JX1060C, JX1070C, JX1075C, JX1085C, JX1095C REPAIR MANUAL COMPLETE CONTENTS

The following pages are the collation of the contents pages from each section and chapter of the JXC Series Repair manual. Complete Repair part # 87393635.

The sections used through out all Case IH product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the JXC Series Tractors.

87393638 12/05

SECTION 00 - GENERAL

Chapter 1 - General

CONTENTS

WARNING

All maintenance and repair work described in this manual must be performed exclusively by CASE IH service technicians in strict accordance with the instructions given and using any specific tools necessary.

WARNING

Anyone who performs the operations described herein without strictly following the instructions is personally responsible for resulting injury or damage to property.

WARNING

The Manufacturer and all organizations belonging to the Manufacturer's distribution network, including but not restricted to national, regional or local distributors, will accept no responsibility for personal injury or damage to property caused by abnormal function of parts and/or components not approved by the Manufacturer, including those used for maintenance and/or repair of the product manufactured or marketed by the Manufacturer. In any case, the product manufactured or marketed by the Manufacturer is covered by no guarantee of any kind against personal injury or damage to property caused by abnormal function of parts and/or components not approved by the Manufacturer.

GENERAL INSTRUCTIONS

IMPORTANT NOTICE

All maintenance and repair operations described in this manual should be carried out exclusively by the authorised workshops. All instructions detailed should be carefully observed and special equipment indicated should be used if necessary.

Everyone who carries out service operations described without carefully observing these prescriptions will be directly responsible of deriving damages.

SHIMMING

At each adjustment, select adjusting shims, measure them individually using a micrometer and then sum up recorded values. Do not rely on measuring the whole shimming set, which may be incorrect, or on the rated value indicated for each shim.

ROTATING SHAFT SEALS

To correctly install rotating shaft seals, observe the following instructions:

- Let the seal soak into the same oil as it will seal for at least half an hour before mounting;
- Thoroughly clean the shaft and ensure that the shaft working surface is not damaged;
- Place the sealing lip towards the fluid. In case of a hydrodynamic lip, consider the shaft rotation direction and orient grooves in order that they deviate the fluid towards the inner side of the seal;
- Coat the sealing lip with a thin layer of lubricant (oil rather than grease) and fill the gap between the sealing lip and the dust lip of double lip seals with grease;
- Insert the seal into its seat and press it down using a flat punch. Do not tap the seal with a hammer or a drift;
- Take care to insert the seal perpendicularly to its seat while you are pressing it. Once the seal is settled, ensure that it contacts the thrust element, if required;
- To prevent damaging the sealing lip against the shaft, place a suitable protection during installation.

O RINGS

Lubricate the O rings before inserting them into their seats. This will prevent the O rings from roll over and twisting during mounting, which will jeopardize sealing.

SEALERS

Apply silicone/gasket eliminator over the mating surfaces marked with an X.
Before applying the sealer, prepare the surface as follows:

- remove possible scales using a metal brush;
- thoroughly degrease the surfaces using one of the following cleaning agents: trichlorethylene, diesel fuel or a water and soda solution.

BEARINGS

It is advisable to heat the bearings to 80° to 90°C (176° to 194°F) before mounting them on their shafts and cool them down before inserting them into their seats with external tapping.

SPRING PINS

When mounting split socket spring pins, ensure that the pin notch is oriented in the direction of the effort to stress the pin.

Spiral spring pins should not be oriented during installation.

GENERAL INSTRUCTIONS

PRECAUTIONARY NOTICE

Only authorized workshops should carry out maintenance and repair operations on the tractor, or tractor components. Carefully observe all instructions, safety precautions, and the use of equipment such as special tools, as detailed in this manual. Damage to the tractor, or injury to personnel is the direct responsibility of anyone who fails to observe these precautions.

EQUIPMENT NOTICE

The equipment proposed in this manual is:

- Designed and studied expressly for use on Case IH tractors
- Necessary for adequate and reliable repair of the tractor
- Strictly tested for the efficient and long lasting life cycle of the tractor

SPARE PARTS NOTICE

Genuine CASE IH spare parts guarantee the same quality, safety and life cycle as original components. These parts bear the logo.

GENERAL NOTICES

In this manual, the description 'FRONT', 'REAR', 'RIGHT-HAND' and 'LEFT-HAND' refer to the view seen by the operator while in the operator's seat, looking in the direction in which the tractor normally moves.

Wear limits detailed in this manual, although advised, are not binding.

HEALTH AND SAFETY

CONTENTS

HEALTH AND SAFETY PRECAUTIONS

Many of the procedures associated with vehicle maintenance and repair involve physical hazards or other risks to health. This section lists, alphabetically, some of these hazardous operations and the materials and equipment associated with them. The precautions necessary to avoid these hazards are identified.

The list is not exhaustive and all operations and procedures and the handling of materials, should be carried out with health and safety in mind.

ACIDS AND ALKALIS - see Battery acids, e.g. caustic soda, sulfuric acid.

Used in batteries and cleaning materials.

Irritant and corrosive to the skin, eyes, nose and throat. Causes burns.

Avoid splashes to the skin, eyes and clothing. Wear suitable protective gloves and goggles. Can destroy ordinary protective clothing. Do not breathe mists.

Ensure access to water and soap is readily available for splashing accidents.

ADHESIVES AND SEALERS - see Fire

Highly Flammable, Flammable, combustible.

Generally should be stored in "No Smoking" areas; cleanliness and tidiness in use should be observed, e.g. disposable paper covering benches; should be dispensed from applicators where possible; containers, including secondary containers, should be labelled.

Solvent based Adhesives/Sealers - See Solvents.

Follow manufacturers instructions.

Water based Adhesives/Sealers

Those based on polymer emulsions and rubber lattices may contain small amounts of volatile toxic and harmful chemicals. Skin and eye contact should be avoided and adequate ventilation provided during use.

Follow manufacturers instructions.

Resin based Adhesives/Sealers - e.g. epoxide and formaldehyde resin based.

Mixing should only be carried out in well ventilated areas as harmful or toxic volatile chemicals may be released.

Skin contact with uncured resins and hardeners can result in irritation; dermatitis and absorption of toxic or harmful chemicals through the skin. Splashes can damage the eyes.

Provide adequate ventilation and avoid skin and eye contact. Follow manufacturers instructions.

Anaerobic, Cyanoacrylate and other Acrylic Adhesives

Many are irritant, sensitizing or harmful to the skin. Some are eye irritants.

Skin and eye contact should be avoided and the manufacturers instructions followed.

Cyanoacrylate adhesives (super-glues) must not contact the skin or eyes. If skin or eye tissue is bonded cover with a clean moist pad and get medical attention. do not attempt to pull tissue apart. Use in well ventilated areas as vapours can cause irritation of the nose and eyes.

For two-pack systems see Resin based adhesives/ sealers.

Isocyanate (Polyurethane) Adhesives/ Sealers - see Resin based Adhesives.

Individuals suffering from asthma or respiratory allergies should not work with or near these materials as sensitivity reactions can occur.

Any spraying should preferably be carried out in exhaust ventilated booths removing vapours and spray droplets from the breathing zone. Individuals working with spray applications should wear supplied air respirators.

ANTIFREEZE - see Fire, Solvents e.g. Isopropanol, Ethylene Glycol, Methanol.

Highly Flammable, Flammable, Combustible.

Used in vehicle coolant systems, brake air pressure systems, screenwash solutions.

Vapours given off from coolant antifreeze (glycol) arise only when heated.

Antifreeze may be absorbed through the skin in toxic or harmful quantities. Antifreeze if swallowed is fatal and medical attention must be found immediately.

ARC WELDING - see Welding.

BATTERY ACIDS - see Acids and Alkalis.

Gases released during charging are explosive. Never use naked flames or allow sparks near charging or recently charged batteries.

BRAKE AND CLUTCH FLUIDS (Polyalkylene Glycols) - see Fire.

Combustible.

Splashes to the skin and eyes are slightly irritating. Avoid skin and eye contact as far as possible. Inhalation of vapour hazards do not arise at ambient temperatures because of the very low vapour pressure.

BRAZING - see Welding.

CHEMICAL MATERIALS - GENERAL - see Legal Aspects.

Chemical materials such as solvents, sealers, adhesives, paints, resin foams, battery acids, antifreeze, brake fluids, oils and grease should always be used with caution and stored and handled with care. They may be toxic, harmful, corrosive, irritant or highly inflammable and give rise to hazardous fumes and dusts.

The effects of excessive exposure to chemicals may be immediate or delayed; briefly experienced or permanent; cumulative; superficial; life threatening; or may reduce life-expectancy.

DO'S

Do remove chemical materials from the skin and clothing as soon as practicable after soiling. Change heavily soiled clothing and have it cleaned.

Do carefully read and observe hazard and precaution warnings given on material containers (labels) and in any accompanying leaflets, poster or other instructions. Material health and safety data sheets can be obtained from Manufacturers.

Do organise work practices and protective clothing to avoid soiling of the skin and eyes; breathing vapours/aerosols/dusts/fumes; inadequate container labelling; fire and explosion hazards.

Do wash before job breaks; before eating, smoking, drinking or using toilet facilities when handling chemical materials.

Do keep work areas clean, uncluttered and free of spills.

Do store according to national and local regulations.

Do keep chemical materials out of reach of children.

