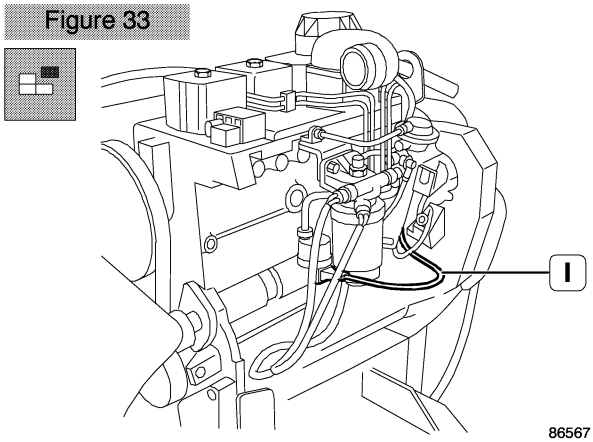
ENGINE BENCH-OVERHAUL

Disassembling the engine

Figure 33



Drain the engine oil by taking the cap off the sump and the oil filling cap off the head cover.

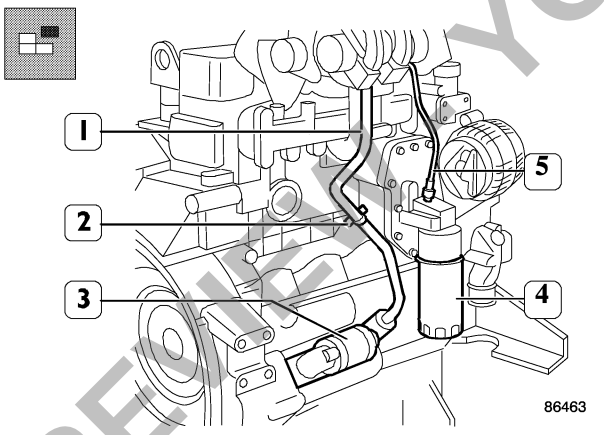
Remove the fan unit from the fan pulley.

In order to be able to fit bracket 380000995 (which fastens the engine to the overhaul stand) to the crankcase, it is necessary to:

- ❑ remove electric wiring (1).

from the engine left side.

Figure 34



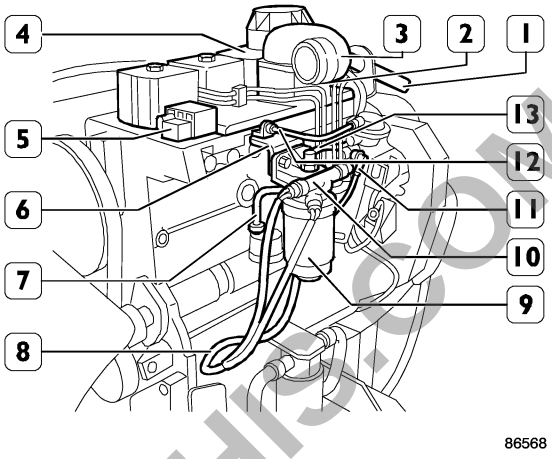
In order to be able to fit bracket 380000995 to the crankcase on the right side, it is necessary to remove:

- ❑ the fastening bracket (2) of the harness (1);
- ❑ the harness (1);
- ❑ the starter motor (3);

Secure the engine to rotary stand 380000978.

- ❑ take off turbine lubrication delivery pipe (5);
- ❑ detach the oil filter (4).

