DEFENDER
90 · 110 · 130

WORKSHOP MANUAL SUPPLEMENT

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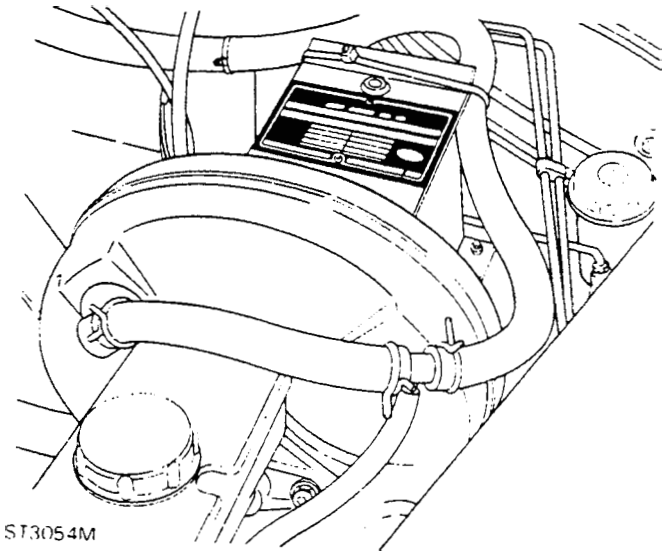
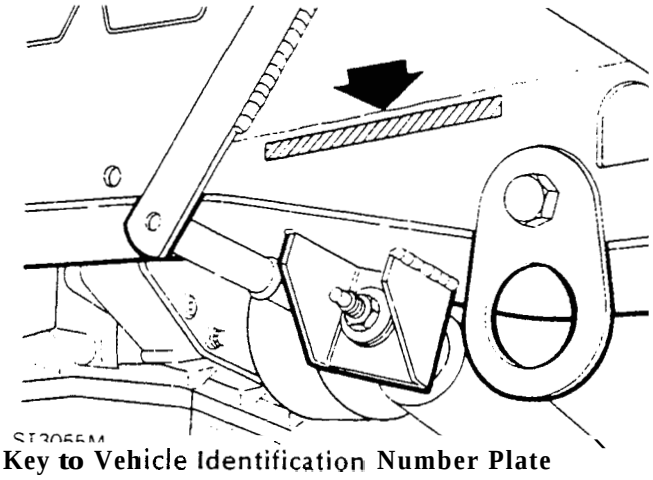
VEHICLE IDENTIFICATION NUMBER (VIN)

The Vehicle Identification Number and the recommended maximum vehicle weights are stamped on a plate riveted to the top of the pedal box behind the brake servo

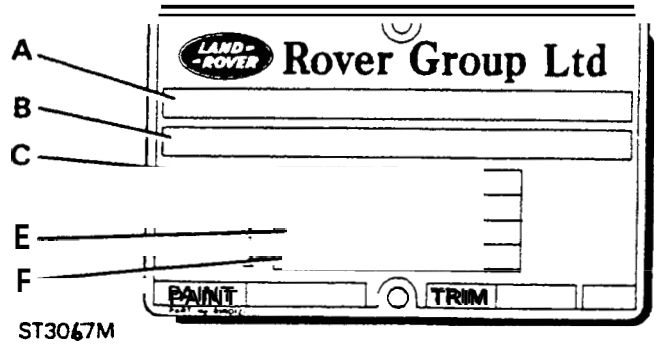


The number is also stamped on the right-hand side of the chassis forward of the spring mounting turret. Always quote this number when writing to Land Rover.



Key to Vehicle Identification Number Plate

A. Type approval
B. VIN (minimum of 17 digits)
C. Maximum permitted laden weight for vehicle
D. Maximum vehicle and trailer weight
E. Maximum road weight - front axle
F. Maximum road weight - rear axle

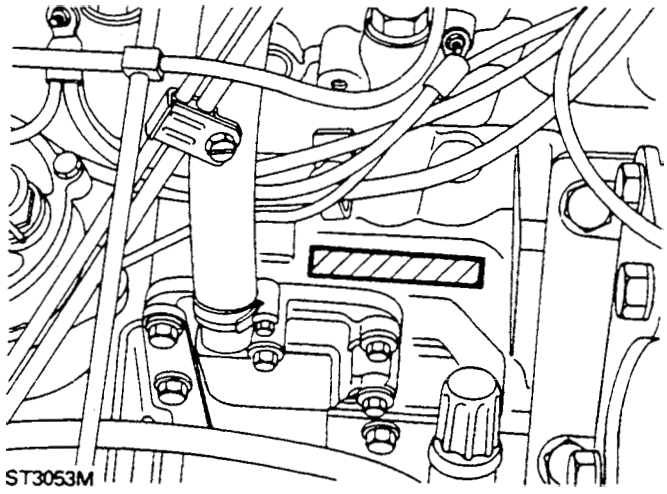


The Vehicle Identification Number identifies the manufacturer, model range, wheel base, body type, engine, steering, transmission, model name and place of manufacture. The following example shows the coding process.

SAL World manufacturer identifier
LD Land Rover
G Class 100 inch
V Class 90 inch
H Class 110 inch
A Basic
B 2 door
M 4 door
H High Capacity
F Tdi or
8 5 speed LHD or
7 5 speed RHD
H 1991 MY
A Solihull site

ENGINE SERIAL NUMBER - Tdi ENGINE

The engine number is stamped on the cylinder block on the right hand side of the engine above the camshaft front cover plate. Commencing Serial Number IIL 00001.



