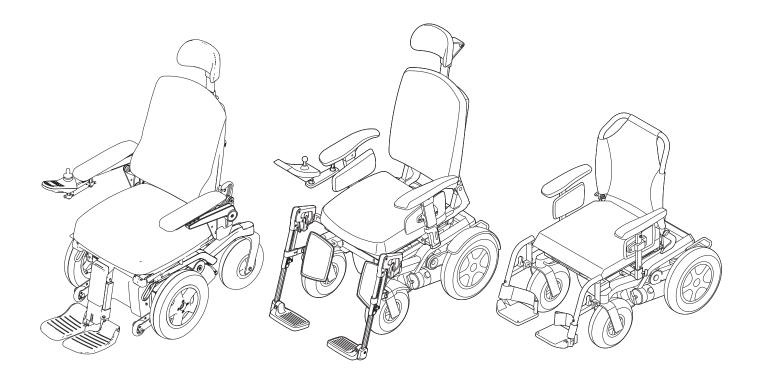
# **Powered wheelchair**



TECHNICAL MANUAL



# Puma 20 / 40



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6 | Introduction Puma 20/40

#### 1 Introduction

# 1.1 This manual

This manual contains the instructions for repairs and general maintenance. Mechanics who do repairs on this wheelchair must be well trained and familiar with the repair methods and the maintenance of the wheelchair.

Always make sure that the work is carried out safely, particularly with respect to procedures requiring the wheelchair to be lifted up.

We advise that you contact our service department before doing repair work on a wheelchair that has been involved in an accident.

The following specifications are important when ordering parts:

- Model
- · Year of manufacture
- Colour
- · Identification number
- Part number
- · Name of the part concerned

This information is provided on the identification plate. See 'Identification of the product'.

#### **Available documentation**

The following technical documentation is available / required to service this wheelchair:

- User manual
- Service manual

#### Service and technical support

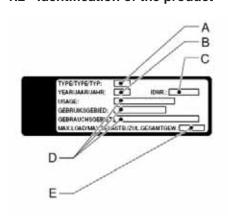
For information concerning specific settings, maintenance or repair works please contact your supplier. He is always prepared to help you.

Ensure you have at hand:

- Model
- · Year of manufacture
- · Identification number

This information is provided on the identification plate. See 'Identification of the product'.

### 1.2 Identification of the product



The identification plate contains the following data:

- A. Model
- B. Year of manufacture
- C. Identification number
- D. Use area indoors or outdoors
- E. Maximum load in kg

#### 1.3 Symbols used in this manual

# Warning symbol



Follow the instructions next to this symbol closely.

Not paying careful attention to these instructions could result in physical injury or damage to the wheelchair or the environment.

#### Reference symbol



The symbol refers to a separate user manual. This reference will indicate the specific user manual and the section to which is being referred.

Pull the charge cord out of the battery charging connection of the electric wheelchair before carrying out any maintenance on the wheelchair.

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# 2 Safety

#### 2.1 Maximum User weight reduction when Puma 20 options are installed on a Puma 40!

In case one of the following Puma 20 options is installed on a Puma 40 carrier, the maximum user weight is reduced to 136 kg:

- · Sedeo Lite seating system (or any Sedeo Lite component)
- Puma 20 motors
- Puma 20 Comfort suspension
- Puma 20 Electrical tilt adjustment (0 25°)

#### 2.2 Personnel qualification

Service technicians:

Repairs may only be carried out by trained and authorised service technicians.

During the execution of their work, they are at all times fully responsible for the fulfilment of locally applicable safety guidelines and standards.

Temporary employees and persons in training may only carry out repair and replacement work under the supervision of an authorised service technician.

#### 2.3 Cautions and warning statements

#### **△** Safety

Safety information is indicated with the warning symbol.

Follow the instructions carefully next to these warning symbols! Not paying careful attention to these instructions could result
in physical injury or damage to the wheelchair or the environment. Where ever possible, safety information is provided in the
relevant chapter.

#### 

- Avoid physical contact with the wheelchair's motors at all times. Motors are continuously in motion during use and can reach high temperatures. After use, the motors will cool down slowly. Physical contact could cause burns.
- If you do not use the wheelchair, ensure that it is not exposed to direct sunlight for lengthy periods of time. Certain parts of the wheelchair, such as the seat, the back and the armrests can become hot if they have been exposed to full sunlight for too long. This may cause burns or allergic reactions to the skin.

#### **⚠** Interference precautions

#### Precautions in combining seat adjustment settings

When fitting and optimizing different seating settings and functions, professionals should be aware that not all settings can be combined over the full range. There are limitations to take into account when using electrical tilt, although unlikely in average fitting situations\*. Combining extremer settings can cause the back of the seat frame to touch the carrier when tilting. This should be avoided since it could damage the wheelchair and can be avoided by making some concessions to one or more settings.

# **Practical guidelines**

When fitting a Puma 20/40 with electrical tilt to the needs of a specific client, professionals should check that the seat frame can tilt freely without the covers with reflector at the back interfer with the carrier.

#### When to expect interference?

Interference is most likely to occur at low seat heights, especially in combination with large seat depth and centre of gravity set to the rear of the wheelchair. For detailed information, please refer to the seat tilt configuration tables.

#### How to avoid interference?

You can resolve interference by:

- Making the seat depth smaller (see seat adjustments, backrest adjustment)
- · Positioning the center of gravity forward (see seat adjustments, centre of gravity setting)
- Increasing the seat height (see seat adjustments, seat height adjustment)
- Choosing a different tilt module, an alternative mounting of the 0- 25° tilt module (see seat adjustments, adjusting the electrical seat tilt) or no tilt at all.
- Also see the seat tilt configuration tables.

<sup>\*</sup> In practice this rarely leads to problems. Firstly because interference mainly occurs when combining a low seat height and large seat depth, settings that rarely coincide in practice. Usually a low seat height means 'small under leg length', 'small person' so small seat depth. Secondly, in most cases a satisfactory solution can be created all the same.

8 | Safety Puma 20/40

#### Seat adjustment factory settings

Sunrise Medical HCM will deliver a Puma wheelchair with default factory settings. These settings depend on the options ticked on the order form. When a configuration is ordered that causes interference, Sunrise Medical HCM applies modified factory settings and informs the customer of this via a note included in the wheelchair delivery. The seat tilt configuration tables also provide detailed information about factory settings.

## ⚠ Moving parts

- A wheelchair has moving and rotating parts. Contact with moving parts may result in serious
  physical injury or damage to the wheelchair. Contact with the moving parts of the wheelchair
  should be avoided.
- · Wheels (turning and castor)
- · Electric tilt in space adjustment
- · Electric high/low option
- Electric backrest adjustment
- · Electric elavating legrests

## **⚠** Electromagnetic radiation

The standard version of your electric wheelchair has been tested on the applicable requirements with respect to electromagnetic radiation (EMC requirements) In spite of these tests:

- it cannot be excluded that electromagnetic radiation may have an influence on the wheelchair. For example:
- mobile telephony
- large-scale medical apparatus
- · other sources of electromagnetic radiation
- it cannot be excluded that the wheelchair may interfere with electromagnetic fields.

#### For example:

- · shop doors
- burglar alarm systems in shops
- · garage door openers

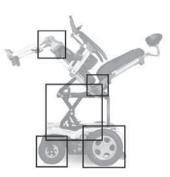
In the unlikely event that such problems do occur, we request that you notify your supplier immediately.

In configurations fitted with an Intelligent Seating Module (ISM) and R-net controller, it is possible that extreme electrical discharge situations (due to static electricity) may cause a fault message ('ISM over-current') flashing on the screen. If this occurs the wheelchair can be turned off for a few seconds and back on again to clear the fault.

#### ⚠ Decals and instructions on the wheelchair

Decals and instructions on the wheelchair

- The signs, symbols and instructions affixed to the wheelchair comprise part of the safety facilities. They must never be covered or removed. They must remain present and clearly legible throughout the entire lifespan of the wheelchair.
- Replace or repair all illegible or damaged signs, symbols and instructions immediately. Please contact your supplier for assistance.



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#### 2.4 Used decals on the wheelchair



Check manual before using



Danger. Hot surfaces. Motors can get hot during the operation of the chair.



(Puma 40)
'Push' mode: freewheel lever outwards/downwards
Don't put the freewheel switch in 'Push' mode



'Drive' mode: freewheel lever inwards/upwards



(Puma 20 and older versions of Puma 40)
'Drive' mode: freewheel lever inwards/upwards
'Push' mode: freewheel lever outwards/downwards
Don't put the freewheel switch in 'Push' mode on a slope



Battery charging connection



Attachment point of the tie-down system for transportation in a vehicle.



Danger of crushing!

Use caution when swinging the controller aside to avoid getting anything crushed.





Trap danger. Danger of getting fingers jammed.

10 | Tools, parts and components Puma 20/40

# 3 Tools, parts and components

#### 3.1 Tools

The tools below are needed for various mechanical settings and maintenance:

Quantity	Description	Size (mm)				
1	Screwdriver, medium	5				
1	Screwdriver, crosshead	-				
1	Hammer (plastic)	-				
1	Chaser	-				
1	Pair of wire cutters	-				
1	Circlip pliers	-				
1	Water pump pliers	-				
2	Open ended spanner	10, 13				
2	Ring spanner	10, 13				
1	Torque wrench, socket	5, 8, 10, 13, 5/16				
1	Torx key	T30				
1	Allen key	2, 4, 6, 8				
1	Loctite 243	-				
1	1 Loctite 270 -					
#	Tie wraps					
Remark Size: the EU key width (of the relevant tool).						

# 

Make sure that the hexagon of the spanner is attached securely to the hexagon of the fastening article. This prevents the 'rotation' of hexagons of fastening articles and spanners that may affect proper adjustment.

#### 3.2 Tools electronics

The following tools are needed for various electronic settings:

Article numbers	Description	DX2	DX	Shark	Rnet	Pilot+	VR-2	PC	Hand	Brand
1001893	Shark Programming adaptor (DK-ADAPT)			Χ					Χ	Dynamic
00355.0440	Hand Held Programmer (DX-HHP-GDW)	X	Χ	Χ					Χ	Dynamic
1009567	Programming adaptor for DX2, Shark, A-series and R-series (DWIZ-ADAPT)	X	Х	X*				X	Х	Dynamic
00355.0469	Wizard programming cable (GSM61171)	X	Х	Χ				Χ		Dynamic
1003236	Dynamic Wizard USB set (DWIZ-KIT + DWD-OEM-U)	X	Χ	Χ				Χ		Dynamic
9006857	R-net Diagnostic Test Tool (D50996)				Χ				Χ	PGDrivesTechnology
9006858	R-net Programming cable for R-net DTT (SA79174)				Х				X	PGDrivesTechnology
PR0111	Pilot+ Hand Held Programmer PP1B (D49511)					Χ	Χ		Χ	PGDrivesTechnology
9006859	VR-2 Programming cable for R-net DTT (SA79176)						Х		Х	PGDrivesTechnology
PR0200	Pilot+ PC Programmer A (D50144)					Χ	Χ	Χ		PGDrivesTechnology
PR0210	PG Pilot+ PC Programmer B (D50145)					Х	Х	Χ		PGDrivesTechnology
9003295	R-net PC Programmer OEM (D50611)				Χ			Χ		PGDrivesTechnology
9003296	R-net PC programmer Dongle OEM				Х			Χ		PGDrivesTechnology

X\* = except the Hand Help Programmer

# 3.3 Driving programs

The driving programs for Sunrise Medical products can be found on our Web IQ programming configurator website. To download driving programs:

- · Open your web browser
- Go to http://www.sunmedwebiq.com
- Enter your user name and password. Alternatively follow the instructions on the screen to request a customer login and password.
- · You will be logged on
- · Accept the website terms of use
- In the navigation pane on the left, click 'Sunrise HCM Powerchairs'
- Download the .ZIP file and find the files that correspond to your product configuration.

For more information about the use of Web IQ, in the navigation pane on the left, click 'Support Documentation' and download the Web IQ Dealer manual (OM-QDELPHI-Web IQ...).

# 4 Service instructions

# 4.1 Maintenance plan

Below, we have indicated what needs to be checked, how often this should be done and by whom.

Time	Description	To be carried out by			
Time	Description	User	Supplier		
Daily	Charging the batteries, after each use.	Х	-		
Weekly	Checking the tyre pressures.	Х	-		
Monthly	Cleaning the wheelchair.	x	-		
Monthly	Cleaning the upholstery (if necessary).	Х	-		
	Inspecting the electrical system.	-	X		
	Checking the batteries.		X		
	Inspecting the drive.	-	x		
Annually	Inspecting the mechanical parts.	-	X		
	Inspecting the bearings.	-	x		
	Inspecting the suspension.		X		
	Checking the tyres.	-	x		
	Checking all fastenings and bolts: tighten if necessary	-	x		

This document is a reference book to be used to order parts for the wheelchair model shown on the front cover.

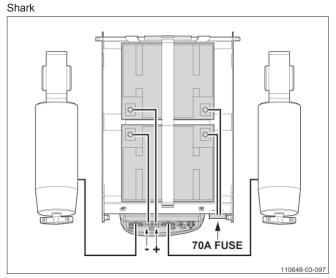
#### **Batteries**

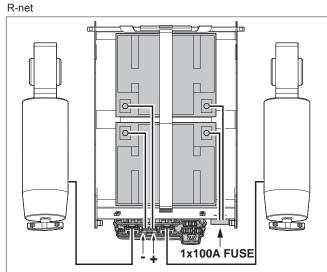
For maintenance, see the following documentation:

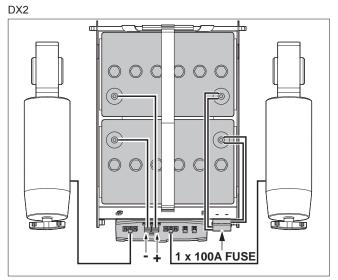
- · Battery instructions.
- · Battery charger user manual.

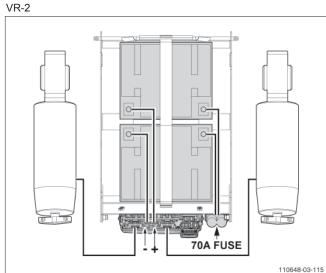
The wheelchair uses dry gel batteries. These dry batteries (dry fit) are sealed and are maintenance free. The battery wiring diagram is located on a sticker inside the battery tray.

# Shark Diagrams / R-net Diagram / DX2 Diagram / VR-2 Diagram









- Do not use the wheelchair if the batteries are almost flat. This may damage the batteries and you run the risk of an unintended standstill.
- The use of 'wet' batteries is not permitted. If the batteries have to be replaced, use only dry batteries.

#### 4.2 Cabling

When connecting the cabling:

- · Fix the cables with tie wraps to the seat to prevent entrapment of loose cables between parts.
- · Ensure that the cables are not trapped under the seat.
- · Replace cables immediately if they are damaged, because of possible risks when wires are broken or electrical breakdown.
- · Never attempt to repair any damaged cables but replace them with original cables.
- Keep the actuator adjustments in mind when routing the cables (eg tilt). There has to be enough cable length to make the electrical adjustment possible. This is why there will be an overlength of the cable in use with the 45° tilt. In case of the lift the cables needs to be fitted in the cable track.
- Never roll up or cross loop the overlength cables to prevent EMC. Better practice is to route the cables up and down and keep the open loops next to each other.
- Take minimum bending radius into account when tracking routes and securing cables. Do not take too sharp turns.
- Do not pull cables tight over sharp corners or edges of the construction since this may damage the calbes.
- Make sure the cables are not too tight and/or under tension.
- · Check all above points after each width, depth or height adjustment made to the chair.

See the cable routing overviews in paragraphs 4.3 Wiring and modules Shark, 4.4 Wiring and modules R-net, 4.5 Wiring and modules DX2, 4.6 Wiring and modules VR 2.

# 4.3 Assembly, replacement and adjustment instructions

This chapter covers illustrated assembly, replacement and adjustment instructions.

Every separate visual instruction is prefaced with:

- Preparation instructions
- · Relevant article numbers
- · Tools used
- Info (suggestions and advice to help you carry out tasks or procedures more easily)
- Notices (extra notes covering information you need when executing the specific task)

In the visual instructions illustrate the tools needed for the specific task.

#### 4.3.1 Replacing Puma 20 motors

Note that motor configurations on Puma 20 wheelchairs have changed over time and not all parts are compatible with each other. Before any service activities on Puma 20 wheelchairs please identify which motor configuration applies.

- Configurations < 2013/2014 with article numbers 9004277, 9004278, 9004279, 9004280, 9004281, 9004282, 9004283, 9004284 (the article number can be found on the ID plate). If the motor that needs replacement has one of these article numbers, replace both motors with a motor according to Chapter 4.2, drawing 7 'Suspension arm and motors Puma 20, < November 2016' (motors with higher rpm requiring lower voltage).</li>
- Configurations > 2013/2014 with article numbers as indicated in Chapter 4.2, drawings 6 'Suspension arm and motors Puma 20, > October 2016' or 7 'Suspension arm and motors Puma 20, < November 2016'.</li>

Always re-program the controller with the latest drive settings, after replacement. Drive-programs can be obtained through Sunrise Medical HCM Customer Service +31 (0)492 593 888

Following Voltage and Speed settings must be set:

DX2 Maximum motor Volts (V) = 22 Speed demand scalar = 95
 Shark Maximum motor Volts (V) = 22 Maximum forward speed (%) = 95

RNET Output Voltage (V) = 22 Maximum forward speed (%) = 95 (in last drive profile)

• VR2 Output Voltage (dV) = 220 Maximum forward speed (%) = 95

In case of problems and/or questions contact Sunrise Medical HCM Customer Service / Technical Support

# 4.3.2 Converting front wheel drive (FWD) to rear wheel drive (RWD) and vice versa, Puma 40 / 5-spoke wheels > October 2016

### Preparation

#### Step 1

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.

#### Step 2

**Note!** Lift the chair in case the wheel chair has an electrical lift.

- · Remove the legrests.
- Remove the entire seating unit (incl. electrical lift, electrical tilt or mechanical tilt) from the carrier. Two people are needed to carry out this operation.

**Note!** Keep the spacers for reuse when rebuilding the wheelchair!

#### Instructions

Note! Suitable work area required!

#### Step 3

 Change the direction of drive wheels and the mudguards Note! Use a lifting device to provide a proper working platform.

**Note!** Position the lift completely under the carrier! **Step 4** 

- Replace the anti-tip wheels and the anti-tip brackets (RWD wheels and brackets into FWD wheels and brackets).
- Change mudguard fixation (FWD to RWD and vice versa).

#### Step 5

· Remount the drive wheels.

# Step 6

· Change the position of the castor wheels.

#### Step 7

Remount the interface and seating.

#### Step 8

· Reprogram the wheel chair.

**Note!** The visual instructions show all actions only on one side. Carry out all actions also on the other side of the carrier!

#### Relevant article numbers

9005962 P2040 Anti-Tip RWD Complete Service 9005963 P2040 Anti-Tip FWD Complete Service For more information see the eletrical diagrams at § 4.3 - 4.6.

#### Tools used

- · Lifting device
- · Allen key, 6 mm
- · Open ended or ring spanners, 13 mm, 2x
- Torx key T30
- Screwdriver, medium, 5 mm
- Hammer (plastic)
- Chaser
- · Torque wrench, socket, 13 mm
- · Pair of wire-cutters
- Water pump pliers
- Tie wraps
- · Blind rivet pliers

#### **Icons**



Parts need to be replaced. Dispose of waste parts in accordance with local regulations.



Action must be carried out by two persons!

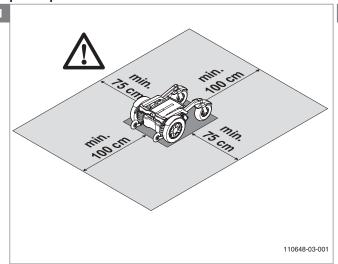


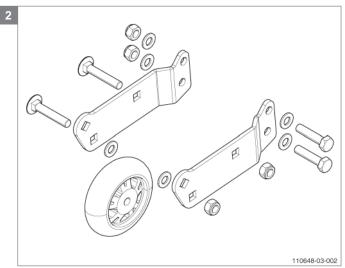
Bolts are provided with Loctite thread locker!



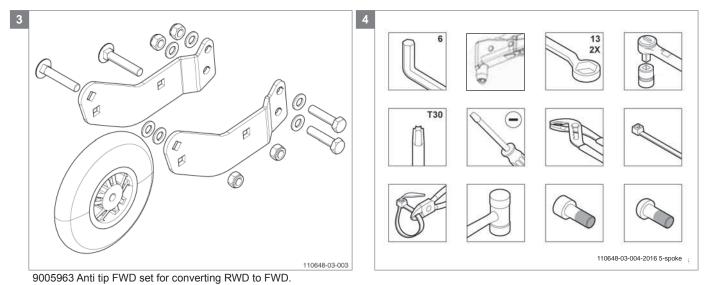
Note! Be aware of the issue9005!

Step 1 Preparation.

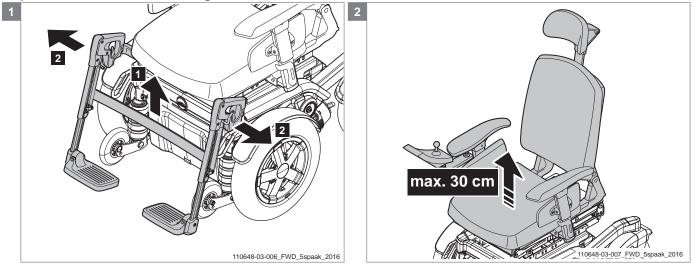


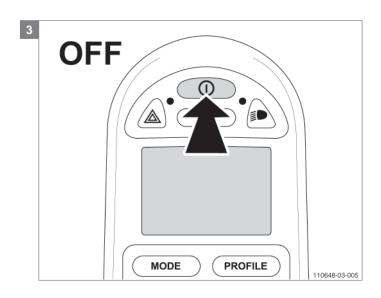


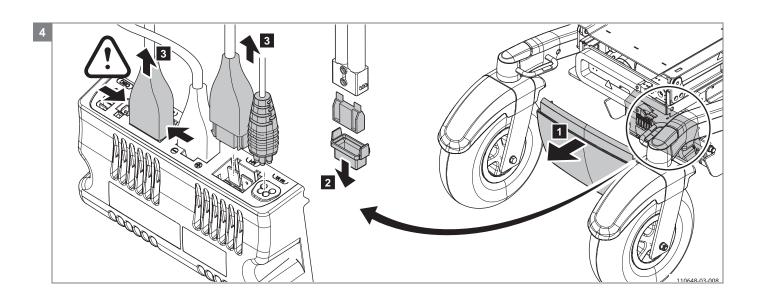
9005962 Anti tip RWD set for converting FWD to RWD.

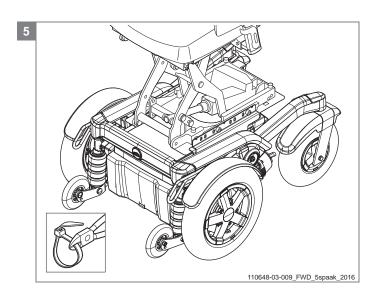


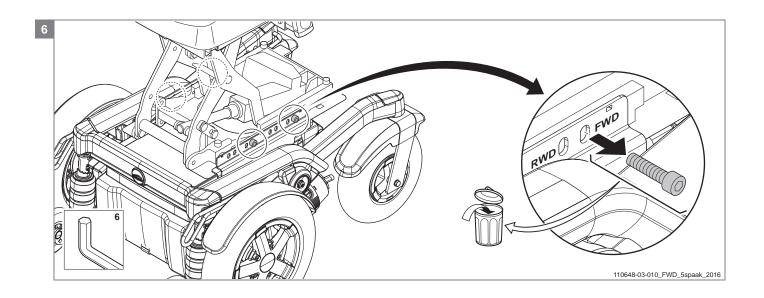


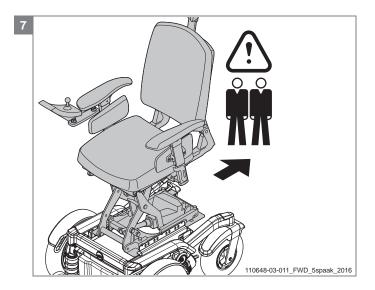




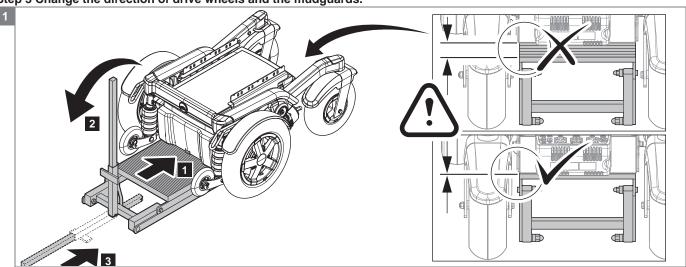




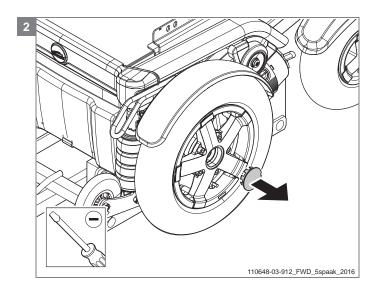


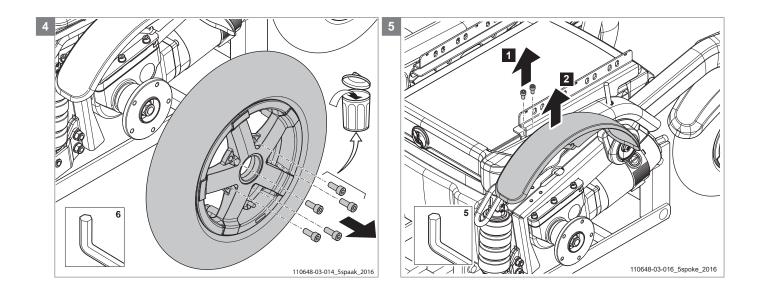


Step 3 Change the direction of drive wheels and the mudguards.

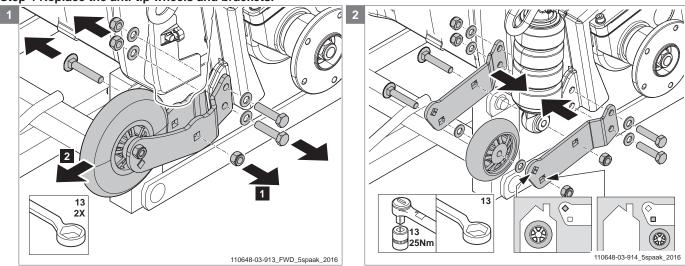


Caution! Check no cables are caught between the lift and the carrier!



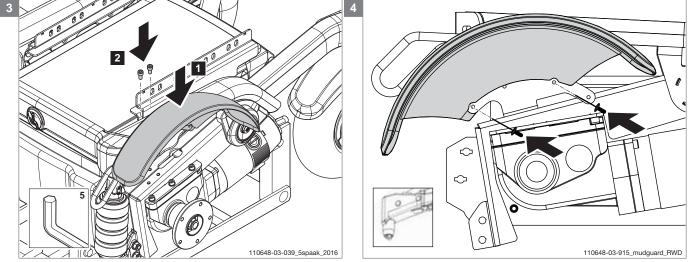


Step 4 Replace the anti-tip wheels and brackets.

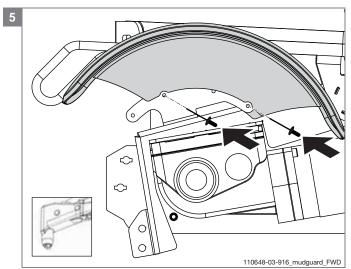


Note! Replace the anti-tip wheels and brackets! FWD into RWD!

**Note!** Use top mounting holes for Indoor anti-tip wheel! **Note!** Use bottom mounting holes for Outdoor anti-tip wheel!

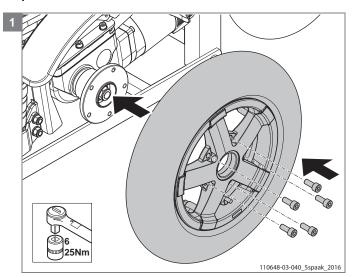


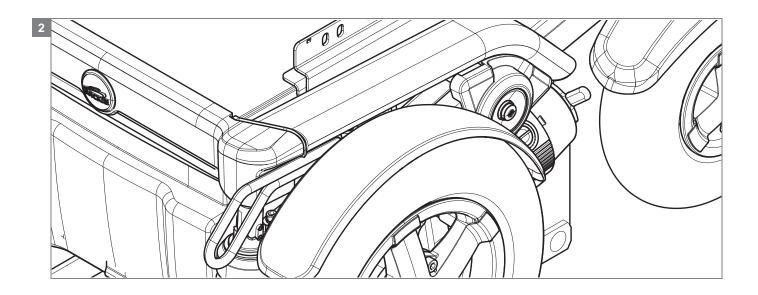
Note! Change mudguard fixation to RWD!



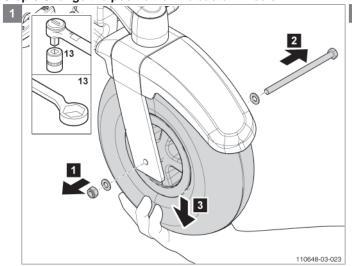
Note! Change mudguard fixation to FWD!

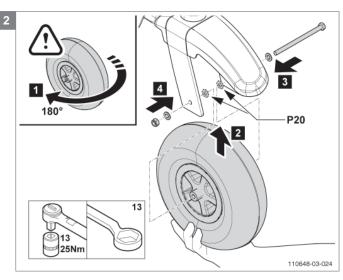
Step 5 Remount the drive wheels.

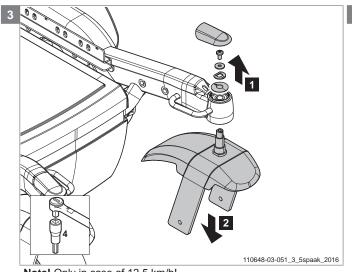


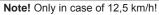


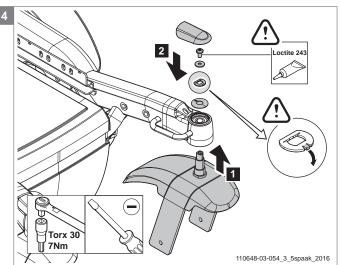
Step 6 Change the position of the castor wheels.



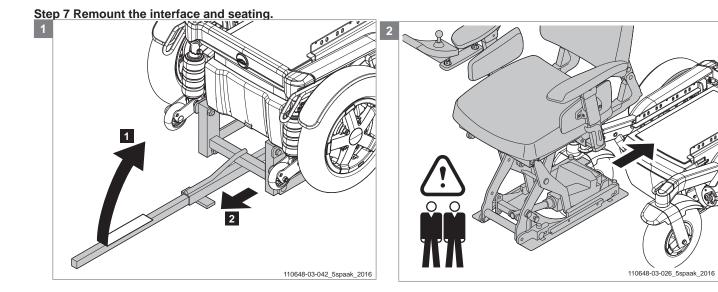


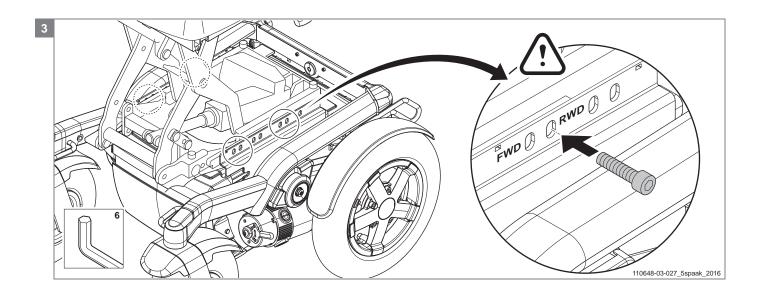


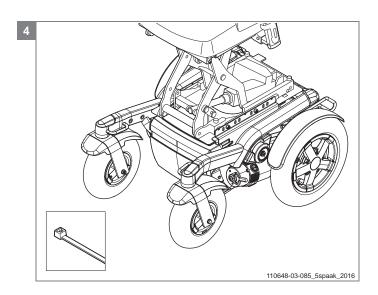


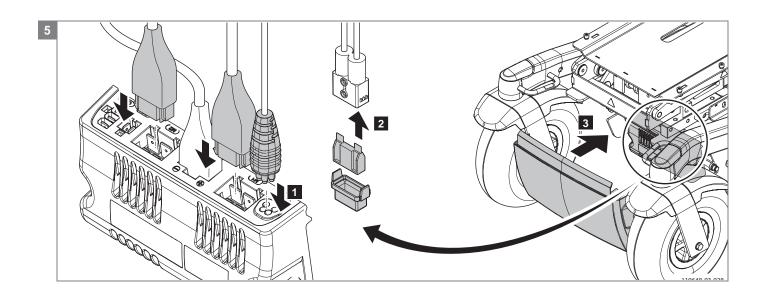


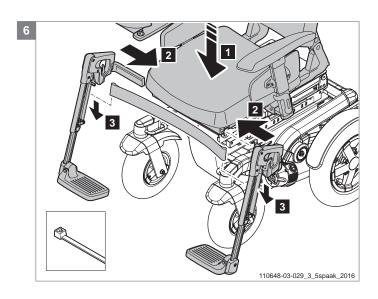
Note! Only in case of 12,5 km/h!











		FWD	RWD			
Shark	9006429	Shark bus extension cable 0.9m	9006430	Shark bus extension cable 1.2m		
Shark with Lift	9006431	Shark bus extension cable 0.64m	9006429	Shark bus extension cable 0.9m		
Shark with Lift	9006304	P2040 Shark Cable Light+Lift+Act FWD	9006305	P2040 Shark Cable Light+Lift+Act RWD		
DX2	00355.0023	DX(2) bus cable 1.0 m	055.00111.000	DX(2) bus cable 1.5 m.		
DX2 with Lift	00355.0024	DX(2) bus cable 2.0 m.	055.00121.000	DX(2) bus cable 2.5 m.		
R-net with Lift	9002482	R-net Cable 2.0m	9002484	R-net Cable 1.5m		
VR-2	9006853	VR-2 Extension Cable 1m	9006854	VR-2 Extension Cable 1,5m		
VR-2 with attendant	9002305	VR-2 Extension Cable 0.5m	9006853	VR-2 Extension Cable 1m		
VR-2 with Lift & Tilt	9006854	VR-2 Extension Cable 1,5m	9006855	VR-2 Extension Cable 2m		
/ Back	9006325	P2040 VR-2 Cable Lift+Act FWD	9006326	P2040 VR-2 Cable Lift+Act RWD		
\/D 2ith 1 iff	9006853	VR-2 Extension Cable 1m	9006854	VR-2 Extension Cable 1,5m		
VR-2 with Lift	9006328	P2040 PGDT Cable Lift 900mm	9006329	P2040 PGDT Cable Lift 1100mm		

Step 8 Reprogram the wheelchair.



