

2

Specifications

Basic engine data

Number of cylinders.	6
Cylinder arrangement	In-line
Cycle	Four stroke
Firing order	1, 5, 3, 6, 2, 4
Direction of rotation	Clockwise from the front
Induction system:	
WD, WF and WJ engines	Turbocharged
WE, WF and WG engines	Turbocharged / intercooled
Bore:	
WD, WE, WF and WG engines	109,2 mm (4.301 in)
WH and WJ engines	116,5 mm (4.590 in)
Stroke:	
WD and WE engines	119,0 mm (4.685 in)
WF, WG, WH and WJ engines	135,9 mm (5.350 in)
Compression ratios.. ...	16.5:1
Cubic capacity:	
WD and WE engines	6,68 litres (408.9 in ³)
WF and WG engines	7,64 litres (466 in ³)
WH and WJ engines	8,70 litres (531 in ³)

Rocker cover

To remove**Operation 3-1**

- 1 Remove the pipe for the air inlet from the rocker cover.
- 2 Remove the pipe for the boost control and discard the copper washers.
- 3 Put a cover on the union of the boost control to prevent the entry of dirt.
- 4 Remove the setscrews for the breather pipe.
- 5 Remove the setscrews for the rocker cover.
- 6 Lift the rocker cover and remove the breather pipe from the cover.

Caution: *The oil deflectors and breather element of the engine breather system will be damaged if the breather pipe is removed from the rocker cover before the rocker cover is lifted from the engine.*

- 7 Remove the rocker cover from the engine.

Recommended torque settings

Notes:

- The torque tensions below apply to components lubricated lightly with clean engine oil before they are fitted.
- The setscrew for the upper idler gear is supplied with a sealant on its thread. Do not put lubricating oil on the thread of this setscrew.

Standard torques

Thread size	Flanged head fasteners				Non-flanged head fasteners			
	Nm	lbf ft	kgf m	Spanner size mm	Nm	lbf ft	kgf m	spanner size mm
M6x1	11	8	0,11	8	8	6	0,08	10
M8x1,25	24	18	0,25	10	20	15	0,21	13
M10x1,5	49	36	0,50	13	40	30	0,41	16
M12x1,75	83	61	0,84	15	69	51	0,71	18
M16x2	208	154	2,13	21	173	128	1,77	24

Contents

1 General information

Introduction	1
Engine identification	3
Safety precautions	4
Engine lift equipment	6
POWERPART recommended consumable products	7

2 Specifications

Basic engine data	9
Data and dimensions	10
Recommended torque settings	19

3 Cylinder head assembly

General description	23
----------------------------------	----

Rocker cover

Operation 3-1 To remove	24
Operation 3-2 To fit	25

Rocker assembly

Operation 3-3 To remove	26
Operation 3-4 To dismantle and inspect	27

Operation 3-5 To assemble	28
Cylinder head	
Operation 3-6 To remove	29
Operation 3-7 To fit	30
Valves and valve springs	
Operation 3-8 To remove	33
Operation 3-9 To fit	34
Operation 3-10 To inspect and to correct	35
Operation 3-11 To inspect a valve rotator	37
Valve guides	
Operation 3-12 To inspect a valve guide	38
Operation 3-13 To remove	38
Operation 3-14 To fit	39
Cylinder head	
Operation 3-15 To inspect and to correct	40
Operation 3-16 To correct a valve seat with a valve seat cutter	42
Operation 3-17 To fit valve seat inserts	43
Operation 3-18 To renew atomiser sleeves	44
Operation 3-19 To set the valve tip clearance	46
 4 Piston and connecting rod assemblies	
General description	49
Big end bearing	
Operation 4-1 To remove	50
Operation 4-2 To fit	51
Operation 4-3 To inspect	51
Piston and connecting rod assembly	
Operation 4-4 To remove	52
Operation 4-5 To fit	53
Operation 4-6 To dismantle and assemble (WD, WE, WF and WG engines)	55
Operation 4-7 To dismantle and assemble (WH and WJ engines)	56
Operation 4-8 To inspect	57
Connecting rod	
Operation 4-9 To inspect	58
Small end bush	
Operation 4-10 To remove and to fit	58
Piston rings	