ENGINE OIL - Tdi ENGINES

The minimum performance level oil required for satisfactory engine performance and protection is defined by specifications BLS 22.0L.09 and CCMC PD1.

The engine oil and filter must be changed every 10,000 km (6000 miles) and it is important that only oils listed below, or clearly marked as meeting the required specification, should be used. Superior engine protection can be obtained by the use of Super High Performance Diesel (SHPD) oils to specification CCMC D3. Some of the oils meeting the above specifications are listed below:-

Oils to BLS 22.OL.09/CCMC PD1
Agip Superdiesel or Sint Turbo Diesel
BP Vanellus C3 or Visco Diesel
Caltex RPM Delo 400*
Castrol Syntron X, TXT, Dynamax or GTX
Century Superb
Duckhams QXR or Hypergrade
Esso Superlube EX 2, Superlube +, Ultra Oil or Super Oil
Gulf Super Diesel or Engine Oil T
Mobil Delvac Super, Mobil 1 Rally Formula or Mobil 1 Formula 15W/50
Kuwait Q8 Auto-4 or Q8 Auto-7
Shell Rimula X or Rotella MTX
Texaco Dieseltex

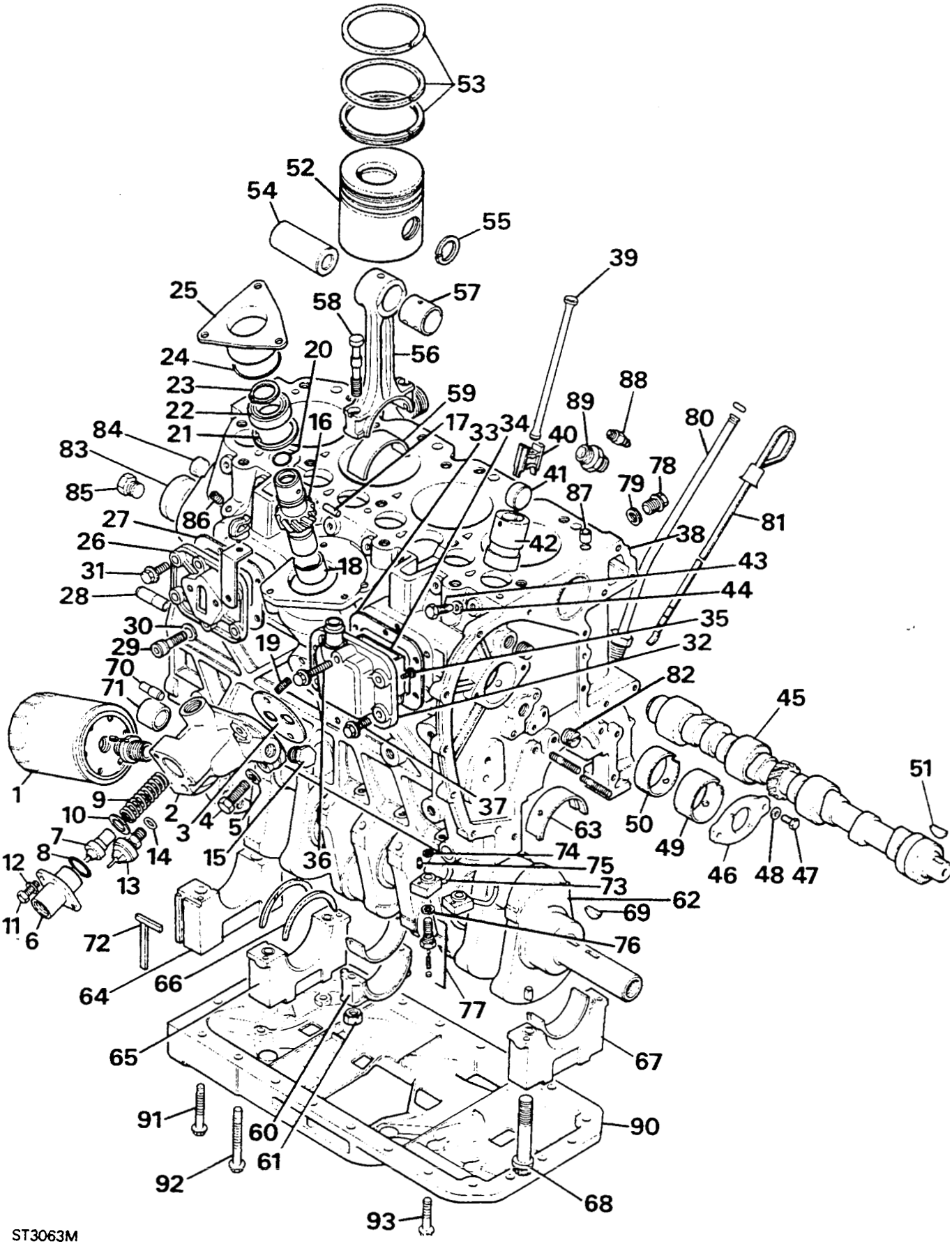
SHPD oils to CCMC D3
Agip Sigma Turbo
BP Vanellus C3 Extra
Castrol Turbomax
Century Centurion
Caltex RPM Delo 450
Duckhams Fleetmaster SHPD or Fleetmaster Extra
Elf Multiperformance 4D
Esso Super Diesel Oil TD or Special Diesel Oil
Fina Kappa LDO
Gulf Superfleet Special
Mobil Delvac 1400 Super
Texaco Ursa Super TD
Shell Myrina
Total Rubia TIR or Total Diesel
Silkolene Turbolene D

In markets where oils to the above specifications are not available use products to MIL-L-2104D or API CD.

