

## Invacare® Modulite

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

### en Seating System Service Manual



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



***Yes, you can.***



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# 1 General

## 1.1 Introduction

This document contains important information about assembly, adjustment and advanced maintenance of a product component. To ensure safety when handling the component, read this document, the service manuals of the base product and additional components, and the user manuals carefully and follow the safety instructions.

The component itself does not bear a CE marking, but it is part of a product that complies with the respective valid regulations concerning medical devices. The components is therefore covered by the CE marking of the product.

Find the user manual on Invacare's website or contact your Invacare representative. See addresses at the end of this document.

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

Before reading this document, make sure you have the latest version. You find the latest version as a PDF on the Invacare website.

For pre-sale and user information, see the user manual.

For more information about the product, for example product safety notices and product recalls, contact your Invacare representative. See addresses at the end of this document.

## 1.2 General Information

Service and maintenance work must be carried out taking this document into account.

It is imperative that you observe safety information.

Information about operation or about general maintenance and care work on the product should be taken from service manual.

Assembly of accessories might not be described in this document. Refer to the manual delivered with the accessory. Additional manuals can be ordered from Invacare. See addresses at the end of this document.

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.

The product 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

Symbols and signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. See the information below for definitions of the signal words.



### 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.



### Tips

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



### Tools

Identifies required tools, components and items which are needed 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 tyre pressures (see technical data).
- Check all electrical components for correct function. Note that incorrect polarity can result in damage to the control system.
- 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 locks must be pressed in. When reassembling ensure that these safety locks 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 Setup

### 4.1 Adjusting seat width/backrest width


For seat frames and surfaces, see 5.3.7 *Seat frame and surface*, page 19, for back posts and backrest frames, see 5.3.3 *Backrest frames*, page 15 and for backrest styles, see 5.3.2 *Backrest styles*, page 15.


#### 4.1.1 Adjusting Seat Width

You can only adjust the seat width for the telescopic seat frame.


The seat is available in different seat width ranges:


- 380 mm/430 mm
- 480 mm/530 mm
- 550 mm.

 The seat width of 550 mm cannot be retrofitted. Contact Invacare for more information.

 When switching between the different seat width ranges, several parts of the seat such as legrest fixation or screwed connections must be replaced. Contact your provider or check the spare parts catalogue.

When modifying the seat width, the backrest width must also be correspondingly adapted. See 4.1.2 *Adjusting Backrest Width*, page 9.

-  • 3 mm Allen key (Seat plates)  
• TX25 Torx key (Sling seat)  
• 5 mm Allen key  
• 13 mm wrench  
• TX40 Torx key

 Backrest posts for Flex3 only adjust up to a seat width setting of 480 mm. The remaining 50 mm are adjusted via backrest plates.

#### Removing Seat Plate

1. Remove backrest cushion and seat cushion.
2. Remove backrest from backrest mounting bracket. See 4.1.2 *Adjusting Backrest Width*, page 9.
3. Loosen and remove screws **A**.
4. Remove middle seat plate **B**.
5. Loosen and remove screws **C**.
6. Remove lateral seat plates **D**.
7. If fitted, remove spacer between plates and frame.

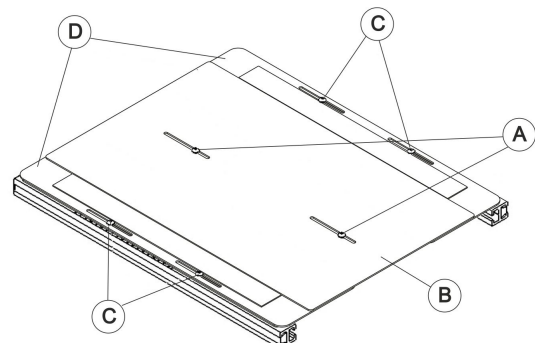


Fig. 4-1

#### Removing Sling Seat

1. Remove backrest cushion and seat cushion.
2. Remove backrest from backrest mounting bracket. See 4.1.2 *Adjusting Backrest Width*, page 9.
3. Loosen and remove screws **A** on both sides.
4. Remove sling seat **B**.

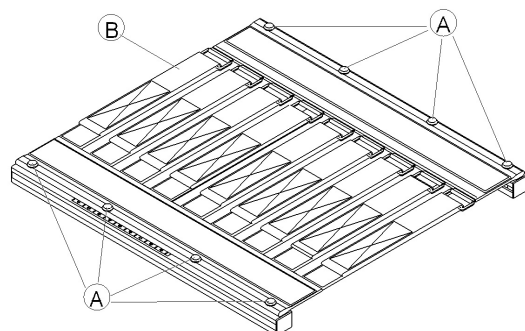


Fig. 4-2

## Adjusting Width

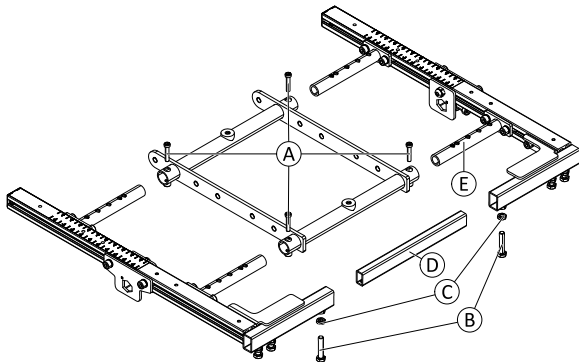


Fig. 4-3 Seat frame of models without tilt- or lifter-tilt modules

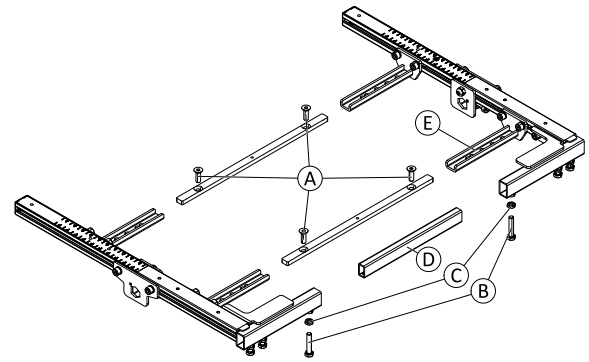


Fig. 4-4 Seat frame of models with tilt- or lifter-tilt modules

1. Loosen and remove screws **A**.
2. Loosen and remove screws **B** and nuts **C**.
3. If required, replace legrest fixation **D**.
4. Adjust seat rail connector and legrest fixation to desired seat width according to table:

Screw Position	Seat Width
<b>F</b>	380 mm
<b>G</b>	430 mm
<b>H</b>	480 mm
<b>I</b>	530 mm
<b>J</b>	550 mm (optional)

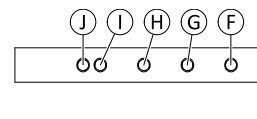


Fig. 4-5 Mounting positions for different seat widths on seat rail connector **E**. Variant on model without tilt- or lifter-tilt module serves as example.

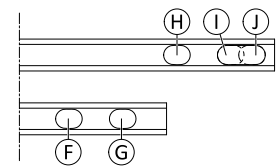


Fig. 4-6 Mounting positions for different seat widths on legrest fixations **D**.

### Installing Parts

1. Install parts in reverse order.
2. Test all functions.

### 4.1.2 Adjusting Backrest Width



The backrest width of 550 mm cannot be retrofitted. Contact Invacare for more information.

Backrest width is adjusted by performing the following tasks:

1. Adjusting backrest posts.
2. Adjusting backrest.
  - a. Tension-adjustable backrest: See 4.1.3 *Adjusting Tension-Adjustable Backrest*, page 10.
  - b. Flex3 backrest: See 4.1.4 *Adjusting Flex3 Backrest*, page 10.
3. Replacing backrest cushion (these are available in various widths).  
When modifying backrest width, seat width must also be correspondingly adapted. See 4.1.1 *Adjusting Seat Width*, page 8.



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

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

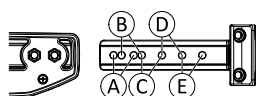


Fig. 4-7 Upper actuator fixation bracket.

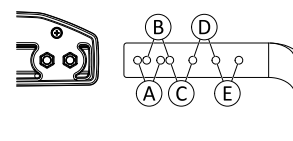


Fig. 4-8 Lower actuator fixation bracket.

Screw position	Backrest width
Ⓐ	550 mm (optional)
Ⓑ	530 mm*
Ⓒ	480 mm
Ⓓ	430 mm
Ⓔ	380 mm

\* Back posts for Flex3 seat only adjust up to a seat width setting of 480 mm. The remaining 50 mm are adjusted via the backrest plates.

1. Remove backrest cushion.
2. Loosen straps of sling backrest or remove plates of Flex3 backrest.
3. Remove backrest from backrest mounting bracket.
4. Loosen and remove both screws Ⓐ of both fixation brackets Ⓕ.
5. Remove shrouds Ⓑ of both fixation brackets Ⓕ.
6. Loosen and remove bolts Ⓒ and nuts Ⓓ of both fixation brackets Ⓕ.
7. Adjust backrest fixation Ⓔ for new backrest width according to table above.
8. Insert bolts Ⓒ and tighten with nuts Ⓓ.
9. Install shrouds Ⓑ.
10. Insert and tighten screws Ⓐ.

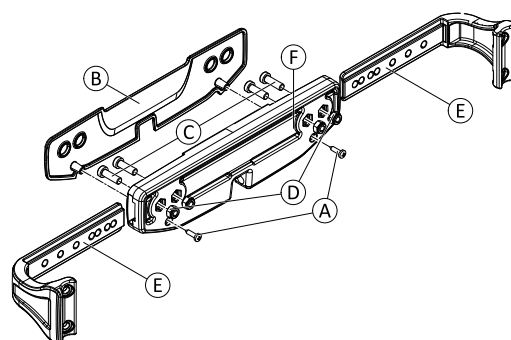


Fig. 4-9 Top actuator fixation bracket serves as an example.

11. Install backrest to mounting bracket.
12. Adjust straps of sling backrest to new width or install adjusted Flex 3 backrest.
13. Install backrest cushion.
14. Test all functions.

#### 4.1.3 Adjusting Tension-Adjustable Backrest

The tension-adjustable backrest can be individually adapted to the user's back shape.

1. Pull front and rear faces of backrest upholstery (1) apart and remove. Backrest upholstery front and rear faces are held together using hook-and-loop straps.
2. Open hook-and-loop straps of backrest belt (2) and adjust to required length.
3. Re-install backrest upholstery and fix it with hook-and-loop straps.

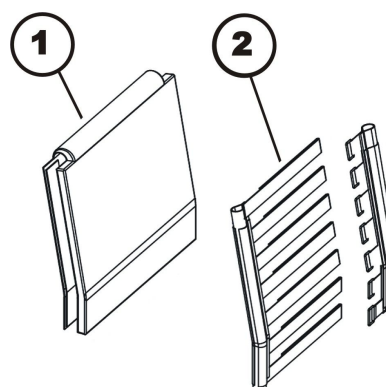


Fig. 4-10

#### 4.1.4 Adjusting Flex3 Backrest



- Phillips screwdriver
- 5 mm Allen key

1.

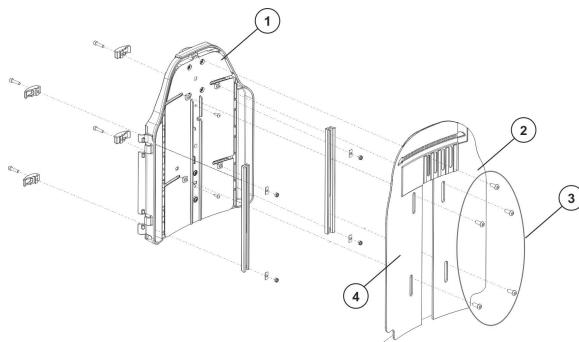


Fig. 4-11

Loosen and remove screws (3).

2. Remove front lateral plates (2 and 4) from backrest (1).

3.

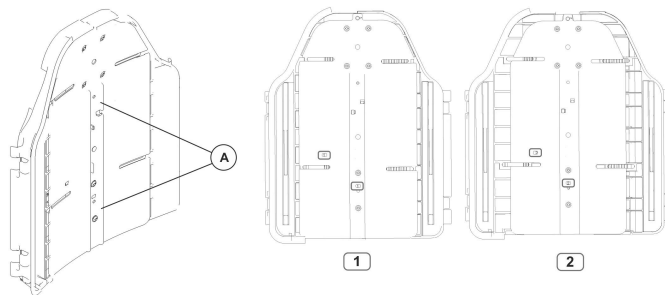


Fig. 4-12

Remove both Phillips screws (A) 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 (A) into middle plate.

