

Leyland Cars



Fault Diagnosis Manual

Electrical

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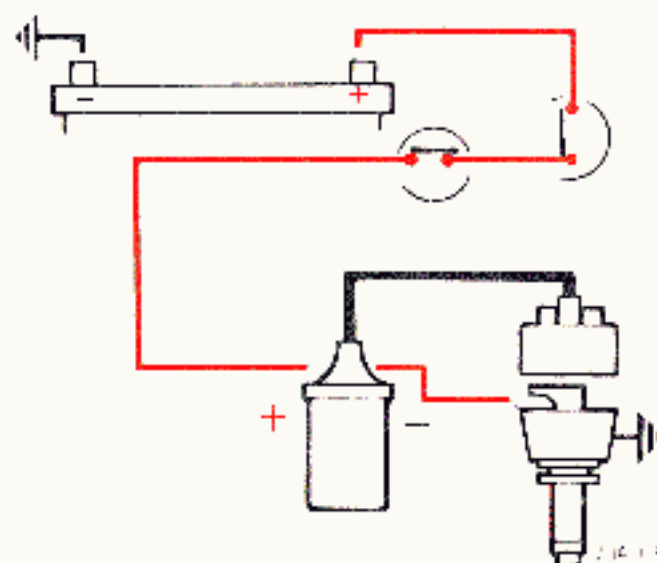
Electrical

CHARGING SYSTEM

Fault	Check	Test	Rectification																				
Battery will not hold charge	1, 2, 3, 4	1. Charging circuit: Check continuity of leads, tightness and cleanliness of connections	Clean, renew as necessary																				
		Battery Service Topping-up: Use distilled or deionised water. Battery additives should never be used. Charging: A slow charge at normal rate is more beneficial than at a fast rate. Condition: If after charging, battery voltage is below 9V, renew the battery.																					
		2. Check battery charge: Using a hydrometer, check the specific gravity in each battery cell. Note: Readings should not be taken if the battery has only just been topped up. It should be charged for 1–2 hours before taking any readings.																					
			<table><tr><th></th><th>Climates normally below 25°C (77°F)</th><th>Climates normally above 25°C (77°F)</th><th></th><th></th></tr><tr><td>(i)</td><td>1.260 – 1.280</td><td>1.210 – 1.230</td><td>Battery fully charged</td><td>Carry out Test 3</td></tr><tr><td>(ii)</td><td>1.230 – 1.250</td><td>1.170 – 1.190</td><td>Battery 70% charged</td><td>Carry out Test 3</td></tr><tr><td>(iii)</td><td>1.110 – 1.130</td><td>1.050 – 1.070</td><td>Battery discharged</td><td>Charge battery and recheck or renew</td></tr></table>		Climates normally below 25°C (77°F)	Climates normally above 25°C (77°F)			(i)	1.260 – 1.280	1.210 – 1.230	Battery fully charged	Carry out Test 3	(ii)	1.230 – 1.250	1.170 – 1.190	Battery 70% charged	Carry out Test 3	(iii)	1.110 – 1.130	1.050 – 1.070	Battery discharged	Charge battery and recheck or renew
			Climates normally below 25°C (77°F)	Climates normally above 25°C (77°F)																			
		(i)	1.260 – 1.280	1.210 – 1.230	Battery fully charged	Carry out Test 3																	
		(ii)	1.230 – 1.250	1.170 – 1.190	Battery 70% charged	Carry out Test 3																	
		(iii)	1.110 – 1.130	1.050 – 1.070	Battery discharged	Charge battery and recheck or renew																	
		(iv) A variation of 0.040 between cells indicates a suspect battery		Renew battery																			
		For every 10°C (18°F) subtract 0.007. For every 10°C (18°F) above 15°C (60°F) add 0.007.																					
3. Heavy voltage discharge check: Using heavy discharge test equipment, set the tester to discharge the battery at three times the Ah capacity (20 hour rate) for 15 seconds.																							
(i) Voltage reading more than 9.6V – Battery satisfactory																							
(ii) Voltage reading less than 9.6V – Battery unsatisfactory		Carry out Test 4																					
4. Intercell voltage check: Charge the battery for three minutes at the stated Ah capacity (20 hour rate) or at 40A, whichever is the lowest. With battery still on charge, record overall voltage and the inter cell readings using the cadmium sticks. Subtract the lowest inter cell reading from the highest.																							
(i) Inter cell voltage variation more than 0.15V – Defective battery.		Renew battery.																					
(ii) Battery voltage below 15.5V, inter cell voltage variation less than 0.15V – Battery satisfactory but discharged.		Charge battery																					
(iii) Battery voltage above 15.5V, inter cell voltage variation less than 0.15V – Battery discharged and may be sulphated.		Charge battery and re-test																					

Fault	Check	Test	Rectification
Battery not being charged CAUTION: The vehicle battery must never be disconnected while the engine is running	1, 2, 3, 4, 5	5. Alternator output Connect a voltmeter across the battery terminals. Connect an ammeter into the alternator battery sensing circuit either at the battery terminal or solenoid. Switch on all loads (except wipers) for one minute. Run the engine at 3,000 rev/min and wait until the ammeter reading is stable.	
Warning light stays on	1, 2, 3, 4, 6, 7	(i) Ammeter reading Zero – Faulty alternator	Overhaul alternator
Warning light does not function when ignition switched on	1, 2, 3, 4, 8, 9	(ii) Ammeter reading below 10A, voltmeter reading between 13.6 and 14.6V and battery in low state of charge	Bench test and overhaul
		(iii) Ammeter reading below 10A, voltmeter reading below 13.6V	Renew voltage regulator
		(iv) Ammeter reading above 10A, voltmeter reading above 14.6V	Renew voltage regulator
		6. Drive belt: Check the drive belt is not broken or slipping	Adjust or renew
		7. IND lead: Disconnect the IND lead from the alternator, start engine and run above idle speed.	
		(i) Warning light stays on – Short circuit to earth between IND lead and warning light	Repair or renew
		(ii) Warning light goes out	Carry out Test 5
		8. Warning light bulb: Check warning lamp bulb	
		(i) Bulb faulty	Renew
		(ii) Bulb not faulty	Carry out Test 9
TEST EQUIPMENT Voltmeter 0–20V moving coil Ammeter 5–0–60A moving coil Hydrometer		9. Alternator plug connections: Remove plug from alternator, switch on ignition and connect a voltmeter between earth and each terminal in turn.	
		(i) Voltmeter reads 12V	Carry out Test 5
		(ii) Voltmeter does not read 12V – cable circuits faulty	Check cable continuity; repair or renew

IGNITION SYSTEM

Fault	Check	Test	Rectification
Engine will not fire	1, 2, 3, 4, 5, 6	1. Engine cranking speed: Too low	See STARTING SYSTEM
C.B. Distributors		2. Sparking plugs: Check for dirty electrodes or incorrect gaps and for faulty operation on pressure test equipment	Clean, set gaps or renew. C.B. distributors carry out Test 3, Electronic distributors carry out Test 4
Engine will not fire	1, 2, 3, 4, 7, 8, 9	3. C.B. points: Check for incorrect gap, burning or pitting	Clean, adjust or renew
Electronic distributors		4. Distributor cap: Check for 'tracking' (thin lines of burned bakelite), ensure the cap is clean and dry and that the centre brush moves freely with no excessive side movement and contacts the rotor arm.	Rectify or replace. Carry out Test 5 Electronic distributors carry out Test 7
		5. H.T. Circuit C.B. distributors only:	
			a. Disconnect main H.T. lead from distributor cap hold approximately 6 mm ($\frac{1}{4}$ in) from a good earth, ensure C.B. points are closed, switch on ignition and flick C.B. points open.
			(i) Good healthy spark – Main H.T. lead, condenser and coil satisfactory
			(ii) Poor or no spark
		b. Replace main H.T. lead with a known good H.T. lead and repeat Test 5a	
		(i) Good healthy spark – Original H.T. lead faulty	Renew main H.T. lead. Carry out Test 5e
		(ii) Poor or no spark	Carry out Test 5c
		c. Replace condenser with a known good one and repeat Test 5a	
		(i) Good healthy spark – Original condenser faulty	Renew condenser. Carry out Test 5e
		(ii) Poor or no spark	Carry out Test 5d
		d. Replace ignition coil with a known good coil and repeat Test 5a	
		(i) Good healthy spark – original coil faulty	Renew coil, refit original H.T. lead and condenser and repeat Tests 5a, b, or carry out Test 5e
		e. Hold loose end of main H.T. lead approximately 3mm ($\frac{1}{8}$ in) from the rotor arm electrode. Ensure C.B. points are closed, switch on ignition and flick C.B. points open	
		(i) Good healthy spark – Rotor arm shorting to earth	Renew rotor arm
		(ii) Very faint or no spark – Rotor arm insulation satisfactory	Carry out Test 6

TEST EQUIPMENT

(A) Voltmeter 0–20V moving coil

(B) Voltmeter 0–1V moving coil

Ohmmeter

Fault	Check	Test	Rectification
		6. L.T. circuit continuity check:	
		a. Check battery voltage and state of charge	See STARTING SYSTEM
		b. Connect voltmeter (B) between earth and coil +ve terminal with ignition on and C.B. points closed:	
		(i) Below 0.2V	Carry out Test 6e
		(ii) Above 0.2V – Resistance or open circuit	Carry out Test 6c
		c. Connect voltmeter (B) between earth and distributor L.T. terminal with ignition on and C.B. points closed:	
		(i) Below 0.2V – Resistance or open circuit between coil –ve and distributor L.T. terminal	Renew lead
		(ii) Above 0.2V – Resistance or open circuit between earth and distributor L.T. terminal	Carry out Test 6d
		d. Connect voltmeter (B) as in Test 4C, fit a jumper lead from earth to distributor body, with ignition on and C.B. points closed:	
		(i) Below 0.2V	Remake earth connections between distributor body and earth
		(ii) Above 0.2V – High resistance or open circuit in distributor	Check/repair or renew C.B. points, base plate screws earth lead or supply lead as necessary
		e. Connect voltmeter (A) as in Test 4b, with ignition on and C.B. points open:	
		(i) Above 12V – Continuity in primary windings of coil, supply line and ballast resistor if fitted	Carry out Test 6g
		(ii) Zero – open circuit feed to coil, open circuit primary windings, open circuit ballast resistor if fitted or short circuit in distributor or coil –ve lead	Carry out Test 6f
		f. Connect voltmeter (A) as in Test 4b, with ignition on and C.B. points open. Remove coil –ve lead from coil and recheck voltage:	
		(i) Above 12V – Short circuit in coil, –ve lead or distributor	Check C.B. points correctly fitted, short circuit in condenser (or capacitor when ballast resistor fitted) or supply lead; repair or renew
		(ii) Zero – reconnect coil –ve lead	Carry out Test 6g
		g. Connect voltmeter (A) between earth and coil +ve terminal, with ignition on and C.B. points closed:	
		(i) Above 12V – Coil primary windings open circuit	Renew coil
		(ii) 11.5V–12V without ballast resistor } If result of Test 4f was above 12V 5V–7V with ballast resistor } L.T. circuit is satisfactory	Fault elsewhere

