

# TM2264 - 35D and 50D Excavator Fuel Injection Pump Remove and Install

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## Fuel Injection Pump Remove and Install

### Fuel Injection Pump Remove

1. **IMPORTANT:**

**Never steam clean or pour cold water on injection pump while the pump is running or warm. Doing so can damage the pump.**

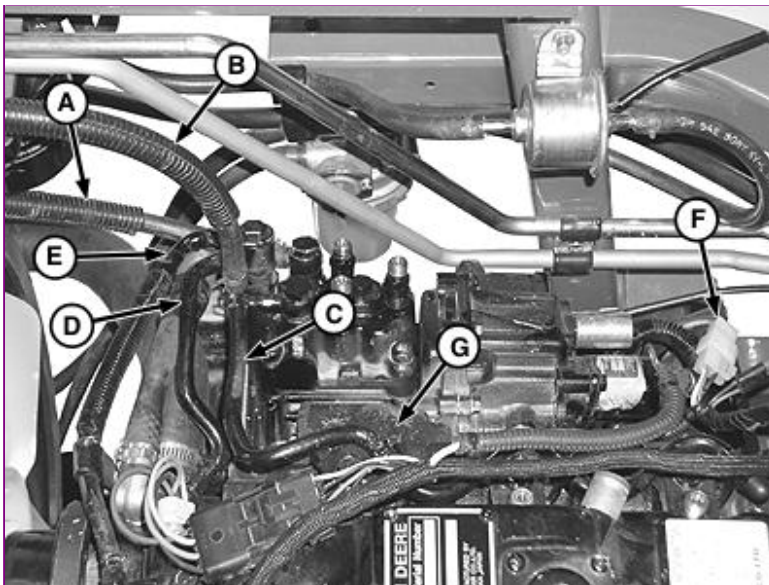
Clean injection lines and area around the injection pump with cleaning solvent or a steam cleaner.

2. Remove radiator, fan, and belt.

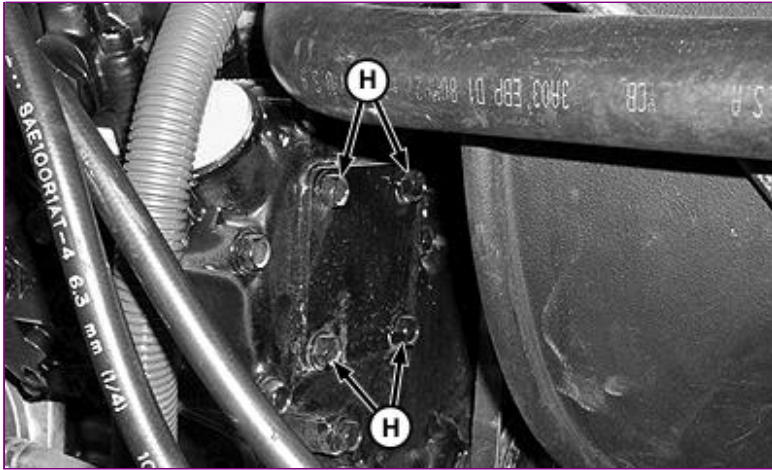
- [See Radiator Remove and Install—35D \(S.N. —254999\)](#) . (Group 0510.)
- [See Radiator Remove and Install—35D \(S.N. 255000—\)](#) . (Group 0510.)
- [See Radiator Remove and Install—50D \(S.N. —274999\)](#) . (Group 0510.)
- [See Radiator Remove and Install—50D \(S.N. 275000—\)](#) . (Group 0510.)

