-button control is operated using the user switch. It is connected to the U1 jack on the connection module with a jack plug (see page 169).



8.3.1.1.2 Mechanical settings

Installation of the button with gooseneck corresponds to installation of the user switch with the sip and puff control (see page 193).

The button with gooseneck has a flexible tube. This allows for individual and easy adjustment to meet the user's preferences. Bend the flexible tube as required and position the button precisely. The piko button is fastened to the arm support or at some other suitable point on the wheelchair using a hook-and-loop strap. The position can be determined individually by the wheelchair user.

8.3.1.2 Programming

The following parameters for the 1-button control can be set via the R-Net programming interface:

Scan rate

The scan rate is set under **Omni/Global**.

Parameter	Setting range	Description
Scan Speed	0 s to 10 s in increments of 0.25 s.	The scan rate defines the time for how long the direction indicator remains in one position.

The settings for latched driving mode are described in the section that follows.

8.3.1.2.1 Configuring latched drive mode

The following parameters can be set under **Latched**:

Parameter	Setting range	Description
Latched Drive (Latched Drive)	Off, Step, Step reverse, Cruise, Cruise reverse	Type of latched drive mode: • **Off**: Latched drive mode is switched off. • **Step**: Step mode in the forward direction only. Driving in Step mode means that the latched speed is increased (when the arrow shown on the LCD module is pointing in the direction of travel) or reduced (when the arrow is pointing in the opposite direction) by briefly pressing the button. • **Step reverse**: Step mode in both the forward and reverse direction. • **Cruise**: Cannot be used with 1-button control. • **Cruise reverse**: Cannot be used with 1-button control.
Latched Actuators (Latched Actuators)	Yes, no	Operation of seat functions in latched mode, i.e. the seat function is triggered by briefly pressing the button.
Latched Timeout (Latched Timeout)	0 to 250 s in single steps	Timeout for driving and operation of the variable motors in latched mode. The timeout period is the maximum period of time for which the button can go without being pushed before movement in latched mode is ended. If the period of time is exceeded, movement in latched mode stops. Timeout is therefore an important safety function with which driving or movement of a variable motor is stopped when the user is unable to stop the functions as usual. It is important that the correct duration is set for the timeout.

Parameter	Setting range	Description
		When a value of 2 or lower is set, the timeout function is disabled. This should be set only in exceptional cases and following a comprehensive risk analysis.
Latched Timeout Beep (Latched Timeout Beep)	Yes, no	A beep is emitted shortly before the end of the timeout period.

The following switch-specific parameters should also be noted for latched driving mode (see page 178):

- User Switch
- Switch Detect
- Switch Medium: specifies the maximum time for which the button may be pressed in order to execute the desired function. If the button is pressed longer than the specified time, this is interpreted as an emergency stop.

8.3.2 3 and 4-button control

8.3.2.1 Installation

8.3.2.1.1 Configuration example

4-button control with TEN° LCD module

The 493U36=SK095 adapter is used to connect the 4 direction buttons. An external on/off switch on the on/off jack and the user switch on the U1 jack are connected in addition on the connection module of the TEN° LCD module (see page 169).

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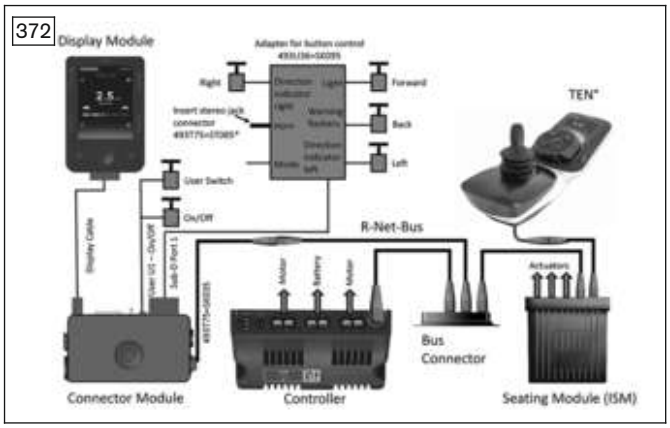

* If switch detect is not used, please change the configuration using the programming software: Switch detect off.

4-button control with input/output module (IOM)

The 493U36=SK095 adapter is used to connect the 4 direction buttons. The external on/off switch is also connected to the input/output module (IOM).

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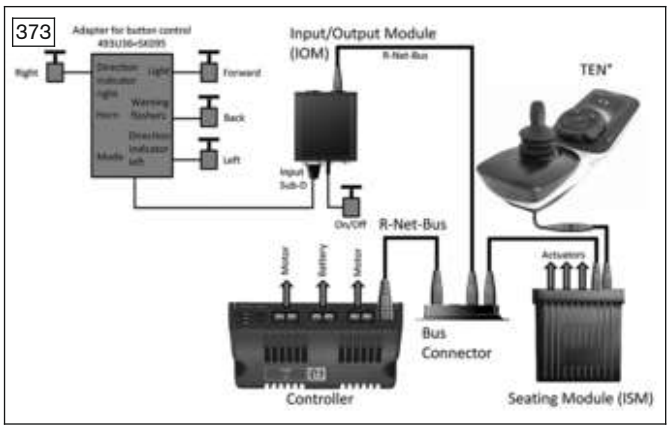
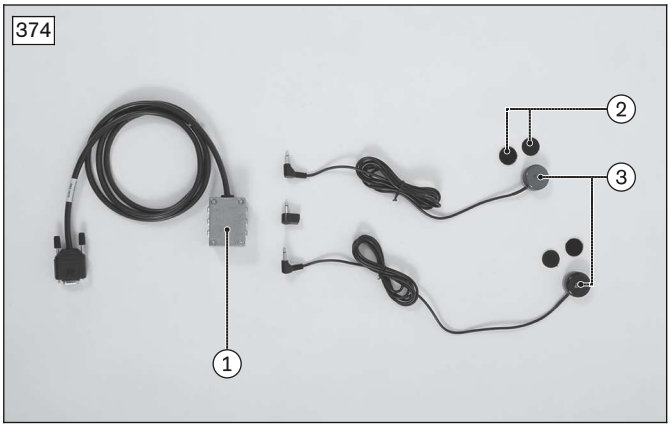


3-button control with TEN° LCD module

By using the above arrangement, a 3-button control can be realised as well by eliminating the [Back] button and configuring the [Forward] button with a double "Forward/Back" assignment.

8.3.2.1.2 Installing push-button control



The buttons can be positioned on the wheelchair as desired using the supplied hook-and-loop pads. Mount the button adapter under the seat using e.g. hook and loop cable ties. Secure the cables on the wheelchair with hook-and-loop cable ties or cable clips.

1. Button adapter
2. Hook-and-loop pads
3. Buttons

8.3.2.2 Programming

With the 4-button control, driving is carried out using the buttons for the Forward, Reverse, Right and Left directions. With the 3-button control, one button is used for both forward and reverse driving. A user switch is used with both types in addition.

The following parameters are relevant for the 3 and 4-button control:

Orientation

The assignment of the individual buttons (Forward/Reverse, Left/Right) can be changed under **Controls/Joystick**.

Parameter	Setting range	Description
Invert Left Right JS Axis Invert Fwd Rev JS Axis Swap Joystick Axis (Invert Left Right JS Axis, Invert Fwd Rev JS Axis, Swap Joystick Axis)	Yes, No	These three parameters are described in a single section as they are closely linked. Eight different configurations for the direction or orientations are possible using the parameters. For example, it may be necessary to have to press the button on the "Reverse" connection in order to drive forwards. In this case, **Invert Fwd Rev JS Axis** can simply be set to **Yes**. However, there are many other combinations which are best explained in the form of a table (see below for details).

Required orientation				Required programming		
Forward	**Reverse**	**Left**	**Right**	**Invert F/R**	**Invert L/R**	**Swap axis**
Forward	Reverse	Left	Right	No	No	No
Reverse	Forward	Left	Right	Yes	No	No
Forward	Reverse	Right	Left	No	Yes	No
Reverse	Forward	Right	Left	Yes	Yes	No
Left	Right	Reverse	Forward	No	No	Yes
Left	Right	Forward	Reverse	Yes	No	Yes
Right	Left	Reverse	Forward	No	Yes	Yes
Right	Left	Forward	Reverse	Yes	Yes	Yes

Seat

The assignment of the operating functions for the seat settings to the buttons can be changed. The "Forward" and "Reverse" buttons are used for seat adjustment (e.g. up, down) by default, while the "Right" and "Left" buttons are used to select the desired seat function.

The settings can be changed under **Omni/Ports/Controls**.

Parameter	Setting range	Description
Actuator Selection (Actuator Selection)	SID, Switch	Setting that defines whether the adjustment functions are selected using special control (SID) commands or with the input device (User Switch).
Actuator Axes (Actuator Axes)	Normal, Swap, Left/Right, Right/Left	Setting that defines which direction commands of the special control (SID) are used to select the available functions. This parameter does not apply when special controls with 1-button scan are used.

Parameter	Setting range	Description
		• **Normal**: The SID commands Left and Right are used to select the available adjustment functions and the Forward/Reverse commands execute the selected function. • **Swap**: The Forward/Reverse SID commands are used to select the available adjustment functions and the Left and Right commands execute the selected function. • **Left/Right**: The SID command "Left" is used to select the available adjustment functions and the SID command "Right" executes the selected function. The execution direction is changed by briefly issuing the SID command "Right". • **Right/Left**: The SID command "Right" is used to select the available adjustment functions and the SID command "Left" executes the selected function. The execution direction is changed by briefly issuing the SID command "Left".

Special features of the 3-button control

With the 3-button control, the same button is used for both forward and reverse driving. The setting is configured under **Omni/Ports/Controls** using the following parameters:

Parameter	Setting range	Description
Fwd/Rev. Auto Toggle (Fwd/Rev. Auto Toggle)	On, Off	Method for changing direction in special controls with 3 directions or 3 switches. This parameter has no effect on other types of special controls. It is intended primarily for the use of head controls. • **On**: The Forward/Reverse direction command of the special control can be used to change the selected driving direction. This is done by executing and confirming the Forward/Reverse direction command within the time defined in the **Auto Toggle Time** parameter. This changes the previously selected driving direction. To drive in the new driving direction, the Forward/Reverse direction command must be executed again within the **Auto Toggle Time**. If the defined time passes without a Forward/Reverse direction command, the selected driving direction returns to the original setting. • **Off**: Briefly operating the input device (user switch) selects a new driving direction. Double-clicking on the input device changes the profile or mode. **INFORMATION: The Fwd/Rev Auto Toggle function cannot be used when latched driving is required, since this causes a conflict with the logic of the user commands. If the parameter is set to On and latched driving has been activated in the programming, the "Invalid settings" error message is displayed.**
Auto Toggle Time (Auto Toggle Time)	0.5 s to 5 s in increments of 0.25 s	Time limit for the user to execute the Forward/Reverse direction command in order for the command to take effect.

