

NEF ENGINES

Mechanical Injection

- Industrial applications

Technical and Repair manual

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

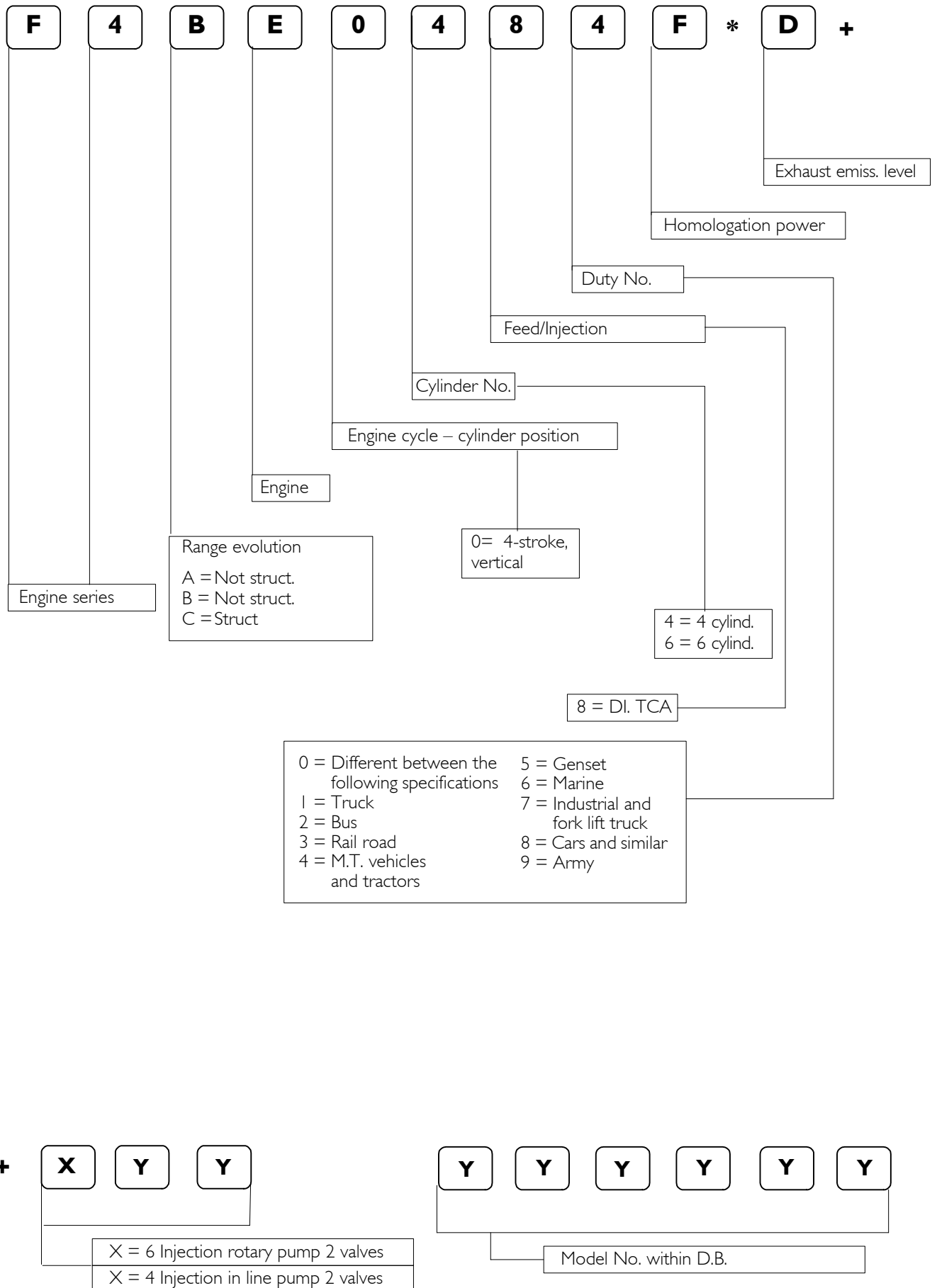
- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

ENGINE IDENTIFICATION CODE



SECTION 2**Fuel**

	Page
INJECTION FEED SYSTEM BY MECHANICAL ROTARY PUMP	3
FEED PUMP	5
PRIMING PUMP	6
FUEL FILTER	7
INJECTION FEED SYSTEM BY MECHANICAL PUMP UNIT	9
FEED PUMP	11
FUEL FILTER	12

FEED PUMP

The pump is driven by a gear mating the camshaft's one.

Direction of rotary: Left

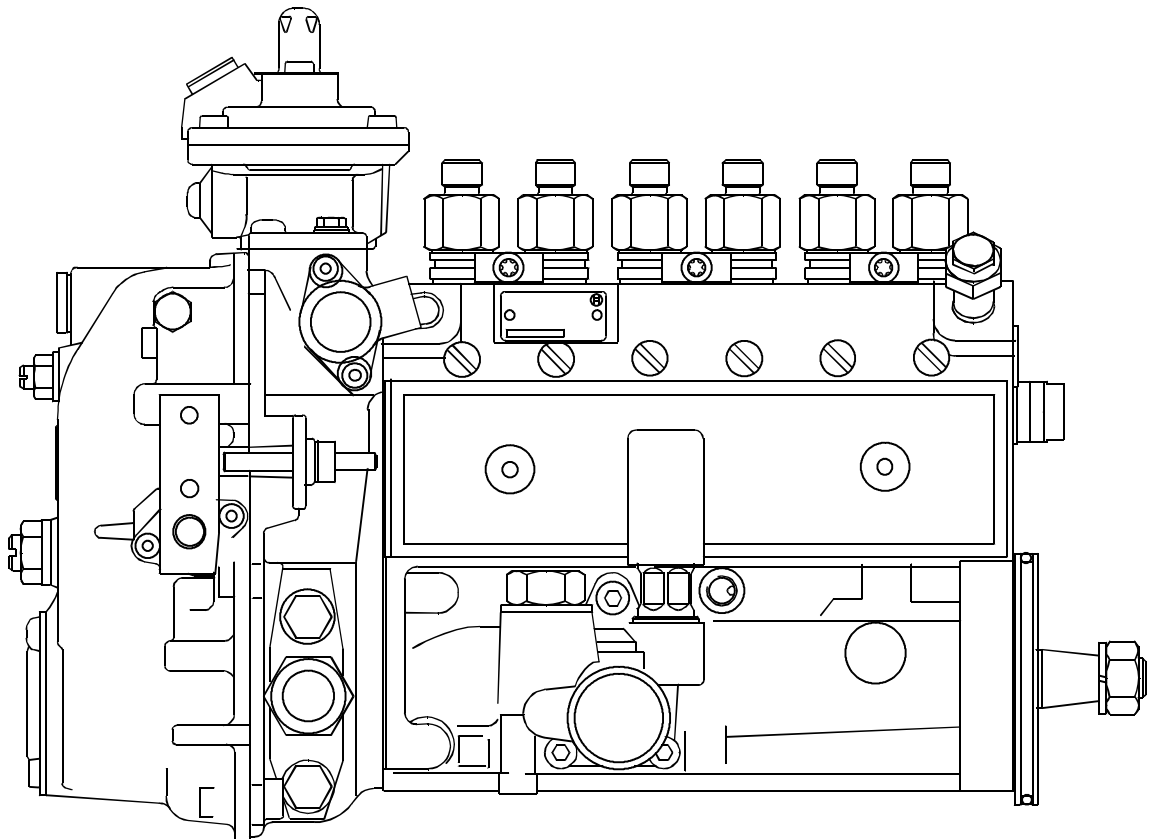
Definition of dir. of rotation "Left" means anticlockwise when looking from the drive end

