

# TiLite

OPERATING &  
MAINTENANCE



THE ULTIMATE RIDE. ONLY IN TITANIUM





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## Special Notes

Warning/Caution notices as used in this manual apply to hazards or unsafe practices which could result in personal injury or property damage.

### Notice

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

### Restocking Fee

There will be a 20% restocking fee on parts returned in "as new" condition.

### Wheelchair User

As a manufacturer of wheelchairs, TiSport endeavors to supply a wide variety of wheelchairs to meet many needs of the end user. However, final selection of the type of wheelchair to be used by an individual rests solely with the user and his/her health care professional capable of making such a selection.

### Wheelchair Tie-Down Restraints And Seat Restraints

TiSport recommends that wheelchair users not be transported in vehicles of any kind while in wheelchairs.

It is TiSport's position that users of wheelchairs should be transferred into appropriate seating in vehicles for transportation and should use the restraints made available by the auto industry. TiSport cannot and does not recommend any wheelchair transporting systems.

Regarding restraints and seat belts. It is the obligation of the DME Dealer, therapists and other health care professionals to determine if a seating restraint is required to ensure the safe operation of this equipment by the user. Serious injury can occur in the event of a fall from a wheelchair.

### Warning

Do not operate this equipment without first reading and understanding this manual. If you are unable to understand the warnings and instructions, contact your dealer or TiSport Customer Service at 800.545.2266 or 509.586.6117 before attempting to use this equipment - otherwise injury and/or equipment damage may result.

### Save These Instructions



1426 East Third Avenue  
Kennewick, Washington 99337  
800.545.2266 Toll-Free  
509.586.6117 Phone  
509.586.2413 Facsimile  
866.586.2413 Toll-Free Fax  
[www.tilite.com](http://www.tilite.com)



EU Auth. Rep.: Agvena Ltd.  
Horsham RH12 2BT UK

## Handling

### Unpacking

1. Check for any obvious damage to the carton or its contents. If damage is evident, notify your carrier.
2. Remove all loose packing from the carton.
3. Carefully remove all components from the carton.

Note: Unless the wheelchair is to be assembled immediately, retain cartons and packing materials for use in storing the chair until assembly is required.

### Inspection

1. Examine exterior of the wheelchair for nicks, dents, scratches or other damage. Inspect all components. If damage is evident, notify your carrier.

### Storage

1. Store the repackaged wheelchair in a dry area.
2. Do not place other objects on top of the repackaged chair.

## Safety Inspection Checklist

Note: TiSport recommends you take your wheelchair to a qualified TiLite dealer for a thorough inspection and servicing twice a year. Regular cleaning will reveal loose or worn parts and enhance the smooth operation of your wheelchair. To operate properly and safely, your wheelchair must be cared for just like any other vehicle. Routine maintenance will extend the life and efficiency of your wheelchair. Initial adjustments should be made to suit your personal body structure and preference. Thereafter, follow these maintenance timelines:

Item	Initially	Inspect/Adjust Weekly	Inspect/Adjust Monthly	Inspect/Adjust Periodically
<b>General</b> <ul style="list-style-type: none"> <li>• Wheelchair rolls straight (no excessive drag or pull to one side).</li> </ul>	✓			✓
<b>Wheel Locks</b> <ul style="list-style-type: none"> <li>• Do not interfere with tires when rolling.</li> <li>• Pivot points free of wear and looseness.</li> <li>• Wheel locks easy to engage.</li> </ul>	✓ ✓ ✓		✓ ✓	✓
<b>Seat and Back Upholstery</b> <ul style="list-style-type: none"> <li>• Inspect for rips or sagging.</li> <li>• Inspect fastening flaps to ensure they securely attach.</li> </ul>	✓ ✓	✓		✓
<b>Rear Wheels</b> <ul style="list-style-type: none"> <li>• Adjustable Axle Position Camber Tube is securely tightened.</li> <li>• Quick release axles lock properly.</li> <li>• No excessive side movement or binding when lifted and spun.</li> </ul>	✓ ✓ ✓	✓	✓	✓
<b>Handrims</b> <ul style="list-style-type: none"> <li>• Inspect for signs of rough edges or peeling.</li> </ul>	✓			✓
<b>Spokes</b> <ul style="list-style-type: none"> <li>• Inspect for bent or broken spokes.</li> <li>• All spokes uniformly tight.</li> </ul>	✓ ✓	✓ ✓		
<b>Front Caster</b> <ul style="list-style-type: none"> <li>• Inspect wheel/fork assembly for proper tension by spinning caster; caster should come to a gradual stop.</li> <li>• Loosen/tighten allen bolt if wheel wobbles noticeably or binds to a stop.</li> <li>• Wheel bearings are clean and free of moisture.</li> </ul> <p>Caution: As with any vehicle, the wheels and tires should be checked periodically for cracks and wear, and should be replaced when necessary.</p>	✓ ✓ ✓	✓	✓	✓
<b>Tires</b> <ul style="list-style-type: none"> <li>• Inspect for flat spots and wear.</li> <li>• In pneumatic tires, check for proper inflation.</li> </ul> <p>Caution: As with any vehicle, the wheels and tires should be checked periodically for cracks and wear, and should be replaced when necessary.</p>	✓	✓ ✓		
<b>Cleaning</b> <ul style="list-style-type: none"> <li>• Clean upholstery and armrests.</li> </ul>	✓			✓

## Troubleshooting

Chair Veers Right	Chair Veers Left	Sluggish Turn or Performance	Caster Flutters	Squeaks & Rattles	Looseness In Chair	Solutions
✓	✓	✓	✓			Check tires for correct and equal pressure.
		✓	✓	✓	✓	Check for loose allen bolts.
				✓	✓	Check spokes and nipples.
✓	✓	✓	✓			Check that both casters contact the ground together.

## Maintenance

### Maintenance Safety Procedures

Warning - After making adjustments, always make sure that parts are properly tightened before using the wheelchair. Do not over-tighten hardware attaching to the frame. This could cause damage to the frame tubing.

### Suggested Maintenance Procedures

1. Before using your TiLite 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 the Quick Release Axle.
3. Oil quick release axles at least once [1] a month [3-in-1 oil or equivalent].
4. Recommended tire pressure is listed on the side wall of the tire. Warning – Do not use the wheelchair unless it has the proper pressure [p.s.i.]. Do not over-inflate the tires. Failure to follow these suggestions may cause the tire to explode and cause bodily harm.
5. The wheels and tires should be checked periodically for cracks and wear, and should be replaced when necessary at your authorized dealer or local bike shop.
6. Regularly check for loose spokes in the rear wheels. If loose, have them adjusted at your authorized dealer or local bike shop.
7. Periodically check handrims to ensure they are secured to the rear wheels. [Refer to Handrim Replacement].
8. Periodically adjust wheel locks in correlation to tire wear. Refer to Adjusting Wheel Locks.
9. Periodically check caster wheel bearings to make sure they are clean and free from moisture and debris.
10. Check upholstery for sagging, rips or tears.

### Cleaning The Finish Of Your Titanium Frame

#### Cross-Tubes

The cross-tubes are made from 6061-T6 aluminum and are powdercoated. Use a clean, damp cloth to clean the finish. DO NOT USE SCOTCH-BRITE™ ON THE CROSS-TUBES.

#### Side Frames

Bead Blasted or Brushed Finish - Use a soft cloth to clean the finish. If the finish becomes scratched, rub in a circular motion with a SCOTCH-BRITE™ pad and spray with Pledge™ Furniture Polish, then wipe off, returning the frame to its original luster. DO NOT USE SCOTCH-BRITE™ ON LOGO AND NEVER USE STEEL WOOL.

Polished - Use a soft cloth to clean the finish. DO NOT USE SCOTCH-BRITE™ ON THE POLISHED FINISH OR ON LOGO. NEVER USE STEEL WOOL.

## Safety Summary – Operating Information

To determine and establish your particular safety limits, practice bending, reaching and transferring activities in several combinations in the presence of a qualified healthcare professional before attempting active use of the wheelchair.

Do not attempt to reach objects if you have to move forward in the seat.

Do not attempt to reach objects if you have to pick them up from the floor by reaching down between your knees.

Do not lean over the top of the back upholstery to reach objects from behind as this may cause the chair to tip over.

Do not shift your weight or sitting position toward the direction you are reaching as the wheelchair may tip over.

Do not tilt the wheelchair without assistance.

Do not use an escalator to move a wheelchair between floors. Serious bodily injury may occur.

The position of the footrest, the center of gravity, as well as the tautness of the back upholstery are directly related to the chair's stability. Any change to one (1) or any combination of the three (3) may cause the chair to decrease in stability. Use extreme caution when using a new seating position for the first time.

Before attempting to transfer in or out of the wheelchair, every precaution should be taken to reduce the transfer distance. Turn both casters toward the object you are transferring onto. TiSport suggests engaging the wheel locks to prevent the wheels from moving when transferring.

Do not operate on roads, streets or highways.

Exercise caution when going up or down steep slopes or ramps.

Do not attempt to move up or down an incline with water, ice or oil film.

Do not attempt to ride over curbs or obstacles. Doing so may cause your chair to turn over and cause bodily harm or damage to the chair.

Do not use parts, accessories, or adapters other than those authorized by TiSport.

Do not attempt to lift the wheelchair by any removable [detachable] parts.

Check all allen head screws and clamps that secure the footrest to the chair frame.

If your wheelchair is equipped with optional anti-tippers, we recommend they be attached at all times.

Do not use the footplate as a platform when getting in or out of the wheelchair.

Always wear your seat restraint if one is recommended.

TiSport recommends the use of wheel locks, calf straps or heel loops at all times.

Do not use your wheelchair unless it has the proper tire pressure [p.s.i.]. Do not overinflate the tires. Failure to follow these suggestions may cause the tire to explode and cause bodily harm.

Note: Tire pressure is indicated on the sidewall of the tires.

## **Safety Summary – Operating Information, Continued**

Replacement of the tire or tube must be performed by an authorized TiLite Dealer or Qualified Technician.

TiSport does not recommend the use of its wheelchairs as a weight training apparatus. TiLite wheelchairs have not been designed or tested for any kind of weight training. If occupant uses wheelchair as a weight training apparatus, TiSport shall not be liable for bodily injury and the warranty will be voided immediately.

The TiLite X, XC, and SX wheelchairs have a weight limitation of 250 pounds.

## **Safety/Handling Of Wheelchairs**

Safety and handling of the wheelchair requires the close attention of the user as well as the assistant. This manual points out the most common procedures and techniques involved in the wheelchair's safe operation and maintenance. It is important to practice and master these safe techniques until you are comfortable maneuvering around frequently encountered architectural barriers.

Use this information only as a "basic" guide. The techniques that are discussed on the following pages have been used successfully by many people.

Individual wheelchair users often develop skills to deal with daily living activities that may differ from those described in this manual. TiSport recognizes and encourages each individual to try what works best for him/her in overcoming architectural obstacles they may encounter. Techniques in this manual are a starting point for the new wheelchair user and assistant with safety as the most important consideration for all.