SECTION 10 - ENGINE

Chapter 1 - Engine (Three-Cylinder)

CONTENTS

SPECIFICATIONS

Engine type:	
– Models JX1060C (Naturally Aspirated)	8035.05C/919
– Models JX1070C (Turbocharged)	8035.25R/919
– Models JX1075C (Turbocharged)	8035.25/919
Cycle	diesel, 4–stroke
Injection	direct
Number of on–line cylinders	3
Piston diameter	
– Models JX1060C	104 mm (4.09 in)
– Models JX1070C	104 mm (4.09 in)
– Models JX1075C	104 mm (4.09 in)
Piston stroke	115 mm (4.53 in)
Total displacement:	
– Models JX1060C	2931 cm^3 (178.85 in^3)
– Models JX1070C	2931 cm^3 (178.85 in^3)
– Models JX1075C	2931 cm^3 (178.85 in^3)
Compression ratio for Models JX1060C	17:1 naturally aspirated
Compression ratio for Models JX1070C, JX1075C	16.5:1 turbocharged
Maximum power:	
– Models JX1060C	gross 57 hp net 55 hp
– Models JX1070C	gross 70 hp net 67 hp
– Models JX1075C	gross 75 hp net 72 hp
Maximum power speed	2300 rpm
Maximum speed no load	2450 – 2500 rpm
Maximum torque speed for Models JX1060C	1400 rpm
Maximum torque speed for Models JX1070C	1400 rpm
Maximum torque speed for Models JX1075C	1400 rpm
Number of main bearings	4
Sump pan	structural, cast iron

Speedometer/tachometer	incorporated in control panel
Operating system	from gear on camshaft
Hour counter calibrated for engine speed of	1800 rpm

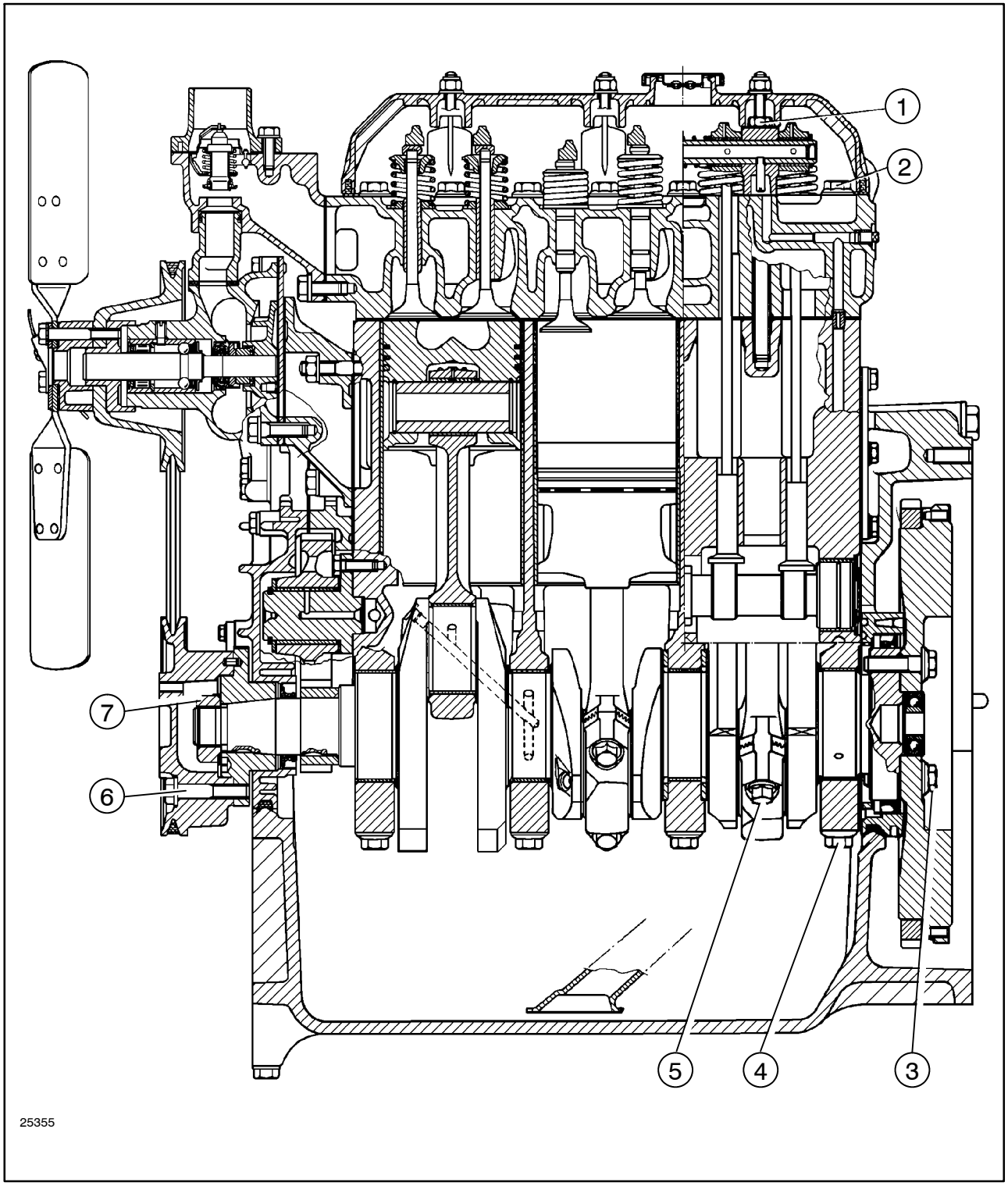
(continued)

Timing system	overhead valves operated by tappets, rods and rocker arms via the camshaft located in the engine block; the camshaft is driven by the crankshaft using helical gears
Intake:	
- start: before TDC.	12°
- end: after BDC.	31°
Exhaust:	
- start: before BDC.	50°
- end: after TDC.	16°
Valve-rocker arm clearance for timing check	0.45 mm (0.0177 in)
Valve-rocker arm clearance (with engine cold):	
- intake	0.30 ± 0.05 mm (0.011 ± 0.0019 in)
- exhaust	0.30 ± 0.05 mm (0.011 ± 0.0019 in)

CRANKCASE/CYLINDER BLOCK DATA	**mm (in)**
Cylinder Block	cast-iron monobloc with parent-bore cylinders, incorporating seatings for crank-shaft, camshaft and tappets
Internal diameter of cylinders	104.000 to 104.024 (4.0944 to 4.0954) ([1])
Cylinder internal diameter oversizes	0.4 to 0.8 (0.0157 to 0.0314)
Maximum permissible cylinder ovality or taper due to wear	0.12 (0.0047)
Main journal half bearing seat diameter	84.200 to 84.230 (3.3149 to 3.3161)
Camshaft bushing seat diameter:	
- front	54.780 to 54.805 (2.1566 to 2.1576)
- intermediate	54.280 to 54.305 (2.1370 to 2.1379)
- rear	53.780 to 53.805 (2.1173 to 2.1183)
Diameter of standard tappet bores in crankcase	15.000 to 15.018 (0.5905 to 0.5912)
Tappet oversizes	0.1 - 0.2 - 0.3 (0.0039 - 0.0078 - 0.0118)

([1]) Measure in the area swept by piston rings, both parallel and perpendicular to the crankshaft axis.

SECTIONAL VIEWS



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Longitudinal section of engine (models JX1060C)

1. Rocker Shaft Pedestal Bolts
2. Cylinder Head Bolts
3. Flywheel Mounting Bolts
4. Main Bearing Cap Bolts
5. Big-end Cap Bolts
6. Fan and Alternator Bolts
7. Crankshaft Hub Retaining Nut

OVERHAUL

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ENGINE

Removal

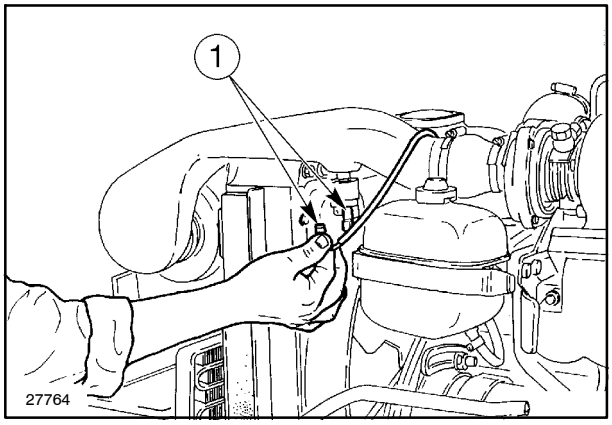
DANGER

Lift and handle all heavy parts using suitable lifting equipment.
Make sure that assemblies or parts are supported by means of suitable slings and hooks. Make sure that no one is standing in the vicinity of the load to be lifted.

WARNING

Always use appropriate tools to align fixing holes. NEVER USE YOUR FINGERS OR HANDS.

1. Carry out operation **18 110 10,** Clutch Removal (see Sect. 18).
2. Remove the clogged air filter sensor connection (1).



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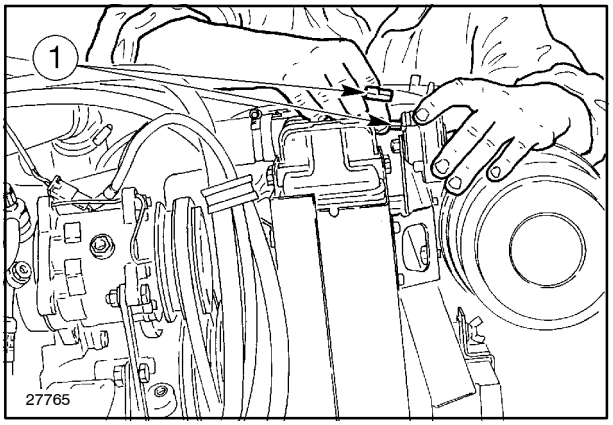
3. Disconnect the horn connection (1).



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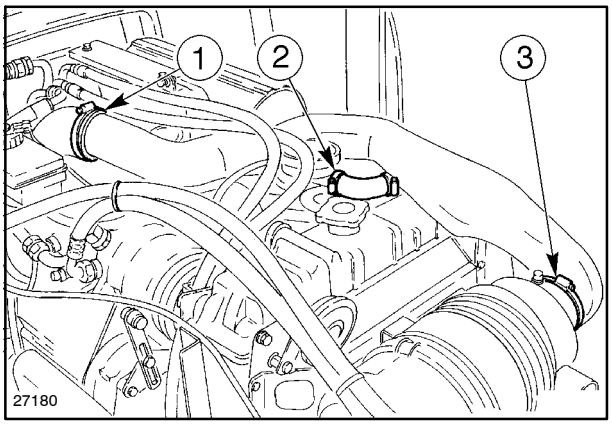
4. Loosen the clamps (1, 2 and 3) and remove the inlet manifold.



