

# ***Excel and P9000***

**DEALER:** KEEP THIS MANUAL. THE PROCEDURES  
IN THIS MANUAL MUST BE PERFORMED BY A  
QUALIFIED TECHNICIAN ONLY.



**Yes, you can.™**

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**WARNING**

**THE PROCEDURES IN THIS MANUAL SHOULD ONLY BE PERFORMED BY A QUALIFIED TECHNICIAN.**

**DO NOT SERVICE OR OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING THIS MANUAL AND THE OWNERS MANUAL SUPPLIED WITH THE WHEELCHAIR. IF YOU ARE UNABLE TO UNDERSTAND THE WARNINGS, CAUTIONS, AND INSTRUCTIONS, CONTACT INVACARE TECHNICAL SUPPORT BEFORE ATTEMPTING TO SERVICE OR OPERATE THIS EQUIPMENT - OTHERWISE INJURY OR DAMAGE MAY RESULT.**

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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.

**WHEELCHAIR USER**

As a manufacturer of wheelchairs, Invacare 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 healthcare professional capable of making such a selection.

**WHEELCHAIR TIE-DOWN RESTRAINTS AND SEAT POSITIONING STRAPS**

Invacare recommends that wheelchair users NOT be transported in vehicles of any kind while in wheelchairs. As of this date, the Department of Transportation has not approved any tie-down systems for transportation of a user while in a wheelchair, in a moving vehicle of any type.

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

AS REGARDS RESTRAINTS - SEAT POSITIONING STRAPS - IT IS THE OBLIGATION OF THE DME DEALER, THERAPISTS AND OTHER HEALTHCARE PROFESSIONALS TO DETERMINE IF A SEATING POSITIONING STRAP IS REQUIRED TO ENSURE THE SAFE OPERATION OF THIS EQUIPMENT BY THE USER. SERIOUS INJURY MAY OCCUR IN THE EVENT OF A FALL FROM A WHEELCHAIR.

**SAVE THESE INSTRUCTIONS**

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**SPECIFICATIONS**

*NOTE: All specifications are approximate.*

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<b>EXCEL</b>				
	<b>INTEGRATED SLING SEAT</b>	<b>CAPTAIN'S SEAT</b>		
		<b>LOW (LOB)</b>	<b>BACKTYPE LOW SOLID SEAT (LOBSS)</b>	<b>HIGH (HIB)</b>
<b>Seat Width Range:</b>	16, 18 or 20-in.	19-in.	19-in.	19-in.
<b>Seat Depth Range:</b>	16, 17 or 18-in. - In 1-in. increments (17 and 18-in. by extension)	17-in.	17-in.	17-in.
<b>Back Height Range Std.:</b>	16, 17, 18, 19 or 20-in. - In 1-in. increments	16-in.	18-in.	22-in.
<b>Opt. Headrest:</b>	N/A	N/A	N/A	28-in.
<b>Opt. Backrest Ext.:</b>	N/A	23-in.	N/A	N/A
<b>Back Angle Range:</b>	N/A	†55° - 114°	†98°	†35° - 170°
<b>Seat-to-Floor:</b>	18-1/2-in.	22-in.	19-1/2-in.	22-in.
<b>Overall Width (No Joystick):</b>	24-5/8-in.	24-3/4-in.	24-3/4-in.	24-3/4-in.
<b>Overall Height:</b>	34-3/8-in. - 16-in. Back Height	35-in.	35-in.	39-in.
<b>⊗Weight W/O Batteries:</b>	90 to 100 lbs.	122 to 127 lbs.		
<b>W/Batteries (Gel Cell):</b>	170 to 180 lbs.	203 to 207 lbs.		
<b>Shipping:</b>	105 to 115 lbs.	153 to 157 lbs.		
<b>Armrests:</b>	Removable, Flip Back, Fixed or Adjustable Height - Desk and Full Length	Flip Back - Adjustable Height - Full Length (Std.)		
<b>Upholstery:</b>	Black Nylon	Vinyl or Cloth with Vinyl		

⊗*NOTE: 18-in. wide x 16-in. deep wheelchair with MKIV RII electronics.*

†*NOTE: Low and High Back Types have an infinite adjustment. Low Backs with Solid Seat have no adjustment.*

<b>INTEGRATED SLING SEAT AND CAPTAIN'S SEAT</b>			
	<b>⊗DRIVE WHEEL POSITION</b>		
	<b>REAR POSITION</b>	<b>MIDDLE POSITION</b>	<b>FORWARD POSITION</b>
<b>Overall Length</b>			
<b>With 8-in. Rear Casters and 93 Front Riggings:</b>	47-1/2-in.	47-1/2-in.	N/A
<b>With 8-in. Rear Casters and no Front Riggings:</b>	32-1/2-in.	33-1/2-in.	N/A
	⊗ <i>NOTE: Refer to REPOSITIONING MOTORS in PROCEDURE 7 of this manual.</i>		
<b>Drive Wheels/Tires:</b>	12-1/2 x 2-1/4-in. (Flat Free or Pneumatic)		
<b>Castors w/Precision Sealed Bearings:</b>	8 x 1-3/4-in. Semi Pneumatic (Std.), 8 x 2-in. Pneumatic (Opt.) 6 x 2-in. Semi Pneumatic (Opt.)		
<b>Footrest/Legrest:</b>	Swingaway, Removable Adjustable Flip Up Removable Footboard		
<b>Battery/Size (Not Supplied):</b>	Dual Group 22NF Gel Cell		

**PERFORMANCE**

<b>Speed (M.P.H.):</b>	0 to 3.8
<b>Turning Radius:</b>	≥ 26-in.
<b>* Range (variable):</b>	17-22 miles
<b>** ⊗ Weight Limitation:</b>	250 lbs.

\**NOTE: Range will vary with battery conditions, surface, terrain and operators weight.*

\*\**NOTE: Includes seating systems and accessories.*

⊗ *NOTE: Refer to REPOSITIONING MOTORS in PROCEDURE 8 of this manual.*

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NOTE: All specifications are approximate.

## POWER 9000

<b>Seat Width Range:</b>	14, 16, 18 or 20-in. - ADULT FRAME 16, 18 or 20-in. - LOW SEAT FRAME
<b>Seat Depth Range:</b>	16, 17 or 18-in. (17 and 18-in. by extension)
<b>Back Height Range Standard:</b>	16, 17, 18, 19 or 20-in.
<b>Seat-to-Floor:</b>	18-1/2-in.- LOW SEAT FRAME 20-1/4-in.- ADULT FRAME
<b>Overall Width:</b>	21-3/4 to 27-3/4-in. (With MKIV Joystick)
<b>Overall Height:</b>	33-1/4 to 37-1/4-in.- LOW SEAT FRAME 35-1/4 to 39-1/4-in.- ADULT FRAME
<b>Overall Length</b>	
<b>RWD Wheelchairs:</b>	36-1/2 to 47-1/4-in.
<b>FWD with 93 Front Riggings:</b>	N/A
<b>FWD with no Front Riggings:</b>	N/A
<b>★Weight</b>	
<b>W/O Batteries:</b>	82 lbs.
<b>W/ Batteries and PW93 Front Riggings</b>	
<b>U1 Gel Cell (14-inch Chairs):</b>	145 lbs.
<b>Dual Group 22NF Gel Cell</b>	
<b>(16, 18 or 20-inch Chairs):</b>	157 lbs.
<b>Shipping:</b>	110 lbs.
<b>Drive Wheels/Tires</b>	12-1/2 x 2-1/4-in.
<b>(Flat Free or Pneumatic):</b>	8x 1-3/4-in. Semi Pneumatic (Standard) 8x 2-in. Pneumatic (Optional)
<b>Casters w/Precision Sealed Bearings:</b>	Rotating, Removable (Standard)
<b>Anti-Tippers:</b>	Swingaway, Removable
<b>Footrest/Legrest:</b>	Fixed Height - Desk and Full Length (Standard) Adjustable Height - Desk and Full Length (Optional)
<b>Armrests:</b>	Black Nylon
<b>Upholstery:</b>	
<b>Battery/Size (Not Supplied)</b>	U1 Gel Cell (14-in. chairs), Dual Group
<b>Two (2) Required:</b>	22NF Gel Cell (16, 18 or 20-in. chairs)

★ NOTE: 18-inch wide x 16-inch deep wheelchair with MKIV RII electronics.

### PERFORMANCE

<b>Speed (M.P.H.):</b>	0 to 4
<b>Turning Radius:</b>	35-inches
<b>* Range (variable):</b>	12-14 miles with U1 batteries 18-22 miles with 22NF batteries
<b>** Weight Limitation:</b>	250 lbs.

\*NOTE: Range will vary with battery conditions, surface, terrain and operators weight.

\*\*NOTE: Includes seating systems and accessories.

<i>This Procedure Includes the Following:</i>
<i>Repair or Service Information</i> <i>Operating Information</i>

**REPAIR OR SERVICE INFORMATION**

Set-up of the Electronic Control Unit is to be performed **ONLY** by individuals certified by Invacare. The final tuning adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur under these circumstances. If non-certified individuals perform any work on these units, the warranty is void.

**OPERATING INFORMATION**

**GENERAL WARNINGS**

Performance adjustments should only be made by professionals of the healthcare field or persons fully conversant with this process and the driver's capabilities. Incorrect settings could cause injury to the driver, bystanders, damage to the chair and to surrounding property.

After the wheelchair has been set-up, check to make sure that the wheelchair performs to the specifications entered during the set-up procedure. If the wheelchair does **NOT** perform to specifications, turn the wheelchair **OFF** immediately and reenter set-up specifications. Repeat this procedure until the wheelchair performs to specifications.

**DO NOT** use parts, accessories, or adapters other than those authorized by Invacare.

**TIRE PRESSURE**

**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. The recommended tire pressure is listed on the side wall of the tire.

**ELECTRICAL**

**Grounding Instructions:**

**DO NOT**, under any circumstances, cut or remove the round grounding prong from any plug used with or for Invacare products. Some devices are equipped with three-prong (grounding) plugs for protection against possible shock hazards. Where a two-prong wall receptacle is encountered, it is the personal responsibility and obligation of the customer to contact a qualified electrician and have the two-prong receptacle replaced with a properly grounded three-prong wall receptacle in accordance with the National Electrical Code. If you must use an extension cord, use **ONLY** a three-wire extension cord having the same or higher electrical rating as the device being connected. In addition, Invacare has placed **RED/ORANGE WARNING TAGS** on some equipment. **DO NOT** remove these tags.

**BATTERIES**

The warranty and performance specifications contained in this manual are based on the use of deep cycle gel cell or sealed lead acid batteries. Invacare strongly recommends their use as the power source for this unit.

**This Procedure Includes the Following:****Field Load Test****Using Hydrometer To Check Battery Cells (Lead Acid)****Motor Testing****Motor Brush Inspection****Electro-Mechanical Parking Brake Test****FIELD LOAD TEST (FIGURE 1)**

*NOTE: The following test can also be performed through the controller of the wheelchair along with a remote programmer. Refer to the individual **CONTROLLER MANUAL** supplied with each wheelchair.*

Old batteries lose their ability to store and release power, due to increased internal resistance. This means that as you try to take power from the battery, some of that power is used up in the process of passing through the battery, resulting in less voltage at the posts. The more power drawn, the lower the voltage available. When this lost voltage drops the output 1.0 volts under load (2.0 for a pair), replace the batteries.

Testing under load is the only way to spot this problem. While special battery load testing equipment is available, it is costly and difficult to transport.

Use a digital voltmeter to check battery charge level at the charger connector. It is located on the base of the wheelchair frame.

*NOTE: **READ** the instructions **CAREFULLY** before using the digital voltmeter.*

*NOTE: Invacare recommends that **ONLY** qualified service personnel perform this test.*

1. Ensure that power is OFF.
2. Make sure battery is fully charged. An extremely discharged battery will exhibit the same symptoms as a bad one.
3. Place a one (1) piece of wood taller than the axle of the drive wheels between the wheelchair and a wall, workbench or other stationary object.
4. Remove the footrests from the wheelchair and place the stabilizer wheels or the front of the wheelchair against the piece of wood.
5. Place the voltmeter leads into the charger plug on the wheelchair. Most digital voltmeters are not affected by polarity, however, analog meters (meters with swinging needles) can be and should be used carefully. A good meter reading should be 25.5 to 26 VDC.
6. Have two (2) individuals (one [1] on each arm) apply as much downward pressure as possible on the arms of the wheelchair.

7. Turn the wheelchair ON and push the joystick forward, trying to drive the wheelchair through the stationary object. This puts a heavy load on the batteries as they try to push through the stationary object. Read the meter while the motors are straining to determine the voltage under load.

*NOTE: If the voltage drops to less than 23.5 volts from a pair of fully charged batteries while under load, they should be replaced regardless of the unloaded voltages.*

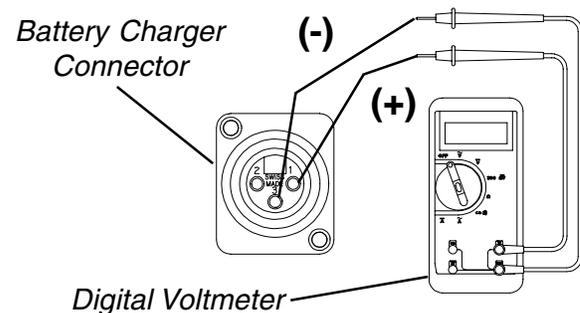


FIGURE 1 - FIELD LOAD TEST

## USING HYDROMETER TO CHECK BATTERY CELLS (LEAD ACID) (FIGURE 2)

*NOTE: Perform this procedure when a digital voltmeter is not available.*

### WARNING

**NEVER** smoke or strike a match near the batteries. If the caps of the battery cells are removed, **NEVER** look directly into them when charging the battery.

The use of rubber gloves and safety glasses is recommended when testing the battery cells.

When reading a hydrometer, **DO NOT** allow any liquid to come in contact with your eyes or skin. It is a form of acid and can cause serious burns, and in some cases, blindness. If you do get battery acid on you, flush the exposed areas with cool water **IMMEDIATELY**. If the acid comes into contact with eyes or causes serious burns, get medical help **IMMEDIATELY**.

The battery acid can damage your wheelchair, clothing, and household items. Therefore, take readings cautiously and only in designated areas.

**WARNING**

ONLY use distilled water when topping off the battery cells.

Most batteries are not sold with instructions. However, warnings are frequently noted on the cell caps. Read them carefully.

1. Remove the battery box(es). Refer to one (1) of the following:
  - A. **FWDWHEELCHAIRS: INSTALLING/REMOVING BATTERY BOXES** in PROCEDURE 8 of this manual.
  - B. **RWDWHEELCHAIRS: INSTALLING/REMOVING BATTERY BOXES** in PROCEDURE 9 of this manual.
2. Remove the battery caps from the battery.
3. Squeeze the air from the hydrometer.
4. Place the hydrometer into a battery cell.

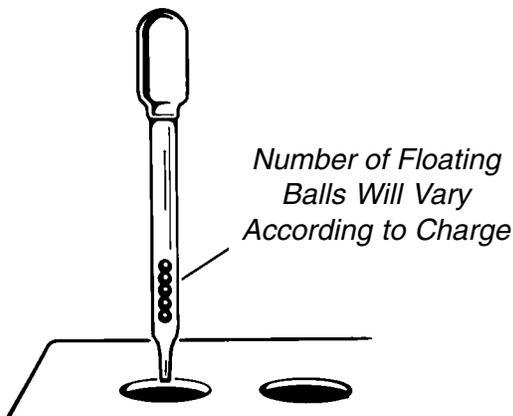
*NOTE: DO NOT fill hydrometer more than 3/4 full.*

5. Draw up sufficient acid to cover float balls.
6. Tap lightly to remove air bubbles.
7. Number of floating balls indicates charge.

**Number of Floating Balls**

0	Discharged
1	25% Charged
2	50% Charged
3	75% Charged
4	100% Charged
* 5	Overcharged

\* Check charging system.



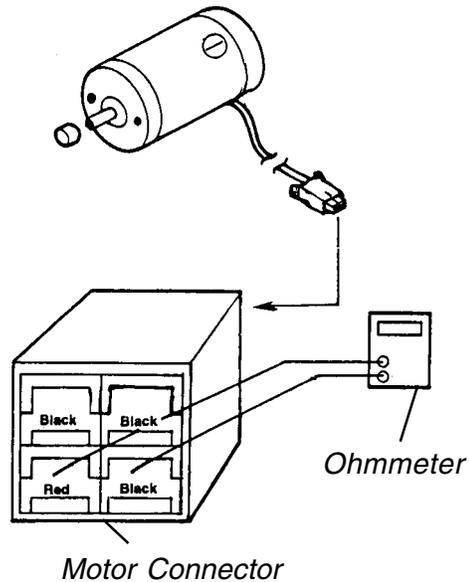
**FIGURE 2 - USING A HYDROMETER TO CHECK BATTERY CELLS (LEAD ACID)**

8. Flush the liquid back into the same cell after reading the float. Repeat this step until all cells have been properly read. A shorted or dead cell can be detected when it is the only cell that does not charge.
9. Flush hydrometer in cold running water by allowing the water to rise into hydrometer as far as possible. Do this several times to guard against burn damage.
10. Replace the battery caps.
11. Reinstall battery boxes. Refer to one (1) of the following:
  - A. **FWDWHEELCHAIRS: INSTALLING/REMOVING BATTERY BOXES** in PROCEDURE 8 of this manual.
  - B. **RWDWHEELCHAIRS: INSTALLING/REMOVING BATTERY BOXES** in PROCEDURE 9 of this manual.

**MOTOR TESTING (FIGURE 3)**

1. On the 4-pin motor connector, locate the two (2) contacts in the red and black housings.
2. Set the digital multimeter to measure ohms ( $\Omega$ ).
3. Measure the resistance between the two (2) motor contacts.

*NOTE: A normal reading is between 1 and 5 ohms ( $\Omega$ ). A reading of 0 ohms ( $\Omega$ ) or in excess of 15 ohms ( $\Omega$ ) indicates a problem. High readings are generally caused by bad connections and/or damaged brushes. Contact authorized dealer or Invacare.*



**FIGURE 3 - MOTOR TESTING**

**MOTOR BRUSH INSPECTION (FIGURE 4)**

There are two (2) contact brushes on the motors located under the brush caps on the motor housing. If these caps are hard to remove they are either overtightened or the motor has become very hot. Let motors cool. If caps still cannot be removed, it is recommended that the motor be sent to Invacare Technical Services for inspection/repair.

*NOTE: It is very important to note which way the brush comes out of the motor. The brush **MUST** be placed into the motor exactly the same way to ensure good contact with the commutator.*

1. Once the motor brush caps have been removed, pull the brushes out of the motor. The end of the brushes should be smooth and shiny and the spring should not be damaged or discolored. If one or both of the brushes are damaged, only the damaged or worn brushes need be replaced. It is very important that any time a brush is replaced, it must be "burned in". This is accomplished by running the motor for one hour in each direction with a half hour break in-between. This should also be done with little or no load on the motor, i.e., put the wheelchair up on blocks so the drive (large) wheels do not contact the ground and run the wheelchair. A motor with only one brush replaced will only carry a small percentage of its rated load capacity until the NEW brush is burned in.

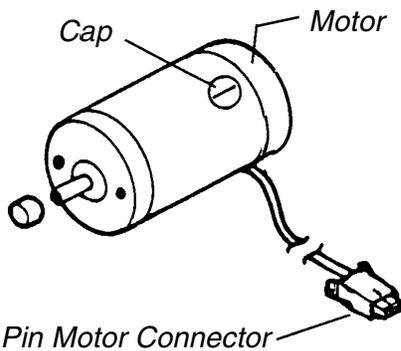


FIGURE 4 - MOTOR BRUSH INSPECTION

**ELECTRO-MECHANICAL PARKING BRAKE TEST (FIGURE 5)**

1. On the four-pin motor connector, locate the side by side connectors in the black housings.
2. Set the digital multimeter to read ohms ( $\Omega$ ).
3. Measure the resistance between the two (2) brake contacts. A normal reading is 100 ohms ( $\Omega$ ). A reading of 0 ohms (W) or a very high reading; i.e., MEG ohms or O.L. (out of limit) indicates a shorted brake or an open connection respectively. If either condition exists, send the motor to Invacare Technical Service for inspection/repair.

**CAUTION**

A shorted electro-mechanical brake will damage the brake output section in the controller. **DO NOT** connect a shorted electro-mechanical brake to a good controller module. A shorted brake **MUST** be replaced.

*NOTE: A bad motor can damage the controller module but a bad controller should NOT damage a motor.*

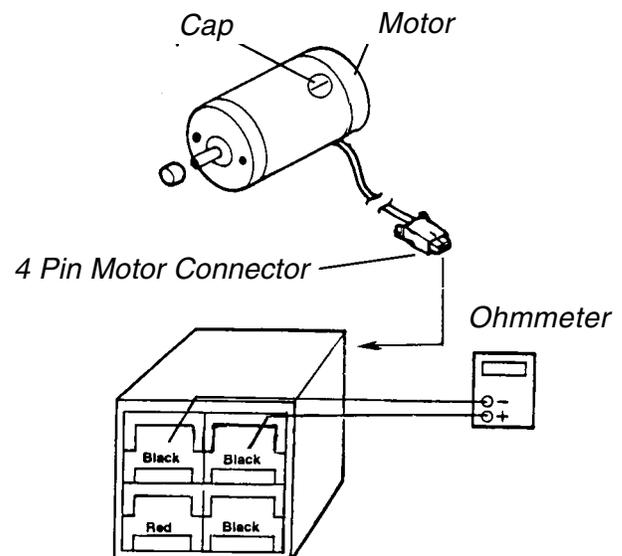


FIGURE 5 - ELECTRO-MECHANICAL PARKING BRAKE TEST

TROUBLESHOOTING

***This Procedure Includes the Following:***  
***Replacing Back Upholstery***

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

**REPLACING BACK UPHOLSTERY (FIGURE 1)**

1. Remove one (1) armrest from the wheelchair.
2. Cut the tie-wraps that secure the bottom of the existing back upholstery to the wheelchair frame.
3. Remove the two (2) phillips screws and washers that secure the existing back upholstery to the back canes.
4. Remove the two (2) hex screws, washers and locknuts that secure one (1) back cane to the wheelchair frame.

*NOTE: It is necessary to remove only one (1) back cane to replace the back upholstery.*

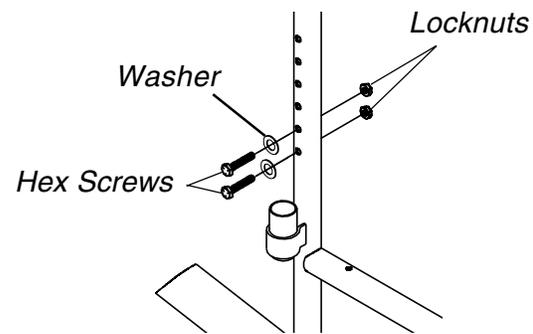
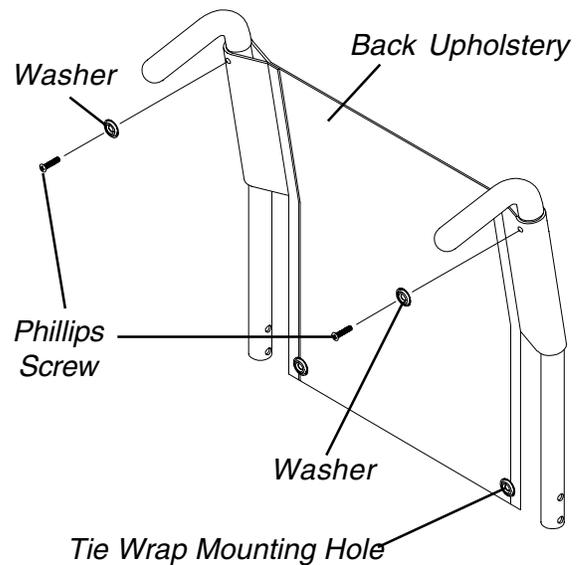
5. Pull the loose back cane out of the existing back upholstery.
6. Pull the existing back upholstery up and over the mounted back cane.
7. Install the new back upholstery over the mounted back cane.
8. Slide the loose back cane through the new back upholstery.

