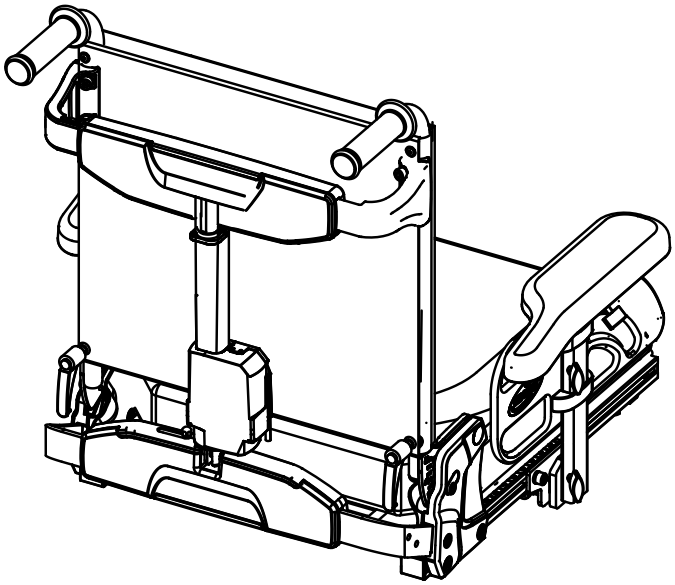

Invacare® Modulite

Supplement to power wheelchair service manual, Pronto M41, Bora/Spectra XTR Series, Kite Series, TDX SP2 Series, Storm^4 Series, FDX, Fox

en Power Wheelchair Service Manual

CE

DEALER: Keep this manual.
The procedures in this manual MUST be performed by a qualified technician.

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Yes, you can.®

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Invacare reserves the right to alter product specifications without further notice.

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1 General

1.1 About this manual

- This document is a supplement to the power wheelchair's documentation.
- The product itself does not bear a CE mark but is part of a product that complies with Directive 93/42/EEC concerning medical devices. It is therefore covered by the power wheelchair's CE marking. See the power wheelchair's documentation for more information.
- For information on electronics, see Invacare LiNX manuals. For information on other electronics, see earlier revisions of service manuals.
- For information on other seating systems than the Modulite, see corresponding service manuals or earlier revisions of service manuals.
- For specific settings, such as center of gravity adjustments, see corresponding power wheelchair's service manual.

1.2 General information

- Service and maintenance work must be carried out taking this service manual into account.
- It is imperative that you observe safety information.
- Information about operation or about general maintenance and care work on the mobility device should be taken from service manual.
- You can find information about ordering spare parts in the spare parts catalogue.
- Spare parts must match original Invacare parts. Only use spare parts which have been approved by Invacare.
- We reserve the right to make any alterations on the grounds of technical improvements.
- For more information about the product, for example product safety notices and product recalls, contact your local Invacare representative. For address and website see back page of this manual.
- The mobility device may only be maintained and overhauled by qualified personnel.
- The minimum requirement for service technicians is suitable training, such as in the cycle or orthopedic mechanics fields, or sufficiently long-term job experience.
  - Experience in the use of electrical measuring equipment (multimeters) is also a requirement.
  - Special Invacare training is recommended.
- Alterations to the mobility device which occur as a result of incorrectly or improperly executed maintenance or overhaul work lead to the exclusion of all liability on the side of Invacare.
- If you have any problems or questions contact your provider.

1.3 Notes on shipping

- If the mobility device has to be shipped back to the manufacturer for major repairs, you should always use the original packaging for transport.
- Please attach a precise description of the fault.

1.4 Symbols in this manual

In this manual, hazard statements are indicated by symbols. The symbols are accompanied by a signal word that indicates the severity of the risk.

WARNING
Indicates a hazardous situation that could result in serious injury or death if it is not avoided.

CAUTION
Indicates a hazardous situation that could result in minor or slight injury if it is not avoided.

IMPORTANT
Indicates a hazardous situation that could result in damage to property if it is not avoided.

Gives useful tips, recommendations and information for efficient, trouble-free use.

This product complies with Directive 93/42/EEC concerning medical devices. The launch date of this product is stated in the CE declaration of conformity.

This symbol identifies a list of various tools, components and items which you will need in order to carry out certain work.

1.5 Images in this manual

The detailed images in this manual are given marks to identify various components. Component marks in text and operational instructions always relate to the image directly above.

2 Safety

2.1 Safety and fitting instructions

These safety instructions are intended to prevent accidents at work, and it is imperative that they are observed.

Before any inspection or repair work

- Read and observe this repair manual and the associated user manual.
- Observe the minimum requirements for carrying out the work (see *1.2 General information, page 4*).

Personal safety equipment

Safety shoes

The mobility device, and some of its components, are very heavy. These parts can result in injuries to the feet if they are allowed to drop.

- Wear standardized safety shoes during all work.

Eye protection

It is possible that battery acid can be discharged when working on defective batteries or when handling batteries improperly.

- Always wear eye protection when working on any defective or possibly defective batteries.

Safety gloves

It is possible that battery acid can be discharged when working on defective batteries or when handling batteries improperly.

- Always wear acid-proof safety gloves when working on any defective or possibly defective batteries.

General safety information and information about fitting / removal

DANGER!
Risk of Death, Serious Injury, or Damage
Lighted cigarettes dropped onto an upholstered seating system can cause a fire resulting in death, serious injury, or damage. Mobility device occupants are at particular risk of death or serious injury from these fires and resulting fumes because they may not have the ability to move away from the mobility device.
– DO NOT smoke while using this mobility device.

WARNING!
Risk of Serious Injury or Damage
Storing or using the mobility device near open flame or combustible products can result in serious injury or damage.
– Avoid storing or using the mobility device near open flame or combustible products.

CAUTION!
Risk of crushing
Various components such as the drive unit, batteries, seat etc are very heavy. This results in injury hazards to your hands.
– Note the high weight of some components. This applies especially to the removal of drive units, batteries and the seat.

CAUTION!
Injury hazard if the mobility device starts moving unintentionally during repair work
– Switch the power supply off (ON/OFF key).
– Engage the drive.
– Before lifting up, secure the mobility device by using chocks to block the wheels.

CAUTION!
Fire and burn hazard due to electrical short-circuit
– The mobility device must be completely switched off before removal of voltage-carrying components! To do this, remove the batteries.
– Avoid short-circuiting the contacts when carrying out measurements on voltage-carrying components.

CAUTION!
Risk of burns from hot surfaces on the motor
– Allow the motors to cool down before commencing work on them.

CAUTION!
Injury hazard and risk of damage to mobility device due to improper or incomplete maintenance work
– Use only undamaged tools in good condition.
– Some moving parts are mounted in sockets with PTFE coating (Teflon™). Never grease these sockets!
– Never use "normal" nuts instead of self-locking nuts.
– Always use correctly-dimensioned washers and spacers.
– When reassembling, always replace any cable ties which were cut during dismantling.
– After completing your work / before renewed start-up of the mobility device, check all connections for tight fitting.
– After completing your work / before renewed start-up of the mobility device, check all parts for correct locking.
– Only operate the mobility device with the approved tire pressures (see technical data).
– Check all electrical components for correct function. Note that incorrect polarity can result in damage to the electronics.
– Always carry out a trial run at the end of your work.

CAUTION!
Risk of injury and damage to property, if the maximum speed reduction on a wheelchair with a lifter does not function correctly
The wheelchair’s control unit must reduce the maximum possible speed as soon as the lifter is raised.
– Test the maximum speed reduction for correct function after any maintenance work or modifications to the wheelchair.

CAUTION!
Any changes to the drive program can affect the driving characteristics and the tipping stability of the mobility device

– Changes to the drive program may only be carried out by trained Invacare providers.
– Invacare supplies all mobility devices with a standard drive program ex-works. Invacare can only give a warranty for safe mobility device driving behavior - especially tipping stability - for this standard drive program.

Mark all current settings for the mobility device (seat, armrests, backrest etc.), and the associated cable connecting plugs, before dismantling. This makes reassembly easier. All plugs are fitted with Mechanical locks which prevent release of the connecting plugs during operation. To release the connecting plugs the safety devices must be pressed in. When reassembling ensure that these safety devices are correctly engaged.

3 Hygiene

3.1 Handling of returned used products

When reconditioning or repairing returned mobility devices:

- Take precautions for yourself and the product.
- Use protection equipment as specified locally.

Before transport (according to Biological Agents Ordinance)

Treat product according to following process steps:

Process step	Component	Application	Conditioning technique	Work station
Manual cleaning	Surface of used device	Before repair or reconditioning	Use saturated towel to apply cleaning detergent and remove residues after impact.	Cleaning and disinfection
Disinfection	Surface of used device	Before repair or reconditioning	Use saturated disinfectant wipes and clean* the device surface.	Cleaning and disinfection

*Invacare uses detergent "Nücosept special" 1.5% in water ml/ml

Disinfection tools

- Disposable wipes (fleece)
- Brushes to clean areas difficult to access

Further information

For more information contact your Invacare service department.

4 Service

4.1 Tightening torques

CAUTION!
Risk of damage to mobility device due to improperly tightened screws, nuts or plastic connections.
– Always tighten screws, nuts etc. to the stated tightening torque.
– Only tighten screws or nuts which are not listed here fingertight.

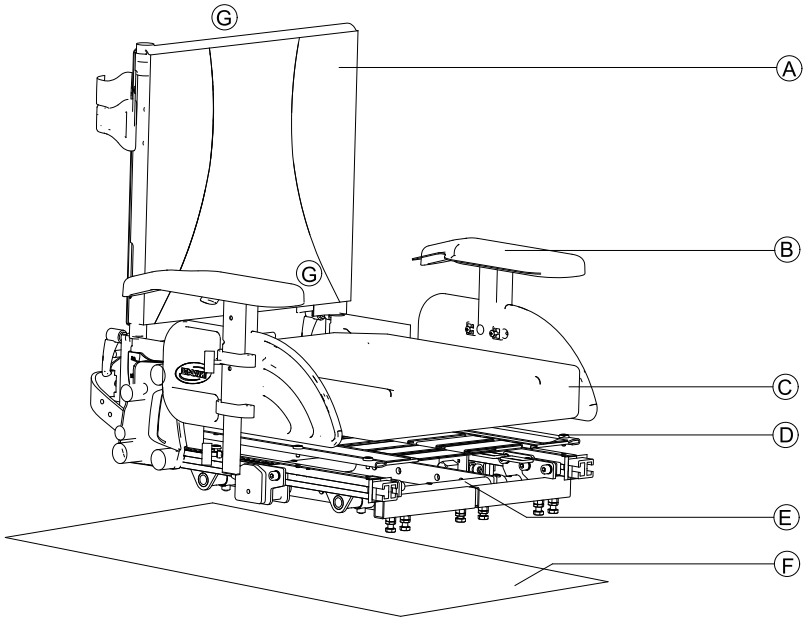
The tightening torques stated in the following list are based on the thread diameter for the nuts and bolts for which no specific values have been determined. All values assume dry and de-greased threads.

Thread	Tightening torque in Nm ±10%
M4	3 Nm
M5	6 Nm
M6	10 Nm
M8	25 Nm
M10	49 Nm
M12	80 Nm
M14	120 Nm
M16	180 Nm

4.2 Overview components

4.2.1 Overview seating system

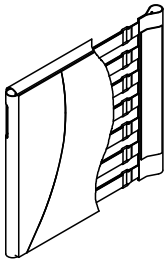
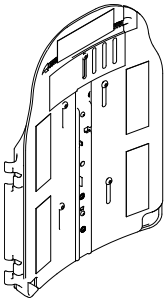
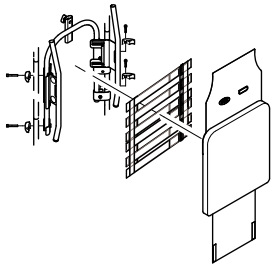
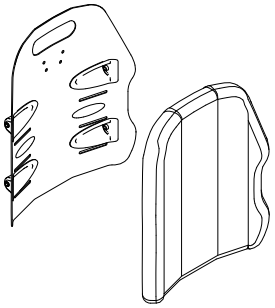
Modulite seat (example)



A	Backrest, see chapter *4.2.2 Backrest styles, page 8*
B	Armrest, see chapter *4.2.4 Armrest styles, page 9*
C	Cushion
D	Seat surface, see chapter *4.2.7 Seat frame and surface, page 13*
E	Seat frame, see chapter *4.2.7 Seat frame and surface, page 13*
F	Chassis and interface, see chapter *4.2.8 Overview seat interfaces, page 14*
G/ H	Remote holder / remote holder for attendant, headrest adapters, see chapter *4.2.5 Remote Brackets and Headrest Adapters, page 10*

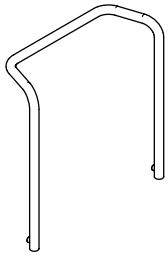
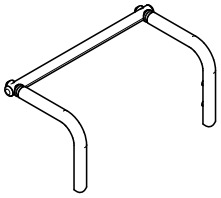
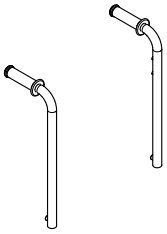
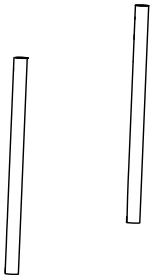
4.2.2 Backrest styles

Modulite seat is available with different backrest styles.

Tension adjustable	Flex 3 backrest plates	Flex 3 Tension Adjustable	Matrx
			

4.2.3 Backrest frames

Modulite is available with different backrest frames. For remote brackets that can be mounted to the backrest, see *4.2.5 Remote Brackets and Headrest Adapters, page 10*.

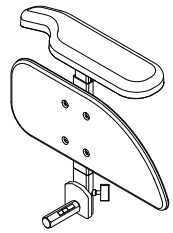
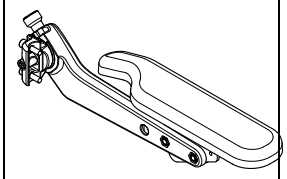
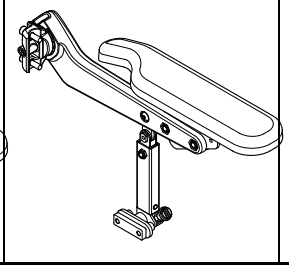
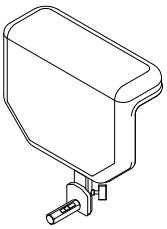
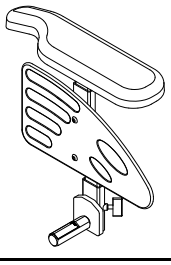
Standard backrest tube*	Push bar for backrest posts with push handles	Backrest posts with push handles	Backrest posts without push handles
			
Backrest height			
48 cm		48 cm / 54 cm	48 cm / 54 cm
Tube diameter			
22 mm	22 mm	25 mm	25 mm

* used with one-piece seat plate only.

Installation follows the same defined order of steps for all backrests.

4.2.4 Armrest styles

Modulite seat is available with different armrest styles. For remote brackets that can be mounted to armrest, see *4.2.5 Remote Brackets and Headrest Adapters, page 10*.