### **Stability And Balance**

To assure stability and proper operation of your wheelchair, you must, at all times, maintain proper balance. Your wheelchair has been designed to remain upright and stable during normal daily activities as long as you do not move beyond the center of gravity.

Virtually all activities which involve movement in the chair have an effect on the center of gravity.

Do not lean forward out of the chair any further than stability will allow. Make sure the casters are trailing forward whenever you lean forward. This can be achieved by advancing the chair and then reversing it in a straight line.

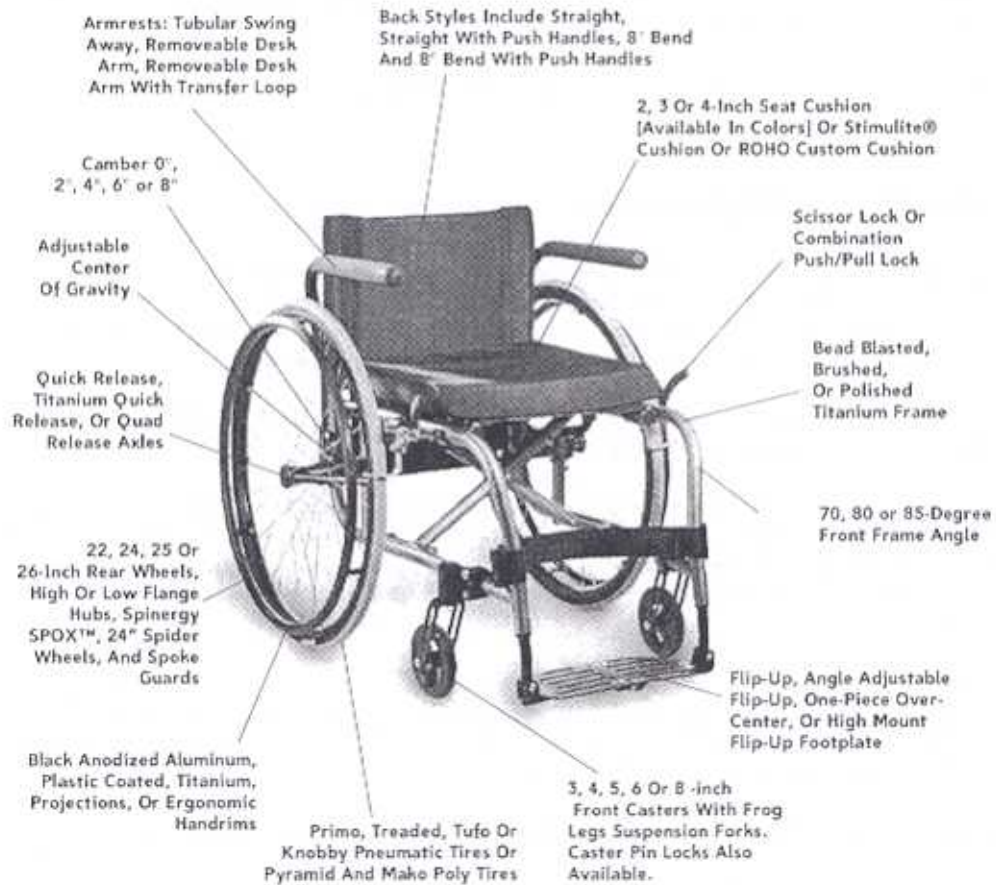
### **Coping With Everyday Obstacles**

Coping with the irritation of everyday obstacles can be alleviated somewhat by learning how to manage your wheelchair. Keep in mind your center of gravity to maintain stability and balance.

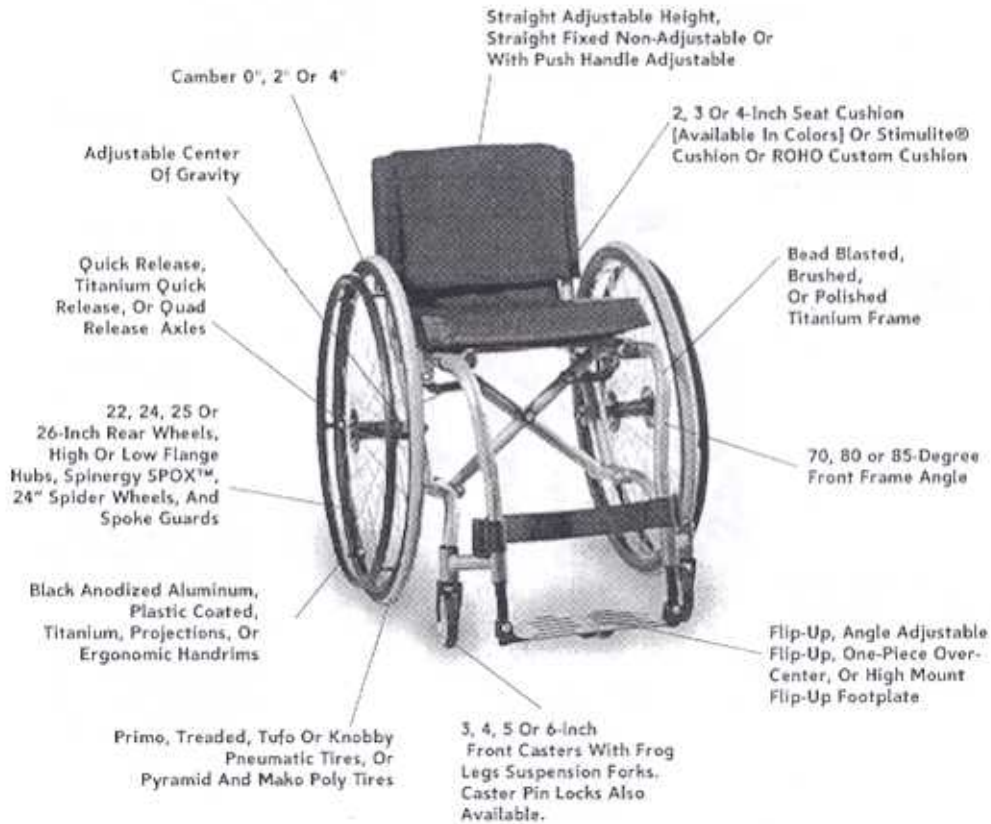
### **A Note To Wheelchair Assistants**

When assistance to the wheelchair user is required, remember to use good body mechanics. Keep your back straight and bend your knees whenever tilting the chair or traversing curbs, or other impediments. Also, be aware of any removable [detachable] parts. These must never be used for hand-holding or lifting supports, as they may inadvertently release, resulting in possible injury to the user and/or assistant(s). When learning a new assistance technique, have an experienced assistant help you before attempting it alone.

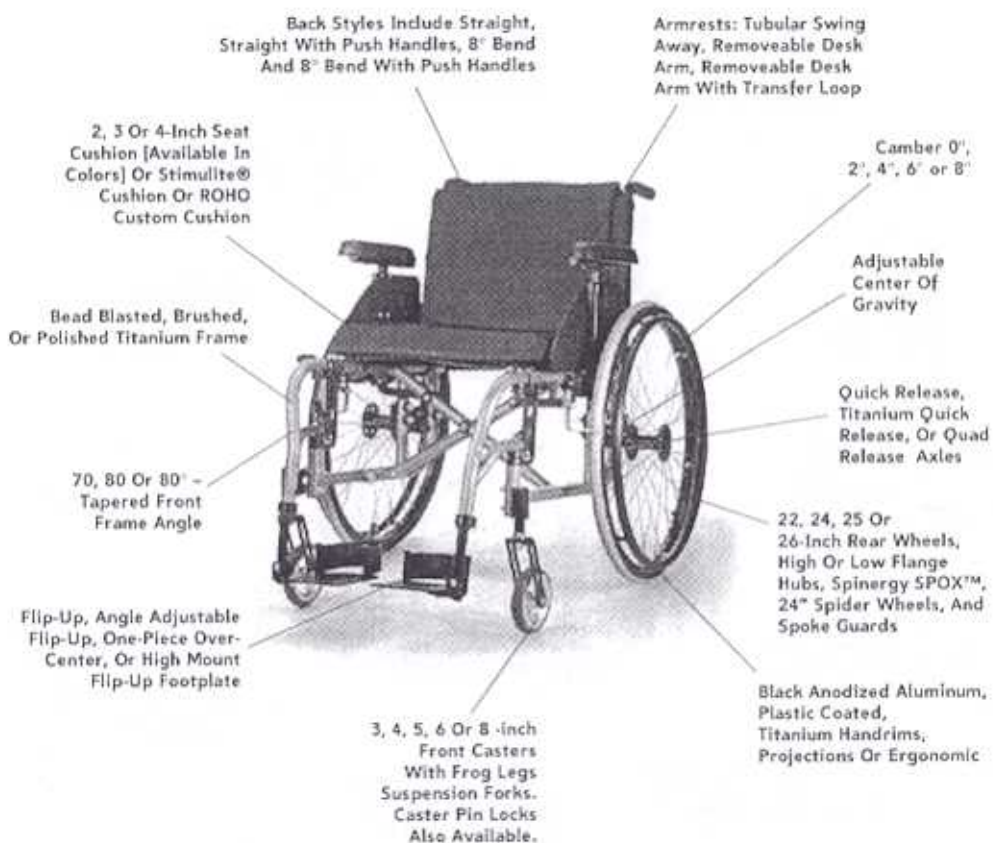
## TiSport X Features



## TiSport XC Features



## TiSport SX Features



### **Tilting**

Caution - Do not tilt the chair without assistance. When tilting the wheelchair, an assistant should grasp the back of the chair on a non-removable [non-detachable] part. Inform the chair occupant before tilting the chair and remind him/her to lean back. Be sure the occupant's feet and hands are clear of all wheels. Apply a continuous motion until the balance point is achieved. At this point, the assistant will feel a difference in the weight distribution. Turn the chair in the desired direction if necessary. Slowly lower the chair in one continuous movement. Do not let the chair drop the last few inches to the ground. This could result in injury to the occupant.

### **Tilting: Curbs Or Steps**

Warning - TiSport does not recommend that these wheelchairs be used where curbs present an obstacle.

After mastering the techniques of tilting the chair, use this procedure to tackle curbs, short stairs, etc.

Method 1 - The attendant should tilt the chair until the front casters clear the curb. Roll the chair forward and lower the front casters to the sidewalk. Push the chair forward until the rear wheels roll up and over the curb.

Method 2 - Unless the first assistant has exceptional upper body strength, it is recommended that Method 2 utilize two assistants. The second assistant should be positioned at the front of the wheelchair lifting upward on a non-removable [non-detachable] part of the wheelchair frame when lifting the wheelchair and stabilizing the wheelchair when the wheelchair is being lowered to the ground.

The first attendant should stand on the sidewalk and turn the wheelchair so that the rear wheels are against the curb or step. The wheelchair should be tilted back to the balance point and, in one continuous movement, the rear wheels should be pulled up and over the curb or step. Do not return the front casters to the ground until the wheelchair has been pulled backwards far enough for the front casters to clear the edge of the curb or step.