Fuel system

Fuel injection pump

Type.	Bosch P3000 or Bosch P7100, in-line
Drive	Forged steel gear
Number 1 outlet... ..	The outlet nearest to the front of the engine
Direction of pump rotation	Clockwise from the drive end of the pump
Static timing	See "Static timing chart" on page 110

Fuel filter

Type.	Canister and strainer
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Atomisers

Type.	Multi hole
Opening pressure	24820/25855 kPa (3600/3750 lbs/in ²)
Opening pressure service limit	20000 kPa (2900 lbs/in ²)

Cooling system

Coolant pump

Type.	Belt driven, impeller
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Coolant filter

Type.	Canister
Number... ..	1

Thermostat

Starts to open	82/85 °C (180/185 °F)
Fully open	94 °C (202 °F)

Flywheel and housing

Flywheel

Alignment.	0,013 mm (0.007 in) measured at a radius of 178 mm (7.0 in)
Run-out	0,15 mm (0.008 in)
Mounting surface alignment	0,05 mm (0.002 in)

Flywheel housing

Alignment.	SAE1 0,030 mm (0.012 in), SAE2 0,028 mm (0.011 in)
Run-out	SAE1 0,030 mm (0.012 in), SAE2 0,028 mm (0.011 in)

13 Where there is little damage, the valve and valve seat can be lapped. When the valve seats are lapped keep the seat to the measurements shown in the relevant Data and dimensions.

Caution: *Ensure that all the compound used to lap the valve seat and the seat is removed.*

14 Badly damaged valve seats can be corrected with a valve seat cutter, see Operation 3-16.

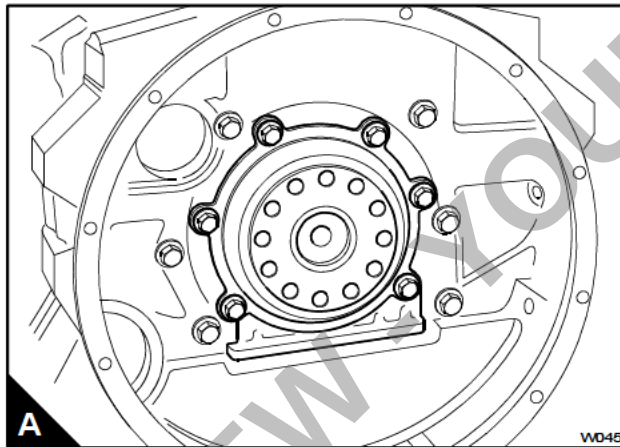
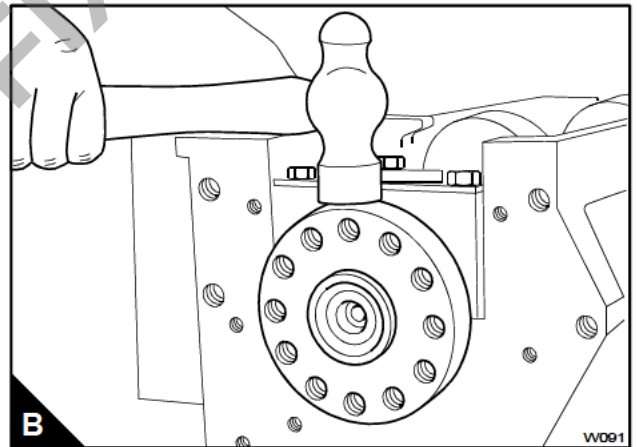
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Rear oil seal housing assembly**Cautions:**

- If the oil seal housing is removed, the rear oil seal and its wear sleeve must be renewed.
- Renew the rear oil seal and the wear sleeve as a unit, do not separate them.
- The flywheel housing does not have to be removed to renew the rear oil seal.