T-Armrest	Flip-up	Following	Padded	Inrigged
				

Function	Available armrest bracket length
T-armrest	Regular or higher (+5 cm) for use with a thick seating cushion
Flip-up Armrest	one size
Following Armrest	one size
Padded Armrest	one size
Inrigged armrest	one size

Armpad styles

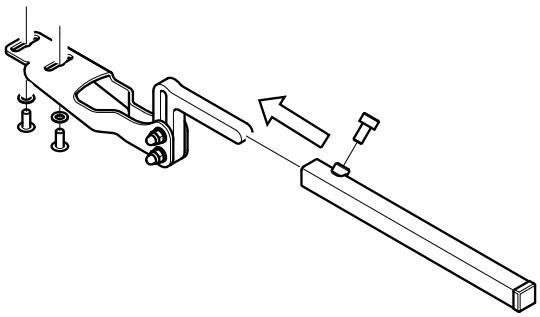
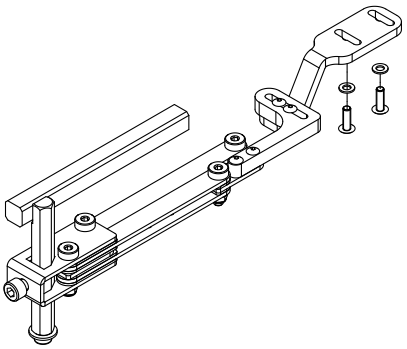
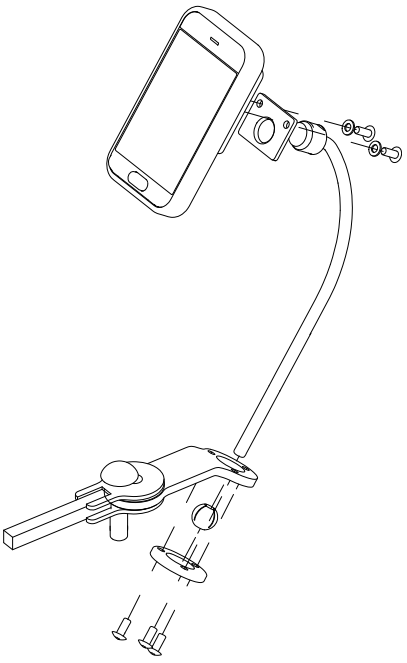
All Modulite armrests are available with the following armpads, except for padded armrest.

Short armpad	Long armpad	Long ergonomic armpad	Soft armpad
325 mm	375 mm	397 mm	468 mm

4.2.5 Remote Brackets and Headrest Adapters

Modulite can be fitted with different brackets for remotes.

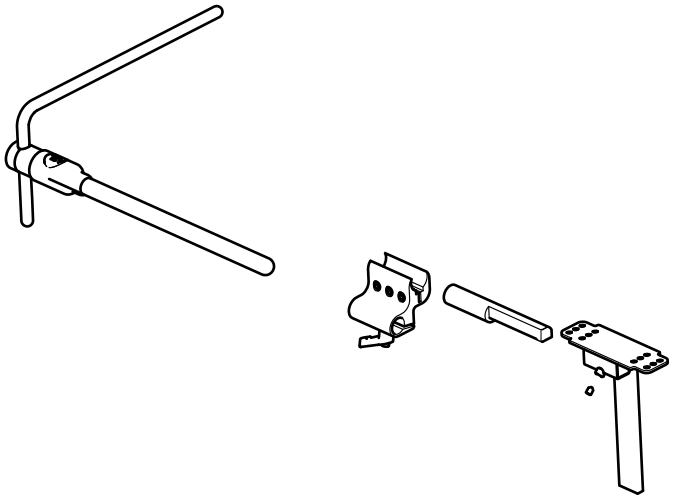
Remotes for users

Standard with support tube	Standard with swing away armrest
	
	REM500 swing-away display holder
	

Remotes for the wheelchair user are mounted at a slot at the armrest or on nucleus midline holder.

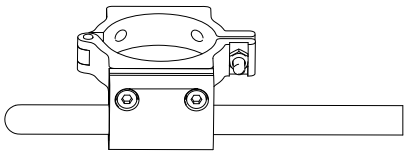
Modulite with nucleus midline holder can carry additional brackets, remotes and switches. An adapter is needed to mount nucleus midline holder to slot at the armrest. See *4.6.1 Replacing nucleus midline holder, page 18*.

Nucleus midline holder

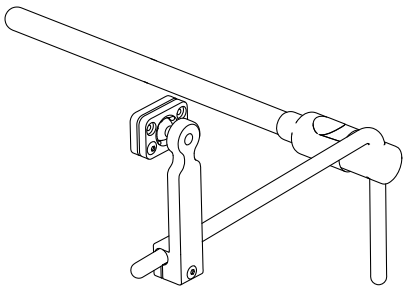


With Modulite seat system the following components can be mounted to nucleus midline holder:

Remote holder for REM400

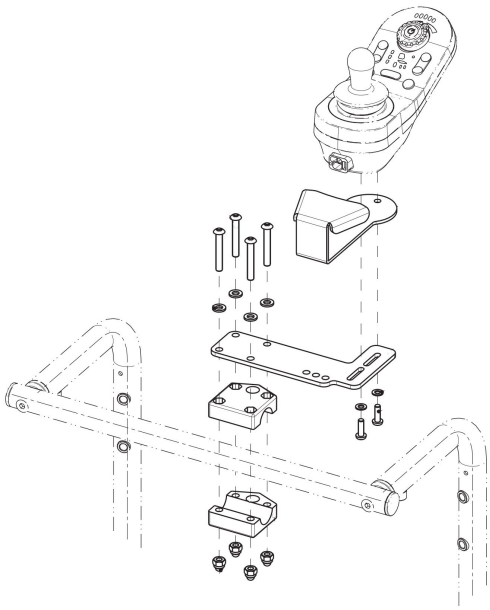
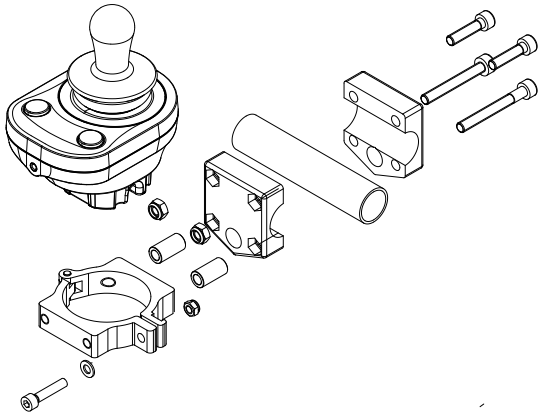


Remote holder for REM500



Remotes for attendant

Remote bracket for the wheelchair attendant is mounted at the push bar or at the push handles at the backrest frame of the power wheelchair.

Attendant remote bracket for primary remotes	Attendant remote bracket for e.g. Attendant Control Unit (ACU)
	

Remote bracket can be mounted in a variety of positions.

Adapter for mounting Elan headrest to Flex3 backrest

Elan headrest can only be mounted to Flex3 backrest via adapter. Elan headrest is not compatible with Modulite sling seat with push bar.

- Rubber mallet
- Elan headrest adapter for Modulite

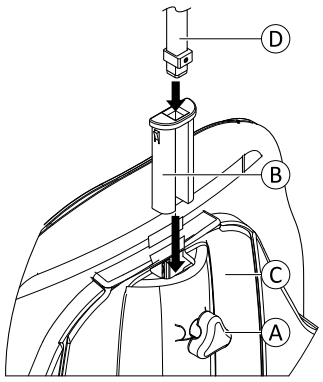
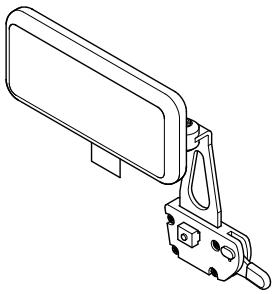
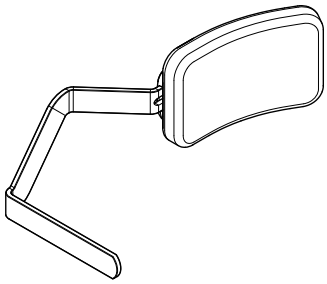
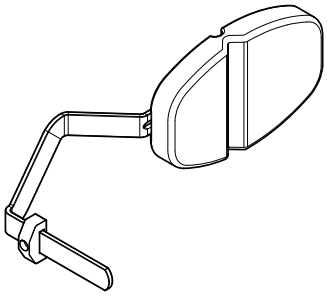


Fig. 4-1

1. Loosen and remove handscrew Ⓐ.
2. Insert adapter Ⓑ into slot of backrest plate Ⓒ.
3. Insert Elan headrest tube Ⓓ into adapter Ⓑ.
4. Attach and tighten handscrew Ⓐ.

4.2.6 Support options

Modulite seat is available with different support options.

Hip Support	Lateral support with extended arm	
		

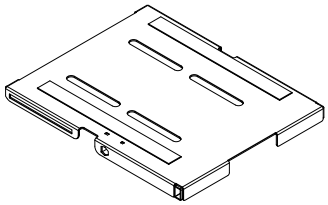
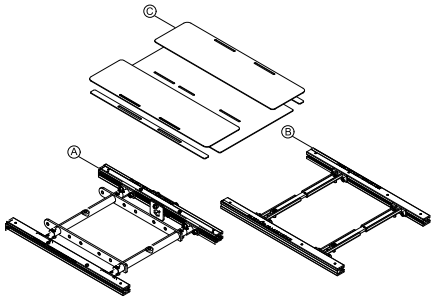
Pad styles

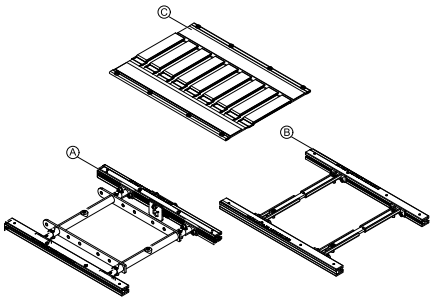
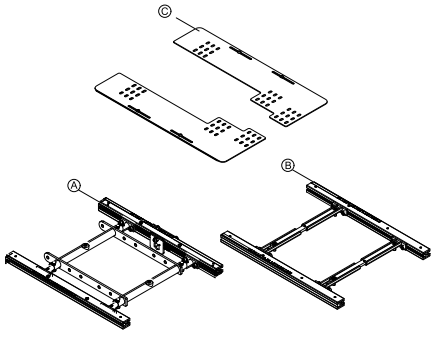
Modulite support options are available with the following pads.

Hip support	Lateral support with extended arm	
Hip support short, pad size 140 x 100 mm	Rigid pad	Multi-adjustable pad
Hip support medium, pad size 230 x 100 mm		
Hip support long, pad size 330 x 100 mm		

4.2.7 Seat frame and surface

Modulite seat is available with different combinations of seat frame and surface.

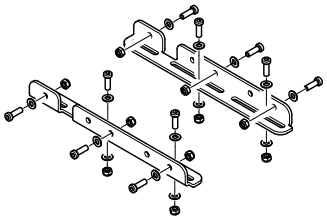
One piece seatplate	Telescopic seat frame Ⓐ or Ⓑ with seatplates Ⓒ
	

Telescopic seat frame Ⓐ or Ⓑ with sling seat Ⓒ	Telescopic seat frame Ⓐ or Ⓑ with universal adapter Ⓒ
	

Telescopic seat frame Ⓑ is used for powered tilt with CoG shift and lifter with powered tilt and CoG shift only. See *4.2.8 Overview seat interfaces, page 14*.

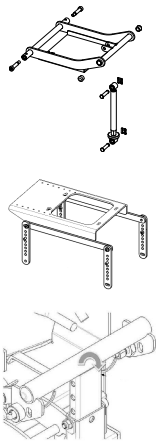
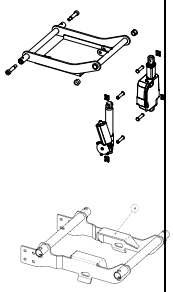
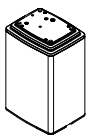
Seat frame adapters

Seat frame adapters interface the seat frame to the seat support of the chassis, respectively a module (lifter & tilt or tilt). It contains slots for the CoG adjustment.
Example Bora



4.2.8 Overview seat interfaces

Modulite seat is available for different seat interfaces depending on the model of the mobility device.

	Example	Pronto M41	Bora/ SpectraXTR	Kite Series	TDX SP2 Series/ FDX	Storm4 Series	Fox
Fixed, manual adjustable or settable angle			✓	✓	✓	✓	✓
Powered tilt, fixed pivot point			✓	✓	✓	✓	
Powered tilt with center of gravity shift		✓	✓	✓	✓		
Lifter with powered tilt and center of gravity shift		✓	✓	✓	✓		
Column lifter						✓	

4.3 Replacing backrest

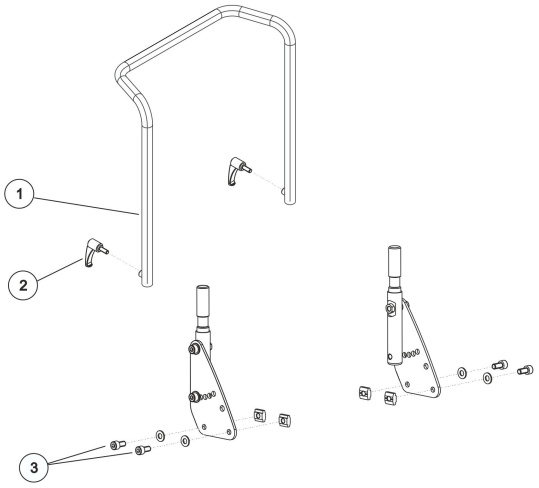
For backrest styles, see *4.2.2 Backrest styles, page 8* .

4.3.1 Replacing standard backrest

Tools:
- 5 mm Allen key
- 10 mm wrench
- 13 mm wrench

Removing backrest unit

1. Remove backrest cushion
2. Loosen fixation lever (2) of backrest tube.
3. Remove backrest tube.
4. Use Allen key to loosen and remove screws (3) including nuts and washers on the left and right side.



Installing backrest unit

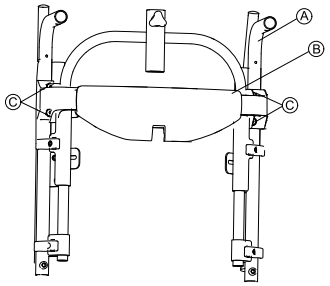
1. Install parts in reverse order.
2. To conclude, carry out a trial run to test vehicle functions.

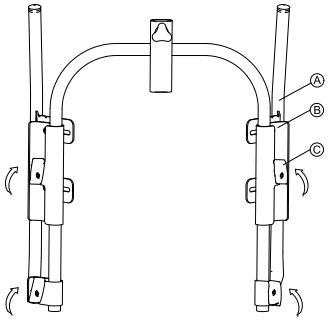
4.3.2 Replacing Flex3 tension adjustable backrest

Tools:
- 5 mm Allen key
- 6 mm Allen key

Push handles are on hinges, fastened from below with two screws.

Removing

1. Loosen screws.
2. Take off backrest from hinges of the seat.
3. 

Loosen four screws Ⓒ and take off upper traverse Ⓑ from push handles Ⓐ.
4. Loosen four screws on four clamps Ⓒ.
5. 

Turn clamps to vertical position.
6. Take off back.
7. Remove seat cover.