IGNITION SYSTEM

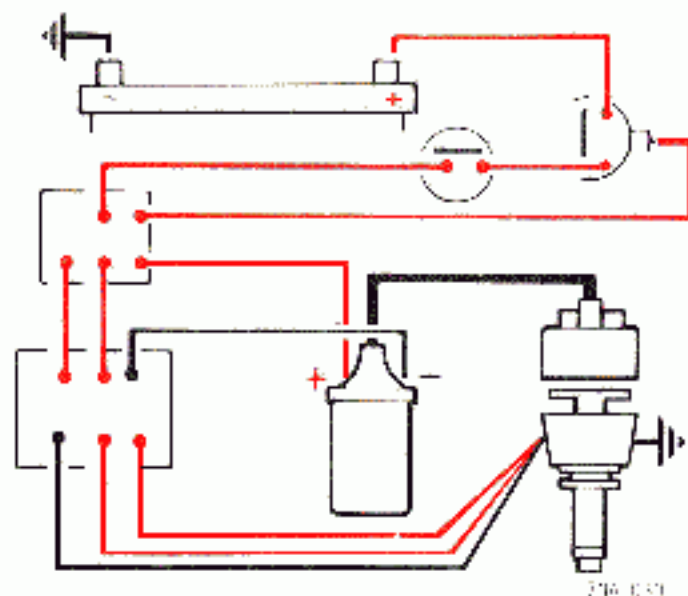
Fault	Check	Test	Rectification
		(iii) Below 11.5V or zero without ballast resistor – Excessive resistance or open circuit supply to coil. Leaving the voltmeter connected to earth, work back through the supply circuit at the terminals on the ignition switch and solenoid until the resistance or open circuit is located	Rectify and recheck
		(iv) Below 5V or zero with ballast resistor – Excessive resistance or open circuit in supply to coil	Carry out Test 6h
		h. Connect voltmeter (A) between earth and the lead from the ballast resistor to the coil +ve terminal, with the ignition on and C.B. points closed:	
		(i) 5V–7V or above 12V – Fault in the ballast resistor to coil lead.	Repair or renew lead then re-test
		(ii) Below 5V or zero – Excessive resistance or open circuit between battery and coil	Carry out Test 6j
		j. Connect voltmeter (A) between earth feed lead to ballast resistor, with ignition on and C.B. points closed:	
		(i) Above 12V – Fault in ballast resistor	Renew and re-test. If satisfactory fault elsewhere
		(ii) Zero or below 11.5V – Fault in supply circuit from battery. Leaving the voltmeter connected to earth, work back through the supply circuit at the terminals on the ignition switch and solenoid until the fault is located.	Rectify and re-test. If satisfactory – fault elsewhere
		7. H.T. Circuit electronic distributor	
		a. Check battery voltage and state of charge	See STARTING SYSTEM
		b. Check H.T. leads are correctly connected	
		(i) Correct	Carry out Test 7c
		(ii) Incorrect	Rectify and recheck
		c. Disconnect main H.T. lead from the distributor cap and position approximately 6mm (¼ in) from a good earth, switch on ignition, disconnect white/blue lead and check for spark each time lead is disconnected.	
		(i) Good healthy spark	Check H.T. leads for fraying, deterioration and security and rotor for deterioration. Rectify or renew then recheck
		(ii) Poor or No spark Main H.T. lead faulty	Renew lead then recheck
		8. Pick-up air gap. Remove the distributor cap, rotor arm and anti-flash shield, ensure the ignition is switched off. Check the air gap is between the tolerance given in the vehicle specification data.	
		(i) Correct	Carry out Test 9
		(ii) Incorrect	Adjust air gap. Recheck

TEST EQUIPMENT

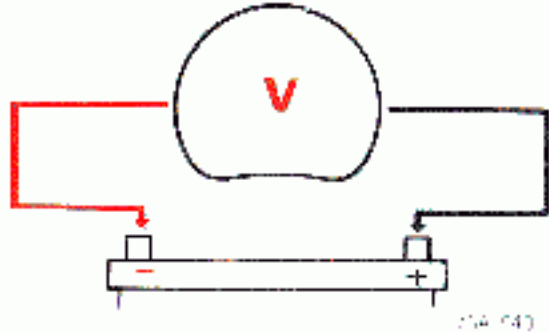
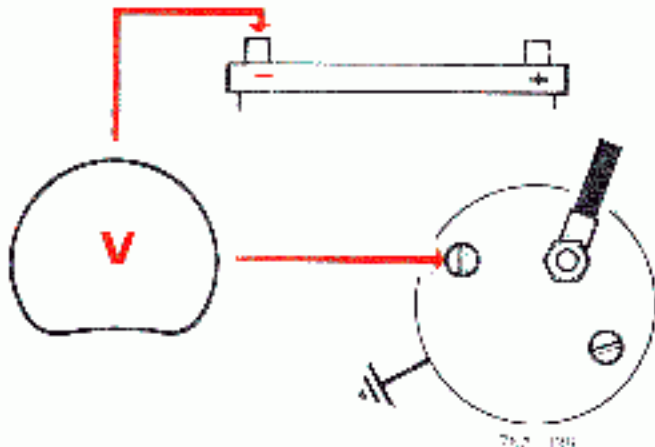
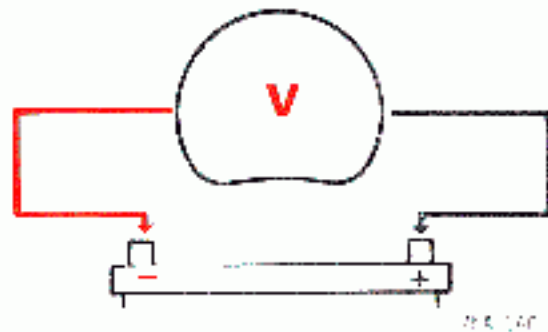
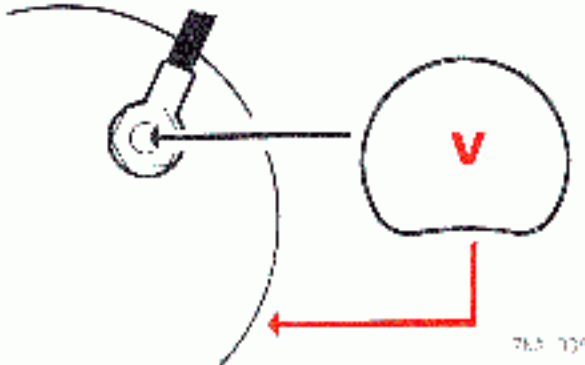
(A) Voltmeter 0–20V moving coil

(B) Voltmeter 0–1V moving coil

Ohmmeter

Fault	Check	Test	Rectification
		9. L.T. Circuit electronic distributor:	
		a. Connect voltmeter (A) to earth and distributor supply lead, switch on ignition	
		(i) Below 11V – check ignition switch, wiring and connections	Rectify or renew and recheck
		(ii) Above 11V	Carry out Test 9b
			Carry out Test 9c
			Carry out Test 9c
			Carry out Test 9c
			Carry out Test 9c
		b. Connect voltmeter (A) to earth and coil +ve terminal, switch on ignition	
		(i) 4–8V	Carry out Test 9c
		(ii) Below 4V and above 8V – Ballast resistor faulty	Renew and recheck
		c. Connect voltmeter (A) to earth and coil –ve terminal, switch on ignition	
		(i) Above 2V	Carry out Test 9d
		(ii) Below 2V	Carry out Test 9c
		d. Switch off ignition, connect ohmmeter (c) across drive resistor and check resistance is between 9–11 ohms	
		(i) Satisfactory	Check distributor body earth; if satisfactory renew distributor
		(ii) Unsatisfactory – faulty drive resistor	Renew. Carry out Test 9f
		e. Connect voltmeter (A) to earth and coil –ve terminal disconnect the white/blue lead to the distributor switch on the ignition	
		(i) Above 9V	Check coil/H.T. by substitution and recheck; if still a fault renew distributor
		(ii) Below 9V – Disconnect coil –ve lead, check voltage at coil –ve terminal if still below 9V	Check coil by substitution; if now more than 9V renew distributor

STARTER SYSTEM

Fault	Check	Test	Rectification
Starter will not operate	1, 2, 3, 4, 5, 6, 7	1. Battery voltage Connect voltmeter between battery terminals: Below 12V	Charge or renew battery
Engine cranking speed low	1, 2, 3, 4, 8, 9, 10		
Engine will not start	1, 2, 3, 4, 9, 10, 11		
Starter operates but crankshaft stationary	8, 9, 10	2. Battery charge Take hydrometer readings: Below 70% charged – 1.230 at 15°C	Charge battery, see CHARGING SYSTEM
		3. Wiring 	a. Check that all connections are clean and tight a. Renew wiring and connectors
		b. Disconnect coil –ve lead. Voltmeter between battery +ve and starter end bracket bolt Operate starter: Above 0.5V	b. Clean and tighten all earth connections, battery, starter engine Tighten starter through bolts Remove starter, clean motor and backplate faces
		4. Battery – on load 	Disconnect coil –ve lead. Voltmeter as Test 1 Operate starter
		a. Below 10V starter or circuit taking too much current	a. Check circuit Overhaul or renew starter
		b. Between 10V to 12V but crankshafts turn slowly	b. Carry out Test 5
		5. Battery voltage at starter – on load 	Disconnect coil –ve lead. Voltmeter starter terminal to earth on motor Operate starter
		a. Above 9.5V – Starter OK	a. Check solenoid Test 8
		b. Below 9.5V	b. Carry out Test 6
		c. Below 9.5V solenoid operating	c. Carry out Test 10

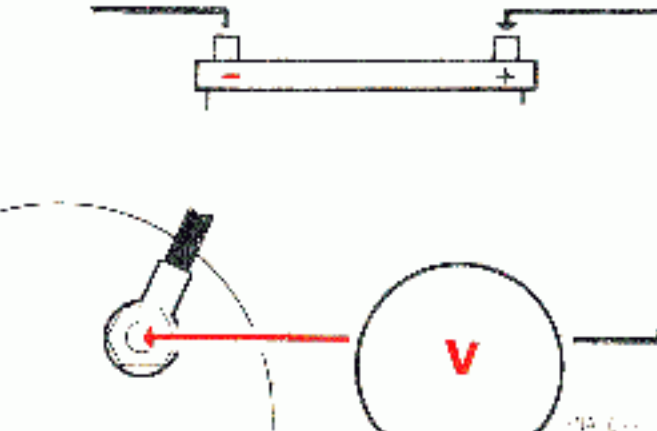

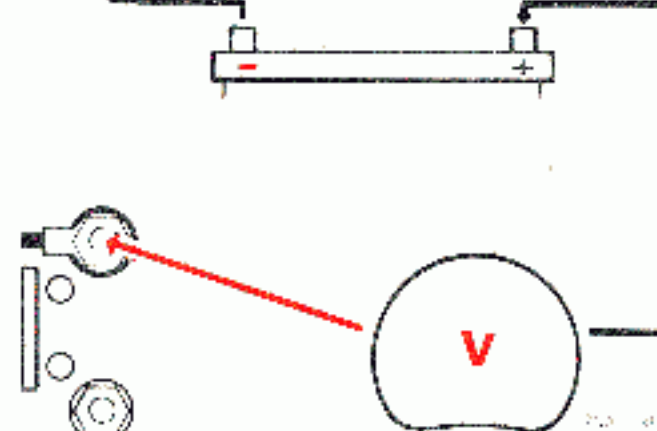
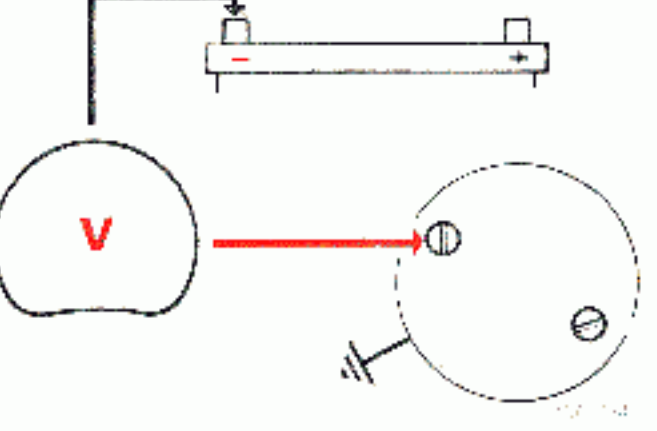
TEST EQUIPMENT

