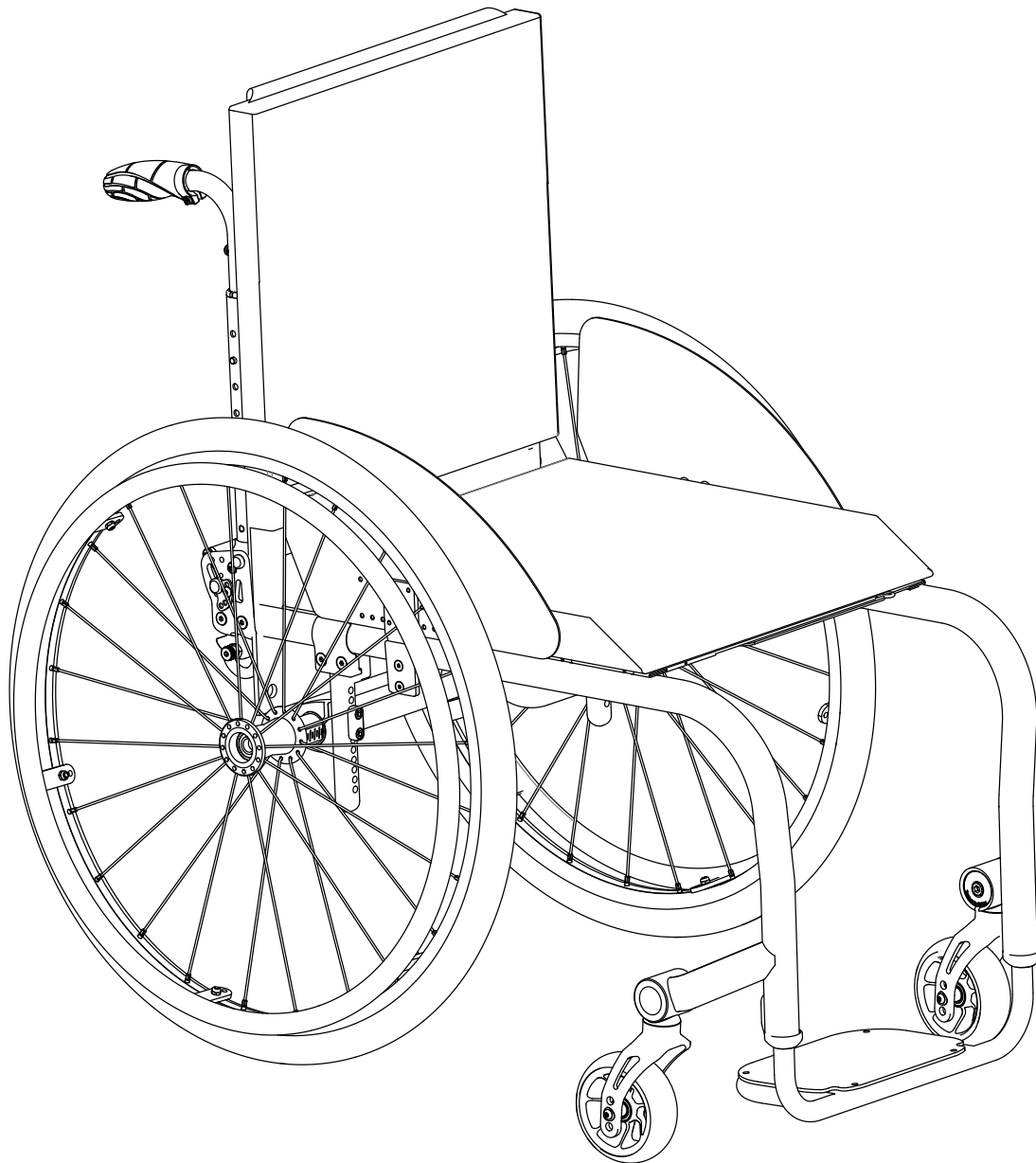


Service Manual

TiLite[®] Z













permobil

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Symbols Glossary

	Warning: Indicates that not following the specified procedure could lead to potentially hazardous conditions resulting in serious injury.	 Manufacturer	 Date of manufacture	 Unique Device Identifier
	Caution: Indicates that not following the specified procedure could lead to potentially hazardous conditions resulting in minor to moderate injury or damage to the equipment or other property.	 Medical Device	 Serial number	 Weight limit
	Consult instructions for use		Add Loctite to threads	

Contact Information

 TiSport, LLC
 2701 W. Court St.
 Pasco, WA 99301 USA
 Customer Support:
 U.S.A.:
 800-736-0925
 Fax: 866-586-2416
customerservice.tilite@permobil.com
permobil.com

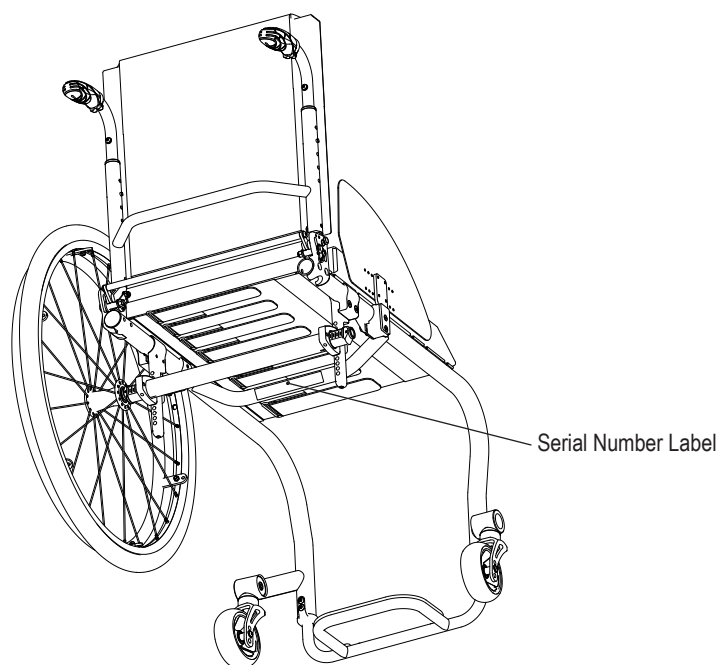
Please Note

The information detailed within this service manual applies to the Permobil TiLite Z.
 Products may be covered by one or more U.S. and foreign patents and trademarks, including TiLite®. Loctite® is a registered trademark of Henkel AG & Company KGaA.
 Product information is changed as needed; current product information is available at permobil.com.
 TiLite is part of Permobil.
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General Information

Product Labeling

The serial number and other important information can be found on the label applied to the center of the under seat rigidizer tube.



Medical Device Combinations

It may be possible to configure this Permobil wheelchair with one or more other Medical Devices, accessories, or products. In the event that a provider wishes to do so, a risk assessment should be performed by competent equipment providers to ensure the safety and efficacy of the combination. Any installation of aftermarket equipment that requires permanent modifications to the wheelchair will void the manufacturer's warranty.

For information on proper mounting and configuration of a Permobil SmartDrive on the Permobil TiLite wheelchair, please refer to the Permobil SmartDrive product documentation. If the wheelchair came configured with a SmartDrive, make sure to read the user manual for the SmartDrive prior to operating the wheelchair.

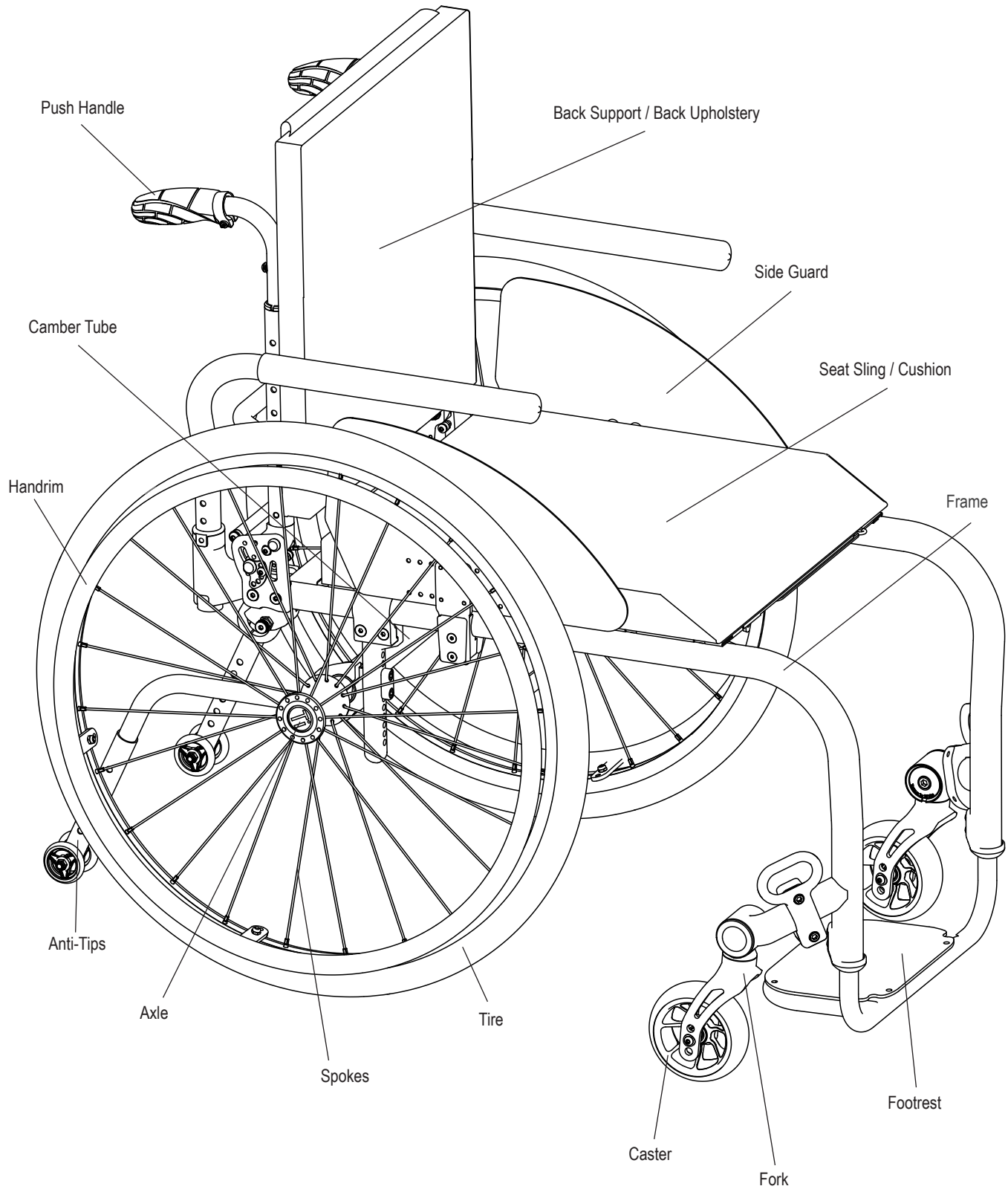
Important Safety Information



Warnings and Cautions

- DO NOT perform any adjustment, removal or installation without first carefully and thoroughly reading and understanding all of the instructions provided in this service manual. If unable to perform any tasks in the service manual, seek assistance by contacting a clinician, equipment provider, or contact TiLite Customer Support.
- Ignoring any warnings listed in this service manual may cause the wheelchair to not perform properly, which in turn, may cause falling, tipping over or losing control of the wheelchair and cause serious injury to the user or others or damage to the wheelchair.
- DO NOT use water-based lubricants on or around the front caster and fork or rear wheel axle as they can cause damage to the bearings.
- Make sure side to side symmetry is maintained when adjusting components of the wheelchair.
- Fasteners with thread patches can be removed and re-installed a maximum of two times before they need to be replaced. If in doubt, use Loctite 242 or equivalent on the last three threads to replicate thread patch functionality.
- Make sure that all detachable or small parts are handled with care. Keep small hardware components out of the reach of children and any individuals who have a tendency to place inedible objects in their mouth. Swallowing or inhalation may lead to serious injury or death. IMMEDIATELY seek emergency medical assistance.
- DO NOT install non Permobil replacement parts that might be incompatible with the chair. Non Permobil replacement parts may interfere with the chair's function, safety, or performance, and may void the warranty.
- Refer to third party manuals for installation instructions when installing third party equipment such as seating and positioning accessories, power assist devices, etc. Third party equipment should be installed according to the manufacturer's specifications and recommendations. Improperly installed third party equipment may cause injury, damage, or malfunction to the user, the chair, or the equipment.

Getting to Know the TiLite Z



Footrests



WARNINGS:

- Check all clamps, screws, nuts and bolts that secure the footrest to the wheelchair frame to make sure they are securely tightened before using the wheelchair.
- Whenever adjusting the angle or height of the footrest, or replacing the footrest, it is recommended to provide at least 5 cm of ground clearance to permit maneuvering over objects.
- Make sure that the footplates are adjusted to the proper height and angle, and that the adjustment is made to the user while the user is wearing their shoes. Improperly adjusted footplates may cause injury, discomfort, or poor posture to the user or damage to the wheelchair.

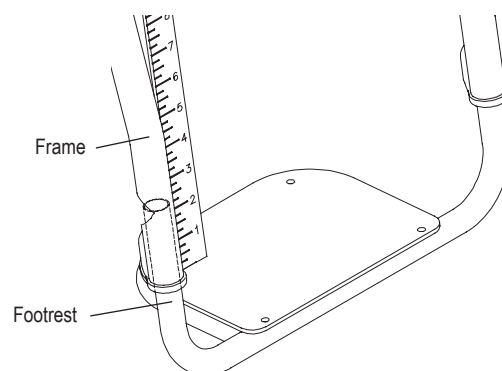
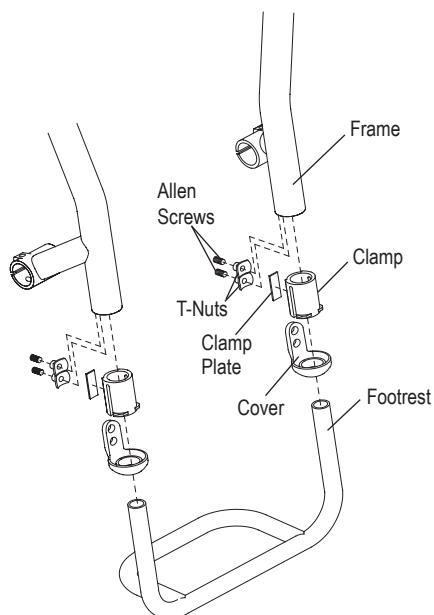
Open Loop Footrest

Adjusting the Height / Replacing:

IMPORTANT! When adjusting the height of the footrest, make sure that at least 4.5 cm of the extension tube remains up inside the frame tube.

Tools:

- 4mm Allen Wrench
 - Ruler
 - Torque Wrench
1. Loosen, but do not remove, the two Allen Screws that engage the T-Nuts to the Clamps that secure the Footrest to the Frame. Loosen the screws just enough to permit the footrest tubes to slide up and down within the Covers. Do not detach the footrest Clamps from the Frame.
 2. If replacing the Footrest, remove the old Footrest and insert the new Footrest tubes through the Covers and Clamps and into the Frame.
 3. Adjust the Footrest to the desired height. Standard Footrest measurement must be at least 2" shorter than the Front Seat Height measurement. To measure Front Seat Height, measure from floor to top of seat tube at front edge of seat sling. Tighten the Allen Screws to 10 Nm in the Clamp so the footrest height cannot change. Make sure there is proper ground clearance for the surrounding environment after adjustment.
 4. Repeat the procedure from Step 2 above on the right side of the Footrest.
 5. When both sides are set at an equal distance from the floor and both casters are in contact with the floor, fully tighten the two Allen Screws into the two T-Nuts securing the Footrest to the Frame, making sure the Covers remain securely butted up against the end of the frame tube.



