

TECHNICAL DATA—B.2

Engine Data

Type	Six cylinder in line, 4 stroke
Combustion System	Indirect injection (Ante-Chamber)
Nominal Bore	3.62 in (92.0 mm)
Stroke	4.00 in (101.6 mm)
Compression Ratio	21 : 1
Cubic Capacity	247.3 in ³ (4.052 litres)
Firing Order	1, 5, 3, 6, 2, 4.
Lubricating Oil Pressure	30 lbf/in ² (2,1 kgf/cm ²) 207 kN/m ² minimum at maximum engine speed and normal operating temperature.
Lubricating Oil Sump Capacity	20 Imperial pints (11.3 litres) 12 U.S. Quarts

Rating Details (S.A.E.)

Rated Output	101 bhp (75,3 kW) at 3600 rev/min
Maximum Torque	168 lbf ft (23,2 kgf m) —228 Nm at 2200 rev/min

Derating for Altitude

If it is necessary to operate continuously at altitudes above 2,000 ft (600 metres), then it may be necessary to derate the engine by reducing the amount of fuel being fed into the engine. Perkins Engines Limited will advise.

Cylinder Numbering

The cylinders are numbered from front to rear, No. 1 cylinder being at the front.

Recommended Torque Tensions

The following figures will apply with the components lightly oiled before assembly.

Securing Items	Screw size			
	U.N.F.	lbf ft	kgf m	Nm
Cylinder Head Setscrews	½	85	11,7	115
Big End Nuts	7/16	60	8,3	81
Main Bearing Cap Setscrews	½	85	11,7	115
Fuel Injection Pump Drive Gear Nut		51	7,0	69
Camshaft Gear Setscrew	½	51	7,0	69
Camshaft Thrust Plate Setscrews	5/16	17	2,4	23
Idler Gear Hub Nuts	5/16	20	2,8	27
Crankshaft Pulley Retaining Setscrew	7/8	300	42,0	407
Flywheel Setscrews	½	100	13,8	136
Injector Securing Nuts	5/16	17	2,4	23
Thermostart and Adaptor		10	1,4	13

Engine Number

The engine number is stamped on a machined pad on the left hand side of the cylinder block, either above the fuel injection pump or at the rear of the block (Fig. B.1.).

The full number should be quoted when requesting information or ordering parts, together with the type of machine into which the engine is fitted.

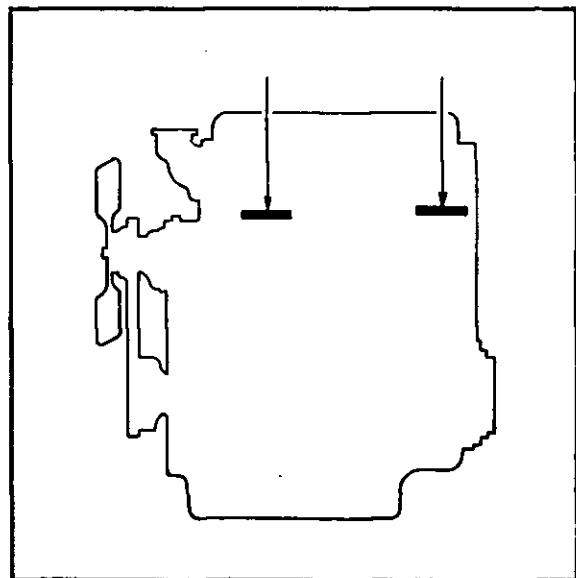


Fig. B.1

CYLINDER HEAD—E.2

To Remove Cylinder Head

1. Drain cooling system.
2. Remove all parts connecting to the cylinder head i.e. fuel injection pipes, inlet and exhaust manifold etc. including the rocker cover, atomisers and washers.
3. Remove the nuts from the two studs locating the rocker arm shaft "A". (Fig. E.1).

