

# The KSL



en Active wheelchair  
Service Manual



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

**Küschall**<sup>®</sup>  
UNLIMIT YOUR WORLD

© 2020 Invacare Corporation

All rights reserved. Republication, duplication or modification in whole or in part is prohibited without prior written permission from Invacare. Trademarks are identified by ™ and ®. All trademarks are owned by or licensed to Invacare Corporation or its subsidiaries unless otherwise noted.

---

# Contents

---

<b>1 General</b>	<b>4</b>
1.1 Introduction	4
1.2 Symbols in This Manual	4
<b>2 Safety</b>	<b>5</b>
2.1 General Safety Information	5
2.2 Personal safety information	5
2.3 General repair information	5
<b>3 Product Overview</b>	<b>7</b>
3.1 Main parts of the wheelchair	7
3.2 Dimensions	7
<b>4 Servicing</b>	<b>8</b>
4.1 Inspection checklist	8
4.2 Spare parts	8
<b>5 Reconditioning</b>	<b>9</b>
5.1 Cleaning	9
5.2 Disinfection	9
5.3 Materials	9
5.4 Reconditioning scheme	10
<b>6 Instructions</b>	<b>11</b>
6.1 Frame overview	11
6.2 Seat	12
6.2.1 Adjusting the seat height (SH)	12
6.2.2 Replacing the Seat Cover	12
6.3 Backrest	14
6.3.1 Adjusting the Backrest Height (BH)	14
6.3.2 Adjusting the Backrest Angle (BA)	14
6.3.3 Replacing the Backrest / Backrest Bands	14
6.3.4 Replacing the Foldable, Angle-Adjustable Backrest	15
6.3.5 Replacing the handle	17
6.3.6 Replacing the foldable Push Handle	17
6.4 Footrests	18
6.4.1 Replacing the footrest	18
6.4.2 Adjusting the footrest height	18
6.4.3 Installing/replacing the foot plate	19
6.4.4 Replacing the angle-adjustable footrest	19
6.5 Sideparts	20
6.5.1 Replacing the Mudguard	20
6.5.2 Replacing the Clothes-guard	20
6.6 Castors	22
6.6.1 Replacing the castor wheel	22
6.6.2 Replacing the castor fork	23
6.7 Rear Wheels	23
6.7.1 Ensuring the rear wheels are parallel	23
6.7.2 Adjusting the Removable Axle	24
6.7.3 Replacing an axle	24
6.7.4 Repairing or changing an inner tube	24
6.7.5 Replacing a solid tire	25
6.7.6 Replacing rear wheel spokes	25
6.8 Parking brakes	26
6.8.1 Installing the parking brake	26
6.8.2 Adjusting the parking brake	26
6.9 Options	27
6.9.1 Installing/Adjusting the Antitipper	27
6.9.2 Installing the posture belt	28
6.9.3 Installing the Positioning Belt	28

---

# 1 General

---

## 1.1 Introduction

This document contains important information about assembly, adjustment and advanced maintenance of the product. To ensure safety when handling the product, read this document and the user manual carefully and follow the safety instructions.

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 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.

## 2 Safety

### 2.1 General Safety Information



**WARNING!**

**Risk of injury or damage to property**

- The procedures in this manual must only be performed by a qualified technician.
- Use only original options and spare parts.
- Do not handle this product or any available optional equipment without first completely reading and understanding these instructions and any additional instructional material such as user manuals, installation manuals or instruction sheets supplied with this product or optional equipment.
- After each assembly, check that all fittings are properly tightened and that all parts have the correct function.



**WARNING!**

**Risk of contamination**

- Clean and disinfect the product before servicing.



**IMPORTANT!**

- Assembly of optional equipment might not be described in this service manual. Refer to the manual, delivered with the optional equipment.
  - Additional manuals can be ordered from Invacare. See addresses at the end of this document.
  - Due to regional differences, refer to your local Invacare catalog or website for available optional equipment or contact your local Invacare representative. See addresses at the end of this document.



**IMPORTANT!**

- Some replacement parts are only available as a kit. Always use the complete new kit when replacing a part.
  - Spare parts can be ordered from Invacare. Refer to your local Invacare website to access the electronic spare parts catalogue (ESPC).



**IMPORTANT!**

- Refer to the user manual of this product for information on
  - Technical data
  - Product components
  - Labels
  - Additional safety instructions



The information contained in this document is subject to change without notice.

### 2.2 Personal safety information

These safety instructions are intended to help avoid accidents during work and must be observed under all circumstances.

All employees coming into contact with contaminated products must regularly consult a company doctor. Work clothing and personal protective equipment must be available in necessary quantities and be in proper condition. Reliable hand and surface disinfection must be ensured.



**WARNING!**

**Risk of contamination**

- Clean and disinfect the product before carrying out repairs.

### 2.3 General repair information

Repairs require a high level of expertise. These assembly instructions therefore break down the various tasks into 3 categories:

Requirement	Symbol
Easy – technical understanding required	■□□
Medium – technical knowledge required	■■□
Difficult – technical knowledge and expertise in assembling required	■■■

The required tools and their sizes are listed before the instructions.

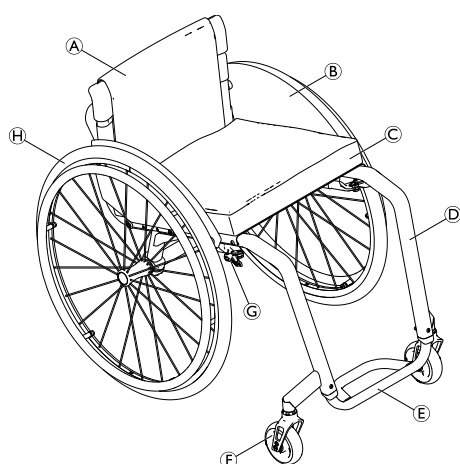
- !** **IMPORTANT!**
- If possible, continue to use the old identification label; if this is not possible, the new identification label must contain the same information and the old serial number. (Replacement of spare parts with serial numbers).
  - When components are replaced it is necessary to ensure the traceability of the components replaced.
  - If screws with thread locker are loosened, these must be replaced with new screws with thread locker. Alternatively, new thread locker must be applied.
  - If screws with circlip rings are loosened, these must be replaced with new ones.
  - Parts that become damaged during removal must be replaced with new ones.
  - All bolts must be tightened with the torque specified in the following instructions. Liquid high-strength and low-strength adhesives are available. After the torque specifications, the adhesive to be used (high-strength or low-strength) is indicated in brackets.

**Fastening with hexagon socket bolts**

<p>Hexagon socket bolts are not designed to withstand an excessive application of force. When tightening or undoing a hexagon socket bolt, force should be applied to the nut wherever possible to avoid damaging the bolt.</p>	
<p><b>Tightening and undoing</b></p> <p>Turn the nut using a socket spanner (only use an open-end spanner if there is insufficient space), using the Allen key simply to stop the bolt turning.</p>	
<p><b>Tightening and undoing when no nut is present</b></p> <p>If a hexagon socket bolt is screwed directly into a thread, the bolt must be tightened using the Allen key.</p>	
<p>Ensure that the Allen key is of good quality and not worn.</p>	

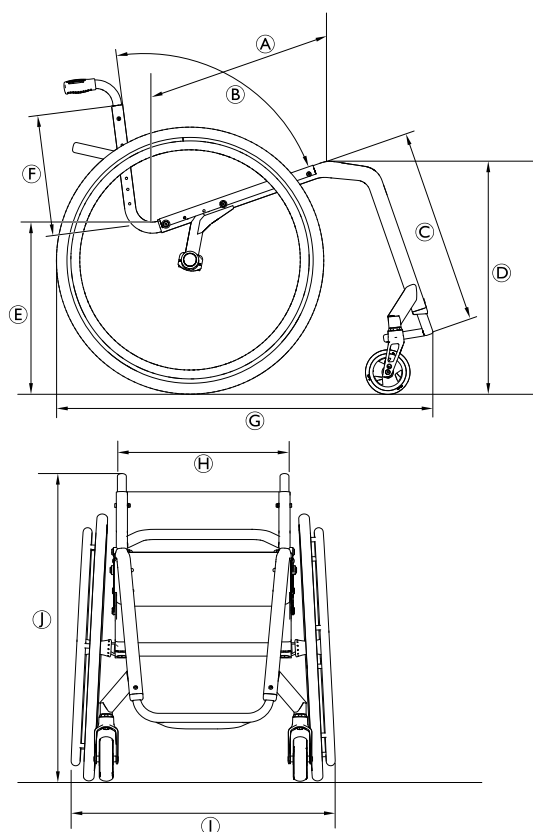
## 3 Product Overview

### 3.1 Main parts of the wheelchair



- Ⓐ Backrest
- Ⓑ Clothes-guard
- Ⓒ Seat with cushion
- Ⓓ Frame
- Ⓔ Footrest
- Ⓕ Castor fork with castor wheel
- Ⓖ Parking brake
- Ⓗ Rear wheel with handrim and quick-release axle