### **Tilting: Stairways**

Warning - TiSport does not recommend that these wheelchairs be transported up or down stairways with occupant in the wheelchair.

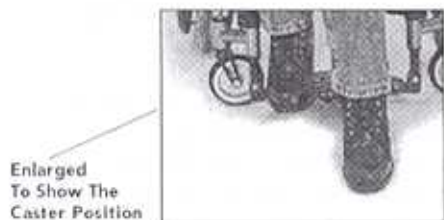
Do not attempt to lift a wheelchair by lifting on any removable [detachable] parts including upholstery. Lifting by means of any removable [detachable] parts of a wheelchair may result in injury to the user or damage to the wheelchair. Extreme caution is advised when it is necessary to move an occupied wheelchair up or down a stairway. TiSport recommends using two [2] assistants and making thorough preparations. Make sure to use only secure, non-detachable parts for hand-hold supports.

Follow this procedure for moving the chair between floors when an elevator is not available:

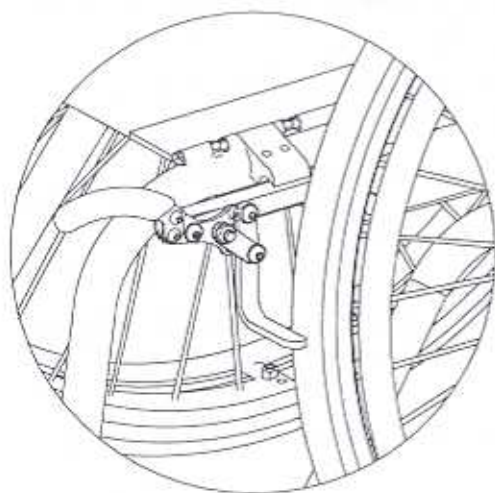
1. After the chair has been tilted back to the balance point, one assistant [in the rear] backs the chair up against the first step, while securely grasping a non-removable [non-detachable] part of the chair for leverage.
2. The second assistant, with a firm hold on a non-detachable part of the framework, lifts the chair up and over the stair and steadies it as the first assistant places one foot on the next stair and repeats the procedure.
3. The front of the chair should not be lowered until the last stair has been negotiated and it has been rolled away from the stairway.



**Figure 1**  
Caster Position  
When Transferring



Enlarged  
To Show The  
Caster Position



**Figure 2**  
Engage Wheel Locks  
When Transferring

### Transferring To And From Other Seats

**Warning** - Before attempting to transfer in or out of the wheelchair, every precaution should be taken to reduce the transfer distance. Turn both casters toward the object you are transferring onto [Figure 1]. Also be certain the wheel locks are engaged to help prevent the wheels from moving [Figure 2]. **Caution** - When transferring, position yourself to a safe position on the seat. This will prevent damage to upholstery and the possibility of the wheelchair tipping forward.

**Note:** This activity may be performed independently provided you have adequate mobility and upper body strength.

During independent transfer, little or no seat platform will be beneath you. Use a transfer board if at all possible.

TiSport recommends that you place your feet on the floor when transferring from your chair.

### Reaching, Bending And Transferring Safety

**Warning** - Do not attempt to reach objects if you have to move forward in the seat to pick them up from the floor by reaching down between your knees. Many activities require the wheelchair user to reach, bend and transfer in and out of the wheelchair. To determine and establish your particular safety limits, practice bending, reaching and transferring activities in several combinations in the presence of a qualified health professional before attempting active use of the wheelchair.

### Lengthening And Shortening The Wheelbase

Proper positioning is essential for your safety. When reaching, leaning, and/or bending forward, it is important to use the front casters as a tool to maintain stability and balance:

Lengthening the wheelbase will increase the stability and decrease maneuverability of the chair. Shortening the wheelbase will increase the maneuverability, but will distribute weight past the center of gravity which may make the chair prone to tipping [Figure 3].

Shortening the wheelbase decreases stability and increases maneuverability of the chair [Figure 3].

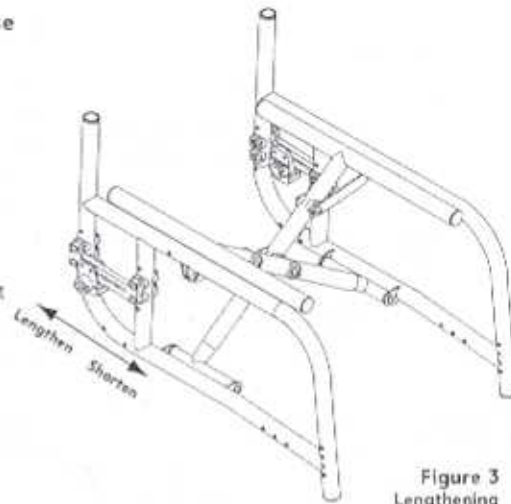


Figure 3  
Lengthening  
And Shortening  
The Wheelbase

### Reaching Backward

Warning - Do not lean over the top of the back upholstery. This will change your center of gravity and may cause you to tip over [Figure 4].



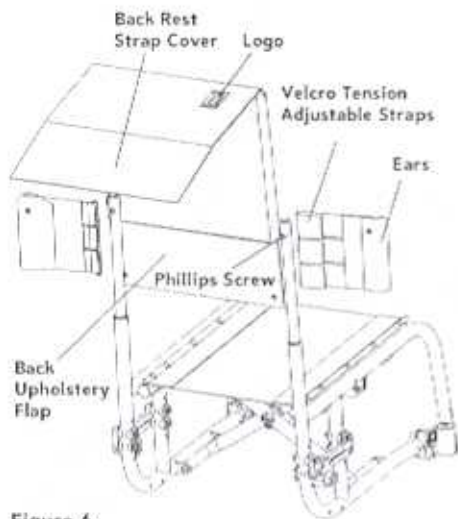
Figure 4  
Reaching Backward

### Reaching And Bending Forward

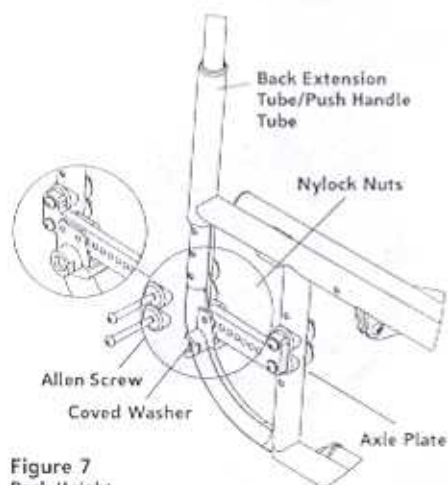
Position the front casters so that they are extended as far forward as possible [Figure 5] and engage wheel locks. Do not lean forward on the armrests.



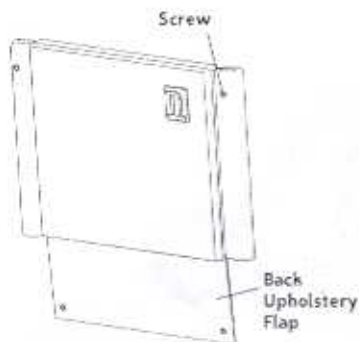
Figure 5  
Reaching And Bending  
Forward



**Figure 6**  
Replacing/Adjusting  
Back Upholstery



**Figure 7**  
Back Height  
Adjustment



**Figure 8**  
Replacing Padded Nylon  
Style Back Upholstery

## Back Adjustment & Upholstery

This Procedure includes the following:

- Replacing/Adjusting Back Upholstery
- Replacing The Back Upholstery On Chairs With Push Handles
- Replacing Padded Nylon Style Back Upholstery
- Back Height Adjustment

### Replacing/Adjusting Back Upholstery

Replacing/Adjusting Tension Adjustable Style Back Upholstery [Figure 6]

1. Cut and remove the plastic tie-downs that anchor the back upholstery flap to the frame.
2. Remove the seat cushion and unfasten the backrest strap cover that is velcroed to the back upholstery. Remove the Phillips screws that secure the ears to the backpost. Loosen the Velcro tension adjustable straps and slip the back upholstery off.
3. Slip new back upholstery over the back posts.
4. To adjust, loosen the Velcro straps and adjust to desired tension by pulling on the straps.
5. Reattach Velcro straps and replace the backrest strap cover. Replace tie-downs. Place seat cushion on chair. Note: Over tightening of back straps may misalign frame.

### Replacing The Back Upholstery On Chairs With Push Handles

1. Remove the Phillips screws from the back of the upholstery [Figure 6].
2. Remove the two allen screws that hold the push handle in place [Figure 7]. One allen screw is located just above the axle plate, and the other one goes through the axle plate. In most cases, depending upon chair configuration, there are two screws that hold each push handle in place however, for higher seat back heights there may only be one screw.
3. Once these screws are removed, pull the push handles out and slide the upholstery over the chair's back posts.
4. Replace the upholstery, then slide the push handles into position and fasten them back in place with the allen screws [Figure 7]. Put the Phillips screw into the back upholstery and secure it in place [Figure 6].

### Replacing Padded Nylon Style Back Upholstery

1. Cut and remove the plastic tie-downs that anchor the back upholstery flap to the frame. Remove seat cushion.
2. Remove screws that hold the upholstery to the back posts [Figure 8]. Slide upholstery over the back posts.
3. Replace padded nylon style back upholstery. Replace tie-downs. Place seat cushion on chair.

### Back Height Adjustment – Continued

Note: For tension adjustable back style, observe tautness of back upholstery for reinstallation.

1. Remove the back upholstery from the back tubes. Refer to Replacing/Adjusting The Back Upholstery in this section of the manual.
2. Remove from the axle plate, the allen screws and coved washers. Also remove the nylock nuts that hold the back tubes in place [Figure 7].  
Note: A third allen screw is sometimes used to hold back tubes in place.
3. Position the back extension tubes as required. Ensure that both back extension tubes are at the same height. Replace and tighten the allen screws, coved washers, and nylock nuts.
4. Replace and adjust back upholstery for desired tautness. Refer to Replacing/Adjusting The Back Upholstery in this section of the manual.

### Seat Cushion/Upholstery

This procedure includes the following:

- Seat Cushion [Foam Insert] Replacement
- Seat Sling Replacement

#### Seat Cushion [Foam Insert] Replacement

1. Lift up and remove the existing seat cushion from seat sling.
2. Open the seat cushion cover and remove the foam insert.
3. Replace foam insert.
4. Close the seat cushion cover and reattach to the seat sling.

#### Seat Upholstery Replacement

Tension Adjustable Bolt-On Seat Sling

1. Remove seat cushion.
2. Unscrew fastening screws that attach the sling to frame [Figure 9].
3. If you have received the aluminum seat rail strips with the replacement sling please proceed to Step 5. If not, remove aluminum seat rail strips from old sling and place into new seat sling.
4. Replace seat sling on frame. Make sure that the fastening holes in sling line up with the frame holes.
5. To adjust, loosen the fastening screws on the side of the seat sling where the Velcro adjustment is located.
6. Loosen Velcro flap and adjust the seat sling to the desired tension and retighten the screws that attach the seat sling to the frame.
7. Replace the seat cushion.