4. Remove cylinder head securing setscrews in reverse order to tightening sequence.

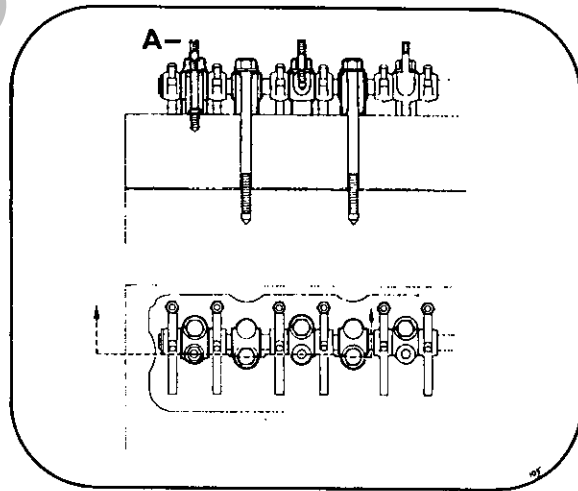


Fig. E.1

5. Remove the rocker arm assembly and push rods.

6. Remove cylinder head.

FAULT FINDING—D.2

Fault Finding Chart

Fault	Possible Cause
Low cranking speed	1, 2, 3, 4.
Will not start	5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 31, 32, 33.
Difficult starting	5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 24, 29, 31, 32, 33.
Lack of power	8, 9, 10, 11, 12, 13, 14, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 31, 32, 33.
Misfiring	8, 9, 10, 12, 13, 14, 16, 18, 19, 20, 25, 26, 28, 29, 30, 32.
Excessive fuel consumption	11, 13, 14, 16, 18, 19, 20, 22, 23, 24, 25, 27, 28, 29, 31, 32, 33.
Black exhaust	11, 13, 14, 16, 18, 19, 20, 22, 24, 25, 27, 28, 29, 31, 32, 33.
Blue/white exhaust	4, 16, 18, 19, 20, 25, 27, 31, 33, 34, 35, 45, 56.
Low oil pressure	4, 36, 37, 39, 40, 42, 43, 44, 58.
Knocking	9, 14, 16, 18, 19, 22, 26, 28, 29, 31, 33, 35, 36, 45, 46, 59.
Erratic running	7, 8, 9, 10, 11, 12, 13, 14, 16, 20, 21, 23, 26, 28, 29, 30, 33, 35, 45, 59.
Vibration	13, 14, 20, 23, 25, 26, 29, 30, 33, 45, 47, 48, 49.
High oil pressure	4, 38, 41.
Overheating	11, 13, 14, 16, 18, 19, 24, 25, 45, 50, 51, 52, 53, 54, 57.
Excessive crankcase pressure	25, 31, 33, 34, 45, 55.
Poor compression	11, 19, 25, 28, 29, 31, 32, 33, 34, 46, 59.
Starts and stops	10, 11, 12.

Key to Fault Finding Chart

1. Battery capacity low.
2. Bad electrical connections.
3. Faulty starter motor.
4. Incorrect grade of lubricating oil.
5. Low cranking speed.
6. Fuel tank empty.
7. Faulty stop control operation.
8. Blocked fuel feed pipe.
9. Faulty fuel lift pump.
10. Choked fuel filter.
11. Restriction in air cleaner or induction system.
12. Air in fuel system.
13. Faulty fuel injection pump.
14. Faulty atomisers or incorrect type.
15. Incorrect use of cold start equipment.
16. Faulty cold starting equipment.
17. Broken fuel injection pump drive.
18. Incorrect fuel pump timing.
19. Incorrect valve timing.
20. Poor compression.
21. Blocked fuel tank vent.
22. Incorrect type or grade of fuel.
23. Sticking throttle or restricted movement.
24. Exhaust pipe restriction.
25. Cylinder head gasket leaking.
26. Overheating.
27. Cold running.
28. Incorrect tappet adjustment.
29. Sticking valves.
30. Incorrect high pressure pipes.
31. Worn cylinder bores.
32. Pitted valves and seats.
33. Broken, worn or sticking piston ring/s.
34. Worn valve stems and guides.
35. Overfull air cleaner or use of incorrect grade of oil.
36. Worn or damaged bearings.
37. Insufficient oil in sump.
38. Inaccurate gauge.
39. Oil pump worn.
40. Pressure relief valve sticking open.
41. Pressure relief valve sticking closed.
42. Broken relief valve spring.
43. Faulty suction pipe.
44. Choked oil filter.
45. Piston seizure/pick up.
46. Incorrect piston height.
47. Damaged fan.
48. Faulty engine mounting (Housing).
49. Incorrectly aligned flywheel housing, or flywheel.
50. Faulty thermostat.
51. Restriction in water jacket.
52. Loose fan belt.
53. Choked radiator.
54. Faulty water pump.
55. Choked breather pipe.
56. Damaged valve stem oil deflectors (if fitted).
57. Coolant level too low.
58. Blocked sump strainer.
59. Broken valve spring.

Preventive Maintenance

Daily or Every 8 Hours (whichever occurs first)

Check coolant level.
Check sump oil level.
Check oil pressure (where gauge fitted).

