

**Routine maintenance service schedule
for 200Tdi and V8 petrol engines (excluding V8i petrol engines)**

MAINTENANCE INTERVALS

Kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	
Miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	
VEHICLE INTERIOR																
1. Check condition and security of seats, seat belt mountings, seat belts, buckles and operation of inertia seat belts		•		•		•		•		•		•		•		
2. Check operation of foot brake and clutch		•		•		•		•		•		•		•		
3. Check operation of all lamps, horns, warning indicators		•		•		•		•		•		•		•		
4. Check operation of front/rear screen wipers and washers and condition of wiper blades		•		•		•		•		•		•		•		
5. Check security and operation of hand brake		•		•		•		•		•		•		•		
VEHICLE EXTERIOR																
6. Check/adjust headlamp and auxiliary lamp alignment		•		•		•		•		•		•		•		
7. Check headlamp levelling system		•		•		•		•		•		•		•		
8. Check front wheel alignment		•		•		•		•		•		•		•		
9. Remove road wheels		•		•		•		•		•		•		•		
10. Check tyres for: compliance with manufacturers specification; visually for cuts, lumps, bulges, uneven tread wear and depth; tyre pressures (including spare) adjust if required		•		•		•		•		•		•		•		
11. Inspect brake pads for wear, calipers for leaks and discs for condition		•		•		•		•		•		•		•		
12. Refit road wheels to original position		•		•		•		•		•		•		•		
13. Check security of spare wheel		•		•		•		•		•		•		•		
14. Check operation of all doors, bonnet and taildoor locks		•		•		•		•		•		•		•		
15. Lubricate all hinges, door-check mechanisms, bonnet catches and fuel flaps		•		•		•		•		•		•		•		
UNDER BONNET																
16. Check cooling and heater systems for leaks, hoses for security and condition		•		•		•		•		•		•		•		
17. Check brake servo hose for security and condition		•		•		•		•		•		•		•		
18. Check condition of heater plug wiring for fraying, chafing and deterioration (200Tdi engines only)		•		•		•		•		•		•		•		
19. Check ignition wiring and H.T.leads for fraying, chafing and deterioration		•		•		•		•		•		•		•		
20. Clean distributor cap, check for cracks and tracking.		•		•		•		•		•		•		•		
21. Lubricate distributor motor spindle with rotor arm removed (V8 petrol engines only)				•				•				•				
22. Renew spark plugs		•		•		•		•		•		•		•		
23. Check/adjust valve clearances at first 6,000 miles, 12,000 miles and thereafter at every 12,000 miles (200Tdi engines only)	•	•		•		•		•		•		•		•		

Kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
24. Renew fuel filter element		•		•		•		•		•		•		•	
25. Check crankcase breathing system for leaks, hoses for security and condition		•		•		•		•		•		•		•	
26. Renew air cleaner element(s)		•		•		•		•		•		•		•	
27. Check air cleaner dump valve, clean or renew		•		•		•		•		•		•		•	
28. Renew engine breather filter (V8 petrol engines only)				•				•				•			
29. Clean engine breather filter (200Tdi engines only)		•		•		•		•		•		•		•	
30. Renew engine flame traps(s) (V8 petrol engines only)		•		•		•		•		•		•		•	
31. Check condition of driving belts - adjust if required		•		•		•		•		•		•		•	
32. Check throttle operation		•		•		•		•		•		•		•	
33. Top-up carburetter piston dampers (V8 petrol engines only)		•		•		•		•		•		•		•	
34. Check/top-up cooling system		•		•		•		•		•		•		•	
35. Check/top-up fluid in power steering reservoir		•		•		•		•		•		•		•	
36. Check/top-up clutch fluid reservoir		•		•		•		•		•		•		•	
37. Check/top-up brake fluid reservoir		•		•		•		•		•		•		•	
38. Check/top-up windscreen and rear washer reservoir		•		•		•		•		•		•		•	
39. Lubricate accelerator control linkages and pedal pivot		•		•		•		•		•		•		•	
40. Check/adjust ignition timing. Note: It is important that the ignition timing dwell angle and carburetter adjustments are set in accordance with the vehicle engine specification and fuel octane rating. Refer to the relevant workshop manual for details (V8 petrol engines only)		•		•		•		•		•		•		•	
41. Check/adjust engine idle speed and carburetter mixture settings with engine at normal running temperature (V8 petrol engines only)		•		•		•		•		•		•		•	
42. Check/adjust steering box		•		•		•		•		•		•		•	
43. Remove battery connections: clean and grease - refit		•		•		•		•		•		•		•	
44. Check security of jack, brace and chocks		•		•		•		•		•		•		•	
45. Clean diesel intercooler element (200Tdi engines only)								•							
UNDER VEHICLE															
46. Renew engine oil and filter (200Tdi engines only)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
47. Renew engine oil and filter (V8 petrol engines only)		•		•		•		•		•		•		•	
48. Renew gearbox oil		•		•		•		•		•		•		•	
49. Renew transfer box oil				•				•				•			
50. Check/top up transfer box oil		•				•				•				•	
51. Renew front axle oil				•				•				•			

Kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
52. Check/top up front axle oil		•				•				•				•	
53. Renew swivel pin housing oil				•				•				•			
54. Check/top up swivel pin housing oil		•				•				•				•	
55. Renew rear axle oil				•				•				•			
56. Check/top up rear axle oil		•				•				•				•	
57. Lubricate propeller shaft sliding joints				•				•				•			
58. Lubricate propeller shaft universal joints		•		•		•		•		•		•		•	
59. Lubricate handbrake mechanical linkage		•		•		•		•		•		•		•	
60. Check visually brake, fuel, clutch pipes/unions for chafing, leaks and corrosion		•		•		•		•		•		•		•	
61. Check exhaust system for leakage, security and damage		•		•		•		•		•		•		•	
62. Check for fluid leaks from power, manual steering and suspension systems, hydraulic pipes and unions for chafing and corrosion		•		•		•		•		•		•		•	
63. Check condition and security of steering unit, joints and gaiters		•		•		•		•		•		•		•	
64. Check tightness of propeller shaft coupling bolts		•		•		•		•		•		•		•	
65. Ensure front and rear axle breathers are free from obstruction		•		•		•		•		•		•		•	
66. Check security and condition of suspension fixings		•		•		•		•		•		•		•	
67. Check for oil leaks from engine and transmission		•		•		•		•		•		•		•	
68. Clean fuel sedimenter (200Tdi engines only)		•		•		•		•		•		•		•	
69. Drain flywheel housing if drain plug is fitted for wading (refit)		•		•		•		•		•		•		•	
70. Check security of fuel tank		•		•		•		•		•		•		•	
71. Check security of towing bracket		•		•		•		•		•		•		•	
72. Check chassis frame and brackets for damage						•						•			
73. Check condition of engine mounting rubbers						•						•			
74. Adjust handbrake if required		•		•		•		•		•		•		•	
75. Carry out road or roller test		•		•		•		•		•		•		•	
76. Check turbo charger boost pressure (200Tdi engines only)				•				•				•			

V8i Service Schedule

Electronic fuel injection
Catalyst exhaust emission
control system

MAINTENANCE INTERVALS

Kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	
Miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	
VEHICLE INTERIOR																
1. Check condition and security of seats, seat belt mountings, seat belts, buckles and operation of inertia seat belts. Lubricate front seat tilt pivots		•		•		•		•		•		•		•		
2. Check operation of foot brake and clutch		•		•		•		•		•		•		•		
3. Check operation of all lamps, horns, warning indicators		•		•		•		•		•		•		•		
4. Check operation of front/rear screen wipers and washers and condition of wiper blades		•		•		•		•		•		•		•		
5. Check security and operation of hand brake		•		•		•		•		•		•		•		
VEHICLE EXTERIOR																
6. Check/adjust headlamp and auxiliary lamp alignment		•		•		•		•		•		•		•		
7. Check headlamp levelling system		•		•		•		•		•		•		•		
8. Check front wheel alignment		•		•		•		•		•		•		•		
9. Remove road wheels		•		•		•		•		•		•		•		
10. Check tyres for: compliance with manufacturers specification; visually for cuts, lumps, bulges, uneven tread wear and depth; tyre pressures (including spare) adjust if required		•		•		•		•		•		•		•		
11. Inspect brake pads for wear, calipers for leaks and discs for condition		•		•		•		•		•		•		•		
12. Refit road wheels to original hub position		•		•		•		•		•		•		•		
13. Check security of spare wheel		•		•		•		•		•		•		•		
14. Check operation of all doors, bonnet and taildoor locks		•		•		•		•		•		•		•		
15. Lubricate all hinges, door-check mechanisms, bonnet catches and fuel flaps		•		•		•		•		•		•		•		
UNDER BONNET																
16. Check cooling and heater systems for leaks, hoses for security and condition		•		•		•		•		•		•		•		
17. Check brake servo hose for security and condition		•		•		•		•		•		•		•		
18. Check fuel evaporative loss control system for leaks								•								
19. Check fuel filler cap seal for leaks								•								
20. Check PCV system for leaks and hoses for security and condition (Positive crankcase ventilation)				•				•				•				
21. Clean plenum chamber ventilation passageway. Check and clean PCV system and breathers (Positive crankcase ventilation)				•				•				•				
22. Renew PCV intake filter, check and clean PCV system (Positive crankcase ventilation)								•								
23. Check/clean air cleaner dump valve and element		•				•				•				•		
24. Renew air cleaner element, check/clean dump valve				•				•				•				
25. Clean distributor cap, check for cracks and tracking.		•		•		•		•		•		•		•		
26. Lubricate distributor motor spindle with rotor arm removed				•				•				•				
27. Check ignition wiring and H.T.leads for fraying, chafing and deterioration		•		•		•		•		•		•		•		
28. Clean/adjust spark plugs		•				•				•				•		
29. Renew spark plugs				•				•				•				
30. Renew charcoal canister								•								
31. Check engine emission control system hoses, tubes and vacuum lines for security and condition								•								
32. Check operation of electronic control unit/systems								•								

V8i Service Schedule (Cont'd)

Kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
33. Check condition of driving belts - adjust if required	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
34. Check throttle operation		*		*		*		*		*		*		*	
35. Check/top-up cooling system		*		*		*		*		*		*		*	
36. Check/top-up fluid in power steering reservoir		*		*		*		*		*		*		*	
37. Check/top-up clutch fluid reservoir		*		*		*		*		*		*		*	
38. Check/top-up brake fluid reservoir		*		*		*		*		*		*		*	
39. Check/top-up windscreen and rear washer reservoir		*		*		*		*		*		*		*	
40. Lubricate accelerator control linkages and pedal pivot		*		*		*		*		*		*		*	
41. Check/adjust ignition timing				*				*				*			
42. Check engine idle speed								*							
43. Check/adjust steering box		*		*		*		*		*		*		*	
44. Remove battery connections: clean and grease - refit		*		*		*		*		*		*		*	
45. Check security of jack, brace and chocks		*		*		*		*		*		*		*	
UNDER VEHICLE															
46. Renew engine oil and filter	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
47. Renew gearbox oil		*		*		*		*		*		*		*	
48. Renew transfer box oil				*				*				*			
49. Check/top up transfer box oil		*				*				*				*	
50. Renew front axle oil				*				*				*			
51. Check/top up front axle oil		*				*				*				*	
52. Renew swivel pin housing oil				*				*				*			
53. Check/top up swivel pin housing oil		*				*				*				*	
54. Renew rear axle oil				*				*				*			
55. Check/top up rear axle oil		*				*				*				*	
56. Lubricate propeller shaft sliding joints				*				*				*			
57. Lubricate propeller shaft universal joints		*		*		*		*		*		*		*	
58. Lubricate handbrake mechanical linkage		*		*		*		*		*		*		*	
59. Check visually brake, fuel, clutch pipes/unions for chafing, leaks and corrosion		*		*		*		*		*		*		*	
60. Check exhaust system for leakage, security and damage		*		*		*		*		*		*		*	
61. Check for fluid leaks from power, manual steering and suspension systems, hydraulic pipes and unions for chafing and corrosion		*		*		*		*		*		*		*	
62. Check/tighten steering unit and steering rod ball joint fixings, check condition of ball joints and dust covers		*		*		*		*		*		*		*	
63. Check tightness of propeller shaft coupling bolts		*		*		*		*		*		*		*	
64. Ensure front and rear axle breathers are free from obstruction		*		*		*		*		*		*		*	
65. Check/tighten front and rear axle suspension link fixings, check condition of mounting rubbers		*		*		*		*		*		*		*	
66. Check for oil leaks from engine and transmission		*		*		*		*		*		*		*	
67. Drain flywheel housing if drain plug is fitted for wading (refit)		*		*		*		*		*		*		*	
68. Check/tighten fuel tank fixings		*		*		*		*		*		*		*	

V8i Service Schedule (Cont'd)

Kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
69. Check/tighten towing bracket fixings		•		•		•		•		•		•		•	
70. Check chassis frame and brackets for damage						•						•			
71. Check condition of engine mounting rubbers						•						•			
72. Adjust handbrake if required		•		•		•		•		•		•		•	
73. Renew fuel filter element								•							
74. Renew oxygen sensors								•							
75. Renew catalytic converters 160,000 km intervals															
76. Carry out road or roller test		•		•		•		•		•		•		•	

It is recommended that:

At 24,000 mile (40,000 km) intervals or every 18 months, whichever is the sooner, the hydraulic brake fluid should be completely renewed.

At 36,000 mile (60,000 km) intervals or every 3 years, whichever is the sooner, all hydraulic brake fluid, seals, brake servo filter and flexible hoses should be renewed.

All working surfaces of the master cylinder and caliper cylinders should be examined and renewed where necessary.

At 36,000 mile (60,000 km) intervals remove all suspension dampers, test for correct operation, refit or renew as necessary.

At two yearly intervals or at the onset of the second winter, the cooling system should be drained, flushed and refilled with the required water and anti-freeze solution. The battery electrolyte level should be checked and topped up, if required, every three years in temperate climates and once a year in high ambient temperatures. Air cleaner. When the vehicle is used in dusty or field conditions or deep wading, frequent attention to the air cleaner may be required.

WARNING: Two wheel roller tests must be restricted to 5 km/hour (3 miles/hour). DO NOT engage the differential lock or the vehicle will drive off the roller test rig because the vehicle is in permanent four wheel drive.

EMMISSION MAINTENANCE

The emission maintenance listed on this page is necessary to keep the vehicle in compliance with the Swiss and other territorial Emission regulations up to 80'000 kilometres or five years. The manufacturer of Discovery recommends that the sequence of maintenance operations be carried out throughout the life of the vehicle in order to maintain vehicle performance and reliability.

Maintenance intervals: Kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
Renew positive crankcase ventilation (PCV) intake filter, check and clean PCV system								•									•
Renew engine oil	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Renew engine oil filter	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Renew fuel filter								•									•
Renew air cleaner element / check / clean dump valve				•				•				•					•
Renew charcoal canister								•									•
Renew spark plugs				•				•				•					•
Renew catalytic converters																	•
Renew oxygen sensors								•									•
Check exhaust systems for leaks, security and damage	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Check condition of driving belts - adjust if required	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Check / top up cooling system	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Check ignition wiring and HT leads for fraying, chafing and deterioration								•									•
Clean distributor cap and rotor arm, check for cracks and tracking. Lubricate rotor spindle with rotor arm removed								•									•
Check / adjust ignition timing								•									•
Check engine idle speed								•									•
Check fuel evaporative loss control system for leaks								•									•
Check fuel filler cap seal for leaks								•									•
Check fuel pipes, filler hoses and connections for leaks and security								•									•
Check engine emission control system hoses, tubes and vacuum line for security and condition								•									•
Check operation of electronic control unit / systems								•									•
Check operation of auxiliary emission control devices								•									•

200Tdi ENGINES

If the vehicle is operated on fuel with a high sulphur content (over 1%) the engine oil change intervals must not exceed 5000 km (3000 miles).

CAMSHAFT DRIVE BELT - 200Tdi engines

The engine timing gears are driven by a flexible rubber belt which must be renewed at intervals determined by the severity of operating conditions.

In reasonable, temperate climate operation, renew the belt every 100,000 km (60,000 miles) or every five years whichever occurs earlier.

In adverse operating conditions such as work in dusty atmospheres, high ambient temperatures and desert and tropical zones, renew the belt every 50,000 km (30,000 miles) or every two and a half years whichever occurs earlier.

CAUTION: If the drive belt is not renewed at the correct interval, it could fail, resulting in serious engine damage.

200Tdi AND V8 PETROL MODELS

It is recommended that:

At 18,000 mile (30,000 km) intervals or every 18 months, whichever is the sooner, the hydraulic brake fluid should be completely renewed.

At 36,000 mile (60,000 km) intervals or every 3 years, whichever is the sooner, all hydraulic brake fluid, seals, brake servo filter and flexible hoses should be renewed.

All working surfaces of the master cylinder and caliper cylinders should be examined and renewed where necessary.

At 36,000 mile (60,000 km) intervals remove all suspension dampers, test for correct operation, refit or renew as necessary.

At two yearly intervals or at the onset of the second winter, the cooling system should be drained, flushed and refilled with the required water and anti-freeze solution. The battery electrolyte level should be checked and topped up, if required, every three years in temperate climates and once a year in high ambient temperatures.

Air cleaner

When the vehicle is used in dusty or field conditions or deep wading, frequent attention to the air cleaner may be required.

WARNING: Two wheel roller tests must be restricted to 3 km/hour (3 miles/hour). DO NOT engage the differential lock or the vehicle will drive off the roller test rig because the vehicle is in permanent four wheel drive.

JACKING

The following instructions must be carried out before raising the vehicle off the ground.

1. Use a solid level ground surface.
2. Apply the parking brake.
3. Select 'P' if automatic gearbox or 1st gear if manual gearbox.
4. Select Low range in transfer gearbox with differential lock engaged.

CAUTION: To avoid damage occurring to the under body components of the vehicle the following jacking procedures must be adhered to.

DO NOT POSITION JACKS OR AXLE STANDS UNDER THE FOLLOWING COMPONENTS.

Body structure

Bumpers
 Fuel lines
 Brake lines
 Front radius arms
 Panhard rod
 Steering linkage
 Rear Trailing links
 Fuel tank
 Engine sump
 Gearbox bellhousing

Jack or support vehicle by axles only.

Vehicle jack

The jack provided with the vehicle is only intended to be used in an emergency, for changing a tyre. Do **NOT** use the jack for any other purpose. Refer to Owner's Manual for vehicle jack location points and procedure. **NEVER** work under a vehicle supported by the vehicle jack.

Hydraulic Floor Jack

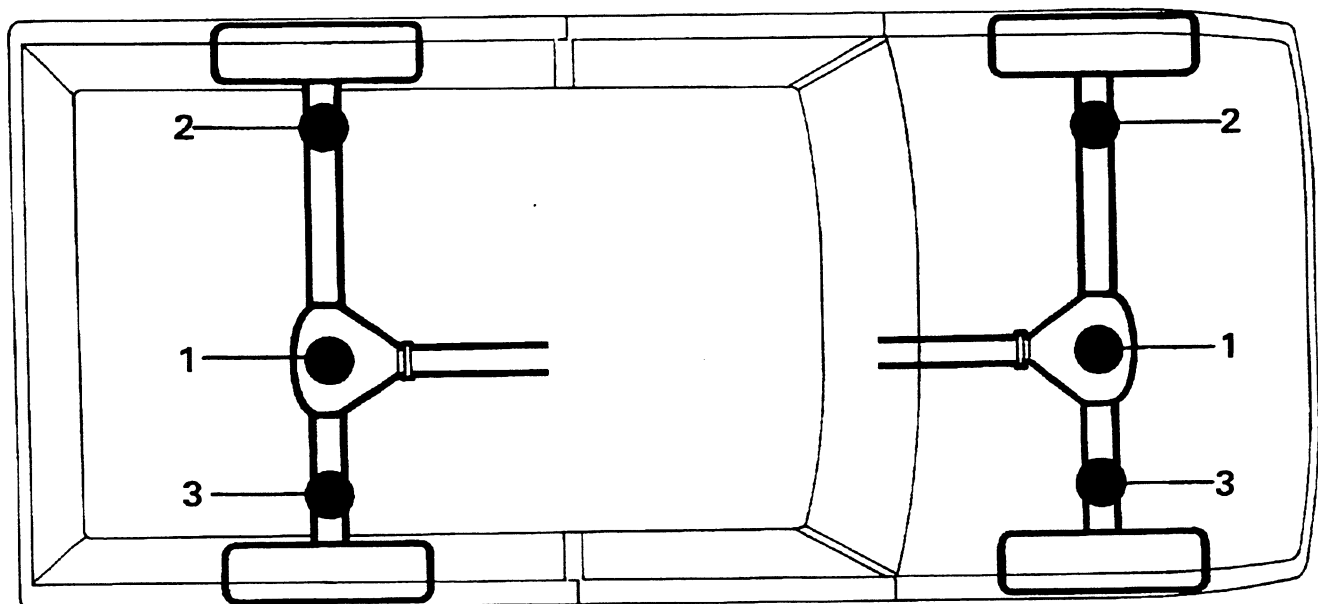
A hydraulic jack with a minimum 3,300 lbs load capacity must be used.

CAUTION: Do not commence work on the underside of the vehicle until suitable axle stands have been positioned under the axle(s):

Raise the front of the vehicle

1. Position the cup of the hydraulic arm under the differential casing.

NOTE: The differential casing is not central to the axle. Care should be taken when raising the front road wheels off the ground as the rear axle has less sway stiffness.



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2. Raise the front road wheels off the ground high enough to enable an axle stand to be installed under the left hand axle tube.
3. Position an axle stand under the right hand axle tube, carefully lower the floor jack until the axle sits securely on both axle stands, remove the floor jack.
4. Before commencing work on the underside of the vehicle re-check the security of the vehicle on the stands.
5. Reverse the procedure when removing the vehicle from the stands.

Raise the rear of the vehicle

1. Position the cup of the hydraulic arm under the differential casing.
2. Raise the vehicle high enough to enable axle stands to be installed under the left and right hand axle tubes.
3. Lower the floor jack until the axle sits securely on the axle stands, remove the floor jack.
4. Before commencing work on the underside of the vehicle re-check the security of the vehicle on the stands.
5. Reverse the procedure when removing the vehicle from the stands.

HYDRAULIC VEHICLE HOIST (FOUR POST)

Use only a 'drive on' type hoist which supports the vehicle by its own road wheels. If a 'wheel-free' condition is required, use a 'drive on' hoist incorporating a 'wheel-free' system that supports under the axle casings. Alternatively, place the vehicle on a firm, flat floor and support on axle stands.

TWO POST VEHICLE HOISTS

Land Rover DO NOT recommend using 'Two Post' hoists that employ four adjustable support arms. These are NOT considered safe.

If the vehicle is installed on a Two Post hoist the responsibility for the safety of the vehicle and safety of the personnel performing service operations is in the hands of the Service Provider.

DYNAMOMETER TESTING OF PERMANENT FOUR-WHEEL DRIVE VEHICLES

Four-wheel dynamometers

Provided that front and rear rollers of the equipment are rotating at the same peripheral speed and that normal workshop safety standards are observed, there is no speed restriction on the use of four-wheel (double axle) roller rigs for the testing of permanent four-wheel drive vehicles.

NOTE: The centre differential must not be locked during brake testing. The brake servo-assistance will not be maintained without the engine running.