8.3.2.2.1 I/O module (IOM)

The IOM can be configured either as an input or an output device. An internal switch is used to configure the IOM:

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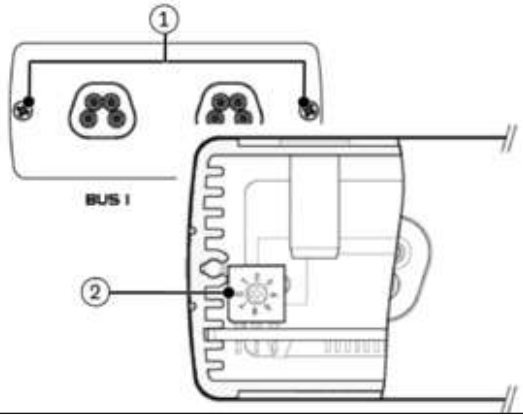

1) Disconnect all cables.
2) Loosen and remove the mounting screws (item 1) on the bus connection plate.
3) Carefully pull the connection plate slightly away from the housing. Ensure that the internal wiring is not damaged.
4) Configure the switch (item 2) as desired (see table).
5) Reposition the connection plate on the housing.
6) Insert and tighten the mounting screws.

Use as	Switch position	Designation in R-Net programming interface
Input device	0	IOM 1 (under Profile Management/Input Device Type)
	1	IOM 2 (under Profile Management/Input Device Type)
	2	IOM 3 (under Profile Management/Input Device Type)
Output device	3	IOM 1 (under Configuration/Mode Name)
	4	IOM 2 (under Configuration/Mode Name)
	5	IOM 3 (under Configuration/Mode Name)

Example: An IOM is to be configured for operation via push-button control. The switch in the IOM must be set to position 0, 1 or 2 (arrow on the mark). A profile with IOM 1, IOM 2 or IOM 3 must be activated as the input device under **Profile Management**.

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In the R-Net programming interface, the **Input Type** parameter for the selected port (Port 1 in the example) must be set to **Switch** under **Input/Output Module** in the **Input Module** section in order to operate the button adapter with the IOM.

8.4 Sip and puff control

8.4.1 Installation

8.4.1.1 Configuration example

The illustration shows a configuration example for a sip and puff control. In addition to the sip and puff unit, a suitable user switch and an external on/off switch can be connected to the connection module of the LCD monitor.

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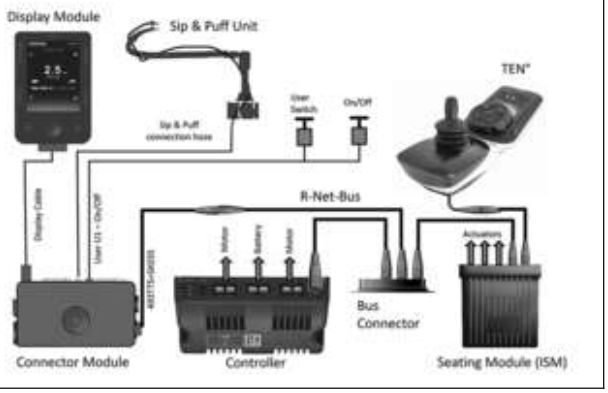

8.4.1.2 Installing the sip and puff control

INFORMATION

The user switch serves as an EMERGENCY STOP. It must be positioned on the wheelchair in such a manner that it can be easily accessed by the user at all times.

The installation side for the mouthpiece and user switch can be individually chosen; mount them as requested by the wheelchair user.

Installing the sip and puff control on the standard seat

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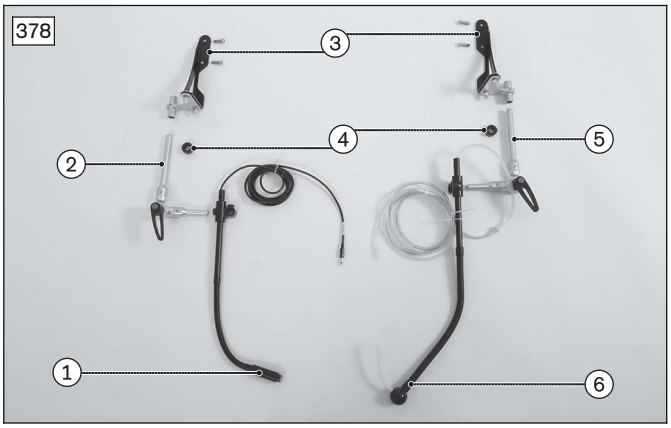

Components of the sip and puff control for installation on the standard seat:

1. User switch with gooseneck
2. Holder for user switch
3. Attachment angle, pre-assembled
4. Adjustment ring
5. Mouthpiece holder
6. Mouthpiece

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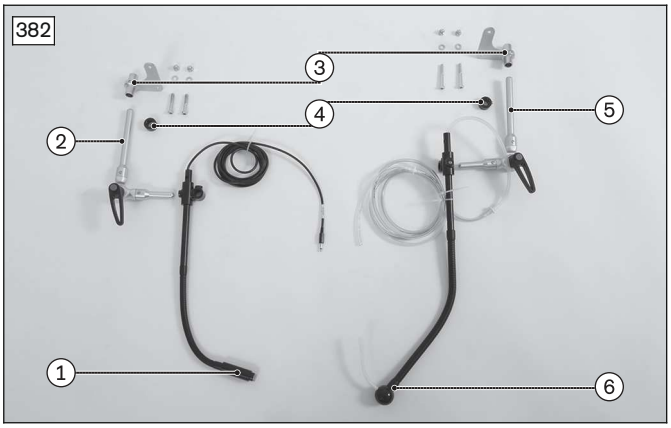
Remove the top 2 Allen head screws respectively from both back tubes.

Screw the pre-assembled attachment angles for the mouthpiece holder and user switch to the back tubes using the supplied Allen head screws.

Slide the mouthpiece holder and user switch with holder into the respective attachment angles. Secure the stop with the help of the adjustment ring.

Route the air hose from the mouthpiece holder to the LCD monitor and connect it there to the pneumatic port for the sip and puff control.

Installing the sip and puff control on the VAS seat

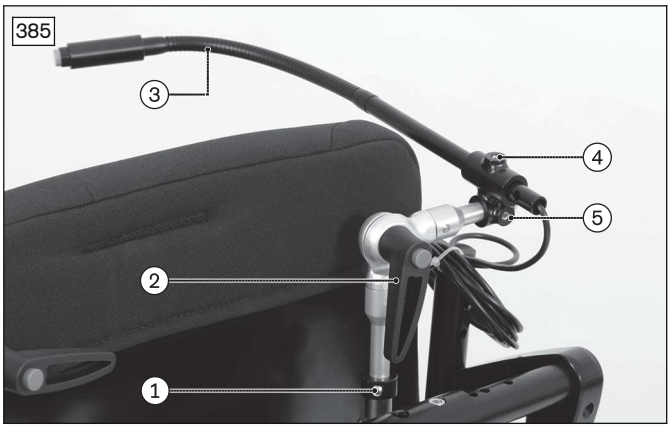


Components of the sip and puff control for installation on the VAS seat:

1. User switch with gooseneck
2. Holder for user switch
3. Attachment angle, pre-assembled
4. Adjustment ring
5. Mouthpiece holder
6. Mouthpiece

Remove the 2 illustrated Allen head screws on the respective side of the back bar (see below regarding particularities for installation in the area of the ISM housing).

Screw the attachment angle for the mouthpiece holder or the user switch, respectively, to the back bar using the supplied Allen head screws.



Slide the mouthpiece holder or the user switch with holder into the respective attachment angle. Secure the stop with the help of the adjustment ring (item 1).

Route the air hose from the mouthpiece holder to the LCD monitor and connect it there to the pneumatic port for the sip and puff control.

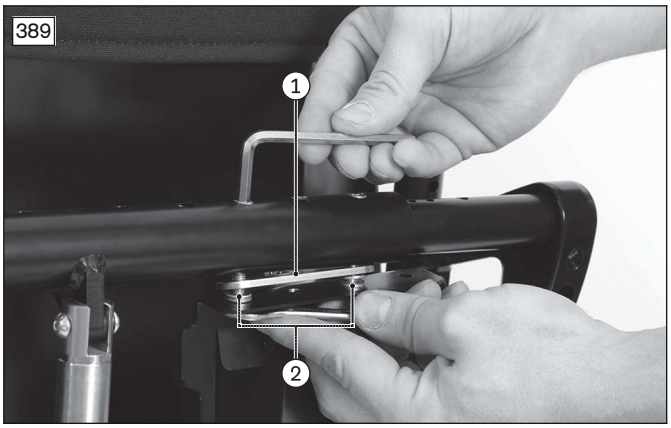
Particularities for installation in the area of the ISM housing

If the seat module (ISM) is installed on the back to the right, it must first be removed in order to install the attachment angle for the mouthpiece holder or user switch:

Reach into the protective housing of the ISM as illustrated, push it slightly out to the side and pull it off.

Loosen and remove the 2 Allen head screws attaching the ISM holder to the back bar. Remove the holder.

Loosen and remove the 2 Allen head screws attaching the ISM to the holder. Remove the ISM from the holder.

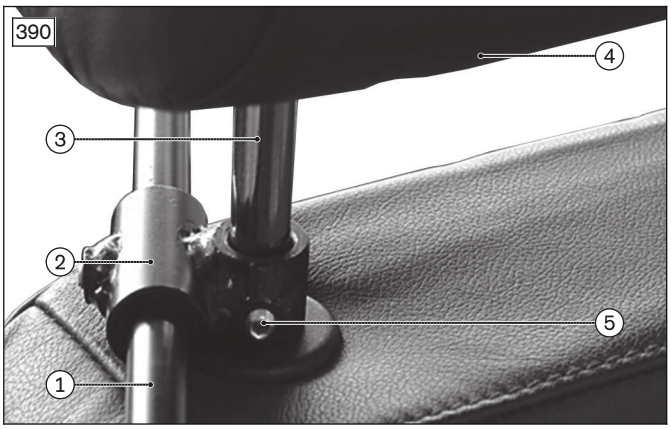


Use the supplied Allen head screws to attach the ISM holder along with the attachment angle for the mouthpiece holder or user switch (item 1) to the back bar. In doing so, insert 2 spacer washers respectively between the attachment angle and nut (item 2).