The low pressure system must be bleed

Ambient temperature from -40° to +120°C

Oil fill quantity 0.45 liters engine oil

Figura 8



76217

OVERHAUL OF ENGINE PROVIDED WITH MECHANICAL ROTARY PUMP

Preface

Part of the operations illustrated within this section can be partially executed while the engine is assembled on the vehicle, depending on the room available for access to the engine and on the equipment application as well.



With regard to the engine disassembly operations, please apply for information consulting the specific manual. All operations of engine disassembly operations as well as overhaul operations must be executed by qualified engineers provided with the specific tooling and equipment required.

The following information relate to the engine overhaul operations only for what concerns the different components customising the engine, according to its specific duties.

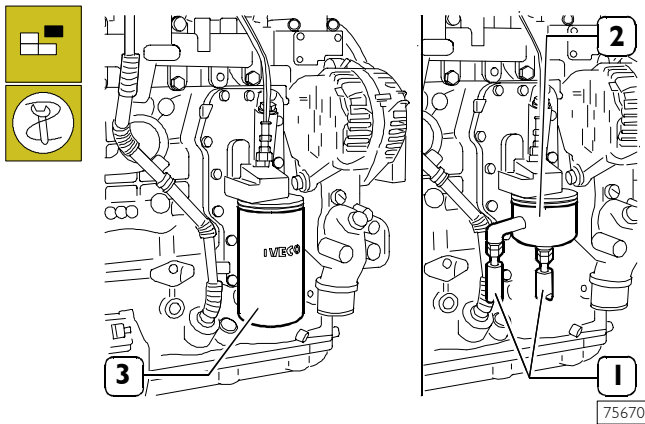


For specific application exigencies, some units can be assembled to the engine in different positions.

Within "General overhaul" section, all the operations of engine block overhaul have been contemplated. Therefore the above mentioned section is to be considered as following the part hereby described.

Engine setting operations for the assembly on turning stand

Figure 2



In order to apply the brackets 99361037 to the engine block to fix it on to the stand 99322205 for the overhaul, it is necessary to perform the following operations:

On the right hand side:

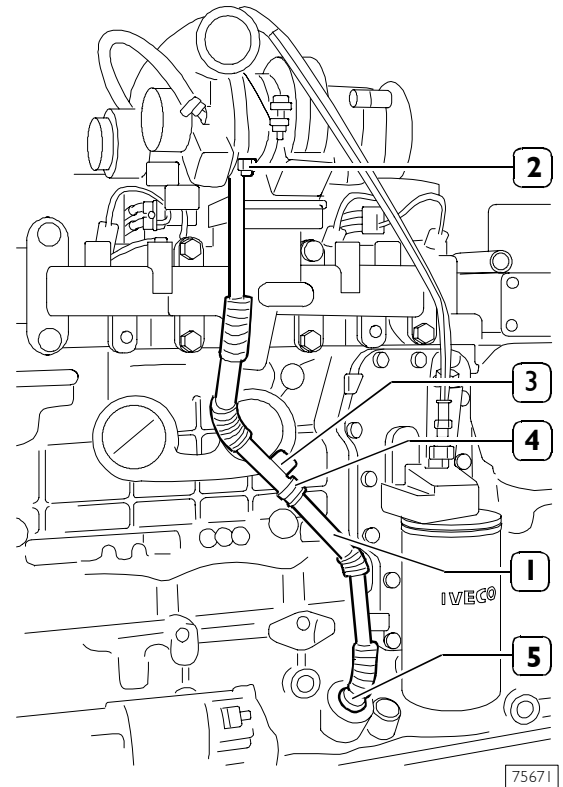
- disassemble pipes (1) from the union (2) fitting the lubrication oil filter (assembled on the opposite side): unlock the nuts fixing the pipes (1) and remove them from the union (2); drain the oil eventually still inside the pipes and plug them properly in order to avoid impurity inlet.



For some versions, the oil filter (3) is directly assembled on to the heat exchanger: in such case it shall be disassembled using tool 99360076.

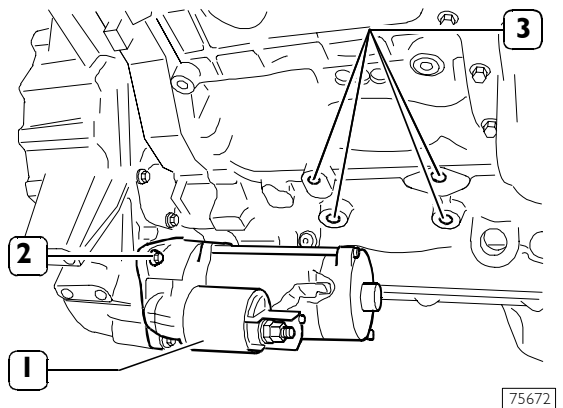
Warning: the oil filter contains inside aprx. 1 kg. of engine oil. Provide for oil recovery and disposal in compliance with the law and regulations in force.

Figure 3



- disassemble lubrication oil exhaust pipe from the turbo-blower:
Undereath the turbo-blower loosen the two screws (2), loosen the screw (3) fixing the pipe throughout the stop collar (4) fixing the block; finally loosen and remove the union (5) from the block; plug the pipe ends and the exhaust of the turbo-blower.