**Note!** Program the correct standard RWD program to the wheelchair.

# 4.3.3 Converting front wheel drive (FWD) to rear wheel drive (RWD) and vice versa, Puma 40 / 3-spoke wheels > October 2016

#### Preparation

#### Step 1

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.

#### Step 2

**Note!** Lift the chair in case the wheelchair has an electrical lift.

- · Remove the legrests.
- Remove the entire seating unit (incl. electrical lift, electrical tilt or mechanical tilt) from the carrier. Two people are needed to carry out this operation.

#### Instructions

Note! Suitable work area required!

#### Step 3

Change the direction of drive wheels and the mudguards .
 Note! Use a lifting device to provide a proper working platform.

**Note!** Position the lift completely under the carrier! **Step 4** 

- Replace the anti-tip wheels and the anti-tip brackets (RWD wheels and brackets into FWD wheels and brackets and vice versa).
- Change mudguard fixation (FWD to RWD and vice versa).

#### Step 5

· Remount the drive wheels.

#### Step 6

· Change the position of the castor wheels.

#### Step 7

Remount the interface and seating.

#### Step 8

· Reprogram the wheel chair.

**Note!** The visual instructions show all actions only on one side. Carry out all actions also on the other side of the carrier!

#### Relevant article numbers

9005962 P2040 Anti-Tip RWD Complete Service 9005963 P2040 Anti-Tip FWD Complete Service For more information see the eletrical diagrams at § 4.3 - 4.6.

#### **Tools used**

- · Lifting device
- Allen key, 6 mm
- Open ended or ring spanners, 13 mm, 2x
- Torx key T30
- Screwdriver, medium, 5 mm
- Hammer (plastic)
- Chaser
- · Torque wrench, socket, 13 mm
- · Pair of wire-cutters
- · Water pump pliers
- · Tie wraps
- Blind rivet pliers

#### **Icons**



Parts need to be replaced. Dispose of waste parts in accordance with local regulations.



Action must be carried out by two persons!

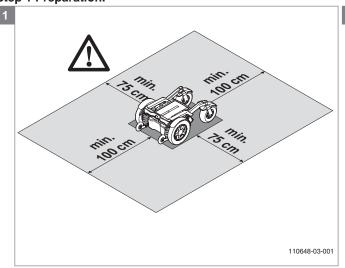


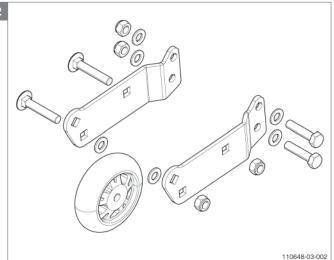
Bolts are provided with Loctite thread locker!



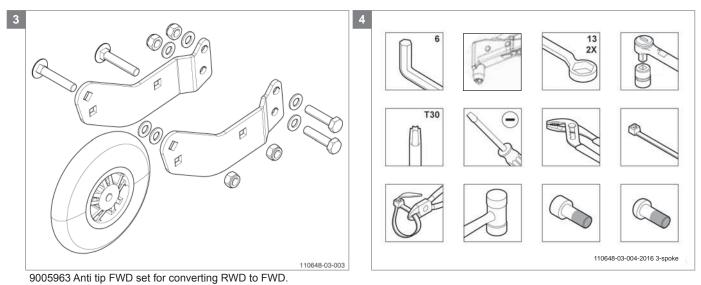
Note! Be aware of the issue!

Step 1 Preparation.

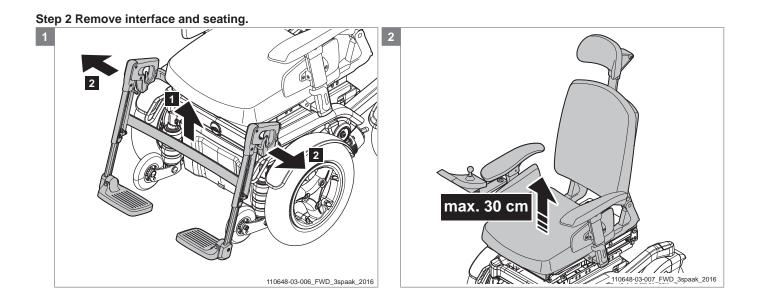


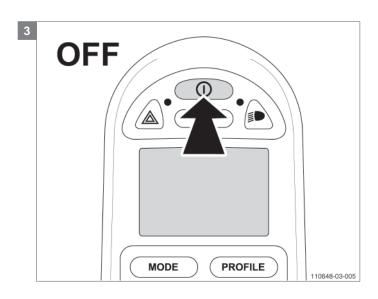


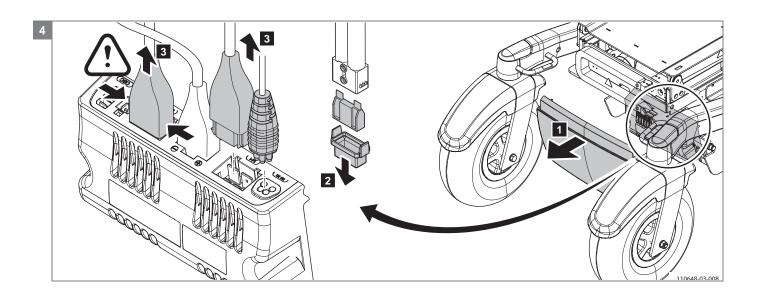
9005962 Anti tip RWD set for converting FWD to RWD.

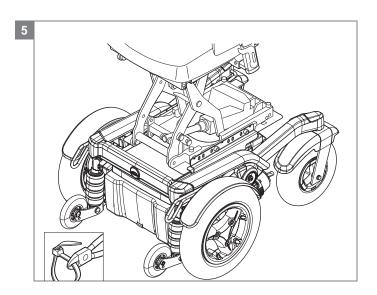


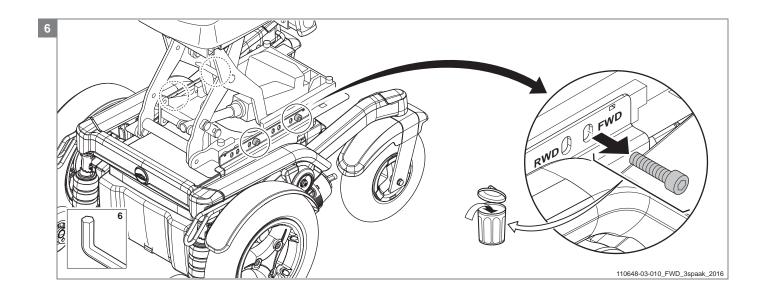
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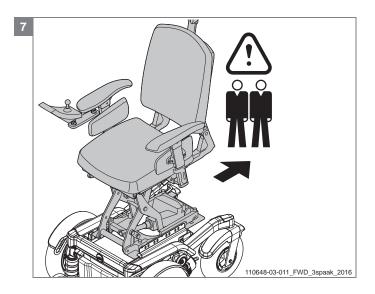




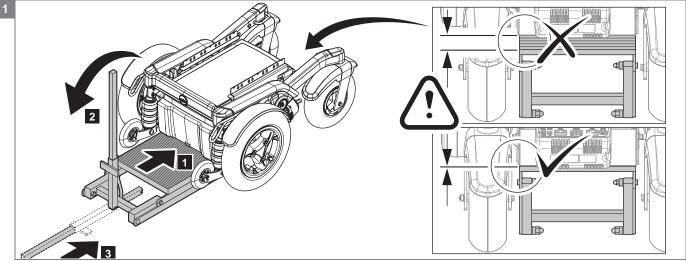




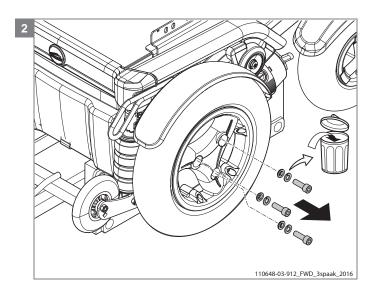


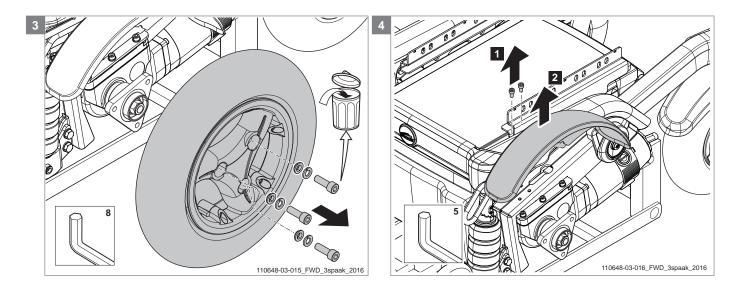


Step 3 Change the direction of drive wheels and the mudguards.

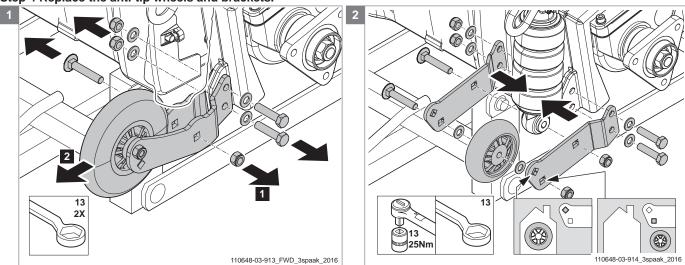


Caution! Check no cables are caught between the lift and the carrier!





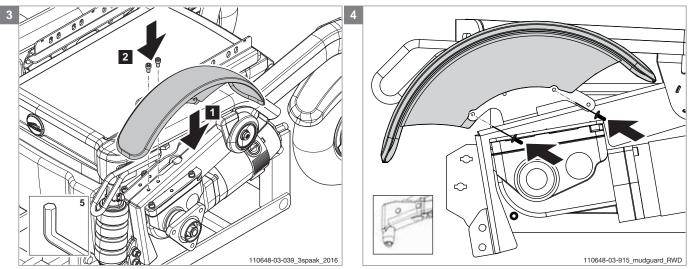
Step 4 Replace the anti-tip wheels and brackets.



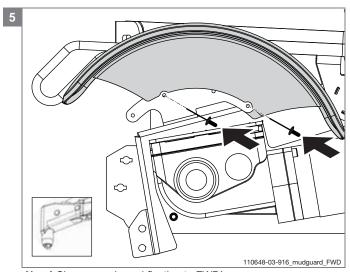
Note! Replace the anti-tip wheels and brackets! FWD into RWD!

Note! Use top mounting holes for indoor anti-tip wheel!

Note! Use bottom mounting holes for outdoor anti-tip wheel!

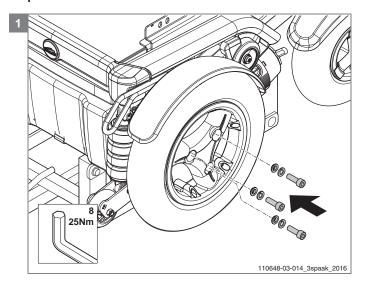


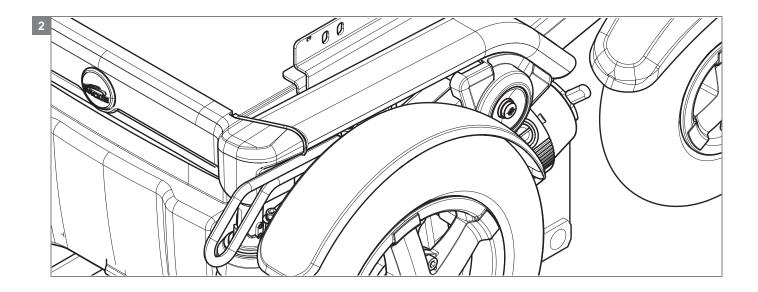
Note! Change mudguard fixation to RWD!



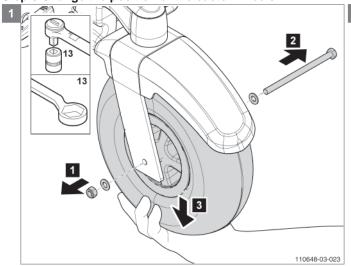
Note! Change mudguard fixation to FWD!

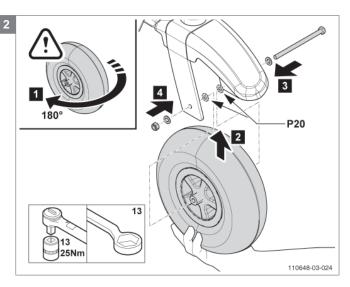
# Step 5 Remount the drive wheels.

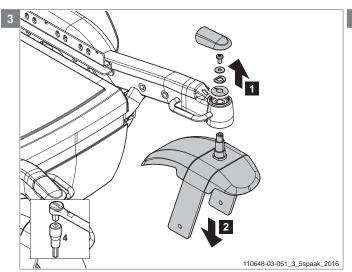


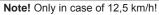


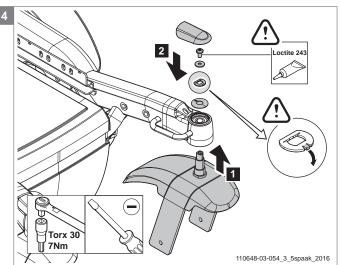
Step 6 Change the position of the castor wheels.



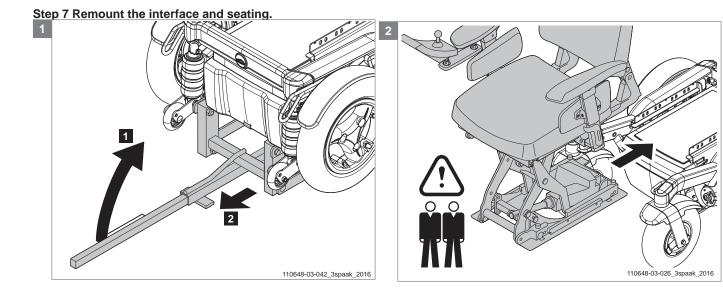


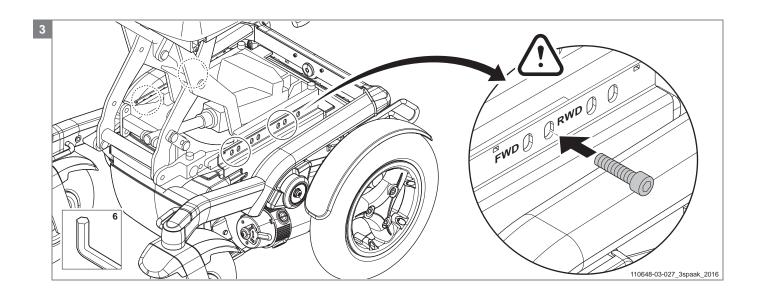


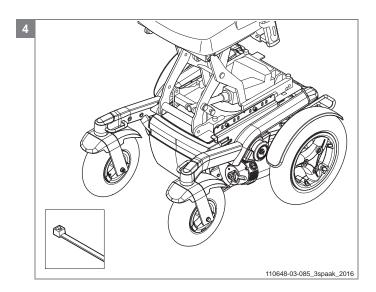


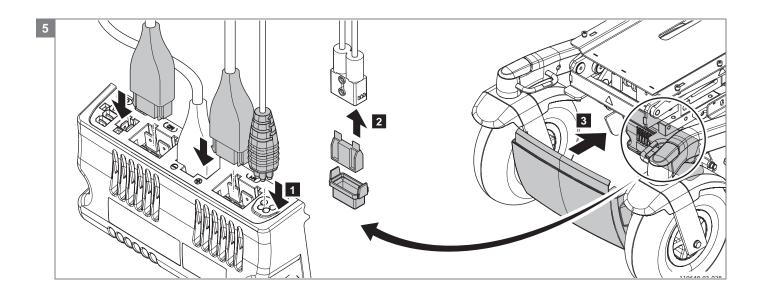


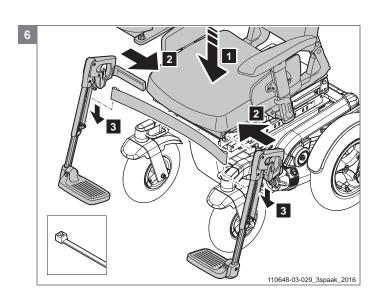
Note! Only in case of 12,5 km/h!











	FWD			RWD
Shark	9006429	Shark bus extension cable 0.9m	9006430	Shark bus extension cable 1.2m
Shark with Lift	9006431	Shark bus extension cable 0.64m	9006429	Shark bus extension cable 0.9m
Shark with Lift	9006304	P2040 Shark Cable Light+Lift+Act FWD	9006305	P2040 Shark Cable Light+Lift+Act RWD
DX2	00355.0023	DX(2) bus cable 1.0 m	055.00111.000	DX(2) bus cable 1.5 m.
DX2 with Lift	00355.0024	DX(2) bus cable 2.0 m.	055.00121.000	DX(2) bus cable 2.5 m.
R-net with Lift	9002482	R-net Cable 2.0m	9002484	R-net Cable 1.5m
VR-2	9006853	VR-2 Extension Cable 1m	9006854	VR-2 Extension Cable 1,5m
VR-2 with attendant	9002305	VR-2 Extension Cable 0.5m	9006853	VR-2 Extension Cable 1m
VR-2 with Lift & Tilt	9006854	VR-2 Extension Cable 1,5m	9006855	VR-2 Extension Cable 2m
/ Back	9006325	P2040 VR-2 Cable Lift+Act FWD	9006326	P2040 VR-2 Cable Lift+Act RWD
VR-2 with Lift	9006853	VR-2 Extension Cable 1m	9006854	VR-2 Extension Cable 1,5m
VIX-Z WILLI LIIL	9006328	P2040 PGDT Cable Lift 900mm	9006329	P2040 PGDT Cable Lift 1100mm

# Step 8 Reprogram the wheelchair.



**Note!** Program the correct standard RWD program to the wheelchair.

# 4.3.4 Converting front wheel drive (FWD) to rear wheel drive (RWD) and vice versa, Puma 20/40 < November 2016

# Preparation

#### Step 1

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.

#### Step 2

- · Remove the legrests.
- Remove the entire seating unit (incl. electrical lift, electrical tilt or mechanical tilt) from the carrier. Two people are needed to carry out this operation.

#### Instructions

Note! Suitable work area required!

#### Step 3

 Change the direction of drive wheels and the mudguards (not valid for Puma 20).

**Note!** Use a lifting device to provide a proper working platform.

**Note!** Position the lift completely under the carrier! **Step 4** 

 Replace the anti-tip wheels and the anti-tip brackets (RWD wheels and brackets into FWD wheels and brackets).

#### Step 5

· Remount the drive wheels.

#### Step 6

· Change the position of the castor wheels.

#### Step 7

· Remount the interface and seating.

#### Step 8

Reprogram the wheel chair.

**Note!** The visual instructions show all actions only on one side. Carry out all actions also on the other side of the carrier!

#### Relevant article numbers

9005962 P2040 Anti-Tip RWD Complete Service 9005963 P2040 Anti-Tip FWD Complete Service For more information see the eletrical diagrams at § 4.3 - 4.6.

#### Tools used

- · Lifting device
- · Allen key, 6 mm
- · Open ended or ring spanners, 13 mm, 2x
- Torx key T30
- · Screwdriver, medium, 5 mm
- Hammer (plastic)
- Chaser
- · Torque wrench, socket, 13 mm
- · Pair of wire-cutters
- · Water pump pliers
- · Tie wraps

#### **Icons**



Parts need to be replaced. Dispose of waste parts in accordance with local regulations.



Action must be carried out by two persons!

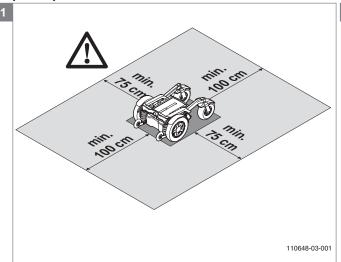


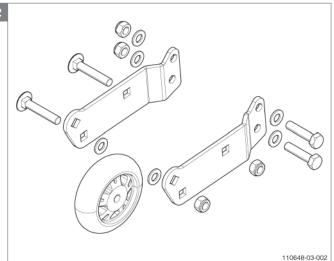
Bolts are provided with Loctite thread locker!



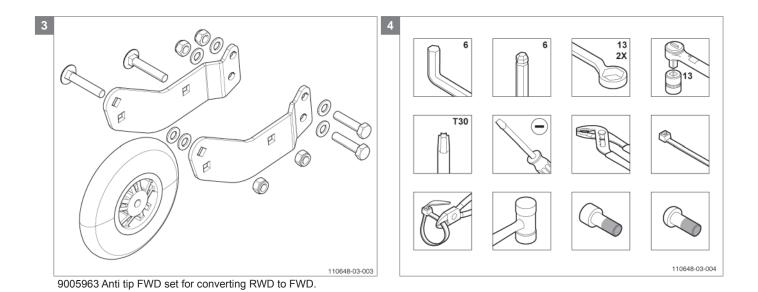
Note! Be aware of the issue!

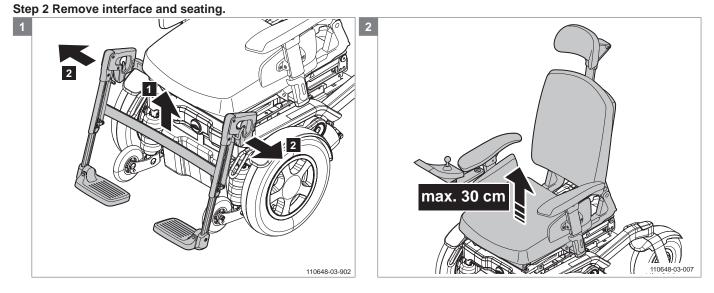
Step 1 Preparation.

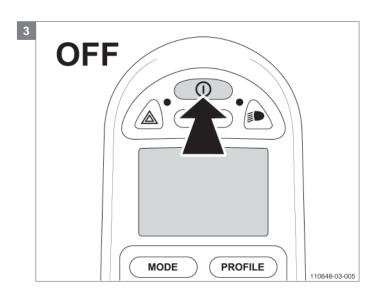


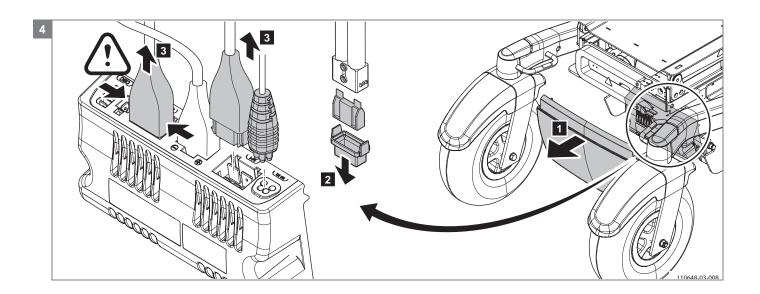


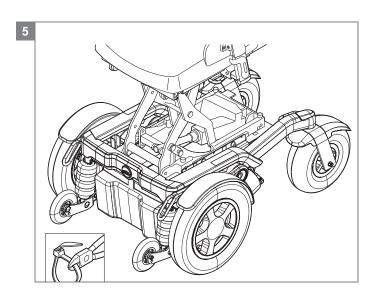
9005962 Anti tip RWD set for converting FWD to RWD.

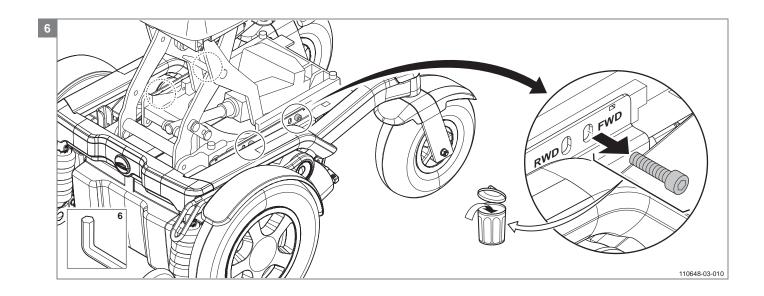


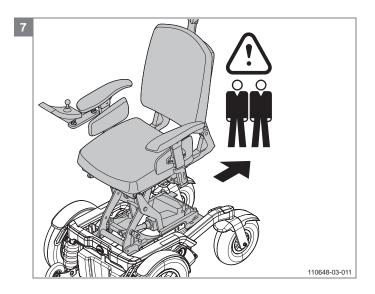




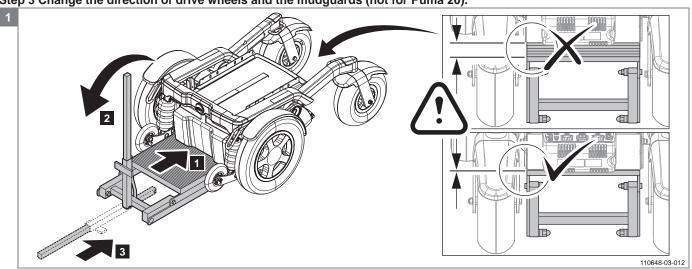




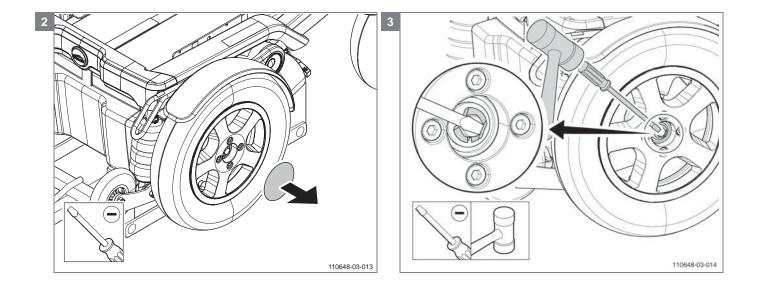


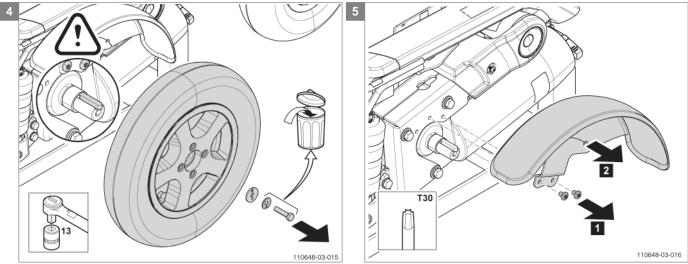


Step 3 Change the direction of drive wheels and the mudguards (not for Puma 20).



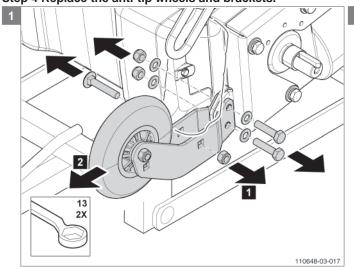
Caution! Check no cables are caught between the lift and the carrier!



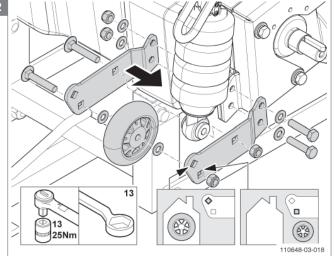


Note! Check the key is still in place!

# Step 4 Replace the anti-tip wheels and brackets.

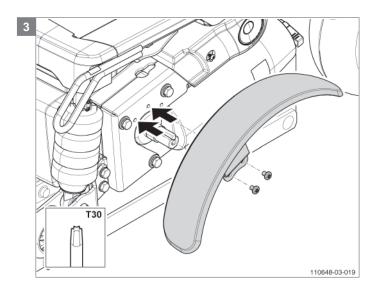


Note! Replace the anti-tip wheels and brackets! FWD into RWD!



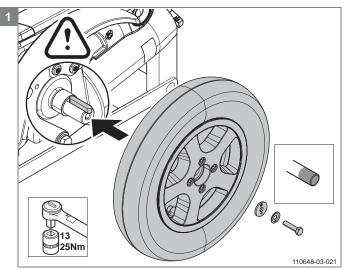
Note! Use top mounting holes for Indoor anti-tip wheel!

Note! Use bottom mounting holes for Outdoor anti-tip wheel!

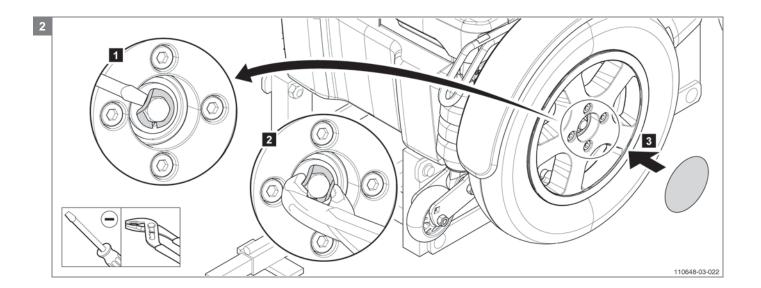


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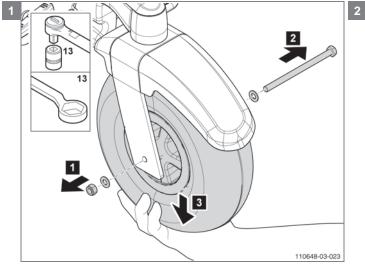
# Step 5 Remount the drive wheels.

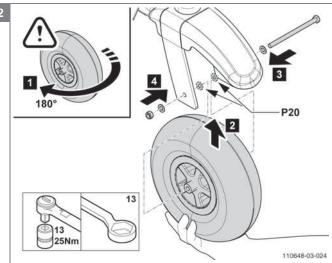


Note! Check the key is still in place!



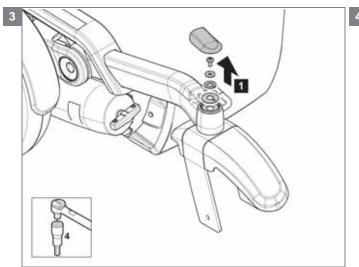
Step 6 Change the position of the castor wheels.

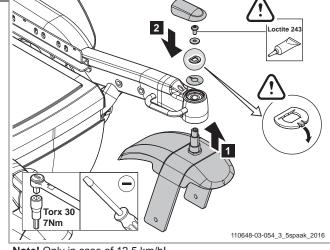




**Caution!** For Puma 20 place an extra ring between the wheel and the fork on both sides of the castor wheel!

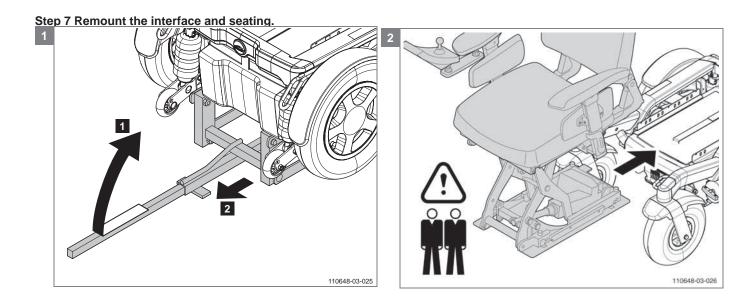
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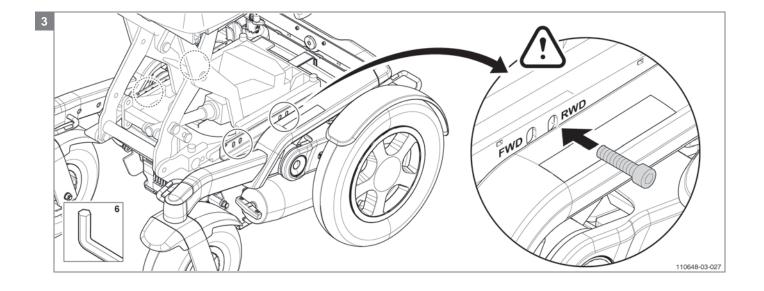




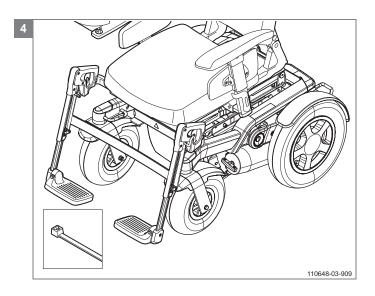
Note! Only in case of 12,5 km/h!

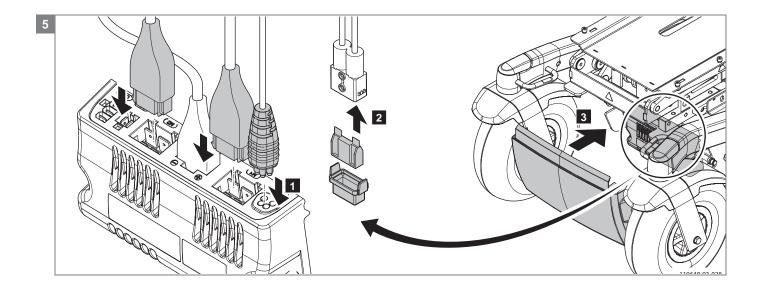
Note! Only in case of 12,5 km/h!

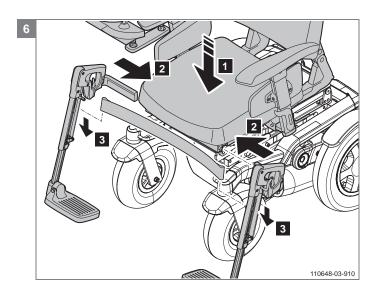




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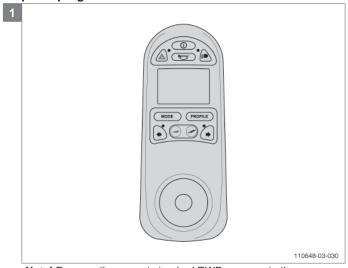




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	FWD		RWD	
Shark	9006429	Shark bus extension cable 0.9m	9006430	Shark bus extension cable 1.2m
Shark with Lift	9006431	Shark bus extension cable 0.64m	9006429	Shark bus extension cable 0.9m
	9006304	P2040 Shark Cable Light+Lift+Act FWD	9006305	P2040 Shark Cable Light+Lift+Act RWD
DX2	00355.0023	DX(2) bus cable 1.0 m	055.00111.000	DX(2) bus cable 1.5 m.
DX2 with Lift	00355.0024	DX(2) bus cable 2.0 m.	055.00121.000	DX(2) bus cable 2.5 m.
R-net with Lift	9002482	R-net Cable 2.0m	9002484	R-net Cable 1.5m
VR-2	9006853	VR-2 Extension Cable 1m	9006854	VR-2 Extension Cable 1,5m
VR-2 with attendant	9002305	VR-2 Extension Cable 0.5m	9006853	VR-2 Extension Cable 1m
VR-2 with Lift & Tilt / Back	9006854	VR-2 Extension Cable 1,5m	9006855	VR-2 Extension Cable 2m
	9006325	P2040 VR-2 Cable Lift+Act FWD	9006326	P2040 VR-2 Cable Lift+Act RWD
VR-2 with Lift	9006853	VR-2 Extension Cable 1m	9006854	VR-2 Extension Cable 1,5m
	9006328	P2040 PGDT Cable Lift 900mm	9006329	P2040 PGDT Cable Lift 1100mm

# Step 8 Reprogram the wheelchair.



**Note!** Program the correct standard RWD program to the wheelchair.

# 4.3.5 Mounting the kerb climber (RWD, all Puma-versions)

# Preparation

- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

Note! Suitable work area required!

