Owner's Operator and Maintenance Manual

TDX® Wheelchairs

TDX 5, TDX 4, TDX 3

including

Formula™ Invisible Super Low™ Tilt

Formula PTO Plus

Formula TRE

(Tilt, Recline, Elevate, Tilt/Recline, Tilt/ Elevate, Tilt/Recline/Elevate)

2G Tarsys®

(2GT™ - Tilt, 2GR™ - Recline, 2GTR™ - Tilt/ Recline)

DEALER: This manual MUST be given to the user of the wheelchair.

USER: BEFORE using this wheelchair, read this manual and save for future reference.

For more information regarding Invacare products, parts, and services, please visit www.invacare.com

INVACARE®

Yes, you can.®

⚠ WARNING

A QUALIFIED TECHNICIAN MUST PERFORM THE INITIAL SET UP OF THIS WHEELCHAIR. ALSO, A QUALIFIED TECHNICIAN MUST PERFORM ALL PROCEDURES IN THE SERVICE MANUAL.

WHEELCHAIR USERS: DO NOT SERVICE OR OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING (1) THE OWNER'S OPERATOR AND MAINTENANCE MANUAL AND (2) THE SEATING SYSTEM'S MANUAL (IF APPLICABLE). 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.

DEALERS AND QUALIFIED TECHNICIANS: DO NOT SERVICE OR OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING (1) THE OWNER'S OPERATOR AND MAINTENANCE MANUAL, (2) THE SERVICE MANUAL (IF APPLICABLE) AND (3) THE SEATING SYSTEM'S MANUAL (IF APPLICABLE). 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.

REFERENCE DOCUMENTS

Refer to the table below for part numbers of additional documents which are referenced in this manual.

MANUAL	PART NUMBER
MK5™ EX™ and MK5 TT-EX Electronics Manual	1114808
MK5 NX™ -80 Electronics Manual	1122140
TDX Base Service Manual	1114819
Formula TRE Service Manual	1123820
Formula PTO Plus Service Manual	1125031
2G Tarsys Service Manual	1114842

NOTE: Updated versions of this manual are available on www.invacare.com.

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REGISTER YOUR PRODUCT

The benefits of registering include:

1. Safeguarding your investment.
2. Ensuring long-term maintenance and servicing of your product.
3. Receiving updates with product information, maintenance tips and industry news.

Register ONLINE at warranty.invacare.com

Please have your model number and purchase date available to complete your registration.

Any registration information you submit will only be used by Invacare Corporation and protected as required by applicable laws and regulations.

SPECIAL NOTES

Signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. Refer to the table below for definitions of the signal words.

SIGNAL WORD	MEANING
DANGER	Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Caution indicates a potentially hazardous situation which, if not avoided, may result in 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. Invacare highly recommends working with a certified rehab technology supplier and/or a member of NRRTS or RESNA.

WHEELCHAIR TIE-DOWN RESTRAINTS AND SEAT RESTRAINTS (TRRO OR TRBKTS)

TRRO includes four factory-installed transport brackets and a wheelchair anchored pelvic belt. TRRO has been crash-tested in accordance with ANSI/RESNA WC Vol 1 Section 19 Frontal Impact Test requirements for wheelchairs with a 168 lb crash dummy, which corresponds to a person with a weight of 114 to 209 lbs.

TRBKTS includes four factory-installed wheelchair transport brackets. TRBKTS has not been crash-tested in accordance with WC 19. Use these transport brackets only to secure an unoccupied wheelchair during transport.

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.

Refer to Transport Ready Package (TRRO) on page 134 for more information about transporting the wheelchair.

⚠ TRRO AND TRBKTS WARNINGS

Only use the transport brackets included with TRRO and TRBKTS for the purposes described in this manual.

Battery support brackets MUST be installed at all times. Otherwise, the wheelchair will not be WC/19 compliant. Refer to Removing/Installing the Batteries From/Into the Wheelchair on page 106.

⚠ WARNING

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

The seat positioning strap is a positioning belt ONLY. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, belt MUST be replaced immediately.

The drive behavior initially experienced by the user may be different from other wheelchairs previously used. This Power Wheelchair has Invacare's SureStep™ technology, a feature that provides the wheelchair with optimum traction and stability when driving forward over transitions and thresholds of up to 3-inches for TDX 5 and TDX 4 and 2-inches for TDX 3. The following warnings apply specifically to the Sure Step feature:

- **DO NOT use on inclines greater than 9°.**
- **DO NOT use on inclines with wet, slippery, icy or oily surfaces. This may include certain painted or otherwise treated wood surfaces.**
- **DO NOT traverse down ramps at high speed. Doing so will reduce traction and increase stopping distance.**
- **The end user's weight can materially affect traction on sloped surfaces. Great care should be taken when traversing such slopes.**

To determine and establish your particular safety limits, practice use of this product on various sloping surfaces in the presence of a qualified healthcare provider BEFORE attempting active use of this wheelchair. Other general warnings listed within this document also apply.

Wheelchairs should be examined during maintenance for signs of corrosion (water exposure, incontinence, etc.). Electrical components damaged by corrosion should be replaced IMMEDIATELY.

Wheelchairs that are used by incontinent users and/or are frequently exposed to water may require replacement of electrical components more frequently.

⚠ POWERED SEATING SYSTEM WARNINGS

This seating system has been custom designed and will be assembled to the wheelchair base before delivery to the user. The information contained in this manual is for maintaining and adjusting the seating system. There are very few adjustments that can safely be made by the user. If there is a procedure or adjustment that needs to be performed on the seating system that is not in this manual, DO NOT perform that procedure. Have the seating system serviced by a qualified technician.

⚠ MANUAL RECLINER WARNINGS TO HEALTHCARE PROFESSIONALS/ASSISTANTS

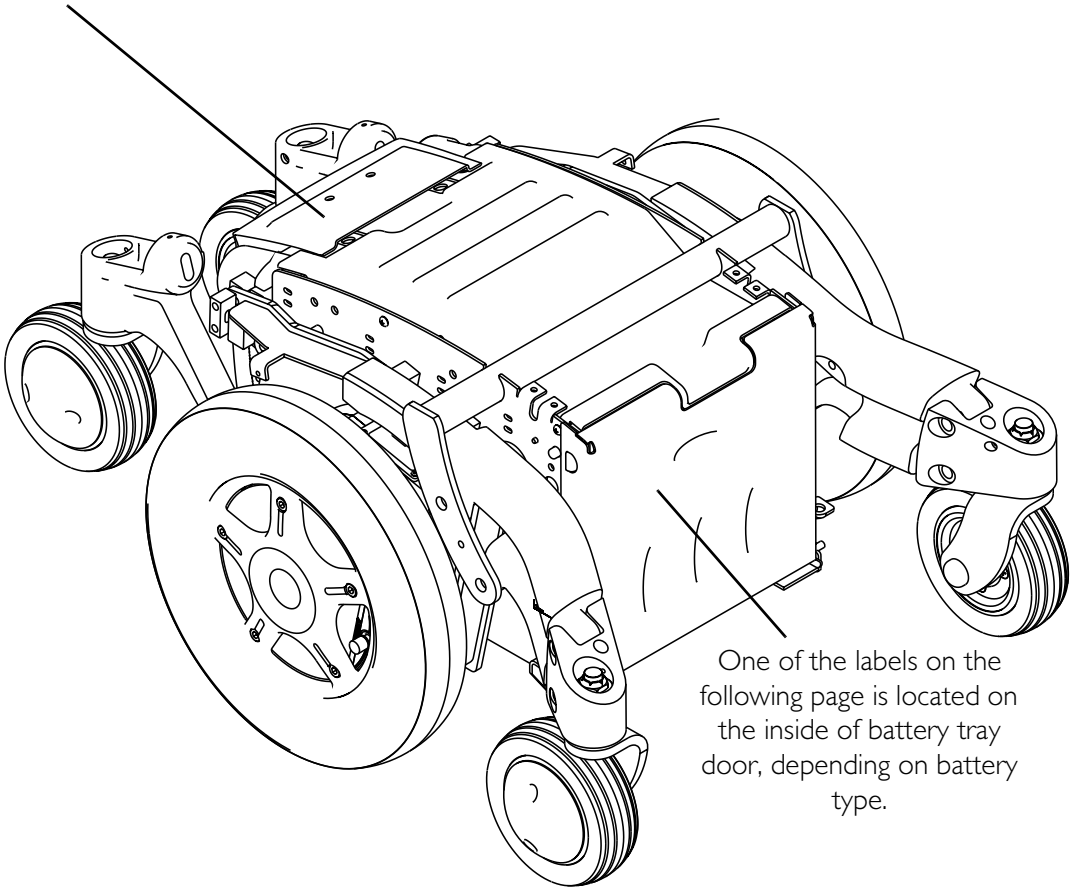
Make sure the occupant of the wheelchair is properly positioned.

When returning the occupant of the wheelchair to the full upright position, more body strength will be required for approximately the last twenty (20) degrees of incline (reverse recline). Make sure to use proper body mechanics (use your legs) or seek assistance if necessary to avoid injury.

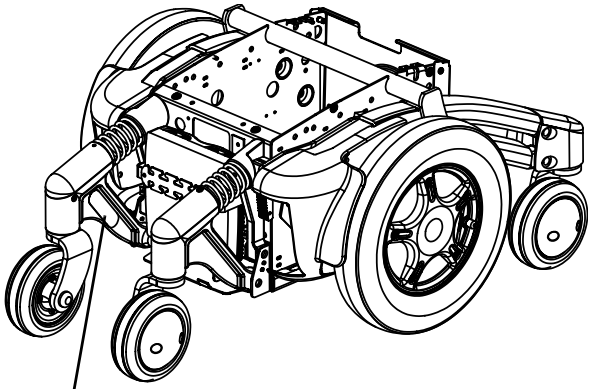
LABEL LOCATIONS

All Wheelchairs

Serial Number Label is located on a plate below the controller.



One of the labels on the following page is located on the inside of battery tray door, depending on battery type.



NO WHEELCHAIR HAS BEEN APPROVED FOR USE AS A SEATING SURFACE WITHIN A MOTOR VEHICLE. THIS LABEL IS FOR INFORMATIONAL PURPOSES ONLY. LIABILITY ISSUES WERE NOT CONSIDERED IN THE ATTACHMENT OF THIS LABEL.

AUCUN FAUTEUIL ROULANT N'A ÉTÉ APPROUVÉ POUR ÊTRE UTILISÉ COMME SIÉGE À L'INTÉRIEUR D'UN VÉHICULE MOTORISÉ. CETTE ÉTIQUETTE NE PEUT ÊTRE UTILISÉE QU'A TITRE D'INFORMATION ET N'A PAS ÉTÉ AFFICHÉE ICI POUR DES RAISONS DE RESPONSABILITÉ LEGALE

Standard TDX Wheelchairs, Formula TRE Non-Elevate Systems, 2G Tarsys Systems and Formula PTO Plus Systems

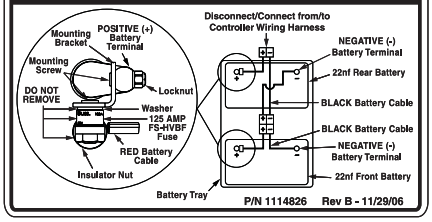
⚠WARNING

Wiring Diagram and Battery Install/Remove for 22NF Batteries

DO NOT REMOVE THIS LABEL

The POSITIVE (+) RED Battery Cable MUST connect to the POSITIVE (+) Battery Terminal(s)/ Post(s). The NEGATIVE (-) BLACK Battery Cable MUST connect to the NEGATIVE (-) Battery Terminal(s)/Post(s). DO NOT allow Battery Cable(s) to contact the opposite Battery Terminal(s)/Post(s). Replace cable(s) immediately if cable(s) insulation becomes damaged. Install protective caps on POSITIVE (+) and NEGATIVE (-) battery terminals. Failure to observe these warnings may result in an electrical short with serious personal injury and/or damage to the electrical system. See Owner's Manual.

DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable mounting screw.



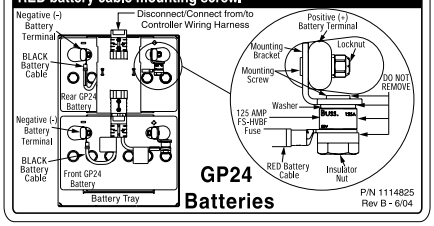
⚠ WARNING

Wiring Diagram and Battery Install/Remove for GP24 Batteries

DO NOT REMOVE THIS LABEL

The POSITIVE (+) RED Battery Cable MUST connect to the POSITIVE (+) Battery Terminal(s)/ Post(s). The NEGATIVE (-) BLACK Battery Cable MUST connect to the NEGATIVE (-) Battery Terminal(s)/Post(s). DO NOT allow Battery Cable(s) to contact the opposite Battery Terminal(s)/Post(s). Install protective caps on positive and negative battery terminals. Replace cable(s) immediately if cable(s) insulation becomes damaged. Failure to observe these warnings may result in an electrical short with serious personal injury and/or damage to the electrical system. See Owner's Manual, part number 1114809.

DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable mounting screw.



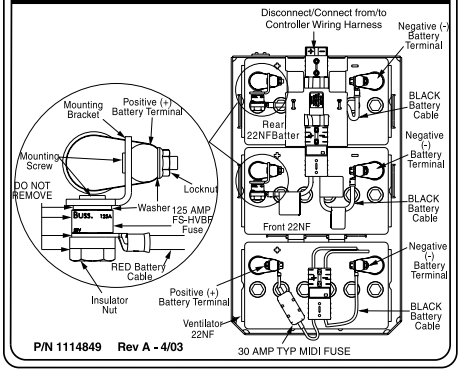
TDX Wheelchairs Equipped with Vent Tray Only

⚠WARNING

The POSITIVE (+) RED Battery Cable MUST connect to the POSITIVE (+) Battery Terminal(s)/ Post(s). The NEGATIVE (-) BLACK Battery Cable MUST connect to the NEGATIVE (-) Battery Terminal(s)/Post(s). DO NOT allow Battery Cable(s) to contact the opposite Battery Terminal(s)/Post(s). Install protective caps on positive and negative battery terminals. Replace cable(s) immediately if cable(s) insulation becomes damaged. Failure to observe these warnings may result in an electrical short with serious personal injury and/or damage to the electrical system. See Owner's Manual.

DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable mounting screw.

DO NOT REMOVE THIS LABEL



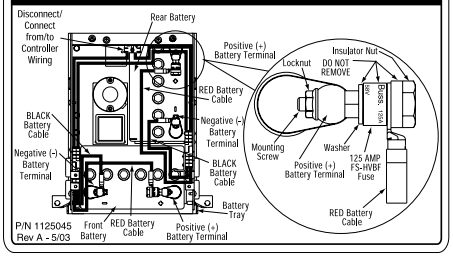
Formula TRE Systems Equipped with Elevate

⚠ WARNING

Wiring Diagram and Battery Remove/Install for 22NF Batteries on Elevate Systems

DO NOT REMOVE THIS LABEL

The POSITIVE (+) RED Battery Cable MUST connect to the POSITIVE (+) Battery Terminal(s)/ Post(s). The NEGATIVE (-) BLACK Battery Cable MUST connect to the NEGATIVE (-) Battery Terminal(s)/Post(s). DO NOT allow Battery Cable(s) to contact the opposite Battery Terminal(s)/Post(s). Install protective caps on positive and negative battery terminals. Replace cable(s) immediately if cable(s) insulation becomes damaged. DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable mounting screw. Failure to observe these warnings may result in an electrical short with serious personal injury and/or damage to the electrical system. See Owner's Manual.



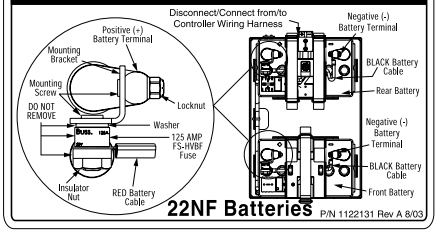
Formula Invisible Super Low Tilt Seating Systems Only

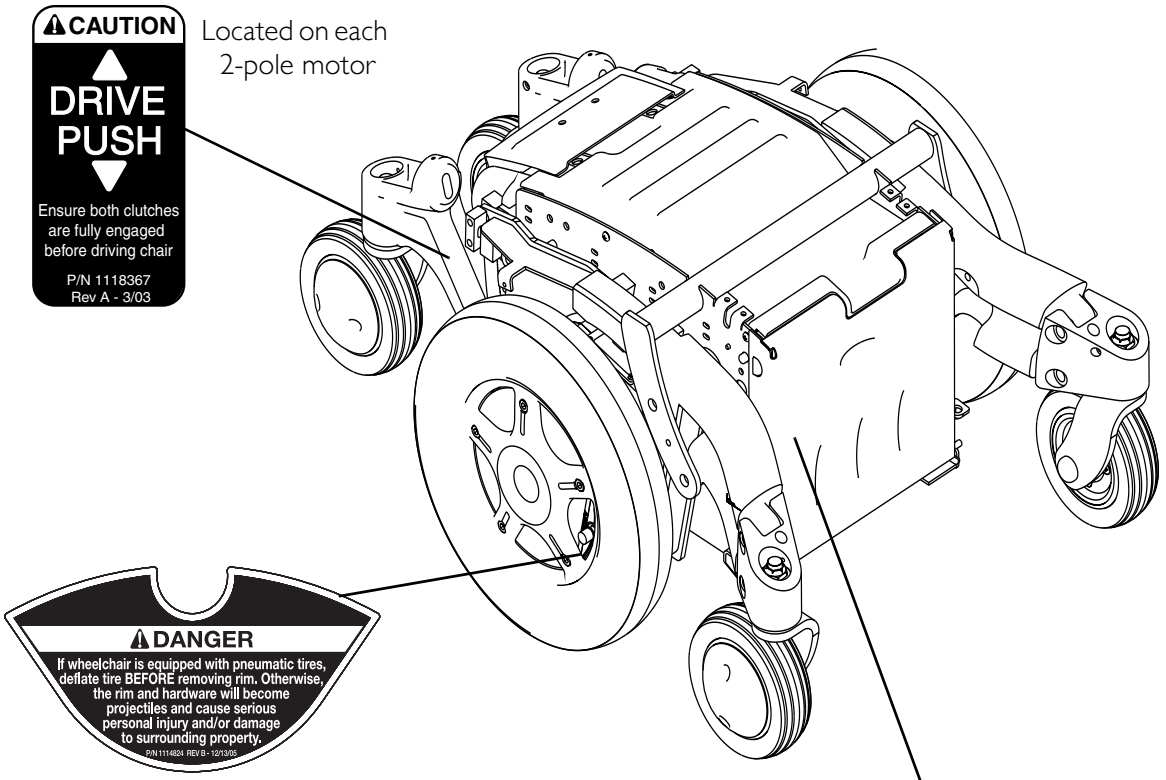
⚠ WARNING

Wiring Diagram and Battery Remove/Install for 22nf Batteries

DO NOT REMOVE THIS LABEL

The POSITIVE (+) RED Battery Cable MUST connect to the POSITIVE (+) Battery Terminal(s)/ Post(s). The NEGATIVE (-) BLACK Battery Cable MUST connect to the NEGATIVE (-) Battery Terminal(s)/Post(s). DO NOT allow Battery Cable(s) to contact the opposite Battery Terminal(s)/Post(s). Install protective caps on positive and negative battery terminals. Replace cable(s) immediately if cable(s) insulation becomes damaged. Failure to observe these warnings may result in an electrical short with serious personal injury and/or damage to the electrical system. For important battery information see Owner's Manual, part number 1114809. DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable mounting screw.

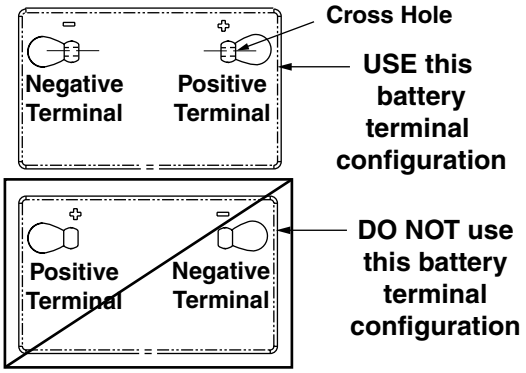




One of these labels will appear on inside of battery tray door depending on battery type.

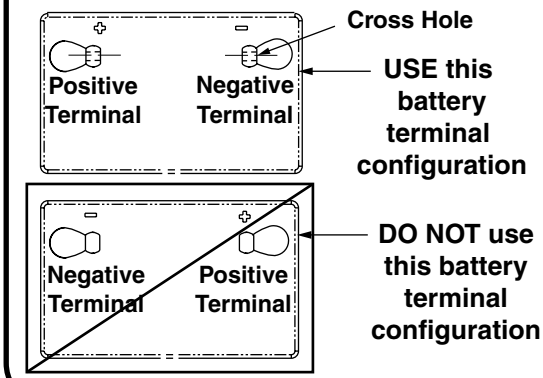
WARNING

GP24 batteries with terminal configuration (negative on the left and positive on the right) as shown MUST be used. GP24 batteries that have the reverse terminal configuration MUST not be used. Terminals MUST have a cross hole located as shown for proper battery connection. See Owner's Manual, part number 1114809. These recommendations MUST be followed otherwise injury and damage may occur. P/N 1114848 Rev A - 2/03

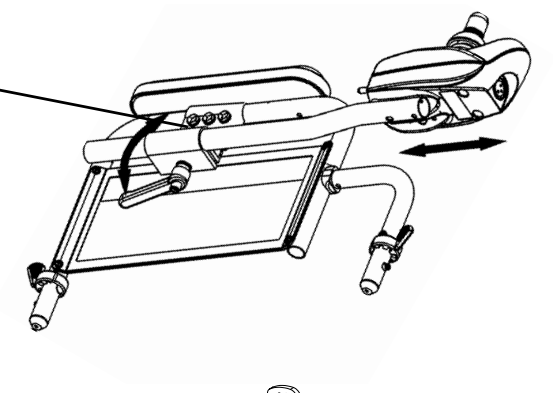


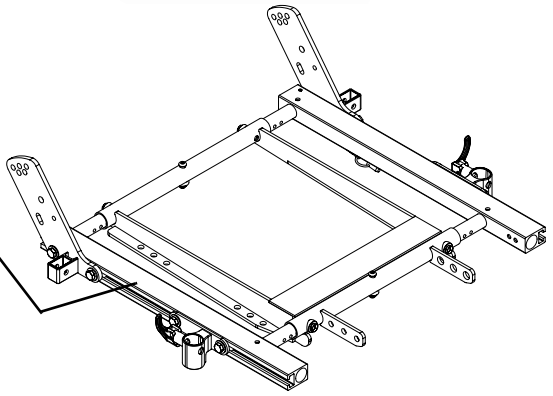
WARNING

22NF batteries with terminal configuration (positive on the left and negative on the right) as shown MUST be used. 22NF batteries that have the reverse terminal configuration MUST not be used. Terminals MUST have a cross hole located as shown for proper battery connection. See Owner's Manual, part number 1114809. These recommendations MUST be followed otherwise injury and damage may occur. P/N 1114847 Rev A - 2/03

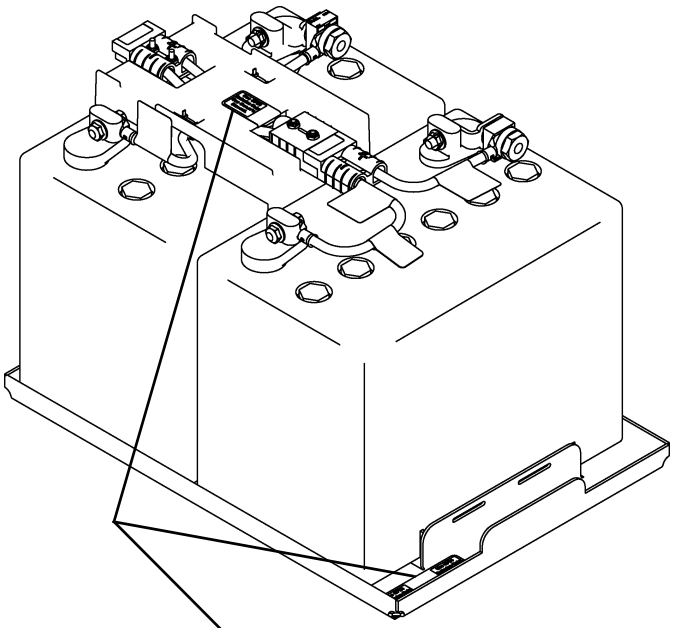


Weight Capacity Label located here





⚠WARNING Refer to Service Manual to reposition the seat - otherwise serious personal injury and damage will result. P/N 1114823 Rev B - 5/10/06

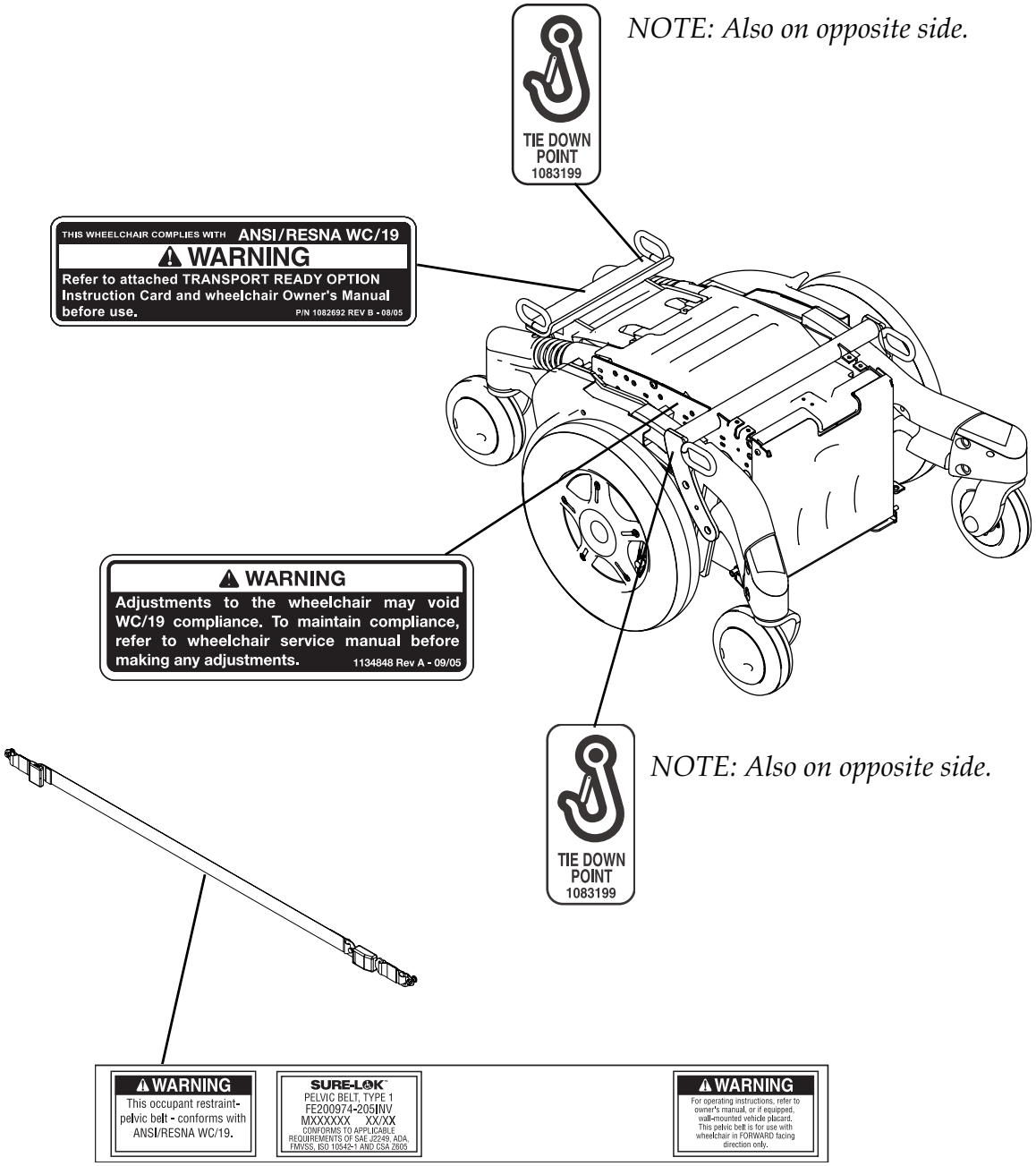


One of these labels will appear on the battery tray and the battery wiring connector bracket, depending on battery type.

Use GP24 Batteries Only. See Owner's Manual, p/n 1114809.	P/N 1118355 REV A - 2/03 P/N 1118355	Use GP24 Batteries Only. See Owner's Manual, p/n 1114809.

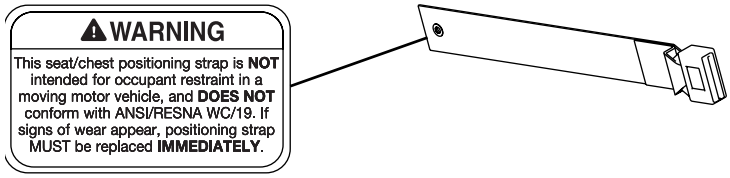
Use 22NF Batteries Only. See Owner's Manual, p/n 1114809.	P/N 1118356 REV A - 2/03 P/N 1118356	Use 22NF Batteries Only. See Owner's Manual, p/n 1114809.

Wheelchairs with TRRO

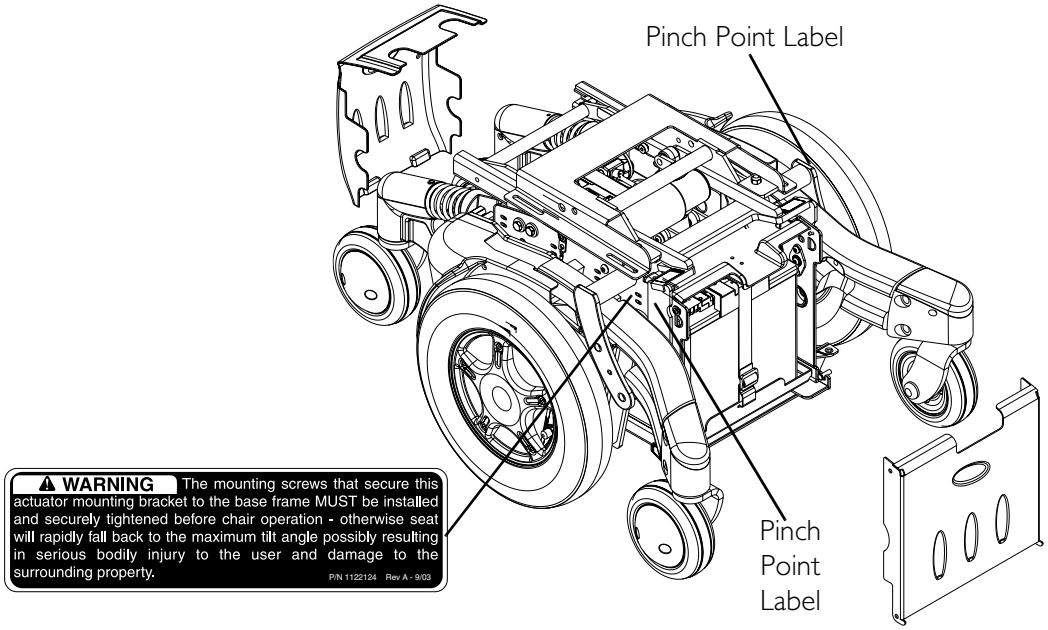


Wheelchairs without TRRO

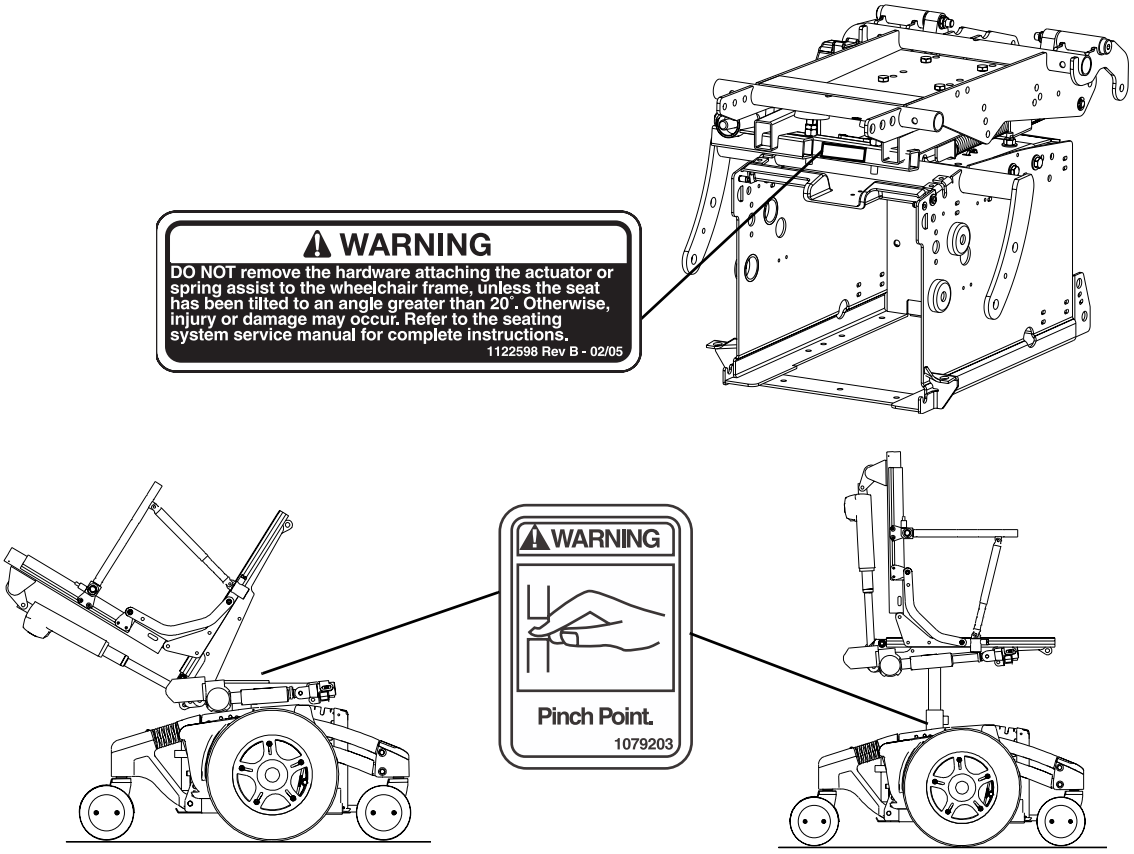
NOTE: Auto style seat positioning strap shown. This label is also on the airline style seat positioning strap.



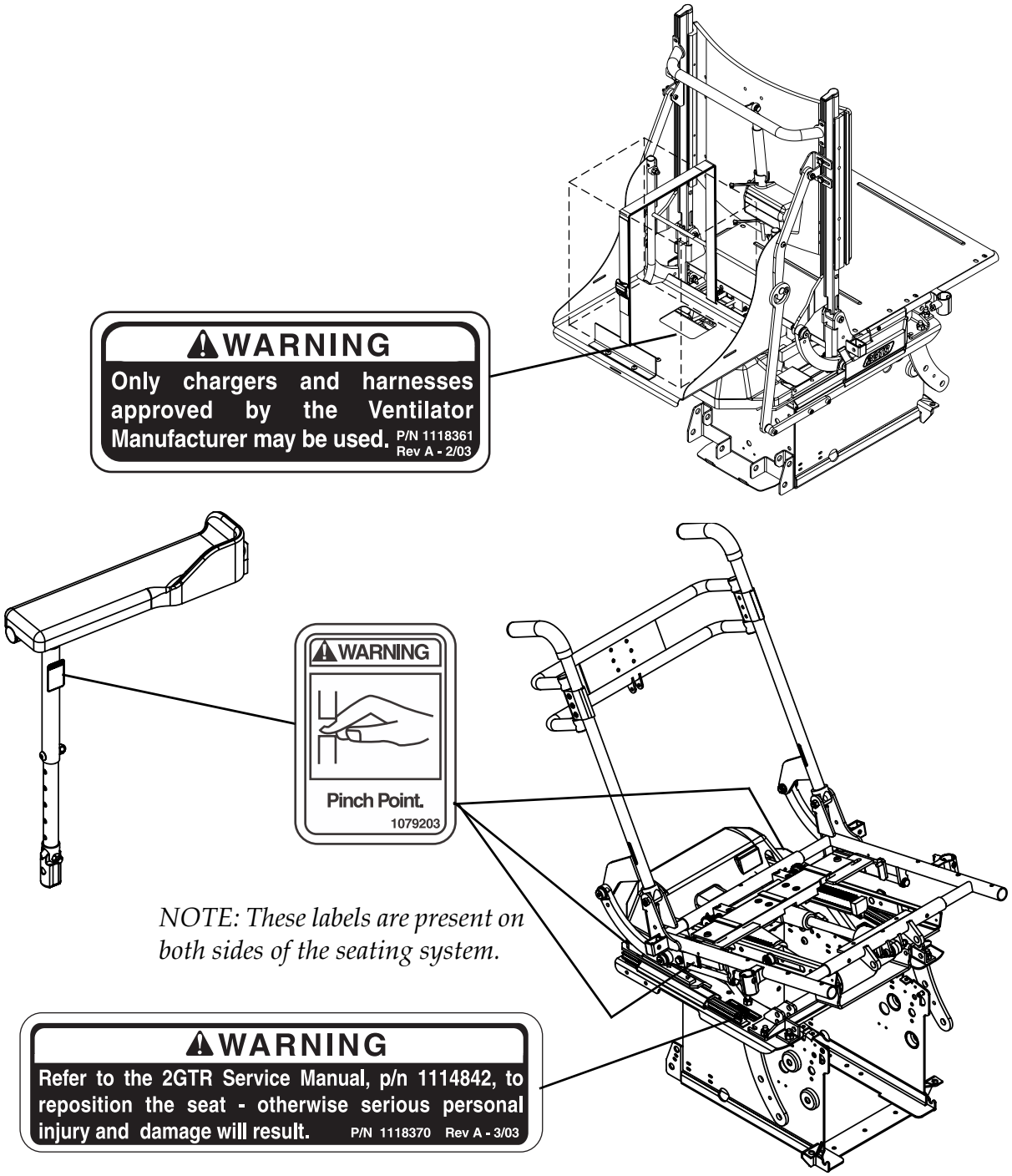
Wheelchairs with Formula Invisible Super Low Tilt



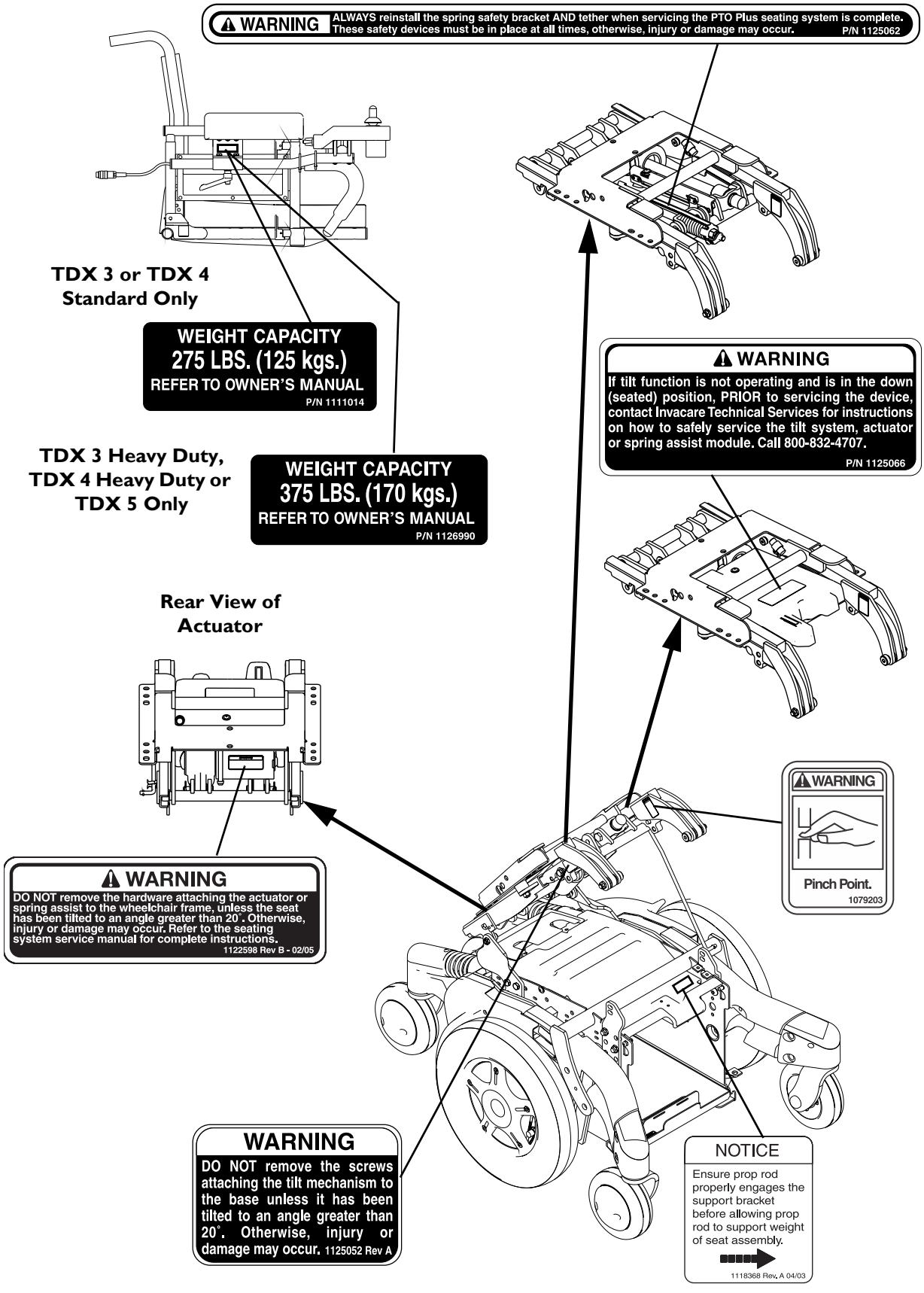
Wheelchairs with Formula TRE



Wheelchairs with 2G Tarsys



Wheelchairs with Formula PTO Plus



TYPICAL PRODUCT PARAMETERS

TDX 5

	ADULT - ADJUSTABLE WIDTH	JUNIOR - ADJUSTABLE WIDTH
SEAT WIDTH RANGE: ADJUSTABLE SEAT BACK ANGLE (ASBA):	16 - 24 inches	12 - 16 inches
SEAT DEPTH RANGE (1-INCH INCREMENTS):	16 - 22 inches	12 - 18 inches
BACK HEIGHT RANGE:	12 - 24 inches	12 - 22 inches
BACK ANGLE RANGE:	85° to 105° in 5° increments	80° to 100° in 5° increments
SEAT-TO-FLOOR LOW: MEDIUM: TALL:	17 inches @ 5° 19 inches @ 5° 21 inches @ 5°	
OVERALL WIDTH OF BASE:	25 inches without joystick	
OVERALL HEIGHT with ASBA seat, 0° seat angle LOW: MEDIUM: TALL:	33.25 inches 35.25 inches 37.25 inches	
OVERALL LENGTH WITH CENTER MOUNT FRONT RIGGING: WITHOUT FRONT RIGGINGS:	42.9 inches @ 0° 35.25 inches	
WEIGHT WITHOUT GP24 BATTERIES: WITH TWO GP24 BATTERIES:	208 lbs 310 lbs	
MOTOR:	TrueTrack HD Motor Package	
DRIVE AXLE:	Non-adjustable	
DRIVE WHEELS/TIRES:	14 x 3-inch Foam Filled or Pneumatic	
CASTERS:	6 x 2-inch, Semi-pneumatic with Precision Sealed Bearings	
ARMRESTS:	Flip Back, Fixed or Adjustable Height (Desk and Full Length)	
BATTERY REQUIREMENTS:	Use MK p/n M24SLDG or p/n M22NFSLDG batteries only.	
WHEELCHAIR UPHOLSTERY OPTIONS:	Nylon	
ELECTRONICS:	MK5™ TT-EX™ with MK5 MPJ™ Joystick	
FRONT RIGGINGS:	Center Mount, Swingaway, Manually Elevating, Power Elevating	
FOOTRESTS:	Telescoping Front Rigging Supports, 2-inch and 4-inch long Pivot Slide Tube	
SEAT TILT ANGLE ADJUSTMENT:	Adjustable (0° to 10°)	
SEAT CUSHION:	Cushion (Optional)	
WEIGHT LIMITATION:	Up to 400 lbs	Up to 150 lbs
NOTE: All dimensions are ± .50 inches unless otherwise indicated.		

