1987 Model Year Supplement

RANGE ROVER
1987

WORKSHOP MANUAL SUPPLEMENT

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86 ELECTRICAL

Notes

INTRODUCTION

A number of major and minor detail changes are introduced on Range Rover Petrol and Diesel models for the 1987 model year.

Specification for individual vehicles may vary, but all models will include some of the new features and options summarised below.

- General Specification Data (petrol models only).
- Engine Tuning Data (petrol models only).
- Revised drive belt arrangement (petrol models only).
- SU carburetters and linkage
- Steering wheel.
- Power steering pump and fluid reservoir.
- Revised handbrake linkage.
- Front door stowage bins.
- Lower tailgate release mechanism.
- Assisted bonnet lift.
- Radiator grille.
- Fuel filler flap
- Asymmetric split rear seats
- Revised front lamps.
- Revised fuse box.
- Distributor (petrol models only).
- Starter motor.
- Rear wiper motor.
- Rear upper tailgate screen incorporating radio antenna.
- Column control switches.
- Revised instrument binnacle to include new warning symbols for low level coolant and screen wash fluid.
- Exterior driving mirror controls.
- Central locking on fuel filler flap.
- Revised heater and controls.

Service and repair information for the new equipment is included in this supplement, which should be used in conjunction with the existing Workshop Manual LSM 180WM and Diesel Model Supplement LSM 227WS.

Notes

GENERAL SPECIFICATION DATA

STEERING PUMP

Make/type	Hobourn-Eaton series 200
Operating pressure - straight ahead position - at idle	7 kgf/cm² (100 lbf/in²) maximum
Full lock (left or right) at idle	28 kgf/cm² (400 lbf/in²) minimum
Full lock (left or right) 1000 rev/min	70-77 kgf/cm² (1000-1110 lbf/in²)

COIL

Make/type	Lucas 32C5

DISTRIBUTOR

Make/type	Lucas 35 DLM8
Rotation	Clockwise
Air gap	0.20 - 0.35mm (0.008 - 0.014)

IGNITION MODULE

Make/type	Lucas 9EM amplifier module, distributor mounted

STARTER MOTOR (Petrol models)

Make/type	Lucas M78R pre-engaged
Minimum brush length	3.5mm (0.138 in)
Minimum commutator diameter	28.8mm (1.13 in)

STARTER MOTOR (Diesel models)

Make/type	Bosch 544 pre-engaged
Minimum brush length	15.5mm (0.610 in)
Minimum commutator diameter	39.5mm (1.55 in)

TAILGATE WIPER MOTOR

Make/type	IMOS (non-serviceable)
Running current, wet screen at 20°C ambient	1.0 to 2.8 amps
Wiper speed, wet screen at 20°C ambient	37 to 43 cycles per minute

REPLACEMENT BULBS		TYPE		
Headlamps	Exterior lights	12V	60/55W	(Halogen) sealed beam
Headlamps - France amber	Exterior lights	12V	60/55W	(Halogen)
Auxiliary driving lamps	Exterior lights	12V	55W H3	(Halogen)
Sidelamps	Exterior lights	12V	5W	bayonet fitting
Stop/tail lamps	Exterior lights	12V	5/21W	bayonet fitting
Reverse lamps	Exterior lights	12V	21W	bayonet fitting
Rear fog guard lamps	Exterior lights	12V	21W	bayonet fitting
Direction indicator lamps	Exterior lights	12V	21W	bayonet fitting
Number plate lamps	Exterior lights	12V	5W	capless
Instrument panel lamps and warning lamps	Interior lights	12V	1.2W	bulb/holder unit
Ignition warning lamp (Instrument panel)	Interior lights	12V	2W	capless
Interior roof lamps	Interior lights	12V	10W	'Festoon'
Clock illumination	Interior lights	12V	2W	bayonet fitting
Cigar lighter illumination	Interior lights	12V	1.2W	capless
Door edge/puddle lamps	Interior lights	12V	5W	capless
Auxiliary switch panel illumination (green)	Interior lights	12V	1.2W	capless
Heated rear screen warning lamp (amber)	Interior lights	12V	1.2W	capless
Hazard warning lamp	Interior lights	12V	1.2W	capless
Automatic graphics illumination	Interior lights	24V	5W	capless
Heater/air conditioning graphics illumination	Interior lights	12V	1.2W	capless
Differential lock warning lamp	Interior lights	12V	2W	bayonet fitting
Column switch illumination	Interior lights	12V	1.2W	capless
Rear fog warning lamp (amber)	Interior lights	12V	1.2W	capless

ENGINE TUNING DATA

Type	V8 Cylinder
Firing order	1.8.4.3.6.5.7.2
Cylinder Numbers - Left bank	1.3.5.7.
Right bank	2.4.6.8.
No. 1 Cylinder location	Pulley end of left bank
Timing marks	On crankshaft vibration damper
Spark plugs	
Make/type	Champion N9YC
Gap	0.85 - 0.95mm (0.033 - 0.038 in)
Distributor	
Make/type	Lucas 35DLM8 Electronic
Air gap	0.20 - 0.35mm (0.008 - 0.014 in)

FUEL INJECTION MODELS

Compression ratio ..... 9.35:1 and 8.13:1

Fuel injection system ..... Lucas 'L' system

Valve timing	**Inlet**	**Exhaust**
Opens	24° BTDC	62° BBDC
Closes	52° ABDC	14° ATDC
Duration	256°	256°
Valve peak	104° ATDC	114° BTDC

Idle speed ..... 700 - 800 rev/min

Ignition timing at ..... 600 rev/min *

Ignition timing

Dynamic or static ..... TDC ± 1°
Exhaust gas CO content at idle ..... 0.5 - 1.0% max

Distributor

Make/type ..... Lucas 35 DLM8 electronic
Rotation ..... Clockwise
Air gap ..... 0.20mm - 0.35mm (0.008 - 0.014 in)
Serial number 42649

Centrifugal advance

Distributor decelerating	-1600 distributor advance	11° to 14°
speeds *	-1100	9° to 11°
	- 600	1° 30' to 4°

No centrifugal advance below ..... 100 rev/min

Fuel ..... 94 min octane - 9.35:1
90 min octane - 8.13:1

*Vacuum pipe disconnected

UK AND EUROPE

CARBURETTER MODELS

Compression ratio 9.35:1

Valve timing	**Inlet**	**Exhaust**
Opens	36° BTDC	74° BBDC
Closes	64° ABDC	26° ATDC
Duration	280°	280°
Valve peak	99° ATDC	119° BTDC

Carburetters

Type	2 x SU HIF44
Specification number	FZX 2006
Needle	BGD
Idle speed (engine hot)	700 - 800 rev/min
Fast idle speed (engine hot)	1050 - 1150 rev/min
Mixture setting -CO at idle	0.5% - 2.5% pulsair connected

Ignition

Distributor make/type	Lucas 35 DLM8 electronic
Direction of rotation	Clockwise
Air gap	0.20mm - 0.33mm (0.008 - 0.014 in)
Distributor serial number	42650

Centrifugal advance

Decelerating check with vacuum pipe disconnected

Distributor decelerating speeds	-2800 Distributor advance	5° 30' to 9°
	-1450	6° to 8°
	-1000	2° 30' to 4° 30'

No advance below ..... 250 rev/min

Ignition timing

Dynamic or static ..... 6° ± 1° BTDC at 750 rev/min max (vacuum pipe disconnected)

Fuel ..... 94 min Octane

Delay valve ..... Orange (manual)
Blue (automatic)

R.O.W./GULF STATES

CARBURETTER MODELS

Compression ratio 8.13:1

Valve timing	**Inlet**	**Exhaust**
Opens	30° BTDC	68° BBDC
Closes	75° ABDC	37° ATDC
Duration	285°	285°
Valve peak	106° ATDC	112° BTDC

Carburetters

Type ..... 2 x HIF44
Specification number ..... FZX 2005
Needle ..... BGC
Idle speed (engine hot) ..... 700 - 800 rev/min
Fast idle speed (engine hot) ..... 1050 - 1150 rev/min
Mixture setting - CO at idle ..... 0.5% to 2.5%

Ignition

Distributor make/type ..... Lucas 35DLM8 electronic
Direction of rotation ..... Clockwise
Air gap ..... 0.20mm - 0.35mm (0.008 - 0.014 in)
Distributor serial number 42652

Centrifugal advance

Decelerating check with vacuum pipe disconnected

Distributor decelerating speeds	-2300 Distributor advance	10° 30' to 12° 30'
	-1800	8° to 10°
	-1200	3° 30' to 5° 30'
No advance below	450 rev/min	

Ignition timing

Dynamic or stati ..... 6° ± 1° BTDC at 750 rev/min max (vacuum pipe disconnected)

Fuel ..... 90 min octane

Recommended Lubricants and fluids

Use only the recommended grades of oil set out below.

These recommendations apply to temperate climates where operational temperatures may vary between -10°C (14°F) and 35°C (95°F)

COMPONENTS	BP	CASTROL	DUCKHAM	ESSO	MOBIL	PETROFINA	SHELL	TEXACO
Petrol engine sump Dash pots (Carburetter models only) Oil can	BP Visco 2000 (15W/40) or BP Visco Nova (10W/30)	Castrol GTX (15W/50) or Castrolite (10W/40)	Duckhams 15W/50 Hypergrade Motor Oil	Esso Superlube (15W/40)	Mobil Super 10W/40 or Mobil 1 Rally Formula	Fina Supergrade Motor Oil 15W/40 or 10W/40	Shell Super Motor Oil 15W/40 or 10W/40	Havoline Motor Oil 15W/40 or Eurotex HD (10W/30)
Diesel engine sump	BP Vanellus C3 Extra (15W/40)	Castrol Turbomax (15W/40)			Mobil Delvac 1400 Super (15W/40)		Shell Myrina (15W/40)	
	The following list of oils are for emergency use only if the above oils are not available. They can be used for topping up without detriment, but if used for engine oil changing, they are limited to a maximum of 5,000 km (3,000 miles) between oil and filter changes. Use only oils to MIL-L-2104D or CCMC D2 or API Service levels CD or SE/CD - 15W/40							
	BP Vanellus C3 Multigrade 15W/40)	Castrol Deusol RX Super (15W/40)	Duckhams Hypergrade (15W/50)	Esso Essolube XD - 3(15W/40)	Mobil Delvac Super (15W/40)	Fina Dilano HPD (15W/40)	Shell Rimula X (15W/40)	Texaco URSA Super Plus (15W/40)
Automatic gearbox	BP Autran DX2D	Castrol TQ Dexron IID	Duckhams Fleetmatic CD or Duckhams D-Matic	Esso ATF Dexron IID	Mobil ATF 220D	Fina Dexron IID	Shell ATF Dexron IID	Texamatic Fluid 9226
Manual gearbox	BP Autran G	Castrol TQF	Duckhams Q-Matic	Esso ATF Type G	Mobil ATF 210	Fina Purfimatic 33G	Shell Donax TF	Texamatic Type G
Front and Rear differential Swivel pin housings and LT230T Transfer gearbox	BP Gear Oil SAE 90EP	Castrol Hypoy SAE 90EP	Duckhams Hypoid 90	Esso Gear Oil GX 85W/90	Mobil Mobilube HD90	Fina Pontonic MP SAE 80W/90	Shell Spirax 90EP	Texaco Multigear Lubricant EP 85W/90
Propeller shaft Front and Rear	BP Energrease L2	Castrol LM Grease	Duckhams LB 10	Esso Multi - purpose Grease H	Mobil Grease MP	Fina Marson HTL 2	Shell Retinax A	Marfak All Purpose Grease
Power steering box and fluid Reservoir	BP Autran DX2D *	Castrol TQ Dexron IID *	Duckhams Fleetmatic CD or Duckhams D-Matic *	Esso ATF Dexron IID *	Mobil ATF 220D *	Fina Dexron II *	Shell ATF Dexron IID *	Texamatic Fluid 9226 *
Brake and clutch reservoirs	Brake fluids having a minimum boiling point of 260°C (500°F) and complying with FMVSS 116 DOT3 or DOT4							
Lubrication nipples (hubs, ball joints etc.)	BP Energrease L2	Castrol LM Grease	Duckhams LB 10	Esso Multi - purpose Grease H	Mobil Grease MP	Fina Marson HTL 2	Shell Retinax A	Marfak All Purpose Grease
Ball joint assembly Top Link	Dextragrease Super GP							
Seat slides Door lock striker	BP Energrease L2	Castrol LM Grease	Duckhams LB 10	Esso Multi - purpose Grease H	Mobil Grease MP	Fina Marson HTL 2	Shell Retinax A	Marfak All purpose grease
	NLGI-2 Multi-purpose Lithium-based Grease							

* Or fluids listed for manual gearbox

Bonnet plinth	Graphite Lock Grease Type 'R'
Door locks (anti-burst) Inertia reels	**DO NOT LUBRICATE.**These components are 'life' lubricated at the manufacturing stage.
Battery lugs Earthing surfaces Where paint has been removed	Petroleum jelly **NOTE:** Do not use silicon grease
Fuel	**Petrol engines** - 9.35:1 97 octane (4 star rating in UK) - 8.13:1 90 octane (2 star rating in UK) with standard ignition timing **Diesel engines** - 22:1 Diesel fuel oil, distillate, diesel fuel, automotive gas oil or Derv fuel to British Standard 2869, 1967 Class A1
Windscreen washers	Universal screen washer fluid
Engine cooling	For all Petrol and Diesel Models use an ethylene glycol based anti-freeze (containing no methanol) with non-phosphate corrosion inhibitors suitable for use in aluminium engines to ensure the protection of the cooling system against frost and corrosion in all seasons. Use one part anti-freeze to one part water for protection down to -36°C (-33°F) **IMPORTANT:**Coolant solution must not fall below proportions one part anti-freeze to three parts water, i.e. minimum 25% anti-freeze in coolant otherwise damage to engine is liable to occur. When anti-freeze is not required, the cooling system must be flushed out with clean water and refilled with a solution of one part Marstons SQ36 inhibitor to nine parts water i.e. minimum 10% inhibitor in coolant.
Air conditioning system Refrigerant	**METHYLCHLORIDE REFRIGERANTS MUST NOT BE USED** Use only with refrigerant 12. This includes 'Freon 12' and 'Arcton 12'
Compressor oil	Shell Clavus 68, BP Energol LPT68, Sunisco 4GS Texaco Capella E Wax Free 68

RECOMMENDED LUBRICANTS AND FLUIDS - ALL CLIMATES AND CONDITIONS

COMPONENTS	SERVICE CLASSIFICATION		AMBIENT TEMPERATURE °C
	Specification	SAE Classification	-30 -20 -10 0 10 20 30 40 50
Petrol models Engine sump Dash pots (carburetter models only) Oil can	Oils must meet BLS.22.OL.07 or CCMC3 or API service levels SF Oils must meet BLS.22.OL.02 or CCMC G1 or G2 or API service levels SE or SF	5W/30 5W/40) 5W/50) 10W/30 10W/40) 10W/50) 15W/40) 15W/50) 20W/40) 20W/50) 25W/40) 25W/50)	
Diesel models engine sump	SHPD oils meeting CCMC D3	10W/30 15W/40	
	* **Emergency only:** Oils meeting MIL-L-2104D or CCMCD2 or API CD		
Main Gearbox Automatic	ATF Dexron IID		
Main Gearbox manual	ATF M2C33 (F or G)		
Transfer gearbox Final drive units Swivel pin housings	API GL4 or GL5 MIL-L-2105 or MIL-L-2105B	90 EP 80W EP	
Power steering	ATF M2C 33 (F or G) or ATF Dexron IID		

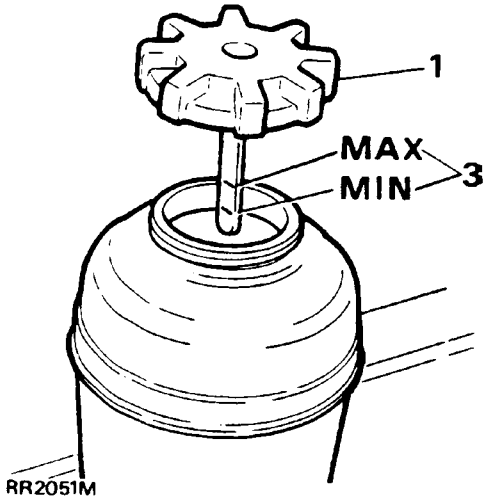
* Oils for emergency use only if the above oils are not available. They can be used for topping up without detriment, but if used for engine oil changing, they are limited to a maximum of 5,000 km (3,000 miles) between oil and filter changes.

Lubrication nipples (hubs, ball joints propeller shafts,etc)	NLGI-2 Multi-purpose lithium based grease
Brake and clutch	Universal Brake Fluids or other Brake Fluids having a minimum boiling point of 260°C (500°F) and complying with FMVSS 116 DOT3 or DOT4
Windscreen	Universal screen washer fluid
Engine cooling system	For all Petrol and Diesel models use an ethylene glycol based anti-freeze (containing no methanol) with non-phosphate corrosion inhibitors suitable for use in aluminium engines to ensure the protection of the cooling system against frost and corrosion in all seasons. Use one part anti-freeze to one part water for protection down to -36°C (-33°F) **IMPORTANT:**Coolant solution must not fall below proportions of one part anti-freeze to three parts water i.e. minimum 25% anti-freeze in coolant otherwise damage to engine is liable to occur. When anti-freeze is not required, the cooling system must be flushed out with clean water and refilled with a solution of one part Marstons SQ36 inhibitor to nine parts water, i.e. minimum 10% inhibitor in coolant.
Air conditioning Refrigerant	**METHYCHLORIDE REFRIGERANTS MUST NOT BE USED** Use only with refrigerant 12. This includes 'Freon 12' and 'Arcton 12'
Compressor oil	Shell Clavus 68, BP Energol LPT 68, Sunisco 4GS, Texaco Capella E Wax Free 68.

MAINTENANCE

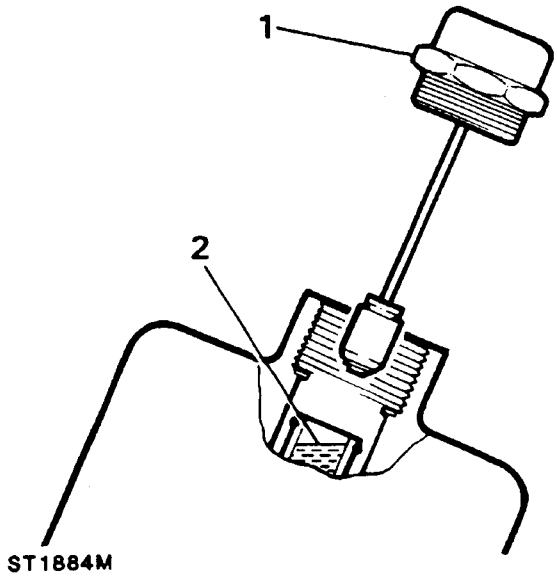
TOP UP STEERING BOX FLUID

1. Clean and remove the reservoir cap.
2. Wipe the reservoir dipstick clean and refit the cap.
3. Remove the cap again and check that the fluid level registers between the **MAX** and **MIN** level markings on the dipstick.
4. Top up as necessary and refit the cap.



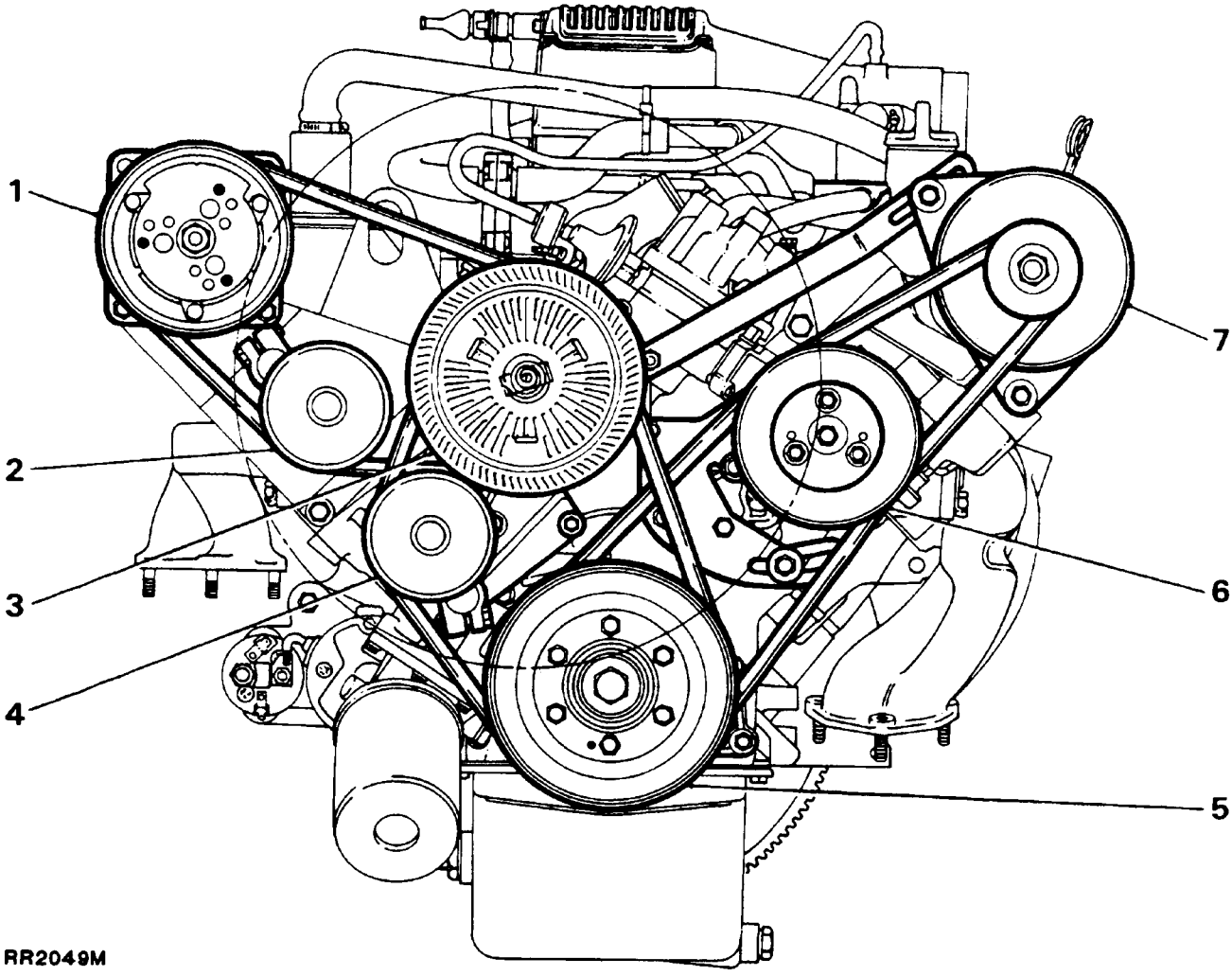
CARBURETTER DAMPER- Topping up

1. Unscrew the cap from the top of the carburetter suction chamber and withdraw the cap and plunger.
2. Top-up with clean engine oil to bring the level to the top of the hollow piston rod.
3. Screw the cap firmly into the carburetter.



MAINTENANCE SCHEDULES

All Range Rovers fitted with a manual gearbox must have the main and transfer gearbox oils changed at 20,000 km (12,000 mile) service intervals.



1. Air conditioning compressor.
2. Jockey wheel.
3. Viscous fan-water pump unit.
4. Jockey wheel.
5. Crankshaft.
6. Power steering pump.
7. Alternator.

WARNING: DISCONNECT THE BATTERY NEGATIVE TERMINAL BEFORE ADJUSTING DRIVE BELTS TO AVOID THE POSSIBILITY OF THE VEHICLE BEING STARTED.

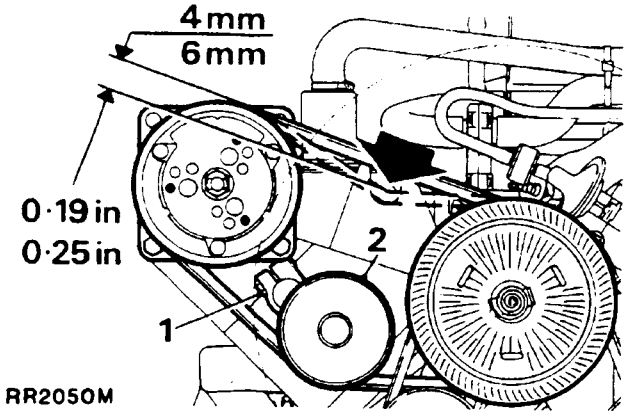
DRIVE BELTS-adjust or renew (Petrol models only)

COMPRESSOR DRIVE BELT

The belt must be tight with not more than 4 to 6mm (0.19 to 0.25 in) total deflection when checked by hand midway between the pulleys on the longest run.

Where a belt has stretched beyond the limits, a noisy whine or knock will often be evident during operating, if necessary adjust as follows:

1. Slacken the jockey wheel securing bolt.
2. Adjust the position of the jockey wheel until the correct tension is obtained.
3. Tighten the securing bolt and re-check the belt tension.



Check driving belts, adjust or renew as necessary

1. Examine the following belts for wear and condition and renew if necessary.

   (A) Crankshaft-Jockey Pulley-Water pump
   (B) Crankshaft-Steering Pump
   (C) Steering Pump-Alternator

ILLUSTRATION A

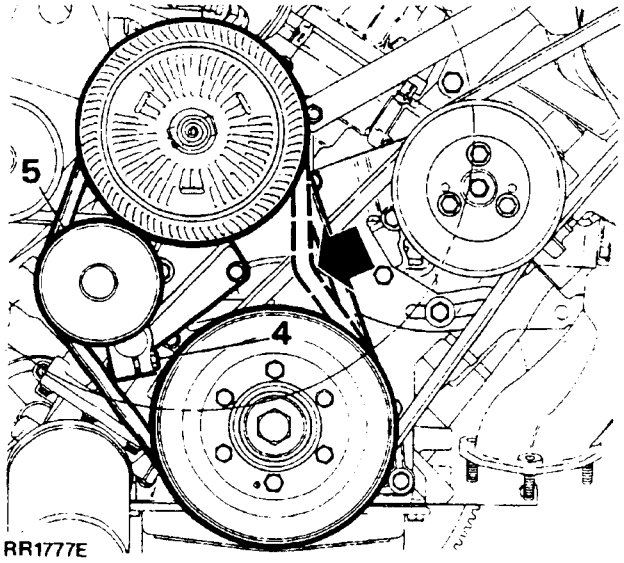


ILLUSTRATION B

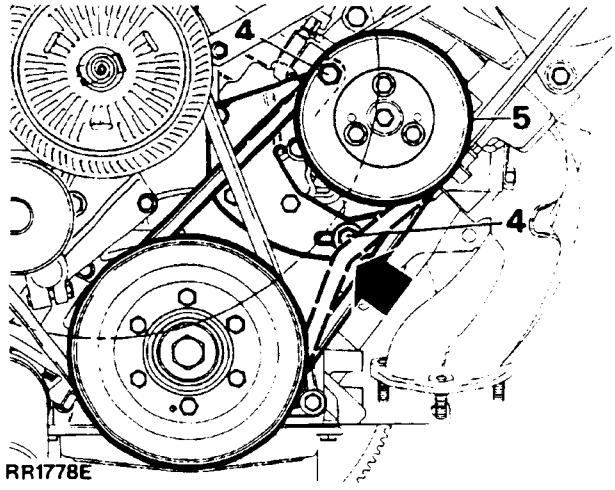
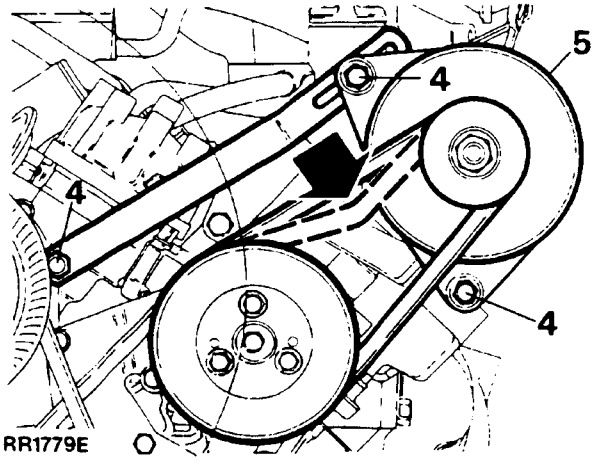
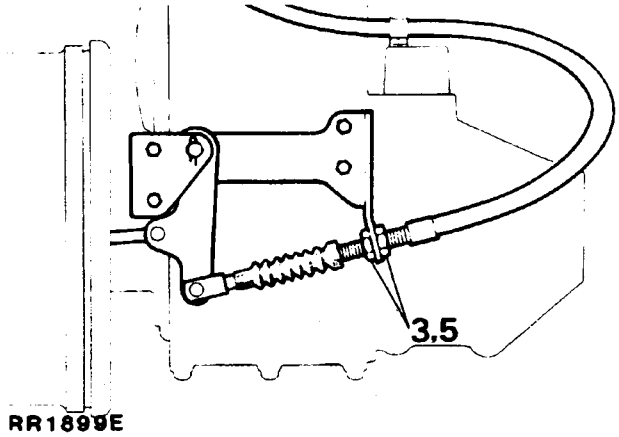


ILLUSTRATION C



2. Each belt should be sufficiently tight to drive the appropriate auxiliary unit without undue load on the bearings.
3. Slacken the bolts securing the unit to its mounting bracket.
4. Slacken the appropriate pivot bolt or jockey wheel and the fixing at the adjustment link where applicable.
5. Pivot the unit inwards or outwards as necessary and adjust until the correct belt tension is obtained.
6. Belt tension should be approximately 11 to 14mm (0.437 to 0.562 in) at the points denoted by the bold arrows.
7. Tighten all unit adjusting bolts. Check adjustment again, when a new belt is fitted, after approximately 1,500 km (1,000 miles) running.



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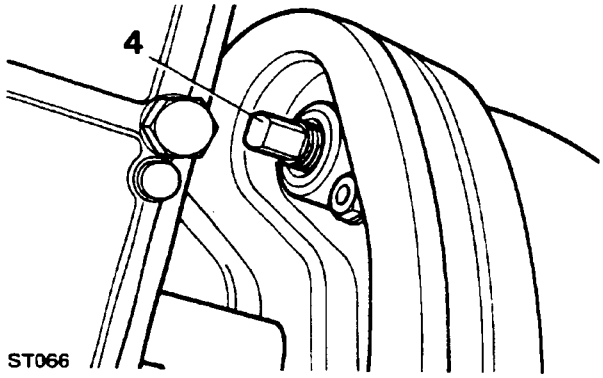
4. Rotate the adjuster on the brake drum back plate clockwise, until the brake shoes are fully expanded against the drum.



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5. Rotate the two outer cable locknuts until contact is made with the mounting bracket, tighten the two nuts consecutively to prevent any movement occurring on the outer cable.
6. Slacken the adjuster on the back of the brake drum until the handbrake lever becomes fully operational on the second or third notch of the handbrake ratchet.
7. Lightly grease the handbrake linkage with a general purpose grease.

CAUTION: DO NOT over-adjust the handbrake, the drum must be free to rotate when the handbrake is released, otherwise serious damage will result.

ADJUST HANDBRAKE CABLE

The handbrake lever acts on a transmission brake drum at the rear of the transfer box.

1. Set the vehicle on level ground and select 'P' in main gearbox. Disconnect the battery negative lead.
2. Fully release the handbrake.
3. From underneath the vehicle slacken the two locknuts securing the handbrake outer cable to the mounting bracket, to enable the brake drum to be adjusted without putting any tension on the handbrake outer cable.

CARBURETTER OVERHAUL-S.U. HIF 44

Right hand
(Horizontal integral float chamber)

DISMANTLE

1. Remove the carburetters from the engine and clean the exteriors with a suitable solvent.
2. Remove the two nuts and spring washers and withdraw the air intake adaptor and joint washer.
3. Unscrew and remove the piston damper assembly and drain the oil.
4. Remove the three screws and lift-off the suction chamber complete with piston and spring.
5. Remove the spring clip from the top of the piston rod and withdraw the piston and spring.
6. Unscrew the metering needle guide locking screw. Attempt to remove assy with fingers. If difficulty is experienced then holding the needle as close to the piston as possible in a soft jawed vice with a sharp pull, withdraw the needle, guide and spring assembly.
7. Remove the four screws and withdraw the float chamber cover plate and sealing ring.
8. Remove jet adjusting lever retaining screw and spring.
9. Withdraw the jet complete with the bi-metal lever and separate the lever from the jet.
10. Unscrew and remove the float pivot spindle and plain washer, and remove the float.
11. Lift-out the needle valve.
12. Unscrew and remove the needle valve and filter.
13. Unscrew and remove the jet bearing nut.
14. Invert the carburetter body to allow the jet bearing to fall out. If the bearing sticks, carefully tap it out from the bridge side.
15. Remove the piston guide peg.
16. Remove the suction chamber-to-body sealing ring.
17. Unscrew and remove the mixture adjusting screw and seal. Use thin nosed pliers to finally withdraw the screw.
18. Bend-back the cam lever nut lock tabs and remove the nut and lock washer.
19. Remove the cam lever and spring.
20. Remove the end seal cover and seal.
21. Remove the two screws and withdraw the cold start valve body and seal together with the valve spindle. Also collect the paper joint washer.
22. Note the position of the throttle levers and return spring.
23. Bend-back the lock washer tabs and remove the throttle lever nut.
24. Remove the lock washer, bush washer and throttle actuating lever.
25. Release the throttle return spring and remove the throttle adjusting lever from the throttle butterfly spindle and remove the return spring.
26. Hold the butterfly closed and mark the relationship of the butterfly to the carburetter flange.
27. Remove the butterfly two retaining screws and withdraw the butterfly from the spindle.
28. Withdraw the throttle butterfly spindle from the carburetter body together with the two seals.
29. Clean all components with petrol or de-natured alcohol ready for inspection. Do not use abrasives for the removal of stains or deposits.

INSPECTION

30. Examine the throttle spindle and bearings for excessive axial clearance.
31. Check the float needle and seating for wear and the float for punctures and renew if necessary.
32. Check the condition of all rubber seals, 'O' rings and joint washers and renew if necessary. The float cover plate seal must be renewed.
33. Examine the carburetter body for cracks and damage.
34. Ensure that the inside of the suction chamber is clean and fit the piston into the chamber without the spring. Hold the assembly horizontally and spin the piston. The piston should spin freely in the suction chamber without any tendency to stick.
35. Inspect the metering needle for wear, scores and distortion. Check also that it has the correct designation number - see Engine Tuning Data, Section 05.

36. Examine the bi-metal jet lever for cracks.
37. Check all springs for cracks and distortion.

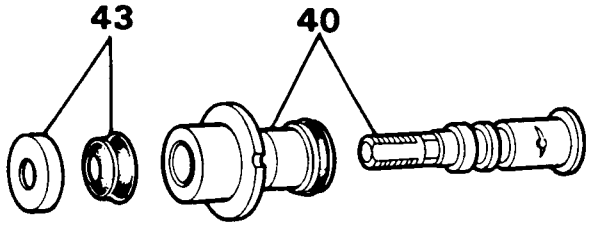
ASSEMBLE

Fit throttle butterfly

38. Fit the throttle spindle to the carburetter body and insert the throttle disc into the spindle in its original position. Secure the disc with new screws and ensure that before tightening the throttle disc is correctly positioned and closes properly. Splay the split ends of the screws to prevent turning.
39. Fit new seals to both ends of the throttle spindle ensuring that they are fitted the correct way round.

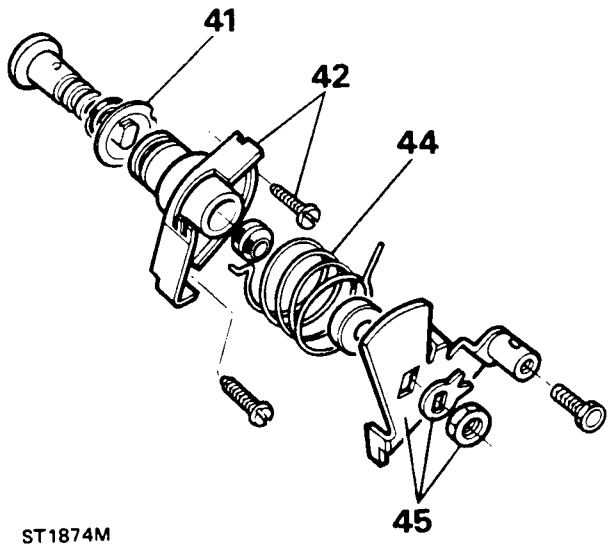
Fit cold start assembly

40. Fit a new 'O' ring to the valve body and assemble the valve spindle to the valve body.
41. Fit a new paper joint washer to the valve noting that the half-moon cut-out in the washer is clearance for the top retaining screw.
42. Fit the starter assembly to the carburetter body and secure with the two screws.
43. Fit the end seal and cover.



