ENGINES CURSOR
Tier3 F2CE9684, F3AE9684

Repair Manual

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1st Printing

CASE IH AGRICULTURE

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UNITS OF MEASURE

In this manual, the units of measure of the IS (International System) are used.

The units of measure of the MKSA system are listed in parenthesis after the units of the International system.

Example: 24.5 Mpa (250 kgf/cm^2).

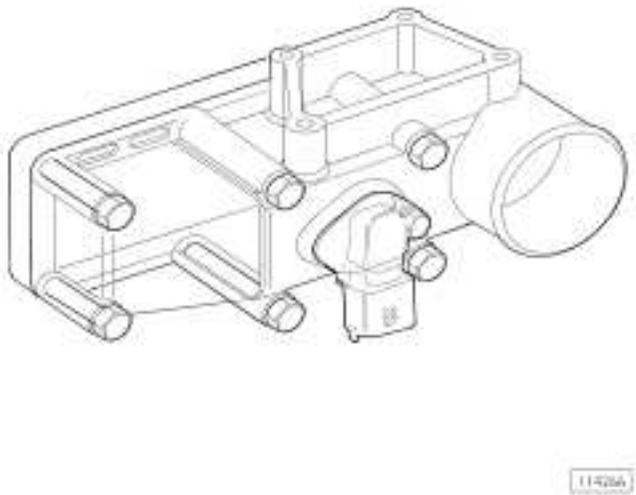
Here below, a conversion table of the units of the IS and some units of measure of other systems is listed. as a reference.

Quantity	To convert from (SI)	into (Others)	Multiply by
Length	mm	in	0.03937
	mm	ft	0.003281
Volume	L	US gal	0.2642
	L	US qt	1.057
	m^3	yd^3	1.308
Mass	kg	lb	2.205
Force	N	kgf	0.10197
	N	lbf	0.2248
Torque	N.m	kgf.m	0.10197
	N.m	lbf.ft	0.7375

Quantity	To convert from (SI)	into (Others)	Multiply by
Pressure	MPa	kgf/cm^2	10.197
	MPa	psi	145.0
Power	kW	PS	1.360
	kW	HP	1.341
Temperature	°C	°F	°C x 1.8 + 32
Velocity	km/h	mph	0.6214
	min^{-1}	rpm	1.0
Flow	L/min	US gpm	0.2642
	mL/rev	cc/rev	1.0

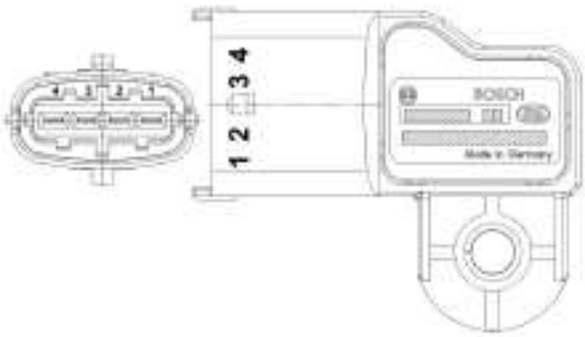
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Figure 17



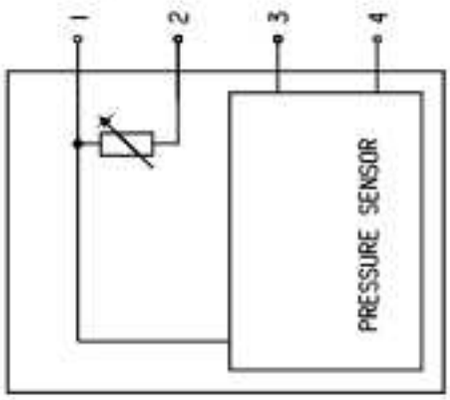
Sensor external view

Figure 18



Linking connector

Figure 19



Wiring diagram

Air pressure/temperature sensor (85156).

This component incorporates a temperature sensor and a pressure sensor.

It replaces the temperature sensors (85155) and pressure sensors (85154) available in the preceding systems.

It is fitted onto the intake manifold and measures the maximum supplied air flow rate used to accurately calculate the amount of fuel to be injected at every cycle.