TDX 4

	ADULT - ADJUSTABLE WIDTH	JUNIOR - ADJUSTABLE WIDTH
SEAT WIDTH RANGE: ADJUSTABLE SEAT BACK ANGLE (ASBA):	16 - 24 inches	12 - 16 inches
SEAT DEPTH RANGE (1-INCH INCREMENTS):	16 - 22 inches	12 - 18 inches
BACK HEIGHT RANGE:	12 - 24 inches	12 - 22 inches
BACK ANGLE RANGE:	85° to 105° in 5° increments	80° to 100° in 5° increments
SEAT-TO-FLOOR LOW: MEDIUM: TALL:	17 inches @ 5° 19 inches @ 5° 21 inches @ 5°	
OVERALL WIDTH OF BASE:	25.5 inches without joystick	
OVERALL HEIGHT LOW: MEDIUM: TALL:	with ASBA seat, 0° seat angle 33.25 inches 35.25 inches 37.25 inches	
OVERALL LENGTH WITH CENTER MOUNT FRONT RIGGING: WITHOUT FRONT RIGGINGS:	42.9 inches @ 0° 35.25 inches	
WEIGHT WITHOUT GP24 BATTERIES: WITH TWO GP24 BATTERIES:	186 lbs 290 lbs	
MOTOR:	4 Pole, HD 4 Pole or True Track HD	
DRIVE AXLE:	Non-adjustable	
DRIVE WHEELS/TIRES:	14 x 3-inch Foam Filled or Pneumatic	
CASTERS:	6 x 2-inch, Semi-pneumatic with Precision Sealed Bearings	
ARMRESTS:	Flip Back, Fixed or Adjustable Height (Desk and Full Length)	
BATTERY REQUIREMENTS:	Use MK p/n M24SLDG or p/n M22NFSLDG batteries only.	
WHEELCHAIR UPHOLSTERY OPTIONS:	Nylon	
STANDARD ELECTRONICS:	MK5 EX™ with MK5 DPJ™ Joystick	
FRONT RIGGINGS:	Center Mount, Swingaway, Manually Elevating, Power Elevating	
FOOTRESTS:	Telescoping Front Rigging Supports, 2-inch and 4-inch long Pivot Slide Tube	
SEAT TILT ANGLE ADJUSTMENT:	Adjustable (0° to 10°)	
SEAT CUSHION:	Cushion (Optional)	
WEIGHT LIMITATION 4 POLE 4 POLE HD OR TRUE TRACK HD:	 Up to 300 lbs Up to 400 lbs	 Up to 150 lbs Up to 150 lbs

NOTE: All dimensions are ± .50 inches unless otherwise indicated.

TDX 3

	ADULT - ADJUSTABLE WIDTH	JUNIOR - ADJUSTABLE WIDTH
SEAT WIDTH RANGE: ADJUSTABLE SEAT BACK ANGLE (ASBA):	16 - 24 inches	12 - 16 inches
SEAT DEPTH RANGE (1-INCH INCREMENTS):	16 - 22 inches	12 - 18 inches
BACK HEIGHT RANGE:	12 - 24 inches	12 - 22 inches
BACK ANGLE RANGE:	85° to 105° in 5° increments	80° to 100° in 5° increments
SEAT-TO-FLOOR LOW: MEDIUM: TALL:	17 inches @ 5° 19 inches @ 5° 21 inches @ 5°	
OVERALL WIDTH OF BASE:	25 inches without joystick	
OVERALL HEIGHT LOW: MEDIUM: TALL:	with ASBA seat, 0° seat angle 33.25 inches 35.25 inches 37.25 inches	
OVERALL LENGTH WITH CENTER MOUNT FRONT RIGGING: WITHOUT FRONT RIGGINGS:	42.9 inches @ 0° 35.25 inches	
WEIGHT WITHOUT 22NF BATTERIES: WITH TWO 22NF BATTERIES:	166 lbs 260 lbs	
MOTOR:	4 Pole, HD 4 Pole or True Track HD	
DRIVE AXLE:	Non-adjustable	
DRIVE WHEELS/TIRES:	12.5 x 2.25-inch Foam Filled or Pneumatic (Standard)	
CASTERS:	6 x 2-inch, Semi-pneumatic with Precision Sealed Bearings	
CASTER FORKS:	Two side fork (Standard), One sided fork (Optional)	
ARMRESTS:	Flip Back, Fixed or Adjustable Height (Desk and Full Length)	
BATTERY REQUIREMENTS:	Use MK p/n M22NFSLDG batteries only (Standard).	
WHEELCHAIR UPHOLSTERY OPTIONS:	Nylon	
STANDARD ELECTRONICS:	MK5™ NX™ -80 with MK5 SPJ™ -80 Joystick	
FRONT RIGGINGS:	Center Mount, Swingaway, Manually Elevating, Power Elevating	
FOOTRESTS:	Telescoping Front Rigging Supports, 2-inch and 4-inch long Pivot Slide Tube	
SEAT TILT ANGLE ADJUSTMENT:	Adjustable (0° to 10°)	
SEAT CUSHION:	Cushion (Optional)	
WEIGHT LIMITATION 4 POLE 4 POLE HD OR TRUE TRACK HD:	 Up to 300 lbs Up to 400 lbs	 Up to 150 lbs Up to 150 lbs
NOTE: All dimensions are ± .50 inches unless otherwise indicated.		

Formula Invisible Super Low Tilt

SEAT WIDTH RANGE:	16 - 22 inches
SEAT DEPTH RANGE (1-INCH INCREMENTS):	16 - 22 inches
BACK HEIGHT RANGE:	16 - 24 inches
BACK ANGLE RANGE:	85° to 105° in 5° increments
SEAT-TO-FLOOR HEIGHT:	16.5 inches
OVERALL WIDTH OF BASE:	27 inches with TRSS
OVERALL HEIGHT:	37 - 45 inches
BACK ANGLE RANGE (ASBA):	80 - 100° in 5° increments
TILT RANGE 0° SEAT ANGLE: 5° SEAT ANGLE:	 0 - 55° ± 3° 5 - 60° ± 3°
SEAT CUSHION:	Cushion (Optional)
WEIGHT OF FORMULA INVISIBLE SUPER LOW TILT ADDITIONAL WEIGHT OVER A TDX W/ASBA SEAT AND 22NF BATTERIES:	 28 lbs ± 5%
WEIGHT LIMITATION FORMULA INVISIBLE SUPER LOW TILT:	 Up to 300 lbs
NOTE: All dimensions are ± .50 inches unless otherwise indicated.	

⚠ WARNING

If the seating system is mounted onto a power wheelchair that has a weight limitation greater than 300 lbs, the weight limitation of the wheelchair is 300 lbs. Example: The TDX 5 wheelchair has a 400 lb weight limitation, the seating system has a weight limitation of 300 lbs, so the TDX 5 now has a 300 lb weight limitation.

Formula TRE

	CONTOURA BACKS	CONVENTIONAL BACKS
SEAT WIDTH RANGE:	16 - 24 inches in 2-inch increments	16 - 24 inches in 1-inch increments
SEAT DEPTH RANGE SMALL FRAME: LARGE FRAME: EXTRA LARGE FRAME:	Adjustable in 1-inch increments 16 - 18 inches 19 - 21 inches 22 inches	Adjustable in 1-inch increments 16 - 19 inches 20 - 22 inches N/A
BACK HEIGHT RANGE ALL SYSTEMS EXCEPT ELEVATE ONLY: ELEVATE ONLY:	Not Adjustable 25 inches and 29.5 inches N/A	Not Adjustable 20 - 26 inches 16 - 24 inches
BACK ANGLE RANGE TILT ONLY, TILT/ELEVATE AND ELEVATE ONLY:	85° - 105° in 5° increments	
TILT RANGE TILT, TILT/RECLINE OR TILT/RECLINE/ELEVATE 0° Seat Angle: 5° Seat Angle:	 0° - 55° ± 3° 5° - 60° ± 3°	
RECLINE RANGE (MEASURED RELATIVE TO THE GROUND) RECLINE ONLY, TILT/RECLINE AND TILT/RECLINE/ELEVATE 0° Seat Angle: 5° Seat Angle:	 90° - 170° ± 3° 95° - 170° ± 3°	
SEAT-TO-FLOOR 0° SEAT ANGLE: 5° SEAT ANGLE:	 18 inches ± .25 inches 19.8 inches ± .25 inches	
ELEVATE RANGE:	7.0 inches	
***OVERALL WIDTH WITH MODEL RA19 ARMS** WITH 4-WAY SWITCH: OVER ARMPADS:	 30.70 inches 28.75 inches	
***OVERALL HEIGHT (CONVENTIONAL BACK WITHOUT HEADREST):**	41.5 inches	
***OVERALL LENGTH** WITH MANUAL CENTER MOUNT FOOTREST AT 90°: WITHOUT FRONT RIGGINGS, FULL LENGTH ARM, MPJ™ JOYSTICK:	 41.5 inches 37.38 inches	

**NOTE: 20-inch deep x 20-inch wide with 24-inch high back.*

NOTE: All dimensions are ± .50 inches unless otherwise indicated.

	CONTOURA BACKS	CONVENTIONAL BACKS
ARMRESTS TILT ONLY, TILT/ELEVATE AND ELEVATE ONLY: RECLINE ONLY, TILT/RECLINE AND TILT/ RECLINE/ELEVATE:	Flip Back, Adjustable Height (9 - 13 inches) - Desk or Full Length Adjustable Height (11 - 16 inches) - Desk or Full Length	
LEGRESTS:	Swingaway Footrests, Power or Manual Center Mount Footrests, Manual or Power Elevating Legrests	
HEADRESTS:	Curved, Contoured, Small or Large	
WEIGHT LIMITATION: ALL SEATING SYSTEMS WITH ELEVATE: ALL SEATING SYSTEMS WITHOUT HEAVY DUTY OPTION: TILT ONLY, RECLINE ONLY OR TILT/RECLINE SYSTEMS WITH HEAVY DUTY OPTION: ALL SEATING SYSTEMS WITH VENT TRAY:	300 lbs 300 lbs 400 lbs Subtract 50 lbs from the seating system weight limitations (250 and 350 lbs respectively)	
BATTERY REQUIREMENTS:	Refer to Handling and Replacing Batteries on page 98.	
ELECTRONICS:	TRECM, TAC, SAC-E, TRSS, ESC	

**NOTE: 20-inch deep x 20-inch wide with 24-inch high back.*

NOTE: All dimensions are ± .50 inches unless otherwise indicated.

⚠ WARNING

If the seating system is mounted onto a power wheelchair that has a weight limitation greater than that of the seating system, the weight limitation is maintained at the seating system's limitation. Example: If a seating system with a weight limitation of 300 lbs is mounted onto a power wheelchair with a weight limitation of 400 lbs, then the power wheelchair is restricted to a 300 lb weight limitation.

Formula PTO Plus

SEAT WIDTH RANGE:	16 - 22 inches
SEAT DEPTH RANGE (1-INCH INCREMENTS):	16 - 22 inches
BACK HEIGHT RANGE:	16 - 24 inches
BACK ANGLE RANGE:	85° to 105° in 5° increments
SEAT-TO-FLOOR HEIGHT (ADJUSTABLE IN ½-INCH INCREMENTS):	18 to 20 inches ± ¼ inch
OVERALL WIDTH WITH JOYSTICK AND TRSS:	 27 inches
OVERALL HEIGHT:	37 - 45 inches
OVERALL LENGTH WITH FRONT RIGGINGS:	43¼ inches
TILT RANGE 0° SEAT PAN ANGLE: 5° SEAT PAN ANGLE:	 0 - 55° 5 - 60°
TURNING RADIUS WITH FRONT RIGGINGS:	28 inches
SEAT CUSHION:	Cushion (Optional)
WEIGHT OF FORMULA PTO PLUS:	25 lbs
ARMRESTS:	Adjustable Angle, Height and Depth
WEIGHT LIMITATION PTO PLUS: PTO PLUS WITH SPRING ASSIST:	 Up to 275 lbs Up to 375 lbs
NOTE: All dimensions are ± .50 inches unless otherwise indicated.	

⚠ WARNING

If the seating system is mounted onto a power wheelchair that has a weight limitation greater than 275 lbs, the weight limitation of the wheelchair is 275 lbs. Example: The TDX 3 wheelchair has a 300 lb weight limitation, the seating system still has a weight limitation of 275 lbs, so the TDX 3 now has a 275 lb weight limitation.

2G Tarsys

	2G TARSYS SEATING SYSTEM
SEAT WIDTH RANGE:	16 - 22 inches in 1-inch increments
SEAT DEPTH RANGE:	16 - 22 inches in 1-inch increments
BACK HEIGHT RANGE	
TILT/RECLINE:	20 - 26 inches in 1-inch increments
RECLINE:	20 - 26 inches in 1-inch increments
TILT:	20 - 25 inches in 1-inch increments
BACK ANGLE RANGE	
TILT:	90° - 115° in 5° increments
TILT RANGE	
TILT AND TILT/RECLINE	
0° Seat Angle:	0° - 45° ± 3°
5° Seat Angle:	5° - 50° ± 3°
RECLINE RANGE (MEASURED RELATIVE TO THE GROUND)	
RECLINE	
0° Seat Angle:	90° - 175° ± 3°
5° Seat Angle:	95° - 175° ± 3°
10° Seat Angle:	100° - 175° ± 3°
15° Seat Angle:	105° - 175° ± 3°
TILT/RECLINE	
0° Seat Angle:	90° - 175° ± 3°
5° Seat Angle:	95° - 175° ± 3°
SEAT-TO-FLOOR	
0° SEAT ANGLE:	18.5 inches ± .25 inches
5° SEAT ANGLE:	20 inches ± .25 inches
***OVERALL WIDTH**	
WITH 4-WAY SWITCH:	28.9 inches
***OVERALL HEIGHT (WITHOUT HEADREST):**	40.9 inches
***OVERALL LENGTH**	
WITH CENTER MOUNT FOOTREST AT 90°:	41.5 inches
WITHOUT FRONT RIGGINGS, FULL LENGTH ARM, MPJ™ JOYSTICK:	39.3 inches
ARMRESTS	
TILT:	Flip Back, Adjustable Height (9 - 13 inches) - Desk or Full Length
RECLINE AND TILT/RECLINE:	Adjustable Height (11 - 16 inches) - Desk or Full Length
LEGRESTS:	Swingaway Footrests, Center Mount Footrests, Mechanical Elevating, Genius Legrests, or Power Elevating Legrests
HEADRESTS:	Curved, Contoured, Small or Large

**NOTE: 20-inch deep x 20-inch wide with 24-inch high back.*

NOTE: All dimensions are ± .50 inches unless otherwise indicated.

NOTE: All parameters apply to Tilt only, Recline only and Tilt/Recline systems except where specified. All parameters are approximate.

	2G TARSYS SEATING SYSTEM
WEIGHT LIMITATION: ALL SEATING SYSTEMS WITHOUT HEAVY DUTY OPTION: TILT ONLY, RECLINE ONLY OR TILT/RECLINE SYSTEMS WITH HEAVY DUTY OPTION: ALL SEATING SYSTEMS WITH VENT TRAY:	 250 lbs 350 lbs Subtract 50 lbs from the seating system weight limitations (200 and 300 lbs respectively)
BATTERY REQUIREMENTS:	Refer to Handling and Replacing Batteries on page 98.
ELECTRONICS SEATING SYSTEM CONTROL MODULES: WHEELCHAIR CONTROL MODULE: JOYSTICKS:	 TRCM, TAC, TRSS MK5 EX or MK5 TT-EX MPJ™ or DPJ™

**NOTE: 20-inch deep x 20-inch wide with 24-inch high back.*

NOTE: All dimensions are ± .50 inches unless otherwise indicated.

NOTE: All parameters apply to Tilt only, Recline only and Tilt/Recline systems except where specified. All parameters are approximate.

⚠ WARNING

If the seating system is mounted onto a power wheelchair that has a weight limitation greater than 350 lbs, the weight limitation of the wheelchair is 350 lbs. Example: If a seating system with a weight limitation of 300 lbs is mounted onto a power wheelchair with a weight limitation of 400 lbs, then the power wheelchair is restricted to a 300 lb weight limitation.

SECTION 1—GENERAL GUIDELINES

⚠ WARNING

SECTION 1 - GENERAL GUIDELINES contains important information for the safe operation and use of this product. DO NOT use this product or any available optional equipment without first completely reading and understanding these instructions and any additional instructional material such as Owner's Manuals, Service Manuals or Instruction Sheets supplied with this product or optional equipment. If you are unable to understand the Warnings, Cautions or Instructions, contact a healthcare professional, dealer or technical personnel before attempting to use this equipment - otherwise, injury or damage may occur.

Repair or Service Information

Set-up of the Electronics Control Unit is to be performed only by a qualified technician. The final adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur if improperly set-up or adjusted.

Except for programming, DO NOT service or adjust the wheelchair while occupied, unless otherwise noted.

PTO Plus Only - If tilt function is not operating and is in the down (seated) position, PRIOR to servicing the device, refer to the seating system service manual, part number 1125031, or contact Invacare Technical Services for instructions on how to safely service the tilt system, actuator or spring assist module. Call 800-832-4707.

ALWAYS reinstall the spring safety bracket AND tether when servicing the PTO Plus seating system is complete. These safety devices MUST be in place at all times, otherwise, injury or damage may occur.

A pinch point exists between head tube cap and walking beam.

A pinch point exists between walking beam/head tube cap and telescoping tube when TDX is at the lowest seat to floor height.

POWERED SEATING SYSTEMS ONLY - Pinch point may occur when lowering the elevating seat and/or returning the tilted seat to the full upright position. Make sure the hands and body of the occupant, attendants and bystanders are clear of all pinch points before lowering seat or returning the tilted seat to the full upright position.

Before adjusting, repairing or servicing the wheelchair, ALWAYS turn the wheelchair power OFF, otherwise, injury or damage may occur.

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

Transport ready packages are not retrofittable to existing models and are not field serviceable.

Battery support brackets MUST be installed at all times. Otherwise, the wheelchair will not be WC/19 compliant. Refer to Removing/Installing the Batteries From/Into the Wheelchair on page 106.

Wheelchairs should be examined during maintenance for signs of corrosion (water exposure, incontinence, etc.). Electrical components damaged by corrosion should be replaced IMMEDIATELY.

Wheelchairs that are used by incontinent users and/or are frequently exposed to water may require replacement of electrical components more frequently.

Operation Information

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 wheelchair and to surrounding property.

After the wheelchair has been set-up/adjusted, 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 section until the wheelchair performs to specifications.

DO NOT leave the power button ON when entering or exiting your wheelchair.

DO NOT attempt to drive over curbs or obstacles greater than 3 inches for TDX 5 and TDX 4 or greater than 2 inches for TDX 3. Doing so may cause your wheelchair to turn over and cause bodily harm or damage to the wheelchair. ALWAYS stop before climbing an obstacle. Approach slowly until casters contact the obstacle. Apply power and the action of the SureStep feature will lift the casters over the obstacle. Weight is transferred to the drive wheels providing traction and motor strength to power the wheelchair over the obstacle.

DO NOT operate on roads, streets or highways.

DO NOT climb, go UP or DOWN ramps or traverse slopes greater than 9°.

DO NOT attempt to move up or down an incline with water, ice or oil film.

DO NOT stand on the frame of the wheelchair.

DO determine and establish your particular safety limits by practicing bending, reaching and transferring activities in the presence of a qualified healthcare professional BEFORE attempting active use of the wheelchair.

DO NOT attempt to reach objects if you have to move forward in your seat.

DO NOT attempt to reach objects if you have pick them up from the floor by reaching between your knees.

DO NOT lean over the top of the back upholstery to reach objects behind you, as this may cause the wheelchair to tip over.

ALWAYS shift your weight in the direction you are turning. DO NOT shift your weight in the opposite direction of the turn. Shifting your weight in the opposite direction of the turn may cause the inside drive wheel to lose traction and the wheelchair to tip over.

DO NOT shift your weight or sitting position toward the direction you are reaching as the wheelchair and/or seating system (if any) may tip over.

DO NOT use an escalator to move a wheelchair between floors. Serious bodily injury may occur.

DO NOT use the footplates as a platform. When getting in or out of the wheelchair, make sure that the footplates are in the upward position or swing footrests towards the outside of the wheelchair.

NEVER leave an unoccupied wheelchair unattended on an incline.

DO NOT attempt to stop a moving wheelchair with the wheel locks. Wheel locks are not brakes.

DO NOT attempt to lift the wheelchair by any removable (detachable) parts. Lifting by means of any removable (detachable) parts of the wheelchair may result in injury to the user or damage to the wheelchair.

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

ALWAYS keep hands and fingers clear of moving parts to avoid injury.

ALWAYS wear your seat positioning strap. The seat positioning strap is a positioning belt ONLY. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, belt MUST be replaced immediately.

ALWAYS turn the wheelchair power OFF and engage the motor locks/clutches to prevent the wheels from moving BEFORE attempting to transfer in or out of the wheelchair. Also make sure every precaution is taken to reduce the gap distance. Align both casters parallel with the object you are transferring onto.

DO NOT use with a broken or missing joystick knob.

DO NOT use if joystick does not spring back to the neutral position or becomes sticky or sluggish.

DO NOT use if joystick boot is torn or damaged.

ALWAYS check foam grips for looseness before using the wheelchair. If loose, contact a qualified technician for instructions.

ALWAYS engage both wheel locks AND reduce the gap distance BEFORE transferring to and from the wheelchair. Turn all casters parallel to the object you are transferring onto.

Avoid storing or using the wheelchair near open flame or combustible products. Serious injury or damage to property may result.

DO NOT engage or disengage the motor locks until the power is in the OFF position.

Wheelchairs with TRRO or TRBKTS Only

Only use the transport brackets included with TRRO and TRBKTS for the purposes described in this manual.

Wheelchairs with Powered Seating Systems Only

Use caution when driving in a tilted, reclined or elevated position.

DO NOT operate the seating system while on an incline.

DO NOT operate the seating system while the wheelchair is moving.

NEVER operate the wheelchair or elevate/lower the seat while in any tilted/reclined/back angle position over 20° relative to the vertical position. If the drive lock-out does not stop the wheelchair from operating or the seat from elevating/lowering in a tilt position over 20° relative to vertical, DO NOT operate the wheelchair or elevate/lower the seat. DO NOT attempt to adjust the drive lock-out. Have the wheelchair serviced by a qualified technician.

Use only SAC-E, TRSS, TRECM, TRCM, TAC and ESC actuator controls to activate the tilt/recline/elevate functions*. DO NOT USE any other actuator controls. Such devices may result in excess heating and cause damage to the actuator and associated wiring and could cause a fire, death, physical injury or property damage. If such devices are used, Invacare shall not be liable and the limited warranty is void.

**NOTE: Specific actuator controls are noted for each function or combination throughout this manual.*

DO NOT operate tilt seat around children.

ALWAYS keep hands and feet out from underneath tilt seat - otherwise serious injury may result.

DO NOT tip the seating system/wheelchair without assistance.

DO NOT store items under seat.

Cables must be routed and secured properly to ensure that cables DO NOT become entangled and damaged during normal operation of seating system.

2G Tarsys Equipped with Vent Tray Only - Reduced tilt/recline limits apply. See the electronics manual listed in Reference Documents on page 2 of this manual.

Wheelchairs with Manual Recliners Only

NEVER operate the wheelchair while in any recline position over 105° relative to the seat frame. If the limit switch does not stop the wheelchair from operating in a recline position greater than 105° relative to the seat frame, DO NOT operate the wheelchair. Have the limit switch adjusted by a qualified technician.

Both gas cylinders MUST be operational and adjusted properly before using the recliner. DO NOT operate the recliner option if only one of the gas cylinders is operational or adjusted properly.

When using the recliner option, the motor/gearbox or motor MUST use the most rearward mounting holes on the suspension arm assembly.

To Healthcare Professionals/Assistants

Make sure the occupant of the wheelchair is properly positioned.

When returning the occupant of the wheelchair to the full upright position, more body strength will be required for approximately the last twenty (20) degrees of incline (reverse recline). Make sure to use proper body mechanics (use your legs) or seek assistance if necessary to avoid injury.

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 recommendations 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 batteries. Invacare strongly recommends their use as the power source for this unit.

Carefully read battery/battery charger information prior to installing, servicing or operating your wheelchair.

Charging Batteries

⚠ DANGER

When using an extension cord, use only a three wire extension cord having at least 16 AWG (American Wire Gauge) wire and the same or higher electrical rating as the device being connected. Use of improper extension cord could result in risk of fire and electric shock. Three prong to two prong adapters should not be used. Use of three prong adapters can result in improper grounding and present a shock hazard to the user.

NEVER attempt to recharge the batteries by attaching cables directly to the battery terminals.

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

DO NOT operate wheelchair with extension cord attached to the AC cable.

DO NOT attempt to recharge the batteries when the wheelchair has been exposed to any type of moisture.

DO NOT attempt to recharge the batteries when the wheelchair is outside.

DO NOT sit in the wheelchair while charging the batteries.

READ and CAREFULLY follow the manufacturer's instructions for each charger (supplied or purchased). If charging instructions are not supplied, consult a qualified technician for proper procedures.

Ensure the pins of the extension cord plug are the same number, size, and shape as those on the charger.

DO NOT under any circumstances cut or remove the round grounding plug from the charger AC cable plug or the extension cord plug.

Rain Test

INVACARE has tested its power wheelchairs in accordance with ISO 7176 "Rain Test". This provides the end user or his/her attendant sufficient time to remove his/her power wheelchair from a rain storm and retain wheelchair operation.

DO NOT leave power wheelchair in a rain storm of any kind.

DO NOT use power wheelchair in a shower.

DO NOT leave power wheelchair in a damp area for any length of time.

Direct exposure to rain or dampness will cause the wheelchair to malfunction electrically and mechanically; may cause the wheelchair to prematurely rust or may damage the upholstery.

Check to ensure that the battery covers are secured in place, joystick boot is NOT torn or cracked where water can enter and that all electrical connections are secure at all times.

DO NOT use if the joystick boot is torn or cracked. If the joystick boot becomes torn or cracked, replace IMMEDIATELY.

Weight Training

Invacare DOES NOT recommend the use of its wheelchairs as a weight training apparatus. Invacare wheelchairs have NOT been designed or tested as a seat for any kind of weight training. If occupant uses said wheelchair as a weight training apparatus, INVACARE SHALL NOT BE LIABLE FOR BODILY INJURY AND THE WARRANTY IS VOID.

Weight Limitation

TDX Wheelchairs without Powered Seating Systems

Refer to Typical Product Parameters for TDX 5 on page 20, TDX 4 on page 21 or TDX 3 on page 22 to determine the weight limit (total combined weight of user and any attachments) of your wheelchair model. DO NOT exceed the limit - otherwise, injury or damage may result.

TDX Wheelchairs with Powered Seating Systems

Refer to Typical Product Parameters to determine the weight limit (total combined weight of user and any attachments) of your wheelchair and seating system. The weight limitation indicated overrides the weight limitation of the wheelchair by itself. DO NOT exceed the limit - otherwise injury or damage may result. Typical Product Parameters can be found for:

- Formula Invisible Super Low Tilt on page 23.
- Formula TRE on page 24.
- Formula PTO Plus on page 26.
- 2G Tarsys on page 27.

SECTION 2—SAFETY/HANDLING OF WHEELCHAIRS

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

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

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

Stability and Balance

⚠ WARNING

ALWAYS wear your seat positioning strap.The seat positioning strap is a positioning belt ONLY. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, belt MUST be replaced immediately.

DO NOT climb, go UP or DOWN ramps or traverse slopes greater than 9°.

Invacare strongly recommends proceeding down ramps or slopes slowly to avoid hard braking or sudden stops.

DO NOT leave elevating legrests in the fully extended position when proceeding down ramps or slopes.

Be aware that carrying heavy objects on your lap while occupying the wheelchair may adversely affect the stability of the wheelchair, resulting in serious bodily injury to the user, damage to the wheelchair and surrounding property.

This wheelchair has been designed to accommodate one individual. If more than one individual occupies the wheelchair this may adversely affect the stability of the wheelchair, resulting in serious bodily injury to the user and passenger and damage to the wheelchair and surrounding property.

To assure stability and proper operation of your wheelchair, you must at all times maintain proper balance. Your wheelchair has been designed to remain upright and stable during normal daily activities as long as you DO NOT move beyond the center of gravity. DO NOT lean forward out of the wheelchair any further than the length of the armrests. Make sure the casters are pointing in the forward position whenever you lean forward. This can be achieved by advancing the wheelchair and then reversing it in a straight line.

Coping with Everyday Obstacles

⚠ WARNING

DO NOT attempt to reach objects if you have to move forward in the seat or pick them up from the floor by reaching down between your knees.

Many activities require the wheelchair user to reach, bend and transfer in and out of the wheelchair. These movements will cause a change to the normal balance, center of gravity, and weight distribution of the wheelchair. To determine and establish your particular safety limits, practice bending, reaching and transferring activities in several combinations in the presence of a qualified healthcare professional BEFORE attempting active use of the wheelchair.

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

NOTE: For this procedure, refer to FIGURE 2.1

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

While the walking beam allows you to traverse up to a 2-inch bump (TDX 3) or 3-inch bump (TDX 4 or TDX 5) or threshold, stopping after the wheels cross the bump poses a problem. The wheelchair cannot reverse over the bump at this point. Continue forward and then turn around.

While the TDX is designed for use primarily in and around the home, the provider should determine whether this wheelchair is suitable for the actual environment in which the wheelchair will be used.

NOTE: DO NOT go down a ramp at full speed. Some seat/back positions will cause the wheelchair to feel unstable.

CAUTION

Be aware of the condition of the ramp. Traction will be diminished/nonexistent on a slippery surface. Proceed with caution.

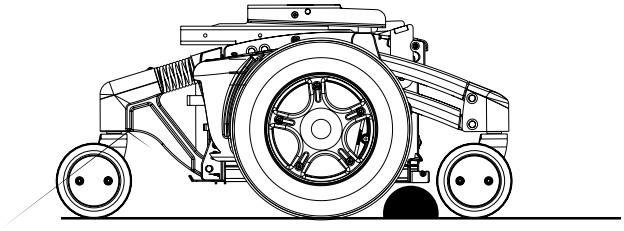


FIGURE 2.1 Coping with Everyday Obstacles

A Note to Wheelchair Assistants

When assistance to the wheelchair user is required, remember to use good body mechanics. Keep your back straight and bend your knees whenever tilting wheelchair or traversing curbs or other impediments.

Also, be aware of detachable parts such as arms or legrests. These must NEVER be used to move the wheelchair or as lifting supports, as they may be inadvertently released, resulting in possible injury to the user and/or assistant(s).

When learning a new assistance technique, have an experienced assistant help you before attempting it alone.

Reaching, Leaning and Bending - Forward

⚠ WARNING

DO NOT attempt to reach objects if you have to move forward in the seat or pick them up from the floor by reaching down between your knees.

NOTE: For this procedure, refer to FIGURE 2.2.

Position the casters so that they are extended away from the drive wheels and engage wheel locks/motor locks/clutches.

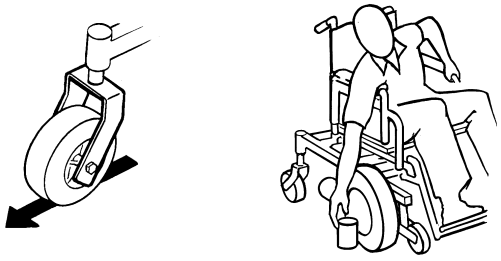


FIGURE 2.2 Reaching, Leaning and Bending - Forward

Reaching, Bending - Backward

⚠ WARNING

DO NOT lean over the top of the back upholstery. This will change your center of gravity and may cause you to tip over.

NOTE: For this procedure, refer to FIGURE 2.3.

Position wheelchair as close as possible to the desired object. Position the casters so that they are extended away from the drive wheels to create the longest possible wheelbase. Reach back only as far as your arm will extend without changing your sitting position.

FIGURE 2.3 Reaching, Bending - Backward

Pinch Points

⚠ WARNING

A pinch point exists between head tube cap and walking beam.

A pinch point exists between walking beam/head tube cap and telescoping tube when TDX is at the lowest seat to floor height.

POWERED SEATING SYSTEMS ONLY - Pinch point may occur when lowering the elevating seat and/or returning the tilted seat to the full upright position. Make sure the hands and body of the occupant, attendants and bystanders are clear of all pinch points before lowering seat or returning the tilted seat to the full upright position.

NOTE: For this procedure, refer to FIGURE 2.4.

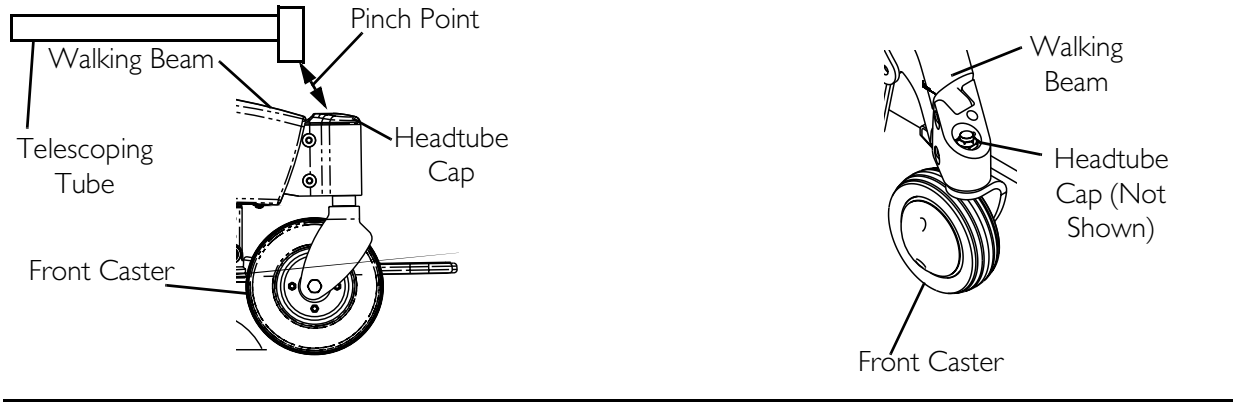


FIGURE 2.4 Pinch Points

Stairways

⚠ WARNING

DO NOT attempt to move an occupied power wheelchair between floors using a stairway. Use an elevator to move an occupied power wheelchair between floors. If moving a power wheelchair between floors by means of a stairway, the occupant MUST be removed and transported independently of the power wheelchair.

Extreme caution is advised when it is necessary to move an UNOCCUPIED power wheelchair up or down the stairs. Invacare recommends using two assistants and making thorough preparations. Make sure to use ONLY secure, non-detachable parts for hand-hold supports.

DO NOT attempt to lift the wheelchair by any removable (detachable) parts. Lifting by means of any removable (detachable) parts of a wheelchair may result in injury to the user or damage to the wheelchair.

The weight of the wheelchair without the user and without batteries is between 166 and 322 lbs. Use proper lifting techniques (lift with your legs) to avoid injury.

Follow this procedure for moving the wheelchair between floors when an elevator is NOT available:

NOTE: When using a stairway to move the wheelchair and any accessories, move all wheelchair components away from the stairway prior to reassembly.

1. Remove the occupant from the wheelchair.
2. Remove the batteries from wheelchair. Refer to one of the following sections:
   - Wheelchairs with NO Powered Seating System - Refer to TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
   - Formula TRE Systems - Refer to TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
   - Formula Invisible Super Low Tilt Systems - Refer to Formula Invisible Super Low Tilt Batteries on page 115.
   - Formula PTO Plus Systems - Refer to TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
   - 2G Tarsys Systems - Refer to TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
3. Bend your knees and keep your back straight.
4. Using non-removable (non-detachable) parts of the wheelchair, lift the wheelchair off of the ground and transfer the wheelchair up or down the stairs.
5. The wheelchair should not be lowered until the last stair has been negotiated and the wheelchair has been carried away from the stairway.

⚠ WARNING: ESCALATORS

DO NOT use an escalator to move a wheelchair between floors. Serious bodily injury may occur.

Transferring To and From Other Seats

⚠ WARNING

ALWAYS turn the wheelchair power OFF and engage the motor locks/clutches to prevent the wheels from moving BEFORE attempting to transfer in or out of the wheelchair. Also make sure every precaution is taken to reduce the gap distance. Align both casters parallel with the object you are transferring onto.

DO NOT allow the user to leave the wheelchair while the seat is tilted. ALWAYS return the seat to upright position when transferring the user in or out of the wheelchair.

CAUTION

When transferring, position yourself as far back as possible in the seat. This will prevent broken screws, damaged upholstery and the possibility of the wheelchair tipping forward.

NOTE: For this procedure, refer to FIGURE 2.5.

NOTE: Adequate mobility and upper body strength is required to perform this activity independently.

1. Position the wheelchair as close as possible along side the seat to which you are transferring, with the casters aligned parallel with the object.
2. Engage motor locks. Refer to Disengaging/Engaging Motor Lock Levers on page 124.
3. Shift body weight into seat with transfer.