**WARNING**  
 The back canes **MUST** be securely fastened to the wheelchair frame **BEFORE** using the wheelchair.

9. Using the mounted back cane as a guide, reinstall the loose back cane to the wheelchair frame with the existing hex screws, washers and locknuts.

*NOTE: Make sure the back canes are mounted to the same height.*

10. Securely tighten the new back upholstery to the back canes with the two (2) phillips screws and washers.
11. Secure the bottom of the new back upholstery to the wheelchair frame with tie-wraps.
12. Reinstall the armrest onto the wheelchair.



**FIGURE 1 - REPLACING BACK UPHOLSTERY**

*This Procedure Includes the Following:*  
**Adjusting Seat Depth**  
**Adjusting Back Height / Replacing Back Canes**

**WARNING**

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

**ADJUSTING SEAT DEPTH (FIGURE 1)**

1. Remove the existing seat upholstery from the wheelchair. Refer to REPLACING SEAT UPHOLSTERY in PROCEDURE 5 of the Owners Manual, part number 1080737.

*NOTE: If adjusting seat depth of the wheelchair, the seat upholstery MUST be changed as well.*

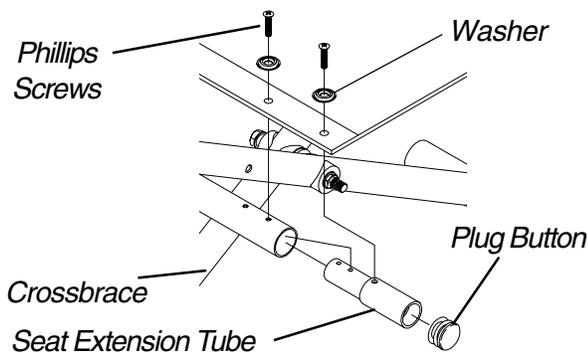
2. Remove the two (2) plug buttons from the ends of the crossbraces that are towards front of wheelchair.

*NOTE: The two (2) plug buttons will be used in the ends of the seat extensions.*

3. Install the two (2) seat extension tubes into the ends on the crossbraces. Line up the **second** mounting hole from the **rear** of the seat extension tube with the front mounting hole in the crossbrace.
4. Install the new seat upholstery onto the wheelchair. Refer to REPLACING SEAT UPHOLSTERY in PROCEDURE 5 of the Owners Manual, part number 1080737.

*NOTE: Make sure to line up the mounting holes in the seat extension tubes with the new seat upholstery.*

5. Install plug buttons into the ends of the seat extension tubes.



**FIGURE 1 - ADJUSTING SEAT DEPTH**

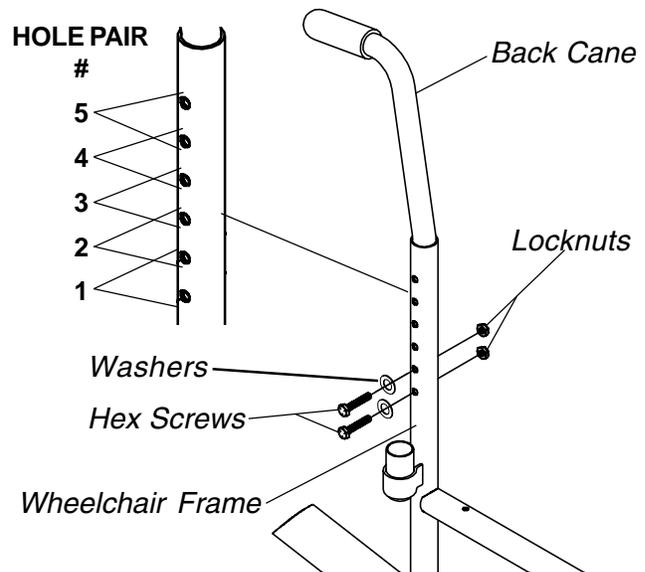
**ADJUSTING BACK HEIGHT/ REPLACING BACK CANES (FIGURE 2)**

1. Remove the four (4) hex screws, washers and locknuts that secure the two (2) back canes to the wheelchair frame.
2. Reposition the back canes to one (1) of five (5) pairs of height adjustment holes:

ORIGINAL BACK HEIGHT (IN INCHES)					
⊕ HOLE PAIR #	1	2	3	4	5
16-20-inches	16	17	18	19	20

⊕ Holes numbered from bottom to top for reference only. (There are no numbers on the back canes.)

3. Reinstall the four (4) hex screws, washers and locknuts that secure the back canes to the wheelchair frame.
4. Securely tighten the hex screws and locknuts.



**FIGURE 2 - ADJUSTING BACK HEIGHT/ REPLACING BACK CANES**

*This Procedure Includes the Following:*  
**Preparing MKIV Joystick for Use**  
**Repositioning MKIV Joystick**

**WARNING**

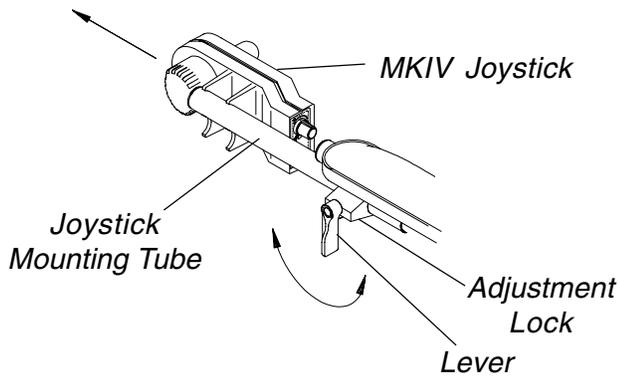
After ANY adjustments, repair or service and BEFORE use, make sure all attaching hardware is tightened securely - otherwise injury or damage may result.

**PREPARING MKIV JOYSTICK FOR USE (FIGURE 1)**

*NOTE: To reposition the MKIV joystick on a Captain's Seat, refer to REPOSITIONING MKIV JOYSTICK - CAPTAIN'S SEAT in PROCEDURE 8 of this manual.*

*NOTE: The MKIV joystick is factory installed on the right side of the wheelchair. To reposition the MKIV joystick onto the left side of the wheelchair, refer to REPOSITIONING MKIV JOYSTICK in this procedure of the manual.*

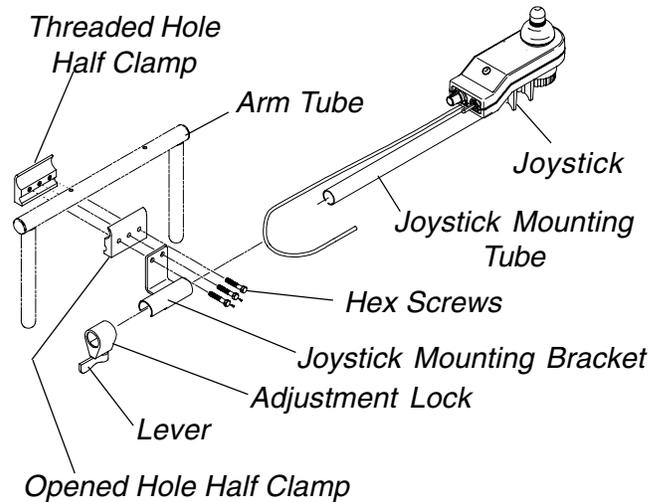
1. Turn the lever on the adjustment lock to release the adjustment lock from joystick mounting tube.
2. Slide joystick mounting tube to the desired position.
3. Turn the lever on the adjustment lock to secure the adjustment lock to the joystick mounting tube.



**FIGURE 1 - PREPARING MKIV JOYSTICK FOR USE**

**REPOSITIONING MKIV JOYSTICK (FIGURE 2)**

1. Turn the lever on the adjustment lock to release the adjustment lock from joystick mounting tube (**tube**).
2. Remove the joystick from the wheelchair.
3. Remove the three (3) hex screws that secure joystick mounting bracket (**bracket**), the threaded hole half clamp and the opened hole half clamp to the arm tube.
4. Reposition the threaded hole half clamp and opened hole half clamp on the opposite arm tube. Make sure threaded hole half clamp is on the inside of arm tube.
5. While holding the two (2) half clamps, install the front hex screw into the two (2) half clamps. Securely tighten.
6. Line up mounting holes of the joystick mounting bracket with the mounting holes in the two (2) half clamps.
7. Secure the joystick mounting bracket to the two (2) half clamps with the remaining two (2) hex screws.
8. Slide tube through the bracket to the desired position.
9. Slide the adjustment lock over the end of the tube and secure the adjustment lock to the tube by turning the lever on the adjustment lock.



**FIGURE 2 - REPOSITIONING MKIV JOYSTICK**

*This Procedure Includes the Following:*

**Replacing Pneumatic Tires/Tubes - Drive Wheels/Casters**

**Removing/Installing Drive Wheels**

**Replacing Casters**

**Replacing Forks**

**WARNING**

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

**CAUTION**

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

**REPLACING PNEUMATIC TIRES/ TUBES - DRIVE WHEELS/CASTERS**

**WARNING**

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.

If tires are pneumatic, replacement of tire or tube MUST be performed by an Invacare dealer or qualified technician.

*NOTE: If drive wheels or casters are pneumatic, under-inflation causes excessive wear which results in poor performance of the tires.*

**REMOVING/INSTALLING DRIVE WHEELS (FIGURE 1)**

**WARNING**

NEVER use a locking tab washer more than once. ALWAYS use a NEW locking tab washer when installing the drive wheels. Otherwise injury or damage may result.

**Removing**

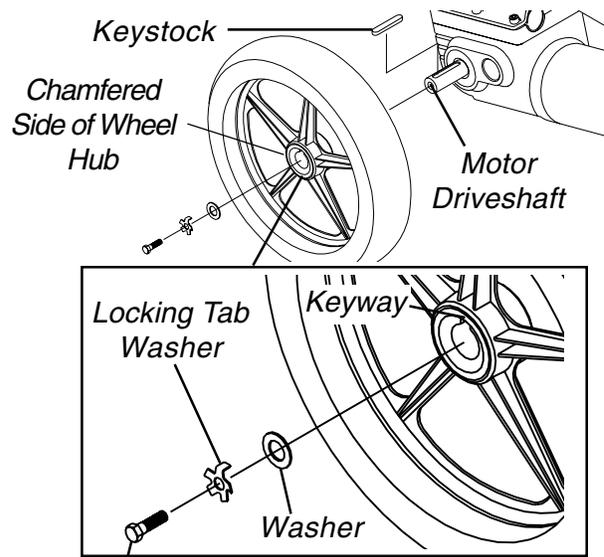
1. Remove the hex screw, locking tab washer and washer that secure the existing drive wheel to the wheel hub.
2. Use a wheel puller to remove the existing drive wheel from the motor drive shaft.

Loctite - Registered trademark of Loctite Corporation.

**Installing**

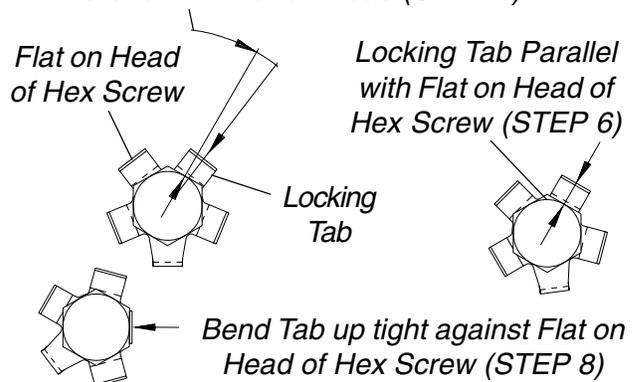
*NOTE: The keystone in the wheel hub MUST lineup with the cutout in the gearbox drive shaft.*

1. Install new/existing drive wheel onto the motor drive shaft. Make sure the chamfered (angled in) side of the wheel hub is pointing away from the wheelchair.
2. Install washer onto motor drive shaft.
3. Install the **NEW** locking tab washer onto the motor drive shaft. Make sure the locking tab is in line with the keyway of the front wheel.
4. Apply Loctite® 242 to the hex screw.
5. Install the hex screw. Use a torque wrench only and torque to 90-inch pounds.
6. Examine the head of the hex screw and the locking tab washer. Make sure one (1) of the tabs on the locking tab washer is parallel with one (1) of the flats on the head of the hex screw.



Hex Screw (Apply Loctite 242 and use a Torque Wrench only to Torque to 90-inch pounds)

*TIGHTEN Hex Screw if Locking Tab is not Parallel with Flat on Head (STEP 7)*



**FIGURE 1 - REMOVING/INSTALLING DRIVE WHEELS**

- If one (1) of the tabs on the locking tab washer is NOT parallel with one (1) of the flats on the head of the hex screw (FIGURE 1), **TIGHTEN** the hex screw until the closest flat and locking tab are parallel.

*NOTE: Tighten hex screw only. DO NOT loosen hex screw to make one of the tabs on the locking washer parallel.*

- Bend the parallel tab of locking tab washer up tight against flat of the hex screw (FIGURE 1).

**REPLACING CASTERS (FIGURE 2)**

- Remove the hex screw, washers and locknut that secure the caster to the fork.
- Remove the caster from the fork.
- Install Loctite 242 onto the hex screw.
- Replace caster and reverse STEPS 1-3.
- Torque the locknut to 120-inch pounds.
- Loosen the locknut 1/8 of a turn.
- Move the caster side to side.

*NOTE: If the caster moves side to side, tighten the locknut slightly. Repeat STEP 7 until there is no side to side movement of the caster.*

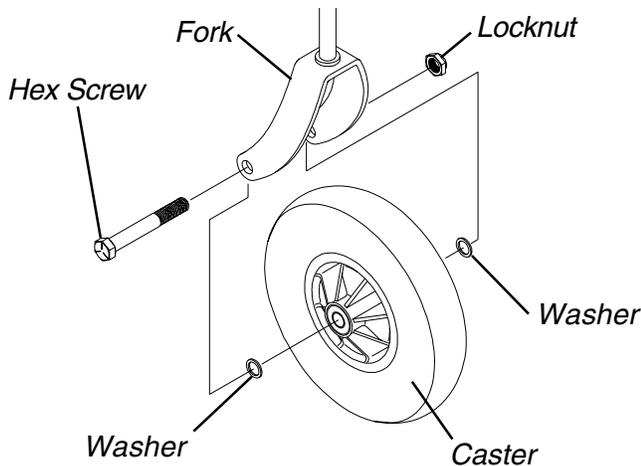


FIGURE 2 - REPLACING CASTERS

**REPLACING FORKS (FIGURE 3)**

- Remove the hex screw, washers and locknut that secure the caster to the existing fork.
- Remove the caster from the existing fork.
- Remove the dust cover.
- Remove the locknut and nylon washer.
- Drop the existing fork out of the caster head tube.
- Slide the new fork into the caster head tube.

*NOTE: Check bearing assemblies and replace if necessary.*

- Ensure that new fork slides completely into the caster head tube.
- Install nylon washer and secure with locknut.

**WARNING**  
Improper positioning of the washer will prohibit the free movement of the forks.

- Install Loctite 242 onto the hex screw.
- Position the caster into the new fork.
- Reinstall the hex screw, washers and locknut that secure the caster to the new fork.
- Torque the locknut to 120-inch pounds.
- Loosen the locknut 1/8 of a turn.
- Move the caster side to side.

*NOTE: If the caster moves side to side, tighten the locknut slightly. Repeat STEP 14 until there is no side to side movement of the caster.*

- Adjust the fork. Refer to **ADJUSTING FORKS** in PROCEDURE 8 of the owner's manual, part number 1080737.

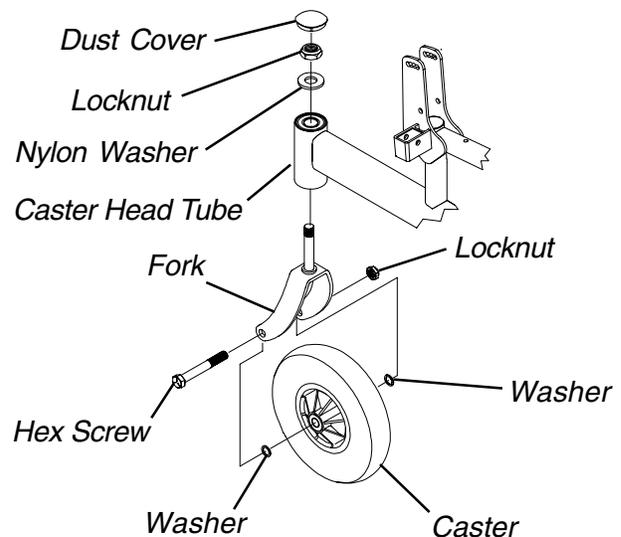


FIGURE 3 - REPLACING FORKS

**This Procedure includes the following:**  
**Installing/Removing Batteries into/From Battery Boxes**  
**Connecting Battery Cables**

**WARNING**

Make sure power to the wheelchair is OFF before performing this procedure.

The use of rubber gloves and safety glasses is recommended when working with batteries.

Invacare strongly recommends that battery installation and battery replacement ALWAYS be done by a qualified technician.

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

*NOTE: For CHARGING BATTERIES or REMOVING/INSTALLING THE BATTERY BOXES, refer to PROCEDURE 8 - FWD wheelchairs or PROCEDURE 9 - RWD wheelchairs.*

**INSTALLING/REMOVING BATTERIES INTO/FROM BATTERY BOXES (FIGURE 1)**

*NOTE: To remove the battery(ies) from the battery box(es), reverse the following procedure.*

*NOTE: Have the following tools available:*

TOOL	QTY	COMMENTS
Battery Lifting Strap	1	See Note
1/2-inch (6 pt) Box Wrench	1	Not Supplied
7/16-inch (6pt) Box Wrench	1	Not Supplied
3/8-inch (6pt) Box Wrench	1	Not Supplied
Diagonal Cutters	1	Not Supplied

*\*NOTE: The Battery Lifting strap supplied is for Dual 22 NF Batteries ONLY. Refer to the battery manufacturer for the proper lifting strap and/or battery tools for U1 battery removal/installation.*

**WARNING**

ALWAYS use a battery lifting strap when lifting a battery. It is the most convenient method and assures that the battery acid will not spill. It also helps to prolong the life of the battery.

DO NOT tip the batteries. Keep the batteries in an upright position.

*NOTE: If there is battery acid in the bottom or on the sides of the battery box(es) or battery(ies), apply baking soda to these areas to neutralize the battery acid. Before reinstalling the NEW or existing battery(ies), clean the baking soda from the battery box(es) or battery(ies).*

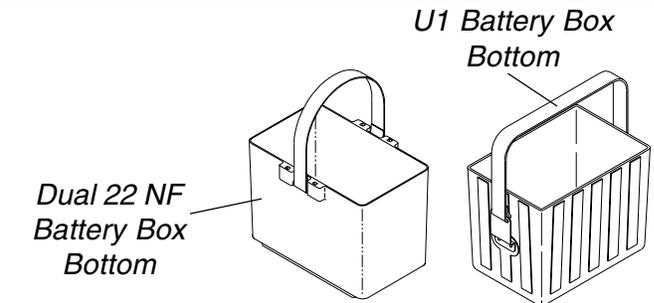
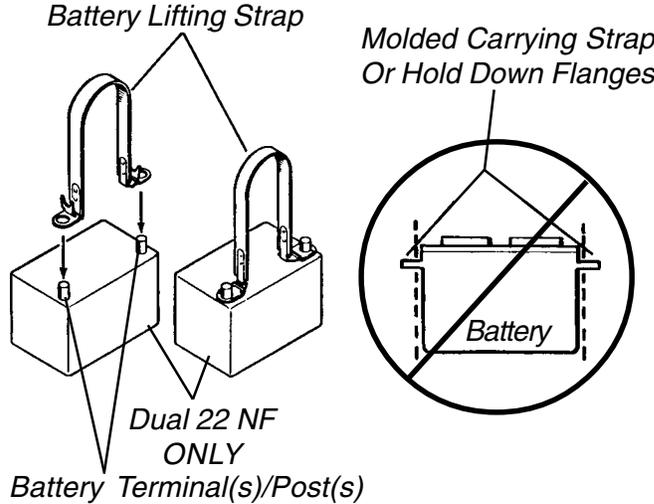
*NOTE: When securing battery lifting strap to battery, observe polarity markings located on the ends of the battery lifting strap, (+) side to POSITIVE (+) battery terminal/post and (-) side to NEGATIVE (-) battery terminal/post.*

1. If necessary, remove the battery boxes from the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES in PROCEDURE 8 - FWD or PROCEDURE 9 - RWD of this manual.
2. Secure the battery lifting strap to battery terminal(s)/post(s) (FIGURE 1).

**CAUTION**

Some battery manufacturers mold a carrying strap and/or hold down flanges directly into the battery case. Batteries which interfere with the battery box cannot be used for these applications. Attempting to "wedge" a battery into a battery box may damage the box and/or the battery.

3. Place batteries into battery box bottom.



**FIGURE 1 - INSTALLING/REMOVING BATTERIES INTO/FROM BATTERY BOXES**

**CONNECTING BATTERY CABLES**

**BATTERIES**

**WARNING**

NEVER allow any of your tools and/or battery cable(s) to contact BOTH battery terminal(s)/post(s) at the same time. An electrical short may occur and serious personal injury or damage may occur.

The use of rubber gloves and safety glasses is recommended when working with batteries.

**Dual U1 or Dual 22NF Battery Boxes**

Perform one (1) of the following methods for connecting the battery cable(s):

- A. **FOR DUAL U1 BATTERIES** - Use direct mount method. Refer to FIGURES 2, and 3.
- B. **FOR DUAL 22NF BATTERIES THAT HAVE MOUNTING HOLES IN THE BATTERY TERMINAL(S)/POST(S)** - Use direct mount method. Refer to FIGURES 2 AND 3.
- C. **FOR DUAL 22NF BATTERIES THAT DO NOT HAVE MOUNTING HOLES IN THE BATTERY TERMINAL(S)/POST(S)** - Use battery clamp method. Refer to FIGURES 4, 5 AND 6.

**DIRECT MOUNT METHOD (FIGURE 2 AND 3).**

1. Install battery terminal cap(s) onto battery cable(s) as follows (FIGURE 2):

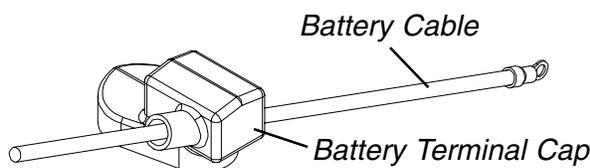
**DUAL U1 BATTERIES:**

- A. ORANGE battery terminal cap onto RED battery cable.
- B. GRAY battery terminal cap onto BLACK battery cable.

**DUAL 22NF BATTERIES:**

- A. RED battery terminal cap onto RED battery cable.
- B. BLACK battery terminal cap onto BLACK battery cable.

**INSTALLING BATTERY TERMINAL CAPS**



*NOTE: Only one (1) battery cable and terminal cap shown for clarity. Both caps install in the same manner.*

**FIGURE 2 - CONNECTING BATTERY CABLES - DIRECT MOUNT METHOD**

**CAUTION**

When connecting the battery cables to the battery(ies), the battery cable(s) MUST be connected to the battery terminal(s)/post(s) as shown in DETAIL "A" or DETAIL "B" of FIGURE 3 (depending on battery type), otherwise damage to the battery cable may result when installing battery terminal caps.

2. Connect battery cable(s) to battery(ies) terminal(s)/post(s) as follows (DETAIL "A" or DETAIL "B" of FIGURE 3, depending on battery type):
  - A. NEGATIVE (-) BLACK battery cable to NEGATIVE (-) battery terminal/post.
  - B. POSITIVE (+) RED battery cable to POSITIVE (+) battery terminal/post.
3. Secure the battery cable(s)/ring terminal(s) to the battery terminal(s)/post(s), BLACK to NEGATIVE (-) and RED to POSITIVE (+), with the provided 1/4-20 x 7/8-inch hex flange screw and hex flange locknut. Securely tighten. (DETAIL "A" or DETAIL "B" of FIGURE 3, depending on battery type).
4. Verify all battery cable(s)/ring terminal(s) are correctly installed and securely tightened.
5. Slide terminal cap(s) down battery cable(s) and onto battery clamps (FIGURE 3).
6. Secure each terminal cap in place with a tie-wrap (Use tie-wraps 11-1/2-inches long) (FIGURE 3).