3. Remove intake manifold. [See Intake Manifold Remove and Install](#) . (Group 0400.)

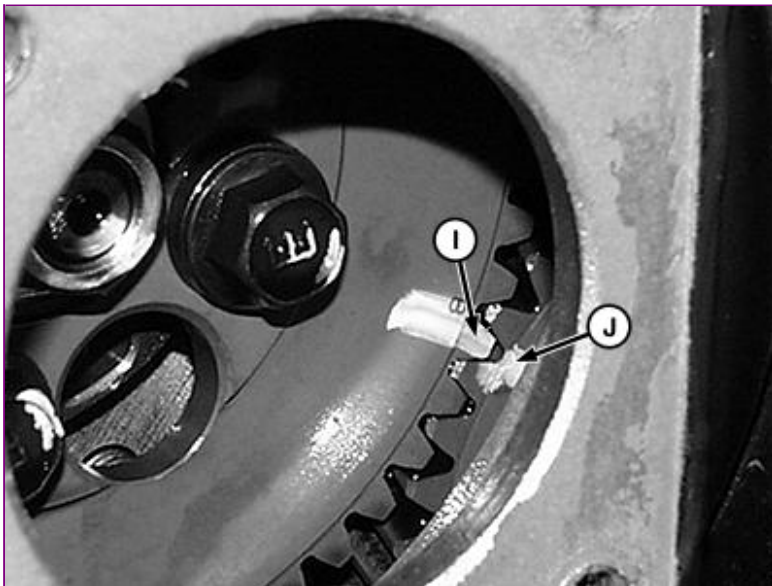
4. Lower air conditioning compressor.



5. RG13396A-UN: Remove Fuel Lines And Coolant Lines.



RG13397A-UN: Injection Pump Gear Cover



RG13398A-UN: Injection Pump Gear Timing Marks

LEGEND:

- A - Fuel Inlet Line
- B - Fuel Return Line
- C - Injector Return Line
- D - Coolant Line
- E - Coolant Line
- F - Fuel Shutoff Solenoid Wire Connector
- G - Foam Spacer
- H - Cap Screw (4 used)
- I - Pump Gear Timing Mark
- J - Idler Gear Timing Mark

Disconnect fuel inlet line (A), fuel return line (B), and injector return line (C).

6. Disconnect coolant lines (D and E).
7. Disconnect fuel shutoff solenoid wire connector (F).
8. Remove foam spacer (G).
9. Remove cap screws (H) and remove injection pump gear access cover.

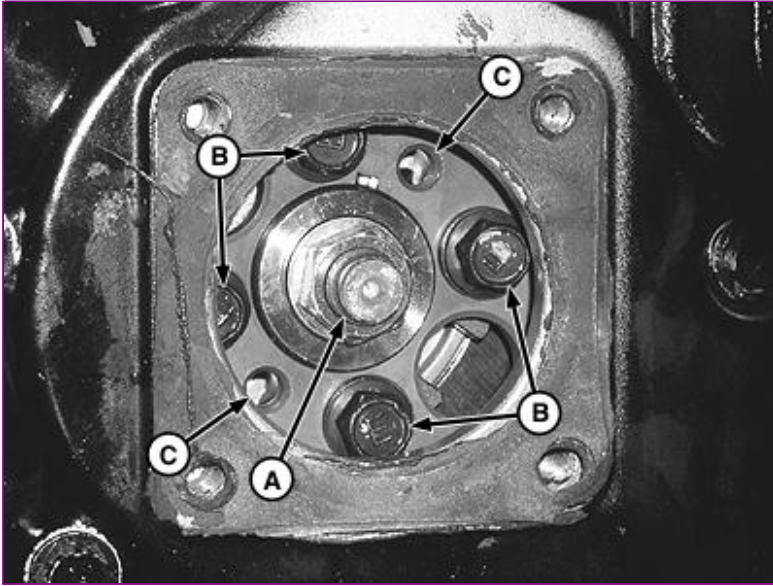
10. **NOTE:**

*For all the timing marks to become aligned, engine may need to be rotated up to fifty-two times.*

