

## Empulse R90®

**Supplier:** This manual must be given to the user of this device.

**User:** Before using this device read this entire manual and save for future reference.

Owner's Manual

## Empulse R90®

**Distribuidor:** Este manual debe entregarse al usuario de este dispositivo.

**Usuario:** Antes de usar este dispositivo, lea este manual completo y guárdelo para referencia futura.

Manual de Instrucciones

Cada una de las sillas se envía con un manual de instrucciones en inglés. El manual en español y francés está disponible en formato PDF en nuestra página en Internet: [www.SunriseMedical.com](http://www.SunriseMedical.com). Ingrese a la página del producto específico para descargar el manual, o comuníquese con el proveedor autorizado de Sunrise Medical.

## Empulse R90®

**Au Fournisseur:** Ce manuel doit être remis à l'utilisateur de ce dispositif.

**Utilisateur:** Avant d'utiliser cet appareil, lisez l'intégralité de ce manuel et enregistrez pour référence future.

Manuel d'instructions

Chaque fauteuil est livré avec un manuel d'instructions en anglais. Les versions en espagnol et en français sont à votre disposition en format PDF sur le site : [www.SunriseMedical.com](http://www.SunriseMedical.com). Veuillez vous rendre à la page de votre produit pour télécharger le manuel dans la langue souhaitée, ou contactez un fournisseur agréé Sunrise Medical.

P/N 252973 Rev. B

**EMPULSE® R90®**  
**General Manual**

Instructions for Use

## SUNRISE MEDICAL LISTENS

Thank you for choosing an Empulse R90. We want to hear your questions or comments about this manual, the safety and reliability of your device, and the service you receive from your Sunrise dealer. Please feel free to write or call us at the address and telephone number below:

### SUNRISE MEDICAL (US) LLC

Customer Service Department  
2842 N. Business Park Avenue  
Fresno, CA 93727 USA  
(800) 333-4000



[www.SunriseMedical.com/register](http://www.SunriseMedical.com/register)

Be sure to register your device, and let us know if you change your address. This will allow us to keep you up to date with information about safety, new products, and options to increase your use and enjoyment of the Empulse R90.

You can also register your product at:  
[www.SunriseMedical.com/register](http://www.SunriseMedical.com/register)

### FOR ANSWERS TO YOUR QUESTIONS

Your Sunrise Medical authorized dealer knows your device best, and can answer most of your questions about device safety, use, and maintenance.

For future reference, please fill in the following:

Dealer: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Serial #: \_\_\_\_\_ Date/Purchased: \_\_\_\_\_

### ADDITIONAL INFORMATION YOU SHOULD KNOW

No component of this device was made with Natural Rubber Latex.



### DISPOSAL AND RECYCLING INFORMATION

When this product reaches the end of its life, please take it to an approved collection or recycling point designated by your local or state government. This product is manufactured using a variety of materials. Your product should not be disposed of as ordinary household waste. You should dispose of your product properly, according to local laws and regulations. Most materials that are used in the construction of this product are fully recyclable. The separate collection and recycling of your product at the time of disposal will help conserve natural resources and ensure that it is disposed in a manner that protects the environment.

Ensure you are the legal owner of the product prior to arranging for the product disposal in accordance with the above recommendations.

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## 1.0 USER INFORMATION

Congratulations on choosing a Sunrise Medical Empulse® R90®. Our high quality mobility products are designed to enhance your independence and make your everyday life easier.

As a part of our ongoing product improvement initiative, Sunrise Medical reserves the right to change specifications and design without notice. Further, not all features and options offered are compatible with all configurations of the R90.

All dimensions are approximate and may be subject to change. The intended lifetime of the R90 is five (5) years. Please DO NOT use or fit any third party components to the R90 unless they are officially approved by Sunrise Medical.

### 1.1 This user manual

This user manual will help to use and maintain the device safely. The entire user manual for this device consists of one booklet:

- The general device user manual (this booklet)

When necessary, this user manual refers to other user manuals or instruction sheets as shown below:

- Sunrise Intelligence App instruction sheet

### Do not use your device until this entire manual (all booklets) has been read and understood!

If one of the user manuals was not included with the device, please contact a Sunrise Medical authorized dealer immediately.

### 1.2 For further information

Please contact a Sunrise Medical authorized dealer if you have any questions regarding the use, maintenance, or safety of the device. In case there is no authorized dealer in your area or you have any questions, contact Sunrise Medical either in writing or by telephone. For information about product safety notices and product recalls, go to [www.SunriseMedical.com](http://www.SunriseMedical.com)

### 1.3 Symbols used in this manual



**DANGER!**

Potential risk of serious injury or death



**WARNING!**

Potential risk of injury



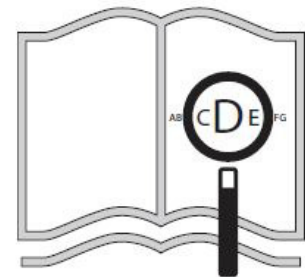
**CAUTION!**

Potential damage to equipment

**NOTE:**

General user advice

Not following these instructions may result in physical injury, damage to the product, or damage to the environment!



If you are visually impaired, this document can be viewed in PDF format at [www.SunriseMedical.com](http://www.SunriseMedical.com)



Follow the instructions carefully next to these warning symbols! Not paying careful attention to these instructions could result in physical injury or damage to the device or the environment. Wherever possible, safety information is provided in the relevant chapter.

## 2.1 Symbols and labels used on the product

The signs, symbols, and instructions affixed to the device comprise part of the safety facilities. They must never be covered or removed. They must remain present and clearly legible throughout the entire lifespan of the device.

Replace or repair all illegible or damaged signs, symbols, and instructions immediately. Please contact your Sunrise Medical authorized dealer for assistance.

Fig. 2.1: Warning – Danger of finger entrapment (pinch point).

Fig. 2.2: Warning – Maximum user weight for the device.

Fig. 2.3: Location of Device Serial Number Label.

## 2.2 Safety: Temperature

### WARNING!

1. Avoid physical contact with the device's motors at all times. Motors are continuously in motion during use and can reach high temperatures. After use, the motors will cool down slowly. Physical contact could cause burns. Allow the motors to cool down for at least thirty (30) minutes after use before any physical contact and/or service.
2. If you do not use the device, ensure that it is not exposed to direct sunlight for lengthy periods of time. Certain parts of the device, such as the battery, motor, and wheel can become hot if they have been exposed to full sunlight for too long. This may cause burns.

## 2.3 Safety: Moving parts

### DANGER!

The device has moving and rotating parts. Contact with moving parts may result in serious physical injury or damage to the device. Contact with the moving parts of the device should be avoided (Fig. 2.4).

1. V-Lock™ Latching Mechanism
2. Wheel and latching block
3. Wheel and shroud



Fig. 2.1

Fig. 2.2

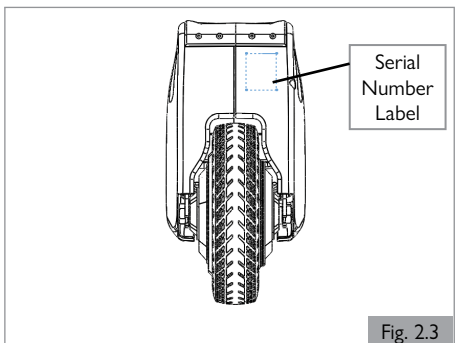
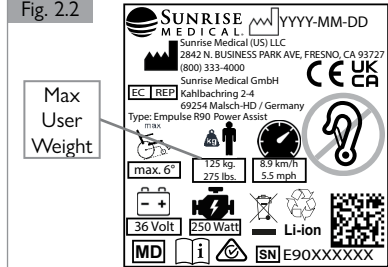


Fig. 2.3

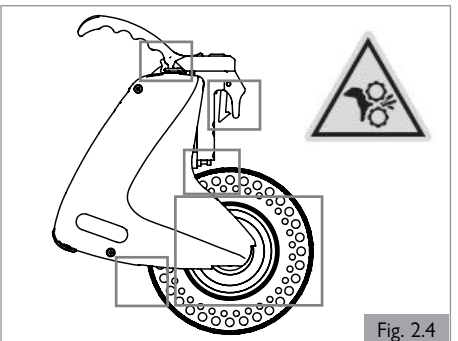


Fig. 2.4

## 2.4 Safety: Electromagnetic radiation

### WARNING!

Heed all warnings to reduce the risk of unintended movement:

1. Beware of the danger from hand-held transceivers. Never turn on or use a hand-held transceiver while power to your device is on. Use extra care if you believe that such a device may be in use near your device.
2. Be aware of nearby radio or TV stations, and avoid coming close to them.
3. If unintended movement occurs, turn your device off as soon as it is safe to do so.

### 2.4.1. What is EMI?

#### WARNING!

1. EMI means: electromagnetic (EM) interference (I). EMI comes from radio wave sources such as radio transmitters and transceivers. (A “transceiver” is a device that both sends and receives radio wave signals).
2. There are a number of sources of intense EMI in your daily environment. Some of these are obvious and easy to avoid. Others are not, and you may not be able to avoid them.
3. Your device may be susceptible to Electromagnetic interference (EMI) emitted from sources such as radio stations, TV stations, amateur radio (HAM) transmitters, two way radios, and cellular phones.
4. EMI can also be produced by conducted sources or electrostatic discharge (ESD).

### 2.4.2. What effect can EMI have?

#### WARNING!

1. EMI can cause your device, without warning, to move by itself. If this occurs, it could result in severe injury to you or others.
2. EMI can damage your device. This could create a safety hazard, and lead to costly repairs.

### 2.4.3. Sources of EMI

#### WARNING!

The sources of EMI fall into three broad types:

1. Hand-Held Transceivers:  
The antenna is usually mounted directly on the unit. These include:
  - a. Citizens band (CB) radios
  - b. “Walkie-talkies”
  - c. Security, fire, and police radios
  - d. Mobile phones
  - e. Lap-top computers with phone or fax
  - f. Other personal communication devices
  - g. Electronic article surveillance systems
 NOTE: These devices can transmit signals while they are on, even if not in use.
2. Medium-Range Mobile Transceivers:  
These include two-way radios used in police cars, fire trucks, ambulances, and taxi cabs. The antenna is usually mounted on the outside of the vehicle.
3. Long-Range Transceivers:  
These include commercial radio and TV broadcast antenna towers and amateur (HAM) radios.

NOTE - The following are not likely to cause EMI problems: Lap-top computers (without phone or fax), cordless phones, TV sets or AM/FM radios, CD or tape players.

### 2.4.4. Distance from the source

#### WARNING!

Electro-magnetic energy rapidly becomes more intense as you get closer to the source. For this reason, EMI from hand-held devices is of special concern. A person using one of these devices can bring high levels of EM energy very close to your device without you knowing it.

### 2.4.5 Immunity level

#### WARNING!

1. The level of EM is measured in volts per meter (V/m). Every power assist device can resist EMI up to a certain level. This is called its “immunity level”.
2. The higher the immunity level, the less the risk of EMI. It is believed that a 20 V/m immunity level will protect the device user from the more common sources of radio waves.
3. The common configuration tested and found to be immune to at least 20 V/m is: Empulse R90 mounted to a Manual Wheelchair using lithium ion batteries.

#### WARNING!

If there is any doubt that the device is not immune to 20V/m, extra care should be taken around known sources of EMI.

#### WARNING!

There is no way to know the effect on EMI if you add accessories or modify the chair your device is mounted to. Any change to your chair may increase the risk of EMI. Parts not specifically tested or parts from other suppliers have unknown EMI properties.

### 2.4.6 Report all suspected EMI incidents

#### WARNING!

You should promptly report any unintended movement. Be sure to indicate whether there was a radio wave source near your device at the time. Contact: Sunrise Medical, Customer Service Department at (800) 333-4000.

### 2.4.7 EMI from device

#### WARNING!

The device itself can disturb the performance of electromagnetic fields such as emitted by commercial and/or residential alarm systems.

## 2.5 Safety: Choking hazard

### DANGER!

This mobility aid uses small parts which under certain circumstances may present a choking hazard to young children.

## 2.6 Safety: Battery

Remove the battery only when the wheelchair or the R90 are on flat, level ground. This will help prevent either the wheelchair or the R90 from tipping.

### DANGER!

Do not remove the batteries while the chair is on a lift table or on any other elevated surface.

## 2.7 Safety: Lifting the device

### WARNING!

Lift the device using the handle. Lifting the device from other parts may damage the device or cause injury to the user.

## 2.8 Safety: Pinch point

### WARNING!

Pinch points exist between the device latch receiver and the folding axle tube and the wheelchair axle plates.

**Indications for use**

The Empulse R90 is intended to be used to provide power assistance to manual wheelchair users. It is designed to augment the manual propulsion provided by the user, reducing the effort required by the user to propel the wheelchair.

**⚠ WARNING!**

DO NOT use this device for purposes other than what is intended by the manufacturer. Unauthorized modifications and use of parts or accessories not supplied or approved by Sunrise Medical may change the device's function. This will void the warranty and may cause a safety hazard. If the warning is ignored, damage to your device and the potential for severe injury of the person using the device for unintended purposes can occur.

This device complies with part 15 of the FCC Rules. Operation is subjected to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**3.1 Area of application: Introduction**

**INTENDED USE OF DEVICE:** The Empulse R90 is a Power Assist device and is suitable for manual wheelchair users who are limited in their field of activities because of their physical conditions. The device can expand their field of activities by providing assistive propulsion power.