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

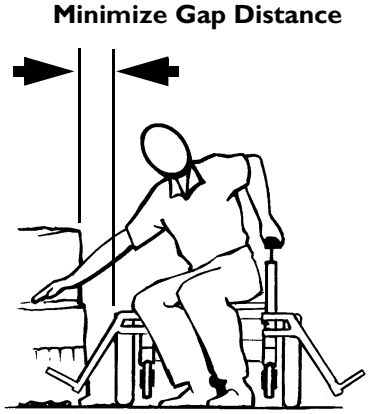


FIGURE 2.5 Transferring To and From Other Seats

SECTION 3—EMI INFORMATION

⚠ WARNING

CAUTION: IT IS VERY IMPORTANT THAT YOU READ THIS INFORMATION REGARDING THE POSSIBLE EFFECTS OF ELECTROMAGNETIC INTERFERENCE ON YOUR POWERED WHEELCHAIR.

Electromagnetic Interference (EMI) From Radio Wave Sources

Powered wheelchairs and motorized scooters (in this text, both will be referred to as powered wheelchairs) may be susceptible to electromagnetic interference (EMI), which is interfering electromagnetic energy (EM) emitted from sources such as radio stations, TV stations, amateur radio (HAM) transmitters, two way radios, and cellular phones. The interference (from radio wave sources) can cause the powered wheelchair to release its brakes, move by itself, or move in unintended directions. It can also permanently damage the powered wheelchair's control system. The intensity of the interfering EM energy can be measured in volts per meter (V/m). Each powered wheelchair can resist EMI up to a certain intensity. This is called its "immunity level." The higher the immunity level, the greater the protection. At this time, current technology is capable of achieving at least a 20 V/m immunity level, which would provide useful protection from the more common sources of radiated EMI.

There are a number of sources of relatively intense electromagnetic fields in the everyday environment. Some of these sources are obvious and easy to avoid. Others are not apparent and exposure is unavoidable. However, we believe that by following the warnings listed below, your risk to EMI will be minimized.

The sources of radiated EMI can be broadly classified into three types:

1) **Hand-held Portable transceivers (transmitters-receivers with the antenna mounted directly on the transmitting unit. Examples include: citizens band (CB) radios, "walkie talkie", security, fire and police transceivers, cellular telephones, and other personal communication devices).**

NOTE: Some cellular telephones and similar devices transmit signals while they are ON, even when not being used.

2) **Medium-range mobile transceivers, such as those used in police cars, fire trucks, ambulances and taxis. These usually have the antenna mounted on the outside of the vehicle; and**

3) **Long-range transmitters and transceivers, such as commercial broadcast transmitters (radio and TV broadcast antenna towers) and amateur (HAM) radios.**

NOTE: Other types of hand-held devices, such as cordless phones, laptop computers, AM/FM radios, TV sets, CD players, cassette players, and small appliances, such as electric shavers and hair dryers, so far as we know, are not likely to cause EMI problems to your powered wheelchair.

⚠ WARNING

Powered Wheelchair Electromagnetic Interference (EMI)

Because EM energy rapidly becomes more intense as one moves closer to the transmitting antenna (source), the EM fields from hand-held radio wave sources (transceivers) are of special concern. It is possible to unintentionally bring high levels of EM energy very close to the powered wheelchair's control system while using these devices. This can affect powered wheelchair movement and braking. Therefore, the warnings listed below are recommended to prevent possible interference with the control system of the powered wheelchair.

Electromagnetic interference (EMI) from sources such as radio and TV stations, amateur radio (HAM) transmitters, two-way radios, and cellular phones can affect powered wheelchairs and motorized scooters.

FOLLOWING THE WARNINGS LISTED BELOW SHOULD REDUCE THE CHANCE OF UNINTENDED BRAKE RELEASE OR POWERED WHEELCHAIR MOVEMENT WHICH COULD RESULT IN SERIOUS INJURY.

1) **DO NOT operate hand-held transceivers (transmitters receivers), such as citizens band (CB) radios, or turn ON personal communication devices, such as cellular phones, while the powered wheelchair is turned ON;**
2) **Be aware of nearby transmitters, such as radio or TV stations, and try to avoid coming close to them;**
3) **If unintended movement or brake release occurs, turn the powered wheelchair OFF as soon as it is safe;**
4) **Be aware that adding accessories or components, or modifying the powered wheelchair, may make it more susceptible to EMI (NOTE: There is no easy way to evaluate their effect on the overall immunity of the powered wheelchair); and**
5) **Report all incidents of unintended movement or brake release to the powered wheelchair manufacturer, and note whether there is a source of EMI nearby.**

Important Information

1) **20 volts per meter (V/m) is a generally achievable and useful immunity level against EMI (as of May 1994) (the higher the level, the greater the protection);**
2) **This device has been tested to a radiated immunity level of 20 volts per meter.**
3) **The immunity level of the product is unknown.**

Modification of any kind to the electronics of this wheelchair as manufactured by Invacare may adversely affect the EMI immunity levels.

SECTION 4—SAFETY INSPECTION/ TROUBLESHOOTING

NOTE: Every six months take your wheelchair to a qualified technician for a thorough inspection and servicing. Regular cleaning will reveal loose or worn parts and enhance the smooth operation of your wheelchair. To operate properly and safely, your wheelchair must be cared for just like any other vehicle. Routine maintenance will extend the life and efficiency of your wheelchair.

Initial adjustments should be made to suit your personal body structure needs and preference. Thereafter follow these maintenance procedures:

Safety Inspection Checklists

All Wheelchairs

Inspect/Adjust Initially

CAUTION

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

- ❑ Ensure wheelchair rolls straight (no excessive drag or pull to one side).
- ❑ Inspect all fasteners.
- ❑ Ensure clothing guards are secure.
- ❑ Arms are secure but easy to release and adjustment levers engage properly.
- ❑ Adjustable height arms operate and lock securely.
- ❑ Upholstery has no rips.
- ❑ Armrest pad sits flush against arm tube.
- ❑ Axle nut and wheel mounting nuts are secure on drive wheels.
- ❑ No excessive side movement or binding when drive wheels are lifted and spun when disengaged (free-wheeling).
- ❑ Wheels/casters have proper tension when wheels/casters are spun (when free-wheeling). Wheels/casters should come to a gradual stop.
- ❑ Loosen/tighten caster locknut if wheel wobbles noticeably or binds to a stop.
- ❑ Ensure all caster/wheel/fork/headtube fasteners are secure and not damaged/missing.
- ❑ Wheel locks DO NOT interfere with tires when rolling.
- ❑ Wheel lock pivot point are free of wear and looseness.
- ❑ Wheel locks are easy to engage.
- ❑ Inspect tires for flat spots and wear.

- ❑ Check pneumatic tires for proper inflation.
- ❑ Check power center mount front riggings for worn/frayed belts and/or loose fasteners. If found, replace these items.
- ❑ Check that all labels are present and legible. Replace if necessary.
- ❑ Ensure that casters are free of debris.

Inspect/Adjust Weekly

CAUTION

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

- ❑ Wheels/casters have proper tension when wheels/casters are spun (when free-wheeling). Wheels/casters should come to a gradual stop.
- ❑ Ensure all caster/wheel/fork/headtube fasteners are secure and not damaged/missing.
- ❑ Loosen/tighten caster locknut if wheel wobbles noticeably or binds to a stop.
- ❑ Inspect tires for flat spots and wear.
- ❑ Wheel locks DO NOT interfere with tires when rolling.
- ❑ Wheel lock pivot point are free of wear and looseness.
- ❑ Wheel locks are easy to engage.
- ❑ Check pneumatic tires for proper inflation.
- ❑ Ensure that casters are free of debris.

Inspect/Adjust Monthly

- ❑ Axle nut and wheel mounting nuts are secure on drive wheels..
- ❑ Clean upholstery and armrests.
- ❑ Clean dirt and lint from axles.
- ❑ Clean dirt and lint from bearings.
- ❑ Inspect stabilizing springs.
- ❑ Inspect mechanical anti-dive for function.
- ❑ Inspect seat positioning strap for any signs of wear. Ensure buckle latches. Verify hardware that attaches strap to frame is secure and undamaged. Replace if necessary.
- ❑ Ensure that casters are free of debris.

Inspect/Adjust Periodically

- ❑ Ensure wheelchair rolls straight (no excessive drag or pull to one side).
- ❑ Inspect all fasteners.
- ❑ Ensure clothing guards are secure.

- ❑ Arms are secure but easy to release and adjustment levers engage properly.
- ❑ Adjustable height arms operate and lock securely.
- ❑ Upholstery has no rips.
- ❑ Armrest pad sits flush against arm tube.
- ❑ Axle nut and wheel mounting nuts are secure on drive wheels.
- ❑ Wheels/casters have proper tension when wheels/casters are spun (when free-wheeling). Wheels/casters should come to a gradual stop.
- ❑ Inspect and clean the stability lock gears or replace if worn.
- ❑ Inspect foam handgrips for damage. If damaged, have them replaced by a qualified technician.
- ❑ Inspect motor brushes and gearbox coupling (4 pole).
- ❑ Check power center mount front riggings for worn/frayed belts and/or loose fasteners. If found, replace these items.
- ❑ Check that all labels are present and legible. Replace if necessary.
- ❑ Inspect electrical components for signs of corrosion. Replace if corroded or damaged.
- ❑ Ensure that casters are free of debris.

Inspect/Adjust Every 18 Months

- ❑ Replace motor brushes and gearbox coupling (4 pole).
- ❑ Ensure that casters are free of debris.

Additional Requirements for Wheelchairs with Powered Seating Systems

Inspect/Adjust Initially

- ❑ Make sure all electrical connections are secure.
- ❑ Check that cables are routed and secured properly to ensure that cables DO NOT become entangled and damaged during normal operation of seating system.
- ❑ Check limit switch position for recline (Formula TRE Only).
- ❑ Make sure drive lock-out operates properly.
- ❑ Make sure tilt operates smoothly and properly.
- ❑ Make sure recline operates smoothly and properly (2G Tarsys and Formula TRE Only).
- ❑ Make sure elevate operates smoothly and properly (Formula TRE Only).
- ❑ Make sure seating systems with the recline function have the retaining pin in place at the top of each back cane (Formula TRE Only).

- ❑ Make sure all systems, except Elevate Only, have the retaining pin in place at the back of each seat rail (Formula TRE Only).
- ❑ Make sure elevate systems drive with reduced speed when seat is in elevated position (Formula TRE Only).
- ❑ Check that spreader bar mounting fasteners are tight (2G Tarsys and Formula TRE Only).
- ❑ Check that back cane mounting fasteners and back mounting fasteners are tight (2G Tarsys and Formula TRE Only).

Inspect/Adjust weekly

- ❑ Make sure all electrical connections are secure.
- ❑ Check that cables are routed and secured properly to ensure that cables do NOT become entangled and damaged during normal operation of seating system.

Inspect/Adjust Monthly

- ❑ Make sure drive lock-out operates properly.
- ❑ Make sure tilt operates smoothly and properly.
- ❑ Make sure recline operates smoothly and properly (2G Tarsys and Formula TRE Only).
- ❑ Make sure elevate operates smoothly and properly (Formula TRE Only).
- ❑ Make sure elevate systems drive with reduced speed when seat is in elevated position (Formula TRE Only).
- ❑ Check that spreader bar mounting fasteners are tight (2G Tarsys and Formula TRE Only).
- ❑ Check that back cane mounting fasteners and back mounting fasteners are tight (2G Tarsys and Formula TRE Only).

Inspect/Adjust Periodically

- ❑ Check limit switch position for recline (Formula TRE Only).
- ❑ Make sure seating systems with the recline function have the retaining pin in place at the top of each back cane (Formula TRE Only).
- ❑ Make sure all systems, except Elevate Only, have the retaining pin in place at the back of each seat rail (Formula TRE Only).
- ❑ Check that spreader bar mounting fasteners are tight (2G Tarsys and Formula TRE Only).
- ❑ Check that back cane mounting fasteners and back mounting fasteners are tight (2G Tarsys and Formula TRE Only).

Troubleshooting - Mechanical

WHEELCHAIR VEERS LEFT/RIGHT	SLUGGISH TURN/ PERFORMANCE	CASTERS FLUTTER	SQUEAKS AND RATTLES	LOOSENESS IN WHEELCHAIR	WHEELCHAIR 3 WHEELS	SOLUTIONS
X	X	X				If pneumatic, check tires for correct and equal pressure.
X	X	X	X			Check for loose stem nuts/bolts.
X		X				Check that casters contact ground at the same time.
				X	X	If pneumatic, check tires for correct and equal pressure.

Troubleshooting - Electrical

NOTE: For additional troubleshooting information and explanation of error codes, refer to the individual Electronics Manual supplied with each wheelchair.

All Wheelchairs

SYMPTOM	PROBABLE CAUSE	SOLUTIONS
Error Code: E9 or E10 - MPJ joystick 3 flashes - DPJ and SPJ-80 joysticks	Motor lock levers disengaged.	Engage motor lock levers. Refer to Disengaging/Engaging Motor Lock Levers on page 124.
Error Code: E28 - MPJ joystick 5 flashes - DPJ and SPJ-80 joysticks	Battery charger connected.	Unplug battery charger from the wheelchair. Refer to Charging Batteries on page 122.
Error Code: E14 - MPJ joystick 5 flashes - DPJ and SPJ-80 joysticks	Batteries need to be charged.	Charge batteries. Refer to Charging Batteries on page 122.
Batteries draw excessive current when charging.	Battery failure. Electrical malfunction.	Have batteries checked for shorted cell. Replace if necessary. Contact Dealer/Invacare for service.
Battery indicator flashes the charge level is low - immediately after recharge.	Battery failure. Malfunctioning battery charger. Electrical malfunction.	Check batteries for shorted cell. Replace if necessary. Contact Dealer/Invacare for Service. Contact Dealer/Invacare for Service.
Battery indicator flashes the charge level is low - too soon after being recharged.	Batteries not charged. Weak batteries.	Have charger checked. Replace batteries if necessary. Contact Dealer/Invacare for Service.
Motor “chatters” or runs irregular.	Electrical malfunction.	Contact Dealer/Invacare for Service.
Joystick erratic or does not respond as desired.	Damaged motor coupling. Electrical malfunction. Controller programmed improperly.	Contact Dealer/Invacare for Service. Contact Dealer/Invacare for Service. Contact Dealer/Invacare to have controller reprogrammed.
Wheelchair does not respond to commands.	Poor battery terminal connection.	Have terminals cleaned.
Power indicator off - even after recharging.	Electrical malfunction.	Contact Dealer/Invacare for Service.
Wheelchair slows or stops while driving AND one of the following occurs: DPJ Joystick - ORANGE LED flashes MPJ Joystick - “HOT” or “SLOW” is displayed	Current rollback. Wheelchair has been driving under a heavy load for an extended period of time.	Adjust driving parameters to match driving environment. Allow time for the electronics to cool down (Light Duty Use).

Wheelchairs with Powered Seating Systems

SYMPTOM	PROBABLE CAUSE	SOLUTIONS
Wheelchair Power ON but does not drive.	System tilted, reclined or elevated beyond drive lock-out angle (20°).	**Return to neutral position (upright and completely lowered). Refer to Operating Powered Seating Systems on page 56.** Contact Invacare/Dealer for service if this does not solve the problem.
Seating system not functioning or working intermittently.	Low batteries. Faulty electrical connection. Blown fuse. Seat has been driven under a heavy load for an extended period of time.	Charge batteries. Check all connections. Have wiring harness replaced by a qualified technician. Allow time for the electronics to cool down (Light Duty Use).
Error Code: E28 - MPJ joystick or 5 flashes - DPJ and SPJ-80 joysticks	System tilted, reclined or elevated beyond drive lock-out angle (20°).	**Return to neutral position (upright and completely lowered). Refer to Operating Powered Seating Systems on page 56.** Contact Invacare/Dealer for service if this does not solve the problem.
Wheelchair slows or stops while driving AND one of the following occurs: DPJ Joystick - ORANGE LED flashes MPJ Joystick - "HOT" or "SLOW" is displayed	Elevating seat is elevated.	**Return the seat to its lowest position. Refer to Operating Powered Seating Systems on page 56.**
Programmer does not work or gives "communication error".	System tilted, reclined or elevated beyond drive lock-out angle (20°).	**Return to neutral position (upright and completely lowered). Refer to Operating Powered Seating Systems on page 56.** Contact Invacare/Dealer for service if this does not solve the problem.

Checking Battery Charge Level

The following "Do's" and "Don'ts" are provided for your convenience and safety.

DON'T	DO
Don't perform any installation or maintenance without first reading this manual.	Read and understand this manual and any service information that accompanies a battery and charger before operating the wheelchair.
Don't perform installation or maintenance of batteries in an area that could be damaged by battery spills.	Move the wheelchair to a work area before cleaning terminals, or opening battery box.
Don't make it a habit to discharge batteries to the lowest level.	Recharge as frequently as possible to maintain a high charge level and extend battery life.
Don't use randomly chosen batteries or chargers.	Follow recommendations in this manual when selecting a battery or charger.
Don't put new batteries into service before charging.	Fully charge a new battery before using.
Don't tip or tilt batteries.	Use a carrying strap to remove, move or install a battery.
Don't tap on clamps and terminals with tools.	Push battery clamps on the terminals. Spread clamps wider if necessary.
Don't mismatch your battery and chargers.	Use ONLY a GEL charger for a GEL battery.

SECTION 5—WHEELCHAIR OPERATION

⚠ 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.

Set-up of the Electronic Control Unit is to be performed only by a qualified technician. The final adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur under these circumstances.

Operating the Wheelchair

NOTE: For this procedure, refer to FIGURE 5.1 on page 54.

Turning the Power On/Off

1. To turn the power ON, perform one of the following steps:
   - SPJ-80 JOYSTICKS - Move the on/off switch UP or DOWN. The switch automatically retracts back to center position.
   - DPJ JOYSTICKS - Move the on/off switch UP to the MIDDLE or TOP position.
   - MPJ JOYSTICKS - Move the on/off switch FORWARD to the ON position.

NOTE: After turning power on, all indicators will light briefly and the display gauge will indicate one of the following:

- *THE CURRENT BATTERY CHARGE - Information gauge shows all LED's lit or partial LED's lit. Refer to table on previous page.*
- *OUT OF NEUTRAL AT POWER UP - Information Gauge shows all LED's flashing slowly. This occurs when the power is turned on when the joystick is out of neutral. This feature prevents sudden and unexpected movements of the power wheelchair.*

2. Turning the power OFF can be achieved by performing one of the following steps:
   - SPJ-80 JOYSTICKS - Move the on/off switch UP or DOWN. The switch automatically retracts back to center position.
   - DPJ JOYSTICKS - Move the on/off switch DOWN to the OFF position.
   - MPJ JOYSTICKS - Move the on/off switch BACK to the OFF position.

Using the Joystick to Drive the Wheelchair

⚠ WARNING

Powered Seating Systems Only - Use caution when driving in a tilted, reclined or elevated position.

The joystick is located at the front of the joystick housing and provides smooth control of speed and direction. It is equipped with 360 degrees of mobility for ease of operation. The joystick is spring-loaded, and automatically returns to the upright (neutral) position when released. Pushing the joystick in a given direction causes the wheelchair to move in that direction.

The joystick has proportional drive control, meaning that the further it is pushed from the upright (neutral) position, the faster the wheelchair moves. The maximum speed, however, is limited by the setting of the speed-control knob.

To slow the wheelchair to a stop, simply release the joystick. The wheelchair has automatic speed and direction compensation to minimize corrections.

When first learning to drive, select a SLOW speed and try to drive the wheelchair AS SLOWLY as possible by pushing the joystick slightly forward. This exercise will help you learn to utilize the full potential of the proportional control and allow you to start and stop smoothly.

To drive the wheelchair, perform the following:

1. Adjust speed control knob to the appropriate setting.
2. Turn the power on. Refer to Turning the Power On/Off on page 53.
3. Maneuver the joystick in the following manner:

MOVEMENT	ACTION
FORWARD	Push forward on the joystick.
REVERSE	Pull back on the joystick.
Turn RIGHT	Move the joystick RIGHT.
Turn LEFT	Move the joystick LEFT.
STOP	Release the joystick and the wheelchair will slow to a stop.

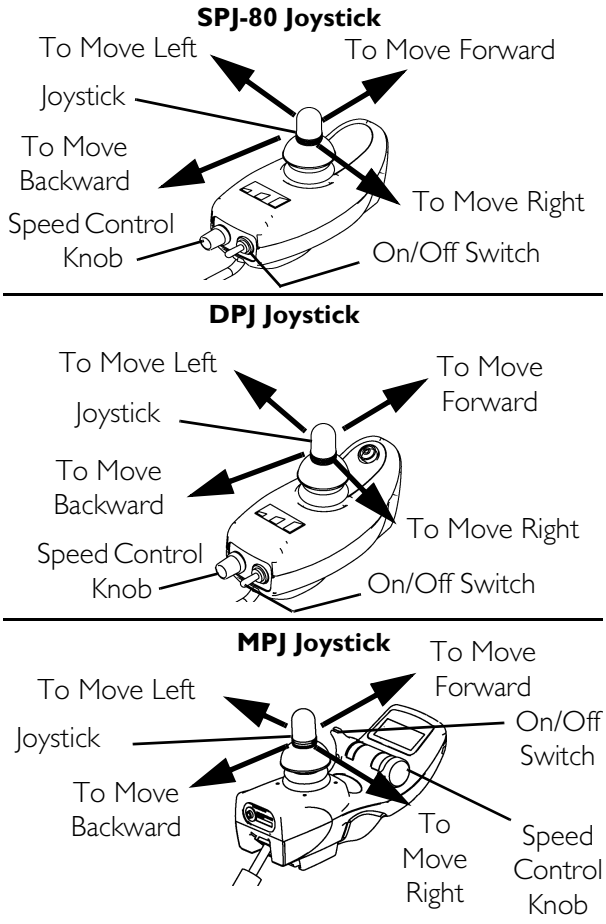


FIGURE 5.1 Operating the Wheelchair

NOTE: For specific information about the joystick installed on the wheelchair, refer to one of these procedures:

- SPJ-80 Joystick Switches and Indicators on page 62.
- DPJ Joystick Switches and Indicators on page 63.
- MPJ Joystick Switches and Indicators on page 64.

A Note About Drive Lock-Out

⚠ WARNING

NEVER operate the wheelchair or elevate/lower the seat while the back is in any tilted/reclined/back angle position over 20° relative to the vertical position. If the drive lock-out does not stop the wheelchair from operating or the seat from elevating/lowering in a tilt/recline/back angle position over 20° relative to the vertical position, DO NOT operate the wheelchair or elevate/lower the seat. DO NOT attempt to adjust the drive lock-out. Have the wheelchair serviced by a qualified technician.

The wheelchair user MUST have a clear line of sight to drive safely. On initial chair delivery and after adjusting the back angle, drive lock-out switch, tilt system or recline system, tilt and recline the seat back to the farthest driving position immediately before drive lock-out engages and ensure there is a clear line of sight present in which to drive the wheelchair. If a clear line of sight is not present, have the back angle repositioned or readjust the lockout angle such that safe driving with a clear line of sight is achieved. Otherwise injury or damage may occur.

The LED on the single function toggle switch will light when the drive lock-out feature has been activated. Drive lock-out is a feature designed to prevent the wheelchair from being driven after the seating system has been tilted or reclined beyond 20°* relative to the vertical position. The back can be positioned at a 10° relative offset to the seat base, thereby resulting in a back angle potential of 30° before which the drive lock-out is activated. This may affect the wheelchair user's line of sight while driving. Make sure the wheelchair user can see properly to ensure safe driving.

**NOTE: 20° back angle can be any combination of recline, tilt, back angle and/or surface angle.*

NOTE: Refer to Typical Product Parameters for Formula Invisible Super Low Tilt on page 23, Formula TRE on page 24 or Formula PTO Plus on page 26 or 2G Tarsys on page 27 for tilt and/or recline angle ranges.

Operating Powered Seating Systems

⚠ GENERAL WARNINGS

Refer to A Note About Drive Lock-Out on page 55 BEFORE performing this procedure.

Pinch points may occur when returning the seat from any tilted position to the full upright position or when lowering the elevating seat. Make sure the hands and body of both the occupant and attendants/bystanders are clear of all pinch points before returning the seat to the full upright position or lowering the elevating seat.

NEVER operate the wheelchair or elevate/lower the seat while the back is in any tilted/reclined/back angle position over 20° relative to the vertical position. If the drive lock-out does not stop the wheelchair from operating or the seat from elevating/lowering in a tilt/recline/back angle position over 20° relative to the vertical position, DO NOT operate the wheelchair or elevate/lower the seat. DO NOT attempt to adjust the drive lock-out. Have the wheelchair serviced by a qualified technician.

Use caution when driving in a tilted, reclined or elevated position.

DO NOT operate the seating system while on an incline.

DO NOT operate seating system while the wheelchair is moving.

DO NOT operate the tilt or elevate function near or under a fixed object such as a table or desk.

⚠ FORMULA TRE WARNING

The elevating seat option is equipped with a speed reduction safety mechanism. While the seat is in an elevated position, the safety feature slows the speed of the wheelchair to 20% of its maximum speed (not to exceed the programmed speed). If the wheelchair operates at maximum speed while in an elevated position, DO NOT operate the wheelchair. Have the wheelchair serviced immediately by a qualified technician.

2G TARSYS CAUTION

DO NOT operate the recline function of the seating system if one or both of the mechanical elevating legrest push rods are bent. Damage to the seating system can occur.

⚠ ACTUATOR CONTROL WARNING

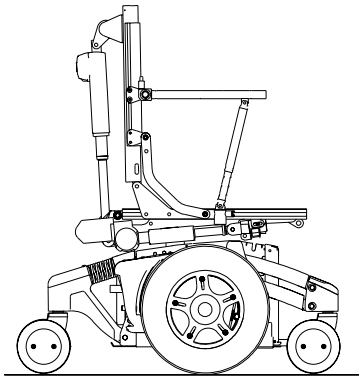
Use only the actuator controls listed in the following chart to activate the tilt/recline/elevate functions. DO NOT USE any other actuator controls. Such devices may result in excess heating and cause damage to the actuator and associated wiring and could cause a fire, death, physical injury or property damage. If such devices are used, Invacare shall not be liable and the limited warranty is void.

SEATING SYSTEM	ACTUATOR CONTROL					
	TRSS	TRCM	TRECM	TAC	SAC-E	ESC
FORMULA INVISIBLE SUPER LOW TILT	Y	N	N	Y	N	N
FORMULA INVISIBLE SUPER LOW TILT WITH POWER LEGS	N	Y	N	N	N	N
FORMULA PTO PLUS	Y	N	N	Y	N	N
FORMULA PTO PLUS WITH POWER LEGS	N	N	Y	N	N	N
FORMULA TRE - TILT ONLY	Y	N	Y	Y	N	N
FORMULA TRE - TILT ONLY WITH POWER LEGS	N	N	Y	N	N	N
FORMULA TRE - RECLINE ONLY	Y	N	Y	Y	N	N
FORMULA TRE - RECLINE ONLY WITH POWER LEGS	N	N	Y	N	N	N
FORMULA TRE - TILT/RECLINE	N	N	Y	N	N	N
FORMULA TRE - ELEVATE ONLY	N	N	Y	N	Y	Y
FORMULA TRE - TILT/ELEVATE	N	N	Y	N	N	N
FORMULA TRE - TILT/RECLINE/ELEVATE	N	N	Y	N	N	N
2G TARSYS - TILT ONLY	Y	Y	N	Y	N	N
2G TARSYS - TILT ONLY WITH POWER LEGS	N	Y	N	N	N	N
2G TARSYS - RECLINE ONLY	N	Y	N	Y	N	N
2G TARSYS - RECLINE ONLY WITH POWER LEGS	N	Y	N	N	N	N
2G TARSYS - TILT/RECLINE	N	Y	N	N	N	N

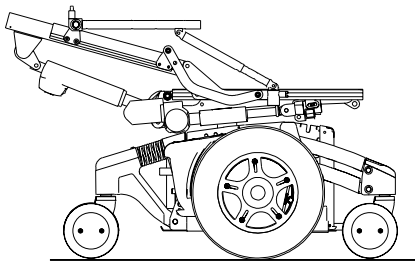
NOTE: For this procedure, refer to FIGURE 5.2 on page 58.

NOTE: This procedure applies to wheelchairs with Formula Invisible Super Low Tilt, Formula TRE, 2G Tarsys and Formula PTO Plus seating systems ONLY.

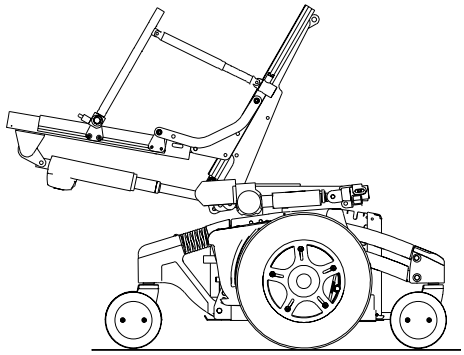
Full Upright Position



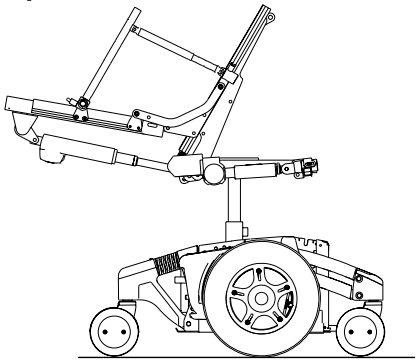
Full Recline Position



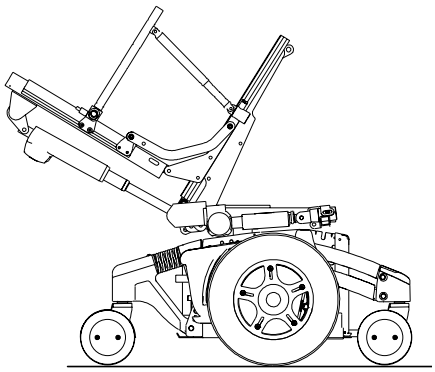
Tilt/Recline Combination



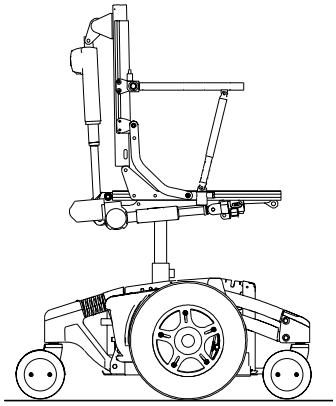
Fully Elevated, Tilted and Reclined Seat



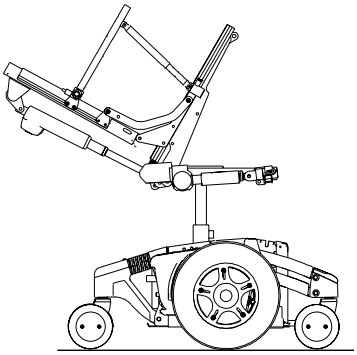
Full Tilt Position



Fully Elevated Seat



Tilt/Elevate Combination



NOTE: Formula TRE shown in this figure for clarity. Other powered seating systems function in a similar manner.

FIGURE 5.2 Operating Powered Seating Systems

Single Function Toggle Switch

NOTE: For this procedure, refer to FIGURE 5.3.

1. Make sure the wheelchair is on a level surface.
2. Refer to the chart which follows for the operation of the seating system using a single function toggle switch mounted on the right side of the wheelchair:

SEATING SYSTEM	SINGLE FUNCTION TOGGLE SWITCH	
	FORWARD	BACK
FORMULA INVISIBLE SUPER LOW TILT	Increase Tilt Angle	Decrease Tilt Angle
FORMULA PTO PLUS	Increase Tilt Angle	Decrease Tilt Angle
FORMULA TRE - TILT ONLY	Increase Tilt Angle	Decrease Tilt Angle
FORMULA TRE - RECLINE ONLY	Increase Recline Angle	Decrease Recline Angle
FORMULA TRE - ELEVATE ONLY	Elevate the Seat	Lower the Seat
2G TARSYS - TILT ONLY	Increase Tilt Angle	Decrease Tilt Angle

3. Release single function toggle switch to neutral position.

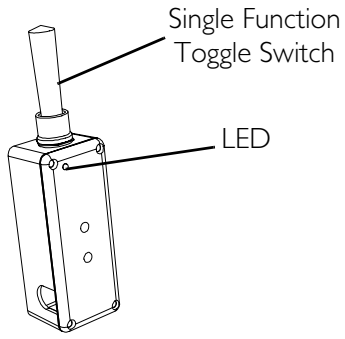


FIGURE 5.3 Single Function Toggle Switch

Optional Four-Way Toggle Switch

NOTE: For this procedure, refer to FIGURE 5.4 on page 60.

NOTE: This procedure applies to wheelchairs with Formula TRE and 2G Tarsys systems only.

1. Make sure the wheelchair is on a level surface.
2. Refer to the chart for the operation of the seating system using a four-way toggle switch.

NOTE: The chart shows the factory programmed settings only. Switch assignments can be reprogrammed.

SEATING SYSTEM	FOUR-WAY TOGGLE SWITCH			
	FORWARD	REAR	LEFT	RIGHT
Formula TRE - Tilt Only	Decrease the Tilt Angle	Increase the Tilt Angle	N/A	N/A
2G Tarsys - Tilt Only	Increase/Decrease the Tilt Angle*	N/A	N/A	Power Legrest Up/Down*
Formula TRE - Recline Only	Decrease the Recline Angle	Increase the Recline Angle	Power Legrest Up/Down*	Power Legrest Up/Down*
2G Tarsys - Recline Only	N/A	Increase/Decrease the Recline Angle*	Increase/Decrease the Back Height (VSR)*	Power Legrest Up/Down*
Formula TRE - Tilt/Recline	Decrease the Recline Angle	Increase the Recline Angle	Decrease the Tilt Angle	Increase the Tilt Angle
2G Tarsys - Tilt/Recline	Increase/Decrease the Tilt Angle*	Increase/Decrease the Recline Angle	Increase/Decrease the Back Height (VSR)*	Power Legrest Up/Down*
Formula TRE - Elevate Only**	N/A	N/A	Elevate/Lower the Seat*	N/A
Formula TRE - Tilt/Elevate	Increase/Decrease the Tilt Angle*	N/A	Elevate/Lower the Seat*	N/A
Formula TRE - Tilt/Recline/Elevate	Increase/Decrease the Tilt Angle*	Increase/Decrease the Recline Angle*	Elevate/Lower the Seat*	Power Legrest Up/Down*

**NOTE: The four-way toggle switch will alternate functions (increase tilt angle, decrease tilt angle) after it has been released to the neutral position for a minimum of three seconds. Refer to MK5 EX and MK5 TT-EX ELECTRONICS Service Manual, part number 1114808 for complete four-way toggle switch operating instructions.*

***NOTE: The seat MUST be tilted/reclined so the back angle is less than 20° relative to the vertical position before elevating/lowering the seat.*

NOTE: If the wheelchair is equipped with switch options, scan to the correct ECU or Auxiliary Mode and activate the control device in the corresponding "forward" direction to operate the tilt function. Refer to MK5 EX and MK5 TT-EX Electronics Service Manual, part number 1114808, for complete switch option operating instructions.

3. Release four-way toggle switch to neutral position.

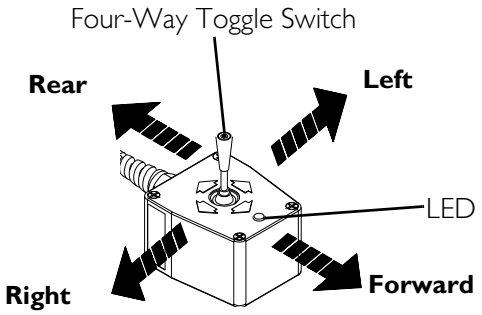


FIGURE 5.4 Optional Four-Way Toggle Switch

Vernier Shear Reduction (2G Tarsys Systems Only)

NOTE: For this procedure, refer to FIGURE 5.4 on page 60.

About Vernier Shear Reduction

⚠ WARNING

The relationship between Vernier Shear Reduction (VSR) and the recline function of the seating system is dependant on the needs of the user and MUST be set and adjusted by a trained qualified technician.

Vernier Shear Reduction (VSR) moves the back of the seating system along with the recline function. VSR reduces shear between the user and the seating system as the seating system reclines.

NOTE: VSR is electronically linked to the recline function of the seating system and operating the recline function automatically activates VSR.

VSR function can also be used independently from the recline function to allow for a change in seating position or access to additional seating system options. Refer to Using Vernier Shear Reduction (VSR) Independently of Recline Function on page 61.

Using Vernier Shear Reduction (VSR) Independently of Recline Function

⚠ WARNING

The back of the seating system MUST be returned to original position before the degree of recline is changed (increased or decreased). Otherwise, the relationship between VSR and the recline function of the seating system will change, possibly resulting in injury to the user.

1. Make sure the wheelchair is on a level surface.
2. Note the current position of the back.
3. Push four-way toggle switch toward the left of the wheelchair until the desired VSR is achieved.

NOTE: Left and right are determined by standing behind the wheelchair.

NOTE: The four-way toggle switch will alternate functions (move VSR actuator up, move VSR actuator down) after it has been released to the neutral position for a minimum of one second.

NOTE: If the wheelchair is equipped with switch options, scan to the correct ECU or Auxiliary Mode and activate the control device in the corresponding "left" direction to operate the tilt function. Refer to MK5 EX and MK5 TT-EX Electronics Service Manual, part number 1114808, for complete switch option operating instructions.

4. Return the back to the position noted in STEP 2 before changing the degree of recline.

SPJ-80 Joystick Switches and Indicators

NOTE: For this procedure, refer to FIGURE 5.5.

NOTE: The SPJ-80 joystick must be used with the MK5 NX-80 (80 amp) controller.

On/Off Toggle Switch

This toggle switch is located at the back of the joystick housing.

Speed Control Knob

The speed control knob is located on the back of the joystick housing. This knob is used for controlling the speed and acceleration of the wheelchair.

1. Turn the knob CLOCKWISE to increase the speed of the wheelchair.

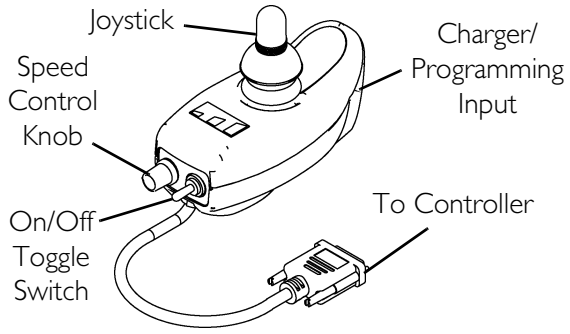


FIGURE 5.5 SPJ-80 Joystick Switches and Indicators

2. Turn the knob COUNTERCLOCKWISE to decrease the speed of the wheelchair.

Joystick

The joystick provides proportional drive control of speed and direction.

Battery Gauge Display

Located at the rear of the joystick housing, it provides information on the remaining charge in the batteries. At full charge all six segments of the bar graph are lit. The lower the battery charge the fewer number of segments light up. Once the battery level reaches the point where only one segment is lit, the last red bar will start to flash on and off to indicate that the user should charge the batteries as soon as possible.

The BGD also serves as a system diagnostic device when a fault is detected by the control module. A specific number of flashes of the last two red bars (up to eight flashes) start to flash on and off separated by a pause to indicate the type of fault detected. A chart of the diagnostic indications is given in DIAGNOSTIC CODE of the Electronics Manual, part number 1122140.

The joystick has proportional drive control, meaning that further the joystick is pushed from the upright (neutral) position, the faster the wheelchair moves. Your top speed, however, is limited by the setting of the speed-control knob and programmed settings.

To slow the wheelchair to a stop, simply release the joystick. The wheelchair has automatic speed and direction compensation to minimize corrections.

Charger/Programming Input

Located at the front of the joystick housing. This provides easy access for charging the wheelchair batteries. This port also serves as the Remote Programmer Communication connection.

DPJ Joystick Switches and Indicators

NOTE: For this procedure, refer to FIGURE 5.6.

NOTE: The DPJ joystick must be used with the MK5 EX™ controller.

Drive Select Toggle Switch

The three position drive select toggle switch is located at the back of the joystick housing. This switch allows the operator to select the type of operation or performance which best suits a particular control need or situation. The DRIVE 1 program uses performance values which are independent of those used for the DRIVE 2 program. As an example, an operator may have a control need for spasticity in the morning and a very different need in the afternoon. DRIVE 1 can be programmed for higher speeds and quicker response while DRIVE 2 can be programmed for slower speeds and less responsiveness or vice versa.

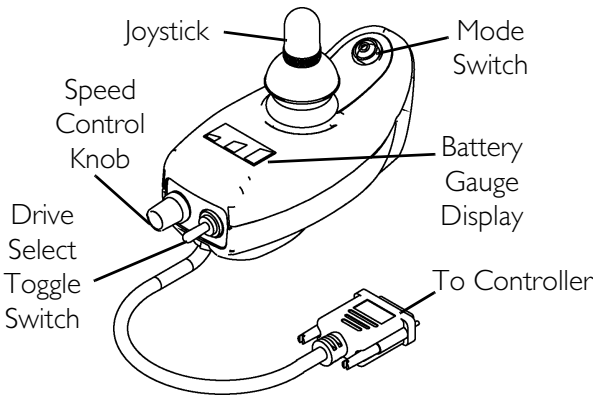


FIGURE 5.6 DPJ Joystick Switches and Indicators

Selecting the drive mode

1. To select DRIVE 1 mode, move the toggle up.
2. To select DRIVE 2 mode, move the toggle to the MIDDLE position.

Speed Control Knob

The speed control knob is located at the back of the joystick housing.