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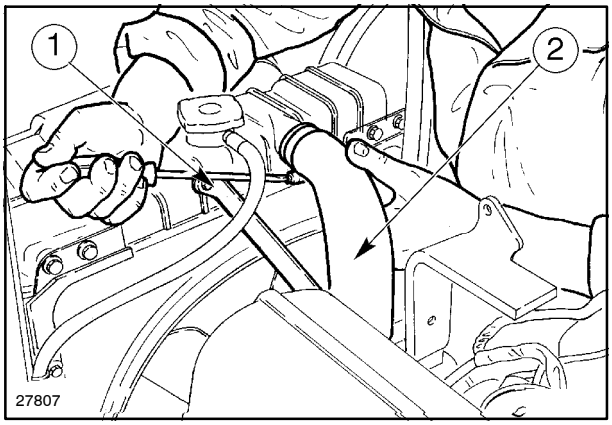
5. Unscrew the band clamps and detach the upper (2) and lower radiator hoses, detach the radiator bracket (1).
6. Position two fixed stands under the front axle support and under the engine. Attach the chains so that the engine is balanced during hoisting and position two wood blocks between the support and the front axle, to prevent oscillation.



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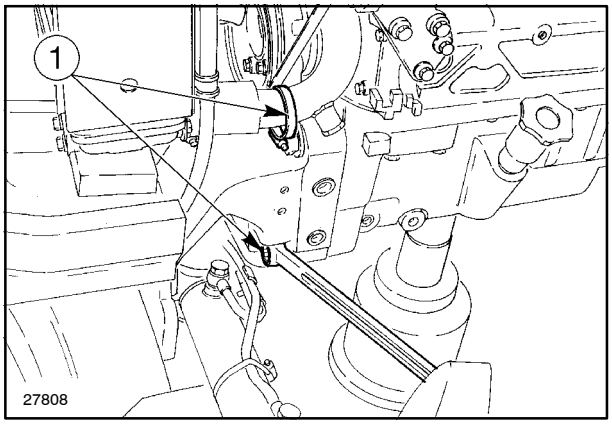
7. Loosen the front axle support retaining bolts (1).
8. Remove the engine from the axle-support unit.



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Installation

⚠ WARNING ⚠

Always use appropriate tools to align fixing holes. NEVER USE YOUR FINGERS OR HANDS.

Apply the prescribed tightening torques. See the "Contents".

1. Install the front axle-support unit on the engine.
2. Connect and secure the upper and lower radiator hoses and the connecting bracket.
3. Install and secure the inlet manifold.
4. Connect the horn and clogged air filter connections.
5. Carry out operation **18 110 10,** Clutch Installation (see Sect. 18).

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Compression Test

In case of poor engine performance, in addition to checking the fuel injection system (injection nozzles and injection pump), also test the compression on each cylinder.

⚠ DANGER ⚠

Do not use matches, lighters, blow torches or any form of naked flame as a source of light when inspecting the engine due to the presence of inflammable fluids and vapor.

Compression Ratio

The compression ratio is a measure of the quantity of air drawn into the cylinder, and provides an indication of the efficiency of the sealing elements in the cylinder (piston rings and valves).

Uniform compression in all the cylinders ensures that they all perform an equal amount of work, provided that each cylinder is injected with the same quantity of fuel at the right time.

Low compression not only reduces engine performance, it also causes incomplete fuel combustion due to the lack of available combustion air.

The engine therefore gives poor performance with excessive fuel consumption and, consequently, exhaust smoke and restriction of the exhaust passages.

As the compression ratio also varies with the temperature of the engine (cold engines produce lower compression values than hot engines), the compression should only be tested when the engine is at normal operating temperature.

Compression should be tested using the compression test kit **380000303**, as follows:

1) Run the engine until it reaches normal operating temperature;
2) Switch off the engine;
3) Disconnect the lead from the engine stop electromagnet on the injection pump in order to close the valve and block the flow of fuel to the injectors;
4) Remove the injector from the cylinder to be tested;
5) Turn the engine over a few times with the starter motor in order to expel any carbon residue;
6) Fit the dummy injector **380000617**, in place of the injector removed previously, interposing the copper sealing washer;
7) Connect the compression test instrument **380000303** and take readings while turning the engine over with the starter motor.

   On engines in perfect working order, with the sump oil at approx. 40°C (104°F) at sea level (760 mm [29.92 in.] of mercury) and at an engine speed of 200 to 280 rpm, the compression should be 25 to 27 bar (369 to 398 psi).
8) Test the compression on the other cylinders, repeating steps 4-5-6-7, bearing in mind that:

   The minimum permissible compression on a used engine is 21 bar (313 psi).

   The maximum permissible compression difference between cylinders is 3 bar (43 psi).

   Every 100 meters (109.36 yards) above sea level corresponds to a reduction in compression by approx. 1%.

Uniform Compression

Although high compression is important, it is more important for smooth engine running that compression is uniform in all cylinders.

Low compression readings

If extremely low pressure readings are obtained on one cylinder it is advisable to repeat the test.

Before testing this time, pour approx. one spoonful of engine oil into the cylinder through the injector bore.

Turn over the engine a few times to distribute the oil evenly over the cylinder walls, and then repeat the test.

If the second test readings are significantly higher, suspect worn piston rings, out-of-round or damaged pistons or cylinders.

If the second test readings are not higher, the problem will be the valves.

On the other hand, if the second test reading shows only a slight improvement, the problem will be due to both the valves and the rings.

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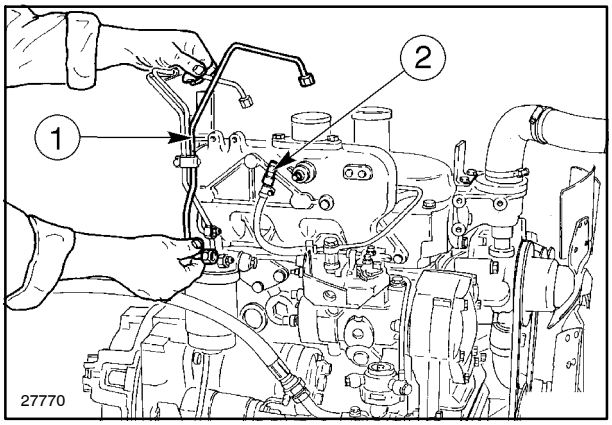
Disassembly

⚠ WARNING ⚠

Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

1. Disconnect the thermostarter union (2), the inlet line retaining unions from the injection pump, the injectors, and the piping (1).



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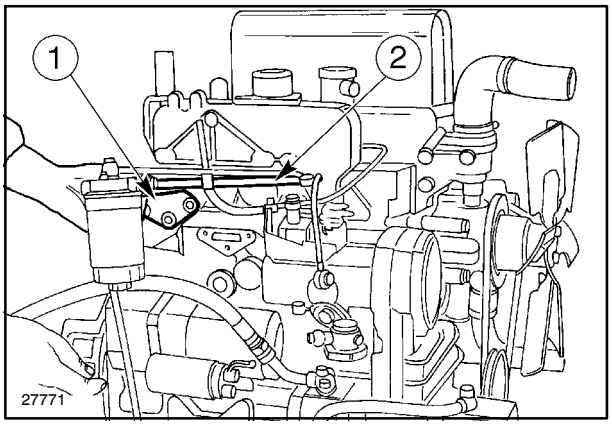
2. Disconnect the fuel filter lines (2) to the injection pump and the support retaining bolts (1). Remove the fuel filter.



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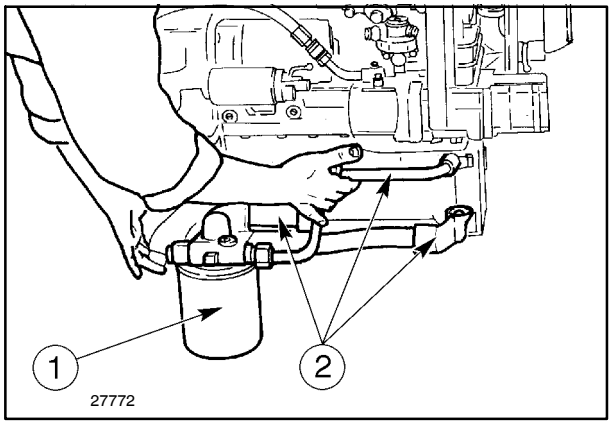
3. Disconnect the hydraulic piping (2) the oil filter (1) retaining bolts complete with the support, and remove from the engine.



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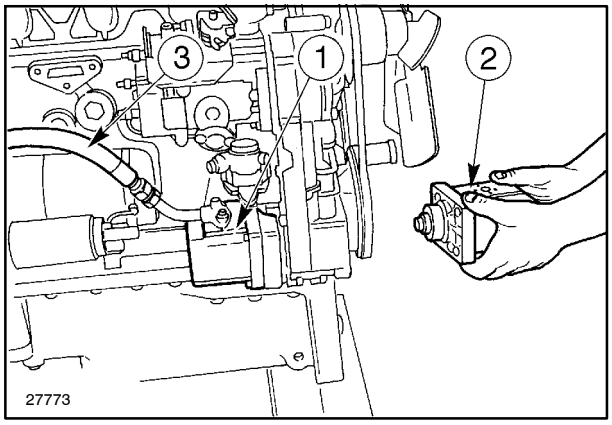
4. Remove the lift (2) and steering (1) hydraulic pumps and remove the piping (3).



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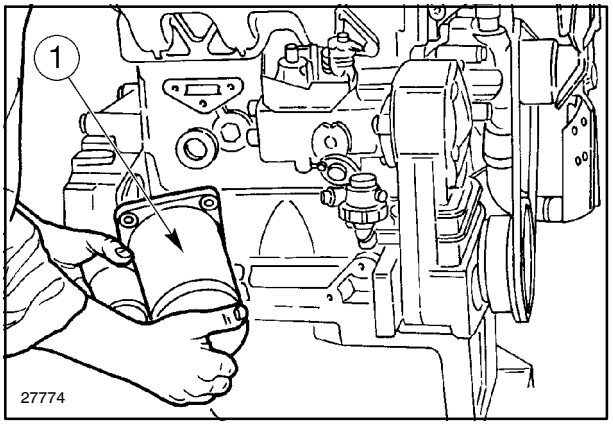
5. Unscrew the retaining bolts and remove the starter motor (1).



