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Introduction
The Service Manual is intended for technical personnel who maintain and repair electric wheelchairs. It is important that anyone who performs maintenance and repairs described in this manual reads and understands the content of this manual so that the work is performed professionally. Always state the chassis number when contacting Permobil to ensure that the correct information is provided.

Technical Support
In the event of Technical Problems, you should contact your dealer, or Pemobil Inc at 800-736-0925.

Spare parts
Spare parts must be ordered through your dealer.
The spare parts catalogue for the Chairman Basic chassis is PAB 1209 and is available from Permobil Inc.

Warranties
Contact your nearest dealer or Pemobil Inc. for information on the current warranties.

Maintenance
See the information in the Owner’s Manual.

Reconditioning
Contact Permobil Inc. for Reconditioning Instructions.
Rating plates

Chairman

Identity marking
Chassis no.

Panel

Identity marking
Art. no.
Serial no.
Modification no.
Raising the seat lift manually
If the seat lift cannot be raised in the normal manner because the batteries are discharged or the adjustment device is defective, the seat can be raised manually.

1. Remove the cushion and the seat plate.
2. Raise the seat using the seat lift crank provided.

Raising the seat
(Fixed seat tube)
1. Remove the cushion and the seat plate.
2. Loosen the screw for the seat tube brace.
3. Raise the seat using the seat lift crank or pull the seat up by hand.
Covers

Removal
1. Raise the seat to its highest position.
2. First remove the rear cover. It is held in place by five screws.
3. Remove the cover of the electronics box and disconnect the contact for the rear light.
4. Then remove the rear battery cover and then the front battery cover.
5. The little cover by the seat lift can be flipped off using a screwdriver.
6. Finally, remove the front cover. It is held in place by two screws underneath it.

Fitting
1. First fit the front cover with two screws.
2. Then fit the front battery cover and then the rear battery cover. Screw them in place.
3. Then reconnect the cable for the rear light and close the electronics box.
4. Fit the rear cover.
Changing the batteries

**NB.** Use protective goggles when working with batteries.

**Removal**
1. Raise the seat to its highest position. If the battery is defective, see Raising the seat lift on page 7.
2. Remove the rear cover and the battery covers. See page 8.
3. Disconnect all battery connections, the positive poles first and then the negative poles.
4. Lift out the batteries. Use lifting straps.

**Fitting**
1. Insert two new batteries. The battery poles must be at the back.
2. Connect the battery connections, first the negative poles and then the positive poles.
**NB.** The cables must be connected correctly.
3. Refit the covers.
4. Charge the batteries.
Changing the drive wheel

Removal
1. Raise and block up the wheelchair’s chassis so that the wheel does not reach the ground.
2. Loosen and remove the centre screw C, the Nordlock washer B and the rim locking washer A (see the figure at the bottom of the page).
3. Pull the wheel off the axle. Use the removal tool 304103-99-0 if the wheel cannot be removed by hand.

Fitting
1. Fit the wheel onto the axle.
2. Fit the rim locking washer A, the Nordlock washer B and the centre screw C and tighten to secure the wheel.

NB. The screw has a locking coating which is sufficient for refitting 3-4 times. Then the screw must be replaced with a new one.
Changing the brake release wires
The upper wire controls the left brake unit and the lower wire controls the right brake unit.

Removal
1. Raise the seat lift to its highest position (use the crank provided for chairs without a seat lift), see page 7.
2. Remove the cover, see page 8. Move the brake release lever forwards to its front position to facilitate removal.
3. Loosen the locking nut (1).
4. Screw the adjusting screw (2) all the way in.
5. Loosen the wire at the magnetic brake and at the brake release mechanism.

Fitting
1. Fit the wire first at the magnetic brake and then at the release lever.
2. Adjust the length of the wire sleeve using the adjusting screw (2) so that the wire is tensioned but does not pull on the release clamp.
3. Check that the brake works. Release the brake with the release lever and check that the wheel can turn.
4. Tighten the locking nut.
5. Refit the cover.
Changing the magnetic brake

Removal
1. Raise the seat to its highest position.
2. Remove the battery covers and the rear cover. See page 8.
3. Disconnect the electrical connection of the magnetic brake.

