

Invacare[®] Action^{®2} NG

SERVICE MANUAL

(MAINTENANCE AND ADJUSTMENT)

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

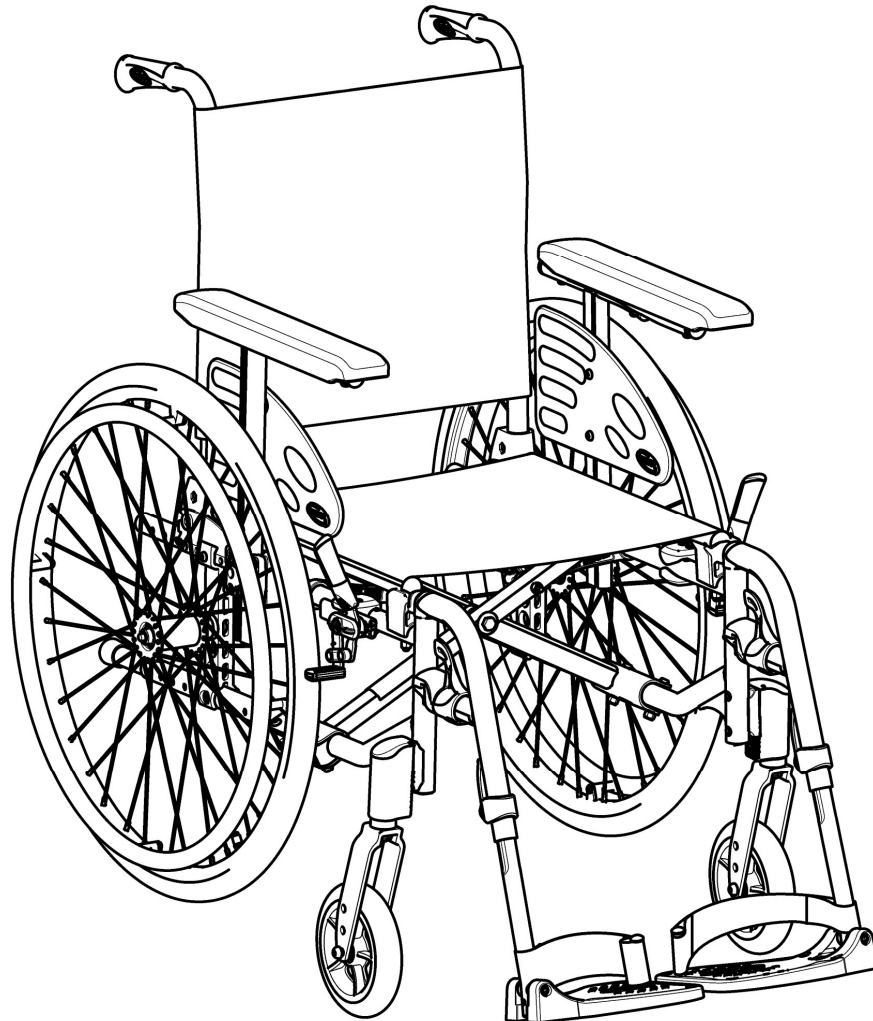


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SECTION 1 — TROUBLESHOOTING AND MAINTENANCE GUIDELINES

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 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

 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 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.

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 the nine 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
CASTOR POSITION											
SEAT HEIGHT	•	X	X	X	X	X	X	X	N/A	N/A	N/A
SEAT DEPTH	X	•	X	X	X	X	X	X	N/A	N/A	N/A
BACK ANGLE	X	X	•	X	X	X	X	X	N/A	N/A	N/A
SEATING SYSTEM/UPHOLSTERY	X	X	X	•	X	X	X	X	X	N/A	N/A
CASTOR SIZE	X	N/A	X	N/A	•	X	X	X	N/A	X	X
CASTOR POSITION	X	N/A	X	N/A	X	•	X	X	N/A	X	X
REAR WHEEL SIZE	X	N/A	X	N/A	X	X	•	X	N/A	X	X
REAR WHEEL POSITION	X	N/A	X	N/A	X	X	X	•	N/A	X	X
USER CONDITION	X	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 castor size/position and seat-to-floor angle.

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.

A 50 mm clearance between the bottom of the footplate and the ground/floor MUST be maintained at all times.

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 at all times.

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.

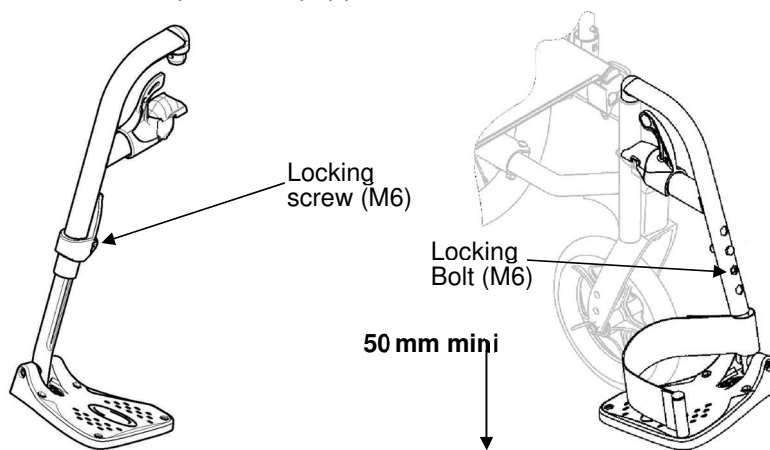


FIGURE 2.1 Adjusting Footrest Height

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).

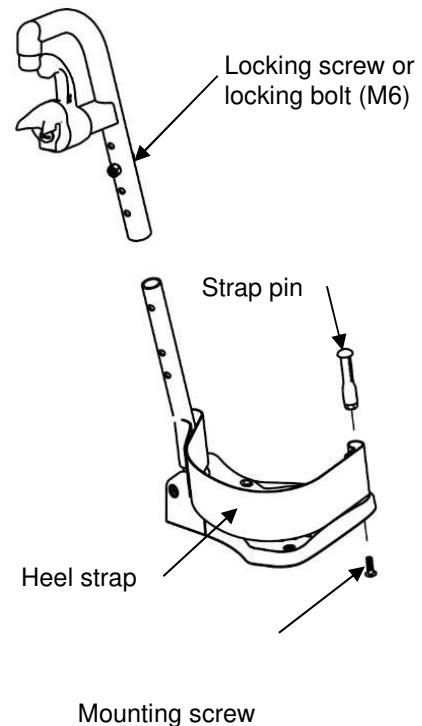


FIGURE 2.2 Replacing Heel Strap

Installing Angle Adjustable Footplate

NOTE: For this procedure, refer to FIGURE 2.4.

NOTE: This procedure is for individual Angle Adjustable Footrests 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.

3. Using the mounting screw, adjust to the desired angle (Tooth Plates) by rotating the footplate and depth by sliding the footplate into the tooth plates support.
4. Using the mounting screw (M6), secure the Angle Adjustable Footplate to the footrest tube. Securely tighten (12 Nm).
5. If necessary, repeat STEPS 1-4 to adjust remaining Angle Adjustable Footplate.

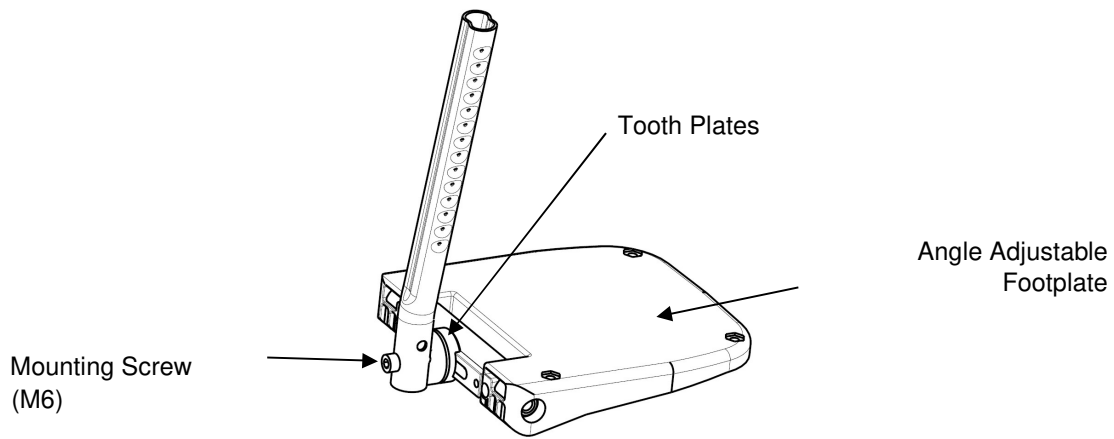


FIGURE 2.4 Installing Angle Adjustable Footplate

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

NOTE: For this procedure, refer to FIGURE 2.5.

Adjusting the Legrest Angle

There are nine pre-set positions available for angle adjustment.

1. Loosening the knob and pull it up with one hand while supporting the leg rest with your other hand.
2. Adjust into one of nine pre-set positions, downwards the knob into the desired position and firmly tighten the knob.
3. If necessary, repeat STEPS 1-2 to adjust remaining elevating legrest angle.

Adjusting the Footplate Height

1. Unscrew locking bolt (5 mm Allen key and 10 mm Spanner).
2. 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 at all times.

3. If the distance between the bottom of footplate and the ground/floor is not 50 mm minimum, adjust footrest tube accordingly.
4. Using the locking bolt with 5 mm Allen key and 10 mm Spanner, secure the footrest tube to the footrest support. Securely tighten (5 Nm).
5. If necessary, repeat STEPS 2-4 to adjust remaining footrest.

Adjusting Calf pad Depth

4. Remove the Locking Screw B that secure the calf pad to the calf pad bracket.
5. Insert Locking Screw B through one of three calf pad bracket mounting holes.
6. Using the Locking Screw B secure the calf pad to the calf pad bracket.
7. If necessary, repeat STEPS 1-3 to adjust remaining calf pad assembly.

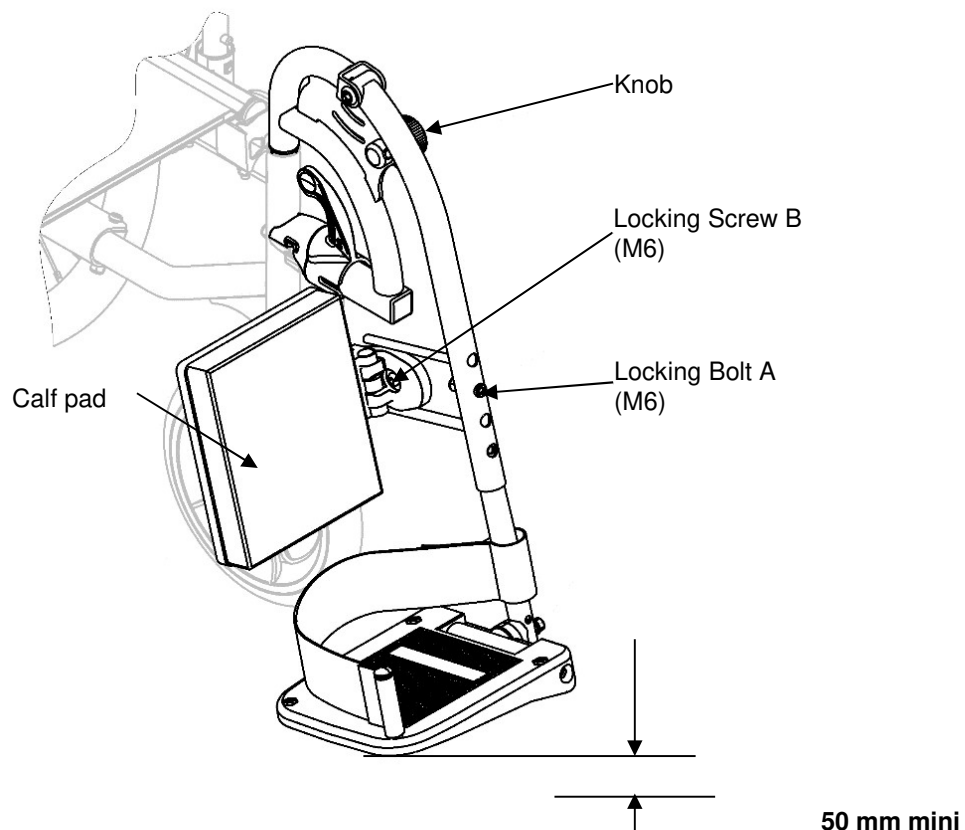


FIGURE 2.5 Adjusting Elevating Legrest Height and Calf pad Height/Depth

SECTION 3 — ARMRESTS



WARNING

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

Removing/Installing and Adjusting Removable Armrests (n°1)

NOTE: For this procedure, refer to FIGURE 3.1.

Removing/Installing removable armrest (n°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 (if so equipped).
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

NOTE: For this procedure, refer to FIGURE 3.1.

1. Remove the removable armrest. Refer to Removing/Installing removable armrest paragraph.
2. Loosen the screw B (M6) in the groove C of the armrest tube.
3. 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).
4. Tighten firmly the screw B (M6).
5. Perform the setting on both sides.
6. Reinstall the removable armrest. Refer to Removing/Installing removable armrest paragraph.