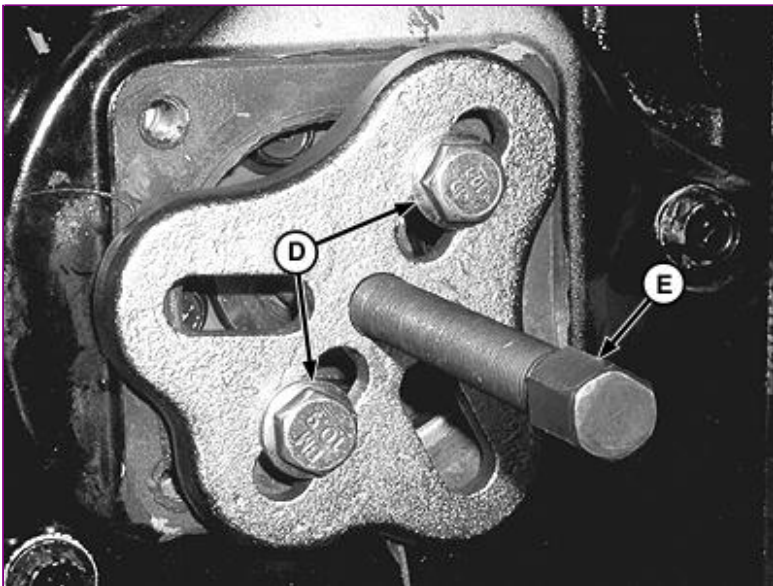
*Alignment marks (I and J) are both identified with a stamped letter "B".*

Rotate engine in the direction of rotation until mark (I) on pump gear aligns with mark on idler gear (J) (both identified by a stamped letter B). Use chalk or paint to mark injection pump gear to idler gear.

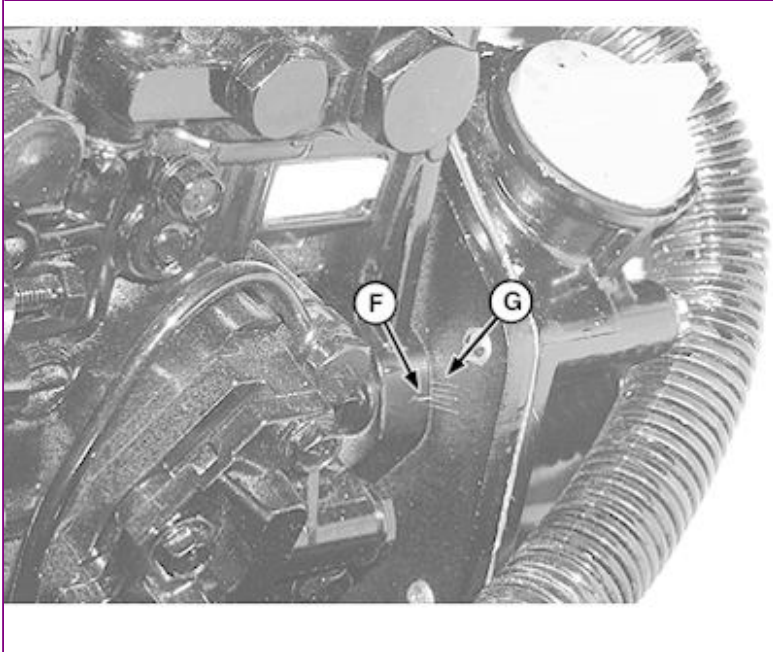
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11. RG13399A-UN: Injection Pump Timing Gear



RG13400A-UN: Injection Pump Timing Gear Puller



TX1062018A-UN: Injection Pump Timing Marks

LEGEND:

- A - Timing Gear Nut and Washer
- B - Cap Screw (4 used)
- C - Threaded Puller Holes
- D - Puller Cap Screw (2 used)
- E - Gear Puller
- F - Injection Pump Timing Mark
- G - Gear Cover Mounting Plate Timing Mark

Remove gear retaining nut and washer (A).

12. **IMPORTANT:**

**Do not loosen or disturb cap screws (B) securing gear to the hub. Gear to hub adjustment is pre-set to comply with strict EPA emissions requirements and is not adjustable. This procedure is done at the pump manufacturer and cannot be duplicated in the field.**

Install puller (E) into threaded holes (C) on gear using cap screws (D).