1. Turn the knob clockwise to increase the maximum speed of the wheelchair.
2. Turn the knob counterclockwise to decrease the maximum speed of the wheelchair.

Joystick

The joystick provides proportional drive control of speed and direction.

Mode (On/Off) Switch

The mode (on/off) switch is a push button switch located at the front of the joystick. When an optional actuator control is present, pushing the switch will change the controller mode to control the wheelchairs actuators through the joystick. The mode switch LED indicator will be ON. Push the switch again to return to normal joystick driving. The mode switch LED indicator will be off.

Battery Gauge Display (BGD)

Located at the rear of the joystick housing, the BGD provides information on the remaining charge in the batteries. At full charge, all six segments of the bar graph are lit. As the battery discharges, the farthest right segment will go out until only the red bar is lit. At this level, the last red bar will start to flash on and off to indicate that the user should charge the batteries as soon as possible.

The BGD also serves as a system diagnostic device when a fault is detected by the control module. A specific number of flashes of the last two red bars (up to eight flashes) separated by a pause will indicate the type of fault detected. This information is useful to a qualified technician when making repairs or reprogramming the electronics.

MPJ Joystick Switches and Indicators

NOTE: For this procedure, refer to FIGURE 5.7 and FIGURE 5.8 on page 66.

NOTE: The MPJ joystick must be used with the MK5 EX controller.

Drive Select Toggle Switch

The drive select toggle switch is located on the left side, below the LCD. The drive select position is momentary, meaning that it will return to the neutral position after a selection is made.

This switch allows the operator to select the type of operation or performance which best suits a particular control need or situation. The DRIVE 1 program uses performance values which are independent of those used for the DRIVE 2 or 3 or 4 program. As an example, an operator may have a control need for spasticity in the morning and a very different need in the afternoon. DRIVE 1 can be programmed for higher speeds and quicker response while DRIVE 2 can be programmed for slower speeds and less responsiveness or vise versa. The other two drive programs could be indoor and outdoor versions of DRIVE 1 and DRIVE 2.

Selecting the Drive Mode

1. Move the toggle up and release. DRIVE 1 will appear on LCD.
2. Move the toggle up and release again. DRIVE 2 will appear on LCD.
3. Move the toggle up and release again. DRIVE 3 will appear on LCD.
4. Move the toggle up and release again. DRIVE 4 will appear on LCD.
5. Move the toggle up and release one more time to select DRIVE 1.

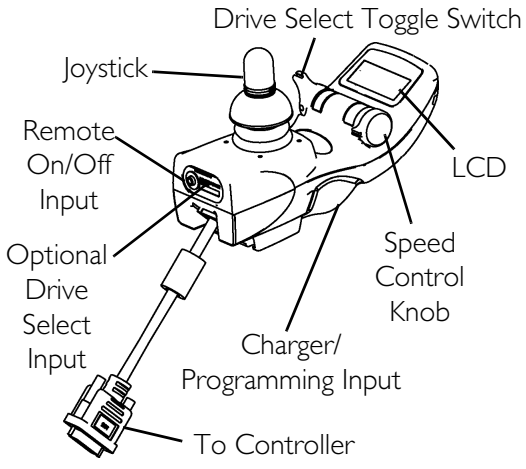


FIGURE 5.7 MPJ Joystick Switches and Indicators

Speed Control

The speed control knob is located on the side of the joystick housing.

1. Rotate the knob clockwise to increase the speed of the wheelchair to the programmed max speed.
2. Rotate the knob counterclockwise to decrease the speed of the wheelchair to the programmed max speed.

Joystick

The joystick provides proportional drive control of speed and direction.

LCD Display

The LCD Display is located in front of the joystick and provides information on the status of the wheelchair through a 2 line by 12 character length backlit display. The LCD display is readable in both bright sunlight and complete darkness.

During normal operation the active drive is displayed on the left half of the first line. The left half of the second line shows the Battery Gauge Display (BGD). It provides information on the remaining charge in the batteries. At full charge, solid blocks fill in all five segments between E (Empty) and F (Full). As the battery becomes discharged, the furthest right segments will progressively disappear a half bar at a time until no segments appear between E and F. At this level the word RECHARGE will appear on the second line to indicate that the user should charge the batteries as soon as possible.

The right half of the display is the Information Center. The Information Center displays current data on the wheelchair. FIGURE 5.8 shows the factory default odometer display. The top line shows the unit of measured MI (miles). The second line is the value, 0000 (total miles driven).

The Information Center can display:

ITEM	DESCRIPTION
Speedometer	Current wheelchair Speed - MPH/KMH
Trip Odometer	Distance traveled since the wheelchair was last powered ON
Odometer	Total Distance Traveled (Factory Default) - MI/KM
Trip Amp-Hour meter	Battery Capacity consumed since the wheelchair was last powered ON - AH
Battery Volts	Current Battery Voltage - VOLT
Battery Current	Battery current being used - AMP
Load Test Results	Current battery condition based on a load test - BATT

If a fault is detected, the cause of the fault will be scrolled across the second line of the display.

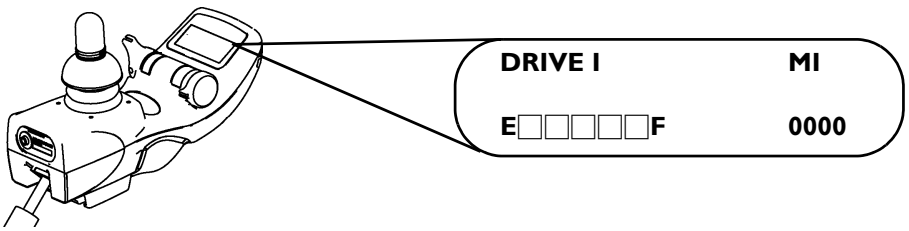


FIGURE 5.8 MPJ Joystick Switches and Indicators - LCD Display

Emergency Stop/Reset Switch

The emergency stop/reset switch is used to stop the wheelchair and to select the operating mode for the wheelchair. The switch input is located on the control module next to the joystick input. An emergency stop/reset switch is needed whenever any of the following operating modes are programmed:

- Environmental Controls (E.C.U.) - including recliner controls
- 3 Speed Mode in Momentary
- Latched Modes
- Pneumatic Control
- Stand-by Mode
- RIM Control
- Remote Drive Selection Mode
- Information Center Display Selection (does not require Reset activation at power up)

If any of the above modes are selected, the control will require activation of the switch immediately after the power switch is turned on in order to enter the drive mode. The second line of the LCD will display - PRESS RESET.

Emergency Stop/Reset Input

The input accepts a 1/8-inch diameter Phono connector. The emergency stop/reset switch must be an open contact for normal driving and a closed contact to activate the emergency stop/reset function.

PIN	DESIGNATION
TIP	Emergency Stop/Reset
RING	COMMON (B–)

Remote On/Off Switch

The remote on/off switch input allows the power switch to be operated by an ability switch (normally open momentary switch with mono plug). To use the remote on/off feature, the Drive Select/On/Off switch must be in the ON position. Each activation of the ability switch will alternately turn the joystick ON or OFF.

SECTION 6—FRONT RIGGINGS

⚠ 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.

For the following procedures, make sure the ON/OFF switch on the joystick is in the OFF position.

DO NOT stand on the flip-up footboard. When getting in or out of the wheelchair, make sure that the flip-up footboard is in the upward position.

While the wheelchair is moving, minimum ground clearance for the front rigging is three inches. If the wheelchair is not moving, the front rigging MUST maintain a minimum of one inch ground clearance - otherwise personal injury and damage may result.

PINCH POINT EXISTS BETWEEN CENTER MOUNT FOOTREST AND CASTERS - There is limited clearance between center mount footrest and casters. The user's feet MUST remain on the center mount footrest while operating the wheelchair. If the user's feet are allowed to rest off the side of the center mount footrest they may come in contact with the caster possibly resulting in injury.

Installing/Removing Footrests

70° and PW93

NOTE: For this procedure, refer to FIGURE 6.1.

1. Turn the footrest to the side (open footplate is perpendicular to wheelchair).
2. Install the hinge plates on the footrest onto the hinge pins on the wheelchair frame.
3. Push the footrest towards the INSIDE of the wheelchair until it locks into place.

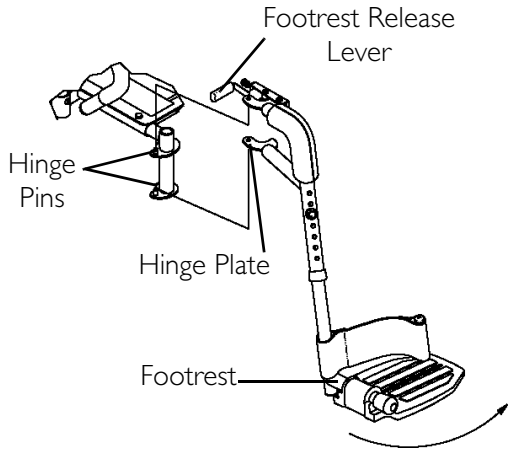


FIGURE 6.1 Installing/Removing Footrests - 70° and pw93

NOTE: The footplate will be on the INSIDE of the wheelchair when locked in place.

4. Repeat STEPS 1-3 for other footrest assembly.
5. To remove the footrest, push the footrest release lever inward, rotate footrest outward.
6. Adjust footrest height, if desired. Refer to Footrest Height Adjustment on page 68.

70° Taper

NOTE: For this procedure, refer to FIGURE 6.2

1. Turn the footrest to the side (open footplate is perpendicular to wheelchair).
2. Insert footrest mounting pin into mounting tube.
3. Push the footrest towards the INSIDE of the wheelchair until it locks into place.

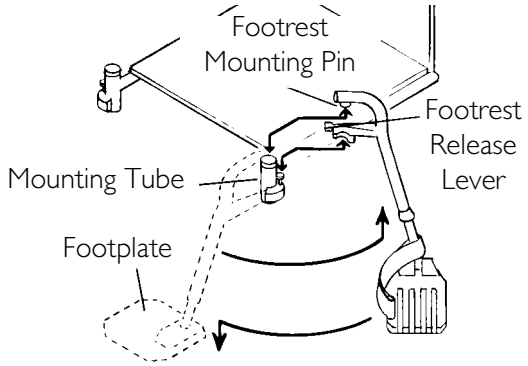


FIGURE 6.2 Installing/Removing Footrests - 70° Taper

NOTE: The footplate will be on the INSIDE of the wheelchair when locked in place.

4. Repeat STEPS 1- 3 for the other footrest assembly.
5. To remove the footrest, push the footrest release lever inward, rotate footrest outward.
6. Adjust footrest height, if desired. Refer to Footrest Height Adjustment on page 68.

Footrest Height Adjustment

⚠ WARNING

Minimum ground clearance for the footrest is 3 inches - otherwise personal injury or damage may result.

70° and PW93

NOTE: For this procedure, refer to FIGURE 6.3.

1. Remove any accessory from the footrest(s).
2. Remove the footrest from the wheelchair. Refer to Installing/ Removing Footrests on page 67.

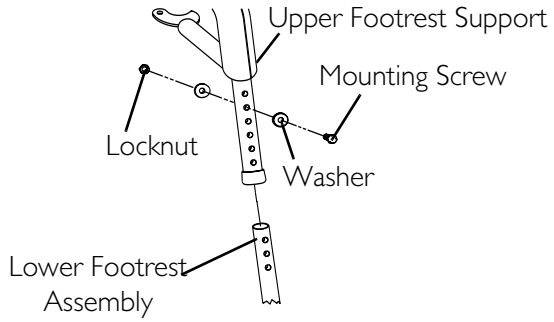


FIGURE 6.3 Footrest Height Adjustment - 70° and PW93

NOTE: Lay the footrest on a flat surface to simplify this procedure.

3. Remove the mounting screw, washers and locknut that secure the lower footrest assembly to the upper footrest support (FIGURE 6.3).
4. Reposition the lower footrest to the desired height.
5. Reinstall the mounting screw, washers and locknut that secure the lower footrest to the footrest support and tighten securely.

6. Repeat STEPS 1-5 for the opposite wheelchair footrest, if necessary.
7. Reinstall the footrest(s) onto the wheelchair. Refer to Installing/Removing Footrests on page 67.
8. Reinstall any accessory onto the footrest(s).

70° Taper

NOTE: For this procedure, refer to FIGURE 6.4.

1. Remove any accessory from the footrest(s).
2. Remove the footrest from the wheelchair. Refer to Installing/ Removing Footrests on page 67.

NOTE: Lay the assembly on a flat surface to improve access to the hardware.

NOTE: Note the position of the spacers before disassembly.

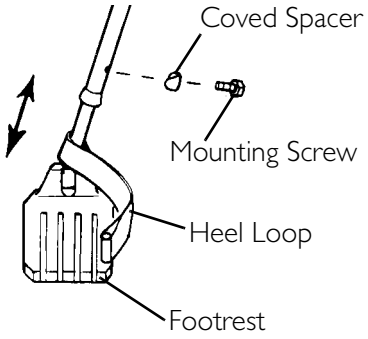


FIGURE 6.4 Footrest Height Adjustment - 70° Taper

3. Remove the mounting screw and coved spacer that secures the lower footrest assembly.
4. Position the footrest assembly to the desired height.
5. Secure lower footrest assembly with existing mounting screw and coved spacer. Securely tighten.

NOTE: Make sure spacers are positioned properly when reassembling to prevent damage to the frame mounting tubes.

6. Reinstall the footrest(s) onto the wheelchair. Refer to Installing/Removing Footrests on page 67.
7. Reinstall any accessory onto the footrest(s).

PHAL4A

NOTE: For this procedure, refer to FIGURE 6.5.

1. Loosen, but DO NOT remove, the lug bolt and locknut that secure the lower footrest to the footrest support.
2. Reposition the lower footrest to the desired height.
3. Securely tighten the lug bolt and locknut that secure the lower footrest to the footrest support.

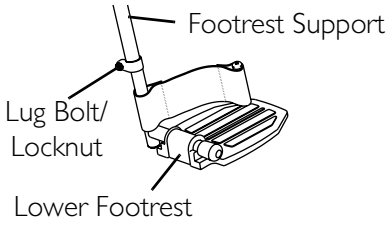


FIGURE 6.5 Footrest Height Adjustment - PHAL4A

4. Repeat STEPS 1-3 for the opposite side of the wheelchair footrest, if necessary.

Adjusting/Replacing Telescoping Front Rigging Support

⚠ WARNING

If the telescoping tubes need to be extended greater than two inches, then the seat must be repositioned rearward to ensure stability - otherwise personal injury and/or damage to the wheelchair and surrounding property may result.

When determining the depth of the telescoping front frame tubes, make sure the rear of the footrests do not interfere with the movement of the front casters. Otherwise damage to the wheelchair may result or may impede proper operation.

Wheelchairs with 2G Tarsys Systems

NOTE: For this procedure, refer to FIGURE 6.6.

NOTE: The two telescoping front rigging supports can be positioned at different depths depending on the need of the user.

1. Remove the two mounting screws, spacers and locknuts that secure the telescoping front rigging support to the seat frame.
2. Perform one of the following:
   - Slide existing telescoping front rigging support to one of three depth positions.
   - Remove existing telescoping front rigging.

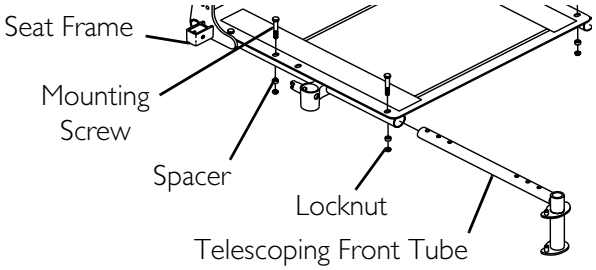


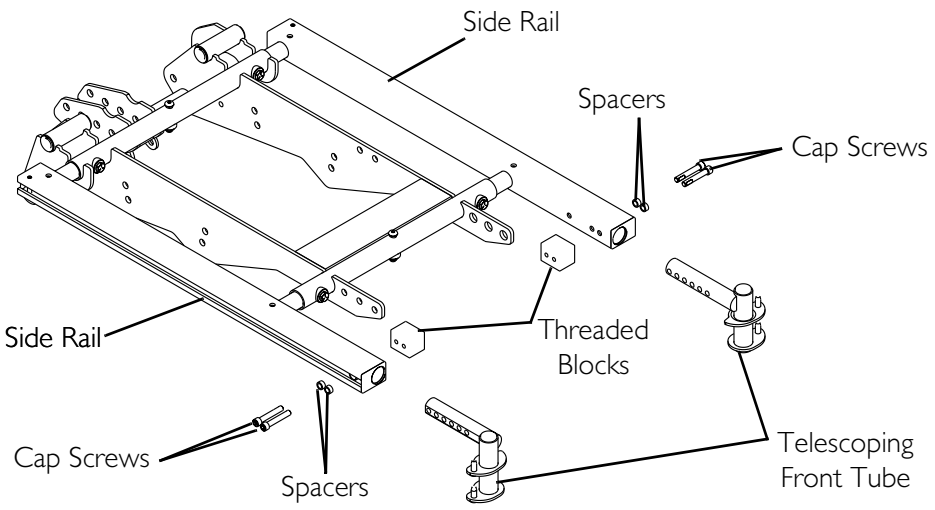
FIGURE 6.6 Adjusting/Replacing Telescoping Front Rigging Support - Wheelchairs with 2G Tarsys Systems

3. Secure telescoping front rigging at desired depth with existing two mounting screws, spacers, and locknuts. Securely tighten.

Wheelchairs without 2G Tarsys Systems

NOTE: For this procedure, refer to FIGURE 6.7 on page 71.

1. Remove the two cap screws, spacers and threaded blocks securing the telescoping front tube to the side rail.
2. Perform one of the following:
   - Slide existing telescoping front rigging support to one of six depth positions.
   - Remove existing telescoping front rigging.
3. Secure the telescoping front tube to the side rail at the desired depth with the existing two cap screws, spacers and threaded blocks.
4. Repeat STEPS 1 to 3 on the opposite side, if desired.



NOTE: Formula TRE seat frame shown. Telescoping front rigging supports install in the same way on the ASBA seat frame.

FIGURE 6.7 Adjusting/Replacing Telescoping Front Rigging Support - Wheelchairs without 2G Tarsys Systems

Installing Adjustable Angle Flip-up Footplate Hinge

NOTE: For this procedure, refer to FIGURE 6.8.

1. Position footplate hinge on the footrest support tube at the desired height.
2. Position mounting screw, washers, spacer, and locknut on the footrest support as shown (FIGURE 6.8).
3. Flip the footplate hinge to the up position.

NOTE: The footplate hinge will fall to the down position.

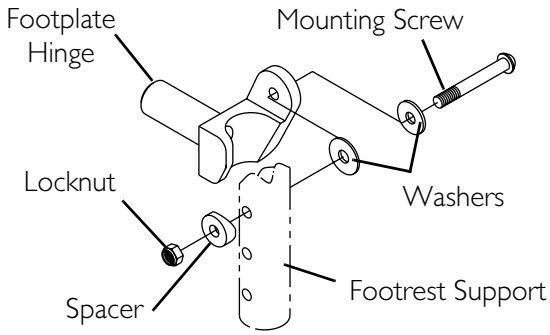


FIGURE 6.8 Installing Adjustable Angle Flip-up Footplate Hinge

4. Tighten the mounting screw, washer, and locknut that secure the footplate hinge to the footrest support until the footplate hinge remains in the up position.
5. Check the up and down motion of the footplate hinge to make sure the user of the wheelchair can operate the footplates easily.

NOTE: If footplate's motion is too tight, loosen the mounting screw and locknut approximately ¼-turn counterclockwise.

NOTE: If the footplate's motion is too loose, tighten mounting screw and locknut approximately ¼-turn clockwise.

6. Adjust footplate. Refer to Installing Adjustable Angle Flip-up Footplates on page 72.

Installing Adjustable Angle Flip-up Footplates

NOTE: For this procedure, refer to FIGURE 6.9.

1. Slide the half clamp over the footplate hinge.
2. Hand tighten the two flat screws that secure the footplate to the half clamp.
3. Adjust the footplates to the necessary angle and depth for the user. Refer to Adjusting Adjustable Angle Flip-Up Footplates on page 72.

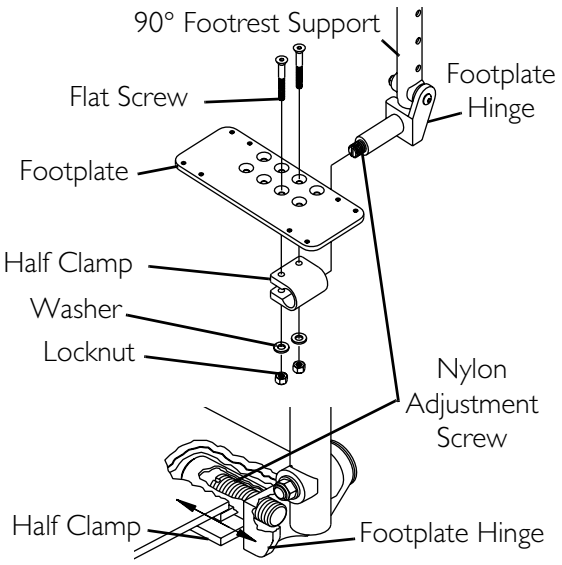


FIGURE 6.9 Installing Adjustable Angle Flip-up Footplates

Adjusting Adjustable Angle Flip-Up Footplates

Depth Adjustment

NOTE: For this procedure, refer to FIGURE 6.9.

1. Remove the two flat screws, washers and locknuts that secure footplate to the half clamp.

NOTE: Observe the angle of the footplate for reinstallation.

2. Move footplate to one of four mounting positions.

NOTE: If desired depth is still not obtained, rotate the half clamp on the footplate hinge 180°.

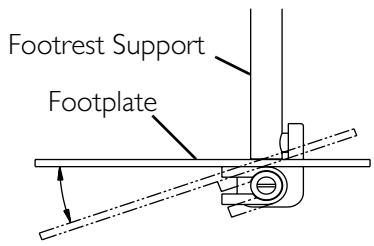
3. Retighten the two flat screws, washers and locknuts.

NOTE: The settings for positioning the footplates on the half-clamps may vary for each footplate.

Angle Adjustment

NOTE: For this procedure, refer to FIGURE 6.9 and FIGURE 6.10.

1. Loosen, but DO NOT remove, the two flat screws, washer and locknuts that secure the footplate to the footplate hinge (FIGURE 6.9).
2. Position the footplate to the necessary angle to accommodate the user (FIGURE 6.10).
3. Retighten the two flat screws, washers and locknuts.



Side View of Footplate and Footrest Support

FIGURE 6.10 Angle Adjustment

Perpendicular and/or Inversion/Eversion Adjustment

NOTE: For this procedure, refer to FIGURE 6.9 on page 72 and FIGURE 6.11.

NOTE: It is not necessary to remove the footplate to perform this adjustment.

1. Insert a flathead screwdriver through the half clamp on the footplate (FIGURE 6.9).
2. Slowly turn nylon adjustment screw in or out until footplate is perpendicular to the footrest assembly or the desired inversion or eversion is obtained (FIGURE 6.11).

Front View of Footplate and Footrest Support

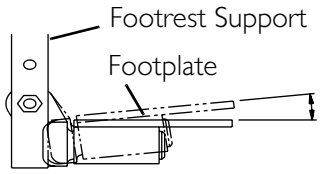


FIGURE 6.11 Perpendicular and/or Inversion/Eversion Adjustment

Composite/Articulating Footplate Heel Loop Replacement

NOTE: For this procedure, refer to FIGURE 6.12.

Disassembly

Composite

1. Remove the mounting screw and coved washer that secures the lower half of the footrest to the swingaway footrest assembly.
2. Remove the lower footrest assembly.
3. Remove the mounting screw and locknut that secure the heel loop to the footrest.
4. Slide heel strap over cane of footrest assembly.

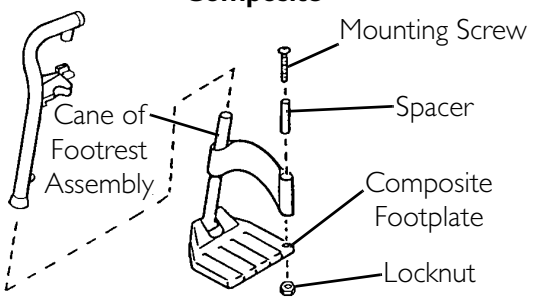
Articulating

1. Remove the two mounting screws that secure the heel loop to the articulating footplate.

Assembly

1. Replace heel strap/loop.
2. Reverse steps in Disassembly to assemble.

Composite



Articulating

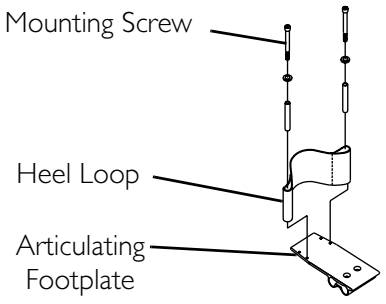


FIGURE 6.12 Composite/Articulating Footplate Heel Loop Replacement

NOTE: When securing heel loop to the footrest assembly, tighten mounting screw until the spacer is secure.

Installing/Removing Elevating Legrests

NOTE: For this procedure, refer to FIGURE 6.13.

Installing

1. Turn legrest to side (open footplate is perpendicular to wheelchair).
2. Install the legrest hinge plates onto the hinge pins on the wheelchair frame.
3. Rotate legrest toward the inside of the wheelchair until it locks in place.

NOTE: The footplate will be on the inside of the wheelchair when locked in place.

4. Repeat STEPS 1-3 for the opposite legrest.
5. After the user is seated in wheelchair, adjust footplate to correct height by loosening nut and sliding the lower footrest assembly UP or down until desired height is achieved.

Removing

1. Push the legrest release handle toward the inside of the wheelchair (facing the front of the wheelchair) and swing the legrest to the outside of the wheelchair.
2. Lift UP on the legrest and remove from the wheelchair.
3. Repeat STEPS 1- 2 for opposite side of wheelchair.

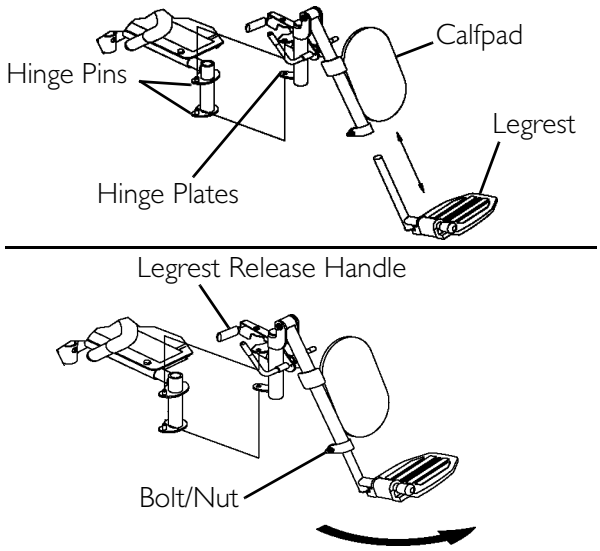


FIGURE 6.13 Installing/Removing Elevating Legrests

Raising/Lowering Elevating Legrests and/or Adjusting Calfpads

NOTE: For this procedure, refer to FIGURE 6.14.

Raising/Lowering Elevating Legrests

1. Perform one of the following:
   - RAISING - Pull back on the release lever until the leg is at the desired height.
   - LOWERING - Support leg with one hand and push release lever downward with other hand.

Adjusting Calfpads

1. Turn the calfpad towards the outside of the wheelchair.
2. Slide the calfpad UP or down until the desired position is obtained.

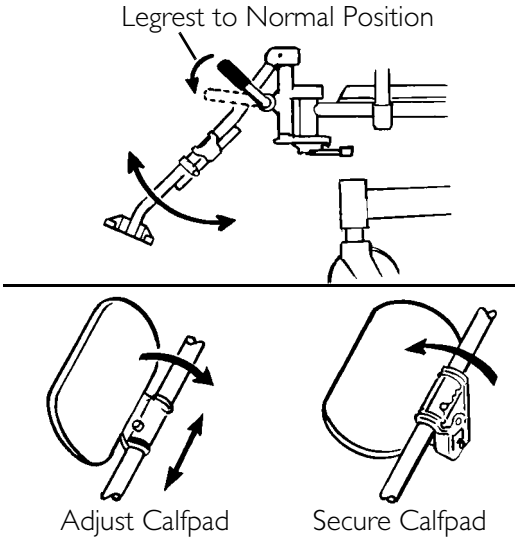


FIGURE 6.14 Raising/Lowering Elevating Legrests and/or Adjusting Calfpads

NOTE: If one of the top two calfpad adjustment positions is being used, the legrest will need to be raised to avoid interference with the front stabilizers while going over obstacles or going UP and down ramps. Refer to Raising/Lowering Elevating Legrests on page 75.

3. Turn the calfpad towards the inside of the wheelchair.

Removing/Installing the Center Mount Footrest

NOTE: For this procedure, refer to FIGURE 6.15 on page 77.

Removing

Power Center Mount Footrests

1. Remove the short quick-release pin that secures the center mount rigging to the link plate (Detail "A").
2. Remove the rigging pivot pin that secures the center mount rigging to the top of the support (Detail "B").
3. Remove the long quick-release pin that secures the center mount rigging to the center support (Detail "C").

NOTE: The link drive tube will fall out when the long quick-release pin is removed. Retain for proper reinstallation.

Manual Center Mount Footrests

1. Remove the rigging pivot pin that secures the footrest to the mounting bracket of the seat frame.
2. Hold the footrest with one hand and engage the release lever with the other while simultaneously pulling the center mount footrest out of the mounting bracket of the seat frame.

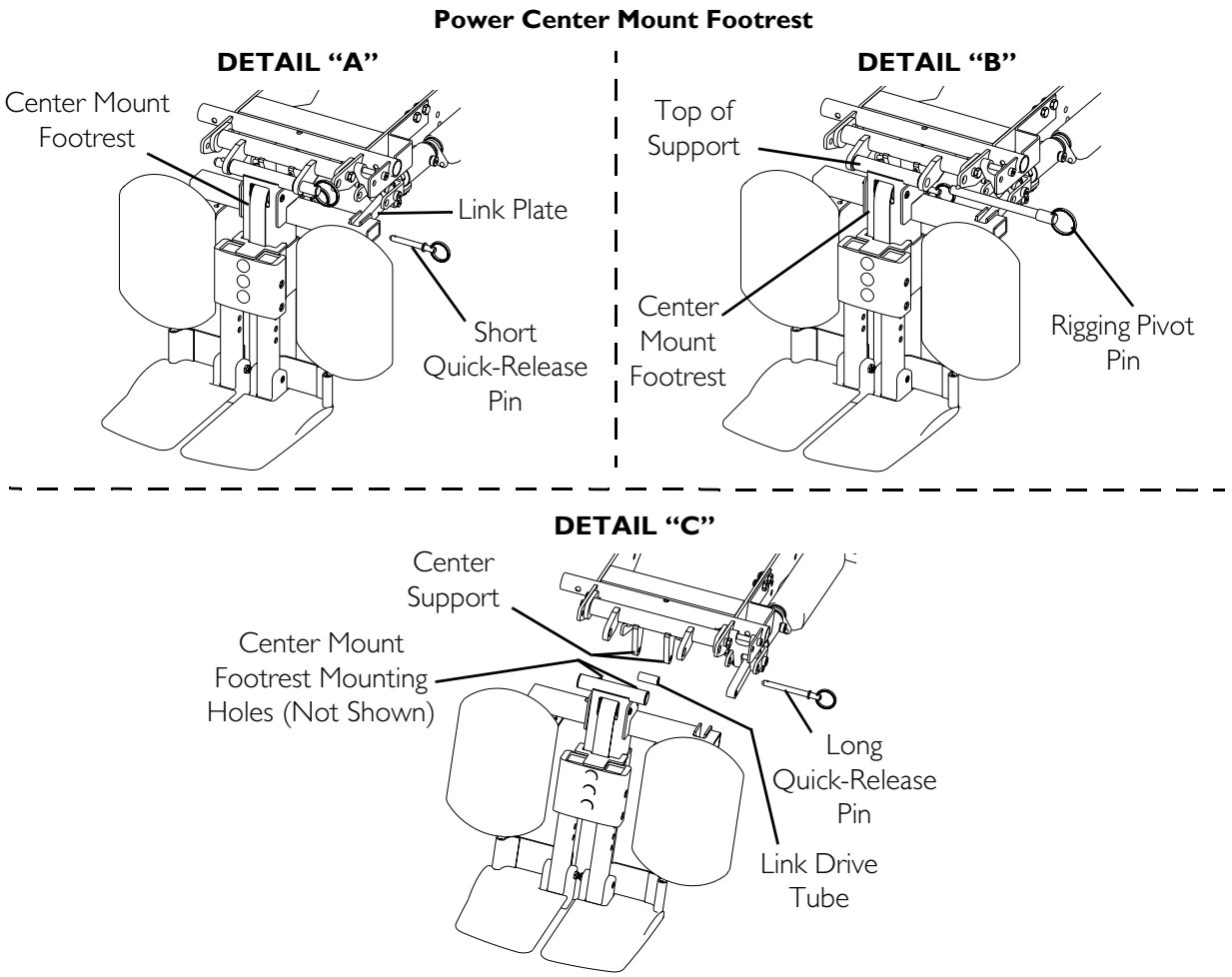
Installing

Power Center Mount Footrests

3. Position the link drive tube between the mounting holes of the center support (Detail "C").
4. Install the long quick-release pin through the mounting holes of the center support, the mounting holes of the center mount footrest and the link drive tube (Detail "C").
5. Install the rigging pivot pin through the upper mounting holes of the support bracket and the upper mounting tube of the center mount rigging (Detail "B").
6. Install the short quick-release pin through the link plate and into the center mount footrest (Detail "A").
7. Ensure all quick-release pins and the rigging pivot pin secure the center mount footrest to the mounting bracket.

Manual Center Mount Footrests

1. Engage the release lever with one hand, hold the center mount footrest with the other, and insert the center mount footrest into the mounting bracket of the seat frame.
2. Reinstall the rigging pivot pin to secure the center mount footrest to the mounting bracket of the seat frame.



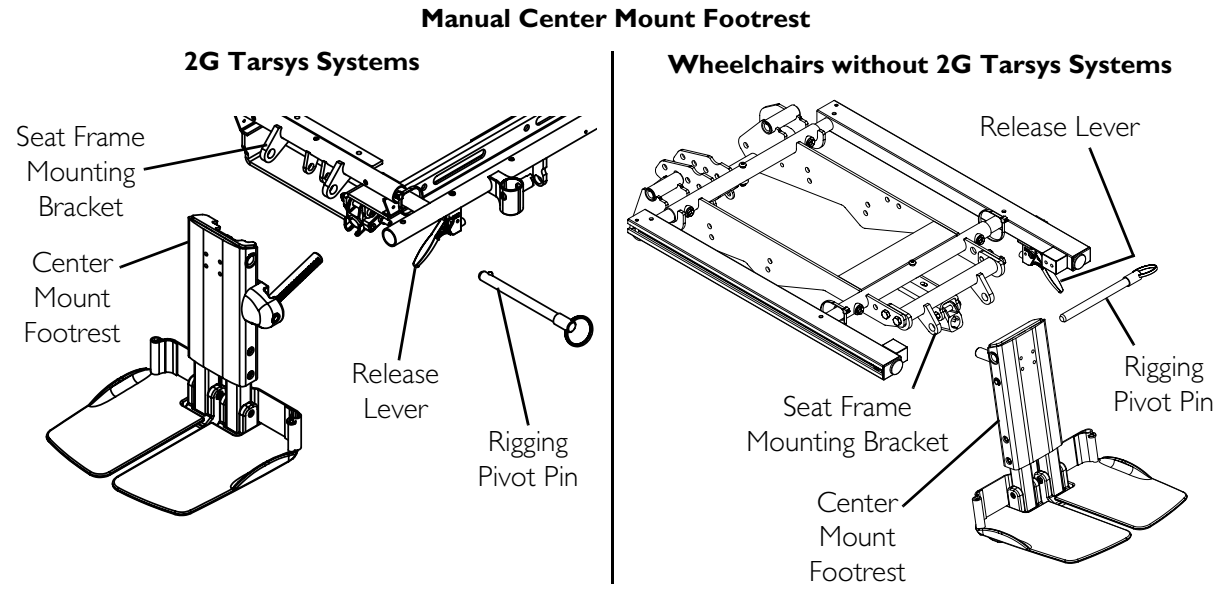


FIGURE 6.15 Removing/Installing the Center Mount Footrest

Adjusting the Height of the Center Mount Footrest

All Wheelchairs Except 2G Tarsys Systems

⚠ WARNING

While the wheelchair is moving, minimum ground clearance for the front rigging is three inches. If the wheelchair is not moving, the front rigging MUST maintain a minimum of one inch ground clearance - otherwise personal injury and damage may result.

NOTE: For this procedure, refer to FIGURE 6.16.

NOTE: This procedure applies to both power and manual center mount footrests.

1. Remove the two mounting screws that secure the footrest extension tube to the extension tube housing.
2. Adjust the footrest extension tube to the desired height and align the corresponding holes to the mounting holes on the extension tube housing.
3. Reinstall the two mounting screws to secure the footrest extension tube to the extension tube housing. Securely tighten.
4. Repeat STEPS 1-3 for the other extension tube.

NOTE: Manual center mount footrest shown. Power center mount footrest adjusts the same way.

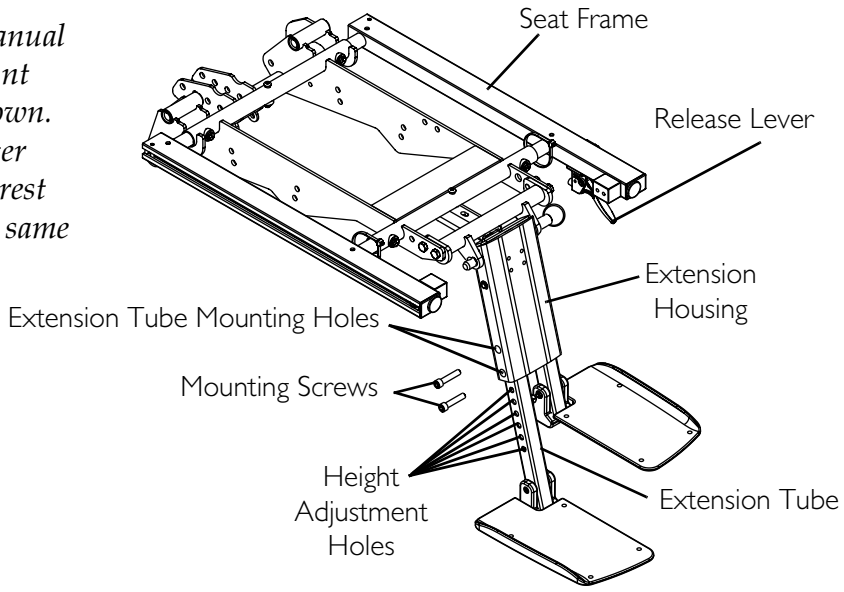


FIGURE 6.16 Adjusting the Height of the Center Mount Footrest - All Wheelchairs Except 2G Tarsys Systems

2G Tarsys Systems

⚠ WARNING

While the wheelchair is moving, minimum ground clearance for the front rigging is three inches. If the wheelchair is not moving, the front rigging MUST maintain a minimum of one inch ground clearance - otherwise personal injury and damage may result.

NOTE: For this procedure, refer to FIGURE 6.17.

1. Remove the two mounting screws that secure the footrest extension tube to the extension tube housing.
2. If adjusting to one of the three shortest settings for footrest height, remove the retaining ring on the angle adjustment pin and slide it out.
3. Adjust the footrest extension tube to the desired height and align the corresponding holes to the mounting holes on the extension tube housing.
4. If adjusting to one of the three shortest settings for footrest height, install the angle adjustment pin and the retaining ring.
5. Reinstall the two mounting screws to secure the footrest extension tube to the extension tube housing. Securely tighten.
6. Repeat STEPS 1-5 for the other extension tube.