Under severe operating conditions, eg. off road in mud, airborne sand, dust, operating at high speeds in high ambient temperatures above 40°C or continual stop/start operation, the oil and filter change period should not exceed 5000 km (3000 miles). Continuous off road operation in mud, dust and wading conditions requires a monthly oil and filter change. Failure to adhere to the recommended service and operating instructions may result in premature engine wear or damage.

Oil Viscosity - Ambient Temperatures Applications Chart

SPECIFICATION	SAE VISCOSITY	AMBIENT TEMPERATURE °C
		-30° -20° -10° 0° 10" 20" 30" 40" 50"
Oils must meet BLS.22.OL.09 or CCMC PD1 or CCMC D3	5W/30 5W/40) 5W/50)	
	10W/30 10W/40) 10W/50)	
	15W/40) 15W/50)	
	20W/40)	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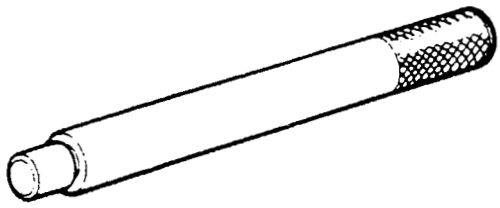
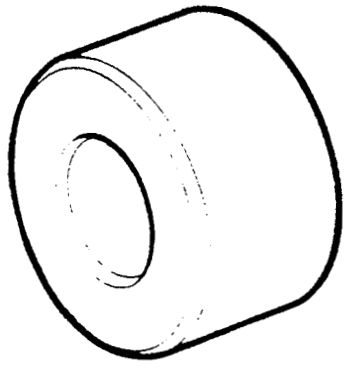
RO.274400



RO.605774A



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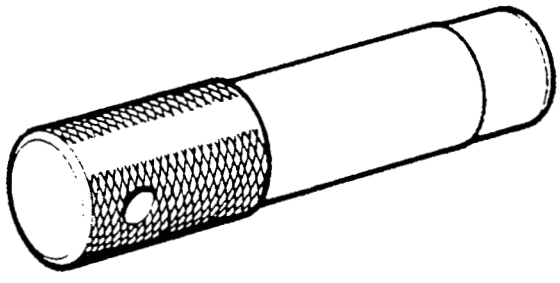
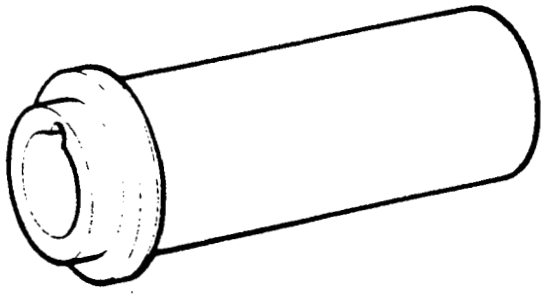
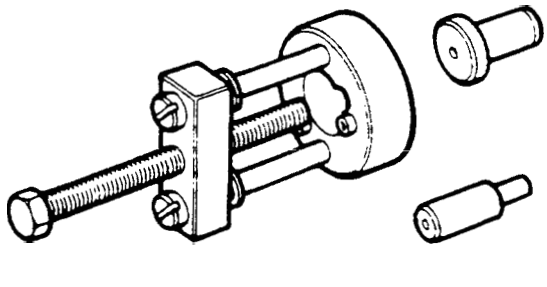


18G 1456



18G.1464



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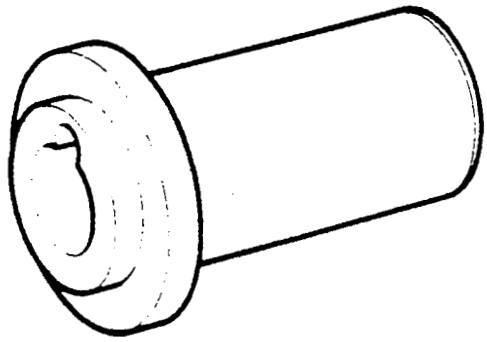
18G.1482



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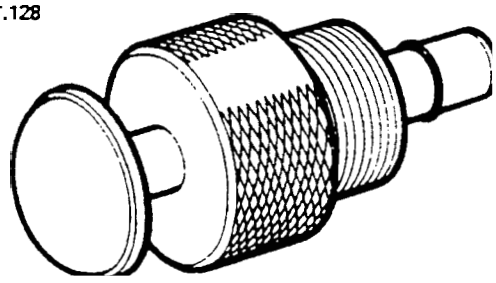

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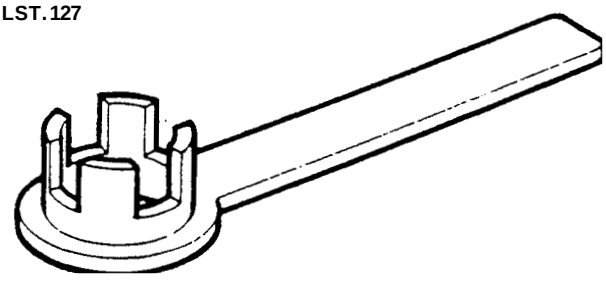