Two-wheel dynamometers

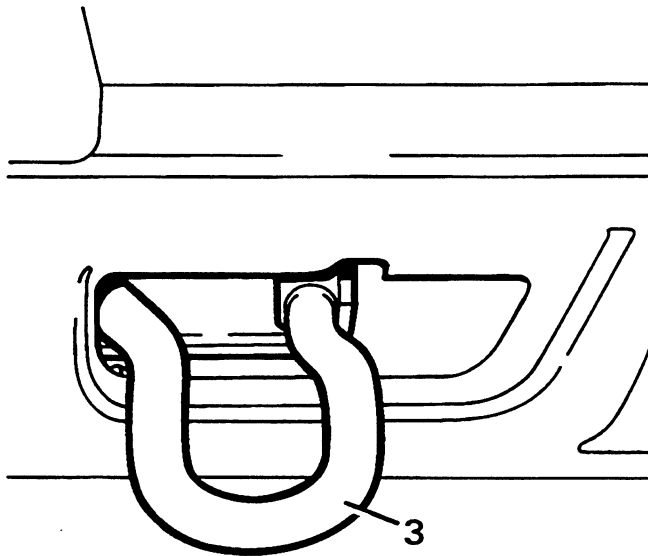
Testing of a four-wheel drive vehicle on a single axle roller rig must be restricted to a maximum roller peripheral speed of 5 kph (3 mph) with the centre differential unlocked and the transfer gearbox in neutral. For tests above this speed on a single axle rig, the centre differential must be locked and the drive shaft to the stationary axle must be removed.

TOWING

CAUTION: This vehicle has permanent four-wheel drive. Should the vehicle need to be towed, the following instructions must be adhered to:

Towing the vehicle on all four wheels with driver operating steering and brakes.

1. Insert the ignition key and turn to the auxiliary switch position '1' to release the steering lock.
2. Select neutral in main gearbox and transfer gearbox with the differential unlocked.
3. Towing rope, chain or cable should be fitted to the towing eye that protrudes out of the front of the spoiler immediately below the front bumper.
4. Release the parking brake.



J5279M

CAUTION: The brake servo and power assisted steering system will not be functional without the engine running. Greater pedal pressure will be required to apply the brakes, the steering system will require greater effort to turn the front road wheels.

The vehicle tow connection should be used only in normal road conditions, 'snatch' recovery should be avoided.

Suspended tow by breakdown vehicle

CAUTION: To prevent damage to the vehicle the front or rear drive shaft **MUST BE** removed, dependent upon which axle is being trailed.

1. Mark the drive shaft drive flanges at the transfer gearbox and axle differential with identification lines to enable the drive shaft to be refitted in its original position.
2. Remove the fixings from the differential drive flange to drive shaft/transfer box drive flange to drive shaft, withdraw the shaft complete from beneath the vehicle.
3. If the front axle is to be trailed it is necessary to insert the ignition key and turn to the auxiliary switch position '1' to release the steering lock.

CAUTION: The steering wheel and/or linkage must be secured in a straight ahead position. **DO NOT** use the steering lock mechanism for this purpose.

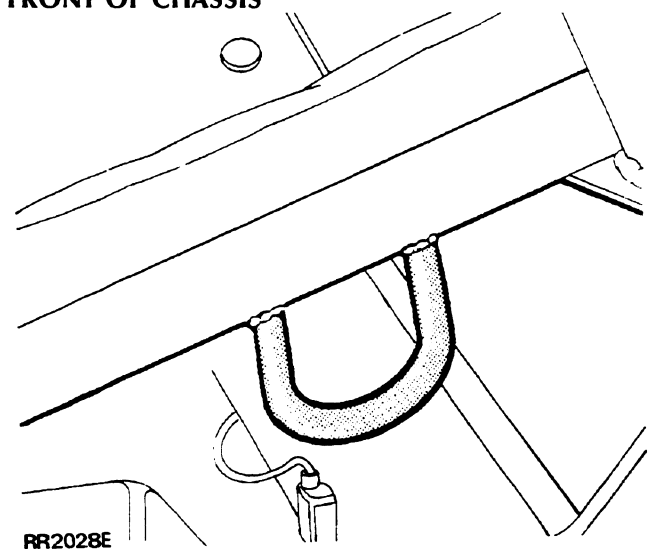
TRANSPORTING THE VEHICLE BY TRAILER

Lashing eyes are provided on the front and rear of the chassis side members, to facilitate the securing of the vehicle to a trailer or other means of transportation.

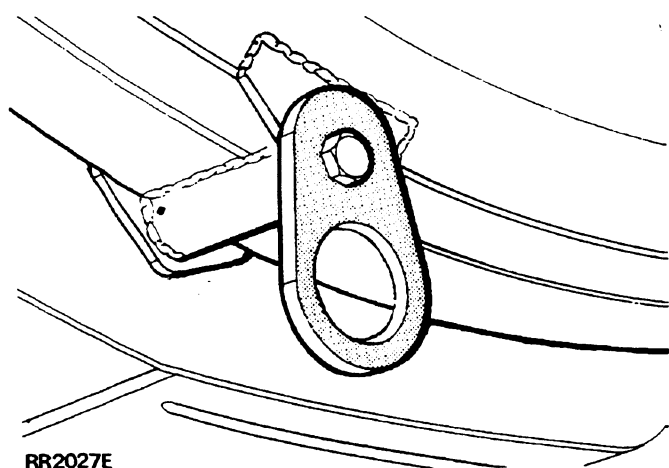
CAUTION: Underbody components must not be used as lashing points.

Install the vehicle on the trailer and apply the parking brake. To prevent damage occurring to the parking pawl of the automatic gearbox select neutral 'N' gear in main gearbox.

FRONT OF CHASSIS



REAR OF CHASSIS



LUBRICATION

The former part of the maintenance section covers renewal of lubricating fluids for the major units of the vehicle as detailed in the "Maintenance schedules". Refer to Section 09 for Capacities and Recommended Lubricants. It also includes service to other components that require access from beneath the vehicle. The latter part of the section covers those components located in and around the engine compartment.

Vehicles operating under severe conditions of sand, dust, mud or water should have lubrication and oil changes carried out at more frequent intervals than those recommended in the maintenance schedules. Draining of used oils should occur after a run when the oil is warmed. Always clean the drain and filler/level plugs, and their surrounding areas, before removal to prevent dirt ingress to the unit being serviced. In the interests of safety disconnect the battery to prevent the engine from being started and the vehicle being moved while oil changing is taking place.

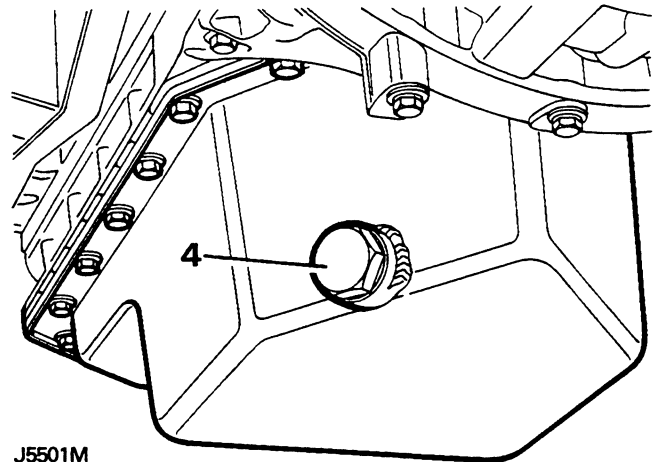
Allow as much time as possible for the oil to drain except where there is a danger of dirt being blown into the plug orifice. In these conditions clean and refit the drain plug as soon as the main bulk of the oil has drained. Always refill with oil of the specification in the lubrication charts and always from sealed containers.

WARNING: See Section 01 USED ENGINE OIL HANDLING PRECAUTIONS.

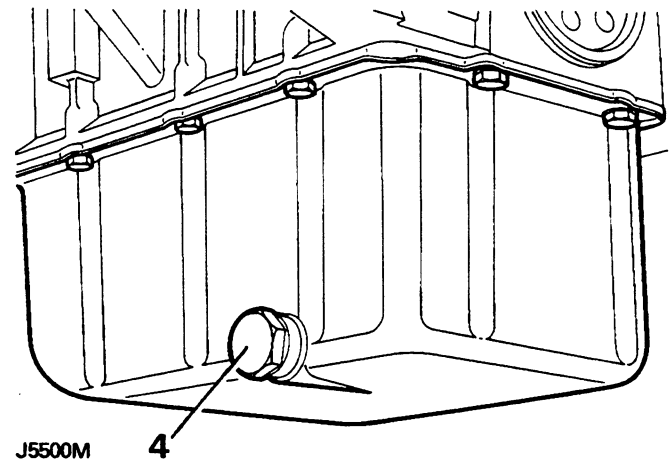
RENEW ENGINE OIL AND FILTER

Drain the oil: All engines

1. Drive the vehicle to level ground.
2. Run the engine to warm the oil, switch off the ignition and disconnect the battery.
3. Locate the engine oil drain plug at the bottom left-hand side of the sump and place an oil tray underneath.
4. Remove the drain plug and allow the oil to drain before replacing the plug and tightening it to the correct torque. Use a new copper washer on the plug if necessary.



J5501M

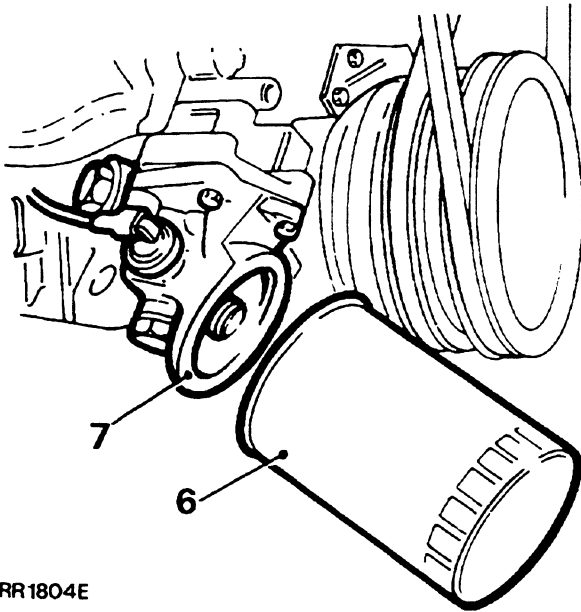


J5500M

Renew oil filter: All engines

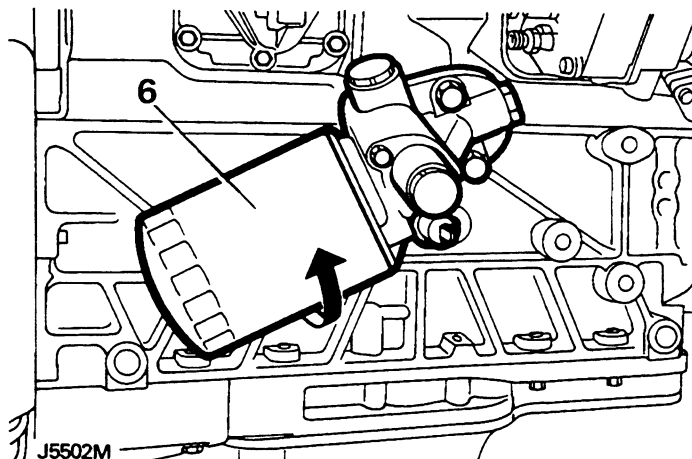
CAUTION: V8 petrol engines. The engine oil filter must not be removed whilst the sump is empty, otherwise the oil pump may have to be primed.

5. Locate the oil filter (front right-hand side of the V8 petrol engine, right-hand side of the 200Tdi engine) and place an oil tray beneath.



RR1804E

6. Unscrew the filter anti-clockwise, using a strap spanner as necessary.
7. Smear a little clean engine oil on the rubber washer of the new filter, then screw the filter on clockwise until the rubber sealing ring touches the machined face, then tighten a further half turn by hand only. Do not overtighten.



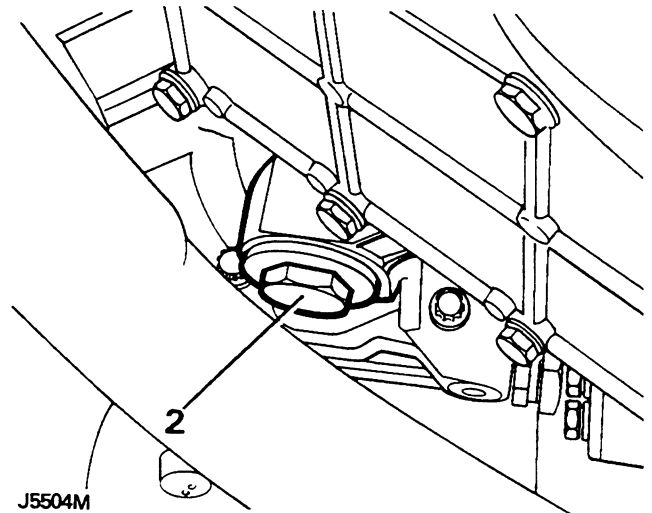
J5502M

Refill sump with oil: All engines

8. Clean the outside of the oil filler cap, remove it from the rocker cover and clean the inside.
9. Pour in the correct quantity of new oil of the correct make and grade to the high mark on the oil dipstick and firmly replace the filler cap.
10. Run the engine and check for leaks from the filter. Stop the engine and allow the oil to drain back into the sump for 15 minutes, then check the oil level and top up if necessary. Do not overfill.

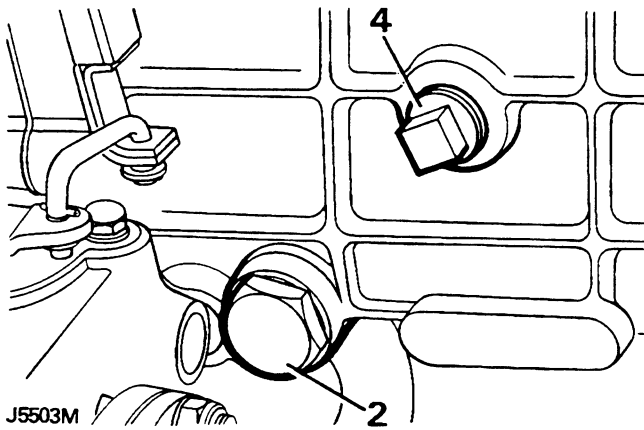
RENEW MAIN GEARBOX OIL LT77

1. Drive the vehicle to level ground.
2. Locate the gearbox and extension case drain plugs and place an oil tray beneath.



J5504M

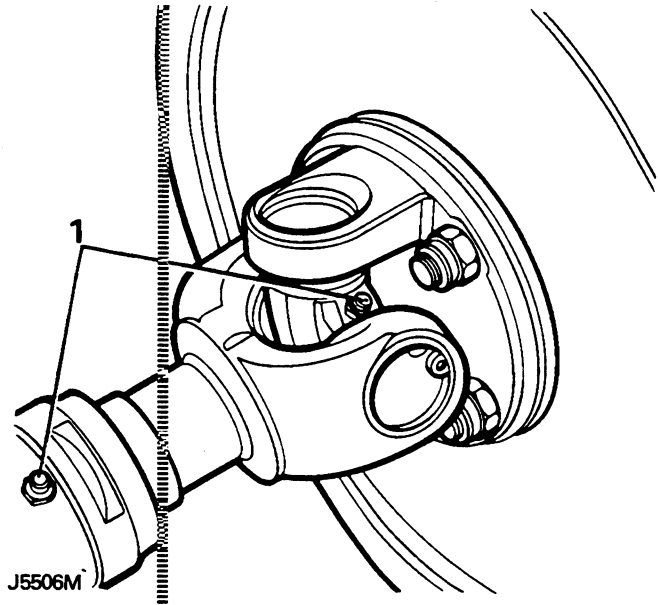
3. Remove the drain plugs and allow the oil to drain completely. Wash the extension case filter incorporated in the drain plug in kerosene and replace the drain plugs, using new washers if necessary, tightening to the correct torque.
4. Remove the oil filler/level plug and inject the approximate quantity of new oil of the correct make and grade until it begins to run out of the filler/level hole.



4. Remove the filler/level plug and inject the approximate quantity of oil of the correct make and grade into the hole until oil begins to flow back out of the hole.
5. Refit the filler/level plug and tighten to the correct torque. Do not overtighten. Wipe away any surplus oil.

LUBRICATE FRONT AND REAR DRIVE SHAFT UNIVERSAL AND SLIDING JOINTS

1. Locate the 3 grease nipples on both of the front and rear drive shafts.

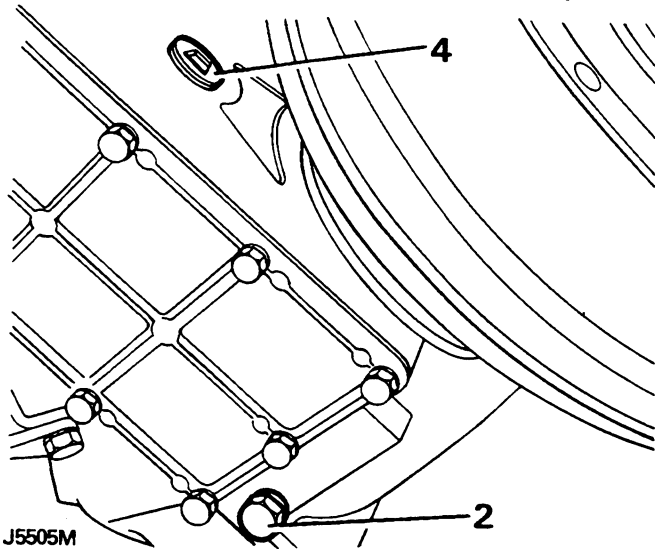


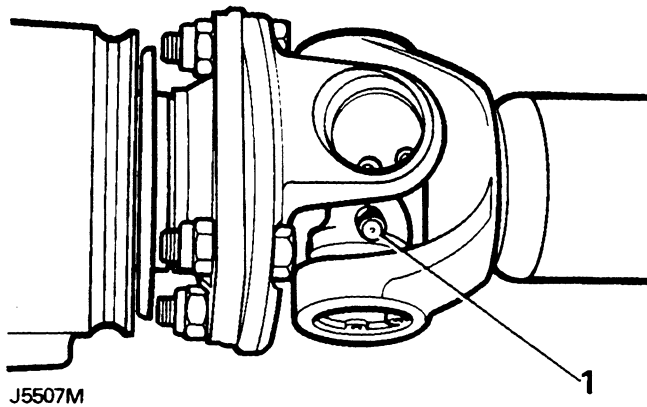
2. Clean the nipples completely to remove any dirt that may have collected on them.
3. Charge a low pressure hand-grease gun with grease of the correct make and grade and apply grease to all 6 nipples.

5. Refit the plug and tighten to the correct torque. Since the plug has a tapered thread it must not be overtightened. Wipe away any surplus oil.

RENEW TRANSFER GEARBOX OIL

1. Drive the vehicle to level ground.
2. Locate the gearbox drain plug and place an oil tray beneath.
3. Remove the drain plug and allow the oil to drain. Refit the plug using a new washer if necessary and tighten to the correct torque.

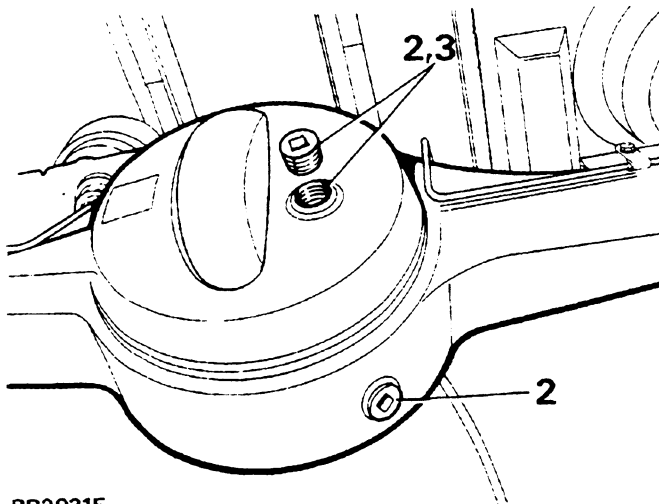




J5507M

RENEW FRONT AND REAR AXLE OIL

1. Drive the vehicle to level ground and place an oil tray under the axle to be drained.
2. Using a spanner with a 13 mm (0.5 in) square drive remove the drain and filler/level plugs and allow the oil to drain completely. Clean and refit the drain plug.
3. Inject oil of the recommended grade into the axle through the filler/level hole until it begins to flow back out of the hole.
4. Clean and refit the filler level plug to the correct torque. Wipe away any surplus oil.



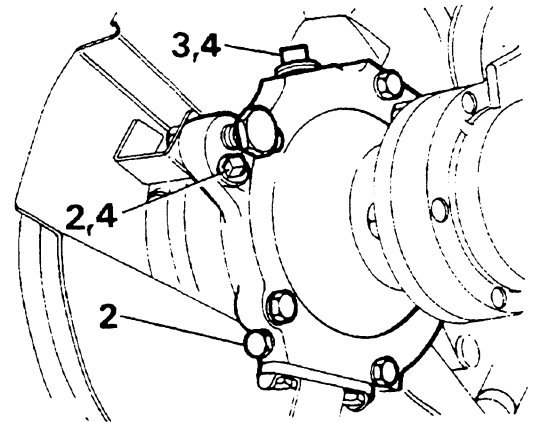
RR2031E

Remote axle breathers

Pipes attached to the breathers on the axles terminate at the engine bulkhead for the front axle and underneath the body below the rear seat for the rear axle. These allow the axles to breath whilst traversing mud or water. No maintenance is required except to ensure that the pipes do not become blocked, kinked or damaged in any way as to impair axle breathing.

RENEW SWIVEL PIN HOUSING OIL

1. Drive the vehicle to level ground. Place an oil tray under each swivel housing to catch the old oil.



RR2032E

2. Remove the drain and level plugs and allow the oil to drain completely. Clean and refit the drain plug.
3. Remove the filler plug and inject the recommended make and grade of oil into the housing until oil reaches the level hole.
4. Clean and refit the level and filler plugs. Wipe away any surplus oil.

STEERING AND SUSPENSION

Check condition and security of steering unit, joints, relays and boots.

Check steering box for fluid leaks.

Check shock absorbers for fluid leaks.

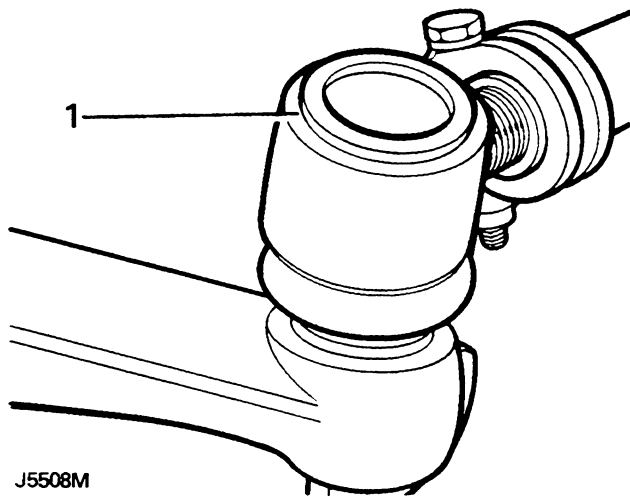
Check power steering system for leaks, hydraulic pipes and unions for chafing and corrosion.

Check security of suspension fixings.

CHECK STEERING BALL JOINTS

Ball joints are lubricated during manufacture for their expected lifespan and require no further lubrication. However they may be contaminated with dirt if the rubber sealing boots protecting them become damaged or dislodged. The joints should be checked at the specified service intervals, but more frequently if the vehicle is used under arduous conditions.

1. Check for wear in the joints by moving the ball joint up and down vigorously. If free movement is apparent fit a new joint assembly.