Angle Adjustable Footrest

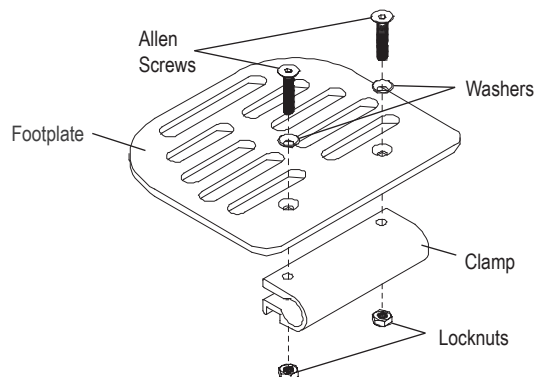
Adjusting the Angle:

Tools:

- 4mm Allen Wrench
1. Loosen, but do not remove, the two Allen screws that secure the footplate to the clamp.
 2. Adjust the footrest to desired angle.
 3. Tighten the Allen screws, making sure the screws and the locknuts are secure and will not permit the footplate to move up or down under weight.

Adjusting the Height / Replacing:

The Angle Adjustable Footrest can be replaced or the height adjusted by using the tools and following the instructions under the "Open Loop Footrest" section.



Footrests, continued

Angle Adjustable High Mount Footrest

Adjusting the Angle:

Tools:

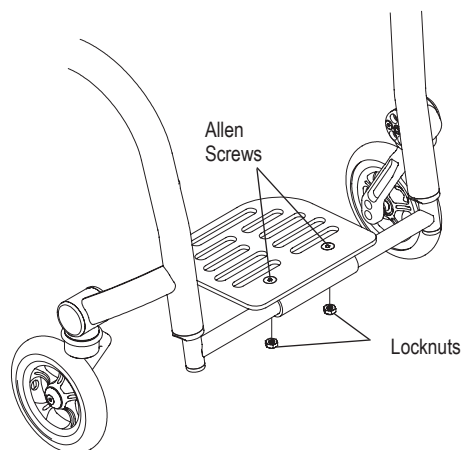
- 4mm Allen Wrench (no high mount extension tubes)
- 5 mm Allen Wrench (high mount extension tubes only)

1. Loosen, but do not remove, the two Allen Screws that secure the footplate to the clamp. If the footrest has extension tubes, 5 mm Allen screws will be in place of the locknuts and only the Allen Screws will need to be loosened to adjust the angle.
2. Adjust the footrest to the desired angle.
3. Tighten the Allen Screws and Locknuts (or 5 mm Allen screws), making sure the Screws and the Locknuts (or 5 mm Allen Screws) are secure and will not permit the footplate to rotate up or down under weight.

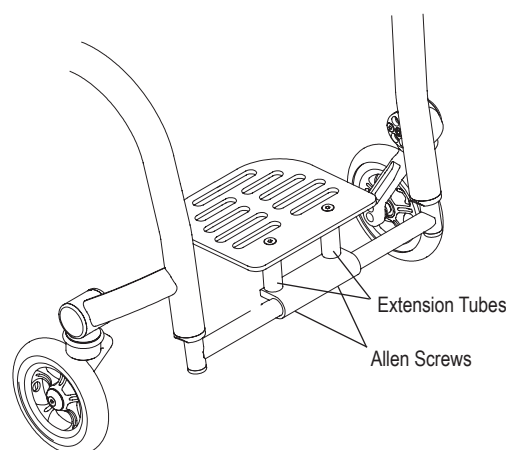
Adjusting the Height / Replacing:

The Angle Adjustable High Mount Footrest for the TiLite Z wheelchairs can be replaced or the height adjusted by using the tools and following the instructions under the "Open Loop Footrest" section.

Angle Adjustable High Mount Footrest

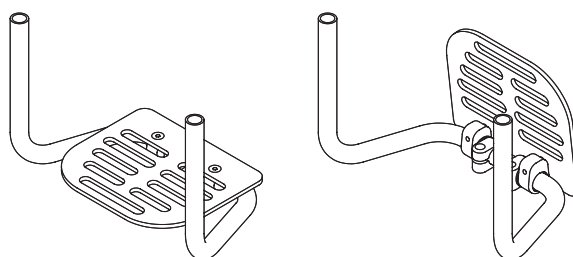


Angle Adjustable High Mount Footrest with Extension Tubes



Flip-Back Footrest

The Flip-Back Footrest can be flipped upward and backward to position the footplate out of the way for purposes of transferring into and out of the wheelchair.



Adjusting the Angle:

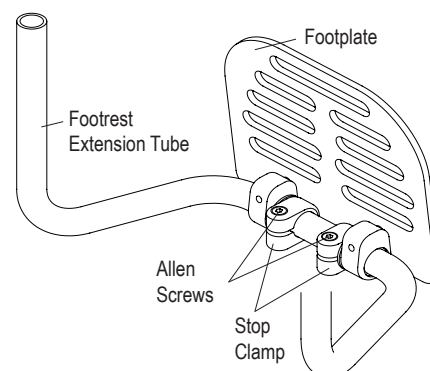
Tools:

- 5mm Allen Wrench

1. Loosen, but do not remove, the two Allen screws that secure the Stop Clamps to the Footrest Extension Tube.
2. Adjust the footrest to the desired angle.
3. Tighten the Allen Screws. Make sure the screws are secure and will not permit the Footplate to rotate up or down under weight.

Adjusting the Height / Replacing:

Adjust the height of, or replace, the flip back footrest by using the tools and following the instructions for adjusting the height of, or replacing a footrest following the instructions under the "Open Loop Footrest" section.

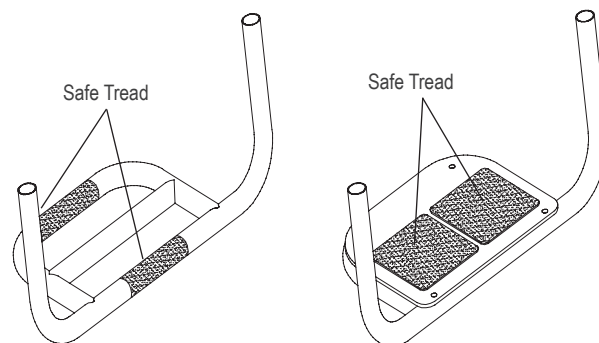


Footrests, continued

Safe Tread

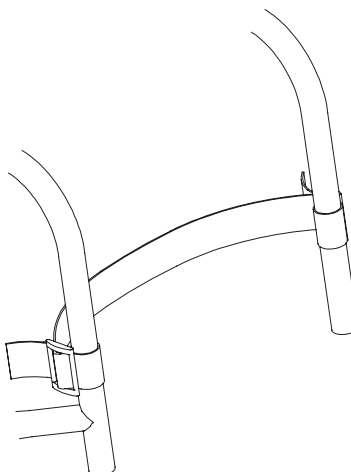
If the wheelchair was ordered with either the Open Loop Footrest with Flat ABS Cover or the Open Loop Footrest, two 10 cm squares of self-adhesive Safe Tread will need to be ordered separately. Safe Tread provides a more slip-resistant surface than the footrest of the wheelchair. Use of the Safe Tread is optional, but Permobil recommends using it in order to reduce the likelihood of a user's feet slipping off the footrest during use of the wheelchair. If applying the Safe Tread to the footrest, follow the following instructions:

1. Without removing the adhesive backing strip, position the Safe Tread on the footrest and, if necessary, use a pen or pencil to draw any edges that need to be trimmed.
2. Carefully cut the Safe Tread to size using scissors, knife or razor blade.
3. Thoroughly clean and dry the footrest.
4. Peel the adhesive strip backing from the Safe Tread and press firmly to the surface of the footrest, starting from the center and working toward the edges of the Safe Tread, making certain the edges are fully adhered.



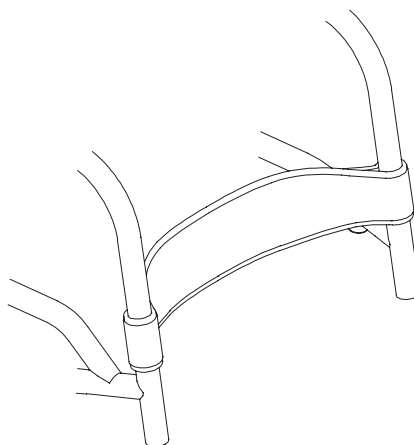
Buckle Adjustable Calf Strap

Buckle Adjustable Calf Straps are shown below. Install the calf strap as shown.



Velcro® Adjustable Calf Strap/ Velcro® Padded Adjustable Calf Strap

The Adjustable Calf Strap and Padded Adjustable Calf Straps are shown below. Install the calf straps as shown.



Backrests and Push Handles

Folding Adjustable Height & Angle Backrest



WARNINGS:

- Before using the wheelchair, make sure the Folding Adjustable Height & Angle Backrest is locked securely in place in the upright position and all mounting hardware is securely tightened.
- Adjust the back support angle, height and depth properly to suit the user's needs and preferences. Improperly adjusted back support may cause poor posture, pressure injuries, or reduced blood circulation to the user or damage to the chair.

IMPORTANT! The Aluminum Adjustable Height & Angle Backrest without Integrated Push Handles is standard on all wheelchairs. Integrated Push Handles are available as an option. The instructions in this section apply to all of these variations.

Folding the Backrest:

1. Grasp the TiShaft Release Bar and pull up.
2. Push the Backrest forward toward the front of the wheelchair.

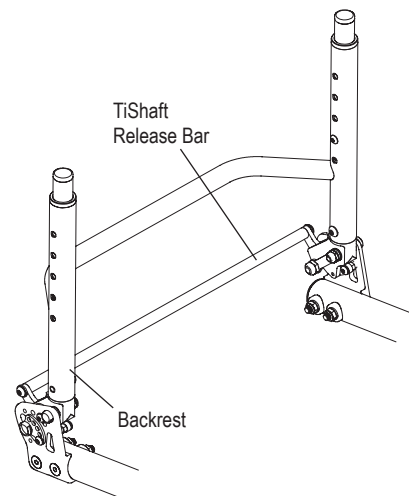
Note: If you have a Lock-Down Backrest, make sure the backrest is locked securely in the folded position.

Unfolding the Backrest:

1. Lift up on the Backrest and pull towards the rear of the wheelchair.
2. Make sure the Backrest locks securely into place.

Unfolding the Lock-Down Backrest:

1. Push up the TiShaft Release Bar and pull the backrest towards the rear of the wheelchair.
2. Make sure the Backrest locks securely into place.

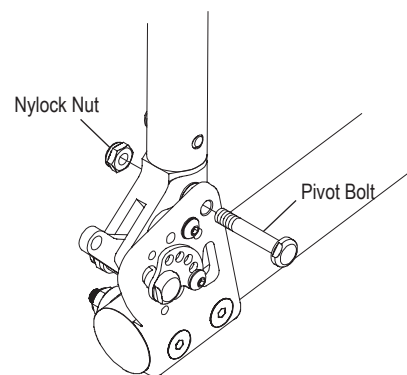


Adjusting the Backrest Mount:

If the backrest is difficult to fold and unfold or is too loose, follow these steps:

Tools:

- 10mm Open End Wrench
1. Using an Open End Wrench, hold the Pivot Bolt in place and slightly loosen or tighten the Nylock Nut with the second Open End Wrench.
 2. Repeat the procedure on each side of the wheelchair until the desired tightness is achieved.



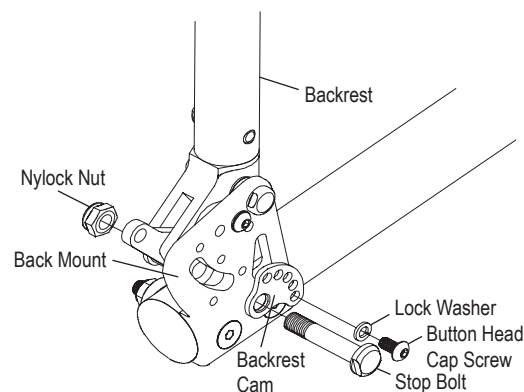
Changing the Backrest Angle:

Tools:

- 13mm Open End Wrench
- 11mm Open End Wrench
- 3mm Allen Wrench

IMPORTANT! Before making the adjustment, loosen only the bolt on the left side of the release bar to prevent binding.

1. Lock the backrest in the unfolded position
2. On both sides of the wheelchair, using the Allen wrench, remove the Button Head Cap Screws and Lock Washers.
3. On both sides of the wheelchair, using the Open End wrenches, loosen but do not remove the Stop Bolts and Nylock Nuts.
4. Adjust the backrest to the desired angle. On one side of the wheelchair, while holding the backrest in place, align one of the five holes in the Backrest Cam with one of the three holes in the Back Mount. Place the Button Head Cap Screw through the Lock Washer, the Backrest Cam and into the Back Mount. Finger tighten. It may be necessary to make a minor adjustment to the backrest angle in order to properly align the hole in the link with an available threaded hole in the bracket. Once aligned, reinsert and finger tighten the Button Head Cap Screw to securely attach the link to the back rest assembly.
5. Repeat Step 4 on the other side of the wheelchair.
6. Securely tighten the Button Head Cap Screws, Stop Bolts and Nylock Nuts.



Backrests and Push Handles, continued

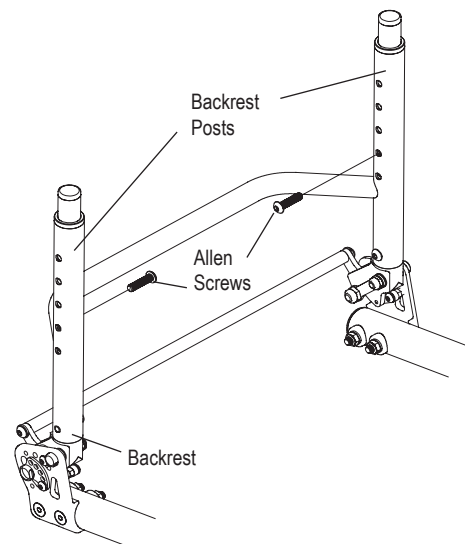
Adjusting the Backrest Height:

Tools:

- 4mm Allen Wrench
- Torque Wrench

IMPORTANT! In order to adjust the backrest height, it is helpful to remove the backrest upholstery. Make note of the tautness of the backrest upholstery before removing so it can be reinstalled to approximately the same degree of tautness.

1. Remove the backrest pad. See the "Tension Adjustable by Straps Back Upholstery" section under Back Upholstery and Seat Upholstery.
2. On both sides of the wheelchair, remove the Allen Screw that secures the Backrest Post inside the backrest.
3. Reposition both Backrest Posts to the desired height inside the Backrest, and reinsert and securely tighten the two Allen Screws to 10 Nm.
4. Make sure both Backrest Posts are at the same height in the Backrest.
5. Reinstall the backrest upholstery. See the "Tension Adjustable by Straps Back Upholstery" section under Back Upholstery and Seat Upholstery.