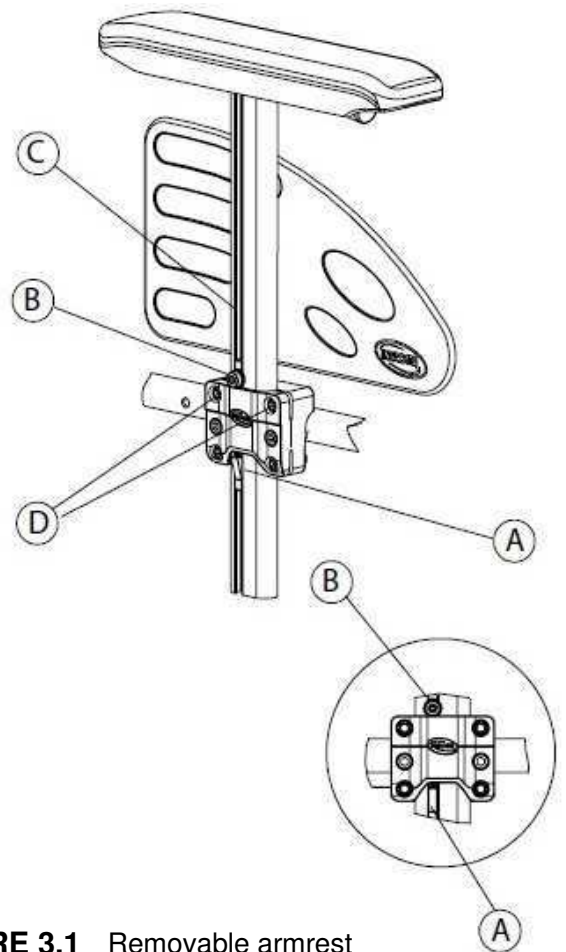


FIGURE 3.1 Removable armrest

Removing/Installing Swing Away Armrests (n° 2)

Removing/Installing Swing Away Armrest (n° 2)

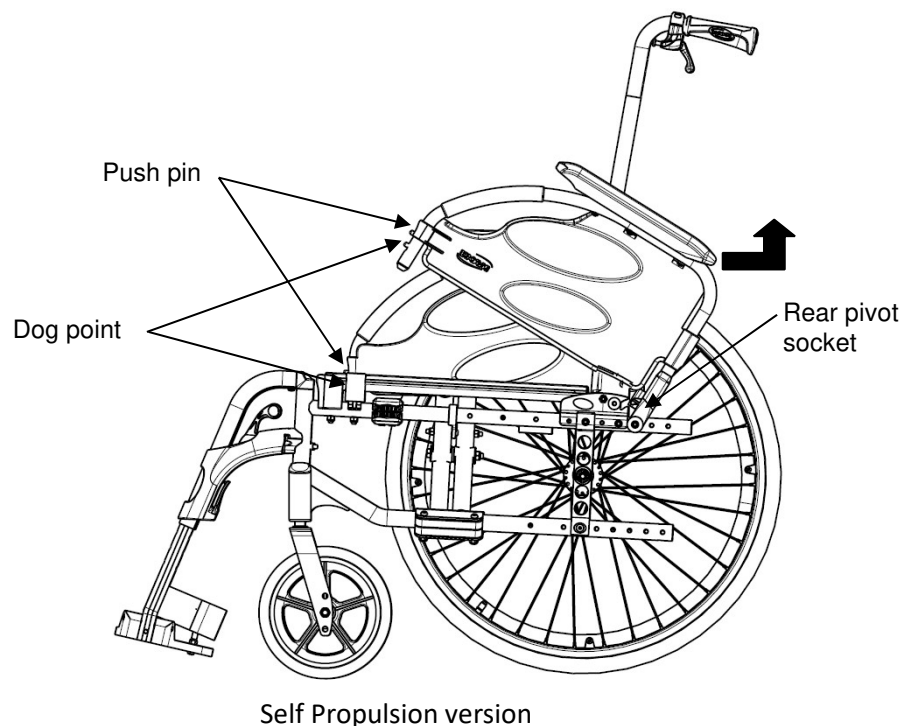
NOTE: For this procedure, refer to FIGURE 3.2.

Removing Swing Away Armrest

1. Unlock existing armrest assembly by operate the push pin.
2. Swing back on the existing armrest to remove from the front arm socket.
3. Pull up on the existing armrest to remove from the rear pivot socket.
4. Repeat STEPS 1-3 for opposite side of wheelchair, if necessary.

Installing Swing Away Armrest

1. If necessary, remove existing armrest assembly as describe above.
2. Install new/existing armrest assembly, first into the rear pivot socket and into the front arm socket.
3. Lock new/existing armrest assembly by operate the push pin.
Make sure that the dog point is properly engaged in its housing.
4. Repeat STEPS 1-3 for opposite side, if necessary.



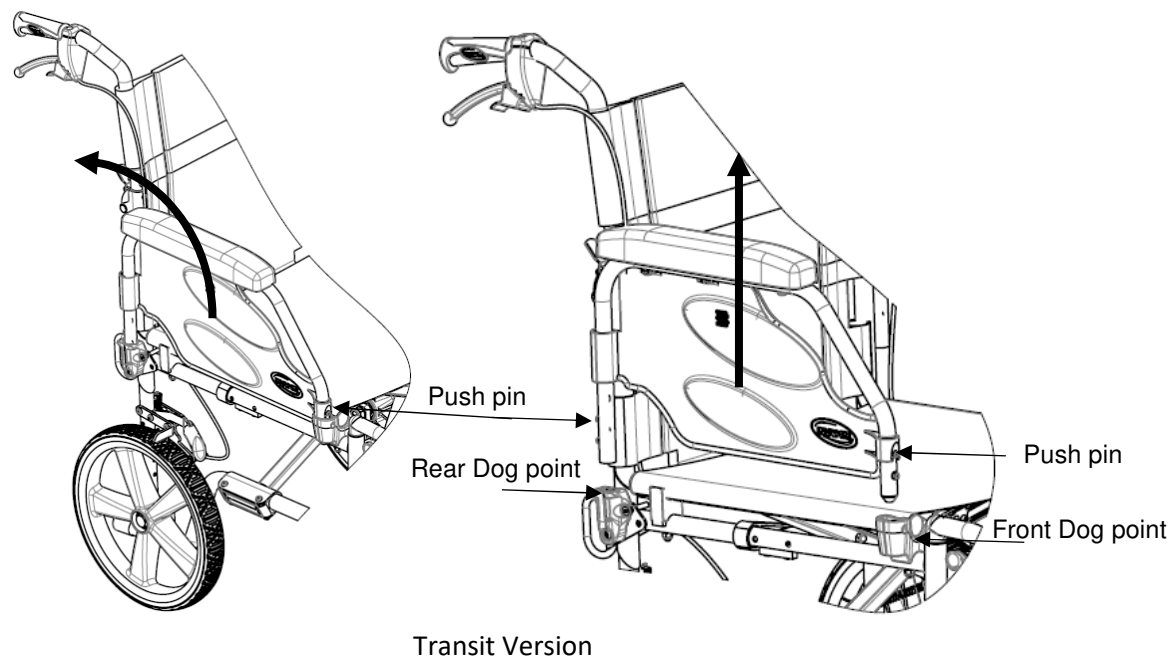
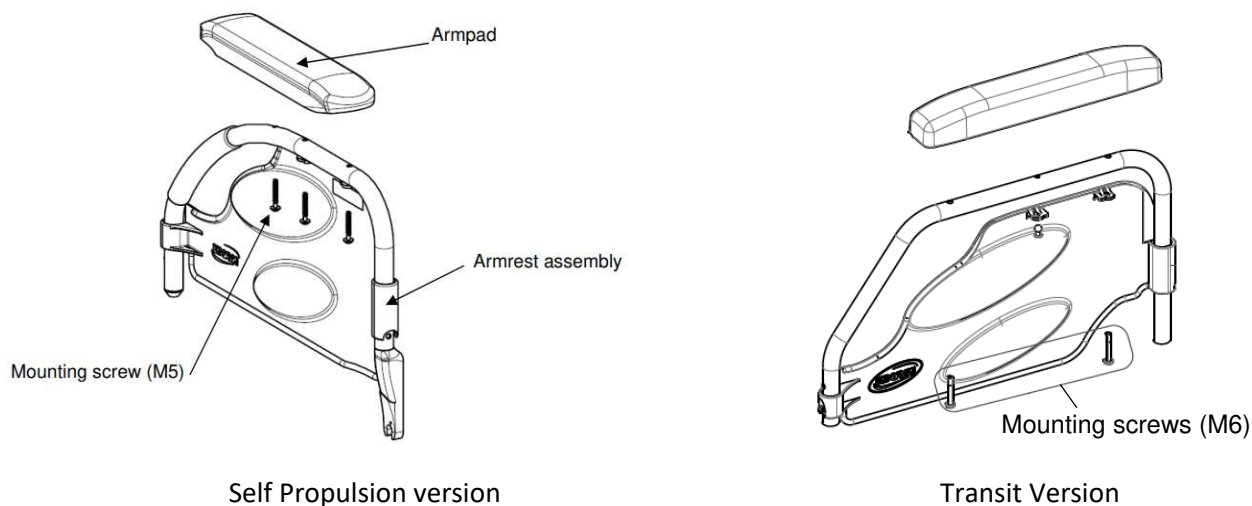


FIGURE 3.2 Removing/Installing Swing Away Armrest
SECTION 3—ARMRESTS

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.
3. **Repeat STEPS 1-2 for the opposite side if necessary.**



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.

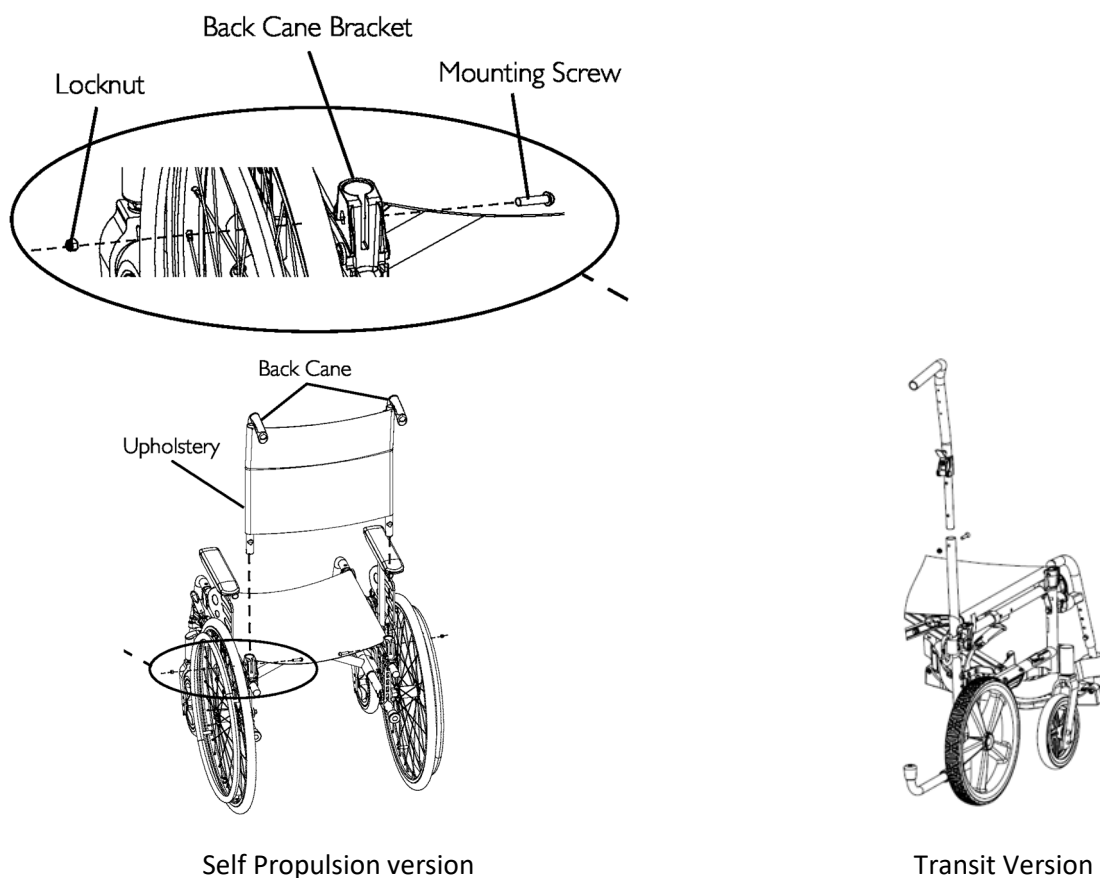


FIGURE 4.1 Removing Back-Canes

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.

SECTION 4—SEAT/BACK

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.

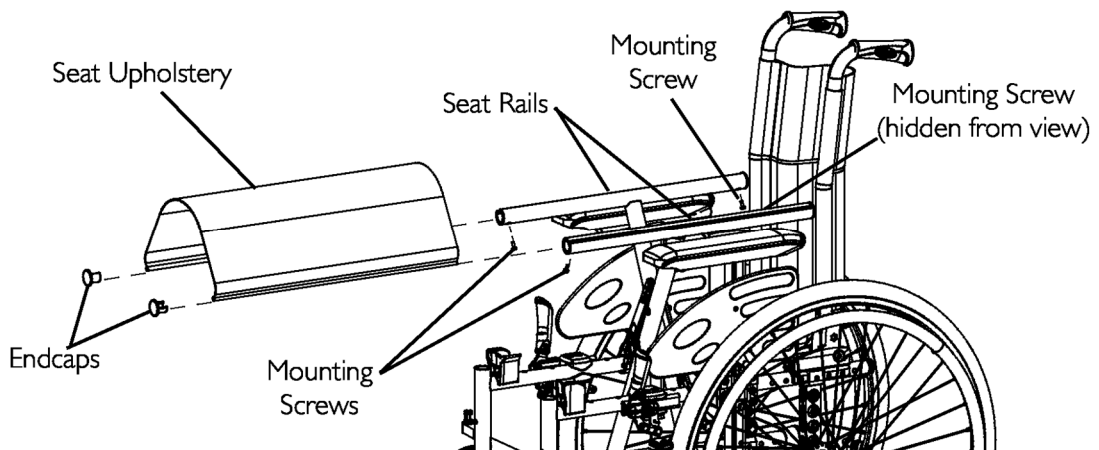


FIGURE 4.2 Removing/Installing Seat Upholstery

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".