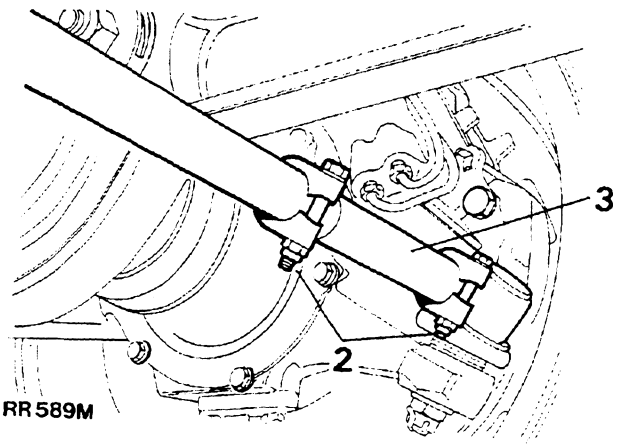


CHECK/ADJUST FRONT WHEEL ALIGNMENT

Use recognised wheel alignment equipment to perform this check and adjustment. See Section 04 'General Specification Data' for the correct alignment figure.

To adjust

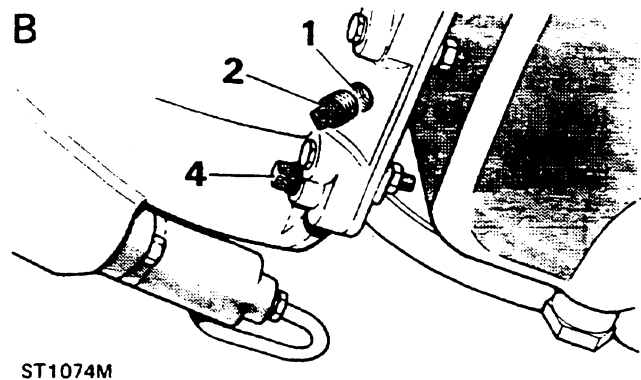
1. Drive the vehicle to level ground, with the road wheels in the straight ahead position, and push it forward a short distance.
2. Loosen the clamps securing the adjusting shaft to the track rod.
3. Turn the adjusting shaft to decrease or increase the effective length of the track rod as required, until the alignment is correct.
4. Retighten the clamps.

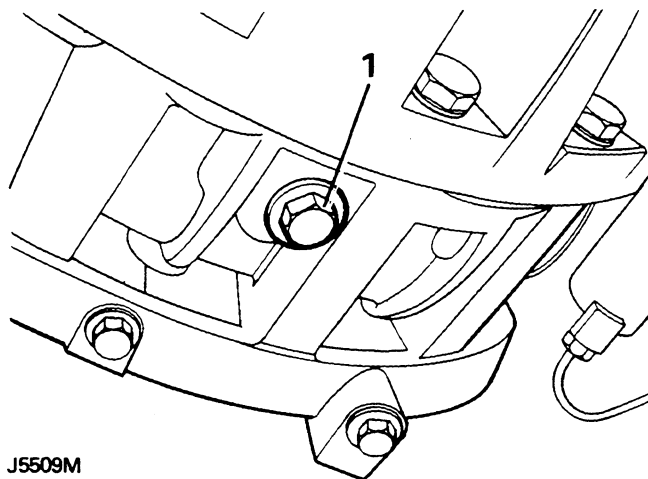


5. Push the vehicle rearwards, turning the steering wheel from side to side to settle the ball joints. Then with the road wheels in the straight ahead position, push the vehicle forwards a short distance.
6. Recheck the wheel alignment. If necessary carry out further adjustment.

DRAIN FLYWHEEL HOUSING

1. The flywheel housing can be completely sealed to exclude mud and water under severe wading conditions, by means of a plug fitted in the bottom of the housing.
2. The plug should only be fitted when the vehicle is expected to do wading or very muddy work.
3. When the plug is in use it must be removed periodically and all oil allowed to drain off before refitting.





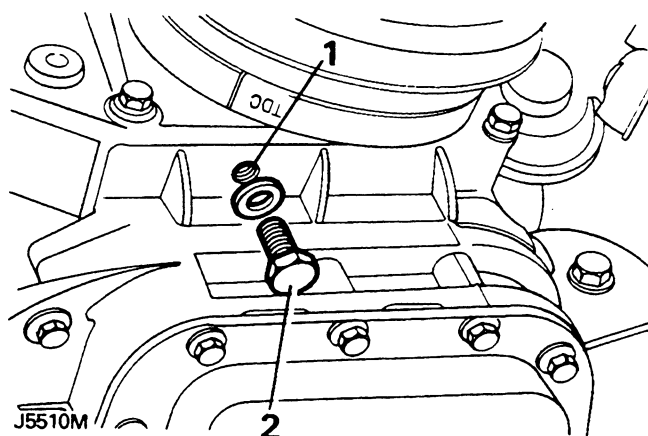
J5509M

4. When the plug is not in use it should be stowed as follows;
 - 200Tdi models - in tool kit
 - V8 petrol models - screwed into housing near drain hole.

DRAIN ENGINE TIMING COVER: 200Tdi models

1. The timing cover can be completely sealed to exclude mud and water in the same manner as the flywheel housing.
2. Use of the sealing plug is the same as that for the flywheel housing, for wading and very muddy work only.
3. Periodically drain off any oil that may be present in the timing housing if the plug is in use.

NOTE: There should not be any oil in the timing cover, but if there is, the cause should be investigated as soon as possible, as the timing belt will deteriorate if it becomes contaminated with oil.



J5510M

4. When not in use, store the drain plug in the vehicle tool kit.

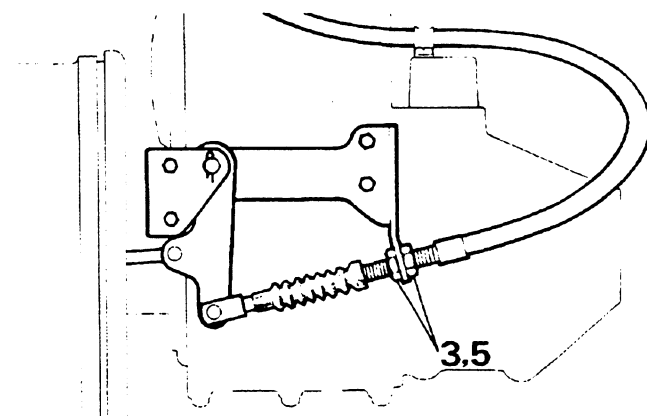
WARNING: Some components on the vehicle such as gaskets and friction surfaces (brake linings, clutch discs or automatic transmission brake bands) may contain asbestos. Inhaling asbestos dust is dangerous to your health and the following precautions must be observed:-

- * 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 vacuuming or by using a well dampened cloth 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 hand tools or low speed power tools used.

ADJUST PARKING BRAKE

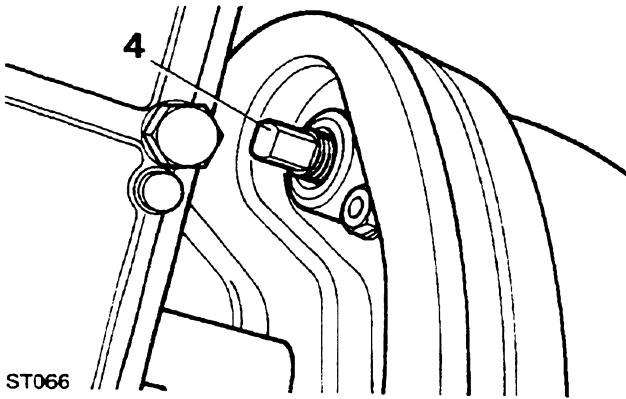
The parking brake lever acts on a drum brake at the rear of the transfer box.

1. Set the vehicle on level ground and disconnect the battery negative lead. Securely chock the road wheels and engage first gear in the main gearbox.
2. Fully release the parking brake.



RR1899E

3. From underneath the vehicle loosen the two locknuts securing the parking brake outer cable to the mounting bracket, so that the outer cable is free to move, to enable the brake drum to be adjusted independantly.
4. Rotate the adjuster on the brake drum back plate clockwise, until the brake shoes are fully expanded against the drum.



ST066

5. Rotate the two outer cable locknuts until contact is made with mounting bracket either side, then tighten the two nuts consecutively to prevent the outer cable from moving with respect to the bracket.
6. Loosen the adjuster on the back plate of the brake drum until the parking brake lever becomes fully operational on the second or third notch of the ratchet.
7. Lightly grease the parking brake linkage with a general purpose grease.
8. Ensure that parking brake is applied then remove wheel chocks, engage neutral in the main gearbox and reconnect the battery neutral lead.

CAUTION: DO NOT overadjust the parking brake, the drum must be free to rotate when the parking brake is fully released otherwise serious damage may occur through it overheating.

BRAKE FLUID

Brake fluid absorbs water and in time the boiling point of the fluid will be lowered sufficiently to cause the fluid to be vapourised by the heat generated when the vehicle service brakes are applied.

This will result in loss of brake efficiency and in extreme cases may cause brake failure.

Therefore, all fluid in the brake system should be renewed at the service intervals quoted in the maintenance schedule.

Fluid should also be changed before touring in mountainous areas if not changed in the previous nine months.

Care must be taken always to observe the following points;

- * At all times use the recommended brake fluid.
- * Never leave fluid in unsealed containers as it absorbs moisture quickly and can be dangerous if used in the braking system in this condition.
- * Fluid drained from the system or used for bleeding should be discarded.
- * The necessity for absolute cleanliness throughout the braking system is of prime importance.

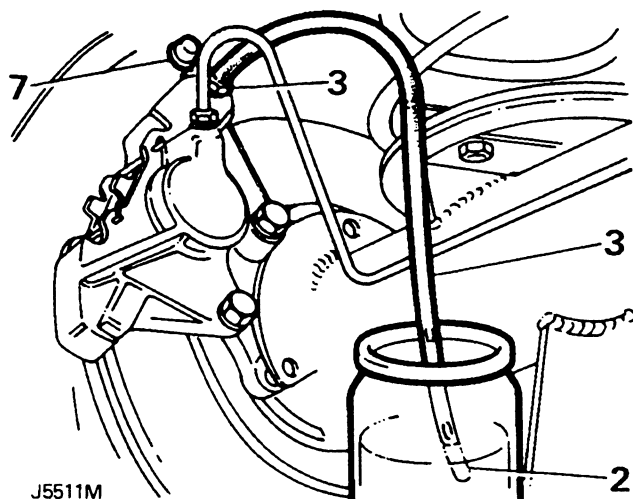
CHECK SERVICE BRAKE OPERATION

If the service brake pedal is 'spongy' bleed the brake system, refer to "Brakes" Section 70. Check all hoses and pipes for security, fractures and leaks. Fit new hoses and pipes as necessary.

CHANGING THE HYDRAULIC BRAKE FLUID

In the service schedule it is recommended that the brake fluid is renewed at regular intervals which are specified. If the following procedure is adopted, air should not enter the system.

1. Proceed in the same way and order as for bleeding the the service brake system, refer to BRAKES Section 70. If a clear plastic tube is not available, interpose a short length of glass tube into the bleed hose being used so that the passage of fluid can be seen.
2. Attach one end of the bleed hose to the bleed nipple of the brake caliper furthest from the master cylinder and immerse the free end into a glass vessel containing a small quantity of brake fluid so that the end of the tube is below the fluid level.



3. Unscrew the bleed nipple about half a turn, enough to allow fluid to be pumped out. Air could be drawn into the system if the nipple is unscrewed too far.
4. Pump out most, but not all, of the fluid from the brake reservoir by continuously depressing and releasing the brake pedal. Do not, however, allow the reservoir to empty completely otherwise air will enter the system.
5. Top-up the reservoir with new, unused fluid of the correct specification from a sealed container. Refer to Section 09 for the fluid specification.

6. Ensure that the reservoir is kept topped-up and continue bleeding the system until the old and discoloured fluid is completely dispelled and the new fluid is seen passing through the bleed hose. Continue bleeding for two complete pedal strokes then tighten the bleed nipple whilst the pedal is still depressed.
7. Remove the bleed hose from the bleed nipple and replace the protection cap to the nipple.
8. Repeat the above procedure at the remaining furthest brake calipers in turn.
9. Top-up the brake reservoir and road-test the vehicle.

FRONT AND REAR SERVICE BRAKE PADS

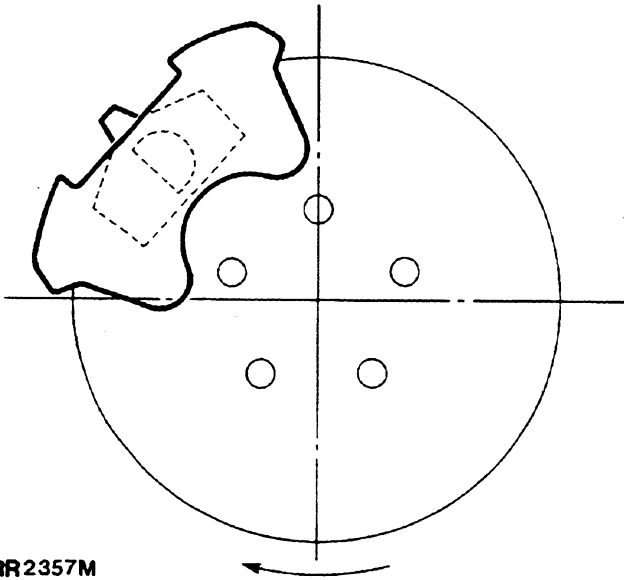
Brake pad wear is indicated by a pad wear warning light incorporated in the instrument binacle. The warning lamp is illuminated when pad depth is reduced to approximately 3,0 mm (0.118 in). The system is operated by an electrical sensor incorporated in both the front and rear right-hand side inboard brake pads. When pad wear is sufficient in either the front or rear pads the sensor within the pads will complete a circuit to ground through the disc, thus illuminating the pad wear warning lamp.

NOTE: Brake pads must only be replaced as a complete set for either axle and as such they are only supplied in sets of four. Additionally, certain markets are supplied with asbestos-free pads which must be replaced with like pads. Identification of those vehicles affected can be made by observing the front brake calipers; ventilated brake discs are used with correspondingly wider calipers but the procedure for brake pad replacement is unaltered for these vehicles.

Brake pad identification

From the side of the vehicle, looking through the disc and caliper at the inboard pad, the 'D' shaped material on the rear of the inboard pad should face the direction of forward rotation (clockwise) of the road wheel so that the curved part of the 'D' is always at the trailing end of the caliper.

Brake pad wear sensed at right wheels

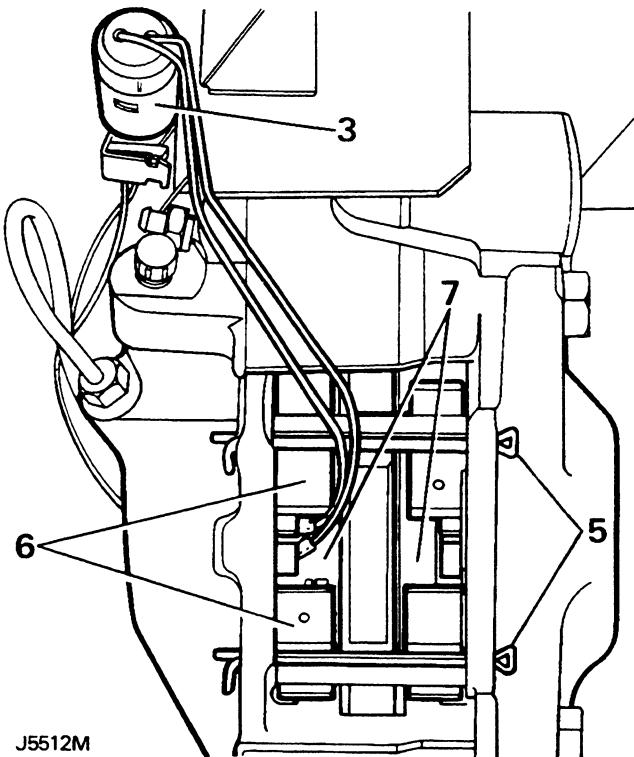


RR2357M

Fit new front brake pads (including asbestos free)

CAUTION: Ensure that 1st gear is engaged in the main gearbox, the differential lock is engaged, the battery negative lead is disconnected and the parking brake is applied.

1. Loosen the wheel nuts on both front wheels, raise the front of the vehicle and lower onto axle stands and remove the front road wheels.

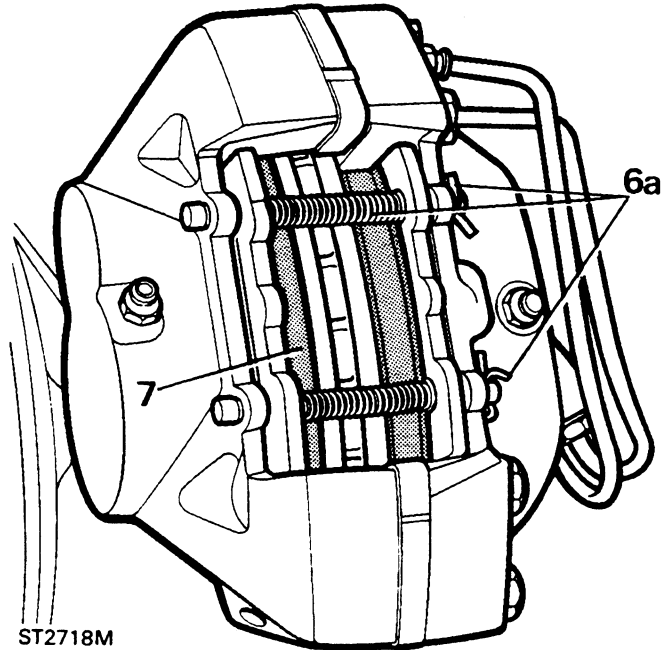


J5512M

2. Chock the wheels remaining on the ground.
3. Disconnect the two-pin electrical plug at the rear of the right-hand disc mudshield.
4. Clean the exterior of the calipers.
5. Remove the cotter pins from the brake caliper.
6. Remove the retaining springs.

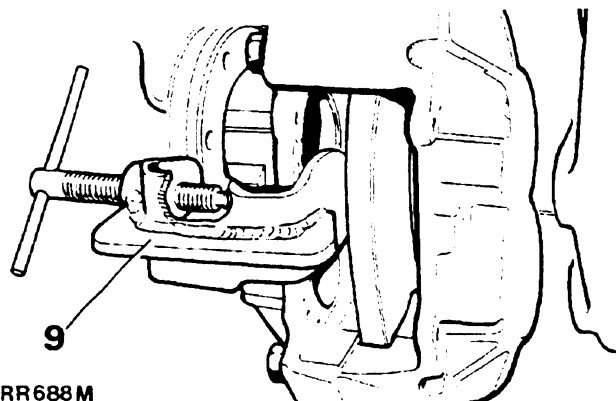
Asbestos free only

- 6a. Remove the split pins and withdraw the pad retaining pins and anti-rattle springs.
7. Withdraw the brake pads.



ST2718M

8. Clean the exposed parts of the pistons using new brake fluid.
9. Using piston clamp 18G672 press each piston back into its bore, whilst ensuring that the displaced fluid does not overflow from the brake reservoir.



RR688M

10. Coat the faces of the pistons with Lockhead disc brake lubricant taking care not to let any reach the lining material.
11. Insert the new brake pads, and connect the electrical plug.
12. Place the brake pad retaining springs in position, fit new cotter pins and spread the ends.

Asbestos free only

Fit the anti-rattle springs and pad retaining pins and secure with new split pins.

13. Apply the service brake pedal several times to locate the pads.
14. Check the fluid reservoir and top-up if necessary.
15. Fit the road wheels and secure them in position with the wheel nuts but do not fully tighten the nuts at this stage. Lower the vehicle and finally tighten the wheel nuts to the specified torque.
16. Remove the wheel chocks.

Rear brake pads

17. Raising the rear of the vehicle, follow the instructions for the front wheels.

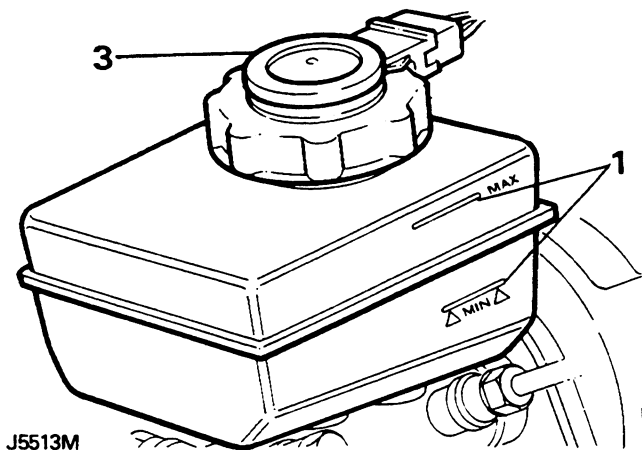
CHECK BRAKE SERVO HOSE

Visually inspect all servo hoses and connections for deterioration and security.

CHECK AND TOP-UP BRAKE FLUID RESERVOIR

1. Visually check the brake fluid level against the 'MIN' and 'MAX' level markings on the side of the reservoir.
2. If necessary, top-up with fluid of the recommended grade (refer to Section 09). **DO NOT OVERFILL.**
3. Release the cap with combined fluid level switch by rotating anticlockwise. Withdraw the cap and switch, top-up the reservoir.

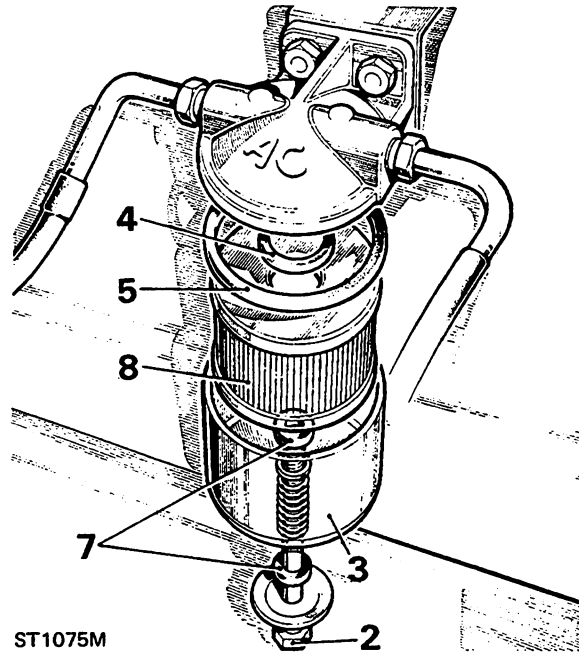
CAUTION: When topping-up the reservoir care should be taken to ensure that the brake fluid does not come into contact with any of the vehicle paintwork. Should this occur, wash the affected area **IMMEDIATELY** with a large quantity of water.



RENEW FUEL FILTER ELEMENT: V8 petrol

The element provides a filter between the in-tank fuel pump and the carburettor and is located on the front LH wing. The fuel pump has a separate filter at its inlet which requires no routine service. To replace the element;

1. Remove all forms of dirt from the filter body before dismantling.
2. Unscrew the centre bolt.
3. Withdraw the filter bowl



4. Remove the small sealing ring and remove the element.
5. Withdraw the large sealing ring from the underside of the filter body.
6. Discard the old element and replace with a new unit.
7. Ensure that the centre and top sealing rings are in good condition, replace as necessary.
8. Fit new element, small hole downwards.
9. Refit small and large sealing rings.
10. Replace the filter bowl and tighten the centre bolt.

RENEW FUEL FILTER ELEMENT: 200Tdi

The fuel filter body is located at the rear of the engine bay on the engine bulkhead.