Voltmeter 0–20V moving coil

Ammeter 5–0–60A moving coil

Hydrometer

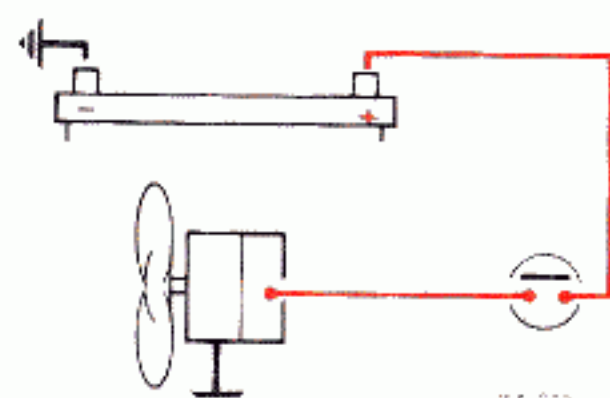
Lock torque clamps and spring balance

Fault	Check	Test	Rectification
		<p>6. Starter voltage — on load</p>  <p>Voltmeter starter terminal to battery +ve. Switch on ignition, battery voltage Disconnect coil -ve lead Operate starter</p> <p>a. Below 0.5V — cable and connections OK</p> <p>b. Above 0.5V — Resistance between battery and starter</p>	<p>a. Carry out Test 8</p> <p>b. Check all connections and cables</p>
		<p>7. Voltage drop across solenoid switch</p>  <p>Voltmeter between starter solenoid terminals. Switch on ignition, battery voltage Disconnect coil -ve lead Operate starter</p> <p>a. Below 0.5V</p> <p>b. Above 0.5V</p>	<p>a. Carry out Test 8</p> <p>b. Faulty switch or connections</p>
		<p>8. Voltage at Solenoid — on load</p>  <p>Disconnect coil -ve lead. Voltmeter between solenoid feed terminal and battery +ve Operate starter</p> <p>a. 9V to 10V — and result of Test 7 was 'b' (below 9V with ballast resistor circuit)</p> <p>b. above 12V — starter does not operate (above 9V with ballast resistor circuit)</p>	<p>a. Change solenoid</p> <p>b. Clean earth, re-test — renew solenoid</p>
		<p>9. Voltage drop in earth line</p>  <p>Disconnect coil -ve lead. Voltmeter between starter through bolt and battery -ve terminal Operate starter: above 0.5V</p>	<p>i. Clean and tighten all earth connections, battery, starter, engine</p> <p>ii. Tighten starter, through bolts</p> <p>iii. Remove starter, clean motor and backplate faces</p>

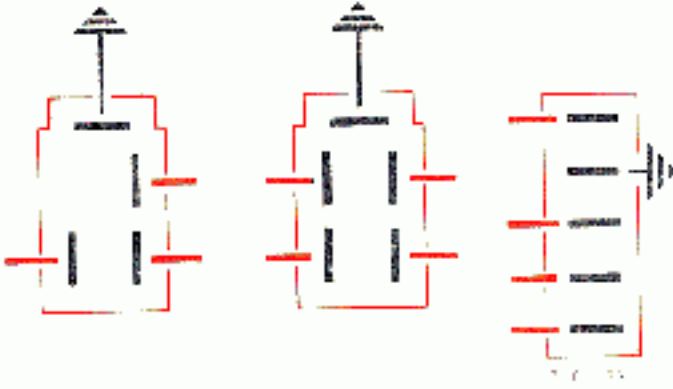
STARTER SYSTEM

Fault	Check	Test	Rectification
		10. Drive faulty	
	a.	Remove starter: check condition of pinion and starter ring gear	a. Renew pinion or ring gear
	b.	Inertia drive, check that pinion rotates freely	b. Renew inertia drive
	c.	Check that crankshaft rotates freely	c. Check for engine fault, tight or seized
	d.	Lock torque, free running speed and current	d. Check brushes overhaul starter
		11. Ignition circuit fault	See IGNITION SYSTEM

COOLING SYSTEM

Fault	Check	Test	Rectification	
Fan does not operate	1, 2, 3, 4	1. Check battery voltage	See STARTING SYSTEM	
		2. Circuit continuity		
			a. Disconnect the leads from the thermostatic switch, connect a voltmeter to the feed wire and earth. Switch on the ignition – If voltmeter zero, lead has short or open circuit	Repair or renew
		b. Connect the two leads from the thermostatic switch together. Disconnect the feed lead from the fan motor, connect a voltmeter to the feed wire and earth. Switch on the ignition – If the voltmeter reading is zero, lead has short or open circuit	Repair or renew	
		3. Thermostatic switch		
		Disconnect the lead from the switch to the fan motor, connect a voltmeter from the switch terminal to earth. Run the engine and check the switch operates before the temperature gauge reaches the red sector. Battery voltage will be registered on the voltmeter when the switch opens. Opening temperature 90° (194°F)	If switch does not operate – renew	
		4. Fan motor		
Remove the fan from the fan motor. Connect the motor to a 13.5V d.c. supply with a moving coil ammeter in series. Check the motor light running speed and light running current				
(i) Light running current below 3A at 13.5V after 60 seconds from cold and light running speed below 3,500 rev/min at 13.5V after 60 seconds from cold	Dirty commutator or faulty brush gear, overhaul motor. See note			
(ii) Light running current 3A (maximum) at 13.5V after 60 seconds from cold and light running speed between 3,500 to 4,000 rev/min after 60 seconds from cold	Fan motor satisfactory			
TEST EQUIPMENT Voltmeter 0–20V moving coil Ammeter 5–0–60A moving coil		NOTE: If after overhauling, current consumption is still high, misalignment of the end cover bearing may be the cause: This can be corrected by applying a series of light blows to the side of the motor end cover only, using a hide or wooden mallet. If this does not correct high current consumption, a faulty armature is indicated	Renew fan motor	

WIPER SYSTEM

Fault	Check	Test	Rectification
Low wiping speed	3, 4	1. Check voltage at wiper plug Disconnect wiring plug from motor, switch on ignition. Connect voltmeter between GREEN terminal and: <div style="display: flex; align-items: center; margin: 10px 0;">  <div style="margin-left: 10px;"> <p>a. Earth, battery voltage</p> <p>b. BLACK terminal, battery voltage</p> <p>c. RED/LIGHT GREEN, switch to wipe (normal speed, two speed wiper)</p> <p>d. BLUE/LIGHT GREEN, switch to fast wipe</p> </div> </div>	a. No voltage; carry out Test 2
Action irregular	1, 3, 4		b. No voltage; check wiring earth
Parking incorrectly	3, 4, 5		c. No voltage; check wiring, switch Voltage – remove and check limit switch
Will not park	1, 3, 5		d. No voltage; check wiring, switch
Delay irregular	6 or 7		
Wiper will not operate	1, 2, 3		
Operates at one speed only	1, 4	2. Check continuity at fuse Check voltage at fuse, switch on ignition: <div style="margin-top: 10px;"> <p>a. Fuse intact</p> <p>b. Fuse blown: renew fuse and disconnect wiring to other units at fuse. Carry out Test 1</p> </div>	a. Check electrical connections b. Fuse intact; wiper motor faulty. Carry out Test 3 Fuse blows, check wiring and switch
		3. Check mechanical loading Connect ammeter in feed line Remove wiper arms, check wiper speed and current <div style="margin-top: 10px;"> <p>a. Normal speed, 2 to 4A. High speed 4 to 6A</p> <p>b. Slow over 4A</p> <p>c. Does not run, zero A</p> </div>	a. Renew wiper blades b. Carry out Test 4 c. Change wiper motor
		4. Check wiper linkage Disconnect wiper motor from linkage <div style="margin-top: 10px;"> <p>a. Motor operates at normal speed</p> <p>b. Slow or erratic</p> </div>	a. Fault in linkage b. Check motor brushes overhaul
TEST EQUIPMENT Voltmeter 0–20V moving coil Ammeter 5 0–60A moving coil	Colour Code B BLACK G GREEN N BROWN P PURPLE R RED U BLUE Y YELLOW LG LIGHT GREEN	5. Check self-parking Switch on ignition, select normal and then fast wipe. Screen wet. Motor continues to run or does not run to park position.	Check that wiring at plugs is correct Fit new parking switch

WIPER SYSTEM

Fault	Check	Test	Rectification
		6. Delay unit check – vacuum type	
		a. Delay reduced or unit inoperative	a. Leaks in vacuum pipe or unit
		b. Delay extended	b. Blocked vacuum pipe or unit
		Connect voltmeter between Earth and c. NLG lead, switch to normal speed – d. YLG lead, switch to delay – e. PLG lead, switch to delay f. NLG lead, switch to delay	c. } d. } Check wiring. Renew switch e. } f. Wiring, renew delay unit
		Wiper does not operate. No voltage	
		7. Delay unit check – electronic type	
		Delay period 6 to 8 seconds	
		a. Irregular, connect voltmeter between unit earth and carry out Tests 6c, 6d, 6e and 6f	Check wiring, renew switch, renew delay unit

UNITS

Instruments Flashers Relays Warning lights Switches	Before removing the unit for test, ensure that the wiring and connections have been checked for continuity, cleanliness and tightness. Check for battery voltage at the feed connections, then check the unit by substitution with a known good one
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DOOR LOCKS – ROVER 3500

DESCRIPTION

The system enables all four door locks and the tailgate lock to be activated simultaneously by a single action at a control position. The control positions are the driver's external key switch, the passenger's external key switch and the internal switch on the driver's armrest. Supply to the system is by a single line fuse. The circuit may be considered in two sections. The relay control circuit and the power circuit.

Relay control circuit Two heavy duty relays are employed. One operates the 'lock' function while the second operates the 'unlock' function. Both circuits are identical. Current passes slowly through the resistor to charge up the capacitor. When an earth path is completed via a control position the capacitor discharges through the relay winding. This pulls in the relay for a very brief period. A time delay of at least three seconds must be allowed for the capacitor to recharge before a second selection may be made.

Power circuit – Two power circuits are employed. One operates the 'lock' function while the second operates the 'unlock' function. Both circuits are identical. Actuation of the relay connects battery supply to the appropriate winding of the four door lock solenoids and the tailgate lock solenoid.

FAULT DIAGNOSIS

To collect the full evidence it is necessary to make 30 observations as follows:

Ensure all doors are unlocked – this may be achieved manually if necessary. Select the driver's key switch to lock. Check all five doors and note if each is locked or unlocked.

Ensure all doors are locked – this may be achieved manually if necessary. Select the driver's key switch to unlock. Check all five doors and note if each is unlocked or locked.

Repeat the same sequence using the passengers' key switch and the internal switch. The 30 observations are best noted on a chart as shown.

