ENGINE SERVICE MANUAL

334T/M2

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NEW HOLLAND CONSTRUCTION

87458412NA

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ENGINE F4CE0354A OVERHAUL



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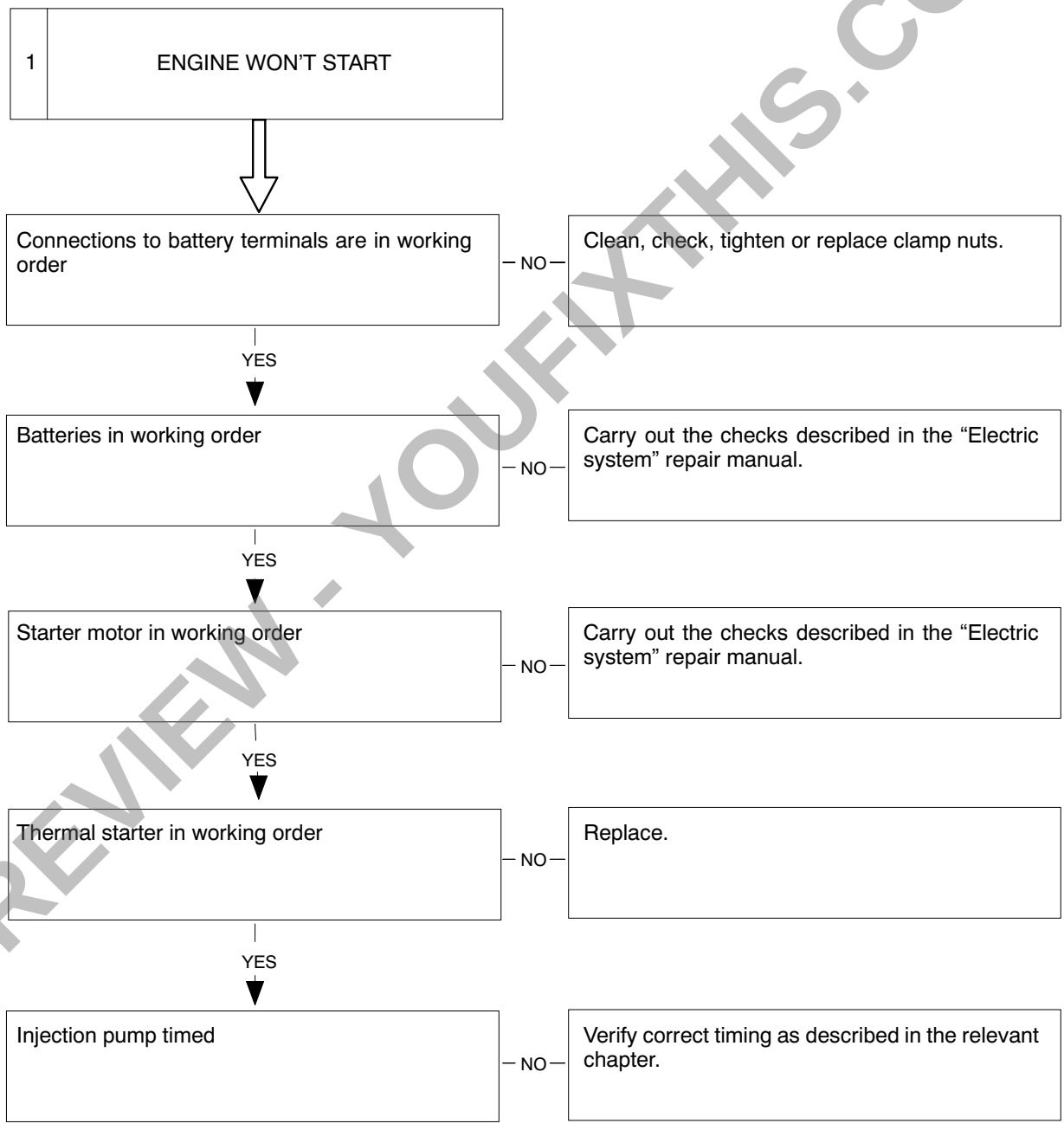
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DIAGNOSTICS

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.

