

# ***Invacare® Esprit Action® 4 NG***

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## **SERVICE MANUAL**

### **(MAINTENANCE AND ADJUSTMENT)**

The procedures in this manual **MUST** be performed by a qualified technician.



1640945-C

February 2019



***Yes, you can.®***

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# SECTION 1—TROUBLESHOOTING AND MAINTENANCE GUIDELINES

## General Information

### User manual and pre-sales information:

For pre-sales information and user manual related to this wheelchair, please consult the [www.invacare.eu.com](http://www.invacare.eu.com) website.

### Esprit Action 4 NG Junior specific options:

Refer to Action<sup>3</sup> Junior service manual for specific options (front hangers, adjustable cross brace, back-brace, headrest, ...) dedicated to the Junior version.

Please consult the [www.invacare.eu.com](http://www.invacare.eu.com) website.

### Electrical and Electronical equipment; maintenance and adjustment:

Refer to ALBER esprit service manual for electrical and electronical maintenance and adjustment. Please consult the [www.alber.de](http://www.alber.de) website.

*NOTE: Please recommend the user to follow the rules mentioned in the User Manual about Maintenance Schedule, Cleaning and Troubleshooting sections.*

## Troubleshooting:

Fault	Possible cause	Action
The wheelchair does not travel in a straight line	Incorrect tire pressure on one rear wheel	Correct tire pressure
	One or more spokes broken	Replace faulty spoke(s), → authorized dealer
	Spokes tightened unevenly	Tighten loose spokes, → authorized dealer
	Front wheel bearings are dirty or damaged	Clean or replace the bearings, → authorized dealer
The wheelchair tips backwards too easily	Rear wheels are mounted too far forwards	Mount the rear wheels further back, → authorized dealer
	Back angle too large	Reduce the backrest angle, → authorized dealer
	Seat angle too large	Mount the front wheel upper on the front fork, → authorized dealer
		Select a smaller front fork, → authorized dealer
The brakes are gripping poorly or asymmetrically	Incorrect tire pressure in one or both rear tires	Correct tire pressure
	Brake setting incorrect	Correct the brake setting, → authorized dealer
Rolling resistance is very high	Tire pressure in rear tires is too low	Correct tire pressure
	Rear wheels not parallel	Ensure the rear wheels are parallel, → authorized dealer
The front wheels wobble when moving fast	Too little tension in front wheel bearing block	Tighten the nut on the bearing block axle slightly, → authorized dealer
	Front wheel has worn smooth	Change front wheel, → authorized dealer
The front wheel is stiff or stuck	Bearings are dirty or faulty	Clean or replace the bearings, → authorized dealer
The wheelchair is very difficult to unfold	Backrest cover is too tight	Loosen the Velcro bands of the backrest cover a little

**⚠ CAUTION**

It is compulsory to use original Invacare spare parts which you can obtain from any Invacare subsidiaries. A list of spare parts is available at [www.invacare.eu.com](http://www.invacare.eu.com)

**⚠ WARNING**

After ANY adjustments, repair or service and before use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.

**⚠ CAUTION**

DO NOT over tighten hardware attaching to the frame. This could cause damage to could cause damage to the frame tubing.

**Tightening torques**

The tightening torques stated in the following table are dependent on the thread diameters for the nuts and bolts for which no special values are determined. All values apply to dry and grease-free threads.

Thread	M4	M5	M6	M8	M10/12
Tightening torque in Nm mini/max	1,5/3 Nm	3/6 Nm	7/12 Nm	10/20 Nm	20/30 Nm

**Caution: All other nuts not noted here must be tightened FINGERTIGHT!**

**Suggested Maintenance Procedures**

1. Before using your wheelchair, make sure all nuts and bolts are tight. Check all parts for damage or wear and replace. Check all parts for proper adjustment.
2. Keep quick release axles free of dirt and lint to ensure positive locking and proper operation. Refer to Adjusting Quick Release Axles, in section 5.

**⚠ WARNING**

DO NOT use WD-40, 3-in-1 oil, or other penetrating lubricants on quick-release axles. Otherwise, binding and/or damage to the wheelchair may occur.

3. Clean quick release axles once a week with a Teflon® lubricant.

**⚠ WARNING**

DO NOT use your wheelchair unless it has the proper tire pressure (BAR, KPa or P.S.I.). DO NOT over inflate the tires. Failure to follow these suggestions may cause the tire to explode and cause bodily harm. The recommended tire pressure is on the sidewall of the tire.

4. Recommended tire pressure is listed on the sidewall of the tire (BAR, KPa or P.S.I.).

**⚠ CAUTION**

As with any vehicle, the wheels and tires should be checked periodically for cracks and wear and should be replaced if damaged.

## SECTION 1— MAINTENANCE GUIDELINES & STABILITY WARNING

5. The wheels, castors and tires should be checked periodically for cracks and wear, and should be replaced when necessary.
6. Regularly check for loose spokes in the rear wheels. If loose, have them adjusted.
7. Periodically check handrims to ensure they are secured to the rear wheels. Refer to Replacing Handrims paragraph, in section 5.
8. Periodically check castor wheel bearings to make sure they are clean and free from moisture. Use a Teflon® lubricant if necessary.
9. Check upholstery for sagging, rips or tears.
10. Clean upholstery with mild soap and water.

### Stability Warning

The seat height, seat depth, back angle, seating system/upholstery, size/position of the rear wheels, size/position of the front castors, seating options (e.g. headrest, back bag, ...) as well as the user condition directly relate to the stability of the wheelchair. Any change to one or any combination of these factors changes the centre of gravity and may cause the wheelchair to increase/decrease in stability.

<i>NOTE: When changes to the left hand column occur, follow across the chart and refer to the X procedure to maintain the proper stability, safety and handling of the wheelchair.</i>	SEAT HEIGHT	SEAT DEPTH	BACK ANGLE	SEATING SYSTEM/UPHOLSTERY	CASTOR SIZE	CASTOR POSITION	REAR WHEEL SIZE	REAR WHEEL POSITION	USER CONDITION	WHEEL BRAKES	ANTI-TIPPERS
	SEAT HEIGHT	•	X	X	X	X	X	X	N/A	N/A	N/A
	SEAT DEPTH	X	•	X	X	X	X	X	N/A	N/A	N/A
	BACK ANGLE	X	X	•	X	X	X	X	N/A	N/A	N/A
	SEATING SYSTEM/UPHOLSTERY	X	X	X	•	X	X	X	X	N/A	N/A
	CASTOR SIZE	X	N/A	X	N/A	•	X	X	N/A	X	X
	CASTOR POSITION	X	N/A	X	N/A	X	•	X	N/A	X	X
	REAR WHEEL SIZE	X	N/A	X	N/A	X	X	•	N/A	X	X
	REAR WHEEL POSITION	X	N/A	X	N/A	X	X	X	•	N/A	X
	USER CONDITION	X	X	X	X	X	X	X	•	N/A	N/A

Seat-to-floor heights have specific positions depending on rear wheel size, rear wheel position, front caster size/position.

## SECTION 2—FRONT HANGERS

### WARNING

After ANY adjustments, repair or service and before use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur. To adjust the leg rest, refer to dedicated paragraphs in user manual. A 50 mm clearance between the bottom of the footplate and the ground/floor **MUST** be maintained always.

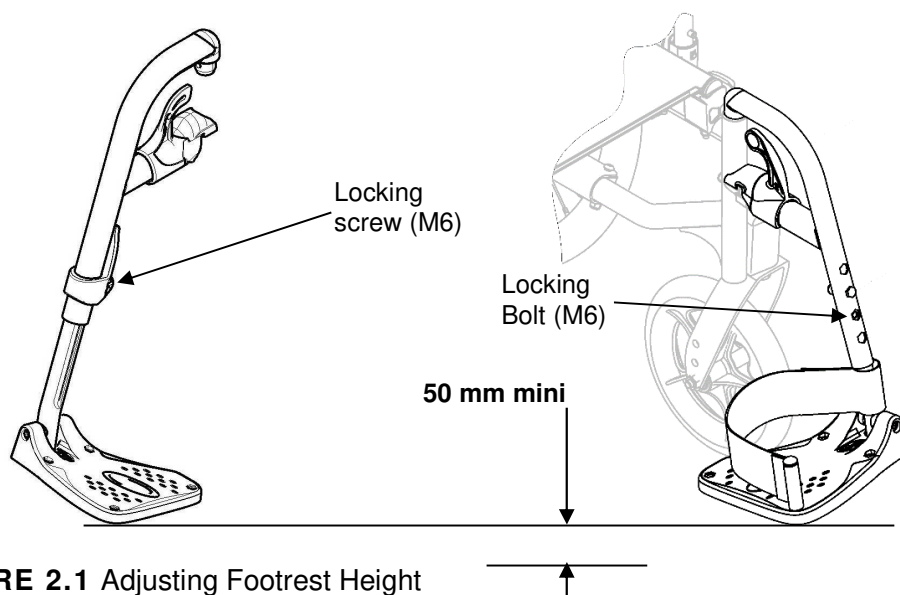
### Adjusting Footrest Height

*NOTE: For this procedure, refer to FIGURE 2.1.*

1. Remove calf strap, if so equipped.
2. Unscrew locking screw (5 mm Allen Key) or locking bolt (5 mm Allen key and 10 mm Spanner).
3. Position the footrest assembly to the desired height.

*NOTE: A 50 mm clearance between the bottom of the footplate and the ground/floor **MUST** be maintained always.*

4. If the distance between the bottom of footplate and the ground/floor is not 50 mm minimum, adjust footrest tube accordingly.
5. Using the locking screw (M6) with a 5 mm Allen Key or the locking bolt with 5 mm Allen key and 10 mm Spanner, secure the footrest tube to the footrest support.
6. Securely tighten (5 Nm).
7. If necessary, repeat STEPS 2-5 to adjust remaining footrest.
8. Reinstall the calf strap, if so equipped.



**FIGURE 2.1** Adjusting Footrest Height

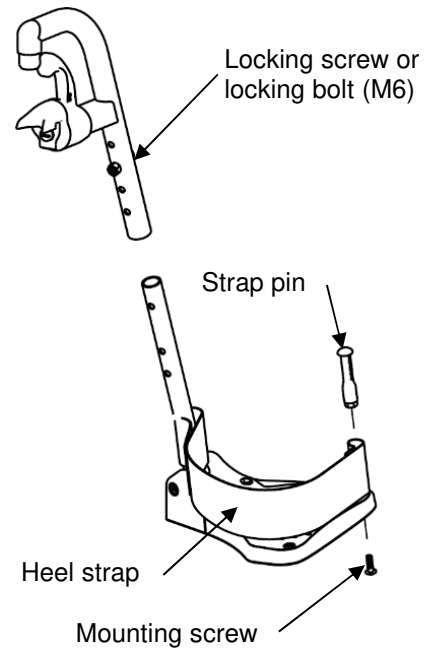
## Replacing Heel Strap

*NOTE: For this procedure, refer to FIGURE 2.2.*

1. Remove the locking screw (5mm Allen Key) or locking bolt (5 mm Allen key and 10 mm Spanner) that secure the footrest tube to the footrest support.
2. Remove the lower footrest assembly.
3. Remove the mounting screw, strap pin that secure the heel strap to the footplate.
4. Slide heel strap over footrest tube.

*NOTE: When securing the heel strap to the footrest assembly, tighten the mounting screw and strap pin until they are secure.*

5. Using the mounting screw, strap pin, secure the heel strap to the footplate.
6. Using the locking screw (M6) with a 5mm Allen key or locking bolt with 5 mm Allen key and 10 mm Spanner, secure the footrest tube to the footrest support.
7. Securely tighten (5Nm).