	DRIVER'S KEY SWITCH SELECT TO		PASSENGER'S KEY SWITCH SELECT TO		INTERNAL SWITCH SELECT TO	
	LOCK	UNLOCK	LOCK	UNLOCK	LOCK	UNLOCK
L.H. FRONT DOOR						
R.H. FRONT DOOR						
L.H. REAR DOOR						
R.H. REAR DOOR						
TAILGATE						

✓ = Correct selection

✗ = Failed selection

SUPPLY LINE

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to lock or unlock from any control position	1, 2, 3	1 Battery condition NOTE: Simultaneous operation of five lock solenoids draws approximately 75A for 100 milliseconds. Battery condition is critical for the door lock circuit. a Check voltage across battery terminals with no load.	12 to 13 volts	Below 12 volts	Refer to 'Battery', page 4
		b Operate starter motor.	Normal cranking speed	Low cranking speed	Refer to 'Battery', page 4
		2 Fuse NOTE: Simultaneous operation of five lock solenoids draws approximately 75A for 100 milliseconds. A 50A fuse will carry this current for the short time period but a fuse rated below 50A will blow immediately. Locate in-line fuse in right-hand front footwell.	50A fuse in good condition	Blown or poor condition fuse	Fit 50A fuse
		3 Supply line continuity a Locate in-line fuse in right-hand front footwell. Check voltage on input wire.	Above 12 volts	Below 12 volts	Check continuity from battery to bulkhead positive stud and from stud to in-line fuse
		b Locate the door lock control assembly, see Manual 86.26.01. Check voltage on two relay input studs and terminal block input - brown wires.	Above 12 volts	Below 12 volts	Check continuity from in-line fuse to door lock - control assembly

DOOR LOCKS – ROVER 3500

LOCK RELAY CONTROL CIRCUIT – This circuit is identified by association with the lock relay which is connected to the following wires: – brown
brown/red
green/black
green/slate

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to lock from any control position	4, 5, 6, 7, 24	4 Resistor Locate the door lock control assembly, see Manual 86.26.01. Disconnect one side of lock circuit resistor. Employ ohmmeter to check resistance.	150 ± 10% ohms	Out of tolerance	Renew resistor
		5 Supply continuity a Check voltage on lock circuit terminal block output down line of resistor – brown/red wire.	Above 12 volts	Below 12 volts	Check continuity from terminal block input
		b Check voltage on lock relay winding input terminal – brown/red wire.	Above 12 volts	Below 12 volts	Check continuity from terminal block input
		c Check voltage on lock circuit capacitor positive terminal – brown/red wire to terminal with red paint spot.	Above 12 volts	Below 12 volts	Check continuity from terminal block input
		6 Capacitor a Check correct connections.	Brown/red wire to terminal with red paint spot Black wire to terminal with no paint spot	Connections misplaced	Correct
		b Check capacitor earth to vehicle body.			
		c Suspect capacitor unserviceable. Check by substitution. This may be achieved by changing over two brown/red capacitor wires. Perform functional check to collect full evidence.	Fault remains the same	Fault transferred from lock circuit to unlock circuit	Renew capacitor

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to lock from driver's key switch and interior switch	8	7 Relay winding a Disconnect one side of lock circuit relay winding. Employ ohmmeter to check resistance.	2.3 to 2.8 ohms	Out of tolerance	Renew relay
		b Disconnect five green/slate wire tags from lock circuit relay output stud. Provide a test lamp circuit between output stud and earth. Disconnect two green/black wire Lucar connectors from relay winding output terminal. Fire capacitor charge through relay winding by employing slave wire from Lucar blade to earth. NOTE: A time delay of at least three seconds must be allowed for the capacitor to recharge before a second selection may be made.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off	Renew relay
		8 Switch line continuity For Tests 8a and 8b disconnect five green/slate wire tags from lock circuit relay output stud. Provide a test lamp circuit between output stud and earth. a Locate snap connectors taped to outer corner of driver's footwell. Disconnect green/black wire snap connector. Fire capacitor charge through relay winding by employing slave wire from snap connector to earth.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off	Check continuity from lock circuit relay
		b Remove driver's door trim pad. Locate two pin harness plug taped to upper door. Disconnect harness plug. Fire capacitor charge through relay winding by employing slave wire from green/black wire pin to earth.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off	Check continuity from driver's footwell snap connector

DOOR LOCKS – ROVER 3500

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to lock from driver's key switch	9	9 Driver's key switch NOTE: The switch is an integral part of the door lock assembly. Free access to the switch is not possible and visual inspection of the contacts is obstructed by the glass run channel. a Mechanical operation – Employ key to operate switch over full travel.	Twin switch blades move smoothly over full travel	Unsatisfactory action	Consider fault and take appropriate action
		b Electrical operation – Locate two pin harness plug taped to upper door. Disconnect harness plug. Employ ohmmeter to check resistance between green/black wire pin and door lock body. Switch unselected. Switch held to lock with key.	Open circuit Closed circuit	Closed circuit Open circuit	Renew door lock Renew door lock
All doors fail to lock from interior switch	10	10 Interior switch Locate three snap connectors taped to upper door. Disconnect green/black wire and black wire snap connectors. Employ ohmmeter to check resistance between two disconnected wires. Switch unselected. Switch held to lock.	Open circuit Closed circuit	Closed circuit Open circuit	Renew switch Renew switch

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to lock from passenger's key switch	11, 12	11 Switch line continuity For Tests 11a and 11b disconnect five green/slate wire tags from lock circuit relay output stud. Provide a test lamp circuit between output stud and earth.			
		a Locate snap connectors taped to outer corner of passenger's footwell. Disconnect green/black wire snap connector. Fire capacitor charge through relay winding by employing slave wire from snap connector to earth.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off	Check continuity from lock circuit relay
		b Remove passenger's door trim pad. Locate two pin harness plug taped to upper door. Disconnect harness plug. Fire capacitor charge through relay winding by employing slave wire from green/black wire pin to earth.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off.	Check continuity from passenger's footwell snap connector
		12 Passenger's key switch NOTE: The switch is an integral part of the door lock assembly. Free access to the switch is not possible and visual inspection of the contacts is obstructed by the glass run channel. Mechanical operation – Employ key to operate switch over full travel. Electrical operation – Locate two pin harness plug taped to upper door. Disconnect harness plug. Employ ohmmeter to check resistance between green/black wire pin and door lock body. Switch unselected. Switch held to lock with key.	Twin switch blades move smoothly over full travel Open circuit Closed circuit	Unsatisfactory operation Closed circuit Open circuit	Consider fault and take appropriate action Renew door lock Renew door lock
		13 Switch earthing The lock relay control circuit switches are earthed on common lines with the power circuit solenoids. Tests are detailed on the 'Power circuit' chart.			

DOOR LOCKS - ROVER 3500

UNLOCK RELAY CONTROL CIRCUIT – This circuit is identified by – brown association with the unlock relay which is connected to brown/red the following wires: blue/black blue/orange					
Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to unlock from any control position	14, 15, 16, 17, 34	14 Resistor Locate the door lock-control assembly, see Manual 86.26.01. Disconnect one side of unlock circuit resistor. Employ ohmmeter to check resistance.	150 ± 10% ohms	Out of tolerance	Renew resistor
		15 Supply continuity a Check voltage on unlock circuit terminal block output down line of resistor – brown/red wire.	Above 12 volts	Below 12 volts	Check continuity from terminal block input
		b Check voltage on unlock relay winding input terminal – brown/red wire.	Above 12 volts	Below 12 volts	Check continuity from terminal block input
		c Check voltage on unlock circuit capacitor positive terminal – brown/red wire to terminal with red paint spot.	Above 12 volts	Below 12 volts	Check continuity from terminal block input
		16 Capacitor a Check correct connections.	Brown/red wire to terminal with red paint spot Black wire to terminal with no paint spot	Connections misplaced	Correct
		b Check capacitor earth to vehicle body.			
		c Suspect capacitor unserviceable. Check by substitution. This may be achieved by changing over two brown/red capacitor wires. Perform functional check to collect full evidence.	Fault remains the same	Fault transferred from unlock circuit to lock circuit	Renew capacitor

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to unlock from driver's key switch and interior switch	18	17 Relay winding a Disconnect one side of unlock circuit relay winding. Employ ohmmeter to check resistance.	2.3 to 2.8 ohms	Out of tolerance	Renew relay
		b Disconnect five blue/orange wire tags from unlock circuit relay output stud. Provide a test lamp circuit between output stud and earth. Disconnect two blue/black wire Lucar connectors from relay winding output terminal. Fire capacitor charge through relay winding by employing slave wire from Lucar blade to earth. NOTE: A time delay of at least three seconds must be allowed for the capacitor to recharge before a second selection may be made.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off	Renew relay
		18 Switch line continuity For Tests 18a and 18b disconnect five blue/orange wire tags from unlock circuit relay output stud. Provide a test lamp circuit between output stud and earth. a Locate snap connectors taped to outer corner of driver's footwell. Disconnect blue/black wire snap connector. Fire capacitor charge through relay winding by employing slave wire from snap connector to earth.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off	Check continuity from unlock circuit relay
		b Remove driver's door trim pad. Locate two pin harness plug taped to upper door. Disconnect harness plug. Fire capacitor charge through relay winding by employing slave wire from blue/black wire pin to earth.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off	Check continuity from driver's footwell snap connector

DOOR LOCKS - ROVER 3500

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to unlock from driver's key switch	19	19 Driver's key switch NOTE: The switch is an integral part of the door lock assembly. Free access to the switch is not possible and visual inspection of the contacts is obstructed by the glass run channel. a Mechanical operation – Employ key to operate switch over full travel.	Twin switch blades move smoothly over full travel	Unsatisfactory action	Consider fault and take appropriate action
		b Electrical operation – Locate two pin harness plug taped to upper door. Disconnect harness plug. Employ ohmmeter to check resistance between blue/black wire pin and door lock body. Switch unselected. Switch held to unlock with key.	Open circuit Closed circuit	Closed circuit Open circuit	Renew door lock Renew door lock
All doors fail to unlock from interior switch	20	20 Interior switch Locate three snap connectors taped to upper door. Disconnect blue/black wire and black wire snap connectors. Employ ohmmeter to check resistance between two disconnected wires. Switch unselected. Switch held to unlock.	Open circuit Closed circuit	Closed circuit Open circuit	Renew switch Renew switch

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
All doors fail to unlock from passenger's key switch	21. 22	21 Switch line continuity For Tests 21a and 21b disconnect five blue/orange wire tags from unlock circuit relay output stud. Provide a test lamp circuit between output stud and earth.			
		a Locate snap connectors taped to outer corner of passenger's footwell. Disconnect blue/black wire snap connector. Fire capacitor charge through relay winding by employing slave wire from snap connector to earth.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamp remains off	Check continuity from unlock circuit relay
		b Remove passenger's door trim pad. Locate two pin harness plug taped to upper door. Disconnect harness plug. Fire capacitor charge through relay winding by employing slave wire from blue/black wire pin to earth.	Relay heard to pull in and out. Test lamp illuminates for brief period	Relay dead. Test lamps remains off	Check continuity from passenger's footwell snap connector
		22 Passenger's key switch NOTE: The switch is an integral part of the door lock assembly. Free access to the switch is not possible and visual inspection of the contacts is obstructed by the glass run channel. Mechanical operation — Employ key to operate switch over full travel. Electrical operation — Locate two pin harness plug taped to upper door. Disconnect harness plug. Employ ohmmeter to check resistance between blue/black wire pin and door lock body. Switch unselected. Switch held to unlock with key.	Twin switch blades move smoothly over full travel Open circuit Closed circuit	Unsatisfactory operation Closed circuit Open circuit	Consider fault and take appropriate action Renew door lock Renew door lock
		23 Switch earthing The unlock relay control circuit switches are earthed on common lines with the power circuit solenoids. Tests are detailed on the 'Power circuit' chart.			

DOOR LOCKS – ROVER 3500

LOCK POWER CIRCUIT – This circuit is identified by – brown
 association with the lock brown/red
 relay which is connected to green/black
 the following wires: green/slate

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
One rear door fails to lock from any control position	25, 26	24 Relay contacts Perform Test 7b NOTE: The Lucas 4ST relay is designed to carry a constant current of 300A. Simultaneous operation of five lock solenoids draws approximately 75A for 100 milliseconds. The relay may be expected to provide reliable service over a long life.			
		25 Power line continuity a Remove lower 'B post' trim pad, see Manual 76.13.29. Pull rear outer corner of carpet away from sill. Locate snap connectors. Disconnect green/slate wire snap connector. Provide a test lamp circuit between snap connector and earth. Select 'lock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from lock circuit relay
		b Remove rear door trim pad. Locate three pin harness plug clipped to lower door. Disconnect harness plug. Provide a test lamp circuit between green/slate wire pin and earth. Select 'lock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from floor snap connector

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
One rear door fails to lock or unlock from any control position	26, 27a	26 Solenoid Remove rear door trim pad. Locate three pin harness plug clipped to lower door. Disconnect harness plug. a Employ ohmmeter to check resistance between green/slate wire pin and black wire pin.	Approximately 0.8 ohm	Out of tolerance	Renew door lock
		b Operate solenoid direct by providing positive supply to green/slate wire pin and negative earth to black wire pin. NOTE: The solenoid may be traversed back to the unlock position by transferring the positive supply to the blue/orange wire pin. Do not energise for more than 20 seconds to prevent overheating of the solenoid and harness.	Solenoid heard to operate	No operation	Renew door lock
		c Mechanical operation – High mechanical resistance within the lock may prevent correct solenoid operation. Check all manual lock controls.	Smooth operation over full travel	Unsatisfactory operation	Renew door lock
		27 Earth line continuity a Remove lower 'B post' trim pad, see Manual 76.13.29. Pull rear outer corner of carpet away from sill. Locate snap connectors. Disconnect black wire snap connector. Check earth to vehicle body.			
On one side of vehicle both doors fail to lock or unlock. Also control position(s) on same side may fail to achieve any selection	27b, 30b	b Locate facia mounting bracket attachment to vehicle body side. Disconnect one '35A' Lucar connector. Check earth to vehicle body.			