ST1873M

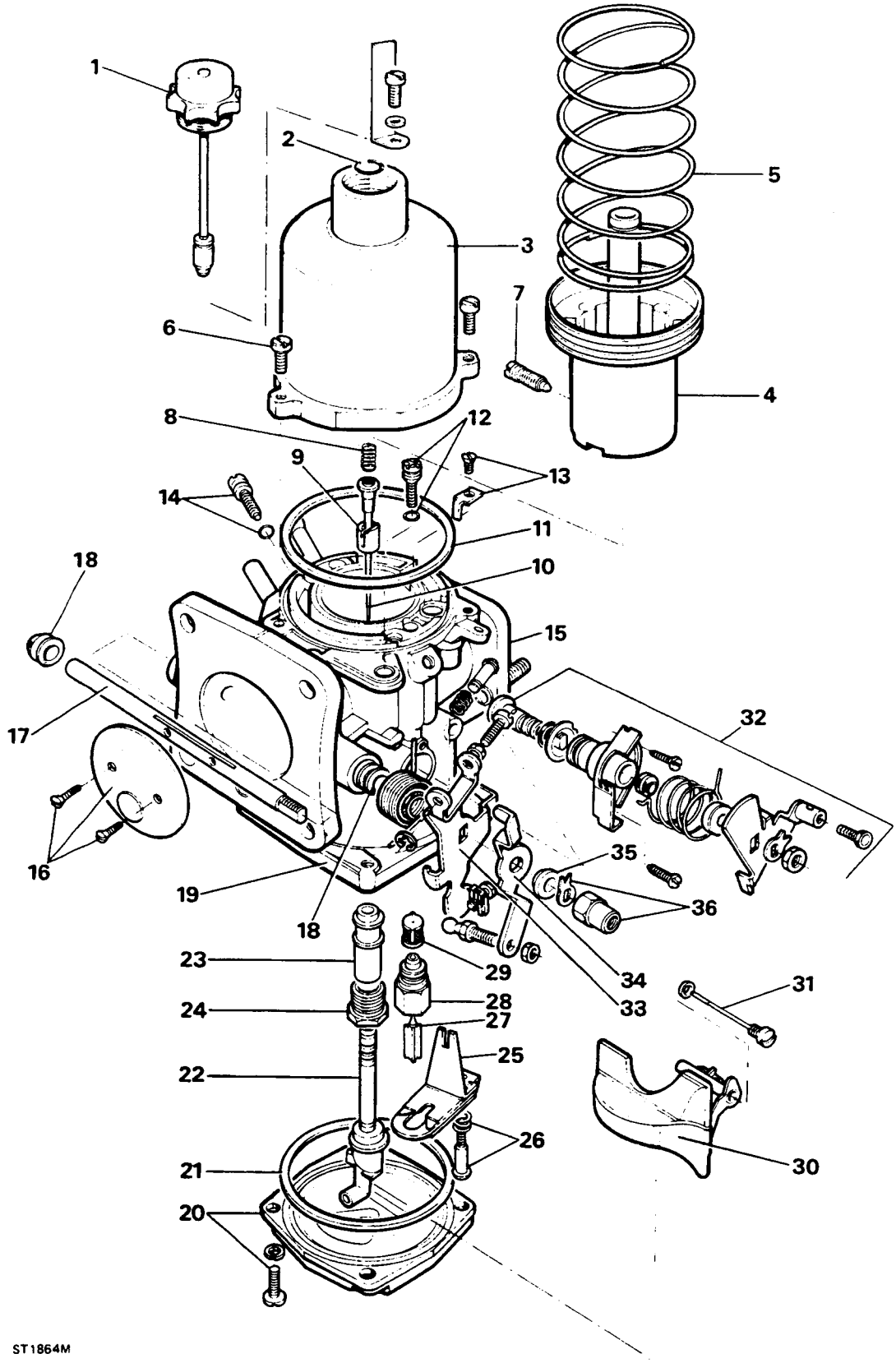
44. Fit the return spring.
45. Fit the cam lever and tension the spring. Fit a new lock washer and secure with the nut and bend the tabs over a convenient flat.
46. Adjust the coils of the spring, if necessary, to prevent coil binding.



ST1874M

KEY TO S.U. CARBURETTER COMPONENTS

1. Piston damper.
2. Spring clip.
3. Suction chamber.
4. Piston.
5. Piston spring.
6. Suction chamber retaining screws -3 off.
7. Needle retaining screw.
8. Needle bias spring.
9. Needle guide.
10. Needle.
11. Suction chamber sealing ring.
12. Throttle adjusting screw and seal.
13. Piston key and retaining screw.
14. Mixture adjusting screw and seal.
15. Carburetter body.
16. Throttle butterfly and retaining screws.
17. Throttle spindle.
18. Throttle spindle seals - 2 off.
19. Float chamber.
20. Float chamber cover and retaining screws.
21. Float chamber cover seal.
22. Jet assembly.
23. Jet bearing.
24. Jet bearing nut.
25. Bi-metal jet lever.
26. Jet retaining screw and spring.
27. Float needle.
28. Float needle seat.
29. Float needle seat filter.
30. Float.
31. Float pivot spindle.
32. Cold start and cam lever assembly.
33. Throttle adjusting lever and lost motion assembly.
34. Throttle actuating lever.
35. Bush washer.
36. Throttle lever assembly retaining nut and lock washer.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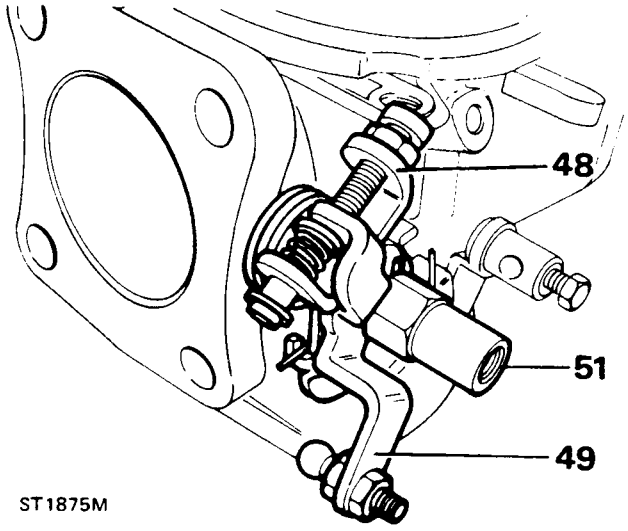
ST1864M

Fit throttle lever assembly

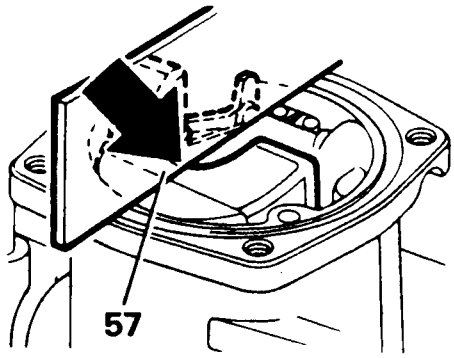
47. Fit the return spring so that the longest leg rests against the throttle adjusting screw housing.
48. Fit the throttle adjusting lever and lost motion assembly and tension the return spring.
49. Fit the throttle actuating lever.
50. Fit the bush washer and lock washer.
51. Fit and tighten the special nut and bend the lock tabs over a convenient flat.

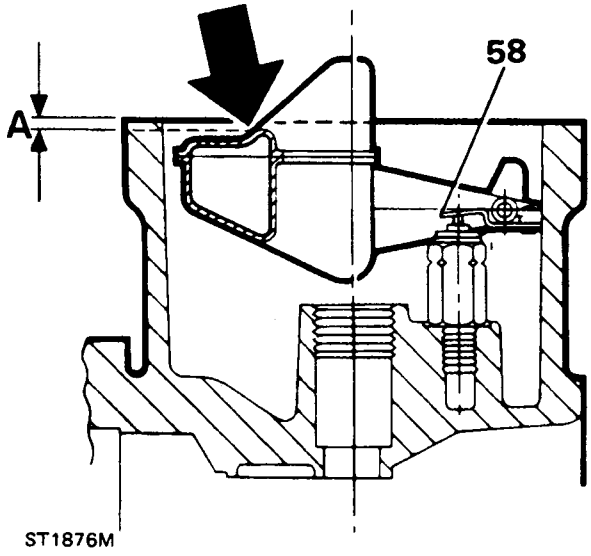


ST1875M

Fit jet and float assembly

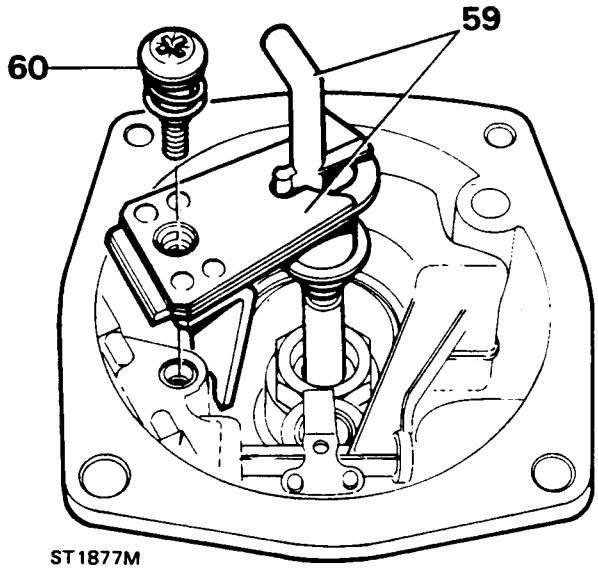
52. Fit the jet bearing, long end towards the float.
53. Fit the jet bearing nut.
54. Clean or renew the filter and fit the float needle seat.
55. Fit the needle valve, spring loaded pin uppermost.
56. Fit the float and secure with the pivot pin.
57. Hold the carburetter in the inverted position so that the needle valve is closed by the weight of the float only. Check using a straight edge that the point on the float, arrowed on the illustration, is 0.5 to 1.5mm (0.020 to 0.059 in) below the level of the float chamber face, dimension 'A'.
58. Adjust the float position by carefully bending the brass pad until the correct dimension is achieved. After adjustment, check that the float pivots freely about the spindle.





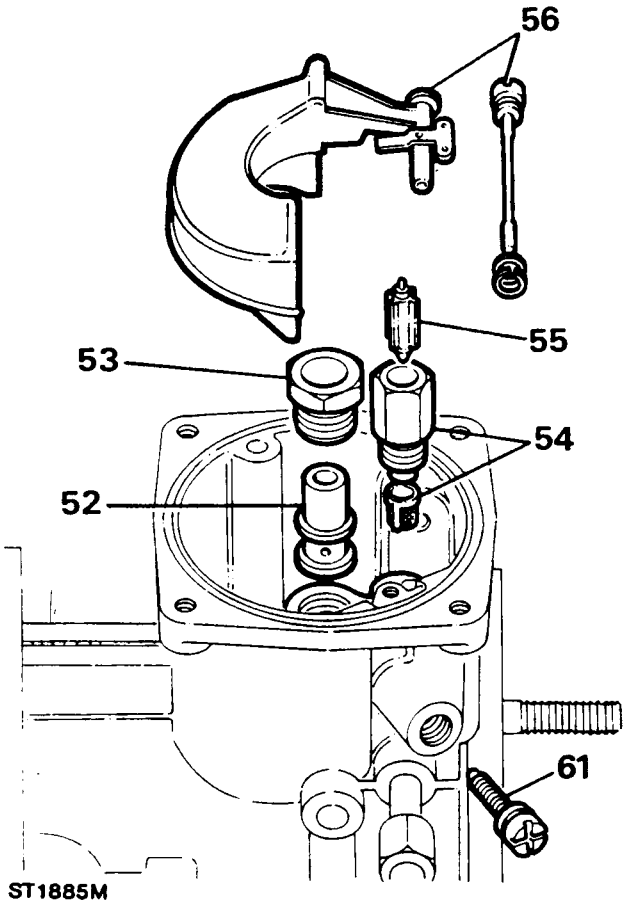
ST1876M

59. Assemble the jet to the bi-metal jet lever and ensure that the jet head moves freely in the cut-out.
60. Fit the jet and bi-metal jet lever to the carburetter and secure with the spring loaded jet retaining screw.



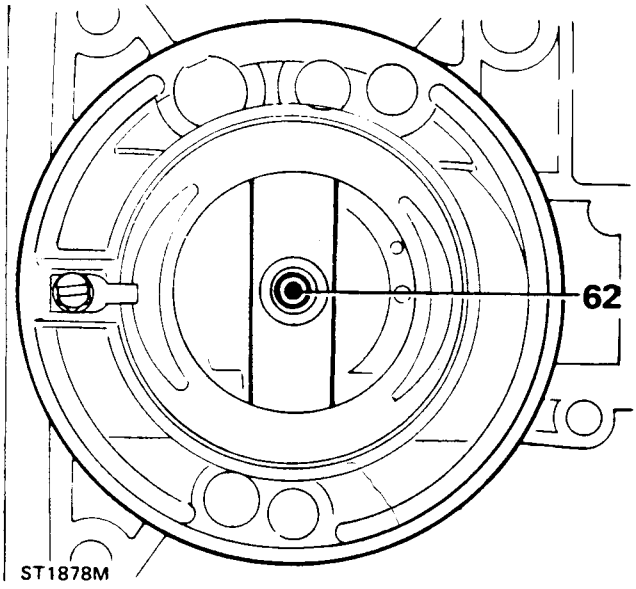
ST1877M

61. Fit the mixture adjusting screw.



ST1885M

62. Adjust until the jet is flush with the carburetter bridge, then re-adjust jet three and one-half turns clockwise.

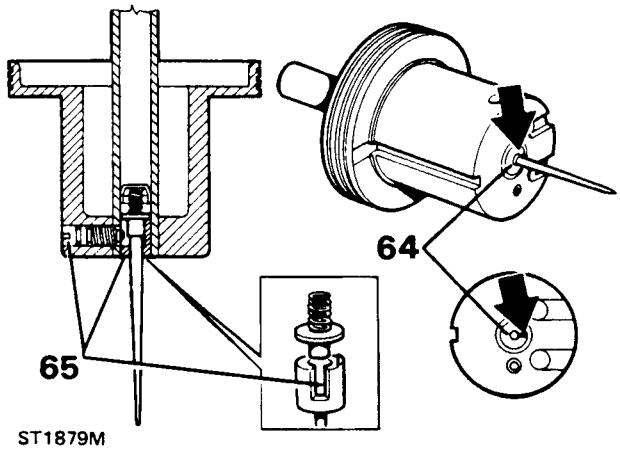


ST1878M

63. Using a new sealing ring, fit the float chamber cover, noting that it can only be fitted one way. Secure with the four screws and spring washers and evenly tighten.

Fit piston and suction chamber

64. Fit the needle, spring and guide assembly to the piston ensuring that the etched arrow head on the needle locating guide is aligned between the piston transfer holes, as illustrated.
65. Secure and ensure that when the screw is tightened the guide is flush with the piston and that the screw locates in the guide slot.



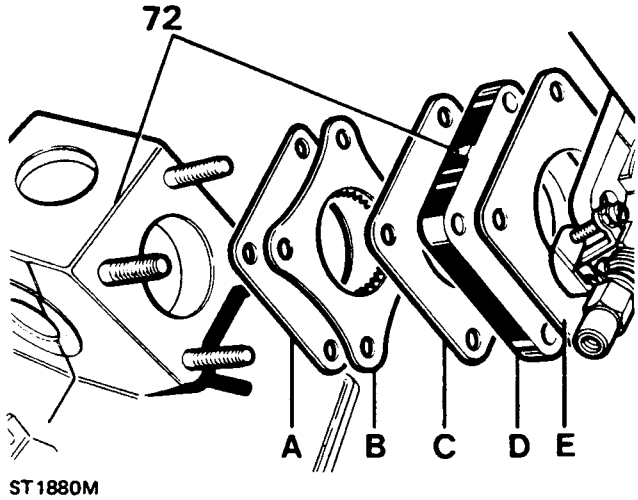
ST1879M

66. Fit the piston key to the carburetter body using a new screw. Tighten the screw and splay the end.
67. Fit a new suction chamber sealing ring to the groove in the carburetter body.
68. To prevent the piston spring being 'wound-up' during assembly, temporarily fit the piston and suction chamber less the spring to the body, and pencil mark the relationship of the chamber to the body. Remove the suction chamber and fit the spring to the piston. Hold the suction chamber above the spring and piston, align the pencil marks and lower the chamber over the spring and piston, taking care not to rotate the suction chamber. Secure the chamber to the body with the three screws, tightening evenly and check that the piston moves freely.
69. Hold the piston at the top of its stroke and fit the spring clip.
70. Fit the piston damper.
71. Using a new joint washer, fit the air intake adaptor and secure with the two nuts and spring washers.

72. Fit the carburetters to the inlet manifold ensuring that the joint washers, deflector and insulator are fitted in the sequence illustrated. The insulator must be fitted with the arrow head uppermost and pointing inwards towards the manifold. Secure with the four nuts and spring washers and tighten evenly to the correct torque.

    A. Joint washer.
    B. Deflector-teeth pointing inwards.
    C. Joint washer.
    D. Insulator.
    E. Joint washer.

73. Connect the linkages, tune and adjust the carburetters.



ST1880M

TUNE AND ADJUST - SU HIF 44 CARBURETTERS

Special tools:

Carburetter balancer 605330 or B89 Non - dispersive infra - red exhaust gas analyser.

General Requirements Prior To Tuning Carburetters.

Accurate engine speed is essential during carburetter tuning, therefore the distributor pick up air gap and ignition timing must be checked together with the vacuum advance system.

Whenever possible the ambient air temperature of the tuning environment should be between 15° to 26° C (60° to 80° F). When checking engine speed, use an independent and accurate tachometer.

Idling adjustments should be carried out on a fully warmed up engine, that is, at least 5 minutes after the thermostat has opened. This should be followed by a run of one minute duration at an engine speed of approximately 2,500 rev/min before further adjustments or checks are carried out. This cycle may be repeated as often as required. It is important that the above cycle is adhered to, otherwise overheating may result and settings may be incorrect. The piston dampers must always be kept topped-up with the correct grade of oil.

Before any attempt is made to check settings a thorough check should be carried out to ensure that the throttle linkage between the pedal and carburetters is free and has no tendency to stick. Ensure that the choke control lever is is pushed fully down.

NOTE: References to left and right hand are as from the drivers seat.

TAMPER - PROOFING

To comply with E.C.E regulations the idle speed and mixture adjusting screws must be tamper - proofed following any adjustments. A red blanking plug; **Part number - JZX 1258** must be fitted into the mixture screw recess and a red cap; **Part number - JZX 1197** fitted over the idle adjustment screw (throttle adjustment screw).

TUNE AND ADJUST

The following instructions apply to both carburetters unless otherwise stated.

CARBURETTER BALANCE

Using **balancer 605330**

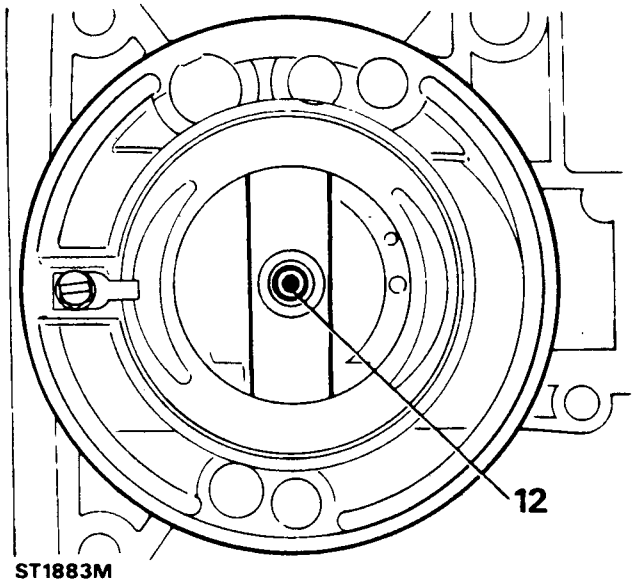
1. Disconnect the inter connecting link between the two carburetters, fit the balancer to the carburetter intakes and ensure that there are no air leaks, if necessary, zero the gauge with the adjustment screw.
2. Start the engine, and if necessary allow it to reach normal operating temperature. If the needle moves to the right, decrease the air flow through the the left hand carburetter by unscrewing the idle screw. Alternatively, increase the air flow through the right hand carburetter by screwing down the idle screw. Reverse the procedure if the pointer moves to the left. When the desired setting has been achieved reconnect the inter connecting link between the two carburetters.

Using **balancer B89**

3. Disconnect the inter-connecting throttle link between the two carburetters.
4. Back-off the idle adjusting screw on each carburetter, clear of the throttle lever.
5. Turn each throttle adjusting screw so that it just touches the throttle lever, then turn the screws by equal amounts to achieve an approximate idle speed of 700 to 800 rev/min.
6. Press the balancer firmly over the carburetter intake. Press or withdraw the control on the side of the balancer to adjust the meter needle reading to approximately half scale, and note the reading.
7. Without altering the position of the balancer control, place the balancer on the second carburetter intake and adjust the idle screw as necessary to achieve the same reading.
8. Alternately, adjust and check the balance of both carburetters until an idle speed of 700 to 800 rev/min is obtained.
9. Reconnect the throttle inter connecting link, and again check the idle speed and balance.

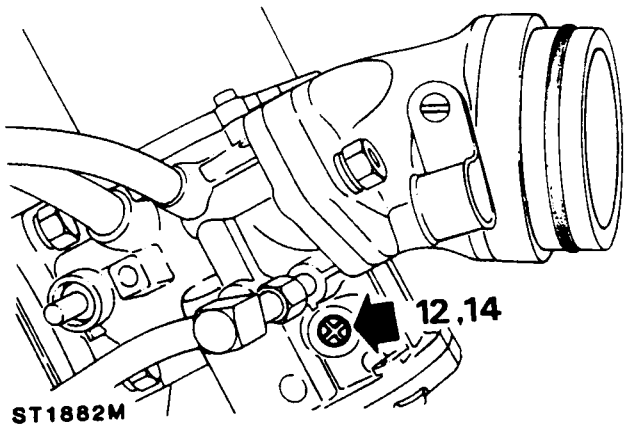
MIXTURE SETTING

10. Ensure that the engine is at normal operating temperature. Remove the air cleaner, air intake elbows and mixture adjustment screw blanking plugs.
11. Mark the relationship of the suction chamber to the carburetter body, remove the retaining screws and lift off the suction chamber complete with pistons.
12. To achieve a datum setting for the mixture screw, turn it anti - clockwise until the jet is level with the carburetter bridge. Check by placing a straight edge across the bridge and adjust as necessary so that the jet just touches the straight edge.



ST1883M

13. Refit the suction chamber and piston, evenly tighten the retaining screws. Check that the piston moves freely without sticking. Top - up the piston damper.
14. Turn the mixture adjustment screw three and one-half turns.



15. Insert the probe of an infra - red exhaust gas analyser as far as possible up the exhaust pipe, start the engine and allow a one and one half minute stabilisation period.
16. Adjust the mixture screw on both carburetters by equal amounts, rich or weak to achieve a CO reading of 0.5 to 2.5%.
17. If after approximately two minutes the CO level is not satisfactory run the engine at 2000 rev/min for one minute to stabilise the equipment, continue the setting procedure until a stable CO reading of 0.5 to 2.5% at an idle speed of 700 - 800 rev/min is obtained.

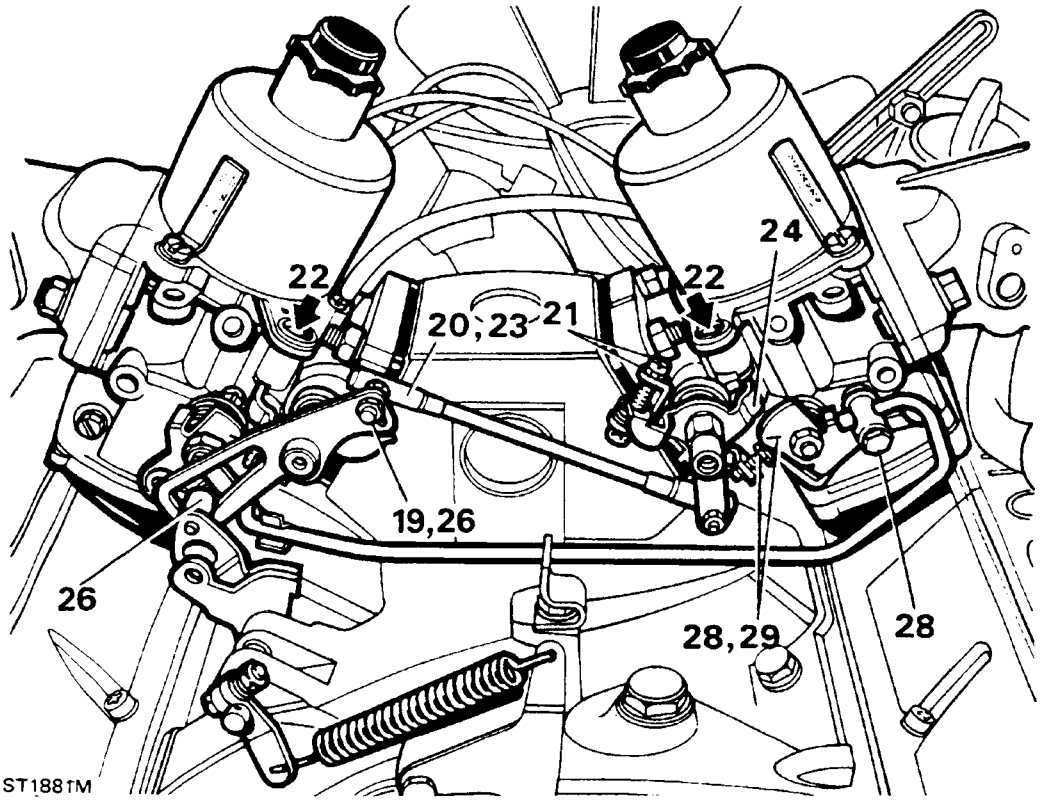
IDLE SPEED AND LINKAGE ADJUSTMENT

18. Check that the engine is at normal operating temperature.
19. **Manual gearbox models-** Slacken the nut, at the left hand carburetter securing the inter-connecting link ball to the throttle cam lever. **Automatic gear box models-** Slacken the lower nut, securing the inter - connecting link ball to the throttle lever at the right hand carburetter.
20. Disconnect the inter - connecting link between the carburetters at the left hand carburetter.
21. At the right hand carburetter, release the lock nut and slacken off the lost motion adjustment screw, until it is well clear of the spring loaded pad.
22. If necessary adjust the idle screw to maintain the correct idle speed. Check the CO level and carburetter balance, adjust if required.
23. Re - connect the inter - connecting link to the left hand carburetter.
24. Hold the right hand throttle lever against the idle screw stop and adjust the lost motion screw until contact is made with the spring loaded pad, tighten the lock nut.
25. Check the idle speed and balance. Adjust the lost motion screw to restore balance if necessary.
26. **Manual gearbox models-**Ensuring that the roller is firmly seated in the lower corner of the cam lever, tighten the nut which secures the inter - connecting link ball to the cam lever.
    Automatic gearbox models-Ensuring that the kick down cable linkage is firmly on its idle stop, tighten the inter - connecting link ball securing nut at the right hand carburetter.

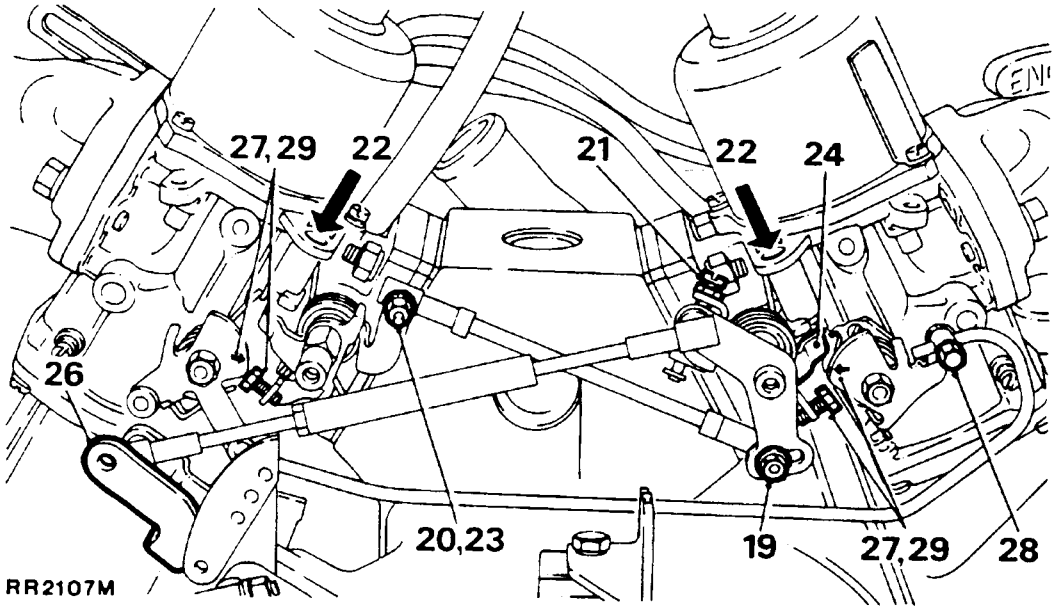
FAST IDLE ADJUSTMENT

27. Pull out the cold start control (choke) until the scribed line on the left hand fast idle cam is in-line with the centre of the fast idle screw head.
28. Check that the scribed line on the right hand fast idle cam is similarly in-line with the fast idle screw head. If there is mis-alignment, slacken the fast idle cam link rod screw at the right hand carburetter and move the cam until the scribed line coincides with the centre of the screw head. Tighten the cam rod screw.
29. Turn each fast idle screw clockwise until just clear of the cam.
30. Turn the fast idle screw of the leading (left-hand) carburetter down (clockwise) until a slight change in engine speed is noted.
31. Similarly turn the fast idle screw of the second carburetter (right-hand) down until a further slight change of engine speed is noted.
32. Adjust the fast idle screws of both carburetters by equal amounts to achieve a fast idle speed of 1100 to 1150 rev/min.
33. Push the cold start (choke) fully home then pull it out again to its full extent and re-check the fast idle speed.

MANUAL GEARBOX MODELS



AUTOMATIC GEARBOX MODELS



34. Fit the appropriate blanking plug and cap to the mixture screw recess and idle adjusting screw.

35. Fit the carburetter air intake elbows and air cleaner.

FUEL PIPE LAYOUT

Fuel injection, Carburetter and Diesel models.

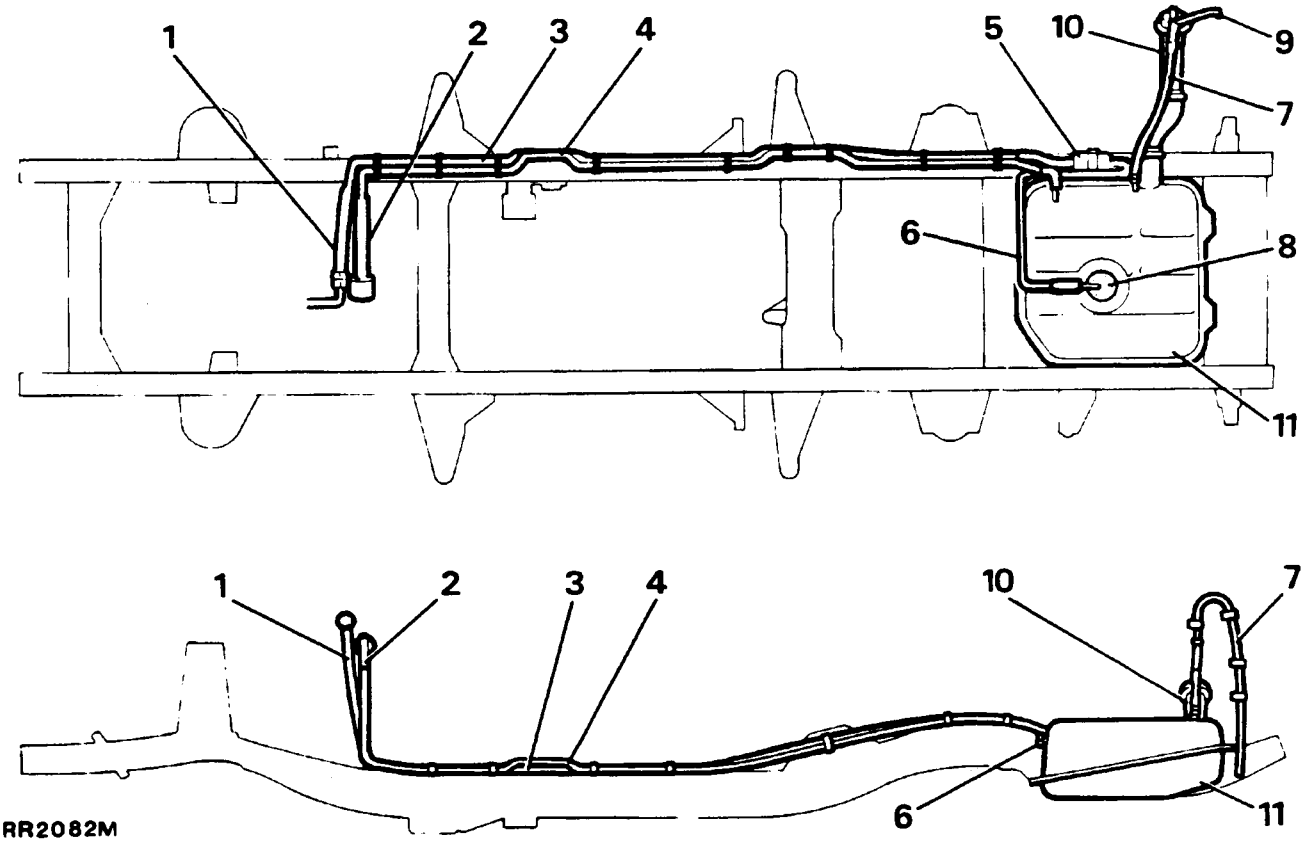
WARNING: The spillage of fuel during the disconnection of any of the pipes in the fuel system is unavoidable, ensure that all necessary precautions are taken to prevent fire or explosion.

FUEL INJECTION MODELS

NOTE: Depressurise the fuel system before attempting to disconnect any pipes within the fuel system.

KEY

1. Fuel feed hose to fuel rail.
2. Spill return hose to fuel tank.
3. Rigid fuel feed pipe.
4. Rigid spill return pipe.
5. Fuel filter.
6. Rigid fuel feed pipe to filter.
7. Breather hose.
8. In-tank fuel pump.
9. Breather valve and pipes (To evaporative loss system - when system fitted).
10. Fuel filler neck.
11. Fuel tank.

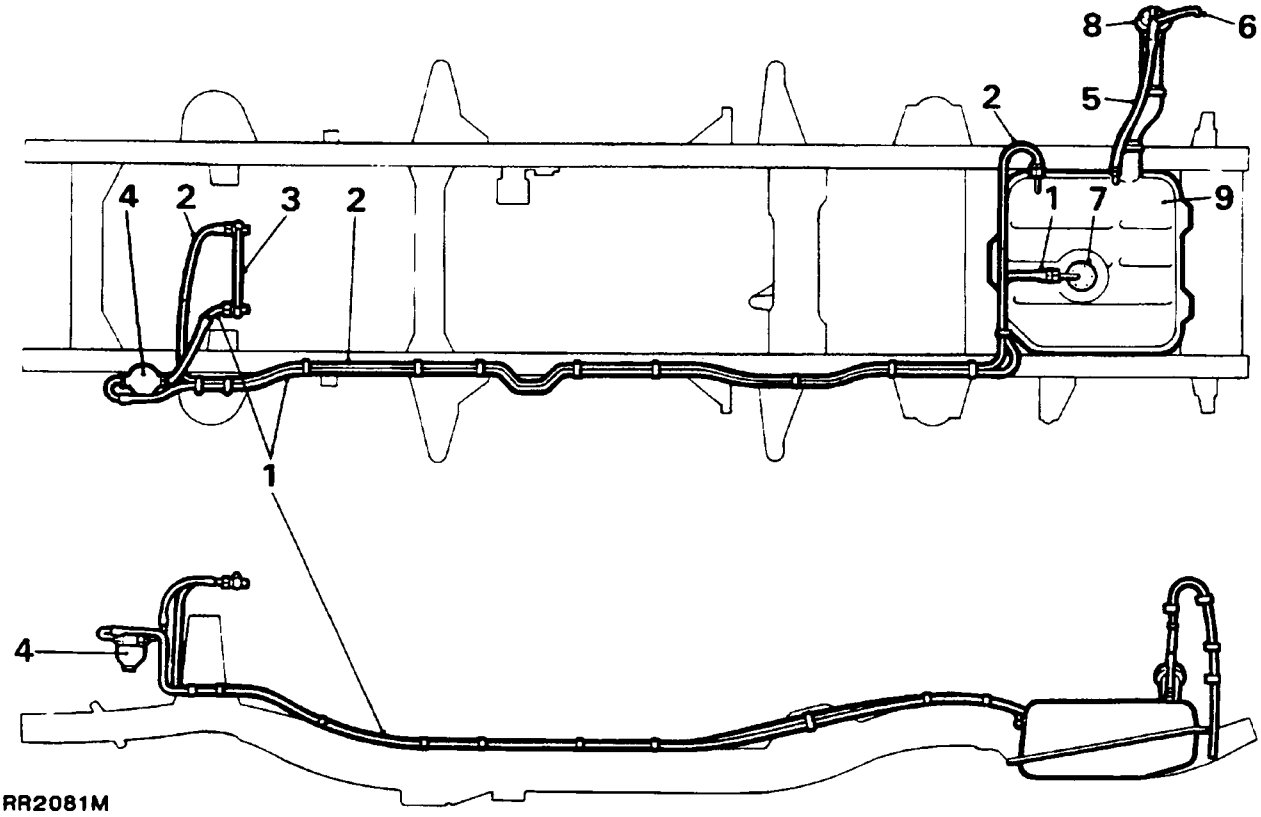


RR2082M

CARBURETTER MODELS

KEY

1. Fuel feed pipe.
2. Spill return pipe.
3. Fuel feed balance pipe.
4. Fuel filter.
5. Breather hose.
6. Breather valve and pipes (To evaporative loss system - when system fitted).
7. In-tank fuel pump.
8. Fuel filler neck.
9. Fuel tank.