Screw the ISM onto the holder again and attach the protective housing.

Installing the sip and puff control on the Recaro seat

1) Pull the head support off the back support together with the head support struts.
2) Loosen the set screw on the guides of the mouthpiece holder clamps and the holder for the user switch.
3) The installation side for the mouthpiece and user switch can be individually chosen; mount them as requested by the wheelchair user.
4) Fasten the guide for the clamp of the mouthpiece holder on to one of the head support struts.
5) Slide the guide for the clamp of the user switch holder onto the other head support strut or the same one.
6) Fix the clamps in the guides of the head support struts by screwing one set screw each into the guides.
7) Reinsert the head support struts of the head support into the back support together with the mounted sip and puff control.
8) Securely fasten the signal converter module beneath the seat to the chassis using a hook-and-loop strap.
9) Connect the mouthpiece holder and the signal converter module to the air hose. Use a hook-and-loop strap to fasten the air hose behind the seat back.

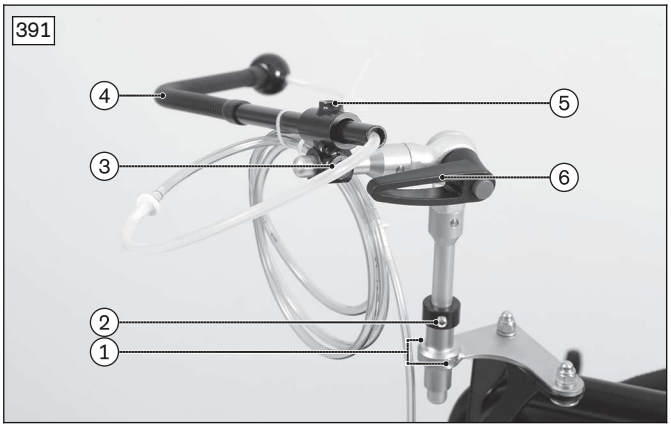


1. Gooseneck of the user switch
2. Clamp
3. Head support strut
4. Head support
5. Set screw

8.4.1.3 Mechanical settings for the sip and puff control

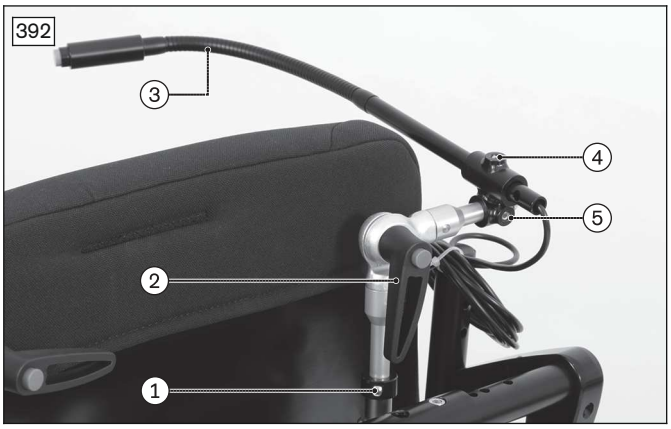
The mouthpiece holder and the holder for the user switch both have flexible tubes. This allows for individual and easy adjustment to meet the user's preferences. Bend the flexible tube as required and precisely position the user switch and the mouthpiece holder.

Mechanical settings on the standard seat and VAS seat



Adjustment options on the sip and puff unit:

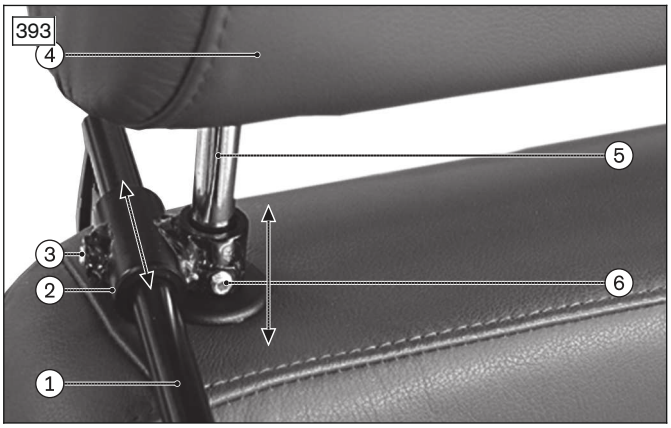
1. 2 set screws
2. Adjustment ring to set the vertical stop
3. Allen head screw
4. Gooseneck
5. Allen head screw
6. Locking lever



Adjustment options on the user switch unit:

1. Adjustment ring to set the vertical stop
2. Locking lever
3. Gooseneck
4. Allen head screw
5. Allen head screw

Mechanical settings on the Recaro seat



1. Gooseneck
2. Clamp
3. Set screw
4. Headrest
5. Headrest strut
6. Set screw

Adjusting the height using the clamp on the headrest strut

1) Loosen the set screw on the clamp guide of the headrest strut.
2) Slide the clamp on the holder up along the headrest strut.
3) Retighten the set screw.

Adjusting the length via the clamp on the holder

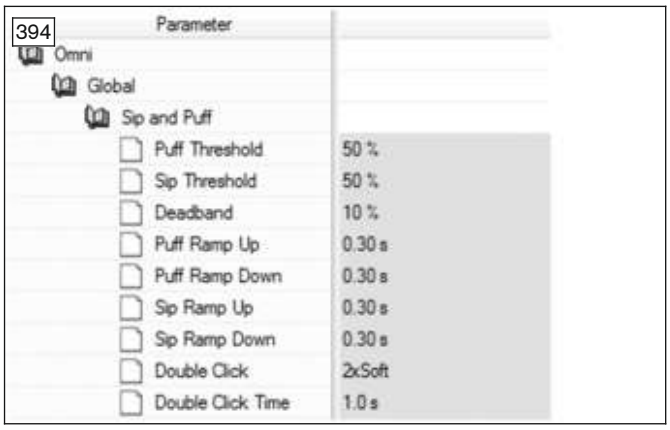
1) Loosen the set screw on the clamp guide of the holder.
2) Slide the holder in the clamp forwards or backwards.

3) Retighten the set screw.

8.4.1.4 Electrical connection of the sip and puff control

1) Connect the 3.5 mm/1/8" diameter hose, equipped with a mouthpiece, to the connection module of the TEN° LCD module (for the connections on the connection module: see page 169).
2) Connect the bus cable of the connection module to a free bus slot in the control device.
3) Connect the jack plug of the user switch to the connection module of the TEN° LCD module.

8.4.2 Programming



The following parameters can be set under **Omni/Global/Sip and Puff** (see fig. 394):

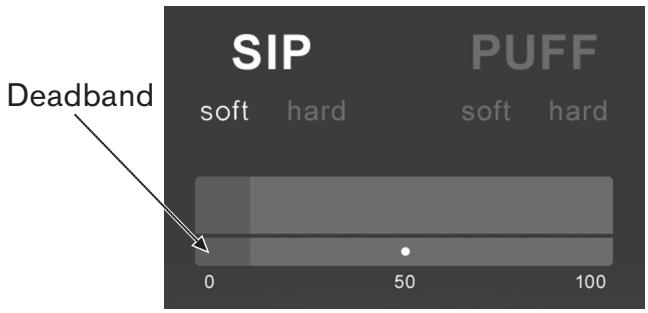
Parameter	Setting range	Description
Puff Threshold (Puff Threshold)	**Deadband** value up to 100 in single steps	Threshold between soft and hard puffing. **INFORMATION: This value is set through calibration (see page 199) and should not be changed.**
Sip Threshold (Sip Threshold)	**Deadband** value up to 100 in single steps	Threshold between soft and hard sipping. **INFORMATION: This value is set through calibration (see page 199) and should not be changed.**
Deadband (Deadband)	5 to 50 in single steps	Extent of the neutral range for sipping/puffing. Here you can set the amount of pressure the user needs to apply by sipping or puffing before the wheel lock of the power wheelchair is released and it starts driving.
Puff Ramp Up (Puff Ramp Up)	0 ms to 2000 ms in increments of 50 ms	Time for the increase from zero pressure to hard puffing When hard puffing starts, the air pressure is briefly below the threshold for hard puffing. This could be interpreted as a command for soft puffing by the TEN° LCD module. The speed with which sufficient pressure can be generated to cross this threshold varies from user to user. If this threshold is not reached within the time set here, this is interpreted as soft puffing, provided the pressure is above the set deadband value.
Puff Ramp Down (Puff Ramp Down)	0 ms to 2000 ms in increments of 50 ms	Time for the drop from hard puffing to zero pressure When hard puffing ends, the air pressure remains below the puff threshold but still above the deadband value for a certain time. This could be interpreted as a command for soft puffing by the TEN° LCD module. With this parameter, the user has enough time to reach the deadband without unintentionally executing soft puffing. If the deadband is not reached within the time configured here, this is interpreted as soft puffing, provided the pressure is below the puff threshold.
Sip Ramp Up (Sip Ramp Up)	0 ms to 2000 ms in increments of 50 ms	Time for the increase from zero pressure to hard sipping When hard sipping starts, the air pressure is briefly below the threshold for hard sipping. This could be interpreted as a command for soft sipping by the TEN° LCD module. The speed with which sufficient pressure can be generated to cross this threshold varies from user to user. With this parameter, the user has more time to reach the threshold for hard sipping. If this

Parameter	Setting range	Description
		threshold is not reached within the time set here, this is interpreted as soft sipping, provided the pressure is above the configured deadband value.
Sip Ramp Down (Sip Ramp Down)	0 ms to 2000 ms in increments of 50 ms	Time for the drop from hard sipping to zero pressure When hard sipping ends, the air pressure remains below the threshold for hard sipping but still above the deadband value for a certain time. This could be interpreted as a command for soft sipping by the TEN° LCD module. With **Sip Ramp Down**, the user has enough time to reach the deadband without unintentionally executing soft sipping. If the deadband is not reached within the time set here, this is interpreted as soft sipping, provided the pressure is below the sipping threshold.
Double Click (Double Click)	2 commands soft; 2 commands hard	Two pneumatic processes carried out within the time set in the **Double Click Time** parameter represent short operation of the input device in standby mode. This parameter configures whether a soft or hard double command is required.
Double Click Time	0 s to 2.5 s in increments of 0.1 s	Duration within which two pneumatic commands must be detected in order to be recognized as double-clicking. If the parameter is set to 0, the double-click function is not supported.