6. Retighten front lateral plates (2 and 4).

#### 4.1.5 Adjusting Flex3 manual recline



Tools:

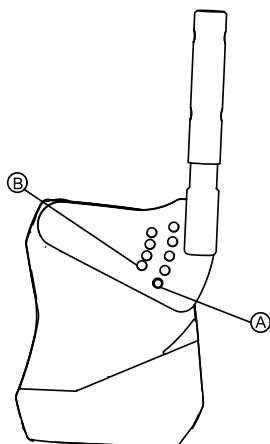
- 6 mm Allen key



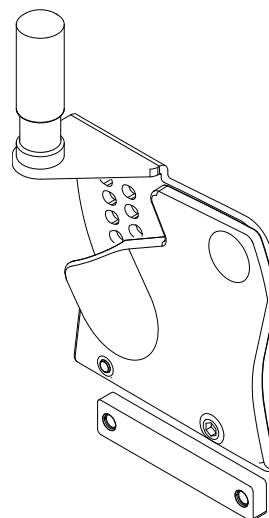
A second inner hole line (B) allows fine adjustments of 3.75 °.



Bracket for seat width 53 is inrigged, see below.



Regular seat width



Seat width 53

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

#### 4.1.6 Adjusting Matrix Backrests

See corresponding manual.

#### 4.1.7 Adjusting Flex3 tension adjustable backrest



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

### 4.2 Adjusting adapter for universal seat

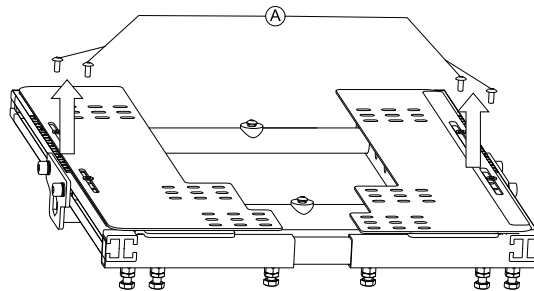
#### 4.2.1 Adjusting universal seat adapter width



Tools:

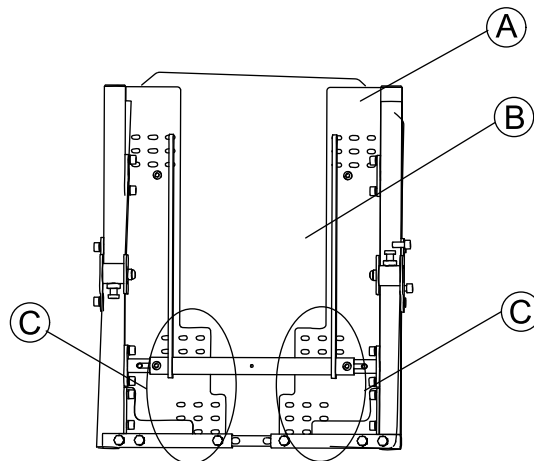
- 3 mm Allen key
- 10 mm wrench

1.



Loosen and remove four screws ①.

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



Fasten adapter plates ① to seat plate of seat ② in area ③.



For smoothness of adjustment you can use button head screws.



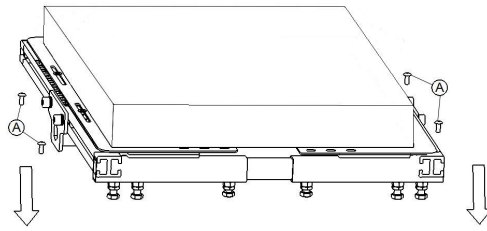
Make sure rubber straps on back of adapter plates face the frame.



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



4.



Insert four screws (A).

5. Tighten four screws.

## 5 Service

### 5.1 Imperial to metric conversion chart

You can use this chart as an orientation to find the right tool size.

IMPERIAL	METRIC
inch	mm
5/64	1.9844
3/32	2.3813
7/64	2.7781
1/8	3.1750
9/64	3.5719
5/32	3.9688
11/64	4.3656
3/16	4.7625
13/64	5.1594
7/32	5.5563
15/64	5.9531
1/4	6.3500
17/64	6.7469
9/32	7.1438
19/64	7.5406
5/16	7.9375
21/64	8.3344
11/32	8.7313
23/64	9.1281
3/8	9.5250
25/64	9.9219
13/32	10.3188
27/64	10.7156
7/16	11.1125
29/64	11.5094
15/32	11.9063
31/64	12.3031
1/2	12.7000
33/64	13.0969
17/32	13.4938
35/64	13.8906
9/16	14.2875
37/64	14.6844
19/32	15.0813

IMPERIAL	METRIC
inch	mm
39/64	15.4781
5/8	15.8750
41/64	16.2719
21/32	16.6688
43/64	17.0656
11/16	17.4625
45/64	17.8594
23/32	18.2563
47/64	18.6531
3/4	19.0500
49/64	19.4469
25/32	19.8438
51/64	20.2406
13/16	20.6375
53/64	21.0344
27/32	21.4313
55/64	21.8281
7/8	22.2250

### 5.2 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.

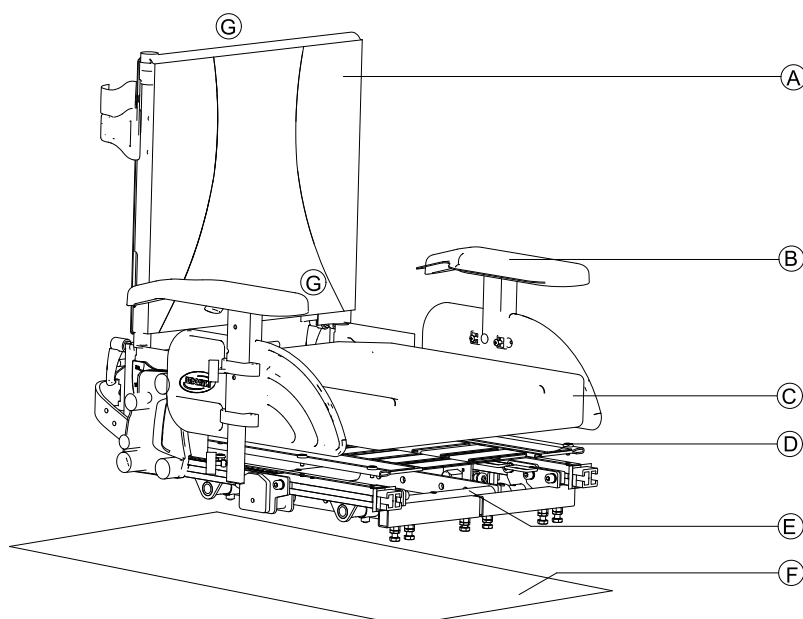
The tightening torques stated in the following list are based on the thread diameter for the nuts and bolts for which no specific values have been determined. All values assume dry and de-greased threads.

Thread	Tightening Torque in Nm $\pm 10$ %
M4	3 Nm
M5	6 Nm
M6	10 Nm
M8	25 Nm
M10	49 Nm
M12	80 Nm
M14	120 Nm
M16	180 Nm

## 5.3 Overview Components

### 5.3.1 Overview seating system

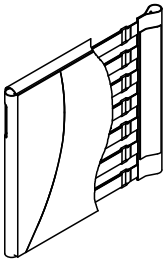
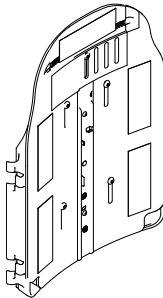
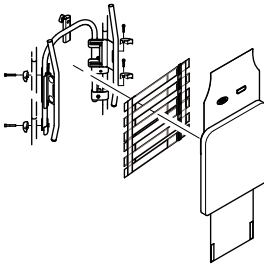
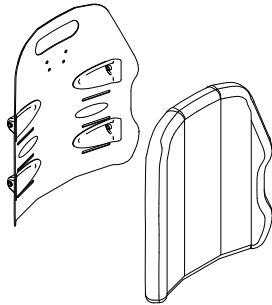
Modulite seat (example)



A	Backrest, see chapter 5.3.2 <i>Backrest styles</i> , page 15
B	Armrest, see chapter 5.3.4 <i>Armrest styles</i> , page 16
C	Cushion
D	Seat surface, see chapter 5.3.7 <i>Seat frame and surface</i> , page 19
E	Seat frame, see chapter 5.3.7 <i>Seat frame and surface</i> , page 19
F	Chassis and interface, see chapter 5.3.8 <i>Overview seat interfaces</i> , page 19
G/ H	Remote holder / remote holder for attendant, headrest adapters, see chapter 5.3.5 <i>Remote Brackets and Headrest Adapters</i> , page 16

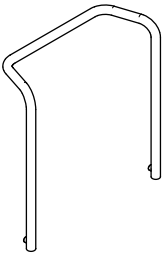
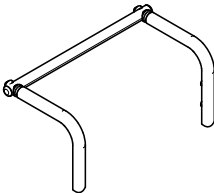
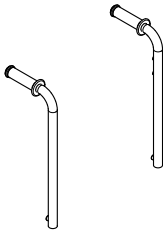
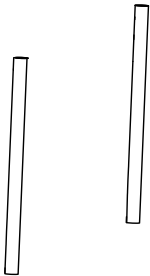
### 5.3.2 Backrest styles

Modulite seat is available with different backrest styles.

Tension adjustable	Flex 3 backrest plates	Flex 3 Tension Adjustable	Matrix
			

### 5.3.3 Backrest frames

Modulite is available with different backrest frames. For remote brackets that can be mounted to the backrest, see 5.3.5 *Remote Brackets and Headrest Adapters*, page 16.

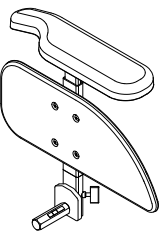
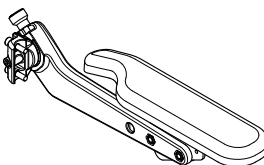
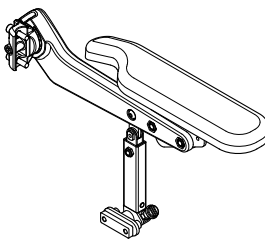
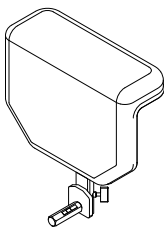
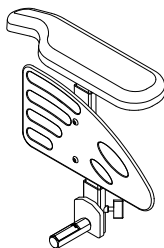
Standard backrest tube*	Push bar for backrest posts with push handles	Backrest posts with push handles	Backrest posts without push handles
			
<b>Backrest height</b>			
48 cm		48 cm / 54 cm	48 cm / 54 cm
<b>Tube diameter</b>			
22 mm	22 mm	25 mm	25 mm

\* used with one-piece seat plate only.

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

### 5.3.4 Armrest styles

Modulite seat is available with different armrest styles. For remote brackets that can be mounted to armrest, see 5.3.5 *Remote Brackets and Headrest Adapters*, page 16.

T-Armrest	Flip-up	Following	Padded	Inrigged
				

Function	Available armrest bracket length
T-armrest	Regular or higher (+5 cm)
Flip-up Armrest	one size
Following Armrest	one size
Padded Armrest	one size
Inrigged armrest	one size

### Armpad styles

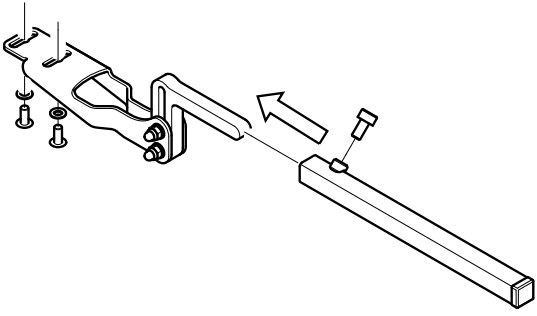
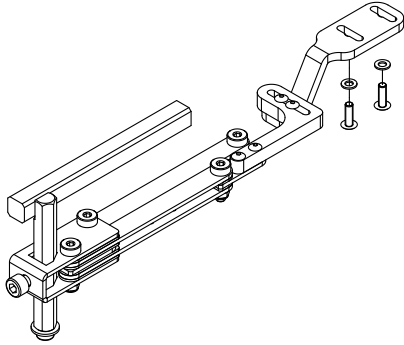
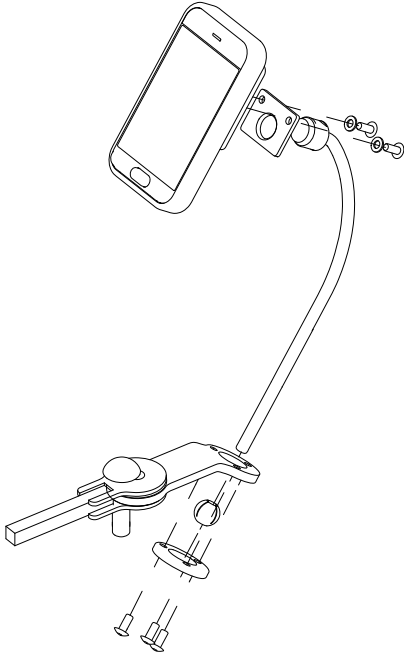
All Modulite armrests are available with the following armpads, except for padded armrest.