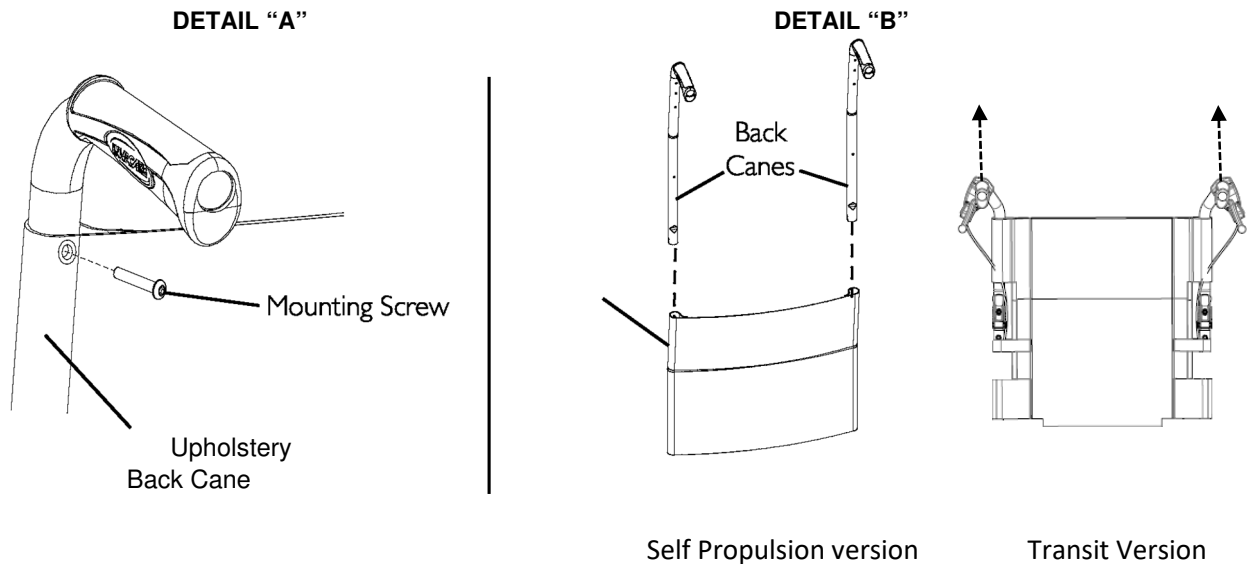


FIGURE 4.3 Removing/Installing Standard Back Upholstery

Adjusting the Height Adjustable Back

NOTE: For this procedure, refer to FIGURE 4.5.

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.

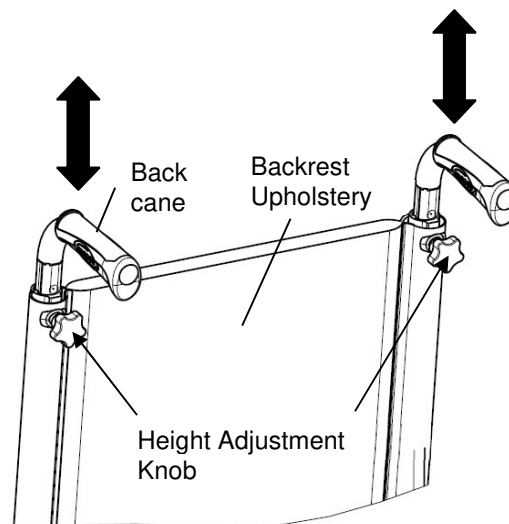


FIGURE 4.5 Adjusting the Height Adjustable Backrest cane

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.

Transit version

Backcanes are designed for 2 backrest heights: 430/510mm.

For a backrest height setting 510mm, a seat cushion may be recommended for a good back support.

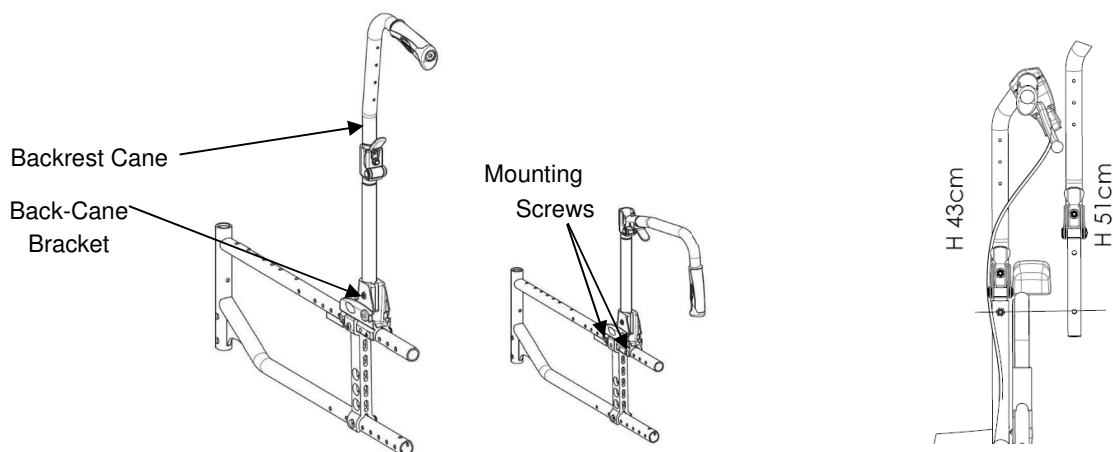


FIGURE 4.6 Fixed/Folding Backrest

Self Propulsion version

Transit Version

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.

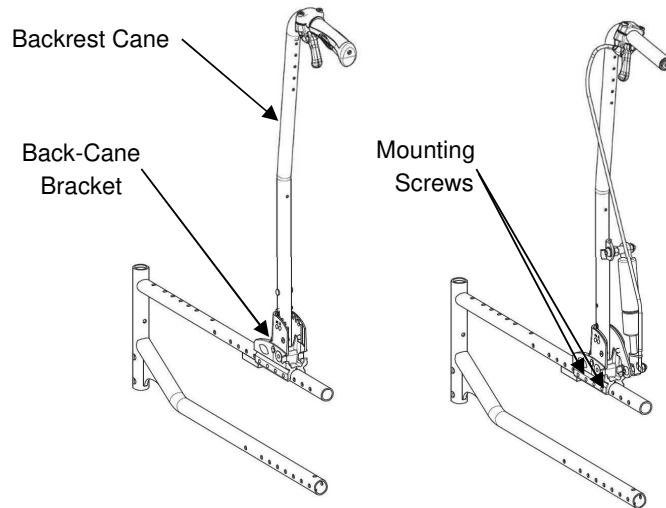


FIGURE 4.7 Recliner Backrests

Removing/Installing/Adjusting the Back-Cane Bracket

NOTE: For this procedure, refer to FIGURE 4.8.

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. Do one of the following:
 - **To Remove:** the back-cane bracket by sliding it off the back of the wheelchair frame.
 - **To Adjust:** slide the back-cane bracket to one of the four adjustment holes on the bracket.

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

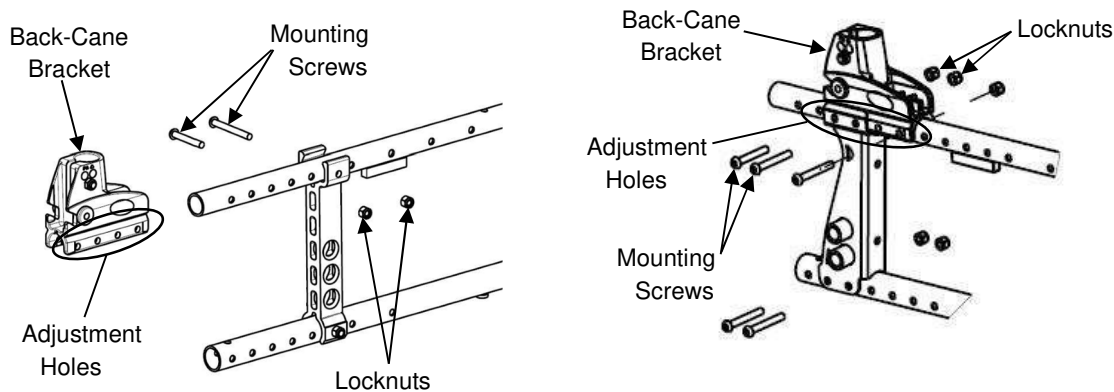


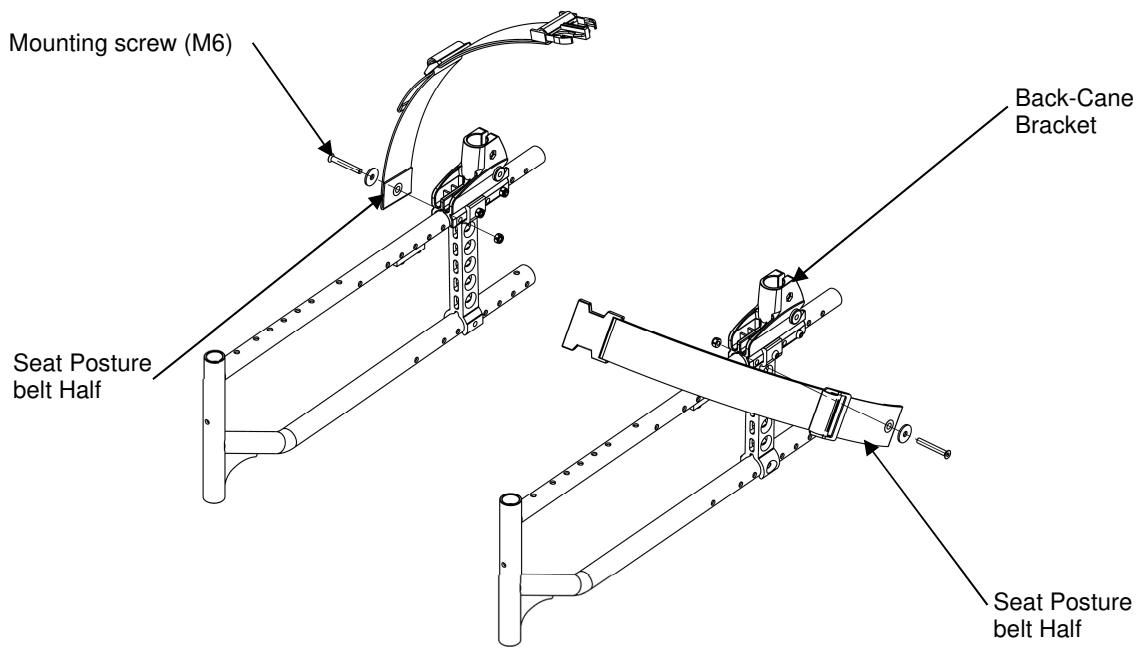
FIGURE 4.8 Removing/Installing/Adjusting the Back-Cane Bracket

Installing/Removing Seat Posture Belt

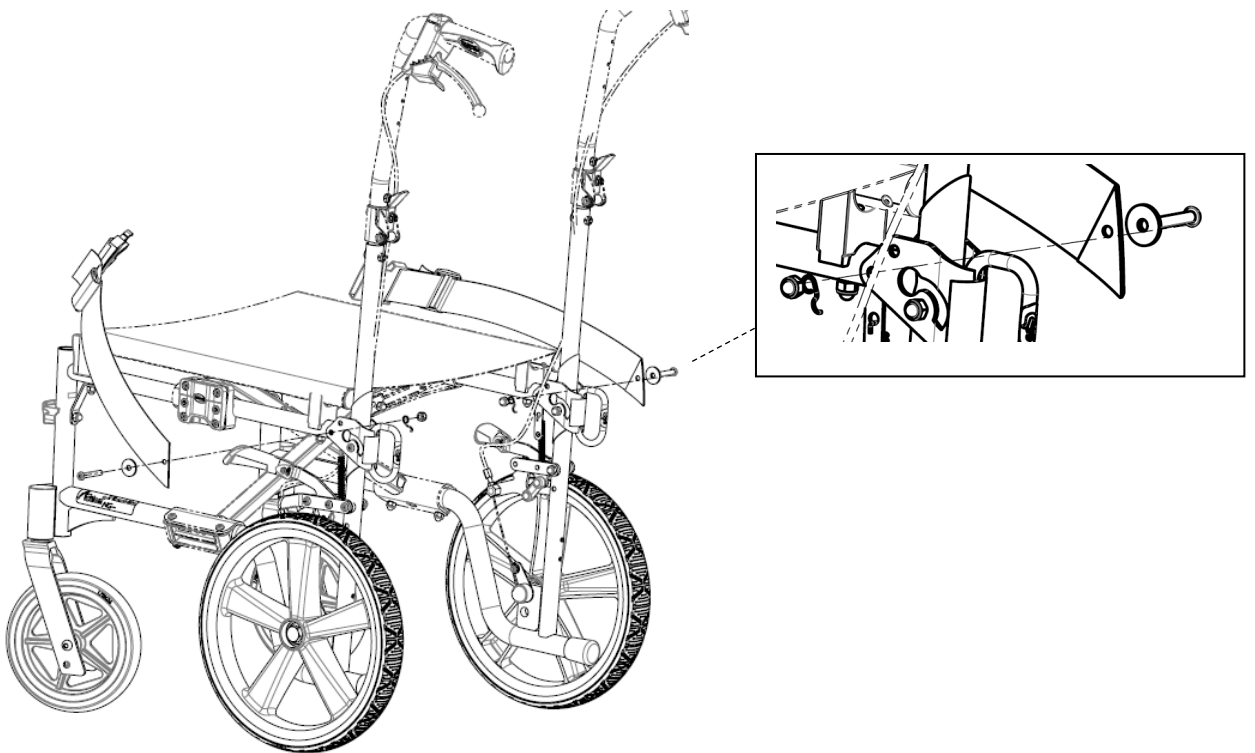
NOTE: For this procedure, refer to FIGURE 4.9.