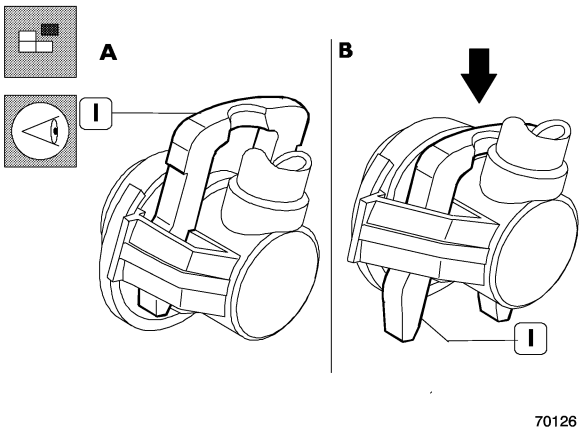
Figure 35



Version F4GE0484G

- ❑ take off intake manifold (3);
- ❑ disconnect the engine oil vapour recovery pipe from blow-by (1);
- ❑ take off tappet covers (4);
- ❑ disconnect electric wiring (8);
- ❑ take off fuel filter (9);
- ❑ take off container (2);
- ❑ take off container control unit (5);
- ❑ disconnect the piping from L.D.A. system (13);
- ❑ disconnect quick-coupling pipes (7), (10), (11) and (13), by following the indications given in Figure 36;