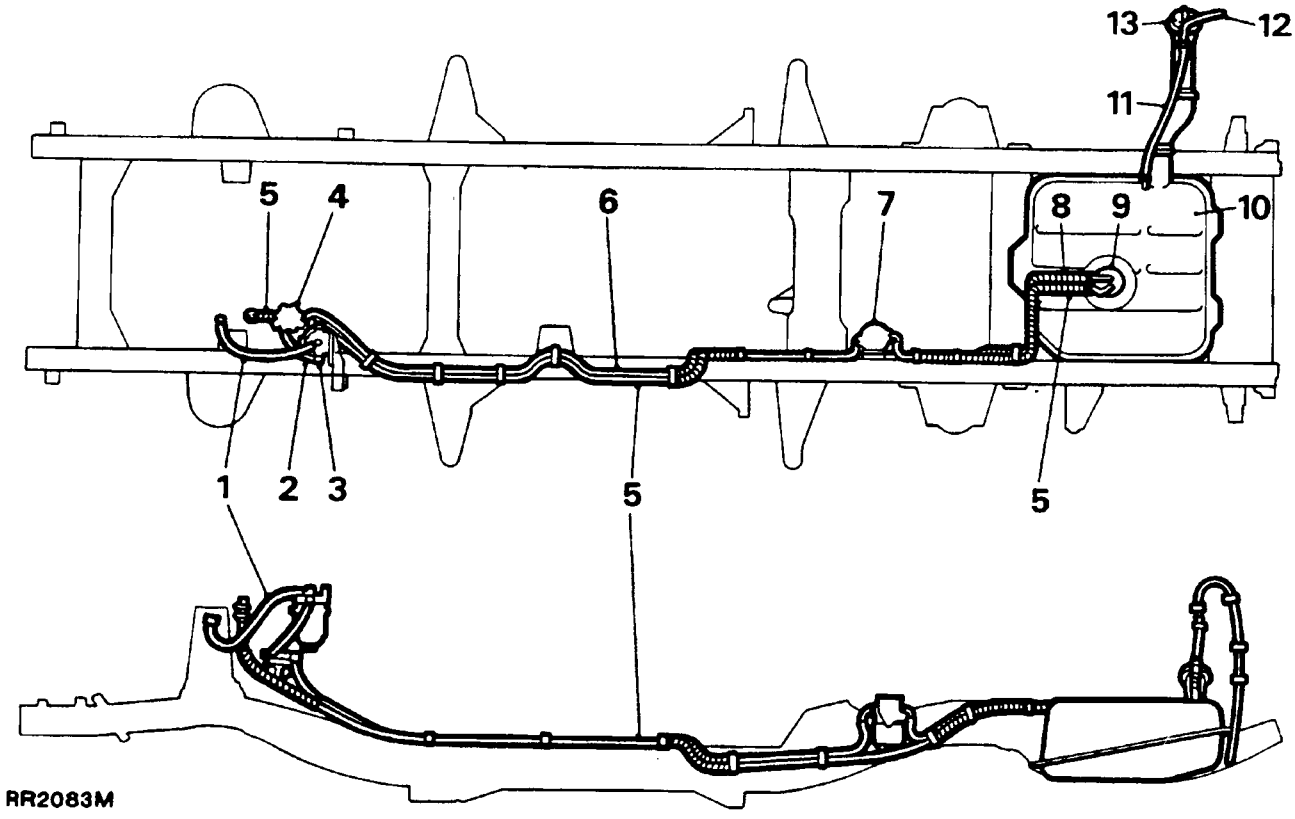


RR2081M

DIESEL MODELS

KEY

1. Fuel feed pipe to distributor pump.
2. Fuel feed pipe - lift pump to filter.
3. Fuel filter.
4. Lift pump.
5. Spill return pipe.
6. Fuel feed - sedimenter to lift pump.
7. Sedimenter.
8. Fuel feed pipe - fuel tank to sedimenter.
9. Assembly - fuel pick-up pipes.
10. Fuel tank.
11. Breather hose.
12. Breather valve and pipes.
13. Fuel filler neck.



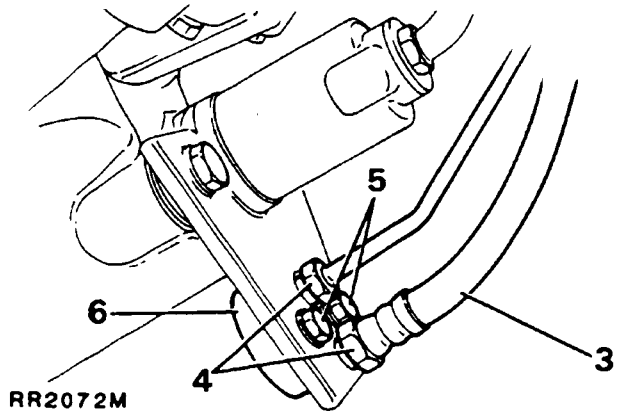
RR2083M

HYDRAULIC DAMPER
(Diesel models only)

Remove and refit

Removing

1. Raise the vehicle on a suitable hydraulic ramp.
2. Thoroughly clean the area around the slave cylinder and damper.
3. Using a recognised hose clamp, clamp the flexible hose to prevent excessive loss of hydraulic fluid.
4. Remove the flexible hose and rigid fluid pipe from the damper.
5. Remove the two bolts securing the damper to the mounting bracket.
6. Withdraw the damper.



Refitting

7. Reverse the removal procedure.
8. Bleed the clutch hydraulic system. (Refer to main workshop manual).
9. Inspect for fluid leaks around hose and pipe connections.

STEERING	Nm	lbf ft	lbf in
Ball joint nuts	40	30	-
Clamp bolt nuts	14	10	-
Steering column bracket nuts	27	20	-
Steering wheel nut	38	28	-
Universal joint pinch bolt	35	26	-
PAS box			
- Drop arm nut	176	130	-
- Sector shaft cover to steering box	22-27	16-20	-
- Steering box to chassis	81	60	-
- Steering box fluid pipes 14mm thread	15	11	-
- Steering box fluid pipes 16mm thread	20	15	-
- Tie bar to steering box	81	60	-
PAS pump			
- High pressure fluid pipe	20	15	-
- Power steering pump mounting	35	26	-
- Pulley bolts, power steering pump	8-12	6-9	-
- Hose clamp	3	-	27
PAS reservoir			
- Hose clamp	3	-	27

STEERING WHEEL

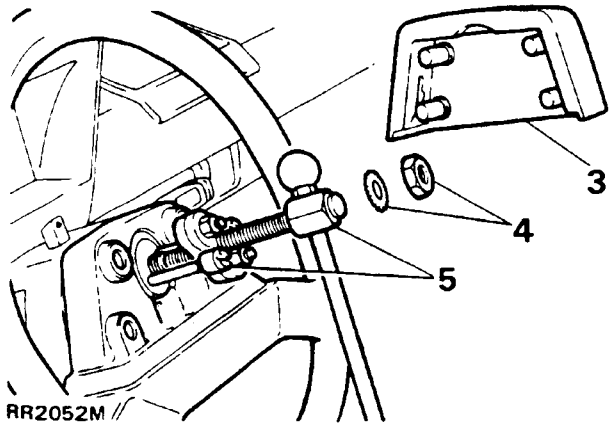
Remove and refit

Removing

Service Tools:
18G 1014 Steering wheel remover
18G 1014-2 Adaptor pins

NOTE: The steering column is of a 'safety' type and incorporates shear pins. Therefore do not impart shock loads to the steering column during removing and refitting the steering wheel or at any time.

1. Disconnect the battery negative lead.
2. Ensure the road are in the straight ahead position to enable the steering wheel to be fitted in its correct location on re-assembly.
3. Carefully ease the centre trim pad off the steering wheel.
4. Restraining the steering wheel remove retaining nut and serrated washer.
5. Extract the steering wheel using service tool 18G 1014. Ensure the extractor pins are inserted in the threads up to the shoulder of the pins.



Refitting

6. Ensure the road wheels are in the straight ahead position.

CAUTION: Do not apply shock loads to the steering wheel to ensure that it is firmly fitted in position.

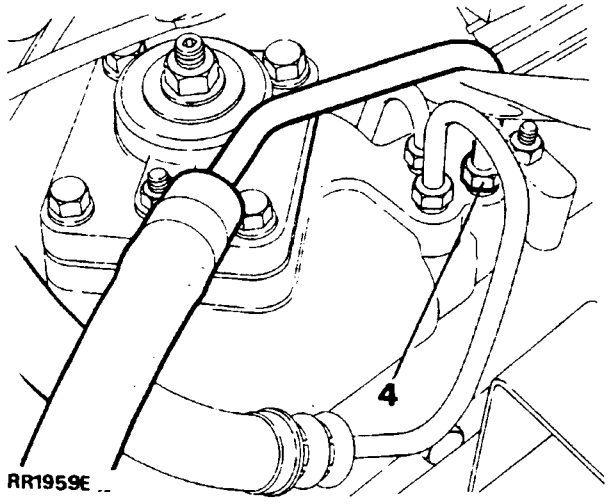
7. Place the steering wheel on the column splines, fit the nut and washer and tighten to the specified torque.
8. Refit the steering wheel centre cover.
9. Re-connect the battery.

POWER STEERING FLUID RESERVOIR

Remove and refit

Removing

1. Place a drain tray beneath the power steering box.
2. Prop open the bonnet.
3. Remove the reservoir filler cap.
4. Disconnect the fluid return hose from the power steering box. Drain the fluid completely from the reservoir and reconnect the hose.

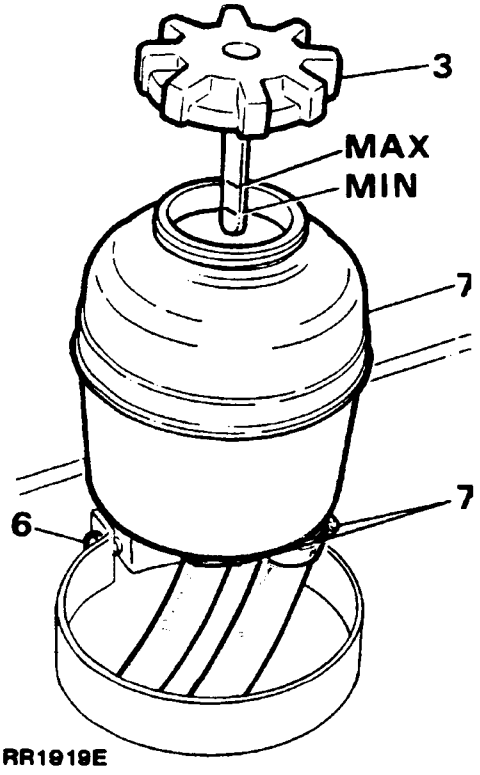


CAUTION: Power steering fluid is corrosive. Should any fluid seep onto paintwork, chassis or any other component immediately wipe clean. It is most important that any power steering fluid drained from the power steering system is not re-used.

5. Carefully dispose of unwanted fluid.
6. Release the pinch bolt and remove the reservoir from the bracket.

7. Release the hose clips and remove the flexible hoses, with draw the the reservoir from the engine compartment.

NOTE: If the reservoir is not to be refitted immediately, the hoses must be sealed to prevent the ingress of foreign matter.



RR1919E

NOTE: The reservoir contains an integral filter which is not serviceable, however, in normal use the reservoir unit should last the life of the vehicle.
Should the power steering system malfunction and under inspection it is found that the steering fluid has been contaminated by foreign matter the fluid reservoir MUST be renewed.

Refitting

8. Reconnect the flexible hoses to the reservoir. Tighten the hose clips securely.
9. Fit the reservoir to the bracket and tighten the pinch bolt securely.
10. Fill the reservoir to the prescribed level on the dipstick with the recommended fluid. Bleed the power steering system. (See recommended fluids and bleed procedure in main workshop manual).
11. Fit the reservoir filler cap.
12. Close the bonnet.

POWER STEERING PUMP DRIVE BELT (Petrol models only)

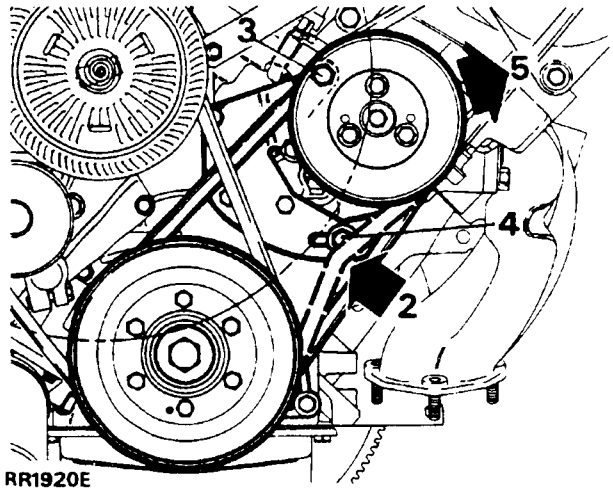
Adjust

Procedure

1. Prop open the bonnet and disconnect the battery negative lead.
2. Check, by thumb pressure, the belt tension between the crankshaft and the pump pulley. There should be a free movement of between 11 to 14mm (0.437 to 0.562 in).

CAUTION: To prevent damage occurring to the steering pump DO NOT use a lever on the outer casing of the pump when tensioning the belt.

3. Slacken the two nuts at the side of the pump to enable the pump to be pivoted.
4. Slacken the bolt securing the pump lower bracket to the slotted adjustment link.
5. Pivot the pump (in the direction of the bold arrow) as necessary and adjust until the correct belt tension is obtained.



RR1920E

6. Maintaining the tension, tighten the pump adjusting bolt and the top pivot nuts.

NOTE: Check the alternator drive belt tension after adjusting the power steering pump belt.

7. Reconnect the battery negative lead and close the bonnet.

POWER STEERING PUMP DRIVE BELT (Petrol models only)

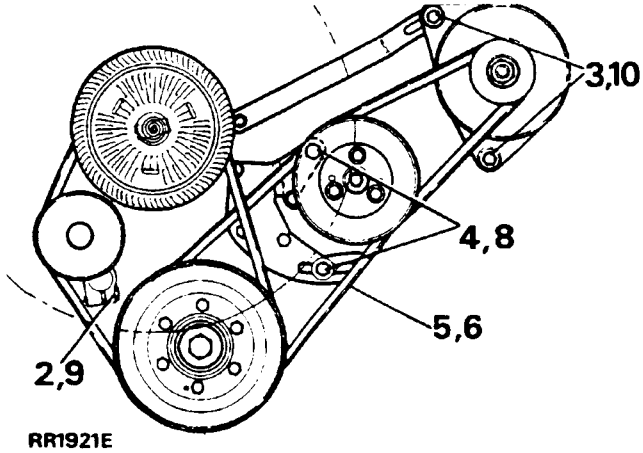
Remove and refit

Removing or preparing for the fitting of a new belt.

1. Prop open the bonnet and disconnect the battery negative lead.
2. Slacken the jockey pulley bolt and remove the fan belt.
3. Slacken the alternator mountings and remove the drive belt.
4. Slacken the power steering pump mountings.
5. Pivot the pump and remove the drive belt.

Refitting

6. Locate the driving belt over the crankshaft and pump pulleys.
7. Adjust the position of the pump to give a driving belt tension of 11 to 14mm (0.437 to 0.562 in) movement when checked by thumb pressure midway between the crankshaft and pump pulleys.



RR1921E

CAUTION: To prevent damage occurring to the steering pump DO NOT use a lever on the outer casing of the pump when tensioning the belt.

8. Maintaining the tension, tighten the pump adjusting bolt and the top pivot nut.
9. Refit the fan belt and adjust the tension to give 11 to 14mm (0.437 to 0.562 in) movement when checked by thumb pressure midway between the crankshaft and wear pump pulleys.
10. Refit the alternator drive belt and adjust to give 11 to 14mm (0.437 to 0.562 in) movement when checked midway between the power steering pump and alternator pulleys.

NOTE: Whenever a new belt is fitted, it is most important that its adjustment is rechecked after approximately 1,500 km (1,000 miles) running.

11. Reconnect the battery negative lead and close the bonnet.

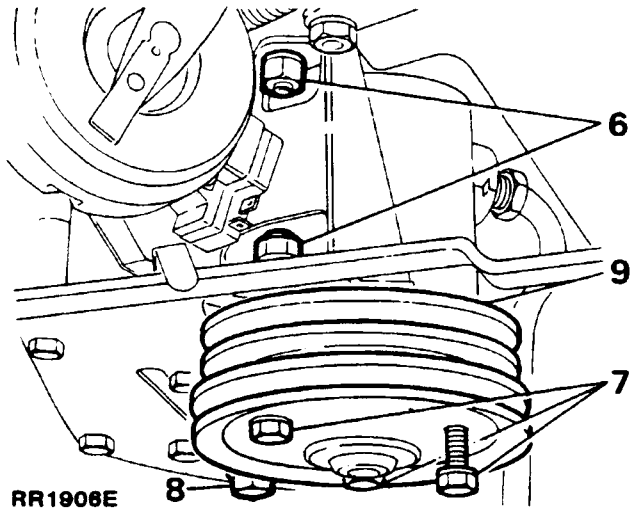
POWER STEERING PUMP
(Petrol models only)

NOTE: The power steering pump is not a serviceable item. In the event of failure or damage a new pump must be fitted.

Remove and refit

Removing

1. Disconnect the battery negative lead.
2. Slacken the alternator pivot bolts and adjustment link bolts, pivot the alternator inwards and remove the drive belt.
3. Slacken the water pump drive belt jockey pulley and remove the drive belt.
4. Remove the left hand bank spark plug leads and detach the distributor cap, place the leads and cap to one side.
5. Disconnect the electrical plug from the distributor amplifier unit.
6. Slacken the two nuts securing the power steering pump pivot bracket.
7. Release the three bolts securing the pulley to the steering pump, do not remove them at this stage.
8. Release the bottom adjustment bolt below the steering pump and pivot the pump inwards towards the water pump to enable the drive belt to be removed.



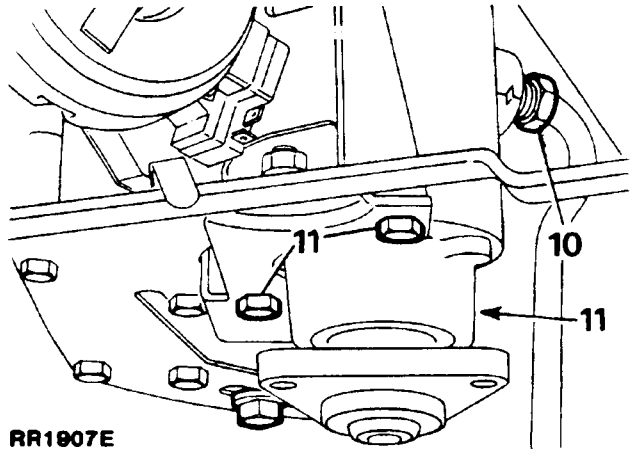
RR1906E

9. Remove the three bolts with plain washers retaining the pulley to the pump and withdraw the pulley.

NOTE: Place a drain tray under the vehicle to catch any power steering fluid which will seep from the pump when the fluid pipe is disconnected. Wipe away any fluid which comes into contact with paintwork or other components.

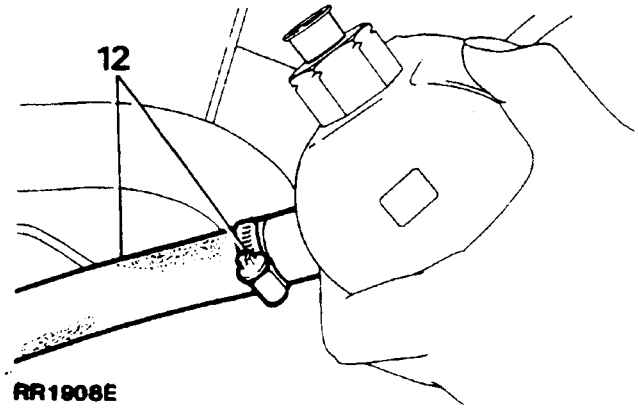
CAUTION: Under no circumstances must the fluid be re-used.

10. Disconnect the fluid pipe from the side of the pump, plug the pipe and pump apertures to prevent ingress of dirt.
11. Remove the three bolts securing the pump to the pivot bracket, manoeuvre the pump out of the bracket and withdraw it from the engine compartment as far as the remaining connected fluid hose will permit.



RR1907E

12. Release the clip securing the hose to the pump, remove the hose and plug both apertures to prevent ingress of dirt.



Refitting

13. Remove the plug from the fluid hose and secure the hose to a **NEW** pump. Tighten the hose clip securely.
14. Manoeuvre the pump into the pivot bracket and secure in position with the three retaining bolts. Tighten the bolts to the specified torque.
15. Remove the plugs from the fluid pipe and steering pump apertures and fit the pipe. Tighten the pipe securely.
16. Fit the pulley to the steering pump drive flange, coat the three bolts with Loctite and fit to the steering pump, do not fully tighten the bolts at this stage.
17. Refit the crankshaft to steering pump drive belt, pivot the steering pump outwards to tension the belt, tighten the pivot bolts securely. Check that the belt deflects approximately 11 to 14 mm (0.437 to 0.562) when checked by thumb pressure midway between the crankshaft and pump pulleys.
18. Tighten the three steering pump pulley retaining bolts to the specified torque.
19. Reverse the remaining removal instructions.
20. Bleed the power steering system.
21. Test the power steering system for leaks with the engine running, holding the steering on full lock in both directions.

CAUTION: Do not maintain this pressure for more than 30 seconds in any one minute, to avoid causing the oil to overheat and possible damage to the seals.

22. Close the bonnet.
23. Road test the vehicle.

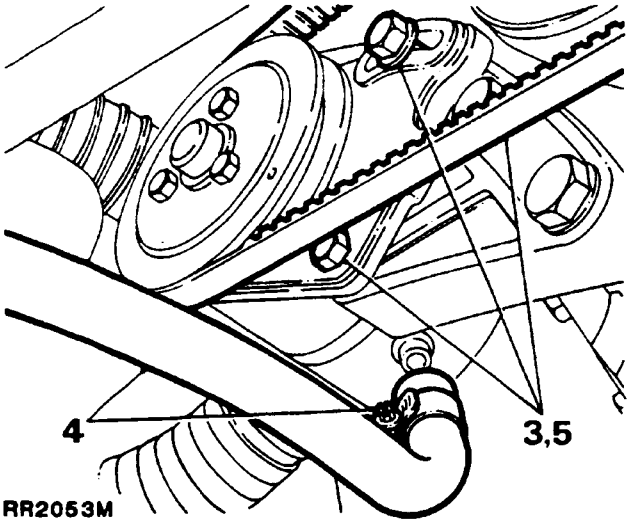
POWER STEERING PUMP
(Diesel models only)

NOTE: The power steering pump is not a serviceable component, in the event of failure or damage a new pump must be fitted.

Remove and refit

Removing

1. Access to the steering pump is gained from beneath the vehicle.
2. Install the vehicle on a suitable hydraulic ramp, apply the handbrake and disconnect the battery negative terminal.
3. Release the pump pivot and adjustment bolts, detach the drive belt.
4. Place a drain tray beneath the vehicle to catch any fluid which may seep from the pump. Release the hose clip and remove the bottom hose from the pump, quickly seal both hose and pump aperture to prevent excessive loss of fluid and ingress of foreign matter.
5. Remove the pivot and adjustment bolts, manoeuvre the pump until access is gained to the fluid pipe at the rear of the pump.



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6. Remove the bolt and release the banjo fitting, seal both hose and pump aperture to prevent ingress of foreign matter.
7. Withdraw the pump from the vehicle.

Refitting

8. Reverse the removal instructions ensuring that the hoses are fitted securely.
9. Tension the drive belt until deflection is between 7 to 12 mm (.275 to .472 inch) at mid point on the longest run of the belt, tighten the adjustment bolts.

CAUTION: To prevent damage occurring to the steering pump DO NOT use a lever on the outer casing of the pump when tensioning the belt.

10. Replenish the steering fluid reservoir with the recommended fluid. (Refer to main workshop manual).
11. Bleed the power steering system.(Refer to main workshop manual).
12. Test the power steering system for leaks with the engine running, holding the steering on full lock in both directions.

CAUTION: Do not maintain this pressure for more than 30 seconds in any one minute, to avoid causing the fluid to overheat, which could result in possible damage to the seals.

POWER STEERING

FAULT DIAGNOSIS

SYMPTOM	CAUSE	TEST ACTION	CURE
INSUFFICIENT POWER ASSISTANCE WHEN PARKING	(1) Lack of fluid	Check hydraulic fluid reservoir level	If low, fill and bleed the system
	(2) Driving belt	Check belt tension	Adjust the driving belt
	(3) Defective hydraulic pump	(a) Fit pressure gauge between high pressure hose and steering pump with steering held hard on full lock, see Note 1 and 'Power Steering System Test'	If pressure is outside limits (high or low) after checking items 1 and 2, see Note 2
		(b) Release steering wheel and allow engine to idle. See 'Power Steering System Test'	If pressure is greater, check box for freedom and self-centering action
POOR HANDLING WHEN VEHICLE IS IN MOTION	Lack of castor action	This is caused by over-tightening the rocker shaft backlash adjusting screw on top of steering box.	It is most important that this screw is correctly adjusted. See instructions governing adjustment
HYDRAULIC FLUID LEAKS	Damaged pipework, loose connecting unions etc.	Check by visual inspection; leaks from the high pressure lines are best found while holding the steering on full lock with engine running at fast idle speed (See Note 1).	Tighten or renew as necessary
NOTE: Leaks from the steering box tend to show up under low pressure conditions, that is, engine idling and no pressure on steering wheel.		Check 'O' rings on pipework	Renew as necessary

SYMPTOM	CAUSE	TEST ACTION	CURE
EXCESSIVE NOISE	(1) If the high pressure hose is allowed to come into contact with the body shell, or any component not insulated by the body mounting, noise will be transmitted to the car interior	Check the loose runs of the hoses	Alter hose route or insulate as necessary
	(2) Noise from hydraulic pump	Check oil level and bleed system	If no cure, change hydraulic pump

Note 1. Never hold the steering wheel on full lock for more than 30 seconds in any one minute, to avoid causing the oil to overheat and possible damage to the seals.

Note 2. High pressure- In general it may be assumed that excessive pressure is due to a fault in the hydraulic pump.
Low pressure- Insufficient pressure may be caused by one of the following:

1. Low fluid level in reservoir) Most usual cause of
2. Pump belt slip) insufficient pressure
3. Leaks in the power steering system
4. Hydraulic pump not delivering correct pressure
5. Fault in steering box valve and worm assembly
6. Leak at piston sealing in steering box
7. Worn components in either steering box or hydraulic pump

Steering pump

Make/type	Hobourn series 200
Operating pressure - straight ahead position - at idle	7 kgf/cm^2 (100 p.s.i.) maximum
Full lock (left or right) at idle	28 kgf/cm^2 (400 p.s.i.) minimum
Full lock (left or right) 1000 rev/min	70-77 kgf/cm^2 (1000-1100 p.s.i.)

BRAKE SYSTEM

Description

The hydraulic braking system fitted to the Range Rover is of the dual line type, incorporating primary and secondary hydraulic circuits.

NOTE: References made to primary and secondary do not imply main service brakes or emergency brakes but denote hydraulic line identification.

The brake pedal is connected to a vacuum-assisted mechanical servo which in turn operates a tandem master cylinder. The front disc brake calipers each house four pistons, the upper pistons are fed by the primary hydraulic circuit, the lower pistons by the secondary hydraulic circuit. The rear disc brake calipers each house two pistons and these are fed by the secondary hydraulic circuit via a pressure reducing valve.

A brake failure switch incorporated in the master cylinder will illuminate a panel warning light if a failure occurs in either the primary or secondary hydraulic circuits.

The brake fluid reservoir is divided, the front section (section closest to the servo) feeds the primary circuit and the rear section feeds the secondary circuit. Under normal operating conditions both the primary and secondary hydraulic circuits operate simultaneously on brake pedal application. In the event of a failure in the primary circuit the secondary circuit will still function and operate front and rear calipers.

Alternatively, if the secondary circuit fails, the primary circuit will still function and operate the upper pistons in the front calipers.

If the servo should fail, both hydraulic circuits will still function but would require greater pedal pressure.

The handbrake is completely independent of the hydraulic circuits.

Brake pad wear sensors are incorporated into the front and rear right hand side, inboard brake pads. The sensors will illuminate a brake pad wear warning light in the instrument binnacle, when pad thickness has been reduced to approximately 3mm (0.118 in).

CAUTION: THOROUGHLY CLEAN ALL BRAKE CALIPERS, PIPES AND FITTINGS BEFORE COMMENCING WORK ON ANY PART OF THE BRAKE SYSTEM. FAILURE TO DO SO COULD CAUSE FOREIGN MATTER TO ENTER THE SYSTEM AND CAUSE DAMAGE TO SEALS, AND PISTONS WHICH WILL SERIOUSLY IMPAIR THE BRAKE SYSTEM EFFICIENCY.

To ensure the brake system efficiency is not impaired the following warnings must be adhered to:-

WARNING:

DO NOT use brake fluid previously bled from the system.

DO NOT use old or stored brake fluid.

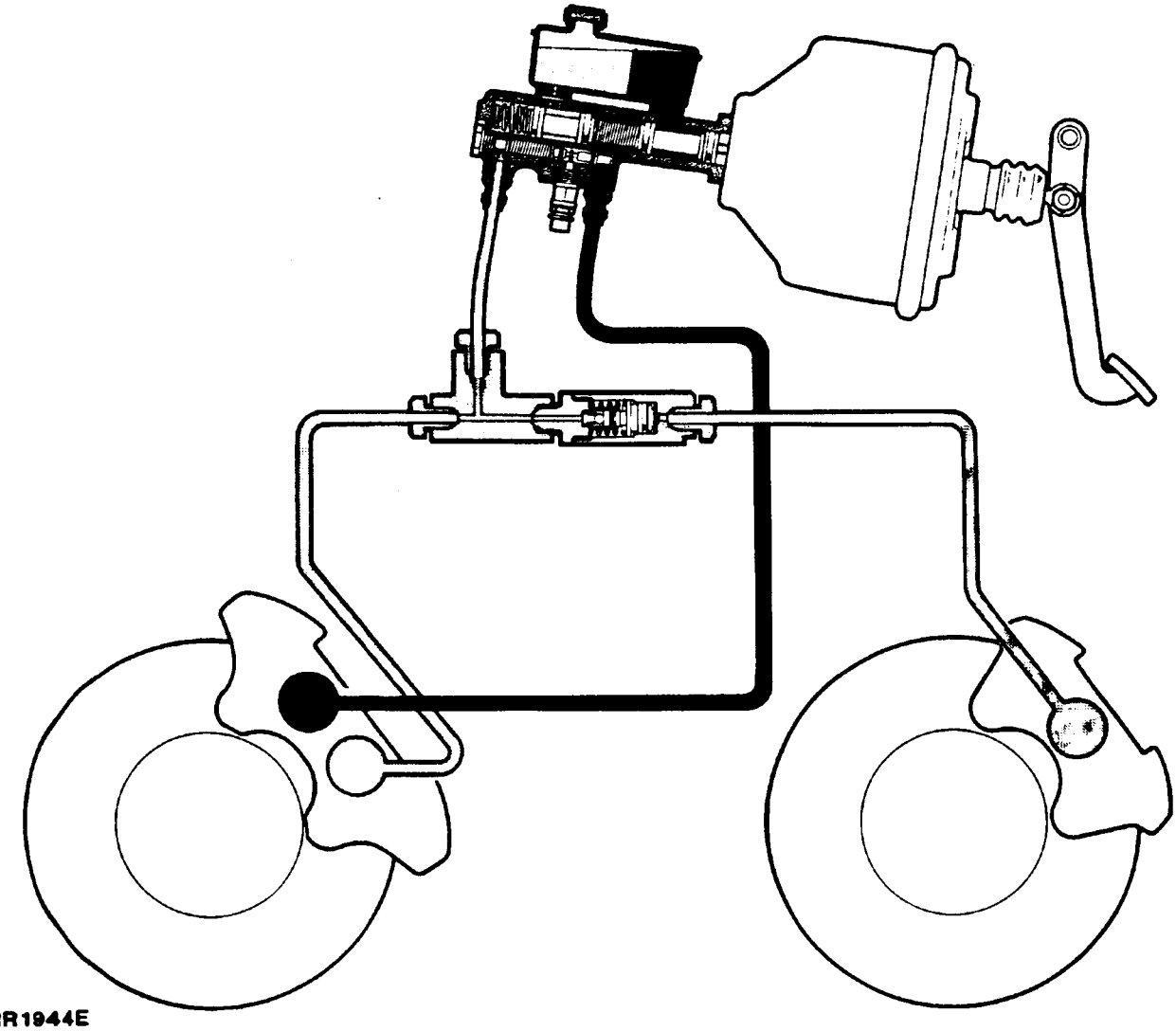
ENSURE that only new fluid is used and that it is taken from a sealed container.

DO NOT flush the brake system with any fluid other than the recommended brake fluid.

The brake system should be drained and flushed at the recommended service intervals.

PRIMARY HYDRAULIC CIRCUIT

SECONDARY HYDRAULIC CIRCUIT



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WARNING: Some components on your vehicle, such as gaskets and friction surfaces (brake linings, clutch discs or automatic transmission brake bands), may contain asbestos. Inhaling asbestos dust is dangerous to your health and the following essential precautions must be observed:-

• Work out of doors or in a well ventilated area and wear a protective mask.

• Dust found on the vehicle or produced during work on the vehicle should be removed by extraction and not by blowing.

• Dust waste should be dampened, placed in a sealed container and marked to ensure safe disposal.

• If any cutting, drilling etc., is attempted on materials containing asbestos the item should be dampened and only hands tools or low speed power tools used.

HANDBRAKE CABLE

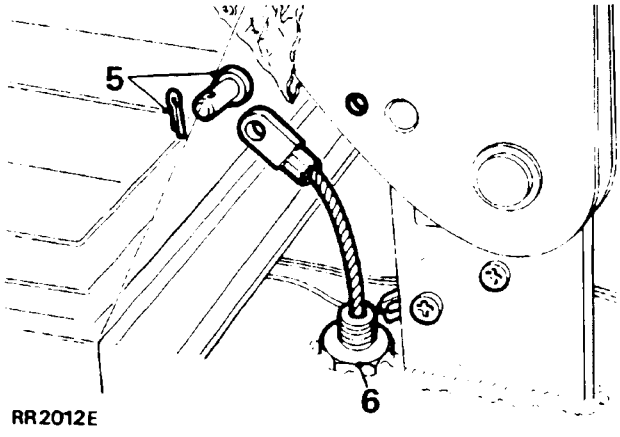
Remove and refit

Removing

1. Set the vehicle on level ground and chock the road wheels and select 'P' in the main gearbox.
2. Disconnect the battery negative terminal and release the handbrake.

From inside the vehicle

3. Remove the four screws securing the liner in the cubby box.
4. Lift out the liner to gain access to the bottom of the handbrake pivot bracket.
5. Remove the split pin and clevis pin from the handbrake lever.
6. Release the nut securing the handbrake outer cable to the top of the handbrake mounting bracket. Slide the nut up the cable and push the inner and outer cable through the floor panel to the underside of the vehicle.



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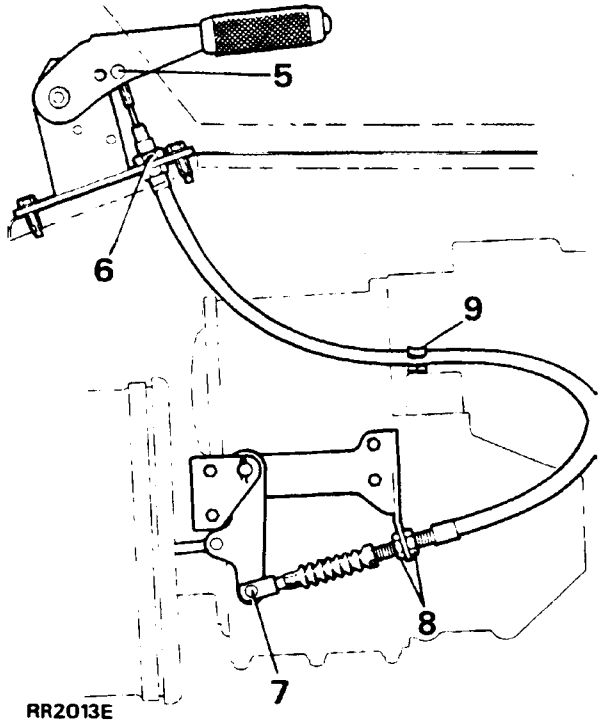
From underneath the vehicle

7. Remove the split pin, plain washer and clevis pin securing the adjustment link to the brake drum actuating lever.
8. Release the locknuts securing the handbrake outer cable to the retaining bracket.
9. Release the outer cable from the 'P' clip located on top of the transfer gearbox, and withdraw the cable assembly from the vehicle.