Every 4,000 Miles (6500 km) or 150 Hours (whichever occurs first)

Drain and renew engine lubricating oil.
Renew lubricating oil filter element.
Check alternator and water pump drive belt tension.
Clean fuel water trap.
Clean air cleaner element.
Check engine for oil, coolant and fuel leaks.

Every 12,000 Miles (19500 km) or 450 Hours (whichever occurs first)

Check and adjust valve tip clearances.
Renew fuel filter element.
Check tightness of manifold setscrews.
Check hoses and clips.
Clean fuel lift pump sediment chamber.

Every 24,000 Miles (39000 km) or 900 Hours (whichever occurs first)

Service atomisers.

Every 48,000 Miles (78000 km) or 1800 Hours (whichever occurs first)

Arrange for check of fuel injection pump timing and idling.

On stop/start door to door operation or when operating in temperatures below -12°C (10°F) for two months or more, the oil changes should be carried out twice as frequently.

When operating in extremely dusty conditions, the air cleaner servicing may have to be carried out more frequently than given above. A 22 in restriction indicator fitted at the air cleaner will eliminate haphazard servicing.

Operators of engines are reminded that the above preventive maintenance periods are general in application. They should be compared with the schedules specified by the manufacturer of the machine to which the engine is fitted and where necessary, the shorter periods should be adopted.

FOREWORD

This manual is designed to be of assistance to all personnel involved with the maintenance and overhaul of Perkins 6.247 engines. Overhaul of the engine components should only be carried out by skilled personnel.

To assist in overhauling the engine, the manufacturing dimensions are given in Section B.

To maintain the engine within the limits of the legal emission and smoke requirements, the limits given in Section B must be maintained during cylinder head overhaul, replacement of pistons, reconditioning of injectors and fuel injection pump timing.

When left or right hand side is referred to in this manual, this denotes the side looking towards the front of the engine from the rear or gearbox end, unless specified otherwise.

This publication is produced by the Service Publications Department of Perkins Engines Limited and every endeavour is made to ensure that the information contained in this manual is correct at the date of publication, but due to continuous developments, the manufacturers reserve the right to make alterations without notice.

Inspection

Clean and inspect the timing case and cover for cracks or damage. Inspect all gears, measure the idler gear and hub, renew if wear exceeds limits given in Section B.

To Renew the Front Oil Seal (Front Cover Removed)

Press out the old seal from the timing case cover using a suitable dolly and press, supporting the cover in the area of the seal bore.

Press in the new seal from the front of the timing case cover to the dimension given in Fig. J.5.

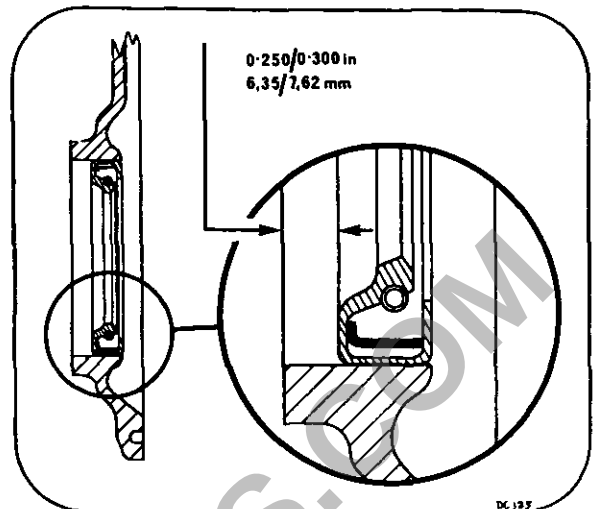


Fig. J.5

To Re-fit Timing Case and Gears

1. Ensure that all parts are clean, fit the idler gear hub (Fig. J.6).
2. Fit the timing case with a new gasket and secure with setscrews, ensuring the lower edge of the case is flush with the sump face of cylinder block. Fit the fuel injection pump to the timing case.
3. Fit the timing gears ensuring the timing marks are correctly aligned (Fig. J.7) and tighten to torque given in Section B. If the cylinder head is fitted and the crankshaft and/or camshaft have to be turned, then the rocker assembly may have to be released, see Section E.