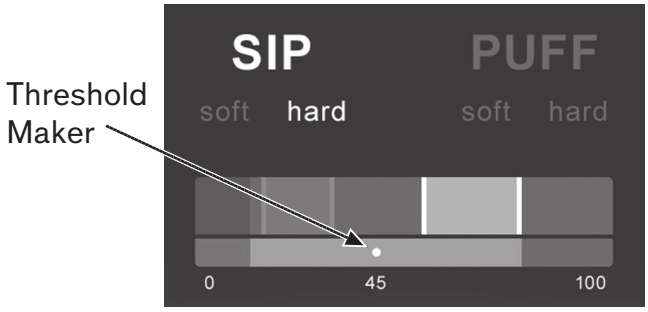
8.4.3 Calibration

Calibration adapts the sip and puff control to the individual abilities of the user.

395



396



> **Prerequisite:** The on-board programming device is switched on (see page 170).

1) Select **Omni > Global > Sip and Puff > Calibrate**. The illustration shows what is displayed on the LCD monitor (see fig. 395). **Sip Soft** is highlighted initially.
2) Now have the user sip softly several times in a row. After each sipping process, the generated sip pressure is shown on the LCD monitor on a scale of 0 to 100.
   → Repeated sipping processes generate a "band" of values. It may be better if the user does not look at the monitor during sipping to prevent them from trying to reach previous values.
3) Once you have ascertained that the user is able to reliably repeat the soft sipping processes within the band, press the right-hand navigation button on the LCD monitor to continue and select **Sip Hard**.
4) Now have the user execute a series of hard sipping processes, once again generating a "band" of values. Ideally, there should be as much difference in pressure as possible between soft and hard sipping processes.
5) Move the threshold marker (see fig. 396) to the middle between the end of the **Sip Soft** band and the start of the **Sip Hard** band. This is done with the + and - buttons on the LCD monitor.
6) Once you have ascertained that the user is able to reliably repeat the hard sipping processes within the band, press the right-hand navigation button on the LCD monitor to continue and select **Puff Soft**.

7) Repeat the process described above for Puff Soft and Puff Hard, including setting the threshold marker.
8) When each calibration step is complete, use the right-hand navigation button on the LCD monitor to continue.

INFORMATION

► Please note that all of these values have to be greater than the value set in the **Deadband** parameter (see page) in order to carry out the calibration successfully.

8.5 Swivel arm

The swivel arm offers the option of power-swiveling the special control elements to a passive position for getting in and out as well as to an active position for controlling the wheelchair.

The following element can be used to operate the swivel arm:

Article number	Designation
493T75=RK161	Satellite switch for on/off and swivel function (right mounted)
493T75=LK161	Satellite switch for on/off and swivel function (left mounted)

8.5.1 Installation

8.5.1.1 Configuration example

The swivel arm can be used e.g for joystick controls, push-button controls or sip and puff controls. When the swivel arm is used, the satellite switch also fulfils the functions of the user switch and the external on/off switch. The other joysticks which are compatible with the joystick control (see page 179) can also be used instead of the 493U75=SK116/117 joystick.

Swivel arm with TEN° LCD module

The illustration that follows shows a configuration example for a special control with a swivel arm, joystick, satellite switch and TEN° LCD module including connection module.

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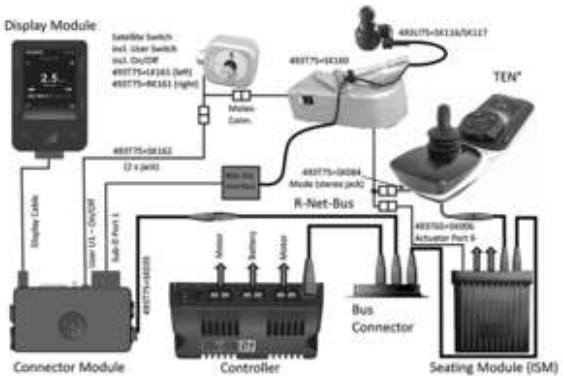
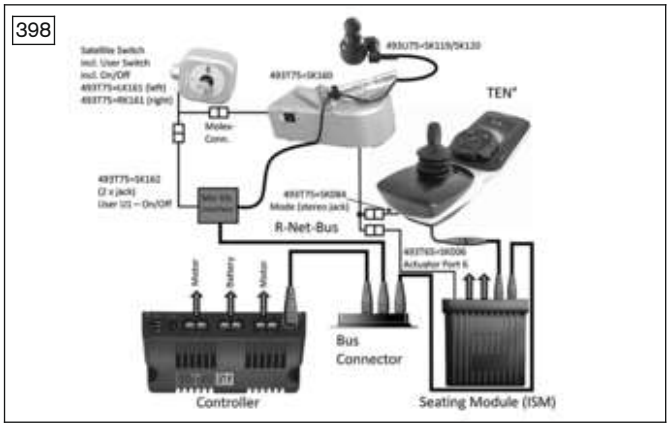


Swivel arm without TEN° LCD module

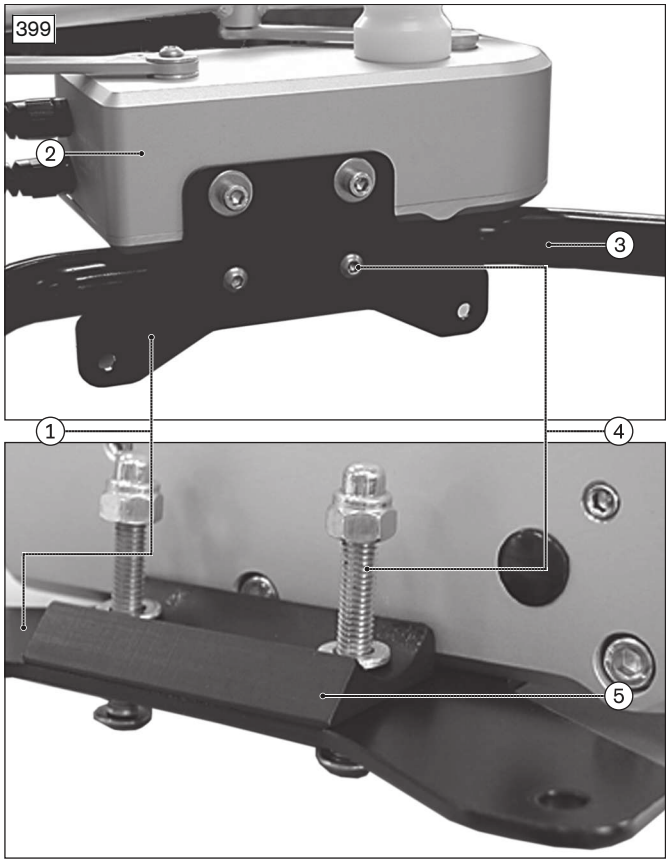
The illustration that follows shows a configuration example for a special control with a swivel arm, joystick and satellite switch, with direct connection to the R-Net bus.



8.5.1.2 Installing the swivel arm

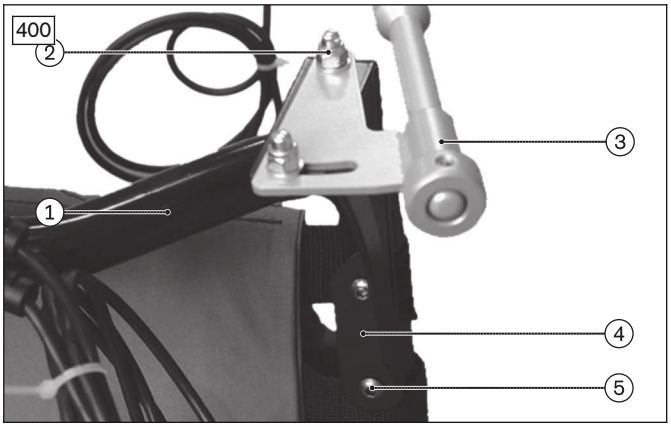
Installing the swivel arm on the standard seat

1) Use two hexagon head screws to fasten the holding plate with the swivel unit and the intermediate piece to the frame tube of the backrest.
2) Use two Allen screws to fasten the angle piece to the right frame strut of the backrest.
3) Use 2 Allen screws with cap nuts to fasten the holding plate of the arm with the satellite switch to the angle piece.



Fastening the swivel unit to the frame tube:

1. Holding plate
2. Swivel unit
3. Frame tube
4. Hexagon head screw
5. Intermediate piece



Attaching the arm with the satellite switch to the frame tube:

1. Frame tube
2. Allen head screw with cap nut
3. Holding plate of the arm with satellite switch
4. Angle piece
5. Allen head screw

Mounting the swivel arm on the standard seat for swivelling overhead is performed in the same manner as described above. The swivel arm is located on the right side of the wheelchair and moves upwards as it swivels out. The satellite switch is located on the left side of the wheelchair.

Installing the swivel arm on the VAS seat

Affix the holding plate for attachment to the VAS seat to the back bar as illustrated using the 2 supplied Allen head screws.

The increments in the holding plate allow the swivel unit to be mounted with an offset to the left or right.

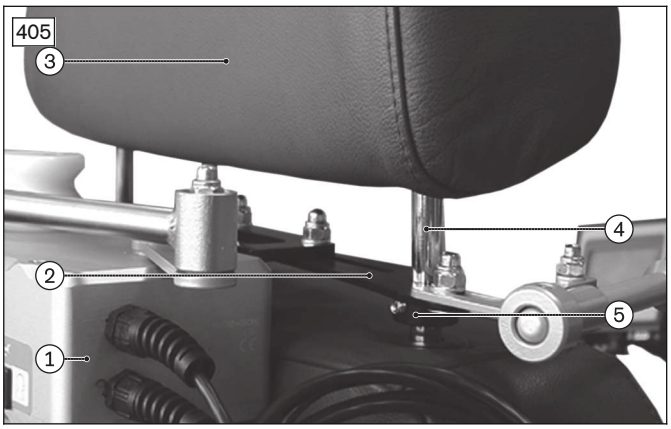
Install the swivel unit on the holding plate using 4 Allen head screws.