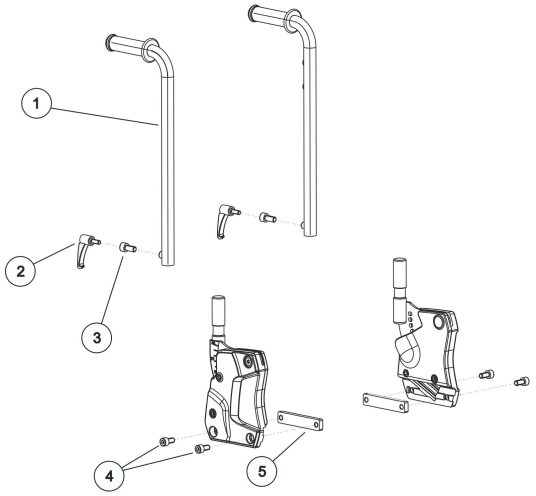
Installing

1. Install parts in reverse order.
2. Tighten screws.

4.3.3 Replacing backrest mounting bracket

Tools
- 5 mm Allen key

Removing backrest unit



1. Remove backrest cushion.
2. Loosen fixation levers (2) of the corresponding backrest posts (1), depending on the version. There are two versions:
   - (2) - for manual backrest
   - (3) - for powered backrest
3. Remove backrest posts.
4. Loosen and remove two screws (4) on the left and right side of the chair.

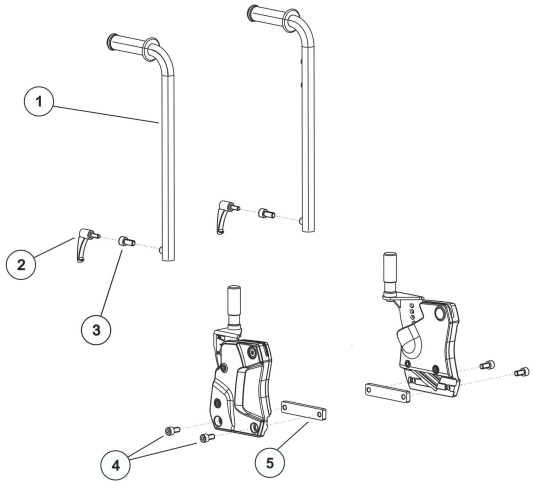
Installing backrest unit

1. Install parts in reverse order.
2. To conclude, you should always carry out a trial run to test the vehicle functions.

4.3.4 Replacing Flex3 backrest mounting bracket for seat width 53 cm

Tools:
- 5 mm Allen key

Removing backrest unit



1. Remove backrest cushion.
2. Loosen fixation levers (2) of corresponding backrest posts (1), depending on the version. There are two versions:
   - (2) - for manual backrest
   - (3) - for powered backrest
3. Remove backrest posts.
4. Loosen and remove two screws (4) to the T-nut (5) on the left and right side of the chair.

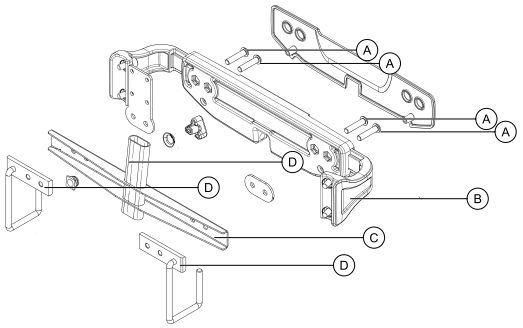
Installing backrest unit

1. Install parts in reverse order.
2. To conclude, you should always carry out a trial run to test the vehicle functions.

4.3.5 Replacing bag hooks

- 6 mm Allen key

Removing



1. Remove screws Ⓐ .
2. Remove bag hooks Ⓓ, Ⓒ and the distance spacers from backrest Ⓑ.

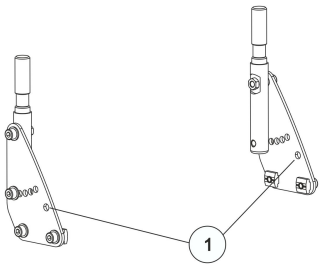
Installing

1. Install parts in reverse order.
2. Tighten screws to 22 Nm.

4.4 Replacing posture belts

4.4.1 Installation on backrest mounting bracket (backrest frame)

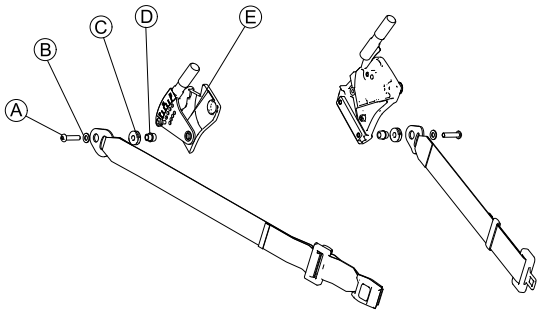
Tools:
- 13 mm socket spanner
- 5 mm Allen key



- Posture belts are attached via drill hole (1) on the top right.

4.4.2 Installation on backrest mounting bracket (telescopic seat frame)

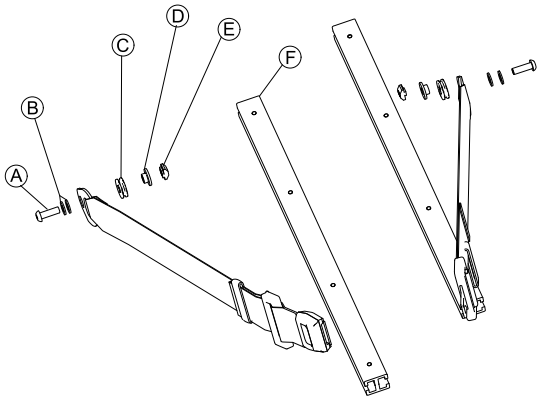
Tools:
- 5 mm Allen key



1. Loosen screw Ⓐ with a 5 mm Allen key.
2. Remove screw Ⓐ, corresponding washer Ⓑ, seat belt, stopper Ⓒ and belt winder Ⓓ from backrest mounting bracket Ⓔ.
3. Replace posture belt.
4. Install parts in reverse order.

4.4.3 Installation on seat frame profile (telescopic seat frame)

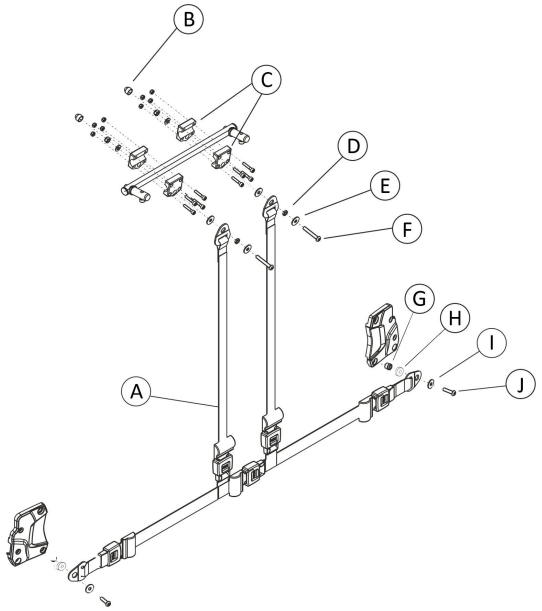
Tools:
- 5 mm Allen key



1. Loosen screw Ⓐ with a 5 mm Allen key.
2. Remove screw Ⓐ, washers Ⓑ, seat belt, stopper Ⓒ, sliding bushing Ⓓ and T-nut Ⓔ from seat frame profile Ⓕ.
3. Replace posture belt.
4. Install parts in reverse order.

4.4.4 Replacing H-belt (telescopic seat frame)

Note:
- 13 mm socket wrench
- 5 mm Allen key



Removing H-belt

1. Remove protective cap Ⓑ.
2. Loosen and remove screw Ⓕ, associated washers Ⓔ and nuts Ⓓ (in front of the/behind the gripper clamp Ⓒ) with a 5 mm Allen key and a 13 mm socket wrench.
3. Loosen and remove screw Ⓙ, associated washer Ⓘ , stopper Ⓗ, belt winder Ⓖ in the lower part of the H-belt Ⓐ with a 5 mm Allen key.

A belt winder is installed, so that the belt bracket can move freely.

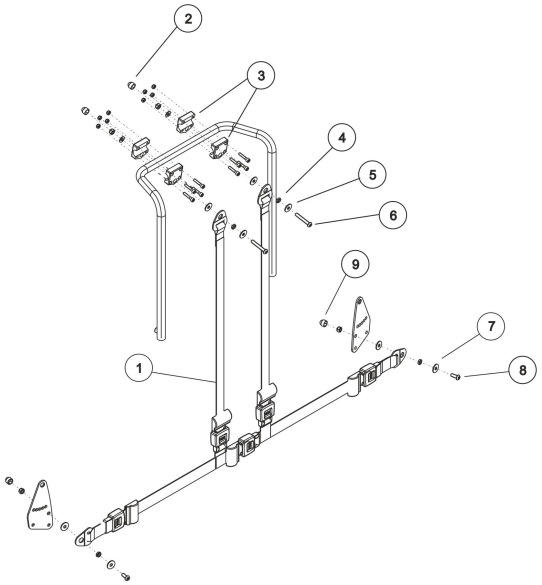
4. Replace H-belt Ⓐ.

Installing H-belt

1. Install parts in reverse order.

4.4.5 Replacing H-belt (backrest frame)

Note:
- 13 mm socket wrench
- 5 mm Allen key



Removing H-belt

1. Remove protective cap (2).
2. Loosen and remove screw (6), associated washers (5) and nuts (4) (in front of the/behind the gripper clamp (3)) with a 5 mm Allen key and a 13 mm socket wrench.
3. Remove protective cap (9).
4. Loosen and remove screw (8), associated washers (7) and nuts in the lower part of the harness belt (1) with a 5 mm Allen key and a 13 mm socket wrench.

   Another nut is installed between washers as a spacer, so that the belt bracket can move freely.

5. Replace harness belt (1).

Installing H-belt

1. Install parts in reverse order.

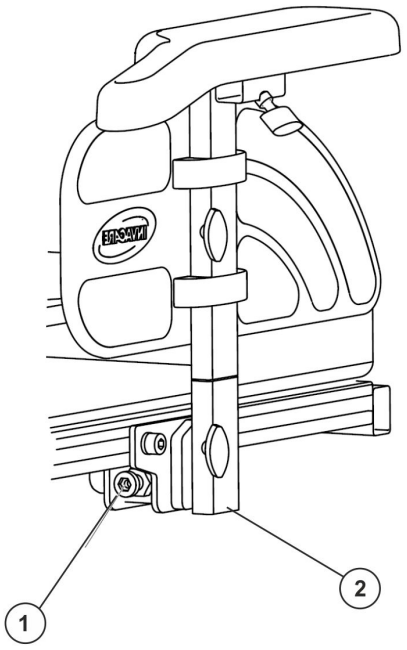
4.5 Replacing armrests and upper body support options

For armrests and upper body support options, see *4.2.4 Armrest styles, page 9* and *4.2.6 Support options, page 12*.

4.5.1 Removing/ Installing armrest

This chapter applies for armrests on the telescopic seat frame.

Tools:
- 8 mm Allen key

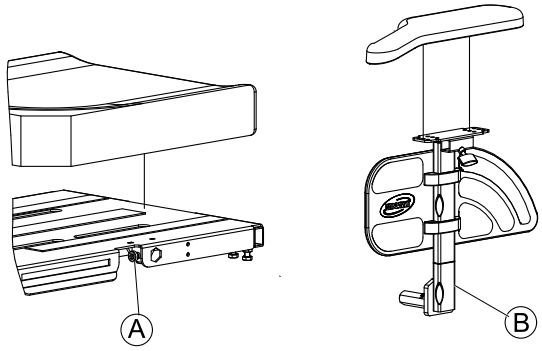


1. If necessary, disconnect joystick.
2. Loosen Allen screw (1) with an 8 mm Allen key.
3. Pull armrest (2) out of mounting bracket.
4. If necessary, replace armrest including mounting bracket.
5. Install parts in reverse order.

4.5.2 Removing/Installing armrest

This chapter applies for armrests on the one piece seat plate.

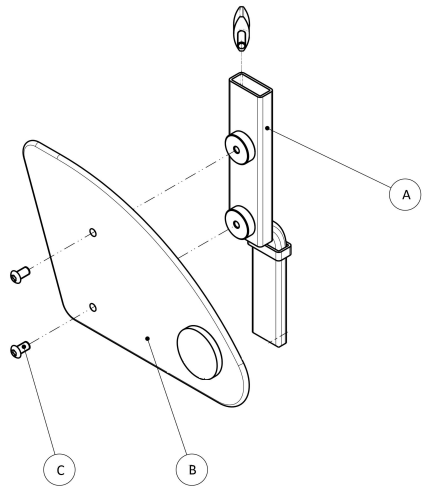
Tools:
- 8 mm Allen key



1. If necessary, disconnect joystick.
2. Loosen screw Ⓐ .
3. Pull the armrest Ⓑ out of mounting bracket.
4. If necessary, replace the armrest including the mounting bracket.
5. Install parts in reverse order.

4.5.3 Replacing skirt guard on inrigged armrest with smaller skirt guard

Tools:
- 4 mm Allen key

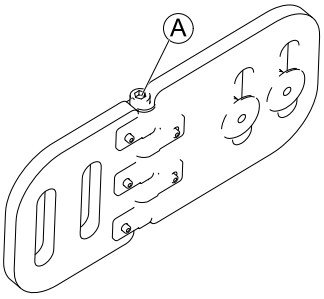


Use the smaller skirt guard for seat depth (41 cm) and above.

1. Loosen and remove two screws (3).
2. Take off skirt guard.
3. Replace skirt guard with smaller skirt guard.
4. Retighten two screws.

4.5.4 Adjusting/fixing angle of lateral supports

Tools:
- 6 mm Allen key

1. Remove cover.
2. 

Loosen screw Ⓐ that allows angle adjustment of lateral supports.
3. Adjust supports to desired angle.
4. Replace cover.
5. Re-tighen screws.

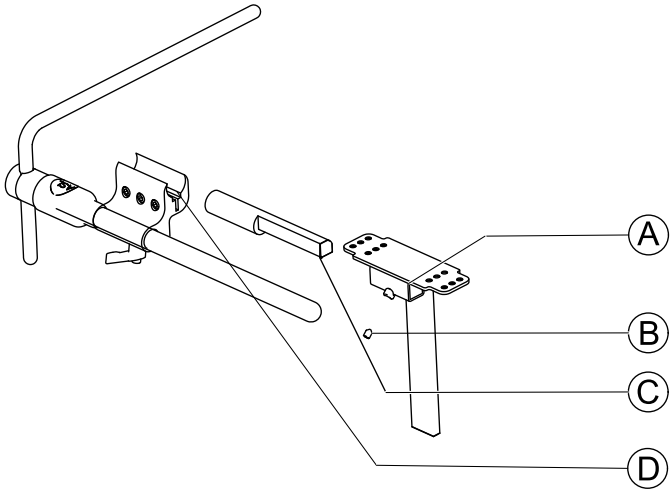
4.6 Replacing remotes/remote holders

4.6.1 Replacing nucleus midline holder

- 3 mm Allen key

Bracket can be mounted either on the left or right hand side of mobility device via slot Ⓐ under armrest bracket.

Removing nucleus midline holder



1. Loosen and remove thumbscrew Ⓑ.
2. Loosen and remove headless screw Ⓒ.
3. Remove adapter Ⓓ from slot under armrest holder Ⓐ.