- · Remove the legrests.
- Mount the mounting bracket of the kerb climber on the castor arms.
- Adjust the kerb climber shoe in the right position:
  - Indoor use: mounting in the lower holes
  - Outdoor use: mounting in the upper holes
- Mount the kerb climber on the mounting bracket.
- · Put back the legrests.

Note! The kerb climber can only be mounted on a RWD!

# Relevant article numbers

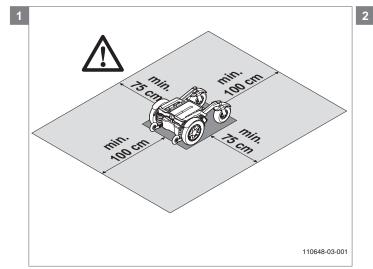
9007864 Kerb climber, adjustable Puma 20/40

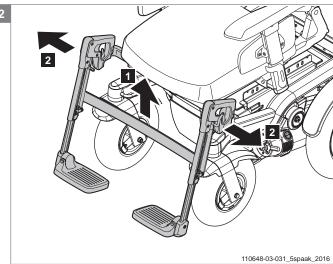
# Tools used

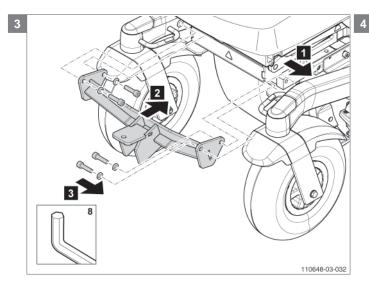
Allen key, 8 mm

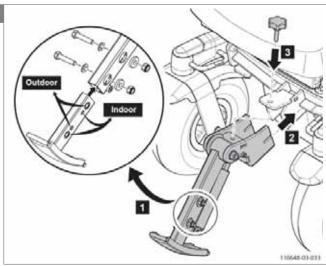
# **Icons**

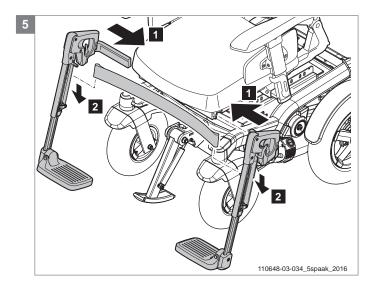
N.a.











# 4.3.6 Replacing the carbon brushes, Puma 40 / 5-spoke wheels > October 2016

# Preparation

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

#### Instructions

Note! Suitable work area required!

The following operations are required to replace the 4 carbon brushes:

- Remove the nut/washer and the locking washers of the drive wheel.
- · Remove the drive wheel from the motor axle.
- Loosen the central motor arm screw and remove the motor arm.
- · Remove the mudguards.
- Loosen the five bolts from motor arm to loosen the motor.
- Unscrew the 4 caps to get access to the carbon brushes.
- Pull the carbon brush out of the housing and remove the brush.
- Inspect the collector on the anchor of the motor; if the collector is seriously worn, replace the entire drive unit.
- Place the carbon brush in the holder; this can be done in one way only.
- Screw the new plastic screw cap onto the carbon brush holder.
- Mount the motor, mudguard, motor arm and driving wheel on the carrier.
- · Check the tyre pressures.

# Relevant article numbers

9011587 Bush Kit 4-Pole Incl Caps, version > October 2016 9011644 Nuts&Bolts Drive Wheel 5-Spoke

If complete drive units need to be replaced see spare parts list 'Suspension arm and motors' for article numbers:

# Tools used

- · Lifting device
- Screwdriver
- Hammer (plastic)
- Hexagonal torque wrench, socket, 5 mm, 6 mm, 8 mm
- Water pump pliers

#### **Icons**

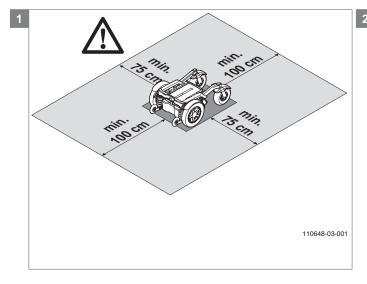


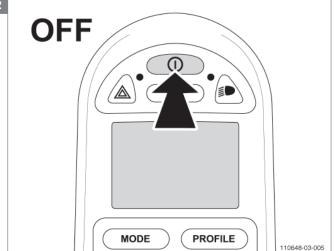
Parts need to be replaced. Dispose of waste parts in accordance with local regulations.

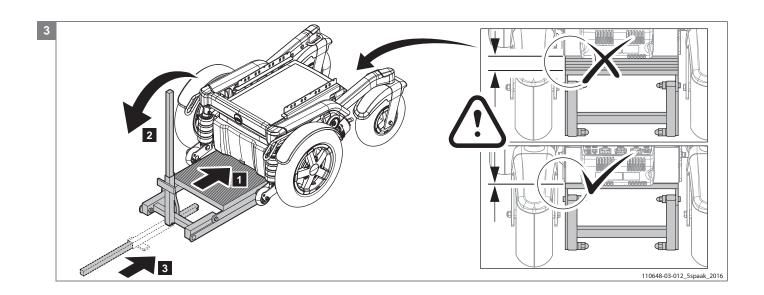


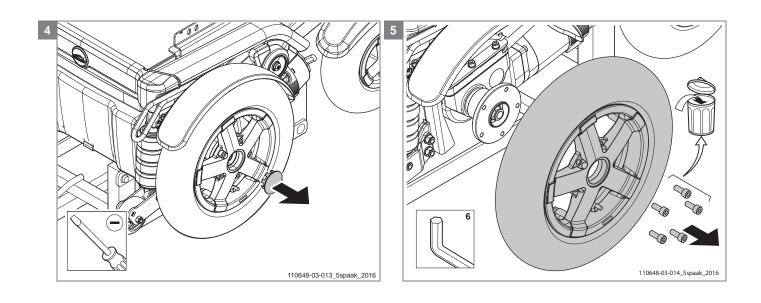
Bolts and/or nuts are provided with Loctite thread locker!

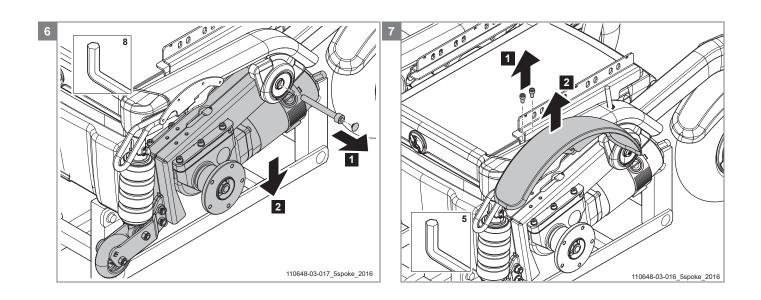


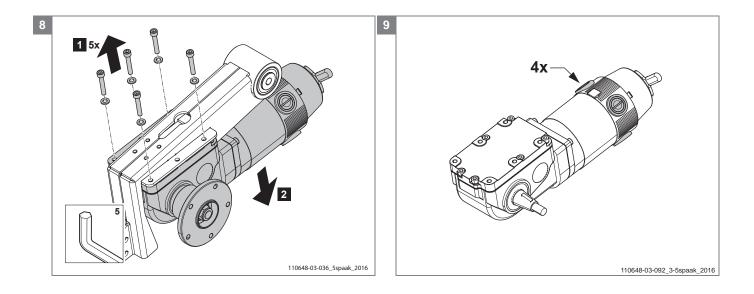


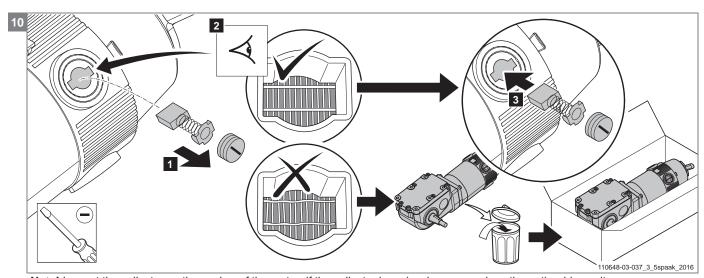




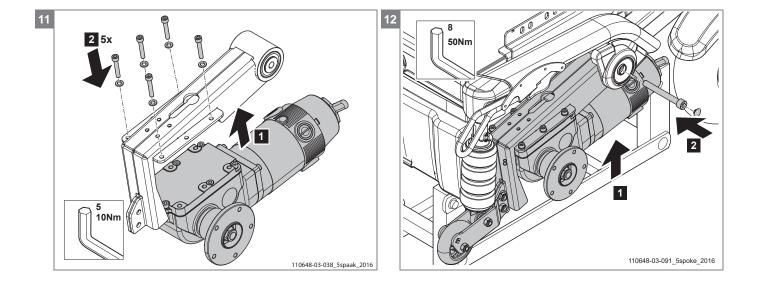


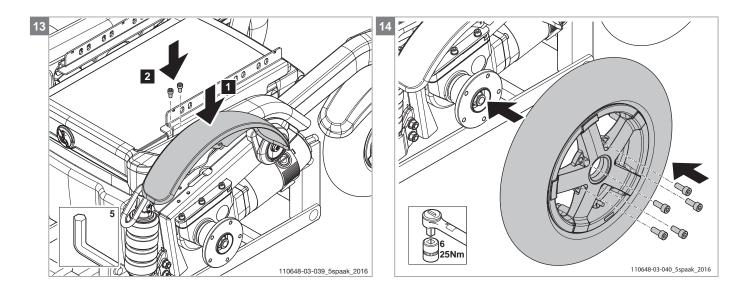


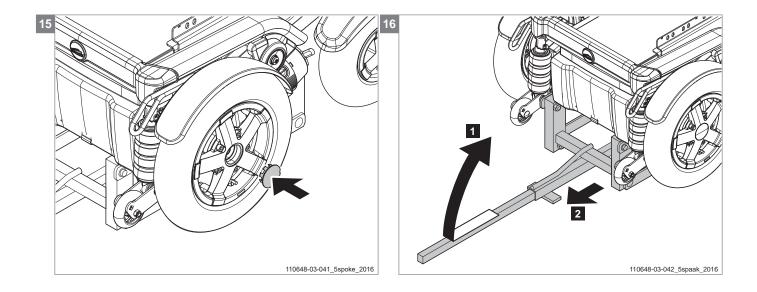




Note! Inspect the collector on the anchor of the motor; if the collector is seriously worn, replace the entire drive unit.







# 4.3.7 Replacing the carbon brushes, Puma 40 / 3-spoke wheels > October 2016

# Preparation

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

#### Instructions

Note! Suitable work area required!

The following operations are required to replace the 4 carbon brushes:

- · Remove the bolts/washers of the drive wheel.
- · Remove the drive wheel from the motor axle.
- Loosen the central motor arm screw and remove the motor arm.
- · Remove the mudguards.
- Loosen the five bolts from motor arm to loosen the motor.
- Unscrew the 4 caps to get access to the carbon brushes.
- Pull the carbon brush out of the housing and remove the brush.
- Inspect the collector on the anchor of the motor; if the collector is seriously worn, replace the entire drive unit.
- Place the carbon brush in the holder; this can be done in one way only.
- Screw the new plastic screw cap onto the carbon brush holder
- Mount the motor, mudguard, motor arm and driving wheel on the carrier.
- · Check the tyre pressures.

# Relevant article numbers

9011587 Bush Kit 4-Pole Incl Caps,

version > October 2016

9011616 Drive wheel mounting set, Puma 40 / 3-spoke wheels, version > October 2016

If complete drive units need to be replaced see spare parts list 'Suspension arm and motors' for article numbers:

# Tools used

- · Lifting device
- Screwdriver
- Hammer (plastic)
- Hexagonal torque wrench, socket, 5 mm, 5/16
- · Water pump pliers

#### **Icons**

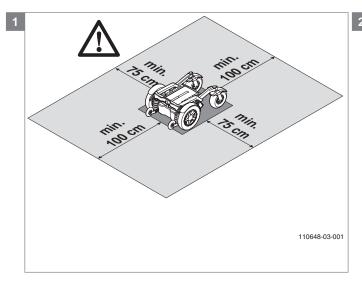


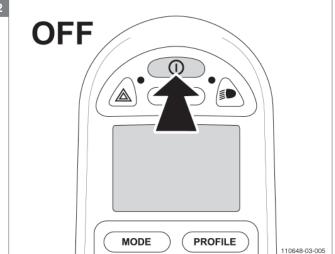
Parts need to be replaced. Dispose of waste parts in accordance with local regulations.

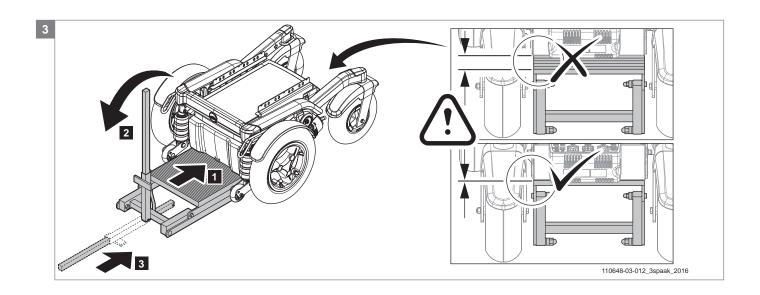


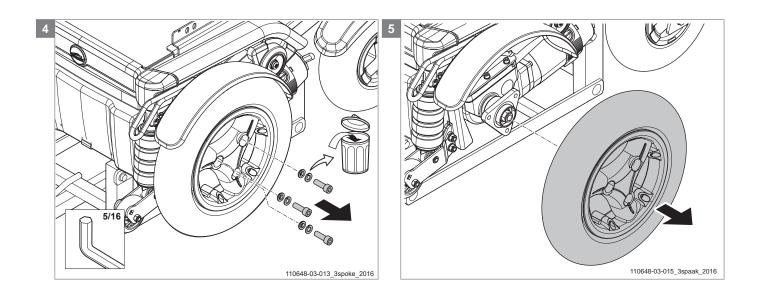
Bolts and/or nuts are provided with Loctite thread locker!

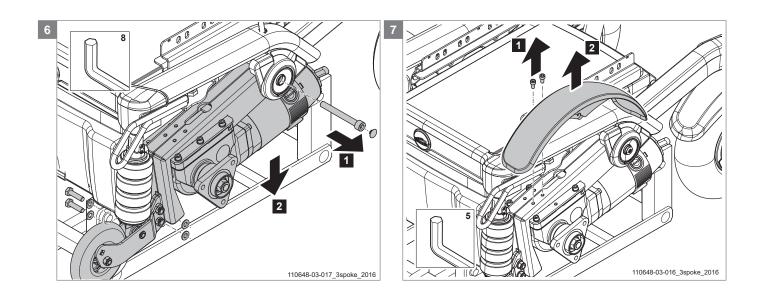


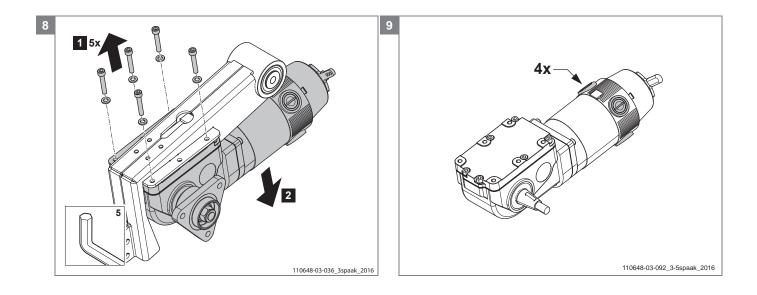


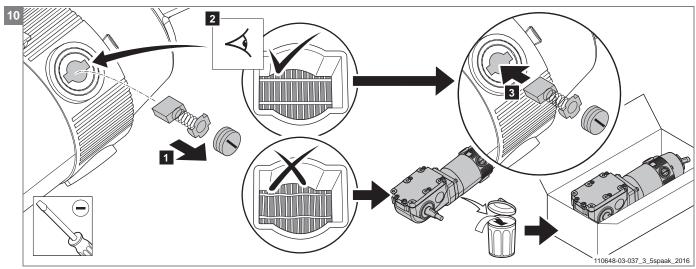




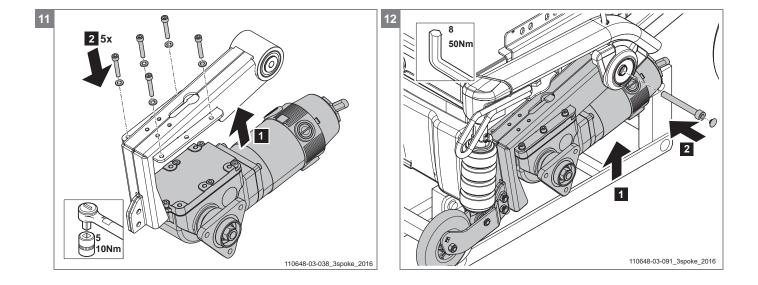


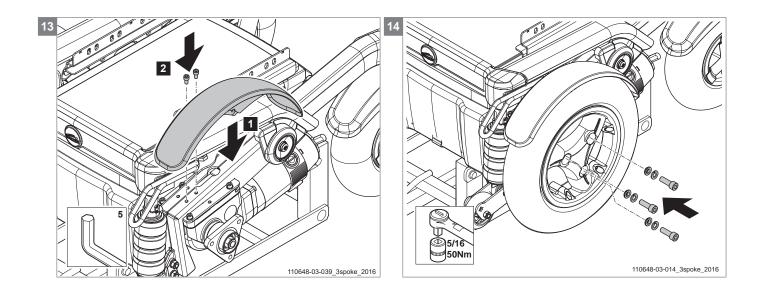


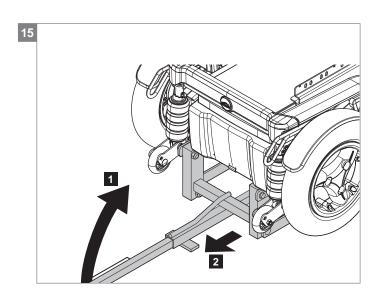




Note! Inspect the collector on the anchor of the motor; if the collector is seriously worn, replace the entire drive unit.







# 4.3.8 Replacing the carbon brushes, Puma 40 < November 2016 and Puma 20 (all versions)

# Preparation

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

#### Instructions

Note! Suitable work area required!

The following operations are required to replace the 4 or 8 carbon brushes:

- Remove the bolt/nut and the locking washers of the drive wheel.
- · Remove the drive wheel from the motor axle.
- · Remove the mudguards and the anti-tip wheels.
- Loosen the three bolts from motor arm to loosen the motor.
- Unscrew the 2 or 4 caps to get access to the carbon brushes.
- Pull the carbon brush out of the housing and remove the brush.
- Inspect the collector on the anchor of the motor; if the collector is seriously worn, replace the entire drive unit.
- Place the carbon brush in the holder; this can be done in one way only.
- Screw the new plastic screw cap onto the carbon brush holder.
- Mount the motor, mudguard, anti-tip wheel and driving wheel on the carrier.
- · Check the tyre pressures.

#### Relevant article numbers

9006360 Puma 20 Motor brush set (2x2pcs with cover)
9005107 4PHT 8 mm motor brushes service (6 and 10 km/h)
9008819 4PHT 5 mm motor brushes service (12,5 km/h)
9006008 Drive wheel mounting set, Puma 40, version <
November 2016

If complete drive units need to be replaced see spare parts list 'Suspension arm and motors' for article numbers:

#### Tools used

- · Lifting device
- Screwdriver
- Hammer (plastic)
- Open ended or ring spanner, 13 mm
- · Torque wrench, socket, 13 mm
- · Torx key, T30
- Water pump pliers

#### **Icons**

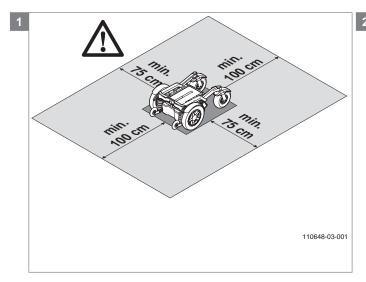


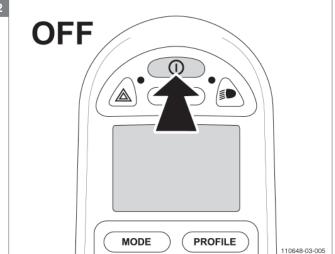
Parts need to be replaced. Dispose of waste parts in accordance with local regulations.

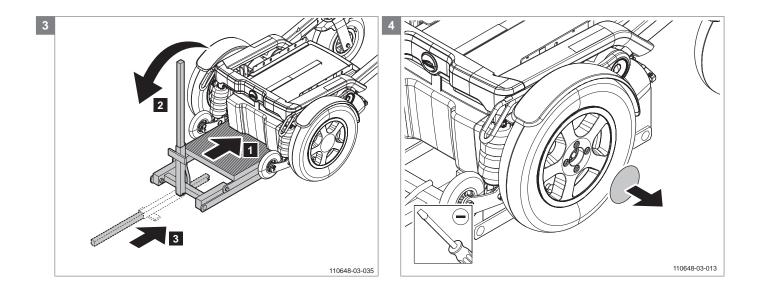


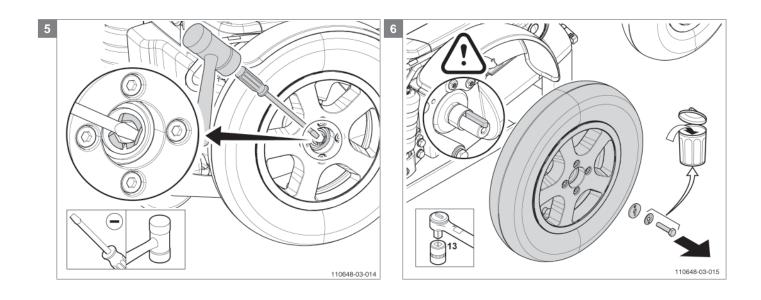
Bolts are provided with Loctite thread locker!

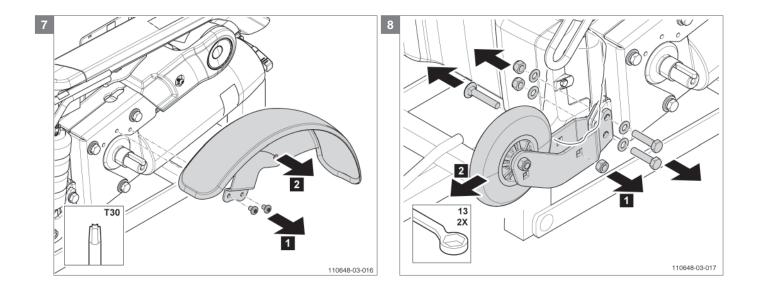


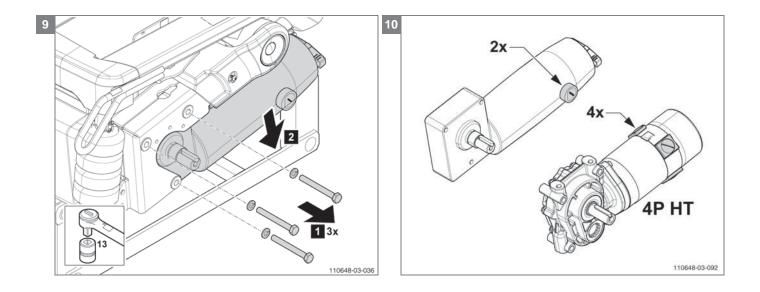


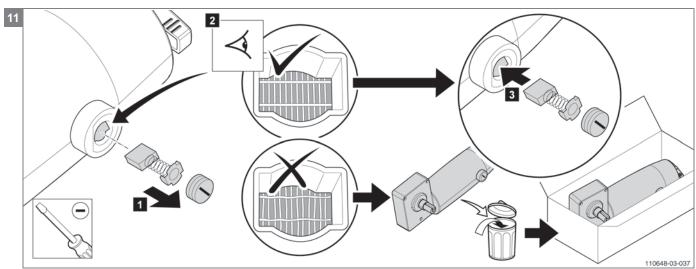




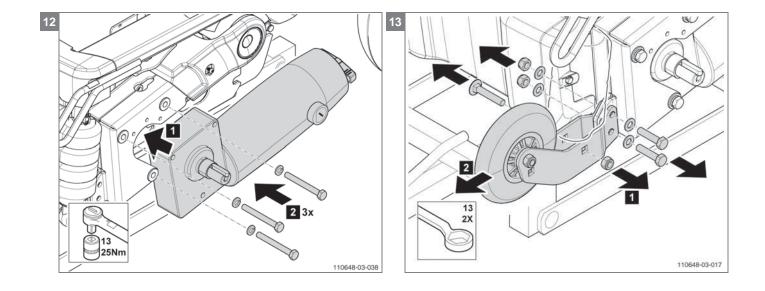


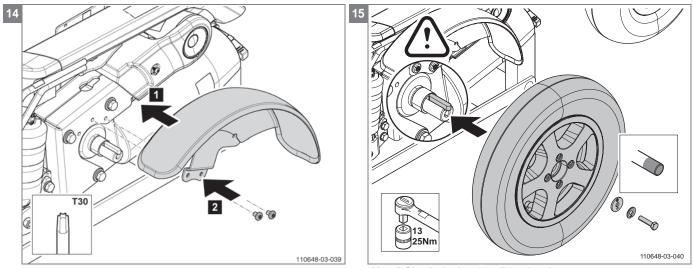




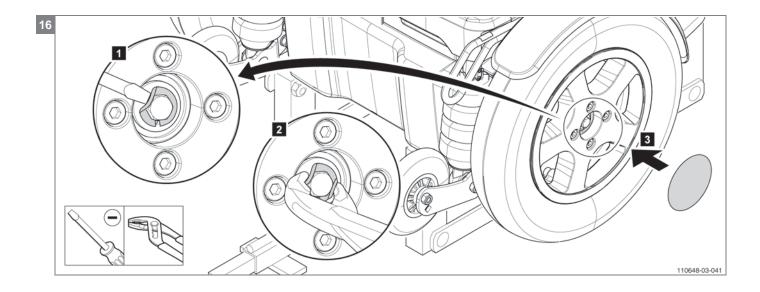


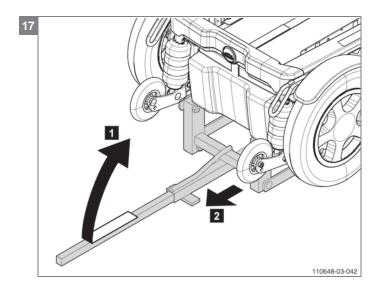
Note! Inspect the collector on the anchor of the motor; if the collector is seriously worn, replace the entire drive unit.





Note! Check the key is still in place!





# 4.3.9 Replacing the drive wheel, indoor/outdoor, Puma 40 / 5-spoke wheels > October 2016

#### **Preparation**

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode.
   If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

Note! Suitable work area required!

- Remove the cap, unlock the locking plate, remove the nut and the locking washer.
- · Replace the new drive wheel.
- Screw the nut with ring and a new locking plate into the shaft, lock the locking plate and put the cap back again.
- Check the tyre pressures.

**Note!** Inflate the tube to the correct pressure! (See 'Technical specifications')

#### Relevant article numbers

9011644 Nuts&Bolts Drive Wheel 5-Spoke

9011588 Drive wheel mounting set, Puma 40 / 5-spoke wheels, version > October 2016

9011634 Drive wheel indoor 12 1/2 x 2 1/4 (13"), air, excl hub

9011635 Drive wheel indoor 12 1/2 x 2 1/4 (13"),

punctureproof, excl hub

9011636 Drive wheel outdoor 3.00-8, grey air (14"), excl hub

9011637 Drive wheel outdoor 3.00-8, grey puncture proof (14"), excl hub

9011638 Drive wheel outdoor 3.00-8, grey air (14"), All Weather, excl hub

9011639 Drive wheel outdoor 3.00-8, black air (14"), excl hub 9011640 Drive wheel outdoor 3.00-8, black puncture proof

(14"), excl hub

9007193 Wheelcover grey

9011632 P40 hub outdoor Service, version > October 2016

9011633 P40 hub indoor Service, version > October 2016

9011644 Nuts&Bolts Drive Wheel 5-Spoke

9011589 Drive wheel indoor 12 1/2 x 2 1/4 (13"), air, version > October 2016

9011590 Wheel Set indoor 12 1/2 x 2 1/4 (13") Air, version > October 2016

9011591 Drive wheel indoor 12 1/2 x 2 1/4 (13") PU, version > October 2016

9011592 Wheel Set indoor 12 1/2 x 2 1/4 (13") PU, version > October 2016

9011593 Drive wheel outdoor 3.00-8, grey air (14"), version > October 2016

9011594 Wheel Set outdoor 3.00-8, grey air (14"), version > October 2016

9011595 Drive wheel outdoor 3.00-8 (14"), grey PU, version > October 2016

9011596 Wheel Set outdoor 3.00-8 (14"), grey PU, version > October 2016

9011597 Drive wheel outdoor 3.00-8(14")grey air Trell, version > October 2016

9011598 Drive wheel outdoor 3.00-8, black air (14"), version > October 2016

9011599 Wheel Set outdoor 3.00-8 , black air (14"), version > October 2016

9011600 Drive wheel outdoor 3.00-8 (14"), black PU, version > October 2016

9011601 Wheel Set outdoor 3.00-8 (14"), black PU, version > October 2016

#### Tools used

- · Lifting device
- · Screwdriver
- Hammer (plastic)
- · Torque wrench, socket, 8 mm
- · Water pump pliers

# Icons

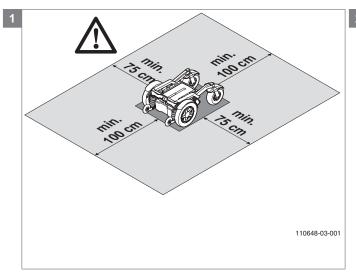


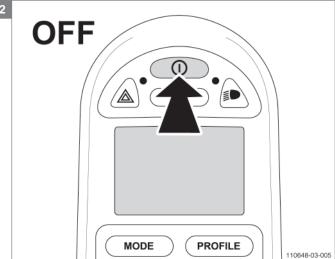
Parts need to be replaced. Dispose of waste parts in accordance with local regulations

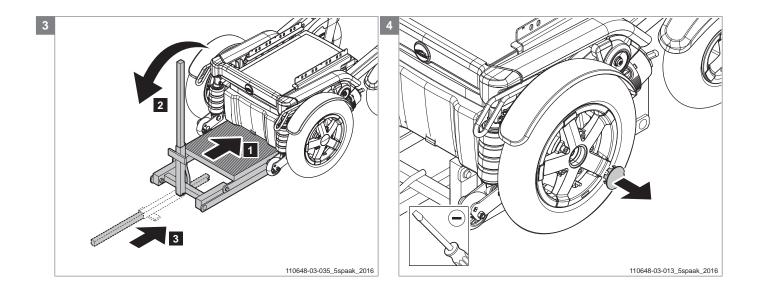


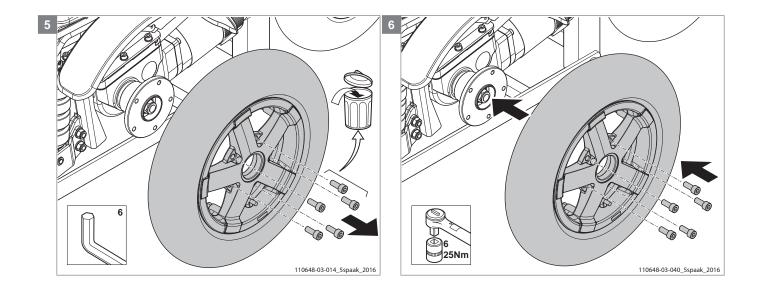
Bolts are provided with Loctite thread locker!

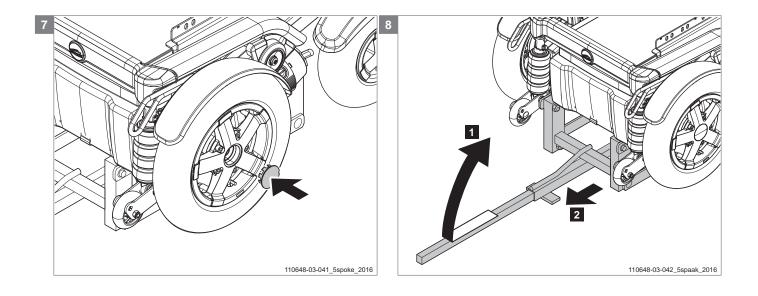












# 4.3.10 Replacing the drive wheel, indoor/outdoor Puma 40 / 3-spoke wheels > October 2016

# Preparation

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

Note! Suitable work area required!

- Remove the cap and remove the bolts and the locking washers.
- · Replace the new drive wheel.
- Screw the bolts with rings into the shaft and put the cap back again.
- · Check the tyre pressures.