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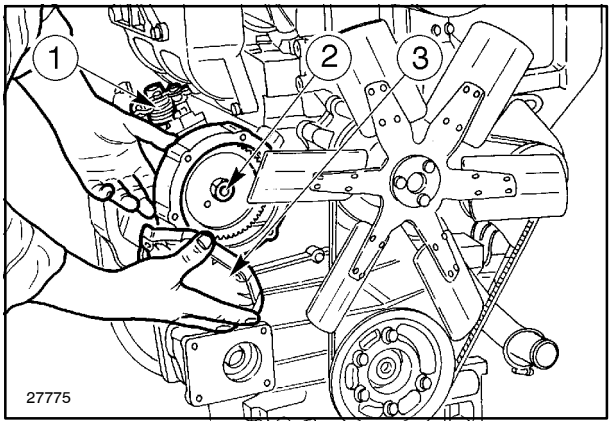
6. Unscrew the retaining bolts and remove the cover (3), loosen the retaining nut (2) on the injection pump (1) and remove from the opposite side.



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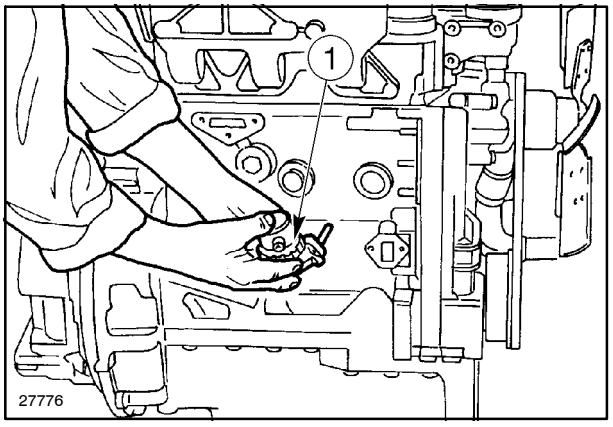
7. Unscrew the retaining nuts and remove the fuel pump (1).



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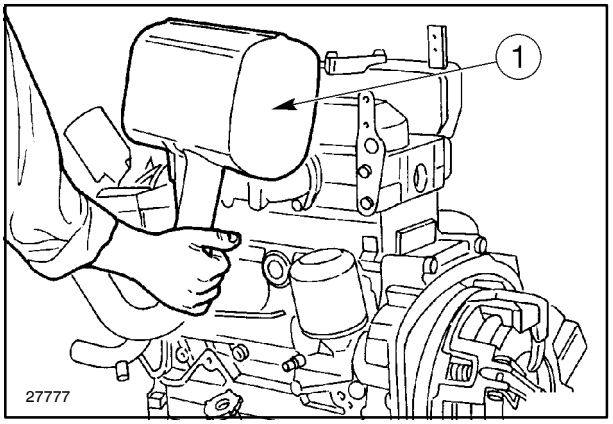
8. Unscrew the retaining bolts and remove the exhaust muffler (1) complete with the vertical pipe. On models with horizontal exhaust pipes, remove when disassembling the engine.



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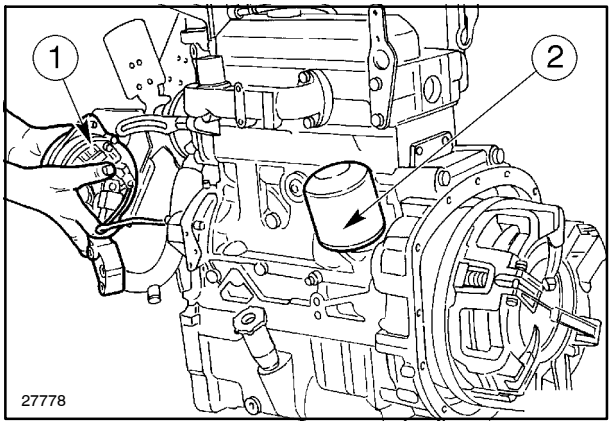
9. Unscrew the retaining bolts, remove the alternator (1) and recover the drive belt.
10. Remove the engine oil filter (2).



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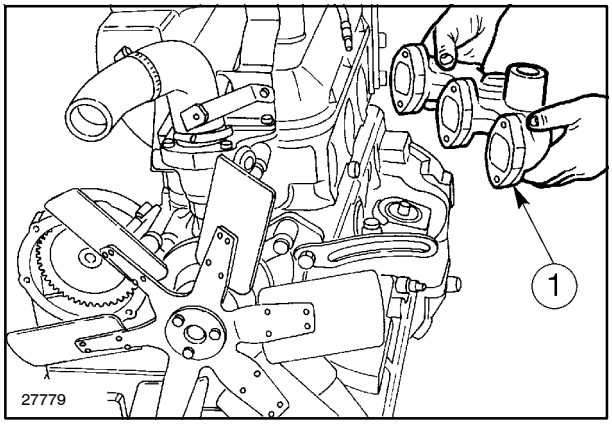
11. Unscrew the retaining bolts and remove the exhaust manifold (1).



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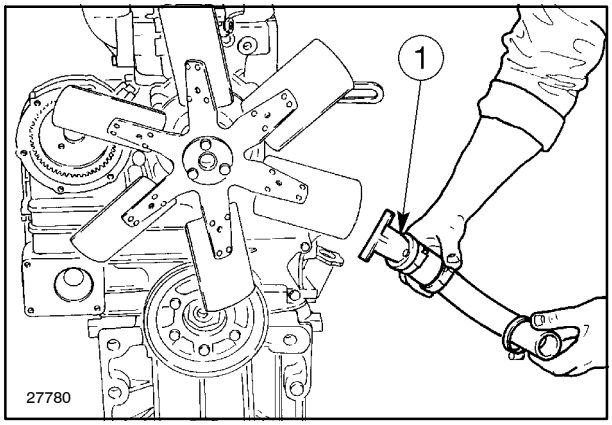
12. Unscrew the retaining bolts and detach the coolant pump hose(1).



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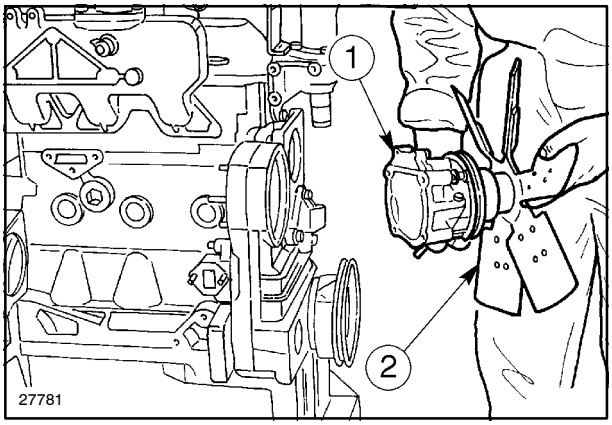
13. Unscrew the retaining bolts and detach the coolant pump (1) complete with fan (2).



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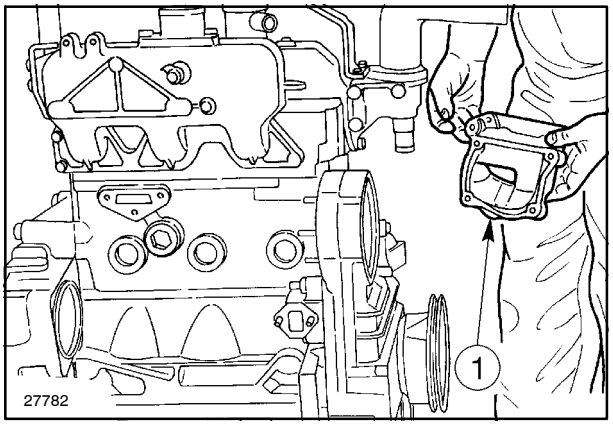
14. Unscrew the retaining bolts and detach the coolant pump support (1).



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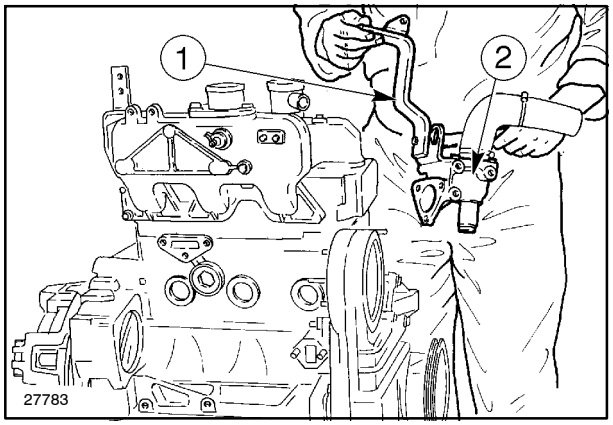
15. Unscrew the retaining bolts and disconnect the thermostatic valve unit (2) complete with bracket (1).



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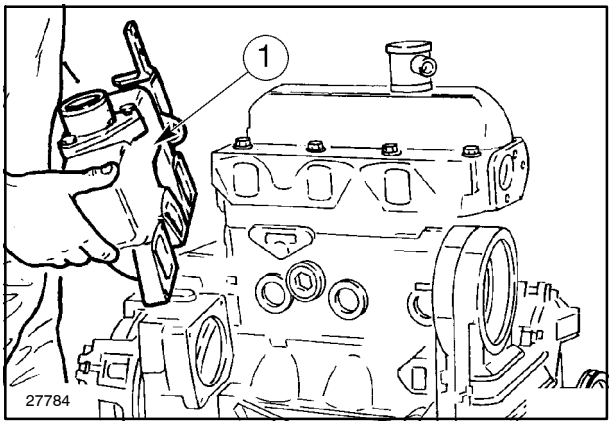
16. Unscrew the retaining bolts and remove the inlet manifold (1).



