Massey Harris
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Service Manual

A4.236

Perkins Diesel Engine

MH-S-ENGA4.236

workshop manual for 4.248, T4.236, 4.236, 4.212 & T4.38 diesel engines

Perkins Engines Limited
Peterborough, England

This publication is written for world wide use. In territories where legal requirements govern engine smoke emission, noise, safety factors etc., then all instructions, data and dimensions given must be applied in such a way that, after servicing (preventive maintenance) or repairing the engine, it does not contravene the local regulations when in use.

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E5

Valve Guides

Engines are fitted with either detachable valve guides or the valve bores are machined direct into the cylinder head.

When wear takes place in the valve bores of cylinder heads without detachable valve guides, valves with oversize stems should be fitted.

Three service valves are available for both inlet and exhaust with oversize stems of 0.003 in, 0.015 in and 0.030 in (0,08, 0,38 and 0.76 mm) respectively.

To fit 0.015 and 0.030 in oversize valves, the bores in the cylinder head must be reamed with a piloted reamer. Suitable reamers for carrying out this operation can be obtained from Messrs. V. L. Churchill and Co. Ltd. (see Appendix).

Where detachable valve guides are fitted, these can be replaced.

To fit new guides; clean the parent bore, smear the Outer surface of the guide with clean oil and press home the guide until 0.594 in (15,10 mm) is protruding above the cylinder head. The guides are manufactured from cast iron and are brittle.

Valves and Valve Seats

Check the valve stems for wear and their fit in the guides.

Examine the valve faces for pitting or distortion. Valve refacing should be at an angle of 45° or 30° for inlet valves on T4.236 engines (see Page B.10).

Valves should always be refitted to their original seats and any new valve fitted should be suitably marked to identify its position if removed at a later date. Refer to Fig. E.6. for illustration of valve numbering.

Note current exhaust valve depths on Page B.10 became effective from the following engine numbers:—

212U3810L
236U135765
236U147150L
236US24721L
248U31918L
212UA200084L
236UA110048L
248UA135686L

E6

The valve seats in the cylinder head should be reconditioned by means of cutters or specialised grinding equipment, at an angle of 45° or 30° for inlet valves on T4.236 engines. Suitable valve seat cutters for 45° seats are included in kit 21825064 (see Appendix) and these cutters give a differential valve seat to reduce the width of the valve seat. A special cutter 21825065 is required for 30° valve seats.

As narrow a seat as possible should always be maintained.

Hand Grinding

When grinding in valves it is essential that no signs of pitting are left on the seatings. At the same time care should be taken to avoid unnecessary grinding away of the seat.

After grinding operations have been completed, check the valve head depths relative to the cylinder head face (Fig. E.7) and wash the cylinder head.

E7

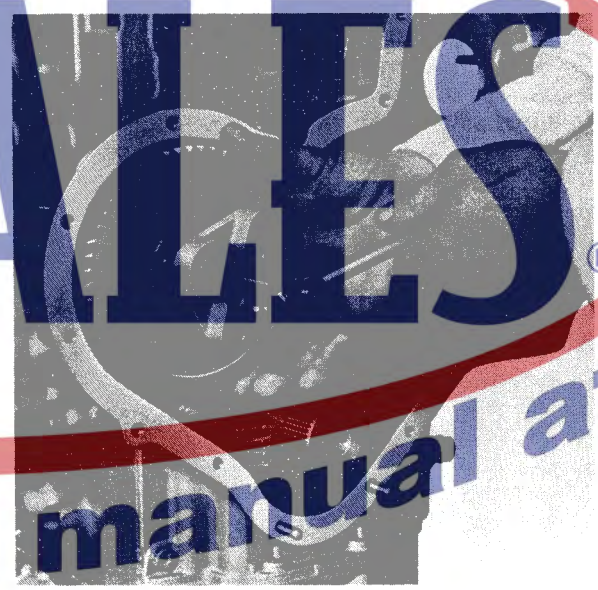
3. Remove the idler gear from the hub which can now be withdrawn from the timing case (Fig. K.4).
4. Examine the gear and hub for wear, cracks, and pitting, etc.
5. Where necessary, replace idler gear bushes. These require boring to finished size after fitting.

NOTE: Where a full load is taken through the timing gear train, certain idler gears are fitted with needle bearings.