**Note!** Inflate the tube to the correct pressure! (See 'Technical specifications')

# Relevant article numbers

9011621 Wheel Mount hub assy 3-Spoke Wheel Service 9011616 Drive wheel mounting set, Puma 40 / 3-spoke wheels, version > October 2016

9011617 Drive wheel outdoor 3.00-8 (14"), black / black, air 9011618 Drive wheel outdoor 3.00-8 (14"), black / black, air, set

9011619 Drive wheel outdoor 3.00-8 (14"), black / black, punctureproof

9011620 Drive wheel outdoor 3.00-8 (14"), black / black, punctureproof, set

# Tools used

- · Lifting device
- Screwdriver
- Hammer (plastic)
- Torque wrench, socket, 5/16
- · Water pump pliers

#### **Icons**

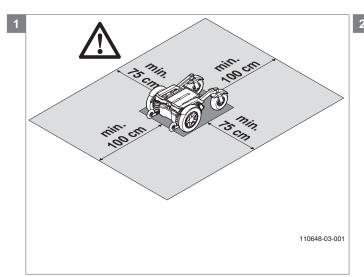


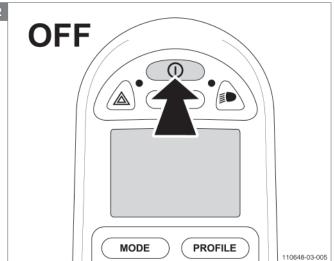
Parts need to be replaced. Dispose of waste parts in accordance with local regulations

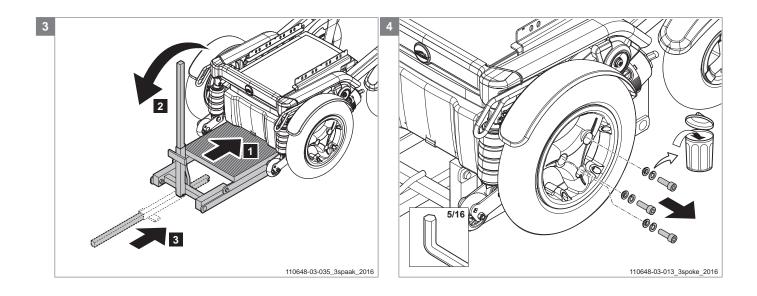


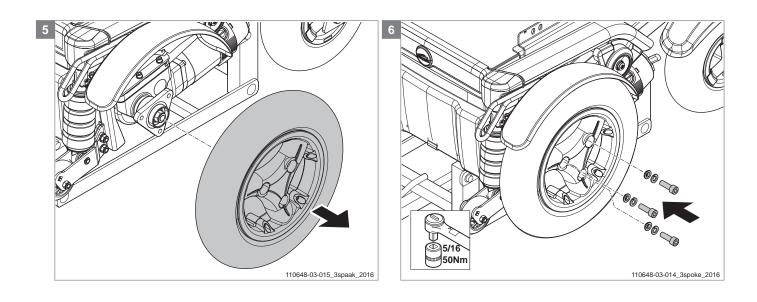
Bolts are provided with Loctite thread locker!

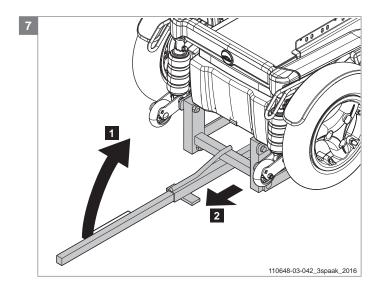












# 4.3.11 Replacing the drive wheel, indoor, Puma 40 < November 2016

# Preparation

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

Note! Suitable work area required!

- Remove the cap, unlock the locking plate, remove the bolt and the locking washer.
- · Replace the new drive wheel.
- Screw the bolt with ring and a new locking plate into the shaft, lock the locking plate and put the cap back again.
- Check the tyre pressures.

**Note!** Inflate the tube to the correct pressure! (See 'Technical specifications')

# Relevant article numbers

9011822 Drive wheel mounting set, Puma 40 1017008 Drive wheel indoor 12 1/2 x 2 1/4, grey air (13"), Puma 40

1017442 Drive wheel indoor 12 1/2 x 2 1/4, grey air (13"), Puma 40, set

1017009 Drive wheel indoor 12 1/2 x 2 1/4, grey punctureproof (13"), Puma 40

1017443 Drive wheel indoor 12 1/2 x 2 1/4, grey punctureproof (13"), Puma 40, set

# Tools used

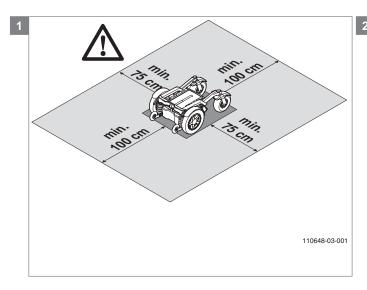
- · Lifting device
- Screwdriver
- Hammer (plastic)
- Torque wrench, socket, 13 mm
- · Water pump pliers

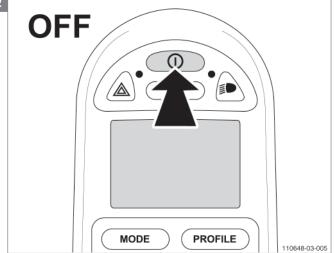
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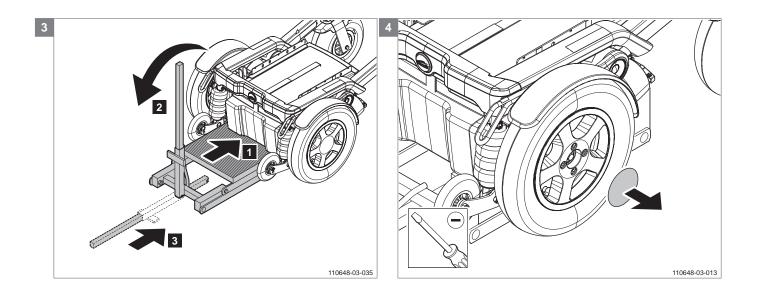


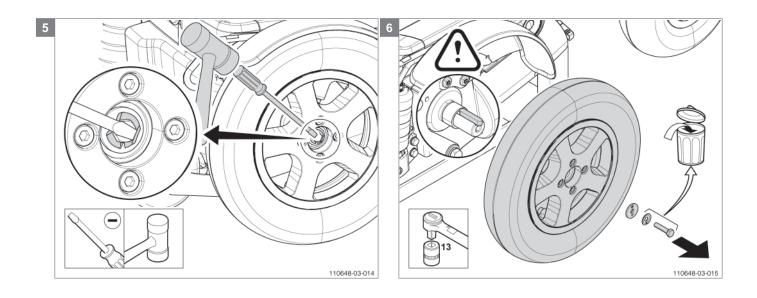
Parts need to be replaced. Dispose of waste parts in accordance with local regulations

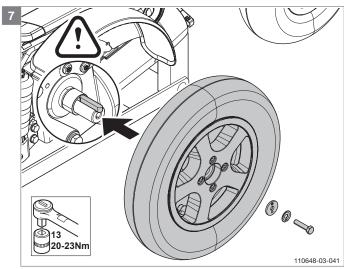




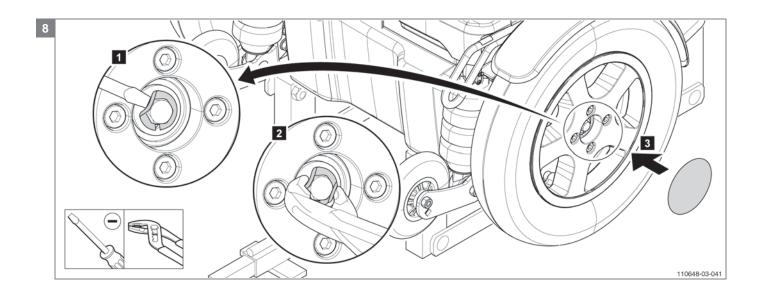


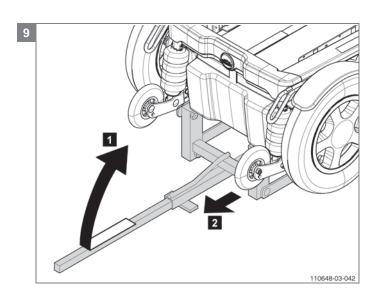






Note! Check the key is still in place!





# 4.3.12 Replacing the drive wheel, outdoor, Puma 40 < November 2016

# Preparation

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

Note! Suitable work area required!

- Remove the cap, unlock the locking plate, remove the bolt and the locking washer.
- Assemble distance ring and locator bushing. Use short bolt for keeping the locator bushing in place for further assembly. Beware that the bolt is only fixed by hand!
- Assemble long key into motor and locator bushing and use plastic hammer if needed.
- · Replace the new drive wheel \*.
- · Remove the short bolt.
- Screw the bolt with o-rings, anti-rotation ring and a new locking plate into the shaft, lock the locking plate and put the cap back again.
- · Check the tyre pressures.

#### Note!

Inflate the tube to the correct pressure! (See 'Technical specifications')

\* The drawing only shows the hub

#### Relevant article numbers

9011821 Drive wheel mounting set, Puma 40 1017010 Drive wheel outdoor 3.00-8, grey air (14"), Puma 40 1017440 Drive wheel outdoor 3.00-8, grey air (14"), Puma 40, set

1017011 Drive wheel outdoor 3.00-8, grey puncture proof (14"), Puma 40

1017441 Drive wheel outdoor 3.00-8, grey puncture proof (14"), Puma 40, set

1017046 Drive wheel outdoor 3.00-8, grey air (14"), All Weather

9010254 Drive wheel outdoor 3.00-8, grey puncture proof (14"), All Weather

1017012 Drive wheel outdoor 3.00-8, black air (14"), Puma 40

1017446 Drive wheel outdoor 3.00-8, black air (14"), Puma 40, set

1017013 Drive wheel outdoor 3.00-8, black puncture proof (14"), Puma 40

1017447 Drive wheel outdoor 3.00-8, black puncture proof (14"), Puma 40, set

# Tools used

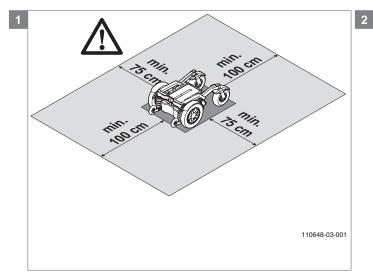
- · Lifting device
- Screwdriver
- Hammer (plastic)
- · Torque wrench, socket, 13 mm
- · Water pump pliers

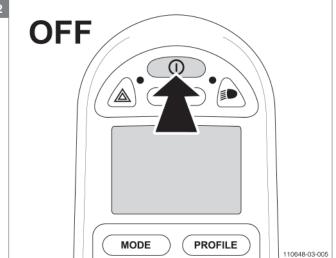
# **Icons**

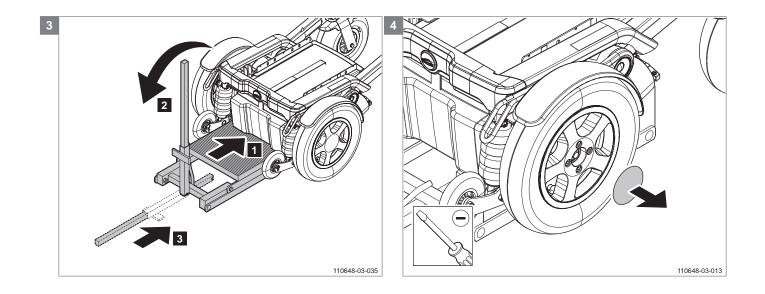


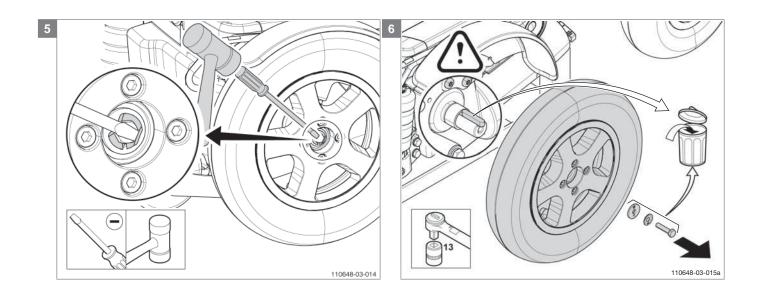
Parts need to be replaced. Dispose of waste parts in accordance with local regulations

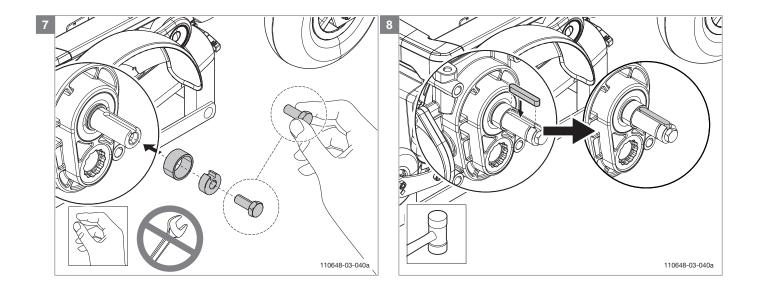


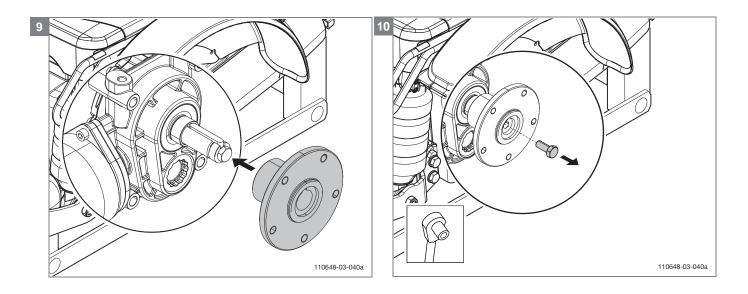


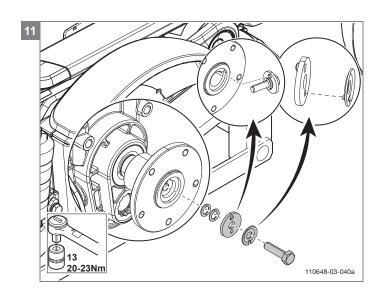


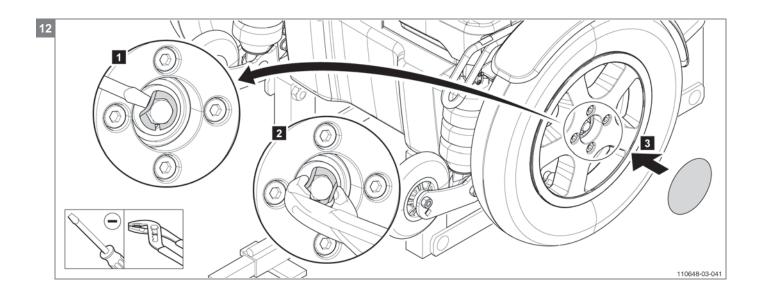


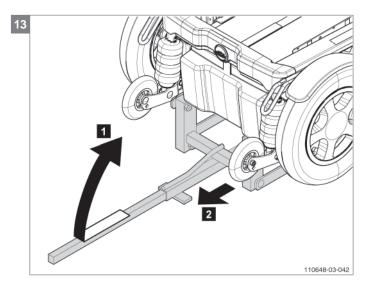












# 4.3.13 Replacing the drive wheel, indoor/outdoor, Puma 20 (all versions)

# Preparation

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

Note! Suitable work area required!

- Remove the cap and remove the bolt and the locking washer
- · Replace the new drive wheel.
- Screw the bolt with ring into the shaft, lock the locking plate and put the cap back again.
- Check the tyre pressures.

**Note!** Inflate the tube to the correct pressure! (See 'Technical specifications')

# Relevant article numbers

9006792 Drive Wheel mounting set, Puma 20

9011634 Drive wheel indoor 12 1/2 x 2 1/4 (13"), air, excl hub

9011635 Drive wheel indoor 12 1/2 x 2 1/4 (13"),

punctureproof, excl hub

9011636 Drive wheel outdoor 3.00-8, grey air (14"), excl hub 9011637 Drive wheel outdoor 3.00-8, grey puncture proof (14"), excl hub

9011638 Drive wheel outdoor 3.00-8, grey air (14"), All Weather, excl hub

9011639 Drive wheel outdoor 3.00-8 , black air (14"), excl

9011640 Drive wheel outdoor 3.00-8, black puncture proof (14"), excl hub

1017314 Drive wheel indoor 12 1/2 x 2 1/4, grey air (13"), Puma 20

1017958 Drive wheel indoor 12 1/2 x 2 1/4, grey air (13"), Puma 20, set

1017315 Drive wheel indoor 12 1/2 x 2 1/4, grey

punctureproof (13"), Puma 20

1017959 Drive wheel indoor 12 1/2 x 2 1/4, grey punctureproof (13"), Puma 20, set

1017312 Drive wheel outdoor 3.00-8, grey air (14"), Puma 20 1017956 Drive wheel outdoor 3.00-8, grey air (14"), Puma 20. set

1017313 Drive wheel outdoor 3.00-8, grey puncture proof (14"). Puma 20

1017957 Drive wheel outdoor 3.00-8, grey puncture proof (14"), Puma 20, set

#### Tools used

- · Lifting device
- Screwdriver
- Hammer (plastic)
- · Torque wrench, socket, 13 mm
- · Water pump pliers

#### Icons

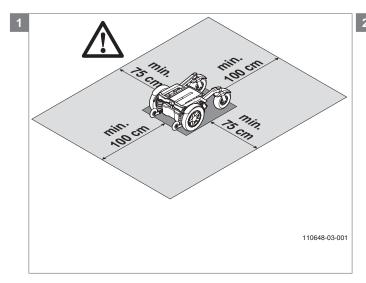


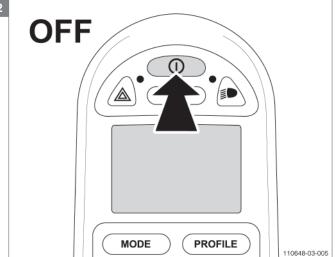
Parts need to be replaced. Dispose of waste parts in accordance with local regulations

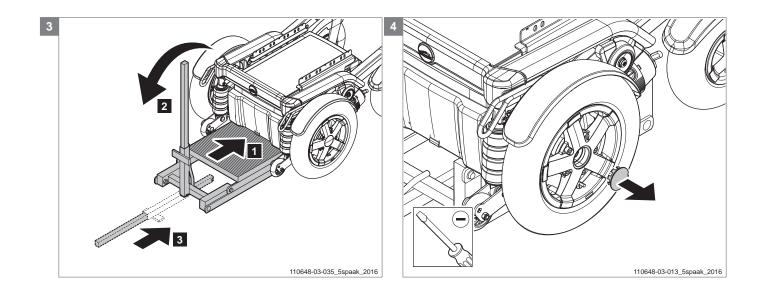


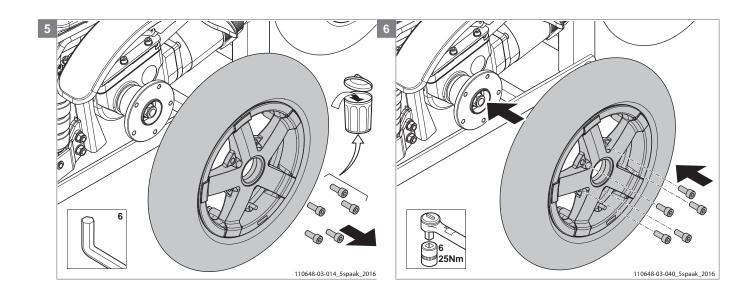
Bolts are provided with Loctite thread locker!

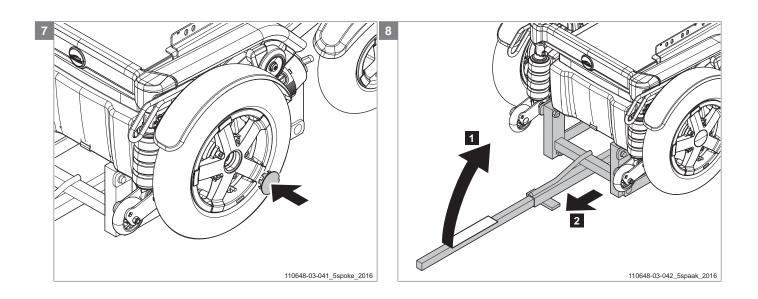












#### Replacing the tube and/or tyre of a drive wheel, Puma 40 / 5-spoke wheels > October 2016 5.3.13

- Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

#### Instructions

# Note! Suitable work area required!

- Remove the wheel from the axle. (See instruction: Replacing the drive wheel, indoor/outdoor)
- Deflate the tyre (not necessary for replacing the complete drive
- Loosen all Allen bolts and remove the front of the rim half.
- Remove the tyre and the tube, replace a new tube and/or tyre.
- Replace the tyre and tube on the rim half.
- Mount the front of the rim half.
- Replace the drive wheel on the axle.
- Inflate the tube to the correct pressure. (See: 'Technical specifications')

#### **Notice**

Inflate the tube to the correct pressure! (See 'Technical specifications')

# Relevant article numbers Puma 40 5 spokes

9011644 Nuts&Bolts Drive Wheel 5-Spoke

9011588 Drive wheel mounting set, Puma 40 / 5-spoke wheels, version > October 2016

9011634 Drive wheel indoor 12 1/2 x 2 1/4 (13"), air, excl hub

9011635 Drive wheel indoor 12 1/2 x 2 1/4 (13"), punctureproof, excl hub

9011636 Drive wheel outdoor 3.00-8, grey air (14"), excl hub

9011637 Drive wheel outdoor 3.00-8, grey puncture proof (14"), excl

9011638 Drive wheel outdoor 3.00-8, grey air (14"), All Weather,

excl hub

9011639 Drive wheel outdoor 3.00-8, black air (14"), excl hub 9011640 Drive wheel outdoor 3.00-8, black punctureproof (14"), excl hub

9007193 Wheelcover grey

9011632 P40 hub outdoor Service, version > October 2016

9011633 P40 hub indoor Service, version > October 2016

9011644 Nuts&Bolts Drive Wheel 5-Spoke

9011589 Drive wheel indoor 12 1/2 x 2 1/4 (13"), air, version > October 2016

9011590 Wheel Set indoor 12 1/2 x 2 1/4 (13") Air, version > October 2016

9011591 Drive wheel indoor 12 1/2 x 2 1/4 (13") PU, version > October 2016

Wheel Set indoor 12 1/2 x 2 1/4 (13") PU, version > 9011592 October 2016

9011593 Drive wheel outdoor 3.00-8, grey air (14"), version > October 2016

Wheel Set outdoor 3.00-8, grey air (14"), version > 9011594 October 2016

9011595 Drive wheel outdoor 3.00-8 (14"), grey PU, version > October 2016

9011596 Wheel Set outdoor 3.00-8 (14"), grey PU, version > October 2016

9011597 Drive wheel outdoor 3.00-8(14")grey air Trell, version > October 2016

9011598 Drive wheel outdoor 3.00-8, black air (14"), version > October 2016

9011599 Wheel Set outdoor 3.00-8, black air (14"), version > October 2016

9011600 Drive wheel outdoor 3.00-8 (14"), black PU, version > October 2016

9011601 Wheel Set outdoor 3.00-8 (14"), black PU, version >

October 2016

1015116 Inner tube 2.80/2.50x4 (9")

1015107 Outer tyre 2.80/2.50x4 (9") grey line profile

1015115 Inner tube 3.00-4 (10")

1015105 Outer tyre 3.00-4 (10") grey highway profile

1015106 Outer tyre 3.00-4 (10") black highway profile 1015118 Inner tube 12 1/2 x 2 1/4 (13")

1015112 Outer tyre 12 1/2 x 2 1/4 (13") grey block profile

Outer tyre 12 1/2 x 2 1/4 (13") black block profile

Inner tube 3.00-8 (14") 1015117

1015111 Outer tyre 3.00-8 (14") grey block profile 1015110 Outer tyre 3.00-8 (14") black block profile

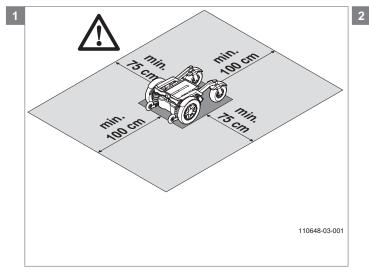
#### Tools used

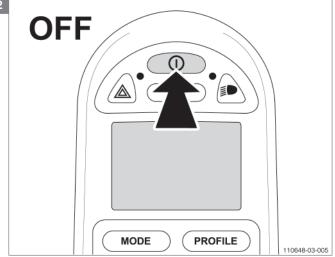
- Lifting device
- Screwdriver
- Hammer (plastic)
- Torque wrench, socket, 8 mm
- Allen key, 6 mm

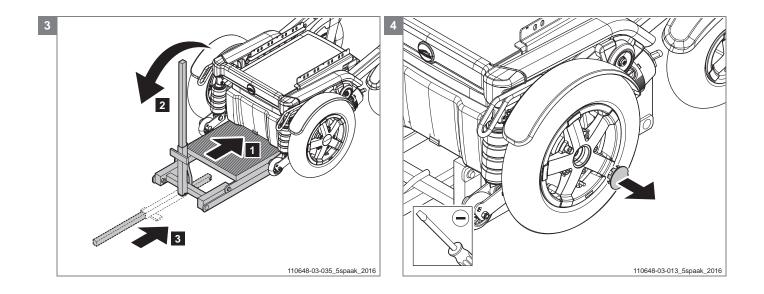
# <u>Icons</u>

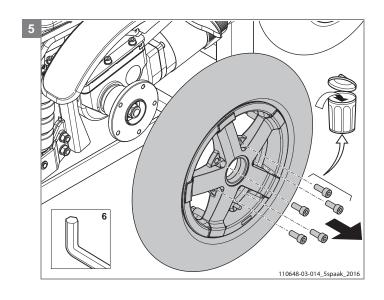
Parts need to be replaced. Dispose of waste parts in accordance with local regulations

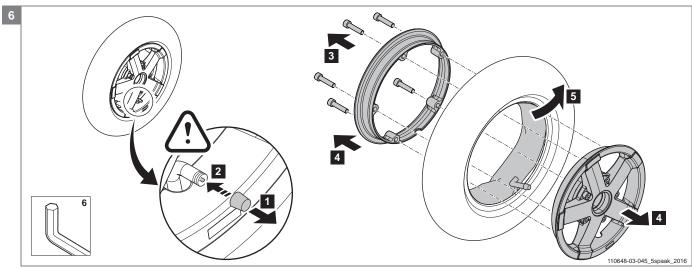




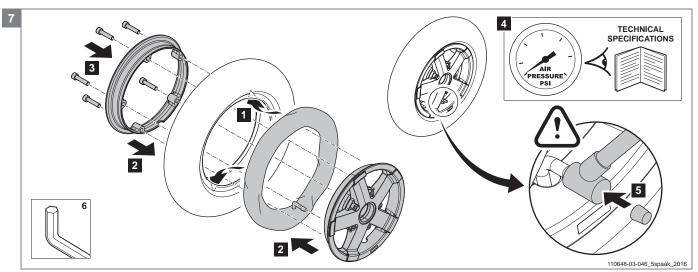




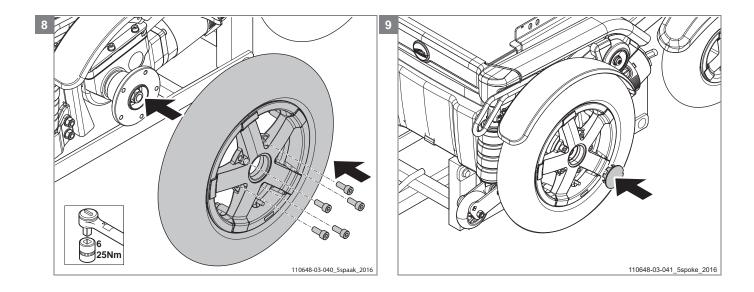


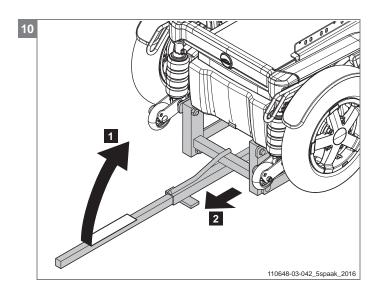


**Caution!** Deflate the tyre first, before you dismantle the wheel. Follow the steps as shown!



**Caution!** Ensure tube and tyre are properly positioned on the rim! **Caution!** Make sure the tube is not jammed between the two rim halves!





# 5.3.14 Replacing the tube and/or tyre of a drive wheel, Puma 40 / 3-spoke wheels > October 2016

#### **Preparation**

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

Note! Suitable work area required!

- Remove the wheel from the axle. (See instruction: Replacing the drive wheel, indoor/outdoor)
- Deflate the tyre (not necessary for replacing the complete drive wheel!).
- Loosen all Allen bolts and remove the front of the rim half.
- Remove the tyre and the tube, replace a new tube and/ or tyre.
- · Replace the tyre and tube on the rim half.
- · Mount the front of the rim half.
- · Replace the drive wheel on the axle.
- Inflate the tube to the correct pressure. (See: 'Technical specifications')

#### **Notice**

Inflate the tube to the correct pressure! (See 'Technical specifications')

# Relevant article numbers Puma 40 3-spoke wheels

9011621 Wheel Mount Hub assy 3-Spoke Wheel Service 9011616 Drive wheel mounting set, Puma 40 / 3-spoke wheels, version > October 2016

9011617 Drive wheel outdoor 3.00-8 (14"), black / black, air 9011618 Drive wheel outdoor 3.00-8 (14"), black / black, air, set

9011619 Drive wheel outdoor 3.00-8 (14"), black / black, punctureproof

9011620 Drive wheel outdoor 3.00-8 (14"), black / black, punctureproof, set

1015115 Inner tube 3.00-4 (10")

1015106 Outer tyre 3.00-4 (10") black highway profile

1015117 Inner tube 3.00-8 (14")

1015110 Outer tyre 3.00-8 (14") black block profile

# Tools used

- · Lifting device
- Screwdriver
- Hammer (plastic)
- Torque wrench, socket, 5/16
- · Allen key, 6 mm

# **Icons**

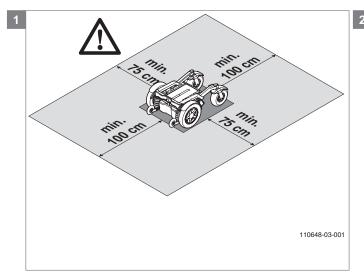


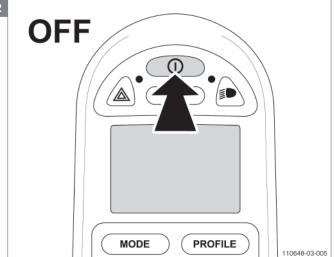
Parts need to be replaced. Dispose of waste parts in accordance with local regulations

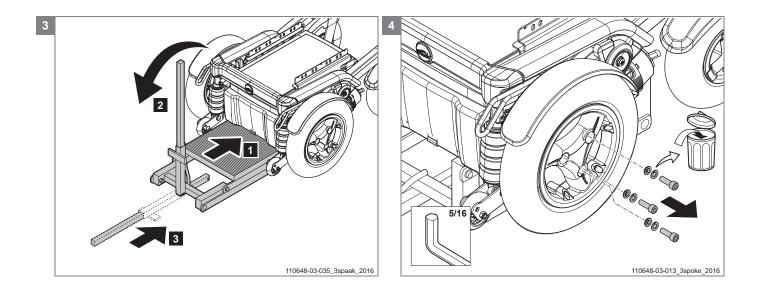


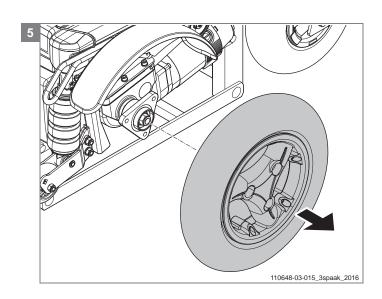
Bolts are provided with Loctite thread locker!

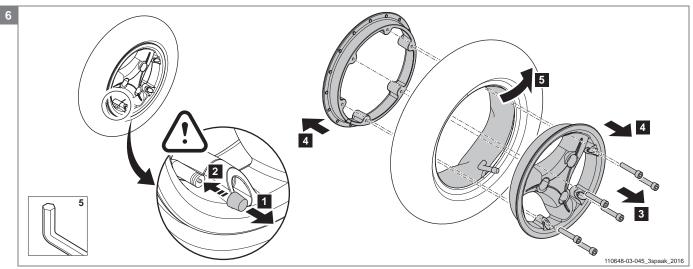




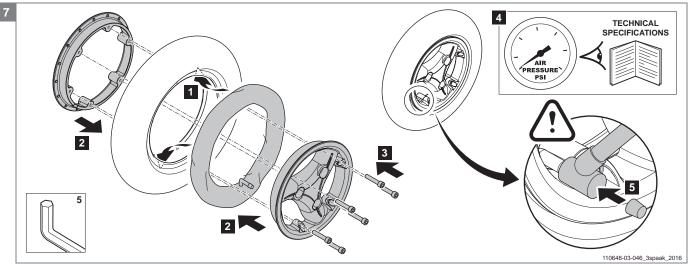




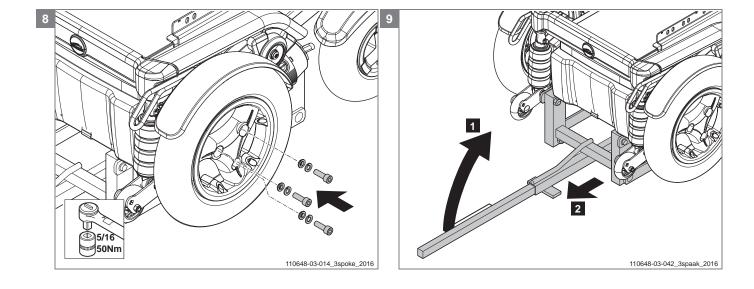




**Caution!** Deflate the tyre first, before you dismantle the wheel. Follow the steps as shown!



**Caution!** Ensure tube and tyre are properly positioned on the rim! **Caution!** Make sure the tube is not jammed between the two rim halves!



# 5.3.15 Replacing the tube and/or tyre of a drive wheel, Puma 20/40 < November 2016

#### **Preparation**

- · Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in 'drive' mode. If the freewheel switch is in 'push' mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

### Instructions

Note! Suitable work area required!