### 3.2 Dimensions



Ⓐ	Seat depth (SD)	385 – 485 mm, in increments of 25 mm
Ⓑ	Backrest angle (BA)	74°/78°/82°/86°/90°
Ⓒ	Lower leg length (LLL)	350 – 500 mm, in increments of 10 mm
Ⓓ	Front seat-to-floor height (FSTF)	450 – 530 mm, in increments of 10 mm
Ⓔ	Rear seat-to-floor height (RSTF)	400 – 480 mm, in increments of 10 mm
Ⓕ	Backrest height (BH)	270 – 420 mm, in increments of 15 mm
Ⓖ	Total length (TL)	75° frame angle: approx. 800 mm 90° frame angle: approx. 730 mm
Ⓗ	Seat width (SW)	340 – 440 mm, in increments of 20 mm
Ⓘ	Total width (TW)	approx. seat width (SW)+ 170 mm
Ⓙ	Total height (TH)	approx. 650 – 1200 mm

## 4 Servicing

### 4.1 Inspection checklist

<b>General inspection</b>	☺	☹
Is the product in good condition and is it complete (product and optional equipment)?	<input type="checkbox"/>	<input type="checkbox"/>
Is the product free from damage or weaknesses of any kind?	<input type="checkbox"/>	<input type="checkbox"/>
Does the product operate correctly under nominal load?	<input type="checkbox"/>	<input type="checkbox"/>
Is the product fully functional in accordance with the user manual?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Eradication of faults</b>	☺	☹
Have all the faults found been eliminated and have faulty components been replaced?	<input type="checkbox"/>	<input type="checkbox"/>
Are all screws/bolts firmly fitted and is the product securely assembled?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Completion of checks</b>	☺	☹
Is the product technically and functionally safe?	<input type="checkbox"/>	<input type="checkbox"/>
Has the product been cleaned and disinfected?	<input type="checkbox"/>	<input type="checkbox"/>
Is the identification label easily readable and is it securely mounted on the product?	<input type="checkbox"/>	<input type="checkbox"/>
Is the product accompanied by the latest revision of the user manual?	<input type="checkbox"/>	<input type="checkbox"/>

### 4.2 Spare parts



**WARNING!**

Original spare parts must be used in all repairs. Otherwise the warranty and product declaration of conformity shall be rendered invalid.

All spare parts must be obtained from the Invacare customer service department. An electronic spare parts catalogue can be found on your local Invacare website.



**WARNING!**

**Risk of injury due to damaged or worn parts**

Some replacement parts are only available as a kit.  
– Always use the complete new kit when replacing a part.




## 5 Reconditioning

### 5.1 Cleaning

**!** **IMPORTANT!**  
– The product does not tolerate cleaning in automatic washing plants, with high-pressure cleaning equipment or steam.

**!** **IMPORTANT!**  
Dirt, sand and seawater can damage the bearings and steel parts can rust if the surface is damaged.  
– Only expose the wheelchair to sand and seawater for short periods and clean it after every trip to the beach.  
– If the wheelchair is dirty, wipe off the dirt as soon as possible with a damp cloth and dry it carefully.


1. Remove any installed optional equipment (only optional equipment which does not require tools).
2. Wipe down the individual parts using a cloth or soft brush, ordinary household cleaning agents (pH = 6 - 8) and warm water.
3. Rinse the parts with warm water.
4. Thoroughly dry the parts with a dry cloth.

 Car polish and soft wax can be used on painted metal surfaces to remove abrasions and restore gloss.

#### Cleaning upholstery

For cleaning upholstery refer to the instructions on the labels of the seat, cushion and backrest cover.

### 5.2 Disinfection

 Information on recommended disinfectants and methods can be found on <https://vah-online.de/en/for-users>.

1. Wipe down all generally accessible surfaces with a soft cloth and ordinary household disinfectant.
2. Allow the product to air-dry.

### 5.3 Materials

The components used to manufacture Kuschall® wheelchairs consist of following materials:

Frame tubes	Aluminum
Backrest tubes	Aluminum
Axle tube	Carbon Fiber
Seat cover / Backrest cover	PA / PE / PVC
Push handles	Aluminum / TPE
Clothes guard / Mudguard	Carbon Fiber or Plastic
Castor forks	Aluminum
Footrest tube	Aluminum / Titanium
Footplate	Carbon Fiber or Plastic
Supporting parts / Attachments	Steel / Aluminum
Screws and bolts	Steel

All components have either a protective coating or are corrosion resistant.

## 5.4 Reconditioning scheme

The following items must be reviewed and checked when reconditioning is required:

Symptoms	Faults	Solution
The wheelchair does not travel in a straight line	Incorrect tyre pressure on one rear wheel	Correct tyre pressure, see user manual
	One or more spokes broken	Replace broken spoke(s)
	Spokes tightened unevenly	Tighten loose spoke(s)
	Castor wheel bearings are dirty or damaged	Clean or replace the bearings or the complete castor wheel <i>6.6.1 Replacing the castor wheel, page 22</i>
	Support bearings in forks faulty	Replace the support bearings, see <i>6.6.2 Replacing the castor fork, page 23</i>
The wheelchair tips too easily	Backrest angle too large	Reduce backrest angle by replacing the backrest, see <i>6.3.3 Replacing the Backrest / Backrest Bands, page 14</i>
	Seat angle too large	Adjust the front seat-to-floor height respectively the rear seat-to-floor height, see <i>6.2.1 Adjusting the seat height (SH), page 12</i>
		Install a smaller castor fork, see <i>6.6.2 Replacing the castor fork, page 23</i>
The parking brakes are gripping poorly or asymmetrically	Incorrect tyre pressure in one or both rear tyres	Correct tyre pressure, see user manual
	Brake setting incorrect	Correct brake setting, see <i>6.8.2 Adjusting the parking brake, page 26</i>
The rolling resistance is very high	Incorrect tyre pressure in one or both rear wheels	Correct tyre pressure, see user manual
	Rear wheels not parallel	Make rear wheels parallel, see <i>Ensuring the rear wheels are parallel</i>
	Bearings are dirty or faulty	Replace the bearings, see <i>6.6.1 Replacing the castor wheel, page 22</i>
The castors wobble when moving fast	Too little tension on the clevis pin housing	Tighten the nut on the castor fork slightly, see <i>6.6.2 Replacing the castor fork, page 23</i>
	Castor wheel is worn out	Replace the castor wheel, see <i>6.6.1 Replacing the castor wheel, page 22</i>
The castor wheel is stiff or stuck	Bearings are dirty or faulty	Replace the bearings, see <i>6.6.1 Replacing the castor wheel, page 22</i>
Increased forward tip tendency	Frame is deformed	Replace the frame, see <i>Frame overview</i>

---

## 6 Instructions

---

### 6.1 Frame overview

#### Adjusting the frame

The seat width, seat depth, lower leg length and tipping point are determined by the design of the frame and cannot be changed retrospectively. A modification of the tip behaviour can only be achieved by ordering a new, one-off backrest. The seat depth can be adjusted by changing the hole position.

#### Changing the frame

Contact the Invacare Customer Service department if you wish to change the frame.

