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Tier 4a

Engine

SERVICE MANUAL

Part number 84473751
1st edition English
April 2011

CASE CONSTRUCTION

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ENGINE - Service limits

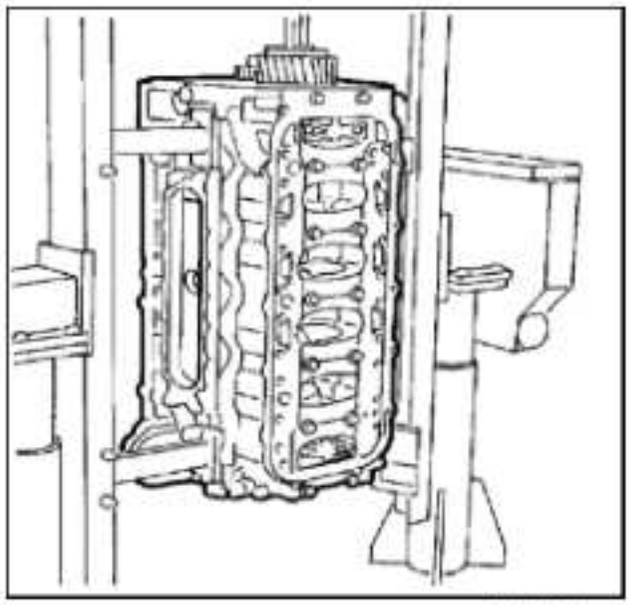
Engine specifications	
Compression Ratio	16.5 : 1
Bore	**135 mm (5.3 in)**
Stroke	**150 mm (5.9 in)**
Displacement	**12880 cm³**
Turbocharging	Inter-cooled, Direct injection
Turbocharger type	Holset HE551
Lubrication	Forced by gear pump, relief valve single action
Oil Pressure (Warm engine) - Idling - Peak RPM	 **3 bar (43.5 psi)** **4.5 bar (65.3 psi)**
Cooling	Liquid cooled
Water pump control	Belt driven
Thermostat (Start of opening)	**81 °C (177.8 °F)**
Intake valve timing - Opens before TDC - Closes after BDC Exhaust valve timing - Opens before BDC - Closes after TDC	 **17 °** **30 °** **50 °** **9 °**
Valve lash setting (when engine is cold) - Intake - Exhaust	 **0.4 mm (0.016 in)** **0.6 mm (0.024 in)**
Firing Order	1 - 4 - 2 - 6 - 3 - 5
Injection pressure	**2000 bar (29000 psi)**
Injector calibration	**290 - 302 bar (4205 - 4379 psi)**
Cylinder block and piston	
Bores for cylinder liners: - Upper - Lower	 **153.500 - 153.525 mm (6.043 - 6.044 in)** **152.000 - 152.025 mm (5.984 - 5.985 in)**
Cylinder liners external diameter: - Upper - Lower	 **153.461 - 153.486 mm (6.042 - 6.043 in)** **151.890 - 151.915 mm (5.980 - 5.981 in)**
Clearance between the OD of liners and ID of bores - Upper - Lower	 **0.014 - 0.039 mm (0.001 - 0.002 in)** **0.085 - 0.135 mm (0.003 - 0.005 in)**
Cylinder liner - ID - ID under a load of **800 N (179.8 lb)** - Protrusion	 **135.000 - 135.013 mm (5.315 - 5.315 in)** **135.011 - 135.024 mm (5.315 - 5.316 in)** **0.045 - 0.075 mm (0.002 - 0.003 in)**
Pistons - Measuring dimension - External diameter (supplied as spares - External diameter (production only) - Pin bore	 **18 mm (0.709 in)** **134.861 - 134.873 mm (5.309 - 5.310 in)** **134.872 - 134.884 mm (5.310 - 5.310 in)** **54.010 - 54.018 mm (2.126 - 2.127 in)**
OD of piston - ID of cylinder liner	**0.127 - 0.151 mm (0.005 - 0.006 in)**
Piston protrusion	**0.12 - 0.42 mm (0.005 - 0.017 in)**
Piston pin diameter	**53.994 - 54.000 mm (2.126 - 2.126 in)**
Piston pin OD - pin bore	**0.010 - 0.024 mm (0.0004 - 0.0009 in)**
Piston ring grooves - Top	 **3.100 - 3.120 mm (0.122 - 0.123 in)**

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Connecting rod and piston - Remove

Prior operation:
Oil pan - Remove (B.60.A)

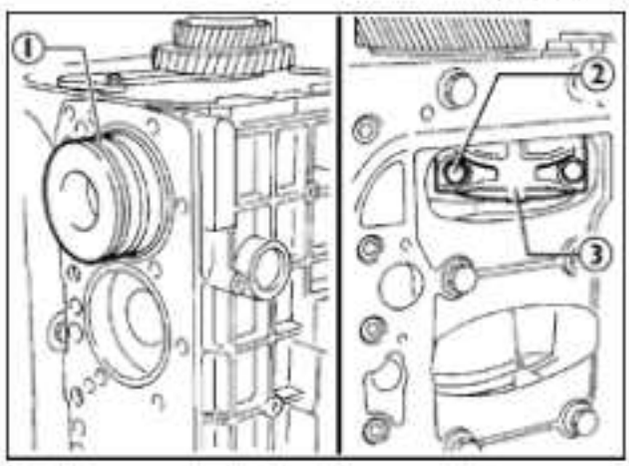
1. Rotate the block **(1)** to the vertical position.



ENGINEROTATE 1

2. Remove the screws **(2)** from the connecting rod cap **(3)**and remove the cap **(3)** from the connecting rod.
3. Remove the piston **(1)** and the connecting rod assembly from the top side of the engine block.
4. Repeat these steps for the remaining cylinders.

NOTE: *Keep the connecting rod half bearings in the corresponding housings and or take note of their assembly position because they must be installed in the original position if they are reused.*



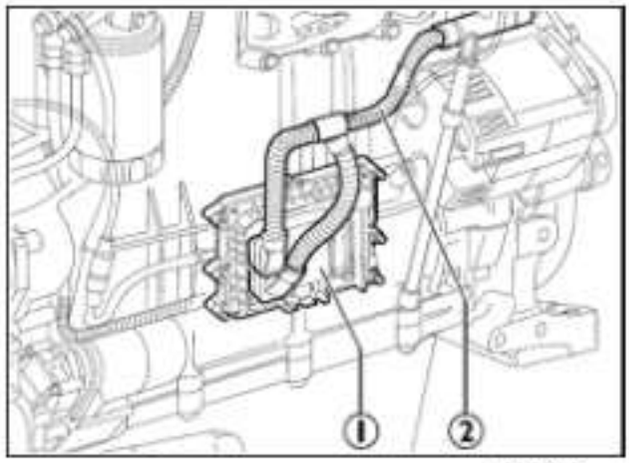
PISTONASSM 2

Next operation:
Connecting rod and piston - Install (B.10.A)

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Wiring harness - Install

1. Connect the engine wiring harness **(2)** to all the sensors and to the electronic control unit **(1)**.



HARNESSF3C 1

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