The sensor is powered with 5 V.

The output voltage is proportional to the pressure or temperature measured by the sensor.

Pin (EDC)	25/C - 33/C	Power supply
Pin (EDC)	36/C	Temperature
Pin (EDC)	34/C	Pressure

Ref.	Description	Control unit pin
1	Ground	25C
2	Temp. Sign.	36C
3	+5	33C
4	Press. Sign.	34C

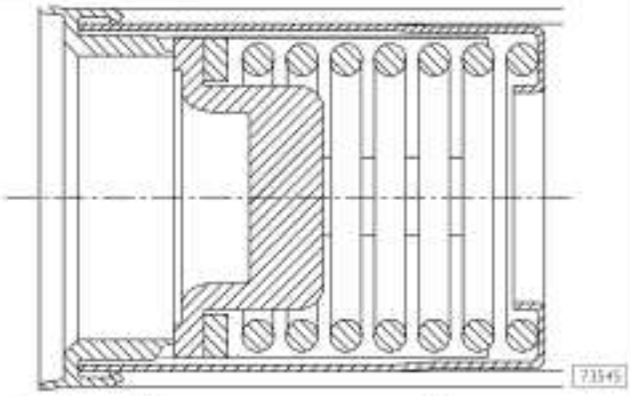
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ANOMALY	POSSIBLE CAUSE (*) = if available in the equipment	RECOMMENDED TESTS OR INTERVENTION	REMARKS
The engine disconnects or does not start.	(*) EDC "burned" by short circuit on the wiring harness of the friction clutch.	Eliminate the short circuit and replace the EDC.	Verify that the wire line, close to the pedal, is not exposed to.
Difficult start and low performance in all conditions.	Inefficient high pressure pump.	After having excluded any other possible cause, replace the high pressure pump.	
Difficult start, low performance and engine running with one cylinder less.	Injector with obstructer or solenoid (mechanical part) blocked open.	The non-working injector is easily recognisable detecting by feeling the absence of pulsing within the relevant high pressure pipe.	In case of low entity blow-by, inficiating the mechanical working of the injector but not involving flow limiter activation, there is no error memorisation in the engine control module. If the flow limiter is activated. Check error code memory.
Starting requires in excess of ten seconds, followed by huge white exhaust fumes and a fuel smell.	Injector blocked in open position (with no return).	The non-working injector is easily recognisable detecting by feeling the absence of pulsing within the relevant high pressure pipe.	Usually, whether such symptoms appear, it is instinctive to give up engine start. However, by insisting, it is possible to start the engine. As a matter of facts, by insisting, if within the rail the pressure makes the flow limiter close up, the engine starts with one cylinder less and gradually the grade of fumes reduces and disappears.
Breaking of high pressure pipeline from pump to rail.	Strange vibrations provoked by slack of pipe bracket.	Replace the pipeline ensuring the correct tightening of the anti-vibration bracket screws.	It is very important, in addition to correct blocking, to keep the brackets in the original position.
The engine works with one cylinder less, without memorising failure blink codes in the engine control module.	Injector blocked in closed position.	Identify the injector that is not working any more and the relating high pressure filler.	The non-working injector is easily recognisable detecting by feeling the absence of pulsing within the relevant high pressure pipe.

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By-pass valve

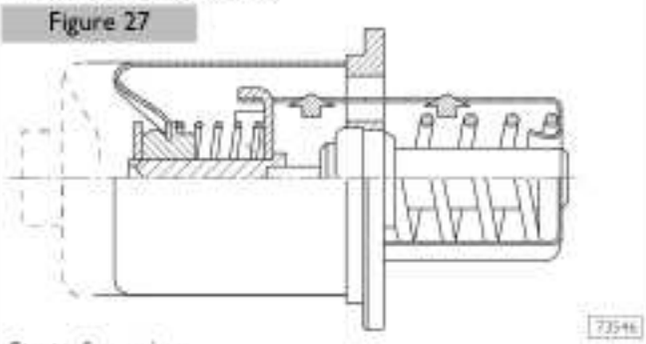
Figure 26



The valve quickly opens at a pressure of 3 bars.

