

OWNER'S MANUAL

US

Permobil K450

Power Wheelchair



Contents

Important information about the owner’s manual	6-7
Safety rules	8-23
Design and function	24
General	24
Driving	25
Shock absorbers	25
Wheels	26
Lights and reflectors	26
Batteries	27
R-Net control panel LCD monochrome display	28
R-Net control panel LCD color display	36
R-Net control panel LED	46
MX seat	56
Electrical seat functions	57
Manual seat functions	57
Other adjustments	57
Electric Seat Lift	58
Electric seat tilt adjustment	59
Seat-to-floor function	60
Combined seat lift/seat-to-floor function	61
ICS Control panel	62
Symbols on the ICS Control panel	63
Settings	66
Leg rest	66
Back rest recline	67
Foot plate angle	67
Arm rest	68
Control panel, rotatable panel holder	69
Operation	70
General	70
General - Driving	70
Joystick Error - R-net electronics	71
Driving technique	72
Driving rules	73
Handling the manual brake release	77
Seat functions	78
Charging batteries	84

Contents

Transport	86
General advice for air transport.....	88
Accessories	90
General.....	90
Positioning belt.....	90
Maintenance and repairs	91
General - batteries/storage.....	92
Air pressure.....	95
Battery replacement	96
Resetting the main fuse/battery isolator.....	98
Technical specifications	100
Troubleshooting	102
R-net diagnostics.....	102
Diagnostic screens.....	102
Example of a screen showing a system fault.....	103
Repair of defective units.....	103
Troubleshooting guide.....	106
Emergency operation of seat functions	107
Connecting the emergency operation cable.....	107
Disconnecting the emergency operation cable	109
Important information about Electromagnetic Interference (EMI)	110-111

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.

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. 205230-US-0.

Indication for Use

The intended use of the K450 series of the powered wheelchair is to provide indoor and outdoor mobility to persons limited to a seating position that are capable of operating a powered wheelchair. The K450 series of the powered wheelchair is intended for sale OTC.

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 rules - General

A power wheelchair is a motor-driven vehicle. Therefore, you need to be very careful when you use and handle it. It is important to read and follow the instructions and safety rules given in this owner's manual before starting to use your wheelchair as incorrect use could lead to a risk of injury to users or damage to the wheelchair and its environment.

Warning labels

The owner's manual contains the following "warning labels" which are intended to draw attention to situations which could lead to problems, near-accidents, personal injury or damage to the wheelchair, etc.

 **CAUTION**

Take care here.

 **WARNING**

Take extra care here.
Risk of personal injury or of damage to the wheelchair and its surroundings.

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 rules - General

Your wheelchair may have been adjusted precisely to your needs on delivery, so you should always ask the advice of the person who ordered the seat on your behalf before making changes or adjustments to the wheelchair. Certain adjustments may impair the wheelchair's safety/functions or its suitability for your needs.

To minimise incorrect use of your wheelchair, it is also extremely important to take the necessary time to familiarise yourself with the wheelchair and its accessories, the various keys, function and steering controls and the various seat adjustment options, etc. before starting to use it.

Do not set out alone on your first test ride. Make sure you have assistance close by if you should need help.

To ensure that nothing has occurred to the seat during its transport to you, please check the following before first use:

- Check that all products ordered are included in the delivery. If you suspect that something is missing, contact your aids centre or Permobil as soon as possible for further information.
- Check that no transport damage or other damage has occurred to the seat and its accessories. If you discover any damage or see any other problem, contact your aids centre or Permobil as soon as possible for further information before you continue the check.

Check also that the wheelchair's batteries are fully charged and that the tires have the right air pressure before using the wheelchair.

If, in any situation, you find that the wheelchair does not behave as expected or you suspect that anything is wrong, stop your test ride as soon as possible, switch off the wheelchair and contact your service contact or Permobil for information.

Safety rules

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.

CAUTION

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 rules

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.

Positioning Belts

Always wear your positioning belt while in your wheelchair. If signs of damage or wear appear, replace the positioning belt immediately through your Permobil dealer.

CAUTION

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

Safety rules



WARNING

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.

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

Safety rules



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 rules

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 your Permobil 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 rules

CAUTION

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 rules

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
- 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, as this will cause the wheelchair to stop abruptly and may cause personal injury.

Safety rules

⚠ WARNING

Support wheels

If your wheelchair is fitted with support wheels, they must always be fitted when you drive.

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.

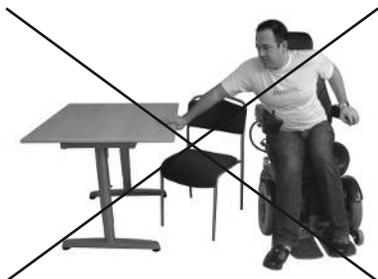
When transferring into or out of the wheelchair, every precaution should be taken to reduce the distance between the wheelchair and the place to which the user is transferring. Overextending this distance can cause user to over-exert, lose balance, or fall.

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 rules

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.

CAUTION: *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 rules

WARNING

Transport

The wheelchair must only be transported in a vehicle that is approved for such purposes. Carefully check that the wheelchair is properly secured and that the wheel locks are engaged. When transporting the wheelchair in a motor vehicle, the wheelchair must be secured by fastening straps through the brackets in the front and the back, each marked with a yellow sticker. Do not connect the fastening straps to any other part of the wheelchair. Secure the wheelchair according to the manufacturer of the vehicle restraint systems (fastening straps) instructions. Always make sure that the fastening points on the transport vehicle are well-anchored.

Transportation 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 according to the appropriate crash test standards, 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. Unless using a crash-tested 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 not to protect you in the event of a motor vehicle accident. The positioning belts do not replace use of a vehicle mounted restraint.

Safety rules

WARNING

Maintenance and service

Carry out only the service and maintenance activities noted in this owner's manual. All other service, alterations to and interventions in the wheelchair and its accessories' vital systems must be carried out by a competent service engineer or a person with sufficient knowledge to do so in an expert manner.

During all work on the wheelchair's electrical system, the battery isolator must be in the OFF position.

Be careful when using metal objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and safety goggles.

Use only spare parts or accessories approved or recommended by Permobil. All other use could lead to changes which might impair the functions and safety of the wheelchair. It could also lead to the warranty for your wheelchair becoming invalid.

If you connect non-approved electrical or electronic appliances to the wheelchair's electrical system, the chair may be damaged and it may no longer be controllable or may drive erratically. Such use may also invalidate the warranty.

Note that the wheelchair is heavy and contains many moving parts, which means there will always be some risk of crushing and of clothes, etc. getting caught.

Charging batteries

The batteries must be charged in a well-ventilated room, not in a wardrobe. The batteries must not be charged in a bathroom or wetroom. Only a charger with max. 10 A charging current (average) may be used (the effective value of the charging current must not exceed 12 A). When the charger is connected, the chair must not and cannot be driven.

Safety rules

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.

Safety rules

WARNING

Changing Tires

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

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 equipment supplier or an Authorized Permobil provider 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 an Authorized Permobil service center 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 rules

CAUTION

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 power 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 power 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 84-85.

Design & Function

General

The Permobil K450 is a power wheelchair for outdoor and indoor use. It is intended for people with physical disabilities.

The wheelchair consists of a chassis and a seat. The chassis contains the wheelchair's electronics, power supply and drive functions. The seat consists of a seat frame, seat plate/back rest, arm rest/leg rest and any accessories/options such as a head rest, etc.

In this owner's manual, we have chosen to show the wheelchair with our MX seat. However, the operation of the chassis and most of its functions are the same regardless of the seat model chosen.

Overview



- | | |
|-------------------------------|------------------|
| 1. Back rest | 6. Foot plate |
| 2. Arm rest | 7. Leg rest |
| 3. Chassis | 8. Seat |
| 4. Rear wheels (drive wheels) | 9. Control panel |
| 5. Front wheels | |

Driving

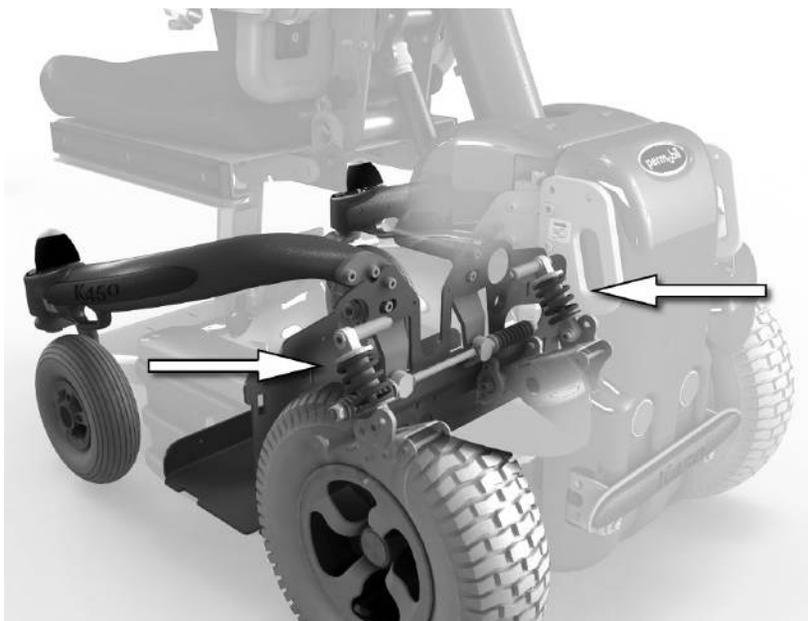
The Permobil K450 is fitted with a drive pack for each drive wheel. The drive pack consists of an electric motor with a drive gear and brake (electromagnetic).

Shock absorbers

The wheelchair is fitted with four shock absorbers with adjustable spring force.

Adjustment of the spring force

The adjustment should be performed by personnel who are very familiar with the design and function of the wheelchair. If adjustment is required, please contact your nearest service engineer/service center or Permobil Service.



Shock absorbers

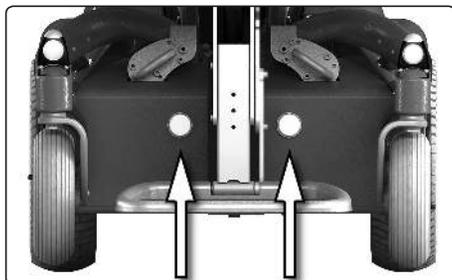
Wheels

The rear wheels of the wheelchair, the drive wheels, have pneumatic tires. The front wheels, the steering wheels, have solid rubber tires.

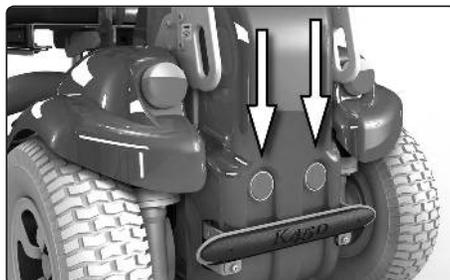
Lights and reflectors

In the standard version, the wheelchair is fitted with reflectors at the front and rear and on the sides.

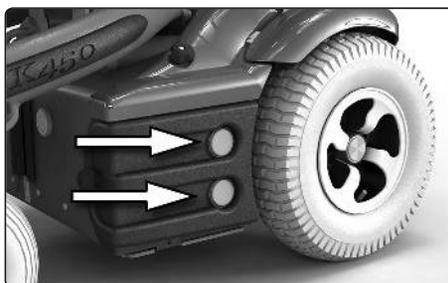
Lighting and direction indicators (blinkers) are available as accessories.



Front reflectors



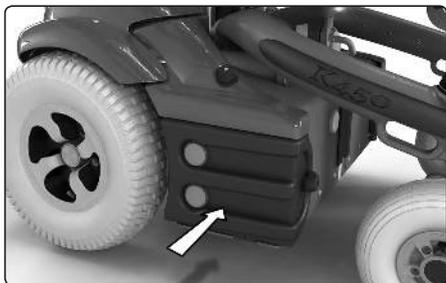
Rear reflectors



Side reflectors

Batteries

The two batteries on the wheelchair are fitted inside the covers on each side of the wheelchair. The batteries are easily accessible when they have to be replaced.



The battery is behind the side cover.



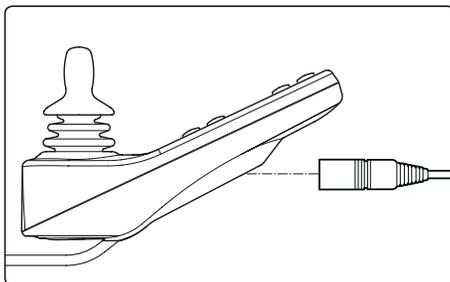
Battery.

Main fuse/battery isolator

The wheelchair is fitted with an automatic main fuse that can be reset when it has been triggered. It also functions as a battery isolator and is controlled (ON/OFF) via the lever located above the left battery cover.

