RJ MOBILITY LTD.

JEWEL INDOOR POWERCHAIR

TECHNICAL MANUAL

THE PROVEN RELIABLE
INDOOR POWERCHAIR

This Technical Manual will ensure that the wheelchair is maintained to the required standard and is for use by trained personnel only.

This Technical Manual contains important information regarding maintenance of the Jewel Powerchair thus ensuring its safe operation. Please make sure that you understand all instructions thoroughly.

It is recommended that maintenance is undertaken at six monthly intervals for a wheelchair that is in constant daily use.

The safety of the wheelchair user is paramount. If there is any doubt as to the suitability of re-using existing parts they should be discarded and replaced with manufacturer approved parts.

User Manuals should be stamped at correct intervals following completion of maintenance work.

If you fail to understand anything or have any questions concerning maintenance and operating instructions please contact:

RJ MOBILITY LTD.
Boy Lane, Wheatley
Halifax HX3 5AF
England
Tel: +44(0) 1422 358888
Fax: +44(0) 1422 355924

CONTENTS

Section

SECTION 1. USER CATEGORIES

A2 Attendant Controlled. Degree of upper body control to maintain sitting position.

A4 Occupant capable of using one hand to control the powerchair having spatial awareness, co-ordinated motor skills and sufficient manual dexterity to operate the controller. The occupant should also have enough upper body control to maintain a sitting position.

A5 Chin Controlled. Degree of upper body control to maintain sitting position. Capable of using chin movements to control powerchair. Co-ordinated motor skills.

IMPORTANT

The above identifies the minimum user characteristics suitable for the Jewel foldaway powerchair.

SECTION 2. SPECIFICATIONS
(Dimensions based on seat size 43cm x 43cm (17inch x 17inch)

1.	Overall length	89cm	(35inch)
2.	Overall width	54cm	(21inch)
3.	Folded length	64cm	(25inch)
4.	Folded width	38cm	(15inch)
5.	Folded height	55cm	($21^{1}/_{2}$inch)
6.	Maximum weight	50kg	(110 lbs)
7.	Heaviest Component	21kg	(47 lbs)
8.	Seat plane angle	8.5^{o} (To Ground)	
9.	*Seat depths available	43cm	(17inch)
		40cm	(16inch)
10.	*Seat widths available	43cm	(17inch)
		40cm	(16inch)
		38cm	(15inch)
		36cm	(14inch)
11.	Seat height at front	49cm	(19inch)
12.	Backrest angle	11.5^{o} (To seat perpendicular)	
13.	Backrest height	43cm	(17inch) above seat
14.	Footrest to seat	36-46cm	(14-18inch)
15.	Leg to seat angle	85^{o} (From Horizontal)	
16.	Armrest to seat	26-35cm	(9-14inch)
17.	Front armrest to backrest	42cm	(17inch)
18.	Drive wheel diameter	170mm	($6^{1}/_{2}$ inch)
19.	Tyre Pressures	N/A (Solid Tyres)	
20.	Maximum load capacity	114kg	(18 stone/252 lbs)
21.	Turning Space		
	(a) Spin turn	185cm	(6ft)
	(b) Between walls	133cm	(3ft 9inch)
22.	Range ** (30 Amp/hr Battery)	8.8km	(5.5mile)
23.	Static Stability		
	(a) Front	21^{o}	
	(b) Rear	24^{o}	
	(c) Side	18^{o}	
24.	Maximum forward speed	2.2kph	(1.4mph)
25.	Maximum stopping distance	1.5m	(5ft)
26.	Dynamic stability uphill	18^{o}	

* Note: Please be aware, other sizes may be available to special request.

** Note: The range test was conducted in accordance with ISO 7176 Pt 4, capacity is affected by ambient temperature, user weight, topography, kerb climbing and battery maintenance.

SECTION 3. POWERCHAIR DIAGRAM

3.1 JEWEL SELF-PROPELLING POWERCHAIR

SECTION 4. MAINTENANCE CHECKS

4.1 Open the powerchair, all movements should be free throughout the folding range.

4.1.1 Examine the seat and backrest fabrics for wear, damage or staining.
Examine retaining screws for tightness and general condition. (See Section 6)

4.1.2 Examine armrest pads for wear or damage and tightness of attachment screws. (See Section 7)

4.1.3 Examine armrest locking assembly for wear and tear and that each armrest is securely retained. (See Section 7)

4.1.4 Examine footrest hanger for effective locking when fully forward and back. Examine clamp assembly for secure location of footplate assembly stem tube. Check that footplates remain vertical when raised. Examine heel loops for damage or excessive wear and security of attachment. (See Section 8)

4.1.5 Examine the parking brake assemblies for wear, damage or misalignment. (See Section 9)

4.1.6 Check operation of folding backrest assembly and that it is free to move and locks into place positively. (See Section 10)

4.1.7. Ensure that tube plugs and ends are fitted to:
Front of seat tubes.
Front of bottom frame tubes.
Armrests front and rear.
Top of backrest tubes.

4.2 Lift the front of the powerchair and rest the backrests on the floor.

4.2.1 Examine the structure of the frame for damage.

4.2.2 Check the pivot points for undue slackness, caused by loose nuts and bolts, or worn parts. Check that front and rear locking links fully lock. (See Section 11)

4.2.3 Check castors for free rotation of the wheel and the complete assembly. Examine castors for wear in the bearings. Examine locating spindle for signs of bending, at the point where it is attached to the frame. (See Section 12)

4.2.4 Examine tyres for uneven wear. Check wheels for free rotation, excessive end float and rim rock.

4.2.5 Check controller is secure to mounting bracket and that this can be secured to powerchair by knurled knob/handle on armrest. Examine controller for damage, particularly any which may allow ingress of fluid. Check joystick knob is secure to controller, speed control knob and charging socket cover are in place. Move joystick around quadrant checking for any roughness or stickiness, on release the joystick must self-centre immediately otherwise braking of the powerchair will be compromised. Ensure that all LED's are functional so that it can be determined when controller is switched on/off and that any diagnostic information is accurate. Check that beau plug on wiring loom fits securely.

4.2.6 The batteries fitted are gel-filled and require no maintenance except to check for damage and security of connections. See Section 14.7 for comprehensive instruction.

4.2.7 The battery charger is maintenance free, the only serviceable part is the fuse fitted to the mains plug. See Section 14.7 for comprehensive instruction.

4.2.8 Ensure the batteries are fully charged.

4.2.9 Drive the Jewel at maximum speed in forward, reverse, left and right directions checking that the joystick response is uniform.

4.2.10 Switch off the controller, hold the joystick forward and switch the controller on; the powerchair must not drive. Release the joystick for two seconds and then the powerchair will drive normally.

4.2.11 Slowly drive the powerchair up a maximum 1 in 6 gradient and attempt to accelerate. The powerchair will climb at normal speed.

4.2.12 Reverse down a 1 in 6 slope and check that the powerchair will come to a halt if the joystick is released.

4.2.13 Whilst driving slowly up the gradient release the joystick and check that the powerchair does not roll back excessively before the automatic parking brakes come on.

4.2.14 Check that all cables are connected to the controller, batteries, motors and brakes.

4.2.15 Check that the circuit breaker push buttons on the battery boxes have not sprung out.

4.2.16 Check that the free wheel devices are releasing and engaging correctly.

4.3. Check that controller rubber gaiter and switch cover are in good condition.

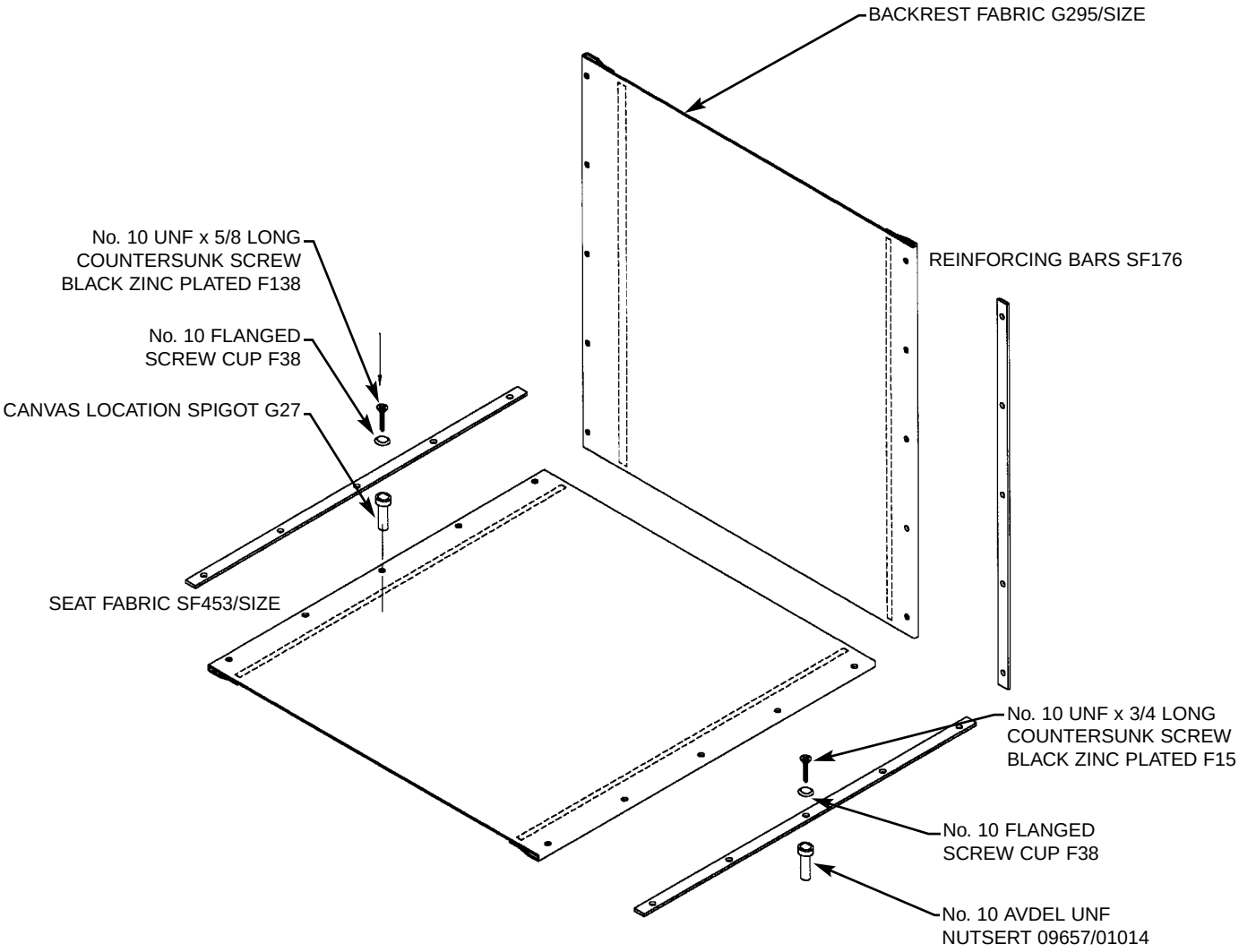
4.3.1 Check the insulation condition of all cables.

4.3.2 Check that the controller is securely mounted.

SECTION 5. TOOL REQUIREMENTS

Spanners:		
1/4inch Whitworth	Legrest Clamp	See Section 8
10mm AF	Heel Loops	See Section 8
8mm AF	Parking Brake	See Section 9
7mm Socket and Drive	Rear Lock Link	See Section 11
1/4inch Whitworth	Anti-tip Device	See Section 11
1 5/16inch or 34mm AF	Castors	See Section 12
1 5/16inch or 34mm AF	Power Drive System	See Section 13
10mm Socket and Driver	Power Drive System	See Section 13
10mm Socket and Driver	Kerb Climber	See Section 20
7/16inch AF	General	
Allen Keys:		
3/16inch AF	Locking Link	See Section 11
2/5mm	Locking Link	See Section 11
5mm	Kerb Climber	See Section 20
5/32inch	Kerb Climber	See Section 20
Pozidrive Screwdriver	Upholstery	See Section 6
Avdel Nutsert Rivet Tool	Upholstery	See Section 6
Loctite Thread Locking Compound Grade 241	Castors & Wheels	See Section 12/13
Terminal Crimp Tool to suit 0.5mm to 6.0mm crimps	Power Drive System	See Section 13
Torque Wrench:		
Minimum Operating Range		
8 lbs/ft (11 Nm)	General	
Small Pliers	General	
Light/Soft Head Hammer	General	
Light Oil, e.g. 3 in 1	General	
Wire cutter	General	
Power Drill and 6mm Bit	General	
1/4inch Receptacle wire crimp tool	General	
Snap Rivet tool	General	
P&G PP1b programmer & diagnostics device		See Section 15
Control Dynamics programmer & diagnostics device		See Section 15
Advised:		
Watt/Minute meter (Current Draw)		

SECTION 6: UPHOLSTERY
6.1 Diagram



6.2 Parts Lists

	RJ No
Backrest Fabric Ninian	G295/Size
Seat Fabric Ninian	SF453/Size
Reinforcing Bar	SF176
No. 10 x 3/4 UNF Csk Screw Black Zinc Plated	F15
No. 10 Flanged Screw Cup	F38
No. 10 UNF Avdel Nutsert	09657/01014
No. 10 x 5/8 UNF Csk Screw Black Zinc Plated	F138
Canvas Location Spigot	G27

6.3 Inspection

Fabric:

Check for staining, wear, tear and stitching.