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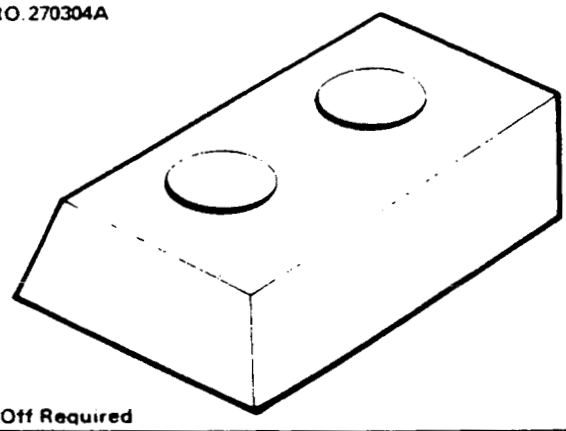


2 Off Required

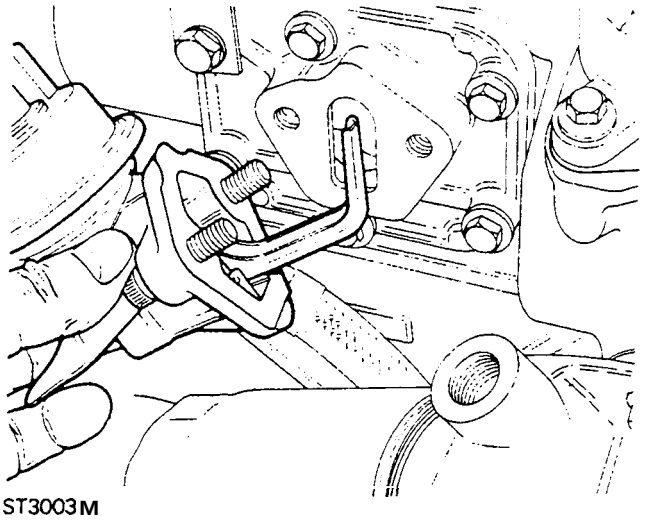
Removing fuel pump and side cover

20. Use a 6 mm allen key to release the fuel lift pump to gain access to the side cover retaining bolts.
21. Release the six bolts and remove the cover plate.

See fitting lift pump.

Remove front side cover plate

22. Release the six bolts and remove the front side cover plate complete with the crankcase ventilation pipe.



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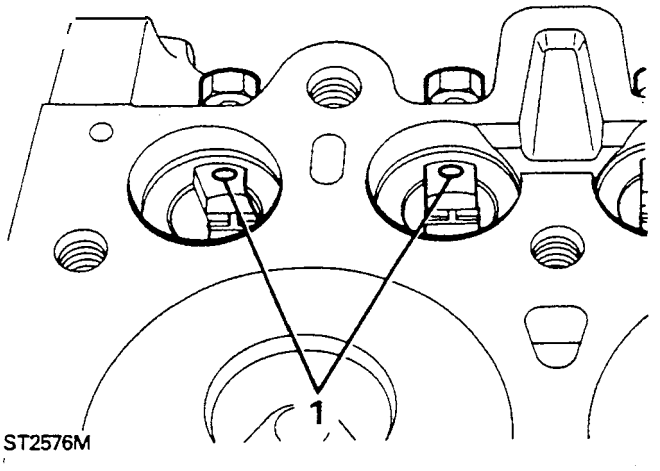
Remove camfollowers

See cylinder head remove

CAUTION: The camfollers are solid rollers held in position against the cam by a slide inside a fixed guide. If the guide is removed before the roller, it is possible that the roller can fall behind the camshaft and become jammed. Furthermore the roller could slip past the cam and fall into the crankcase. It is therefore important to adopt the following procedure for removal.

1. Slacken back the guide locating screw so that the end is below the bore of the guide.



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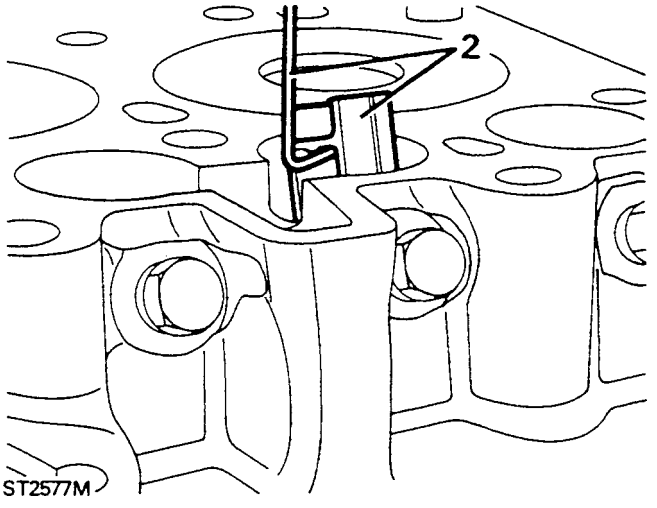
2. Using a length of thin wire with a hooked end lift-out the slide.
3. With the same piece of wire remove the roller
4. Remove the guide locating screw and lift-out the guide.
6. As each assembly is removed number it, from one to eight, for refitting to its original location.