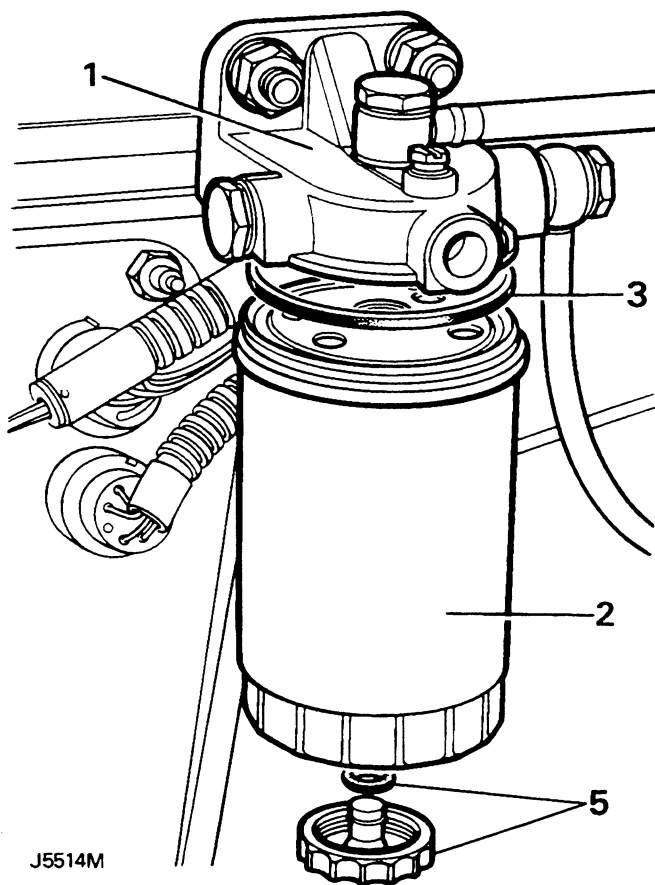
Drain off water

CAUTION: It is essential that any water and sediment in the filter is drained off, as water in the fuel can damage the injection pump.

1. Hold a small receptacle beneath the drain tap and unscrew the tap half a turn.
2. Drain off water and sediment until fuel begins to flow from the tap.
3. Immediately close the tap when fuel flows from it. Failure to do so may result in the fuel system requiring bleeding.

Renew filter element

1. Clean the area around the filter head, and place a container beneath the filter.



J5514M

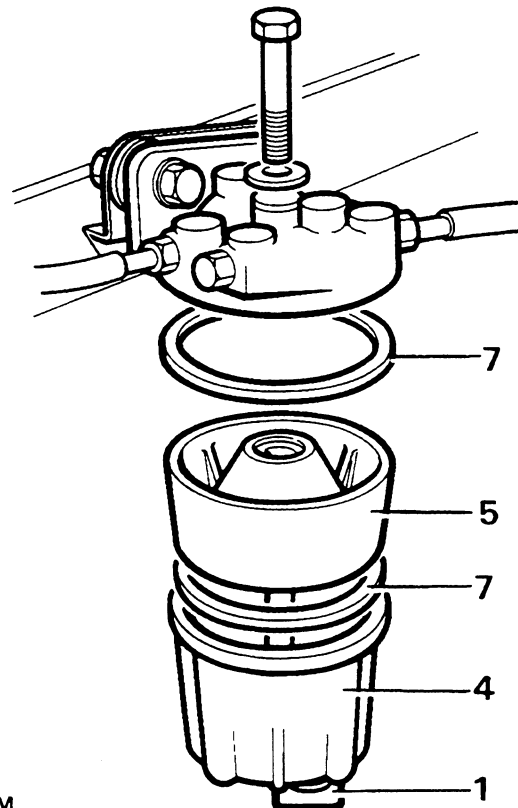
2. Unscrew the filter and catch the fuel that is released in the container. A large spanner or strap wrench will grip the flats formed on the base of the filter element.
3. Wet the seal of the new filter element with diesel fuel.
4. Screw the new filter into position and tighten with a spanner.
5. Ensure that the drain tap at the base of the filter is closed.
6. Prime the fuel system, by operating the priming lever on the fuel lift pump.

FUEL SEDIMENTER: 200Tdi

The sedimenter increases the working life of the fuel filter by removing the larger droplets of water and the larger particles of dirt from the fuel before it reaches the fuel filter. It is located on the right-hand side of the chassis (inboard) forward of the back axle.

Drain off water

1. Slacken off the drain plug at the bottom of the sedimenter body and allow water to run out.
2. When pure diesel is emitted, tighten the drain plug.



J5515M

Clean element

3. Disconnect fuel inlet pipe at sedimenter and raise pipe above level of fuel tank or suitably plug the end to prevent fuel draining from the tank.
4. Support sedimenter bowl and unscrew bolt on the top of the unit and remove bowl.
5. Remove the sedimenter element.
6. Clean all parts in kerosene.
7. Fit new seals and reverse removal procedure.
8. Slacken off the drain plug, when pure diesel fuel is emitted tighten the plug.
9. Prime the fuel system, refer to Section 19.
10. Start the engine and check for leaks from the sedimenter.

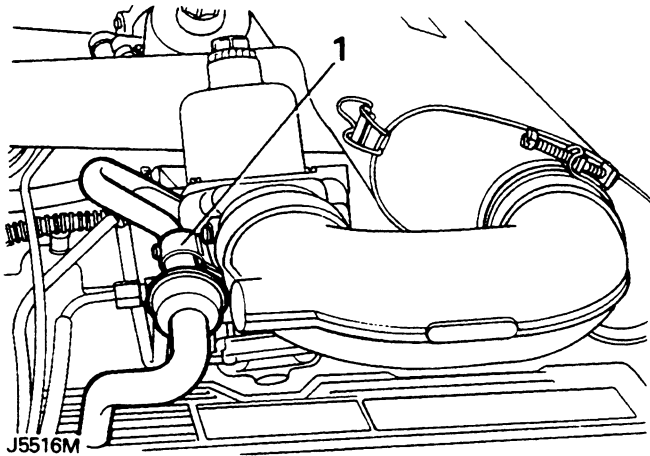
FUEL SYSTEM: All models

Check all hose connections for leaks and hose deterioration, renew hoses or tighten hose clips as necessary.

CLEAN OR RENEW ENGINE FLAME TRAPS AND ONE WAY CHECK VALVE: V8 petrol

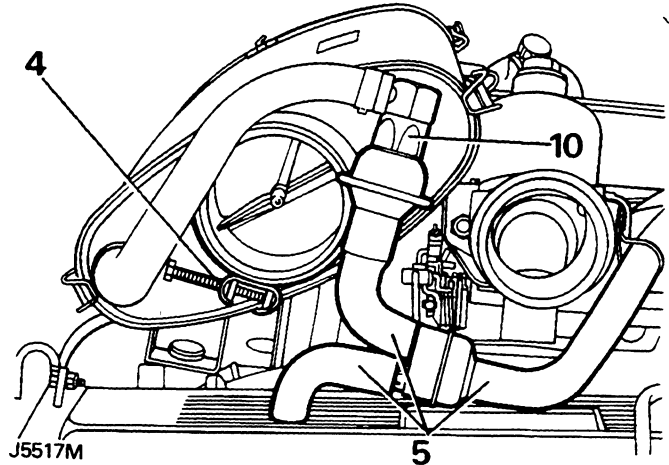
Remove LH flame trap

1. Pull the flame trap hose through the retaining clip.
2. Pull the hoses from the flame trap.
3. Withdraw the flame trap.



Remove RH flame trap

4. Remove the RH air intake elbow from the air cleaner and carburettor by slackening the circular clip on the air cleaner and pulling away the elbow.
5. Pull the hoses from the RH carburettor, RH rocker cover and check valve off from the flame trap.
6. Withdraw the flame trap.



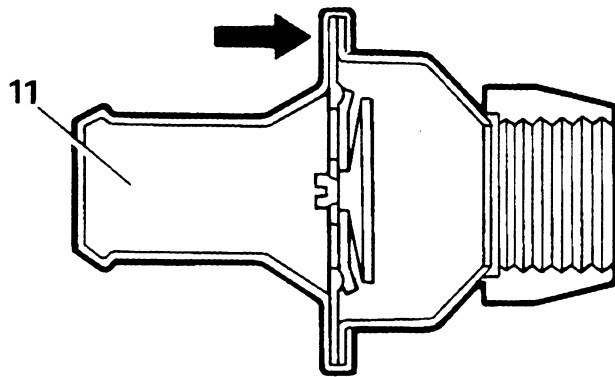
Check flame traps

7. Visually inspect the wire gauze inside the flame trap. If it is in poor condition renew the unit otherwise clean the gauze as follows.
8. Immerse flame trap in a small amount of petrol, allow time for the debris within the flame trap to loosen and dissolve.
9. Allow the flame traps to dry in still air.

WARNING: Do not use compressed air to dry or clean the flame traps as this could cause fire or personal injury through heating.

Check one way valve

10. Disconnect the hose adapter from the check valve by using two open-ended spanners, one to hold the adapter steady while the other is used to unscrew the valve assembly.



J5518M

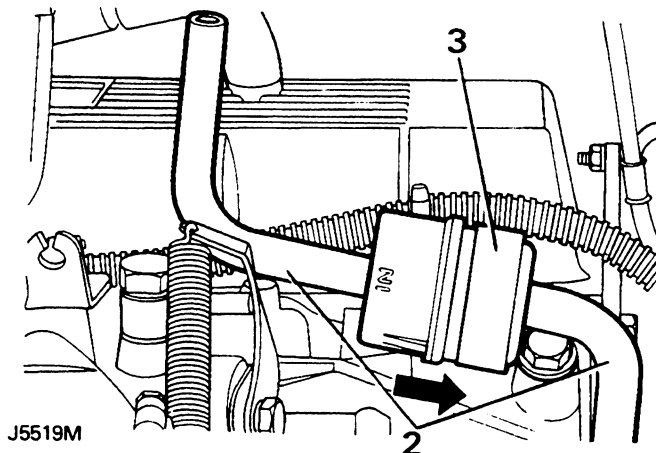
11. To test the valve, blow air through the valve, orally, in both directions in turn. Air should only pass through the valve when it is blown from the hose end. Should air pass through from the adapter connection end the valve is faulty and must be renewed.

CAUTION: Do not use a pressure air supply for this test.

12. Replace the one way valve and flame traps in reverse sequence ensuring that all connections are firmly pushed together and are secure.

RENEW ENGINE BREATHER FILTER: V8 petrol engine

1. To gain access to the filter, remove the air cleaner, see air cleaner element removal.
2. Pull off the two hoses from the engine breather filter.
3. Slacken the filter clip retaining screw and withdraw the filter.

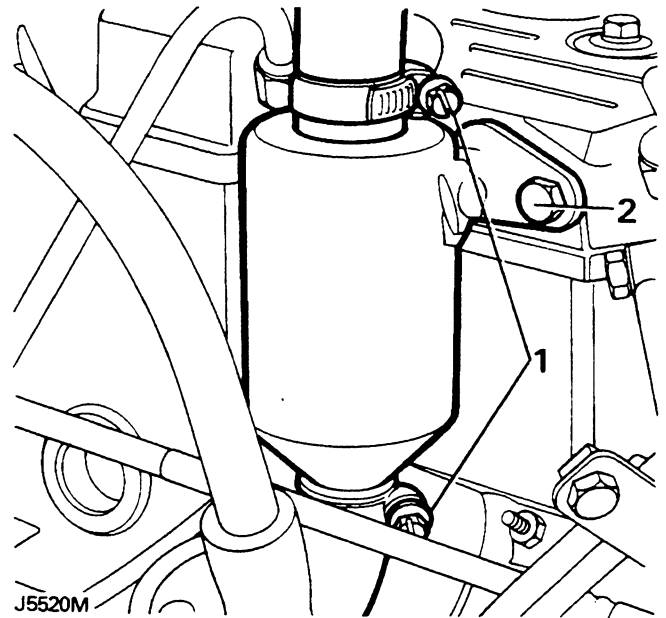


J5519M

4. Examine the hoses and renew them if they are split, perished or blocked.
5. Fit a new filter unit with end marked 'IN' facing forwards towards the front of the engine. If the filter is marked with arrows they must face away from the air cleaner connection.

CLEAN CYCLONE ENGINE BREATHER CLEANER: 200Tdi engine

1. Slacken the hose clips securing the hoses to the top and bottom of the cleaner body and pull off the hoses.
2. Remove the two bolts securing the cleaner to the rocker cover.



J5520M

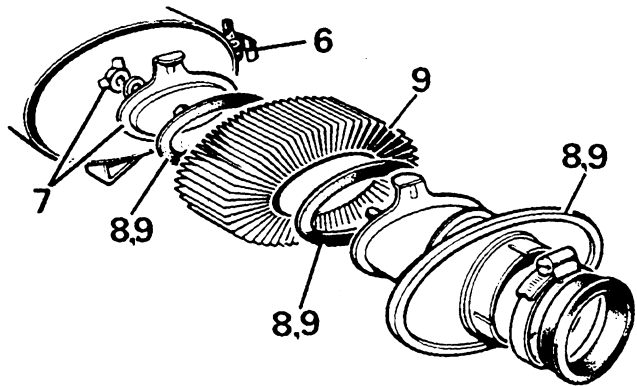
3. Pull away the cleaner from the rocker cover taking care not to tear the sealing gasket.
4. Immerse the cleaner in a small container of kerosene to dissolve oily deposits which may have accumulated.
5. When the cleaner is free of deposits, remove it from the solvent and dry it completely.

CAUTION: The cleaner must be completely dry before it is refitted to the engine, otherwise overspeeding of the engine may result.

6. Refit the cleaner to the rocker cover using a new gasket.
7. Refit hoses to the cleaner ensuring that the clips are fully tightened for a gas-tight seal.

RENEW THE AIR CLEANER ELEMENT: V8 petrol engine

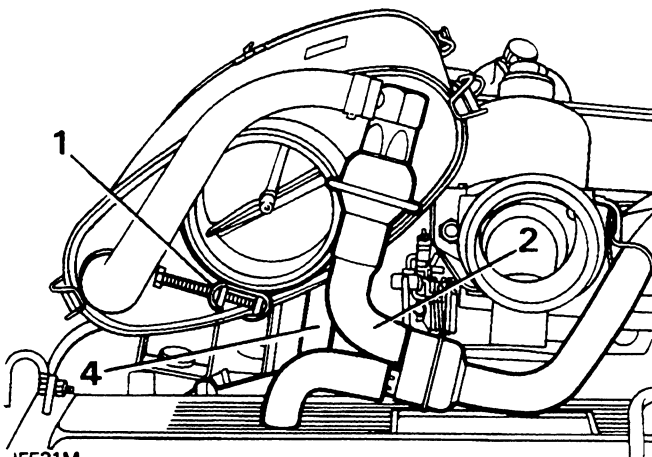
1. Slacken the clips and pull the air intake elbows from the carburettors and air cleaner assembly.
2. Disconnect the one-way valve hose from the flame trap.
3. Remove the air cleaner from the retaining posts by lifting and easing forward.
4. As the air cleaner is withdrawn from its position, remove the hose to the engine breather filter from beneath the assembly.



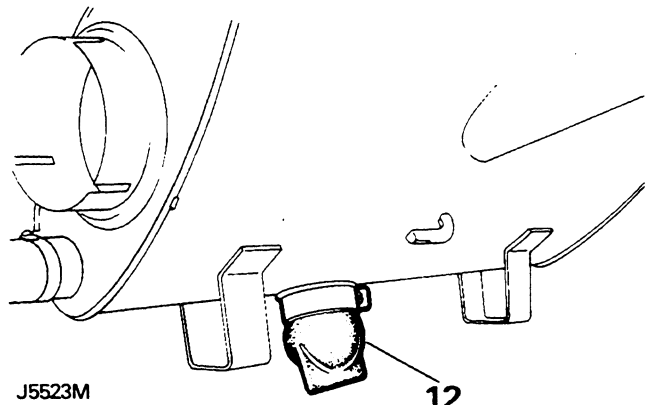
J5522M

Check the air cleaner dump valve

12. Squeeze open the dump valve and check that the interior is clean. Also check that the rubber is flexible and in good condition.
13. If necessary, remove the dump valve to clean the interior. Fit a new valve if the original one is in poor condition.



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J5523M

Refit the air cleaner

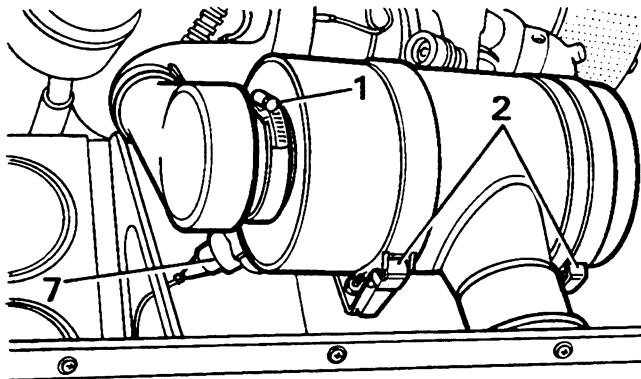
14. Offer the air cleaner into position, while holding the engine breather cleaner hose.
15. Reconnect the engine breather cleaner hose to the underside of the air cleaner body.

5. Remove the air cleaner and one-way valve from the vehicle.
6. Release the two over-centre clips at each side of the air cleaner casing and withdraw the frames and elements.
7. Release the wing nuts and withdraw the plates and sealing washers from the ends of the frames.
8. Remove and discard the used elements and discard any perished or damaged rubber seals.
9. Assemble new elements onto the frames with new seals if necessary.
10. Secure the elements with the end plates, sealing washers and wing nuts.
11. Fit the element frames to the air cleaner body and secure with the over-centre clips.

16. Locate the air cleaner onto its support posts.
17. Reconnect the one-way valve hose to the flame trap.
18. Refit the air intake elbows and tighten the clips at the air cleaner.

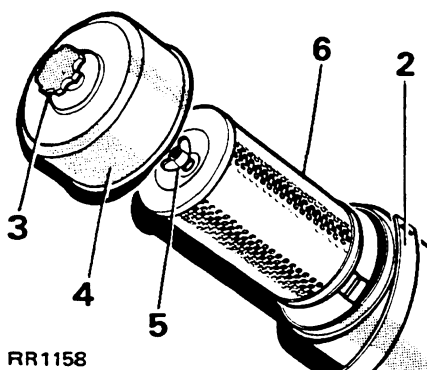
RENEW THE AIR CLEANER ELEMENT: 200Tdi engine

1. Slacken the clip at the front of the air cleaner body and pull the elbow from the cleaner.
2. Release the two over-centre clips securing the air cleaner body and pull the cleaner away from its supports, easing the inlet side of the cleaner away from the bulkhead elbow.



J5524M

3. Unscrew the knob at the end of the case.
4. Pull the end of the case away from the main body.
5. Unscrew the wing nut and remove with the sealing washer.
6. Pull the element from the element frame and discard it.



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Check air cleaner dump valve

7. Squeeze open the dump valve and check that the interior is clean. Also check that the rubber is flexible and is in good condition.
8. If necessary, remove the dump valve to clean the interior. Fit a new valve if the original one is in a poor condition.

Refit the element

9. Fit a new element to the element frame, ensuring that the sealing rubber is towards the cleaner outlet.
10. Refit the wing nut to the element frame and tighten to secure the element.
11. Refit the end of the cleaner case.
12. Offer the cleaner assembly to the vehicle, engaging the intake of the cleaner in the bulkhead elbow as the cleaner is fitted.
13. Push the cleaner outlet elbow onto the front of the cleaner case.

NOTE: There is a location cutout in the cleaner case flange which corresponds to a moulding on the elbow.

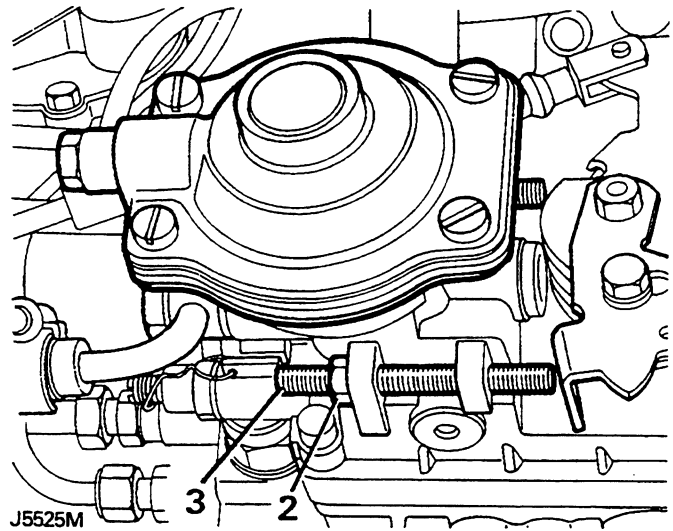
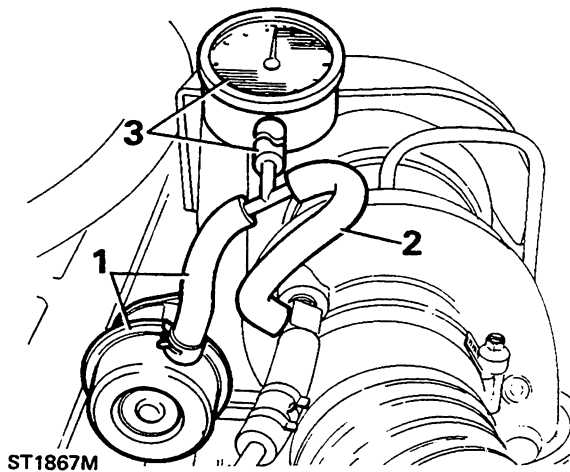
14. Tighten the elbow clip then secure the air cleaner case with the two over-centre clips.

CHECK TURBOCHARGER BOOST PRESSURE: 200Tdi engine

Maximum boost pressure
- 61 cm Hg (11.8 p.s.i.g.)

Minimum boost pressure
- 56 cm Hg (10.9 p.s.i.g.)

1. Disconnect, from the turbocharger, the hose to the actuator and insert into the free end a suitable "T" piece.
2. Connect a short length of suitable hose to the turbocharger and connect the other end to the "T" piece.
3. Connect a further length of hose to the third leg of the "T" piece and the other end to a pressure gauge capable of reading in excess of 61 cm Hg. The pressure gauge hose must be capable of reaching the passenger compartment so that the gauge may be observed by either passenger or driver.



CARBURETTOR DAMPER: V8 petrol engine

Topping-up

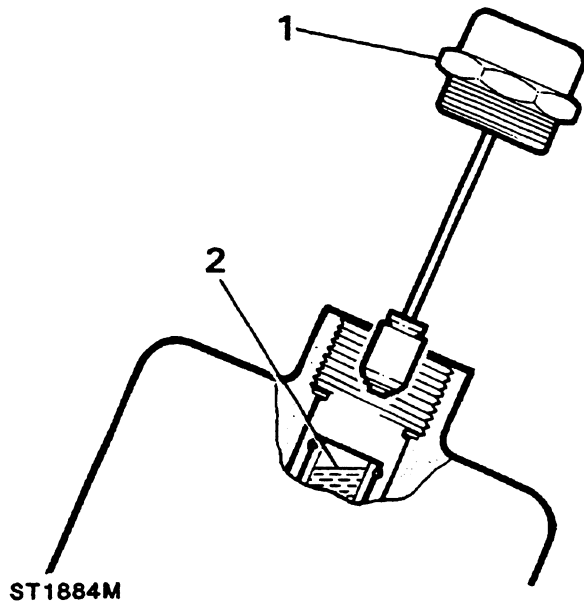
1. Unscrew the cap from the top of the carburettor suction chamber and withdraw the cap and plunger.
2. Top-up the chamber with clean engine oil to bring the level to the top of the hollow piston rod.
3. Screw the cap firmly onto the carburettor.

4. To check the maximum boost pressure, drive the vehicle normally but in such a manner that full throttle can be maintained whilst climbing a hill with the engine speed held steady between 2,500 and 3,000 r.p.m. Under these circumstances, the boost pressure should be between 56 to 61 cmHg (10.9 to 11.8 p.s.i.g.).