- ❑ take off fuel filter support (6).

Figure 36



Act on fork (1) as shown in the figure (detail A), then remove the adapter. To avoid damaging the same, bring fork (1) back to the locking position (detail B) after the adapter has been removed.

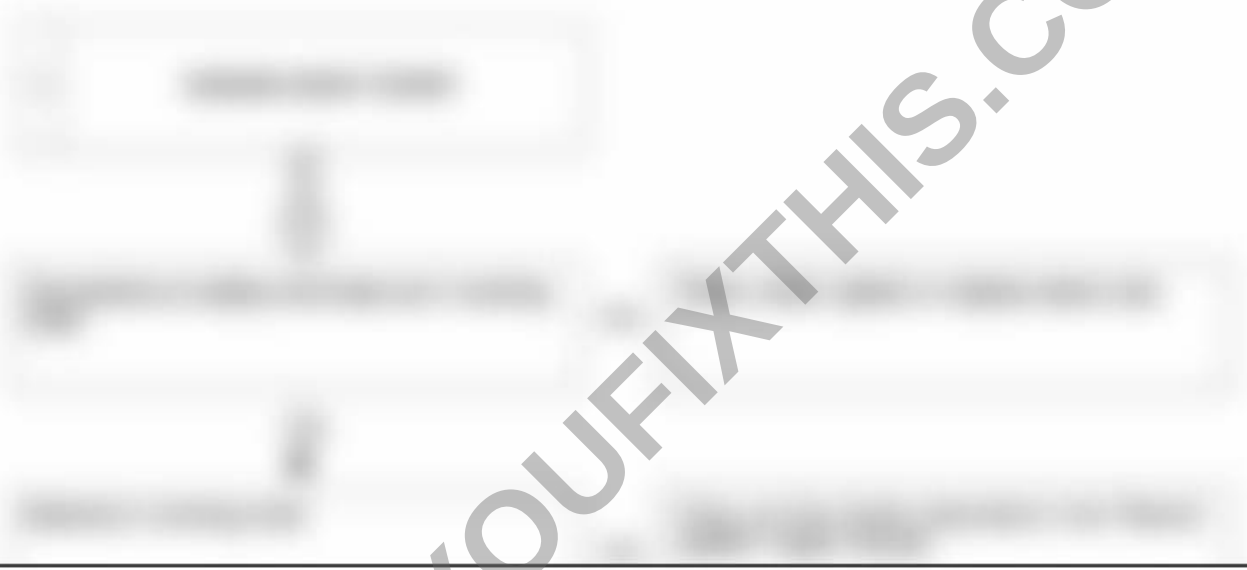
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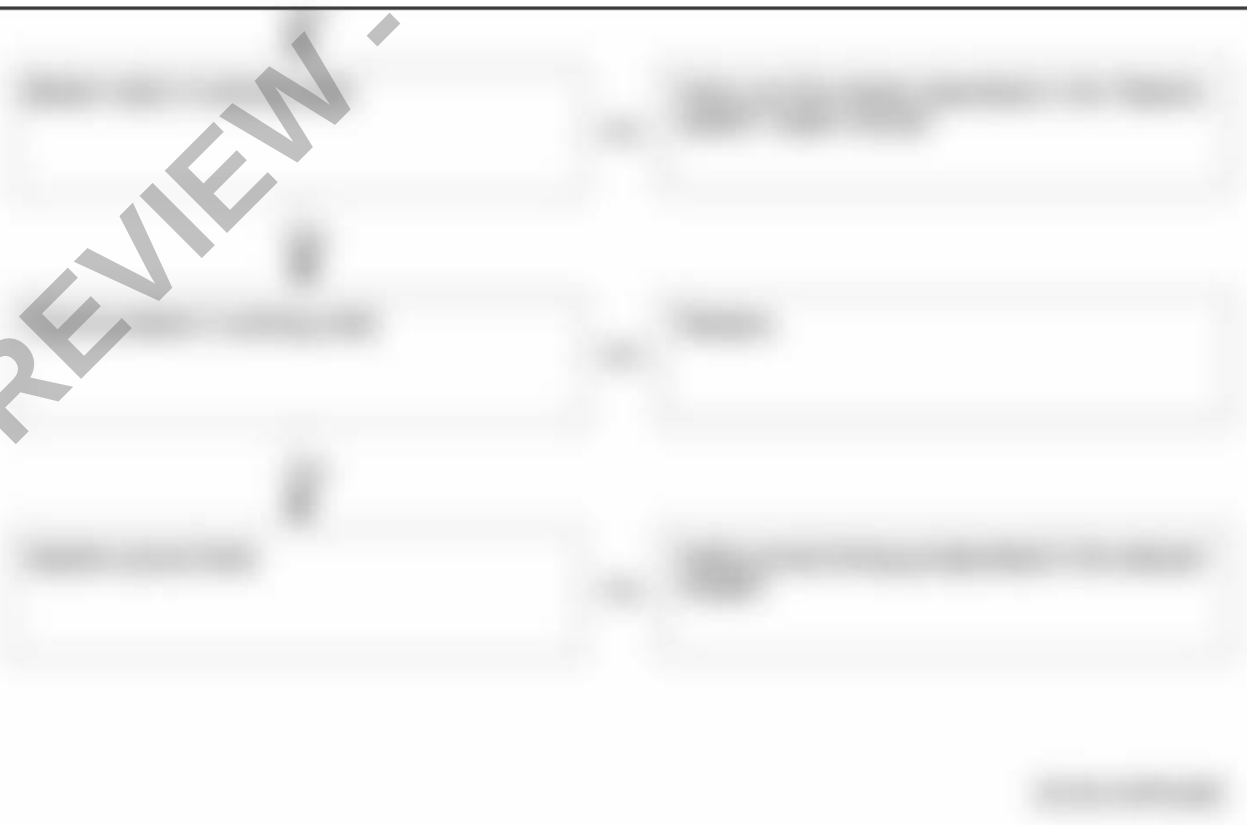
DIAGNOSTICS