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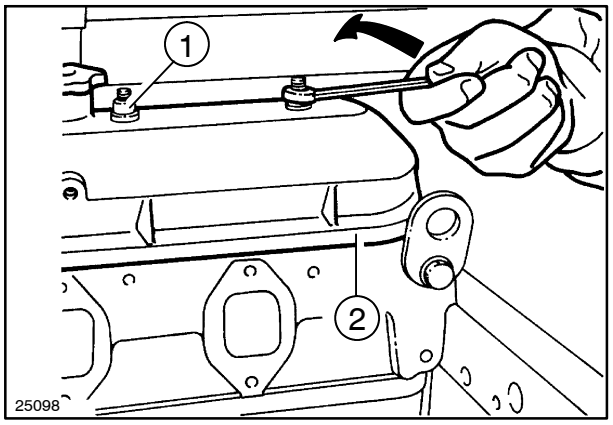
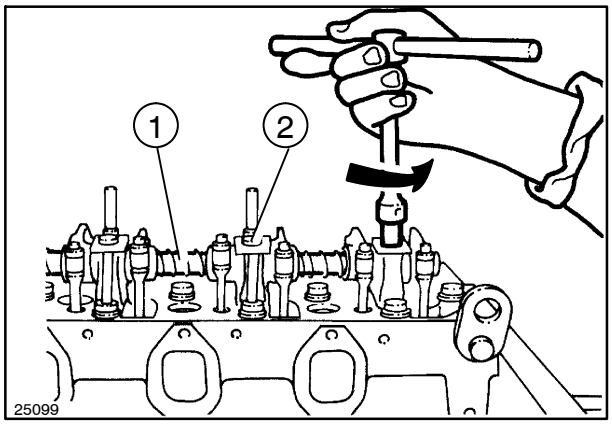
17. Remove the injector mounting nuts, the underlying spherical washers, then the supports and the injectors themselves.
18. Remove the rocker cover bolts (1), washers and seals, and then the rocker cover (2) and the gasket.



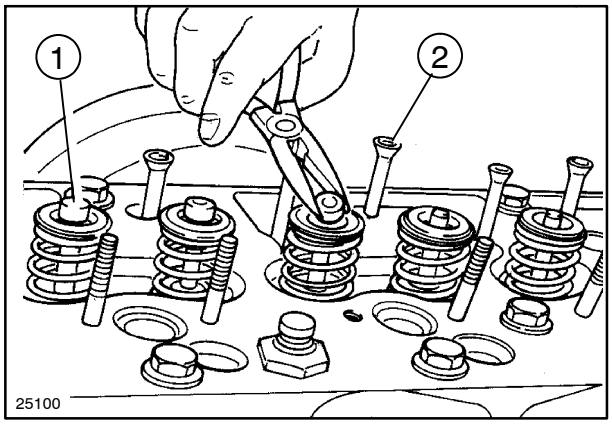
24

19. Remove the rocker shaft retaining bolts (2), then remove the entire rocker shaft assembly (1).



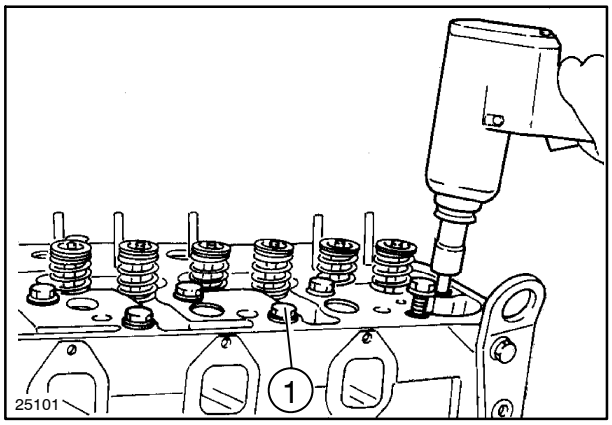
25

20. Remove the valve collets (1) and extract the pushrods (2).



26

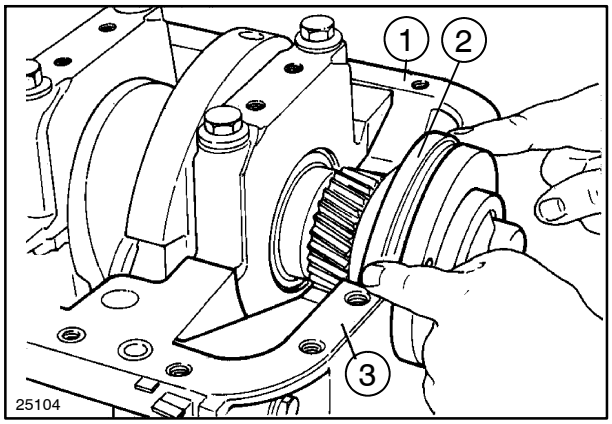
21. Unscrew the cylinder head bolts (1) and remove the head using a hoist and lifting hook **380000216**.
22. Remove the cylinder head gasket.



27

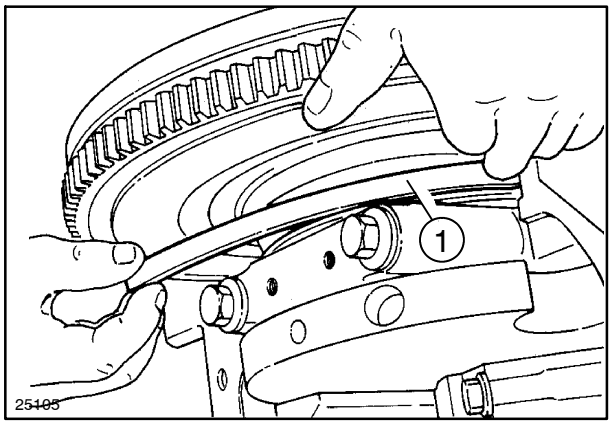
23. Unscrew the sump pan retaining bolts and remove the sump pan using a hoist, lifting hook **380000216** and lifting chain with eyeholes.
24. Remove the half-gaskets (1) and (3) between the crankcase and sump pan and the gasket (2) between the timing gear carrier and sump pan.

NOTE: *When reinstalling gaskets (1) and (2, fig. 28), apply RHODORSIL CAF1 silicone sealing compound to the mating surfaces.*