To remove the oil seal housing**Operation 5-4**

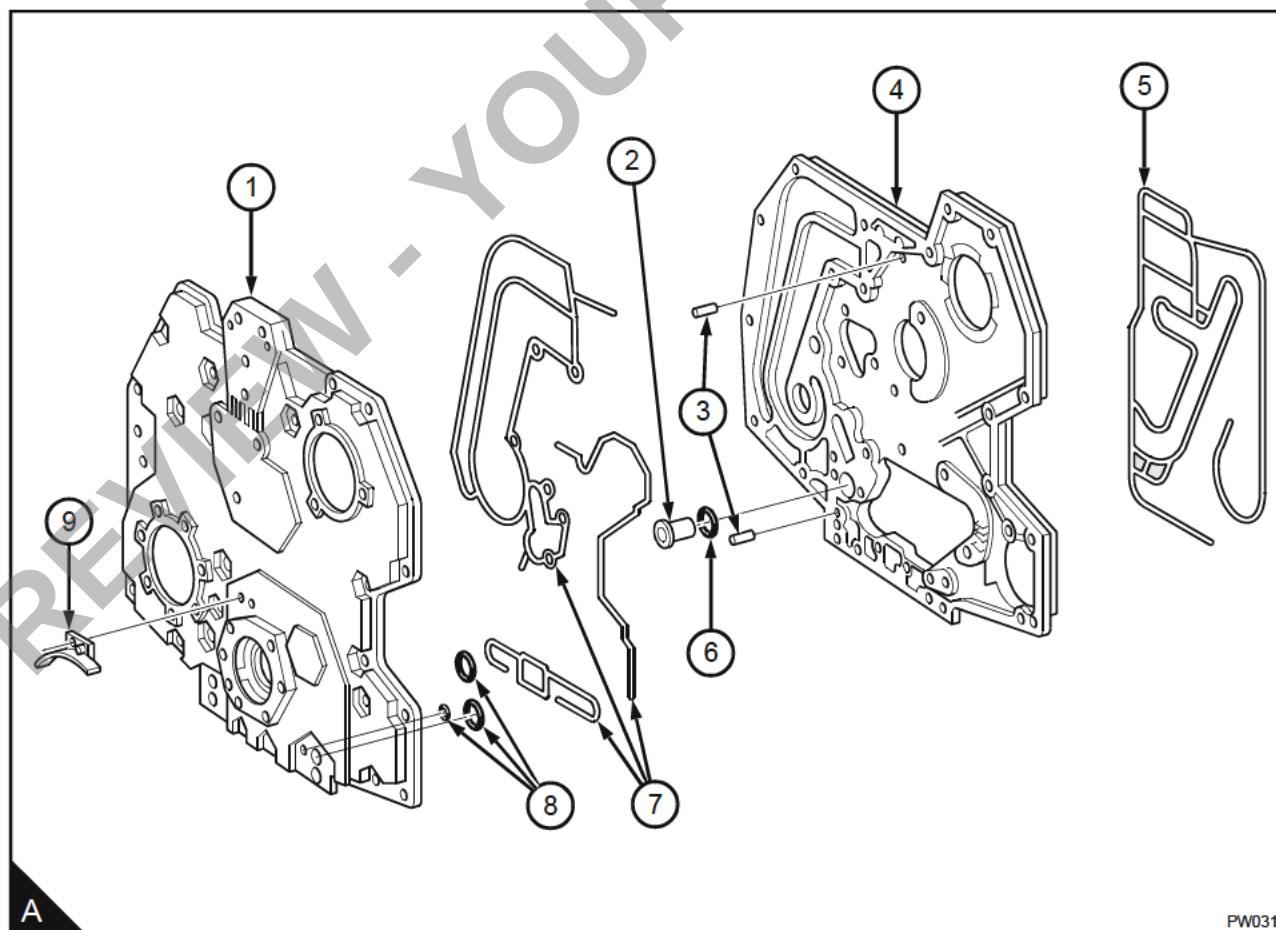
- 1 Drain the lubricating oil.
- 2 Remove the lubricating oil sump, see Operation 10-9 or Operation 10-10.
- 3 Remove the drive components from the rear end of the engine.
- 4 Remove the flywheel, see Operation 13-1.
- 5 Remove the four setscrews which pass through the flange of the sump and into the bottom of the seal housing.
- 6 Remove the six setscrews which retain the seal housing to the cylinder block.
- 7 Remove the rear oil seal and housing assembly (A). Remove and discard the old length of seal from between the housing and the cylinder block.
- 8 Hit carefully the face of the wear sleeve with a hammer to loosen the wear sleeve from the crankshaft.(B)
- 9 Remove the wear sleeve from the crankshaft.