- Remove the wheel from the axle. (See instruction: Replacing the drive wheel, indoor/outdoor)
- Deflate the tyre (not necessary for replacing the complete drive wheel!).
- · Loosen all Allen bolts and remove the front of the rim half.
- Remove the tyre and the tube, replace a new tube and/ or tyre.
- · Replace the tyre and tube on the rim half.
- · Mount the front of the rim half.
- · Replace the drive wheel on the axle.
- Inflate the tube to the correct pressure. (See: 'Technical specifications')

#### **Notice**

Inflate the tube to the correct pressure! (See 'Technical specifications')

# Relevant article numbers

#### Puma 20/40

9006792 Drive wheel mounting set, Puma 20 9006008 Drive wheel mounting set, Puma 40

1015118 Inner tube 12 1/2 x 2 1/4 (13")

1015112 Outer tyre 12 1/2 x 2 1/4 (13") grey block profile

1015117 Inner tube 3.00x8 (14")

1015111 Outer tyre 3.00x8 (14") grey block profile

#### Puma 40

1015113 Outer tyre 12 1/2 x 2 1/4 (13") black block profile 1015110 Outer tyre 3.00x8 (14") black block profile

### Tools used

- · Lifting device
- Screwdriver
- Hammer (plastic)
- · Torque wrench, socket, 13 mm
- · Allen key, 6 mm

#### **Icons**



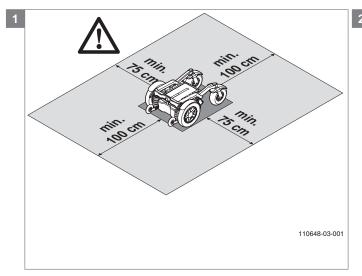
Parts need to be replaced. Dispose of waste parts in accordance with local regulations

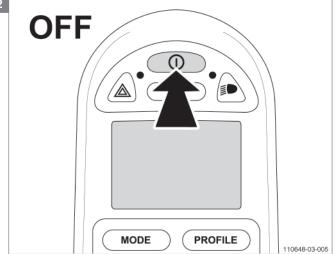


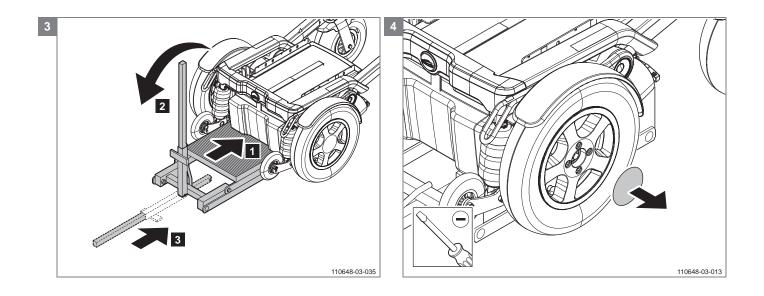
Bolts are provided with Loctite thread locker!

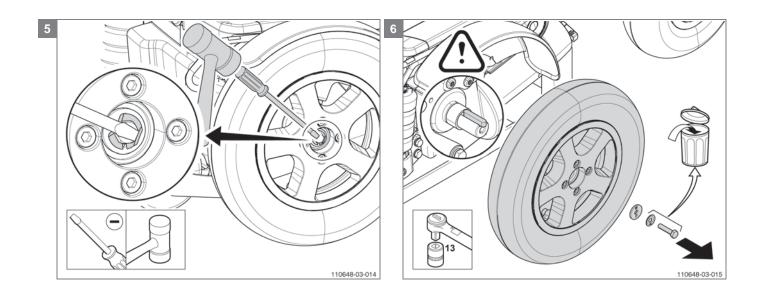


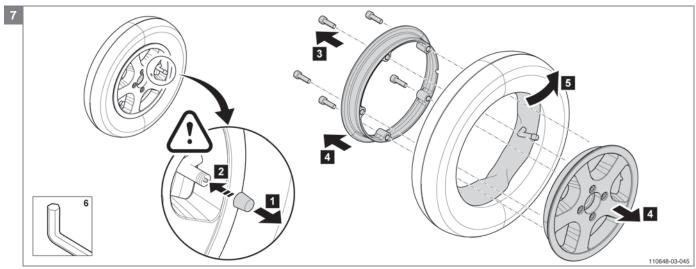
Note! Be aware of the issue!



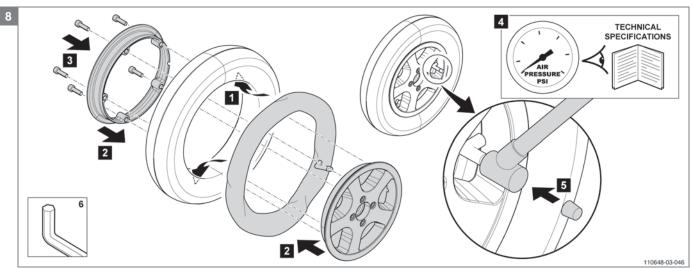




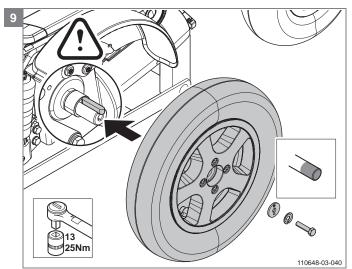




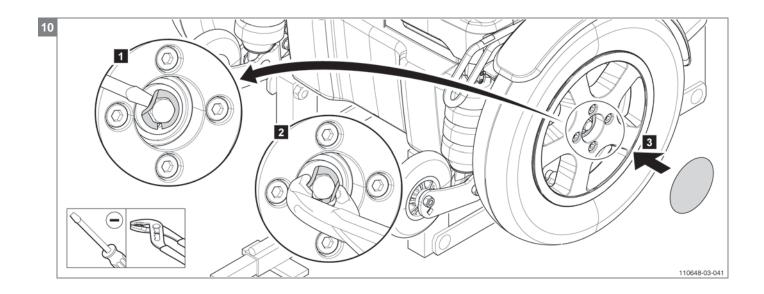
**Caution!** Deflate the tyre first, before you dismantle the wheel. Follow the steps as shown!

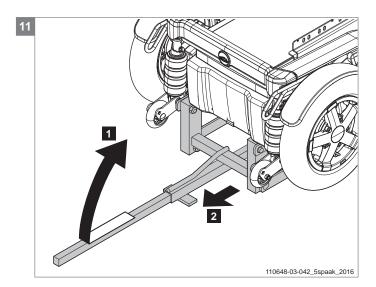


**Caution!** Ensure tube and tyre are properly positioned on the rim! **Caution!** Make sure the tube is not jammed between the two rim halves!



Note! Check the key is still in place!





### 5.3.16 Replacing the castor wheel, all Puma-versions

### Preparation

- · Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive and castor wheels clear of the ground.

#### Instructions

Note! Suitable work area required!

- · Loosen the shaft and locking nut.
- · Hold the wheel tight and remove the shaft.
- · Take the castor wheel out of the fork.
- Mount the new castor wheel in the reverse order.

### Relevant article numbers

#### Puma 20

1016987 Castor wheel indoor 200x50 (8"), grey air 1017434 Castor wheel indoor 200x50 (8"), grey air, set 1016988 Castor wheel indoor 200x50 (8"), grey punctureproof

1017435 Castor wheel indoor 200x50 (8"), grey punctureproof, set

#### Puma 20/40

1016998 Castor wheel indoor 2.80/2.50x4 (9"), air 1017438 Castor wheel indoor 2.80/2.50x4 (9"), air, set 1016999 Castor wheel indoor 2.80/2.50x4 (9"), punctureproof 1017439 Castor wheel indoor 2.80/2.50x4 (9"), punctureproof, set

1017000 Castor wheel outdoor 3.00x4 (10"), grey air, right 1017001 Castor wheel outdoor 3.00x4 (10"), grey air, left

1017436 Castor wheel outdoor 3.00x4 (10"), grey air, set

1017002 Castor wheel outdoor 3.00x4 (10"), grey punctureproof, right

1017003 Castor wheel outdoor 3.00x4 (10"), grey punctureproof, left

1017437 Castor wheel outdoor 3.00x4 (10"), grey punctureproof, set

### Puma 40

1017004 Castor wheel outdoor 3.00x4 (10"), black air, right 1017005 Castor wheel outdoor 3.00x4 (10"), black air, left 1017444 Castor wheel outdoor 3.00x4 (10"), black air, set 1017006 Castor wheel outdoor 3.00x4 (10"), black

1017006 Castor wheel outdoor 3.00x4 (10"), black punctureproof, right

1017007 Castor wheel outdoor 3.00x4 (10"), black punctureproof, left

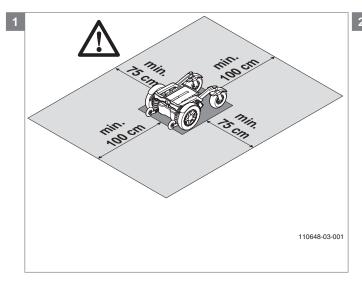
1017445 Castor wheel outdoor 3.00x4 (10"), black punctureproof, set

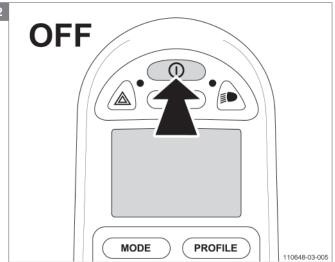
#### Tools used

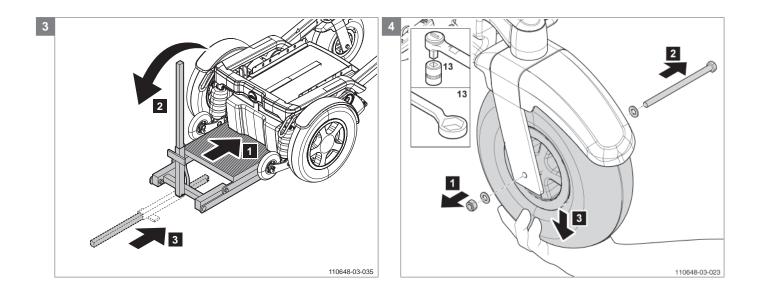
- · Lifting device
- · Open-ended or ring spanners, 13 mm
- · Torque wrench, socket, 13 mm

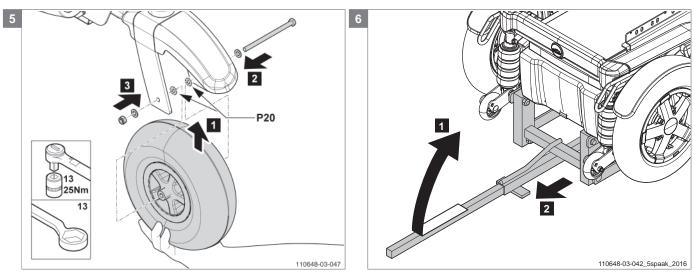
### **Icons**

N.a.









**Caution!** Place at the Puma 20 on both sides of the castor wheel an extra ring between the wheel and the fork!

# 5.3.17 Replacing the tyre and/or tube of the castor wheel, all Puma-versions

### Preparation

- · Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive and castor wheels clear of the ground.

#### Instructions

Note! Suitable work area required!

- Deflate the tyre (not necessary for replacing the complete castor wheel!).
- Loosen the shaft and locking nut. (See instruction: Replacing the castor wheel)
- · Hold the wheel tight and remove the shaft.
- · Take the castor wheel out of the fork.
- · Loosen all Allen bolts and remove the front of the rim half.
- Remove the tyre and the tube, replace a new tube and/ or tyre.
- · Replace the tyre and tube on the rim half.
- · Mount the front of the rim half and remount the wheel.
- Inflate the tube to the correct pressure. (See: 'Technical specifications')

# Relevant article numbers

#### Puma 20

1015297 Inner tube 200x50 (8") 1015298 Outer tyre 200x50 (8") grey line profile

#### Puma 20/40

1015116 Inner tube 2.80/2.50x4 (9") 1015107 Outer tyre 2.80/2.50x4 (9") grey line profile 1015115 Inner tube 3.00x4 (10") 1015105 Outer tyre 3.00x4 (10") grey block profile

#### Puma 40

1015106 Outer tyre 3.00x4 (10") black highway profile

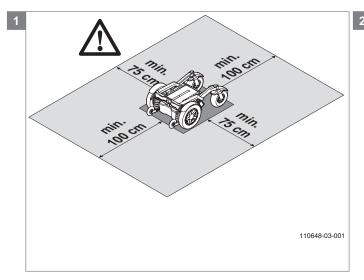
### Tools used

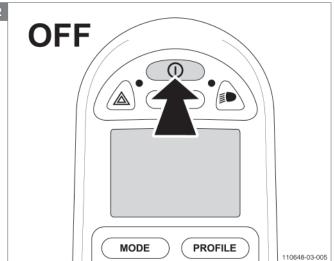
- · Lifting device
- · Open-ended or ring spanners, 13 mm
- · Torque wrench, socket, 13 mm
- · Allen key, 5 mm

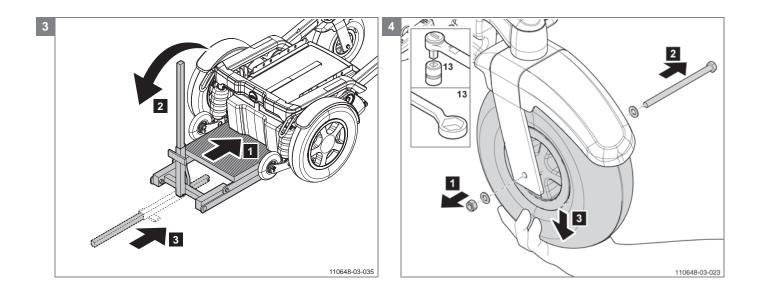
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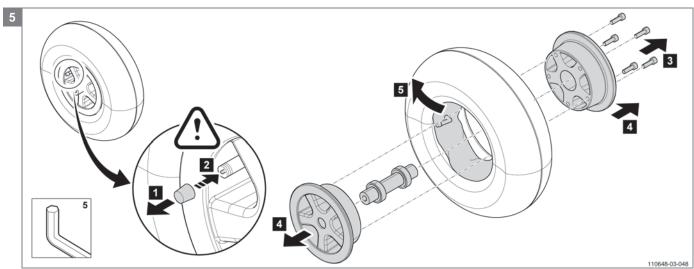


Note! Be aware of the issue!

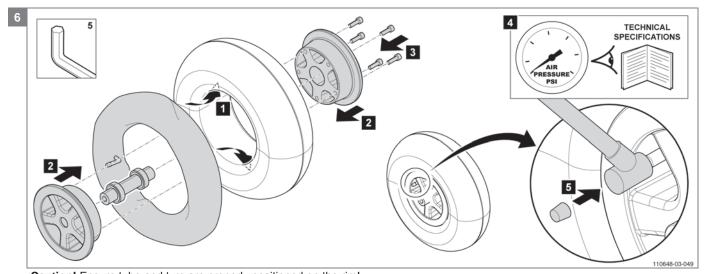




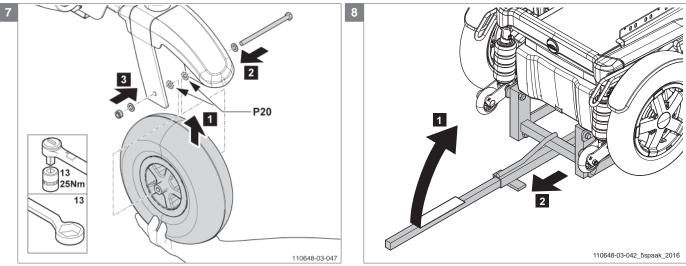




Caution! Deflate the tyre first, before you dismantle the wheel. Follow the steps as shown!



**Caution!** Ensure tube and tyre are properly positioned on the rim! **Caution!** Make sure the tube is not jammed between the two rim halves!



**Caution!** Deflate the tyre first, before you dismantle the wheel. Follow the steps as shown!

# 5.3.18 Replacing the castor fork, all Puma-versions

### Preparation

- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive and castor wheels clear of the ground.

#### Instructions

Note! Suitable work area required!

- Remove the castor wheel. (See instruction: Replacing the castor wheel)
- Remove the ball head cover and loosen the bolt, washers and shaft that hold the castor fork in the castor arm
- · Take the castor fork out of the castor arm.
- Remove the fender from the castor fork (not valid for Puma 20).
- Replace the fender on the new castor fork.
- Mount the castor fork and wheel in the reverse order.

#### Relevant article numbers

9005932 Castor fork (9" and 10") 9007752 Castor fork 60 mm (8") (only for Puma 20)

#### Tools used

- · Lifting device
- Torque wrench, socket, 13 mm
- Torque wrench, Torx key T30
- · Circlip pliers
- · Loctite 243

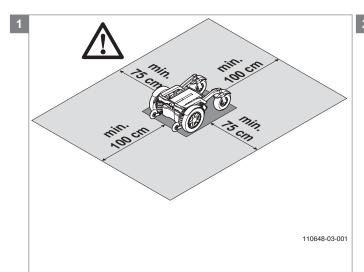
### Icons

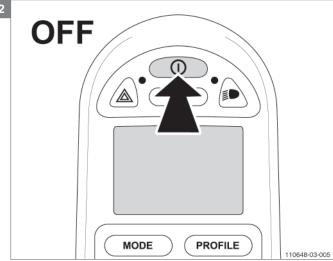


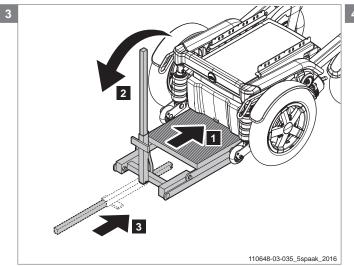
Bolts are provided with Loctite thread locker!

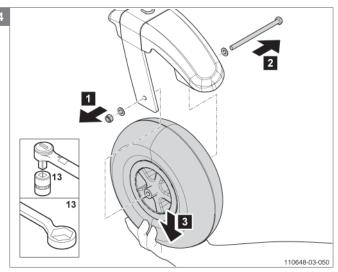


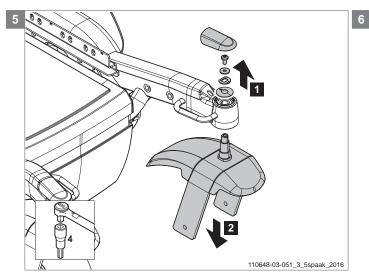
Note! Be aware of the issue!

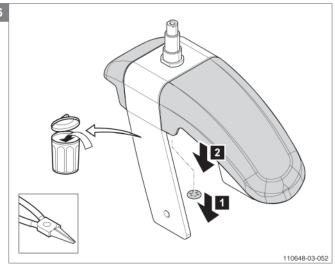


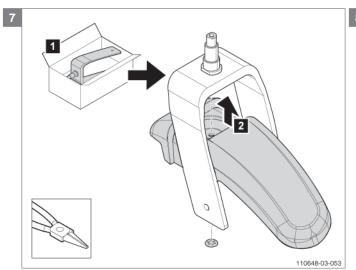


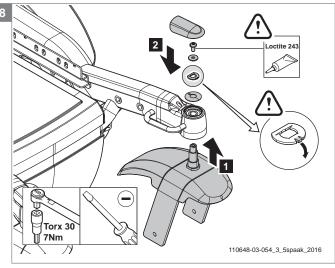


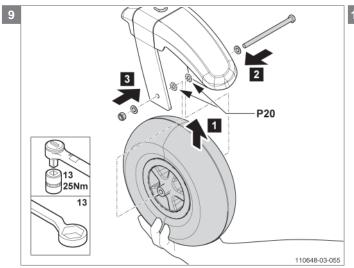


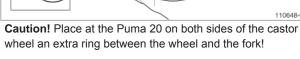


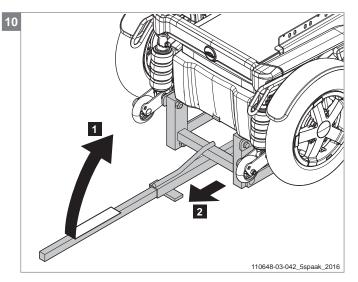












# 5.3.19 Mounting the direct access, all Puma-versions

# Preparation

Note! Switch off the wheelchair via remote control.

# Instructions

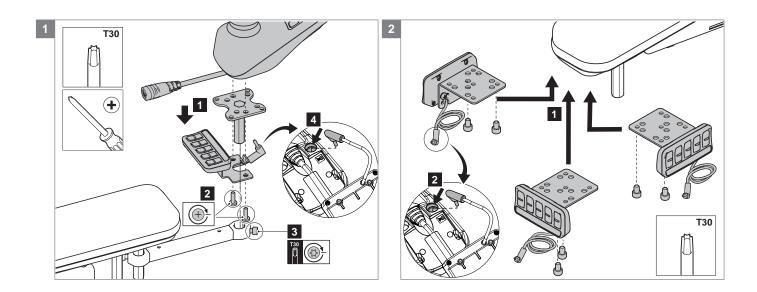
**Note!** Suitable work area required! Follow the illustrated instructions.

- 1. Joystick side
- 2. Not joystick side

# Relevant article numbers

1016968 R-net direct access keypad joystick side, set 1016969 R-net direct access keypad not joystick side, set





# 5.3.20 Mounting the attendant steering on backrest frame Sedeo Pro+, all Puma-versions

# Preparation

Note! Switch off the wheelchair via remote control.

# Instructions

Note! Suitable work area required!

**Note!** Attendant steering bracket can be mounted right or left

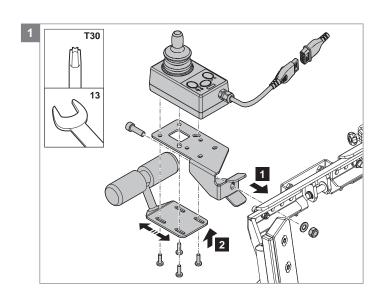
Follow the illustrated instructions.

### Relevant article numbers

1017036 Attendant steering R-net including mounting set and electronics, set, Sedeo Pro+







# 5.3.21 Mounting the attendant Z-steering mechanisme Sedeo Pro+ (only for Norwegian market)

# Preparation

Note! Switch off the wheelchair via remote control.

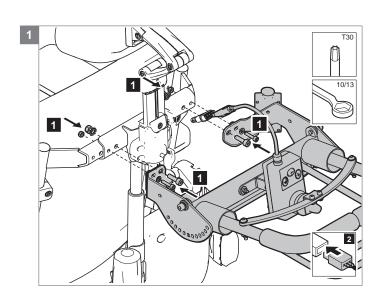
# Instructions

**Note!** Suitable work area required! Follow the illustrated instructions.

# Relevant article numbers

1017034 R-net Z-steering incl. electronics and mounting set, Sedeo Pro+





### 5.3.22 Replacing the batteries, all Puma-versions

### Preparation

- · Switch off the wheelchair via the remote control.
- Remove the fuses from the battery compartment before carrying out any work on the electrical system.

#### Instructions

Note! Suitable work area required!

- · Remove the leg rests and the chair.
- Remove the battery access cover, the battery-guard and the battery strap rear.
- Remove the power module cover and disconnect all connections from the power module.
- Release the battery strap from the battery-guard and slide the battery-guard out of the battery box.
- · Release the battery tray by tilting the battery-guard.
- Release the battery strap top and remove the batteries from the battery tray.
- · Disconnect all connections from the batteries.
- · Replace the new batteries in reverse order.

**Caution!** A battery tray with batteries is a heavy load! Be careful at the moment you undock the battery tray from the battery box!

**Caution!** Dock and undock the battery tray slowly from projection in the battery box!

### **Notice**

- Contact your supplier, who will advise about disposing the batteries as required.
- Avoid damage to the batteries when replacing them; this may cause the batteries to leak.

#### Relevant article numbers

9002592 M8x12 CKS BZK PRECOTE 85 00000.2003 Locking ring, flat M8

9002758 Battery 38 Ah (C20) Gel

6000589 Battery 50 Ah (C20) AGM

9002759 Battery 60 Ah (C20) Gel

9002760 Battery 78 Ah (C20) Gel

9005956 Battery spacer set universal

9005957 Battery spacer set MK (40/50A)

9005958 Battery spacer set MK (60/74A)

9005959 Battery spacer set Sonnenschein

#### Tools used

Torque wrench, socket, 10 mm

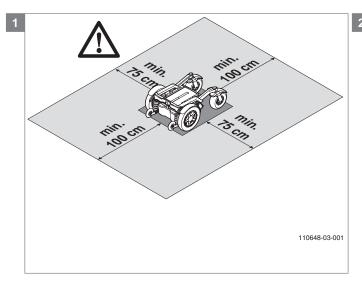
#### Icons

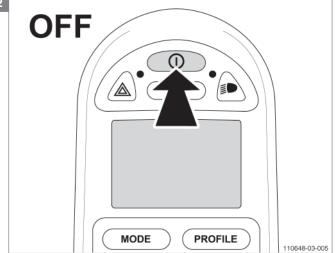


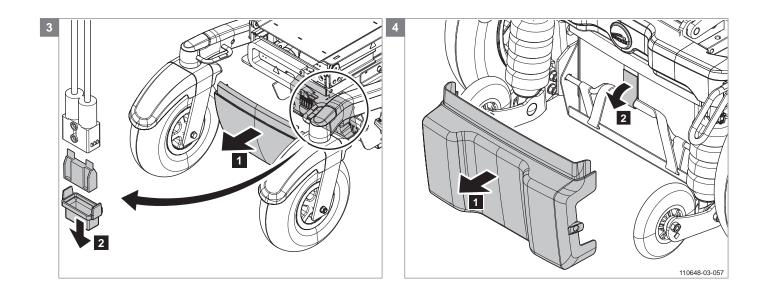
Parts need to be replaced. Dispose of waste parts in accordance with local regulations.

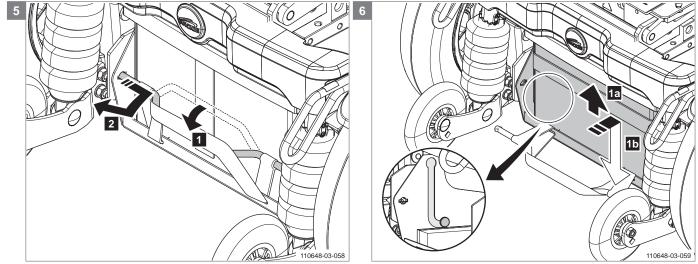


Note! Be aware of the issue!

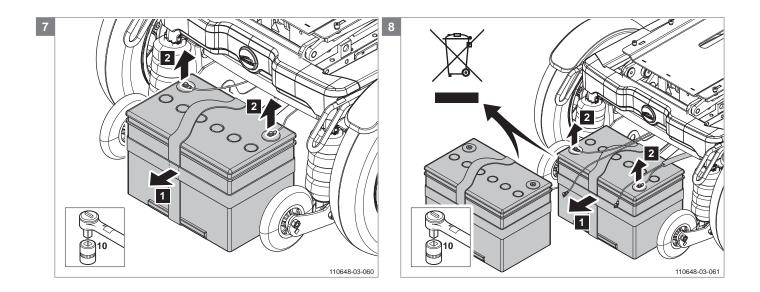


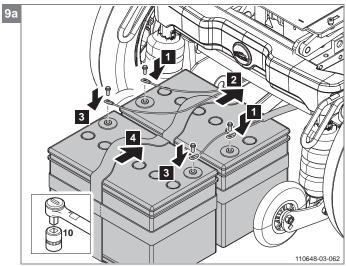




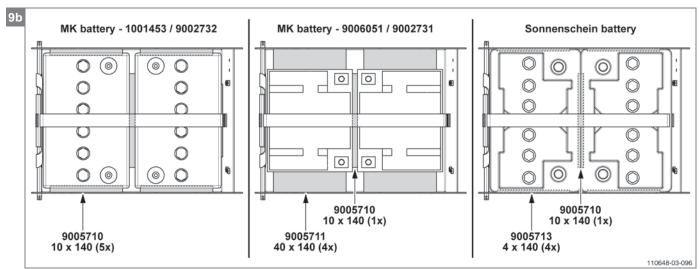


**Caution!** A battery tray with batteries is a heavy load! **Caution!** Undock the battery tray slowly from projection in the battery box!

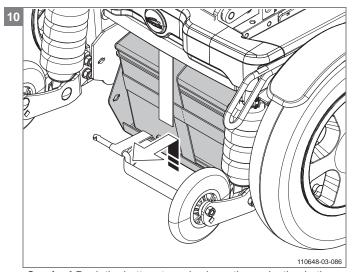




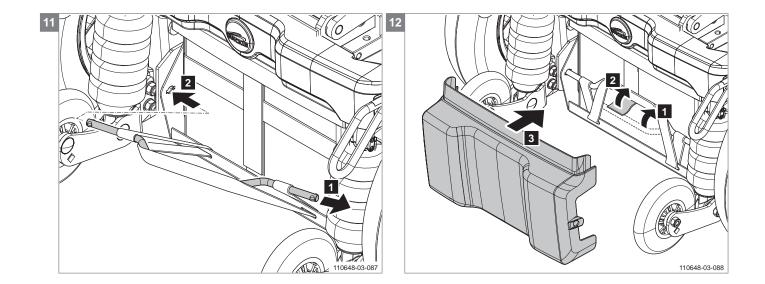
Note! Insert the battery spacer set as shown in the next diagrams!



Note! Insert the battery spacer set correctly, as shown in the diagrams!



**Caution!** Dock the battery tray slowly on the projection in the battery box!



### 5.3.23 Replacing the power module, all Puma-versions

### Preparation

- · Switch off the wheelchair via the remote control.
- Remove the fuses from the battery compartment before carrying out any work on the electrical system.
- Use a lifting device to raise the drive wheels clear of the ground.

#### Instructions

Note! Suitable work area required!

- · Remove the power module cover.
- Disconnect all connections of the power module and the battery fuses.
- · Unscrew both screws and washers from the battery box.
- Remove the old power module, replace the new power module in the reverse order.
- · Reprogram the wheelchair.

**Note!** Always remove the fuses from the battery compartment before carrying out any work on the electrical system!

### Relevant article numbers

9007150 Shark power module DK-PMB01 (60+15A) 9007151 Shark power module DK-PMB31 (60+15A) 9007152 Shark power module DK-PMB21 (60+15A) 9007158 R-net power module 90A 9002918 R-net power module 120A 9007159 DX2 power module PMA90L 90A 9007620 DX2 power module PMA90L Gyro 9002916 VR-2 power module VR2-90 (90A) 9002917 VR-2 power module VR2-90-2A (90A)

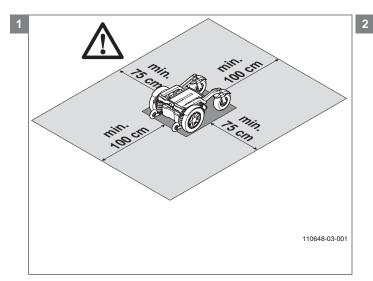
### Tools used

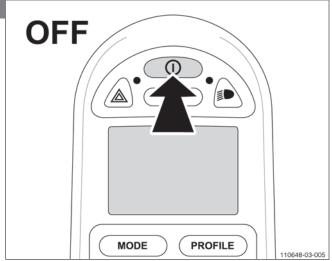
- · Lifting device
- · Allen key 4 mm

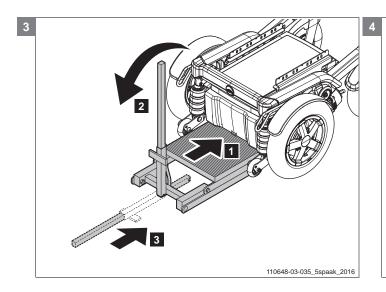
#### **Icons**

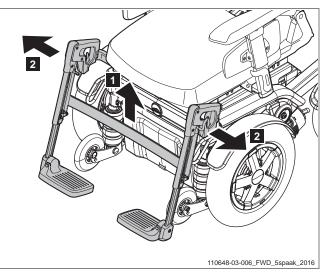


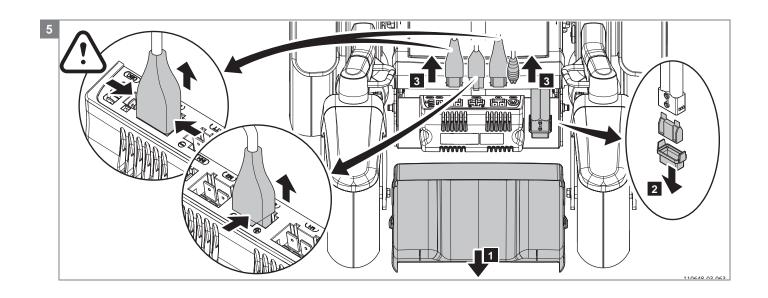
Parts need to be replaced. Dispose of waste parts in accordance with local regulations.

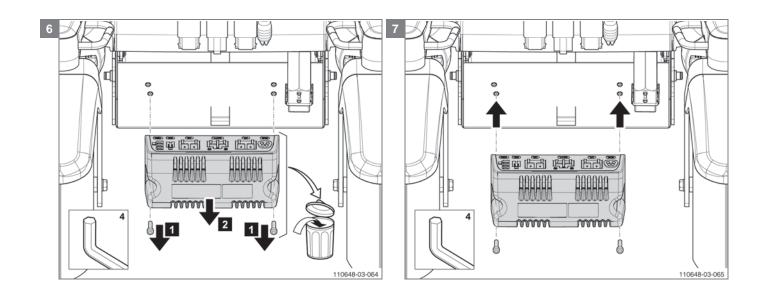


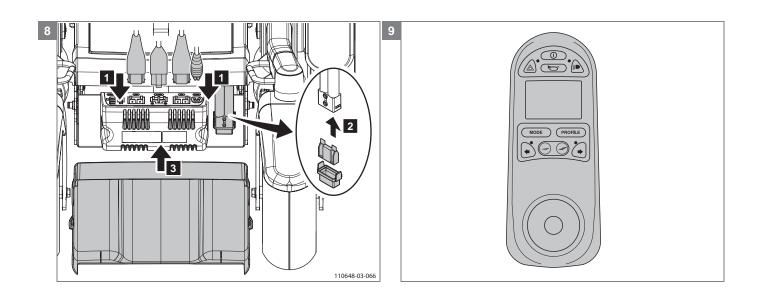












# 5.3.24 Replacing the mudguards, Puma 40 / 5-spoke wheels > October 2016

# Preparation

- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

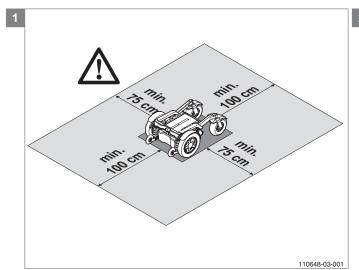
Note! Suitable work area required!

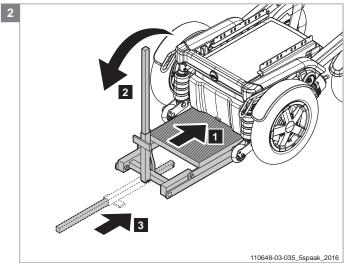
- Turn the drive wheel in the correct position.
- Loosen (through the rim) the 2 bolts of the mudguard brackets on the motor arm.
- · Remove the mudguards with brackets.
- Tighten the new mudguard with brackets on the motor arm

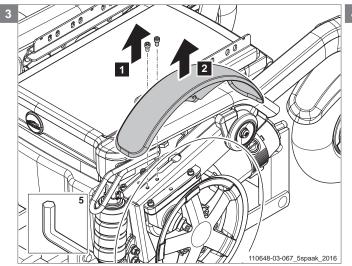
### Relevant article numbers

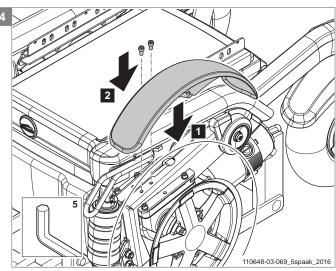
9011606 Drive wheel fender black with bracket set, version > October 2016 9011607 Drive wheel fender bracket set, version > October 2016

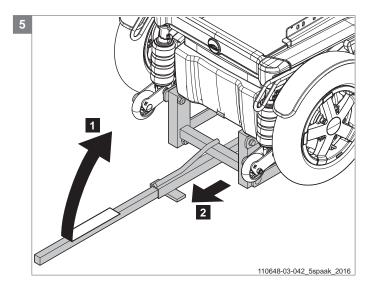
- · Lifting device
- · Hexagonal socket wrench, 5mm











# 5.3.25 Replacing the mudguards, Puma 40 / 3-spoke wheels > October 2016

# Preparation

- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

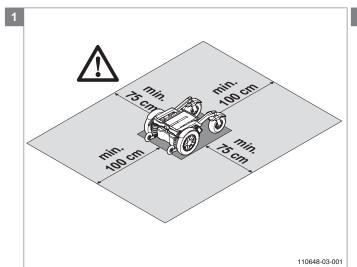
Note! Suitable work area required!