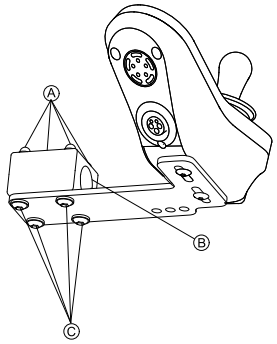
Installing nucleus midline holder

1. Install parts in reverse order.

4.6.2 Replacing remote bracket for attendant

Removing

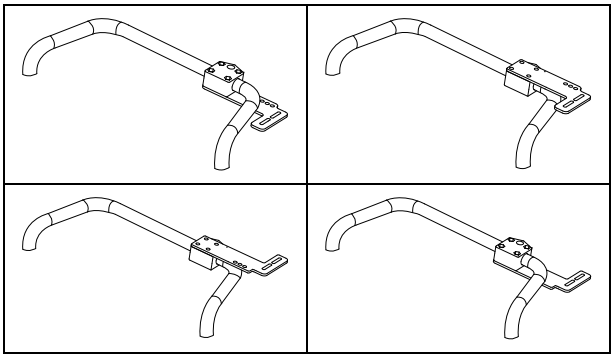
- 3 mm Allen key
- 4 mm Allen key

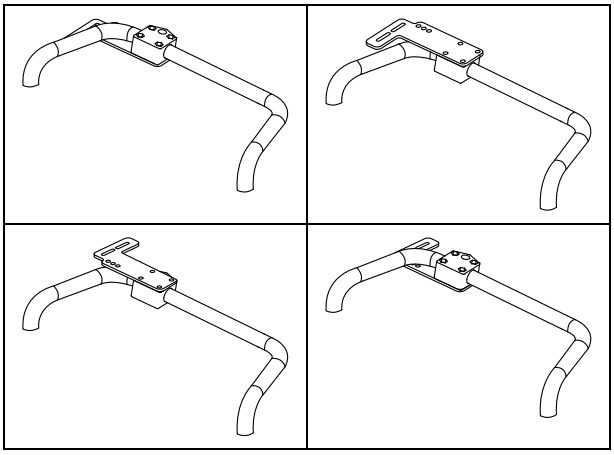


1. Loosen screws Ⓒ and nuts Ⓐ.
2. Remove bracket Ⓑ.

Installing

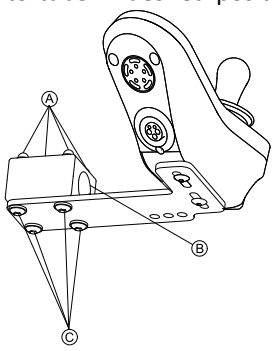
1.





Mount bracket to tube in desired position.

2.



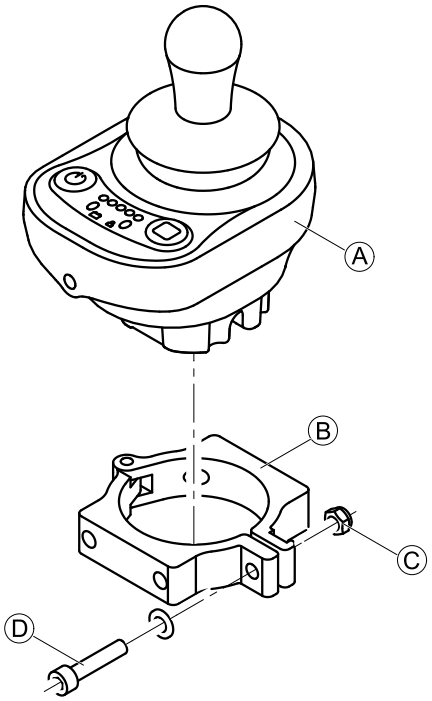
Tighten screws Ⓒ and nuts Ⓐ.

4.6.3 Replacing Remote Bracket for DLX-ACU200

Removing

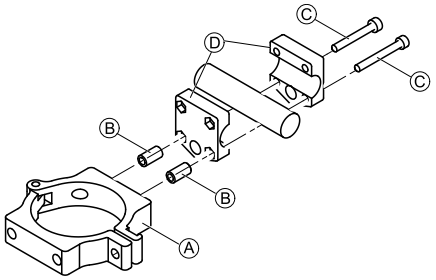
- 3 mm Allen key
- 5 mm Allen key
- 10 mm wrench

1.



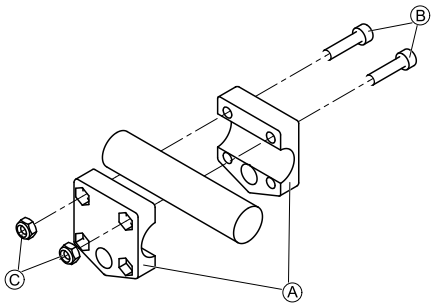
Loosen screws Ⓓ. Remove remote Ⓐ from clamp Ⓑ.

2.



Remove screws Ⓒ and spacers Ⓑ and clamp Ⓐ from gripper clamp Ⓓ.

3.



Loosen screws Ⓑ on gripper clamp Ⓐ.

4. Remove gripper clamp Ⓐ.

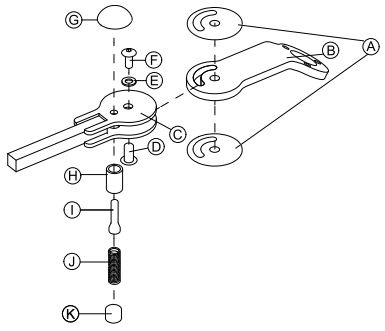
Installing

1. Install parts in reverse order.

4.6.4 Mounting the DLX-REM500

Swing away remote holder

- 3 mm Allen key
- 4 mm Allen key
- Medium-strength thread-locking fluid, e.g. Loctite 243



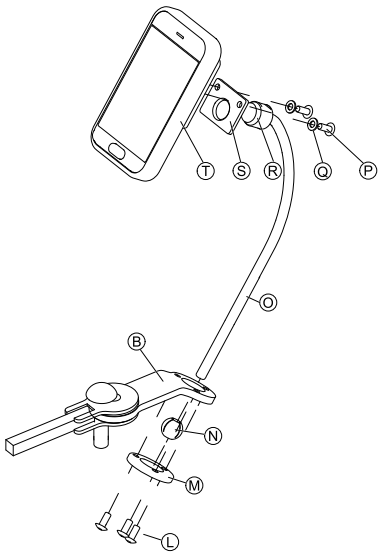
1. Connect slip sticker Ⓐ with joint arm Ⓑ and insert into support Ⓒ.
2. Fix with sleeve nut Ⓓ, washer Ⓔ and screw Ⓕ.

   Apply medium-strength thread-locking fluid to screw Ⓕ.

3. Insert locking bolt Ⓗ and compression spring Ⓘ through support Ⓒ and joint arm Ⓑ.
4. Fix with locking knob Ⓖ and grub screw Ⓙ .

   Apply medium-strength thread-locking fluid to grub screw Ⓙ.

5.



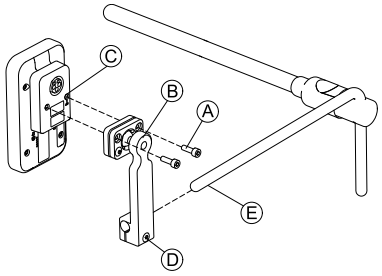
Insert bracket Ⓞ into joint arm Ⓑ, clamp ball Ⓝ and clamp ring Ⓜ.
Fix with screws Ⓛ.

6. Mount remote Ⓣ to support plate Ⓢ and clamping bush Ⓡ with washers Ⓠ and screws Ⓟ.

Nucleus remote holder

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.

- 4 mm Allen key
- 3/16” Allen key



1. Mount remote Ⓒ to bracket Ⓑ with screws Ⓐ.
2. Pull bracket Ⓑ over nucleus Ⓔ.
3. Tighten bracket to nucleus with screw Ⓓ.

4.7 Chin Control

4.7.1 Maintenance

- Keep all electronic components free of dust, dirt and liquids. To clean the product, use a cloth dampened with warm soapy water. Do not use chemicals, solvents or abrasive cleaners, as this may cause damage to the product.
- Once a month, check all vehicle components for loose, damaged or corroded components, such as connectors, terminals or cables. Ensure that all connectors are fully mated. Restrain all cables to protect them from damage. Replace damaged components. Check for and remove any foreign objects or material.

- Every 6 months, test all functions on the controls system to ensure they function correctly.

Risk of damage to the remote
There are no user-serviceable parts in any electronic component.
– Do not attempt to open any case or undertake any repairs, else warranty will be voided and the safety of the system may be compromised.

If any component is damaged in any way, or if internal damage may have occurred (for example by being dropped), have it checked by qualified personnel before operating.

Where any doubt exists, consult your nearest Invacare provider.

4.7.2 Replacing Components

Replacing Joysticks / Switches

Risk of Damage to Screws
If you tighten screws to an improper torque, they might either come loose or get damaged.
– Tighten the screws to a torque of 3 Nm ± 10 %.

- 3 mm Allen key (RJM/RJM—LF remote)
- 4 mm Allen key (all other components)
- Torque wrench 0 Nm — 20 Nm (or similar)

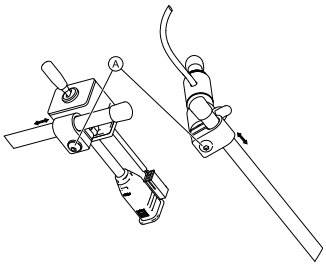


Fig. 4-2

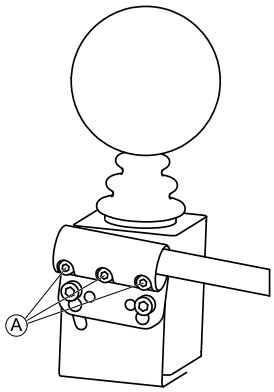


Fig. 4-3

1. Remove end caps.
2. Loosen screws Ⓐ.
3. Remove joystick / switch from linkage.
4. Install parts in reverse order.
5. Test all functions.

Replacing Linkage

Risk of Damage to Screws / Clamping Lever
If you tighten screws or lever to an improper torque, they might either come loose or get damaged.
– Tighten the screws to a torque of 3 Nm ± 10 %.
– Tighten the lever to hand-tight only.

- 3 mm Allen key

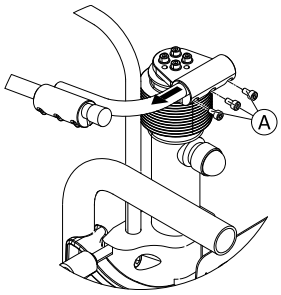


Fig. 4-4 Top Linkage

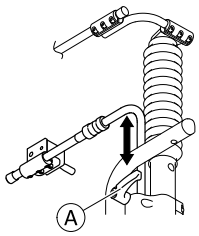


Fig. 4-5 Bottom Linkage

1. Remove components that are installed on linkage, such as joysticks and switches. See *Replacing Joysticks / Switches, page 21*.
2. Loosen screws / clamping lever Ⓐ.
3. Replace linkage.
4. Install parts in reverse order.
5. Test all functions.

Replacing Connection Bracket

- 3 mm Allen key
- Medium-strength thread locking adhesive (Loctite 242 or similar)

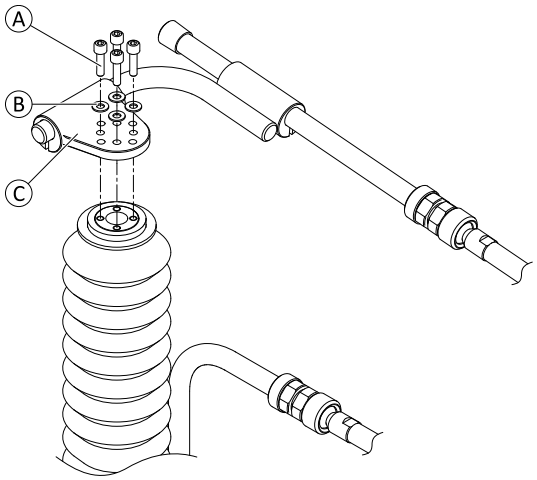


Fig. 4-6 Connection bracket and top linkage. Linkage variant with ball joints served as example.

1. Remove top linkage. See *Replacing Linkage, page 21*.

   It is possible to remove this component without removing any parts installed on the component such as joysticks and switches. When removing, take care of cable connections and installed parts.

2. Loosen and remove screws Ⓐ and washers Ⓑ.
3. Replace bracket Ⓒ.
4. Apply thread locking adhesive to screws Ⓐ. Install and tighten screws.
5. Re-install linkage.

Replacing Actuator

- 5 mm Allen key

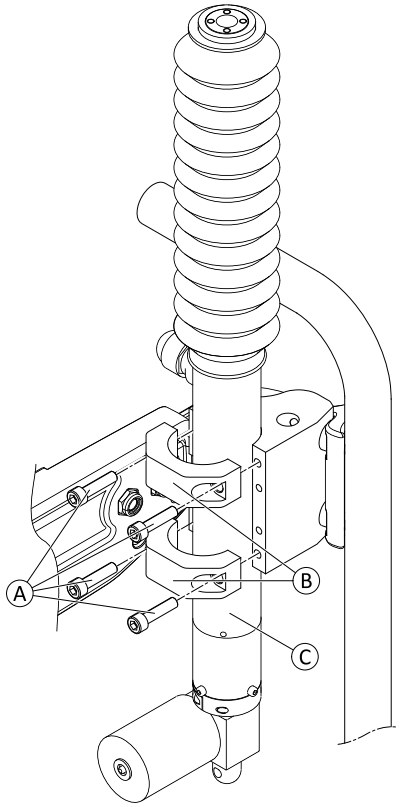


Fig. 4-7

1. Remove top linkage including bracket. See *Replacing Connection Bracket, page 21*.

   It is possible to remove this component without removing any parts installed on the component such as joysticks and switches. When removing, take care of cable connections and installed parts.

2. Secure actuator. Loosen and remove screws Ⓐ.
3. Remove brackets Ⓑ.
4. Replace actuator Ⓒ.
5. Install parts in reverse order.
6. Re-install top linkage including bracket.
7. Test all functions.

Replacing Mounting Hardware

- 6 mm Allen key

1. Remove actuator including top linkage and bracket. See *Replacing Actuator, page 21*.

   It is possible to remove this component without removing any parts installed on the component such as joysticks and switches. When removing, take care of cable connections and installed parts.

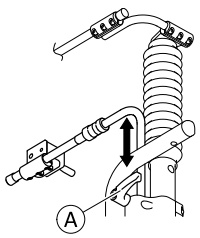
2. 

Fig. 4-8

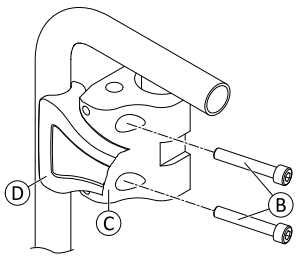
   Loosen clamping lever Ⓐ.
3. Remove bottom linkage.
4. 

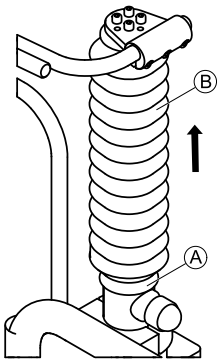
Fig. 4-9 Mounting hardware. For better view the stabilization bracket is shown partially only.

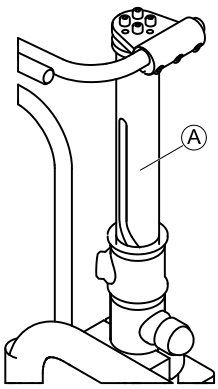
   Loosen and remove screws Ⓑ including mounting hardware Ⓒ.
5. Install parts in reverse order.
6. Re-install components of chin control.
7. Test all functions.

4.7.3 Servicing linkage of Chin Control

The linkage of the Chin Control should be greased once a year.

- Pliers
- Grease
- Cable tie

1. 

