SUNRISE MEDICAL

Empulse

E|M90

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

P/N 257555 Rev. D

EMPULSE® M90™

General Manual
Joystick Controller

Instructions for Use

SUNRISE MEDICAL LISTENS

Thank you for choosing the Empulse® M90™. 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 Medical authorized dealer. Please feel free to write or call us at the address and telephone number below:

SUNRISE MEDICAL (US) LLC
Customer Service Department
12002 Volunteer Blvd.
Mount Juliet, TN 37122, USA
Tel: 1-800-333-4000

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 M90.

You can also register your product at:
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 USER INFORMATION

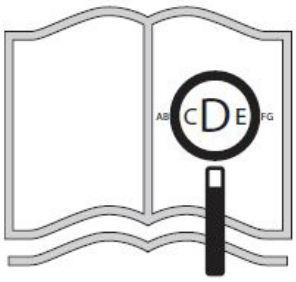
Congratulations on choosing a Sunrise Medical Empulse® M90™. Our device provides electronic power to manual wheelchairs through a retrofitted wheel enabling the user to reduce the manual power needed to move their wheelchair. Our high-quality mobility products are designed to enhance your independence and make your everyday life easier.

NOTE: The Empulse M90 will be referred to as the M90 throughout this document.

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 M90.

All dimensions are approximate and may be subject to change. The intended lifetime of the M90 is five (5) years.

Please DO NOT use or fit any third-party components to the M90 unless they are officially approved by Sunrise Medical. Only use Original Equipment or Equipment officially approved by Sunrise Medical. Only assemble the control unit dock as instructed by an authorized occupational therapist. Only original equipment is to be used with the M90. Discontinue use of damaged equipment. Avoid creating a trip hazard when plugging in charging cables. Avoid entanglement of charging cables with the M90. Always check for warnings displayed via M90.



If you are visually impaired, this document can be viewed in PDF format at **www.SunriseMedical.com**

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)

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**

1.3 Symbols used in this manual

⚠ DANGER!
Potential risk of serious injury or death

⚠ CAUTION!
Potential damage to equipment

⚠ WARNING!
Potential risk of injury

NOTE:
General user advice

WARNING!
Potential risk of finger entrapment

Tips or special information

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

1.4 Acronyms

LED: Light-Emitting Diode

OE: Original Equipment

M90 Techtool: The M90 has several parameters that can be tuned. The tuning parameters are to be set in conjunction with a Sunrise Medical authorized dealer.

Follow safety instructions carefully. Not paying careful attention to these instructions may result in injury to the user or environment. It may also result in damage to the device. Safety information is provided in this chapter and where relevant throughout the user manual.

2.1 Safety: Symbols and Labels used on the Product

	The Regulatory Compliance Mark (RCM).
	Keep Device Dry.
	Storage temperature ranges apply for device.
	Maximum rated incline.
	Maximum total mass inclusive of wheelchair mass, occupant mass, and accessories.
	Refer to instruction manual/booklet.
	Manufacturer's address.
XXXX-XX-XX	Date of Manufacture.
	Wheelchair is not to be used as a seat in a motor vehicle.
UDI	Unique device indicator located adjacent to this symbol.
MD	This symbol means medical device.
SN	Serial number.
EC REP	European Authorized Representative.
	Wheelchair is not to be driven while engagement cam is in free-roll position. Refer to user manual.
	Electrical device, thus, is not suitable for general waste disposal.
CE	The Conformité Européene. Indicating device has been tested to the applicable regulatory standard for sale in the EU.
	Device contains Li-ion battery and thus care must be taken when disposing of device. The device must be taken to a battery recycling facility.
	MR unsafe.

Note: Observe these warning and caution symbols throughout the manual to avoid damage to person, environment, and device.

ISO 7010-M002
Instruction manual/booklet must be read!
(Blue Icon)

2.2 Induction

⚠ WARNING!

Do not use the M90 before you have been properly instructed on their handling and operation by a Sunrise Medical authorized dealer. Failure to do so may result in damage to person, environment, or device.

2.3 Safety: Abnormal Behavior

⚠ WARNING!

Do not operate the device when observing abnormal behavior.

2.4 Safety: Weight Range

⚠ WARNING!

The maximum user weight is 120kg (265 lbs). Exceeding Max user weight will reduce performance, void warranty, and may damage the product.

2.5 Safety: Maximum Speed

⚠ WARNING!

Maximum speed is 6 km/h (3.7 MPH).

Please Note: When travelling on inclines, maximum speed may vary depending on user weight and slope angle.

2.6 Safety: Battery Charging

⚠ WARNING!

1. Only use original manufacturer equipment to charge batteries.
2. Only use Lithium-Ion original manufacturer equipment batteries.
3. Do not use original manufacturer equipment to charge other batteries.
4. Do not continuously charge batteries for more than 24 hours. Charge batteries indoors only.

2.7 Safety: Battery Usage

⚠ WARNING!

Do not use any other battery other than the battery supplied with the device or batteries purchased in surplus. Only use OE batteries with the device.

2.8 Safety: Vehicle Safety

During motor vehicle transportation, where the M90 is to be combined with a wheelchair used as a passenger seat in a motor vehicle, the M90 may only be combined with a wheelchair that has the required safety approval to be used as a seat in a motor vehicle.

3 INTENDED USE OF THE DEVICE

3.1 Indications for Use

The Empulse M90 is intended to be used to provide power assistance to manual wheelchair users who are limited in their field of activities because of their physical conditions. It is designed to augment or replace the manual propulsion provided by the user, reducing the effort required by the user to propel the wheelchair.

3.1.1 Intended Use

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 M90 is a medical device intended to provide electronic power to manual wheelchairs through retrofitted wheels. The Empulse M90 is a class A power assist wheelchair. The M90 is intended for slopes up to 6 degrees.

The device is designed for active wheelchair users who have adequate cognitive and physical ability to safely operate the wheelchair with the M90 attached. This extends to being competent in all possible conditions, while also having the ability to manually stop and slow the wheelchair down in the event of the M90 electronic brakes failing.

3.1.2 Dimensions

The Empulse M90 is retrofittable to existing wheelchairs. Retrofitting your wheelchair with the M90 in most cases will not change the dimensions of your wheelchair. In rare cases, it may increase the total width of your chair by up to 50mm (2-in).

The M90 will add a total of 10.6kg (23.4 lbs) to the weight of your wheelchair. *Measurement excluding battery and charging component weight.

The turning circle of the M90 is dependent on the specific wheelchair the M90 has been retrofitted to.

The M90 will not interfere with any dismountable configurability that the retrofitted chair previously possessed.

CCP-01-08-001 WHEELCHAIR 24 SYSTEM (Wheel assembly x2)
- Size: 610 x 99.35mm (24 x 3.9 in)
- Weight: 5.3 kg (11.7 lbs)
- Material: Aluminum PC Black/ABS

CCP-01-08-007 WHEELCHAIR AXLE 0.5 INCH ASM (QR Axle x2)
- Size (overall): 143.50 x 28 mm (5.7 x 1.1 in)
- Weight: 0.11 kg (.25 lbs)
- Material: Aluminum PC Black/Stainless steel

CCP-01-08-013 BATTERY ASM (Battery x2)
- Size (overall): 164 x 68 x 66 mm (6.5 x 2.7 x 2.6 in)
- Weight: 0.6 kg (individual)
- Material: ABS

CCP-01-08-014 JOYSTICK ASM (Control unit x1)
- Size (overall w/ standard handle): 135 x 79 x 60 mm (5.3 x 3.1 x 2.4 in)
- Size (overall w/ Joystick): 135 x 52 x 60 mm (5.3 x 2.1 x 2.4 in)
- Weight: 0.17 kg (.4 lbs)
- Material: ABS/ TPE

CCP-01-08-015 DOCK LEG ASM (Leg strap dock x1)
- Size (overall excluding strap): 24 x 67 x 111 mm (.9 x 2.6 x 4.4 in)
- Weight: 0.04 kg (.1 lbs)
- Material: ABS

CCP-01-00-021 DOCK ARM REST ASM (Fix-to-arm dock x1)
- Size (overall): 24 x 67 x 111 mm (.9 x 2.6 x 4.4 in)
- Weight: 0.04 kg (.09 lbs)
- Material: ABS

CCP-01-08-024 CHARGING DOCK ASM (Charging dock QTY 1)
- Size (overall): 43 x 176 x 181 mm (1.7 x 6.9 x 7.1 in)
- Weight: 0.45 kg (.99 lbs)
- Material: ABS

CCP-01-08-025 POWER SUPPLY ASM (Wheel battery charger QTY 1)
- Size: 180 mm x 65 diameter (7.1-in x 2.6-in (diameter))
- Weight: .75 kg (1.65 lbs)
- Material: PC/ PVC

CCP-01-08-020 JOYSTICK CHARGER (Control unit charging cable QTY 1)
- Size: 80 mm x 25 diameter (3.1-in x .1-in (diameter))
- Weight: 0.025 kg (.05 lbs)
- Material: PVC

3.1.3 Curb Height

The Empulse M90 will not affect the curb height that the retrofitted wheelchair could previously climb.

3.1.4 Tuning Parameters

The Empulse M90 has several parameters that can be tuned. The tuning parameters are to be set in conjunction with a Sunrise Medical authorized dealer.

Note: A user must be instructed in handling and operating the device before use. A training session should be arranged through a Sunrise Medical authorized dealer.

Note: If the operator is likely to deteriorate further due to their condition, this needs to be handled very carefully. Further mitigation requires the operator to gain access to a caregiver, such that they are no longer an operator and are instead an occupant. Thus, it is critical for the operator to have professional recommendation regarding their ability to operate the M90, inclusive of how to manage potential future risks that their condition may introduce over time.

The maximum user weight shall not exceed:
Max User weight is 120kg (265 lbs).

⚠ WARNING!

Exceeding Max user weight will reduce performance, damage the product, and void warranty. Use of any un-authorized features will void warranty.

Note: Exceeding the weight limit will void warranty.

3.1.5 Maintenance

The M90 is to be taken to a Sunrise Medical authorized dealer for maintenance and service once per year. This guideline interval may vary with the product's degree of utilization and the behavior of a user. Ultimately, the degree of use and user behavior is the responsibility of the operator, and therefore the need for maintenance should be assessed accordingly.

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. An attendant may only assist a user when the M90 is in Free-roll mode.

Note: Do not attempt to push a user while the electronic braking is on.

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. Drive within one's own ability when in Free-roll mode. Take caution as there is added weight compared to the user's traditional system.

There will always be circumstances that will result in the M90 experiencing failure. Excessive falls, outdoor terrain, sand etc. are not to be attempted via the M90. The M90 is designed to accommodate foreseeable misuse within the scope of a class A wheelchair. Wheelchairs are intended for driving on flat horizontal surfaces and gentle slopes.

The drive pin is not to be disengaged in usual operation. However, in the event of an emergency, or need to revert to manual wheelchair control, the drive pin can be disengaged via the engagement cam. Use the emergency stop facility to stop/prevent erratic or unexpected behavior. (Fig. 3.1)

There are general wear components such as tires, operating elements (e.g., handles), or batteries (e.g., bearings and belts) used in the M90. Safe operation requires prescribed 1-year interval servicing by a Sunrise Medical authorized dealer to maintain general wear components.

3.3.1 Safety: Wheels

⚠ WARNING!

Only tires provided by a Sunrise Medical authorized dealer are to be used on the device. Other types of tires are prohibited. If you have a punctured tire, please contact a Sunrise Medical authorized dealer.

Statistics in this Owner's manual refer to testing conducted using pneumatic tires. Statistics stated will differ when using alternative tires. This must be taken into consideration.

3.3.2 Safety: Anti-tip Wheels

⚠ WARNING!

1. It is recommended to not use M90 without anti-tippers. The anti-tip device is important for your safety and prevents you from tipping backwards in case of high acceleration on a steep slope.
2. If the anti-tip blocks other parts of your own wheelchair, please contact your Sunrise Medical authorized dealer. Consult your clinician for an assessment of individual capability to use device without anti-tippers.

3.3.3 Safety: Stopping Distance

⚠ WARNING!

Stopping distance on slopes can be significantly greater than on level ground. Reduce speed and take caution when travelling down hill.

3.3.4 Safety: Sudden Stop

⚠ WARNING!

1. The device may stop suddenly when exceeding load capacity.
2. The wheelchair may stop suddenly when exceeding maximum slope rating, exceeding weight limit, on rough terrain, or prevailing drive conditions.

3.3.5 Safety: Caster Wheels

⚠ WARNING!

Using the M90 on wet grass, without an adequately prescribed caster wheel, may affect performance and create risk of tip-over.

3.3.6 Safety: Quick Release Axle

⚠ WARNING!

Before each use of your device, ensure the M90 is locked in by the quick release axles. Do this by attempting to remove the M90 without pressing the axle button.

Note: Only use an original equipment QR axle or a QR axle prescribed by a Sunrise Medical authorized dealer. Failure to do so may result in damage to person, environment, or device.

3.3.7 Safety: Pairing

⚠ WARNING!

