This manual MUST be given to the user of the product.
BEFORE using this product, read this manual and save for future reference.
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1 General

1.1 Symbols

Warnings

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

**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 or minor injury or both.

**IMPORTANT**

Indicates a hazardous situation that could result in damage to property if it is not avoided.

**Gives useful tips, recommendations and information for efficient, trouble-free use.**
# GENERAL

## 1.2 Reference Documents

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

<table>
<thead>
<tr>
<th>MANUAL</th>
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<td>MK6i™ Electronics Programming Guide</td>
<td>1141471</td>
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<tr>
<td>Adjustable ASBA Owner’s Manual</td>
<td>1143192</td>
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<td>Formula™ CG Seating System</td>
<td>1143155</td>
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<td>Adjustable ASBA Service Manual</td>
<td>1143238</td>
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<td>M91 and M94™ Service Manual</td>
<td>1125038</td>
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2 Wear and Tear Information

2.1 General Information

Normal wear and tear items and components include but are not limited to: all upholstery items including seat and back upholstery, arm and calf pads, cushions, wheels, tires and casters, all types of batteries, joystick overlays and inductive rubberized protective boots.

Invacare reserves the right to ask for any item back that has an alleged defect in workmanship. Refer to the Warranty section in this manual for specific warranty information.

Refer to the Inspection Checklists in this manual for proper preventative maintenance schedule.

This is just a general guideline and does not include items damaged due to abuse and misuse.

<table>
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<th>PRODUCT TYPE</th>
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<td>Mobility Hardware and Electronics</td>
<td>Rubber Urethane Tires and Casters, Handgrips, Joystick Inductive Tops, Joystick Overlays, Motors and Gearboxes (if exposed to prolonged moisture, urine, etc.), Stability Lock</td>
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<td>Batteries</td>
<td>Lead acid/Lithium, Coin cell (watch type), Gel (6 months)</td>
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3 Warranty

3.1 Global Limited Warranty (Excluding Canada)

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 within any country excluding Canada 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. For product purchased in Canada, please refer to the Canada Limited Warranty.

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 all electronics and electrical components (excluding batteries), motors, powered seating actuators and gearboxes to be free from defects in materials and workmanship for a period of thirteen (13) 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 batteries to be free from defects in materials and workmanship 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) to be free from defects in materials and workmanship 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 period any such product shall be proven to be defective, such product shall be repaired or replaced, at Invacare's option, with refurbished or new parts. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Product repairs shall not extend this warranty - coverage for repaired product shall end when this limited warranty terminates. 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.

3.2 Canada Limited Warranty

This warranty is extended only to the original purchaser who purchases this product within Canada 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 all electronics and electrical components (excluding batteries), powered seating actuators, 2-pole motors and gearboxes to be free from defects in materials and workmanship for a period of two (2) 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 batteries to be free from defects in materials and workmanship 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) to be free from defects in materials and workmanship 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 period any such product shall be proven to be defective, such product shall be repaired or replaced, at Invacare’s option, with refurbished or new parts. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Product repairs shall not extend this warranty - coverage for repaired product shall end when this limited warranty terminates. Invacare’s sole obligation and your exclusive remedy under this warranty shall be limited to such repair and/or replacement. 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.
4 Safety

The safety section contains important information for the safe operation and use of this product.

4.1 General Guidelines

**DANGER**

Risk of Death, Serious Injury or Damage
Improper use of this product may cause injury or damage
If you are unable to understand the warnings, cautions or instructions, contact a health care professional or dealer before attempting to use this equipment.
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 user manual, service manuals or instruction sheets supplied with this product or optional equipment.
Procedures other than those described in this manual must be performed by a qualified technician.

**DANGER**

Risk of Death, Serious Injury, or Damage
Incorrect repair and/or servicing of this wheelchair performed by users/caregivers or unqualified technicians can result in death, serious injury, or damage.
Users/Caregivers — DO NOT attempt to repair and/or service this wheelchair.
Repair and/or service of this wheelchair MUST be performed by a qualified technician. Contact a dealer or Invacare technician.
DANGER
Risk of Death, Serious Injury or Damage
Use of incorrect or improper replacement (service) parts may cause death, serious injury, or damage.
Replacement parts MUST match original Invacare parts.
ALWAYS provide the wheelchair serial number to assist in ordering the correct replacement parts.

WARNING
DO NOT connect any medical devices such as ventilators, life support machines, etc. directly to the batteries used to power the wheelchair. This could cause unexpected failure of the device and the wheelchair.

WARNING
Risk of Serious Injury or Damage
Use of non-Invacare accessories may result in serious injury or damage.
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.
DO NOT use non-Invacare accessories.
To obtain Invacare accessories, contact Invacare by phone or at www.invacare.com.

DANGER
Risk of Death or Serious Injury
Not wearing your seat positioning strap could result in death or serious injury.
ALWAYS wear your seat positioning strap. Your seat positioning strap helps reduce the possibility of a fall from the wheelchair. 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, seat positioning strap MUST be replaced IMMEDIATELY.
4.1 Operation Information

Set Up

**WARNING**

**Risk of Injury or Damage**

Incorrect set up of this wheelchair performed by users/caregivers or unqualified technicians can result in injury or damage. User/Caregivers - DO NOT attempt to set up this wheelchair.

Initial set up of this wheelchair MUST be performed by a qualified technician.
**DANGER**

**Risk of Death, Serious Injury, or Damage**

Continued use of the wheelchair that is not set to the correct specifications may cause erratic behavior of the wheelchair resulting in death, serious injury, or damage.

Performance adjustments should only be made by professionals of the healthcare field or persons fully conversant with this process and the driver's capabilities.

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. Contact Invacare, if wheelchair still does not perform to correct specifications.

**WARNING**

**Risk of Serious Injury or Damage**

Moving the seating system from the factory setting may reduce driver control, wheelchair stability, traction and increase caster wear resulting in serious injury or damage.

Move the seating system ONLY when necessary to fit the wheelchair to the user.

If the seating system must be moved, ALWAYS inspect the wheelchair to ensure the front rigging DOES NOT interfere with the front casters.

If the seating system must be moved, ALWAYS inspect to ensure the wheelchair DOES NOT easily tip forward or backward.
DANGER
Risk of Death, Serious Injury or Damage
Operating the wheelchairs outdoors or in areas of poor lighting may result in death, serious injury, or damage.
Operating the wheelchair near motor vehicles may result in death, serious injury or damage.
DO NOT operate on roads, streets or highways.
Use caution when operating the wheelchair outdoors at night or in areas with poor lighting.
ALWAYS be aware of motor vehicles when using the wheelchair.

WARNING
EXTREME care should be exercised when using oxygen in close proximity to electric circuits and other combustible materials. Contact your oxygen supplier for instruction in the use of oxygen.

WARNING
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.
WARNING

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

Risk of Death, Serious Injury, or Property Damage

Failure to observe the following transport warnings may result in death, serious injury, or property damage.

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

TRRO (Transport Ready Option) - TRRO includes four factory-installed transport brackets and a wheelchair anchored pelvic strap. TRRO has been crash-tested in accordance with ANSI/RESNA WC Vol I Section 19 Frontal Impact Test requirements for wheelchairs with a 168 lb crash dummy, which corresponds to a person with a weight of 165 to 300 lbs.

TRBKTS (Wheelchair Transport Brackets) - 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 Option (TRRO) on page 74 for more information about transporting the wheelchair.
WARNING

STAIRWAYS AND ESCALATORS

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 use an escalator to move a wheelchair between floors. Serious bodily injury may occur.

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 203 and 318 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 or lifting the wheelchair is necessary:

1. Remove the occupant from the wheelchair.
2. Remove the batteries from wheelchair. Refer to Installing/Removing the Batteries on page 92.
3. Bend your knees and keep your back straight.
4. Using the rear frame and the front edge of the front forks as hand hold supports.
5. Transfer the wheelchair base to the desired location.
6. The wheelchair should not be lowered until the last stair has been negotiated and the wheelchair has been carried away from the stairway.
Repair or Service Information - Dealers and/or Qualified Technicians

**WARNING**

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.

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.

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

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

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

**DANGER**

**Risk of Death, Serious Injury, or Damage**

Corroded electrical components due to water, liquid exposure, or incontinent users can result in death, serious injury, or damage.

Minimize exposure of electrical components to water and/or liquids. Electrical components damaged by corrosion MUST be replaced immediately.

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

“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.

Users and assistants must be aware that the handling and maneuverability characteristics of center wheel drive wheelchairs are inherently different from front and rear wheel drive wheelchairs. Handling and maneuverability differences will be most noticeable when traveling down declines (Example: ramps and slopes) or over obstacles and rough terrain as this may shift the users center of mass forward resulting in decreased stability. ALWAYS reduce speed and wear the seat positioning strap when driving under these conditions.

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.

Invacare strongly recommends that initial use of center wheel drive wheelchairs be supervised by an assistant.

---

**DANGER**

Risk of Death, Serious Injury or Damage

Misuse of the wheelchair may cause component failure and/or the wheelchair to start smoking, sparking, or burning. Death, serious injury, or damage may occur due to fire.

DO NOT use the wheelchair other than its intended purpose. If the wheelchair starts smoking, sparking, or burning, discontinue using the wheelchair and seek service IMMEDIATELY.

---

**WARNING**

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

DO NOT go UP or DOWN ramps or traverse slopes greater than 9°.
**WARNING**

NEVER leave an unoccupied wheelchair unattended on an incline.

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.

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 make sharp turns in the forward or reverse directions at excessive speed. Failure to observe this warning can cause the wheelchair to tip over and may result in injury to users, bystanders and/or damage to product.

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.

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

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.

DO NOT store items under seat - interference with seat latch may result.

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

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

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

Stability and Balance

**DANGER**

Risk of Death, Serious Injury or Damage

Not performing periodic maintenance on stability lock could result in death or serious injury.

ALWAYS perform the periodic maintenance to the stability lock listed in the inspection checklist of this manual.

**WARNING**

With regards to seat/chest positioning straps - it is the obligation of the DME dealer, therapists and other healthcare professionals to determine if a seat/chest positioning strap is required to ensure the safe operation of this equipment by the user. Serious injury can occur in the event of a fall from a wheelchair.

The drive behavior initially experienced by the user may be different from other wheelchairs previously used. This 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. The following warnings apply specifically to the SureStep Feature.