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Fit new cable

10. Feed the handbrake cable assembly through the floor aperture and secure the outer cable in position with the retaining nut.
11. Secure the cable to the handbrake lever, using a new split pin.
12. Secure the outer cable into the 'P' clip.
13. Position the outer cable into the retaining bracket bolted to the side of the transfer gearbox and loosely secure in position with the two outer cable lock nuts.
14. Reconnect the outer cable to the brake drum actuating lever. Fit the clevis pin, plain washer and new split pin.
15. Rotate the brake drum adjuster clockwise until the brake shoes are fully expanded against the drum.
16. Tighten the two brake cable outer lock nuts to secure the cable to its mounting bracket.

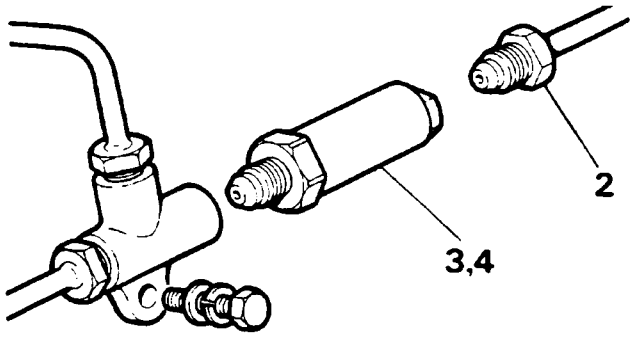
17. Apply the handbrake, and slacken the brake drum adjuster until the handbrake lever fully operates the brake shoes on the second or third notch of the handbrake ratchet.
18. Refit the cubby box liner.

BRAKE PRESSURE REDUCING VALVE

Remove and refit

Removing

1. Remove all dust, grime, etc., from the vicinity of the pressure reducing valve fluid pipe unions.
2. Disconnect the outlet fluid pipe from the pressure reducing valve. Plug the pipe and reducing valve port to prevent the ingress of foreign matter.
3. Remove the valve from the three-way connector and plug both apertures.
4. Withdraw the pressure reducing valve from the engine compartment.



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Refitting

5. Reverse the removal instructions.
6. Bleed the brake systems.

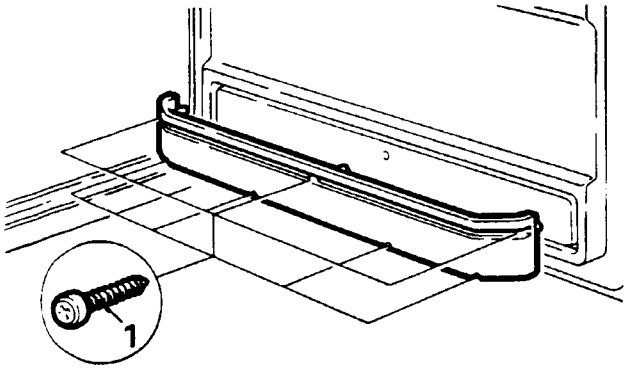
NOTE: The pressure reducing valve is not a serviceable item, in the event of failure or damage, a new unit must be fitted.

FRONT DOOR STOWAGE BINS

Remove and refit

Removing

1. Remove the seven fixings securing the stowage bin to the inner door trim pad.
2. Withdraw the stowage bin.



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Refitting

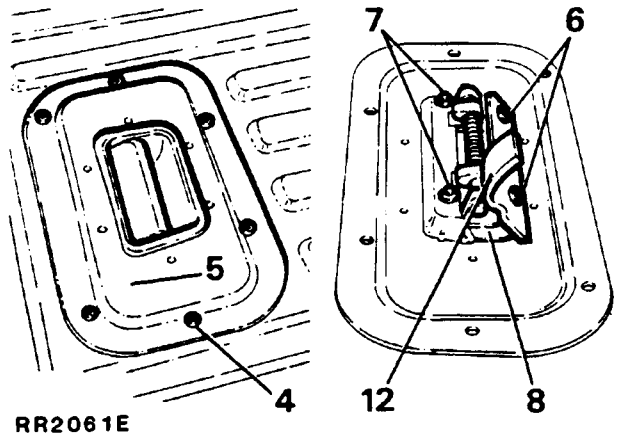
3. Reverse the removal procedure.

LOWER TAILGATE RELEASE MECHANISM

Remove and refit

Removing

1. Open and raise the upper tailgate.
2. Release and lower, the lower tailgate.
3. Lift the trim panel off the tailgate inner panel.
4. Remove the screws securing the lock cover plate.
5. Remove the cover plate complete with handle release mechanism.
6. Remove the two screws and detach the handle release actuator lever.
7. Remove the two nyloc nuts and detach the handle release retaining bracket.
8. Withdraw the handle release mechanism from the cover plate.



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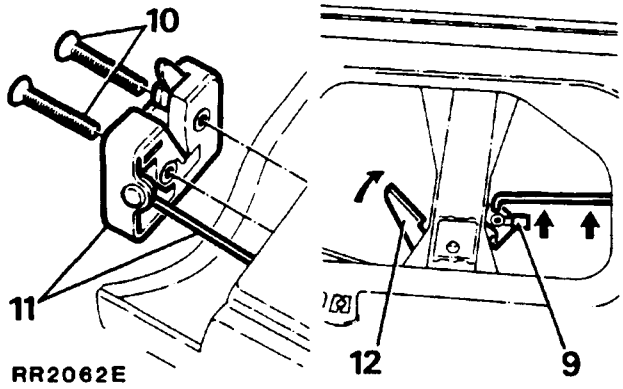
9. Release the spring clips securing the operating rods to the internal tailgate release mechanism.
10. Remove the screws securing the exterior locks at either side of the tailgate.
11. Withdraw the exterior locks with operating rods.



RR2062E

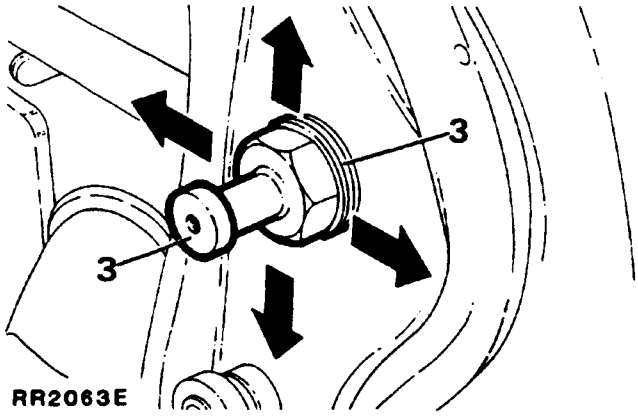
Refitting

12. Reverse the removal procedure, lightly grease the handle release actuator lever and internal tailgate operating lever.

LOWER TAILGATE STRIKER ADJUSTMENT

Adjust

1. Open and raise upper tailgate.
2. Open and lower, lower tailgate.
3. Release the striker and move in the appropriate direction, either add or subtract spacing washers between the striker and tailgate aperture.
4. Adjustment is correct when outer profile of tailgate panel aligns with both rear body corner panels.



ASSISTED BONNET LIFT

Remove and refit

Removing

CAUTION: The assisted lift mechanism of the bonnet eases the bonnet open and lift procedure. When the bonnet is fully open, secure the bonnet stay in position. The assisted lift mechanism alone WILL NOT retain the bonnet in its upright position.

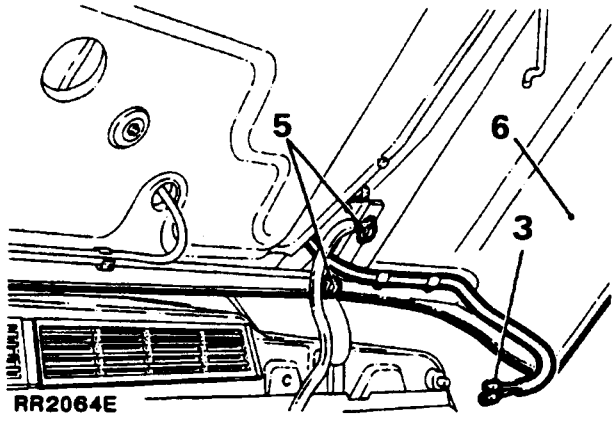
1. Carefully prise the wiper arms off the spindle bosses, noting their position for re-assembly.
2. Raise the bonnet and disconnect the battery negative terminal.
3. Disconnect the electrical lead to the bonnet illumination lamp.
4. Disconnect the screen washer fluid feed pipe at the 'T' joint, remove the feed pipe from the bonnet retaining clip.

NOTE: The removal of the bonnet will require the assistance of a second person.

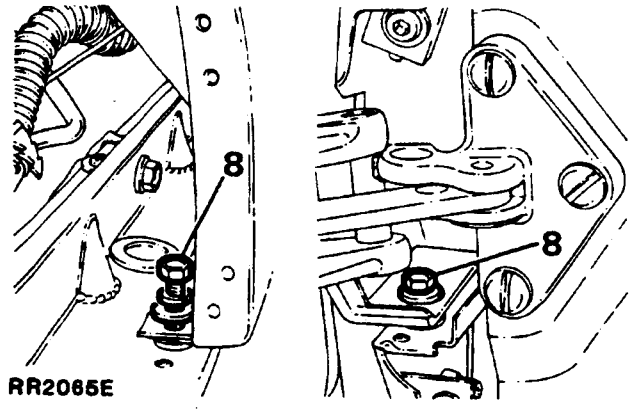
5. Release the four bolts (with plain washers) securing the bonnet to the hinges.

NOTE: Petrol Models Only:- An engine earth braid is attached to the forward bolt of the left hand hinge.

6. With assistance lift the bonnet clear of the hinges and store safely to one side, cover bonnet to protect paintwork.



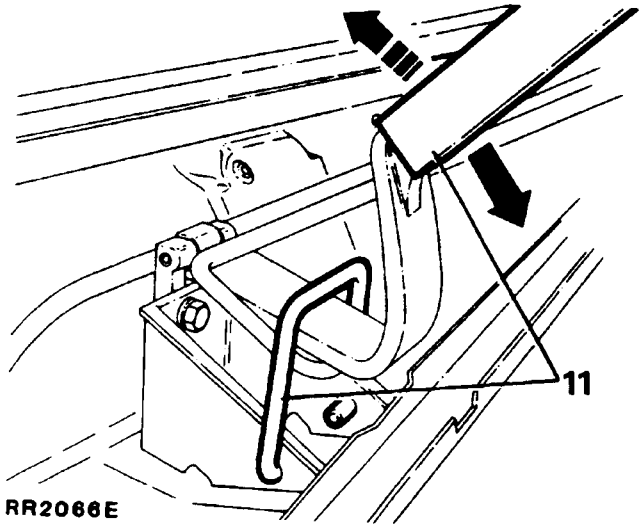
7. Remove the two wiper box wheel nuts and rubber spacers.
8. Remove the four fixings securing the decker panel to the front wings, the front two fixings are accessible from the front of the decker panel, access to the rear two fixings is gained by opening the front doors. Note the nylon spacing washers at each bolt.



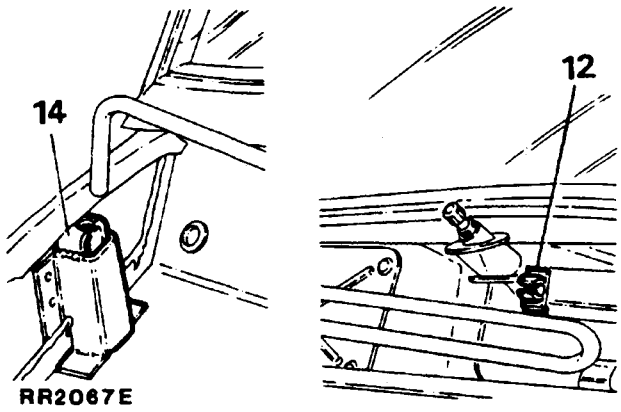
9. Remove the nine cross-head screws from the front of the decker panel water channel.
10. Place extension tubes over each bonnet hinge, with assistance lower the hinges, manoeuvre the decker panel off the wiper arm spigot bosses and along the tubes until the panel is clear of the vehicle. Place the panel to one side and cover to protect paintwork.

WARNING: Gradually let the torsion bar spring tension return the hinges to their upright position to prevent the possibility of personal injury or damage to the vehicle.

11. Place an extension tube over the hinge, lower the hinge until the stop bracket can be removed, with draw the bracket and gradually allow the hinge to return to its upright position.



12. Release the torsion bar from the retaining clip.
13. Manoeuvre the torsion bar until it can be released from the hinge.
14. Release the torsion bar from the retaining bracket.



15. Remove the two bolts (with plain washers) securing the hinge to its mounting bracket.
16. Withdraw the hinge.

Refitting

17. Fit the hinge and securely tighten the two retaining bolts (with plain washers).
18. Fit the torsion bar ensuring that it is securely located in the retaining clip and bracket.
19. Reverse the remaining removal instructions.

NOTE: Petrol Models Only:- Fit the earth braid under the forward bolt of the left hand hinge.

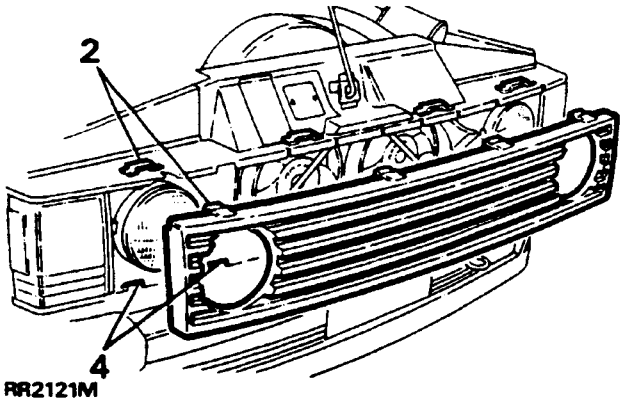
20. Using a soft blunt implement ease the bottom lip of the windscreen seal up and over onto the face of the decker panel.

RADIATOR GRILLE

Remove and refit

Removing

1. Raise the bonnet and secure the bonnet support.
2. Depress the four upper retaining lugs and ease the grille forward.
3. Lift the grille upwards and withdraw it from the vehicle.



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Refitting

4. Fit the radiator grille ensuring that the bottom lugs of the grille locate in their respective slots below the headlamp units.
5. Ease the grille rearwards and locate the upper retaining lugs.

FUEL FILLER FLAP

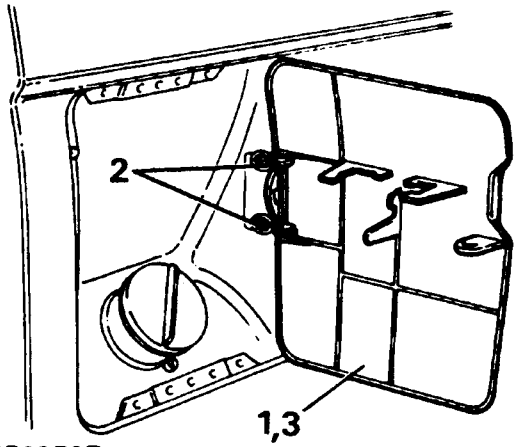
Remove and refit

Adjust

Removing

NOTE: If the vehicle has central locking ensure that the locking system has been released before attempting to open the fuel filler flap.

1. Open the fuel filler flap.
2. Release the two screws (with plain washers).
3. Withdraw the flap.



RR2073E

Refitting

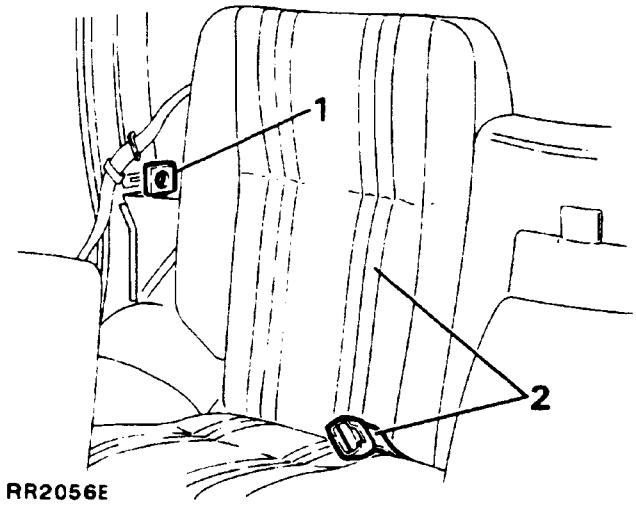
4. Fit the flap, but do not fully tighten the screws at this stage.
5. Close the flap and check that the outer profile of the flap aligns with the rear wing, adjust by easing the flap in or out of the aperture.
6. Open the flap and securely tighten the screws.

ASYMMETRIC SPLIT REAR SEAT

Remove and refit

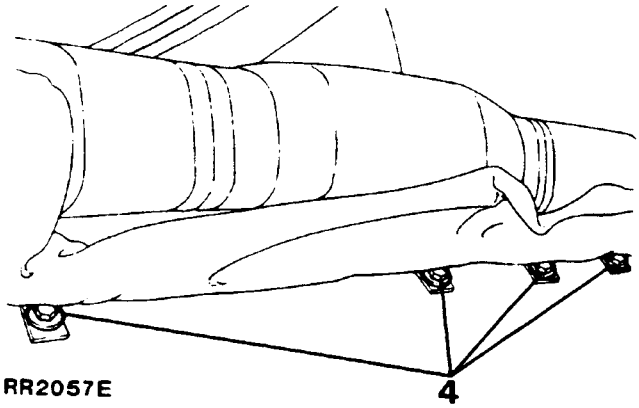
Removing

1. Lift the finger button to release the seat back rest securing catch and fold the seat forward.
2. Whilst folding the seat forward feed the rear seat lower part of the seat belt through the aperture between the seat back and squab.



RR2056E

3. Fold the seat fully forward and remove the four rear pivot bracket bolts.
4. Fold the seat back and lift the rear footwell carpet from just below the front of the seat to gain access to the four front fixings securing the pivot brackets, remove the bolts, withdraw the seat assembly from the vehicle.



RR2057E

Refitting

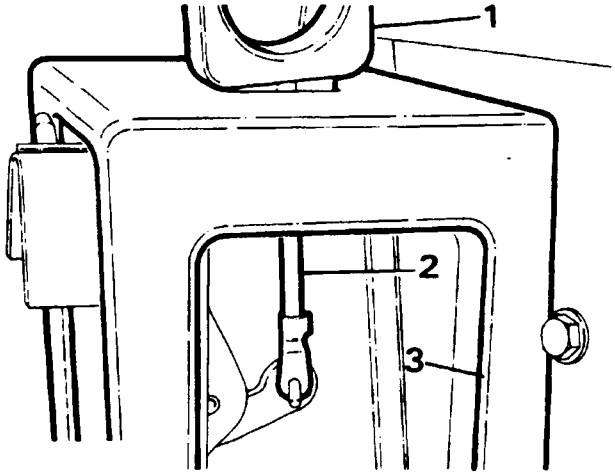
5. Reverse the removal procedure ensuring that all fixings are securely tightened.
6. Adjust the seat mechanism plate if necessary.

ASYMMETRIC SPLIT REAR SEAT-LOCKING MECHANISM

Remove and refit

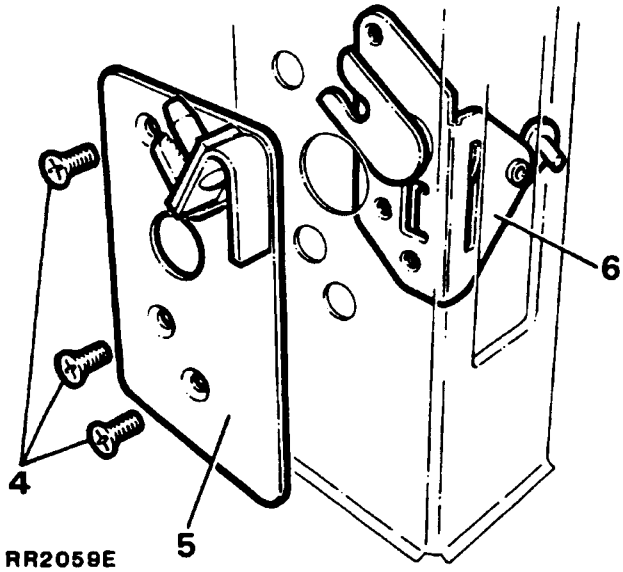
Removing

1. Lift the finger button and fold the seat back rest forward.
2. Remove the spring clip securing the finger button operating rod to the lock mechanism lever, accessible through the lock mounting bracket, withdraw the finger button.



RR2058E

3. Remove the trim covering.
4. Remove the three screws from the face of the lock catch plate.
5. Manoeuvre the catch plate off the lock mechanism.
6. Retrieve the lock mechanism from the mounting bracket aperture.



RR2059E

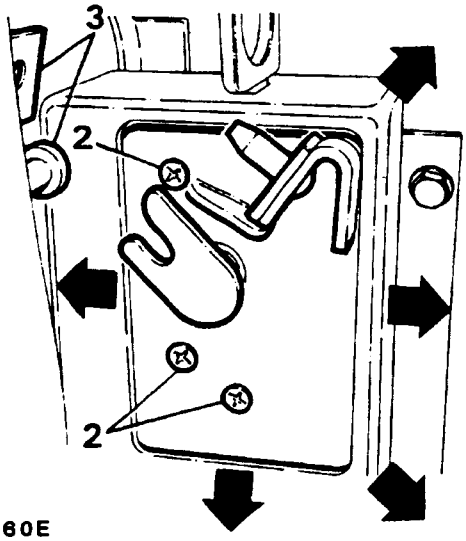
Refitting

7. Lightly grease the internal lock mechanism.
8. Reverse the removal instructions.
9. Adjust the lock catch plate to align with the seat striker.

ASYMMETRIC SPLIT REAR-SEAT LOCKING MECHANISM ADJUSTMENT

Adjust

1. Release the finger button and fold the seat back rest forward.
2. Slacken the three screws securing the catch plate to the lock mechanism.
3. Manoeuvre the lock assembly either horizontally, vertically or diagonally until the catch plate aligns with the striker at the side of the seat.
4. Securely tighten the retaining screws.



RR2060E

HEATING AND VENTILATION

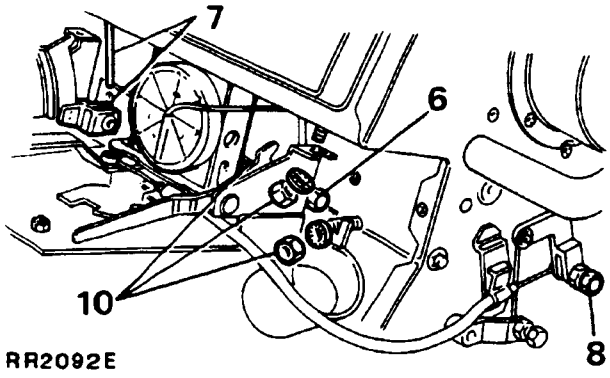
The heater/ventilation and air conditioning controls are integrated in the heater control panel.
The fresh air/recirculating flap in the heater is controlled by a solenoid operated vacuum unit.

HEATER AND AIR CONDITIONING CONTROLS

Remove and refit

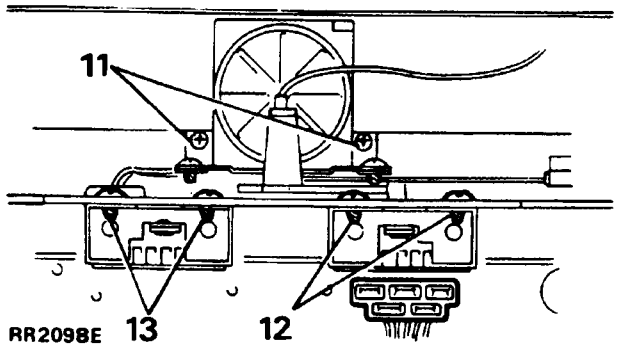
Removing

1. Disconnect the battery negative lead.
2. Remove the transmission lever surround and radio housing.
3. Remove the lower fascia panel.
4. Remove the centre fascia unit.
5. Disconnect the electrical leads from the thermostat,fan speed and recirculate/fresh air switches.
6. Disconnect the relay rod from the **'SCREEN-CAR'** lever.
7. Disconnect the relay rod from the **'VENT'** lever.
8. Disconnect the control cable from the side of the heater unit.



RR2092E

9. Remove the thermostat sensor from the fins of the evaporator.
10. Remove the four securing nuts and washers, and two screws behind the thermostat, and withdraw the heater controls assembly.
11. **Thermostat:** remove the two securing screws. Remove cable from control lever and lift thermostat over lever to remove.
12. **Fan speed switch:** drill out securing rivets, or remove fixing screws, and withdraw the switch.
13. **Air conditioning / fresh air / recirculating switch:** drill out securing rivets, or remove fixing screws and withdraw the switch.



RR2098E

Refitting

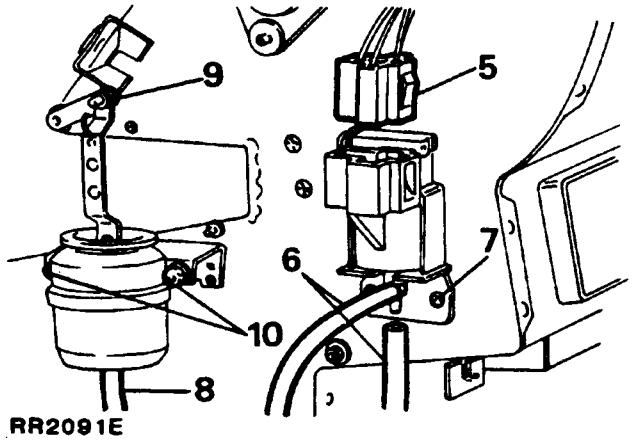
14. Reverse instructions 5 to 13.
15. Check that the control levers give full movement to the flaps. If necessary, adjust at the relay rod or cable end fixings.
16. Reverse instructions 1 to 4.

RECIRCULATING/FRESH AIR SOLENOID SWITCH

VACUUM UNIT (recirculating/fresh air flap)

Remove and refit

1. Disconnect the battery negative lead.
2. Remove the transmission lever surround.
3. Remove the radio mounting console.
4. Remove the centre fascia unit and the lower fascia panel.
5. Disconnect the electrical leads to the solenoid.

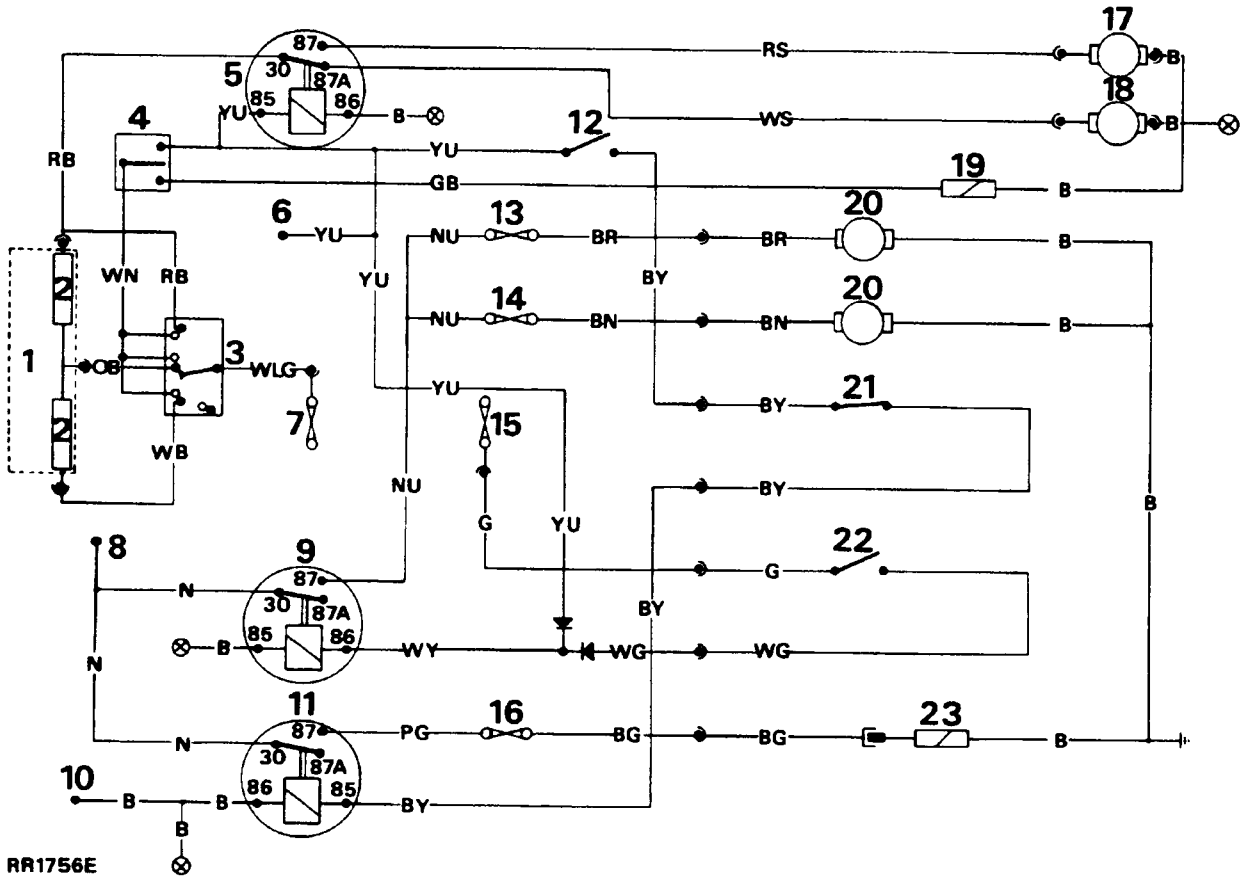


6. Disconnect the two vacuum pipes.
7. Remove the solenoid fixings and withdraw the solenoid.
8. Vacuum unit: remove the vacuum pipe from the vacuum unit.
9. Remove the actuating rod securing clip.
10. Remove two fixing nuts and washers and withdraw the vacuum unit.

Refitting

11. Reverse the removal procedure.

HEATER AND AIR CONDITIONING- circuit diagram



1. Heater unit.
2. Resistors.
3. Fan speed switch
4. Air conditioning/re- circulating/fresh air-switch.
5. Air conditioning/heater relay.
6. Cable connection to ECU.
7. Fuse 8-main fuse panel.
8. Pick up point main cable connection.
9. Fan relay.
10. Ground-via main cable.
11. Compressor clutch relay.
12. Thermostat.
13. Fuse A1-auxiliary fuse panel.
14. Fuse A2-auxiliary fuse panel.
15. Fuse 13-main fuse panel.
16. Fuse A3-auxiliary fuse panel.
17. Air conditioning motor - dashboard unit.
18. Heater motor.
19. Heater recirculating solenoid.
20. Condenser fan motors.
21. High pressure switch.
22. Engine water temperature sensor.
23. Compressor clutch.

Cable colour code

B	Black
U	Blue
N	Brown
G	Green
L	Light
O	Orange
P	Purple
R	Red
S	Slate
W	White
Y	Yellow

The last letter of a colour code denotes the tracer.

AIR CONDITIONING/HEATER CONTROLS

The air conditioning controls are now incorporated in the heater control panel. See Section 80 -Heating and Ventilation.

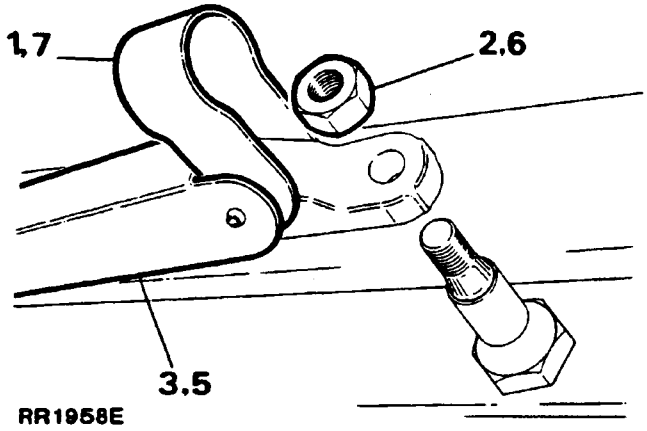
Notes

TAILGATE WIPER ARM

Remove and refit

Removing

1. Lift the wiper arm end cap to gain access to the wiper motor spindle.
2. Remove the wiper arm securing nut.
3. Withdraw the wiper arm from the spindle.



RR1958E

Refitting

4. Allow the motor to move to the 'park' position.
5. Fit the wiper arm to the spindle,locating it on the splines so that the wiper blade is just clear of the screen surround.
6. Fit and tighten the securing nut.
7. Push the end cap back into position.
8. Check the correct operation of the wiper.

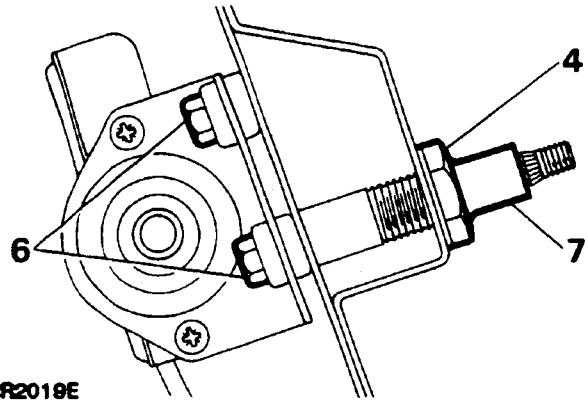
TAILGATE WIPER MOTOR

The tailgate wiper motor contains non-serviceable parts,repair is by replacement only.

Remove and refit

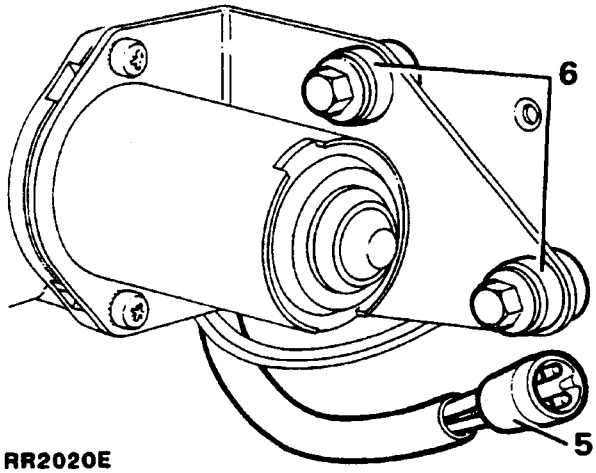
Removing

1. Disconnect the battery negative lead.
2. Lower or remove the headlining rear section to gain access to the wiper motor assembly.
3. Remove the wiper arm and blade.
4. Slacken the nut securing the wiper motor to the body. DO NOT remove at this stage.



RR2019E

5. Disconnect the electrical leads at the multi-plug.
6. Remove the two bolts securing the wiper motor to the inner body.



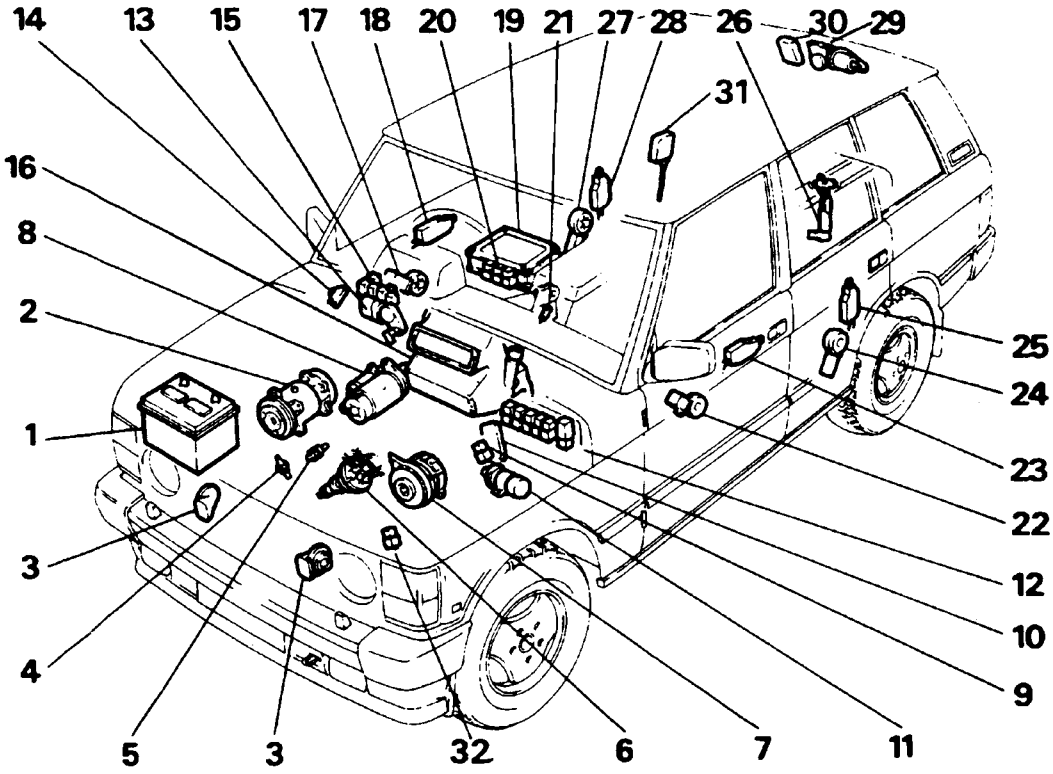
RR2020E

7. Supporting the wiper motor, remove the nut slackened at instruction 4, complete with protective cover, washer and seal. Simultaneously withdraw the wiper motor from the body.