Install the satellite switch on the back tube using the clamp and tighten the 2 Allen head screws.

Mounting the swivel arm on the VAS seat for swivelling overhead is performed in the same manner as described above. The swivel arm is located on the right side of the wheelchair and moves upwards as it swivels out. The satellite switch is located on the left side of the wheelchair.

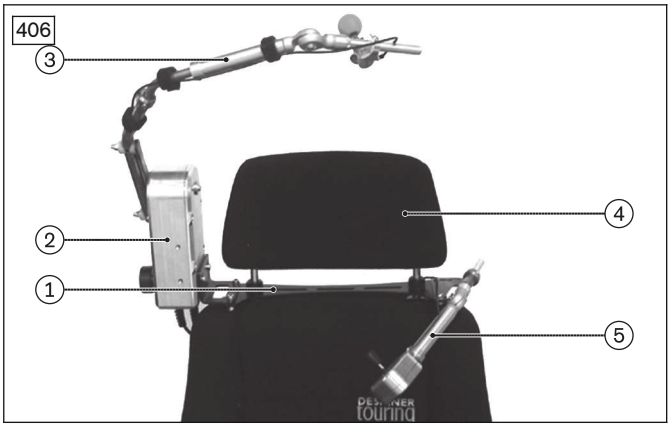
Installing the swivel arm on the Recaro seat

1) Pull the headrest off the backrest together with the headrest struts.
2) Loosen the set screws in the holding plate guides of the swivel arm.
3) Insert the headrest struts in the guides on the holding plate of the swivel arm.
4) Fix the holding plate in the guides of the headrest struts by screwing one set screw each into the guides.
5) Reinsert the headrest struts of the headrest with the mounted swivel arm into the backrest.



1. Swivel unit
2. Holding plate
3. Headrest
4. Headrest strut
5. Set screw

Mounting the swivel arm on the Recaro seat for swivelling overhead is performed in the same manner as described above. The swivel arm is located on the right side of the wheelchair and moves upwards as it swivels out. The satellite switch is located on the left side of the wheelchair.



1. Holding plate
2. Swivel unit
3. Swivel arm with joystick
4. Headrest
5. Arm with satellite switch

8.5.1.3 Mechanical settings for the swivel arm

INFORMATION

The satellite switch serves as an EMERGENCY STOP. It must be positioned on the wheelchair in such a manner that it can be easily accessed by the user at all times.

Adjusting the length using telescopic guides for the arms

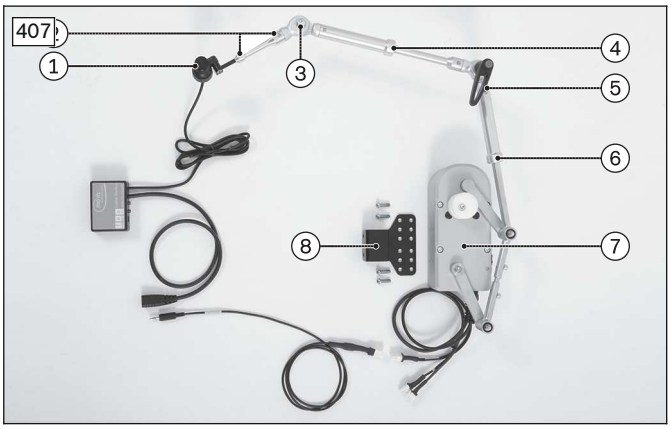
1) Loosen the set screws (next illustration, item 2, 4, 6) on the telescopic guide and set the desired length.
2) Tighten the set screws again.

Adjusting the angle of the joystick

1) Loosen the set screw securing the joystick (next illustration, item 1) on the end of the arm.
2) Turn the joystick to the desired position.
3) Retighten the set screw.

Adjusting the angle via the screw connection on the pivot arm

1) Loosen the socket fillister-head screw at the joint (next illustration, item 3).
2) Set the desired angle and retighten the hexagon socket oval-head screw.



Adjusting the angle and length on the swivel arm:

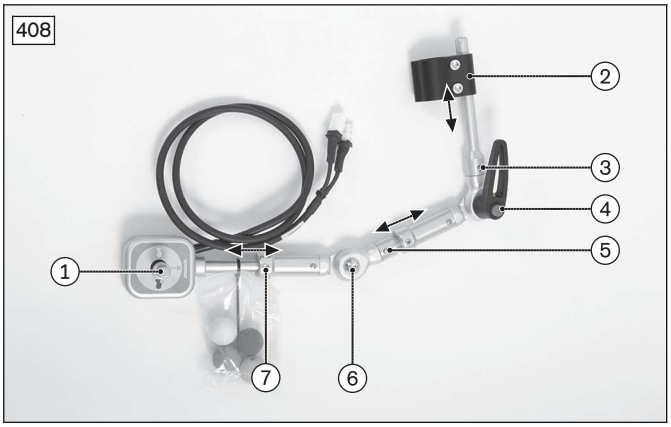
1. Joystick
2. Set screws
3. Joint with hexagon socket oval-head screw
4. Set screw
5. Lock lever
6. Set screw
7. Swivel unit
8. Retaining plate

Adjusting the angle using the lock lever

1) Release the locking lever (see next illustration, item 4).
2) Set the desired angle.
3) Fix this angle with the locking lever.
4) Pull out the handle of the lock lever, turn it to the desired position and allow it to latch back into place.

Adjusting the angle of the satellite switch

1) Loosen the set screw (next illustration, item 7) in the telescopic guide.
2) Turn the satellite switch to the desired position.
3) Retighten the set screw.



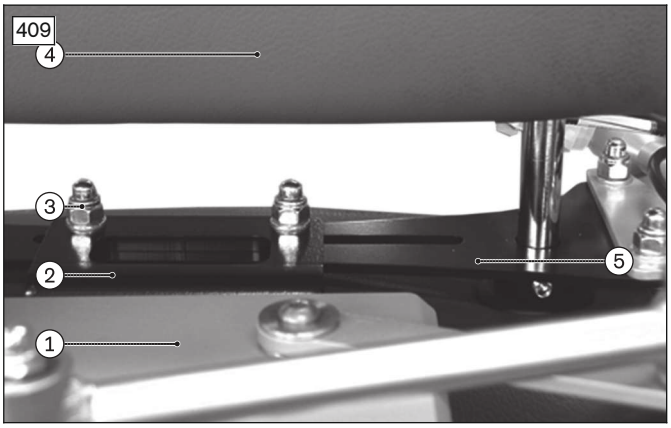
Adjusting the angle and length on the satellite switch:

1. Satellite switch
2. Clamp for attachment to the back support tube
3. Set screw
4. Lock lever
5. Set screw
6. Joint with hexagon socket oval-head screw
7. Set screw

Article number	Designation
493T75=RK161	Satellite switch, pre-assembled, right
493T75=LK161	Satellite switch, pre-assembled, left

Sliding the holding plate laterally (only in conjunction with installation on Recaro seat)

1) Loosen the two cap nuts on the holding plate.
2) Slide the holding plate along the slotted holes to the desired position.
3) Refasten the holding plate with hexagon socket screws and cap nuts.

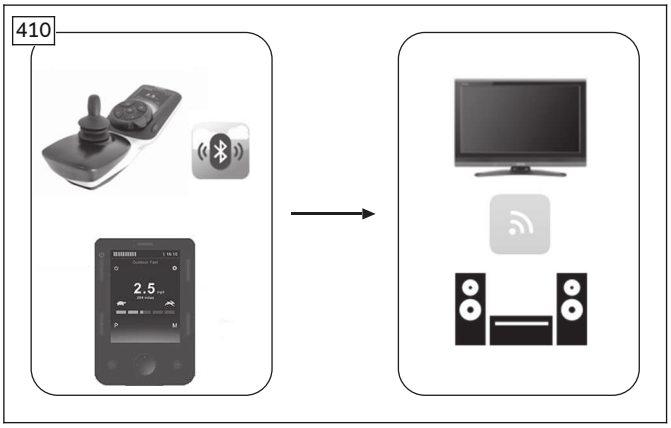


Sliding the holding plate laterally:

1. Swivel unit
2. Swivel unit angle bracket
3. Cap nut
4. Head support
5. Retaining plate

8.6 Environmental control

8.6.1 Environmental control via infrared (IR)



The IR function integrated in the TEN° control panel and TEN° LCD module makes it possible to control a wide range of different infrared devices.

Functions of devices in the home environment (audio, video, PC, telephone, etc.) or at work can be stored in the control device using a learning mode or programmed using a programming interface.

Environmental control via infrared is selected by pressing the [Profile/mode] button on the TEN° control panel or the [Mode] button on the TEN° LCD module.

8.6.1.1 Cables

Environmental control via infrared (IR) is available directly without separate components.

8.6.1.2 Programming

The IR Configurator of the R-Net control unit is a PC-based tool that offers the following functions:

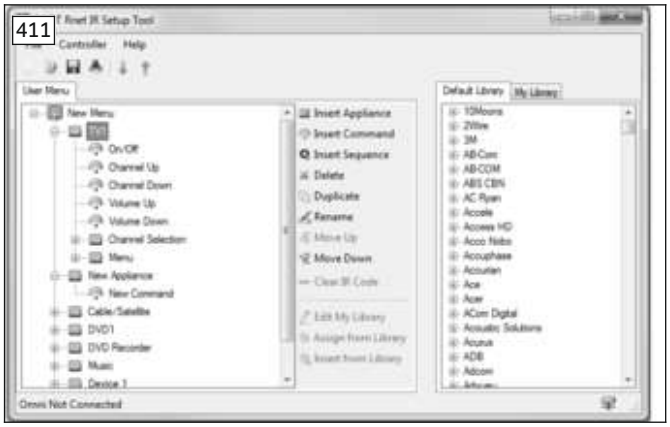
- Creating IR user menus
- Changing IR user menus
- Saving IR user menus
- Reading IR user menus from the R-Net control unit and writing IR user menus to the R-Net control unit.

The IR Configurator can be started through the R-Net PC Programmer under **Tools/IR Configurator...**.

8.6.1.2.1 Configuring the menu tree

The left side of the IR Configurator is used to build and structure the menu tree and to set the labels.

411



The commands available for a device are displayed by clicking the "+" symbol. If an IR code is already assigned, the command symbol is shown in colour.