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

### 5.3.5 Remote Brackets and Headrest Adapters

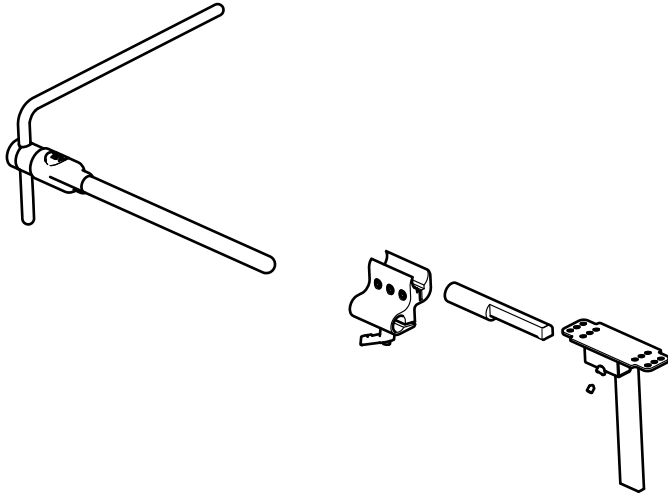
Modulite can be fitted with different brackets for remotes.

Remotes for users

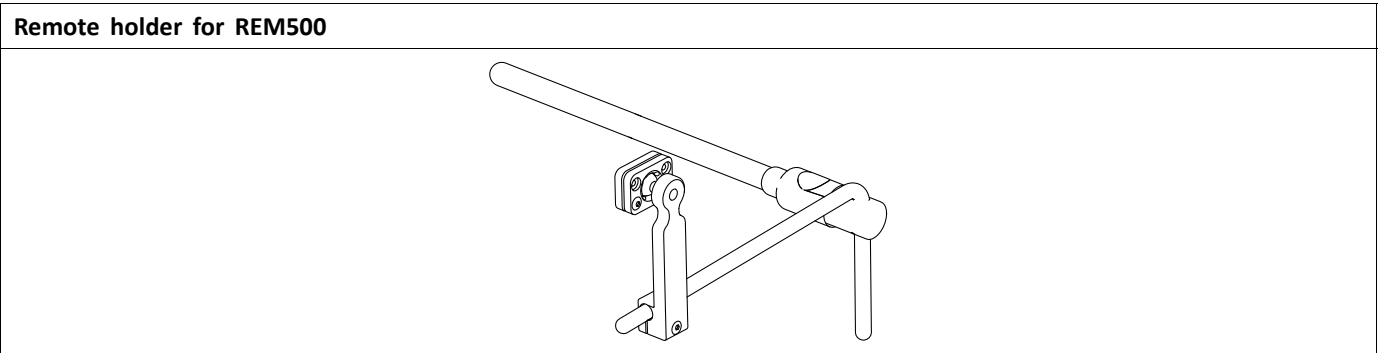
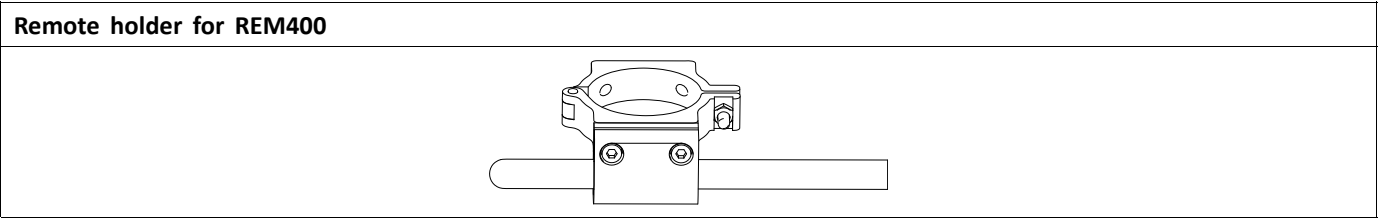
Standard with support tube	Standard with swing away armrest
	
	REM500 swing-away display holder
	

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 *5.8.1 Replacing Nucleus Midline Holder, page 25*.

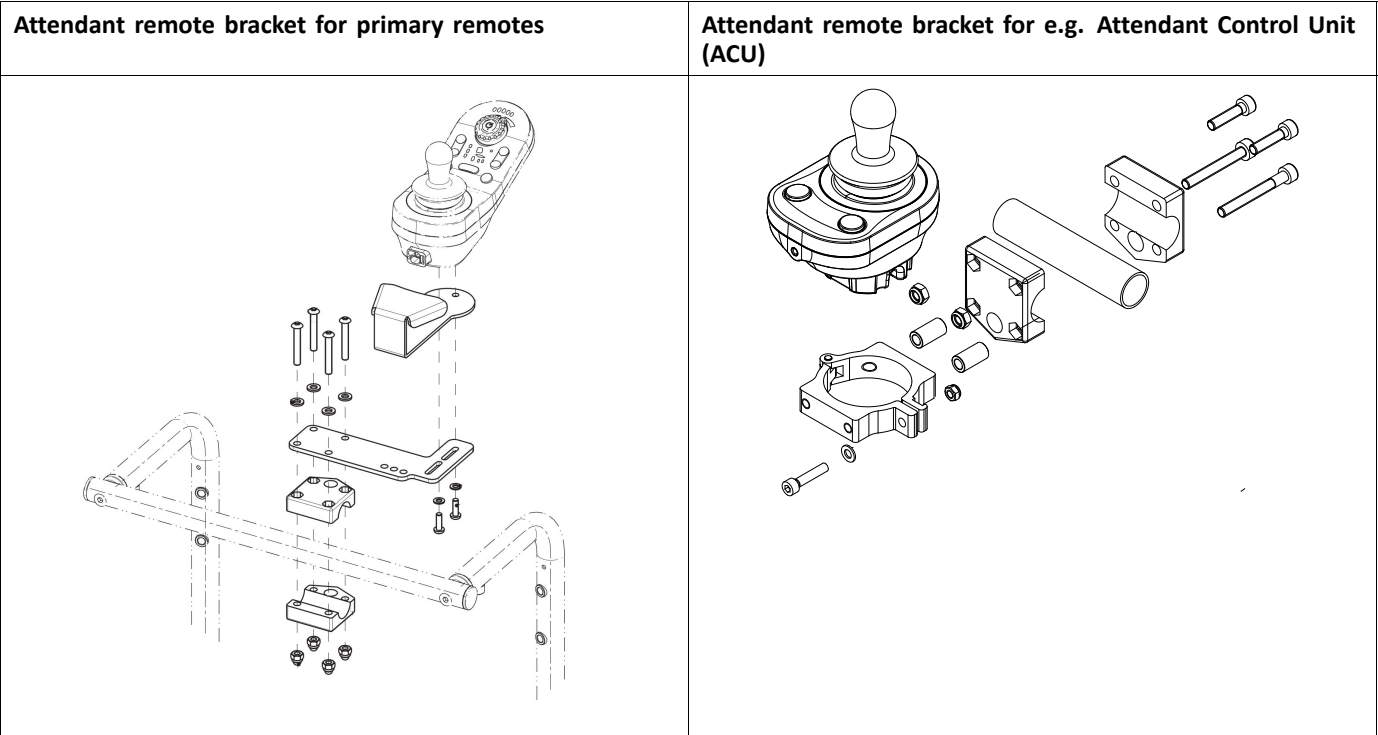
Nucleus midline holder


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



**Remotes for attendant**

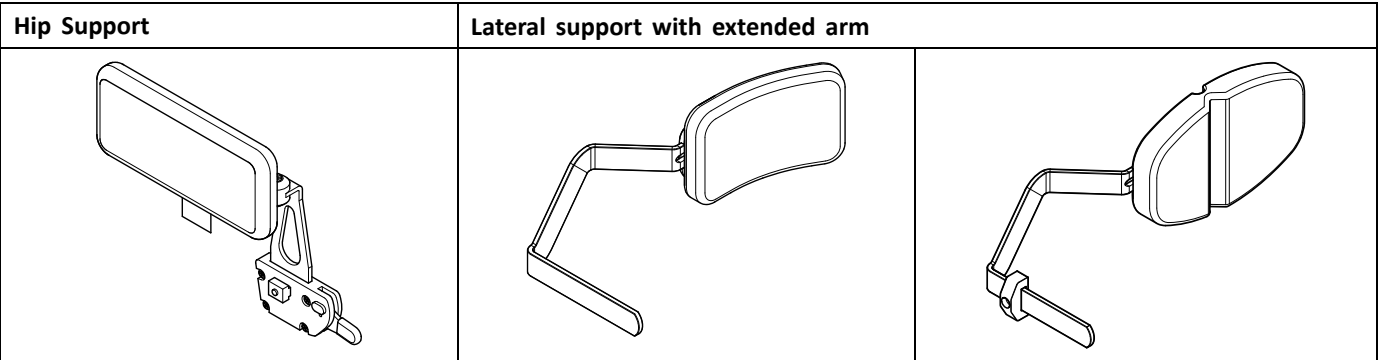
Remote bracket for the wheelchair attendant is mounted at the push bar or at the push handles at the backrest frame of the power wheelchair.



Remote bracket can be mounted in a variety of positions.

**5.3.6 Support options**

Modulte seat is available with different support options.



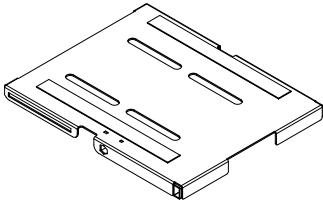
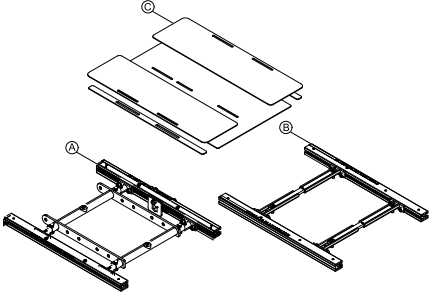
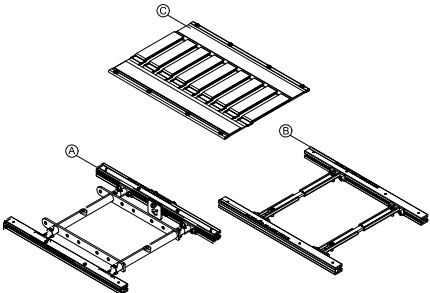
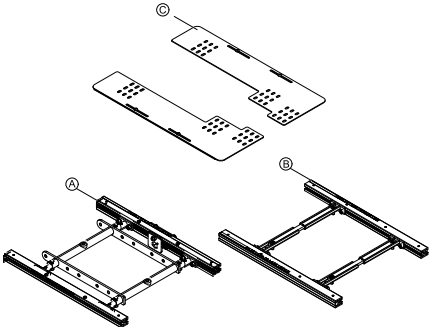
## Pad styles

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		

## 5.3.7 Seat frame and surface

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

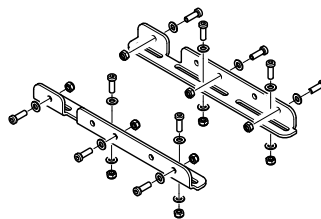
One piece seatplate	Telescopic seat frame (A) or (B) with seatplates (C)
	
Telescopic seat frame (A) or (B) with sling seat (C)	Telescopic seat frame (A) or (B) with universal adapter (C)
	

Telescopic seat frame (B) is used for powered tilt with CoG shift and lifter with powered tilt and CoG shift only. See 5.3.8 *Overview seat interfaces*, page 19.

### Seat frame adapters

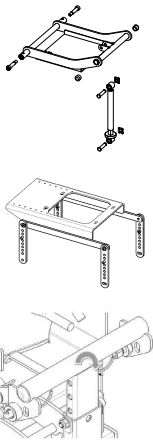
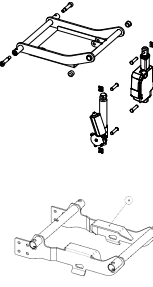


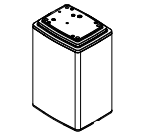
Seat frame adapters interface the seat frame to the seat support of the chassis, respectively a module (lifter & tilt or tilt). It contains slots for the CoG adjustment.

#### Example Bora



## 5.3.8 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						✓	

## 5.4 Replacing backrest

For backrest styles, see 5.3.2 *Backrest styles*, page 15.