See fitting cam followers



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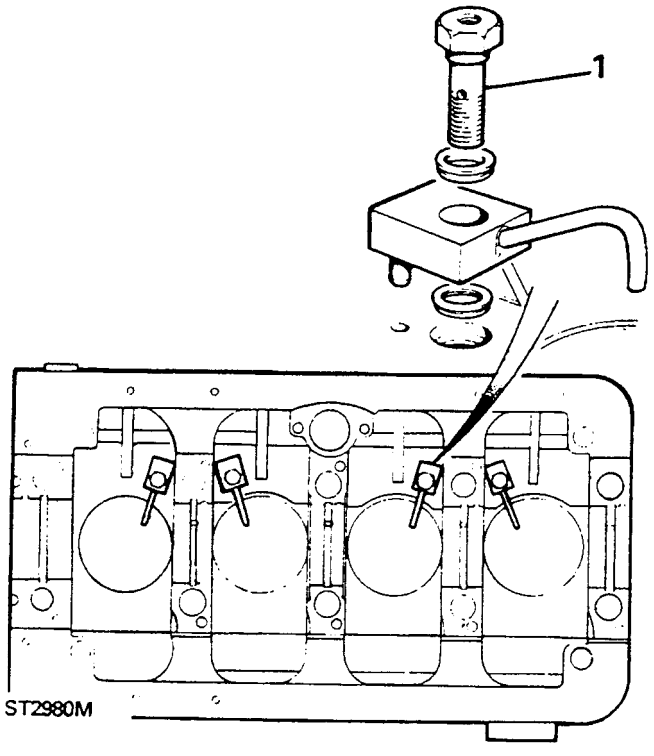
ASSEMBLE ENGINE

Ensure that the cylinder block and all oilways are thoroughly clean using an air line, if available, prior to assembly.

Refitting cylinder lubrication jet tubes

Oil jet tubes are fitted to lubricate the pistons and bores directly from the main oil gallery.

1. Assemble and fit the jet tube as illustrated ensuring that the dowls locate in the holes in the cylinder block, and that the larger diameter washer fits under the bolt head. Tap the jet blocks down to ensure that the locating dowel is fully home. Fit and tighten the retaining bolts to the correct torque.

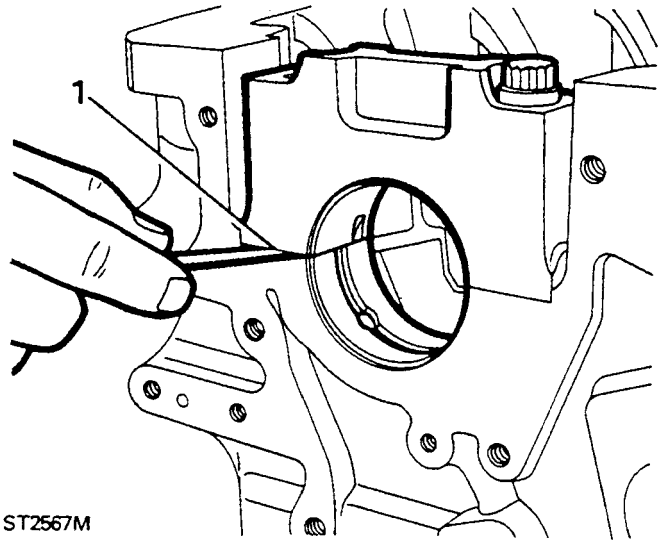


Crankshaft bearings.

Main bearing nip clearance

Clean the protective coating from new bearings before fittin.

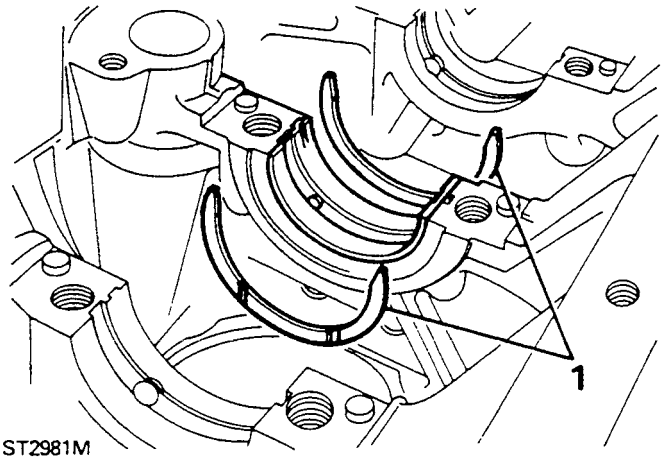
1. Fit the bearing halves to the cylinder block ensuring full engagement of the location tags.
2. Install the other half shells into the main bearing caps, again ensuring that the tags locate correctly.
3. Fit all the main bearing caps to their original locations tightening the bolts to the correct torque, then release one bolt on each cap.
4. Check the clearance between the cap and the block as illustrated.



The nip clearance which ensures that the bearings are correctly clamped, must be within 0,10 to 0,15 mm (0.004 to 0.006 in). Investigate and correct any nip clearance errors before removing the main bearing caps prior to fitting the crankshaft.

Fitting crankshaft

1. Insert two standard thickness thrust washers each side of the centre main bearing location with the oil grooves towards the crank thrust faces.
2. Lubricate the cylinder block bearing shells and carefully install the crankshaft.