The editor actions can be selected to the right of the menu tree:

Insert Appliance

A new device (appliance) can be inserted. The name can be freely edited after clicking twice.

Insert Command

A new command for a device can be inserted. The name can be freely edited after clicking twice.

Delete

The chosen entry is deleted from the user menu

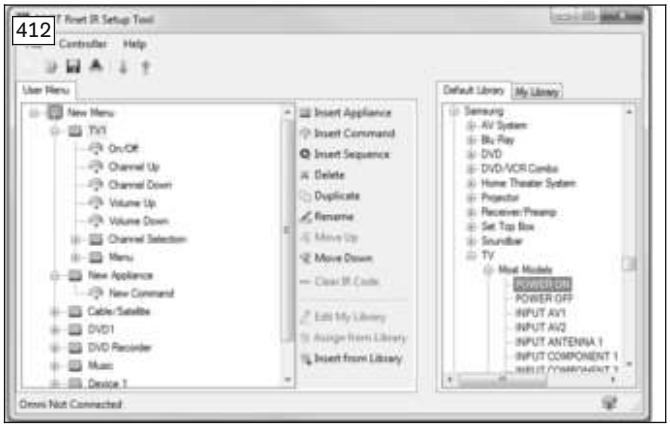
Move Up, Move Down

The selected entry can be moved up or down within the user menu. These functions can also be carried out using drag and drop.

Clear IR Code

The IR code of the selected command is erased. The symbol is shown in grey (no IR code).

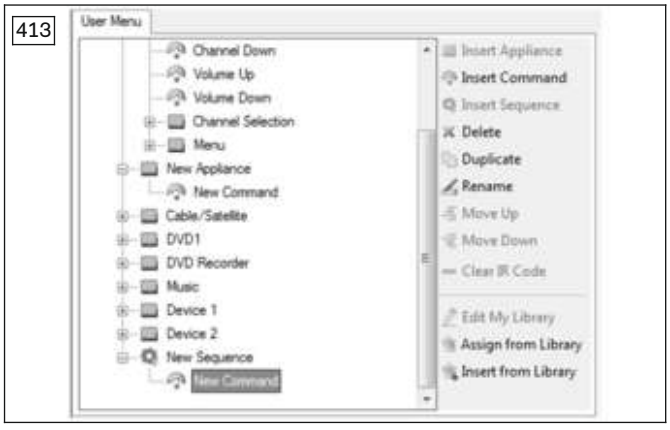
412



TIP: Always check the **Default Library** (to the right in the window) first to see if it contains the desired device. Then click and hold the left mouse button to drag it from the Default Library to the desired place in the user menu.

Custom IR codes can be stored in the **My Library** tab and dragged into the user menu when needed by clicking and holding the left mouse button. The custom codes are stored on the PC in the file "Mydatabase.sdf" in the IR Configurator installation folder.

413



Insert Sequence

Multiple IR codes can be assigned to a command in one sequence. All IR codes contained in the sequence are output at the same time when the sequence is selected.

8.6.1.2.2 Editing the library

The **My Library** (My Library) tab allows the qualified personnel to save and collect IR codes not contained in the **Default Library** of the R-Net control unit.

The entries for the device and the assigned commands are stored on the PC in the file "Mydatabase.sdf" in the IR Configurator installation folder.

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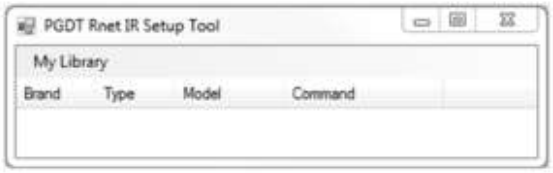
- Select the **My Library** (My Library) tab to the right in the window.
- Select **Edit My Library** (Edit My Library) in the middle of the window.

415



The following functions can be accessed through the **My Library** (Edit My Library) drop-down menu:

- **Add Appliance** (Add Appliance): A new device (appliance) is added to the library structure.
- **Edit Appliance** (Edit Appliance): The entry for the currently selected device (appliance) can be edited.
- **Delete Appliance** (Delete Appliance): The entry for the currently selected device (appliance) is deleted from

  My Library.
- **Clear All** (Clear All): All entries are deleted from **My Library**.

The **My Library** (My Library) function saves all IR codes within the device entry. To store a new IR code, it either has to be recorded within an existing device entry or a new device entry has to be created.

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Add Appliance (Add Appliance)

The brand, type and model of the device (appliance) can be specified here.

Use the **Add** (Add) and **Delete** (Delete) buttons to add codes to the library or remove them.

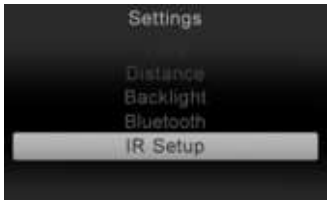
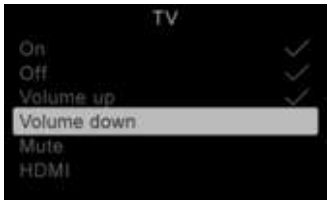
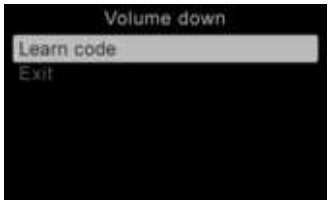
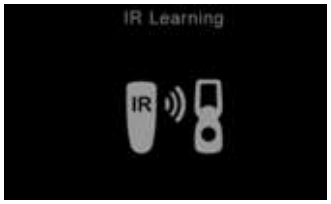
8.6.1.2.3 Learning and assigning IR codes

Learning prerequisites

To enable an optimal learning process, the following recommendations should be observed:

- Put new batteries in the remote control to ensure the IR signal is of good quality.
- Avoid directly exposing the IR sensor to daylight or lamps when signals are being transferred.
- Position the remote control directly in front of the control panel or the TEN° LCD module during the learning process. When pressing a button on the remote control, make sure that the remote control remains still (do not move it back and forth during learning). The ideal distance between the remote control and TEN° control panel or TEN° LCD module is in the range of 40 to 100 mm (1.57" to 3.94").

LCD screen in "Settings" menu

Display	Information
	**TEN° control panel:** Open the "Settings" menu by pressing and holding the [Warning flashers on/off] button. **TEN° LCD module:** Open the "Settings" menu by pressing the [Settings] button. Using the respective installed input device (e. g. joystick, up/down and right/left navigation buttons on the TEN° LCD module, special control input devices), select the menu item [IR Setup]. • Scroll through the list: move forward/back • Select entry: move to the right
	Select a device, e.g. [TV]. The commands which have been set up for the device are displayed.
	Select the command which needs to be learned, e.g. [Volume down].
	Select [Learn code].
	Point the TV remote control towards the control panel or TEN° LCD module and press the desired button (e.g. [Volume down]) twice in succession. The learning progress is displayed on the control panel or TEN° LCD module in learning mode.
	**INFORMATION: Hold the remote control at a distance of 40 to 100 mm (1.57" to 3.94") away from the receiver for infrared signals.** **The receiver is located on the front side of the TEN° control panel or TEN° LCD module above the LCD screen (see arrow).** **Notice: The illustration shows the receiver for infrared signals on the TEN° control panel.**
	A tick mark indicates that the learning process was successful.

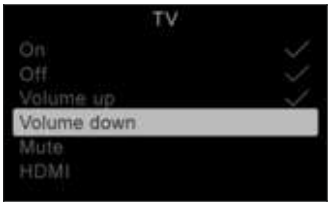
Display	Information
	If the learning process was not successful, an X is displayed. Repeat the learning process in this case.

8.6.1.2.4 Activating and deactivating IR codes

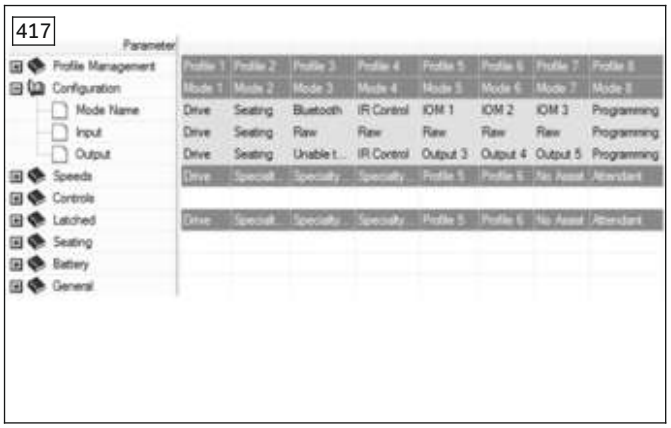
The learned IR codes can be activated or deactivated:

- Once an IR code is deactivated, it no longer appears in the user menu. The corresponding command (e.g. [Volume down]) can no longer be transmitted or executed.
- If an IR code is activated, it appears in the user menu. The corresponding command (e.g. [Volume down]) can be transmitted and executed.

LCD screen in "Settings" menu

Display	Information
	**TEN° control panel:** Open the "Settings" menu by pressing and holding the [Warning flashers on/off] button. **TEN° LCD module:** Open the "Settings" menu by pressing the [Settings] button. Using the respective installed input device (e. g. joystick, up/down and right/left navigation buttons on the TEN° LCD module, special control input devices), select the menu item [IR Setup].
	**Deactivating an IR code** **TEN° control panel:** An IR code can be deactivated by turning the rotary multi-selector to the left. **TEN° LCD module:** An IR code can be deactivated by a movement to the left in the menu using the respective installed input device (e. g. joystick, +/- navigation buttons on the TEN° LCD module, special control input devices). A deactivated IR code appears with an "X" next to the list entry. **Activating an IR code** An IR code can be activated by the respective movement to the right. An activated IR code appears with a tick mark next to the list entry.

8.6.1.2.5 Configuring IR control mode



Mode 4 is configured as the IR control mode at the factory. If this programming has been overwritten, the programming shown here may have to be restored. Restoring the programming is required if the IR user menu cannot be accessed after learning IR codes.