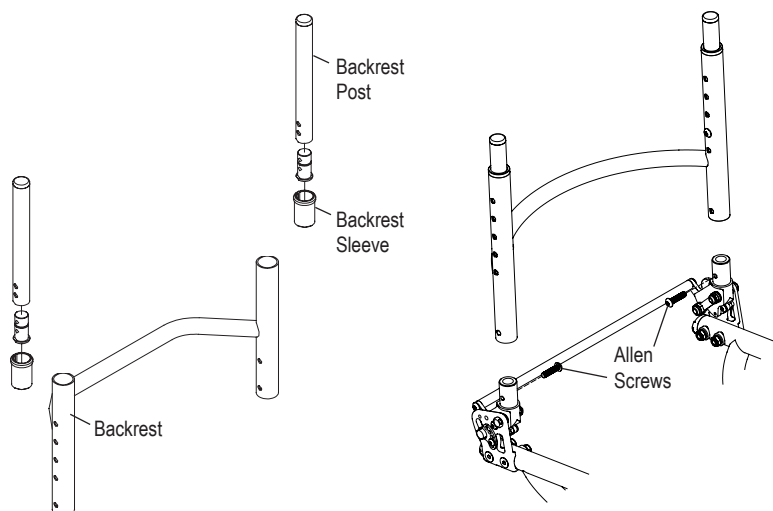


Replacing the Backrest:

Tools:

- 4mm Allen Wrench
- Torque Wrench

1. Remove the backrest upholstery. See the "Tension Adjustable by Straps Back Upholstery" section under Back Upholstery, Seat Upholstery and Seat Cushions.
2. Remove the Backrest Posts. See the "Adjusting the Backrest Height" section above.
3. Remove the Backrest Sleeves.
4. Remove the two Allen Screws (one on each side of the wheelchair) and remove the Backrest.
5. Install the new Backrest and securely tighten the two Allen Screws to 10 Nm.
6. Install the Backrest Sleeves on the new Backrest.
7. Reinstall the Backrest Posts.
8. Reinstall the backrest upholstery.



Backrests and Push Handles, continued

Folding Adjustable Depth, Height & Angle Backrest

Adjusting the Depth:

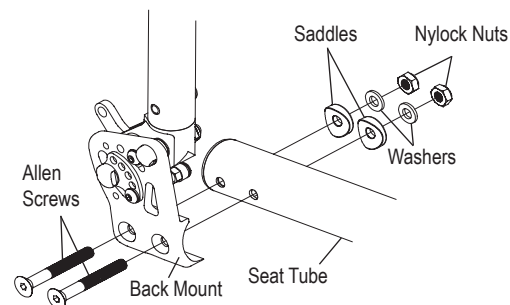


WARNINGS:

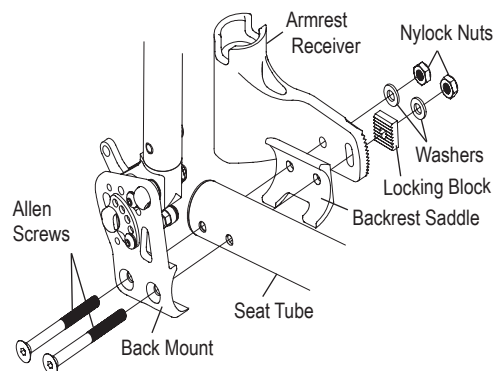
- Before using your wheelchair, make sure the Folding Adjustable Depth, Height & Angle Backrest is securely in place in the upright position and all mounting hardware is securely tightened.
- Any changes to the depth of the backrest will affect the stability (i.e. center of gravity) of the wheelchair. Use extreme caution when using a new backrest depth as it may make the wheelchair more prone to tip over. After adjusting the depth of the backrest, consider whether additional changes need to be made to compensate for the modified stability of the wheelchair (e.g., changing the rear axle position, backrest angle, rear seat height).

Tools:

- 10mm Open End Wrench
 - 4mm Allen Wrench
1. Remove the four Allen Screws (two on each side) that secure the back mount to the seat tube. Note the order of the Saddles, Washers and Nylock Nuts.
 2. Reposition the back mounts to the desired depth.
 3. Reinstall the four Allen Screws through the Back Mount, Seat Tube, Saddles, Washers and securely tighten the Nylock Nuts.



IMPORTANT! If the wheelchair has Swing Away Armrests, the longer screws provided with the wheelchair may be needed in order to secure both the Back Mount and the Armrest Receiver.



Adjustable Push Handles

IMPORTANT! Adjustable Height Push Handles should only be used on aluminum backrests.

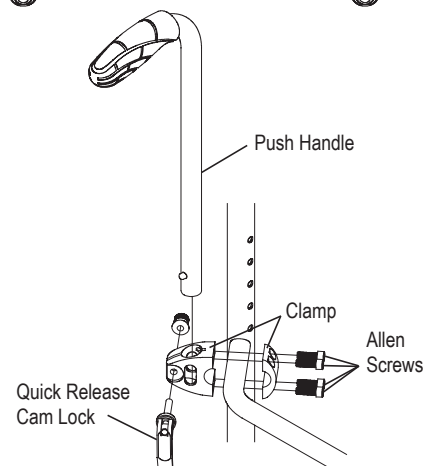
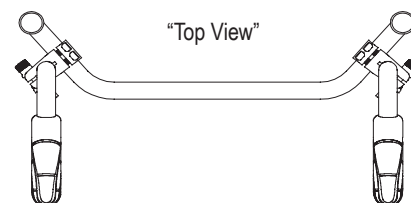
Tools:

- 45mm Allen Wrench

IMPORTANT! The Quick Release Cam Lock enables the user to easily disengage and engage the clamp for purposes of repositioning or removing the Push Handles.

Mounting:

1. Refer to the "Top View" image for the correct location to mount the Adjustable Height Push Handles.
2. Assemble the two halves of the Clamp around the rigidizer bar.
3. Insert the four Allen Screws into the two halves of the clamp and securely tighten.
4. Insert the push handle through the clamp until the handle is at the desired height and securely tighten the quick release cam lock.



Removal:

1. Remove the four Allen Screws.
2. Remove the Clamp and Cam Lock.

Armrests

WARNING: Make sure that the armrests are adjusted properly fore-aft before the user uses the wheelchair. The armrests should be positioned to provide optimal support and comfort for the user's arms and elbows. Improperly adjusted armrests may cause injury, discomfort, or poor posture to the user or damage to the wheelchair.

Swing Away Armrest

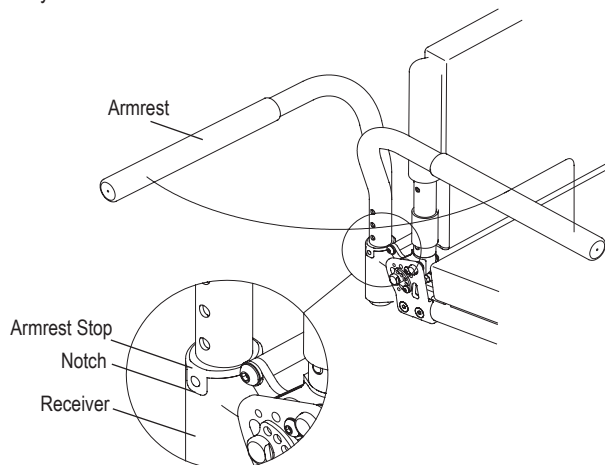
IMPORTANT! The Swing Away Armrests pivot on nylon sleeves, located inside the receiver. If the armrest does not rotate properly, remove the armrest, clean the armrest and inside the receiver thoroughly. If this does not solve the problem, check the nylon sleeves for wear.

To Swing Away the Armrest:

1. Lift the Armrest and rotate the Armrest away from the wheelchair.
2. Make sure to lift the Armrest until the Armrest Stop is above the Notch on the Receiver.

To Replace the Armrest:

1. Rotate the Armrest back towards the wheelchair and gently push it down into place.
2. Make sure the Armrest stop is in the Notch on the Receiver.

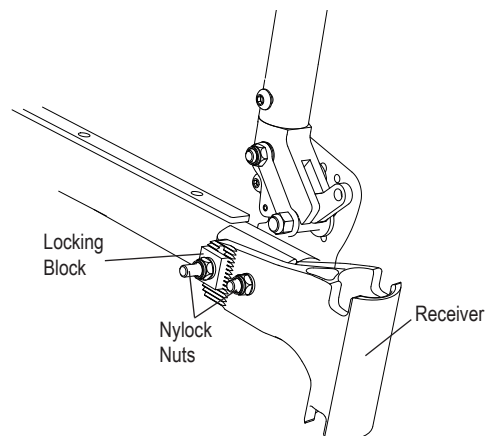


Adjusting the Angle:

Tools:

- 10mm Open End Wrench
- 4mm Allen Wrench

1. Remove the armrest from the Receiver.
2. On one side of the wheelchair, loosen, but do not remove, the Nylock Nuts while holding the Locking Block in position with a finger.
3. To change the angle of the armrest, move the Locking Block one or more teeth up or down until the desired armrest angle is achieved.
4. Make sure the Locking Block teeth are fully engaged with the teeth on the Receiver, and securely tighten the Nylock Nuts.
5. Repeat these steps for the other side of the wheelchair.

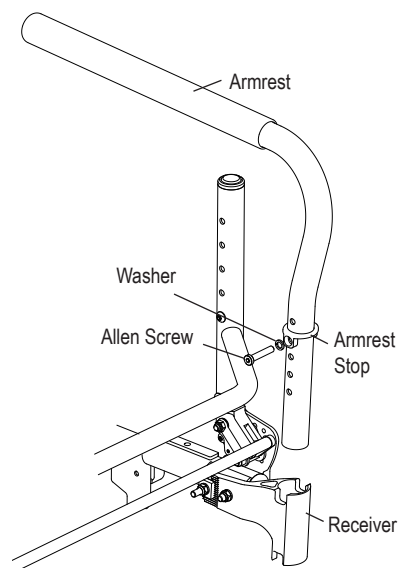


Adjusting the Height:

Tools:

- 4mm Allen Wrench

1. Remove the Armrest from the Receiver.
2. Remove the Allen Screw and Washer securing the Armrest Stop.
3. Reassemble the Armrest Stop in the desired location on the Armrest (in 19mm increments).
4. Securely tighten the Allen Screw.
5. Reinstall the Armrest in the Receiver.



Armrests, continued

Removable, Height Adjustable T-Armrest



WARNING: Make sure the armrest height adjustment pin is securely engaged before applying weight to the armrest.

IMPORTANT! Never lift the wheelchair using the T-Armrest.

Adjusting the Armrest Height:

1. Pull Height Adjustment Pin to allow the Armrest to be raised or lowered to the desired height.
2. After repositioning the Armrest to the desired height, release the Height Adjustment Pin. The positioning holes are in half inch increments.

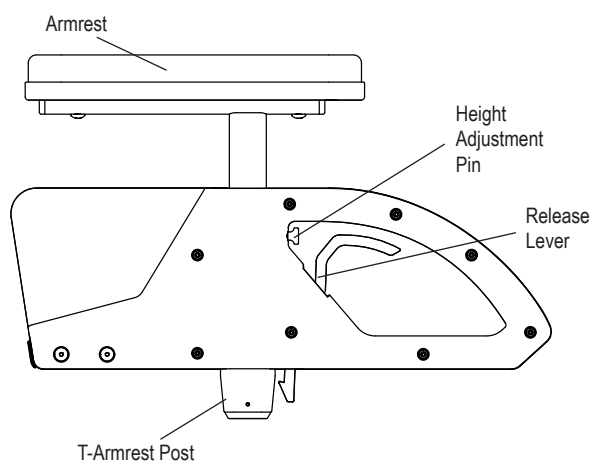
Removing:

1. To remove the T-Armrest, pull and hold the Release Lever.
2. While holding the Release Lever, lift the T-Armrest to remove it from the Armrest Receiver.

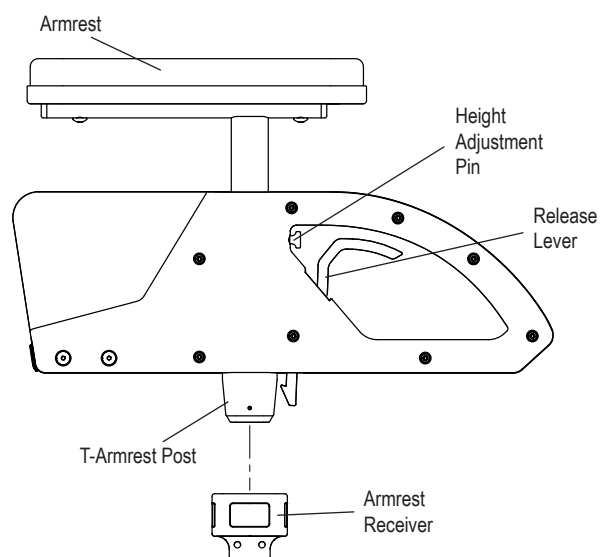
Mounting:

1. Insert T-Armrest Post into the Armrest Receiver until the Release Lever clicks into place.

Removable Height Adjustable T-Armrest

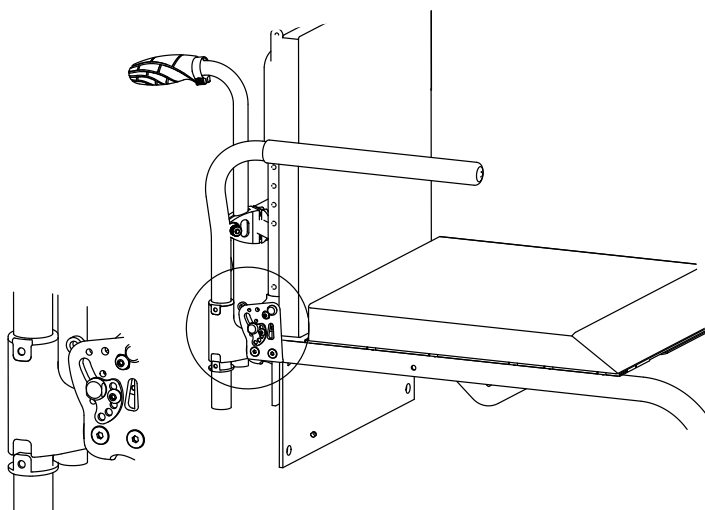


Mounting T-Armrest



Standard Armrest

The Standard Armrests are a fixed height and location. Height of armrest is determined by short and tall selection on order form.



Armrests, continued

Swing Away Flip-Back Armrest

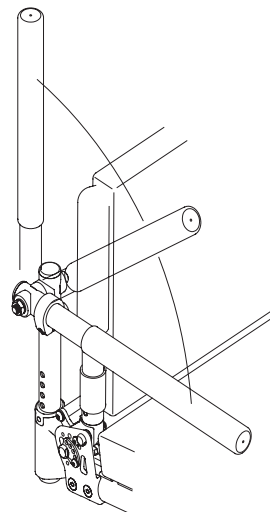
IMPORTANT! The Swing Away Armrests pivot on nylon sleeves, located inside the receiver. If the armrest does not rotate properly, remove the armrest, clean the armrest and inside the receiver thoroughly. If this does not solve the problem, check the nylon sleeves for wear.

To Flip Back the Armrest:

1. Raise the front of the armrest and rotate it straight back, as far as possible.
2. Reverse this step to return the armrest to its original position.

To Swing Away the Armrest:

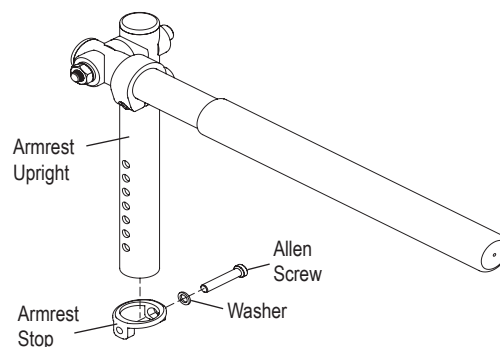
1. Lightly lift up on the armrest and rotate the armrest away from the wheelchair.
2. To replace the armrest, swing back towards the wheelchair and gently push it back down into place.



Adjusting the Armrest Height:

Tools:

- 4mm Allen Wrench
1. Remove the Armrest from the Receiver.
 2. Remove the Allen Screw and Washer securing the Armrest Stop.
 3. Reassemble the Armrest Stop in the desired location on the Armrest (in 19mm increments).
 4. Securely tighten the Allen Screw.
 5. Reinstall the Armrest in the Receiver.