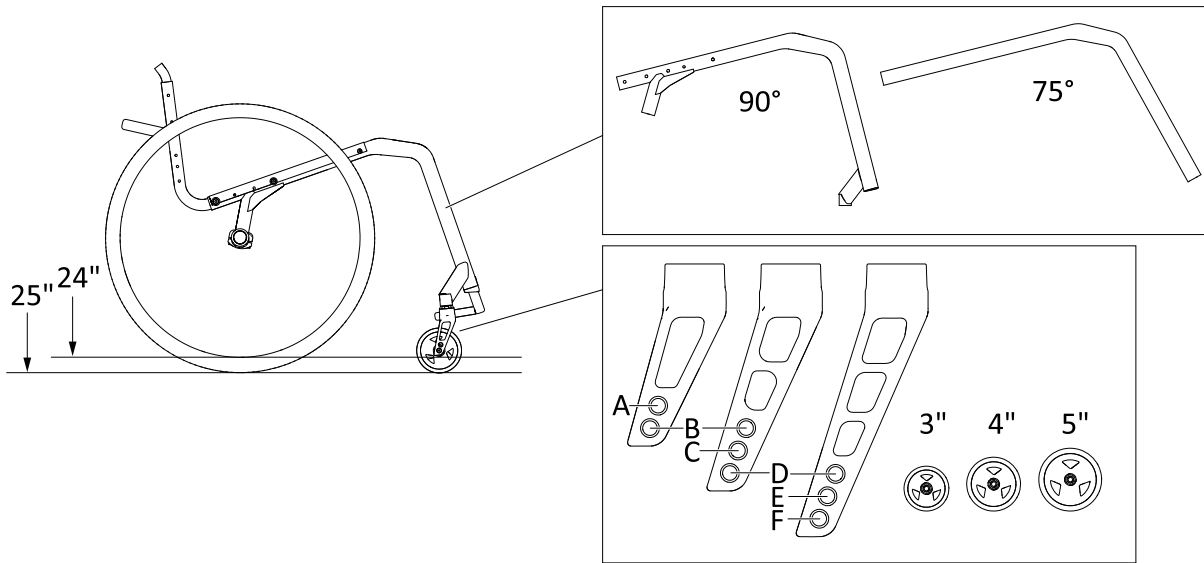
## 6.2 Seat


### 6.2.1 Adjusting the seat height (SH)

The seat height can only be adjusted by fitting a larger or smaller rear wheel and at the same time using a larger or smaller castor fork and castor.

Possible Front Seat-to-Floor Heights (FSTF) [mm]: 450 – 530. As the seat angle is dictated by the design of the frame, the Rear Seat-to-Floor Height (RSTF) also changes by 10 mm.

The following settings are possible:




 To ensure that the frame is straight and the axes of the castor forks are perpendicular to the ground, choose one of the combinations listed in the table:

**Front seat-to-floor height (FSTF) / Rear seat-to-floor height (RSTF) according to castor wheel size, castor fork size/position and rear wheel**


FSTF [mm]	RSTF [mm]	Rear wheel size	Frame type	Castor fork size/position / Castor wheel size		
				3" Castor wheel	4" Castor wheel	5" Castor wheel
450 – 520	400 – 480	24"	75°	D	C	B
			90°	B	A	—
460 – 530	400 – 480	25"	75°	E	D	C
			90°	C	B	—

### 6.2.2 Replacing the Seat Cover

 Socket spanner (8, 10 mm) / Allen key (3, 4, 5 mm)



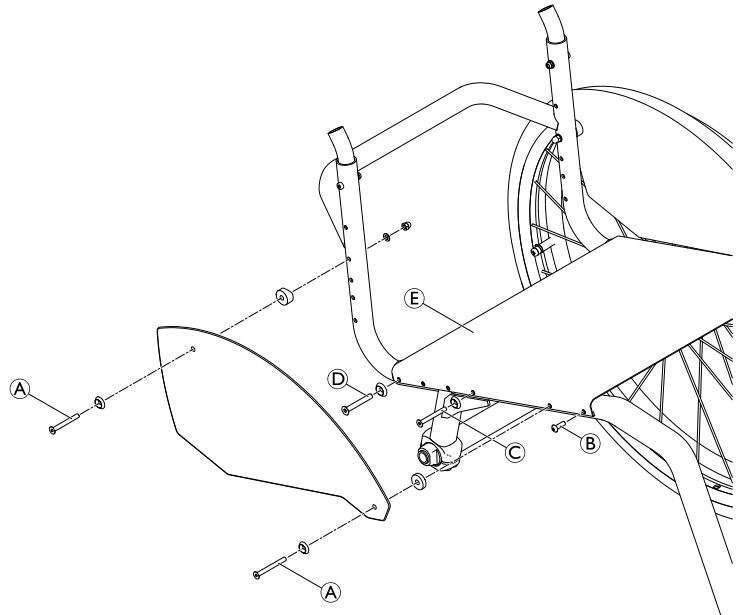
1. Remove mudguard or clothes guard by removing bolts **A** with washers, spacers and nuts on both sides.
2. Remove bolts **B**, **C** and **D** with washers on both sides of the seat cover.
3. Remove seat cover **E** and replace with new one.

 Owing to the tension inherent in the design of the frame, it may not be possible to fit the seat cover. In this case the axle holders must be loosened.

4. Loosen the axle holders, if necessary.
5. Install new seat cover using bolts **B**, **C** and **D** with washers on both sides.
6. Ensure the rear wheels are parallel, see 6.7.1 *Ensuring the rear wheels are parallel*, page 23, and tighten axle holder bolts.
7. Reinstall mudguard or clothes guard using bolts **A** with washers, spacers and nuts on both sides.

**A** = 7 Nm

**B** = 4 Nm




## 6.3 Backrest


### 6.3.1 Adjusting the Backrest Height (BH)

Possible backrest heights (BH):

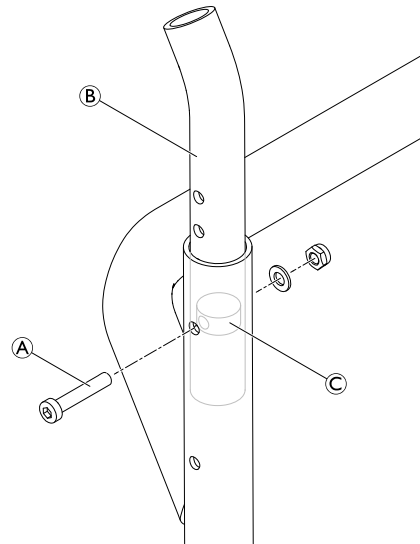
BH [mm]	270	285	300	315	330	345	360	375	390	405	420
---------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

 Allen key (3 mm) ■■■

1. Remove the backrest cover.
2. Remove the bolt **A** and adjust the required height of the push handle or the telescopic tube by bringing the threaded insert **B** to the appropriate position.
3. Reinsert and tighten the bolt.
4. Carry out the same setting on both sides.
5. Reinstall the backrest cover.

 If the required height cannot be achieved, a different telescopic tube or push handle must be used.


**A** = 7 Nm




### 6.3.2 Adjusting the Backrest Angle (BA)

If you want to change the backrest angle, then the complete backrest will have to be replaced.

Possible backrest angles are: 74° / 78° / 82° / 86° / 90°


 Changing the backrest angle also modifies the tipping point of the wheelchair.

### 6.3.3 Replacing the Backrest / Backrest Bands

 Allen key (3, 4, 5 mm) / Spanner (8, 10 mm) / Phillips Screwdriver (2 mm) ■■■

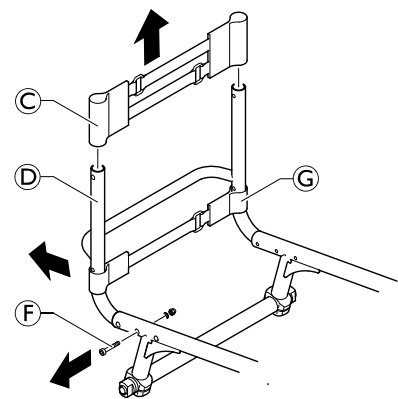
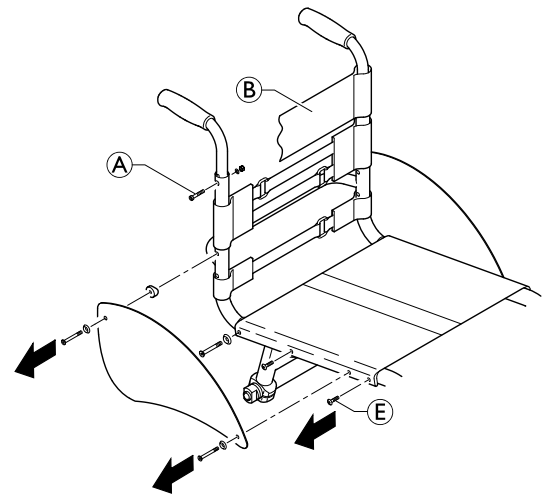
The upper backrest bands can be taken straight off, the backrest must be removed in order to access the lower ones.