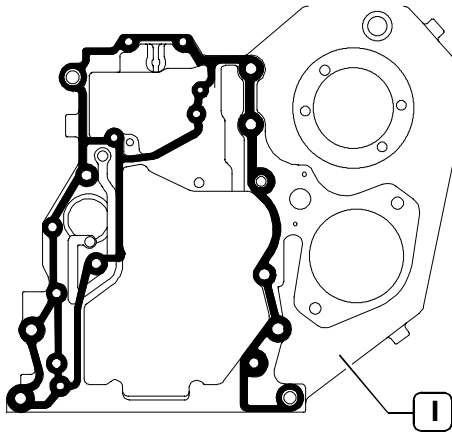
Figure 4



- Disassemble the starter;
Properly hold the starter (1) and loosen the two fixing screws (2); assemble the bracket bearing 99361037 using the four screw threaded ports (3).

Installation of application components

Figure 38



75712

DIAGRAM SHOWING SEALING LOCTITE 5205 APPLICATION WITHIN GEARBOX AREAS

- Accurately clean the timing gearbox (1) and the engine block.



It is necessary and essential to clean the surface to be sealed in order to achieve excellent tight seal.

Apply sealing LOCTITE 5205 on the box in order to form a kerbstone of a few mm. Diameter.

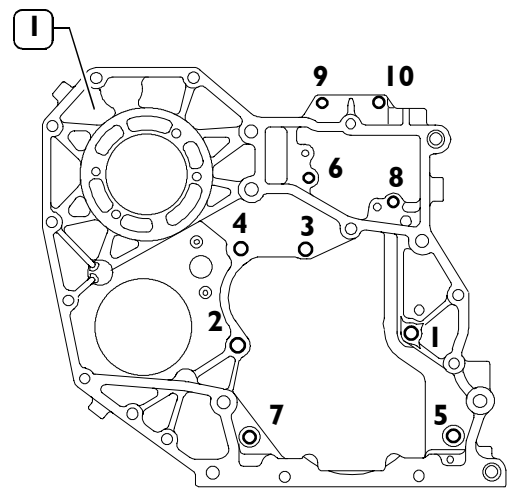
It must be uniform (no crumbs), with no air blisters, thinner or irregular zones.

Any eventual imperfection shall be correct as soon as possible.

Avoid using material in excess to seal the joint. Too much sealing material would drop out on both sides of the joint and obstruct lubricant passages.

After having completed seal application, the joints must be immediately assembled (10-20 minutes time).

Figure 39



75711

DIAGRAM SHOWING SCREW TIGHTENING TO FIX REAR GEARBOX

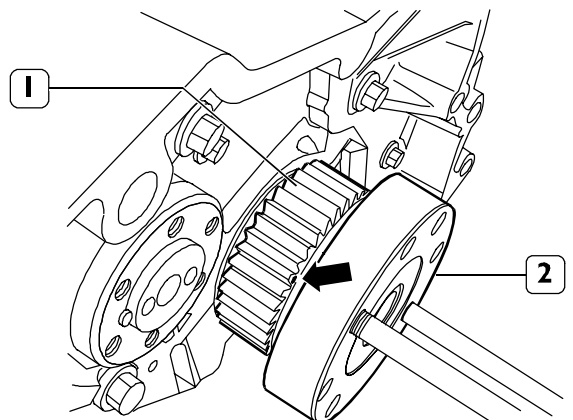
- Reassemble to box (1) to the engine block.
- Tighten the fixing screws in the same position as found out during disassembly and fix the screws to the locking couples listed here below, following the order as shown in the picture.

Screws M12	65 ÷ 89 Nm
Screws M8	20 ÷ 28 Nm
Screws M10	42 ÷ 52 Nm



Before assembly, always check that the threads of the ports and of the screws have no evidence of tear and wear nor dirt.

Figure 40



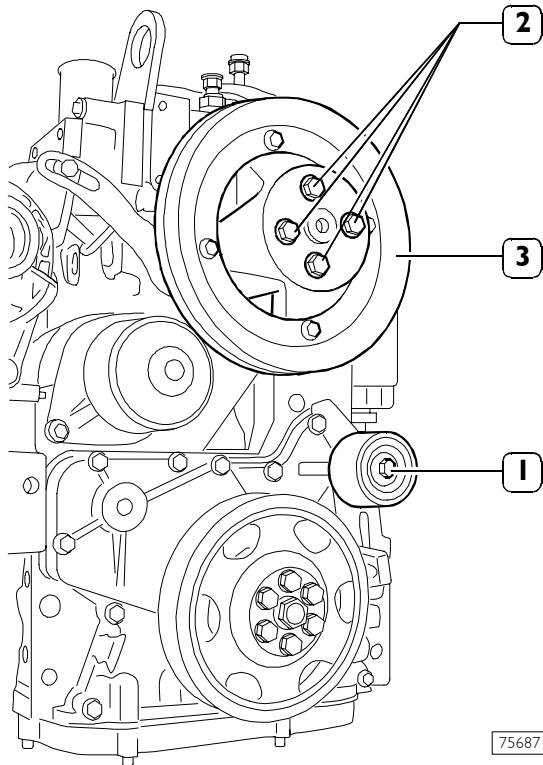
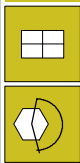
70211

- With a pen marker, mark the tooth (1) of the driving gear assembled to the engine drive shaft with (2) (→) timing notch.



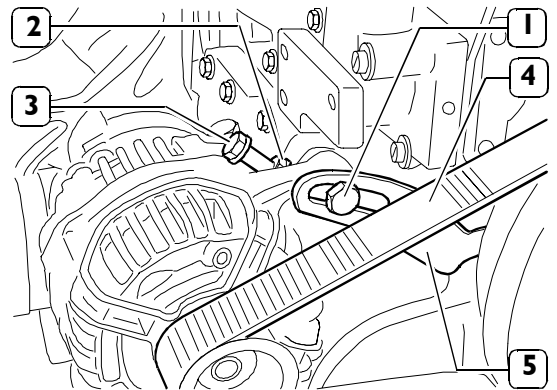
Screw up two pins to facilitate operation of engine drive shaft rotation.

Figure 79



- Assemble the pulley fan bearing tightening the screws to the prescribed couple.
- Assemble the alternator tensioning bracket.
- Assemble the two pulleys (3) and fix them tightening the screws (2) of the bearing.
- Assemble the transmission pulley (1).

Figure 80



- Assemble the driving belt (4) tighten the screw (1) without locking it in order to let it slide within the bracket hole (5).
- Adjust belt tensioning by tightening the screw (3). After having set correct tensioning block the check nut (2) and the screw (1).