Each M90 is paired to a single control unit. Do not attempt to pair your control unit with another user's set of wheels. If your control unit is damaged or lost, please contact a Sunrise Medical authorized dealer

3.3.8 Safety: Tampering

⚠ WARNING!

DO NOT attempt to open the M90. The removal of void and/or compliance labels will result in voided warranty. Tampering with your device may result in damage to person, environment, or device.

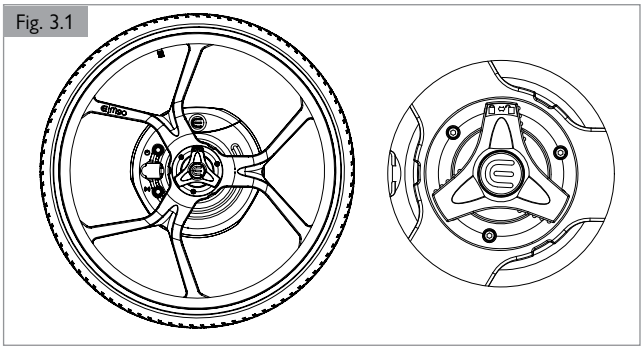
3.3.9 Safety: Engagement Switch

⚠ WARNING!

Note: The M90 can be placed in Free-roll mode at any time by rotating both engagement switches. Use engagement switches to switch into Free-roll mode if the M90 is unresponsive. (Fig. 3.1)

The engagement switch should be re-engaged before the occupant is left unattended or attempts to operate the wheelchair.

Fig. 3.1



3 INTENDED USE OF THE DEVICE

3.3.10 Safety: Pinch Points

⚠ WARNING!

Beware of pinch points. The device has several moving parts. Beware of pinch points between the spokes and device hub. Also be aware of pinch points between spokes and the wheelchair.

NOTE: Ensure the device is switched off when removing batteries to avoid potential pinch points.

3.3.11 Safety and Security: Contraindications

⚠ WARNING!

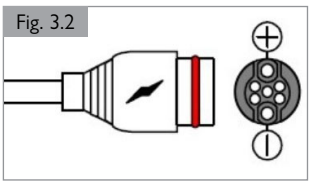
1. If you are under the influence of medicines that can have an effect on your ability to operate the device, you are not permitted to use the device.
2. Adequate vision is required in order to safely operate the device in the user situation concerned.
3. Not more than one person at a time can use the device.
4. Do not allow children to use the device unsupervised.
5. The Control Unit dock, Left hand side M90 Wheelchair Bracket, power supply plug and charging sockets in wheels and charging dock contain permanent magnets. These elements of the device must not come within 6 inches of other magnetically susceptible medical devices.
6. Ensure device is kept out of reach of unauthorized individuals. Ensure only the devices contained in M90 System View are connected to the device.
7. Ensure OTA updating mode is entered in an isolated environment. Do not allow unauthorized updates of medical device firmware to be installed.

3.3.12 Safety: Charging Connector Pin Assignment

⚠ WARNING!

Connector pin assignment is directed by magnets in the charging socket and power supply. (Fig. 3.2)

Fig. 3.2



3.4 Area of Application: Environment

⚠ WARNING!

This device has been designed to accommodate indoors and outdoors; care facilities and private residences. 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, or near cliffs or sudden terrain or ground elevation changes, including adjacent to open water. 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.

Reduce speed when cornering and/or cornering on a slope. Reduce speed when a clear path is not visible to avoid unforeseen obstacles. Maintain perspective of upcoming surface terrain. Avoid parking close to a hazard. Hence, inadvertently bumping the control unit will not put the user at risk.

NOTE: Avoid using the Outdoor profile in confined or inappropriate areas.

3.4.1 Safety: Temperature Range

3.4.1.1 Wheel

- Optimal Temperature: 0 to 30°C (32 to 86°F)
- Minimum Temperature: –10°C (14°F)
- Maximum Temperature: 40°C (104°F)

⚠ WARNING!

Note: Operating at greater than 30°C (86°F) may have adverse effects on motor performance including overheating. Less than 0°C (32°F) may have adverse effects on battery performance, with more frequent charging required.

3.4.1.2 Battery

- Operating Temperature Range: 0 to 55° C (32 to 131°F)

⚠ WARNING!

Do not use the battery outside of the operating range. This will have adverse effects on performance and may cause damage.

3.4.2 Safety: Ground Type

⚠ WARNING!

Avoid using the M90 on soft ground such as loose chips, gravel, mud, ice, wet grass, sand, snow, or deep puddles. Such conditions may affect performance and may result in wheelchair toppling over. Do not attempt to traverse debris. Maintain awareness of gaps in terrain. Maintain consistent terrain under all wheels. Avoid terrain near cliffs or other significant ground elevation changes, including adjacency to open water, all of which reduce the User's ability to take mitigating actions in case of unforeseen events or malfunction.

3.4.3 Safety: Maximum Slope

⚠ WARNING!

Tested to 6° slopes. Reduce speed when commencing or traversing a downward slope.

NOTE: Performance tested at minimum speed setting of 1.5Km/h.

NOTE: When travelling downhill the maximum speed will be electronically limited for safety depending on the gradient of the hill. If user wishes to travel faster, device can be switched into manual mode.

3.4.4 Safety: Weather Conditions

⚠ WARNING!

1. Adapt wheelchair speed for wet ground conditions – wet wheels may affect grip and result in slipping. Adapt driving behavior accordingly and never drive with worn tires. Reduce speed in wet conditions.
2. Use caution when operating push rims in wet weather. Account for loss of grip by using adherent gloves or using the control unit instead.

3.4.5 Safety: Escalators or Moving Walkways

⚠ WARNING!

Do not use the M90 on escalators or moving walkways.

3.4.6 Safety: Railroads and Tram Tracks

⚠ WARNING!

Please take caution when traveling around and/or over railroads or tram tracks.

3.4.7 Safety: Water Ingress

⚠ WARNING!

1. Do not submerge wheels under water. The M90 is Ingress Protection rated 64, dust tight and water splashes from any angle. It is not designed for any further liquid ingress including sea water, temporary submersion, or permanent submersion.
2. The M90 may deteriorate quicker when not stored appropriately in a dark, dry, and protected location.

3.4.8 Safety: Sunlight

⚠ WARNING!

When not in use, do not expose M90 to strong sunlight for long periods of time. This could cause the motor to heat up and not be able to operate at full power. The push rim or chassis will become too hot to use and potentially burn the user. The materials of the device may also discolor and deteriorate quicker when not stored appropriately in a dark, dry, and protected location.

3.4.9 Safety: Tire Pressure

⚠ WARNING!

1. Ensure that tires maintain recommended pressure, which is between 85-145 psi (586-1000 Kpa).
2. Operating device on sharp surfaces can cause a reduction in tire pressure and result in unintended movement. Overinflating tires beyond recommended pressure can adversely affect control of device.

NOTE: Users should follow the specifications printed on the tires. Some users will use their own tires.

3.4.10 Safety: Obstacles

⚠ WARNING!

Do not attempt to overcome obstacles you are not experienced in or have trouble when traversing with a manual wheelchair. Always be aware of upcoming terrain.

NOTE: You can switch to freewheel mode to overcome obstacles in the same fashion as a manual wheelchair.

3.4.11 Safety: Public Transport

⚠ WARNING!

When using public transport, please follow procedures outlined by the public transportation staff and markings on how to safely commute.

NOTE: Failure to follow instructions may result in damage to person, environment, or device.

3.4.12 Safety: Unattended Chair

⚠ WARNING!

Do not leave your chair unattended around children or public places. Your chair may be designed for an adult user. A child is not trained in operating the chair and may cause damage to person, environment, or device.

3.4.13 Safety: Choking Hazard

⚠ WARNING!

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

3.4.14 Safety: Lifting the device

⚠ WARNING!

Lift the device only when disassembled. Lifting the device when assembled may damage the device or cause injury to the user.

3.4.15 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.

3.4.15.1 Safety: 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).

3.4.15.2 Safety: What effect can EMI have?

⚠ WARNING!

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

3.4.15.3 Safety: 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.

3.4.15.4 Safety: MR unsafe

⚠ WARNING!

Device poses unacceptable risks to the patient, medical staff, or other persons within a MR environment.

3.4.15.5 Distance from the source

⚠ WARNING!

1. 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. This device may be susceptible to interference from diathermy and electrocautery equipment. Exercise caution when operating near such equipment, as it may affect device functionality.

3.4.15.6 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: M90 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.

3.4.15.7 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.

3.4.15.8 EMI from device

⚠ WARNING!

The device itself can disturb the performance of electromagnetic fields such as emitted by alarm systems of shops.

3.4.16 Radio Communication Regulations

The device is compliant to radio communication regulations dictated by the European Union and Australian regulatory bodies, and as such, the device has been formally proven to be safe with respect to radio communications testing and electromagnetic compatibility.

The device is exempt from FCC authorization for use in North America.

3.4.17 Wireless remote control

⚠ WARNING!

1. Your device utilizes wireless remote control to communicate between the Control Unit and the Wheels. It is intended for use in environments that do not have unsatisfactory levels of EMI, as noted above. Use of the device may be impacted during use in abnormally cramped and/or metallic or ferro-concrete spaces due to signal degradation.
2. Your device wireless connection is range-limited to less than 10 meters (typical, depending on environmental factors) in order to localize control. Do not attempt control of your device when not in close proximity to it, otherwise unpredictable results may arise.
3. You should promptly report any poor wireless remote control performance. Be sure to indicate whether there was a radio wave source near your device at the time, and describe the surrounding environment's composition. Contact: Sunrise Medical, Customer Service Department.

3.4.17.1 Wireless operating modes

⚠ WARNING!

Your device will only operate for driving purposes when the wireless remote control is enabled. Battery charging is possible when wireless remote control connections are not made.

3.4.17.2 Wireless connection and security

⚠ WARNING!

1. Connection of your device to other wireless systems is not supported. Industry-standard security measures are applied to prevent other system types and users of other similar devices access to your device.
2. Your device does not store any personal/patient data. Any data stored is purely device performance related and is anonymous in nature.

3.4.17.3 Wireless risks and performance

⚠ WARNING!

1. Your device includes an industry-standard radio system configured with a robust data exchange algorithm to enhance reliability and responsiveness of the remote control when driving. If degradation of this remote control occurs, protective mechanisms are in place to help ensure that the device maintains personal safety. Such mechanisms include signal strength monitoring, data corruption detection, and command timeouts.
2. You should promptly report any poor wireless control unit performance. Be sure to indicate whether there was a radio wave source near your device at the time, and describe the surrounding environment's composition. Contact: Sunrise Medical, Customer Service Department.

3.4.17.4 Software update proces

1. Download the Empulse M90 app from your device's app store.
2. Open the app and follow the on-screen instructions to connect it to your M90.
3. Navigate to the app settings to check if a software update is available for the M90.
4. If an update is available, follow the in-app instructions to complete the update process.

3.4.18 Safety: Power Supply

⚠ WARNING!

Use power supply in dry locations only.

3.4.19 Safety: Charging

⚠ WARNING!

1. Explosive gases can be generated while charging. Remove all components away from sources of ignition such as flames and sparks.
2. Charging is carried out with the wheelchair in a space at least twice its volume with sufficient ventilation so that there is no hazard due to build-up of flammable gas.
3. Do not carry the power supply on wheelchairs.