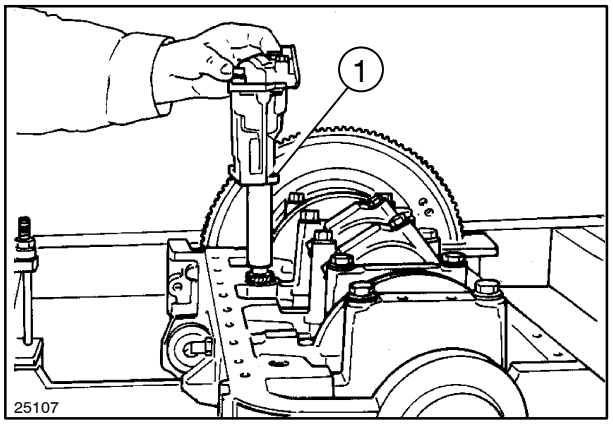
28

25. Remove the gasket (1) between the flywheel carrier and the sump pan.



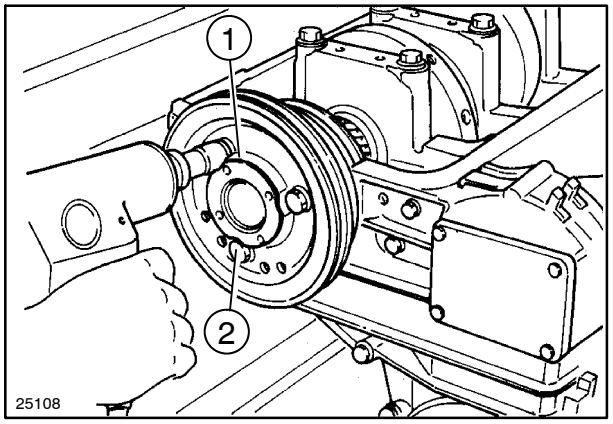
29

26. Unscrew retaining bolts (1) and remove the complete oil pump (non-turbo version shown).



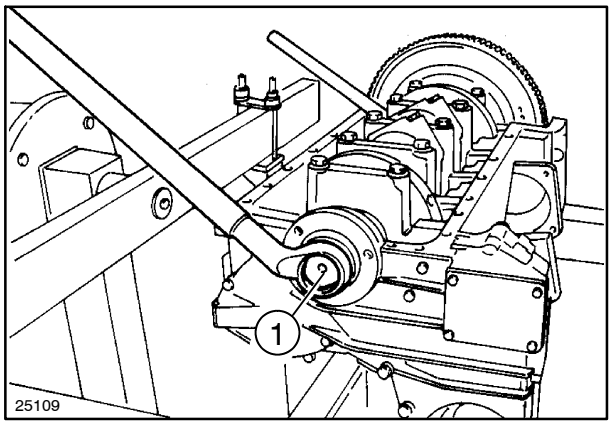
30

27. Unscrew the retaining bolts (2) and remove the crankshaft pulley (1).



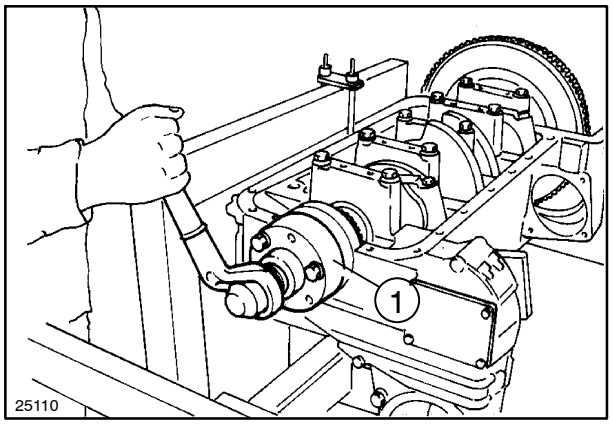
31

28. Straighten the lock tab, securing the crankshaft against rotation and unscrew nut (1).



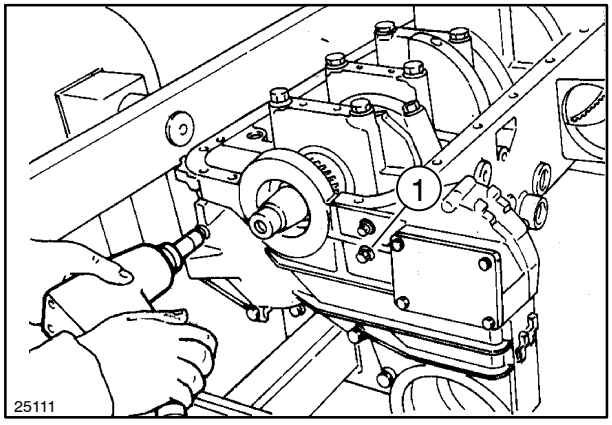
32

29. Pull the pulley hub off the crankshaft using tool **380000226** (1) and recover the woodruff key.



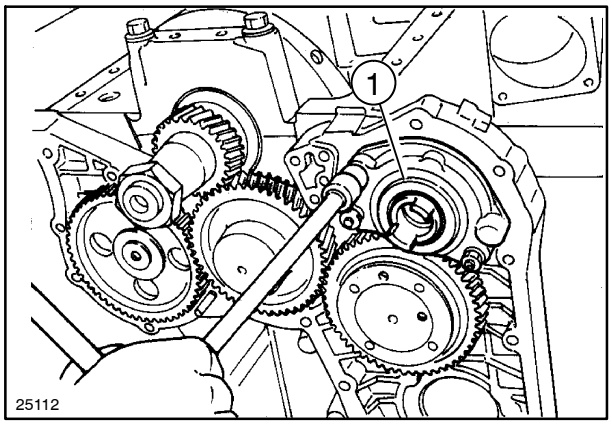
33

30. Unscrew the retaining bolt (1) and remove the timing cover and gasket.



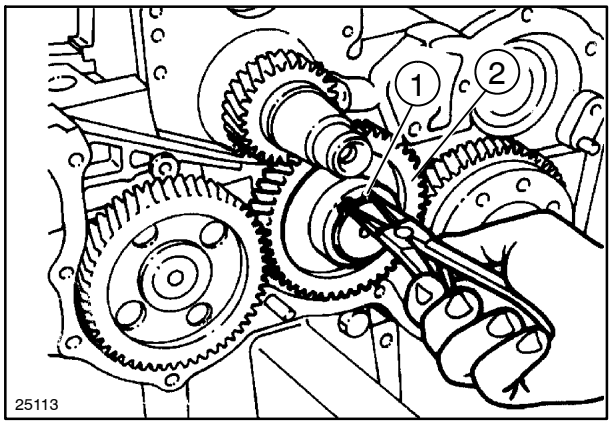
34

31. Unscrew the retaining bolts and remove the lift pump drive gear carrier (1).



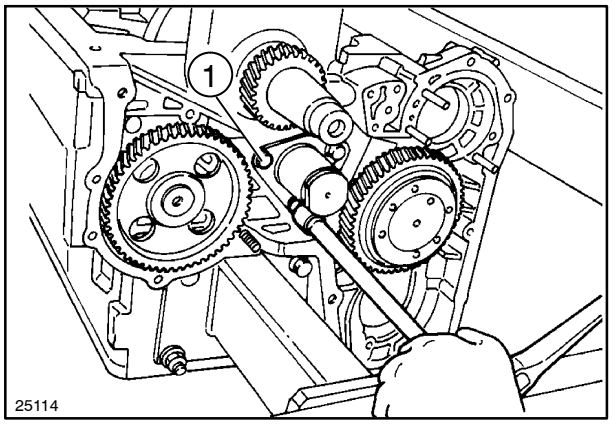
35

32. Remove the circlip (1) and recover the thrust washer and the intermediate gear (2):



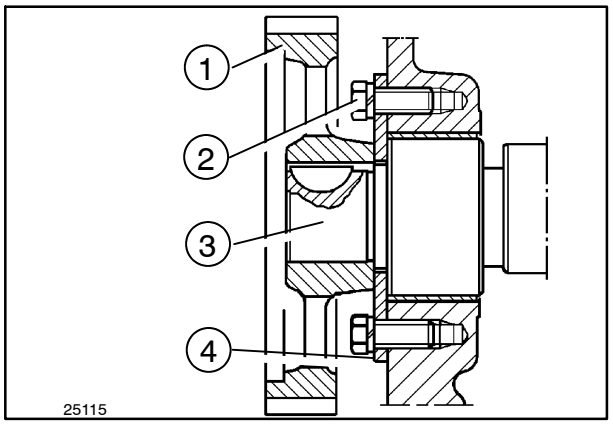
36

33. Unscrew the retaining bolts (1) and remove the intermediate gear journal.



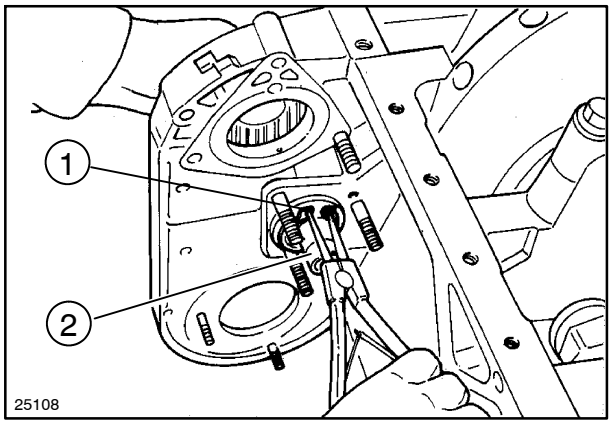
37

34. Unscrew the retaining bolts (2) and withdraw the camshaft (3) complete with the camshaft gear (1) and the end plate (4).



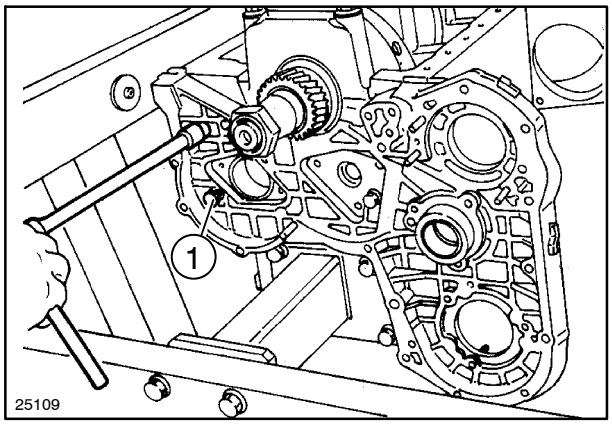
38

35. Remove the circlip (1) and the thrust washer, and withdraw the gear with fuel supply pump camshaft (2) from the opposite side.



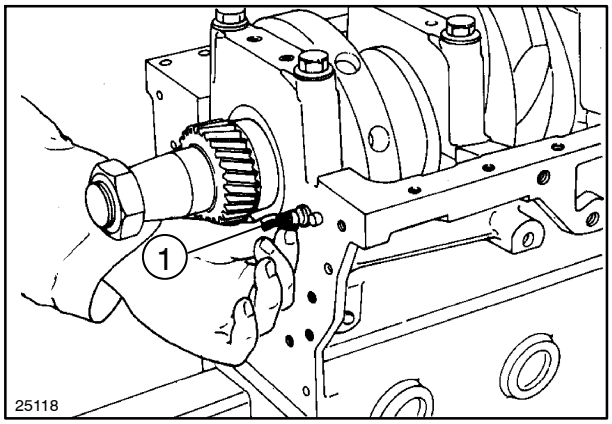
39

36. Unscrew the retaining bolts (1) and remove the timing gear case.



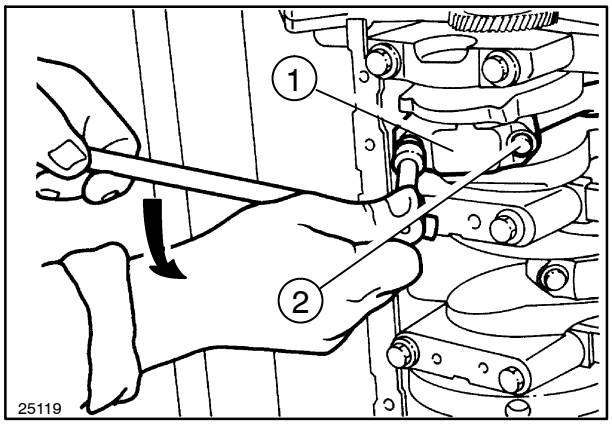
40

37. Replace the O-ring seal (1) installed in the lift pump drive shaft lubrication line.
38. Remove the crankcase - timing gear case gasket.



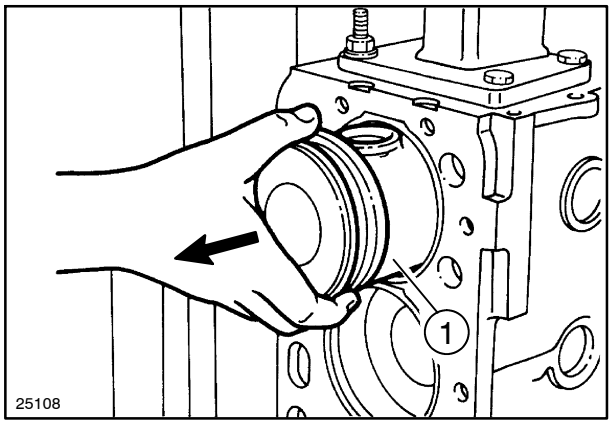
41

39. Rotate the engine through 90°on the stand. Unscrew the big-end cap bolts (2) and recover the big-end caps (1) with their half shell bearings.



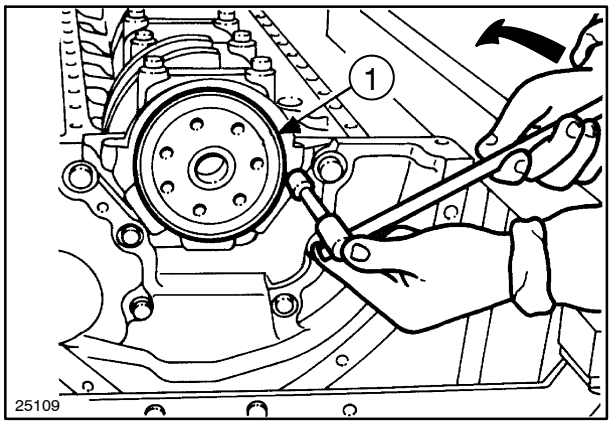
42

40. Slide the pistons (1), complete with rings, wrist pins and connecting rods, out of the cylinders.



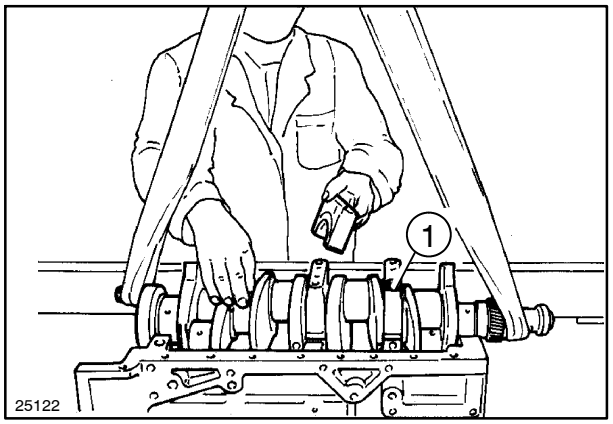
43

41. Rotate the engine on the stand through 90° back to the horizontal position. Unscrew the flywheel bolts and remove the flywheel with the aid of a hoist and hook **380000216**.
42. Unscrew the retaining bolts and remove the rear oil seal carrier (1) complete with gasket.