• DO NOT use on inclines greater than 9°.
• 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.
• ALWAYS reduce speed when traveling up or down an incline or over obstacles and rough terrain. Traveling under these conditions may shift the users weight forward resulting in reduced stability.
WARNING

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

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.

DO NOT stand on the frame of the wheelchair.

DO NOT adjust the rear seat posts higher than the front seat posts.

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.

Coping with Everyday Obstacles

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 to traverse up to a 3 inch bump 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 wheelchair 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.
**WARNING**

DO NOT attempt to drive over curbs or obstacles greater than 3 inches. 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 front casters are approximately 18 inches away from the obstacle. Slowly apply power to move forward, over the obstacle.

**CAUTION**

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

For this procedure, refer to FIGURE 1.

Do not go down a ramp at full speed. Some seat/back positions will cause the wheelchair to feel unstable.

---

**Pinch Points**

**WARNING:**

Pinch point may occur when 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 (FIGURE 2).

DO NOT store or place items under the seat.

For this procedure, refer to FIGURE 2 and FIGURE 3.
**WARNING:**
Pinch point may occur when adjusting the arm angle position (Detail “A”).
Pinch point may occur when rotating the footboard assembly (Detail “B”).
Footplates and Front Rigging

**WARNING**

**Risk of Serious Injury or Damage**
Operating the wheelchair with a ground clearance of less than 3 inches between the footplates and the ground/floor may cause serious injury or property damage.

ALWAYS maintain a minimum of 3 inches between the bottom of the footplates and ground/floor to ensure proper ground clearance while the wheelchair is in motion. If necessary, adjust the footplates height to achieve proper ground clearance.
After footplates height adjustment, if the wheelchair dips forward and the footplates touch the ground while in motion, please contact your dealer for an inspection and avoid use of the wheelchair if possible.

**Risk of Injury or Damage**
Using the footboard as a platform may cause injury or damage.
DO NOT use the footboard as a platform when getting in or out of the wheelchair. Make sure that the footboard is in the upward position.

**WARNING**

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.
DO NOT use the footplates/footboard 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.
Make sure detent balls of the quick-release pin are fully released before operating the wheelchair.
Keep detent balls clean.
Reaching, Leaning and Bending - Forward

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.

**WARNING**

Risk of Serious Injury or Damage

Improper positioning while leaning or bending could cause the wheelchair to tip forward resulting in serious injury or damage.

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.

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.

For this procedure, refer to FIGURE 4.

Engage motor locks and turn power off before reaching, leaning or bending only as far as your arm will extend without changing your sitting position.

**FIGURE 4** 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.

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

For this procedure, refer to FIGURE 5.

Rain Test

**CAUTION**

Risk of Damage

Operating the wheelchair in rain or dampness may cause the wheelchair to malfunction electrically and mechanically; may cause the wheelchair to prematurely rust or may damage the upholstery.

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

DO NOT use wheelchair in a shower.

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

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.

NOTE: 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.

Position wheelchair as close as possible to the desired object. Point the front and rear casters rearward to create the longest possible wheelbase, engage the motor locks and turn power off. Reach back only as far as your arm will extend without changing your sitting position.
4 SAFETY

Transferring To and From Other Seats

WARNING:

Risk of Serious Injury or Damage
Improper transfer techniques may cause serious injury or damage. Before attempting transfers, consult a health care professional to determine proper transfer techniques for the user and type of wheelchair. Reduce gap between transfer surface and wheelchair seat to the minimum distance necessary to perform transfer. Align casters parallel to the drive wheels to improve stability during transfer. ALWAYS turn the wheelchair power off. ALWAYS engage both motor locks/clutches and free wheel hubs (if equipped) to prevent the wheels from moving before transferring into or from the wheelchair.

For this procedure, refer to FIGURE 6.

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

1. Position the wheelchair to minimize the gap distance between the wheelchair seat and the seat to which you are transferring.
2. Ensure the casters are aligned parallel with the object.
3. Engage motor locks. Refer to Disengaging/Engaging Motor Lock Levers on page 73.
4. Flip back or remove arm on side of wheelchair you are transferring from.
5. Shift body weight into seat with transfer.

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

FIGURE 6 Transferring To and From Other Seats
**Storage**

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

**Electrical - Grounding Instructions**

**WARNING**
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.

**Electrical - Batteries**

**WARNING**
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.

Some battery manufactures mold a carrying strap and/or hold down flanges directly into the battery case. Batteries that interfere with the battery box cannot be used for these applications. Attempting to “wedge” a battery into a battery box may damage the box, the battery and/or be a fire hazard, resulting in serious injury or further damage to property.

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

When using an extension cord, use an 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 a risk of fire and electric shock.

**WARNING**

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.
DO NOT attempt to recharge batteries using BOTH the on-board battery charger and an independent battery charger (plugged into the joystick charger port) at the SAME time. Doing so will reduce the life of 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.
AFTER charging batteries, ALWAYS make sure that the battery charger cord is securely wrapped and stored within the hook and loop strap assembly on the rear of the battery tray. Failure to do so may result in damage to the cord or personal injury to the user or bystanders.
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.
4.3 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).

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

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.

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.

4.4 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.

**WARNING**

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.
WARNING

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.
4) Modification of any kind to the electronics of this scooter as manufactured by Invacare may adversely affect the EMI immunity levels.
5 Safety Guidelines

**WARNING**

Risk of Serious Injury or Damage
Attaching hardware that is loosely secured could cause loss of stability resulting in serious injury or damage. After ANY adjustments, repair or service and before use, make sure that all attaching hardware is tightened securely.

**DANGER**

Risk of Death, Serious Injury, or Damage
Missing attaching hardware could cause instability resulting in death, serious injury or damage. Ensure all attaching hardware is present and tightened securely.

**WARNING**

Risk of Serious Injury or Damage
Loss of power due to loose electrical connections could cause the wheelchair to suddenly stop resulting in serious injury or damage. ALWAYS ensure that all electrical connections are tightly connected so they don’t vibrate loose.

**WARNING**

Risk of Minor to Serious Injury
Pinch points can cause minor to serious injury. Be mindful of potential pinch points and use caution when using this product.
**WARNING**
Risk of Serious Injury
Impacting objects in the surrounding environment can cause serious injury.
When maneuvering the wheelchair around, ALWAYS have assured cleared distance with all objects in environment.

**WARNING**
Risk of Serious Injury
Sharp edges can cause serious injury.
Be mindful that some parts may have sharp edges. Use caution when encountering these sharp edges.

**WARNING**
Risk of Serious Injury
Hot surfaces can cause severe burns.
Be mindful of potential hot surfaces and avoid touching.

**DANGER**
Risk of Death, Serious Injury, or Damage
Lighted cigarettes dropped onto an upholstered seating system can cause a fire resulting in death, serious injury, or damage. Wheelchair occupants are at particular risk of death or serious injury from these fires and resulting fumes because they may not have the ability to move away from the wheelchair.
DO NOT smoke while using this wheelchair.
**WARNING**

**Risk of Serious Injury or Damage**
Accidental activation of wheelchair caused by pets, children, etc. can result in serious injury or damage. ALWAYS turn power off when around pets and/or children to prevent unintended movement.

**DANGER**

**Risk of Death or Serious Injury**
Traveling on inclines with wet, slippery, icy or oily surfaces could cause loss of traction resulting in death or serious injury. DO NOT use on inclines with wet, slippery, icy or oily surfaces. This may include certain painted or otherwise treated wood surfaces.

**WARNING**

**Risk of Death or Serious Injury**
Braking hard and/or sudden stops while on inclines could cause loss of stability resulting in death or serious injury. While on inclines, ALWAYS travel at a reduced, constant speed to maintain stability. Traveling down ramps at high speeds will reduce traction and increase stopping distance. DO NOT brake hard and avoid sudden stops while traveling on an incline. If stopping becomes necessary while on an incline, release the joystick and allow the wheelchair to come to a full stop. Then proceed at a slower speed.
**DANGER**
*Risk of Death or Serious Injury*
Electric shock can cause death or serious injury
To avoid electric shock, inspect plug and cord for cuts and/or frayed wires. Replace cut cords or frayed wires immediately.

**WARNING**
*Risk of Serious Injury or Damage*
Dropping the battery can result in serious injury or property damage.
Batteries can weigh up to 52 lbs (23.6 kg). ALWAYS use a battery lifting strap when lifting the battery. It is the most reliable method of carrying a battery and preventing serious injury.

**WARNING**
*Risk of Death, Serious Injury or Damage*
Exceeding the weight capacity of the wheelchair/seating system could cause instability resulting in death or serious injury.
DO NOT exceed the weight capacity.

**WARNING**
*Risk of Serious Injury or Death*
Failure to observe this warning can result in serious injury or death.
Loss of traction on ramps and inclines can occur for a variety of reasons including; water, ramp material, surface conditions, steepness or grade etc. Lighter weight users may be at an increased risk for loss of traction. As such, when using on ramps or inclines always reduce speed and proceed with caution.
WARNING
Risk of Death, Serious Injury, or Damage
Improperly connected joystick could cause loss of power resulting in death, serious injury, or damage.
Ensure the joystick is securely connected to controller.

DANGER
Risk of Death, Serious Injury, or Damage
Malfunctioning joystick could cause unintended/erratic movement resulting in death, serious injury, or damage.
If unintended/erratic movement occurs, stop using the wheelchair immediately and contact a qualified technician.
6 Label Locations

Serial Number Label is located on the inside of the right rear frame.

Weight Capacity Label located here (Base Only).

M91 Standard

- WARNING
  WIRING DIAGRAM for Dual 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 Cables to connect to 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.

- AVERTISSEMENT
  SCHEMA POUR LE FILAGE des batteries doubles 22NF
  NE PAS ENLEVER CETTE ETIQUETTE
  Le câble ROUGE POSITIF (+) DOIT être connecté à la borne POSITIVE (+). Le câble NOIR NEGATIF (-) DOIT être connecté à la borne NEGATIVE (-). NE PAS laisser les câbles de batteries toucher les bornes opposées. Remplacer le câble immédiatement si l'isolation du câble est endommagée. Un court-circuit peut se produire et causer des blessures graves et/ou des dommages au système électrique si ces avertissements ne sont pas respectés. Se référer au MANUEL DE L’UTILISATEUR.
  NE PAS enlever le fusible ou la quincaillerie de montage de la vis de montage du câble de batterie ROUGE POSITIF (+).