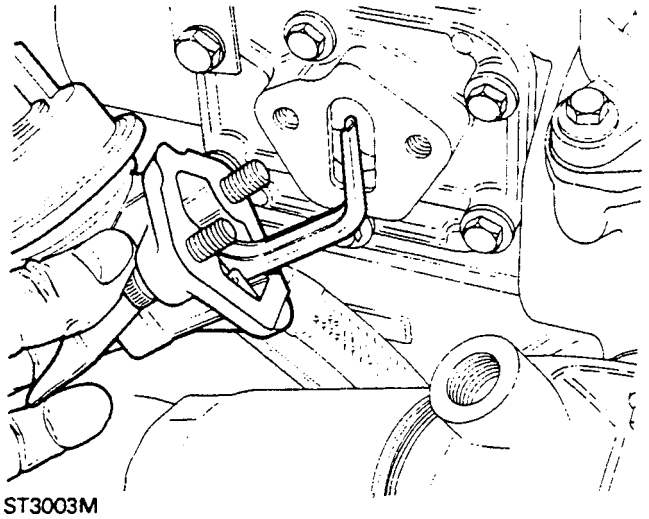


Fitting rear cover

9. Fit the rear cover also using a new gasket and secure with six bolts tightened to the correct torque.

Fitting fuel lift pump

10. Check that the lift pump is serviceable and refit using a new gasket, ensuring that the pump actuating lever locates correctly onto the camshaft.



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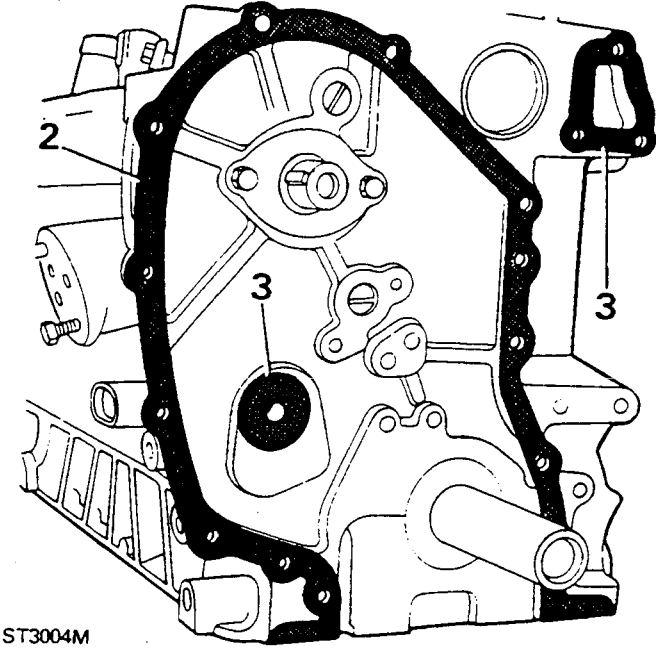
FITTING FRONT COVER TIMING BELT AND GEARS

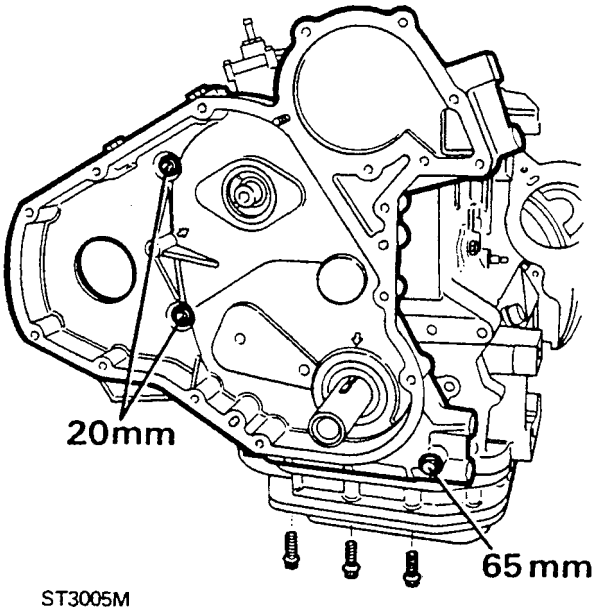
1. Clean the front cover and remove the crankshaft and camshaft oil seals taking care not to damage the seal housing. Examine the cover for damage, cracks and distortion. Check the mating face of the cylinder block and the cover plate for burrs.

2. Clean the front face of the cylinder block and use a little grease to hold in position a new joint washer.



ST3004M

3. Also fit a new joint washer to the coolant aperture and to the tapped hole for the jockey pulley clamp bolt.
4. Fit the front cover locating it over the single stud and secure with the three retaining bolts tightening evenly to the correct torque. The correct bolt length foreach hole is given in the following chart.