13. **IMPORTANT:**

**Engine must not be rotated when timing gear is removed from injection pump shaft. Engine should only be rotated when timing gear is securely fastened to pump or engine damage could result.**

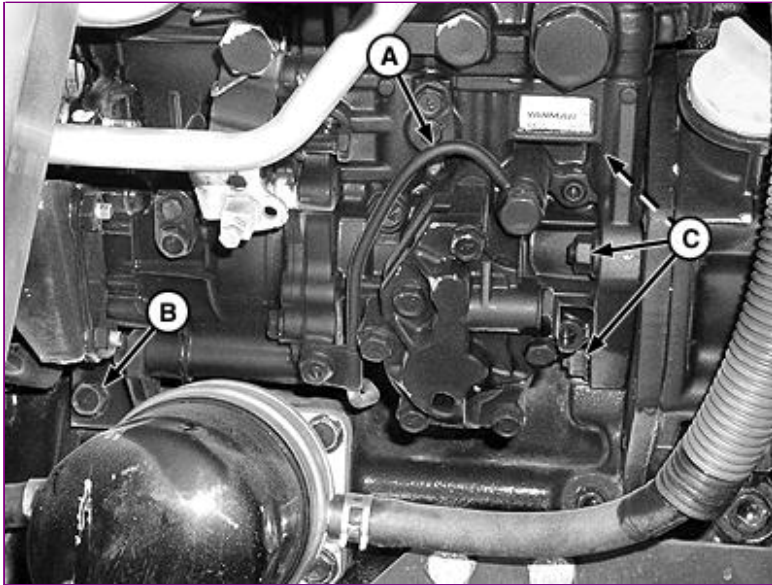
Remove gear and hub assembly from injection pump shaft. Gear will stay inside timing cover.

14. **IMPORTANT:**

**Marks must be made on the injection pump and the gear cover mounting plate to correctly install the pump. If marks are not made, there will be no way to properly time the injection pump.**

Note position of timing marks on gear cover mounting plate (G) and injection pump (F). Pump must be installed at the exact same timing mark as when removed. Scribe a line as accurately and straight as possible at the pump flange mark (F) onto the gear cover mounting plate.

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15. RG13402A-UN: Injection Pump Mounting Points

**LEGEND:**

- A - External Lube Line
- B - Cap Screw
- C - Nut (3 used)

Remove external lube line (A) from pump.

16. Remove cap screw (B).

17. **IMPORTANT:**

**Marks must be made on the injection pump and the gear cover mounting plate to properly install pump. You must also record the injection pump timing number marked on the pump to correctly install the pump. If marks are not made and the timing number not recorded, there will be no way to properly time the injection pump.**

Remove pump flange mounting nuts (C) and remove pump.

18. **NOTE:**

*The injection pump timing number is stamped on the engine side of the fuel injection pump housing. Treat this number as though there is a decimal point between the two digits. (Example 68 = 6.8).*

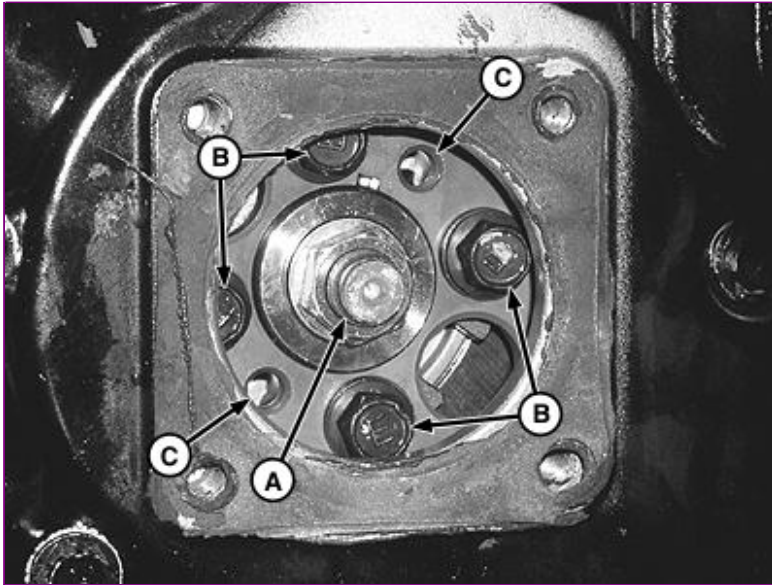
Find and record pump timing number stamped on pump. This number will be needed if pump is being replaced or recalibrated.