4. Detach the brake release wire from the brake.

5. Unscrew the three screws which hold the brake and remove the brake with the extensible cover, brake disc and cover.
6. Note the position of the brake release arm.
Fitting
1. Check the setting of the brake. Follow the instructions on the decal on how the two Allen screws are adjusted.

2. Place the magnetic brake's brake disc in the brake assembly.

3. Put on the cover.
Changing the magnetic brake

4. Insert a screw to align the parts and screw the magnetic brake in place using all three screws.

5. Attach the magnetic brake's electrical connection.

6. Fit the chassis cover. See Covers, page 8.

The magnetic brake's electrical connection
Changing the drive motor

Removal
1. Raise the seat to its highest position.
2. Remove all the covers. See page 8.
3. Remove the positive pole from one battery.
4. Block up the appropriate side of the wheelchair.
5. Remove the wheel. See Changing the drive wheel, page 10.
6. Detach the electrical connections for the motor and magnetic brake.
7. Detach the brake release wire from the magnetic brake.
8. Remove the three screws which hold the motor.

9. Turn the motor sideways so that the wheel axle turns freely. Pull the motor straight forwards.
Fitting

1. Lift the motor into place. Turn it a little so that the wheel axle can turn freely without being obstructed by the chassis.

2. Screw the motor in place with the three screws.

3. Attach the brake release wire.
4. Attach the electrical connections for the motor and magnetic brake. **NB.** Ensure that the contacts are fully interlocking.

5. Fit the wheel. See page 10.
6. Remove the blocks.
7. Connect the battery poles.
8. Fit the covers. See page 8.
Changing the carbon-brush in the drive motor

Removal
1. Remove the drive motor. See page 14.
2. Remove the motor's cables from the coupling box.

3. Remove the magnetic brake and the mounting plate.
4. Mark the stator’s position against both ends with a small mark before loosening the nuts. It is important for the function of the motor that the parts are assembled precisely without being moved away from the original position.
5. Loosen two nuts and pull off the motor end. Press the cable gland off the motor end.

6. Remove the brush holder completely.
Fitting

1. Fit a new brush holder using the fitting ring provided with the new brush holder. Ensure that you turn the cables in the same direction as the outgoing shaft of the gear.

2. Fit the end with two nuts.
   Remember the wave washer between the bearing and the end. Ensure that you assemble the parts according to the marking made earlier.
   It is important for the function of the motor that the parts are assembled precisely without being moved away from the original position.

3. Insert the mounting plate, cover and brake disc. Ensure that you position the holes correctly for fitting the brake.
   Turn the brake so that the brake arm is in the correct position.

4. Screw the motor cables to the plinth.

5. Fit the drive motor. See page 16.
Changing the seat lift

Removal
1. Raise the seat lift to its highest position (use the crank provided for chairs without a seat lift). Lift up the little protective cover on the seat lift shaft.
2. Remove all covers. See page 8. (Move the brake release lever to its forward position to facilitate removal)
3. Cut off the cable ties which hold the cables between the seat lift and the side panel.
4. Disconnect the seat lift cable.
5. Unscrew the four screws which hold the seat and lift off the seat.
6. Unscrew the nuts and remove the yoke which holds the seat lift.
7. Lift out the seat lift.
Changing the seat lift

Fitting

1. Lift and replace the seat lift.
2. Refit the yoke and secure the seat lift by tightening the two nuts.
3. Attach the contacts to the seat lift.
4. Lift and replace the seat and secure it by tightening the four screws.
5. Fasten the cables between the seat lift and the side panel with new cable ties.
6. Refit the covers. See page 8.
Changing the seat lift motor

Removal
1. Remove the seat lift as shown on page 21.
2. Disconnect the seat lift cables from the motor.
3. Unscrew the three screws which hold the motor and remove the motor.