### 5.4.1 Replacing standard backrest

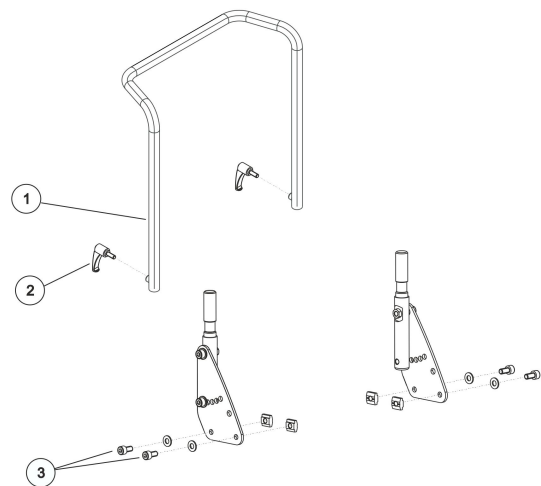


Tools:

- 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.

### 5.4.2 Replacing Flex3 tension adjustable backrest



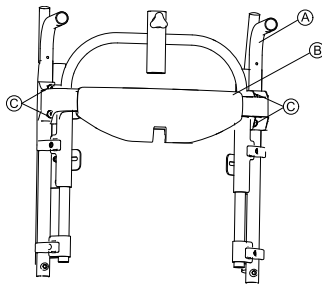
Tools:

- 5 mm Allen key
- 6 mm Allen key

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

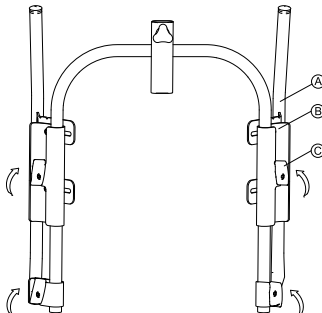
#### Removing

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



Loosen four screws © and take off upper traverse ⑥ from push handles ①.

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.

### 5.4.3 Replacing Backrest Mounting Bracket



- 6 mm Allen key



The mounting brackets for the Flex3 backrest and a seat width of 530 mm are inrigged. The course of action is the same.

### Removing Bracket

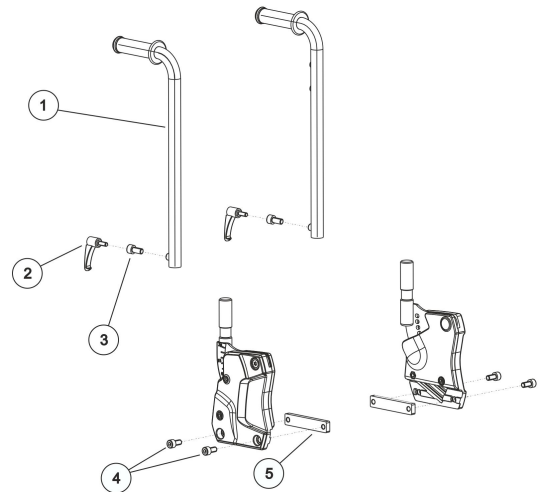


Fig. 5-1

1. Remove backrest cushion.
2. Loosen fixation of corresponding backrest posts (1), depending on version. There are two versions of fixations:
  - (2) Fixation lever: for manual backrest
  - (3) Screw: for powered backrest
3. Remove backrest posts.
4. Loosen and remove two screws (4) to T-nut (5) on both sides.

#### Installing Bracket

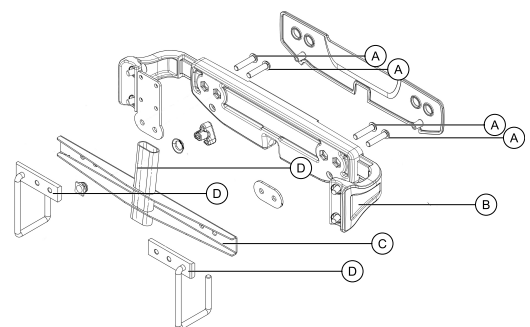
1. Install parts in reverse order.
2. Test all functions.

### 5.4.4 Replacing bag hooks



- 6 mm Allen key

#### Removing



1. Remove screws ①.
2. Remove bag hooks ④, ③ and the distance spacers from backrest ②.

#### Installing

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

## 5.5 Headrest/Neckrest

### 5.5.1 Replacing Rea Headrest

#### Removing Headrest

1. Loosen hand screw ⑥.
2. Pull headrest ① out of bracket ③.

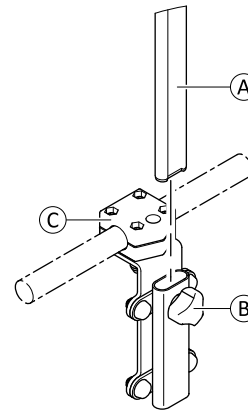


Fig. 5-2

#### Installing Headrest

1. Install parts in reverse order.
2. Tighten hand screw ⑥ hand-tight.
3. Test all functions.

### 5.5.2 Replacing Rea Headrest Mounting Bracket (Sling Backrest)



- 4 mm Allen key

#### Removing Bracket



Not all bolts and washers are shown in illustration.

1. Loosen and remove bolts ⑤ including washers ⑥, mounting plate ④ and bottom side of bracket ③.
2. Remove top side of bracket ② including nuts ①.

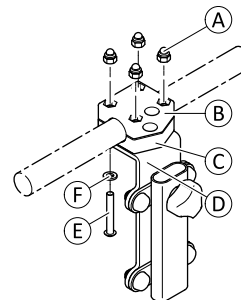


Fig. 5-3

#### Installing Bracket

1. Install parts in reverse order.
2. Test all functions.

### 5.5.3 Installing Elan Headrest to Flex3 Backrest

The Elan headrest can only be mounted to a Flex3 backrest via an adapter.



#### **Risk of Damage to Property**

After mounting parts of adapter, parts are difficult to separate again.


- Mount parts only within headrest housing.
- To dismount, use small Allen key or paperclip to disengage locking clips on inside while pulling parts apart.
- Mount parts completely to headrest mounting and ensure that parts engage with audible click.



- Rubber mallet
- Elan headrest adapter(s) for Modulite

1. Loosen and remove handscrew (A).

2.

 Curved side of adapter must face away from backrest frame.

Install adapter:

- Backrest plates: Insert adapter (B) into slot of backrest plate (C).
- Tension-adjustable backrest: Insert upper adapter (B) and lower adapter (E) into slot until it clicks.

3. Insert Elan headrest tube (D) into adapter.

4. Attach and tighten handscrew (A).

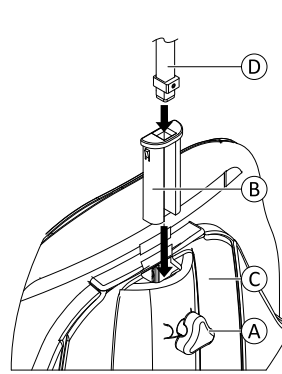


Fig. 5-4

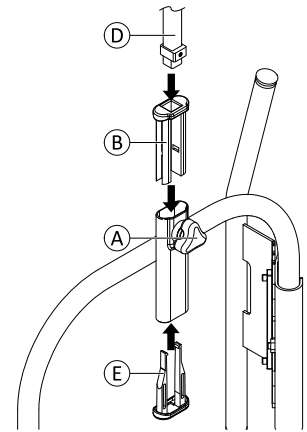


Fig. 5-5

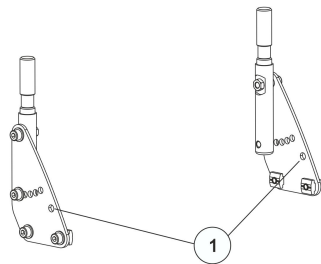
## 5.6 Replacing posture belts

### 5.6.1 Installation on backrest mounting bracket (backrest frame)



Tools:

- 13 mm socket spanner
- 5 mm Allen key



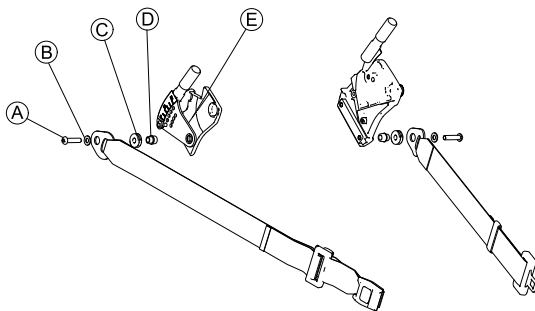
- Posture belts are attached via drill hole (1) on the top right.

### 5.6.2 Installation on backrest mounting bracket (telescopic seat frame)



Tools:

- 5 mm Allen key



1. Loosen screw (A) with a 5 mm Allen key.
2. Remove screw (A), corresponding washer (B), seat belt, stopper (C) and belt winder (D) from backrest mounting bracket (E).

3. Replace posture belt.

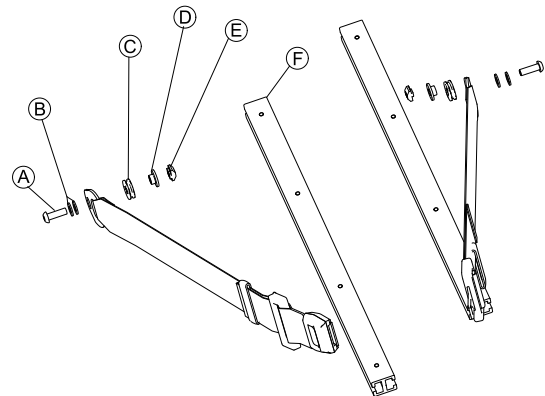
4. Install parts in reverse order.

### 5.6.3 Installation on seat frame profile (telescopic seat frame)



Tools:

- 5 mm Allen key



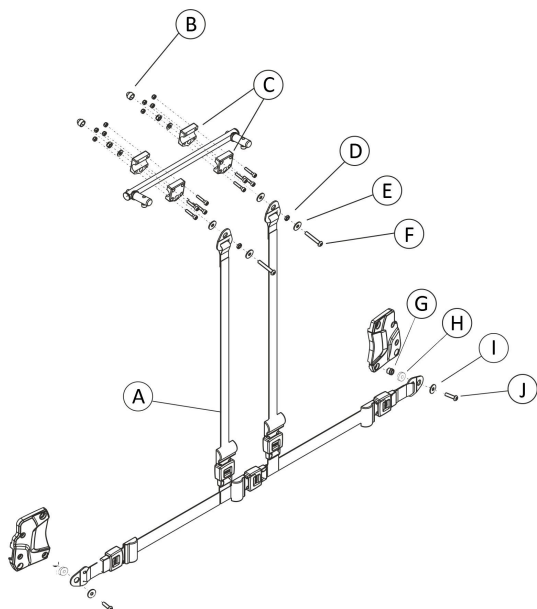
1. Loosen screw (A) with a 5 mm Allen key.
2. Remove screw (A), washers (B), seat belt, stopper (C), sliding bushing (D) and T-nut (E) from seat frame profile (F).
3. Replace posture belt.
4. Install parts in reverse order.

### 5.6.4 Replacing H-belt (telescopic seat frame)




Note:

- 13 mm socket wrench
- 5 mm Allen key



### Removing H-belt

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

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

4. Replace H-belt (A).

### Installing H-belt

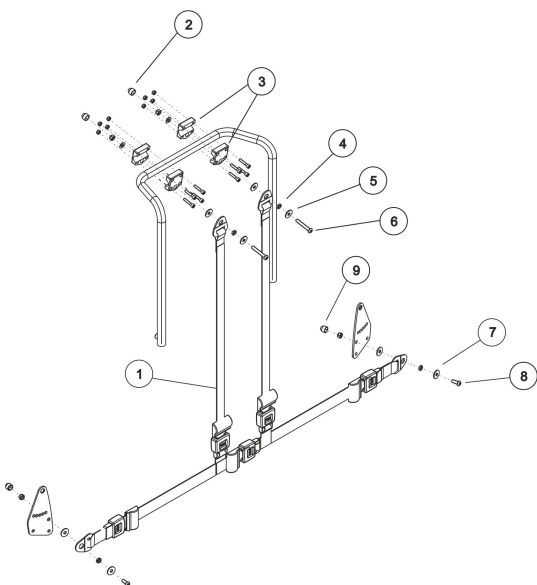
1. Install parts in reverse order.

### 5.6.5 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.

## 5.7 Replacing armrests and upper body support options

For armrests and upper body support options, see 5.3.4 *Armrest styles*, page 16 and 5.3.6 *Support options*, page 18.

### 5.7.1 Removing/ Installing armrest

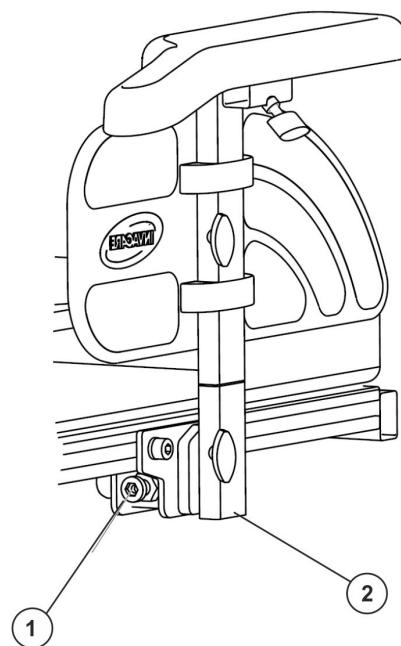


This chapter applies for armrests on the telescopic seat frame.