**IMPORTANT:**

**DO NOT attempt to service the injection pump or governor. If unit is in need of repair, it must be serviced by a qualified EPA/CARB certified fuel injection repair shop. If replacement is necessary, replace entire unit. Do not rotate engine while injection pump is removed. If engine is rotated, the timing gear cover must be removed to ensure correct timing.**

## Pump Installation





1. RG13399A-UN: Injection Pump Timing Gear

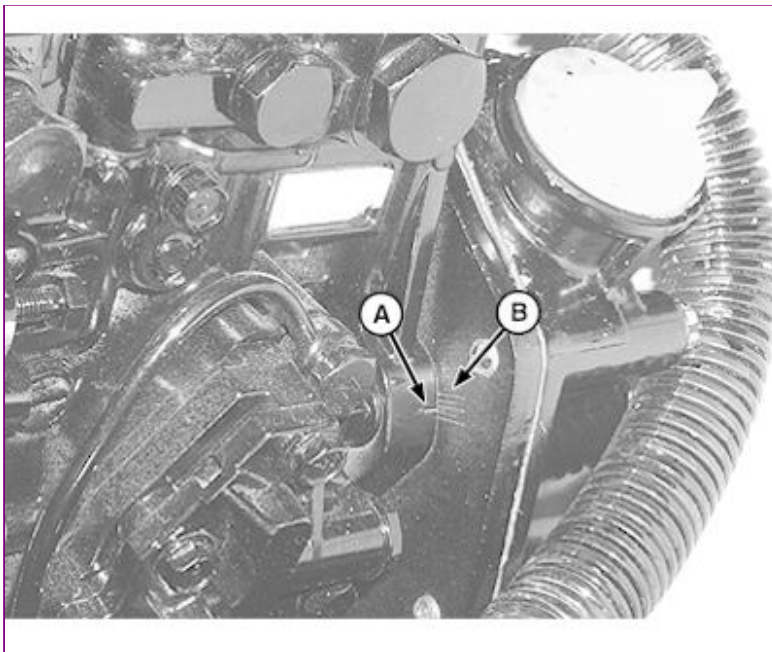
**LEGEND:**

- A - Timing Gear Nut and Washer
- B - Cap Screw (4 used)
- C - Threaded Puller Holes

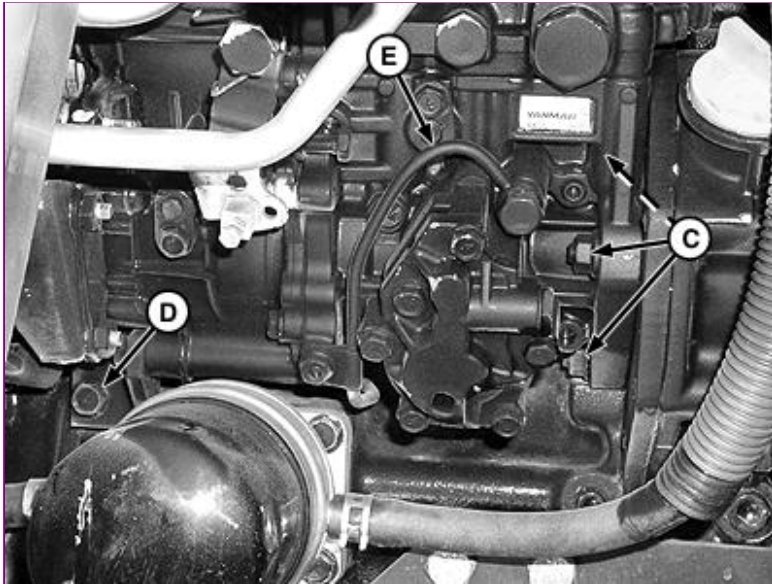
Install new O-ring on injection pump.