Main engine operating anomalies:

1 – Engine won't start;
2 – Engine overheats;
3 – Engine lacks power and works erratically;
4 – Engine exhaust smoke black or dark grey;
5 – Engine exhaust smoke grey (verging on white);
6 – Engine exhaust smoke light blue;
7 – Engine knocks irregularly;
8 – Engine stops;
9 – Engine exceeds max. revs number;
10 – Excessive or insufficient oil pressure;
11 – Excessive fuel consumption;
12 – Engine won't stop.



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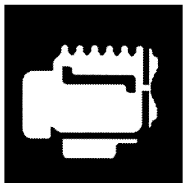
REPAIR MANUAL

ENGINES

INDEX OF SECTIONS



Section 1 – Diagnostics EW–1–1



Section 2 – Engine F4GE0454C – F4GE0484G overhaul EW–2–1



Section 3 – Recharging and start–up EW–3–1

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INTRODUCTION

TO THE READER

- ❑ This manual was written for a skilled technician and contains all the technical information needed to repair this vehicle.
- ❑ Read this manual carefully for the information concerning repairing operations.
- ❑ For any question or comment, or should you notice any mistake concerning the content of this manual, please contact an Authorised Dealer.

FURTHER REFERENCES

PAGE NUMBER

- ❑ Every page carries a number on the top right corner. Every page contains the following information:

Example:: **T 1 - 2 - 3**

- **T 1 - 2 - 3** → Progressive page number for each group
- **T 1 - 2 - 3** → Group number (if any)
- **T 1 - 2 - 3** → Section number
- **T 1 - 2 - 3** → **S:** Safety rules
- **T 1 - 2 - 3** → **T:** Technical section { Operation principle / Performance tests / Fault diagnosis
- **W:** Instruction section for excavator repairing
- **EW:** Instruction section for engine repairing

SYMBOLS

This manual contains safety warning symbols and indications referring to possible injuries or vehicle damages.



This symbol regards safety.

Use great care when you see this symbol because possible injuries to the personnel may occur.

Strictly observe the precautions marked with this symbol.

The safety warning symbol is used also to draw attention on the weight of a component or an element.

Make sure you are always using the right equipment and lifting techniques when handling heavy loads, in order to prevent injuries or damages.

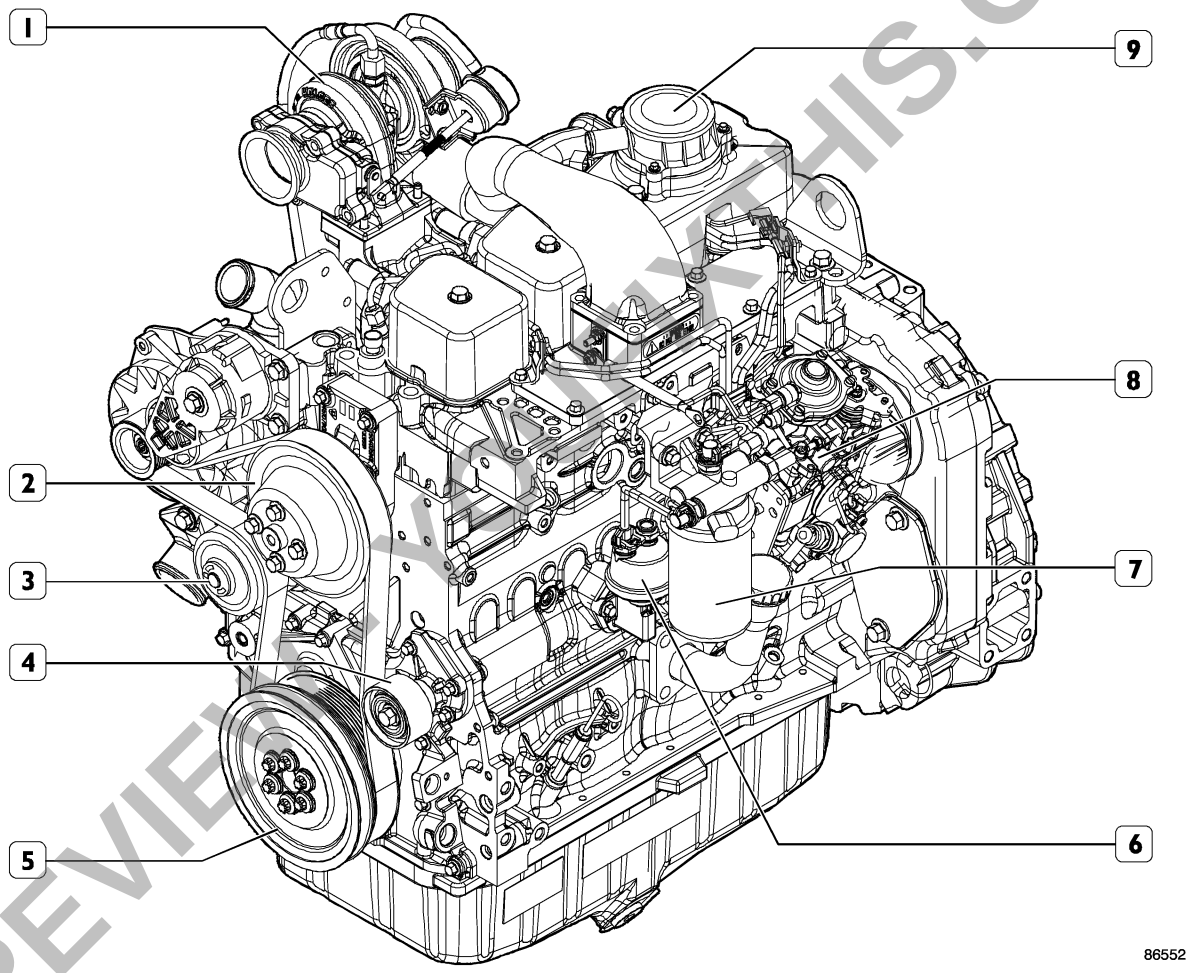
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GENERAL REMARKS