Charging socket

The charging socket is located on the bottom of the control panel. K450 can also be equipped with a charging socket on the front of the chassis.



Charging socket



Charging socket

R-Net control panel LCD monochrome display

The control panel consists of a joystick, function keys and an LCD screen. On the rear of the panel are also the charging contact and two jack contacts.

In addition to the control panel, your wheelchair may also be fitted with an additional control panel for the seat.

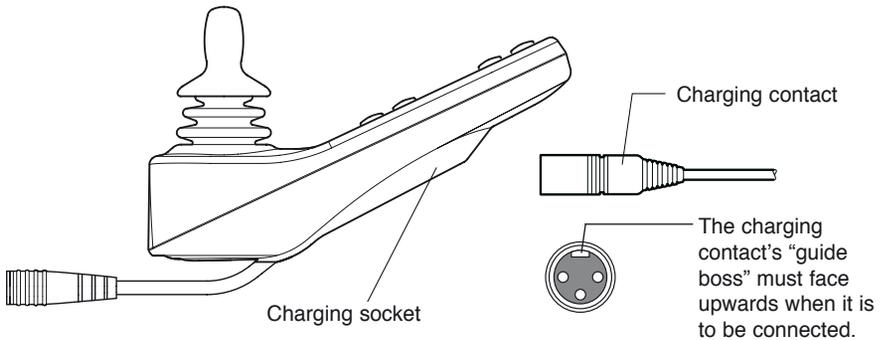
Overview of the control panel



R-Net control panel LCD monochrome display

Charging socket

This socket is used only to charge or lock the wheelchair. Do not connect any programming cable to this socket. The socket must not be used as a power source for any other electrical equipment. Connecting other electrical equipment may damage the control system or lead to the wheelchair having poorer electro-magnetic compatibility (EMC).

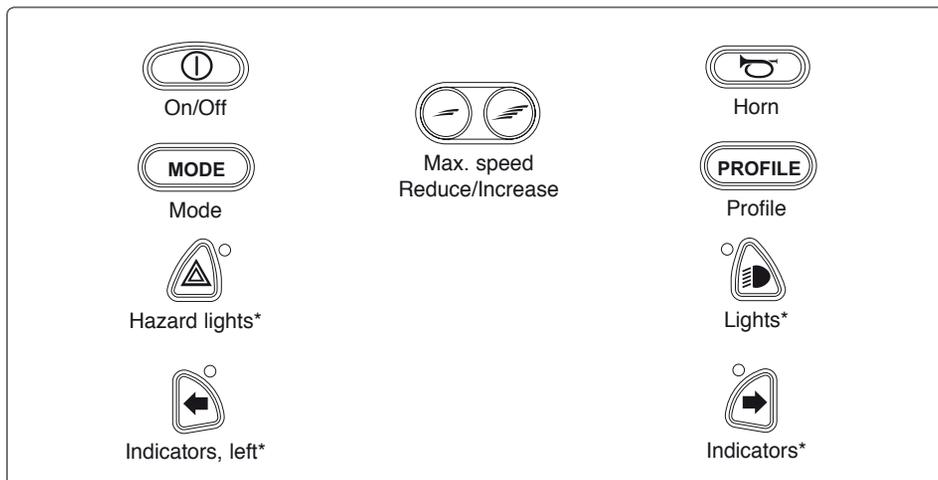


WARNING

The wheelchair's warranty ceases to apply if any equipment other than the battery charger belonging to the wheelchair or the key used for locking is connected to the control panel's charging contact.

R-Net control panel LCD monochrome display

There are a total of 10 function keys on the control panel.



* Applies only if the wheelchair is fitted with lights.

On/off key

The on/off key is the switch for the control system's electronics which, in turn, supply power to the wheelchair's motors.

WARNING

Do not use the on/off key to stop the wheelchair, except in an emergency. You may be thrown out of the chair, or you may shorten the life of the wheelchair's drive system.

Max. speed

These keys normally reduce or increase the wheelchair's maximum speed. Depending on how the control system has been programmed, a temporary screen may be displayed when this key is pressed.

Horn

Press the switch to produce a signal to attract attention.

R-Net control panel LCD monochrome display

Mode

The user can use the Mode key to scroll between the control system's available modes. The available modes depend on the programming and on which other output devices are connected to the control system.

Profile

The user can use the Profile key to scroll between the control system's available profiles. The number of available profiles depends on how the control system has been programmed. Depending on how the control system has been programmed, a temporary screen may be displayed when this key is pressed.

Hazard lights*

This key activates and deactivates the wheelchair's hazard lights. Hazard lights are used when the wheelchair is stationary in a position which may represent a risk or an obstacle for others. Press this key to activate the hazard lights. Press it again to deactivate them. When the hazard lights are active, the indicator lamp next to the control key flashes in time with all the indicators on the wheelchair.

Lights*

This key activates and deactivates the wheelchair's lights. Press this key to switch on the lights. Press it again to switch them off. When the lights are activated, the indicator lamp next to the control key is also switched on.

Indicators, left*

This key activates and deactivates the wheelchair's left indicators. Press the key to activate the indicators. Press it again to deactivate them. When the indicators are active, the indicator lamp next to the control key flashes in time with the left indicators on the wheelchair.

Indicators, right*

This key activates and deactivates the wheelchair's right indicators. Press the key to activate the indicators. Press it again to deactivate them. When the indicators are active, the indicator lamp next to the control key flashes in time with the indicators on the wheelchair.

*) Applies only if the wheelchair is fitted with lights.

R-Net control panel LCD monochrome display

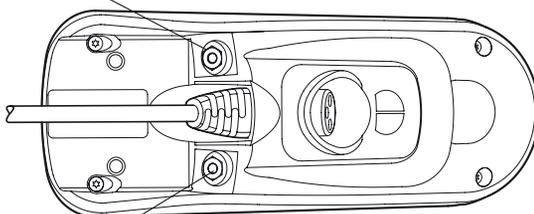
Socket for external on/off key

You can use this socket to activate and deactivate the control system with an external device.

Socket for external profile key (applies if profiles are programmed and used).

You can use this socket to select a profile with an external device.

Socket for external on/off key



Socket for external profile key

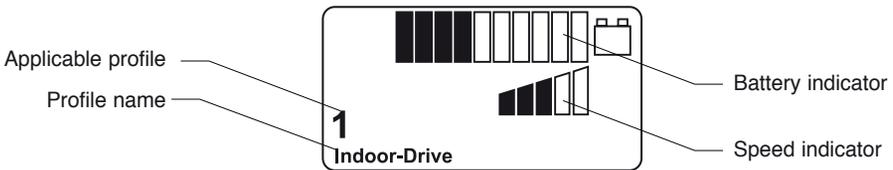
R-Net control panel LCD monochrome display

Display

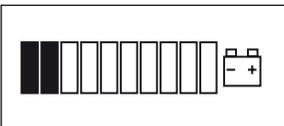
By looking at the control panel display, you can get an idea of the status of the control system. The control system is active when the screen is lit.

Symbols

Some symbols on the R-net display are always displayed and some symbols are only displayed under certain conditions. Below is the typical appearance of the display when driving with profile 1.



Battery indicator



The battery indicator displays the status of the battery.

Constantly on

This shows that everything is working correctly.

Flashing slowly

The control system is working correctly but the battery needs to be charged as soon as possible.

Moving

The wheelchair's batteries are being charged. The wheelchair cannot be driven until the charger has been disconnected and the control system has been restarted.

R-Net control panel LCD monochrome display

Max. speed indicator



This displays the current maximum speed setting. The maximum speed setting is adjusted using the keys for higher and lower max. speed.

Current profile



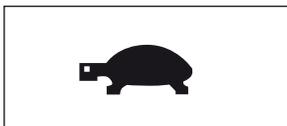
The profile number describes the profile currently being used by the control system. The profile text is the name or description of the profile currently being used by the control system.

In focus



When the control system has more than one method for direct control, like another joystick module or a double module for companion control, the module currently controlling the wheelchair displays the In focus symbol.

Speed limitation



This symbol is displayed when the wheelchair's speed is limited, for example when the seat is raised. If the wheelchair is prevented from driving, the symbol flashes.

Restart



This symbol flashes when the control system needs to be restarted, for example after a module has been reconfigured.

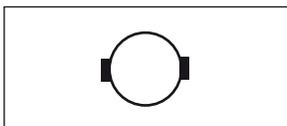
R-Net control panel LCD monochrome display

Fault



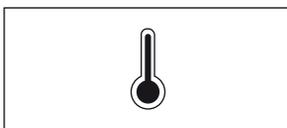
The control system can detect a large number of faults. When the system has detected a fault that is not serious enough to cause a stoppage, this symbol is displayed.

Motor temperature



This symbol is displayed when the control system has intentionally reduced the power supply to the motors to protect them against overheating.

Control system temperature



This symbol is displayed when the control system has intentionally reduced its own power supply to protect itself against overheating.

Wait



This symbol is displayed when the control system switches between different stages. For example, it may be displayed when you enter programming mode. The symbol is animated so that you can see the sand running through the hourglass.

Emergency stop



If the control system has been programmed for locked operation or automatic adjustment of the seat, an emergency stop key is normally connected via the socket for an external profile key. If the emergency stop key is used or disconnected, this symbol flashes.

R-Net control panel LCD color display

General

The Control Panel consists of a joystick, function buttons and a display. At the front of the panel is the Charger Socket. Two Jack Sockets are located on the bottom of the panel.

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

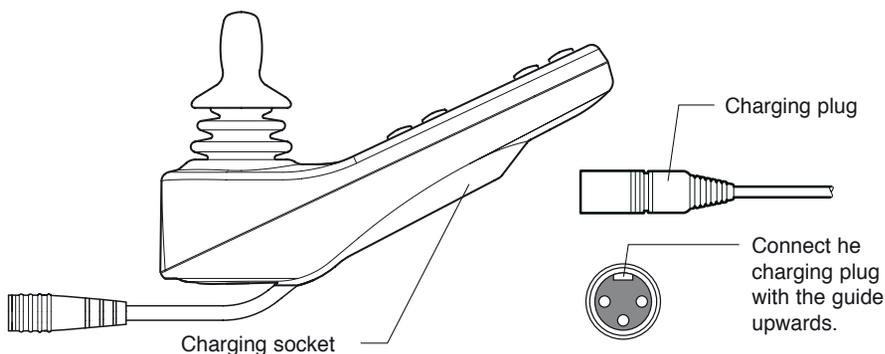
Control Panel Overview



R-Net control panel LCD color display

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.)



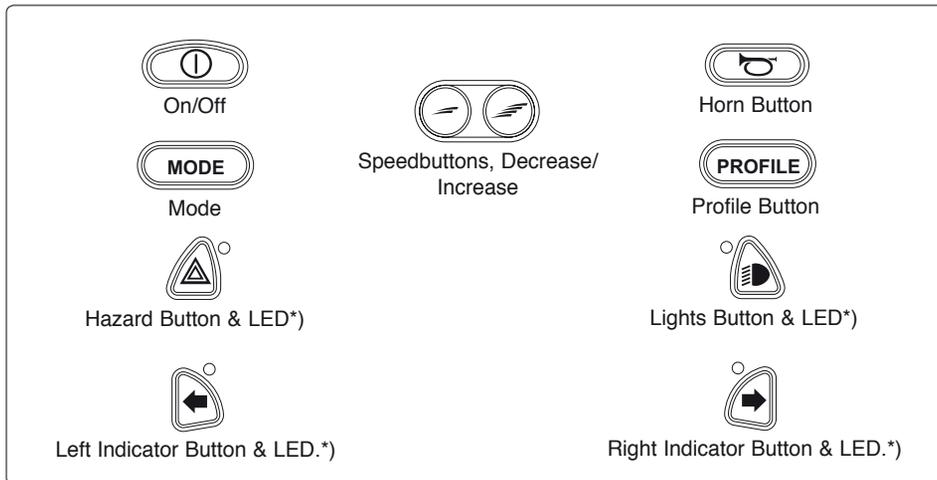
WARNING

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.

R-Net control panel LCD color display

Function Buttons

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



*) Only active if the wheelchair is equipped with lights.

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.

Maximum Speed Buttons

These buttons decrease/increase the wheelchair's maximum speed. Depending on the way the control system has been programmed a momentary screen may be displayed when these buttons are pressed.

R-Net control panel LCD color display

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/deactivates the wheelchairs hazards lights. This function is used when the wheelchair is positioned in a way making it a obstruction for others. Push the button to activate the hazard lights and push it again to deactivate them. When activated the indicator LED will flash in sync with the wheelchair's indicators.

Lights Button and LED*)

This button activates and deactivates 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 deactivates 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 active if the wheelchair is provided with lights.