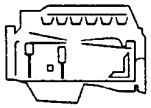
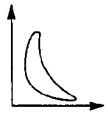
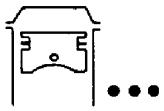
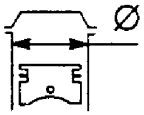
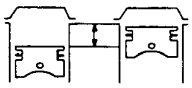
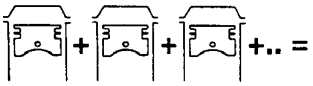
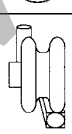


(to be continued)

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GENERAL ENGINE FEATURES

	Type		**F4CE0354A *D**
	Cycle		4-stroke diesel engine
	Feeding		Turbocharged
	Injection		Direct
	Number of cylinders		In-line, 3-cylinder
	Bore	mm	104
	Stroke	mm	132
	Total displacement	cm^3	3364
	Compression ratio		17.5 : 1
	Max. rating	kW min^{-1}	58 2300
	Max. torque	Nm (kgm) min^{-1}	310 (31) 1400
	No-load idle rpm	min^{-1}	—
	No-load peak rpm	min^{-1}	—
	BOOSTING Type of turbocompressor:		HOLSET HX20W
	LUBRICATION		Forced by means of a lobe pump, pressure modulating valve, oil filter
	Oil pressure with hot engine: at idle rpm at peak rpm	 bar bar	 1.2 3.8

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DESCRIPTION OF MAIN MECHANIC ENGINE COMPONENTS

Drive shaft

It is made of steel and rests on four induction-hardened supports.

Inside the drive shaft are the lubricating oil ducts.

The following items are force-fitted on the front shank: oil pump drive gear, damper flywheel and auxiliary component drive pulley.

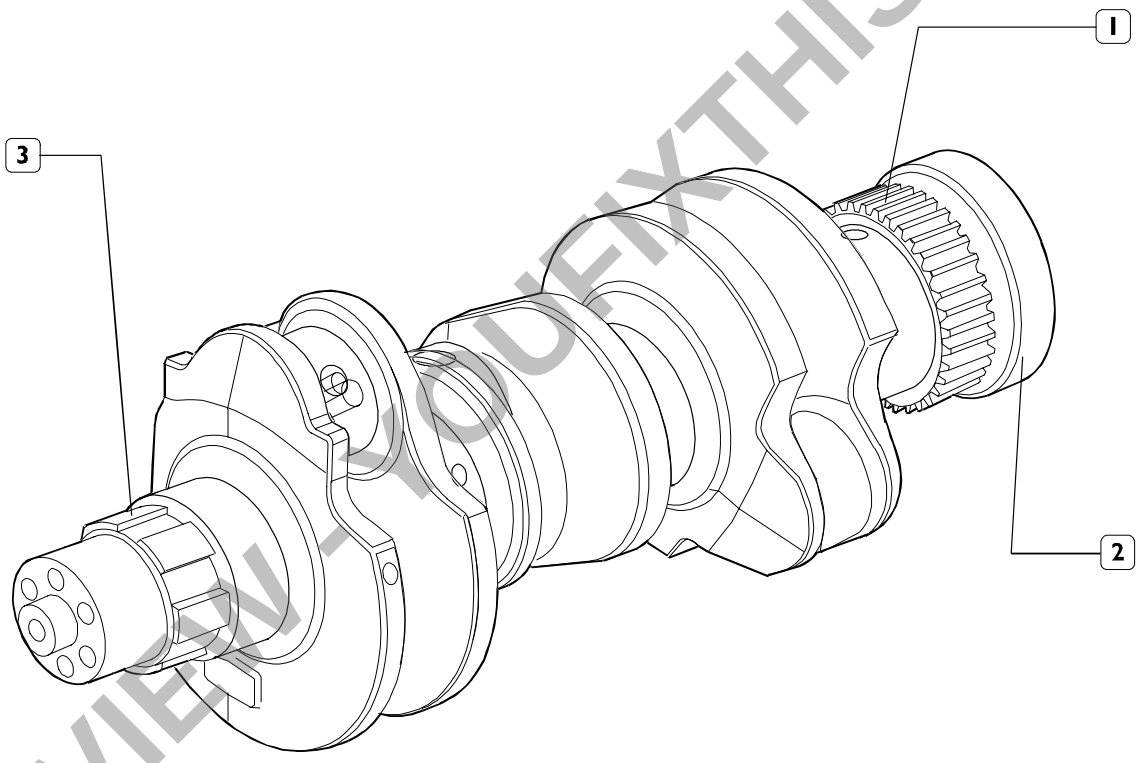
The following items are force-fitted on the rear shank: distributing shaft drive gear and engine flywheel mounting hub.

The main half bearings are made of steel with anti-friction alloy coating.

The second main half bearing is equipped with a shoulder to restrain the drive shaft end play.