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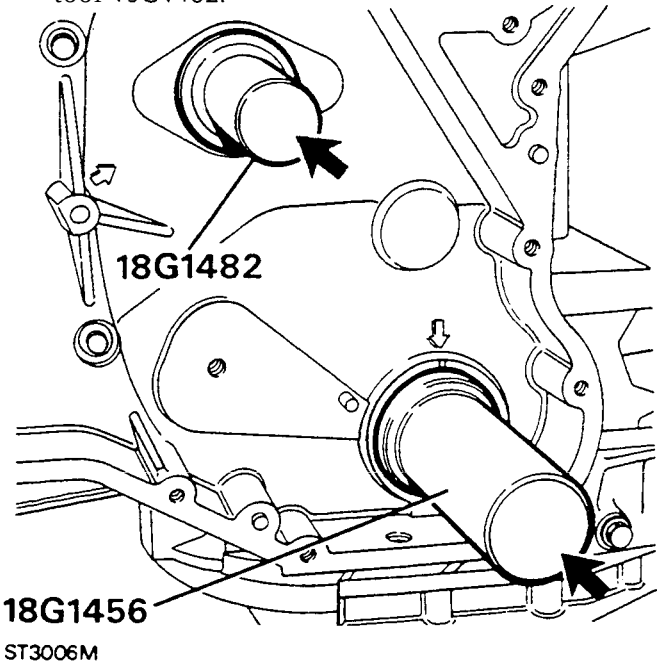
Front cover seals

5. Lubricate a new crankshaft oil seal. With the lip side leading, drive-in the seal, squarely, using special service tool 18G1456.

6. Similarly, lubricate and drive-in a new camshaft oil seal, lip side leading, using special service tool 18G1482.



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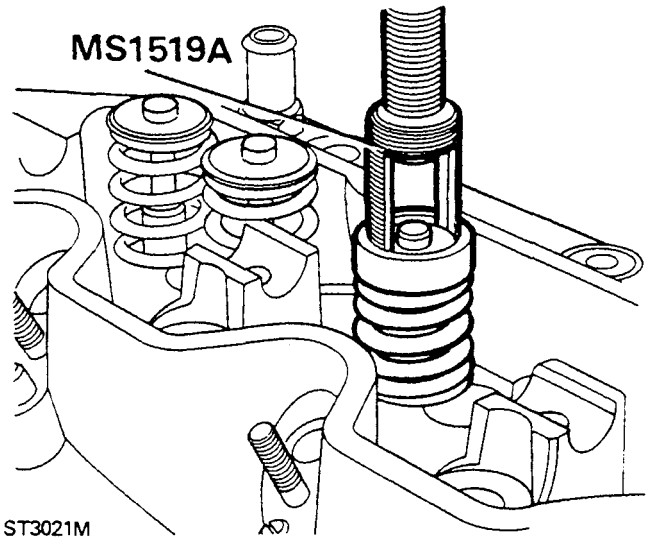
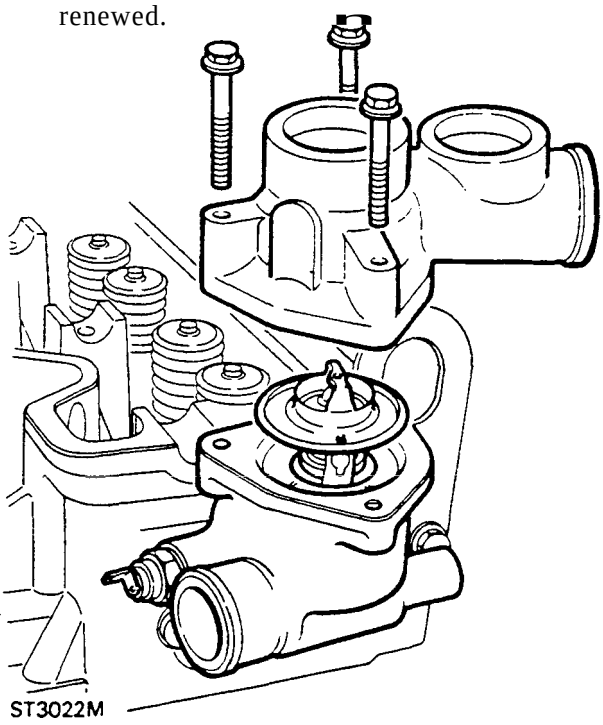
22. Fit a spring and cup to each valve and compress with special service tool MS1519A or a suitable altemative. Retain with the multi-groove cotters ensuring that they are fully located in the valve stem and cup.



Thermostat and housing

23. If necessary remove the temperature transmitter and temperature sensor from the housing.
24. Release the three bolts securing the thermostat cover and lift out the thermostat. The thermostat may be tested by immersing it in hot water of a known temperature and comparing its operation with the temperature range stamped on the flange. Any leakage of wax (which is the colour of copper) from around the center pin of the thermostat, indicates that it is faulty and should be renewed.

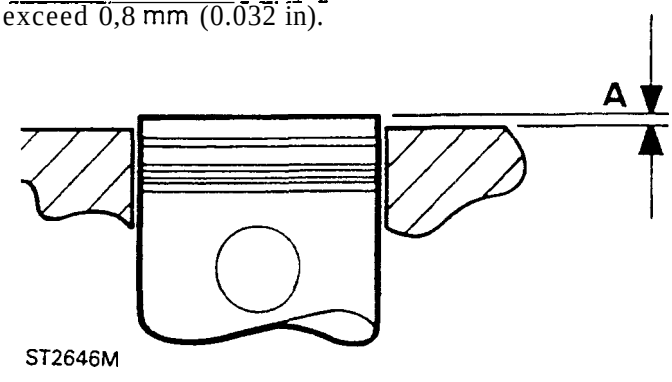


25. The thermostat housing may be removed from the cylinder head at this stage and if necessary the gasket renewed.
26. The "jiggle pin" which allows any air to escape from below the thermostat, may be fitted in any position. Renew the gasket when fitting the thermostat and apply a little Hylomar sealant to the threads of temperature sensor and transmitter before screwing into position.