**FIGURE 2.2** Replacing Heel Strap



## Installing Angle Adjustable Footplate

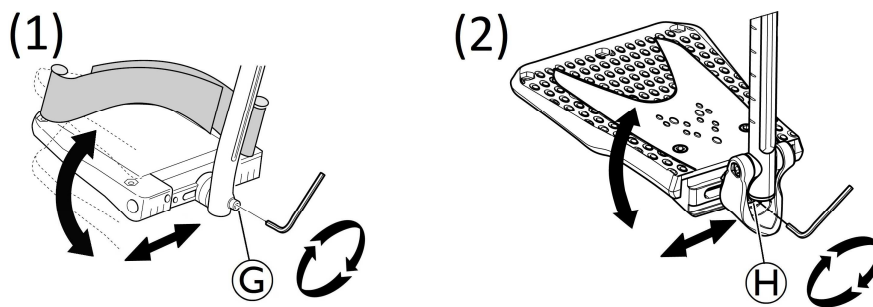
*NOTE: For this procedure, refer to FIGURE 2.4.*

*NOTE: This procedure is for individual Angle and Depth Adjustable Footrests standard version (1) and new version (2) only.*

1. Position the angle adjustable footplate on the footrest support tube at the desired height.
2. Using the locking screw, loosely secure the angle adjustable footplate to the footrest support tube.

*NOTE: Refer to Adjusting Footrest Height paragraph on page 9.*

3. Using the mounting screw, adjust to the desired angle by rotating the footplate and depth by sliding the footplate into the tooth plates support.
4. Using the mounting screw © version (1) or © version (2), secure the Angle Adjustable Footplate to the footrest tube. Securely tighten.
5. If necessary, repeat STEPS 1-4 to adjust remaining Angle Adjustable Footplate.



**FIGURE 2.4** Installing Angle Adjustable Footplate

## Adjusting Elevating Legrest Angle, Height and Calf pad Height/Depth

*NOTE: For this procedure, refer to FIGURE 2.5.*

### Adjusting the Legrest Angle

1. Loosen locking knob © securing the rotating axle of the elevating legrest.
2. Adjust to desired angle, securely engage the locking knob ©.
3. If necessary, repeat STEPS 1-2 to adjust remaining elevating legrest angle.

### Adjusting the Footplate Height

1. Loosen locking screw © securing the slide tube to the elevating legrest.

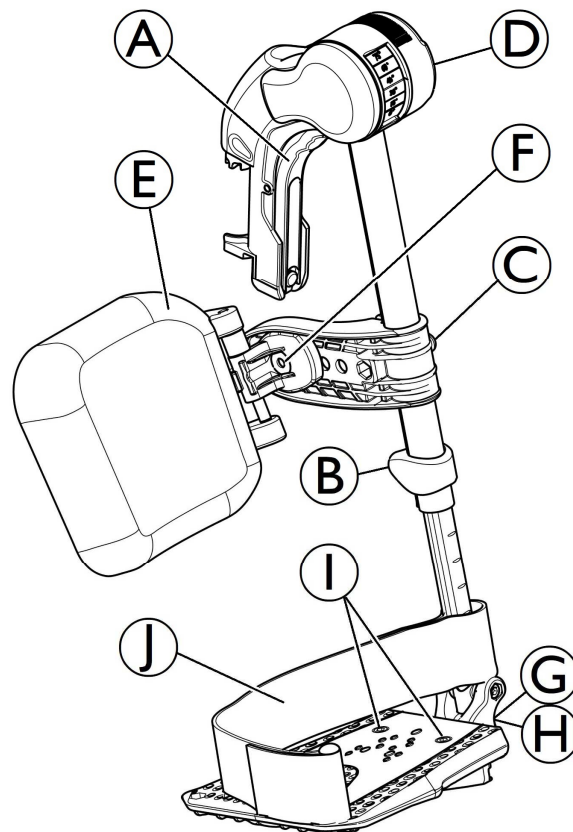
2. Reposition footplate to desired height, securely tighten locking screw (B).
3. If necessary, repeat STEPS 1-2 to adjust remaining footplate height.

### Adjusting Calf pad Height

1. Loosen the locking button (C) that secure the calf pad bracket to the elevating legrest assembly.
2. Slide the calf pad bracket up or down until the desired calf pad height is obtained.
3. Tighten the locking button (C) securing the calf pad bracket to the elevating legrest assembly.
4. If necessary, repeat STEPS 1-3 to adjust remaining calf pad bracket.

### Adjusting Calf pad Depth

1. Remove the mounting screw (F) that secure the calf pad (E) to the calf pad bracket.
2. Insert mounting screw (F) through one of four calf pad bracket mounting holes.
3. Using the mounting screw (F), secure the calf pad to the calf pad bracket.
4. If necessary, repeat STEPS 1-3 to adjust remaining calf pad assembly.



**FIGURE 2.5** Adjusting Elevating Legrest Height and Calf pad Height/Depth

## SECTION 3—ARMRESTS

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### WARNING

After ANY adjustments, repair or service and BEFORE use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.

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### Removing/Installing/Adjusting, Adjustable & Removable Armrest

*NOTE: For this procedure, refer to FIGURE 3.1.*

*NOTE: To remove the removable armrest, reverse this procedure.*

1. Previously press on the locking mechanism A located at the bottom of the armrest vertical bracket.
2. Pull /Push the armrest by the arm cushion out of the holder.
3. To adjust how easy or difficult it is to pull/push the armrest out of the holder, change the degree to which the 4 screws D (M6) are tightened.

### Adjusting removable armrest Height

1. Loosen the screw B (M6) at top of the armrest tube.
2. Move the armrest upwards or downwards until you reach the desired height, while keeping screw B (M6) in place (at the top edge of the holder).
3. Tighten firmly (5-6 Nm) the screw B (M6).
4. Perform the setting on both sides

### Adjusting the armrest width and depth (2 positions)

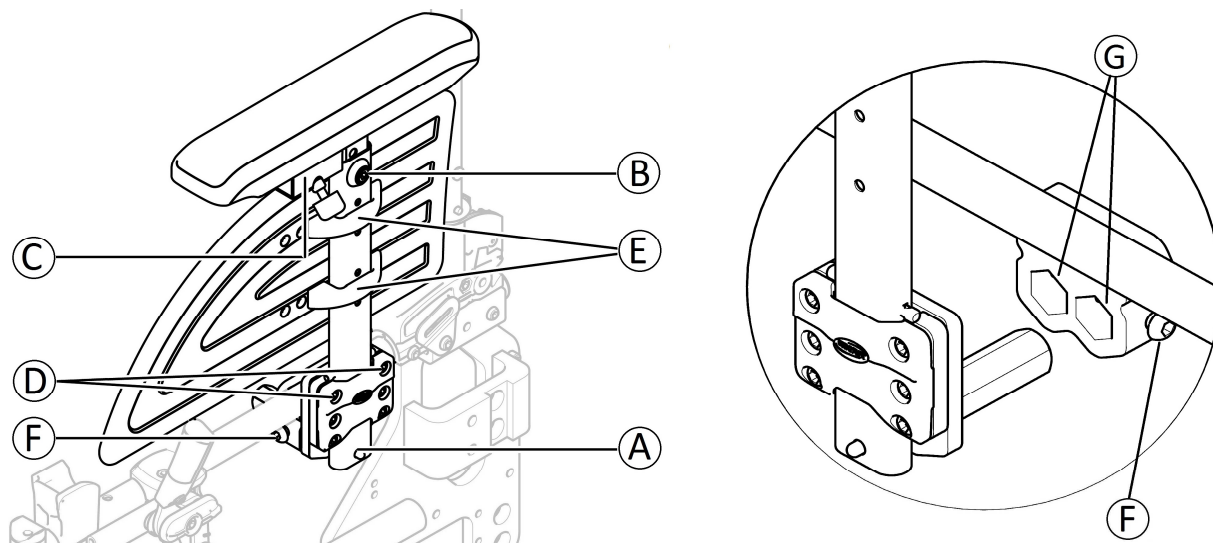
1. Loosen the screw F with 5 mm Allen key at bottom of the armrest bracket.
2. Move the armrest side wards until you reach the desired width, while keeping screw B in place.
3. Tighten firmly (8-9 Nm) the screw F.
4. Two depth positions G are possible, frontwards or backwards.
5. Perform the setting on both sides, if necessary.

### Adjusting the armpad depth

1. Loosen the 2 screws C below the armpad bracket.
2. Move the armpad frontwards or rearwards until you reach the desired depth, while keeping screw C in place.
3. Tighten the 2 screws C (1,5–2 Nm).
4. Perform the setting on both sides.

### Adjusting the side protection height

1. Loosen the 2 screws of the side protection clamps E.
2. Move the side protection upwards or downwards until you reach the desired height.
3. Tighten the 2 screws of the side protect clamps E (0,7–1,2 Nm).
4. Perform the setting on both sides.

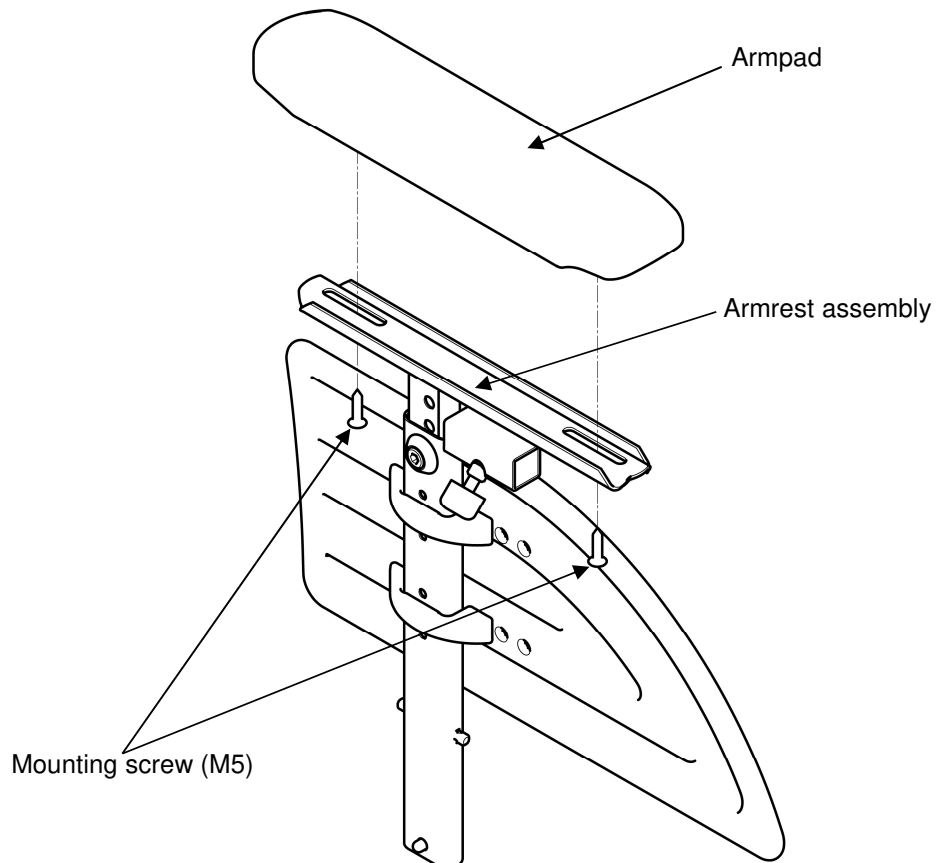


**FIGURE 3.1** Adjustable & Removable Armrest

## Replacing Armrest Arm pad

*NOTE: For this procedure, refer to FIGURE 3.3.*

1. Remove the mounting screws that secure the arm pad to the armrest assembly.
2. Replace arm pad and securely tighten with the existing mounting screws (M5).
3. Repeat STEPS 1-2 for the opposite side if necessary.