Parts (1) and (3) are mounted in an interfering manner on the rear shank and cannot be replaced.

Figure 3



1. Valve gear drive gear - 2. Flywheel attachment hub - 3. Oil pump drive gear

Drive shaft seal rings

The front and rear seal rings are of the “box” type, with radial seal. They can be removed by means of tools 380000665 and 380000663, and mounted by means of tools 380000666 and 380000664.

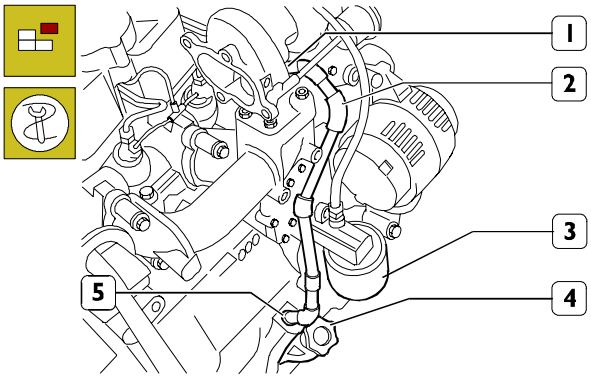
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ENGINE BENCH-OVERHAUL

Disassembling the engine

Figure 26



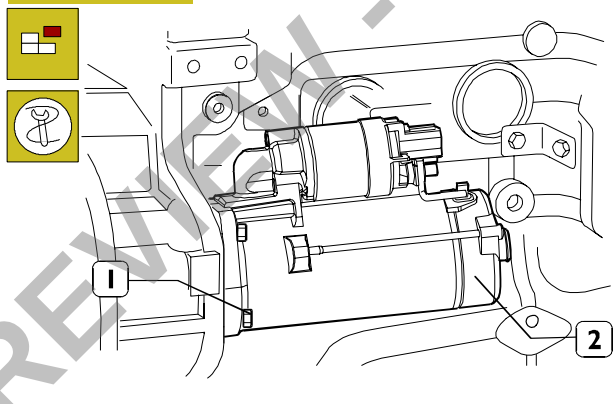
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In order to apply the brackets 380000661 the engine block to fix it on to the stand 380000301 for the overhaul, it is necessary to perform the following operations:

On the right hand side:

- ❑ disassemble lubrication oil exhaust pipe (2) from the turbo-blower:
  Underneath the turbo-blower loosen the screws (1); finally loosen and remove the union (5) from the block; plug the pipe ends and the exhaust of the turbo-blower.
- ❑ oil level rod (4);
- ❑ oil filter (3).

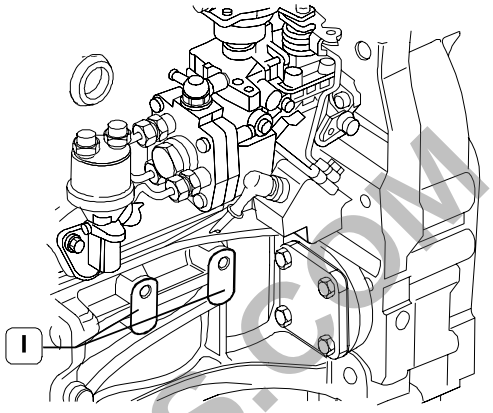
Figure 27



87712

- ❑ Disassemble the starter;
  properly hold the starter (2) and loosen the two fixing screws (1);
  assemble the supporting bracket 380000661 using the threaded ports on the block.

Figure 28

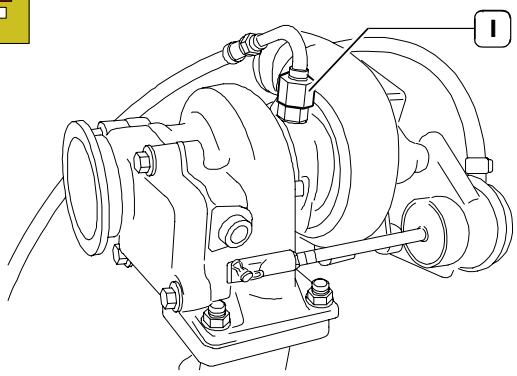


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On the left hand side:

- ❑ assemble the second bracket 380000661 throughout the screw-threaded ports (1).
- ❑ Lift the engine using the rocker arm 380000216 and put it on the turning stand 380000301.
- ❑ Drain the oil through the cap underneath the plug.