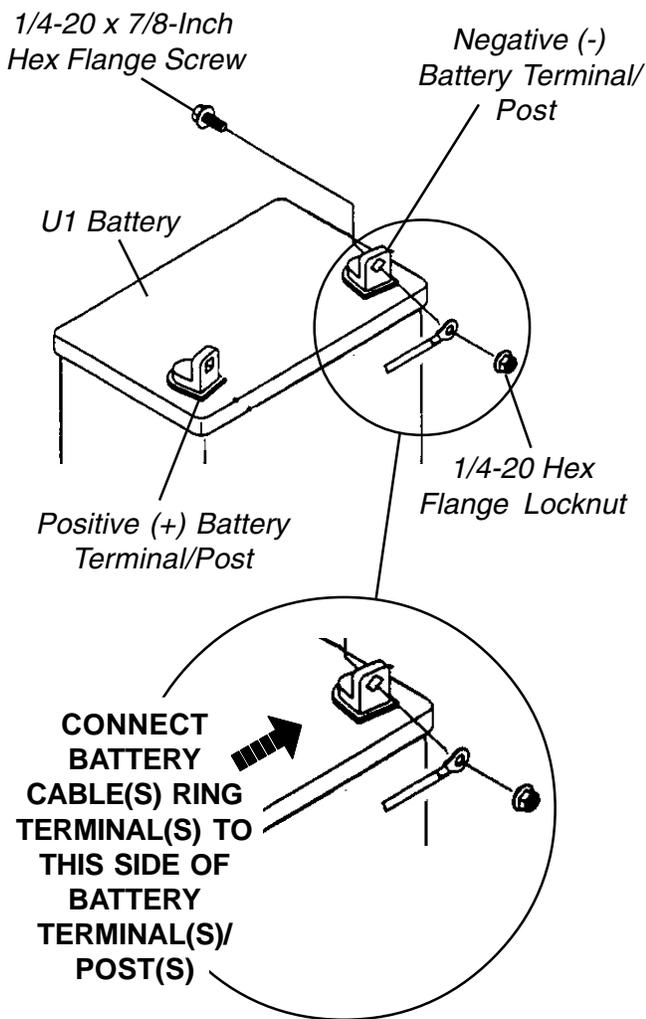
*NOTE: It will be necessary to trim excess tie-wrap in order to install the battery box top(s).*

7. Install the battery box top(s).
8. Install the battery box(es) into the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOX(ES) in the PROCEDURE 8 - FWD MODELS or PROCEDURE 9 - RWD MODELS of this manual.

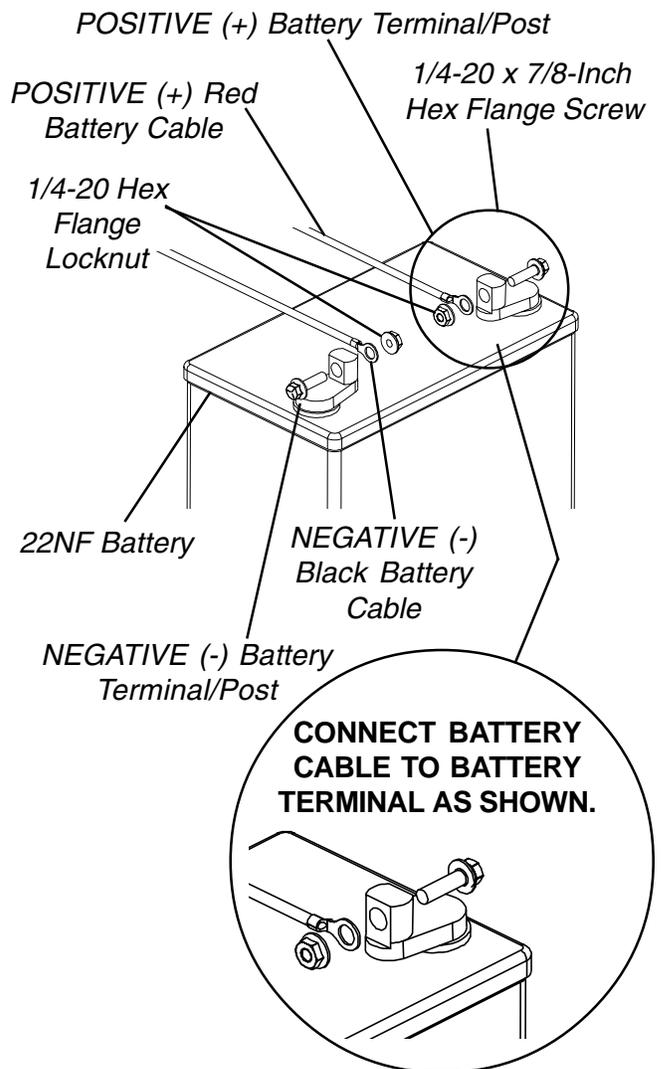
*NOTE: New Battery(ies) MUST be fully charged BEFORE using, otherwise the life of the battery(ies) will be reduced.*

9. If necessary, charge the battery(ies). Refer to CHARGING BATTERIES in the PROCEDURE 8 - FWD MODELS or PROCEDURE 9 - RWD MODELS of this manual.

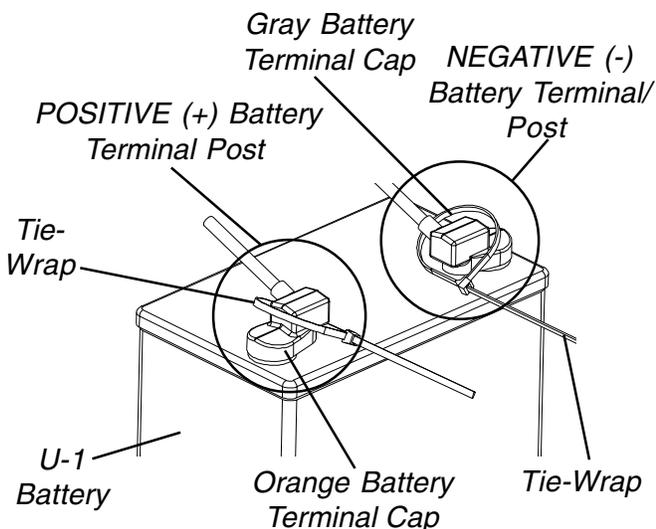
**DETAIL "A"**  
**DUAL U1 BATTERIES**



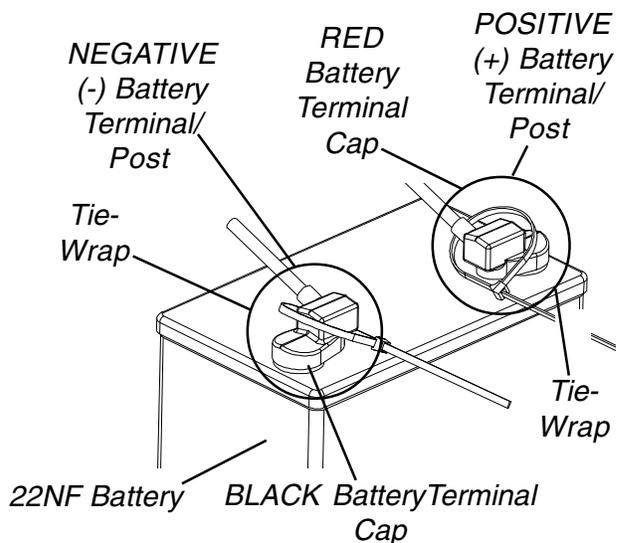
**DETAIL "B"**  
**DUAL 22NF BATTERIES**



**DUAL U1 BATTERIES**



**DUAL 22NF BATTERIES**



**FIGURE 3 - CONNECTING BATTERY CABLES - DIRECT MOUNT METHOD**

BATTERIES

**Battery Clamp Method (FIGURES 4, 5 and 6).**

**WARNING**

The battery clamp of the POSITIVE (+) battery terminal/post MUST be mounted in the position shown in FIGURE 5, otherwise the battery box top cannot be installed properly.

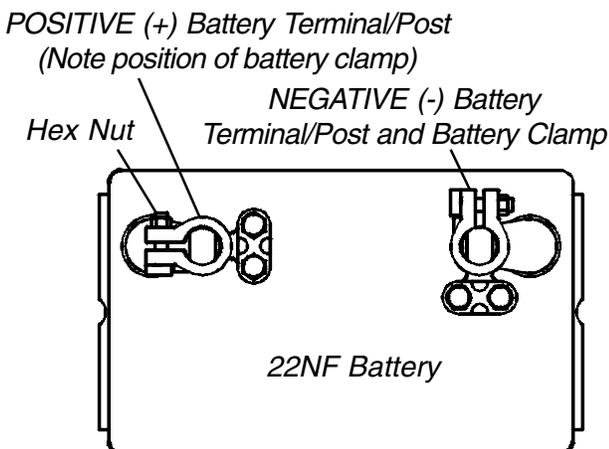
1. Perform one (1) of the following:
  - A. If the battery clamp of the POSITIVE (+) battery terminal/post is **NOT** mounted in the orientation shown in FIGURE 5, perform the following:
    - Loosen the hex nut that secures the battery clamp to the POSITIVE (+) battery terminal/post.
  - B. If the battery clamp on the POSITIVE (+) battery terminal/post is positioned as shown in FIGURE 4, proceed to STEP 2.

**CAUTION**

When tightening the clamps, always use a box wrench. Pliers will "round off" the nuts. NEVER wiggle the battery terminal(s)/post(s) when tightening. The battery may become damaged.

- Remove the battery clamp from the POSITIVE (+) battery terminal/post.
- Reposition the battery clamp on the POSITIVE (+) battery terminal/post as shown in FIGURE 4.
- Securely tighten the hex nut that secures the battery clamp to the positive (+) battery terminal/post.

**CORRECT ORIENTATION OF THE POSITIVE (+) BATTERY TERMINAL/POST BATTERY CLAMP**

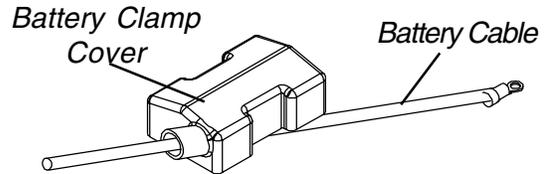


**FIGURE 4 - CONNECTING BATTERY CABLES - BATTERY CLAMP METHOD**

2. Install battery clamp covers onto battery cables as follows (FIGURE 5):
  - A. RED battery clamp cover onto RED battery cable.
  - B. BLACK battery clamp cover onto BLACK battery cable.

*NOTE: Only one (1) battery cable and battery clamp cover are shown for clarity. Both battery clamp covers install in the same manner.*

**INSTALLING BATTERY CLAMP COVERS**



**FIGURE 5 - CONNECTING BATTERY CABLES - BATTERY CLAMP METHOD**

**CAUTION**

When connecting the battery cable/ring terminal(s) to the battery(ies) clamp(s), the battery cable(s) MUST be connected in the position shown in DETAIL "A", otherwise damage may occur to the battery cable and/or battery clamp covers.

3. Connect battery cable(s) to battery(ies) terminal(s)/post(s) as follows (DETAIL "A"):
    - A. NEGATIVE (-) BLACK battery cable/ring terminal between the mounting plate and battery clamp of NEGATIVE (-) battery terminal/post.
    - B. POSITIVE (+) RED battery cable/ring terminal between the mounting plate and battery clamp of POSITIVE (+) battery terminal/post.
  4. Secure the battery cable(s)/ring terminal(s) to the battery clamp(s), BLACK to NEGATIVE (-) and RED to POSITIVE (+), with existing hex screws. Securely Tighten. (DETAIL "A")
  5. Verify battery cable ring terminal(s) are correctly installed and securely tightened.
  6. Slide battery clamp covers down battery cables and onto battery terminals. (DETAIL "B")
  7. Secure each terminal cap in place with a tie-wrap (Use tie-wraps 11-1/2-inches long). (DETAIL "B")
- NOTE: It will be necessary to trim excess tie-wrap in order to install the battery box top(s).*
8. Install the battery box top(s).

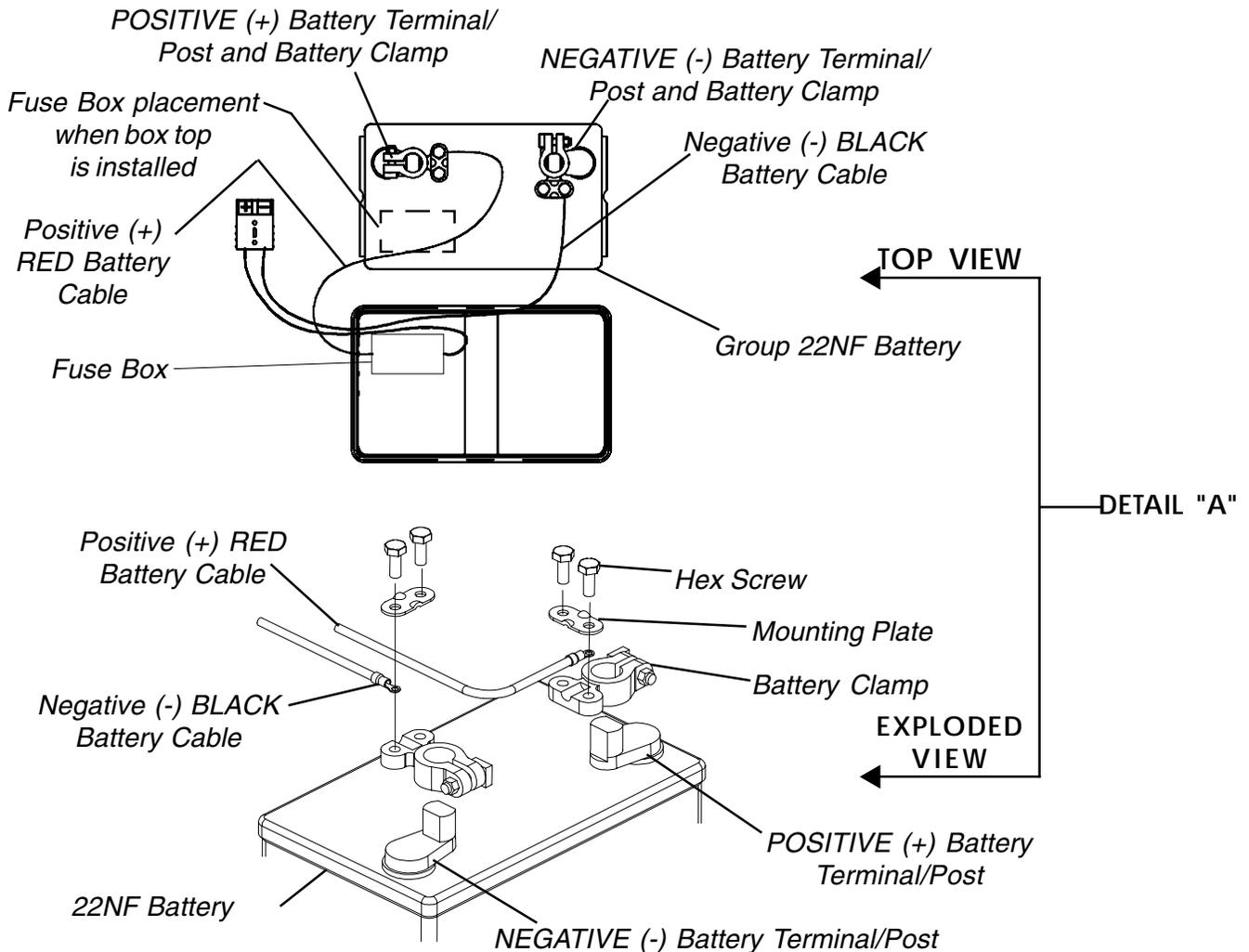
9. Install the battery box(es) into the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOX(ES) in the PROCEDURE 8 - FWD MODELS or PROCEDURE 9 - RWD MODELS of this manual.

10. If necessary, charge the battery(ies). Refer to CHARGING BATTERIES in the PROCEDURE 8 - FWD MODELS or PROCEDURE 9 - RWD MODELS of this manual.

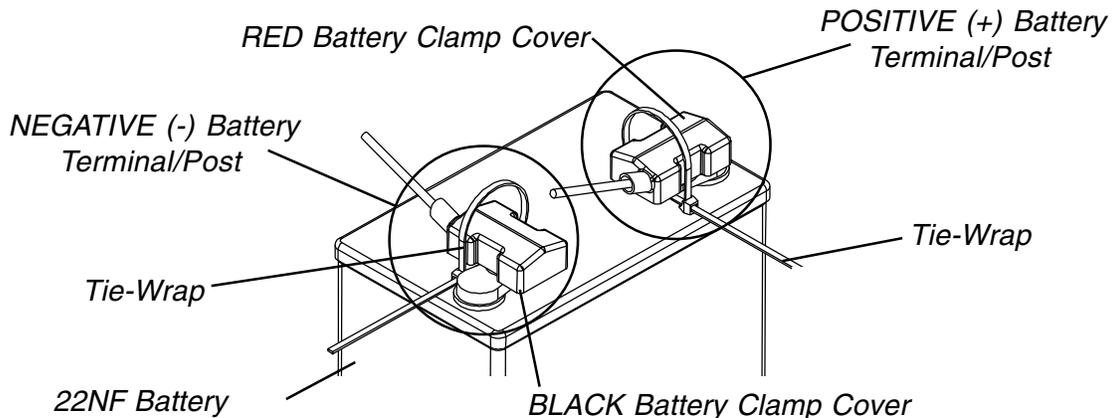
*NOTE: New Battery(ies) MUST be fully charged BEFORE using, otherwise the life of the battery(ies) will be reduced.*

**CONNECTING BATTERY CABLE(S) TO BATTERY(IES) TERMINAL(S)/POST(S)**

**B  
A  
T  
T  
E  
R  
I  
E  
S**



**DETAIL "B"**



**FIGURE 6 - CONNECTING BATTERY CABLES - BATTERY CLAMP METHOD**

**This Procedure Includes the Following:**

- Assembling Excel*
- Adjusting Flip-Up Removable Footboard*
- Replacing Armrest Pads*
- Replacing Armrest Plate*
- Replacing Seat Positioning Strap*
- Replacing Captain's Seat*
- Repositioning MKIV Joystick - Captain's Seat*
- Removing/Installing MKIV Controller*
- Replacing Wiring Harness*
- Disconnecting/Connecting Limit Switch*
- Adjusting Limit Switch*
- Removing/Installing Shrouds*
- Changing Seat Width - Integrated Sling Seats*
- Replacing Crossbraces - Captain's Seat*
- When to Charge Batteries*
- Charging Batteries*
- Replacing Batteries*
- Installing/Removing Battery Boxes*
- Battery Tray*
- Repositioning Motors*
- Replacing Clutch Handles*
- Replacing Motor/Gearbox*

**WARNING**

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

**ASSEMBLING EXCEL**

**WARNING**

The weight of the wheelchair without the user and batteries is still between 90 and 127 lbs. Use proper lifting techniques (lift with your legs) to avoid injury. Extreme caution is advised when it is necessary to move an UNOCCUPIED power wheelchair. Invacare recommends using two (2) assistants and making thorough preparations. Make sure to use ONLY secure, non-detachable parts for hand-hold supports.

Keep hands and fingers clear of moving parts to avoid injury.

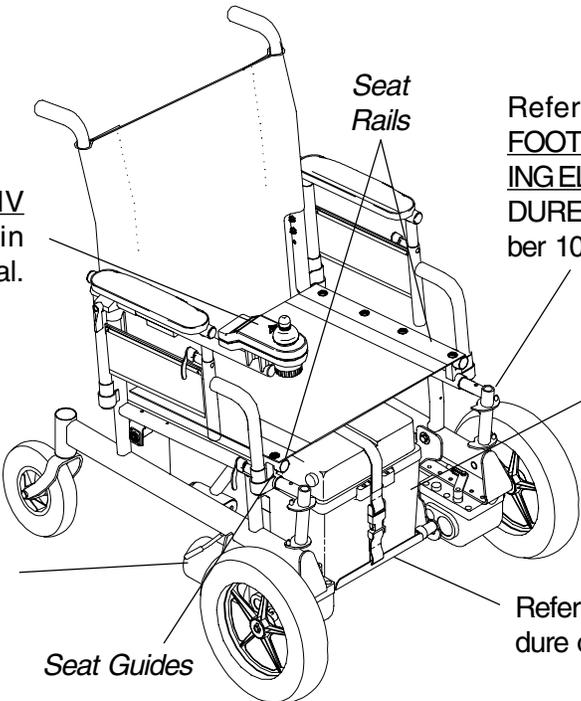
The overall performance of the wheelchair WILL be affected by the front wheel mounting position. Refer to REPOSITIONING MOTORS - FWD WHEELCHAIRS in this procedure of the manual BEFORE operating the wheelchair.

**Unfolding/Folding - Integrated Sling Seat (FIGURE 1)**

**UNFOLDING.**

1. Push down on the seat rails until the seat rails are positioned in the seat guides.
2. Assemble the wheelchair. Refer to FIGURE 1.

Refer to PREPARING MKIV JOYSTICK FOR USE in PROCEDURE 5 of this manual.



Refer to INSTALLING/REMOVING FOOTRESTS or INSTALLING/REMOVING ELEVATING LEGRESTS in PROCEDURE 3 of the owners manual, part number 1080737.

Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

Refer to REPOSITIONING MOTORS in this procedure of the manual.

Refer to BATTERY TRAY in this procedure of the manual.

**FIGURE 1 - ASSEMBLING EXCEL - UNFOLDING/FOLDING - INTEGRATED SLING SEAT**

**FOLDING.**

1. Remove the batteries and footrests/legrests from the wheelchair. Refer to FIGURE 1.
2. Lift the battery tray UP and out of the way. Refer to FIGURE 1.
3. Lift up on the seat rails of the wheelchair.

**Unfolding/Folding - Captain's Seat (FIGURE 2)**

**UNFOLDING.**

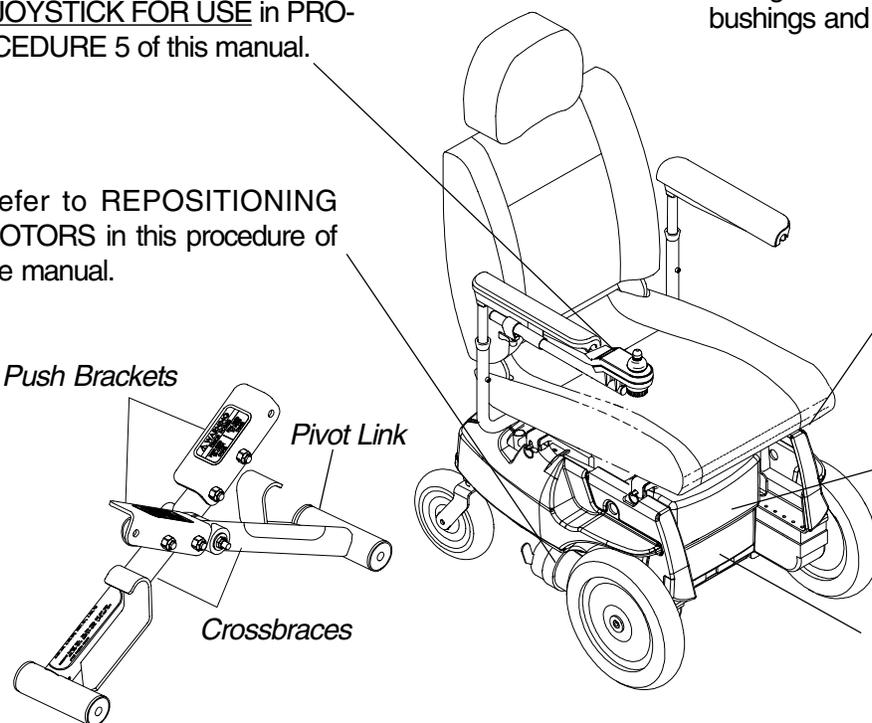
1. Push down on the push brackets until they are flush with the pivot links on the crossbraces.
2. Assemble the wheelchair. Refer to FIGURE 2.
3. Install the shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
4. Install the Captain's Seat. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.
5. **HIGH BACK CAPTAIN'S SEATS ONLY** - Connect the limit switch. Refer to DISCONNECTING/CONNECTING LIMIT SWITCH in this procedure of the manual.

**FOLDING.**

1. **HIGH BACK CAPTAIN'S SEATS ONLY** - Disconnect the limit switch. Refer to DISCONNECTING/CONNECTING LIMIT SWITCH in this procedure of the manual.