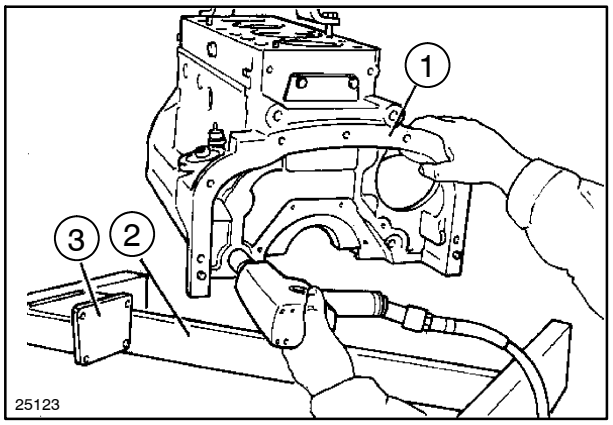
44

43. Unscrew the main bearing cap bolts (1), and remove the main bearing caps with relative bearing shells, and recover the thrust washers located on the penultimate main bearing, as shown in the figure.
44. Lift the crankshaft clear of the crankcase using a hoist and nylon sling. Recover the bearing shells, thrust washers and tappets.



45

45. Rotate the engine through 180° on the stand **380000301** (2). Attach the lifting chain with eye holes to the crankcase, as shown in the figure. Raise the hook **380000216**, unscrew the bolts securing the crankcase to the stand (2) and mounting bracket (3) from set **380000313**.
46. Lift the engine clear of the stand.
47. Unscrew the retaining bolts and remove the rear crankcase housing (1) and its gasket.



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Assembly

⚠ WARNING ⚠

Handle all parts carefully, do not put your hands or fingers between parts and use appropriate tools to align fixing holes.
Wear the prescribed safety clothing, including goggles, gloves and safety footwear.

Assemble the engine by performing the disassembly procedures in reverse order, and with the following requirements:

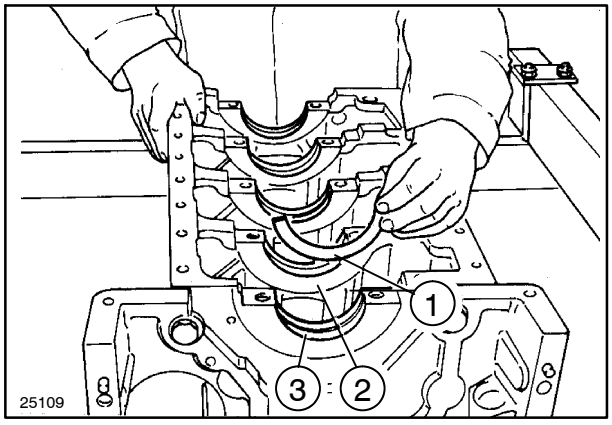
- Thoroughly clean all parts before assembling the engine.
- Apply the prescribed tightening torques. See table of contents.
- Replace all seals before assembling the engine.
- Before inserting rotating parts and seals in seats, lubricate the parts with engine oil.
- When installing the oil filter, lubricate the seal with engine oil.

Crankshaft, Main Bearings and Thrust Rings

1. Install the tappets in their crankcase bores.

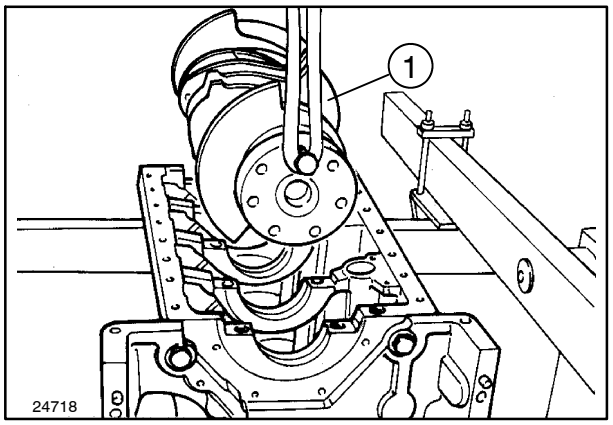
2. Lubricate the main bearing seats with engine oil and install the half-shell bearings (3).

3. To facilitate installation, apply grease to the thrust rings, then insert crankshaft semi-circular thrust washers, 1.



47

4. Lubricate the upper surfaces of the main bearing shells with engine oil and lower the crankshaft (1) into position, taking care not to dislodge the semi-circular thrust washers installed previously.



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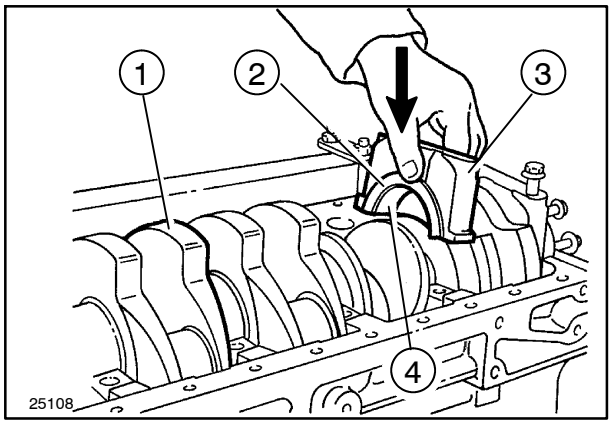
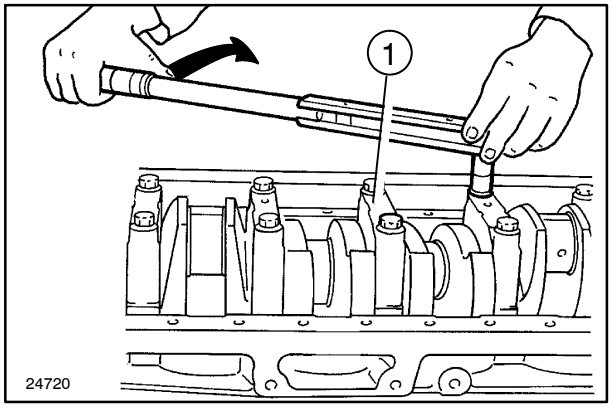
5. Lubricate the crankshaft journals with engine oil and install the main bearing caps (3) with the half-shells (4), installing the top semi-circular thrust washers (2) to the thrust bearing cap (3).
6. Rotate the crankshaft (1) a few times to allow the parts to settle into position.
7. Insert the main bearing cap bolts and screw in until the head of the bolt is up against the cap.



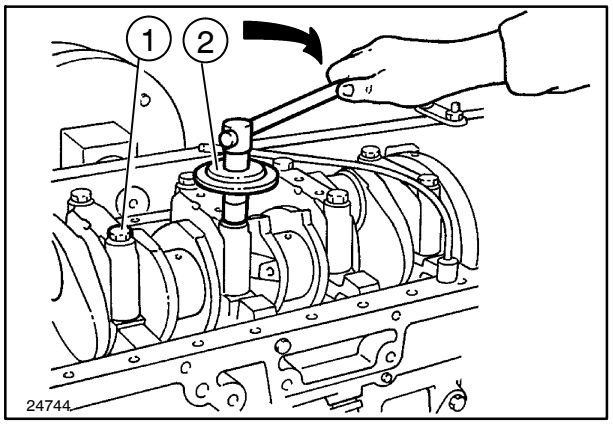
49

8. Tighten all cap bolts (1) to a torque of 80 Nm (59 lb-ft).



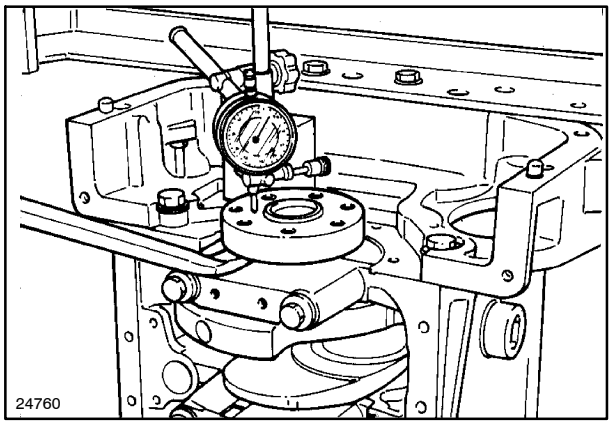
50

9. Using tool **380000304** (2), tighten each cap bolt (1) through a further 90°.



51

10. Check that the crankshaft endfloat does not exceed the value specified. See the “Specifications”.



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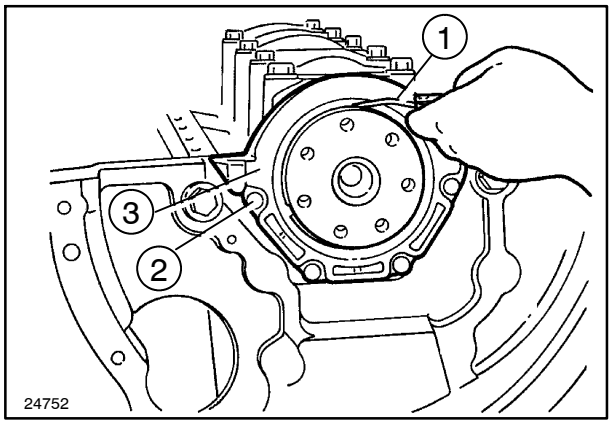
Rear Cover, Crankshaft Seal and Engine Flywheel

– Install the rear oil seal carrier (3) with the outer seal. Tighten the retaining bolts (2). See “Tightening Torques” – refer to “Contents”. Using a feeler gauge (1), check that the crankshaft flange is centered in the carrier.