To fit

Operation 6-7

- 1 Clean and inspect all components for wear or damage. Inspect the timing case for cracks, especially around the channels for the engine fluids.
- 2 Fit a new joint (A5) to the backplate.
- 3 Engage the backplate dowels (A3) and push the backplate onto the engine.
- 4 Lightly lubricate the threads and shoulders of the setscrews for the backplate with clean engine lubricating oil.
- 5 Fit and tighten the setscrews to 26 Nm (19 lbf ft) 2,6 kgf m.
- 6 Fit the camshaft, see Operation 6-9.
- 7 Fit the tappets into their original bores.
- 8 Fit the cylinder head, see Operation 3-7.
- 9 Fit the oil pressure relief valve together with its 'O' ring (A6).
- 10 Fit the idler gears, see Operation 6-4.
- 11 Fit a new coolant filter.
- 12 Fit the power steering pump, see Operation 15-2, and the compressor, see Operation 15-1, if removed earlier.
- 13 Fit the fuel injection pump and its drive gear, see Operation 11-9.
- 14 Fit the timing case cover, see Operation 6-2.
- 15 Fill the cooling system to the correct level.
- 16 Fill the lubricating system to the correct level with an approved oil.

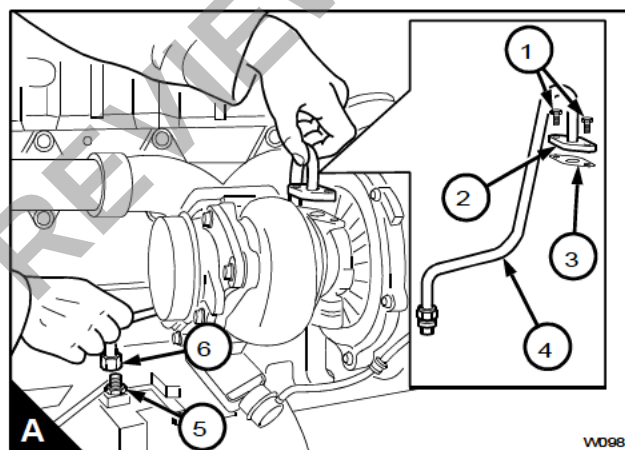
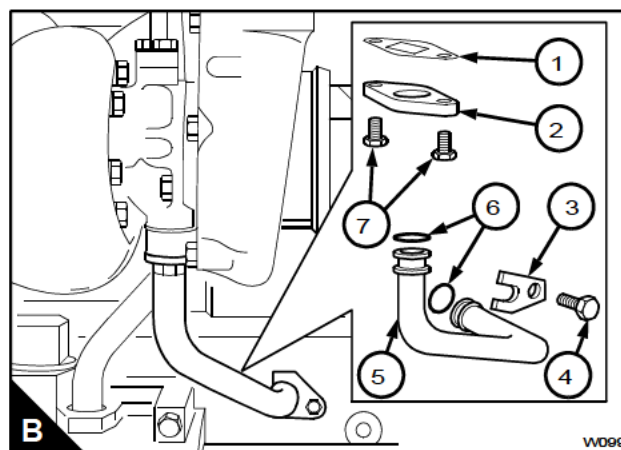


To fit

Operation 9-2

Warning! Turbochargers operate at high speed and at high temperatures. Keep fingers, tools and other objects away from the inlet and outlet ports of the turbocharger and avoid contact with hot surfaces.

