SERVICE MANUAL

Chairman Robo PG8

permobil

US

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Contents

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 1212 and is available from Permobil Inc.

Warranties

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

Maintenance

See the information in the Owner’s Manual.

Reconditioning

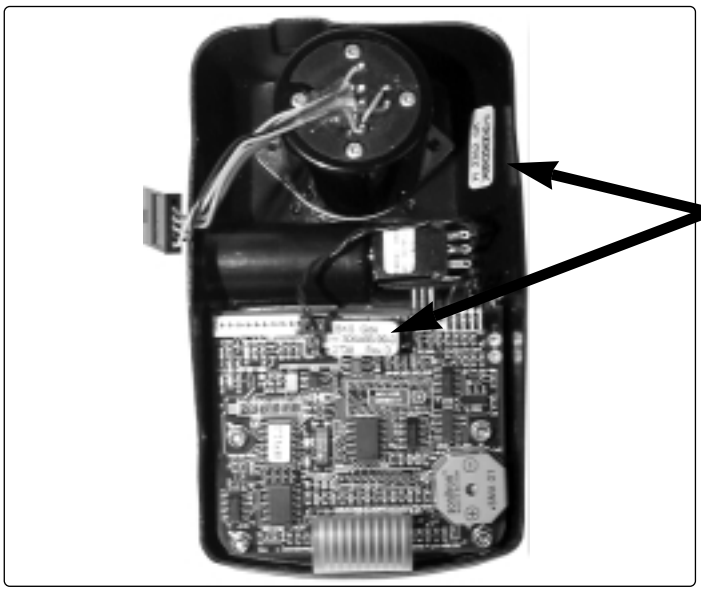
Contact Permobil Inc. for Reconditioning Instructions.

Rating plates

Chairman Robo

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 plug on the left side of the cover.

2. Unscrew the adjustment device with the enclosed special key.

NB. Block up the seat at the front before the screw is unscrewed.

The seat is heavy and may fall forwards.

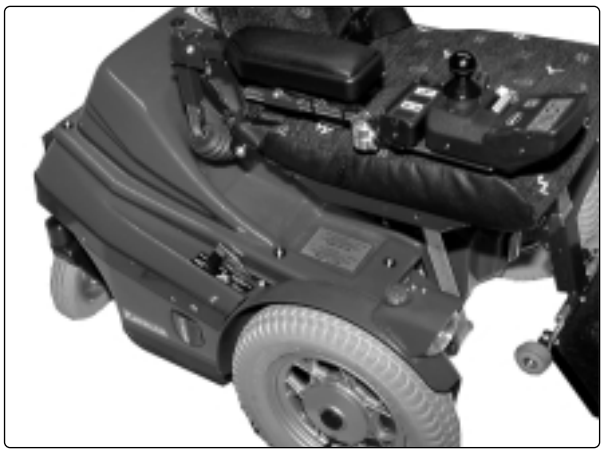
3. Carefully fold the seat forwards.

NB. Check that the cables are not too taut.

4. Remove the upper cover.

5. Refit the adjustment device screw.

Covers

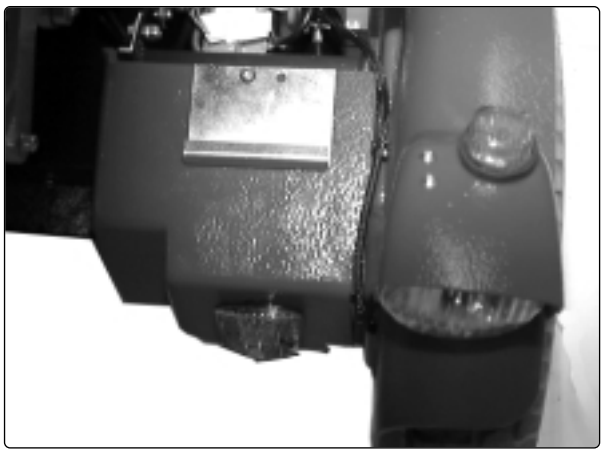


Removal

1. Raise the seat to its highest position, se page 7.
2. Remove the top cover. It is held in place by Velcro tape, so it just needs to be pulled upwards.
3. Then remove the chassis cover. It is held in place by four screws.

4. Open the electronics box and disconnect the contact for the rear light.

Contact for rear light



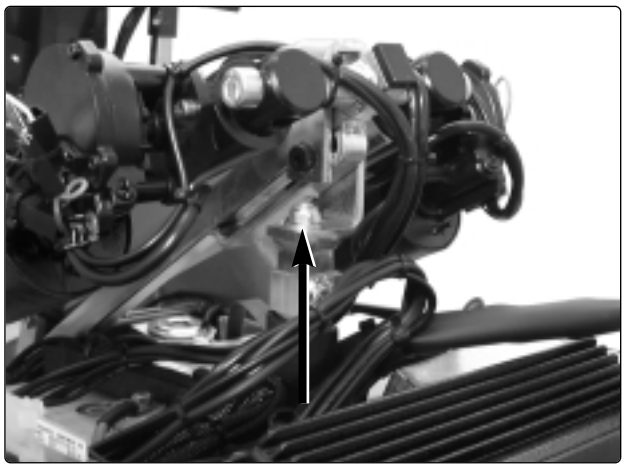
5. Finally, remove the two front covers. They are each held in place by two screws.

Fitting

1. First fit the two front covers.
2. Then reconnect the cable for the rear light and close the electronics box.
3. Fit the chassis cover.
4. Refit the top cover. Press the Velcro tape firmly in place.

Changing the batteries

NB. Use protective goggles when working with batteries.



Removal

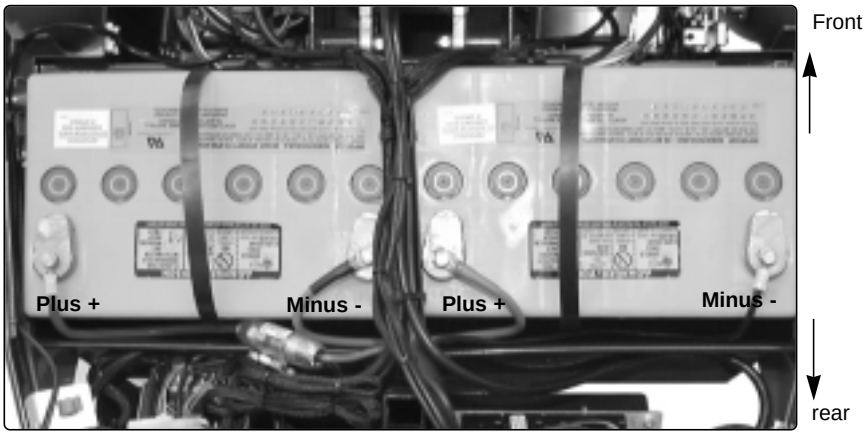
1. Raise the seat to its highest position., se page 7.
2. Remove the covers. See removing the covers, page 7.
3. Remove the rear cover and the battery covers. See page 8.
4. Disconnect all battery connections, the positive poles first and then the negative poles.
5. Lift out the batteries. Use lifting 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.

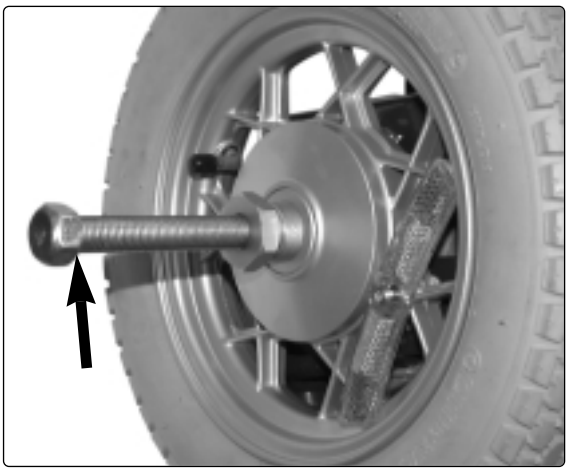


Battery connections

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 center screw C, the 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.