4 DESCRIPTION OF DEVICE

Standard Options

The Empulse M90 comes standard with:

- 2x Wheels
- 2x Wheel Batteries
- 1x Control Unit
- 1x Power Supply and Charging Cables for Wheel Batteries
- 1x Control Unit Charging Cable
- 2x Control Unit Mounts
- 2x Quick Release Axles
- 1x Retrofitting Kit
- 1x Owner's Manual
- 1x Battery Docking Charger

Fig. 4.1

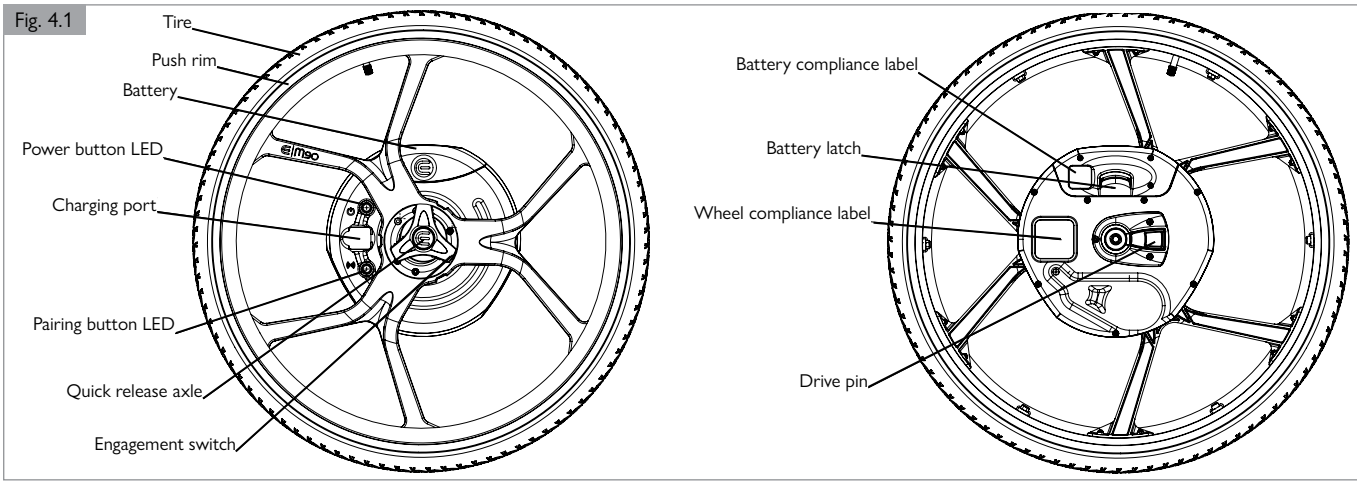


Fig. 4.2

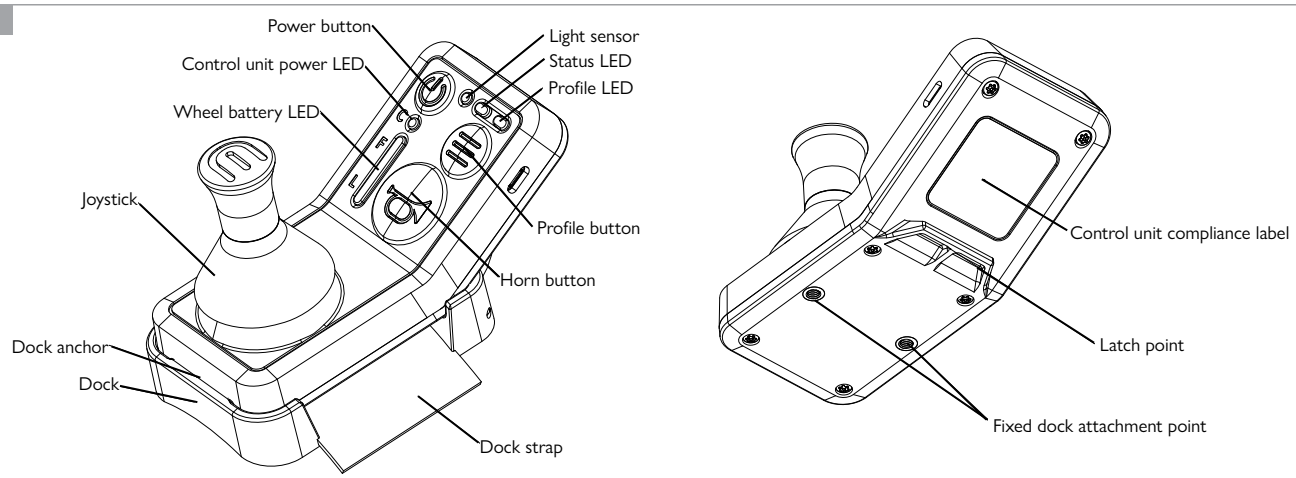


Fig. 4.3

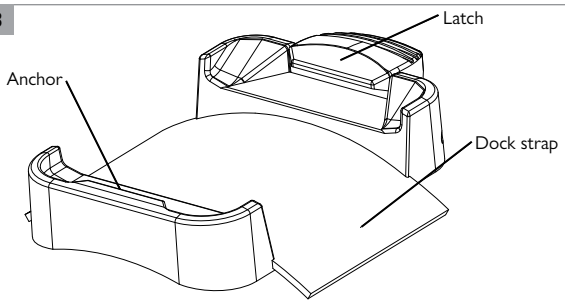
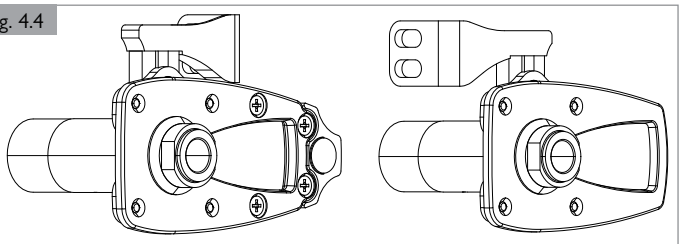
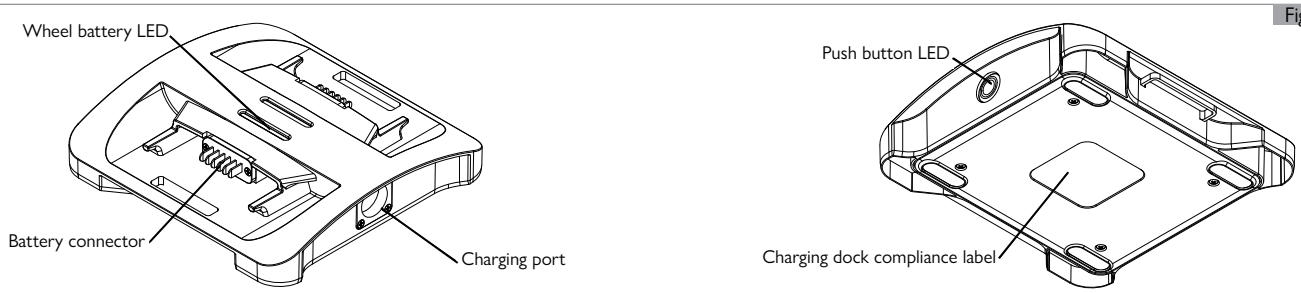


Fig. 4.4



Note: Depending on chair model the M90 brackets may look different than the one pictured.

Fig. 4.5



* Included but not pictured M90 control unit charging cables, M90 battery power supply, and power supply cable.

Prior to operating the Empulse M90, please conduct a thorough inspection of the device for safety:

5.1 Check Clothing Entrapment

When operating the device, please 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.

⚠ WARNING!

Potential clothing entrapment.

5.2 Check Wheelchair Brackets

Check wheelchair brackets are firmly in place on the wheelchair. See Chapter 6 for reference on how the bracket is secured to the chair.

Ensure the magnet on the left-hand-side bracket is free of debris.

5.3 Check Wheelchair Brakes

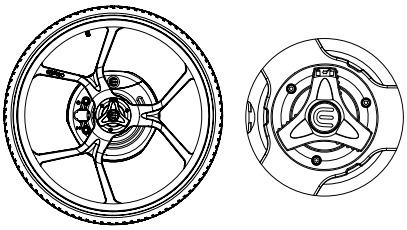
Check manual wheelchair brakes are free of debris and are functioning correctly.

5.4 Check for Foreign Objects

⚠ WARNING!

Check for foreign objects in/around the M90. Ensure the battery, quick wheel release/engagement cam and spokes are free of debris. (Fig. 5.1)

Fig. 5.1



5.5 Check Tires

⚠ WARNING!

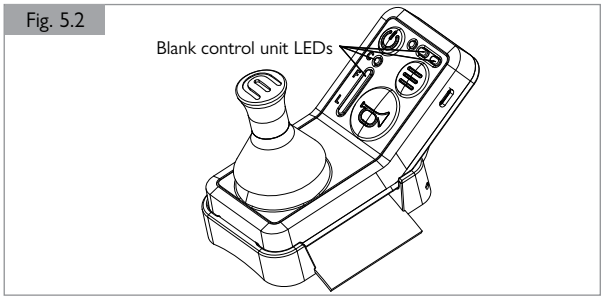
1. Check the air pressure in the tire is inflated to between 85-145 psi (586-1000 Kpa).
2. Schwalbe RightRun Plus Tires: Puncture resistance is maximized when the wheel is vertical and diminishes with the amount of camber.
3. It is recommended to use an automatic pump for tires to avoid injury.
4. Check tire wear. If tire is overly worn and/or there is a loss of traction, then replacement of the device tire is recommended.
5. Follow the specification on the tire if you have replaced or are using non-stock tires.

5.6 Check Control Status

⚠ WARNING!

1. Check the device is switched off before entering/exiting.
2. Ensure the control unit LEDs are blank. (Fig. 5.2)

Fig. 5.2



5.7 Inspection: Batteries

⚠ WARNING!

1. Check that the batteries are sufficiently charged for operation. Before using your device for the first time, charge your batteries for a period of 24 hours. Full charge on the wheel batteries is indicated by two solid purple LEDs. Full charge on the control unit is indicated by the control unit power LED displaying a solid purple light.
2. Sunrise Medical can provide additional or replacement batteries if required. Contact your Sunrise Medical authorized dealer if another battery is required.
3. Refer to chapters 9 and 11 for the proper care, use, and maintenance of the battery and charger.
4. See Chapter 3, section 3.4 for battery warnings.

5.8 Inspection: Function

Check there are no cracks or functional faults on device.

5.9 Inspection: Control Unit

⚠ WARNING!

Check control unit can freely move and is free of debris. If control unit is jammed or unable to adjust, the device may move unpredictability resulting in damage to person, environment, or device.

6 MOUNTING SETUP

6.1 Setup

Before You Begin

A Sunrise Medical authorized dealer needs to install the M90 bracket on your wheelchair. This bracket connects the M90 to your chair and lets you use both M90 and regular manual wheels. Refer to the bracket's packaging for detailed instructions or visit: www.SunriseMedical.com.

NOTE: Each wheelchair must be matched with its specific M90 bracket model.

The following instructions outline universal requirements that apply to all brackets and wheelchair types. Regardless of the chair model, these steps must be followed in the order listed.

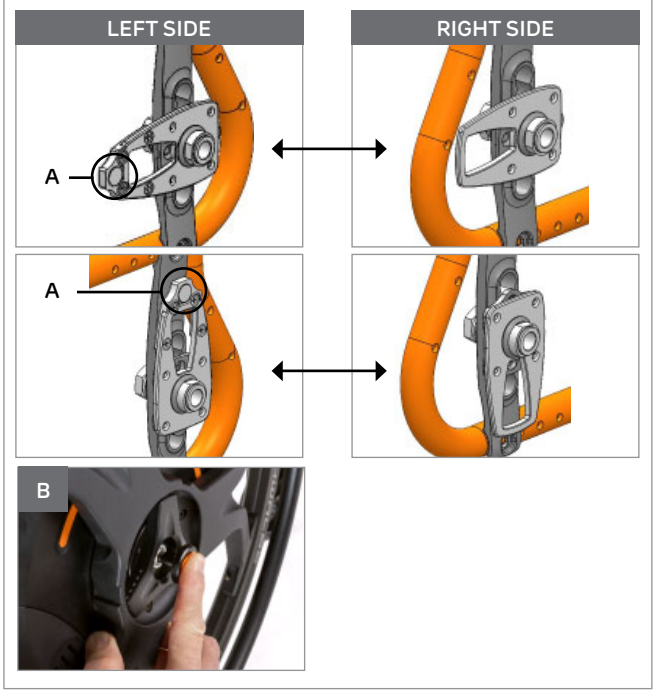
6.1.1 Mounting Bracket Installation (Fig. 6.1)

Each bracket is specific to the wheelchair make/model and must match the chair. The bracket kit includes chair specific installation instructions.

1. The bracket with the magnet (A) will be installed on the LEFT SIDE of the wheelchair.
2. Orient the magnetic bracket so the magnet faces either toward the front of the chair or straight upward, as instructed in the chair-specific installation instructions.
3. Install the RIGHT SIDE bracket in the opposite orientation of the LEFT SIDE bracket.
4. Torque all mounting hardware to the specifications provided in the bracket installation instructions.
5. Insert the quick release (QR) axles into the center hub of each M90 wheel. (B)
6. Install the M90 wheels onto the chair to confirm proper fit. If the QR axle does not fully lock (ball bearing does not extend completely), adjust axle length using a 19 mm and 11 mm wrench.
7. Check wheel locks and adjust if necessary. Wheel locks may require adjustment if the wheel width or diameter changes when installing the M90.

IMPORTANT: Wheel lock adjustment must be completed by a Sunrise Medical authorized dealer to ensure compliance with medical safety standards.

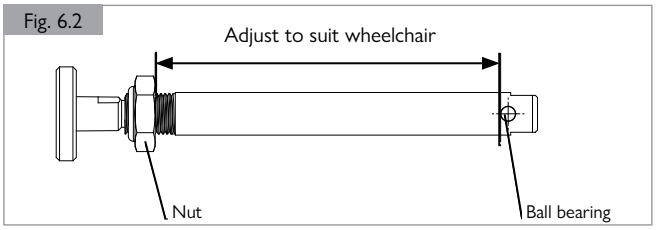
Fig. 6.1



6.1.2 Quick Release Axle Length

Quick Release axles must be adjusted so the ball bearing fully extends when the axle is inserted. Use a size19mm and 11mm wrench to adjust length of QR axle. This is measured as the distance from nut to ball bearing. (Fig. 6.2)

Fig. 6.2



⚠ WARNING!