Choosing the best device for your unique mobility needs, will depend on such things as:

1. Your disability, grasping strength, balance, and coordination.
2. The types of hazards you must overcome in daily use (where you live and work, and other places you are likely to use your device).

**The overall maximum user weight shall not exceed:**

Standard configuration - 125 kg (275 lbs)

The maximum user weight specified by the manual wheelchair shall also be observed. In no case should the R90 be used where the maximum overall weight is greater than 125 kg (275 lbs).

**⚠ WARNING!**

Exceeding the weight capacities could lead to injury and/or permanent damage to the equipment.

**NOTE** — Exceeding the weight limit will void the warranty.

The user must be informed of the contents of this user manual before using the device.

The variety of fitting variants as well as the modular design means that this device can be used by those who cannot walk or have limited mobility e.g. because of:

1. Paralysis
2. Loss of extremity (leg amputation)
3. Extremity defect deformity
4. Joint contractures/joint injuries
5. Strokes and brain injuries
6. Neurological disabilities (e.g. Multiple Sclerosis (MS), Parkinson's Disease)
7. Illnesses such as heart and circulation deficiencies, disturbance of equilibrium or cachexia as well as for elderly people who still have the strength in the upper body.
8. Persons who are mentally and physically able to control an input device to operate the device and its functions in a safe way.

**⚠ WARNING!**

Improper use of the Empulse R90 or the wheelchair it is attached to, depending on surface, weather, and traffic conditions can present a potential injury and cause damage to the device or wheelchair. The device must only be operated under the following prerequisites:

1. The user is both physically and mentally capable of operating the wheelchair and device in all possible conditions and situations.
2. Proper instruction on its handling and operation has been received by reading and understanding this owner's manual in its entirety.
3. No unauthorized modifications have been made to the device.
4. The user must take time to become accustomed to the device's response and performance by first practicing its operation in a safe area that is free from hazards. The user must become comfortable with deactivation response, acceleration/top speed, etc. of the device before venturing out with the device where potentially more hazardous situations may exist.
5. It is strongly recommended that the user not attempt to use the Empulse R90 outdoors until it can be safely operated indoors without difficulty.

6. Do not operate the device beyond its stated design scope (i.e. user travelling uphill, exceeding maximum load on device).

If any issues or malfunctions exist, cease use of the Empulse R90 and contact Sunrise Medical Customer Service. Any contrary use to the directions of this owner's manual, to the recommendations of one's mobility equipment dealer, or to the technical limitations defined by either Sunrise Medical and one's wheelchair manufacturer is considered to be misuse of the Power Assist.

Sunrise Medical is not responsible for any injuries or damage caused by this type of misuse.



Fig. 3.1

- |                           |                     |  |
|---------------------------|---------------------|--|
| 1. Latch Plug             | 7. Drive Wheel      | 15. Rigid Wheelchair Attachment Hardware   |
| 2. Charger Port           | 8. Skidplate        | 16. Folding Wheelchair Attachment Hardware |
| 3. Wheel Up/Down Button   | 9. Handle           |  |
| 4. Battery Release Button | 10. V-Lock™ Release |  |
| 5. Battery Display        | 11. Travel Bag      |  |
| 6. Battery                | 12. Control Box     |  |
|                           | 13. Device Charger  |  |
|                           | 14. Docking Charger |  |

**NOTE:** All features may not be available with some chair setups or in conjunction with another chair feature. Please consult your Sunrise Medical authorized dealer for information.

**NOTE:** The Empulse R90 is designed to fit on a variety of manual wheelchairs. For information concerning a specific chair, please contact Sunrise Medical customer service.

**⚠ WARNING!**

1. If you are under the influence of medicines that can have an effect on your ability to operate the device, you are not permitted to use the device.
2. Adequate vision is required in order to safely operate the device.
3. Not more than one person at a time can use the device.
4. Do not allow children to use the device unsupervised.

**⚠ CAUTION!**

The user of the device is at all times completely responsible for complying with the applicable local safety regulations and guidelines.

**3.2 Area of Application: Attendants**

Before you assist a user, ensure you read all warnings contained in this manual, and follow all instructions that apply. Be aware that after consulting a health care provider, you will need to learn safe and proven body mechanics to use and create assistive methods best suited to your abilities.

**3.3 Area of Application: User**

Before using the device ensure you read all warnings contained in this manual and follow the instructions that apply. Be aware that after consulting a health care provider, you will need to learn safe and proven body mechanics to use and create assistive methods best suited to your abilities.

**⚠ WARNING!**

The addition of the Empulse R90 to one's wheelchair may cause it to feel different. Take the time to learn the feel of the device before you begin riding. Practice and become familiar with the response and performance of the device prior to regular use. Do not attempt to use outdoors until it can be safely operated indoors without colliding into walls or any other objects.

If you use too much force, damage to your device, a fall, tip-over, or loss of control may occur and cause severe injury to the user or others.

**⚠ WARNING!**

1. BEFORE you begin using the device, you should be trained in the safe use of the device by your health care provider.
2. First, with the device attached to your chair, practice propelling your wheelchair at slow speeds and in open areas.
3. Be aware that you must develop your own methods for safe use best suited to your level of function and ability.
4. NEVER try a new maneuver on your own. Ask the advice of your health care provider to lower the risk of a fall or tip-over.
5. Get to know the areas where you plan to use your device.

**⚠ WARNING!**

Before each use of your device:

1. Verify there is no unusual vibration in the device. Inspect for any problems. Your Sunrise Medical authorized dealer can help you find and correct the problem(s).
2. Ensure the device battery is properly charged.
3. When attaching the device to the wheelchair, ensure the device is locked in place by observing the position of the latch release handle.
4. Ensure that the coupling receiver mounted to the wheelchair receiver is tight and secure. For folding wheelchairs, ensure that the attachment bar is properly secured to both axle plates.

**⚠ WARNING!**

Unauthorized modifications, or use of parts or accessories not supplied or approved by Sunrise Medical may damage your device. This will void the warranty and may cause a safety hazard.

**⚠ WARNING!**

NOTE - This device contains parts and hardware of many shapes and sizes. When using or working around the device, take caution to avoid any corners or edges that may cause a scrape or a cut.

**⚠ WARNING!**

Adding the device to an existing wheelchair can affect the center of balance. The point where the chair will tip forward, back, or to the side depends on its center of balance and stability. How your chair is set up, the options you select, and the changes you make may affect the risk of a fall or tip-over.

1. The Center of Balance Is Also Affected By:
  - a. A change in your body position, posture, or weight distribution.
  - b. Riding your chair on a ramp or slope.
  - c. A backpack or other options and the amount of added weight.
2. To Reduce the Risk of an Accident:
  - a. Consult your Sunrise Medical authorized dealer BEFORE you modify or adjust this device. Be aware that you may need to make other changes to correct the center of balance.
  - b. Have someone help you until you know the balance points of your chair and how to avoid a tip-over.
  - c. Use anti-tip tubes.

If you fail to heed these warnings, you are at a high risk of a fall, tip-over, or loss of control that could cause severe injury to yourself or others.

**⚠ WARNING!**

NOTE - Your device has many moving parts that can create pinch points and possible finger traps. Pinch points exist between device and receiver, folding axle and adapter, and drive unit and battery. Be aware when making any adjustments, when moving, and any other situation that could cause a pinch point situation.

**⚠ WARNING!**

If you reach or lean it will affect the center of balance of your chair. This may cause you to fall or tip over. Always follow the acceptable use guidelines recommended by the wheelchair manufacturer.

If you fail to heed these warnings, you are at a high risk of a fall, tip-over, or loss of control that could cause severe injury to yourself or others.

**3.4 Area of application: The user environment (Fig. 3.2)**

This device has been designed to accommodate both indoor and outdoor use. When operating the device outdoors, drive only on paved roads, pavements, footpaths, and bicycle paths. Do not operate on loose, rocky, grass, rough, or wet surfaces. This could cause a loss of traction or stability resulting in damage to the device, loss of control, and put the user at risk of a fall or tip-over. The speed must be adapted to suit the environment.

**⚠ WARNING!**

1. Do not operate device on slippery roads resulting from rain, ice, or snow!
2. When driving at higher speeds you must be extra careful.
3. Select a lower maximum speed indoors, on the pavement, and in pedestrian areas.
4. Do not drive off high obstacles.

**⚠ CAUTION!**

1. Prevent the device from coming into contact with both sea water and road salt during operation, transportation, or storage: sea water and road salt are caustic and may damage the device.
2. Prevent the device from coming into contact with sand: sand can permeate into the moving parts of the device, causing extensive wear on these parts.
3. Do not use the device if temperatures are below  $-25^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$ ) or above  $+50^{\circ}\text{C}$  ( $120^{\circ}\text{F}$ ).
4. Do not push and/or tow any objects with the device.
5. Do not drive through puddles of water.
6. Ensure the battery cover is secure.
7. Never take your device into a shower, tub, pool, or sauna.
8. Dry the device as soon as you can if it gets wet, or if you use water to clean it.

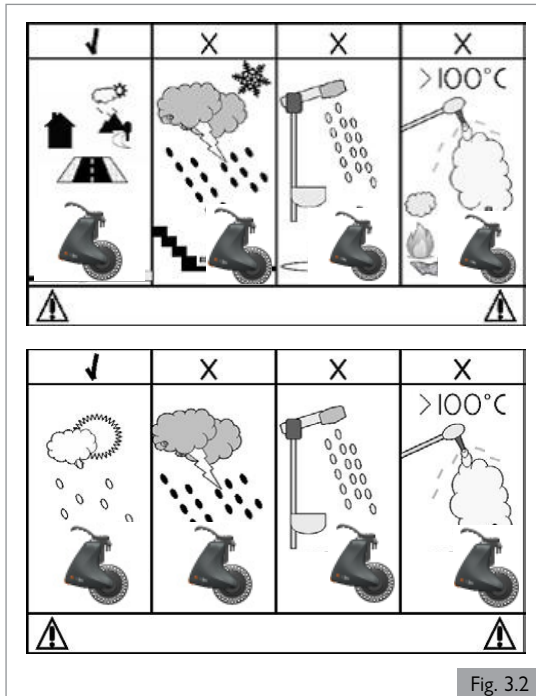


Fig. 3.2

**⚠ WARNING!**

Do not use the device if it has been involved in a motor vehicle accident. A sudden stop and/or collision may structurally damage your device. There may have been a change to the structure of the device and/or damaged or broken some of the components.

Inspect for: visual cracks, dents, metal distortion, or bends. If the device has been involved in an accident, discontinue use immediately and contact your Sunrise Medical authorized dealer for a thorough inspection. Work with the dealer to determine if the device is still safe to use if it has been involved in a collision. If damage is questionable or if there is concern regarding the condition of the device Sunrise Medical recommends replacement of the device.

**NOTE — The warranty is void on any device that is involved in a collision.**

**⚠ CAUTION!**

Continuous or prolonged UV exposure can damage your device. Avoid exposing your device to continuous or prolonged UV light as it can cause component materials to weaken and become brittle, and cause labels to become illegible and/or discolored.

**⚠ WARNING!**

Avoid overheating of device motor and battery by only operating and/or storing device within acceptable temperature ranges:

1. Operating temperature range:  $-25^{\circ}\text{C}$  to  $50^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$  to  $120^{\circ}\text{F}$ )
2. Storage temperature range:  $-40^{\circ}\text{C}$  to  $65^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $149^{\circ}\text{F}$ )

If you fail to heed these warnings, you are at a high risk of damaging the device and injuring the user or others.



The R90 must be adjusted according to specific needs of the user and to the wheelchair to which it is attached.

Setting up the device includes:

1. Attachment of the receiver clamp to the wheelchair
2. Setting the operating height of the R90
3. Attachment of the R90 to the wheelchair mounted receiver
4. Setting the wheel up height
5. Charging and installing the battery
6. Insertion and removal of the R90 into the wheelchair receiver
7. Check after set-up and adjustment

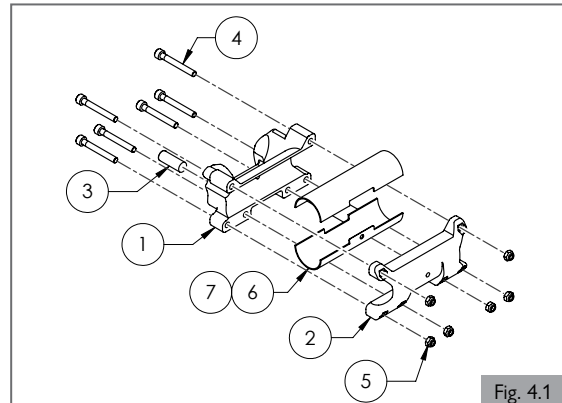
### **⚠ WARNING!**


Attachment and set-up of the R90 should be done by a Sunrise Medical authorized dealer. Improper attachment and set-up of the device onto a wheelchair may result in damage to or failure of the device, the wheelchair, or injury to the user.

## 4.1 Attachment of the receiver to the wheelchair

### For Rigid Frame wheelchairs (Fig. 4.1)

Note: there are two size receiver clamps: the small is 32 mm and the large is 45mm. If the camber tubes are a different size than these size receiver clamps (32mm and 45mm), then item 6 and 7 (receiver mount shims) will be required to attach the receiving mount and hardware.



