WORKSHOP MANUAL

200 Series Diesel Engines

4.135, 4.154, 4.182

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1990
Perkins Engines Limited
Peterborough, England

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Engine data

	4.135	4.154	4.182
Jo. of cylinders	4	4	4
Cycle	Four stroke	Four stroke	Four stroke
Combustion system	Indirect injection	Indirect injection	Indirect injection
Nominal bore	88,9 mm (3.5 in)	88,9 mm (3.5 in)	95,0 mm (3.74 in)
Stroke	88,9 mm (3.5 in)	101,6 mm (4.0 in)	105,0 mm (4.13 in)
Compression ratio	21:1	21:1	21:1
Cubic capacity	2,209 litres (134.8 in^3)	2,523 litres (153.9 in^3)	2,977 litres (181.7 in^3)
Firing order	1,3,4,2	1,3,4,2	1,3,4,2
Valve tip clearance (cold)	0,30 mm (0.012 in)	0,30 mm (0.012 in)	0,30 mm (0.012 in)
Lubricating oil sump capacity	5,0 litres (8.8 Imp. pints) 5,3 US quarts	6,0 litres (10.6 Imp. pints) 6,3 US quarts	6,0 litres (10.6 Imp. pints) 6,3 US quarts
Lubricating oil pressure:	207 kN/m^2 (30 lbf/in^2) 2,1 kgf/cm^2 minimum at maximum engine speed and normal engine temperature.		
Direction of rotation:	Clockwise from the front.		

Approximate installed dry engine weights

4.135	240 kg (530 lb)
4.154	245 kg (540 lb)
4.182	251 kg (553 lb)

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Preventive maintenance

These preventive maintenance periods are general in application. Check the periods given by the manufacturer of the equipment in which the engine is installed and, where necessary, use the shorter periods. These periods and procedures must also be adapted to ensure correct operation for any local vehicle or machine regulations.

On stop/start short distance operation the hours run are more important than the distance.

It is good maintenance to check for leakage and loose fasteners at each service interval.

These maintenance periods are only for engines that are operated with fuel and lubricating oil to the specifications given in this manual.

Daily or every 8 hours (use interval that comes first)

Check amount of coolant.
Check amount of lubricating oil in sump.
Check lubricating oil pressure (where gauge installed).
In extreme dust conditions, clean dust bowl of air filter (where fitted).

Every 5000km (3,000 miles), 150 hours or 1 month (use interval that comes first)

Change lubricating oil.
Inspect drive belt.
Clean dust bowl of air fitter (where fitted).
Check for water in fuel pre-filter (where fitted).

Every 10000km (6,000 miles), 300 hours or 2 months (use interval that comes first)

Change lubricating oil filter canister.
Check coolant hoses for condition.

Every 15000km (9,000 miles), or 450 hours (use interval that comes first)

Adjust valve tip clearances.
Check atomisers.

Every 20000km (12,000 miles), or 600 hours (use interval that comes first)

Tighten induction and exhaust manifold nuts.
Change fuel filter canister.
Check injection timing.
Clean or renew air filter element (if not indicated earlier).

Every 100000km (60,000 miles), or 3,000 hours (use interval that comes first)

Have the accessory equipment (starter motor, alternator, exhauster, etc.) checked.

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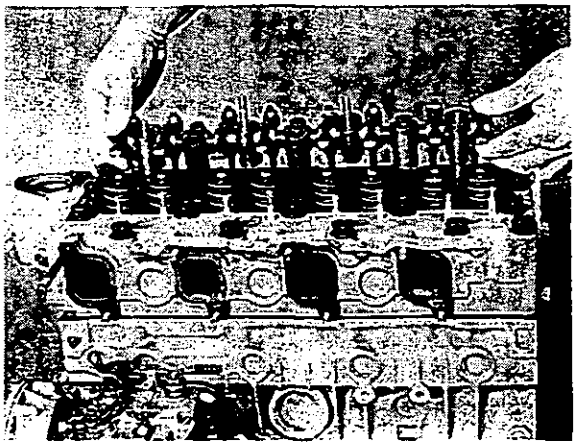


Fig. F1.
Rocker assembly removal.

To remove cylinder head

1. Drain the coolant from the radiator and cylinder block.
2. Disconnect the hose connection from the coolant outlet at the front of the cylinder head.
3. Disconnect the breather pipe from the rocker cover.
4. Remove the air filter or disconnect the air inlet hose from the induction manifold.
5. Disconnect the exhaust pipe from the exhaust manifold.
6. Disconnect the glow plug electrical supply connection.
7. Disconnect the electrical connection from the coolant temperature sender.
8. Disconnect and remove the high pressure fuel pipes from the fuel injection pump and atomisers. Fit suitable caps to the pump and atomiser connections.
9. Where necessary, remove the fuel filter from the cylinder head. Release the clips that hold the fuel inlet pipe to the induction manifold.
10. Disconnect the fuel injection pump to fuel teak off pipe and the leak off pipe return to tank connection.
11. Where necessary, remove the fuel leak off pipe and the atomisers (see Section P).
12. Remove the rocker cover.
13. Remove the nut and washer from the front and rear rocker bracket studs.
14. Loosen the cylinder head setscrews gradually in the reverse sequence to that given in fig. F14 or F15.
15. Remove the rocker assembly (see fig. F1). Ensure that the valve stem caps do not come off the valves as the rocker assembly is lifted.
16. Remove the valve stem caps.
17. Remove the cylinder (see fig. F2) and put it on a flat wood surface to prevent damage. Do not use a sharp toot between the cylinder head and the cylinder block.