DOOR LOCKS – ROVER 3500

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
One front door fails to lock from any control position	28, 29	28 Power line continuity a Locate snap connectors taped to outer corner of appropriate side footwell. Disconnect green/slate wire snap connector. Provide a test lamp circuit between snap connector and earth. Select 'lock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from lock circuit relay
		b Remove front door trim pad. Locate three pin harness plug taped to upper door. Disconnect harness plug. Provide a test lamp circuit between green/slate wire pin and earth. Select 'lock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from appropriate footwell snap connector
One front door fails to lock or unlock from any control position	29	29 Solenoid Remove front door trim pad. Locate three pin harness plug taped to upper door. Disconnect harness plug. Perform tests 26a, b and c.			
One front door fails to lock or unlock from any control position. Also control position(s) on same side may fail to achieve any selection	30a	30 Earth line continuity a Locate snap connectors taped to outer corner of appropriate side footwell. Disconnect black wire snap connector. Check earth to vehicle body.			
		b Locate facia mounting bracket attachment to vehicle body side. Disconnect one '35A' Lucas connector. Check earth to vehicle body.			

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
Tailgate fails to lock from any control position	31, 32	31 Power line continuity a Open the tailgate. Pull the carpet away from the luggage boot right-hand side panel. Locate two pin harness plug to rear of door lock control assembly. Disconnect harness plug. Provide a test lamp circuit between green/slate wire pin and earth. Select 'lock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from lock circuit relay
		b Remove extractor finisher from tailgate – this is included in Manual operation 76.37.16. Locate snap connectors pushed into right-hand corner of tailgate. Disconnect green/slate wire snap connector. Provide a test lamp circuit between green/slate wire pin and earth. Select 'lock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from luggage boot harness plug
Tailgate fails to lock or unlock from any control position	32, 33	32 Solenoid Remove extractor finisher from tailgate – this is included in Manual operation 76.37.16. Locate snap connectors pushed into right-hand corner of tailgate. Disconnect green/slate wire, black wire and blue/orange wire snap connectors. Perform tests 26a, b and c.			

DOOR LOCKS -- ROVER 3500

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
		33 Earth line continuity NOTE: The tailgate solenoid shares a common earth line with the heated backlight and the plate illumination lamps. a Remove extractor finisher from tailgate -- this is included in Manual operation 76.37.16. Locate snap connectors pushed into right-hand corner of tailgate. Disconnect black wire snap connector. Check earth to vehicle body.			
		b Remove extractor finisher from tailgate -- this is included in Manual operation 76.37.16. Locate snap connectors pushed into left-hand corner of tailgate. Disconnect black wire snap connector. Check earth to vehicle body.			
		c Open the tailgate. Pull the carpet away from the luggage boot left-hand side panel. Locate two pin harness plug. Disconnect harness plug. Check black wire pin earth to vehicle body.			
		d Remove left-hand rear lamp cover. Remove two harness earth tags from one stud. Check earth to vehicle body.			

UNLOCK POWER CIRCUIT – This circuit is identified by – brown association with the unlock brown/red relay which is connected to blue/black the following wires: blue/orange

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
One rear door fails to unlock from any control position	35, 36	34 Relay contacts Perform Test 17b NOTE: The Lucas 4ST relay is designed to carry a constant current of 300A. Simultaneous operation of five lock solenoids draws approximately 75A for 100 milliseconds. The relay may be expected to provide reliable service over a long life.			
		35 Power line continuity a Remove lower 'B post' trim pad, see Manual 76.13.29. Pull rear outer corner of carpet away from sill. Locate snap connectors. Disconnect blue/orange wire snap connector. Provide a test lamp circuit between snap connector and earth. Select 'unlock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from unlock circuit relay
		b Remove rear door trim pad. Locate three pin harness plug clipped to lower door. Disconnect harness plug. Provide a test lamp circuit between blue/orange wire pin and earth. Select 'unlock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from floor snap connector

DOOR LOCKS – ROVER 3500

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
One rear door fails to lock or unlock from any control position	36, 37a	36 Solenoid Remove rear door trim pad. Locate three pin harness plug clipped to lower door. Disconnect harness plug. a Employ ohmmeter to check resistance between blue/orange wire pin and black wire pin.	Approximately 0.8 ohm	Out of tolerance	Renew door lock
		b Operate solenoid direct by providing positive supply to blue/orange wire pin and negative earth to black wire pin. NOTE: The solenoid may be traversed back to the lock position by transferring the positive supply to the green/slate wire pin. Do not energise for more than 20 seconds to prevent overheating of the solenoid and harness.	Solenoid heard to operate	No operation	Renew door lock
		c Mechanical operation – High mechanical resistance within the lock may prevent correct solenoid operation. Check all manual lock controls.	Smooth operation over full travel	Unsatisfactory operation	Renew door lock
On one side of vehicle both doors fail to lock or unlock. Also control position(s) on same side may fail to achieve any selection	37b, 40b	37 Earth line continuity a Remove lower 'B post' trim pad, see Manual 76.13.29. Pull rear outer corner of carpet away from sill. Locate snap connectors. Disconnect black wire snap connector. Check earth to vehicle body.			
		b Locate facia mounting bracket attachment to vehicle body side. Disconnect one '35A' Lucas connector. Check earth to vehicle body.			

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
One front door fails to unlock from any control position	38, 39	38 Power line continuity a Locate snap connectors taped to outer corner of appropriate side footwell. Disconnect blue/orange wire snap connector. Provide a test lamp circuit between snap connector and earth. Select 'unlock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from unlock circuit relay
		b Remove front door trim pad. Locate three pin harness plug taped to upper door. Disconnect harness plug. Provide a test lamp circuit between blue/orange wire pin and earth. Select 'unlock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from appropriate footwell snap connector
One front door fails to lock or unlock from any control position	39	39 Solenoid Remove front door trim pad. Locate three pin harness plug taped to upper door. Disconnect harness plug. Perform tests 36a, b and c.			
One front door fails to lock or unlock from any control position. Also control position(s) on same side may fail to achieve any selection	40a	40 Earth line continuity a Locate snap connectors taped to outer corner of appropriate side footwell. Disconnect black wire snap connector. Check earth to vehicle body.			
		b Locate facia mounting bracket attachment to vehicle body side. Disconnect one '35A' Lucar connector. Check earth to vehicle body.			

DOOR LOCKS – ROVER 3500

Fault	Check	Test	Satisfactory result	Unsatisfactory result	Rectification
Tailgate fails to unlock from any control position	41, 42	41 Power line continuity a Open the tailgate. Pull the carpet away from the luggage boot right-hand side panel. Locate two pin harness plug to rear of door lock control assembly. Disconnect harness plug. Provide a test lamp circuit between blue/orange wire pin and earth. Select 'unlock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from unlock circuit relay
		b Remove extractor finisher from tailgate – this is included in Manual operation 76.37.16. Locate snap connectors pushed into right-hand corner of tailgate. Disconnect blue/orange wire snap connector. Provide a test lamp circuit between blue/orange wire pin and earth. Select 'unlock' from any control position.	Test lamp illuminates for brief period	Test lamp remains off	Check continuity from luggage boot harness plug
Tailgate fails to lock or unlock from any control position	42, 43	42 Solenoid Remove extractor finisher from tailgate – this is included in Manual operation 76.37.16. Locate snap connectors pushed into right-hand corner of tailgate. Disconnect green/slate wire, black wire and blue/orange wire snap connectors. Perform tests 36a, b and c.			

DOOR LOCKS—JAGUAR

DESCRIPTION

The electrically operated system enables door locks to be activated simultaneously from a two-position switch on the centre console. Supply to the system is by a single thermal circuit-breaker. The circuit is in two parts, the relay control and power circuits.

Relay circuit

Two relays are employed, one operates the LOCK function while the second operates the UNLOCK function. The circuits are identical.

Power circuit

Two power circuits are employed, one operates the LOCK function while the second operates the UNLOCK function. The circuits are identical.

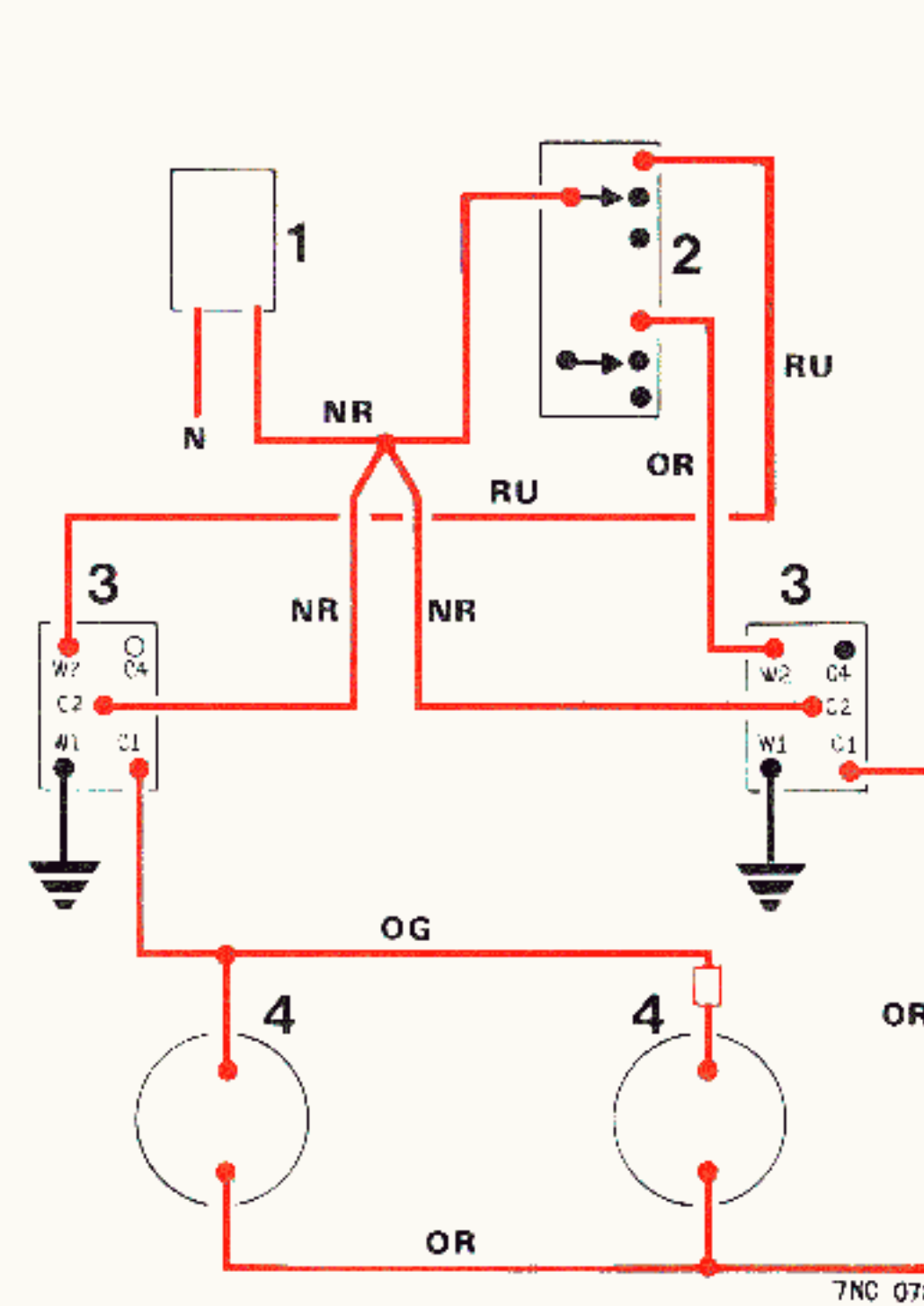
FAULT DIAGNOSIS

Ensure all doors are unlocked — this may be achieved manually if necessary — check the LOCK and UNLOCK functions and note on a chart as shown:

	INTERNAL SWITCH SELECT TO	
	LOCK	UNLOCK
L.H. FRONT		
R.H. FRONT		
L.H. REAR		
R.H. REAR		

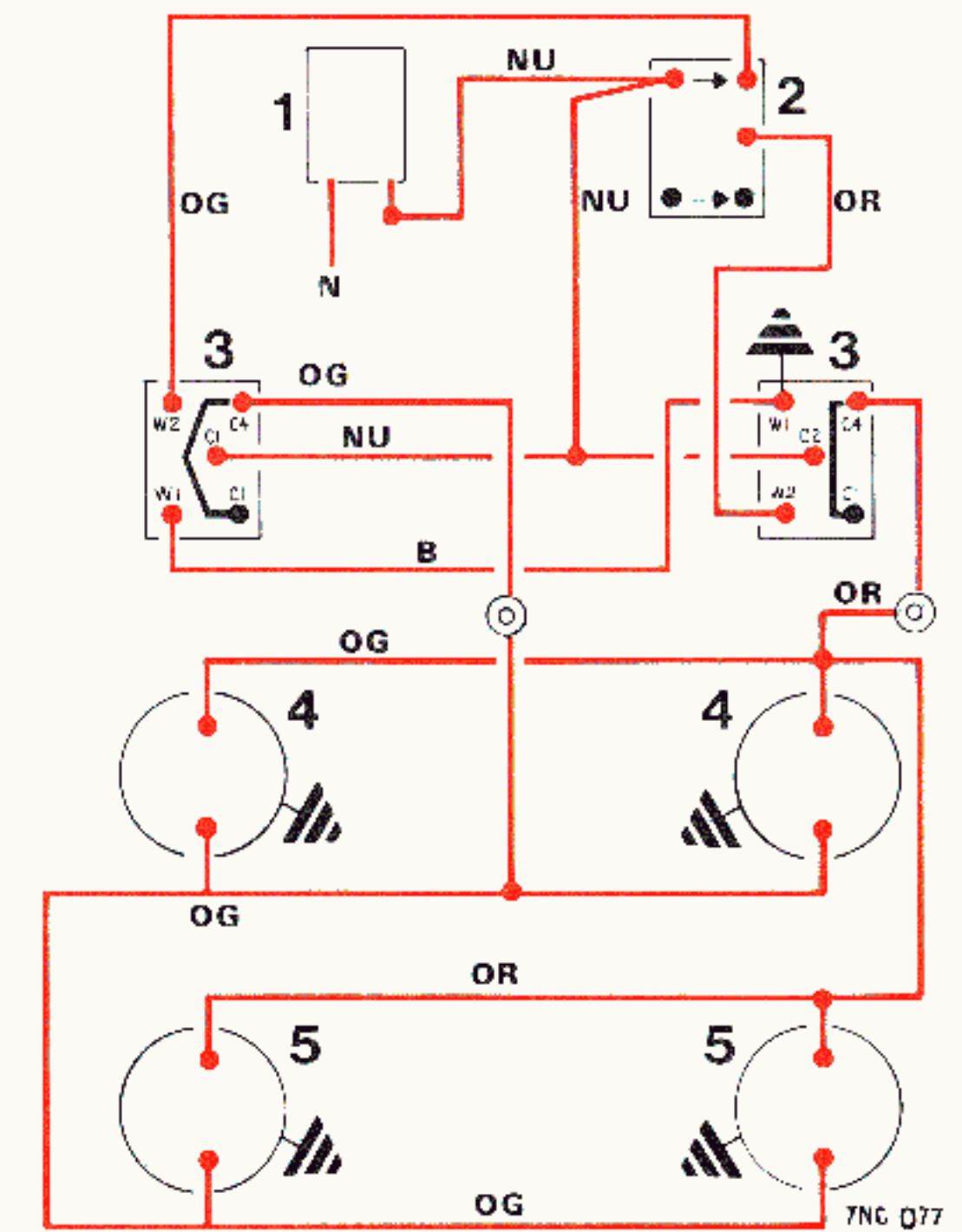
✓ = correct selection

✗ = failed selection



XJ-S

- 1 Thermal circuit-breaker
- 2 Switch — LOCK/UNLOCK
- 3 Relay
- 4 Solenoid — front
- 5 Solenoid — rear



XJ Saloons

- Colour Code
- B BLACK
 - G GREEN
 - N BROWN
 - O ORANGE
 - P PURPLE
 - R RED
 - U BLUE

Fault	Check	Test	Rectification
All doors fail to LOCK or UNLOCK	1, 2	1 Battery condition NOTE: Simultaneous operation of four solenoids draws 50A; press the switch and release. Battery condition is critical for door lock operation a Check voltage across battery terminals; below 12V	Refer to Battery, page 4
All doors fail to LOCK	3	b Operate starter motor; low cranking speed	Refer to Battery, page 4
Two doors fail to LOCK	4	2 Thermal circuit-breaker Remove the dash liner for access, see Manual 76.46.11. Operate switch, LOCK and UNLOCK: a No voltage* at input terminal; Brown wire	Check connections
One front door fails to LOCK	5	b No voltage* at output terminal; Brown/blue wire	Renew thermal circuit-breaker
One rear door fails to LOCK	5	3 Switch a No voltage* at input terminal; Brown/blue or Brown/red wire	Check continuity from circuit-breaker
		b No voltage* at either output terminal; Orange/green or Orange/red wire	Renew switch
		4 Relay XJS: Remove the dash liner for access, see Manual 76.46.11. XJ Saloon: Remove the rear seat cushion, see Manual 86.25.33 Operate the switch, LOCK and UNLOCK a No voltage* at input terminals; Brown/blue and Orange/green wires	Check continuity to switch Check earth
		b No voltage* at output terminals; Black; Orange/red and Orange/green wires Interchange the multi-connections on the relays to check that the fault transfers	Renew relay
		5 Solenoid Remove the door trim pad Operate switch LOCK and UNLOCK a Disconnect the wiring connectors: i No voltage* at feed cable; Orange/green and Orange/red wires	Check continuity from relay
		ii Check solenoid earth	Make good earth
		b Disconnect the solenoid operating piston from the door lock push-rod:	
		i Solenoid operation not satisfactory	Renew solenoid
		ii LOCK and UNLOCK using the door lock push-rod -- check for high mechanical resistance within the lock mechanism which may prevent the solenoid operating	Rectify door lock
TEST EQUIPMENT Voltmeter 0—20V moving coil Test lamp 12V		* or use Test Lamp	

WINDOW LIFT – JAGUAR

DESCRIPTION

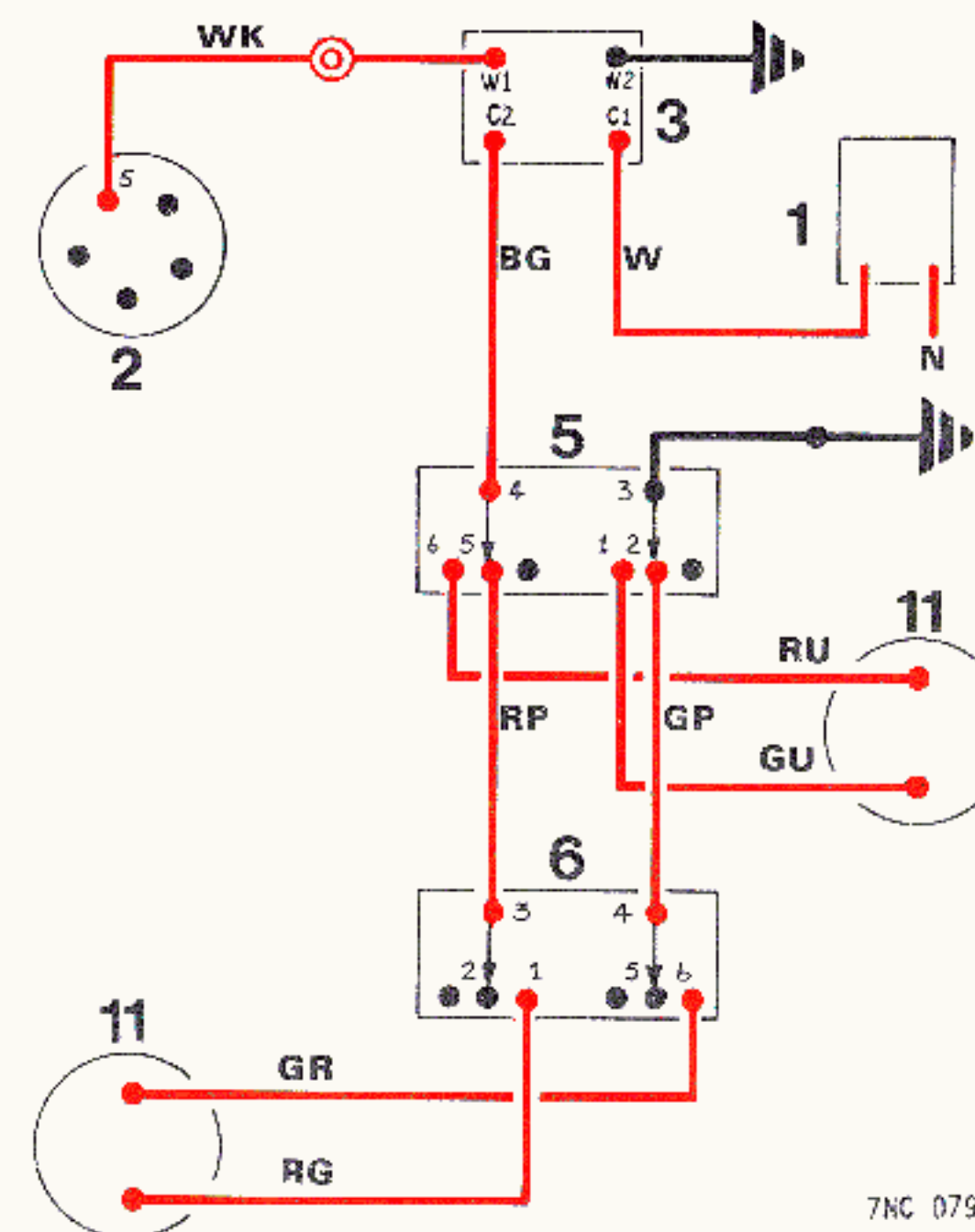
The electrically operated window lift system enables the door windows to be opened and closed from switches on the centre console. Supply to the system is by a single thermal circuit-breaker. The system is in two parts, the relay control and the power circuits.

Relay

The relay isolates the circuit when the ignition switch is in the 'LOCK' position.

Power circuit

The two pole switches have spring return to the off position. The circuit is arranged so that the operation of a switch isolates the subsequent circuit, thus preventing the operation of more than one motor at a time. On the four window system the switches can be isolated by the master switch.