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.

### 5.7.2 Removing/Installing armrest

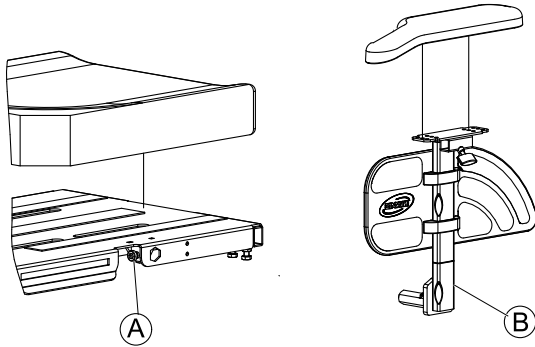


This chapter applies for armrests on the one piece seat plate.



Tools:

- 8 mm Allen key



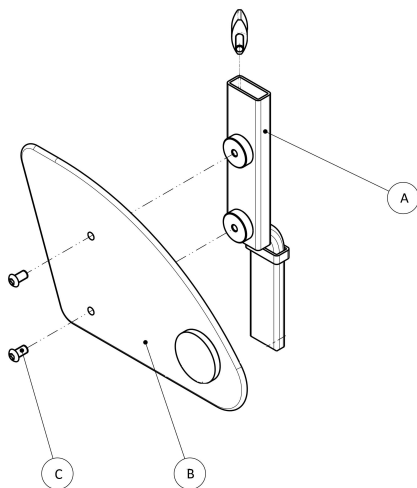
1. If necessary, disconnect joystick.
2. Loosen screw (A).
3. Pull the armrest (B) out of mounting bracket.
4. If necessary, replace the armrest including the mounting bracket.
5. Install parts in reverse order.

### 5.7.3 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.

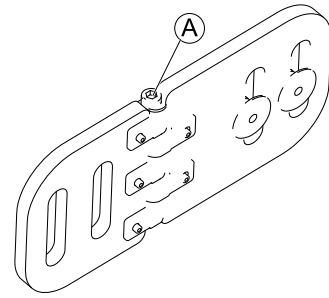
### 5.7.4 Adjusting/fixing angle of lateral supports



Tools:

- 6 mm Allen key

1. Remove cover.
- 2.



Loosen screw (A) that allows angle adjustment of lateral supports.

3. Adjust supports to desired angle.
4. Replace cover.
5. Re-tighten screws.

## 5.8 Replacing remotes/remote holders

### 5.8.1 Replacing Nucleus Midline 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.
- Check end cap for tight fitting.



- 4 mm Allen key
- 3/16 inch Allen key

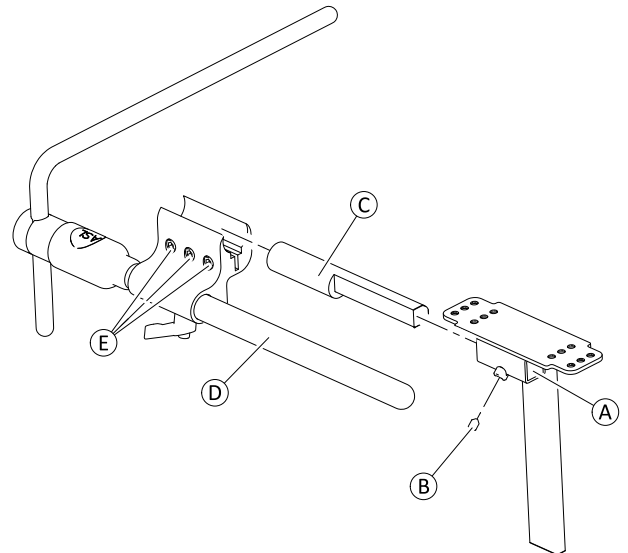


Fig. 5-6



The bracket can be mounted either on the left- or right-hand side of the mobility device via a slot (A) under the armrest bracket.

#### Removing Holder

1. Loosen screw (E).
2. Remove adapter (C) including nucleus (D) from slot (A) under armrest bracket.
3. Loosen screws (E).
4. Remove adapter.
5. Replace nucleus.

## Installing Holder

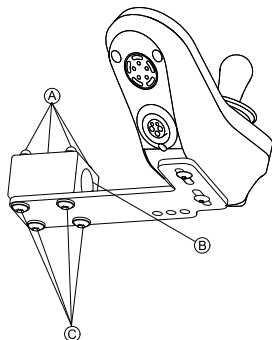
1. Install parts in reverse order. Tighten screw ⑥ to 6 Nm.
2. Test all functions.

## 5.8.2 Replacing remote bracket for attendant

### Removing



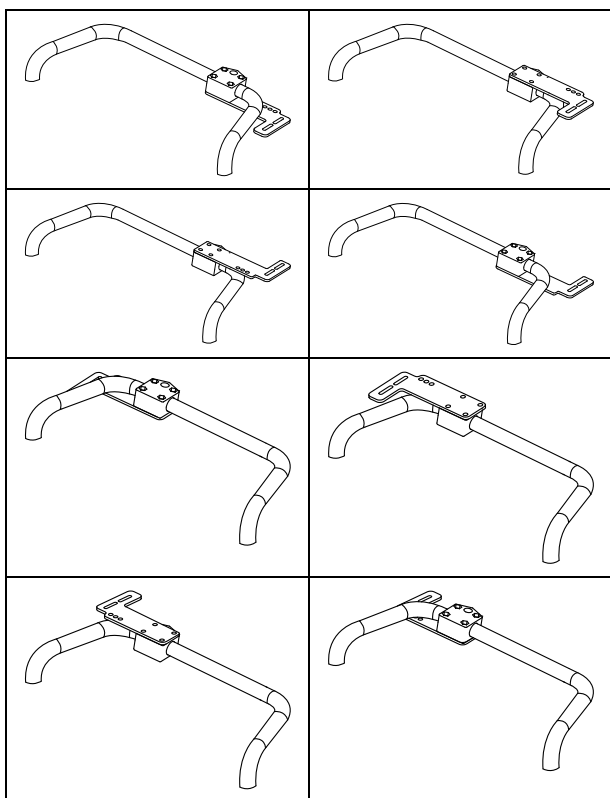
- 3 mm Allen key
- 4 mm Allen key



1. Loosen screws ③ and nuts ①.
2. Remove bracket ②.

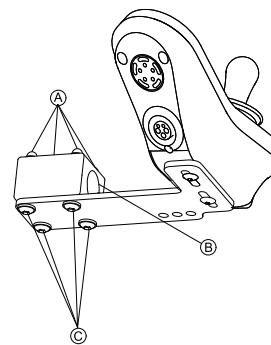
### Installing

- 1.



Mount bracket to tube in desired position.

- 2.



Tighten screws ③ and nuts ①.

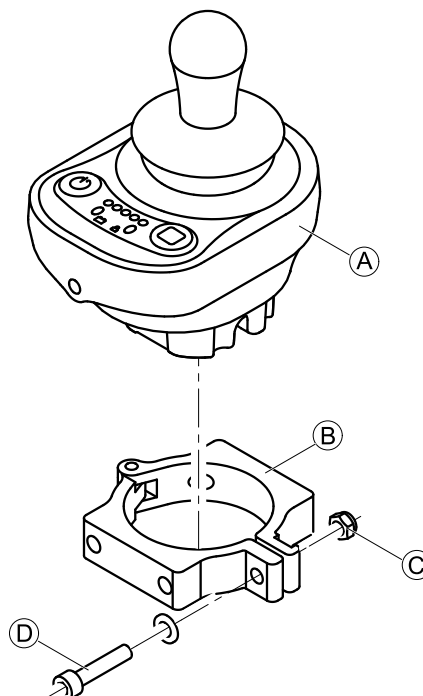
## 5.8.3 Replacing Remote Bracket for DLX-ACU200

### Removing



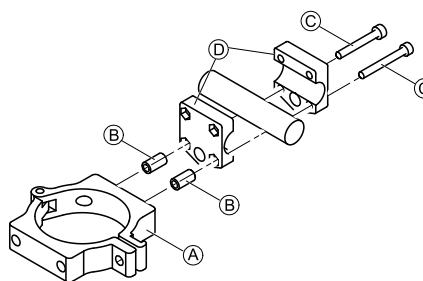
- 3 mm Allen key
- 5 mm Allen key
- 10 mm wrench

- 1.



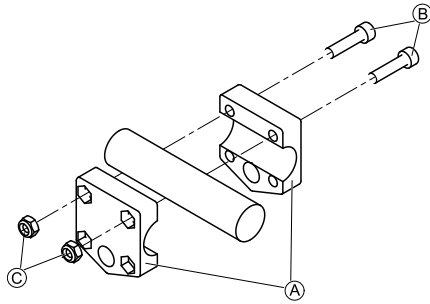
Loosen screws ④. Remove remote ① from clamp ②.

- 2.



Remove screws ③ and spacers ② and clamp ① from gripper clamp ④.

- 3.



Loosen screws (B) on gripper clamp (A).

4. Remove gripper clamp (A).

#### Installing

1. Install parts in reverse order.

### 5.8.4 Mounting DLX-REM500 to Swing-Away Remote Holder



- 3 mm Allen key
- 4 mm Allen key
- Medium-strength thread locking adhesive (Loctite 243 or similar)

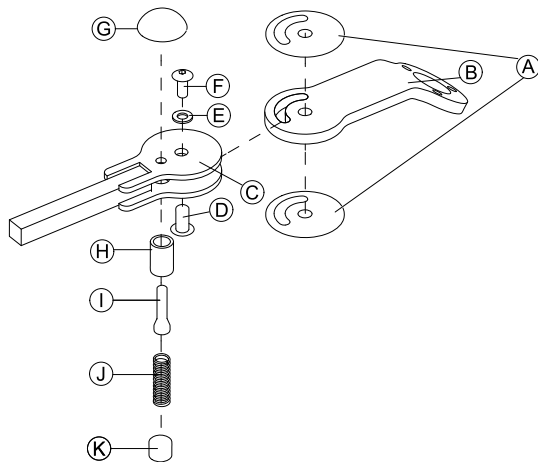


Fig. 5-7

1. Connect slip sticker (A) with joint arm (B) and insert into support (C).

2. Fix with sleeve nut (D), washer (E) and screw (F).



Apply thread locking adhesive to screw (F).

3. Insert locking bolt (H) and compression spring (I) through support (C) and joint arm (B).

4. Fix with locking knob (G) and grub screw (J).



Apply thread locking adhesive to grub screw (J).

5.

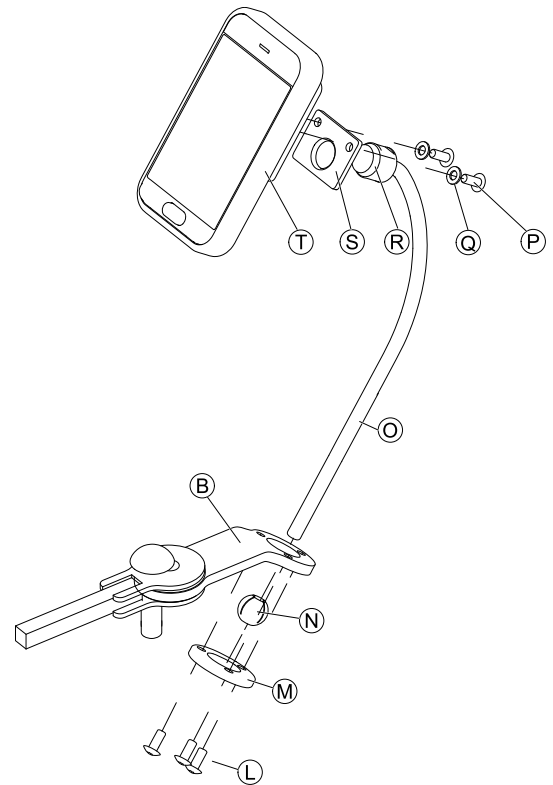


Fig. 5-8

Insert bracket (O) into joint arm (B), clamp ball (N) and clamp ring (M).

Fix with screws (L).

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

### 5.8.5 Mounting Primary Remotes to Nucleus Midline 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.
- Check end cap for tight fitting.

### Mounting DLX-REM110, DLX-REM2XX, DLX-REM400



- 4 mm Allen key
- 8 mm wrench

1.