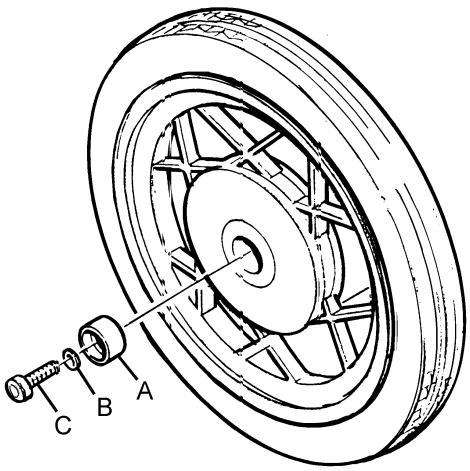


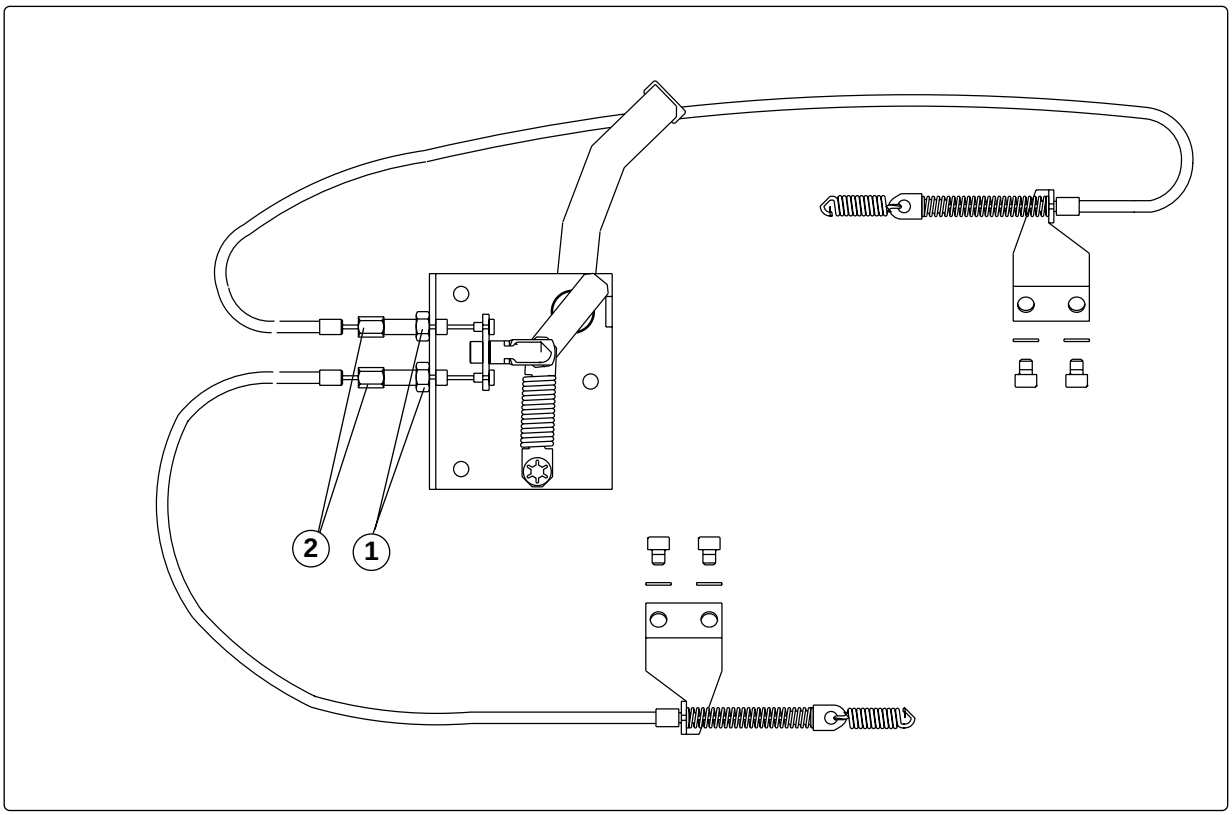
Removal tool 304103-99-0

Fitting

1. Fit the wheel onto the axle.
2. Fit the rim locking washer A, the washer B and the center 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.





Brake release mechanism

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.

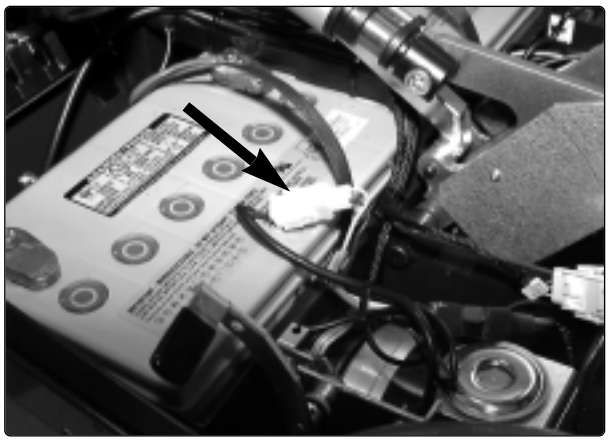
Fitting

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

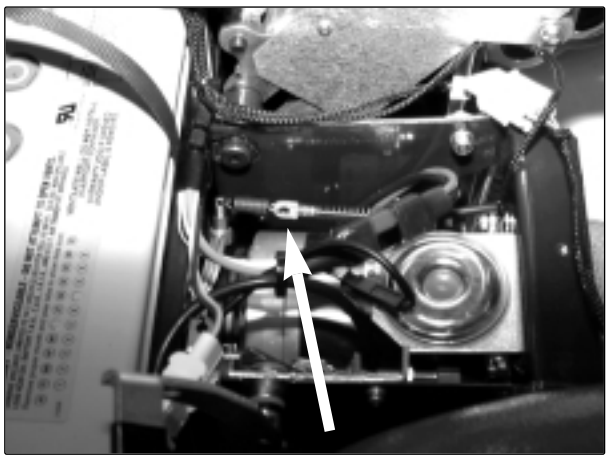
Removal

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

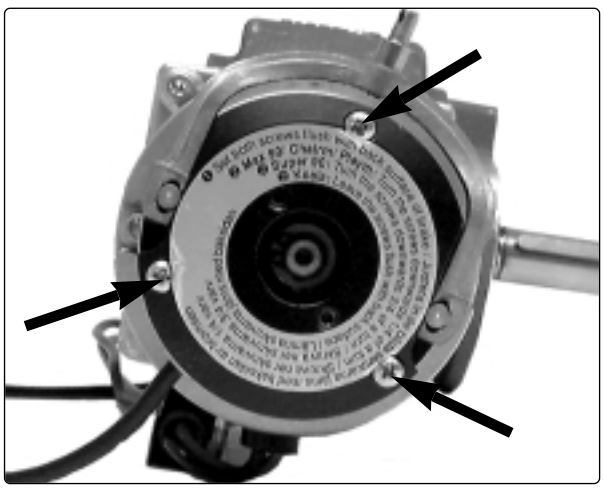


Electrical connection of the magnetic brake

4. Detach the brake release wire from the brake.

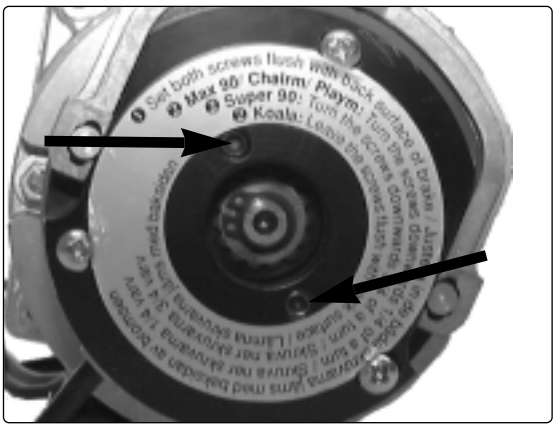


5. Unscrew the three screws which hold the brake and remove the brake with the extensible cover, brake disc and cover.
6. Note the position of the brake release arm.