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 (M6) and washer. Tighten securely (3-4 Nm).
8. Repeat STEPS 6 and 7 for the opposite side of the seat posture belt.
9. Reinstall seat cushion onto wheelchair, if necessary.

NOTE: Seat upholstery removed for clarity.



Self Propulsion version



Transit Version

FIGURE 4.9 Installing/Removing Seat Posture Belt

Installing/Removing the Back Brace



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.

NOTE: For this procedure, refer to FIGURE 4.10.

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 a sharp tool).
3. Install the inserts into the canes.
4. Secure the inserts with mounting screws.
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.

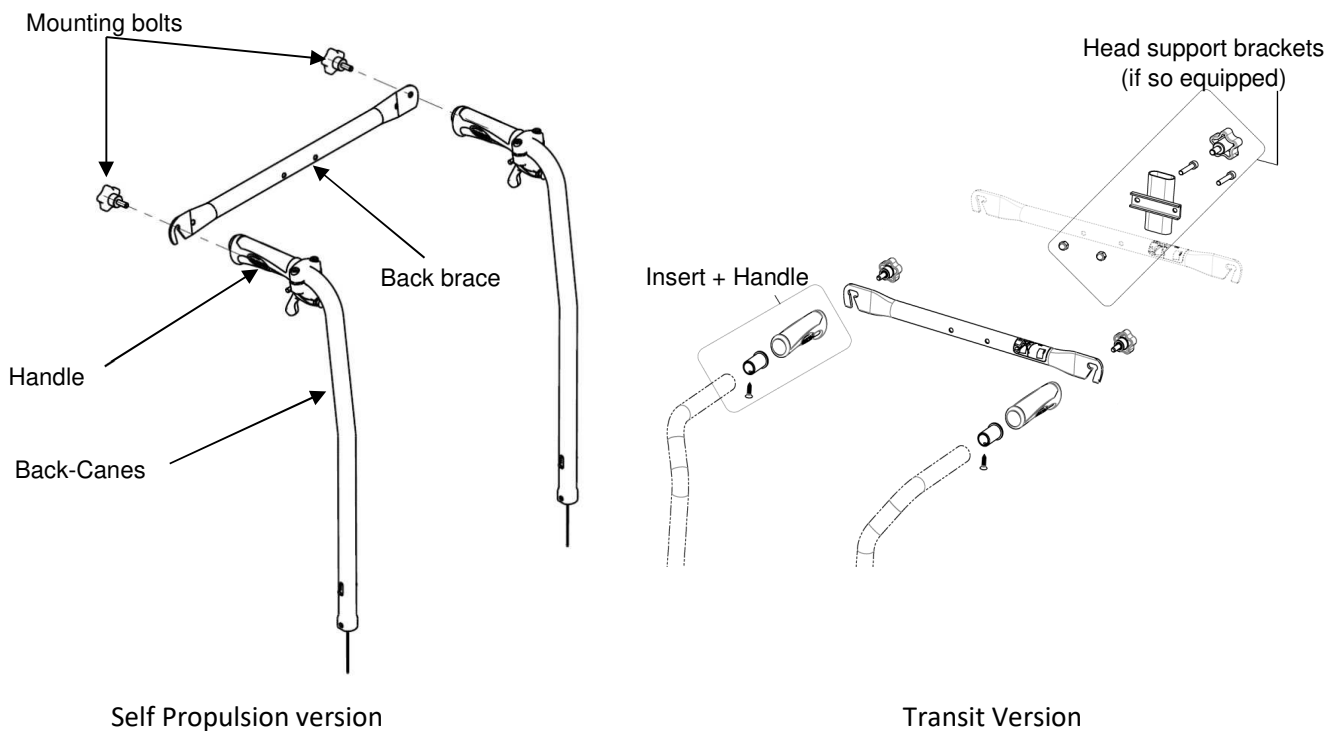


FIGURE 4.10 Installing/Removing the Back brace

SECTION 5—REAR WHEELS/FRONT CASTORS



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.

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

Removing/Installing Rear Wheels



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

Fixed Axles, Transit version

NOTE: For this procedure, refer to FIGURE 5.1, next page.

Removing rear wheels

1. 12"; remove the fixed axle, washers and locknut that secure rear wheel to the axle bracket. Remove existing rear wheel from the wheelchair.
2. Install new/existing rear wheel onto wheelchair. Refer to Transit versions paragraph.
3. 24" or 22"; remove the complete wheel and the axle bracket from the side frame. Refer to Removing/Installing Rear Wheels paragraph.

Transit version

1. Install fixed axle through the wheel, spacer, frame, and washer
2. Securely tighten with the existing fixed axle locknut. Torque to 25 Nm.
3. Fixed and adjust the transit brake with its brake hardware, adjust the distance between the brake shoe and the wheel, see Adjusting Wheel Brake paragraph.
4. If necessary, repeat STEPS 1-3 for opposite rear wheel.

NOTE: Both Axle brackets should be set at the same position. Head of bottom mounting screws needs to be on the outside position.

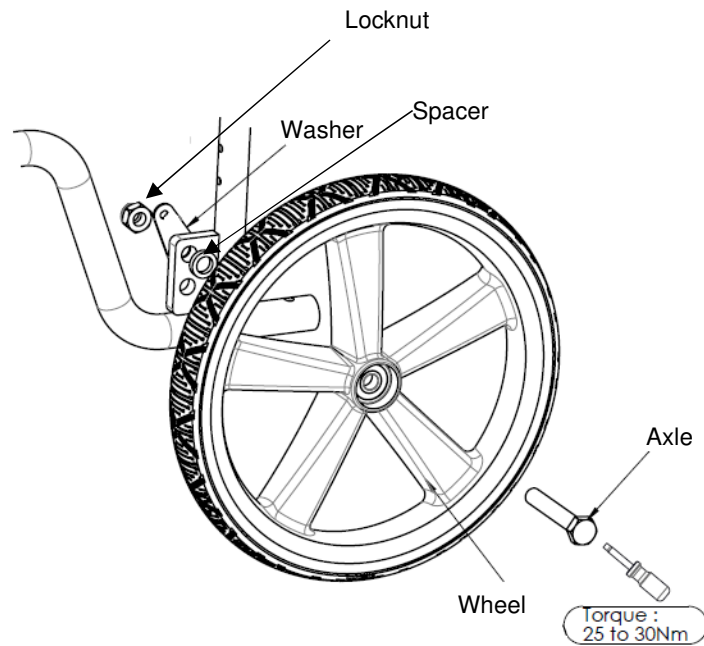
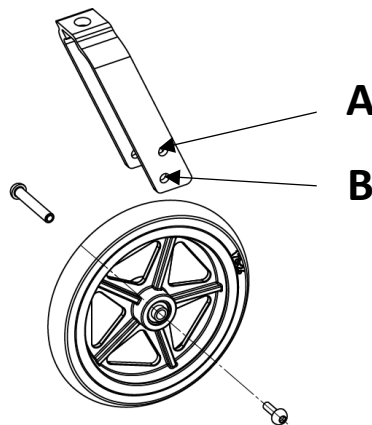
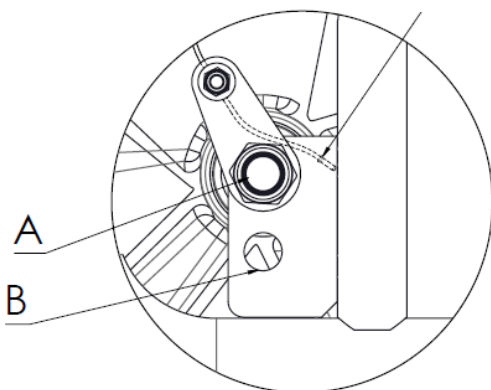


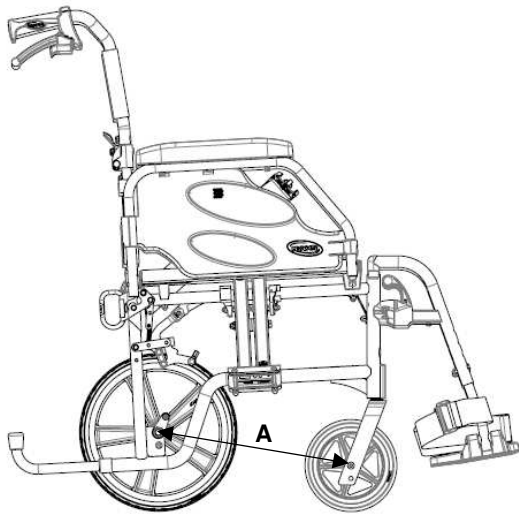
FIGURE 5.1 Removing/Installing Rear Wheels

NOTE: To obtain the desired front seat to floor height (for details, see Seat-to Floor Height paragraph), it will be necessary to perform one or both of the following:

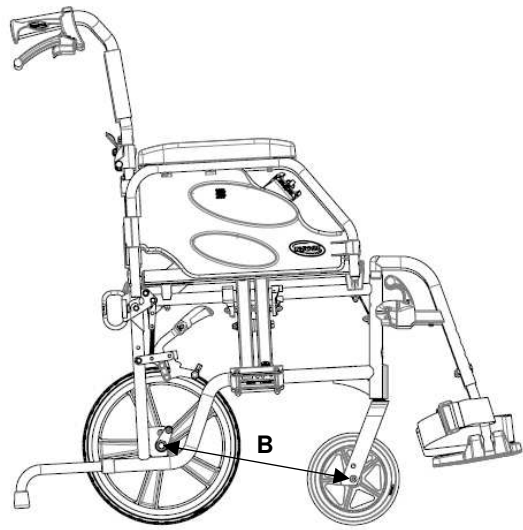
- Changing the mounting position on the fork. Refer to Removing/Installing/Repositioning the Castor Assemblies paragraph.
- Changing the rear height positioning. Refer to the table below.

SEAT ANGLE 3°	REAR WHEEL		FRONT CASTOR	
SEAT HEIGHT				
		12"		7"
485 mm		A		A
510 mm		B		B





H 485



H 510

Quick-Release Axles

NOTE: For this procedure, refer to FIGURE 5.2.

Removing

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 wheelchair. Refer to [Removing/Installing Rear Wheels](#) paragraph.



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

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.

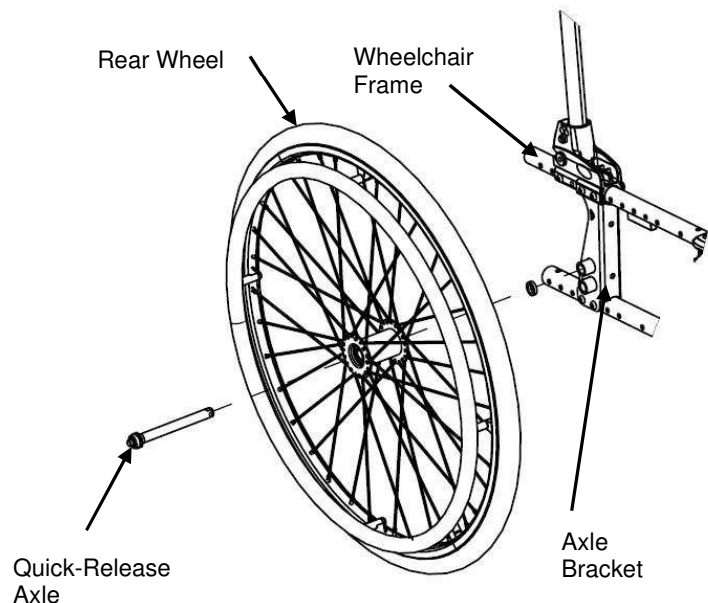


FIGURE 5.2 Removing/Installing Rear

Adjusting Quick-Release Axles

NOTE: For this procedure, refer to FIGURE 5.3.

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.



WARNING

4. Increase or decrease end play by adjusting the locknut on the end of the quick release axle.

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 5.3** Adjusting Quick-Release Axles

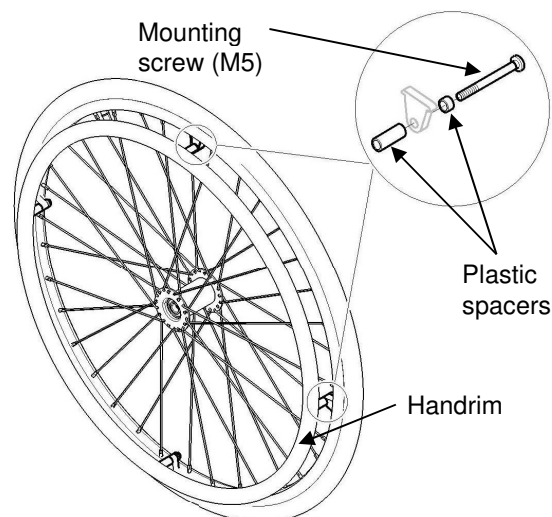
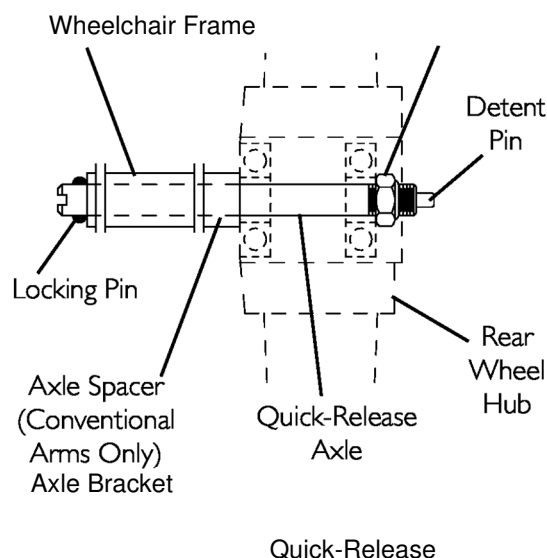


FIGURE 5.4 Replacing Handrims



Replacing Handrims

NOTE: for this procedure, refer to FIGURE 5.4.