Figure 29



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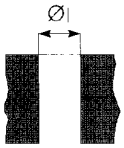
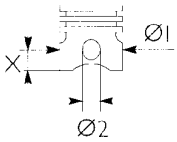
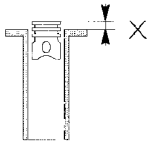
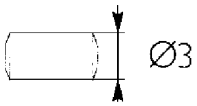
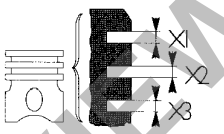
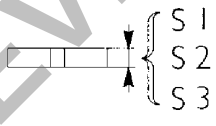
Proceed disassembling the supercharger:

- ❑ Loosen the fixing nut (1) and remove the lubrication pipe from the turbocharger. Analogously carry out the same operation on the other end of the pipe and remove it from the upper part of the heat exchanger.
- ❑ Loosen the screw nuts fixing the supercharger on the exhaust manifold.
- ❑ Hold up the turbocharger and after lifting it remove the gasket.

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ASSEMBLING PLAY - SPECIFICATIONS

	Type		F4CE0354A *D
CRANK GEAR COMPONENTS AND CYLINDER ASSEMBLY			mm
	Cylinder liners	∅1	104.000 to 104.024
	Pistons: supplied with standard spares		
	Measurement dimension	X	59
	Outer diameter	∅1	103.730 to 103.748
	Pin seat	∅2	38.010 to 38.016
	Piston - cylinder liners		0.252 to 0.294
	Piston diameter	∅1	0.4 - 0.8
	Position of pistons from crankcase	X	0.28 to 0.42
	Gudgeon pin	∅3	37.994 to 38.000
	Gudgeon pin - Pin seat		0.004 to 0.016
	Piston ring slots	X1*	2.705 to 2.735
		X2	2.440 to 2.460
		X3	4.030 to 4.050
	* measured on ∅ of 101 mm		
	Piston rings	S1*	2.560 to 2.600
		S2	2.350 to 2.380
		S3	3.970 to 3.990
	* measured on ∅ of 101 mm		
	Piston rings – Slots	1	0.155 to 0.175
		2	0.060 to 0.110
		3	0.040 to 0.080
	Piston rings		0.4 to 0.8

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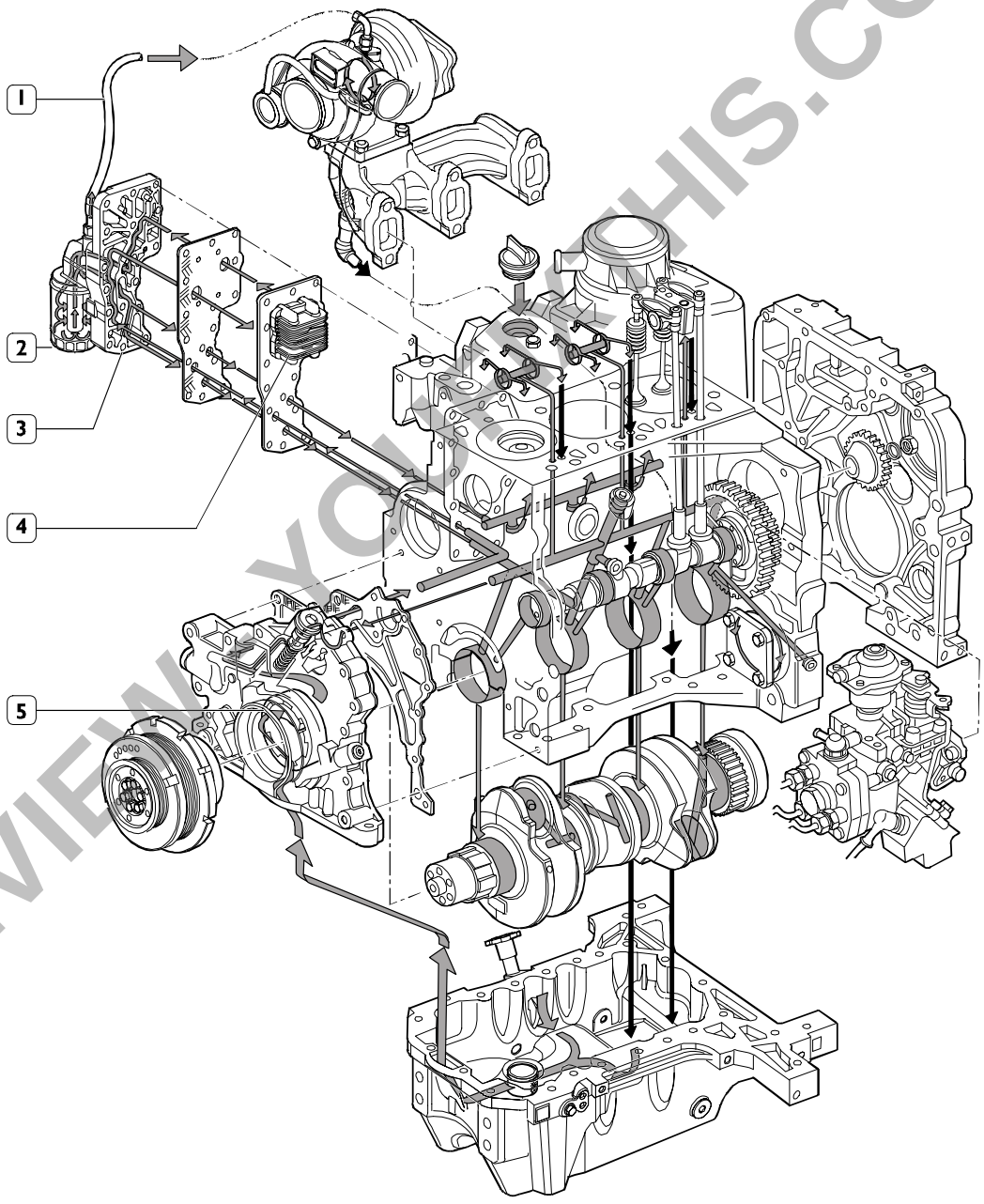
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LUBRICATION