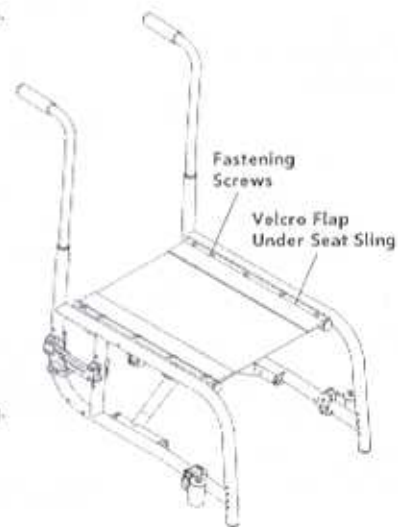
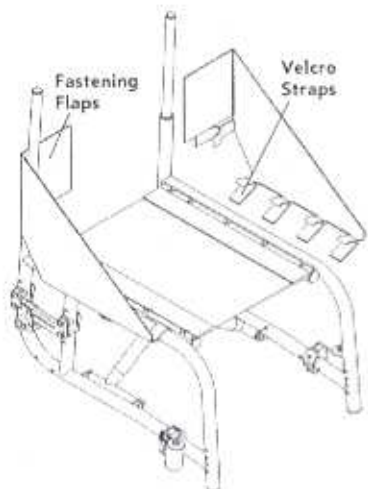


Figure 9  
Replacing  
The Tension  
Adjustable Bolt-On  
Seat Sling



**Figure 10**  
Nylon Cloth Side Guard Replacement

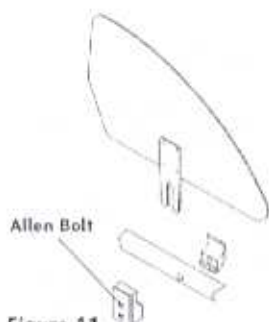
## Side Guards

This Procedure includes the following:

- Nylon Cloth Side Guard Replacement
- Rigid Side Guard Replacement

### Nylon Cloth Side Guard Replacement

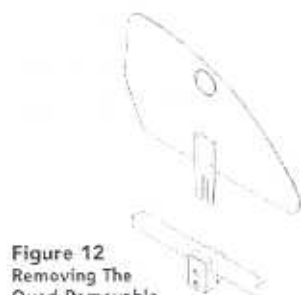
1. Lift up seat cushion and remove from chair.
2. Separate nylon cloth side guards from the seat back upholstery, and unfasten the Velcro straps from side frames [Figure 10].
3. Install new side guards to frame and back upholstery.  
Note: The fastening flaps attach to the outside of the back upholstery for nylon padded seat backs and underneath the backrest strap cover for tension adjustable seat backs.
4. Reattach the seat cushion to the seat upholstery.



**Figure 11**  
Removing The Regular Rigid Side Guard

### Rigid Side Guard Replacement

1. To remove the regular rigid side guard, lift the side guard out of the mounting bracket by grasping it at the top and pulling it upwards [Figure 11]. To remove the quad release side guard, put thumb into top hole and pull upwards [Figure 12].
2. To replace the rigid side guard, place the fork on the bottom of the rigid side guard on top of the socket and push down.
3. Adjust allen bolts to remove any excess play in mounting bracket(s) [Figure 11].
4. If desired, allen bolts can be firmly tightened to make side guard permanently attached.



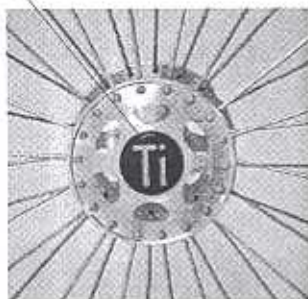
**Figure 12**  
Removing The Quad Removable Rigid Side Guard

## Wheels/Camber Tubes/Wheel Locks

This Procedure includes the following:

- Removing And Replacing The Rear Wheel
- Removing And Replacing The Rear Wheel With Quad Release Axle
- Wheel Lock Adjustment/Replacement
- Handrim Replacement
- Adjusting The Quick-Release And Quad Release Axles
- Adjusting Wheelbase Length
- Adjusting Toe-In And Toe-Out
- Replacing The Front Caster Wheels
- Caster Barrel Angle Adjustment - TiSport X
- Using Caster Pin Locks
- Replacing The Elastomer Shock On Frog Legs

Button



**Figure 13**  
Removing And Replacing The Rear Wheel

### Removing And Replacing The Rear Wheel

Removing

- Note: Do not attempt this procedure when the chair is occupied.
1. Hold wheel securely at the hub through the spokes [Figure 13].
  2. Depress button on the quick-release axle and slide the wheel out.
  3. Release the button.

Replacing

- Note: Do not attempt this procedure when the chair is occupied.
1. Hold wheel securely at the hub through the spokes [Figure 13].
  2. Depress button on the quick-release axle, making sure the locking balls are recessed and replace the wheel.
  3. Release the button.

## Removing And Replacing The Rear Wheel With Quad Release Axle

### Removing

1. Unlock the lever on the quad release axle [Figure 14].
2. Pull wheel out of axle sleeve.

### Replacing

1. Unlock lever on quad release axle [Figure 14].
- Note: Make sure the locking balls in the axle are recessed.
2. Push wheel into axle sleeve.
  3. Lock lever on the quad release axle.



Figure 14  
Removing And Replacing The Rear Wheel With Quad Release Axle

## Handrim Replacement

Note: Do not attempt this procedure when the chair is occupied. Warning - Replacement of the handrim must be performed by an authorized TiLite dealer or qualified technician.

1. Remove the rear wheel from the chair.
- Warning - Tire must be deflated before any disassembly procedures are performed.
2. Remove all air from the tube. If you have a Schrader valve [Figure 16], remove valve stem cap. Release all of the air from the tube, by pressing down on the pin in the center of the valve stem. If you have a Presta valve [Figure 17], remove valve stem cap. Unscrew [counter clockwise] the knurled nut on the valve stem. Release all of the air from the tube, by pressing down on the pin in the center of the valve stem.
  3. While carefully holding the tire, tube and rim strip to one side, hold the allen head screws and remove the locknuts that secure the handrim to the rear wheel [Figure 15].
  4. Remove the existing handrim.
  5. Install the new handrim by reversing the above procedures. Note: Your handrim may have two [2] holes on each tab as shown [Figure 15]. If you choose to install the handrim in the closest position to the wheel, cut off the extra length of tab. Otherwise, it could catch on your clothing.

Warning - Do not inflate the tire until it is completely assembled.

6. Reinstall rear wheel to the chair. Warning - Make sure the locking balls of the quick-release and/or quad release axles are fully released outside the axle sleeve before operating the wheelchair.
7. Inflate the tire to the correct psi rating on the sidewall of the tire.
8. Repeat the procedure for the opposite rear wheel if necessary.

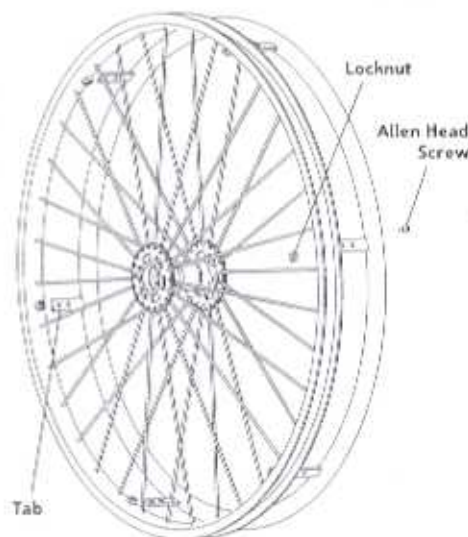


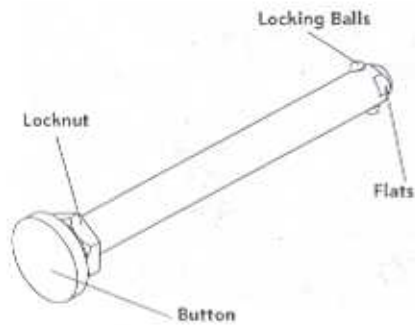
Figure 15  
Handrim Replacement



Figure 16  
Schrader Valve



Figure 17  
Presta Valve



**Figure 18**  
Adjusting The Quick  
Release Axle

### Adjusting The Quick-Release And Quad Release Axles

Note: Do not attempt this when the chair is occupied.

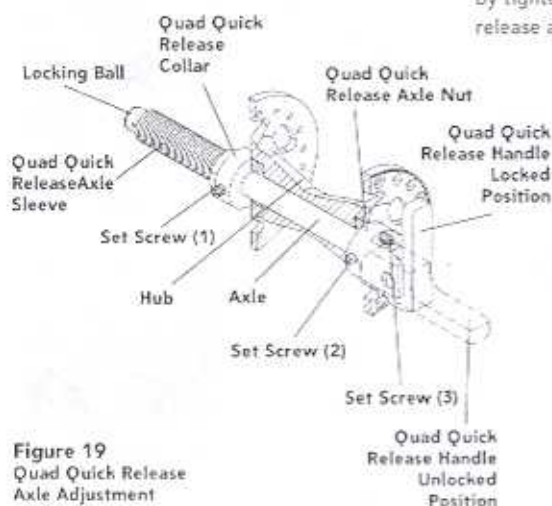
#### Quick Release Axles

1. Remove rear wheel and quick-release axle.
2. Depress button on the quick-release axle and slide axle through the wheel hub.
3. Release button ensuring that the locking balls are fully released outside the axle sleeve.
4. Increase or decrease axle play by adjusting the locknut on the end of the quick-release axle using a 3/4-inch wrench on the locknut and a 7/16-inch wrench on the flats at the end of the axle [Figure 18].
5. Reinstall rear wheel onto the chair.

Warning - Make sure the locking balls of the quick-release axle are fully released outside axle sleeve before operating the wheelchair. Keep the quick-release axle clean.

#### Quad Quick-Release Axles

1. To adjust the quad quick release axle, place the lever in the locked position, loosen the set screw (2) and turn the quad quick release axle nut until it touches the release button on the axle [Figure 19]. Flip the lever to the unlocked position. Make sure it doesn't stick. If it does, loosen the nut slightly until the lever works in both positions.
2. Tighten the set screw (2) to lock the nut in place.
3. Flip lever to unlocked position. Slide the axle through hub, collar, and axle sleeve.
4. Flip lever to locked position, loosen set screw (1), push collar and axle sleeve towards the locking balls in the axle. Lock the set screw (1) in the collar. Flip lever to unlocked position and back to locked position. Make sure the balls release fully.
5. Remove any play between the nut and the hub by tightening the set screw (3) on the quad quick release axle nut.



**Figure 19**  
Quad Quick Release  
Axle Adjustment

### Adjusting Wheelbase Length

Note - The position of the footrest, axle plate as well as the tautness of the back upholstery are directly related to the wheelchair's stability. Any change to one [1] or any combination of the three [3] may cause the wheelchair to decrease in stability. Use extreme caution when using a new seating position.