Refer to PREPARING MKIV JOYSTICK FOR USE in PROCEDURE 5 of this manual.

Refer to REPOSITIONING MOTORS in this procedure of the manual.



Refer to INSTALLING/REMOVING FOOTRESTS or INSTALLING ELEVATING LEGRESTS in PROCEDURE 3 of the owner's manual, part number 1080737.

Refer to BATTERY TRAY in this procedure of the manual.

Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

2. Remove the Captain's Seat. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.
3. Remove the shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
4. Remove the batteries and footrests/legrests from the wheelchair. Refer to FIGURE 2.
5. Lift the battery tray UP and out of the way. Refer to FIGURE 2.
6. Lift up on push brackets located on the crossbraces.

**ADJUSTING FLIP-UP REMOVABLE FOOTBOARD**

**Angle (FIGURE 3)**

*NOTE: Angle availability is limited when the motors are in the forward-most position.*

1. Remove the caplug caps.
2. Remove the front hex screw and caplug washer that secure the footboard mounting bracket and bushing to the wheelchair.
3. Repeat STEP 2 for the opposite front hex screw and caplug washer.
4. Move the footboard mounting brackets to one (1) of three (3) positions.

*NOTE: To ensure the existing hex screws tighten securely, apply Loctite 242 onto the threads.*

5. Reinstall the two (2) hex screws and caplug washers through the two (2) footboard mounting brackets and bushings and into the wheelchair.

FIGURE 2 - ASSEMBLING EXCEL - UNFOLDING/FOLDING - CAPTAIN'S SEAT

- Torque the two (2) hex screws to 156-in/lbs.
- Reinstall the two (2) caplug caps.

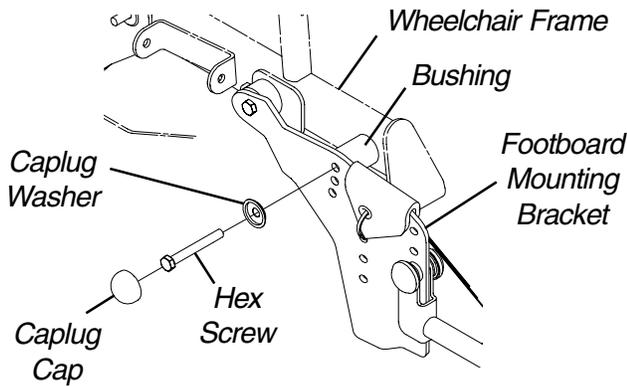


FIGURE 3 - ADJUSTING FLIP-UP REMOVABLE FOOTBOARD - ANGLE

**Height (FIGURE 4)**

- If necessary, remove the four (4) caplug caps.
- Remove the hex screw, two (2) spacers, washers and locknut that secure one (1) of the footboard pivots to the footboard mounting bracket.
- Repeat STEP 2 for opposite side of the wheelchair.
- Move the footboard pivots to one (1) of five (5) positions.
- Resecure the two (2) footboard pivots to the footboard mounting brackets with the hex screws, spacers, washers and locknuts. Refer to FIGURE 4 for the correct hardware orientation.
- Torque the two (2) hex screws to 156in/lbs. and back off the hex screws 1/8-1/4 of a revolution.
- If necessary, reinstall the four (4) caplug caps.

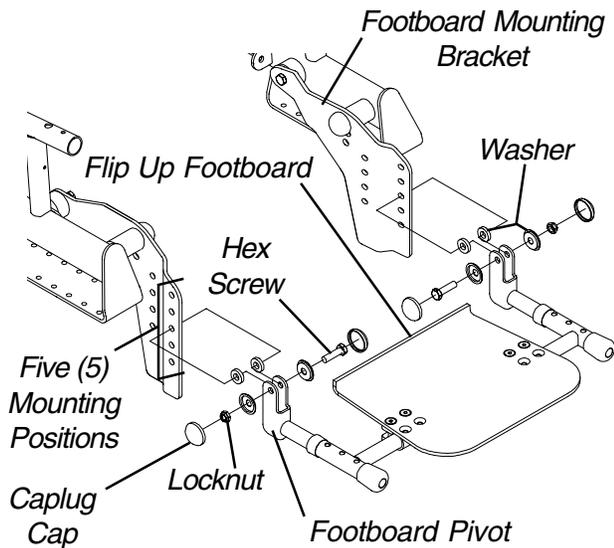


FIGURE 4 - ADJUSTING FLIP-UP REMOVABLE FOOTBOARD - HEIGHT

**REPLACING ARMREST PADS (FIGURE 5)**

- Remove the mounting screws that secures the front of the armrest pad to the armrest plate.
- Remove the mounting screw that secures the rear of armrest pad and armrest insert to the armrest plate.
- Remove the existing armrest pad and position the new armrest pad on the armrest plate.
- Line up the mounting holes in the armrest insert, armrest plate and new armrest pad.
- Reinstall the rear mounting screw through the armrest insert, armrest plate and armrest pad and tighten securely.
- Reinstall the front mounting screw into the armrest plate and new armrest pad and tighten securely.

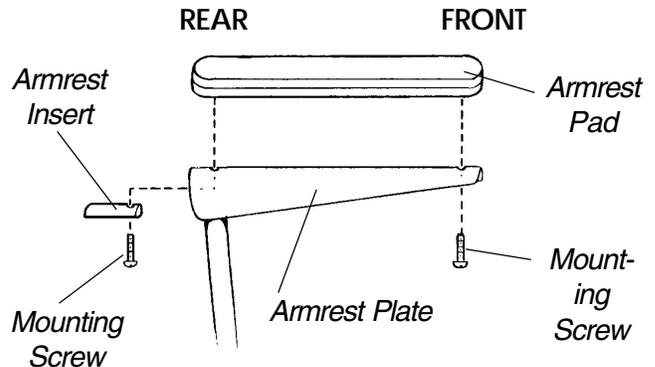


FIGURE 5 - REPLACING ARMREST PADS

**REPLACING ARMREST PLATE (FIGURE 6)**

- If necessary, remove the three (3) hex bolts, spacers and locknuts that secure the joystick mounting bracket to the armrest plate.
- Remove armrest pad. Refer to REPLACING ARMREST PADS in this procedure of the manual.
- Remove the lug bolt, washers and locknut that secure the existing armrest plate to the seat frame assembly.
- Position the new armrest plate on the seat frame assembly and secure with the lug bolt, washers and locknut. Refer to FIGURE 2 for correct hardware orientation.
- Reinstall armrest pad. Refer to REPLACING ARMREST PADS in this procedure of the manual.
- If necessary, reinstall the three (3) hex bolts, spacers and locknuts that secure the joystick mounting bracket to the armrest plate.
- Repeat STEPS 1-6 for the opposite armrest plate, if necessary.

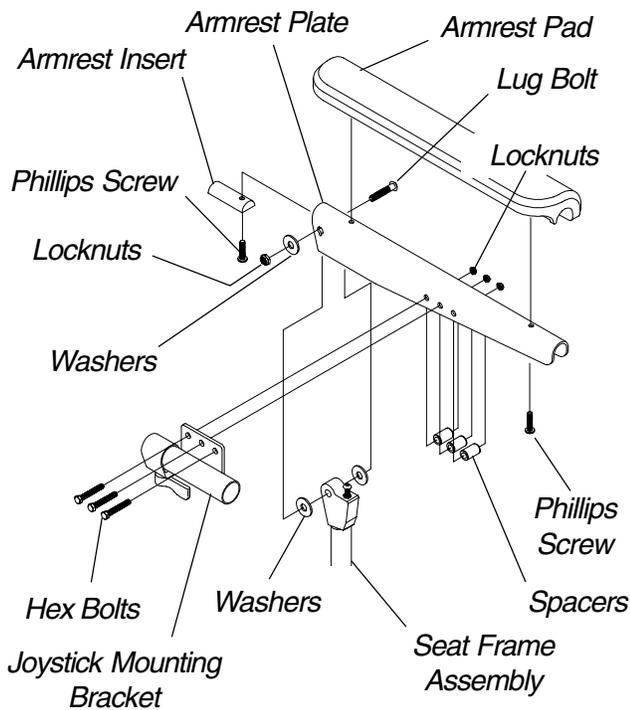


FIGURE 6 - REPLACING ARMREST PLATE

**REPLACING SEAT POSITIONING STRAP (FIGURE 7)**

*NOTE: The following procedure is for Captain's Seats only.*

1. Remove the Captain's seat from the wheelchair. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.
2. Remove the two (2) hex bolts, washers and locknuts that secure the seat positioning strap to the seat frame assembly.
3. Remove the two (2) halves of the seat positioning strap from the seat frame assembly.
4. Position the two (2) new seat positioning strap halves on the inside of the seat frame assembly as shown in FIGURE 7.

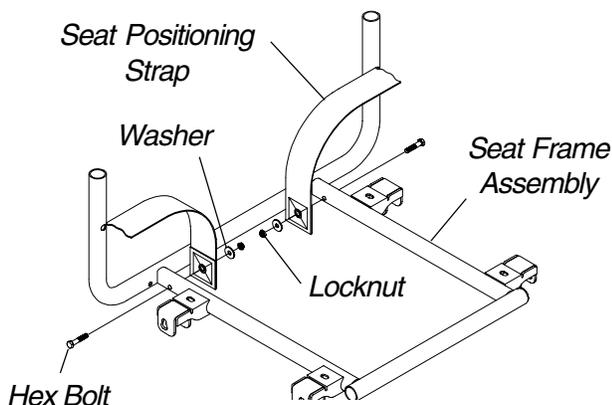


FIGURE 7 - REPLACING SEAT POSITIONING STRAP

5. Position the mounting holes in the two (2) new seat positioning strap halves with the mounting holes in the seat frame assembly.
6. Reinstall the two (2) hex bolts, washers and locknuts that secure the seat positioning strap to the seat frame assembly and tighten securely.
7. Install the captain's seat onto the wheelchair. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.

**REPLACING CAPTAIN'S SEAT (FIGURE 8)**

1. Remove the Captain's seat from the wheelchair. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual part number 1080737.
2. Remove the four (4) hex screws and washers that secure existing captain's seat to the seat frame assembly.
3. Line up mounting holes in the new captain's seat with mounting holes in the seat frame assembly.
4. Apply Loctite 242 to the hex screws.
5. Install the four (4) hex screws and washers through the seat frame assembly and into the new captain's seat. Tighten securely.
6. Install the new captain's seat onto the wheelchair. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.

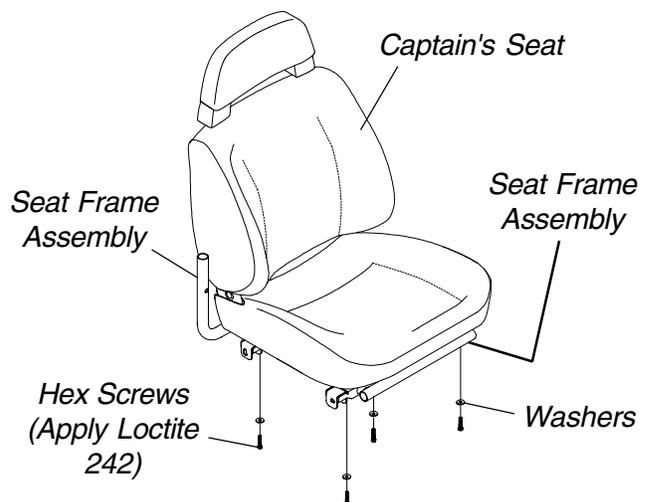


FIGURE 8 - REPLACING CAPTAIN'S SEAT

**REPOSITIONING MKIV JOYSTICK - CAPTAIN'S SEAT (FIGURE 9)**

1. Turn the lever on the adjustment lock to release the adjustment lock from joystick mounting tube.
2. Remove the joystick from the wheelchair.

3. Remove the three (3) hex bolts, spacers and locknuts that secure joystick mounting bracket to armrest plate.
4. Remove the phillips screw that secures the front of the armrest pad to the armrest plate.
5. Remove the phillips screw that secures the rear of the armrest pad and armrest insert to the armrest plate.
6. Remove the armrest pad from the armrest plate.
7. Remove the lug bolt, washers and locknut that secure the existing armrest plate to the seat frame assembly.
8. Repeat STEPS 4-7 for opposite side of wheelchair.
9. Position armrest plate with joystick mounting holes on desired side of seat frame assembly and secure with lug bolt, washers and locknut. Refer to FIGURE 9.
10. Position armrest plate without joystick mounting holes on opposite side of seat frame assembly and secure with lug bolt, washers and locknut. Refer to FIGURE 9.
11. Position the armrest pad on the armrest plate.
12. Line up the mounting holes in the armrest insert, armrest plate and armrest pad.
13. Reinstall rear phillips screw through the armrest insert, armrest plate and armrest pad and tighten securely.
14. Reinstall the front phillips screw into the armrest plate and armrest pad and tighten securely.
15. Repeat STEPS 11-14 for opposite side of wheelchair.
16. Install Loctite 242 onto the three (3) hex bolts.

17. Install the three (3) hex bolts, spacers and locknuts that secure joystick mounting bracket to armrest plate.
18. Slide the joystick mounting tube through the joystick mounting bracket to the desired position.
19. Secure adjustment lock to joystick mounting tube by turning lever on adjustment lock.

**REMOVING/INSTALLING MKIV CONTROLLER (FIGURE 10)**

**WARNING**

Replacement controller **MUST** be same part number as factory installed controller - Otherwise injury or damage may result.

**Removing**

1. If necessary, remove the rear shroud and rear compartment (if equipped). Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
2. Disconnect the left/right motor leads and battery leads.
3. Remove the two (2) locknuts that secure the existing MKIV controller and washer(s) to the wheelchair.
4. Remove existing MKIV controller from the wheelchair.

**Installing**

1. Install washer(s) onto rear mounting stud.
2. Install new/existing MKIV controller onto wheelchair frame.
3. Secure the new/existing MKIV controller to the wheelchair with NEW locknuts. Torque to 156-in/lbs.
4. If necessary, install the rear shroud and rear compartment (if equipped). Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.

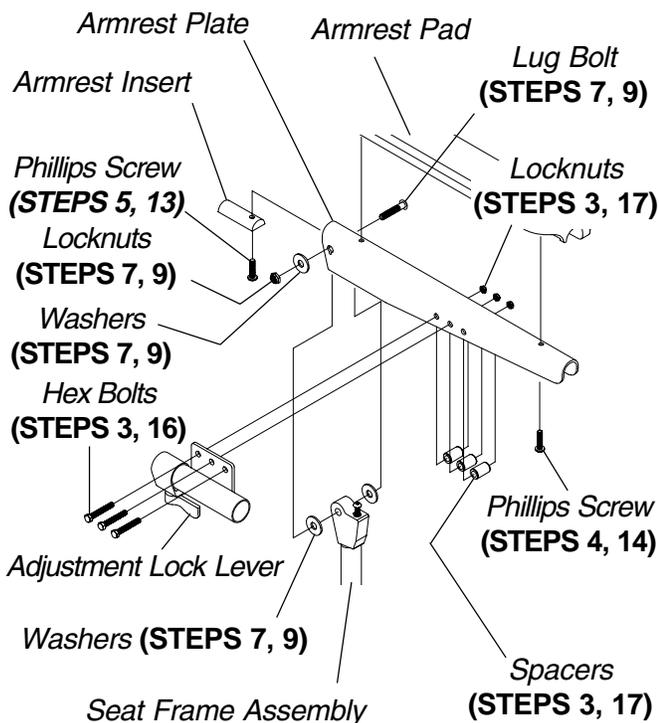


FIGURE 9 - REPOSITIONING MKIV JOYSTICK - CAPTAIN'S SEAT

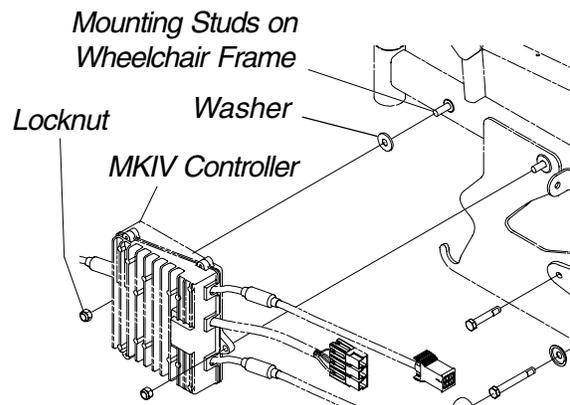


FIGURE 10 - REMOVING/INSTALLING MKIV CONTROLLER

**REPLACING WIRING HARNESS  
(FIGURE 11)**

1. If necessary, remove the front and rear shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
2. **HIGH BACK CAPTAIN'S SEAT MODEL WHEELCHAIRS ONLY (DETAIL "A")** - Perform the following:
  - A. Disconnect the limit switch. Refer to DISCONNECTING/CONNECTING LIMIT SWITCH in this procedure of the manual.
  - B. Remove the phono jack nut that secures the phono jack to the side shroud.
3. Remove the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
4. Disconnect the wiring harness (BLUE) from the controller connector (BLUE).
5. Remove the two (2) phillips screws and spacers that secure the rear battery connector to the wheelchair frame.

6. Remove the two (2) phillips bolts and locknuts that secure the front battery connector to wheelchair frame.
7. Remove the two (2) phillips screws that secure the wiring harness to the charger cable mounting bracket.
8. Note the position of the tie wraps that secure the existing wiring harness and motor cables to the crossbraces.
9. Cut the tie wraps that secure the existing wiring harness and motor cables to the crossbraces.
10. Remove the existing wiring harness from wheelchair.
11. Position the rear battery connector on the wheelchair frame as shown in FIGURE 11 and secure with the two (2) phillips screws and spacers.
12. Position the front battery connector on the wheelchair frame as shown in FIGURE 11 and secure with the two (2) phillips bolts and locknuts.
13. Secure the wiring harness to existing charger cable mounting bracket on the seat frame with the two (2) phillips screws.
14. Connect the wiring harness (BLUE) to the controller connector (BLUE).
15. Resecure the wiring harness and motor cables to the crossbraces with new tie wraps at the positions noted in STEP 8.
16. **HIGH BACK CAPTAIN'S SEAT MODEL WHEELCHAIRS ONLY** - Perform the following:
  - A. Position the new phono jack on the side shroud.
  - B. Reinstall the phono jack nut onto the new phono jack and tighten securely.

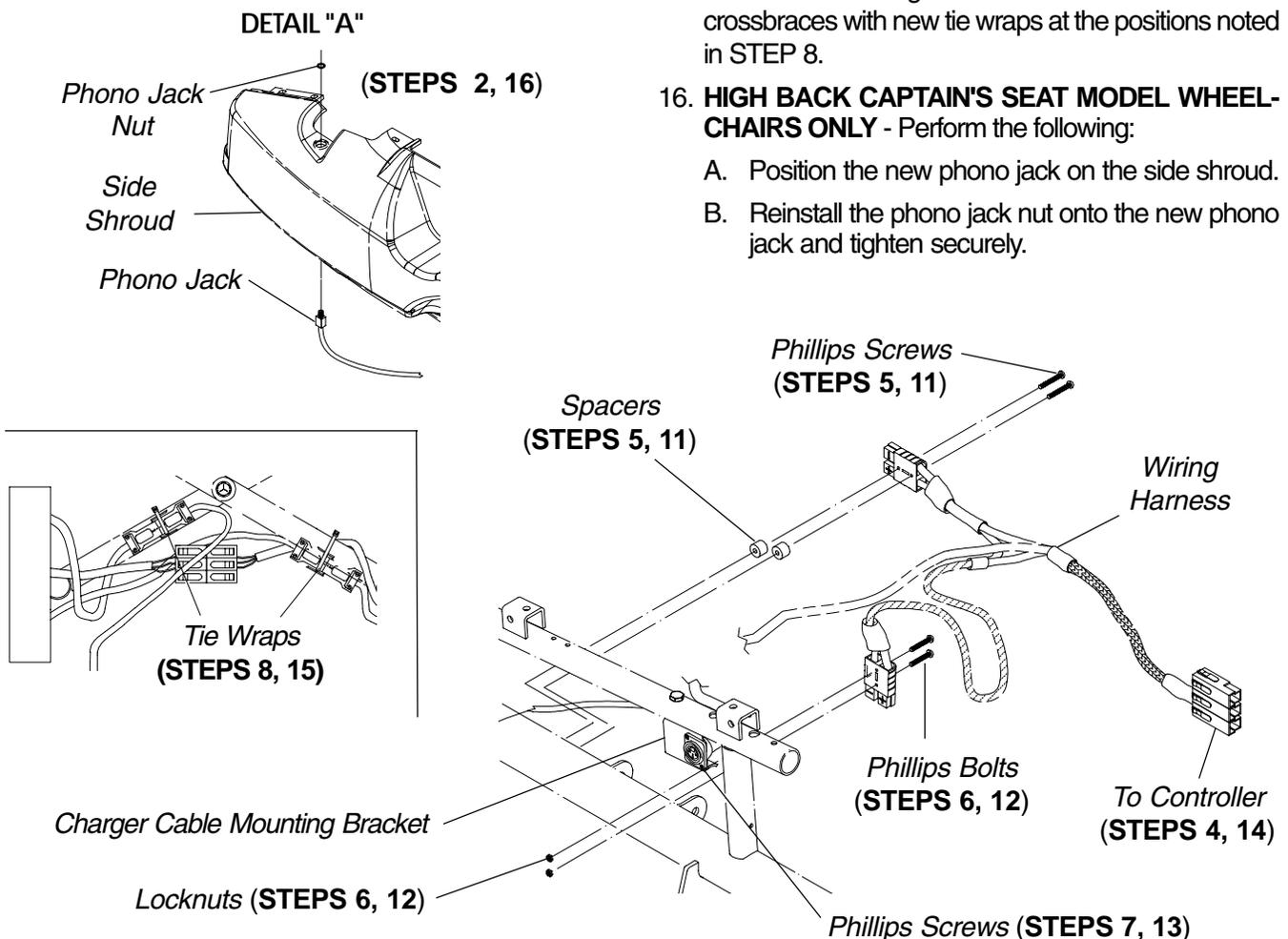


FIGURE 11 - REPLACING WIRING HARNESS

C. Connect the limit switch. Refer to DISCONNECTING/CONNECTING LIMIT SWITCH in this procedure of the manual.

17. Reinstall the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

18. If necessary, install the front and rear shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.

**DISCONNECTING/CONNECTING LIMIT SWITCH (FIGURE 12)**

*NOTE: The following procedure is for High Back Captain's seat model wheelchairs only.*

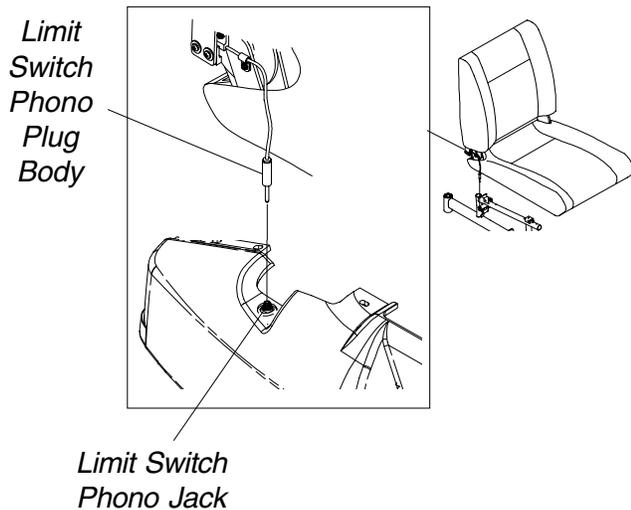
**CAUTION**

Disconnect limit switch **BEFORE** removing seat or damage to switch may occur.

1. Perform one (1) of the following:
  - DISCONNECTING -** While holding the body of the limit switch phono plug, lift up gently.

*NOTE: When the limit switch is unplugged the wheelchair will NOT operate.*

- CONNECTING -** Plug limit switch plug into the limit switch phono jack.



**FIGURE 12 - DISCONNECTING/CONNECTING LIMIT SWITCH**

**ADJUSTING LIMIT SWITCH (FIGURE 13)**

*NOTE: The following procedure is for High Back Captain's seat model wheelchairs only.*

**WARNING**

**NEVER** operate the wheelchair while in any recline position over 114° **RELATIVE TO THE SEAT FRAME**. If the limit switch does not stop the wheelchair from operating in a recline position greater than 114° **RELATIVE TO THE SEAT FRAME**, **DO NOT** operate the wheelchair. Adjust the limit switch or have the wheelchair serviced by a dealer or qualified technician, otherwise injury or damage may occur.