**FIGURE 3.3** Replacing Armrest Arm Pad

## SECTION 4—SEAT/BACK

### WARNING

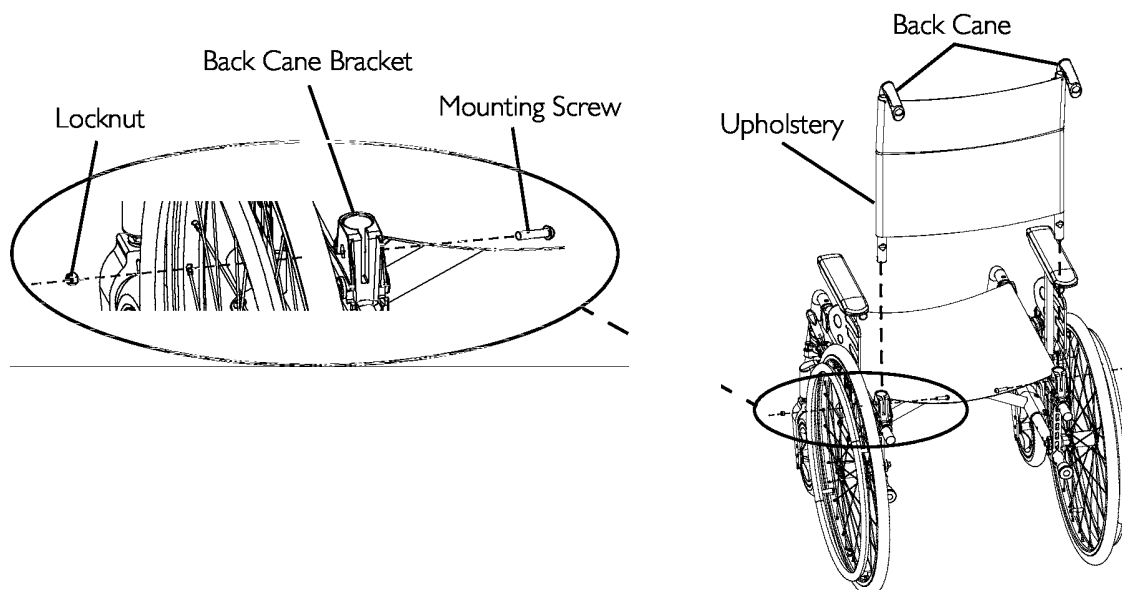
The seat height, seat depth, back angle, seating system, size/position of the rear wheels, size/position of the front castors, seating options (e.g. headrest, back bag, ...) as well as the user condition directly relate to the stability of the wheelchair. Any change to one or any combination of the nine may cause the wheelchair to decrease in stability. Refer to table on page 6.

After ANY adjustments, repair or service and BEFORE use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.

### Removing Back-canes

*NOTE: For this procedure, refer to FIGURE 4.1.*

1. Remove the mounting screw and locknut (M6) that secures the back cane to the back-cane bracket.
2. Repeat STEP 1 for the other back cane.
3. Remove the back canes out of the back-cane brackets.



**FIGURE 4.1** Removing Back-canes

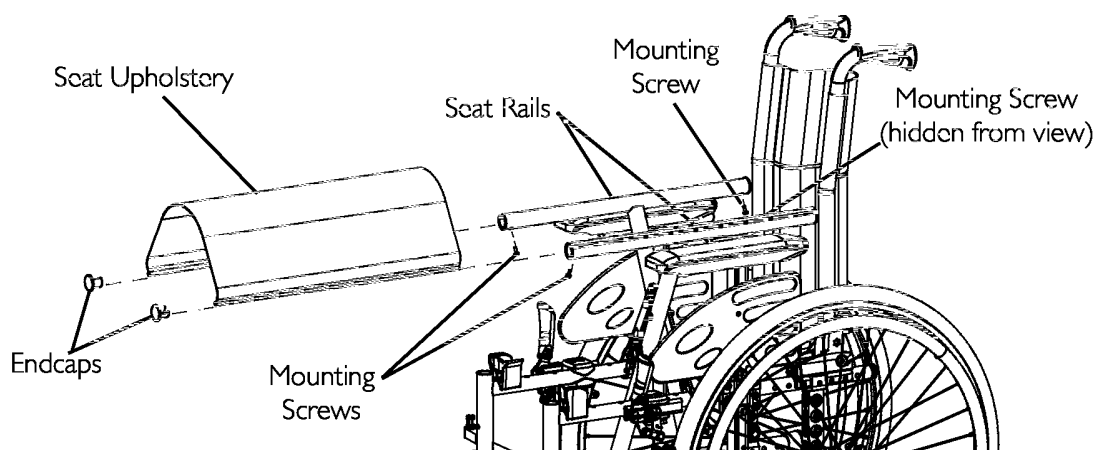
### Removing/Installing Seat Upholstery

*NOTE: For this procedure, refer to FIGURE 4.2, next page.*

#### Removing Seat Upholstery

*NOTE: To install the seat upholstery, reverse this procedure.*

1. Fold the wheelchair.
2. Remove the mounting screw (Torx) that secures the seat upholstery to the front and back seat rails.
3. Remove the end caps from the front of the seat rails.
4. Slide the seat upholstery out of the seat rails.



**FIGURE 4.2** Removing/Installing Seat Upholstery

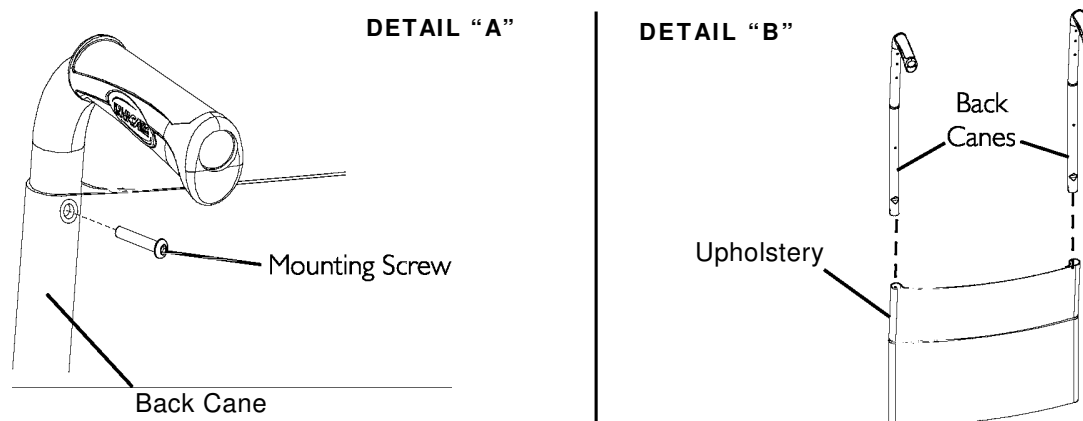
## Removing/Installing Standard Back Upholstery

*NOTE: For this procedure, refer to FIGURE 4.3.*

### Removing Back Upholstery

*NOTE: To Install the Back Upholstery, reverse this procedure.*

1. Remove the back canes. Refer to [Removing Back Canes](#) paragraph.
2. Remove the mounting screw that secures the back upholstery to the back canes. Refer to Detail "A".
3. Remove the back upholstery from the back canes. Refer to Detail "B".



**FIGURE 4.3** Removing/Installing Standard Back Upholstery

## Adjusting the Height Adjustable Back

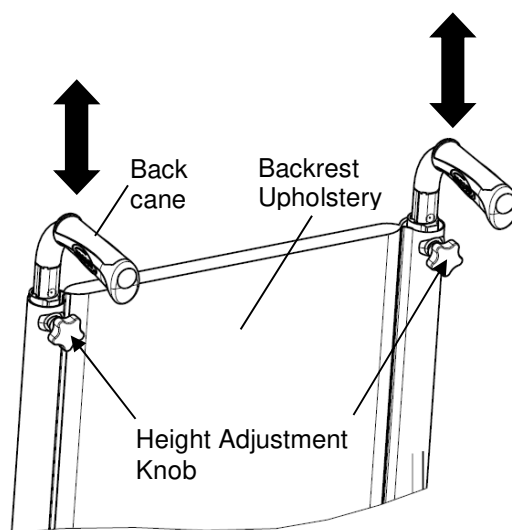
*NOTE: For this procedure, refer to FIGURE 4.4.*

1. Loosen, but DO NOT remove, the height adjustment knobs.
2. Reposition the back canes to the desired height.

*NOTE: Both back canes should be adjusted to the same height.*

*NOTE: DO NOT raise push handles to maximum height when tilting the chair.*

3. Tighten the height adjustment knobs.



**FIGURE 4.4** Adjusting the Height Adjustable Backrest cane

## Adjusting the Angle Adjustable Backrest

*NOTE: For this procedure, refer to FIGURE 4.5, next page.*

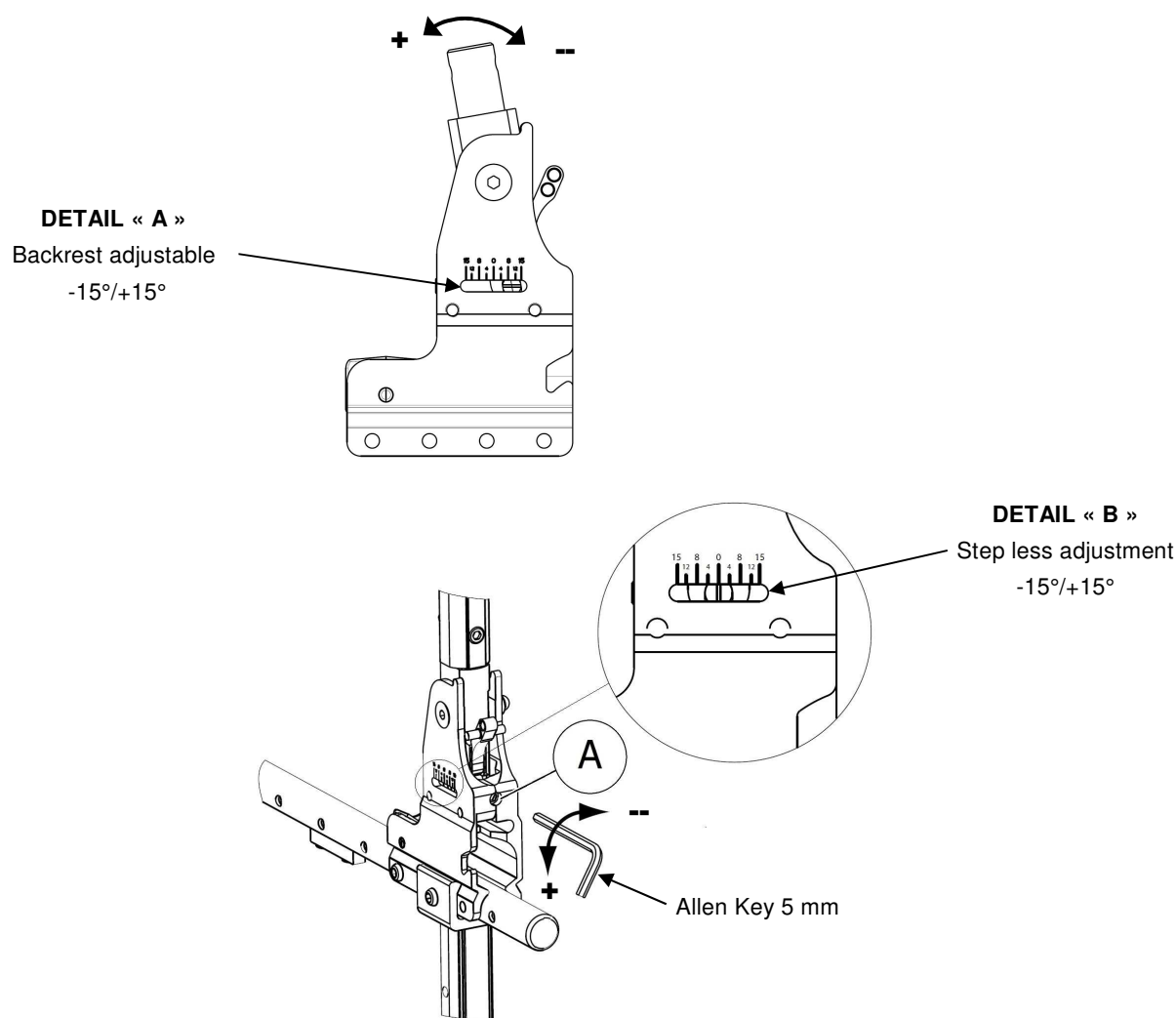
*NOTE: This procedure applies to adjustable angle backs only (refer to detail "A").*