Refitting

8. Reverse instructions 1 to 7,ensuring that the spacer is correctly positioned before fitting the motor.

Notes



RR2104M

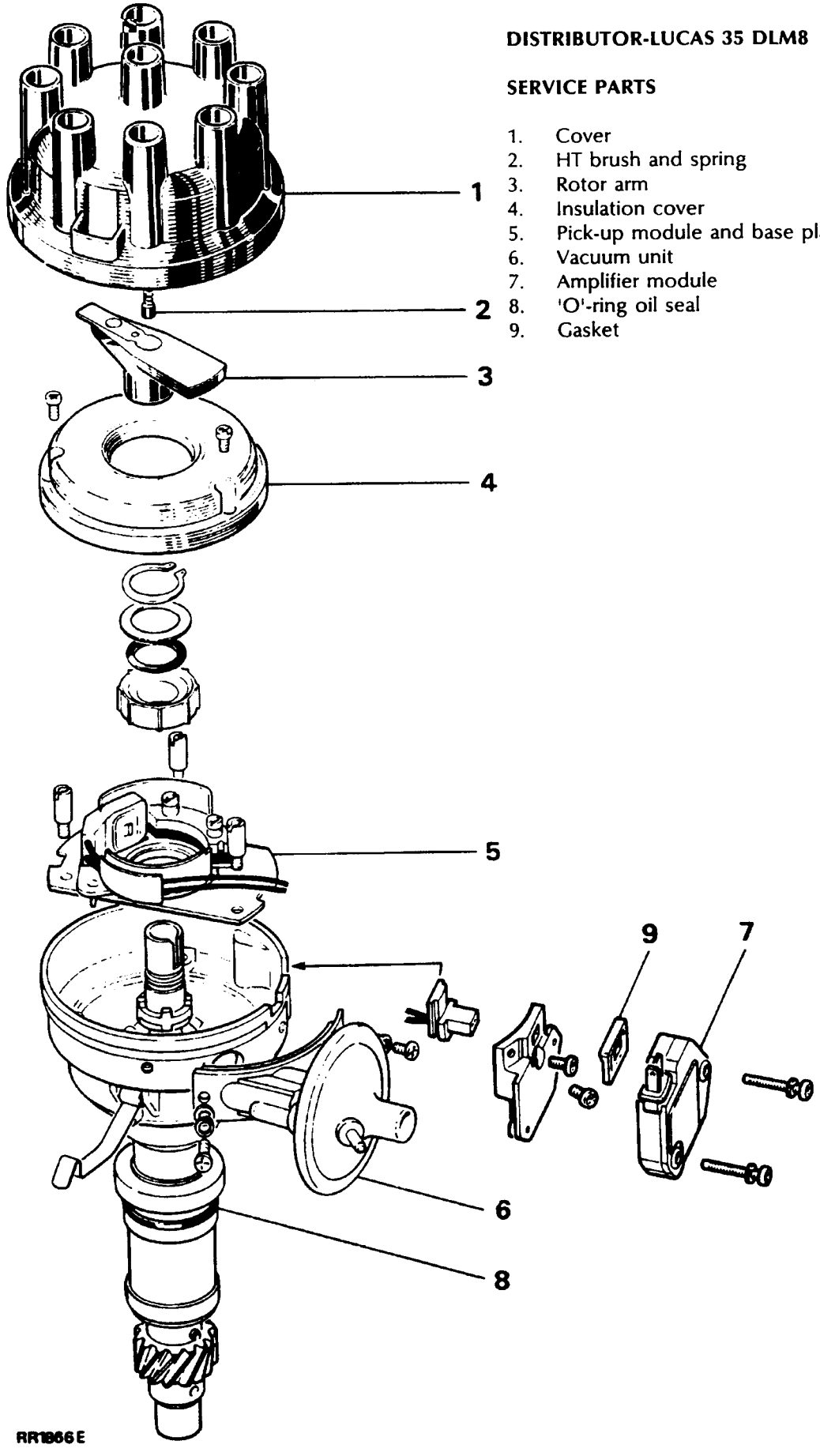
LOCATION OF ELECTRICAL EQUIPMENT

1. Battery
2. Air conditioning compressor (if fitted)
3. Horns
4. Oil pressure switch
5. Water temperature switch
6. Electronic distributor
7. Alternator
8. Starter motor
9. Fuel shut-off relay (fuel injection models only)
10. Power resistor (fuel injection models only)
11. Coil and amplifier assembly
12. Relays
13. Wiper motor-front screen
14. Choke warning light switch (carburetter models only)
15. Relays
16. Heater
17. Window lift motor (front right-hand door)
18. Door lock actuator (front right-hand door)
19. Electronic control unit (fuel injection models only)
20. Relays (fuel injection models only)
21. Handbrake warning light switch
22. Window lift motor (front left-hand door)
23. Door lock actuator (front left-hand door)
24. Window lift motor (rear left-hand door)
25. Door lock actuator (rear left-hand door)
26. Electrical in-tank fuel pump
27. Window lift motor (rear right-hand door)
28. Door lock actuator (rear right-hand door)
29. Wiper motor-rear screen
30. Radio aerial amplifier
31. Fuel filler lock actuator
32. Fuel cut-off relay (carburetter models only)

NOTE: Right-hand drive vehicle illustrated: Certain electrical components may change position on left-hand drive vehicles, but can be found in a similar location on the opposite side of the vehicle.

For full information on fuel injection related items - see Main Workshop Manual.

To identify individual relays (Items 12 and 15) see relays in Electrical Section of Manual.



DISTRIBUTOR-LUCAS 35 DLM8

SERVICE PARTS

1. Cover
2. HT brush and spring
3. Rotor arm
4. Insulation cover
5. Pick-up module and base plate assembly
6. Vacuum unit
7. Amplifier module
8. 'O'-ring oil seal
9. Gasket

ELECTRONIC IGNITION

A Lucas 35DLM8 distributor is employed. This has a conventional advance unit and centrifugal automatic advance mechanism.

A pick-up module, in conjunction with a rotating timing reluctor inside the distributor body, generates timing signals. These are applied to an electronic ignition amplifier module mounted on the side of the distributor body.

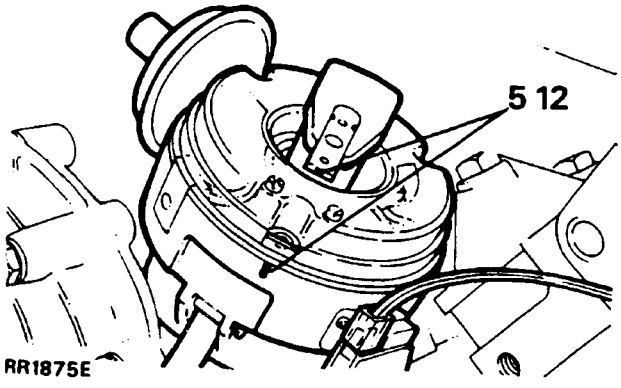
NOTE: The pick-up air gap is factory set. Do not adjust the gap unless the pick-up is being changed or the base plate has been moved. Use a non-ferrous feeler gauge to set the air gap.

DISTRIBUTOR

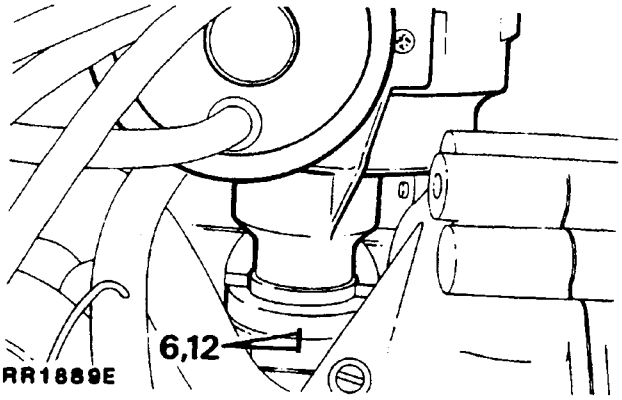
Remove and refit

Removing

1. Disconnect the battery negative lead.
2. Disconnect the vacuum pipe.
3. Remove the distributor cap.
4. Disconnect low tension lead from the coil.
5. Mark distributor body in relation to centre line of rotor arm.



6. Add alignment marks to distributor and front cover.

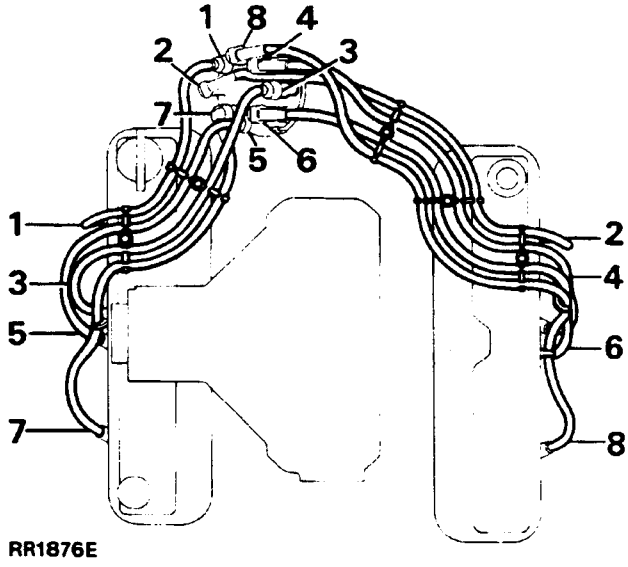


NOTE: Marking the distributor enables refitting in exact original position, but if engine is turned while distributor is removed, complete ignition timing procedure must be followed.

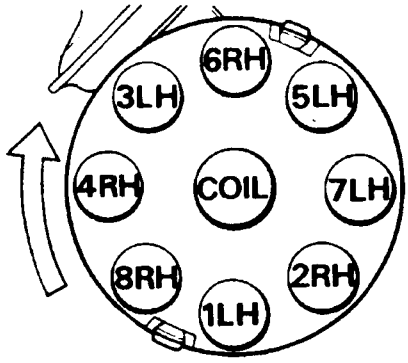
7. Release the distributor clamp and remove the distributor.

Refitting

NOTE: If a new distributor is being fitted, mark body in same relative position as distributor removed.



8. Leads for distributor cap should be connected as illustrated. Figures 1 to 8 inclusive indicate plug lead numbers. RH-Right hand side of engine, when viewed from the rear. LH-Left hand side of engine, when viewed from the rear.



RR616M

9. If engine has not been turned whilst distributor has been removed, proceed as follows (Items 10 to 17). Alternatively proceed to instruction 18.
10. Fit new 'O' ring seal to distributor housing.
11. Turn distributor drive until centre line of rotor arm is 30o anti-clockwise from mark made on top edge of distributor body.
12. Fit distributor in accordance with alignment markings.

NOTE: It may be necessary to align oil pump drive shaft to enable distributor drive shaft to engage in slot.

13. Fit clamp and bolt. Secure distributor in exact original position.
14. Connect vacuum pipe to distributor and low tension lead to coil.
15. Fit distributor cap.
16. Reconnect battery.
17. Using suitable electronic equipment, set the ignition timing, see **IGNITION TIMING-Adjust.**
18. If, with distributor removed, engine has been turned it will be necessary to carry out the following procedure.
19. Set engine-No. 1 piston to static ignition timing figure (see Engine Tuning Data- Section 05) on compression stroke.
20. Turn distributor drive until rotor arm is approximately 30o anti-clockwise from number one sparking plug lead position on cap.
21. Fit distributor to engine.
22. Check that centre line of rotor arm is now in line with number one sparking plug lead on cap. Reposition distributor if necessary.
23. If distributor does not seat correctly in front cover, oil pump drive is not engaged. Engage by lightly pressing down distributor while turning engine.
24. Fit clamp and bolt leaving both loose at this stage.
25. Set the ignition timing statically to within 2°-3° of T.D.C.
26. Connect the vacuum pipe to the distributor.
27. Fit low tension lead to coil.
28. Fit distributor cap.
29. Reconnect the battery.
30. Using suitable electronic equipment set the ignition timing, see **IGNITION TIMING-Adjust.**

DISTRIBUTOR-LUCAS 35DLM8

Overhaul

DISTRIBUTOR COVER

1. Unclip and remove the cover.
2. Renew the cover if known to be faulty.
3. Clean the cover and HT brush with a nap free cloth.

ROTOR ARM

4. Pull rotor arm from shaft.
5. Renew rotor arm if known to be faulty.

INSULATION COVER (Flash shield)

6. Remove cover, secured by three screws.
7. Renew cover if known to be faulty.

VACUUM UNIT

8. Remove two screws from vacuum unit securing bracket, disengage vacuum unit connecting rod from pick-up base plate connecting peg, and withdraw vacuum unit from distributor body.

AMPLIFIER MODULE

9. Remove two screws and withdraw the module.
10. Remove the gasket.
11. Remove two screws securing the cast heatsink and remove the heatsink.

WARNING: The amplifier module is a sealed unit containing Beryllia. This substance is extremely dangerous if handled. Do not attempt to open or crush the module.

PICK-UP AND BASE PLATE ASSEMBLY

12. Use circlip pliers to remove the circlip retaining the reluctor on rotor shaft.
13. Remove the flat washer and then the 'O' ring recessed in the top of the reluctor.
14. Gently withdraw the reluctor from the shaft, taking care not to damage the teeth.

NOTE: Coupling ring fitted beneath reluctor.

15. Remove three support pillars and cable grommet. Lift out the pick-up and base plate assembly.

NOTE: Do not disturb the two barrel nuts securing the pick-up module, otherwise the air gap will need re-adjustment.

16. Renew pick-up and base plate assembly if module is known to be faulty, otherwise check pick-up winding resistance (2k-5k ohm).

RE-ASSEMBLY

17. This is mainly a reversal of the dismantling procedure, noting the following points:

LUBRICATION

Apply clean engine oil:

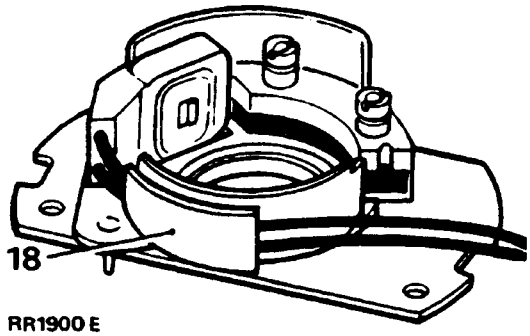
a. Three drops to felt pad reservoir in rotor shaft.

Apply Omnilube 2 (or equivalent) grease.

b. Auto advance mechanism.
c. Pick-up plate centre bearing.
d. Pre tilt spring and its rubbing area (pick-up and base plate assembly).
e. Vacuum unit connecting peg (pick-up and base plate assembly).
f. The connecting peg hole in vacuum unit connecting rod.

FITTING PICK-UP AND BASE PLATE ASSEMBLY

18. Pick-up leads must be prevented from fouling the rotating reluctor. Both leads should be located in plastic carrier as illustrated. Check during re-assembly.



RR1900E

REFITTING RELUCTOR

19. Slide reluctor as far as it will go on rotor shaft, then rotate reluctor until it engages with the coupling ring beneath the pick-up base plate. The distributor shaft, coupling ring and reluctor are 'keyed' and rotate together.

PICK-UP AIR GAP ADJUSTMENT

20. The air gap between the pick-up limb and reluctor teeth must be set within the specified limits, using a non-ferrous feeler gauge.

NOTE: When the original pick-up and base plate assembly has been refitted the air gap should be checked, and adjusted if necessary.

When renewing the assembly the air gap will require adjusting to within the specified limits.

Refer to 'Engine Tuning Data'

AMPLIFIER MODULE

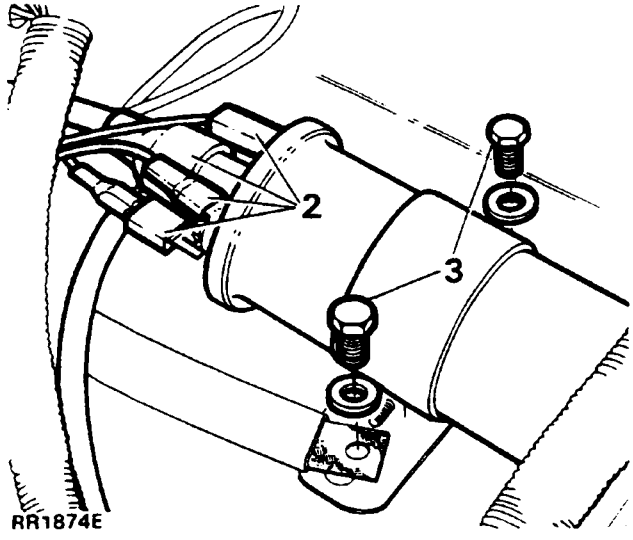
21. Before fitting the module, apply MS4 Silicone grease or equivalent heat-conducting compound to the amplifier module backplate, the seating face on distributor body and both faces of the heatsink casting.

IGNITION COIL

Remove and refit

Removing

1. Disconnect the battery negative terminal.
2. Disconnect the High Tension and Low Tension electrical leads from the ignition coil.



3. Remove the two bolts securing the coil to the valance.

NOTE: An earth braid is located under one of the bolts.

4. Remove the coil from the engine compartment.

Refitting

5. Reverse the removal instructions.

NOTE: Ensure that the bolting location for the earth braid is free from paint and grease. Coat the area around the bolt with petroleum jelly.

IGNITION TIMING

Adjust

1. It is essential that the following procedures are adhered to. Inaccurate timing can lead to serious engine damage and additionally create failure to comply with emission regulations. If the engine is being checked in the vehicle and is fitted with an air conditioning unit the compressor must be isolated.

2. On initial engine build, or if the distributor has been disturbed for any reason, the ignition timing must be set statically to within 2°-3° of T.D.C.

   (This sequence is to give only an approximation in order that the engine may be started) **ON NO ACCOUNT MUST THE ENGINE BE STARTED BEFORE THIS OPERATION IS CARRIED OUT.**

Equipment required

Calibrated Tachometer
Stroboscopic lamp

3. Couple stroboscopic timing lamp and tachometer to engine following the manufacturer's instructions.

4. Disconnect the vacuum pipe from the distributor.
5. Start engine, with no load and not exceeding 3,000 rev/min run engine until normal operating temperature is reached. (Thermostat open). Check that the normal idling speed falls within the tolerance specified in the data section.
6. Idle speed for timing purposes must not exceed 600 rev/min.
7. With the distributor clamping bolt slackened turn distributor until the timing flash coincides with the timing pointer and the correct timing mark on the rim of the torsional vibration damper as shown in the engine tuning section.
8. Retighten the distributor clamping bolt securely. Recheck timing in the event that retightening has disturbed the distributor position.
9. Refit vacuum pipe.
10. Disconnect stroboscopic timing lamp and tachometer from engine.

LUCAS CONSTANT ENERGY IGNITION SYSTEM 35DLM8-PRELIMINARY CHECKS

Inspect battery cables and connections to ensure they are clean and tight. Check battery state of charge if in doubt as to its condition.

Inspect all LT connections to ensure that they are clean and tight. Check the HT leads are correctly positioned and not shorting to earth against any engine components. The wiring harness and individual cables should be firmly fastened to prevent chaffing.

PICK-UP MODULE AIR GAP SETTINGS

Air gap settings vary according to vehicle application.

NOTE: The gap is set initially at the factory and will only require adjusting if tampered with or when the pick-up module is replaced.

Test Notes

(i) The ignition must be switched on for all checks.
(ii) Key to symbols used in the charts for Tests 2.

C	Correct Reading
H	High Reading
L	Low Reading

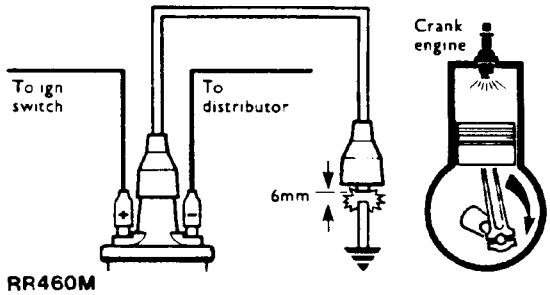
(iii) Use feeler gauges manufactured from a non-magnetic material when setting air gaps.

TEST 1:

Check HT Sparking

Remove coil/distributor HT lead from distributor cover and hold approximately 6mm (0.25 in) from the engine block. Switch the ignition 'On' and operate the starter.
If regular sparking occurs, proceed to Test 6. If no sparking proceed to Test 2.

Test 1



RR460M

TEST 2:

Amplifier Static Checks

Switch the ignition 'On'

(a) Connect voltmeter to points in the circuit indicated by the arrow heads and make a note of the voltage readings.

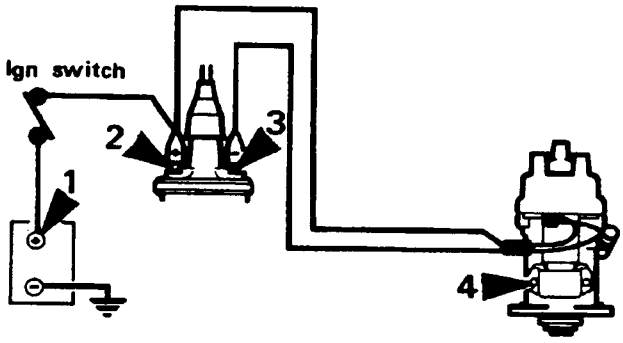
NOTE: Only move the voltmeter POSITIVE lead during tests 2,3, and 4.

(b) Compare voltages obtained with the specified values listed below:

EXPECTED READINGS

1. More than 11.5 volts.
2. 1 volt max below volts at point 1 in test circuit.
3. 1 volt max below volts at point 1 in test circuit.
4. O volt-0.1 volt.

Test 2



RR1768E

(c) If all readings are correct proceed to Test 3.
(d) Check incorrect reading(s) with chart to identify area of possible faults, i.e. faults listed under heading **'Suspect'**.

1	2	3	4	SUSPECT
L	C	C	C	DISCHARGED BATTERY
C	L	L	C	IGN. SWITCH AND/OR WIRING
C	C	L	C	COIL OR AMPLIFIER
C	C	C	H	AMPLIFIER EARTH

TEST 3:

Check Amplifier Switching

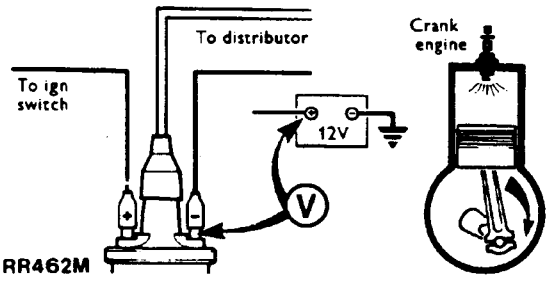
Disconnect the high tension lead between the coil and distributor.

Connect the voltmeter between positive (+ ve) terminal and H.T. coil negative (- ve) terminal, the voltmeter should register zero volts.

Switch the ignition 'On' then crank the engine. The voltmeter reading should increase when cranking, in which case proceed with Test 5.

If there is no increase in voltage during cranking proceed to Test 4.

Test 3



RR462M

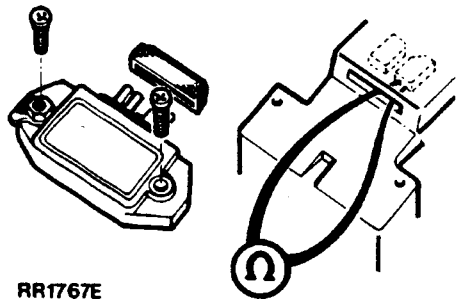
TEST 4:

Pick-Up Coil Resistance
Applications with Separate Amplifier

Disconnect the pick-up leads at the harness connector. Connect the ohmmeter leads to the two pick-up leads in the plug.

The ohmmeter should register between 2k and 5k ohm if pick-up is satisfactory. Change the amplifier if ohmmeter reading is correct. If the engine still does not start carry out Test 5.

Test 4



RR1767E

Change the pick-up if ohmmeter reading is incorrect. If the engine still does not start proceed to Test 5.

TEST 5:

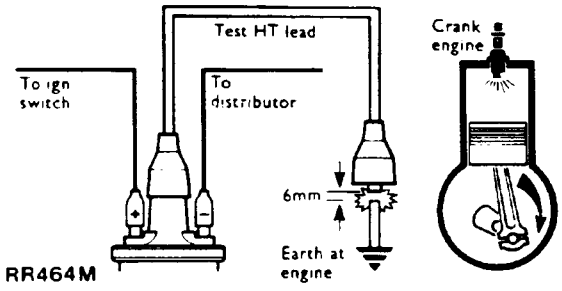
Coil H.T. Sparking

Remove existing coil/distributor H.T. lead and fit test H.T. lead to coil chimney. Hold free end about 6mm (0.25 in) from the engine block and crank the engine.

H.T. sparking good, repeat test with original H.T. lead, if then no sparking, change H.T. lead. If sparking is good but engine wil not start, proceed to Test 6.

If no sparking, replace coil. If engine will not start carry out Test 6.

Test 5



TEST 6:

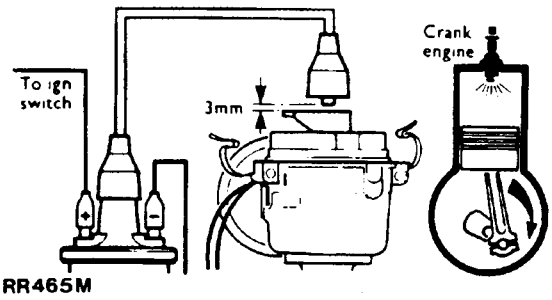
Check Rotor Arm

Remove distributor cover. Disconnect coil H.T. lead from cover and hold about 3mm (0.13 in) above rotor arm electrode and crank the engine. There should be no H.T. sparking between rotor and H.T. lead. If satisfactory carry out Test 7.

H.T. sparking, replace rotor arm.

If engine will not start carry out Test 7.

Test 6



TEST 7:

Visual and H.T. Cable Checks

	Examine:	**Should be:**
1.	Distributor Cover	Clean, dry, no tracking marks
2.	Coil Top	Clean, dry, no tracking marks.
3.	H.T. Cable Insulation	Must not be cracked, chafed or perished
4.	H.T. Cable Continuity	Must not be open circuit
5.	Sparking Plugs	Clean, dry, and set to correct gap

NOTE:

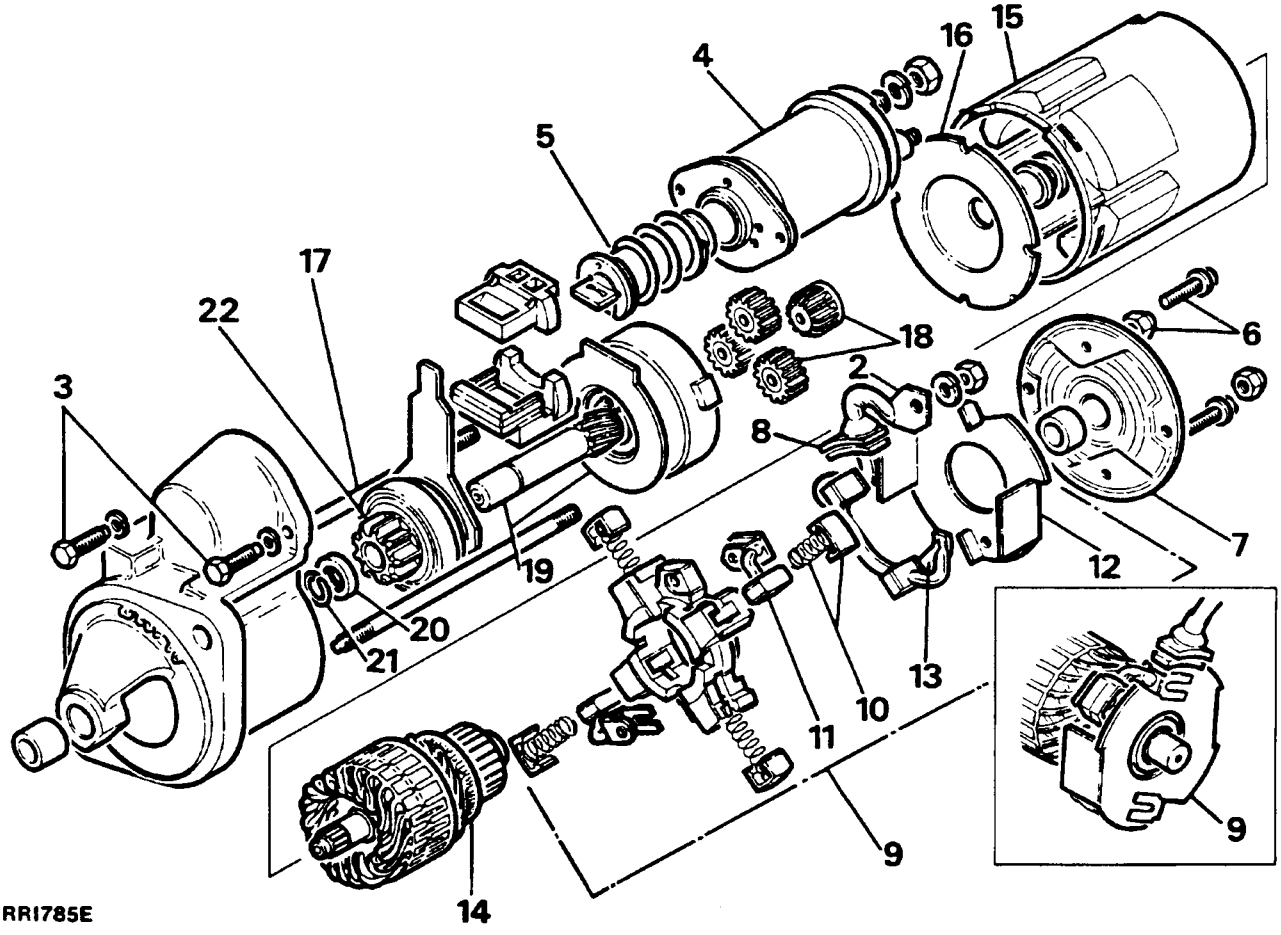
1.	Reluctor	Must not foul pick-up or leads
2.	Rotor and Insulation Cover	Must not be cracked or show signs of tracking marks

STARTER MOTOR-Lucas M78R
(Petrol models)

Overhaul

Dismantling

1. Remove the starter motor.
2. Remove the braid between the starter and the solenoid terminal.
3. Remove the solenoid fixing screws.
4. Withdraw the solenoid body.
5. Lift and remove the solenoid plunger.
6. Remove two nuts and two screws from the commutator end bracket.
7. Remove the commutator end bracket.
8. Remove the grommet from the yoke.
9. Lift the brushbox assembly clear of the armature.
10. Remove the brush springs.
11. Unclip and remove the earth brushes.
12. Remove the insulating plate.
13. Withdraw the brushes and bus bar.
14. Remove the armature from the yoke.
15. Remove the yoke.
16. Remove the intermediate bracket.
17. Loosen and remove the through bolts from the drive end bracket.
18. Remove the sun and planet gears.
19. Push out the drive shaft sprocket assembly from the drive end bracket.
20. Carefully tap the thrust collar from over the jump ring back towards the drive.
21. Prise the jump ring from its locating groove.
22. Remove the drive assembly from the drive shaft.

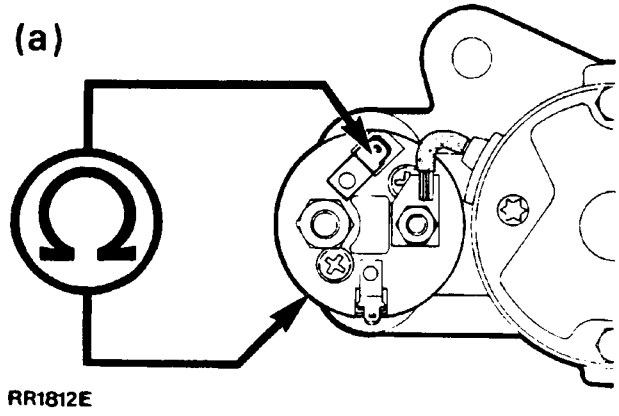


RR1785E

Inspecting

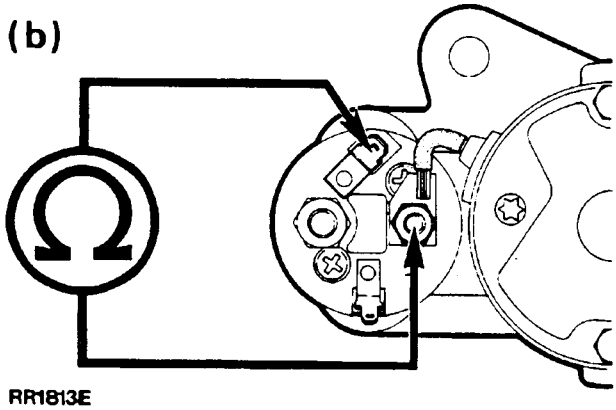
Solenoid

23. Check the continuity and resistance value of windings by connecting an ohmmeter as shown.



RR1812E

(a) Resistance value should be: 1.074 ± 0.035 ohms

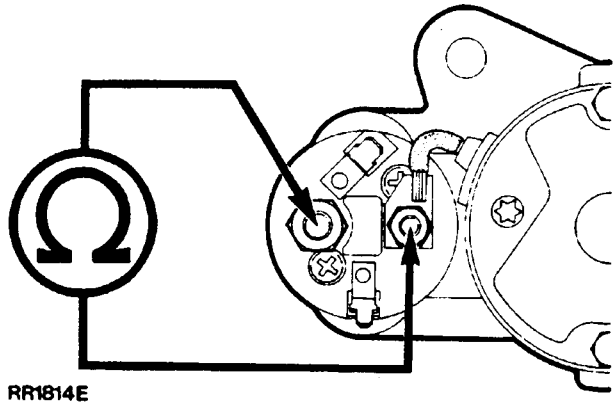


RR1813E

(b) Resistance value should be: 0.298 ± 0.015 ohms

If test results are unsatisfactory replace the solenoid.
If results are correct proceed to 24.

24. Check the contacts by connecting an ohmmeter as shown. Solenoid plunger removed, ohmmeter should read infinity.



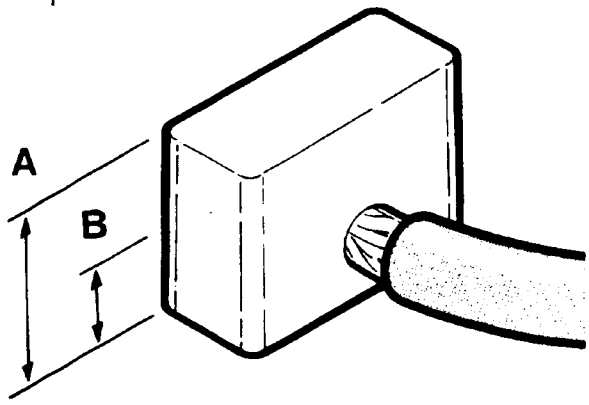
RR1814E

Solenoid plunger operated by hand, ohmmeter should read zero. If test results are unsatisfactory, replace the solenoid. If results are correct proceed to 25.

25. Check operation of spring for freedom of movement.

Brush gear

26. Check brush springs and ensure that the brushes move freely in their holders. Clean the brushes with a petrol moistened cloth, if required.

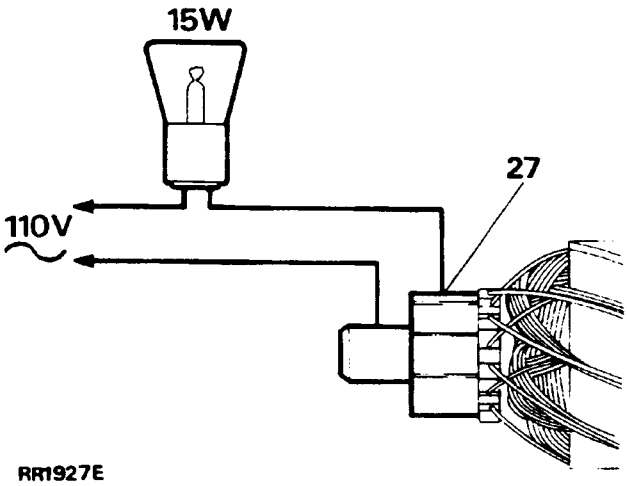


RR1815E

Brush length new, Dimension A is 9mm (0.354 in). Minimum brush length, Dimension B is 3.5mm (0.138 in).

Armature

27. Check the armature insulation using suitable test equipment. Connect the tester between any one commutator segment and the shaft. The method illustrated uses a 110V, 15W test lamp. If the lamp illuminates the armature is faulty, and a replacement component is required.



RR1927E

28. If necessary, the commutator may be machined, providing a finished surface can be obtained without reducing the diameter below 28.8mm (1.13 in), otherwise a new commutator must be fitted. Finish the surface with fine emery cloth. Do not undercut the insulation slots.

Drive assembly

29. Test the roller clutch. The pinion should rotate in one direction only, independent of the clutch body. Replace the unit if unsatisfactory or if teeth are damaged or worn.

Bearings

30. Renew the bearing bushes if there is evidence of armature fouling magnets or if there is perceptible side play between the shaft and bush.
31. Drive end/intermediate end bracket: press out the bush using a suitable press and mandrel.
32. Press the new bush in, ensuring that on the drive end bracket, the bush is flush with the casting.
33. Commutator end bracket; thread a 9/16" Whitworth or suitable similar tap firmly into the bush. Extract the bush with the tap using a power press in reverse.