1. Remove the backrest cover.
2. Remove the mudguard or clothes guard.
3. Push the backrest band down in order to access the bolts (A).
4. Remove bolts on both sides.
5. If installed, remove the push handle and the end band (B) from the backrest tube.
6. Remove the upper backrest band (C) from the backrest tube (D).
7. Remove bolts (E) on both sides.
8. Remove the bolts (F) on both sides.
9. Remove the seat cover and pull the backrest out of the frame tubes.
10. Replace the lower backrest band (G) and put the backrest aside.

 Owing to the tension inherent in the design of the frame, it may be extremely difficult to reposition the backrest in the frame. In this case the axle holders must also be undone.

11. Remove the axle holders.
12. Insert the new backrest and secure using bolts (F).
13. Reinstall the seat cover using bolts (E).
14. Ensure the rear wheels are parallel, see 6.7.1 *Ensuring the rear wheels are parallel*, page 23, and retighten the axle holder bolts.
15. Pull the upper backrest band (C) over the backrest tube (D).
16. Reinstall the push handles and the end band using bolts (A) on both sides.
17. Reinstall the mudguard or clothes-guard.

- (A) = 7 Nm
- (E) = 4 Nm
- (F) = 7 Nm



### 6.3.4 Replacing the Foldable, Angle-Adjustable Backrest

Optionally, a foldable, angle-adjustable backrest can be installed.



**WARNING!**

– Installing the foldable, angle-adjustable backrest requires a special Invacare training.



When switching to the foldable backrest, the axle of the rear wheels must also be replaced with a new one which is 20 mm longer, see chapter .

#### Pre-assembling the foldable backrest

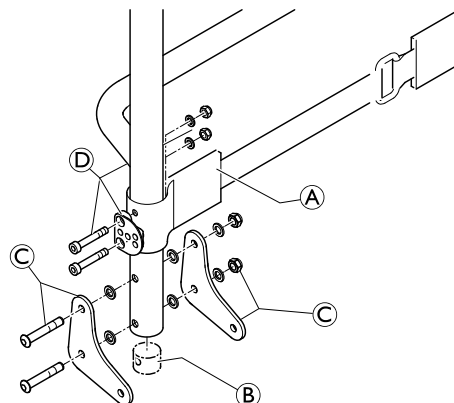


Allen key (3, 4, 5 mm) / Socket spanner (8, 10 mm)



1. Position the backrest band (A) on the backrest tubes.
2. Install the round nuts (B) in the backrest tubes on both sides.
3. Install the backrest joint plates (C) on both backrest tubes using screws, washers and nuts.
4. Install the backrest angle adjustor (D) through the back band on both backrest tubes using screws, washers and nuts. The backrest angle adjustor must be facing forwards or backwards. See section “Adjusting the Backrest Angle” below.

(C) / (D) = 7 Nm



#### Installing the Foldable, Angle-Adjustable Backrest

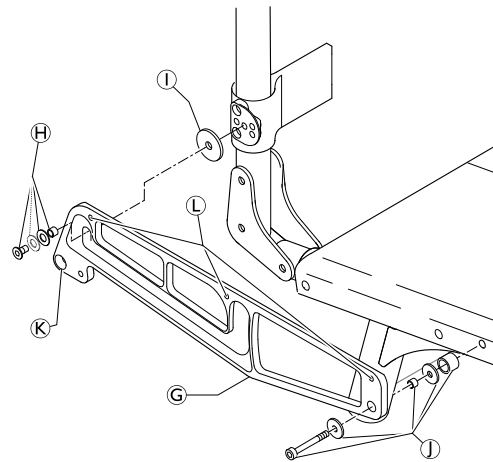
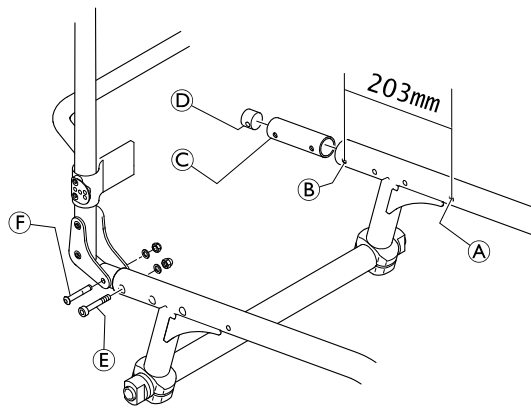


Allen key (3, 4, 5 mm) / Socket spanner (8, 10 mm) / Drill & Drill Bit (Æ6.1 mm)



1. Remove the mudguard or clothes-guard on both sides.
2. Remove the seat cover.
3. Remove old backrest, see 6.3.3 *Replacing the Backrest / Backrest Bands*, page 14.
4. On both sides, drill a new hole (A) in the frame with a  $\varnothing$  6.1 mm bit, at a distance of 203 mm from the rear-most hole (B).
5. Reinstall the seat cover.
6. Install the seat tube (C) into the frame on both sides using bolt (E).
7. Install the end plugs (D) into the end of both seat tubes.
8. Install the pre-assembled backrest to the seat tubes using bolt (F) on both sides.
9. Install the support plate (G) to the frame using bolt, spacers and washers (I).
10. Install the support plate to the backrest tubes using bolt (H) with spacer, washers and plastic washer in the required adjustor position, see section "Adjusting the Backrest Angle" below.
11. On both support plates, insert the release cord into the hole (K) and make a knot at both ends.
12. Position the mudguard or clothes-guard on the support plate and drill through at position (L).
13. Screw the mudguard or clothes-guard onto the support plate with a torque of 7 Nm.

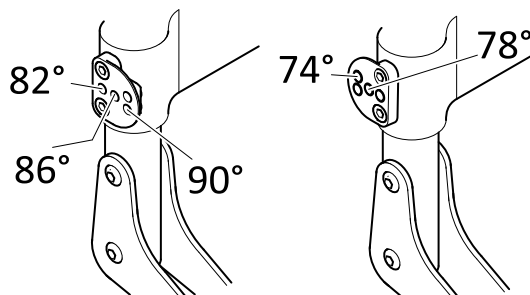
(E) / (F) / (H) / (J) = 9 Nm



### Adjusting the Backrest Angle

The backrest angle adjustor can be installed facing forwards or facing backwards:

Installed facing forwards for backrest angles 82°, 86° and 90°.  
 Installed facing backwards for backrest angles 74° and 78°.





### 6.3.5 Replacing the handle

An adhesive (e.g. hair spray) is used in these instructions. When applied to the handle, this substance works as a lubricant and as an adhesive once dry.



**CAUTION!**

**Risk of accidents due to the handle comes loose**

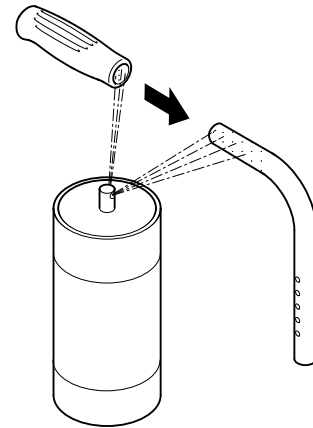
– After drying, the adhesive used must be able to resist a pull-off force of 750 N. If in doubt, contact Invacare.



1. Remove the old handle.
2. Remove any residue (residual adhesive, grease, dust) from the push handle tube.
3. Apply a thin layer of hair spray all over the surface of the push handle tube onto which the handle is to be slid.
4. Apply a thin layer of hair spray to the inside of the handle.
5. Slide the new handle onto the push handle tube.
6. Move the handle into the correct position (grooves facing upwards).

If a long handle has been fitted and this is to be replaced with a short one, the push handle tube must be shortened by 35 mm.

The push handle tube must be replaced when switching from a short to a long handle.