8.6.2 Environmental control via Bluetooth

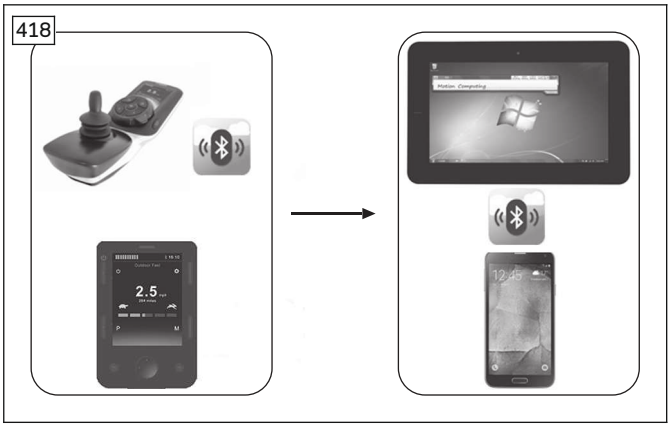
NOTICE

Use of devices with electromagnetic emissions

Restriction of function due to electromagnetic fields

► The performance of the product can be affected by electromagnetic fields (highly radiating devices such as amateur radio or superimposed frequencies). If necessary, switch such devices off while using this product.

418



The TEN° control panel with integrated Bluetooth function or the TEN° LCD module can be used for the wireless operation of PCs, smartphones/tablets (Android 4.0 or higher) and iOS devices (iPhone, iPad).

The signals of installed input devices (such as a joystick, special control input device) are used to control the device/mouse functions.

Environmental control via Bluetooth is selected by pressing the [Profile/mode] button on the TEN° control panel or the [Mode] button on the TEN° LCD module.

The **"Bluetooth Device"** menu item is only available if Bluetooth-enabled devices have been activated. For more information about activation, see the instructions for use (user).

8.6.2.1 Cables

Environmental control via Bluetooth is available directly without separate components.

8.6.2.2 Programming

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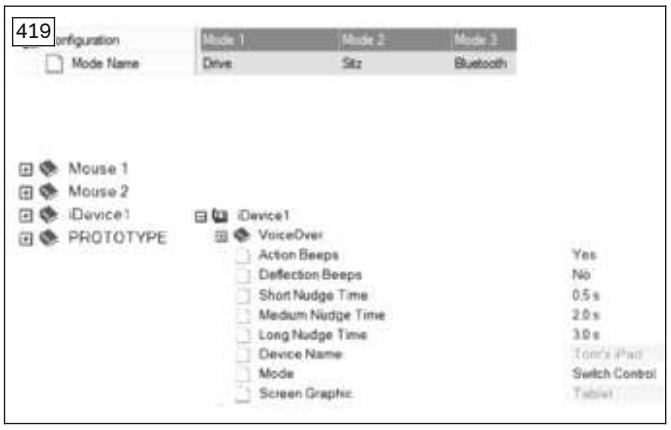


In the programming interface, **Bluetooth** has to be set as the output for the mode in which you want to implement environmental control via Bluetooth. A corresponding **Mode Name** also has to be assigned.

INFORMATION: The naming and assignment to "Mode 3" were already performed by Ottobock.

A **Device Name** parameter is available within each of the **Mouse 1**, **Mouse 2**, **iDevice1** and **iDevice2** branches. The device names displayed in the Bluetooth menu of the TEN° and on the device when establishing the connection are defined in this parameter (e.g. Tom's PC etc.).

The **Screen Graphic** parameter is used to assign an appropriate symbol (PC, tablet and smartphone) to each connected device. Reaction times, signal tones and the like can be adapted for each user with the remaining parameters. Load the configuration to the R-Net after completion.

For the assignment of the signals from installed TEN° input devices to the device functions, see the document "PG DRIVES TECHNOLOGY R-NET BLUETOOTH MODULES – TECHNICAL MANUAL SK79614" from the control device manufacturer Curtiss-Wright.

8.6.3 Wireless environmental control

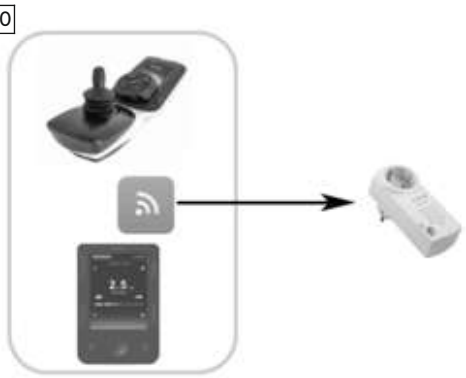
NOTICE

Use of devices with electromagnetic emissions

Restriction of function due to electromagnetic fields

► The performance of the product can be affected by electromagnetic fields (highly radiating devices such as amateur radio or superimposed frequencies). If necessary, switch such devices off while using this product.

420



An additionally available wireless module makes it possible to control up to 6 building services receivers (e.g. outlets, light switches, roller shutters, etc.) wirelessly via the TEN° control panel or TEN° LCD module.

The wireless module is a transmitter (frequency 868.30 MHz), which uses the Easywave protocol especially developed for building services. This protocol is used in numerous building services products available in the market.

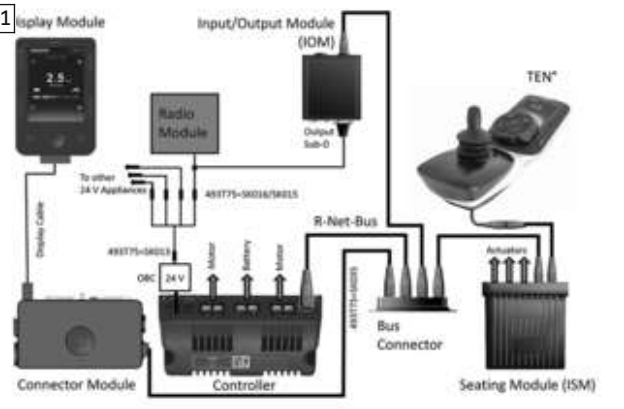
The maximum tested driving distance range is **20 m**.

8.6.3.1 Cables

Environmental control with TEN° LCD module

The illustration that follows shows a wiring example for a wireless module in combination with an input/output module (IOM) and an integrated TEN° LCD module including connection module.

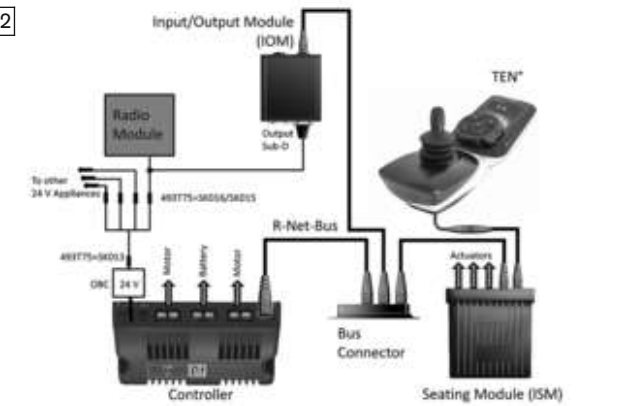
421



Environmental control with input/output module (IOM)

The illustration that follows shows a wiring example for a wireless module in combination with an input/output module (IOM)

422



8.6.3.2 Programming

The IOM can be configured either as an input or an output device. An internal switch is used to configure the IOM:

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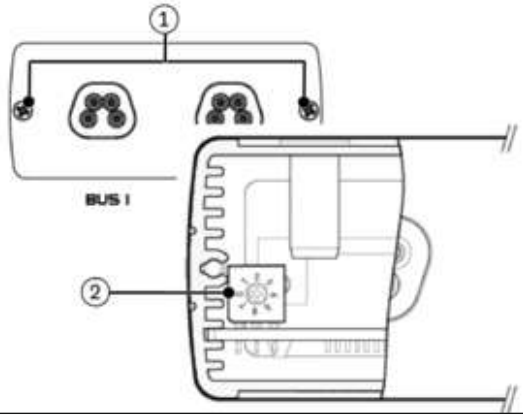
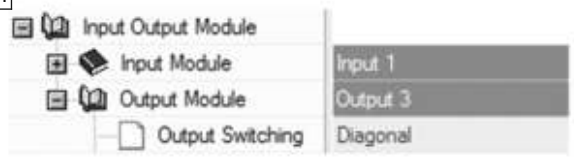


1) Disconnect all cables.
2) Loosen and remove the mounting screws (item 1) on the bus connection plate.
3) Carefully pull the connection plate slightly away from the housing. Ensure that the internal wiring is not damaged.
4) Configure the switch (item 2) as desired (see table).
5) Reposition the connection plate on the housing.
6) Insert and tighten the mounting screws.

Use as	Switch position	Designation in R-Net programming interface
Input device	0	IOM 1 (under Profile Management/Input Device Type)
	1	IOM 2 (under Profile Management/Input Device Type)
	2	IOM 3 (under Profile Management/Input Device Type)
Output device	3	IOM 1 (under Configuration/Mode Name)
	4	IOM 2 (under Configuration/Mode Name)
	5	IOM 3 (under Configuration/Mode Name)

Example: The IOM is to be used to control the wireless module. This requires configuration of the IOM as an output device. The switch in the IOM must be set to position 3 (arrow on mark 3).

424



In the R-Net programming interface under **Input Output Module**, **Output Module**, the **Output Switching** parameter for the selected port (Port 3 in the example) must be set to **Diagonal** for operation of the wireless module with the IOM.

9 Technical data

All technical data for the current wheelchair configuration are found in the current instructions for use (user or qualified personnel). You can request the updated instructions for use for your new configuration from the manufacturer (see the overview of national Ottobock branches at www.ottobock.de).

10 Appendices

10.1 Approved seat brackets

Front-wheel drive (FWD)

Seat height adjustment/tilt	Seat	Approved seat brackets
with module	Standard	491C75=SS101; 491C75=SS102; 491C75=SS128
	VAS/Recaro*	491C75=SS101; 491C75=SS102; 491C75=SS215
without module	Standard	491C75=LS126; 491C75=RS126; 491C75=LS127; 491C75=RS127
	VAS/Recaro	491C75=SS101; 491C75=SS102; 491C75=SS205

* For mobility base size 2 and seat depth ≥ 52 cm, use the 491C75=SS111 seat bracket.