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 for the opposite wheel

Adjusting the Wheelbase Length

NOTE: For this procedure, refer to FIGURES 5.5, 5.6 a & 5.6 b.

1. Remove the wheel. Refer to Removing/Installing Rear Wheels paragraph.
2. Remove the (two or four) mounting screws that secure the top and bottom of the axle plate to the wheelchair frame.



The top of the axle plate must remain on the plastic seat bracket. Otherwise, scratching and slight frame damage may occur.

-
3. Align the axle plate with one of (two or four) adjustment holes. There are 2 positions possible:
 - Factory setting for Fixed backrest is Standard position “A”, for Recliner backrest is Passive position “B”. Refer to detail “A”, next page.



The (four or two) mounting screws need to be (four or two) adjustment holes apart to maintain frame integrity.

Respect factory settings related to backrest type (Standard “A” for Fixed, Passive “B” for Recliner), refer to FIGURES 5.6 a and 5.6 b.

Any change to one or any combination of the 2 positions may cause the wheelchair to increase/decrease in stability.

Anti-tippers can be fitted to secure the stability if required. Refer to SECTION 9.

NOTE: When using the last adjustment position, the existing mounting screws needs to be switched to the front of the back-cane bracket. 4. Repeat STEPS 1 to 3 for the other axle plate.

NOTE: Both axle plates should be set at the same position. Head of bottom mounting screws needs to be on the outside position.

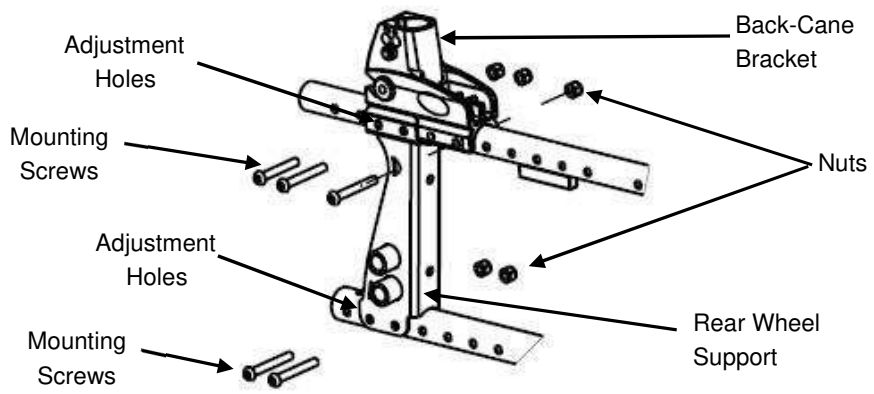


FIGURE 5.5 Adjusting the Wheelbase Length

 **WARNING**

The longitudinal position of the rear wheels axis of the wheelchair compared to the backrest position can affect its stability.

- A forwards position makes the wheelchair less stable and increase the risk of tipping backwards but improves its maneuverability by a better grip position of the handrim and a short turning radius.
- Conversely, by moving the rear wheels axis backwards, the wheelchair is more stable and tilts less easily, but its maneuverability is reduced.
- Depending on the user's abilities and its safety limits, the decrease in stability can be compensated for by installing an anti-tipper device.

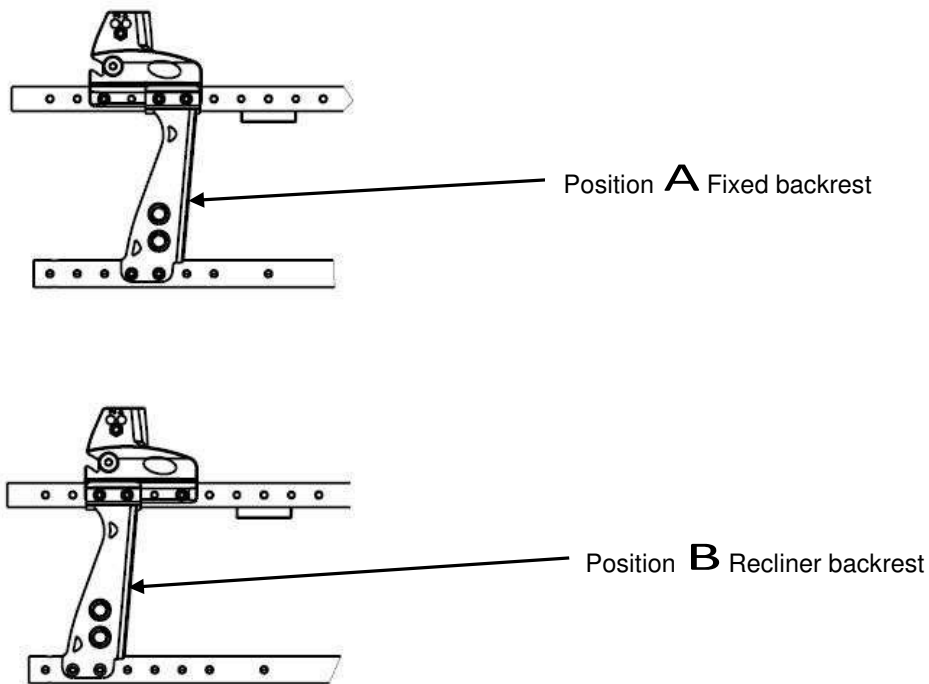


FIGURE 5.6 a 2 Possible Positions of Wheel Plate
(four mounting screws)

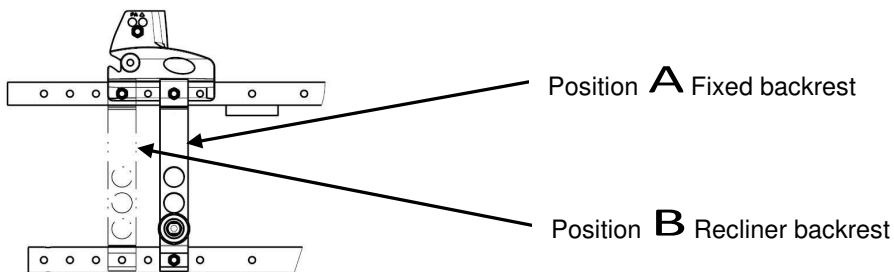


FIGURE 5.6 b 2 Possible Positions of Wheel Plate
(two mounting screws)

Adjusting Rear Wheel Height

NOTE: For this procedure, refer to FIGURE 5.7.

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 or three 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.

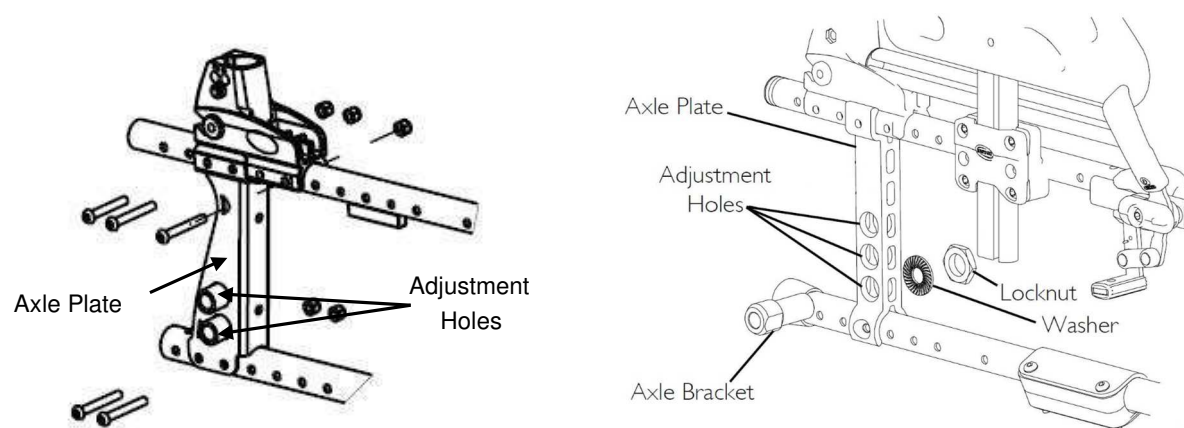


FIGURE 5.7 Adjusting Rear Wheel Height

Replacing/Repairing Rear Wheel & Front Castor Tire/Tube



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

Adjusting Fork

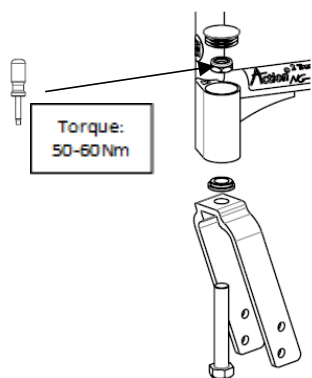
WARNING

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

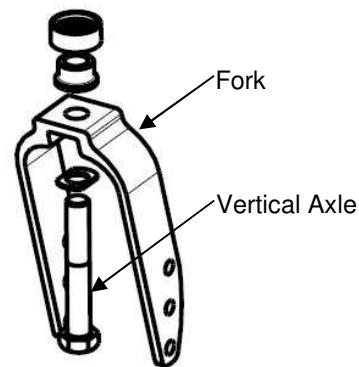
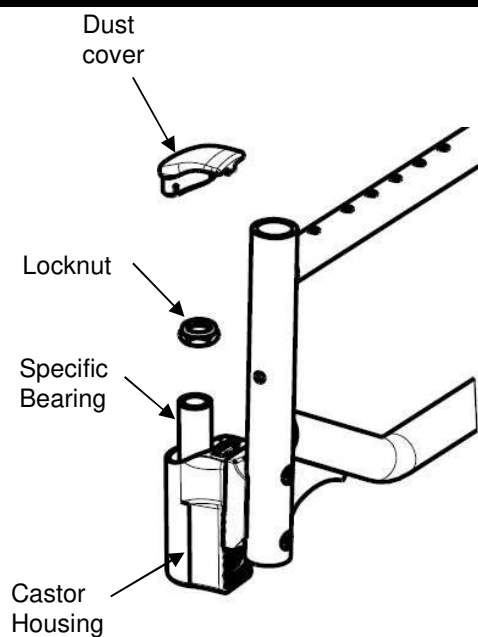
After **ANY** adjustments, before use, make sure all attaching hardware is tightened securely - otherwise injury or damage may occur.

NOTE: For this procedure, refer to FIGURE 5.8.

1. Remove the dust cover from the caster housing.
2. To properly tighten castor journal system and guard against flutter, perform the following check:
 - A. Tip back the wheelchair to floor.
 - B. Pivot castor fork assemblies in rear position
 - C. Push castor to initiate clockwise movement
 - D. Let castor fork assembly rotate freely, if not change the upper specific bearing.
3. Adjust locknuts to appropriate torque (50-60 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 housing.
6. Perform STEPS 1 to 5 on the other side.



Transit Version



Self Propulsion Version

FIGURE 5.8 Adjusting Fork

Removing/Installing/Repositioning the Castor Assemblies

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

NOTE: If repositioning front castors or replacing the existing front castor with a castor of a different size, refer to [Changing Front Seat-to-Floor Height](#) paragraph to determine the front castor position needed for the required front seat-to-floor height.

NOTE: Both front castors MUST be the same size and adjusted to the same height.

NOTE: For this procedure, refer to FIGURE 5.9.

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.

Axle Spacers

(if present)

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.

Refer to [Adjusting Castor Angle](#) paragraph.

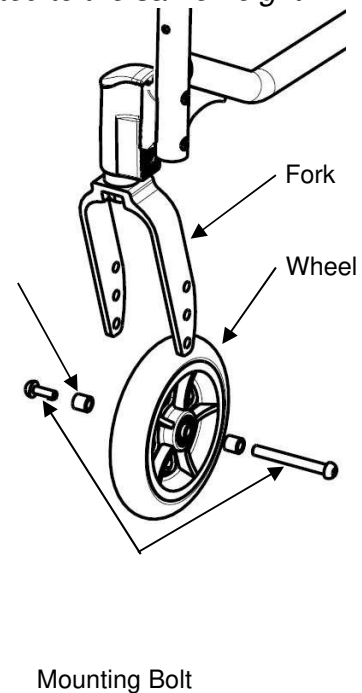


FIGURE 5.9 Castor Assembly

Adjusting Castor Angle (if so equipped)

IMPORTANT: Fixing screws may only be used once. Always use the dedicated spare parts kit (**SP1657713**) for castor housing **Standard**.

Alternatively, the screws can be cleaned (remove old thread locking adhesive) and reinstalled with new medium-strength thread locking adhesive (e.g.: LOCTITE® 243™ or 270™).

INFORMATION: Always refer to the liquid thread locking adhesive supplier's recommendations before applying on the screw.

NOTE: For this procedure, refer to FIGURE 5.10, next page.

1. Remove the two mounting screws (5 mm Allen key) that secure the castor housing assembly to the wheelchair frame and the attachment plate.

IMPORTANT: To adjust the castor angle on both sides, use the spare parts kit (**SP1657713**) consisted of 4 mounting pre-glued screws (M6x37mm) and 2 attachment plates.