Thermostatic valve

Figure 27



Start of opening:

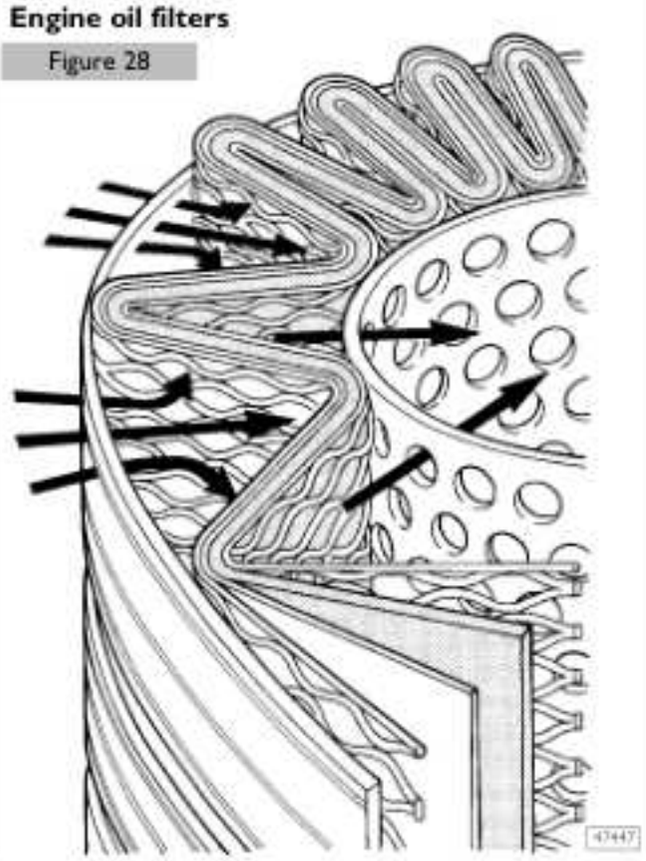
- ❑ travel 0.1 mm at a temperature of 82 ±2°C.

End of opening:

- ❑ travel 8 mm at a temperature of 97°C.

Engine oil filters

Figure 28



This is a new generation of filters that permit much more thorough filtration as they are able to holder back a greater amount of particles of smaller dimensions than those held back by conventional filters with a paper filtering element.

These high-filtration devices, to date used only in industrial processes, make it possible to:

- ❑ reduce the wear of engine components over time;
- ❑ maintain the performance/specifications of the oil and thereby lengthen the time intervals between changes.

External spiral winding

The filtering elements are closely wound by a spiral so that each fold is firmly anchored to the spiral with respect to the others. This produces a uniform use of the element even in the worst conditions such as cold starting with fluids with a high viscosity and peaks of flow. In addition, it ensures uniform distribution of the flow over the entire length of the filtering element, with consequent optimization of the loss of load and of its working life.

Mount upstream

To optimize flow distribution and the rigidity of the filtering element, this has an exclusive mount composed of a strong mesh made of nylon and an extremely strong synthetic material.

Filtering element

Composed of inert inorganic fibres bound with an exclusive resin to a structure with graded holes, the element is manufactured exclusively to precise procedures and strict quality control.

Mount downstream

A mount for the filtering element and a strong nylon mesh make it even stronger, which is especially helpful during cold starts and long periods of use. The performance of the filter remains constant and reliable throughout its working life and from one element to another, irrespective of the changes in working conditions.

Structural parts

The o-rings equipping the filtering element ensure a perfect seal between it and the container, eliminating by-pass risks and keeping filter performance constant. Strong corrosion-proof bottoms and a sturdy internal metal core complete the structure of the filtering element.