1. Remove the two allen screws that hold the camber plug clamps on to the axle plate [Figure 20].

Note: Do not loosen allen screws on bottom of clamp.

2. Position the camber plug clamps at desired location.

Securely tighten the allen screws that hold the clamps onto the axle plate.

Note: Lengthening the wheelbase will increase the stability and decrease maneuverability of the wheelchair. Shortening the wheelbase will increase the maneuverability, but will distribute weight past the center of gravity which may make the chair prone to tipping.

Note: Make sure the placement of the clamps, on each side of the wheelchair, are the same.

3. Roll the wheelchair before using it to ensure there is no excessive drag to either side. If excessive drag occurs refer to Adjusting Toe-In And Toe-Out in this section of the manual.

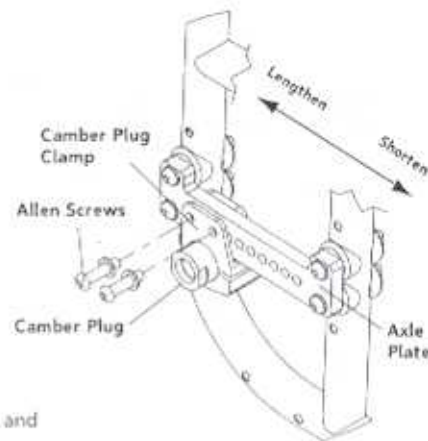


Figure 20  
Adjusting The Wheelbase

### Adjusting Toe-In And Toe-Out

Check to be sure that the camber plug is centered on the chair by measuring the distance from the outside of the chair frame to the end of the axle sleeve. It should be the same on each side. Make sure the chair is on all four wheels, the casters are pointing rearwards, and the rear wheels are properly inflated. Measure from the floor to the center of the axle and note this measurement. Be sure the tape measure/ruler is perpendicular to the floor. Next, block the wheels with a heavy object so the chair will not roll forward or back. Measuring from the floor at the rear and then the front of each tire, mark the tire [with a felt tip pen] at the same height as the center of axle measurement. This will give you a reference point on each tire at a consistent height. Measure the distance between the tires at the reference point at both the front and back. If the measurements are the same, then measure the distance from the front of each tire to the wheelchair frame at the same location on each side [Dimension "D" on Figure 21]. If these are also equal you do not need to adjust any further. If they are different, do the following:

1. Loosen the two allen head screws located on the bottom of the camber plug clamps.

- 2a. If the measurement is less at the front of the wheels - rotate the camber plug backwards to toe-out the wheels [Figure 21].

Note: Make sure tires are equal distance from the frame on both sides. Refer to dimension "D" [Figure 21].

- 2b. If the measurement is greater at the front of the wheels - rotate the camber plug forward to toe-in the wheels.

Note: Make sure tires are equal distance from the frame on both sides. Refer to dimension "D" [Figure 21].

3. Adjust the camber plug until the front and rear measurements are equal and retighten the clamps to secure the camber plug.

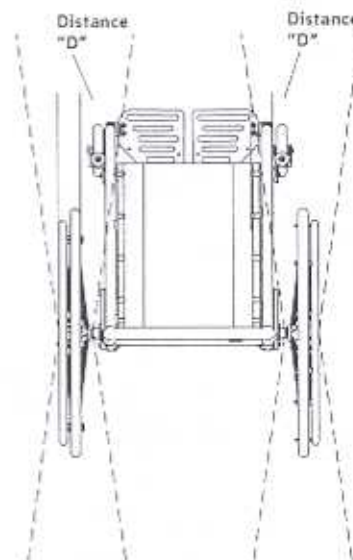
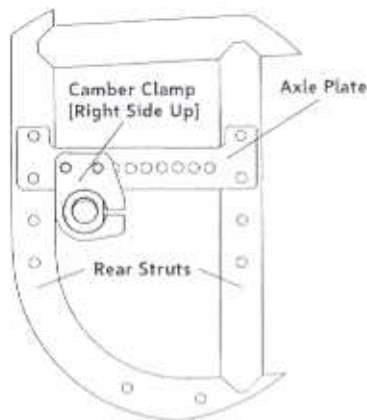
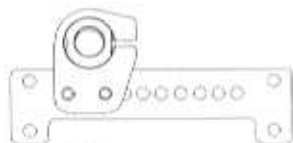


Figure 21  
Adjusting Toe-In And Toe-Out



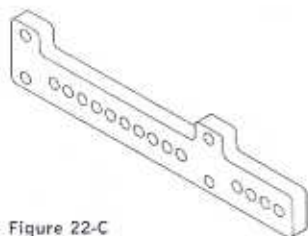
**Figure 22**  
Adjusting The Rear  
Seat Height



**Figure 22-A**  
Axle Plate Right Side Up w/Clamp Upside Down



**Figure 22-B**  
Axle Plate Upside Down w/Clamp Upside Down



**Figure 22-C**  
Amputee Axle Plate

## Axle Plates

This Procedure includes the following:

- Adjusting The Rear Seat Height
- Axle/Camber Clamp Positions
- Wheel Spacing

### Adjusting The Rear Seat Height

To adjust the rear seat height, remove the allen screws from the camber clamp and/or the axle plate and place in the desired configuration (Figure 22, 22-A, or 22-B).

### Axle/Camber Clamp Positions

Adjust Rear Seat Height In 1/2-inch Increments

1. Turn the axle plate upside down, but keep the axle clamp right side up (Figure 22).

Note: Lowering the camber clamp will raise the rear seat height. Raising the camber clamp will lower the rear seat height. Ensure both sides are positioned the same.

Adjust Rear Seat Height In 1-Inch Increments

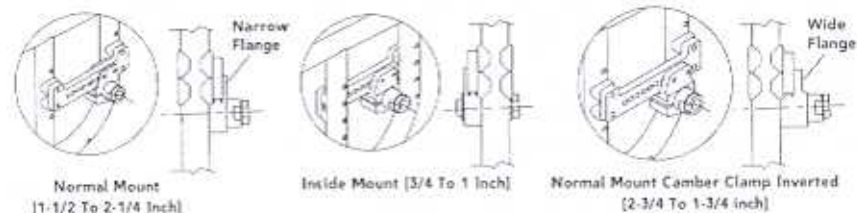
1. Move the axle plate up or down the rear struts, align holes, insert allen screws and tighten (Figure 22).

Note: Holes on rear strut are 1-inch apart. Ensure both sides are positioned the same.

Note: Caster barrels may need to be realigned after making adjustments to the axle plates. See Caster Barrel Angle Adjustment.

### Wheel Spacing

Set axle plate for desired wheel spacing per diagram below (based on 2-degree camber plugs) (Figure 23).



**Figure 23**  
Wheel Spacing Options

### Replacing The Front Caster Wheels

1. Remove the two allen screws and finish washers that secure the front caster to the mounting fork [Figure 24].
2. Remove the front caster and fork spacers from the mounting fork.
3. Install the new front caster and spacers onto the mounting fork and securely tighten.
4. Repeat the procedure for the opposite front caster if necessary.

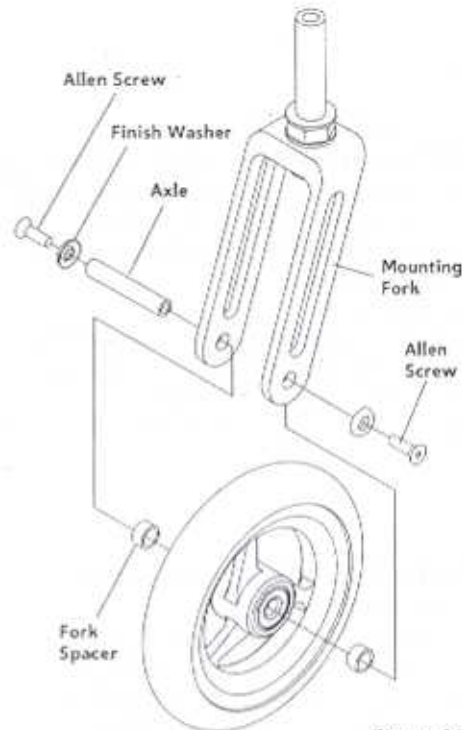


Figure 24  
Replacing The Front Caster Wheels

### Caster Barrel Angle Adjustment

#### - TiSport X, SX

1. Place the wheelchair on a level surface. Loosen the two allen screws that hold the caster barrel in place.
2. Rotate the caster barrel until the flat edge is perpendicular with the ground. Use a triangle or straight edge placed against the flat edge for accuracy [Figure 25].
3. Tighten the allen screws. Note: Make sure the locking block is seated in the grooved surface of the caster barrel.

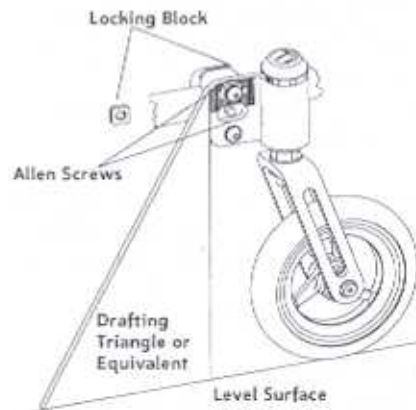


Figure 25  
Caster Barrel Adjustment

### Using Caster Pin Locks

1. To engage, align the L-handle pin with the notch in the stainless steel lock ring, then rotate the L-handle towards the front of chair until it snaps down into the locked position.
  2. To disengage caster pin locks lift the L-handle and rotate it towards rear of chair.
- Note: Figure 26 depicts the caster pin lock in the unlocked position.
- Note: Always be sure to disengage caster pin lock

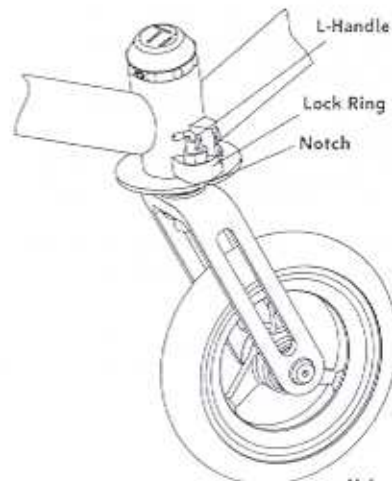


Figure 26  
Using The Caster  
Pin Lock

before using the wheelchair.

### Replacing The Elastomer Shock On Frog Legs

1. Remove allen screws from hinge and push out the threaded spacer. Note: Use a 5/32 allen wrench for removing the threaded spacer [Figure 27].
2. Rotate the fork stem section to release the elastomer shock.
3. Replace elastomer shock and rotate fork stem section to center the bushing. Push firmly to align and insert allen screws and threaded spacer.

Note: The metal disk goes on top of the elastomer shock.