NOTE: Soak new bushes in engine oil for thirty minutes before fitting.

Reassembly

34. Reverse the instructions 1 to 22. Smear the teeth and operating collar of the roller clutch with Shell Retinax 'A' grease. Smear the pivot lever of the drive assembly with Mobil 22 grease. Smear the drive shaft sun and planet gears with Rocol BRB1200 grease.

35. Tighten all the fixings to the correct torque-see Torque Wrench Settings.

STARTER MOTOR - Bosch 544 (Diesel models)

The solenoid, brushes and drive gear are the only components that can effectively be replaced on the Bosch 544 starter motor.

Should a major fault occur within the internal windings a new starter motor is to be fitted.

The starter motor is a fully water-proof unit, when dismantling care should be taken to note the location of 'O' rings and seals to ensure that they are refitted on assembly.

As a secondary precaution to ensure the complete water tightness of the starter motor, coat all threads of bolts and joint faces with a Silicon based sealing compound.

Remove, test and refit

Removing

1. Install the vehicle on an hydraulic ramp.
2. Prop open the bonnet and disconnect the two battery negative terminals.
3. Remove the single nut and bolt securing the heat shield to its mounting bracket, adjacent to the starter motor to flywheel housing lower fixing.
4. Remove the two bolts securing the heat shield and mounting bracket to the starter motor end cover.
5. Withdraw the heat shield.
6. Release the two bolts securing the starter motor mounting bracket to the side of the cylinder block, do not fully remove the bolts but allow the bracket to remain as loose as possible.
7. Remove the electrical leads from the solenoid.
8. Supporting the starter motor remove the upper and lower fixings, note that an earth braid and heat shield bracket is located under the lower nut.
9. Manoeuvre the starter motor and withdraw it from the flywheel housing, place the unit on a suitable workbench.

DISMANTLE

SOLENOID

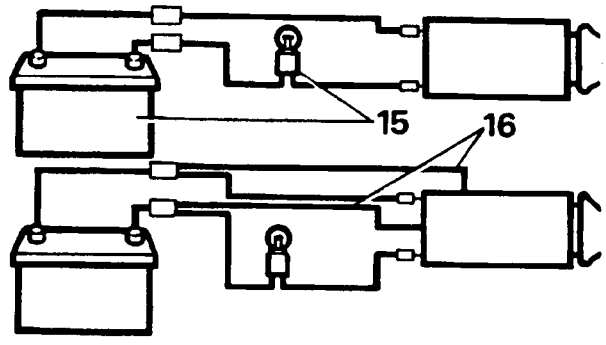
Remove and test

Remove

10. Disconnect the link lead, solenoid to starter motor.
11. Remove the three fixings and withdraw the body of the solenoid from the solenoid housing.
12. Remove the operating fork pivot bolt, withdraw the solenoid plunger from its housings.
13. Inspect the rubber boot on the solenoid for condition, if in poor condition, renew as necessary.
14. Refit the plunger to the solenoid body.

Test

15. Connect a 12 volt battery supply and a 12 volt 60 watt test lamp between the solenoid main terminals. The lamp should not light, if it does light, fit a new solenoid.
16. Leave the test lamp connected and using the same 12 volt battery supply between the small solenoid operating 'spade' terminal and a good earth point on the body.



RR2088M

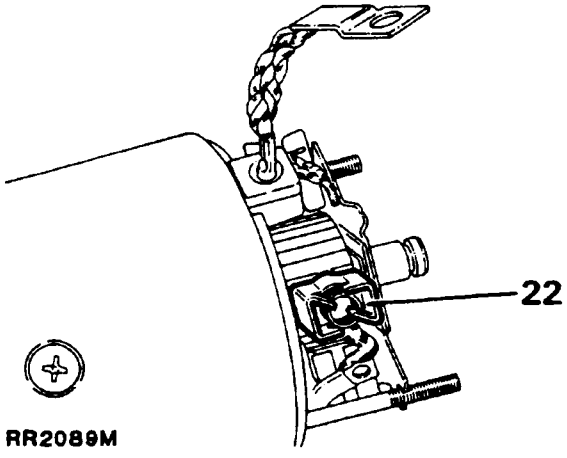
17. The plunger should pull back in the solenoid body and the test lamp should illuminate, otherwise fit a new solenoid.

BRUSHES

Remove and test

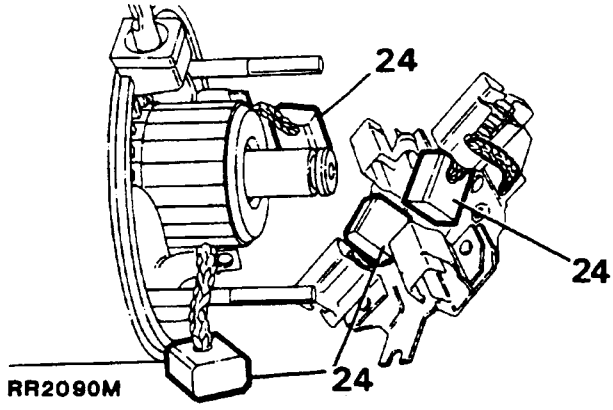
Remove

18. Remove the two screws securing the end cap to the starter motor end cover, note the two small 'O' rings on the screw threads.
19. Remove the 'C' clip and shims from the end of the armature shaft.
20. Remove the two nuts (with plain washers) securing the starter motor end cover, note the position of the two 'O' rings behind the nuts.
21. Withdraw the end cover.
22. Depress the field winding brush springs and open out the four retaining lugs to release the spring and brush from its holder.



RR2089M

23. Withdraw the brush carrier assembly from the commutator, noting that the two negative brushes are still attached to the carrier. Care should be taken to ensure that the two negative brush springs do not jump out of the carrier.

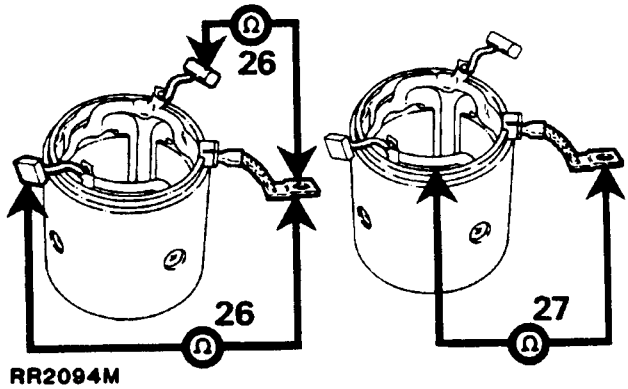


RR2090M

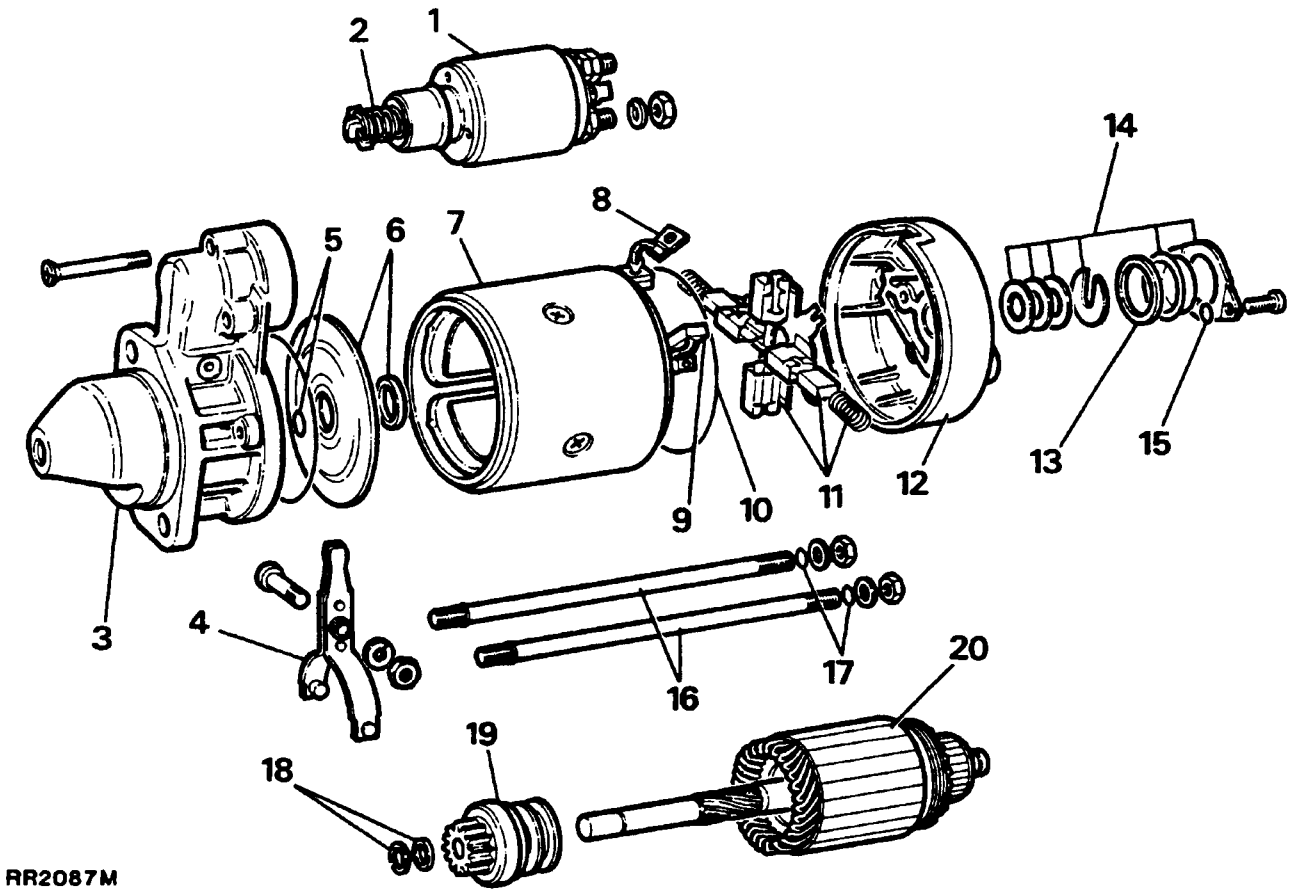
25. Withdraw the yoke of the starter motor from the drive end bearing housing. Note the position of 'O' rings for reassembly.

Test

26. Check for continuity between link lead and each brush in turn, if no continuity renew starter motor.
27. Check field winding insulation between each brush in turn to a clean paint free part of the yoke, there should be no continuity, if continuity exists renew starter motor.



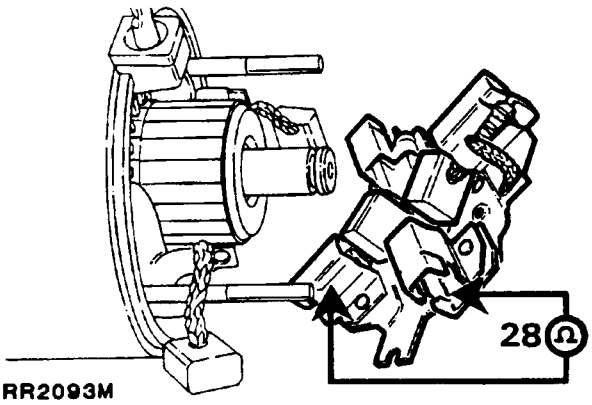
RR2094M



KEY TO STARTER MOTOR

1. Solenoid
2. Solenoid plunger and spring
3. Drive end - bearing housing
4. Operating fork
5. 'O' Rings - bearing housing (3 off)
6. Seal and end plate
7. Yoke
8. Link lead
9. Field winding brushes
10. 'O' Ring
11. Armature brushes and carrier assembly
12. End cover
13. 'O' Ring
14. Shims, 'C' clip and end cap
15. 'O' Rings (2 off)
16. Through studs
17. 'O' Rings (2 off)
18. Circlip and retainer
19. Drive gear assembly
20. Armature

28. Check the insulation between the brush carrier and brush holder, if continuity exists renew the carrier assembly.



RR2093M

ARMATURE

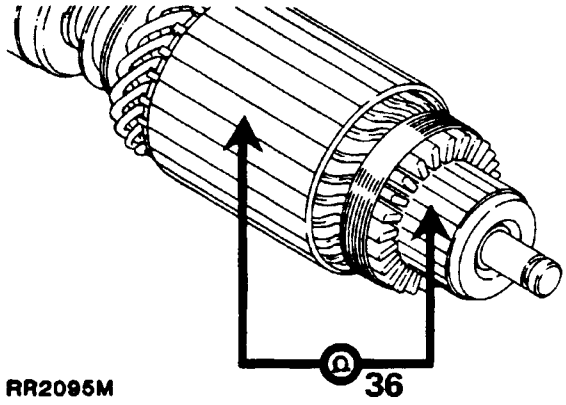
Remove and test

Remove

29. Remove the two long through studs to enable the armature to be withdrawn.
30. Ensure the drive gear is as far forward in the bearing housing as is possible.
31. Withdraw the armature until the drive gear operating fork is visible between the armature end plate and bearing housing.
32. Manoeuvre the armature assembly until the operating fork can be removed from the bearing housing and withdraw the armature. Note the position of the 'O' rings for reassembly.
33. Check the commutator, if cleaning only is necessary use a piece of very fine glass paper on a flat surface to remove any brush score marks, follow by wiping the commutator surface with a petrol moistened cloth.
34. If the commutator is heavily worn or has excessively deep score marks it may be necessary to machine the commutator surface, providing that, when all marks have been removed the finished diameter is not below 39.5mm (1.55 inch).
35. Having machined the ommutator each segment must now be undercut to reduce the insulation to a depth of 0.5mm (0.019 inch) below the surfae of the commutator.

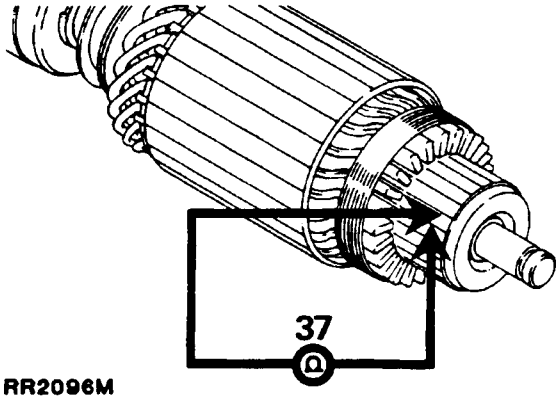
Test

36. Check to see if there is any continuity between the commutator and armature core, if continuity exists it indicates that the insulation between the windings and core have broken down, renew starter motor.



RR2095M

37. Check for continuity between each adjacent pair of commutator segments, if there is no continuity this will indicate that the armature windings have broken down, renew starter motor.

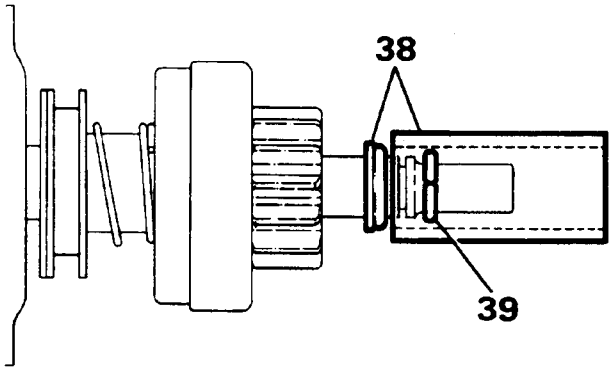


RR2096M

DRIVE GEAR

Remove

38. Using a suitable piece of tube over the armature shaft, carefully tap the circlip retainer down the shaft to expose the circlip.
39. Remove the circlip, inspect the groove to ensure that sharp edges have not been raised during the removal of the circlip, if necessary, with a smooth file remove any sharp edges before removing the drive gear assembly.



RR2097M

ASSEMBLE

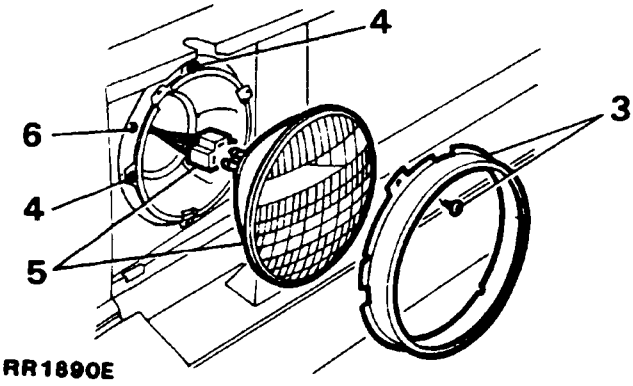
40. Coat the spiral gear on the armature shaft and the groove in the collar of the drive gear with Shell Retinax 'A' prior to assembly.
41. Ensure that all 'O' rings are in good condition and that they are fitted in their correct locations.
42. Coat all joint faces and screw threads with a Silicon based sealing compound to prevent ingress of water.
43. Reverse the dismantling instructions ensuring that all srews and nuts are securely tightened.
44. Refit the starter motor to the flywheel housing.
45. Reverse instructions 1 to 8 ensuring that the fixing bolts are tightened to the correct torque.
46. Securely tighten the nut which secures the electrical feed lead to the solenoid.
47. Lightly smear petroleim jelly around both of the terminals.

HEADLAMP ASSEMBLY/SEALED BEAM UNIT

Remove and refit

Removing

1. Disconnect the battery negative lead.
2. Remove the radiator grill- see Body Section 76.
3. Remove three crosshead screws and the headlamp retaining rim.



RR1890E

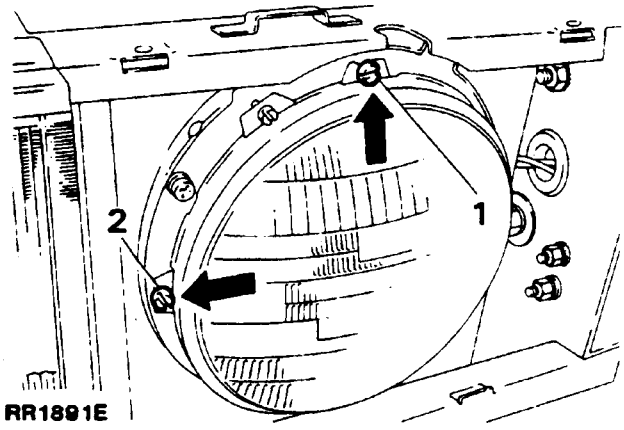
4. **DO NOT** disturb the two adjusting screws.
5. Withdraw the sealed beam unit and disconnect the wiring plug from the rear of the unit.
6. Remove three securing screws, prise away the grommet and withdraw the headlamp bowl.

Refitting

7. Reverse removal procedure.

HEADLAMP ALIGNMENT

Headlamp beam setting should only be carried out by qualified personnel using suitable beam setting equipment.



RR1891E

Adjusting

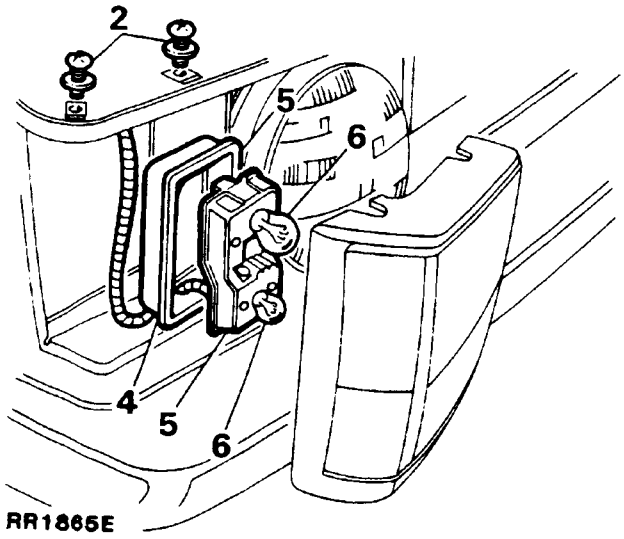
1. Turn the top adjusting screw anti-clockwise to lower the beam, clockwise to raise the beam.
2. Turn the side adjusting screw anti-clockwise to move the beam to the left, clockwise to move the beam to the right.

SIDELIGHT AND FLASHER LAMP ASSEMBLY - RH AND LH AND BULB

Remove and refit

Removing

1. Open the bonnet and disconnect the battery negative lead.
2. Remove the two screws and plain washers securing the lamp assembly.



RR1865E

3. Lift the assembly away sufficiently to gain access to the rear of the lamp.
4. Remove the waterproof cover.
5. Depress the two retaining clips and withdraw the bulb holder.
6. Remove the required bulb. The direction indicator bulb is located in the upper section of the bulb holder, the side lamp bulb in the lower.
7. Disconnect the multi-plug to remove the complete assembly.

Refitting

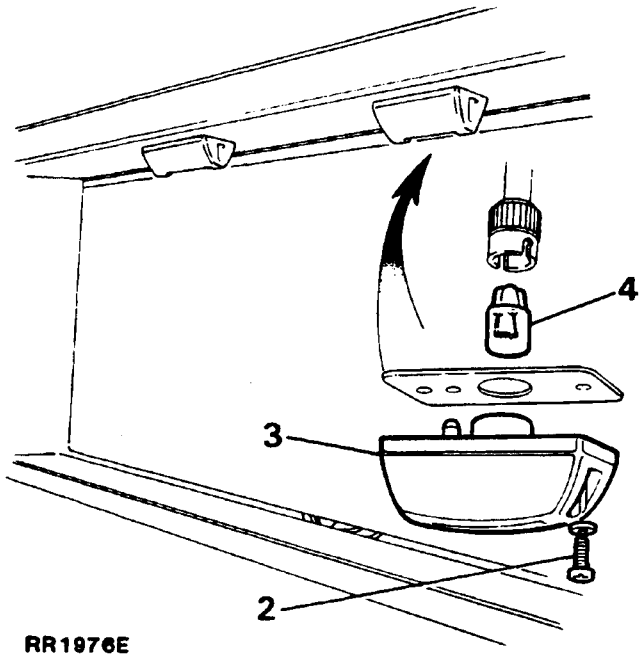
8. Reverse the removal procedure, ensuring the waterproof cover is located correctly.

NUMBER PLATE LAMP ASSEMBLY AND BULB REPLACEMENT

Remove and refit

Removing

1. Disconnect the battery negative lead.
2. Remove the two self-tapping screws and washers.



RR1976E

3. Detach the lamp assembly.
4. Disconnect the bulb holder and remove the bulb.

NOTE: Carefully pull the electrical leads out of the bottom of the lower tailgate panel to reveal the snap connectors.

5. Disconnect the electrical connections located at the bottom of the lower tailgate.
6. Remove the bulb holder.
7. Carefully pull the electrical leads up through the inside of the lower tailgate panels.

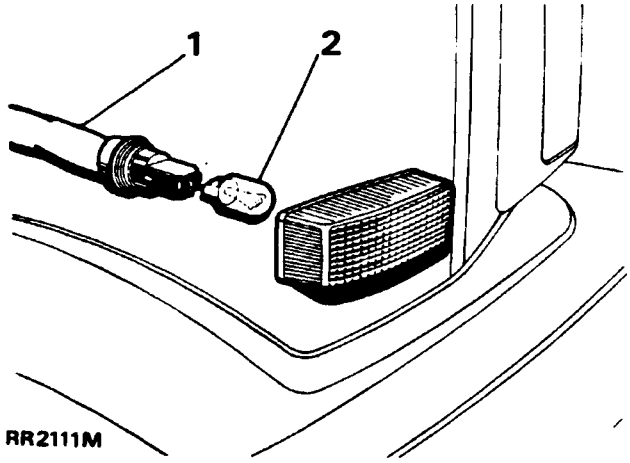
Refitting

8. Reverse the removal procedure. The correct bulb 'type' is a 12-volt, 5 watt wedge base (capless).

DIRECTION INDICATOR SIDE REPEATER LAMP BULB REPLACEMENT

Remove and refit

1. Working at the back of the lamp,through the wheel arch, slightly twist the bulb holder anti-clockwise to release it from the lamp assembly.
2. Remove the bulb.



RR2111M

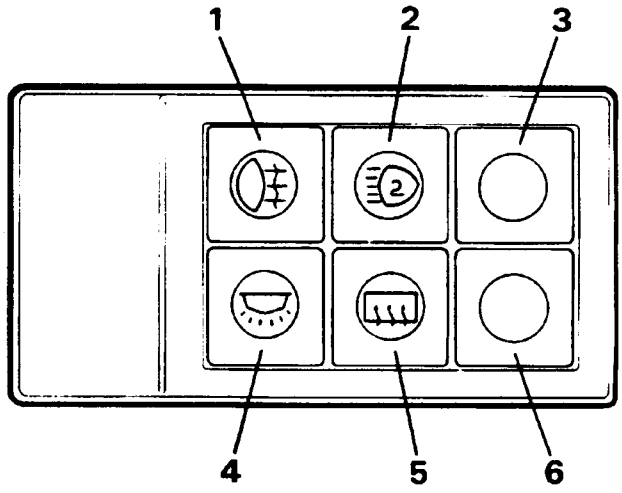
Refitting

3. Reverse the removal instructions. The correct bulb 'type' is a 12-volt, 5 watt wedge base (capless).

AUXILIARY SWITCH PANEL

The auxiliary switch panel contains four 'push-push' type switches which incorporate integral symbols for identification.
(The unused apertures are fitted with blank covers, which are removable, to facilitate the fitting of extra switches if required).
The symbols are illuminated by two bulbs which become operational when the vehicle lights are on.

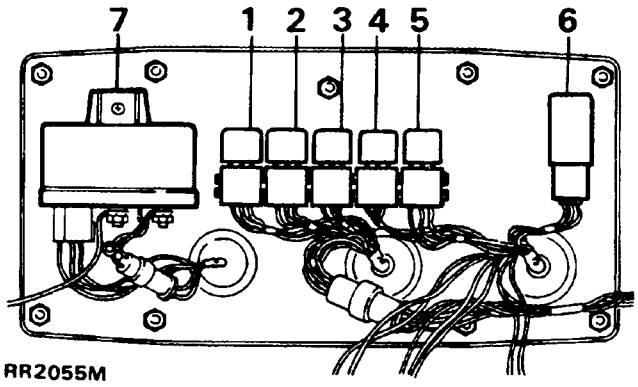
The rear fog guard lamp and heated rear screen switches (1 and 5) are also provided with individual warning lights, illuminated when the switches are operated.



RR2102M

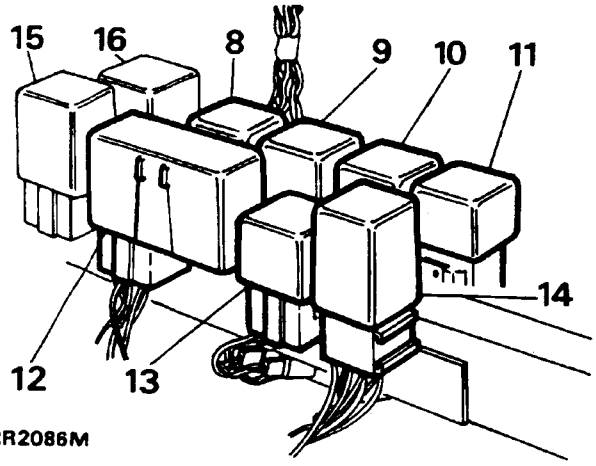
1. Rear fog guard lamps.
2. Auxiliary driving lamps.
3. Blank.
4. Interior and tailgate lamps.
5. Heated rear screen.
6. Blank.

RELAYS-Identification



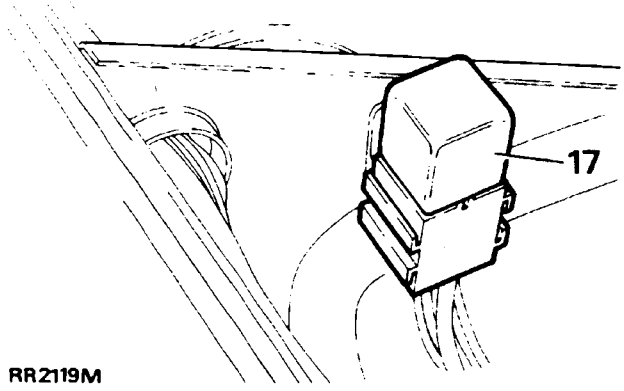
RR2055M

Closure panel viewed from the engine compartment, with protective cover removed.



RR2086M

Steering column mounted relays viewed with the lower fascia panel removed.

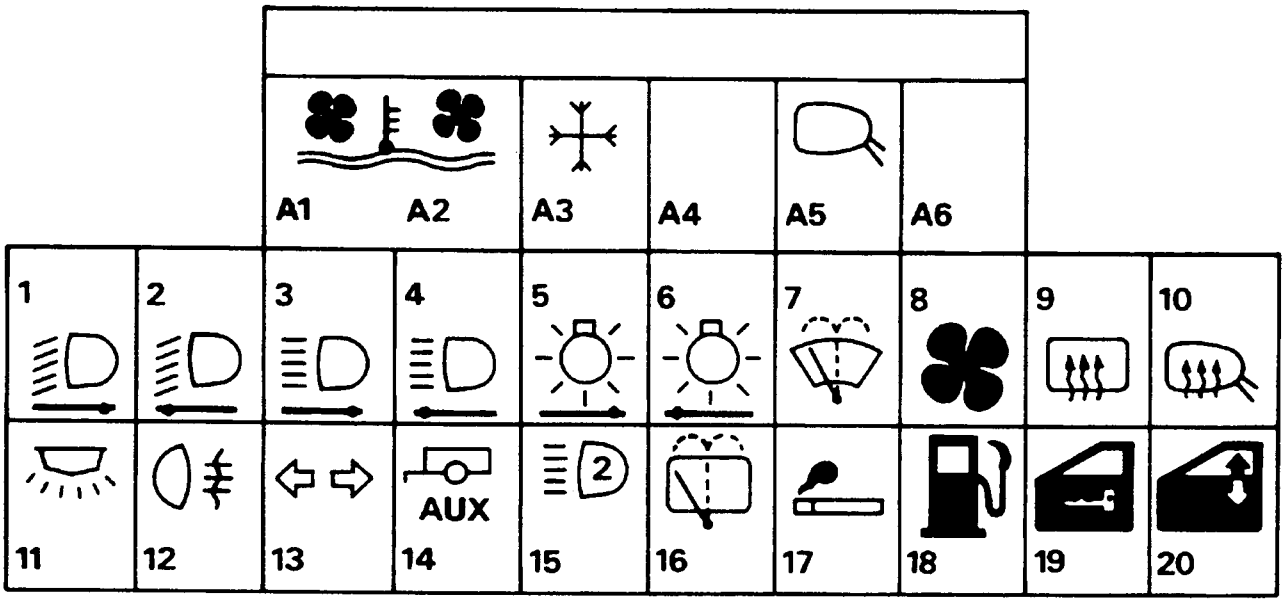


RR2119M

Fuel cut-off relay (carburetter models only) located in the engine compartment attached to the left-hand valance stiffener brackets.

Relay	Right-hand Drive Circuit Diagram Item Number	Left-hand Drive Circuit Diagram Item Number	Colour
1. Air conditioning/heater		5.	Natural
2. Condenser fan	Left and Right	9. Air conditioning	Natural
3. Compressor clutch	Hand Drive	11. circuit diagram	Natural
4. Starter solenoid relay	6.	6. Main circuit diagram	Natural
5. Heated rear window	66.	64. Main circuit diagram	Natural
6. Headlamp wash timer unit	19.	17. Main circuit diagram	Black
7. Glow plug timer (Diesel)	143.	150. Main circuit diagram	Black
8. Flasher/Hazard unit	75.	73. Main circuit diagram	Blue
9. Voltage sensitive switch	72.	70. Main circuit diagram	Yellow
10. Interior lamp delay	101.	99. Main circuit diagram	Red
11. Auxiliary lamp relay	88.	86. Main circuit diagram	Natural
12. Rear wiper delay	132.	139. Main circuit diagram	Black
13. Ignition load relay	1.	1. Main circuit diagram	Black
14. Front wiper delay	15.	14. Main circuit diagram	Red
15. Overspeed monitor) Saudi	-	132. Main circuit diagram	Green
16. Buzzer unit) only	-	133. Main circuit diagram	Black
17. Fuel cut-off relay (carburetter models only)	117.	115. Main circuit diagram	Natural

FUSE BOX



RR2101M

FUSE NO.	COLOUR CODE	FUSE VALUE	CIRCUIT SERVED	IGNITION KEY CONTROLLED
MAIN FUSE PANEL				
1	Brown	7.5 amp	RH headlamp dipped beam and power wash	
2	Brown	7.5 amp	LH headlamp dipped beam	
3	Brown	7.5 amp	RH headlamp main beam	
4	Brown	7.5 amp	LH headlamp main beam	
5	Tan	5 amp	RH parking lights and instrument illumination	
6	Tan	5 amp	LH parking lights and radio illumination	
7	Blue	15 amp	Front wash/wiper motors	AUX
8	Yellow	20 amp	Heating/air conditioning motor	AUX
9	White	25 amp	Heated rear screen	IGN
10	Violet	3 amp	Mirror heaters	IGN
11	Blue	15 amp	Headlamp flash,door, underbonnet and internal lamps, radio, clock and horns	
12	Red	10 amp	R/LH rear fog lamps	
13	Blue	15 amp	Low coolant monitor, stop and reverse lamps, direction indicators, instruments and screen wash fluid monitor	IGN
14	Blue	15 amp	Auxiliary feed trailer	
15	Blue	15 amp	Auxiliary driving lamps	
16	Red	10 amp	Rear wash/wipe motor	AUX
17	Yellow	20 amp	Cigar lighters (front and rear),automatic gear selector illumination	IGN
18	Red	10 amp	Fuel pump	IGN
19	Red	10 amp	Central locking-option	
20	White	25 amp	Window lifts-option	AUX

NOTE: Radio/Cassette combination. An in-line type 5 amp fuse is incorporated in the power input lead of the unit.

AUXILIARY FUSE PANEL-(A)

A1	Yellow	20 amp	Air conditioning fan-option	IGN
A2	Yellow	20 amp	Air conditioning fan-option	IGN
A3	Tan	5 amp	Air conditioning compressor clutch-option	IGN
A4			Spare	
A5	Violet	3 amp	Electric mirror motors-option	IGN
A6			Spare	

STEERING COLUMN CONTROLS

The steering column switch layout is as follows:

LEFT HAND CONTROLS

Lower switch-Main lighting switch
Upper switch-Main and dipped beam, direction indicators and horn.

RIGHT HAND CONTROLS

Lower switch - Rear screen programmed wash/wipe.
Upper switch - Windscreen programmed wash/wipe.

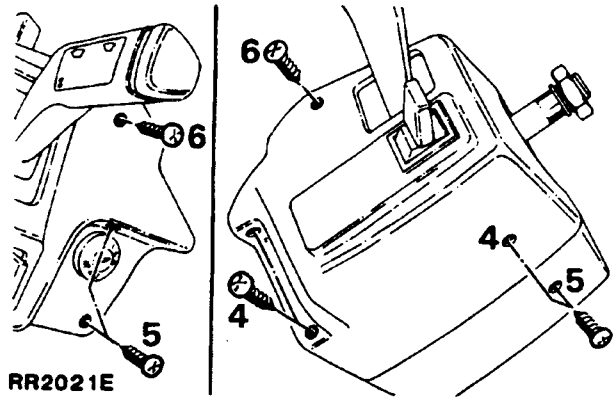
STEERING COLUMN SHROUD

Certain operations within the electrical section necessitate removal of the steering column shroud. Unless removal of both sides of the shroud assembly is required, remove ONLY the side necessary for access.

Remove and refit

Removing

1. Disconnect the battery negative lead.
2. Remove the lower fascia panel.
3. Disconnect the electrical connections to either the master lighting switch or the rear screen wash wipe switch. (Disconnect both if removing the complete shroud).
4. Left hand shroud-remove three securing screws and remove the shroud over the indicator/main beam switch.



5. Right hand shroud-remove three securing screws and remove the shroud over the windscreen wash wipe switch.
6. To facilitate reassembly remove the screw securing the two halves of the shroud together from one side only.

Refitting

7. If both sides of the shroud have been removed ensure that the plate on the steering column is correctly located in the slot in the shroud.
8. Reverse the removal procedure.

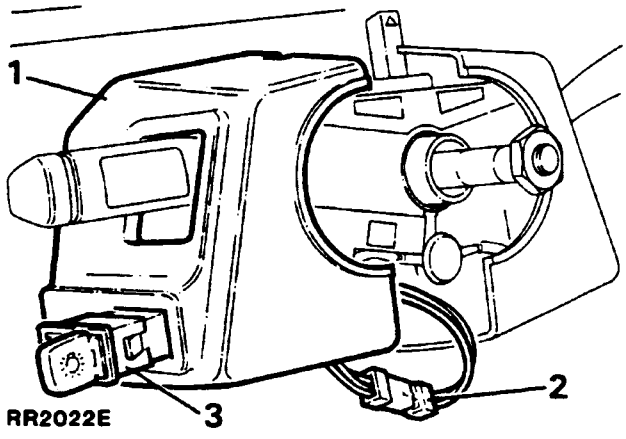
MAIN LIGHTING SWITCH

REAR SCREEN PROGRAMMED WASH WIPE SWITCH

Remove and refit

Removing

1. Remove the steering column shroud from the required side.
2. Disconnect cables at snap connectors.
3. Push the two spring clips locating the switch inwards and remove the switch from its mounting.