1. Do not use this chair UNLESS you are sure that both quick-release rear axles are locked.
2. An axle is not locked until the quick-release button pops out fully.
3. An unlocked axle may come off during use, resulting in a fall, tip-over, or loss of control and cause severe injury to the rider or others.
4. Quick-release axles should be periodically cleaned and inspected for function and signs of wear or bending. Replace as necessary.

If you fail to head these warnings damage to your chair, a fall, tip-over, or loss of control may occur and cause severe injury to the rider or others.

6.1.3 Wheel Lock Adjustment

Check if wheel locks need adjusting. Wheel locks will need adjusting if adding the M90 adds to wheel width position or there is a change in wheel diameter. A medically compliant wheel lock must be used and fitted by a Sunrise Medical authorized dealer.

6.1.4 Calibration (Fig. 6.3)

M90 wheels should be calibrated before first use. Calibration is needed during initial setup or when switching to a different chair. Calibration sets slope and hill thresholds for optimal performance.

IMPORTANT — BEFORE YOU BEGIN, ENSURE:

- The mounting brackets and wheels are properly installed.
- The M90 docking pins are securely locked in the mounting brackets and the wheelchair's wheel locks are engaged.
- The batteries of both the wheels and the controller are fully charged.
- The wheelchair is on level ground.

Follow steps 1–5 on both the left and right wheels, completing each wheel one at a time.

1. Remove the battery on the M90 wheel.
2. Press and HOLD either button on the M90 wheel while reinserting the battery.
3. When the lights turns ORANGE release the button.
4. Wait until the lights turn WHITE and then GREEN.
5. When the lights are GREEN, remove and reinsert the battery. The wheel will beep to confirm the calibration was successful.
6. Repeat steps 1–5 on the other wheel.
7. Remove and swap wheels to the opposite sides and repeat steps 1-6.

NOTE: You will complete calibration steps 1–6 four times—once for each wheel in both left and right positions.

6.1.5 Device Set Up Using the M90 App (Fig. 6.4)

1. Download the Empulse M90 app from your device's app store. (C)
2. Open the app and follow the on-screen instructions to connect it to your M90.
3. Select RIDER WEIGHT Category when prompted. Rider Weight can also be adjusted later in the app's Settings menu.
4. On the app HOME SCREEN, select the preferred DRIVE PROFILE between, Base, Standard and Max. Each DRIVE MODE in indoor and outdoor can be set up with the below profiles: (D)
   BASE: Provides the least reactive settings, perfect for individuals new to power assist or those preferring a more relaxed and controlled ride.
   STANDARD: A balanced profile that combines speed and responsiveness. Recommended as the starting point for most users.
   MAX: Offers the most sensitive and responsive performance, ideal for experienced riders seeking an active and dynamic power assist experience.
5. App SETTINGS provide access to key adjustments, including rider weight category, drive mode restrictions, default drive mode, and a summary of current drive profiles.

6.1.6 Charging the M90 (Fig. 6.5)

1. The charging port for each M90 wheel is located between the wheel LED's. To access the charging port lift the silicon cover by pulling the tab. (E)
2. Ensure the M90 charger is plugged into an outlet and power is being provided.
3. When plugging the charger connector into the M90 wheel ensure the lightning bolt symbol is aligned with the orange triangle indicator on the M90 wheel. The magnetic force will assist in correct alignment.
4. Charging is indicated by the M90 wheel LEDs FLASHING PURPLE (F). Leave batteries to charge until both wheels display two SOLID PURPLE LEDs, indicating full charge.
5. When charging is complete, remove the charger and press silicone cover back in place.

Fig. 6.3

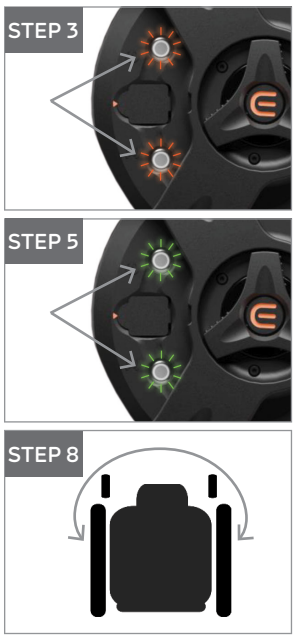


Fig. 6.4

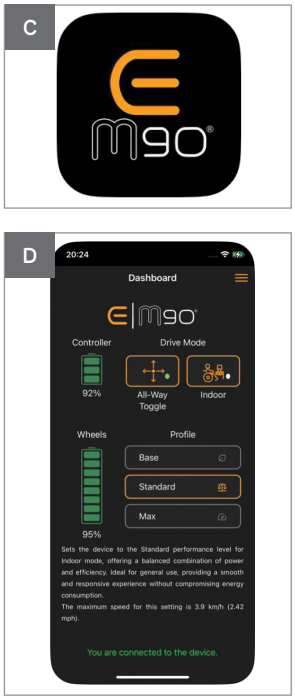
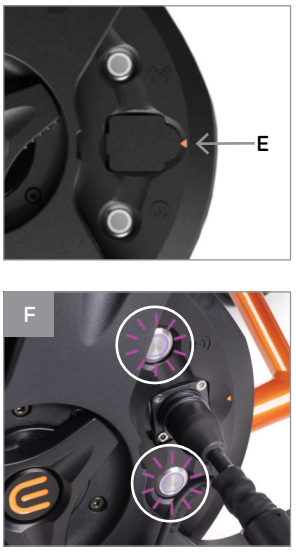


Fig. 6.5



7 DEVICE SET UP

7.1 Instructions For Use

Follow the steps below to begin using your M90.

NOTE: Before setting up your device, ensure yourself and the chair are in a safe position, on flat ground and using the wheelchair's manual parking brake.

7.1.1 Insert Battery

Insert battery on each side of the wheel (Fig. 7.1), ensuring 'click' of latch is heard (Fig. 7.2).

⚠ WARNING!

1. If the batteries are not 'clicked in' correctly, they may fall out. Double check batteries are inserted correctly.
2. Wheels will be in a sleep state until the control unit is turned on.

Fig. 7.1

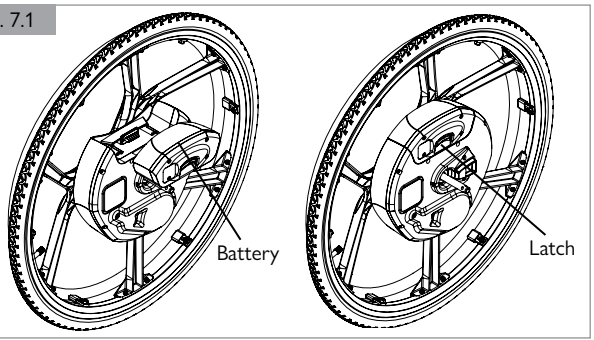
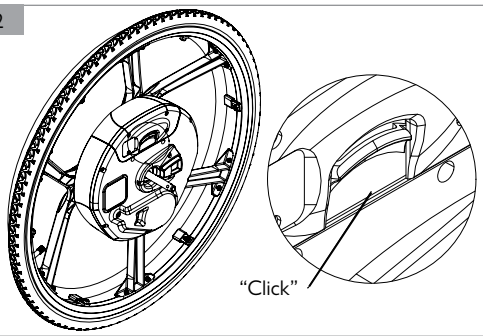


Fig. 7.2



7.1.2 Attach Wheels to Chair

Attach wheels to your chair by sliding the axle into the M90 bracket attached to the chair while pressing down on the M90 axle button.

Ensure quick release axles are correctly engaged by attempting to remove the wheel without pressing the axle button.

The wheels are not Left and Right specific. They will detect a magnet in the LHS M90 bracket and determine left and right once inserted into the chair, and the battery is attached.

If using a controller dock strap continue reading, otherwise skip to step 7.1.4.

7.1.3 Controller Dock

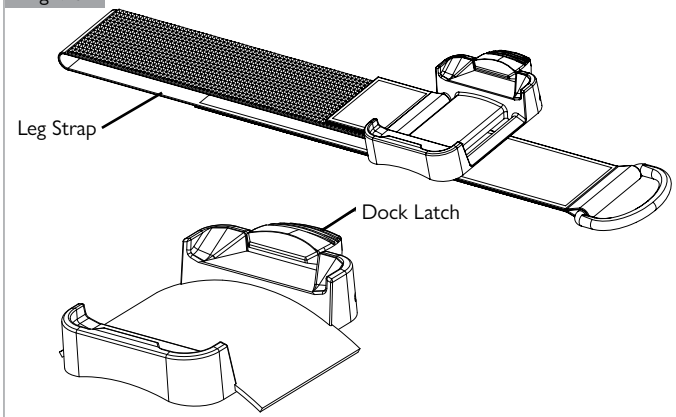
There are two docking options for the M90. The Strap Dock, a dock that utilizes a strap to attach to your body and the mounted dock, a dock which utilizes two bolts to attach to a controller mount. See Fig 7.3 for reference.

7.1.3.1 Leg Strap Dock

Strap controller dock to your preferred arm or leg by wrapping the strap around your limb and fastening with the hook and loop fasteners. (Fig. 7.3)

Ensure the strap is NOT wrapped over bare skin. Wrap the strap over clothing.

Fig. 7.3



7.1.3.2 Frame Mounted Dock

This dock is designed to attach the controller to the wheelchair's frame.

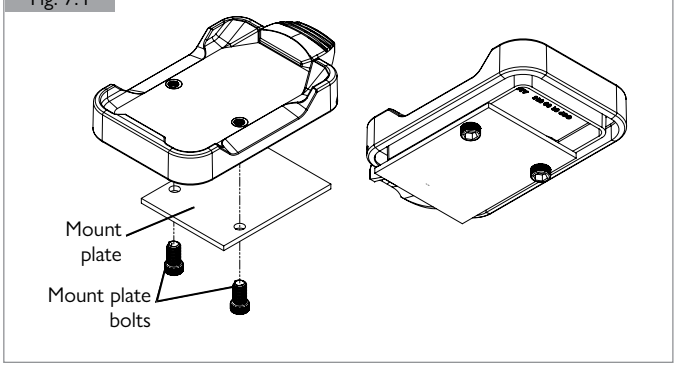
1. Attach the mounting dock to the frame attachment by using the mount plate bolts. Torque to 6.3 Nm [55.8 in-lbs]. (Fig 7.4)
2. Attach the frame mounting hardware to the wheelchair frame with a 5mm allen wrench.
3. To adjust the angle to the desired location, loosen the two small screws with a 2.5 mm allen wrench. Once aligned to the preferred angle tighten the two screws.
4. Insert the frame attachment into the frame mounting hardware until you feel a click. The mount should be secure but still removable by pulling straight up on controller.
5. Ensure the controller can be easily accessed by the wheelchair user. Adjust the position on the frame as needed.

⚠ WARNING!

Only use the mounted dock on a controller mounting approved by a Sunrise Medical authorized dealer.

Attach the mounted dock by using the mount plate bolts. Torque to 6.3 Nm [55.8 in-lbs]. (Fig. 7.4)

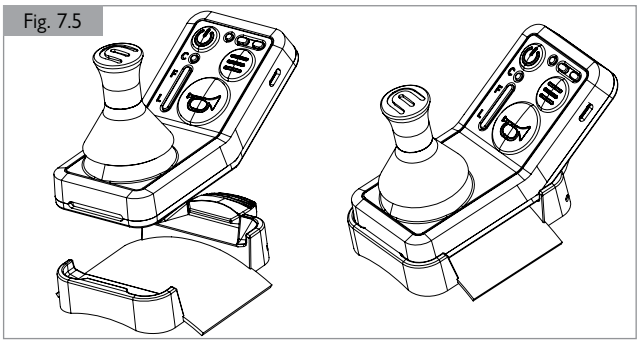
Fig. 7.4



7.1.4 Control Unit

Attach the control unit to the dock by sliding the bottom side of device in first and then lock in place by pushing down on the dock latch to secure the top side of the controller in place. (Fig. 7.5)

Fig. 7.5

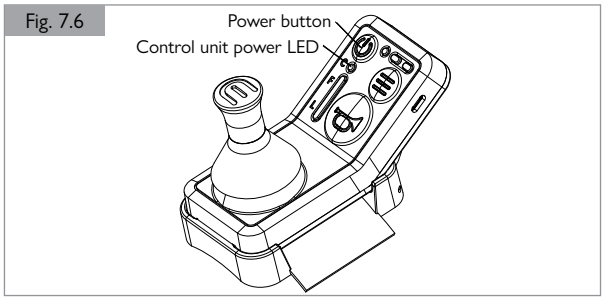


7.1.5 Turn on Control Unit

Turn on control unit: press power button once and a beep will be heard once the controller connects to the wheels. A lit Control Unit power LED will also be displayed. (Fig. 7.6)

- Control Unit Power LED will flash white while connecting. This may take up to 5 seconds.
- Control Unit Power LED will display a solid green light when connected.

Fig. 7.6

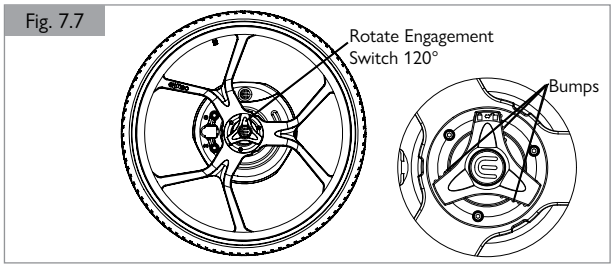


7.1.6 Rotate Engagement Switch

Reach down to each wheel and turn the device into powered mode using the engagement switch. (Fig. 7.7)

- To do this, push against the bumps on the surface of the switch until it stops rotating. The direction of rotation will be opposite for Left hand side and Right hand side wheel.
- The engagement switch should be re-engaged before the occupant is left unattended or attempts to operate the wheelchair.

Fig. 7.7

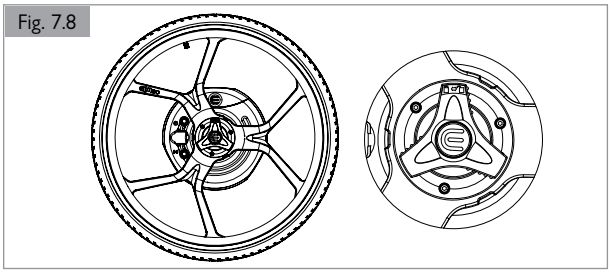


7.1.7 Engage

Push and hold control unit forward and wait until wheelchair registers drive-pin engagement. The control unit status light will turn from white to green when the wheels are locked and engaged. In order to trigger engagement Control LED must be green. Engage remote by pushing power button. (Fig. 7.8)

- If drive pins are engaged, device will go into Indoor profile, if either drive pin is not engaged, device will assume Free-roll mode.
- If not successful in engaging the drive pin, attempt to re-engage by re-peating steps 7.1.1- 7.1.7. Both wheels must be engaged for control unit control to be enabled.

Fig. 7.8



7.1.8 Drive and Profile Switching (Fig. 7.9)

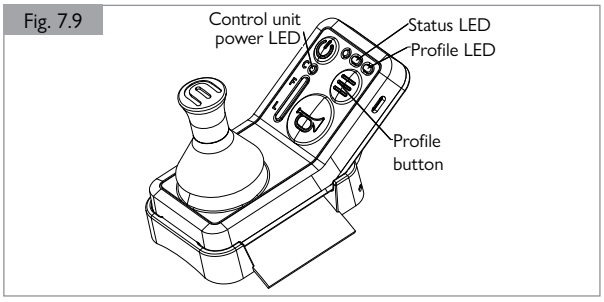
Wheels are ready for use in power mode, indicated by a solid green LED displayed on the control unit power and status LEDs.

Drive

When entering Power Mode, the M90 will go into Indoor profile (solid white profile LED) by default. To switch to Outdoor profile, press the profile button once (Flashing White profile LED).

NOTE: Do not allow the pushing of a chair once the electric brake has been switched on. Pushing the chair while the electric brakes are on may cause damage to the M90.

Fig. 7.9



Profile Switching

The M90 has two profiles pre-saved: Indoor and Outdoor. To switch between them, press the profile button. The profile button has three lines and is shown in Figure 7.9.

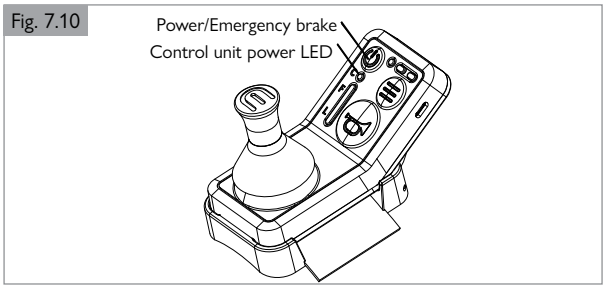
If the wheels are driven into over-load while in Outdoor profile, the current profile may auto-switch “down” to Indoor profile.

7.1.9 Emergency Brake

In the instance of an emergency, use the emergency brake on the control unit. To apply the emergency brake, press the power button once. This will also disable the control unit. A disabled control unit is shown by a solid white control unit power LED. To remove the emergency brake, press the power button. (Fig. 7.10)

Turning the Control Unit off completely also results in emergency braking.

Fig. 7.10



7.2 LED Indications Control Unit and Wheel (Fig. 7.11)

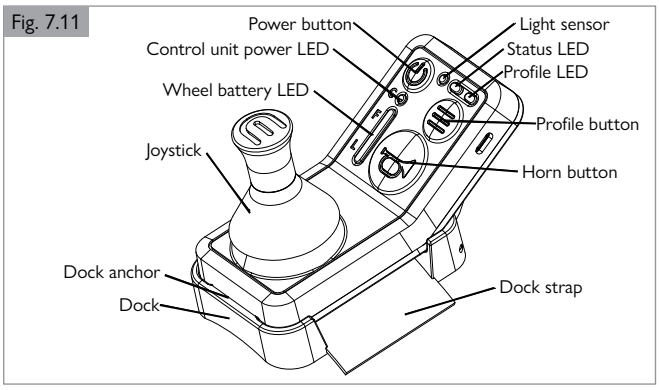


Fig. 7.11

7.2.1 Connected Mode Unlocked: Control Unit

The unlocked control unit status and control unit power LEDs display green. The M90 system is in a 'ready-to-go' state. (Fig. 7.12)

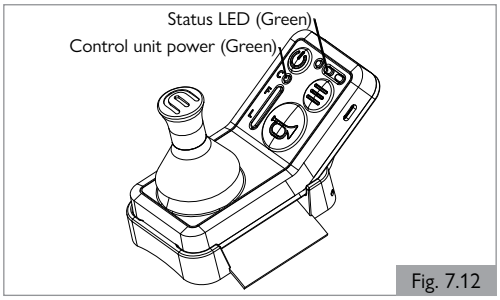


Fig. 7.12

7.2.2 Connected Mode Locked: Control Unit

The locked control unit status LED displays green. The locked control unit power LED displays white. (Fig. 7.13)

To enter or exit locked mode, press the power button. While in locked mode, only the horn button will be responsive.

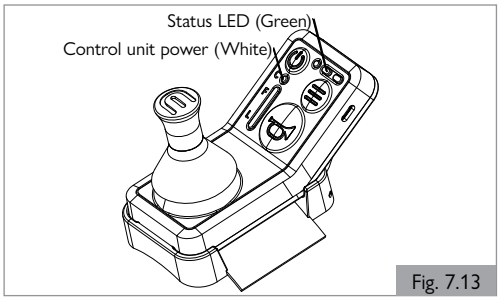


Fig. 7.13

7.2.3 Unconnected Mode: Control Unit

To connect your device, press the power button on the control unit. While the control unit is connecting to the wheels, the control unit power LED will flash white. (Fig. 7.14)

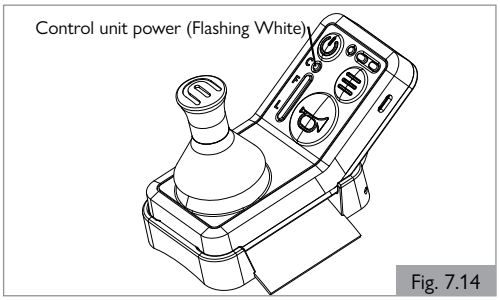


Fig. 7.14

7.2.4 Connected Mode: Wheel

In connected mode the two wheel LEDs on each wheel will display white. (Fig. 7.15)

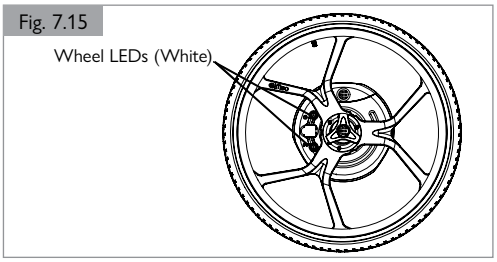


Fig. 7.15

7.2.5 Unconnected Mode: Wheel

In connected mode the two wheel LEDs on each wheel will display no light.

However, when the batteries are placed, the two wheel LEDs will flash white. (Fig. 7.16)

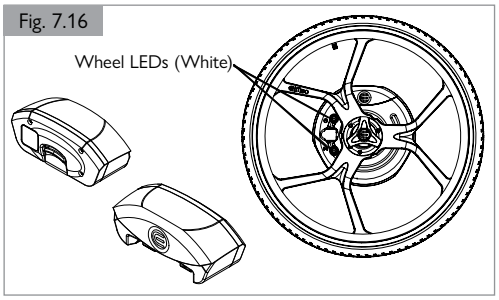


Fig. 7.16

7.2.6 Wheel Battery Charge (Fig 7.17)

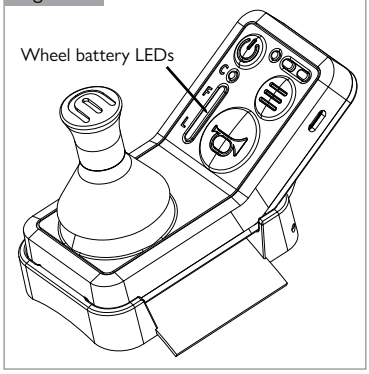
Wheel battery LED will display:

- 3x Green: 90% < SoC ≤ 100%
- 3x White: 60% < SoC ≤ 90%
- 2x White: 30% < SoC ≤ 60%
- 1 White: 15% < SoC ≤ 30%
- 1x yellow: 05% < SoC ≤ 15%
- 1x red: SoC ≤ 5%

Note: When charging wheel batteries, full charge is indicated by solid purple wheel LEDs.

Solid purple wheel LEDs override control unit wheel battery LEDs indication.

Fig. 7.17



7.2.7 Control Unit Charge <15%

The control unit power LED will display yellow when the control unit possesses less than 15% charge. (Fig. 7.18)

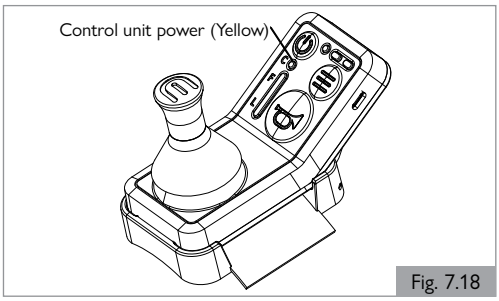


Fig. 7.18

7.2.8 Control Unit Charge <5%

The control unit power LED will display flashing yellow when the control unit possesses less than 5% charge. (Fig. 7.19)

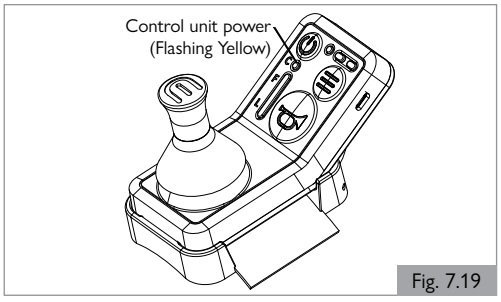


Fig. 7.19

7.2.9 Charging: Control Unit Charging

When plugged in, the control unit power LED will display a flashing purple light. (Fig. 7.20)

Use a USB-C charging cable to charge the controller. The charging port is located on the side of the controller.

NOTE: Drive system will be disabled during charging.

NOTE: Additional charging instructions are in section 9.

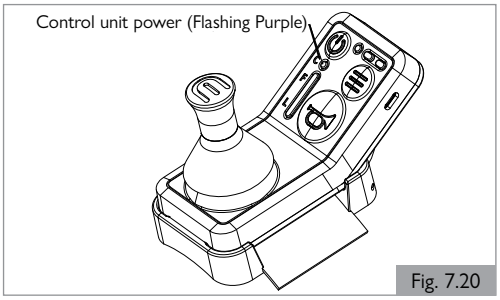


Fig. 7.20

7.2.10 Charging: Control Unit

When plugged in and charged, the control unit power LED will display a solid purple light. (Fig. 7.21)

NOTE: Drive system will be disabled while charging source plugged in.

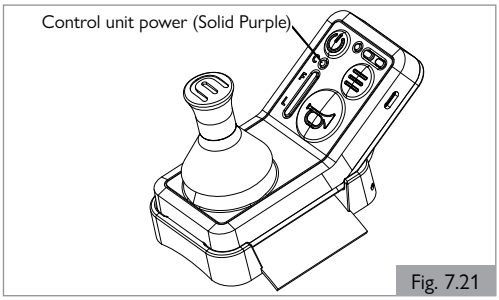


Fig. 7.21

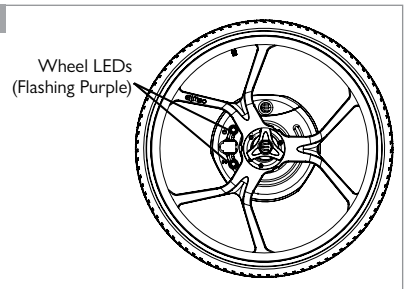
7.2.11 Charging: Wheel Batteries Charging

Wheel LEDs will display 2 purple flashing lights when charging. (Fig. 7.22)

The charging port on the M90 wheel is located between the two LED lights. To charge the wheel, open the protective cap and connect the magnetic charger cable to the port. Both wheels can be charged simultaneously using the cable charger. Ensure that the arrow indicator on the wheel aligns with the lighting indicator on the charger to confirm proper connection.