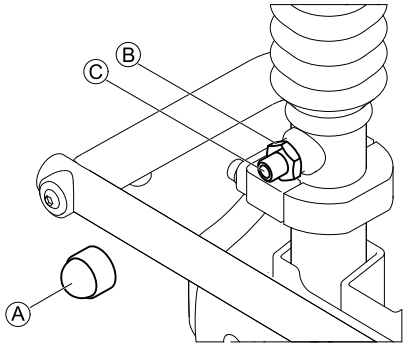
   Remove cable tie Ⓐ.
2. Push up bellows Ⓑ.
3. 

   Clean linkage Ⓐ.
4. Apply thin layer of grease to linkage.
5. Pull down bellows.
6. Secure with new cable tie.

4.7.4 Tightening electrical linkage

Check the electrical linkage of the Chin Control once a year for play.

- Slotted screwdriver
- 6 mm Allen key
- 19 mm wrench



1. Remove cap Ⓐ
2. Loosen counter nut Ⓑ.
3. Tighten grub screw Ⓒ until linkage is free from play.
4. Tighten counter nut.
5. Move linkage up and down to check for increased actuator noise.

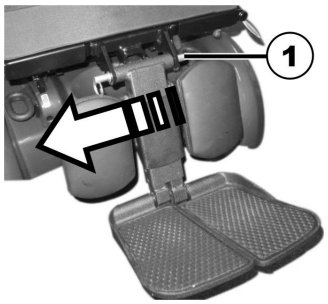
   If grub screw is too tight, this damages the actuator, recognizable by increased actuator noise.

6. If grub screw is too tight, repeat steps 1 to 4 and tighten it a bit less.
7. Reattach cap.

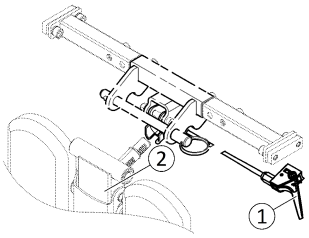
4.8 Replacing legrests

4.8.1 Removing the legrest

You can remove central, manually adjustable legrest completely.

1. 

   Remove removable axle (1).

2. 

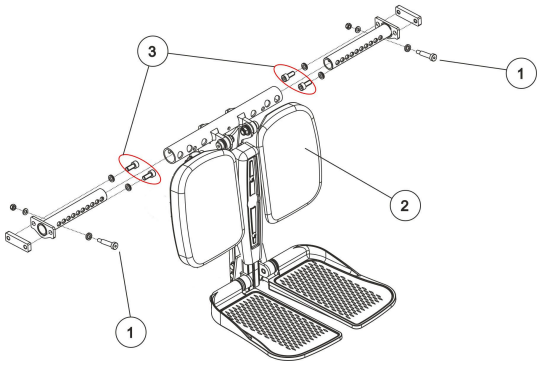
   Hold legrest securely and pull lever (1).

3. Remove legrest from holder (2).

4.8.2 Replacing LNX powered center-mounted legrest

WARNING!
Risk of crushing
The legrest is very heavy. Danger of injury to hands and feet.
– Pay attention to the heavy weight.

Tools:
- 4 mm Allen key
- 10 mm wrench



Removing LNX powered center-mounted legrest

1. If possible, raise the lifter to highest position.
2. If possible, tip wheelchair with tilt module as far backwards as it will go.
3. Switch off controls.
4. Pull plug of legrest actuator out of actuator module.
5. Remove protective caps from profile.
6. Loosen screws (3) with a 6 mm Allen key. Pull entire legrest (2) forwards out of seat frame profile.
7. Loosen and remove screws (1) including nuts and washers with a 4 mm Allen key and a 10 mm ring spanner or jaw spanner.
8. Replace legrest (2).

Installing LNX powered center-mounted legrest

1. Install parts in reverse order.
2. Test all functions of the wheelchair.

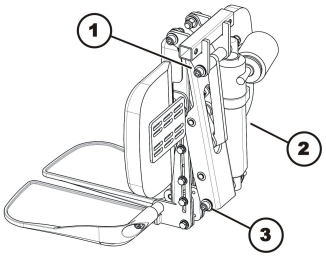
4.8.3 Replacing an powered legrest actuator

- 1/2" socket wrench
- 3/8" Allen key
- Side cutting pliers
- Cable ties

Removing powered legrest

1. Switch controls system off. The actuator module for lifter and tilt actuator are mounted to front edge of seat frame.
2.

   Completely remove both screws including washers.

3. Remove shroud.
4. 

   Pull plug of legrest actuator out of actuator module.

5. Loosen screw (3).

6. Loosen screw (1).
7. Remove nuts including washers, but leave screw inserted in screw hole, do not pull it completely out.
8. Pull actuator (2) toward the side of screws (1) and (3) off.
9. Replace actuator.

Installing powered legrest

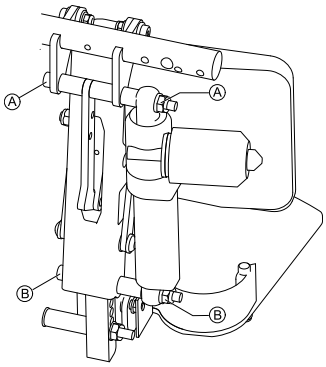
1. Install parts in reverse order.
2. Test all functions of mobility device.

4.8.4 Replacing LNX powered center-mounted legrest with telescoping footboard

Replacing the complete legrest must be done by Invacare. There are several settings to observe to ensure correct functioning. Contact Invacare for details.

Replacing legrest actuator

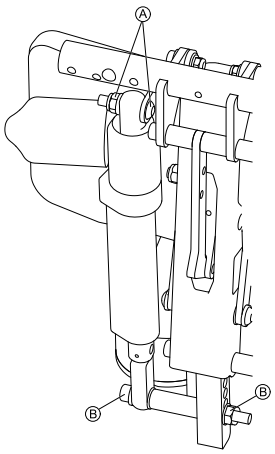
Tools:
- 6 mm Allen key
- 8 mm Allen key
- 16 mm wrench



1. Switch off power wheelchair.
2. Unplug actuator from actuator module.
3. Remove screws and nuts at top Ⓐ and bottom Ⓑ of actuator.
4. Replace actuator with new one.
5. Re-insert screws and nuts and tighten.

Replacing footboard actuator

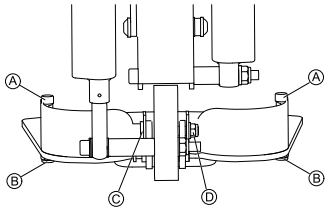
Tools:
- 8 mm Allen key
- 16 mm wrench



1. Switch off power wheelchair.
2. Unplug actuator from actuator module.
3. Remove screws and nuts at top Ⓐ and bottom Ⓑ of actuator.
4. Replace actuator with new one.
5. Re-insert screws and nuts and tighten.

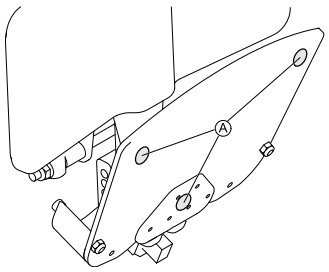
Replacing heel strap

Tools:
- 6 mm Allen key
- 8 mm Allen key
- 13 mm wrench
- 16 mm wrench



1. Loosen and remove screws Ⓐ and nuts Ⓑ.
2. Loosen and remove screw and washer Ⓒ and nut and washers Ⓓ.
3. Remove heel strap and replace by new one.
4. Re-insert and tighten screws and nuts.

Replacing felt pads



1. Replace worn felt pads Ⓐ on bottom of footboard to avoid damage to the floor.

Replacing footboard

- 8 mm Allen key

1.

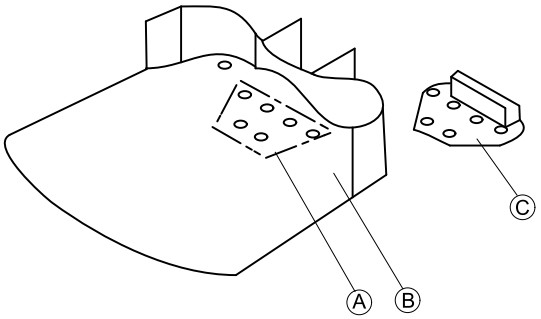
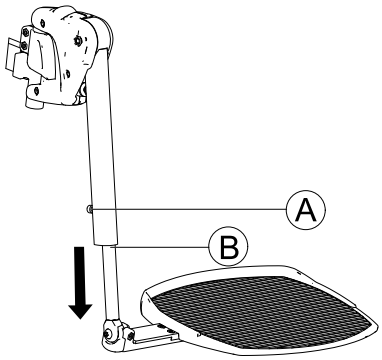


Fig. 4-10

Loosen screws Ⓐ on footboard Ⓑ.
2. Remove footboard Ⓑ from pivot interface Ⓒ.
3. Insert and tighten screws Ⓐ.

4.8.5 Replacing footboard

- 5 mm Allen key

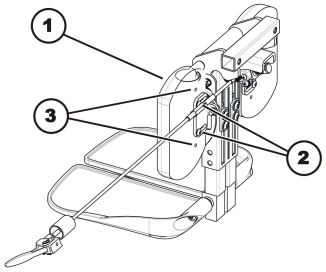


1. Loosen screw Ⓐ on hanger, left and right side.
2. Pull out footboard Ⓑ and replace.
3. Install parts in reverse order.

For adjusting footboard, see user manual of mobility device.

4.8.6 Replacing the calf plate on the center-mounted legrest (electric & manual)

- 1/64" Allen key



A manual legrest can be seen in the illustration. The method of fixation to the seat is almost identical for both legrests.

Removing calf plate

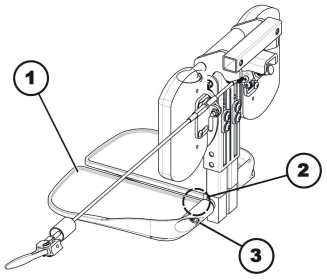
1. If possible, raise lifter to highest position.
2. If possible, tip wheelchair with tilt module as far backwards as it will go.
3. Switch controls system off.
4. Use 1/64" Allen key to loosen and remove both screws (2).
5. Remove calf plate (1).

Installing calf plate

1. Install parts in reverse order.
2. Using different adjustment holes (3) in calf plate and in calf plate brackets, calf plates can be mounted at different heights and widths. This must be adjusted to fit needs of the user.

4.8.7 Replacing foot plate on center-mounted legrest (electric & manual)

- 1/64" Allen key
- 1/4" Allen key



A manual legrest can be seen in illustration. The method of fixation to seat is almost identical for both legrests.

Removing

1. If possible, raise lifter to highest position.
2. If possible, tip mobility device with tilt module as far backwards as it will go.
3. Switch controls system off.
4. Loosen and remove both screws (3).
5. Replace foot plate (1).

Installing

1. Install parts in reverse order.
2. Tighten screws (3) till they are tight enough that footplate can barely be moved. In area denoted by (2) there is an adjustment screw that can only be reached when footplate is swivelled upwards.
3. Use 1/64" Allen key to adjust angle of footplate to needs of user with this screw.

4.9 Adjusting seat width/backrest width

For seat frames and surfaces, see *4.2.7 Seat frame and surface, page 13*, for back posts and backrest frames, see *4.2.3 Backrest frames, page 9* and for backrest styles, see *4.2.2 Backrest styles, page 8* .

4.9.1 Adjusting seat width

You can only adjust the seat width for the telescopic seat frame. The sling seat is available in two widths:

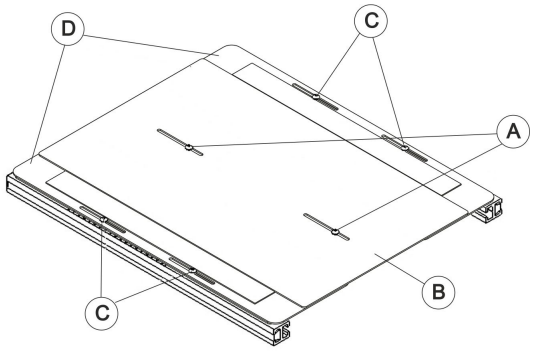
- for a seat width of 38-43 cm and
- for a seat width of 48-53 cm

When modifying the seat width, the backrest width must also be correspondingly adapted. See *4.9.2 Adjusting backrest width, page 26*.

- 3 mm Allen key
- 5 mm Allen key
- 13 mm wrench
- TX25 Torx wrench
- TX40 Torx wrench

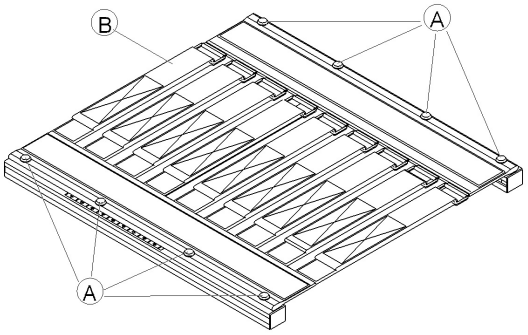
1. Remove backrest cushion.
2. Remove backrest from backrest mounting bracket. See *4.9.2 Adjusting backrest width, page 26*.

3.



Loosen and remove screws, which secure middle seat plate Ⓐ with 3 mm Allen key.

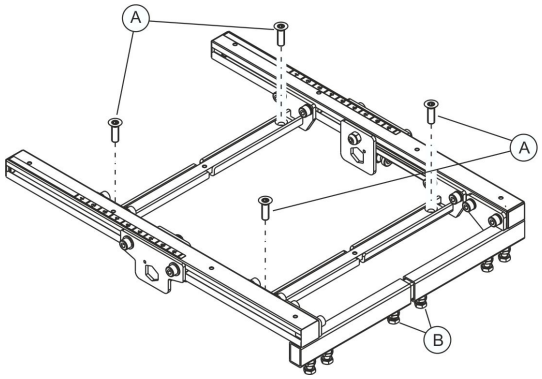
4. Remove middle seat plate Ⓑ.
5.



Loosen and remove screws on both sides, which secure lateral seat plates Ⓒ with 3 mm Allen key.

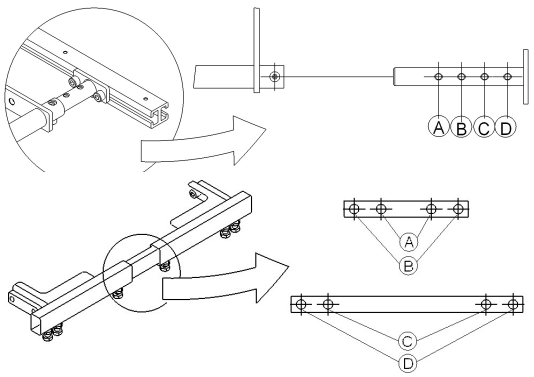
6. Remove lateral seat plates Ⓓ. Or:
7. Remove seat cushion.
8. Loosen and remove screws on both sides, which secure sling seat Ⓐ with T25 Torx wrench.
9.

ⓘ Backrest posts for Flex3 only adjust up to a seat width setting of 480 mm. The remaining 5 cm are adjusted via backrest plates.



Remove sling seat (B).

10.



Loosen and remove screws of seat frame adjustment Ⓐ with TX 40 Torx wrench.

11. Loosen and remove screws of fixation of legrest mounting brackets Ⓑ.
12. Adjust seat frame and legrest fixation to desired width according to the following illustrations and tables:
Seat frame:

Screw position	Seat width
A	530 mm
B	480 mm
C	430 mm
D	380 mm

Leg supports connection:

Screw position	Seat width
A	380 mm
B	430 mm
C	480 mm
D	530 mm

ⓘ When switching from 430 mm to 480 mm and the other way around, the fixation of the legrests must be replaced.