1. Place the wheelchair on a level surface.
2. Recline the captain's seat back to a 24° to achieve the 114° angle relative to the seat frame. Refer to ADJUSTING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.

*NOTE: The captain's seat frame is at a 5° angle relative to the ground. When the back angle is adjusted to 114° relative to the seat, it will measure 61° relative to the ground.*

*NOTE: To determine 114° back angle relative to the seat frame, place a magnetic protractor (available at any hardware store) on the back as shown in FIGURE 13 and adjust the back until the magnetic protractor reads 61°.*

3. Turn the wheelchair power switch on the joystick to the ON position.

*NOTE: The wheelchair should not operate.*

4. **IF** wheelchair operates, proceed to the following steps to adjust the actuator on the upper limit switch bracket:
  - A. Fully recline the back. Refer to ADJUSTING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.

*NOTE: This will make access to limit switch easier.*

- B. Loosen, but do not remove, the two (2) phillips screws, washers and locknuts that secure the actuator to the upper limit switch bracket.
- C. Slide actuator UP (towards top of the wheelchair).

**CAUTION**

**DO NOT** over tighten the phillips screws that secure the actuator to the upper limit switch bracket. Damage to the actuator may occur.

- D. Only tighten the two (2) phillips screws, washers and locknuts that secure the actuator to the upper limit switch bracket until the actuator does not move.
- E. Repeat STEPS 1-3 until wheelchair does not operate when captain's seat back is at a 24° angle.

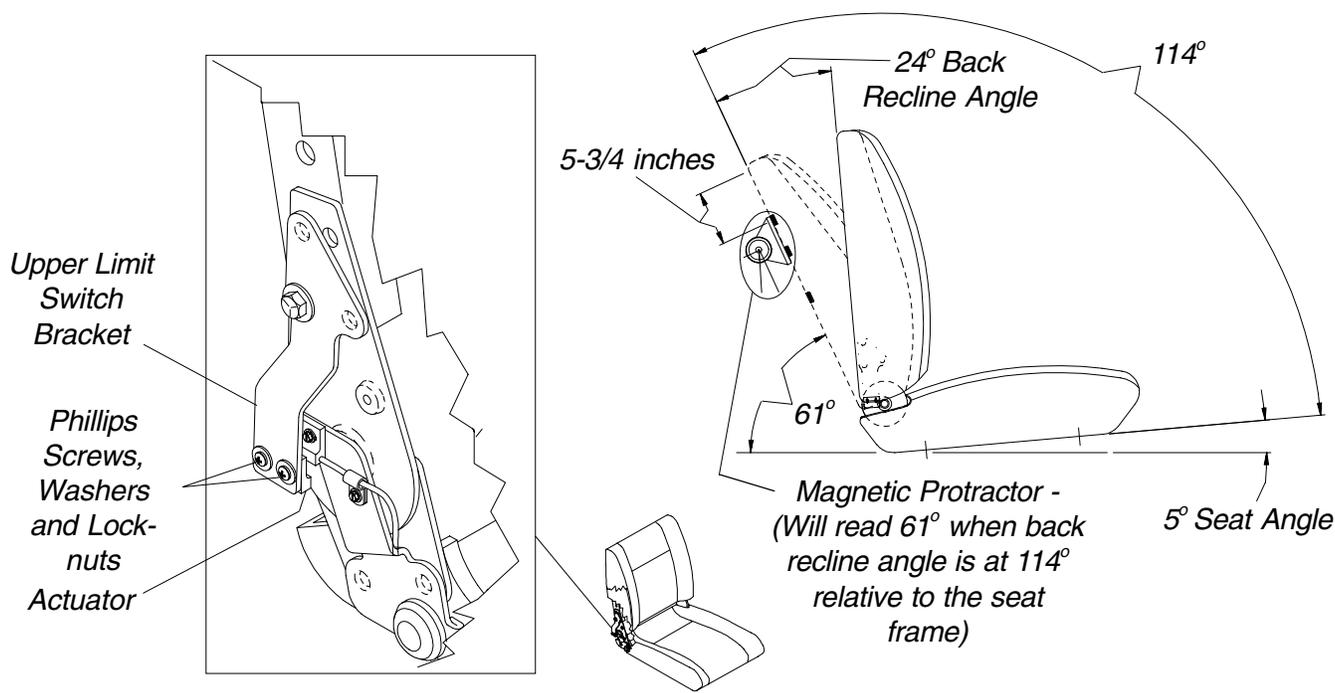


FIGURE 13 - ADJUSTING LIMIT SWITCH

**REMOVING/INSTALLING SHROUDS (FIGURE 14)**

**Removing Front Shroud**

1. Unclip the retaining strap securing the front shroud and battery box to the wheelchair.
2. Feed the retaining strap through the front shroud.
3. Remove the front shroud from the wheelchair.

**Installing Front Shroud**

1. Feed the retaining strap through the front shroud as shown in FIGURE 14.
2. Position the bottom of the front shroud between the battery box and the battery tray.
3. Clip the retaining strap together.

**Removing Rear Shroud**

1. Unclip the retaining strap securing the rear shroud and battery box to the wheelchair.
2. Feed the retaining strap through the rear shroud.
3. Remove the rear shroud from the wheelchair.

**Installing Rear Shroud**

1. Feed the retaining strap through the front shroud as shown in FIGURE 14.
2. Clip the retaining strap together.
3. Press down on the rear shroud until the two (2) clips secure the rear shroud to the two (2) side shrouds.

**Removing Side Shrouds and Fillers**

1. Remove the front shroud from the wheelchair. Refer to REMOVING/INSTALLING FRONT SHROUD in this procedure of the manual.
2. Remove the rear shroud from the wheelchair. Refer to REMOVING/INSTALLING REAR SHROUD in this procedure of the manual.
3. Perform one (1) of the following:
  - A. INTEGRATED SLING SEAT MODELS - Fold the wheelchair. Refer to TRANSPORTING EXCEL in this procedure of the manual.
  - B. CAPTAIN'S SEAT MODELS - Remove the Captain's Seat from the wheelchair. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.
4. HIGH BACK CAPTAIN'S SEAT MODEL WHEELCHAIRS ONLY (DETAIL "A") - Remove the phono jack nut that secures the phono jack to the side shroud.
5. Remove the phillips screws, bolts, washers and lock-nuts that secure side shroud and filler to the wheelchair frame. Refer to FIGURE 14 for phillips screw and washer locations.
6. Remove side shroud and filler from the wheelchair.
7. Repeat STEPS 5-6 for the opposite side of the wheelchair, if necessary.

**Installing Side Shrouds and Fillers**

1. Position side shroud and filler on the wheelchair frame.
2. Line up the mounting holes in the side shroud and filler with the mounting holes in the wheelchair frame.

**CAUTION**

**DO NOT** overtighten the phillips screws and phillips bolt that secure the side shroud to the wheelchair frame - otherwise damage to the side shroud can occur.

3. Install the phillips screws, bolts, washers and locknuts that secure the side shroud and filler to the wheelchair frame and tighten securely. **DO NOT OVERTIGHTEN.** Refer to FIGURE 14 for phillips screw, bolt, washer and locknut locations.
4. Repeat STEPS 1-3 for the opposite side of the wheelchair, if necessary.
5. HIGH BACK CAPTAIN'S SEAT MODEL WHEELCHAIRS ONLY - If necessary, perform the following:
  - A. Position the phono jack on the side shroud.

6. Perform one (1) of the following:
  - A. **INTEGRATED SLING SEAT MODELS** - Unfold the wheelchair. Refer to TRANSPORTING EXCEL in this procedure of the manual.
  - B. **CAPTAIN'S SEAT MODELS** - Reinstall the Captain's Seat onto the wheelchair. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.
7. Reinstall the rear shroud onto the wheelchair. Refer to REMOVING/INSTALLING REAR SHROUD in this procedure of the manual.
8. Reinstall the front shroud onto the wheelchair. Refer to REMOVING/INSTALLING FRONT SHROUD in this procedure of the manual.

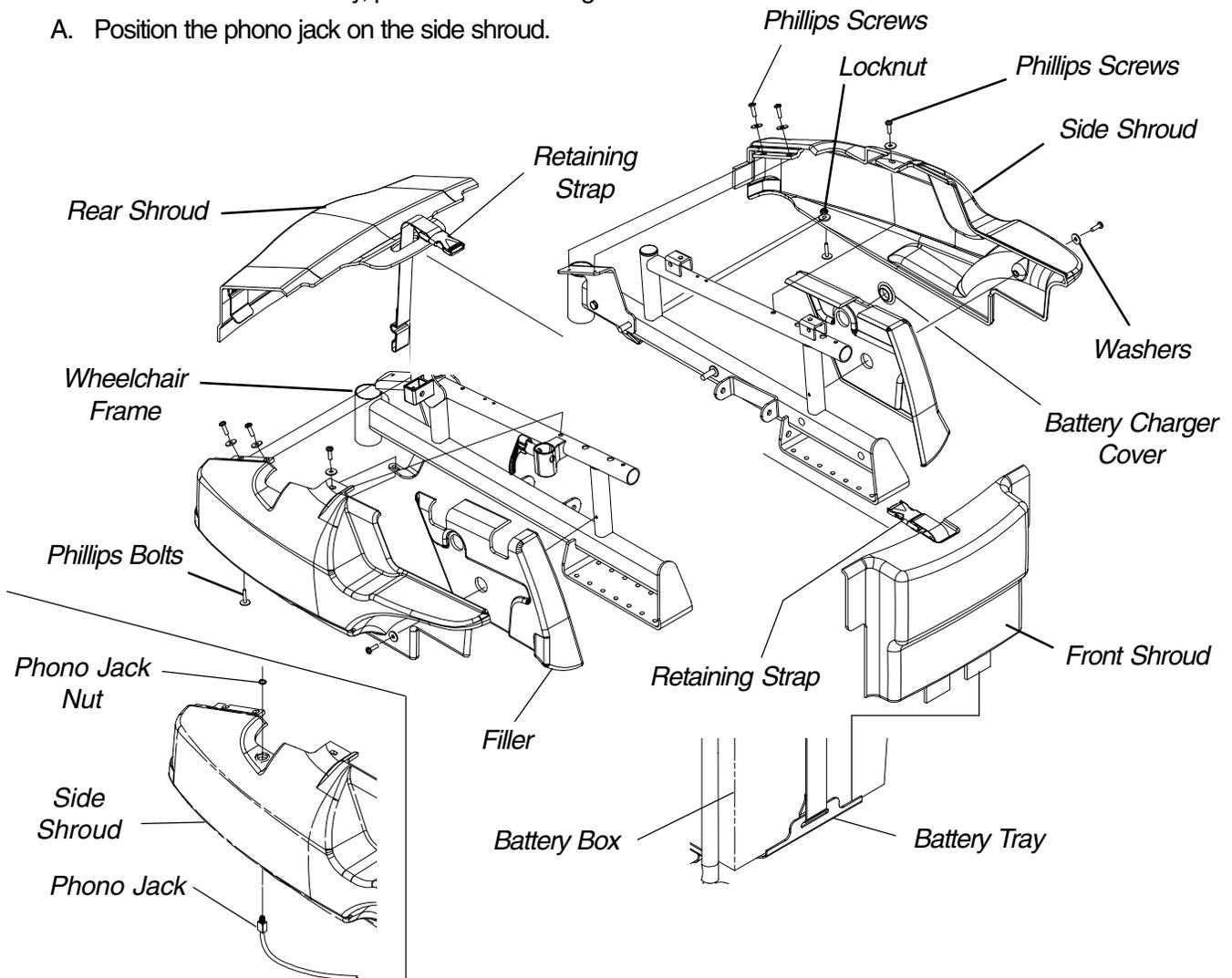


FIGURE 14 - REMOVING/INSTALLING SHROUDS - FWD WHEELCHAIRS

**CHANGING SEAT WIDTH - INTEGRATED SLING SEATS (FIGURE 15)**

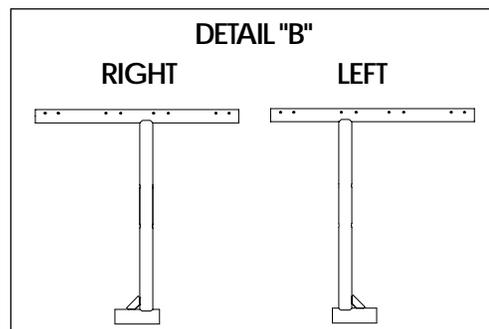
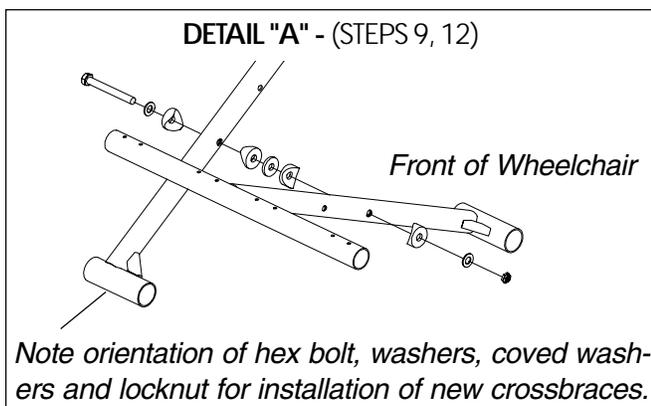
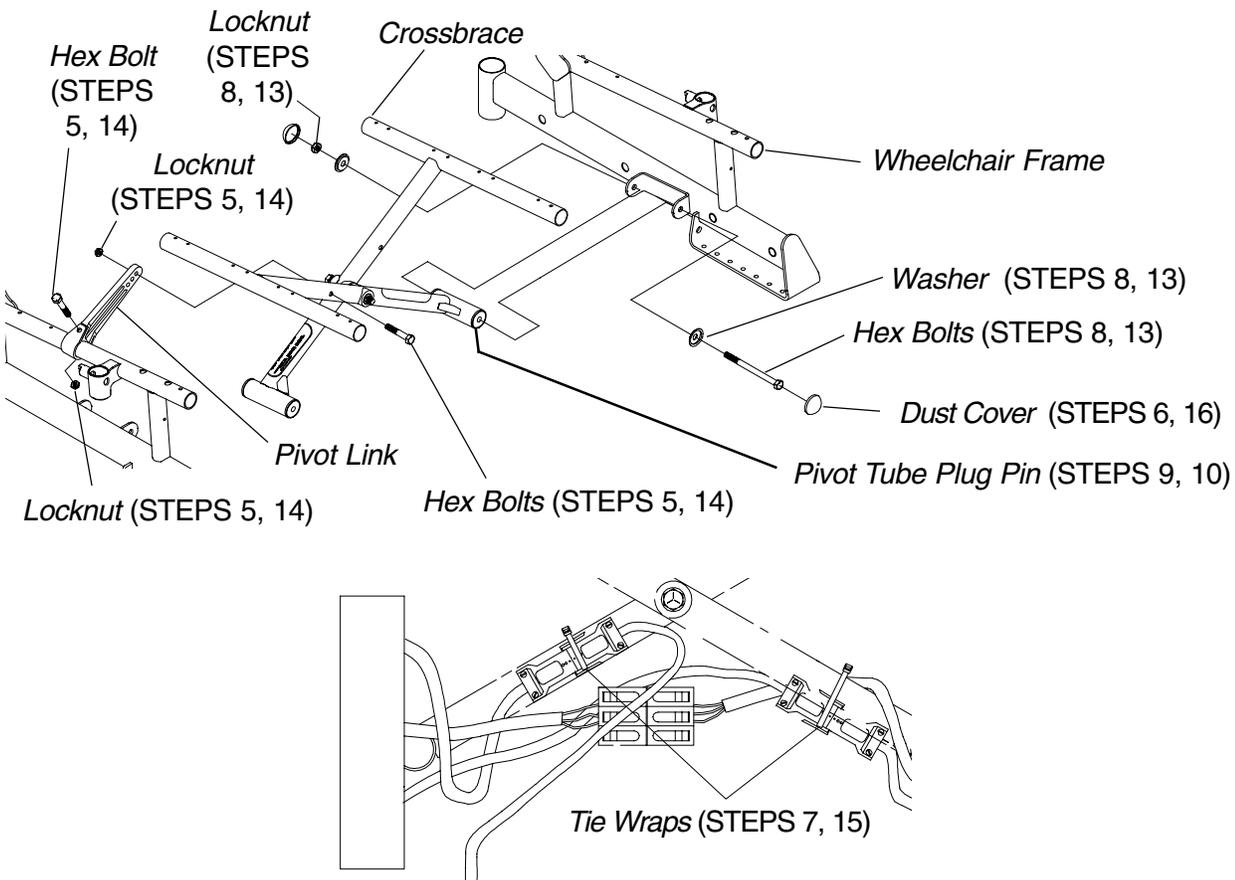
1. If necessary remove the shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
2. Remove the battery boxes from the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
3. Fold the battery tray. Refer to FOLDING BATTERY TRAY FOR TRANSPORT in this procedure of the manual.

4. Remove the existing back and seat upholstery from the wheelchair. Refer to REPLACING BACK UPHOLSTERY in PROCEDURE 5 of this manual and REPLACING SEAT UPHOLSTERY in PROCEDURE 5 of the owner's manual, part number 1080737.

*NOTE: If adjusting the seat width of the wheelchair, the back and seat upholstery MUST be changed as well.*

5. Remove the hex bolts and locknuts that secure the two (2) pivot links to the wheelchair frame and crossbraces. Refer to the following chart to determine if new pivot links will be needed:

PIVOT LINK SEAT WIDTH RANGE (in inches)
16-18 or 20



*NOTE: Right and left is determined by sitting in the wheelchair.*

**FIGURE 15 - CHANGING SEAT WIDTH - INTEGRATED SLING SEAT S**

- Remove the dust covers from the bottom of the crossbraces.

*NOTE: Note position of the tie wraps that secure the wiring harness to the crossbraces.*

- Cut the tie wraps that secure the wiring harness to the crossbrace.
- Remove the hex bolts, washers and locknuts that secure the bottom of the two (2) crossbraces to the wheelchair frame.
- Remove the hex bolt, coved spacers, washers and locknut that secure the two (2) existing crossbraces together.

*NOTE: Note coved spacer, washer and locknut order for reinstallation.*

- Remove the four (4) pivot tube plug pins from the bottom of the two (2) existing crossbraces.
- Install the four (4) pivot tube plug pins into the bottom of the two (2) new crossbraces.
- Assemble the two (2) new crossbraces together. Refer to DETAIL "A" in FIGURE 15 for hardware orientation.

*NOTE: There are right and left crossbraces. Refer to DETAIL "B" in FIGURE 15.*

- Reinstall the hex bolts, washers and locknuts that secure the bottom of the two (2) new crossbraces to the wheelchair frame and tighten securely.
- Reinstall the hex bolts and locknuts that secure the new/existing pivot links to the wheelchair frame and crossbraces and tighten.

*NOTE: Seat widths are stamped on the pivot links.*

- Secure wiring harness to the new crossbraces with new tie wraps.
- Reinstall the dust covers onto the bottom of the crossbraces.
- Install the new back and seat upholstery onto the wheelchair. Refer to REPLACING BACK UPHOLSTERY in PROCEDURE 3 of this manual and REPLACING SEAT UPHOLSTERY in PROCEDURE 5 of the owner's manual, part number 1080737.
- Change the width of the battery tray. Refer to CHANGING WIDTH OF BATTERY TRAY in this procedure of the manual.
- Unfold the battery tray. Refer to FOLDING BATTERY TRAY FOR USE in this procedure of the manual.
- Reinstall the battery boxes onto the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
- If necessary, reinstall the shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.

## REPLACING CROSSBRACES - CAPTAIN'S SEAT (FIGURE 16)

- Remove the captain's seat from the wheelchair. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.
- Remove the shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
- Remove the battery boxes from the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
- Fold the battery tray. Refer to FOLDING BATTERY TRAY FOR TRANSPORT in this procedure of the manual.
- Remove the hex bolts and locknuts that secure the two (2) pivot links to the existing crossbraces.
- Remove the hex bolts, spacers, washers and locknuts that secure the two (2) push brackets to the existing crossbraces.
- Remove the dust covers from the bottom of the existing crossbraces.

*NOTE: Note position of the tie wraps that secure the wiring harness to the existing crossbraces.*

- Cut the tie wraps that secure the wiring harness to the existing crossbrace.
- Remove the hex bolts, washers and locknuts that secure the bottom of the two (2) existing crossbraces to the wheelchair frame.
- Remove the hex bolt, coved spacers, washers and locknut that secure the two (2) existing crossbraces together.

*NOTE: Note coved spacer, washer and locknut order for reinstallation.*

- Remove the four (4) pivot tube plug pins from the bottom of the two (2) existing crossbraces.
- Install the four (4) pivot tube plug pins into the bottom of the two (2) new crossbraces.
- Assemble the two (2) new crossbraces together. Refer to DETAIL "C" in FIGURE 16 for hardware orientation.
- Reinstall the hex bolts, washers and locknuts that secure the bottom of the two (2) new crossbraces to the wheelchair frame and tighten.
- Secure the wiring harness to the new crossbraces with new tie wraps.
- Reinstall the dust covers onto the bottom of the new crossbraces.

17. Reinstall the hex bolts, spacers, washers and locknuts that secure the (2) push brackets to the new crossbraces and tighten securely.
18. Reinstall the hex bolts, washers and locknuts that secure the pivot links to the crossbraces and tighten securely.
19. Unfold the battery tray. Refer to FOLDING BATTERY TRAY FOR USE in this procedure of the manual.
20. Reinstall the battery boxes onto the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
21. Reinstall shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
22. Reinstall the Captain's seat. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.

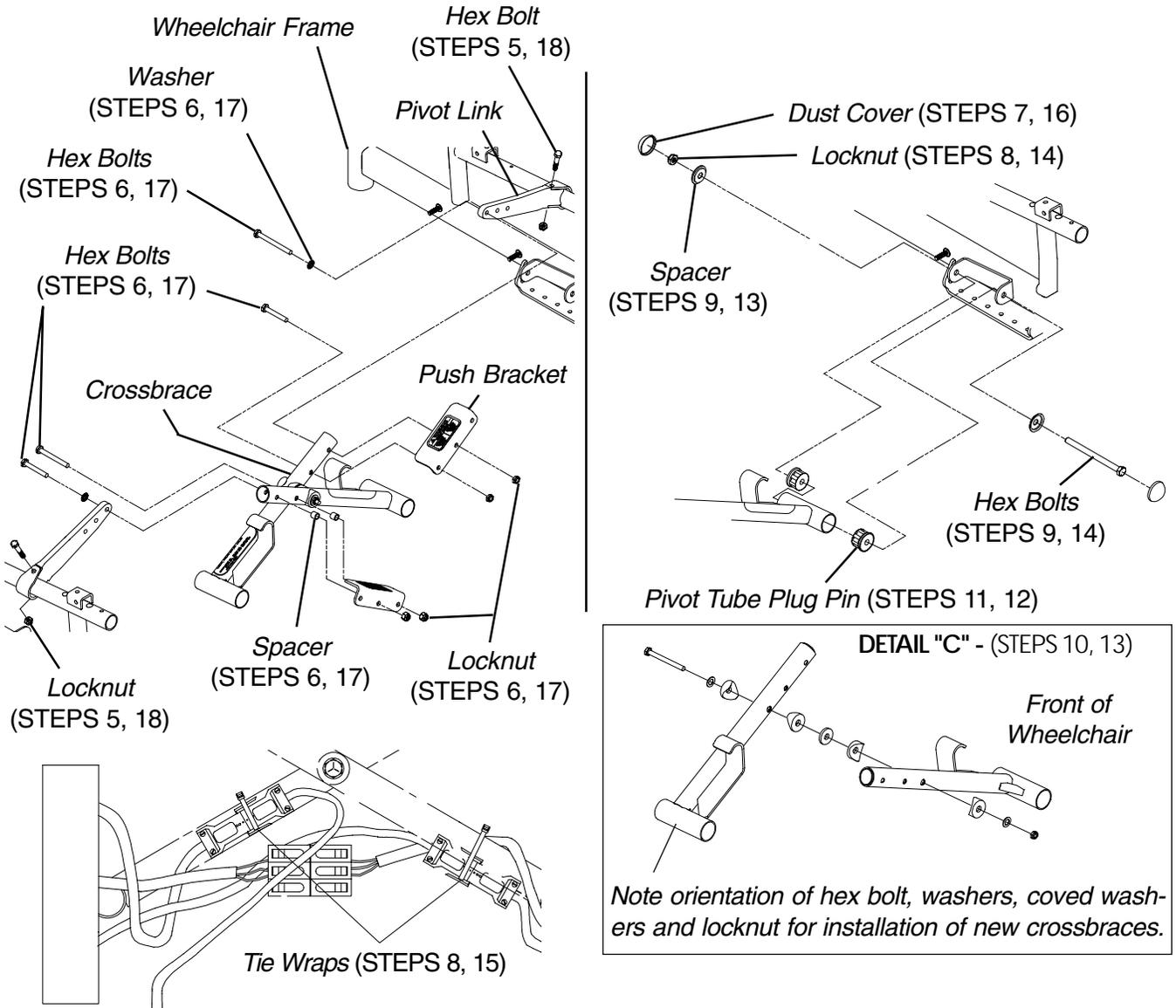


FIGURE 16 - REPLACING CROSSBRACES - CAPTAIN'S SEAT

## WHEN TO CHARGE BATTERIES (FIGURE 17)

It is advantageous to recharge frequently rather than only when necessary. In fact, a battery's life is extended if the charge level is maintained well above a low condition.