1. Attaching the receiving mount and hardware onto wheelchairs:
  - a. There are two receiver clamp sizes, one sized to fit a 32mm camber tube and one to fit a 45mm camber tube. Receiver mount shims are available to fit alternate sized camber tubes. A shim is available for the 32 mm receiver that will accommodate a 25mm and 30mm camber tube. For the 45mm receiver, 35mm and 38mm receiver shims are available. When using a shim, snap each half of the shim (6 and 7) around the camber tube and apply each half of the receiver (1 and 2) completely over the shim.
  - b. Attach the hardware (4 and 5) with 4mm allen wrench and tighten the screws until they barely allow the receiver clamp to rotate and slide transversely.
  - c. Move the receiver clamp to the center of the camber tube by measuring from the receiver clamp edge to the side frame of both sides and make sure the distance is the same.
  - d. Rotate the receiver clamp until level bubble (3) is centered or slightly back so that when weight is added on the chair, the level bubble will be centered.
  - e. Tighten all six fasteners (4 and 5) to 7.8 Nm [5.8 ft-lb]. 
2. Removing the receiving mount and hardware from Rigid wheelchairs:
  - a. Remove all six fasteners (4 and 5).
  - b. Remove receiver clamps (1 and 2) and level bubble (3).
  - c. Remove inserts (6 and 7) if used.

### **⚠ WARNING!**

The receiver must be properly centered when mounted to the wheelchair camber tube. It must be centered both horizontally (i.e. between the two large drive wheels) and vertically. The receiver must be set such that the level bubble is in between the two lines to ensure it is vertical. This must be done on flat, level ground. Failure to do so may result in damage to the device, wheelchair, or risk of injury to the user.

### **⚠ WARNING!**

The receiver must be fastened to the camber tube using proper torque. The fastener torque is provided in Section 4.1. Failure to do so may result in improper function of the device, wheelchair, or risk of injury to the user.

### **⚠ WARNING!**

Prior to attachment of the device into its receiver, ensure that the device is in proper operating condition with no broken or damaged components. Also, inspect the receiver as well as the battery to ensure they are in proper operating condition. This includes inspection for loose hardware. Failure to do so may result in damage to the device, wheelchair, or risk of injury to the user.

**For Folding Frame wheelchairs (Fig. 4.2 - Fig. 4.7)**

Note: Folding axle adapters will be attached to camber tube but will require adjustment to center on camber tube.


Note: Folding Frame wheelchairs always use small 32mm receiver clamps without inserts.

Note: The Folding Axle Assembly (1) is adjustable based on a range of chair seat widths. To ensure the Folding Axle Assembly (1) functions properly increasing the spring force may be required. Refer to step 5 for instructions on how to increase the spring force.


Note: The Folding Axle will ship from the factory setup for right hand installation (Fig. 4.2). To flip the receiver mount (10), loosen and remove receiver mount hardware. Flip receiver mount so that the bubble level is on the same side as the brass bushing. See Fig. 4.3 for left hand installation.

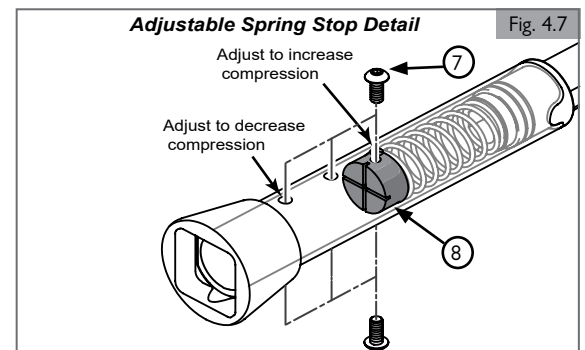
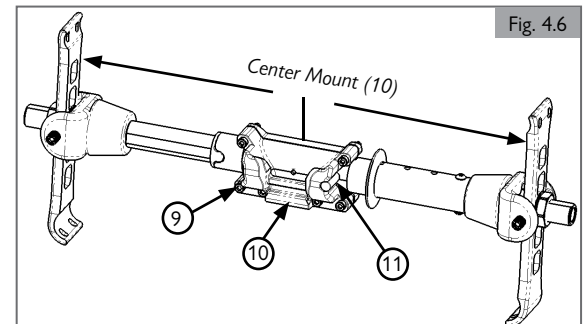
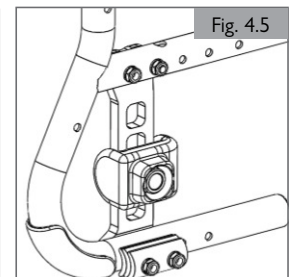
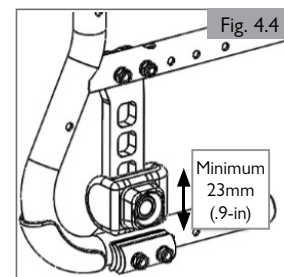
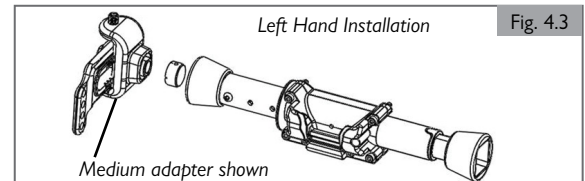
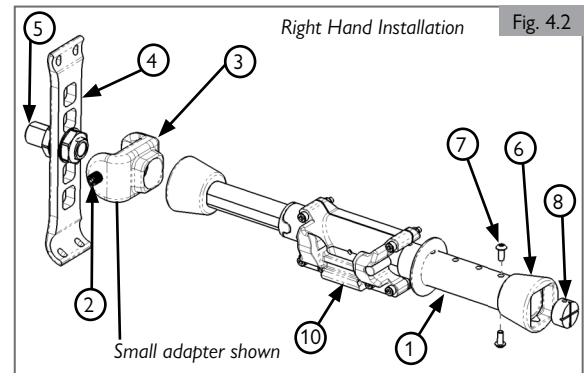
Note: All directions for mounting the R90 can be found on the R90 page at [www.SunriseMedical.com](http://www.SunriseMedical.com). This includes directions for specialty brackets including the Q55X Adapter Plate.

1. Attaching small/large Folding Axle Adapters and hardware onto wheelchairs:
  - a. Using 5mm allen wrench, attach Folding Axle Adapters (3) and hardware (2) onto Axle Plates (4). Folding Axle Adapters must be centered over the Axle Sleeve (5).
 

Note: The Folding Axle Adapter (3) requires the Axle Sleeve (5) to be a minimum distance of approximately 23mm (.9-in) from the frame. If the Folding Axle Adapter (3) does not fit as shown in Fig 4.4, the CG (center of gravity) will need to be adjusted to the next available CG position as shown in Fig. 4.5.
  - b. Tighten hardware on one side. Leave one side loose. Follow Step 2 to align Folding Axle Adapter with Folding Axle. Once properly aligned, tighten loose side.
  - c. Tighten hardware (2) to 9 Nm [7 ft-lb]. 

Note: Folding Axle Adapter (3) can be flipped to more easily access the set screw. Mount the Folding Axle Adapter (3) in an orientation so access to set screw is in the desired location.
2. Attaching Folding Axle to Wheelchair:
  - a. Grab the outside of the larger tube to avoid pinching your hand while attaching the assembly.
  - b. Slide the Axle Adapter Receiver (6) over the Folding Axle Adapter (3) on one side.
  - c. Compress the Folding Axle Assembly (1) until you are able to slide the other Axle Adapter Receiver (6) over the corresponding Folding Axle Adapter (3).
  - d. Check to ensure the Folding Axle Assembly (1) is securely compressed between the wheelchair's two Axle Plates (4).
3. Centering the receiving mount and hardware onto wheelchair (Fig. 4.6):
  - a. Loosen the hardware (9) with 4mm allen wrench so the mount (10) can be positioned correctly.
  - b. Move the mount to the center of the camber tube by measuring from the mount edge to the side frame of both sides and ensure the distance is the same.
  - c. Rotate the mount until level bubble (11) is centered when weight is added on the chair.
 

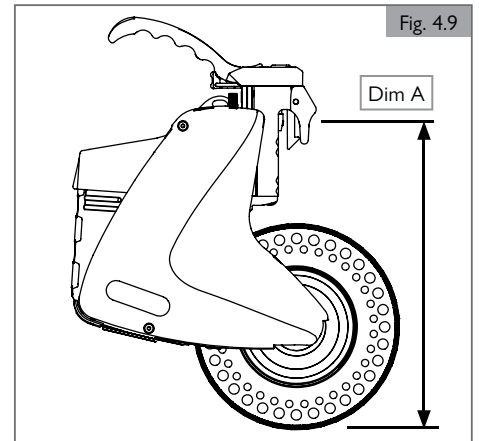
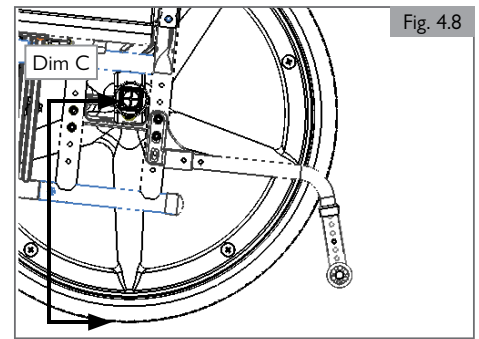
Note: Weight in the chair causes the mount to tilt back slightly.
  - d. Tighten all six fasteners (9) to 7.8 Nm [5.8 ft-lb]. 
4. Removing Folding Axle Assembly:
  - a. Ensure the Power Assist Module is already removed from the Folding Axle Assembly (1).
  - b. Grab the Folding Axle Assembly (1) and compress the larger tube toward the smaller tube until the Axle Adapter Receiver (1) is free of the Folding Axle Adapter (3).
  - c. Pull the Folding Axle Assembly (1) toward the rear of the chair.
5. Removing the Folding Axle Adapter and hardware from Folding Axle Assembly (1):
  - a. Remove hardware (2).
  - b. Remove Folding Axle Adapters (3) and hardware (2) from Axle Plates (4).
6. Adjusting Folding Axle Spring Force (Fig. 4.7):
  - a. Remove both screws (7) using 3mm allen wrench. Use screwdriver to keep Spring Stop (8) from falling out.
  - b. To increase spring force move Spring Stop (8) to new hole location closer to center of assembly. Use screwdriver to align Spring Stop (8) with hardware (7).
  - c. Attach both screws (7) to properly hold Spring Stop (8).
  - d. Attach Folding Axle Assembly (1) onto chair to check spring force. Adjust as necessary.



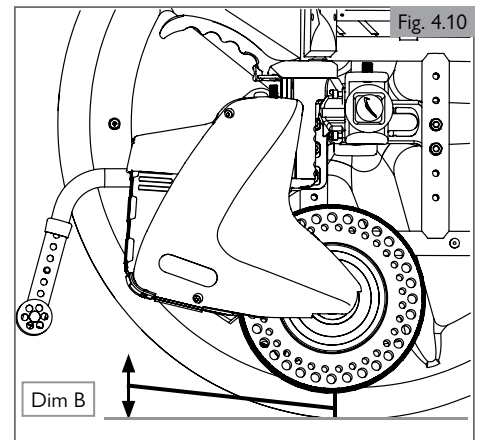
**4.2 Wheel Up height setting (Fig. 4.8 - Fig. 4.10)**

To ensure proper fit and traction of the device, the height between the latching mechanism and the drive wheel must be properly set. If this is not set to match the height between the wheelchair camber tube/folding axle tube, the device will not perform properly. Follow the steps below to properly set the height of the device.

1. Use the included wheel height gauge to measure and set the drive wheel. The stair-shaped gauge has the words "GO" and "NO GO" engraved on the respective steps.
2. With the R90 attached to the wheelchair and the wheel up, slide the gauge under the drive wheel. The R90's drive wheel should be higher than the first step engraved with "GO" and lower than the second step engraved with "NO GO". For further information on wheel height refer to Table 1.
3. If any adjustment is needed, refer to section 4.4.
4. With the height of the device now confirmed, it is ready to be set-up on the wheelchair.



	Dim A		Dim B	Dim C
	Wheel up default setting	Wheel up fine tune adjustment setting		
	Height between the latching radius and bottom of the wheel with set screw adjusted to normal position (Fig. 4.9)	Use the set screw (Fig 4.16) to adjust Dim A to the following height (Fig. 4.9)	Recommended gap between ground and bottom of the wheel (Fig. 4.10)	Height between ground and the center of the axle tube (Fig. 4.8)
For 540mm (24-in) Wheel Configuration	292mm (11.50-in)	275-297mm (10.83-in - 11.70-in)	6.35-8mm (1/4-in - 3/8-in)	305mm (12.0-in)
For 559mm (25-in) Wheel Configuration	299mm (11.75-in)	289-314mm (11.37-in - 12.36-in)	6.35-8mm (1/4-in - 3/8-in)	318mm (12.5-in)
For 590mm (26-in) Wheel Configuration	318mm (12.50-in)	304-329mm (11.96-in - 12.95-in)	6.35-8mm (1/4-in - 3/8-in)	330mm (13.0-in)



### 4.3 Attachment of the R90 to the receiver (Fig. 4.11 - Fig. 4.14)

Prior to attaching the device on to the wheelchair for the first time, it must be set to the correct attachment position. The correct attachment position is known as the wheel up position. This is the same position that will allow the device to be elevated off the ground while remaining attached to the wheelchair. The second position is the wheel down position. The wheel up position and the wheel down position are shown in Fig. 4.11 and Fig. 4.12. The device must be attached to the receiver while in the wheel up position. The wheel down position is used when the device is assisting with the propulsion of the wheelchair.