Fitting

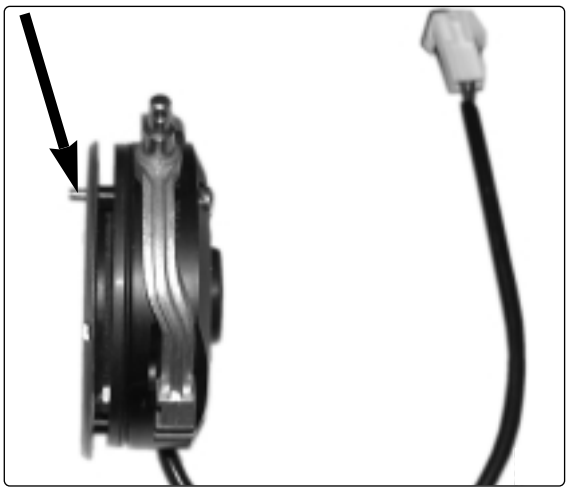
1. Check the setting of the brake. Follow the instructions on the decal on how the two Allen screws are adjusted.



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

3. Put on the cover.

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.

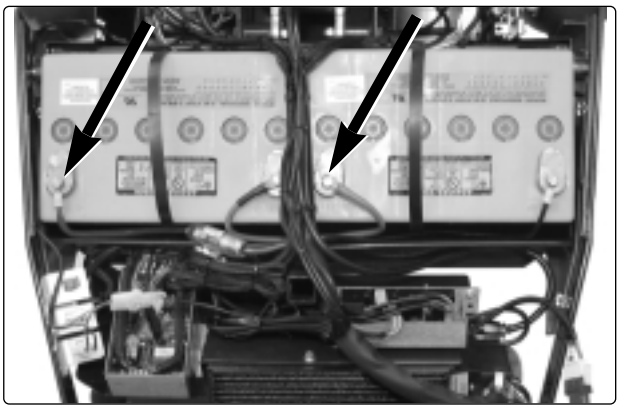
6. Fit the chassis cover. See Covers, page 8.

The magnetic brake's electrical connection

Changing the drive motor

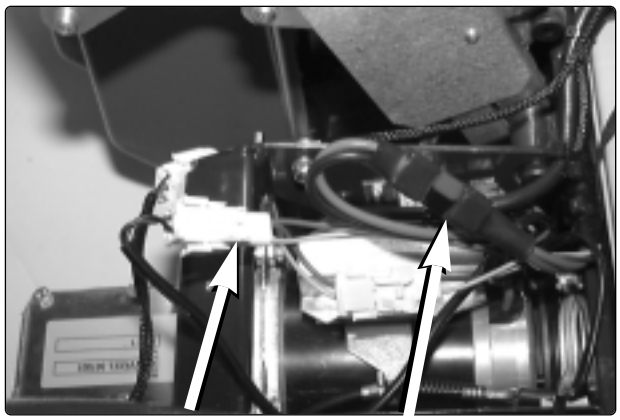
Removal

1. Raise the seat to its highest position.
2. Remove all the covers. See page 8.



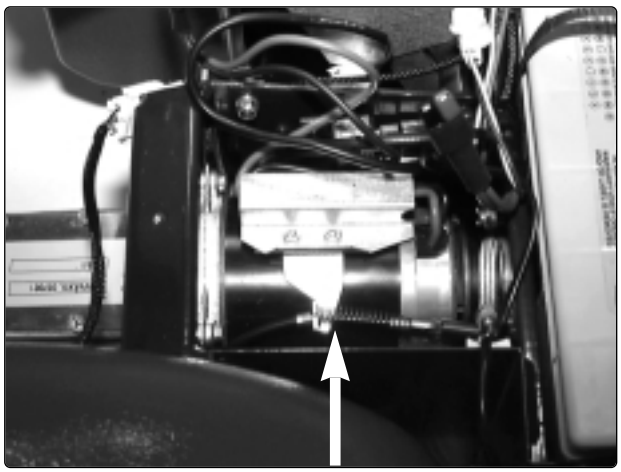
3. Remove the positive pole from one battery.
4. Block up the appropriate side of the wheelchair.
5. Remove the wheel. See Changing the drive wheel, page 10.

6. Detach the electrical connections for the motor and magnetic brake.

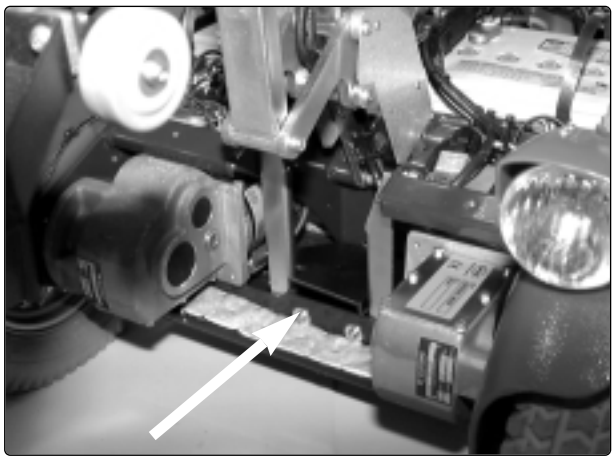


Magnetic brake Motor

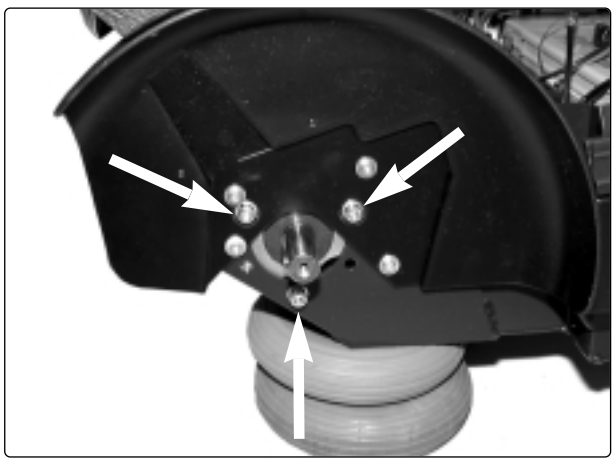
7. Detach the brake release wire from the magnetic brake.



8. To remove the motors, the chassis reinforcement must be removed. Take off the little plastic cover to reach the nuts on the rear. The reinforcement is held in place by four screws.

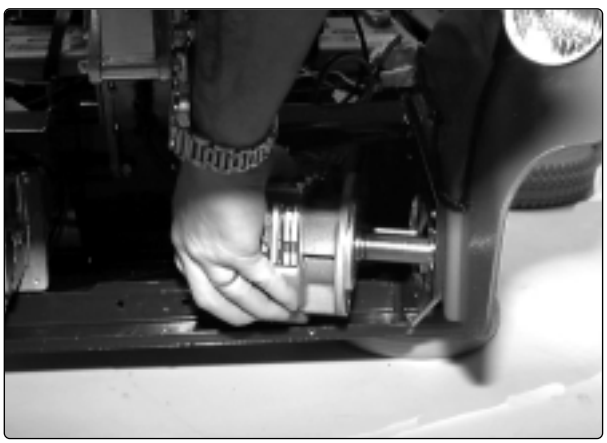


9. Remove the three screws which hold the motor.



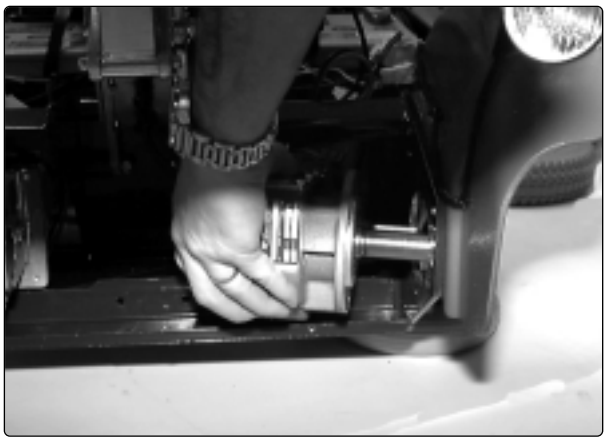
10. Turn the motor sideways so that the wheel axle turns freely. Pull the motor straight forwards.

NB. To facilitate removal, press the battery as far back as possible.

