

OWNER'S MANUAL

US

# *Permobil* C500

Power Wheelchair





# How to contact Permobil

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# ***Permobil C500***

Power Wheelchair

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## **Important Information about this Owner's Manual**

We congratulate you on your choice of power wheelchair. Our goal is for you to continue to feel satisfied with your choice of both vendor and wheelchair.

Before you begin using your wheelchair, it is important that you read and understand the content of these operating instructions and in particular the Safety Instructions.

These operating instructions are primarily intended to acquaint you with the functions and characteristics of the wheelchair and how you can use them in the best manner possible. They also contain important safety and maintenance information, as well as describing possible problems that can arise while driving the wheelchair.

Always keep these operating instructions handy in connection with your wheelchair, since the need for important information can arise concerning its use, safety and maintenance.

It is also possible to obtain information concerning our products from our home page on the Internet. You can find us at [www.permobil.com](http://www.permobil.com).

All information, pictures, illustrations and specifications are based upon the product information that was available at the time that these operating instructions were printed. Pictures and illustrations that are found in these operating instructions are representative examples and not intended to be exact depictions of the various parts of the wheelchair.

We reserve the right to make changes to the product without prior notice.

### **Ordering of Documentation**

If you are in need of another copy of the Owner's Manual, it can be ordered from Permobil, ask for item No. 205209-US-0.

## **TECHNICAL SUPPORT**

In the event of technical problems, you should contact your dealer or Permobil Inc USA at 1-800-736-0925.

Always state the chassis serial number when contacting Permobil to ensure that the correct information is provided.

## **SPARE PARTS & ACCESSORIES**

Spare parts and accessories must be ordered through your dealer.

## **SCRAPPING THE WHEELCHAIR**

Contact Permobil Inc. for information about scrapping agreements in force.

## **WARRANTY**

A warranty registration card is attached to each new wheelchair. The Permobil Inc. Product Warranty Information sets forth the conditions of the warranty.

Contact your dealer or Permobil Inc USA for information about the warranty period for this wheelchair.

## Safety Instructions - General

An electric wheelchair is a motorized vehicle and special care must therefore be taken when it is used. Please read and follow all instructions and warnings in this manual before operating your Permobil powered wheelchair. Incorrect use may both injure the user and damage the chair. In order to reduce these risks, you should read the Owner's Manual carefully, in particular the safety instructions and their warning texts.

Throughout this manual the following symbol will be used to note items that have significant importance to safety concerns:



### NOTE

Please use caution where this symbol appears.



### WARNING

Please use extreme caution where this warning symbol appears. Failure to observe warnings can lead to personal injury and property damage, including damage to the wheelchair.

*Permobil is not responsible for personal injuries or property damage resulting from any person's failure to follow the warnings and instructions in this manual. Permobil is not responsible for injuries or damage resulting from failure to exercise good judgment.*

The final selection and purchasing decision about the type of electric wheelchair to be used is the responsibility of the wheelchair user and his or her healthcare professional. Permobil Inc. is not responsible for inappropriate selections of wheelchair models or features or improper fitting of the wheelchair.



## Safety Instructions - General

Your wheelchair was configured specifically for your needs as prescribed by your healthcare provider. Consult your healthcare provider before changing the seat position or making any other adjustment. Some adjustments may reduce your wheelchair's performance or safety or may not be appropriate for your needs.

It is also of the utmost importance that you devote sufficient time to become acquainted with the different buttons, the function and steering controls, the different adjustment possibilities of the seat, etc. of your wheelchair and its accessories before you begin using it.

*Do not undertake your own first test drive without making sure that you have assistance in the immediate vicinity if you should need help.*

In order to make sure that nothing happened to the wheelchair while it was being shipped to you, you should check the following items before beginning to use it:

- that all products ordered are included in the delivery, including operating instructions and possible other documentation. If you suspect that something is missing, then contact your supplier or Permobil for more information as soon as possible.
- that no transport-related or other damages have occurred to the wheelchair and its accessories. If you discover that something has been damaged or in some other manner appears to be incorrect, then contact your supplier or Permobil for more information as soon as possible before you continue the checks.

We recommend that you charge your wheelchair's batteries before you begin using it. The chapter titled "Charging the Batteries" describes how to do this.

Always be sure that tires are inflated properly before driving.

*If you experience that the wheelchair in any manner is not behaving as expected or if you suspect that something is wrong: abort the test drive as soon as possible, shut off the wheelchair and get in touch with your service contact or Permobil for more information.*

## Safety Instructions



### WARNING

#### Operation

Permobil recommends the use of wheelchair lights at all times user is riding near public rights of way. Use extreme caution when driving near unprotected ledges, drop-offs or on elevated surfaces. Unintended movement or excessive speed in these areas can lead to personal injury or property damage.

Do not drive the wheelchair over any curbs or edges higher than 3 inches. When driving over a curb or similarly elevated surface, you must cross the surface at a 90 degree angle (perpendicular). Crossing such surfaces at any other angle may result in the wheelchair tipping.

Reduce your speed when driving on uneven terrain or soft surfaces. Do not use your wheelchair on stairs or escalators. Always use an elevator.

Do not lift or move the wheelchair by any of its removable parts. Doing so could lead to personal injury and property damage, including damage to the wheelchair.



### NOTE

#### Operation

Do not let children drive the wheelchair without supervision. Do not drive the wheelchair on public streets or roadways. Obey all local pedestrian rules and be aware that vehicle drivers may have difficulty seeing you.

Do not operate your wheelchair under the influence of alcohol. Consumption of alcohol may impair your ability to operate your wheelchair safely.

Some physical limitations or use of medication, either prescribed or over-the-counter, may limit your ability to operate your wheelchair safely. Be sure to consult with your physician about your physical limitations and medications.

## Safety Instructions



### WARNING

#### **Modifications**

Any unauthorized modifications to the wheelchair or its various systems may increase the risk of personal injury and property damage, including damage to the wheelchair.

All modifications to and interventions in the vital systems of the wheelchair must be performed by a qualified service technician authorized by Permobil to perform such service on Permobil products.

#### **Weight Limitations**

The maximum user weight for your Permobil is set forth in the specification section of the supplied Owner's Manual for current seat model. Operation of the wheelchair by users who exceed the maximum allowable user weight can lead to personal injury and property damage, including damage to the wheelchair, as well as voiding any applicable warranty to the wheelchair.

Do not carry passengers on the wheelchair. Doing so can lead to personal injury and property damage, including damage to the wheelchair.



### NOTE

#### **Prior to Riding**

In some instances, including where certain medical conditions exist, users should practice operating their wheelchair under the supervision of an assistant who is familiar with the operation of the wheelchair and with the abilities and limitations of the user.

## Safety Instructions



### NOTE

#### **Operation - Inclines**

When driving downhill, select the slowest speed and proceed with caution. Driving down an incline in a front wheel drive wheelchair can shift the user's center of gravity forward. If the wheelchair rolls faster than you would like, stop the wheelchair by releasing the joystick and begin descending again at a slower speed.

Avoid sudden stops or starts. Stop by releasing joystick rather than by turning the power off. Turning off power while the wheelchair is in motion will cause the wheelchair to stop suddenly. Be sure to keep all recommended positioning belts securely fastened at all times.

When driving up an incline, try to keep moving at a steady speed. Stopping and starting the chair while moving up an incline makes the wheelchair more difficult to control.

Do not drive up or down slopes with a gradient greater than indicated in the technical specifications section of the manual. There is a risk that the wheelchair will not maneuver safely.

## Safety Instructions



### WARNING

#### **Operation - Inclines**

Do not drive the wheelchair where the sideways gradient is more than indicated in the technical specifications section of the manual. There is a risk of tipping over.

Do not drive up or down ramps that are not equipped with proper edge protection along the sides of the ramp to prevent the wheelchair from falling off of the ramp.

When driving up an incline, be sure to drive your wheelchair straight up the incline (perpendicular). Driving at an angle up an incline increases the risk of tipping or falling. Use extreme caution when driving up an incline.

Do not drive down or up a hazardous incline, such as a surface covered with snow, ice, or wet leaves or a surface that is uneven. Also avoid driving on ramps that do not have proper edge protection.

## Safety Instructions



### WARNING

#### **Operation - Turning**

Turning your wheelchair at high speeds can create the possibility of the wheelchair tipping and personal injury. The possibility of tipping can be increased by high turning speed, sharp turns, uneven surfaces, abrupt changes in direction, and driving from an area of low traction (e.g. lawn) to an area of high traction (e.g. sidewalk).

To protect against tipping, personal injury and property damage, reduce speed and reduce the sharpness of your turn when turning.

#### **Operation - Freewheel Mode**

In order to prevent the wheelchair from rolling away, ensure that the wheelchair is on a level and dry surface before releasing the brakes.

In order to avoid personal injury do not use your Permobil in freewheel mode without an attendant present. Do not attempt to put the wheelchair in freewheel mode by yourself while seated in it.

Do not put the wheelchair in freewheel mode while on an incline. This could cause the wheelchair to roll on its own, causing injury and property damage, including damage to the wheelchair.

## Safety Instructions



### NOTE

#### **Driving on a Loose or Soft Surface**

When the wheelchair is set to its lowest speed and the batteries are not fully charged, driving on certain surfaces, for example gravel, sand or thick carpeting, can involve constrained navigability.

#### **Driving in Darkness**

Driving in the dark may only be done if your wheelchair is equipped with functioning lighting in the front and the back, or as per the applicable national or local traffic regulations.

#### **Driving in Extreme Climate Conditions**

Permobil's wheelchairs are designed to withstand most adverse weather conditions, however to minimize the risk of being caught in difficult situations you should avoid using the wheelchair outdoors during, for example, severe cold, heavy rain or thick snow.

Also bear in mind that certain surfaces on the wheelchair can be heated up or cooled down in the event of prolonged exposure to intense sunlight or cold respectively.

## Safety Instructions



### WARNING

#### **Driving with Seat Lift/Seat Tilt/Backrest Recline**

Be careful in making sure that nothing gets stuck between the chassis and the seat when the seat lift/seat tilt is operated. Operating the seat lift, seat tilt/ backrest recline changes the center of gravity and increases the risk of tipping over. Always drive in low speed and only use those seat functions on level ground, and not on hills, ramps, slopes or other inclines. Using those seat functions while driving on inclines can lead to personal injury and property damage, including damage to the wheelchair.

#### **Center of Balance**

The possibility of this wheelchair tipping and the point where this wheelchair will tip forward, back or to the side depends on its center of balance. Please note that the following factors can affect the wheelchair's center of balance:

- Elevation of the seat
- Height and angle of the seat/backrest
- Body position or weight distribution
- Driving on an incline such as a ramp or a hill
- Use of a backpack or other accessories, depending on the amount of weight added.

If your wheelchair begins to move in an unexpected manner, immediately release the joystick to stop the wheelchair. Except in an emergency, do NOT use the on/off button to stop your wheelchair. This will cause the wheelchair to stop abruptly and may cause personal injury.

#### **Fixed Seat Post**

Adjusting the seat height may only be performed by an authorized service provider. See the Service Manual for more information.



## Safety Instructions



### WARNING

#### **Positioning Belt**

Permobil positioning belts are designed to position the user only and will not protect you in an accident. You may even receive further injury from the belts.

#### **Support Wheels**

If your wheelchair is equipped with support wheels, they must always be mounted when the wheelchair is being driven.

#### **Transfer into and out of the chair**

Be sure that the power is turned OFF before entering or leaving the wheelchair and before lifting the control side armrest.

When transferring into or out of the wheelchair, every precaution should be taken to reduce the distance between the wheelchair and the place to which the user is transferring. Overextending this distance can cause user to overexert, lose balance, or fall.

Permobil recommends that users transfer in the presence of or with the assistance of an attendant.

Use caution when bending or reaching.

Never use the joystick as a handhold or point of support.

Do not use foot plates or armrests as supports when transferring into or out of the wheelchair. The footplates and armrests are not designed to be weight-bearing structures. Excessive force may cause them to give way, resulting in personal injury or property damage, including damage to the wheelchair.

## Safety Instructions



### WARNING

#### **Passengers**

The wheelchair is not intended to transport passengers, regardless of the age of the passenger. The Maximum User Weight stated in the Owner's Manual for your seating includes the user and any personal effects. The Maximum limit should not be exceeded. The wheelchair's maneuverability and stability can be degraded as a result.

#### **Environmental Conditions**

Protect your wheelchair from exposure to any type of moisture, including rain, snow, or wash. Exposure to moisture can cause the chair to short-circuit, catch fire and cause personal injury or property damage. Do not operate your wheelchair if it has been exposed to moisture until it has dried completely.

If any of the shrouds or the joystick boot has cracks or tears, they must be replaced immediately. Failure to do so can allow moisture to enter the electronics and cause personal injury or property damage, including fire.

Do not operate your wheelchair in icy or slippery conditions. These conditions can lower the performance and safety of your wheelchair which could lead to an accident, personal injury and property damage, including damage to the wheelchair.

**NOTE:** *Extreme care should be exercised when using oxygen in close proximity to electric circuits and other combustible materials. Contact your oxygen supplier for instruction in use of oxygen.*

## Safety Instructions



### WARNING

#### **Transport**

The wheelchair must be transported in or with transport solutions that have been approved for this purpose.