1. Place a charged battery into the battery receiver on the device.
2. Ensure the device is now in the wheel up position by pushing the Wheel Up/Down button and ensuring that the Wheel Up/Down button light is off. When the R90 Wheel Up/Down button light is off, the R90 is in the wheel up position.
3. Using the handle, lift the device into position and drop the tapered V-Lock™ tongue into the wheelchair receiver. (Fig. 4.13 and Fig. 4.14)
4. Ensure that the latch hook properly locks the V-Lock into place.

#### **⚠ WARNING!**

The V-Lock latch must be secured to the receiver. If not, the latch may become displaced from the receiver during operation. Failure to do so may result in improper function of the device, the wheelchair, and/or injury to the user.

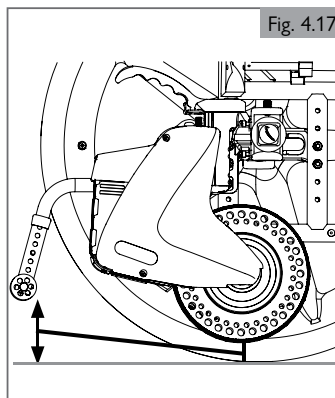
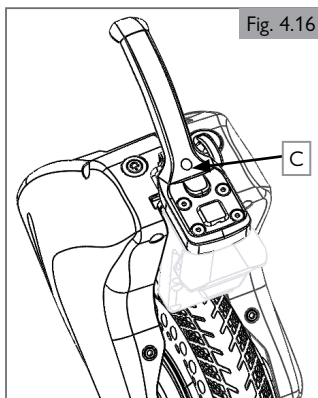
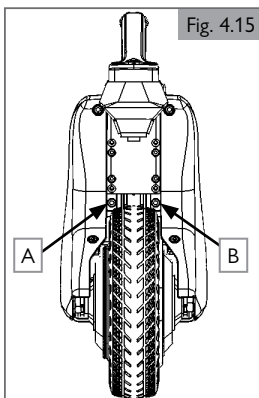
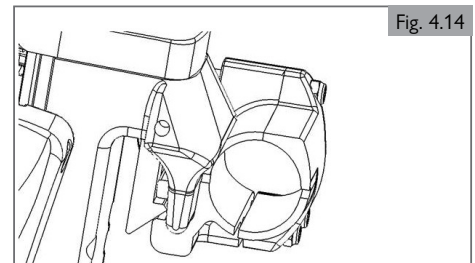
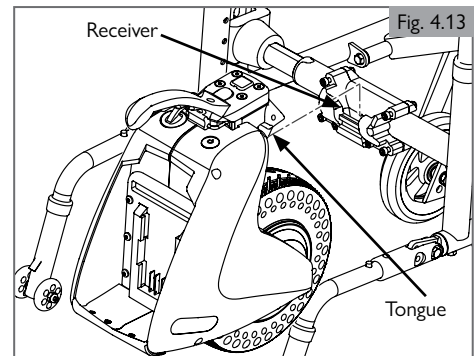
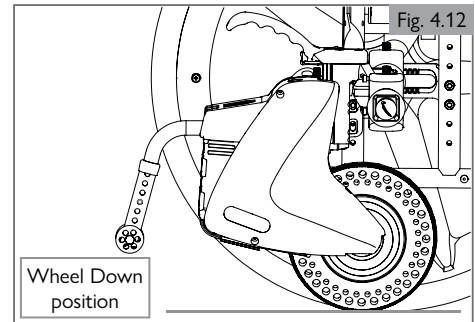
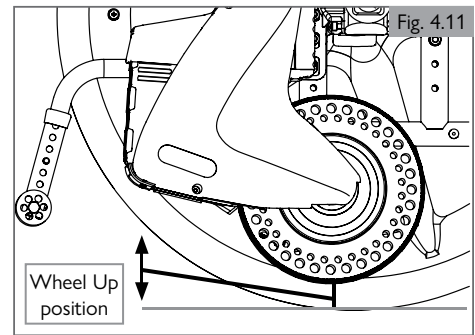
### 4.4 Wheel Up height adjustment (Fig. 4.15 - Fig. 4.17)

The wheel up height needs to be set in order to ensure proper traction of the device.

1. Before beginning the height adjustment procedure:
  - a. Ensure the device is now in the off position by pushing the Wheel Up/Down button and ensuring that the Wheel Up/Down button light is off. The R90 can only be completely powered off by removing the battery. The R90 will continue to drain the battery as long as it is plugged in.
  - b. The device must be mounted to the receiver.
  - c. The wheelchair user should be seated in the wheelchair.
  - d. If using pneumatic tires, the tires should be set to their rated pressure.
2. Loosen, but do not remove, fasteners (A and B). (Fig. 4.15)
3. Adjust the manual height adjustment screw (C) using a 4mm hex wrench as shown. (Fig. 4.16)
4. Adjust the adjustment lead screw (C) such that wheel height gauge can slide under the drive wheel. The R90's drive wheel should be higher than the first step engraved with "GO" and lower than the second step engraved with "NO GO". This will position the drive wheel 6.3mm-8mm (1/4-in to 3/8-in) off of the ground as shown. (Fig. 4.17)
5. Once 6.3mm to 8mm off the ground, tighten again fasteners (A) and (B) to a torque setting of 12 Nm [8.85 ft-lb]. 
6. The wheel up height is now set.
7. Adjust set screw (C) to get correct gap between tire and floor. Use spacer to achieve 6.3mm-8mm (1/4-in to 3/8-in) gap. (Fig. 4.16)

#### **⚠ DANGER!**

The latch must be secured to the receiver. If not, the latch may become displaced from the receiver during operation. Failure to do so may result in improper function of the device, the wheelchair, and/or injury to the user.



#### 4.5 Charging and Attaching the Battery

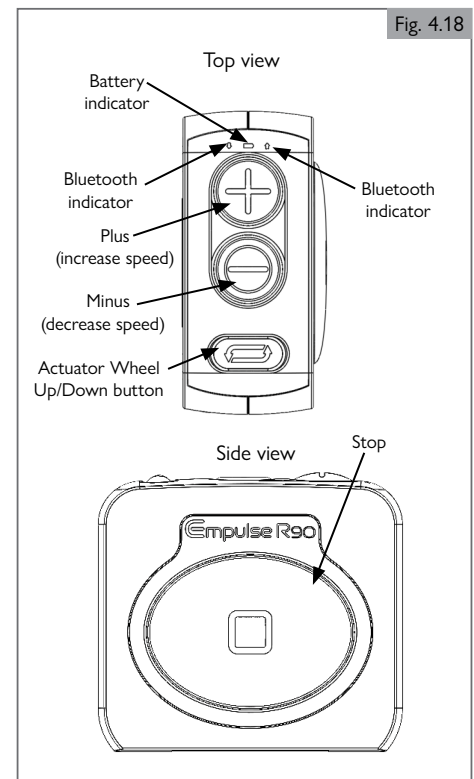
For proper charging and attachment of the battery, refer to section 6.0 Battery and Charger.

#### 4.6 Mounting the Control Box

1. Attach the mounting hardware onto the wheelchair frame with a 5mm allen wrench.
2. To adjust the angle to the desired location, loosen the two small screws with a 2.5mm allen wrench. Once aligned to preferred angle, tighten the two screws.
3. Place the two AA batteries into the back of the control box.
4. Insert the control box into the wheelchair mount.
5. Ensure the control box can be easily accessed by the wheelchair user. Adjust the position on the frame if needed.

#### 4.7 Setting up the Control Box (Fig. 4.18)

1. Upon delivery of the R90 device and control box option, proceed with placing the R90's battery. Then place the control box batteries. First, remove the control box battery compartment cover and then place two AA batteries into the control box. Upon placing the batteries in the control box, there will be two brief flashes of the blue LEDs by the battery indicator LED located at the top of the push button panel.
  - a. For best bluetooth pairing, ensure that you are only working with one R90 unit at a time, and are at least 10 meters (33 feet) away from any other R90 units.
2. After the control box has powered on, the bluetooth signal will automatically begin searching for its mating bluetooth signal from the R90 unit, and will indicate this by signaling the left and right blue LEDs in an alternating pattern until the bluetooth connection is made. When the bluetooth connection successfully pairs to the R90, the blue LEDs will briefly flash three times.
  - a. Once the control box has paired with the R90 device, it will remember the connection and automatically reconnect itself if the R90 is powered cycled.
  - b. To pair the control box with a different R90 device, hold the Stop and Actuator Wheel Up/Down button down for 5 seconds. It will now pair to the nearest R90 device that is powered on.
3. If the Control Box does not successfully pair with the R90 device, you may need to manually reset it and complete the bluetooth search again. To do this, press and hold down the stop button for 5 seconds. The control box will then begin searching to pair to the R90 device and will again show the blue LEDs in a left – right alternating pattern until it successfully pairs.
4. Once paired, the R90 is ready to be driven with the control box. Refer to section 5 Using the Device for information on operating the control box.



#### 4.8 Setting up the Sunrise Intelligence App

The app is required during the initial set up to optimize the drive performance of the R90 to the rider and their chair. Do not use the app while actively driving the R90.

1. Download the Sunrise Intelligence app from the Apple App Store or the Google Play Store.
2. Install a charged battery into the R90 and turn on the phone's Bluetooth.
3. Open the Sunrise Intelligence App. The user will be prompted to agree to the Terms of Use. The user must agree to continue.
4. Select Connect to scan for nearby devices. After scanning all available devices will be shown; select the user's R90.
5. The App will prompt the user to agree to the R90's Terms of Use. The user must agree to continue.
6. The app will prompt the rider to calibrate the R90 and enter the user's weight. These settings optimize the R90's performance for the user. For calibration, the R90 needs to be properly installed and attached to the rider's wheelchair. The wheelchair should have the wheel locks engaged and be set on level ground before the calibration is initiated. The R90 can always be re-calibrated through the app's settings page.
7. The top half of the home screen on the app will show the R90's current battery level as well as the speed, distance, and time for the last 9 sessions.
8. From the homepage the user can select Drive Profiles to switch between the two pre-set drive profiles. The indoor and outdoor drive profiles will optimize the R90 for their respective environments.
9. From the homepage the R90 drive wheel can be raised or lowered using the Wheel Up and Wheel Down buttons.
10. The Stop button will stop the R90 while driving.
11. The gear icon in the top right corner of the homepage allows access to the settings page. In the settings, the user weight and the calibration can be adjusted. In addition, the Consent to Liability can be reviewed.
12. The support page, which can be accessed by selecting Support from the homepage, provides links and access to support videos and the R90 Web-page.

#### 4.9 Attachment and Removal of the R90 from the Receiver

With the receiver properly mounted to the wheelchair the device is now ready to be attached into the wheelchair mounted receiver.

#### **WARNING!**

Before attaching the device into the receiver, ensure that the power to the device is off by checking the Wheel Up/Down button. The Wheel Up/Down button should be dark with no blue light around the edge.

#### 4.10 Check after Set-up or Adjustment

After set-up and attachment, check to ensure that all fasteners are tightened to the specified torque setting and that no interferences exist between any of the components.

#### 4.11 Additional Warnings

#### **DANGER!**

1. See your health care provider and have them re-assess the basic fit and performance measurements, and adjust seating components when the device is added to an existing chair.
2. Unauthorized modifications or use of parts not supplied or approved by Sunrise Medical may change the function of the device. This will void the warranty and may cause a safety hazard.
3. The device may require adjustment by a Sunrise Medical authorized dealer when components of the wheelchair are changed. If the rear wheels of the wheelchair are altered, the device's traction may be affected and the device may need adjustment.
4. When using the control box, remove the control box from the wheelchair receiver prior to transferring. Always ensure the device is powered off prior to transferring.

Many of the screws, bolts, and nuts on this device are special high-strength fasteners. Use of improper fasteners may cause your device to fail.

1. ONLY use fasteners provided by a Sunrise Medical authorized dealer (or ones of the same type and strength, as indicated by the markings on the heads).
2. Over- or under-tightened fasteners may fail or cause damage to device parts.
3. If bolts or screws become loose, tighten them as soon as you can.

NOTE — For safety and optimum performance, do not reuse fasteners.

#### **DANGER!**

Anti-tip tubes can help keep your chair from tipping over backward in normal conditions. If your chair includes anti-tip tubes ensure you re-adjust them after adding the device to the chair.

1. Sunrise Medical recommends the use of anti-tip tubes.
2. Ensure anti-tip tubes are set and adjusted per the wheelchair manufacturer's recommendations.

If you fail to heed these warnings damage to your device, a fall, tip-over, or loss of control may occur and cause severe injury to yourself or others.

**⚠ DANGER!**

1. Check and adjust the settings regularly.
2. Consult your Sunrise Medical authorized dealer to adjust the operational settings immediately if you notice any change in your ability to:
  - a. Control the device
  - b. Stopping and starting
  - c. Insufficient traction

**5.1 Checking Device Before Use**

Perform the following daily check routine before driving:

**⚠ CAUTION!**

**Checking Tire**

If tire is overly worn and/or there is a loss of traction, adjust the set screw (Fig 4.15 and Fig 4.16) to lower the drive wheel until traction is achieved. If there is no more adjustment and there is still a loss of traction, then replacement of the device tire is recommended.

**Checking Batteries**

1. Before using your device for the very first time, charge your batteries to full capacity. (Refer to Battery section.)
2. Are the batteries sufficiently charged? The green lights on the battery indicator must be on.

**⚠ WARNING!**

Battery chargers are only intended to charge:

1. The battery supplied for the device. Do not try and charge other batteries with the device charger.
2. Do not use any battery other than the battery supplied with the device.
3. Sunrise Medical can provide additional or replacement device batteries if required. Contact your Sunrise Medical authorized dealer if another battery is required.
4. Refer to the battery and charger section for the proper care, use, and maintenance of the battery and charger.

**Checking the Latch Release**

Ensure that the latch release can be moved freely and locks in place when holding the latch hook.

**Checking Clothing on Potential Entrapment**

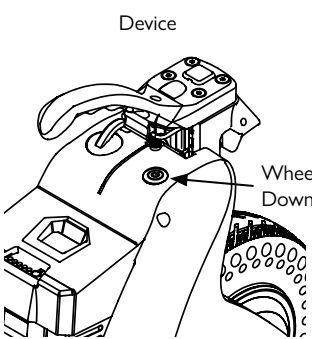
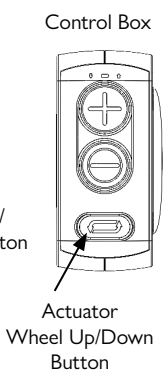
When operating the device, ensure that your clothing does not hamper the device (i.e. too long). Before use, always ensure your clothing or accessories do not come into contact with the wheels or other moving and/or rotating parts in which they could become entangled.

**Checking Weather Condition**

In winter, batteries have a reduced capacity. During a period of light frost, the capacity is roughly 75% of the normal capacity. At temperatures below -5°C (23°F) this will be roughly 50%. This will reduce the total specified range.

**5.2 Wheel Up/Down**

1. Wheel Down	Device	Confirm device battery is in place Press the Device Wheel Up/Down Button (located on top surface of the device)	Wheel Up/Down Button blue LED light on device will illuminate when the wheel is down. When the wheel is completely down a long tone will sound to signal that the device is ready to be used.
	Control Box	Confirm device battery and control box battery are in place Press the Actuator Wheel Up/Down Button	Wheel Up/Down Button blue LED light on device will illuminate when the wheel is down. When the wheel is completely down a long tone will sound to signal that the device is ready to be used.
2. Wheel Up	Device	Press the Device Wheel Up/Down Button	Blue LED light on device will not be lit. A short tone will sound to signal that the device is deactivated.
	Control Box	Press the Actuator Wheel Up/Down Button	

### 5.3 Operating the control box

Once paired, the R90 is ready to be driven with the control box.

Engaging the device wheel	To begin operation, press the actuator Wheel Up/Down button on the control box to engage the device wheel to the ground.	<p>The image contains two diagrams of the Empulse R90 control box. The top diagram is a 'Top view' showing the layout of buttons and indicators: a battery indicator at the top, two Bluetooth indicators on either side, a plus button (increase speed) in the center, a minus button (decrease speed) below it, and an actuator wheel up/down button at the bottom. The bottom diagram is a 'Side view' showing the device wheel and a stop button on the right side.</p>
Acceleration	Begin driving by first pressing the plus (increase speed) button once. The right blue LED will illuminate.	
	Each press of the plus button will make the R90 drive faster. Do not hold the buttons down.	
Deceleration	To slow down/decelerate, press the minus (decrease speed) button. The left blue LED button will illuminate.	
Stopping	The stop button can be used to de-energize the motor at any time.	
	The R90 does not have a brake. Once the motor is deenergized, the wheelchair must be brought to a stop by applying a braking force to the handrim, as would be done with a manual wheelchair without the R90 attached.	
Wheel Up <sup>1</sup> (Actuator disengage)	Raises the device wheel. Ensure motor is de-energized. Press the actuator Wheel Up/Down button to lift the R90 device wheel off the ground.	
Sleep state	Wheel up mode allows the wheelchair to be pushed, either by the occupant or by an attendant, without any activation or resistance from the device.	
	After 30 minutes of non-use the control box will enter a sleep state. To awaken the control box, press and hold the stop button for 5 seconds.	
Bluetooth connection	To manually put the control box into sleep state, press and hold both the actuator and the stop buttons at the same time for 5 seconds.	
	If the bluetooth connection is lost during use, the drive motor will de-energize and coast. Reconnect the control box by pressing and holding the stop button for 5 seconds.	
Battery charging/ battery life	The red LED will illuminate when the control box batteries begin running low (indicating about 20% battery life remaining). Replace the AA batteries to avoid loss of function. Once batteries are replaced, the control box will begin the pairing process automatically.	
	Recommended use of AA batteries with a nominal voltage of 1.5V; do not use rechargeable batteries which have less nominal voltage.	

<sup>1</sup> For more information on wheel up mode, see section 5.4.



## 5.4 Driving the R90

### **WARNING!**

Please show the utmost consideration for the other traffic on the road.

### **DANGER!**

1. Remember that the last thing a car or truck driver expects to see is a device backing off the curb into the road.
2. If in any doubt, do not risk crossing the road until you are certain that it is safe.
3. Always cross the road as quickly as possible, there may be other traffic.
4. Ensure that there are no objects in your path that could possibly become lodged in your device. This could cause the device to come to a sudden stop.
5. Riding over drains or grids could cause the device wheel to become lodged, causing the chair to come to a sudden stop.

The device operates by responding to inputs from the control box. When using the control box, pressing the plus button will engage the drive motor without requiring you to propel.

#### 1. Accelerating

To initiate motion, engage the plus button on the control box. The device has sixteen (16) electronic speed levels. At first press of the plus button, it will be set at the appropriate speed level. To go faster, additional press of the plus button will accelerate the wheelchair. The device will increase its electronic speed level accordingly.

### **CAUTION!**

When using the control box, become familiar with how the device increases speed when pressing the plus button; allow a few seconds between pressing the plus button additional times to avoid reaching a speed faster than intended.

#### 2. Maintaining Direction

While moving forward, it is important that you maintain control of the wheelchair through the wheelchair's handrims. The device may veer left or right due to the grade of the terrain or the set-up of the wheelchair. Maintaining the desired direction is done in the same manner as is used in operating the wheelchair without the device attached, by applying a push or stopping force to either the left or right handrim.

#### 3. Turning

To turn while the device is operating requires either pushing on the left or right handrim, just as would be done without the device assisting.

### **DANGER!**

Full speed turns should not be attempted. If you need to turn sharply you must reduce your speed prior to executing the turn by slowing down by using the control box. This is particularly important when traveling across or down a slope. Disregarding this advice could lead to your device tipping over which may result in damage to the device or injury to the user.

#### 4. Decelerating

There are multiple ways to stop the device:

- a. Pressing the Wheel Up/Down button on the device will de-energize the motor.
- b. Pressing the minus button on the control box will reduce the speed of the wheelchair. Additional presses of the minus button will decrease the speed further with each press of the button.
- c. Pressing the stop button on the control box will de-energize the motor.
- d. Pressing the actuator button on the control box will de-energize the motor and lift the device into wheel up mode.

#### 5. Stopping

The device does not have a brake. When the motor is de-energized, it will provide some slowing force, but it will not provide a braking force. Full stopping force must be provided by the user in order to come to a full stop.

#### 6. Operating on an incline

- a. The device will provide assistive propulsion up an incline. It is best to be in motion prior to encountering the incline.
- b. When using the control box, it is recommended to engage the motor by pressing the plus button prior to encountering the incline.
- c. When climbing an incline be aware of the motor's traction. If your speed begins to slow or the drive wheel slips, provide manual assistance through the handrims. This will maintain power to the drive wheel and assist the rider up the incline.

Note: Refer to your manual wheelchair owner's manual for warnings regarding maximum allowable incline.

#### 7. Operating on a decline

The device does not have a brake. The device will, however, provide some slowing force through the motor, but it will in most situations be insufficient to bring the chair to a stop, especially on a decline. Maintain control of the wheelchair through the handrims in order to come to a complete stop.

#### 8. Operating rearward

The device does not provide any powered assistance in the rearward direction. However, it will provide a small amount of resistance moving rearward. To avoid this resistance, put the device into wheel up mode.

#### 9. Wheel Up mode

- a. Wheel up mode is intended to be used when powered assistance is not required on a temporary basis, such as when operating in tight or confined spaces.
- b. To position the device in wheel up mode: use the Wheel Up/Down button on the device, or the actuator button on the control box. These actions will move the internal actuator in the device and lift it off the ground. This way, no power assist will be provided until the device is positioned back into wheel down mode.
- c. To reposition the device back into wheel down mode, simply press the device Wheel Up/Down button ON until the device drive wheel reengages the ground (wheel down mode). Additionally, you can press the actuator button on the control box.

### **WARNING!**

**Do not operate the R90 at high speeds in tight or confined spaces. Either reduce the speed, turn off the device, or position it into wheel up mode.**

#### Adverse conditions

Please be aware that when operating the R90 in adverse conditions, e.g. on wet grass, mud, ice, snow, or other slippery surfaces, you may experience a reduction in the grip and traction of your device.

1. It is recommended that you take extra precautions in these conditions, particularly on hills and slopes. The device could become unstable or skid causing possible injury.
2. If you are in any doubt about the capabilities of your device on a slope, then do not attempt to drive up or down the slope/curb. Try to find an alternate route.
3. When using the device take extra care with loose or long items of clothing. Moving parts, such as wheels, can be potentially dangerous or even fatal if clothing becomes entangled.

**Gradients: ascents** **WARNING!**

1. When going uphill, keep the chair moving.
2. Steer by carefully pushing on either the left or right handrim making slight left and right adjustments as you go.
3. If you have stopped on a hill, you should start slowly.
4. If necessary, lean forward.
5. Slopes greater than that recommended for your manual wheelchair should not be attempted. Curbs of greater than 1/2-in (12mm) should not be ascended or descended unless the device is turned off. When traversing an obstacle of less than 1/2-in (12mm), or ascending or descending a slope, caution should be taken to properly shift your weight to ensure the device is properly balanced during the maneuver.

**Gradients: descents:**

1. On descents, it is important not to let the device accelerate beyond its normal level of ground speed.
2. For steep inclines, it is recommended to power off the device.

 **DANGER!**

1. Proceed slowly down steep descents and stop if you feel anxious.
2. If the chair is moving too fast, apply a stopping force to the handrims.
3. Restart slowly and do not increase speed above what you are comfortable with.

 **DANGER!**

1. In certain circumstances your device could become unstable.
2. Slopes greater than that recommended for your manual wheelchair should not be attempted. Curbs of greater than 1/2-in (12mm) should not be ascended or descended unless the device is turned off. When traversing an obstacle of less than 1/2-in (12mm), or ascending or descending a slope, caution should be taken to properly shift your weight to ensure the device is properly balanced during the maneuver.
3. To improve stability lean forward when driving uphill, with the seat and back in an upright position.
4. Alternatively sit in an upright position when travelling in a forward, downhill direction and/or recline the seat backwards.
5. When traveling on a slope, exceeding the maximum user weight of the device can cause the device to lose traction or respond abnormally. Do not exceed the weight limit when traveling on slopes.

## 6.1 Battery Introduction (Fig. 6.1)

### 1. Battery Notes

- Batteries supply the power for your device. They contain a finite amount of energy and have limits on how long they can store and supply energy.
- You can charge batteries only a certain number of times before they will fail and no longer hold a charge.
- When storing or transporting your chair and device, ALWAYS remove the battery for storage.
- The R90 can only be powered off by fully removing the battery. Even in the wheel up position the battery will be drained by the device.
- For answers to questions about batteries, consult your Sunrise Medical authorized dealer.

### 2. Use Proper Batteries

Your device operates on one battery.

- Use the battery supplied with the device.
- When you buy a replacement, purchase R90 batteries or recommended replacement batteries.

### 3. Removing the battery

- Ensure the wheelchair is stopped and on level ground.
- Turn off the device.
- Disconnect the battery by pressing the battery release button and pulling it out of the cradle. (Fig. 6.1)

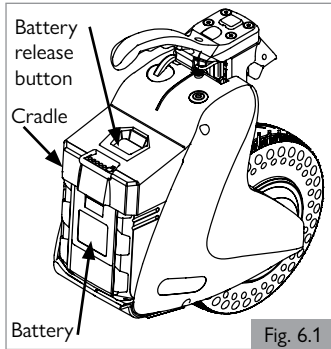


Fig. 6.1

## 6.2 Battery Types

The Empulse R90 utilizes Lithium ion batteries (2.5Ah or 5.0Ah):

- Li-ion 00 (Lithium ion) uses the specialized plug on the dual charging system when charging the batteries while connected to the device. A docking charger is available for battery charging off of the device.
- Do not use chargers other than those provided with your R90 batteries. Damage to the battery, and/or the charger unit can occur if using a charging unit other than what was provided by the manufacturer.

## 6.3 Battery storage

### ⚠ WARNING!

Store the battery fully charged and disconnected. Exposed contacts on the bottom of the battery can cause short circuits and lead to a fire or battery rupture. Never store the battery in direct sunlight or outdoors.

## 6.4 Low battery levels

### ⚠ WARNING!

ALWAYS be aware of the battery life. Check it frequently. It is best to carry a spare battery when taking prolonged rides. When changing to a replacement battery:

- First get your wheelchair to a safe place. Turn the Wheel Up/Down button off and switch to the replacement battery. If you have no replacement battery with you, leave the Wheel Up/Down button turned off while driving.
- If you cannot change the battery on your own, an attendant must be present.

## 6.5 Battery safety (Fig. 6.2)

### ⚠ WARNING!

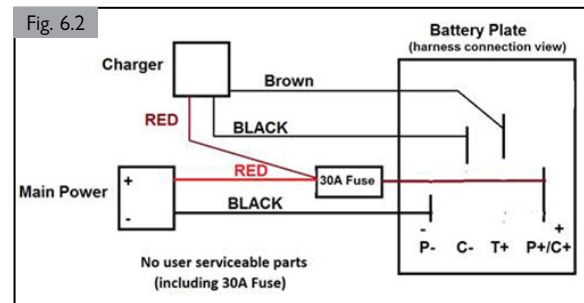
The battery on the Empulse R90 is not very large but stores a large amount of charge. Improper use can cause damage or in certain circumstances lead to burns or fire.

- Only use battery for the intended purpose of power assist for a wheelchair.
- Keep the battery out of reach of children and anyone who is not familiar with it.
- When transporting the wheelchair, remove the battery from the device.
- When the battery is not in use, store it in the travel bag.
- Do not allow battery connection clamps to come into contact with wires or metal.
- Do not expose the battery to impact; do not add parts to or remove parts from the battery.
- Do not expose the battery to heat or place near fire or water.
- Do not use a broken or damaged battery.
- Do not disassemble or modify the battery.
- Do not charge or store the battery near pets or children.

### Safety cut-outs

In the event of a short circuit there are several safety systems built into your device to safeguard your electrical circuits (Fig. 6.2).

- The 30A fuses are integrated into the battery harnesses to protect the batteries and wiring.
- To replace them contact your Sunrise Medical authorized dealer, who will also diagnose the original fault.



6.6 Lithium Ion battery



**WARNING!**

1. Temperature

- a. While travelling, if the internal temperature of the lithium ion battery becomes too high or too low, the battery will not provide power to the unit. The power assist function will not operate.
- b. If the unit is in the wheel down position it will not operate. It may be necessary to manually remove the drive unit from the wheelchair.
- c. When descending down a slope on the wheelchair, the drive motor, contrary to normal operation, generates electricity and charges the battery. Charging a lithium ion battery in this way when its temperature is below 0°C (32°F) or above 45°C (113°F) will cause its deterioration. To protect the battery in these conditions, the device may stop itself.

2. Charging:

- a. The Lithium Ion battery uses the specialized plug on the dual charging system when charging the battery in the unit.
- b. The battery can be removed to charge in the docking charger.
- c. Do not use a charger other than the one provided with your specific battery.

If you fail to heed this warning, damage to the battery, and/or the charger unit can occur.

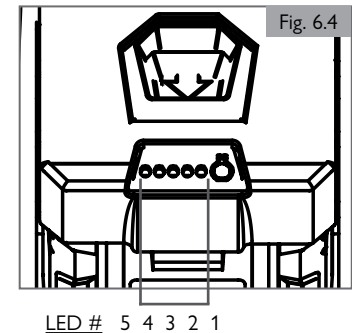
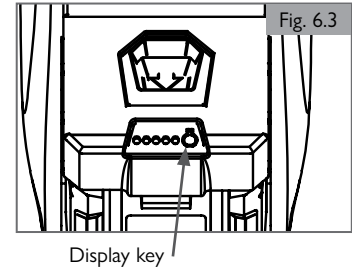
6.7 Checking the battery (Fig. 6.3 - Fig. 6.5)

The battery capacity and charging progress is shown when the display key is pressed. The total capacity is shown by LED indicator lights. Each light represents about 20% of the total capacity of the battery. The display is active for approximately 3 seconds.

1. What each battery level means

LED's only light up when the display key is pressed (Fig. 6.3). There are five LED lights on the battery display (Fig. 6.4).

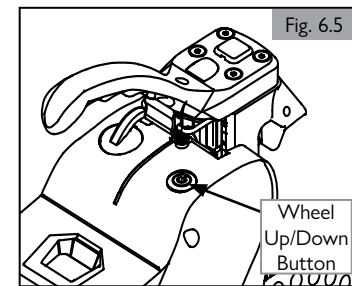
STATUS	Battery Capacity	LED 1 Flashing Red	LED 1 Solid Red	LED 2 Solid Yellow	LED 3 Solid Orange	LED 4 Solid Green	LED 5 Solid Green
Battery is active		any lights					
Voltage is 13-33.9V	less than 10%	☑					
Voltage is 34-34.9V	10% - 20%		☑				
Voltage is 35-35.9V	20% - 40%		☑	☑			
Voltage is 36-36.9V	40% - 60%		☑	☑	☑		
Voltage is 37-38.4V	60% - 80%		☑	☑	☑	☑	
Voltage is 38.5-41.8V	80% - 100%		☑	☑	☑	☑	☑



- a. The R90 Wheel Up/Down button (Fig 6.5) will pulse when the device charger is connected and will not allow drive while the device charger is connected.
- b. If the battery LED's do not respond when the display key is pressed, the battery should be connected to a charger. This can "wake up" the battery management system. If there is still no response after charging for at least 2 hours, the battery is defective.

2. Lithium Ion battery life:

- a. When the battery can no longer be charged, the battery indicator lamp no longer lights.
- b. Recycle battery. Do not dispose of in bodies of water or sewer systems. Dispose of in accordance with local, state, and federal regulations.



## 6.8 Charging the battery

### Device Charger: charging (Fig. 6.6)

Note: Charging can be done on-board or table top.

**Important** - If charging from the travel bag, ensure that the charge cord is not tangled.

1. Open the battery charge port connector cover.
2. Connect the magnetic charge cord to the device charging port. The charge light should come on. Charging can take 1 hour for 2.5Ah battery and 2 hours for 5.0Ah battery.
3. The progress of charging is shown on the battery capacity display. This display serves as an indicator for the progress.
4. When charging is complete, the charging light and the battery capacity display will shut off.
5. After charging is complete, replace the battery's connector cover, then secure the battery charge port connector cover.

### Device Charger: troubleshooting (Fig. 6.7, Fig. 6.8)

1. Automatic charging mode (ACH) – Device Charger: Once connected to the e-mobility device the charger will automatically start charging as long as:
  - a. The voltage of the battery is between 20V-42.5V, and
  - b. The internal battery cells are at normal temperature range. (No measurement of this temperature is possible)
2. Manual charging mode (MCH) - Device Charger (press “Refresh”): If the battery has been in long-term storage, or the battery is allowed to be depleted below 20V, or the battery has a fault, the automatic charging mode may fail to start. In this case the manual charging mode will be needed.
  - a. After connecting the charger to the e-mobility device press the “Refresh” button (Fig 6.7).
  - b. If the battery voltage is below 20V and the internal battery cells are at normal temperature the charging LED will be illuminated and the charger will now start. Allow the process to complete.
  - c. If the battery temperature is not normal the charger will trip.
    - i. Disconnect the charger and wait 5-10 minutes to allow the internal battery cells to cool.
    - ii. Reconnect the charger; do not press the “Refresh” button (Fig 6.7). If the battery temperature is now normal, the charging LED will be illuminated and the charger will now start.
    - iii. If the charging LED does not illuminate, the battery is defective and must be replaced.

### Device charger: Important safety instructions

#### **⚠ WARNING!**

The charger for the Empulse R90 is a very sensitive piece of equipment. Improper use can cause damage or in certain circumstances lead to burns or fire.

1. When charging always use the charger supplied.
2. Always charge on a level surface. After use do not keep it plugged into the power outlet.
3. Keep the charging unit out of reach of children and anyone who is not familiar with it.
4. Do not use chargers that have a damaged cord, or chargers that have been dropped.
5. There is a temperature detection wire on the output of the charger. Do not mistakenly connect to the battery+ to avoid burning the charger.
6. This charger is designed for Sunrise Medical R90 batteries, with a temperature detection wire, through which the charging and battery over-temperature protection can be automatically started.
7. For some other battery BMS, the charging may not detect the battery voltage, and the charger may not automatically start output charging. At this time, the charger is in standby mode and must be forced to output through the upper right refresh button on the on-board charger.
8. The charger design is focused on dust-proof and water-proof (IP65). Please do not use it in direct sunlight or high temperature environment (35°C > or 95°F).
9. There is more set time for each stage of the machine. Excessive battery capacity may cause faulty judgment. It does not support charging batteries that the capacity is more than 75Ah.

Fig. 6.6

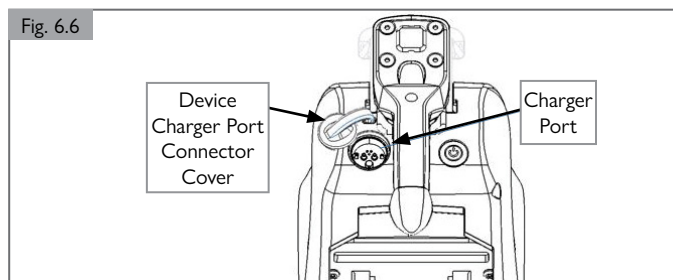


Fig. 6.7

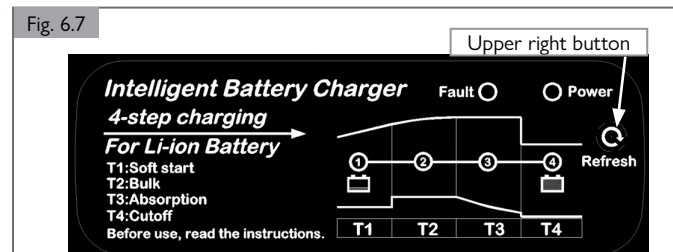
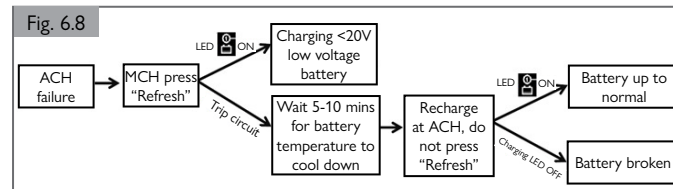
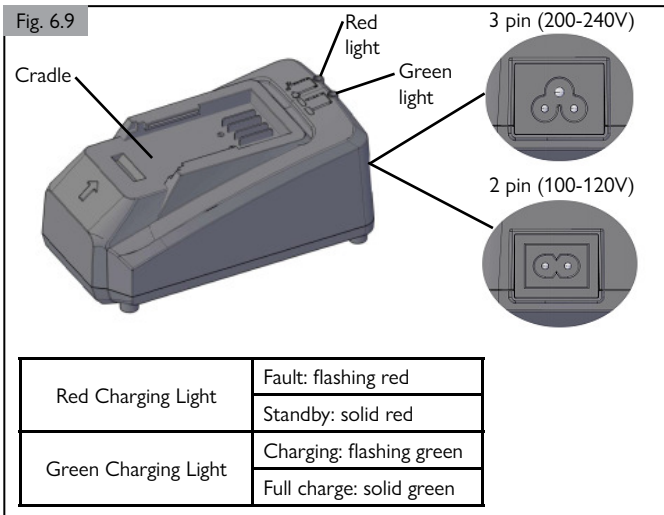


Fig. 6.8



**Docking Charger: charging (Fig. 6.9)**

1. Plug the battery charger into the proper AC voltage source. Charging red light will flash red.
2. Insert the battery cartridge into charger cradle and slide along track until it clicks into place.
3. When the battery cartridge is inserted, charging will begin. Charging green light will flash green during charging.
4. When charging is complete, the charging green light will stay on (solid green).
5. Charging time varies by temperature (10°C to 35°C (50°F to 95°F) ) that battery cartridge is charged at and conditions of the battery cartridge, such as battery cartridge which is new or has not been used for a long period of time.
6. After charging a Li-ion battery, remove it from the charger and unplug the charger.

**Docking Charger: maintenance**

1. Visually inspect both sides of charger for wear or damage every three months.
2. To maintain product SAFETY and RELIABILITY, repairs, any other maintenance, or adjustment should be performed by Sunrise Service Centers, always using Sunrise replacement parts.

**Docking Charger: Important Safety Instructions****⚠ WARNING/CAUTION!**

The following instructions contain important safety and operating instructions for battery charger.

1. Before using battery charger, read all instructions and cautionary markings on (1) battery charger, (2) battery, and (3) product using battery.
2. CAUTION – To reduce risk of injury, charge only Sunrise R90 rechargeable batteries. Other types of batteries may burst causing personal injury and damage.
3. Non-rechargeable batteries cannot be charged with this battery charger.
4. Use a power source with the voltage specified on the nameplate of the charger.
5. Do not charge battery cartridge in presence of flammable liquids or gases.
6. Do not expose charger to rain or snow.
7. Never carry charger by cord or yank it to disconnect from receptacle.
8. After charging or before attempting any maintenance or cleaning, unplug the charger from the power source. Pull by plug rather than cord whenever disconnecting charger.
9. Ensure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
10. Do not operate charger with damaged cord or plug — replace them immediately.
11. Do not operate or disassemble charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service technician. Incorrect use or reassembly may result in a risk of electric shock or fire.
12. The battery charger is not intended for use by young children or infirm persons without supervision.
13. Young children should be supervised to ensure that they do not play with the battery charger.
14. Do not charge battery cartridge when temperature is BELOW 10°C (50°F) or ABOVE 35°C (95°F).
15. Do not attempt to use a step-up transformer, an engine generator or DC power receptacle.
16. Do not allow anything to cover or clog the charger vents.
17. The battery charger is for charging battery cartridge. Never use it for other purposes or for other manufacturer's batteries.
18. If charging light flashes in red color, battery condition is as below and charging may not start.
  - a. Battery cartridge from just-operated tool or battery cartridge that has been left in a location exposed to direct sunlight for a long time.
  - b. Battery cartridge that has been left for a long time in a location exposed to cold air.
19. Charging will begin after the battery cartridge temperature reaches the degree at which charging is possible.
20. Do not use if the terminals on the charger or battery cartridge are clogged with dust or the battery cartridge is worn out or damaged.

## 7.0 TRANSPORTATION

**7.1 Transport in a car****⚠ DANGER!**

The device should not be attached to the wheelchair when being transported in a car or any other moving vehicle, whether the wheelchair is transit certified or not. The device has not been tested or certified to be used while attached to a wheelchair when in a moving vehicle.

Failure to heed this warning could result in damage to the device or the wheelchair, and result in risk of injury or death to the user or other occupants in the vehicle.

**7.2 Transport in an airplane**

Shipping lithium-ion batteries or taking them with you on airplanes is strictly regulated. The guidelines may vary depending on the airline. In all cases, contact your airline or carrier, before you transport or want to send a device which operates on lithium-ion batteries on an airplane.

**⚠ WARNING!**

1. The battery of the Empulse R90 contains lithium-ion cells. For shipping or transportation, you must comply with the relevant legal guidelines.
2. The guidelines for shipping lithium-ion batteries or transportation in an airplane may change. It is essential that you contact your airline or travel operator in order to obtain information about the current guidelines before you start a trip or plan shipping.
3. Defective batteries cannot be transported in an airplane under any circumstances.
4. If your battery is defective, please contact your dealer to find out how to proceed. In this case, special conditions apply for transporting hazardous products.
5. In all cases switch the battery off for transportation and protect the contacts on the underside of the battery against short circuiting.

The device's lifespan is dependent on it being well maintained.

For information concerning specific settings, maintenance, or repair work, please contact your Sunrise Medical authorized dealer. Always ensure you mention the model and year of manufacture and identification number provided on the identification plate of the device when contacting your Sunrise Medical authorized dealer.

**⚠ CAUTION!**

The device should be serviced by your Sunrise Medical authorized dealer once a year or, in the case of intensive use, every six months. For a list of approved authorized dealers in your area please contact Sunrise Medical Customer Service.

The contact details of your local Sunrise Medical Service Center can be found on the inside front cover of this booklet.

Website addresses are on the back cover.

**8.1 Maintenance**

**⚠ WARNING!**

- Loose fasteners should be re-tightened according to the assembly instructions.
- If a broken or loose component is found, discontinue use immediately and contact your Sunrise Medical authorized dealer for replacement.

**⚠ WARNING!**

- If you are in any doubt about the performance requirements of your device contact your Sunrise Medical authorized dealer.
- After performing any maintenance or repairs on the device you must ensure that it is functioning correctly before it is used.
- All fasteners must be replaced like for like using the correct length, tensile strength, and materials.
- When replacing self-locking nuts, or nuts/studs secured with a thread locking solution, ensure that a suitable thread locking solution is reapplied to the fastener.
- Failure and cracking can happen due to aging. Inspect the device regularly in order to detect any damage due to aging.

**Daily checks**

Perform the daily check routine before driving as described in chapter 5.1.

**Weekly checks**

Perform the weekly check routine before driving as described below.

**Checking connectors and cables**

- Ensure that all connectors are securely mated.
- Check the condition of all cables and connectors for damage.

**General weekly checks**

- Check tire to ensure not overly worn.
- Check device for foreign objects and/or obstructions.
- Ensure the latch release functions properly.

**Quarterly checks**

Perform the quarterly check routine before driving as described below.

- Check to ensure the wheelchair receiver mounted on the camber tube or the folding axle tube are correctly positioned relative to the wheelchair.
- Check chair for any missing or loose nuts, bolts, and / or fasteners. Contact a Sunrise Medical authorized dealer if found.
- Check device for any broken components, unusual wear, or other indicators of excessive wear. Discontinue use if damage is found and contact a Sunrise Medical authorized dealer.

**⚠ WARNING!**

- If you are in any doubt about the performance requirements of your device contact your Sunrise Medical authorized dealer.
- After performing any maintenance or repairs on the device you must ensure that it is functioning correctly before it is used.
- A complete inspection, safety check, and service should be made by a Sunrise Medical authorized dealer at least once per year.
- All fasteners must be replaced like for like using the correct length, tensile strength, and materials.
- When replacing self-locking nuts, or nuts/studs secured with a thread locking solution, ensure that a suitable thread locking solution is reapplied to the fastener.
- Ensure that any contamination, such as fluff, hair, etc. is removed from the device. Such contamination may affect tongue latching into receiver.
- Do not reuse fasteners.

Maintenance and Inspection Schedule	End User / Caregiver			Sunrise Medical Authorized Dealer
	Daily*	Weekly	Quarterly*	Annually
Daily Check routine as described in Section 5.1	<input checked="" type="checkbox"/>			
Weekly Check routine as described in Section 8.1		<input checked="" type="checkbox"/>		
Quarterly Check routine as described in Section 8.1			<input checked="" type="checkbox"/>	
<b>Complete inspection, safety check, and service should be made by a Sunrise Medical authorized dealer</b>				<input checked="" type="checkbox"/>

\* Daily = Before each use of the device. Quarterly = Every three (3) months.

If fasteners are found to be loose a Sunrise Medical authorized dealer should tighten the fastener to the torque setting per size detailed below, unless stated otherwise in all appropriate owner's manuals or instruction sheets (if applicable).

- M5 Fasteners = 5.8 Nm [51 in-lbs]
- M4 Fasteners = 2.2 Nm [19.5 in-lbs]
- M3 Fasteners = 1.0 Nm [8.9 in-lbs]
- M2 Fasteners = 0.9 Nm [8.0 in-lbs]



## 8.2 Tire maintenance and replacement (Fig. 8.1 - Fig. 8.8)

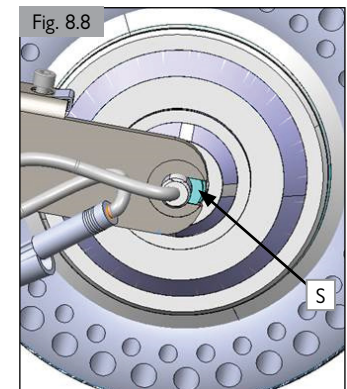
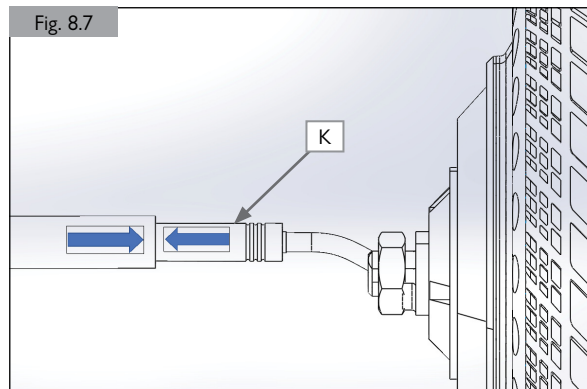
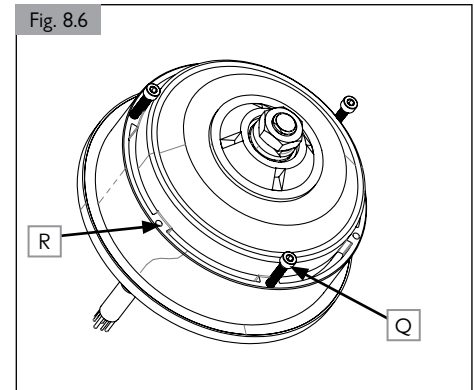
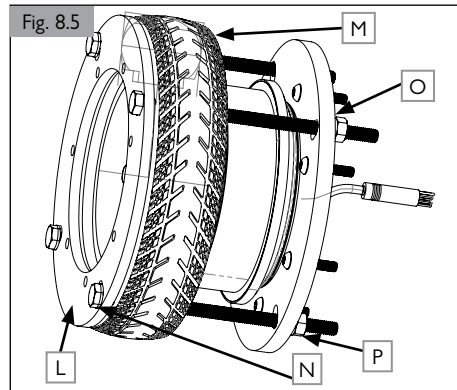
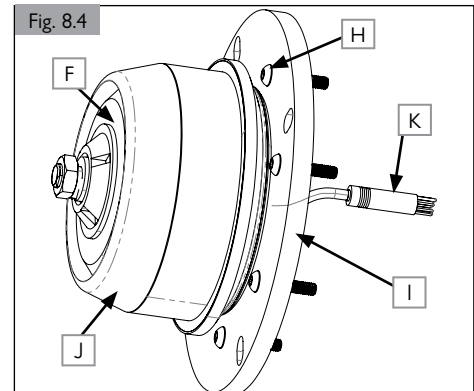
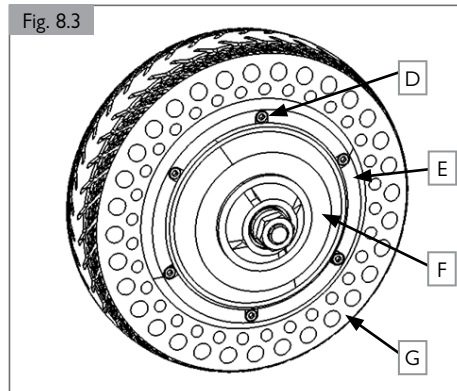
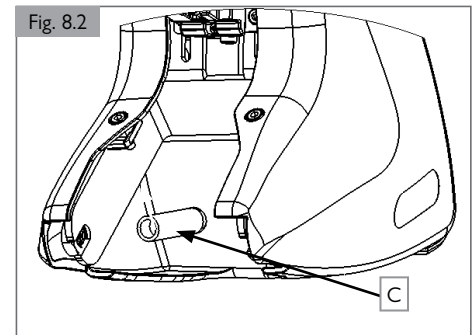
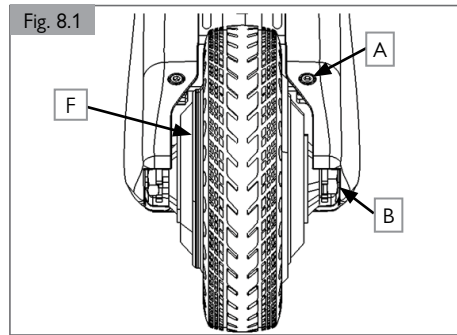
Note: This installation requires R90 Tire Replacement Tool P/N 257350 (available on Sunparts).

### A. Removing the tire:

1. Use a 4mm allen wrench to loosen/remove the shroud hardware (A) for ease of disassembly. (Fig. 8.1)
2. Remove the motor (F): use a slim 19mm wrench to remove the motor nuts (B). (Fig 8.1)
3. Pull the motor out of the slot and unplug the motor connector (C). (Fig 8.2)
4. Remove the collar screws (D) that hold the collar using a 3mm Allen wrench. (Fig 8.3)
5. Lay the motor to the side with the collar pointing downwards.
6. Push the tire (G) downwards until it is removed from the motor (F). The collar (E) will also slip out.

### B. Replacing the tire:

1. Insert seven M6 bolts (H) onto the bottom plate of the R90 tire replacement tool P/N 257350 (available on Sunparts) (I). (Fig 8.4)
2. Put the motor (F) on top of the bottom clamp (I). Ensure that the motor connector (K) runs underneath the clamp (I). (Fig 8.4)
3. Place the tire installation cone (J) on top of the motor (F). (Fig. 8.4)
4. Place the new tire (M) on top of the cone, then place the top clamp (L) on top of the tire (M). Align both of the clamps' and tires' holes. (Fig 8.5)
5. Insert the 4 M8 bolts (N) with a washer (O) on top and bottom of the bolt into the slots from the top of the clamp and secure them with M8 Hex nuts (P) from the bottom clamp. (Fig 8.5)
6. Use two 13mm wrench to secure the M8 bolts (N) and nuts (P) in small increments by using a star pattern, 5-6 turns per increment. Stop the process once the tire reaches the motor wall. (Fig 8.5)
7. Remove the top and bottom clamps.
8. Use a flat screwdriver to pry out the tire installation cone.
9. Align the collar and attach it to the motor with three M4x25 bolts (Q). (Fig 8.6)
10. Attach three M4x16 bolts in the remaining holes (R) and torque them to 4.8 Nm [3.6 ft-lbs]. 
11. Replace the M4x25 bolts (Q) with M4x16 bolts and torque them to 4.8 Nm [3.6 ft-lbs]. 
12. Attach the motor connector (K) by aligning the arrows on each connector and pushing them together. (Fig 8.7)
13. Route the wire to fit between the fork and shroud. Then, orient the motor shaft to align with the fork slot and slide it on.
14. Ensure the key washer faces the slot opening. The key washer (S) is always on the opening slot of the fork (Fig 8.8). Push the motor shaft all the way into the fork slot and tighten the 19mm hex nuts.
15. If loosened/removed earlier, tighten/insert the shroud hardware.





**8.3 Cleaning and disinfection**

The device should be wiped down once per week with a slightly damp, not wet, cloth. Any fluff or dust that has accumulated around the motor should be blown or dusted away.

**⚠ CAUTION!**

Ensure that you dry all parts of your device if it becomes wet or damp after cleaning or if it is used in a wet or damp environment.

**⚠ WARNING!**

Regular cleaning is important to avoid unwanted odor and to prevent contaminants from spreading.

**⚠ CAUTION!**

Do not apply too much cleaning fluid or chemical as an excessive amount of cleaning fluid can result in corrosion, degradation, or impair the structural integrity of the device.

**⚠ DANGER!**

It is important that should the device be used by more than one person it is cleaned thoroughly to ensure there is no cross infection.

**Hygiene measures when being re-used**

Prior to the device being re-used, it must be carefully prepared. All surfaces which come into contact with the user must be treated with a disinfection spray.

To do this, you must use a suitable disinfectant for rapid alcohol-based disinfection of medical products and medical devices.

Please take into account the manufacturer's instructions for the disinfectant you are using.

**⚠ CAUTION!**

1. Do not use solvents, bleaches, abrasives, synthetic detergents, wax polishes, or aerosols.
2. Disinfectants may be used in dilution as specified by the manufacturer.
3. Ensure surfaces are rinsed with clean water and dried thoroughly.

**⚠ WARNING!**

1. Always read the label on any commercial or domestic cleaning substances.
2. Always follow the instructions carefully.

**8.4 Medium to long term storage**

When storing your device for long periods of time (in excess of one week), follow these simple instructions:

1. Fully charge the device..
2. Disconnect the charger.
3. Disconnect the batteries.

**⚠ WARNING!**

Never store your device:

1. Outside.
2. In direct sunlight (plastic parts may discolor).
3. Near a source of direct heat.
4. In a damp environment.
5. In a cold environment
6. With the batteries connected (even if power is switched off).

Avoiding all of the above will minimize battery discharge and extend battery lifetime.

When returning the device to use, please reconnect the batteries and fully charge the device.

**⚠ CAUTION!**

At the end of the life of the device, it should be disposed of following your local disposal and recycling regulations.

**9.0 TROUBLESHOOTING****9.0 Troubleshooting**

If the device is not working as it should, check the following points:

1. Check whether the batteries are charged.
2. Check that the battery is properly seated in the device.
3. Check that the wheel is down and engaged with the ground.
4. Remove and reinsert the battery.
5. Check whether the battery plugs are all securely in place.
6. Check whether app software is up to date.

If the problem has not been resolved:

Contact your Sunrise Medical authorized dealer.

## Overall Physical Specifications:

## Unit Weight:

- w/2.5A Battery: 6.6 kgs (14.5 lbs)
- w/5A Battery: 7.1 kgs (15.6 lbs)

## Unit Size:

- 150mm W x 312mm L x 378mm - 421mm H
- (5.9-in W x 12.3-in L x 14.9-in - 16.6-in H)

## Color: Black

Fits Wheel Size: 540 mm (24-in), 559mm (25-in), and 590mm (26-in)

Fits Camber Tube: 22mm (.86-in), 25mm (.98-in), 28.2mm (1.11-in), 30mm (1.18-in), 32mm (1.25-in), 35mm (1.38-in), 38mm (1.5-in), 45mm (1.77-in)

Fits width: 305mm (12-in) to 533mm (21-in)

Maximum user weight: 125 kg (275 lbs)

## Performance:

Maximum speed: 8.9kph (5.5mph)

Range (Range measured on a level surface with no resistance. Actual range will be dependent upon user weight and terrain):

- w/2.5A Battery: 15.7 km (9.8 miles)
- w/5A Battery: 31.4 km (19.5 miles)

Operation: by control box

## Motor/Wheel:

- Rated Output Power: 250W
- Rated Voltage: 36V
- Max Current: 15A
- Wheel: 203mm (8-in) Black Airless Tire

## Charger:

- Model type: Device Charger
- Input Voltage: 100 120 VAC (or 220-240V AC)
- Input Frequency: 50/ 60Hz
- Charging Current: 2.7 AMP
- Range of Temperature at start of charging: 0°C to 35°C (32°F to 95°F) (Battery Temp)

## Model type: Docking Charger

- Input Voltage: 100 120 VAC (or 220-240V AC)
- Input Frequency: 50/ 60Hz
- Charging Current: 3 AMP
- Range of Temperature at start of charging: 0°C to 35°C (32°F to 95°F) (Battery Temp)

## Battery:

- Model type (Standard): Lithium Ion 36V
- Nominal Voltage: 36V
- Nominal Capacity: 2.5Ah
- Power: 90W (2.5Ah)

- Model type (optional): Lithium Ion 36V
- Nominal Voltage: 36V
- Nominal Capacity: 5.0Ah
- Power: 180W (5.0Ah)

## Electronic: Bluetooth

## Wheelchair Compatibility:

- Wheelchair Frame Type: Rigid, Folding
- Drive Wheel Diameter: 540mm (24-in), 559mm (25-in), and 590mm (26-in)
- Folding Width: 305mm (12-in) to 356mm (14-in), 381mm (15-in) to 457mm (18-in), 483mm (19-in) to 533mm (21-in)

## 11.0 SUNRISE LIMITED WARRANTY

## THIS GUARANTEE DOES NOT AFFECT YOUR LEGAL RIGHTS IN ANY WAY.

Sunrise Medical\* provides a guarantee, as set out in the warranty conditions, for devices to its customers covering the following.

### SUNRISE GUARANTEE/WARRANTY

1. Sunrise Medical guarantees the R90 device against defects in material and workmanship for 24 months after delivery to the customer, then the affected part or parts will be repaired or replaced free of charge. The warranty will only cover manufacturing defects and does not apply if:
  - a. The device is subject to abuse.
  - b. The device is not maintained as recommended in the owner's manual.
  - c. The device is transferred to a different person from the original owner.
2. **FOR ONE (1) YEAR** - We warrant all Sunrise-made parts and components of this device including: motor and electronic components, against defects in materials and workmanship for one year from the date of first consumer purchase.
3. **FOR SIX (6) MONTHS** - We warrant batteries and chargers for six months from the date of first consumer purchase.
4. **LIMITATIONS**
  - a. Claims from this warranty shall not arise, if a repair or replacement of a device or a part is required for the following reasons:
    - i. Normal wear and tear on items such as tires and tubes, upholstery, chargers.
    - ii. Damage from neglect, accident, misuse, or from improper installation or repair.
    - iii. Changes or modifications made without Sunrise Medical's express written consent.
    - iv. Damage from exceeding the weight limit.
  - b. This warranty is VOID if the original serial number tag is removed or altered.
  - c. This warranty is non transferrable and only applies to the first consumer purchase of this device through a Sunrise Medical authorized dealer.
  - d. This warranty applies in the USA and Canada only. Check with your Sunrise Medical authorized dealer to find out if international warranties apply.
5. **WHAT WE WILL DO** - Our sole liability is to repair or replace covered parts. This is the exclusive remedy for consequential damages.
6. **WHAT AUTHORIZED DEALER MUST DO** - Obtain from Sunrise Medical, while this warranty is in effect, prior approval for return or repair of covered parts. Contact Customer Service for a Re-

turned Material Authorization (RMA) number and information as to where to return the product. Upon contacting Customer Service please provide Model number, Serial number, description of what is required for service/repair, and any additional information as to reason for service being performed to the device.

### 7. NOTICE TO CONSUMER -

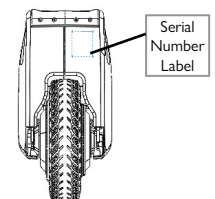
- a. You must pay the cost of labor to repair, remove, or install parts even if they are covered under warranty.
  - b. If allowed by law, this warranty is in place of any other warranty (written or oral, express or implied, including a warranty of merchantability, or fitness for a particular purpose).
  - c. This warranty gives you certain legal rights. You may also have other rights that vary from state to state or province to province.
8. This guarantee is subject to the law of the country in which the product was purchased from Sunrise Medical. Check with your supplier to find out if international warranties apply.

\* Denotes the Sunrise Medical facility from which the product was purchased.

### ADDITIONAL WARRANTY INFORMATION FOR AUSTRALIA ONLY

1. For goods provided by Sunrise Medical Pty Ltd in Australia, our goods come with a guarantee by Sunrise Medical that cannot be excluded under the Australian Consumer Law.
2. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage.
3. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
4. The benefits to you given by this warranty are in addition to your other rights and remedies under a law in relation to the goods to which the warranty relates.

Record your serial number here for future reference:



(Serial Number Label is located on the inside of the shroud, as shown.)

GENERAL DATA	
Battery	36 V 2.5 Ah Li-Ion or 5.0 Ah Li-Ion
Operating voltage	36 Volts
Range	Up to 15.7 km (9.8 miles) or 31.4 km (19.5 miles)
Speed	0 - 8.9 kph (5.5 mph) or 0-6 (3.7 mph)
Climbing Power	6° incline
Max user weight/load	125 kg (275 lbs)
Total weight	6.6 kg or 7.1 kg (14.5 lbs or 15.6 lbs)
Weight of drive unit	5.9 kg (13.0 lbs)
Weight of battery pack	0.7kg (1.5 lbs) or 1.2 kg (2.6 lbs)
Unit serial number	Example: E90XXXXXXX or E90EXXXXXX
Overall dimensions	Total length 312mm (12.25-in) x total width 150mm (6-in) x total height 395-420mm (15.5-in to 16.5-in)
MOTOR DATA	
Rated Voltage	36 volts
Maximum current	15 A
Continuous rated power	250 W
Maximum torque	22 Nm (16.2 lb-ft)
Protection rating	ISO-7176-9
Serial number	Example: Laserprint SOF2011FD0007 serial number 0007
Wheel size	197mm (8-in)
Motor noise	Max. 62±5 dbA
Motor temperature (normal operation)	Max. 41°C (106°F)
Warranty	1 year
BATTERY DATA	
Rated voltage	36 volts
Capacity (nominal charge)	2.5 Ah or 5.0 Ah
Electrical power	90 Wh or 180 Wh
Discharge current	25 A (2 sec) or 30 A (2 sec) 12.5 A or 25 A
Charging time	1 hour (for 2.5A) or 2 hours (for 5.0A)
Temperature in normal operation	Max. 41°C (106°F)
Charging temperature range	0°C to 45°C (32°F to 113°F)
Operating temperature	0°C to 45°C (32°F to 113°F) (charging) -20°C to 65°C (-4°F to 149°F) (dis-charging)
Storage temperature range	-20°C to 50°C (-4°F to 122°F) -20°C to 50°C (-4°F to 122°F) (weekly) -20°C to 35°C (-4°F to 95°F) (6 month)
Protection rating	ISO-7176-9
Serial number	Example: Laserprint S2021JUN0001 or 2111B25S0001
Warranty	6 months
Display	State of charge

Functions	N/A
Fuse	Built in short circuit protection
UN test certificate	Present
CHARGER	
Input	100-120V or 220-240V AC
End-of-charge voltage/current	42V / 2.7A or optional 3.0A (docking charger)
Protection rating	IP65 or IP4
Fuse	None
Serial number	Example: Sticker label 2201DVC0001 or 2201DKC0001
Surface temperature	Up to 51°C (124°F)
Warranty	6 months
CONTROLLER	
Rated voltage	36 Volts
Maximum current	15 A
Nominal current	50 mA
Protection rating	ISO-7176-9
CONTROL BOX	
Batteries	Two AA
Battery lifetime	4 months (under normal operation)
Functions	Forced sleep, forget current paired device, and soft reset
+/- Button	Accelerating / Decelerating
Top circle arrow button	Lower and lift the R90 unit or press and hold 5 seconds to put the control box into sleep state
Side oval button	Stop the R90 unit or reset/awaken the control box by press and hold it for 5 seconds
LED indication	When scanning for a R90, a single blink every 5-7 seconds 3 blinks when connection established 3 second blink when entering sleep mode 2 blinks when wakes up from sleep 1 second blink when forced soft reset When Faster button pressed, left LED blinks for 2 seconds When Slower button pressed, right LED blinks for 2 seconds Red LED blinks when battery is low
Bluetooth connection	BT 5.0
Protection rating	ISO-7176-9
Mounting system	Left or Right orientation
Side Frame tubes size	Ø23mm (.90-in) / Ø28.6mm (1.13-in) / Ø35mm (1.38-in)
Height	Short plate (60mm [2.4-in]), Tall plate (110mm [4.3-in])
Angle position	360° Angle set (in 22.5° increments)

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