M91 Heavy Duty

- WARNING
  WIRING DIAGRAM for Dual 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 Cables to connect to 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.

- AVERTISSEMENT
  SCHEMA POUR LE FILAGE des batteries doubles 22NF
  NE PAS ENLEVER CETTE ETIQUETTE
  Le câble ROUGE POSITIF (+) DOIT être connecté à la borne POSITIVE (+). Le câble NOIR NEGATIF (-) DOIT être connecté à la borne NEGATIVE (-). NE PAS laisser les câbles de batteries toucher les bornes opposées. Remplacer le câble immédiatement si l'isolation du câble est endommagée. Un court-circuit peut se produire et causer des blessures graves et/ou des dommages au système électrique si ces avertissements ne sont pas respectés. Se référer au MANUEL DE L’UTILISATEUR.
  NE PAS enlever le fusible ou la quincaillerie de montage de la vis de montage du câble de batterie ROUGE POSITIF (+).
Wheelchairs without TRRO

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

Wheelchairs with TRRO

Also on opposite side of wheelchair.
## 7 Technical Data

### 7.1 Specifications

#### Models

<table>
<thead>
<tr>
<th>M91</th>
<th>M91, M91R, M91-TS, M91-C, M91-M, M91HD</th>
</tr>
</thead>
</table>

#### Overall Dimensions

<table>
<thead>
<tr>
<th>M91</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Width (Without Joystick):</td>
<td>25.75 inches</td>
</tr>
<tr>
<td>Base Length (Without Front Rigging):</td>
<td>39 inches (with Footboard Folded)</td>
</tr>
<tr>
<td>Overall Height:</td>
<td>36 - 49.25 inches (Based on 18 inch deep Van seat)</td>
</tr>
<tr>
<td>Seat-to-Floor Height - Adjustable ASBA:</td>
<td>22.5 to 23.5 inches (Cushion Not Compressed)</td>
</tr>
<tr>
<td>Van Seat:</td>
<td>20 - 22 inches (To Seat Pan)</td>
</tr>
</tbody>
</table>

#### Wheels

<table>
<thead>
<tr>
<th>M91</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Casters:</td>
<td>6 x 2 inch Front/Rear with Precision Sealed Bearings</td>
</tr>
<tr>
<td>Drive Wheel:</td>
<td>14 x 3 inch</td>
</tr>
</tbody>
</table>

#### Operating/Storage Temperature

<table>
<thead>
<tr>
<th>M91</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature:</td>
<td>122 F (50 C) Maximum to -13 F (-25 C) Minimum</td>
</tr>
<tr>
<td>Storage Temperature:</td>
<td>149 F (65 C) Maximum to -58 F (-40 C) Minimum</td>
</tr>
</tbody>
</table>
7 TECHNICAL DATA

Driving

<table>
<thead>
<tr>
<th></th>
<th>M91 STANDARD</th>
<th>M91 HEAVY DUTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed Range:</td>
<td>0 - 6.4 mph</td>
<td>0 - 4.25 mph</td>
</tr>
<tr>
<td>Maximum Incline Capability:</td>
<td>9°</td>
<td></td>
</tr>
<tr>
<td>Turning Radius:</td>
<td>Front (with Footboard): 19.5 inches, Rear: 21.5 inches</td>
<td></td>
</tr>
<tr>
<td>*Range:</td>
<td>22 miles</td>
<td>12 - 16 miles</td>
</tr>
</tbody>
</table>

*Values for range are calculated for maximum chair weight rating using largest batteries applicable (22NF), per test procedures described in ANSI/RESNA WC/VOL2?1998 Section 4 and meet federal reimbursement requirements for this product. While considered typical, they are derived based on certain ideal conditions. Variances in battery condition, user weight, usage pattern or overall terrain conditions will result in actual values for range that differ from these stated values. Users should become accustomed to how their unique conditions impact their individual results. Users should become familiar with the battery discharge indicator on the joystick to determine the range of their wheelchair. Refer to Battery Charger Operation on page 64 for more information about the battery discharge indicator.

Weight

<table>
<thead>
<tr>
<th></th>
<th>M91 STANDARD</th>
<th>M91 HEAVY DUTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Weight (Without Batteries):</td>
<td>199 lbs</td>
<td></td>
</tr>
<tr>
<td>Shipping Weight:</td>
<td>260 lbs (w/o Batteries), 310 lbs (w/ Batteries)</td>
<td></td>
</tr>
<tr>
<td>Battery Weight:</td>
<td>37 lbs Each (Use 22NF Batteries Only)</td>
<td></td>
</tr>
<tr>
<td>*Maximum Weight Limitation:</td>
<td>Up to 300 lbs</td>
<td>Up to 400 lbs</td>
</tr>
</tbody>
</table>

Refer to Weight Limitation on page 35.
8 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.

8.1 Preparing the Joystick for Use

For this procedure, refer to FIGURE 1.

The joystick is factory installed on the right side of the wheelchair. To reposition the joystick onto the left side of the wheelchair, refer to Repositioning Joystick on page 108.

1. Turn the adjustment lock lever to release the adjustment lock from joystick mounting tube.
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 1 Preparing the Joystick for Use
8 WHEELCHAIR OPERATION

8.2 Operating the Wheelchair

Turning the Power On/Off

For this procedure, refer to FIGURE 2.

1. To turn the power On, perform one of the following steps:

<table>
<thead>
<tr>
<th>JOYSTICK</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPJ™ +</td>
<td>Move the On/Off switch Forward to the On position.</td>
</tr>
<tr>
<td>SPJ™ +</td>
<td>Press the On/Off button.</td>
</tr>
</tbody>
</table>

2. Turning the power Off can be achieved by performing one of the following steps:

<table>
<thead>
<tr>
<th>JOYSTICK</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPJ+</td>
<td>Move the On/Off switch Back to the Off position.</td>
</tr>
<tr>
<td>SPJ+</td>
<td>Press the On/Off button.</td>
</tr>
</tbody>
</table>

FIGURE 2 Turning the Power On/Off
Using the Joystick to Drive the Wheelchair

For this procedure, refer to FIGURE 3 on page 50.

The joystick is located on 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 48.
3. Maneuver the joystick in the following manner:
## WHEELCHAIR OPERATION

<table>
<thead>
<tr>
<th>MOVEMENT</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORWARD</td>
<td>Push joystick forward, towards the front of the wheelchair.</td>
</tr>
<tr>
<td>REVERSE</td>
<td>Pull joystick back, towards the rear of the wheelchair.</td>
</tr>
<tr>
<td>Turn RIGHT</td>
<td>Move joystick toward the right side of the wheelchair.</td>
</tr>
<tr>
<td>Turn LEFT</td>
<td>Move joystick toward the left side of the wheelchair.</td>
</tr>
<tr>
<td>STOP</td>
<td>Release the joystick and the wheelchair will slow to a stop.</td>
</tr>
</tbody>
</table>

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

- **SPJ™+, MK6i™ SPJ+ w/PSS and MK6i SPJ+ w/ACC Joystick Switches and Indicators** on page 51.
- **CMPJ+ Joystick Switches and Indicators** on page 54.

**FIGURE 3** Using the Joystick to Drive the Wheelchair

- **To Move**
  - **Forward**
  - **Left**
  - **Right**
  - **Backward**

**Front of Wheelchair**

**Rear of Wheelchair**
8.3 **SPJ™ +, MK6i™ SPJ+ w/PSS and MK6i SPJ+ w/ACC Joystick Switches and Indicators**

For this procedure, refer to FIGURE 4.

*The mode button is only present on SPJ+ w/ACC joystick.*

**FIGURE 4** SPJ™ +, MK6i™ SPJ+ w/PSS and MK6i SPJ+ w/ACC Joystick Switches and Indicators
8 WHEELCHAIR OPERATION

On/Off Button

This button is located at the front of the joystick housing. It is used to turn the wheelchair On and Off.

Speedometer

The speedometer is used to show the maximum speed. The right-most LED indicates current maximum speed setting. The bottom left GREEN LED flashes to indicate that the joystick is in speed limit mode. Speed limit mode limits the drive speed to a pre-programmed value, typically when the seat has been elevated and the wheelchair is required to drive at 20% speed.

Speed Control Buttons

The speed control buttons (tortoise button ( ) and hare button ( )) are used to set and adjust the maximum speed.

1. To adjust the speed, perform one of the following:
   • Adjust Speed in 20% Increments (5 Speed Mode) - Press the tortoise button ( ) or hare button ( ) to decrease/increase the speed in 20% increments. The larger bars in the speedometer will light.
   • Adjust Speed in Smaller Increments (VSP Mode) - Perform the following steps:
     i. Press and hold both the tortoise button ( ) and hare button ( ) until the joystick beeps.
     ii. Perform one of the following:
        • Press the tortoise button ( ) or hare button ( ) to decrease/increase the speed in 20% increments. The larger bars in the speedometer will light.
        • Press and hold the tortoise button ( ) or hare button ( ) to decrease/increase the speed in smaller increments. The smaller bars in the speedometer will light.
**Joystick**

The joystick has proportional drive control, meaning that the further the joystick is pushed from the upright (neutral) position, the faster the wheelchair or seat moves. Your top speed, however, is limited by the 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**

The charger/programming input is 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. Driving is prevented while the system is charging.

**Information Gauge Display**

The information gauge display is located on the front of the joystick housing and provides the following information to the user on the status of the wheelchair:

1. Power is On.
2. True state-of-battery-charge, including notification of when the battery requires charging:
   - A. GREEN LEDs are lit, indicating well charged batteries.
   - B. AMBER LEDs are lit, indicating batteries are moderately charged. Recharge batteries before taking a long trip.
   - C. RED LEDs are lit, indicating batteries are running out of charge. Recharge batteries as soon as possible.

The Information Gauge display also serves as a system diagnostic device when a fault is detected by the control module. A specific number of flashes of the LEDs indicate the type of fault detected. Refer to **Information Gauge Display Diagnostics** on page 113 for the diagnostic indications of the wheelchair status.

**Service Indicator**

The AMBER service indicator 🔄 will light when an error or fault occurs. Refer to **Service Indicator Light Diagnostics** on page 114 for a listing of the flash codes and what they indicate.
8 WHEELCHAIR OPERATION

8.4 CMPJ+ Joystick Switches and Indicators

For this procedure, refer to FIGURE 5.