ENGINE SLOW RUNNING: 200Tdi engine

1. Using a suitable tachometer, check the engine slow running speed against the figure given in Section 05 "Engine Tuning Data". The engine should be at normal operating temperature for this check. If no tachometer is available, adjustment should be made to the engine speed until the slowest even running is achieved.
2. If adjustment is necessary, slacken the locknut on the injector pump.
3. Screw the adjuster either clockwise to increase the engine speed or anticlockwise to decrease the speed. Run the engine at an increased speed for a few seconds then check the slow running speed again.
4. When the correct speed has been achieved, hold the adjuster screw steady while tightening the locknut.

NOTE: The slow running control is the only permitted adjustment in service. Any additional adjustments required must be entrusted to authorised Bosch agents.

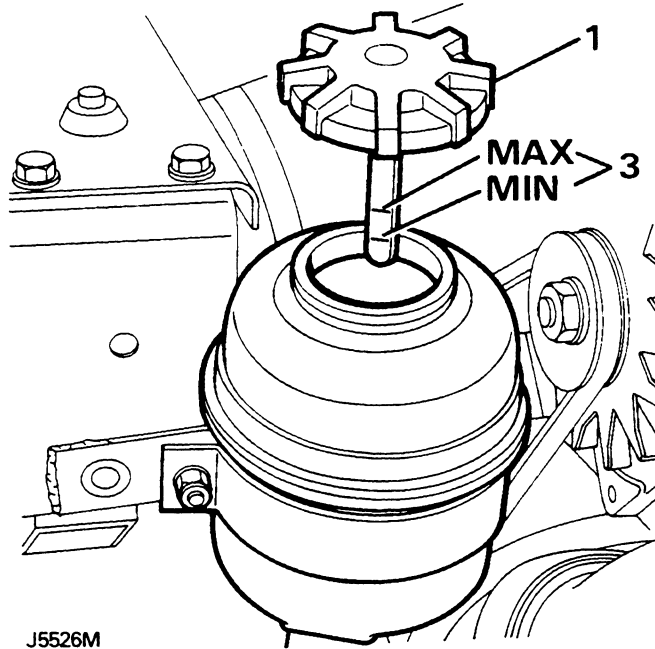


CARBURETTOR ADJUSTMENTS: V8 petrol engine

Refer to Section 19 for check and adjustment procedures for the carburettors.

POWER STEERING FLUID RESERVOIR**Check and top-up**

1. Clean the reservoir cap and its surrounding area before removing it.
2. Wipe the attached dipstick with a clean cloth, then replace the cap.

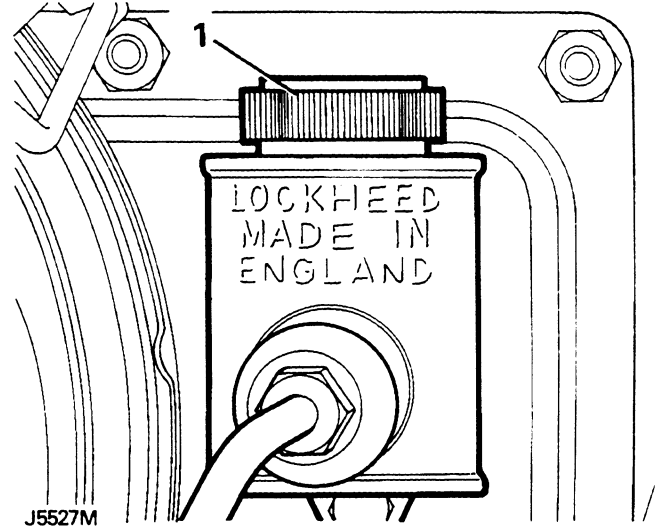


3. Remove the cap and check the level of the fluid against the marks on the dipstick.
4. Top up the reservoir, if necessary, to the high mark on the dipstick, refer to Section 09 for the recommended grade of fluid.

If significant topping-up is required, check the steering system for leaks at all hoses and unions and also at the steering box. Rectify any faults found.

CLUTCH FLUID RESERVOIR**Check and top-up**

1. Clean and remove the reservoir cap and observe the fluid level in relation to the marks on the side of the reservoir.



2. Top-up, if necessary, with new, clean fluid from a sealed container. Refer to Section 09 for the recommended grade of fluid.

If significant topping-up is required, check the clutch hydraulic system for leaks and deterioration.

3. Refit the reservoir cap.

BATTERY CHECKING

WARNING: Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames, sparks or lighted tobacco are brought near the battery. When charging or using a battery in an enclosed space, always provide ventilation and shield your eyes.

Keep out of reach of children. Batteries contain sulphuric acid. Avoid contact with skin, eyes or clothing. Also, shield your eyes when working near the battery to protect them against possible splashing of the acid solution. In case of acid contact with skin, eyes or clothing, flush immediately with water for a minimum of fifteen minutes. If acid is swallowed, drink large quantities of milk or water, followed by milk of magnesia, a beaten egg or vegetable oil. **SEEK MEDICAL AID IMMEDIATELY**

A low maintenance battery is installed in the vehicle. Dependant upon climate conditions, the electrolyte levels should be checked as follows;

Temperate climates (below 26.5°C, 80°F): every three years

Hot climates (above 26.5°C, 80°F): every year

The exterior of the battery should be occasionally wiped clean to remove any accumulation of dirt and grease.

Check and top-up the electrolyte levels

1. Wipe clean the battery top.
2. Remove the filler covers. If necessary add sufficient distilled water to raise the electrolyte to the top of the separators. Avoid the use of naked lights when examining the battery cells.
3. Replace the filler covers. In very cold weather, the vehicle must be used immediately after topping-up to ensure that the added water is thoroughly mixed with the electrolyte. Failure to do this may result in the water freezing and the battery being damaged.

Battery terminals

1. Periodically remove the battery leads to clean the terminals and smear them with petroleum jelly.
2. Replace the leads onto the battery and press them firmly over the terminal posts. Do not use the terminal screw to pull the leads onto the posts, and do not overtighten the screw.

CAUTION: DO NOT disconnect the battery while the engine is running otherwise the alternator semiconductor components may be damaged as a result. It is also inadvisable to make or break any connections in the alternator charging or control circuits while the engine is running.

CAUTION: It is essential to observe the correct polarity of connections to the battery, alternator and regulator as any incorrect connections made when reconnecting cables may cause irreparable damage to the semiconductor devices.

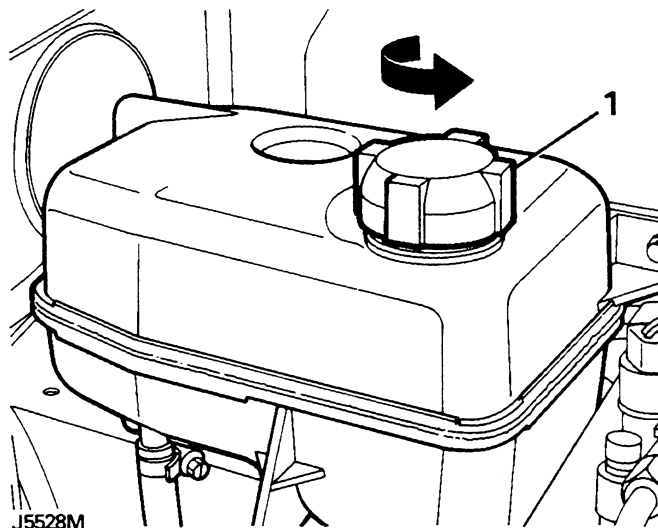
IMPORTANT NOTE: If a new battery is fitted to the vehicle, it should be the same type as fitted to the vehicle when new. Alternative batteries may vary in size and terminal positions. Should these touch the battery clamp assembly or bodywork, there is a possible fire hazard. When fitting a new battery, ensure that the terminals are clear of the battery clamp assembly and bodywork.

CHECK/TOP-UP COOLING SYSTEM

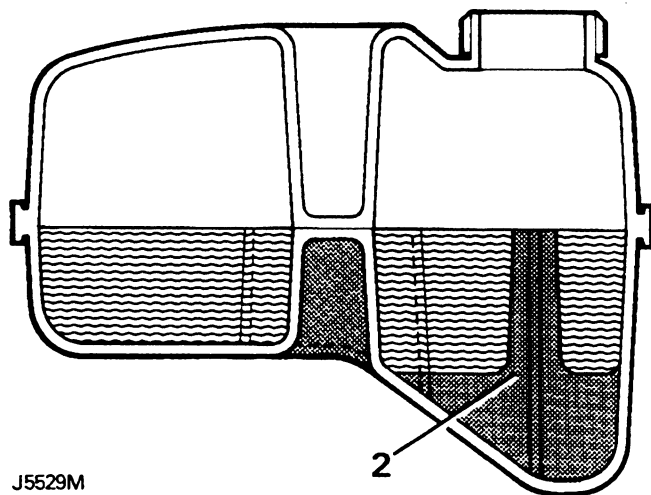
To prevent corrosion of the engine parts, it is imperative that the cooling system is filled with a solution of water and phosphate free anti-freeze, winter or summer. **Never fill or top-up with plain water. This is especially important for the V8 engine.**

Always mix the correct proportion of anti-freeze to water in a clean container before filling or topping-up the cooling system. Do not use domestic containers for this mixing, refer to Section 01 "Poisonous substances".

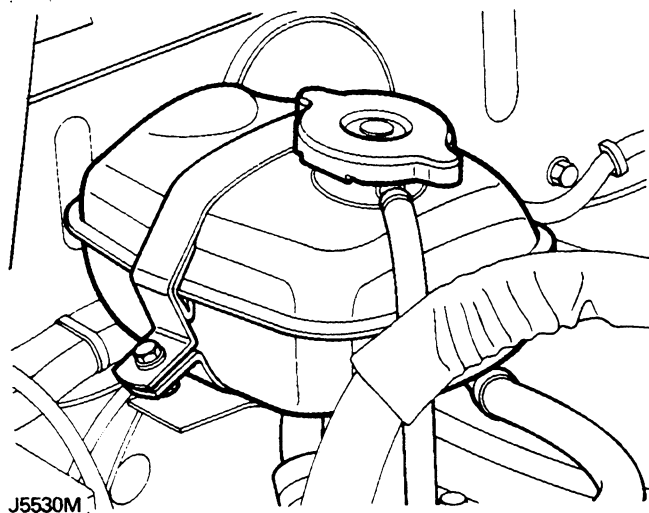
WARNING: Do not remove the filler cap when the engine is hot; the cooling system is pressurised and personal scalding may result.

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1. When removing the filler cap, first turn it a little way very gently and gauge any pressure that may be behind it. Allow all pressure to escape slowly before fully releasing the cap.
2. With a cold engine, the coolant level should be just to the top of the level indicator post situated in the expansion tank below the filler hole.

**V8 petrol engine**

3. When removing the filler cap, turn it anti-clockwise a quarter of a turn and allow all pressure to escape before turning it further to lift off.
4. The coolant level should be approximately 1.00 inch (25 mm) below the filler neck.

**All engines**

5. If necessary, top-up the cooling system with pre-mixed coolant. Refer to Section 09 for the recommended proportions. Use soft water whenever possible. If the local water supply is hard, use rainwater.
6. When replacing the filler cap, ensure that it is fully tightened otherwise water loss may occur with resultant overheating and possible damage to the engine.

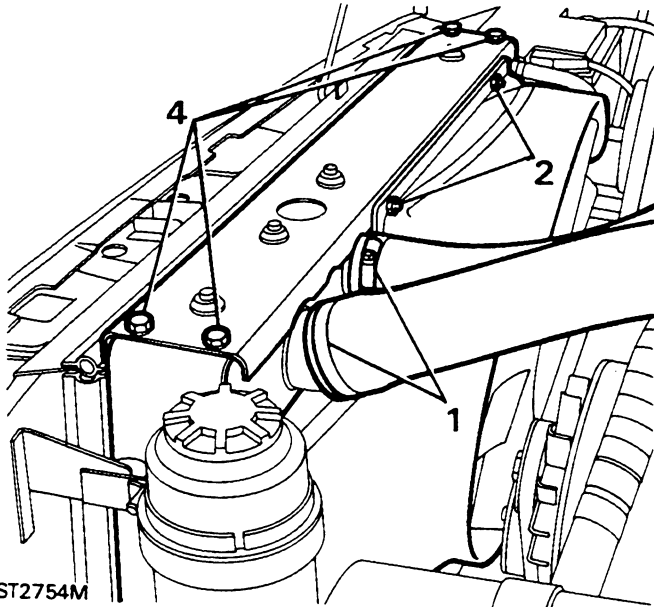
Check the security of all hoses within the cooling system, including the heater hoses, and check their condition. Hoses should be replaced at the first sign of deterioration.

Check the condition of the intercooler hoses fitted to the diesel engines from the turbocharger to the intercooler elements at the left of the water coolant elements.

Check the oil cooler hoses and their unions for leaks and deterioration. Periodically clean the elements of the radiator assembly of road debris and inspect for leaks and damage.

INTERCOOLER ELEMENT: Clean**Remove**

1. Loosen the upper and lower intercooler hose securing clips at the element and carefully pull the hoses from the inlet/outlet pipes.
2. Remove the two nuts and washers securing the fan cowl upper to the radiator assembly.
3. Ease the fan cowl upwards to disengage the lower from the fastening clips and move the cowl towards the rear of the vehicle, over the fan blades.
4. Remove the radiator assembly frame top by removing the two bolts on either side and lifting the top off of the element location dowels.
5. Lift the intercooler element from the support frame.

**Flush**

6. Flush the element with ICI "GENKLENE" proprietary cleaner, following instructions with the product.
7. Dry the element completely and check it for damage or deterioration. Renew the element if necessary.

Refit

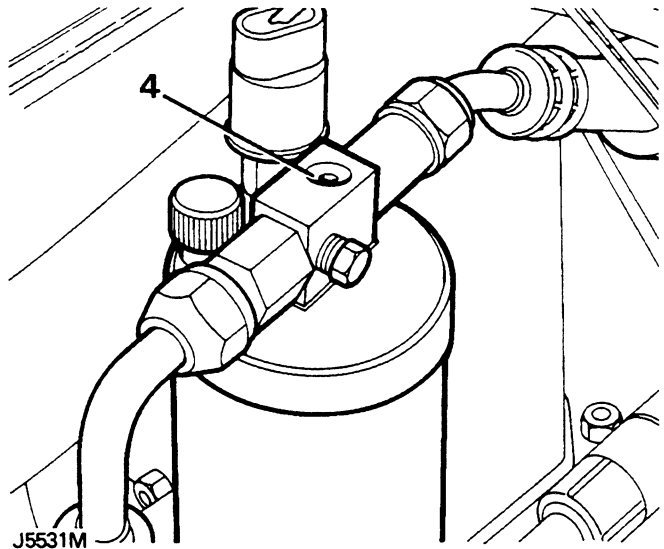
8. Refit the intercooler to the support frame and refit the frame top, ensuring that the element dowels are correctly located in the rubber seats.
9. Refit other components in reverse order.

AIR CONDITIONING SYSTEM: Check

WARNING: Adjustments or rectification operations should be carried out by a Land Rover dealer or a trained automotive air conditioning specialist. Under no circumstances should non-qualified personnel attempt repair or servicing of air conditioning equipment.

The following items should be checked:

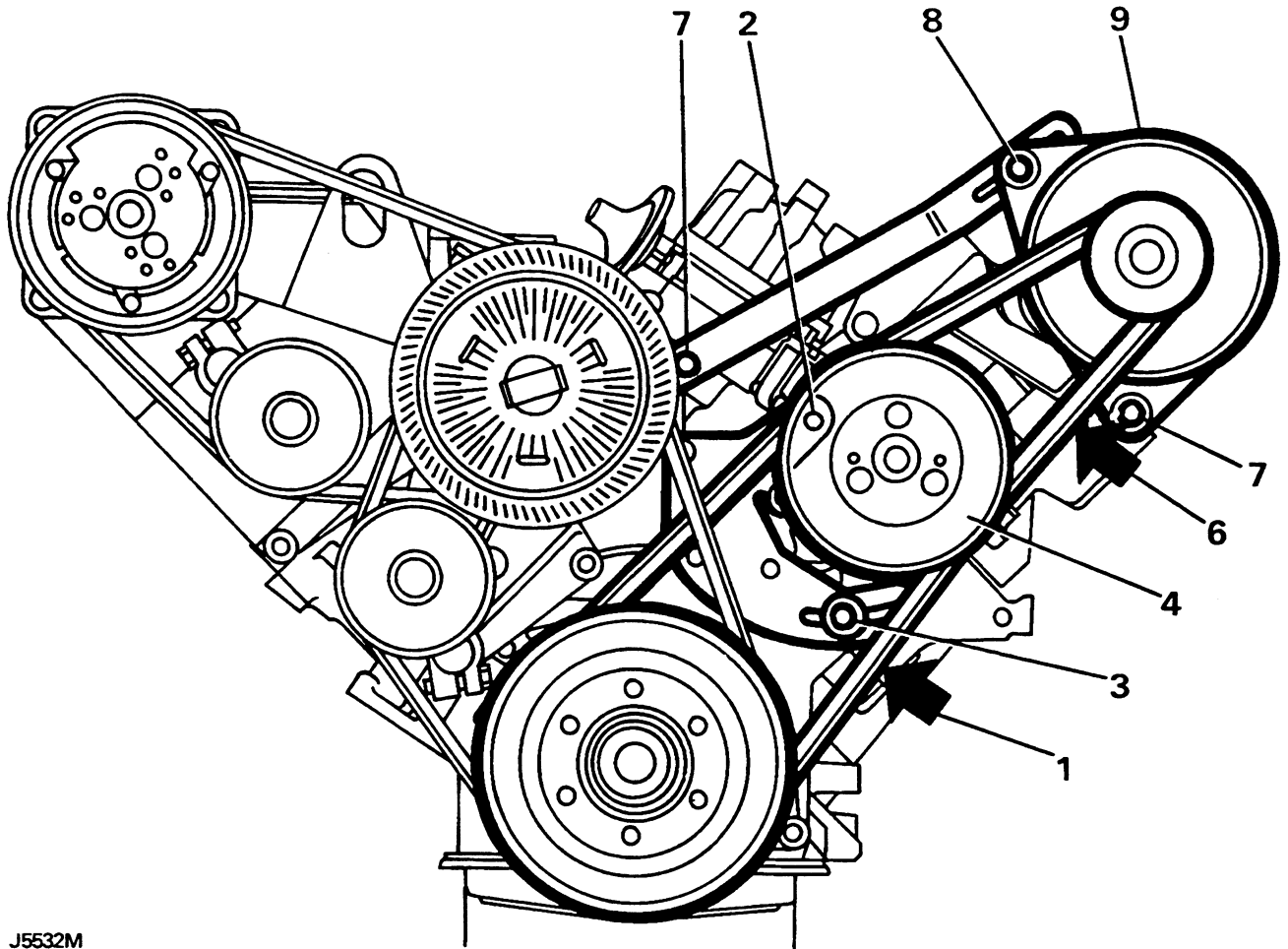
1. Condenser: Clean the exterior of the condenser matrix using a water hose or compressed air-line.
2. Check pipe connections for sign of fluid leakage. A propriety leak detection device of the ion accelerator type should be used.
3. Evaporator: Examine the pipe connections for signs of fluid leakage.
4. Receiver/drier glass: After running the engine for five minutes with the air conditioning system in operation, examine the sight glass, there should be no sign of bubbles.



5. Check pipe connections for signs of fluid leakage.
6. Compressor: Check the pipe connections for fluid leakage and the hoses for swellings.

DRIVE BELTS:

Check and adjust

**V8 POWER STEERING AND ALTERNATOR BELTS:**

Check and adjust

1. Check the power steering belt at the point arrowed. If it is correct proceed to item 6 otherwise follow the procedure for adjustment.
2. Slacken the pump securing bolts at the front and back.
3. Slacken the adjust clamp bolt.
4. Move the pump to correct the tension in the power steering pump belt.

NOTE: DO NOT lever against the power steering pump body to move the pump.

5. Tighten the adjust clamp bolt and the pump securing bolts and re-check the belt tension. Repeat adjustment procedure if necessary.

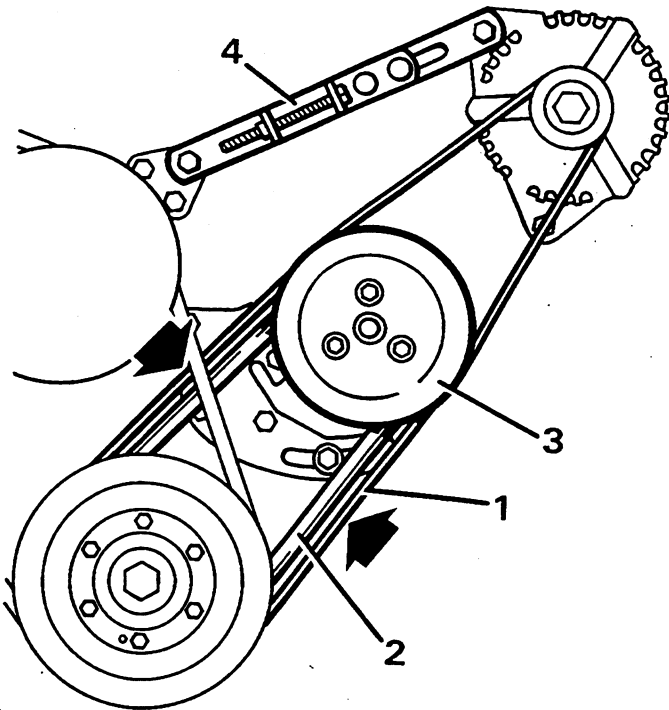
6. Check the alternator drive belt at the point shown. If it is correct, ignore the following items.
7. Slacken the alternator mounting bolts and adjustment link mounting bolt.
8. Slacken the adjustment link clamp bolt.
9. Move the alternator to correct the tension in the drive belt.

NOTE: DO NOT lever against the slip ring end or the stator to move the alternator.

10. Tighten the adjustment link clamp bolt, its mounting bolt and the alternator mounting bolts. Recheck the tension in the alternator drive belt, repeat adjustment procedure if necessary.

1994 MODEL YEAR MAINTENANCE

Alternator and steering pump drive belts.



RR3909M

- 1. Alternator drive belt
- 2. Steering pump drive belt
- 3. Steering pump and guide pulley
- 4. Alternator drive belt tensioner

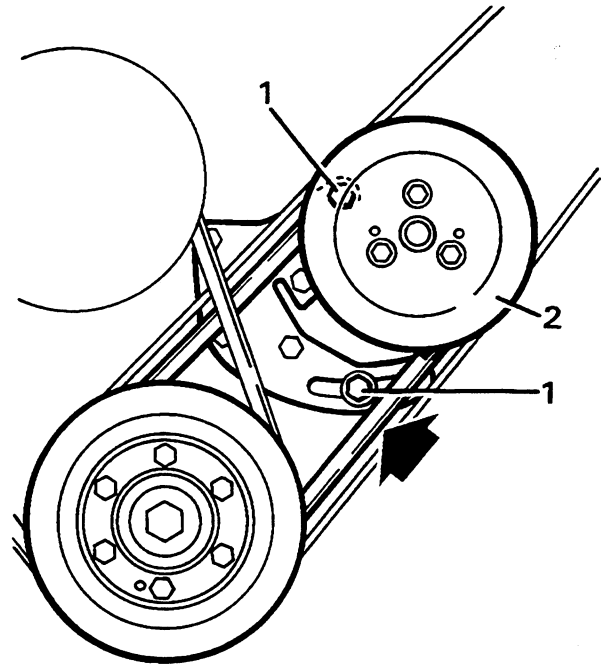
A new alternator drive belt is used, driven from the crankshaft pulley. A guide pulley on the power steering pump guides the belt in this area. Alternator and power steering belts have individual adjustment, but PAS belt must be adjusted before alternator belt.

Steering pump drive belt -10/6

Adjust

NOTE: Loosen alternator drive belt to facilitate accurate adjustment of the PAS drive belt.

- 1. Loosen steering pump adjuster bolt and pivot nuts.
- 2. Ensure pump is free to rotate on mounting. **DO NOT** lever pump, loosen fixings further if necessary.