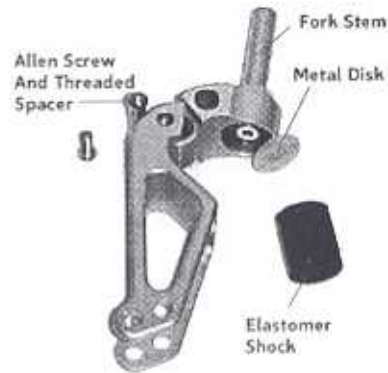


Figure 27  
Replacing The Elastomer Shock  
On Frog Legs

### Wheel Lock Adjustment/Replacement

Scissor Lock and Uni-Lock

Note: Before adjusting or replacing the Scissor Lock [Figure 28-A] or the Uni-Lock [Figure 28-B, 28-C] wheel locks, ensure that the tires are inflated to the recommended psi on the sidewall of the tire.

If Replacing the Scissor Lock or Uni-Lock:

1. Remove the allen head screws from the wheel lock clamp [Figure 28-B] and remove the wheel lock from the chair.
2. Install the new wheel lock then adjust using instructions below.

If Adjusting the Scissor Lock or Uni-Lock Wheel Lock:

1. Loosen the allen head screws [Figure 28-B] that secure the Scissor Lock or Uni-Lock wheel locks to the side frame.
2. Adjust the position of wheel lock until the 3/16-inch measurement is obtained for correct wheel lock adjustment.

Note: Any wheel lock adjustments should embed the wheel stop at least 3/16-inch into the tire [pneumatic tires] when engaged.

3. Engage the wheel locks and push against the tire and determine if the wheel locks engage the wheel enough to hold the chair.
4. Repeat the above procedures until the wheel locks hold the chair.
5. Securely tighten the allen head screws that secure the wheel locks to the chair frame and engage the wheel lock.

Note: TiSport does not recommend using the Uni-Lock wheel locks when engaging in any contact sport.

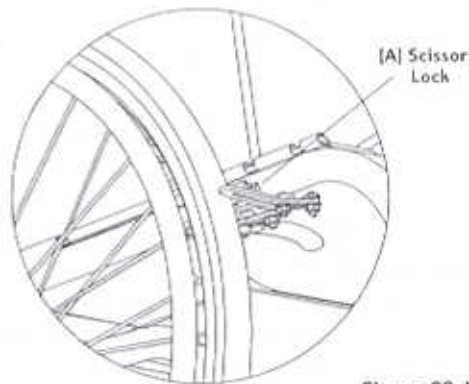


Figure 28-A  
Scissor Lock Replacement/  
Adjustment

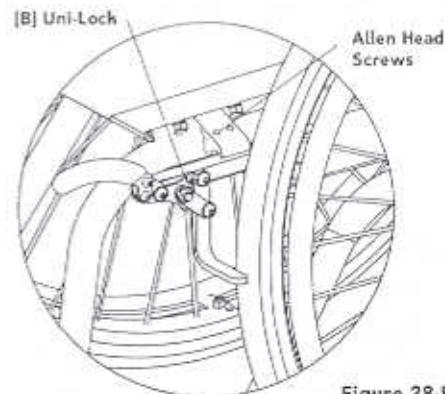


Figure 28-B  
Uni-Lock Replacement/  
Adjustment

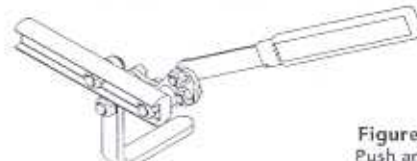
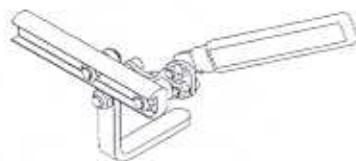
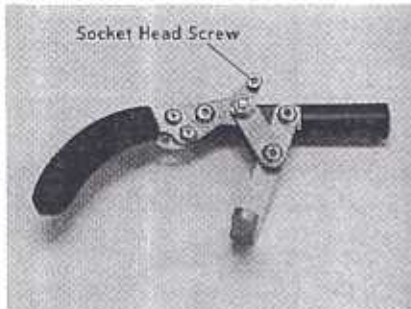
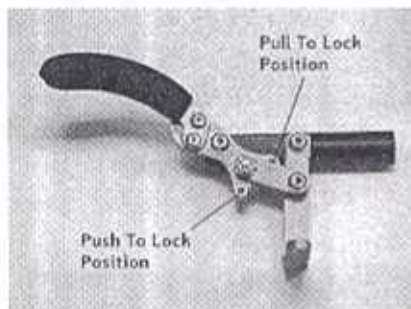


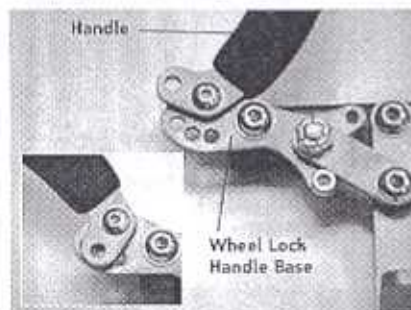
Figure 28-C  
Push and Pull  
Wheel Lock Positions



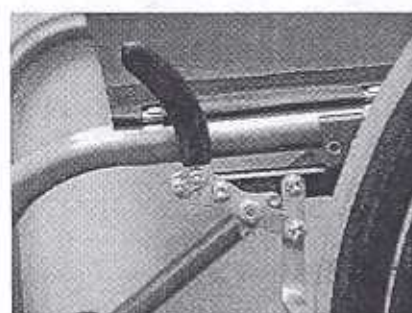
**Figure 29**  
Socket Head Screw



**Figure 30**  
Pull Or Push  
To Lock Position



**Figure 31**  
Repositioning  
The Handle



**Figure 32**  
Wheel Lock  
Position

## Changing Wheel Locks From The Pull To The Push Position And Multiple Handle Positions

### Tools Needed:

- 5/32" allen wrench
- 1/8" allen wrench
- 3/8" open end Wrench
- 7/16" open end Wrench

On the base piece (the piece the handle is attached to) locate the small Socket head screw [Figure 29]. The position of the Socket head screw will determine whether you have a Push to Lock wheel lock or a Pull to Lock wheel lock [Figure 30]. It may be in the upper-hole position [Figure 29]. Using the 5/32" allen wrench, remove this screw and reposition it to either a Pull or Push to lock position [Figure 30].

### Repositioning The Handle For Your Push/Pull Wheel Lock

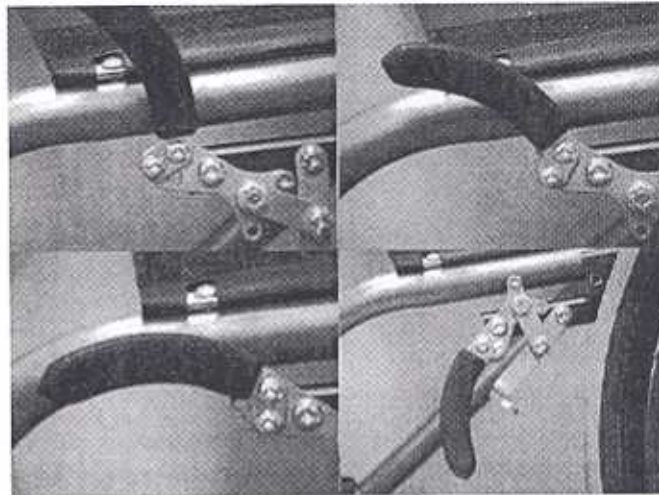
With the wheel lock on the chair, check to see which handle configuration will correctly position the handle for your chair [Figure 32 thru Figure 40]. To do this use the 1/8" allen wrench and the 3/8" open end wrench and remove the nut and screws that attach the handle to the Wheel lock handle base piece [Figure 31]. Please note that if anything else special has to be done to position the handle, follow the instructions that are with the picture of the handle position you want to change to. You will see three positioning holes on the wheel lock handle base [Figure 31]. Position the handle and replace the nut and screws [Figure 31]. If this position does not work then try the another handle position with the Push/Pull wheel locks [Figure 32 thru Figure 40].

Figure 32 shows how your wheel lock may already be positioned. You can change the position of the handle into three different positions from the one shown. Figure 33 will show you what each position will look like. Figure 32 shows the wheel lock in the engaged position.

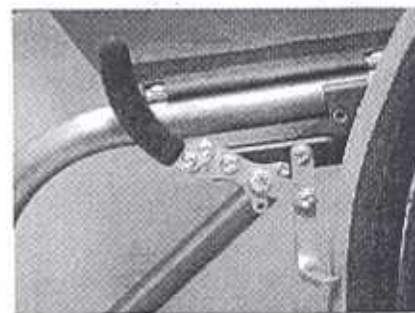
Each of the first three pictures shown (Figure 33) are what the handle will look like in the engaged position. The fourth picture in Figure 33 shows the disengaged position of the wheel lock.

If the wheel lock handle is still not located to where you would want the handle then you can switch the left and right handles, as shown in Figure 34. The right wheel lock handle has been switched with the left wheel lock handle. This will give you three more positions for the handle [Figure 35]. Figure 34 shows the Wheel lock in the engaged position.

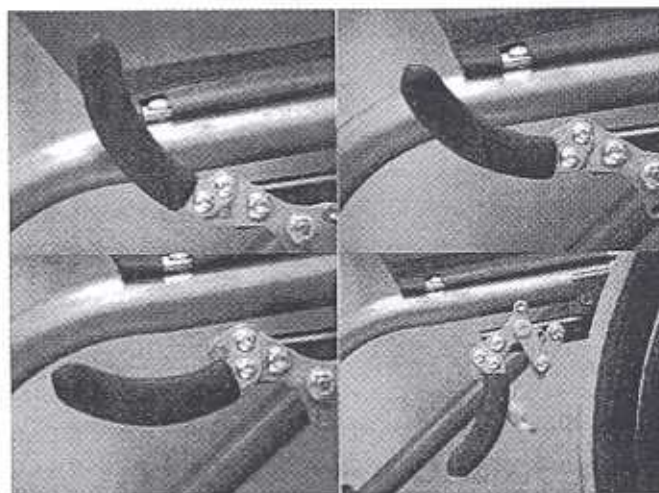
Figure 35 shows you what the three positions you can use should look like. Please note that each of the handle positions shown are in the engaged position. The fourth picture in Figure 35 shows what the disengaged position will look like.