2. Put injection pump onto back of gear cover mounting plate. Install three mounting nuts. Do not tighten. Align key on shaft with keyway in gear hub. Ensure gear is still aligned to idler gear.
3. Install nut and washer (A) on pump shaft. Tighten nut to specification.

Item	Measurement	Specification
Fuel Injection Pump Drive Gear Hub-to-Shaft Retaining Nut	Torque	78—88 N·m 58—65 lb-ft



4. TX1062057A-UN: Injection Pump Timing Marks



RG13415A-UN: Injection Pump Mounting

**LEGEND:**

- A - Injection Pump Timing Mark
- B - Gear Cover Mounting Plate Timing Mark
- C - Pump Mounting Nut (3 used)
- D - Cap Screw
- E - External Lube Line

Align timing mark on injection pump (A) with correct mark on gear cover mounting plate (B).

5. Tighten three pump mounting nuts (C) to specification.

Item	Measurement	Specification
Injection Pump Mounting Nuts	Torque	26 N·m 228 lb-in.

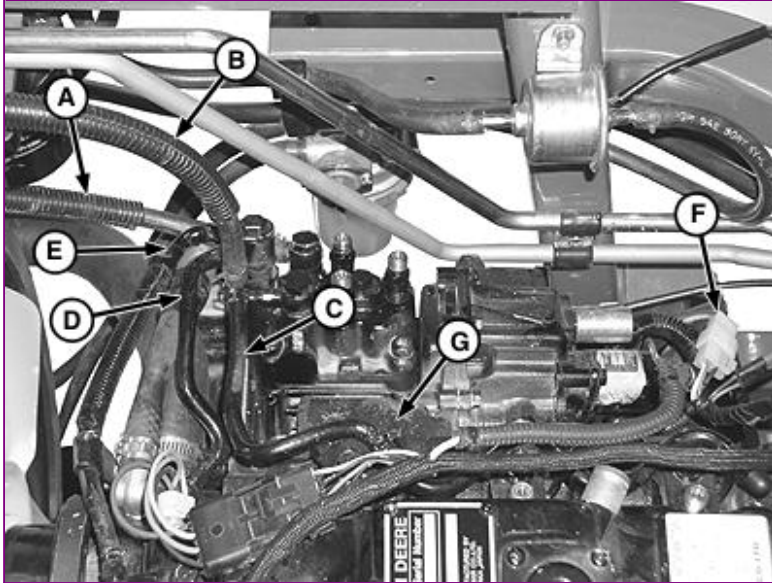
6. Install cap screw (D). Tighten to specification.

Item	Measurement	Specification
Injection Pump Mounting Cap Screw	Torque	26 N·m 228 lb-in.

7. Fill pump with engine oil through external lube line port until oil runs out. Install external lube line. Tighten lube line fitting (E) to specification.

Item	Measurement	Specification
Injection Pump External Lube Line Fitting	Torque	15 N·m 133 lb-in.

8. Install cover for injection pump timing gear.
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9. RG13396A-UN: Install Fuel and Coolant Lines

