SERVICE MANUAL

PERKINS DIESEL ENGINE 4.2032

40542000

SPERRY NEW HOLLAND

Reprinted

MANUFACTURING DATA & DIMENSIONS

The data regarding clearances and tolerances are given as a guide for personnel engaged upon major overhauls and the figures given are those used in the factory for production purposes.

Cylinder Block

Height of Cylinder Block between Top and Bottom Faces	13.7405/13.7435 in (349,01/349,08 mm)
Parent Bore Diameter for Cylinder Liner	3.6875/3.6885 in (93,66/93,69 mm)
Depth of Recess for Liner Flange	0.148/0.152 in (3,76/3,86mm)
Dia. of Recess for Liner Flange	3.820/3.825 in (97,03/97,16 mm)
Main Bearing Parent Bore	2.9165/2.9175 in (74,08/74,10 mm)
No. 1 Bore (bushed) for camshaft	1.872/1.874 in (47,55/47,60 mm)
No. 2 Bore for Camshaft	1.864/1.867 in (47,34/47,42 mm)
No. 3 Bore for Camshaft	1.844/1.847 in (46,84/46,91 mm)

Cylinder Liners

Service Cast Iron

Type	Dry — Transition Fit
Outside Diameter of Liner	3.6875/3.6885 in (93,66/93,69 mm)
Transition Fit in Cylinder Block	0.001/0.001 in (0,03/0,03 mm)
Flange Thickness	0.148/0.150 in (3,76/3,81 mm)
Outside Diameter of Flange	3.803/3.808 in (96,60/96,72 mm)
Depth of Liner Flange relative to Top Face of Cylinder Block	+0.002/-0.004 in (+0,05/-0,10 mm)
Inside Diameter of Finished Liner in Cylinder Block	3.6015/3.6025 in (91,48/91,50 mm)

Cylinder Liners

Production Cast Iron

Type	Dry — Interference Fit
Outside Diameter of Liner	3.6895/3.6905 in (93,71/93,74 mm)
Interference Fit of Liner in Cylinder Block	0.001/0.003 in (0,03/0,08 mm)
Flange Thickness	0.148/0.150 in (3,76/3,81 mm)
Outside Diameter of Flange	3.803/3.808 in (96,60/96,72 mm)
Depth of Liner Flange Relative to Top Face of Cylinder Block	+ 0.002 in/- 0.004 in (+0,05/-0,10 mm)
Inside Diameter of Finished Liner in Cylinder Block	3.6015/3.6025 in (91,48/91,50 mm)

Pistons

Type	Re-Entrant Chamber in Crown (Squish Lip)
Overall Height — Skirt to Crown	
"H" Grade (see Page D.5)	4.308/4.310 in (109,42/109,47 mm)
"L" Grade (see Page D.5)	4.3032 in (109,30 mm)
Centre Line of Gudgeon Pin to Crown	
"H" Grade (see Page D.5)	2.4329/2.4349 in (61,80/61,85 mm)
"L" Grade (see Page D.5)	2.4274/2.4289 in (61,66/61,69 mm)
Skirt Diameter—across Thrust	3.5975 in (91,38 mm)
Height in relation to Cylinder Block Top Face	0.0065 in (0,17 mm) BELOW to 0.0012 in (0,03 mm) ABOVE
Bore Diameter for Gudgeon Pin	1.2499/1.2501 in (31,747/31,753 mm)
Compression Ring Groove Width — No. 1	0.0957/0.0977 in (2,43/2,48 mm)
Compression Ring Groove Width — Nos. 2 and 3	0.0957/0.0967 in (2,43/2,46 mm)
Scraper Ring Groove Width	0.1895/0.1905 in (4,81/4,84 mm)

SECTION B
Maintenance

To Refit the Cylinder Head to the Engine

Remove all traces of carbon, etc., from the face of the cylinder block.

Remove all carbon from the tops of the pistons leaving them clean and bright. During this operation it is advisable to lower the piston in its bore, smear some grease around the top of the bore and then bring the piston to T.D.C.

The grease will then form an effective seal and prevent carbon from reaching the piston rings.

Thoroughly clean, paying particular attention to the areas around the bases of the two cylinder head studs, removing them from the block if considered necessary.

Examine the cylinder head studs/setscrews for damage to the threads or looseness in the cylinder block, and check nuts.

The cylinder head gasket should be fitted dry. No jointing compound should be used. It is marked "TOP FRONT" to show how it should be fitted (See Fig. C.11).

After ensuring that the face of the cylinder head is perfectly clean, position it on the studs and lower gently on to the gasket.

Fit the cylinder head nuts/setscrews and using a torque wrench tighten down evenly in the sequence shown in Fig. C.12 to the recommended torque (See Page A.2).