- 1 Thermal circuit-breaker
- 2 Ignition switch
- 3 Relay
- 4 Master switch
- 5 Front R.H. } Switch
- 6 Front L.H. } front
- 7 Rear R.H. }
- 8 Rear L.H. } rear
- 9 Rear R.H. } Switch
- 10 Rear L.H. }
- 11 Lift motor

Colour Code

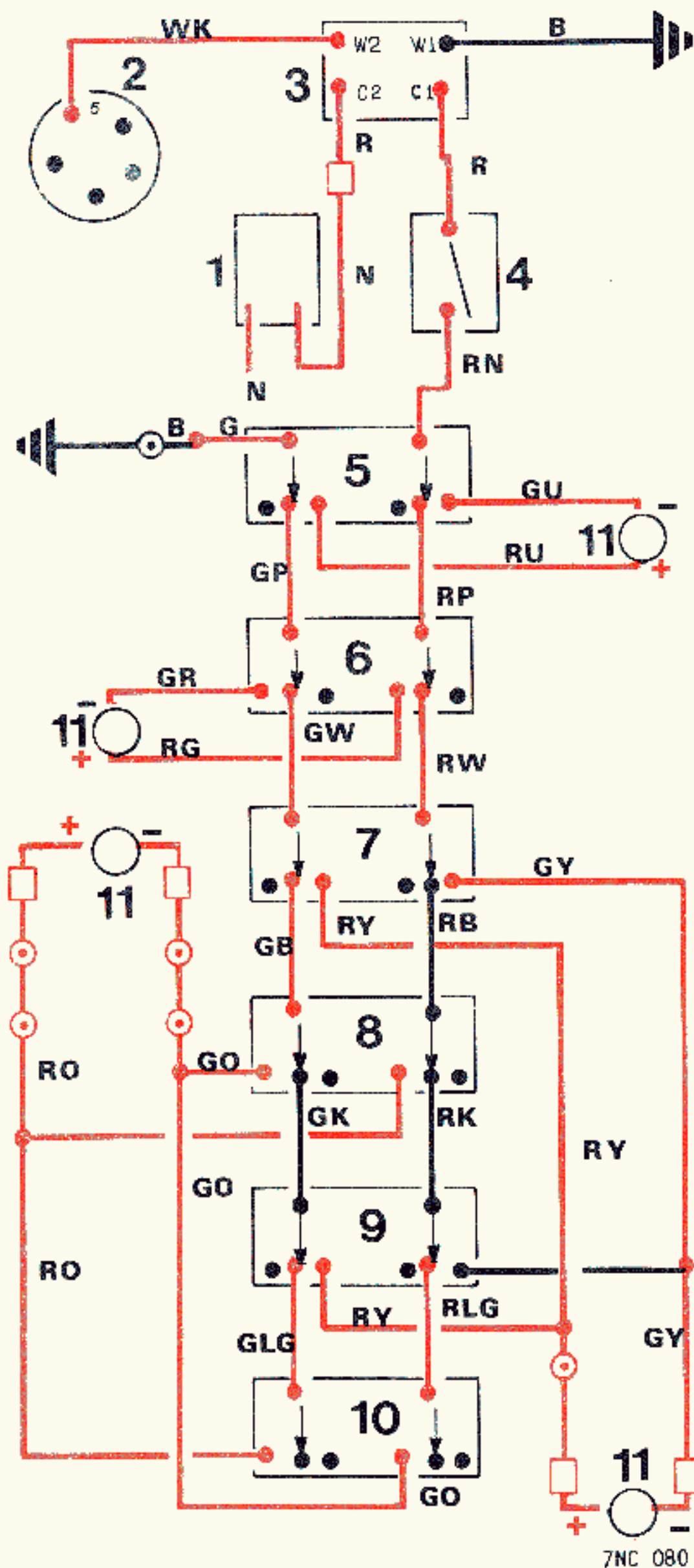
- B BLACK
- G GREEN
- N BROWN
- K PINK
- O ORANGE
- P PURPLE
- R RED
- U BLUE
- W WHITE
- Y YELLOW

XJ-S

Fault	Check	Test	Rectification
All windows fail to OPEN or CLOSE	1, 2, 3	Ignition switch to Accessories, or Ignition Master switch ON:	
Two of three windows do not operate	4	1 a Press rear of switch windows does not open	Check thermal circuit-breaker and relay
One window fails to OPEN or CLOSE	4, 5	b Press front of switch – window does not close	
		2 Thermal circuit-breaker	
		XJ-S: Remove the dash liner for access, see Manual 76.46.11	
		XJ Saloon: Remove the rear seat cushion, see Manual 86.25.33	
		Operate the driver's window switch – OPEN, CLOSE	
		a No voltage* at input terminal; Brown wire	Check continuity from battery
		b No voltage at output terminal; Brown or Red/brown wire	Renew circuit-breaker

TEST EQUIPMENT

Voltmeter, 0–20 moving coil
Test lamp 12V



XJ Saloons

Test

3 Relay

Access and check as 2

a No voltage at input terminal;

White/pink wire

Brown or Red wire

b No voltage at output terminals – open circuit

4 Switch

Remove the appropriate window switch, disconnect and connect the input terminal to each output terminal; operate the window switch – OPEN, CLOSE in turn

a Window does not operate no voltage*

b Window operates

c Window does not operate

5 Motor

Remove the door trim pad, see Manual 76.34.01/02

Operate appropriate window switch; OPEN, CLOSE

a Disconnect feed wires; no voltage*

b Disconnect motor from window slide

i Motor operates

ii Motor does not operate

* or use Test Lamp

Rectification

Check continuity
from ignition switch
From battery

Renew relay

Check wiring from relay

Check wiring between switches –
renew switch

Check motor

Check continuity to switch

Check for defect in window
mechanism or seized window slide

Renew motor

WINDOW LIFT – ROVER

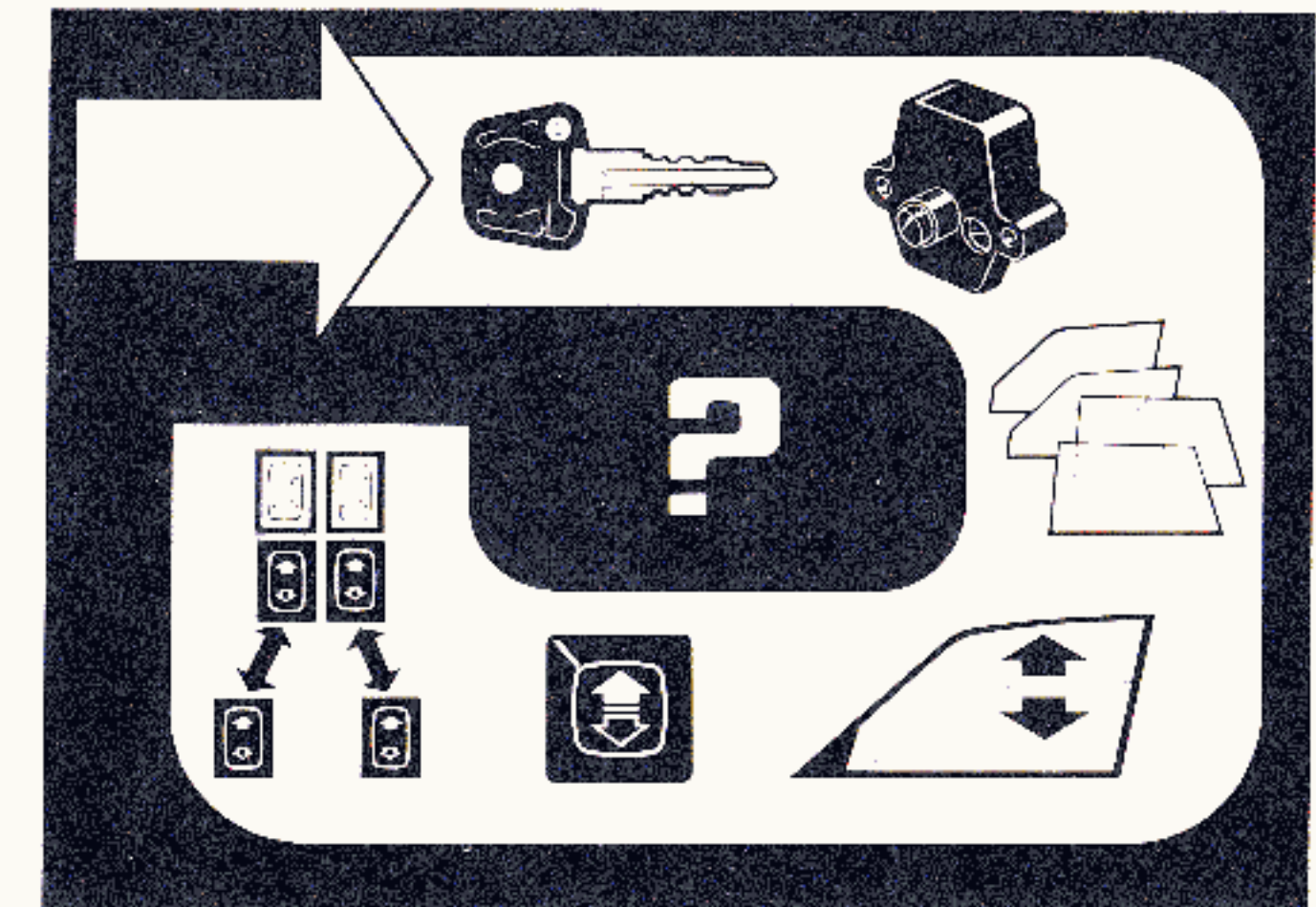
OPERATION

IGNITION SWITCH MUST BE AT POSITION '1' or '2'. A set of four rocker switches mounted in the centre console between the front seats affords individual control over related windows. A control switch mounted on each rear door giving rear seat passengers control over individual rear window operation. A push/push type switch mounted in the main instrument binnacle isolates the rear window motors from the door mounted switches to prevent abuse, and confines operating control to the centre console switches.

A Thermal Delay Unit is located at the rear of the passenger's glove compartment. This operates to isolate main supply from the circuit in overload conditions arising from continuous rapid operation, excessive friction, etc. To reset after operation press the red button and check for correct window operation.

Two control relays are mounted next to the Thermal Delay Unit and are connected to the circuit via multi-connectors.

If a fault occurs in the system, first try to isolate the type of fault as indicated in the following diagnostic procedure.