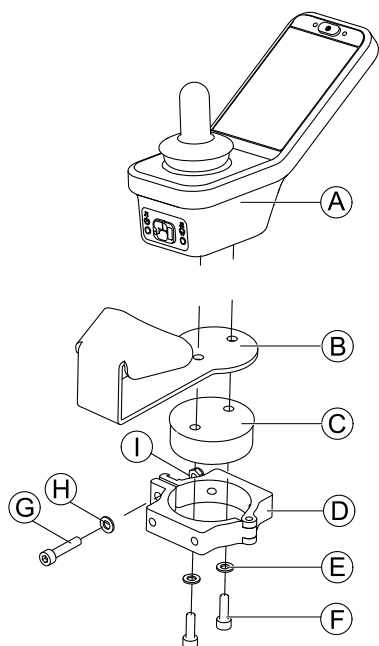


Fig. 5-9 Example of DLX-REM400 adjustment. DLX-REM110, DLX-REM211 and DLX-REM216 are adjusted the same way.

Mount remote (A) with support (B) and support drum (C) to clamp (D) with screws (F) and washers (E).

2.



#### Risk of damage to the remote

The maximum torque to tighten the screw is 1 Nm.

- Do not exceed this rating as it may damage the remote.

Fix support drum (C) in clamp (D) with screw (G), washer (H) and nut (I).

3.

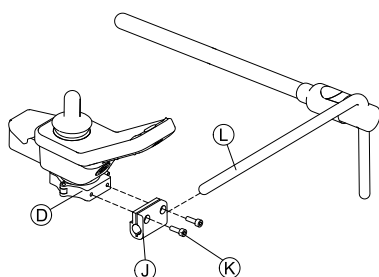


Fig. 5-10 Example of DLX-REM400 adjustment. DLX-REM110, DLX-REM211 and DLX-REM216 are adjusted the same way.

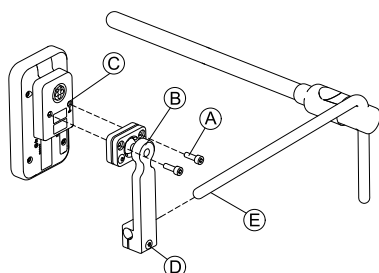
Pull clamp bracket (J) over nucleus (L).

4. Attach clamp (D) to clamp bracket (J) and fix everything with screws (K).

### Mounting DLX-REM500



- 4 mm Allen key
- 3/16 inch Allen key



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

## 5.9 Chin Control

### 5.9.1 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.

### 5.9.2 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  $\pm$  10 %.



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

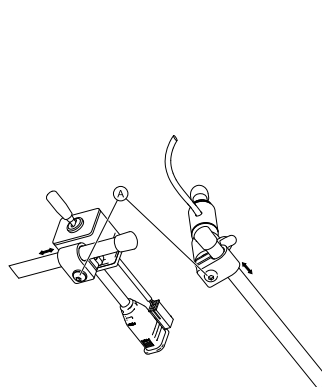


Fig. 5-11

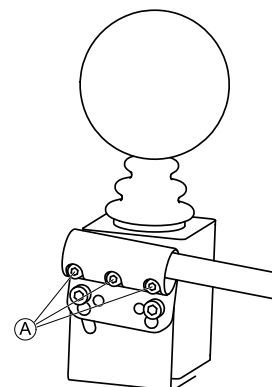


Fig. 5-12



1. Remove end caps.
2. Loosen screws (A).
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  $3 \text{ Nm} \pm 10 \%$ .
- Tighten the lever to hand-tight only.



- 3 mm Allen key

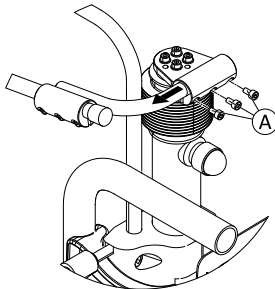


Fig. 5-13 Top Linkage

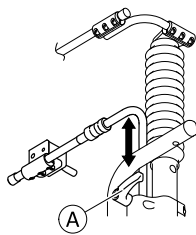


Fig. 5-14 Bottom Linkage

1. Remove components that are installed on linkage, such as joysticks and switches. See *Replacing Joysticks / Switches*, page 28.
2. Loosen screws / clamping lever (A).
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)

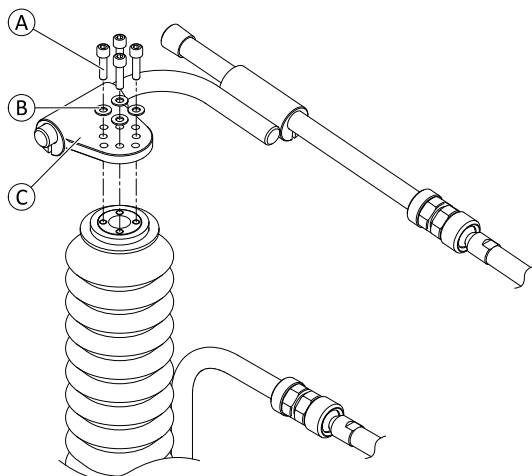


Fig. 5-15 Connection bracket and top linkage. Linkage variant with ball joints served as example.

1. Remove top linkage. See *Replacing Linkage*, page 29.



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

### Replacing Actuator



- 5 mm Allen key

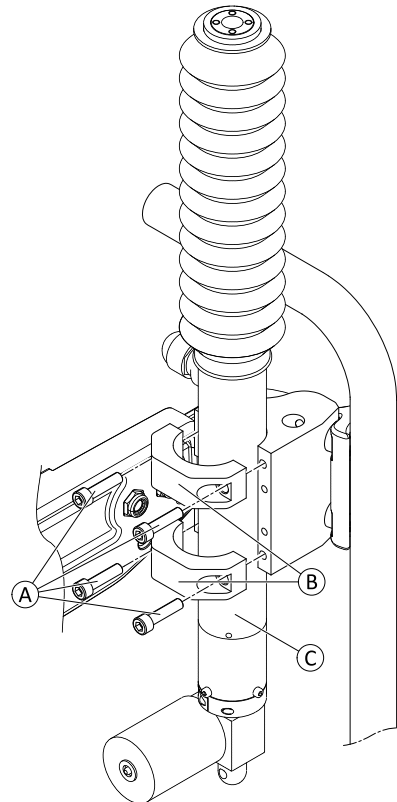


Fig. 5-16

1. Remove top linkage including bracket. See *Replacing Connection Bracket*, page 29.



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 (A).
3. Remove brackets (B).
4. Replace actuator (C).
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 29.

 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.

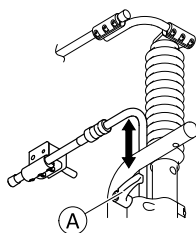


Fig. 5-17

Loosen clamping lever (A).

3. Remove bottom linkage.

- 4.

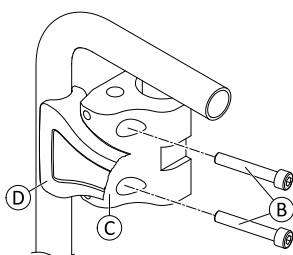



Fig. 5-18 Mounting hardware. For better view the stabilization bracket is shown partially only.

Loosen and remove screws (B) including mounting hardware (C).

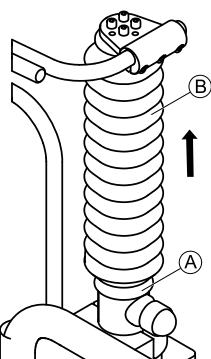
5. Install parts in reverse order.
6. Re-install components of chin control.
7. Test all functions.

### 5.9.3 Servicing linkage of Chin Control

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

- |  |             |
|--|-------------|
|  | • Pliers    |
|  | • Grease    |
|  | • Cable tie |

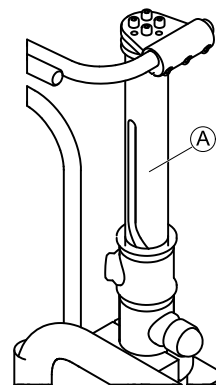
- 1.



Remove cable tie (A).

2. Push up bellows (B).

- 3.




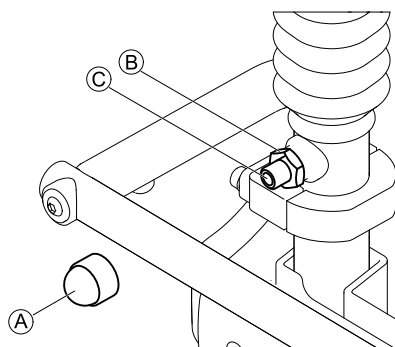
Clean linkage (A).

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


### 5.9.4 Tightening powered linkage

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

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



1. Remove cap (A).
2. Loosen counter nut (B).
3. Tighten grub screw (C) 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.

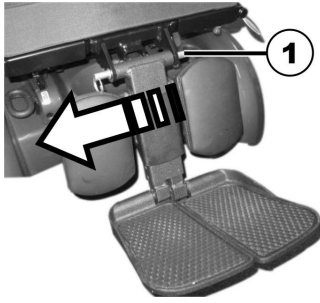
6. If grub screw is too tight, repeat steps 1 to 4 and tighten it a bit less.
7. Reattach cap.

### 5.10 Replacing legrests

#### 5.10.1 Removing the legrest

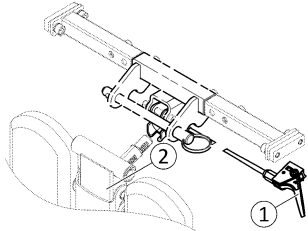
You can remove central, manually adjustable legrest completely.

1.



Remove removable axle (1).

2.



Hold legrest securely and pull lever (1).

3. Remove legrest from holder (2).

### 5.10.2 Replacing LNX powered center-mounted legrest



#### WARNING!

#### Risk of crushing

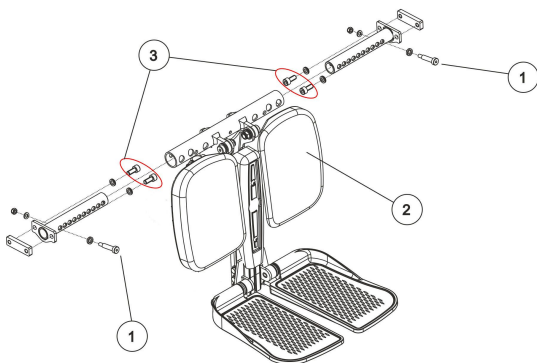
The legrest is very heavy. Danger of injury to hands and feet.

– 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.

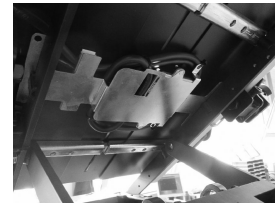
### 5.10.3 Replacing an powered legrest actuator



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

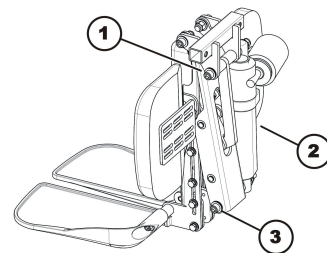
#### Removing powered legrest

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.

### 5.10.4 Replacing LNX powered center-mounted legrest with telescoping footboard

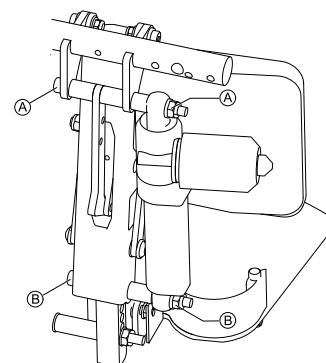
Replacing the complete legrest must be done by Invacare. There are several settings to observe to ensure correct functioning. Contact Invacare for details.

#### Replacing legrest actuator




Tools:

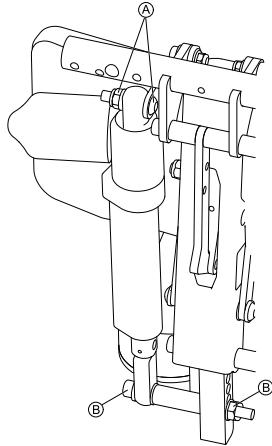
- 6 mm Allen key
- 8 mm Allen key
- 16 mm wrench



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


#### Replacing footboard actuator

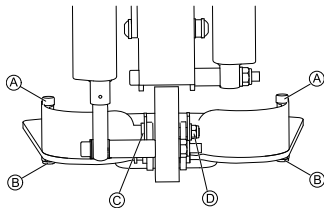
-  Tools:
- 8 mm Allen key
  - 16 mm wrench



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

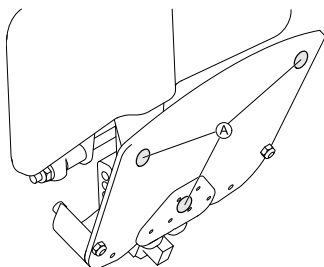
#### Replacing heel strap

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




1. Loosen and remove screws (A) and nuts (B).
2. Loosen and remove screw and washer (C) and nut and washers (D).
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 (A) on bottom of footboard to avoid damage to the floor.