**BATTERY DISCHARGE INDICATOR (BDI)** is located at the rear of the joystick housing and provides information on the remaining charge in the batteries. At FULL charge the BDI will be GREEN. As the battery becomes discharged, the BDI indicator will turn AMBER (YELLOW), then RED and finally FLASHING RED. If the BDI is FLASHING RED, the user should charge the batteries as soon as possible.

*NOTE: Accurate readings are displayed when in neutral.*

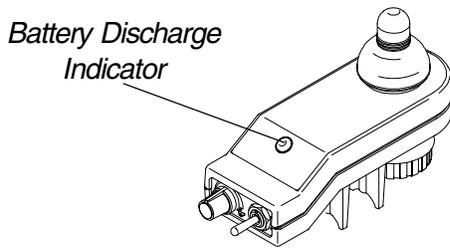


FIGURE 17 - WHEN TO CHARGE BATTERIES

## CHARGING BATTERIES (FIGURE 18)

### WARNING

Never attempt to recharge the batteries by attaching cables directly to the battery terminals or clamps. Always use the recharging plug located on the side of the wheelchair frame.

DO NOT attempt to recharge the batteries and operate the power wheelchair at the same time.

During use and charging, unsealed batteries will vent hydrogen gas which is explosive in the right concentration with air.

### CAUTION

Always charge new batteries fully BEFORE initial use or battery life will be reduced.

*NOTE: As a general rule, batteries should be recharged daily to assure the longest possible life and minimize the required charging time. Plan to recharge the batteries when it is anticipated the wheelchair will not be used for a long period of time.*

The range per battery charge using recommended batteries should be approximately 5 to 9 hours of typical operation. Extensive use on inclines may substantially reduce per charge mileage.

## Description and Use of Battery Chargers

The charger automatically reduces the charge from an initially high rate to a zero reading at a fully charged condition. If left unattended, the charger should automatically shut-off when full charge is obtained.

**There are some basic concepts which will help you understand this automatic process:**

The amount of electrical current drawn within a given time to charge a battery is called "charge rate". If, due to usage, the charge stored in the battery is low, the charge rate is high, as indicated by the green light on the charger. Initially, the green light will stay illuminated for a short period of time followed by a longer period of off time. As a charge builds up, the charge rate is reduced, and the green light will stay illuminated for a longer period of time followed by a shorter off time.

*NOTE: If performing the charging procedures independently, READ and CAREFULLY follow the individual instructions for each charger (supplied or purchased).*

*NOTE: If charging instructions are not supplied, consult a qualified service technician for proper procedures.*

### Required Items:

TOOL	QUANTITY	COMMENTS
Battery Charger	1	Supplied
⊛ Extension Cord	1	Not Supplied

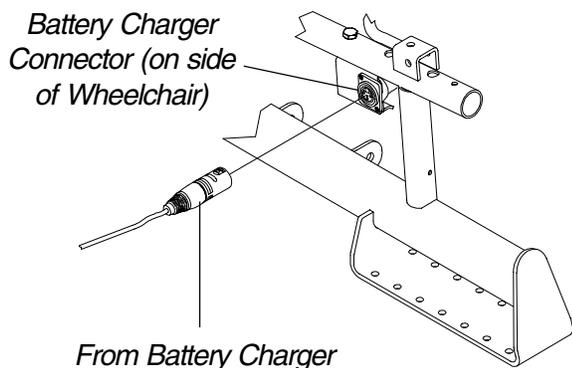
⊛ 3-prong plug, 15 ampere current rating; industrial type

1. If necessary, remove the rear shroud. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
2. Attach the battery charger connector to the charger cable/battery harness.
3. Plug the charger's AC power cord, or extension, into the grounded 120 VAC wall outlet.
4. Wait until charging is complete.

*NOTE: Allow eight (8) hours for normal charging. Larger batteries (greater than 55 ampere-hours) or severely discharged batteries may require up to sixteen (16) hours to be properly charged and equalized. If the charger operates for sixteen (16) hours and is unable to fully charge the batteries, an internal timer turns the charger off and begins to fast blink the green light.*

*NOTE: If the batteries need to be charged more often or take longer to charge than normal, they may need to be replaced. Contact an authorized dealer for service.*

5. If necessary, install the rear shroud. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.



NOTE: Position of Battery Charger Connector may vary depending on wheelchair options.

FIGURE 18 - CHARGING BATTERIES

### REPLACING BATTERIES

#### WARNING

Most batteries are not sold with instructions. However, warnings are frequently noted on the cell caps. Read them carefully, otherwise injury or damage can occur.

NOTE: Invacare recommends that both batteries be replaced if one (1) battery is defective.

#### Recommended Battery Types

#### WARNING

The warranty and performance specifications contained in this manual are based on the use of deep cycle gel cell or sealed lead acid batteries. Invacare strongly recommends their use as the power source for this unit.

#### CAUTION

Failure to use the correct battery size and/or voltage may cause damage to your wheelchair and give you unsatisfactory performance.

CHAIR SEAT WIDTH	QTY	VOLTS	BATTERY SIZE	REMARKS
16,18, 20-inches	2	12	22NF	Deep Cycle

1. Remove the battery boxes from the wheelchair. Refer to REMOVING/INSTALLING BATTERY BOXES in this procedure of the manual.
2. Remove the existing batteries from the battery boxes. Refer to INSTALLING/REMOVING BATTERIES TO FROM BATTERY BOXES in PROCEDURE 7 of this manual.
3. Clean the new battery terminals.
4. Install the new batteries into the battery boxes. Refer to INSTALLING/REMOVING BATTERIES TO/FROM BATTERY BOXES in PROCEDURE 7 of this manual.

### Cleaning Battery Terminals

#### WARNING

DO NOT allow the liquid in the battery to come in contact with skin, clothes or other possessions. It is a form of acid and harmful or damaging burns may result. Should the liquid touch your skin, wash the area immediately and thoroughly with cool water. In serious cases or if eye contact is made, seek medical attention IMMEDIATELY.

NEVER smoke or strike a match near batteries. If the caps of the battery cells are removed, NEVER look directly into them while charging batteries.

1. Examine battery clamps and terminals for corrosion.
2. Verify that the plastic caps are in place over the battery cell holes.
3. Clean the terminals and inside the battery clamps by using a battery cleaning tool, wire brush, or medium grade sand paper.

NOTE: When done, these areas should be shiny, not dull.

4. Carefully dust off all metal particles.

### INSTALLING/REMOVING BATTERY BOXES (FIGURE 19)

#### WARNING

NEVER unplug the battery cables by pulling on the wires. Unplug the battery cables by pulling on the connector ONLY. Otherwise injury or damage may result.

NOTE: To remove the battery boxes from the wheelchair, reverse the following procedure.

1. Verify that the ON/OFF switch on the joystick is in the OFF position.
2. If necessary, remove the Captain's Seat. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.
3. If necessary, remove the front and rear shrouds. Refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual.
4. Position the battery boxes onto the battery tray.

NOTE: Make sure the battery cables on the battery boxes are on the same side as the battery connectors on the wheelchair frame.

5. Connect the battery cables from the battery boxes to the battery connectors on the wheelchair frame.

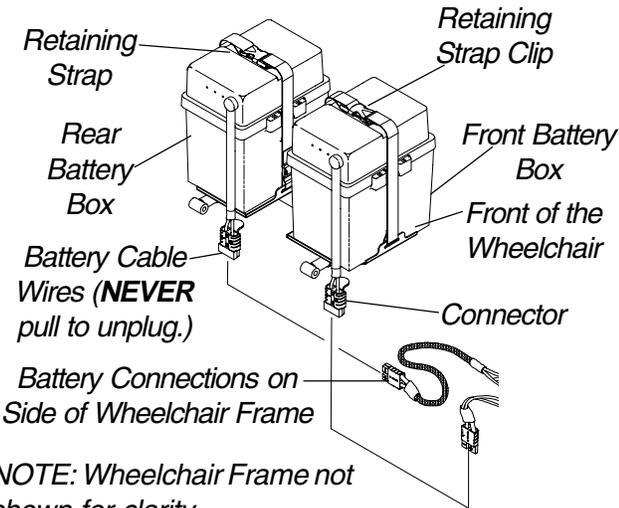
**WARNING**

The Battery Box Retaining Strap **MUST** be fastened securely and adjusted properly to hold battery boxes in place before using the wheelchair.

- Position retaining straps around each battery box as shown in FIGURE 19, clip retaining strap together and adjust if necessary.

*NOTE: If wheelchair is equipped with shrouds, refer to REMOVING/INSTALLING SHROUDS in this procedure of the manual before connecting retaining strap together.*

- If necessary, install the Captain's Seat. Refer to REMOVING/INSTALLING CAPTAIN'S SEAT in PROCEDURE 9 of the owner's manual, part number 1080737.



*NOTE: Wheelchair Frame not shown for clarity.*

FIGURE 19 - INSTALLING/REMOVING BATTERY BOXES

**BATTERY TRAY**

**Folding Battery Tray for Transport (FIGURE 20)**

- Remove the battery boxes from the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

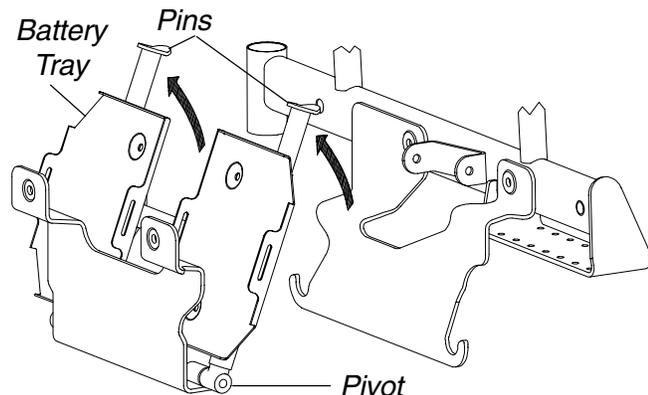


FIGURE 20 - BATTERY TRAY - FOLDING BATTERY TRAY FOR TRANSPORT

- Lift up on the pin side of the battery tray and rotate UP towards the battery tray pivot.
- Fold the wheelchair. Refer to ASSEMBLING EXCEL in this procedure of the manual.

**Unfolding Battery Tray for Use (FIGURE 21)**

- Unfold the wheelchair. Refer to ASSEMBLING EXCEL in this procedure of the manual.
- Rotate the pin side of the battery tray DOWN towards the mounting slots on the hanger bracket.

**WARNING**

Make sure pins of battery tray are secure in the mounting slots of the hanger bracket, otherwise injury or damage may result.

- Install the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

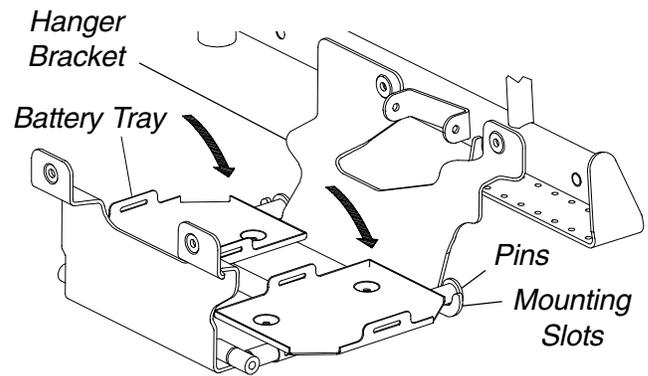


FIGURE 21 - BATTERY TRAY - UNFOLDING BATTERY TRAY FOR USE

**Changing Width of Battery Tray (FIGURE 22)**

*NOTE: This procedure is only necessary when changing the width of the wheelchair.*

- Fold the battery tray. Refer to FOLDING BATTERY TRAY FOR USE in this procedure of the manual.
- Remove the hex bolt and locknut that secure one (1) of the battery tray pins to the battery tray.
- Refer to FIGURE 24 to determine mounting hole in the battery tray that corresponds to width of the wheelchair.
- Reposition the battery tray pin to the mounting hole determined in STEP 3.
- Secure the battery tray pin to the battery tray with the hex bolt and locknut.
- Repeat STEPS 2-5 for remaining battery tray pin and two battery tray pivots.

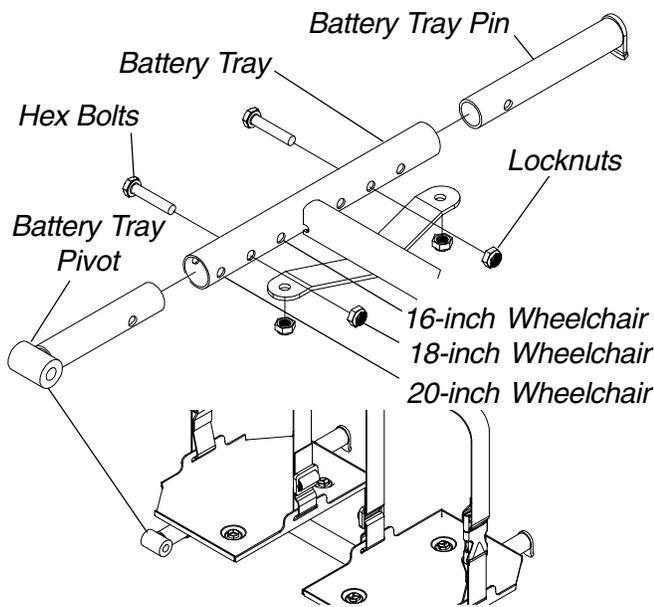


FIGURE 22 - BATTERY TRAY - CHANGING WIDTH OF BATTERY TRAY

**Removing Battery Tray (FIGURE 23)**

1. Remove the battery boxes from the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
2. Remove the two (2) hex bolts and locknuts that secure the existing battery tray and washers to the battery tray hanger bracket.
3. Remove the existing battery tray from the wheelchair.

**Installing Battery Tray (FIGURE 23)**

1. Line up the mounting holes in the new/existing battery tray with the mounting holes in the battery tray hanger bracket.
2. Position one (1) of the washers between the battery hanger bracket and the new/existing battery tray.
3. Reinstall one (1) of the hex bolts and washers through the new/existing battery tray, washer and battery tray hanger bracket and loosely tighten with one (1) of the locknuts.
4. Repeat STEPS 2-3 for the remaining washers, hex bolt, and locknut.
5. Tighten the two (2) hex bolts and locknuts.

*NOTE: Tighten the Two (2) hex bolts and locknuts until the tray stays up by itself. Over tightening the hex bolts and locknuts will make the battery tray difficult to flip up.*

6. Reinstall the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

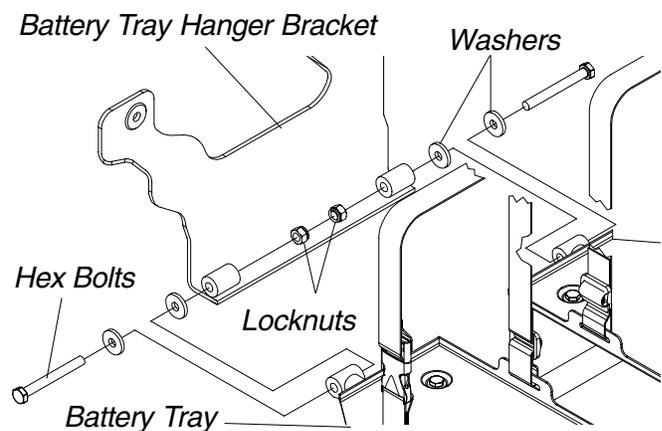


FIGURE 23 - BATTERY TRAY - REMOVING/INSTALLING BATTERY TRAY

**Replacing Right Battery Tray Hanger Bracket (FIGURE 24)**

*NOTE: Right and left is determined by sitting in the wheelchair.*

1. Remove the battery boxes from the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
2. Remove the battery tray. Refer to REMOVING BATTERY TRAY in this procedure of the manual.
3. Perform one (1) of the following:
  - A. **WHEELCHAIR EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Remove the hex screw and spacer that secures the existing right battery tray hanger bracket and footboard mounting bracket to the wheelchair frame.
  - B. **WHEELCHAIR NOT EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Remove the front hex screw that secures the existing right battery tray hanger bracket to the wheelchair frame.
4. Remove the rear hex bolt that secures the existing right battery tray hanger bracket to the wheelchair.

*NOTE: NOTE hex screw size for reinstallation.*

5. Remove the existing right battery tray hanger bracket from the wheelchair.
6. Line up the mounting holes in the new battery tray hanger bracket with the mounting holes in the wheelchair frame.
7. Perform one (1) of the following:
  - A. **WHEELCHAIR EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Reinstall the hex screw and spacer that secures the new right battery tray hanger bracket and footboard mounting bracket to the wheelchair frame. Use Loctite 242 and torque to 156-in/lbs.

FWD WHEELCHAIRS

B. **WHEELCHAIR NOT EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Reinstall the front hex screw that secures the new right battery tray hanger bracket to the wheelchair frame. Use Loctite 242 and torque to 156-in/lbs.

8. Reinstall the rear hex screw. Use Loctite 242 and torque to 156-in/lbs.
9. Reinstall the battery tray. Refer to **INSTALLING BATTERY TRAY** in this procedure of the manual.

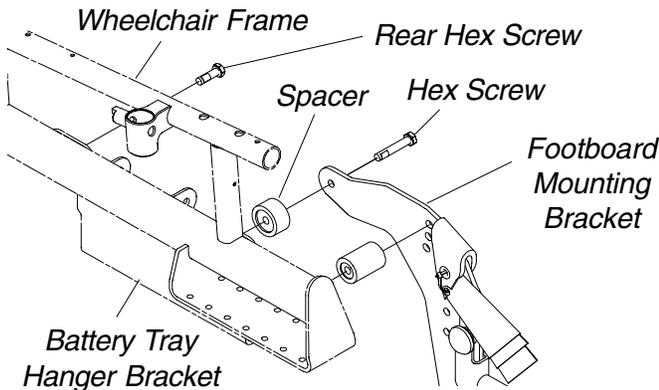


FIGURE 24 - BATTERY TRAY - REPLACING RIGHT BATTERY TRAY HANGER BRACKET

**Replacing Left Battery Tray Hanger Bracket (FIGURE 25)**

*NOTE: Right and left is determined by sitting in the wheelchair.*

1. Remove the battery boxes from the wheelchair. Refer to **INSTALLING/REMOVING BATTERY BOXES** in this procedure of the manual.
2. Loosen, but do not remove the rear locknut that secures MKIV controller to the wheelchair.
3. Perform one (1) of the following:

A. **WHEELCHAIR EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Remove the hex screw and spacer that secures the existing left battery tray hanger bracket and footboard mounting bracket to the wheelchair frame.

B. **WHEELCHAIR NOT EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Remove the front hex screw that secures the existing left battery tray bracket to the wheelchair frame.

4. Remove the locknut that secures the existing left battery tray hanger bracket and MKIV controller from the wheelchair.
5. Remove the existing left battery tray hanger bracket from the wheelchair.
6. Line up the mounting holes in the new battery tray hanger bracket with the front mounting hole and rear stud on the wheelchair frame.

7. Perform one (1) of the following:

A. **WHEELCHAIR EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Reinstall the hex screw and spacer that secures the new left battery tray hanger bracket and footboard mounting bracket to the wheelchair frame. Use Loctite 242 and torque to 156-in/lbs.

B. **WHEELCHAIR NOT EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Reinstall the front hex screw that secures the new left battery tray hanger bracket to the wheelchair frame. Use Loctite 242 and torque to 156-in/lbs.

8. Reinstall the locknut. Use Loctite 242 and torque to 156-in/lbs.
9. Torque the rear locknut that secures MKIV controller to the wheelchair to 156-in/lbs.

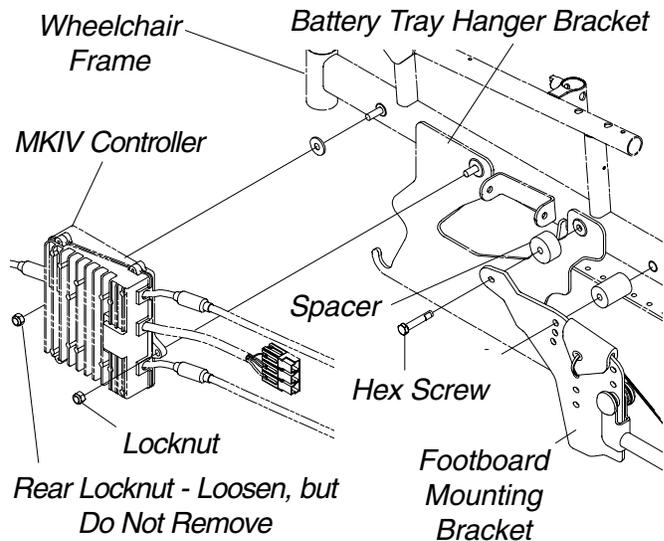


FIGURE 25 - BATTERY TRAY - REPLACING LEFT BATTERY TRAY HANGER BRACKET

**REPOSITIONING MOTORS (FIGURE 26)**

WARNING

The overall performance of the wheelchair **WILL** be affected by the front wheel mounting position. The following charts show the mounting position of the motors for each seat width and depth depending on the factory setting or user's weight. If the mounting position that corresponds to the user's weight is different than the factory setting, the motors **MUST BE** repositioned to maintain proper stability **BEFORE** using the wheelchair. Otherwise injury or damage may occur.

Periodically review the following charts to make sure the motor mounting position still corresponds to the user's weight to maintain the proper stability.