Check nut inserts in frame for security and stripped threads.

Check securing screws for bending and stripped threads and burrs.

Cushions (if fitted);

Check cushions for staining, wear, tear and stitching.

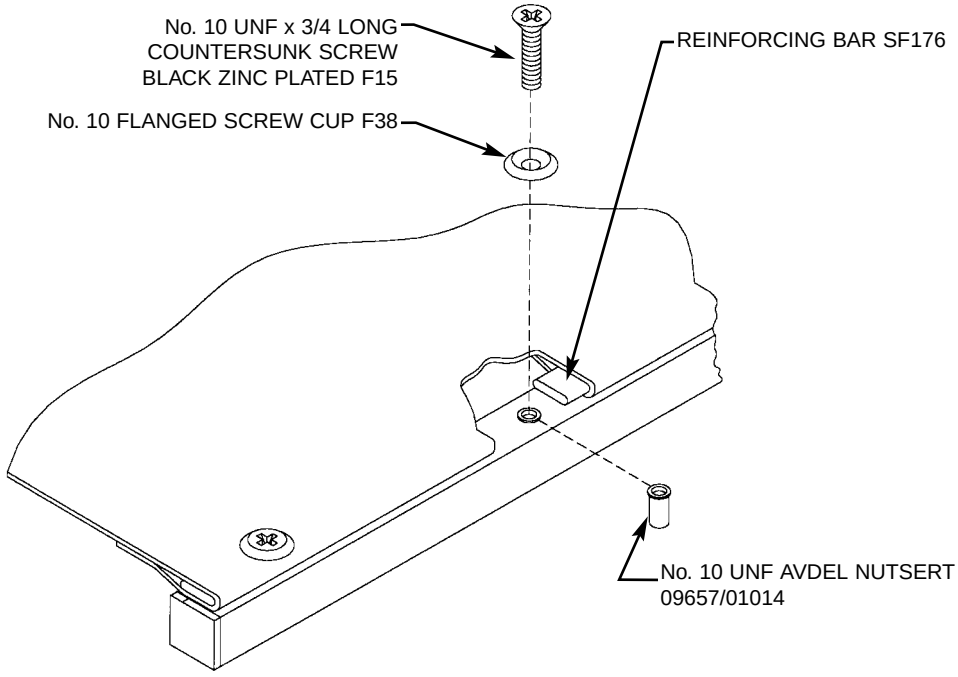
Check Velcro attachment tabs are present and secure.

Check Velcro on frame is present and secure.

6.4 Fabric Removal

If the Nutserts need replacement, use Avdel recommended tooling.

6.5 Fabric Fitting



Slide reinforcing bar into stitched section on each side of the seat fabric only.

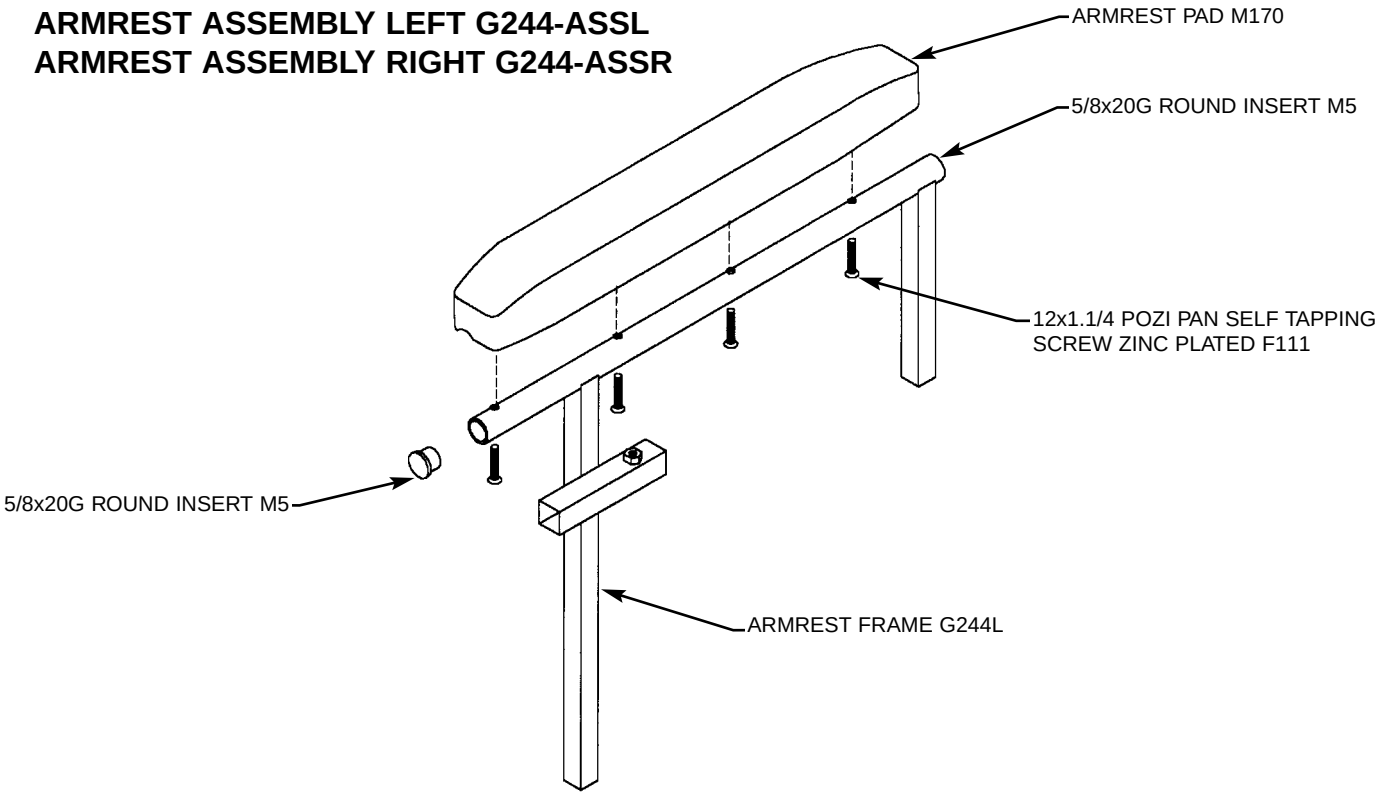
Fit countersunk screws through flanged cups and fit through holes in fabric and reinforcing bars.

Place fabric on seat and backrest tubes and tighten screws taking care not to exert excessive force to flatten the flange cup or cut into the fabric.

SECTION 7: ARMRESTS

7.1 Diagram

ARMREST ASSEMBLY LEFT G244-ASSL
ARMREST ASSEMBLY RIGHT G244-ASSR



7.2 Parts Lists

		GZF No	RJ No
Armrest Frame	Left	632	G244L
Armrest Frame	Right	631	G244R
Armrest Pad		119	M170
No. 12 x 1 1/4 Pozi Pan Self Tapper Screw Zinc Plated			F111
5/8 x 20G Black Round Insert			M5

7.3 Inspection

Check armpad for excess wear or damage.
Check armpad is secured to frame.
Ensure armrest ocates in srear bracket on push handle when fitted to powerchair.
Check armrest lock latch assembly retains armrest to frame assembly.

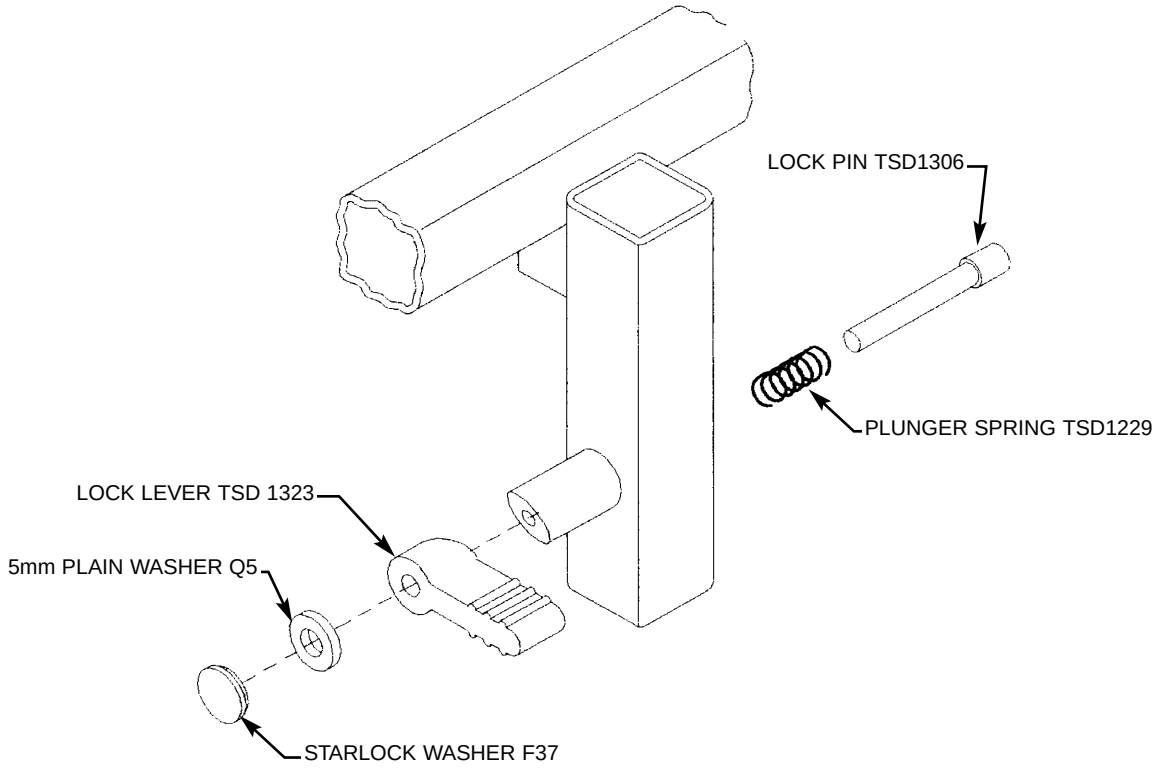
7.4 Armrest Pad

The armrest pad is secured to the armrest frame with three screws. Removal of the screws releases the pad. Secure the pad with the attachment screws to refit.

7.5 Armrest Lock Assembly

To dismantle the assembly, place a screwdriver or similar tool between the starlock washer (F37) and the lock lever (TSD 1323) and prise apart. Remove the starlock washer, plain washer (Q5) and the lock lever.
Withdraw the lock pin (TSD 1306) and plunger spring (TSD 1229) from the pin housing in the armrest location tube.

To assemble, place the plunger spring (TSD 1229) over the lock pin (TSD 1306) and locate in the pin housing inside the armest location tube.
Pull the lock pin (TSD 1306) through the pin housing using a small pair of pliers and place a length of tube in the armest location tube or reverse the armrest in the location tube. This will retain the lock pin inside the pin housing.
Fit the lock lever (TSD 1323) and plain washer (Q5) over the lock pin and press a new starlock washer (F37) onto the end of the lock pin. Thumb pressure should be sufficient to fit the starlock washer or alternatively tap with a light hammer.