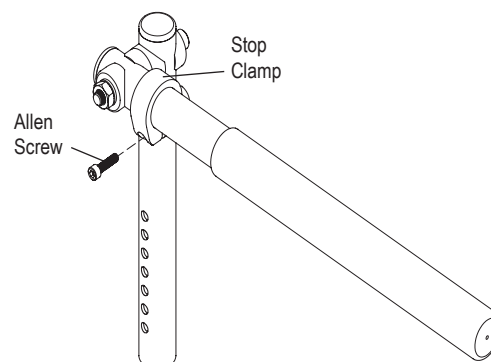
Adjusting the Armrest Angle:



WARNING: Make sure that the Stop Clamp is securely tightened before applying weight to the armrest.

Tools:

- 4mm Allen Wrench
1. To adjust the angle at which the armrest sits when in the down position, loosen, but do not remove the Allen Screw that secures the Stop Clamp.
 2. Slide the Stop Clamp forward on the armrest to lower the angle at which the armrest sits in the down position, or slide the Stop Clamp rearward on the armrest to raise the angle.
 3. Securely tighten the Allen Screw to fix the Stop Clamp in place.



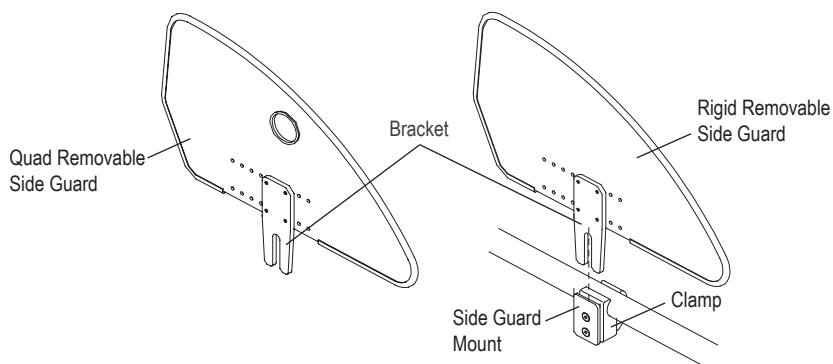
Side Guards

Rigid Removable and Quad Removable Side Guards

Using Rigid Side Guards:

To remove either type of Rigid Side Guard, lift the side guard out of the side guard mount by grasping it at the top or place finger in the hole and pull it upwards.

To replace, place the bracket into the slot between the side guard mount and the clamp and push down.



Adjusting:

Tools:

- 3mm Allen Wrench

Adjust the "snugness" of the fit of the side guard Bracket in the Side Guard Mount by loosening or tightening the two Allen Screws in the Side Guard Mount.

Note: Either type of Rigid Side Guard can be made "non-removable" by firmly tightening the two Allen Screws in the Side Guard Mount while the side guard is installed.

Adjusting/Removing/Reinstalling

Removing:

Tools:

- 5mm Allen Wrench

To remove the entire side guard assembly, including the clamp:

1. Remove the side guard from the side guard mount.
2. Remove the Allen Screw that secures the two halves of the clamp to the frame.

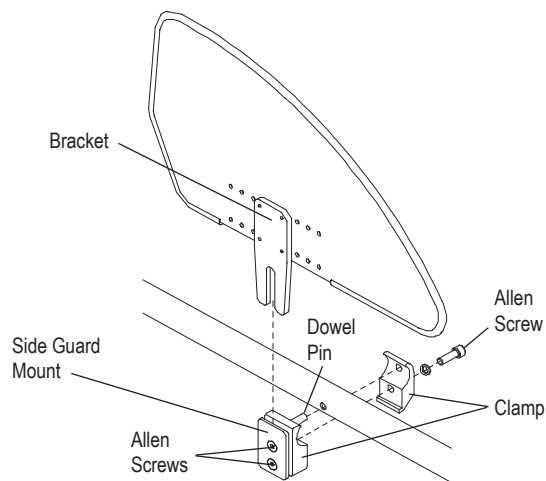
Reinstalling:

Tools:

- 5mm Allen Wrench

IMPORTANT! The half of the clamp to which the Side Guard Mount is attached has a dowel pin protruding from the clamp that must be inserted in the clamp hole in the frame.

1. Align the two halves of the Clamp around the seat tube of the wheelchair frame.
2. Insert the Allen Screw through the washer, the two halves of the Clamp and securely tighten.
3. Insert the side guard Bracket into the Side Guard Mount and adjust the two Allen Screws as described in the "Adjusting" section.



Side Guards, continued

Fold-Down Rigid Side Guards (Aluminum)

Using Fold-Down Side Guards:

To fold down, simply remove the seat cushion and push the top of the side guard toward the seat sling.

To unfold, simply pull the side guard up away from the sling seat.

Removing:

Tools:

- 5mm Allen Wrench

1. Remove the two Allen Screws that secure the two halves of the side guard Clamp.
2. Remove the Fold-Down Guard Clamp assembly.

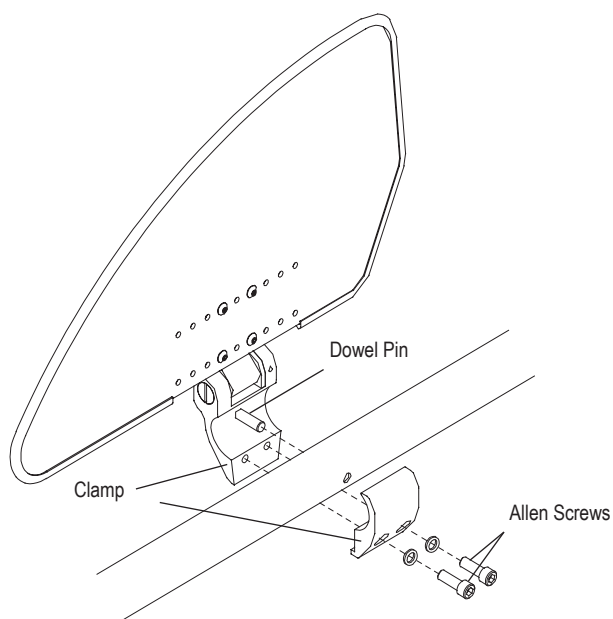
Reinstalling:

Tools:

- 5mm Allen Wrench

IMPORTANT! The half of the side guard clamp to which the Side Guard Mount is attached has a Dowel Pin protruding from the Clamp that must be inserted in the side guard clamp hole on the wheel side of the frame.

1. Align the two halves of the side guard Clamp around the seat tube of the wheelchair frame.
2. Insert the two Allen Screws through the washers and the two halves of the Clamp and securely tighten.



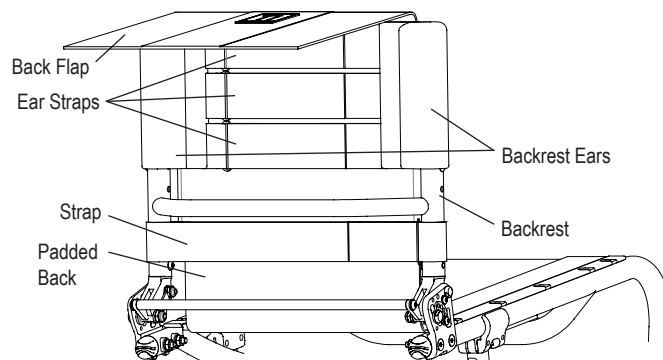
Back Upholstery and Seat Upholstery

Tension Adjustable by Straps Back Upholstery

Adjusting the Tension:

IMPORTANT! When adjusting the tension of the back upholstery, DO NOT apply so much tension that the backrest tubes are pulled out of vertical. If this occurs, it may cause the wheelchair to "track" improperly or develop a "floater".

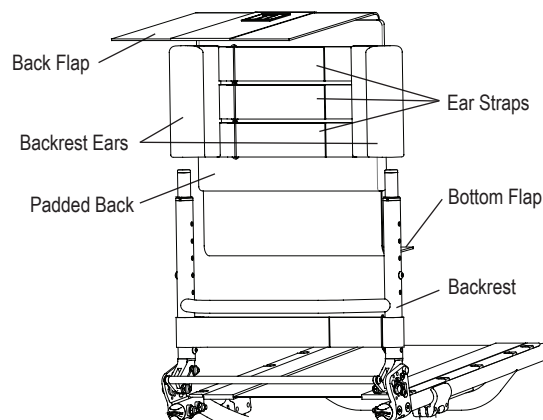
1. Lift the back flap to expose the Backrest Ears.
2. Completely detach the padded back from the Backrest Ears.
Do not remove the Backrest Ears from the Backrest.
3. Adjust to the desired tautness by loosening the Ear Straps and then pulling on the loose end to pull the Backrest Ears closer together.
Tighter back upholstery will increase the stability and maintain normal maneuverability of the wheelchair because the user is pushed forward slightly. Looser back upholstery will increase maneuverability, but will make the wheelchair more prone to tip over backward because additional weight is being distributed onto the rear wheels.
4. Align the top of the Padded Back with the two Backrest Ears.
5. If desired, adjust the tension on the Strap(s).
6. Securely attach the Padded Back to the Backrest Ears and lower the Back Flap back into position in front of the rigidizer bar.



Replacing:

IMPORTANT! If the wheelchair has Integrated or Fold-Down Push Handles, remove the bolts that secure the backrest ears to the backrest (using a 3 mm Allen Wrench) and the bolts that secure the backrest posts inside the backrest (using a 4 mm Allen Wrench). See the "Adjusting the Backrest Height" section under Backrests and Push Handles.

1. Lift the Back Flap to expose the Backrest Ears.
2. Completely detach the Backrest Ears and the Ear Strap(s) from the Padded Back and remove them from the Backrest.
3. Remove the seat cushion.
4. Detach the Bottom Flap from the seat upholstery.
5. Attach the Bottom Flap of the new back upholstery to the seat upholstery at the underside of the seat upholstery.
6. Install the new Backrest Ears on the Backrest. If Integrated or Fold Down Push Handles, tighten to 5 Nm.
7. Adjust to the desired tautness. See the "Adjusting the Tension" section.
8. Align the top of the Padded Back with the Backrest Ears.
9. Reinstall the Ear Strap(s) and adjust to the desired tautness.
10. Securely attach the Padded Back to the Backrest Ears and lower the Back Flap back into position in front of the rigidizer bar.
11. Replace the seat cushion.



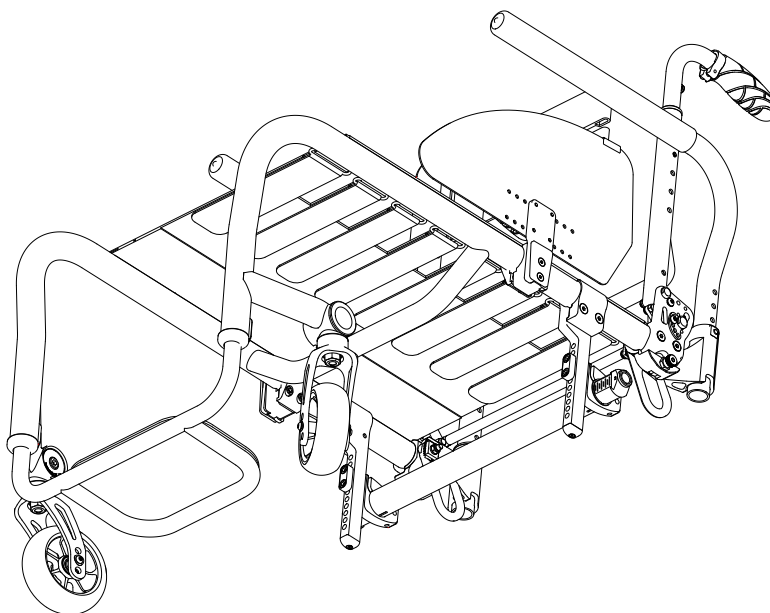
Back Upholstery and Seat Upholstery, continued

Tension Adjustable by Straps Seat Sling Upholstery

WARNING: DO NOT make the tension of the seat sling so loose that it does not properly support the user's weight. Never let the sling become so loose that the user's weight is borne by the frame below the seat sling.

Adjusting the Tension:

1. The upholstery is tension adjustable by hook and loop fastener straps. To adjust the tension on the seat upholstery, access the straps underneath the seat and adjust to preference. For optimal wheelchair performance and responsiveness, it is recommended to keep the seat sling tightly fastened to the wheelchair frame.
2. To tighten the sling, begin with a strap towards the middle of the seat sling. Undo the hook and loop fastener strap, pull tightly around the attachment ring and re-secure on the exposed hook and loop fastener of the same strap.
3. Continue this same process with the strap behind the first strap. It is best to alternate with consecutive straps in front and back until there are no more straps in the back and then finish the remaining straps, working towards the front.



Back Upholstery and Seat Upholstery, continued

Velcro®-Style Adjustable Seat Belt



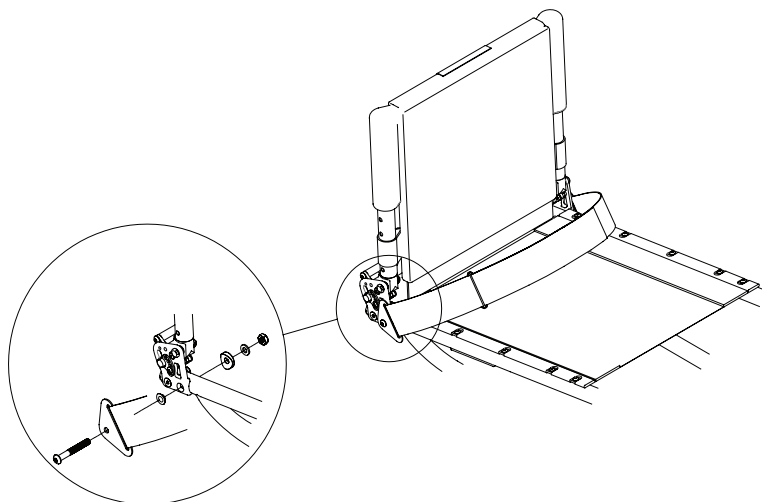
WARNINGS:

- Installation of the Velcro®-Style Seat Belt must be performed by an authorized Permobil Manual dealer or qualified technician.
- A wheelchair user must never use the wheelchair which has seat belts installed without proper securement of the seat belt around the user. If the seat belt is not properly secured, the belt may become entangled in the wheels or an external obstacle which may lead to the wheelchair coming to a sudden stop causing the user to fall out of the wheelchair.
- The Velcro®-Style Seat Belt must be worn tightly fitted across the lower pelvis or thighs at all times. A loose belt can allow the user to slip down and create a risk of strangulation. A seating specialist should demonstrate its proper adjustment and use. Accidental release of the Velcro®-Style Seat Belt can allow the user to slip down or fall from the wheelchair. If the user's movements or cognitive abilities could lead to accidental release, a caregiver must be present at all times during its use. Make sure that all caregivers know how to unfasten the product. Failure to do so may delay release in an emergency. As with any new seating support, the Velcro®-Style Seat Belt may change the way a person sits. Users must continue to practice regular pressure relief activities and skin integrity checks, not only where this product contacts the user, but also in primary pressure-bearing areas such as the sacrum, legs, and buttocks. If increased skin redness or irritation occurs, discontinue use and consult a physician or seating specialist.

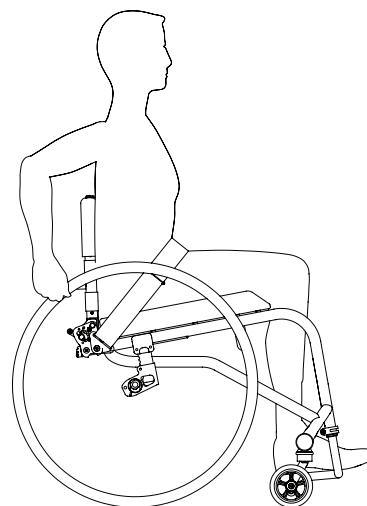
Installation:

The seat belt should be installed as shown in the images below.