*NOTE: If motors are repositioned, the front riggings may need to be repositioned. Refer to ADJUSTING/REPLACING TELESCOPING FRONT RIGGING SUPPORT in PROCEDURE 9 of the owner's manual, 1080737.*

**FACTORY SETTINGS  
MOTOR MOUNTING POSITIONS**

SEAT WIDTH	SEAT DEPTH		
	16	17	18
16	MIDDLE	MIDDLE	MIDDLE
18	MIDDLE	MIDDLE	MIDDLE
20	MIDDLE	MIDDLE	MIDDLE

**USERS' WEIGHT 200 LBS AND UNDER -  
MOTOR MOUNTING POSITIONS**

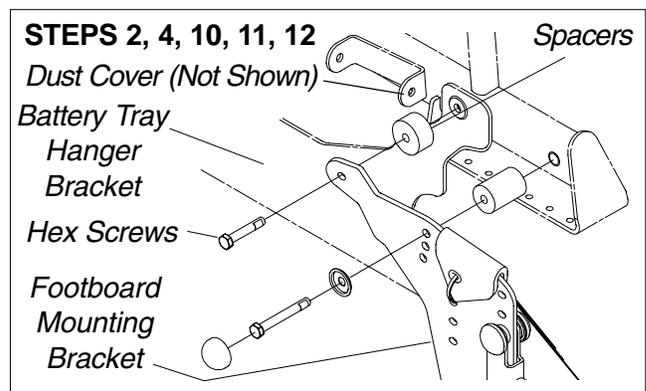
SEAT WIDTH	SEAT DEPTH		
	16	17	18
16	REAR	REAR	REAR
18	REAR	REAR	REAR
20	REAR	REAR	REAR

**USERS' WEIGHT 201 TO 250 LBS -  
MOTOR MOUNTING POSITIONS**

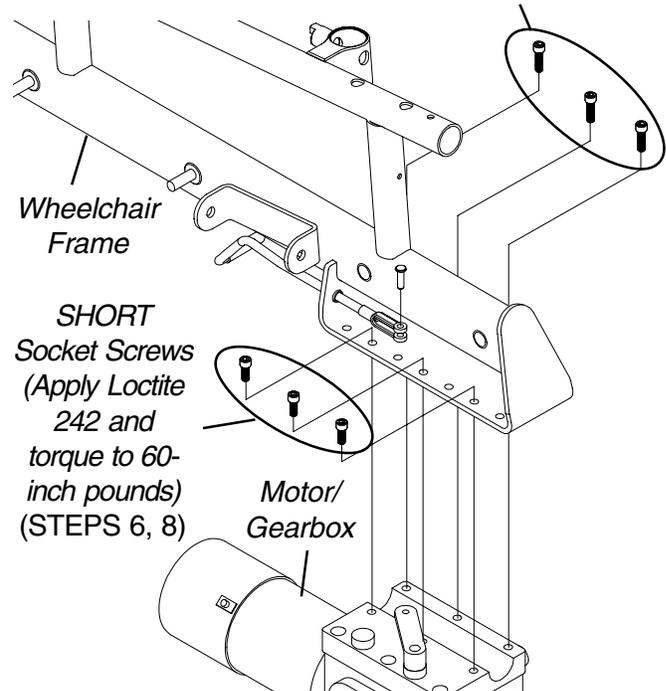
SEAT WIDTH	SEAT DEPTH		
	16	17	18
16	MIDDLE	MIDDLE	MIDDLE
18	MIDDLE	MIDDLE	MIDDLE
20	MIDDLE	MIDDLE	MIDDLE

*NOTE: The front motor mounting position is reserved for future applications.*

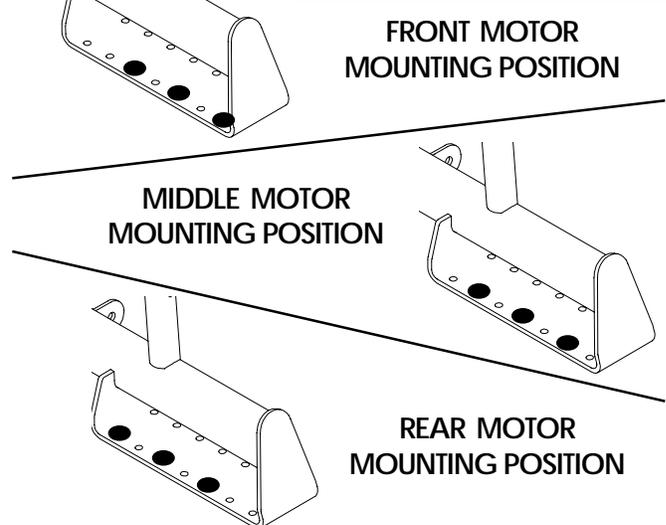
- Remove the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
  - Perform one (1) of the following:
    - WHEELCHAIR EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Remove the hex screws and spacers that secure the battery tray hanger bracket and footboard mounting bracket to the wheelchair frame.
    - WHEELCHAIR NOT EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Remove the front hex screw that secures the battery tray hanger bracket to the wheelchair frame.
  - Rotate battery tray hanger bracket up.
  - Left side of wheelchair only** - Remove the front dust cover from the end of the crossbrace.
- NOTE: Left is determined by sitting in the wheelchair.*
- Refer to charts in this procedure to determine the proper mounting position that corresponds to the user's weight.
  - Remove the six (6) socket screws that secure the motor to the wheelchair frame.
  - Position the motor on the wheelchair frame at the position noted in STEP 5 as shown in FIGURE 26.



**LONG** Socket Screws (Apply Loctite 242 and torque to 60-inch pounds) (STEPS 6, 8)



*NOTE: It is not necessary to disconnect the clutch handle from the motor/gearbox.*



**FIGURE 26 - REPOSITIONING MOTORS**

**CAUTION**

The longer socket screws must be positioned in the mounting holes on the **OUTSIDE** of the wheelchair frame and the short socket screws must be in the mounting holes on the **INSIDE** of the wheelchair frame. Otherwise damage to the gearbox may result.

8. Use Loctite 242 and tighten the motor to the wheelchair frame securely with the six (6) socket screws. Torque to 60-inch pounds.
9. Repeat STEPS 2-8 for the opposite side of the wheelchair, if necessary.
10. Line up the mounting hole in the battery tray hanger bracket with the mounting hole in the wheelchair frame.
11. **Left side of wheelchair only** - Reinstall the front dust cover onto the end of the crossbrace.
12. Perform one (1) of the following:
  - A. **WHEELCHAIR EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Reinstall the hex screws and spacers that secure the battery tray hanger bracket and footboard mounting bracket to the wheelchair frame. Use Loctite 242 and torque to 156-in/lbs.
  - B. **WHEELCHAIR NOT EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Reinstall the front hex screw that secures the battery tray hanger bracket to the wheelchair frame. Use Loctite 242 and torque to 156-in/lbs.
13. Reinstall the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

**REPLACING CLUTCH HANDLES (FIGURE 27)**

1. Remove the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
  2. Remove the tip from the existing clutch handle.
  3. Remove the pin that secures the existing clutch handle to the motor/gearbox.
  4. Disconnect existing clutch handle from motor/gearbox.
  5. Feed the existing clutch handle through the wheelchair frame.
  6. Remove the rubber tip from the new clutch handle.
  7. Install the new clutch handle onto the wheelchair.
- NOTE: Make sure the new clutch handle is pointing towards the outside of the wheelchair.*
8. Install the rubber tip onto the new clutch handle.

9. Connect the clutch handle to the motor/gearbox and line up the mounting holes in the clutch handle and motor/gearbox.
  10. Insert the pin through the clutch handle and motor/gearbox as shown in DETAIL "A" in FIGURE 27.
- NOTE: Make sure the detent ball on the pin is fully visible.*
11. Repeat STEPS 2-10 for the opposite side of the wheelchair, if necessary.
  12. Reinstall the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

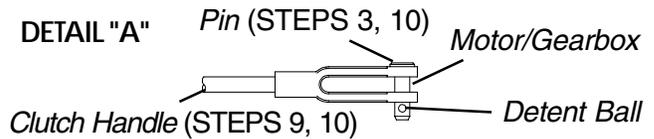
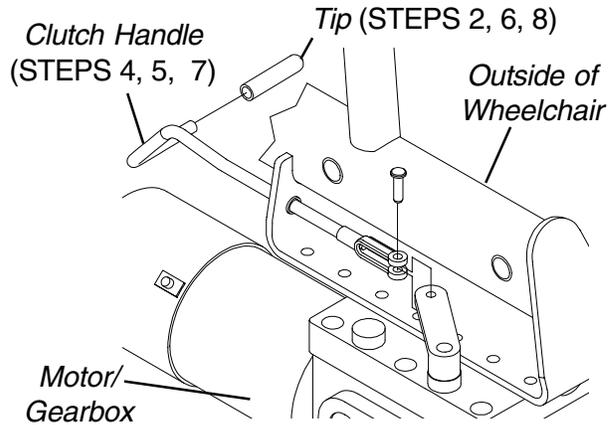


FIGURE 27 - REPLACING CLUTCH HANDLES

**REPLACING MOTOR/GEARBOX (FIGURE 28)**

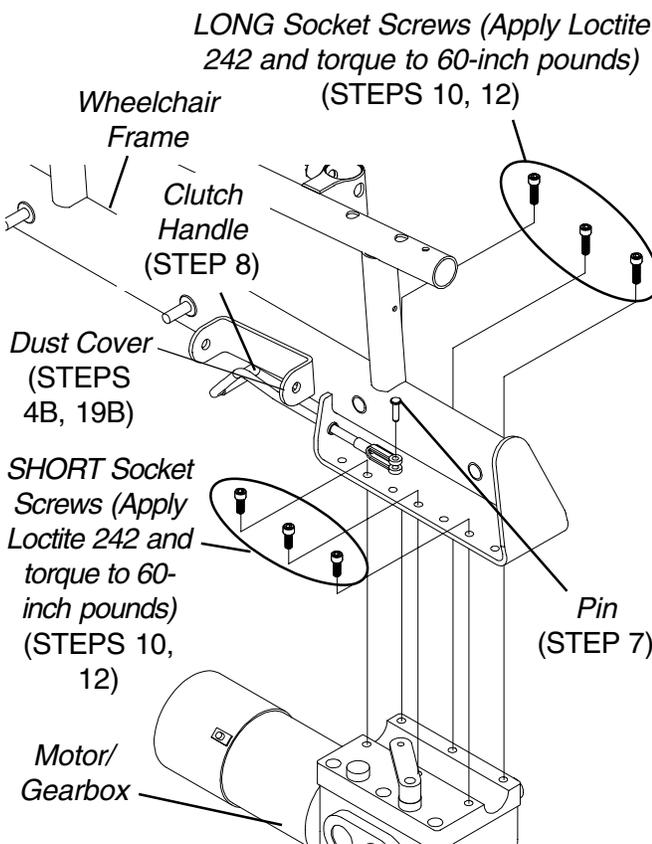
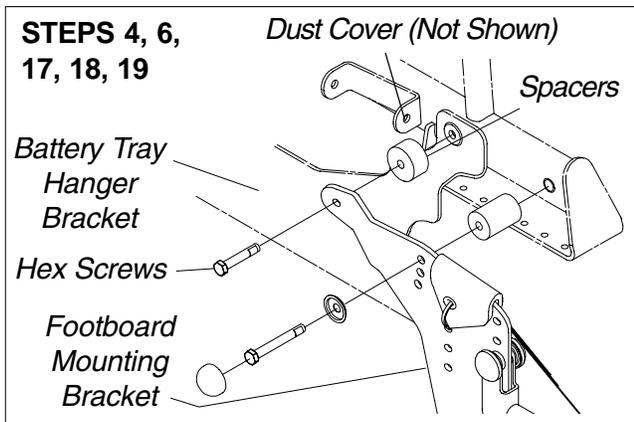
1. Remove the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
2. Disconnect the right and/or left motor connector from the controller.
3. Remove the drive wheels from the wheelchair. Refer to REMOVING/INSTALLING DRIVE WHEELS in PROCEDURE 6 of this manual.
4. Perform one (1) of the following:
  - A. **WHEELCHAIR EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Remove the hex screws and spacers that secure the battery tray hanger bracket and footboard mounting bracket to the wheelchair frame.
  - B. **WHEELCHAIR NOT EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Remove the front hex screw that secures the battery tray hanger bracket to the wheelchair frame.

5. Rotate battery tray hanger bracket up.
  6. **Left side of wheelchair only** - Remove the front dust cover from the end of the crossbrace.
- NOTE: Left is determined by sitting in the wheelchair.*
7. Remove the pin that secures the clutch handle to the existing motor/gearbox.
  8. Disconnect clutch handle from existing motor/gearbox.
  9. Note mounting position of motor/gearbox on the wheelchair frame for installation of the new motor/gearbox.

10. Remove the six (6) socket screws that secure the existing motor/gearbox to the wheelchair frame.
11. Position the new motor/gearbox on the wheelchair frame at the position noted in STEP 7 as shown in **FIGURE 28**.

**CAUTION**

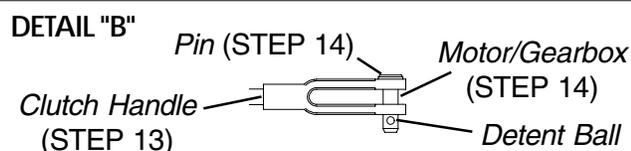
The longer socket screws must be positioned in the mounting holes on the **OUTSIDE** of the wheelchair frame and the short socket screws must be in the mounting holes on the **INSIDE** of the wheelchair frame. Otherwise damage to the gearbox may result.



12. Use Loctite 242 and tighten the motor/gearbox to the wheelchair frame securely with the six (6) socket screws. Torque to 60-inch pounds.
13. Connect the clutch handle to the new motor/gearbox and line up the mounting holes.
14. Insert the pin through clutch handle and new motor/gearbox as shown in DETAIL "B" in FIGURE 28.

*NOTE: Make sure the detent ball on the pin is fully visible.*

15. Repeat STEPS 2-13 for the opposite side of the wheelchair, if necessary.
16. Reinstall the drive wheels onto the wheelchair. Refer to REMOVING/INSTALLING DRIVE WHEELS in PROCEDURE 6 of this manual.
17. Line up the mounting hole in the battery tray hanger bracket with the mounting hole in the wheelchair frame.
18. **Left side of wheelchair only** - Reinstall the front dust cover onto the end of the crossbrace.
19. Perform one (1) of the following:
  - A. **WHEELCHAIR EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Reinstall the hex screws and spacers that secure the battery tray hanger bracket and footboard mounting bracket to the wheelchair frame. Use Loctite 242 and torque to 156-in/lbs.
  - B. **WHEELCHAIR NOT EQUIPPED WITH FLIP-UP REMOVABLE FOOTBOARD** - Reinstall the front hex screw that secures the battery tray hanger bracket to the wheelchair frame. Use Loctite 242 and torque to 156-in/lbs.
20. Reconnect the right and/or left motor connector to the controller.
21. Reinstall the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.



**FIGURE 28 - REPLACING MOTOR/GEARBOX**

*This Procedure Includes the Following:*

- Assembling Power 9000*
- When to Charge Batteries*
- Charging Batteries*
- Replacing Batteries*
- Installing/Removing Battery Boxes*
- Battery Tray*
- Changing Seat Width*
- Adjusting Seat-to-Floor Height*
- Disconnecting/Connecting MKIV Controller, Motor and Battery Leads*
- Removing/Installing MKIV Controller*
- Replacing Wiring Harness*
- Replacing Motor/Gearbox*

**ASSEMBLING POWER 9000 (FIGURE 1)**

**WARNING**  
 The weight of the wheelchair without the user and batteries is approximately 82 lbs. Use proper lifting techniques (lift with your legs) to avoid injury. Extreme caution is advised when it is necessary to move an UNOCCUPIED power wheelchair. Invacare recommends using two (2) assistants and making thorough preparations. Make sure to use ONLY secure, non-detachable parts for hand-hold supports.

**Unfolding/Folding the Wheelchair**

**WARNING**  
 Keep hands and fingers clear of moving parts to avoid injury.

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

**UNFOLDING.**

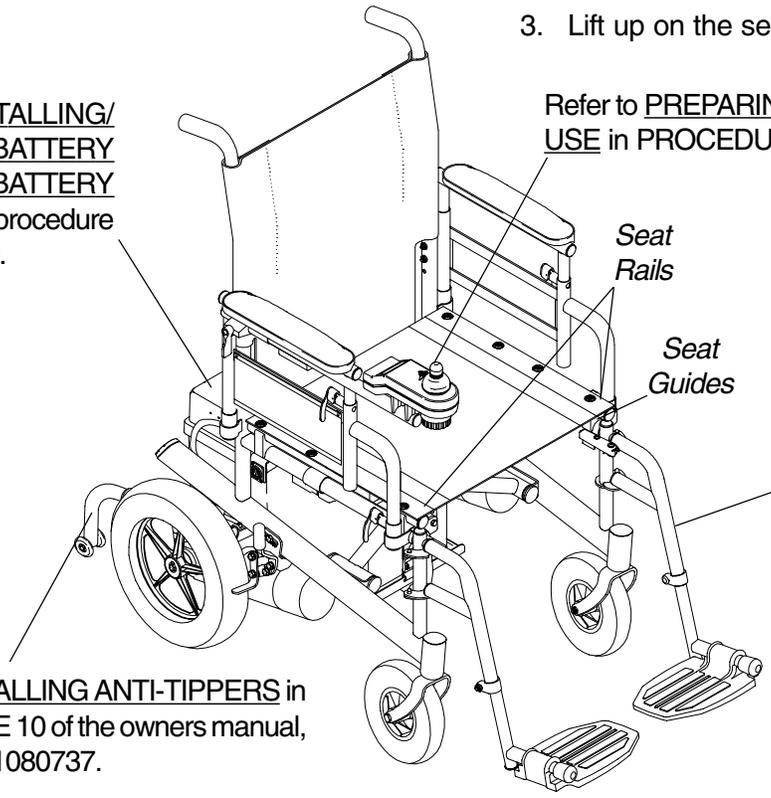
1. Push down on the seat rails until the seat rails are positioned in the seat guides.
2. Assemble the wheelchair. Refer to FIGURE 1.

**FOLDING.**

1. Remove the batteries and footrests/legrests from the wheelchair. Refer to FIGURE 1.
2. Lift the battery tray UP and out of the way. Refer to FIGURE 1.
3. Lift up on the seat rails of the wheelchair.

Refer to INSTALLING/REMOVING BATTERY BOXES and BATTERY TRAY in this procedure of the manual.

Refer to PREPARING MKIV JOYSTICK FOR USE in PROCEDURE 5 of this manual.



Refer to INSTALLING/REMOVING FOOTRESTS or INSTALLING/REMOVING ELEVATING LEGRESTS in PROCEDURE 3 of the owners manual, part number 1080737.

Refer to INSTALLING ANTI-TIPPERS in PROCEDURE 10 of the owners manual, part number 1080737.

FIGURE 1 - ASSEMBLING POWER 9000

## WHEN TO CHARGE BATTERIES (FIGURE 4)

*NOTE: As a general rule, batteries should be recharged daily to assure the longest possible life and minimize the required charging time. In fact, a battery's life is extended if the charge level is maintained well above a low condition. Plan to recharge the batteries when it is anticipated the wheelchair will not be used for a long period of time.*

**BATTERY DISCHARGE INDICATOR (BDI)** is located at the rear of the joystick housing and provides information on the remaining charge in the batteries. At FULL charge the BDI will be GREEN. As the battery becomes discharged, the BDI indicator will turn AMBER (YELLOW), then RED and finally FLASHING RED. If the BDI is FLASHING RED, the user should charge the batteries as soon as possible.

Battery Discharge Indicator

*NOTE: Accurate readings are displayed when in neutral.*

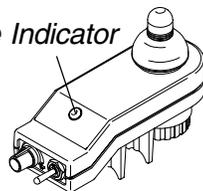


FIGURE 4 - WHEN TO CHARGE BATTERIES

## CHARGING BATTERIES (FIGURE 5)

*NOTE: New batteries MUST be fully charged prior to initial use of the wheelchair.*

### WARNING

Never attempt to recharge the batteries by attaching cables directly to the battery terminals or clamps. Always use the recharging plug located on the side of the wheelchair frame.

DO NOT attempt to recharge the batteries and operate the power wheelchair at the same time.

During use and charging, unsealed batteries will vent hydrogen gas which is explosive in the right concentration with air.

### CAUTION

Always charge new batteries before initial use or battery life will be reduced.

*NOTE: As a general rule, batteries should be recharged daily to assure the longest possible life and minimize the required charging time. In fact, a battery's life is extended if the charge level is maintained well above a low condition. Plan to recharge the batteries when it is anticipated the wheelchair will not be used for a long period of time.*

Range per battery charge using recommended batteries should be approximately 5 to 9 hours of typical operation. Extensive use on inclines may substantially reduce per charge mileage.

## Description and Use of Battery Chargers

The charger automatically reduces the charge from an initially high rate to a zero reading at a fully charged condition. If left unattended, the charger should automatically shut-off when full charge is obtained.

**There are some basic concepts which will help you understand this automatic process:**

The amount of electrical current drawn within a given time to charge a battery is called "charge rate". If, due to usage, the charge stored in the battery is low, the charge rate is high, as indicated by the green light on the charger. Initially, the green light will stay illuminated for a short period of time followed by a longer period of off time. As a charge builds up, the charge rate is reduced, and the green light will stay illuminated for a longer period of time followed by a shorter off time.

*NOTE: If performing the charging procedures independently, READ and CAREFULLY follow the individual instructions for each charger (supplied or purchased).*

*NOTE: If charging instructions are not supplied, consult a qualified service technician for proper procedures.*

### Required Items:

TOOL	QUANTITY	COMMENTS
Battery Charger	1	Supplied
⊕ Extension Cord	1	Not Supplied

⊕ 3-prong plug, 15 ampere current rating; industrial type

1. Attach the battery charger connector to the charger cable/battery harness.
2. Plug the charger's AC power cord, or extension, into the grounded 120 VAC wall outlet.
3. Wait until charging is complete.

*NOTE: Allow eight (8) hours for normal charging. Larger batteries (greater than 55 ampere-hours) or severely discharged batteries may require up to sixteen (16) hours to be properly charged and equalized. If the charger operates for sixteen (16) hours and is unable to fully charge the batteries, an internal timer turns the charger off and begins to fast blink the green light.*

*NOTE: If the batteries need to be charged more often or take longer to charge than normal, they may need to be replaced. Contact an authorized dealer for service.*

Battery Charger Connector (on Side of Wheelchair)

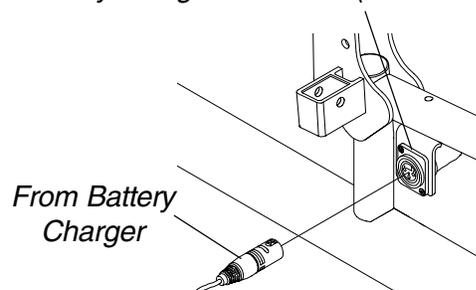


FIGURE 5- CHARGING BATTERIES

**REPLACING BATTERIES**

**WARNING**

Most batteries are not sold with instructions. However, warnings are frequently noted on the cell caps. Read them carefully, otherwise injury or damage may occur.

*NOTE: Invacare recommends that both batteries be replaced if one (1) battery is defective.*

**Recommended Battery Types**

**WARNING**

The warranty and performance specifications contained in this manual are based on the use of deep cycle gel cell or sealed lead acid batteries. Invacare strongly recommends their use as the power source for this unit.

**CAUTION**

Failure to use the correct battery size and/or voltage may cause damage to your wheelchair and give you unsatisfactory performance.

CHAIR SEAT WIDTH	QTY	VOLTS	BCI STOCK NO.	REMARKS
14-inches	2	12	U1	Deep Cycle
16,18, 20-inches	2	12	22NF	Deep Cycle

*NOTE: Charge batteries daily. It is critical not to let them run low at any time.*

**Cleaning Battery Terminals**

**WARNING**

DO NOT allow the liquid in the battery to come in contact with skin, clothes or other possessions. It is a form of acid and harmful or damaging burns may result. Should the liquid touch your skin, wash the area immediately and thoroughly with cool water. In serious cases or if eye contact is made, seek medical attention IMMEDIATELY.

The use of safety glasses is recommended when cleaning the battery terminals.

NEVER smoke or strike a match near batteries. If the caps of the battery cells are removed, NEVER look directly into them while charging batteries.

1. Examine battery clamps and terminals for corrosion.
2. Verify that the plastic caps are in place over the battery cell holes.

3. Clean the terminals and inside the battery clamps by using a battery cleaning tool, wire brush, or medium grade sand paper.

*NOTE: When done, these areas should be shiny, not dull.*

4. Carefully dust off all metal particles.

**INSTALLING/REMOVING BATTERY BOXES (FIGURE 6)**

*NOTE: To remove the battery boxes from the wheelchair, reverse the following procedure.*

1. Verify that the ON/OFF switch on the joystick is in the OFF position.
2. Position battery boxes onto battery tray. Make sure battery cables on battery boxes are on the same side as the battery connectors on the wheelchair frame.
3. Connect the battery cables from the battery boxes to the battery connectors on the wheelchair frame.
4. Connect the battery box retaining strap clip together.

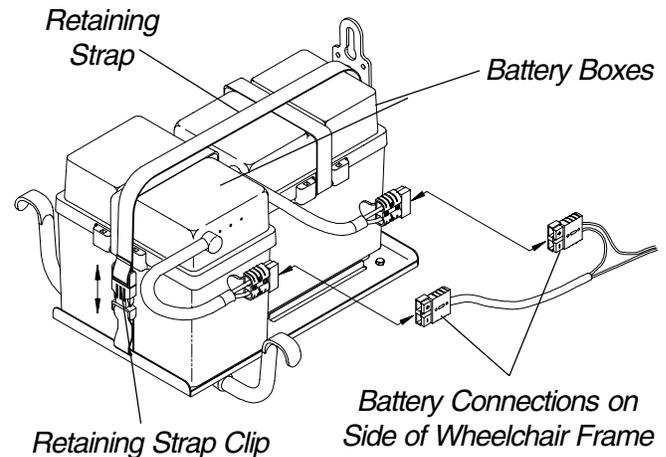


FIGURE 6 - INSTALLING/REMOVING BATTERY BOXES

**WARNING**

The Battery Box Retaining Strap MUST be fastened securely and adjusted properly to hold battery boxes in place before using the wheelchair.