2. Fit but not tighten the new attachment plate and the 2 mounting screws
3. Rotate the castor assembly to the desired angle.
NOTE: Both castors housing must be set at the same angle.
4. Tighten in 3 steps (lower-upper-lower) progressively the 2 mounting pre-glued screws (13/14 Nm) that secure the castor housing assembly to the wheelchair frame.
5. Repeat STEPS 1 to 4 for the other castor housing assembly.
6. **IMPORTANT:** Wait 24 hours before using the wheelchair (polymerisation time required for a safe assembly).

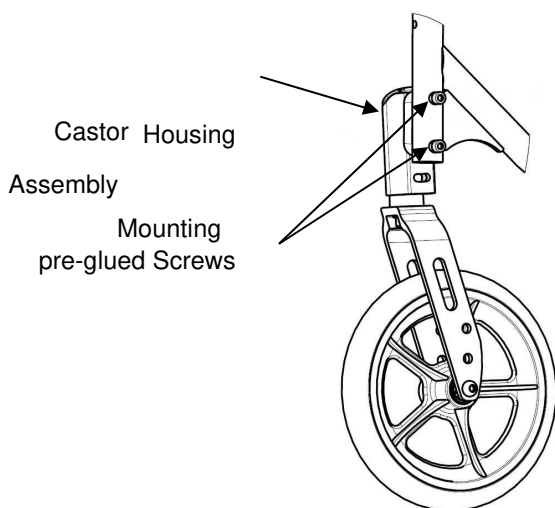


FIGURE 5.10 Adjusting Castor Angle

Adjusting Castor Height Position (if so equipped)

NOTE: For this procedure, refer to FIGURE 5.11.

1. Remove the two mounting screws that secure the castor assembly to wheelchair frame.

IMPORTANT: To adjust the castor position on both sides, use the spare parts kit (**SP1657713**) consisted of 4 mounting pre-glued screws (M6x37mm) and 2 attachment plates.

2. Move the castor housing assembly to one of two positions. Refer to Detail “A” of FIGURE 5.11. Always check that the plastic insert is present before tightening the mounting screws.

NOTE: Both castor housing assemblies must be set at the same position.

3. To finalise the assembly, refer to section Adjusting Castor Angle, repeat STEPS 4 to 6.

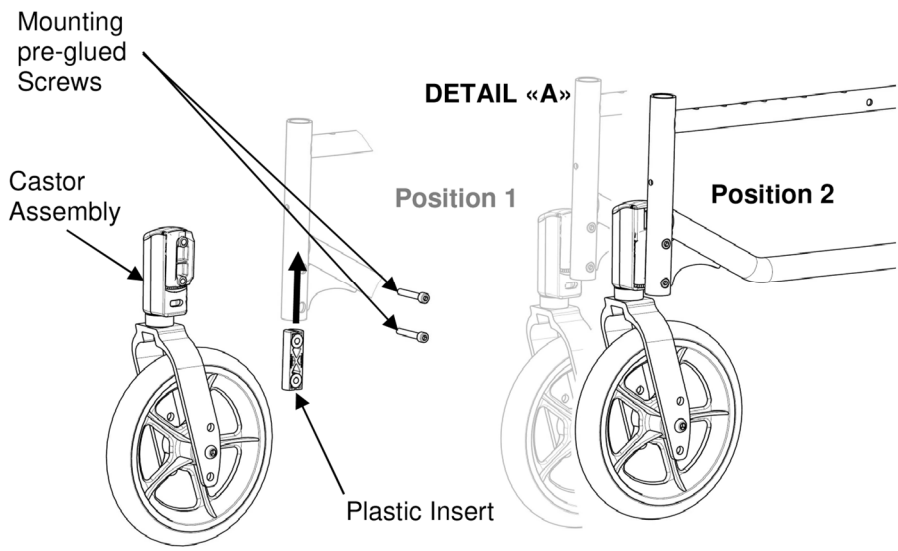


FIGURE 5.11 Adjusting Castor Height Position

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.

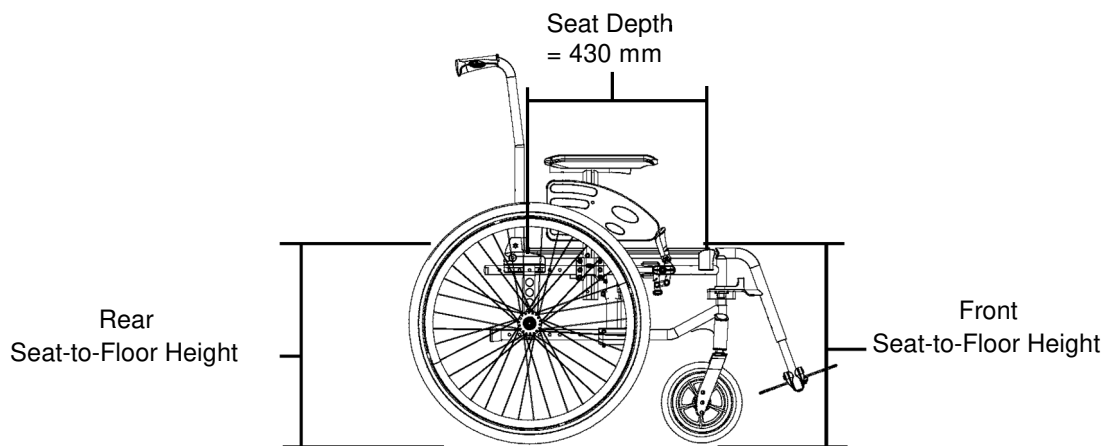
Seat Angle

NOTE: For this procedure, refer to FIGURE 6.1.

NOTE: Refer to Measuring Seat-to-Floor Height paragraph for measuring instructions.

NOTE: Invacare recommends that the rear seat-to-floor height be AT LEAST 25 mm shorter than the front seat-to-floor height. Otherwise a forward seat angle can occur.

Subtract the rear seat-to-floor height measurement from the front seat-to-floor height measurement to determine the amount of seat angle as shown in the example in FIGURE 6.1.



Example:

510 mm Front Seat-to-Floor Height
- 485 mm Minus Rear Seat-to-Floor
 Height (3° +/-1°) Equals Seat Angle

FIGURE 6.1 Seat Angle

 **WARNING**

Because of the parts mechanical tolerances and all adjustments possible (+/- 1°) the seat angle possible is 3° +/-1° depending of the wheelchair assembly. Refer to table “Seat-to-floor heights” paragraph.

Measuring Seat-to-Floor Height

NOTE: For this procedure, refer to FIGURE 6.2.

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.

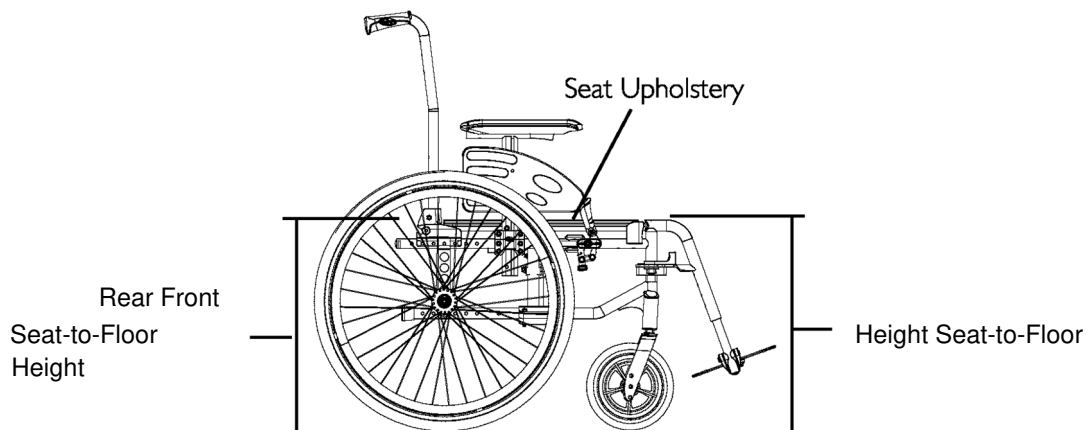


FIGURE 6.2 Seat Angle

Changing Seat-to-Floor Height



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 table on page 6.

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

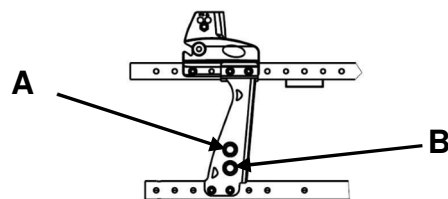
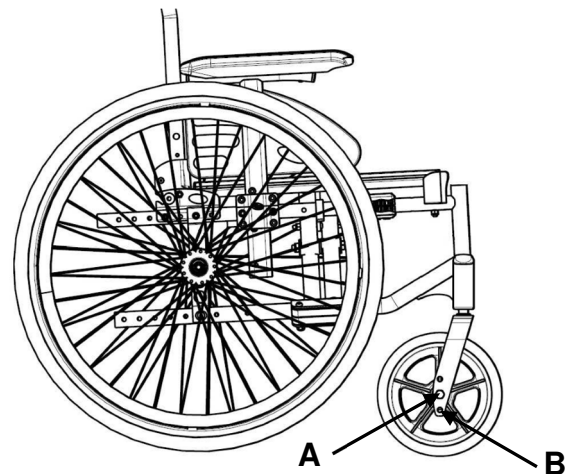
NOTE: For this procedure, refer to the table to determine adjustment(s) necessary to achieve desired front seat to floor height.

NOTE: To obtain the desired front seat to floor height, it will be necessary to perform one or both of the 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°	REAR WHEEL		FRONT CASTOR	
SEAT HEIGHT				
		24"	8"	
485 mm		A	A	
510 mm		B	B	



Note: For more information about CHANGING SEAT-TO-FLOOR HEIGHT of Transit Version, refer to Chapter 5

SECTION 7—WHEEL BRAKES



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 FIGURES 7.1 & 7.2.

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.

Action 1 R Brake Type

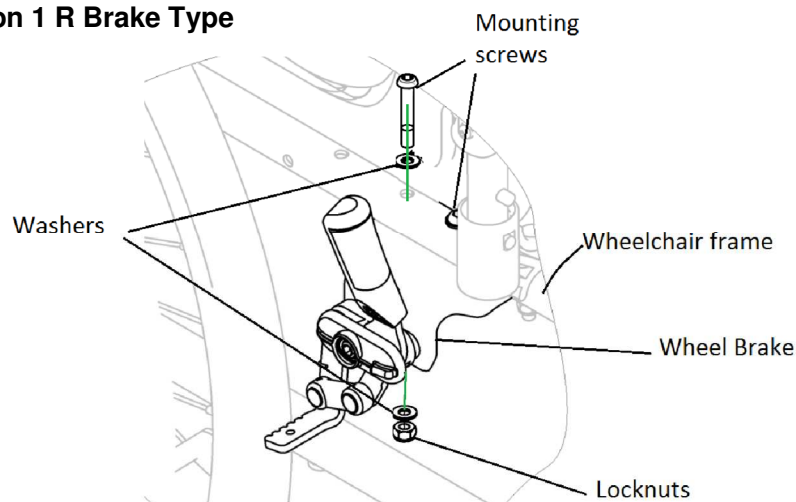


FIGURE 7.1 Adjusting Wheel Brakes Action 1 R - Adjusting Wheel Brake Position

Action 2 NG Brake Type

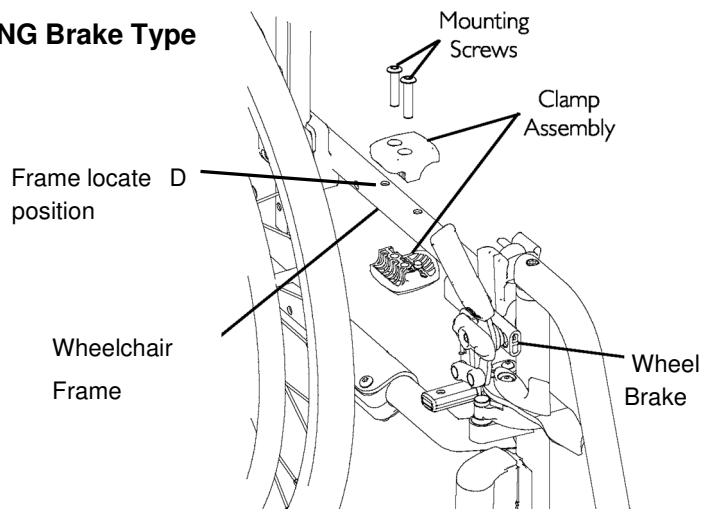


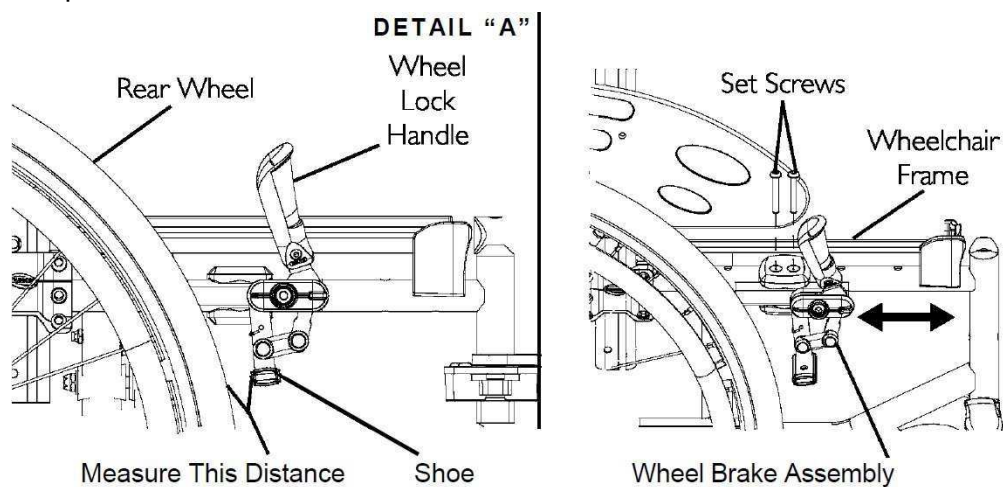
FIGURE 7.2 Adjusting Wheel Brakes Action 2 NG- Adjusting Wheel Brake Position

Note : For Transit version, refer to Figure 7.3

Adjusting Wheel Brake Tension

NOTE: For this procedure, refer to FIGURE 7.3.