*NOTE: The backrest angle adjusts from -15° to +15° (step less).*

1. Adjust the back angle thanks to the adjustable screw "A".
2. Turn Allen key (5 mm) clockwise to obtain a negative angle.
3. Alternatively, turn Allen key (5 mm) under clockwise to obtain a positive angle.
4. Ensure both adjustment to the desired angle are equal on each side of the Back Cane Bracket. Refer to Detail "B" of FIGURE 4.5

*NOTE: Both backrest angle should be set to the same position.*





**FIGURE 4.5** Adjusting the Angle Adjustable Backrest

## Removing/Installing different type of Backrests

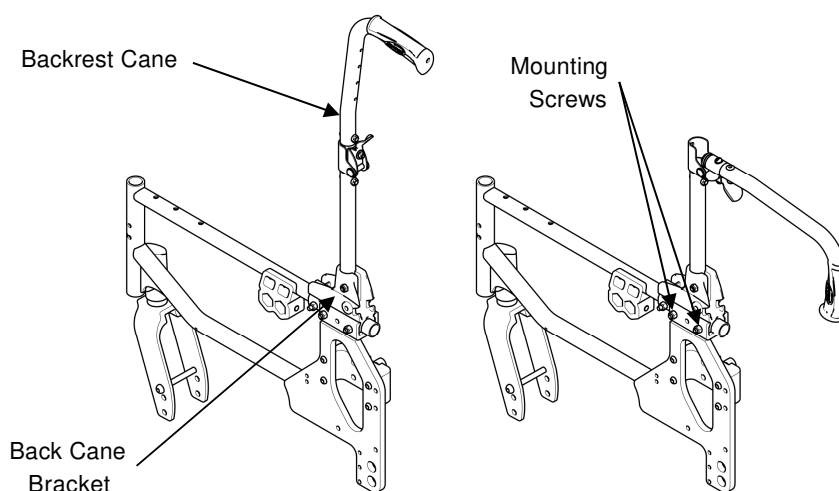
*NOTE: For this procedure, refer to FIGURE 4.6, next page.*

### Folding backrest

*NOTE: To Install the Fixed/Folding backrest, reverse this procedure from STEP 3 to 1.*

1. Remove the back-cane bracket. Refer to Removing Back Cane Bracket paragraph.
2. Pull up on the seat upholstery.
3. Remove the two mounting screws and locknuts (M6) that secure the back-cane bracket to the wheelchair frame.
4. Install the new set including the appropriate backrest upholstery

*NOTE: Both back canes should be set to the same adjustment hole.*



**FIGURE 4.6** Fixed/Folding Backrests

## Removing/Installing different type of Backrests

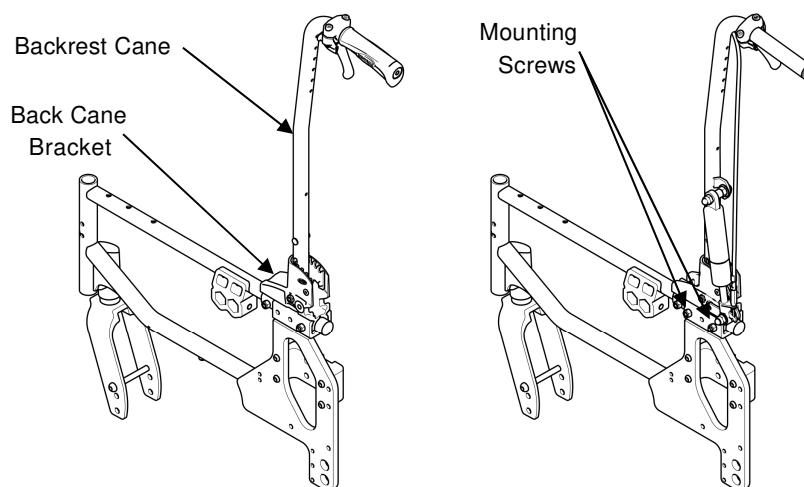
### Recliner backrest (Mechanical and Gas strut versions)

*NOTE: For this procedure, refer to FIGURE 4.7.*

*To Install the Recliner backrest, reverse this procedure from STEP 1 to 3.*

1. Remove the back-cane bracket. Refer to Removing Back Cane Bracket paragraph.
2. Pull up on the seat upholstery.
3. Remove the two mounting screws and locknuts that secure the back-cane bracket to the wheelchair frame.
4. Install the new set including the appropriate backrest upholstery

*NOTE: Both back canes should be set to the same adjustment hole.*



**FIGURE 4.7** Recliner Backrests

## Removing/Installing different type of Backrests

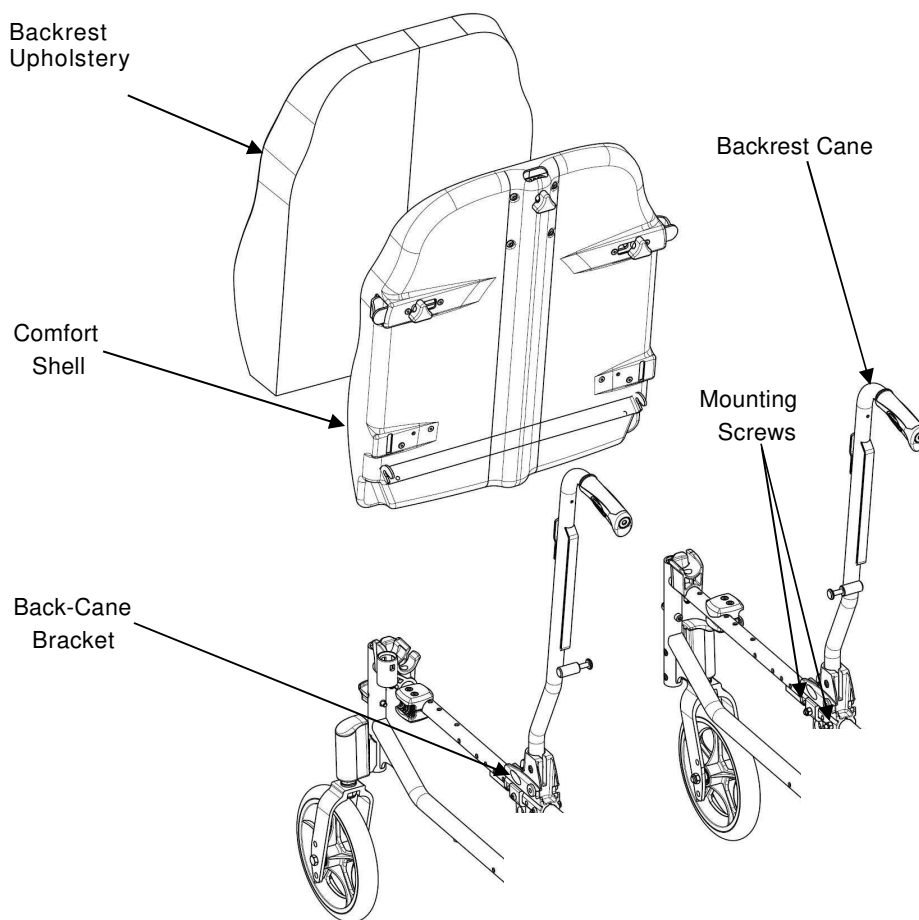
### Comfort backrest (Mechanical and Gas strut versions)

*NOTE: For this procedure, refer to FIGURE 4.8.*

*To Install the Comfort backrest, reverse this procedure from STEP 1 to 3.*

1. Remove the back-cane bracket. Refer to Removing Back Cane Bracket paragraph.
2. Pull up on the seat upholstery.
3. Remove the two mounting screws and locknuts that secure the back-cane bracket to the wheelchair frame.
4. Install the new set including the appropriate backrest upholstery and shell  
(Refer to user guide to lock and unlock the complete backrest upholstery)

*NOTE: Both back-canes should be set to the same adjustment hole.*



**FIGURE 4.8** Comfort Backrests

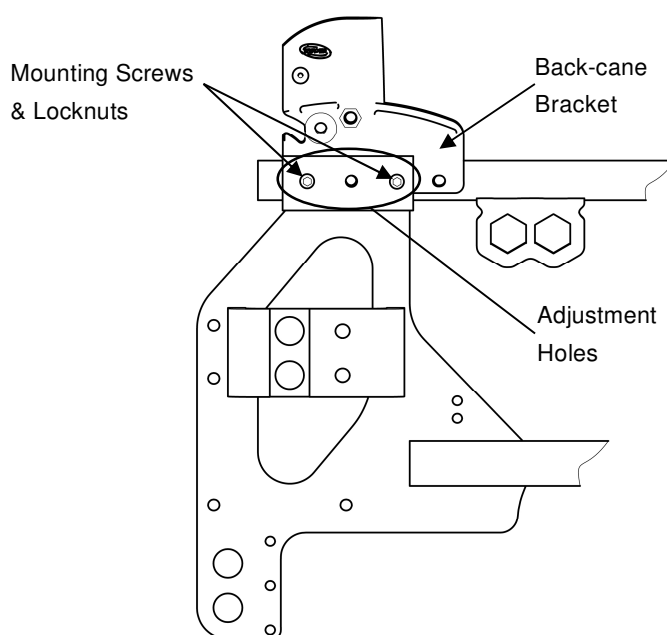
## Removing/Installing the Back-cane Bracket

*NOTE: For this procedure, refer to FIGURE 4.9.*

*NOTE: To install the back-cane bracket, reverse this procedure.*

1. Remove the back canes. Refer to Removing Back-canes paragraph.
2. Pull up on the seat upholstery.
3. Remove the two mounting screws and locknuts that secure the back-cane bracket to the wheelchair frame.
4. Remove the back-cane bracket by sliding it off the back of the wheelchair frame.
5. Install the new back-cane bracket by sliding it to the same adjustment holes on the bracket.