13. Reposition screws and re-tighten them.
14. Install seat plate or sling seat.
15. Reposition seat cushion.

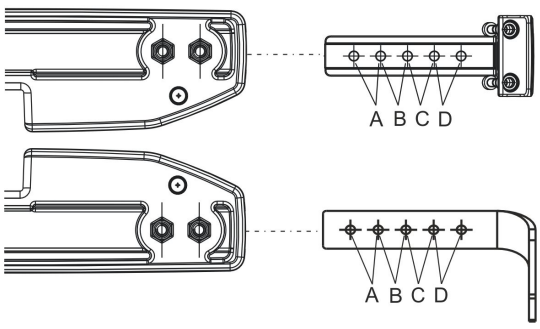
4.9.2 Adjusting backrest width

Backrest width is adjusted by performing the following tasks:

1. Adjusting back posts.
2. Adjusting backrest:
   - Tension adjustable backrest, as described in *4.9.3 Adjusting Tension Adjustable Backrest, page 27*.
   - Flex3 backrest, as described in *4.9.4 Adjusting Flex3 backrest, page 27*.
3. Replacing backrest cushion (these are available in various widths). When modifying backrest width, seat width must also be correspondingly adapted. See *4.9.1 Adjusting seat width , page 25*.

- 3 mm Allen key
- 5 mm Allen key
- 13 mm wrench

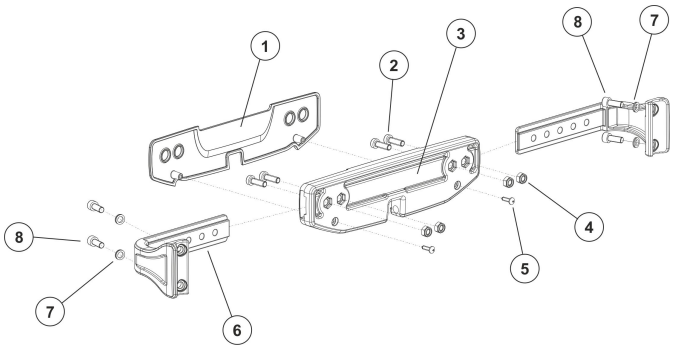
For screw position per backrest width, refer to table below.



Screw position	Seat width
A	530 mm*
B	480 mm

Screw position	Seat width
C	430 mm
D	380 mm

* Back posts for Flex3 seat only adjust up to a seat width setting of 480 mm. The remaining 5 cm are adjusted via the backrest plates.



1. Remove backrest cushion.
2. Loosen straps of sling backrest or remove Flex3 backrest.
3. Loosen and remove both screws (5) of actuator fixation bracket.
4. Remove shroud of actuator fixation bracket.
5. Loosen and remove screws and nuts (2, 4) on upper and lower actuator fixation bracket on both sides.
6. Adjust backrest fixation (6) for new backrest width according to the table above.
7. Insert screws (2) through shroud of actuator fixation bracket and corresponding holes of backrest fixation to actuator fixation.
8. Tighten these with nuts (4).
9. Reposition cover of actuator fixation bracket.
10. Insert and tighten screws (5) again.
11. Adjust straps of sling backrest to new width or install adjusted Flex 3 backrest.
12. Install backrest cushion.
13. Perform a function check of mobility device.

4.9.3 Adjusting Tension Adjustable Backrest

Tension adjustable backrest can be individually adapted to the user's back shape.

1. Pull the front and rear faces of the backrest upholstery (1) apart and remove. The backrest upholstery front and rear faces are held together using hook-and-loop fasteners.
2. Open the backrest belt (2) hook-and-loop fastenings and adjust to the required length.
3. Reattach the backrest upholstery and fix with hook-and-loop fastenings.

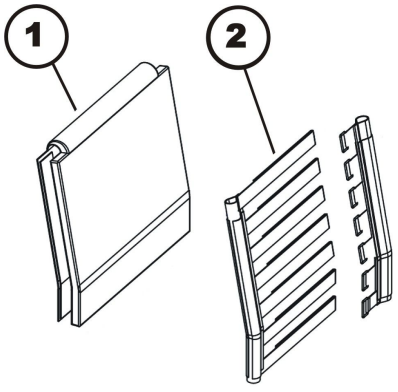
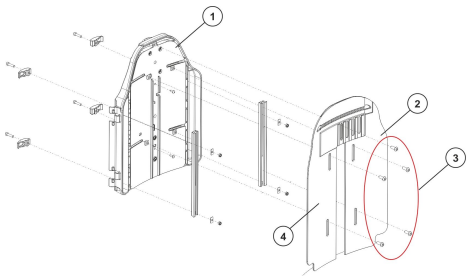
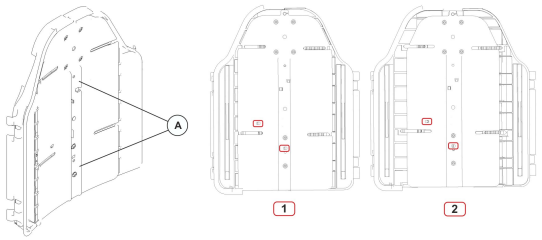


Fig. 4-11

4.9.4 Adjusting Flex3 backrest

Tools:
- Phillips screwdriver
- 5 mm Allen key

1. 

Loosen and remove screws (3).
2. Remove front lateral plates (2 and 4) from backrest (1).
3. 

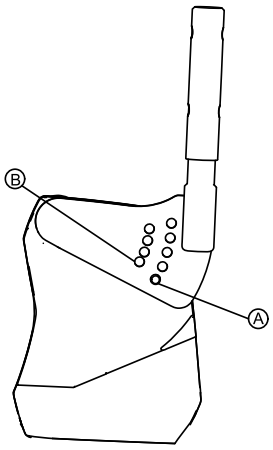
Remove both Phillips screws Ⓐ on middle plate.
4. Shift position of rear plate halves (three settings are possible using drill holes).
   - Before pulling Flex3 backrest apart, a "1" will be visible in the small, rectangular cut-out.
   - After pulling Flex3 backrest apart, a "2" will be visible in the small, rectangular cut-out.
5. Re-insert two screws Ⓐ into middle plate.
6. Retighten front lateral plates (2 and 4).

4.9.5 Adjusting Flex3 manual recline

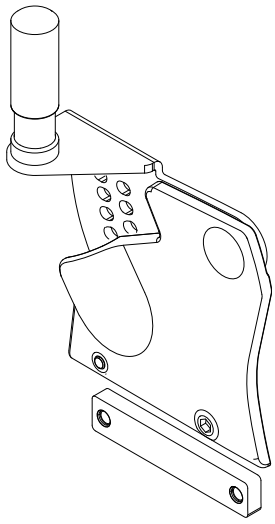
Tools:
- 6 mm Allen key

A second inner hole line Ⓑ allows fine adjustments of 3.75 °.

Bracket for seat width 53 is inrigged, see below.



Regular seat width



Seat width 53

1. Loosen screw in position Ⓐ or Ⓑ.
2. Adjust recline to desired angle.
3. Tighten screws in position Ⓐ or Ⓑ.

4.9.6 Adjusting Matrx backrests

See corresponding manual.

4.9.7 Adjusting Flex3 tension adjustable backrest

For adjustment of Flex3 tension adjustable backrest, see user manual.

4.10 Setting anterior tilt

4.10.1 Anterior tilt

The seating system can be set to a predefined anterior tilt.

For TDX SP2 and TDX SP2 Low-Rider:

- 5° anterior tilt which reduces the maximum possible tilt by 5°

Orientation of tilt wedge

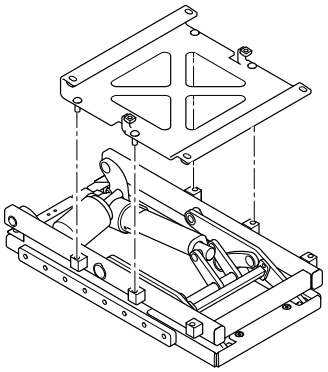


Fig. 4-12 5° anterior tilt

Setting tilt

CAUTION!
Risk of strains from lifting heavy parts!
– Use proper lifting techniques.

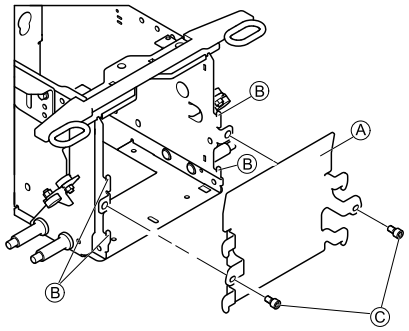
Tools:
- 6 mm Allen key

1. Remove seat.
2. Align tilt wedge with holes on module and in the desired orientation. See graphics above.
3. Insert screws and tighten.
4. Align seat with holes on tilt wedge and install.

Anterior tilt — replacing battery front cover

Tools:
- 14 mm (5/8”) Allen key

1. Remove the front cover as described in the service manual of TDX SP2.
2.



Push the recessed front cover Ⓐ down on the hooks Ⓑ.

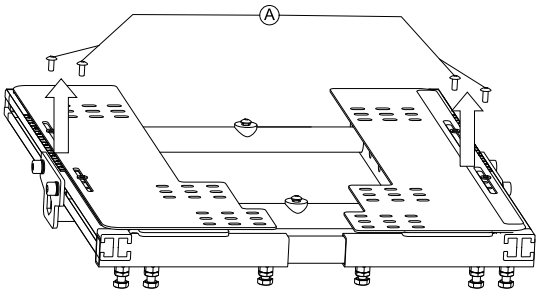
3. Re-tighten the screws Ⓒ finger-tight.

4.11 Adjusting adapter for universal seat

4.11.1 Adjusting universal seat adapter width

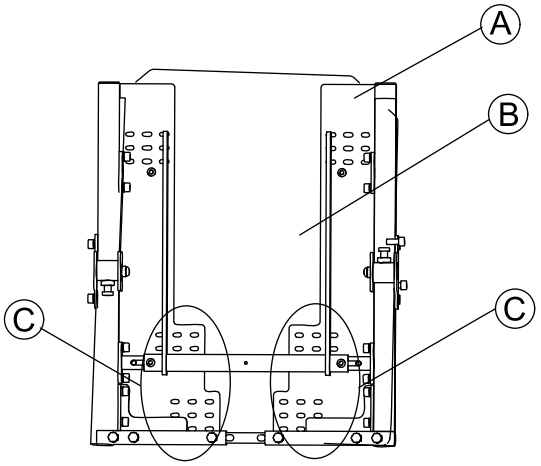
Tools:
- 3 mm Allen key
- 10 mm wrench

1.



Loosen and remove four screws Ⓐ.

2. Put seating plate on top of adapter plates.
3.



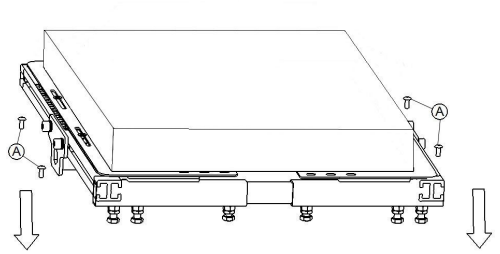
Fasten adapter plates Ⓐ to seat plate of seat Ⓑ in area Ⓒ.

For smoothness of adjustment you can use button head screws.

Make sure rubber straps on back of adapter plates face the frame.

To optimize seating position move element back or forth in slot before fastening to frame.

4.



Insert four screws Ⓐ.

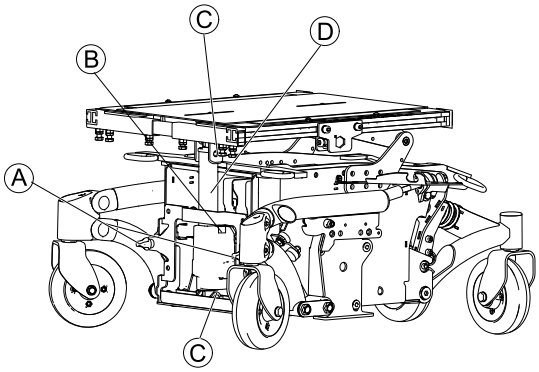
5. Tighten four screws.

4.12 Replacing actuators

4.12.1 Replacing actuator — powered tilt with fixed pivot point

Tools:
- Small screwdriver
- Wooden block

Example TDX SP2



1. Remove legrests.
2. Switch off controls.
3. Loosen screws Ⓐ.
4. Remove front cover.
5. Remove cap Ⓑ.
6. Pull plug out under Ⓑ.
7. Take cable out of duct.
8. Separate actuator from seat:
   - Remove SL retainer clip Ⓒ above and below with screwdriver.

     CAUTION!
     Crushing hazard
     Seat plate sinks when actuator is removed.
     – Fold seat back. Or:
     – To support seat, put wooden block where actuator Ⓓ was.

   - Pull out bolt.
9. Exchange actuator.
10. Install parts in reverse order.

4.12.2 Replacing actuator — powered tilt with fixed pivot point

When an electrical adjustment option is retrofitted, then this option needs to be activated in the driving program as well.

Tools:
- Flat screwdriver width approx. 6 mm blade
- Oblique pliers
- Small hammer
- Cable binder

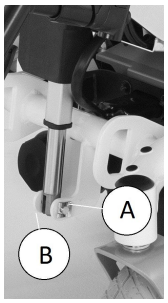
Example Bora

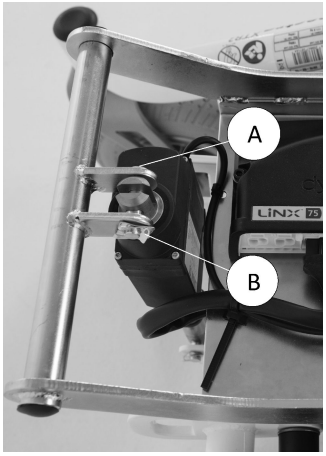
Making tilt actuator accessible

1.

   Remove legrests
2. Release seat (1) and tilt forwards.
3. Disconnect remote bus cable from power module or ACT.
4. Lift seat out of front anchorage and remove it. The seat has a heavy weight. Use proper lifting techniques.
5. Remove both battery cases (see “Removing battery cases” in service manual).
6. Pull actuator plug out of power module.
7. Actuator able is secured inside the frames with cable ties. Remove cable ties with oblique pliers.

Replacing actuator



1. Remove SL retainer clip Ⓑ on the bottom fixing bolt Ⓐ with the screwdriver.
2. Remove SL retainer clip Ⓑ on the bottom fixing bolt Ⓐ with the screwdriver.
3. Pull fixing bolt Ⓐ out.
4. 

   Remove SL retainer clip Ⓑ on the top fixing bolt Ⓐ with the screwdriver.

5. Pull fixing bolt Ⓐ out.
6. Pull spindle with actuator out.

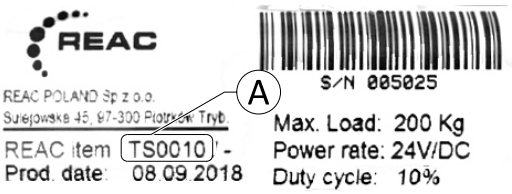
Installing actuator

1. Reinsert fixing bolts and SL retainer clips. Fix SL retainer clips securely to fixing bolt with the hammer.
2. Secure actuator cable to the frame with cable ties. The cable must be routed so that it does not rub or get trapped.
3. To complete, check all seat tilting functions.

4.12.3 Identifying Type of Actuator (Modules With CoG Shift)

This mobility device can be fitted with different types of modules. Before replacing an actuator you must identify the type of the fitted module. The different module types including the actuators are not compatible with each other.