1. Loosen, but DO NOT remove the set of screws/bolts (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 set of screws/bolts (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.



Transit version

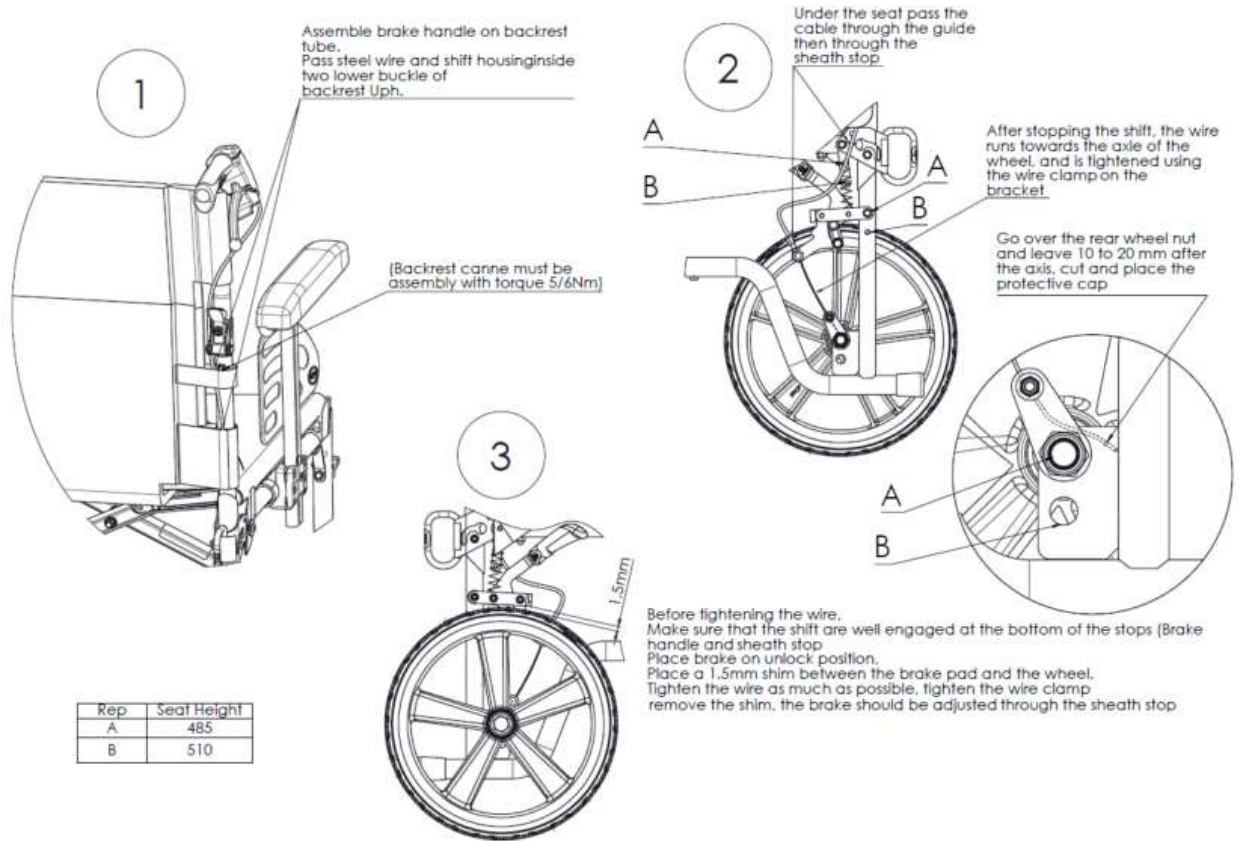


FIGURE 7.3 Adjusting Wheel Brakes- Adjusting Wheel Brake Tension

Replacing Wheel Brake Handle

NOTE: For this procedure, refer to FIGURE 7.4.

1. Remove the mounting screw and locknut that secures the wheel brake handle to the wheel brake assembly.
Handle

2. Remove the wheel brake handle and discard.

Brake extension option :

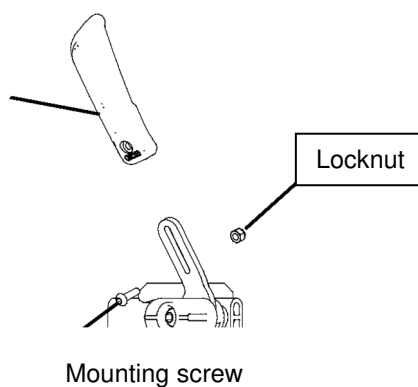
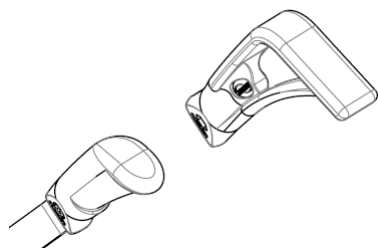


FIGURE 7.4 Replacing Wheel Brakes Handle

 **WARNING**

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

Always operate the two brakes simultaneously and do not take slopes exceeding 5° to ensure perfect control of the wheelchair steering.

Hub brakes are running brakes only, always use the manual brakes to secure the wheelchair during short or long stops.

Ensure both hub brakes are adjusted to the same mounting hole.

Installing/Adjusting Hub Brakes

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

Installing Hub Brakes

NOTE: For this procedure, refer to FIGURE 7.5.

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.
3. Thread a brake shoe support on a QR axle bush support then add spacer HB.
4. Present the set in front of the axle plate outside of the chair, by directing the brake shoe support following the plan opposite then insert the anti-rotating spacer between the pin of the brake shoes support and the hole of the axle support.
5. Align the hub brake set with one of the five adjustment holes on the axle plate.
6. Secure the hub brake set to the axle plate, at the desired height, with the locknut and washer.

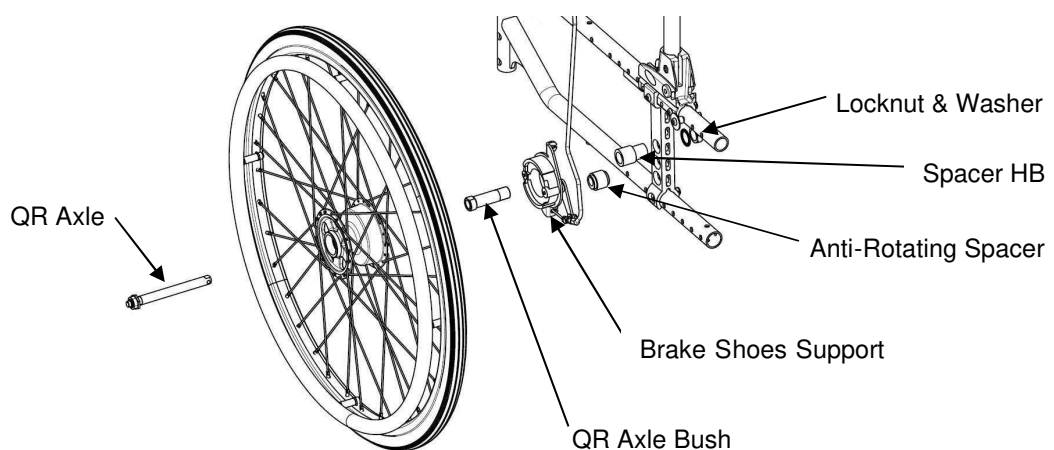


FIGURE 7.5 Installing Hub Brakes

7. Repeat STEPS 1 to 6 for the other rear wheel.

Installing/adjusting Hub Brake

NOTE: For this procedure, refer to FIGURE 7.6.

1. Install the hub brake lever with the cable on the backrest canes.
2. Secure the cable to the lever of the brake shoes support by tightening the cable bolt
3. Adjust the cable tension to desire brake effort by screw/unscrew the tensional bolt situated on the brake shoes support.
4. Repeat STEPS 1 to 3 for the other side

NOTE: the cable adjustment MUST have the same brake effect on both sides.

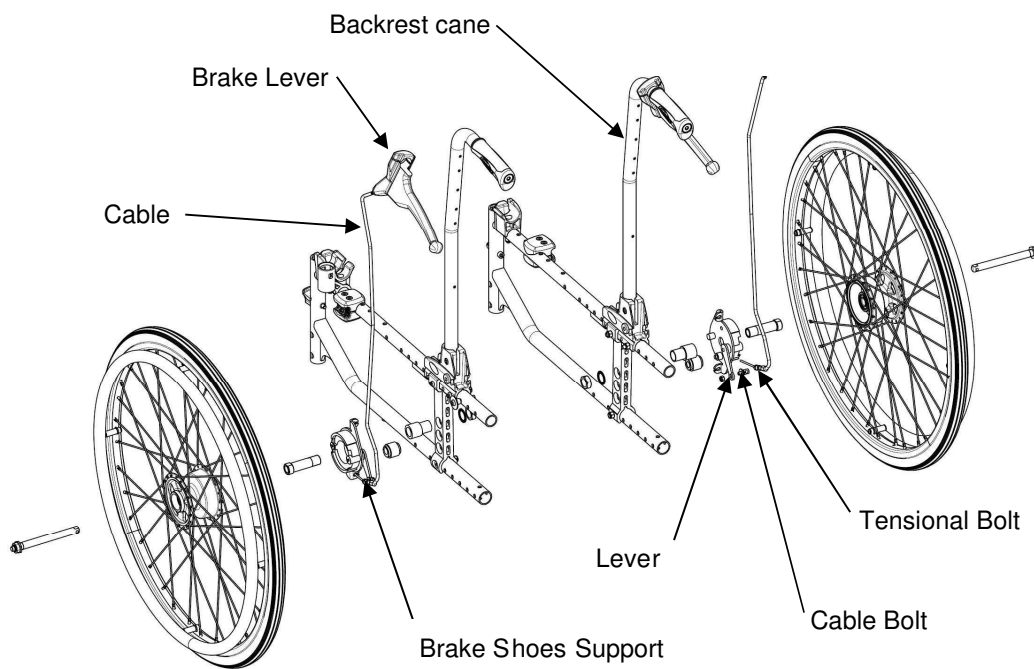


FIGURE 7.6 Installing/Adjusting Hub Brake

SECTION 8—OPTIONS

Installing/Adjusting Headrest



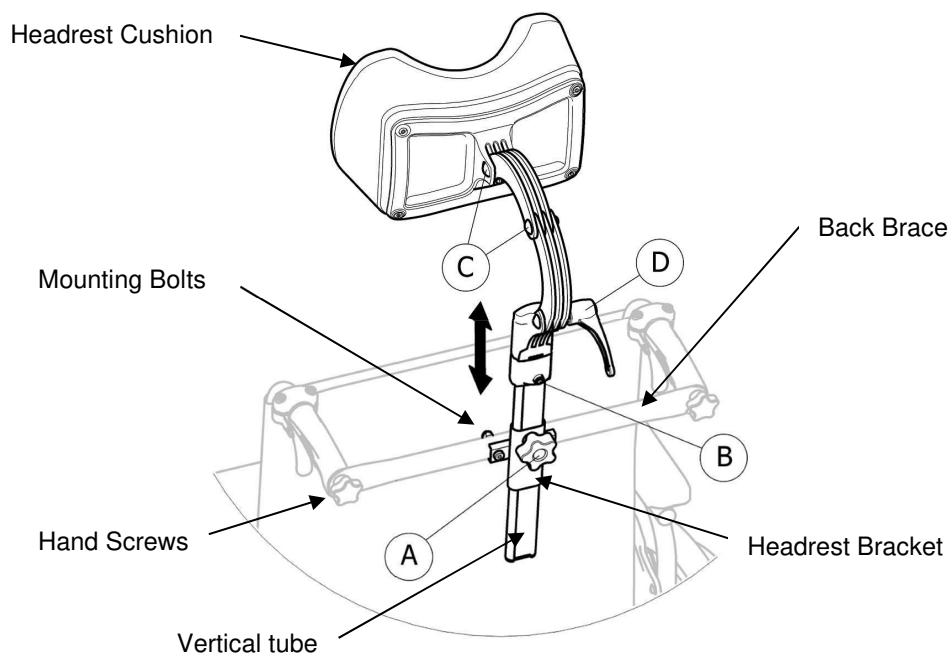
WARNING

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

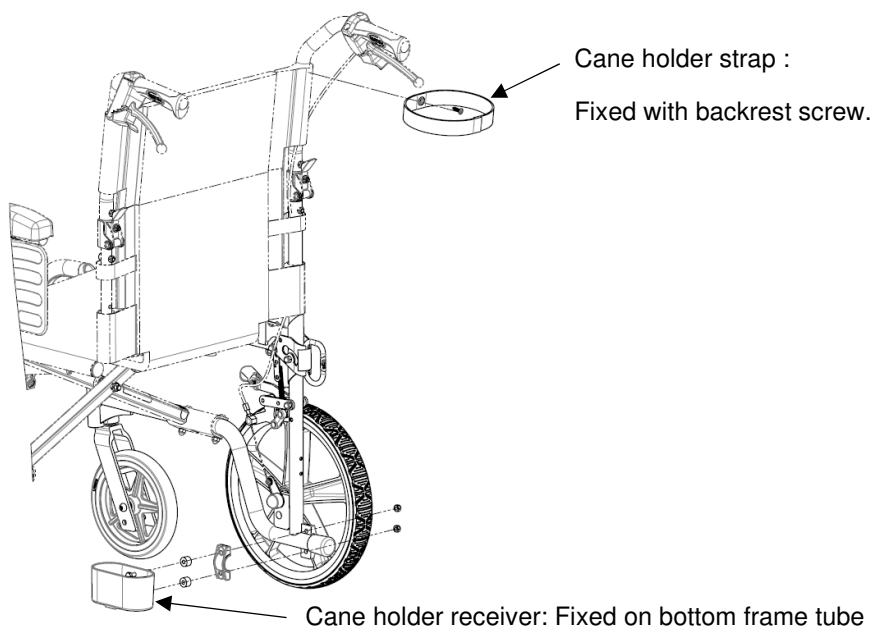
Installing Headrest

NOTE: For this procedure, refer to FIGURE 8.2.