*NOTE: Both back-canes brackets should be set to the same adjustment holes.*



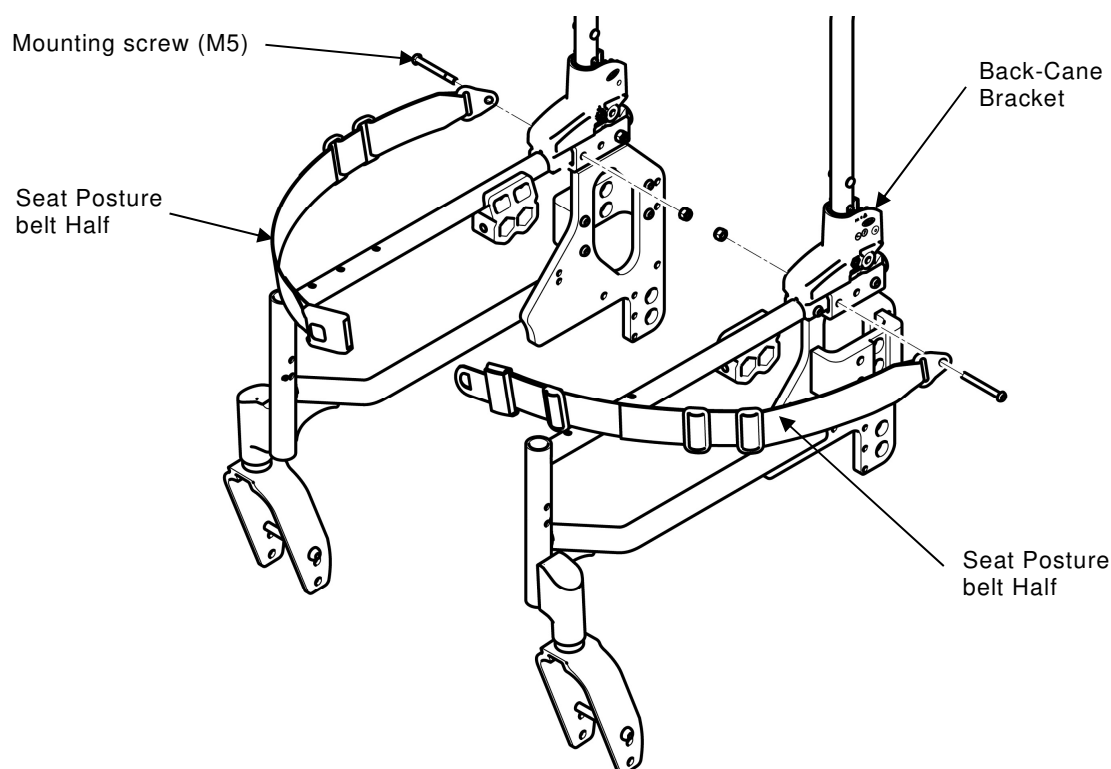
**FIGURE 4.9** Removing/Installing the Back-cane Bracket

## Installing/Removing Seat Posture Belt

*NOTE: For this procedure, refer to FIGURE 4.10.*

1. Remove seat cushion from wheelchair, if necessary.
2. Remove the mounting screw and locknut that secures the seat posture belt half to the back-cane bracket.
3. Repeat STEP 2 for opposite side, if necessary.
4. Do one of the following:
  - To install the seat posture belt, proceed to STEP 6.
  - Remove the existing seat posture belt from the wheelchair.
5. Engage the two halves of the new seat posture belt.
6. Align the mounting holes on the back-cane bracket and one end of the new seat posture belt.
7. Secure the new seat posture belt to the wheelchair frame with one mounting screw and washer. Tighten securely.
8. Repeat STEPS 6 and 7 for the opposite side of the seat posture belt.
9. Reinstall seat cushion onto wheelchair, if necessary.

*NOTE: Wheels, armrests and seat upholstery removed for clarity.*



**FIGURE 4.10** Installing/Removing Seat Posture Belt

## Installing/Removing the Back-brace

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### WARNING

**If a back brace is already installed, you don't have to re-install the back-cane inserts (for fixed backrest canes only).**

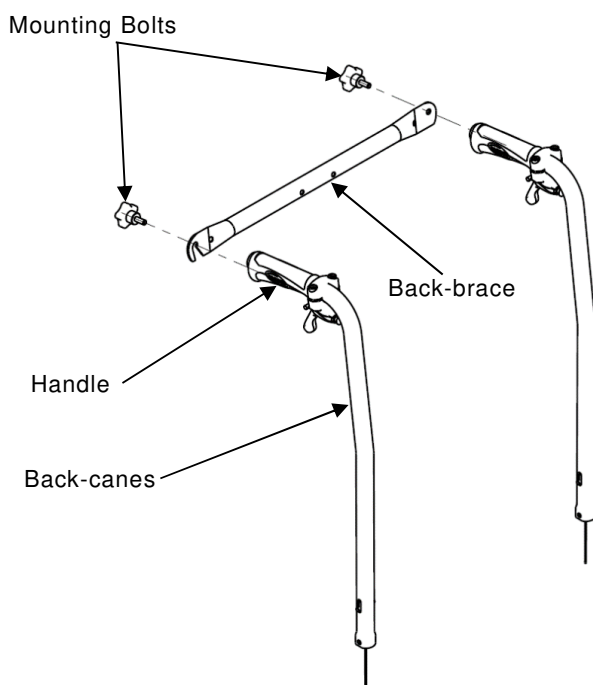
**After ANY adjustments, repair or service and before use, make sure all attaching hardware is fitted and tightened securely - otherwise injury or damage may occur.**

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*NOTE: For this procedure, refer to FIGURE 4.11.*

*NOTE: To remove the back-brace, reverse this procedure.*

1. Remove the end caps from the back-canes.
2. Remove the handles from the back-canes (Cut the handle lengthwise thanks to an appropriate sharp tool).
3. Install the inserts into the canes (fixed backrest canes only).
4. Secure the inserts with mounting screws (fixed backrest canes only).
5. Install the handles on the back canes (Previously, spray a solution of neutral alcohol inside the handle and settle it immediately on the back-cane).
6. Align the back-brace ends with the handles of the back-canes.
7. Secure the back-brace to the back-canes with the mounting bolts.



**FIGURE 4.11** Installing/Removing the Back-brace

## SECTION 5—REAR WHEELS/FRONT CASTORS

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### WARNING

The seat height, seat depth, back angle, seating system, size/position of the rear wheels, size/position of the front casters, seating options (e.g. headrest, back bag, ...) as well as the user condition directly relate to the stability of the wheelchair. Any change to one or any combination of the nine may cause the wheelchair to decrease in stability.

After ANY adjustments, repair or service and before use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.

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## Removing/Installing 22"/24" Rear Wheels

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### WARNING

If changing the size of the rear wheel or the seat-to-floor height, refer to the table in the next page.

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### Quick-Release Axles

*NOTE: For this procedure, refer to FIGURE 5.1.*

### Removing 22"/24" Rear Wheels

1. Hold the centre of the rear wheel and push in the tip of the quick release axle.
  2. Pull the quick release axle and rear wheel out of the axle bracket on the wheelchair frame.
  3. Push in the tip of the quick release axle again and pull the quick release axle out of the existing rear wheel.
  4. Install new/existing rear wheel onto the wheelchair.
- 

### WARNING

Make sure the detent pin and locking pins of the quick-release axle are fully released before operating the wheelchair.

The locking pins **MUST** be protruding past the inside of rear wheel hub for a positive lock.

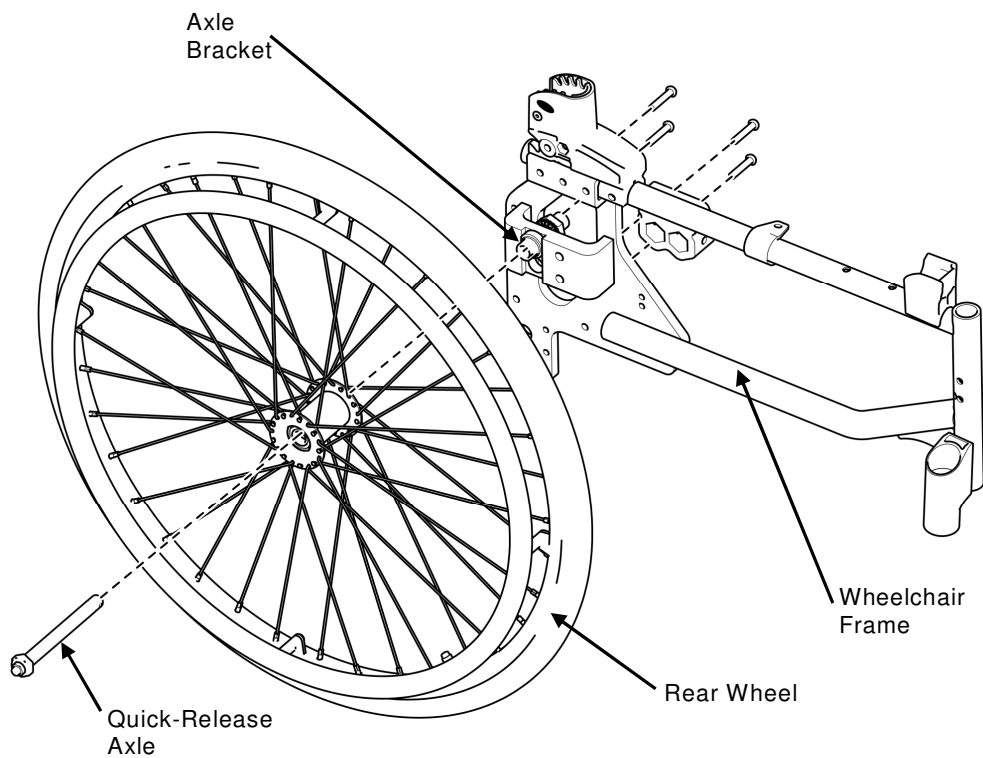
Keep locking pins clean.

Invacare recommends inserting quick-release axles with the head end to the inside of the wheelchair to prevent accidental release during contact leisure activities.

---

### Installing 22"/24" Rear Wheels

1. Install the existing quick release axle through the new/existing rear wheel.
2. Install the new/existing rear wheel and quick release axle into the axle bracket on the wheelchair frame.
3. Refer to Adjusting Quick Release Axles paragraph if the locking pins are not protruding past the inside of the axle bushing or there is too much movement of the rear wheel assembly in a back and forth position.



**FIGURE 5.1** Removing/Installing 22"/24" Rear Wheels



## Adjusting Quick-Release Axles

*NOTE: For this procedure, refer to FIGURE 5.2.*

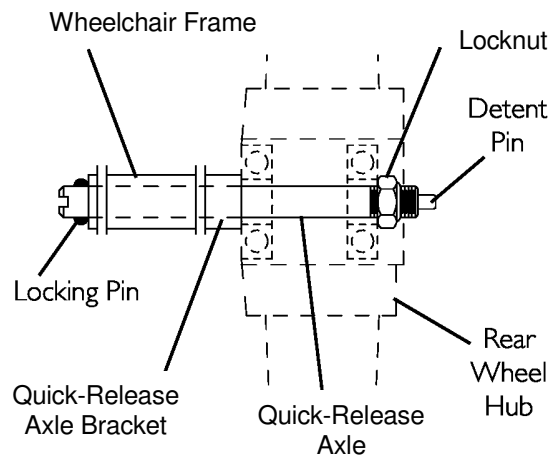
1. Remove rear wheel and quick release axle from the wheelchair. Refer to Removing/Installing Rear Wheels paragraph.
2. Depress detent pin in the quick release axle and slide the quick release axle through the rear wheel hub.
3. Release detent pin to ensure that the locking pins are fully released.
4. Increase or decrease end play by adjusting the locknut on the end of the quick release axle.



### WARNING

**Make sure the detent pin of the quick release axle is fully released BEFORE operating the wheelchair.**  
**Keep locking pins clean.**

5. Reinstall rear wheel onto the wheelchair. Refer to Removing/Installing Rear Wheels paragraph.
6. Repeat STEPS 4-5 until the quick release axle detent pins are fully released past the wheelchair frame.