- 1 Remove the covers from the pipes and manifolds.
- 2 Check that the turbocharger inlet and outlet are clean and free from restriction. Check that the turbocharger shaft rotates freely. Also check that the openings in the manifolds and the exhaust pipe are clean and free from restriction.
- 3 Fit a new gasket to the exhaust manifold to turbocharger flange.
- 4 Put the turbocharger in position and hold it. Fit the setscrews and tighten them to 68 Nm (50 lbf ft) 6,9 kgf m.
- 5 Put a suitable container under the turbocharger to contain the oil from the oil drain outlet of the turbocharger.
- 6 Pour 140 cm³ (0.25 pints) of clean engine lubricating oil into the oil supply port of the bearing housing.
- 7 Fit a new joint (A3) to the oil supply port on the top of the turbocharger.
- 8 Clean the threads of the union connection (A5 and A6) and apply a thread sealant to the union connection (A5).
- 9 Put the oil supply pipe (A4) in position, fit but do not tighten the flange setscrews (A1).
- 10 Use a spanner to hold the union connection (A5) on the oil filter head while the union nut (A6) on the pipe is tightened.
- 11 Tighten the flange setscrews (A1).
- 12 Fit the air cleaner hose to the compressor inlet.
- 13 Fit the compressor outlet hose.
- 14 Operate the stop control or, where fitted, disconnect the electrical stop control. Operate the starter motor until there is a flow of lubricating oil from the oil drain pipe of the turbocharger.
- 15 Connect the electrical stop control, if it was disconnected earlier.
- 16 Fit a new joint (B1), the flange (B2) and two new 'O' rings (B6) onto the oil drain pipe (B5).
- 17 Install the oil drain pipe into its port in the crankcase. Put and hold the flanged end of the oil drain pipe against the oil drain port, at the bottom of the turbocharger.
- 18 Fit but do not tighten the two flange setscrews (B7).
- 19 Put the pipe clamp (B3) in position and hold it. Fit but do not tighten the setscrew (B4).
- 20 Tighten the three setscrews evenly and gradually.
- 21 Remove the container and dispose of the lubricating oil in a safe place in accordance with local regulations.

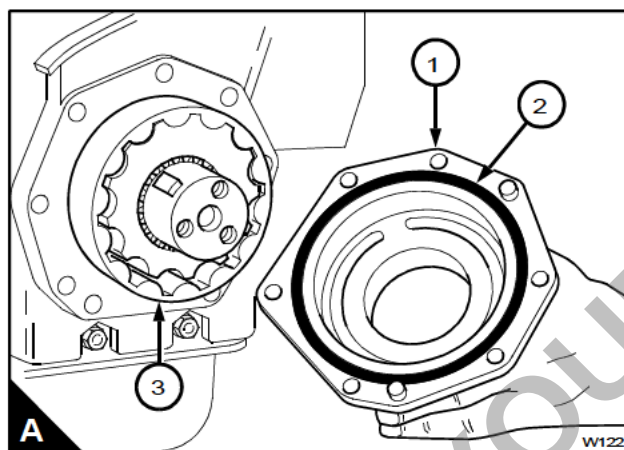
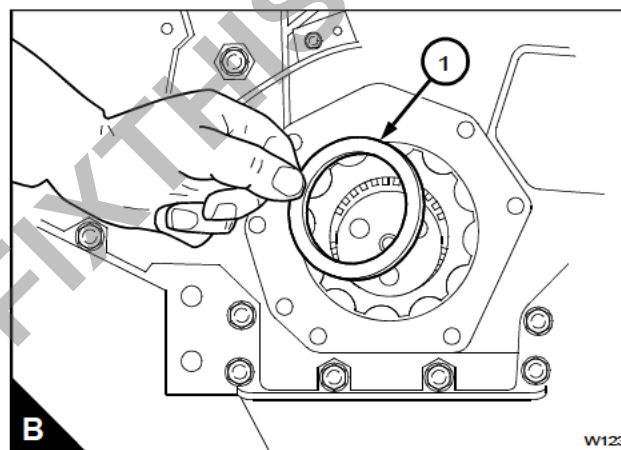