Velcro®-Style Seat Belt with D-Ring



Proper Belt Position for Belt with D-Ring



Adjustment:

When the belt is properly adjusted and tightened, it should fit snug so that the user's pelvis is secure. If length adjustment is necessary to achieve a good fit or to remove the belt for cleaning, this can be done using the belt end fittings.

Safety Check:

When properly positioned in wheelchair, the wheelchair user should lean forward and side to side to check the fit. Check for:

1. Normal operation of adjustment straps.
2. Comfort: look for areas of irritation.
3. Position: if too high or too low, adjust anchor points.
4. Interference with other devices: relocate anchor points as necessary.
5. Move the wheelchair through full range of motion, including folding, and rolling. Check for any interference.

Maintenance:

Check periodically for signs of wear in the stitching and webbing. If significant wear is found, contact a supplier for qualified repair or replacement by Permobil.

Axles & Camber Plugs (Center of Gravity; Rear Seat Height)

TiLite Z wheelchairs are equipped with a camber tube. By adjusting the position of the camber tube, the center of gravity of the wheelchair can be adjusted. The information in the Axle Plates and Camber Plugs section of this Service Manual explains the various adjustments that are possible.



WARNINGS:

- Make sure that the COG brackets are adjusted to the same distance with respect to the back support. The COG brackets should be aligned to provide optimal stability and performance for the wheelchair. Improperly aligned COG brackets may cause instability, noise, or failure of the wheelchair.
- When adjusting the position of the camber tube (either to adjust the rear seat height or the center of gravity), it may be necessary to adjust the toe-in/toe-out of the rear wheels. See the "Adjusting Toe-In/Toe-Out" section.

IMPORTANT! It is recommended to remove the rear wheels and turn the chair upside down before attempting to make any adjustments described in the following sections. A padded surface will help protect the frame's finish.

Camber Mounts

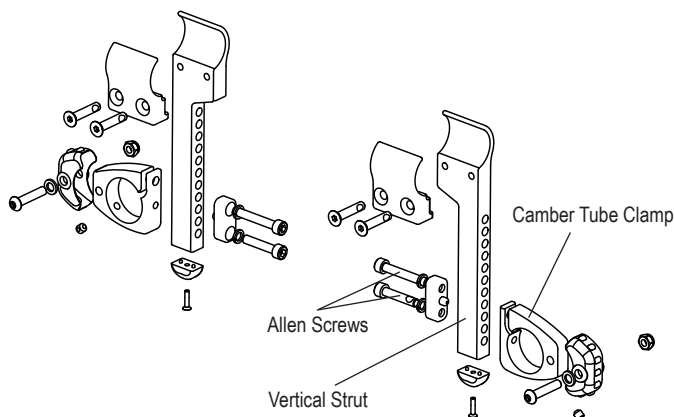
Adjusting the Rear Seat Height:

Tools:

- 5mm Allen Wrench
- Torque Wrench

IMPORTANT! Vertical Struts come in three sizes; short, medium and long. If unable to achieve the desired seat height with existing vertical strut, longer or shorter vertical struts may need to be purchased.

1. Note the original position of the Camber Tube Clamp in relation to the holes in the Vertical Strut.
2. Remove the four Allen Screws (two on each side) that secure the Camber Tube Clamps to the Vertical Struts.
3. Reposition the camber tube to the desired height.
4. Make sure identical holes are used on both Vertical Struts.
5. Reinstall the four Allen Screws and washers and securely tighten to 10 Nm.

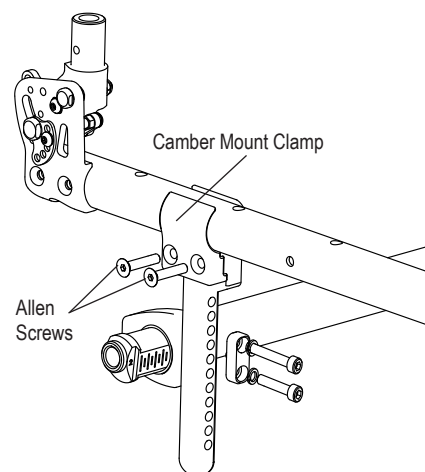


Adjusting the Center of Gravity:

Tools:

- 5mm Allen Wrench
- Ruler
- Torque Wrench

1. Loosen, but do not remove, the four Allen Screws (two on each side of the wheelchair) that secure the Camber Mount Clamps to the frame.
2. Slide the Camber Mount Clamps forward or rearward along the frame until it is positioned in the desired location. Use a ruler to ensure the camber mount assemblies on both sides of the wheelchair are the same distance from the ends of the frame tubes.
3. Securely tighten the four Allen Screws to 10 Nm.
4. Check the rear seat height and adjust as needed.



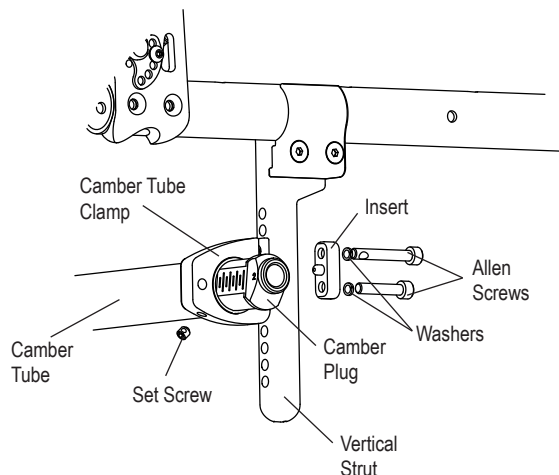
Axle Plates & Camber Plugs (Center of Gravity; Rear Seat Height), continued

Replacing the Camber Tube:

Tools:

- 5mm Allen Wrench
- 2.5mm Allen Wrench
- Ruler

1. Remove the rear wheels and place the frame on a level surface.
2. Locate and remove the Set Screw on the underside of the Camber Tube Clamp on both sides.
3. Loosen the top screw connecting the Camber Tube Clamp to the Vertical Struts on both sides.
4. Slide the Camber Tube out.
5. Unscrew the two Allen Screws and remove both Camber Plugs and Inserts.
6. Replace the Camber Tube and follow steps in reverse order to reassemble.



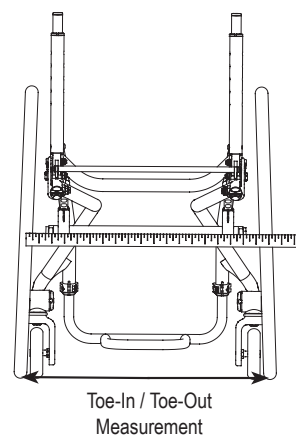
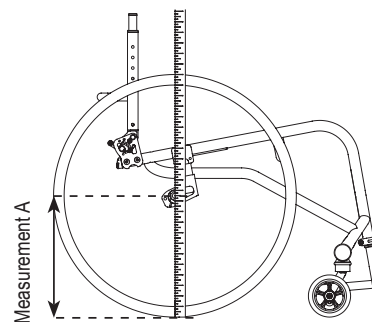
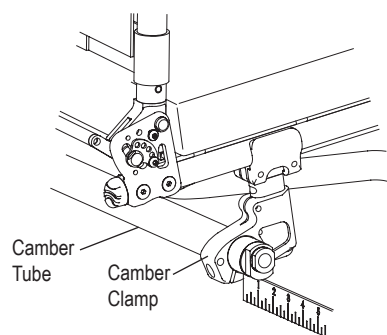
Adjusting Toe-In / Toe-Out

Tools:

- 5mm Allen Wrench
- Ruler or Tape Measure

IMPORTANT! Adjusting the toe-in / toe-out does not apply to chairs with 0° camber; however it is still necessary to make sure the camber plug flats are perpendicular to the ground and the axle sleeve is located at the uppermost part of the plug.

1. Make sure the distance from the end of the camber tube to the camber clamp is identical on both sides of the wheelchair.
2. Make sure the rear wheels are properly inflated.
3. Place the chair on all four wheels with the casters trailing toward the rear of the frame.
4. Measure from the floor to the center of the axle ("Measurement A"). Be sure the tape measure/ruler is perpendicular to the floor.
5. Block the wheels with a heavy object so the chair can not roll forward or backward (do not use the wheel locks as this may affect the toe-in/toe-out adjustment).
6. Measuring from the floor at the rear of each tire, mark the tire (with a felt tip pen) at the same height as Measurement A.
7. Measuring from the floor at the front of each tire, mark the tire (with a felt tip pen) at the same height as Measurement A.
8. Measure the distance between the left and right tires at the rear reference marks made in Step 6.
9. Measure the distance between the left and right tires at the front reference marks made in Step 7.
10. If the measurements in Steps 8 and 9 are the same (within 3 mm), no toeing adjustment is needed, skip to Step 13. If not, proceed to Step 11.
11. Loosen the Allen screw in each camber clamp that secures the camber tube in place.
12. If the measurement in Step 9 is less than the measurement in Step 8, rotate the camber tube rearward to toe-out the rear wheels. If the measurement in Step 9 is greater than the measurement in Step 8, rotate the camber tube forward to toe-in the rear wheels. Continue adjusting the camber tube until these two measurements are equal.
13. Securely tighten the Allen screws in the camber tube mount.
14. Square the casters to the floor.



Axles

WARNINGS:

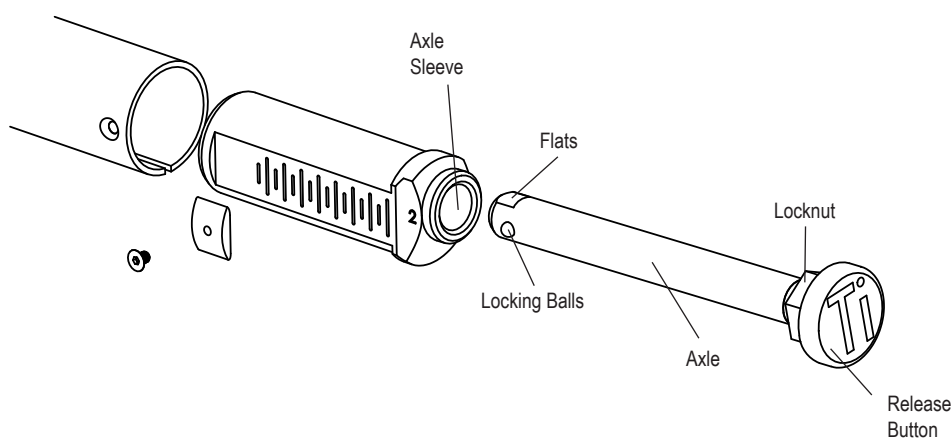
- DO NOT attempt any adjustments when the wheelchair is occupied.
- Quick-Release Axles are pre-adjusted to permit minimal “play” in the axle. Permobil recommends not adjusting the axle. Improperly adjusting the axle could cause it to malfunction—too much “play” can cause the axle to bend and become stuck in the axle sleeve or camber plug; too little “play” can prevent the locking balls from engaging fully, causing the wheel to disengage from the wheelchair without warning. Permobil recommends that an authorized dealer make any adjustments.

Stainless Quick-Release Axles

Adjusting:

Tools:

- 19mm End Wrench
 - 11mm End Wrench
1. Press down on the Release Button and remove the rear wheel and Quick-Release Axle.
 2. Remove the Axle from the wheel by pressing down the Release Button and sliding the Axle through the rear wheel hub.
 3. Once removed from the hub, release the Release Button (the Locking Balls should be fully extended).
 4. Increase or decrease Axle play by adjusting the Locknut while securing the opposite end of the Axle using the smaller wrench at the Flats at the end of the Axle.
 5. Press down on the Release Button on the Quick-Release Axle and slide the Axle through the rear wheel hub.
 6. Press down on the release button and reinstall the rear wheel into the Axle Sleeve or Zero Play camber tube.
 7. Before riding in the wheelchair, make sure the Locking Balls have fully secured the wheel in the Axle Sleeve or Zero Play Camber Tube by pulling on the hub without pressing down the Release Button on the Quick-Release Axle. If the Locking Balls do not fully engage, repeat these steps and increase the play (i.e., increase the distance between the Locknut and the Locking Balls) to permit the Locking Balls to fully engage properly. Also, check to make sure there is not too much play in the Axle.



Axles, continued

Quad Quick-Release Axles

WARNING: The threads on the set screws on the Quad Quick-Release Axles assemblies are treated with Loctite® 242®, a medium strength thread lock. If any set screw is loosened, remove and reapply Loctite® 242® or an equivalent medium strength thread lock.

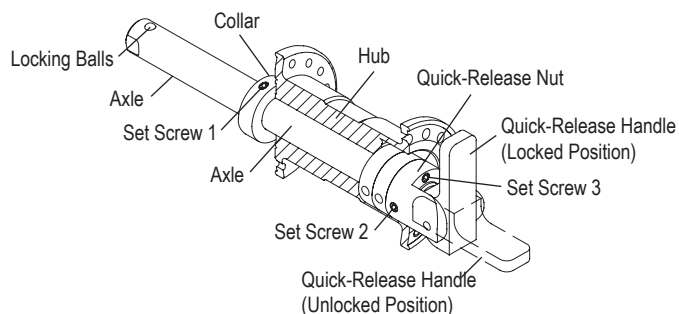
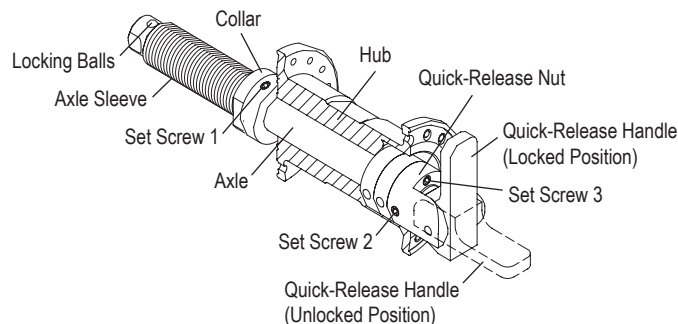
Adjusting the Quad Quick-Release Handle:

If the release handle does not flip back and forth from the locked to unlocked properly, or if it does not fully engage in the locked or unlocked position, the following instructions allow for adjusting the operation of the handle.

Tools:

- 2mm Allen Wrench

1. Flip the Quick-Release Handle to the unlocked position and remove the rear wheel and Quick-Release Axle.
2. Flip the Quick-Release Handle to the locked position.
3. To adjust the "play" between the Quick-Release Handle and the release button inside the Quick-Release Nut: (a) loosen Set Screw 2 on the Quick-Release Nut; (b) rotate the Quick-Release Nut clockwise or counter-clockwise on the Axle until the release button inside the quad Quick-Release Nut just touches the Release Handle while it is in the locked position; and (c) tighten Set Screw 2.
4. Adjusting the "play" in the Quick-Release Handle may necessitate an adjustment to the "play" between the Collar and the wheel Hub. See the "Adjusting the Play" section.
5. With the Quick-Release Handle in the unlocked position, reinstall the rear wheel on the wheelchair.
6. Before riding in the wheelchair, make sure the Locking Balls have fully secured the wheel in the Axle Sleeve by pulling on the Hub with the Release Handle in the locked position. If the Locking Balls do not fully engage, repeat these steps to increase the "play" (i.e., increase the distance between the Quick-Release Nut and the Locking Balls), to permit the Locking Balls to fully engage properly. Also, check to make sure there is not too much "play" in the Axle. See "Adjusting the Play" section below.



Adjusting the "Play":

If there is too much "play" in the axle so the wheel is loose when locked into position in the axle sleeve or Zero Play camber tube or too little "play" so the locking balls do not properly engage, follow these steps.

