LAND ROVER

Land Rover Series III

Repair Operation Manual

AKM3648 (EDITION 4)

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BY APPOINTMENT TO HER MAJESTY THE QUEEN
BL CARS LIMITED · BIRMINGHAM
MANUFACTURERS OF ROVER CARS, LAND-ROVERS,
RANGE ROVERS AND AUSTIN CARS

BY APPOINTMENT TO HER MAJESTY QUEEN ELIZABETH
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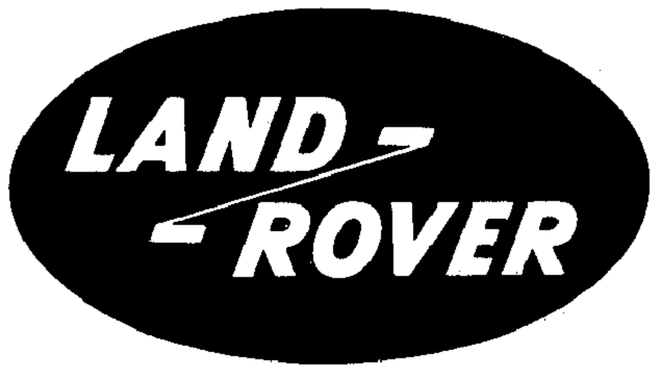
MANUFACTURERS OF DAIMLER, JAGUAR AND ROVER CARS
AND LAND-ROVERS

BY APPOINTMENT
TO H.R.H. THE PRINCE OF WALES
LAND ROVER LIMITED · SOLIHULL
MANUFACTURERS OF MOTOR VEHICLES



LAND ROVER

Series III

REPAIR OPERATION MANUAL
INCORPORATING FIVE MAIN BEARING
ENGINE SUPPLEMENT

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England

SPECIFICATION

Land Rover Limited is constantly seeking ways to improve the specification of its vehicles and alterations take place continually. While every effort is made to produce up-to-date literature this Manual should not be regarded as an infallible guide to current specifications. Further the specification details set out in the Manual apply to a range of vehicles and not to any particular one.

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INTRODUCTION

The purpose of this manual is to assist skilled mechanics in the efficient repair and maintenance of the range of vehicles given on the title-page. The procedures detailed, carried out in the sequence given and using the appropriate service tools, will enable the operations to be completed in the time stated in the Repair Operation Times.

Indexing

The content pages list the titles and reference numbers of the divisions in alphabetical order.

Operation Numbering

Each operation is followed by the number allocated to it in a master index. The number consists of six digits arranged in three pairs.

The master index of operations has been compiled for universal application to vehicles manufactured by British Leyland Motor Corporation and therefore continuity of the numbering sequence is not maintained throughout the manual.

Each instruction within an operation has a sequence number, and to complete the operation in the minimum time it is essential that these instructions are performed in numerical sequence commencing at 1 unless otherwise stated. Where applicable, the sequence numbers identify the components in the appropriate illustration.

Where performance of an operation requires the use of a service tool, the tool number is quoted under the operation heading and is repeated in, or following, the instruction involving its use.

An illustrated list of all service tools necessary to complete the operations described in the manual is also included.

References

References to the left- or right-hand side in the manual are made when viewing the vehicle from the rear. With the engine and gearbox assembly removed, the water pump end of the engine is referred to as the front.

To reduce repetition, operations covered in this manual do not include reference to testing the vehicle after repair. It is essential that work is inspected and tested after completion and if necessary a road test of the vehicle is carried out particularly where safety related items are concerned.

Dimensions

The dimensions quoted are to design engineering specification. Alternative unit equivalents, shown in brackets following the dimensions, have been converted from the original specification.

During the period of running-in from new, certain adjustments may vary from the specification figures given in this Manual. These adjustments will be re-set by the Distributor or Dealer at the After Sales Service, and thereafter should be maintained at the figures specified in the Manual.

REPAIRS AND REPLACEMENTS

When replacement parts are required it is essential that only genuine Land Rover replacements are used.

Attention is particularly drawn to the following points concerning repairs and the fitting of replacement parts and accessories:

Safety features embodied in the vehicle may be impaired if other than genuine Land Rover replacements are fitted. In certain territories, legislation prohibits the fitting of parts not to the vehicle manufacturer's specification. Torque wrench setting figures given in the Repair Operation Manual must be strictly adhered to. Locking devices, where specified, must be fitted. If the efficiency of a locking device is impaired during removal it must be renewed. Owners purchasing accessories while travelling abroad should ensure that the accessory and its fitted location on the vehicle conform to mandatory requirements existing in their country of origin. The terms of the Owners Service Statement may be invalidated by the fitting of other than genuine Land Rover parts.

All genuine Land Rover replacements have the full backing of the Owners Service Statement.

Land Rover Distributors and Dealers are obliged to supply only genuine Land Rover service parts.

POISONOUS SUBSTANCES

WARNING

Many liquids and other substances used in motor vehicles are poisonous and should under no circumstances be consumed and should as far as possible be kept away from open wounds. These substances among others include antifreeze, brake fluid, fuel, windscreen washer additives, lubricants and various adhesives.

FUEL HANDLING PRECAUTIONS

The following information provides basic precautions which must be observed if petrol (gasoline) is to be handled safely. It also outlines the other areas of risk which must not be ignored.

This information is issued for basic guidance only, and in any case of doubt appropriate enquiries should be made of your local Fire Officer.

General

Petrol/gasoline vapour is highly flammable and in confined spaces is also very explosive and toxic.

When petrol/gasoline evaporates it produces 150 times its own volume in vapour, which when diluted with air becomes a readily ignitable mixture. The vapour is heavier than air and will always fall to the lowest level. It can readily be distributed throughout a workshop by air current, consequently, even a small spillage of petrol/gasoline is potentially very dangerous.

Always have a fire extinguisher containing FOAM CO_2 GAS, or POWDER close at hand when handling or draining fuel, or when dismantling fuel systems and in areas where fuel containers are stored.

Always disconnect the vehicle battery BEFORE carrying out dismantling or draining work on a fuel system.

Whenever petrol/gasoline is being handled, drained or stored, or when fuel systems are being dismantled all forms of ignition must be extinguished or removed, any headlamps used must be flameproof and kept clear of spillage.

NO ONE SHOULD BE PERMITTED TO REPAIR COMPONENTS ASSOCIATED WITH PETROL/GASOLINE WITHOUT FIRST HAVING HAD SPECIALIST TRAINING.

Fuel Tank Draining

WARNING: PETROL/GASOLINE MUST NOT BE EXTRACTED OR DRAINED FROM ANY VEHICLE WHILST IT IS STANDING OVER A PIT.

Draining or extracting petrol/gasoline from vehicle fuel tank must be carried out in a well ventilated area.

The receptacle used to contain the petrol/gasoline must be more than adequate for the full amount of fuel to be extracted or drained. The receptacle should be clearly marked with its contents, and placed in a safe storage area which meets the requirements of local authority regulations.

WHEN PETROL/GASOLINE HAS BEEN EXTRACTED OR DRAINED FROM A FUEL TANK THE PRECAUTIONS GOVERNING NAKED LIGHTS AND IGNITION SOURCES SHOULD BE MAINTAINED.

Fuel Tank Removal

On vehicles where the fuel line is secured to the fuel tank outlet by a spring steel clip, it is recommended that such clips are released before the fuel line is disconnected or the fuel tank unit is removed. This procedure will avoid the possibility of residual petrol fumes in the fuel tank being ignited when the clips are released.

As an added precaution fuel tanks should have a PETROL/GASOLINE VAPOUR warning label attached to them as soon as they are removed from the vehicle.

continued

WEIGHTS

Short-wheelbase weights

	Full Length Canvas Hood				Truck Cab				Hard Top				Station Wagon			
	Petrol		Diesel		Petrol		Diesel		Petrol		Diesel		Petrol		Diesel	
	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb
UNLADEN WEIGHT																
Front axle	718	1583	747	1647	725	1599	754	1663	713	1572	742	1636	705	1555	734	1619
Rear axle	580	1279	589	1299	582	1283	591	1303	625	1378	634	1398	713	1572	722	1592
Total	1298	2862	1336	2946	1307	2882	1345	2966	1338	2950	1376	3034	1418	3127	1456	3211
EEC KERB WEIGHT																
Front axle	756	1667	786	1733	763	1682	793	1749	751	1656	781	1722	743	1638	773	1705
Rear axle	650	1433	661	1457	652	1438	663	1462	695	1532	706	1557	783	1727	794	1751
Total	1406	3100	1447	3190	1415	3120	1456	3211	1446	3188	1487	3279	1526	3365	1567	3456
GROSS VEHICLE WEIGHT	kg	lb			kg	lb			kg	lb			kg	lb		
Front axle	930	2051			930	2051			930	2050			930	2050		
Rear axle	1190	2624			1190	2624			1190	2624			1190	2624		
Total	2120	4675			2120	4675			2120	4674			2120	4674		

NOTE: Unladen weight is the minimum vehicle specification—excluding fuel and driver.
EEC kerb weight is the minimum vehicle specification—plus full fuel tank and 75 kg (165 lb) driver.
Gross vehicle weight is the maximum all-up weight including driver, passengers, payload and equipment.

NOTE: For sustained cross-country use the gross vehicle weight must be reduced by 90 kg (off the rear axle).

Maximum Permissible Towed Weights	On-road		Off-road	
	kg	lb	kg	lb
Trailers without brakes	500	1100	500	1100
Trailers with over-run brakes	2000	4400	1000	2200
4-wheel trailers with continuous or semi-continuous brakes, i.e. coupled brakes	3500 (Petrol)	7700		
	3500 (Diesel)	7700	1000	2200

NOTE: The weights above do not authorise use outside the legislation enforced by the territory in which the vehicle and trailer combination is being operated.

Long-wheelbase weights

	Full Length Canvas Hood				Truck Cab				Hard Top				12-seater Station Wagon			
	4-cylinder Petrol		4-cylinder Diesel		4-cylinder Petrol		4-cylinder Diesel		4-cylinder Petrol		4-cylinder Diesel		4-cylinder Petrol		4-cylinder Diesel	
	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb
UNLADEN WEIGHT																
Front axle	785	1733	814	1795	794	1751	823	1815	786	1733	815	1797	788	1797	819	1806
Rear axle	700	1544	712	1570	694	1530	706	1557	744	1641	756	1667	891	1965	890	1962
Total	1485	3277	1526	3365	1488	3281	1529	3372	1530	3374	1571	3464	1679	3702	1709	3768
EEC KERB WEIGHT																
Front axle	811	1788	839	1850	820	1808	848	1870	812	1790	840	1852	814	1795	844	1861
Rear axle	798	1760	819	1806	792	1746	813	1793	842	1857	863	1903	989	2181	997	2198
Total	1609	3548	1658	3656	1612	3554	1661	3663	1654	3647	1703	3755	1803	3976	1841	4059
GROSS VEHICLE WEIGHT	kg	lb			kg	lb			kg	lb			kg	lb		
Front axle	1000	2205			1000	2205			1000	2205			1000	2205		
Rear axle	1710	3771			1710	3771			1710	3771			1710	3771		
Total	2710	5976			2710	5976			2710	5976			2710	5976		

High Capacity Pick-Up Weights

	2710 kg Gross vehicle weight		3020 kg Gross vehicle weight	
	4-cylinder Petrol	4-cylinder Diesel	4-cylinder Petrol	4-cylinder Diesel
	kg	kg	kg	kg
UNLADEN WEIGHT				
Front axle	799	812	818	831
Rear axle	720	732	744	756
Total	1519	1544	1562	1587
EEC KERB WEIGHT				
Front axle	825	837	844	856
Rear axle	818	839	842	863
Total	1643	1676	1686	1719
GROSS VEHICLE WEIGHT	kg		kg	
Front axle	1000		1120	
Rear axle	1710		1900	
Total	2710		3020	

ENGINE TUNING DATA

ENGINE

2¼ litre 4-cylinder Petrol models (Refer to Division 17 for emission controlled engines)

Type	In line four cylinder four stroke, overhead valves
Capacity	2286 cm^3 (139.5 $in.^3$).
Compression ratio	
Standard	8.0:1 (Engine number commencing 901....)
Optional	7.0:1 (Engine number commencing 904....)
Firing Order	1–3–4–2
Compression pressure	
8.0:1 compression ratio	11,2 kgf. cm^2 (160 lbf. $in.^2$)
7.0:1 compression ratio	10,2 kgf. cm^2 (145 lbf. $in.^2$)
Idling speed	500 rev/min
Fast idle setting	1,40 mm (0.055 in.) throttle butterfly clearance, 1200 ± 50 rev/min
Ignition timing, static	
8.0:1 compression ratio	TDC when using 90 octane fuel 3° ATDC when using 85 octane fuel
7.0:1 compression ratio	3° BTDC when using 83 octane fuel TDC when using 75 octane fuel
Timing marks	On crankshaft pulley
Valve clearance, inlet and exhaust	0,25 mm (0.010 in.)

DISTRIBUTOR

Make/type	Lucas 45D
Rotation of rotor	Anti-clockwise
Contact breaker gap	0,36 mm to 0,40 mm (0.014 in. to 0.016 in.)
Condenser capacity	0.2 microfarad
Serial number	5069

Centrifugal advance with TDC ignition timing

Decelerating check with vacuum unit disconnected

Crankshaft angle	Engine rev/min
38° to 42°	4500
30° to 34°	3500
22° to 26°	2500
12° to 16°	1200
4° to 12°	900
0° to 4°	600
No advance below	450

Vacuum advance

Starts	89 mm (3.5 in.) Hg.
Finishes	635 mm (25.0 in.) Hg.

SPARKING PLUGS

Make/type	
8.0:1 compression ratio	Champion N12Y or Unipart GSP 131
7.0:1 compression ratio	Champion N8 or Unipart GSP 130
Gap	0,75 to 0,80 mm (0.029 to 0.032 in.)

IGNITION COIL

Make/type	HA12
Primary resistance at 20°C (68°F)	3.0 to 3.5 ohms
Consumption–ignition on at engine idle speed	2.0 amps approx.

CARBURETTER

Make/type	Zenith 361V
Choke diameter	27 mm
Main jet	125
Compensating (enrichment) jet	150
Pump jet	65 (short stroke, outer hole)
Needle valve	1.75

High altitude carburetter

Main	(120)	Altitude: 1524 to 2133 m (5000 to 7000 ft)
	(117.5)	2133 to 2743 m (7000 to 9000 ft)
	(115)	2743 to 3657 m (9000 to 12000 ft)
	(112.5)	3657 to 4267 m (12000 to 14000 ft)
Slow running	(55)	2743 to 4267 m (9000 to 14000 ft)

ENGINE

2¼ litre 4-cylinder Diesel models

Type	In line four cylinder four stroke, overhead valves
Capacity	2286 cm^3 (139.5 $in.^3$)
Compression ratio	23.0:1
Firing order	1–3–4–2
Idling speed	590 ± 20 rev/min
Injection timing setting	13° B.T.D.C.
Timing marks	
Valve timing — inlet and exhaust	
Injection timing	On engine flywheel and pump flange
Valve clearance — inlet and exhaust	0,25 mm (0,010 in)

INJECTORS

Make/type	CAV Pintaux
Nozzle size	BDNO/SPC 6209
Opening pressure	135 Atm

HEATER PLUGS

Make/type	KLG GF 210/T or Champion AG45

DISTRIBUTOR PUMP

Make/type	CAV type DPA
Direction of rotation	Clockwise, viewed from drive end
Maximum speed setting (sealed)	4,200 engine rev/min

(12) Fan belt adjustment

4 cylinder models:

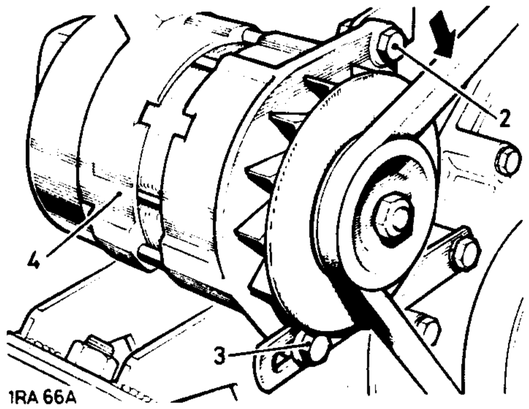
1 Check by thumb pressure between the fan and crankshaft pulleys. Movement should be 6,3 to 9,5 mm (0.25 to 0.375 in.)

If necessary adjust as follows:

2 Slacken the pivot bolt securing the alternator to the mounting bracket.
3 Slacken the adjusting bolt.
4 Pivot the alternator inwards or outwards as necessary and adjust until the correct belt tension is obtained.
5 Tighten adjusting and pivot bolts.

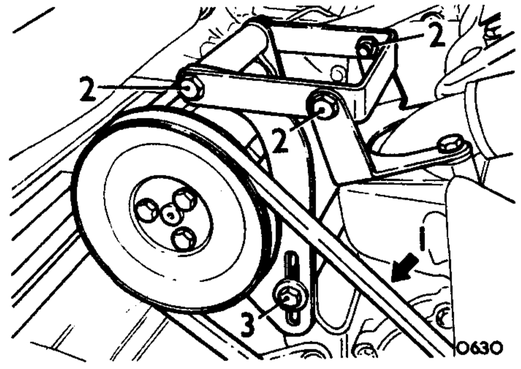
6-cylinder models:

6 Check by thumb pressure between the fan and crankshaft pulleys. Movement should be 8 to 11 mm (0.312 to 0.437 in.) Adjust as above.



Air pump drive belt adjustment, 6-cylinder models

1 Check by thumb pressure midway between the air pump and water pump pulleys. Movement should be 6,3 mm (0.25 in.). If necessary, adjust as follows:
2 Slacken the pivot bolts securing the air pump to the top mounting bracket.
3 Slacken the nut and bolt securing the air pump to the adjustment bracket.
4 Pivot the air pump as necessary and adjust until the correct belt tension is obtained.
5 Tighten the adjusting and pivot bolts and nuts.



(13) Accelerator linkage—all Models

1 Lubricate the accelerator linkage using clean engine oil paying particular attention to accelerator cross craft brackets, bell crank bushes and ball joint sockets on the control rods.
2 Check the linkage for correct operation and ensure that there is no tendency to stick.
Badly worn parts should be replaced as soon as possible.

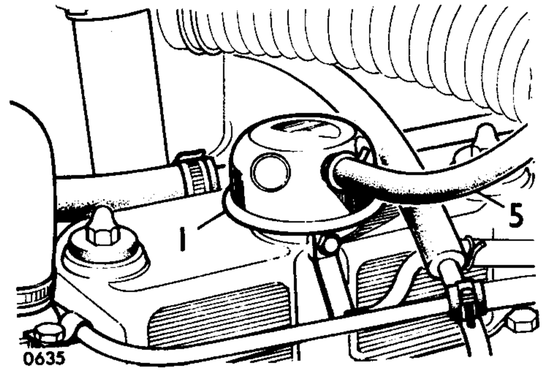
(14) Engine mountings

Check security of engine mountings; rectify as necessary.
Engine sump bolts, see operation 12.60.44.

(15) Engine breather filters—all Models

Clean as follows:

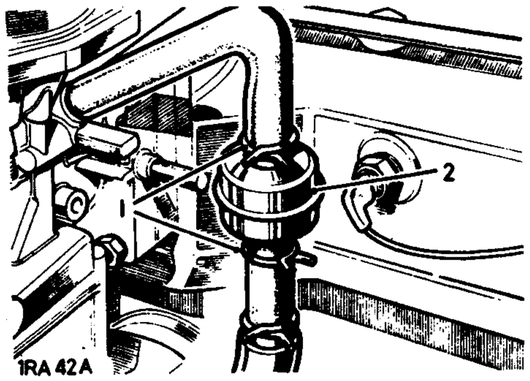
1 Remove the filters.
2 Wash the gauze thoroughly by swilling the units in petrol.
3 Re-wet the gauzes by dipping in clean engine oil and shake off the surplus; 4-cylinder models, replace the engine breather filter with the slot facing forward and the oil filler filter with the slot facing the rear of the vehicle.
4 Models with sealed engine breather system. Connect hose to top breather.



(16) Crankcase emission control, flame-trap type (as applicable)

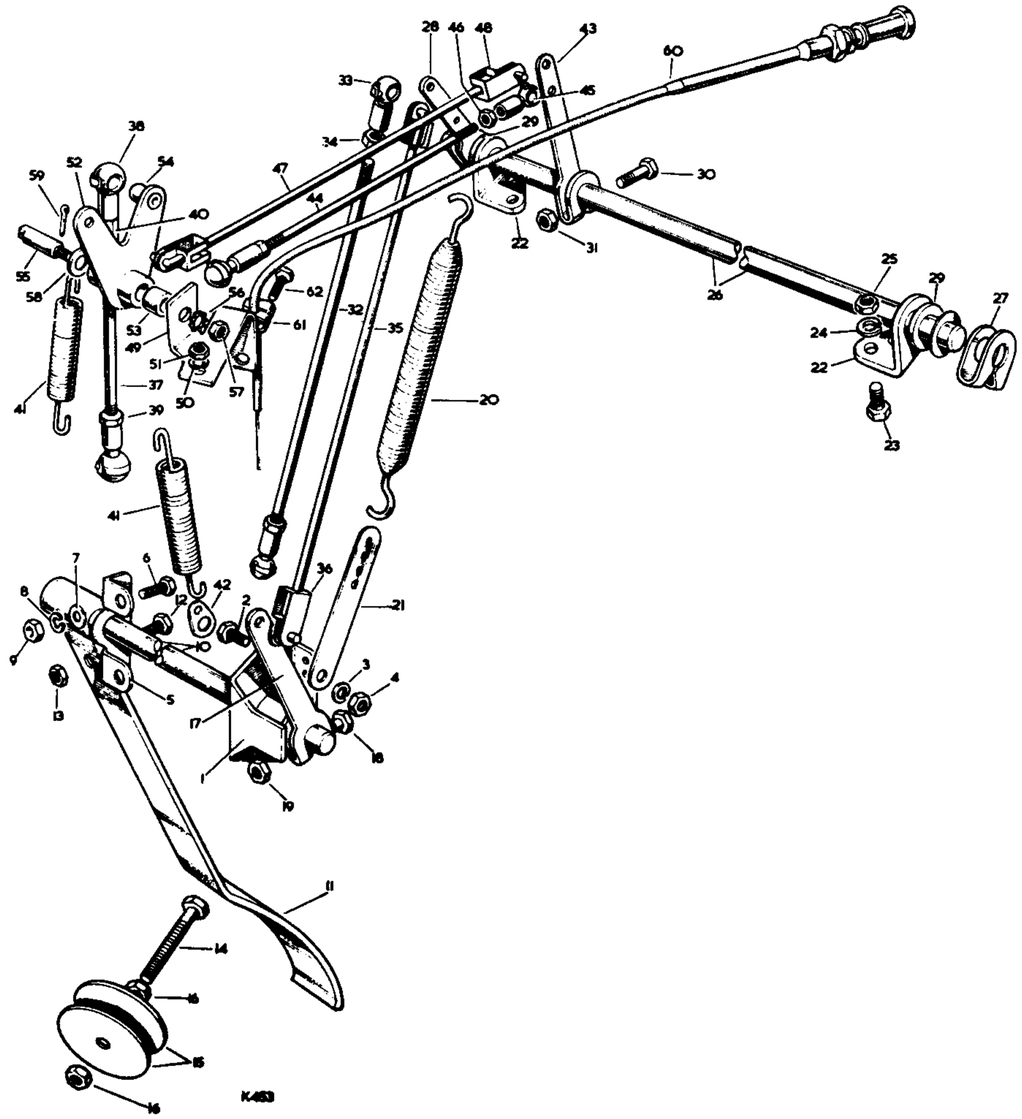
Replace as follows:

1 Detach the rubber hoses from each side of the flame trap by compressing the clips.
2 Withdraw flame trap.
3 Fit new flame trap by reversing removal procedure.
4 Warm up engine and re-adjust carburetter if necessary.



KEY TO ILLUSTRATION OF ACCELERATOR CONTROLS, 2¼ LITRE DIESEL MODELS

1 Housing for accelerator shaft and pedal stop
2 Bolt (¼ in. UNF X ½ in. long) Fixing housing
3 Spring washer and pedal stop
4 Nut (¼ in. UNF) to dash
5 Bracket for accelerator pedal shaft
6 Bolt (¼ in. UNF X $\frac{5}{8}$ in. long)
7 Plain washer Fixing bracket
8 Spring washer to dash
9 Nut (¼ in. UNF)
10 Shaft for accelerator pedal
11 Accelerator pedal
12 Bolt ($\frac{5}{16}$ in. UNF X $\frac{7}{8}$ in. long) Fixing pedal
13 Nut ($\frac{5}{16}$ in. UNF) to shaft
14 Bolt ($\frac{5}{16}$ in. UNF X 2½ in. long) Pedal
15 Plain washer stop in
16 Nut ($\frac{5}{16}$ in. UNF) floor
17 Lever for accelerator on pedal shaft
18 Bolt (¼ in. UNF X 1¼ in. long) Fixing lever
19 Nut (¼ in. UNF) to shaft
20 Return spring for pedal
21 Anchor for return spring
22 Bracket for accelerator cross-shaft
23 Bolt (¼ in. UNF X $\frac{5}{8}$ in. long) Fixing
24 Spring washer brackets
25 Nut (¼ in. UNF) to dash
26 Accelerator cross-shaft
27 Stop clip for cross-shaft
28 Accelerator lever on cross-shaft from pedal
29 Distance washer for cross-shaft
30 Bolt (¼ in. UNF X 1¼ in. long) Fixing levers and
31 Nut (¼ in. UNF) stop clip to cross-shaft
32 Control rod, pedal shaft to cross-shaft
33 Ball joint socket For
34 Locknut (2 BA) rod
35 Control rod, pedal shaft to cross shaft
36 Linkage clip for control rod
37 Control rod, bell crank to accelerator lever
38 Ball socket
39 Nut (2 BA) For bell crank control rod
40 Adjuster nut
41 Return spring for accelerator and stop levers on distributor pump
42 Anchor for return spring
43 Accelerator lever on cross-shaft to engine
44 Control rod, cross-shaft to bell crank
45 Ball joint For
46 Locknut (2 BA) control rod
47 Control rod, cross-shaft to bell crank
48 Linkage clip for control rod
49 Bracket for bell crank on distributor pump
50 Spring washer Fixing bracket to
51 Nut (10 UNF) distributor pump
52 Bell crank complete on distributor pump
53 Bush for bell crank
54 Ball end for bell crank
55 Pin for bell crank
56 Shakeproof washer Fixing pin to bell
57 Nut (¼ in. UNF) crank bracket
58 Plain washer Fixing bell crank
59 Split pin lever to pin
60 'Engine stop' control
61 Clip Fixing control outer cable
62 Screw (2 BA X $\frac{5}{8}$ in. long) to abutment bracket on distributor pump



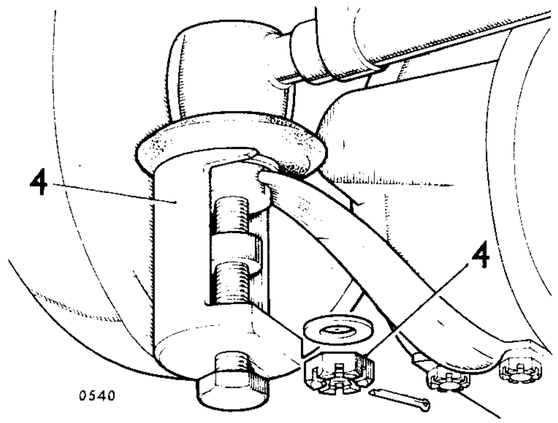
SWIVEL PIN HOUSING ASSEMBLY

Remove and refit **60.15.20**

Service tool. 601763. Ball joint extractor.

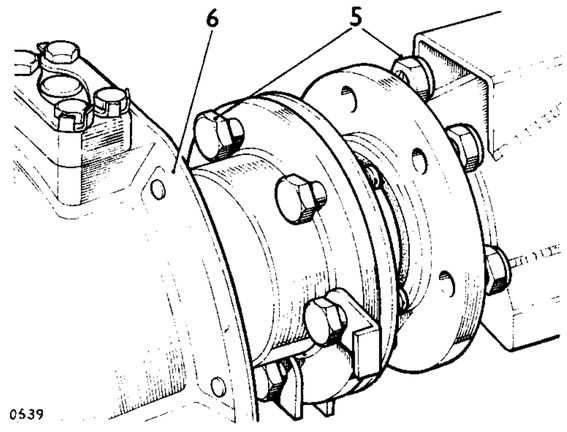
Removing

1 Remove the front hub. 60.25.01.
2 Remove the front stub axle. 60.25.22.
3 Withdraw the half shaft.
4 Disconnect the track rod at the track arm; tool 601763. If the swivel housing to be removed is fitted to the steering box side of the vehicle disconnect the drag link.
5 Remove the bolts and nuts securing the inner flange of the swivel housing assembly to the axle flange. Note the location of the steering stop bracket, and, on the right hand flange only, the position of the jack location stop bracket.
6 Remove the swivel pin housing assembly.
7 Remove and discard the inner flange gasket.



Refitting

8 Reverse instructions 1 to 7. Torque – track rod end nut 4,0 kfg. m (30 lbf. ft.).



SWIVEL PIN HOUSING ASSEMBLY

Overhaul **60.15.23**

1 Remove the swivel pin housing assembly from the vehicle 60.15.20

Dismantling

2 Remove the bolts, spring and plain washers securing the inboard oil seal cover. Note the position of the steering stop bracket, brake hose bracket, and if the swivel unit is fitted to the right hand side of the vehicle, the position of the jack location plate. Withdraw the oil seal cover.
3 Prise out and discard the oil seal.
4 Release the lock tabs from the upper swivel pin bolts and remove the bolts and lock plates.
5 Withdraw the upper swivel pin and shims.
6 Release the lock tabs from the track arm nuts and remove the nuts and lock plates.
7 Withdraw the track arm complete with the lower swivel pin. Remove and discard the 'O' ring.
8 Separate the swivel pin inner and outer housings.
9 Remove the lower swivel pin roller bearing and bearing track.
10 Press out the Railko bush housing.
11 Remove the half shaft bearing track.

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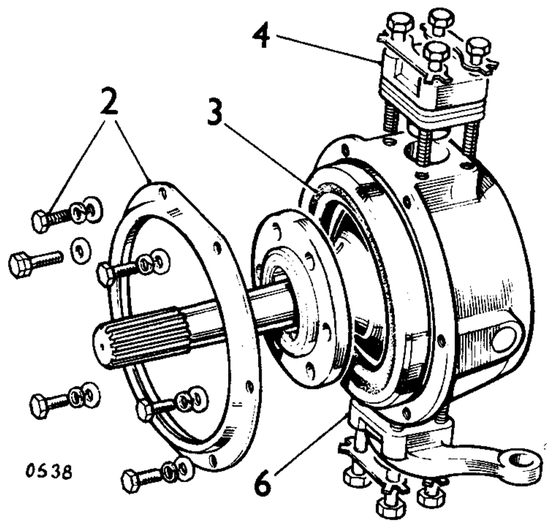
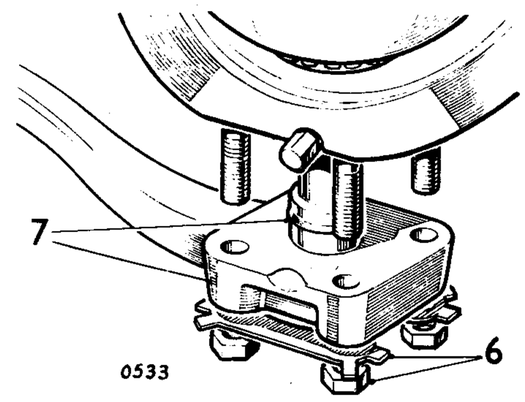
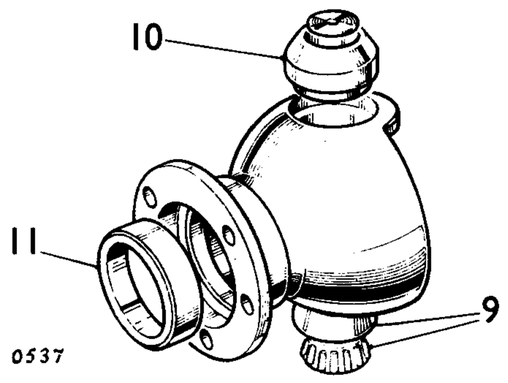
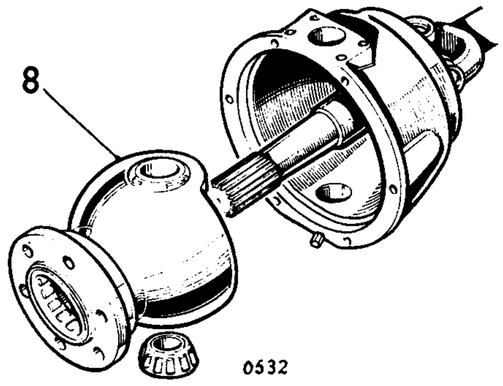


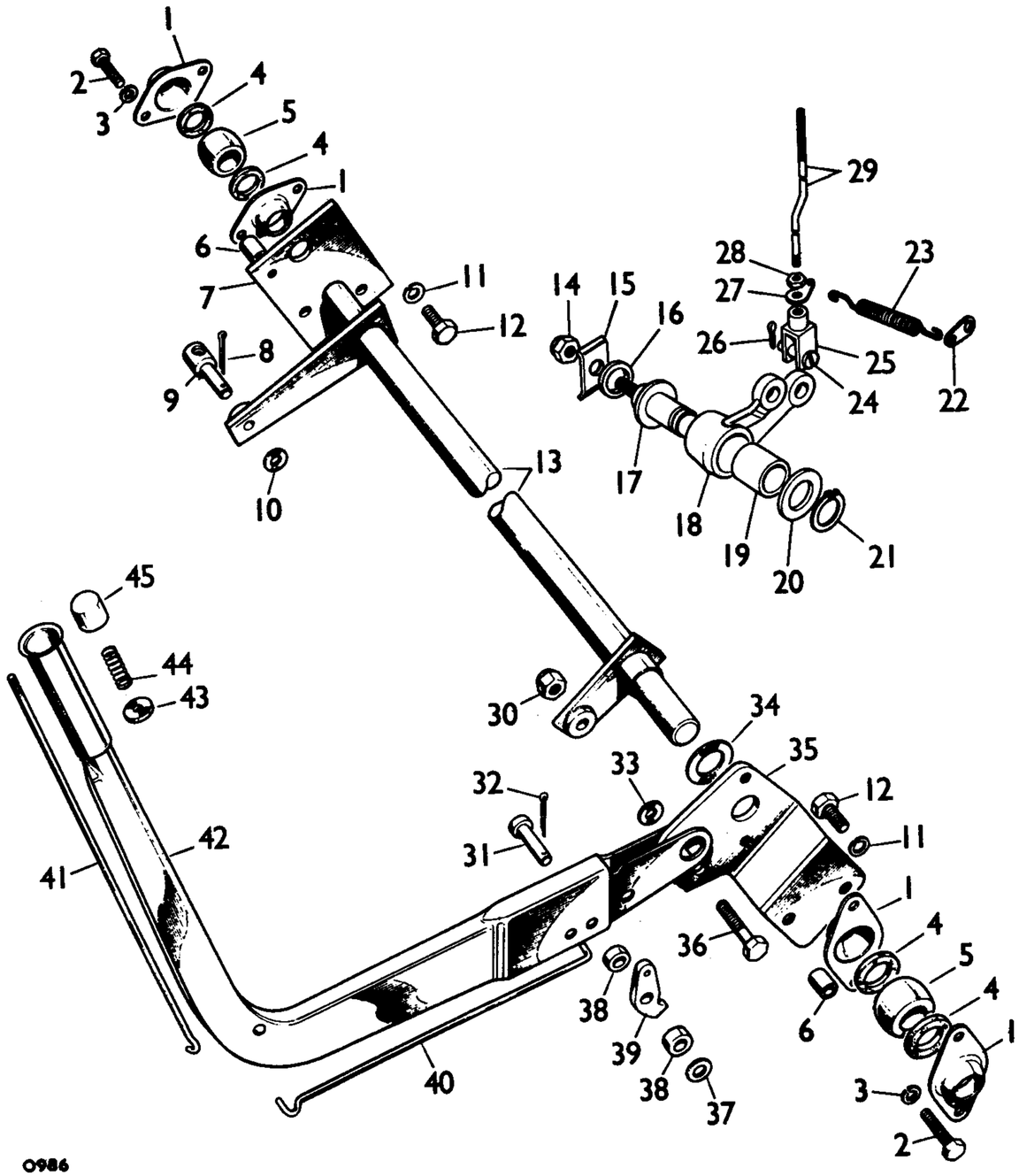






Key to hand brake lever arrangement LH Steering

1 Housing–cross shaft bearing
2 Bolts
3 Spring washer
4 Felt ring
5 Bearing–cross shaft
6 Distance piece
7 Support plate
8 Split pin
9 Pin–adjuster rod
10 Plain washer
11 Spring washer
12 Bolt
13 Cross shaft
14 Nut–self-locking
15 Plate washer
16 Washer
17 Shaft
18 Relay lever
19 Bush
20 Washer
21 Circlip
22 Spring anchor
23 Spring
24 Clevis pin
25 Fork–clevis
26 Split pin
27 Spring anchor
28 Nut
29 Rod
30 Nut–self-locking
31 Clevis pin
32 Split pin
33 Plain washer
34 Washer
35 Ratchet
36 Bolt
37 Plain washer
38 Distance piece
39 Pawl
40 Plunger rod–lower
41 Plunger rod–upper
42 Hand brake lever
43 Washer
44 Spring
45 Plunger



TRANSMISSION BRAKE ASSEMBLY

Adjust. Instructions 36 to 39 **70.45.09**
Remove and refit Instructions 1 to 39 **70.45.16**

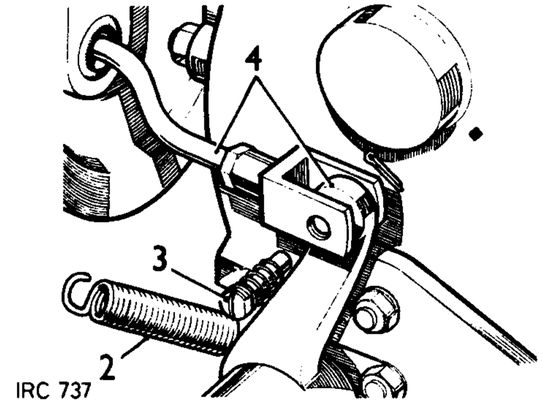
TRANSMISSION BRAKE SHOES

Remove and refit Instructions 1 to 7, and 32 to 39 **70.45.18**

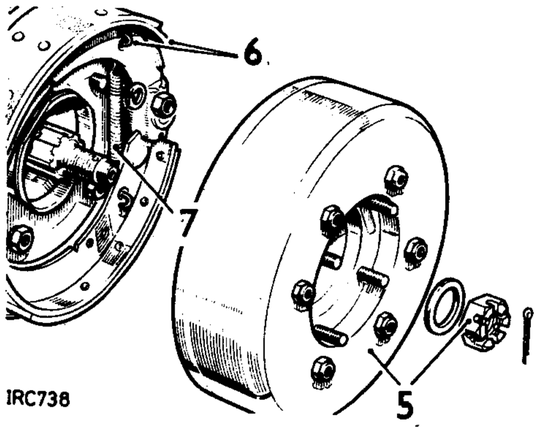
Removing

NOTE: Brake shoe components are accessible after removing the brake drum, which can be detached from the gearbox output flange and pushed back over the propeller shaft.

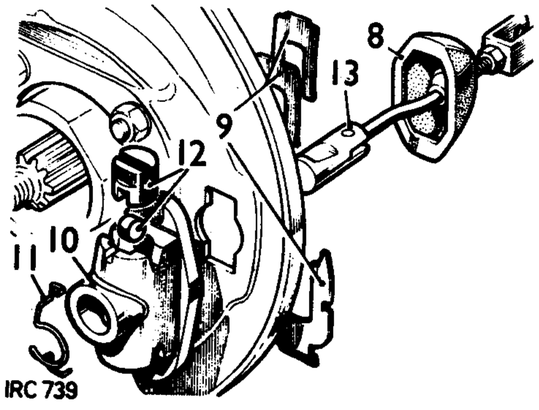
1 Chock the road wheels.
2 Disconnect the brake return spring.
3 Remove the expander rod fork fixings.
4 Disconnect the expander rod from the relay lever, and remove the propeller shaft on the 109 in Land-Rover.
5 Remove the fixings and withdraw the brake drum.
6 Remove the brake shoes together with the pull-off springs.
7 Separate the shoes by detaching the springs.
8 Withdraw the dust excluder.
9 Remove the expander unit fixing plates.
10 Withdraw the expander unit.
11 Remove the spring clip from the expander unit.
12 Withdraw the plungers and rollers.
13 Withdraw the operating rod.
14 Remove the adjuster unit assembly.
15 Pull out the adjuster plungers.
16 Unscrew the adjuster cone.



IRC 737



IRC738



IRC 739

Inspecting

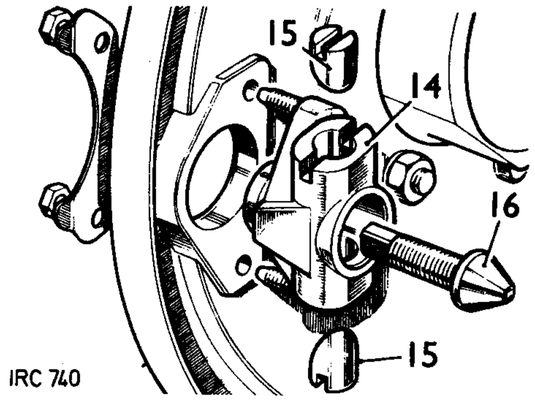
17 Clean all components in Girling cleaning fluid and allow to dry.
18 Examine all items for obvious wear and replace as necessary.
19 Examine the brake drum for scoring and ovality and skim if required. Standard diameter is 228,6 mm (9.0 in.); reclamation limit is 0,75 mm (0.030 in.) oversize.
20 If the brake linings are oily, check and if necessary replace the output shaft oil seal, Division 37.
21 If required, reline the brake shoes. 70.40.10.

Assembling

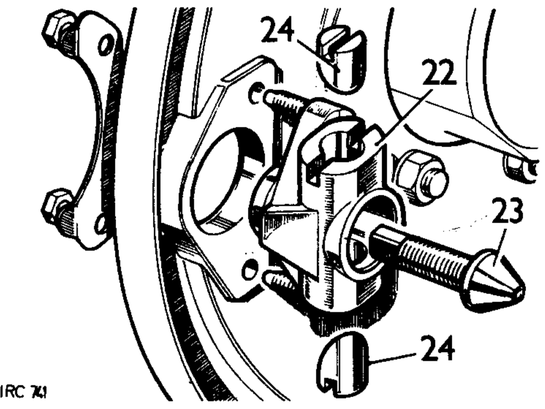
22 Fit the adjuster unit housing, do not tighten the fixings at this stage.
23 Screw in the adjuster cone.
24 Grease and refit the adjuster plungers.

NOTE: The two plungers are identical and may be fitted to either bore. Align the chamfered ends of the plungers with the cone on the adjuster.

continued

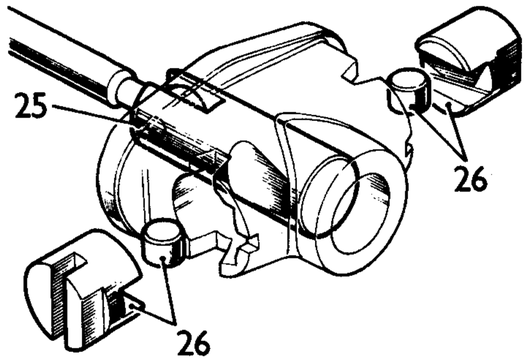


IRC 740

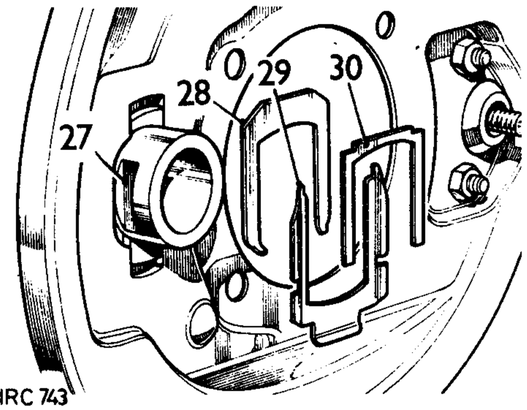


IRC 741

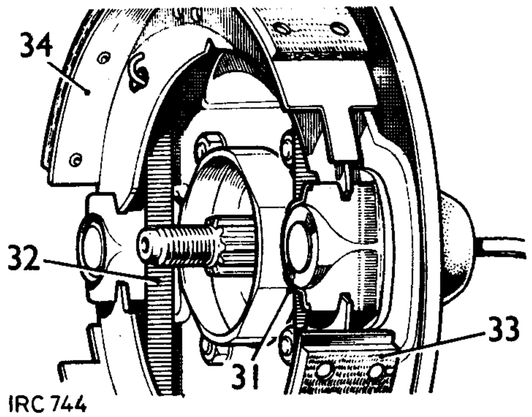
25 Grease and fit the expander rod.
26 Grease and fit the plungers and rollers.
27 Position the adjuster housing on the back plate.
28 Fit the packing piece.
29 Fit the locking plate.
30 Fit the retainer spring.
31 Fit the spring clip to the expander unit.
32 Fit the brake shoes and pull-off springs together.
33 The fully lined end of the lower shoe must be toward the expander housing.
34 The fully lined end of the upper shoe must be toward the adjuster housing.
35 Reverse instructions 2 to 5.
36 Turn the adjuster cone fully in and tighten the fixings.
37 Slacken off the adjuster cone two 'clicks'; give the brake a firm application to ensure that the shoes have centralised at the expander end. The brake drum should now be free to rotate.
38 Set the hand brake linkage at the vertical adjuster rod, so that the hand brake has one or two clicks free movement in the 'off' position.
39 Remove the road wheel chocks.



IRC 742



IRC 743



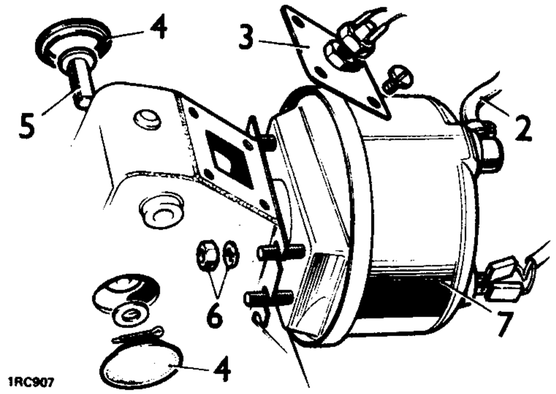
IRC 744

SERVO ASSEMBLY

Remove and refit **70.50.01**

Removing
1 Remove the brake master cylinder. 70.30.01 or 70.30.08 as applicable.
2 Disconnect the vacuum hose from the servo assembly.
3 Remove the switch plate.
4 Remove the rubber plugs from the pedal box.
5 Remove the split pin and withdraw the clevis pin securing the servo rod to the pedal.
6 Remove the fixings.
7 Withdraw the servo assembly.

Refitting
8 Reverse instructions 1 to 7. Torque load for servo fixings is 1,2 kgf. m. (9 lbf. ft.).



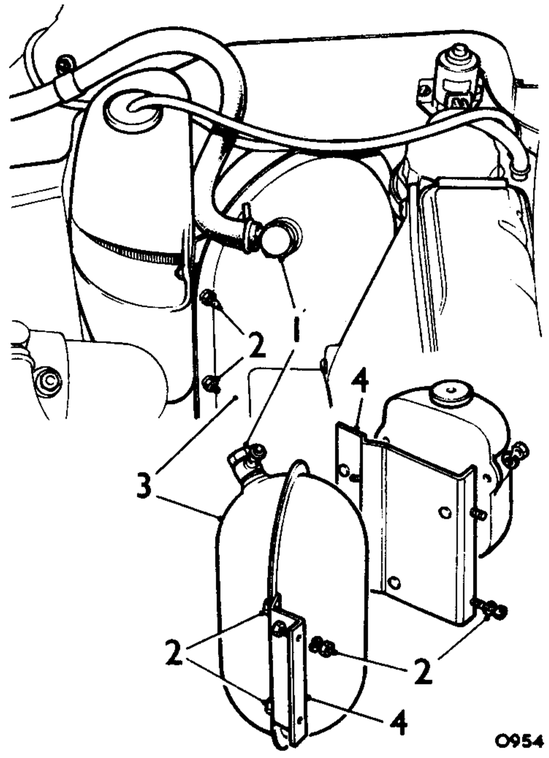
1RC907

VACUUM RESERVOIR TANK – Diesel models with Servo

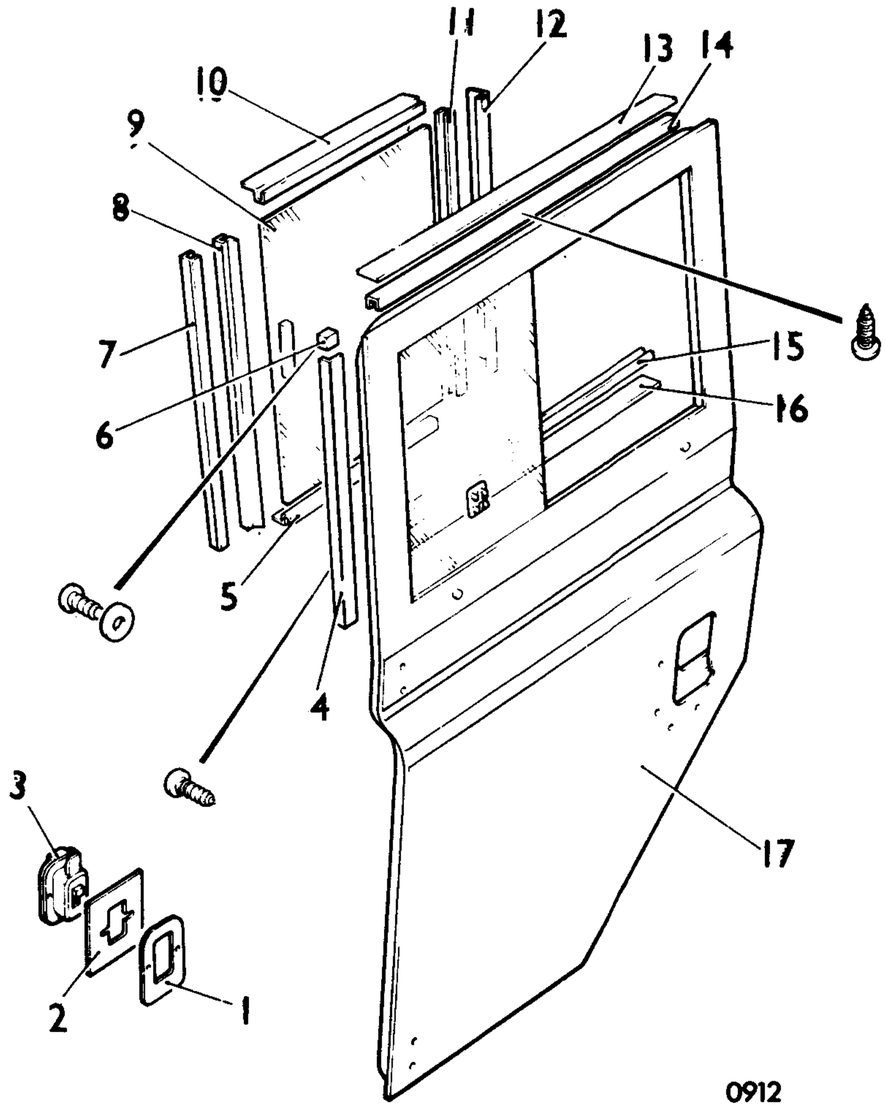
Remove and refit **70.50.04**

Removing
1 Remove the union bolt and washers securing the vacuum pipes to the vacuum tank.
2 Remove the bolts, washers and nuts securing the vacuum tank brackets to the vehicle.
3 Withdraw the vacuum tank and brackets from the vehicle.
4 Remove the brackets from the vacuum tank.

Refitting
5 Reverse instructions 1 to 4.

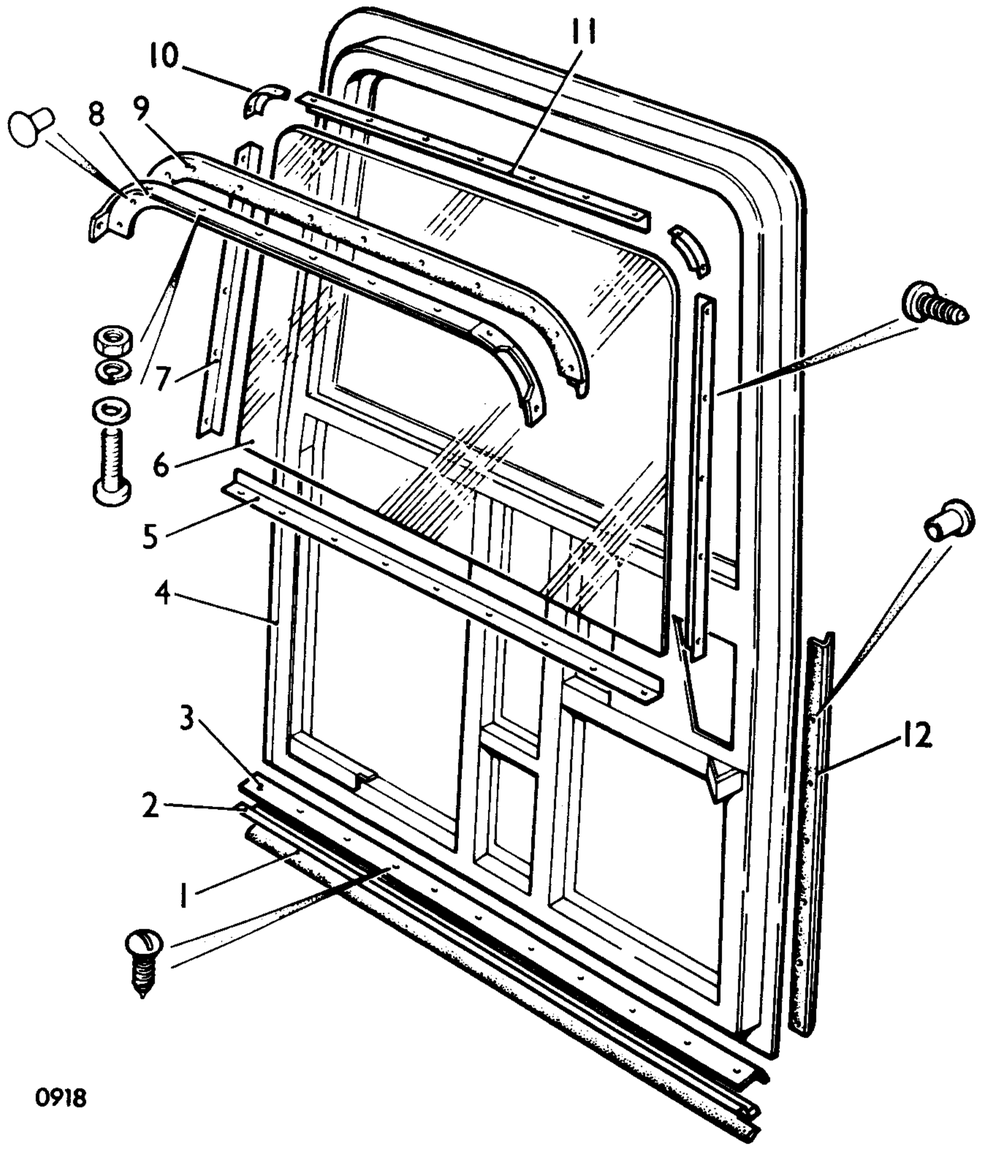


0954



Door – rear – 109 station wagon
Key

1	Seal – window catch	10	Retainer
2	Mask – window catch	11	Channel
3	Window catch	12	Filler
4	Retainer	13	Packing strip
5	Filler	14	Channel
6	Buffer	15	Channel
7	Channel	16	Packing strip
8	Sealing rubber	17	Rear door
9	Door glass – sliding		



Tail door – station wagon
Key

1	Seal	7	Glass retainer strip – side
2	Seal retainer	8	Arch-hard top
3	Protection strip	9	Sealing rubber
4	Rear door	10	Glass retainer – corner piece
5	Glass retainer strip – bottom	11	Glass retainer strip – top
6	Glass	12	Seal

SIDE DOOR GLASS

Front door	**76.31.01**
Rear door	**76.31.02**

Remove and refit

Removing

Sliding glass

1 Remove the screw and rubber stop from the front end of the sliding glass top channel. Remove the remaining channel securing screws.
2 Incline the sliding glass inwards complete with top channel and the filler strip.
3 Remove the channel and filler strip.
4 Lift out the sliding glass.

Fixed glass

5 Remove the sliding glass (instructions 1 to 4 above).
6 Remove the front angle strip.
7 Carefully release the fixed glass from the sealing compound.
8 Withdraw the fixed glass.
9 Remove the old sealing compound from glass and door.

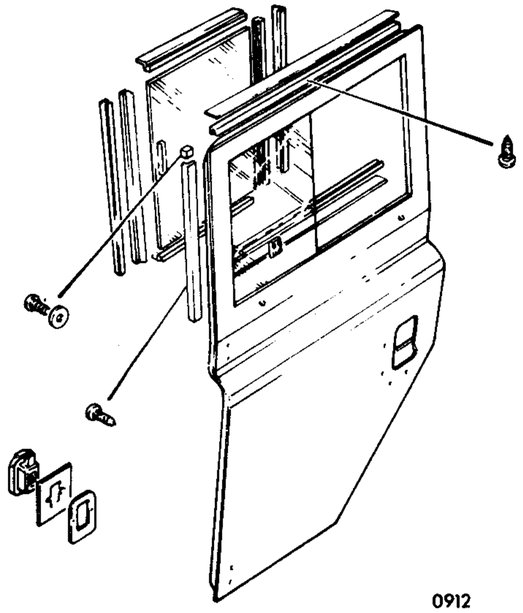
Refitting

Fixed glass

10 Apply fresh sealing compound to the door frame.
11 Carefully insert the fixed glass and press firmly into position. Remove surplus sealing compound.
12 Fit the front angle sealing strip.

Sliding glass

13 Fit the sliding glass, top channel and filler strip in reverse order to instructions 1 to 4.



0912

DOOR LOCK

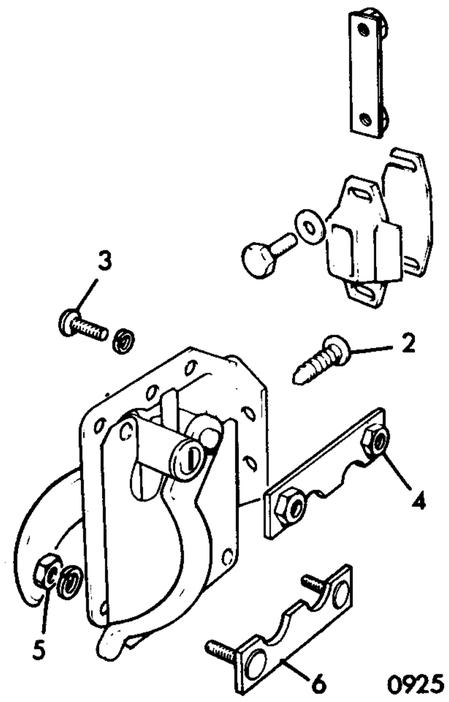
Remove and refit	
Side door, front	**76.37.12**
Side door, rear	**76.37.13**
Tail door	**76.37.16**

Removing

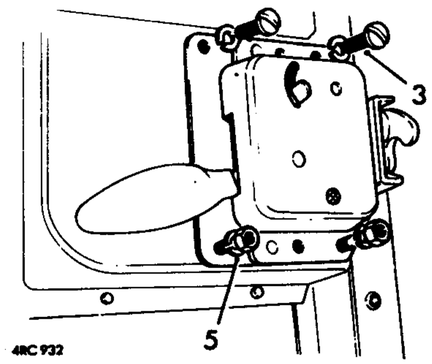
1 Remove the door trim where fitted.
2 Remove the screws securing the lock to the door edge (not anti-burst type).
3 Remove the two screws securing the top of the lock to the door.
4 Remove the tapped plate.
5 Remove the nuts securing the bottom of the lock to the door.
6 Remove the studplate.
7 Remove the door lock and sealing plate. (Sealing plates are not fitted to anti-burst type locks.)

Refitting

8 Reverse instructions 1 to 7.



0925



4RC 932

FASCIA TOP RAIL

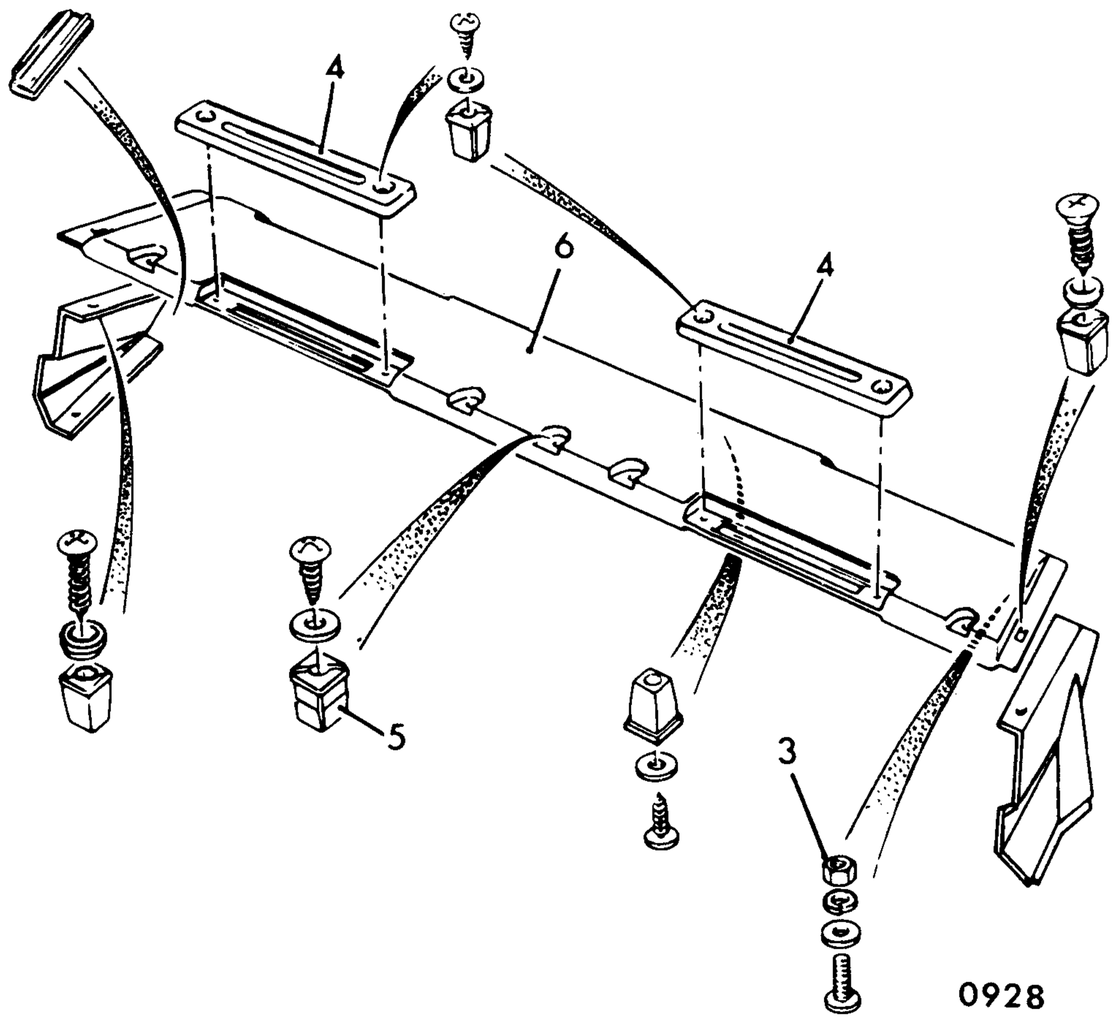
Remove and refit 76.46.04

Removing

1 Remove the screws securing the fascia top rail end cover and heater control. Ease the end cover aside.
2 Remove the screws securing the fascia top rail end cover (passenger's side). Withdraw the end cover.
3 Remove the two nuts and bolts securing the rear of the fascia top rail to the fascia mounting plate.
4 Remove the screws securing the demist outlets. Withdraw the demist outlets.
5 Remove the screws securing the front of the fascia top rail.
6 Remove the top rail.

Refitting

7 Reverse instructions 1 to 6.



0928

LOWER FASCIA

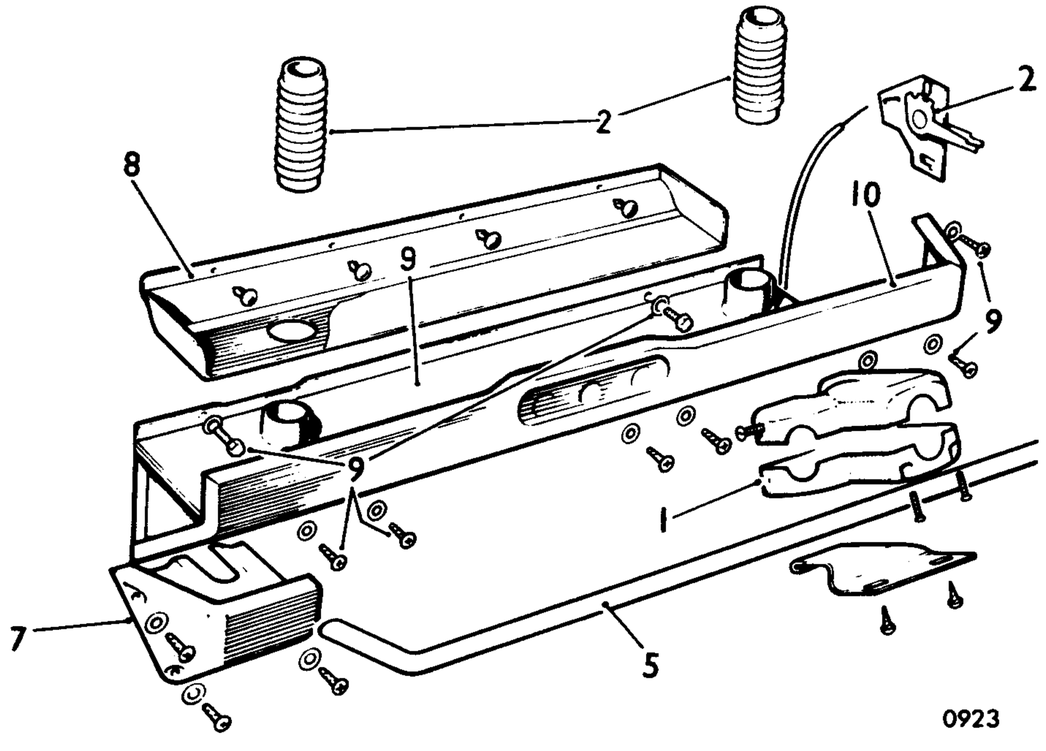
Remove and refit 76.46.05

Removing

1 Release the shroud from the steering column and the lower fascia.
2 Remove the heater control panel from the driver's end of the fascia and disconnect the distribution control cable.
3 Withdraw the instrument panel clear of the dash.
4 Withdraw the demister hoses.
5 Withdraw the finisher strip from the top edge of the lower fascia.
6 If the vehicle is fitted with auxiliary instruments at the centre of the lower fascia, remove as applicable.
7 Remove the end cover from the lower fascia.
8 Remove the parcel tray.
9 Remove the fixings securing the lower fascia to the dash.
10 Withdraw the lower fascia.
11 If required, remove the heater duct cover and the distribution flap valves, as applicable.

Refitting

12 Reverse instructions 1 to 11. Where applicable, ensure that the gasket is fitted between the heater duct and the dash.

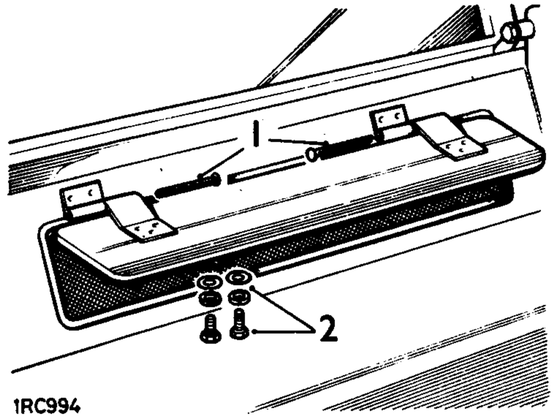


0923

AIR DISTRIBUTION FLAPS

Remove and refit **80.15.09**

This operation is described in operation 80.10.06.



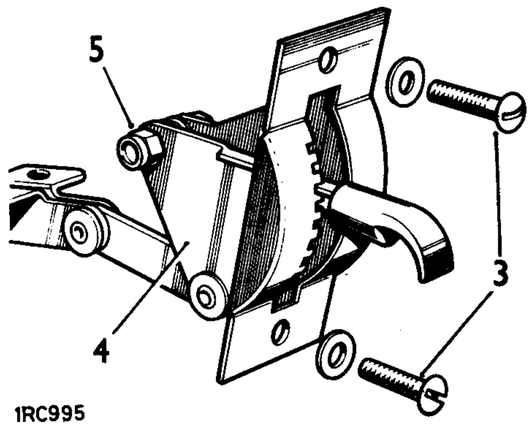
1RC994

VENTILATOR GRILLE PANEL

Remove and refit **80.15.16**

Removing
1 Remove the hinge pins.
2 Remove the control lever fixings.
3 Remove the ventilator control to dash fixings.
4 Withdraw the ventilator control and quadrant assembly.

Refitting
5 Check the lever operation in the quadrant. If required, adjust the special locknut to alter the spring loading on the lever.
6 Reverse instructions 1 to 4.



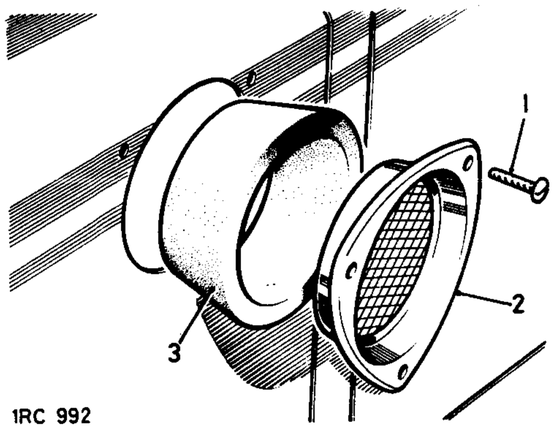
1RC995

FRESH AIR INTAKE

Remove and refit **80.15.29**

Removing
1 Remove the fixings.
2 Withdraw the intake grille assembly.
3 If required, withdraw the air inlet seal.

Refitting
4 Reverse instructions 1 to 3.



1RC 992

HEATER BOX COMPLETE

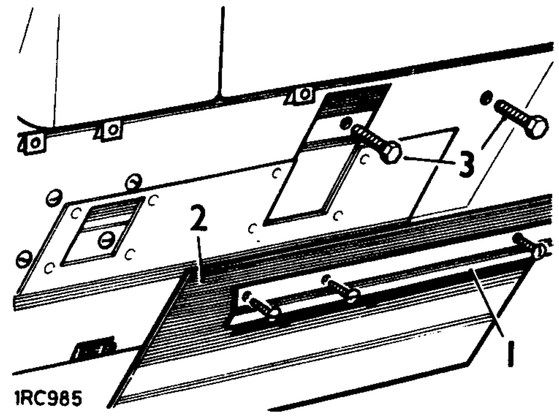
Remove and refit 1 to 7, 12 & 13 **80.20.01**

HEATER RADIATOR

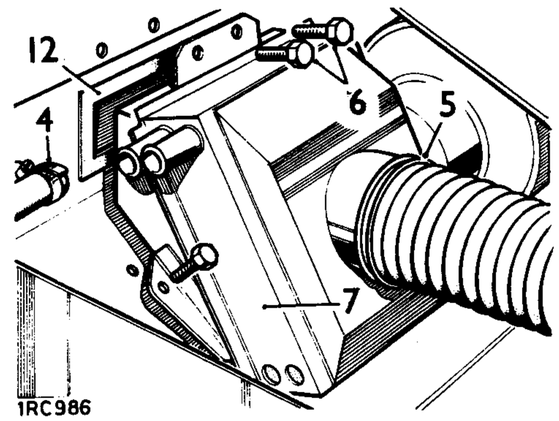
Remove and refit 1 to 13 **80.20.29**

Removing
1 From inside the cab remove the trim board rail, if fitted.
2 Withdraw the trim board from the clip, if fitted.
3 Remove the heater box lower fixings.
4 Disconnect the heater water hoses.
5 Disconnect the air inlet hose.
6 Remove the heater box upper fixings.
7 Withdraw the heater box.
8 If removal of the heater radiator is required, proceed as follows, instructions 9 and 10.
9 Remove the fixings and withdraw the detachable side panel.
10 Withdraw the radiator and pipes assembly.

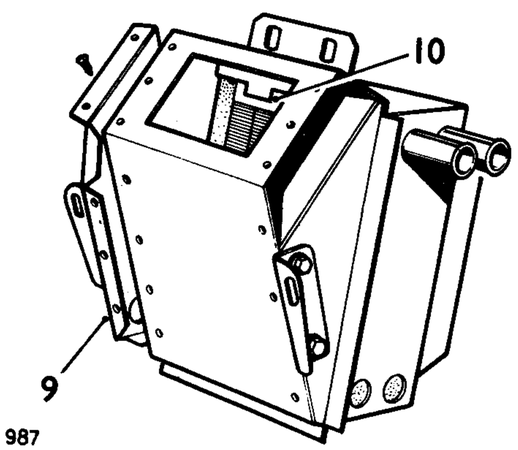
Refitting
11 If the heater radiator was removed reverse instructions 9 and 10.
12 Ensure that the joint seal is present and sound.
13 Reverse instructions 1 to 7.



1RC985



1RC986



IRC 987

HEATER/BLOWER FAN MOTOR

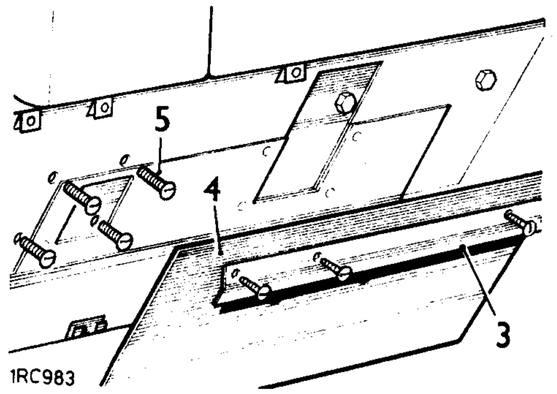
Remove and refit **80.20.15**

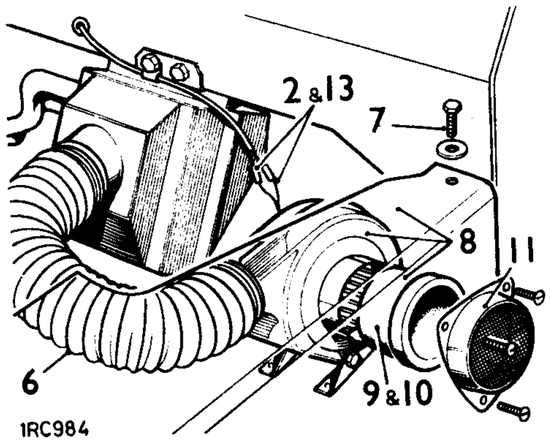
Removing

1 Disconnect the battery.
2 Disconnect the blower motor leads.
3 From inside the cab remove the trim board rail.
4 Withdraw the trim board from the clip.
5 Remove the blower motor fixings.
6 Disconnect the air hose at the matrix inlet.
7 Remove the wing panel rear top fixing bolt.
8 Manoeuvre the blower motor assembly clear, lifting the wing panel sufficient to allow passage.
9 Withdraw the air inlet seal.

Refitting

10 Fit the blower motor but omit the air inlet seal at this stage.
11 Remove the air intake grille.
12 Fit the air inlet seal and replace the intake grille.
13 Reverse 2 to 7. Connect the electrical leads from the blower motor at the snap connectors as follows: Brown lead with green marker band — to green/slate lead; green/yellow lead — to green/yellow lead.





HEATER PIPES

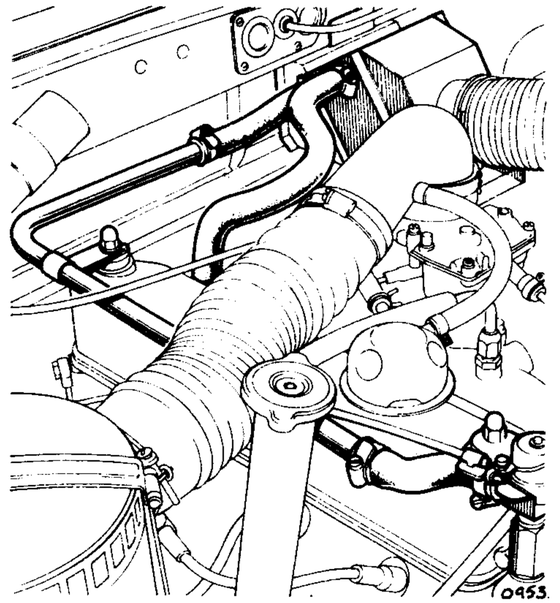
Remove and refit
Feed to heater **80.25.15**
Return from heater **80.25.16**

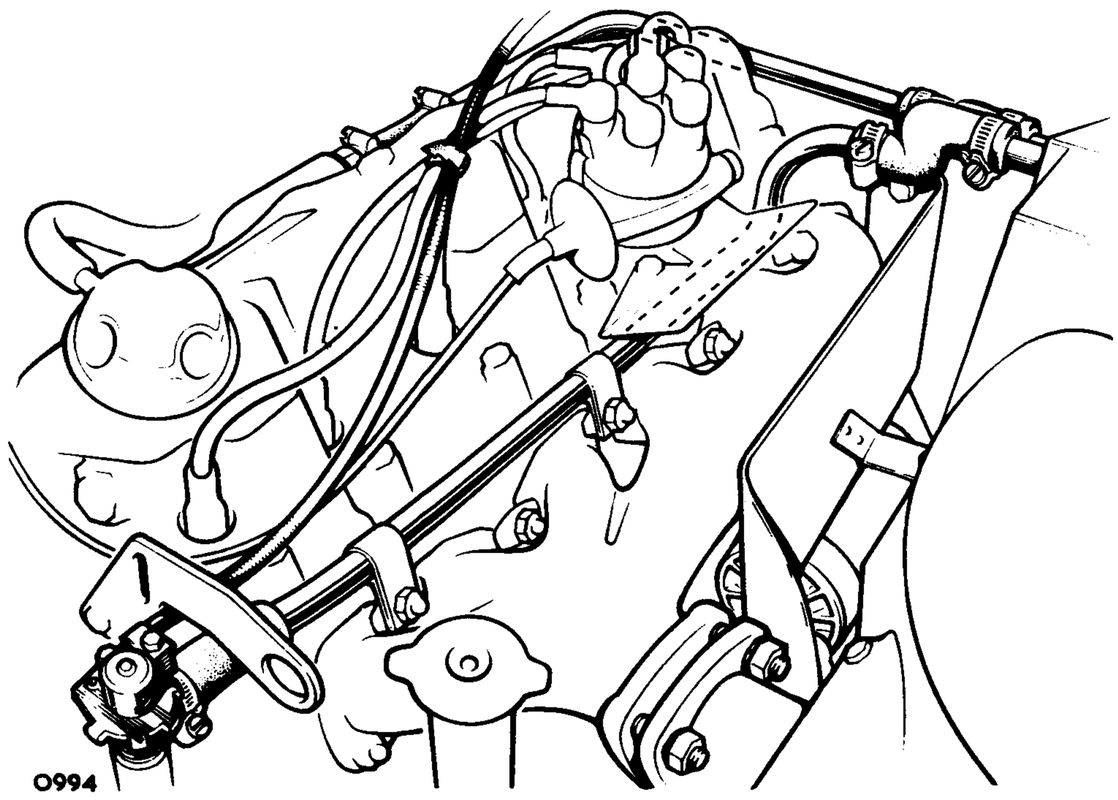
Removing

1 Partially drain the coolant.
2 Disconnect the hoses.
3 Remove the fixings and withdraw the pipe.

Refitting

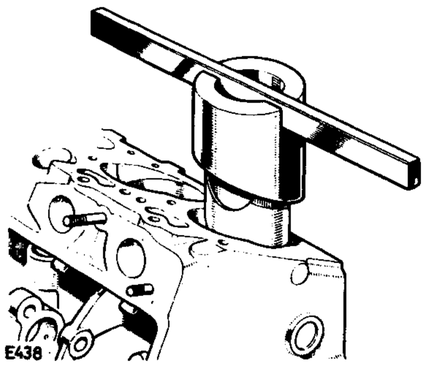
4 Reverse instructions 1 to 3.



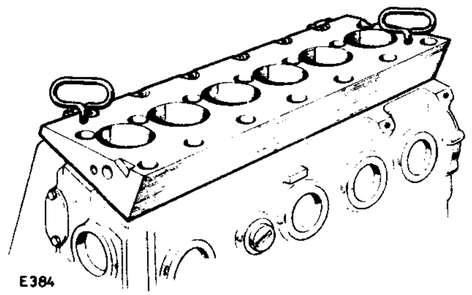


SERVICE TOOLS

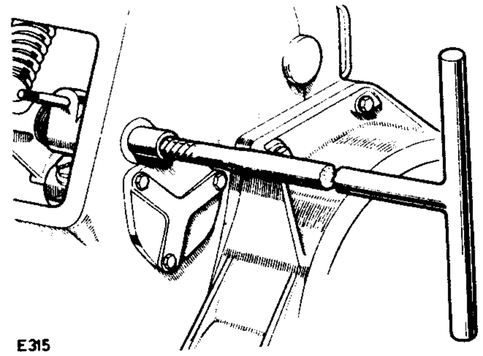
ENGINE



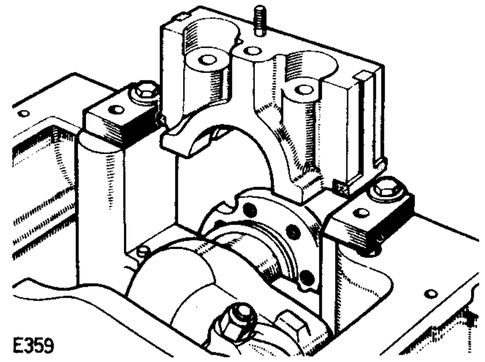
246650. Cylinder liner press block (2.6 Petrol)



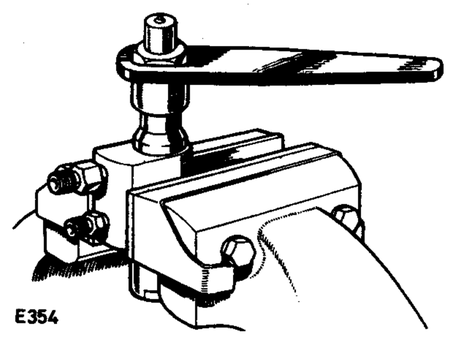
261288. Reboring jig block (2.6 Petrol)



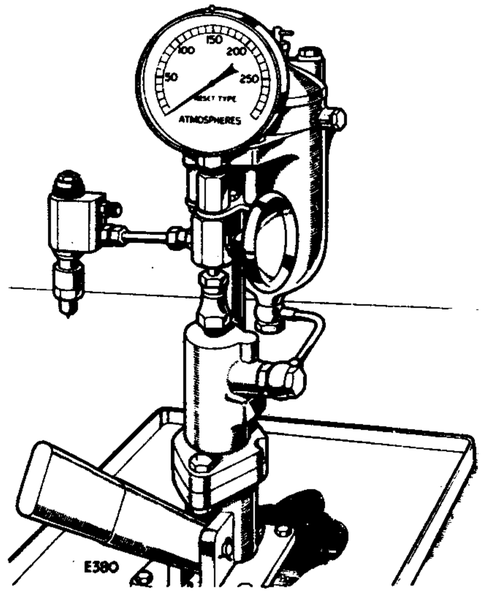
262749. Extractor—side rocker shaft (2.6 Petrol)



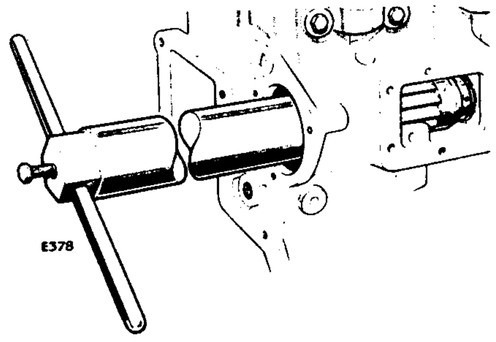
270304. Guide—rear bearing cap seals



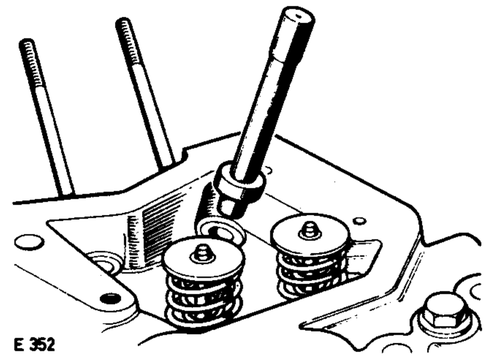
271482. Injector cap spanner (2¼ Diesel)



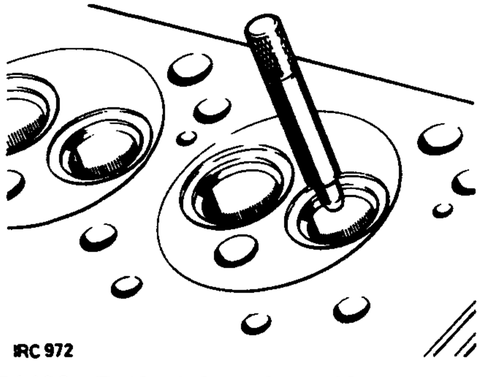
271483 (18G 109A). Test gauge—injector (2¼ Diesel)



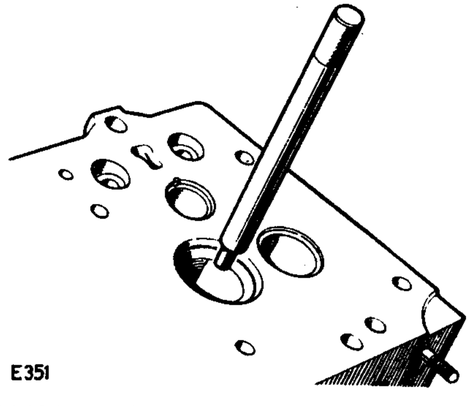
274389. Reamer—camshaft bearings (2¼ Engines)



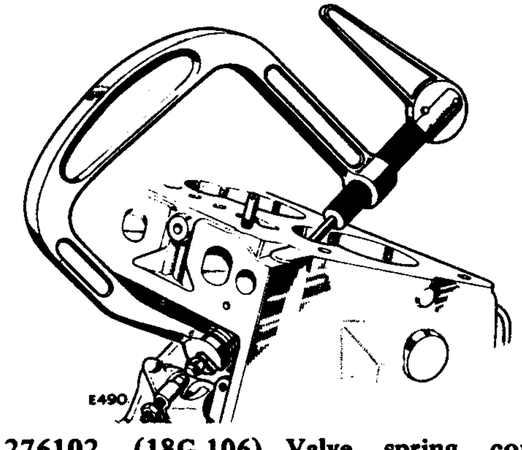
274399. Drift-push rod tube and injector shroud (2¼ Diesel)



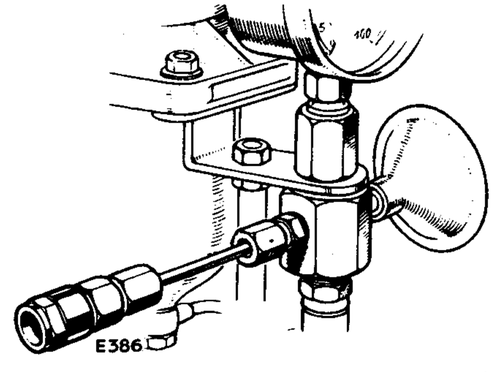
274400. Drift—inlet valve guide



274401. Drift—exhaust valve guide



276102 (18G 106). Valve spring compressor



278181. Injector—nozzle flushing tool (2¼ Diesel)

continued

INTRODUCTION

This supplement must be used in conjunction with the current Land Rover Series III Repair Operation Manual.

The introduction of a five main bearing crankshaft to the 2¼ litre petrol and diesel engine has caused changes to some repair operations. The operations concerned have been revised and are included in this publication together with details of the differences between the new engines and the existing three bearing units.

Since the new petrol engine is manufactured at different plants, some variations exist and for purposes of identification two commencing serial numbers have been allocated namely 36100001A and 99100001A. The diesel engine commencing number is 36600001A.

Set out below are the principal differences between the three and five main bearing petrol engines and the variations between the two five main bearing units. Parts common to diesel engine serial number range 36600001A are also mentioned.

Crankshaft

Redesigned to include five main bearings. The main bearing journal and crankpin dimensions remain the same as for the three bearing shaft. The five bearing shaft fitted to commencing serial number range 36100001A is a casting whereas a forged shaft is used in serial number range 99100001A and the diesel engine. Whilst a cast crankshaft must not be fitted to engines in serial range 99100001A and the diesel version a forged may be used in serial number range 36100001A. Forged crankshafts, however, will only be supplied for spares.

Cylinder Block

Redesigned to accommodate five main bearings. Sealing of the rear main bearing changed to a lip type seal pressed into the flywheel housing. The outside diameter of the crankshaft flange runs in the seal. The relevant repair operations have been revised and included in this supplement.

Camshaft

The valve timing of the camshaft fitted to the engine serial number range 36100001A is as follows.

Inlet opens	6° BTDC
Inlet closes	52° ABDC
Inlet peak	113° ATDC
Exhaust opens	34° BBDC
Exhaust closes	24° ATDC
Exhaust peak	95° BTDC

Number one exhaust cam peak is on the centre line of camshaft keyway.

The camshaft sprocket retaining bolt has a UNF thread.

Valve timing for the camshaft fitted to serial number range 99100001A and diesel engine number range 36600001A is:

Inlet opens	16° BTDC
Inlet closes	42° ABDC
Inlet peak	103° ATDC
Exhaust opens	51° BBDC
Exhaust closes	13° ATDC
Exhaust peak	109° BTDC

Number one exhaust cam peak on the camshaft fitted to serial number range 99100001A is 7° to the right of the keyway centre line viewed from the keyway end.

The camshaft sprocket retaining bolt has a metric thread.

Oil Pump

Interchangeable as an assembly between serial number range 36100001A and 99100001A. The pump gears, although different, are interchangeable with either assembly provided the gears are fitted as a matched set. The pump is interchangeable on serial number range 36100001A . The idler gear and the driver are both steel on serial number range 99100001A. On serial number range 36100001A the idler is aluminium and the driver steel.

Flywheel

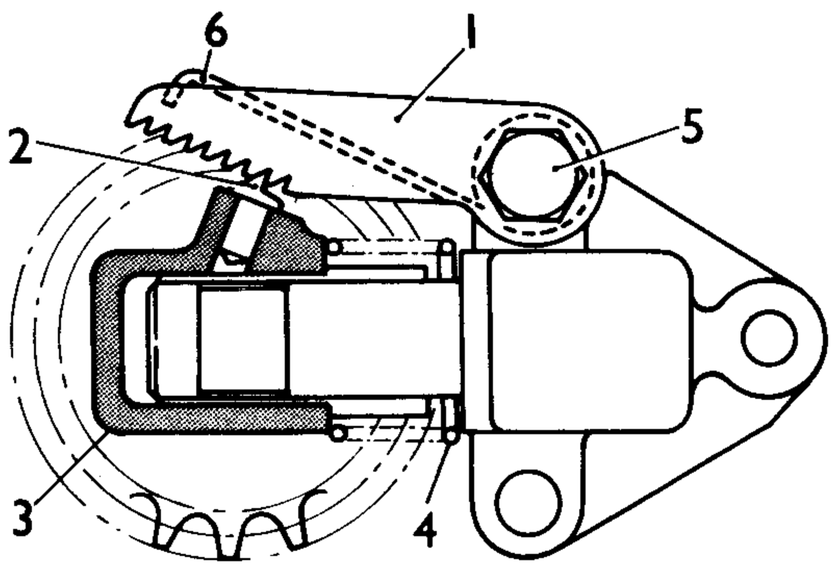
Design change to fit five main bearing crankshaft flange. Interchangeable between serial number ranges 36100001A and 99100001A but not with diesel engine range 36600001A.

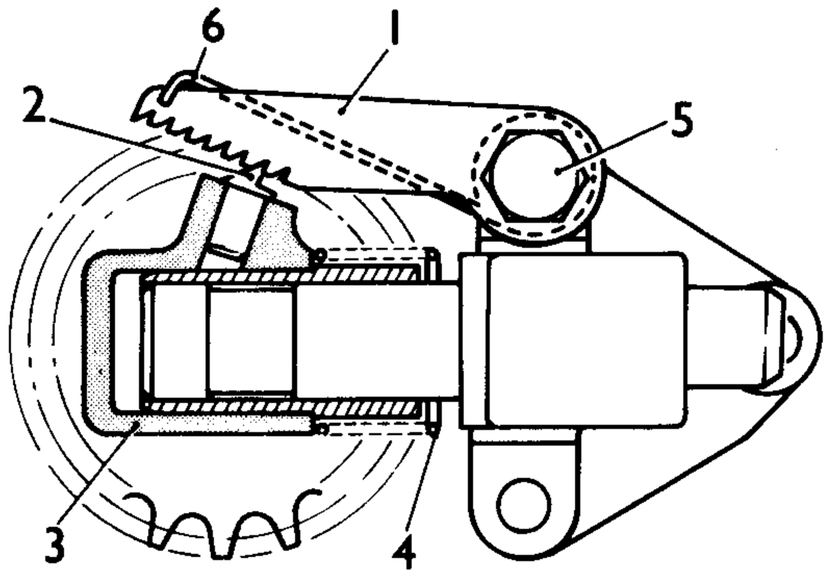
Flywheel Housing

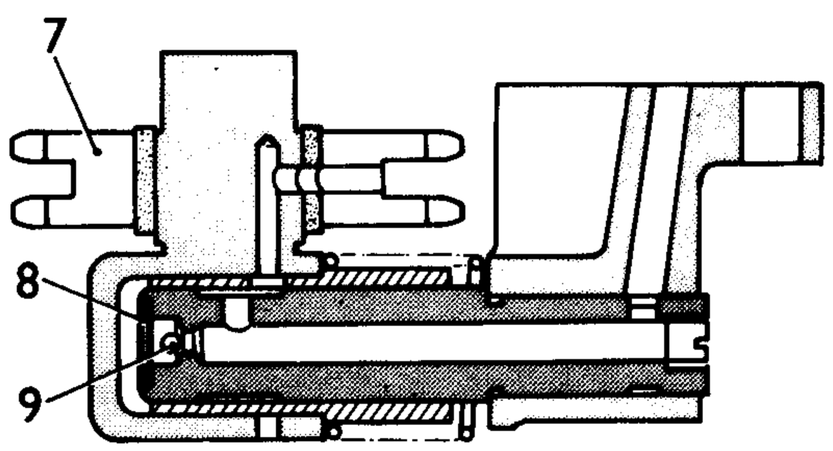
Design change to accommodate new crankshaft and rear main bearing oil seal arrangement. Interchangeable between serial number ranges 36100001A and 99100001A but not with diesel engine range 36600001A.

Timing Chain Tensioner

The timing chain tensioner assembly is the same as used on the three main bearing versions. The assembly fitted to serial number range 99100001A is the same as that used on diesel engine range 36600001A. The tensioner fitted to early petrol engine range 36100001A has a different piston assembly incorporating a relief valve. This has now been discontinued and all three engines now have the same tensioner. The ratchet on serial number range 99100001A is different in appearance and method of manufacture but dimensionally the same.

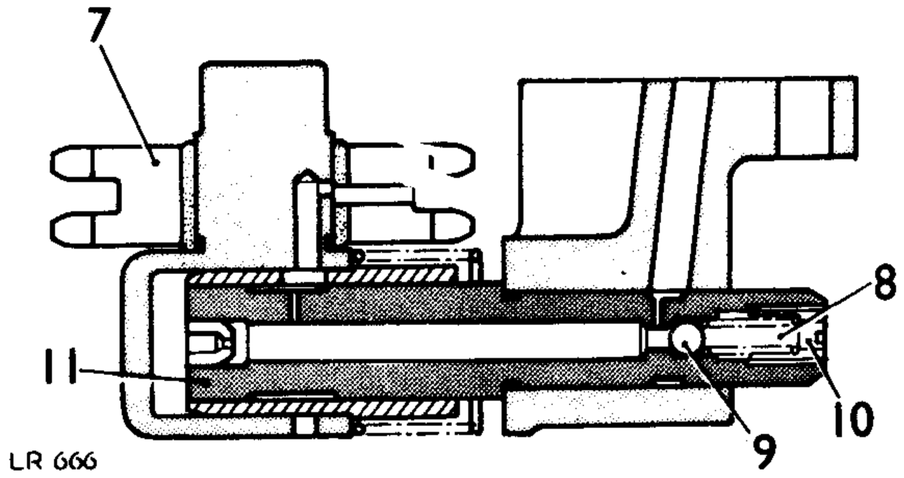






99100001A and 36600001A engine serial no. range

1. Ratchet
2. Pawl
3. Cylinder
4. Spring
5. Ratchet pivot and retaining bolt
6. Ratchet return spring
7. Jockey sprocket
8. Retaining clip for ball
9. Ball



36100001A engine serial no. range (Early engines only)

1. Ratchet
2. Pawl
3. Cylinder
4. Spring
5. Ratchet pivot and retaining bolt
6. Ratchet return spring
7. Jockey sprocket
8. Relief valve spring
9. Relief valve ball
10. Relief valve plug
11. Piston assembly

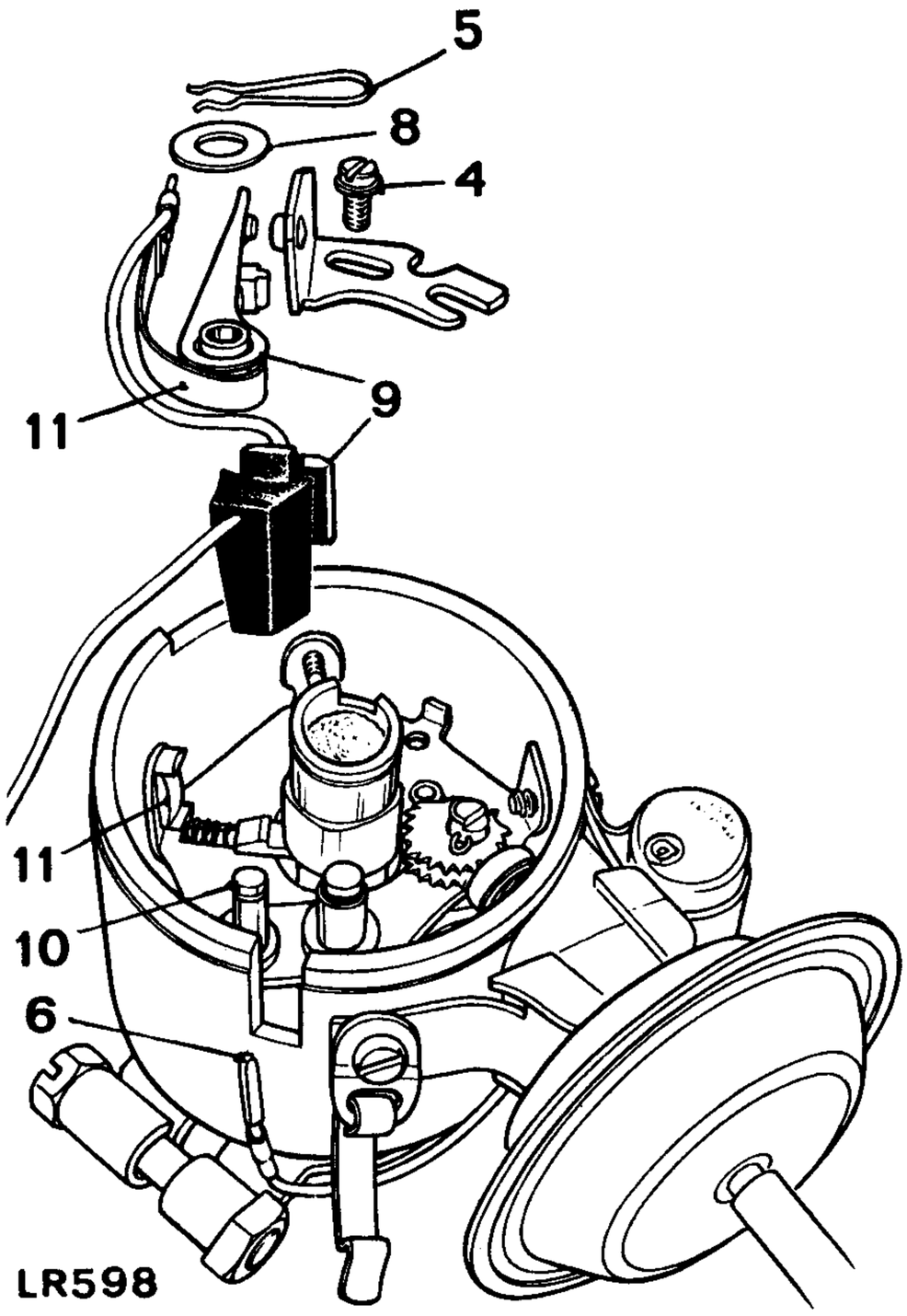
CONTACT BREAKER POINTS (Ducellier)

–Remove and refit **86.35.13**

Special tool 18G1308

Removing

1. Release the spring clips and remove the distributor cap.
2. Pull off the rotor arm.
3. Remove the dust shield.
4. Remove the retaining screw and remove the fixed contact point.
5. Slide the spring clip rearwards.
6. Disconnect the suppressor lead from the connector block.
7. Disconnect the lead from ignition coil.
8. Remove insulation washer from the moving contact point.
9. Lift off the moving contact point complete with leads and connector block from the distributor body.

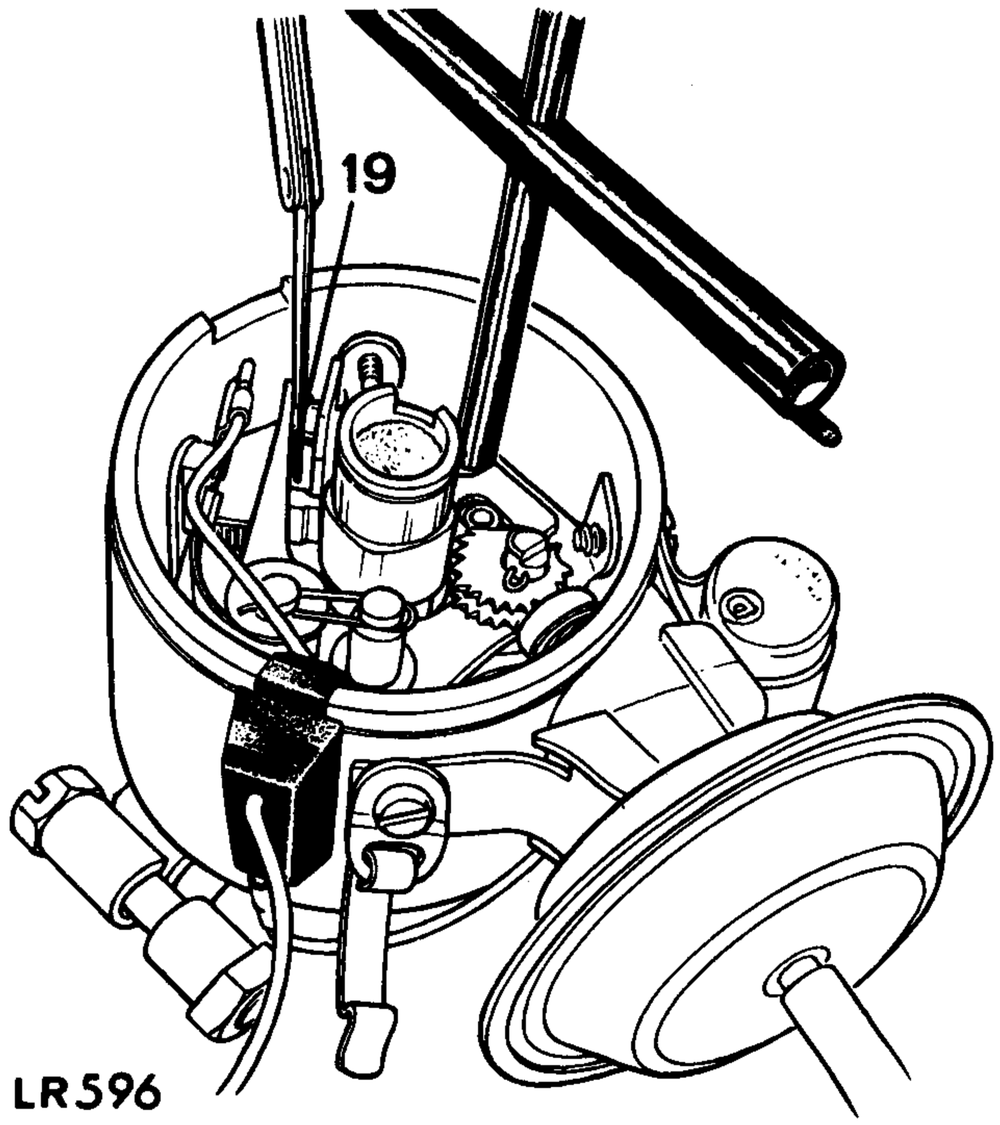


Refitting

10. Fit the new moving point over post.
11. Locate the leaf spring in the plastic guide.
12. Fit the insulation washer.
13. Secure the assembly with the spring clip.
14. Fit the connector block to the distributor body.
15. Connect ignition coil lead.
16. Fit suppressor lead to connector block.
17. Fit the fixed contact point and loosely retain with the screw.

NOTE: The following two instructions describe the adjustment of the contact points. The accompanying illustration shows it being done with the aid of special tool 18G1308. Whilst the points can be adjusted to the datum setting only (see data) without the tool full distributor adjustment, i.e. dwell angle, dwell variation and vacuum advance can only be achieved by using this tool in conjunction with engine diagnostic equipment. It is essential that the above adjustments are carried out in order to maintain correct emission levels and maximum engine efficiency.

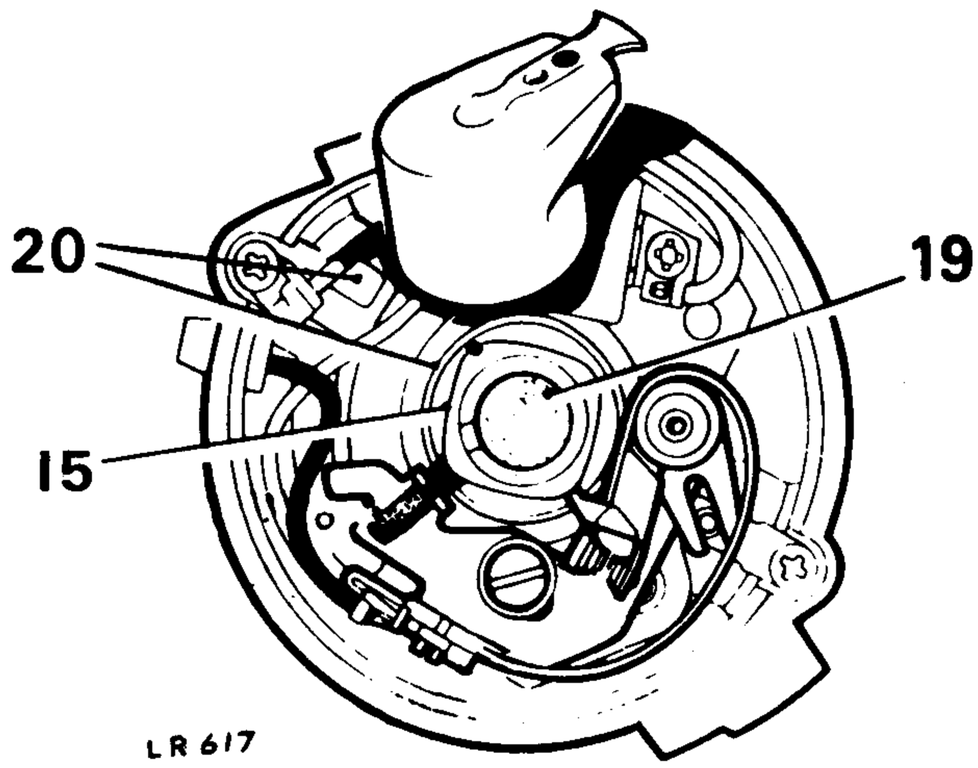
18. Rotate the engine until a cam of the rotor fully opens the points.
19. Using a feeler, adjust the position of the fixed contact point to the datum setting and tighten the retaining screw.
20. Check and adjust the dwell angle, dwell variation and vacuum advance, see instructions 38 to 43 operation 86.35.26.



Lubrication

NOTE: The following instructions should be carried out every 20,000km (12,000 miles) except instruction 20.

15. Clean and lightly grease the cam with Shell Retinax or equivalent and remove any surplus lubricant.
16. Using the same grease lubricate the underside of the heel actuator.
17. Grease the actuator ramps and contact breaker heel ribs.
18. Apply grease to the fixed pin and the actuator fork.
19. Apply a drop of clean engine oil to the felt pad underneath the rotor arm.
20. Every 40,000km (25,000 miles) lubricate the automatic advance mechanism by injecting one or two drops of engine oil through the aperture in the base plate.
21. Wipe the internal and external surfaces of the distributor cap with clean dry nap-free cloth and fit the cap to the distributor body.



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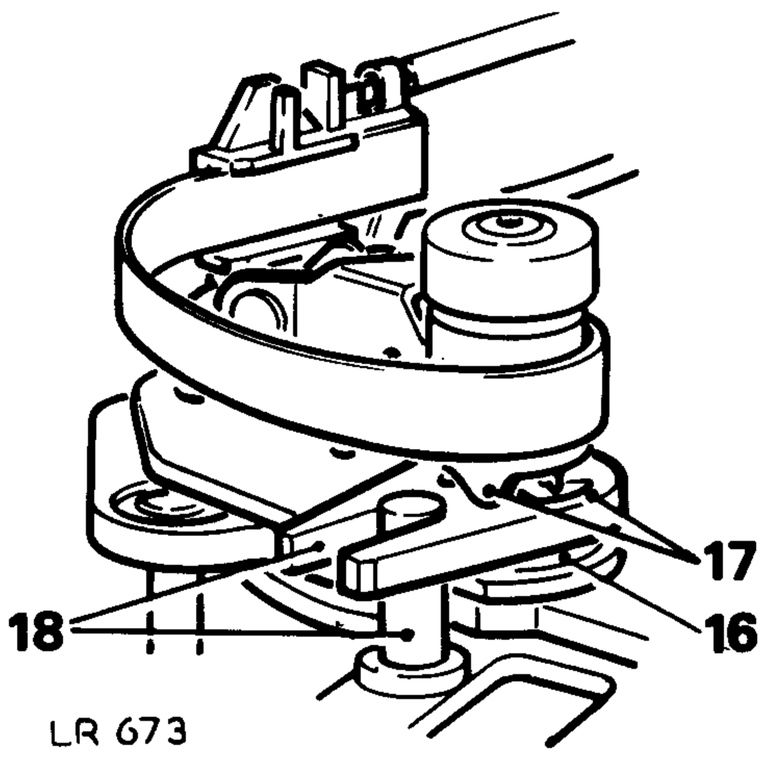

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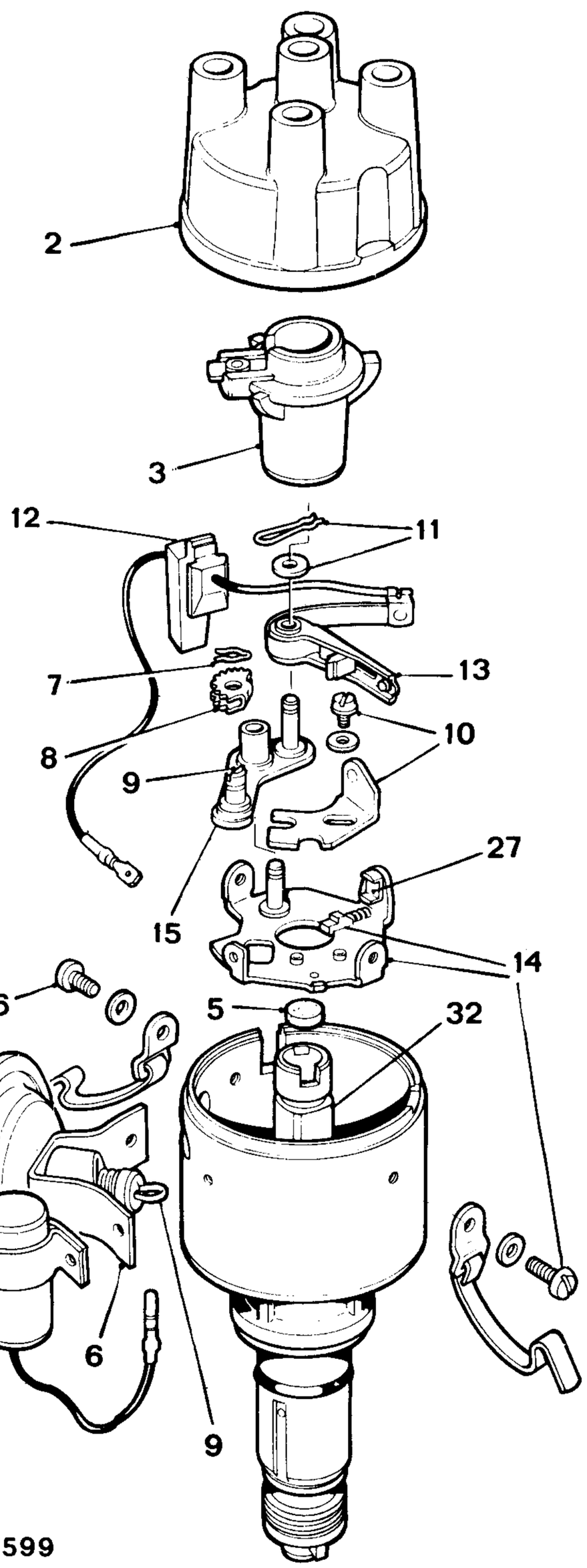
DISTRIBUTOR (Ducellier)

–Overhaul 86.35.26

Special tool 18G1308

Dismantling

1. Remove the distributor from the engine 86.35.20.
2. Remove the distributor cap.
3. Remove the rotor arm.
4. Remove the dust cover.
5. Remove the felt pad from the top of the rotor.
6. Remove the two screws retaining the condenser and vacuum unit and remove the condenser lead from the connector block.
7. Remove the retaining clip from the eccentric 'D' post.
8. Mark the position of the serrated cam in relation to the spring seat of the vacuum operating link.
9. Disengage the vacuum operating link and serrated cam from the eccentric 'D' post and remove the vacuum unit.
10. Remove the retaining screw and withdraw the fixed contact plate.
11. Remove the retaining clip and insulation washer.
12. Release the connector block from the distributor body.
13. Lift out the moving contact complete with connector block and leads.
14. Mark the relationship of the base plate to the body and remove the retaining screw. Whilst holding the pressure pad clear of the rotor, withdraw the base plate.
15. Remove the moving contact post-plate.



Inspection

NOTE: The distributor drive dog is loosely retained on the drive shaft, the "float" allows for any misalignment.

16. Examine the advance mechanism of the cam, check the shaft for excessive side play. If any of these parts are damaged or worn renew the complete distributor.
17. Examine all other components for damage or excessive wear and renew where necessary.
18. Check the distributor cover for signs of tracking or cracks and check that the pick-up brush moves freely in its holder.
19. Check the rotor arm for damage, electrode security, burning and tracking.

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LAND ROVER