Lubricating oil pump

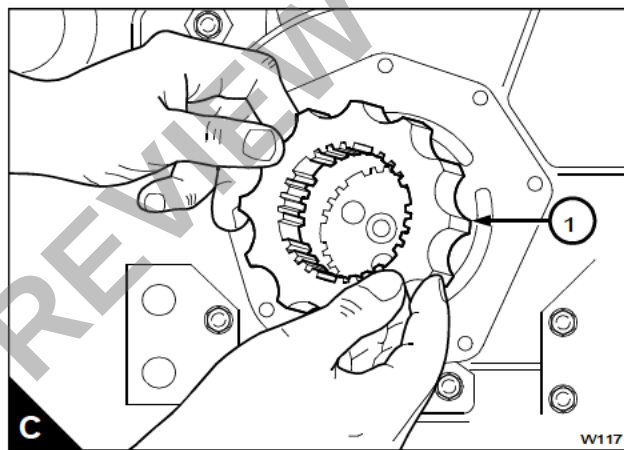
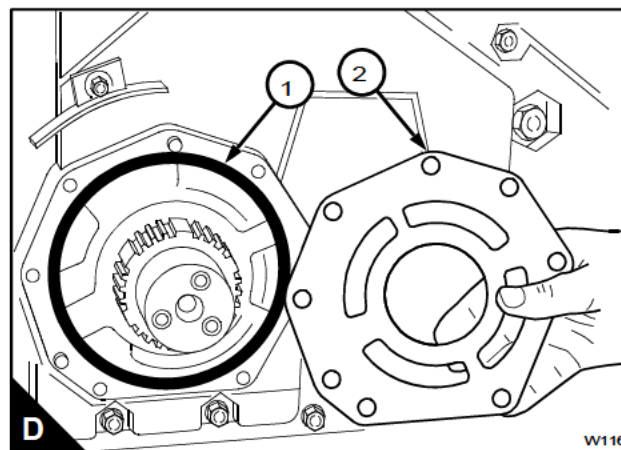
To remove

Operation 10-12

- 1 Drain the lubricating oil.
 - 2 Remove the crankshaft pulley and damper assembly, see Operation 5-1.
 - 3 Remove and discard the front oil seal, see Operation 10-15.
 - 4 Remove the six setscrews of the oil pump.
- Note:** There are short setscrews at the 2 o'clock and the 3 o'clock positions.
- 5 Remove the oil pump body (A1) and discard the 'O' ring (A2).
 - 6 Remove the outer rotor (A3).
 - 7 Remove the drive key.
 - 8 Remove the oil deflector (B1).



- 9 Remove the inner rotor (C1).
- 10 Remove the backplate (D2).
- 11 Remove and discard the 'O' ring (D1).



Filter canister

To renew the canister of the coolant filter/ inhibitor

Operation 12-1

Warning! Do not remove the canister while the engine is still hot and under pressure because dangerous hot fluid can be discharged.

Caution: The canister contains a corrosion inhibitor which is circulated around the cooling system as the coolant passes through the canister. It is important that only the genuine correct Perkins canister is used.

1 When the engine has cooled, remove the radiator filler cap to release the system pressure.

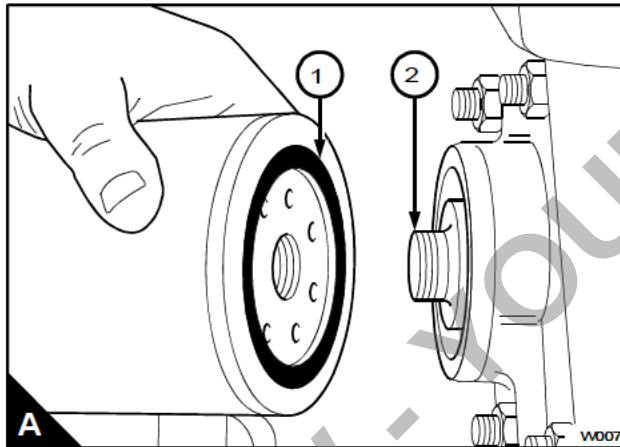
Note: When the system pressure is released, valves will close in the filter canister and in the housing for the canister. This will prevent the loss of coolant when the filter is removed.

2 Thoroughly clean the outside surfaces of the coolant filter assembly.

3 Use a strap wrench or similar tool to loosen the filter canister and remove the canister. Valves in the filter head will prevent the loss of coolant when the canister is removed.

4 Ensure that the threaded adaptor (A2) is secure in the filter head and that the inside of the head is clean.

5 Lubricate lightly the seal (A1) on top of the new canister with clean engine coolant. Fit the new canister to the filter head and tighten, by hand only. Do not overtighten the canister.



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