Tools:

- 2mm Allen Wrench

1. Flip the Quick-Release Handle to the unlocked position and remove the rear wheel and Quick-Release Axle.
2. Adjust Set Screw 3 on the Quick-Release Nut so that no portion of Set Screw 3 is protruding out of the opposite side of the Quick-Release Nut (the side adjacent to the wheel Hub).
3. Loosen Set Screw 1 on the Collar.
4. Replace the wheel on the wheelchair.
5. With the wheel still on the wheelchair and the quad Quick-Release Handle in the locked position so the Locking Balls are fully engaged, be sure the Collar is snug against the outer rear wheel bearing and securely tighten Set Screw 1 so the Collar is securely on the Axle.
6. With the Quick-Release Handle in the unlocked position, turn Set Screw 3 clockwise to remove any remaining play between the wheel hub and collar.
7. Flip the quad Quick-Release Handle to the locked position and check the "play" in the Axle. Make sure the Locking Balls fully engage and lock the Axle into the camber tube. If there is still too much "play" in the Axle, repeat Step 6. If too much "play" has been taken out of the Axle, repeat Step 6, but turn Set Screw 3 counterclockwise to add "play" to the Axle.
8. Before riding in the wheelchair, check the "play" in the wheel and check to make sure the Locking Balls have fully secured the Axle inside the Axle Sleeve or Zero Play camber tube by pulling on the Hub with the quad Quick-Release Handle in the locked position. If the Locking Balls do not properly engage or there is too much "play", return to Step 1 and repeat the instructions.

Wheel Locks



WARNINGS:

- Permobil recommends removing the wheel locks from the wheelchair frame prior to engaging in any contact sport.
- The wheel stop must embed at least 5 mm into the tire or the wheelchair may roll unexpectedly. Therefore, before adjusting the lock inflate the tires to the recommended tire pressure (see sidewall of the tire). If adjusting the locks when the tires are under-inflated, the lock will not operate properly when the tire is fully inflated.
- After adjusting the wheel locks, engage the wheel locks and push against the tires to verify that the wheel locks prevent the wheels from moving. If not, readjust the wheel locks until the wheel locks securely prevent the chair from rolling.

Compact Push to Lock

Adjusting:

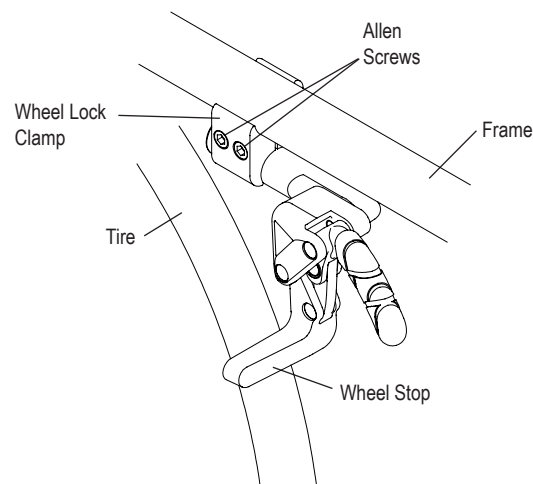
Tools:

- 5mm Allen Wrench
1. Loosen, but do not remove, the Allen screws in the wheel lock clamp.
 2. Adjust the position of the wheel lock clamp on the frame so the wheel stop embeds at least 5 mm into the tire when engaged in the locked position.
 3. Securely tighten the two Allen screws that secure the wheel lock clamp to the frame.

Replacing:

Tools:

- 5mm Allen Wrench
1. Loosen, but do not remove, the two Allen screws that secure the wheel lock clamp to the frame.
 2. Slide the wheel lock out of the clamp.
 3. Slide the new wheel lock into the wheel lock clamp, but do not tighten the Allen screws.
 4. Follow the instructions in the "Compact Push to Lock - Adjusting" section to position and secure the new wheel lock.



Compact Pull to Lock

Adjusting:

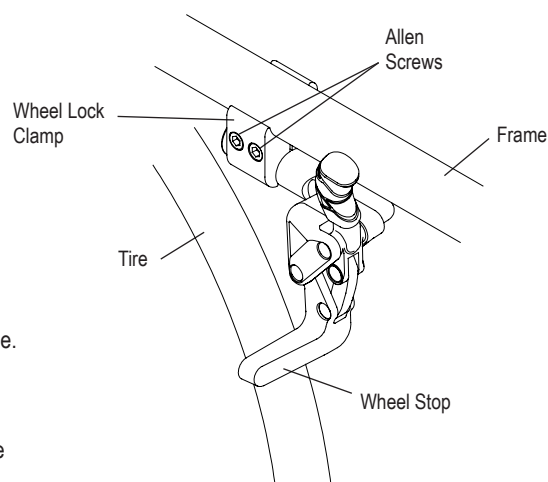
Tools:

- 5mm Allen Wrench
1. Loosen, but do not remove, the Allen screws in the wheel lock clamp.
 2. Adjust the position of the wheel lock clamp on the frame so the wheel stop embeds at least 5 mm into the tire when engaged in the locked position.
 3. Securely tighten the two Allen screws that secure the wheel lock clamp to the frame.

Replacing:

Tools:

- 5mm Allen Wrench
1. Loosen, but do not remove, the two Allen screws that secure the wheel lock clamp to the frame.
 2. Slide the wheel lock out of the clamp.
 3. Slide the new wheel lock into the wheel lock clamp, but do not tighten the Allen screws.
 4. Follow the instructions under "Compact Pull to Lock - Adjusting" section to position and secure the new wheel lock.



Compact Push to Lock and Compact Pull to Lock Wheel Locks with Extension Handles

All of the adjustments steps under the "Compact Push to Lock" and "Compact Pull to Lock" sections apply to the Compact Push to Lock and Compact Pull to Lock Wheel Locks with Extension Handles and to the Aluminum Push to Lock and Aluminum Pull to Lock options.

Wheel Locks, continued

Composite Scissor Lock

Adjusting:

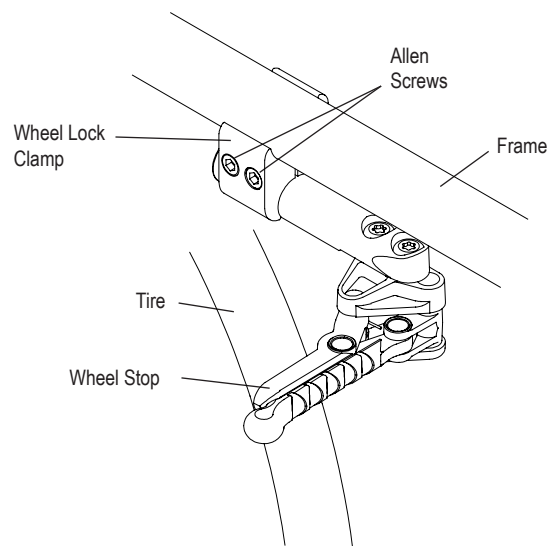
Tools:

- 5mm Allen Wrench
1. Loosen, but do not remove, the Allen Screws in the Wheel Lock Clamp.
 2. Adjust the position of the Wheel Lock Clamp on the Frame so the Wheel Stop embeds at least 5 mm into the Tire when engaged in the locked position.
 3. Securely tighten the two Allen Screws that secure the Wheel Lock Clamp to the Frame.

Replacing:

Tools:

- 5mm Allen Wrench
1. Loosen, but do not remove, the two Allen Screws that secure the Wheel Lock Clamp to the Frame.
 2. Slide the wheel lock out of the clamp.
 3. Slide the new wheel lock into the Wheel Lock Clamp, but do not tighten the Allen Screws.
 4. Follow the instructions in the "Composite Scissor Lock - Adjusting" section to position and secure the new wheel lock.



Grade Aids

Permobil provides Newton Grade Aid Wheel Locks. For information on how to adjust the Grade Aid Wheel Locks, please refer to the product documentation available from Newton.

Casters and Forks

WARNING: Always mount identical size Casters and Forks on both sides of the wheelchair.

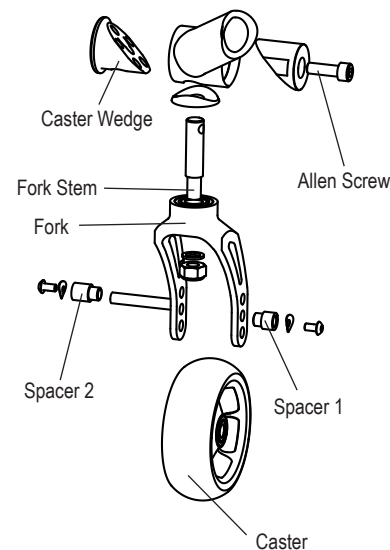
Standard Forks

Replacing Casters:

IMPORTANT! If your wheelchair has 4", 5", or 6" LiteSpeed Casters, make sure that Spacer 2 (which is wider than Spacer 1) is positioned on the recessed side of the Caster, which should be oriented outwards when the Casters are in the trailing position.

Tools:

- 3mm Allen Wrench (2)
1. Remove one Allen Screw, C Spring Washer, and Axle. Use one Allen Wrench to hold one Allen Screw in place and a second Allen Wrench to loosen the other Allen Screw.
 2. Remove the Axle, Caster, and Spacers.
 3. Install the new Caster, Spacers, Axle, and C Spring Washers onto the Fork. Securely tighten the two Allen Screws so there is no space between the Caster, the Spacers, and the Fork sides by using one Allen Wrench to hold one Allen Screw in place and another to tighten the other Allen Screw.



Replacing Forks:

Tools:

- 3mm Allen Wrench (2)
 - 17mm Wrench
1. Remove the Casters. See the "Standard Forks – Replacing Casters" section.
 2. Using the 17mm Wrench, loosen and remove the Nylock Nut and Washer from the Fork Stem.
 3. Remove the Fork and Caster Cap, then install the Caster Cap and replacement Fork on the Fork Stem.
 4. Replace the Nylock Nut and Washer and securely tighten using the 17mm Wrench. Nylock Nut should be tight enough to provide a slight amount of swivel on the Fork.
 5. Reinstall the Casters. See the "Standard Forks – Replacing Casters" section.

Adjusting the Front Seat Height with Standard Forks:

WARNING: Always use identical Axle holes on both sides of the wheelchair.

Tools:

- 3mm Allen Wrench (2)

IMPORTANT! If using 3" or 4" Casters, the front seat height of the wheelchair can be adjusted up or down without changing the casters to a larger or smaller size. The full range of adjustability is not available with 5" or 6" Casters. Additional adjustability may be achieved with different forks or casters or with fork stem extensions. Contact Permobil Customer Service for assistance.

1. Remove the Casters. See the "Standard Forks – Replacing Casters" section.
2. With the Axle removed, line up the Spacers, Caster, and desired alternative Axle hole.
3. Insert Axle into lined up holes and secure together with Allen Screws using the Allen Wrench. See the "Standard Forks – Replacing Casters" section.
4. Repeat steps 1 through 3 for opposite Fork.

Casters and Forks, continued

Adjusting the Angle of the Fork in the Caster Mount:

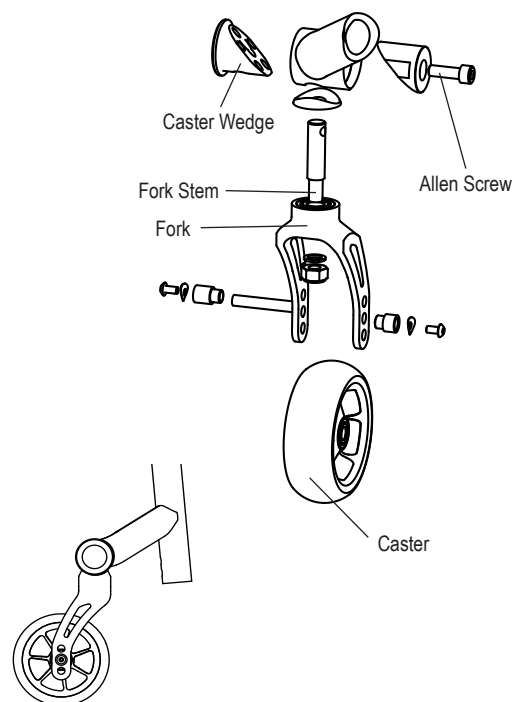
⚠ WARNINGS:

- When assembling caster wedges, be sure to clean all surfaces from foreign objects and grease using a dry cloth. Using rubber gloves, apply SAC-2 SuperGrip™ to the inside of the caster housing after every fourth removal.
- Be sure that the Allen Screw is sufficiently tightened to 25Nm.

Tools:

- 6mm Socket Bit
- Torque Wrench
- Drafting Triangle
- SAC-2 SuperGrip™ Carbon and Alloy Assembly Compound
- Rubber Gloves

1. Place the wheelchair on a smooth, level surface with the Casters trailing rearward.
2. Using a 6mm Socket Bit on a Torque Wrench, loosen but do not remove the Allen Screw enough to allow the Fork Stem to slide inside the Caster Housing slot.
3. Using a Drafting Triangle or similar 90° angle tool, rotate the Fork until the flat edge of the Fork is perpendicular to the level surface.
4. Tighten the Allen Screw through the Caster Wedges to 25Nm using the 6mm Socket Bit and Torque Wrench.
5. Repeat steps 2 through 4 for the opposite side caster.
6. Recheck flat edge of the Forks to be certain they are perpendicular to the level surface before riding.



Slipstream Single-Sided Forks

Replacing Casters:

IMPORTANT! Caster wheel is asymmetrical. Deeper caster side should be outward facing when in the trailing position

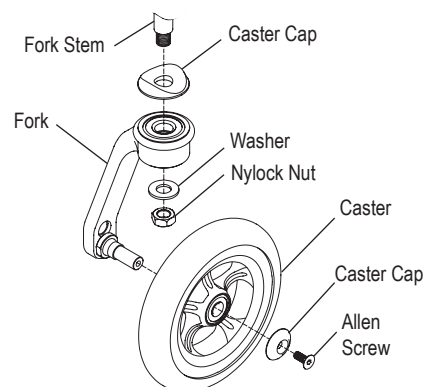
Tools:

- 3mm Allen Wrench
1. Remove the Allen Screw and Caster Cap.
 2. Remove the caster.
 3. Install the new caster onto the Slipstream Single-Sided Fork, replace the single sided Caster Cap and securely tighten the screw so there is no space between the caster and the Slipstream Single-Sided Fork side.

Replacing Forks:

Tools:

- 17mm Wrench
 - 3mm Allen Wrench
1. Remove the casters. See the "Slipstream Single-Sided Forks – Replacing Casters" section.
 2. Remove the Nylock Nut and Washer.
 3. Remove the old Fork and install the replacement Fork on the Fork Stem.
 4. Replace the Nylock Nut and Washer and securely tighten.
 5. Reinstall the casters. See "Slipstream Single-Sided Forks – Replacing Casters" section.



Casters and Forks, continued

Adjusting the Front Seat Height with Slipstream Single-Sided Forks:

⚠ WARNINGS:

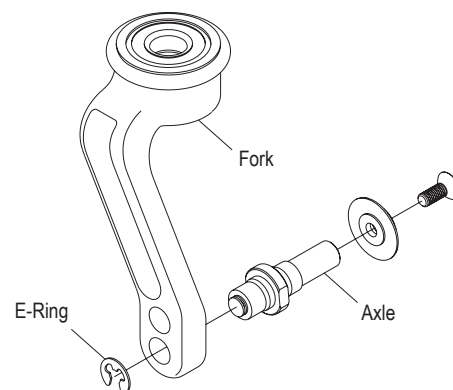
- Always use identical axle holes on both sides of the wheelchair.
- The threads on the screws that secure the casters to the fork and the axles are treated with Vibra-TITE® VC-3, a locking and sealing coating, to reduce the possibility they will become loose. The screws and axles should be able to be removed and reinstalled approximately four times without reapplying the coating. If the screws or axles are repeatedly removed and reinstalled, Permobil requires that Vibra-TITE® VC-3 be applied after every fourth adjustment.