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- 3. Carefully lever against pump bracket to tension belt. On left hand drive models, where access is restricted, a lever with one end cranked at 5° to 10°, may be fed down between water pump and distributor. Place lever against steering pump bracket, carefully levering from water pump/front cover.

CAUTION: DO NOT lever against steering pump casing. Damage to casing may result in oil leaks.

- 4. Check tension using a recognised belt tensioning gauge.

Belt tension using a Clavis gauge:
- 142 - 152 Hz.

When checked with normal hand pressure at the mid-point of the longest span, the belt should deflect 0,5 mm per 25 mm of belt run between pulley centres.

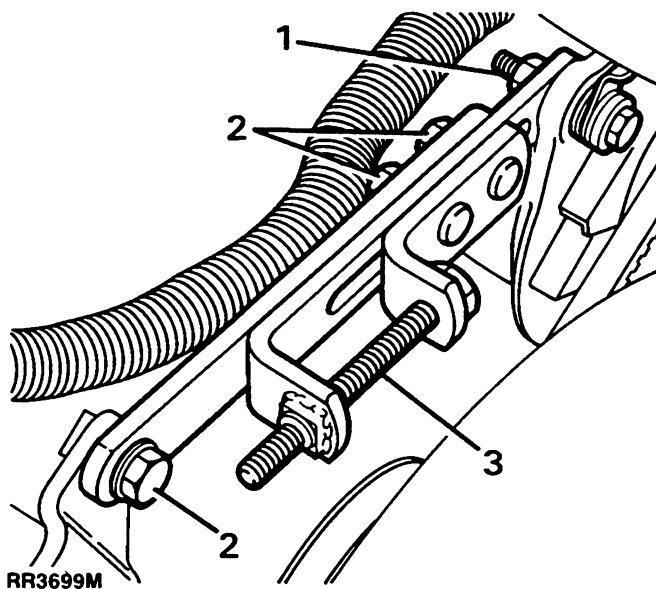
- 5. Tighten steering pump fixings.
- 6. Recheck belt tension.
- 7. Adjust alternator belt.

CAUTION: When fitting a new drive belt, tension belt as described above. Reconnect battery and start and run engine for 3 to 5 minutes at fast idle, after which time belt must be re-checked, re-tension belt if necessary.

Alternator drive belt/power steering belt**Adjust**

NOTE: A positive drive tensioner is fitted to provide greater accuracy when setting power steering and alternator drive belts.

1. Loosen alternator pivot bolt and bolt securing alternator to tensioner.
2. Loosen two tensioner nuts and bolt securing tensioner to water pump bracket.
3. Rotate tensioner lead screw anti-clockwise, remove drive belt.
4. Loosen power steering pump adjuster bolt and pump pivot nuts.
5. Remove power steering belt.



6. Ensure pump is free to rotate on its mounting, **DO NOT** lever pump, further loosen fixings if necessary
7. Check both drive belts, renew if necessary.
8. Fit power steering and alternator drive belts.
9. Rotate tensioner lead screw clockwise until alternator belt is tensioned to specified figure, see table.
10. Check steering belt is tensioned to specified figure.
11. Tighten all fixings on tensioner, steering pump and alternator.
12. Run engine at fast idle speed for 3 to 5 minutes if a new belt has been fitted. Repeat above steps 1 to 6 and 9 to 11 without removing belts.
13. Adjust position of top radiator hose to give 20 to 30 mm clearance between hose and alternator fan guard.

Belt tension**Fitting alternator or steering belt**

Tension or retension belts to:

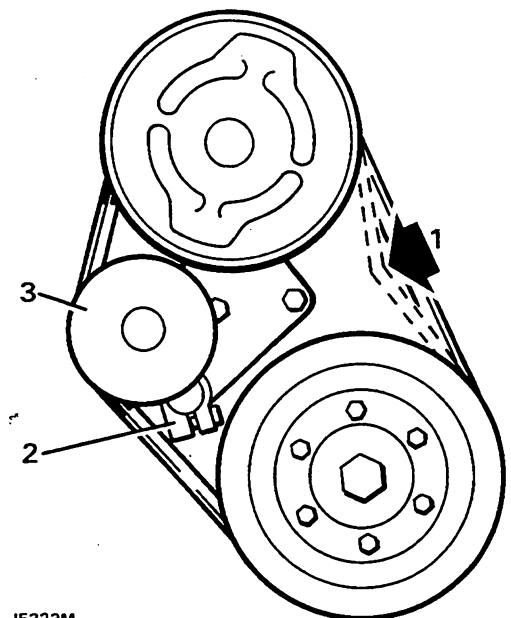
Alternator	Steering
110 - 120 lbf	85 - 105 lbf
470 - 500 N	380 - 465 N

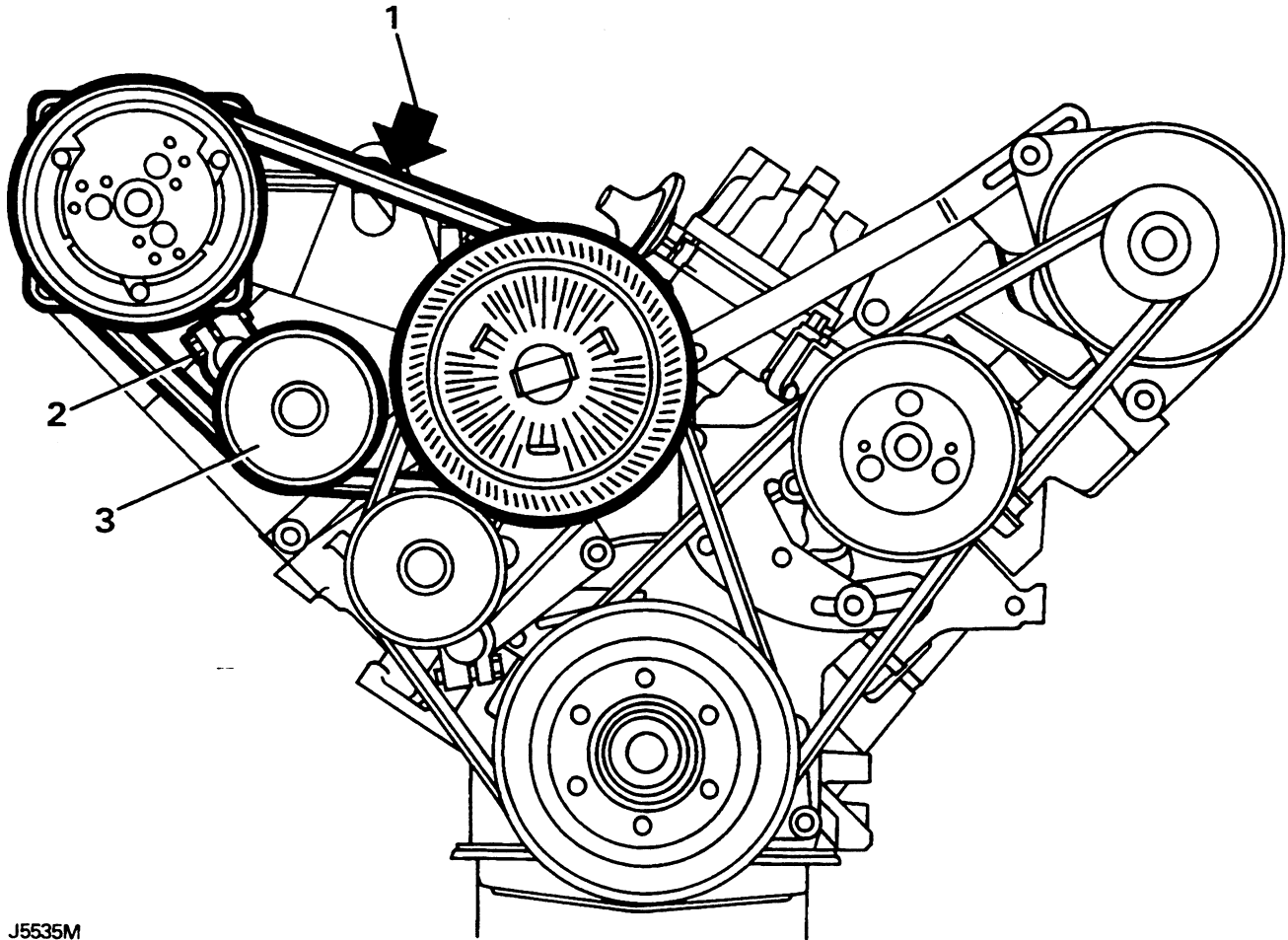
Refitting used belts

90 - 95 lbf	75 - 95 lbf
400 - 420 N	335 - 420 N

V8 WATER PUMP DRIVEBELT:**Check and adjust**

1. Check the belt at the arrow shown.
2. Slacken the jockey wheel clamp bolt.
3. Move the wheel in or out as required to correct the belt tension.
4. Tighten the jockey wheel clamp bolt and re-check the belt tension. Repeat the adjustment procedure if necessary.



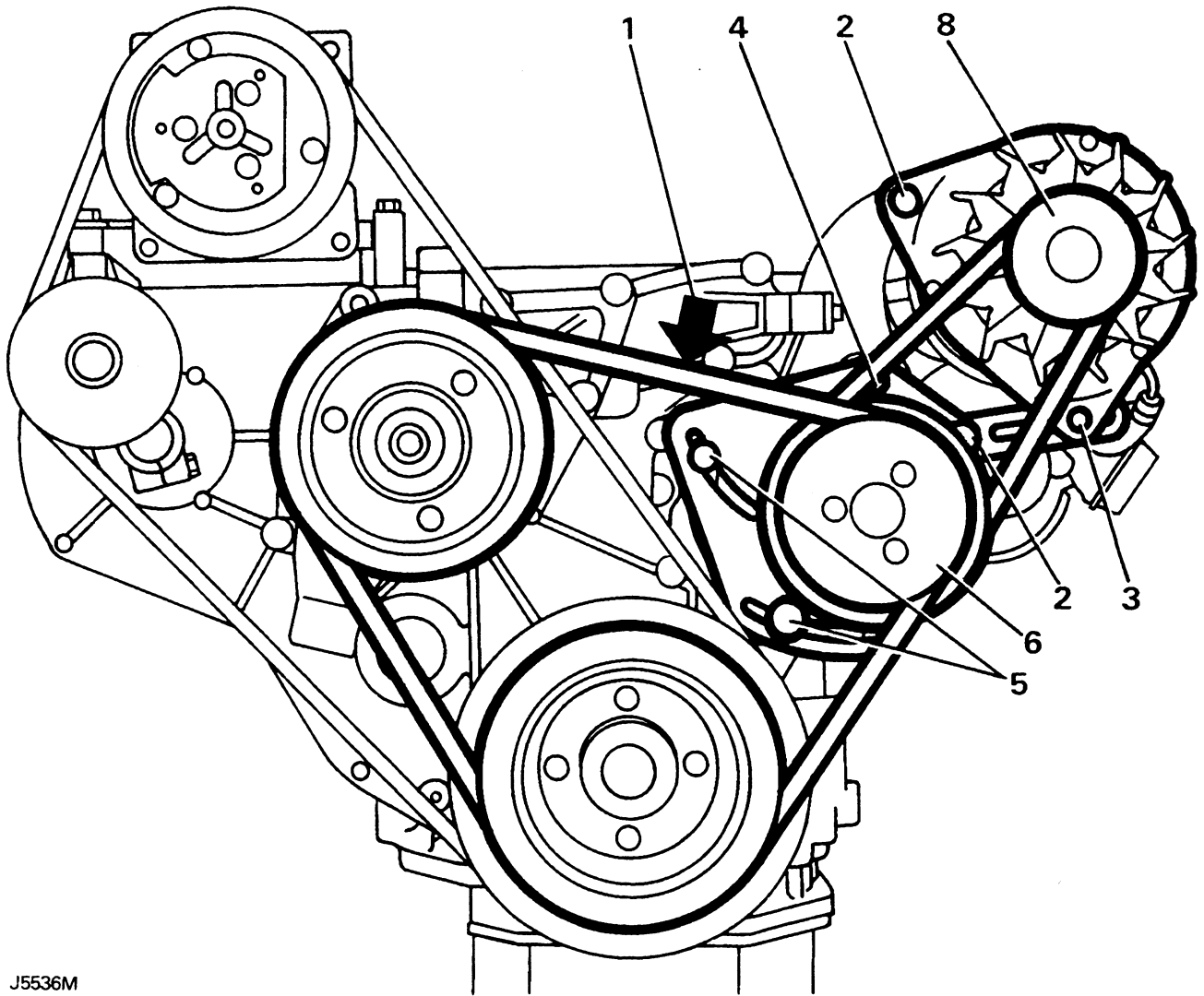


J5535M

V8 AIR CONDITIONING COMPRESSOR DRIVEBELT:

Check and adjust

1. Check the belt at the point shown. If it is correct, ignore the following items.
2. Slacken the jockey wheel clamp bolt.
3. Move the wheel in or out as required to correct the belt tension. Ensure that the compressor mount bolts are secure.
4. Tighten the jockey wheel clamp bolt and re-check the belt tension. Repeat the adjustment procedure if necessary.



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200Tdi WATER PUMP/POWER STEERING DRIVEBELT:

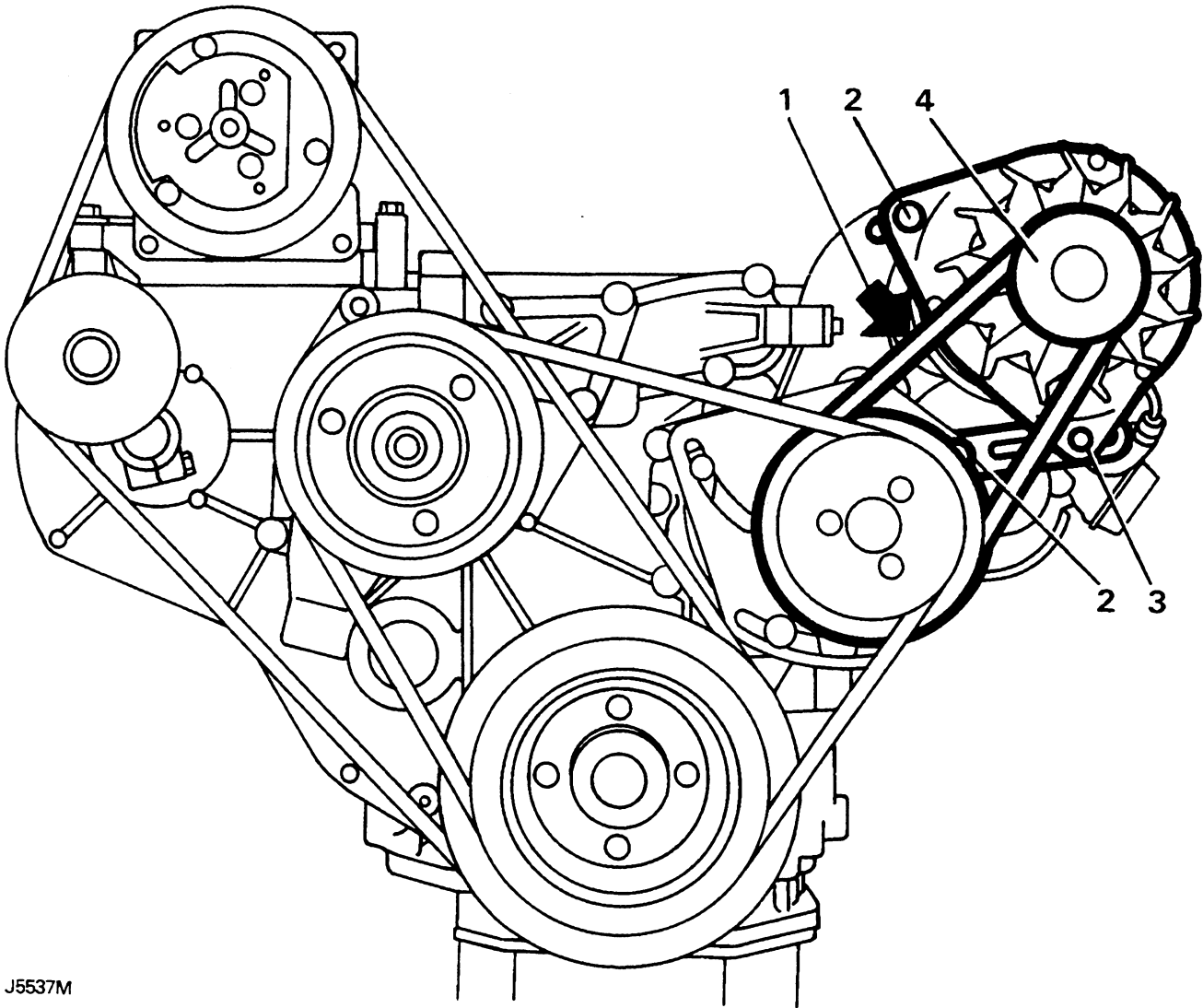
Check and adjust

1. Check the tension of the drivebelt at the point shown. If it is correct ignore the following items.
2. Slacken the front and rear alternator mounting bolts and adjustment link mounting bolt at the power steering pump plate.
3. Slacken the adjustment link clamp bolt at the alternator.
4. Slacken the mounting bolt at the power steering pump plate.
5. Slacken the clamp bolts at the power steering pump plate.

6. Move the power steering pump in or out as required to correct the belt tension.

NOTE: DO NOT lever against the pump body to move it.

7. Tighten the clamp bolts and mounting bolt at the power steering pump plate and re-check the belt tension. Slacken the pump plate bolts and re-tension if necessary.
8. The alternator drivebelt tension must be adjusted after this operation. Refer to "200Tdi Alternator Drivebelt: Check and adjust".



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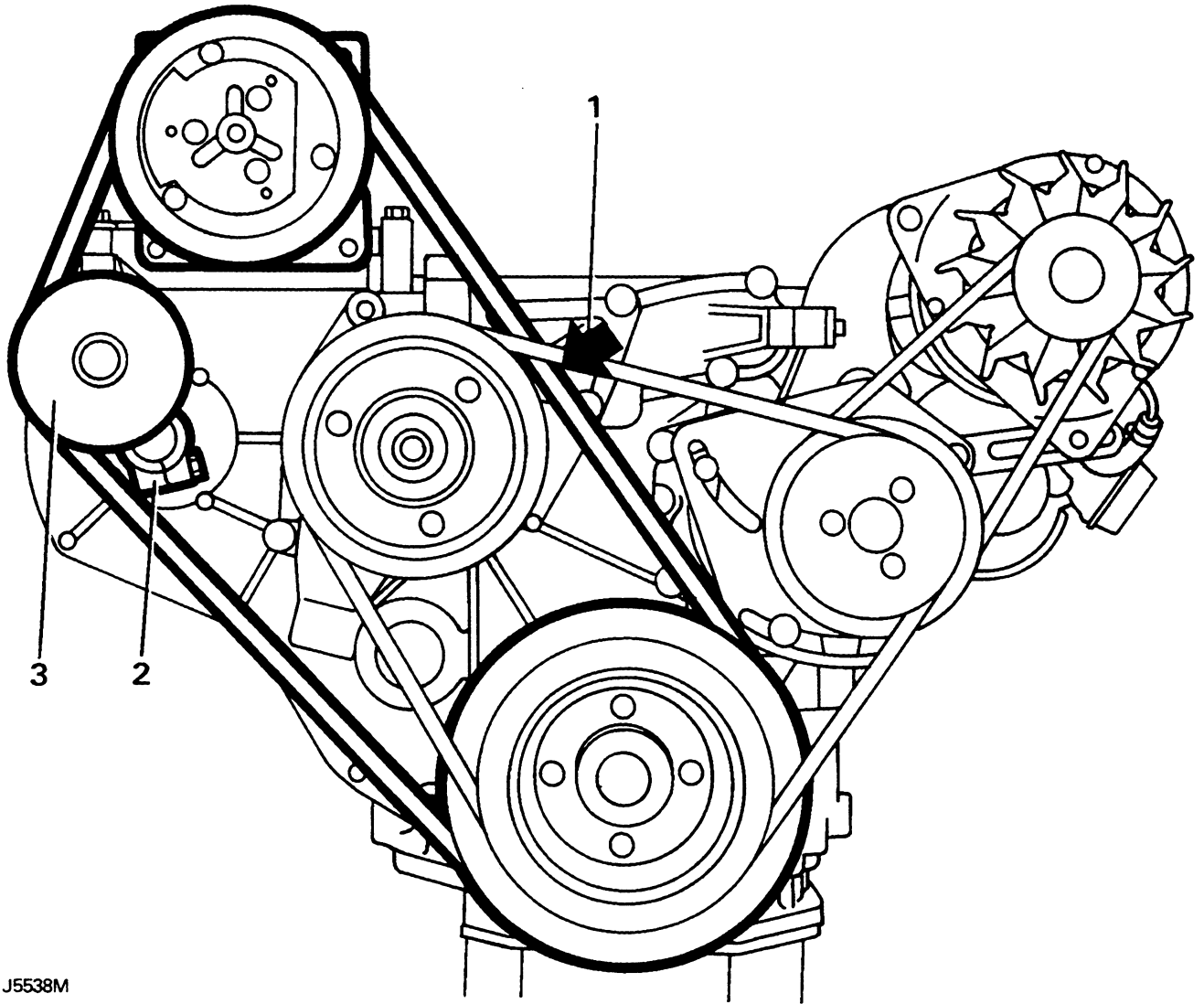
200Tdi ALTERNATOR DRIVEBELT:**Check and adjust**

1. Check the alternator drivebelt tension at the point shown. If it is correct, ignore the following items.
2. Slacken the front and rear alternator mounting bolts and the adjustment link bolt at the power steering pump plate.
3. Slacken the adjustment link clamp bolt at the alternator.

4. Move the alternator to correct the drivebelt tension.

NOTE: DO NOT lever against the alternator slip ring end or the stator to move the alternator.

5. Tighten the adjustment link clamp bolt and re-check the belt tension. If it is correct, tighten the mounting bolts at the alternator.



J5538M

**200Tdi AIR CONDITIONING COMPRESSOR
DRIVEBELT:****Check and adjust**

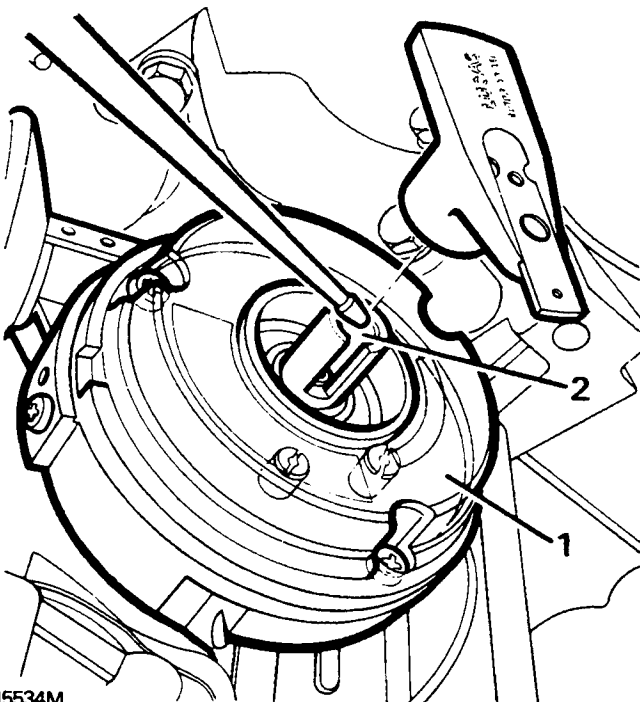
1. Check the tension of the belt at the point shown. If it is correct, ignore the following items.
2. Slacken the jockey wheel clamp bolt.
3. Move the jockey wheel either in or out to correct the tension. Ensure that the compressor mount bolts are tight.
4. Tighten the clamp bolt and re-check the tension. Adjust if necessary.