On/Off - 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 vice 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  CMPJ+ Joystick Switches and Indicators
Speed Control
The speed control knob is located on the side of the joystick housing.
1. Rotate the knob clockwise (forward) to increase the speed of the wheelchair to the programmed max speed.
2. Rotate the knob counterclockwise (backward) to decrease the speed of the wheelchair to the programmed max speed.

Joystick
The joystick has proportional drive control, meaning that the further the joystick is pushed from the upright (neutral) position, the faster the wheelchair or seat moves. Your top speed, however, is limited by the 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
The charger/programming input is 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. Driving is prevented while the system is charging.

LCD Display Screens
The LCD Display is located in front of the joystick and provides information on the status of the wheelchair through a backlit display. The LCD display is readable in both bright sunlight and complete darkness.

Splash Screen
For this procedure, refer to FIGURE 6.

This screen is displayed at startup of the joystick for about 2 seconds. This screen displays the software version and date information.

After this screen, the joystick displays the Main Screen.
Main Screen

For this procedure, refer to FIGURE 7 on page 58.

During normal operation, the active drive is displayed in the upper half of the LCD display. Battery charge level is shown in the Battery Gauge Display (BGD) located on the right side of the LCD display. At full charge, solid blocks fill in all ten segments between E (Empty) and F (Full). As the battery becomes discharged, the top most segments will progressively disappear until no segments appear between E and F. At this level, the user should charge the batteries as soon as possible.

The lower half of the LCD display is the Information Center. The Information Center displays current data on the wheelchair.

Refer to LCD Display table on page 56 for descriptions of information shown.

### LCD DISPLAY

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRIVE NAME</td>
<td>This field shows the currently selected Drive’s Name.</td>
</tr>
<tr>
<td></td>
<td>Available choices are as follows:</td>
</tr>
<tr>
<td></td>
<td><strong>Color CMPJ+</strong></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Drive Names" /></td>
</tr>
<tr>
<td></td>
<td>*Drive names can be customized. Actual drive names may display differently.</td>
</tr>
<tr>
<td></td>
<td><strong>No Drive</strong> selected via the programmer.</td>
</tr>
<tr>
<td>BATTERY LEVEL INDICATOR</td>
<td>This symbol shows the Battery Level and will change depending on the available battery power. This indicator is shown on every screen.</td>
</tr>
</tbody>
</table>
### ITEM

<table>
<thead>
<tr>
<th>STATUS MESSAGE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>This area displays status or instructions.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLOCK</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays current time.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATUS INDICATOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>The status indicator will show a “Warning” (exclamation point inside a triangle) indicator when the chair has a condition that requires attention.</td>
<td></td>
</tr>
<tr>
<td>The status indicator will show a “STOP” sign when a serious condition exists. The chair will not be allowed to operate.</td>
<td></td>
</tr>
<tr>
<td>The status indicator shows an Attendant Icon if the attendant’s override switch is active.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODES</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>The dotted-box shows the area that contains the available “modes” in the currently selected drive. The modes are programmed for each drive and are based upon the configuration of the chair.</td>
<td></td>
</tr>
<tr>
<td>These modes are highlighted when the Mode is active. The operator changes modes by pressing the Mode Select Switch.</td>
<td></td>
</tr>
<tr>
<td>The available modes are as follows:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="diag1.png" alt="Digital 3 Speed 1 - 3" /></td>
<td>Digital 3 Speed 1 - 3</td>
</tr>
<tr>
<td><img src="diag2.png" alt="RIM Mode" /></td>
<td>RIM Mode</td>
</tr>
<tr>
<td><img src="diag3.png" alt="No Driving" /></td>
<td>No Driving</td>
</tr>
<tr>
<td><img src="diag4.png" alt="Automatic Positioning" /></td>
<td>Automatic Positioning</td>
</tr>
<tr>
<td><img src="diag5.png" alt="Powered Seating" /></td>
<td>Powered Seating</td>
</tr>
<tr>
<td><img src="diag6.png" alt="4-Switch Level 1 (L1, L1 Latched)" /></td>
<td>4-Switch Level 1 (L1, L1 Latched)</td>
</tr>
<tr>
<td><img src="diag7.png" alt="4-Switch Level 2 (L2, L2 Latched)" /></td>
<td>4-Switch Level 2 (L2, L2 Latched)</td>
</tr>
<tr>
<td><img src="diag8.png" alt="Drive Select" /></td>
<td>Drive Select</td>
</tr>
<tr>
<td><img src="diag9.png" alt="ECU Output Activated" /></td>
<td>ECU Output Activated</td>
</tr>
<tr>
<td><img src="diag10.png" alt="ASM 1" /></td>
<td>ASM 1</td>
</tr>
<tr>
<td><img src="diag11.png" alt="ASM 2" /></td>
<td>ASM 2</td>
</tr>
<tr>
<td><img src="diag12.png" alt="Infrared" /></td>
<td>Infrared</td>
</tr>
<tr>
<td><img src="diag13.png" alt="Mouse" /></td>
<td>Mouse</td>
</tr>
<tr>
<td><img src="diag14.png" alt="Mouse B" /></td>
<td>Mouse B</td>
</tr>
</tbody>
</table>
Driving Screen

For this procedure, refer to FIGURE 8.

This screen is shown when the operator issues a drive command and the Drive Icon on the main screen was highlighted.

The Drive’s name, warning/info message, status icon and battery indicator are displayed on this screen.
**User Settings**

Depress the mode button of the CMPJ+ joystick for 10 seconds and the User Settings screen will appear with three choices. Move the joystick forward or reverse to scroll through list. Move the joystick to the right to select a user setting.

<table>
<thead>
<tr>
<th>User Settings</th>
<th>Set Date and Time</th>
<th>Battery Voltage</th>
<th>Fault Codes</th>
<th>Connected Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="User Settings" /></td>
<td><img src="image2" alt="Set Date and Time" /></td>
<td><img src="image3" alt="Battery Voltage" /></td>
<td><img src="image4" alt="Fault Codes" /></td>
<td><img src="image5" alt="Connected Devices" /></td>
</tr>
</tbody>
</table>

### USER SETTINGS

| SET DATE AND TIME | SET DATE AND TIME - Sets the clock on the color CMPJ+ joystick. Adds date and time stamp to error codes.  
  • Move the joystick Up or Down to change the highlighted value (hour, minute, AM/PM, month, day, year)  
  • Move the joystick Right or Left to select a value or the Set icon.  
  • Highlight the Set icon and move the joystick forward to enter new date and time. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BATTERY VOLTAGE</td>
<td>BATTERY VOLTAGE - Displays current battery voltage. This is a diagnostic test a user can perform prior to a service call.</td>
</tr>
<tr>
<td>FAULT CODE</td>
<td>FAULT CODES - Displays time and date stamped fault codes. This information can be helpful to a provider prior to making a service call.</td>
</tr>
<tr>
<td>CONNECTED DEVICES</td>
<td>CONNECTED DEVICES - Displays device connections. Refer to Connected Devices Screen on page 60.</td>
</tr>
</tbody>
</table>
8  WHEELCHAIR OPERATION

Connected Devices Screen

For this procedure, refer to FIGURE 9.

This screen is displayed if the Mode Select switch is held active for about 10 seconds. This screen shows an icon that represents any additional devices that are connected to the chair.

![Connected Devices Screen](image)

<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Intelligent Tilt Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Intelligent Recline Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Intelligent Center Leg Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Elevate Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Generic Tilt Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Generic Recline Actuator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Generic Leg Actuators</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Generic Right Leg Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Generic Left Leg Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Intelligent CG Tilt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Shark Power Module (SPM) Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>SANODE or Single Actuator Control Interface</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>4-way Switch Box</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Multiple Actuator Control Box</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>RIM Control</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>ECU 1/2 and ECU 3/4</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Proportional Attendant Control</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Compact Joystick</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Sip and Puff control</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Digital Attendant Control</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Micro Extremity Control</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Peachtree Control</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>ASL Digital Control</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Generic Tilt Actuator</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Generic Recline Actuator</td>
</tr>
</tbody>
</table>

FIGURE 9  LCD Display Screens - Connected Devices Screen
Programmable Mono Ports 1 and 2 with External Mode Switch

The programmable mono port with external mode switch input is located at the rear of the joystick on the left side. The programmable mono port input offers the choice of three options:

- Remote drive select
- Remote stop/mode (reset) input
- Single actuator input

The single switch functions operate through mono port 1. An optional y-cable allows a second programmable function through mono port 2.

Remote Stop Switch

The remote reset switch may be used to stop the wheelchair if the wheelchair is in motion.

The remote reset switch also functions in the same way as the joystick mode switch when the wheelchair is not in motion. Refer to Mode Switch on page 62.

Remote On/Off Switch

The remote On/Off switch input is located at the rear of the joystick on the right side and 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.
Mode Switch

The mode switch is used to select the operating mode for the wheelchair. The mode switch is located on the joystick. A mode switch is needed whenever any of the following operating modes are programmed:

- Environmental Controls (ECU 1, ECU 2, ECU 3, ECU 4)*
- 3 Speed Mode in Digital 3 Speed (Slow, Medium, Full)
- Sleep Mode
- RIM Mode*
- Remote Drive Selection Mode*
- Tilt/Recline 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.

*In these modes, Standby Select allows the reset switch to be bypassed for users unable to activate the switch.

Memory Card Slot

The memory card slot is used with the basic or professional memory card for saving or reading wheelchair parameters.

When to Charge Batteries

Keep Batteries charged. When possible, DO NOT allow battery charge to empty.

If battery charge becomes so low that no battery indicators are lit, allow the batteries to charge overnight.
SPJ+, SPJ+ w/PSS and SPJ+ w/ACC Joysticks

For this procedure, refer to FIGURE 10.

The Information Gauge Display located on the front of the joystick housing, it provides the state-of-battery charge, including notification of when the battery requires charging. It also provides the following information to the user on the status of the wheelchair:

A. GREEN LEDs are lit, indicating well charged batteries.
B. AMBER LEDs are lit, indicating batteries are moderately charged. Recharge batteries before taking a long trip.
C. RED LEDs are lit, indicating batteries are running out of charge. Recharge batteries as soon as possible.

CMPJ+ Joystick

For this procedure, refer to FIGURE 11.

The far right side of the display screen is the Battery Gauge Display (BDG). It provides information on the remaining charge in the batteries.

At full charge, solid blocks fill in battery gauge. As the battery becomes discharged, the segments will progressively disappear starting on the right and moving towards the left a bar at a time until no segments appear. At this level the user should charge the batteries as soon as possible.
8.6 Charging Batteries

**DANGER**

Use of improper extension cord could result in risk of fire and electric shock.