Tools:

- 16mm Open End Wrench
- Screwdriver

IMPORTANT! The front seat height of the wheelchair can be adjusted up or down without changing the casters to a larger or smaller size. The full range of adjustability is not available with 5" or 6" Casters.

1. Remove the caster. See the "Slipstream Single-Sided Forks – Replacing Casters" section.
2. Using the shaft of the screwdriver, remove the E-Ring by pressing downward across the open portion of the E-Ring. The E-Ring will spring off of the Axle, so protective eyewear must be worn.
3. Using the 16 mm Open End wrench, remove the Axle from the Single-Sided Fork.
4. Place the Axle in the alternate axle hole and securely tighten.
5. Using the shaft of the screwdriver, replace the E-Ring by pressing downward across the closed portion of the E-Ring, snapping the E-ring into place.
6. Replace the caster. See the "Slipstream Single-Sided Forks – Replacing Casters" section.
7. Follow Steps 1 through 6 on the opposite Fork.



Glide Forks

⚠ WARNING: Always mount identical size casters and forks on both sides of the wheelchair.

Replacing Casters - Standard Glide Fork:

IMPORTANT! If the wheelchair has 5" or 6" LiteSpeed Casters, make sure that Spacer 2 (which is wider than Spacer 1) is positioned on the recessed side of the caster, which should be oriented outwards when the casters are in the trailing position.

Tools:

- 3mm Allen Wrench (2)
1. Remove one Allen Screw, C Spring Washer, and Axle. Use one Allen Wrench to hold one Allen Screw in place and a second Allen Wrench to loosen the other Allen Screw.
 2. Remove the Axle, Caster, and Spacers.
 3. Install the new Caster, Spacers, Axle, and C Spring Washers onto the Fork. Securely tighten the two Allen Screws so there is no space between the Caster, the Spacers, and the Fork sides by using one Allen Wrench to hold one Allen Screw in place and another to tighten the other Allen Screw.

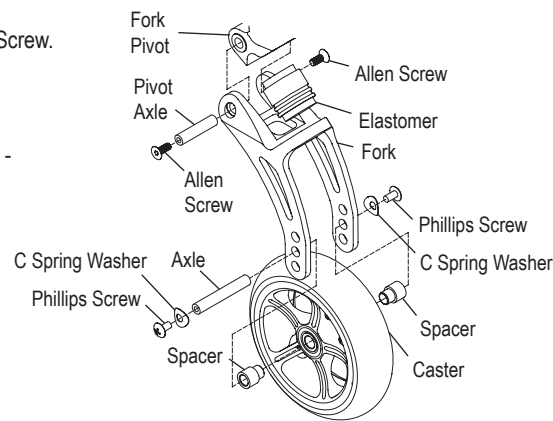
Replacing Casters - Single-Sided Glide Fork:

To replace the casters, use the tools and follow the instructions in the "Slipstream Single-Sided Forks - Replacing Casters" section.

Replacing the Elastomer:

Tools:

- 3mm Allen Wrench (2)
1. Remove the Allen Screws from the Fork Pivot and push out the Pivot Axle. in place and a second Allen Wrench to loosen the other Allen Screw.
 2. Separate the two halves of the Glide Fork to release the Elastomer.
 3. Install the new Elastomer.
 4. Push firmly on the two halves of the Glide Fork to facilitate reinstalling the Allen Screws and Pivot Axle.



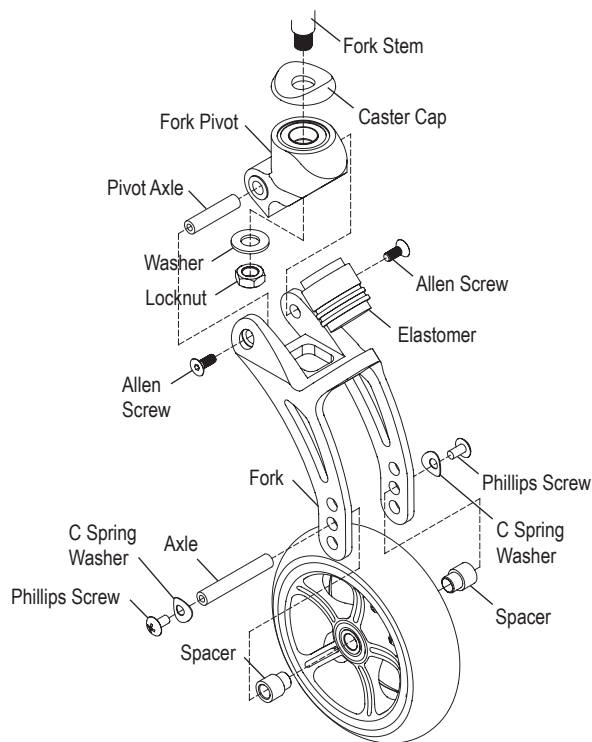
Casters and Forks, continued

Replacing Glide Forks - Standard Sided:

Tools:

- 3mm Allen Wrench (2)
- 17mm Socket Wrench

1. Remove the casters. See the "Glide Forks - Replacing Casters - Standard Forks" section or the "Slipstream Single-Sided Forks – Replacing Casters" section.
2. Remove the Allen screws from the fork pivot and push out the pivot axle.
3. Separate the two halves of the Glide fork.
4. Using the Open End wrench, loosen and remove the locknut and washer from the fork stem. Slide the fork pivot and caster cap off of the fork stem. Slide the caster cap and replacement fork pivot onto the fork stem and holding the parts in place, slide the washer onto the fork stem and tighten the locknut.
5. Push firmly on the two halves of the Glide fork with the elastomer in place, aligning the holes of the fork pivot with the fork. Insert the pivot axle, reinstall the Allen screws and securely tighten.
6. Reinstall the casters. See the "Glide Forks - Standard Forks – Replacing Casters" section or the "Slipstream Single-Sided Forks – Replacing Casters" section.



Rear Wheels

WARNING: DO NOT attempt any adjustments when the wheelchair is occupied.

Rear Wheel with Quick-Release Axle

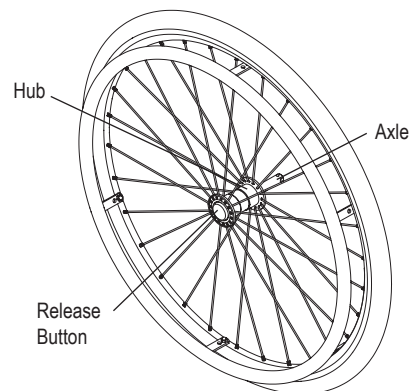
Removing:

1. Hold the wheel securely at the Hub.
2. Press down the Release Button on the quick-release axle and slide the wheel and Axle out of the axle sleeve.
3. Release the Release Button.

Replacing:

WARNING: Make sure the locking balls fully secure the quick-release axle inside the axle sleeve before operating the wheelchair.

1. Hold wheel securely at the hub.
2. Press down the release button on the quick-release axle, making sure the locking balls recess into the axle.
3. Insert the axle all the way into the axle sleeve.
4. Release the release button.
5. Pull firmly on the wheel (without depressing the release button) to make sure the wheel is locked securely in place.



Quad Quick-Release Axle

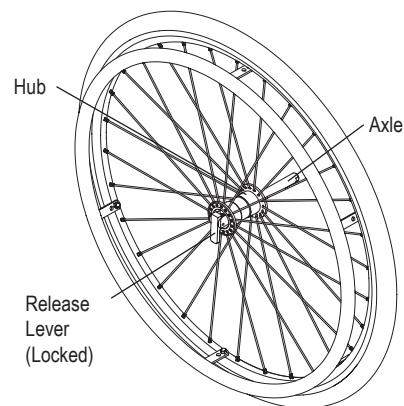
Removing:

1. Unlock the Release Lever on the Quad Quick-Release Axle.
2. Slide the wheel and Axle out of the axle sleeve.

Replacing:

WARNING: Make sure the locking balls fully secure the Quad Quick-Release Axle inside the axle sleeve before operating the wheelchair.

1. Hold the wheel securely at the hub.
2. Unlock the lever on the Quad Quick-Release Axle, making sure the locking balls recess into the axle.
3. Insert the axle all the way into axle sleeve.
4. Lock the lever on the Quad Quick-Release Axle.
5. Pull firmly on the wheel (without unlocking the lever) to make sure the wheel is locked securely in place.



Handrims

WARNING: Handrims must be replaced by an authorized Permobil dealer or qualified technician.

Rear Wheels, continued

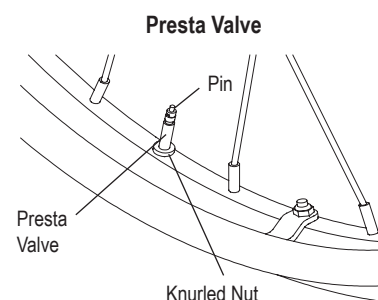
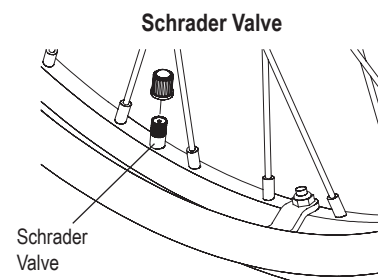
Pneumatic Tires and Tubes

WARNING: Fully deflate the tire before performing any disassembly procedures. DO NOT re-inflate the tire until all re-assembly is completed.

Tools:

- Tire Lever

1. Remove the rear wheel from the wheelchair.
2. Remove all air from the inner tube. For a Schrader valve, remove the valve stem cap and release all of the air from the tube, by pressing down on the pin in the center of the valve stem. For a Presta valve, remove the valve stem cap, unscrew, counterclockwise, the knurled nut on the valve stem and release all of the air from the tube by pressing down on the pin in the center of the valve stem.
3. Remove the tire and inner tube.
4. Make sure the rim strip is properly in place.
5. Install the new inner tube and wheel tire onto the wheel.
6. Make sure the tire is properly seated in the wheel rim, and inflate the tire to the correct PSI rating on the sidewall of the tire.
7. Reinstall the rear wheel on the chair.



Solid Tires

WARNING: Replacement of solid tires requires specialized equipment. If the solid tires need replacement, this must be done by an authorized Permobil dealer or qualified technician.

Rear Wheel Spacing

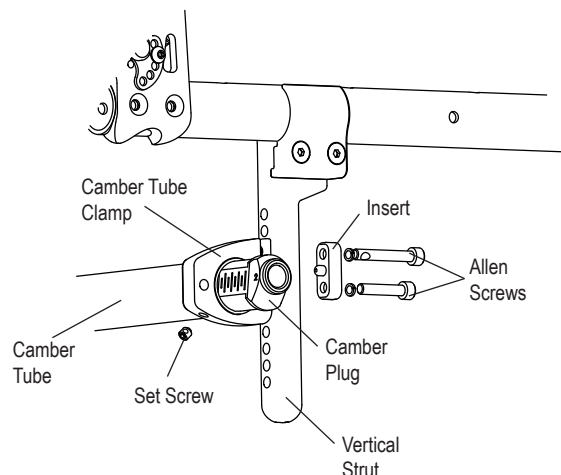
Adjusting the Rear Wheel Spacing:

WARNING: Make sure to use the same spacing on both sides of the wheelchair.

Tools:

- 5mm Allen Wrench
- 3mm Allen Wrench
- Torque Wrench

1. Remove the rear wheels and place the frame on a level surface.
2. Locate and remove the Set Screw on the underside of the Camber Tube Clamp on both sides.
3. Loosen the top screw connecting the Camber Tube Clamp to the Vertical Struts on both sides.
4. Adjust the Camber Plugs on both sides. Using the hash marks ensure that the plugs are aligned on the same hash mark.
5. Follow steps in reverse order to reassemble. Tighten set screw to 4 Nm and tighten Allen Screws to 10 Nm



Anti-Tips



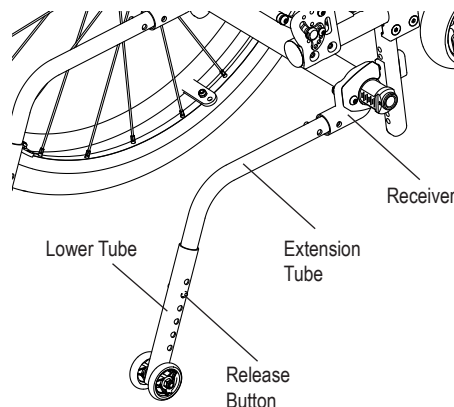
WARNINGS:

- Only an authorized Permobil dealer or qualified technician should install the anti-tip receiver.
- DO NOT disassemble the anti-tip mounting assembly.
- Before sitting in the wheelchair, make sure the anti-tips are operating properly. Place the unoccupied wheelchair on a level surface, engage the anti-tips and tip the chair backward until the anti-tips are supporting the weight of the chair. Apply sufficient pressure to ensure the anti-tips are operating properly.

IMPORTANT!: If anti-tips were not originally ordered with the Permobil wheelchair, anti-tips will need to be ordered as well as replacement Allen Screws.

Adjusting the Anti-Tip:

1. The bottom of the anti-tip wheels should be between 4cm and 5cm above the floor to ensure proper functionality. To adjust the height, press the two Release Buttons on the telescoping lower Tube, then adjust the height of the Lower Tube.
2. To rotate the anti-tips upward, press the two Release Buttons on the Extension Tube to release the Extension Tube and rotate upward until the release button locks in place on the opposite side of the anti-tip Receiver.
3. To remove the anti-tip, press the Release Button on the Extension Tube and pull the Extension Tube out of the anti-tip Receiver.

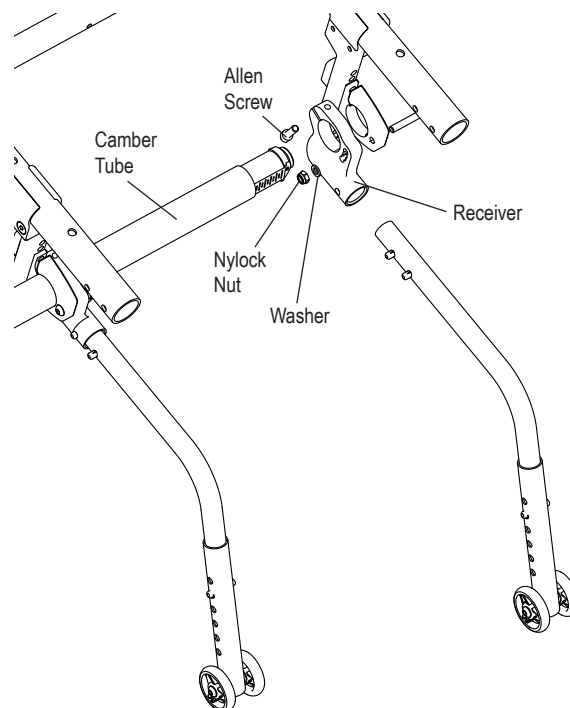


Mounting the Anti-Tip Receiver:

Tools:

- 4mm Allen Wrench
- 5mm Allen Wrench
- 10mm Open End Wrench

1. Remove the rear wheels and place the frame on a level surface.
2. Remove the Camber Tube. See the "Replacing the Camber Tube" section under Axle Plates & Camber Plugs (Center of Gravity, Rear Seat Height).
3. Thread the Allen Screw through the right side camber mount, right side anti-tip Receiver and the Washer and securely tighten the Nylock Nut. Make sure that the anti-tip Receiver is oriented parallel to the floor.
4. Repeat Step 3 on the left side camber mount and the left side anti-tip Receiver.
5. Reinstall the Camber Tube. See the "Replacing the Camber Tube" section under Axle Plates & Camber Plugs (Center of Gravity, Rear Seat Height).
6. Tighten the Allen Screw in each anti-tip Receiver so that it securely clamps into the Camber Tube.
7. Reinstall the rear wheels.