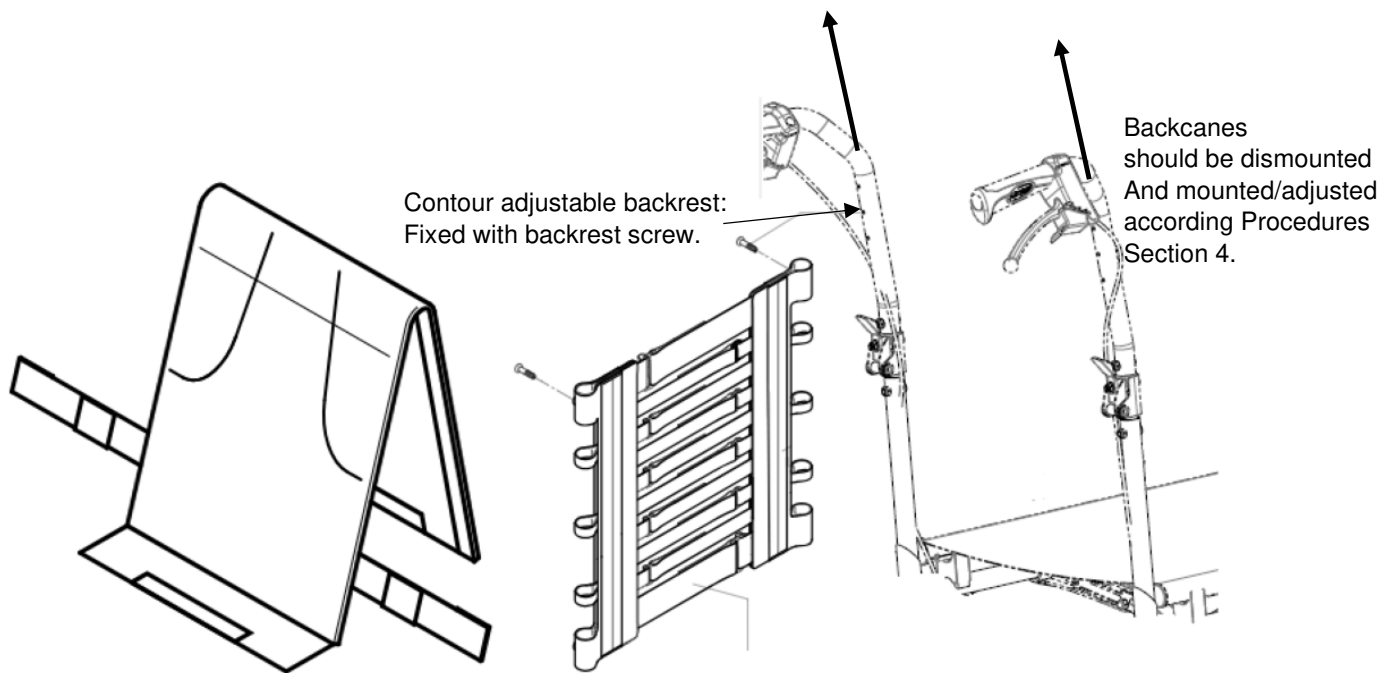
1. Install the back brace. Refer to Installing removing the back brace paragraph.
2. Set the Headrest bracket (mounting bolts, headrest bracket and the hand wheel A) in the fixing holes on the back brace tube.
3. Introduce the vertical tube that support the headrest cushion into the headrest bracket.
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.



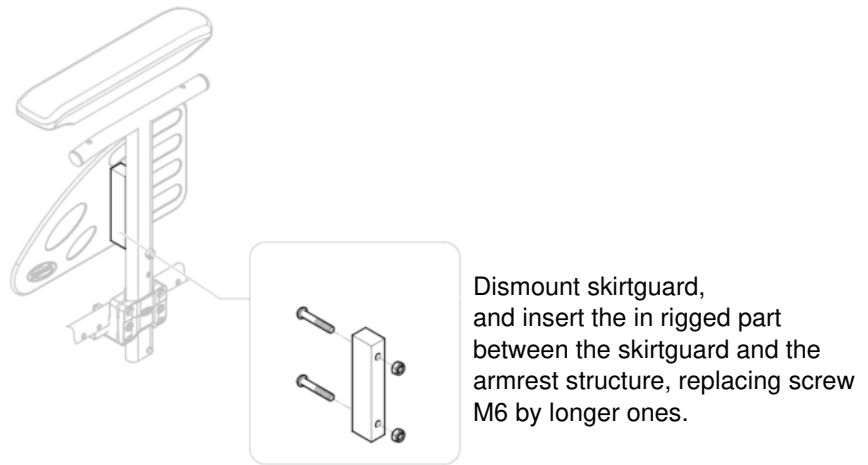
Installing Cane Holder



Installing Tension adjustable



Installing Cane Holder



FIGURES 8.2

Installing Options - Headrest/ Cane Holder/Tension adjustable backrest / In rigged armrest

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 simple Anti-Tippers

Installing Anti-Tippers

NOTE: For this procedure, refer to FIGURE 9.1.

1. Press release buttons in and insert antitippers with the anti-tipper wheels pointing toward ground/floor into the rear frame tubing until bottom release button locks in place.
2. Measure the distance between the bottom of the anti-tipper wheels and the ground/floor.
3. *NOTE: A 30 to 50 mm clearance between the bottom of the anti-tipper wheels and the ground/floor MUST always be maintained.*
4. If the distance between the bottom of anti-tipper wheels and the ground/floor is not 30 to 50 mm, adjust anti-tippers.

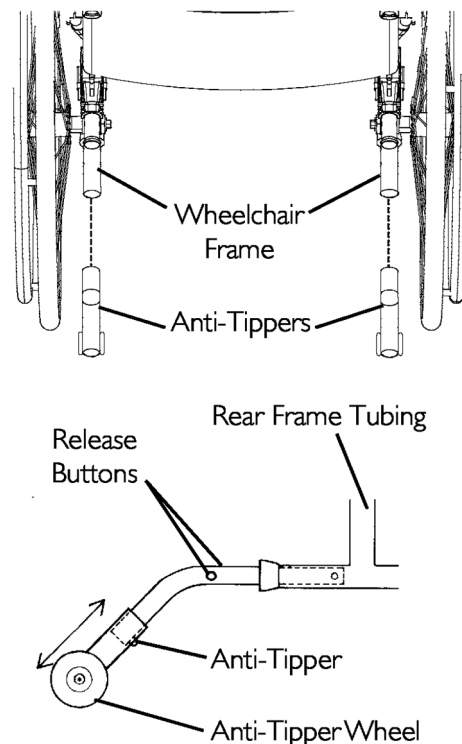
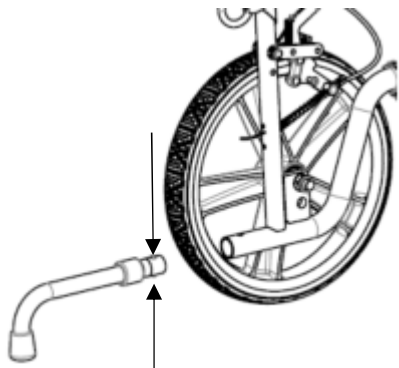


FIGURE 9.1 Installing Simple Anti-Tippers

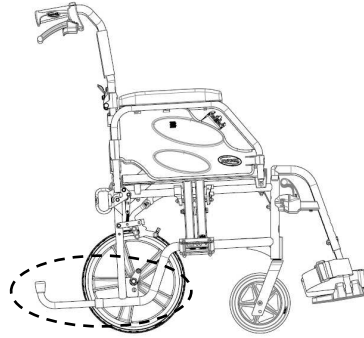
NOTE: Make sure that the anti-tipper wheel is

ALWAYS located outside the rear wheel volume (50 mm Minimum); refer to FIGURE 9.3.

Transit Version: Press both release buttons to engage the anti-tipper.



Release Buttons



H 485



H 510

Installing/Adjusting Anti-Tippers with Tipping Aid

Installing Anti-Tippers with Tipping Aid

NOTE: For this procedure, refer to FIGURE 9.2.

1. Insert anti-tippers with the anti-tipper wheels pointing toward ground/floor into the rear frame tubing until antitippers vertical hole appear in the frame vertical hole.
2. Secure the anti-tippers with the mounting set (screw, washer and locking nut) to the wheelchair frame.
3. Measure the distance between the bottom of the antitipper wheels and the ground/floor.
4. *NOTE: A 30 to 50 mm clearance between the bottom of the anti-tipper wheels and the ground/floor MUST be maintained always.*
5. If the distance between the bottom of anti-tipper wheels and the ground/floor is not 30 to 50 mm, adjust antitippers by push down the large washer (refer to detail "A").

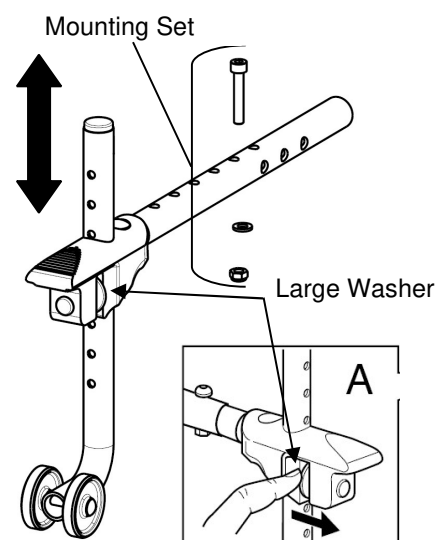


FIGURE 9.2

Installing Anti-Tippers with Tipping Aid

Adjusting Anti-Tippers

NOTE: For this procedure, refer to FIGURE 9.3.



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 9.3.

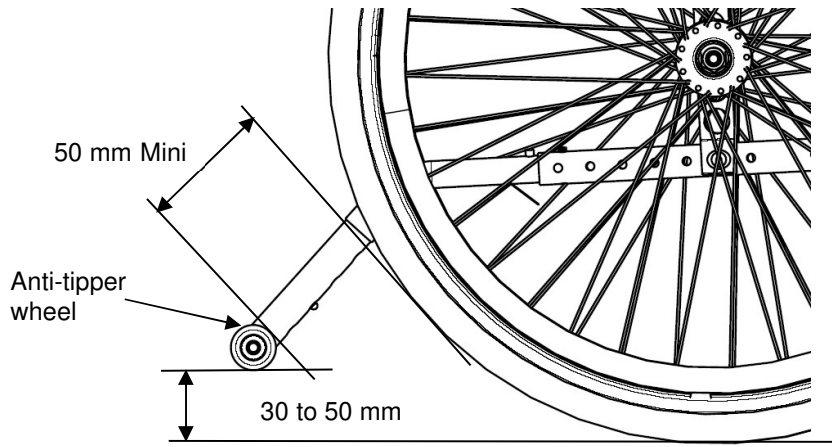


FIGURE 9.3 Adjusting Anti-tippers

SECTION 10—PERIODIC MAINTENANCE GUIDELINES

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 6).
- All fasteners on clothing guards are secure.
- Arms are secure but easy to release and locking systems engage properly.
- Adjustable height arms 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 27).
- 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 castor/wheel/fork/head tube fasteners are secure (see pages 6 & 33).
- 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/castors 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 castors 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 27).
- 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/castors for flat spots and wear.
- Check pneumatic tires for proper inflation (recommended tire pressure is listed on the side wall of the tire).
- Ensure castors are free of debris.

Inspect/Adjust Monthly

- Inspect seat positioning 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.
- Check the tension and appearance of the brake cable.
- Ensure all castor/wheel/fork/head tube fasteners are secure (see pages 6 & 33).
- Ensure all hardware is tight (see page 6).
- Ensure hand grips are secure to backrest canes.
- Ensure castors are free of debris.

Inspect/Adjust every twelve months (1)

- Wheelchair rolls straight (no excessive drag or pull to one side).
- Arms are secure but easy to release and locking systems engage properly.
- Adjustable height arms 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/castors 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.
- Change brake cable and readjust the brake tension cable
- 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.



United Kingdom & Ireland:

Invacare Limited
Pencoed Technology Park,
Pencoed Bridgend CF35 5AQ
Tel: (44) (0) 1656 776 200
uk@invacare.com
www.invacare.co.uk

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

Australia:

Invacare Australia Pty. Ltd.
Unit 18/12 Stanton Road, Seven
Hills, NSW 2147, Australia
Phone: 1800 460 460
Fax: 1800 814 367
orders@invacare.com.au
www.invacare.com.au

Asia:

Invacare Asia Ltd.
Unit 18/12 Stanton Road, Seven
Hills, NSW 2147 Australia
Phone: (61) (02) 8839 5333 Fax: (61)
(02) 8839 5343
asiasales@invacare.com
www.invacare.com

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Invacare France Operations SAS
Route de St Roch
37230 Fondettes, France



Yes, you can.