In case the same belt priory removed is assembled again, proceed examining it carefully to check there

OVERHAUL OF ENGINE PROVIDED WITH MECHANICAL IN LINE PUMP

Preface

Part of the operations illustrated within this section can be partially executed while the engine is assembled on the vehicle, depending on the room available for access to the engine and on the equipment application as well.



With regard to the engine disassembly operations, please apply for information consulting the specific manual. All operations of engine disassembly operations as well as overhaul operations must be executed by qualified engineers provided with the specific tooling and equipment required.

The following information relate to the engine overhaul operations only for what concerns the different components customising the engine, according to its specific duties.

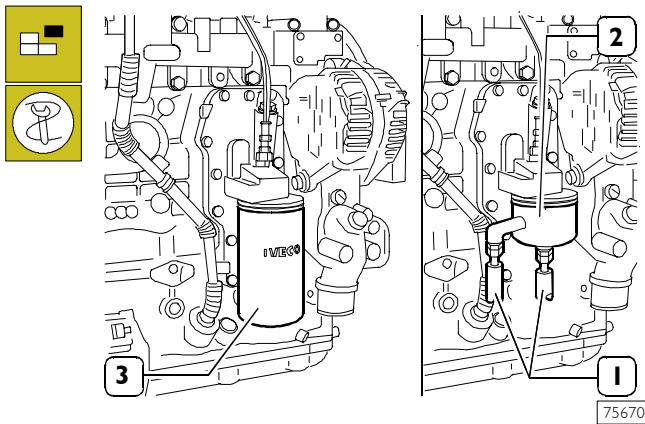


For specific application exigencies, some units can be assembled to the engine in different positions.

Within "General overhaul" section, all the operations of engine block overhaul have been contemplated. Therefore the above mentioned section is to be considered as following the part hereby described.

Engine setting operations for the assembly on turning stand

Figure 105



In order to apply the brackets 99361037 to the engine block to fix it on to the stand 99322205 for the overhaul, it is necessary to perform the following operations:

On the right hand side:

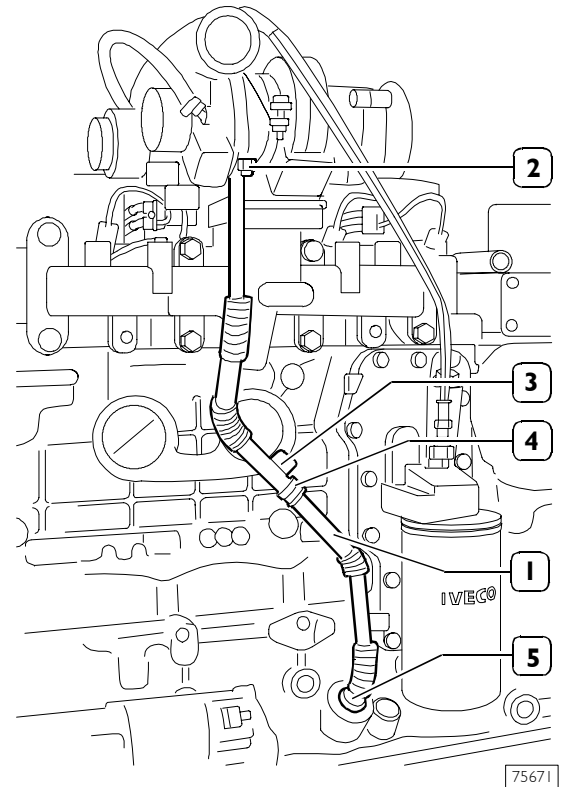
- disassemble pipes (1) from the union (2) fitting the lubrication oil filter (assembled on the opposite side): unlock the nuts fixing the pipes (1) and remove them from the union (2); drain the oil eventually still inside the pipes and plug them properly in order to avoid impurity inlet.



For some versions, the oil filter (3) is directly assembled on to the heat exchanger: in such case it shall be disassembled using tool 99360076.

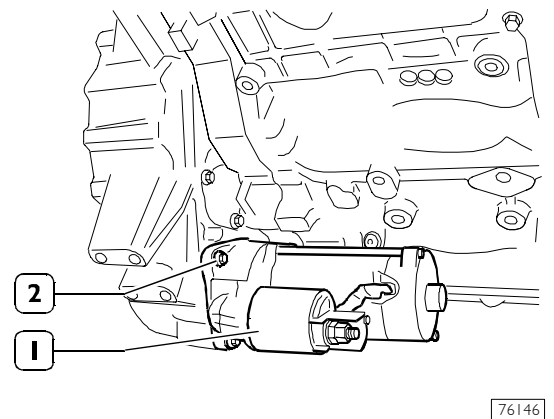
Warning: the oil filter contains inside aprx. 1 kg. of engine oil. Provide for oil recovery and disposal in compliance with the law and regulations in force.

Figure 106



- disassemble lubrication oil exhaust pipe from the turbo-blower:
Undereath the turbo-blower loosen the two screws (2), loosen the screw (3) fixing the pipe throughout the stop collar (4) fixing the block; finally loosen and remove the union (5) from the block; plug the pipe ends and the exhaust of the turbo-blower.

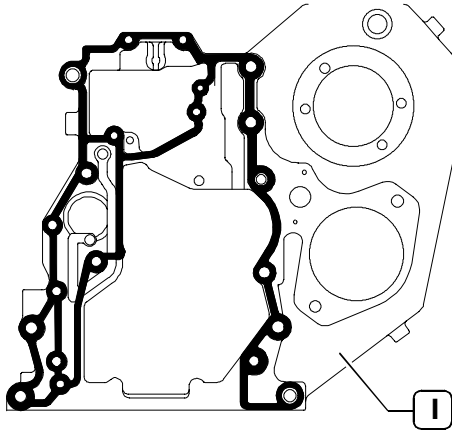
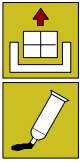
Figure 107



- Disassemble the starter;
Properly hold the starter (1) and loosen the two fixing screws (2)

Installation of application components

Figure I43



75712

DIAGRAM SHOWING SEALING LOCTITE 5205 APPLICATION WITHIN GEARBOX AREAS

- Accurately clean the timing gearbox (1) and the engine block.



It is necessary and essential to clean the surface to be sealed in order to achieve excellent tight seal.

Apply sealing LOCTITE 5205 on the box in order to form a kerbstone of a few mm. Diameter.