#### Replacing footboard

-  • 8 mm Allen key

1.

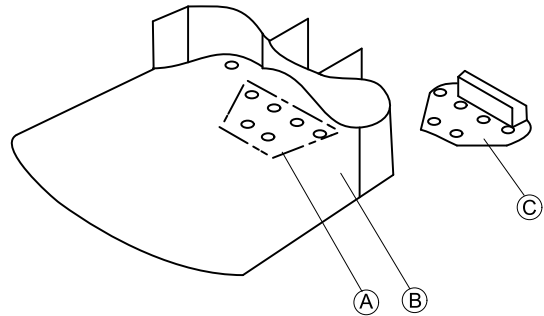

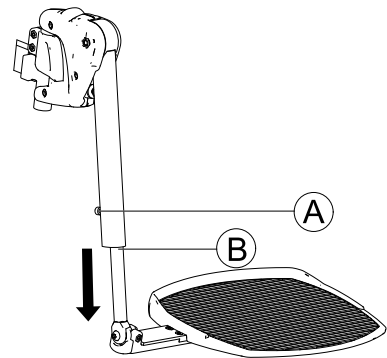


Fig. 5-19


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

#### 5.10.5 Replacing footboard


-  • 5 mm Allen key



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

 For adjusting footboard, see user manual of mobility device.

#### 5.10.6 Replacing the calf plate on the center-mounted legrest (powered and manual)

-  • 1/64 inch Allen key

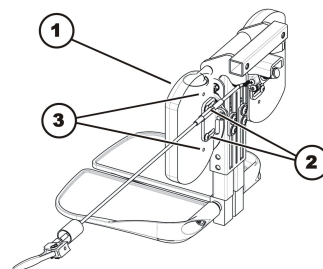


Fig. 5-20

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 inch 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.

### 5.10.7 Replacing foot plate on center-mounted legrest (powered and manual)



- 1/64 inch Allen key
- 1/4 inch Allen key

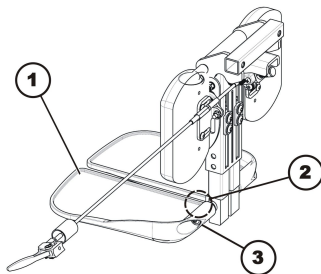


Fig. 5-21

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 inch Allen key to adjust angle of footplate to needs of user with this screw.

## 5.11 Setting Anterior Tilt

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

For TDX SP2 and TDX SP2 Low-Rider:

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

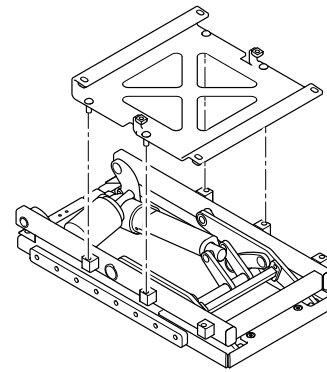


Fig. 5-22 5° anterior tilt

### Replacing Tilt Wedge



#### CAUTION!

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



- 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.

### Replacing Front Shroud



- 5/8 inch Allen key

- 1.

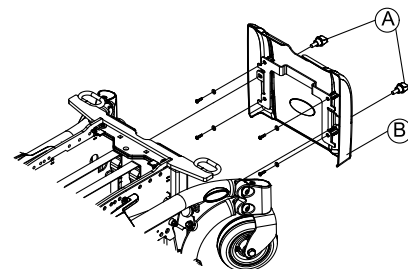


Fig. 5-23

Remove screws (A) on front shroud (B).

2. Pull front shroud upwards and remove it.
- 3.

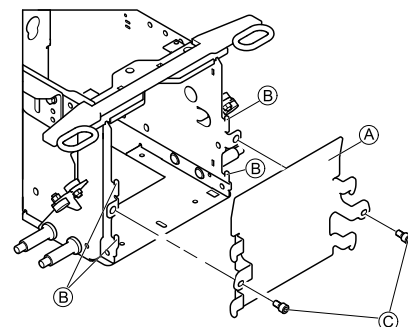


Fig. 5-24

Push recessed front shroud (A) down on hooks (B).

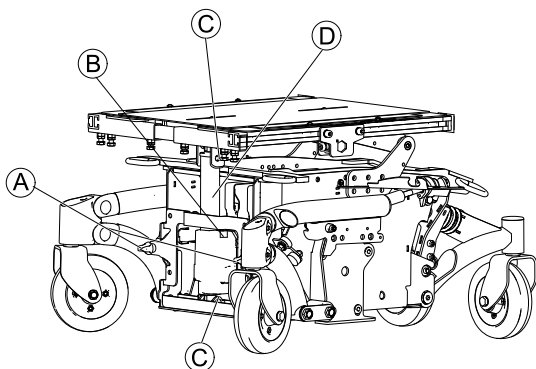
4. Tighten screws (C) finger-tight.

## 5.12 Replacing actuators

### 5.12.1 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 **A**.
  4. Remove front cover.
  5. Remove cap **B**.
  6. Pull plug out under **B**.
  7. Take cable out of duct.
  8. Separate actuator from seat:
    - Remove SL retainer clip **C** 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 **D** was.
- Pull out bolt.
  9. Exchange actuator.
  10. Install parts in reverse order.

### 5.12.2 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

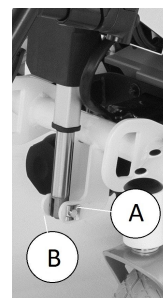
**Example Bora**
**Making tilt actuator accessible**

1.

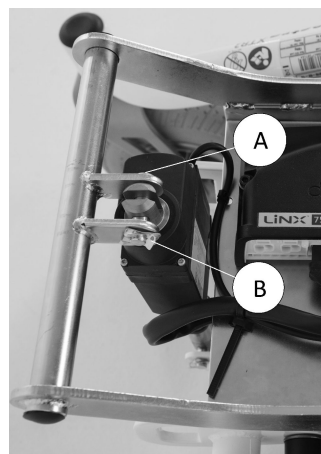


Remove legrests

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 cable is secured inside the frames with cable ties. Remove cable ties with oblique pliers.

**Replacing actuator**


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



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

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



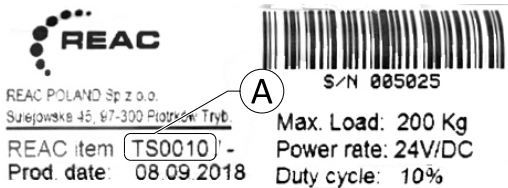

### Installing actuator

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.

### 5.12.3 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 **A** on the examples:

	Type TS	Type NL
Serial Label	 <p>REAC POLAND Sp. z o.o. Sulejowska 45, 97-300 Piotrków Tryb. REAC item: <b>TS0010</b> - Prod. date: 08.09.2018</p> <p>S/N 005025 Max. Load: 200 Kg Power rate: 24V/DC Duty cycle: 10%</p>	 <p>MBL Polano Sulejowska 45 97-300 Piotrków Tryb. Tilt Lift 30deg 300mm <b>NL0200</b> Rev A Power: 24DC 6A Max Load: 227kg 500lbs Duty cycle: 10% (2 min work 18 min rest)</p> <p>REF 1642581 SN 7 (240)1642581(13)180307(21)7</p>
Variants	TS: Tilt LTS: Lifter-Tilt	NL01: Tilt NL02: Lifter-Tilt
Tilt Actuator	See <i>Replacing Actuator in Tilt Module (Type TS)</i> , page 35 or <i>Replacing Actuator in Lifter/Tilt Module (Type TS)</i> , page 35.	See <i>Replacing Actuator (Type NL)</i> , page 36.
Lifter Actuator	See <i>Replacing Actuator (Type TS)</i> , page 36.	See <i>Replacing Actuator (Type NL)</i> , page 37.

### 5.12.4 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 5.12.3 *Identifying Type of Actuator (Modules With CoG Shift)*, page 35.

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

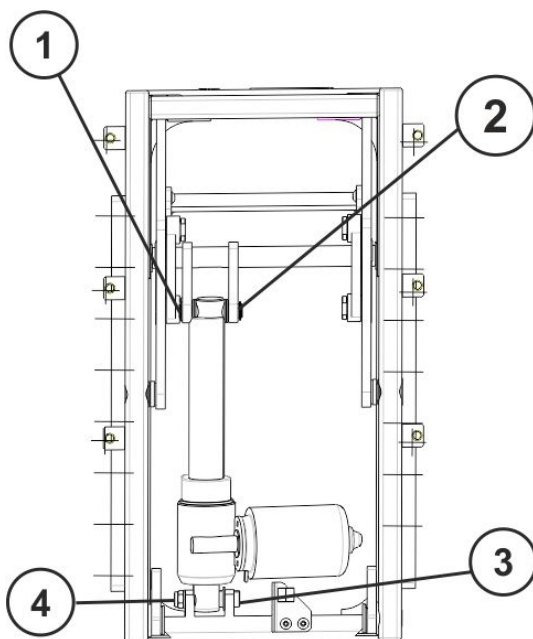




Fig. 5-25

### 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 5.12.6 *Setting Limits of Actuator (Type NL)*, page 37.
10. Install parts in reverse order.
11. Connect actuator cable to cable harness.
12. Test tilting function.

### 5.12.5 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 5.12.3 *Identifying Type of Actuator (Modules With CoG Shift)*, page 35.

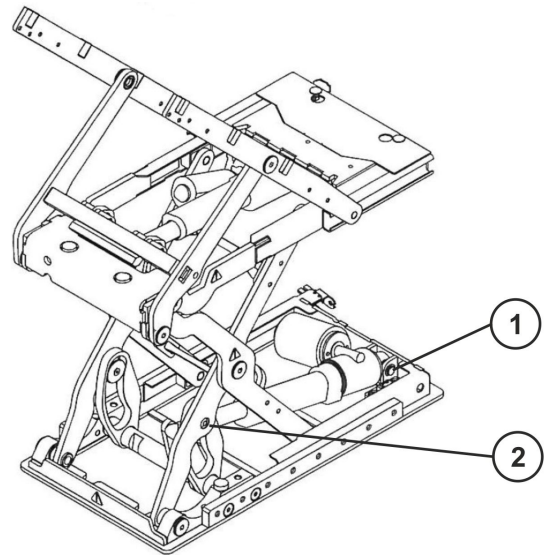


Fig. 5-26 Bottom fixation (1) and top fixation (2) of actuator

### 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.

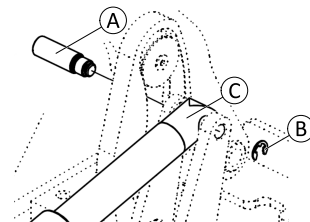


Fig. 5-27

Remove snap ring (B).

8. Secure actuator (C). Loosen and remove screw (A).



9.

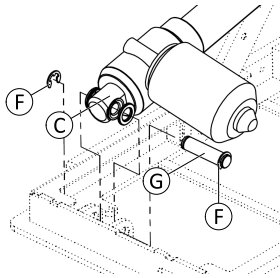


Fig. 5-28

Remove one snap ring (F) and pin (G) 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.

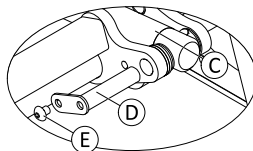


Fig. 5-29

Loosen and remove screw (E).

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

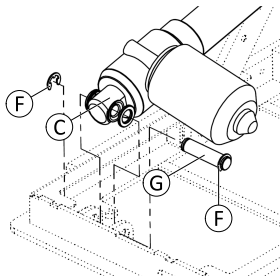


Fig. 5-30

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

10. Replace actuator.
11. Adjust end switches of new actuator. See 5.12.6 *Setting Limits of Actuator (Type NL)*, page 37.
12. Install parts in reverse order.