Logical sequence of checks 1—4

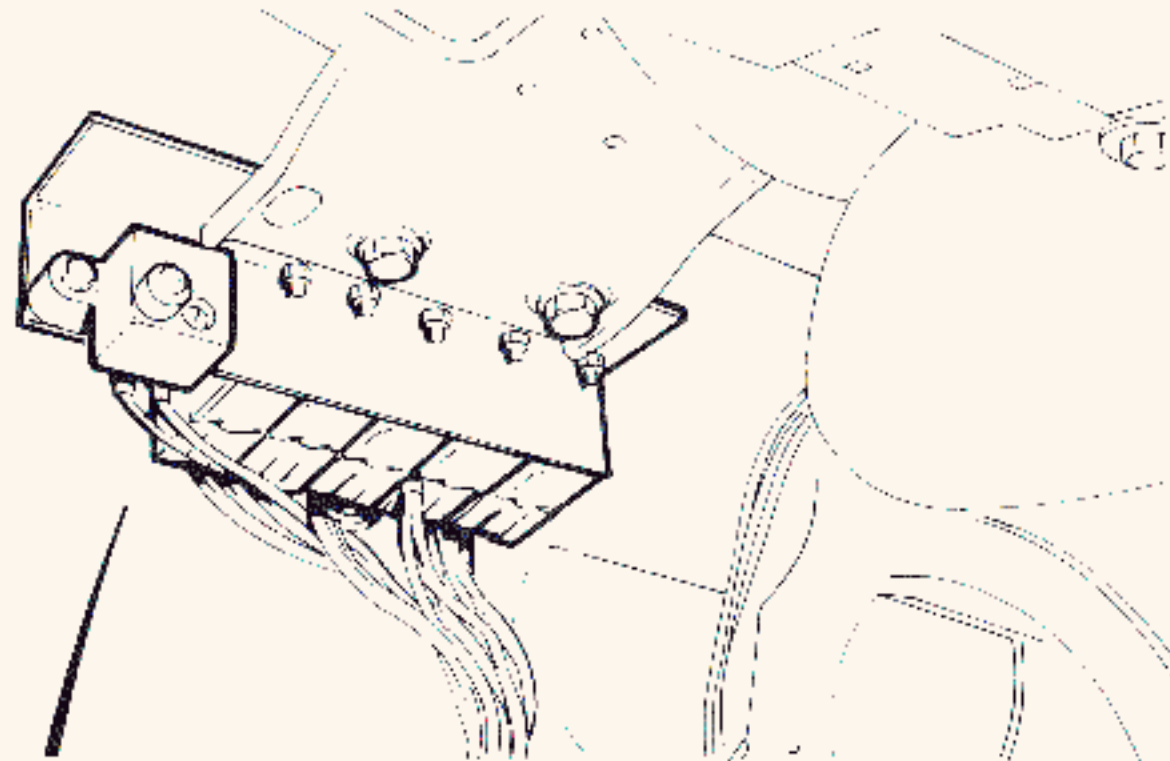
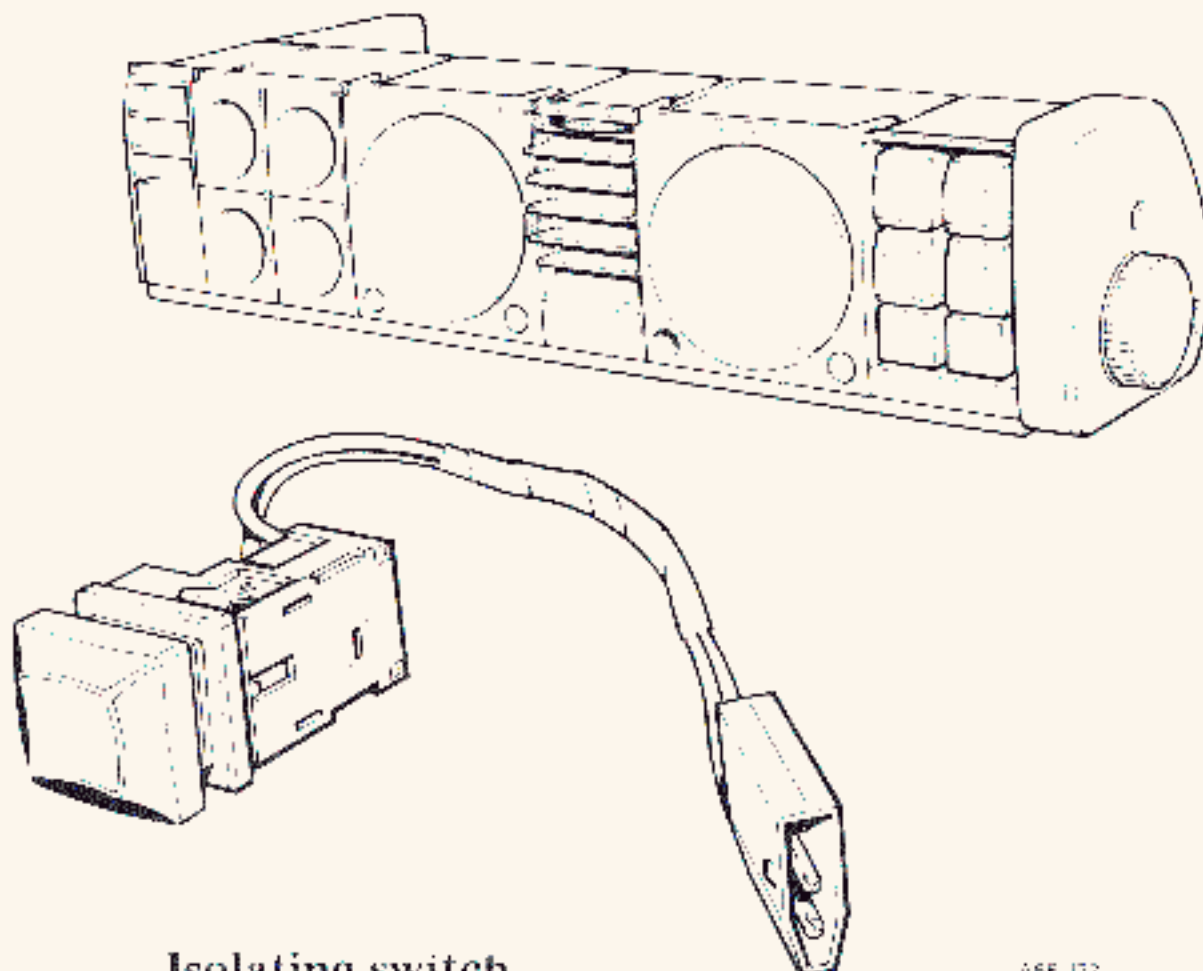
PRELIMINARY CHECKS

ENSURE BATTERY IS WELL CHARGED, SUBSTITUTE BATTERY IF NECESSARY

Fault	Check	Possible Cause	Rectification
All windows inoperative	1,5	1 a Ignition not switched ON b Switch not in auxiliary position (car stationary) c Thermal Delay Unit (circuit breaker) has operated	Switch to '1' or '2' Select auxiliary '1' on ignition switch Reset by pressing RED button, if circuit still not operative carry out Test 5
REAR windows only, do not operate	2,6	2 Isolating switch operated	Operate switch, if rear windows remain inoperative carry out Test 6
One REAR window will not operate	3	3 Check that fault remains if both central console switch and door switch are operated	If window operates on one switch suspect the other If window will not operate with either switch suspect the motor
Window operates in one direction only	4	4 a Defective switch b Defective motor	Replace suspect switch Check motor operation, see Test 7

TEST EQUIPMENT
Test lamp 12V

FROM THE ABOVE IT SHOULD BE POSSIBLE TO ISOLATE THE TYPE OF FAULT AND OBTAIN SOME INDICATION AS TO ITS WHEREABOUTS. MORE SPECIFIC CHECKS ARE GIVEN BELOW:

Fault	Check	Test	Rectification
<p>All windows inoperative with ignition switch ON and reset button pressed</p> 		<p>5 Using 12V test lamp check supply from Thermal Delay Unit. Press button while check takes place. Connect test lamp to a good earth and test probe applied to Brown wire connector first to confirm main supply is available, then to Brown/Green wire to confirm continuity through delay unit</p> <p>a Lamp fails to light or lights but goes off as button is pressed</p> <p>b If lamp lights but delay unit continually trips</p> <p>c All switches are at OFF and substitute unit continually trips</p>	<p>Check Delay Unit by substitution and replace as necessary</p> <p>Check control switches to ensure that all switches are in the centre OFF position</p> <p>All switches must be checked. 7.1 refers</p>
<p>Rear windows ONLY inoperative</p> <p>6</p>  <p>Isolating switch</p> <p>AKM 122</p>		<p>6 a Check isolating switch by substitution. (AKM 3616 86.15.70 refers)</p> <p>b Check control relays for correct operation</p> <p>c Identify rear supply line relay (multi-connector wires, Brown/Green, Light Green, Brown/Purple, Black) disconnect multi-connector from back of relay and swap it with connector from front supply line relay.</p>	<p>If substitution does not cure fault carry out Test 6b</p> <p>This should allow the rear motors to operate, if so, replace rear supply line relay with serviceable component</p>

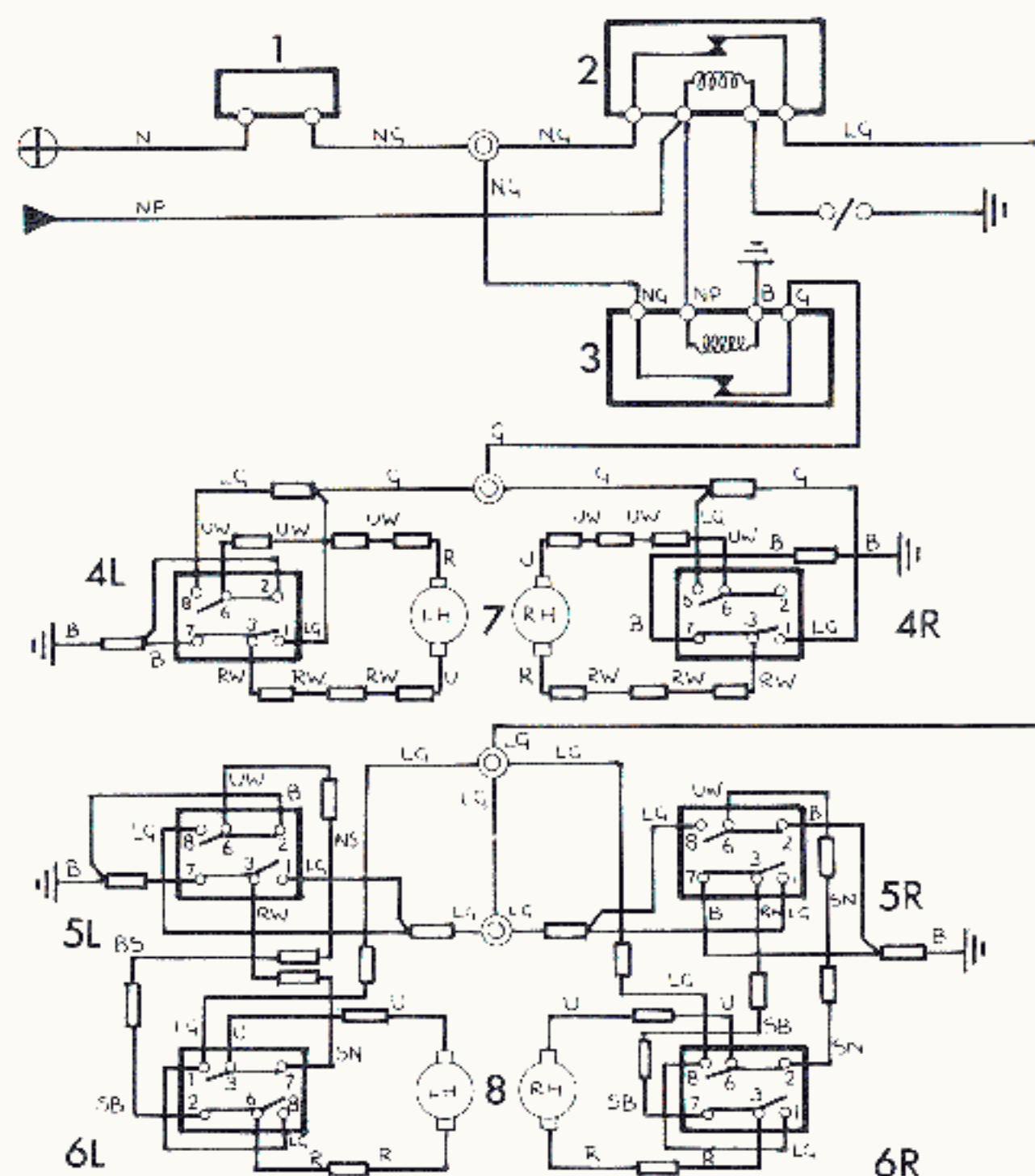


Fig. 3

ROVER 3500

- 1 Thermal Delay Unit (circuit breaker)
- 2 Rear window motor supply relay
- 3 Front window motor supply relay
- 4L Left-hand front window selector switch
- 4R Right-hand front window selector switch
- 5L Left-hand rear window selector switch
- 5R Right-hand rear window selector switch
- 6L Left-hand rear door mounted switch
- 6R Right-hand rear door mounted switch
- 7 Front window motors
- 8 Rear window motors

Colour code, see page 26

Fault	Check	Test	Rectification
Window operates in one direction only	7,8	7 Check related switch for correct operation (Use 12V test lamp, connect free wire to good earth, check for supply at Light Green input wire connector No. 1, operate switch and check for output at Red/White wire connector No. 3; repeat at No. 8 and No. 6 terminals)	Correct operation, carry out Test 8 Incorrect operation, replace switch
Thermal Delay Unit and Relays	8	8 Check motor return feed with test lamp Disconnect related switch earth connections at snap connector, insert test lamp in series with earth wire. Operate switch in both directions, lamp should light.	If lamp does not light in one direction remove motor for bench test