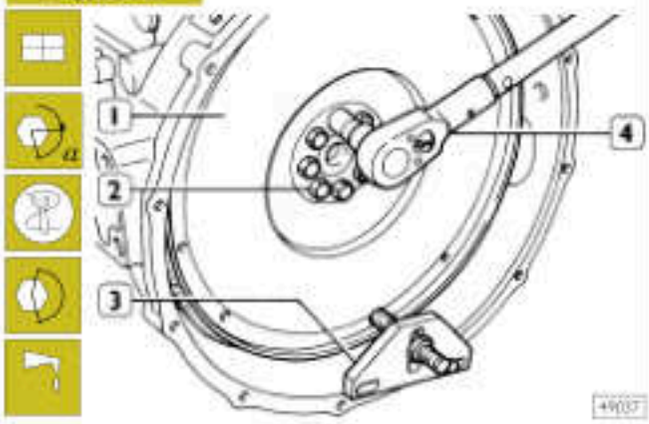
When mounting the filters, keep to the following rules:

- ❑ Oil and fit new seals.
- ❑ Screw down the filters to bring the seals into contact with the supporting bases.
- ❑ Tighten the filter to a torque of 35-40 Nm.

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If the teeth of the ring gear mounted on the engine flywheel, for starting the engine, are very damaged, replace the ring gear. It must be fitted after heating the ring gear to a temperature of approx. 200°C.

Figure 48

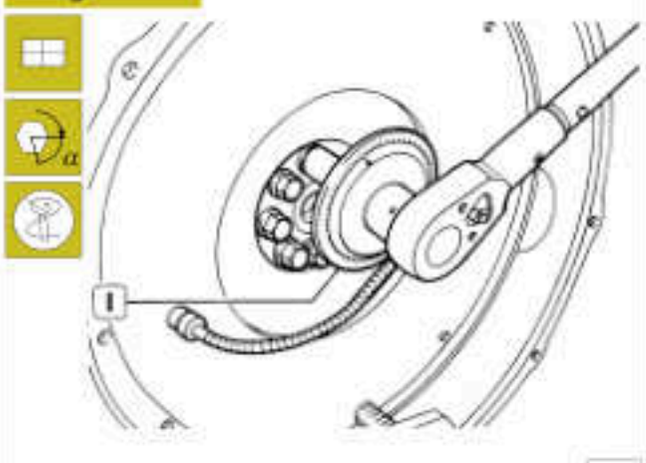


NOTE The crankshaft has a locating peg that has to couple with the relevant seat on the engine flywheel.

Position the flywheel (1) on the crankshaft, lubricate the thread of the screws (2) with engine oil and screw them down. Lock rotation with tool 380000144 (3). Lock the screws (2) in three phases.

First phase: pre-tightening with torque wrench (4) to a torque of 120 Nm (12 kgm).

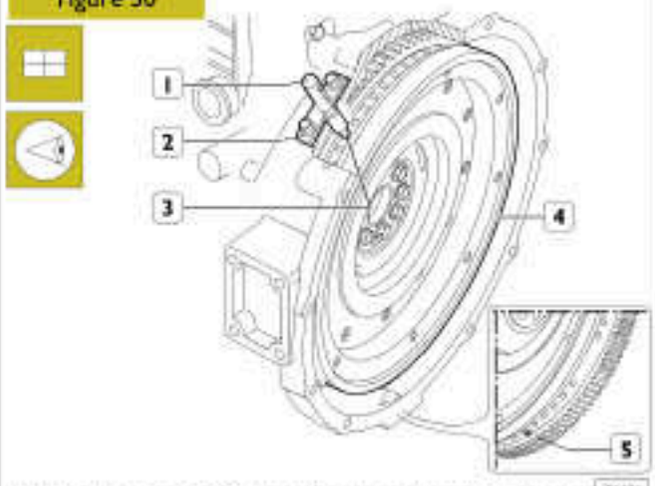
Figure 49



Second and third phase: closing to angle of 60° ÷ 30° with tool 380000304 (1).