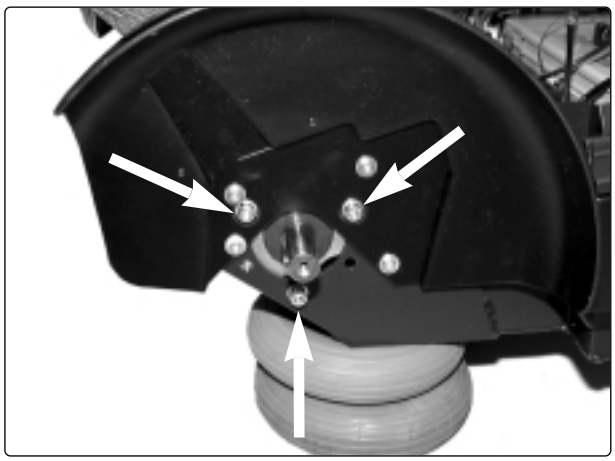


Fitting

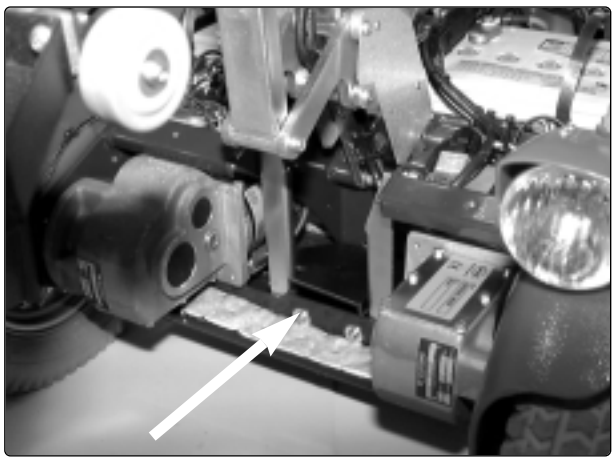
1. Lift the motor into place. Turn it a little so that the wheel axle can turn freely without being obstructed by the chassis.



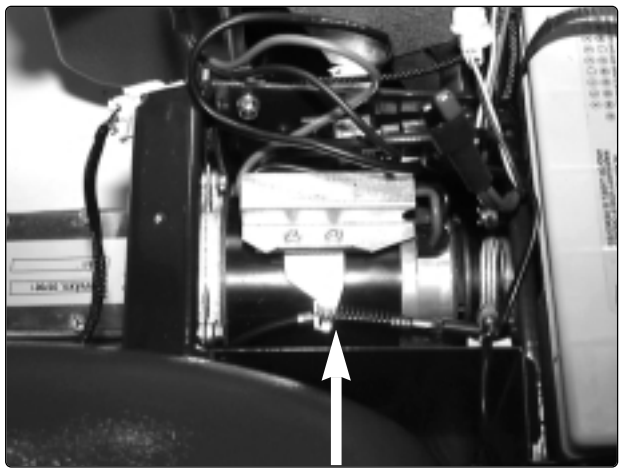
2. Screw the motor in place with the three screws.



3. Refit the chassis support. Press the cover in place.

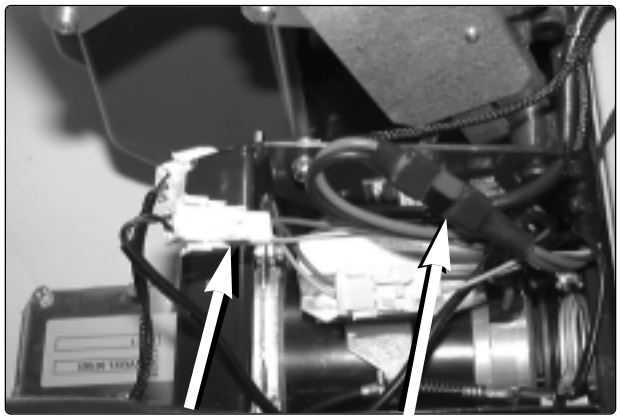


4. Attach the brake release wire.



5. Attach the electrical connections for the motor and magnetic brake.

NB. Ensure that the contacts are fully interlocking.



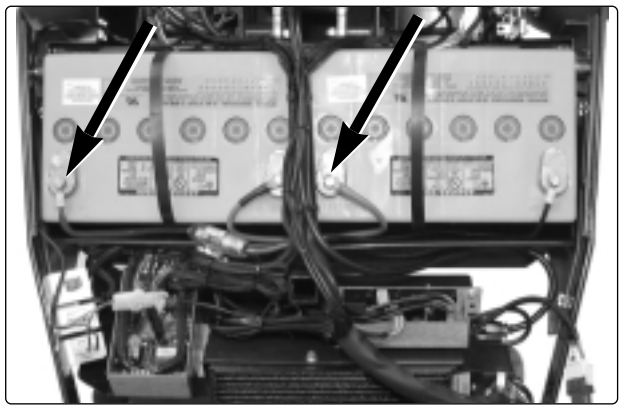
Magnetic brake Motor

6. Fit the wheel. See page 10.

7. Remove the blocks.

8. Connect the battery poles.

9. Fit the covers. See page 8.



Changing the carbon-brush in the drive motor

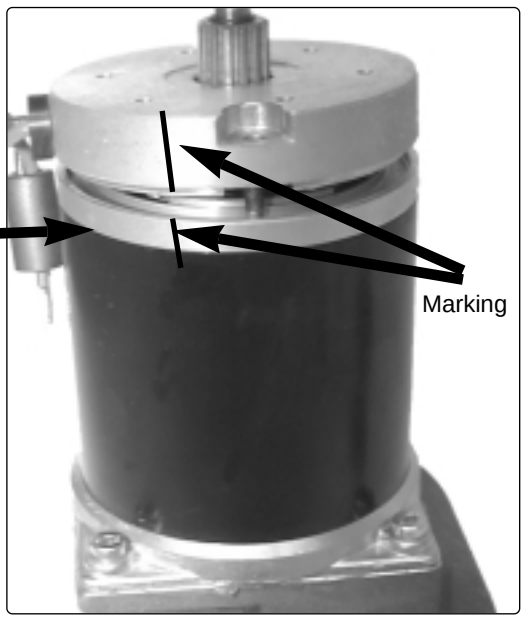
Removal

1. Remove the drive motor. See page 15.
2. Remove the motor's cables from the coupling box.

3. Remove the magnetic brake.
4. Mark the stator's position against both ends with a small mark before loosening the nuts.

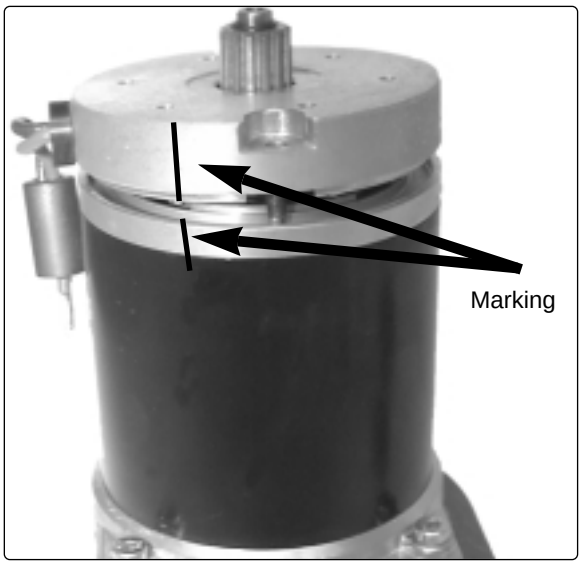
   It is important for the function of the motor that the parts are assembled precisely without being moved away from the original position.
5. Loosen two nuts and pull off the motor end. Press the cable gland off the motor end.

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 17.

Changing the seat lift adjustment device

The procedure is the same for both adjustment devices for the seat lift.