Forced circulation lubrication is performed by the following components:

- ❑ oil lobe pump fitted in the front part of the basement, driven by the splined bush, keyed on the hold of the engine drive shaft;
- ❑ water / oil heat exchanger housed in the crankcase;
- ❑ oil pressure regulating valve incorporated in the oil filter support;
- ❑ bypass valve for bypassing the clogged oil filter, in the oil filter support;
- ❑ cartridge-type oil filter.

Figure 14



Pressure oil path

Oil return drop-type path

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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:

CNH AMERICA LLC
700 State Street
Racine, WI 53404 U.S.A.

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**

- Progressive page number for each group
- Group number (if any)
- Section number
- **S:** Safety rules
- **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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Water pump

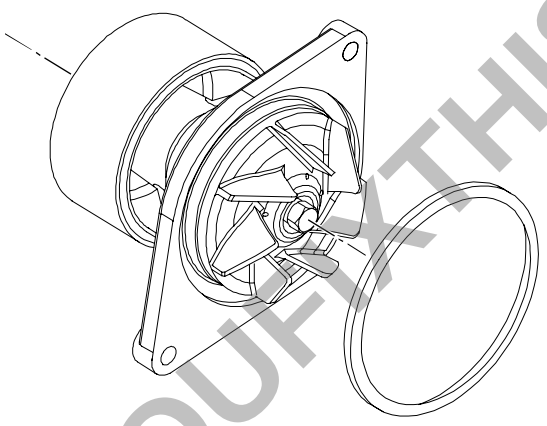
The water pump is housed in a seat obtained from the crankcase and is controlled by means of a poly-V belt.

The nearly total absence of outer pipes, sleeves and clamps eliminates many connections, thus reducing possible leak points.

The engine temperature is controlled by a thermostat.

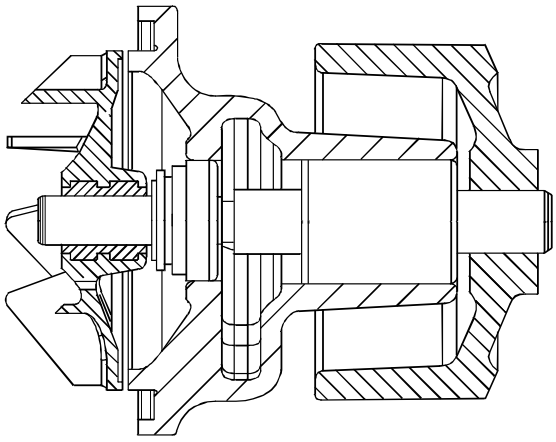
The coolant flows also in the oil heat exchanger.