K6

To Refit the Idler Gear and Hub

1. Refit the hub to its location in the timing case.
2. Remove the top cover and slacken off the rocker assembly securing nuts.
3. Turn the crankshaft to T.D.C. No. 1 and 4 cylinders, i.e., with the crankshaft gear keyway at the top of its periphery.
4. Refit the idler gear to its hub with the timing marks on the crankshaft, camshaft, fuel pump and idler gears aligned (Fig. K.5).
5. Refit the idler gear retaining plate and secure with the three setscrews tightened to a torque of 30 lbf ft (4,1 kgf m) —41 Nm. Check idler gear end float (Fig. K.6).
6. Tighten down the rocker assembly and adjust the valve clearance to 0.010 in (0,25 mm) cold.
7. Refit the timing case front cover.



K7

To Remove the Camshaft Gear

1. Remove the timing case front cover.
2. Remove the camshaft gear retaining setscrew, locking washer and retaining plate.
3. Using a suitable extractor, remove the camshaft gear (Fig. K.7).
4. Examine the gear for wear, cracks and pitting, etc.

Note: Where a camshaft gear is stamped with the letter 'M', use metric adaptors PD.155B-5

To Refit the Camshaft Gear

1. Remove the idler gear.
2. Slacken off the rocker assembly securing nuts.
3. Refit the gear to the camshaft by drawing it onto the shaft with the retaining plate, new tabwasher and setscrew.
4. Turn the engine until No. 1 piston is at T.D.C., with the crankshaft gear keyway at the top of its periphery.
5. Refit the idler gear to its hub ensuring all timing marks are aligned (Fig. K.5). Fit the idler gear retaining plate and secure to a torque of 30 lbf ft (4,1 kgf m) —41 Nm.
6. Tighten the camshaft setscrew to a torque of 50 lbf ft (7 kgf m)—68 Nm, and lock the tabwasher.
7. Refit the timing case front cover.
8. Tighten down the rocker assembly and adjust the valve clearances to 0.012 in (0,30 mm) cold.

To Remove the Fuel Pump Gear (Hydraulic Governor)

1. Remove the timing case front cover.
2. Remove idler gear and refit so that the timing marks are aligned (Fig. K.5).
3. Remove the fuel pump drive plate from the quill shaft (Fig. K.8).
4. Remove the fuel pump gear retaining circlip from the gear carrier (Fig. K.9) and withdraw the gear (Fig. K.10).
5. Examine the gear for wear, cracks and pitting etc.

If the bearing is housed in a blank end cover, it should be extracted, or machined out, taking care not to damage the housing. In an emergency it may be removed by cutting a groove along the bearing, using a narrow half round chisel. Inspect housing and remove any burrs. Press new bush fully into cover.

Roller Bearing and Shaft Collar—To Renew

Withdraw roller bearing inner race and shaft collar using the Churchill Universal Taper Base C.D. 370, and special withdrawal tool C.D. 4221-3 (Fig. Q.4).

Insert the adaptor into the taper base as shown in Fig. Q.3. Position the rotor in the adaptor, drive end up, and insert four "fingers" in the slots with the pegged ends set in the adaptor, and the other ends, against the bearing inner race. Place or screw the appropriate Thrust Block on to the shaft, and while supporting the rotor under the Taper Base, press the bearing and collar off the shaft.

Lightly grease the shaft, and, using the Installer C.D. 44, press bearing inner race on to shaft.

NOTE :— *There will be a slight clearance between the bearing and the rotor face (Fig. Q.5).*

Similarly fit collar with recessed shoulder against the bearing.

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Q6

NOTE :— *The rotor assembly should be supported on the bed of the press by a tubular spacer placed over the shaft, and not by the rotor or shaft itself.*

Re-Assembly

Lubricate all moving parts with clean engine oil and renew joint and/or rubber ring(s).

NOTE :— *No special tools are required to re-assemble exhausters having one oil seal. With exhauster having two seals, use installer C.D. 44.*

Where applicable, place the Installer on the shaft to guide the seals on to the collar (Fig. Q.6). Smear the rollers with grease to hold them against the inner race, and insert the end of the rotor assembly into the drive end cover.

Assemble cover to body as originally fitted, with rubber ring or joint, and secure. Dowel pins ensure correct location.

Hold the body, drive end downwards, and replace blades into rotor slots, making sure that marks made during dismantling correspond.

Install rear end cover on to body, with rubber ring, and secure.

Rotate the rotor by hand to be sure that it turns without binding, and tighten the socket headed screws.

Fig. Q.4 illustrates the special Churchill tools for this exhauster.

Installation

Refit the drive gear to rotor shaft and secure with two half round thrust washers. Replace the joint and remount the exhauster, aligning the hole in the joint with the air/oil discharge passage, and tighten the four securing nuts.

Reconnect the oil and vacuum pipes.

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