When using an extension cord, use an 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 a risk of fire and electric shock.

**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 front of the joystick.

DO NOT sit in the wheelchair while charging the batteries.

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.

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

DO NOT attempt to recharge batteries using BOTH the on-board battery charger and an independent battery charger (plugged into the joystick charger port) at the SAME time. Doing so will reduce the life of 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.

**CAUTION**

Always charge new batteries before initial use or battery life will be reduced.
New batteries MUST be fully charged prior to initial use of the wheelchair.

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.

### 8.7 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 or enter a trickle charge mode to maintain the batteries depending on charger model.

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

Once the charger has been connected to the wheelchair and wall outlet and, if necessary, the charger has been turned on, the battery charger indicator lights will flash and light to show the battery charger status and condition of batteries to be charged. Refer to owner’s manual shipped with battery charger.

**WARNING**

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

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.

The batteries can be charged using the on-board battery charger or by plugging an independent battery charger into the port located on the front of the SPJ-80/DPJ/CMPJ joysticks.
8 WHEELCHAIR OPERATION

8.8 On-Board Battery Charger

**WARNING**

AFTER charging batteries, ALWAYS make sure that the battery charger cord is securely wrapped and stored within the hook and loop strap assembly on the rear of the battery tray. Failure to do so may result in damage to the cord or personal injury to the user or bystanders.

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

For this procedure, refer to FIGURE 12 on page 67.

Charge indicator light is only visible with rear shroud removed.

1. Plug the female connector of the AC power cord (supplied) to the AC receptacle on the charger and plug in the male connector on the AC power cord into the wall outlet.
2. The On/Off LED indicator illuminates solid RED indicating that the charger is On.
3. If the On/Off LED indicator is “Blinking” RED, this is abnormal. Unplug AC power cord from the on-board battery charger and wall outlet. Contact Invacare at the number listed on the back page of this manual.
4. When the On/Off LED indicator light is Off, charger is Off.
5. When the Charge LED indicator light is YELLOW, the batteries are charging.
6. When the Charge LED indicator light is solid GREEN, the batteries are fully charged (as their condition will allow). At this point, the charger automatically stops charging.
7. When charging is complete, unplug the male connector of the AC power cord from the wall outlet and then unplug the female connector of the AC power cord from the AC receptacle on the charger.

**WARNING**

DO NOT operate wheelchair with AC power cord attached to the wheelchair.
Wheelchair shown without seat for clarity. Charge indicator light is only visible when rear shroud is removed.

<table>
<thead>
<tr>
<th>CHARGING INDICATOR</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW</td>
<td>Charging (Under 80%)</td>
</tr>
<tr>
<td>“Blinking” YELLOW</td>
<td>Partially Charges (Over 80%)</td>
</tr>
<tr>
<td>Solid GREEN</td>
<td>Fully Charges</td>
</tr>
<tr>
<td>LED “Off”</td>
<td>Charger Disconnected</td>
</tr>
<tr>
<td>Solid RED or “Blinking” RED</td>
<td>Under Voltage, Over Voltage or Over Temperature</td>
</tr>
</tbody>
</table>

FIGURE 12  On-Board Battery Charger
8 WHEELCHAIR OPERATION

8.9 Independent Battery Charger

WARNING

DO NOT use an independent charger with an output rating of over 8A (amps). Otherwise, damage may occur.

For this procedure, refer to FIGURE 13 on page 68.

The charger port located on the Front of the joystick requires the use of an independent charger. The independent charger is NOT supplied with the wheelchair.

<table>
<thead>
<tr>
<th>REQUIRED ITEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool</td>
</tr>
<tr>
<td>Battery Charger</td>
</tr>
</tbody>
</table>

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.

Allow eight hours for normal charging. Larger batteries (greater than 55 ampere-hours) or severely discharged batteries may require up to sixteen hours to be properly charged and equalized.

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.
8.10 Removing/Installing the Seat Assembly

**WARNING**
DO NOT store items under seat - interference with seat latch may result.

For this procedure, refer to FIGURE 14 on page 70.

This procedure is for wheelchairs without the Formula PTO Plus seating system only. For wheelchairs with the Formula PTO Plus seating system, refer to Tilting the Seat Assembly on page 71.

**Removing**
1. Disconnect the joystick. Refer to Disconnecting/Connecting the Joysticks on page 110.
2. Push down on the latch bar underneath front of seat.
3. Tilt front edge of seat up.
4. Slide the seat assembly forward to disengage seat from the pivot brackets located in the rear.

**Installing**
1. Position the seat in the rear pivot brackets as shown in FIGURE 14.
2. Tilt front edge of seat down.
3. When seat is lowered, engage seat brackets into seat clevis pins.
4. Pull up on latch bar to verify that brackets are engaged with the seat clevis pins by pulling up on the latch bar.
5. Connect the joystick. Refer to Disconnecting/Connecting the Joysticks on page 110.
Van Seat model shown. Adjustable ASBA seat removes/installs in the same way.

FIGURE 14 Removing/Installing the Seat Assembly
8.11 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.

For this procedure, refer to FIGURE 15 on page 72.

This procedure is for M91 wheelchairs with the Formula PTO Plus Seating System ONLY.

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**

1. Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.
2. Use the tilt function to tilt the seat back 20° to 25°.
3. Verify the joystick On/Off switch is in the Off position and disconnect joystick cable.
4. Engage the motor release levers. Refer to Disengaging/Engaging Motor Lock Levers on page 73.
5. Remove the footboard. Refer to Removing/Installing the Footboard Assembly on page 102.
6. Remove the two screws and washers securing the Formula PTO Plus frame to the front seat posts.
7. Firmly grasp the front edge of the seat assembly, slowly tilt the seat assembly back into the up/open position.
8 WHEELCHAIR OPERATION

8. Remove prop rod from the clip located on the Formula PTO Plus frame and engage the prop rod end into the front seat post as shown in FIGURE 15.

9. Gently allow weight of seat assembly to be supported by the prop rod.

> 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 and ensure it is in the locked position 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 front seat post and secure into clip.

3. Using both hands, slowly tilt the seat assembly Forward into the Down/Closed position.

4. Insert the two screws through the washers, the Formula PTO Plus frame and the two front seat posts.

---

**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.
9 Motor Locks

9.1 Disengaging/Engaging Motor Lock Levers

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

For this procedure, refer to FIGURE 1.

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

Motor lock levers are located between the rear caster assembly and drive wheel on both sides of the wheelchair.

1. Perform one of the following as if viewing the motors from behind the wheelchair (Detail “A”):
   - **Engage (DRIVE)** - Move the motor lock levers DOWN to engage the motors and drive the wheelchair.
   - **Disengage (PUSH)** - Move the motor lock levers UP to disengage the motors and push the wheelchair.

![Detail A](image)

**FIGURE 1** Disengaging/Engaging Motor Lock Levers
10 Transport Ready Option (TRRO)

**WARNING**

This section applies only to wheelchairs equipped with TRRO (Transport Ready Option).

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.
### WARNING

Seat angle is factory set at time of shipment. Adjustments to the wheelchair may void WC 19 compliance. To maintain compliance, refer to wheelchair service manual before making any adjustments.

**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.

---

### 10.1 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 165 to 300 lbs.

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 system.
10 TRANSPORT READY OPTION (TRRO)

10.2 Compliance Information

This wheelchair conforms with the requirements of the ANSI/RESNA WC/Vol. 1 - Section 19 (Frontal Impact Test)

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 165-300 pounds, restrained by BOTH pelvic and shoulder belts in accordance with ANSI/RESNA WC Vol I Section 19. BOTH pelvic and upper torso belts should be used to reduce the possibility of head and chest impacts with vehicle components.

10.3 Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>WEIGHT LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>M91 Standard</td>
<td>Up to 300 lbs</td>
</tr>
<tr>
<td>M91 Heavy Duty</td>
<td>Up to 400 lbs</td>
</tr>
</tbody>
</table>
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.
Securement Points

For this procedure, refer to FIGURE 1.

FIGURE I  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.

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.
10.4 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.

For this procedure, refer to FIGURE 2 on page 80.

The wheelchair has been provided with a pelvic belt which meets the requirements of ANSI/RESNA WC/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”) into slot in the pelvic belt bracket (Detail “B”). Pull upwards until it snaps into place.

   **Info**

   Both ends of the pelvic belt have a pin which is used to secure the vehicle-anchored upper torso belt.

2. Repeat STEP 1 for the opposite pelvic belt bracket.

3. Install the vehicle-anchored upper torso belt onto the pin located at either end of the pelvic belt.
**FIGURE 2** Wheelchair-Anchored Belts

- **DETAIL “A” - PELVIC BELT**
  - Male End
  - Pin
  - Pelvic Belt
  - (Used to secure the vehicle-anchored upper torso belt.)

- **DETAIL “B”**
  - Back Angle Bracket
  - Belt Mounting Bracket
  - Large End of Slot
  - Small End of Slot
Vehicle-Anchored Belts

For this procedure, refer to FIGURE 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:

<table>
<thead>
<tr>
<th>RATING</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
</tr>
<tr>
<td>C</td>
<td>Fair</td>
</tr>
<tr>
<td>D</td>
<td>Poor</td>
</tr>
</tbody>
</table>

The test for Lateral Stability Displacement for Point (P) is shown in FIGURE 3. The average test result for point (P) is 0.44-inches (11.2 mm).

Seating System

**WARNING**

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

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

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.

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

For this procedure, refer to FIGURE 4 on page 83.
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 4 for proper and improper positioning of the belts.
4. Ensure the belt(s) are not be twisted.
5. Adjust belts as firmly as possible, being mindful of user comfort.

**FIGURE 4** Positioning Belts

**DO** position belts INSIDE of armrests, wheels, etc.

**DO NOT** position belts OUTSIDE of armrests, wheels, etc.
II Setup/Maintenance

### 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.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

#### 11.1 Setup/Delivery Inspection

Setup/delivery inspection should be performed by dealer at time of delivery/set up.

Initial adjustments should be made to suit your personal body structure needs and preference. Thereafter weekly, monthly and periodic inspections should be performed by user/attendant between the six month service inspections. Refer to User/Attendant Inspection Checklists on page 85.

Every six months, and as necessary, take your wheelchair to a qualified technician for a thorough inspection and servicing. Refer to Service Inspection on page 87.