13. Plug in actuator cable.
14. Install cable ties.
15. Test lifting function.

#### 5.12.6 Setting Limits of Actuator (Type NL)

The actuators of type NL are fitted with two end switches. The switches allow to change both end positions of the actuator 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)

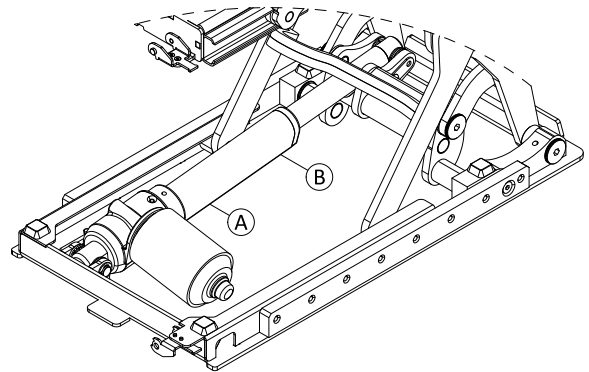


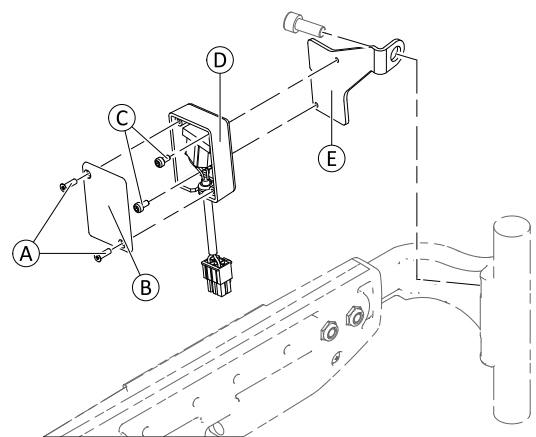
Fig. 5-31

1. Loosen both screws (A) and (B) 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.

#### 5.12.7 Replacing Ball Switch



- 2.5 mm Allen key
- Phillips screwdriver

Fig. 5-32 Mounting position on Storm<sup>4</sup> serves as an example.

#### Removing Switch

1. Unplug cable.
2. Loosen and remove screws (A) including covering plate (B).
3. Loosen screws (C) on inner side of housing (D). Remove housing including screws from mounting sheet (E).
4. Replace switch.

## Installing Switch

1. Install parts in reverse order.
2. Plug in cable.
3. Test all functions.

### 5.12.8 Replacing recline actuator



#### Tools:

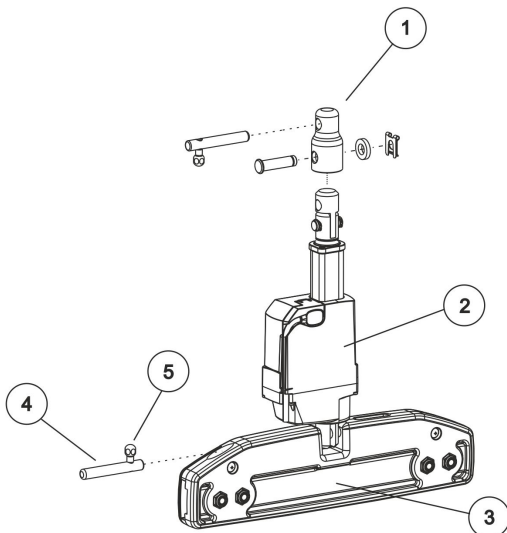
- 8 mm Allen key
- Open-ended spanner, 10 mm
- Open-ended spanner, 13 mm

#### 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 5.12.8 *Replacing recline actuator*, page 38.



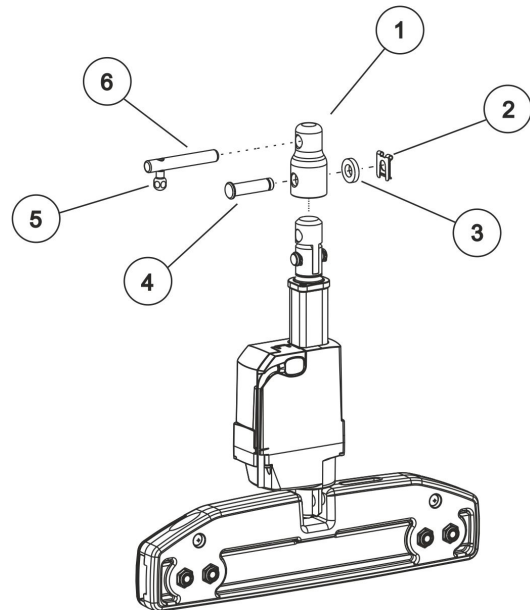
#### Install recline actuator

1. Install parts in reverse order.

### 5.12.9 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).

## 5.13 Replacing Seat Interface/Frame

### 5.13.1 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.



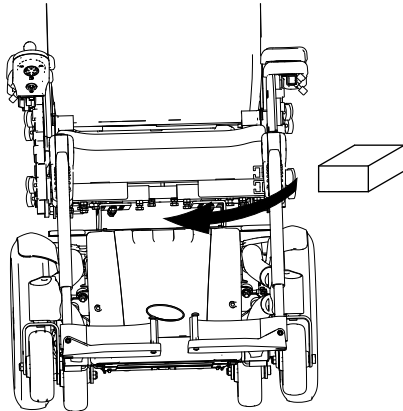
- 6 mm Allen key
- Torque wrench 5 – 30 Nm (or similar)
- Protractor
- Side cutting pliers
- Cable ties
- Wooden block



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.

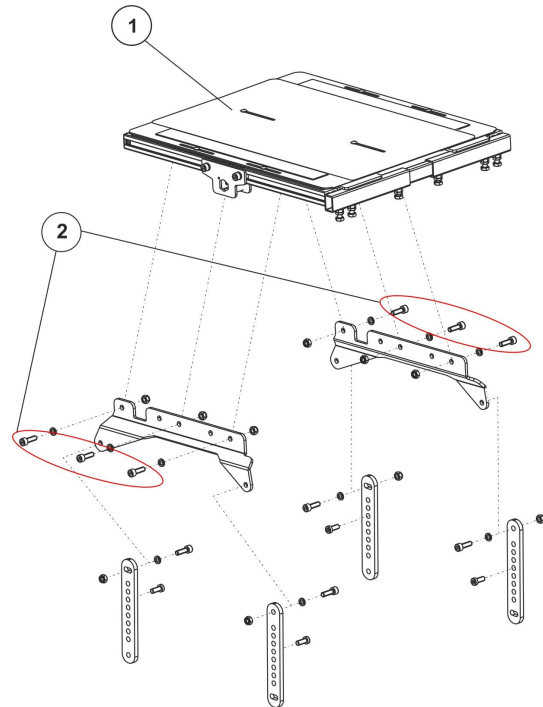
– Use proper lifting techniques.

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.

## 5.13.2 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.

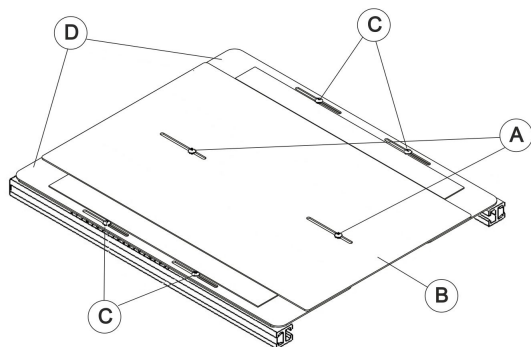


### Tools:

- 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.

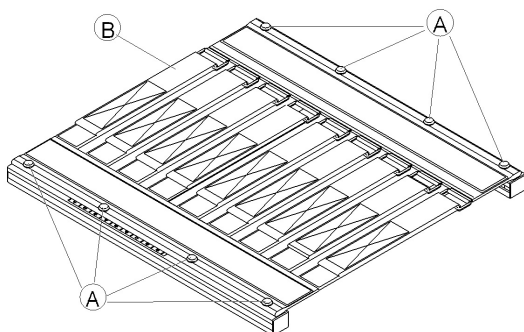
4.



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

5. Remove middle seat plate **B**.

6.



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

7. Remove lateral seat plates **D**. Or:

8. Remove seat cushion.

9. Loosen and remove screws on both sides, which secure sling seat **A** with a T25 Torx wrench.10. Remove sling seat **B**.

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

#### Example TDX

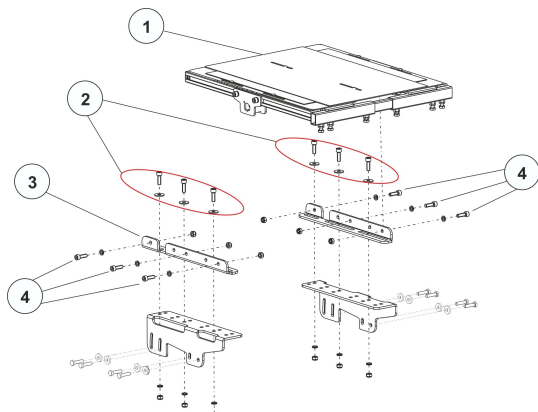


Tools:

- 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.

### 5.13.3 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 5.13.2 *Replacing seat support (without lifter or tilt module)*, page 39 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

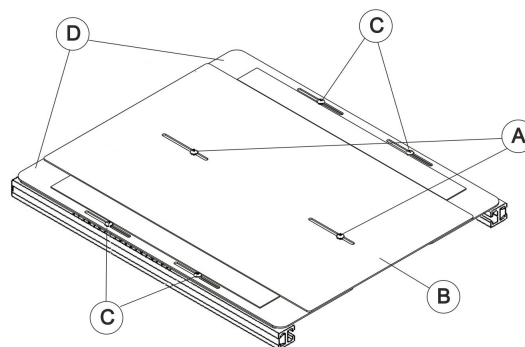


Fig. 5-33

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

7.

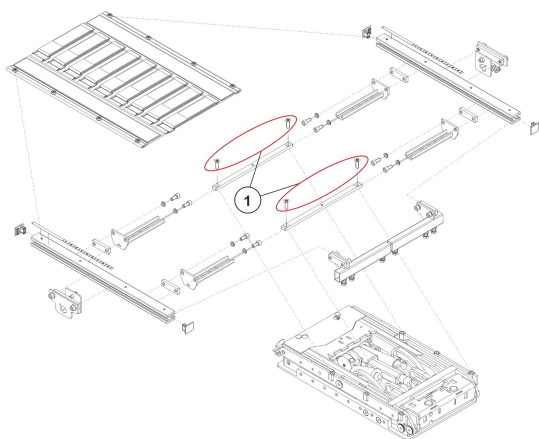


Fig. 5-34

Loosen and remove screws (1).

8. Remove seat frame.

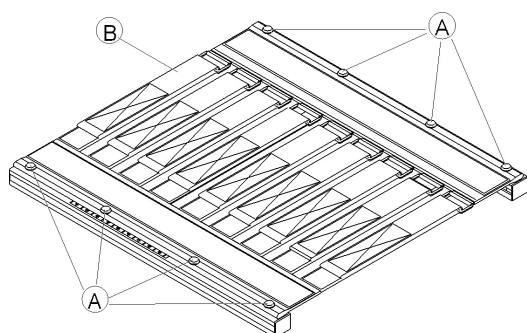
**Removing on Variants With Sling Seat**

Fig. 5-35

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

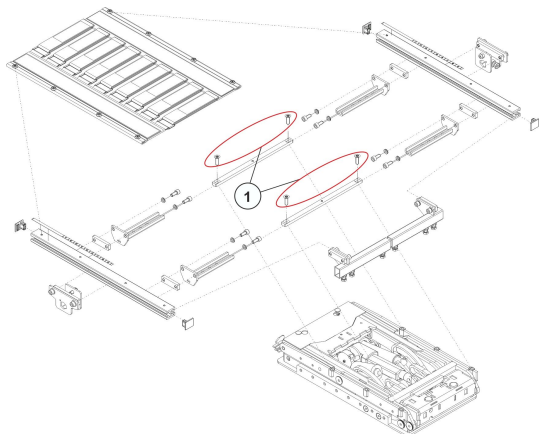


Fig. 5-36

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.

**5.13.4 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 <sup>NB</sup>	
TDX SP2 Low-Rider	
FDX	
Kite	
Pronto M41	



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

1. Remove seat support. See 5.13.3 *Replacing Seat Support (Modules With CoG Shift)*, page 40.
2. Unplug actuator cable and microswitch cable from cable harness.

3.

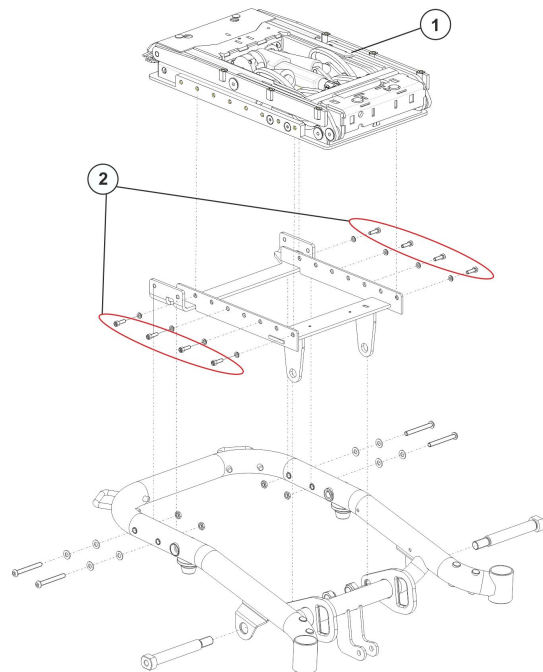


Fig. 5-37

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.



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