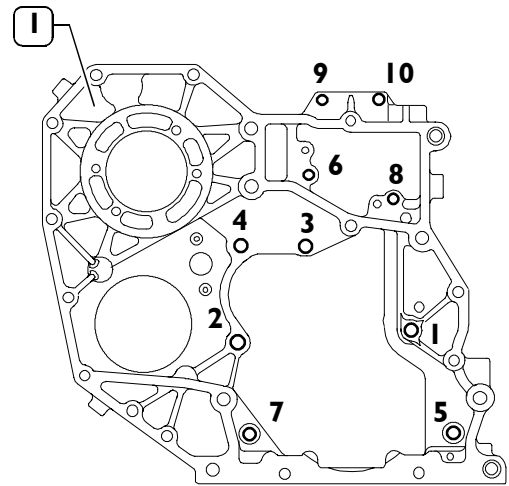
It must be uniform (no crumbs), with no air blisters, thinner or irregular zones.

Any eventual imperfection shall be correct as soon as possible.

Avoid using material in excess to seal the joint. Too much sealing material would drop out on both sides of the joint and obstruct lubricant passages.

After having completed seal application, the joints must be immediately assembled (10-20 minutes time).

Figure I44



75711

DIAGRAM SHOWING SCREW TIGHTENING TO FIX REAR GEARBOX

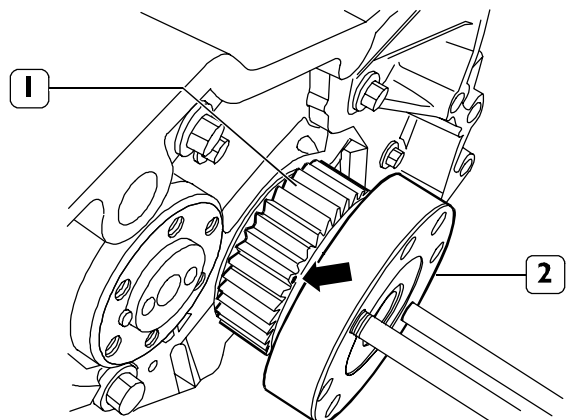
- Reassemble to box (1) to the engine block.
- Tighten the fixing screws in the same position as found out during disassembly and fix the screws to the locking couples listed here below, following the order as shown in the picture.

Screws M12	65 ÷ 89 Nm
Screws M8	20 ÷ 28 Nm
Screws M10	42 ÷ 52 Nm



Before assembly, always check that the threads of the ports and of the screws have no evidence of tear and wear nor dirt.

Figure I45



70211

- With a pen marker, mark the tooth (1) of the driving gear assembled to the engine drive shaft with (2) (→) timing notch.



Screw up two pins to facilitate operation of engine drive shaft rotation.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

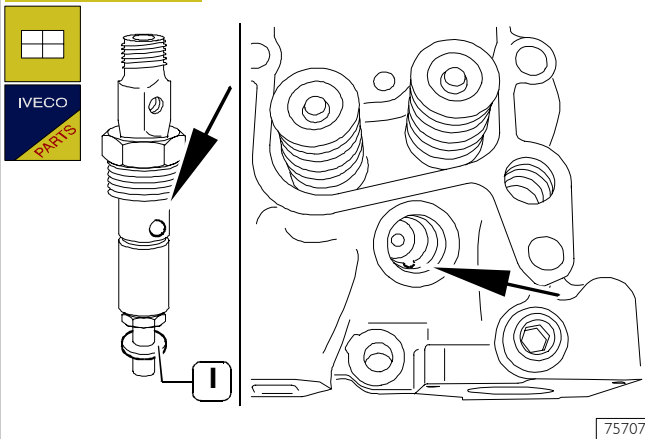
- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

Figure 183



75707

- Assemble injectors after having replaced the sealing gasket (1).



During assembly of injectors, verify that the injector sphere is correctly positioned on the head housing.

Figure 184



76149

- Assemble cylinder covers (2) with the respective gaskets;
- Fit the seal nuds and tighten the screws (1) fixing them to the prescribed couple.

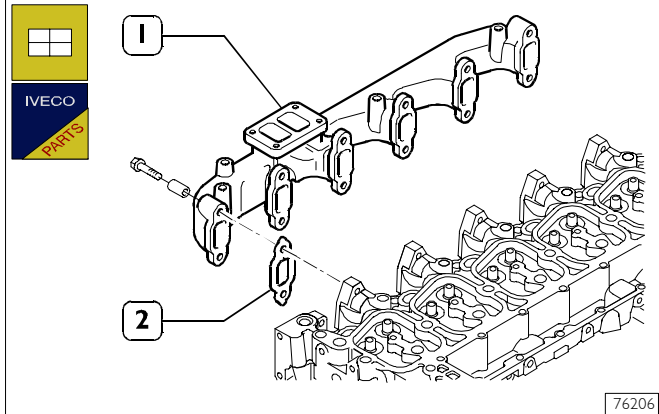


Always replace the gaskets using new ones.

Check the threads of the fixing screws: there shall be no evidence of wear or dirt deposit.

Seal nuds shall have no visible deformation. In such case provide for replacement with new nuds.

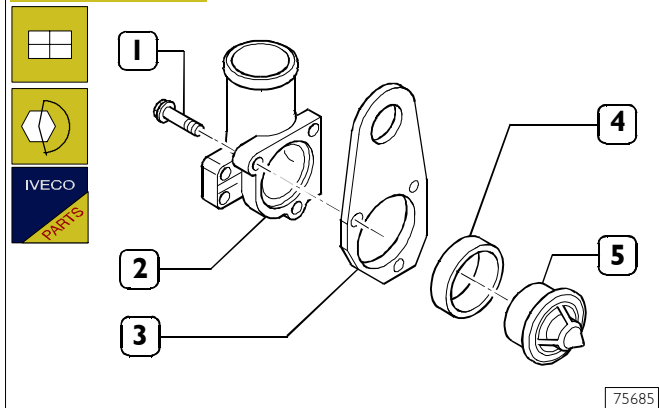
Figure 185



76206

- Assemble exhaust manifold (1) providing new gaskets (2).

Figure 186



75685

- Assemble thermostat unit (2) including thermostat (5) and gasket (4).
- Tighten the screws to the prescribed couple.



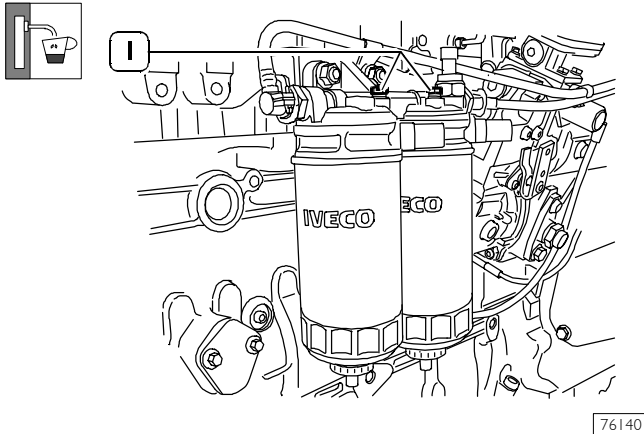
The screws (1) have been utilised to fix the bracket (3).