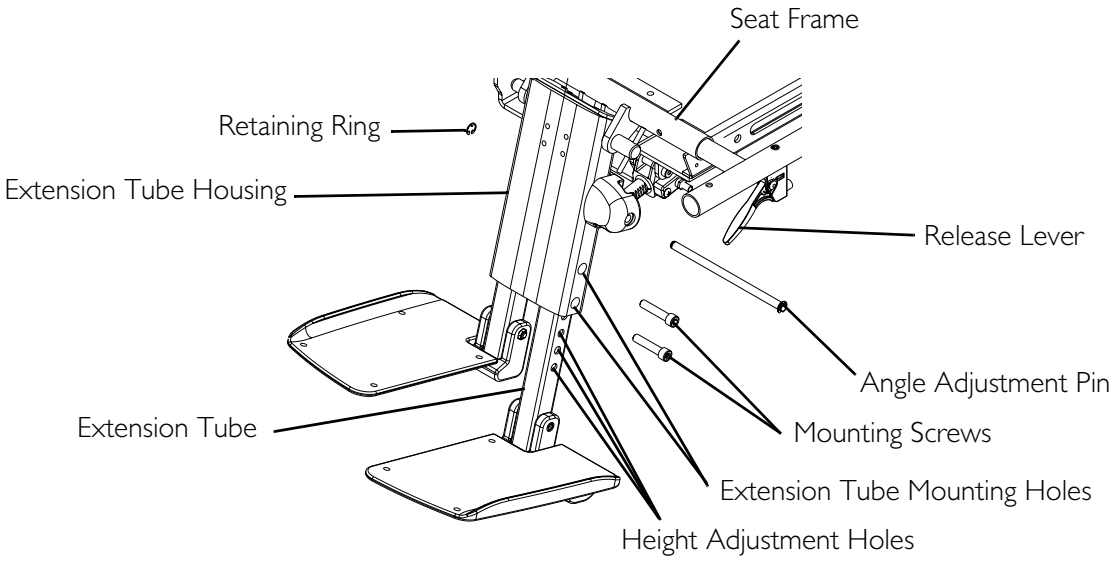


FIGURE 6.17 Adjusting the Height of the Center Mount Footrest - 2G Tarsys Systems

Adjusting the Angle of the Manual Center Mount Footrest

⚠ WARNING

While the wheelchair is moving, minimum ground clearance for the front rigging is three inches. If the wheelchair is not moving, the front rigging MUST maintain a minimum of one inch ground clearance - otherwise personal injury and damage may result.

NOTE: For this procedure, refer to FIGURE 6.16 on page 78 and FIGURE 6.18.

1. Engage the release lever with one hand (not shown) and move the center mount footrest to the desired angle with the other hand.

NOTE: Refer to FIGURE 6.16 for the location of the release lever.

2. Disengage the release lever (not shown) to lock the center mount footrest in the new position.

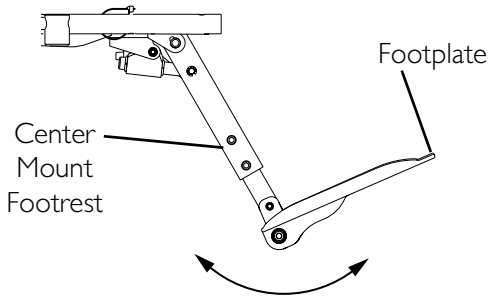


FIGURE 6.18 Adjusting the Angle of the Manual Center Mount Footrest

Adjusting the Footplate Angle

After 2/14/07

NOTE: For this procedure, refer to FIGURE 6.19.

1. Loosen, but DO NOT remove, the two rear mounting screws and side mounting screw.
2. Move the footplate to the desired angle.
3. Tighten the two rear mounting screws and side mounting screw to secure the footplate in the desired position.
4. Repeat STEPS 1 and 2 for the other footplate.

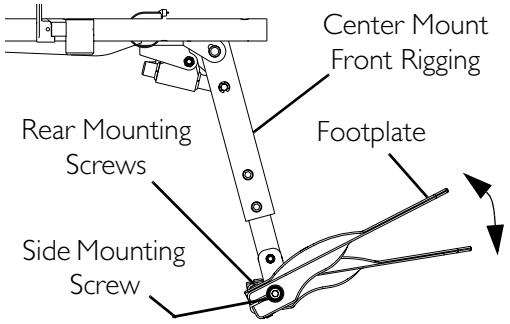


FIGURE 6.19 Adjusting the Footplate Angle - After 2/14/07

Before 2/15/07

NOTE: For this procedure, refer to FIGURE 6.20.

NOTE: This procedure applies to both power and manual center mount footrests.

1. Loosen the footplate mounting screw and move the footplate to the desired angle.

NOTE: DO NOT remove the footplate mounting screw.

2. Tighten the footplate mounting screw to secure the footplate in the desired position.
3. Repeat STEPS 1 and 2 for the other footplate.

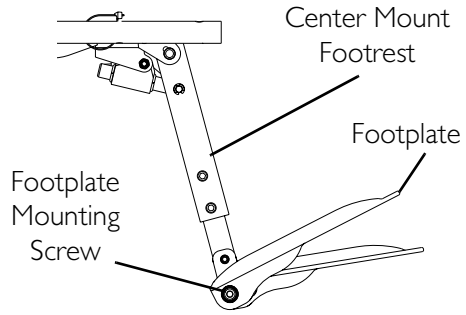


FIGURE 6.20 Adjusting the Footplate Angle - Before 2/15/07

Adjusting the Tension of the Flip Up Footplate

NOTE: For this procedure, refer to FIGURE 6.21.

NOTE: This procedure applies to both power and manual center mount footrests.

NOTE: The tension can be adjusted to increase or decrease the rotation effort of the flip up footplates.

1. Loosen the mounting screw on the footrest angle hinge to decrease the rotation effort.

NOTE: DO NOT remove the footplate mounting screw.

2. Tighten the footrest angle hinge mounting screw to increase the rotation effort.
3. Repeat STEPS 1 and 2 for the other footplate.

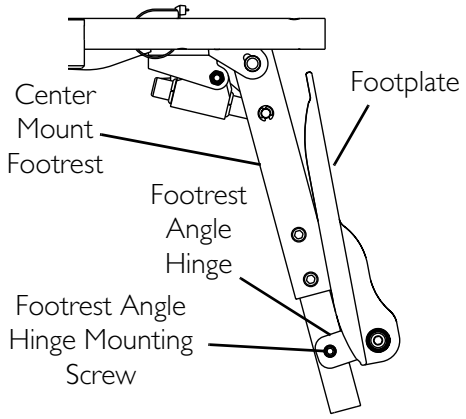


FIGURE 6.21 Adjusting the Tension of the Flip Up Footplate

Calf Pad Adjustment for Power Center Mount Footrests

NOTE: For this procedure, refer to FIGURE 6.22.

NOTE: Ensure footrest height has been adjusted before performing this procedure. Refer to Adjusting the Height of the Center Mount Footrest on page 78.

Depth Adjustment

1. Remove the two depth adjustment screws securing the calf pad mounting bracket to the carriage assembly.
2. Move the calf pad mounting bracket to the desired position.
3. Install the two depth adjustment screws to secure the calf pad mounting bracket to the carriage assembly.
4. Check operation of the calf pads to ensure there is no interference with the seat pan or the carriage assembly. If there is interference, readjust calf pad.
5. Repeat STEPS 1 to 4 for the opposite side, if desired.

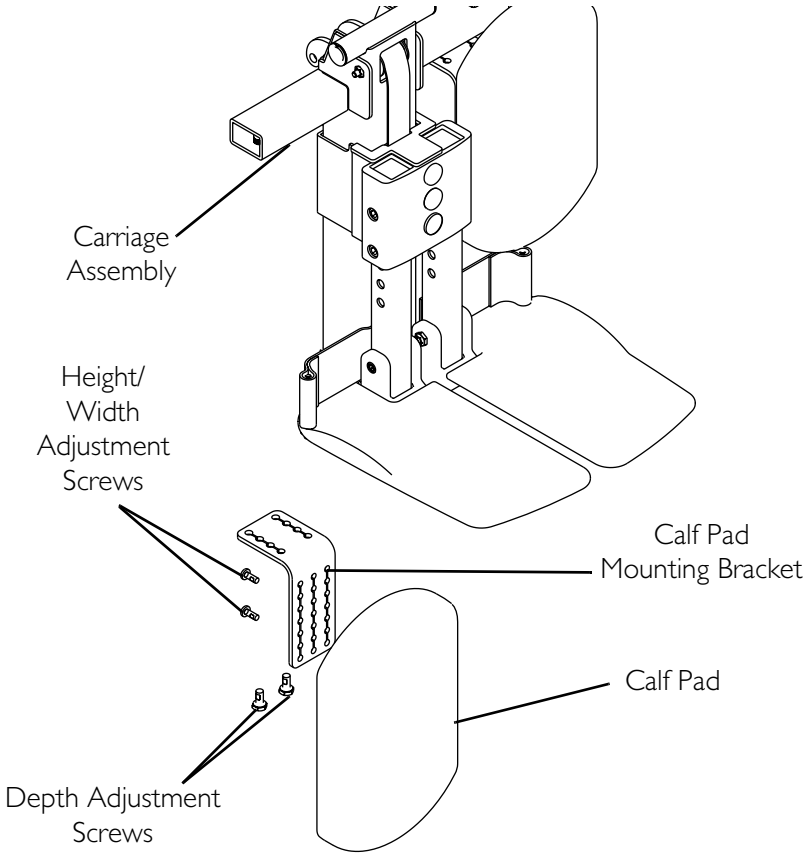


FIGURE 6.22 Calf Pad Adjustment for Power Center Mount Footrests

Height and Width Adjustment

1. Remove the two height/width adjustment screws securing the calf pad to the calf pad mounting bracket.

2. Move the calf pad to the desired position.
3. Install the two height/width adjustment screws to secure the calf pad to the calf pad mounting bracket.
4. Check operation of the calf pads to ensure there is no interference with the seat pan or the carriage assembly. If there is interference, readjust calf pad.
5. Repeat STEPS 1 to 4 for the opposite side, if desired.

Installing/Removing the Power Elevating Legrests

⚠ WARNING

To prevent personal injury, always verify proper positioning of legs and feet prior to use. Individual user weight may impact the rate of travel for each legrest assembly. If simultaneous operation is desired, select a speed which allows for the most uniform travel.

DO NOT insert fingers between legrest components, otherwise personal injury may occur.

CAUTION

Never allow items to become trapped between the legrest assemblies, otherwise damage to the power legrests may occur.

Ensure that all parts of both power legrests are clear of any obstructions before raising and lowering, otherwise damage to the power legrests may occur.

NOTE: For this procedure, refer to FIGURE 6.23 on page 84.

NOTE: Power legrests are linked to the recline function of the powered seating system. Operating the recline function automatically operates power legs. Power legrests can also be operated independently of the recline function.

Installing the Power Elevating Legrests

1. Turn power legrest to side (open footplate is perpendicular to wheelchair) (Detail "A" of FIGURE 6.23).
2. Insert the mounting pin of power legrest into the mounting hole of the seat frame (Detail "A" of FIGURE 6.23).

NOTE: Make sure the legrest sits flush on the seat frame.

3. Rotate the power legs toward the INSIDE of the wheelchair until it locks in place.

NOTE: The footplate will be on the INSIDE of the wheelchair when locked in place.

4. Repeat STEPS 1-3 for the opposite legrest.
5. Connect power legrest connector to jumper cable (Detail "B" of FIGURE 6.23).

Removing the Power Elevating Legrests

1. Disconnect power legrest connector from jumper cable.

2. Push legrest release handle and swing legrest to the outside of the wheelchair.
3. Lift up on powered legrest and remove from wheelchair.
4. Repeat STEPS 1-3 for opposite power legrest.

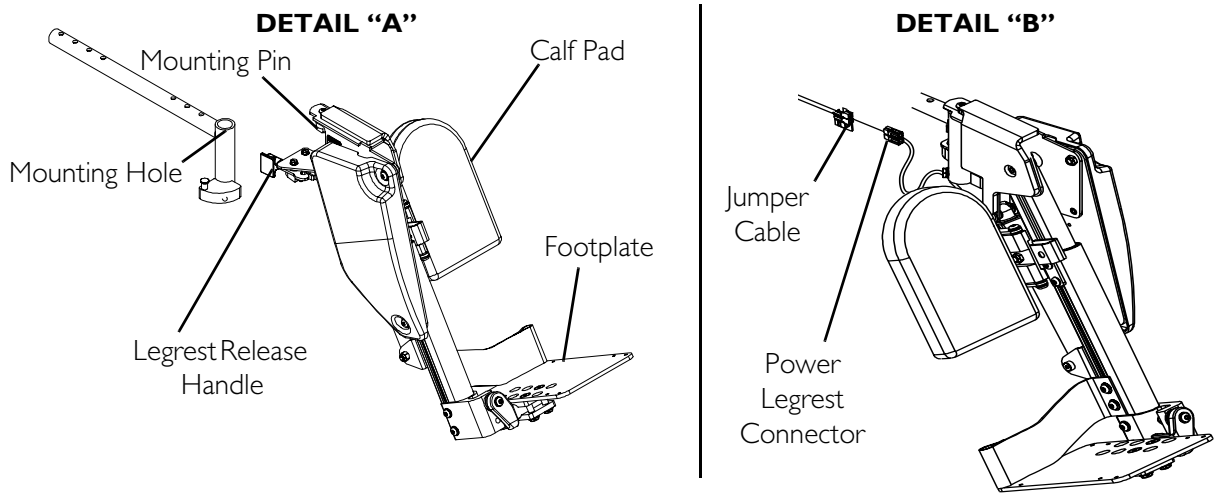


FIGURE 6.23 Installing/Removing the Power Elevating Legrests

Using Mechanical Elevating/Genius Legrests

CAUTION

DO NOT operate the recline function of the seating system if one or both of the mechanical elevating legrest push rods are bent. Damage to the seating system can occur.

NOTE: For this procedure, refer to FIGURE 6.24.

Mechanical elevating legrests are linked to the recline function of the seating system. Operating the recline function automatically operates elevating legrests.

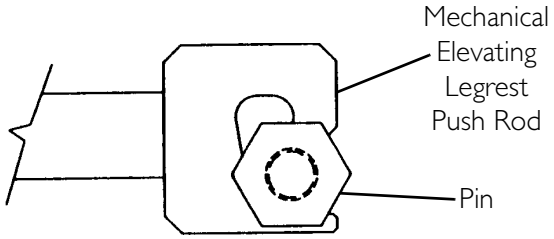


FIGURE 6.24 Using Mechanical Elevating/Genius Legrests

Installing/Removing Mechanical Elevating/Genius Legrests

NOTE: For this procedure, refer to FIGURE 6.25.

Installing

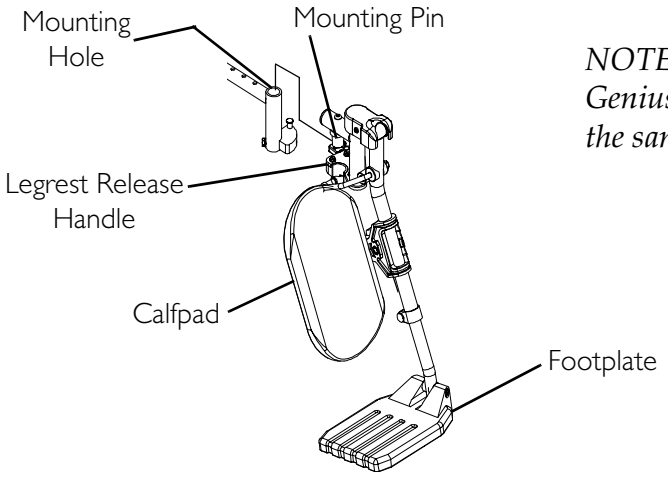
1. Turn elevating legrest to side (open footplate is perpendicular to wheelchair) and position the mounting pin on the legrest mounting holes on the seat frame.
2. Insert the mounting pin into the mounting hole.

NOTE: Make sure the legrest sits flush on the seat frame.

3. Rotate the elevating legrest toward the inside of the wheelchair until it locks in place.

NOTE: The footplate will be on the inside of the wheelchair when locked in place.

4. Lift the elevating legrest up and position the mechanical elevating legrest push rod around the pin on the legrest as shown in FIGURE 6.25.
5. Press down on mechanical elevating legrest push rod until there is an audible "click".
6. Repeat STEPS 1-5 for the opposite elevating legrest.
7. If necessary, adjust elevating legrests. Refer to one of the following:
   - Adjusting Mechanical Elevating Legrests on page 86.
   - Adjusting Genius Legrests on page 87.



NOTE: AT5544 shown. Genius legrest installs the same way.

FIGURE 6.25 Installing/Removing Mechanical Elevating/Genius Legrests

Removing

1. Lift up on the mechanical elevating legrest push rod and remove from the pin on the legrest as shown in FIGURE 6.25.
2. Push elevating legrest release handle toward the opposite side of the wheelchair and swing legrest to the outside of the wheelchair.
3. Lift up on elevating legrest and remove from wheelchair.
4. Repeat STEPS 1-3 for opposite side of wheelchair.

Adjusting Mechanical Elevating Legrests

Calfpads

NOTE: For this procedure, refer to FIGURE 6.26.

1. Turn the calfpad toward the outside of the wheelchair.
2. Slide calfpad up or down until desired position is obtained.
3. Turn the calfpad toward the inside of the wheelchair.

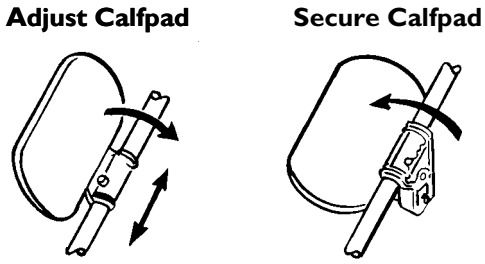


FIGURE 6.26 Adjusting Mechanical Elevating Legrests - Calfpads

Footplate Height

NOTE: For this procedure, refer to FIGURE 6.27.

NOTE: The following procedure should be performed with the user in the wheelchair.

1. Loosen, but DO NOT remove, the bolt and locknut that secure the lower legrest assembly to the upper legrest assembly.
2. Move the lower legrest assembly to the desired position for the user.
3. While holding the lower legrest in position, tighten the bolt and locknut securely.
4. Repeat STEPS 1-4 for opposite legrest if necessary.

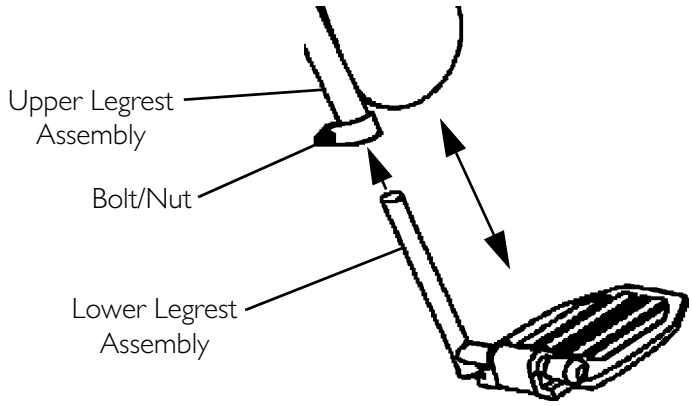


FIGURE 6.27 Adjusting Mechanical Elevating Legrests - Footplate Height

Speed/Height

NOTE: Mechanical Elevating Legrest speed and height cannot be adjusted independently of the recline function of the wheelchair. If the mechanical elevating legrests are not operating as desired, have the wheelchair serviced by an Invacare dealer or technician.

Adjusting Genius Legrests

Footplate Height

NOTE: For this procedure, refer to FIGURE 6.28.

1. Note the angle of the footplate in relation to the legrest as shown in FIGURE 6.28.
2. Loosen, but DO NOT remove, the three hex bolts and locknuts that secure the footplate to the legrest.
3. Adjust the footplate to the desired height.
4. Line up the footplate to the angle noted in STEP 1.
5. While holding the footplate, tighten the three hex bolts and locknuts securely.

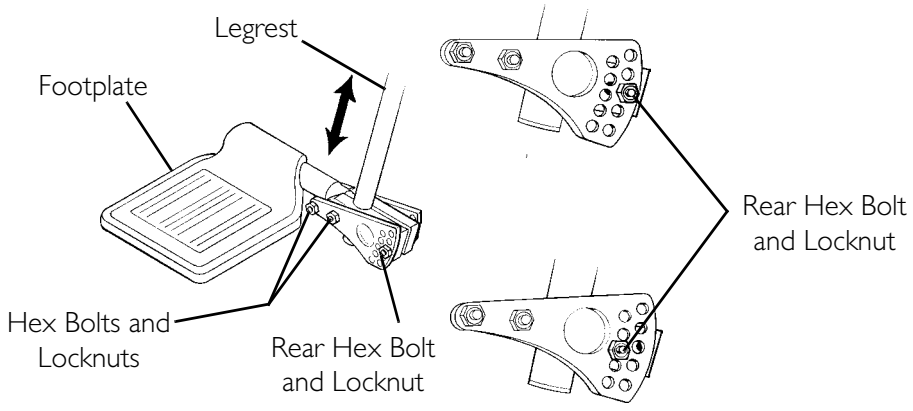


FIGURE 6.28 Adjusting Genius Legrests - Footplate Height/Footplate Angle

Footplate Angle

NOTE: For this procedure, refer to FIGURE 6.28.

1. Note the angle of the footplate in relation to the legrest as shown in FIGURE 6.28.
2. Remove the rear hex bolt and locknut that secure the footplate to the legrest.
3. Move the footplate to the desired angle.
4. Install the hex bolt through the mounting holes that correspond to the desired footplate angle.
5. Install the locknut onto the hex bolt.
6. Line up the footplate to the angle noted in STEP 1.
7. While holding the footplate, tighten the hex bolt and locknut securely.

Calfpad Height

NOTE: For this procedure, refer to FIGURE 6.29.

1. Turn the calfpad towards the outside of the wheelchair.
2. Slide calfpad up or down until desired position is obtained.
3. Turn the calfpad towards the inside of the wheelchair.

Calfpad Depth

NOTE: For this procedure, refer to FIGURE 6.29.

1. Remove the hex bolt and locknut that secure the calfpad and spacer to the adjustment bracket.
2. Move the legrest to one of three positions.
3. Reinstall the hex bolt through the spacer and calfpad.

NOTE: Make sure hex bolt sits flush adjustment bracket channel.

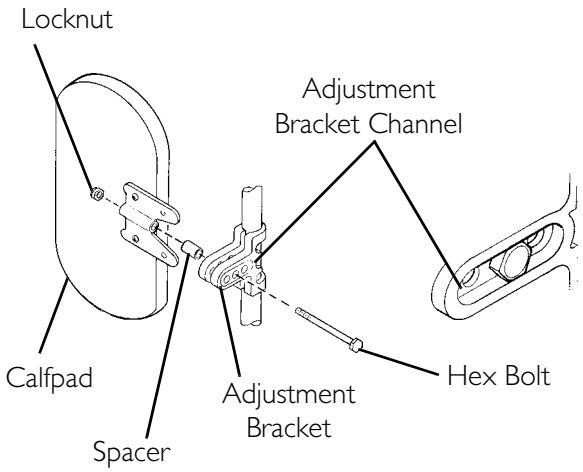


FIGURE 6.29 Adjusting Genius Legrests - Calfpad Height/Calfpad Depth

4. Reinstall locknut onto the hex bolt and tighten securely.

Legrest Height

NOTE: For this procedure, refer to FIGURE 6.30.

1. Remove the button screw that secures the adjustment link and two washers to the legrest support.
2. Move adjustment link to one of three positions.
3. Line up the two washers and adjustment link with the mounting hole in the legrest support.
4. Install the button screw and tighten securely.

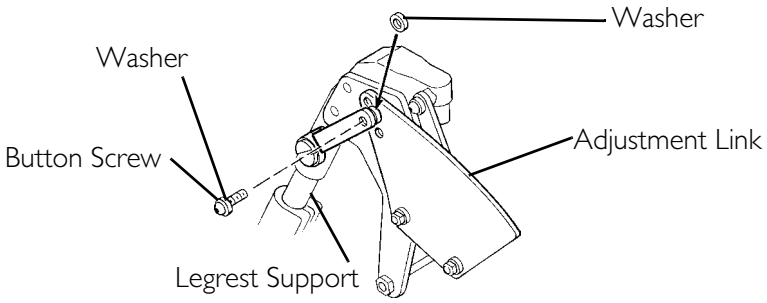


FIGURE 6.30 Adjusting Genius Legrests - Legrest Height

SECTION 7—ARMS

⚠ 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.

Installing/Removing Flip Back Armrests

⚠ WARNING

Make sure the flip back armrest release and height adjustment levers are in the locked position before using the wheelchair.

NOTE: For this procedure, refer to FIGURE 7.1.

NOTE: Flip back armrest release lever must be in the unlocked (up-horizontal) position when placing the armrest into the arm sockets.

Installing

1. Visually inspect to ensure flip back armrest release lever is in the unlocked (up-horizontal) position (FIGURE 7.1).
2. Slide the flip back armrest into the arm sockets on the seat frame.
3. Install the quick-release pin through the rear arm socket and flip back armrest.
4. Lock the flip back armrest by pressing the flip back armrest release lever into the down (vertical) position.
5. Repeat STEPS 1-4 for the opposite flip back armrest.

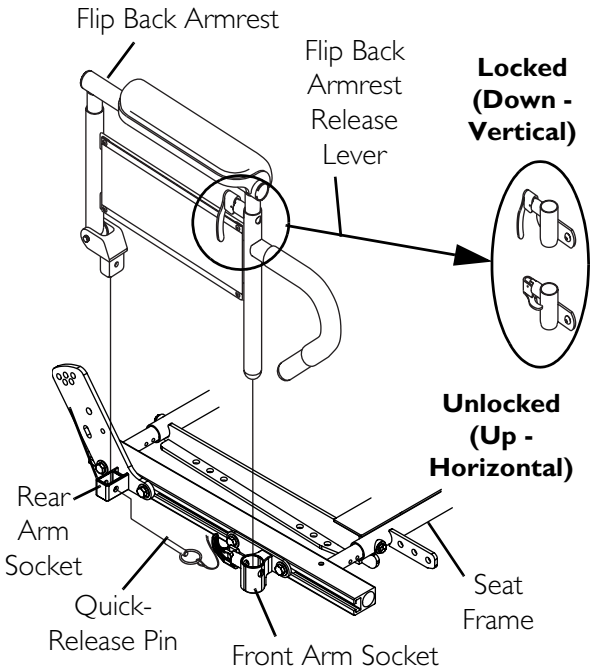


FIGURE 7.1 Installing/Removing Flip Back Armrests

Removing

1. Unlock the flip back armrest by positioning the flip back armrest release lever into the up (horizontal) position (FIGURE 7.1).
2. Remove the quick-release pin that secures the flip back armrest to the rear arm socket.
3. Pull UP on the flip back armrest and remove the armrest from the arm sockets.
4. Repeat STEPS 1-3 for the opposite flip back armrest, if necessary.

Adjusting Flip Back Armrests

⚠ WARNING

Make sure the flip back armrest release and height adjustment levers are in the locked position before using the wheelchair.

NOTE: For this procedure, refer to FIGURE 7.2.

Positioning Flip Back Armrests for User Transfer

1. Unlock the flip back armrest by pulling the armrest release lever into the up (horizontal) position.

⚠ WARNING

Armrest release lever MUST remain in the horizontal position during transfer, otherwise injury may result.

2. Pull up on the flip back armrest and remove the armrest from the front arm socket.
3. Continue to pull up on the flip back armrest until the armrest is out of the way.
4. Repeat STEPS 1-3 for opposite flip back armrest, if necessary

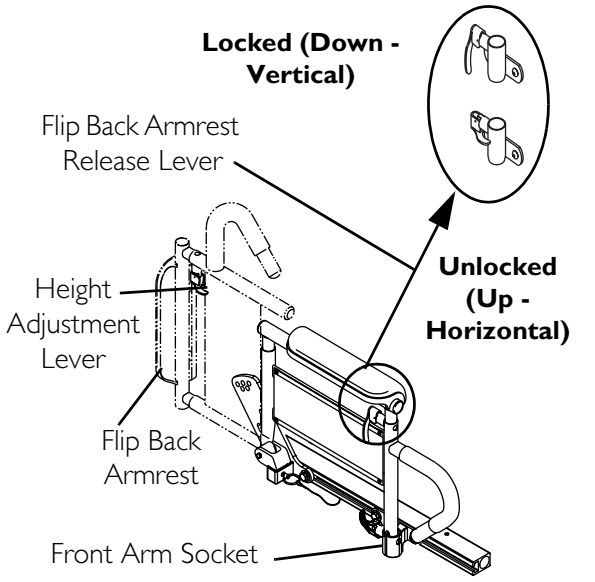


FIGURE 7.2 Adjusting Flip Back Armrests

Positioning Flip Back Armrests for Use

1. Make sure the flip back armrest release lever is in the up (horizontal) position.
2. Install the flip back armrest into the front arm socket.
3. Lock flip back armrest by pressing flip back armrest release lever into the down (vertical) position.
4. Lift up on flip back armrest to make sure the armrest is locked in place.
5. Repeat STEPS 1-4 for opposite flip back armrest, if necessary.

Adjusting

1. Unlock flip back armrest by pulling height adjustment lever into the up (horizontal) position.
2. Adjust the flip back armrest to the desired height.
3. Lock flip back armrest by pushing height adjustment lever into the down (vertical) position.

Removing/Installing Reclining Armrests

NOTE: For this procedure, refer to FIGURE 7.3.

NOTE: This procedure applies to Formula TRE and 2G Tarsys seating systems only.

Removing Armrests

1. Lift the armrest release lever at the front of the wheelchair to the unlocked (horizontal) position.
2. Lift up on the armrest and remove from the front arm socket.
3. Press the release button at the rear of the armrest in.
4. While holding the release button in, remove the armrest from the seat frame.

Installing Armrests

1. Position the armrest on the seat frame as shown in FIGURE 7.3.
2. Press the release button at the rear of the armrest in.
3. While holding the release button in, slide the armrest onto the seat frame.
4. Make sure the armrest release lever is in the unlocked (horizontal) position.
5. Install the armrest into the front socket.
6. Push the armrest release lever down into the locked (vertical) position.

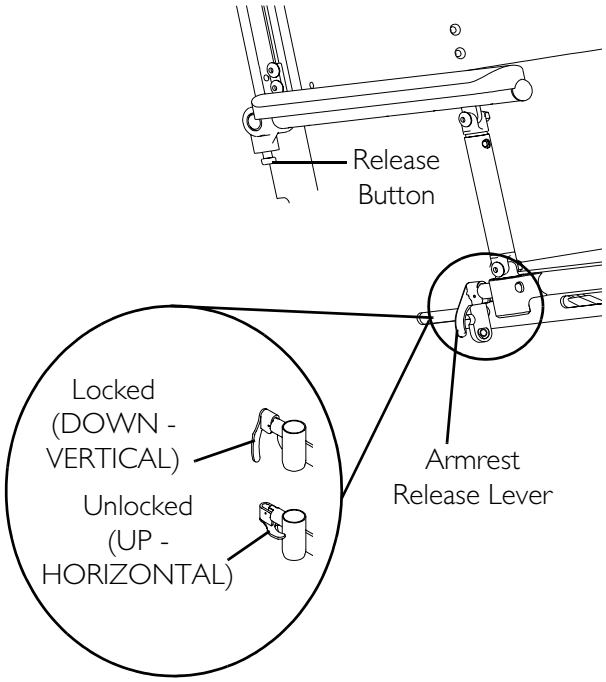


FIGURE 7.3 Removing/Installing Reclining Armrests

Adjusting Reclining Armrest Height

NOTE: For this procedure, refer to FIGURE 7.4 on page 93.

NOTE: This procedure applies to Formula TRE and 2G Tarsys seating systems only.

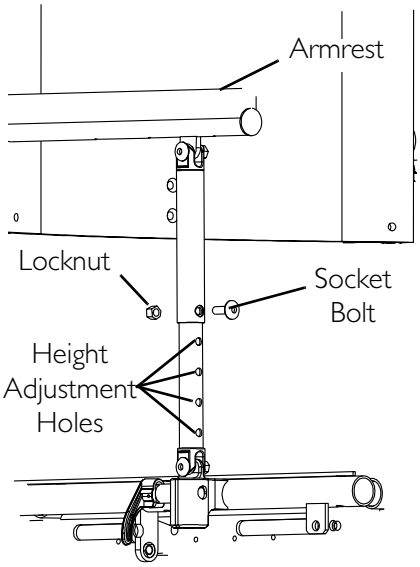
1. Make sure the seating system is in the full upright position. **Refer to <u>Operating Powered Seating Systems on page 56</u>**.
2. Remove the socket bolt and locknut that secure the front of the upper armrest to the lower armrest (Detail "A").
3. Perform one of the following:
   - Formula TRE with Conventional Back - Loosen, but DO NOT remove, the two socket screws securing the arm adapter plate to the back cane (Detail "B").
   - Formula TRE with Contoura Back - Loosen, but DO NOT remove, the two cap screws and the locknut securing the arm adapter plate to the back cane (Detail "C").
   - 2G Tarsys - Loosen, but DO NOT remove, the two socket screws that secure the rear of the armrest of the back cane (Detail "D").
4. Adjust the armrest to the desired height for the user.

NOTE: The armrests can be at different heights to accommodate the user.

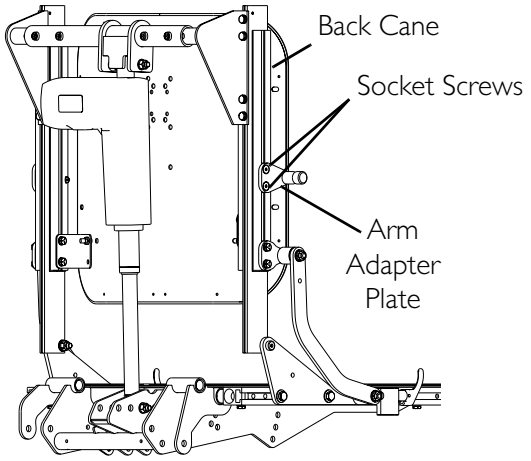
NOTE: The armrest adjusts from 11 to 16 inches in 1-inch increments.

5. Reinstall the socket bolt through the mounting hole determined in STEP 4 (Detail "A").
6. Reinstall the locknut and tighten securely.
7. While holding the armrest level, perform one of the following:
   - Formula TRE with Conventional Back - Tighten the two socket screws to secure the arm adapter plate to the back cane (Detail "B").
   - Formula TRE with Contoura Back - Tighten the two cap screws and the locknut to secure the arm adapter plate to the back cane (Detail "C").
   - 2G Tarsys - Tighten the two socket screws that secure the rear of the armrest to the back cane (Detail "D").
8. Repeat STEPS 2-7 for the opposite side if necessary.

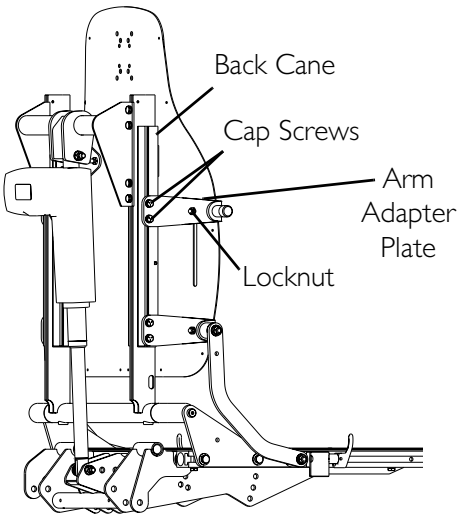
DETAIL "A" - FRONT OF ARMREST



DETAIL "B" - FORMULA TRE SEATING SYSTEM WITH CONVENTIONAL BACK



DETAIL "C" - FORMULA TRE SEATING SYSTEM WITH CONTOURA BACK



DETAIL "D" - 2G TARSYS SEATING SYSTEM

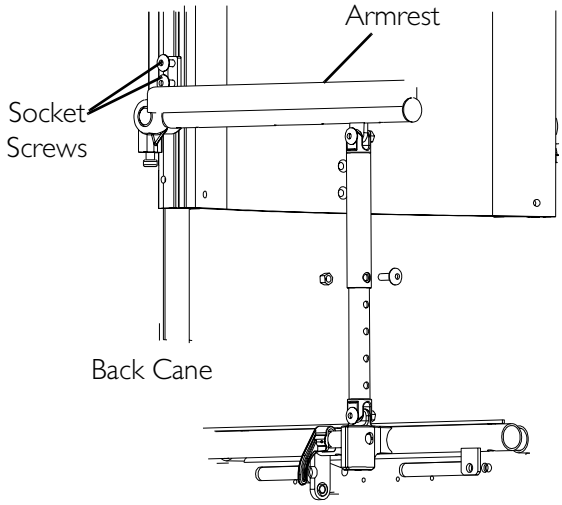


FIGURE 7.4 Adjusting Reclining Armrest Height

SECTION 8—SEAT

⚠ 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.

The seat positioning strap is a positioning belt only. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, belt MUST be replaced immediately.

Replacing Seat Positioning Strap

Wheelchairs with TRRO Option

To replace the seat positioning strap, refer to Wheelchair-Anchored Belts on page 138.

Wheelchairs without 2G Tarsys Seating Systems or TRRO Option

NOTE: For this procedure, refer to FIGURE 8.1 on page 95.

1. Remove the seat cushion from the seat pan.
2. Move the flip back armrests out of the way. Refer to Adjusting Flip Back Armrests on page 90.
3. Remove the two mounting screws, locknuts, washers and quick-release pin tabs that secure the seat positioning straps to the seat frame.
4. Remove the two halves of the seat positioning strap from the rear seat frame.
5. Reposition the two new seat positioning strap inside of the seat frame as shown.
6. Reinstall the two mounting screws and quick-release pin tabs that secure the seat positioning straps to the seat frame and torque to 75 in-lbs.
7. Reinstall the seat cushion onto the seat pan.

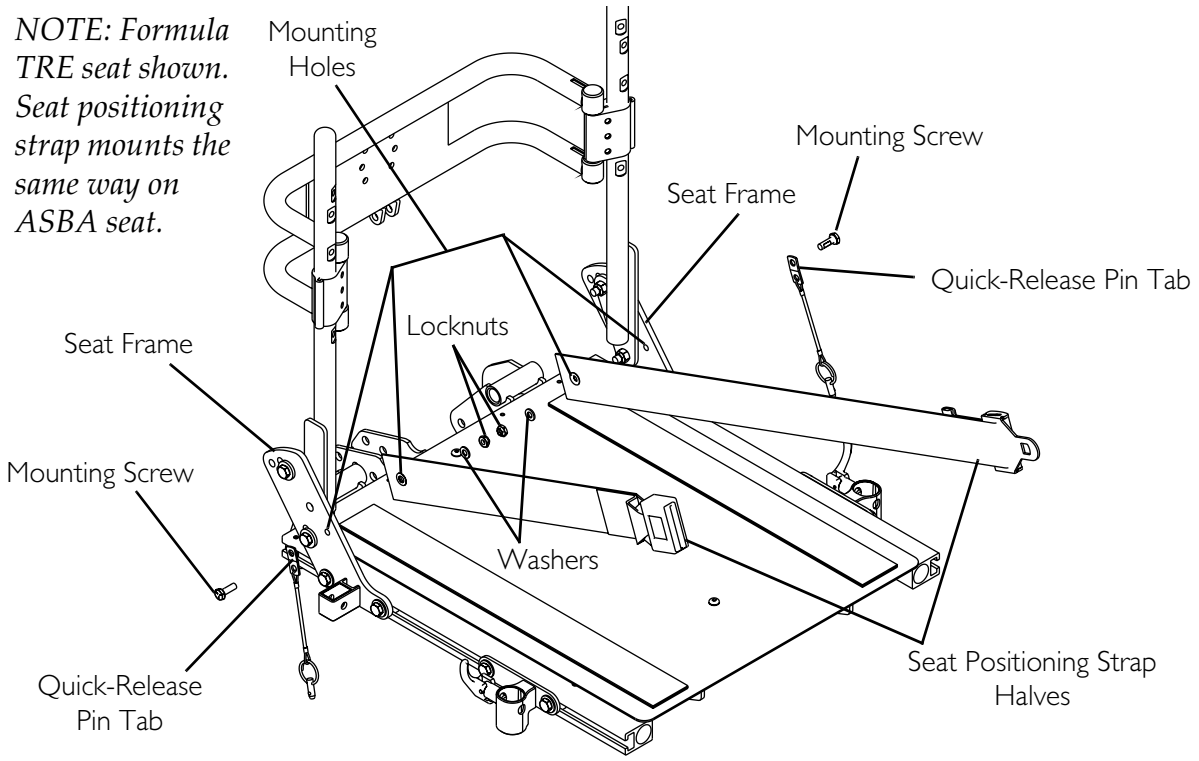


FIGURE 8.1 Replacing Seat Positioning Strap - Wheelchairs without 2G Tarsys Seating Systems or TRRO Option

Wheelchairs with 2G Tarsys Seating Systems

NOTE: For this procedure, refer to FIGURE 8.2.

1. Remove the two hex bolts, washers and locknuts that secure the two halves of the seat positioning strap to the seat frame.
2. Remove the existing seat positioning strap from the seat frame.
3. Position the new seat positioning strap on the seat frame as shown.
4. Reinstall the hex bolt, washer and locknut as shown. Tighten securely.