R-Net control panel LCD color display

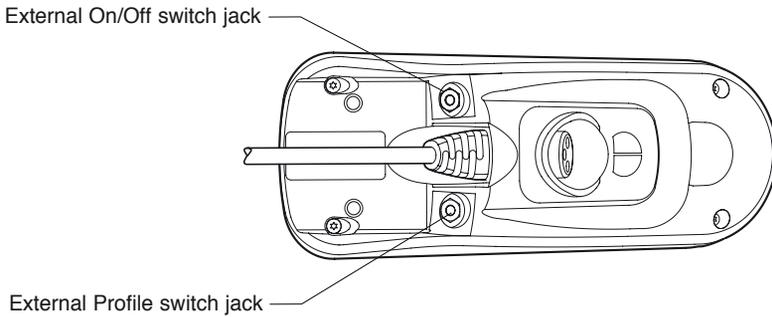
External On/Off Switch Jack

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

External Profile/Mode Switch Jack

(This jack's function varies depending on the programming.)

This allows the user to select Profiles using an external ability switch, such as a buddy button.



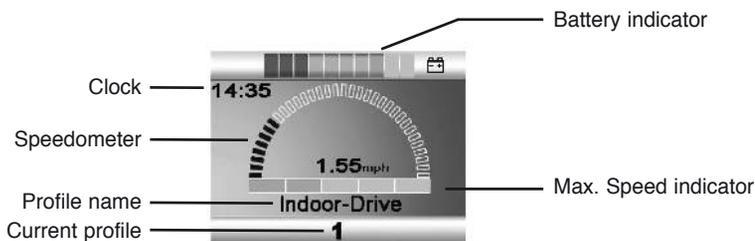
R-Net control panel LCD color display

Display

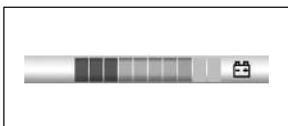
The status of the control system is shown in the display. The control system is on when the display is backlit.

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 of the status of the battery.

Steady

This indicates that all is well.

Flashing Slowly

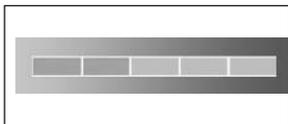
The control system is functioning correctly, but you should charge the battery as soon as possible.

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.

R-Net control panel LCD color display

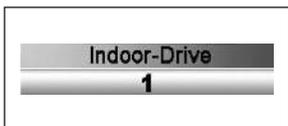
Speed Indicator



This displays the current speed setting.

The speed setting is adjusted using the Speed Buttons.

Current Profile



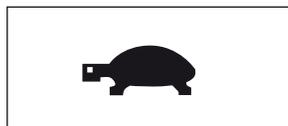
The Profile Number describes which Profile the control system is currently operating in. The Profile Text is the name or description of the Profile the control system is currently operating in.

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.

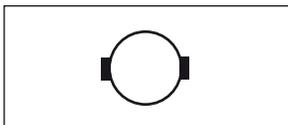
Restart



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

R-Net control panel LCD color display

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 so that you can see the sand running through the hourglass.

E-Stop



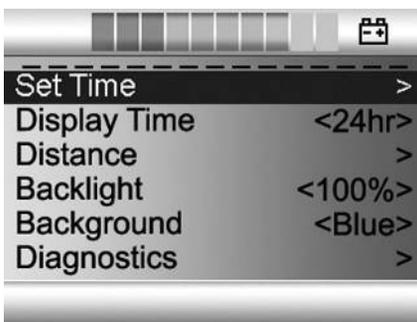
If the control system is programmed for latched operation, then it is normal for an Emergency Stop Switch to be connected into the External Profile Switch Jack. If the Emergency Stop Switch is operated or disconnected, this symbol will flash.

R-Net control panel LCD color display

Installation menu

The installation menu permits the user to set the clock, the display brightness, background color etc. Access the menu by holding down the keys for higher and lower maximum speed simultaneously. Scroll through the menu by moving the joystick up or down.

Exit the installation menu by first selecting “Exit” at the bottom of the menu and then moving the joystick to the right.



Setting the time (Set Time)

Select “Set Time” in the menu. Move the joystick to the right to go to the menu for setting the time. Then select “Year”, “Month”, “Date”, “Hours” and “Minutes” by moving the joystick left or right. Set the desired value by moving the joystick up or down. Exit the installation menu by selecting “Exit” and then moving the joystick up or down.

Displaying the time (Display Time)

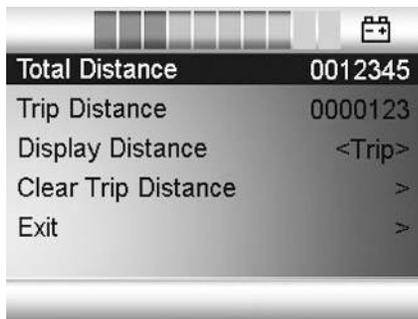
Select “Display Time” in the menu. Move the joystick right or left to select 12 or 24 hour display, or “Off” to remove the clock from the display.

Control panel R-Net LCD color display

Distance measurement (Distance)

Select “Distance” in the menu. Move the joystick to the right to go to the menu for setting distance measurement. Then select “Total distance”, “Trip”, “Distance display” or “Reset” by moving the joystick up or down.

- **Total distance** (Total Distance): Shows the total distance traveled by the control system.
- **Trip** (Trip Distance): Shows the total distance traveled since the last reset.
- **Distance display** (Display Distance): Selects Trip or Total Distance in the display.
- **Reset** (Clear trip distance): Move the joystick to the right to reset the Trip measurer.
- **Exit** (Exit): Move the joystick to the right to exit the installation menu.



Brightness (Backlight)

Select “Backlight” in the menu. Move the joystick to right or left to set the desired brightness for the display backlight. Ten fixed levels are available from 10-100%.

Background (Background)

Select “Background” in the menu. Move the joystick right or left to select “Blue”, “White” or “Auto”.

- **Blue** (Blue): The display background is blue in all profiles.
- **White** (White): The display background is white in all profiles.
- **Automatic** (Auto): The display background is programmed in the various travel profiles. E.g. blue background for slow profile for indoors travel and white background for rapid profile for outdoors travel.

Diagnostics (Diagnostics)

For qualified technicians only.

R-Net control panel LED

General

The Control Panel consists of a joystick, function buttons and a display. At the front of the panel is the Charger Socket. Two Jack Sockets are located on the bottom of the panel.

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

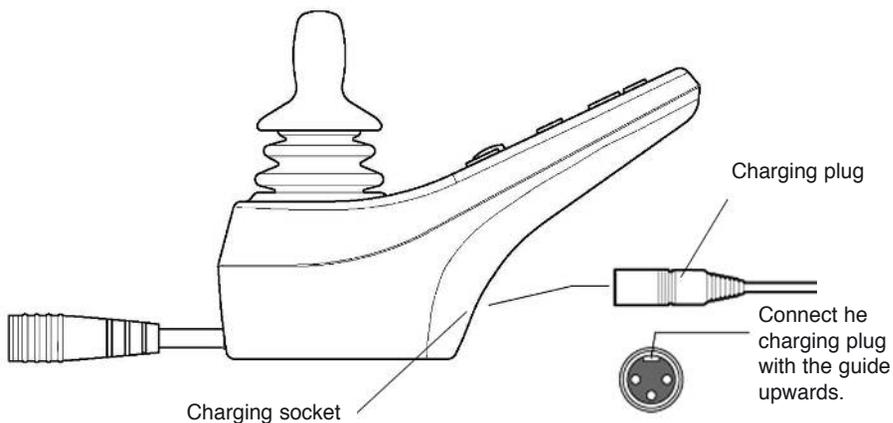
Control Panel Overview



R-Net control panel LED

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.)



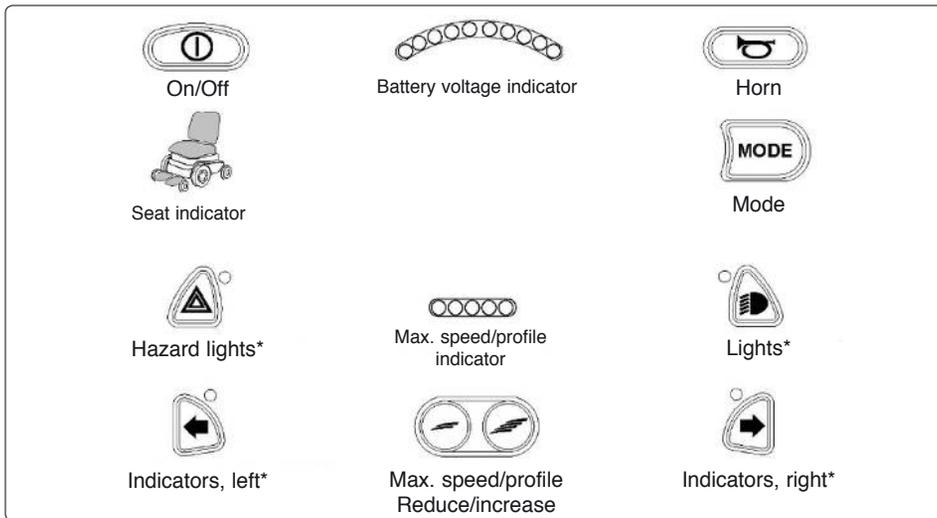
WARNING

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.

R-Net control panel LED

Function keys

There are a total of 9 function keys on the control panel with LEDs.



* Applies only if the wheelchair is fitted with lights.

On/off key

The on/off key is the switch for the control system's electronics which, in turn, supply power to the wheelchair's motors.

WARNING

Do not use the on/off key to stop the wheelchair, except in an emergency. You may be thrown out of the chair, or you may shorten the life of the wheelchair's drive system.

Horn

Pressing the switch produces a sound signal for attracting attention.

Max. speed/choice of profile

These keys normally reduce or increase the wheelchair's maximum speed. In special applications, the keys can instead control the choice of driving profile.

R-Net control panel LED

Mode

With the Mode key the user can scroll between the control system's available operating modes. The available modes depend on the programming and on which other output devices are connected to the control system.

Hazard lights*)

This key activates and deactivates the wheelchair's hazard lights. Hazard lights are used when the wheelchair is stationary in a position which may represent a risk or an obstacle for others. Press this key to activate the hazard lights. Press it again to deactivate them. When the hazard lights are active, the indicator lamp next to the control key flashes in time with the wheelchair's direction indicators.

Lights*

This key activates and deactivates the wheelchair's lights. Press this key to switch on the lights. Press it again to switch them off. When the lights are activated, the indicator lamp next to the control key also lights up.

Indicators, left*

This key activates and deactivates the wheelchair's left-hand direction indicators. Press the key to activate the indicators. Press it again to deactivate them. When the indicators are active, the indicator lamp next to the control key flashes in time with the wheelchair's left-hand direction indicators.

Indicators, right*

This key activates and deactivates the wheelchair's right-hand direction indicators. Press the key to activate the indicators. Press it again to deactivate them. When the indicators are active, the indicator lamp next to the control key flashes in time with the wheelchair's right-hand direction indicators.

* Applies only if the wheelchair is fitted with lights.

R-Net control panel LED

Battery voltage indicator

Shows the voltage remaining in the batteries (from left to right):

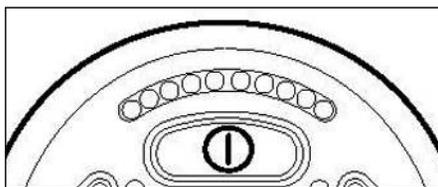
Red+Yellow+Green = Fully charged

Red+Yellow = Half charged

Red = Charge the batteries

A good way of using this indicator is to learn how it works while you are driving. Like a fuel gage in a car, it does not show exactly how much “fuel” is left, but it gives you a rough idea so that you can avoid unnecessary stops due to discharged batteries.

The indicator shows a more exact value after approximately 1 minute of travel.



CAUTION

The battery voltage indicator also functions as a “fault indicator” for the wheelchair’s electronics. See page 96 for further information.

R-Net control panel LED

Max. speed indicator

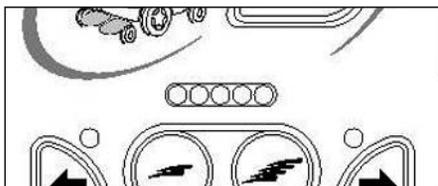
Speed

Indicates the maximum speed set for the wheelchair.

- 1 - 2 lamps = Low speed
- 3 - 4 lamps = Average speed
- 5 lamps = Max. speed

Driving profile

For special applications, the wheelchair can be programmed with more than one driving profile. In this case, the indicator's LEDs will instead display the selected driving profile. There can be up to 5 driving profiles.