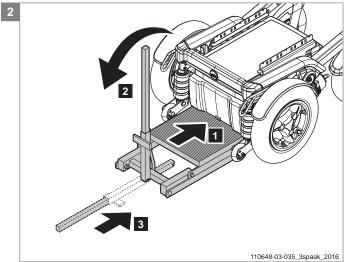
- Turn the drive wheel in the correct position.
- Loosen (through the rim) the 2 bolts of the mudguard brackets on the motor arm.
- · Remove the mudguards with brackets.
- Tighten the new mudguard with brackets on the motor arm.

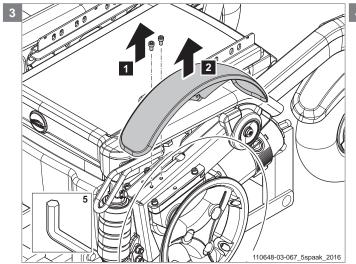
# Relevant article numbers

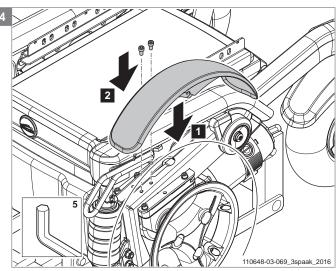
9005978 Drive wheel fender black with bracket set, version > October 2016 9005979 Drive wheel fender bracket set, version > October 2016

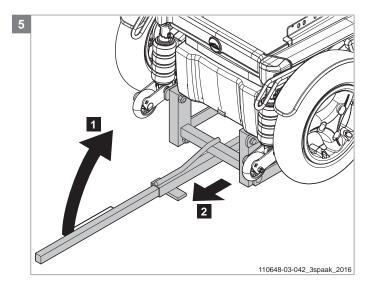
- · Lifting device
- · Hexagonal socket wrench, 5mm











# 5.3.26 Replacing the mudguards, Puma 20/40 < November 2016

# Preparation

- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive wheels clear of the ground.

# Instructions

Note! Suitable work area required!

- Turn the drive wheel in the correct position.
- Loosen (through the rim) the 2 bolts of the mudguard brackets on the motor arm.
- · Remove the mudguards with brackets.
- Tighten the new mudguard with brackets on the motor arm.

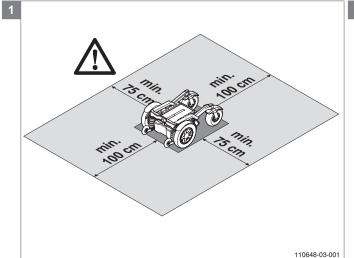
# Relevant article numbers

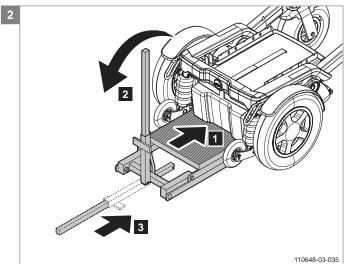
0001.1110 Rivets alu 3,2 x 10

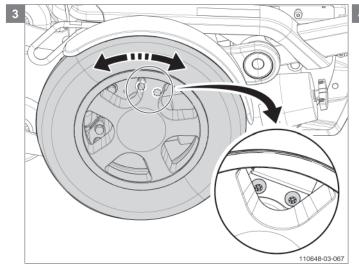
9006008 Drive wheel mounting set, Puma 40, version < November 2016

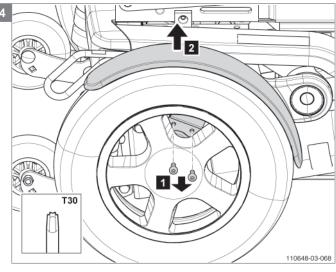
9005978 Drive wheel fender with bracket

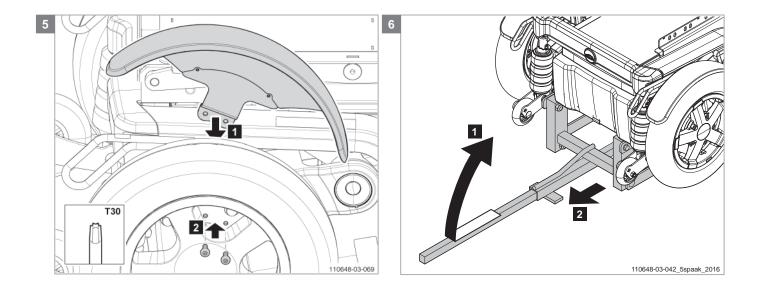
- · Lifting device
- Torx key T30











# 5.3.27 Replacing the coloured covers (all Puma 40-versions, not valid for Puma 20)

Ball head cover / Deco ring motor arm / Deco strip suspension bridge cover

### Preparation

Switch off the wheelchair via the remote control.

### Instructions

Note! Suitable work area required!

Ball head cover set:

· Take away the old cover and click back the new cover.

Deco ring motor arm set:

· Take away the old cover and click back the new cover.

Deco strip under the suspension bridge cover:

- · Take away the old cover
- Click the new cover with turning movement back under the suspension bridge cover.

**Note!** Use a screwdriver in case you can't get off the covers by hand.

### Relevant article numbers

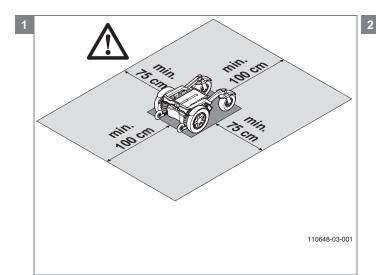
9009748 Deco covers green 9009749 Deco covers blue 9009750 Deco covers orange 9009751 Deco covers silver

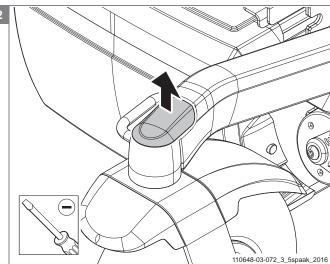
#### Tools used

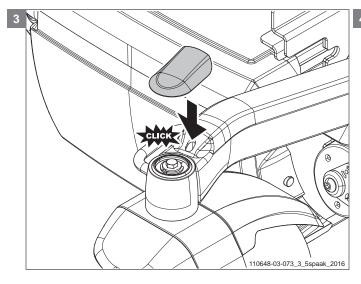
Screwdriver

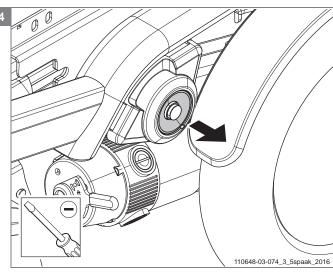
# **Icons**

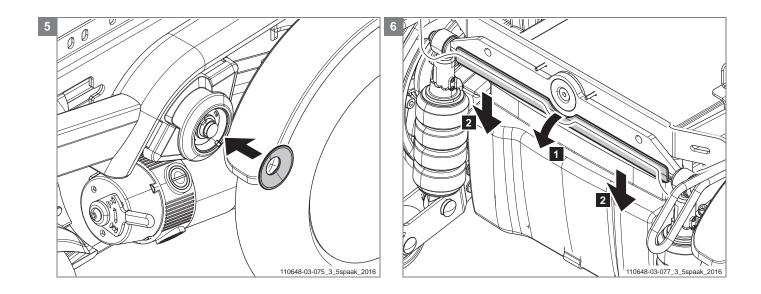
N.a.

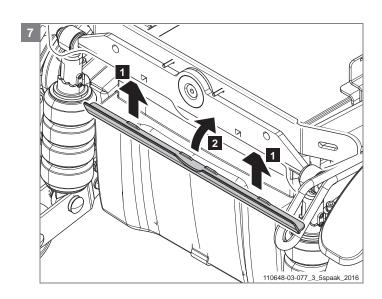












# 5.3.28 Replacing the anti-tip wheels and bracket, all Puma-versions

# Preparation

Switch off the wheelchair via the remote control.

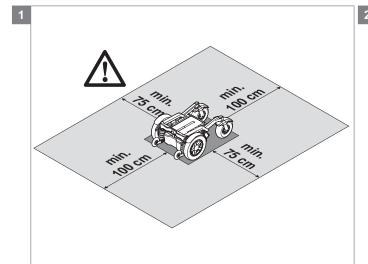
### Instructions

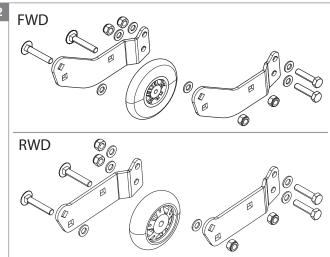
Follow the illustrated instructions.

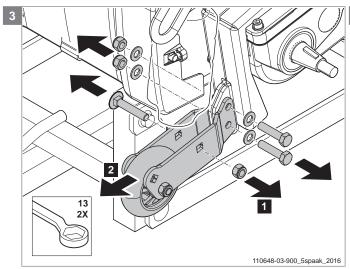
### Relevant article numbers

9005962 P2040 Anti-Tip RWD Complete Service 9005963 P2040 Anti-Tip FWD Complete Service

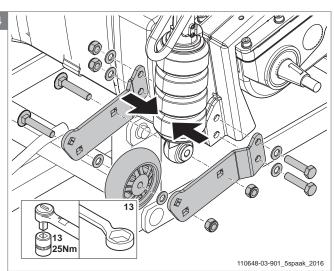
- Open ended or ring spanners, 13 mm, 2x
- Torque wrench, socket, 13 mm







Note! Replace the anti-tip wheels and brackets!



**Note!** Use top mounting holes for Indoor anti-tip wheel! **Note!** Use bottom mounting holes for Outdoor anti-tip wheel!

# 5.3.29 Adjusting the seating height, all Puma-versions

#### **Preparation**

- · Switch off the wheelchair via the remote control.
- Remove the fuses from the battery compartment before carrying out any work on the electrical system.
- Use a lifting device to raise the drive wheels clear of the ground.

#### Instructions

Note! Suitable work area required!

- · Remove the legrests.
- · Lift the chair, in case the wheelchair has a lift.
- Disconnect all connections of the power module and the battery fuses.
- Remove the entire seating unit (incl. electrical lift, electrical tilt or mechanical tilt) from the carrier.
- Loosen the mounting supports (I/r) of the lift supports.
- Adjust the height of lift support; 5 height adjustments are possible (0/+25/+50/+75/+100).
- Is the lift support in the lowest position? Mount also the battery cover in the lowest position!
- Replace the entire seating unit on the carrier. Two people are needed to carry out this operation.
- Tighten the interface and seat on the carrier.
- Replace the legrests.

### **Notice**

Raising the seat height has a negative effect on dynamic stability, because of the centre of gravity rises. Please read the user manual or contact your supplier, who will advise about the seat adjustments.

#### Relevant article numbers

9002592 M8x12 CKS BZK PRECOTE 85 00000.2003 Locking ring, flat M8

#### **Tools used**

- · Lifting device
- Screwdriver
- Allen key, 6 mm
- Torx kev. T30
- Open ended or ring spanner, 10 mm
- · Pair of wire-cutters
- Tie wraps

#### **Icons**



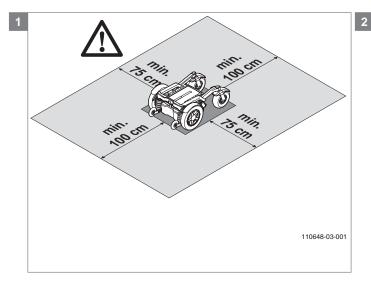
Parts need to be replaced. Dispose of waste parts in accordance with local regulations.

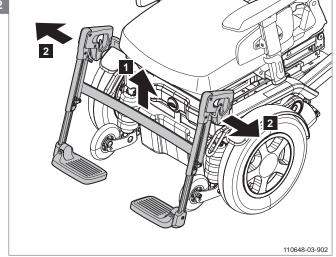


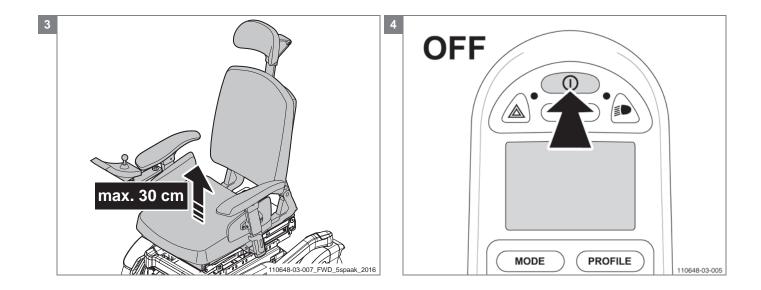
Note! Be aware of the issue!

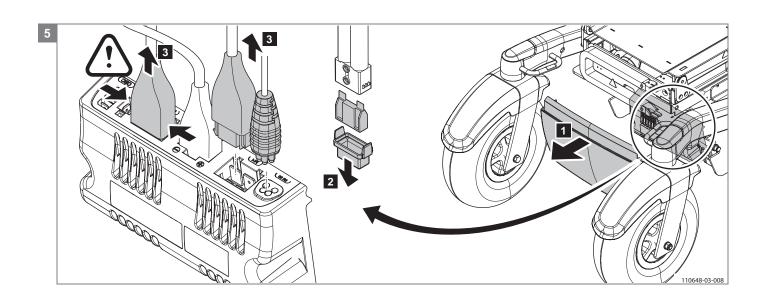


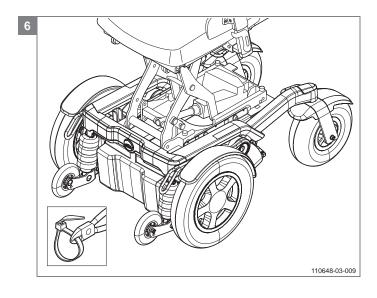
Action must be carried out by two persons!

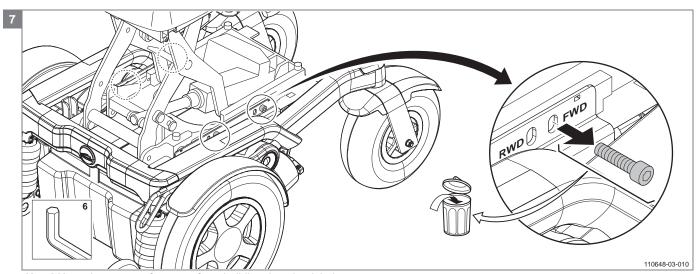




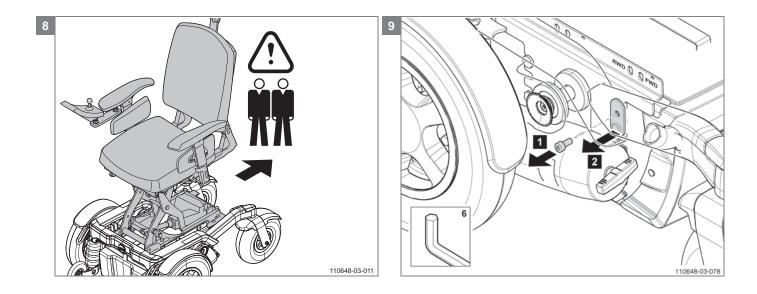


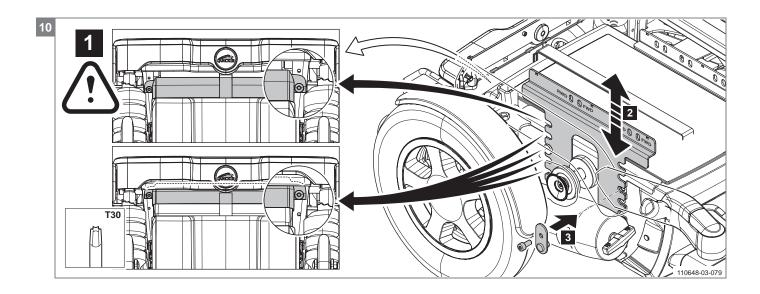


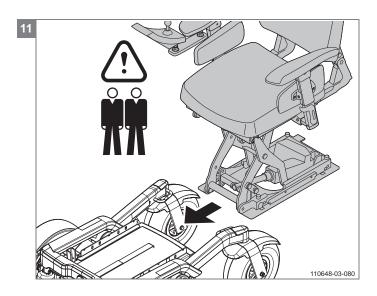


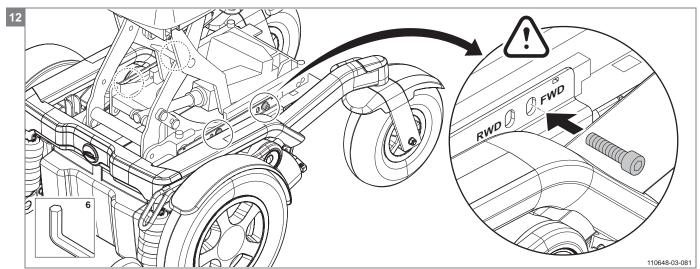


Note! Keep the spacers for reuse for rebuilding the wheelchair.

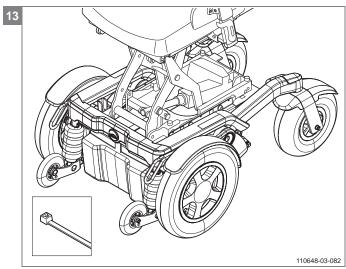




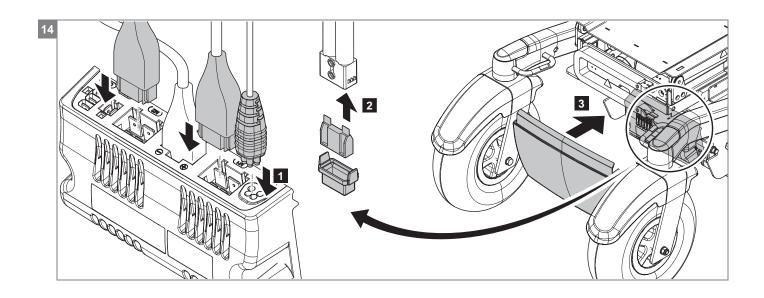


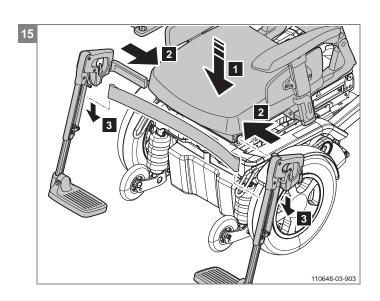


Note! Reuse the spacers.



Note! Fasten the cables with tie wraps!





## 5.3.30 Adjusting the centre point of gravity, all Puma-versions

## Preparation

Switch off the wheelchair via the remote control.

## Instructions

Note! Suitable work area required!

· Remove the leg rests.

**Note!** Lift the chair in case the wheel chair has an electrical lift

- · Loosen the 4 bolts.
- Move the whole chair unit to the correct position.
- · Remount the 4 bolts.
- · Replace the leg rests.

#### **Notice**

Changing the wheelchair's centre of gravity may negatively influence the wheelchair's driving characteristics and/or its dynamic stability! Therefore it might be sensible to use the RWD hole for a FWD and vice versa

#### Relevant article numbers

9002592 M8x12 CKS BZK PRECOTE 85 00000.2003 Locking ring, flat M8

#### Tools used

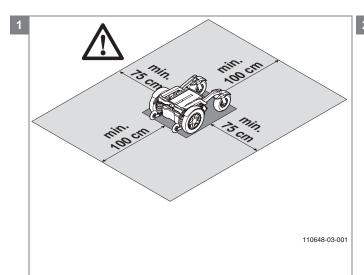
Allen key, 6 mm

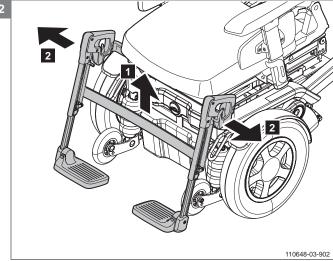
#### **Icons**

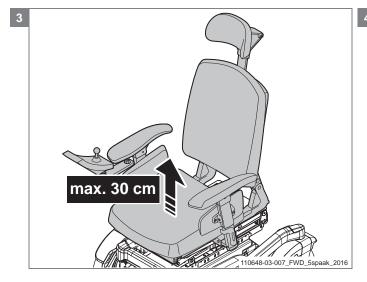


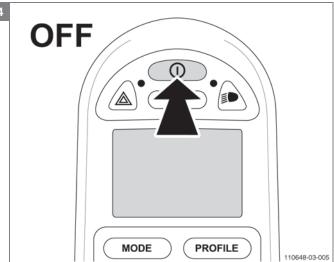
Parts need to be replaced. Dispose of waste parts in accordance with local regulations.

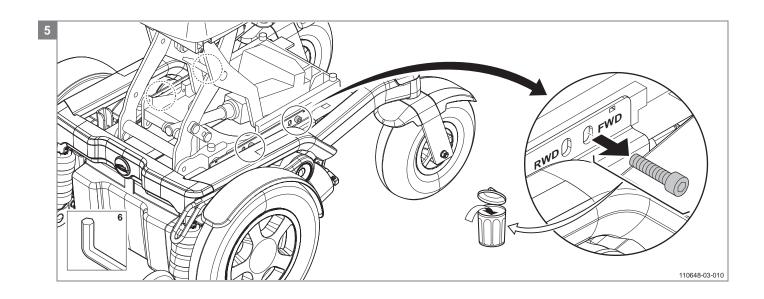


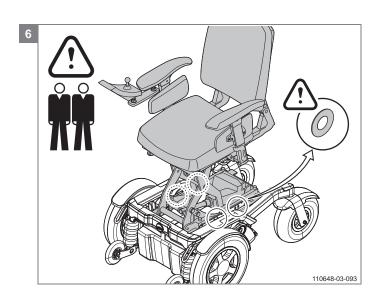


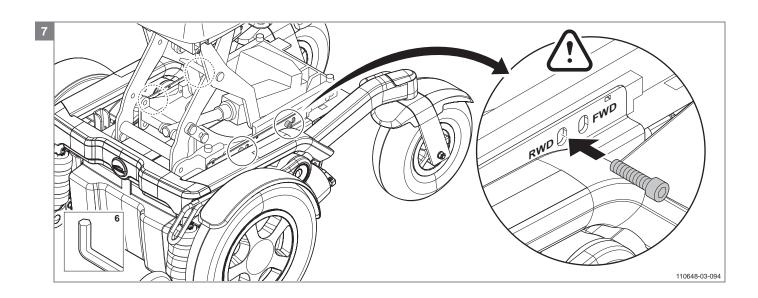


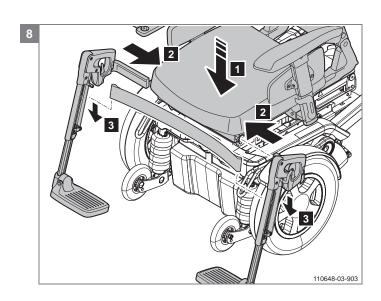












## 5.3.31 Adjusting the mechanical seat tilt, all Puma-versions

## Preparation

Switch off the wheelchair via the remote control.

## Instructions

Note! Suitable work area required!

- Remove the entire seating unit from the carrier. Two
  people are needed to carry out this operation.
  (See instruction: Converting front wheel drive (FWD) to
  rear wheel drive (RWD), Step 2 Remove interface and
  seating.)
- · Loosen the 2 bolts in the interface frame
- Move the upper part of the interface in the desired position
- · Tighten the 2 bolts
- · Replace the seat on the interface

#### Relevant article numbers

9006016 Mechanical tilt

## Tools used

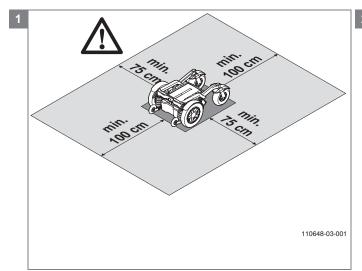
- Torque wrench, socket, 13 mm
- · Allen key, 6 mm

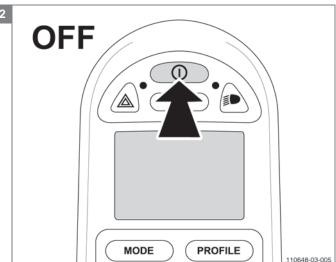
#### **Icons**

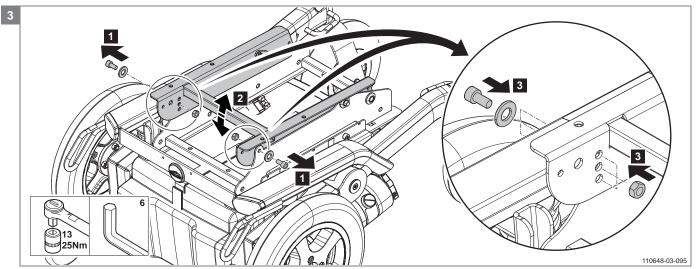


Action must be carried out by two persons!









Caution! Changing the wheelchair's tilt position may negatively influence the wheelchair's driving characteristics! Please read the user manual!

## 5.3.32 Adjusting the electrical seat tilt 0 - 25°, all Puma-versions

## Preparation

Switch off the wheelchair via the remote control.

## Instructions

Note! Suitable work area required!

- Remove the entire seating unit from the carrier. Two
  people are needed to carry out this operation.
  (See instruction: Converting front wheel drive (FWD) to
  rear wheel drive (RWD), Step 2 Remove interface and
  seating.)
- Loosen the 2 bolts of hinge 1 or hinge 2 in the interface frame.
- Move the upper part of the interface in the desired position (hinge point 1 (hp1): 0 - 25°, hinge point 2 (hp2): 0 - 20°).
- · Tighten the 2 bolts.
- · Replace the seat on the interface.

#### **Notice**

Changing back the wheelchair's tilt position from 20° to 25° may negatively influence the wheelchair's driving characteristics.

## Relevant article numbers

9006017 Electrical tilt 25°

#### Tools used

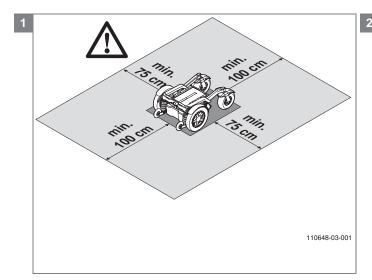
Open ended or ring spanner 10 mm IAlen key 5 mm

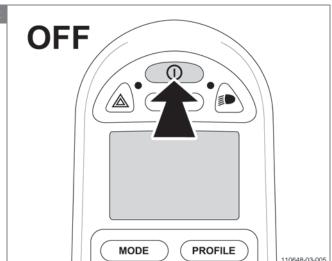
#### **Icons**

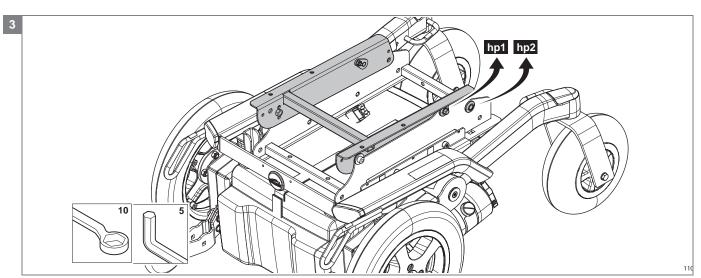


Action must be carried out by two persons!









Caution! Changing the wheelchair's tilt position may negatively influence the wheelchair's driving characteristics! Please read the user manual!

## 5.3.33 Adjusting the electrical seat tilt $0 - 45^{\circ}$ , the minimum tilt angle $(0 - 9^{\circ})$ , all Puma-versions

With this adjustment the minimum / down limit angle of the tilt can be set. On the left rear corner of the tilt module a limit switch is placed which stops the downward movement. This switch is triggered by a set screw which moves past. Standard it is adjusted to stop at 0 degrees. The angle at which the switch is triggered can be adjusted by turning the set screw. The more the screw is turned inwards (clockwise), the earlier the switch is triggered, and the bigger the angle will be at which the tilt stops.

#### Preparation

Switch on the wheelchair via the remote control.

# Instructions

Note! Suitable work area required!

- · Tilt the seat backwards about 10 degrees
- Turn the set screw with use of a size 2 Allen key (a quarter turn equals approx. 1 degree).
  - Turning it clockwise will result in a bigger down limit angle
  - Turning it counterclockwise will result in a smaller down limit angle

 Carefully tilt the seat forward until it stops, and check if the resulting angle is as desired

**Caution!** Adjusting the minimum angle should be done with caution. If the set screw is turned inward too much it can damage the limit switch.

**Note!** Minimum angle adjustments of greater than 9 degrees are not recommended. This is the angle at which the inhibit switch is activated (for safety reasons), and drive speed is automatically limited.

## Relevant article numbers

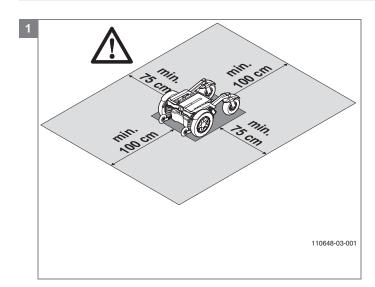
9006021 Electrical tilt 45° 9006020 Electrical lift with electrical tilt 45°

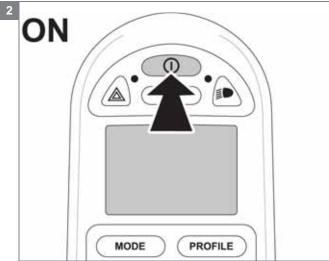
## Tools used

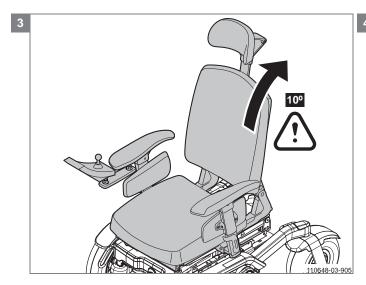
Allen key, size 2 mm

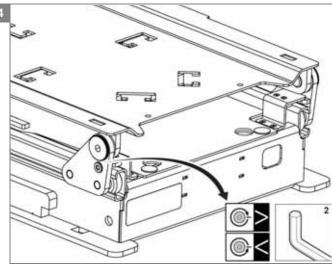
### **Icons**



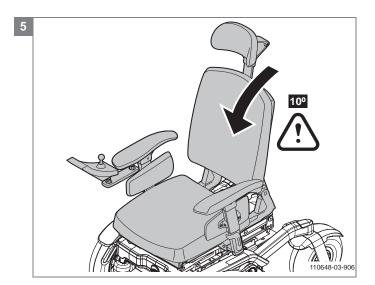








**Caution!** If the set screw is turned inward too much it can damage the limit switch.



# 5.3.34 Adjusting the electrical seat tilt 0 - 45°, the maximum tilt angle (< 45°) ), all Puma-versions

There are certain settings of the carrier and seating system combination at which interference can occur between the Sedeo seating system and the Carrier (see 5.2.6). In these situations the maximum tilt angle must be limited to prevent serious damage.

The maximum tilt angle can be adjusted by use of the up limit switch which is placed in the profile on the right side of the tilt module. This switch stops the upward movement as soon as the triangular slider travels in to it.

## Preparation

Switch on the wheelchair via the remote control.

## Instructions

Note! Suitable work area required!

- Adjust the seating height and seating system (see 5.2.5 seat adjustments) to the desired settings
- Carefully tilt the seat backwards to the point that it almost makes contact with the frame of the wheelchair.
- Loosen the up limit switch by unscrewing the cross head

screws a little

- Move the switch to the point that it makes contact with the slider and push it just a little further until it clicks/ switches
- Tighten the screws again and if needed fixate the cable with a new tie wrap
- Tilt the seat forward and backward again to check if it stops at the correct angle

## Relevant article numbers

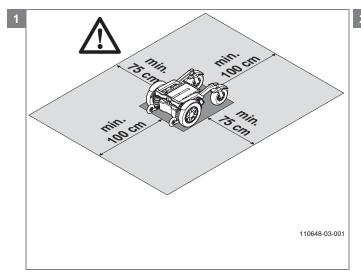
9006021 Electrical tilt 45° 9006020 Electrical lift with electrical tilt 45°

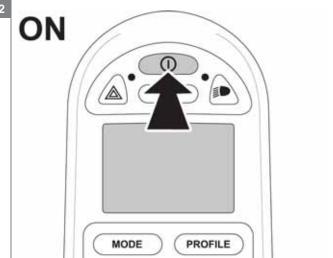
## Tools used

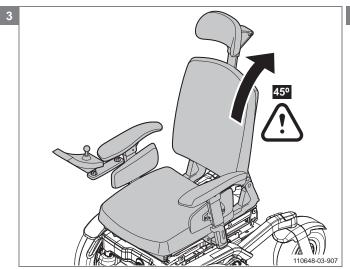
- · Screwdriver, crosshead
- Pair of wire cutters (for tie-wraps)

### **Icons**

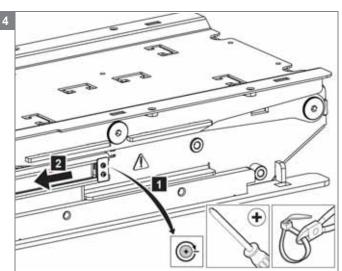




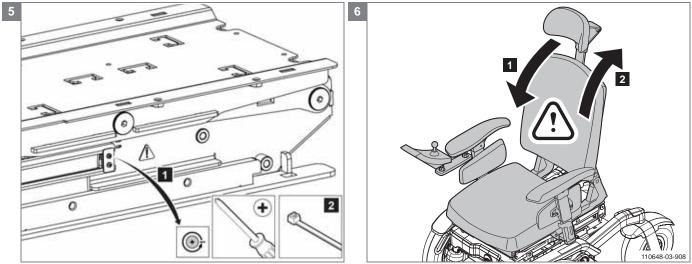




Note! Make sure to keep a gap of about one finger thickness



Note! It might be needed to loosen the switch cable



Note! If needed fixate the cable with a new tie wrap

# 5.4 Seat tilt configuration tables

The tables show in which configurations / adjustment settings seat tilt is limited due to interference. Several factors are involved: driving wheels (FWD or RWD), seating system (Sedeo Lite or Pro) tilt module type (0-45 ° or 0-25°), mounting of the 0-25° tilt module (on hinge point 1 or hinge point 2, see figure), seat height, seat depth, seat cushion, centre of gravity setting.