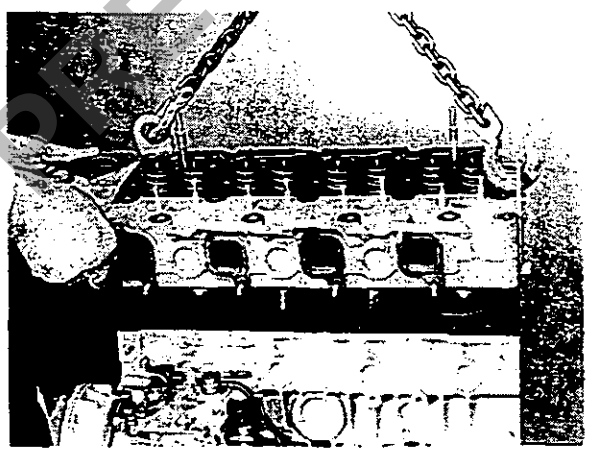


Fig. F2.
Cylinder head removal.

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Fault diagnosis chart

Problem	Possible causes
Starter motor turns engine too slowly	1, 2, 3, 4
Will not start	5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 30, 31, 32
Difficult to start	5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 23, 28, 30, 31, 32
Not enough power	8, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 30, 31, 32
Misfire	8, 9, 11, 12, 13, 15, 17, 18, 19, 24, 25, 27, 28, 29, 31
High fuel consumption	10, 12, 13, 15, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 30, 31, 32
Black exhaust	10, 12, 13, 15, 17, 18, 19, 21, 23, 24, 26, 27, 28, 30, 31, 32
Blue/white exhaust	4, 15, 17, 18, 19, 24, 26, 30, 32, 33, 34, 44, 55
Low lubricating oil pressure	4, 35, 36, 37, 38, 39, 41, 42, 43, 57
Engine knocks	13, 15, 17, 18, 21, 25, 27, 28, 30, 32, 34, 35, 44, 45, 58
Runs erratically	7, 8, 9, 10, 11, 12, 13, 15, 19, 20, 22, 25, 27, 28, 29, 32, 34, 44, 58
Vibration	12, 13, 19, 22, 24, 25, 28, 29, 32, 44, 46, 47, 48
High lubricating oil pressure	4, 37, 40
Engine temperature too high	10, 12, 13, 15, 17, 18, 23, 24, 44, 49, 50, 51, 52, 53, 56
Crankcase pressure	24, 30, 32, 33, 44, 54, 59
Bad compression	10, 18, 24, 27, 28, 30, 31, 32, 33, 45, 58
Starts and stops	9, 10, 11

Code list of possible causes

1. Battery capacity low.
2. Bad electrical connections.
3. Fault in starter motor.
4. Wrong grade of lubricating oil.
5. Low engine speed from starter motor.
6. Fuel tank empty.
7. Stop control fault.
8. Restriction in fuel pipe.
9. Dirty fuel filter element.
10. Restriction in air filter or induction system.
11. Air in fuel system.
12. Fault in fuel injection pump.
13. Fault in atomisers or not correct type.
14. Cold start equipment not used correctly.
15. Fault in cold start equipment.
16. Broken fuel injection pump drive.
17. Fuel injection pump timing not correct.
18. Valve timing not correct.
19. Bad compression.
20. Restriction in fuel tank vent.
21. Type or grade of fuel not correct.
22. Restriction of engine speed control movement.
23. Restriction in exhaust pipe.
24. Cylinder head gasket leaks.
25. Engine temperature too high.
26. Engine temperature too low.
27. Valve tip clearances not correct.
28. Valves not free.
29. Wrong high pressure pipes.
30. Worn cylinder bores.
31. Valves and seats do not seal correctly.
32. Piston rings not free or are worn or broken.
33. Valve stems and/or guides worn.
34. Wet type air cleaner too full or wrong type of oil used.
35. Crankshaft bearings worn or damaged.
36. Not enough lubricating oil in the sump.
37. Gauge not correct.
38. Lubricating oil pump worn.
39. Relief valve not free to close.
40. Relief valve not free to open.
41. Relief valve spring broken.
42. Fault in suction pipe of lubricating oil pump.
43. Dirty lubricating oil filter element.
44. Piston damaged.
45. Piston height not correct.
46. Fan damaged.
47. Fault in engine mounting (housing).
48. Flywheel housing or flywheel not aligned correctly.
49. Fault in thermostat or wrong type.
50. Restriction in coolant passages.
51. Water pump drive belt loose.
52. Restriction in radiator.
53. Fault in water pump.
54. Restriction in breather pipe.
55. Damaged valve stem oil seals (where used).
56. Not enough coolant in system.
57. Restriction in sump strainer.
58. Valve spring broken.
59. Fault in exhauster or vacuum pipe leakage.

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