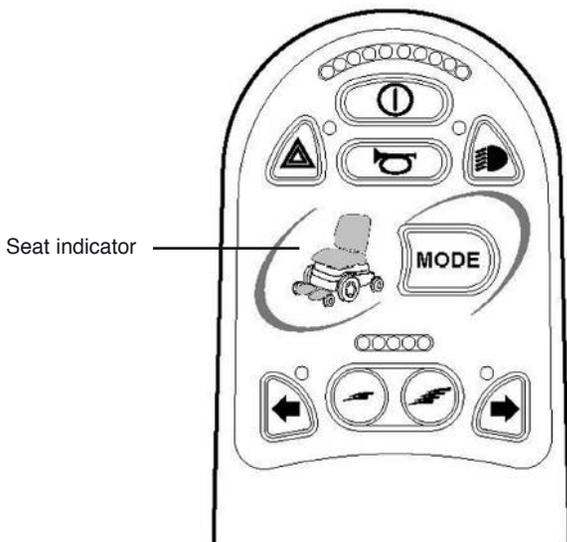
⚠ CAUTION

The indicator for max. speed/driving profile also functions as a “fault indicator” for the wheelchair’s electronics. See page 96 for further information.

R-Net control panel LED

Seat indicator

On certain seats the electrical functions for seat lift, seat angle, backrest angle and legrest angle are controlled with the control panel joystick. In this case the active seat function is indicated on the control panel seat indicator.



R-Net control panel

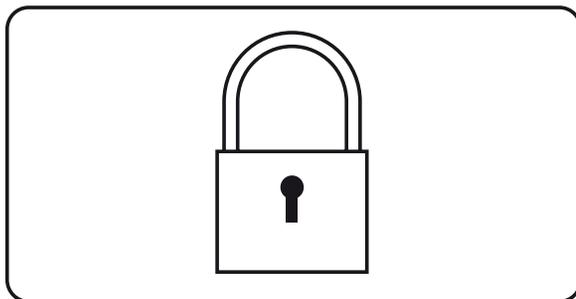
Locking/unlocking the wheelchair

The control system can be locked in two different ways. Either by using a key sequence on the keypad or with a physical key. The method used depends on how the system has been programmed.

Locking with the keypad:

- Press and hold down the on/off key while the control system is active.
- After 1 second, the control system emits a beep. Release the on/off key.
- Move the joystick forwards until the control system emits a beep.
- Move the joystick back until the control system emits a beep.
- Release the joystick. You will hear a long beep.
- The wheelchair is now locked.

Control panels with display will now show the following screen:



Unlocking:

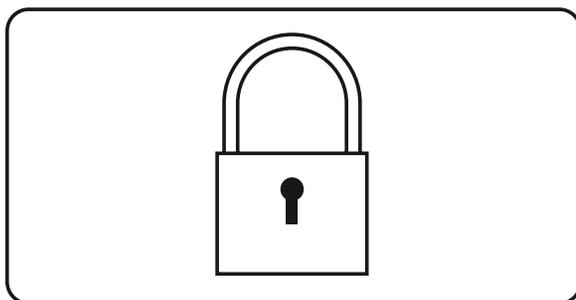
- Press the on/off key if the control system is switched off. On control panels without display the LEDs on the speed indicator will “wander” backwards and forwards).
- Move the joystick forwards until the control system emits a beep.
- Move the joystick back until the control system emits a beep.
- Release the joystick. You will hear a long beep.
- The wheelchair is now unlocked.

R-Net control panel

Locking with a key

- Press the on/off key if the control system is switched off.
- Insert and remove the key from the charging contact on the control panel.
- The wheelchair is now locked.

Control panels with display will now show the following screen:



Unlocking:

- Press the on/off key if the control system is switched off. On control panels without display the LEDs on the speed indicator will “wander” backwards and forwards).
- Insert and remove the key from the charging contact.
- The wheelchair is now unlocked.

Electrical seat functions

The functions may vary depending on the equipment fitted on your wheelchair.

The electrical seat functions are driven by an electrical adjustment system which is steplessly controlled from the wheelchair control panel or what is called the seat control panel, normally placed adjoining the maneuvering panel.

MX seat functions

- seat lift
- seat tilt
- seat-to-floor function
- combined seat lift/seat-to-floor function

Manual seat functions

The functions vary depending on the equipment fitted on your wheelchair.

The seat can be adjusted manually by adjusting a number of locking screws and locking handles.

MX seat functions

- leg rest
- foot plate
- control panel
- arm rest

Other adjustments

It is possible to adjust the positioning belt and other accessories (e.g. head rest) manually.

Electric Seat Lift

The electrically controlled seat lift permits steplessly variable raising or lowering of the seat in order to adjust the height to tables, benches etc.

Whenever the seat lift is raised above its lowest position, the maximum speed of the wheelchair will be reduced.

WARNING

Raising the seat lift will raise the center of gravity and thus entail a higher risk of tipping. For this reason use the seat lift only on level ground.



Electric seat lift

Electric Seat Tilt

The electrically controlled seat tilt function permits steplessly variable adjustment of the seat angle.

If the seat slopes more steeply than 15° the wheelchair's max. speed will be reduced.

WARNING

Always drive at low speed and never move the seat/back angle so far back that the wheelchair cannot be controlled safely when moving over sloping, uneven ground or when negotiating obstructions.



Electric seat tilt adjustment

Seat-to-floor function

With the help of this function the user can when required lower the seat to the floor, and climb out of the chair. A support wheel at the back edge of the foot plate makes the leg support glide forwards and stretch out as the seat is lowered to the floor.

When the seat has reached floor level, it is not possible to drive the chair forward or backwards. If the wheelchair is fitted with the widest seat (400mm.), it will not go all the way down to the floor.

WARNING

There will always be a risk of crushing when the electric functions are in action.

Crush protection

To reduce the risk of crushing when the seat is lowered to the floor, crush protection is built in along the sides of the seat. The crush protection works by stopping the seat and reversing for 1.5 seconds, and then stopping again if anything gets in the way.



The built-in crush protection along the sides of the seat reduces the risk of damaging anything when the seat-to-floor function is used.



The seat at floor level.

Combined seat lift/seat-to-floor function

The seat lift function can be combined with the seat-to-floor function.

In the normal position the seat is positioned as far back as possible with the seat lift in it's lowest position.

When the seat reaches floor level, it is not possible to drive the chair forward or backwards. If the wheelchair is fitted with the widest seat (16"), it will not go all the way down to the floor.

Whenever the seat lift is raised above its lowest position, the maximum speed of the wheelchair will be reduced.

WARNING

There will always be a risk of crushing when the electric functions are in action.



Raised seat.



The seat at floor level.

ICS Control panel

The electric functions of the seat can be controlled from the wheelchair control panel, to provide further details. On seats equipped with the ICS control system, the electric functions can also be controlled with the help of the ICS control panel.

The seat’s electrical functions are controlled from the control panel. The control system may take the form of conventional push buttons or may have levers for those users who find these easier to maneuver. The levers are moved forward to operate the front button and back to operate the rear button. The functions of the control panel are described in the following as fitted with levers. The functions are the same, however, whatever the design of the control system.

⚠ WARNING

The number of available functions will vary depending on how your wheelchair and seat are equipped.



The standard design control panel.



Control panel with memory function.

Symbols on the ICS Control panel

The symbols on the control panel show which seat functions are available, which are limited, and which will cause a reduction in speed or prevent the wheelchair from running altogether.

The symbols may be unlighted, flashing or fully lit up.

Unlighted symbol

The symbol for a function is unlighted. This means that the function is not currently available.

Lighted symbol

A symbol that is steadily lighted up provides information related to the driving speed.

- A steady green light means everything is OK, and the wheelchair can be driven at maximum speed.
- A steady yellow light means that the wheelchair's maximum speed is limited because of the current position of the seat function.
- A steady red light means that the wheelchair cannot be driven because of the current position of the seat function.

Flashing symbol

A flashing symbol provides information relating to the adjustment device.

- A flashing green symbol means a special function, the memory function for example.
- A flashing yellow symbol means that for reasons of safety the function is blocked in one direction. The control device for that function will only work in the "safe" direction.
- A flashing red symbol means that a fault has been detected in the adjustment device concerned, and in consequence that seat function may not work. Contact service.

Symbols on the ICS Control panel



Seat lift

The seat can be raised by pressing the upper part of the button and lowered by pressing the lower part.



seat tilt

The seat can be angled backwards by pressing the lower part of the button and forwards by pressing the upper part.



Seat-to-floor function

The seat is lowered to the floor when the lever is pushed forwards, and is raised again when the lever is pulled back.



Combined Seat lift and Seat-to-floor function

The seat is lowered to the floor when the lever is pushed forwards, and is raised again at the same time as the seat lift when the lever is pulled back.

Symbols on the ICS Control panel



Memory function

The control panel has a built-in memory with three storage locations. Each location can store all the electric settings of the seat.

Save setting

Adjust the seat to the position you want to save.

- Activate the memory function by holding down the memory button(8) for 2 seconds, see the picture. The symbol will flash in green when the memory function is activated.
- Hold down the button for the memory function you want (5, 6 or 7) for three seconds to store the setting of the seat, see the picture.
- The symbol opposite the current memory function will light up in red and the control panel will give a short acoustic signal when the setting has been saved.
- Return to the standard functions on the control panel by pressing the memory button(8), see the picture.

Recall the setting

- Activate the memory function by holding down the memory button(8) for 2 seconds, see the picture. The symbol will flash in green when the memory function is activated.
- Hold down the button for the memory function you want (1, 2 or 3) for three seconds, and the seat will be moved to the position stored earlier, see the picture. For reasons of safety, the button must be held down until the seat is fully adjusted in the required position.
- When the seat has reached the saved position, the seat adjustment device will stop, the symbol beside the storage location will light up in green, and the control panel will give a short acoustic signal.
- Return to the standard functions on the control panel by pressing the memory button(8), see the picture.



The control panel memory function.

Settings

Leg rest

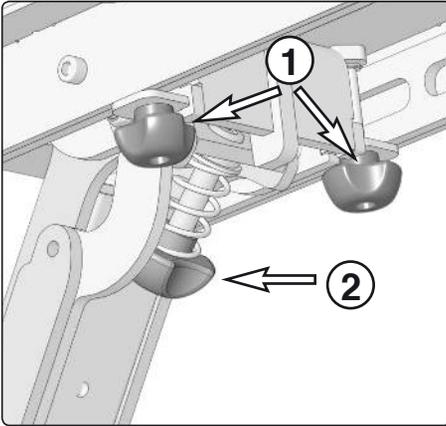
Underneath the seat there are two locking knobs, which locks the position of the leg rest, and a adjustment knob, which is used when adjusting the angle of the leg rest, see the pictures below.

Leg rest position

1. Loosen the locking knobs (1).
2. Adjust the position of the leg rest forwards or backwards to the desired position.
3. Tighten the locking knobs (1).

Leg rest angle

Adjust the angle of the leg rest to the desired angle by turning the knob (2) clockwise or counterclockwise.



Leg rest adjustment.



Adjusting the position and angle of the leg rest.

Leg rest length

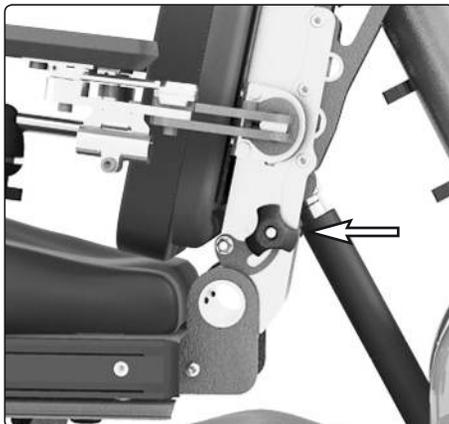
If needed, the Leg rest length can be adjusted. Adjusting the Leg rest length must be carried out by a competent servicing engineer or person with sufficient knowledge to give a competent result. Detailed information is found in the service manual.

Settings

Back rest recline

The Back rest recline can be manually adjusted. The setting is fixed with two knobs on the back of the Back rest.

1. Loosen the knobs on the left and right hand side of the seat. See fig.
2. Adjust the Back rest recline and fix the setting by tightening the knobs. See fig.

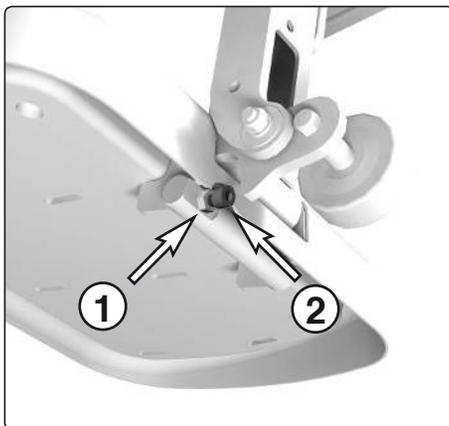


The Back rest recline is fixed with a knob on the left and right hand side of the seat.

