

Perkins DP200 pump timing

FUEL SYSTEM

DESCRIPTION

NOTE: Special tools and training are needed to repair the Lucas fuel injection pumps. They are normally sent to an authorized repair station if repairs are necessary. Fuel injectors also require special equipment and training for repair. Most users have a special repair service do this work.

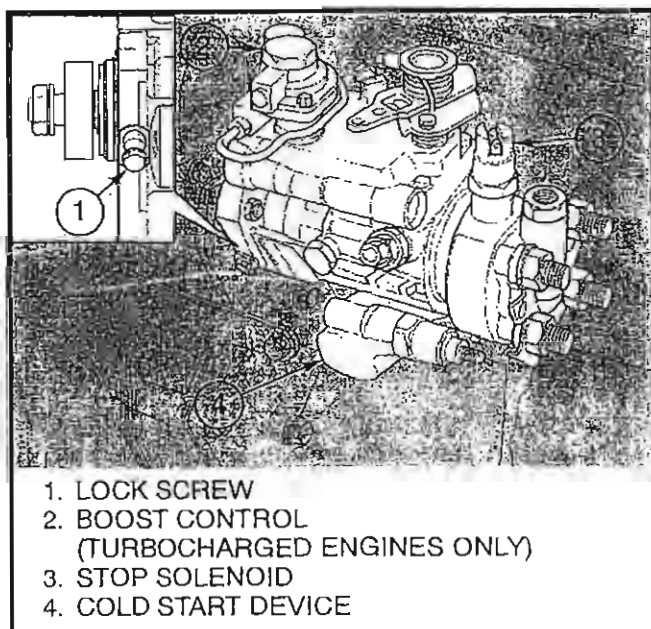


FIGURE 132. LUCAS FUEL INJECTION PUMP

A Lucas DP200 series fuel injection pump is used on these engines. The pump timing and the speed adjustment can not be changed. A mechanical governor controls the maximum engine speed. A lock screw holds the shaft of the pump from turning when it is not installed on the engine. See FIGURE 132. **This lock screw must be released when the fuel injection pump is installed on the engine.**

An electrically operated cold start device retards the timing for normal operation. A stop solenoid stops the operation of the engine. A vent in the pump permits an engine to start if there is a small amount of air in the fuel system. If the fuel system has a large amount of air, the air must be removed as described in Remove Air From The Fuel System

A boost control is added to the fuel injection pump for turbocharged engines See FIGURE 132. The boost con-

trol is a device that is affected by the pressure from the turbocharger and reduces the the maximum fuel flow at lower engine speeds. When the engine speed is lower, there is a reduced air supply to the cylinders.

The fuel injectors receive fuel under high pressure from the fuel injection pump. The fuel injectors are set by the manufacturer, but must be checked according to the maintenance schedules. See **PERIODIC MAINTENANCE**. The operation pressure of a fuel injector can be changed by adding or removing shims above the spring in the fuel injector.

The fuel pump has a diaphragm that is actuated by a lever. The lever is actuated by a lobe on the camshaft. The fuel pump has a small lever that can be operated with your hand to "prime" the fuel pump.

NOTE: Good operation of the fuel injection system requires clean fuel and no dirt can be permitted in the system. Always clean carefully around a connection before it is disconnected. Install covers on open ports during maintenance. When the fuel system is opened for maintenance, the air must be removed from the fuel system before the engine is operated.

FUEL INJECTION PUMP

Removal

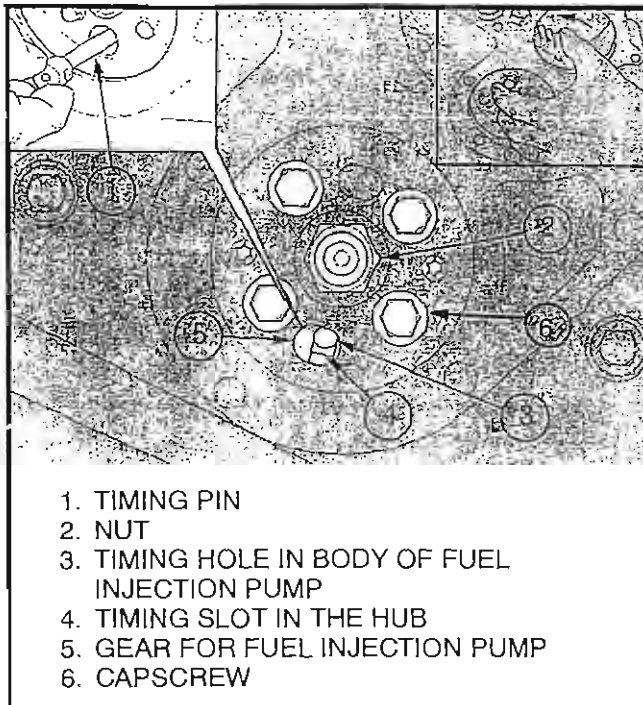
Special Tools: Timing Pin PD.246 for Lucas fuel injection pumps

⚠ CAUTION

See FIGURE 133. Do not release the nut (2) on the shaft of the fuel injection pump. If this nut is removed, the fuel injection pump must be returned to an authorized service center. Setting the correct timing requires special equipment.