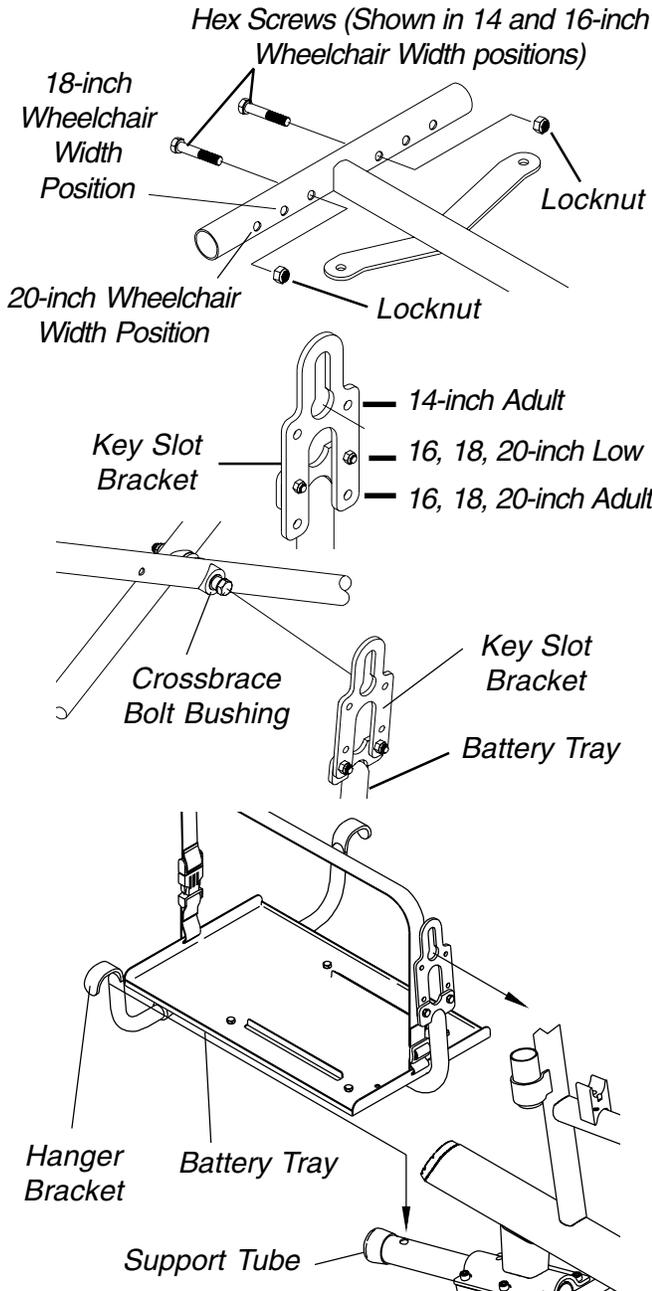
5. Connect the battery box retaining strap clip together and adjust if necessary.

**BATTERY TRAY (FIGURE 7)**

*NOTE: To remove the battery tray from the wheelchair, reverse the following procedure.*

1. Remove the battery tray from the packaged container.

*NOTE: The hex socket screws will be positioned in the correct mounting holes for the corresponding width of the wheelchair.*



**FIGURE 7 - BATTERY TRAY**

2. Secure the hanger brackets to the battery tray in the mounting holes that the hex screws are mounted.
3. Attach the key slot bracket located at the front of the battery tray over the crossbrace bolt bushing under the seat upholstery of the wheelchair.

*NOTE: If wheelchair is 14-inch wide and equipped with MKIV RII electronics, it may be necessary to turn battery tray slightly away from controller to install the battery tray.*

4. Attach the hanger brackets to the support tubes on the wheelchair frame.

**CHANGING SEAT WIDTH (FIGURE 8)**

1. Remove the battery boxes and battery tray from the wheelchair. Refer to INSTALLING/REMOVING BATTERY BOXES and INSTALLING/REMOVING BATTERY TRAY in this procedure of the manual.
2. Remove the existing back and seat upholstery from the wheelchair. Refer to REPLACING BACK UPHOLSTERY in PROCEDURE 3 of this manual and REPLACING SEAT UPHOLSTERY in PROCEDURE 5 of the owners manual, part number 1080737.

*NOTE: If adjusting the seat width of the wheelchair, the back and seat upholstery MUST be changed as well.*

3. Remove the hex screws and locknuts that secure the two (2) pivot links to the wheelchair frame and crossbraces. Refer to the following chart to determine if new pivot links will be needed:

PIVOT LINK SEAT WIDTH RANGE (IN INCHES)	
14-15, 16-18 and 19-20	

4. Remove dust covers from bottom of crossbraces.
5. Remove the hex screws, washers and locknuts that secure the bottom of the two (2) crossbraces to the wheelchair frame.
6. Remove the hex screw, covered spacers, washers and locknut that secure the two (2) existing crossbraces together.

*NOTE: Note covered spacer, washer and locknut order for reinstallation.*

7. Remove the four (4) pivot tube plug pins from the bottom of the two (2) existing crossbraces.
8. Install the four (4) pivot tube plug pins into the bottom of the two (2) new crossbraces.
9. Assemble the two (2) new crossbraces together. Refer to FIGURE 8 for hardware orientation.
10. Reinstall the hex screws, washers and locknuts that secure the bottom of the two (2) new crossbraces to the wheelchair frame.

R  
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D  
W  
H  
E  
E  
L  
C  
H  
A  
I  
R  
S

11. Reinstall dust covers onto bottom of crossbraces.
12. Reinstall the hex screws and locknuts that secure the pivot links to the wheelchair frame and crossbraces.
13. Install the new back and seat upholstery onto the wheelchair. Refer to REPLACING BACK UPHOLSTERY in PROCEDURE 3 of this manual and REPLACING SEAT UPHOLSTERY in PROCEDURE 5 of the owners manual, part number 1080737.
14. Reinstall the battery tray and battery boxes/batteries onto the wheelchair. Refer to BATTERY TRAY and INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

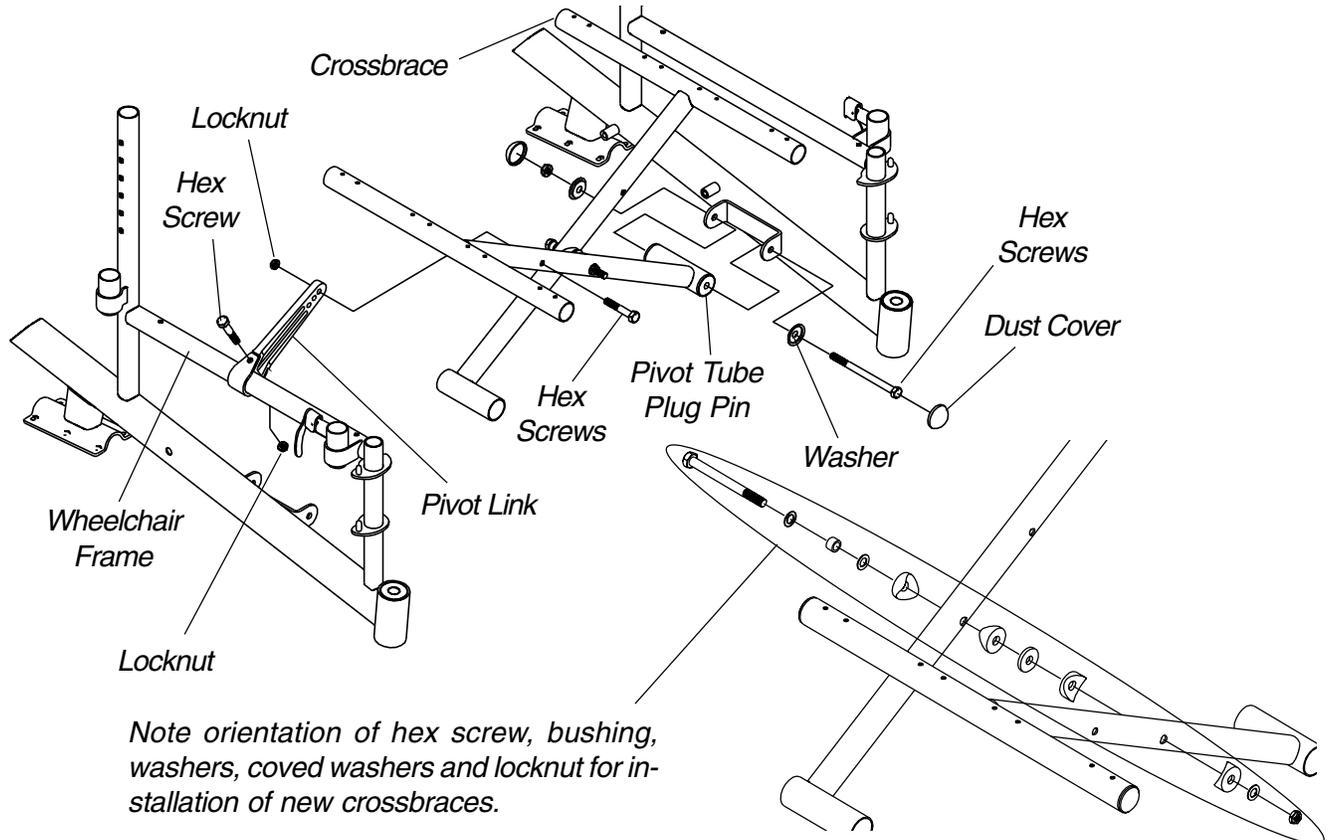


FIGURE 8 - CHANGING SEAT WIDTH

### ADJUSTING SEAT-TO-FLOOR HEIGHT

**WARNING**  
 Adjusting seat-to-floor height **MUST** be performed by Invacare Technical Support, 1-800-832-4707.

### DISCONNECTING/CONNECTING MKIV CONTROLLER, MOTOR AND BATTERY LEADS (FIGURE 9)

*NOTE: To connect MKIV controller motor and battery leads, reverse the following procedure.*

1. Disconnect the fastening straps that secure the nylon boot around the connected motor and battery leads.
2. Disconnect controller left/right motor and battery leads from the leads secured to the wheelchair with tie wrap.

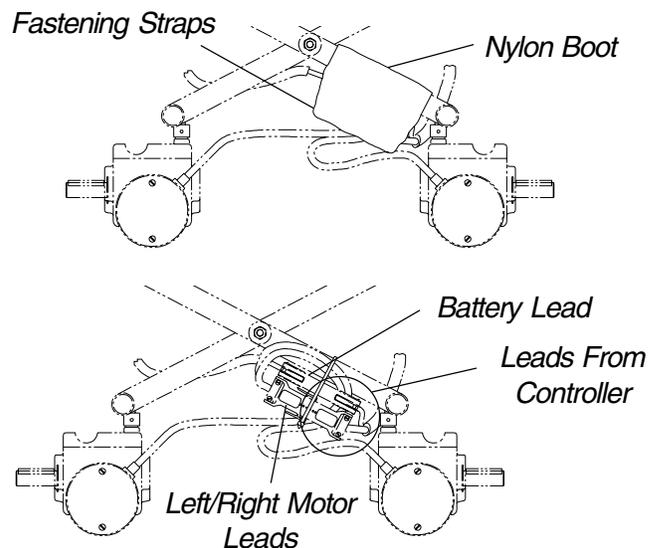


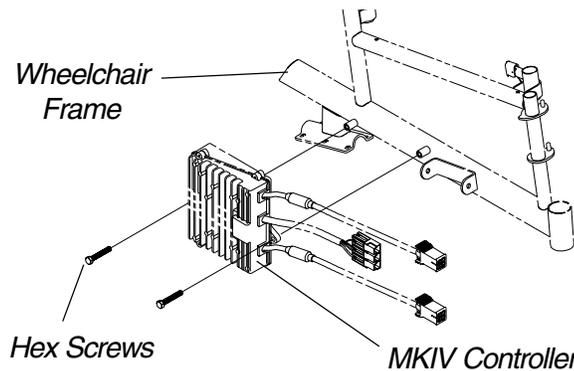
FIGURE 9 - DISCONNECTING/CONNECTING MKIV CONTROLLER, MOTOR AND BATTERY LEADS

**REMOVING/INSTALLING MKIV CONTROLLER (FIGURE 10)**

1. Disconnect the left/right motor leads and battery leads. Refer to DISCONNECTING/CONNECTING MKIV CONTROLLER, MOTOR AND BATTERY LEADS in this procedure of the manual.
2. Remove the two (2) hex screws that secure the MKIV controller onto the wheelchair.

*NOTE: When installing the MKIV controller onto the wheelchair, use Loctite 242 on hex screws.*

3. Install the new/existing MKIV controller onto the wheelchair by reversing STEPS 1 and 2.



**FIGURE 10 - REMOVING/INSTALLING MKIV CONTROLLER**

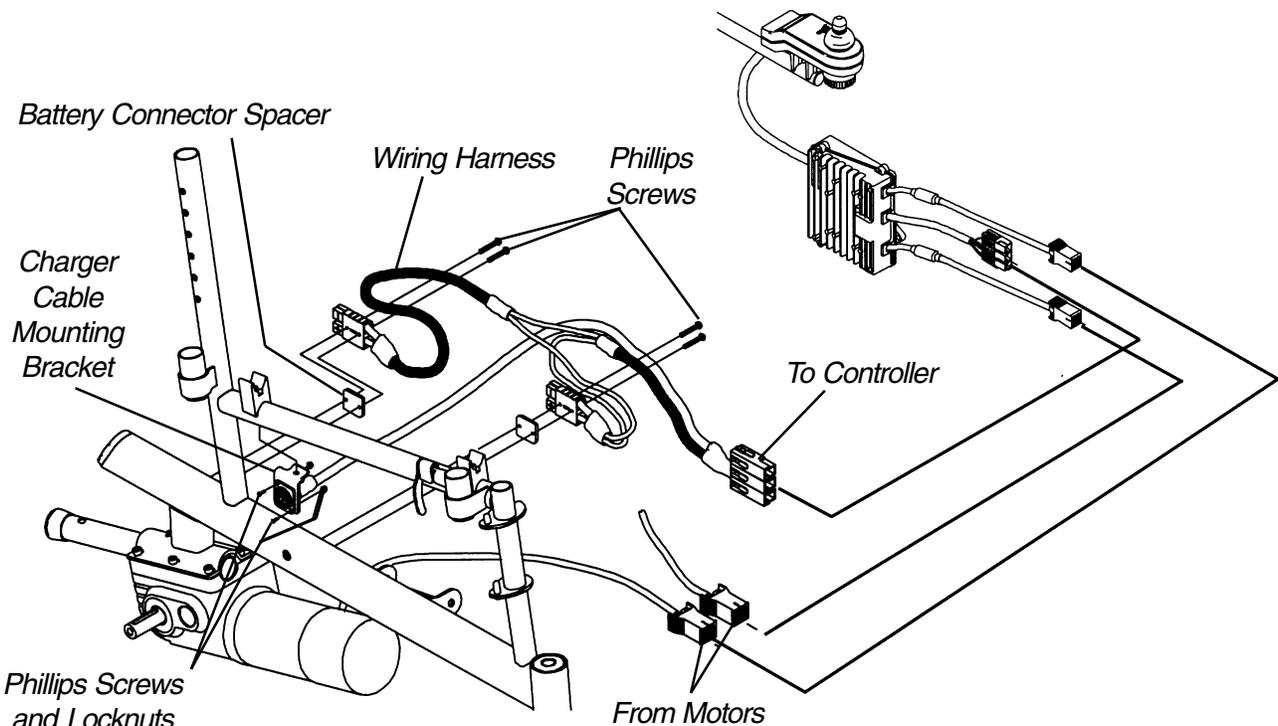
**REPLACING WIRING HARNESS (FIGURE 11)**

**Disassembly**

1. Remove the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
2. Disconnect the wiring harness (BLUE) from the controller connector (BLUE).
3. Remove the four (4) phillips screws that secure the battery connectors and battery connector spacers to the wheelchair frame.
4. Remove the two (2) phillips screws, washers and locknuts that secure the charger cable to the charger cable mounting bracket.
5. Cut the tie wrap that secures the wiring harness and motor cables to the crossbraces.
6. Remove the wiring harness from the wheelchair.

**Reassembly**

1. Secure the two (2) battery connectors of the new battery harness and the battery connector spacers to the wheelchair frame with the four (4) phillips screws.
2. Secure charger cable to existing mounting bracket on seat frame with two (2) phillips screws, washers and locknuts.



**FIGURE 11 - REPLACING WIRING HARNESS**

R  
W  
D  
W  
H  
E  
E  
L  
C  
H  
A  
I  
R  
S

3. Connect the wiring harness (BLUE) to the controller connector (BLUE).
4. Re-secure the wiring harness and motor cables to the crossbraces with new tie wrap.
5. Reinstall the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

10. Repeat procedure for opposite side of the wheelchair, if necessary.
11. Reinstall the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.

**REPLACING MOTOR/GEARBOX (FIGURE 12)**

1. Remove the battery boxes. Refer to INSTALLING/REMOVING BATTERY BOXES in this procedure of the manual.
2. Disconnect the right and/or left motor connector from the controller.
3. Remove the drive wheels from the wheelchair. Refer to REPLACING DRIVE WHEELS in PROCEDURE 6 of this manual.
4. Remove the six (6) socket screws that secure the motor/gearbox and support tube to the wheelchair frame.
5. Reposition new motor/gearbox on the wheelchair frame.
6. Position the support tube between the wheelchair frame and the new motor/gearbox. Make sure the alignment hole in the support tube is positioned with the alignment pin on the motor mount plate.

*NOTE: The alignment pin is the longest of the three (3) pins and is located in the center of the wheelchair frame motor mount plate. Refer to DETAIL "A" in FIGURE 12.*

*NOTE: When the alignment hole in the support tube is positioned with the alignment pin on the wheelchair frame, the anti-tipper wheels should be pointing down towards the ground/floor.*

**CAUTION**

The longer socket screws must be positioned in the mounting holes on the **OUTSIDE** of the wheelchair frame and the short socket screws must be in the mounting holes on the **INSIDE** of the wheelchair frame. Otherwise damage to the gearbox casting can result.

7. Use Loctite 242 and securely tighten the support tube and motor/gearbox to the wheelchair frame with the six (6) socket screws. Torque to 60-inch pounds.
8. Reinstall the drive wheels onto the wheelchair. Refer to REPLACING DRIVE WHEELS in PROCEDURE 6 of this manual.
9. Reconnect the right and/or left motor connector to the controller.

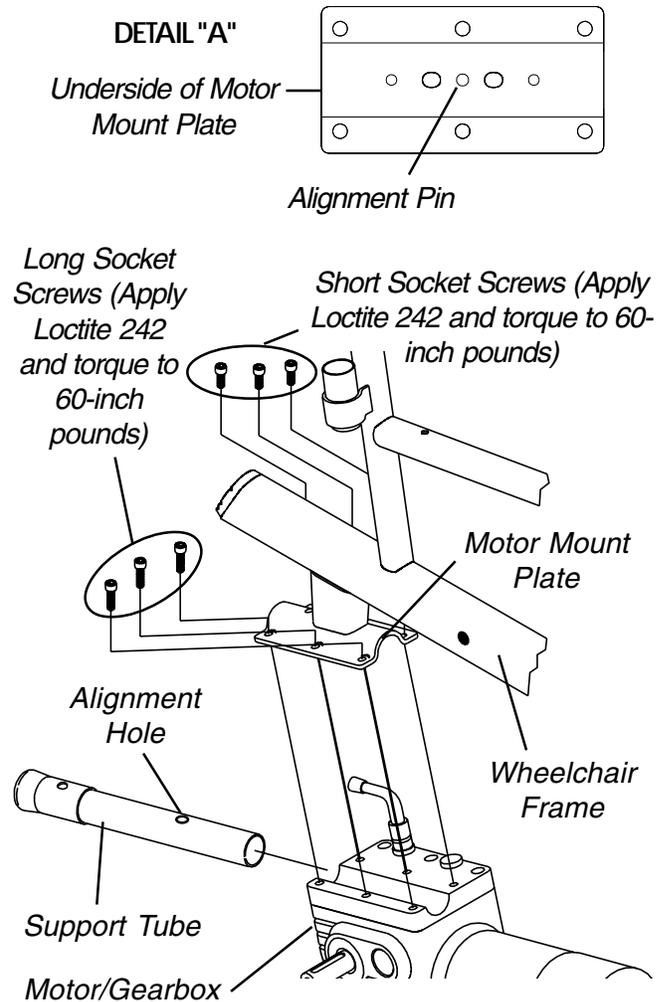


FIGURE 12 - REPLACING MOTOR/GEARBOX

## LIMITED WARRANTY

PLEASE NOTE: THE WARRANTY BELOW HAS BEEN DRAFTED TO COMPLY WITH FEDERAL LAW APPLICABLE TO PRODUCTS MANUFACTURED AFTER JULY 4, 1975.

This warranty is extended only to the original purchaser/user of our products.

This warranty gives you specific legal rights and you may also have other legal rights which vary from state to state.

Invacare warrants the side frames and crossbraces to be free from defects in materials and workmanship for a period of five (5) years from date of purchase; electronics for a period of one (1) year from the date of purchase; motors and gearboxes for a period of twelve (12) months from the date of purchase; all remaining components (including gas cylinders for recliners) for one (1) year from the date of purchase except upholstered materials, padded materials and tires/wheels. If within such warranty period any product shall be proven to be defective, such product shall be repaired or replaced, at Invacare's option. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Invacare's sole obligation and your exclusive remedy under this warranty shall be limited to such repair and/or replacement.

For warranty service, please contact the dealer from whom you purchased your Invacare product. In the event you do not receive satisfactory warranty service, please write directly to Invacare at the bottom of the back cover. Provide dealer's name address, date of purchase, indicate nature of the defect and, if the product is serialized, indicate the serial number. Do not return products to our factory without our prior consent.

LIMITATIONS AND EXCLUSIONS: THE FOREGOING WARRANTY SHALL NOT APPLY TO SERIAL NUMBERED PRODUCTS IF THE SERIAL NUMBER HAS BEEN REMOVED OR DEFACED, PRODUCTS SUBJECT TO NEGLIGENCE, ACCIDENT, IMPROPER OPERATION, MAINTENANCE OR STORAGE, COMMERCIAL OR INSTITUTIONAL USE, PRODUCTS MODIFIED WITHOUT INVACARE'S EXPRESS WRITTEN CONSENT INCLUDING, BUT NOT LIMITED TO, MODIFICATION THROUGH THE USE OF UNAUTHORIZED PARTS OR ATTACHMENTS; PRODUCTS DAMAGED BY REASON OF REPAIRS MADE TO ANY COMPONENT WITHOUT THE SPECIFIC CONSENT OF INVACARE, OR TO A PRODUCT DAMAGED BY CIRCUMSTANCES BEYOND INVACARE'S CONTROL, AND SUCH EVALUATION WILL BE SOLELY DETERMINED BY INVACARE. THE WARRANTY SHALL NOT APPLY TO PROBLEMS ARISING FROM NORMAL WEAR OR FAILURE TO ADHERE TO THESE INSTRUCTIONS.

A CHANGE IN OPERATING NOISE, PARTICULARLY RELATIVE TO MOTORS AND GEARBOXES DOES NOT CONSTITUTE A FAILURE. ALL SUCH DEVICES WILL EXHIBIT A CHANGE IN OPERATING NOISE DUE TO AGING.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, IF ANY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE DURATION OF THE EXPRESSED WARRANTY PROVIDED HEREIN AND THE REMEDY FOR VIOLATIONS OF ANY IMPLIED WARRANTY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT PURSUANT TO THE TERMS CONTAINED HEREIN. INVACARE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES WHATSOEVER.

THIS WARRANTY SHALL BE EXTENDED TO COMPLY WITH STATE/PROVINCIAL LAWS AND REQUIREMENTS.



**Yes, you can.™**

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