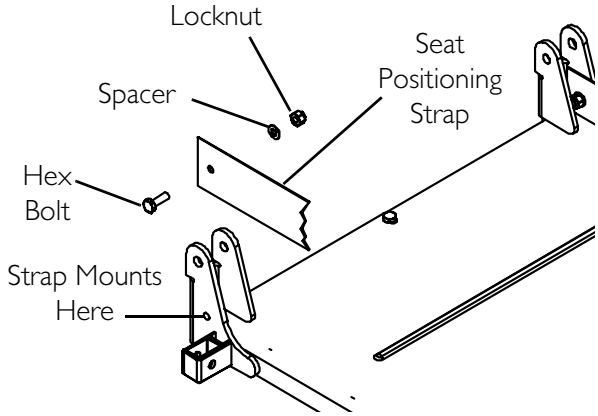


FIGURE 8.2 Replacing Seat Positioning Strap - Wheelchairs with 2G Tarsys Seating Systems

Tilting the Seat Assembly

⚠ WARNING

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

NEVER leave the seat assembly in the UP/OPEN position unless necessary to perform a procedure on the wheelchair - otherwise injury or damage may result.

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 this procedure, refer to FIGURE 8.3 on page 97.

NOTE: This procedure is for TDX wheelchairs with the Formula PTO Plus Seating Systems ONLY.

NOTE: Removing the seat is not necessary to access the battery compartment on wheelchairs equipped with a Formula PTO Plus seating system. The seat assembly with the Formula PTO Plus seating system tilts back and props into place to provide access to the batteries and the underside of the seat.

Tilting the Seat Assembly Back

CAUTION

Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.

1. Tilt seat back 20° to 25°. **Refer to Operating Powered Seating Systems on page 56**.
2. Verify the joystick ON/OFF switch is in the OFF position and disconnect joystick cable.
3. Engage the motor release levers. Refer to Disengaging/Engaging Motor Lock Levers on page 124.
4. Remove front rigging. Refer to Installing/Removing Footrests on page 67.
5. Note the mounting position of the two screws securing the Formula PTO Plus frame to the seat brackets.
6. Remove the two screws and washers securing the Formula PTO Plus frame to the seat brackets.
7. Firmly grasp the front edge of the seat assembly and slowly tilt the seat assembly back into the UP/OPEN position.
8. Remove prop rod from the clip located on the Formula PTO Plus frame and engage the prop rod end into the seat bracket.
9. Gently allow weight of seat assembly to be supported by the prop rod.

NOTE: Only leave the seat assembly in the UP/OPEN position while performing any necessary procedures. Always lower the seat assembly to the DOWN/CLOSED position when not servicing the wheelchair. Ensure the seat is locked in place before using.

Tilting the Seat Assembly Forward

1. Using one hand, firmly grasp the front edge of the seat assembly and lift until seat assembly is no longer supported by the prop rod.
2. Disengage the prop rod from the seat bracket and secure into clip.
3. Using both hands, slowly tilt the seat assembly FORWARD into the DOWN/CLOSED position.

⚠ WARNING

Ensure the two screws are fully engaged and the Formula PTO Plus frame is securely locked in place before use - otherwise injury or damage may result.

4. Insert the two screws through both the Formula PTO Plus frame and the two seat brackets.

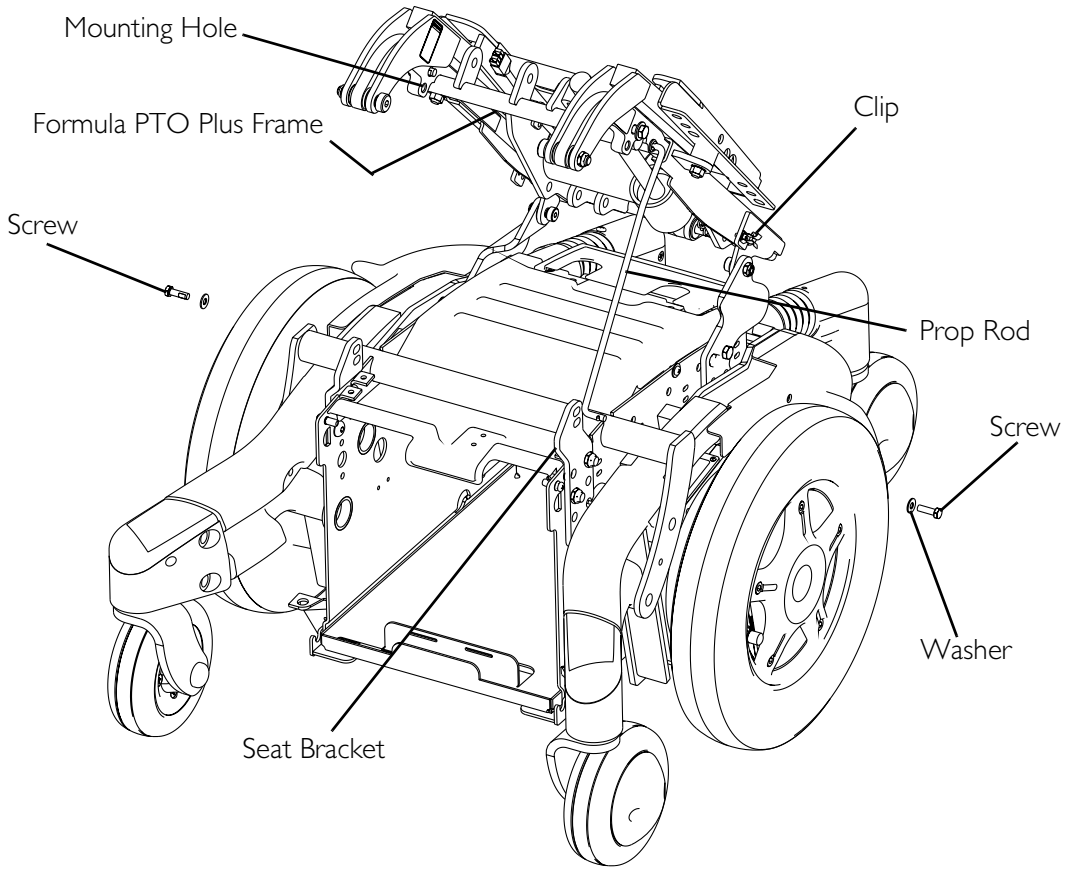


FIGURE 8.3 Tilting the Seat Assembly

SECTION 9— HANDLING AND REPLACING BATTERIES

⚠ WARNING

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

Warnings for Handling and Replacing Batteries

⚠ WARNING

Make sure power to the wheelchair is OFF before performing these procedures.

The use of rubber gloves 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.

22NF batteries weigh 37 pounds each. GP24 batteries weigh 51 pounds each. Use proper lifting techniques (lift with your legs) to avoid injury.

FORMULA TRE SEATING SYSTEMS, 2G TARSYS SYSTEMS, FORMULA PTO SEATING SYSTEMS AND TDX WHEELCHAIRS WITHOUT POWERED SEATING SYSTEMS ONLY - Use MK p/n M24SLDG or p/n M22NFSLDG batteries only. Failure to use the correct battery size and/or voltage may cause damage to your wheelchair and give you unsatisfactory performance.

FORMULA INVISIBLE SUPER LOW TILT SYSTEMS ONLY - Use MK p/n M22NFSLDG batteries only. Failure to use the correct battery size and/or voltage may cause damage to your wheelchair and give you unsatisfactory performance

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.

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

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.

The POSITIVE (+) RED battery cable MUST connect to the POSITIVE (+) battery terminal(s)/post(s), otherwise serious damage will occur to the electrical system.

Install protective caps on POSITIVE (+) and NEGATIVE (-) battery terminals.

⚠ WARNING

DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable mounting screw.

NOTE: If there is battery acid in the bottom of the battery tray or on the sides of the battery(ies), apply baking soda to these areas to neutralize the battery acid. Before reinstalling the existing or new battery(ies), clean the baking soda from the battery tray or battery(ies) being sure to avoid contact with skin and eyes. Determine source of contamination. Never install/reinstall a battery with a cracked or otherwise damaged case.

Using the Proper Batteries

1. Position battery on ground/flat surface as shown below.
2. Visually inspect the battery to ensure proper polarity:

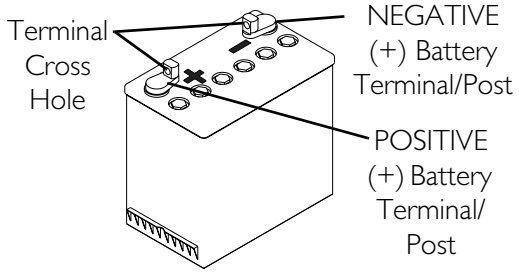
⚠ WARNING

FOR TDX WHEELCHAIRS, 2G TARSYS SYSTEMS, FORMULA TRE SEATING SYSTEMS, FORMULA PTO PLUS SEATING SYSTEMS AND FORMULA INVISIBLE SUPER LOW TILT SEATING SYSTEMS THAT USE 22NF BATTERIES

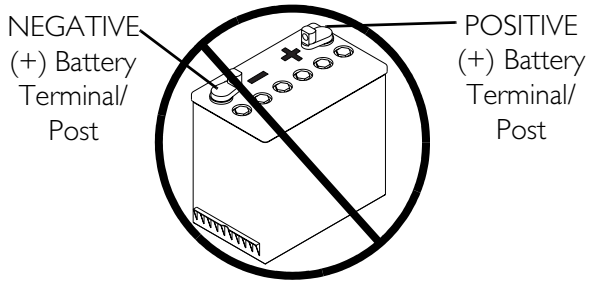
Batteries with terminal configuration (POSITIVE on the left and NEGATIVE on the right) as shown below MUST be used. Batteries that have the reverse terminal configuration MUST not be used - otherwise injury and damage may occur.

Terminals MUST have a cross hole in them as shown below.

PROPER BATTERIES TO USE



DO NOT USE THIS TYPE OF BATTERY



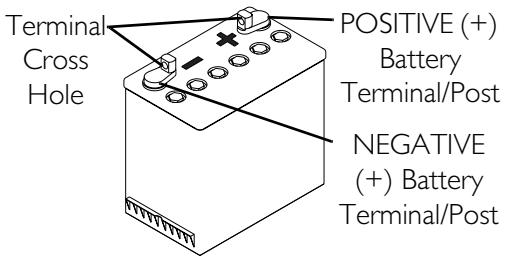
⚠ WARNING

FOR TDX WHEELCHAIRS, 2G TARSYS SYSTEMS, FORMULA PTO PLUS SEATING SYSTEMS AND FORMULA TRE SEATING SYSTEMS THAT USE GP24 BATTERIES

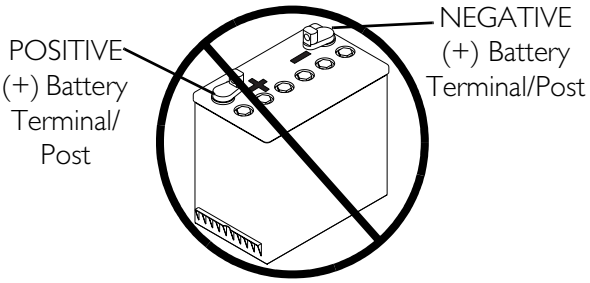
Batteries with terminal configuration (POSITIVE on the right and NEGATIVE on the left) as shown below MUST be used. Batteries that have the reverse terminal configuration MUST not be used - otherwise injury and damage may occur.

Terminals MUST have a cross hole in them as shown below.

PROPER BATTERIES TO USE



DO NOT USE THIS TYPE BATTERY



Replacing Batteries

NOTE: For this procedure, refer to FIGURE 9.1 on page 102, FIGURE 9.2 on page 103 or FIGURE 9.3 on page 104.

NOTE: The following tools are required to perform this procedure.

- Wire Cutter

1. Remove the batteries from the wheelchair. Refer to one of the following sections:
   - NO Powered Seating System - TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
   - Formula TRE Systems - TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
   - Formula PTO Plus Systems - TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
   - Formula Invisible Super Low Tilt Systems - Formula Invisible Super Low Tilt Batteries on page 115.
   - 2G Tarsys Systems - TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
2. Cut the tie-wraps that secure the battery terminal covers to the battery terminals.
3. Slide the RED battery terminal cover back on the RED battery cable to expose the POSITIVE battery terminal.
4. Slide the BLACK battery terminal cover back on the BLACK battery cable to expose battery terminal.

⚠ WARNING

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

5. Remove the locknut that secures the bracket of the POSITIVE battery cable to the POSITIVE (+) battery post of the battery.
6. Remove the locknut that secures the NEGATIVE battery cable to the NEGATIVE(-) battery post of the battery
7. Discard the existing battery.
8. Position battery connector bracket or wiring harness onto the new 22NF or GP24 battery as shown.
9. Secure the NEGATIVE battery cable to the NEGATIVE (-) battery post with existing mounting screw and locknut.
10. Secure the bracket of the POSITIVE battery cable to the POSITIVE (+) battery post with existing mounting screw and locknut.
11. Position each battery terminal cover over top of each battery terminal.
12. Secure battery terminal covers in place with one tie-wrap.
13. Install batteries into wheelchair. Refer to one of the following sections:
    - TDX Wheelchairs with NO Powered Seating System - TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
    - TDX Wheelchairs with Formula TRE Seating System - TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
    - Formula PTO Plus Seating Systems - TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.
    - TDX Wheelchairs with Formula Invisible Super Low Tilt Seating System - Formula Invisible Super Low Tilt Batteries on page 115.
    - 2G Tarsys Systems - TDX, Formula TRE, 2G TARSYS and Formula PTO Plus Batteries on page 106.

TDX Wheelchairs without Powered Seating Systems, 2G Tarsys Systems, Formula PTO Plus Systems and Non-Elevate Formula TRE Systems

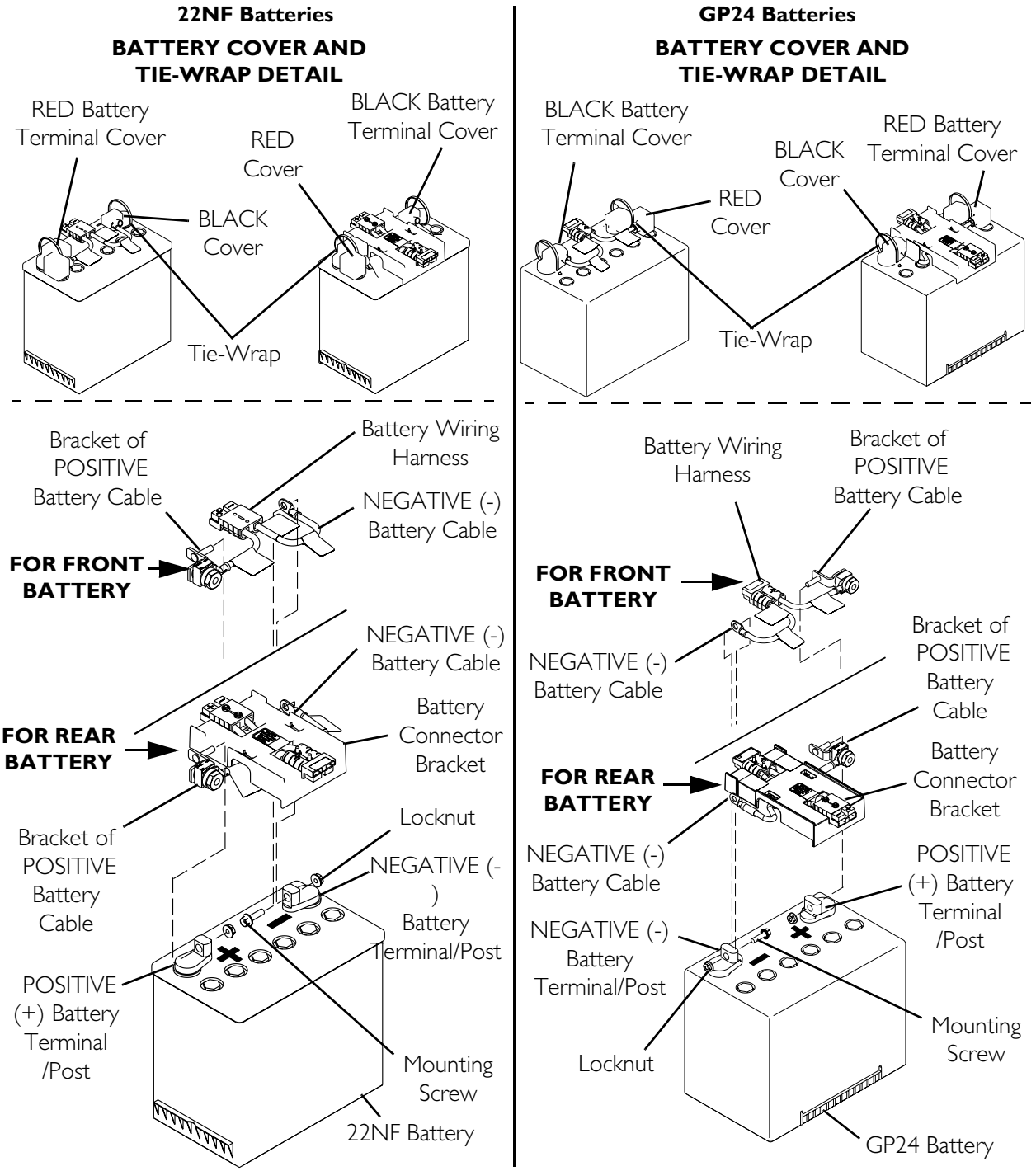
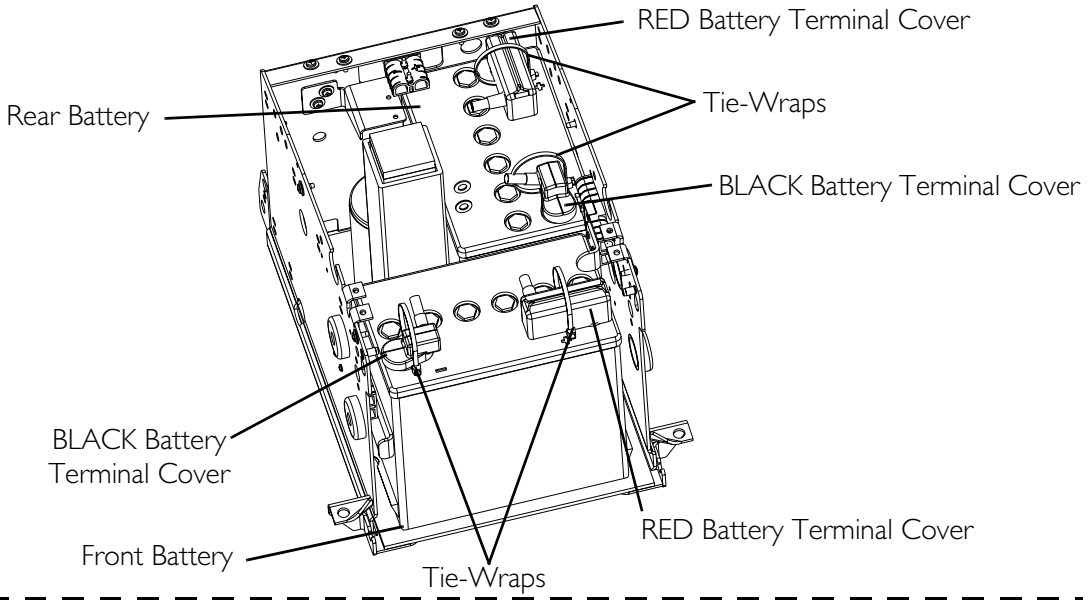


FIGURE 9.1 Replacing Batteries - TDX Wheelchairs without Powered Seating System And Non-Elevate Formula TRE Systems

TDX Wheelchairs with Elevate Formula TRE Systems
22NF Batteries
BATTERY COVER AND TIE-WRAP DETAIL



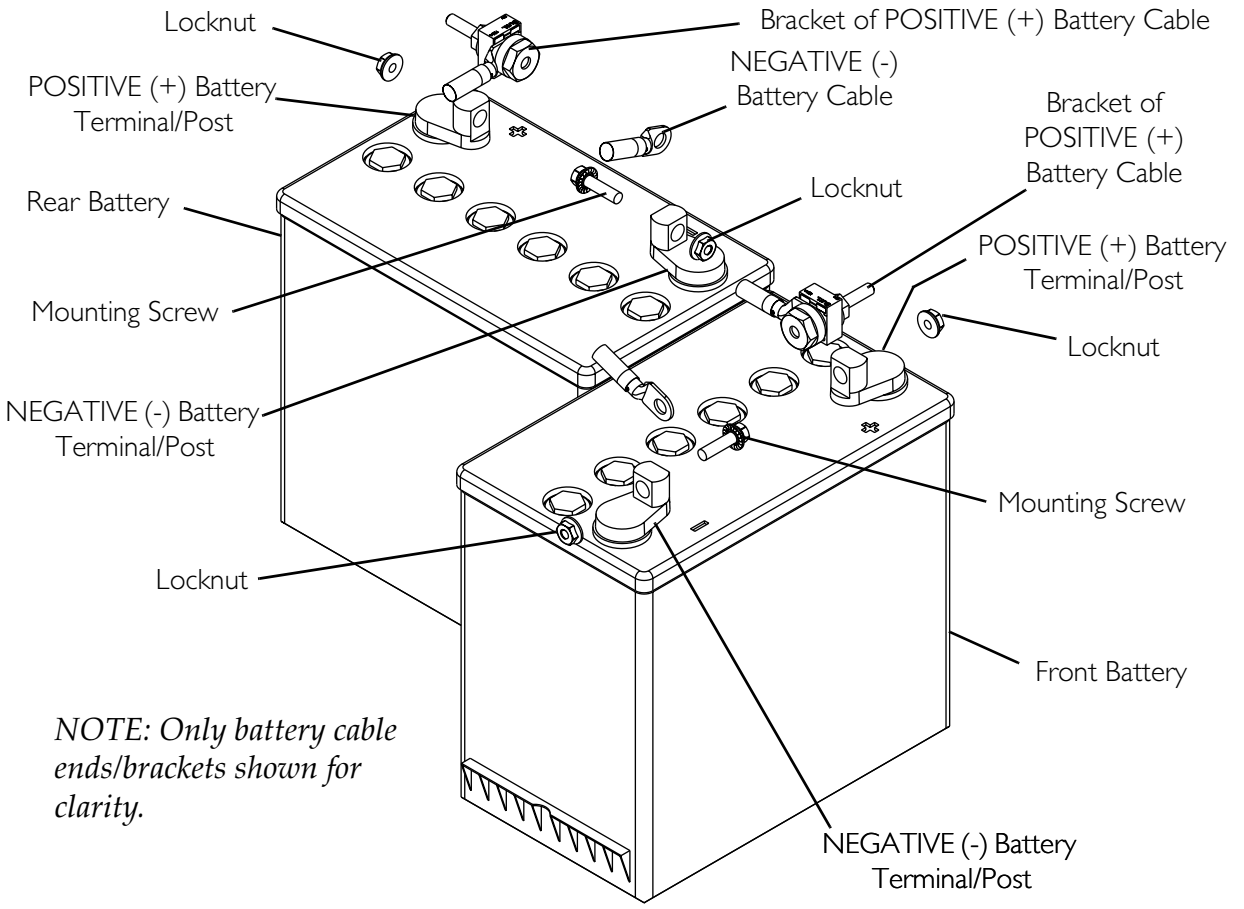


FIGURE 9.2 Replacing Batteries - TDX Wheelchairs with Elevate Formula TRE Seating Systems

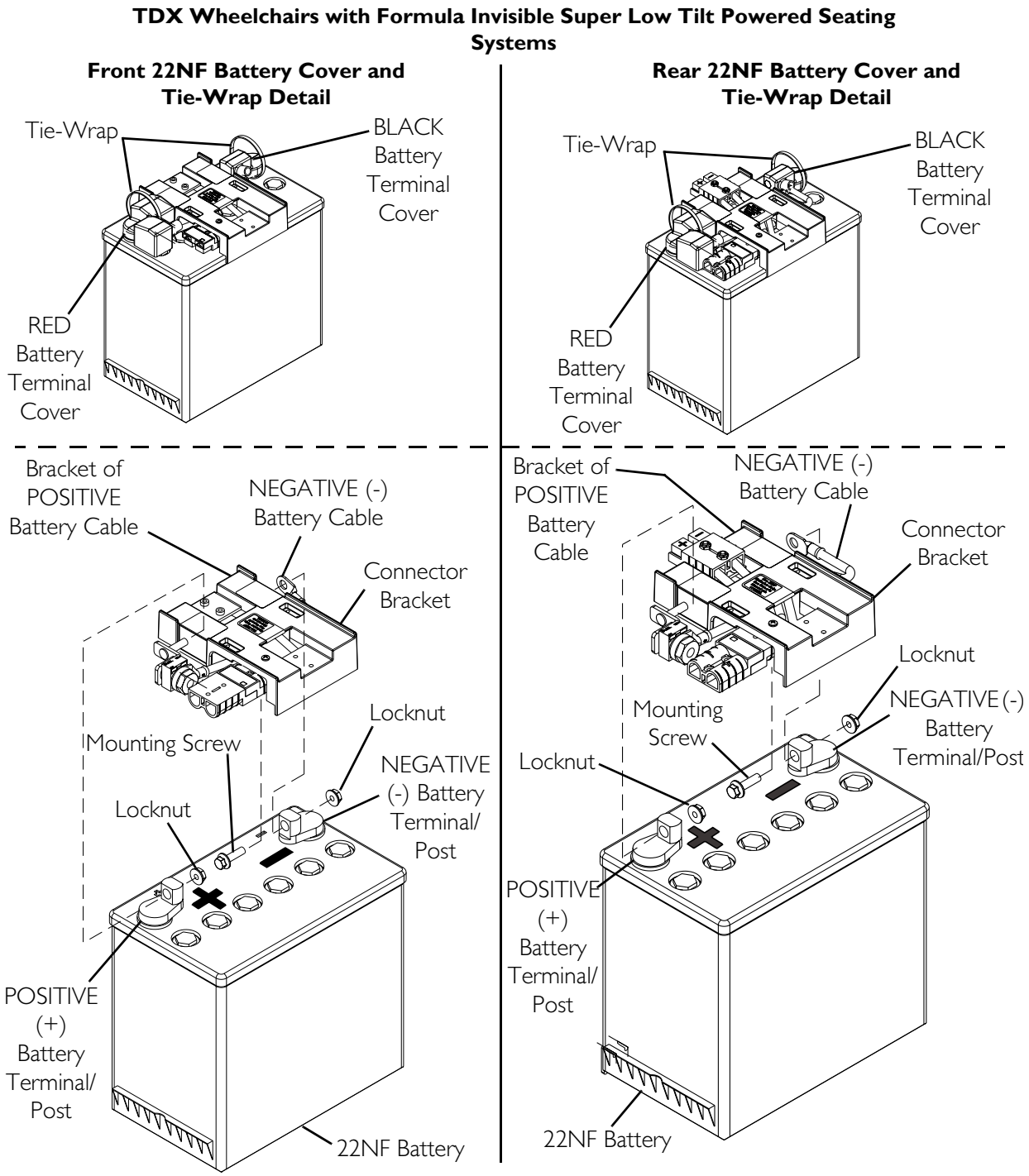


FIGURE 9.3 Replacing Batteries - TDX wheelchairs with Formula Invisible Super Low Tilt

Cleaning Battery Terminals

⚠ WARNING

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

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.

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

NOTE: Upon completion, areas should be shiny, not dull.

4. Carefully dust off all metal particles.

SECTION 10—TDX, FORMULA TRE, 2G TARSYS AND FORMULA PTO PLUS BATTERIES

⚠ WARNING

Read and understand the information and warnings in Handling and Replacing Batteries on page 98 before performing these procedures.

Unless otherwise indicated, make sure power to the wheelchair is OFF before performing these procedures.

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

NOTE: If there is battery acid in the bottom of the battery tray or on the sides of the battery(ies), apply baking soda to these areas to neutralize the battery acid. Before reinstalling the existing or new battery(ies), clean the baking soda from the battery tray or battery(ies) being sure to avoid contact with skin and eyes. Determine source of contamination. Never install/reinstall a battery with a cracked or otherwise damaged case.

Removing/Installing the Batteries From/Into the Wheelchair

Removing the Battery Door and Rear Shrouds

CAUTION

Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.

NOTE: For this procedure, refer to FIGURE 10.1 on page 107 and FIGURE 10.2 on page 108.

1. Verify the joystick ON/OFF switch is in the OFF position.
2. Remove the two thumb screws that secure the rear shroud to the wheelchair.
3. Remove the rear shroud from the wheelchair.
4. TRRO and TRBKTS Options Only - Perform the following steps:
   A. Remove two thumb screws that secure the top controller shroud (FIGURE 10.2) to the battery box.
   B. Remove the top controller shroud from the battery box.
5. Formula PTO Plus ONLY - Tilt the PTO Plus back. Refer to Tilting the Seat Assembly on page 96.
6. Remove both mounting screws from side of battery door.

7. Remove the battery door from the front of wheelchair.
8. TRRO and TRBKTS Options Only - Perform the following steps (FIGURE 10.2):
   A. Remove the four screws and four locknuts (if applicable) that secure the battery support bracket to the battery box.
   B. Remove the battery support bracket.
9. Disconnect the controller from the batteries at the rear of the wheelchair.
10. Remove the batteries. Proceed to one of the following procedures:
    - Wheelchairs without Elevate - Removing the Batteries from Wheelchairs without Elevate on page 109.
    - Wheelchairs with Elevate - Removing the Batteries from Wheelchairs with Elevate on page 110.

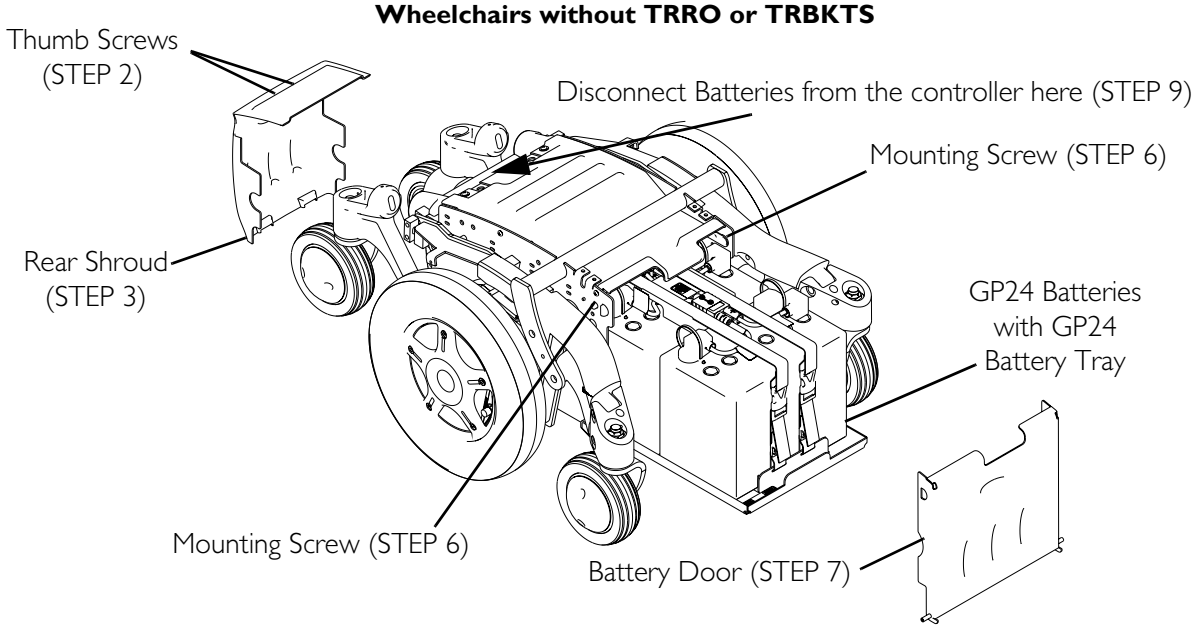
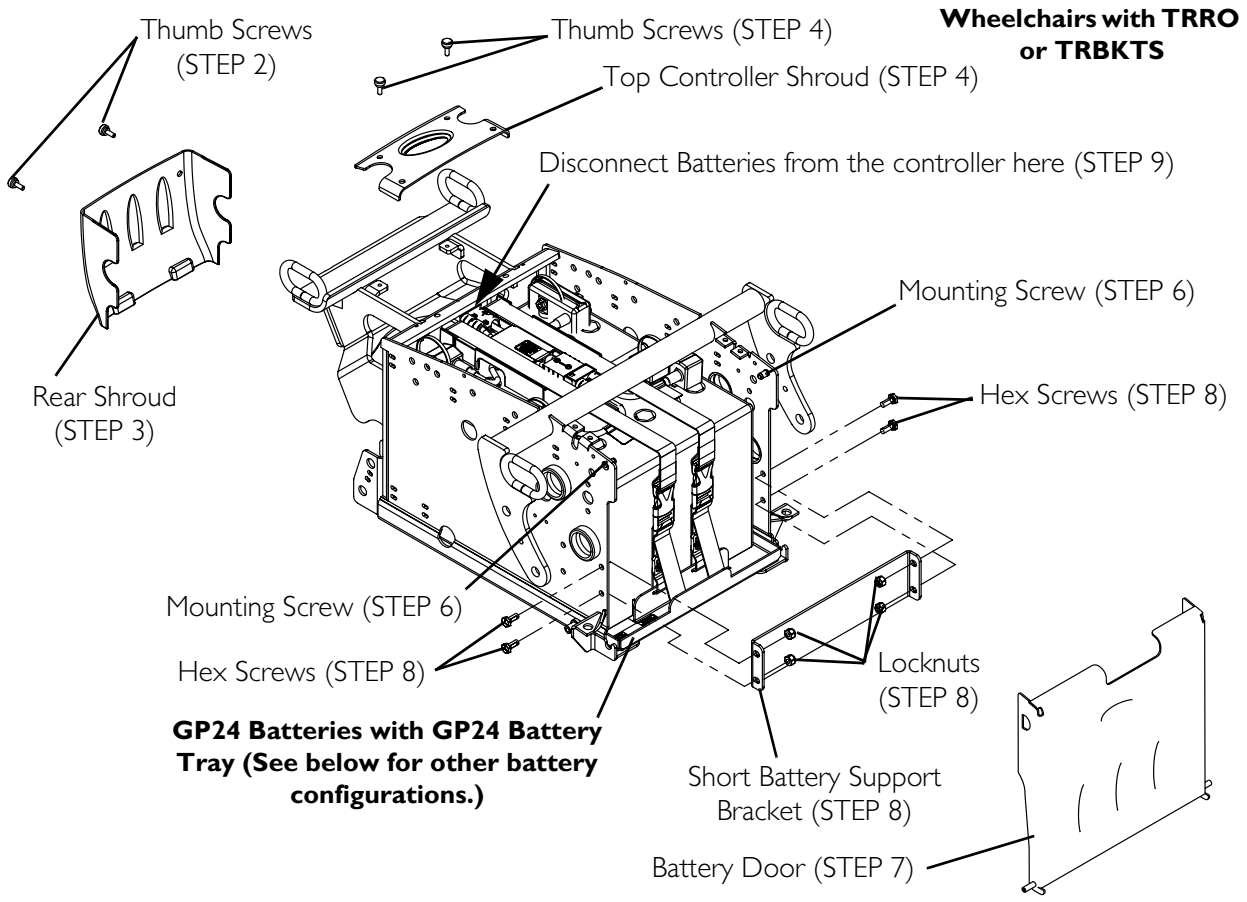


FIGURE 10.1 Removing the Battery Door and Rear Shrouds - Wheelchairs without TRRO or TRBKTS



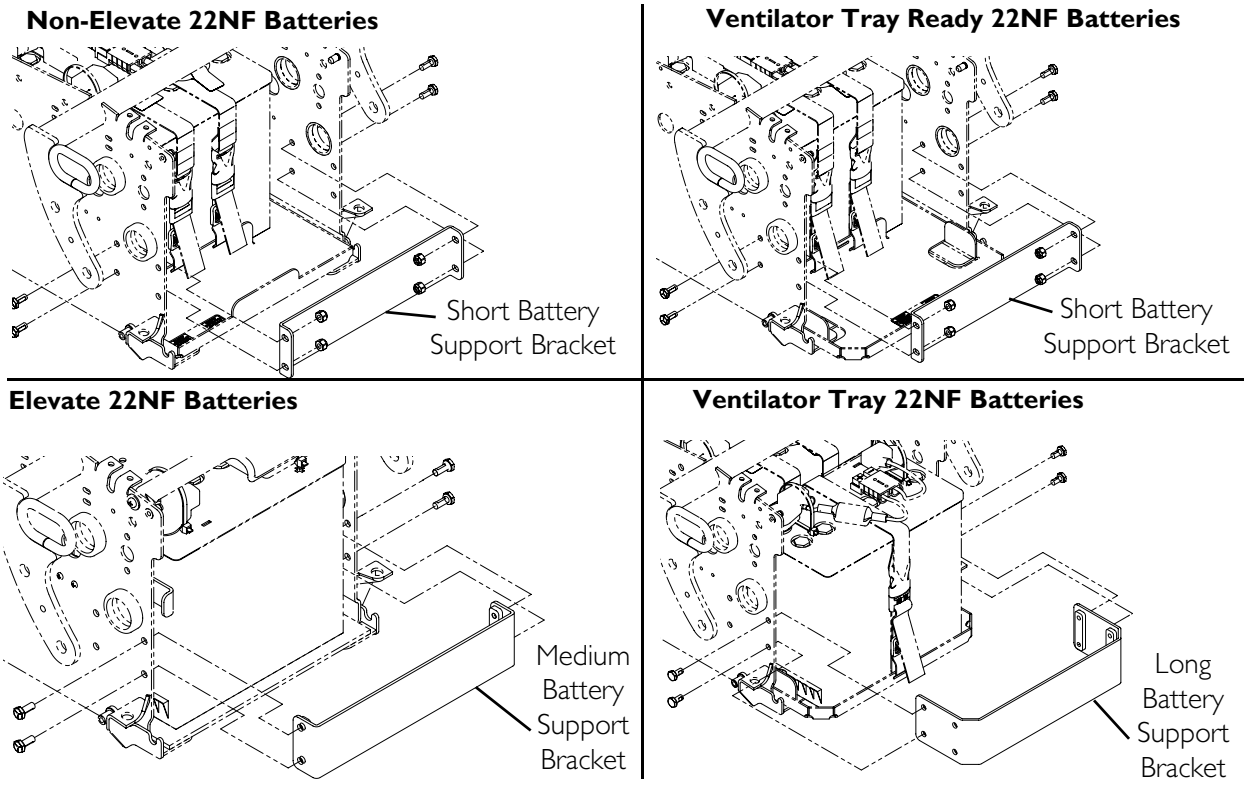


FIGURE 10.2 Removing the Battery Door and Rear Shrouds/Installing the Battery Door and Rear Shroud - Wheelchairs with TRRO and TRBKTS

Removing the Batteries from Wheelchairs without Elevate

NOTE: For this procedure, refer to FIGURE 10.3 on page 110.

1. If wheelchair is equipped with ventilator tray, perform the following steps:

   NOTE: Refer to DETAIL "A" in FIGURE 10.3 on page 110.

   A. Disconnect ventilator battery from wiring harness.

   B. Disconnect the strap that secures the ventilator battery to the tray.

   C. Remove the ventilator battery.
2. Slide battery tray with batteries out.
3. Disconnect the battery straps.
4. Unplug front battery from rear battery.
5. Remove the front battery.
6. Slide the rear battery forward and remove it from the tray.