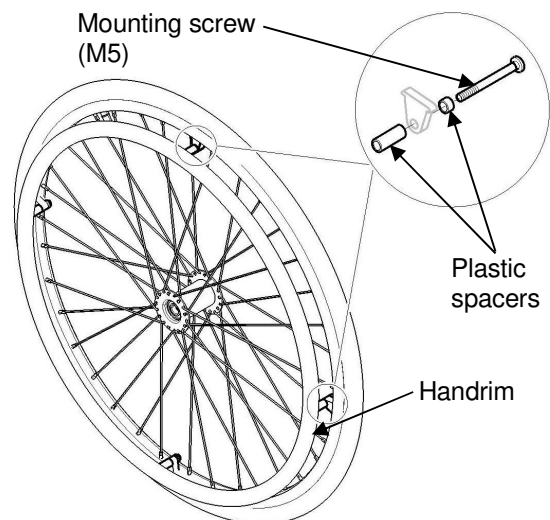
**FIGURE 5.2** Adjusting Quick-Release Axles

## Replacing Handrims

*NOTE: for this procedure, refer to FIGURE 5.3.*

*NOTE: To replace the handrim, use 8 new mounting pre-glued screws (M5).*

1. Remove the rear wheel from the wheelchair. Refer to Removing/Installing Rear Wheels paragraph.
2. Remove the mounting screws that secure the existing handrim to the rear wheel.
3. Remove the existing handrim.
4. Install the new handrim and secure to the rear wheel with the new mounting pre-glued screws (M5).
5. The space between the rim and handrim can be adjusted thanks to the different length of the plastic spacers.
6. Reinstall the wheel to the wheelchair. Refer to section 5, page 23.
7. Repeat STEPS 1~6 for opposite side.



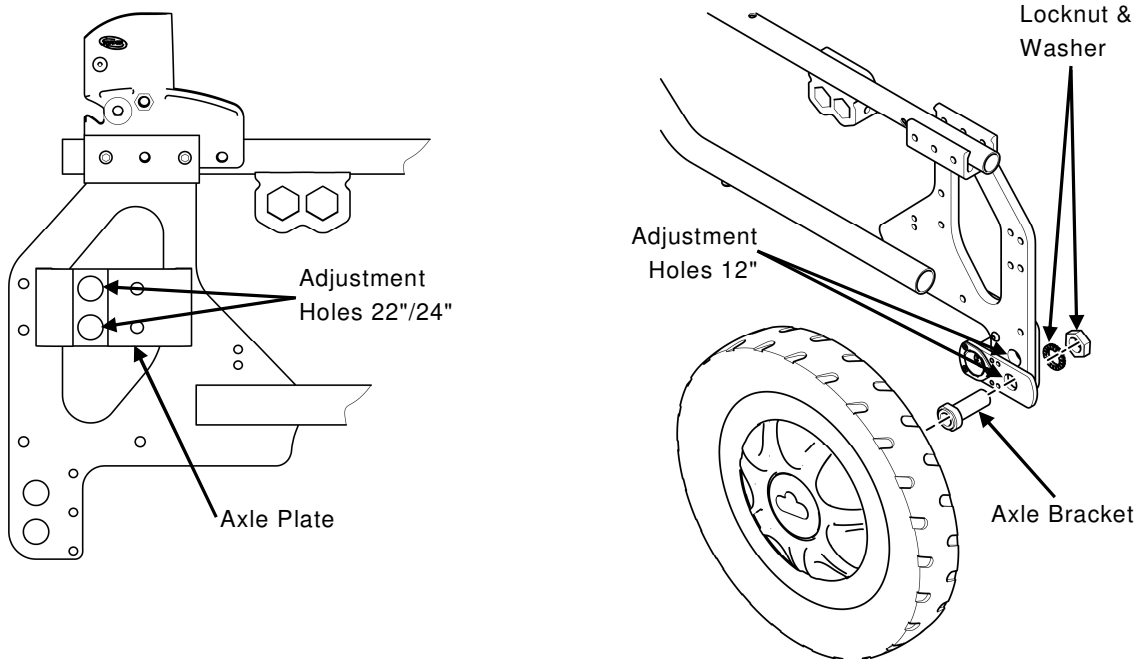
**FIGURE 5.3** Replacing Handrims

## Adjusting Rear Wheel Height

*NOTE: For this procedure, refer to FIGURE 5.4.*

1. Remove the rear wheel. Refer to Removing/Installing Rear Wheels paragraph.
2. Remove the locknut and washer that secures the axle bracket to the axle plate (if needed).
3. Align the axle bracket with one of the two adjustment holes on the axle plate.
4. Secure the axle bracket to the axle plate, at the desired height, with the locknut and washer (if needed).
5. Install the rear wheel. Refer to Removing/Installing Rear Wheels paragraph.
6. Repeat STEPS 1 to 5 for the other rear wheel.

*NOTE: Both rear wheels should be set at the same position.*



**FIGURE 5.4** Adjusting Rear Wheel Height

## Replacing/Repairing Rear Wheel & Front Caster Tire/Tube



### CAUTION

As with any vehicle, the wheels and tires should be checked periodically for cracks and wear and should be replaced when necessary.

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## Adjusting Fork Rotation



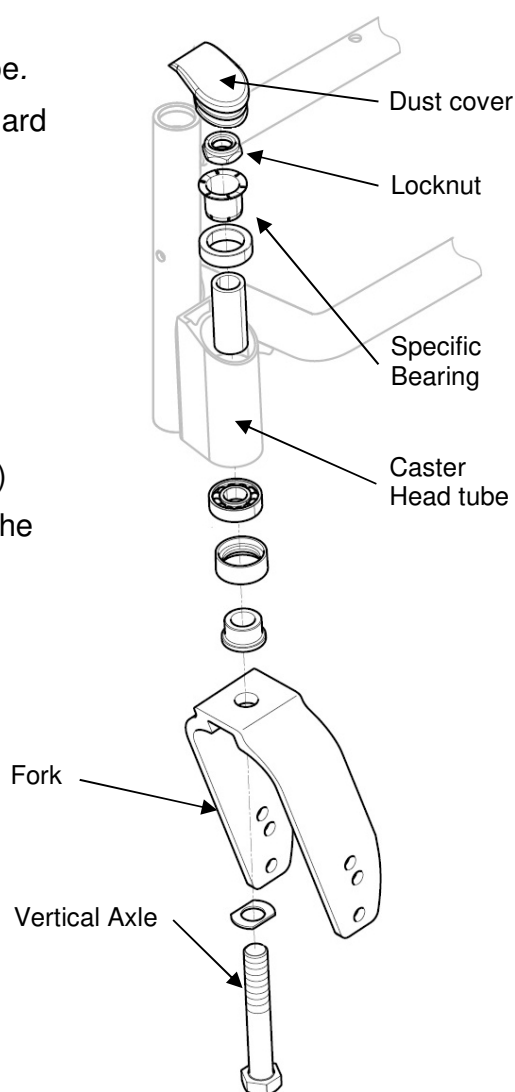
### WARNING

Caster angle vertical axis **MUST** be at  $90^{\circ} \pm 1^{\circ}$  from the ground, if not a flatter risk may occur. Both caster assemblies should be at the same angle.

After **ANY** adjustments, before use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.

*NOTE: For this procedure, refer to FIGURE 5.5.*

1. Remove the dust cover from the caster head tube.
2. To properly tighten castor journal system and guard against flutter, perform the following check:
  - A. Tip back the wheelchair to floor.
  - B. Pivot caster fork assemblies in rear position
  - C. Push caster to initiate clockwise movement
  - D. Let caster fork assembly rotate freely, if not change the upper specific bearing.
3. Adjust locknuts to appropriate torque (15/20 Nm) with a 19 mm socket wrench; do not over tight the locknut, you may risk damaging the bearings.
4. Test wheelchair for manoeuvrability.
5. Snap dust cover into the caster head tube.
6. Perform STEPS 1 to 5 on the other side.



**FIGURE 5.5** Adjusting Fork Rotation

## Removing/Installing/Repositioning the Caster Assemblies

*NOTE: If replacing a front caster note the mounting position of the existing front caster for installation of the new front caster.*

*NOTE: If repositioning front casters or replacing the existing front caster with a caster of a different size, refer to Changing Front Seat-to-Floor Height paragraph to determine the front caster position needed for the required front seat-to-floor height.*

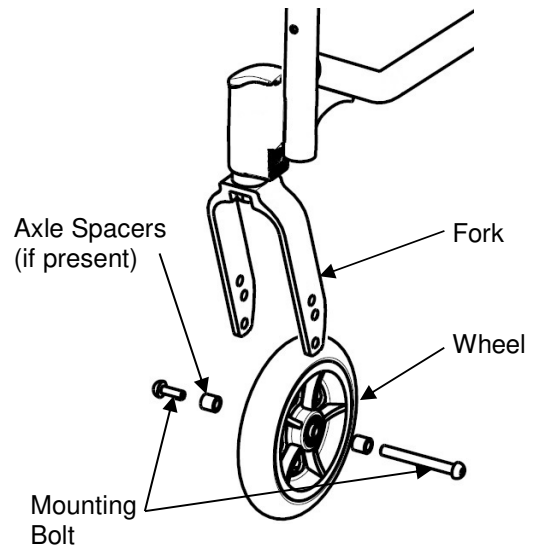
*NOTE: Both front casters MUST be the same size and adjusted to the same height. For this procedure, refer to FIGURE 5.6.*

### Removing Front Wheel

1. Remove the mounting bolt (5 mm Allen key), axle spacers (if present) that secure the front wheel to the fork.
2. Remove the wheel from the fork.

### Installing Front Wheel

1. Using the mounting bolt (5 mm Allen key), axle spacers (if present), secure the wheel to the desired wheel mounting position.
2. Ensure fork stem is perpendicular to the flat surface.



**FIGURE 5.6** Removing/Installing/Repositioning the front wheel

## SECTION 6—SEAT-TO-FLOOR HEIGHT

### WARNING

After ANY adjustments, repair or service and before use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.

## Measuring Seat-to-Floor Height

*NOTE: For this procedure, refer to FIGURE 6.1.*

*NOTE: All measurements are in millimetres. The front and rear seat-to-floor heights are approximate to 6.5 mm due to tire wear and air pressure.*

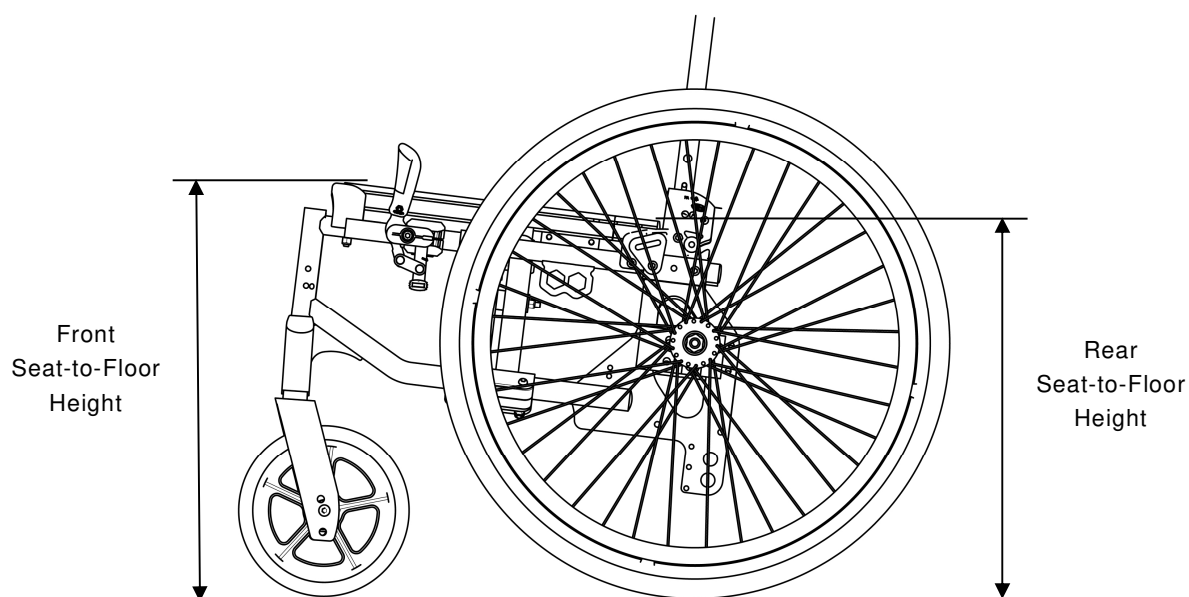
### Measuring Front Seat-to-Floor Height

Front Seat-to-Floor Height: Measure the distance between the front of the seat upholstery and the ground/floor.