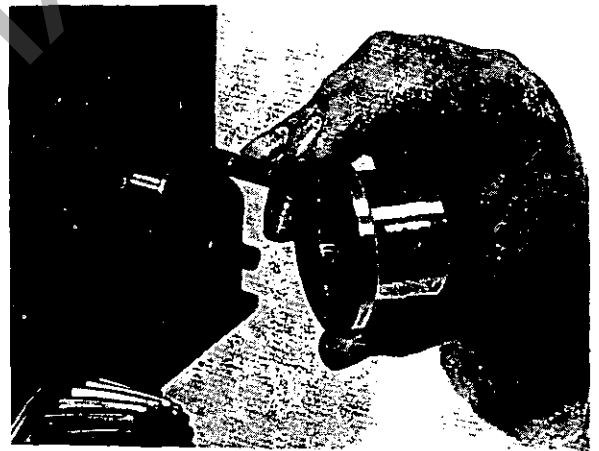


Fig. J.6

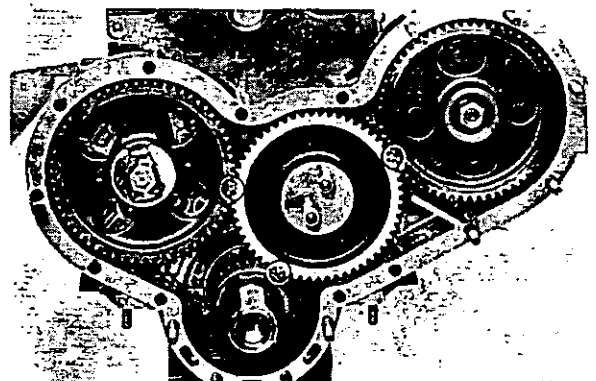


Fig. J.7

To Dismantle Fuel Lift Pump (Fig. N.2)

1. Clean exterior of pump and mark flanges of housing (3) and body (14) to ensure correct replacement.
2. Where necessary, detach cable (15) from priming lever (13) and housing.
3. Remove end cover (1) and pulsator diaphragm (2).
4. Remove valve clips (8) and valves (9).
5. Depress diaphragm (4) and unhook from rocker arm (7). Remove spring (10), seal retainer (11), and seal (12).

Lift Pump Inspection

Inspect the cover, housing and body for cracks or other damage and the flanges for distortion.

Check the valves for correct function and renew where necessary.

Check diaphragms for deterioration, cracks or other damage and renew where necessary.

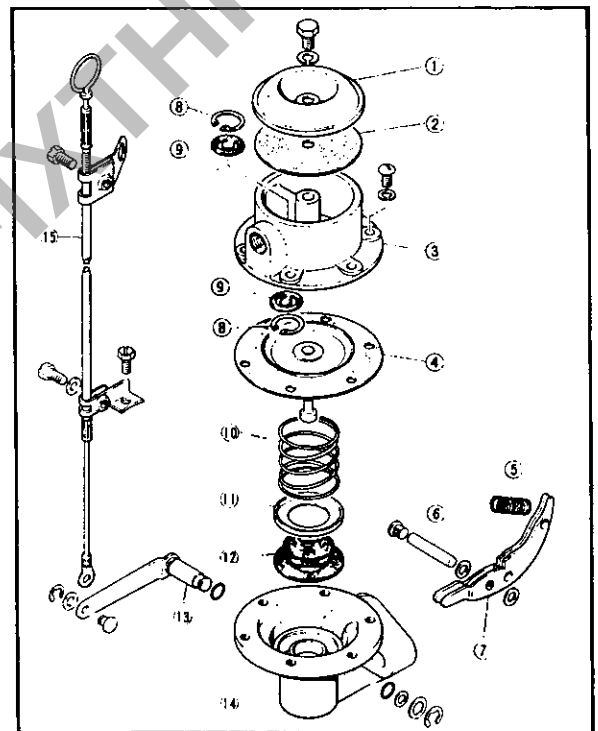


Fig. N.2. Fuel Lift Pump.

To Assemble Fuel Lift Pump (Fig. N.2)

1. Fit new seal (12) in body (14).
2. Position spring retainer (11) and spring (10).
3. Pass spindle of diaphragm (4) through seal and hook on to rocker arm (7). Line up screw holes of diaphragm and body.
4. Position valves (9) in housing (3) and retain with circlips (8).
5. Position housing on body with location marks in line, press rocker arm so that diaphragm is flush with edge of flanges and secure housing to body.
6. Fit pulsator diaphragm (2) and end cover (1).
7. Where necessary, attach cable (15) to priming lever (13) and housing.

1. Cover.
2. Pulsator Diaphragm.
3. Housing.
4. Diaphragm.
5. Spring.
6. Pin.
7. Rocker Arm.
8. Clip.
9. Valve.
10. Spring.
11. Retainer
12. Seal
13. Priming Lever
14. Body
15. Priming Cable

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