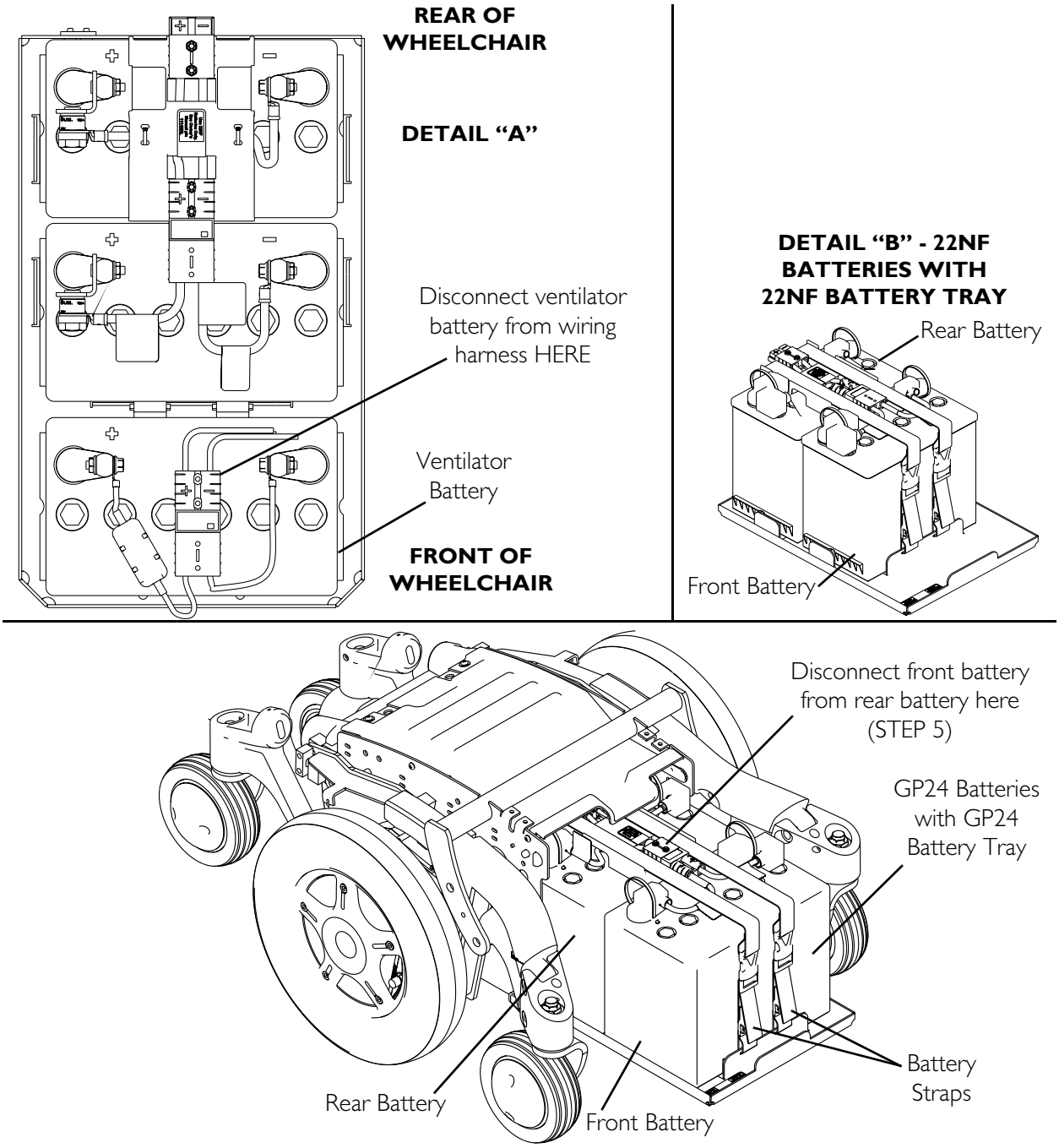


FIGURE 10.3 Removing the Batteries from Wheelchairs without Elevate

Removing the Batteries from Wheelchairs with Elevate

NOTE: For this procedure, refer to FIGURE 10.4 on page 111.

1. Grasp and pull the YELLOW battery connector tab to unplug the front battery.
2. Slide the front battery FORWARD and remove it from the battery box.
3. Grasp and pull the BLACK battery connector tab to unplug the rear battery.
4. Slide the rear battery FORWARD and remove it from the battery box.

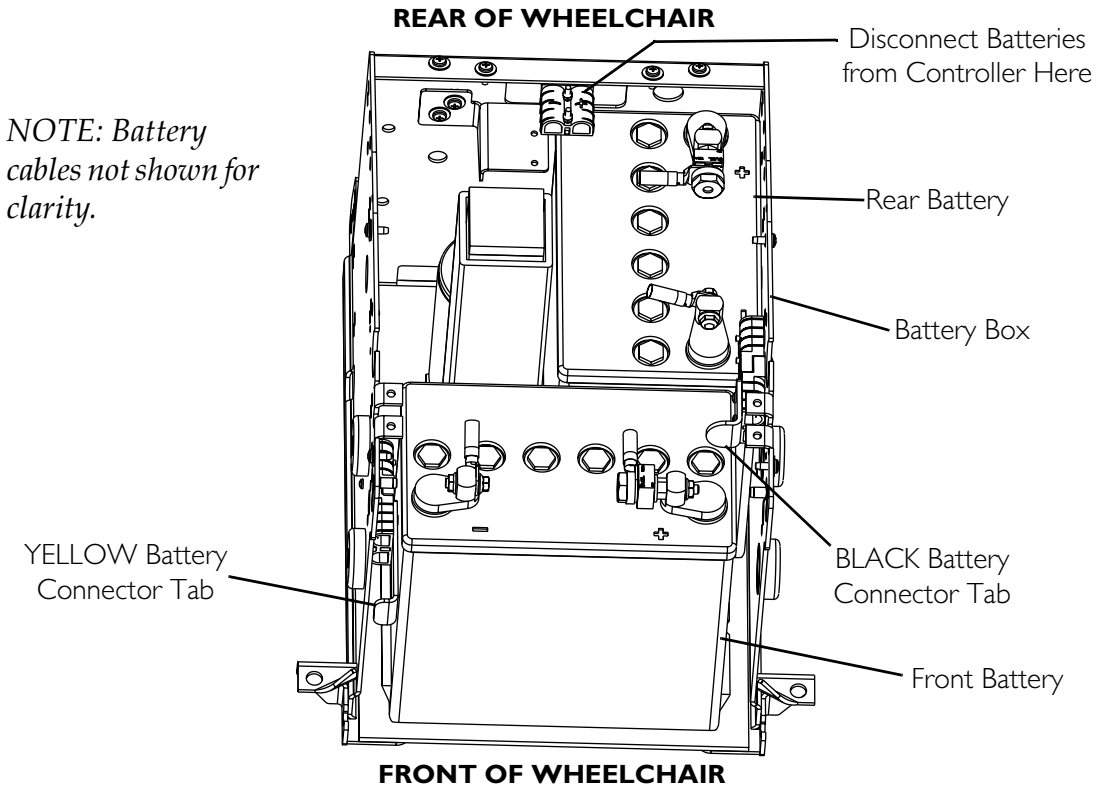


FIGURE 10.4 Removing the Batteries from Wheelchairs without Elevate

Installing Batteries into Wheelchairs without Elevate

NOTE: For this procedure, refer to FIGURE 10.3 on page 110 and FIGURE 10.5 on page 112.

NOTE: Positioning of the batteries into the battery tray is completed with battery tray positioned in wheelchair and partially pulled out. Refer to FIGURE 10.3 for full view of wheelchair base. Illustrations in FIGURE 10.5 are shown without the wheelchair for clarification purposes only.

1. Position the battery with battery connector bracket in the REAR of the battery tray in the orientation as shown. See DETAIL "A".

NOTE: Front of battery tray is designated by the battery stop. Rear of the battery tray is the opposite end.

NOTE: Orientation of the battery is critical otherwise batteries will not connect to the controller or each other.

2. Position the remaining battery in the FRONT of the battery tray in the orientation shown so that the wiring harnesses can be connected together. See DETAIL "B".
3. Connect front battery to rear battery. See DETAIL "B".
4. Connect battery straps. See DETAIL "C".
5. Slide the battery tray into the wheelchair.

NOTE: Refer to FIGURE 10.3 on page 110.

6. If wheelchair is equipped with ventilator tray, perform the following:
   A. Install ventilator battery in the orientation.
   B. Connect ventilator battery to wiring harness.
   C. Connect the strap to secure the ventilator battery to the tray.
7. Install the battery door and rear shroud. Refer to Installing the Battery Door and Rear Shroud on page 113.

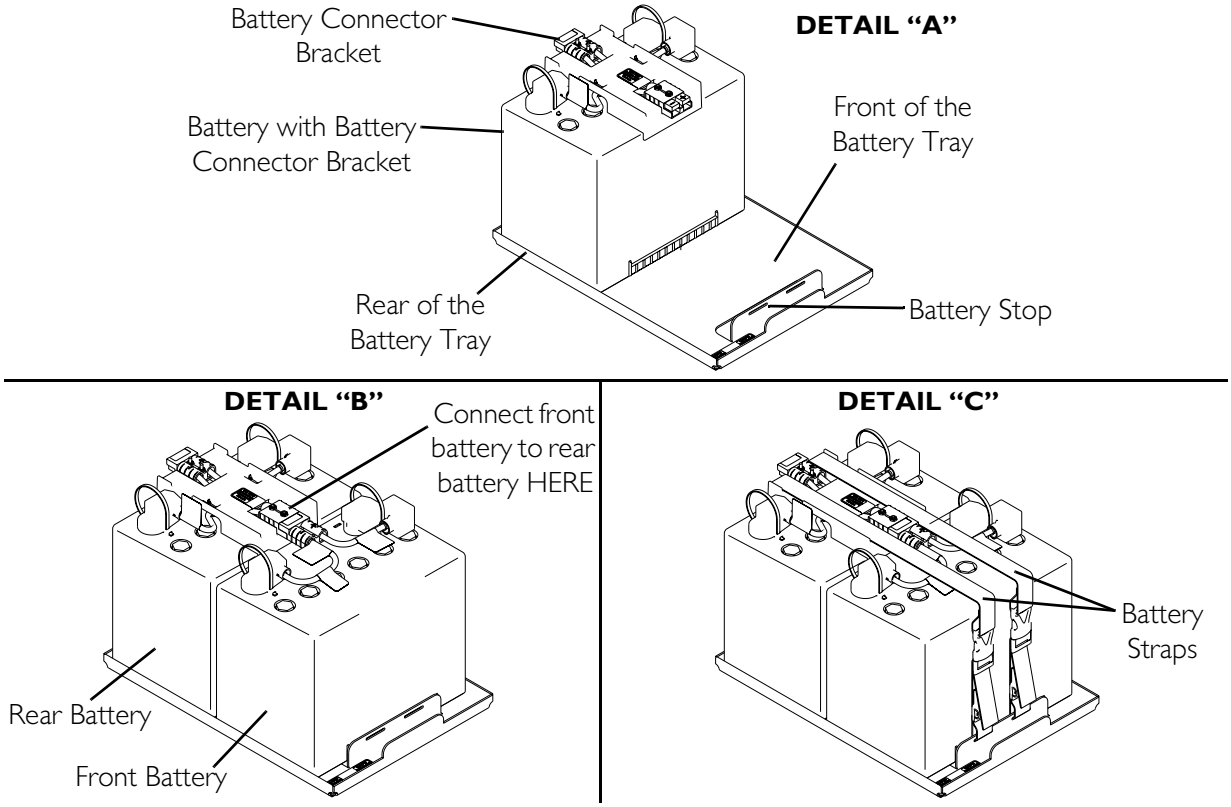


FIGURE 10.5 Installing Batteries into Wheelchairs without Elevate

Installing Batteries into Wheelchairs with Elevate

NOTE: For this procedure, refer to FIGURE 10.6 on page 113.

1. Position the battery with the BLACK battery connector tab into the REAR of the battery box as shown.
2. Plug the BLACK battery connector tab into the RIGHT battery connector.
3. Position the battery with the YELLOW battery connector tab into the FRONT of the battery box as shown.
4. Plug the YELLOW battery connector tab into the LEFT battery connector.
5. Install the battery door and rear shroud. Refer to Installing the Battery Door and Rear Shroud on page 113.

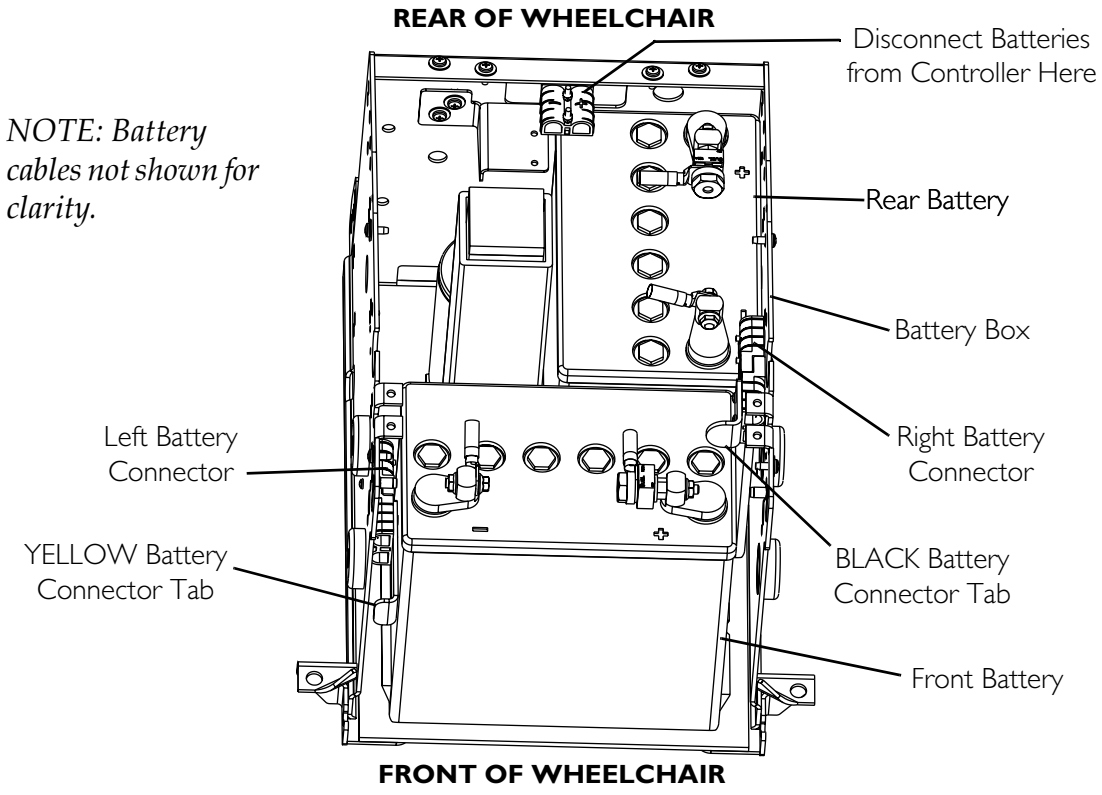


FIGURE 10.6 Installing Batteries into Wheelchairs with Elevate

Installing the Battery Door and Rear Shroud

⚠ WARNING

Wheelchairs with TRRO or TRBKTS Only - Battery support brackets MUST be installed at all times. Otherwise, the wheelchair will not be WC/19 compliant.

After installing battery door, ensure that the mounting screws on the side of the battery door are fully engaged into the side of the battery box.

NOTE: For this procedure, refer to FIGURE 10.1 on page 107 and FIGURE 10.2 on page 108.

1. Wheelchairs with TRRO and TRBKTS Only - Install the battery support bracket onto the battery box (FIGURE 10.2 on page 108) using the four hex screws and four locknuts (if applicable). Torque to 75 in-lbs.

NOTE: The installation of the battery support bracket depends on the type of battery and options on the wheelchair. Refer to the correct configuration in FIGURE 10.2 on page 108.

2. Reinstall battery door onto front of wheelchair.
3. Install both mounting screws on the side of the battery door.

NOTE: Ensure that the mounting screws on the side of the battery door are fully engaged into the side of the battery box.

⚠ WARNING

When installing batteries, ensure battery connector is securely engaged to the controller connector - otherwise serious personal injury may result.

4. Connect the controller to the batteries at the rear of the wheelchair.
5. Wheelchairs with TRRO and TRBKTS Only - Reinstall the top controller shroud using the two thumb screws (FIGURE 10.2 on page 108).
6. Reinstall the rear shroud and secure in place with the existing two thumb screws.

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

7. Formula PTO Plus Only - Tilt the seat forward. Refer to Tilting the Seat Assembly on page 96.
8. If necessary, charge the battery(ies). Refer to Charging Batteries on page 122.

SECTION 11—FORMULA INVISIBLE SUPER LOW TILT BATTERIES

⚠ WARNING

Read and understand the information and warnings in Handling and Replacing Batteries on page 98 before performing these procedures.

Unless otherwise indicated, make sure power to the wheelchair is OFF before performing these procedures.

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

NOTE: If there is battery acid in the bottom of the battery tray or on the sides of the battery(ies), apply baking soda to these areas to neutralize the battery acid. Before reinstalling the existing or new battery(ies), clean the baking soda from the battery tray or battery(ies) being sure to avoid contact with skin and eyes. Determine source of contamination. Never install/reinstall a battery with a cracked or otherwise damaged case.

Removing/Installing Front/Rear Shrouds

NOTE: For this procedure, refer to FIGURE 11.1 on page 116.

Removing

CAUTION

Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.

1. Ensure the wheelchair seat is completely down.
2. Verify the joystick ON/OFF switch is in the OFF position.
3. Remove the two thumb screws that secure the rear shroud to the wheelchair.
4. TRRO and TRBKTS Options Only - Remove the top controller shroud.
5. Remove the rear shroud from the wheelchair.
6. Remove both mounting screws from side of battery door.
7. Remove battery door from front of wheelchair.
8. TRRO and TRBKTS Options Only - Perform the following steps:
   A. Remove the four hex screws that secure the battery support bracket to the battery box.
   B. Remove the battery support bracket.
9. Tilt seat back approximately halfway.

10. Disconnect the controller from the batteries at the rear of the wheelchair.

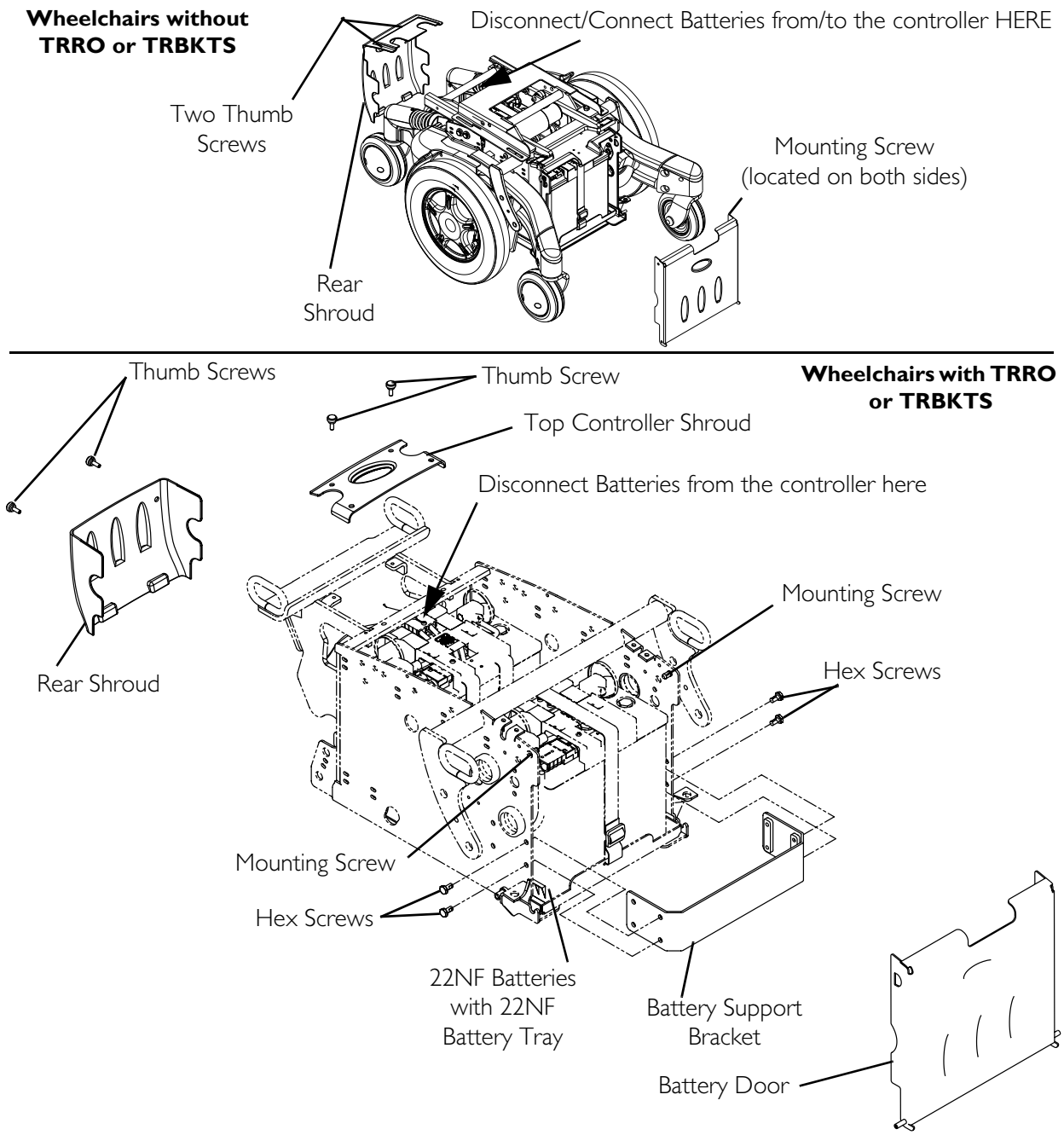


FIGURE 11.1 Removing/Installing Front/Rear Shrouds

Installing

⚠ WARNING

Wheelchairs with TRRO or TRBKTS Only - Battery support brackets MUST be installed at all times. Otherwise, the wheelchair will not be WC/19 compliant.

1. Connect the controller to the batteries at the rear of the wheelchair.
2. Return seat to upright position (either 0° or 5°).

3. Wheelchairs with TRRO or TRBKTS Only - Install the battery support bracket onto the battery box using the four hex screws. Torque to 75 in-lbs.
4. Secure battery door to front of wheelchair with two mounting screws. Securely tighten.
5. Wheelchairs with TRRO or TRBKTS Only - Install the top controller shroud to the battery box using the two thumb screws.
6. Secure the rear shroud to the wheelchair with the two thumb screws.

Removing the Batteries from the Wheelchair

Removing the Actuator/Mounting Bracket Assembly

NOTE: For this procedure, refer to FIGURE 11.2.

NOTE: Seat support in FIGURE 11.2 is shown exploded away for clarification purposes only. It is not necessary to remove the seat support to perform this procedure.

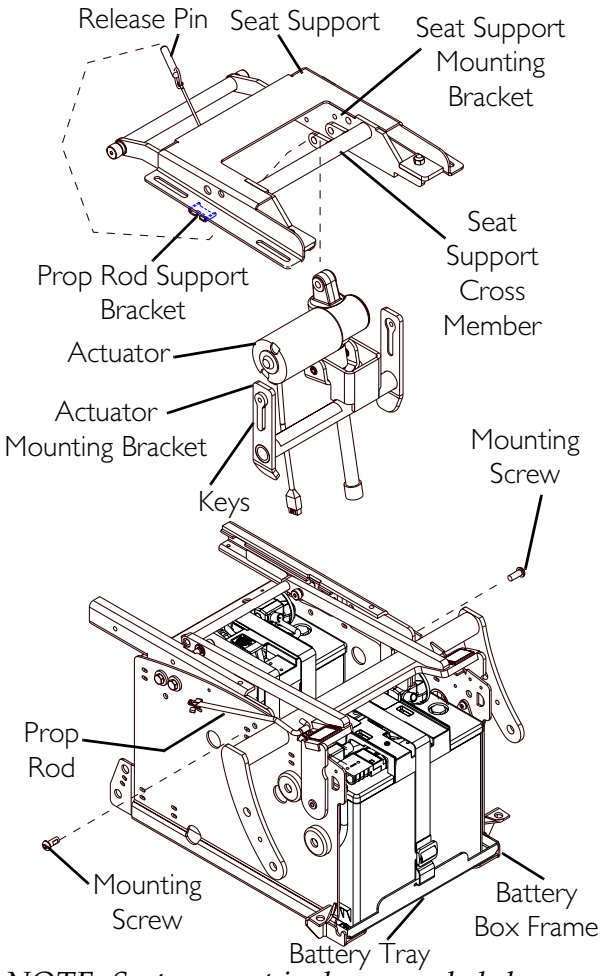
NOTE: A 3/16-inch Ball End Extended Hex Wrench is necessary to complete this procedure.

1. Remove the front and rear shrouds. Refer to Removing/Installing Front/ Rear Shrouds on page 115.
2. Remove the two mounting screws that secures the actuator mounting bracket to the battery box frame.
3. Manually lift/tilt the seat until it reaches the maximum tilt position.

⚠ WARNING

Prop rod MUST be engaged to hold the seat frame up before manually releasing the seat frame from the maximum tilt position - otherwise injury will result.

4. While holding the seat in this position engage the prop rod into the support bracket as shown to secure seat in upright position.
5. Remove the release pin that secures the actuator to the seat support crossmember.
6. Lift the actuator with mounting bracket up and out of battery box frame and lay horizontal on seat frame crossmembers.
7. Slide battery tray with batteries out until it engages battery tray stop.



NOTE: Seat support is shown exploded away for clarification purposes only. It is not necessary to remove the seat support.

FIGURE 11.2 Removing the Actuator/ Mounting Bracket Assembly

NOTE: Battery tray stop is designed to prevent battery tray from being pulled completely out of the wheelchair and having the batteries drop to the ground/floor.

Disconnect Battery Straps and Remove Batteries from Tray

NOTE: For this procedure, refer to FIGURE 11.3.

1. Once battery tray has reached battery stop, disconnect front battery strap.

NOTE: On the front battery strap, the quick-release is located behind the battery.

2. Disconnect the front battery from the battery extension harness.
3. Remove front battery.
4. Disconnect rear battery straps.
5. Disconnect the rear battery from the battery extension harness.
6. Remove rear battery.

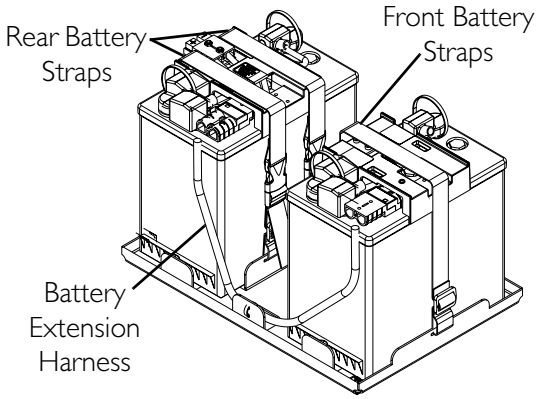


FIGURE 11.3 Disconnect Battery Straps and Remove Batteries from Tray

NOTE: Batteries shown without wheelchair for clarity only. Battery tray does not pull completely out of wheelchair.

Installing Batteries into the Wheelchair

Connect Battery Straps and Install Batteries into Tray

NOTE: For this procedure, refer to FIGURE 11.4 on page 119.

1. Install the rear battery in the orientation shown otherwise the battery extension harness cannot be installed. The connector for the controller faces the rear of the wheelchair.
2. Connect the rear battery to the battery extension harness.
3. Connect the rear battery straps.
4. Install front battery in the orientation shown otherwise the battery extension harness cannot be installed.
5. Connect the front battery to the battery extension harness.
6. Connect front battery strap.

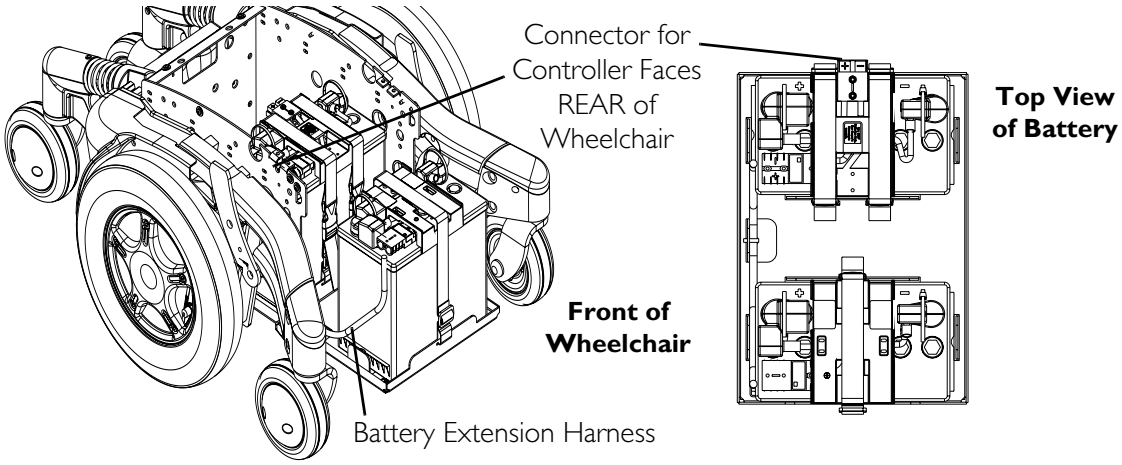


FIGURE 11.4 Connect Battery Straps and Install Batteries into Tray

Install Actuator/Mounting Bracket Assembly

NOTE: For this procedure, refer to FIGURE 11.5 on page 120.

NOTE: A 3/16-inch Ball End Extended Hex Wrench is necessary to complete this procedure.

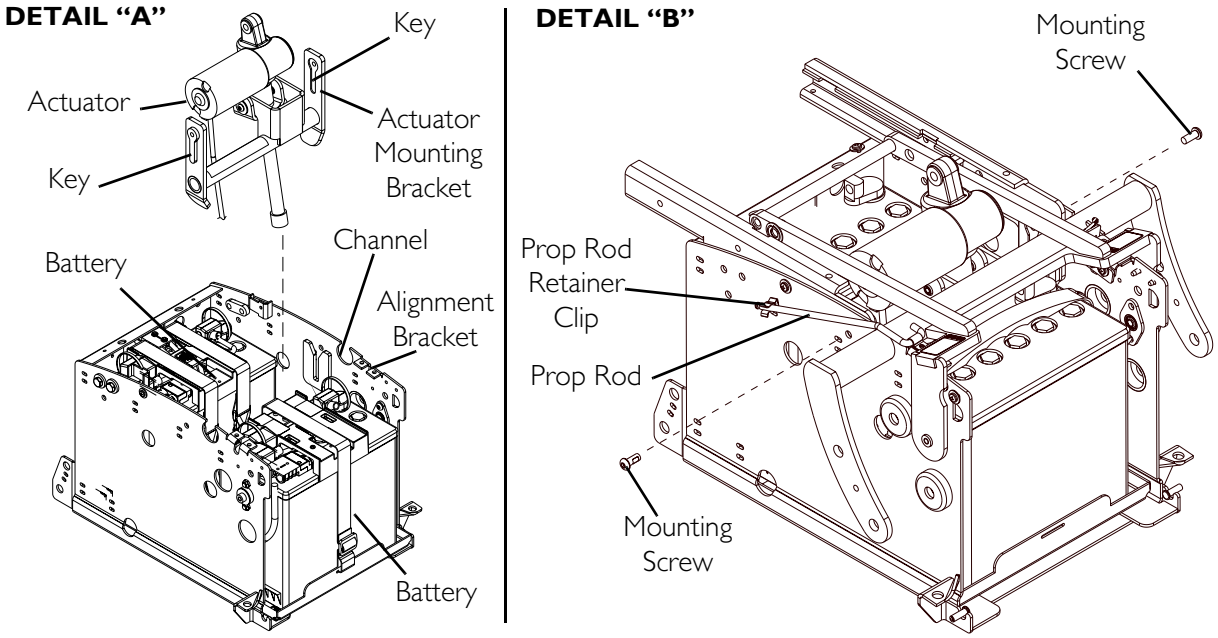
1. Slide battery tray with batteries into wheelchair (DETAIL "A").
2. Secure the actuator to the seat support with the release pin (DETAIL "B").
3. While holding the seat in the maximum tilt position, disengage the prop rod from the support bracket that holds the seat in the upright position. Engage the prop rod into the prop rod retainer clip (DETAIL "B").
4. Align the keys of the actuator mounting bracket (one on each side) with the channel in the alignment brackets (DETAIL "A")
5. Slide the actuator with mounting bracket down in between the batteries by manually lowering the seat down. (DETAIL "A").

NOTE: Keys on bracket will self-align as assembly is lowered into position.

⚠ WARNING

Failure to install the two mounting screws to secure actuator in place WILL result in sudden seating system tilt and may result in serious bodily injury.

6. Secure the actuator mounting bracket to the battery box frame with two mounting screws (DETAIL "B"). Securely tighten.
7. Install the front/rear shrouds. Refer to Removing/Installing Front/Rear Shrouds on page 115.



NOTE: Seat support is not shown for clarification purposes only. It is not necessary to remove the seat support.

FIGURE 11.5 Install Actuator/Mounting Bracket Assembly

SECTION 12—CHARGING BATTERIES

⚠ WARNING

Read and understand the information and warnings in Handling and Replacing Batteries on page 98 before performing these procedures.

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

When to Charge Batteries

DPJ and SPJ-80 Joystick

NOTE: For this procedure, refer to FIGURE 12.1.

The Battery Gauge Display (BGD) is a bar graph display located on the MK5 joystick. It will keep you informed as to power availability. A visual warning is given before the power becomes too low to operate the wheelchair. At full charge, the two LEFT segments and the farthest RIGHT segment of the bar graph will be illuminated. As the battery becomes discharged, the farthest RIGHT segment will progressively move to the LEFT until only the last two bars (LEFT) are illuminated. At this level the last two bars (LEFT) will start to Flash ON and OFF to indicate that the end user should charge the batteries as soon as possible.

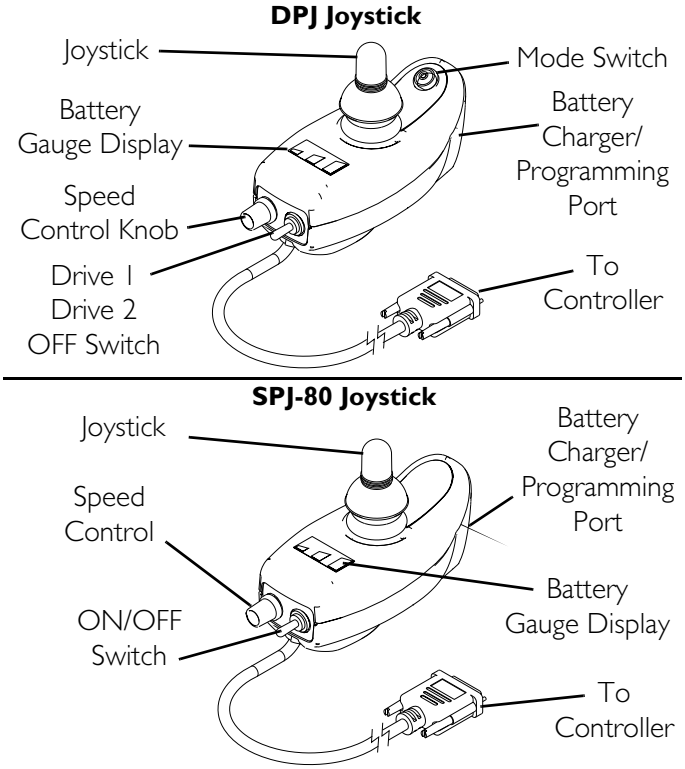


FIGURE 12.1 DPJ and SPJ-80 Joystick

MPJ Joystick

NOTE: For this procedure, refer to FIGURE 12.2 on page 122.

The left half of the second line is the Battery Gauge Display (BGD). It provides information on the remaining charge in the batteries. At full charge, solid blocks fill in all five segments between E (Empty) and F (Full). As the battery becomes discharged, the farthest right segments will progressively disappear a half bar at a time until no segments appear between E and F. At this level, the word RECHARGE will appear on the second line to indicate that the user should charge the batteries as soon as possible.

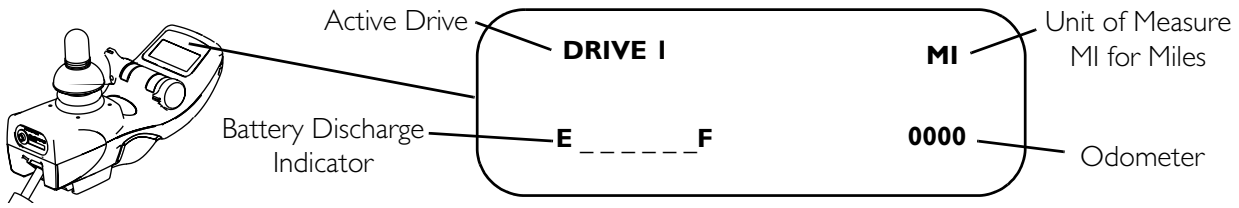


FIGURE 12.2 MPJ Joystick

Charging Batteries

⚠ 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 back of the joystick.

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: For this procedure, refer to FIGURE 12.3 on page 123.

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

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. They are:

The amount of electrical current drawn within a given time to charge a battery is called the "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.

⚠ WARNING

NEVER leave the charger unattended when the breaker has tripped. A fault condition exists. Unplug and discontinue using immediately. Contact an Invacare dealer.

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

1. Attach the battery charger connector to the charger port on the joystick.
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 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.

NOTE: 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.

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 Invacare dealer for service.

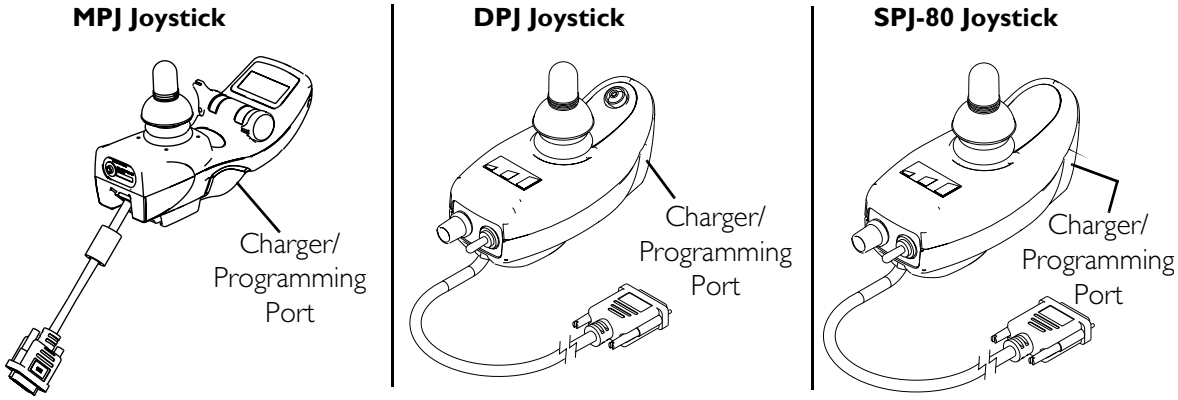


FIGURE 12.3 Charging Batteries

SECTION 13—MOTOR LOCKS/FORKS

⚠ 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.

CAUTION

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

Disengaging/Engaging Motor Lock Levers

Standard and Heavy Duty 4 Pole Motors

⚠ WARNING

DO NOT engage or disengage motor locks until the power is in the OFF position.

NOTE: For this procedure, refer to FIGURE 13.1.

NOTE: Motor lock disengagement/ engagement allows free-wheeling or joystick controlled operation. Free-wheeling allows an assistant to maneuver the wheelchair without power.

1. Perform one of the following (FIGURE 13.1):
   - Disengage (PUSH) - Push motor lock levers down.
   - Engage (DRIVE) - Pull motor lock levers up.

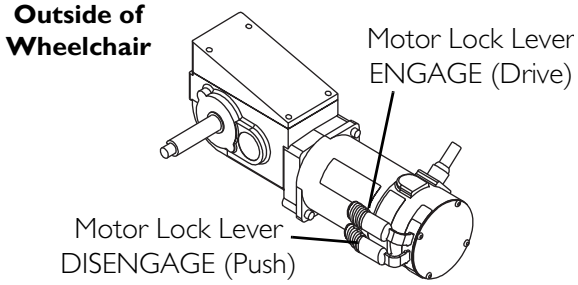


FIGURE 13.1 Disengaging/Engaging Motor Lock Levers - Standard and Heavy Duty 4 Pole Motors

Gearless Brushless GB™ Motors

⚠ WARNING

DO NOT engage or disengage motor locks until the power is in the OFF position.

NOTE: For this procedure, refer to FIGURE 13.2 on page 125.

NOTE: Motor lock disengagement/engagement allows free-wheeling or joystick controlled operation. Free-wheeling allows an assistant to maneuver the wheelchair without power.

1. Perform one of the following (FIGURE 13.2):
   - Disengage (PUSH) - Pull motor lock levers up.
   - Engage (DRIVE) - Push motor lock levers down.

NOTE: Motor package is designed for an occupant weight up to 400 lbs. Force to disengage motor lock may exceed ANSI/RESNA wc/vol2-1998 requirements for section 14.7 paragraph 7.2d. The RESNA requirements assume a maximum occupant weight of 220 lbs.