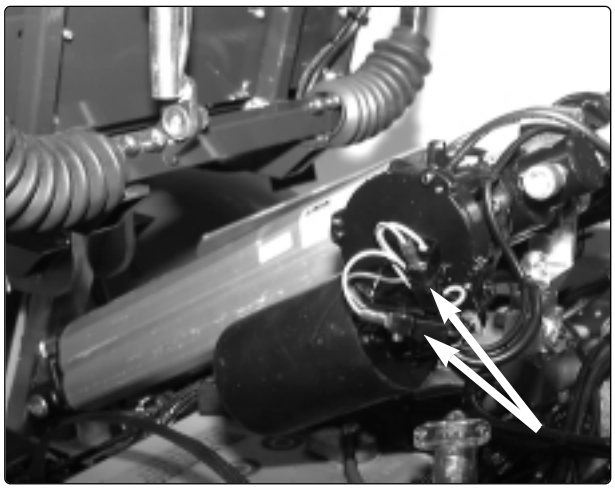
Removal

1. Raise the seat lift to its highest position.

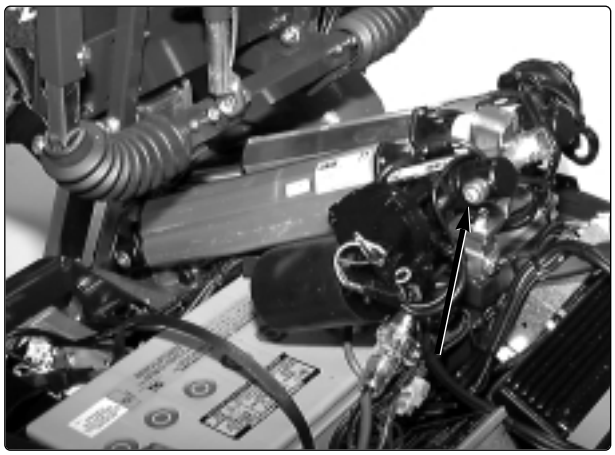
2. Remove all covers. See page 8. Lower the seat lift again.

3. Cut off the cable ties which hold the cables to the adjustment device.

4. Disconnect the connections to the adjustment device. Note how the cables are attached.

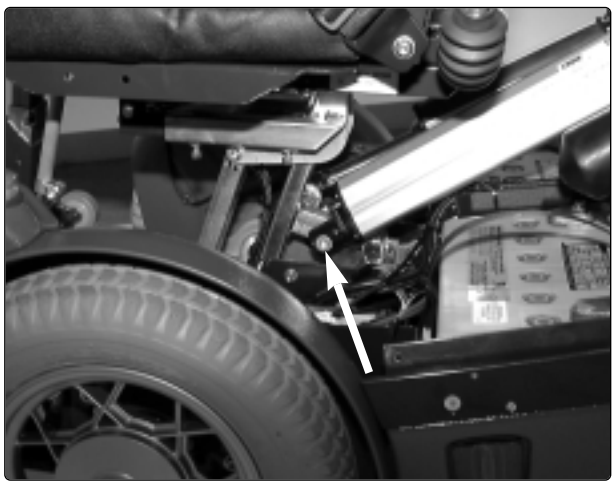


5. Unscrew the rear bolt of the adjustment device.



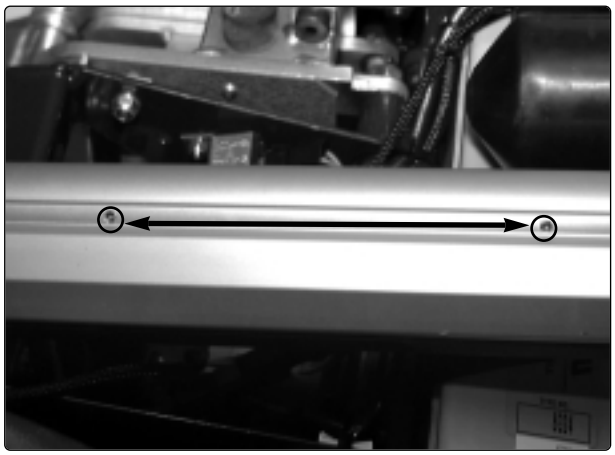
6. Unscrew the front bolt of the adjustment device.

NB. Work on the left adjustment device is facilitated if you manually push the chair forwards. Check that no cables are too taut.



7. Remove the clamping ring of the limit switch.

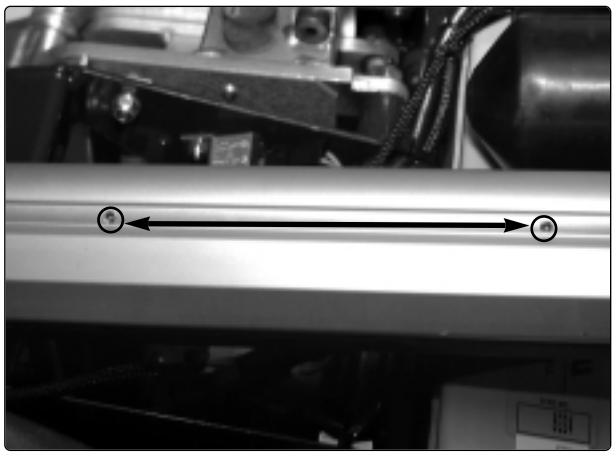
8. Loosen the screws which hold the limit switch. Pull away the adjustment device.



Fitting

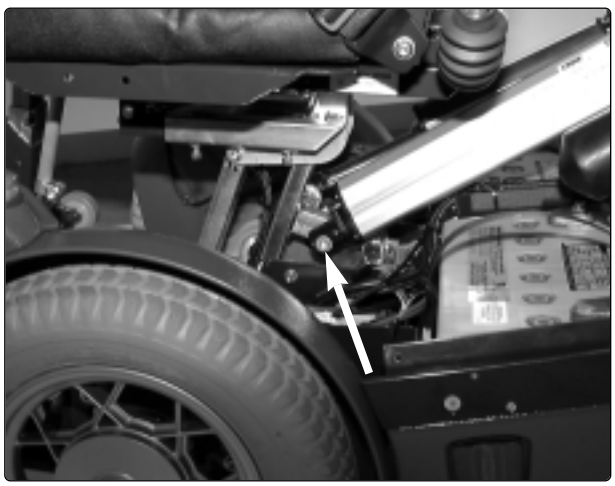
1. Fit the limit sleeve on the new adjustment device. Press it as far back as possible before the sleeve is fastened on the adjustment device.

NB. Check that the clamping ring of the limit sleeve clamps against the frame.

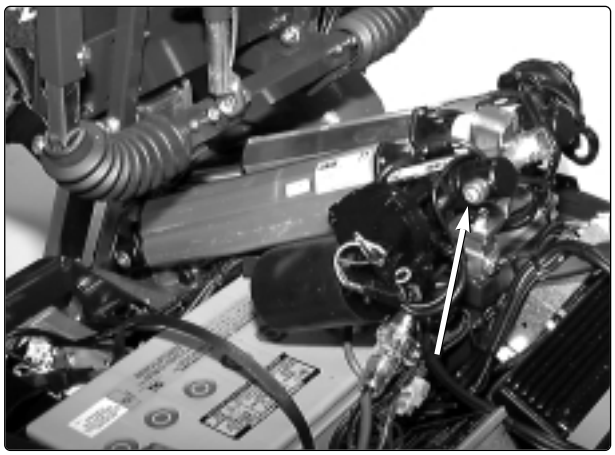


2. Fit the clamping ring of the limit sleeve.

3. Tighten the front screw of the adjustment device.

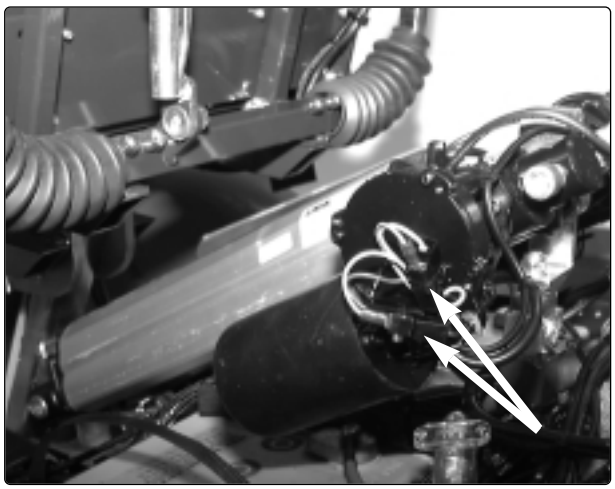


4. Fit the rear screw of the adjustment device.



5. Reattach the cables of the adjustment device.

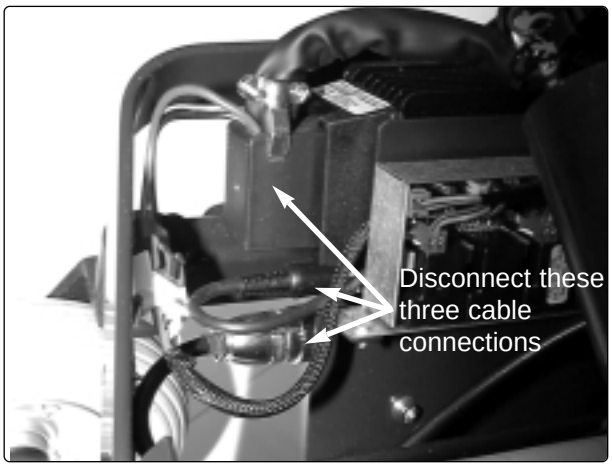
6. Fit the covers. See page 8.



Changing the control unit

Removal

1. Raise the seat to its highest position.
2. Connect the DP1c programming unit. Read off and note the drive parameters. See page 32.
3. Remove the top cover and rear cover.
4. Disconnect the power connections from the electronics unit.



5. Unscrew the two screws which hold the electronics unit in place.

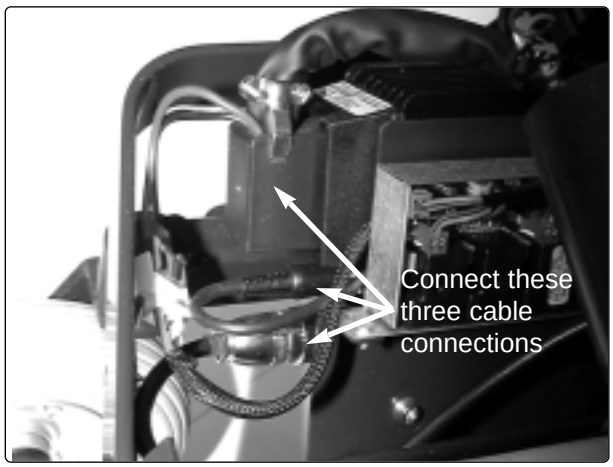
The electronics unit is held in place by two screws

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.

The electronics unit is held in place by two screws

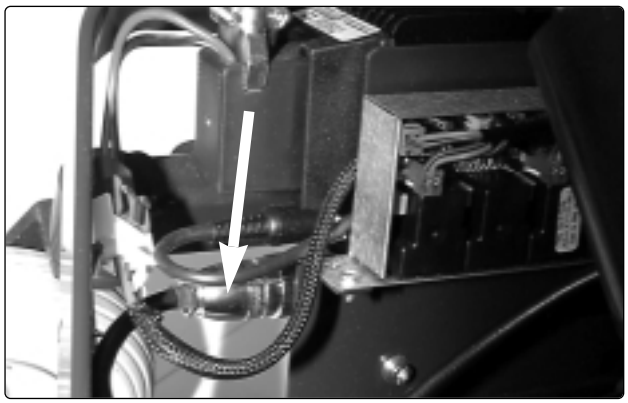
3. Connect the three cable to the electronics unit.
4. Fit the wheelchair's rear cover and top cover.
5. Connect the DP1c programming unit and switch the chair on. See page 32
6. Check and compare the drive parameters. Adjust as required. See page 32.



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).

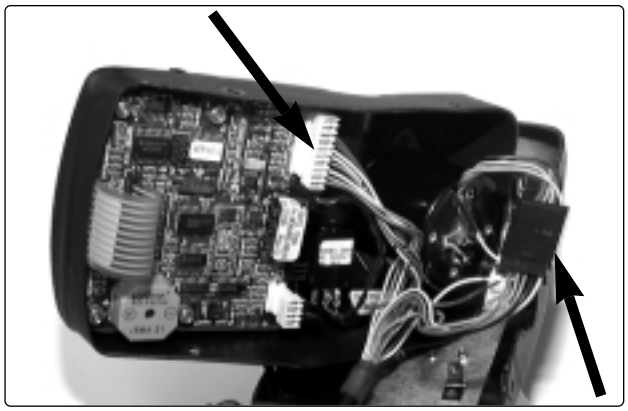
4. Disconnect the upper cables in the panel.

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.



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.

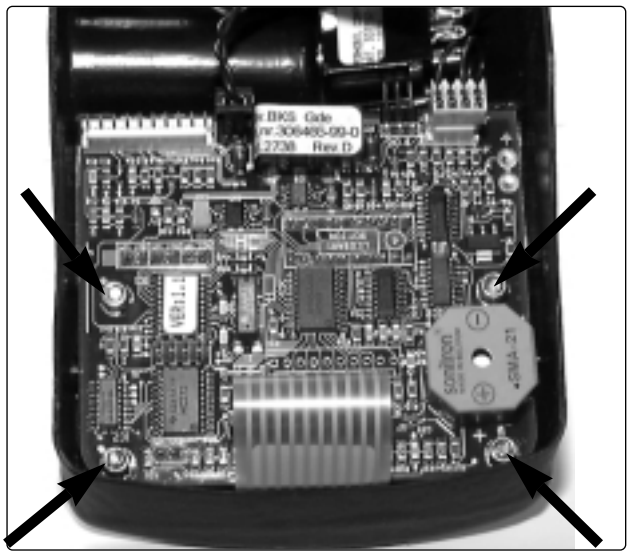
6. Screw the new joystick in place and connect it to the printed circuit board. Turn the joystick so that the pointed side is to the left.
7. Assemble the control panel using the screws.
8. Connect the upper cables to the electronics.

CAUTION!

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

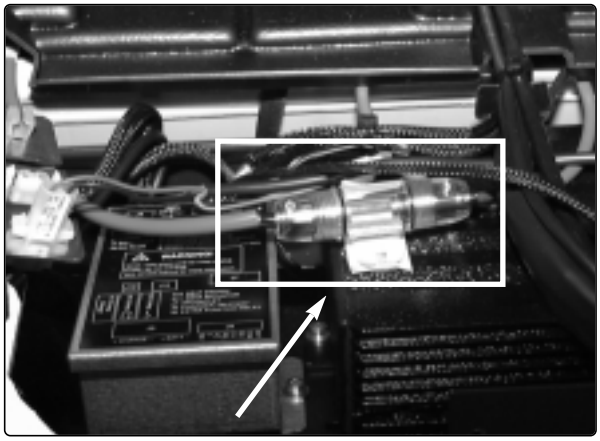
Changing the printed circuit board

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.



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 attached to the electronics (connector).*



80 A main fuse

Main fuse

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

NB. If the main fuse blows, it often means that there is 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.

Fuse box

The fuses in the fuse box have the following functions:

1. Seat lift/lights/24 V switched 15 A

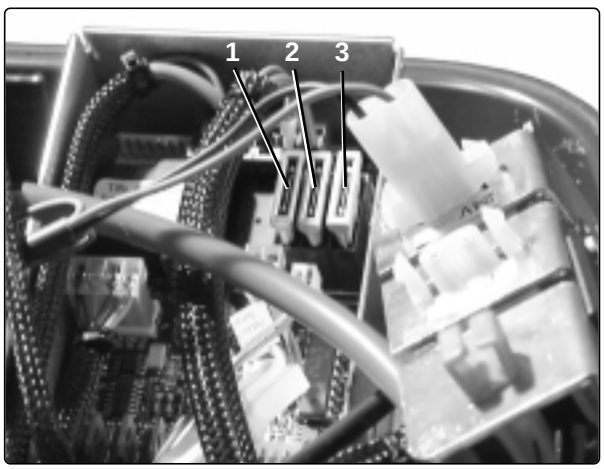
2. 24 V direct 15 A

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.

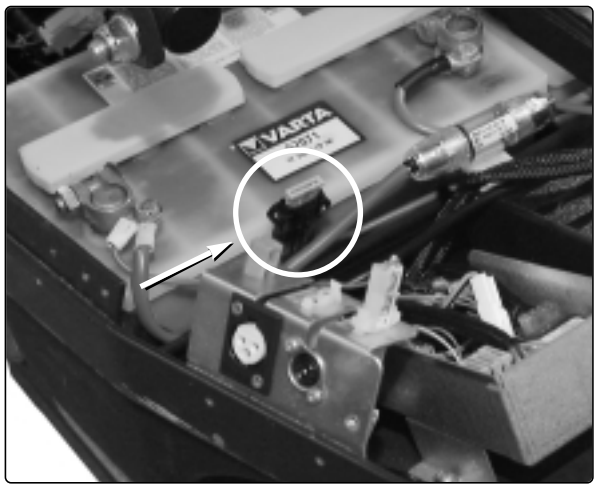


Fuses

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.



15 A charging fuse

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.

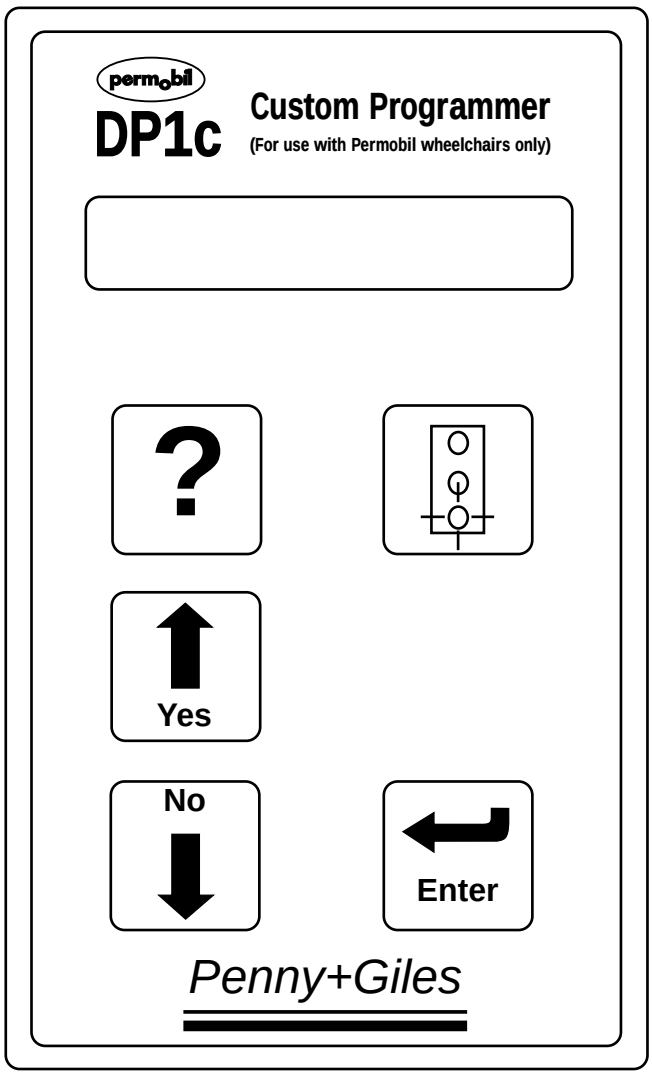
20 A cable fuse

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 Robo 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 Robo 8 GS

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, *up = increase in value, down = reduction, 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, *up = increase in value, down = reduction, 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, *up = increase in value, down = reduction, 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, *up = increase in value, down = reduction, 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, *up = increase in value, down = reduction, 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. *Normal setting = Yes.*

Response State
Possible future parameters. Answer Yes or No and press Enter. *Normal setting = 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. *Normal setting = 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. *Normal setting = 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. *Normal setting = Yes.*

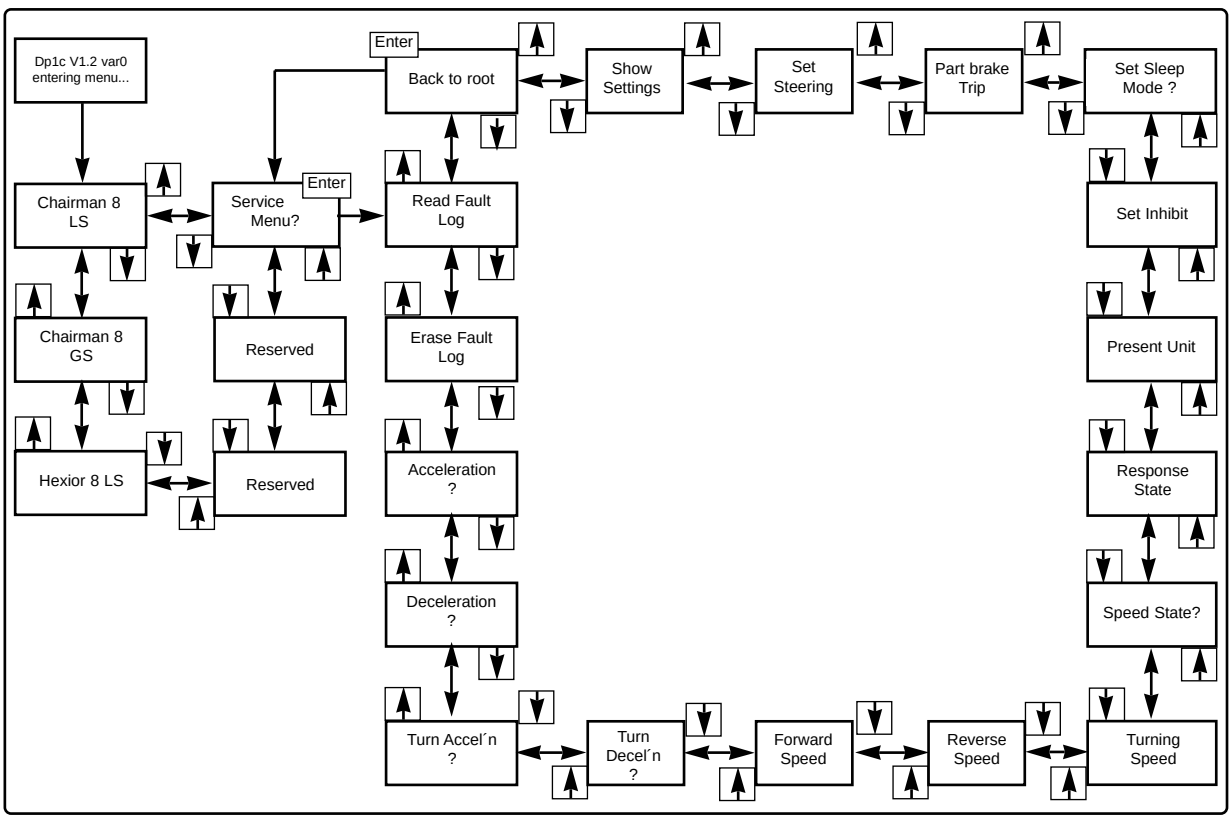
Set Steering
Straight trim. Trim with the arrow keys: arrow up (+) = trim to the right, arrow down (-) = trim to the left. Press Enter to confirm the trim. Applies from V4 of the electronics.

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

Value	Chairman Robo 8 LS	Chairman Robo 8 GS
Acceleration	50	50
Deceleration	70	70
Turn Accel´n	15	20
Turn Deccel´n	28	25
Forward Speed	90/30	100/30
Reverse Speed	42	60
Turning Speed	25/10	25/8
Speed State	Yes	Yes
Response State	No	No
Set Inhibit	No/No	No/No
Set Sleep Mode	No	No
Part Brake Trip	Yes	Yes



Battery indicator

The battery indicator indicates the status of the wheelchair.

– Battery indicator lights permanently
  This indicates that everything is OK.

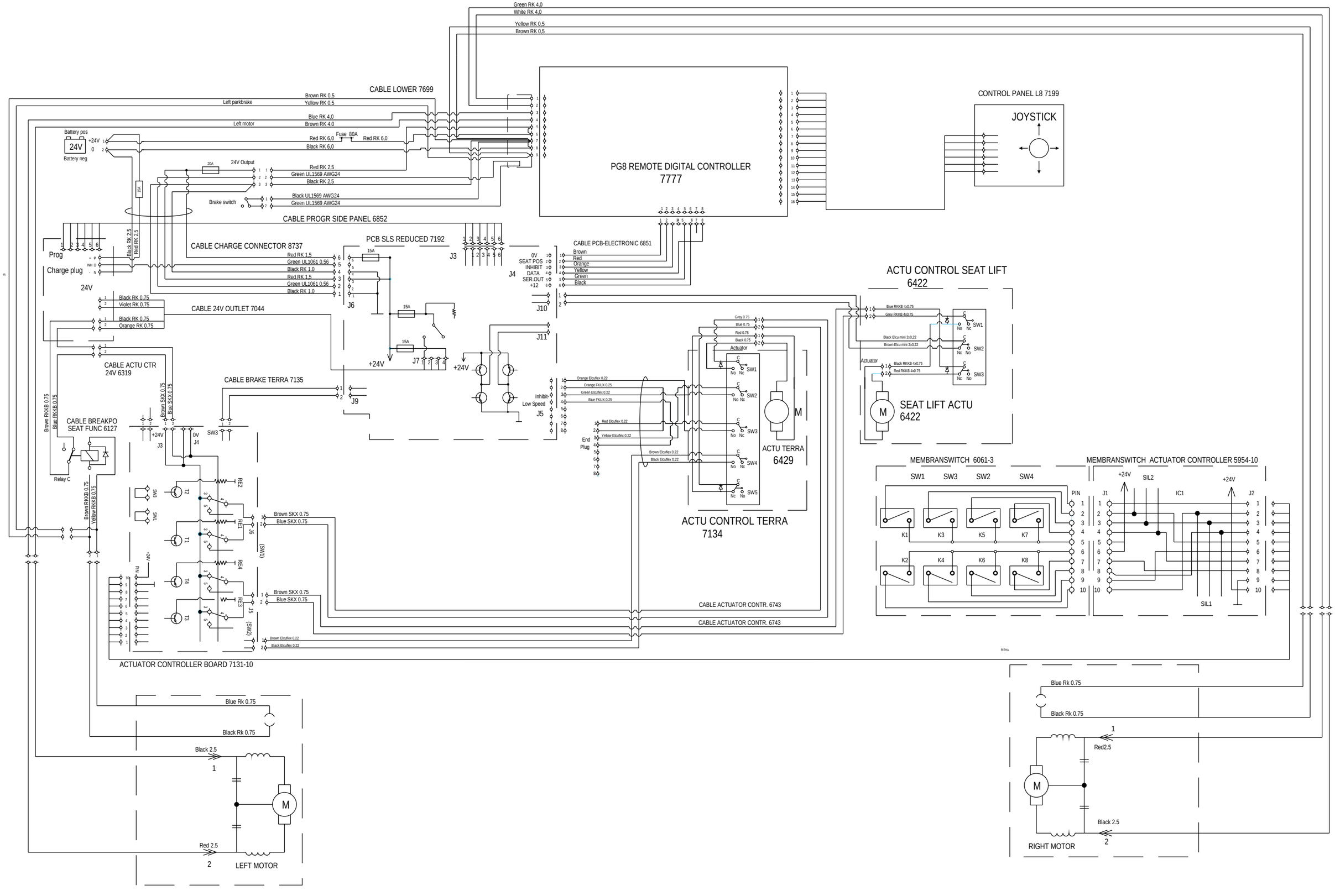
– Battery indicator flashes slowly.
  This indicates that the battery should be charged as soon as possible.

– 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.

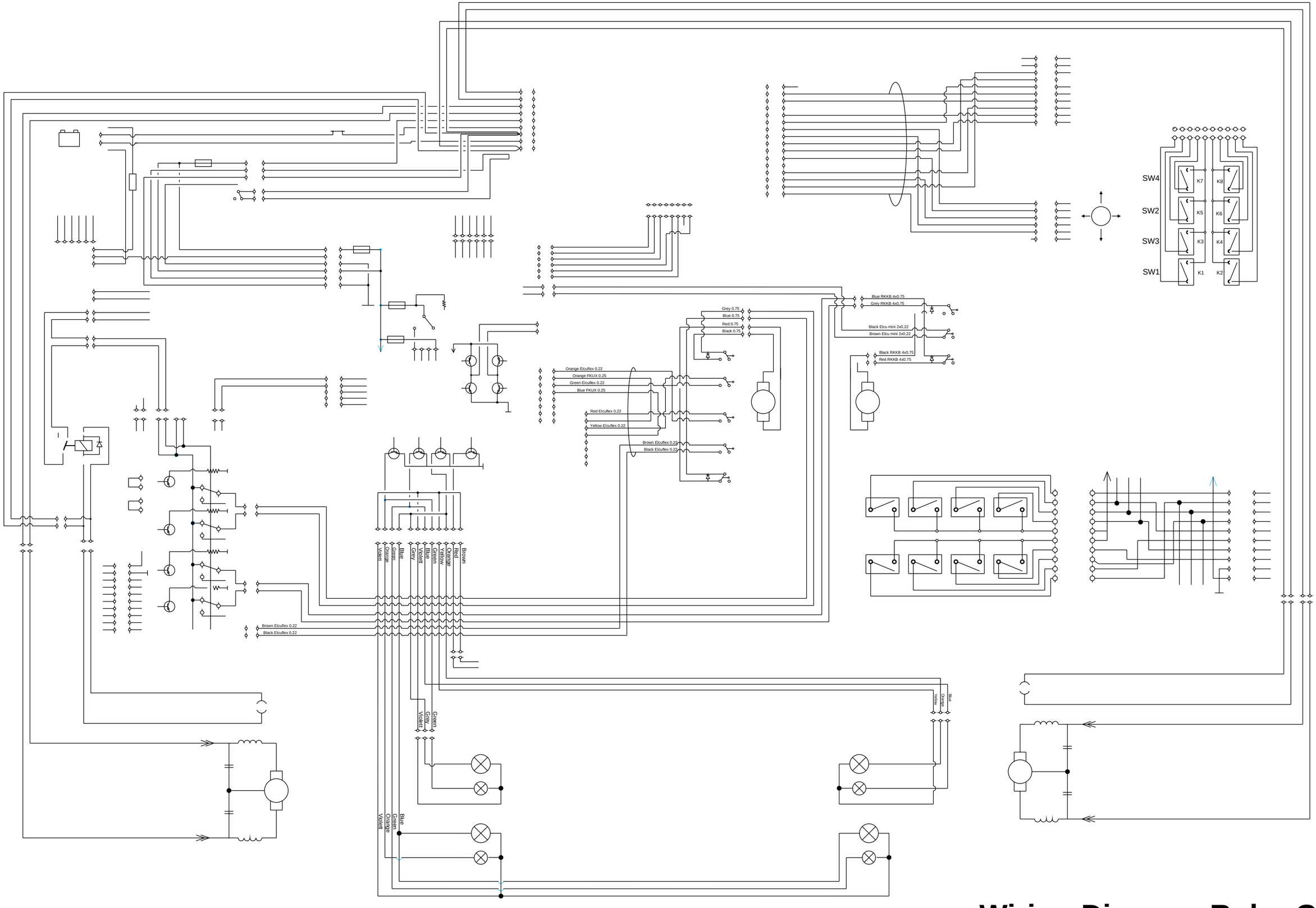
Troubleshooting

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.

Number of lights	Cause	Remedy
1	The charge level of the battery is much too low. It requires immediate charging	Check the condition of the battery to see whether it needs replacing. Check the contact between the battery and the control unit.
2	There is an interruption to the left motor.	Check the connection to the left drive motor. Check whether the drive motor's carbon-brush is worn.
3	Short-circuit between the battery and the drive motor.	Check the contacts and cables of the motor.
4	There is an interruption to the right motor.	Check the connection to the right drive motor. Check whether the drive motor's carbon-brush is worn.
5	Short-circuit between the battery and the drive motor.	Check the contacts and cables of the motor.
6	Charger connected to charging socket.	Remove the charging contact from the chair.
7	Joystick fault.	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.
8	Control unit fault.	Check the contacts of the control unit. If the fault is still present, replace the control unit.
9	Interruption in brake circuit.	Check the contacts of the magnetic brake.
10	Too high voltage in the battery	Check the battery and the contacts between the battery and the control unit.



Wiring Diagram Robo S



Wiring Diagram Robo CS