See the following table how to identify the different types using the serial label on the module itself. The type of the module is highlighted by Ⓐ on the examples:

	Type TS	**Type NL**
Serial Label		
Variants	TS: Tilt LTS: Lifter-Tilt	NL01: Tilt NL02: Lifter-Tilt
Tilt Actuator	See *Replacing Actuator in Tilt Module (Type TS), page 30* or *Replacing Actuator in Lifter/Tilt Module (Type TS), page 30*.	See *Replacing Actuator (Type NL), page 31*.
Lifter Actuator	See *Replacing Actuator (Type TS), page 31*.	See *Replacing Actuator (Type NL), page 32*.

4.12.4 Replacing Tilt Actuator

Different types of modules can be fitted to this mobility device. Due to compatibility reasons, you must identify the type of the module first before replacing an actuator. See *4.12.3 Identifying Type of Actuator (Modules With CoG Shift), page 30*.

ⓘ Replacing the actuator for the tilt in the lifter / tilt module is also described.

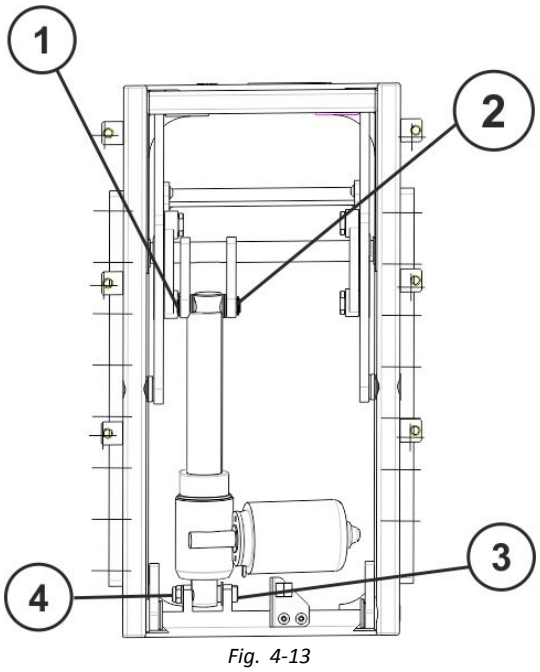


Fig. 4-13

Replacing Actuator in Tilt Module (Type TS)

The actuators of this type are fitted with a bolt and a nut on bottom fixation and a bolt secured by a snap ring on top fixation.

- Flat screwdriver, width 6 mm
- 13 mm wrench (2x)
- Grease (LT-43 or similar)

ⓘ When removing, take care of small parts such as screws and washers. Put all small parts down so that they can be installed in correct sequence.

1. Remove legrests.
2. Turn OFF electronics.
3. Disconnect actuator cable from cable harness.
4. Loosen and remove nut (4) and bolt (3) on bottom fixation.
5. Remove snap ring (1) on top fixation.
6. Loosen and remove bolt (2).
7. Replace actuator.
8. Install parts in reverse order.
9. Connect actuator cable to cable harness.
10. Test tilting function.

Replacing Actuator in Lifter/Tilt Module (Type TS)

The actuators of this type are fitted with a bolt secured by a snap ring on bottom fixation and snap rings on top fixation.

- Flat screwdriver, width 6 mm
- Grease (LT-43 or similar)

When removing, take care of small parts such as screws and washers. Put all small parts down so that they can be installed in correct sequence.

1. Remove legrests.
2. Turn OFF electronics.
3. Disconnect actuator cable from cable harness.
4. Remove snap ring (4) on bottom fixation.
5. Loosen and remove bolt (3).
6. Remove one snap ring (1) and pin (2) on top fixation.
7. Replace actuator.
8. Install parts in reverse order.
9. Connect actuator cable to cable harness.
10. Test tilting function.

Replacing Actuator (Type NL)

The actuators of this type are fitted with snap rings on both fixations. The procedures are the same for all type of modules.

- Flat screwdriver, width 6 mm
- 5.5 mm torque wrench 0.5 Nm — 4.5 Nm (or similar)
- Grease (LT-43 or similar)

When removing, take care of small parts such as screws and washers. Put all small parts down so that they can be installed in correct sequence.

1. Remove legrests.
2. Turn OFF electronics.
3. Secure seat.
4. Disconnect actuator cable from cable harness.
5. Remove one snap ring (1) and pin (2) on top fixation.
6. Secure actuator.
7. Remove one snap ring (1) and pin (2) on bottom fixation.
8. Replace actuator.
9. Adjust end switches of new actuator. See *4.12.6 Adjusting End Switches of Actuator — Type NL, page 32*.
10. Install parts in reverse order.
11. Connect actuator cable to cable harness.
12. Test tilting function.

4.12.5 Replacing Lifter Actuator

Different types of modules can be fitted to this mobility device. Due to compatibility reasons, you must identify the type of the module first before replacing an actuator. See *4.12.3 Identifying Type of Actuator (Modules With CoG Shift), page 30*.

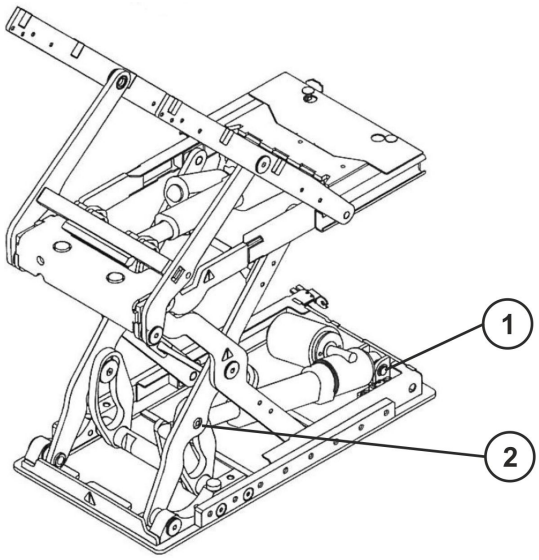


Fig. 4-14 Bottom fixation (1) and top fixation (2) of actuator

Replacing Actuator (Type TS)

- Screwdriver flat, width 6 mm
- Large screwdriver
- Flat screwdriver
- Medium-strength thread locking adhesive (Loctite 243 or similar)
- Grease (LT-43 or similar)

When removing, take care of small parts such as screws and washers. Put all small parts down so that they can be installed in correct sequence.

1. Remove legrests.
2. Run the lifter up to top position, if possible.

   If the lifter cannot be raised, a shroud can be removed from the upper rear side of the module. This way it is possible to reach the lower fixation of the actuator.

3. Turn OFF electronics.
4. Secure seat.
5. Remove cable ties.
6. Unplug actuator cable.
7.

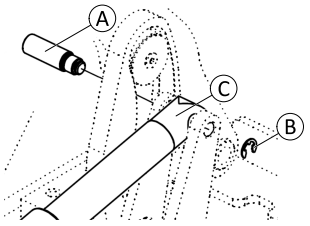


Fig. 4-15

   Remove snap ring Ⓑ.
8. Secure actuator Ⓒ. Loosen and remove screw Ⓐ.

9.

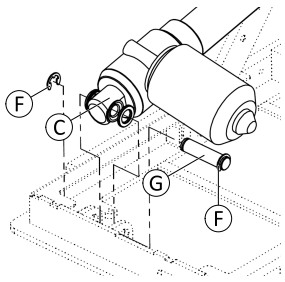


Fig. 4-16

Remove one snap ring Ⓕ and pin Ⓖ on bottom fixation.

10. Replace actuator.
11. Install parts in reverse order.
12. Plug in actuator cable.
13. Install cable ties.
14. Test lifting functions.

Replacing Actuator (Type NL)

- Flat screwdriver
- 2 mm Allen key
- 5.5 mm torque wrench 0.5 Nm - 4.5 Nm (or similar)
- Grease (LT-43 or similar)

When removing, take care of small parts such as screws and washers. Put all small parts down so that they can be installed in correct sequence.

1. Remove legrests.
2. Run the lifter up to top position, if possible.

   If the lifter cannot be raised, a shroud can be removed from the upper rear side of the module. This way it is possible to reach the lower fixation of the actuator.

3. Turn OFF electronics.
4. Secure seat.
5. Remove cable ties.
6. Unplug actuator cable.
7.

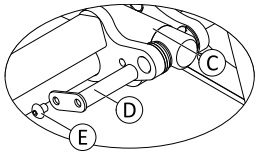


Fig. 4-17

Loosen and remove screw Ⓔ.

8. Secure actuator Ⓒ. Pull pin Ⓓ out off fixation.
9.

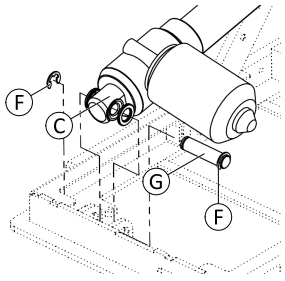


Fig. 4-18

Remove one snap ring Ⓕ and pin Ⓖ on bottom fixation.

10. Replace actuator.
11. Adjust end switches of new actuator. See *4.12.6 Adjusting End Switches of Actuator — Type NL, page 32*.
12. Install parts in reverse order.
13. Plug in actuator cable.
14. Install cable ties.
15. Test lifting function.

4.12.6 Adjusting End Switches of Actuator — Type NL

The actuators of type NL are fitted with two end switches to adjust both end positions of the module in a range of approximately 3 mm. This helps to reduce the risk of collisions and damage to the actuator and the module.

The setting screws to position the switches are located on the lower side of the actuator.

- 5.5 mm torque wrench 0.5 Nm - 4.5 Nm (or similar)

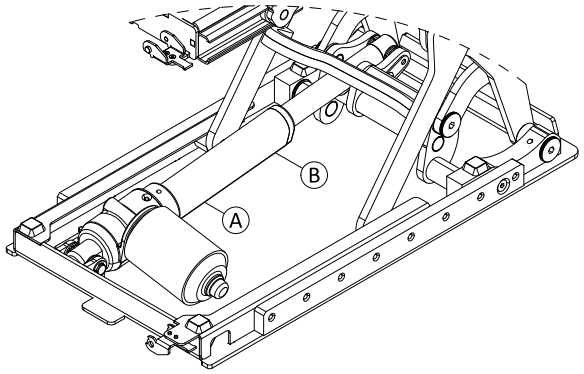


Fig. 4-19

1. If not already done, loosen both screws Ⓐ and Ⓑ slightly.
2. Move lifter to both end positions.
3. Move lifter to a position where you can reach both screws.
4. Tighten screws to 0.5 Nm.

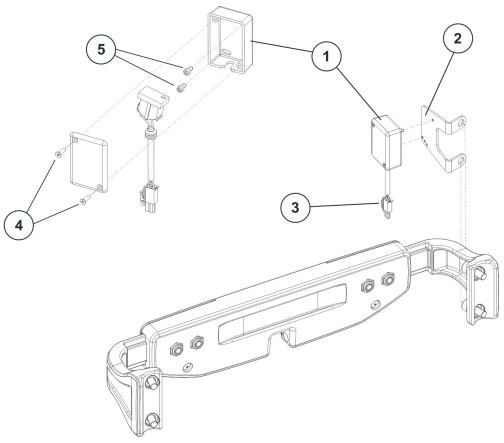
4.12.7 Replacing angle sensor

Bora, Kite

Tools:
- 5 mm Allen wrench
- Phillips screwdriver

Removing angle sensor

1.



Remove plug (3) from sensor (1).

2. Open cover of sensor box by loosening and removing both Phillips screws (4).

3. Loosen two Allen screws (5) and remove sensor (1) from mounting plate (2).
4. Replace angle sensor.

Installing angle sensor

1. Install parts in reverse order.

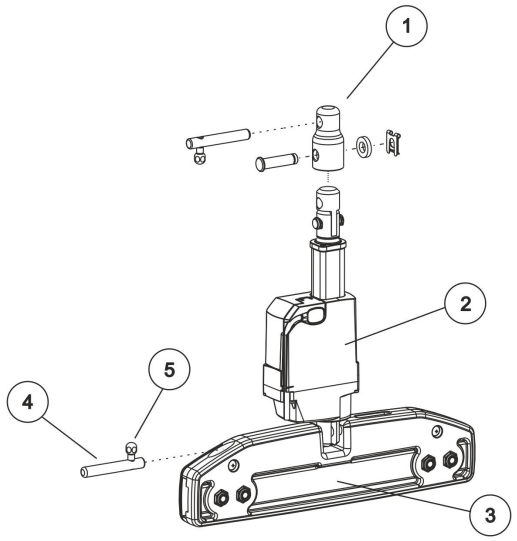
4.12.8 Replacing recline actuator

Tools:
- 8 mm Allen key
- Open-ended spanner, 10 mm
- Open-ended spanner, 13 mm

Remove recline actuator

1. Pull cable off directly where it is connected to actuator (2).
2. Detach bracket from actuator at top and bottom; to do this, slide bolts (4) to the side using the lever (5) and tilt the actuator (2) out of backrest clamp (3).
3. Replace actuator.

To increase the angle of the backrest, you can remove the adapter (1). See *4.12.8 Replacing recline actuator, page 33*.



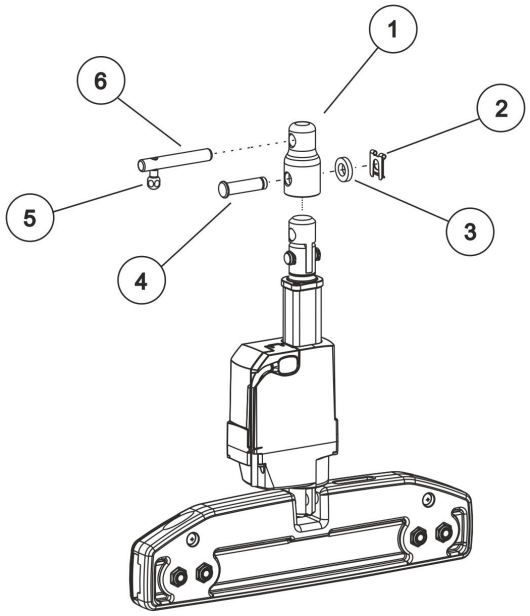
Install recline actuator

1. Install parts in reverse order.

4.12.9 Recline actuator - removing adapter

The Modulite seat is shipped ex works with an adapter on the backrest actuator, which allows a backrest angle of 75 to 105 degrees. This is done for safety reasons, in order to ensure tipping stability in cases of heavy user weight or tall users with a corresponding shift in their center of gravity. Smaller or lighter users can use the full range of backrest angles from 90 to 120 degrees.

1.



The adapter (1) must be removed to allow this.

The tipping stability must be checked afterwards, to determine the safety and stability of the electric wheelchair. See service manual, “Checking tipping stability”.

2. Slide bolts (6) to the side using the lever (5) and tilt actuator out of the upper bracket.
3. Remove SL retainer clip (2) incl. washers (3) from the fixation bolt (4).
4. Pull fixing bolt (4) out.
5. Remove adapter (1).

4.13 Replacing Seat Interface / Frame

4.13.1 Replacing seat/ seat frame without lifter

TDX SP2; FDX

This chapter describes how to replace the seat frame on a mobility device without a lifter or tilt module. To replace a lifter or tilt module, follow the procedures explained in “Replacing lifter/tilt module”.