Anti-Tips, continued

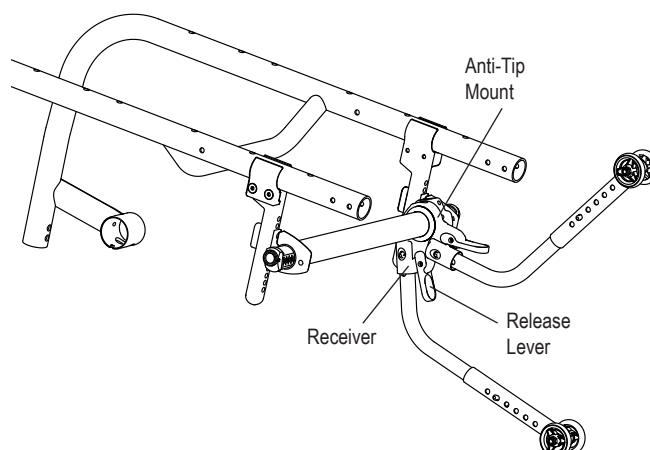
User-Friendly Anti-Tips

Engaging:

To engage the User-Friendly Anti-Tips, grip the anti-tip Receiver firmly and pull it rearward, away from the anti-tip mounting plate and lower it until it re-engages in the mounting plate.

Disengaging:

To disengage the User-Friendly Anti-Tips, grip the anti-tip receiver firmly and pull it downward, away from the anti-tip mounting plate and raise it until it re-engages in the mounting plate.



Adjusting:

To adjust the height of the User-Friendly Anti-Tips, press the two Release Buttons on the telescoping Lower Tube and adjust the height of the Lower Tube until the wheels are within 1 1/2" to 2" off the ground.

Removing:

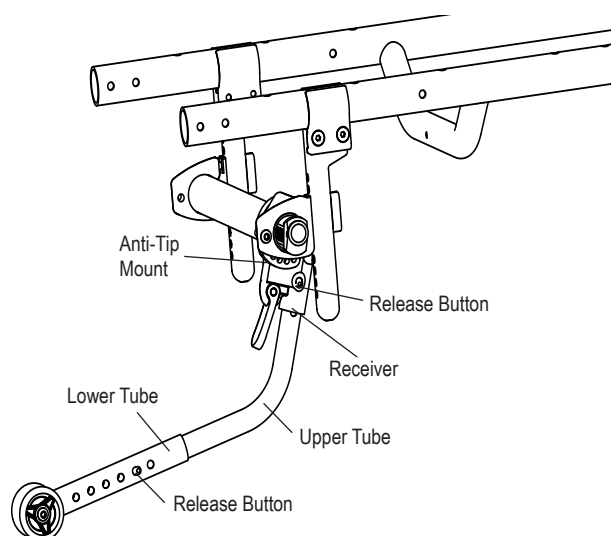
To remove the User-Friendly Anti-Tips, press the Release Buttons on the anti-tips Receiver and pull the Upper Extension Tube out of the anti-tip Receiver.

Mounting:

Tools:

- 5mm Allen Wrench
- 10mm Open End Wrench

1. Remove the rear wheels and place the frame on a level surface.
2. Remove camber tube. See the "Replacing the Camber Tube" section under Axle Plates & Camber Plugs (Center of Gravity, Rear Seat Height).
3. Do not disassemble the mounting plate from the anti-tip Receiver. Align the mounting plate with two holes in the rear of the frame and install the new Allen screws through the various washers, frame and plate.
4. Securely tighten all Allen screws and locknuts.
5. Reinstall the rear wheels.
6. With the wheelchair standing upright on a level surface, engage the anti-tip as described in the "Engaging" section.
7. Adjust the height of the anti-tip as described in the "Adjusting" section.



Transportation

Occupied Use in a Motor Vehicle

Please read and understand all warnings before using the wheelchair. Safety is our top priority.



Warnings:

- This wheelchair conforms with the requirements of ISO 7176-19:2022 and has been designed and tested for use only as a forward-facing seat in a motor vehicle.¹
- The wheelchair has been dynamically tested in a forward-facing orientation with the ATD restrained by a three-point belt restraint.
- Only the designated securement points should be used to secure the wheelchair to the vehicle.
- This wheelchair has been tested with the Q-STRAINT Standard Lap Belt restraint.
- Both pelvic- and shoulder-belt restraints should be used to reduce the possibility of head and chest impacts with vehicle components.
- Pelvic- and shoulder-belt restraints should be used together as designed for (DO NOT connect a latch plate to a pin-bushing anchorage unless the system is designed to interface this way).
- In order to reduce potential of injury to vehicle occupants, wheelchair-mounted trays not specifically designed for crash safety should be removed and secured separately in the vehicle. If the tray cannot be removed, it should be secured to the wheelchair but positioned away from the occupant with energy-absorbing padding placed between the tray and the occupant.
- When possible, other auxiliary wheelchair equipment should be secured to the wheelchair or removed from the wheelchair and secured in the vehicle during travel so that it does not break free and cause injury to vehicle occupants in the event of a collision.
- Postural supports should not be relied on for occupant restraint in a moving vehicle.
- The wheelchair should be evaluated by a manufacturer's representative for determination whether the wheelchair is suitable for reuse after involvement in any type of vehicle collision.
- Alterations or substitutions should not be made to the wheelchair securement points or to structural and frame parts or components since this can affect the crashworthiness of the wheelchair, and it can also change the performance of the wheelchair in normal use. If it is considered necessary to make these kinds of alterations, the wheelchair manufacturer shall be consulted.
- Care should be taken when applying the occupant restraint to position the seatbelt buckle so that the release button will not be contacted by wheelchair components during a crash.

¹ Crash testing is a simulation of a frontal impact only. It does not simulate any other type of impact. Furthermore, TiLite wheelchairs are highly customized and can be ordered in millions of combinations and it is impossible to test every conceivable combination. Therefore, TiLite recommends that wheelchair users transfer to the vehicle seat when being transported in a vehicle. The vehicle seat offers the greatest degree of safety because it is secured to the chassis of the vehicle and is designed with the primary purpose of protecting the occupant in a crash. By contrast, the primary purpose of any wheelchair is to maximize mobility, which in turn requires that the product be as light as possible. As of this date, the U.S. Department of Transportation has not approved any tie-down system for transportation of a user while in a wheelchair in a moving vehicle of any type.

Transportation, continued

Transit Tie Downs

Wheelchair users should transfer to the vehicle seat and use the vehicle-manufacturer-installed restraint systems whenever it is feasible, and the unoccupied wheelchair should be stored in a cargo area or secured in the vehicle during travel. If the wheelchair must be occupied during vehicle travel, please ensure the following information is taken into account:

- The minimum recommended occupant mass for use in a transit equipped chair is 50 lbs (23 Kg).
- The maximum recommended occupant mass for use in a transit equipped chair is 275 lbs (125 Kg).
- The TiLite Z with Transit Tie-Down Option has been found to meet or exceed the performance requirements of ISO 7176-19:2022. This standard requires that transit equipped wheelchairs are tested by subjecting the wheelchair to a frontal impact at 30 mph (48 km/h). A wheelchair is loaded with a suitable crash test dummy, accelerated to 30 mph and brought to a controlled stop, simulating a frontal impact generating 20 g of force on the crash test dummy. Permobil has crash tested the TiLite Z with Transit Tie-Down Option in one configuration and the wheelchair tested was compliant with ISO 7176-19:2022. The wheelchair was tested utilizing a 170 lb (77 kg) crash test dummy, which corresponds to an occupant weight of 165 to 300 lbs (75 to 136 kg), and used a vehicle-anchored shoulder belt and a wheelchair-anchored pelvic belt. To minimize risk when travelling in motor vehicles, make sure that any adjustable accessories are configured as close as possible to the crash tested chair configuration. The wheelchair tested had a total mass of 22 lbs (10 kgs) and was configured as follows:

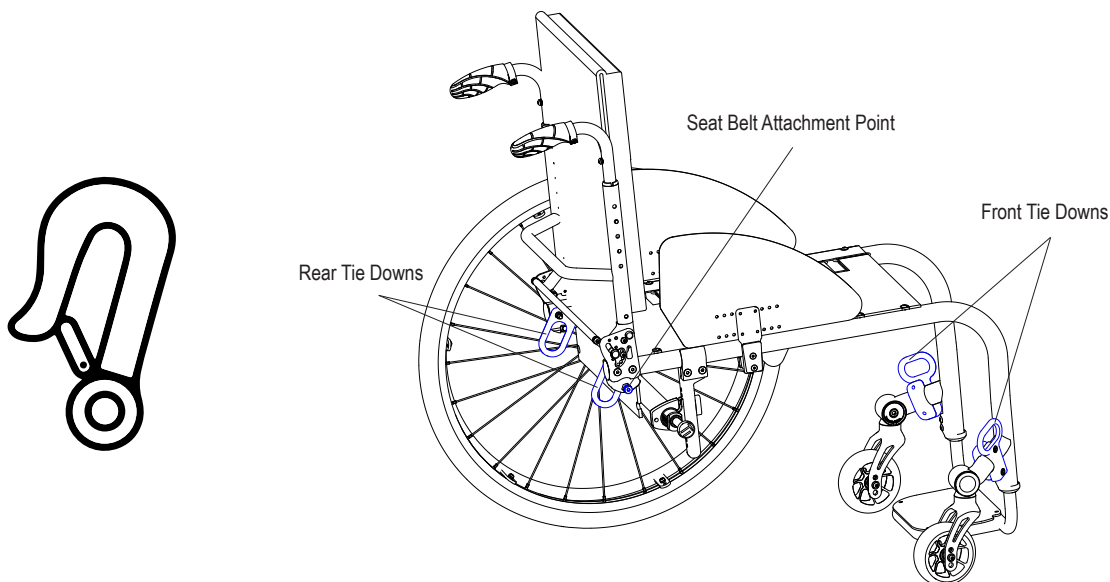
Seat Width	16.0 in. (40 cm)	Front Angle	80°	Push Handles	N/A	Rear Wheels	24" (540) Shadow
Seat Depth	14.0 in. (35.5 cm)	Seat to Footrest	16.5 in. (42 cm)	Center of Gravity	0.5 in. (1 cm)	Tires	Pneumatic
Front Seat Height	19 in. (48 cm)	Foot Plates	Aluminum Open Loop	Camber	2°	Anti-Tips	N/A
Rear Seat Height	17 in. (43 cm)	Back Height	20.5 in. (52 cm)	Caster Wheels	5" Soft Roll		

- This option is labeled "Transit Tie-Down Option" on the TiLite Z order form. When ordered, product ships with four factory-installed, transit tie-down brackets and two factory-installed, wheelchair-anchored, pelvic belt brackets. The four tie-down brackets are used to secure the wheelchair within the vehicle using a four-point, strap-type wheelchair tie-down system. The two pelvic belt brackets provide anchorage points to secure a crashworthy wheelchair-anchored pelvic belt that conforms to the requirements of ISO 7176-19:2022 and that can be used in conjunction with a vehicle-anchored shoulder belt with a standard lower-anchorage connector for effective crashworthy three-point belt restraint in a motor vehicle. The occupant is to be secured within the wheelchair using a three-point restraint system consisting of a wheelchair-anchored pelvic belt and a vehicle-anchored shoulder belt. The TiLite Z with Transit Tie-Down Option was tested using a Q'STRAIT Wheelchair-Anchored Pelvic Belt. However, the TiLite Z with Transit Tie-Down Option does not ship with such a pelvic belt as standard equipment. The Q'STRAIT Wheelchair-Anchored Pelvic Belt may be ordered from TiLite as an optional accessory at the time of purchase or after. TiLite recommends that the TiLite Z be used only with a vehicle-anchored shoulder belt and a wheelchair-anchored pelvic belt. While the Transit Tie-Down Option is compatible with, and can be purchased with, additional seat sizes, optional components and varied configurations, TiLite makes no claim that any other components or configurations have been tested beyond the above-described ISO 7176-19:2022 conforming configuration. TiLite does not claim that its Transit Tie-Down Option will prevent injury or death in the event of a motor vehicle accident.
- Annex D of ISO 7176-19:2022 provides a method of testing a wheelchair for its ability to accommodate vehicle-anchored pelvic and shoulder belts. When tested in accordance with Annex D of ISO 7176-19:2022, the TiLite Z had a score of "Good" for ease of proper belt positioning and an overall score of "Excellent" (16 of 16 points). The ease of access to, and maneuverability in, motor vehicles can be significantly affected by wheelchair size and turning radius. Smaller wheelchairs and/or wheelchairs with a shorter turning radius will generally provide greater ease of vehicle access and maneuverability to a forward-facing position.

Transportation, continued

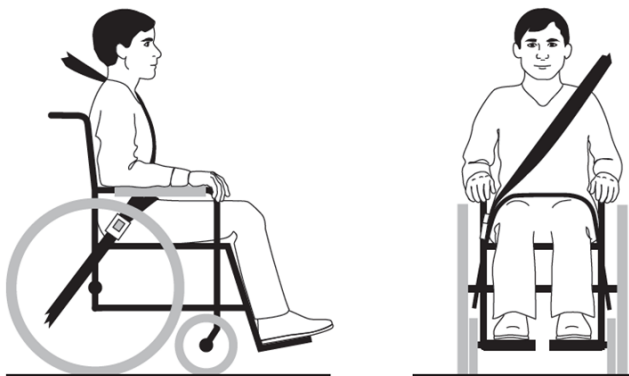
Securement in a Motor Vehicle

Make sure that the wheelchair is secured in a forward-facing orientation using all four attachment points prior to travelling in the motor vehicle. To secure the wheelchair, locate the four tiedown points, marked with the hook symbol shown below:

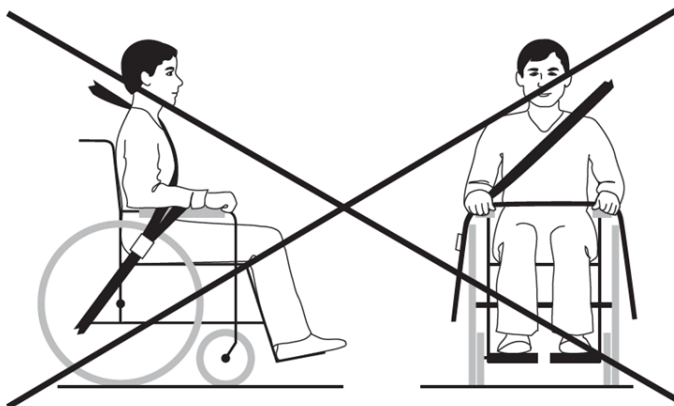


The tie downs on this wheelchair are compatible with four-point strap-type securement point end fittings.

Once the wheelchair has been secured, the occupant shall be secured with the vehicle mounted belt restraints. Ensure that the pelvic belt is worn low across the front of the pelvis, so that the angle of the pelvic-belt restraint is within the zone of 30° to 75° to the horizontal. If feasible, a steeper (greater) pelvic belt angle between 45° to 75° to the horizontal is preferred. Shoulder-belt restraints should fit over the middle of the shoulders and belt restraints should be adjusted as snugly as possible, consistent with occupant comfort. Belt webbing should not be twisted when in use.



The belt restraints shall not be held away from the body by wheelchair components or parts, such as the wheelchair arm supports or wheels.



permobil

TiSport, LLC
2701 W. Court St.
Pasco, WA 99301

permobil.com