PHOENIX PLUS

SERVICE GUIDE

PART NO: 1420254

INTRODUCTION

1) This manual provides basic details to enable the PHOENIX Wheelchair to be maintained. It is not intended to be a comprehensive maintenance guide/policy, but is intended for use by competent personnel to enable the chair to adequately maintained.

2) The manual includes detailing assemblies that are maintainable and the relevant procedures.

3) The Wheelchair is manufactured by:

   INVACARE Ltd
   South Road
   Bridgend Industrial Estate
   Bridgend
   Mid-Glamorgan
   CF31 3PY

   SALES TEL NO: 01656 647327 TECHNICAL SERVICE TEL NO: 01656 753337
   FAX NO: 01656 649016 FAX NO: 01656 753299

4) For TECHNICAL ADVICE, repairs, servicing, contact Technical Services.
   For SPARE PARTS orders contact Sales.

5) Quote the following details at all times:

   5.1 Part Number
   5.2 Description
   5.3 Quantity required
   5.4 Serial Number
   5.5 Chair Type

POLICY

INVACARE Ltd repair is as follows:

Repairs to ANY component other than those detailed in this manual are not covered. Repairs to ANY tube metal work is not generally permitted without express permission of INVACARE Ltd. ALL fasteners i.e. bolts, Nyloc nuts, and any fastener showing damage MUST be renewed.

In the event of repairing a crash damaged Vehicle we strongly advise you contact INVACARE TECHNICAL SERVICES DEPARTMENT before proceeding with repairs.

Failure to comply with the above absolves INVACARE Ltd of liability.

Note: Certain components will require removal to carry out maintenance. With the exception of fasteners, those components should be refitted.

CONTENTS

TOOLS REQUIRED

THE FOLLOWING LIST DETAILS THE BASIC TOOLS REQUIRED TO CARRY OUT THE MAINTENANCE GIVEN IN THE FOLLOWING CHAPTERS.

2 - Open End Spanner (13mm)

1 - Open End Spanner (11mm)

2 - Open End Spanner (10mm)

1 - Open End Spanner (8mm)

1 - 1/4" BSW Open End Spanner

1 - Combination Spanner (19mm)

1 - Socket / Wrench (Shallow) (19mm)

1 - Phillips Screwdriver (No 1)

1 - Flat Bladed Screwdriver (No 1)

1 - Nylon Mallet

1 - Torque Wrench

1 - Allen Key - (6mm)

1 - Allen Key - (5mm)

1 - Allen Key - (3mm)

1 - Allen Key - (4mm)

1 - Knife

1 - Pressure Gauge

2 - Tyre Levers

1 - Pump

1 - Drift

1 - Vice

1 - Talcum Powder

1 - Valve Remover

1 - Multi-Meter

1 - Soldering Iron

1 - Pin Hammer

1 - Punch

1 - Pair Pliers

1 - Battery Discharge Tester

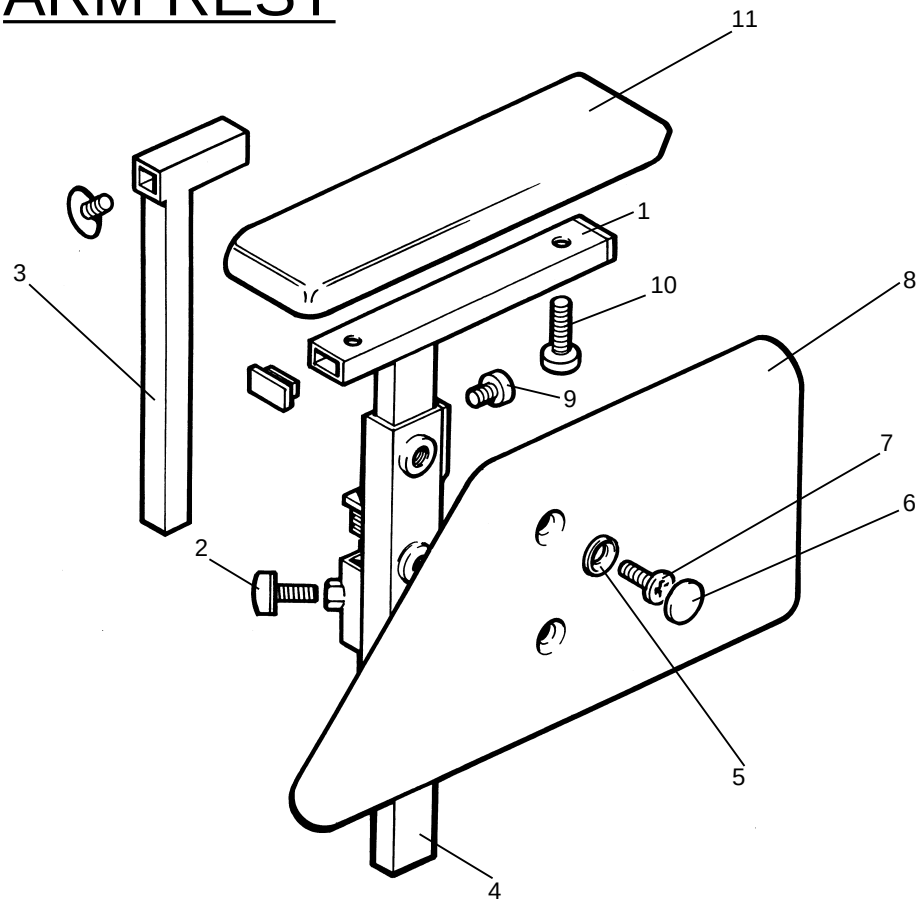
1 - HHP - Programmer

NOTE: THE ABOVE LIST IS NOT EXHAUSTIVE

ARM REST

PARTS:

1. Armrest Pad Bracket
2. Hand Knob
3. Armrest Bracket
4. Arm Upright Assembly
5. Washer
6. Cap
7. Screw
8. Skirt Guard
9. Screw (Allen)
10. Armpad Fixing Screws
11. Armrest Pad



Tools Required:

No1 Phillips Screwdriver
Flat Headed Screwdriver
6mm Allen Key

INTRODUCTION

STEP 1
Check that the skirtguard is fixed and not physically damaged. If the panel is loose re-tighten the fixing screw, install a new panel if necessary.

STEP 2
Check for armpad wear or damage. Replace if necessary.

STEP 3
Check for corrosion or paint damage to the bracketry and replace affected parts where necessary.

DISMANTLING

STEP 1
Remove the handknob by rotating it anti-clockwise. Pull out the arm assembly.

STEP 2
Remove the two armpad fixing screws under the armpad and remove the armpad.

STEP 3
Remove the allen screw and pull out the armpad bracket.

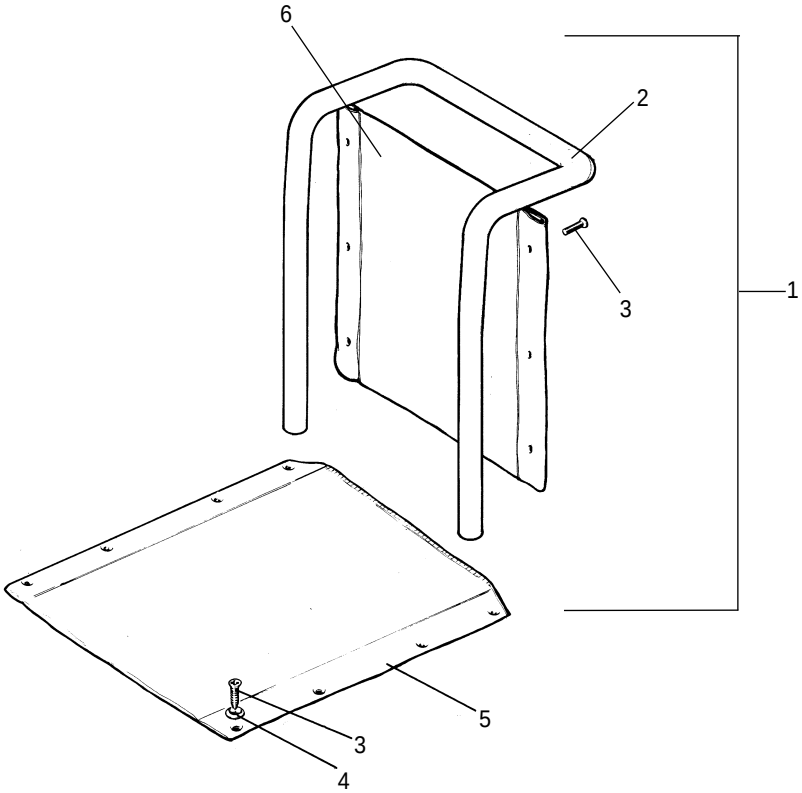
STEP 4
Carefully remove the 2 caps with a flat headed screwdriver, remove the 2 phillips screws and remove the skirtguard. Take care not to loosen the washers.

To re-assemble reverse step 4 to 1 taking care not to over tighten the fixing screws as this could cause burrs and split the plastic washer.

UPHOLSTERY AND BACK/SEAT CLOTH

PARTS:

1. One Piece Backrest Complete
2. One Piece Backpost
3. Taptite Screw
4. Upholstery Washer
5. Seat Upholstery
6. 40cm High Back Upholstery



Tools Required:

No1 Phillips Screwdriver

INTRODUCTION

STEP 1
Check that the upholstery does not sag and is not unevenly stretched, torn or excessively worn, paying attention to the adjustment features within the tension adjustable back upholstery.

STEP 2
Check that all stitches are in good condition.

STEP 3
Check that all screws and washers are tight and free of sharp edges and burrs.

DISMANTLING

STEP 1
Remove all fixing screws and detach upholstery from tubework.

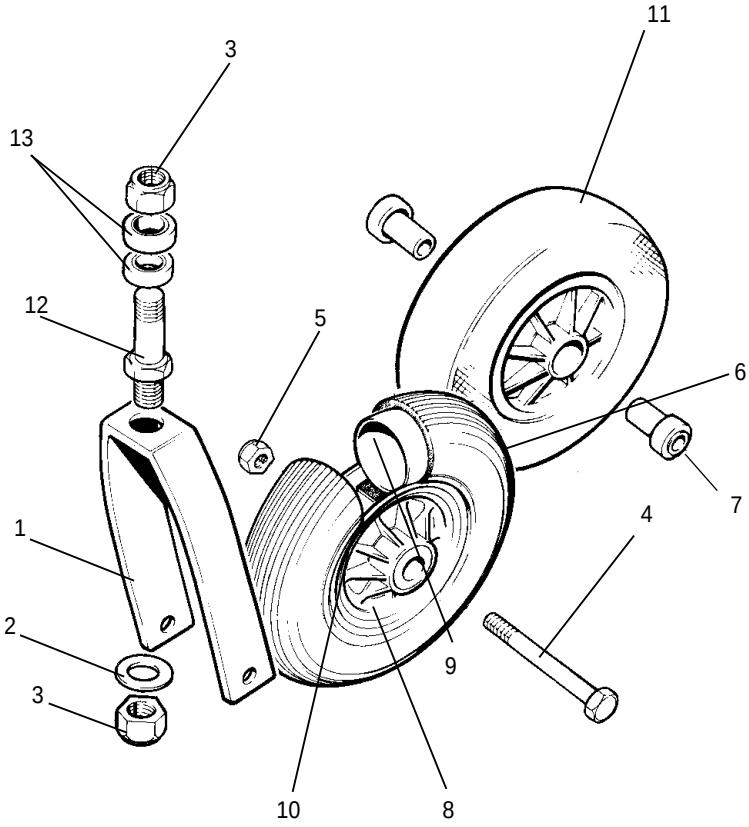
To re-assemble reverse above procedure ensuring that the fixing holes in the upholstery and tubes are properly aligned.

NOTE:
TAKE CARE NOT TO OVER TIGHTEN SCREWS AS THIS MIGHT CAUSE BURRS.

CASTOR WHEEL AND FORK

PARTS:

1. Castor fork
2. Washer
3. Nyloc Nut
4. Axle Bolt
5. Nyloc Nut
6. Pneumatic Castor
7. Bearing
8. Tyre
9. Inner Tube
10. Hub Centre
11. Castor Wheel
12. Fork Stem
13. Bearings



Tools Required:

19mm Socket Spanner x 2
Flat Bladed Screwdriver
Mallet
Pressure Gauge
Tyre Levers
Pump
Drift

INTRODUCTION

STEP 1
Check castor wheels are not buckled or physically damaged. Replace if required.

STEP 2
Check that the wheel bearings run freely without excessive play.

STEP 3
Check that the castor wheel and fork nuts are tight.

STEP 4
Check that the castor forks are bent or damaged.

STEP 5
Check the crown/castor fork bearings for wear and correct adjustment.

STEP 6
Check tyres for wear and correct inflation. Both wheels should show the same degree of wear (see side of tyre pressure rating). For tyre fitment see rear tyre section.

CASTOR WHEEL AND FORK

DISMANTLING

STEP 1
Remove castor socket cap with flat bladed screw driver, hold the lower fork stem nut secure with 19mm spanner and remove the upper fork stem nut.

STEP 2
Gently tap the threaded end to the fork stem with a mallet taking care not to damage the threads. Remove the castor fork assemblies

STEP 3
Lever out the top fork bearings carefully, using the fork stem as a lever. Take care not to damage the threads.

STEP 4
Remove the castor fork bearings using a drift and a mallet, tapping gently to avoid damaging the castor socket and bearing.

STEP 5
To remove the castor wheels undo the axle nut with a 13mm spanner using a second spanner at the other end of the axle to lock against rotation. Remove the axle bolt and remove the wheel from the fork.

STEP 6
Remove the bearings by hand.

To reassemble reverse step 6 & 7, but adjust tightness of nut until the wheel runs freely to a gradual halt.

a) If the wheel stops abruptly, loosen the castor axle nut.

b) If the wheel wobbles (sideplay), tighten the castor axle nut enough to allow free spinning without sideplay.

TO RE-ASSEMBLE

STEP 1
Insert the fork stem bearings using a mallet and drift across the bearing to prevent damage.

STEP 2
Start at the bottom and place the threaded end of the fork stem through both bearings and in the castor fork socket.

CASTOR WHEEL AND FORK

TO RE-ASSEMBLE

STEP 3
Locate fork stem nut on the threaded end of the stem and tighten with a 19mm spanner just enough to allow the fork to swivel freely.

STEP 4
To check for correct tightness, preform the following test:

a) Tip chair backwards and rest the push handles on the floor (remove the battery boxes first).

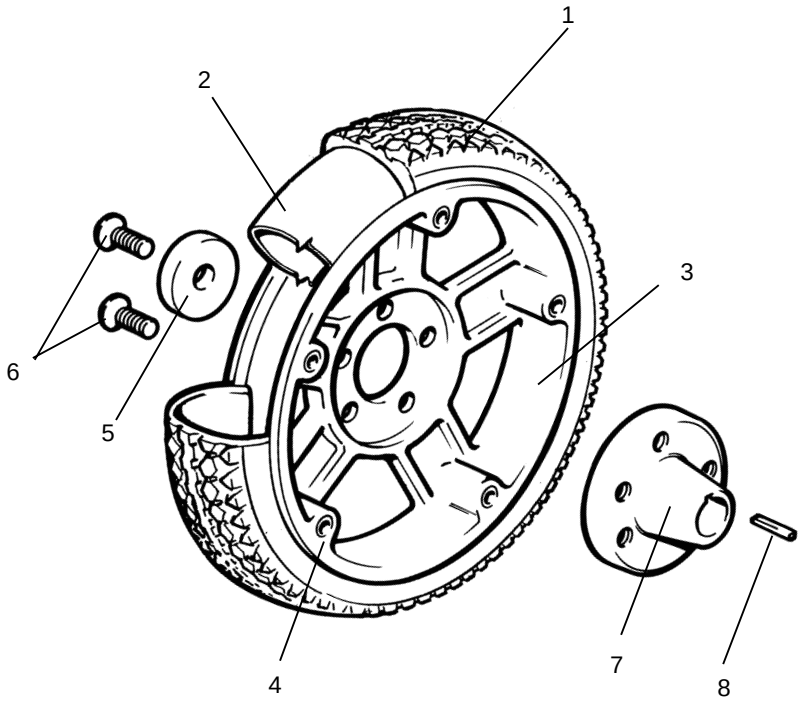
b) Raise castor wheel towards ceiling, then gently push downward to either side. The wheel and fork should freely rotate down and hang straight towards the floor after a pendulum - type swing.

NOTE:
IF THE WHEEL STOPS ANGLED TO ONE SIDE, LOOSEN THE FORK STEM NUT SLIGHTLY. IF THE WHEEL CONTINUES TO SWING TO BOTH SIDES (LIKE A PENDULUM), TIGHTEN THE FORK STEM NUT SLIGHTLY. CHECK BEARINGS FOR EXCESSIVE PLAY BY GENTLY ROCKING THE FORK ASSEMBLY.

REAR WHEEL AND TYRES

PARTS:

1. Tyre
2. Inner Tube
3. Outer Rim
   Inner Rim
4. Socket Head Cap Screw
5. Washer
6. Wheel Bolts
7. Wheel Hub
8. Key



Tools Required:
Allen Key 6mm
Spanner 13mm
Mallet
Tyre Levers
Pressure Gauge
Pump
Vice
Talcum Powder
Valve Remover
Flat Bladed Screwdriver

DISMANTLING
ALLOY TYPE WHEELS

INSPECTION

STEP 1
Check wheel is not buckled or physically damaged. Replace if required.

STEP2
Check tyres for wear and correct inflation, both wheels should allow the same degree of wear (see side of tyre for pressure rating).

DISMANTLING

STEP 1
Jack up one of the gearboxes to lift one wheel off the floor.

STEP 2
Remove the 5 M8 Wheel Bolts securing the Wheel to the Wheel Hub. Remove the Wheel.

STEP 3
Deflate the tyre, locate, loosen and remove Socket Head Cap Screw securing the two halves of the Wheel Rims together. **Important note: Ensure the tyre is fully deflated before attempting to separate to the two halves of the Wheel Rims.**

STEP 4
Remove the tyre and tube.

STEP 5
To remove the Wheel Hub from the Axle Shaft locate loosen and remove the Wheel Hub Bolt securing the Wheel Hub to the Axle Shaft.

STEP 6
Gently tap the wheel centre with a mallet and pull the wheel off the gear box shaft (take care not to loose the key located in the gearbox shaft).

TO RE-ASSEMBLE

STEP 1
Re-fit the Wheel Hub to the gearbox shaft ensuring alignment of the keyway of the wheel centre to the key fitted to gearbox shaft. Gently tap the wheel centre with a mallet until the threads can be seen inside the shaft.

STEP 2
Fit the wheel bolt, ensuring that the washer has been fitted, to the gearbox shaft. Torque rating of rear wheel bolt = 35 - 40Mm.

STEP 3
Locate tyre and tube to the face of the inside Rim that has the hole for the valve to seat in, slightly inflate the tube.

STEP 4
Locate the other half of the Wheel Rim in position, insert Socket Cap Screws in position and proceed to tighten the screws. Ensure the inner tube is not trapped between the Wheel Rim halves. Tighten securely Socket Head Cap Screws.

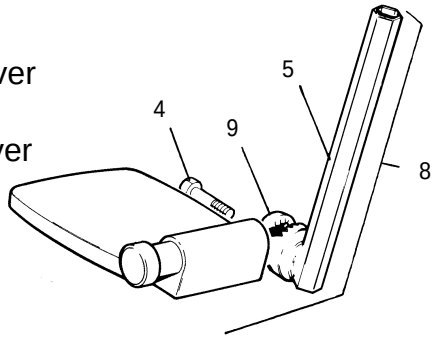
STEP 5
Inflate to the correct pressure as indicated on the Tyre Side Wall.

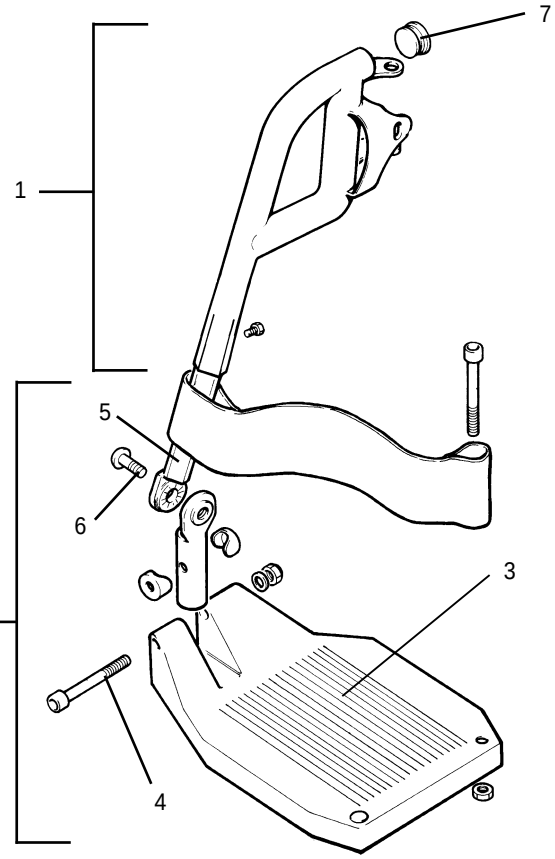
STEP 6
Position Wheel on Wheel Hub, locate and tighten Wheel Bolts securely.

FOOT REST

PARTS:

1. Hanger assembly
2. Extension assembly
3. Footplate
4. Screw
5. Extension tube
6. Extension adjustment screw
7. Tube end plug
8. Angle Footrest Assembly
9. Tube Sub-Assembly





TOOLS REQUIRED

No1 Philips screwdriver
Spanner 13mm
Flat bladed screwdriver
Mallet

INSPECTION

STEP 1
Check that the Footplate fits securely and operates correctly.

STEP 2
Check the operation of the Footplate extension, clamping and adjustment bolt.

STEP 3
Check the footrest for damage

STEP 4
Check for damage and distortion to the footrest hanger paying particular attention to the securing tabs that clamp the extension (welds, flanges etc).

DISMANTLING

STEP 1
Operate the quick release mechanism and detach the footrest assembly.

STEP 2
Remove the extension clamping screw with a 13mm spanner and detach the footrest extension from its hanger.

STEP 3
Remove the bumper rubber screw and pull out the bumper rubber.

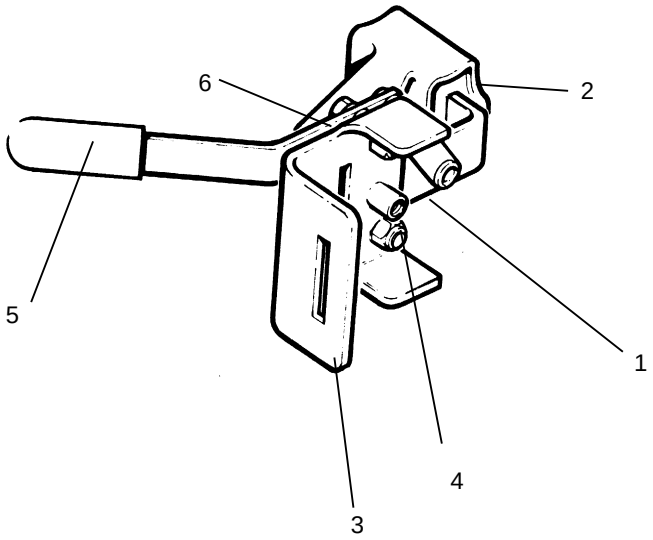
STEP 4
With a mallet, gently tap the footplate of the extension

To re-assemble reverse steps 1 to 4.

MECHANICAL HAND BRAKE

PARTS:

1. Brake Assembly Complete
2. Brake Shoe
3. Brake clamp bracket
4. Brake fixing nut
5. Rubber tip
6. Brake lever mechanism



Tools Required:

Spanner 10mm
No1 Philips screwdriver

INSPECTION

STEP 1
Check that the brake mechanism has no excessive looseness, is not worn or damaged.

STEP 2
Check that the brake shoe is positioned correctly to provide maximum surface area contact on the tyre tread, and gives the positive brake hold (apx 10-11 gap between tyre and brake shoe).

DISMANTLING

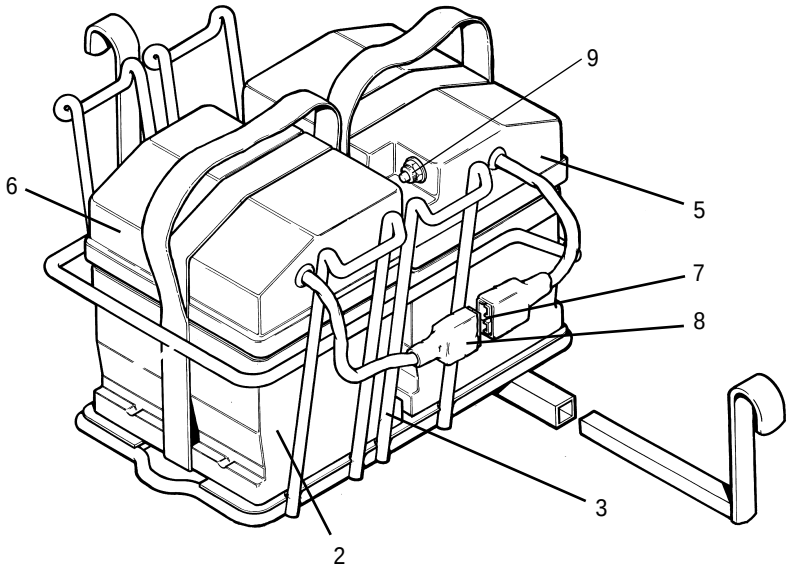
STEP 1
Loosen and remove the brake fixing bolt with an 10mm spanner.

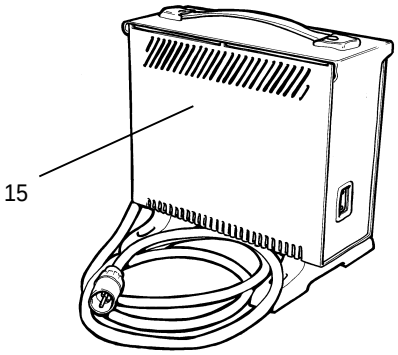
STEP 2
Remove the brake from the sideframe, slide off the rubber tip.

STEP 3
Use a 10mm spanner to dismantle lever mechanism if necessary.

STEP 4
Use No1 Philips screw driver to remove brake block fixing screw.
To re-assemble reverse steps 1 to 4.

BATTERIES AND CHARGER





PARTS:

1. Rear Battery Box (Battery not shown)
2. Front Battery (Battery not shown)
3. Battery Cradle
4. Power Lead (not shown)
5. Battery Box Lid - Front Moulding
6. Battery Box Lid - Rear Moulding
7. Connector Plug
8. Plug Cover
9. 40 Amp Circuit Breaker
10. 40 Ah Sonnenschien Battery (Not shown)
11. Power Socket (not shown)
12. Power Lead Plug (not shown)
13. Battery Terminal Cover RH - (Not Shown)
14. Battery Terminal Cover LH - (Not Shown)
15. Battery Chargers

Tools Required:

Pliers /Flat Bladed Screwdriver/10mm Spanner/No 1 Phillips Screwdriver/Multi Meter
Astratech Battery Discharger

INSPECTION - BATTERIES

STEP 1
Check that the battery box case, leads, sockets, and batteries are not damaged.

STEP 2
Measure the battery voltages, the values must be the same +/- 0.2v. If not replace the batteries.

STEP 3
For the battery charger operate, the battery voltage must be shown above 8v each. If not the batteries must be removed and charged with an unregulated charger until the voltage reaches 9v. Re-connect the batteries and charge through a complete charge cycle (this may or may not recover the batteries, if not replace the batteries).

STEP 4
On completion of charge the battery voltage must read 14.20v (+/-) at 20°C or combined 28.4v.

BATTERIES AND CHARGER

DISMANTLING - BATTERIES

STEP 1
Unplug the battery lead, disconnect the battery box from the connecting plug, lift off the battery cradle and remove the battery cradle from the mounting bars.

STEP 2
Remove the battery boxes/battery box from cradle.

STEP 3
Unclip the battery box lids, with a 10mm spanner, undo the battery terminals and remove the batteries from the cases.

To re-assemble, reverse steps 1 to 3 and charge the battery fully.

INSPECTION - CHARGER

STEP 1
Check the charger case for physical damage.

STEP 2
Check the input and output leads and plugs for damage, cuts and wear.

STEP 3
Check that the charging, charge complete and power on lamps are operating correctly.

STEP 4
With an ammeter or a multimeter set to amp (range 10A) test the charging current.

NOTE :
AMMETERS MUST BE CONNECTED IN SERIES WITH THE BATTERY CIRCUIT.

STEP 5
The current reading should read approximately 7amp at charge start and 0.2 amp at complete charge.

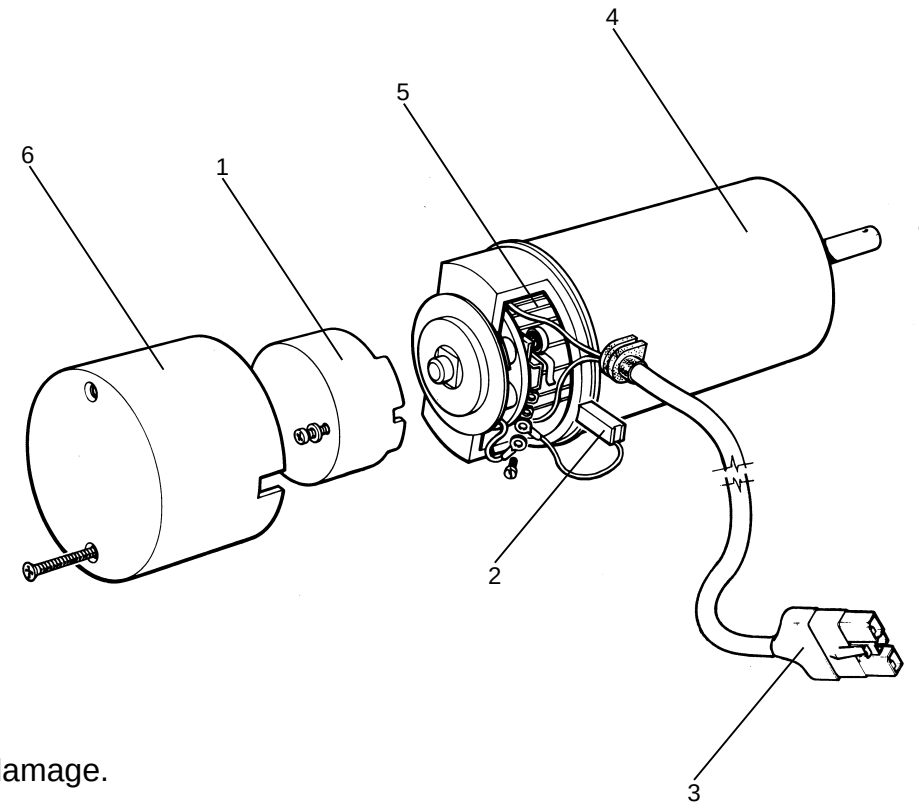
STEP 6
With a voltmeter or a multimeter, set to volts (range 30v) test the charging voltage at the battery supply (red + blue - ve wires). The reading should increase to 28.4v during charging.

NOTE:
NO DISMANTLING IS NECESSARY FOR CHARGERS (INSPECTION OF PLUGS ONLY).

MOTOR ASSEMBLY

PARTS:

1. Electro-Magnetic Brake
2. Brush
3. Motor Plug
4. Motor Complete
5. Commutator
6. Motor End Cap



Tools Required:

No1 Phillips Screwdriver
Flat Headed Screwdriver
Soldering Iron
Multi Meter
3mm Allen Key

INSPECTION

STEP 1
Check motor assembly for damage.

STEP 2
Set multimeter to continuity test.

STEP 3
Test continuity of motor leads and electro-magnetic brake leads (motor - lead shows in diagram). Brake resistance should read 50ohms - 80 ohms.

STEP 4
Check all joints for bad connection, cracked or dry solder joints and oxidation.

STEP 5
Check that all the brushes can move freely in the brush guides with no obstruction (this can be easily done by pulling on the free brush feeder wire).

STEP 6
Check that all the brushes are not chipped, cracked or worn.

STEP 7
Check that the brush spring is positioned to the centre of the brush body to apply even force. Also check the brush spring tensions.

STEP 8
Check the condition of the brush feeder wire and check that the termination screws are secure.

MOTOR ASSEMBLY

STEP 9
Visually inspect the commutator for carbon deposits and remove with a soft brush.

NOTE:
ENSURE ALL THE SEGMENTS OF THE COMMUTATOR ARE NOT BRIDGED WITH CONDUCTIVE MATERIALS (I.E. CARBON OR COPPER).

DISMANTLING

STEP 1
Remove the motor end via the two phillips screws.

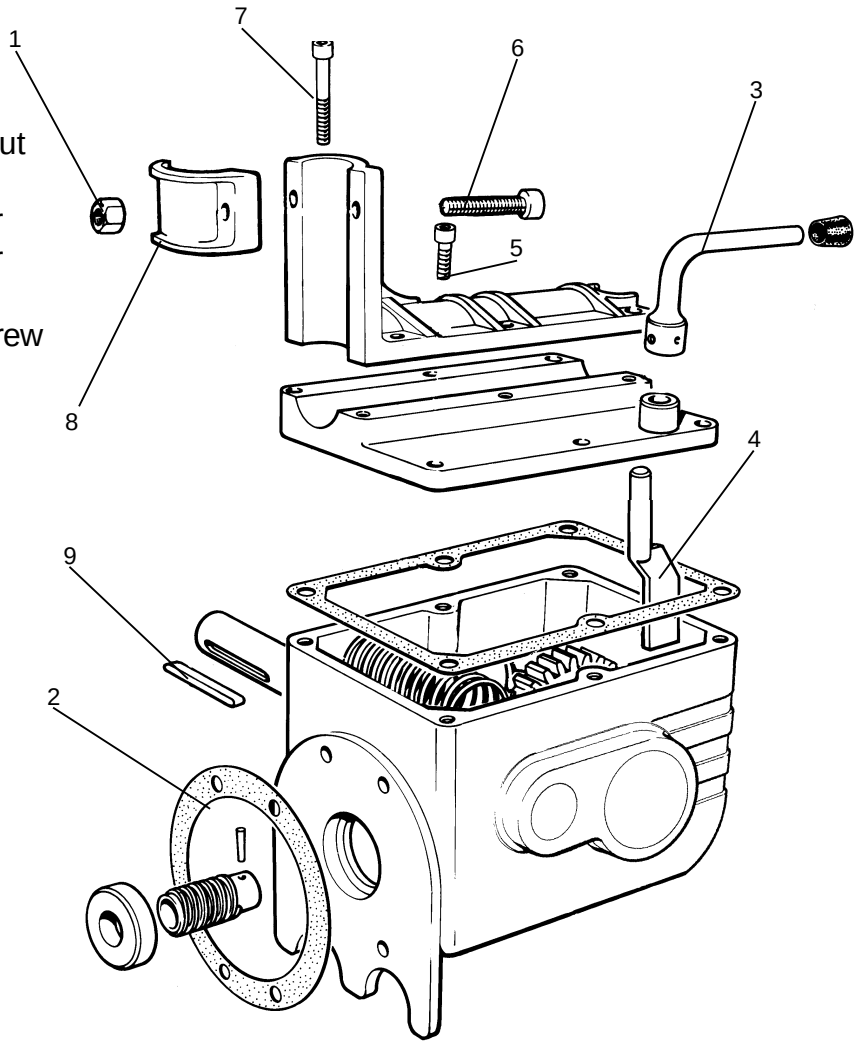
STEP 2
Remove the two/three electro magnetic brake fixing screws and remove the brake.

STEP 3
Remove the brush feeder wire termination screws, release the brush springs and remove the brushes.

To reassemble reverse the steps 1 to 4, taking care not to damage the brushes and ensuring correct alignment of the electro-magnetic brake.
Should there be fitting, scoring or wear then replace the Motor Unit.

NOTE:
WHEN REFITTING MOTORS, PLEASE ENSURE THAT BOTH SUPPLY WIRES ARE FASTENED TO THE CONTROLLER IN SUCH A WAY THAT THE RIGHT HAND MOTOR CANNOT BE ACCIDENTLY CONNECTED TO THE LEFT AND VISA VERSA

GEARBOX ASSEMBLY



PARTS:

1. Motor Gearbox Clamp Nut
2. Gearbox Gasket
3. Declutching Lever Lower
4. Declutching Lever Upper
5. Gearbox Lid Screw
6. Motor Gearbox Clamp Screw
7. Lid to Gearbox Screw
8. Clamp
9. Key

Tools Required:

5mm Allen Key
Pin Hammer
Punch
3mm Allen Key
Pliers
Vice
Spanner
8mm Spanner

INSPECTION

STEP 1
Check casing for cracks or damage or leakages.

STEP 2
Check Gearbox for noises (gears and bearings).

STEP 3
Check the declutching lever and mechanism engages and disengages correctly.

STEP 4
Check that the output shaft of the gearbox is not damaged or bent. Remove the rear wheel and inspect the key and keyway for wear and correct fitting.

DISMANTLING

STEP 1
Remove the rear wheel from the gearbox (see page 6).

GEARBOX ASSEMBLY

DISMANTLING

STEP 2
Unplug the motor from the main control box. Loosen and remove the six gearbox lid securing screws. The lower half of the gearbox will now detach from the top half, whilst still attached to the side frame of the chair.

STEP 3
To dismantle the declutching lever upper and lower parts, remove the allen screw and knock out the fixing pin using a pin hammer and punch, separate the two halves.

STEP 4
To detach the gearbox from the motor, degrease the gearbox, remove the four fixing screws with an 8mm spanner, taking care not to deface or damage any gear teeth. Separate the gearbox and motor assembly.

To reassemble reverse steps 1 to 4 ensuring correct motor to gearbox alignment is achieved. Replace both gaskets and re-pack the gearbox with ‘Shell Albida’ Grease (approx. 200g)

NOTE:
TO REFIT THE DECLUTCHING LEVER THE GEARBOX TOP MAY NEED TO BE REMOVED FROM THE CHAIR AND A VICE USED TO CLAMP THE UPPER AND LOWER LEVERS IN PLACE.

CONTROLLER WITH INTEGRAL JOYSTICK REMOTE (DL,40)

Tools
No 1 Philips Screw Driver
No 2 Philips Screw Driver

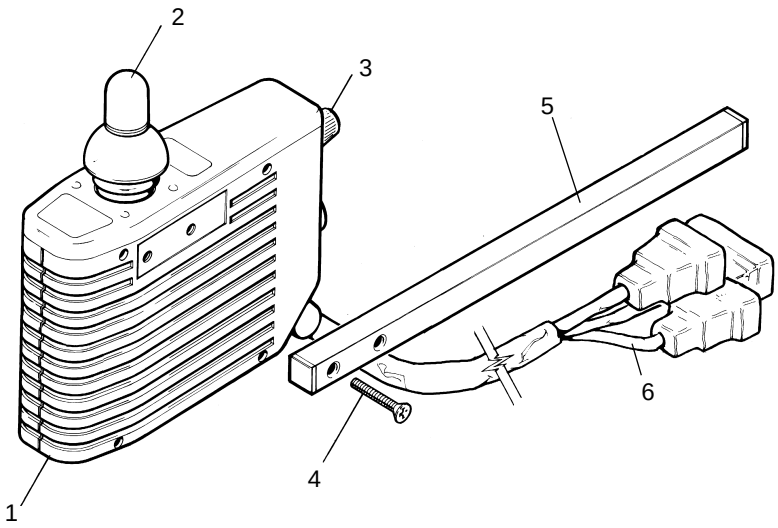
METHOD OF REMOVAL

STEP 1
Disconnect motor and battery feed wires. Unfasten cable ties from chassis.

STEP 2
Undo controller mounting bracket fixing. Unplug motor connectors. Controller will then be free from the chair.

INSPECTION
STEP 1
Check for any physical damage to the outer casing

PARTS:
1. DL40 Controller
2. Joystick Knob
3. Speed Control
4. Fixing Screw
5. Harness
6. Support Bracket



STEP 2
Inspect the rubber gaiter around the joystick knob for any cracks, splits or perishing. This would enable water or moisture to access the unit. This would cause serious damage to the controller.

STEP 3
Check speed control knob is secure and its action is free and easy in rotation. To adjust the needle pointer, remove the end cap with a knife by sliding it down between the small gap at the knob. Using a No1 Philips Screw Driver loosen off the fixing screw. The knob can then be removed. Turn the potentiometer shaft fully clockwise, re-fit the knob onto the potentiometer shaft and position the needle pointer on the cap to apx. 11 o'clock and tighten up firmly.

NOTE: CHECK THAT: MAX SPEED IS @ 11 O'CLOCK
MIN. SPEED IS @ 2.00 O'CLOCK

TO REASSEMBLE REVERSE STEPS 1 TO 3

READ THE FOLLOWING CAREFULLY. THIS INFORMATION IS DESIGNED TO HELP US UNDERSTAND HOW THE CONTROL SYSTEM FUNCTIONS

GENERAL FEATURES
The DP PWC has the following general features:
- Radio frequency interference compatible to 20 Volts/metre
- Ergonomic on-off switch
- Audible on-off switch feedback and low battery charge warning
- True state-of-charge battery gauge with three colour display

- Digital motor control
- Built-in diagnostics with fault display and fault logging
- Complies with ISO7176, part 14 when correctly installed
- Load compensation (described below)

SAFETY AND PROTECTION FEATURES
The DL has the following safety and protection features:
- Soft top or controlled speed reduction to a stop if a fault is detected or the controller switched off
- Protected against external faults such as reverse battery connection, overloaded motors or park brakes and external short circuits
- Joystick out of neutral at power up detection with drive inhibit.
- Over voltage shut down
- Detection of open circuit motors
- Detection of open or short circuit park brake outputs
- Battery under voltage protection with “battery saver” to prevent battery damage through over discharge
- Thermal overload protection with progressive motor current roll back and automatic recovery
- Driving inhibit when a battery charger is connected to the built-in charger socket

THE BATTERY DISCHARGE INDICATOR
The three colour Battery Gauge gives an indication of the amount of charge in the batteries. The display also provides an on or off status indication for the controller and diagnostic information in the event of a fault. (Diagnostics are described in section 8)

WHAT TO DO IN THE EVENT OF A FAULT

SYMPTOM	CHECK/ACTION
ON/OFF button pressed to ON, lamp does not light up wheelchair does not move	Is the main cable loom plug properly inserted into the rear of the controller?
	Are the batteries completely flat?
	Have you left the battery charger plugged in?
ON/OFF lamp lights up, wheelchair does not move or behaves erratically, controller is hard to click	Are one or both motors disengaged (freewheel mode)?
	Are the batteries discharged to the critical level?
Battery Charge indicator flashing slowly, wheelchair moves, but with reduced speed and sluggish response.	
Battery Charge indicator flashing quickly (twice per second) wheelchair not moving	Are the batteries discharged below the critical safety level?
	Are the batteries overcharged (charger fault)?

Batteries will not accept charge	Possible charger fault Is the charger fuse blown? (screw cap on the rear of the controller)

DIAGNOSTICS

THE DL.40 CONTROLLER HAS FULL ON BOARD DIAGNOSTICS, WHICH WILL IN THE EVENT OF A SYSTEM MALFUNCTION , IDENTIFY FAULTS QUICKLY AND EASILY.

Diagnostic information is provided to enable a fault in the system to be identified and localised to a major component: eg: motor. The following system diagnostics are provided:

	Flash code sequence
1) Low battery voltage fault	●–●–●–
2) High battery voltage fault	●●–●●–●●–
3) Left motor (or connection) fault	●●●–●●●–
4) Right motor (or connection) fault	●●●●–●●●●–
5) Left or right park brake (or connection) fault	●●●●●–●●●●●–
6) Controller fault	●●●●●●–●●●●●●–
7) Motor stalled or joystick out of neutral time out	●●●●●●●–●●●●●●●–

In the event of a system fault, the diagnostic indicators are displayed by the battery gauge flashing. Fault are encoded as one (for low battery voltage fault) to seven (for a motor stalled or joystick out of neutral time out fault) and displayed by flashing all LED's the number of times give by the fault code. The flash sequence (one to seven) is following by a long of period (2 seconds).

TROUBLESHOOTING

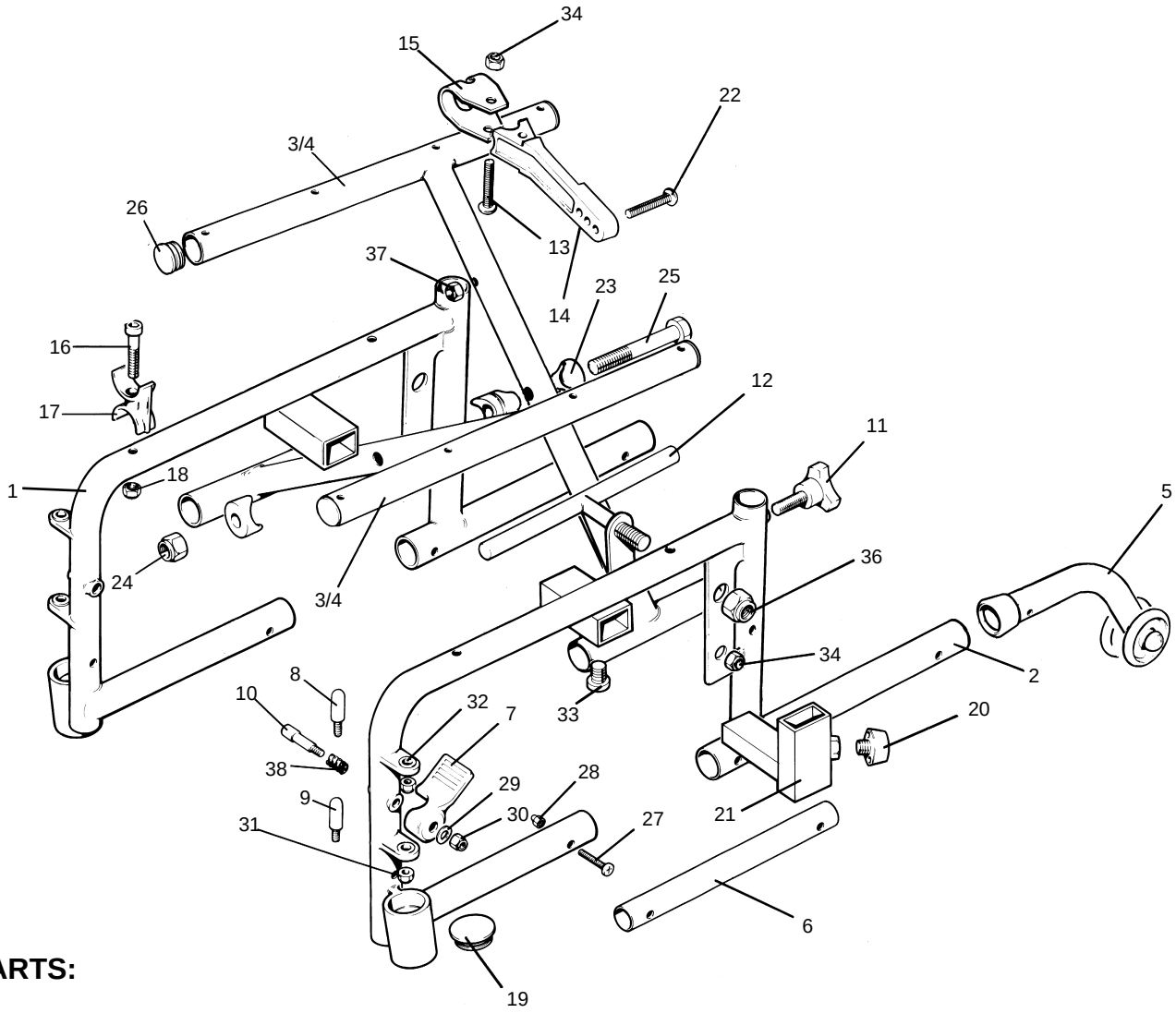
The following is a check list to assist with diagnosing an electrical fault on a wheelchair. If after consulting the check list the person persists then an authorised service agent should be contracted.

PROBLEM	**CHECK/ACTION**
0. The On status indicator/ Battery Gauge does not light when the controller is switched on	1. Check the battery connector to the controller is securely plugged into the connector from the battery 2. Check the batteries themselves are connected correctly. ie check the battery terminals 3. Check the batteries are not flat 4. Check the battery supply fuse or circuit breaker
1. Low battery voltage fault	1. Check the battery connector to the controller is securely plugged into the connector from the battery
2. High battery voltage fault	1. Check the battery charger. Is it over charging the batteries? Is the battery charger the right type?

PROBLEM	CHECK/ACTION
3. Left Motor (or connection) fault	1. Check the left and right motor/park brake connectors are securely plugged in 2. Check the contacts in the left and right motor connectors for corrosion or damage 3. Check the left and right motors using a ohmmeter disconnect the motors and measure the motor resistances at the motor resistances at the motor connectors. If the resistance is more than 1 Ohm or less than 100mili Ohms the motor is probably faulty. (If the motor seems OK sometimes and not others when rotated then the motors brushes or commutator are is/faulty 4. Check the resistance of the motor to its housing. Using an ohmmeter measure the resistances of either motor contact to the motor housing. If the resistance is less than 1 MegOhms the motor is probably faulty. (If the motor seems OK sometimes and not others when rotated then the motors brushes may be touching the housing as the commutator is rotated) **N.B. Due to limitations of the diagnostics a fault in one motor may be indicated as a fault in the other motor** 5. Disconnect both motors (and park brakes). Turn the controller off and on leaving the joystick in neutral. If a motor fault is still indicated then the fault is actually with the controller **N.B. Due to limitations of the diagnostics a fault in the controller output electronics may be indicated as motor fault.**
4. Right Motor (or connection) fault	As above
5. Right Motor (or connection) fault	1. Check the motor/park brake connectors are securely plugged in 2. Check the contacts in the connectors or damage 3. Check the park brakes. Using an ohmmeter disconnect each park brake and measure the resistance at the connector. If the resistance is less than 20 ohms the park brake is probably faulty

PROBLEM	CHECK/ACTION
6. Controller fault	1. Disconnect both motors (and park brakes). Turn the controller off and on leaving the joystick in neutral. If a controller fault is still indicated then the controller fault is confirmed 2. Disconnect both motors (and park brakes). Turn the controller off and on leaving the joystick. If the controllers relay clicks twice and a left motor fault is now indicated then the controller is OK. If another fault other than the left motor is indicated and the relay does not click then a controller fault is confirmed.
7. Motor stalled or joystick out of neutral time out	1. Check joystick is released and in neutral when controller is switched on. 2. Check wheelchair is able to move and is not blocked by an obstacle. 3. Check motors and gearboxes are OK by releasing the ref wheeling hubs, deflecting the joystick forward and observing the hubs to see if both left and right hubs turn.
8. The battery Gauge is on and control box is heard to “click”, but chair does not move or steering is erratic	1. Check both free wheeling hubs are engaged? With the controller off, push or pull the wheelchair to ensure both left and right wheel do not free wheel.
9. The wheelchair turns in circle or does not drive straight.	1. Check motors and gearboxes are OK by releasing the free wheeling hubs, deflecting the joystick forward and observing the hubs to see if both left and right hubs turn. 2. Check both free wheeling hubs engaged. With the controller off, push or pull the wheelchair to ensure both left and right wheels do not free wheel 3. Check if one park brake is dragging. Does one or both park braked get hot after driving? The park brake should be able to be touched without any discomfort.
10. Batteries not charging	1. Check the battery charger is plugged switched on. 2. Check the charger is the correct type. 3. Check the charger operation 4. Check the fuse next to the power connector on the charger **Warning: Disconnect charger from both the mains socket before checking the fuse**

FRAMES AND CHASSIS



PARTS:

1 Sideframe Assembly RH
2. Sideframe Assembly LH
3/4. Crossbrace Assembly
5. Anti Tipping Lever
6. Inner Bottom Rail
7. Footrest Release Lever RH
   Footrest Release Lever LH
8. Footrest Hinge Pin - Upper
9. Footrest Hinge Pin - Lower
10. Pin - Footrest Release
11. Handknob
12. Tee Bar
13. Bolt
14. Crossbar Link Arm
15. Crossbar Link Bracket
16. Seat Clamp Screw
17. Seat Guide
18. Nyloc Nut
19. Castor Socket Cap
20. Handknob
21. Armrest Bracket
22. Screw
23. Crossbar Washer
24. Crossbar Nut
25. Crossbar Bolt
26. Tube End Plug
27. Screw
28. Domed Nylock Nut
29. Washer
30. Nyloc Nut
31. Nyloc Nut
32. Washer
33. Skt Cap Screw
34. Nut
36. Nyloc Nut
37. Nyloc Nut
38. Spring

Tools Required:
No1 Phillips Screwdriver
Flat Bladed Screwdriver
8mm Spanner
13mm Spanner
4mm Allen Key

INSPECTION

STEP 1
Check all tubing for misalignment, damage or bending of the frame or crossbar assembly.

STEP 2
Check that no misalignment is present at the castor mount area (castor fork and socket).

STEP 3
Check all brazed/welded joints for fractures or damage.

STEP 4
Check the crossbar assembly is not damaged (pivot bolt should not be over-tightened).

STEP 5
Check the paint or chrome finish for damage or peeling.

STEP 6
Check that the chair folds easily and that the crossbar pivots and folding mechanisms operate correctly.

FRAMES AND CHASSIS

DISMANTLING

STEP 1
Remove the arm rest assemblies and footrest

STEP 2
Unplug and remove the battery boxes, joystick assembly and control box (see pages 10,19)

STEP 3
Remove the back assembly complete by removing the two hand knobs and pulling the push handles upwards.

STEP 4
Remove the seat upholstery (see page 2).

STEP 5
Loosen and detach the top crossbar link assembly using 11mm spanner and 4mm allen key (see diagram on page 24).

STEP 6
Remove the bottom rail screws and nuts with a Philips No1 screwdriver and an 11mm spanner.

STEP 7
Remove the side frame from the crossbar assembly (see page 24)

STEP 8
Remove the crossbar bolt with a 13mm spanner, using a second spanner on the nut to hold against rotation. Take care not to loose the washer (see page 24).

STEP 9
Remove all rubber and plastic end stops with a flat bladed screwdriver.

To reassemble reverse steps 1 to 9 remembering to lubricate the inner bottom rail with a light grease prior to fitment.

Servicing Requirements

We recommend that routine servicing be carried out at six monthly intervals. The routine service consists of the following.

1. Motors:

a) Inspect plugs for physical damage.

b) Inspect insulation for cracks and splits.

c) Check and clean brake. Resistance = Appx. 50 - 80 Ohms.

d) Inspect and clean brushes and commutator.

e) Check action to clutch mechanism.

f) Check and inspect gear box for excess wave noise, replace grease, recommended grease Shell Albida R2 (Q1100Z).

2. Controller and Joystick Assy:

a) Check for physical damage to outer casings.

b) Inspect joystick shroud and gaiter for cracks and splits.

c) Check all switch operations, and Led's.

d) Check joystick lead and plug ends for signs of cracks, wear or physical damage.

e) Check, status LED on side of controller is on (Stable).

f) Check diagnostics. To assure no faults present on systems. (Check On / Off lamp status, if flashing refer to diagnostics supplement on page 23/24

3. Chassis:

a) Inspect all fixtures and fittings for tightness and integrity.

b) Check front and rear wheel/axle bolts are tight.

c) Ensure that all upholstery screws are present and tight. Check surface of screw head for sharp edges.

Servicing Requirements

4. Batteries:

a) Check batteries for any signs of physical damage.

b) Check terminals for cracks or blackness.

NOTE:
SHOULD BATTERIES BE SUSPECT USE BATTERY DISCHARGE TESTER, BY ASTRA- TECH, (MODEL DC39) TO TEST CAPACITY AND RUN TIME.

Battery Charger:

a) Check for physical damage of casing.

b) Check all LED's are operational.

c) For testing the battery charger, see page 10 section Batteries and charger.