FITTING CYLINDER HEAD

Piston protrusion and gasket selection

Before fitting the cylinder head, the protrusion of the pistons above the block face must be checked in order that the correct thickness gasket may be selected from the range of three. The height of all the pistons above the cylinder block must be measured and the thickness of the gasket selected is based upon the largest value of dimension **'A', as** illustrated. This dimension, however, must not exceed 0,8 mm (0.032 in).



Three thicknesses of gasket are available and each size can be recognised by the number of identification holes punched in the side of the gasket as illustrated. The table below gives the details of the gaskets available. The thickness of gasket fitted can be seen when the cylinder head is fitted since the identification holes can be seen protruding from the right hand side of the engine towards the rear.

Number of holes	Metric	Imperial	Gasket
			ERR0382
2	0.70 to 0.61	0.024 to 0.0275	ERR038
3	0.80 to 0.71	0.0279 to 0.0314	ERR0384

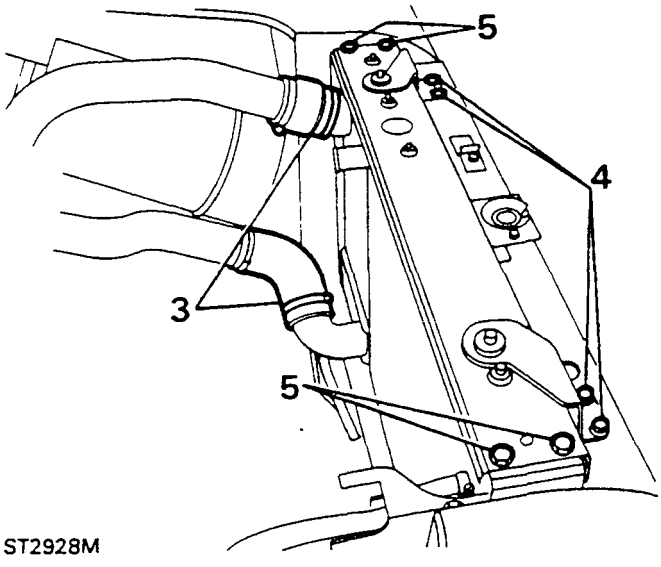
14. Fit the turbo charger and secure with the four nuts and tighten evenly to the correct torque.
15. connect the oil feed and retum pipes to the turbo charger and tighten the feed pipe clamp.
16. Connect the boost pressure pipe to the "T" piece and secure with the clip.
17. Connect the intercooler hose to the turbo inlet.
18. Fit the hose to air cleaner and turbo charger.
19. Fit the turbo charger elbow.
20. Connect the exhaust front pipe to the elbow using Holts "Firegum" to seal the joint.
21. Fit the heat shield and secure at the **two** fixing points.
22. Fit the bonnet and connect the battery.

INTERCOOLER

Service Repair No. 19.42.15

Remove, clean and refit.

1. Remove the fan and viscous coupling assembly, see operation 26.25.19.
2. Remove the fan cowl, see operation 26.25.11.
3. Disconnect the top and bottom hoses from the Intercooler.
4. Remove the four bolts (**two** each side) retaining the radiator top support brackets.
5. Remove the four bolts (two each end) securing the radiator surround top panel, and remove the panel.
6. Lift out the Intercooler.



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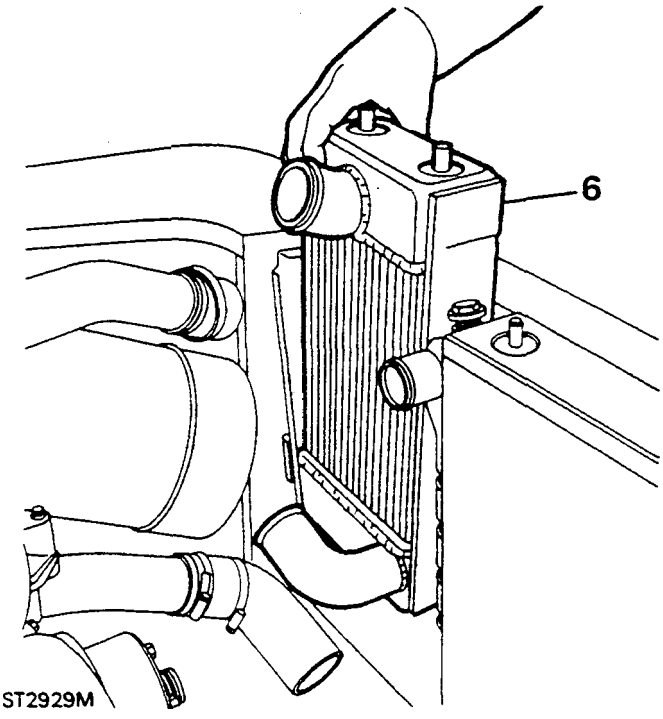

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Cleaning.

7. Flush the intercooler with ICI "GENKLENE" propriety cleaner, following the manufacturers instructions.
8. **Dry** the Intercooler completely ensuring that no liquid remains in the element.

Refitting.

9. Slide the Intercooler into position taking care not to damage the insulation material on the sides.
10. Fit the radiator surround top panel and secure with the four bolts.
11. Fit the **two** top brackets and secure with the four bolts.
12. Connect the top and bottom hoses.
13. Fit the fan cowl.
14. Fit the fan and coupling assembly.