## RWD, Sedeo Lite, electrical tilt adjustment 0 - 45°

				CoG Setting	Backrest Adjustment Setting (hole no.   seat depth in cm)
			Warnings	(holes no.)	Hole 1 Hole 2 Hole 3 Hole 4 Hole 5 Hole 6 Hole 7 Hole 8 Hole 9
				. ,	39 cm   41 cm   43 cm   45 cm   47 cm   49 cm   51 cm   53 cm   55 cm
			<u></u>	Hole 1 + 7	holes 1 and 2 not available due to interference with seat frame
	E	ڃ	$(\mathcal{S})$	Hole 2 + 8	
~	40,5 cm	41,5 cm		Hole 3 + 9	45 45 45 45 25 5 X X X 45 45 45 45 25 5 X X X X 45 45 45 45 45 45 45 45 45 45 45 45 45
5	40,	41,		Hole 4 + 10	
Sir			9	Hole 5 + 11	45 45 45 45 45 45 45 25 5 X 30-5 = limited tilt
hee	-			Hole 6 + 12	
e ×				Hole 1 + 7 Hole 2 + 8	holes 1 and 2 not available due to interference with seat frame
13" drive wheels in cm   i.c.w. 14" drive wheels in cm)	Ę	ڃ		Hole 3 + 9	45 45 45 45 45 45 30 20 15
<u>-4</u>	43 cm	44 cm		Hole 4 + 10	45 45 45 45 45 45 30 20 15 45 45 45 45 45 30 20 Default Factory Settings per Seat Height / Seat Cushion Depth
> _	4	4		Hole 5 + 11	45 45 45 45 45 45 45 45 30
.c.				Hole 6 + 12	45 45 45 45 45 45 45 45 45 45 45 45 45 4
				Hole 1 + 7	
n Cr				Hole 2 + 8	holes 1 and 2 not available due to interference with seat frame = setting for seat cushion depth 45 cm
Si	45,5 cm	CH.		Hole 3 + 9	45 45 45 45 45 45 45 45 30
he	5,5	46,5		Hole 4 + 10	45 45 45 45 45 45 45 45 45 45 45 45 45 4
é	4	4		Hole 5 + 11	45 45 45 45 45 45 45 45 45 45
dr.				Hole 6 + 12	45 45 45 45 45 45 45 45 45 45 45 45 45 4
13".				Hole 1 + 7	holes 1 and 2 not available due to interference with seat frame
, .				Hole 2 + 8	
(j. c.	48 cm	CH.		Hole 3 + 9	45 45 45 45 45 45 45 45 Warnings
ing	48	49		Hole 4 + 10	45 45 45 45 45 45 45 45
t e				Hole 5 + 11	45 45 45 45 45 45 45 45 45 45 45 45 45 4
Seat height Setting (i.c.w.				Hole 6 + 12	45   45   45   45   45   45   45   45
leig				Hole 1 + 7	holes 1 and 2 not available due to interference with seat frame = no tilt possible for seat cushion depth 45 cm with Comfort backrest
at	٤	сш		Hole 2 + 8	AT AT 2 AT AT AT AT AT
Se	,5 cm	TÚ		Hole 3 + 9 Hole 4 + 10	45 45 45 45 45 45 45 45 45 45 45 45 45 4
1	50,	51		Hole 4 + 10	45 45 45 45 45 45 45 45 45 45 45 45
				Hole 5 + 11	45 45 45 45 45 45 45 45 45 45 45 45
ш				TUIE 0 + 12	Max. tilt (45 of 25°)
					IVIAX. UIL (40 01 20 )

# FWD, Sedeo Lite, electrical tilt adjustment 0 - 45°

				0-00-44	Ba	ckrest A	djustm	nent Set	ting (ho	le no.   s	eat dep	th in cm)		
			Warnings	CoG Setting (holes no.)	Hole 1 Ho	ole 2 Ho	ole 3	Hole 4	Hole 5	Hole 6	Hole 7	Hole 8	Hole 9	
				(Holes Ho.)	39 cm 41	1 cm 43	3 cm	45 cm	47 cm	49 cm	51 cm	53 cm	55 cm	
				Hole 1 + 7	holes	1 and 2	not au	/ailahle	due to i	nterferer	nce with	seat frai	ne	Seat Tilt Range
	_	_		Hole 2 + 8						nici ici ci	icc with	ocat mai	770	
	40,5 cm	41,5 cm	9	Hole 3 + 9			45	45	45	15	5	Х	Χ	45 = full tilt 0 - 45°
.m.	40,5	41,5		Hole 4 + 10			45	45	45	45	15	5	Χ	
Ë.				Hole 5 + 11			45	45	45	45	45	15	5	20 - 5 = limited tilt
14" drive wheels in cm)				Hole 6 + 12	45	45	45	45	45	45	45	45	15	
Š				Hole 1 + 7	holes	1 and 2	not av	/ailable	due to i	nterferer	nce with	seat frai	ne	x = no tilt possible
ive	l _	_		Hole 2 + 8										
<u> </u>	3 cm	E		Hole 3 + 9	)	4	45	45	45	45	45	20	15	
	43	44		Hole 4 + 10			45	45	45	• 45	45	45	20	Default Factory Settings per Seat Height / Seat Cushion Depth
×.				Hole 5 + 11			45	45	45	45	45	45	45	
<u> </u>				Hole 6 + 12	45	45	45	45	45	45	45	45	45	= setting for seat cushion depth 39 cm
E				Hole 1 + 7	holes	1 and 2	not av	vailable !	due to ii	nterferer	nce with	seat frai	ne	A
.⊑	۶	cm		Hole 2 + 8	15	4E 18	45 21	45	45	1 45	45	45	45	= setting for seat cushion depth 45 cm
eels	45,5 cm			Hole 3 + 9		4.	45	45	45	45	45	45	45	**************************************
Š	45,	46,5		Hole 4 + 10			45	45	45	• 45	45	45	45	= setting for seat cushion depth 39 cm with Comfort backrest
ĕ.				Hole 5 + 11			45	45	45	45	45	45	45	**
5	_			Hole 6 + 12	45	45	45	45	45	45	45	45	45	= setting for seat cushion depth 45 cm with Comfort backrest
13				Hole 1 + 7	holes	1 and 2	not av	vailable	due to ii	nterferer	nce with	seat frai	ne	
>	_	_		Hole 2 + 8	AF.	4E  +	4E *1	45	45	I 4F	1 45	I 4F	I 4E	M!
<u>:</u>	48 cm	mo 6		Hole 3 + 9		4.	45 ,	45 45	45	45 • 45 •	45	45	45	Warnings
li ĝi	4	49		Hole 4 + 10			45		45	45	45	45	45	ma tilt massible for each such ion dowth 30 cm with Comfort beautrest
Set				Hole 5 + 11			45	45 45	45		45	45	45	= no tilt possible for seat cushion depth 39 cm with Comfort backrest
Seat height Setting (i.c.w. 13" drive wheels in cm   i.c.w.		Н		Hole 6 + 12	45	45	45	45	45	45	45	45	45	= no tilt possible for seat cushion depth 45 cm with Comfort backrest
heić				Hole 1 + 7 Hole 2 + 8	holes	1 and 2	not av	ailable	due to ii	nterferer	nce with	seat frai	ne	= no tilt possible for seat cushion depth 45 cm with Comfort backrest
eat	Ε	E			45	4E .	4E °	4E	45	I 4E	I 4E	I 4E	45	Decition of tilt changed for EMD, has consequences for may tilt
Se	,5 cm	LC		Hole 3 + 9 Hole 4 + 10		- 4	45 45	45 45	45 45	45	45 45	45 45	45 45	Position of tilt changed for FWD; has consequences for max. tilt
	50,	51,		Hole 5 + 11			45	45	45	45	45	45	45	
				Hole 5 + 11			45 4F	45 4F	45	45	45	45	45	

# RWD, Sedeo Lite, electrical tilt adjustment 0 - 25°

				Seat Tilt Range		25 = full tilt 0 - 25° (only if tilt module is mounted on hinge point		20 = limited tilt 0 - 20° (only if tilt module is mounted on hinge po	* see Service Manual chapter 5.2.5 'Adjusting the electrical seat tilt		X = no tilt possible			Default Factory Settings per Seat Height / Seat Cushion Depth		= setting for seat cushion depth 39 cm	) <	= setting for seat cushion depth 45 cm		***** = setting for seat cushion depth 39 cm with Comfort backrest		****** = setting for seat cushion depth 45 cm with Comfort backrest			Warnings		= no tilt possible for seat cushion depth 39 cm with Comfort backres	) (	= no tilt possible for seat cushion depth 45 cm with Comfort backres				
	Hole 9	55 cm	HP1 HP2			×	×	×	×	×	×	×	×	×	X 20	X 20	× 20	× 20	× 20	× 20	X 20	× 20	× 20	X 20	X 20	25 20	25 20	25 20	25 20	25 20	25 20	25 20	25 20
	8 8	m	HP2			×	×	×	×	×	×	×	×	20	20	20	20	20	20	20	20	20	20	20	20	70	20	20	20	20	70	20	20
	Hole 8	53 cm	HP1			×	×	×	×	×	×	×	×	×	X	×	×	×	×	×	25	×	×	×	25	25	25	25	25	25	22	25	25
(m	le 7	51 cm	HP2	alaadw	N IOU	×	X	X	×	X	X	×	20	20	20	20	20	20	20	20	20	70	20	20	20	20	20	20	20	20	20	20	20
Backrest Adjustment Setting (hole no.   seat depth in cm)	Hole 7	51	HP1	or 2 post assistable due to interference with castor wheels	castol	×	×	×	×	×	×	×	×	×	×	×	×	×	×	25	25	×	×	25	25	25	25	25	25	25	25	25	25
seat de	Hole 6	49 cm	HP2	d+ivv o	- N	×	×	×	×	×	×	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	70	20	20
ou e	Ĭ	46	HP1	rforonc		×	×	×	×	×	×	×	×	×	×	×	×	×	25	25	25	×	25	25	25	25	25	25	25	25	25	25	25
əloų) gı	Hole 5	47 cm	I HP2	to into	2	×	×	×	×	×	20	20	20		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
t Settir	Τ	4	2 HP1	مربام ماد	ם ממני	×	×	×	×	×	×	×	×	×	25	×	×	25	*.	25	25	25	25	25			25	25	25	25		25	25
nstmen	Hole 4	45 cm	1 HP2	availak	avallar	×	×	×	20	20	20	20	20	20	5 20	20	5 20	5 20	20	5 20	5 20	5 20	5 20	5 20	20	5 20	5 20	5 20	5 20	5 20	20	5 20	5 20
est Adju	+	_	P2 HP1	10 no t	10117	×	×	×	×	X	X	× 0	× 0:	20 25	20 25	X 02	20 25	25 25	20 ZE	20 25	20 25	20 25	20 25	20 25	20 25	20 25	20 25	20 25	20 25	20 25	20 25	20 25	20 25
Backre	Hole 3	43 cm	HP1 HF	holos 1 and		×	ו	<b>7</b>	× 20	χ Σ(	< 20	< 20	25 2	25 2	25 2	25 2	25 2	25 2	25 2	25 2	25 2		25 2	25 2	25 2	25 2	25 2	25 2	25 2	25 2	25 2	25 2	25 2
	-	_	НР2 Н	Jod	5	×	20	20	20	20	20	20	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2	20 2
	Hole 2	41 cm	HP1 H			×	×	×	25	×		25		25	25	25		25		25	25	25		25		25	25	25		25		25	25
	_	L	HP2 F		(	20	20	20	20	20	20	20	20	20	20	70	20	20	20	20	20	70	20	20 🐈	20	20	20	20	70	20	20	20	20
	Hole 1	39 cm	HP1			×	×	25	25	×	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	tting	no.)		+ 7	∞ +	6+	+ 10	+ 11	+ 12	+ 7	8 +	6+	+ 10	+ 11	+ 12	+ 7	8 +	6+	+ 10	+ 11	+ 12	+ 7	8 +	6+	+ 10	+ 11	+ 12	+ 7	ω +	6+	+ 10	+ 11	+ 12
	CoG Setting	(holes no.)		Hole 1	Hole 2	Hole 3	Hole 4 + 10	Hole 5 + 11	Hole 6 -	Hole 1	Hole 2	Hole 3	Hole 4 + 10	Hole 5 + 11	Hole 6	Hole 1	Hole 2	Hole 3	Hole 4 + 10	Hole 5 + 11	Hole 6 +	Hole 1	Hole 2	Hole 3	Hole 4 + 10	Hole 5 + 11	Hole 6 + 12	Hole 1	Hole 2	Hole 3	Hole 4 + 10	Hole 5 + 11	Hole 6 + 12
	Warnings	S S S S S S S S S S S S S S S S S S S		(	2	)	Q		)		<u> </u>	<u> </u>		<u> </u>			<u> </u>		<u> </u>		<u> </u>		<u> </u>							<u> </u>			
					ι	uo (	g′lt	7				шэ	77				ι	มว	3'9t	7				шэ	67				ι	no i	ց՛լ։	ì	
					ι	uo 🤉	9′0t	7				шэ	43				ι	มว	9'St	7				шэ	81⁄2				ι	uo 🤅	9′09	ì	_
						(	(wɔ	uį s	sl96	чм	θVi	, qu	.Þl	.W.	o.i	w	o ui	slə	ЭЦΛ	۸ Ә/	driv	1.8	. W	o.i	) bu	itte	S Ir	₹βi∈	9 <b>4</b> 1	Sea	;		

# FWD, Sedeo Lite, electrical tilt adjustment 0 - 25°

				Seat Tilt Range		25 = full tilt 0 - 25° (only if tilt module is mounted on hinge point 1*)		20 = limited tilt 0 - 20° (only if tilt module is mounted on hinge point 2*)	* see Service Manual chapter 5.2.5 'Adjusting the electrical seat tilt 0-25° '		X = no tilt possible			Default Factory Settings per Seat Height / Seat Cushion Depth		= setting for seat cushion depth 39 cm		= setting for seat cushion depth 45 cm		***** = setting for seat cushion depth 39 cm with Comfort backrest	•	••••• = setting for seat cushion depth 45 cm with Comfort backrest			Warnings		= no tilt possible for seat cushion depth 39 cm with Comfort backrest	<b>)</b> (	= no tilt possible for seat cushion depth 45 cm with Comfort backrest	•			
	Hole 9	55 cm	HP1 HP2	×	×	X	X	×	XX	X	X	×	×	×	X 20	X 20	X 20	X 20	× 20	X 20	X 20	X 20	X 20	× 20	25 20	25 20	25 20	25 20	25 20	25 20		25 20	25 20
	Hole 8	cm	HP2	×	×	×	×	×	×	×	×	×	×	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
	HOI	53 cm	HP1	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	25	×	×	25	25	25	25	25	25	25	25	25	25
cm)	Hole 7	51 cm	HP2	×	×	×	×	×	20	×	×	×	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20		20	20
seat depth in cm)	Ĭ	2.	2 HP1	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	25	25	×	25	25	25	25	25	25	25	25		25	25
	Hole 6	49 cm	1 HP2	×	×	×	X	20	20	×	X	20	. 20	70	5 20	20	20	20	5. 20	25 20	5 20	5 20	5 20	5 20	5. 20	25 20	5 20	5 20	5 20	5 20		5 20	5 20
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ent Setting (hole no.	Hole 5	47 cm	HP1 H	×	×	×	×	×	X	×	×	×	×	25 2	25 2	×	×	25 2	25	25 2	25 2		25 2	25	25 2	25 2	25		25 2	25 2		25 2	25 2
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	Hole 2	41 cm	1 HP2	20	20	20	5 20	20	5 20	20	5 20	20	20	20	5 20	5 20	5 20	5 20	20	5 20	5 20	5 20	5 20	20	5 20	5 20	5 20		5 20	5 20		, 20	20
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	CoG Setting	(holes no.)		Hole 1 +	Hole 2 + 8	Hole 3 + 9	Hole 4 + 10	Hole 5 + 11	Hole 6 + 12	Hole 1 + .	Hole 2 + 8	Hole 3 + 9	Hole 4 + 10	Hole 5 + 11	Hole 6 + 12	Hole 1 +	Hole 2 + 8	Hole 3 + 9	Hole 4 + 10	Hole 5 + 11	Hole 6 + 12	Hole 1 +	Hole 2 + 8	Hole 3 + 9	Hole 4 + 10	Hole 5 + 11	Hole 6 + 1	Hole 1 +	Hole 2 + 8	Hole 3 + 9	Hole 4 + 10	Hole 5 + 11	Hole 6 + 12
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					43 cm 45,5 cm 43 cm 40,5 cm																3′09	ì	_										
					Setting (i.c.w. 13" drive wheels in cm   i.c.w. 14" drive wheels in cm)											S Ir	ીβi∈	9 <b>4</b> 1	Sea														

# RWD, Sedeo Pro, electrical tilt adjustment 0 - 45°

	Gritari o	Seat Tilt Range		45 = full tilt 0 - 45°				A = no tilt possible		Default Factory Settings per Seat Height / Seat Cushion Depth		= setting for seat cushion depth 50 cm		= setting for seat cushion depth 54 cm		= setting for seat cushion depth 58 cm			Warnings		= no tilt possible for seat cushion depth 54 cm	)(	= no tilt possible for seat cushion depth 58 cm	D		Basic setting		6 = basic setting marked bold on frame																	
Max	Max	2	× :	×	× :	< >	< >	< >	< ×		15	15	15	15	15	15	20	20		25	25	25	25	25	25	25	35		30	30	30	30	35	40	45	40	35	40	AE	45	45	45	45	45	
17	29 cm	3	× :	×	× :	< >	< >	< >	< ×		15	15	15	15	15	20	20	20		25	25	25	25	25	25	32	40		30	30	30	32	40	45	45	40	40	45	AE	45	45	45	45	45	
16	58 cm	2	× :	×	× :	< >	< >	< >	<sup>×</sup> 10	2	15	15	15	15	20	20	20	20		25	25	25	25	25	32	40	45		30	30	32	40	45	45	45	40	45	45	AE.	45	45	45	45	45	
15	57 cm	2	× :	×	× :	< >	< >	< ?	01	2	15	15	15	20	20	20	70	30		25	25	25	25	32	40	45	45		30	32	40	45	45	45	45	40	45	45	4E	45	45	45	45	45	
14	26 cm	2	× :	×	× :	< >	< 5	10	2 2	2	15	15	20	20	20	20	30	35		25	25	25	32	40	45	45	45		32	40	45	45	45	45	45	40	45	45	AE.	45	45	45	45	45	
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	49	505	10	15	15	30	32	40	45	CoC	35	40	45	45	45	45	45	45	000	45	45	45	45	45	45	45	45	000	45	45	45	45	45	45	45	70J	45	45	AE	45	45	45	45	45	
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	44 cm		45	45	45	40	40	40	45	2	45	45	45	45	45	45	45	45		45	45	45	45	45	45	45	45		45	45	45	45	45	45	45	40	45	45	45	45	45	45	45	45	
-	43 cm		45	45	45	45	45	45	45	2	45	45	45	45	45	45	45	45		45	45	45	45	45	45	45	45		45	45	45	45	45	45	45	40	45	45	AE.	45	45	45	45	45	Ш
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Seat height Setting (i.c.w. 13" drive wheels in cm  $\mid$  i.c.w. 14" drive wheels in cm)

# FWD, Sedeo Pro, electrical tilt adjustment 0 - 45°

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Seat height Setting (i.c.w. 13" drive wheels in cm | i.c.w. 14" drive wheels in cm)

# RWD, Sedeo Pro, electrical tilt adjustment 0 - 25°

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Marming Cook Switting 41 mm 44 mm 45 mm 44 mm 41 mm 44 mm 47 mm 44 mm 45 mm 54 mm 54 mm 54 mm 44 mm 44 mm 44 mm 44 mm 44 mm 47 mm 44	10	52 c	H H	$\times$	×	:   >	< >	< >	< :	×	$\times$	×	×	$\times$	×	×	×	×	×	×	×	×	$\times$	×	×	×	×	×	×	25	25	×	25	25	25	25	25	25	25	25	25	25	25	6	25	25	25	25	HP1	
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= setting for seat cushion depth 50 cm

setting for seat cushion depth 54 cm

no tilt possible for seat cushion depth 54 cm

= basic setting marked bold on frame

no tilt possible for seat cushion depth 58 cm

setting for seat cushion depth 58 cm

no tilt possible

limited tilt 0 - 20° (only if tilt module is mounted on hinge point 2°)  $^\ast$  see Service Manual chapter 5.2.5

= full tilt 0-25° (only if tilt module is mounted on hinge point 1\*)

25 20

# FWD, Sedeo Pro, electrical tilt adjustment 0 - 25°

14         15         16         17         Max           cm         57 cm         58 cm         59 cm         Max           HP2         HP1         HP2         HP1         HP2	× > > × > × > × > × > × > × > × > × > ×	< > < > < > < > < > < > < > < > < > < >	<			× × × × × × × ×	× × × × × × × ×	× × × × × × × ×	20 X 20 X 20 X 20 X 20	X 20 X 20 X 20 X	× × × × × × × × × × × × × × × × × × ×	07 × 07 × 07 × 07 × 07	× × × × × × × × × × × × × × × × × × ×	× × 20 × 20 × 20 × × 20 × ×	20 X 20 X 20 X 20 X 20	20 × 20 × 20 × 20 × 20	20 X 20 X 20 X 20 X 20	20 X 20 X 20 X 20 X 20	× 20 × 20 ×	× 20 × 20 × 20 ×	× 20 × 20 × 20 × × 30 × ×	20 × 20 × 20 × 20 × 20 × 20 × 20 × 20	25 20 × 20 × 20 ×	25 20 25 20 X 20 X	25 20	25 20 25 20 25 20 25	25 20 25 20 25 20 25	20 25 20 25 20 25 20 25 20 25 20	25 20 25 20 25 20 25	20 25 20 25 20	25 20 25 20 25 20 25	20 25 20 25 20 25 20 25 20	25 20 25 20 25 20 25	25 20 25 20 25 20 25	25 20 25 20 25 20 25	20 25 20 25 20	25 20 25 20 25 20	25 20 25 20 25 20 25	25 20 25 20 25 20	20 25 20 25 20 25 20 25 20	
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= full tilt 0 - 25° (only if tilt module is mounted on hinge point 1\*) 25

basic setting marked bold on frame

9

 no tilt possible for seat cushion depth 54 cm no tilt possible for seat cushion depth 58 cm

setting for seat cushion depth 50 cm = setting for seat cushion depth 54 cm setting for seat cushion depth 58 cm

limited tilt 0 - 20° (only if tilt module is mounted on hinge point 2")  $^{\ast}$  see Service Manual chapter 5.2.5



20

= no tilt possible

# RWD, Sedeo Pro+, electrical tilt adjustment 0 - 45° (no limitation FWD, Sedeo Pro+)

	Seat tilt range		45 = full tilt 0 - 45°		35-10 = limited tilt		X = no tilt possible		Basic setting		6 = basic setting marked bold on frame																														
Max	×	×	×	×	10	15	25	35	20	25	25	35	40	40	40	40	40	40	40	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
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- 58 cm	×	×	10	15	25	35	35	40	25	32	40	40	40	40	45	45	40	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
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56 cm	10	15	25	35	35	40	40	40	40	40	40	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
55 cm	15	25	35	35	40	40	40	45	40	40	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
54 cm	25	32	35	40	40	40	45	45	40	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
53 cm	35	32	40	40	40	45	45	45	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	eps of 5)
52 cm	35	40	40	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	lax. tilt (45 to 10 in steps of 5)
51 cm	40	40	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	ilt (45 to
50 cm	40	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	Max. t
49 cm	40	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
48 cm	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
47 cm	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
46 cm	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
45 cm	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
44 cm	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
43 cm	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
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Seat height Setting (i.c.w. 13" drive wheels in cm  $\mid$  i.c.w. 14" drive wheels in cm)

# 5.5 Guidelines to solve shimmy problems

If the castor wheels shimmy at a higher speeds (≥10 km/h), check the following points:

Possible cause	Check	Solution
The anti-shimmy set does not function properly.	Check the anti-shimmy set: In case of a 10kmh Puma, the castor fork should only make a half/three-quarter turn when pushed (with its wheel of the ground). In case of a 12.5kmh RWD Puma, the castor fork should only rotate a quarter to a half turn (since this is equipped with a different disk spring).	If the castor fork turns to loose; replace the anti-shimmy set, as described in the mounting instruction 5.2.2 Step 6 Change the position of the castor wheels
Not enough pressure on the castor wheels.	Check the setting of the seating system.  Normally the Center of Gravity setting should be the same as the back depth (6-6, 10-10 etc).	In case of a light-weight user, it might help to set the CoG setting of the seating system a little more towards the castors. Adjust the setting as described in the Sedeo user manual. This will result in more pressure on the castor wheels.  Note; adjustment of the seating system should always be done with caution, since incorrect weight distribution might negatively affect drive performance and comfort.
There is not enough friction in the front fork for this specific user and/or configuration.	Check the environment of use; is the wheelchair mainly used at higher speed outdoors, or more indoors (on carpet)?	In the case that the other solutions are not sufficient or unwanted: the anti-shimmy set can be adapted with a thicker disk spring (XT), which will increase the friction in the fork. (A 12.5 km/h RWD is standard equipped with this XT disk spring 9008818).  Note; the thick disk spring will cause the fork to turn less easy. This can have a negative effect on behavior on carpet, in combination with heavy users.
High tire pressure (air castors only).	Check the tire pressure of the castor wheels.	The tires can be inflated up to 3.5 bar; in case of shimmy problems, it might help to lower the tire pressure of the castor wheels (min. is 1.5 bar).  Note; This is not a preferred solution. Lower tire pressure will result in more friction between the wheel and ground. This can cause problems when turning on carpet and can have a negative effect on the range.

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# 6 Trouble shooting

If your electric wheelchair is not working even though the batteries are fully charged, the following checks can be carried out before contacting your supplier.

Check whether all of the battery clips are firmly in place.

Check whether the freewheel handle is in the drive mode (and not in the freewheel / neutral mode).

Troubleshooting table

If your scooter is not working, or is not working as it should, go through the following list of possible problems before contacting your supplier. You may be able to solve the problem yourself.

## 6.1 Shark faultfinding table

Signal	Possible cause	Remedy
service indicator flashes once.	User error	This is probably a 'STALL' timeout. Place the joystick in neutral and try again
service indicator flashes twice	Battery fault	Check the batteries and the cabling Charge the batteries or replace them.
ON/OFF light	The m1 motor connection is faulty	Check the motor connections and cabling.
flashes three times	The m1 motor is defective	Replace this motor
ON/OFF light	The connection of the m2 motor is faulty.	Check the motor connections and cabling.
flashes four times	The m2 motor is defective	Replace this motor
ON/OFF light:	The m1 parking brake connection is faulty or loose.	Correct the connection
liasties 5 tillies	The m1 parking brake is defective.	Replace the parking brake
ON/OFF light: flashes 6 times	The m2 parking brake connection is faulty or loose.	Correct the connection
liasties o times	The m2 parking brake is defective.	Replace the parking brake
ON/OFF light flashes 7 timest	There is a fault in the controller	Check all connections and correct as necessary If a fault signal is still present after this, replace the power module.
ON/OFF light flashes 8 times	There is a fault in the power module	Check all connections and correct as necessary If a fault signal is still present after this, replace the power module.
ON/OFF light flashes 9 times	There is a communication fault in the Shark system.	Check the connection and correct it if necessary.  If a fault signal is still present after this, replace the controller.
ON/OFF light flashes 10 times	Unknown fault	Check all connections and correct as necessary Consult a service engineer.
ON/OFF light flashes 11 times	System does not 'fit'. System modules are not compatible.	Check that the type of the controller corresponds with the power module.  Replace one of the two if necessary.

#### Note:

If all the plugs are connected properly and you have used the troubleshooting list but not found the cause, contact the Service Department of Sunrise Medical HCM.

▲ Before changing Shark bus cables, fuses and/or modules, remove both fuses from the battery compartment, so that the system is dead.

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# 6.2 R-net faultfinding table

Trip Text	Trip Code	Description
Joystick Error	-	The most common cause of this trip is if the joystick is deflected away from center before and during the time the control system is switched on. The joystick displaced screen will be displayed for 5 seconds, if the joystick is not released within that time then a trip is registered. Although a trip screen is not displayed the system log will show the trip and numbers of occurrences.  • Ensure that the joystick is centered and power-up the control system. If the trip is still present then the joystick or Joystick Module may be defective.
Low Battery	-	This occurs when the control system detects that the battery voltage has fallen below 16V.  • Check the condition of the batteries and the connections to the control system.  If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective.
High Battery	-	This occurs when the control system detects that the battery voltage has risen above 35V. The most common reasons for this are overcharging of the battery or bad connections between the control system and the batteries. • Check the condition of the batteries and the connections to the control system.  If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective.
M1 Brake Error	1505	This occurs when the control system detects a problem in the solenoid brakes or the connections to them.  • Check the solenoid brakes, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the Power Module may be defective.
M2 Brake Error	1506	This occurs when the control system detects a problem in the solenoid brakes or the connections to them.  • Check the solenoid brakes, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the Power Module may be defective.
M1 Motor Error	3B00	This occurs when the control system detects that a motor has become disconnected.  • Check the motors, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the Power Module may be defective.
M2 Motor Error	3C00	This occurs when the control system detects that a motor has become disconnected.  • Check the motors, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the Power Module may be defective.
Inhibit Active	1E01 1E09 1E0A	This occurs when any of the Inhibit inputs are active and in a latched state.  The actual inhibit that is active is indicated by the last 2 digits in the Trip Code.  • Cycle the power. This will drop out of Latched Mode which might clear the trip.  • Check all wiring and switches connected to the indicated Inhibits.  If the trip is still present after the above checks have been made, then the ISM may be defective.
Joystick Calibration Error	-	This occurs when the Joystick Calibration process has not been successful.  • Enter OBP and attempt calibration.  If the trip is still present after the above has been attempted, then the Joystick Module may be defective.
Latched Timeout	-	This occurs when the control system detects that the Latched Timeout programmed time has been exceeded. For example, the Input Device, Joystick, Head Aray, Sip and Puff, etc.) has not been operated frequently enough.  The trip is a notification of why the control system has dropped out of Latched Mode.  • Cycle the power.  • Initiate Latched Mode.  If the trip is still present after the above checks have been made, then the Input Device may be defective.
Brake Lamp Short	-	This occurs when the control system detects a short in the Brake Lamp Circuit.  • Check the brake lamps, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the ISM may be defective.

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Trip Text	Trip Code	Description
Left Lamp Short	7205	This occurs when the control system detects a short in either of the Lamp Circuits.  • Check the lamps, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the ISM may be defective.
Right Lamp Short	7209	This occurs when the control system detects a short in either of the Lamp Circuits.  • Check the lamps, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the ISM may be defective.
Left Indicator Lamp Short	7206	This occurs when the control system detects a short in either of the Indicator Circuits.  • Check the indicators, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the ISM may be defective.
Right Indicator Lamp Short	720A	This occurs when the control system detects a short in either of the Indicator Circuits.  • Check the indicators, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the ISM may be defective.
Left Indicator Lamp Failed	7207	This occurs when the control system detects a failure in either of the Indicator Circuits. This is most likely to be an indicator bulb failure.  • Check the indicator bulbs, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the ISM may be defective.
Right Indicator Lamp Failed	7208	This occurs when the control system detects a failure in either of the Indicator Circuits. This is most likely to be an indicator bulb failure.  • Check the indicator bulbs, cables and connections to the control system.  If the trip is still present after the above checks have been made, then the ISM may be defective.
Over Current	-	<ul> <li>This occurs when the Intelligent Seating/lighting Module (ISM) has detected an over-current condition in the wheelchairs actuator circuit(s).</li> <li>Check the wiring and connectors to all the wheelchair's actuators and cycle the power.</li> <li>If the problem persists, check the actuator mechanisms are in good working order. If there are any obstructions or there is too much friction in the system, then an excessive amount of current may be drawn. Check also that any end-stop switches are operating correctly and terminate the power to an actuator.</li> <li>If the trip persists, contact your service center.</li> </ul>
		In configurations fitted with an Intelligent Seating Module (ISM) and R-net controller, it is possible that extreme electrical discharge situations (due to static electricity) may cause a fault message ('ISM over-current') flashing on the screen. If this occurs the wheelchair can be turned off for a few seconds and back on again to clear the fault.
Overtemp. (Lamps)	-	This occurs when the control system detects that the ISM's actuator circuitry has become too hot. The control system will cease drive to the actuator motor in question.  • Allow the ISM to cool.  • If the ISM is frequently overheating check the condition of the actuator motors and the connections to them.  • If the trip persists contact your service agent.
Overtemp. (Actuators)	-	This occurs when the control system detects that the ISM's actuator circuitry has become too hot. The control system will cease drive to the actuator motor in question.  • Allow the ISM to cool.  • If the ISM is frequently overheating check the condition of the actuator motors and the connections to them.  • If the trip persists contact your service agent.
DIME Error	-	This occurs when the control system detects an identification conflict between two modules in the system.  If a new module has been introduced:  • Disconnect the new module and cycle the power.  • If no trip is present connect the new module to the system and cycle the power.  • If the trip reappears then the new module must be the cause of the problem.  If there has been no additions:  • Disconnect one module at a time and cycle the power.  If the trip is still present after the above checks have been made, contact your service agent.