F4GE0454C ENGINE

Figure 3



1. Turbo-charger - 2. Fan pulley - 3. Water pump - 4. Fixed guide pulley - 5. Crankshaft pulley - 6. Priming pump - 7. Fuel filter - 8. Rotary injection pump - 9. Blow-by

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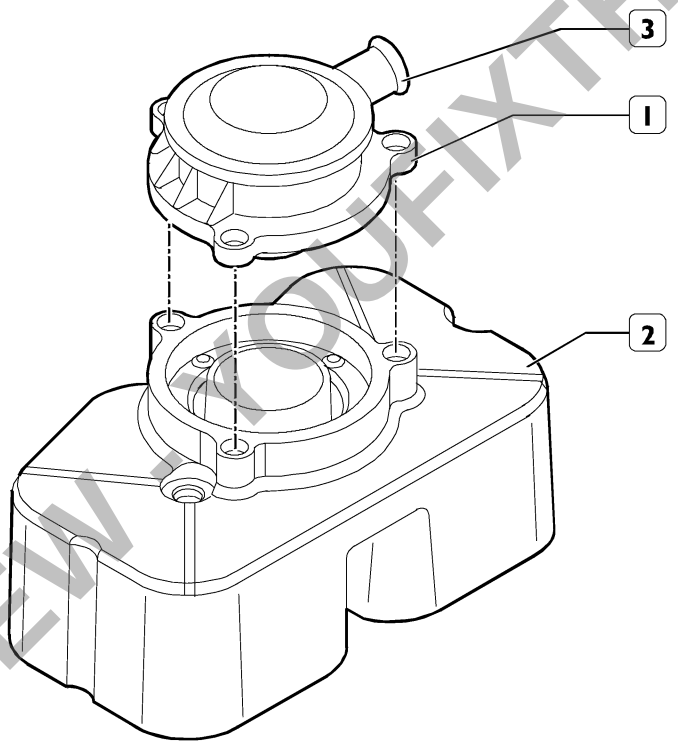
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Oil vapour recirculation

Oil vapour recirculation takes place by means of valve (1) placed above the tappet cover (2).

The vapour condensed therein fall below the tappet cover (2) due to gravity, whereas the remaining vapour is recovered by vent (3) and properly conveyed to the intake phase.