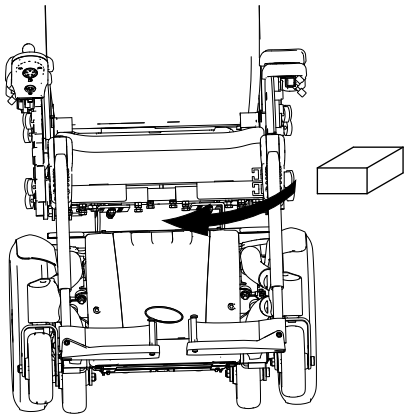
WARNING!
Risk of crushing
The seat is very heavy. Risk of injury to hands and feet.
– Use proper lifting techniques.

- 6 mm Allen key
- Torque wrench 5 – 30 Nm (or similar)
- Protractor
- Side cutting pliers
- Cable ties
- Wooden block

Take careful note of the exact position of the seat. Mark the position it is mounted in, the angle and so on. If necessary, make photographs with a digital camera. Any modification of the adjustment of the seat affects the centre of gravity of the wheelchair.

Removing seat

1. Switch off mobility device.
2. Remove front shroud and rear shroud, as described in the service manual of the mobility device “Opening front shroud” “Opening rear shroud”.
3. Take exact note of the positions of all cables and sockets that they are connected to. Mark connectors and sockets or take a photograph with a digital camera.
4. Detach all cables from the electronic modules which run from seat to chassis.
5. Place cables so that they do not get in the way when you remove the seat.
6.



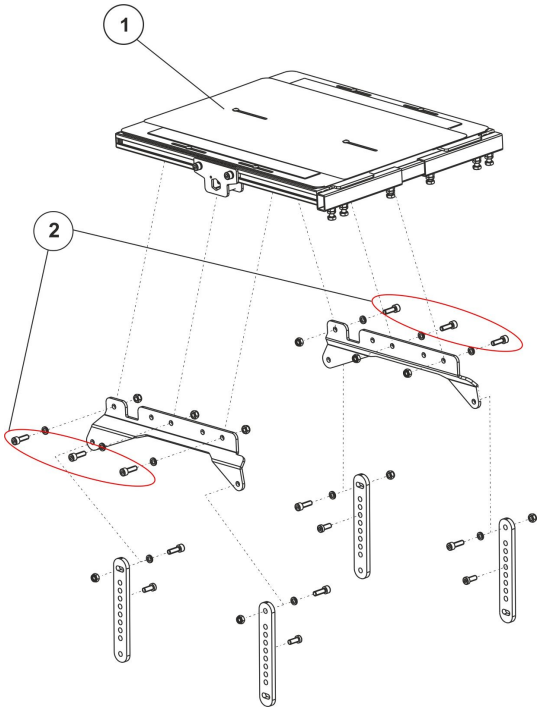
Insert a suitable wooden block between seat support and chassis. This will prevent the seat from falling down when you loosen and remove the screws.

WARNING!
Risk of crushing
The seat is very heavy. Risk of injury to hands and feet.
– Use proper lifting techniques.

7. Use Allen key to loosen and remove screws on both sides at the same time.
8. Hold seat securely and loosen rear hexagon socket head screw on both sides at the same time.
9. Lift seat off.

Removing seat support (telescopic seat frame / one-piece seat plate)

- 6 mm Allen key
- 13 mm wrench



The figure above shows the seat support with the telescopic seat frame.

1. Loosen Allen key screws (2) with a 6 mm Allen key.
2. Pull seat frame (1) up and off.

Installing seat and seat support

1. Install parts in reverse order.

   When installing the seat, pay attention to its heavy weight.

2. Tighten screws to a torque of 25 Nm.
3. Check all vehicle functions and go for a test drive.

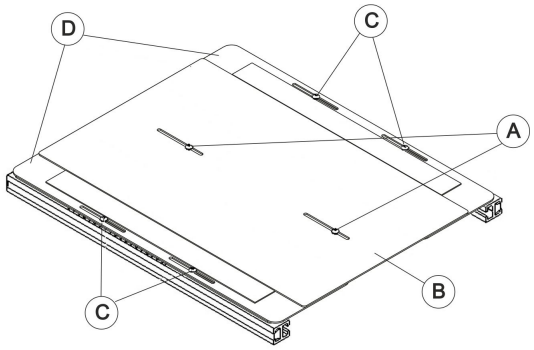
4.13.2 Replacing seat support (without lifter or tilt module)

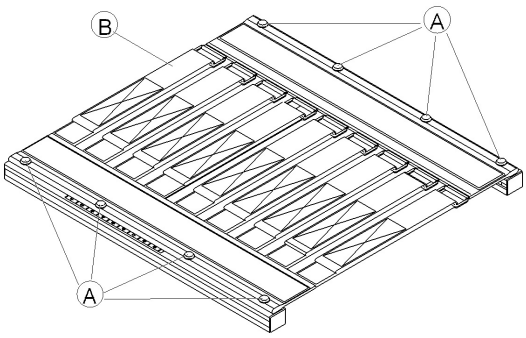
This chapter deals with replacing the seat support for a seat without lifter or tilt modules. Proceed as described in *Replacing lifter/tilt module* to replace lifter or tilt modules.

WARNING!
Risk of crushing
The seat is very heavy. Injury hazard to hands and feet.
– Pay attention to the hand and feet.
– Use proper lifting techniques.

Tools:
- 3 mm Allen key
- 10 mm wrench
- T25 Torx wrench
- T40 Torx wrench
- Side cutting pliers
- Cable ties

1. Remove legrests.
2. Switch controls OFF on the remote.
3. Remove backrest cushion.

4. 

   Loosen and remove screws, which secure middle seat plate Ⓐ with a 3 mm Allen key.
5. Remove middle seat plate Ⓑ.
6. 

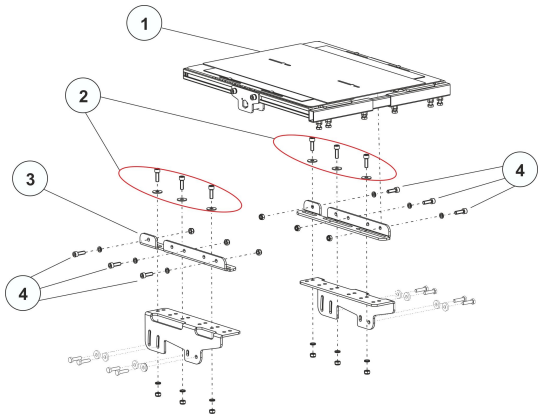
   Loosen and remove screws on both sides, which secure the lateral seat plates Ⓒ with a 3 mm Allen key.
7. Remove lateral seat plates Ⓓ. Or:
8. Remove seat cushion.
9. Loosen and remove screws on both sides, which secure sling seat Ⓐ with a T25 Torx wrench.
10. Remove sling seat Ⓑ.

Removing seat support (telescopic seat frame / one-piece seat plate)

Example TDX

Tools:
- 6 mm Allen key
- 13 mm wrench

The following figure shows seat support with telescopic seat frame.

1. 

   Loosen and remove screws (2) incl. washers and nuts with a 6 mm Allen key and a 13 mm wrench.
2. Pull seat frame (1) up and off.
3. Loosen and remove screws (4) incl. washers and nuts with a 6 mm Allen key and a 13 mm wrench.
4. Remove seat adapter (3).

   The dismantling of the seat support on the chassis is described under “Seat support” of the corresponding service manual.

Installing seat and seat support

1. Replace all parts in reverse order.

   Make sure that all screws, washers and nuts are replaced in the correct order and securely tightened during installation.

   When installing the seat, pay attention to its heavy weight.

   Tighten screws to a torque of 25 Nm.

2. Check all functions of the vehicle and go for a test drive.

4.13.3 Replacing Seat Support (Modules With CoG Shift)

This chapter deals with replacing the seat support for a seat with lifter or tilt modules with Centre of Gravity shift function. Proceed as described in *4.13.2 Replacing seat support (without lifter or tilt module), page 34* to replace lifter or tilt modules.

Telescopic seat frame served as an example.

- 3 mm Allen key (Seat plates)
- TX25 Torx key (Sling seat)
- TX40 Torx key
- Oblique pliers
- Cable ties

Removing on Variants With Seat Plate

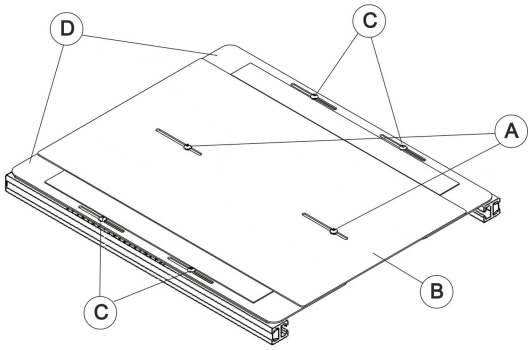


Fig. 4-20

1. Remove things that are in the way, such as legrests and backrest cushion.
2. Turn OFF electronics.
3. Loosen and remove screws Ⓐ.
4. Remove middle seat plate Ⓑ.
5. Loosen and remove screws Ⓒ.
6. Remove lateral seat plates Ⓓ.

7.

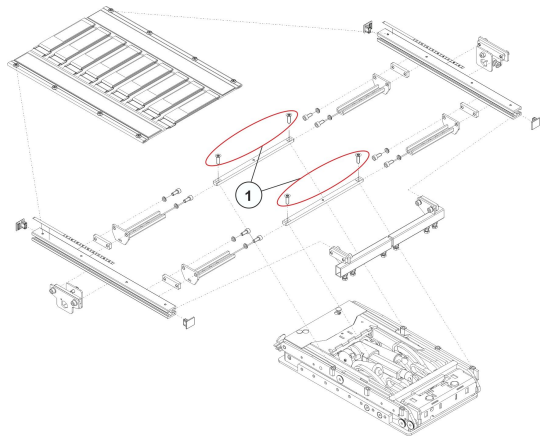


Fig. 4-21

Loosen and remove screws (1).

8. Remove seat frame.

Removing on Variants With Sling Seat

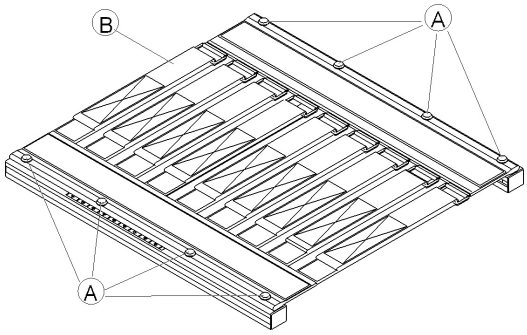


Fig. 4-22

1. Remove things that are in the way, such as legrests and backrest cushion.
2. Turn OFF electronics.
3. Loosen and remove screws Ⓐ on both sides.
4. Remove sling seat Ⓑ.
5.

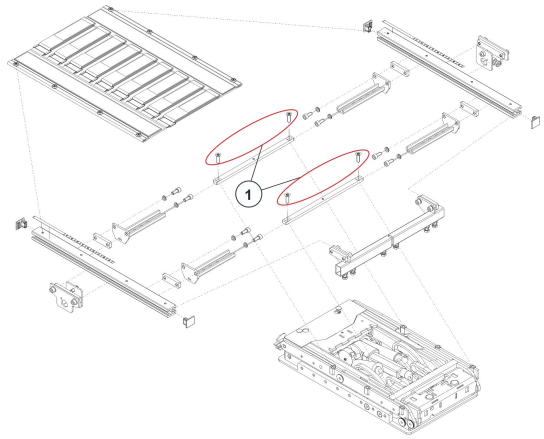


Fig. 4-23

Loosen and remove screws (1).

6. Remove seat frame.

Installing Seat Support

1. Install parts in reverse order. Tighten screws to 25 Nm.
2. Test all functions.

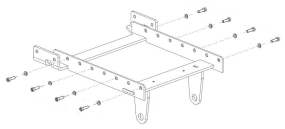
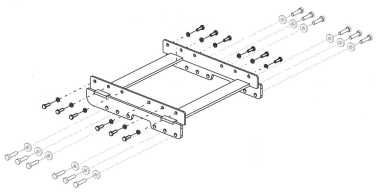
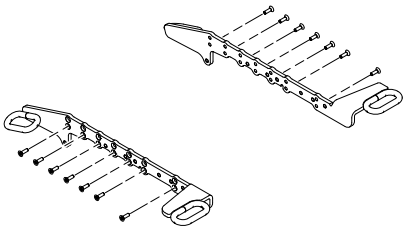
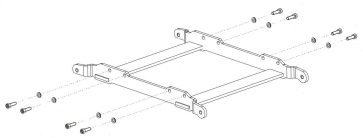
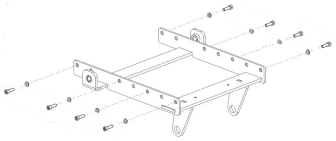
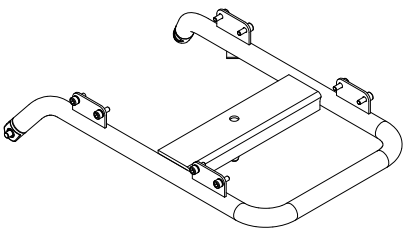
4.13.4 Replacing Modules (CoG Shift Modules)

This chapter deals with the replacing of modules with CoG shift, or changing the type of the module in case of retrofitting.

CAUTION!
Risk of crushing
The seat is very heavy. Danger of injury to hands and feet.
– Use proper lifting techniques.

- 5 mm Allen key (Pronto M41)
- TX30 Torx key (TDX SP2 Low-Rider)
- 10 mm wrench (all other models)

The procedures are the same for all mobility devices and type of modules. However, the brackets differ for the different models. For details on the brackets see following table:

Bracket for ...	
Bora Spectra XTR, Spectra XTR2, Spectra XTR2 HD	
TDX SP2, TDX SP2[NB]	
TDX SP2 Low-Rider	
FDX	
Kite	
Pronto M41	

Bora model graphics served as an example in the following procedure.

1. Remove seat support. See *4.13.3 Replacing Seat Support (Modules With CoG Shift), page 35*.
2. Unplug actuator cable and microswitch cable from cable harness.

3.

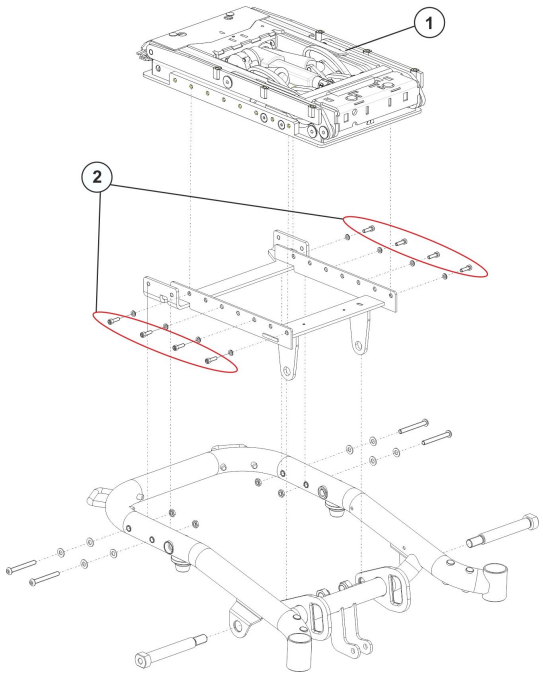


Fig. 4-24

Loosen and remove screws (2) including washers.

4. Replace module (1).
5. Install parts in reverse order.
6. If required, update configuration of mobility device. See LiNX service manual.
7. Test all functions.

5 Accessories

5.1 Accessories list

- Cane holder
- Head-/ Neckrest
- Headrest sidewise adjustable
- Headrest with cheek support

The installation instructions for additional accessories are available at your Invacare® specialist supplier or directly from Invacare ®.

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