Disassemble the bracket and reassemble components from 1 to 5 as shown in the picture.

The gasket (4) must be new.

Feed system bleed procedure

Figure 213



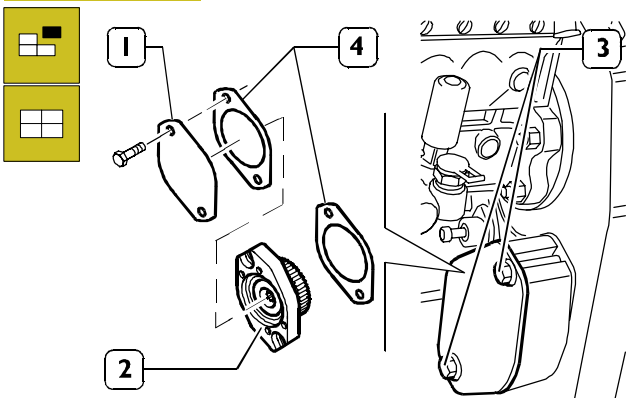
76140

In case any operation has been executed on the components of the feed circuit, it is necessary to execute bleeding of air within the system.

- Loosen the bleeder vent screws (1) on the fuel filter supports.
- Switch starter revolution on, activating the priming pump and driving fuel delivery to the filters.
- Continue executing this operation until when fuel drains from the bleeder vent screws, then tighten the screws.

Power take-off disassembly and assembly procedure

Figure 214



76137

Where designed, there is a power take-off able to transmit motion to different auxiliary parts.

Disassembly of such mechanism shall be executed as following:

- Loosen the two screws (3) and after having removed the cover (1) with a specially provided extractor, withdraw the power take-off (2).
- The two gaskets (4) shall be replaced in phase of reassemble.

- Vary out the assembly fitting the power take-off in its housing, providing new gasket and checking the sprocket gear meshing.
- Assemble cover and gasket and tighten the screws to the prescribed couple.

Checks and controls



The following tests shall be made after engine assembly to the vehicle.

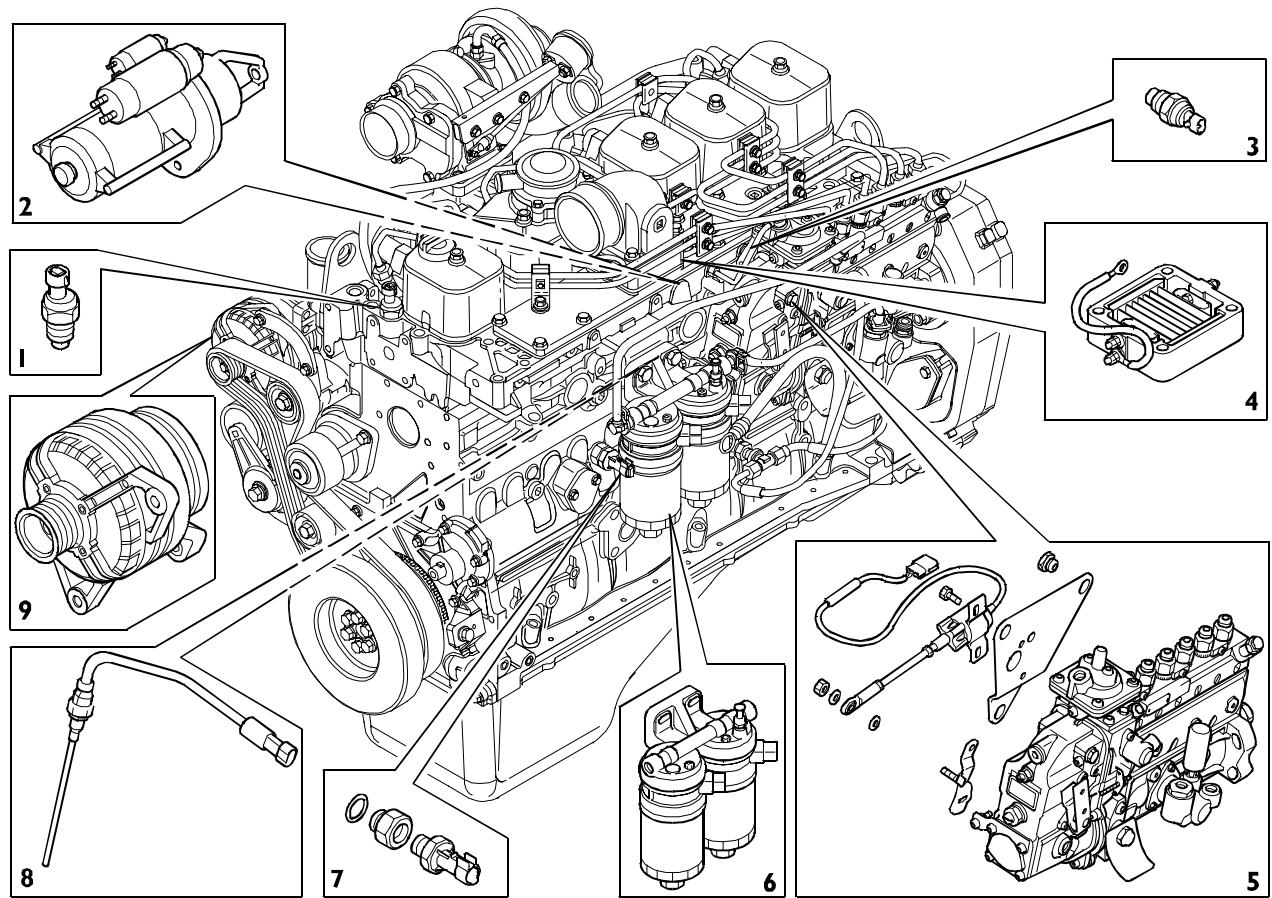
Preventively check that the liquid levels have been correctly restored.



Start the engine, let it run at revolution regimen slightly higher than idling and wait that the cooling liquid temperature reaches the value enabling thermostat opening, then check that:



- There is no water bleeding from the manifolds connecting engine cooling circuit pipelines and cabin internal heating, eventually providing to further tighten the locking rings.
- Carefully check the fuel connection pipes to the respective unions.
- There is no oil leakage from the lubrication circuit of the various pipelines connecting cover and.
- Cylinder head, oil pan and bearing, oil filter and heat exchanger as well as relating housings.
- There is no fuel leakage from fuel pipelines.
- There is no blow-by from pneumatic pipes (if provided).
- Verify correct working of the lighting leds of the dashboard containing the tools as well as of the equipment that was disconnected during engine disconnection.
- Check and blow by with care the engine cooling system, carrying out frequent drainage.