ELECTRONIC DISTRIBUTOR: V8 engines

Clean and lubricate

WARNING: The electronic ignition system involves very high voltages. Inexperienced personnel and wearers of medical pacemaker devices should not be allowed near any part of the high tension circuit.

1. Remove the distributor cap by releasing the two clips at the side and pull the the rotor arm from its spindle. Wipe the inside with a nap free cloth but do not disturb the clear plastic cover which protects the magnetic pick-up module.
2. Apply three drops of engine oil to the rotor spindle.



J5534M

3. Refit the rotor arm and distributor cap, ensuring that it is properly located and secured with the two clips.

DISTRIBUTOR TIMING: V8 engines

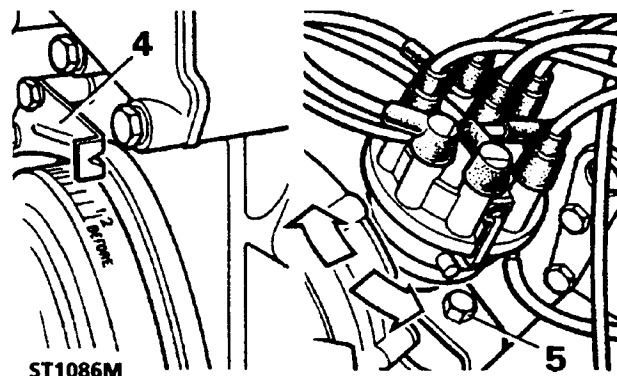
Check and adjust using electronic timing equipment

A pointer on the timing cover and marks on the crankshaft pulley indicate positions T.D.C. on No. 1 cylinder (ie. front cylinder on left-hand bank). Refer to Section 05 "Engine Tuning Data" for the correct ignition timing figure. Engine speed accuracy during the ignition timing check is important. Any variation from the required engine idle speed, particularly in an upward direction, will lead to wrongly set ignition timing.

1. Connect a stroboscopic timing light as instructed by the manufacturer. The engine is timed on No. 1 cylinder.
2. Run the engine at idle speed.

WARNING: During the next operation, ensure that personnel and loose clothing are kept well clear of the cooling fan blades whilst using the timing light.

3. Position the timing light to illuminate the crankshaft pulley and scale.
4. If the timing is correct, the pulley mark given in the "Engine Tuning Data" will be indicated by the timing pointer. If so, ignore any further instructions and stop the engine.
5. If the timing is incorrect, stop the engine and slacken the pinch bolt at the base of the distributor, and carefully rotate the distributor body either clockwise to retard the ignition or anti-clockwise to advance the ignition.



ST1086M

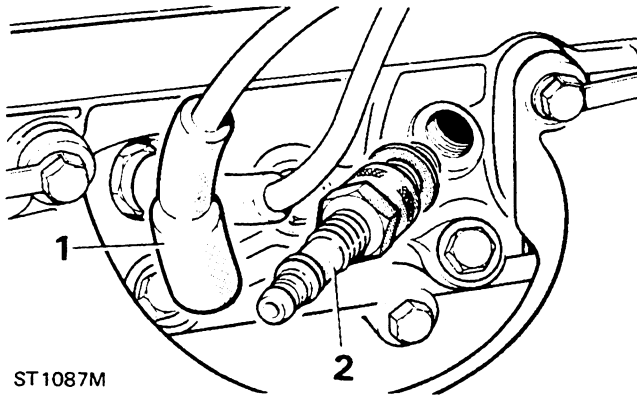
6. Tighten the clamp bolt and re-check the ignition timing.
7. Repeat the process in 5. and 6. until the ignition timing is correct.

SPARK PLUGS**Clean, adjust or renew**

CAUTION: Ensure that spark plugs are screwed into their holes correctly, without being cross-threaded, when they are replaced, otherwise costly damage will be caused to the cylinder head.

Remove

1. Withdraw the H.T. leads from the spark plugs by gripping the shrouds, do not pull on the leads.
2. Using an appropriate plug spanner, remove the spark plugs.



ST1087M

Clean

3. Fit each plug in turn into a plug cleaning machine.
4. Wobble the plug with a circular motion whilst operating an abrasive blast for a maximum of four seconds.

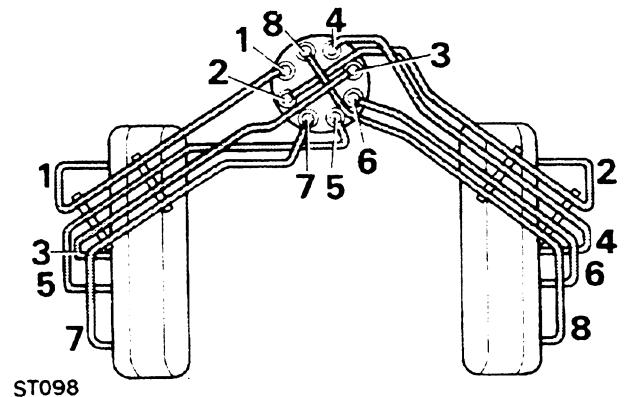
CAUTION: Excessive abrasive blasting will erode the insulator nose of the plug

5. Change to air-blast only and continue to wobble the plug for a minimum of thirty seconds to remove all the abrasive grit from the plug cavity.
6. Wire brush the plug threads and open the spark gap slightly.

7. Using a point file, square off the electrode surfaces.
8. Set the electrode gap to the figure given in Section 05 "Engine Tuning Data".
9. Test the plugs in accordance with the cleaning machine manufacturer's instructions. If satisfactory, refit the plugs to the engine.
10. If no cleaning machine is available, wire brush the electrodes and blow or wash away the particles.

Refit or renew

11. Check that the washers are fitted to the plugs.
12. It is important that only spark plugs specified in the Data section are used for replacements.
13. Incorrect grades of plug may lead to piston overheating and engine failure.
14. Wash new plugs in petrol to remove the protective coating, then set the plug gaps to the specified figures in Section 05 "Engine Tuning Data".
15. Fit the plugs and washers to the engine but do not overtighten.
16. Examine high tension leads, including coil to distributor lead, for insulation cracking or corrosion at end contacts. Fit new leads as necessary.
17. In addition to ensuring the correct firing order, it is important that the leads are fitted in correct relation with each other to avoid cross-firing, as shown in the illustration.



ST098

18. When pushing the leads onto the plugs, ensure that the ferrules within the shrouds are seated firmly on the plugs.

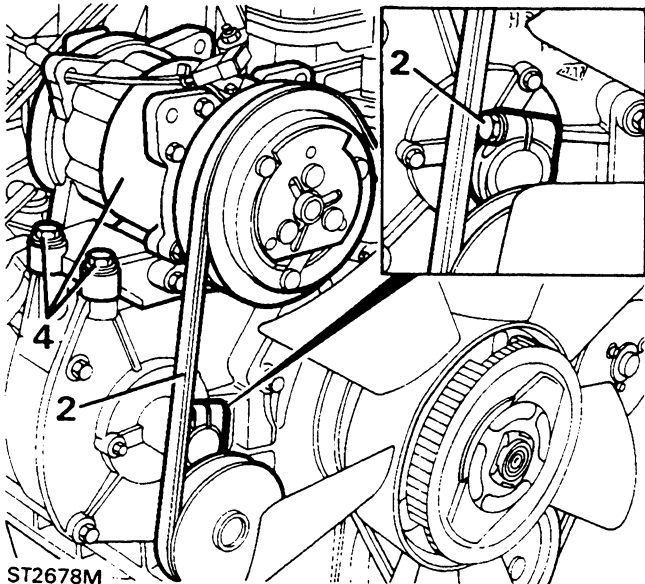
RENEW CAMSHAFT DRIVE BELT - 200Tdi engine

Special tools:-

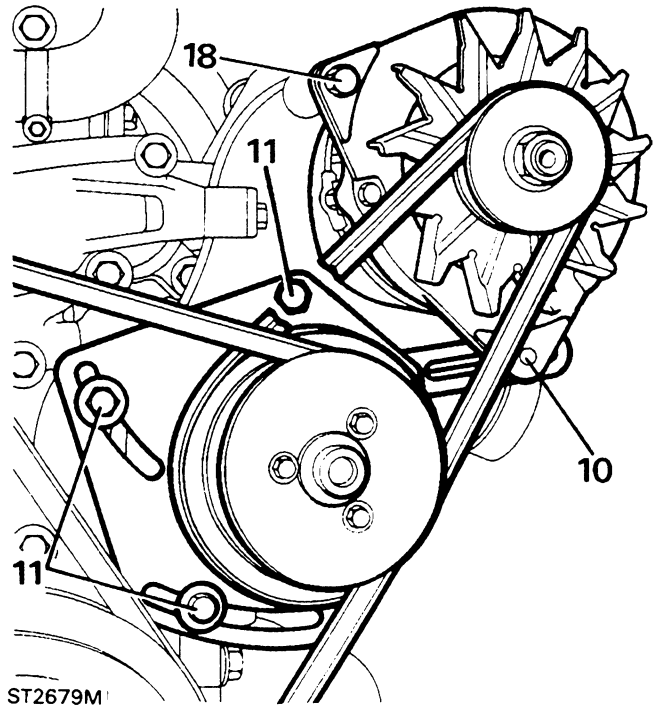
Crankshaft damper restrainer	LST 127
Injection pump timing pin (part of LST 129)	LST 129/2
Flywheel timing pin	LST 128

Air conditioning models - to gain access.

1. Disconnect the battery for safety.
2. Release the compressor drive belt tensioning pulley and remove the belt from the compressor pulley.
3. Disconnect the two electrical leads from the thermostat housing sensor.
4. Remove the four bolts securing the compressor to the engine and move the compressor aside taking care not to strain the hoses.



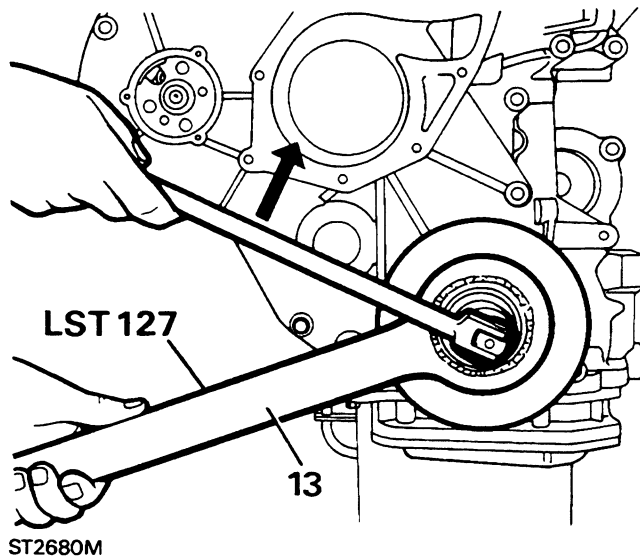
7. Disconnect the intercooler to manifold hose at the manifold.
8. Remove the top hose.
9. Remove the two nuts securing the fan cowl to top of radiator and lift-out the cowl.
10. Slacken the alternator belt adjustment bolt.
11. Likewise slacken the PAS pump belt adjustment bolts and remove both belts.



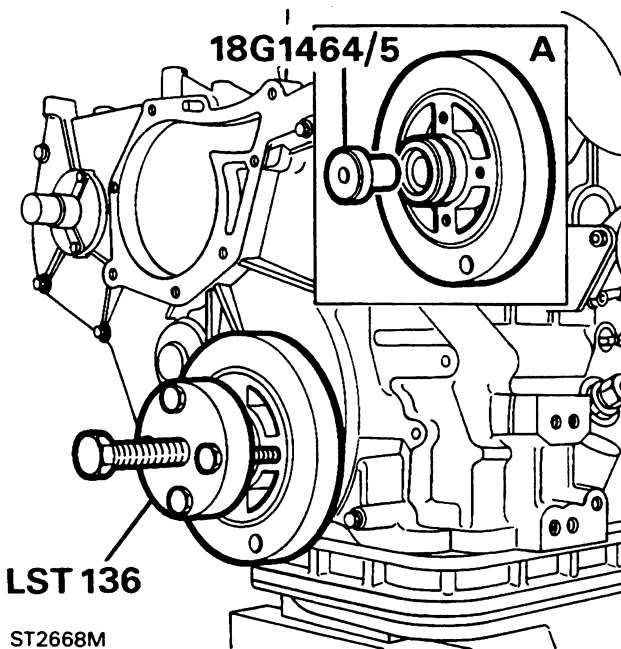
12. Remove the four screws and remove the crankshaft pulley from the damper.
13. Restrain the damper with special tool LST 127 and using a 30mm socket, remove the damper retaining bolt and spacer. Since this bolt is retained with Loctite and tightened to a very high torque considerable effort will be required to release it.

All models - to gain access

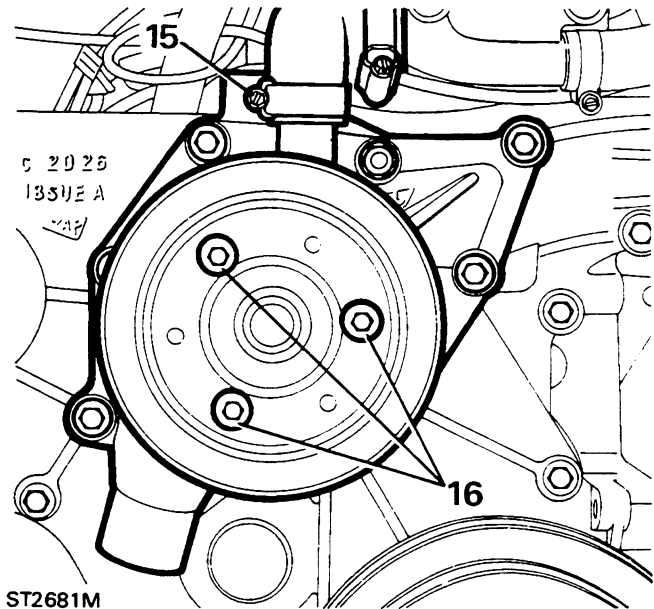
5. Disconnect the battery and drain the cooling system by removing the bottom hose from the radiator and allowing the coolant to drain into a suitable container.
6. Remove the viscous coupling and fan assembly noting that the coupling is secured to the water pump shaft with a left hand thread.



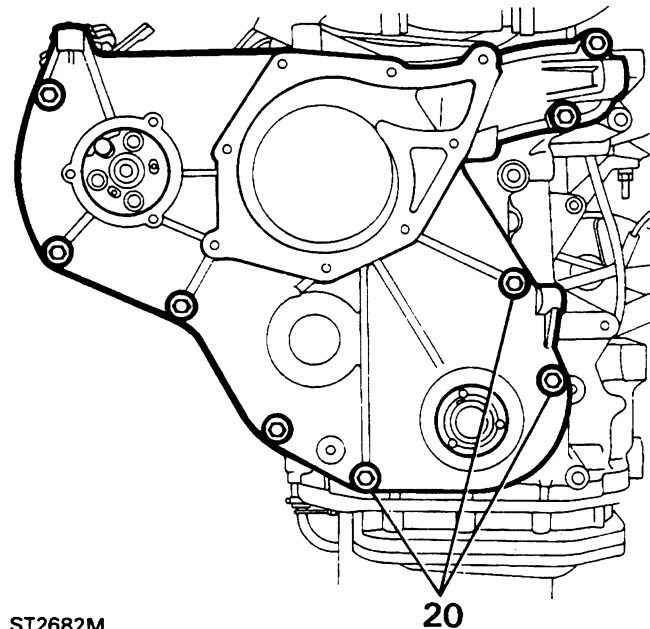
14. Since the damper is also retained with loctite, use special tool LST 136 to withdraw it from the crankshaft.



15. Disconnect the bottom and by-pass hoses from the water pump.
16. Remove the three screws to remove the waterpump pulley and the seven bolts to remove the water pump.



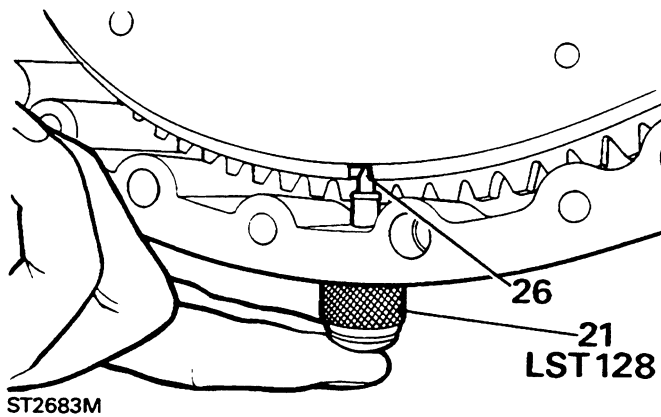
17. Remove the air cleaner to turbo charger hose.
18. Withdraw the pivot bolt and nut and remove the alternator. Similarly, remove the PAS pump.
19. Remove the five bolts to release the common bracket.
20. Finally, to gain access to the timing belt and gears, remove the nine bolts and carefully ease the cover plate from the front cover.



To renew the drive belt

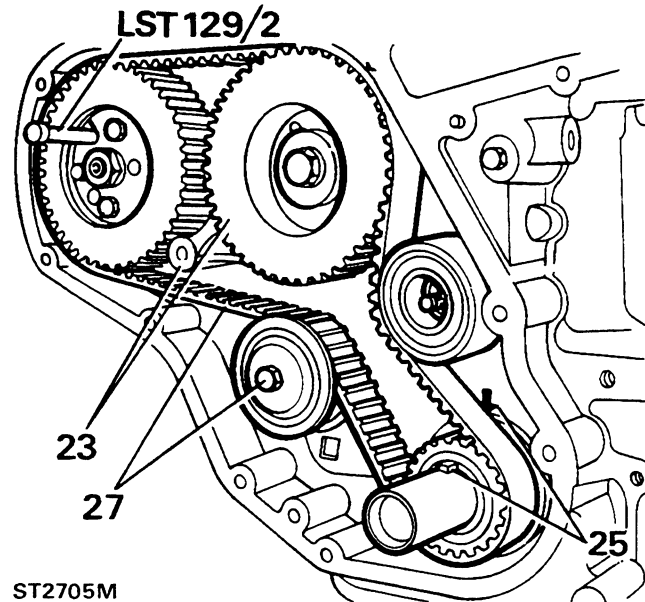
21. Screw the body of the flywheel timing pin into the flywheel housing location.

NOTE: If automatic gearbox, the timing pin fits into a slot in the ring gear. Access is through a hole in the engine backplate below the starter motor.



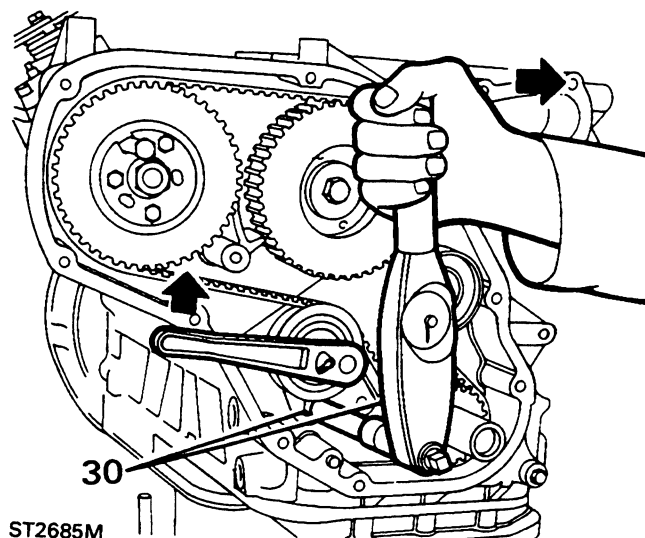
22. Fit the crankshaft damper and with special service tool LST 127 turn the crankshaft in a clockwise direction until the following conditions are achieved:-
23. The timing dot on the camshaft gear aligns with the front cover web.
24. The injector pump timing pin LST 129/2 can be fully and easily inserted into the pump hub hole.
25. The crankshaft key aligns with the arrow on the front cover.
26. The flywheel timing pin LST 128 can be inserted cleanly into the appropriate slot in the flywheel. It should be noted that the flywheel has two timing slots one being narrower than the other. The narrowest slot determines T.D.C for this direct injection engine. Provided that instructions 23 to 26 are achieved, the correct slot in the flywheel will be correctly positioned. Remove the damper.
27. Remove the single bolt and withdraw the drive belt tensioning pulley assembly complete, from the engine and carefully remove the drive belt.

CAUTION: Before fitting a new drive belt refer to instruction 1. in section 12 under the heading **VALVE AND INJECTION PUMP TIMING** which concerns the care and storage of new belts.



ST2705M

28. Slacken the three bolts securing the injector pump drive gear to the hub. Without moving the gears, carefully feed the drive belt over the gears keeping it tight on the drive side.
29. Fit the tensioner assembly ensuring that the round hole in the pulley mounting plate locates over the dowel in the front cover.
30. Insert a 13mm (0.5in) square drive extension into the hole in the mounting plate and with a dial type torque wrench, held vertically, tension the belt to 18 to 20 Nm (13 to 15 lbf.ft.) and tighten the the tensioner clamp bolt to the correct torque. Do not use a "break" type wrench.



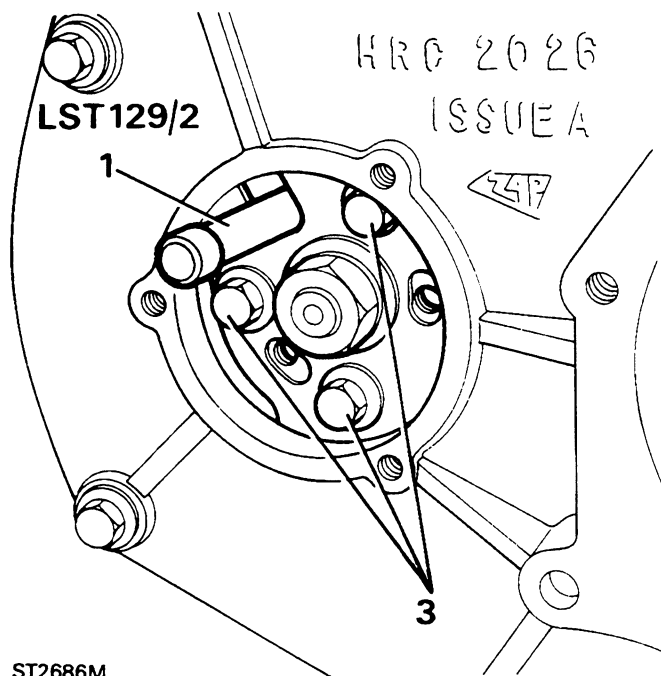
ST2685M

31. Tighten the three drive gear securing bolts to the correct torque. Remove the timing pin from the pump hub and check that the flywheel timing pin is clear of the slot. Temporarily fit the damper and with special tool LST 127 rotate the crankshaft two complete revolutions. Slacken the tensioner clamp bolt and tension the belt again as in instruction 30.

CAUTION: The double tensioning procedure is vital otherwise the belt could fail resulting in serious damage to the engine.

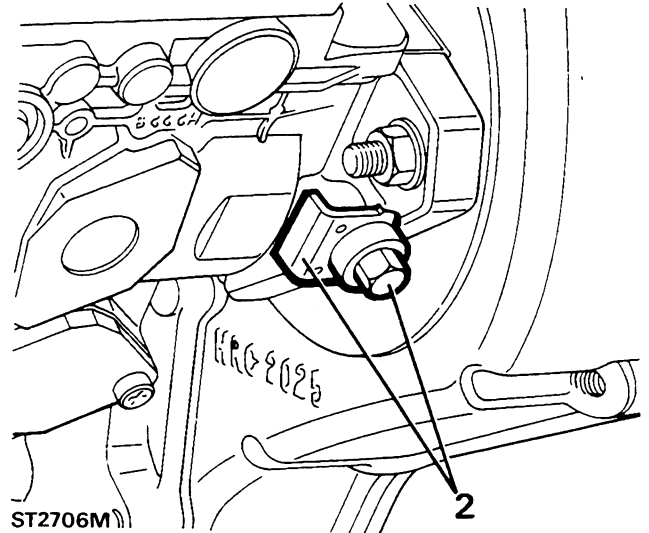
32. Turn the crankshaft again, in a clockwise direction until all the timing marks and pins align as in instructions 23 to 26. If the timing pin cannot be inserted into the pump hub, it will be necessary to adopt the following procedure:-

- (1) Turn the crankshaft the small amount necessary to enable the timing pin to be inserted into the pump.