Foot plate angle

The footplate angle can be regulated by the stop screw placed under the foot plate.

1. Release the locking nut (1) at the back of the foot plate.
2. Adjust the foot plate angle by screwing the stop screw (2) in or out.
3. Lock the stopscrew with the locking nut (1).



Adjustment of the foot plate angle

Arm rest

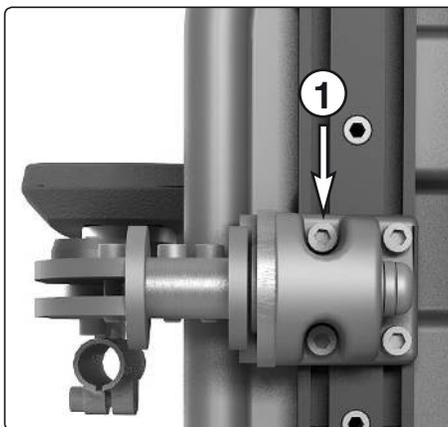
Both arm rests on the MX seat can be adjusted in a number of ways. Besides stepless adjustment of the height and angle of the arm rests, they can be adjusted forwards and backwards.

WARNING

Do not subject the arm rests to load when adjusting them. Risk of crushing.

Armrest height

1. Release the four locking screws (1) which attach each arm rest to the seat back.
2. Adjust the arm rest to the desired height.
3. Tighten the locking screws.



Locking screws for adjusting the arm rest height.

Arm rest forwards/backwards

1. Release the two locking screws (2) on the underside of each arm rest.
2. Slide the arm rest forwards or backwards to the desired position.
3. Tighten the locking screws.



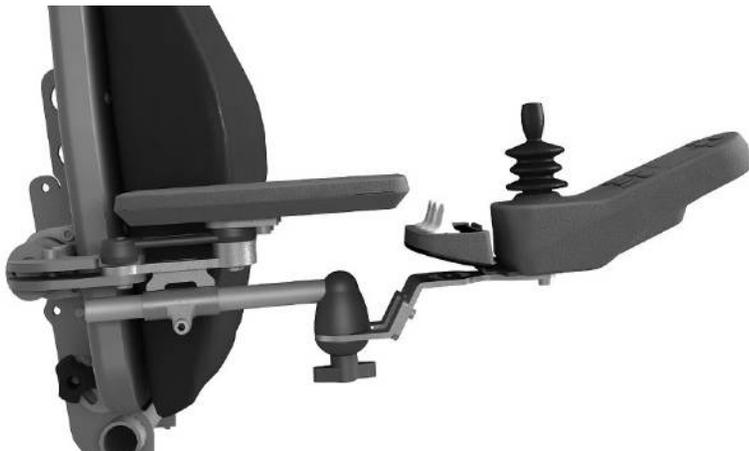
Locking screws for adjusting the arm rest angle and forwards/backwards adjustment.

Arm rest angle

1. Release the two locking screws (3) on the anchoring arms of each arm rest.
2. Adjust the arm rest to the desired angle.
3. Tighten the locking screws.

Control panel, rotatable panel holder

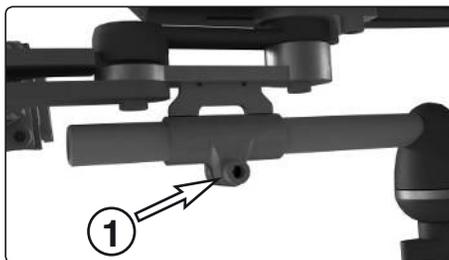
To find the optimum driving position, the location of the control panel can be adjusted lengthwise. It is also possible to adjust the angle of the panel sideways, which facilitates getting in and out.



Control panel

Length adjustment

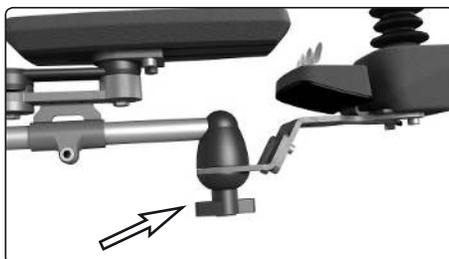
1. Loosen the locking handle (1) on the jointed arm of the panel.
2. Adjust the panel to the desired position.
3. Tighten the locking screw (1).



Length adjustment screw.

Angle adjustment, friction joint

Use the handle on the friction joint to adjust how easily or stiffly the panel is to move for sideways adjustment.



Friction joint knob

Operation

General

The Permobil K450 is designed for use both indoors and outdoors. When you drive indoors, you must be careful, for example, in narrow passages, when going through doors and entrances and when using lifts, ramps, etc.

You should also consider the risk of crushing when you use the electric seat lift and seat tilt functions, above all if the wheelchair has been driven under tables, benches, etc. Outdoors you should remember to drive very slowly down steep slopes and to be very careful when driving on uneven surfaces, up slopes, on side slopes and over obstacles. Always observe a good safety distance when driving near edges and precipices.

We recommend that you do repeated test drives in an environment in which you feel safe so that you are very familiar with how the wheelchair and its accessories behave in different situations before you start to use the wheelchair on public roads and in other public locations.

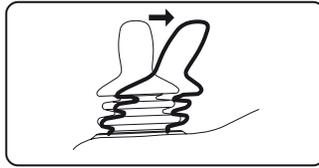
General - Driving

Check that the control panel is correctly fitted and the joystick is in the neutral position. Ensure that you have good support, for example the wheelchair's arm rest, for the part you use to handle the joystick with. Do not just use the joystick as a support. Fast turns and driving on uneven surfaces can interfere with your ability to handle the wheelchair safely. Check and make sure the brake release control fits correctly with the chassis i chassis (brakes not released).

1. Switch on the power by pressing the start key on the control panel.
2. Select a suitable driving profile with the PROFILE key (if the system is programmed for more than one driving profile). See page 30.
3. Move the joystick carefully forwards to drive forwards or backwards to reverse.
4. The speed setting is adjusted using the keys for higher and lower speed. The wheelchair's electronics allow it to run very slowly over edges. You can drive up to the edge and then carefully drive over it.

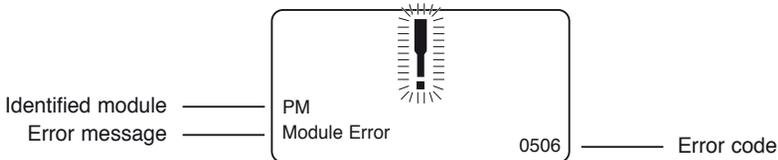
Joystick Error

If the joystick was moved away from the central position before, during and immediately after the time at which the control system was switched on, the screen for a shifted joystick is displayed for 5 seconds. If the joystick is not released during this time, a joystick error is registered and the wheelchair cannot be driven. To be able to drive the wheelchair again, ensure that the joystick is in the central position. Then switch the wheelchair off and on again.



Screen: Shifted joystick

If the wheelchair still cannot be driven after the restart and a “Diagnostics screen” is displayed (see example below), R-net has detected an error in the wheelchair's electronics that needs to be remedied. You should contact your service contact as soon as possible.

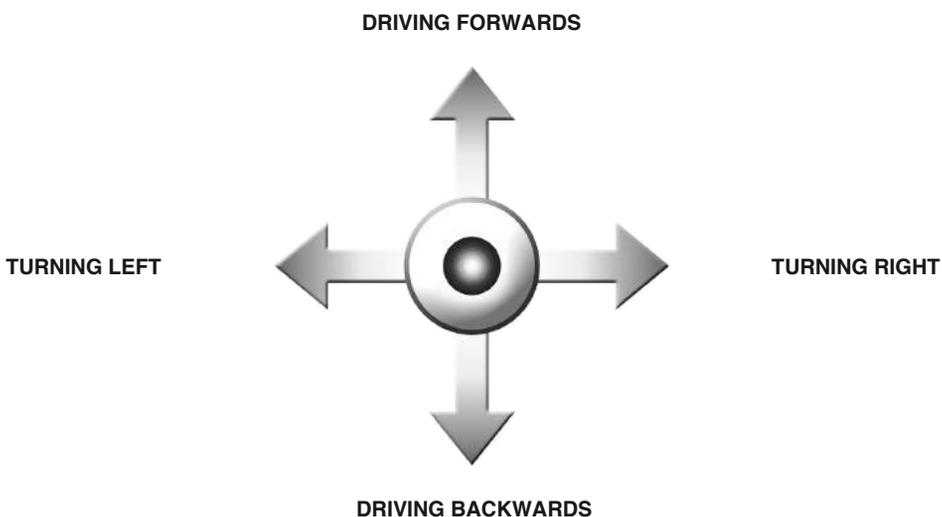


Screen: Diagnostics screen on monochrome display

Driving technique

The control panel's electronics "interpret" the movements of the joystick and move the wheelchair as intended. For normal driving, the user needs to employ no complex techniques, which is an advantage if the user is inexperienced. A good way of starting is quite simply to move the joystick in the direction you want to go.

However, always remember to drive as gently as possible and to avoid sudden braking and evasive maneuvers.



CAUTION

Do not take the first test drive on your own. The test drive is intended to establish how you and the wheelchair work together and you may need assistance.

Before driving, check that the brake release lever is in the drive position.

WARNING

Do not just use the joystick as a support. Fast turns and driving on uneven surfaces can interfere with your ability to handle the wheelchair safely.

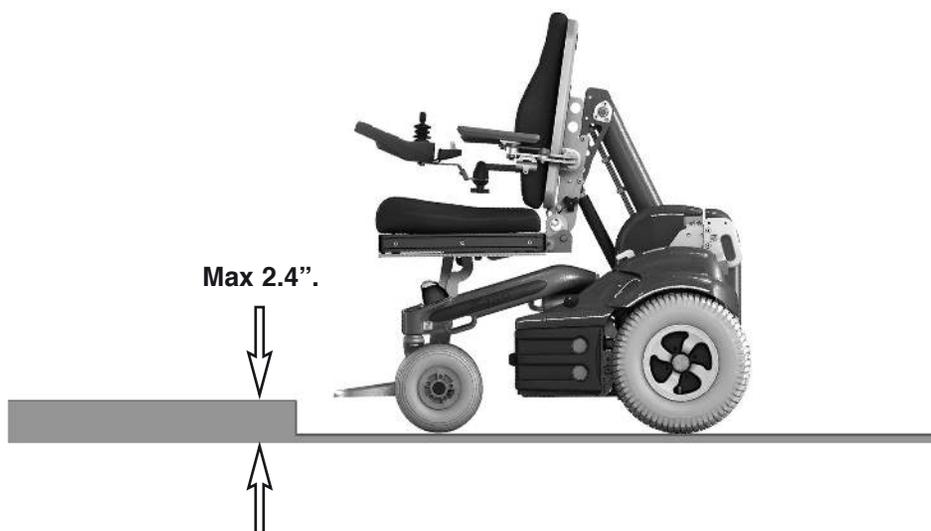
If the wheelchair moves in a way that you do not want, **RELEASE THE JOYSTICK!**
This always makes the wheelchair interrupt the current movement.

Driving rules

Driving over obstacles

Do not drive the wheelchair over obstacles higher than 2.4". If you drive over higher edges, there is a higher risk of tipping and of damage to the wheelchair.

You should always drive over obstacles with great caution.



CAUTION

Do not drive the wheelchair over obstacles higher than 2.4". You should always drive over obstacles with great caution.

WARNING

Raising the seat lift raises the center of gravity and increases the risk of tipping. For this reason use the seat lift only on a level surface.

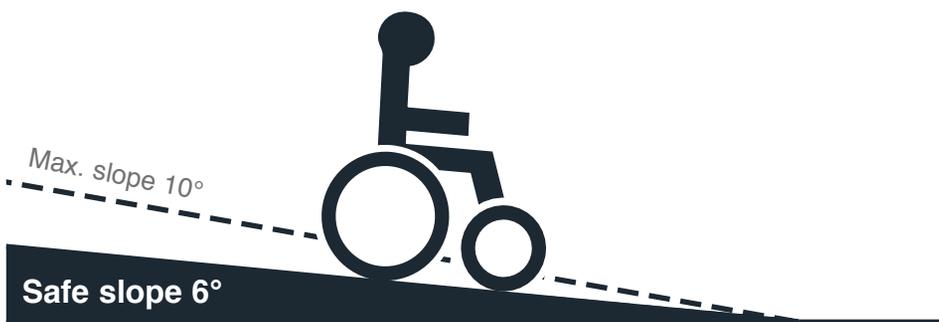
Driving rules

Driving downhill

You should always drive downhill at low speed and with great caution.

Avoid braking suddenly and sudden evasive maneuvers and never drive so fast that you are unable to control the wheelchair safely without risks.

You should be extremely careful when driving downhill on an uneven surface (for example grass, gravel, sand, ice and snow).



WARNING

Do not drive downhill on a gradient greater than 10 degrees.

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

WARNING

Raising the seat lift raises the center of gravity and increases the risk of tipping. For this reason use the seat lift only on a level surface.

Driving rules

Driving uphill

You should always drive uphill with great caution.

Avoid sudden evasive maneuvers and never drive so fast that you are unable to control the wheelchair safely without risks.

You should be extremely careful when driving uphill on an uneven surface (for example grass, gravel, sand, ice and snow).



WARNING

Do not drive uphill on a gradient greater than 10 degrees.
Dynamic stability according to ISO 7176-2 = 6°.

WARNING

Raising the seat lift raises the center of gravity and increases the risk of tipping. For this reason use the seat lift only on a level surface.

Driving rules

Driving on side slopes

You should always drive on side slopes with great caution.

Avoid sudden evasive maneuvers and never drive so fast that you are unable to control the wheelchair safely without risks.

You should be extremely careful when driving on side slopes with an uneven surface (for example grass, gravel, sand, ice and snow).



⚠ WARNING

Do not drive the wheelchair on side slopes steeper than 6 degrees. There is a risk of tipping.

⚠ WARNING

Raising the seat lift raises the center of gravity and increases the risk of tipping. For this reason use the seat lift only on a level surface.

Handling the manual brake release

The wheelchair is fitted with a manual brake release that can be released to make it possible to move the wheelchair manually. The brake release control is located in the left side of the chassis.

WARNING

Never use the wheelchair on a sloping surface with the brakes released.

Always ensure that the wheelchair is switched off when the brakes are activated/deactivated.

To prevent the wheelchair from rolling off, ensure that it is on a dry, level surface before releasing the brakes.

Anyone who pushes a wheelchair with the brakes released must ensure that this is done safely without risks.

Always reset the brake release after moving the wheelchair manually.

CAUTION

When the brake release is activated, the wheelchair cannot be driven.



Brake release control.



Releasing the brakes

Releasing the brakes

1. Switch off the wheelchair with the On/Off key on the control panel.
2. Press the release control out from the chassis and, at the same time, pull it backwards. See the picture. The chair can now be moved manually.

Resetting released brakes

Pull the release control forwards, and then press it in towards the chassis.



Resetting released brakes

Seat functions R-Net LCD

(Not applicable to all seat models)

On some seats the electrical functions can be controlled with the help of the control panel joystick. Some models are equipped with three memory locations. Each memory location can store the position of the seat's adjustment device. This means that it is easy to retrieve a seat position saved earlier.

Maneuvering the seat

1. Press the "Mode" button one or more times until an icon for seat function appears in the control panel display - see illustration.
2. Move the joystick to the left or right to select a seat function. The icon for the seat function selected appears in the display.
3. Move the joystick forwards or backwards to activate the function.

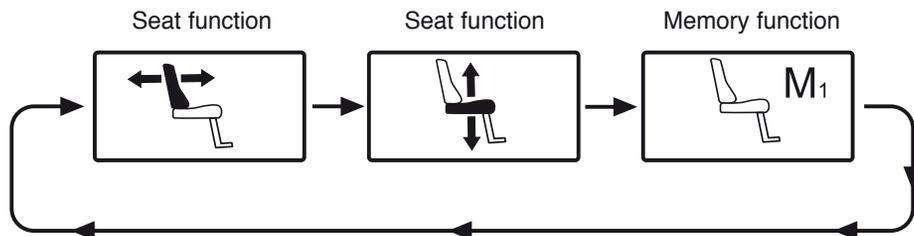
Below is an example of the icons that may be shown in the display. Which icons are shown varies depending on the seat model and available functions.



Seat function activated.

⚠
CAUTION

If the symbol "M" appears together with the seat icon, this means that a memory function has been activated. Move the joystick to the left or right to choose a seat function instead.



*Move the joystick to the left or right to select a function.
The icon for the function selected appears in the display.*

Seat functions R-Net LCD

(Not applicable to all seat models)

Return to drive mode

Press the “Mode” button one or more times until a standard display image with speed indicator appears in the control panel display - see illustration.



Standard display image with speed indicator.

Seat functions R-Net LCD

(Not applicable to all seat models)

The control system on some seats has three memory locations for seat positions. Each memory location can store the position of the seat's adjustment device. This means that it is easy to retrieve a seat position saved earlier.

Retrieving position from memory

1. Press the "Mode" button one or more times until a seat icon appears in the control panel display.
2. Move the joystick to the left or right to select a memory location (M1, M2 or M3). A seat icon and memory symbol "M" for the memory location selected are shown in the control panel display - see illustration.
3. Move and hold the joystick forwards. The seat adjusts to the position stored earlier. For reasons of safety, the joystick must be held forwards until the seat is fully adjusted to the required position. Once the seat has adjusted to the saved position, it stops moving.

CAUTION

Movement of the seat can be stopped at any time by releasing the joystick.

Return to drive mode

Press the "Mode" button one or more times until a standard display image with speed indicator appears in the control panel display - see illustration.



Memory function activated.



Standard display image with speed indicator.

Seat functions R-Net LCD

(Not applicable to all seat models)

Saving position to memory

1. Set the seat's electrical functions to the desired mode.
2. If not activated, activate the seat/memory function by pressing the "Mode" button one or more times until a seat icon appears in the control panel display.
3. Move the joystick to the left or right to select a memory location (M1, M2 or M3). A seat icon and memory symbol "M" for the memory location selected are shown in the control panel display - see illustration.



Memory function activated.

4. Move the joystick backwards to activate the "save" function. An arrow will appear next to the memory symbol "M" - see illustration.
5. Save the current position by moving the joystick forwards and holding it in that position until the arrow next to the memory symbol "M" disappears.



Save function activated.

Return to drive mode

Press the "Mode" button one or more times until a standard display image with speed indicator appears in the control panel display - see illustration on previous page.

Seat functions R-Net LED

(Not applicable to all seat models)

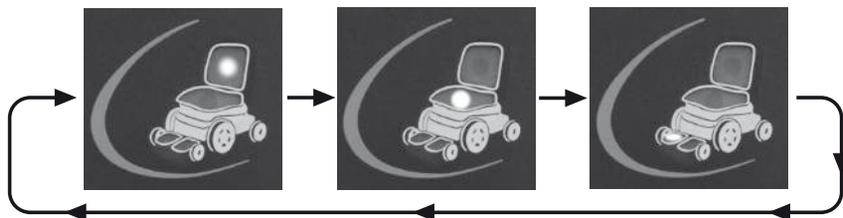
On certain seats the electrical functions for seat lift, seat angle, backrest angle and legrest angle are controlled with the control panel joystick. Other seat functions require a separate seat control panel.

Maneuvering the seat

1. Press the "Mode" button one or more times until the LED for a seat function lights up.
2. Move the joystick to the left or right to select a seat function. The LED for the selected seat function will light up.
3. Move the joystick forwards or backwards to activate the function.



Seat indicator



*Move the joystick to the left or right to select a function.
The LED for the selected function will light up.*

Seat functions R-Net LED

(Not applicable to all seat models)

Return to drive mode

Press the "Mode" button one or more times until a standard display image with speed indicator appears in the control panel display - see illustration.

Charging batteries

When should the batteries be charged?

How frequently you need to charge the batteries in your wheelchair depends on a number of factors, including how you use your wheelchair, the temperature and age of the batteries and how they are made. All batteries also gradually lose capacity as they age.

The most important factor for the life of the batteries is how much power is taken out of them before they are charged and how often they are charged/discharged.

To achieve the best life, the batteries should not be discharged completely. Always charge the batteries immediately after they have been discharged.

If the battery voltage indicator shows that the batteries appear to be losing power faster than normal, the batteries may be worn out and need to be replaced.

WARNING

Use only the charger supplied with your wheelchair or recommended by Permobil. Using other chargers may damage the batteries, the wheelchair electronics or the charger itself. It may also result in parts becoming overheated, which may entail a greater risk of fire.

Be careful if using metal objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and safety goggles.

You may only use a charger with a maximum charging current of 10 A (average)

(the effective value of the charging current must not exceed 12 A).

The batteries must be charged in a well-ventilated room, not in a closet. The batteries must not be charged in a bathroom or wetroom.

If you want to interrupt the charging process, the mains voltage should be switched off before the charging contact is disconnected from the wheelchair's charging socket. This is to avoid sparking and unnecessarily high wear on the charging contact.

The charger's charging cable must not be extended.

The charger may get hot and must not be covered. The charger must be placed so that it has free space on all sides.

The charging contact must be replaced if it is damaged or gets hot during charging. Both the contact on the charger's cable and the wheelchair's charging socket should be replaced if one part is damaged or worn. The contacts must be replaced by qualified personnel.

Charging batteries

Charging

Ensure that the wheelchair is switched off with the On/Off key on the control panel and then connect the charging plug to the control panel's or the chassis charging socket. The battery voltage indicator on the wheelchair's control panel lights up and shows the charging status during charging.

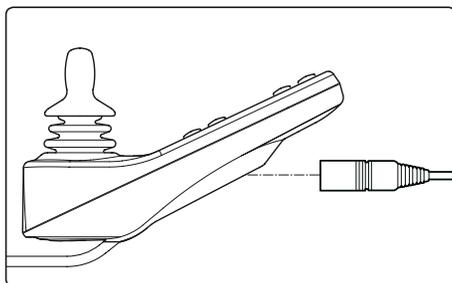
CAUTION

CAREFULLY READ THE INSTRUCTIONS SUPPLIED WITH DIFFERENT CHARGERS BEFORE STARTING TO CHARGE THE WHEELCHAIR.

CAUTION

Switch off the wheelchair with the On/Off key on the control panel before charging.

Ensure that the charging contact has been fully inserted in the charging socket.
The wheelchair cannot be driven when the charger is connected.



Charging socket



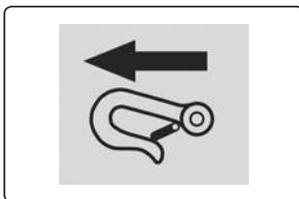
Charging socket

Transport

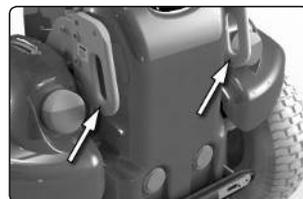
The wheelchair must only be transported in a vehicle that is approved for such purposes. Carefully check that the wheelchair is properly secured and that the wheel locks are engaged. When transporting the wheelchair in a motor vehicle, the wheelchair must be secured by fastening straps through the brackets in the front and the back, each marked with a yellow sticker. Do not connect the fastening straps to any other part of the wheelchair. Secure the wheelchair according to the manufacturer of the vehicle restraint systems (fastening straps) instructions. Always make sure that the fastening points on the transport vehicle are well-anchored.



Front transport eyes



Sticker for transport eyes



Rear transport eyes

⚠ WARNING

Transportation 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 according to the appropriate crash test standards, 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.

Unless using a crash-tested 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 not to protect you in the event of a motor vehicle accident. The positioning belts do not replace use of a vehicle mounted restraint.

**WARNING**

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

When transporting your wheelchair by air, you should primarily pay attention to the following three things:

1. Batteries

Gel batteries: In most cases, they do not need to be removed from the wheelchair.

The cables attached to the battery must be disconnected and the cable terminals insulated.

Acid batteries: Most airlines require that batteries be removed from the wheelchair and transported in special boxes that the airline may provide.

2. The wheelchair's dimensions and weight

How much the wheelchair weighs and how large it is are important, depending on the type of airplane in which the wheelchair is to be transported. The smaller the airplane is, the smaller the wheelchair may be/weigh and vice versa. Always check with the airline what rules apply.

CAUTION

Some airlines may refuse to accept acid batteries on board.

General advice for air transport

3. Preventing damage

When transported by air, the wheelchair will be put with other goods in a confined space. Therefore, it is important to take preventive action to minimize transport damage to the wheelchair.

Cover the control panel with soft, shock-absorbing material (foam plastic or similar) and fold it in towards the back rest. Protect other protruding objects in a similar manner. Tape any loose cables to the seat or covers.



CAUTION

To ensure that the wheelchair can be transported safely and no nasty surprises crop up at the last minute, you should always contact the airline before you travel.

Accessories

General

Accessories for Permobil wheelchairs are subject to continuous development. Contact your nearest dealer for more information on the accessories available for your wheelchair.

Positioning belt

There is a screw hole on both sides of the seat frame for mounting the positioning belt. The positioning belt should be mounted in the upper groove of the rail.

WARNING

Permobil's fixing belt is only designed to hold the user in place and not as a protection in the case of a collision or accident. Check the condition of the belts regularly in case any they have been damaged or become worn.

Mounting of positioning belt

Attach the snap lock of the belt on the side that suits the user best.

1. Screw the locking screw tight (1) in the upper groove in each side rail.
2. Check that the belt buckle locks properly in the snap lock.



Snap Lock for the Belt.



Fitted Belt.



Fitted Belt.

Maintenance and repairs

To ensure that your wheelchair works well, it is important for it to be used correctly and regularly maintained. A well maintained wheelchair lasts longer and has a lower risk of faults.

Toolkit

The wheelchair comes with a toolbag with the following toolkit that can be used for maintenance and minor repairs.

TOOL	AREA OF USE
Two Screw drivers	General maintenance
Allen keys	General maintenance/seat adjustment
10-11, 12-13 mm spanners	General maintenance/replacing batteries
Box spanner 17 mm.	Adjusting the suspension
Emergency operation cable	Emergency operation of seat functions

 **CAUTION**

Some repairs may require tools other than those supplied with the wheelchair.

 **CAUTION**

The power supply to the control panel must always be switched off when batteries and fuses are replaced.

 **WARNING**

Any unauthorized alterations to the wheelchair and its systems may lead to an increased risk of accident.

All alterations to and interventions in the wheelchair’s vital systems must be performed by a competent service engineer. In case of doubt, always contact a competent service engineer.

General - batteries/storage

- Please note that a battery discharges itself and that a discharged battery can burst when it is cold. If the wheelchair is to be stored unused for an extended period of time, the batteries must always be charged once a month to avoid damaging them.
- The wheelchair must not be stored in areas subject to condensation (steam or moisture on surfaces), for example utility rooms or similar.
- The wheelchair may be stored in an unheated room. From the point of view of corrosion, it is best for the room to be a few degrees warmer than the surroundings as this keeps the room drier.
- If the wheelchair is fitted with acid batteries, the acid level should be checked regularly. If the wheelchair is fitted with gel batteries, the liquid level does not need to be checked.
- The life of the batteries depends entirely on regular charging.

Short-term storage

For the charging process to produce a battery with good capacity, the temperature in the storage room should not be lower than +5 degrees. If it is stored at a temperature below +5 degrees, there is a higher risk that the battery has not been fully charged when it comes to be used and also a higher risk of corrosion.

Long-term storage

The battery may be stored in an unheated room but it should be charged at least once a month for maintenance purposes.



WARNING

Be careful if using metal objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and safety goggles.

Care and maintenance

Regular care and maintenance will prevent unnecessary wear and damage to your wheelchair. The following is general advice recommended by Permobil. For severe soiling of the upholstery or damage to the surface finish, contact Permobil for information.

Upholstery, cloth/vinyl

For normal cleaning, wash the upholstery with lukewarm water and a mild non-abrasive soap. Use a soft cloth or brush. Before the surface dries, wipe off any water/soap residues with a clean, dry cloth. This procedure may be repeated to remove stubborn dirt or stains.

If necessary, the cover may be removed before cleaning. See also the washing instructions on the upholstery materials.

Metal surfaces

For normal cleaning it is best to use a soft cloth/sponge, hot water and a mild detergent. Wipe down carefully with a cloth and water, and dry off.

Remove scuff marks from semi-matt surfaces with soft wax (follow manufacturer's instructions).

Remove scuff marks and scratches from shiny surfaces using car polish, either liquid or paste. After polishing, apply soft car wax to restore the original surface gloss.

Plastics

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



WARNING

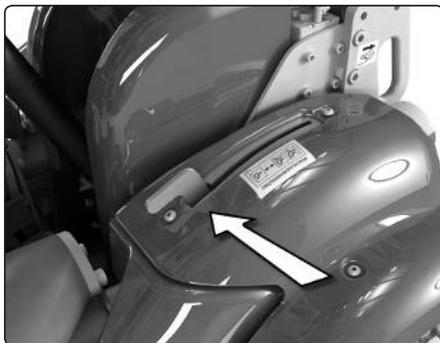
Never hose the wheelchair down as the electronics may be damaged. The wheelchair must always be turned off when being cleaned.

Always contact Service if any defects are discovered in the wheelchair. Using a defective wheelchair may cause injury to the user and damage the wheelchair.

Regular inspections

Check regularly:

- The condition of the positioning belt in case it has become worn or been damaged.
- The condition of the fixing belts in case they have become worn or been damaged.
- That the lock nuts on the link heads are screwed tight.
- That the adjustment device is firmly attached in its fixtures.
- That moveable parts such as the arm rests and foot plates are firmly and properly attached, and that all knobs are tightened.
- The brake release and the function of the brake release lever (about once a month). When the brakes are released, it should not be possible to drive the wheelchair.



Care and maintenance

Air pressure

Check at regular intervals that the wheelchair's tires have the correct tire pressure. The incorrect tire pressure may result in lower stability and maneuverability. Too low tire pressure also results in abnormal wear and shorter range. Therefore, check regularly that the tire pressure is maintained at 250 kPa. (2.5 bar). in the front tires and at 120-200 kPa. (1,2-2.0 bar). in the rear tires.

Pumping tires with air

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



Filling valve, front tire



Filling valve, rear tire

WARNING

The recommended tire pressure for front tires is 250 kPa (2.5 bar). The recommended tire pressure for rear tires is 120-200 kPa (1.2-2.0 bar). Overfilling entails a risk of explosion.

The incorrect tire pressure may result in lower stability and maneuverability. So check regularly that the tires have the correct pressure.

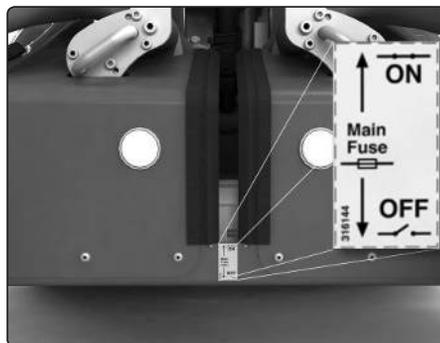
Battery replacement

⚠ WARNING

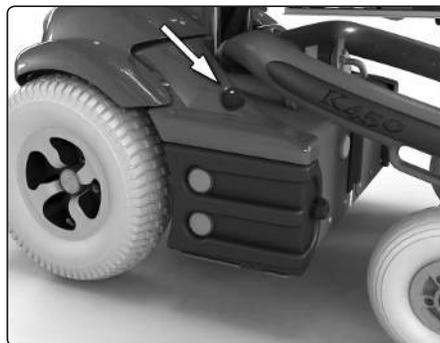
Be careful if using metal objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and safety goggles.

1. Place the wheelchair on a level surface.
2. Switch off the main power switch on the control panel.
3. Set the main fuse in the Off position.

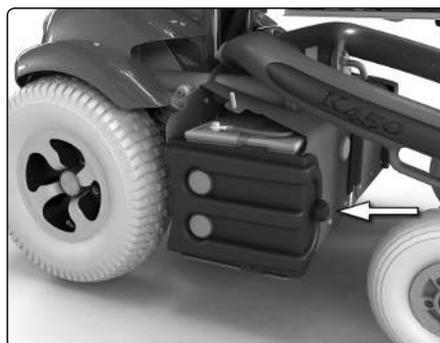
4. Detach the knob for the upper cover on the side of the chassis (see the picture). Lift off the cover.
5. Loosen the knob for the lower cover on the side of the chassis (see the picture). Lift off the cover.
6. Lift/pull the battery out of the chassis using the battery belt (see the picture).



The main fuse between the front wheels.



Locking handle for the upper cover.

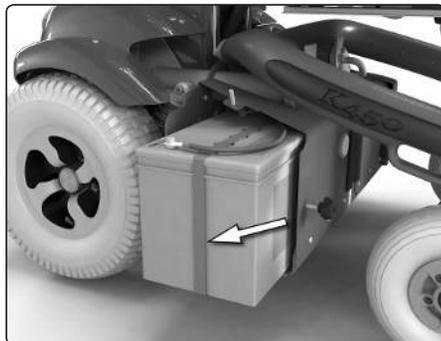


Locking handle for the lower cover.

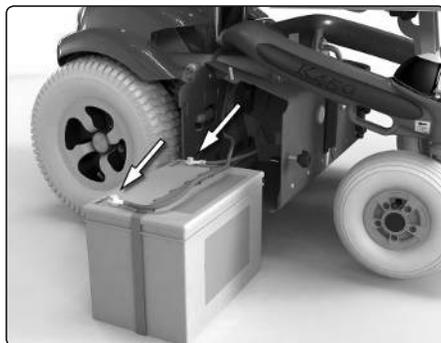
Battery replacement

7. Remove the battery connectors. See the picture. See also the sticker on the inside of the battery cover.
8. Connect the battery connections on the new battery, see the picture. See also the sticker on the inside of the lower battery cover.
9. Lift up the new battery and slide it in with the help of the battery belt.
10. Replace the upper cover, and attach it with the handle.
11. Lift up the new battery and slide it in with the help of the battery belt.
12. Set the main fuse in the ON position.

Repeat the procedure with the second battery on the other side of the wheelchair.



Battery belt.



The battery connectors.

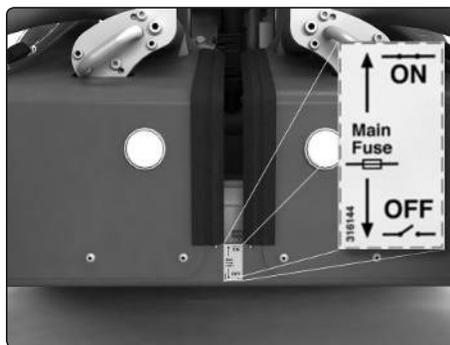
Resetting the main fuse/battery isolator

WARNING

If the main fuse is triggered, there is often a major electrical fault. The cause of the fault should be checked carefully before the switch is reset. Contact Service in case of doubt.

The main fuse also functions as a battery isolator but it is called the main fuse in the owner's manual.

It is not normally necessary to replace the main fuse as it is automatic and can be reset when it has been triggered. It is reset by switching the switch to On.



The main fuse is accessible between the front wheels from the front of the chassis.

CAUTION

Always switch off the power supply to the control panel before interrupting the power with the main fuse.

Technical specifications

The specifications given on the following pages apply only to the Permobil K450 chassis with an MX seat.

DATA

General

Name Permobil K450

Dimensions and weight

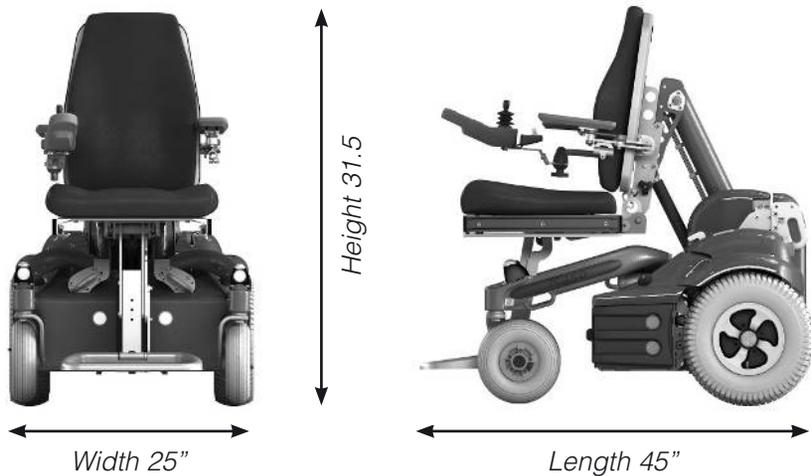
Length 45"
 Width 25"
 Height 31.5"
 Minimum transport dimensions, lwxh 43.5"x 25" x 24"
 Weight, incl. batteries and MX seat 311 lbs
 Max. battery size 10.2" x 6.6" x 7"
 Seat width (MX seat) 10"/12"/14"/16"
 Maximum user weight (MX seat) 125 lbs

Wheels

Front tire dimensions 210x65
 Rear tire dimensions 13"x5.00"x6"
 Rec. tire pressure front 250 kPa (2.5 bar)
 Rec. tire pressure rear 120-200 kPa (1.2-2.0 bar)

Performance

Range 17.3 miles
 Min. turning radius 41.75"
 Min. turning area 51.5"
 Max. height of obstacles 2.4"
 Min. clearance under the wheelchair 2.5"
 Hill Climbing Capability 10 degrees
 Safe slope 6 degrees
 Sideways slope capability 6 degrees
 Static stability downhill 18 degrees
 Static stability uphill 18 degrees
 Static stability side tilt 16 degrees
 Max speed, forwards 5.2 mph.



ELECTRICAL SYSTEM

Electronics	PM120
Control panel	JSM-L-SV
Batteries	
Recommended battery type.....	Group 34, Gel
Battery capacity	60 Ah
Charging time	8 hours
Fuses	
Main fuse63 A
Control force	
Joystick.....	1.5 Nm
Keys	2.0 Nm

R-net diagnostics

When an error or a fault occurs in the wheelchair's electronics, information on it is displayed in the control panel's display. This information can then be used to diagnose where the error/fault occurred and its cause.

Troubleshooting and repairs must always be performed by competent personnel with good knowledge of the wheelchair's electronics. More information on troubleshooting and remedies can be found in the Service Manual for this wheelchair model.

Diagnostic screens

Current diagnostic screen

When the control system's integrated protection circuits have been triggered so that the control system can no longer operate the wheelchair, a diagnostic screen is displayed in the control panel's display.

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

NB! *If the fault is in a module that is not currently being used, it may still be possible to drive the wheelchair, but the diagnostic screen is displayed occasionally.*

Switch off the wheelchair and leave it off for a few minutes. Then restart the wheelchair. If the fault persists, you must switch off the wheelchair and contact your service contact. Write down the information displayed in plain text in the control panel's display and pass it on to your service contact.

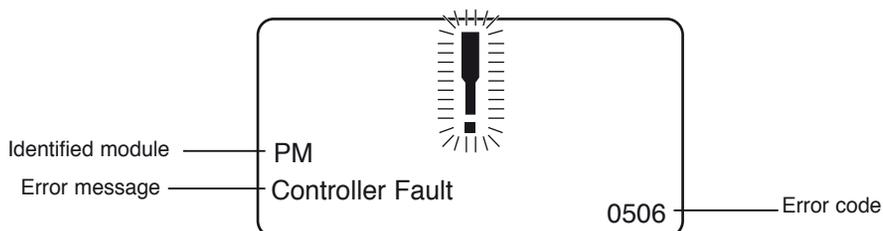
Do not use the wheelchair until the problem has been remedied or you have received other instructions from your service contact.



WARNING

Diagnostics should only be performed by persons with sound knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair works may make it dangerous to use the wheelchair. Permobil accepts no liability for any personal injury or damage to the wheelchair and its surroundings that may occur on account of incorrect or poorly performed repair work.

Example of a screen showing a system fault



Identified module

This indicates the control system module that detected the problem.

PM= Power module

JSM= Joystick module

Error message

The error message provides a brief description of the error type.

Error code

The four-digit code indicates which protection circuit has been triggered.

Repair of defective units

Apart from specific OEM-approved spare parts (contact Permobil for further information on these), there are no replaceable parts in the R-net control system. Consequently, defective units must be sent to Permobil or a Permobil-approved repairer for repair.

CAUTION

If any part is replaced without Permobil's approval, the wheelchair's warranty lapses. Permobil accepts no liability for any loss that occurs as a result of a component of the R-net control system being opened, adjusted or modified without permission.

Diagnostics R-Net LED

Battery voltage indicator

Each time the wheelchair is started up, parts of the wheelchair's electronics are checked. If any fault has occurred in these parts, this is displayed on the control panel's battery voltage indicator and the indicator for speed/driving profile in the form of one or more flashing lamps.

Troubleshooting and repairs must always be performed by competent personnel with good knowledge of the wheelchair's electronics. More information on troubleshooting and remedies can be found in the Service Manual for this wheelchair model.

Permanently on

All in order. The number of lamps that light up depends on the voltage remaining in the batteries. If the batteries are fully charged, all the lamps light up.

Slowly flashing red lamps, 1 - 2

The batteries need recharging immediately.

Rapid flashes, 1 - 10 lamps

A fault has been detected in the wheelchair's electronics and the wheelchair cannot be driven.

- Switch off the wheelchair.
- Check that all visible cables and the cable to the control panel are connected correctly.

Switch the wheelchair on again. If the fault persists, count the number of flashing lamps and check for a possible cause and remedy in the table on the adjoining page.

Do not use the wheelchair until the problem has been remedied or you have received other instructions from your service contact.



WARNING

Diagnostics should only be performed by persons with sound knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair work may make it dangerous to use the wheelchair. Permobil accepts no liability for any personal injury or damage to the wheelchair and its surroundings that may occur on account of incorrect or poorly performed repair work.

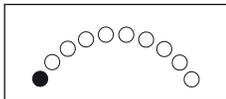


CAUTION

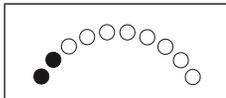
Any error signals on the indicators are not displayed while the wheelchair is being driven. They appear when it is next started.

ERROR SIGNAL

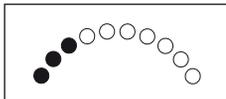
ERROR INDICATION - REMEDY



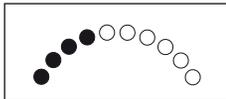
1 Lamp - Low battery voltage
 Check the condition of the battery. Check the contact between the battery and the control unit.



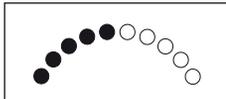
2 Lamps - Failure in left-hand drive motor
 Check the connection to the left-hand drive motor.



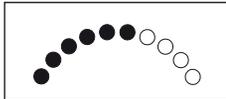
3 Lamps - Short-circuit in left-hand drive motor
 Check the drive motor's contacts and cables.



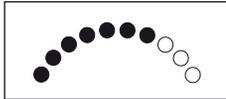
4 Lamps - Failure in right-hand drive motor
 Check the connection to the right-hand drive motor.



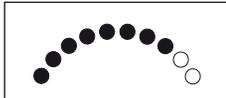
5 Lamps - Short-circuit in right-hand drive motor
 Check the drive motor's contacts and cables.



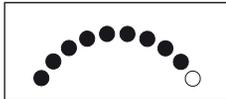
6 Lamps - Battery charger connected
 Disconnect the battery charger.



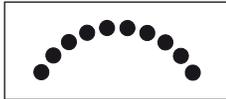
7 Lamps - Joystick error
 Check that the joystick is not being moved when the wheelchair is started



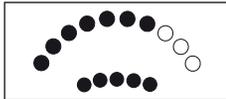
8 Lamps - Control system error
 Check the contacts to the output stage.



9 Lamps - Failure in brake circuit
 Check the contacts to the magnetic brake.



10 Lamps - High battery voltage
 Check the battery and the contacts between the battery and the control unit.



7+5 Lamps - Communication error
 Check that the cable to the control panel is correctly inserted and is not damaged.



Actuator indicator - Actuator error
 If the wheelchair is fitted with more than one actuator, check which one is not working. Check the actuators' cable connections.

Troubleshooting guide

The following troubleshooting guide describes a number of faults and events which may occur when you use your wheelchair, together with suggested remedies. Note that this guide cannot describe all the problems and events which may occur and you should always contact your service contact or Permobil in case of doubt.

EVENT	POSSIBLE CAUSE	REMEDY
The wheelchair cannot be started.	Batteries discharged.	Charge the batteries.
	The cable connection to the control panel has come loose.	Reconnect the cable
	Main fuse switched to OFF position after, for example, battery replacement.	Reset the main fuse. See page 98.
	Main fuse triggered.	See page 98.
The wheelchair cannot be driven.	Battery charger connected.	Stop charging and disconnect the charging cable from the wheelchair’s charging socket.
	Brake release activated.	Reset the brake release.
	Wheelchair locked with the security key.	Unlock the wheelchair. See page 54.
The wheelchair “switches itself off” after a certain period of inactivity (20-30 min.).	The electronics’ energy-saving mode has been activated.	Switch the wheelchair on again using the start key on the control panel.
The wheelchair stops while being driven.	The cable connection to the control panel has come loose.	Reconnect the cable
	Main fuse triggered.	See page 98
The wheelchair can only be driven at reduced speed. Applies to electrically controlled seat lift and seat tilt.	Seat lift or seat tilt raised too high.	Lower the seat lift or seat angle. see pages 40-41.
The wheelchair cannot be charged.	Main fuse switched to OFF position after, for example, battery replacement.	Reset the main fuse, see page 98.

Emergency operation of seat functions

If any of the electric seat functions cannot be operated in the normal way because of a fault other than discharged batteries or a faulty adjustment device, the function can be operated manually using the emergency operation cable supplied.



Connecting the emergency operation cable

WARNING

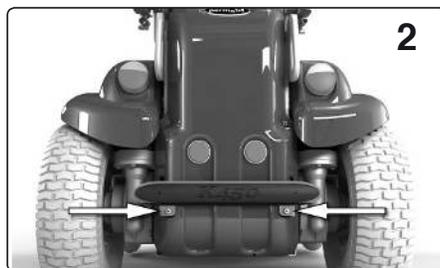
Emergency operation must only be used in emergencies, and then with great care. When the seat is operated in the emergency mode, all safety functions in the control system are bypassed. There is a risk of crushing and a risk of damage to the wheelchair.

Never drive the wheelchair while using the emergency operation cable at the same time.



Connecting the emergency operation cable to the charging socket.

1. Connect one end of the emergency operation cable to the loading socket of the control panel (picture 1).
2. Remove two Allen screws at the back of the wheelchair as shown in picture 2. Lift off the bumper.

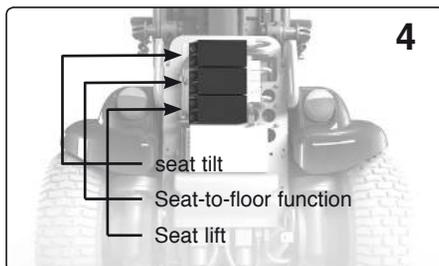


The Allen screws that attach the bumper.

3. Remove two Allen screws, as shown in Picture 3. Lift off the back cover.
4. The seat control modules are now visible. There may be two or three modules, depending on whether seat tilt is included as an extra option. The individual functions are placed as shown in picture 4.
5. A cable from each function is connected to a control module. Remove the cable connected to the module that you want to maneuver. Picture 5 shows how the cable from the adjustment device for the seat-to-floor function has been removed from the control module.



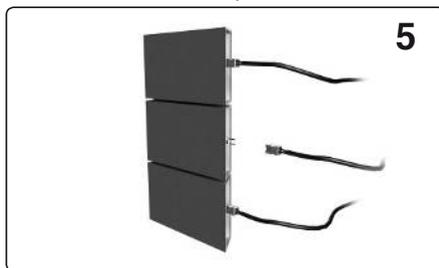
The Allen screws that attach the back cover.



Control modules behind the back cover, and their respective functions.

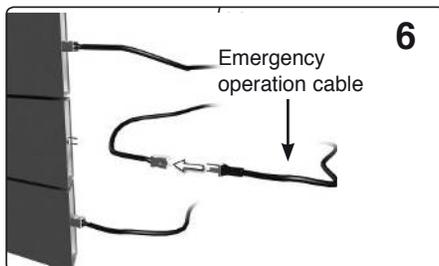
CAUTION

Take care when connecting the emergency operation cable with the control module cable, so that the pin of the male connector flushes with the groove in the female connector, to avoid any risk of damaging the cable contacts.



Cables connected to control mod-

6. Connect the free end of the emergency operation cable with the cable from the adjustment device of the function you want to maneuver, see picture 6.



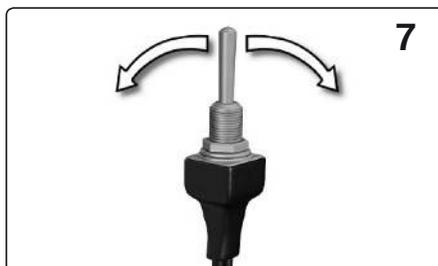
Connecting the emergency operation cable and the cable from the adjustment device.

⚠ WARNING

Emergency operation must only be used in emergencies, and then with great care. When the seat is operated in the emergency mode, all safety functions in the control system are bypassed. There is a risk of crushing and a risk of damage to the wheelchair.

Never drive the wheelchair and use the emergency operation cable at the same time.

- 7 Use the control lever on the emergency operation cable to operate the function you chose to connect to one of the holes, see picture 7.
- 8. If required, change to a new function by first disconnecting the emergency operation cable and then reconnecting it as shown before to the appropriate control module. Then repeat steps 5-7.



Maneuvering with the control lever of the emergency operation cable

Disconnecting the emergency operation cable

- 1. Disconnect the end of the emergency operation cable from the connection to the adjustment device cable.
- 2. Disconnect the other end of the emergency operation cable from the connection to the charging socket on the control panel.
- 3. Connect all adjustment device cables to their respective control modules.
- 4. Replace the back cover of the wheelchair with two Allen screws.
- 5. Replace the bumper with two Allen screws.

 **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.

CAUTION! 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.

CAUTION! 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.

CAUTION! 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.