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Trip Text	Trip Code	Description
Memory Error	-	This is a non specific memory error which could be caused by any of the modules within the system.  Check all cables and connections.  Cycle the power.  If the trip is still present and the system contains 3rd party Modules:  Disconnect all the non PGDT modules and cycle the power.  If this has cleared the trip:  Connect each 3rd party module in turn, cycling the power each time.  If the trip reappears after one of the power cycles then the last module to have been added to the system must be defective.  If the trip is still present after the above checks have been made, then the PM may be defective.
PM Memory Error	-	This is a specific Power Module based trip.  • Check all cables and connections.  • Using the R-net PC Programmer, re-program the control system.  This should be done with either the most current specific program file for the wheelchair or the manufacturers original programming file.  If the trip is still present after the above checks have been made, then the PM may be defective.
Bad Cable	-	This occurs when the control system detects a fault in the wiring in the communication cables between any of the modules.  • Check all cables and connections for continuity.  • If there is any visible damage to cables, replace and cycle power.  • Disconnect one cable from the system at a time cycling the power after each disconnection. If the trip is still present after the above checks have been made, then the PM may be defective.
Bad Settings	-	This occurs when the control system detects incorrect or invalid program settings.  • Check all parameter settings and re-program the control system using the R-net PC Programmer.  • Make a note of the current parameter settings and then reset the control system to default settings.  • Re-program the required settings in small groups, cycling the power after each group to see if the trip occurs.  If the trip is still present after the above checks have been made, then the PM may be defective.
Module Error	-	This occurs when the control system detects a trip within a specific module. The module will be identified on the diagnostics Screen.  • Check all cables and connections.  • Cycle the power.  If the trip is still present after the above checks have been made, then the module identified may be defective.
System Error	-	This occurs when the system detects a trip which cannot be attributed to a specific module.  • Check all cables and connections.  • Cycle the power.  If the trip is still present and the system contains 3rd party Modules:  • Disconnect all the none PGDT modules and cycle the power.  If this has cleared the trip:  • Connect each 3rd party module in turn, cycling the power each time.  • If the trip reappears after one of the power cycles then the last module to have been added to the system must be defective.  If the trip is still present after the above checks have been made, then the PGDT control system may be defective
SID Detached	-	The Omni has detected that the Specialty Input Device (SID) has become disconnected.  • Check all cables and connectors between the Omni and the SID.  If the error persists:  • Check that the setting of the parameter, 9-Way Detect, is appropriate for the SID that is being used. For example, if the SID has no detect-link, then this parameter should be set to Off.  If the trip is still present after the above checks have been made, then the Input Device may be defective. Contact your service agent.

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Trip Text	Trip Code	Description	
User Switch detached	-	The Omni has detected that the User Switch has become disconnected.  • Check all cables and connectors between the Omni and the User Switch.  If the trip is still present after the above checks have been made, then the User Switch may be defective. Contact your service agent.  If it is required to use the Omni without a User Switch being connected, then the parameter, Switch Detect, should be set to Off. If a User Switch is not used the responsibility for that decision lies with the healthcare professional.	
Gone to Sleep		This occurs when the control system has been left inactive for a time greater than the parameter Sleep Timer.  An entry is made in the system log each time this occurs.	
Charging		This occurs when the control system detects that a charger is connected to either Inhibit 1 or Inhibit 3. Refer to section 2.3 for connection details The Battery charging screen will be displayed during charger connection.  An entry is made in the system log each time this occurs. If an On-Board Charger is used:  • Disconnect the charger from the AC supply. If an Off-Board Charger is used:  • Disconnect the charger from the Wheelchair. If the trip is still present after the charger has been disconnected then the Joystick Module may be defective.	

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# 6.3 DX2 faultfinding table

Signal	Possible cause	Remedy
ON/OFF light	The controller plug is not properly inserted in the 'power module'.	This is probably a 'STALL' timeout. Place the joystick in neutral and try again
does not go on: the wheelchair does not move.	Both fuses are defective	Replace the defective fuses.
	The batteries are not properly connected.	Check the connections.
	A connection of the batteries is loose.	Secure the connection.
ON/OFF light: flashes once	DX module faulty.	Replace one or more modules. The "on/off" LED indicates the condition of the entire system. The modules all have a separate status LED: in this way, you can see which one is faulty.
		The module displays a fault as a result of a programming fault or short circuit and/or overload of the accessories.
ON/OFF light: flashes twice.	DX accessory faulty.	The (optional) electrical high/low adjustment is not in the lowest position. The LED flashes twice to indicate that the speed limitation has been switched on: the wheelchair will drive considerably more slowly.
	The m1 motor connection is faulty or loose	Check the connection and secure it.
	The m1 motor is defective	Replace this motor.
	Short circuit in the m1 motor connections.	Correct the connections.
ON/OFF light: flashes three times	Defective power module output.	Check the motor for a defect: an output of the power module will only become defective through a defect in the motor itself.  Only replace the power module if the fault occurs immediately upon switching the unit on. If the fault occurs when you are starting to drive, the entire left-hand motor circuit is causing the fault.  In this case, replace the entire drive unit concerned.
	The m2 motor connection is faulty or loose.	Check the connection and secure it
	The m2 motor is defective	Replace this motor.
	Short circuit in the m2 motor connections.	Correct the connections.
ON/OFF light: flashes four times	Defective power module output.	Check the motor for a defect: an output of the power module will only become defective through a defect in the motor itself.  Only replace the power module if the fault occurs immediately upon switching the unit on. If the fault occurs when you are starting to drive, the entire left-hand motor circuit is causing the fault.  In this case, replace the entire drive unit concerned.
ON/OFF light:	The m1 parking brake connection is faulty or loose.	Correct the connection.
nasnes 5 times	The m1 parking brake is defective.	Replace the drive motor.
ON/OFF light:	The m2 parking brake connection is faulty or loose.	Correct the connection.
flashes 6 times	The m2 parking brake is defective.	Replace the drive motor.
ON/OFF light: flashes 7 times	The battery voltage is low, or the batteries are flat or bad	Charge the batteries or replace them.  Note:  If the voltage is low (< 12 V) the electronics will not work properly. A number of random LEDs of the 'DX' controller flash and the wheelchair will not function.
ON/OFF light: flashes 8 times	The battery voltage is high, above 32 V.	This usually occurs during (trickle) charging. Frequent occurrence will result in a defective power module. Set the charger correctly.
ON/OFF light: flashes 9 times	'BUS low' fault: cable breakage (in one of the DX bus cables) or short circuit in the DX bus system (entrances to the modules)	Check the cables and the modules and replace if necessary.

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Signal	Possible cause	Remedy
ON/OFF light: flashes 10 times	Bus high fault: usually a communication fault caused by one of the DX bus cables or DX modules (entrances to the modules)	Check the cables and the modules and replace if necessary.
ON/OFF light: flashes 11 times	'STALL' overload fault: A motor is continually demands too much power.	Check the drive units.  Note: This fault is often caused by taking obstacles that are too high, or driving against walls, and door frames, etc.  This fault may also be caused by a difficult turn from a standing position. Check the weight distribution of the chair.
ON/OFF light: flashes 12 times	System does not 'fit'. System modules are not compatible.	Program the entire drive system for the relevant wheelchair with the aid of the DX-Wizard program on the PC. Always confirm the programming by switching the wheelchair on and off.

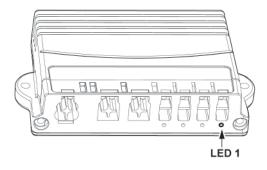
#### Note:

If all the plugs are connected properly and you have used the troubleshooting list but not found the cause, contact the Service Department of Sunrise Medical HCM.

▲ Before changing DX bus cables, fuses and/or modules, remove both fuses from the battery compartment, so that the system is dead.

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# **DX2-ACT Flash Code List**



## Note:

These flash codes are the Actuator Module flash codes that are visible on LED 1 of the Actuator Module. They are not the DX System flash codes that are visible on the DX System status LED on the Master Remote. For DX System flash codes, see DX2 faultfinding table

Flash Code	Fault source	Sub code (HHP)	Meaning
		00	Wizard programming in progress  • Finish programming and then turn the system off and on.  • Make sure that you wait 10 seconds after you have turned the system off before you turn it on again.
01	User	01	Power Down in progress  • Wait 10 seconds before you turn the system on again.
		02	Joystick source changed to a joystick that is not in the centre position • Release the joystick to the centre
		03	Invalid Actuator Profile (A-F) or direction demand • If this happens often, contact the Service Department of Sunrise Medical HCM
		none	see DX2 System condition indications
02	Slow function battery	00	Battery Voltage too low or too high  • Check the batteries and the cables  • Batteries may be empty: charge the batteries  • Batteries may be damaged: replace the batteries  Batteries may be overcharged: if driving downhill, slow down
		00 01 02 03	Internal current or Voltage fault  • Contact the Service Department of Sunrise Medical HCM
03	Actuator	04 05	Actuator motor voltage is not what it should be during drive Possible motor short circuit • check the actuator cables for damage • check that the actuator is not faulty • Otherwise internal controller fault, contact the Service Department of Sunrise Medical HCM
		06	Failed To Stop
		07	Too Many Fast Current Limit Events
		08	Driving Stopped Due To Trip
		All	Internal fault
		other	Contact the Service Department of Sunrise Medical HCM
		01	Module ID collision  • Check that multiple Actuator Modules in the system do not have the same ID
		02	System check failed
		03	Missing system check
06	Configuration	05	DX System internal fault Actuators will not move when the DX System itself is in a fault state
	3	All other	Internal DX2-ACT configuration fault  • Check DX BUS cables  • Turn the system off and on several times.  Make sure to wait 10 seconds before you turn the system on again.  • If turning the system off and on does not help, contact the Service Department of Sunrise Medical HCM

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Flash Code	Fault source	Sub code (HHP)	Meaning
09, 10	DX BUS	All	DX BUS hardware fault  • Check DX BUS cables  • Turn the system off and on several times. Make sure to wait 10 seconds before you turn the system on again.  • If all DX BUS connections are OK and turning the system off and on does not help, contact the Service Department of Sunrise Medical HCM
All other	Internal fault	All	Contact the Service Department of Sunrise Medical HCM

## **DX2 System condition indications**

	Condition	DX2-ACT indication	DX2-REM550 indication (DX2)	DX-REMG90 indication (DX)
	CLAM is enabled	None, but ACT will not drive actuators	None	None
DX System Faults	Master Remote in Fault State	FC6	FC according to fault	FC according to fault
	DX2-ACT detects CAN Fault	FC6/9/10, depending on actual fault	FC according to fault detected by Remote	FC according to fault detected by Remote
	Module ID Collision (2 modules with same ID)	FC6, No DX BUS communication	Actuator system will be "missing"*	None
	ACT Module Missing "Slow1/Slow2"	None	FC2, Drive inhibit*	Not detected
Actuator System	ACT Module Missing "Stop"	None	FC2*	Not detected
Configuration Faults	Actuator Module Local Fault	FC2 on remaining ACT Module	Drive Inhibit	Drive Inhibit
	Actuator Module Local Fault	See DX2-ACT Flash Code List	None	None
	ACI "Flash Code 2"	FC2	FC2	FC2
	ACI "Stop (Drive Inhibit)"	FC2	Drive inhibit	Drive inhibit
ACI "Slow" function active	ACI "System Slowdown"	FC2	FC2	FC2
	ACI "Local Slow"	FC2	Reduced speed on Speedometer	None
	ACI in Speed Pot or Speed Limit mode, with outputs less than 100%	FC2	Reduced speed on Speedometer	None

<sup>\*</sup>The REM550 responds to a missing DX2 actuator system if the following parameters are set:

ParameterRequired ValueActuator System TypeDX2 Actuator System

Actuator System Is Critical Yes Actuator System Missing "St

Actuator System Missing "Stop Drive" or "Slowdown Drive", as desired.

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# 6.4 VR-2 faultfinding table

# Trip types and their possible causes

Once the trip type has been established, refer to the relevant section below for further information.

Trip code	Trip Type	Description & Reference
1320	-	Refer to "Current Limit Active"
1505	9	M1 Selenoid Brake Trip, refer to "Type 9 - Solenoid Brake Trip"
1506	9	M2 Selenoid Brake Trip, refer to "Type 9 - Solenoid Brake Trip"
1600	10	High Battery Voltage, refer to "Type 10 - High Battery Voltage"
1E03	Charging	Refer to "Type 6 - Charger Connected"
1E04	6	Refer to "Inhibit 2 Active"
1E05	Charging	Refer to "Inhibit 3 Active"
2C00	1	Low Battery Voltage, refer to "Type 1 - Low Battery Voltage"
2C02	-	Low Battery Lockout, refer to "Type 1 - Low Battery Voltage"
2F00	User	Refer to sections, refer to "Type 7 - Possible Joystick Trip" & "Joystick Displaced at Power-up"
3B00	2	M1 motor disconnected, refer to "Type 2 - m1 motor Disconnected"
3C00	4	M2 motor Disconnected, refer to "Type 4 - m2 motor Disconnected"
3D00	3	M1 motor Wiring Trip, refer to "Type 3 - m1 motor Wiring Trip"
3D01	3	M1 motor Wiring Trip, refer to "Type 3 - m1 motor Wiring Trip"
3E00	5	M2 motor Wiring Trip, refer to "Type 5 - m2 motor Wiring Trip"
3E01	5	M2 motor Wiring Trip, refer to "Type 5 - m2 motor Wiring Trip"
4401	8	Control System Trip, refer to "Type 8 - Possible Control System Trip"
5400	7 + S *	Communications Trip, refer to "Communication Error"
7A03	A Only **	Actuator Motor Wiring Trip, refer to "Actuator Motor Wiring Trip"
7100	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7101	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7102	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7103	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7104	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7147	User	Dual Joystick Displaced Refer to "Joystick Displaced at Power-up"
7902	-	Refer to "High Temperature"
All Other Codes	7 or 8	Possible Control System Trip, refer to "Type 7 - Possible Joystick Trip" & "Type 8 - Possible Control System Trip"

<sup>\* -</sup> S = Flashing Speed Indicator LED's.

<sup>\*\* -</sup> A = Flashing Actuator LED's

Trip	Possible cause	Remedy
Type 1	Low Battery Voltage	This occurs when the control system detects that the battery voltage has fallen below 16V. Check the condition of the batteries and the connections to the control system. If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective. Refer to Section 5. In the case of 2C02 the Control System is making a log of the times that the Low Battery Lockout has been initiated.
Type 2	Left Motor Disconnected	This occurs when the control system detects that the left motor has become disconnected. Check the left motor, motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5. The VR-2 control system may be programmed to exchange the left and right motor outputs. In this instance, this section will refer to the right motor. Consult the wheelchair manufacturer for more details.
Type 3	Left Motor Wiring Trip	This occurs when the control system detects a fault in the wiring to the left motor. In particular if a motor connection has short-circuited to a battery connection. Check the left motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5. The VR-2 control system may be programmed to exchange the left and right motor outputs. In this instance, this section will refer to the right motor. Consult the wheelchair manufacturer for more details.

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Trip	Possible cause	Remedy
Type 4	Right Motor Disconnected	This occurs when the control system detects that the right motor has become disconnected. Check the right motor, motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5. The VR-2 control system may be programmed to exchange the left and right motor outputs. In this instance, this section will refer to the left motor. Consult the wheelchair manufacturer for more details.
Type 5	Right Motor Wiring Trip	This occurs when the control system detects a fault in the wiring to the right motor. In particular if a motor connection has short-circuited to a battery connection. Check the right motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5. The VR-2 control system may be programmed to exchange the left and right motor outputs. In this instance, this section will refer to the left motor. Consult the wheelchair manufacturer for more details.
Type 6	Charger Connected	This occurs when the control system detects that an off-board charger is connected. Check that the battery charger is disconnected. If the trip is still present after the charger has been disconnected then the Joystick Module may be defective. Refer to Section 5.
Type 7	Possible Joystick Trip	This occurs if the control system detects a problem within its own joystick, or there is a communications error between the Joystick Module and Power Module. The joystick can only be replaced by a person authorized by the wheelchair manufacturer.  7100 Loss of comms to the joystick, check the joystick cable and, if you have authorization the joystick ribbon cable, connections and mating sockets. 7101 Loss of comms to the joystick, check the joystick cable and, if you have authorization the joystick ribbon cable, connections and mating sockets. 7102 Loss of power to the joystick, check check the joystick cable and, if you have authorization the joystick ribbon cable, connections and mating sockets. 7103 Internal trip, if you have authorization check the joystick ribbon cable, connections and mating sockets. Ensure the cable is connected correctly to both the joystick and the PCB. 7104 Internal trip, if you have authorization check the joystick ribbon cable, connections and mating sockets. Ensure the cable is connected correctly to both the joystick and the PCB. Refer to Section 1.2 for details on removal, fitting and calibration of the joystick. If the trip is still present after the appropriate checks have been made then the Joystick Module may be defective. Refer to Section 5.
Type 8	Possible Control System Trip	This occurs if the control system detects a problem within itself. The control system can only be repaired by an authorized person. Refer to Section 5.
Type 9	Solenoid Brake Trip	This occurs when the control system detects a problem in the solenoid brakes of the connections to them.  1505 - Left Brake Trip 1506 - Right Brake Trip Check these connections and the solenoid brakes. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5.
Type 10	High Battery Voltage	This occurs when the control system detects that the battery voltage has risen above 35V. The most common reason for this are overcharging of the battery or bad connections between the control system and the batteries. If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective. Refer to Section 5.

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Possible cause	Remedy
Joystick Displaced at Power-up	The most common cause of this trip is if the joystick is deflected away from the center when the control system is being switched on. When the control system is switched on, the battery gauge will blink for a short time. Check that the user is not deflecting the joystick before the blink finishes. If the problem persists, refer to section .37.
Communication Error	The most likely cause of a communication error is a defective cable between the Power Module and the Joystick Module. The cable should be checked for damage, and replaced if found to have a fault. The Joystick Cable can only be replaced by a person authorized by the wheelchair manufacturer. Refer to Section 1.3 for the replacement procedure. If the problem persists then either the Power Module or the Joystick Module could be defective. Refer to Section 5.
Inhibit 2 Active	This occurs when the Inhibit 2 Input is active. The Inhibit 2 input is via the INH-2 way connector and is normally associated with speed limit or actuator functions. The operation of Inhibit 2 will depend upon the programmed settings and the wheelchair on which it is being used. Check all wiring and switches connected to Inhibit 2. If these appear to be in working order, then the Power Module may be defective. Refer to Section 5.
Inhibit 3 Active	This occurs when the Inhibit 3 Input is active. The Inhibit 3 input is via the 3 way on-board charger (OBC) and is normally associated with this function. The operation of Inhibit 3 will depend upon the programmed settings and the wheelchair on which it is being used. Check all wiring, switches and OBC (if fitted) connected to Inhibit 3. If these appear to be in working order, then the Power Module may be defective. Refer to Section 5.
Actuator Motor Wiring Trip	This occurs when the control system detects a fault in the wiring to either actuator motor. Check the motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5.
Current Limit Active	This occurs when the control system operates above the Current Limit Threshold for a periode of time greater than the Current Limit Time. It has been designed to notify the Healthcare Technician that the control system has operated outside of its programmed range.
High Temperature	This occurs when the control system reaches its Temperature Threshold and thus becomes to hot. The controller will not allow drive until the controller to cooled down. An entry is made in the system log each time the controller gets too hot and goes out of drive.

# 7 Technical product information

# 7.1 CE Declaration and standards



This product complies with the COUNCIL DIRECTIVE 93/42/EEC of 14 June 1993 concerning medical devices. The product also meets the following requirements and standards. This has been verified by independent test organizations.

Standard	Definition/description	Test dummy weight
EU guideline 93/42 EEC	93/42 EEC Requirements as stated in Appendix 1 apply n/a	n/a
NEN-EN 12182	The EN 12182 requirements as stated in NEN-EN 12184 (2009): Technical aids for disabled persons - General requirements and test methods October 1999	Puma 20: 136 kg Puma 40: 160 kg
NEN-EN 12184 (2009) Class B	Electrically powered wheelchairs, scooters and their chargers - Requirements and test methods October 2009	Puma 20: 136 kg Puma 40: 160 kg
ISO 7176-8	Requirements and test methods for impact, static and fatigue strengths July 1998	n/a
ISO 7176-9	Climatic tests for electric wheelchairs IPX4	n/a
ISO 7176-14	Requirements and test methods for power and control systems for electrically powered wheelchairs 1997	n/a
ISO 7176-16	Requirements for resistance to ignition of upholstered parts May 1997	n/a
ISO 7176-19 (2008)	The Puma 20/40 meets the crash test requirements as described in ISO 7176-19 (2008)	77 kg

## 7.2 Technical information

Batteries	Max.	Unit	
Maximum battery dimensions	260 x 172 x 210 (10.2 x 6.8 x 8.3)	mm (inch)	
Maximum battery dimensions with Dahl system	260 x 172 x 190 (10.2 x 6.8 x 7.5)	mm (inch)	
Battery capacity	40 / 60 / 74 GEL; 50 AGM (Puma 20 only)	Ah	
Battery capacity with Dahl system	40 / 60	Ah	
Maximum permissible charging voltage	24	V	
Maximum charging current	12	A (rms)	
Connector type	Controller		
Insulation Class 2 double insulated	Class 2 double insulated		

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Model: PUMA 40 Sedeo Pro+	Class B			
Description	Unit	FWD	RWD	
Maximum user weight	kg (st.)	160 (25.2)	160 (25.2)	
Maximum user weight with car docking	kg (st.)	136 (21.4)	136 (21.4)	
Total length including legrests	mm (inch)	1160 (45.7)	1115 (43.9)	
Total width 12,5" drive wheels	mm (inch)	610	(24)	
Total width 14" drive wheels	mm (inch)	655 (25.8)		
Total weight without batteries:	kg (st.)	87,3 (		
Batteries 40 Ah (C20) (set of two)	kg (st.)	+ 28,4 (4.5)		
Batteries 60 Ah (C20) (set of two) Batteries 74 Ah (C20) (set of two)	kg (st.) kg (st.)	+ 34,6 (5.5)		
Electrical high/low adjustment	kg (st.)	+ 45,8 (7.2) + 18,8 (3)		
Electrical tilt adjustment	kg (st.)	+ 10,8 (3)		
Electrically elevating central legrest	kg (st.)	+ 9,5		
Electrically elevating legrests	kg (st.)	+ 4 (		
Car docking	kg (st.)	+ 4,5	• •	
Puncture-proof drive wheels (set of two)	kg (st.)	+ 8,4 (1.3)		
Transport weight of the heaviest part	kg (st.)	83,9 (13.2)		
Maximum safe slope	0	6	5	
Static stability	0		0	
Downwards Upwards	0	18 15		
Sidewards	0	1		
Reversing distance	mm (inch)	1180 (46.5)	1700 (66.9)	
Turning radius (ISO 7176-5)	mm (inch)	585 (23) 850 (33.5)		
Distance range* 74 Ah (C20) approx. (ISO 7176-4)			,	
6 km/h	km (mi.)	42,5 (26.4)		
10 km/h	km (mi.)	37,2 (23.1)		
Climbing capacity for obstacles (outdoor)	mm (inch)	60 (2.4) 80 (3.1)		
Maximum speed forwards	km/h	6 / 10 (3.7 / 6.2)		
Seat angle adjustment	0	0 - 6		
Electrical tilt adjustment	0	0 - 45		
Effective seat depth	mm (inch)	440 - 600 (17.3- 23.6)		
Effective seat width	mm (inch)	380 - 600 (15 - 23.6)		
Seat height i.c.w. 12.5" wheels (excl. cushion)**	mm (inch)	405 / 430 / 455 / 480 / 505 (15.9 / 16.9 / 17.9 / 18.9 / 19.9)		
Seat height i.c.w.14" wheels (excl. cushion)**	mm (inch)	415 / 440 / 465 / 490 / 515 (16,3 / 17.3 / 18.3 / 19.3 / 20.3)		
Seat height i.c.w. 12.5" wheels (incl. cushion)**	mm (inch)	475 / 500 / 525 / 550 / 575 (18.7 / 19.7 / 20.7 / 21.7 / 22.6)		
Seat height i.c.w.14" wheels (incl. cushion)**	mm (inch)	485 / 510 / 535 / 560 / 585 (19.1 / 20.1 / 21.1 / 22.0 / 23.0)		
Backrest recline	0	90 - 135		
Backrest height	mm (inch)	480 - 670 (18.9 - 26.4)		
Lower leg length standard legrest (with compressed seat cushion)	mm (inch)	340 - 510 (13.4 - 20.1)		

All mesurements of dimensions etc. should be considered as value with a average tolerance of 1%

<sup>\*</sup> The following aspects have a negative effect on the distance range: obstacles, rugged terrain, driving on slopes, exposure to temperatures below freezing point and frequent use of electronic adjustment options.

<sup>\*\*</sup> Seat height incl. load, 0° set angle

Model: PUMA 40 Sedeo Pro	Class B		
Description	Unit	FWD	RWD
Maximum user weight	kg (st.)	160 (25.2)	160 (25.2)
Total length including legrests	mm (inch)	1190 (46.9)	1115 (43.9)
Total width 12,5" drive wheels Total width 14" drive wheels Total weight without batteries:	mm (inch) mm (inch) kg (st.)	610 (24) 655 (25.8)	
Batteries 40 Ah (C20) (set of two) Batteries 60 Ah (C20) (set of two) Batteries 74 Ah (C20) (set of two) Electrical high/low adjustment Electrical tilt adjustment Electrically reclining backrest Electrically elevating legrests Puncture-proof drive wheels (set of two)	kg (st.)	97,6 (15.4) + 28,4 (4.5) + 34,6 (5.5) + 45,8 (7.2) + 18,8 (3) + 9,8 (1.5) + 1,5 (3.3) + 4 (8.8) + 8,4 (1.3)	
Transport weight of the heaviest part	kg (st.)	97,6 (15.4)	
Maximum safe slope	° (%)	10 (17.6)	
Static stability Downwards Upwards Sidewards	0 0	15 15 15	
Reversing distance	mm (inch)	1200 (47.2)	1700 (66.9)
Turning radius (incl. footrests)	mm (inch)	600 (23.6)	850 (33.5)
stance range* 74 Ah (C20) approx. (ISO 7176-4) km (mi.) 49,9 (31) km/h km (mi.) 43,7 (27.2) km/h km (mi.) 39,9 (24.8)		27.2)	
Climbing capacity for obstacles (outdoor)	mm (inch)	60 (2.4) 80 (3.1)	
Maximum speed forwards	km/h	6 / 10 /	12,5
Seat angle adjustment	0	0 - 6	
Effective seat depth	mm (inch)	440 - 600 (17.3- 23.6)	
Effective seat width	mm (inch)	400 - 540 (15.7 - 21.3)	
Seat height i.c.w. 12.5" wheels (excl. cushion)**	mm (inch)	405 (15.9)	
Seat height i.c.w. 14" wheels (excl. cushion)**	mm (inch)	415 (16.3)	
Seat height i.c.w. 12.5" wheels (incl. cushion)**	mm (inch)	475 (18.7)	
Seat height i.c.w. 14" wheels (incl. cushion)**	mm (inch)	485 (19.1)	
Backrest recline	0	89 - 128	
Backrest height	mm (inch)	500 - 640 (19.7 - 25.2)	
Lower leg length	mm (inch)	360 - 530 (1	·

All mesurements of dimensions etc. should be considered as value with a average tolerance of 1%

<sup>\*</sup> The following aspects have a negative effect on the distance range: obstacles, rugged terrain, driving on slopes, exposure to temperatures below freezing point and frequent use of electronic adjustment options.

<sup>\*\*</sup> Seat height incl. load, 0° seat angle

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Model: PUMA 20 Sedeo Lite	Class B			
Description	Unit	FWD	RWD	
Maximum user weight	kg (st.)	136 (21.4)	136 (21.4)	
Total length including legrests	mm (inch)	1160 (45.7)	1095 (43.1)	
Total width 12,5" drive wheels	mm (inch)	610		
Total width 14" drive wheels	mm (inch)	655 (25.8)		
Total weight without batteries:	kg (st.)	77,6 (12.2)		
Batteries 40 Ah (C20) (set of two)	kg (st.)	+ 28,4 (4.5)		
Batteries 50 Ah (C20) (set of two) Batteries 60 Ah (C20) (set of two)	kg (st.) kg (st.)	+ 29,6 (4.7)		
Batteries 74 Ah (C20) (set of two)	kg (st.)	+ 34,6 (5.5) + 45,8 (7.2)		
Electrical tilt adjustment	kg (st.)	+ 6,5 (1)		
Puncture-proof drive wheels (set of two)	kg (st.)	+ 2 (0.3)		
Transport weight of the heaviest part	kg (st.)	77,6 (12.2)		
Maximum safe slope	° (%)	10 (1	17.6)	
Static stability				
Downwards	0	15		
Upwards	0	15		
Sidewards Reversing distance	mm (inch)	15 1200 (47.2) 1700 (66.9)		
Turning radius (incl. footrests)	mm (inch)	600 (23.6)	850 (33.5)	
Distance range* 74 Ah (C20) approx. (ISO 7176-4)		000 (20.0)	000 (00.0)	
6 km/h	km (mi.)	43.7 (	(27.2)	
10 km/h	km (mi.)	38.8 (24.1)		
Climbing capacity for obstacles (outdoor)	mm (inch)	60 (2.4)	80 (3.1)	
Maximum speed forwards	km/h	6 / 10		
Seat angle adjustment	0	0 - 6		
Effective seat depth	mm (inch)	420 / 440 / 460 / 480 / 500 (16.5 / 17.3 / 18.1 / 18.9 / 19.7)		
Effective seat width	mm (inch)	400 - 510 (15.7 - 20.1)		
Seat height i.c.w. 12.5" wheels (excl. cushion)**	mm (inch)	405 (15.9)		
Seat height i.c.w. 14" wheels (excl. cushion)**	mm (inch)	415 (16.3)		
Seat height i.c.w. 12.5" wheels (incl. cushion)**	mm (inch)	465 (18.3)		
Seat height i.c.w. 14" wheels (incl. cushion)**	mm (inch)	475 (18.7)		
Backrest recline	0	92 / 97 / 102 / 107		
Backrest height	mm (inch)	480 (18.9)		
Lower leg length	mm (inch)	360 - 460 (14.2 - 18.1)		

All mesurements of dimensions etc. should be considered as value with a average tolerance of 1%

<sup>\*</sup> The following aspects have a negative effect on the distance range: obstacles, rugged terrain, driving on slopes, exposure to temperatures below freezing point and frequent use of electronic adjustment options.

<sup>\*\*</sup> Seat height incl. load, 0° seat angle

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## 8 Warranty

THIS GUARANTEE DOES NOT AFFECT YOUR LEGAL RIGHTS IN ANY WAY.

Sunrise Medical\* provides a guarantee, as set out in the warranty conditions, for wheelchairs to its customers covering the following.

#### Warranty conditions:

- 1. Should a part or parts of the wheelchair require repair or replacement as a result of a manufacturing and/or material fault within 24 months or for frame and cross-braces within 5 years after delivery to the customer, then the affected part or parts will be repaired or replaced free of charge. The warranty will only cover manufacturing defects
- 2. To enforce the warranty, please contact Sunrise Medical Customer Service with the exact details of the nature of the difficulty. Should you be using the wheelchair outside the area covered by the Sunrise Medical customer service agent, repairs or replacement will be carried out by another agency as designated by the manufacturer The wheelchair must be repaired by a Sunrise Medical designated Customer Service agent, (dealer).
- 3. For parts, which have been repaired or exchanged within the scope of this warranty, we provide a warranty in accordance with these warranty conditions for the remaining warranty period for the wheelchair in accordance with point 1).
- 4. For original spare parts which have been fitted at the customer's expense, these will have a 12 months guarantee, (following the fitting), in accordance with these warranty conditions.
- 5. Claims from this warranty shall not arise, if a repair or replacement of a wheelchair or a part is required for the following reasons:
  - a. Normal wear and tear, which include batteries, armrest pads, upholstery, tyres, brakes shoes, etc.
  - b. Any overloading of the product, please check the EC label for maximum user weight.
  - c. The product or part has not been maintained or serviced in accordance with the manufacturer's recommendations as shown in the user instructions and/or the service instructions.
  - d. Accessories have been used which are not specified as original accessories.
  - e. The wheelchair or part having been damaged by neglect, accident or improper use.
  - f. Changes/modifications have been made to the wheelchair or parts, which deviate from the manufacturer's specifications.
  - g. Repairs have been carried out, before our Customer Service has been informed of the circumstances.
- 6. This guarantee is subject to the law of the country in which the product was purchased from Sunrise Medical\*

## **Additional Notes For Australia Only:**

- i. For goods provided by Sunrise medical Pty Ltd in Australia, our goods come with a guarantee by Sunrise Medical that cannot be excluded under Australian Consumer Law.
- ii. You are entitled to a replacement or refund for a major failure and for compensation for any foreseeable loss or damage.
- iii. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
- iv. The benefits to you given by this warranty are in addition to your other rights and remedies under a law in relation to the goods to which the warranty relates.

<sup>\*</sup> Means the Sunrise Medical facility from which the product was purchased.

# **Version list**

Version	Page	Draw	Changes			
2016 v1	-	-	Replaced Handicare by Sunrise Medical HCM			
	16	2	Changed article number 1017124 into 9009478 and changed position numbers			
	17	3	Changed article number 1017124 into 9009478 and changed position numbers			
	20	6	<ul> <li>Deleted HC out of article descriptions</li> <li>Updated pos numbers article number 9006792</li> <li>Added article number 9007193</li> </ul>			
	21	7	<ul> <li>Deleted HC out of article descriptions</li> <li>Added article number 9010254 and 9007193</li> </ul>			
	30-33	4.3	<ul> <li>Added article number 00355.0441, 00355.0458, 00355.0454, 00355.0444 and 00355.0443</li> <li>Added electric diagrams Shark</li> </ul>			
	34-37	4.4	<ul> <li>Changed description article number 9002918 and 9007158 (add speed)</li> <li>Added article number 19052, 19063, 19065, 19054 and 19032</li> <li>Added electric diagrams R-net</li> </ul>			
	38-42	4.5	<ul> <li>Added article number 00355.0441, 00355.0458, 00355.0454, 00355.0444, 00355.0443, 00355.0509 and 1003305</li> <li>Added electric diagrams DX2</li> </ul>			
	43-47	4.6	<ul> <li>Added article number 19052, 19063, 19065, 19054 and 19032</li> <li>Added electric diagrams VR-2</li> </ul>			
	72	5.2.15	Updated all article numbers in mounting instruction			
2016v1.0	-	-	Complete update with new motors, motor arms; covers and wheels.			
v2.0	14	1	Changed article number 1007080 and 1007078.			
	21	6	Changed description article number 9007479 and 9007480.			
	25	10	Removed article numbers 1017956, 1017957, 10179586, 1017959			
	27	11-12	<ul> <li>Merged drawings 11 Castor forks and wheels Puma 20 &gt; October 2016 and 12 Castor forks and wheels Puma 20 &lt; November 2016 to drawing 11 Castor forks and wheels Puma 20 (all versions)</li> </ul>			
	29	12	<ul> <li>Changed position 9011608</li> <li>Added article number 1007448 PVC black cover M10 DIN912</li> <li>Added position 18e in drawing</li> </ul>			
	30	13	<ul> <li>Changed position 9011608</li> <li>Added article number 1007448 PVC black cover M10 DIN912</li> <li>Added position 18e in drawing</li> </ul>			



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Serial number:

CE

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