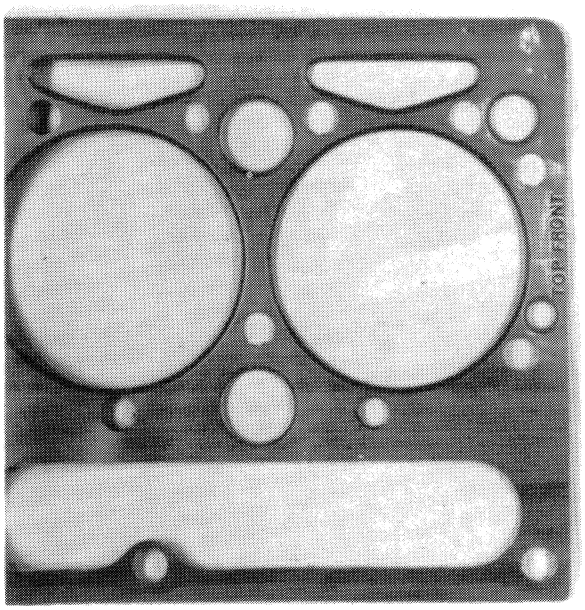

Fig. C.11.
Cylinder Head Gasket Markings.

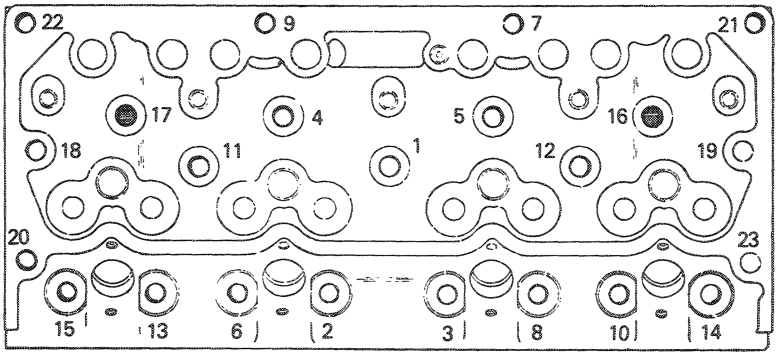

Fig. C.12.
Cylinder Head Tightening Sequence.

SECTION E
Cylinder Block and Liners

SECTION G
Timing Case and Drive

4. Fit the fuel pump gear ensuring that the dowel locates in the slot of the fuel pump shaft.

5. See that the fuel pump is correctly fitted with the scribed lines on the mounting flange and timing case in-line (See Fig. H.3).

6. With the crankshaft gear fitted, replace the two idler gears, ensuring that the timing marks coincide (See Fig. H.1).

7. After testing the engine, final adjustments may be necessary to find the most suitable injection point.

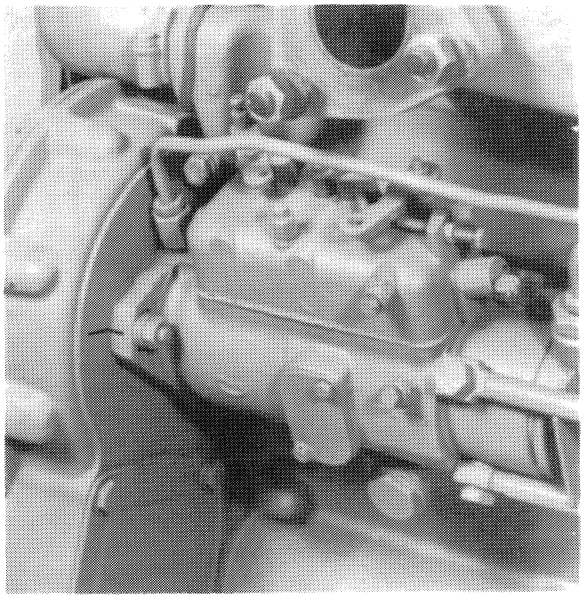

Fig. H.3.
Alignment of Fuel Pump Timing Marks.

Checking Marking Angle of Fuel Injection Pump using Tool MS67B

1. Release screw (5, Fig. G.11) and position splined shaft with the small splined diameter to the rear to locate in the centre of the fuel pump hub.

2. Ensure that slotted pointer (2) is positioned with slot to rear of tool and chamfered sides of slot outwards. At this stage, slotted end of pointer should be kept well back towards body of tool. Ensure that the flat in the washer fitted behind the pointer securing screw (3) is located over side of pointer.

3. Release bracket screw (4) and set bracket so that the chamfered edge is in line with the relevant fuel pump marking angle (See Page A.10).

4. Position timing tool with splined shaft in hub, slide tool towards pump to rest on end of hub and lock shaft in tool (See Fig. H.4).

5. Connect No. 1 outlet of pump to an atomiser tester and pump up to 30 atm (31 kgf/cm^2) or 440 lbf/in^2. If pressurising valve is fitted, this must be removed.

6. Turn pump in normal direction of rotation as shown on pump nameplate until it locks.

7. In this position, slide pointer forward until it is halfway over pump flange and check that timing mark is central to slot in pointer.