NOTE: Drive system will be disabled during charging.

Fig. 7.22



7.2.12 Charging: Wheel Batteries Charged

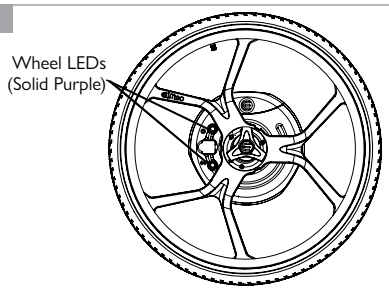
Wheel LEDs will display 2 purple solid lights when charged. (Fig. 7.23)

NOTE: If wheel LEDs are blank, check connectors are inserted correctly as outlined in 9.1.2.

You can also check wheel battery charge by turning on the control unit and observing the control unit wheel battery LEDs.

NOTE: Drive system will be disabled while charging source plugged in.

Fig. 7.23



7.2.13 Error Message (Fig 7.24)

Error message implies critical failure. Error message will override any status LED indication

Control Unit: Control unit power LED will flash red.

Wheel: Wheel LEDs will display 2 red flashing lights.

Sound: Loud irregular beeps will come from both the control unit and wheel.

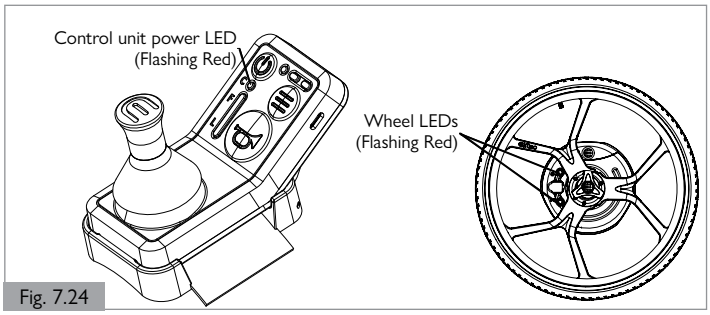


Fig. 7.24

7.2.14 Control Unit: Profiles (Fig. 7.25)

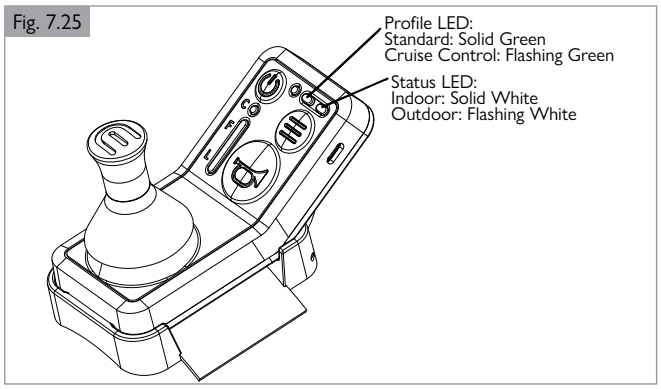
Indoor: Control unit profile LED will display a solid white light. The M90 will initiate in this profile when turned on.

Outdoor: Control unit profile LED will display a flashing white light. Press the profile button to switch between Indoor and Outdoor profiles.

Cruise Control: Control unit status LED will display a flashing green light. Press the Joystick down while pushing the Joystick forwards to enter cruise control. Exit cruise control by utilizing any command other than pushing the Joystick forward.

The cruise control command works in both Indoor and Outdoor profiles.

Fig. 7.25



7.2.15 Error Message: General

⚠ WARNING!

Flashing Red LED: Take device to your nearest Sunrise Medical authorized dealer for analysis **– DO NOT ATTEMPT TO USE DEVICE.**

Yellow LED: Safety Warning; observe indication and take necessary steps to remediate issue by visiting the troubleshooting section of this user manual.

Wheel Errors: Displayed on control unit and wheel/s with error. Error will be specific to a wheel, indicated by matching error LED on the wheel. Technician may have access to more specific errors.

Both LEDs on a single wheel will always be the same color – this is a safety feature if one LED is covered by a spoke.

7.2.16 Temperature Warnings

⚠ WARNING!

Solid Cyan on Control Unit Status LED & Wheel Button LEDs: Outdoor profile locked out. Only indoor profile is available.

Indicated audibly a single wheel beep from the affected wheel. Audible indication if mode change is attempted again.

Flashing Yellow Control Unit Status LED & Wheel Button LEDs: Control Unit is locked and wheelchair cannot be driven. Electronic brake applied for 5 seconds. Apply manual brakes upon entering this state.

Indicated audibly by a continuous 5 second continuous beep from the affected wheel.

Flashing Red Control Unit Status LED and Wheel Button LEDs: Control Unit is locked and wheelchair cannot be driven. Passive brake applied. Apply manual brakes upon entering this state.

Indicated audibly by 3-2-3-2 beep pattern from the affected wheel.

8.1 Joystick Step by Step Instructions

1. Mount the controller with the Joystick knob using either the frame mount or leg dock strap.
2. Ensure that the control unit controller is firmly secured in the controller dock. Check the control unit has been inserted into the anchor and latch attachment points correctly.

NOTE: If the control unit is removed from dock, the M90 will be locked.

3. Transition wheels into drive mode by pushing against the bumps on the rotating switch for each wheel. The rotation will be opposite for the Left and Right wheels.
4. Press power button once.
5. The device will assume Free-roll mode by default.
6. To use device, push control unit forward until single beep is heard and green LEDS on the power and the status indicate drive pin is engaged. Device is now ready to be operated.
7. To move wheelchair, push control unit in desired direction of travel.
   - The further down the control unit controller is pushed, the faster the speed (forward and reverse).
   - When stationary, pushing control unit left and right will turn wheelchair on the spot. Anything in between will steer toward that direction.
8. To reduce speed, bring control unit closer to the center vertical line.
9. To stop motion, let control unit controller return to center. To stop quickly, apply pressure to control unit in the opposite direction of travel (forward or reverse).
10. To lock device when stationary, press power button and engage manual parking brake. You can also use this as an emergency brake when not stationary.

The electronic brake uses power, you must engage the manual parking brake to lock device and remain stationary for a longer period. This will save battery.

⚠ WARNING!

NOTE: Do not allow the pushing of a chair once the electric brake has been switched on. Pushing the chair while the electric brakes are on may cause damage to the M90.

⚠ WARNING!

NOTE: When the device is not in use but remains on for convenience, disable the control unit by pressing the power button. Do this to avoid accidental command inputs. Press the power button a second time to enable the control unit.

⚠ WARNING!

NOTE: The control unit is activated by a magnet in the dock. When the control unit is out of the dock, it will not be able to connect to the wheels.

8.2 Methods Of Braking

8.2.1 Smooth Braking

Release control unit, allowing it to center.

8.2.2 Emergency Braking

Press power button once, center joystick, apply reverse when traveling forward or forward command when traveling backwards. This will stop acceleration and bring wheelchair to a stop within 2m (6.6-ft). (depends on user configurations).

NOTE: The control unit will remain locked until power button is pressed again if emergency brake is activated by pressing the control unit power button.

⚠ WARNING!

Wheelchair will stop suddenly when emergency brake is used.

8.2.3 Braking Logic

Low Load: Wheelchair will maintain active braking indefinitely.

High Load: The wheelchair will indicate one continuous beep, silence for three seconds, then a five second continuous beep. After the nine seconds the wheelchair will switch from active braking to passive braking.

Apply manual brakes within the nine seconds to remain stationary or use the joystick to steer the wheelchair.

Extreme Load: The wheelchair will indicate a five second continuous beep. After the five seconds the wheelchair will switch from active braking to passive braking.

Apply manual brakes within the nine seconds to remain stationary or use the joystick to steer the wheelchair.

8.2.4 Manual Braking

After coming to a stop, engage the manual wheelchair brake to avoid movement.

Control unit controller must be secured in dock for device to be functional. If controller becomes detached, the M90 will decelerate and come to a stop, entering locked mode. This is equivalent to letting go of control unit and allowing it to center.

8.2.5 Fail-safe Braking

When the wheels are not powered but are engaged, or powered on but not ready for driving (engagement not confirmed), fail-safe brakes are applied.

⚠ WARNING!

NOTE: Do not allow the pushing of a chair once the fail-safe brake has been switched on. Pushing the chair while the fail-safe brake is on may cause damage to the M90.

8 USING THE JOYSTICK CONTROL UNIT

8.3 M90 Modes

When a wheel battery level is below 10%, Outdoor profile is disabled if in use, and system will switch to Indoor profile.

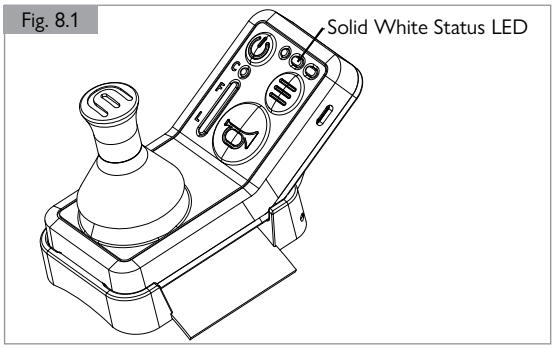
8.3.1 Free-roll Mode
Regular manual wheelchair use – no M90 power features enabled.

8.3.2 Powered Mode
Outdoor and Indoor profiles are selectable by pressing the profile button on the control unit controller.

8.3.2.1 Not Engaged or Not Ready
Fail-safe brakes active and drive disabled - Solid White Status LED. Can be invoked on transient/acute system overloading, or disengagement of drive pins during powered mode use. This is the initial state of the system when turned on and connected to wheels. (Fig. 8.1)

Perform engagement process for powered driving.

Fig. 8.1



8.3.2.2 Indoor Profile
Slower acceleration and speed - Solid White Profile LED.

8.3.2.3 Outdoor Profile
Faster speed and acceleration – tuned by dealer technician - Flashing White Profile LED.

8.3.2.4 Cruise Control
Constant speed - Flashing Green Status LED

To enter cruise control, follow the four steps outlined below:

1. Ensure that system is in power mode, and you are traveling at the desired cruising speed you would like to set.
2. Push control unit Joystick down when in the acceleration position you would like to cruise at and then let go. Upon entering cruise control, a click will be heard, along with 3 beeps. The Status LED will flash Green.
3. While in cruise control, you are still able to steer by moving control unit in the left or right direction.
4. Cruise control is disengaged by pushing controller forward or backward.

8.4 Horn Button

On press of the horn button, a buzzer will sound from the wheels until button is released.

Please use the horn to alert pedestrians of your approach or to signal for any reason.

⚠ WARNING!

Consideration to the possibility that horn buzzers are not heard by the party being warned should be taken into account. If the User is unable to vocalize a warning, or to gain attention via hand gesturing, it is recommended that additional clearance and caution be taken by the User to allow them to take mitigating action in the event of unforeseen circumstances or malfunction.

8.5 Power Off Device
Instructions to power off the device:
1. Make sure you are stationary and in a safe place.
2. Press the control unit power button for 3 seconds.
3. All LEDS will turn off on control unit controller.
4. Engage parking brake within 30 seconds of pressing down on power button.
5. If in Free-roll mode, turning off the device will have no effect.

Do NOT engage parking brake until you have commanded the wheels to shut down by pressing the power button for 3 seconds. If you try to drive forward without powering off, the motor will be trying to fight the parking brake.

8.6 Device Timeout
The device will automatically switch off when left unattended for 30 minutes.

9.1 Charging of Battery Using Wheel

Ensure the device is switched off and completely dry.

If charging socket is obstructed by spoke, rotate wheel until socket is freely exposed. This can be done by having the wheel drive pins engaged while still attached to the chair and using the handrims.

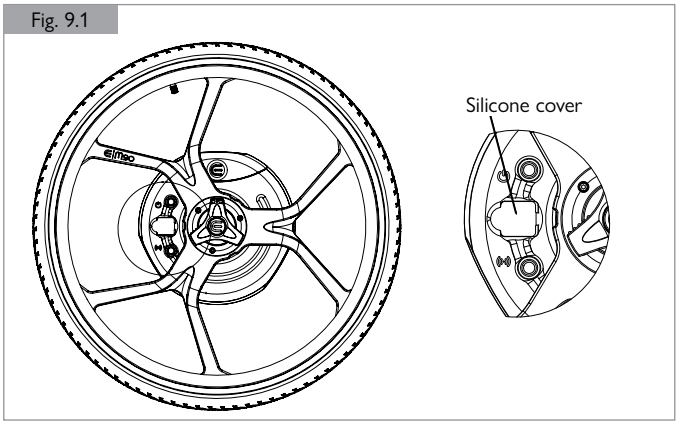
⚠ WARNING!

Do not attempt to charge while the M90 is turned on. Danger of finger or charging cable entrapment.