ELECTRICAL COMPONET LAYOUT (6 CYL. ENGINES WITH PUMP UNIT)**Figure 224**

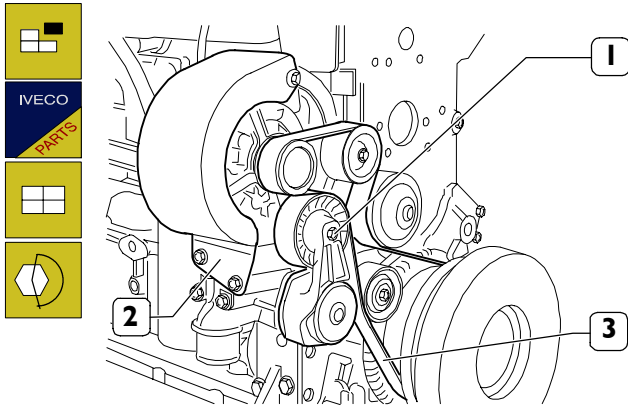
76521

The electrical components provided with NEF F4BE0684 Engine are listed here following:

1. Cooling liquid temperature sensor;
2. Starter;
3. KSB Water temperature sensor;
4. Resistor for cold start (whether specifically designed);
5. Engine stop assembled to feed pump;
6. Fuel heater;
7. Oil pressure switch;
8. Engine oil lever transmitted;
9. Alternator;

For the application with an automatic screw coupling the procedure is the following:

Figure 237



74171

- Unscrew the screws which fix the belt guard (2) to the support and dismount it.
- Operate on the tightener (1) and withdraw the belt (3) from the alternator and water pumps from pulleys and from the returns pumps.
- Replace the worn belt with a new part.
- Place the belt on the pulleys and the guide rollers.
- Place the automatic tightener in order to key the belt in the functioning position.
- Further adjustments are not required.

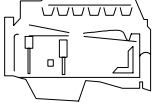
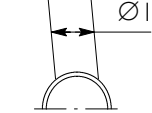
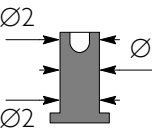


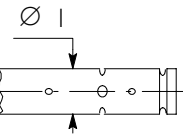
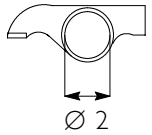

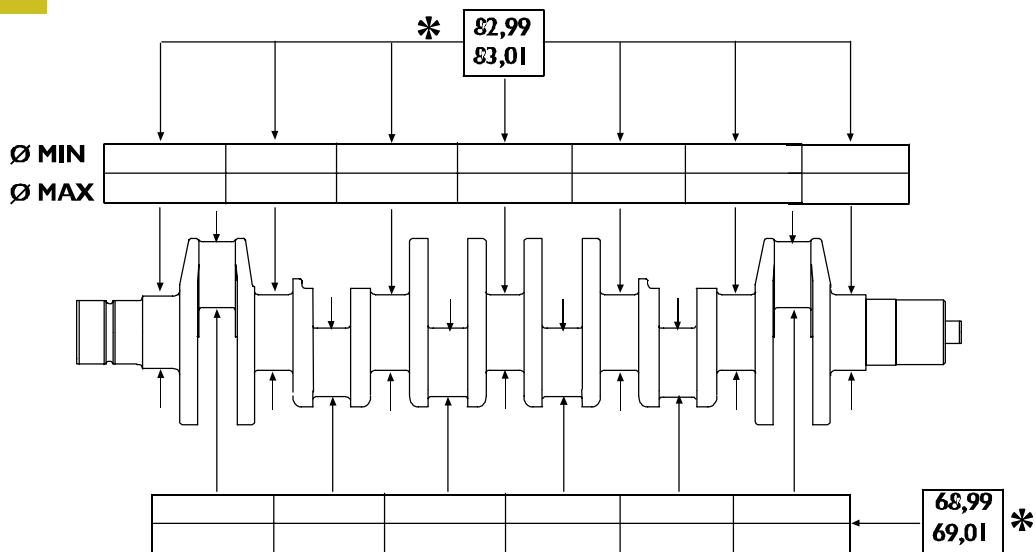
 Type	4 CYLINDERS	6 CYLINDERS
CYLINDER HEAD – TIMING SYSTEM		
mm		
 Tappet cap housing on block <div style="display: flex; justify-content: space-between; width: 100%;"> $\varnothing 1$ $\varnothing 1$ </div>		-
 Tappet cap outside diameter: <div style="display: flex; justify-content: space-between; width: 100%;"> $\varnothing 2$ $\varnothing 3$ </div>		15.924 to 15.954 15.965 to 15.930
 Between tappets and housings		0.025 to 0.070
 Tappets		-
 Rocker shaft <div style="display: flex; justify-content: space-between; width: 100%;"> $\varnothing 1$ $\varnothing 1$ </div>		21.963 to 21.975
 Rockers <div style="display: flex; justify-content: space-between; width: 100%;"> $\varnothing 2$ $\varnothing 2$ </div>		19.000 to 19.026
 Between rockers and shaft		0.025 to 0.063