- Check all parts for shipping damage. In case of damage, DO NOT use.
- Ensure wheelchair rolls straight (no excessive drag or pull to one side).
- Ensure clothing guards are secure
- Ensure arms are secure but easy to release and adjustment levers engage properly.
- Adjustable height arms operate and lock securely.
- Ensure seat is secured to wheelchair frame and seat release latch is functional. Replace if necessary.
- Ensure axle nut or bolt and wheel mounting nuts are secure on drive wheels.
- Ensure casters are free of debris, and all mounting hardware is secure and not damaged/missing.
- Check that cables are routed and secured properly to ensure that cables DO NOT become entangled and damaged during normal operation of seating system.
Ensure proper operation of powered functions (Example: drive, seating and legrests).

### 11.2 User/Attendant Inspection Checklists

Every six months, and as necessary, take your wheelchair to a qualified technician for a thorough inspection and servicing. See Service Inspection on page 87.

**Inspection/Adjust Weekly**

- Ensure that the casters are free of debris.
- Inspect tires for flat spots and wear.
- Inspect all fasteners.
- Inspect TRBKTS/TRRO fasteners and hardware.
- Ensure seat release latch is not worn and is functional. Replace if necessary.
- Ensure proper operation of powered functions (Example: drive, seating and legrests).

**Inspection/Adjust Monthly**

- Clean upholstery and armrests.
- Clean dirt and lint from axles.
- Clean dirt and lint from bearings.

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

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.
II SETUP/MAINTENANCE

- Ensure that the casters are free of debris.
- 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.

Inspect/Adjust Periodically

- Ensure wheelchair rolls straight (no excessive drag or pull to one side).
- Inspect all fasteners.
- Inspect TRBKTS fasteners and hardware.
- Ensure clothing guards are secure.
- Ensure arms are secure but easy to release and adjustment levers engage properly.
- Adjustable height arms operate and lock securely.
- Ensure upholstery does not have any rips or tears.
- Armrest pad sits flush against arm tube.
- Ensure that the casters are free of debris.
- Inspect foam handgrips for damage. If damaged, have them replaced by a qualified technician.
- Check front riggings/footboard for loose fasteners. Replace /tighten if necessary.
- Check that all labels are present and legible. Replace if necessary.
- Inspect charger AC power cord for damage. Replace if necessary.
11.3 Service Inspection

Every six months take your wheelchair to a qualified technician for a thorough inspection and servicing. Service inspections MUST be performed by a qualified technician.

**DANGER**

**Risk of Death or Serious Injury**

Failure to complete the inspection of the critical components listed below could result in death or serious injury.

Inspect stability control components which could include anti-dive spring, anti-dive cylinder, ratcheting gears, or end stops to ensure proper operation.

Inspect drive axle nut, locking tab, wheel fasteners or quick release to ensure drive wheel is secure.

**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.

The following are recommended items to inspect during regular service inspections performed by a qualified technician. Actual items to be inspected during the service inspection may vary according to the specific wheelchair:

**Six Month Inspection**

- Clean upholstery and armrests.
- Clean dirt and lint from axles.
- Clean dirt and lint from bearings.
- Check that all labels are present and legible. Replace if necessary.
II SETUP/MAINTENANCE

- Ensure clothing guards are secure.
- Ensure adjustable height arms operate and lock securely.
- Ensure upholstery does not have any rips or tears.
- Ensure armrest pad sits flush against arm tube.
- Ensure arms are secure but easy to release and adjustment levers engage properly.
- 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 wheelchair rolls straight (no excessive drag or pull to one side).
- Ensure that there is no excessive side movement or binding when drive wheels are lifted and spun when disengaged (free-wheeling).
- Ensure axle nut or bolt and wheel mounting nuts are secure on drive wheels.
- Inspect tires for flat spots and wear.
- Ensure that the casters are free of debris.
- Ensure 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.
- Inspect and clean the stability lock gears. Replace if worn.
- Ensure the anti-tipper wheels are properly installed and located in the proper mounting position.
- Ensure wheel locks DO NOT interfere with tires when rolling.
- Ensure wheel lock pivot point are free of wear and looseness.
- Ensure wheel locks are easy to engage.
- Check front riggings/foot board for loose fasteners. Replace /tighten if necessary.
- Check that cables are routed and secured properly to ensure that cables DO NOT become entangled and damaged during normal operation of seating system.
- Ensure proper operation of powered functions (drive, seating, legrests, etc...).
- Inspect motor brushes and gearbox coupling.
11 SETUP/MAINTENANCE

- Inspect electrical components for signs of corrosion. Replace if corroded or damaged.
- Inspect battery terminals for loose cable connection. Tighten if necessary.
- Inspect all fasteners.
- Inspect TRBKTS fasteners and hardware.
- Inspect foam handgrips for damage. If damaged, have them replaced by a qualified technician.
- Ensure swingarm stops are in place and not deteriorated or damaged. Replace if necessary.

Inspect/Adjust Every 18 Months
- Replace motor brushes and gearbox coupling.

11.4 Batteries

**DANGER**

Risk of Death or Serious Injury
Failure to observe these warnings can cause an electrical short resulting in death, serious injury, or damage to the electrical system.

- 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).
- 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 injury or damage may occur.
- 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.
**WARNING**

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 occur.

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

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.

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.

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

If there is battery acid in the bottom of the battery box 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.
11.5 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 WHEELCHAIRS USING 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.

For proper battery connection, batteries MUST use post style terminals with mounting holes through the terminal.

PROPER BATTERIES TO USE

DO NOT USE THIS TYPE OF BATTERY

<table>
<thead>
<tr>
<th>Terminal Mounting Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSITIVE (+) Battery Terminal/Post</td>
</tr>
<tr>
<td>NEGATIVE (-) Battery Terminal/Post</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminal Mounting Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEGATIVE (-) Battery Terminal/Post</td>
</tr>
<tr>
<td>POSITIVE (+) Battery Terminal/Post</td>
</tr>
</tbody>
</table>
11.6 Installing/Removing the Batteries

**WARNING**

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

If there is battery acid in the bottom of the battery tray or on the sides of the battery, apply baking soda to these areas to neutralize the battery acid. Before reinstalling the existing or new battery, clean the baking soda from the battery tray or battery 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.

Have the following tools available.

<table>
<thead>
<tr>
<th>TOOL</th>
<th>QTY</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BATTERY LIFTING STRAP</td>
<td>1</td>
<td>Supplied</td>
</tr>
<tr>
<td>DIAGONAL CUTTERS</td>
<td>1</td>
<td>Not Supplied</td>
</tr>
<tr>
<td>7/16-INCH (6PT) BOX WRENCH</td>
<td>1</td>
<td>Not Supplied</td>
</tr>
<tr>
<td>1/2 INCH (6PT) BOX WRENCH</td>
<td>1</td>
<td>Not Supplied</td>
</tr>
<tr>
<td>3/8 INCH (6PT) BOX WRENCH</td>
<td>1</td>
<td>Not Supplied</td>
</tr>
</tbody>
</table>

**Installing the Batteries**

For this procedure, refer to FIGURE 1 on page 94 and FIGURE 2 on page 95.

1. Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.
2. Verify the joystick On/Off switch is in the Off position and disconnect joystick cable (not shown). Refer to Disconnecting/Connecting the Joysticks on page 110.
3. Perform one of the following:
   • Wheelchairs without Formula PTO Plus - Remove the seat. Refer to Removing/Installing the Seat Assembly on page 69.
   • Wheelchairs with Formula PTO Plus - Tilt the seat back. Refer to Tilting the Seat Assembly on page 71.
4. Remove the top shroud. Refer to Removing/Installing the Shrouds on page 100.
5. If necessary, disconnect right and left motor leads to allow access to the front of the battery tray.
6. Move aside the motor leads and controller cable to allow unobstructed access to the front of the battery tray.
   ![Notice] Perform this section on one battery at a time starting with the rear battery. Repeat STEP 6 to position the remaining battery into the battery tray.
7. Perform one of the following to position the battery into the battery tray:
   • Batteries With Built In Lifting Strap - Use built in lifting strap to position battery into the battery tray (Detail “A” of FIGURE 1).
   • Batteries Without Built In Lifting Strap - Use the battery lifting strap to position battery into the battery tray. When battery is in proper position, remove lifting strap (Detail “B” of FIGURE 1).
8. Using the battery retaining strap, secure the two batteries into the battery tray.
9. If necessary, connect the wiring harness to the two batteries. Refer to Replacing the Batteries and/or Battery Cables on page 97.
10. Reconnect RIGHT and LEFT motor leads to allow access to the FRONT of the battery tray, if disconnected in STEP 5.
11. Connect the front battery to the controller (RED connector). Refer to FIGURE 2.
12. Connect the rear battery to the front battery (RED and BLACK connectors). Refer to FIGURE 2.
13. Reinstall the top shroud. Refer to Removing/Installing the Shrouds on page 100.
14. Perform one of the following:
   • Wheelchairs without Formula PTO Plus - Reinstall the seat. Refer to Removing/Installing the Seat Assembly on page 69.
   • Wheelchairs with Formula PTO Plus - Tilt the seat forward. Refer to Tilting the Seat Assembly on page 71.
15. Connect the joystick. Refer to Disconnecting/Connecting the Joysticks on page 110.

New battery(ies) MUST be fully charged before using, otherwise the life of the battery(ies) will be reduced.

16. If necessary, charge the battery(ies). Refer to Charging Batteries on page 64.

FIGURE 2 Installing/Removing the Batteries
Removing the Batteries.

For this procedure, refer to FIGURE 2 on page 95 and FIGURE 1 on page 94.

1. Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.
2. Verify the joystick On/Off switch is in the Off position and disconnect joystick. Refer to Disconnecting/Connecting the Joysticks on page 110.
3. Perform one of the following:
   • Wheelchairs without Formula PTO Plus - Remove the seat. Refer to Removing/Installing the Seat Assembly on page 69.
   • Wheelchairs with Formula PTO Plus - Tilt the seat back. Refer to Tilting the Seat Assembly on page 71.
4. Remove the top shroud. Refer to Removing/Installing the Shrouds on page 100.
5. If necessary, disconnect right and left motor leads to allow access to the front of the battery tray.
6. Disconnect the front battery from controller (RED connector). Refer to FIGURE 2.
7. Move aside the motor leads and controller cable to allow unobstructed access to the front of the battery tray.
8. Disconnect the rear battery from the front battery (RED and BLACK connectors). Refer to FIGURE 2.
9. If necessary, disconnect the wiring harness from batteries. Refer to Replacing the Batteries and/or Battery Cables on page 97.
10. Unfasten the retaining strap that secures the two batteries in the battery tray.

Perform this section on one battery at a time starting with the FRONT battery. Repeat STEP 10 to remove remaining battery from battery tray.

11. Perform one of the following to remove the battery from the battery tray:
   • Batteries With Built-in Lifting Strap- Use built in lifting strap to remove the battery from the battery tray (Detail “A” of FIGURE 1).
   • Batteries Without Built-in Lifting Strap- Use the battery lifting strap to remove the battery from the battery tray (Detail “B” of FIGURE 1).
11.7 Replacing the Batteries and/or Battery Cables

**WARNING**

The use of rubber gloves is recommended when working with batteries. NEVER allow any of your tools and/or battery cables to contact both battery terminals at the same time. An electrical short may occur and serious personal injury or damage may occur.

For this procedure, refer to FIGURE 3 on page 98.

Perform this section on one battery at a time starting with the front battery. The front battery has three connectors - two to the rear battery wiring harness (RED and BLACK) and one to the controller cable (RED), and the rear battery has two connectors (RED and BLACK) to the front battery wiring harness. Both the front and rear wiring harnesses are shipped with the POSITIVE (+) RED battery cable and mounting screw connected. Use the exposed, threaded portion of the mounting screw to secure the POSITIVE (+) RED cable to the POSITIVE (+) terminal.

**Disconnecting Battery Cables.**

**WARNING**

DO NOT remove fuse or mounting hardware from POSITIVE (+) battery cable mounting screw. To replace the fuse, obtain and replace battery harness with fuse.

1. Remove the existing tie-wraps that secure the battery terminal covers to the battery terminals.
2. Peel back RED battery terminal cover to expose RED battery cable connection to battery terminal.
3. Peel back BLACK battery terminal cover from BLACK battery cable on front battery or GREY battery terminal cover from BLACK battery cable on rear battery.
4. Remove the mounting screws and nuts that secure the POSITIVE (+) RED battery cable to the POSITIVE (+) battery terminal/post as shown in FIGURE 3.
11 SETUP/MAINTENANCE

5. Remove the mounting screws and nuts that secure the NEGATIVE (-) BLACK battery cable to the NEGATIVE (-) battery terminal/post as shown in FIGURE 3.

6. Set wiring harness aside.

7. Repeat STEPS 1-6 to disconnect the rear battery from the rear battery harness.

FIGURE 3 Replacing the Batteries and/or Battery Cables
Connecting Battery Cables

**WARNING**

Connect same color connectors to each other (GRAY to GRAY, BLACK to BLACK).

Battery terminal configuration as shown in Detail “A” of FIGURE 3 MUST be used. Batteries that have the terminal configuration reversed MUST NOT be used - otherwise serious injury or damage may occur.

All battery terminal covers (two on the front battery and two on the rear battery) must be installed prior to use.

**CAUTION**

When connecting the battery cables to the battery, the battery cables MUST be connected to the battery terminals, as shown in FIGURE 3, otherwise damage to the battery cable may result when installing battery terminal caps.

Perform STEP 1 on one battery at a time.

1. Peel back RED battery terminal cover to expose RED battery cable connection to battery terminal.
2. Peel back BLACK battery terminal cover from BLACK battery cable on front battery or GREY battery terminal cover from BLACK battery cable on rear battery.
3. Using the mounting screws and nuts, secure the NEGATIVE (-) BLACK battery cable to NEGATIVE (-) battery terminal/post as shown in FIGURE 3.
4. Using the mounting screws and nuts, secure the POSITIVE (+) RED battery cable to POSITIVE (+) battery terminal/post as shown in FIGURE 3.
5. Verify wiring harness is correctly installed and securely tightened.
6. Verify proper battery orientation.
7. Reposition battery terminal covers over battery post(s).
8. Using new tie-wraps, secure the terminal covers to the battery terminals as shown in FIGURE 3.
9. Repeat STEPS 1-8 to install and connect the rear battery to the rear battery harness.
10. If necessary, charge the battery. Refer to Charging Batteries on page 64.

11.8 Replacing the Flat Free Tires on the Wheel Rim

**WARNING**

DO NOT attempt to replace flat free tires. This procedure MUST be performed by a qualified technician.

During initial use of the wheelchair, the user may experience flat spots on the wheels. Flat spots will vanish with continued use of the wheelchair.

11.9 Removing/Installing the Shrouds

For this procedure, refer to FIGURE 4 on page 101.

**Removing**

1. Perform one of the following:
   - Wheelchairs with Formula PTO Plus - Tilt the seat back. Refer to Tilting the Seat Assembly on page 71.
   - Wheelchairs without Formula PTO Plus - Remove the seat assembly. Refer to Removing/Installing the Seat Assembly on page 69.
2. Perform one of the following:
   - Top Shroud - Lift up on rear edge of top shroud to release the four hook and loop strips that secure the top shroud to the base frame (Detail “A”).
   - Front Shroud - Turn release knob ¼-turn to the unlocked position and lift up to remove front shroud from base frame hooks (Detail “B”).

**Installing**

1. Perform one of the following:
Top Shroud - Position top shroud on to the base frame and gently press down on top shroud to secure the four hook and loop strips that secure the top shroud to the base frame (Detail “A”).

Front Shroud - Position front shroud onto the two base frame hooks. Turn release knob ¼-turn to the locked position (Detail “B”).

2. Perform one of the following:
   - Wheelchairs with Formula PTO Plus - Tilt the seat forward. Refer to Tilting the Seat Assembly on page 71.
   - Wheelchairs without Formula PTO Plus - Reinstall the seat. Refer to Removing/Installing the Seat Assembly on page 69.

**FIGURE 4** Removing/Installing the Shrouds
11.10 Removing/Installing the Footboard Assembly

**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.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

Pinch point may occur when rotating the footboard assembly.

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.

LIMITED CLEARANCE BETWEEN FOOTBOARD AND CASTER - The user’s feet MUST remain on the footboard while operating the wheelchair. If the user’s feet are allowed to rest off the side of the footboard they may come in contact with the caster possibly resulting in injury.

For this procedure, refer to FIGURE 5 on page 103.
Removing

1. Remove the quick release pin that secures the footboard assembly to the wheelchair frame by depressing the button while sliding the pin out.
2. Remove the footboard assembly from the wheelchair frame.

Installing

**WARNING**

Make sure the detent balls of the quick release pin are fully released and protruding past the outer edge of the tube before operating the wheelchair. Otherwise, injury and/or damage may result. Keep detent balls clean.

1. Position the footboard assembly onto the wheelchair frame so that the mounting hole in the wheelchair frame aligns with the desired mounting hole in the footboard assembly.
2. Install the quick release pin by depressing the button while sliding the pin in. Ensure that the detent balls of the quick release pin are fully released and protruding past the outer edge of the tube (Detail “A”).
11 SETUP/MAINTENANCE

11.11 Adjusting the Footboard Assembly

Angle

For this procedure, refer to FIGURE 6.

1. Loosen the jam nut and set screw located underneath on the back of the footplate.
2. Adjust the set screw in or out to obtain the desired footboard assembly angle.
3. Thread the jam nut and washer inward until it is flush with the footboard bracket.
4. Securely tighten the jam nut and washer to secure the mounting screw in place.

FIGURE 6 Adjusting the Footboard Assembly - Angle
Depth

For this procedure, refer to FIGURE 7.

1. Remove the quick release pin that secures the footboard assembly to the wheelchair frame.

**WARNING**
Make sure the detent balls of the quick release pin are fully released and protruding past the outer edge of the tube before operating the wheelchair. Otherwise, injury and/or damage may result. Keep detent balls clean.

2. Adjust footboard to one of three mounting positions.

3. Install the quick release pin. Make sure the detent balls of the quick release pin are fully released and past the outer edge of the tube (Detail “A”).

**FIGURE 7** Adjusting the Footboard Assembly - Depth
11 SETUP/MAINTENANCE

11.12 Replacing Front/Rear Caster Assemblies

For this procedure, refer to FIGURE 8.

Front and rear caster assemblies are replaced in the same manner.

When replacing the front/rear caster assemblies, it is necessary to brace the caster assemblies to prevent the wheel from spinning.

1. Remove the mounting screw, two washers, and locknut that secures the caster to the fork.

2. Remove the caster and discard.

3. Secure new caster to fork with existing mounting screw, two washers and locknut (FIGURE 8). Securely tighten.

FIGURE 8 Replacing Front/Rear Caster Assemblies
11.13 Adjusting Forks

For this procedure, refer to FIGURE 9.
This procedure must be performed by a qualified technician.
This procedure applies to both Forks.

1. Remove the dust cover.
2. To properly tighten caster journal system and guard against flutter, perform the following check:
   A. Tip the wheelchair forward, toward the 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.
3. Test wheelchair for maneuverability.
4. Readjust locknuts if necessary, and repeat STEPS 1-3 until correct.
5. Snap the dust cover into the caster headtube ensuring that the tabs are under the side shroud.

FIGURE 9 Adjusting Forks
11 SETUP/MAINTENANCE

11.14 Repositioning Joystick

Adjustable ASBA

For this procedure, refer to FIGURE 10.
This procedure must be performed by a qualified technician.

1. Turn the adjustment lock lever to release the joystick mounting tube from the mounting bracket.
2. Remove the joystick from the wheelchair.
3. Remove the three hex screws that secure both halves of the mounting bracket to the arm tube.
4. Reposition mounting bracket on opposite arm tube ensuring the threaded plate of the mounting bracket is on the inside of the arm tube as shown in FIGURE 10.
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.

Joystick not shown.

FIGURE 10   Repositioning Joystick
Van Seat

For this procedure, refer to FIGURE 11.

Take note of position and orientation of mounting hardware for reinstalling the joystick assembly.

1. Turn the adjustment lock lever to release the joystick mounting tube from the mounting bracket.
2. Remove the joystick from the wheelchair.
3. Remove the three hex mounting screws, spacers and locknuts that secure the mounting bracket to the three mounting holes on the arm frame.
4. Reposition the mounting bracket on the opposite arm frame.
5. Using the three hex mounting screws, spacers and locknuts secure the mounting bracket to the three mounting holes of the arm frame.
6. If necessary, perform the following to reposition the adjustment lock:
   A. Slide the adjustment lock from the mounting bracket.
   B. Rotate adjustment lock 180° and slide adjustment lock over the opposite end of the mounting bracket.
7. Slide joystick mounting tube through the mounting bracket to the desired position and secure adjustment lock to tube by turning lever on adjustment lock.

MK5 SPJ-80 joystick shown, all other joysticks reposition in the same way.

FIGURE 11 Repositioning Joystick - Van Seat
### 11 SETUP/MAINTENANCE

#### 11.15 Disconnecting/Connecting the Joysticks

For this procedure, refer to FIGURE 12.

The joystick connector is located at the rear of the seat frame.

**SPJ+ Joysticks**

**Disconnecting**

1. Hold the light GREY collar portion of the joystick connector with one hand and the controller connector on the wheelchair in the other and disconnect them by pulling them apart.

**Connecting**

![Image of joystick connectors]

**WARNING**

The joystick connector and controller connector fit together in one way only. DO NOT force them together.

1. Hold the light GREY collar portion of the joystick connector with one hand and the controller connector on the wheelchair in the other and align them.
2. Lightly push to engage the joystick connector and the controller connector.

**FIGURE 12**  Disconnecting/Connecting the Joysticks - SPJ+ Joysticks
MPJ+ Joysticks

For this procedure, refer to FIGURE 13.

Disconnecting
1. Pull the latch away from the joystick connector.
2. Disconnect the joystick connector from the remaining connectors.

Connecting
1. Ensure the latch is pulled away from the network connector.
2. Connect the network connector to the other connectors.
3. Top and Bottom Connectors - Install connector caps onto the network connector.
4. Push the latch in to secure the network connectors and caps.
5. If necessary secure excess cable using tie-wraps.

FIGURE 13  Disconnecting/Connecting the Joysticks - MPJ+ Joysticks
# Troubleshooting

## 12.1 Driving Performance

<table>
<thead>
<tr>
<th>WHEELCHAIR VERS.</th>
<th>SUDDEN SLUGGISH TURN/PERFORMANCE</th>
<th>CASTERS FLUTTER</th>
<th>SQUEAKS AND RATTLES</th>
<th>LOOSENESS IN WHEELCHAIR</th>
<th>WHEELCHAIR 3 WHEELS</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check for loose stem nuts/bolts, bearings or signs of wear.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Check for uneven tire wear, bent fork/frame or loose hardware.</td>
</tr>
</tbody>
</table>

## 12.2 Electrical

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

**SPJ+, SPJ+ w/PSS or SPJ+ w/ACC Joysticks**

The joystick information gauge and the service indicator give indications of the type of fault or error detected by the control module. When a fault is detected, the wheelchair may stop and not drive. The LEDs on the information gauge may flash in a particular pattern or the service indicator light will flash. The number or type of flashes indicates the nature of the error. If multiple errors are found, only the first error encountered by the control module will be displayed.
### Information Gauge Display Diagnostics

<table>
<thead>
<tr>
<th>DISPLAY</th>
<th>DESCRIPTION</th>
<th>DEFINITION</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="All LEDs are off" /></td>
<td>All LEDs are off.</td>
<td>Power is off.</td>
<td></td>
</tr>
<tr>
<td><img src="image2" alt="All LEDs are on" /></td>
<td>All LEDs are on.</td>
<td>Power is on.</td>
<td>Fewer than three LEDs on implies reduced battery charge.</td>
</tr>
<tr>
<td><img src="image3" alt="Left RED LED is flashing" /></td>
<td>Left RED LED is flashing.</td>
<td>Battery charge is low.</td>
<td>The batteries should be charged as soon as possible.</td>
</tr>
<tr>
<td><img src="image4" alt="Left to Right “chase” alternating with steady display" /></td>
<td>Left to Right “chase” alternating with steady display.</td>
<td>Joystick is in programming, inhibit and/or charging mode.</td>
<td>The steady LEDs indicate the current state of the battery charge.</td>
</tr>
<tr>
<td><img src="image5" alt="All LEDs are flashing slowly" /></td>
<td>All LEDs are flashing slowly.</td>
<td>Joystick has detected Out-of-Neutral-at-Power-Up mode.</td>
<td>Release the joystick back to Neutral.</td>
</tr>
</tbody>
</table>
SERVICE INDICATOR LIGHT DIAGNOSTICS

For this procedure, refer to FIGURE 1.

![Service Indicator Light]

**FIGURE 1** Service Indicator Light Diagnostics

<table>
<thead>
<tr>
<th>NUMBER OF FLASHES</th>
<th>ERROR CODE DESCRIPTION</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>User Fault</td>
<td>Release joystick to neutral and try again.</td>
</tr>
<tr>
<td>2</td>
<td>Battery Fault</td>
<td>Charge the batteries. Refer to Charging Batteries on page 64. Check that battery cables are connected properly. If necessary, replace batteries. Refer to Replacing the Batteries and/or Battery Cables on page 97.</td>
</tr>
<tr>
<td>3</td>
<td>Left Motor Fault</td>
<td>Contact Invacare/Dealer for service.</td>
</tr>
<tr>
<td>4</td>
<td>Right Motor Fault</td>
<td>Contact Invacare/Dealer for service.</td>
</tr>
<tr>
<td>5</td>
<td>Left Park Brake Fault</td>
<td>Ensure brake lever is in the drive position before turning on the wheelchair. Ensure motor cable is plugged into the controller. Contact Invacare/Dealer for service.</td>
</tr>
<tr>
<td>6</td>
<td>Right Park Brake Fault</td>
<td>Ensure brake lever is in the drive position before turning on the wheelchair. Ensure motor cable is plugged into the controller. Contact Invacare/Dealer for service.</td>
</tr>
</tbody>
</table>
## Troubleshooting

### CMPJ+, PSR+, PSF+ Joysticks or Displays

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBABLE CAUSE</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEFT BRAKE FAULT or RIGHT BRAKE FAULT displays</td>
<td>Motor lock levers disengaged (Error code E9 or E10).</td>
<td>Engage motor lock levers. Refer to Disengaging/Engaging Motor Lock Levers on page 73.</td>
</tr>
<tr>
<td>and wheelchair does not drive.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARGER PLUGGED IN displays.</td>
<td>Battery charger connected (Error code E28).</td>
<td>Unplug battery charger from the wheelchair. Refer to Charging Batteries on page 64.</td>
</tr>
<tr>
<td>BATTERY FAULT displays and the wheelchair</td>
<td>Batteries need to be charged (Error code E14).</td>
<td>Charge batteries. Refer to Charging Batteries on page 64. If batteries fail to charge properly, check battery charger or replace batteries. Refer to Replacing the Batteries and/or Battery Cables on page 97.</td>
</tr>
<tr>
<td>does not drive.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JOYSTICK TIMEOUT displays and the wheelchair</td>
<td>Joystick or input device is disconnected (Error code 32).</td>
<td>Turn off power, reconnect the joystick of input device and turn power on.</td>
</tr>
<tr>
<td>does not drive.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Number of Flashes and Error Code

<table>
<thead>
<tr>
<th>NUMBER OF FLASHES</th>
<th>ERROR CODE DESCRIPTION</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Remote Fault</td>
<td>Check to make sure joystick is connected properly. Turn Joystick off then on. Contact Invacare/Dealer for service.</td>
</tr>
<tr>
<td>8</td>
<td>Controller Fault</td>
<td>Contact Invacare/Dealer for service.</td>
</tr>
<tr>
<td>9</td>
<td>Communications Fault</td>
<td>Check joystick cable connections. Check joystick cable and connectors for damage. Contact Invacare/Dealer for service.</td>
</tr>
<tr>
<td>10</td>
<td>General Fault</td>
<td>Contact Invacare/Dealer for service.</td>
</tr>
<tr>
<td>11</td>
<td>Incompatible or incorrect Remote</td>
<td>Wrong type of remote connected. Contact Invacare/Dealer for service.</td>
</tr>
</tbody>
</table>
## 12  TROUBLESHOOTING

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBABLE CAUSE</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOYSTICK FAULT displays and the wheelchair does not drive.</td>
<td>The joystick or input device is sending a value outside of the reverse, forward, left or right limits (Error codes E01, E02, E03 or E04).</td>
<td>Replace joystick or input device.</td>
</tr>
<tr>
<td>NEUTRAL TESTING displays.</td>
<td>The joystick neutral test has failed (Error code E18).</td>
<td>Release the joystick and try to get the joystick back into the center-most position.</td>
</tr>
<tr>
<td>BAD JOYSTICK CAL VALUES displays and the wheelchair does not drive.</td>
<td>The joystick calibration values are outside of the expected range (Error code E19).</td>
<td>Recalibrate the joystick (joystick throw procedure).</td>
</tr>
<tr>
<td>CTRL NOT CONNECTED</td>
<td>The CMPJ or Display module is not communicating with the control module (Error code E200).</td>
<td>Check the connections between the joystick or display and the controller. Turn the power off and then back on. Replace the controller if necessary.</td>
</tr>
<tr>
<td>CTRL COM FAULT displays and the wheelchair drives slowly.</td>
<td>The controller has determined a fault during a previous turn-off process (Error code E41).</td>
<td>Turn the wheelchair off and back on.</td>
</tr>
<tr>
<td>MISSING CONFIGURATION displays at power up.</td>
<td>One or more devices have been removed or disconnected from the wheelchair.</td>
<td>Reconnect the device.</td>
</tr>
<tr>
<td>ATTENDANT ACTIVE and displays.</td>
<td>The Proportional or Digital Attendant control is active and can be used to drive the chair.</td>
<td>This is normal behavior.</td>
</tr>
<tr>
<td>Batteries draw excessive current when charging.</td>
<td>Battery failure.</td>
<td>Have batteries checked for shorted cell. Replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>Electrical malfunction.</td>
<td>Contact Dealer/Invacare for service.</td>
</tr>
</tbody>
</table>
### TROUBLESHOOTING

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBABLE CAUSE</th>
<th>SOLUTIONS</th>
</tr>
</thead>
</table>
| 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. Refer to Replacing the Batteries and/or Battery Cables on page 97. |
| 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. | Electrical malfunction. | Contact Dealer/Invacare for Service. |
## 12 TROUBLESHOOTING

### 12.3 Checking Battery Charge Level

The following “Do’s” and “Don’ts” are provided for your convenience and safety.

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