Figure 20



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Figure 21



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Bushings

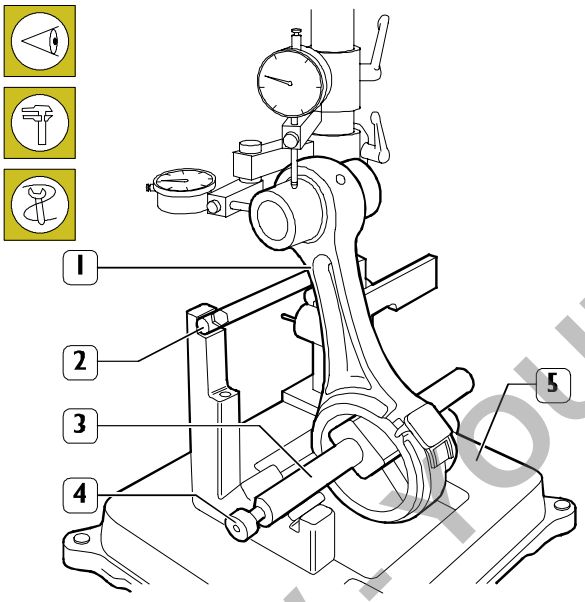
Verify that the bushing in the connecting rod small-end is not loosened and does not show traces of scoring or seizing. Otherwise, replace it.

Removing and reassembling are carried out with the same suitable beater.

When driving, take the greatest care that the holes allowing oil to flow onto the bushing and the connecting rod small-end correspond to each other. Use a reamer to reface the bushing so as to obtain the required diameter.

Checking the connecting rods

Figure 106



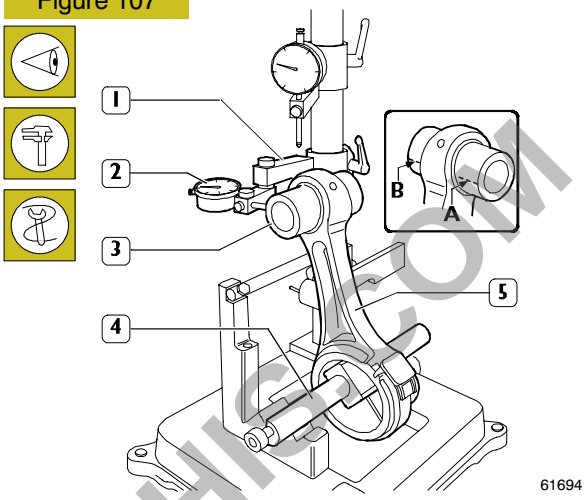
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Check the parallelism of connecting rod axes (1) by means of device 380001003 (5). Proceed as follows:

- ❑ mount connecting rod (1) on tool 380001003 (5) spindle, then secure it by means of screw (4);
- ❑ place spindle (3) on V-shaped block squares by putting connecting rod (1) on stop bar (2).

Checking the torsion

Figure 107



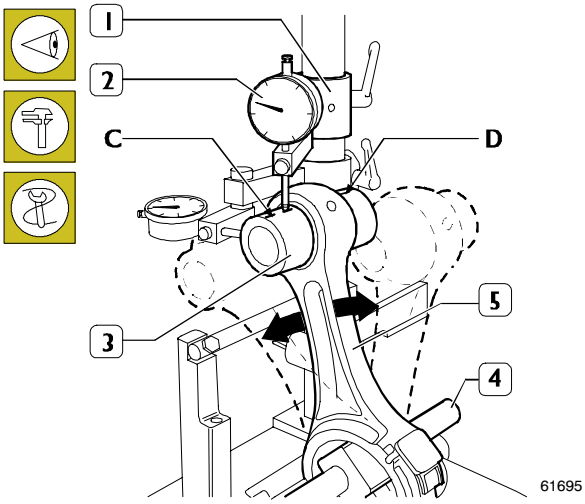
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Check connecting rod torsion (5) by comparing two points (A and B) of pin (3) on the horizontal plane of the connecting rod axis.

Place comparator (2) support (1) so that the comparator is preloaded by ~ 0.5 mm on pin (3) at point A, then set comparator (2) to zero. Move spindle (4) with connecting rod (5), then compare the deviation (if any) on opposite side (B) of pin (3): the difference between A and B must not be greater than 0.08 mm.

Checking the flexion

Figure 108



61695

Check connecting rod flexion (5) by comparing two points C and D of pin (3) on the vertical plane of the connecting rod axis. Place comparator (2) vertical support (1) so that the comparator rests on pin (3) at point C. Swing the connecting rod to and fro, looking for the highest position of the pin; under such condition, set comparator (2) to zero. Move the spindle with connecting rod (5) and repeat the highest point check on opposite side (D) of pin (3). The difference between points C and D must not be greater than 0.08 mm.

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