### Measuring Rear Seat-to-Floor Height

*NOTE: The rear seat-to-floor heights are based on pneumatic tires and pneumatic tires with flat free inserts. If wheelchair is equipped with urethane tires, subtract 6.5 mm from the measurement.*

Rear Seat-to-Floor Height: Measure distance between the rear of the seat upholstery and the ground/floor.



**FIGURE 6.1** Seat-to-Floor Height

## Changing Seat-to-Floor Height

### WARNING

The seat height, seat depth, back angle, seating system, size/position of the rear wheels, size/position of the front castors, seating options (e.g. headrest, back bag, ...) as well as the user condition directly relate to the stability of the wheelchair. Any change to one or any combination of these factors changes the centre of gravity and may cause the wheelchair to increase/decrease in stability. Refer table on page 6.

**Always check castor vertical axis is to 90° +/-1° from the ground.**

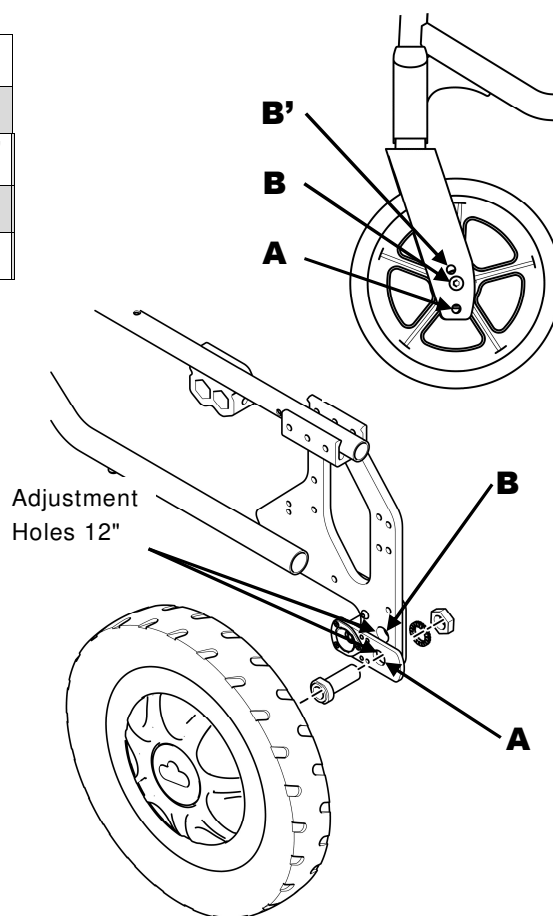
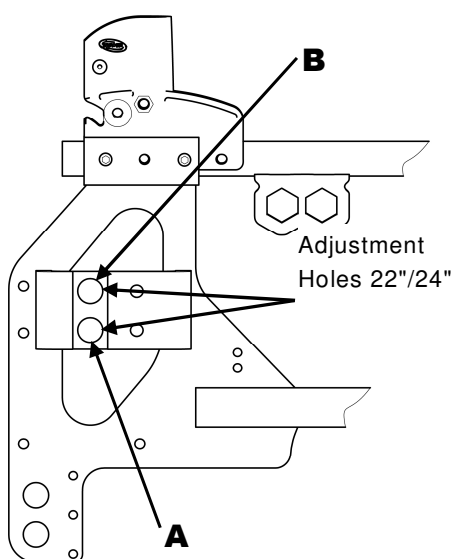
*NOTE: For this procedure, refer to the table to determine adjustment(s) necessary to achieve desired front seat to floor height.*

*NOTE: To obtain the desired front seat to floor height, it will be necessary to perform one or both following:*

- Changing the castor size and/or mounting position on the fork, and/or seat angle. Refer to Removing/Installing/Repositioning the Castor Assemblies paragraph.
- Changing the rear height positioning. Refer to Adjusting Rear Wheel Height paragraph.

### CHANGING SEAT-TO-FLOOR HEIGHT

SEAT ANGLE 3°	FRONT CASTOR		REAR WHEEL		
SEAT HEIGHT					
	8"	7" Junior	12"	24"	22"
485 mm	A		A	A	
460 mm	B	B'	B	B	B



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## SECTION 7—WHEEL BRAKES

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### WARNING

After **ANY** adjustments, repair or service and **BEFORE** use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur. Ensure that the clamp assembly is well positioned in its frame located position.

---

### Adjusting Wheel Brakes

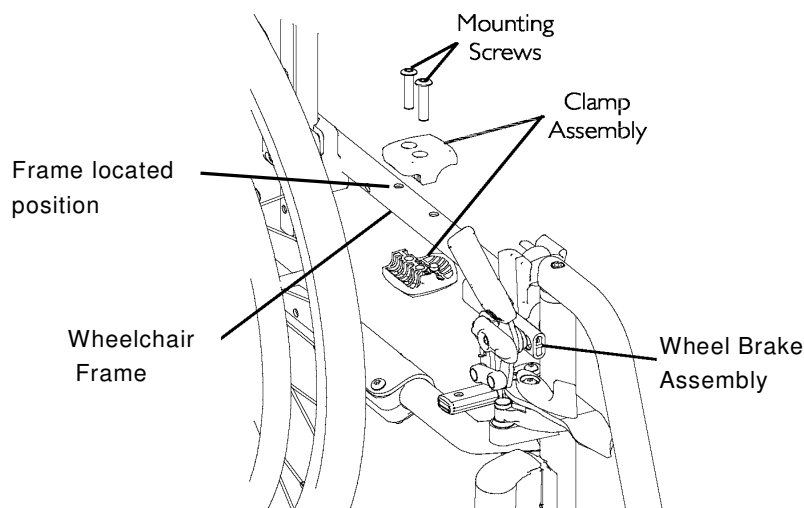
*NOTE: When changing the position of the rear wheels, the wheel brakes **MUST** be repositioned.*

*NOTE: Before adjusting or replacing the wheel brake assemblies, ensure that the tires are inflated to the recommended BAR, KPa, P.S.I on the side wall of the tire.*

### Adjusting Wheel Brake Position

*NOTE: For this procedure, refer to FIGURE 7.1.*

1. Remove the two mounting screws that secures the wheel brake assembly to the wheelchair frame.
2. Remove the wheel brake assembly from the clamp assembly.
3. Move the clamp assembly (if necessary) to the other wheel brake position on the wheelchair frame.
4. Install the wheel brake assembly into the clamp assembly.
5. Secure the wheel brake assembly to the wheelchair frame with the two mounting screws.
6. Repeat STEPS 1 to 6 for the other wheel brake assembly.

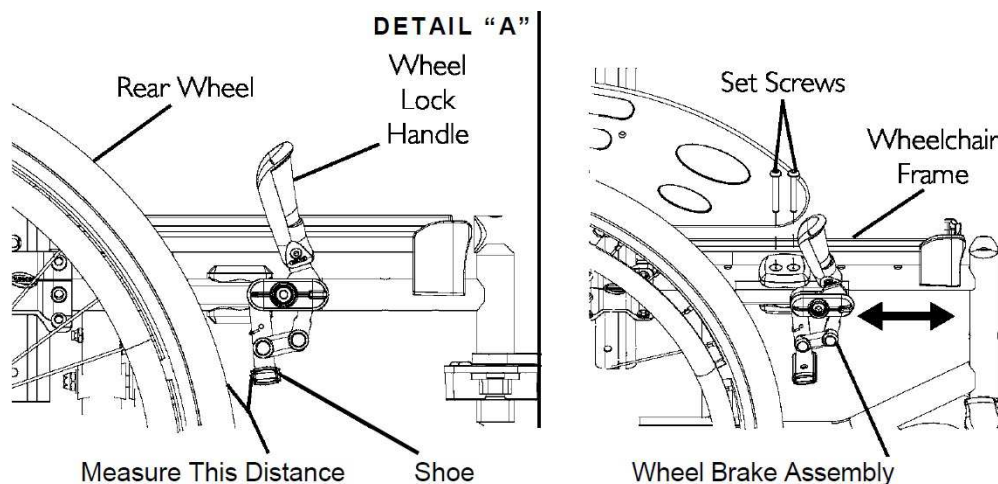


**FIGURE 7.1** Adjusting Wheel Brakes - Adjusting Wheel Brake Position

## Adjusting Wheel Brake Tension

*NOTE: For this procedure, refer to FIGURE 7.2.*

1. Loosen, but DO NOT remove the two set screws (Detail –A–) that secure the wheel brake assembly to the wheelchair frame.
2. Measure the distance between the wheel brake shoe and the rear wheel.
3. Slide the wheel lock along the wheelchair frame until the measurement is 4 mm for solid tire and for pneumatic.
4. Securely tighten the two set screws (Detail –A–).
5. Repeat STEPS 1-4 for the opposite wheel brake.
6. Engage the wheel brakes and push against the wheelchair to determine if the wheel brakes engage the rear wheels enough to hold the occupied wheelchair.
7. Repeat STEPS 1-6 until the wheel brakes engage the rear wheels enough to hold the occupied wheelchair.

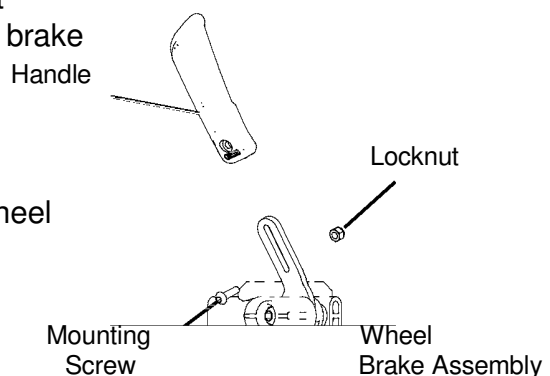


**FIGURE 7.2** Adjusting Wheel Brakes- Adjusting Wheel Brake Tension

## Replacing Wheel Brake Handle

*NOTE: For this procedure, refer to FIGURE 7.3.*

1. Remove the mounting screw and locknut that secures the wheel brake handle to the wheel brake assembly.
2. Remove the wheel brake handle and discard.
3. Align the new wheel brake handle with the wheel brake assembly.
4. Secure the new wheel brake handle with the mounting screw and locknut.
5. If necessary, repeat STEPS 1 to 4 for the other wheel brake.