Check that the wheelchair is properly secured and that the wheel locks are not disengaged. The wheelchair can be locked into position by running fastening straps through the brackets at the front and back. Also check that the fastening points on the transport vehicle are well-anchored.

A defectively fastened chair can cause serious injury to persons in the vehicle and serious damage to the vehicle.

#### **Use Prohibited in Motor Vehicles**

Permobil recommends that users NOT be transported in any kind of vehicle while in their wheelchair, unless the user is in an approved Permobil wheelchair configuration, has secured the wheelchair using a Permolock C, and is using a seatbelt attached to the vehicle. The only other safe alternative is that users be transferred into factory vehicle seating for transportation and use safety restraints made available by the auto industry. The only wheelchair transportation system Permobil recommends is a Permolock C used in combination with an approved Permobil wheelchair.

Unless using a Permolock C with an approved Permobil wheelchair, never sit in your wheelchair while in a moving vehicle. In an accident or sudden stop, you may be thrown from the chair and seriously injured or killed.

Permobil positioning belts are designed to position the user only and will not protect you in your vehicle if you are in an accident.

## Safety Instructions



### WARNING

#### **Maintenance and Service**

Carry out only the service and maintenance which are stated in the Owner's Manual. All other service and maintenance must be performed by a qualified service technician authorized by Permobil to perform such service on Permobil products

During all work on the electrical system of the wheelchair, the Circuit Breaker must always be in OFF position. To avoid the risk of electric shock, use extreme caution when using metal objects while working on the batteries. Short-circuiting can easily cause an explosion. Never perform service on the wheelchair without using protective gloves and goggles. Failure to do so can lead to personal injury.

Do not use parts or accessories not authorized by Permobil. Use of unapproved "aftermarket" accessories and parts may cause changes in the wheelchair, which may make the wheelchair unstable or uncontrollable. Such use may also void the warranty on the wheelchair.

Connecting any unapproved electrical or electronic devices to the wheelchair's electrical system can cause damage to the chair and caused the chair to become uncontrollable or drive erratically. Such use may also void the warranty.

The wheelchair is heavy and contains many moving parts, which means that the risk of being caught between them is always present.

#### **Charging of Batteries**

Charging must be done in a well-ventilated room, not in a wardrobe or closet. Charging must not be done in a bathroom or wet room. Only chargers with a max 10 A charging current (average value) may be used (the RMS value of the charging current must not exceed 12A). When the charger is connected, the chair must not and cannot be driven.

## Safety Instructions



### WARNING

#### **Safety Circuits**

Permobil products are equipped with safety circuits. Inhibit circuits prevent the wheelchair from driving under certain conditions. Speed reduction circuits limit the wheelchair's maximum speed under certain conditions. Limit switch circuits limit the wheelchair's functions under certain circumstances. Overload protection circuits shut the wheelchair off in case of an overload. The user should stop using the wheelchair immediately and consult an authorized Permobil distributor if any of these circuits should become disabled.

Any attempt to modify the safety circuits will result in unsafe operation of the wheelchair and could cause the chair to become unstable or uncontrollable. Such modifications may also void the wheelchair's warranty.

#### **Changing Batteries and Fuses**

The Circuit Breaker must always be in OFF-position when batteries and fuses are replaced.

Observe care in the use of metallic objects when working with batteries. A short-circuit can easily cause an explosion. Always use protective gloves and protective eye-glasses.

#### **Filling Air into tires**

Check at regular intervals that the wheelchair's tires have the prescribed tire pressure. Incorrect tire pressure can cause deteriorating stability and maneuverability.

The prescribed tire pressure is 29-36 psi (200-250 kPa).

Note that overfilling causes a risk of explosion.

## Safety Instructions



### WARNING

#### **Changing Tires**

Avoid the use of sharp-edged tools when working with tires.

If the wheel bolt is removed for tire service, replace it with a new, unused part from Permobil and tighten the bolt to the recommended torque. Also, inspect the drive axle and wheel rim for any damage. Damage to either part can cause the wheel bolt to loosen or fracture. Permobil recommends that wheel bolts be used only one time.

#### **Storage**

The wheelchair and its accessories must always be shut off when they are not being used. Always store the wheelchair so that access for unauthorized individuals is avoided.

Never store the wheelchair in a room in which condensation can arise (mist or dampness on the surfaces) e.g. in pool areas, laundry rooms, or similar rooms.

If you are unsure as to how your wheelchair and its accessories should be properly stored, contact your supplier or Permobil for more information.

#### **Damages/malfunctions on the wheelchair and its accessories**

If you experience that the wheelchair in any manner is not behaving as expected or if you suspect that something is wrong: Stop driving as soon as possible, shut off the wheelchair and contact your service contact or Permobil for more information.

It's also of greatest importance that Permobil be informed if the wheelchair and its accessories have been subjected to transport damages, damages during driving or damages due to another cause as soon as possible after the event. There exists a risk that the wheelchair and its accessories can no longer be used in a safe and secure manner.

## Safety Instructions



### NOTE

#### **Recycling of Batteries**

Used or broken drive batteries should be taken care of in an environmentally correct manner in accordance with locally applicable recycling directions.

#### **EMC Requirements**

The electronics of an electrical wheelchair can be affected by external electromagnetic fields (for example from mobile telephones). Similarly, the electronics of the wheelchair itself can also emit electromagnetic fields that can affect the immediate surroundings (for example certain alarm systems in businesses).

The limit values for Electromagnetic Compatibility (EMC) with respect to electrical wheelchairs is set in the harmonized standards for the EU in the Medical Devices Directive, No. 93/42/EEC.

Permobil's electronic wheelchair's comply with these limit values.

Also see Important Information about **Electromagnetic Interference (EMI)** on page 94-95.

## Design and Function

### General

The Permobil C500 is a power wheelchair for outdoor and indoor driving intended for persons with functional impairments.

The wheelchair consists of a chassis and a seat. The seat consists of the seat frame, seat plate/backrest, armrest/legrest, seat lift/fixed seat and possible accessories and additional options such as a headrest, calf rest, chest support, etc.

In these operating instructions, we have chosen to show the wheelchair with our Corpus II seat. The management of the chassis and most of its functions are, however, the same regardless of which seat model is selected.

### Overview



- |                  |                              |
|------------------|------------------------------|
| 1. Backrest      | 6. Front Wheel (drive wheel) |
| 2. Control Panel | 7. Rear Wheel                |
| 3. Seat          | 8. Chassis                   |
| 4. Legrest       | 9. Armrest                   |
| 5. Footplate     |                              |



## Seat

The Permobil C500 can be combined with different seat models, which are supplied with separate operating instructions.

## Driving

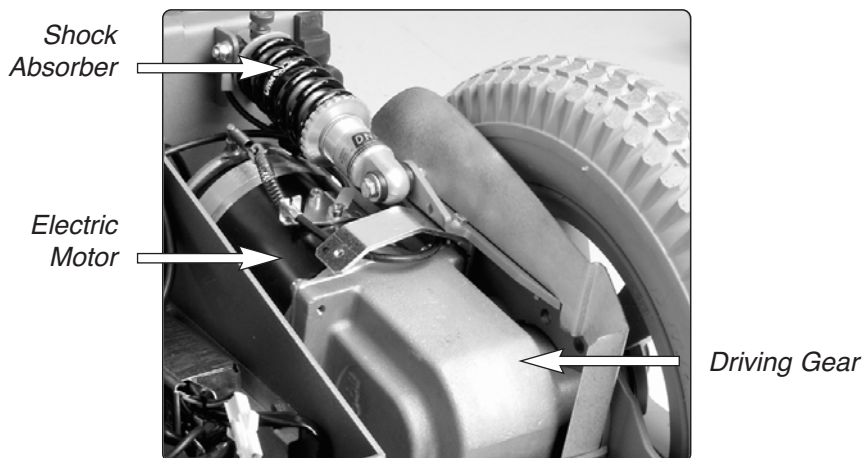
The wheelchair has a drive pack for each drive wheel. The motors regulate the speed, turning and braking. A joystick on the control panel sends signals to the electronics unit. The electronics unit then controls the motors.

## Shock Absorbers

The wheelchair is fitted with two shock absorbers, with adjustable spring force. If the weight of the user is not specified, the wheelchair is supplied with the shock absorbers set to a standard value, which is correct for a user from 110 – 154 lbs.

## Adjusting Spring Force

Adjustments should be made by someone familiar with the design and operation of the shock absorbers. When adjustment is required, contact your nearest service engineer/service center or Permobil.



## Seat Lift

The Permobil C500 can be fitted with an electrically controlled seat height adjuster. An actuator device which is controlled from the maneuvering panel makes it possible to raise the seat up to 7 3/4" to adapt the height to tables, benches, etc. If the seat lift is raised from its lowest position, the wheelchair's maximum speed is reduced.

## Seat Tilt

The Permobil C500 can be fitted with an electric seat tilt actuator adjuster, which lets you adjust the angle of the seat. The electric seat tilt actuator is controlled from the control panel or from the seat control panel.



### NOTE

#### User Weight over 220 Lbs.

If the user weight exceeds 220 Lbs. the wheelchair can be provided with safety inhibits on the seating system to secure the wheelchair's stability. These inhibits prevents the ability to tilt the backrest/seat tilt backward when the seat lift is raised from its lowest position, or driving the seat lift upward if the backrest is tilted backward more then 45 degrees.



*Seat Lift*



*Seat Tilt*

## Wheels

The front wheels have pneumatic tires and the rear wheels can have either pneumatic or solid rubber tires.

## Lights and Reflectors

In the standard version the wheelchair is equipped with reflectors in the front and back as well as on the sides. Front/back lights and flashing indicators are available as accessories



*Two Front Reflectors*



*Two Rear Reflectors*



*Two Side Reflectors*

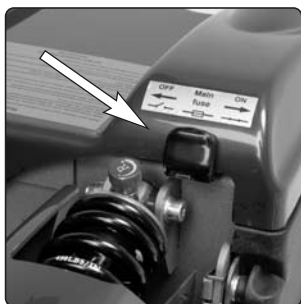
## Electrical system

### Circuit Breaker

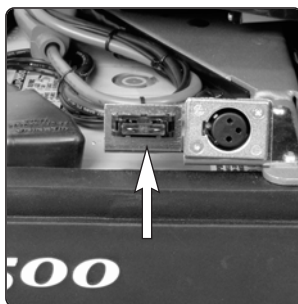
Permobil C500 is equipped with a 63A (C500) or 80A (C500s) automatic Circuit Breaker, which can be reset after having been triggered. It also functions as a battery isolator and is controlled (ON/OFF) via the lever located above the left battery cover.

### Charging Fuse 15A/Charging Socket

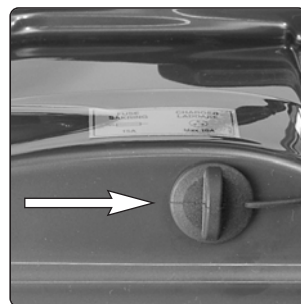
The Charging Fuse is located under the rear chassis cover and the Charging Socket is located in an cutout up on the right side at the rear end of the chassis cover and is covered by a rubber protection.



*Lever for automatic  
Circuit Braker*



*Charging Fuse 15A*



*Charging Socket*



#### NOTE

Always shut off the Power Supply on the Control Panel before switching off the Circuit Breaker.



#### WARNING

A triggered automatic Circuit Breaker can indicate larger electrical faults. The cause should be checked carefully before the circuit breaker is reset. Always contact an authorized serviceman or Permobil when in doubt.



#### WARNING

Always shut off the Power Supply on the Control Panel before changing the Charging Fuse. The battery charger must not be connected when the Charging Fuse is replaced.

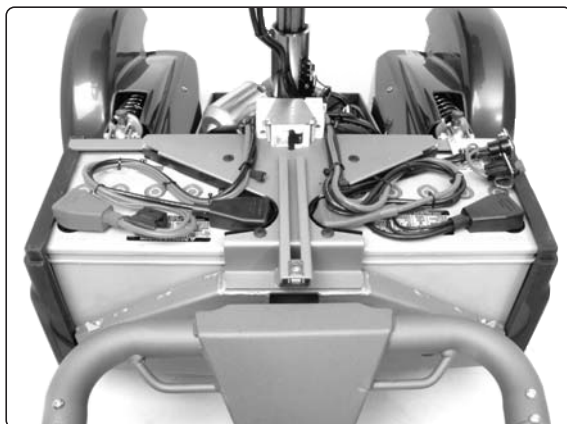
A triggered Charging Fuse can indicate a problem or defect with batteries, charger, charger cables or the wheelchair's charging socket.

The cause of a triggered Charging Fuse should be carefully checked before the fuse is replaced.

## Electrical System

### Batteries

The wheelchair's two batteries are located under the rear end of the chassis cover. Both of the batteries are easily accessible for maintenance and battery replacement.



*Location of the Batteries*



#### NOTE

Used or broken drive batteries should be taken care of in an environmentally correct manner in accordance with locally applicable recycling directions



#### WARNING

Observe care in the use of metallic objects when working with batteries. A short-circuit can easily cause an explosion. Always use protective gloves and protective eye-glasses.

**The batteries are heavy and must be handled with care.**

## Control Panel Pilot+

The Control Panel consists of a joystick, function buttons and indicator lights.

Your wheelchair may also be equipped with an extra Seat Control Panel in addition to the control panel.

You can choose whether you wish to control the electrical seat functions from the seat control panel or from the control panel.

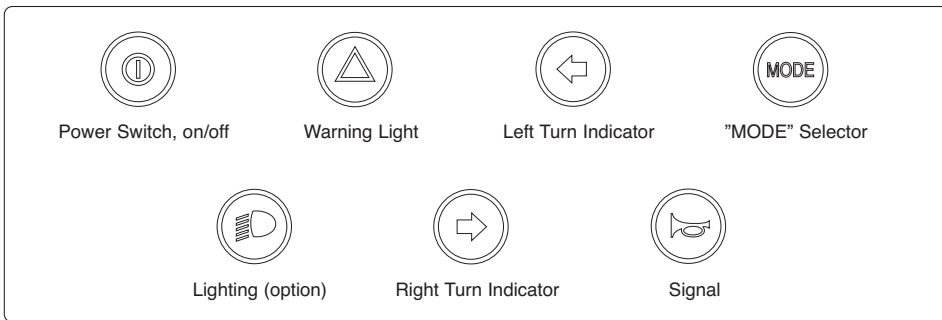
### *Control Panel Overview*



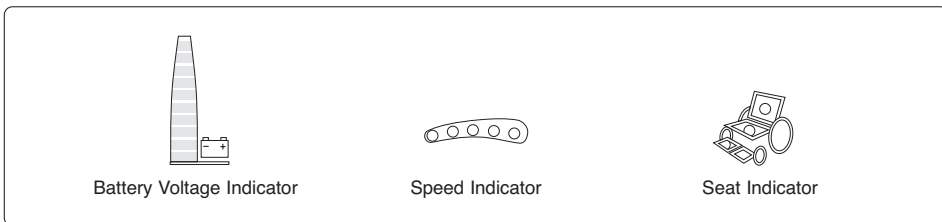
### Function Buttons/Indicator Lights

On the control panel there are a total of 7 function buttons and a total of 3 indicator lights.

#### Function Buttons

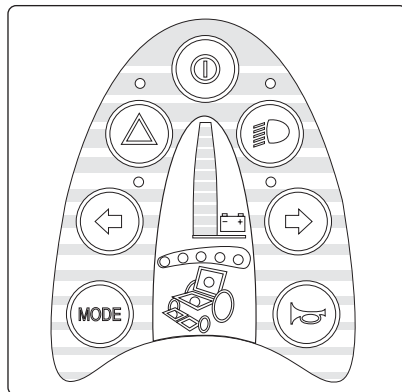


#### Indicator Lights



## Panel Display for Control Panel JSM-L 7key Pilot+

**NOTE!** If your wheelchair is not equipped with lights (option) the push buttons for lights and turning indicators have no function. However the turning display lamps on the control panel flash when the warning button is activated.



**Overview Panel Display**



### Power Switch, On/Off

Button to power up and power down the wheelchair. This button must have been pressed for the chair to operate.



### **WARNING**

Do not use the Power Switch Button to stop the wheelchair unless there is an emergency. If you do, you may get thrown out of the chair or shorten the life of the wheelchair drive components.



### Warning Symbol

When you press the switch, the indicators lamps for warning symbol (red lamp) and for both indicator lights (green lamp) flash on the control panel. If your wheelchair is equipped with lights, the turning indicators on the chassis also flash to attract attention.

**NOTE!** This function works even when the start button is switched off.



### Turning Indicators

Pressing the right or left arrow activates the wheelchair's turning indicators.



### MODE (selector)

Activates the speed indicator and electric seat functions.





### Lights (option)

Press the switch to turn on the lights of the wheelchair.



### Warning Horn

Press the button to sound the horn and attract attention.



### Seat Function Indicator

Indicates active seat function when Leverman is used.



### Speed Display

Indicates the adjusted speed at which the wheelchair is set.

- 1 - 2 lamps = Low speed
- 3 - 4 lamps = Medium speed
- 5 lamps = Maximum speed



### Battery Voltage Indicator

The battery voltage indicator lets you know how much charge is left in your batteries

The window display on the control panel shows the following indicator lights (from bottom to top):

- Red+Yellow+Green = Fully charged
- Red+Yellow = Half charged
- Red = Charge the batteries

The best way for you to use the indicator is to learn how it behaves as you

drive your wheelchair. Like the fuel gauge in a car, it is not completely accurate, but will help you avoid running out of "fuel".

The indicator gives you a more accurate reading about a minute after you start driving the wheelchair.

The voltage indicator also serves as a "fault indicator" for the wheelchair's electronic system. See page 66 for more information.

## Locking/Unlocking the Wheelchair

Wheelchairs with Pilot+ control system are equipped with a security key which can be used to lock the wheelchair to prevent unauthorized use.

### To lock the wheelchair:

Make sure the wheelchair is switched On. The key should then be inserted into and withdrawn from the panel outlet. The wheelchair will now be locked.

### To unlock the wheelchair:

To unlock the wheelchair, switch it On. The maximum speed indicator will ripple up and down but driving will not be possible. The key should now be inserted into and withdrawn from the panel outlet. The wheelchair can now be driven.



## Joystick

The primary function of the joystick is to control the speed and direction of the wheelchair. The further you push the joystick from the center position, the faster the wheelchair will move. When you release the joystick the brakes are automatically applied.

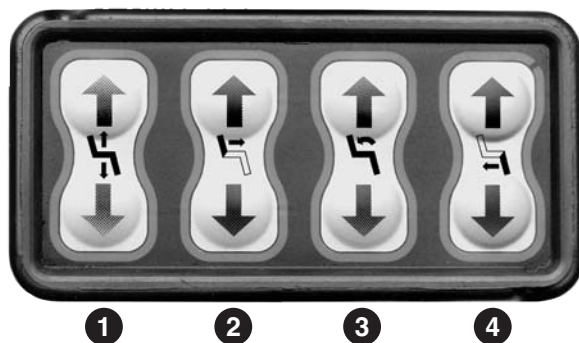
If the wheelchair is fitted with actuators, the joystick can also be used to select and move actuators, see page 37.



## Seat Control Panel

With this panel, the wheelchair's electrical seat functions are controlled.

**NOTE!** The number of available functions and their position on the panel, can vary depending on how your wheelchair is equipped.



### 1. Seat Lift

The seat is raised when the top part of the seat lift button is pressed, and lowered when the bottom part of the button is pressed.

### 2. Backrest Recline

The backrest is tilted backwards when the bottom part of the backrest angle button is pressed and forwards when the top part of the button is pressed.

### 3. Seat Tilt

The seat is angled backwards when the bottom part of the seat tilt angle button is pressed, and move forwards when the top part of the button is pressed.

### 4. Legrest

The legrest moves forwards when the top part of the leg support button is pressed, and backwards when the bottom part of the button is pressed.

## Leverman (Joystick Manager)

With the help of Leverman, you can set the maximum speed of the wheelchair and also control the electric seat functions.

### Speed Selector

Press MODE button once. The speed indicator lights flash and by moving the joystick to the right/left you can increase/decrease the maximum speed of the wheelchair.

- Confirm your setting and return to drive by pressing the MODE button twice or move on to next step by one press.

**NOTE!** If the joystick is moved forwards/backwards during setting of the maximum speed, the chair will go back to drive mode using the present speed range.

### Legrest

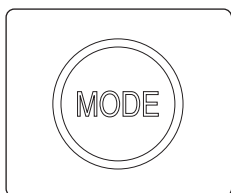
Press MODE button twice. The right footplate indicator lamp is lit. Move the joystick forward/backwards to move the legrest out or in.

- Make your adjustment and return to drive by pressing the MODE button once or go on to next step by moving the joystick to the right.

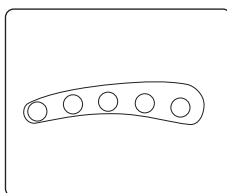
### Seat Lift/Seat Tilt/Backrest

Press MODE button twice. The right footplate indicator lamp is lit. By moving the joystick to the right or left you can now select desired seat function and make your adjustments by moving the joystick forward/backward.

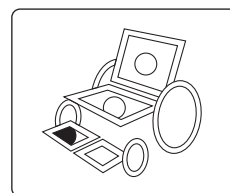
- Return to drive by pressing the MODE button once.



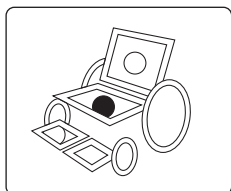
MODE Button



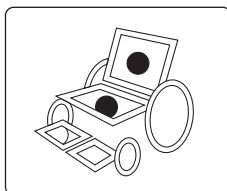
Speed Indicator



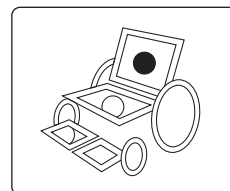
Legrest active



Seat Lift active



SeatTilt active



Backrest Recline active

## Control Panel R-Net

The Control Panel consists of a joystick, function buttons and an LCD Screen. At the back of the panel you also find the Charger Socket and two Jack Sockets.

Your wheelchair may also be equipped with an extra Seat Control Panel in addition to the control panel.

*Control Panel Overview*



### Charger Socket

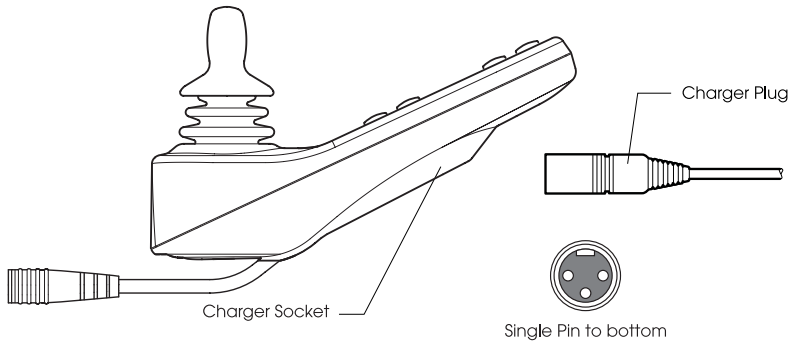
This socket should only be used for charging or locking the wheelchair. Do not connect any type of programming cable into this socket. This socket should not be used as a power supply for any other electrical device. Connection of other electrical devices may damage the control system or affect the E.M.C. performance of the wheelchair.

**NOTE**

To achieve a faster and more effective charging, we recommend to use the wheelchair's charging socket on the chassis. See page 57.

**WARNING**

The wheelchair's warranty will be voided if any device other than a battery charger supplied with the wheelchair, or the lock key is connected into the control panels charger socket.



## Locking the Control System

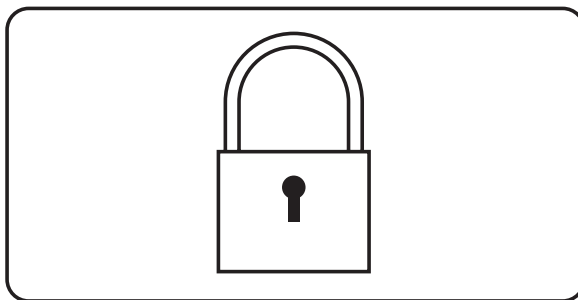
The Control System can be locked in one of two ways. Either using a button sequence on the keypad or with a physical Key. How the Control system is locked depends on how your system is programmed.

### Keypad Locking

To lock the wheelchair using the keypad:

- While the control system is switched on, depress and hold the On/Off button.
- After 1 second the control system will beep. Now release the On/Off button.
- Deflect the joystick forwards until the control system beeps.
- Deflect the joystick in reverse until the control system beeps.
- Release the joystick, there will be a long beep.
- The wheelchair is now locked.

The following screen will be displayed.



To unlock the wheelchair:

- If the control system has switched off, press the On/Off button.
- Deflect the joystick forwards until the control system beeps.
- Deflect the joystick in reverse until the control system beeps.
- Release the joystick, there will be a long beep.
- The wheelchair is now unlocked.

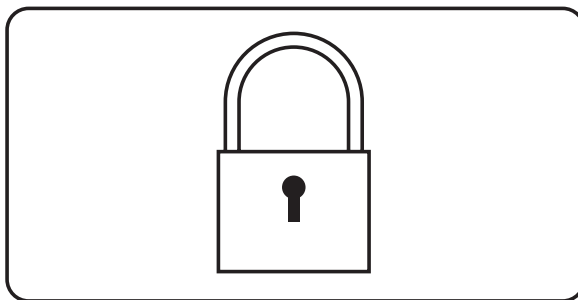


## Key Locking

To lock the wheelchair with a key lock:

- Insert and remove a PGDT supplied key into the Charger Socket on the Joystick Module.
- The wheelchair is now locked.

The following screen will be displayed.

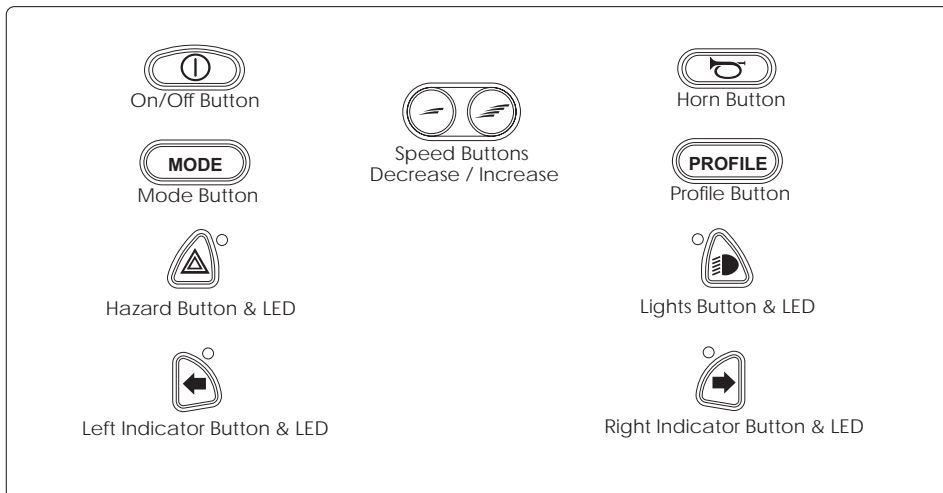


To unlock the wheelchair:

- Insert and remove a PGDT supplied key into the Charger Socket.
- The wheelchair is now unlocked.

## Function Buttons

On the control panel there are a total of 10 Function Buttons.



### On/Off Button

The On/Off button applies power to the control system electronics, which in turn supply power to the wheelchair's motors.



#### WARNING

Do not use the On/Off Button to stop the wheelchair unless there is an emergency. If you do, you may get thrown out of the chair or shorten the life of the wheelchair drive components.

### Horn Button

The horn will sound while this button is depressed.

### Speed Decrease Button

This button decreases the maximum speed setting. Depending on the way the control system has been programmed a momentary screen may be displayed when the button is pressed.

### **Speed Increase Button**

This button increases the maximum speed setting. Depending on the way the control system has been programmed a momentary screen may be displayed when the button is pressed.

### **Mode Button**

The Mode button allows the user to navigate through the available operating Modes for the control system. The available modes are dependant on programming and the range of auxiliary output devices connected to the control system.

### **Profile Button**

The profile button allows the user to navigate through the available Profiles for the control system. The number of available Profiles is dependant on how the control system is programmed. Depending on the way the control system has been programmed a momentary screen may be displayed when the button is pressed.

### **Hazard Warning Button and LED\*)**

This button activates and de-activates the wheelchair's hazard lights. Depress the button to turn the hazards on and depress the button again to turn them off. When activated the hazard LED and the indicator LED's will flash in sync with the wheelchair's indicators.

### **Lights Button and LED\*)**

This button activates and de-activates the wheelchair's lights. Depress the button to turn the lights on and depress the button again to turn them off. When activated the lights LED will illuminate.

### **Left Indicator Button and LED\*)**

This button activates and de-activates the wheelchair's left indicator. Depress the button to turn the indicator on and depress the button again to turn it off. When activated the left indicator LED will flash in sync with the wheelchair's indicator.

### **Right Indicator Button and LED\*)**

This button activates and de-activates the wheelchair's right indicator. Depress the button to turn the indicator on and depress the button again to turn it off. When activated the right indicator LED will flash in sync with the wheelchair's indicator.

\*)Only if the wheelchair is provided with lights.

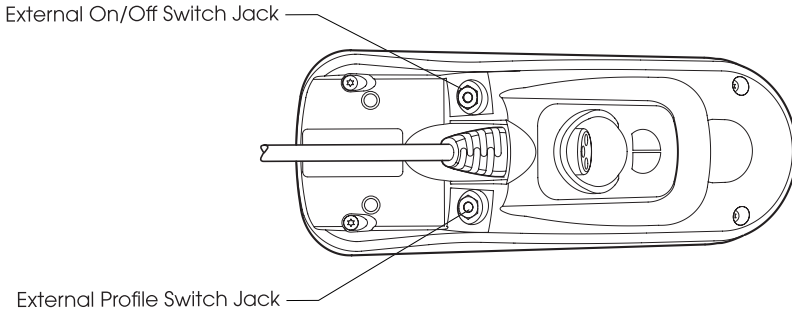
## Jack Sockets

### External On/Off Switch Jack

This allows the user to turn the control system on and off using an external device, such as a buddy button.

### External Profile Switch Jack (If profiles programmed/used)

This allows the user to select Profiles using an external device, such as a buddy button. To change the Profile whilst driving simply press the button.

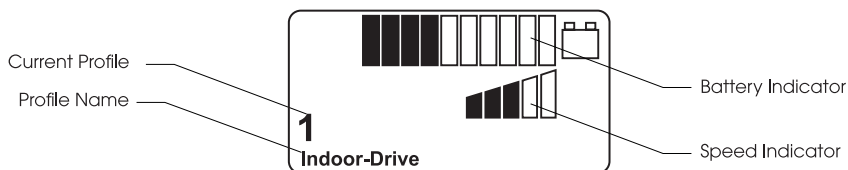


## LCD Screen

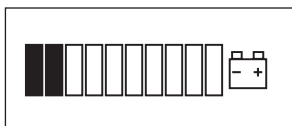
The status of the control system can be understood by observing the LCD screen. The control system is on when the screen is backlit.

### Screen Symbols

The Drive screen for the R-net has common components, which will always appear, and components which will only appear under certain conditions. Below is a view of a typical Drive screen in Profile 1.



### Battery Indicator



This displays the charge available in the battery and can be used to alert the user on the status of the battery.

#### *Steady*

This indicates that all is well.

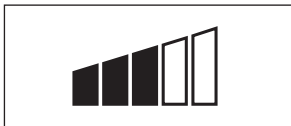
#### *Flashing Slowly*

The control system is functioning correctly, but you should charge the battery as soon as possible.

#### *Stepping Up*

The wheelchair batteries are being charged. You will not be able to drive the wheelchair until the charger is disconnected and you have switched the control system off and on again.

## Speed Indicator



This displays the current speed setting.

The speed setting is adjusted using the Speed Buttons.

## Current Profile



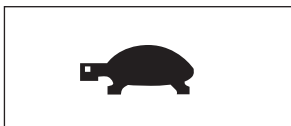
The Profile Number describes which Profile the control system is currently operating in. The Profile Text is the name or description of the Profile the control system is currently operating in.

## In Focus



When the control system contains more than one method of direct control, such as a secondary Joystick Module or a Dual Attendant Module, then the Module that has control of the wheelchair will display the In Focus symbol.

## Speed Limit



If the speed of the wheelchair is being limited; for example, by a raised seat, then this symbol will be displayed. If the wheelchair is being inhibited from driving, then the symbol will flash.

## Restart



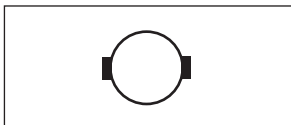
When the control system requires a restart; for example, after a module re-configuration, this symbol will be flashed.

## Fault



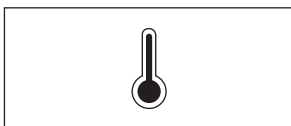
The control system can detect a wide variety of errors. When the system has detected an error that is not severe enough to cause the system to trip, then this symbol will be displayed.

## Motor Temperature



This symbol is displayed when the control system has intentionally reduced the power to the motors, in order to protect them against heat damage.

## Control system Temperature



This symbol is displayed when the control system has intentionally reduced its own power, in order to protect itself against heat damage.

## Timer



This symbol is displayed when the control system is changing between different states. An example would be entering into Programming Mode. The symbol is animated to show the sands falling.

## E-Stop



If the control system is programmed for latched drive or actuator operation, then it is normal for an Emergency Stop Switch to be connected into the External Profile Switch Jack. If the Emergency Stop Switch is operated or disconnect, this symbol will flash.

# Handling

## General

The Wheelchair is designed for indoor and outdoor use. When driving indoors, you must observe care when driving in, for example, narrow passageways, when passing through doors and entries as well as when using elevators, ramps, etc. Also be conscious of the risk of things getting caught in the machinery when you use the electrical seat lift and seat tilt, in particular when the wheelchair has been run in under a table, workbench or the like.

Outdoors, you must remember to drive very slowly on steep downhill slopes and to observe great care when driving on uneven foundations, on uphill slopes, with sideways slopes and when negotiating obstacles. Always maintain a safe distance from the edge when driving close to drop-offs and precipices and drive using the lowest speed possible for the terrain.

We recommend that you make repeated test drives in surroundings in which you know you feel secure so that you are quite familiar with how the wheelchair and its accessories behave in different situations before you begin using the wheelchair in public areas.

## Driving - General

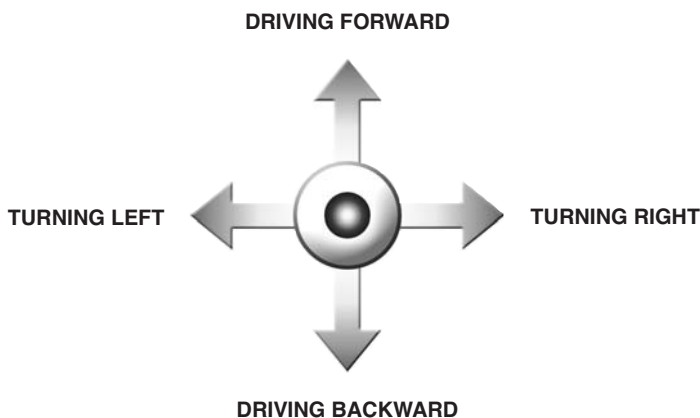
Make sure that the control system is mounted securely and that the joystick position is correct. The hand or limb you use to operate the joystick should be supported, for example by the wheelchair arm pad. Do not use the joystick as the sole support for your hand or limb - wheelchair movements and bumps could upset your control.

1. Switch on the power by pressing the start button on the control panel.
2. Set an appropriate maximum speed. It is preferable to begin with a low speed.
3. Carefully move the joystick forward to drive forward, and backward to drive backward.
4. The speed of the wheelchair is adjusted continuously by the joystick being moved different distances forward and backward respectively. The wheelchair's electronics make creep driving possible over edges (max. 3 in.) You can drive up to the edge, and then carefully drive over it.



## Driving Technique

The control system interprets your joystick movements and produces appropriate movements of your wheelchair. You will need very little concentration to control the wheelchair, which is especially useful if you are inexperienced. One popular technique is to simply point the joystick in the direction you want to go. The wheelchair will "home-in" on the direction you push the joystick. Always think about driving as flexibly as possible and avoid severe braking and avoidance maneuvers.



### NOTE

Do not perform the first test drive on your own. The test drive is of course just a check of how you and the wheelchair function together, and you may need some assistance.

Before driving, check that the wheel lock is set in the drive position.

### WARNING

Do not use the joystick as the sole support for your hand or limb - wheelchair movements and bumps could upset your control!

Always bear in mind that a high speed and extended braking distance entail an increased risk of accidents.

We recommend the use of a positioning seat belt when driving the Permobil C500.

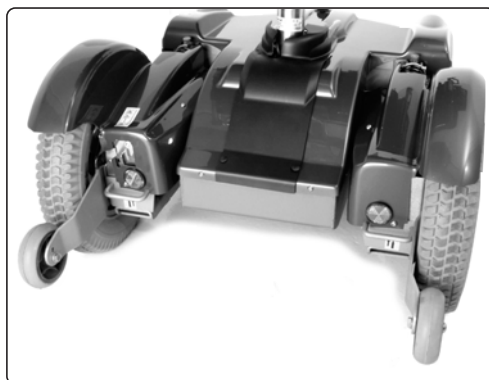
In the event of the wheelchair moving in an unexpected way, **RELEASE THE JOYSTICK!**

This action should stop the wheelchair under any circumstances.

## Driving Rules

### Support Wheels

Your wheelchair can be equipped with support wheels mounted at the front to minimize the risk of the wheelchair tipping over forward when passing obstacles and the like. If your wheelchair is equipped with support wheels, they must always be mounted when the wheelchair is being driven.



*Front Support Wheels*



#### WARNING

The front support wheels (if equipped) must always be mounted when the chair is being driven. There is a risk of tipping.

Always bear in mind that high speed and extended braking distance entail an increased risk of accidents. We recommend the use of positioning belt (option) when seated in your powered wheelchair.

Never drive rapidly or at full speed along narrow passages, on narrow sidewalks, etc. where an incorrect maneuver or incorrect steering can cause an increased risk of accidents.

Always drive at low speed on uneven surfaces.

Keep in mind that driving along slopes will have an effect on the wheelchair and could make it steer to the side. Never drive at full speed along slopes.

Use of the seat lift, backrest/seat tilt function displaces the center of gravity, which can have a negative effect on the chair's handling characteristics while it is being driven. So you should never drive at full speed if an extreme backrest/seat tilt is being used.

### Driving over Obstacles

Do not drive the wheelchair over obstacles of a height greater than 3 inches. Driving over tall edges increases the risk of tipping over as well as the risk of damage to the wheelchair.

Negotiating obstacles must always be done with great care.



#### WARNING

Do not drive the wheelchair over obstacles of a height greater than 3 inches. Negotiating obstacles must always be done with great care.



#### WARNING

Operating the seat lift, seat tilt, backrest recline changes the center of gravity and increases the risk of tipping over, hence those seat functions shall only be used on level ground, driving in low speed with great caution.

## Driving on Downhill Slopes

Driving on downhill slopes must always be done at a low speed and with great care.

Avoid rapid braking, abrupt avoidance maneuvers and never maintain a speed higher than that at which you can maneuver the wheelchair in a safe and secure manner.

**When driving on downhill slopes with an uneven surface (for example grass, gravel, sand, ice or snow) a great deal of extra care must be observed.**



### WARNING

Do not drive down a downhill slopes with a slope of greater than 12 degrees.

\*) Dynamic stability according to ISO 7176-2= 6°.



### WARNING

Operating the seat lift, seat tilt, backrest recline changes the center of gravity and increases the risk of tipping over, hence those seat functions shall only be used on level ground, driving in low speed with great caution.

## Driving on Uphill Slopes

Driving on uphill slopes must always be performed with great care.

Avoid abrupt avoidance maneuvers and never maintain a speed higher than that at which you can maneuver the wheelchair in a safe and secure manner.

**When driving on uphill slopes with an uneven surface (for example grass, gravel, sand, ice or snow) a great deal of extra care must be observed.**



### WARNING

Do not drive up an uphill slope of greater than 12 degrees.

\*) Dynamic stability according to ISO 7176-2= 6°.



### WARNING

Operating the seat lift, seat tilt, backrest recline changes the center of gravity and increases the risk of tipping over, hence those seat functions shall only be used on level ground, driving in low speed with great caution.

## Driving with Sideways Slopes

Driving with a sideways slope must always be performed with great care.

Avoid abrupt avoidance maneuvers and never maintain a speed higher than that at which you can maneuver the wheelchair in a safe and secure manner.

**When driving on sideways slopes with an uneven surface (for example grass, gravel, sand, ice or snow) a great deal of extra care must be observed.**



**Max 10°**



### WARNING

Do not drive the wheelchair on sideways slopes of greater than 10 degrees. There is a risk of tipping over.



### WARNING

Operating the seat lift, seat tilt, backrest recline changes the center of gravity and increases the risk of tipping over, hence those seat functions shall only be used on level ground, driving in low speed with great caution.

## Manual Handling of the Magnetic Wheel Locks

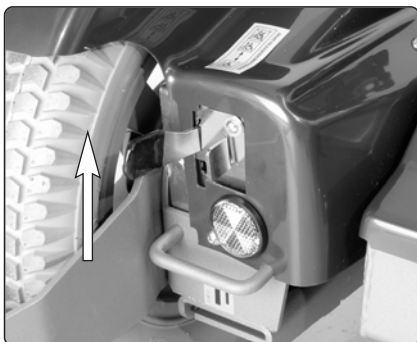
The magnetic wheel locks can be released to make it possible to move the wheelchair manually. The wheel lock lever is located at the front of the right wheel cover.

### Releasing the Wheel Locks

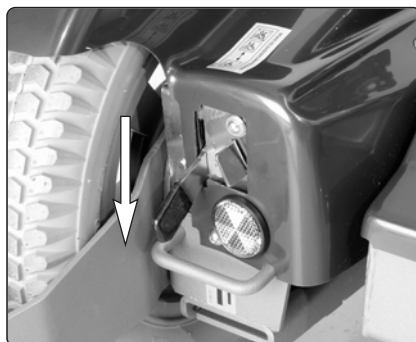
1. Switch off the wheelchair with the On/Off button on the control panel.
2. Move the lever upwards to release the wheel locks. Hold the lever up as you simultaneously press the lever safety catch to the right to secure the lever. The wheelchair can now be moved manually.

### Engage the Wheel Locks

1. Move the lever upwards to release the lever safety catch. The wheel lock lever will automatically move down to lock position.



*Released Wheel Locks  
with Security Catch*



*Engaged Wheel Locks*



#### WARNING

Do not use the wheelchair on hilly slopes with the wheel lock in free-wheel position.

Do not engage or disengage wheel locks unless power to the wheelchair is off.

In order to avoid the wheelchair rolling away, ensure that the wheelchair is on a level and dry base before releasing the wheel locks.

Be aware that the wheelchair will not have brakes when wheel locks are in the free-wheel position.

Make sure that the person pushing the wheelchair has full control when wheel locks are disengaged.

Always make sure that the wheel locks are engaged after manually moving the wheelchair.



#### NOTE

When the wheel locks are released, the chair will not drive.

If it does, contact your Permobil serviceman as soon as possible.

## Battery Charging

The amount of charge in your batteries depends on a number of factors, including the way you use your wheelchair, the temperature of the batteries, their age and the way they are made. These factors will affect the distance you can travel in your wheelchair. All wheelchair batteries will gradually lose their capacity as they age.

The most important factor that reduces the life of your batteries is the amount of charge you take from the batteries before you recharge them. Battery life is also reduced by the number of times you charge and discharge the batteries.

To make your batteries last longer, do not allow them to become completely discharged. Always recharge your batteries promptly after they are discharged.

If your battery gauge reading seems to fall more quickly than usual, your batteries may be worn out.



### NOTE

If the batteries should be drained completely, it is important that you charge them up again as soon as possible since a complete loss of charge reduces the lifespan of the batteries.



### WARNING

Observe care in the use of metallic objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and protective eye-glasses.

Only chargers with a max 10 A charging current (average value) may be used.  
(The RMS value of the charging current must not exceed 12A.)

Charging must be done in a well-ventilated room, not in a wardrobe or closet. Charging must not be done in a bathroom or wet room.

The charger's charging cable must not be extended.

The charger can become hot and hence must not have anything covering it. The charger must be positioned so that there is an air gap on all of its sides, including below (do not set the charger on thick carpeting, for example).

The charger contact must be replaced if it is damaged or becomes hot during charging. Both the contact on the charger's cord and the wheelchair's charging outlet should be replaced if one of them is damaged or worn. Replacement must be performed by qualified personnel.



## Charging

1. Loosen the charging sockets round rubber protection and connect the charger plug into the battery charging socket up on the right side at the rear end of the chassis cover.
2. Connect the charger to the 110 volt supply and turn on the power for the charger.

***Description and Use of Battery Charger, see supplied Owner's Manual.***

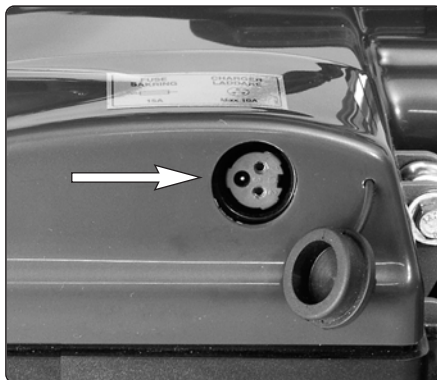
### NOTE

Ensure that the charger plug is pushed fully in position. You will not be able to drive the wheelchair when the charger is connected. If the wheelchair does drive with the charger plugged in, contact your Permobil serviceman as soon as possible.

### WARNING

Only use the battery charger that has been supplied with your wheelchair or recommended by Permobil. The use of incorrect chargers could damage the batteries, wheelchair, control system or charger itself, or may result in parts overheating creating the potential for burns or even fire.

To avoid sparking and unnecessary wear and tear of the wheelchair's charging socket, be sure that the main voltage and the charger is in OFF position when connecting/disconnecting the charging cable to the wheelchair's charging socket.



*Charger Connection*

# Transport

The wheelchair must only be transported in a vehicle that is approved for such purposes.

Check that the wheelchair is properly fastened and that the wheel locks are engaged. The wheelchair can be locked into position by running fastening straps through the brackets in the front and the back, each marked with a yellow sticker.

Secure the wheelchair according to the manufacturer of the vehicle restraint systems instructions. Always make sure that the fastening points on the transport vehicle are well-anchored.

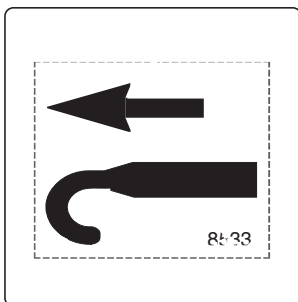
**NOTE**

If your wheelchair is equipped with a Luggage Box (option) difficulty may occur to anchor the wheelchair at the rear fastening brackets.

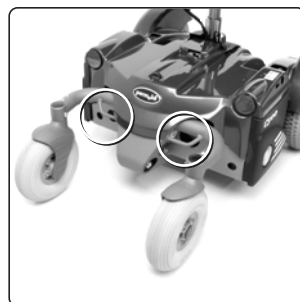
This can be solved by ordering an extra pair of Rear Fastening Brackets. Please contact Permobil or your nearest dealer for more information and how to order.



*Front Fastening Brackets*



*Sticker*



*Rear Fastening Brackets*

**WARNING****Use Prohibited in Motor Vehicles**

Currently, the Department of Transportation has not approved any tie-down or restraint system in a moving vehicle of any type to transport a person while seated in a wheelchair.

Permobil recommends that users NOT be transported in any kind of vehicle while in their wheelchair. The only safe alternative is that users be transferred into factory vehicle seating for transportation and use safety restraints made available by the auto industry. Permobil does not recommend any wheelchair transportation systems.

Never sit in your wheelchair while in a moving vehicle. In an accident or sudden stop you may be thrown from the chair and seriously injured or killed.

Permobil positioning belts are designed to position the user only and will not protect you in an accident. You may even receive further injury from the belts.

When transporting the wheelchair in a vehicle, ensure that the wheelchair is properly secured. If the chair is not properly secured and comes loose, it can cause serious injury to persons in the vehicle and serious damage to the vehicle.

If the wheelchair has to be transported with the user in the chair into the vehicle through a ramp, the wheelchair shall be secured against tipping backwards by a person behind.

Wheelchair users should transfer to the vehicle seat and use the vehicle-installed restraint system whenever it is feasible.

The vehicle restraint belt should not be worn twisted.

Always make sure that the vehicle restraint belt is not adjusted over sharp edges of the wheelchair.

The vehicle restraint belt should not be held away from the body by wheelchair components or parts, such as the wheelchair's armrest or wheels.

All wheelchair-mounted trays shall be removed and secured separately in the vehicle, or be secured to the wheelchair.

When possible, other auxiliary wheelchair equipment should be either secured to the wheelchair or removed from the wheelchair and secured in the vehicle during transit, so that it does not break free and cause injury to vehicle occupants in the event of a collision.

A poorly fastened chair can cause extensive damage and injury both to the people in the transport vehicle as well as to the vehicle itself and the wheelchair if it comes loose.

## General Advice for Air transport

Please refer to the Air Carrier Access Act at 49 USC § 41705 and accompanying regulations at 14 CFR Part 382 for specific guidelines and regulations pertaining to transporting wheelchairs on aircraft in the United States.

Further guidelines on transporting powered wheelchairs and batteries can be found at the Department of Transportation hazardous materials regulations (49 CFR Parts 171, 172, 173, 175).

Due to the variance in aircraft sizes and cargo space dimensions, Always contact the airline prior to traveling or purchasing a ticket to make sure that your Permobil can be accommodated.

When transporting your wheelchair by air, there are especially these three items you should consider:

### 1. Batteries

*Gel batteries:* In most cases they don't need to be taken out of the wheelchair.

If your wheelchair is equipped with a Main Fuse, the electrical connections to the batteries must be disconnected and insulated. If your wheelchair has a Circuit Breaker, make sure the Circuit Breaker is in OFF-position.

*Acid batteries:* Most airlines require that the batteries should be taken out of the wheelchair and that they must be transported in special boxes that the airline can provide.

### 2. The Dimensions and Weight of the Wheelchair

The weight and dimensions of the wheelchair are significant in relation to the type of airplanes in which the wheelchair is to be transported. Always check with the airline before traveling to make sure that the aircraft in question can accommodate your wheelchair.



#### NOTE

The weight and dimensions of the wheelchair listed in this manual are based on the most common configurations of the wheelchair. Wheelchairs which have had custom modifications or additional features may have different dimensions or weights. Be sure to measure the dimensions of your particular chair whenever exact dimensions are critical or required.

Certain airlines can refuse to take acid batteries onboard.

## General Advice for Air transport

### 3. Preventing Damages

The electronic components, as well as other critical parts, in your wheelchair are highly sophisticated and fragile and care must be taken to protect them.

When transporting your wheelchair by air, we recommend that you cover the control panel with soft, shock-absorbing material (foamed plastic or similar) and fold it in towards the backrest.

Protect other fragile parts in a similar fashion. Tape any loose cables to the seat frame or covers.



#### NOTE

In order to ensure that the transport can take place in a safe manner and that no unpleasant surprises arise at the last minute, you should always contact the respective airlines before the transport.

## Maintenance and Repairs

To ensure that your wheelchair works well, you must inspect, maintain, and obtain routine service on it regularly. Every wheelchair is subject to wear and tear between the moving parts and also due to the strains and stresses of typical use. Therefore, you must know how the wheelchair works, how to use it correctly, and how to maintain it. Preventive maintenance will minimize the risk of component failure. If you look after your wheelchair, it will work well and the risk of faults is reduced.

### Tool Kit

A tool kit comes with the wheelchair and contains the following that can be used for performing maintenance and easier repairs.

TOOL	AREA OF USE
Set of Allen Keys	General maintenance/adjustment of seat
11/13 mm Spanner	General maintenance/battery replacement
Seat Lift Crank	Raising the seat
Security Key	Lock/unlock the wheelchair

#### NOTE

Certain repairs can require tools other than those that come with the wheelchair.

#### NOTE

The circuit breaker must always be shut off when replacing batteries or fuses. Shut off the power supply by pressing the On/Off button on the control panel before switching off the power with the circuit breaker. If your wheelchair is equipped with a main fuse, shut off the power by pressing the On/Off button on the control panel.

#### WARNING

Any inappropriate modifications to the wheelchair and its various systems may entail an increased risk of accidents. Carefully follow the recommendations in the Handling section to prevent the risk of accidents in connection with driving.

All modifications to and interventions in the vital systems of the wheelchair must be performed by a qualified service technician. Always contact a qualified service technician in cases of doubt.

## General Batteries/Storage

- Note that a battery drains on its own and a discharged battery can freeze and burst when it is cold. If the wheelchair must be stored without being used for a longer period of time, the batteries should always be charged up once per month so that they do not incur any damage.
- The wheelchair must not be stored in a room where condensation arises (mist or dampness on the surfaces) e.g. laundry rooms or similar rooms.
- The wheelchair can be stored in an unheated room. What is best for the wheelchair from a corrosion standpoint is that the room be some degrees warmer than its surroundings, which keeps the room drier.
- If the wheelchair is equipped with acid batteries, the acid level should be checked regularly. If the wheelchair is equipped with GEL batteries, the fluid level need not be checked.
- The lifespan of the batteries depends entirely upon regular charging.

### Short-term Storage

In order for the charging procedure to give a battery with good capacity, the temperature in the storage room must not be lower than 41 F. Storage at under 41 F increases the risk of the battery not being fully charged when it is to be used as well as increasing the risk of corrosion.

### Long-term Storage

Storage can occur in an unheated room, however the battery should be maintenance-charged at least once per month.



#### WARNING

Observe care in the use of metallic objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and protective eye-glasses.

## Finishes Care and Maintenance

With regular care and maintenance, your Permobil will provide years of superior performance and satisfaction. To maintain the finish quality of your wheelchair, please follow the cleaning procedures provided below.

The instructions for the care and maintenance of Permobil products are provided to you as a service. No warranty is implied since results may vary.

### Vinyl Upholstery

For normal cleaning, wash vinyl upholstery with a soft cloth or soft-bristled brush lathered with mild, nonabrasive soap and lukewarm water. Before the surface dries, wipe with a clean, dry cloth to remove any residue. This procedure may be repeated to remove stubborn dirt or stains.

Ink spots can sometimes be removed by washing with soap and water followed by isopropyl alcohol.

Do not use any cleaning method that is not listed above, as other methods may attack the vinyl and cause eventual degradation.

### Coated Metal

For normal cleaning, wash coated metal surfaces with a soft cloth soaked in detergent and warm water; rinse thoroughly and dry.

Remove scuff marks from low-gloss coatings with pre-softened paste wax, following the manufacturer's instructions.

Remove scuff marks and scratches from high-gloss coatings using automotive polishing compounds, either liquid or paste. After polishing, apply a pre-softened automotive paste wax to restore original sheen.

### Plastic

For normal cleaning, wash plastic surfaces with a soft cloth soaked in mild detergent and warm water. Rinse thoroughly and dry with a soft cloth. Do not use solvents or abrasive kitchen cleaners.



#### WARNING

Do not rinse the wheelchair off with a water hose, its electronics can be damaged. The wheelchair must always be shut off while it is being cleaned.

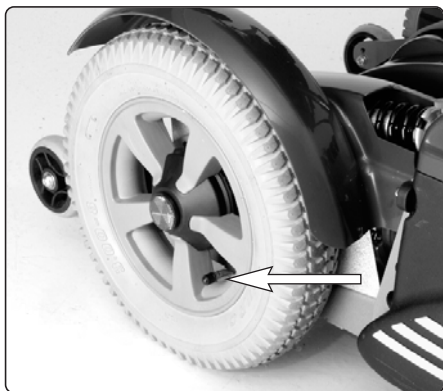


## Wheels

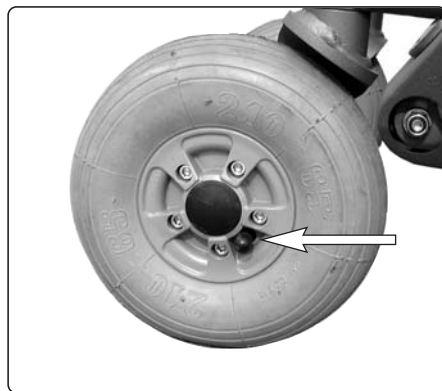
Check at regular intervals that the wheelchair's tires have the prescribed tire pressure. An incorrect tire pressure can cause deterioration in stability and maneuverability, plus extremely low air pressure can give rise to abnormal wear as well as shorter driving distances. So check regularly to see that the tires are maintained at a pressure of 29 psi (200 kPa).

### Filling With Air

1. Unscrew the plastic cap on the air valve of the tire.
2. Connect the compressed air nozzle to the air valve and adjust the tire pressure to the prescribed level.



*Filling Valve, front wheel*



*Filling Valve, rear wheel*

### Replacement of Front Tire inner tube

1. Put the wheelchair up on blocks so that the wheel is free and then let the air out of it.
2. Force the tire off the rim.
3. Replace the broken inner tube.
4. Put the tire back on the rim and fill with air.

### Replacement of Rear Tire inner tube

**NOTE** Applies only if your wheelchair is equipped with air-filled rear tires.

1. Put the wheelchair up on blocks so that the wheel is free and then let the air out of it.
2. Disassemble the rim by unscrewing the five socket head cap screws that are holding the rim together.
3. Replace the broken inner tube.
4. Assemble the rim back together again with the tire, check that the inner-tube is not caught anywhere between the parts of the rim, and fill with air.



#### WARNING

The recommended air pressure for front/rear tires is 29 psi (200 kPa). Overfilling causes a risk of explosion. Incorrect tire pressure can involve a deterioration of stability and maneuverability, so check regularly that the tire contains the prescribed air pressure.

If the wheel bolt is removed for tire service, replace it with a new, unused part from Permobil and tighten the bolt to the recommended torque. Also, inspect the drive axle and wheel rim for any damage. Damage to either part can cause the wheel bolt to loosen or fracture. Permobil recommends that wheel bolts be used only one time.

## Wheel Lock Release

Check regularly, approx. once per month, the functionality of the wheel lock release and lever safety catch.

It must not be possible to drive the wheelchair when the wheel locks are disengaged.

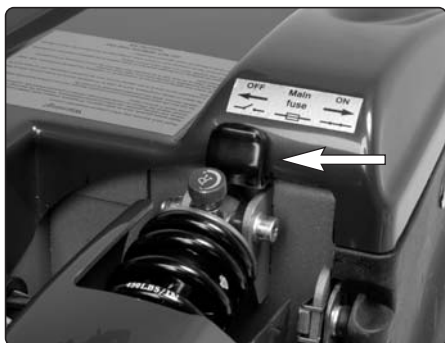


*Wheel Lock Release Lever  
and Safety Catch*

## Changing the Batteries

(Also see Stickers inside the Battery Covers.)

1. Put the wheelchair on a level surface.
2. Shut off the power supply with the On/Off button on the control panel and put the Circuit Breaker in OFF position.
3. Loosen the the rear end of the chassis cover a little by unscrewing the knob that holds the cover.
4. Open the battery covers by loosening the knobs that holds the battery covers, and drop the covers down.
5. Use the battery straps to pull each battery out just enough so you can loosen the first battery connection.
6. Pull the batteries completely out and disconnect the other battery connections.



*Circuit Breaker in OFF position*



*Battery cover/chassis cover handle*



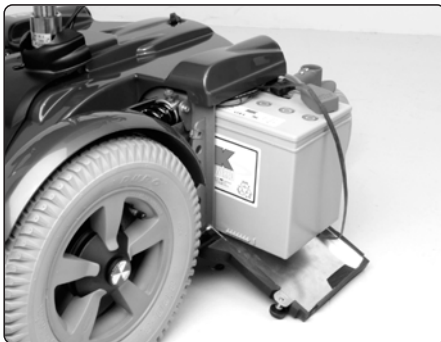
### WARNING

Observe care in the use of metallic objects when working with batteries. A short-circuit can easily cause an explosion. Always use protective gloves and protective eye-glasses.

**The batteries are heavy and must be handled with care.**

## Changing the Batteries

7. Lift the batteries away by using the battery straps.
8. Use the battery straps and connect new batteries in reverse order (leave the straps on the new batteries).
9. Close and lock the battery covers and reassembly the chassis cover.
10. Switch the Circuit Breaker to position ON.



*Pulling out the batteries*



### NOTE

Used or broken drive batteries should be taken care of in an environmentally correct manner in accordance with locally applicable recycling directions.

## Resetting the Circuit Breaker

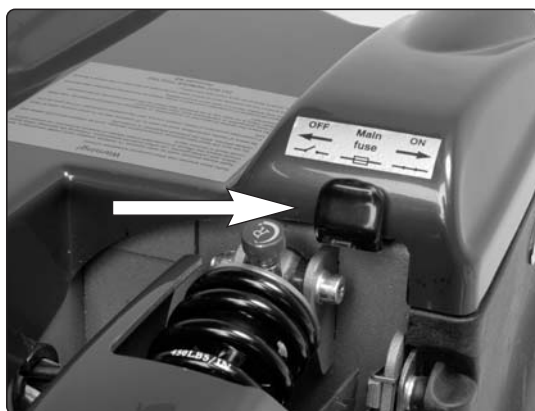


### WARNING

A triggered automatic Circuit Breaker can indicate larger electrical faults. The cause should be checked carefully before the Circuit Breaker is reset. Always contact an authorized serviceman or Permobil when in doubt.

The circuit breaker also serves as a battery isolator, but is normally referred to as a circuit breaker.

Replacement of the circuit breaker is normally not necessary as it is of the automatic type that can be reset when it has been triggered. The resetting is done by placing the switch in the "ON" position.



*Circuit Breaker in "ON" position*



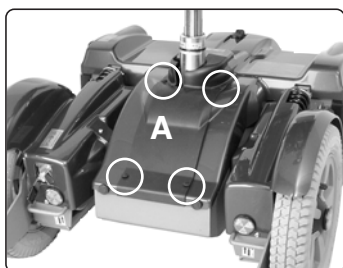
### NOTE

Always shut off the Power Supply on the Control Panel before switching off the power with the Circuit Breaker.

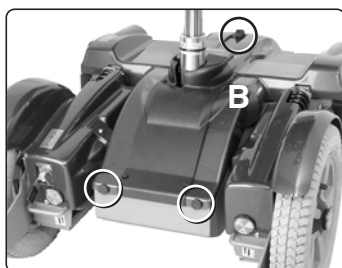
## Replacement of Charging Fuse, 15A

The charging fuse is located under the main chassis cover. To replace the charging fuse, you must remove the main and front center chassis cover.

- Remove the small front center chassis cover. The cover is fastened with four plastic plugs, and can be removed by pulling the cover upwards by hand.
- Remove two knobs that holds the front of the main chassis cover and the knob at the rear. Lift the cover off and replace the triggered fuse with a new 15A charging fuse.
- Reassemble in reverse order.



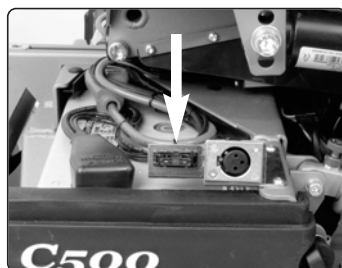
*Remove the Center Chassis Cover (A)*



*Remove the Main Chassis Cover (B)*



*The Charging Fuse is located under the Main chassis cover*



*Charging Fuse 15A*



### WARNING

Always shut off the Power Supply on the Control Panel before changing the Charging Fuse. The battery charger must not be connected when the Charging Fuse is replaced.

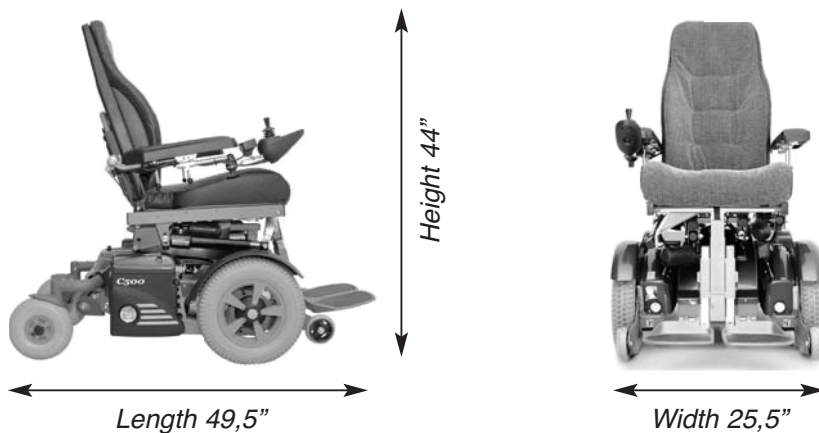
A triggered Charging Fuse can indicate a problem or defects with batteries, charger, charger cables or the wheelchair's charging socket.

The cause of a triggered Charging Fuse should be carefully checked before the fuse is replaced.

## Technical Specifications

The specifications given in the following pages are only applicable to the Permobil C500 chassis with Corpus II Seat.

For size and weight information about each seat, see the Owner's Manual accompanying the seat.



*Smallest transportation size = length 37,5", width 25,5", height 33"*



**DATA**

**General**

Name ..... Permobil C500/C500 Lowrider

**Size and weight**

Length.....49,5”  
Width.....25,5”  
Height C500 .....52,5”  
Height C500 Lowrider .....47,5”  
Smallest Transport Size, lxwxh C500 .....37,5x25,5x33”  
Smallest Transport Size, lxwxh C500 Lowrider .....37,5x25,5x32”  
Weight incl. Batteries and Corpus-Seat .....350 lbs  
Max. Battery Size ..... 10,25x6,75x8,25”

**Wheels**

Tire Size, front.....300 x 8  
Tire Size, back .....210 x 65  
Max Air Pressure, front/back tires .....29 psi (200 kPa)

**Performance**

Range .....19 - 25 miles  
Minimum Turning Radius .....28”  
Ability to Negotiate Obstacles .....3”  
Hill Climbing Capability, uphill .....12 degrees\*  
Hill Climbing Capability, downhill .....12 degrees\*  
Sideways Slope Capability .....10 degrees

Max Speed Forward.....	<b>C500</b>	<b>C500s</b>
	5 mph	7,5 mph
Max Speed Backward, approx.....	2,5 mph	2,5 mph

\*Dynamic stability according to ISO 7176-2 = 6°.

**ELECTRIC SYSTEM PILOT+**

**Electronics** .....**C500/C500s**  
PM80/PM100

**Control Panel**  
JSM-L 7key Pilot+

**Batteries**  
Recommended Battery Type..Group 24, Gel  
Battery Capacity .....2x73 Ah  
Charging Time .....9 hour

**Fuses**.....**C500/C500s**  
Circuit Breaker .....63A/80A  
Charging Fuse .....15A/15A

**ELECTRIC SYSTEM R-net**

**Electronics** .....**C500/C500s**  
PM80/PM120

**Control Panel**  
JSM-L-SV

**Batteries**  
Recommended Battery Type..Group 24, Gel  
Battery Capacity .....2x73 Ah  
Charging Time .....9 hour

**Fuses**.....**C500/C500s**  
Circuit Breaker .....63A/80A  
Charging Fuse .....15A/15A

## Trouble Shooting Guide

The troubleshooting guide below describes a number of events that can arise when you use your wheelchair, as well as providing suggestions for solutions. Note that this guide does not describe all the possible events that can arise, and you should always get in touch with your service contact or Permobil when you are unsure.

EVENT	POSSIBLE CAUSE	SOLUTION
The wheelchair does not start.	Batteries discharged.	Charge the batteries.
	The cable connection to the control panel has become loose.	Attach the cable to the control panel.
	Circuit Breaker set in "OFF" position after, for example, changing batteries.	Reset the Circuit Breaker. See page 70.
	<b>Triggered Circuit Breaker.</b>	Carefully check possible causes before resetting. See page 70.
The wheelchair can not be driven.	Battery charger connected.	Terminate the charging and remove the charging cable from the charging outlet.
	Wheel Locks activated.	Reset the Wheel Locks.
	The wheelchair is locked.	Unlock the wheelchair. See page 34 alt. 40
Battery voltage indicator on the control panel blinking once every 2.5 seconds and the wheelchair can not be driven. <i>Only Pilot+!</i>	The control system is in Sleep Mode.	Switch the Start button on the control panel off and on again.
Battery voltage indicator on the control panel rapidly blinking and the wheelchair can not be driven. <i>Only Pilot+!</i>	Fault indicated in the drive electronics.	See pages 76-77. Alt. contact service.
The wheelchair stops while being driven.	The cable connection to the control panel has become loose.	Attach the cable to the control panel.
	<b>Triggered Circuit Breaker.</b>	See page 70.

EVENT	POSSIBLE CAUSE	SOLUTION
<p>The wheelchair can only be driven with reduced speed.  <i>Applies for electrical seat lift only.</i></p>	<p>Seat lift raised from its lowest position.</p>	<p>Lower the seat lift.                      See pages 26.</p>
<p>The wheelchair will not charge.</p>	<p>Circuit Breaker set in "OFF" position after, for example, changing batteries.</p> <hr/> <p>Triggered charging fuse due to fault in, for example, batteries, charger, charging cables, charging outlet.</p>	<p>Reset the Circuit Breaker.                      See page 70.</p> <hr/> <p>Carefully check possible causes before replacing                      See page 71.</p>

## Error signals - Battery voltage Indicator (Only applies to Pilot+).

Every time the wheelchair is started up, a check is performed on parts of the wheelchair's electronics. If any faults have arisen in these parts, this is shown on the control panel's battery voltage indicator by one or more blinking lights.

### Constant Light

Everything is in order. How many lights are lit, depends upon how much voltage there is in the batteries. With fully charged batteries, all lights are lit.

### Slowly blinking red lights

The batteries need to be charged immediately.

### Rapidly blinking, 1 - 10 lights

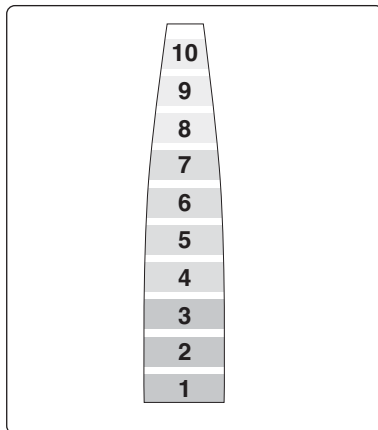
Error signals, an error has arisen and the wheelchair can not be driven.

### Error Signals

The number of blinking lights indicate what the problem could be.

- Note the number of blinking lights
- Turn off the wheelchair
- Turn the wheelchair back on again

If the error persists, count the number of blinking lights, check possible causes and solutions in the table on the adjoining page.



BATTERY VOLTAGE INDICATOR PILOT+

#### NOTE

Possible error signals on the battery voltage indicator are not displayed while the wheelchair is being driven, they only first appear the next time the wheelchair is restarted.

#### WARNING

The remedying of errors that are indicated via the battery voltage indicator must be performed by a person with sufficient expertise to be able to perform such in a professional manner. Always contact an authorized serviceman when in doubt.

CAUSE		SOLUTION
High battery voltage	<b>10</b> Green	Check the battery and the connections between the battery and the control unit.
Failure in wheel lock circuit	<b>9</b> Green	Check the connections to the magnetic wheel lock.
Fault in electronics	<b>8</b> Green	Check the contacts to the output stage. If the fault persists, change the output stage.
Fault in the control panel	<b>7</b> Orange	Make sure the joystick isn't actuated at switch-on, change the control panel.
Charger connected	<b>6</b> Orange	Remove the charging plug from the charging socket on the wheelchair
Short circuit right drive motor	<b>5</b> Orange	Check the drive motor connections and cable.
Open circuit, right drive motor	<b>4</b> Orange	Check the connection to the right drive motor.
Short circuit left drive motor	<b>3</b> Red	Check the drive motor connections and cable.
Open circuit, left drive motor	<b>2</b> Red	Check the connection to the right drive motor.
Low battery voltage	<b>1</b> Red	Check the condition of the battery. Check the connection between the battery and the control unit.

EXAMPLE 1	EXAMPLE 2
<p><b>INDICATOR LIGHTS</b> Light 1 (red) slowly blinking.</p> <p><b>CAUSE</b> The batteries need charging or there is a bad connection to the batteries.</p> <p><b>SOLUTION</b> Check the connections to the batteries. If the connections are good, try charging the batteries.</p>	<p><b>INDICATOR LIGHTS</b> Lights 1-7, 3 red and 4 orange, blinking rapidly upon start-up and the wheelchair can not be driven.</p> <p><b>CAUSE</b> A joystick fault is indicated.</p> <p><b>SOLUTION</b></p> <ul style="list-style-type: none"> <li>• Make sure the joystick isn't actuated at switch-on, or</li> <li>• Replace the Control Panel.</li> </ul>

## 1. R-net Diagnostics

**The primary objective of this chapter is to assist service personnel in finding the likely area of a detected trip within the whole wheelchair electrical system.**

It is important to realize that even though the control system is signalling a trip, it may not be the control system itself that is defective. This is because the control system is able to detect problems in other electrical components (motors, batteries, solenoid brakes, etc.) or, more importantly, the wiring to them. When a control system has detected a trip, a system trip is indicated.

This chapter covers the diagnostic process for the R-net control system, including; JSM trip display analysis, accessing the system log using OBP, trip identification and possible restorative guidelines.



### WARNING

Diagnostics should only be conducted by healthcare professionals with in-depth knowledge of PGDT electronic control systems. An incorrect or badly effected repair could result in an unsafe set-up of a wheelchair. Permobil accept no liability for losses of any kind arising from an incorrect or badly effected repair.

### 1.1 Diagnostic Procedure

To diagnose a trip please follow this procedure:

- *Read and note the Trip Text displayed, the Identified Module and the Trip Code. Refer to section 2.*
- *Switch off the control system.*
- *Make sure that all connectors on the listed Module and the wheelchair are mated securely.*
- *Check the condition of the battery.*
- *Find the definition of the Trip Text, and take the required action. Refer to section 3.*
- *Switch on the control system again and try to drive the wheelchair. If the safety circuits operate again, switch off and do not try to use the wheelchair.*

**Contact your service agent!**

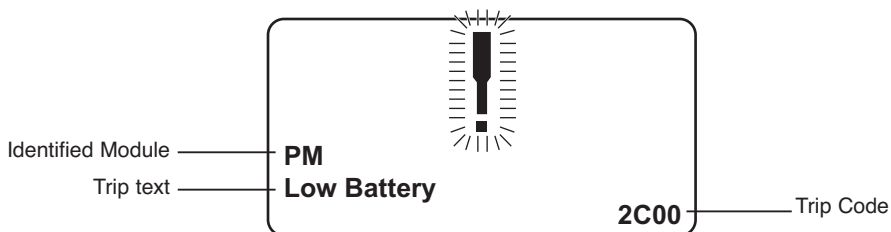
## 2. Diagnostic Screens

### 2.1 Current Diagnostic Screen

When the control system safety circuits have operated and the control system has been prevented from moving the wheelchair a diagnostics screen will be displayed.

This indicates a system trip, i.e. the R-net has detected a problem somewhere in the wheelchair's electrical system.

If the error is in a non-active module, then drive will still be possible, however, the diagnostic screen will appear intermittently.



#### 2.1.1 Identified Module

This identifies which module of the control system has registered the problem.

**PM:** Power Module

**JSM:** Joystick Module

#### 2.1.2 Trip Text

The Trip Text gives a brief description of the trip type.

#### 2.1.3 Trip Code

The 4 digit code displayed gives the exact trip that has been recorded.

### 2.1.4 Example

The example screen shown below show the following information:

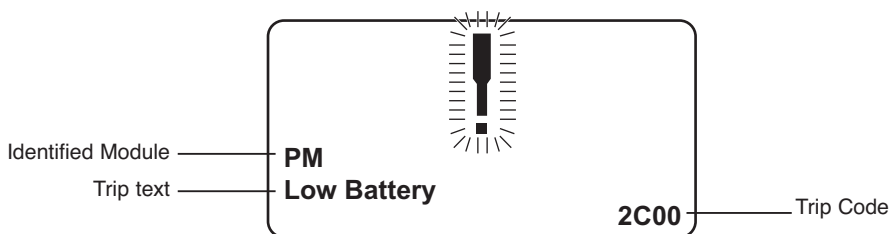
**Identified Module:** Power Module Trip.

**Trip Text:** Low Battery

**Trip Code:** 2C00

This means the battery needs charging or there is a bad connection to the battery.

- *Check the connections to the battery. If the connections are good, try charging the battery.*





## 2.2 System Log Screen

All trips are stored in the system log, whether they have been resolved or are still active. The system Log stores the Trip Text and the number of occurrences. The trips are stored in their respective Modules within the system.

The System Log is entered using On Board Programming, OBP.

*For more information about OBP, contact Permobil or your service agent.*

### Enter OBP Mode

- *Select System from the menu.*
- *Select Diagnostics from the menu.*
- *This displays the Diagnostic screen which show the connected modules and the version history. See diagram below.*
- *If a Module has had no trips then the message No Entries will be displayed, otherwise something similar to the following screen will be displayed.*

Diagnostics	
JSM 1.9	
PM 1.9	
ISM 1.9	

PM 1.9	
M1 Brake Error	6
System Error	1

### 3. Diagnostic Text Definitions

Once a trip text and module have been established use the following definitions to ascertain the possible cause and required corrective procedure.

Trip Text	Referral Point
Joystick Error	Refer to section 3.1
Low Battery	Refer to section 3.2
High Battery	Refer to section 3.3
M1 Brake Error	Refer to section 3.4
M2 Brake Error	Refer to section 3.4
M1 Motor Error	Refer to section 3.5
M2 Motor Error	Refer to section 3.5
Inhibit Active	Refer to section 3.6
Jstick Cal Error	Refer to section 3.7
Latched Timeout	Refer to section 3.8
Brake Lamp Short	Refer to section 3.9
Left Lamp Short	Refer to section 3.10
Right Lamp Short	Refer to section 3.10
L Ind Lamp Short	Refer to section 3.11
R Ind Lamp Short	Refer to section 3.11
L Ind Lamp Failed	Refer to section 3.12
R Ind Lamp Failed	Refer to section 3.12
DIME Error	Refer to section 3.16
Memory Error	Refer to section 3.17
PM Memory Error	Refer to section 3.18
Bad Cable	Refer to section 3.19
Bad Settings	Refer to section 3.20
Module Error	Refer to section 3.21
System Error	Refer to section 3.22
Gone to Sleep	Refer to section 3.23
Charging	Refer to section 3.24

### 3.1 Joystick Error

The most common cause of this trip is if the joystick is deflected away from center before and during the time the control system is switched on. The joystick displaced screen will be displayed for 5 seconds, if the joystick is not released within that time then a trip is registered. Although a trip screen is not displayed the system log will show the trip and numbers of occurrences.

- *Ensure that the joystick is centered and power-up the control system.*

If the trip is still present then the joystick or Joystick Module may be defective. Refer to Section 5.

### 3.2 Low battery

This occurs when the control system detects that the battery voltage has fallen below 16V.

- *Check the condition of the batteries and the connections to the control system.*

If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective. Refer to section 5.

### 3.3 High Battery Voltage

This occurs when the control system detects that the battery voltage has risen above 35V. The most common reasons for this are overcharging of the battery or bad connections between the control system and the batteries.

- *Check the condition of the batteries and the connections to the control system.*

If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective. Refer to Section 5.

### 3.4 Brake Error

This occurs when the control system detects a problem in the solenoid brakes or the connections to them.

1505 - M1 Brake Error.

1506 - M2 Brake Error.

- *Check the solenoid brakes, cables and connections to the control system.*

If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5.

### 3.5 Motor Error

This occurs when the control system detects that a motor has become disconnected.

3B00 - M1 Motor Error.

3C00 - M2 Motor Error.

- *Check the motors, cables and connections to the control system.*

If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5.

### 3.6 Inhibit Active

This occurs when any of the Inhibit inputs are active and in a latched state.

The actual inhibit that is active is indicated by the last 2 digits in the Trip Code. The code is in Hex.

1E01 - For Inhibit 1.

1E09 - For Inhibit 9.

1E0A - For Inhibit 10.

- *Cycle the power. This will drop out of Latched Mode which might clear the trip.*
- *Check all wiring and switches connected to the indicated Inhibits.*

### 3.7 Joystick Calibration Error

This occurs when the Joystick Calibration process has not been successful.

- *Enter OBP and attempt calibration.*

If the trip is still present after the above has been attempted, then the Joystick Module may be defective. Refer to Section 5.

### 3.8 Latched Timeout

This occurs when the control system detects that the Latched Timeout programmed time has been exceeded. For example, the Input Device, (Joystick, Head Array, Sip and Puff, etc.) has not been operated frequently enough.

The trip is a notification of why the control system has dropped out of Latched Mode.

- *Cycle the power.*
- *Initiate Latched Mode.*

If the trip is still present after the above checks have been made, then the Input Device may be defective. Refer to Section 5.

### 3.9 Brake Lamp Short

This occurs when the control system detects a short in the Brake Lamp Circuit. Refer to section 2.3 for connection details.

- *Check the brake lamps, cables and connections to the control system.*

### 3.10 Lamp Short

This occurs when the control system detects a short in either of the Lamp Circuits.

- 7205 - Left Lamp Short.
- 7209 - Right Lamp Short.

- *Check the lamps, cables and connections to the control system.*

### 3.11 Indicator Lamp Short

This occurs when the control system detects a short in either of the Indicator Circuits.

7206 - Left Indicator Short.

720A - Right Indicator Short.

- *Check the indicators, cables and connections to the control system.*

### 3.12 Indicator Lamp Failed

This occurs when the control system detects a failure in either of the Indicator Circuits. This is most likely to be an indicator bulb failure.

7207 - Left Indicator Failed.

7208 - Right Indicator Failed.

- *Check the indicator bulbs, cables and connections to the control system.*

### 3.16 DIME Error

This occurs when the control system detects an identification conflict between two modules in the system.

If a new module has been introduced:

- *Disconnect the new module and cycle the power.*
- *If no trip is present connect the new module to the system and cycle the power.*
- *If the trip reappears then the new module must be the cause of the problem.*

If there has been no additions:

- *Disconnect one module at a time and cycle the power.*

If the trip is still present after the above checks have been made, contact your service agent.

### 3.17 Memory Error

This is a non specific memory error which could be caused by any of the modules within the system.

- *Check all cables and connections.*
- *Cycle the power.*

If the trip is still present and the system contains 3rd party Modules:

- *Disconnect all the non PGDT modules and cycle the power.*

If this has cleared the trip:

- *Connect each 3rd party module in turn, cycling the power each time.*
- *If the trip reappears after one of the power cycles then the last module to have been added to the system must be defective.*

If the trip is still present after the above checks have been made, then the PM may be defective. Refer to Section 5.

### 3.18 PM Memory Error

This is a specific Power Module based trip.

- *Check all cables and connections.*
- *Using the R-net PC Programmer, re-program the control system.*

This should be done with either the most current specific program file for the wheelchair or the Permobil's original programming file.

If the trip is still present after the above checks have been made, then the PM may be defective. Refer to Section 5.



#### NOTE

Programming should only be conducted by healthcare professionals with in-depth knowledge of PGDT control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for a user. Permobil accept no responsibility for losses of any kind if the programming of the control system is altered from the factory pre-set values.

### 3.19 Bad Cable

This occurs when the control system detects a fault in the wiring in the communication cables between any of the modules.

- *Check all cables and connections for continuity.*
- *If there is any visible damage to cables, replace and cycle power.*
- *Disconnect one cable from the system at a time cycling the power after each disconnection.*

If the trip is still present after the above checks have been made, then the PM may be defective. Refer to Section 5.

### 3.20 Bad Settings

This occurs when the control system detects incorrect or invalid program settings.

- *Check all parameter settings and re-program the control system using the R-net PC Programmer.*
- *Make a note of the current parameter settings and then reset the control system to default settings.*
- *Re-program the required settings in small groups, cycling the power after each group to see if the trip occurs.*

If the trip is still present after the above checks have been made, then the PM may be defective. Refer to Section 5.

### 3.21 Module Error

This occurs when the control system detects a trip within a specific module. The module will be identified on the diagnostics screen as described in section 2.

- *Check all cables and connections.*
- *Cycle the power.*

If the trip is still present after the above checks have been made, then the module identified may be defective. Refer to Section 5.



### 3.22 System Error

This occurs when the system detects a trip which cannot be attributed to a specific module.

- *Check all cables and connections.*
- *Cycle the power.*

If the trip is still present and the system contains 3rd party Modules:

- Disconnect all the none PGDT modules and cycle the power.

If this has cleared the trip:

- *Connect each 3rd party module in turn, cycling the power each time.*
- *If the trip reappears after one of the power cycles then the last module to have been added to the system must be defective.*

If the trip is still present after the above checks have been made, then the PGDT control system may be defective. Refer to Section 5.

### 3.23 Gone to Sleep

This occurs when the control system has been left inactive for a time greater than the parameter Sleep Timer. An entry is made in the system log each time this occurs.

### 3.24 Charging

This occurs when the control system detects that a charger is connected to either Inhibit 1 or Inhibit 3. Refer to section 2.3 for connection details.

The Battery charging screen will be displayed during charger connection.

An entry is made in the system log each time this occurs.

If an On-Board Charger is used:

- *Disconnect the charger from the AC supply.*

If an Off-Board Charger is used:

- *Disconnect the charger from the AC wheelchair.*

If the trip is still present after the charger has been disconnected then the Joystick Module may be defective. Refer to Section 5.

## 4. Basic Test

After a repair has been completed, the following tests should be carried out. These are minimum recommendations, depending on the nature of the original trip then additional tests may be required.



### WARNING

These tests are a minimum recommendation only. It is the responsibility of the service person(s) to perform other tests relevant to the original trip and wheelchair type are carried out. Refer to the wheelchair's Service Manual for exact information of other tests. Permobil accept no liability for losses of any kind arising from the carrying out of the described tests, or from not carrying out additional relevant tests.



### WARNING

These tests should be conducted in an open space and a restraining device such as a seat belt should always be used. Permobil accepts no liability for losses of any kind arising from failure to comply with this condition.

### 4.1 General Inspection

Make sure all connectors are securely mated.

- *Check the condition of all cables and connectors for damage.*
- *Check the rubber gaiter or boot around the base of the joystick shaft for damage. Check visually only, do not handle the gaiter.*
- *Make sure that all components of the control system are securely mounted.*
- *Do not overtighten any securing screws.*

## 4.2 Brake Test

These tests should be carried out on a level floor with at least one meter clear space around the wheelchair.

- *Switch on the control system.*
- *Check that the screen remains on after initialisation.*
- *Push the joystick slowly forwards until you hear the parking brakes operate. The wheelchair may start to move.*
- *Immediately release the joystick. You must be able to hear each parking brake operate within 2 seconds.*
- *Repeat the test a further three times, pushing the joystick slowly backwards, left and right.*

## 4.3 Drive Test

With the maximum speed control in the minimum position, drive the wheelchair in all directions, ensuring the drive is comfortable and easy to control for the user.

Repeat the above but with the speed control set to maximum.

## 4.4 Gradient Test



### WARNING

Before carrying out this test ensure another person is present to prevent the wheelchair from tipping backwards.

Drive the wheelchair forwards up its maximum rated gradient. While on the gradient release the joystick and ensure the wheelchair comes to rest and the brakes are applied without the front wheels lifting of the ground.

Deflect the joystick forwards and continue driving up the slope. Ensure the pick up is smooth and positive.

Stop the wheelchair and reverse down the gradient. While on the gradient release the joystick and ensure the wheelchair comes to rest and the brakes are applied without the front wheels lifting of the ground.

#### **4.5 Lights, Indicators and Hazard Lamps Test**

If lights are fitted:

- *Visually check each bulb for correct illumination.*
- *Check each bulb for correct illumination and that the flashrate is  $1.5\text{Hz} \pm 0.5\text{Hz}$ .*
- *Disconnect each bulb in turn and check that the remaining bulb for that side flashes at  $3\text{Hz} \pm 0.5\text{Hz}$ .*

If hazard lamps are fitted:

- *check each bulb for correct illumination and that the flashrate is  $1.5\text{Hz} \pm 0.5\text{Hz}$ .*

#### **4.6 Actuator Test**

If actuators are fitted:

- *Check each motor for correct direction of movement.*
- *Ensure the mechanical end-stops are secure and that they stall the actuator motors, thus operating the ISM's automatic end-stop detection.*

#### **4.7 Inhibit Input Test**

Insert an appropriate battery charger, or equivalent inhibit connection, into the Charger Connector on the JSM and ensure that drive is inhibited.

If Inhibits 2, 3, 4 and 5 are used for inhibit or speed limiting purposes, suitable tests should be devised to ensure correct operation.

## 5. Servicing of Defective Units

Excluding specific OEM approved replacement parts (for details of these contact Permobil), there are no serviceable parts in the R-net control system. Consequently, any defective units must be returned to Permobil or a Permobil approved service organization for repair.



### NOTE

Any replacement work carried out without Permobil's permission will invalidate the control system's warranty.



### NOTE

Permobil accepts no liability for losses of any kind arising from unauthorized opening, adjustments or modifications to any component of the R-net control system.

**WARNING**

**It is very important that you read this information regarding the possible effects of Electromagnetic Interference on your powered wheelchair.**

## **Electromagnetic Interference (EMI) From Radio Wave Sources**

Powered wheelchairs and motorized scooters (in this text, both will be referred to as powered wheelchairs) may be susceptible to electromagnetic interference (EMI), which is interfering electromagnetic energy (EM) emitted from sources such as radio stations, TV stations, amateur radio (HAM) transmitters, two-way radios, and cellular phones.

The interference (from radio wave sources) can cause the powered wheelchair to release its parking brakes, move by itself, or move in unintended directions. It can also permanently damage the powered wheelchair's control system. The intensity of the interfering EM energy can be measured in volts per meter (V/m). Each powered wheelchair can resist EMI up to a certain intensity. This is called its "immunity level". The higher the immunity level, the greater the protection.

The immunity level of this powered wheelchair model as shipped, with no further modification, is 20V/m in the range of 26 MHz to 1000 MHz.

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

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

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

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

**2. MEDIUM-RANGE MOBILE TRANSCEIVERS** such as those used in police cars, fire trucks, ambulances, and taxis. These usually have the antenna mounted on the outside of the vehicle.

**3. LONG-RANGE TRANSMITTERS AND TRANSCEIVERS** such as commercial broadcast transmitter (radio and TV broadcast antenna tower) and amateur (HAM) radios.

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

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

## **WARNINGS**

Electromagnetic interference (EMI) from sources such as radio and TV stations, amateur radio (HAM) transmitters, two-way radios, and cellular phones can affect powered wheelchairs and motorized scooters. Following the warnings listed below should reduced the chance of unintended wheel lock release or powered wheelchair movement which could result in serious injury.

- Do not operate hand-held transceivers (transmitters/receivers), such as citizens band (CB) radios, or turn ON personal communications devices, such as cellular phones, while the powered wheelchair is turned ON.
- Be aware of nearby transmitters, such as radio or TV stations, and try to avoid coming close to them.
- If unintended movement or wheel lock release occurs, turn the powered wheelchair OFF as soon as it is safe.
- Be aware that adding accessories or components, or modifying the powered wheelchair, may make it more susceptible to EMI.

**NOTE!** There is no easy way to evaluate their effect on the overall immunity of the powered wheelchair).

- Report all incidents of unintended movement or wheel lock release to the powered wheelchair manufacturer, and note whether there is a radio wave source near by.

## **Accessories**

We are constantly developing accessories for our wheelchairs. Contact your nearest Permobil retailer for more information about the accessories available for your wheelchair.



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