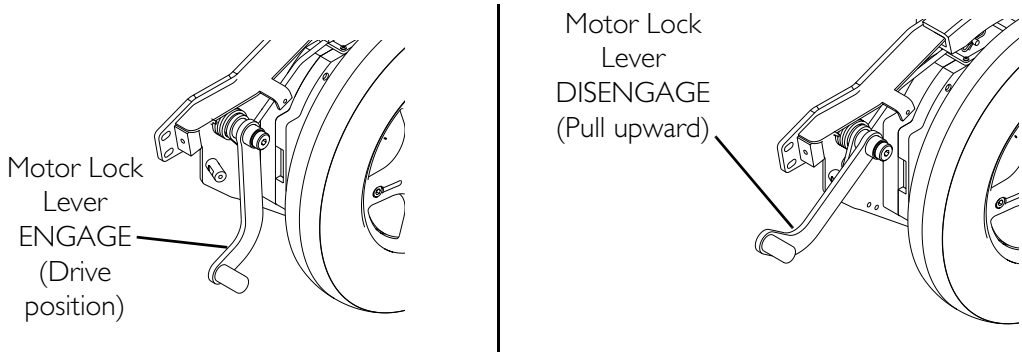
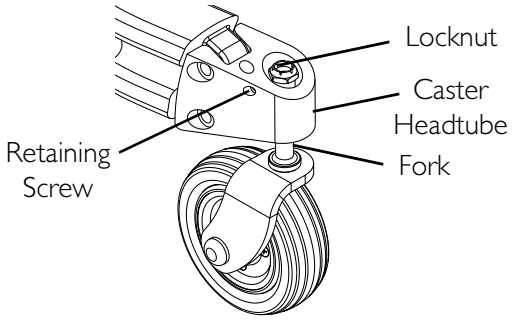


FIGURE 13.2 Disengaging/Engaging Motor Lock Levers - Gearless Brushless GB™ Motors

Adjusting Forks

NOTE: For this procedure, refer to FIGURE 13.3.

1. Remove the retaining screw that secures the headtube cover in place.
2. Remove the headtube cover (not shown) from the caster headtube.
3. To properly tighten caster journal system and guard against flutter, perform the following check:
   A. Tip back the wheelchair to floor.
   B. Pivot both forks and casters to top of their arc simultaneously.
   C. Let casters drop to bottom of arc (wheels should swing once to one-side, then immediately rest in a straight downward position).
   D. Adjust locknuts according to freedom of caster swing.



NOTE: Headtube cover not shown for clarity.

FIGURE 13.3 Adjusting Forks

4. Test wheelchair for maneuverability.
5. Readjust locknuts if necessary, and repeat STEPS 1-3 until correct.
6. Snap headtube cover into the caster headtube.
7. Reinstall retaining screws.

SECTION 14—ELECTRONICS

⚠ 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.

Preparing MK5 Joystick for Use

NOTE: Refer to FIGURE 14.1.

1. Turn the adjustment lock lever to release the adjustment lock from joystick mounting tube (FIGURE 14.1).
2. Slide joystick mounting tube to the desired position.
3. Turn the adjustment lock lever to secure the adjustment lock to the joystick mounting tube.

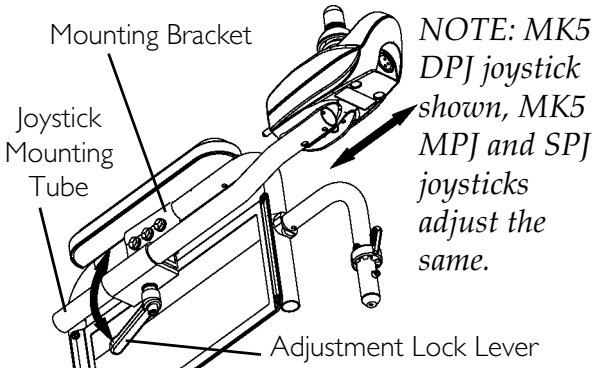


FIGURE 14.1 Preparing MK5 Joystick for Use

Repositioning MK5 Joystick

NOTE: Refer to FIGURE 14.2.

1. Turn the adjustment lock lever to release the joystick mounting tube from the mounting bracket.
2. Remove the joystick from wheelchair.
3. Remove the three hex screws that secure both halves of the mounting bracket to the arm tube.
4. Reposition the mounting bracket on the opposite arm tube, ensuring the threaded plate of the mounting bracket is on the inside of the arm tube as shown.
5. Using the three hex mounting screws and washers, secure both halves of the mounting bracket to the arm tube.
6. Slide the joystick mounting tube through the mounting bracket to the desired position.
7. Turn the adjustment lock lever to secure the joystick mounting tube into the mounting bracket.

NOTE: MK5 DPJ joystick shown, MK5 MPJ and SPJ joysticks reposition in the same manner.

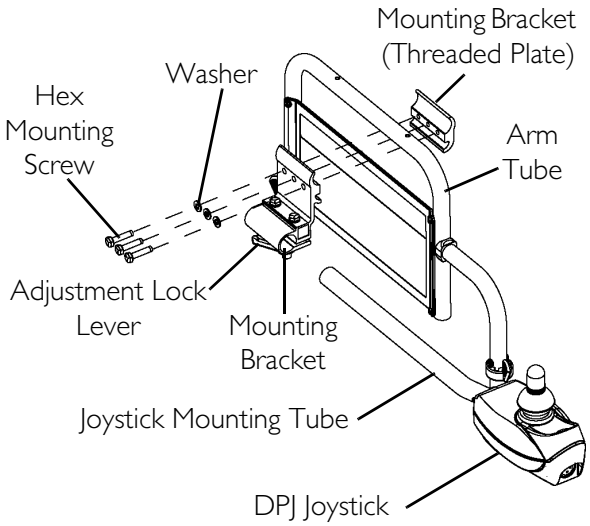


FIGURE 14.2 Repositioning MK5 Joystick

SECTION 15—HEADREST

⚠ 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

If using a ventilator, verify headrest support does not interfere at ALL angles. Otherwise, injury or damage may occur.

Removing/Installing/Adjusting Headrest

NOTE: For this procedure, refer to FIGURE 15.1.

Removing

1. Loosen, but DO NOT remove, the thumb screw that secures the headrest to the headrest mounting bracket.
2. Remove the headrest from the headrest mounting bracket.

Installing

1. Make sure thumb screw is loose.
2. Install the headrest until the headrest stop sits on the headrest mounting bracket.
3. If necessary, adjust the height, depth or direction of the headrest. Refer to Adjusting Headrest Height or Adjusting Headrest Depth/Direction in this procedure.

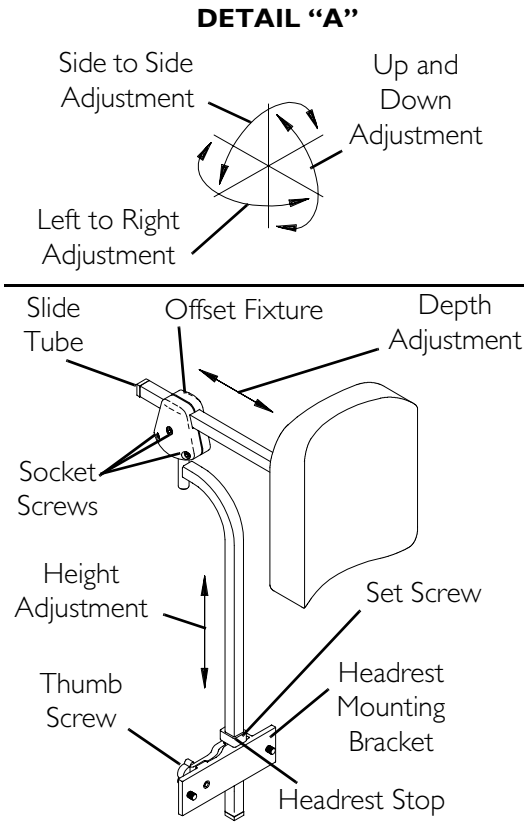


FIGURE 15.1 Removing/Installing/Adjusting Headrest

Adjusting Headrest Height

1. Loosen the set screw on the headrest stop.
2. Loosen, but DO NOT remove, the thumb screw that secures the headrest to the headrest mounting bracket.
3. Position the headrest to the desired height.
4. Tighten the thumb screw that secures the headrest to the headrest mounting bracket.
5. Tighten the set screw on the headrest stop.
6. If necessary, adjust the depth or direction of the headrest. Refer to Refer to Adjusting Headrest Depth/Direction on page 128.

Adjusting Headrest Depth/Direction

1. Loosen, but DO NOT remove, the three socket screws that secure the offset fixture to the slide tube.
2. If necessary, reposition the headrest to the desired depth by sliding the headrest towards the front of the wheelchair or towards the rear of the wheelchair.
3. If necessary, reposition the headrest to the desired position (headrest will move in any direction). Refer to DETAIL "A" in FIGURE 15.1.
4. While holding the headrest in the desired position, securely tighten the three socket screws.
5. If necessary, adjust the height of the headrest. Refer to Refer to Adjusting Headrest Height on page 128.

Replacing Headrest

NOTE: For this procedure, refer to FIGURE 15.2.

1. Remove the three socket screws that secure the headrest to the headrest mounting bracket.
2. Position the new headrest on the headrest mounting bracket and secure with the existing three socket screws.
3. If necessary, adjust the height, depth or direction of the headrest. Refer to Adjusting Headrest Height or Adjusting Headrest Depth/Direction on page 128.

NOTE: One style of headrest shown for clarity. Both styles of headrest attach the same way.

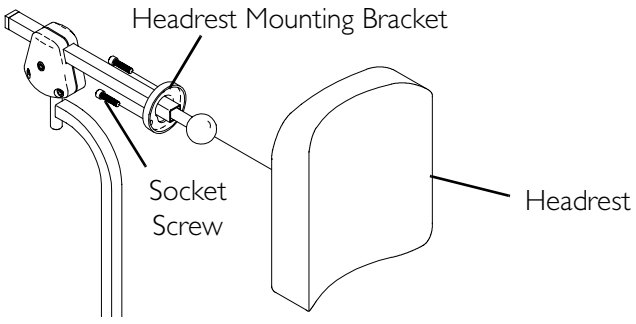


FIGURE 15.2 Replacing Headrest

SECTION 16—VENTILATOR TRAY

⚠ WARNING

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

Before adjusting, repairing or servicing the seating system, ALWAYS turn the wheelchair power OFF, otherwise, injury or damage may result.

Pinch points exist between seat and base frames. Use caution, otherwise injury may occur.

Using the Optional Ventilator Tray

⚠ WARNING

Maximum weight capacity for the vent tray is 40 lbs ± 20%. DO NOT exceed weight capacity for vent tray - otherwise, injury or damage may occur.

CAUTION

This ventilator tray was designed to hold a ventilator that is approximately 13 inches long, 14½ inches wide, and 14 inches high. Use of ventilators larger than the above specifications may result in damage to the ventilator or stability issues.

ALWAYS disconnect the ventilator battery harness from the ventilator battery harness extension before connecting the ventilator battery harness to the ventilator. Otherwise damage to the product may occur.

Wheelchairs with Recline System Only - Wheelchairs with Ventilator Trays - Any ventilator installation MUST provide adequate clearances to allow unobstructed mechanical operation of the seating system. In addition, some ventilators may have additional clearance requirements. ALWAYS refer to the ventilator's instructions prior to installation for any additional requirements.

NOTE: For this procedure, refer to FIGURE 16.1 on page 130.

NOTE: This procedure applies to Formula TRE and 2G Tarsys Seating Systems only.

1. Position straps to the outside of the ventilator tray.
2. Position the ventilator (not shown) on the ventilator tray.
3. Disconnect the ventilator battery harness connector from the ventilator battery harness extension (Detail "B").
4. Connect the ventilator battery harness to the ventilator. Refer to the ventilator manufacturer's installation instruction.
5. Secure strap around the ventilator and clip together.

6. Securely tighten the straps around the ventilator by pulling the ends of the strap through the rear portion of each buckle (Detail "A").
7. Connect the ventilator battery harness connector to the ventilator battery harness extension (Detail "B").

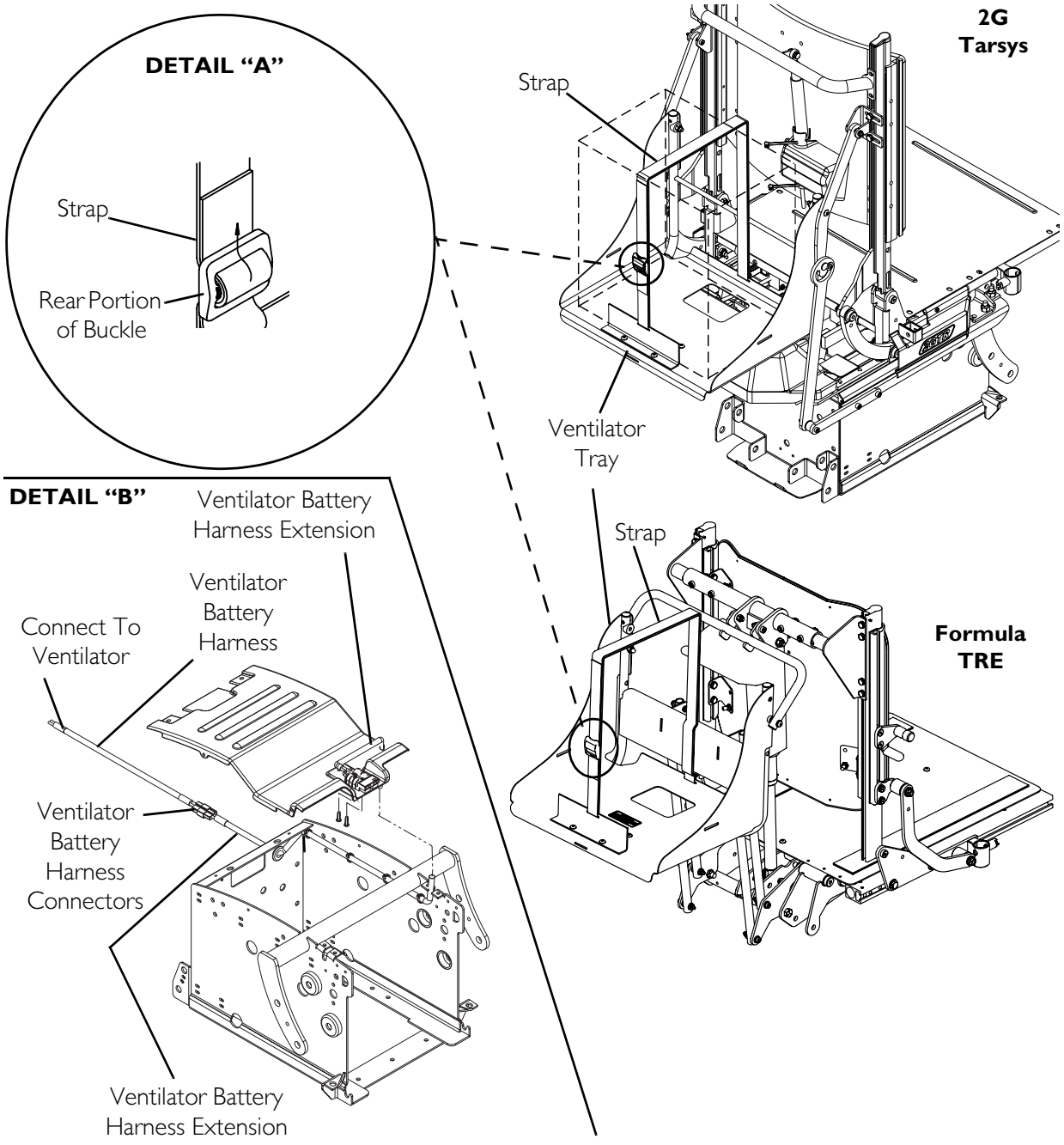


FIGURE 16.1 Using the Optional Ventilator Tray

SECTION 17—RECLINER

⚠ WARNING

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

NEVER operate the wheelchair while in any recline position over 105° relative to the seat frame. If the limit switch does not stop the wheelchair from operating in a recline position greater than 105° relative to the seat frame, DO NOT operate the wheelchair. Have the limit switch adjusted by a qualified technician.

Both gas cylinders MUST be operational and adjusted properly BEFORE using the recliner. DO NOT operate the recliner option if only one of the gas cylinders is operational or adjusted properly.

TO HEALTHCARE PROFESSIONALS/ASSISTANTS:

Make sure the occupant of the wheelchair is properly positioned.

When returning the occupant of the wheelchair to the full upright position, more body strength will be required for approximately the last twenty (20) degrees of incline (reverse recline). Make sure to use proper body mechanics (use your legs) or seek assistance if necessary to avoid injury.

Recliner Operation

NOTE: For this procedure, refer to FIGURE 17.1.

1. Make sure the wheelchair is on a level surface.
2. Inform the occupant of the wheelchair that the wheelchair is about to be reclined.
3. Stand behind the wheelchair and grasp both back canes firmly.
4. Pull up on the handles of the recliner cable assemblies to release the gas cylinders.
5. Slowly, push down on the back canes while squeezing the handles of the recliner cable assemblies in a continuous motion.
6. When the back reaches the desired angle, slowly let go of the handles of the recliner cable assemblies.
7. To return the back to the full upright position, reverse the above steps keeping in mind proper body mechanics.

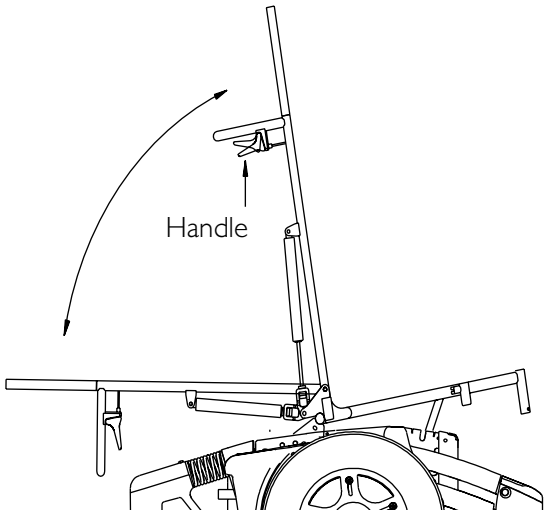


FIGURE 17.1 Recliner Operation

Replacing Back or Headrest Upholstery

NOTE: For this procedure, refer to FIGURE 17.2.

Replacing Back Upholstery

1. Remove the ten or twelve mounting screws (depending on back height) that secure the back upholstery to the back canes.
2. Remove existing back upholstery from back canes.
3. Install the new back upholstery onto the back canes.
4. Install the ten or twelve mounting screws (depending on back height) that secure the back upholstery to the recliner back canes.
5. Adjust the back upholstery to the desired tautness. Refer to Adjusting Back or Headrest Upholstery on page 133.

NOTE: Changing the back upholstery height must be performed by an authorized dealer or qualified technician.

Replacing Headrest Upholstery

1. Remove the six mounting screws that secure the headrest upholstery to the headrest extensions.
2. Remove the existing headrest upholstery from the headrest extensions.
3. Install the new headrest upholstery onto the headrest extensions.
4. Install the six mounting screws that secure the headrest upholstery to the headrest extensions.
5. Adjust the headrest upholstery to the desired tautness. Refer to Adjusting Back or Headrest Upholstery on page 133.

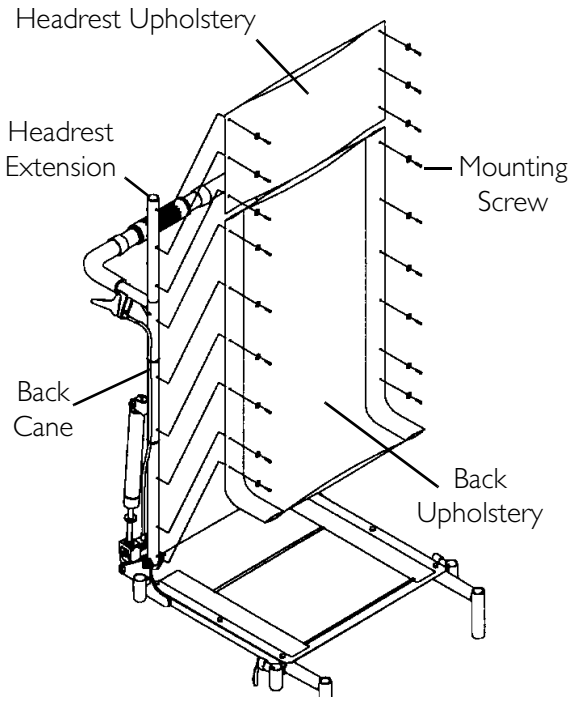


FIGURE 17.2 Replacing Headrest Upholstery

Adjusting Back or Headrest Upholstery

NOTE: For this procedure, refer to FIGURE 17.3.

1. Rotate the spreader bar either:
   - Counterclockwise (away from back upholstery) to loosen back/headrest upholstery.
   - Clockwise (towards back upholstery) to tighten back/headrest upholstery.

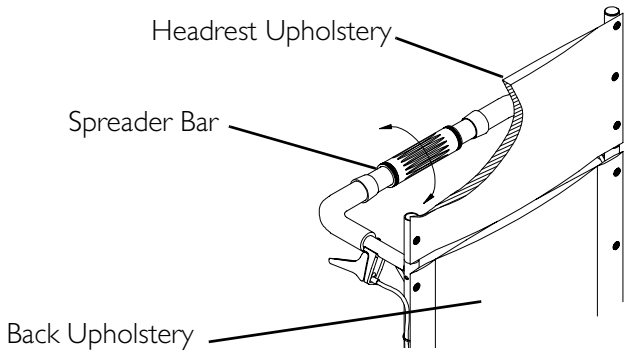


FIGURE 17.3 Adjusting Back or Headrest Upholstery

SECTION 18—TRANSPORT READY PACKAGE (TRRO)

NOTE: The information in this section is for wheelchairs ordered with the transport ready package ONLY.

⚠ WARNING

Contact Invacare Corporation (800-333-6900) with any questions about using this wheelchair for seating in a motor vehicle.

When feasible, wheelchair occupants should transfer into the vehicle seat and use the OEM (Original Equipment Manufacturer) vehicle-installed restraint system.

This wheelchair has been dynamically tested in a forward-facing mode with the specified crash test dummy restrained by BOTH pelvic and upper-torso belt(s) (shoulder belts), and that BOTH pelvic and upper-torso belt(s) should be used to reduce the possibility of head and chest impacts with vehicle components.

Use ONLY Wheelchair Tie-down and Occupant Restraint Systems (WTORS) which meet the requirements of the SAE (Society of Automotive Engineers) J2249 Recommended Practice during travel in a motor vehicle.

This wheelchair has been tested for seating in a motor vehicle with the factory installed seating system ONLY.

This wheelchair MUST be in a forward facing position during travel in a motor vehicle.

This wheelchair is equipped and has been dynamically tested to rely on WHEELCHAIR-ANCHORED pelvic belts. If desired, VEHICLE-ANCHORED pelvic belts may be used.

IT IS STRONGLY RECOMMENDED THAT BOTH PELVIC AND UPPER-TORSO BELT(S) BE USED TO REDUCE THE RISK OF INJURY.

To reduce the potential of injury to vehicle occupants, wheelchair-mounted accessories, including but not limited to IV poles, trays, respiratory equipment, backpacks, and other personal items should be removed and secured separately.

Postural supports, positioning devices, and/or strap(s) should not be relied on for occupant restraint. These items may be used IN ADDITION TO the wheelchair-anchored or vehicle-anchored belts.

Wheelchairs with adjustable seat angles MUST be set to 10°.

DO NOT alter or substitute wheelchair frame parts, components, or seating systems.

A sudden stop and/or collision may structurally damage your wheelchair. Wheelchairs involved in such incidents should be replaced.

Spill proof batteries, such as "gel cells", should be installed on wheelchairs to be used during travel in a motor vehicle.

Transport ready packages are not retrofittable to existing models and are not field serviceable.

⚠ WARNING

Only use the transport brackets included with TRRO and TRBKTS for the purposes described in this manual.

Battery support brackets MUST be installed at all times. Otherwise, the wheelchair will not be WC/19 compliant. Refer to Removing/Installing the Batteries From/Into the Wheelchair on page 106.

About Transport Ready Packages

TRRO includes four factory-installed transport brackets and a wheelchair anchored pelvic belt. TRRO has been crash-tested in accordance with ANSI/RESNA WC Vol 1 Section 19 Frontal Impact Test requirements for wheelchairs with a 168 lb crash dummy, which corresponds to a person with a weight of 114 to 209 lbs.

TRBKTS includes four factory-installed wheelchair transport brackets. TRBKTS has not been crash-tested in accordance with WC 19. Use these transport brackets only to secure an unoccupied wheelchair during transport.

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.

Compliance Information

This wheelchair conforms with the requirements of the ANSI/RESNA WC/Vol. 1 - Section 19.

NOTE: ANSI = American National Standards Institute, RESNA= Rehabilitation Engineering and Assistive Technology Society of North America.

This wheelchair has been dynamically tested in a forward-facing mode with the specified crash test dummy, which corresponds to a person **with a weight of 114-209 pounds**, restrained by BOTH pelvic and upper-torso belts in accordance with ANSI/RESNA WC Vol 1 Section 19. BOTH pelvic and upper-torso belts should be used to reduce the possibility of head and chest impacts with vehicle components.

Specifications

MODEL	MOTOR	WHEELCHAIR WEIGHT LIMIT	
		ADULT	JUNIOR
TDX 5	GB	Up to 400 pounds	Up to 150 pounds
TDX 4	GB	Up to 400 pounds	Up to 150 pounds
TDX 4	4 Pole HD	Up to 400 pounds	Up to 150 pounds
TDX 4	4 Pole	Up to 300 pounds	Up to 150 pounds
TDX 3	GB	Up to 400 pounds	Up to 150 pounds
TDX 3	4 Pole HD	Up to 400 pounds	Up to 150 pounds
TDX 3	4 Pole	Up to 300 pounds	Up to 150 pounds

Securing the Wheelchair to the Vehicle

Positioning the Wheelchair in the Vehicle

⚠ WARNING

This wheelchair must be in a forward facing position during travel in a motor vehicle.

The recommended clear zones for wheelchair seated occupants restrained by BOTH pelvic and upper-torso belt(s) and ONLY by a pelvic belt are shown in the diagrams and described below.

Frontal Clear Zones (FCZ) need to be LARGER when upper-torso belt(s) are NOT used.

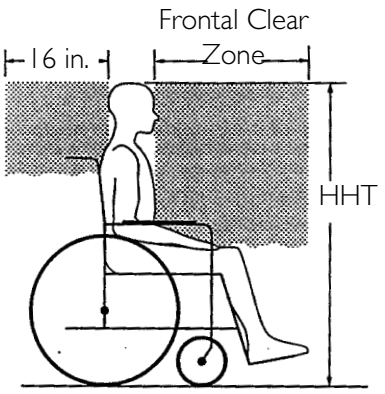
The rear clear zone of 16-inches is measured from the rearmost point on an occupant's head.

The frontal clear zone is measured from the frontmost point on an occupant's head and is 26-inches with pelvic and upper-torso belt(s) and 37-inches with ONLY a pelvic belt.

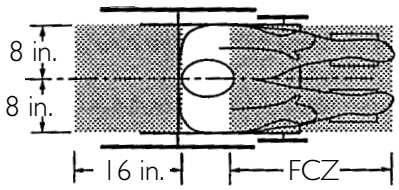
The frontal clear zone may not be achievable for wheelchair-seated drivers.

The estimated seated height (HHT) from the ground or floor to the top of the wheelchair-seated occupant's head ranges from approximately 47-inches for a small adult female to about 61-inches for a tall adult male.

Side View



Top View



Frontal Clear Zone

Securement Points

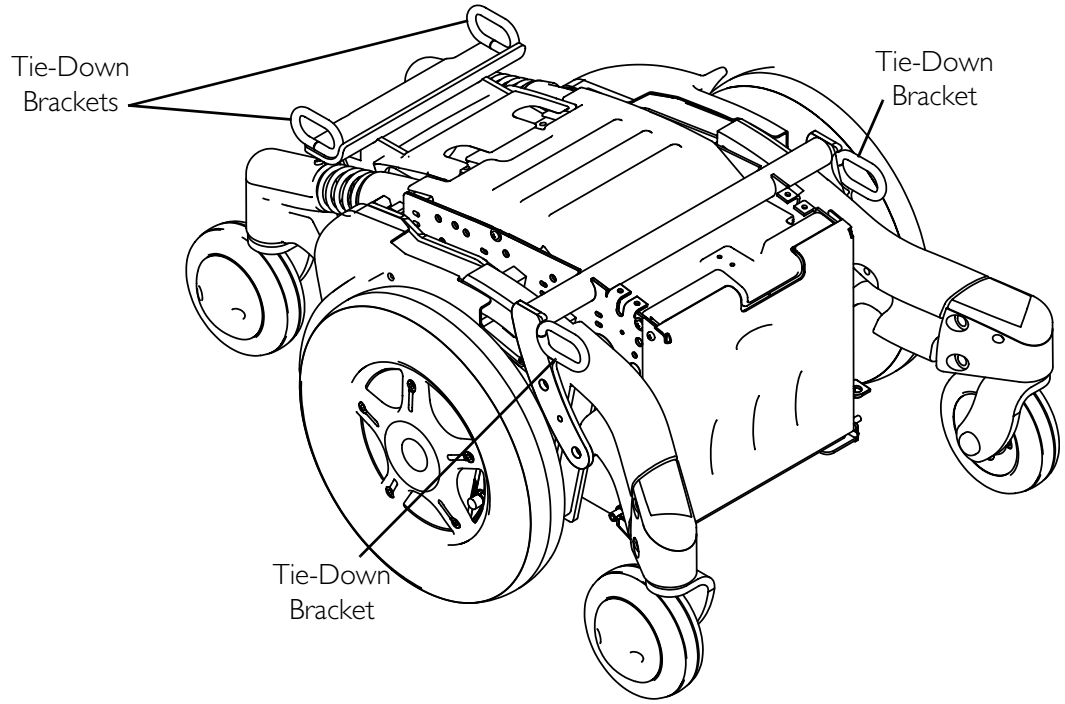


FIGURE 18.1 Securement Points

Securing the Wheelchair

This wheelchair is to be used only with Wheelchair Tie-down and Occupant Restraint Systems (WTORS) that have been installed in accordance with the manufacturer's instructions and SAE J2249.

NOTE: A copy of SAE J2249 Wheelchair Tie-down and Occupant Restraint Systems (WTORS) for use in Motor Vehicles can be obtained from: SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, (877) 606-7232 or (724) 776-4970.

Attach WTORS to the tie-down brackets in accordance with the manufacturer's instructions and SAE J2249.

Securing the Occupant

Wheelchair-Anchored Belts

⚠ WARNING

The pelvic belt that is provided by Invacare has been tested for use in a motor vehicle on this wheelchair ONLY. DO NOT replace the pelvic belt with a different style pelvic belt.

NOTE: For this procedure, refer to FIGURE 18.2 on page 139.

The wheelchair has been provided with a pelvic belt which meets the requirements of ANSI/RESNA W/C 19.

The pelvic belt, provided by Invacare, has been designed to accommodate use on either side of the vehicle. If necessary, follow the instructions below to reverse the orientation of the pelvic belt to accommodate the vehicle-anchored upper-torso belt.

1. Install the pelvic belt pin (Detail "A" of FIGURE 18.2) into the large end of the slot in the belt mounting bracket (Detail “B” or Detail “C”). Rotate downward and forward until it snaps into place into the small end of the slot.

NOTE: Note the position of the male end of the belt when installing the pelvic belt onto the belt mounting brackets. The male end of the pelvic belt (Detail ”A” of FIGURE 18.2) has a pin which is used to secure the vehicle-anchored upper-torso belt.

2. Repeat STEP 1 for the opposite belt mounting bracket.
3. Install the vehicle-anchored upper-torso belt onto the pin on the male end of the pelvic belt.

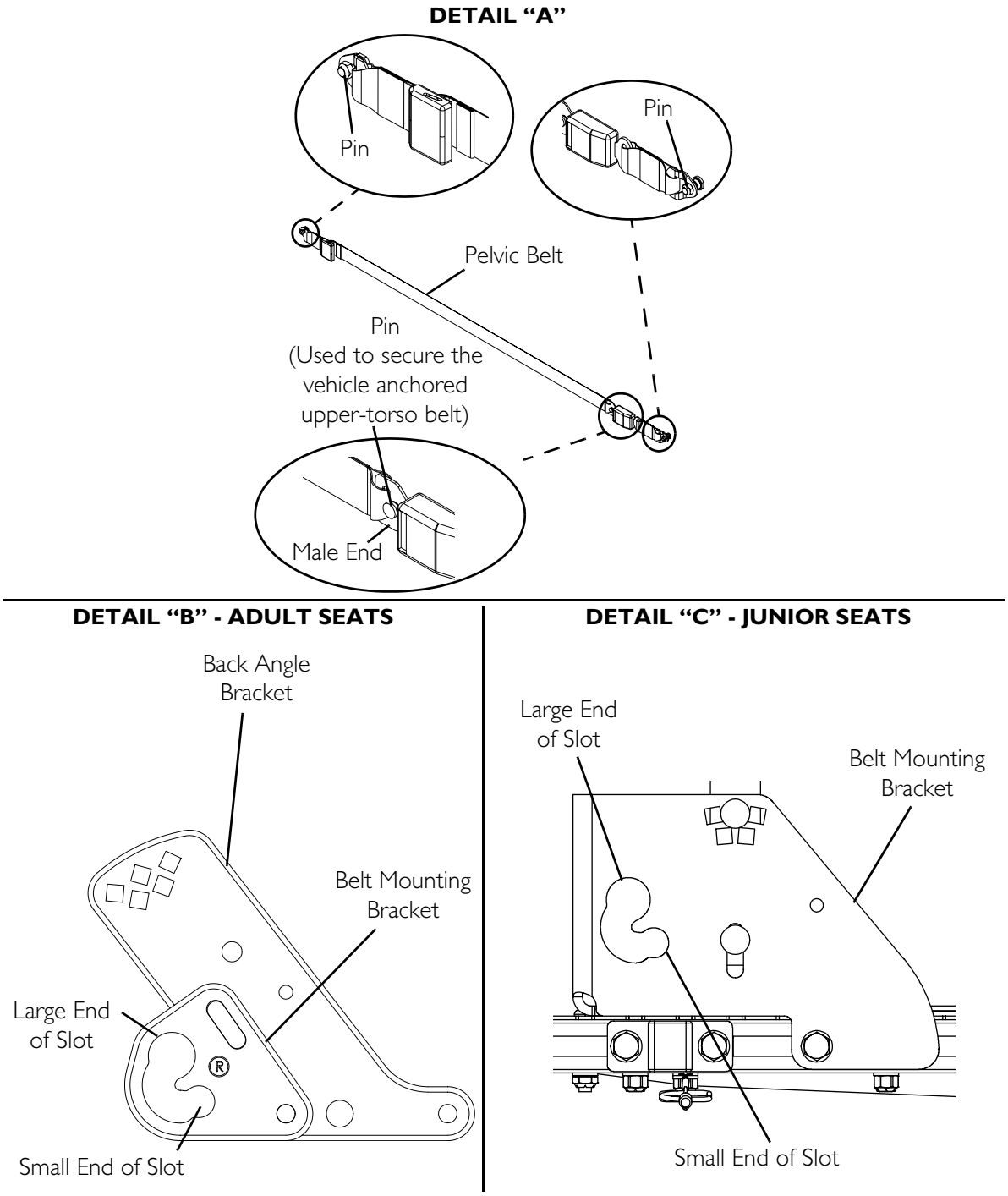


FIGURE 18.2 Wheelchair-Anchored Belts

Vehicle-Anchored Belts

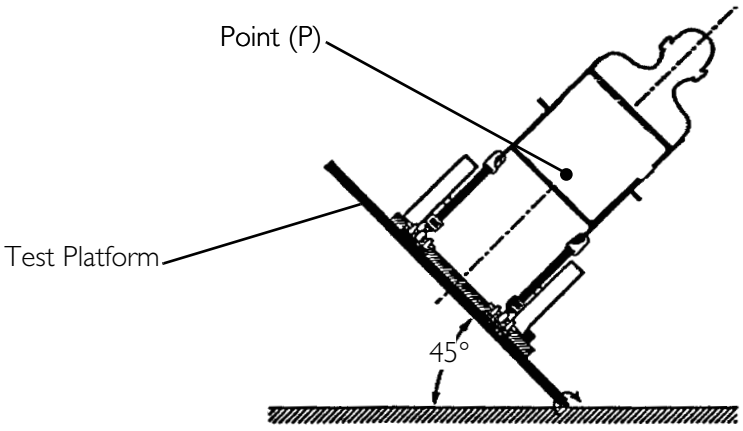
NOTE: For this procedure, refer to FIGURE 18.3.

This wheelchair has an overall rating of "A" with regard to accommodating the use and fit of vehicle-anchored belts. This rating is scored as follows:

RATING	DESCRIPTION
A	Excellent
B	Good
C	Fair
D	Poor

The test for Lateral Stability Displacement for Point (P) is shown in FIGURE 18.3. The average test result for point (P) is:

- TDX Adult - 0.54-inches (13.8 mm).
- TDX Junior - 0.48 inches (12.1 mm).



NOTE: Rear view of the wheelchair and human surrogate secured on test platform and tilted to 45°.

FIGURE 18.3 Vehicle-Anchored Belts

Seating System

⚠ WARNING

This wheelchair has been tested for seating in a motor vehicle with the factory installed seating system ONLY.

Ensure that the factory installed seating system is secured to the wheelchair frame before operation. Refer to the seating system owner's manual.

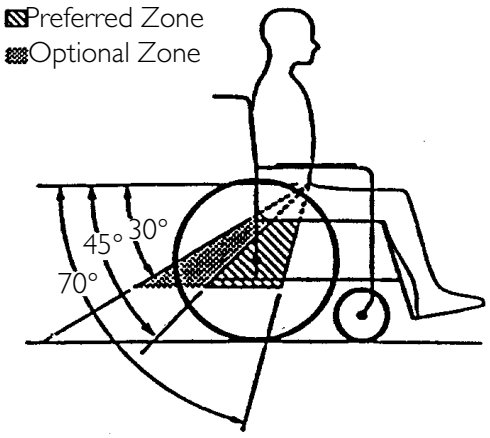
Positioning Belts

⚠ WARNING

The angle of the pelvic belt should be within the preferred zone of 45 to 75 degrees to the horizontal OR within the optional zone of 30 to 45 degrees to the horizontal.

Steeper side-view pelvic belt angles are especially important if the pelvic belt is intended to be used for postural support in addition to occupant restraint in a frontal crash. Steeper angles will reduce the tendency for a vertical gap to develop between the user and the belt due to compliance of seat cushions and belt movement, thereby reducing the tendency for the user to slip under the belt and for the belt to ride up on the soft abdomen during normal use.

Side View

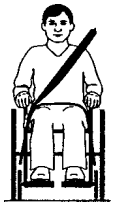


Steeper belt angles also reduce the tendency for upper-torso belts to pull the pelvic belt onto the abdomen during frontal impact loading.

NOTE: For this procedure, refer to FIGURE 18.4.

1. The pelvic belt should be worn low across the front of the pelvis.
2. Position the upper-torso belt(s) over the shoulders.
3. The belt(s) should not be held away from the body by wheelchair components or parts, including but not limited to wheelchair armrests or wheels. Refer to FIGURE 18.4 for proper and improper positioning of the belts.
4. Ensure the belt(s) are not twisted.
5. Adjust belts as firmly as possible, being mindful of user comfort.

DO POSITION BELT INSIDE OF ARMRESTS, WHEELS, ETC.



DO NOT POSITION BELT OUTSIDE OF ARMRESTS, WHEELS, ETC.

FIGURE 18.4 Positioning Belts

NOTES

NOTES

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 who purchases this product when new and unused from Invacare or a dealer. This warranty is not extended to any other person or entity and is not transferable or assignable to any subsequent purchaser or owner. Coverage under this warranty will end upon any such subsequent sale or other transfer of title to any other person.

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

Invacare warrants the base frame to be free from defects in materials and workmanship for a period of five (5) years from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. Invacare warrants the seat frame to be free from defects in materials and workmanship for a period of three (3) years from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. Invacare warrants all electronics and electrical components (excluding batteries), motors (including gearless/brushless), powered seating actuators and gearboxes for a period of one (1) year from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. Invacare warrants all batteries for a period of six (6) months from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. Invacare warrants all remaining components (excluding all upholstered materials, padded materials, tires and wheels) for a period of one (1) year from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. If within such warranty periods any such product component shall be proven to be defective, the product component 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 address on 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 AND TEAR OR FAILURE TO ADHERE TO THE PRODUCT INSTRUCTIONS. A CHANGE IN OPERATING NOISE, PARTICULARLY RELATIVE TO MOTORS AND GEARBOXES DOES NOT CONSTITUTE A FAILURE OR DEFECT AND WILL NOT BE REPAIRED; ALL DEVICES WILL EXHIBIT CHANGES IN OPERATING NOISE DUE TO AGING.

THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTIES WHATSOEVER, WHETHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THE SOLE REMEDY FOR VIOLATIONS OF ANY WARRANTY WHATSOEVER, SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT PURSUANT TO THE TERMS CONTAINED HEREIN. THE APPLICATION OF ANY IMPLIED WARRANTY WHATSOEVER SHALL NOT EXTEND BEYOND THE DURATION OF THE EXPRESS WARRANTY PROVIDED HEREIN AND INVACARE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES WHATSOEVER; SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGE, OR LIMITATION OF HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE EXCLUSION AND LIMITATION MAY NOT BE APPLICABLE.

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

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Part No 1114809

Rev K - 04/04/07

Yes, you can.