**FIGURE 7.3** Replacing Wheel Brake Handle



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## Installing/Adjusting Headrest

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### WARNING

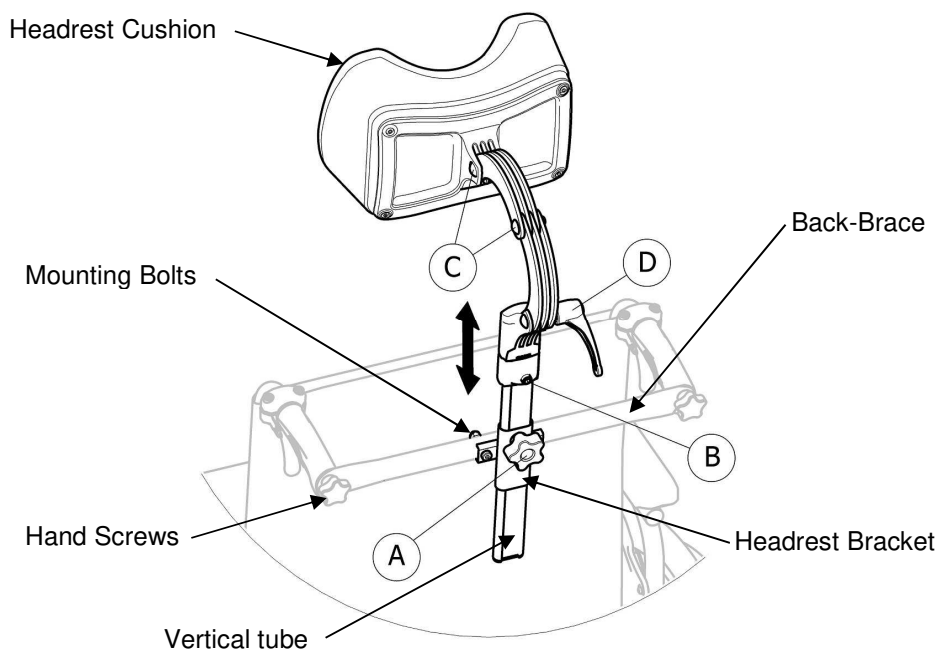
**After ANY adjustments, repair or service and before use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.**

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### Installing Headrest

*NOTE: For this procedure, refer to FIGURE 8.1.*

1. Install the back brace. Refer to Installing removing the back-brace paragraph.
2. Set the Headrest bracket (mounting bolts, headrest bracket and the hand wheel A) in the fixing holes on the back-brace tube.
3. Introduce the vertical tube that support the headrest cushion into the headrest bracket.
4. Adjust to the appropriate height position with the user sat into the chair, tighten the hand wheel A.
5. Adjust the headrest cushion (depth and angle position) and tighten securely the screws C and the handle D.



**FIGURE 8.1** Installing Headrest

## SECTION 9—ANTI-TIPPERS

### WARNING

After ANY adjustments, repair or service and BEFORE use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.

Anti-tippers **MUST** be attached always. Since the anti-tippers are an option on this wheelchair (you may order it with or without the anti-tippers), Invacare strongly recommends ordering the anti-tippers as an additional safeguard for the wheelchair user.

Anti-tippers **MUST** be fully engaged and release buttons fully protruding out of adjustment holes.

Ensure both anti-tippers are adjusted to the same mounting hole.

## Installing/Adjusting Anti-Tippers with Tipping Aid

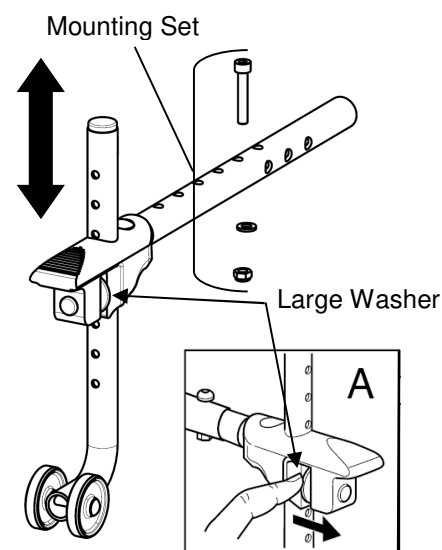
### Installing Anti-Tippers with Tipping Aid

*NOTE: For this procedure, refer to FIGURE 9.1.*

1. Insert anti-tippers with the anti-tipper wheels pointing toward ground/floor into the rear frame tubing until anti-tippers vertical hole appear in the frame vertical hole.
2. Secure the anti-tippers with the mounting set (screw, washer and locking nut) to the wheel chair frame.
3. Measure the distance between the bottom of the anti-tipper wheels and the ground/floor.

*NOTE: A 30 to 50 mm clearance between the bottom of the anti-tipper wheels and the ground/floor **MUST** be maintained always.*

4. If the distance between the bottom of anti-tipper wheels and the ground/floor is not 30 to 50 mm, adjust anti-tippers by push down the large washer (refer to detail "A").



**FIGURE 9.1**  
Installing Anti-Tippers with  
Tipping Aid

## Adjusting Anti-Tippers

*NOTE: For this procedure, refer to FIGURE 9.2.*

### WARNING

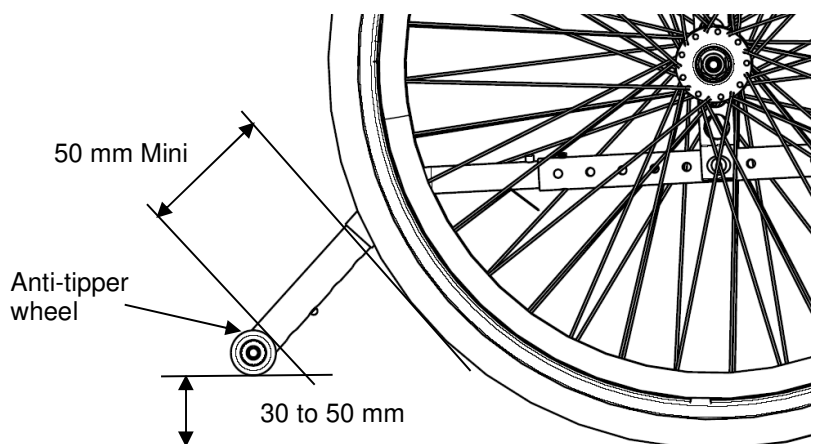
When anti-tippers are used, anti-tippers **MUST** be adjusted to maintain a 30 to 50 mm clearance between the bottom of the anti-tipper wheels and the ground/ floor. This spacing should always be checked whenever adjustments/changes are made to the wheelchair.

Make sure that the anti-tipper wheel is **ALWAYS** located outside the rear wheel volume.

Failure to maintain proper spacing may result in the chair tipping over backward causing serious injury or property damage

1. Press the release buttons on the wheeled portion of the anti-tipper and slide it up or down to achieve the 30 to 50 mm clearance.
2. Check to make sure that the release buttons are fully engaged in adjustment holes.

*NOTE: Make sure that the anti-tipper wheel is ALWAYS located outside the rear wheel volume (50 mm Minimum); refer to FIGURE 9.2.*



**FIGURE 9.2** Adjusting Anti-Tippers

## SECTION 10—PERIODIC MAINTENANCE GUIDELINES

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*NOTE: Always clean the wheelchair before any inspection/adjustment. Regular cleaning will reveal loose or worn parts and enhance the smooth operation of the wheelchair.*

### **Initial Inspection:**

Initial adjustments should be made to suit the personal body structure needs and preferences of the user:

### **Inspect/Adjust Initially**

- ☐ Wheelchair rolls straight (no excessive drag or pull to one side).
- ☐ Ensure all hardware is tight (see page 5).
- ☐ All fasteners on clothing guards are secure.
- ☐ Armrests are secure but easy to release and locking systems engage properly.
- ☐ Adjustable height armrests operate and lock securely.
- ☐ Armrest armpad sits flush against arm tube.
- ☐ Seat and/or back upholstery have no rips.
- ☐ Inspect adjustable angle back attaching hardware is securely tightened.
- ☐ Ensure hand grips are secure to backrest canes.
- ☐ Sealed bearings and axle nut tension are correct.
- ☐ No excessive side movement or binding when rear wheels are lifted and spun.
- ☐ Quick-release axles lock properly (see page 25).
- ☐ Inspect handrims for signs of rough edges or peeling finish.
- ☐ Inspect for broken spokes.
- ☐ Wheel/fork assembly has proper tension when caster is spun. Caster should come to a gradual stop.
- ☐ Wheel bearings are clean and free of moisture.
- ☐ Loosen/tighten locknut if wheel wobbles noticeably or binds to a stop.
- ☐ Ensure all caster/wheel/fork/head tube fasteners are secure (see pages 5 & 27).
- ☐ Wheel brakes do not interfere with tires when rolling.
- ☐ Wheel brakes pivot point are free of wear and looseness.
- ☐ Wheel brakes are easy to engage.
- ☐ Inspect tires/casters for flat spots and wear.
- ☐ Check pneumatic tires for proper inflation (recommended tire pressure is listed on the side wall of the tire).
- ☐ Ensure axles are free from dirt, lint, etc.
- ☐ Ensure roller bearings are free from dirt, lint, etc.
- ☐ Adjust wheel brakes as tires wear.
- ☐ Clean and wax all parts.
- ☐ Clean upholstery and armrests.
- ☐ Ensure casters are free of debris.

### **Inspect/Adjust Weekly**

- ☐ Wheelchair rolls straight (no excessive drag or pull to one side).
- ☐ Quick-release axles lock properly (see page 25).
- ☐ Inspect for broken spokes. Adjustment/replacement.
- ☐ Wheel/fork assembly has proper tension when caster is spun. Caster should come to a gradual stop.
- ☐ Inspect tires/casters for flat spots and wear.
- ☐ Check pneumatic tires for proper inflation (recommended tire pressure is listed on the side wall of the tire).
- ☐ Ensure casters are free of debris.

### **Inspect/Adjust Monthly**

- ☐ Inspect seat posture strap for any signs of wear. Ensure buckle latches. Verify hardware that attaches strap to frame is secure and undamaged. Replace if necessary.
- ☐ Loosen/tighten locknut if wheel wobbles noticeably or binds to a stop.
- ☐ Wheel bearings are clean and free of moisture.
- ☐ Wheel brakes do not interfere with tires when rolling.
- ☐ Wheel brake pivot point are free of wear and looseness.
- ☐ Ensure all caster/wheel/fork/head tube fasteners are secure (see pages 5 & 27).
- ☐ Ensure all hardware is tight (see page 5).
- ☐ Ensure hand grips are secure to backrest canes.
- ☐ Ensure casters are free of debris.

### **Inspect/Adjust every twelve months (1)**

- ☐ Wheelchair rolls straight (no excessive drag or pull to one side).
- ☐ Armrests are secure but easy to release and locking systems engage properly.
- ☐ Adjustable height armrests operate and lock securely.
- ☐ Armrest armpad sits flush against arm tube.
- ☐ All fasteners on clothing guards are secure.
- ☐ Seat and/or back upholstery have no rips.
- ☐ Inspect the backrest attaching hardware and mechanisms are securely tightened.
- ☐ No excessive side movement or binding when rear wheels are lifted and spun.
- ☐ Inspect handrims for signs of rough edges or peeling finish.
- ☐ Inspect side frame and cross brace for signs of cracks, flaked paint or deformed metal work.
- ☐ Inspect tires/casters for flat spots and wear.
- ☐ Check pneumatic tires for proper inflation (recommended tire pressure is listed on the side wall of the tire).

### **Inspect/Adjust every twelve months (2)**

- ☐ Wheel brake pivot point are free of wear and looseness.
- ☐ Clean upholstery and armrests.
- ☐ Sealed bearings and axle nut tension are correct.
- ☐ Wheel/fork assembly has proper tension when caster is spun. Caster should come to a gradual stop.
- ☐ Loosen/tighten locknut if wheel wobbles noticeably or binds to a stop.
- ☐ Wheel bearings are clean and free of moisture.
- ☐ Wheel brakes are easy to engage.
- ☐ Clean quick-release axles with a Teflon lubricant.
- ☐ Ensure axles are free from dirt, lint, etc.
- ☐ Ensure roller bearings are free from dirt, lint, etc.
- ☐ Adjust wheel brakes as tires wear.
- ☐ Clean and wax all parts.
- ☐ Ensure castors are free of debris.

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