Fitting camshaft

Figure 50



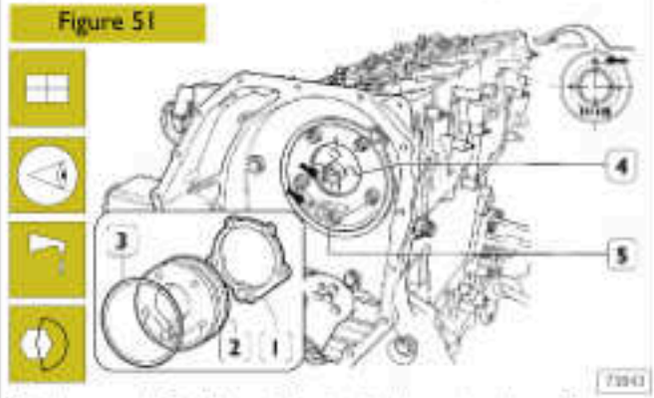
Position the crankshaft with the pistons 1 and 6 at the top dead centre (T.D.C.).

This situation occurs when:

1. The hole with reference mark (5) of the engine flywheel (4) can be seen through the inspection window.
2. The tool 380000150 (1), through the seat (2) of the engine speed sensor, enters the hole (3) in the engine flywheel (4).

If this condition does not occur, turn the engine flywheel (4) appropriately. Remove the tool 380000150 (1).

Figure 51

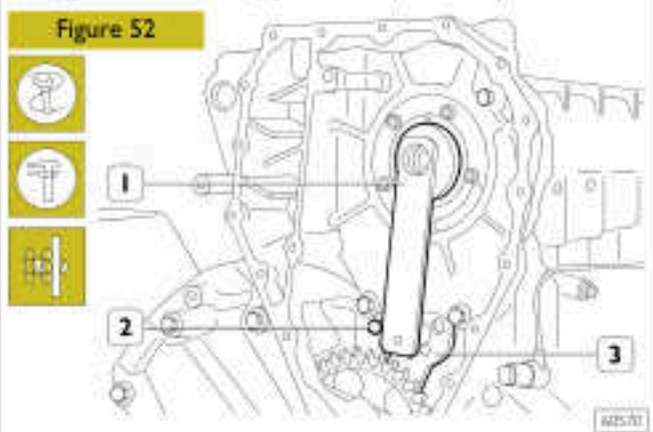


Fit the camshaft (4), positioning it observing the reference marks (→) as shown in the figure.

Lubricate the seal (3) and fit it on the shoulder plate (2).

Mount the shoulder plate (2) with the sheet metal gasket (1) and tighten the screws (5) to the required torque.

Figure 52



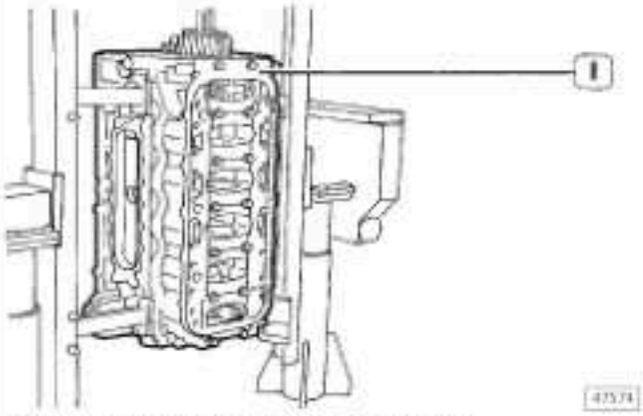
❑ Apply the gauge 380000167 (1). Check and adjust the position of the link rod (3) for the idle gear. Lock the screw (2) to the required torque.

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ENGINE OVERHAUL
ENGINE REMOVAL AT THE BENCH

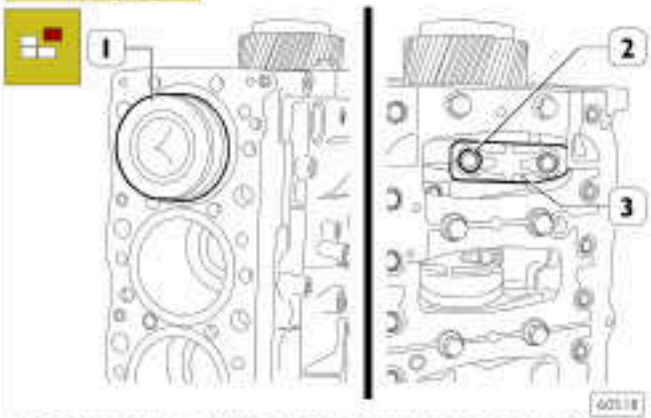
The following instructions are prescribed on the understanding that the engine has previously been placed on the rotating bench and that removal of all specific components of the equipment have been already removed as well. (See Section 3 of the manual herein).
The section illustrates therefore all the most important engine overhaul procedures.

Figure 1



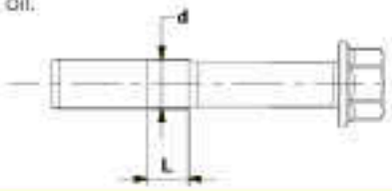
Rotate the block (1) to the vertical position.

Figure 2



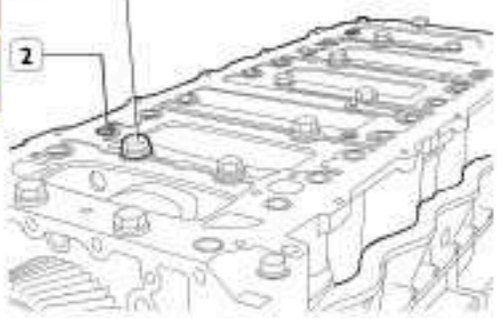
Untighten screws (2) fixing the connecting rod cap (3) and remove it. Remove the connecting rod-piston (1) assembly from the upper side. Repeat these operations for the other pistons.

NOTE The screws of the connecting rod wires must be used again up to when the diameter of the threading (d) measured in zone (L) is not less than 13.4 mm. Otherwise replace the screw.
Before assembly lubricated screw threading with engine oil.



NOTE Keep the big end bearing shells in their respective housings and/or note down their assembly position since, if reusing them, they will need to be fitted in the position found upon removal.

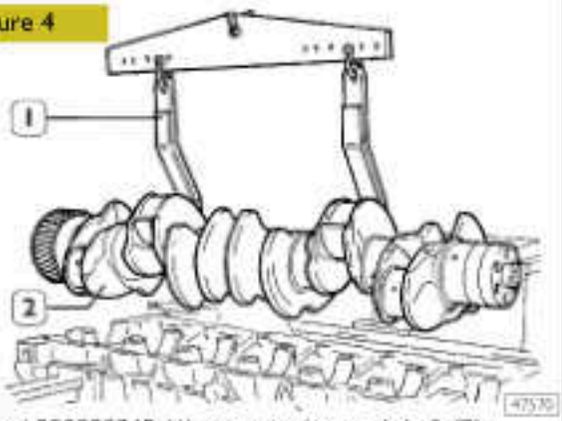
Figure 3



By means of proper and splined wrenches, untighten the screws (1) and (2) and remove the under-block.

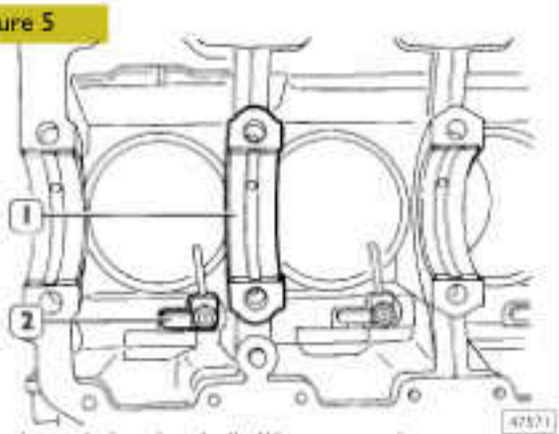
NOTE Note down the assembly position of the top and bottom main bearing shells since, if reusing them, they will need to be fitted in the position found upon removal.

Figure 4



Using tool 380000362 (1), remove the crankshaft (2).

Figure 5



Remove the main bearing shells (1), unscrew the screws and take out the oil nozzles (2).
Remove the cylinder liners as described under the relevant subheading on page 14.

NOTE After disassembling the engine, thoroughly clean disassembled parts and check their integrity.
Instructions for main checks and measures are given in the following pages, in order to determine whether the parts can be re-used.

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