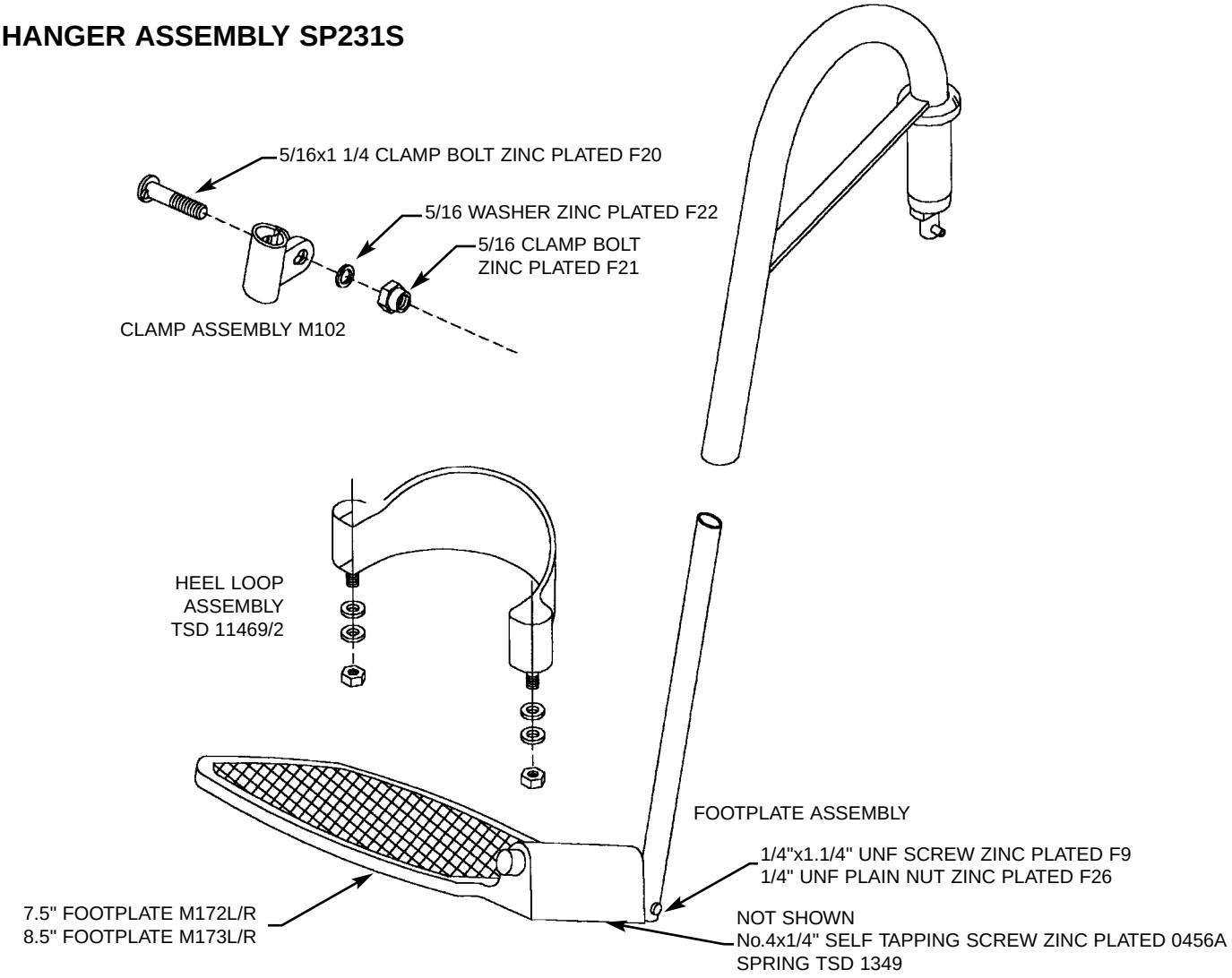


	RJ No
Starlock Washer	F37
5mm Plain Washer	Q5
Lock Lever	TSD1323
Plunger Spring	TSD1229
Lock Pin	TSD1306

SECTION 8: FOOTREST

8.1 Diagram

HANGER ASSEMBLY SP231S



8.2 Parts List

		GZF No	RJ No
Footrest Hanger with retaining	Right	113	SP261S/R
clamp assembly M102	Left	114	SP261S/L
Retaining Clamp Assembly			M102
5/16inch x 1 1/4inch Clamp Bolt, zinc plated			F20
5/16inch Clamp Locking Nut, zinc plated			F21
5/16inch Washer, zinc plated			F22
Footplate Assembly 8 1/2inch, complete	Left	111	SP356
with Stem and Heel Loop	Right	110	SP357
Footplate Assembly 7 1/2inch, complete	Left	111	SP358
with Stem and Heel Loop	Right	110	SP359
Footplate Spring			TSD1349
Heel Loop complete with nuts and washers		112	TSD11469/2
No.4 x 1/4 Pozipan Type Self Tapping			
Screw, zinc plated			0456A

8.3 Inspection

Check that footrest assembly locks into position.
Apply light grease to swivelling end.
Ensure that stem clamp holds footplate in position.
Ensure that footplate will remain in vertical position when required.
Ensure no sharp edges/burrs which could injure user.

8.4 Footrest Removal

Remove the footrest assembly from the powerchair by lifting and rotating the hanger section. Loosen the clamp with a 1/4inch Whitworth spanner and slide the stem assembly out.

8.5 Footrest Fitting

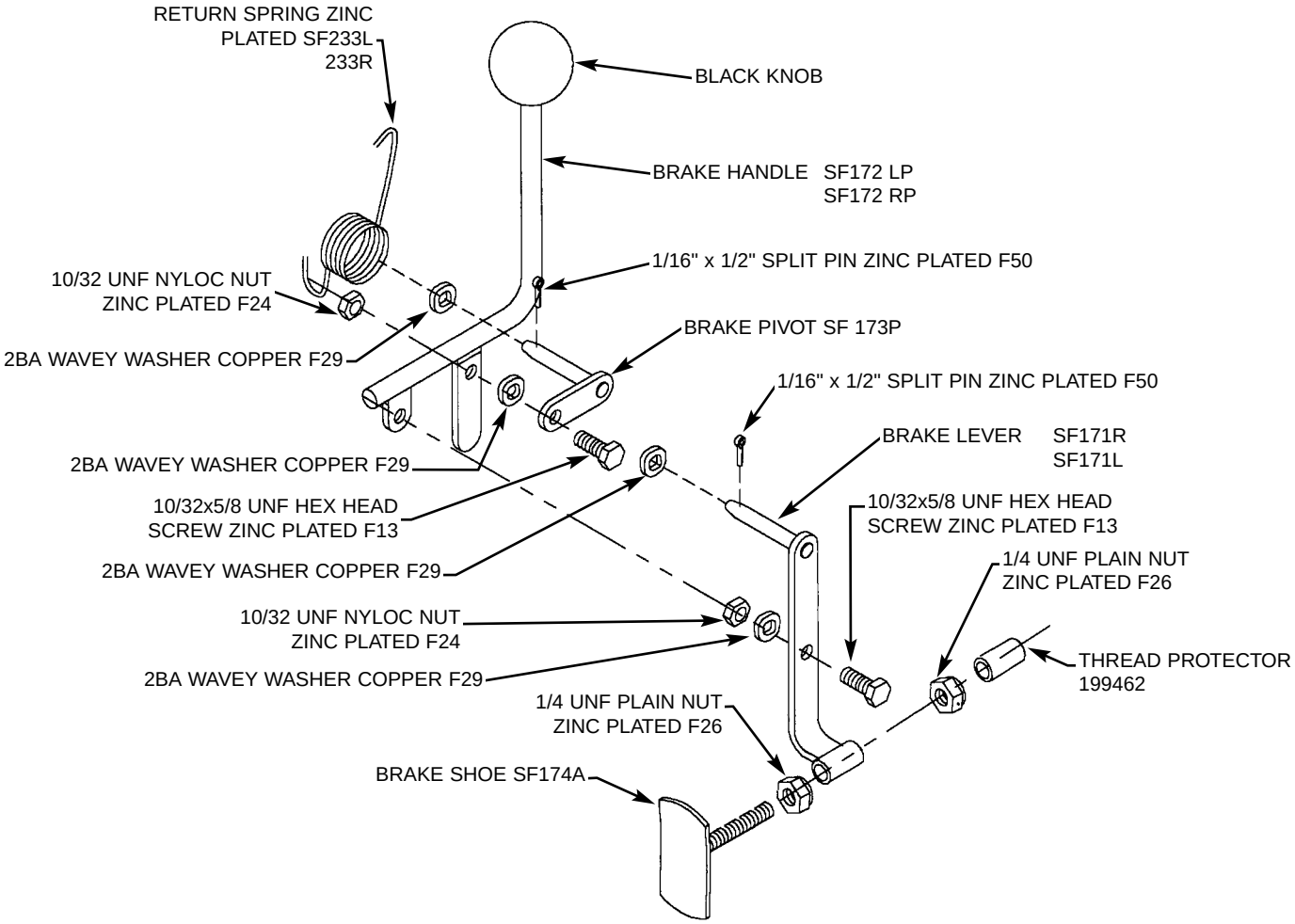
Re-assemble heel loop to footplate and tighten nuts to 10 lbs/ft (13.5Nm). Insert footplate stem into hanger tube and tighten clamp to 35 lbs/ft (47Nm).

The footplate should remain in the vertical position when required. This is maintained by semi-elliptic spring acting between the footplate and the pivot tube. This does not normally require maintenance.

SECTION 9: BRAKES

9.1 Diagram

BRAKE ASSEMBLY 300-19-11



9.2 Parts List

		GZF No	RJ No
Brake Assembly	Left		300-19-11L
Brake Assembly	Right		300-19-11R
Brake Handle	Left		SF172LP
Brake Handle	Right		SF172RP
Black Ball Knob			KB5-125
Brake Pivot			SF173P
Brake Lever	Left		SF171L
Brake Lever	Right		SF171R
Brake Shoe			SF174A
Return Spring Zinc Plated	Left	258	SF233L
Return Spring Zinc Plated	Right	259	SF223R
1/16x1/2 Split Pin Zinc Plated			F50
10/32x5/8 UNF Hex Head Screw Zinc Plated			F13

9.2 Parts List Cont'd

	GZF No	RJ No
1/4 UNF Plain Nut Zinc Plated		F26
2BA Wave Washer Copper		F29
10/32 UNF Nyloc Nut Zinc Plated		F24
Thread Protector		199462

9.3 Inspection

Check ball knob for security.
Check levers for distortion.
Check brazed joints for cracks.
Check pivot shafts for distortion.
Replace pivot bolts if necessary due to excessive wear.
Ensure no oil/grease on brake pad.

9.4 Brake Assembly Removal

Remove the two 1/16inch Split Pins from the Brake Pivot shaft and Brake Lever shaft. Remove the 2BA Wavey Washers and slide the brake assembly from the frame.

9.5 Brake Assembly Fitting

Fit the Brake Pivot and Brake Lever shafts through the bushes on the frame. Fit the 2BA Wavey Washers on each shaft and fit two new Split Pins. Retain the Split Pins in the holes by bending the ends apart using small pliers. Replace with a new Return Spring if necessary.

Ensure pivot bolts are not over tightened as this will lead to fracture of the brazed tabs on the brake handle.
Lubricate with light oil.

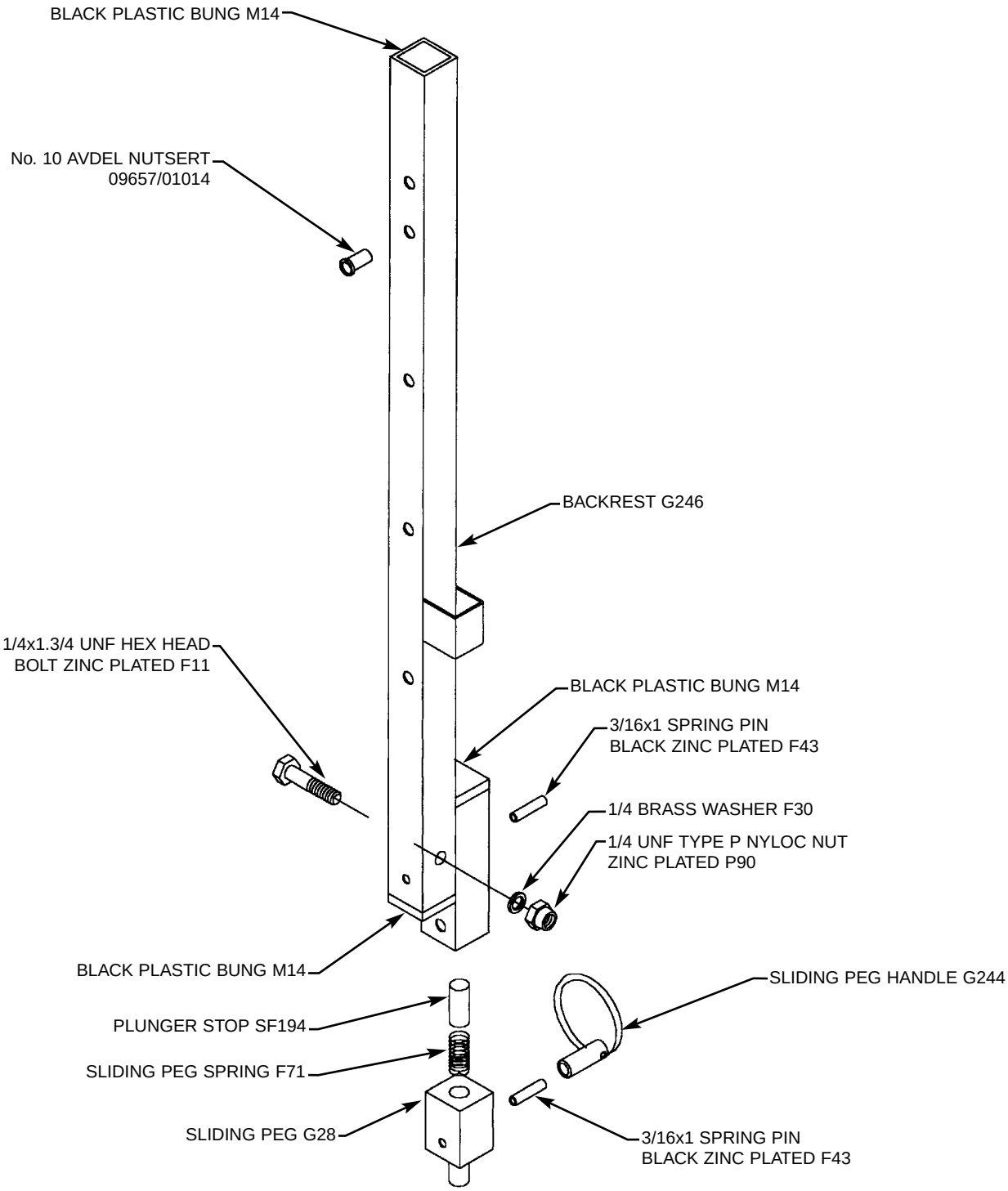
9.6 Brake Adjustment

The Brake Shoe position can be adjusted by loosening the lock nut and repositioning the shoe. The nuts should be adjusted to allow an operating force at the knob to be between 10lbf to 13lbf (44 to 58 N) with the tyres inflated to the correct pressure (50psi/340 KiloPascals).

SECTION 10: BACKRESTS

10.1 Diagram

BACKREST ASSEMBLY LEFT G223
BACKREST ASSEMBLY RIGHT G224



10.2 Parts List

		GZF No	RJ No
Backrest Assembly	Left		G223
Backrest Assembly	Right		G224
Backrest Frame	Left	335/965	G246L
Backrest Frame	Right	336/966	G246R
Sliding Peg			G28
Sliding Peg Handle			G244
Black Plastic Bung			M14
Knurled Plastic Nut			F47
3/16x1 Spring Pin Black Zinc Plated			F43
1/4 Brass Washer			F30
1/4 UNF Type P Nyloc Nut Zinc Plated			P90
Sliding Peg Spring			F71
Plunger stop			SF194
1/4 x 1 3/4 UNF Hex Head Bolt Zinc Plated			F11
No. 10 Avdel Nutsert			09657/01014

10.3 Inspection

Check each backrest for evidence of bending.
Check each backrest for evidence of cracking through nutsert holes.
Check for free movement of the plunger. Lubricate with light oil.
Check that the plunger locates in the hole on the side frame.
Ensure Nyloc nut still grips thread.

10.4 Backrest Removal

Unscrew 5 off No. 10 UNF countersunk screws holding the backrest fabric to the backrest assembly.
Unscrew the 1/4 UNF nut and withdraw the bolt.

10.5 Push Handle Fitting

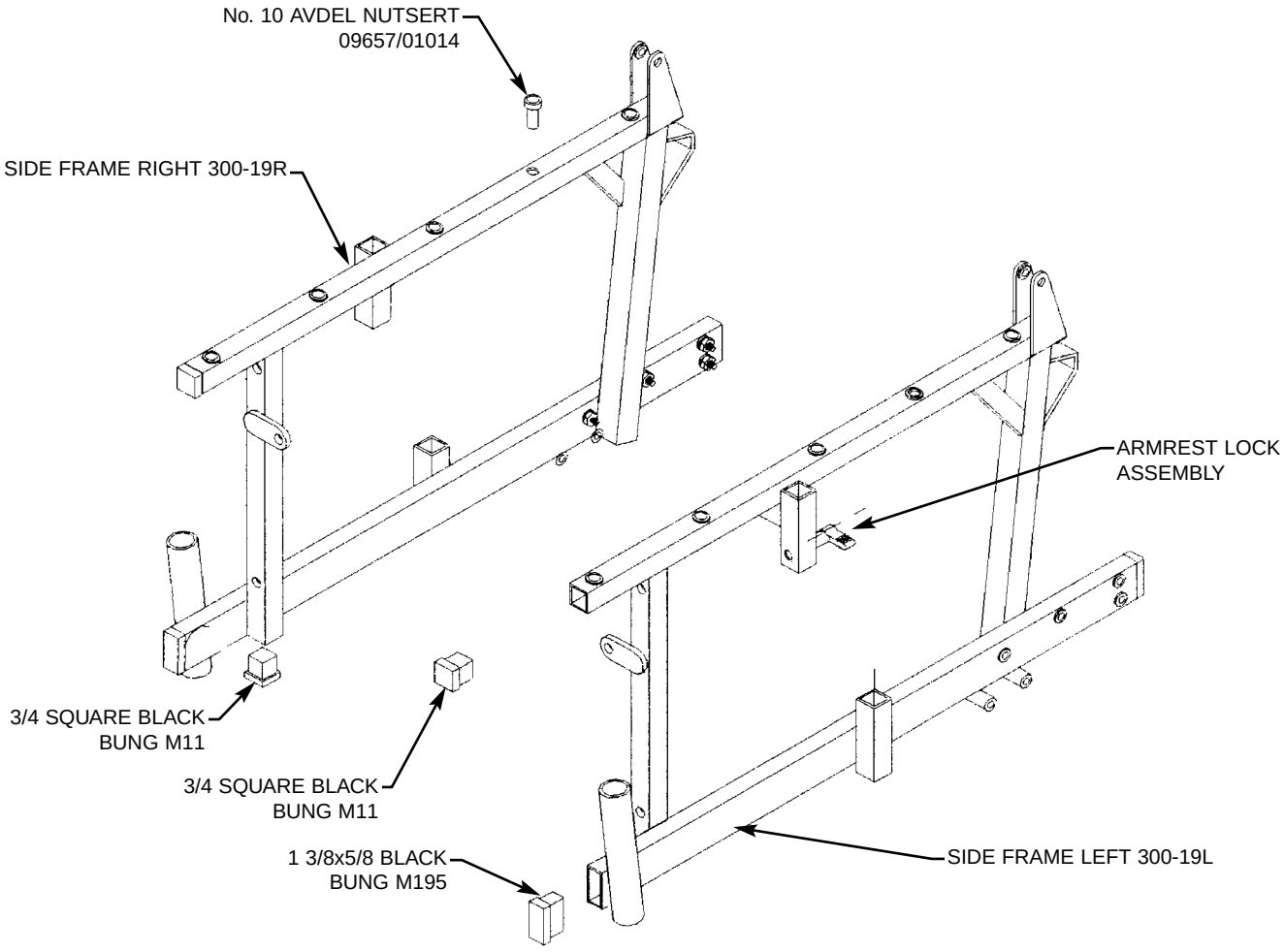
Insert the 1/4 UNF bolt through the backrest and hinge plates. Replace the washer and tighten the Nyloc nut until the backrest pivots freely without excessive free-play.

Fit the 5 off No. 10 UNF countersunk screws to hold the backrest fabric to the backrest assembly.

SECTION 11: FRAME, LOCKING LINKS AND CROSSBRACES

11.1 Diagram

SIDE FRAME ASSEMBLY LEFT 300-19L
SIDE FRAME ASSEMBLY RIGHT 300-19R



11.2 Parts List

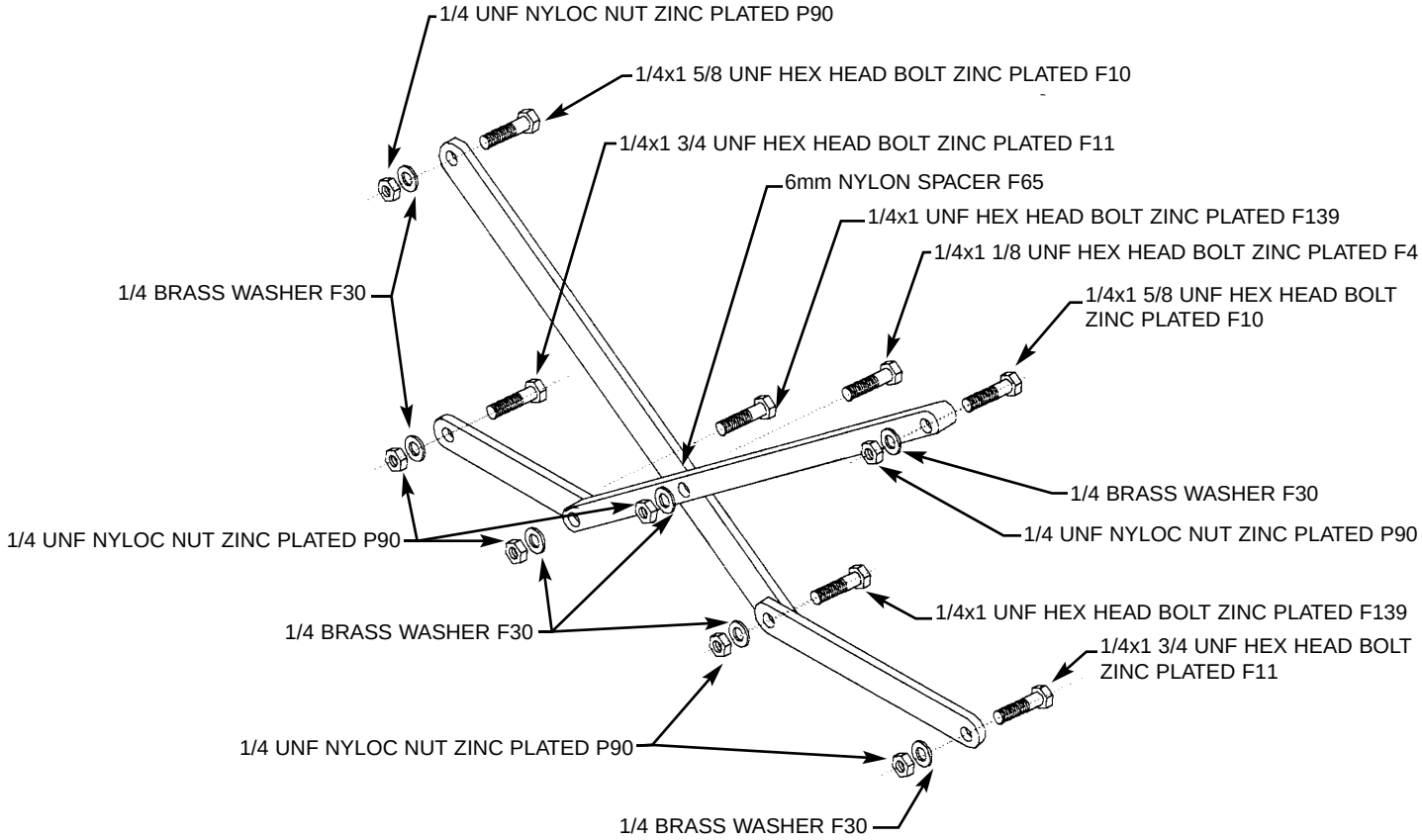
		RJ No
Side Frame Assembly	Left	G1
Side Frame Assembly	Right	G2
3/4 Square Black Plastic Bung		M11
1 3/8x5/8 Black Plastic Bung		M195
No. 10 Avdel Nutsert		09657/01014

11.3 Inspection

Check Armrest Locking assembly operates effectively.
Check each tab on the sideframes for evidence of bending, elongation or worn holes, and cracks in brazing or tubing.
Check tube inserts are fitted correctly.
Examine frame for damage.

11.4 Diagram

CROSS BRACE ASSEMBLY SF 205



11.5 Parts List

	GZF No	RJ No
Cross Brace Assembly 17" Complete with Fasteners	006	SF205
Cross Brace Assembly 15" Complete with Fasteners	007	SF206
1/4 UNF Nyloc Nut		P90
1/4 x 1 5/8 UNF Hex Head Bolt Zinc Plated		F10
1/4 x 1 3/4 UNF Hex Head Bolt Zinc Plated		F11
1/4 Brass Washer		F30
1/4 x 1 UNF Hex Head Bolt Zinc Plated		F139
1/4 x 1 1/8 UNF Hex Head Bolt Zinc Plated		F4
1/4 Plastic Spacer		F65

11.6 Inspection

Check Cross Braces for bending and evidence of cracks around pivot holes.
Check each tab on the side frames for evidence of bending, elongation or worn holes, and cracks in brazing or tubing.
Check securing bolts for excessive wear.

11.7 Cross Brace Assembly Removal

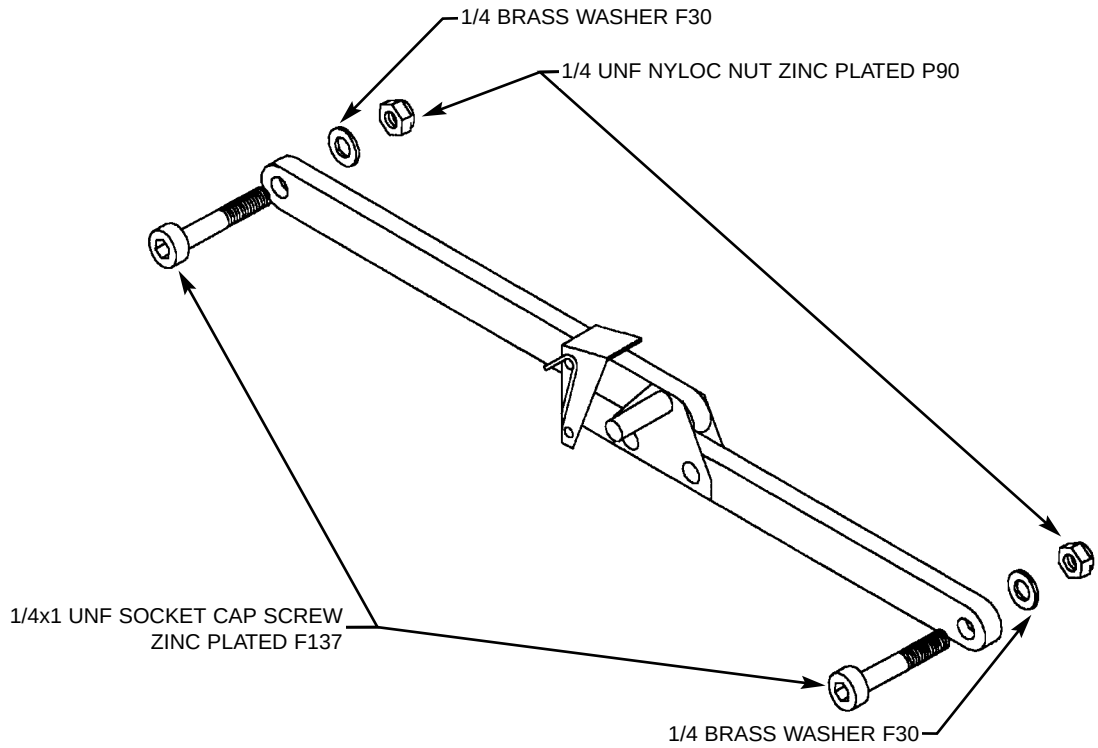
Remove the two 1/4 UNF set screws securing the Cross Braces to each side frame.

11.8 Cross Brace and Locking Link Assembly Fitting

Fit the two 1/4 UNF set screws securing the Cross Braces to each side frame.
Tighten until the Cross Brace is just securely held, then loosen the nut half a turn.

The Cross Brace Assembly must be free to move without binding, but show no signs of excessive free play. Lubricate with light oil, eg 3 in 1. Overtightening of Cross Brace Assembly will prevent the pivoting action and will lead to fracture of the tab on the side frame.

11.9 Diagram



11.9 Parts List

		GZF No	RJ No
Front Locking Link Assembly	17"	109	SF 207F
Front Locking Link Assembly	15"	005	SF 208F
1/4 x 1 UNF Socket Cap Screw Zinc Plated			F137
1/4 UNF Nyloc Nut Zinc Plated			P90
1/4 Brass Washer			F30
6mm Nylon Washer			F86

11.10 Inspection

Check Locking Links for security of thumb catch and correct operation. The locking link should open/close easily and the thumb catch must hold securely in the open position so that the powerchair will not fold under load.

Check each tab on the side frame for evidence of bending, elongation or worn holes, and cracks in the brazing or tubing.

11.12 Locking Link Assembly Removal

Remove the 1/4 UNF Socket Cap Screw securing the Locking Link to each side frame.

11.13 Locking Link Assembly Fitting

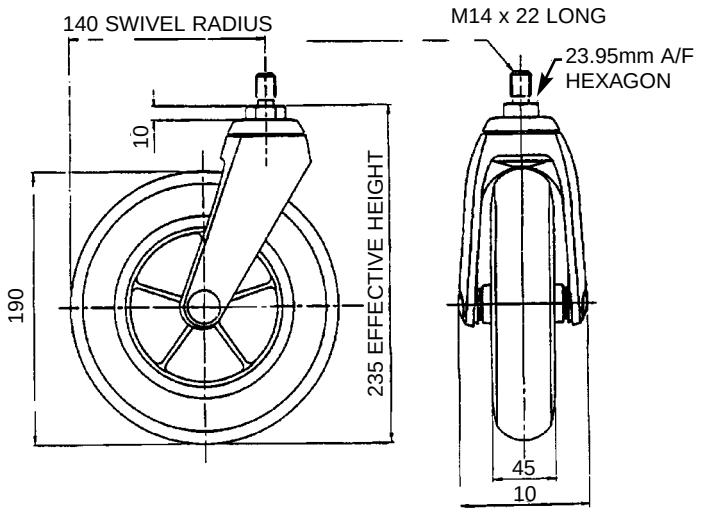
Fit the two 1/4 UNF Socket Cap Screws to secure the Locking Link assembly to each side frame. Tighten until the Locking Link is just securely held, then loosen the nut half a turn.

The Locking Link Assembly must be free to move without binding, but no signs of excessive free play. Lubricate with light oil, eg 3 in 1. Overtightening of Cross Brace Assembly will prevent the pivoting action and will lead to fracture of the tab on the side frame.

SECTION 12: CASTORS

12.1 Diagram

190mm WIDE PROFILE M51



12.2 Parts List

	GZF No	RJ No
190mm wide profile MCP	557	M51

12.3 Inspection

Check for excessive wear in crown bearings and wheel spindle. Replace castor if necessary.
Check for condition of stud which screws into frame.
View frame and check both castor mounting tubes are at the same angle, checking for frame distortion due to impact damage, replace if necessary.
Check tyre security to rim and for splits, cracking or damage.
Check security of castor.

12.4 Castor Removal

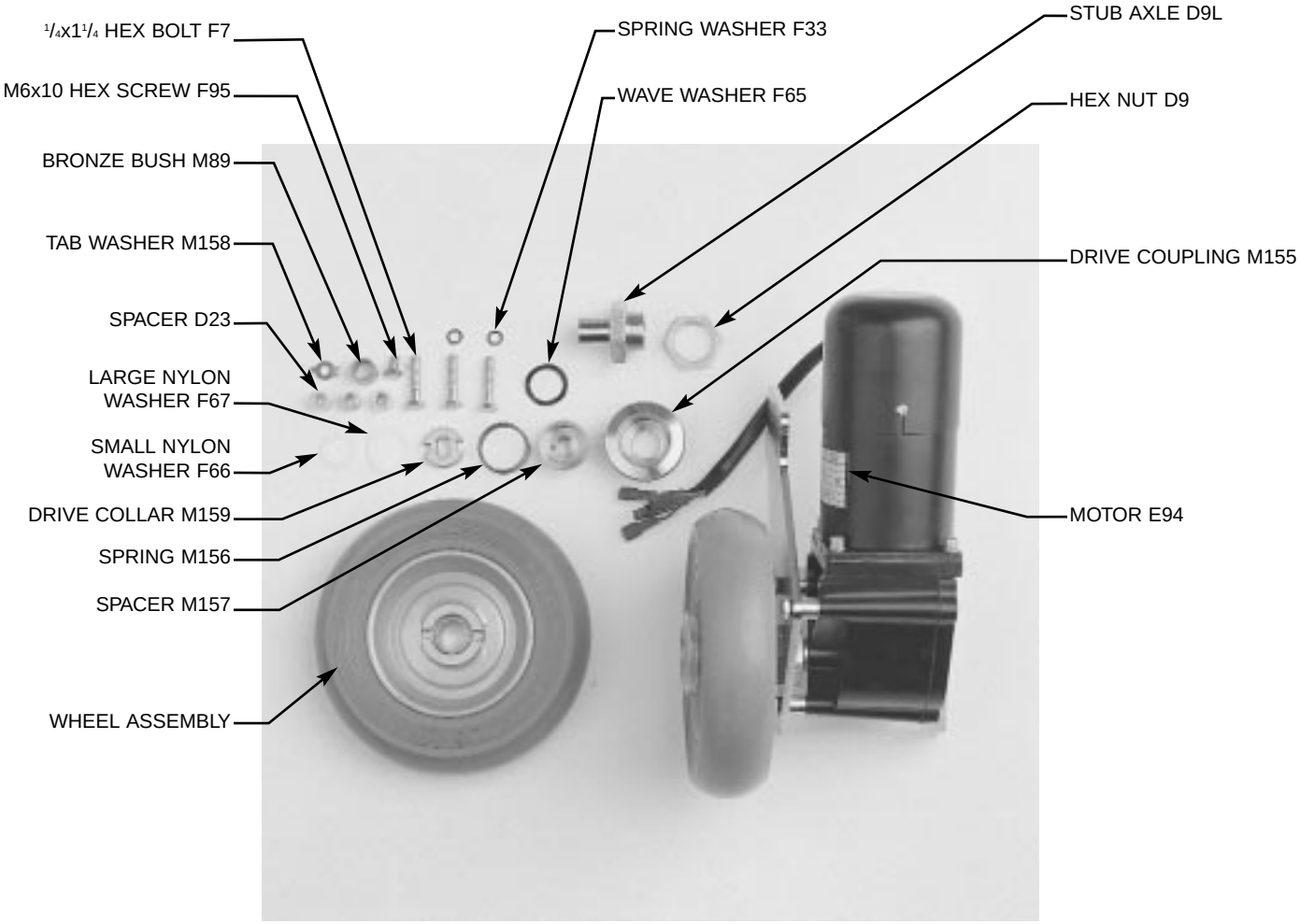
Unscrew the hexagon at the top of the castor swivel, using a 24mm (15/16inch) AF spanner, until the castor is removed.

12.5 Castor Fitting

Apply Loctite thread locking compound Grade 241, or equivalent, to the thread and tighten to 30-35 lbs/ft (40-47 Nm).

SECTION 13: POWER DRIVE SYSTEM

13.1 Diagram



13.2 Parts List

		GZF No	RJ No
Motor & Gearbox	Left	624	E95L
Motor & Gearbox	Right	623	E95R
Motor Brush Replacement (Not Shown)			
Wheel Assembly			G297/ASS
Stub Axle			D9L
Hex Nut		314	D9
Drive Coupling		958	M155
Spring		959	M156
Bronze Bush		320	M89
Drive Collar		962	M159
Spacer		960	M157
Nylon Washer (Large)			F67
Nylon Washer (Small)			F66
1/4 x 1 1/4 UNF Hex Head Bolt Zinc Plated			F7
			M74

Tab Washer	M158
M6x10 Hex Head Screw Zinc Plated	F95
10mm Spacer	D23
1/4 Spring Washer	F33
Wavey Washer	F65
Clamp Bolt	F20
Clamp Washer	F22
Clamp Nut	F21
Knob	

13.3 Inspection

The motor/gearbox/wheel assembly is mounted securely to the motor, which should be securely attached to the side frame.

Check the tyre for excessive wear and the wheel for signs of damage.

Check for rim-rock which will indicate worn bearings and/or stub axle. Maximum allowable is 5mm total.

Check for end-float which will indicate worn thrust washers. Maximum allowable is 3mm.

Check that the free-wheel mechanism engages and dis-engages freely and that the drive dogs do not have rounded corners.

Check the drive securing bolt in the end of the drive shaft is tight and the tab washer is bent up for security.

Check the motor loom for damage and that the plug wiring is secure.

Check for unusual noises such as whining or rubbing which might indicate that the solenoid brake is touching the cowl.

Move the joystick around the quadrant and check that when released it self-centres and the brakes operate.
An audible click will be heard from each motor when the brakes are applied and released.

Raise the rear of the powerchair and support on suitable stands. Engage the drive mechanism and move the joystick around the quadrant to simulate forward, reverse and turning. Observe the wheel rotation to ensure it mirrors joystick movement and check for any wheel/tyre distortion.

13.4 Power System Removal

If it is required to remove the complete drive assembly as one unit the following procedure applies.
Support the rear of the powerchair on suitable stands and disconnect the motor wiring loom from the main loom. Using 7/16 AF spanners release the four nuts/bolts which attach the mounting plate to the side frame. Withdraw the bolts and remove the assembly.

13.5 Power System Replacement

Replacement is a straightforward reversal of the above procedure. The attachment nuts and bnolts should be renewed and tightened to a torque of 35 lbs/ft (47Nm).

13.6 Motor Brake Removal

IMPORTANT

Investigate warranty status before proceeding. Failure to do so may invalidate your warranty. Motor and gearbox maintenance is limited to complete assembly replacement except replacing motor brakes and brushes. Check Brake and Motor functions operate correctly after any maintenance when completed.

Remove the motor cowl by releasing the two self-tapping screws and lifting off the motor cowl, being careful to feed the loom through the grommet so that no force is applied to the wiring.
Disconnect the motor plug and brake wires and cut off the crimped spade connectors. From inside the cowl pull the two brake wires through from the motor loom sheath. Using Allen key remove the two securing bolts on the top of the brake assembly. The brake asembly can now be removed.

13.7 Motor Brake Removal

The brake is not serviceable so a new one must be fitted. Place on top of the motor and secure with Allen bolts after applying small quantity of thread locking compound. Torque to 10lbs/ft (13.5Nm). Feed the two brake wires through the grommet in the cowl alongside the motor loom and refit the cowl. Cut off the brake wires to the required length and fit new spade connectors. Tape the brake wires to the outside of the motor loom to give complete protection. Reconnect the motor to the main loom and test.

13.8 Motor Brush Removal & Replacement

Disconnect the motor loom from the main loom, release the two self-tapping screws which hold the motor cowl and slide the motor cowl along the motor loom, taking care not to apply any force to the wiring.

The brushes are located vertically either side of the brake assembly. They are joined together by a wire and by gently pulling this will release the brushes.

To replace, press gently into the slots and position wire so that it is not in contact with the brake assembly. Refit the motor cowl taking care not to trap any wiring. Re-connect the motor loom and test.

On some later model powerchairs cartridge brushes are fitted which require no dismantling. These are accessed from the outside of the motor and are removed by unscrewing the caps situated below the rim of the motor cowl.

13.9 Drive Coupling Removal and Replacement

If it is only necessary to remove part of the drive assembly the following procedure applies. Support the rear of the powerchair on suitable stands and disconnect the motor wiring loom from the main loom. Bend the tab washer (M158) away from the bolt head and using a 10mm spanner remove the drive securing bolt (F95). This is made easier if the drive is engaged.
The drive components can now be withdrawn from the motor drive shaft and care should be taken not to lose any parts.
Examine the components for damage or wear as indicated from the previous checks. If the wheel bushes need replacing these can be removed by the use of a soft drift and hammer. Replacement of wheel bushes requires the use of a press to prevent burring the edges of the bushes.

If it is necessary to replace the stub axle (D9L) the motor will require removal from the mounting plate. Using a 7/16 AF spanner release the three retaining bolts and withdraw, being careful not to lose the spacers. The motor can now be removed by sliding the drive shaft out of the stub axle. Using spanners 34mm AF and 35mm AF remove the stub axle. Replace the stub axle (D9L), apply thread locking compound and tighten to 35 lbs/ft (47Nm) torque. Refit the motor to the mounting plate, insert spacers and tighten bolts to 10 lbs/ft (13.5Nm) torque.

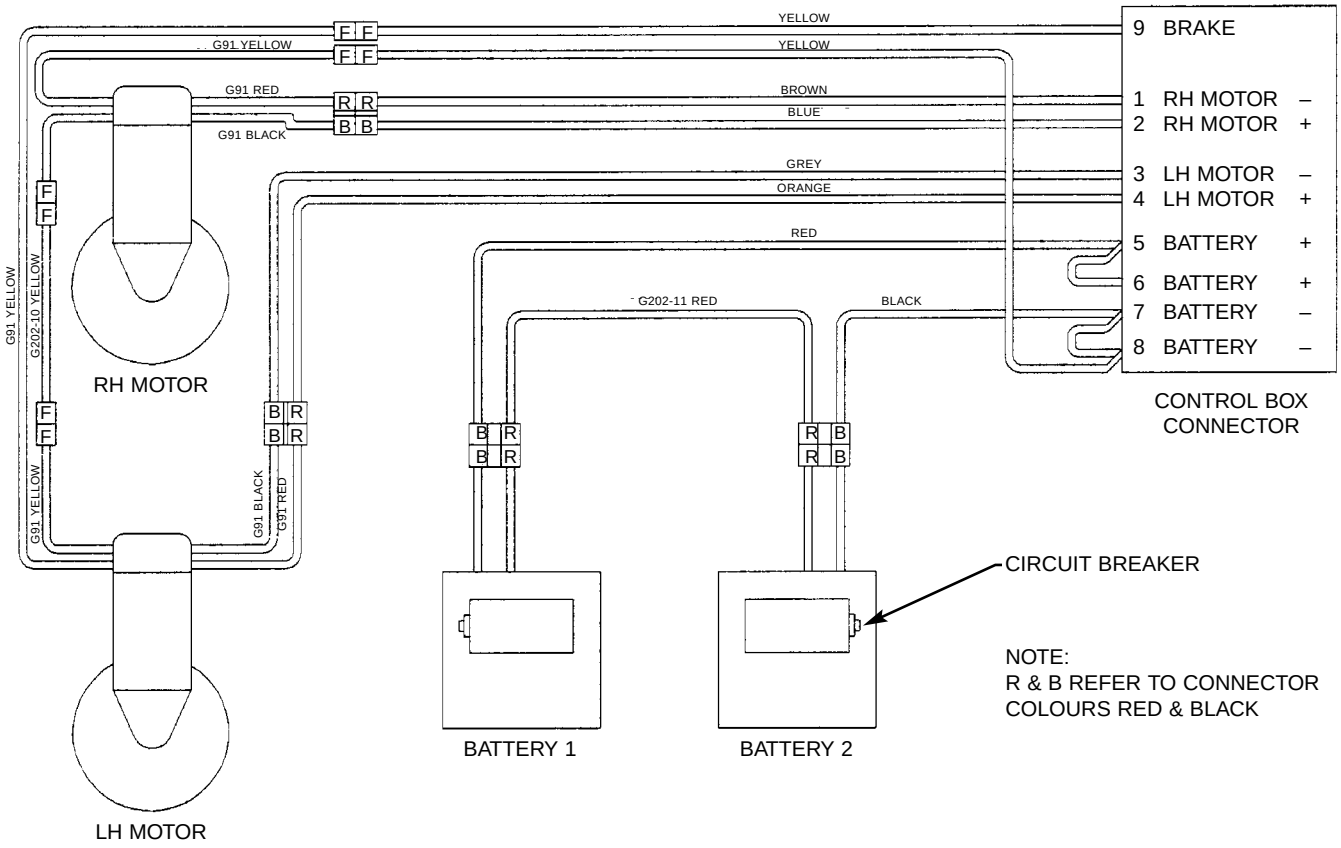
Re-assemble the thrust washers, metal wavy (F65) first, plain nylon second. Fit the wheel and small plain nylon washer. Fit the drive collar (M159), cup washer (M157), spring (M156) and drive dog (M155). Use a new tab washer (M158) and bolt (F95). Apply threadloc compound (Grade 66) to the bolt threads and tighten 10 lbs/ft (13.5Nm) torque. Finally bend the tabs up ensuring that they are in contact with the bolt head.

IMPORTANT

Motor and gearbox maintenance is limited to complete assembly replacement except replacing motor brakes and brushes.

SECTION 14: ELECTRICAL SYSTEM

14.1 Diagram



14.2 Parts List

		GZF No	RJ No
Main Wiring Loom			G202
Battery Loom			201/18
Motor Assembly	Left	624	E94LL
Motor Assembly	Right	623	E94R
30 Amp/Hr Battery		620	E75/30amp/hr
Circuit Breaker			

14.3 Electerical System Inspection

A full function test of the powerchair should be carried out to determine any major faults which will be indicated by flashing lights on the controller. By reference to Section 15 the fault may be diagnosed.

Check the condition of the main wiring loom for damage. Check the beau plug connector which should be tight fitting so that it is not easily dislodged in use.

Check the plugs connecting the main loom to the motor and battery looms should be examined to ensure that the wiring is secure with no evidence of chafing or damage. The contacts inside the plugs should be inspected for prominence to ensure good contact is made.

A stall-test should be performed to check that the circuit breakers function correctly. Place the powerchair with the castor wheels against a solid object and ensuring the drive wheels do not spin, push the joystick forward. After a short period the power to the motors will be cut by the operation of the circuit breakers.

Reset the circuit breakers by pushing in the buttons which are found on the battery boxes.

14.4 Wiring Loom Removal and Replacement

Disconnect the beau-plug from the rear of the controller. Disconnect the motor and battery loom plugs from the main loom and withdraw the main loom.

To replace, feed the main loom underneath the seat from the same side as the controller. Connect the motor and battery loom plugs to the main loom and re-connect the beau plug to the controller. The application of petroleum grease to the contacts will assist in assembly and offer protection against moisture.

14.5 Battery Loom Removal and Replacement

There are two distinct looms fitted depending on which battery box is being worked upon. When viewed from the rear of the powerchair the front battery box has a loom with one grey plug, the rear battery box has a loom with two plugs - one grey and one black.

Remove the rear battery box from the powerchair and remove the lid. The connections to the battery terminals should be removed and then pull off the connections to the circuit breaker.

Re-fitment is a reversal of the above. Note that the grey plug is positioned to the front and the black plug exits from the rear.

Remove the front battery box from the powerchair and remove the lid. The connections to the battery terminals should be removed and then pull off the connections to the circuit breaker.

Re-fitment is a reversal of the above. Note that the grey plug exits from the rear of the lid.

14.6 Circuit Breaker Removal and Refitment

Follow the above procedure for removal of the battery wiring looms. When the wiring loom has been pulled off the circuit breaker it can be removed from the battery box lid. Grasp the circuit breaker with one hand and with a pair of pliers grip the serrated nut on the outside and release.
Re-fitment is a reversal of the above.

14.7 Batteries and Battery Charging

The batteries and battery charger require no maintenance but a check for function should be carried out.

14.7.1 Battery Inspection

Remove the batteries from the powerchair and from their containers. It should be noted if the battery connections are tight.
Examine the batteries for any damage. **Beware** : acid-gel may leak from a damaged battery which is highly corrosive. Any contamination should be washed off immediately with copious amounts of clean water. Seek medical advice if any irritation persists.
The battery condition should be checked. Ideally this should be done using specialised equipment such as a discharge tester. However this may take several hours as the battery will be left in a discharged state and will require re-charging.
At the least a 'drop-test' should be performed using a simple car battery load tester. This measures internal resistance and it is known that the internal resistance of a battery increases as the battery ages and performance decreases.
This type of test doeso not provide an assurance that the battery is fully capable of delivering its rated active energy and is dependent on the experience of the test engineer. All testing should be performed on fully charged batteries and the test engineer should satisfy himself that this is so.

14.7.2 Battery Replacement

If the batteries are deemed fit for further use they may be re-fitted to the powerchair. Replace in their containers and smear the terminals with petroleum grease. Ensure the connections are tight and the battery wiring looms are undamaged. Refit to the powerchair.

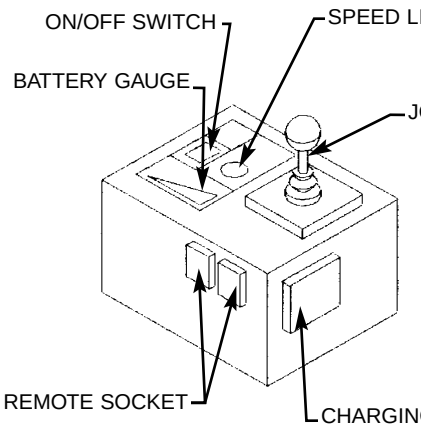
14.7.3 Battery Charger Inspection

<u>The charger is maintenance free but a check for function should be made.</u>
Check for damage to the charger and to the mains and charging cables. Ensure the ventilation slots are clear.
Connect the charger to the powerchair and then to the mains. Switch on the mains and the yellow light should light up immediately, followed shortly afterwards by the orange 'charging' indicator. The yellow 'bulk charge complete' light will illuminate between 4 and 11 hours after commencement of charging, depending on the state of discharge of the batteries. The green 'charging complete' will illuminate between 8 and 14 hours after commencement of charging, depending on the state of disdcharge of the batteries.
Full operating and use instructions are given in the battery charger's User Manual supplied with the powerchair.

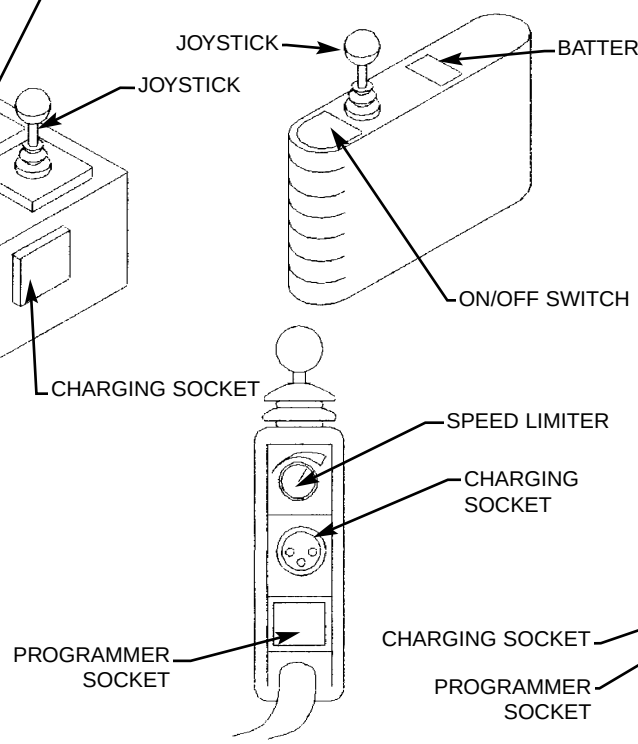
SECTION 15: PROGRAMMABLE CONTROLLER

15.1 Diagram

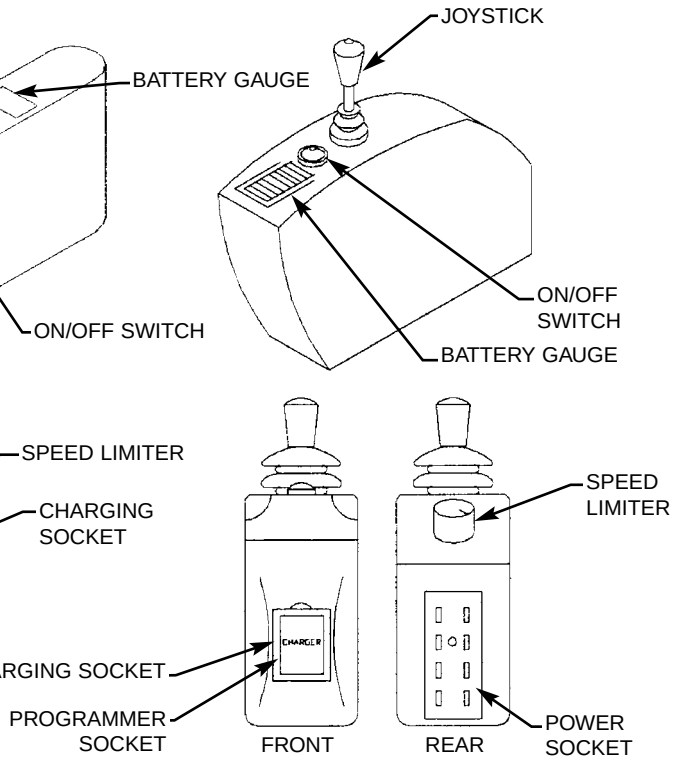
CONTROL DYNAMICS DX SYSTEM



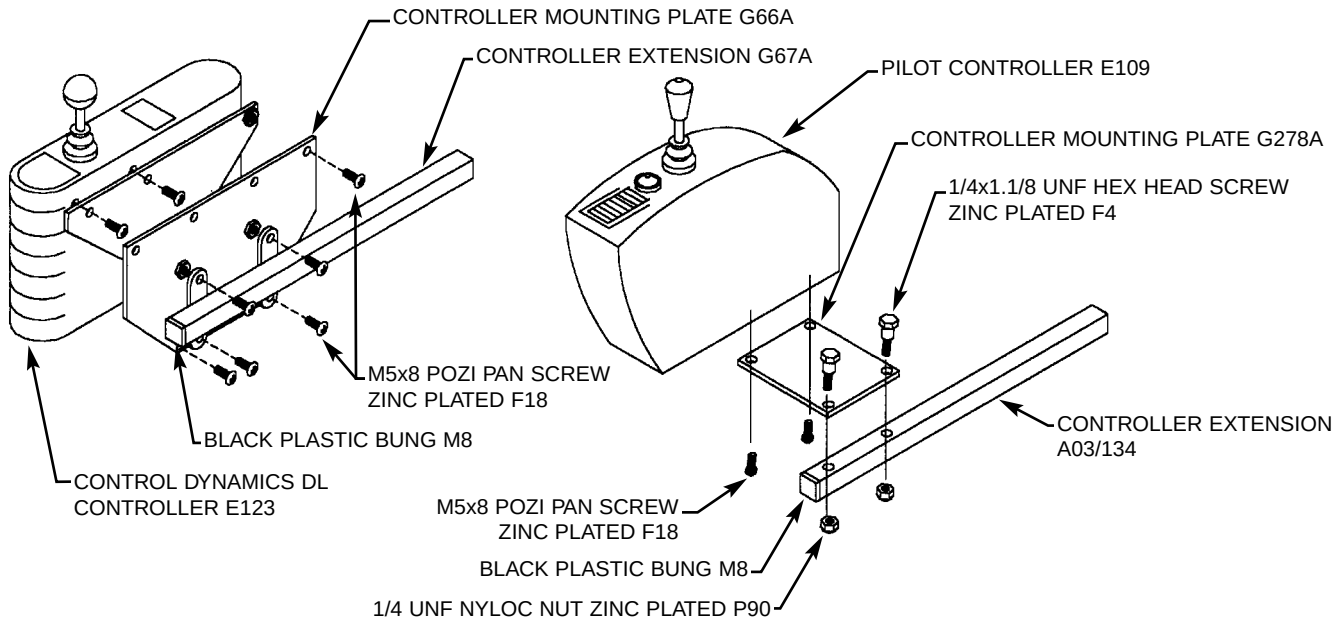
CONTROL DYNAMICS DL CONTROLLER



PENNY & GILES PILOT CONTROLLER



CONTROLLER MOUNTING



15.2 Parts List

	GZF No	RJ No
Penny & Giles Pilot Controller		
Controller Extension		A03/134
Controller Mounting Plate		G278A
P&G Pilot Controller	621	E108
1X1 1/8 UNF Hex. HD Screw Zinc Plated		F4
1/4 UNF Nyloc Nut Zinc Plated		P90
M5x8 Pozipan Screw Zinc Plated		F18
Black Plastic Bung		M8
Control Dynamics DL Controller		
Controller Extension		G67A
Controller Mounting Plate		G66A
Control Dynamics DL Controller		E123
M5x8 Pozipan Screw Zinc Plated		F18
Black Plastic Bung		M8

15.3 Inspection

Check the M5 Pozipan screws are tight and hold the controller securely to the Controller Extension.
Check the condition of the Black Plastic Bungs.

15.4 Programmable Controller Removal

Penny & Giles Pilot Controller

Remove the two M5x8 Pozipan screws which secure the Controller to the Controller mounting plate.

Release the two 1/4 UNF Nyloc nuts from the underside of the Controller Extension and remove the 1/4 x 1 1/8 UNF Bolt holding the Controller Mounting Plate.

Control Dynamic DL Controller

Remove the four M5x8 Pozipan Screws which secure the Controller to the Controller Extension.

Release the four M5x8 Pozipan Screws which secure the Controller to the Controller Mounting Plate.

15.5 Programmable Controller Replacement

Follow 15.3 in reverse.

15.6 Inspection

Each controller acts as a diagnostic system and if a fault is detected the battery gauge will flash to a pre-determined sequence.

Control Dynamic DL Controller

The three colour illuminated display onthe top surface of the DL Controller acts as both a fuel gauge and a warning gauge. When all lights are on the batteries are fully charged. As the power is used the green lights and then amber lights will go out. When only the red lights are left on the batteries will require recharging. If a fault is detected the illuminated display will flash. To determine the fault count the number of flashes and refer to the following table:

1	Low battery	You may need to charge your batteries
2	High battery	Possible charger fault
3	Left Motor	There may be a fault or a loose connection
4	Right Motor	There may be a fault or a loose connection
5	Left or Right Park Brake	There may be a fault or a loose connection
6	Controller fault	Please contact Customer Services -
7	Motor stalled or joystick out of neutral/time out	Switch the controller off then back on again

Control Dynamic DX System

The three colour illuminated display on the top surface of the DL Controller acts as both a fuel gauge and a warning gauge. When all lights are on the batteries are fully charged. As the power is used the green lights and then amber lights will go out. When only the red lights are left on the batteries will require recharging. If a fault is detected the illuminated display will flash. To determine the fault count the number of flashes and refer to the following table:

1	Limp Mode	Turn the controller off & then on again
2	Accessory Fault	Possible remote joystick fault
3	Left Motor	There may be a fault or a loose connection
4	Right Motor	There may be a fault or a loose connection
5	Left Park Brake	There may be a fault or a loose connection
6	Right Park Brake	There may be a fault or a loose connection
7	Low Battery	You may need to charge your batteries
8	Over Voltage	Check the battery circuit for loose connection
9,10	Limp Mode	Turn the controller off & then on again
11	Motor stalled or joystick out of neutral/time out	Switch the controller off then back on again
12	Module Mismatch	Check the compatibility of modules

Pilot Controller

The battery gauge is a 10 segment illuminated display which indicates if the controller is turned on and also gives the status of the battery, the controller and the powerchair electrical system.

Red, Yellow and Green bars lit	Battery charger; controller and electrical system OK
Red and Yellow bars lit	Charge battery if possible; controller and electrical system OK
Red bars only lit	Charge batteries AS SOON AS POSSIBLE; controller and electrical system OK
Rapid flashing of bars	Indicates a fault in the controller or electrical system. See table below for fault diagnosis.
Ripple up and down of bars	Joystick displaced at turn on

Fault Type		**Description**
The number of flashing bars indicate the possible area of fault.	GREEN	High battery voltage
	GREEN	Solenoid brake faulty
	GREEN	Possible controller fault
	YELLOW	Possible joystick fault
	YELLOW	Charger connected
	YELLOW	Right motor wiring fault
	YELLOW	Right motor disconnected
	RED	Left motor wiring fault
	RED	Left motor disconnected
	RED	Low battery voltage

General

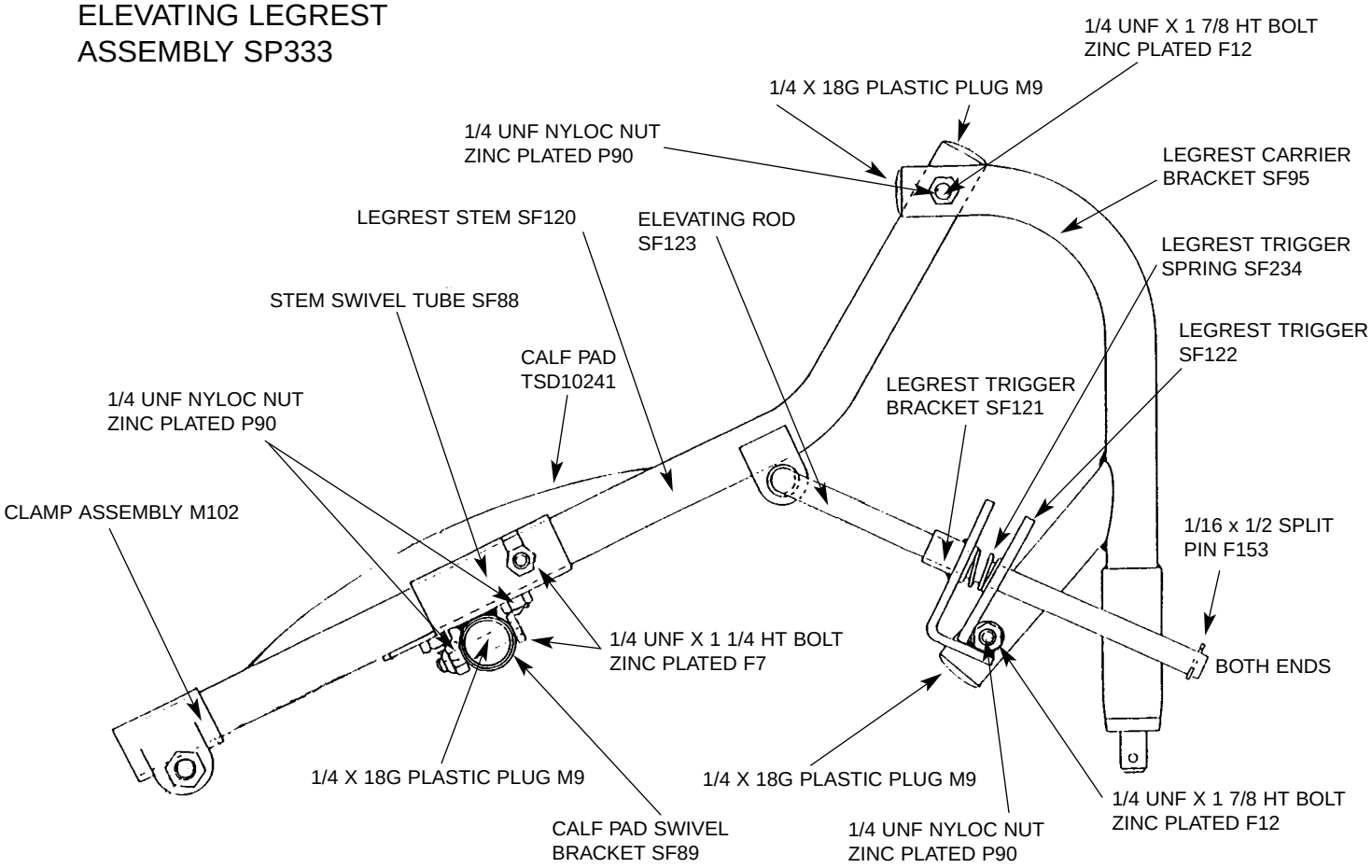
Check that the insulation of the connecting cables is in good condition and that the connectors are fully mated.

Check to ensure the control system is securely mounted.

SECTION 16: ELEVATING LEGREST

16.1 Diagram

ELEVATING LEGREST
ASSEMBLY SP333



16.2 Parts List

		GZF No	RJ No
Legrest Assembly Complete	- Left		SP333L
	- Right		SP333R
Legrest Trigger Spring			SP234
Elevating Rod			SF123
Legrest Trigger			SF122
Legrest Trigger Bracket			SF121
Legrest Stem, Left or Right			SF120
Legrest Carrier Bracket, Left or Right			SF95
Calf Pad Swivel Bracket			SF89
Stem Swivel Tube, Left or Right			SF88
Calf Pad MCP			TSD10241
Clamp Assembly			M102
1/4 UNF Nyloc Nut, zinc plated			P90
1/4 UNF x 1 7/8 HT Bolt, zinc plated			F12
1/4 UNF x 1 1/4 HT Bolt, zinc plated			F7
1/16 x 1/2 Split Pin			F153
1/4 x 18G Plastic Plug			M9

16.3 Inspection

Check heel loop for security. Nuts should be tightened to 10 lbs/ft (13 Nm).
Check pivot bolt for wear.
Check calf pad for wear/damage.
Check adjustment rod for bending.
Check footplate maintains set position.

16.4 Elevating Legrest Removal

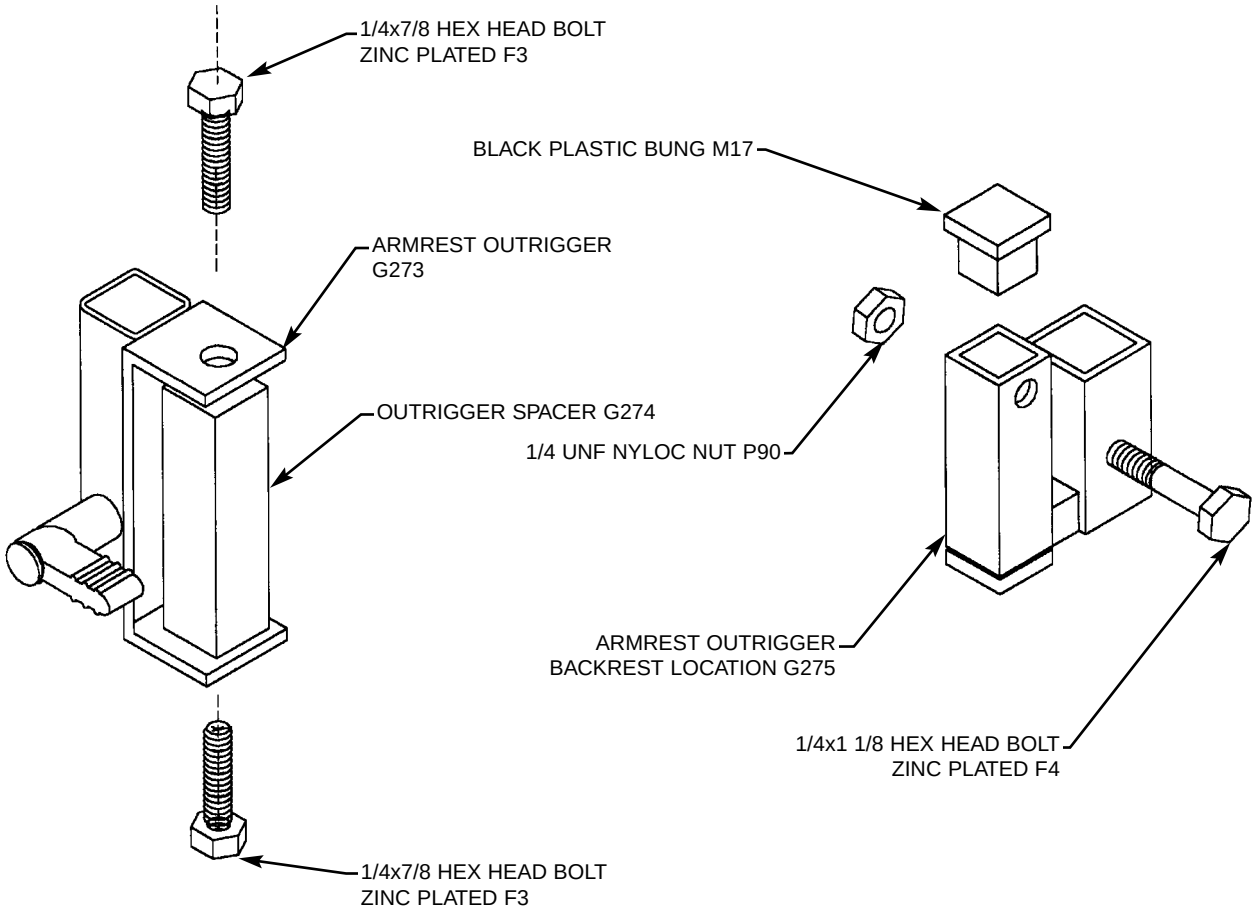
Remove the footrest assembly from the powerchair by lifting and rotating the hanger section.
Release stem clamp and withdraw footplate and stem.
Release nuts securing calf pad and remove.
Release pivot bolt and separate elevating section from swivelling section.
Remove rubber end cap from adjustment rod, and holding trigger withdraw rod.

16.5 Elevating Legrest Fitting

Assemble elevating section to swivelling section. Use new pivot bolt, if necessary.
Slide adjustment rod through bracket and trigger ensuring spring is positioned to force trigger forward. Replace rubber end cap.
Assemble calf pad to bracket. Tighten nuts to 10 lbs/ft (13 Nm).
Insert footplate stem into tube and tighten clamp to 35 lbs/ft (47 Nm).
Apply light grease to swivelling end and insert into castor tube.
Ensure no grease/oil on adjustment rod or it will cause slippage.

SECTION 17: ARMREST OUTRIGGERS

17.1 Diagram



17.2 Parts List

	GZF No	RJ No
Armrest Outrigger Socket Assembly - Left		G273/ASS/L
Armrest Outrigger Socket Assembly - Right		G273/ASS/R
Armrest Outrigger Rear Location Assembly		G275/ASS
Armrest Outrigger Socket		G273
Armrest Outrigger Backrest location		G275
Outrigger Spacer		G274
1/4 x 7/8 UNF Hex Head Bolt Zinc Plated		F3
1/4 x 1 1/8 UNF Hex Head Bolt Zinc Plated		F4
1/4 UNF Nyloc Nut Zinc Plated		P90
7/8 Black Plastic Bung		M17

17.3 Inspection

Check for damage to sockets.
Ensure spacers are fitted.
Check screw threads are not stripped particularly on backrest bracket.
Ensure armrests locate in backrest bracket when fitted to powerchair. Check for bending of armrest tube at insertion point.

17.4 Dismantling

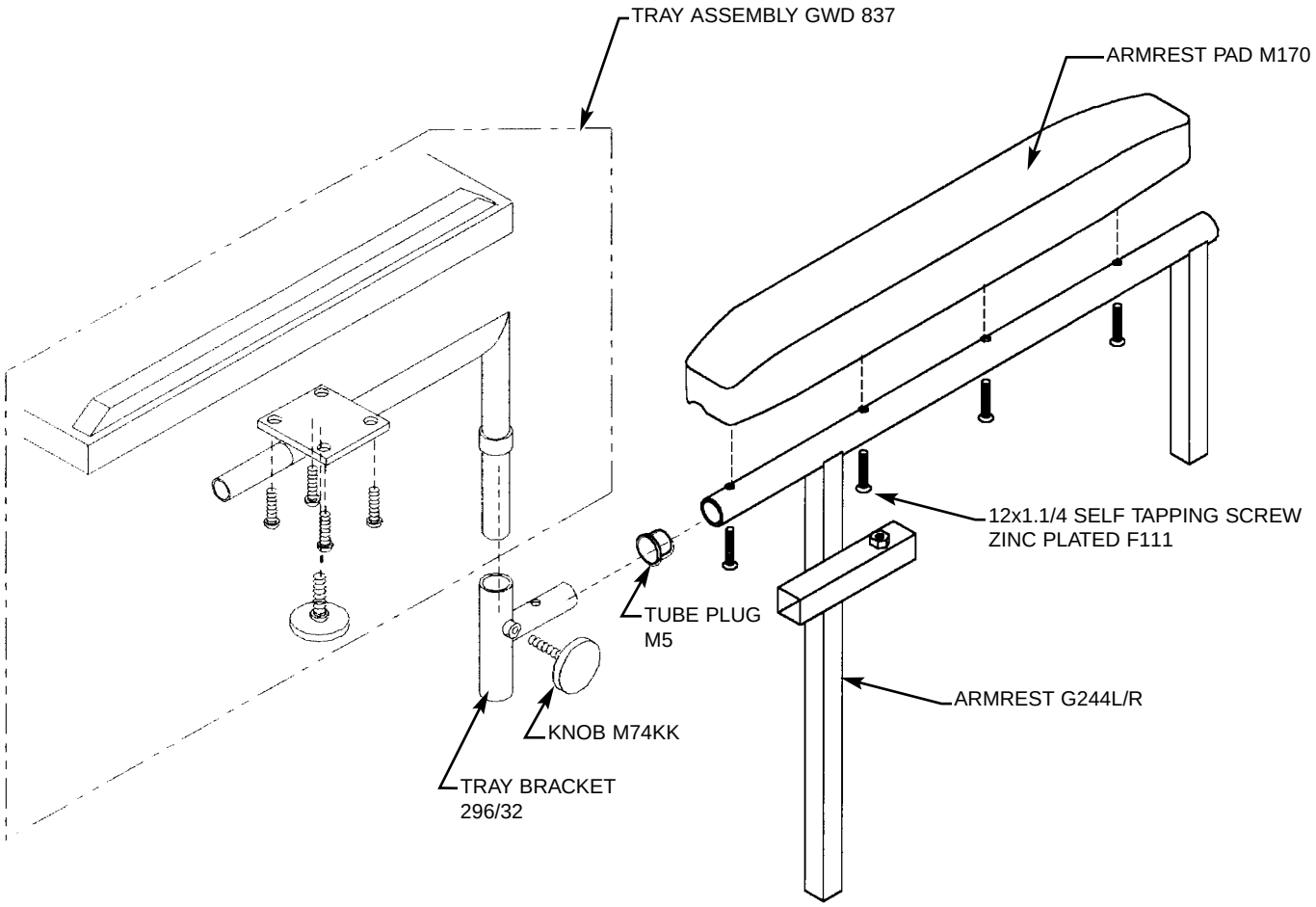
Release nuts securing sockets to side frame and remove.
Slide sockets away from frame and remove spacers.
Release extension bracket from backrest.

17.5 Fitting

Replace spacers in side frame sockets.
Slide outrigger sockets into position and insert bolts.
Tighten nuts to 10 lbs/ft (13 Nm).
Hook rear bracket over backrest loop and tighten screw to 3 lbs/ft (4 Nm).

SECTION 18: DETACHABLE TRAY

18.1 Diagram



18.2 Parts List

		GZF No	RJ No
Tray Bracket	- Left		296/32/L
	- Right		SF316R
Tray		837	
Tray Bracket		838	

18.3 Inspection

Check for damage to the tray, particularly for wooden splinters.
Check security of attachment screw 'B' and check tray attachment screws for security.
Check all adjustment knobs are present, undamaged and hold tray at the required position.

18.4 Assembly

Remove plastic bung 'A'. Remove screw 'B'.
Insert 3/4 inch diameter tube item 'C' over end of armrest tube. Line up holes in item 'C' with screw hole in armrest tube. Insert screw 'B' and retighten.
Insert the tubular mounting stems complete with stem brackets supplied with the tray, into the armrest stem assembly with the horizontal extensions of the mounting stems projecting forward.
Place the tray symmetrically on the stem brackets, ensuring that the flat plates are located between the two guide strips on the under-side of the tray.
Mark through the screw holes in the stem brackets.
Remove the tray and brackets from the powerchair and secure brackets to tray with screws supplied.
Refit tray assembly to the powerchair. Screw the two loose knurled knobs supplied with the tray assembly, into nuts welded to the armrest stem assembly item 'C'.
Adjust tray position and tighten the four knobs.

AMENDMENT RECORD

ISSUE	SECTION	DATE AMENDED	COMMENTS