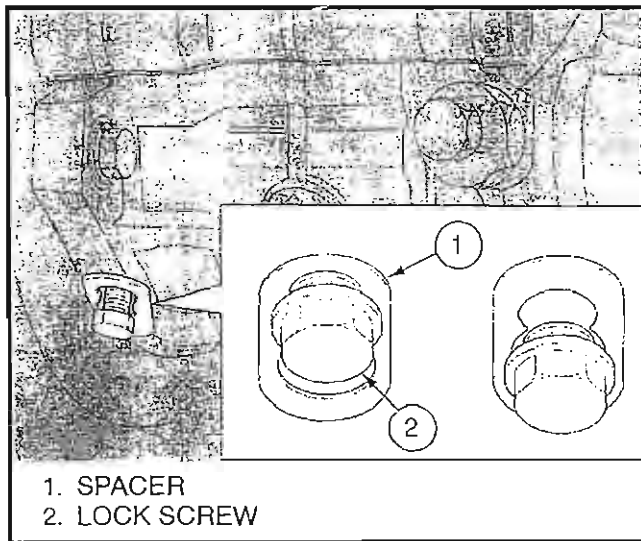
A replacement fuel injection pump can have the pump shaft locked in position. See FIGURE 134. The drive shaft of the pump must not be turned unless the spacer (1) is in position under the lock screw (2).

Before the crankshaft is turned or the pump is installed, put the spacer (1) into position under the locking screw (2) to ensure that the pump drive shaft is released.



1. TIMING PIN
2. NUT
3. TIMING HOLE IN BODY OF FUEL INJECTION PUMP
4. TIMING SLOT IN THE HUB
5. GEAR FOR FUEL INJECTION PUMP
6. CAPSCREW

FIGURE 133. TIMING COMPONENTS



1. SPACER
2. LOCK SCREW

FIGURE 134. LOCK SCREW

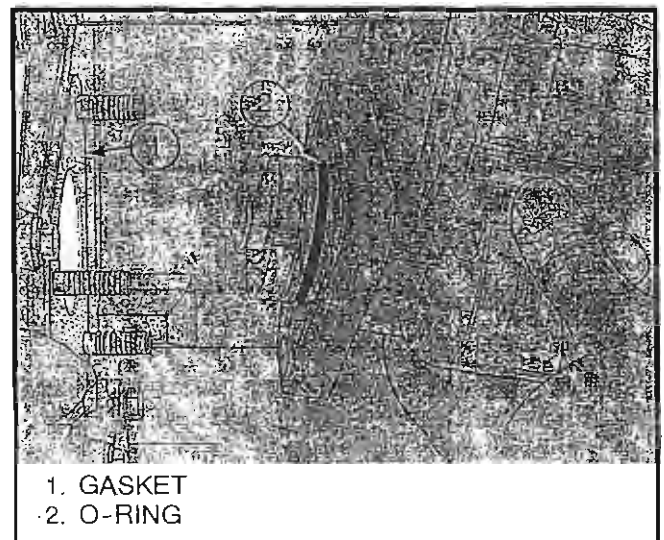
1. Disconnect the battery. Remove the coolant pump as described in Coolant Pump, Removal.
2. Set the number 1 piston to TDC on the compression stroke. See How To Set Number 1 Piston To TDC On The Compression Stroke.
3. See FIGURE 133. Insert the timing pin (1) through the hole (5) in the fuel pump gear and the slot of the hub (4). Push the pin fully into the hole (3) in the body of the

fuel pump. If the pin can be fully inserted then the pump timing is correct. There should be no resistance when the pin is inserted.

4. Disconnect all of the fuel lines from the fuel injection pump. Use a second wrench to prevent movement of the union nuts when the fuel lines are disconnected. Disconnect the engine stop control. Disconnect the throttle cable. Disconnect the cold start device.

5. Remove the gear for the fuel injection pump as described in Gear For The Fuel Injection Pump.

6. Remove the nuts that fasten the flange of the fuel injection pump to the timing case. See FIGURE 135.



1. GASKET
2. O-RING

FIGURE 135. MOUNT, FUEL INJECTION PUMP

Installation

1. The engine must be set for the number 1 piston to TDC on the compression stroke. If the crankshaft needs to be rotated, the pump must be installed temporarily, or the loose gear could damage the timing case.
2. Install a new gasket and new O-ring as shown in FIGURE 135. Lubricate the O-ring with a thin coat of engine oil.
3. Install the fuel injection pump on the three studs and install the nuts. Tighten the nuts to 28 Nm (20 lbf ft).
4. See FIGURE 133. Install the fuel pump gear onto the hub of the fuel pump. The fasteners (6) for the fuel pump gear should be in the center of the slots to allow for the removal of the backlash. Tighten the capscrews finger tight.