Refitting

4. Reverse the removal procedure.

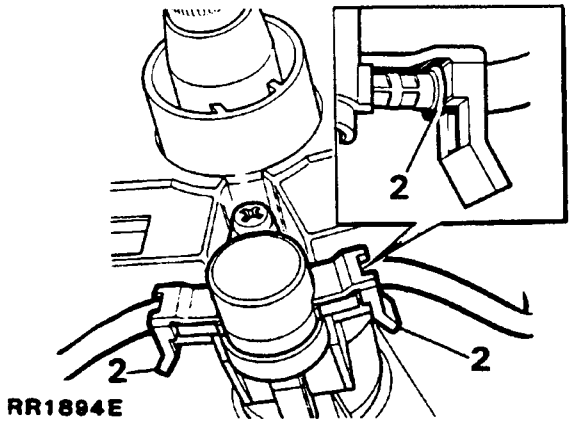
WINDSCREEN PROGRAMMED WASH WIPE SWITCH

MAIN AND DIPPED BEAM, DIRECTION INDICATORS AND HORN SWITCH

Remove and refit

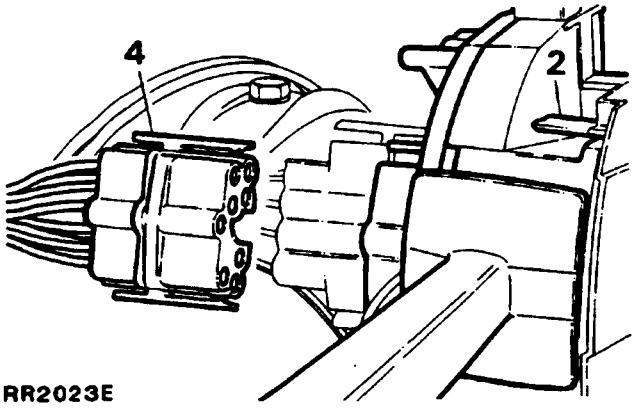
Removing

1. Remove the steering column shroud from the required side.
2. Release the appropriate retaining clip and pull the fibre optic guide from the housing.



RR1894E

3. Depress the retainers at the top and bottom of the switch and pull combined switch assembly away from the steering column switch housing.



RR2023E

4. Lighting, indicator and horn switch: release the two harness multi-plugs from the back of the switch and remove the switch assembly.

NOTE: Wiper and washer switch: release the harness multi-plug from the back of the switch and remove the switch assembly

Refitting

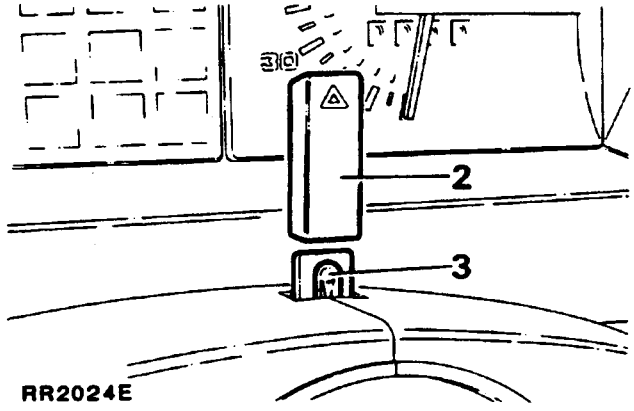
5. Reverse the removal procedure.

HAZARD WARNING SWITCH BULB REPLACEMENT

Remove and refit

Removing

1. Disconnect the battery negative lead.
2. Pull the hazard switch cover upwards and remove it to gain access to the bulb.



RR2024E

3. Remove the bulb by pulling it upwards. A piece of rubber tubing or adhesive tape attached to the bulb may facilitate removal and refitting.

Refitting

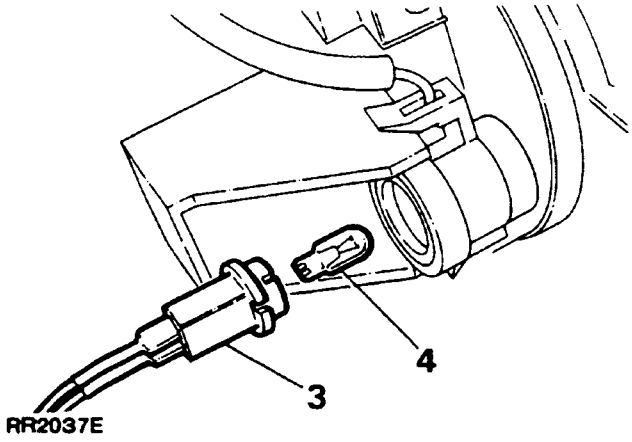
4. Locate the bulb in its holder and reverse instructions 1 and 3.
   The correct bulb is a 12V, 1.2 watt 'wedge' base (capless).

COLUMN SWITCH ILLUMINATION BULB REPLACEMENT

Remove and refit

Removing

1. Disconnect the battery negative lead.
2. Remove the left hand side steering column shroud.
3. Working behind the column switch housing twist the bulb holder through 90° and withdraw.
4. Remove the bulb.



RR2037E

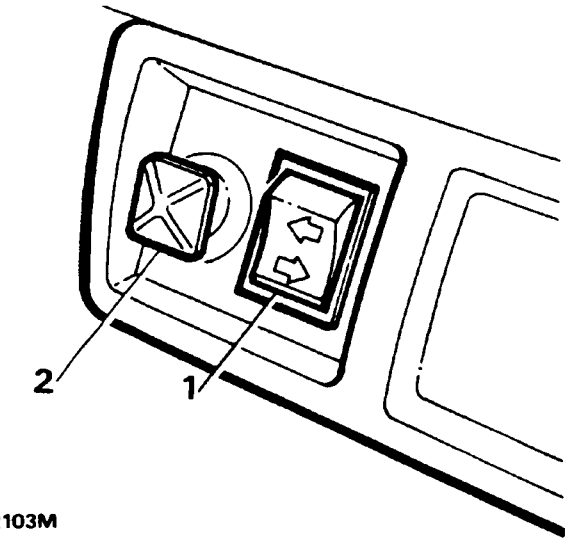
Refitting

5. Reverse the removal procedure. The correct bulb type is a 12-volt, 1.2-watt 'wedge' base (capless).

EXTERIOR DRIVING MIRRORS CONTROLS

Adjusting

1. Fine adjustment is controlled by an electric motor inside the mirror housing. This is operated by two controls fitted in the fascia panel. To adjust, select left or right hand mirror using the rocker switch.



RR2103M

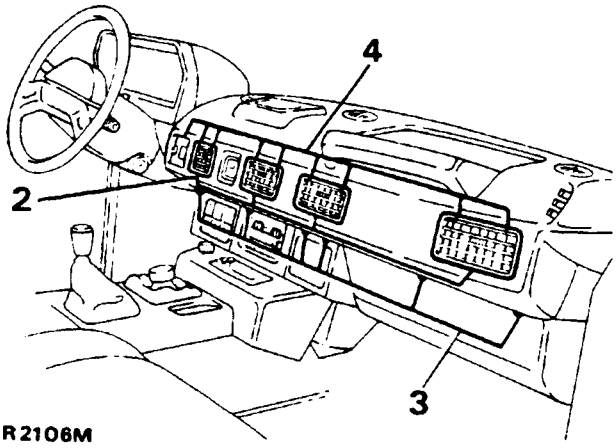
2. Move the head of the finger tip control to the left, right, up or down as required.

EXTERIOR DRIVING MIRRORS

CONTROL SWITCHES

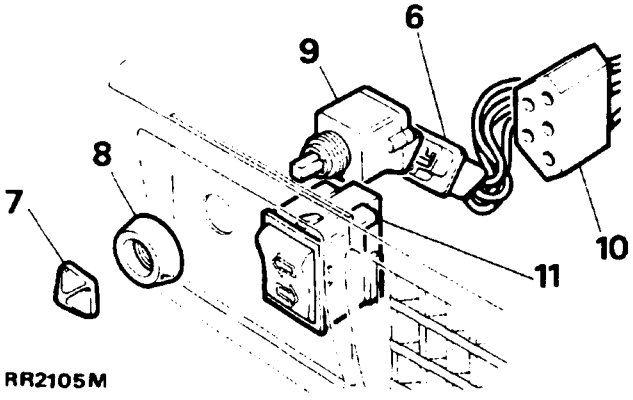
Remove and refit

1. Disconnect the battery negative lead.
2. Carefully prise the four air vents out of the fascia panel.



RR2106M

3. Remove the six screws securing the fascia to the lower panel.
4. Remove the nine screws securing the fascia to the upper panel.
5. Withdraw the panel only as far as the electrical leads will permit.
6. Pull the multi-plug from the rear of the fingertip controlled mirror switch.



RR2105M

7. Carefully prise off the fingertip button at the operating end of the switch.
8. Unscrew the black plastic retaining collar securing the switch.
9. Remove the switch from the panel.
10. Disconnect the multi-plug at the rear of the selector switch.
11. Apply pressure to the switch from the rear and remove it from the panel.

Refitting

12. Reverse operations 1 to 11.

INSTRUMENT BINNACLE WARNING LIGHT SYMBOLS

Trailer connected-flashes with direction indicators (green)

Direction indicator-left turn /right turn (green)

Seat belt (red) NOTE: The seat belt warning symbol appears on all binnacles but will only be illuminated when Territory regulations require a seat belt warning system to be fitted.

Headlamp main beam on (blue)

Engine oil pressure low (red)

Cold start control (Petrol models) engaged
Heater plugs operating (Diesel models) (amber)

Ignition on/low charge (red)

Low coolant (red)

Automatic gearbox oil temperature high (red)

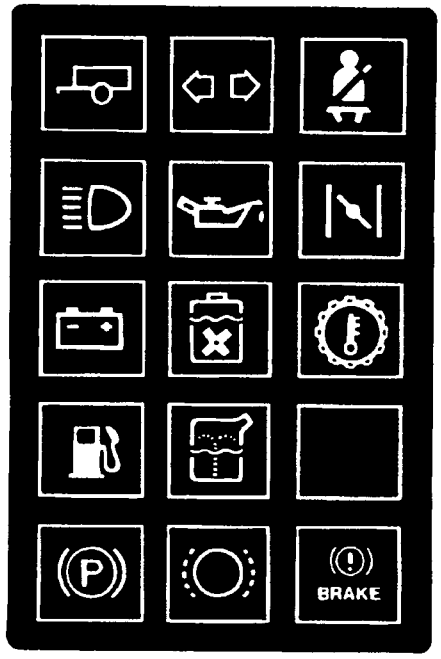
Low fuel indicator (amber)

Low wash fluid (amber)

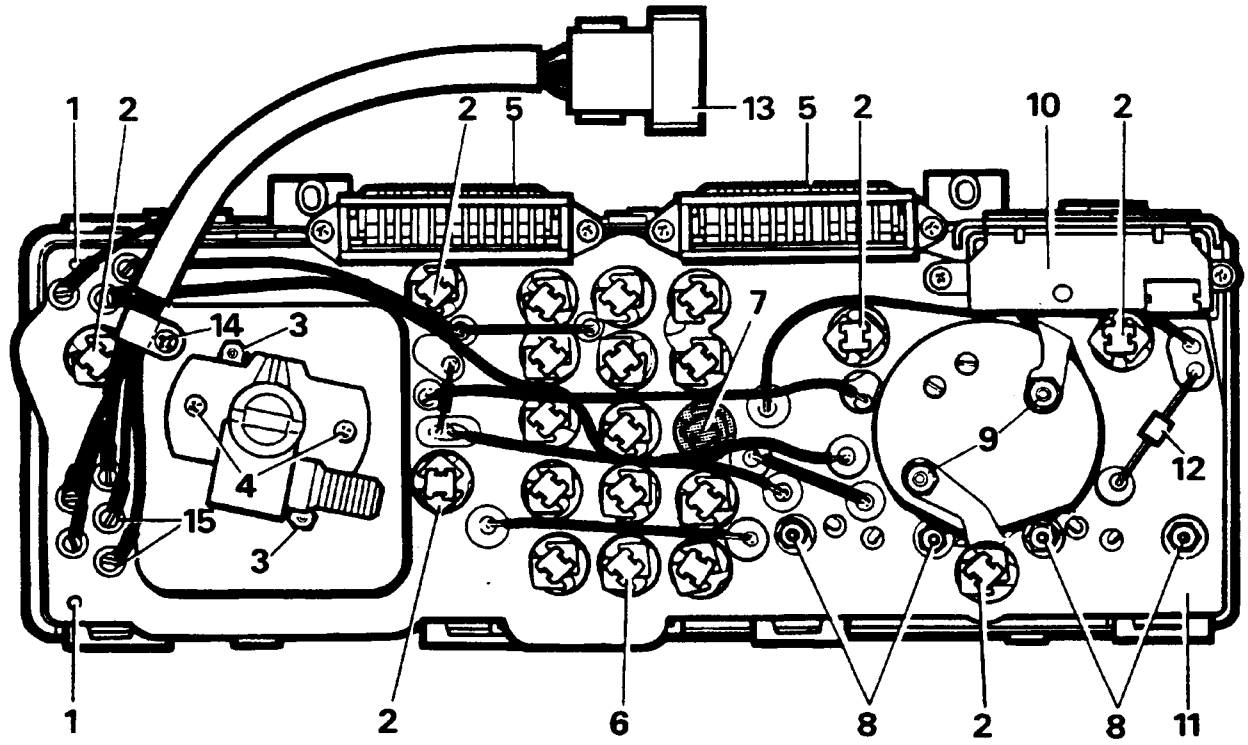
Transmission handbrake on (red)

Brake pad wear (amber)

Brake fluid pressure failure/low fluid level (red)



RR2113M



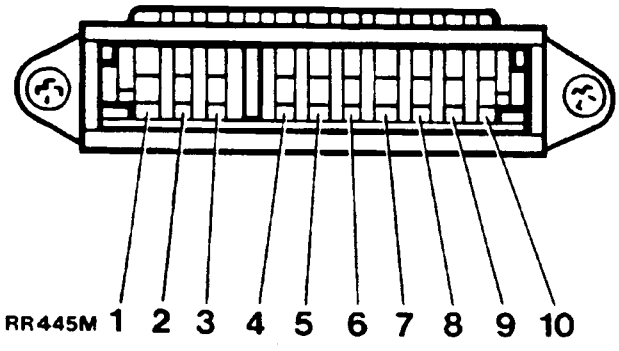
RR2109M

Instrument case (back)

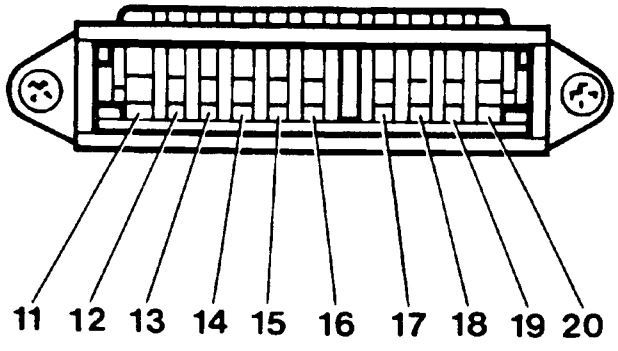
1. Locating pegs
2. Panel light bulbs
3. Speedometer securing screw
4. Speedometer drive securing screws
5. Harness connectors
6. Warning light bulbs (14)
7. No charge warning light bulb (red holder)
8. Temperature and fuel gauge unit securing nuts
9. Tachometer securing nuts
10. Multi-function unit
11. Printed circuit
12. Pull-up resistor-high temperature gearbox oil
13. Single multi-plug
14. Single multi-plug securing screw
15. Single multi-plug wiring connecting screws

PRINTED CIRCUIT HARNESS CONNECTIONS

Sequence of connections viewed from back of instrument case.



RR445M

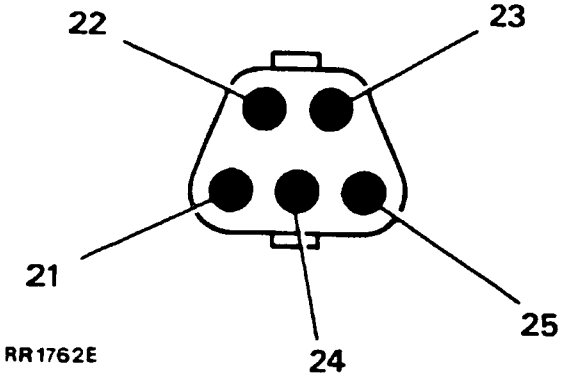


CIRCUIT SERVED

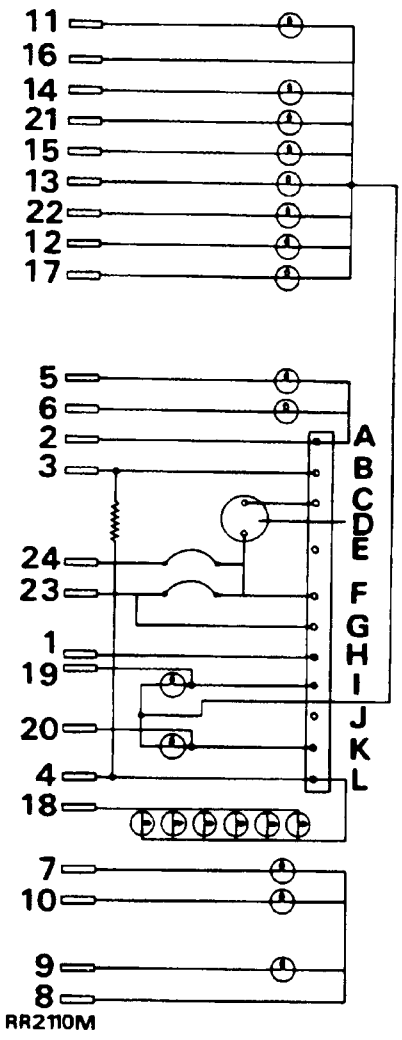
Tacho signal 1
Ignition switch 12V+ 2
Low coolant input 3
Earth-VE 4
Ignition warning light 5
Low oil and low pressure warning light 6
Main beam warning light 7
Zero volts from dimmer 8
Trailer warning light 9
Direction indicators warning light 10
Seat belts warning light 11
Cold start warning light 12
Temperature warning light
(automatic gearbox) 13
Low wash fluid warning light 14
Not used 15
12V+ from dimmer 16
Brake fail warning light 17
Panel illumination bulbs (6 off) 18
Low fuel warning light 19
Low coolant warning light 20

NOTE: The following 21 to 25 are connected at the single multi- plug located behind the binnacle

Brake pad wear warning light 21
Not used 22
Fuel tank unit and fuel gauge 23
Temperature gauge 24
Not used 25



Sequence of connections at the single multi-plug.



MULTI-FUNCTION UNIT

A. 12V+ supply
B. Input to low coolant circuit
C. Tachometer drive
D. Tachometer
E. Spare
F. 10V+ stabilised
G. Input to fuel tank unit - stabilised
H. Tachometer signal
I. Low fuel warning light
J. Spare
K. Low coolant warning light
L. Earth

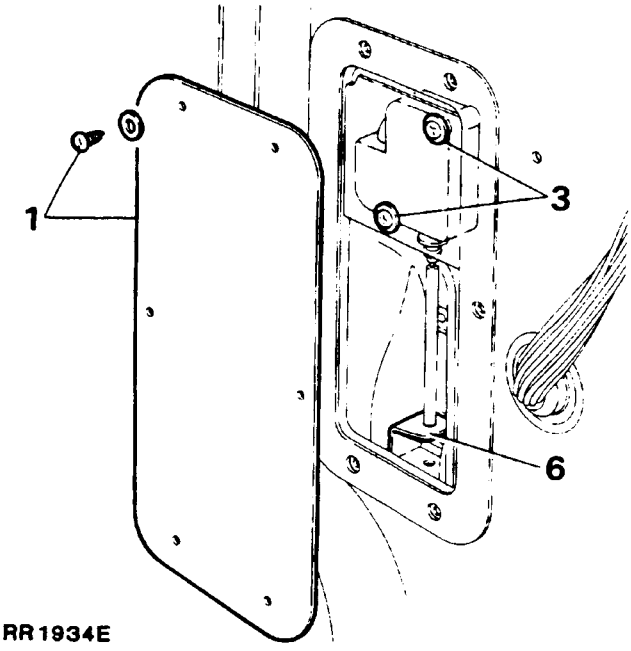
CENTRAL LOCKING-FUEL FILLER FLAP ACTUATOR UNIT

The fuel filler flap is locked when the vehicle central locking is actuated. Repair is by replacement of the actuator unit.

Remove and refit

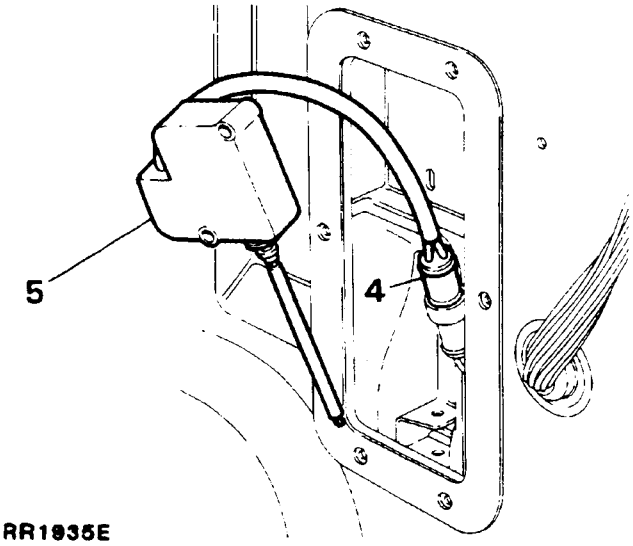
Removing

1. Remove six screws and withdraw the closure panel, situated in the tool stowage area.
2. Ensure that the actuator is in the unlocked position and the fuel filler flap is open.
3. Release two screws and manoeuvre the actuator unit clear of its mounting.



RR1934E

4. Disconnect the wiring plug.
5. Withdraw the actuator.



RR1935E

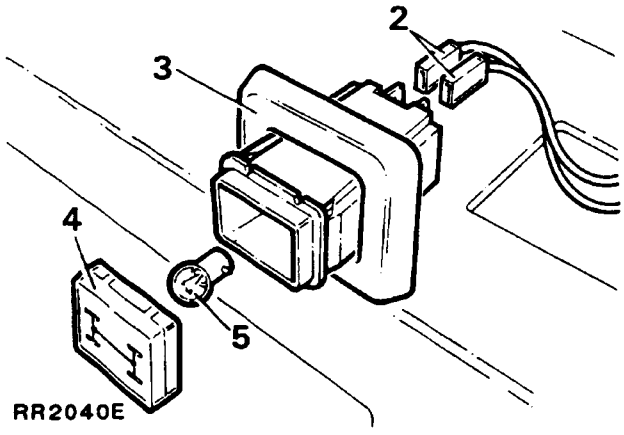
Refitting

6. Reverse the removal procedure. The actuator mounting holes in the body are elongated. Adjust the position of the actuator to ensure that the rod will pass through the guide brackets without fouling.
7. Check the operation of the central locking system.

DIFFERENTIAL LOCK WARNING LAMP ASSEMBLY/BULB REPLACEMENT

Remove and refit

1. Carefully prise the warning lamp out of the radio console.
2. Remove the two wiring connectors and withdraw the lamp assembly, if required.
3. Squeeze the sides of the lamp body to enable the lens surround to be slid back along the body.
4. Remove the amber lens.
5. Remove the bayonet fitting bulb.



Refitting

6. Reverse the removal procedure.

The correct bulb type is a 12-volt, 2-watt bayonet fitting.

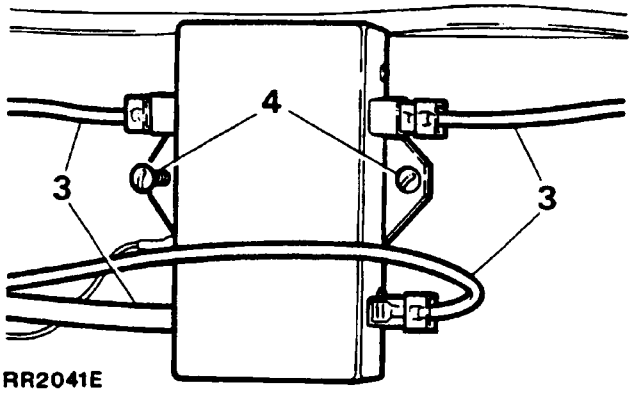
RADIO ANTENNA AMPLIFIER

The radio aerial is incorporated in the rear screen heater element. The signal to the radio is electronically boosted by the amplifier mounted at the rear of the vehicle adjacent to the tailgate screen wiper motor.

Remove and refit

Removing

1. Disconnect the battery negative lead.
2. Lower or remove the rear headlining.
3. Remove the electrical leads and the antenna lead to the radio.



Refitting

4. Reverse the removal procedure.

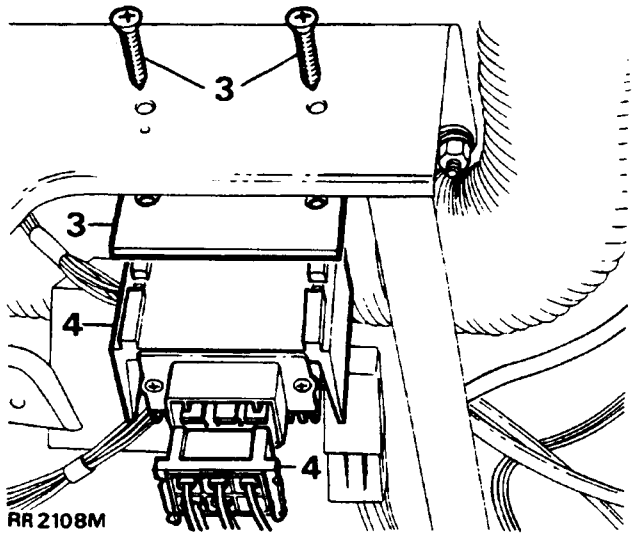
HEADLAMP DIM-DIP LIGHTING (U.K. only)

Vehicles manufactured after October 1st 1986 must comply with new lighting regulations,which prohibit such vehicles being driven on side lights only. This is achieved by the addition of an electronic control unit in the lighting system,so that when the side lights are switched on with the engine running, low voltage current is supplied to the headlamp dipped beam circuit, giving dim-dipped lighting. When the headlamps are switched on, full voltage is automatically restored, giving normal headlamp lighting.

ELECTRONIC CONTROL UNIT (DIM-DIP LIGHTING)

Remove and refit

1. Disconnect the battery negative lead.
2. Remove the lower fascia panel.
3. Remove two securing screws and retain the distance piece.
4. Disconnect the wiring connector and withdraw the electronic control unit.



Refitting

5. Reverse the removal procedure.

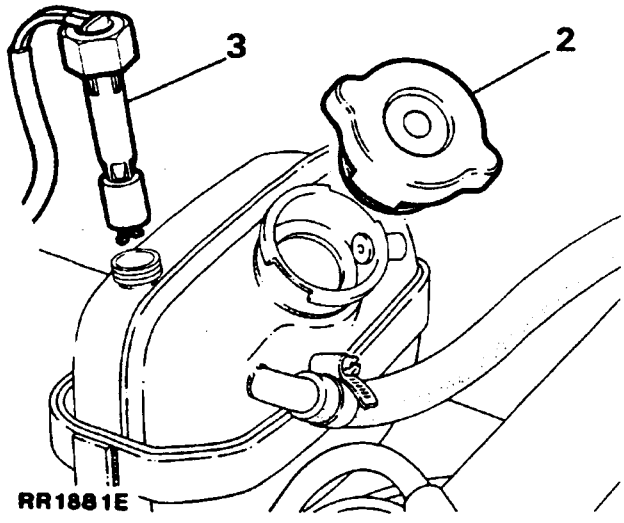
COOLANT LEVEL SENSOR

Remove and refit

Removing

WARNING: Do not remove the expansion tank filler cap when the engine is hot beause the cooling system is pressurised and personal scalding could result.

1. Disconnect the multi-plug from the sensor.
2. Remove the expansion tank filler cap by first turning it anti-clockwise a quarter of a turn to allow pressure to escape. Then turn it in the same direction and lift off.
3. Release the retaining nut and withdraw the sensor from the expansion tank and disconnect the electrical leads.



Refitting

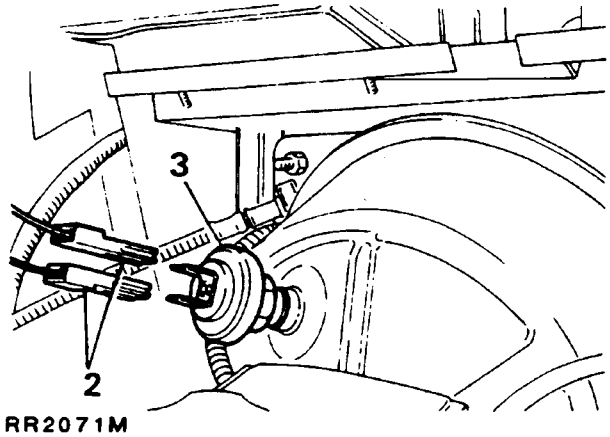
4. Reverse the removal instructions.
5. Start engine and run until normal running temperature is attained, thermostat open. Check for coolant leaks around the sensor.

VACUUM SENSOR - BRAKE SERVO (Diesel models only)

The sensor will illuminate the brake fail warning light indicating lack of vacuum within the servo. When the engine is started the warning light will remain illuminated until the vacuum is restored.

Remove and refit

1. Disconnect the battery negative lead.
2. Remove the two wiring connectors from the sensor.
3. Slacken the sensor and remove from the servo.



RR2071M

Refitting

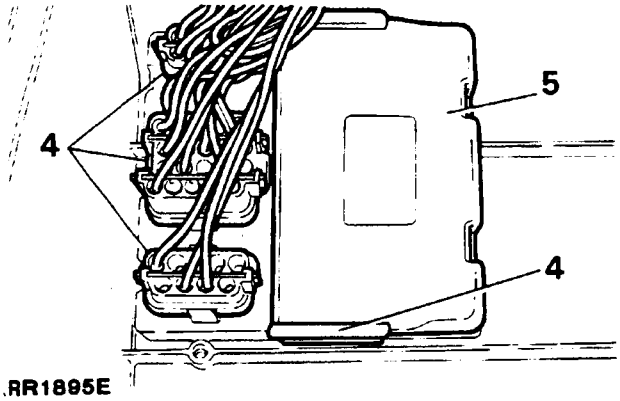
4. Reverse the removal procedure.

BRAKE CHECK UNIT

Remove and refit

Removing

1. Disconnect the battery negative terminal.
2. Release the six screws securing the lower fascia panel below the steering column.
3. Lower the fascia panel and disconnect the multi-plug from the rheostat switch.
4. Pull the brake check unit from the spring clip on the underside of the fascia panel and disconnect the three multi-plugs from the unit.
5. Remove the brake check unit from the vehicle.

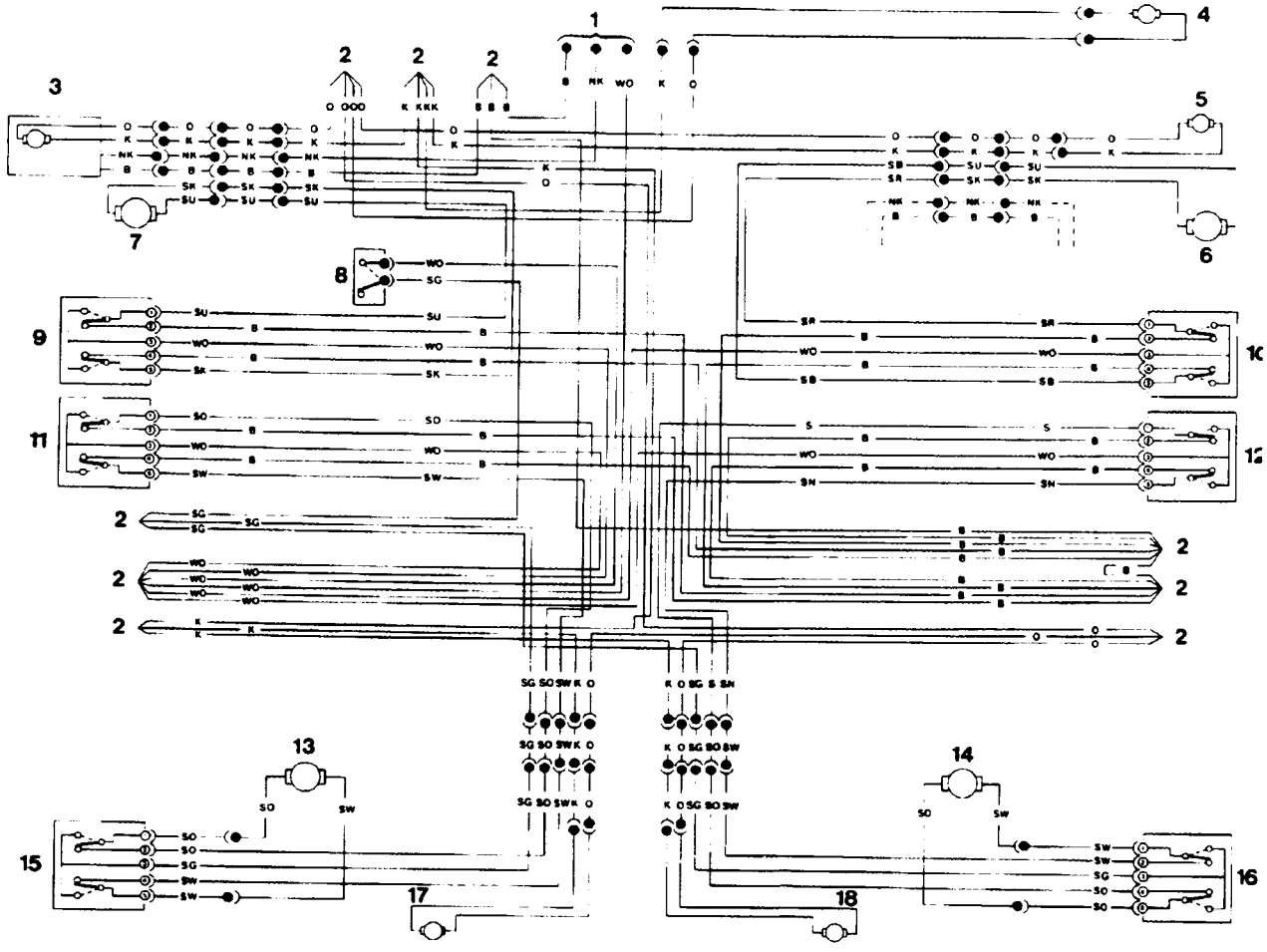


RR1895E

Refitting

6. Reverse the removal procedure ensuring that the multi-plugs and unit are securely pushed into position.

ELECTRICAL EQUIPMENT - CIRCUIT DIAGRAMS



RR1755E

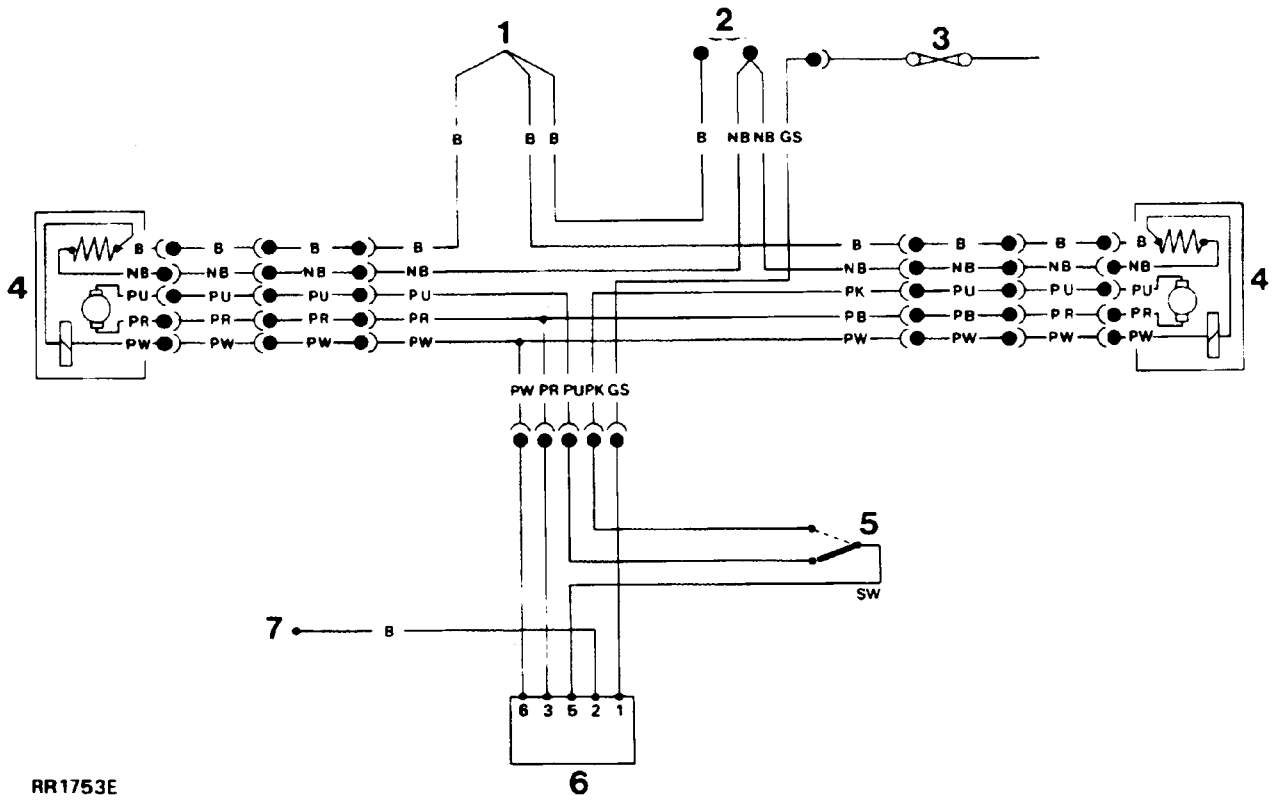
WINDOW LIFTS AND DOOR LOCKS-
Circuit diagram

1. Main cable connections
2. Clinches
3. Switch unit-central door locking (driver's door)
4. Fuel flap actuator
5. Lock unit-central door locking (front passenger door)
6. Window lift motor L/H front
7. Window lift motor R/H front
8. Isolator switch
9. Window lift switch L/H front
10. Window lift switch R/H front
11. Window lift switch L/H rear
12. Window lift switch R/H rear
13. Window lift motor L/H rear
14. Window lift motor R/H rear
15. Window lift switch L/H rear door
16. Window lift switch R/H rear door
17. Lock unit central door locking L/H rear door
18. Lock unit central door locking R/H rear door

CABLE COLOUR CODE

B	Black	**G**	Green	**K**	Pink	**S**	Slate
U	Blue	**L**	Light	**P**	Purple	**W**	White
N	Brown	**O**	Orange	**R**	Red	**Y**	Yellow

The last letter of a colour code denotes the tracer.