9.1.1 Remove Silicone Cover from Charging Port

To access the charging port, lift the silicone cover by pulling the tab, as shown in Fig. 9.1. After charging, unplug the charger and press the silicone cover back into place. (Fig. 9.1)

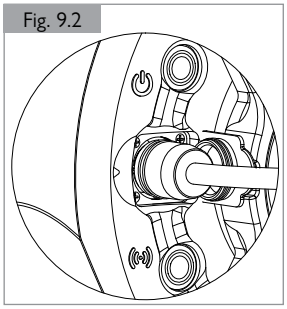
Fig. 9.1



9.1.2 Attach Charging Cable

Plug power supply into charging port on each wheel. (Fig. 9.2)
Plug power supply into wall outlet.

Fig. 9.2



⚠ WARNING!

Avoid creating a trip hazard when plugging in charging cables.

⚠ WARNING!

Ensure battery plug orientation is correct.

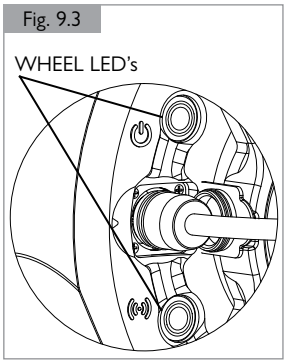
The “lightning” symbol must face towards the orange triangle indicator.

When plugging in the connector, use minimal force. The plug and socket are magnetic. The magnetic force will assist correct alignment.

9.1.3 Charge Wheels

Switch on wall power and leave batteries to fully charge. Charging is indicated by 2 flashing purple LEDs on the wheel. Leave batteries to charge until both wheel batteries display 2 solid purple LEDs, indicating full charge. (Fig. 9.3)

Fig. 9.3



⚠ WARNING!

Do not continuously charge batteries for more than 24 hours.

9.1.4 Replace Magnetic Cover

Turn off the wall socket and remove the power supply from charging port on each wheel and the wall outlet.

Replace the charging port cover. To do this, press the cover into the charging port.

⚠ WARNING!

Ensure charging port cover is reinserted after use. Charging connections are not to be left exposed during use.

9.1.5 Store Accessories

Ensure the device is switched off and completely dry.

9.1.6 Charging Error

Battery charging errors are displayed by wheel push buttons displaying two solid yellow LEDs.

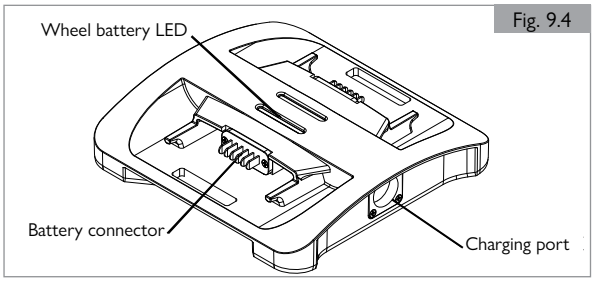
9 CHARGING INSTRUCTIONS

9.2 Charging of Battery Using Charging Dock

The M90 Charging Dock is intended to be used to charge the wheel batteries of the M90. Either one or two batteries are permitted to be charged at one time. (Fig. 9.4)

Please observe the electrical characteristics of the charging dock and never overload the power supply or use the Charging Dock if there are any electrical faults noted, such as exposed wiring, sparks, buzzing, or excessive heat.

Fig. 9.4



9.2.1 Electrical Characteristics

Input: 27-28V DC, 1.5A max (per Battery)
Output: 24V nominal, 1.5A max (per Battery)

9.2.2 Physical Characteristics

Indoor use only, IP44 rated.

9.2.3 Instructions for Use

There are three instructions for use of the M90 Charging Dock:

9.2.3.1 Plug in Charging Cable

Plug the Charging Dock cable into a wall outlet.

⚠ WARNING!

Avoid creating a trip hazard when plugging in charging cables.

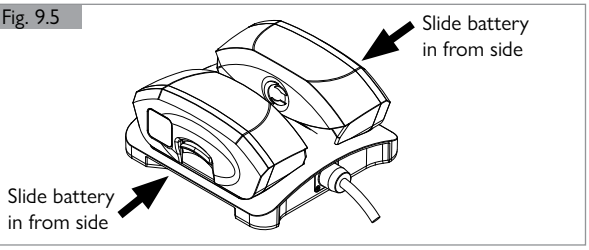
⚠ WARNING!

Only use one of the two connectors on a single charging dock at a time. The other connector must have its cap on. Do not allow the un-used connector to become a trip hazard. Therefore, only one power supply can be used to charge two batteries on one charging dock at a time.

9.2.3.2 Insert Batteries

Insert a battery into each side of the Charging Dock, inserting the battery into the battery connectors of the Charging Dock. One or two batteries may be charged at one time. (Fig. 9.5)

Fig. 9.5

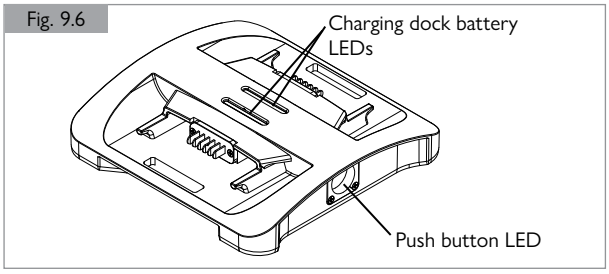


9.2.3.3 Turn Wall Outlet On

Once the charging cable is plugged into the charging socket and wall outlet and when batteries are inserted, turn on the wall outlet.

Observe the power button LED of the charging dock, as well as the LEDs being displayed on the Battery/Batteries, to indicate charging status. (Fig. 9.6)

Fig. 9.6



9.2.4 Remove Charging Cables

Once the wheel batteries are fully charged, switch off the wall outlet, remove the batteries then remove the power supply from the charging dock and wall socket. Store components in a secure location.

Do not continuously charge batteries for more than 24 hours.

9.2.5 Faulty Battery

Battery faults are displayed by charging dock battery LEDs displaying three solid red lights and a flashing push button LED. (Fig. 9.6)

9.2.6 Charging Dock LED Indications

The charging dock has one power button LED located at the front of the device and two sets of three LEDs on the upper surface of the device, one set for each battery.

9.2.6.1 Push Button LED: Power

The charging dock will display a solid yellow light when the power is on and no batteries are inserted.

9.2.6.2 Push Button LED: Charging

The charging dock will display a flashing purple light when the batteries are charging.

9.2.6.3 Push Button LED: Charged

The charging dock will display a solid purple light when the batteries are fully charged.

9.2.6.4 Charge LED Display

The Charge LED will display:

- 3x Green: 99% OR charge indicating complete
- 3x Magenta: 60% < SoC ≤ 99%
- 2x Magenta: 30% < SoC ≤ 60%
- 1x Magenta: SoC ≤ 30%

9.2.6.5 Troubleshooting

- If no LEDs are displayed, the charging dock has no input power supply. Please check that the power is switched on at the wall, the batteries are inserted fully, and the charging dock is free of electrical faults, such as exposed wiring or visible damage.
- On power-up, the Charging Dock LEDs will be at full brightness, suitable for indoor viewing in ambient lighting of 400 to 1000 lux. On pressing of the Power Button Switch, the LEDs shall dim to 20% of their maximum value, and thereafter toggle between their maximum value and 20% brightness.
- If issue persists, remove batteries from charging dock and place into wheels. Insert power supply into wheel charging sockets to charge the batteries.

⚠ CAUTION!

Do not use a single power supply to charge more than two batteries at a time.

9.3 Charging Of Control Unit Controller

9.3.1 Plug into Controller

Plug USB-C charging plug into the control unit controller. Plug the other end into your charging device.

9.3.2 Turn on Power

Switch on wall power and leave the battery to fully charge, indicated by a flashing purple Control Unit Power LED, until Control Unit Power LED turns solid purple.

Occasional use of the wheelchair prior to complete charging indication is acceptable if the need is urgent.

⚠ WARNING!

Do not continuously charge batteries for more than 24 hours.

9.3.3 Remove Plug

Remove charging plug and store charger away, and store or use control unit as desired.

Do not charge the control unit controller while in use. The control unit will be locked when charging.

9.4 Power Supply Indicators

A green LED on the power supply indicates trickle charging or disconnection. A red LED on the power supply indicates charging status.

10 CLEANING

Cleaning the device will assist in longevity of the product and ensure optimal functionality.

⚠ CAUTION!

1. Always turn off your device before cleaning and keep battery attached to wheel.
2. Ensure charging socket cover is attached when cleaning.
3. Do not wet the charging port.
4. Do not use control unit controller while cleaning wheels as there is a risk of hand entrapment.

10.1 Cleaning Products

Do not use abrasive agents, detergents, or high-pressure cleaners (can scratch the components and damage the product seals). Avoid contact with solvents such as degreasers or methylated spirits.

10.2 Wet Weather

Avoid using the device in wet weather. Dry the device immediately after exposure to wet weather.

10.3 Cleaning Interval

Clean at least once per month, or after using in muddy/sandy terrain. If using in corrosive environments, you must routinely check for signs of corrosion on components during regular cleaning and increase cleaning intervals.

If external electrical components get wet, dry using a soft cloth after use (such as charging socket).

10.4 Cleaning Method

Clean device with a soft damp cloth and wipe parts dry using a soft dry cloth.

⚠ CAUTION!

Potential damage to equipment

Do not use pressured water jets to clean device. High pressure water cleaning will damage the device and void warranty.

11 MAINTENANCE

It is recommended that the M90 be taken to a Sunrise Medical authorized dealer for maintenance and service every year. This guideline interval may vary with the product's degree of utilization and the behavior of a user. Ultimately, the degree of use and user behavior is the responsibility of the operator, and therefore the need for maintenance should be assessed accordingly.

11.1 Maintenance Information

- Must be serviced by a Sunrise Medical authorized dealer.
- Contact your nearest Sunrise Medical authorized dealer to know whether a spare part is available.

11.2 Inspection Checklist

The user must follow inspection steps each time they operate the device. For further information see section 5 'INSPECTION OF DEVICE'.

1. Check for clothing entrapment.
2. Check wheelchair brackets.
3. Check wheelchair brakes.
4. Check for foreign object inhibiting the device.
5. Check tire wear and pressure.
6. Ensure batteries are charged.
7. Check the device is not damaged.
8. Check the control unit can move freely.
9. 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.

11.3 Periodic Maintenance

- Check tire pressure is between 85-145 Psi (586-1000 Kpa), while also checking the wheel wear/tread is sufficient, before using the M90.

This is to ensure user safety and to maintain optimal functioning of the device. Using the M90 with flat tires can damage the tires and rims, inhibit performance, and reduce the effectiveness of handbrake/manual brake lever.

- Check tire pressure at least once weekly to ensure optimal performance of powered wheel, and to prevent excessive wear or puncture.
- Charge the batteries before every use, and check for low battery warning before use.

Long Storage: If batteries are going to be stored for more than 2 weeks, fully charge both batteries prior to storage, and then every 3 months of non-use, to preserve longevity of the battery life.

⚠ CAUTION!

Never exceed the maximum tire pressure. Tires should only be replaced by a Sunrise Medical authorized dealer.

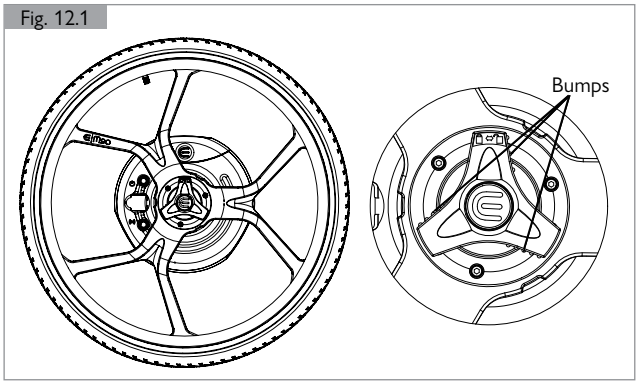
12 TROUBLESHOOTING

If the M90 is not working as expected, please check the following points:

12.1 Check Charge
Plug USB-C charging plug into the control unit controller. Plug the other end into your charging device.

12.2 Check Mode
Check that you have switched the wheel to 'power' mode by pressing on the bumps of the engagement switch until it stops rotating. (Fig. 12.1)

Fig. 12.1



12.3 Restart
Carry out a system restart by holding the power button on the control unit for three seconds, then turn the system back on.

If your problem persists after attempting all of the above steps, please contact a Sunrise Medical authorized dealer for further assistance.

13 STORAGE AND TRANSPORT

It is preferred to transport the M90 attached to the wheelchair, with the battery removed, stored safely and securely.

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.

- The M90 is intended to be packed for shipping with reasonable ease, compliant with air, railroad and sea transport, with batteries conforming to IATA regulations (Under 100-Watt Hours (Wh) limit per battery).
- The device must always be switched off when being transported.
- If travelling on a plane, enter "Flight" mode by pressing and holding power button on each wheel for 5 seconds. This mode does not affect the control unit, only the state of the wheel. The control unit can be turned off normally. Upon successfully entering flight mode, a short beep will sound from the Control Unit.
- To exit flight mode, press the power button on the wheel again to operate normally.

⚠ WARNING!

1. The battery of the M90 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 Sunrise Medical authorized 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.

14 CYBERSECURITY

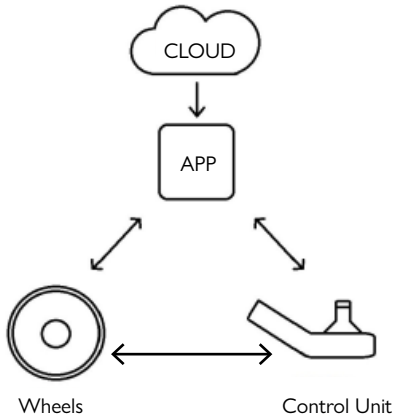
14.1 Introduction

Ensure that sections of the Owner's Manual relating to processes and performance of the device under situations such as battery charging, wheelchair engagement, OTA updating mode engagement, feedback on the OTA updating application, steering response with their specific tuning parameters are all understood. Any changes to behavior that can be observed can indicate potential cybersecurity events. If you are experiencing changed wheelchair behavior or you would like more clarity regarding how your device operates, contact your Sunrise Medical authorized dealer.

14.2 Security: OTA Updating Process

Figure 14.1 indicates the means by which the OTA updating application connects to your device and ensures that the correct firmware is installed. A user shall note that all devices that are to be updated successfully enter the OTA mode. Download the Empulse M90 app from your device's app store. Open the app and follow the on-screen instructions to connect it to your M90. Navigate to the app settings to check if a software update is available for the M90. If an update is available, follow the in-app instructions to complete the update process. Ensure to follow all prompts in the OTA application and do not close or minimize the application until the update process is finished. Refer to section 3.4.16.1 for information regarding this process, as well as section 3.3.11 for contraindications.

Fig. 14.1 Connectivity During OTA Updating Process



14.3 Security: Understanding Your Device

If you believe that any of the Bluetooth connection ports are not operating as expected, contact your Sunrise Medical authorized dealer as soon as possible.

15 TECHNICAL DATA

GENERAL	
Maximum User Weight	120kg (265 lbs)
Maximum Weight Overall	150kg (331 lbs)
Class of Medical Device (Australia)	Class 1
Country of Manufacture	Australia
Ingress Protection (IP) Rating	IP64 rating (Dust Tight/Water Splashes from any angle)
WHEEL	
Distance Range Approx. (*)	15 km (9.3 mi) (ISO 7176–4)
Rated Slope (*)	3°, Standards tested to 6° slopes, with the capability to climb steeper slopes of up to 6° for short distances.
Regenerative Braking	Up to 18% Recovery
Rated Voltage	Charging Input: 27 V to 28 V DC (@ 1A DC); Battery Input: 21.6 V (nominal)
Motor Power Rating	150 W (Per wheel)
Speed	Maximum 6 km/h (3.7 MPH)
Optimal Operating Air Temperature Range	0 to +30°C (32 to 86°F)
Extreme Operating Temperature Range	-10 to +40°C (14 to 104°F)
Wheel Tires	Schwalbe Right Run Plus (Grey Striped 24 x 1-in) (610mm x 25mm)
Wheel Diameter	24 in (610mm)
Connection (to Controls)	Bluetooth 5
Sound frequency and alarms	2900 +/- 500Hz and 70dB
(WHEEL) BATTERY PACK	
Battery Type	Lithium Ion Cells (Rechargeable) (86.4Wh); UN38.3 certified
Nominal Voltage	21.6 V; Cut-off: 16V
Rated Battery Capacity	4 Ah
Battery Charging Time	6 Hours (full charge)
Battery Service Life	300 cycles of normal use to retain 80% capacity.
Cubic Battery Size	164 x 68 x 66 mm (6.5 x 2.7 x 2.6 inch)
Operating Temperature Range	0 to 55°C (32 to 131°F)
Charging Temperature Range	0 to 55°C (32 to 131°F)
Storage Temperature	-20 to +60°C (-7 to 140°F)

CHARGING DOCK	
Rated Voltage	Input: 27 V to 28 V DC (@ 2A DC); Battery Output: 2x 21.6 V (nominal) (@ 1A DC)
Rated Power	56 W
Battery Charging Time (full charge) Approximately	4-5 Hours
Optimal Operating Air Temperature Range	0 to +30°C (32 to 86°F)
Extreme Operating Temperature Range	-10 to +40°C (14 to 104°F)
POWER SUPPLY	
Type	Off-board
Rated Input Voltage Range	100 V to 240 V
Rated Power	110 W
Rated DC Output Current	4.0 A
Rated DC Output Voltage	28 V
Optimal Operating Air Temperature Range	-29°C to 35°C (20°F to 95°F)
CONTROL UNIT	
Battery Type	Lithium Ion Cell (Rechargeable) (3.7Wh); UN38.3 certified
Charging Power Source	USB-C (5V, 400mA)
Rated Voltage	3.7 V
Rated Battery Capacity	1 Ah
Battery Charging Time (full charge) Approximately	4-5 Hours
Battery Service Life	300 cycles of normal use to retain 80% capacity.
Charging Temperature	0 to +45°C (32 to 113°F)
Storage Temperature	-20 to +60°C (-4 to 140°F)
WEIGHT OF COMPONENTS	
Wheel (Individual)	5.3 kg (11.7 lbs)
Battery Pack (Individual)	0.6 kg (1.3 lbs)
Total Weight without Batteries (Pair)	10.6 kg (23.4 lbs)
Total Weight with Batteries (Pair)	11.9 kg (26.2 lbs)
Control unit Controller with Dock	0.25 kg (0.6 lbs)
Charging Dock	0.41 kg (0.9 lbs)

Software Bill of Materials (SBOM) Off-the-shelf(OTS)/Software of Unknown Provenance (SOUP) Used in the Device

SOUP/OTS Title	Manufacturer	Version	Release Date	End of Support Date	Supplier	Cybersecurity Information	Where it is Used in Device
nRF5 Software Development Kit "nRF5_SDK_17.1.0_ddde560"	Nordic Semiconductor	17.1.0	August, 2021	Not Supplied by Manufacturer	Nordic Semiconductor https://www.nordicsemi.com/	https://infocenter.nordicsemi.com/topic/struct_sa/struct/sa.html	nRf52 Processor software - any part related to radio communications. (Bluetooth) Thus, OTS/SOUP is used in Control Unit nRF MCU, Wheel nRF MCU, and Charging Dock nRF MCU.
nRF5 Soft Device "s140_nrf52_6.1.1_softdevice	Nordic Semiconductor	6.1.1	November, 2018	Not Supplied by Manufacturer	Nordic Semiconductor https://www.nordicsemi.com/	https://infocenter.nordicsemi.com/topic/struct_sa/struct/sa.html	nRf52 Processor software - any part related to radio communications. (Bluetooth) Thus, OTS/SOUP is used in Control Unit nRF MCU, Wheel nRF MCU, and Charging Dock nRF MCU.

(*) see Warning below:

⚠ WARNING!

1. Range ability depends on the terrain, user weight, prevailing driving conditions, and regenerative braking energy recovery.
2. Stopping distance on slopes can be significantly greater than on level ground.

16 MANUFACTURER SPECIFICATION

Manufacturer: Concourse Assistive Technology Pty Ltd

Address: 11 Daniel Street, Wetherill Park NSW 2164, Australia

Model: Empulse M90 Wheels CAT-SW-2W24

Maximum Occupant Mass: **120kg (265 lbs)**

Disclosure information (ISO)			
Standard reference		Minimum	Maximum
	Overall length with leg rest	*See retrofitted wheelchair manual	*See retrofitted wheelchair manual
	Overall width	** _____mm	** _____mm
	Folded length	*See retrofitted wheelchair manual	*See retrofitted wheelchair manual
	Folded width	*See retrofitted wheelchair manual	*See retrofitted wheelchair manual
	Folded height	*See retrofitted wheelchair manual	*See retrofitted wheelchair manual
	Total mass	*See retrofitted wheelchair manual	*See retrofitted wheelchair manual
	Mass of the heaviest part	5.3kg (11.7 lbs)	5.3kg (11.7 lbs)
	Static stability downhill	*See retrofitted wheelchair manual	*See retrofitted wheelchair manual
	Static stability uphill	*See retrofitted wheelchair manual	*See retrofitted wheelchair manual
	Static stability sideways	*See retrofitted wheelchair manual	*See retrofitted wheelchair manual
	Energy consumption	12Km (7.5 mi)	15Km (9.3 mi)
	Dynamic stability uphill	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Obstacle climbing	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Maximum speed forward	N/A	6Km/h (3.7 MPH)
	Minimum braking distance from max speed		1m (39.4 in)
	Seat plane angle	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Effective seat depth	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Effective seat width	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Seat surface height at front edge	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Backrest angle	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Backrest height	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Footrest to seat distance	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Leg to seat surface distance	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Armrest to seat distance	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Front location of armrest structure	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Handrim diameter	N/A	19mm (0.8 in)
	Horizontal location of axle	See retrofitted wheelchair manual	See retrofitted wheelchair manual
	Minimum turning radius	See retrofitted wheelchair manual	See retrofitted wheelchair manual

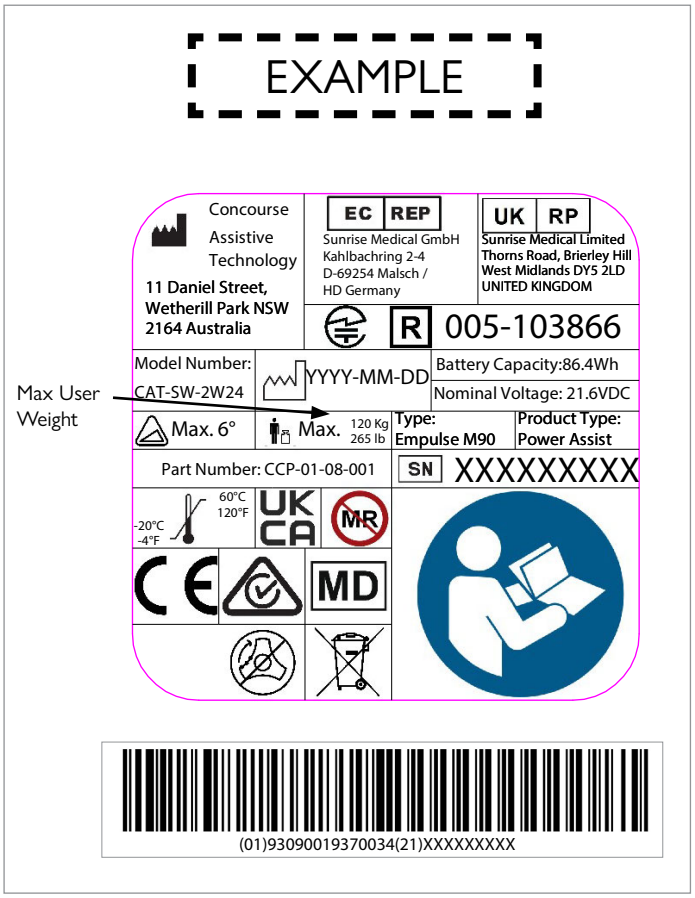
(**) Varies depending on the specific wheelchair and configuration.

There are labels on the M90 that include information regarding product details. The symbols identification table contained within this user manual will assist in understanding important warnings and safety information for the device.

Please, NEVER REMOVE ANY LABELS, MARKINGS, OR INSTRUCTIONS FROM THIS DEVICE. Replace or repair any labels, markings, or instructions that have become illegible or damaged immediately. Please contact your Sunrise Medical authorized dealer for assistance.

Label Inclusions:

- The name and address of the manufacturer of the wheelchair
- The model designation and serial number of the wheelchair, or unique device identifier (UDI) code
- The year/date of manufacture, or use by date if applicable
- Any driving restrictions
- Recommended maximum mass of the user
- Software version
- QR code to online PDF User Manual
- Storage and handling instructions
- General technical specifications: max slope, safe slope, rated power, rated voltage
- All relevant device symbols: disposal, temperature, warnings



18 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 M90 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.
      v. Any components with broken or removed seals.
      vi. Imperfections caused by normal wear, improper use, accidents, reckless damage, damage caused by fire, water, force majeure, or any other events that are outside of the control of Sunrise Medical.
      vii. Sunrise Medical device inspection without detection of a fault or defect.
   b. As the manufacturer of the M90, Concourse Assistive Technology Pty Ltd shall not be liable for the safety of the product if:
      i. The device is handled in contradiction to the instructions in this user manual.
      ii. The device is not serviced at the prescribed 1-year interval by a Sunrise Medical authorized dealer.
      iii. The device is recklessly damaged.
      iv. The device is operated with insufficient battery charge.
      v. The device is fitted with any external or unoriginal accessory parts.
      vi. The device has any parts removed.
   c. This warranty is VOID if the original serial number tag is removed or altered.
   d. This warranty is non-transferrable and only applies to the first consumer purchase of this device through a Sunrise Medical authorized dealer.
   e. 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 Returned 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 for future reference:

_____

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