NOTE: The fuel pump gear will only fit in one position. The gear is fitted with the letters C and M at the front.

5. See FIGURE 133. Insert the timing pin (1) through the hole (5) of the fuel pump gear and the slot of the hub (4) until it can be pushed fully into the hole (3) in the body of the fuel pump. If the timing pin cannot be pushed into the pump body, check that the engine is correctly set at TDC on the number 1 cylinder.

6. Carefully turn the gear for the injection pump with your hand to remove the clearance between the gear and the idler gear. See FIGURE 136. Do not rotate the crankshaft or the shaft of the fuel injection pump. Tighten the capscrews for the gear for the fuel injection pump to 28 mm (20 lbf ft).

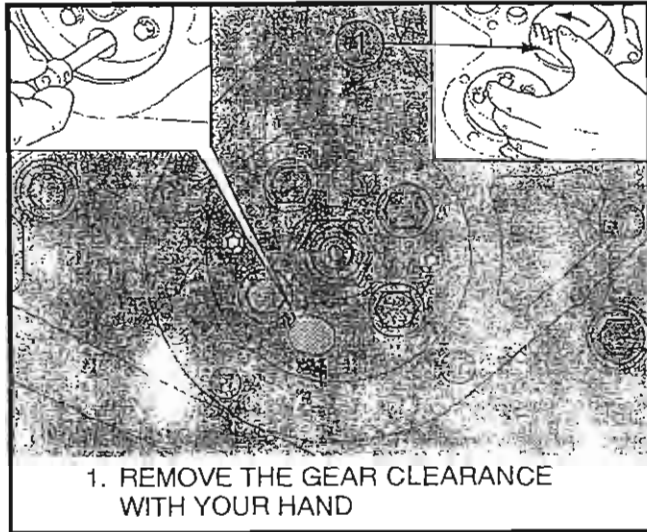


FIGURE 136. GEAR FOR THE FUEL INJECTION PUMP, INSTALLATION

7. Remove the timing pin.

8. Install the coolant pump. See Coolant Pump, Installation.

9. Connect the fuel lines. Use a second wrench to prevent movement of the union nuts when the fuel lines are connected. Do not tighten the union nuts greater than 22 Nm (16 lbf ft). If there is a leak, make sure the fuel line is correctly aligned. A union nut that is too tight can cause a restriction in the fuel line.

10. Connect the engine stop control and the control rod for the fuel injection pump.

11. Remove the air from the fuel system. See Remove Air From The Fuel System.

12. When the engine can be operated, do Checks And Adjustments.

FUEL INJECTION PUMP, CHECKS AND ADJUSTMENTS

1. Operate the engine until it reaches normal operating temperature and check the idle speed. The idle speed can be adjusted with the idle adjustment screw (2) shown in FIGURE 137.

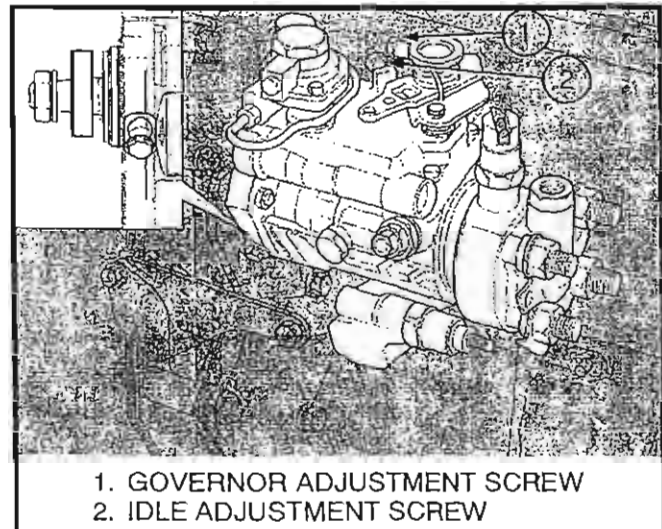


FIGURE 137. ADJUSTMENT SCREWS

NOTE: The idle speed and the the governed speed can be different than the Engine Data when these engines are installed in some models of lift trucks. See the section, **PERIODIC MAINTENANCE** for the specifications that apply to a lift truck model.

2. Check the governed speed. The maximum engine speed can be adjusted with (1) shown in FIGURE 137. See the Engine Data for the correct governed speed. The setting code for the fuel injection pump is also found on a data plate fastened to the side of the pump. A typical setting code can be 2643M000AK/1/2750 where 2750 is the correct governed speed. **The governed speed on an original fuel injection pump is set and sealed by the manufacturer. A replacement fuel injection pump must have the governed speed correctly set and the adjustment screw sealed. A setting that has been changed from the correct setting can affect the engine warranty.**