Fitting
1. Fit the new motor and secure it by tightening the three screws.
2. Reconnect the seat lift motor's cables.
3. Adjust the belt tension by moving the motor sideways before tightening the motor screws. The belt is sufficiently taut when it can be pressed in 4-5 mm.
Changing the seat lift belt

1. Remove the seat lift. See page 21.
2. Loosen the four screws which hold the seat lift motor. Move the motor sideways so that the belt becomes slack.
3. Remove the belt first from the motor and then from the cog wheel on the seat lift screw.
4. Change the belt and reassemble in the reverse order.
5. Adjust the belt tension by moving the motor sideways. The belt is sufficiently taut when it can be pressed in 4-5 mm.
6. Tighten the four screws again.
7. Fit the seat lift. See page 21.
Changing the control unit

Removal

1. Raise the seat to its highest position, see page 7.
2. Connect the DP1c programming unit. Read off and note the drive parameters. See page 32.
3. Remove the rear cover, see page 8.
4. Disconnect the power connections from the electronics unit.
5. Unscrew the two screws which hold the electronics unit in place.

The electronics unit is held in place by two screws
Changing the electronics

Fitting

1. Remove the mounting plate from the old electronics and mount it on the new electronics.
2. Screw the electronics unit to the frame with the two screws.
3. Connect the three cables to the electronics unit.
4. Fit the wheelchair's rear cover and battery cover.
5. Connect the DP1c programming unit and switch the chair on. See page 32.
6. Check and compare the drive parameters. Adjust as required. See page 32.
Control panel

CAUTION!

Anyone opening the panel must be ESD-protected (with a wristband connected to earth).

Changing the panel

1. Remove the upper cables from the electronics.
2. Unscrew and remove the control panel from the panel bracket (two Allen screws under the panel).
3. Unscrew and remove the upper part of the control panel (four screws).
4. Disconnect the upper cables in the panel.
5. Open the new panel and connect the upper cables.
6. Assemble the panel and screw it to the panel bracket.

NB! The panel cover and base cover are marked with ID numbers and modification numbers and belong together.
7. Connect the upper cables to the electronics.
Control panel

---

**CAUTION!**

Anyone opening the panel must be ESD-protected (with a wristband connected to earth).

---

**Changing the joystick**

1. Remove the upper cables from the electronics.
2. Unscrew and remove the upper part of the control panel (four screws).
3. Disconnect the joystick connection from the electronics.
4. Unscrew the two mounting screws of the joystick.
5. Pull out the joystick ball and then remove the whole mechanism.
6. Screw the new joystick in place and connect it to the printed circuit board. Turn the joystick so that the pointed side is to the left.
7. Assemble the control panel using the screws.
8. Connect the upper cables to the electronics.
Changing the printed circuit board

1. Remove the upper cables from the electronics.
2. Unscrew and remove the upper part of the control panel (four screws).
3. Disconnect the upper cables in the panel.
4. Unscrew the printed circuit board from the panel (four screws).
5. Remove the old printed circuit board and fit a new one.
6. Screw the new printed circuit board in place and reconnect the cables.
7. Assemble the control panel using the screws.
8. Connect the upper cables to the electronics.

CAUTION!

Anyone opening the panel must be ESD-protected (with a wristband connected to earth).
**Changing the fuses**

In order to be able to change the fuses, you must remove the rear cover. Unscrew the five screws and lift off the cover. *Ensure that the rear light cables in the rear cover are firmly connected to the electronics (connector).*

The main fuse must only be changed by persons with a good knowledge of the wheelchair.

**NB:** If the main fuse blows, there is often a major electrical fault. The cause should be investigated carefully before a new fuse is inserted.

Change the main fuse and refit the rear cover.

---

**Fuse box**

Remove the lid of the fuse box.

Replace any blown fuses. Refit the lid of the fuse box, refit the rear cover and screw it in place.

The fuses in the fuse box have the following functions:

1. Seat lift/lighting/24 V switched 15 A
2. 24 V direct 15 A
3. This fuse has various functions depending on the cable in the chassis.
   - Charging fuse 15 A (cable 306858-00-0)
   - Loop (cable 308737-00-0)

**NB.** The loop must not be removed.
Changing the fuses

Charging fuse
on cable 308737-00-0
The fuse holder for the charging fuse is placed on the narrow red cable which goes to the positive pole of the battery.

Cable fuse
on cable 308737-00-0
The cable fuse protects the cable in the event of a short-circuit in the contact. If this fuse blows, there is a faulty connection in the contact in the card in the fuse box.
Connection

1. Switch off the chair.
2. Connect the DP1c to the socket beside the charging socket on the left side of the chair.
3. Switch on the chair.