Figure 25



84056

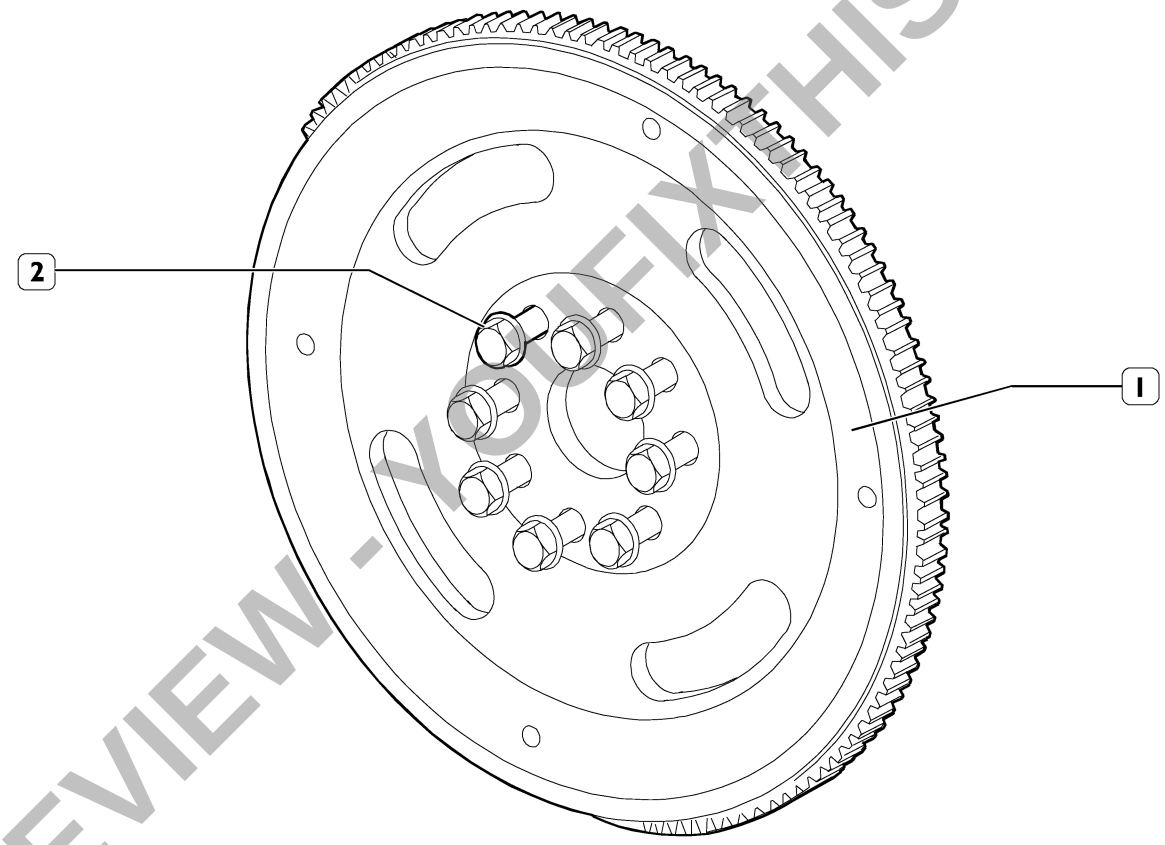
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Engine flywheel

The flywheel (1) does not need being positioned in a fixed manner on the drive shaft, since it does not bear any stamping, notch or reference hole for sensors or timing. The equidistance of fastening screw holes (2) allows it to be mounted in any position.