ST2686M

- (2) Remove the keeper plate and lock the pump.



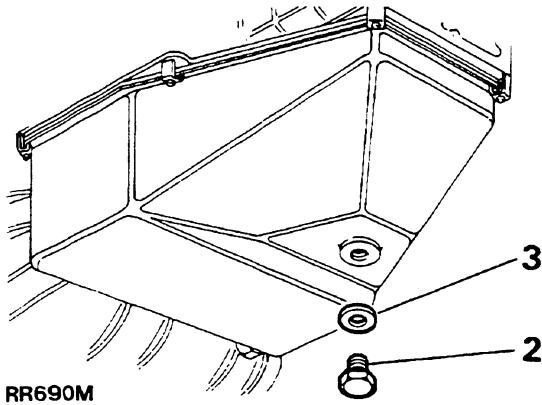
- (3) Slacken the three pump gear retaining bolts.
 (4) Turn the crankshaft to TDC.
 (5) Check that the timing pin is an easy fit in the pump.
 (6) Tighten the pump gear securing bolts to the correct torque.
 (7) Unlock the pump, fit the keeper plate and tighten the bolt. Remove the timing pin from the pump and the timing pin tool from the the flywheel housing.

Reassemble

33. Clean the front cover and cover plate mating faces. Fit a new gasket and secure with the nine bolts tightening evenly to the correct torque.
34. Reassembling of the remaining components is mainly a reversal of the dismantling sequence. Fitting of these components is described in "Engine dismantle and overhaul" section 12. It is important that reference is made to this section at each stage of assembly to ensure that the correct procedure is followed. It is essential that the instructions concerning the fitting of the crankshaft damper are observed. **Also, it is absolutely vital that the bolt is indeed tightened to 340 Nm (250 lbf.ft).**

RENEW ZF AUTOMATIC GEARBOX FLUID

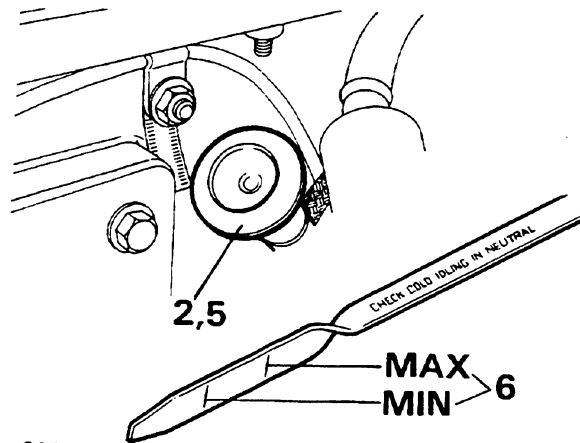
1. Before changing the oil ensure that the vehicle is level on either hoist or ground. Obtain a suitable container to drain the gearbox fluid into. Disconnect the battery.
2. Remove the gearbox dipstick located at the rear of the right hand rocker cover, to aid oil drainage. Release the plug from the bottom of the sump and allow time for the fluid to drain.
3. Refit the plug using a new sealing washer and tighten to the correct torque value. Do not overtighten.



REFILL ZF AUTOMATIC GEARBOX AND CHECK FLUID LEVEL.

NOTE: The fluid level in the ZF automatic gearbox is checked when the fluid is cold and the engine idling in neutral gear.

4. Ensure the vehicle is on level ground.
5. Refill or top-up with the correct quantity and grade of fluid (see Lubricants and Fluids Section 09) at the combined filler/dipstick tube.
6. Reconnect the battery, start and run the engine, ensure that the fluid level registers between the minimum and maximum level markings on the dipstick.

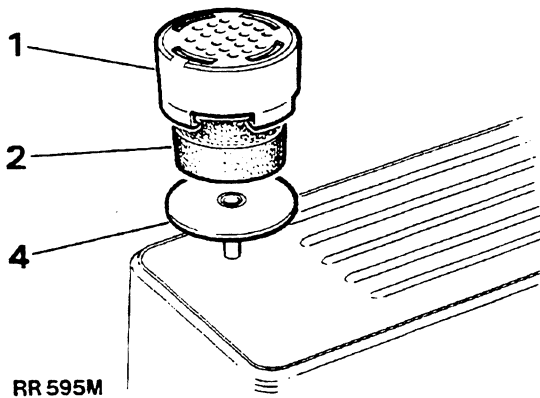


POSITIVE CRANKCASE VENTILATION AIR INTAKE FILTER

The PCV air intake filter is located at the rear of the left hand rocker cover, beneath the throttle linkage bracket.

Removing

1. Prise the filter outer cover upwards to release it from its mounting.
2. Remove the sponge filter from the cover and discard the sponge.



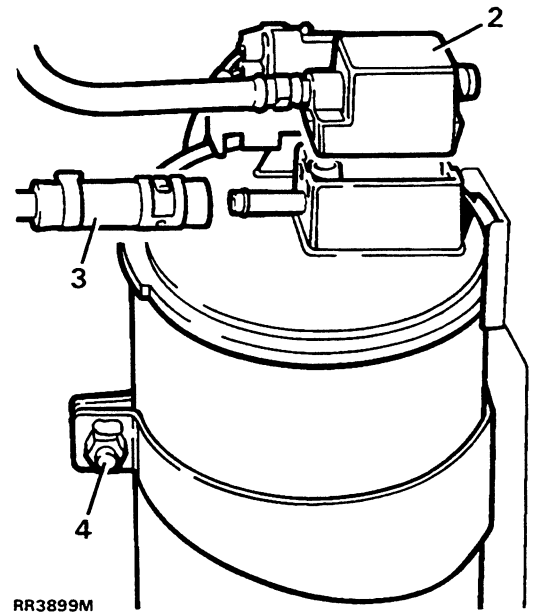
Refitting

3. Insert a new filter into the filter cover.
4. Press the filter onto its mounting until it clips firmly into position.

CHARCOAL CANISTER 93 MODEL YEAR

Remove

1. Disconnect battery negative lead.
2. Pry out purge valve.
3. Disconnect pipe.
4. Loosen bolt.
5. Remove charcoal canister.



Refit

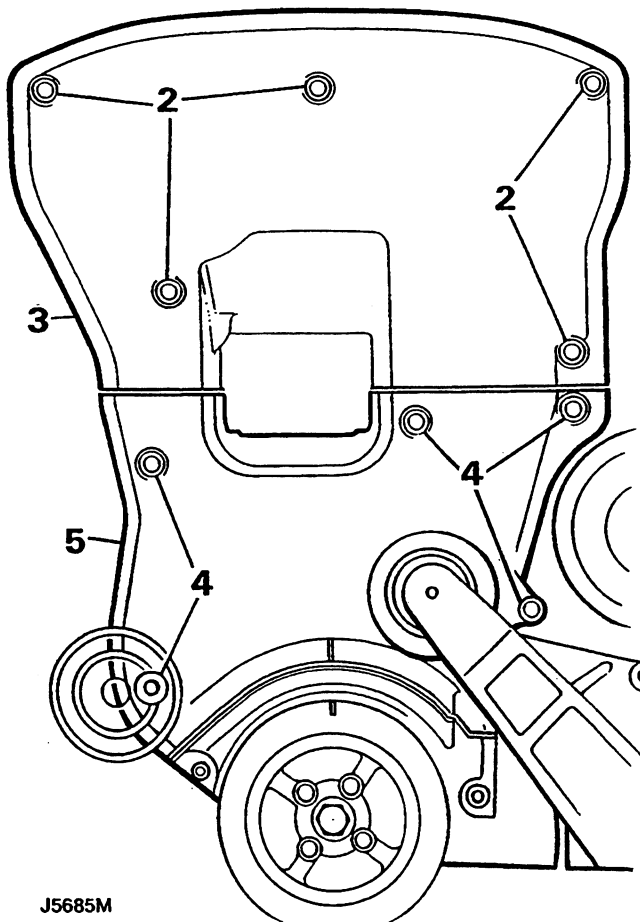
6. Reverse removal procedure.

CAMSHAFT TIMING BELT Mpi

Remove

NOTE: If the timing belt is to be removed from the camshaft gears only, it is not necessary to remove the drive belt, crankshaft pulley or timing belt lower cover.

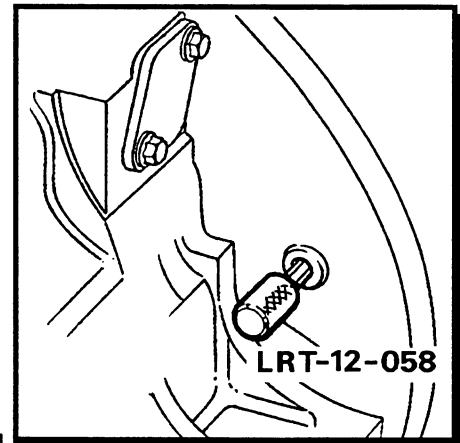
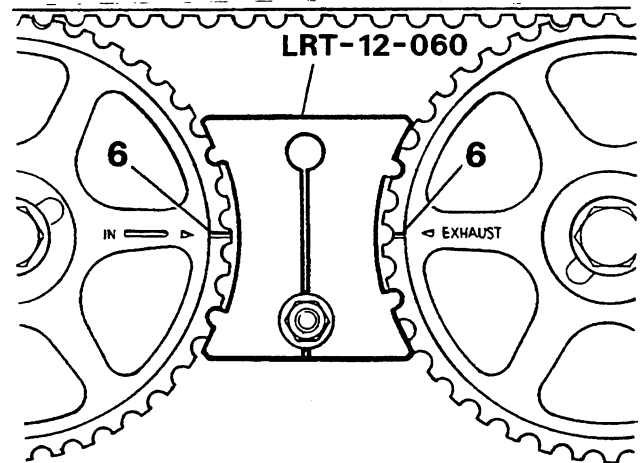
1. Remove drive belt.
2. Remove 5 bolts securing timing belt top cover.
3. Remove top cover.
4. Remove 5 bolts securing timing belt centre cover.
5. Remove timing belt centre cover.



6. Rotate crankshaft to align timing marks on camshaft gears - 90° BTDC.

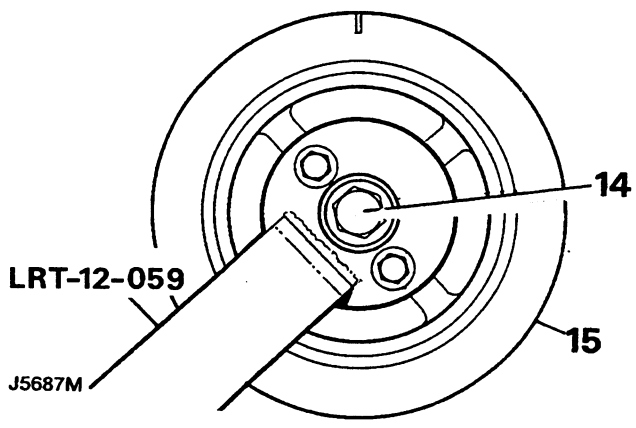
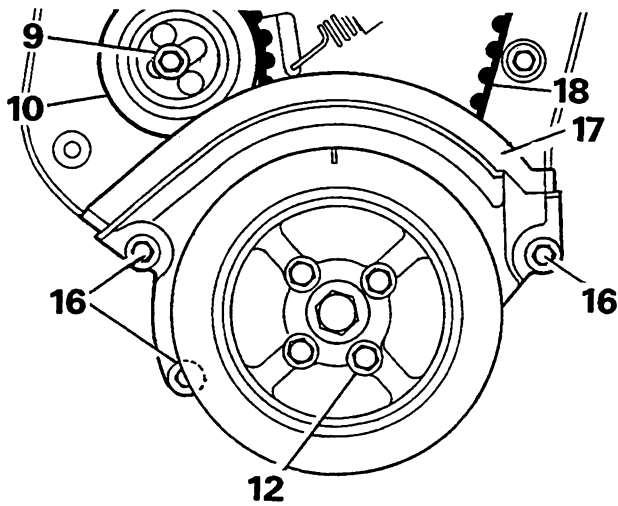
CAUTION: Never use the camshaft gears, gear retaining bolts or timing belt to rotate crankshaft.

7. Fit tool LRT-12-058 to lock flywheel.
8. Position tool LRT-12-060 to lock camshaft gears.



J5686M

9. Loosen camshaft belt tensioner pulley bolt.
10. Move tensioner to release timing belt tension.
11. Retighten tensioner pulley bolt.
12. Remove 4 bolts securing crankshaft pulley to crankshaft timing gear.
13. Fit tool LRT-12-059 to crankshaft pulley, fit 2 pulley bolts to retain tool.
14. Restrain crankshaft pulley using tool LRT-12-059 and remove crankshaft pulley bolt.
15. Remove bolts securing tool LRT-12-059, remove crankshaft pulley.
16. Remove timing belt lower cover.



17. If timing belt is to be refitted, mark direction of rotation of belt.
18. Remove timing belt.

CAUTION: Ease timing belt off gears using fingers only. Metal levers may damage the belt and gears. Do not rotate engine with timing belt removed and cylinder head fitted. Timing belts must be stored and handled with care. Always store a timing belt on its edge with a bend radius greater than 50 mm. Do not use a timing belt which has been twisted or bent double as this can fracture reinforcing fibres. Do not use an oil contaminated timing belt. Although the belt has a service life of 96,000 miles, 160,000 km, an existing belt should only be refitted if it has completed less than 48,000 miles, 80,000 km.

Refit

1. Clean timing belt gears and pulleys.
2. Clean crankshaft pulley.

CAUTION: If original belt is to be refitted, ensure direction of rotation mark is facing correct way.

3. Fit timing belt to gears, starting at the crankshaft gear and working in an anti-clockwise direction.

CAUTION: Ensure the belt run between the crankshaft and exhaust camshaft gear is kept taut during the fitting procedure.

4. Fit timing belt lower cover, tighten 3 bolts to the correct torque.
5. Fit crankshaft pulley to crankshaft timing gear.
6. Fit tool LRT-12-059 to crankshaft pulley, fit 2 bolts to retain tool.
7. Fit crankshaft pulley centre bolt, and using tool LRT-12-059 to restrain pulley, tighten bolt to the correct torque.
8. Remove tool LRT-12-059.
9. Fit bolts securing crankshaft pulley to timing gear, tighten bolts to the correct torque.
10. Remove tool LRT-12-060.

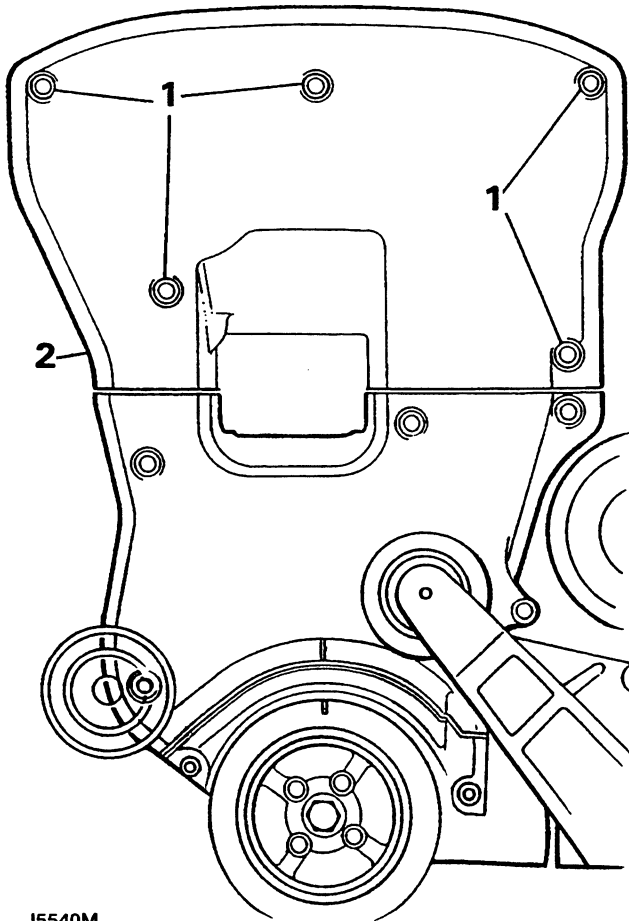
Tension belt

1. Loosen timing belt tensioner pulley bolt.
2. Apply 40Nm anti-clockwise torque to inlet cam pulley bolt and release.
3. Tighten tensioner pulley bolt to the correct torque.
4. Remove tool LRT-12-058 from flywheel.
5. Fit timing belt centre cover, tighten 5 bolts to the correct torque.
6. Fit timing belt upper cover, tighten 5 bolts to the correct torque.
7. Fit drive belt.

Maintenance check camshaft belt - Mpi

CAUTION: This check must be carried out at the service intervals specified in the **SERVICE MAINTENANCE CHECK SHEET** and whenever carrying out any repair which requires the timing belt to be disturbed. Pay particular attention for signs of belt splitting at base of teeth.

1. Remove 5 bolts securing timing belt upper cover.
2. Remove upper cover.



J5540M

3. Using a socket and extension bar on the crankshaft pulley bolt, rotate engine to allow the timing belt to be inspected.

CAUTION: Do not use camshaft gears or retaining bolts to rotate engine.

4. Check timing belt condition, renew any belt that shows signs of oil contamination, cracking, fraying or splitting at base of teeth.

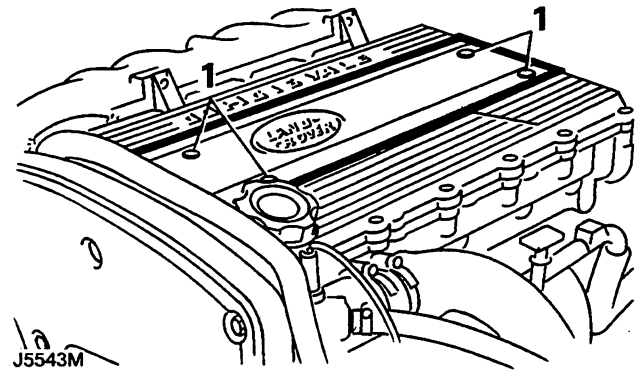
CAUTION: Cause of oil contamination, if present, must be rectified.

5. Clean timing belt upper cover.
6. Position upper cover.
7. Fit upper cover securing bolts and tighten to the correct torque.

SPARK PLUGS - Mpi

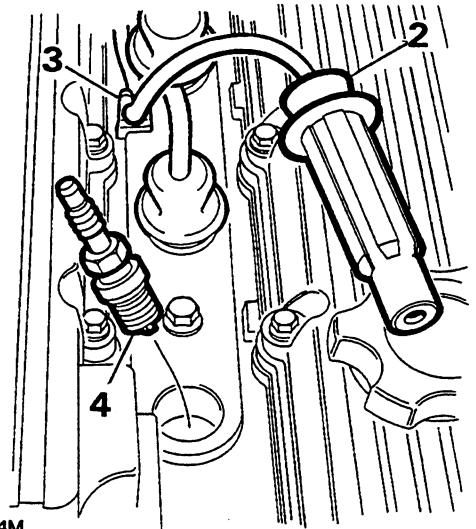
Remove

1. Release 4 screws and remove spark plug cover.



J5543M

2. Disconnect 4 plug leads.
3. Release plug leads from securing clips.
4. Remove spark plugs from cylinder head.



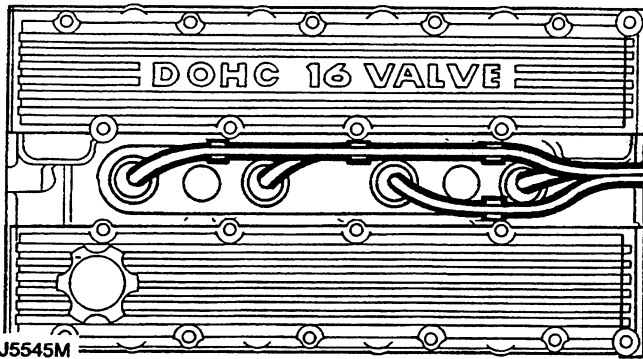
J5544M

Refit

1. Inspect spark plugs.
2. Set plug gaps.

CAUTION: Use correct type and grade of plug

3. Apply anti-seize to plug threads.
4. Fit spark plugs and tighten to the correct torque.
5. Connect and route spark plug leads as illustrated.

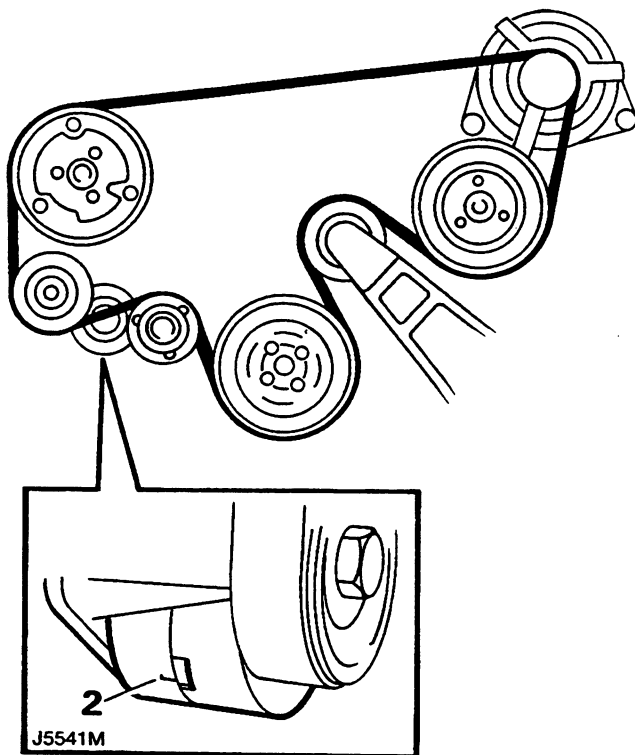


6. Refit spark plug cover.

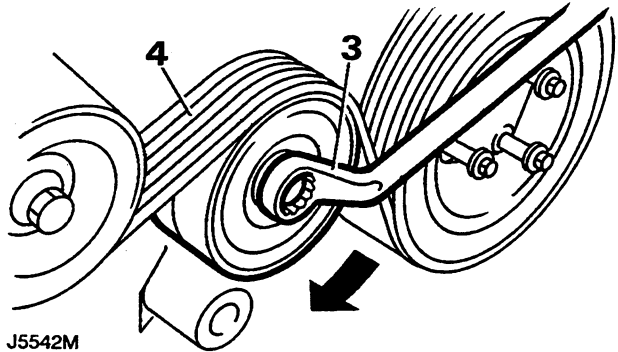
DRIVE BELT - Mpi

Check condition

1. Check condition of drive belt, renew a belt that shows signs of wear, splitting or oil contamination.
2. Check belt length indicator, belt must be renewed before indicator reaches R.H. end of slot.



3. Use 15 mm ring spanner on bolt and hold tensioner pulley fully clockwise.
4. Release drive belt from tensioner pulley and remove ring spanner.
5. Remove drive belt from between pulleys.



6. Clean drive belt pulley grooves and ensure grooves are not damaged.
7. Fit new drive belt around pulleys, except tensioner pulley, ensuring all grooves are correctly engaged.
8. Hold tensioner pulley fully clockwise and fit drive belt centrally around tensioner pulley.