**NB. The seat lift must be in its lowest position for the instrument to work.**

The instrument

The arrow keys are used to step to the various programming positions and to make the necessary changes in these positions.

The ? key can be used to obtain help in the respective programming positions.

Enter is used to confirm programming and to jump to programming positions from the menu.

The Traffic Light is used to prepare the chair for driving/testing.
Root Menu
When the chair is switched on and the DP1c is connected, driving is blocked. "DP1c Vn.n" is displayed in the text window of the DP1c, where n.n is the version number of the program in the DP1c in question. Then the Chairman 8 LS menu position is displayed. It is now possible to step through the various menus by pressing on either of the arrow keys. The menus in the root menu are:

To go from the menu to the respective program positions, press Enter.

Chairman 8 LS
Downloads all the parameters which a Chairman with Leroy Somer motors had on delivery. Answer Yes or No and press Enter. These parameters will now be the new basic settings.

Chairman 8GS
Downloads all the parameters which a Chairman with Grosshop motors had on delivery. Answer Yes or No and press Enter. These parameters will now be the new basic settings.

Reserved
2 reserve positions for any future chair models.

Service Menu?
Jump to the service menu.

Service Menu
To enter the service menu, step to Service Menu? with the arrow keys and press Enter. It is possible to step through the service menu using the arrow keys as in the root menu. The service menu is used to set special drive parameters for a user and to read/erase the fault log. The following positions are available in the service menu:

To go from the menu to the respective program positions, press Enter.

Read Fault Log
In the fault log it is possible to read off the alarms which have occurred in the chair. For example, this may appear as follows: 1:Code 3B00#5. This means that fault 3B00 has occurred 5 times in the chair and the most recent type of fault was 3B00 = Cable break left drive motor. To return to the menu, press Enter.

Erase Fault Logg
It is possible to erase the fault log here. Answer Yes or No and press Enter.

Acceleration
Here it is possible to set how fast/slowly the chair is to accelerate. Set the desired value with the arrow keys, up = increase in value, down = reduction, between 0 and 100. Then press Enter. See the table for the normal value.

Deceleration
Here it is possible to set how fast/slowly the chair is to brake. Set the desired value with the arrow keys, up = increase in value, down = reduction, between 0 and 100. Then press Enter. See the table for the normal value.
Turn Accel’n
Here it is possible to set how fast/slowly the chair is to reach the maximum turn speed. Set the desired value with the arrow keys, \( \text{up} = \text{increase in value}, \text{down} = \text{reduction}, \text{between 0 and 100} \). Then press Enter. See the table for the normal value.

Turn Decel’n
Here it is possible to set how fast/slowly the chair is to stop turning. Set the desired value with the arrow keys, \( \text{up} = \text{increase in value}, \text{down} = \text{reduction}, \text{between 0 and 100} \). Then press Enter. See the table for the normal value.

Forward Speed
Here it is possible to set the maximum and minimum forward speeds. Set the desired value with the arrow keys, \( \text{up} = \text{increase in value}, \text{down} = \text{reduction}, \text{between 0 and 100} \). Then press Enter. See the table for the normal value.

Reverse Speed
Here it is possible to set the maximum reverse speed. The minimum speed is calculated from the forward speed. Set the desired value with the arrow keys, \( \text{up} = \text{increase in value}, \text{down} = \text{reduction}, \text{between 0 and 100} \). Then press Enter. See the table for the normal value.

Turning Speed
Here it is possible to set the maximum and minimum turning speeds. Set the desired value with the arrow keys, \( \text{up} = \text{increase in value}, \text{down} = \text{reduction}, \text{between 0 and 100} \). Then press Enter. See the table for the normal value.

NB. Adjust with great care.

Speed State
States whether the maximum speed setting is possible. Answer Yes or No and press Enter. \( \text{Normal setting} = \text{Yes} \).

Response State
Possible future parameters. Answer Yes or No and press Enter. \( \text{Normal setting} = \text{No} \).

Present Unit
Resets all parameters to the most recent basic settings. Answer Yes or No and press Enter.

Set Inhibit
Here it is possible to set how inhibit (stop driving) is to function. First answer Yes or No to the question about whether the chair is to stop in the event of a short-circuit and press Enter, then answer Yes or No to whether there is be an alternate function for inhibit and press Enter. \( \text{Normal setting} = \text{No/No} \).

Set Sleep Mode
Here it is possible to determine whether the chair is to switch itself off if it is inactive for more than 5 minutes. Answer Yes or No and press Enter. \( \text{Normal setting} = \text{No} \).

Park Brake Trip
Here it is possible to set whether the chair is to sense the magnetic brakes. Answer Yes or No and press Enter. \( \text{Normal setting} = \text{Yes} \).

Set Steering
Straight trim. Trim with the arrow keys: \( \text{arrow up (+)} = \text{trim to the right}, \text{arrow down (-)} = \text{trim to the left} \). Press Enter to confirm the trim. Applies from V4 of the electronics.

Show Settings
Shows all settings which have been made. Press Enter again to exit the display.

Back to Root
Return to the root menu.
Preprogrammed values

<table>
<thead>
<tr>
<th>Värde</th>
<th>Chairman 8 LS</th>
<th>Chairman 8 GS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleration</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Deceleration</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Turn Accel’n</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Turn Decel’n</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>Forward Speed</td>
<td>90/30</td>
<td>100/30</td>
</tr>
<tr>
<td>Reverse Speed</td>
<td>42</td>
<td>60</td>
</tr>
<tr>
<td>Turning Speed</td>
<td>25/10</td>
<td>25/8</td>
</tr>
<tr>
<td>Speed State</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Response State</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Set Inhibit</td>
<td>No/No</td>
<td>No/No</td>
</tr>
<tr>
<td>Set Sleep Mode</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Part Brake Trip</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

![Diagram showing the menu structure and options available.](image-url)
Battery indicator
The battery indicator indicates the status of the wheelchair.

- Battery indicator lights permanently
  This indicates that everything is OK.
- Battery indicator flashes slowly.
  This indicates that the battery should be charged as soon as possible.
- Battery indicator flashes fast.
  A fault has occurred and the wheelchair will not work. The number of flashing lights indicates the nature of the fault.
  - Note the number of flashing lights.
  - Switch off the wheelchair.
  - Switch the wheelchair back on.
  - Check whether the fault is still present.

Troubleshooting
If a fault occurs in the wheelchair, a number of lights flash on the battery voltage indicator. Count the number of lights, starting from the joystick, and check in the list what the fault is and what you can do.

<table>
<thead>
<tr>
<th>Number of lights</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The charge level of the battery is much too low. It requires immediate charging</td>
<td>Check the condition of the battery to see whether it needs replacing. Check the contact between the battery and the control unit.</td>
</tr>
<tr>
<td>2</td>
<td>There is an interruption to the left motor.</td>
<td>Check the connection to the left drive motor. Check whether the drive motor's carbon-brush is worn.</td>
</tr>
<tr>
<td>3</td>
<td>Short-circuit between the battery and the drive motor.</td>
<td>Check the contacts and cables of the motor.</td>
</tr>
<tr>
<td>4</td>
<td>There is an interruption to the right motor.</td>
<td>Check the connection to the right drive motor. Check whether the drive motor's carbon-brush is worn.</td>
</tr>
<tr>
<td>5</td>
<td>Short-circuit between the battery and the drive motor.</td>
<td>Check the contacts and cables of the motor.</td>
</tr>
<tr>
<td>6</td>
<td>Charger connected to charging socket.</td>
<td>Remove the charging contact from the chair.</td>
</tr>
<tr>
<td>7</td>
<td>Joystick fault.</td>
<td>Ensure that the joystick is not affected by operation. Check the contact between the joystick and the control unit. Replace the joystick unit. Replace the joystick cables. If the fault is still present, replace the control unit.</td>
</tr>
<tr>
<td>8</td>
<td>Control unit fault.</td>
<td>Check the contacts of the control unit. If the fault is still present, replace the control unit.</td>
</tr>
<tr>
<td>9</td>
<td>Interruption in brake circuit.</td>
<td>Check the contacts of the magnetic brake.</td>
</tr>
<tr>
<td>10</td>
<td>Too high voltage in the battery</td>
<td>Check the battery and the contacts between the battery and the control unit.</td>
</tr>
</tbody>
</table>
Wiring diagram Chairman S8