Figure 16



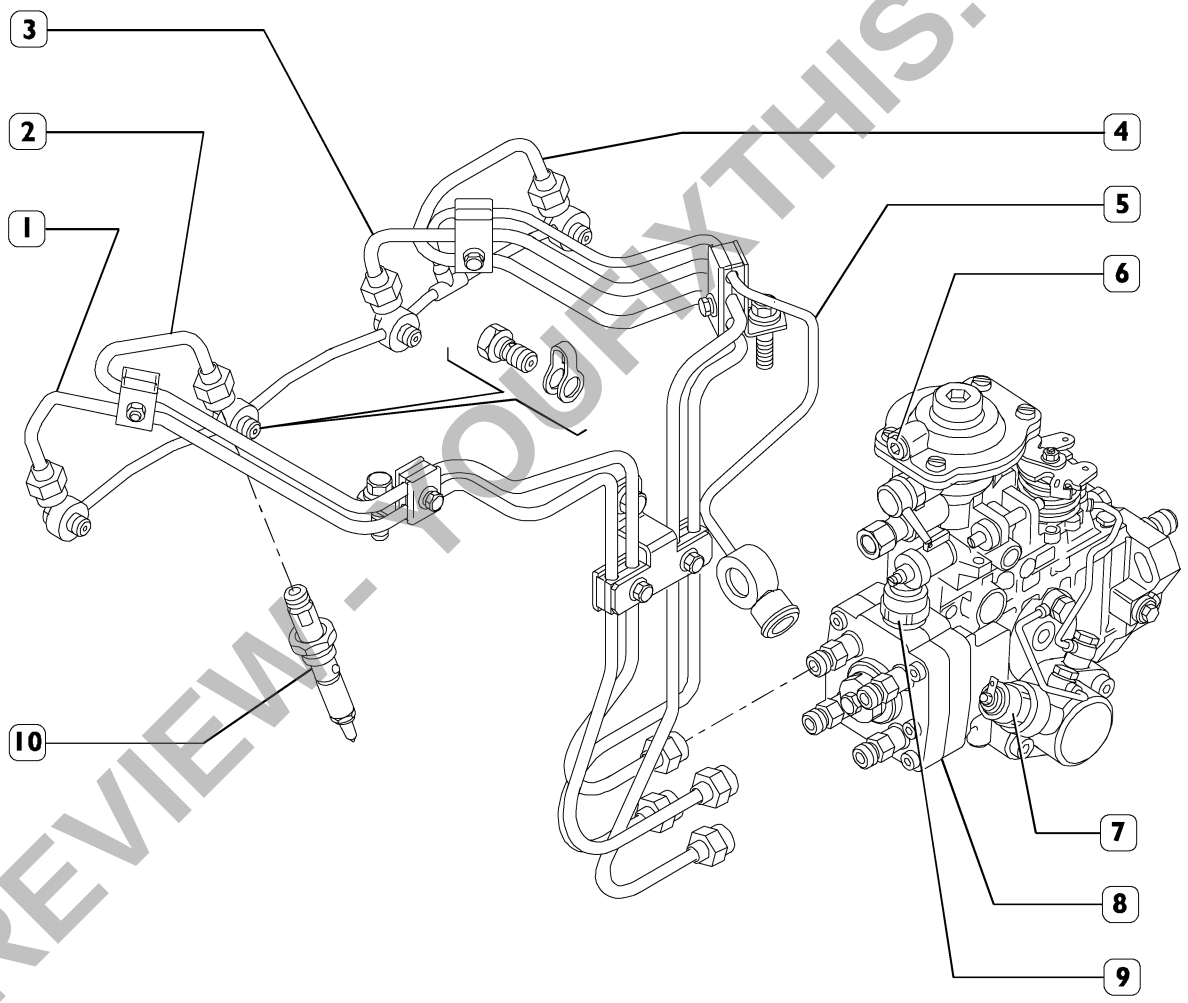
86560

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INJECTION ASSEMBLY

Figure 32



84251

1. Injector 1 fuel pipe - 2. Injector 2 fuel pipe - 3. Injector 3 fuel pipe - 4. Injector 4 fuel pipe - 5. Pipe for fuel discharge from injectors - 6. Connector for pipe measuring the pressure inside the L.D.A. intake manifold - 7. Thermal bulb for KKSB - 8. Injection pump – 9. Solenoid valve - 10. Injector

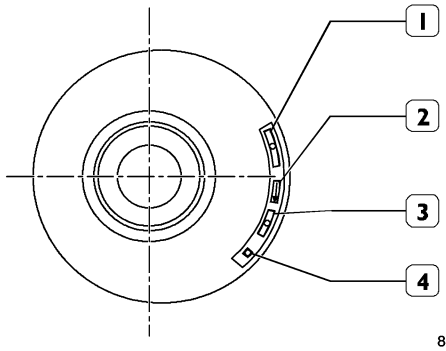
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Mounting the connecting rod-piston assembly

Connecting rod-piston match

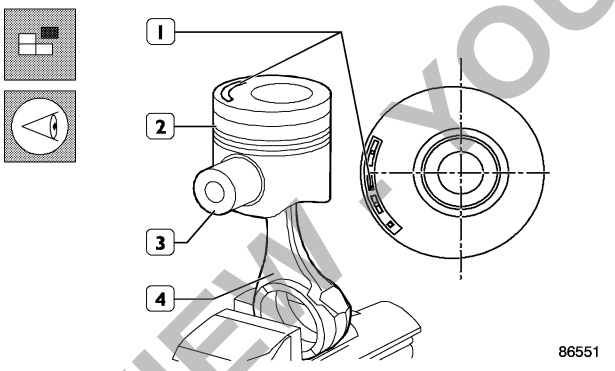
Figure 113



The following references are engraved on the crown of the piston:

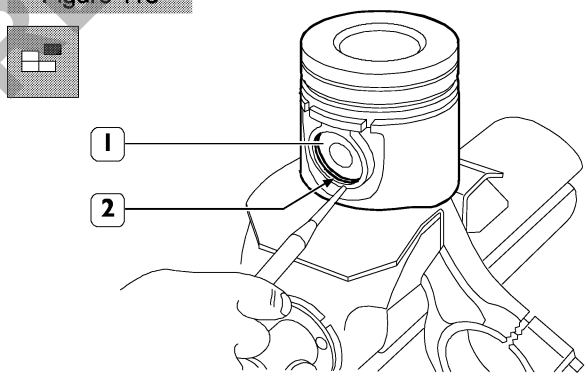
1. Spare part and engineering change number.
2. Arrow indicating the direction of insertion of the piston in the cylindrical liner; it must be facing towards the front side of the engine block.
3. Date of manufacture.
4. Stamp indicating testing of the 1st hollow insert.

Figure 114



Connect piston (2) to connecting rod (4) by means of pin (3) so that reference inscription (1) for mounting piston (2) in the cylinder liner.

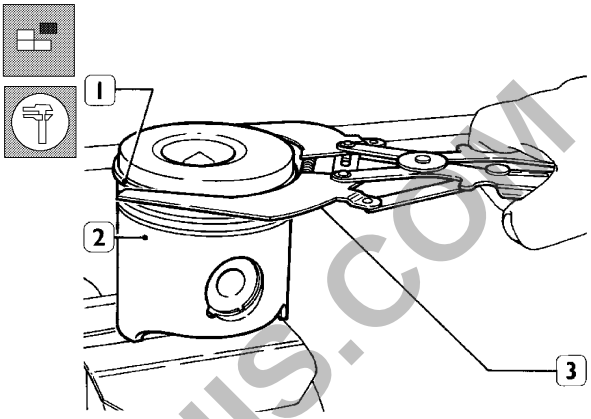
Figure 115



Insert pin (1) fastening piston rings (2).

Mounting the piston rings

Figure 116



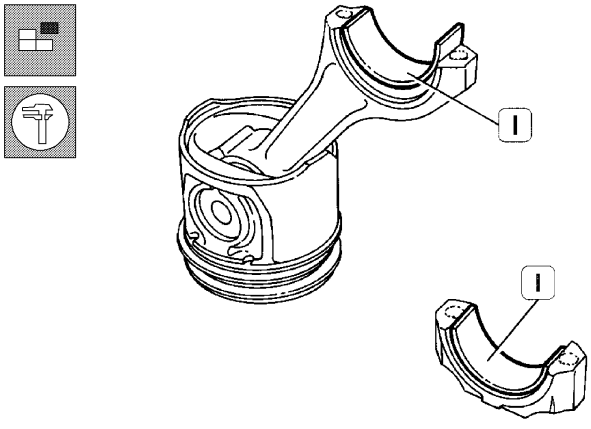
Use pliers 380000986 (3) to fit piston rings (1) on piston (2).

IMPORTANT - *Spare piston rings are supplied in the following dimensions:*

- standard, marked with yellow paint;

- increased by 0.5 mm, marked with yellow/green paint;

Figure 117



Mount half bearings (1) both on the connecting rod and the cap.

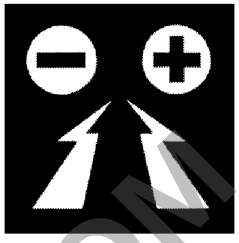
IMPORTANT - *If connecting rod bearings do not need replacing, they must be fitted in the same order and positions they had prior to being taken off.*

No matching operation must be carried out on half bearings.

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RECHARGE AND START-UP



INDEX

Starter motor	EW-3-3	**Alternator**	EW-3-5
Quick diagnosis	EW-3-3	Quick diagnosis	EW-3-5
Bosch 24 V - 4 kW	EW-3-4	Bosch NCBI 28 V 35-70 A	EW-3-6

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