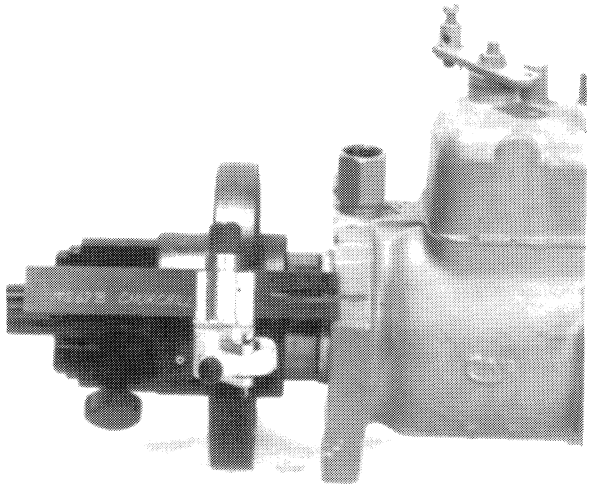

Fig. H.4.
Checking Fuel Pump Marking Angle.

SECTION K
Cooling System

Fuel Lift Pump

This is positioned on the right hand side of the engine, and is fixed to a flange on the camshaft chamber by four studs and nuts. Operation is by the pump lever contacting a cam on the engine camshaft.

The pump is of the diaphragm type.

A hand-primer is fitted to enable the fuel system to be bled when the engine is stationary.

Testing the Lift Pump Fitted to the Engine

Disconnect the outlet fuel pipe.

Rotate the engine, or operate the hand priming lever. A spurt of fuel should emit from the outlet port once every two engine revolutions, or every time the hand priming lever is depressed.

NOTE: If the hand lever cannot be depressed, rotate the engine one complete revolution in order to turn the eccentric on the camshaft from its maximum lift position.

Pressure Testing of Fuel Lift Pump in Position

Fit a 0-10 lbf/in² (0-0,7 kgf/cm²) or 0-70 kN/m² pressure gauge to the outlet of the pump. Ensure that there are no leaks at the connections between pump and gauge. Crank engine for 10 seconds and note the maximum pressure on the gauge. If the pressure recorded is less than 75% of the minimum production static pressure shown below, then rectify the pump. Also observe the rate at which the pressure drops to half the maximum pressure obtained when cranking has ceased. If less than 30 seconds, rectify the pump.

Minimum Production Static Pressure			Minimum Test Pressure (75% of Min. Production Pressure)		
lbf/in²	kgf/cm²	kN/m²	lbf/in²	kgf/cm²	kN/m²
5	0,35	34	3.75	0,26	25

To Remove the Lift Pump

Disconnect the fuel pipe, from the inlet and outlet ports.

Remove the nuts and washers which secure the pump to the cylinder block, and withdraw the pump.

To Dismantle the Lift Pump

Before dismantling, make a file mark across the two flanges for location purposes when the pump is being reassembled. Remove the six cover screws and separate the two main parts, then remove the diaphragm assembly from the lower half by turning the diaphragm through 90° in either direction.

The valves are "staked-in", and can be prised out by using a screwdriver or other suitable tool. Clean the casting so that new valves can be correctly seated. Press valves into position using a suitable "dolly". Stake the casting around the valves in six places.

The rocker arm pin can be removed by securing the rocker arm in a vice, and tapping the face of the body with a soft mallet until the retainers are dislodged. The rocker, pin, lever and return spring can now be examined for wear.

To Re-assemble the Lift Pump

Fit the rocker arm assembly into the bottom half of the lift pump. Fit the rocker arm return spring making sure that it seats properly.

Tap new retainers into the grooves in the casting, and stake over the open ends of the grooves.

Place the diaphragm assembly over the spring, with the pull rod downwards, locating the top of the spring in the diaphragm protector washer. Position the rod so that the notched blade locates into the rocker arm link. Press downwards on the diaphragm assembly so that the notches on the pull rod align with the rocker arm link and twist it through 90° in either direction, this action will engage and retain the pull rod in the fork of the link.

When re-assembling the two pump halves, push the rocker arm towards the pump until the diaphragm is level with the body flanges. The cover assembly can now be placed in position, with the file marks aligned. Maintaining the pressure on rocker arm, fit the securing screws and washers and tighten evenly.

Service Repair Kits are available for the reconditioning of fuel lift pumps.

To Refit the Fuel Lift Pump

Ensure that the pump flange and cylinder block pump mounting face is clean, and using a new joint, enter the pump operating lever into the aperture in the block. Fit the pump onto the mounting studs and secure with nuts and washers.

Fuel Pipes

When fitting, no bending should be necessary. Offer both nipples to their respective unions and tighten the nuts alternately a little at a time.

Never slacken one end of a fuel pipe (e.g. when changing atomisers) leaving the other end tight. Always remove the pipe entirely.

Never use undue force on a union nut in an attempt to obtain a seal. This will only result in damage to the nipple, union nut, and thread.

The correct tightening torque for high pressure fuel pipe nuts is 15 lbf ft (2,1 kgf m) or 20 Nm.