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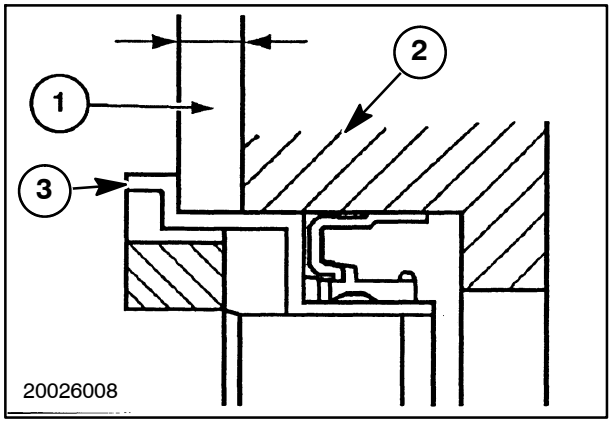
Oil leakage from the crankshaft rear oil seal will result if the seal is not handled or installed correctly. The correct handling and installation procedures are as follows:

1. The seal that was originally installed had a 6mm (0.236 in) gap, (1) between the seal housing (2) and the molded plastic insert (3).



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IMPORTANT: *The seal is preassembled with a protective molded plastic insert.*

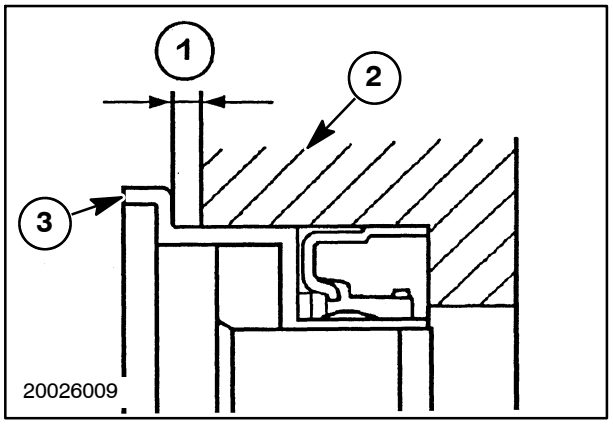
Carefully handle the seal by the molded plastic insert only.

The insert protects the seal from any damage during parts stock and during installation.

The protective molded plastic insert MUST NOT be removed or rotated in the seal prior to installation.

The insert should only be removed after the new seal has been completely installed as detailed in these instructions.

2. The machined sealing surface area of the crankshaft **MUST NOT** be cleaned using any type of abrasive paper.
3. The new seal lip should never be positioned in the exact same location on the crankshaft as the previous seal that was removed. This is to prevent the new seal lip from riding in the wear groove made by the previous seal lip.
4. The first replacement seal should be installed with a gap (1) of 3.8 to 4 mm (0.150 to 0.157 in) between the seal housing (2) and the molded plastic insert (3).



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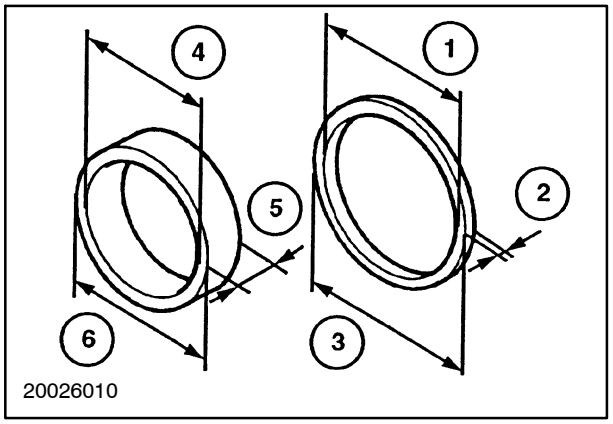
5. The seal, complete with the insert, must only be installed using the special made tools described below.

NOTE: *The spacer is used for the correct clearance gap of 3.8 to 4 mm (0.150 to 0.157 in). The installer bushing is used to install the seal into the housing.*

(See dimensions for the spacer and installer bushing as shown)

1. Spacer ID: 135.5 to 136 mm (5.335 to 5.354 in)
2. Spacer Width: 3.8 to 4 mm (0.150 to 0.157 in)
3. Spacer OD: 145 mm (5.709 in)
4. Installer Bushing: 115 mm (4.527 in)
5. Installer Bushing Width: 30 mm (1.181 in)
6. Installer Bushing OD: 129 mm (5.079 in)



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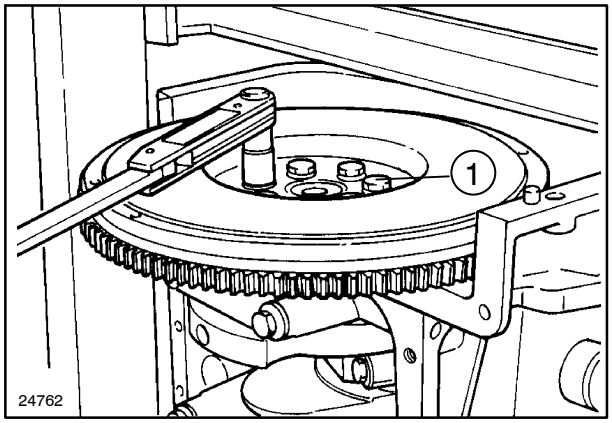
Seal Installation

6. Lightly oil the crankshaft seal area with new engine oil.
7. Install the spacer onto the molded plastic insert. Use the installed bushing to push the seal into position in the seal housing.
8. Ensure that the seal is installed evenly around the full circumference (the spacer should be against the molded plastic insert and the housing all the way around).

NOTE: *The molded plastic insert should not be removed until the seal is correctly positioned.*

IMPORTANT: *The engine* ***MUST NOT*** *be started within* ***24 HOURS*** *of the seal installation and plastic insert removal. This is required to allow the seal to expand and settle onto the crankshaft after the molded plastic insert is removed.*

– Install the flywheel and tighten the retaining bolts (1) to a torque of 40 Nm (30 lb-ft).



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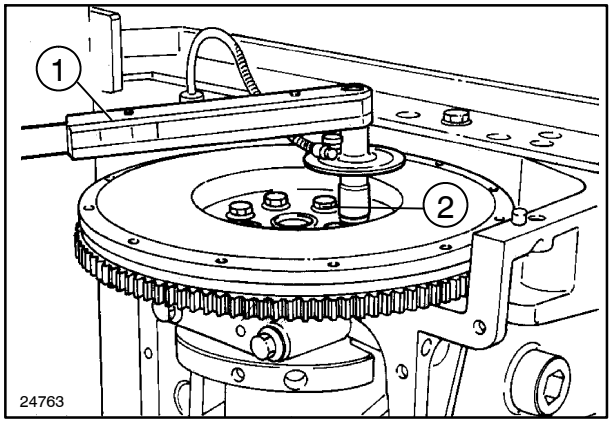
– Using tool **380000304** (1), tighten each flywheel bolt (2) through a further 60°.



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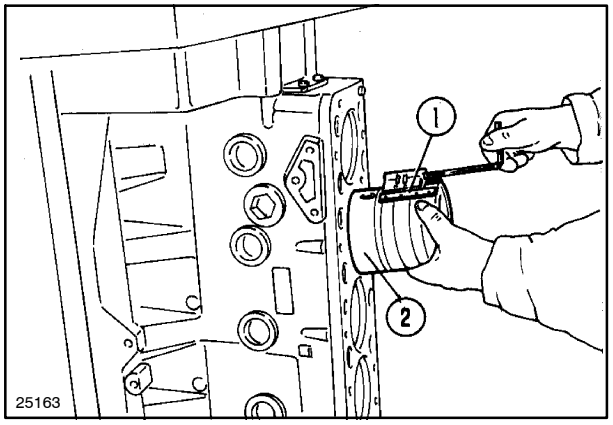
Pistons with Rings, Pins, Connecting Rods, Big End Caps and Bearings

1. Lubricate pistons, rings and cylinders with engine oil prior to fitting.
2. Using the piston ring pliers **380000221** install the piston rings. Make sure that the piston ring gaps are offset at 180°.
3. Install piston ring clamp **380000220** (1) to compress the rings (2), making sure that the piston ring gaps remain in the positions specified in the previous point.



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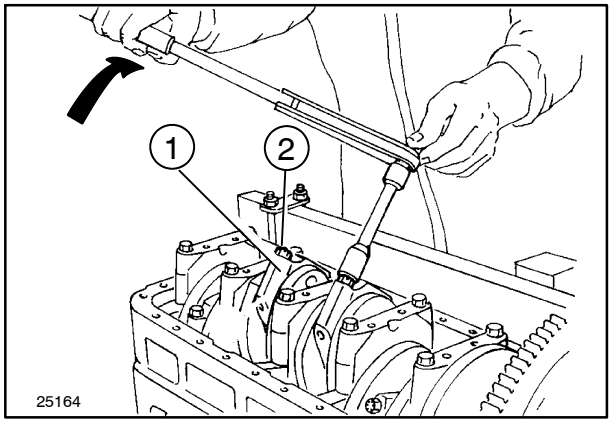
4. Insert the piston / connecting rod into the cylinder, checking that the connecting rod number corresponds with the cylinder number and that the number stamped on the connecting rod is facing away from the camshaft.
5. Install the big-end caps (1), complete with shells, to the crankpins and tighten the cap bolts (2) to a torque of 40 Nm (30 lb-ft).



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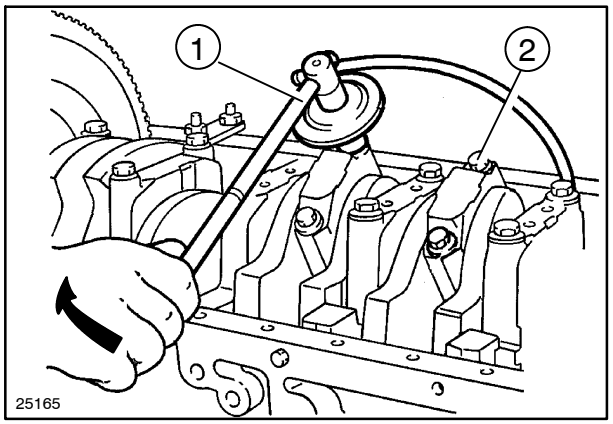
6. Using tool **380000304** (1), tighten each big-end cap bolt (2) through a further 60°.



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