### 6.3.6 Replacing the foldable Push Handle



Hole punch pliers (6 mm) / Allen key (3 mm, 4 mm)



1. Remove the old foldable push handle.
2. Pull down the backrest cover ⑥ on the telescopic tube, until its hole ② is uncovered.

**IMPORTANT!**

– Make sure that the threaded insert ⑤ (part no. 1580450) supplied with the new push handle is used for assembly.

3. Place the threaded insert ⑤ in the telescopic tube.
4. Punch a hole through the backrest cover with a distance of 10 mm from the upper edge, using hole punch pliers (see graphic below).
5. Slide the new foldable push handle ① onto the telescopic tube.
6. Pull up the backrest cover, until it covers completely the rear hole in the push handle.
7. Install the foldable push handle with screw ③ and washer ④.
8. Check screws ③ on both sides of the push handle and retighten if necessary.
9. Carry out the same steps for the other push handle.

**IMPORTANT!**

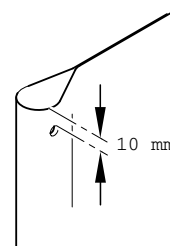
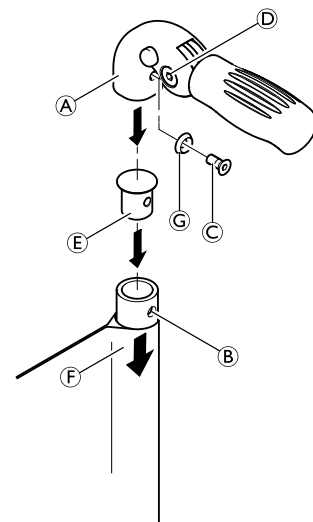
– Make sure that the folding force is approximately 5 N (0.5 kg).

**IMPORTANT!**

– Fixing screw ③ may only be used once. Alternatively the screw can be cleaned (remove old thread locking adhesive) and reinstalled with new low-strength thread locking adhesive.



The retrofit of foldable push handles requires new tubing.



## 6.4 Footrests

The footrest must be selected in accordance with the seat width. Standard footrests and angle-adjustable footrests are available. Furthermore, there is a choice between a high-mounted footrest and a fold-up footrest.

### Lower leg length (LLL)

To change the lower leg length, the footrest can be installed in a higher or lower position, see 6.4.2 *Adjusting the footrest height*, page 18. Also refer to the table in chapter *Frame overview*. The shortest lower leg lengths can be achieved using a high-mounted footrest, see .

### 6.4.1 Replacing the footrest

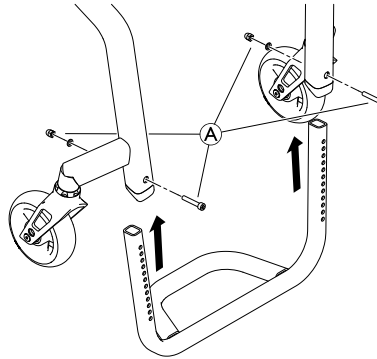


Allen key (4 mm) / Socket spanner (8 mm)



1. Remove the bolts, washers and nuts **A** on both sides.
2. Remove the footrest.
3. Insert the new footrest into the frame tubes and move it to the required height.
4. Reinsert bolts, washers and nuts on both sides and tighten.

**A** = 7 Nm



### 6.4.2 Adjusting the footrest height

The height of the footrest can be adjusted in steps of 10 mm.



Allen key (4 mm) / Socket spanner (8 mm)

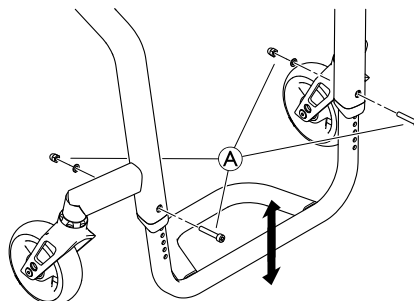


1. Remove the bolts, washers and nuts **A** on both sides.
2. Move the footrest to the required height.
3. Reinsert bolts, washers and nuts on both sides and tighten.

**A** = 7 Nm



If the required lower leg length cannot be achieved, a high-mounted footrest must be installed, see chapter .

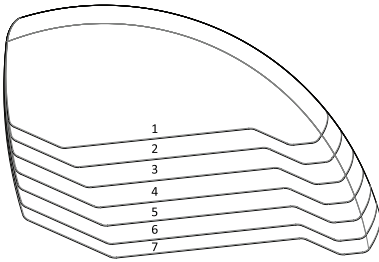




## 6.5 Sideparts

### 6.5.1 Replacing the Mudguard

Seven different mudguard sizes are available. The mudguards are made from Carbon fibre.



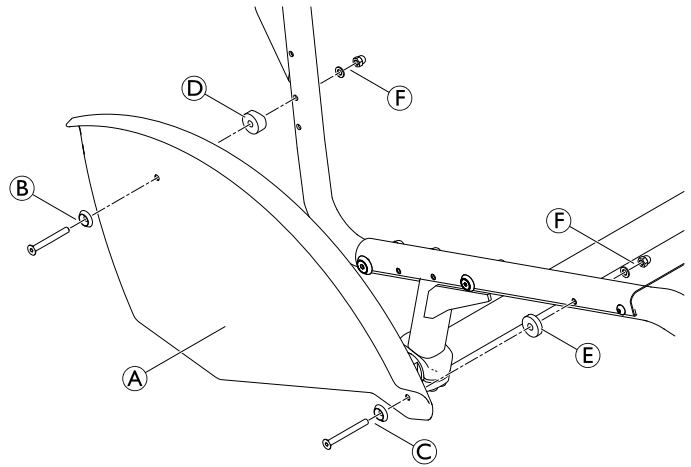
Allen key (5 mm) / Socket spanner (8 mm) / Drill & Drill bit ( $\text{AE}$  5,2 mm)



The mudguard is customised to fit the geometry of the individual wheelchair. It must therefore only be replaced by another mudguard of the same size.

1. Remove screws and spacers **B** and **C**, distance pieces **D** and **E**, nuts with washers **F** and the mudguards **A** on both sides.
2. Use the old mudguard from the other side as a template by placing it on the new one and marking the position of the holes. Drill holes in the new mudguard.
3. Install the new mudguards by following step 1 in reverse order.

**F** = 7 Nm



### 6.5.2 Replacing the Clothes-guard

Seven different clothes-guard sizes are available. The clothes-guards are made from Carbon fibre.


#### Clothes-guard Size in Relationship to Backrest type, Rear Wheel Size and Rear Seat-to-Floor Height (RSTF)

Backrest type	fixed		foldable	
	24"	25"	24"	25"
RSTF [mm]				
400	4	5	4	5
410	4	5	3	4
420	4	5	3	4
430	3	4	3	4
440	3	4	2	3
450	3	4	2	3
460	2	3	2	3
470	2	3	1	2
480	2	3	1	2



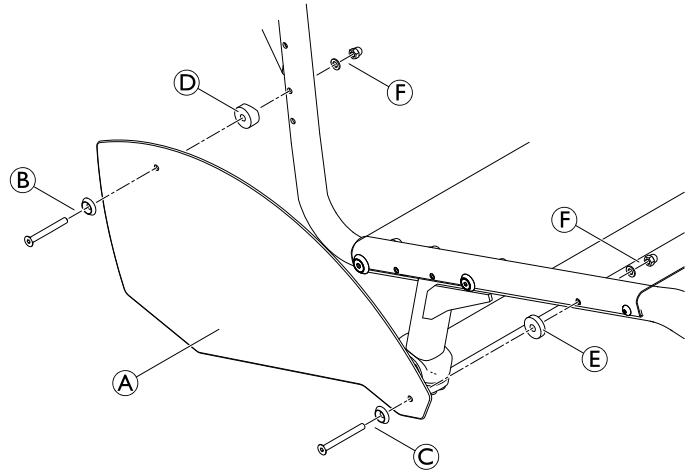
Allen key (5 mm) / Socket spanner (8 mm) / Drill & Drill bit ( $\text{AE}$  5,2 mm)



 The clothes-guard is customised to fit the geometry of the individual wheelchair. It must therefore only be replaced by another clothes-guard of the same size.

1. Remove screws and spacers **B** and **C**, distance pieces **D** and **E**, nuts with washers **F** and the clothes-guards **A** on both sides.
2. Use the old clothes-guard from the other side as a template by placing it on the new one and marking the position of the holes. Drill holes in the new clothes-guard.
3. Install the new clothes-guards by following step 1 in reverse order.

**F** = 7 Nm



## 6.6 Castors

### 6.6.1 Replacing the castor wheel

- !** **IMPORTANT!**  
 The following sub-assembly contains pre-coated screws.  
 – Only use original Invacare spare parts.  
 – If the screws need adjustment, replace by new ones.

Only use original Invacare spare parts. Any change in the adjustment of these screws requires a change of screw.



Allen key (3 mm)

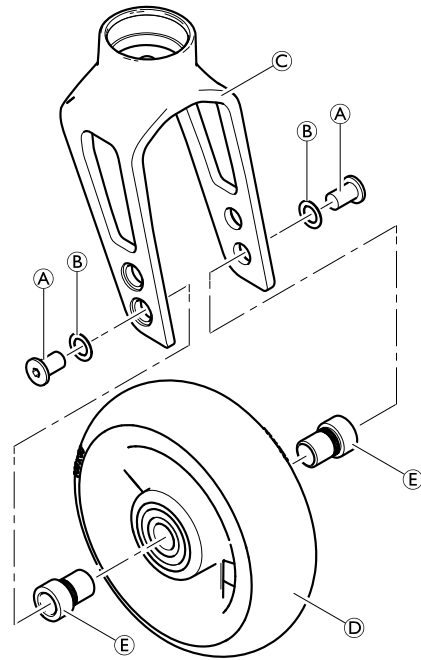


1. Remove the screws **A** and washers **B**.
2. Remove the castor wheel **D** from the castor fork **C**.
3. Place the sleeves **E** in the bearing of the new castor wheel.
4. Place the castor wheel with sleeves in the required position of the fork.
5. Secure the castor wheel to the fork using screws and washers.

**A** = 4 Nm

Function check:

The wheel may not wobble, but must rotate easily.



## 6.6.2 Replacing the castor fork



### IMPORTANT!

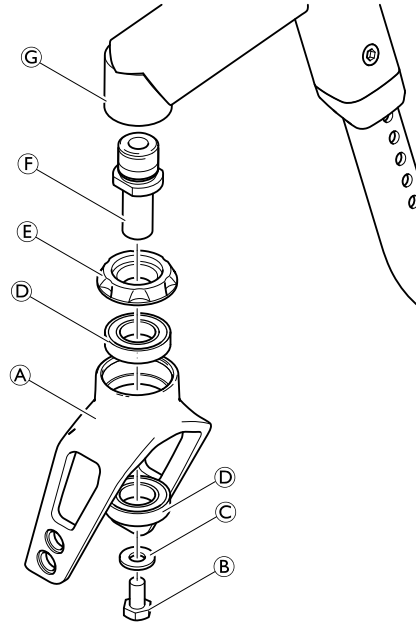
- The following sub-assembly contains pre-coated screws.
- Only use original Invacare spare parts.
- If the screws need adjustment, replace by new ones.



Socket spanner (10 mm) / Wrench (17 mm)



1. Remove the castor wheel, see 6.6.1 *Replacing the castor wheel*, page 22.
2. Remove bolt ⑥, washer ③, the castor fork ① with bearings ④ and part ⑤ from the threaded bolt ⑦.
3. If necessary, turn the threaded bolt ⑦ out of the supporter ⑧ and replace with a new one. Apply high-strength adhesive on the thread.
4. Replace the castor fork and reinstall in reverse order.



### IMPORTANT!

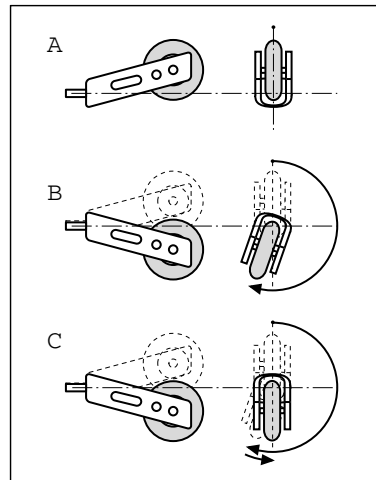
- Risk of damaging the castor fork bearing
- Do not overtighten the bolt ⑥.
- Tighten the bolt only so far that the fork can still be turned freely.

5. Reinstall the castor wheel.

⑦ = 13 Nm (high-strength)

### Function check

Tip the wheelchair backwards by 90° so that it is lying on the backrest and the rear wheels. Make sure that the clevis pin is as horizontal as possible. Turn the fork upwards (position A) and let it tip downwards. The fork has been correctly adjusted if it easily turns to slightly beyond the bottommost point (position B) and then maximally turns back to the bottommost point (position C). If the fork turns back over the bottommost point or even swings back and forth, it has not been sufficiently tightened. There is a risk that the castor wheel will start to wobble at high speeds.



## 6.7 Rear Wheels



### WARNING!

**Risk of accidents to the wheelchair user**


- Check and adjust the antitipper and parking brake settings after each change on the rear wheel position.

### 6.7.1 Ensuring the rear wheels are parallel



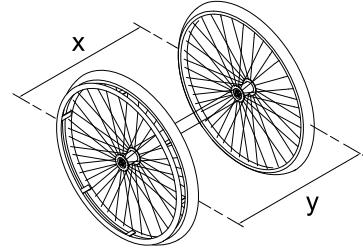
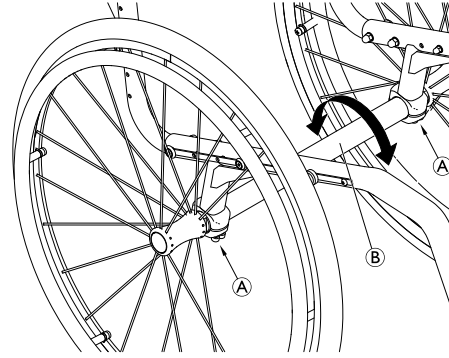
Allen key (5 mm) / Wrench (22 mm)




 This setting must be carried out on a horizontal surface. The track of the rear wheels is correct if the distance between the rear wheels is the same at the front and the back ( $x=y$ ) – measured at the height of the centre of the axle.

1. Loosen the bolts **A** on both clamp sets.
2. Rotate the axle tube **B** to adjust the correct position of both rear wheels.
3. Retighten the bolts on both sides.


**A** = 9 Nm

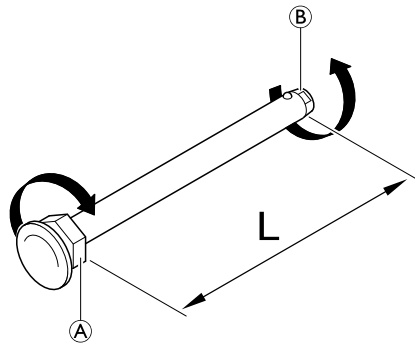


### 6.7.2 Adjusting the Removable Axle

 Open-end spanner (19) / Straddle spanner (11) ■■■


1. Remove the rear wheel.
2. Hold the end of the removable axle **B** using the straddle spanner.
3. Adjust the length **L** of the removable axle by turning the nut **A**. The length is correctly adjusted if the removable axle engages correctly when installing the wheel and the wheel has just minimal clearance.

 The wheels must be exchanged (left to right side and vice versa) after adjusting both removable axles. The adjustment must now be checked or carried out again to ensure the wheels can be switched.



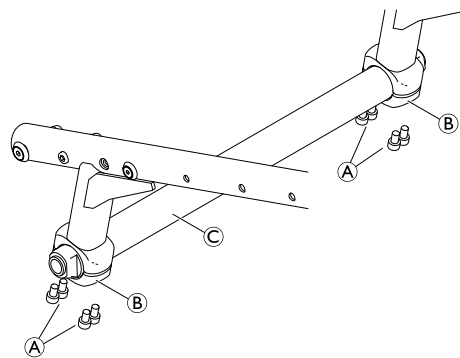
### 6.7.3 Replacing an axle

A new axle must be used to change the wheel camber.


 Allen key (5 mm) ■■■

1. Remove both rear wheels.
2. Remove the screws **A**, the lower parts of the axle holders **B** and the axle **C**.
3. Replace the axle with a new one with the desired wheel camber.
4. Reinstall the lower parts of the axle holders using screws **A** but only tighten slightly.
5. Ensure that the rear wheels are parallel, see 6.7.1 *Ensuring the rear wheels are parallel, page 23.*
6. Tighten screws on both sides.

**A** = 7 Nm



### 6.7.4 Repairing or changing an inner tube

 Tyre lever ■■■



1. Remove the rear wheel and release any air from the inner tube.
2. Lift one tyre wall away from the rim using a bicycle tyre lever. Do not use sharp objects such as a screwdriver which could damage the inner tube.
3. Pull the inner tube out of the tyre.
4. Repair the inner tube using a bicycle repair kit or, if necessary, replace the tube.
5. Inflate the tube slightly until it becomes round.
6. Insert the valve into the valve hole on the rim and place the tube inside the tyre (the tube must lie right round the tyre with no creases).
7. Starting close to the valve, push the tyre wall over the edge of the rim using both hands. When doing this, check all the way round to ensure that the inner tube is not trapped between the tyre and the rim.
8. Inflate the tube to its maximum operating pressure. Check that no air is escaping from the tyre.

### 6.7.5 Replacing a solid tire

#### Removing a solid tire



Lever bar



1. Push on the side wall of the tire while inserting a lever bar.



Some solid tires are quite a bit smaller than the rim so this can be difficult.

2. Once one lever is in, insert a second lever and push the tire over the rim until it comes off.



If you are unable to push off the tire, it needs to be cut off. Make sure not to damage the rim.

#### Installing a solid tire

Installing solid tires on a rim can only be accomplished with the right tools. Most of these tires are smaller than the rim they fit and need to be stretched to be installed. Follow the instructions that come with the tools for the process.

### 6.7.6 Replacing rear wheel spokes

We recommend having the spokes replaced by a qualified technician.

## 6.8 Parking brakes

### 6.8.1 Installing the parking brake

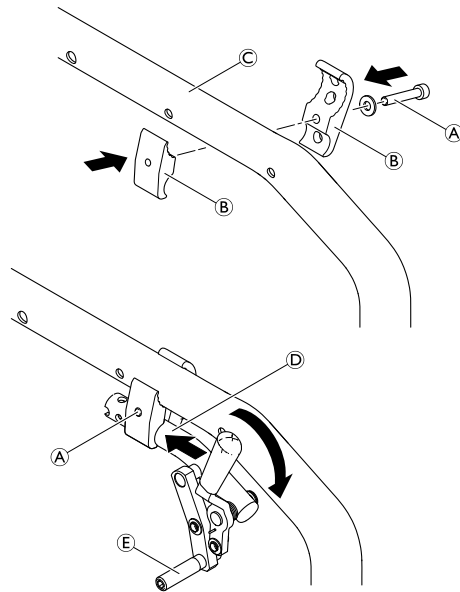


Allen key (5 mm)



1. Position the brake holder (B) around the front frame tube (C).
2. Place the brake (D) in the brake holder.
3. Screw the bolt (A) with washer into the brake assembly but do not tighten.
4. Rotate the brake holder assembly around the frame tube to adjust the lateral distance of the brake.
5. Rotate the brake in the brake holder to achieve a horizontal position of the brake rod (E) to the tyre.
6. Fully apply the brake and slide it towards the tyre until the brake rod bears flush against the tire.
7. Release the brake and slide it 3 mm backwards and tighten the bolt.

(A) = 13 Nm



### 6.8.2 Adjusting the parking brake



Allen key (5 mm)



**WARNING!**  
**Risk of injury**

- The parking brakes must be readjusted whenever the rear wheels are replaced or the wheel camber is changed.
- The parking brake function is only guaranteed if the tyre has the corresponding inflation pressure.

1. Check the tyre pressure in the rear wheels and correct if necessary.
2. Slightly loosen bolt (A) of the brake holder.
3. Change the position of the brake assembly as described in chapter 6.8.1 *Installing the parking brake, page 26*.
4. Tighten the bolt (A).

**IMPORTANT!**

- The force to apply the parking brake must be 60 N (maximum).



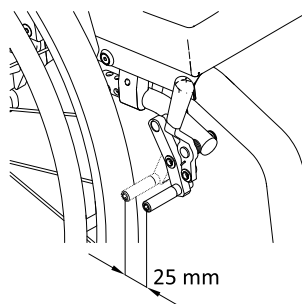
Very little force is required for activating and deactivating the brake. If necessary, a brake lever extension can be mounted.

**Visual check**

Check that the parking brakes are positioned correctly. The brake is set correctly if the brake rod depresses the tire by no more than 4 mm when the brake is applied. (In the case of push/pull and standard brakes this will be the case when the brake shoe is approx. 25 mm away from the tire when released.)

**Function check**

Place a weighted wheelchair with parking brake engaged facing uphill and then facing downhill on a ramp with an incline of 7°. The wheelchair must not move.



## 6.9 Options

### 6.9.1 Installing/Adjusting the Antitipper

There are two different sizes of antitipper for both the left and the right sides.



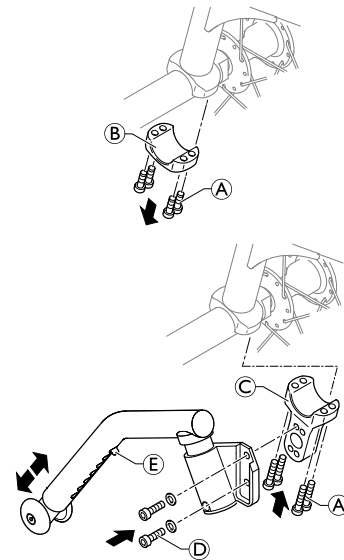
Allen key (3 mm, 5 mm) / Socket spanner (8 mm, 10 mm)



1. Remove screws **A** and the lower part **B** of the axle holder.
2. Install the adaptation holder **C** using screws **A**.
3. Mount the antitipper to the adaptation holder using screws **D**.
4. Measure the distance between the antitipper and the ground and adjust the length of the antitipper according to the below description.
5. Ensure that the rear wheels are parallel, see *Ensuring the rear wheels are parallel*.

**A** = 7 Nm (Low-strength)

**D** = 9 Nm

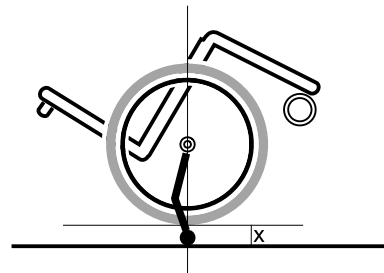


#### Adjusting the length of the antitipper

1. Press the spring pin **E**. Slide the inner part of the antitipper to the required position until the spring pin locates in the correct hole.

#### Function control:

The distance between the antitipper and the ground must be 50 - 70 mm. It must be easy to fold up the antitipper. Tip the wheelchair backwards using the antitipper until the axle is perpendicular to the antitipper's point of contact with the ground. In this position, the distance between the rear wheel and the ground must be  $x \geq 50$  mm.



## 6.9.2 Installing the posture belt



Allen key (5 mm) / Socket spanner (10)



1. Remove cap nut **A** and washer **C**.
2. Install the steel strap **D** using screw **B** and washer **E** with the supplied, new cap nut and washer.

**A** = 7 Nm

### WARNING!

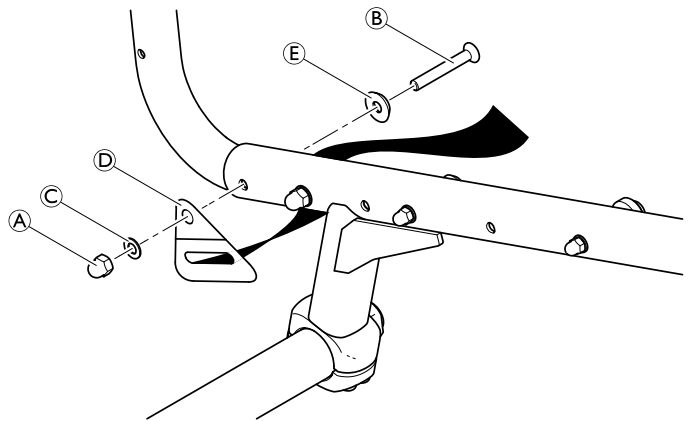
#### Risk of injury due to incorrect installation

- Make sure that the webbing of the posture belt is not twisted during assembly and the locking mechanism shows towards the front.

### WARNING!

#### Risk of injury due to incorrect installation

- Make sure that the seat cover does not get caught between the steel strap and the side supporters during assembly.



## 6.9.3 Installing the Positioning Belt


### Adapter Plate used in Relation with Seat Depth (SD), Seat Width (SW)

SD [mm] / SW [mm]	340	360	380	400	420	440	Distance between fixing screws
385	not possible						—
410	S	S	S	S	S	S	62.5
435	S	S	S	S	S	S	62.5
460	S	S	S	S	S	S	62.5
485	L	L	L	L	L	L	62.5




ø6.1 Allen key (3 mm, 4 mm) / Drill and drill bit (ø 6.1 mm)



 The frame tube needs to be drilled to install the adapter plate.

1. Position the adapter plate **C** against the seat, aligning the hole with the first frame hole, and the groove with second frame hole.


 If necessary, reposition the clamping part of the parking brake.


**WARNING!**

**Risk of injury due to incorrect installation**

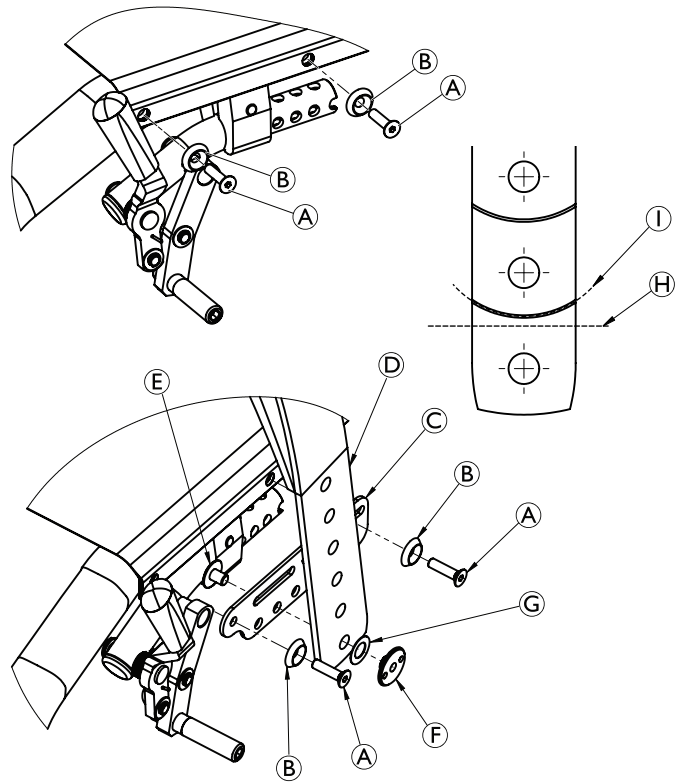
– Make sure that the parking brakes are positioned correctly to ensure the function.

2. Insert bolts **A** with washers **B** and tighten.
3. Mount the belt **D** to the adapter plate **C** in the required hole using bolt **E** and nut **F**.

 The washer **G** can be placed between the belt and the nut to avoid the rotation of the belt.

 If necessary, reduce the length of the belt by cutting straight across the belt at position **H**. Trim along the curved line **I** for a proper appearance.

**A** = 5 Nm







## Invacare distributors

### Asia:

Invacare Asia Ltd.  
1 Lenton Place, North Rocks NSW 2151  
Australia  
Phone: (61) (02) 8839 5333  
Fax: (61) (02) 8839 5343  
asiasales@invacare.com  
www.invacare.com

### Deutschland:

Invacare GmbH  
Am Achener Hof 8  
D-88316 Isny  
Tel: (49) (0)7562 700 0  
kontakt@invacare.com  
www.invacare.de

### Ireland:

Invacare Ireland Ltd,  
Unit 5 Seatown Business Campus  
Seatown Road, Swords, County Dublin  
Tel : (353) 1 810 7084  
Fax: (353) 1 810 7085  
ireland@invacare.com  
www.invacare.ie

### Norge:

Invacare AS  
Grensesvingen 9, Postboks 6230,  
Etterstad  
N-0603 Oslo  
Tel: (47) (0)22 57 95 00  
Fax: (47) (0)22 57 95 01  
norway@invacare.com  
www.invacare.no

### Sverige:

Invacare AB  
Fagerstagatan 9  
S-163 53 Spånga  
Tel: (46) (0)8 761 70 90  
Fax: (46) (0)8 761 81 08  
sweden@invacare.com  
www.invacare.se

### Australia:

Invacare Australia Pty. Ltd.  
1 Lenton Place, North Rocks NSW 2151  
Australia  
Phone: 1800 460 460  
Fax: 1800 814 367  
orders@invacare.com.au  
www.invacare.com.au

### Eastern Europe, Middle East & CIS:

Invacare EU Export  
Am Achener Hof 8  
D-88316 Isny  
Tel: (49) (0)7562 700 397  
eu-export@invacare.com  
www.invacare-eu-export.com

### Italia:

Invacare Mecc San s.r.l.,  
Via dei Pini 62,  
I-36016 Thiene (VI)  
Tel: (39) 0445 38 00 59  
Fax: (39) 0445 38 00 34  
italia@invacare.com  
www.invacare.it

### Österreich:

Invacare Austria GmbH  
Herzog-Odilo-Straße 101  
A-5310 Mondsee-Tiefgraben  
Tel: (43) 6232 5535 0  
Fax: (43) 6232 5535 4  
info-austria@invacare.com  
www.invacare.at

### Schweiz / Suisse / Svizzera:

Invacare AG  
Benkenstrasse 260  
CH-4108 Witterswil  
Tel: (41) (0)61 487 70 80  
Fax: (41) (0)61 487 70 81  
switzerland@invacare.com  
www.invacare.ch

### Belgium & Luxemburg:

Invacare nv  
Autobaan 22  
B-8210 Loppem  
Tel: (32) (0)50 83 10 10  
Fax: (32) (0)50 83 10 11  
belgium@invacare.com  
www.invacare.be

### España:

Invacare SA  
Avda. Del Oeste n.50, 1ª, 1ª  
Valencia-46001  
Tel: (34) (0)972 49 32 14  
contactsp@invacare.com  
www.invacare.es

### Nederland:

Invacare BV  
Galvanistraat 14-3  
NL-6716 AE Ede  
Tel: (31) (0)318 695 757  
Fax: (31) (0)318 695 758  
nederland@invacare.com  
www.invacare.nl

### Portugal:

Invacare Lda  
Rua Estrada Velha, 949  
P-4465-784 Leça do Balio  
Tel: (351) (0)225 1059 46/47  
Fax: (351) (0)225 1057 39  
portugal@invacare.com  
www.invacare.pt

### United Kingdom:

Invacare Limited  
Pencoed Technology Park, Pencoed  
Bridgend CF35 5AQ  
Tel: (44) (0) 1656 776 222  
Fax: (44) (0) 1656 776 220  
uk@invacare.com  
www.invacare.co.uk

### Danmark:

Invacare A/S  
Sdr. Ringvej 37  
DK-2605 Brøndby  
Tel: (45) (0)36 90 00 00  
Fax: (45) (0)36 90 00 01  
denmark@invacare.com  
www.invacare.dk

### France:

Invacare Poirier SAS  
Route de St Roch  
F-37230 Fondettes  
Tel: (33) (0)2 47 62 64 66  
Fax: (33) (0)2 47 42 12 24  
contactfr@invacare.com  
www.invacare.fr

### New Zealand:

Invacare New Zealand Ltd  
4 Westfield Place, Mt Wellington 1060  
New Zealand  
Phone: 0800 468 222  
Fax: 0800 807 788  
sales@invacare.co.nz  
www.invacare.co.nz

### Suomi:

Camp Mobility  
Patamäenkatu 5, 33900 Tampere  
Puhelin 09-35076310  
info@campmobility.fi  
www.campmobility.fi



Invacare France Operations SAS  
Route de St Roch  
F-37230 Fondettes  
France