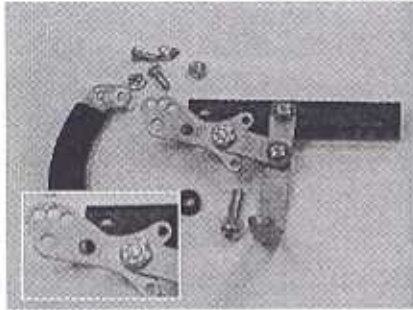
**Figure 33**  
Wheel Lock In Engaged And Disengaged Positions



**Figure 34**  
Wheel Lock In Engaged Position

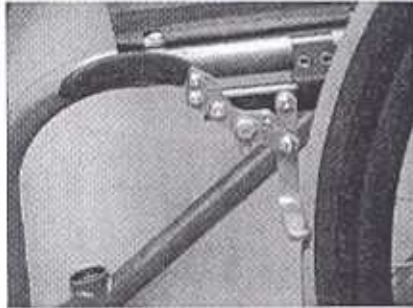


**Figure 35**  
Wheel Lock In Engaged And Disengaged Positions



**Figure 36**  
Wheel Lock Handle Base  
Shown Turned Upside Down

If pivoting the handle using any of the six positions [Figure 33 and Figure 35] does not work then you will have to remove the handle. Next you will have to take the wheel lock handle base off of the wheel lock and turn it upside down [Figure 36]. You will need a 5/32" allen wrench and a 7/16" open end wrench to remove the parts from the wheel lock base. After you have turned the Handle base upside down then attach all parts except the handle. Figures 37 thru Figure 40 will show the other six handle positions that you can use for the Push/Pull wheel lock.

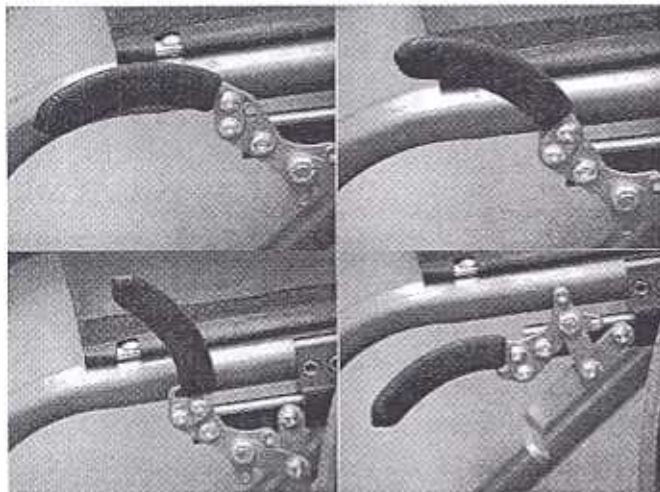


**Figure 37**  
Wheel Lock Handle Base  
Shown Turned Upside Down

Figure 37 shows the next type of handle position you can use for the Push/Pull wheel lock. Before you do this, you must make sure that you have reoriented the wheel lock handle base upside down as shown in Figure 36. Figure 38 will show the next three orientations that you can use. Figure 37 shows the Wheel lock in the engaged position.

Figure 38 shows you what the other three positions should look like. Please note that each of the handle positions shown are in the engaged position. The fourth picture in Figure 38 shows what the disengaged position will look like.

Switching the left and right handles [Figure 39] shows the last three positions you can use. The right and left wheel lock handles have been switched with the left wheel lock handle. This will give you three more positions for the handle. Figure 40 will show what this positioning should look like. Figure 39 shows the Wheel lock in the engaged position.



**Figure 38**  
Wheel Lock In Engaged and  
Disengaged Positions

Figure 40 shows you what three other positions you can use should look like. Please note that each of the handle positions shown are in the engaged position. The fourth picture in Figure 40 shows what the disengaged position will look like.

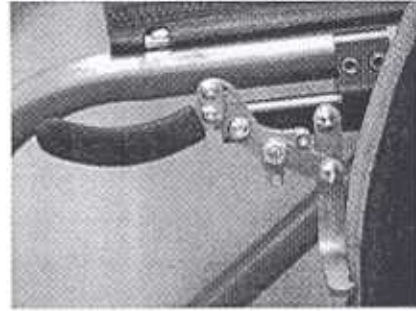


Figure 39

The Right and Left Wheel Lock Handles Have Been Switched

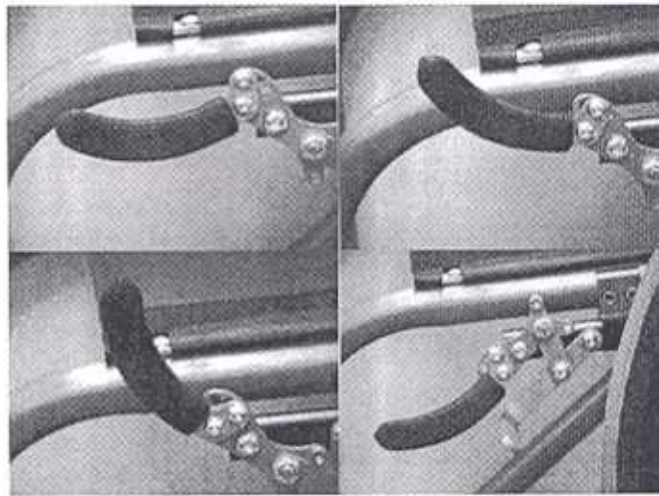


Figure 40

Wheel Lock In Engaged and Disengaged Positions

Figure 41 shows the standard orientation for the Wheel lock adjustable mount. If you need, you can take the mount off of the wheel lock using a 5/32 allen wrench and turn it around. Figure 42 shows what the adjustable mount will look like when you reorient it.

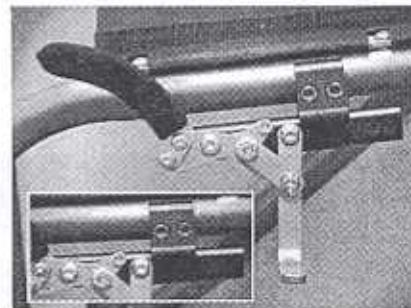


Figure 41

Wheel Lock Adjustable Mount

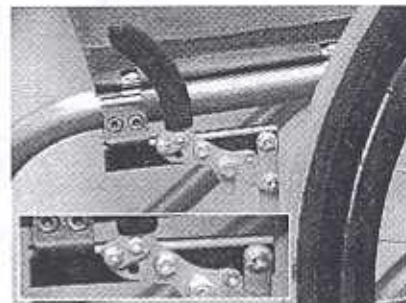


Figure 42

Wheel Lock Adjustable Mount

## Changing Scissor Wheel Lock Handle Positions

### Tools Needed:

- 5/32" allen wrench
- 3/8" open end Wrench

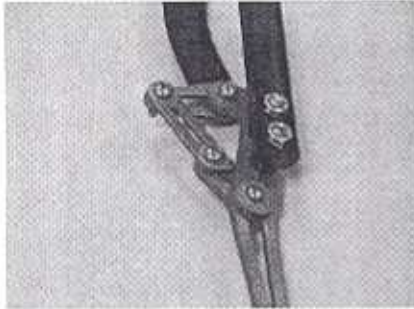


Figure 43

Figure 43 shows the standard orientation for the wheel lock handle.

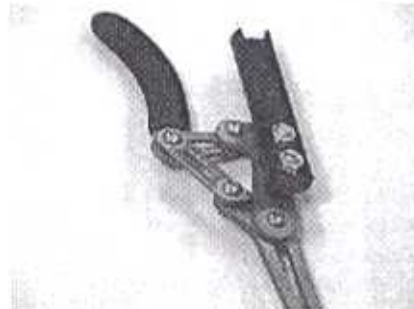


Figure 44

The next position that you can do is to take off the wheel lock handle and turn it around [Figure 44]

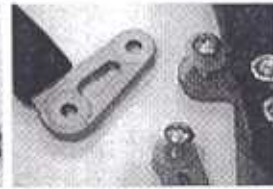


Figure 45

Another position for your wheel lock is to take off the link bar and the handle and put them back together [Figure 45]

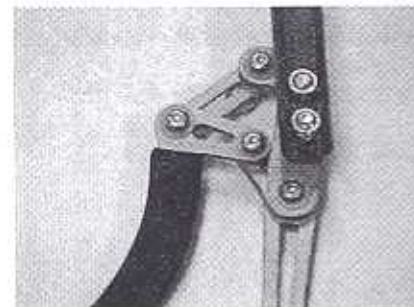
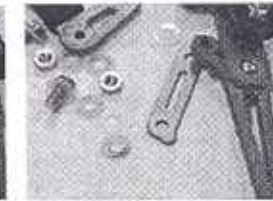
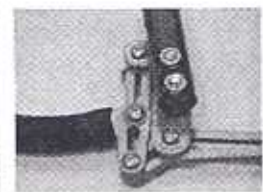


Figure 46



In Figure 46 the wheel lock handle has been turned around, similar as what was done in Figure 44.

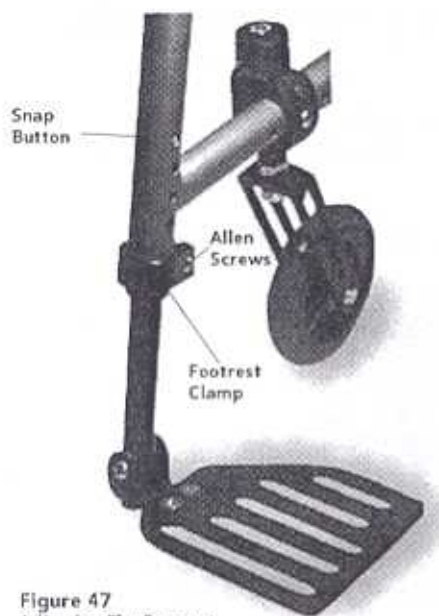


Figure 47  
Adjusting The Footrest

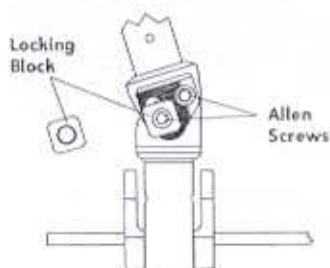


Figure 48  
Adjustable Angle Footrest

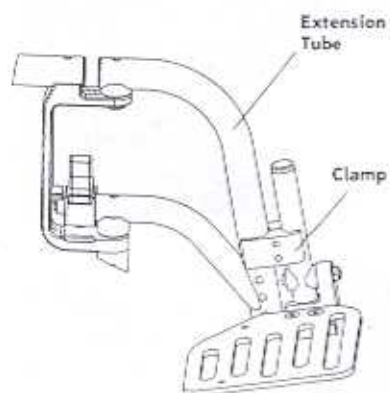


Figure 49  
High Mount Angle  
Adjustable Footrest

## Footrest

Warning - Check all allen screws that secure the footrest to the chair frame, especially if engaging in sports before using the wheelchair.

This Procedure includes the following:

- Standard Footrest Adjustment/Replacement
- Replacing The Footrest
- Adjusting The Footrest
- Removing The Swing-Away Hangers

### Standard Footrest Adjustment/Replacement

Warning - The position of the footrest and tautness of the back upholstery are directly related to the wheelchair's stability. Any change to one [1] or any combination of the three [3] may cause the wheelchair to decrease in stability. Use extreme caution when using a new seating position for the first time.

### Replacing The Footrest

1. Loosen the allen screw on the footrest clamp [Figure 29].
2. Press the snap button in and slide footrest out.
3. Replace with new footrest by pressing the snap button in to achieve desired height.
4. Tighten the allen screw on the footrest clamp.