Figure 28

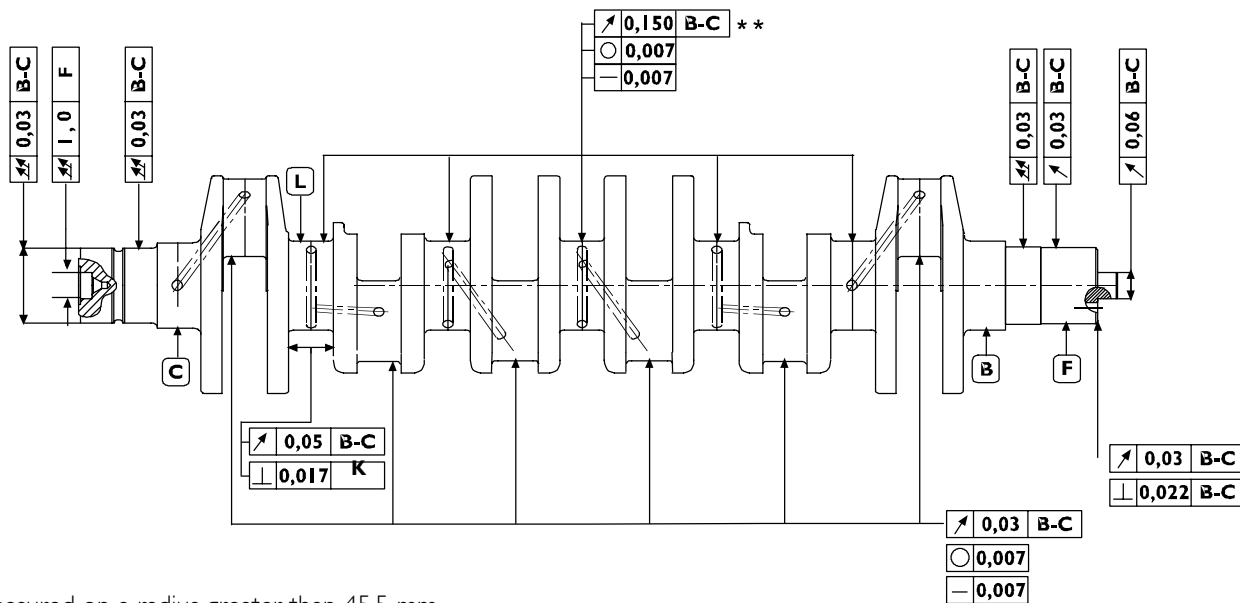


FILL THIS TABLE WITH OUTPUT SHAFT JOURNAL AND CRANKPIN MEASURED VALUES

70514

*Rated value

Figure 29



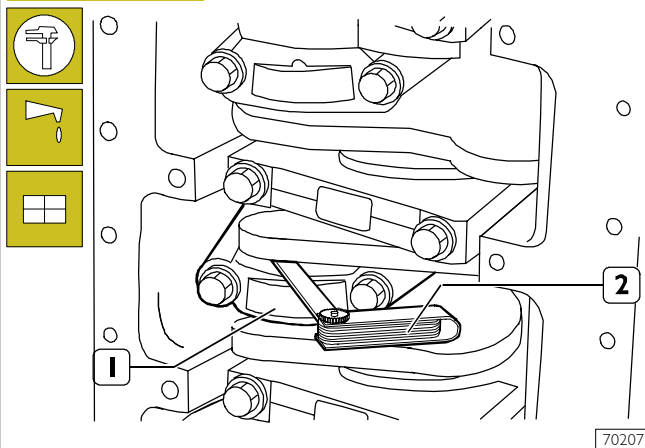
* Measured on a radius greater than 45.5 mm

** $\sqrt{0.500}$ between adjacent main journals

70577

MAIN OUTPUT SHAFT TOLERANCES

Figure 67



If a different clearance value is found, replace the half bearings and repeat the check.

Once the specified clearance has been obtained, lubricate the main half bearings and fit them by tightening the connecting rod cap fastening screws to the specified torque.

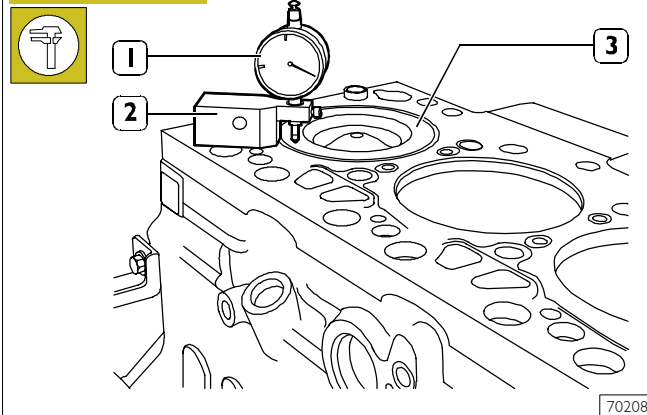


Before the final fitting of the connecting rod cap fastening screws, check that their diameter measured at the centre of the thread length is not < 0.1 mm than the diameter measured at approx. 10 mm from screw end.

Check manually that the connecting rods (1) are sliding axially on the output shaft pins and that their end float, measured with feeler gauge (2) is 0.250 to 0.275 mm.

Checking piston protrusion

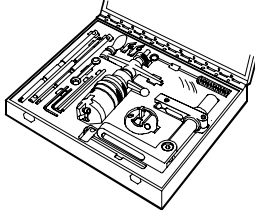
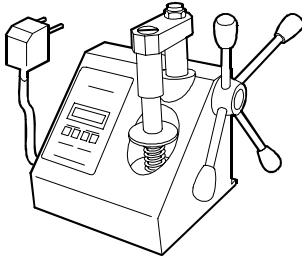
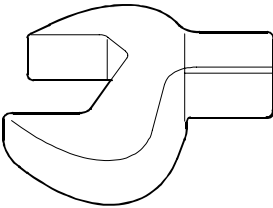
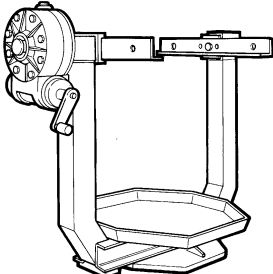
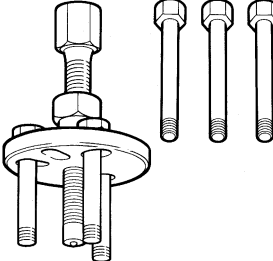
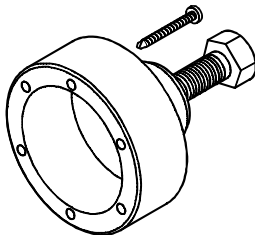
Figure 68



Once connecting rod-piston assemblies refitting is over, use dial gauge 39395603 (1) fitted with base 99370415 (2) to check piston (3) protrusion at T.D.C. with respect to the top of the engine block.

Protrusion shall be 0.28 to 0.42 mm.

TOOLS

TOOL No.	DEFINITION	
99305018	 A collection of various grinding stones and tools arranged in a tray, used for valve seat regrinding.	Kit for valve seat regrinding
99305047	 A mechanical device with a digital display and a handle, used for testing spring load.	Spring load tester
99317915	 A specialized wrench with a unique hook-like shape, designed for plug-in applications.	Plug-in wrench (set of three: 14, 17, 19)
99322205	 A heavy-duty mechanical stand with a rotating platform and a vertical support, used for overhauling units.	Revolving stand for overhauling units (700 daN/m capacity, 120 daN/m torque)
99340035	 A mechanical tool consisting of a central gear and several bolts, used for extracting injection pump gears.	Injection pump gear extractor.
99340055	 A circular tool with a central threaded hole and a handle, used for removing the front gasket of the output shaft.	Tool to remove output shaft front gasket

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL