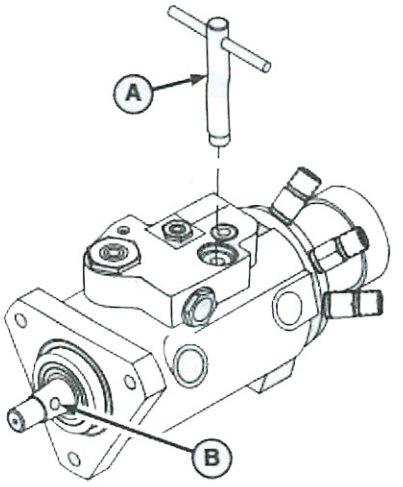
Diamond Diesel Service, Inc.
DE PUMP INSTALLATION GUIDE

Install Injection Pump (Static Loc Pin Timing)

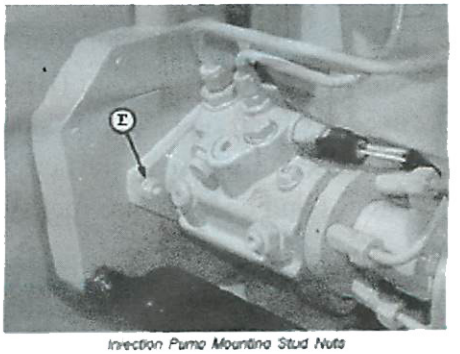
1. Before installing injection pump on engine, install JDG1559 Injection Pump Timing Pin (A) into pump timing pin bore. Install a small punch or screwdriver into hole in pump drive shaft (B not a timing indicator) and turn shaft until timing pin drops into recess in injection pump drive.
2. Make sure that number 1 cylinder is locked at TDC of compression stroke and install JDG1571 Timing Pin in Flywheel.

NOTE: Retain JDG1559 Timing Pin (A) in pump during installation.

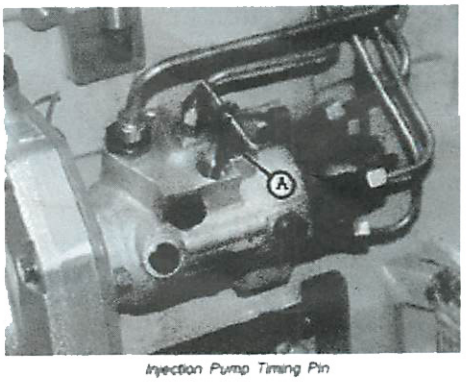


Install Timing Pin

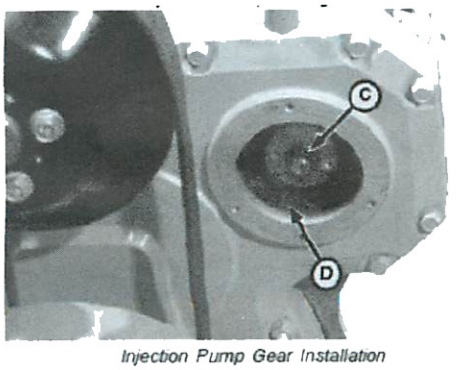
3. Install injection pump onto mounting studs and tighten three pump mounting stud nuts (E) to specification. Position drive gear while installing pump. Specification: Torque 19 Lbs-ft (25 Nm)
4. Install injection pump gear (D) on drive shaft. Install, but do not tighten, injection pump gear mounting nut (C).
5. Rotate gear counterclockwise (viewed from front of engine) to remove any backlash, and tighten gear mounting nut to specification. Specification: Torque 145 lbs-ft (195 Nm)
6. Install injection pump gear access plate and remove timing pin (A) from pump. Install plug in injection pump timing pin hole and tighten to specification. Inspection: Torque 7.5 lbs-ft (9.5 Nm)
7. Remove JDG1571 Timing Pin from flywheel.



Injection Pump Mounting Stud Nuts



Injection Pump Timing Pin



Injection Pump Gear Installation

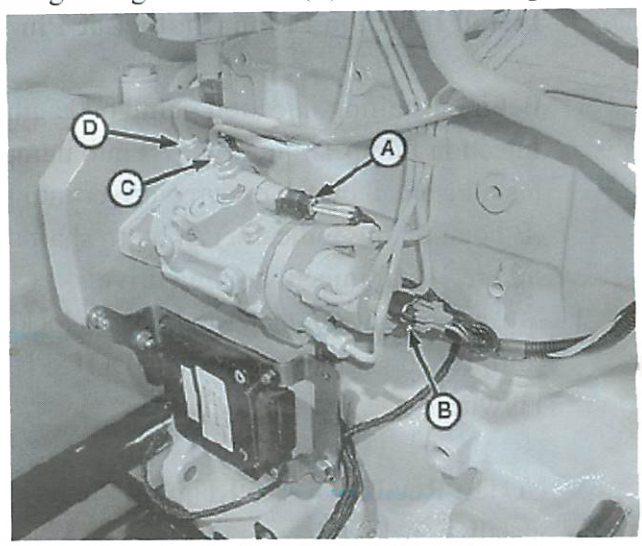
Timing Kit # 40572 from Stanadyne is available at Diamond Diesel. The kit contains:

1) DE Pump Timing Pin (# 40610)
2) Engine Timing Pin (# 40571)
3) 1/4" Hex Key Wrench (# 13324)

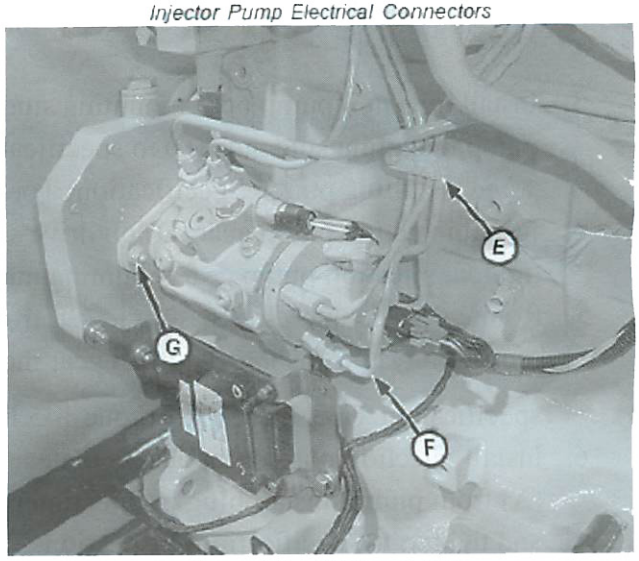
See page 5 of this guide for Stanadyne Timing Kit Pump Installation Kit Guide.

8. Connect injection pump fuel delivery (pressure) lines (F). Beginning with outlet (1) and continuing around the pump head in counterclockwise direction, attach lines in same order as engine firing (1-5-3-6-2-4 on 6-cylinder engines and 1-3-4-2 on 4-cylinder engines).
   IMPORTANT: ALWAYS use a backup wrench when loosening or tightening fuel delivery lines at fuel injection pump, so that the pump discharge fittings are *not* altered. This prevents possible internal pump damage.
9. Tighten fuel delivery lines at pump to specification. Injection Pump Fuel Delivery (Pressure) Lines – Torque 20 Lbs-ft (27Nm)
10. Install clamp (E).
11. Connect fuel supply line (D) and fuel return line ©.
12. Install temperature sensor connector (A) and fuel control solenoid connector (B).
13. Bleed air from fuel system as outlined in this group. After Bleeding system start engine, run for several minutes and check entire fuel system for leaks.

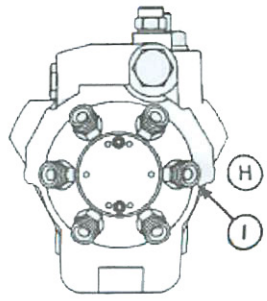
A—Temperature Sensor
B—Fuel Control Solenoid
C—Fuel Return Line
D—Fuel Supply Line
E—Clamp
F—Fuel Delivery Lines
G—Nut (3used)
H—Engine Block Side
I—Outlet Connection to No. 1 Cylinder



Injector Pump Electrical Connectors



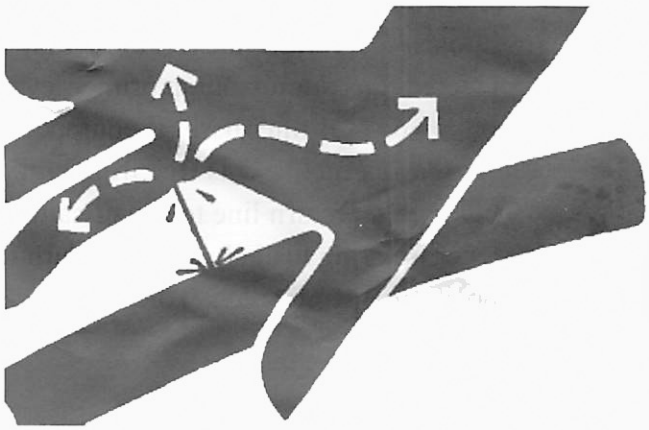
Connect Fuel Delivery Lines



Bleed the Fuel System

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid hazards by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

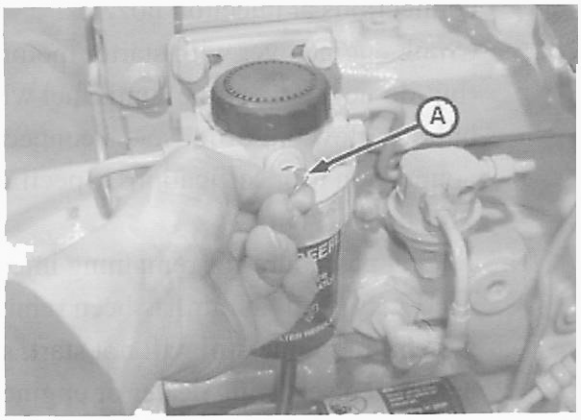
If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.



High Pressure Fluids

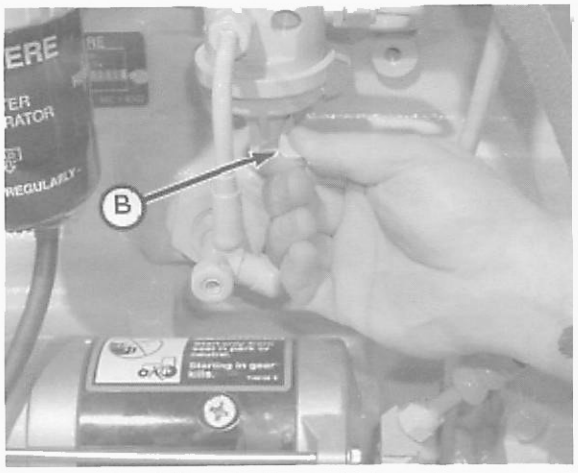
Any time the fuel system has been opened up for service (lines disconnected or filters removed), it will be necessary to bleed air from the system. The fuel system may be bled at one of several locations. On some engine applications it may be necessary to consult your operator's manual and choose the best location for your engine/machine application.

1. Loosen the air bleed vent screw (A) two full turns by hand on fuel filter base.



Final Fuel Filter Bleed Vent Screw

2. Operate fuel supply pump prime lever (B) or primer button on fuel filter base (if equipped).
3. Tighten bleed plug securely; continue operating primer until pumping action is not felt.
4. Start engine and check for leaks.
   If engine will not start, it may be necessary to bleed air from fuel system at fuel injection pump or injection nozzles.



Fuel Supply Pump Primer Lever

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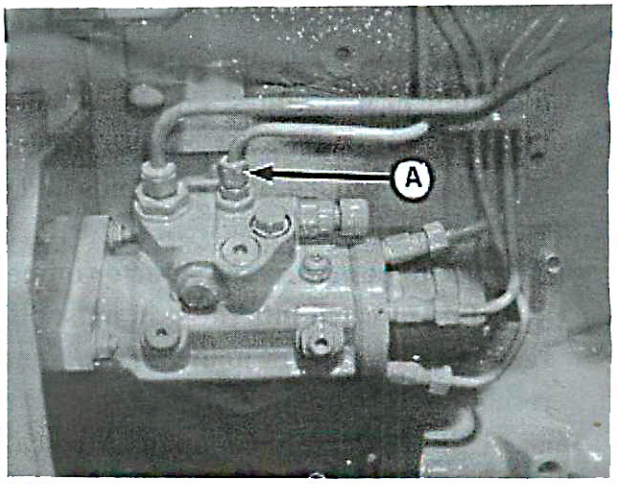
At Fuel Injection Pump

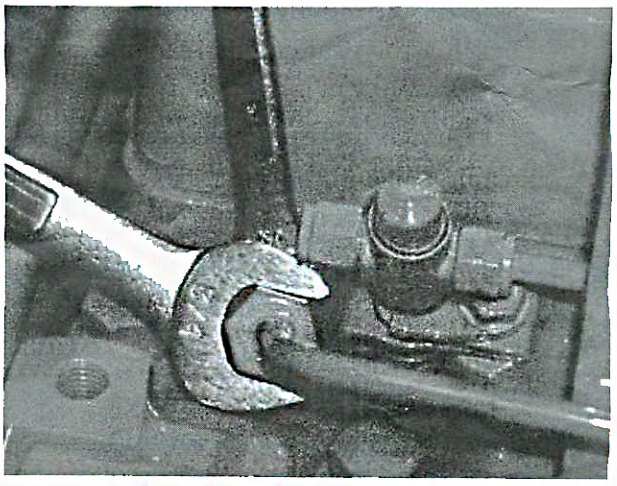
1. Loosen fuel return line (A) at fuel injection pump.
2. Operate fuel supply pump primer lever or primer-button on fuel filter base (if equipped).
3. As soon as fuel flow is free from air bubbles, tighten fuel return line to specifications. Primer lever is spring loaded and will return to normal position. Specification: Torque 20 lbs-ft (27 Nm)



Fuel Injection Pump Return Line

At Fuel Injection Nozzles

1. Place throttle lever in half-throttle position.
2. Using two open-end wrenches loosen two fuel line connections at injection nozzles.
3. Crank engine over with starter motor for 15 seconds (but do not start engine) until fuel without any air bubbles flow out of loosened connection. Retighten connection to specifications. Specification: Torque 20 Lbs-ft (27Nm)
4. Repeat procedure for remaining injection nozzles (if necessary) until all air has been removed from fuel system. If engine still will not start, see you authorized servicing dealer or engine distributor.



Nozzle Fuel Pressure Line

Pump / Engine Timing Kit

P/N 40572

IMPORTANT: Complete installation instructions including requirements for safety, cleanliness and environmental awareness are contained in the John Deere Technical Manual for 4.5L & 6.5L PowerTech® Engines with DE Electronic Fuel Injection (John Deere P/N CTM331).

Timing Kit Contents:

40610	DE Pump Timing Pin
40571	Engine Timing Pin
13324	1/4" Hex Key Wrench

Torque Values:

Injection Pump Mounting Stud Nut	19 lb-ft (25 N•m)
Injection Pump Drive Gear Nut	145 lb-ft (195 N•m)
Injection Pump Timing Pin Plug	7.5 lb-ft (9.5 N•m)

Pump Installation:

1. Position the engine crankshaft so number one cylinder is at TDC on the compression stroke. Insert the Engine Timing Pin (P/N 40571) thru the hole in the flywheel housing and engage the pin in the flywheel (Figure 1).
2. Using the included 1/4" Hex Key Wrench (P/N 13324), remove the timing hole plug on the top of the fuel injection pump (Figure 2).
3. Insert the Pump Timing Pin (P/N 40610) into the hole (Figure 3a) and rotate the pump's drive shaft until the pin indexes in the internal drive shaft slot. Leave the pump timing pin in the pump until installation is complete. *NOTE: A small punch may be temporarily inserted into the small hole in the drive shaft taper to facilitate shaft rotation (Figure 3b).*
3. Ensure the pump's flange seal is in place and that the drive shaft and mating surfaces are clean and dry. Carefully insert the injection pump drive shaft into the drive gear and guide the housing flange onto the three mounting studs. Install washers and nuts then tighten the nuts evenly to 19 lbf-ft. (25 N•m).
4. Install the drive gear retaining nut and washer (Figure 4). Do not tighten the nut at this time.
5. Rotate the crankshaft counterclockwise (as viewed from the front of the engine) to remove gear backlash*. Tighten the gear retaining nut to 145 lbf-ft (195 N•m).

IMPORTANT: Gear backlash can cause the injection timing to be off by as much as several degrees resulting in poor engine performance.

6. Install the injection pump drive gear access cover. Remove the engine timing pin (P/N 40571) from the flywheel and remove the pump timing pin (P/N 40610) from the pump. Install the timing hole plug (Figure 2) and tighten to 75-100 lbf.-in. (8-11 N•m).

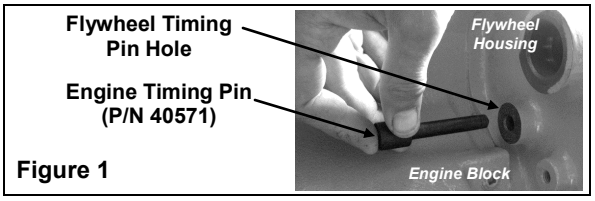


Figure 1

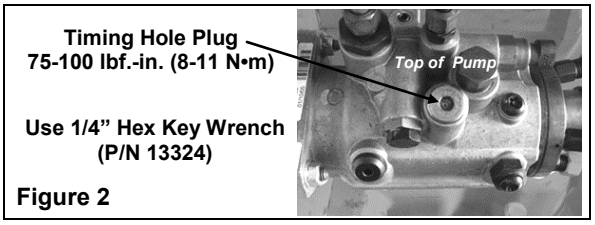


Figure 2

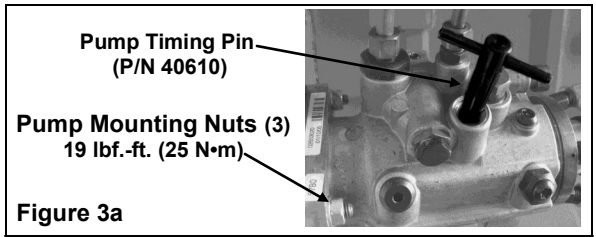


Figure 3a

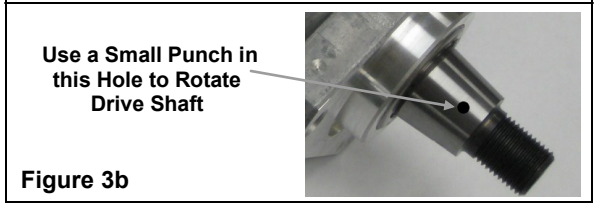


Figure 3b

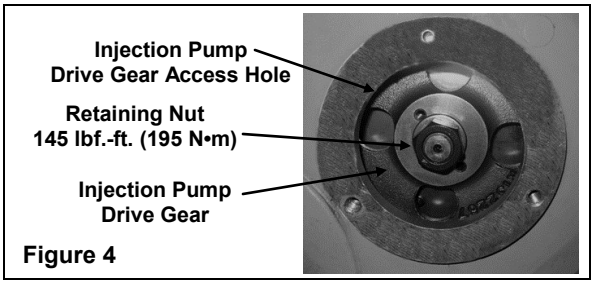


Figure 4