### Adjusting The Footrest

1. Loosen the allen screws on the footrest clamp [Figure 47].
2. Press the snap button in and slide to desired position.
3. When both sides are equal distance from the floor, tighten the two allen screws that secure the footrest to the chair frame.

Warning: When adjusting footrest, allow ample ground clearance to maneuver over objects when using this wheelchair.

### Adjusting The Angle On The Adjustable Angle And High Mount Footplates

The high mount footrest will allow you to attain shorter seat to footrest heights. To adjust it do the following:

1. Loosen the allen screws that are holding the clamp together [Figure 48].
2. Adjust the height of the clamp and extension tube as needed.
3. Before tightening the allen screws, make sure that the locking blocks teeth are fully engaged.

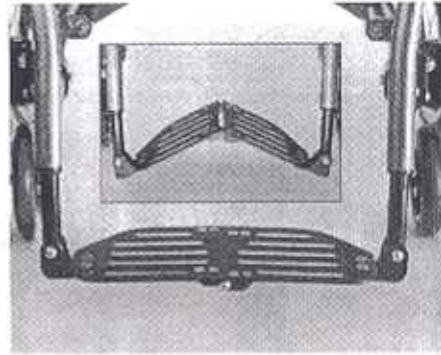


Figure 50  
Footrest

### Removing The Swing-Away Hangers

TiSport SX swing-away hangers can be rotated inward or outward to be removed or positioned out of the way.

To swing footrest hanger outward, press on the outside of the release lever (Figure 51) and push it toward the inside of the chair. To remove the hanger from the chair, pull upward.

To swing hanger inward, pull on the release lever (Figure 51) and push it toward the outside of the chair. To remove the hanger from the chair, pull upward.

To replace hanger on frame, lineup the pivot bushings [Figure 51] with the holes in the frame front, sliding in the bottom pivot first. This must be done with the hanger slightly off center of the frame. Next holding the hanger (not the release lever) swing until hanger locks in place.

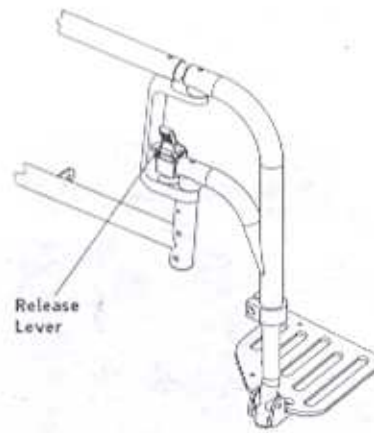


Figure 51  
Removing The  
Swing Away Hangers

## Anti-Tipper

This Procedure includes the following:

- Anti-Tipper Adjustment

### Anti-Tipper Adjustment

1. To adjust the height of the anti-tipper press the two buttons on the telescoping lower tube [Figure 52], then adjust the wheels so they are as close to the ground as practical.
2. To rotate the anti-tippers upward press the button on the mount to release the anti-tipper and rotate upward until they lock in place.
3. To remove the anti-tippers press the two buttons on the mount and pull towards the rear of the chair.

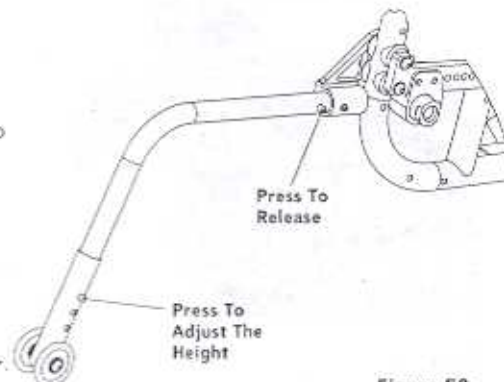
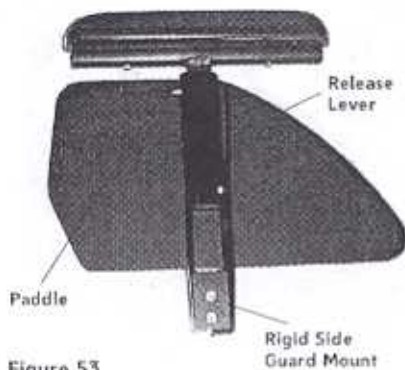
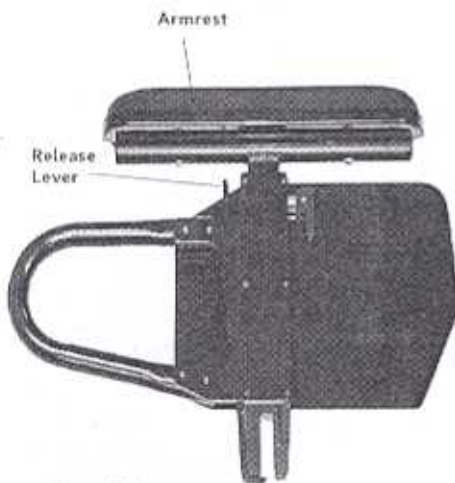


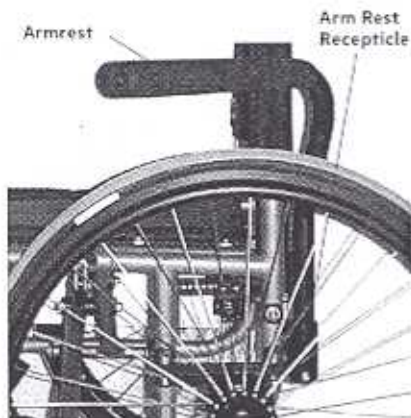
Figure 52  
Anti-Tipper Adjustment



**Figure 53**  
Removing/Replacing The  
Desk Armrest



**Figure 54**  
Removing/Replacing The  
Desk Armrest With Transfer  
Loop



**Figure 55**  
Using The Tubular Swing  
Away Armrest

## Armrests

This Procedure includes the following:

- Using the Desk Armrest
- Using the Removeable Desk Arm with Transfer Loop
- Using the Tubular Swing Away Armrests

### Using The Desk Armrest And Removeable Desk Arm With Transfer Loop

#### Raising/Lowering

Flip the paddle up to raise or lower the armrest to the desired height then flip the paddle back down and secure the pin into one of the positioning holes.

[Figure 53 & 54].

Note: The positioning holes are in 1/2-inch increments according to which size desk arm ordered. The height ranges from 9 to 12 inches or 12 to 15 inches.

#### Removing

1. To remove, use the release lever located under the armrest at the front of the rigid side guard bracket [Figure 53 & 54].
2. Press the lever in and slide the armrest out of the rigid side guard mount.

### Using The Tubular Swing Away Armrest

To swing away the armrest, slightly lift up on the armrest and rotate the armrest away from chair.

To replace the armrest, swing it back towards chair and gently push it back down into place.

Note: The swing away armrests pivot on nylon bearings, which are located in the armrest receptacle [Figure 55]. If the armrest does not rotate properly check the bearing for wear.

### XC Tubular Swing Away Armrest

To adjust your armrest height, loosen the armrest pin using a flat head screwdriver. Change the height by moving the pin up or down to increase or decrease your height of your armrest [Figure 56].

Note: The bracket is not to be removed from your XC frame.

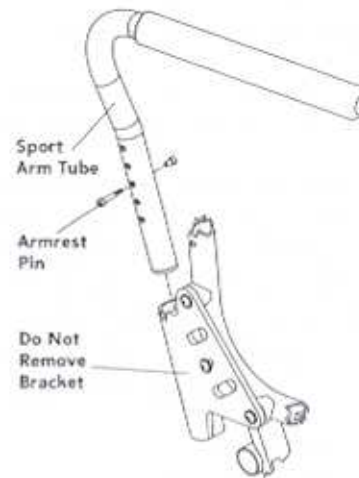


Figure 56  
XC Tubular Swing  
Away Armrest

### Unfolding & Folding The Wheelchair

This Procedure includes the following:

- Unfolding The Wheelchair
- Folding The Wheelchair

#### Unfolding The Wheelchair

For easy lifting, transporting, and storage, your TiSport X, XC or SX, can be easily unfolded and folded. To unfold, push down on the seat rails [Figure 57].

Caution: Always be sure to push down with the palm of your hand, keeping your fingers and thumb on top of the seating surface. This will prevent your fingers from being pressed between the seat rail and the side frame. Keep pushing the seat rails down until the wheelchair is completely unfolded and the seat rails are seated securely in the seat rail saddles. Flip down the footrests and replace the seat cushion.

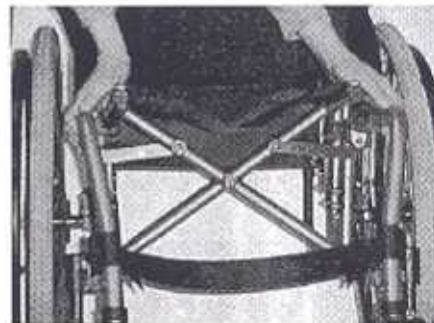


Figure 57  
Unfolding The Chair

#### Folding The Chair

First flip up the footrests so they do not inhibit the folding of the wheelchair. Remove any seat/back cushion or seating device that may be in use. At the front and back of the seat sling, grasp the seat upholstery at its midpoint [Figure 58]. Pull up sharply and the wheelchairs will begin to fold. To continue folding to its narrowest width, press the seat rails toward each other until they are as close together as possible.



Figure 58  
Folding The Chair

## TiSport Manual Wheelchair Warranty

TiSport warrants our TiLite™ and TiSport® wheelchairs, including frame, x-brace and stainless quick release axles, against defects in materials and workmanship for the lifetime of the original owner.

All TiSport manufactured and distributed parts and frame attachment components, including, but not limited to, rigid side guards, anti-tippers, push handles, wheel locks, caster forks, hubs, armrests, caster and bearings for front wheel assembly and titanium axles are warranted against defects in materials and workmanship for one year from date of purchase. Rear wheel assembly and spoke guards are warranted for 90-days for workmanship only. Items not warranted include all tires and tubes, upholstery, including sewn items [pouch, backpack, frame protectors, cloth side guards, etc. unless problem occurs with workmanship within 30 days], armrest padding, plastic footplate covers and push handle and wheel lock grips. Supracore™ Cushions include one year warranty against manufacturer defects.

TiSport will repair or replace, at TiSport's sole discretion, the wheelchair, its parts or components provided an authorization for return has been approved by TiSport or its TiLite representative and the part in question is returned to TiSport, 1426 East Third Avenue, Kennewick, WA 99337 within the prescribed period of warranty.

Wheelchairs returned to TiSport on which the serial number plate has been removed or altered will not be repaired or replaced, and the warranty will be voided.

TiSport will not warranty any parts damaged by improper installation and/or repair, neglect, accident or misuse on the part of the owner, nor those parts altered or serviced by an agency not authorized by TiSport. TiSport will not warranty the frame or any parts damaged when the maximum weight limit of two-hundred and fifty [250] pounds is exceeded.

TiSport's sole liability extends to repair or replacement of the wheelchair, its parts or components, as specified herein. The foregoing is in lieu of all other warranties, expressed, implied, or statutory, whether written or oral.





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