ELECTRIC MIRRORS - Circuit diagram

1. Clinch
2. Main cable connections
3. Fuse 10-main fuse panel
4. Mirror motors
5. Change over switch
6. Mirror control switch
7. Earth-via main cable

CABLE COLOUR CODE

B Black
U Blue
N Brown
G Green
O Orange
P Purple
R Red
S Slate
W White
Y Yellow

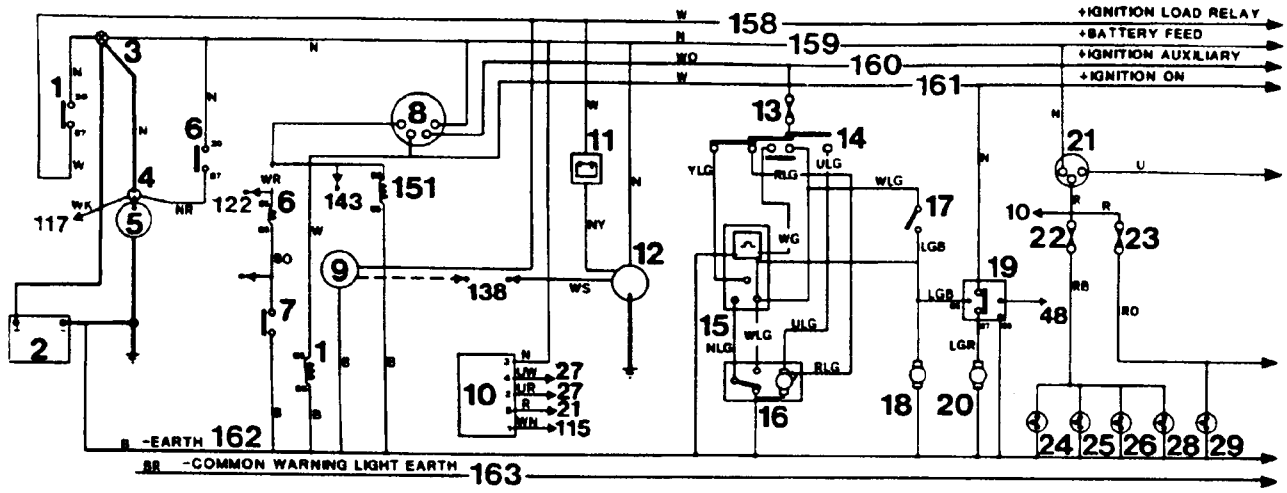
The last letter of a colour code denotes the tracer.

MAIN CIRCUIT DIAGRAM
Right Hand Steering - RR2343M & RR2344M

1. Ignition load relay
2. Battery
3. Terminal post
4. Starter solenoid
5. Starter motor
6. Starter relay
7. Starter inhibit switch (Automatic)
8. Ignition switch
9. Tachometer
10. Voltage transformer(dim dip)
11. Ignition warning lamp
12. Alternator
13. Fuse 7
14. Front wipe/wash switch
15. Front wipe delay unit
16. Front wiper motor
17. Front wash switch
18. Front wash pump
19. Headlamp wash timer unit (option)
20. Headlamp wash pump (option)
21. Main lighting switch
22. Fuse 6
23. Fuse 5
24. LH side lamp
25. LH tail lamp
26. Number plate lamp(2 off)
27. Main beam dip/flash switch
28. Radio illumination
29. RH side lamp
30. RH tail lamp
31. Rheostat
32. Fuse 3
33. Fuse 4
34. Fuse 1
35. Fuse 2
36. Rear fog switch
37. Fuse 12
38. Switch illumination (2 off)
39. Cigar lighter illumination (2 off)
40. Heater illumination (4 off)
41. Clock illumination
42. Automatic gear selector illumination (2 off)
43. Instrument illumination (6 off)
44. Rear fog warning lamp
45. LH rear fog
46. RH rear fog
47. LH dip beam
48. RH dip beam
49. LH main beam
50. RH main beam
51. Main beam warning lamp
52. Fuel gauge
53. Fuel gauge sender unit
54. Water temperature gauge
55. Water temperature sender unit
56. Fuse 11
57. Horn switch
58. RH horn
59. LH horn
60. Under bonnet illumination switch
61. Under bonnet light
62. Clock
63. Fuse 19
64. Fuse 20
65. Pick-up point central locking/window lift (option)
66. Heated rear window relay
67. Fuse 9
68. Radio aerial amplifier
69. Heated rear screen
70. Heated rear screen switch
71. Heated rear screen warning lamp
72. Voltage sensitive switch
73. Fuse 13
74. Hazard switch
75. Flasher unit
76. Direction indicator switch
77. Hazard/indicator warning lamp
78. LH rear indicator lamp
79. LH front indicator lamp
80. LH side repeater lamp
81. RH side repeater lamp
82. RH front indicator lamp
83. RH rear indicator lamp
84. Trailer warning lamp
85. Fuse 15
86. Stop lamp switch
87. Reverse lamp switch
88. Auxiliary lamp relay (option)
89. LH stop lamp
90. RH stop lamp
91. LH reverse lamp
92. RH reverse lamp
93. LH auxiliary lamp (option)
94. RH auxiliary lamp (option)
95. Auxiliary lamp switch (option)
96. Fuse 17
97. Dash cigar lighter
98. Cubby box cigar lighter
99. LH interior lamp
100. RH interior lamp
101. Interior lamp delay unit
102. LH door edge lamp
103. RH door edge lamp
104. LH puddle lamp
105. RH puddle lamp
106. Interior lamp switch
107. LH rear door switch
108. RH rear door switch
109. Tailgate switch
110. LH front door switch
111. RH front door switch
112. Differential lock warning lamp
113. Differential lock switch
114. Oil pressure warning lamp
115. Oil pressure switch
116. Fuse 18
117. Fuel cut off relay (carburetter models)
118. Fuel pump(petrol models)
119. Ignition coil
120. Capacitor
121. Distributor
122. EFI Harness plug
123. Fuel shut off solenoid (Diesel)
124. Radio choke
125. Radio fuse
126. Radio and four speakers
127. Ignition pick up points
128. Automatic transmission oil temperature warning lamp
129. Automatic transmission oil temperature switch
130. Fuse 16
131. Rear wash wipe switch
132. Rear wipe delay unit
133. Rear wiper motor
134. Rear screen wash pump
135. Low screen wash fluid level warning lamp
136. Low screen wash switch
137. Low coolant switch
138. Multi-function unit in binnacle
139. Low coolant level warning lamp
140. Low fuel level warning lamp
141. Cold start/diesel glow plug warning lamp
142. Cold start switch - carburetter
143. Glow plug timer (diesel)
144. Glow plugs (diesel)
145. Handbrake warning lamp
146. Brake fail warning lamp
147. Handbrake warning switch
148. Brake fail warning switch
149. Brake pad wear warning lamp
150. Brake pad wear sensors
151. Brake check relay
152. Split charge relay (option)
153. Split charge terminal post (option)
154. Heater/air conditioning connections
155. Fuse 8
156. Coil negative (engine RPM input to ECU.)

CABLE COLOUR CODE

B	Black
U	Blue
N	Brown
G	Green
L	Light
O	Orange
K	Pink
P	Purple
R	Red
S	Slate
W	White
Y	Yellow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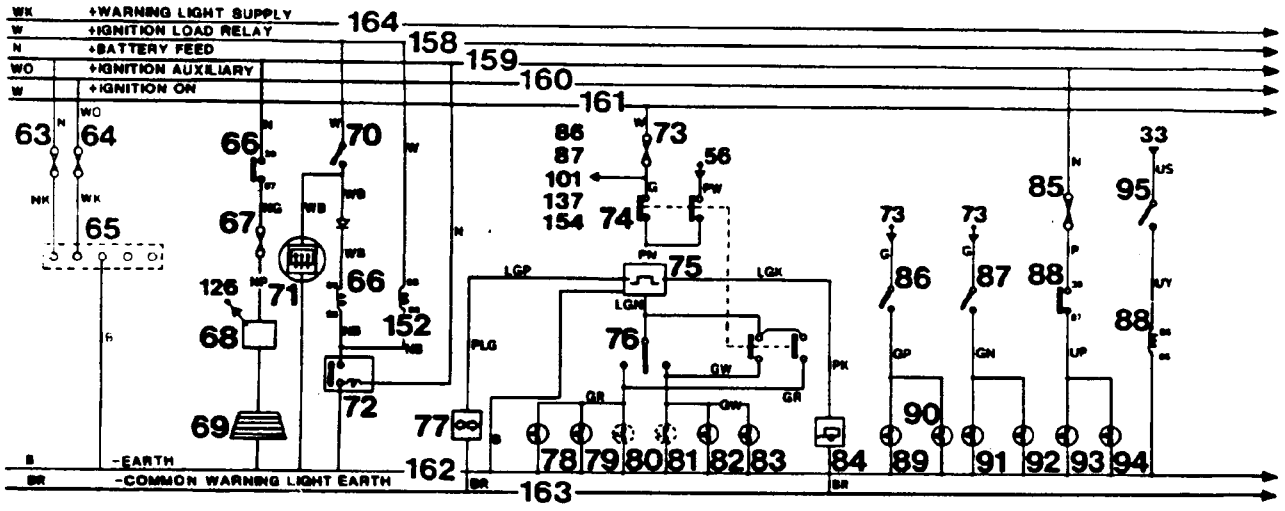
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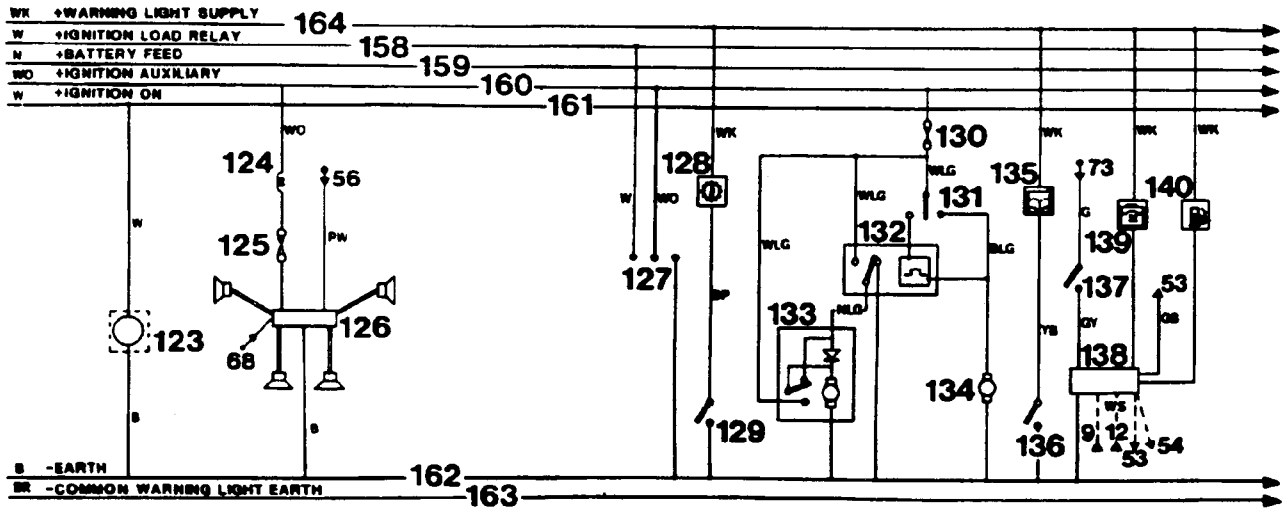
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-EARTH
-COMMON WARNING LIGHT EARTH
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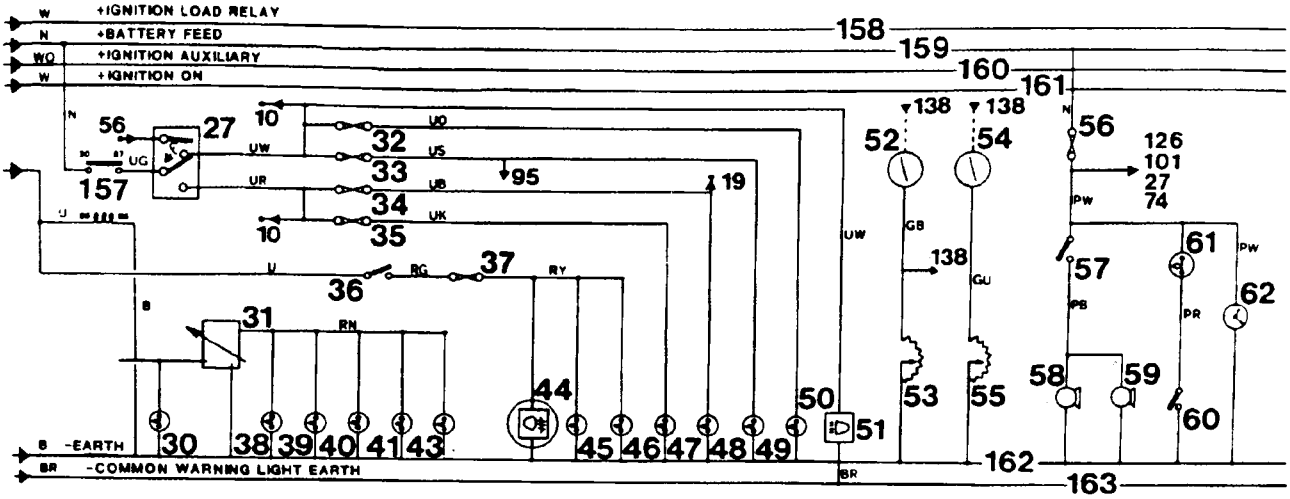
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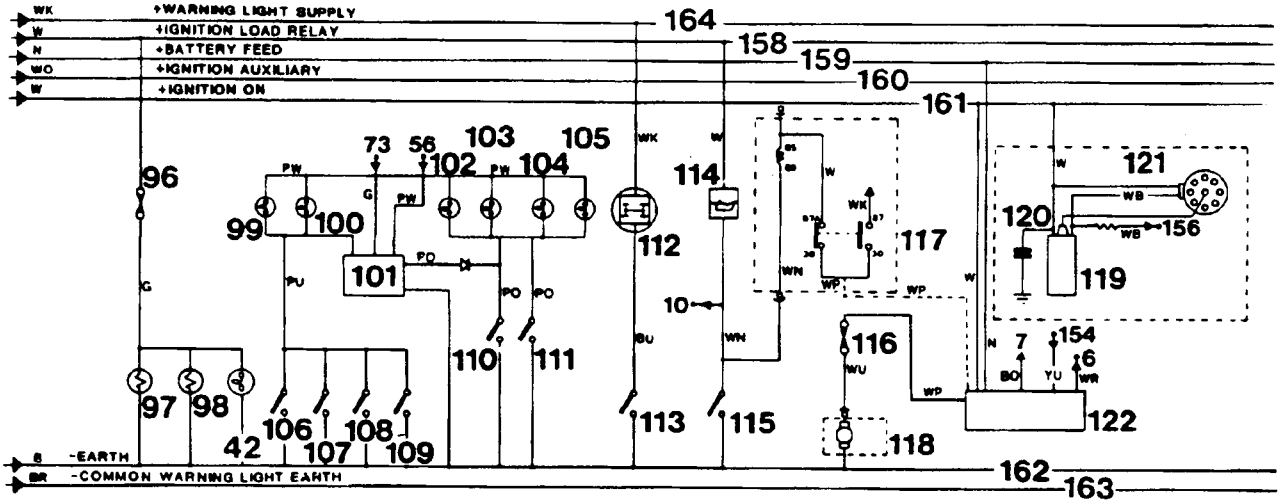
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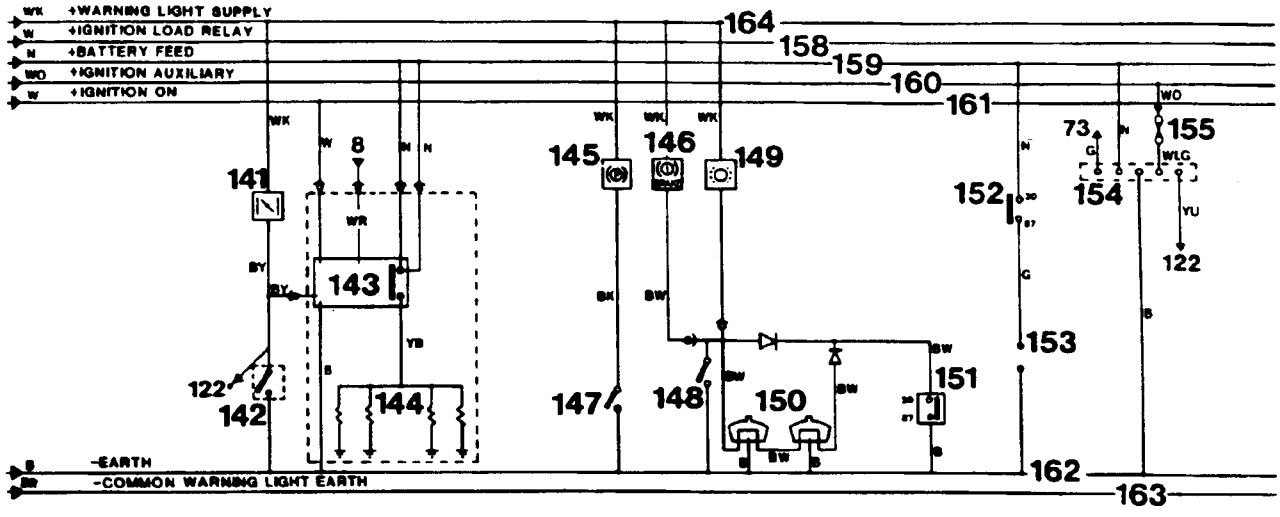
-EARTH
-COMMON WARNING LIGHT EARTH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RR2344

MAIN CIRCUIT DIAGRAM
Left-hand Steering - RR2345M & RR2346M

1. Ignition load relay
2. Battery
3. Terminal post
4. Starter solenoid
5. Starter motor
6. Starter relay
7. Starter inhibit switch (automatic)
8. Ignition switch
9. Tachometer
10. Ignition warning lamp
11. Alternator
12. Fuse 7
13. Front wipe/wash switch
14. Front wipe delay unit
15. Front wiper motor
16. Front wash pump
17. Headlamp wash timer unit (option)
18. Headlamp wash pump (option)
19. Main lighting switch
20. Fuse 6
21. Fuse 5
22. LH side lamp
23. LH tail lamp
24. Number plate lamp (2 off)
25. Main beam dip/flash switch
26. Radio illumination
27. RH side lamp
28. RH tail lamp
29. Rheostat
30. Fuse 3
31. Fuse 4
32. Fuse 1
33. Fuse 2
34. Rear fog switch
35. Fuse 12
36. Switch illumination (2 off)
37. Cigar lighter illumination (2 off)
38. Heater illumination (4 off)
39. Clock illumination
40. Automatic gear selector illumination (2 off)
41. Instrument illumination (6 off)
42. Rear fog warning lamp
43. LH rear fog
44. RH rear fog
45. LH dip beam
46. RH dip beam
47. LH main beam
48. RH main beam
49. Main beam warning lamp
50. Fuel gauge
51. Fuel gauge sender unit
52. Water temperature gauge
53. Water temperature sender unit
54. Fuse 11
55. Horn switch
56. RH horn
57. LH horn
58. Under bonnet illumination switch
59. Under bonnet light
60. Clock
61. Fuse 19
62. Fuse 20
63. Pick-up point central locking/window lift
64. Heated rear window relay
65. Fuse 9
66. Radio aerial amplifier
67. Heated rear screen
68. Heated rear screen switch
69. Heated rear screen warning lamp
70. Voltage sensitive switch
71. Fuse 13
72. Hazard switch
73. Flasher unit
74. Direction indicator switch
75. Hazard/indicator warning lamp
76. LH rear indicator lamp
77. LH front indicator lamp
78. LH side repeater lamp
79. RH side repeater lamp
80. RH front indicator lamp
81. RH rear indicator lamp
82. Trailer warning lamp
83. Fuse 15
84. Stop lamp switch
85. Reverse lamp switch
86. Auxiliary lamp relay
87. LH stop lamp
88. RH stop lamp
89. LH reverse lamp
90. RH reverse lamp
91. LH auxiliary lamp (option)
92. RH auxiliary lamp (option)
93. Auxiliary lamp switch (option)
94. Fuse 17
95. Dash cigar lighter
96. Cubby box cigar lighter
97. LH interior lamp
98. RH interior lamp
99. Interior lamp delay unit
100. LH door edge lamp
101. RH door edge lamp
102. LH puddle lamp
103. RH puddle lamp
104. Interior lamp switch
105. LH rear door switch
106. RH rear door switch
107. Tailgate switch
108. LH front door switch
109. RH front door switch
110. Differential lock warning lamp
111. Differential lock switch
112. Oil pressure warning lamp
113. Oil pressure switch
114. Fuse 18
115. Fuel shut-off relay - carburetter
116. Fuel pump - petrol models
117. Ignition coil
118. Capacitor
119. Distributor
120. EFI Harness plug
121. Fuel shut-off solenoid-Diesel
122. Radio choke
123. Radio fuse
124. Radio
125. Four speakers
126. Seat belt warning lamp
127. Speed transducer, Saudi only
128. Resistor
129. Audible warning unit
130. Transfer box neutral switch
131. Seat buckle switch
132. Overspeed monitor (Saudi only)
133. Overspeed buzzer (Saudi only)
134. Ignition pick up points
135. Automatic transmission oil temperature warning lamp
136. Automatic transmission oil temperature switch
137. Fuse 16
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
141. Rear screen wash pump
142. Low screen wash fluid level warning lamp
143. Low screen wash switch
144. Low coolant switch
145. Multi-function unit in binnacle
146. Low coolant level warning lamp
147. Low fuel level warning lamp
148. Cold start/Diesel glow plug warning lamp
149. Choke switch - carburetter
150. Glowplug timer/Diesel
151. Glowplugs/Diesel
152. Handbrake/warning lamp
153. Handbrake warning switch
154. Brake fail warning switch
154a. Brake fail warning lamp
155. Brake pad wear warning lamp
156. Brake pad wear sensors
157. Brake check unit
158. Split charge relay (option)
159. Split charge terminal post
160. Heater/air conditioning connections
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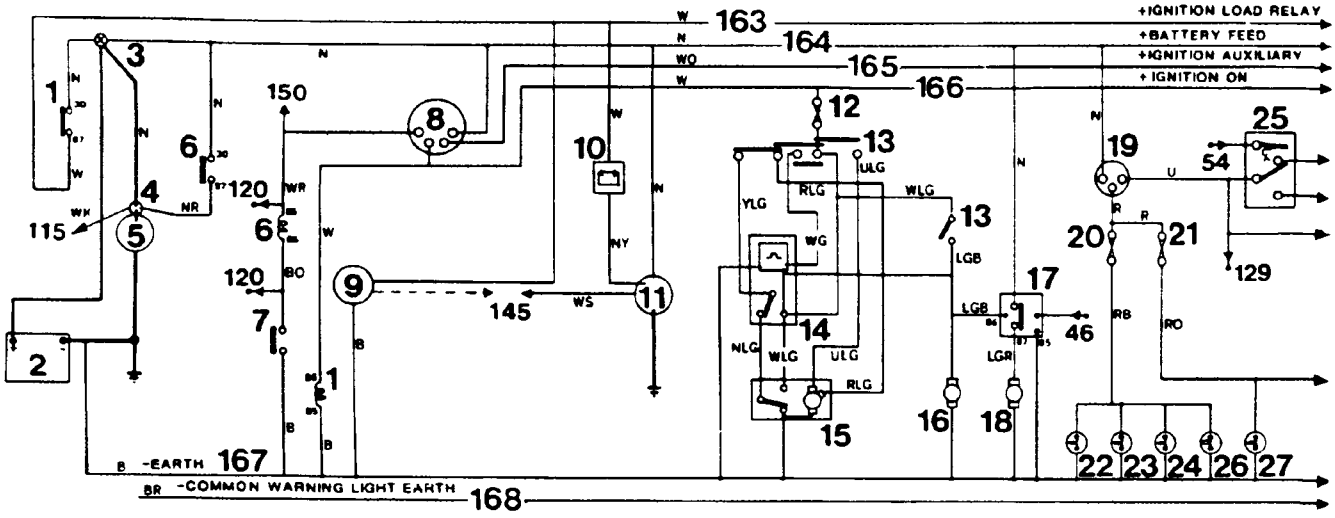
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-EARTH
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-COMMON WARNING LIGHT EARTH
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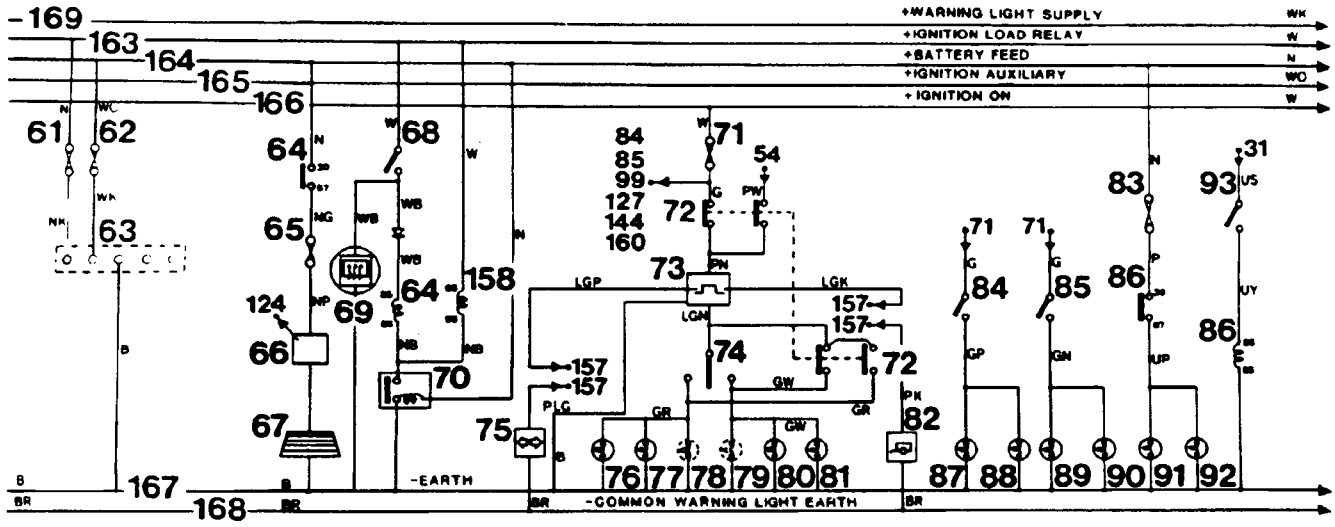
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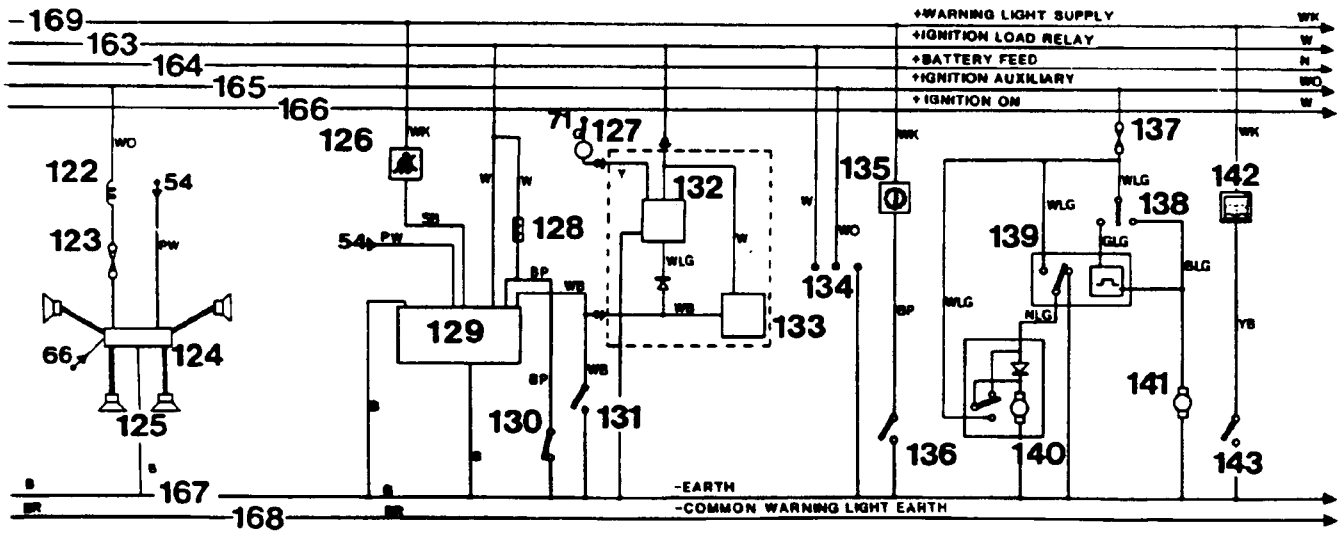
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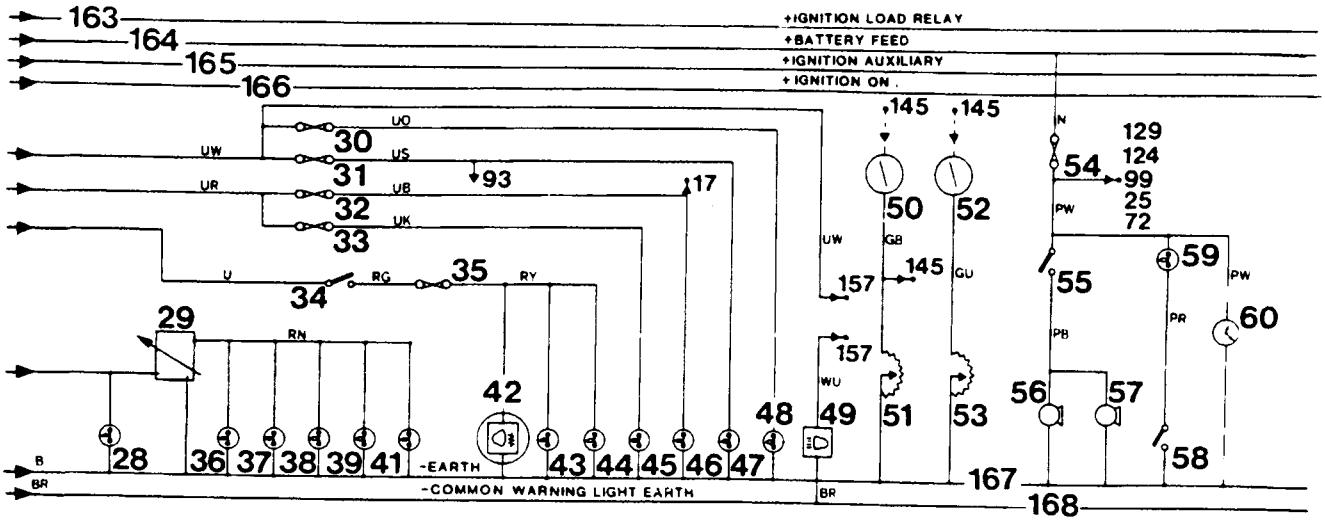
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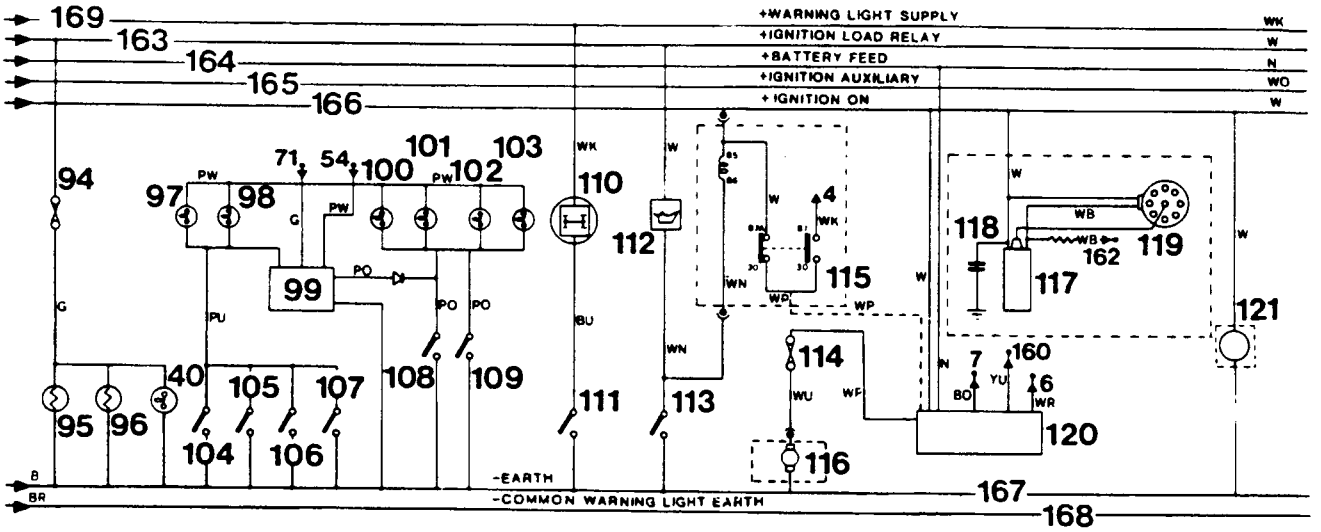
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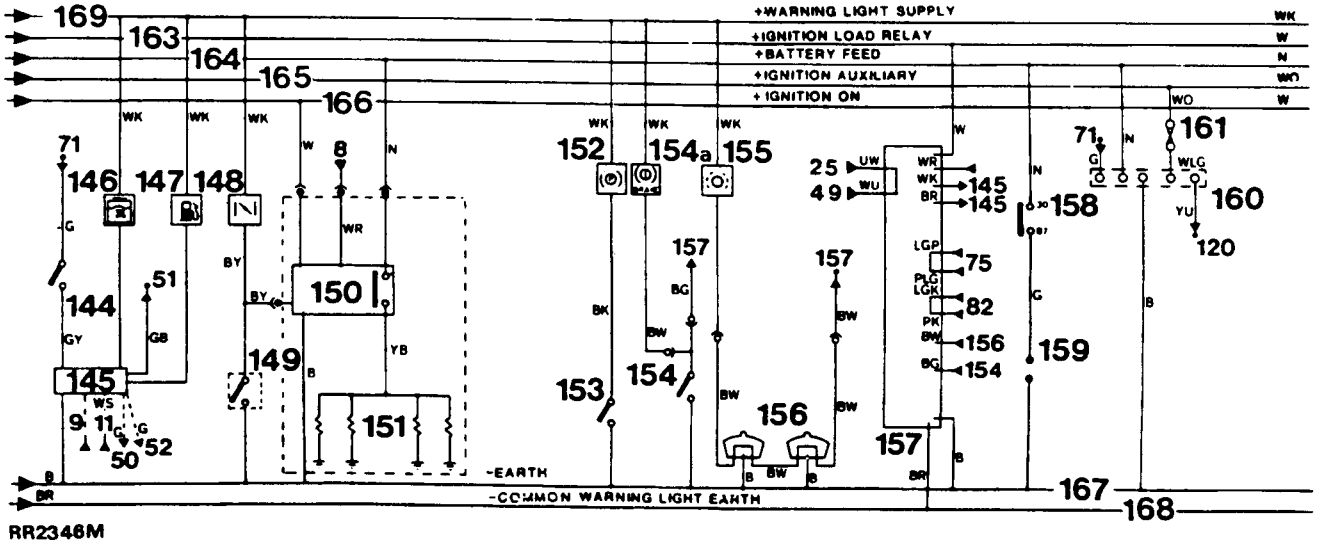
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-EARTH
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RR2346M

Notes