Rear-wheel drive (RWD)

Seat height adjust-ment/tilt	Seat	Approved seat brackets
with module	Standard	491C75=SS111; 491C75=SS112; 491C75=SS128
	VAS/Recaro	491C75=SS111; 491C75=SS112; 491C75=SS215
without module	Standard	491C75=LS126; 491C75=RS126; 491C75=LS127; 491C75=RS127
	VAS/Recaro	491C75=SS111; 491C75=SS112; 491C75=SS205

Mid-wheel drive (MWD)

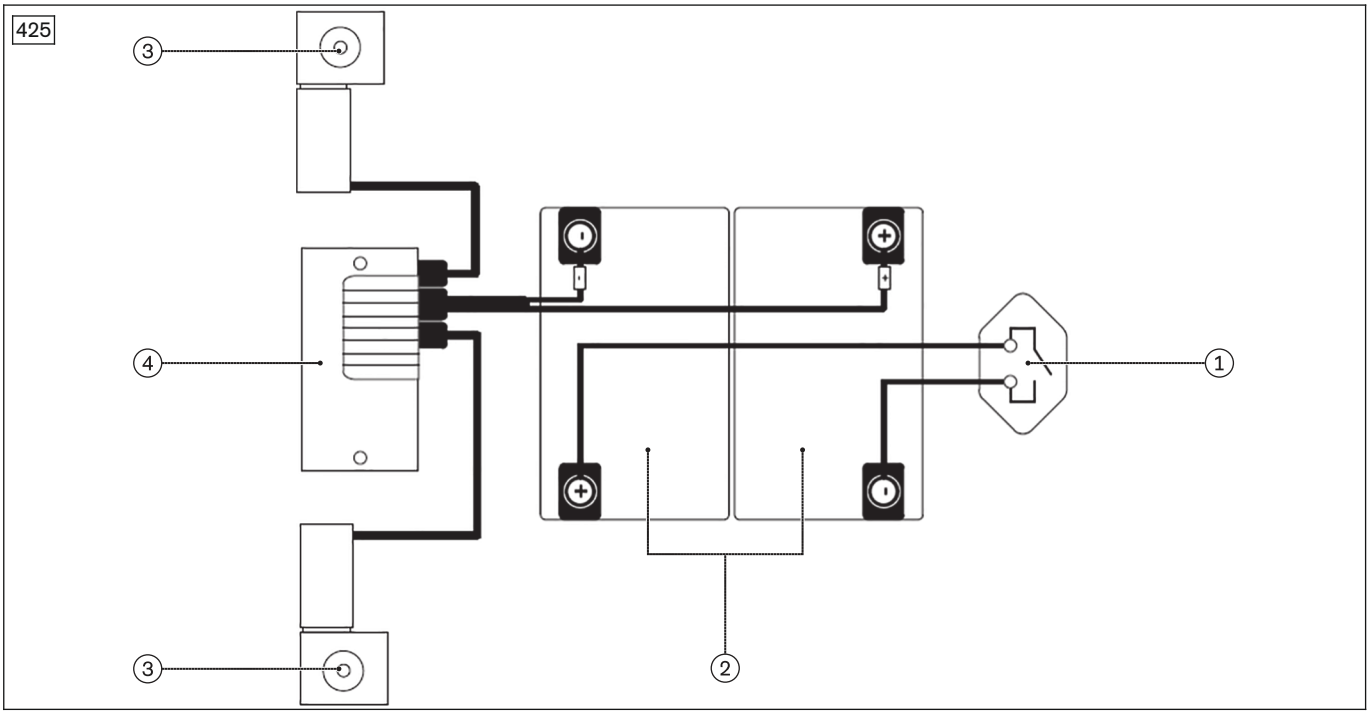
Seat height adjust-ment/tilt	Seat	Mobility base	Seat depths	Approved seat brackets
with module	Standard	All sizes	All seat depths	491C75=SS111; 491C75=SS112; 491C75=SS128
	VAS/Recaro	All sizes	All seat depths	491C75=SS111; 491C75=SS112; 491C75=SS215
without module	Standard	All sizes	All seat depths	491C75=LS126; 491C75=RS126; 491C75=LS127; 491C75=RS127
	VAS/Recaro	Size 1	38 – 50 cm	491C75=SS101; 491C75=SS102; 491C75=SS205
			52 – 58 cm	491C75=SS111; 491C75=SS112; 491C75=SS205
		Size 2	38 – 50 cm	491C75=SS111; 491C75=SS102; 491C75=SS205
			52 – 58 cm	491C75=SS111; 491C75=SS112; 491C75=SS205

10.2 Torque values of the screw connections

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

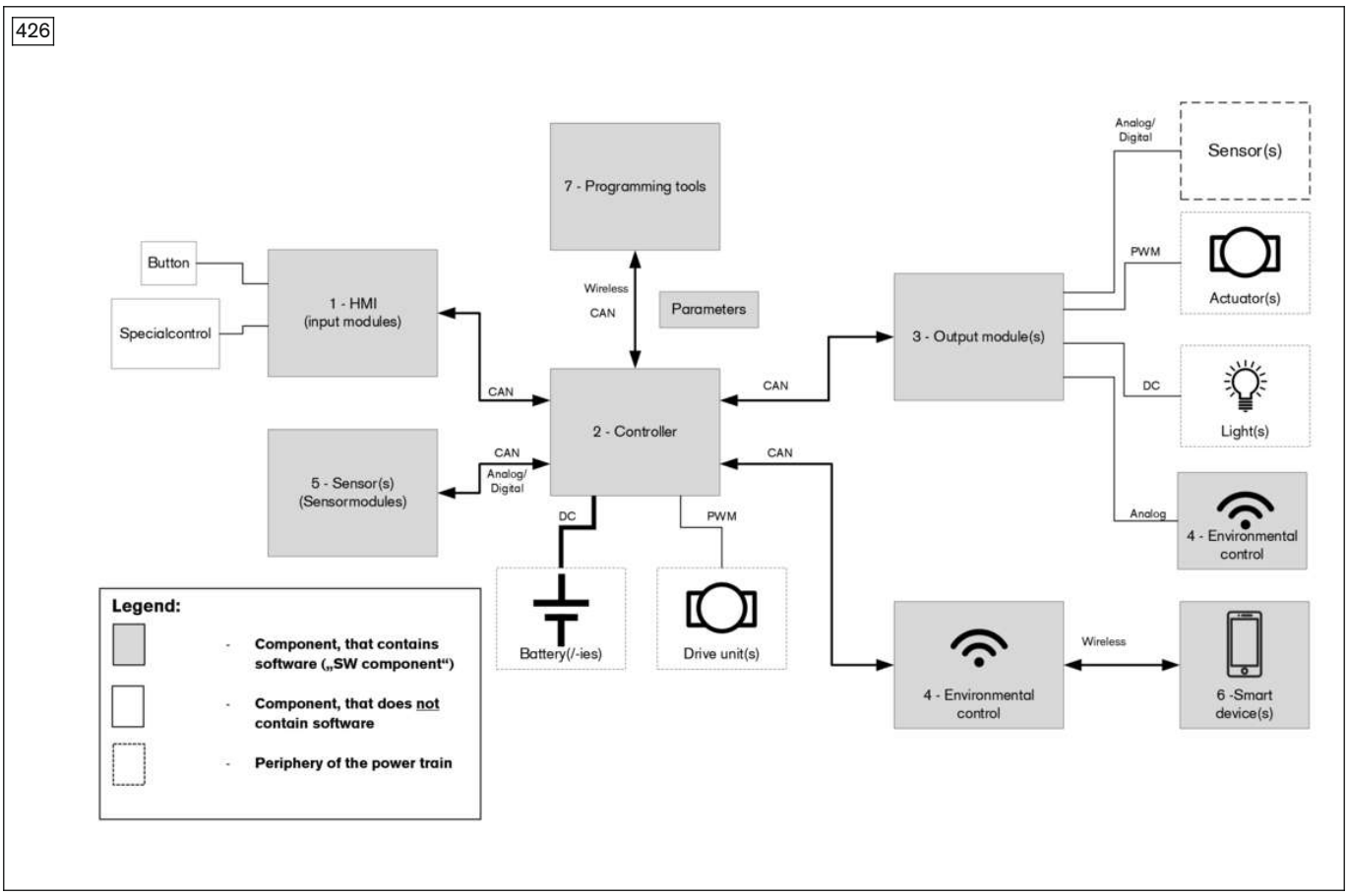
- Thread diameter M4: 3 Nm
- Thread diameter M5: 5 Nm
- Thread diameter M6: 10 Nm
- Thread diameter M8 or larger than 25 Nm

10.3 Battery circuit diagram



1 Automatic circuit breaker (see page 21)
2 Batteries (see page 21)
3 Drive motor (see page 50)
4 Controller (see page 25)

10.4 System architecture of the control device



10.5 Record of delivery

INFORMATION

- ► On delivery, also observe the information in the section "Maintenance plan".
- ► 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 number:**

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

10.6 Maintenance Schedule

INFORMATION

- ► Also observe the information for delivery in the previous section.
- ► 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.

Maintenance plan	**Type of wheelchair:**	**Customer:**
Department	**Inspection (checklist)**	

Serial number:	**Function/setting (depending on equipment)**	**In good condition**	**Damage**	**Exchange/replace**
Whole product	Visual inspection			
	Seat folding mechanism			
Covers	Front cover			
	Rear cover			
	Battery cover			
	Seat module cover			
	Splash guard for drive wheels and caster wheels			
Batteries	Batteries			
	Battery contacts			
	Cabling			
Power supply	Automatic circuit breaker			
	External power supply receptacles			
	External charging receptacle			
	Cabling			
Control device	Controller			
	Seat module			
	Control modules			
	Control panel			
	Attendant control			
Drive unit	Motors with brake release			
	Suspension			
	Drive wheel swing arms			
	Anti-tipper			
Caster wheels	Caster fork			
	Caster wheel swivel lock			
	Track stabiliser			
	Suspension/rigid elements			
	Caster wheel swing arms/stabilising wheel swing arms			
Tyres	Drive wheels			

Serial number:	Function/setting (depending on equipment)	In good condition	Damage	Exchange/replace
Tyres	Caster wheels			
Seat/back support	Seat plate			
	Seat frame			
	Seat height adjustment			
	Seat tilt			
	Back support angle adjustment			
	Cushion/upholstery			
	Cabling			
	Belts			
	Centre of gravity setting			
Side panels	Forearm support			
	Side panel holder			
	Clothing guard			
Leg supports	Leg support holder			
Lighting	Lamps			
	Brackets			
	Cabling			
Safety accessories	Curb climbing assist			
	Transport brackets			
	Accessories for ISO transport (ISO 7176-19)			

Notes:	
Do the wheelchair settings match the user's requirements?	
Maintenance was carried out by:	**on:**

Ihr Fachhändler | Your specialist dealer

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www.ottobock.com