**LEGEND:**

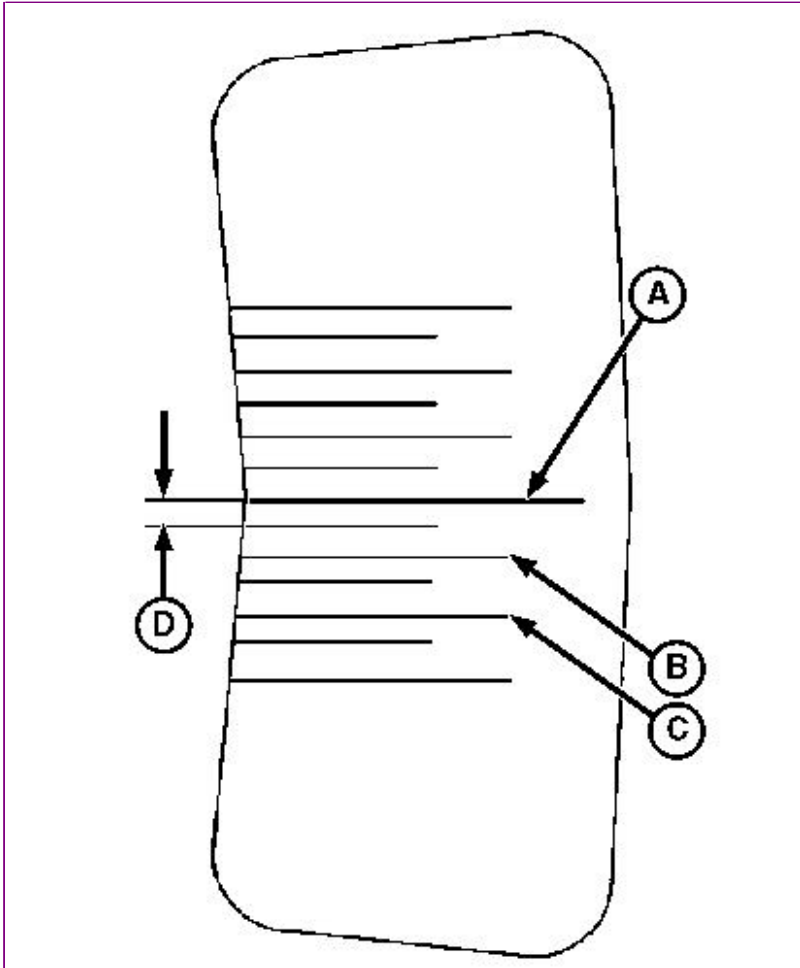
- A - Fuel Inlet Line
- B - Fuel Return Line
- C - Injectors Return Line
- D - Coolant Line
- E - Coolant Line
- F - Fuel Shutoff Solenoid Wire Connector
- G - Foam Spacer

Install spacer (G) between pump and engine block.

10. Connect fuel shutoff solenoid wire connector (F).
11. Connect fuel lines (A, B, and C).
12. Connect coolant lines (D and E).
13. Install intake manifold. [See Intake Manifold Remove and Install](#) . (Group 0400.)
14. Install radiator, fan, and belt.
  - [See Radiator Remove and Install—35D \(S.N. —254999\)](#) . (Group 0510.)
  - [See Radiator Remove and Install—35D \(S.N. 255000—\)](#) . (Group 0510.)
  - [See Radiator Remove and Install—50D \(S.N. —274999\)](#) . (Group 0510.)
  - [See Radiator Remove and Install—50D \(S.N. 275000—\)](#) . (Group 0510.)

**New, Rebuilt, or Recalibrated Pump Timing**





1. RG13614-UN: Injection Pump Sticker

**LEGEND:**

- A - Middle 0° Line
- B - 1° Line
- C - 2° Line
- D - 0.5° Line

Install timing mark sticker supplied with pump so that the (A) line is exactly in-line with the mark that was made on the gear cover mounting plate when the pump was removed.

2. **IMPORTANT:**

**Injection pump timing can not be performed without injection pump timing numbers from original and replacement pumps. There is no way to properly install the injection pump without these numbers.**

Calculate the difference between the timing numbers, recorded earlier, from the original and replacement/recalibrated pumps. This calculated number will be needed to correctly time the pump.

Example: If the timing number on the replacement/recalibrated pump was 6.0, and the timing number on the original pump is 4.0 (fuel injection angle of replacement/recalibrated pump) - (fuel injection angle of original pump), the replacement pump should be timed at the +2.0° (advanced) mark (C) on the new timing mark sticker.

3. **NOTE:**

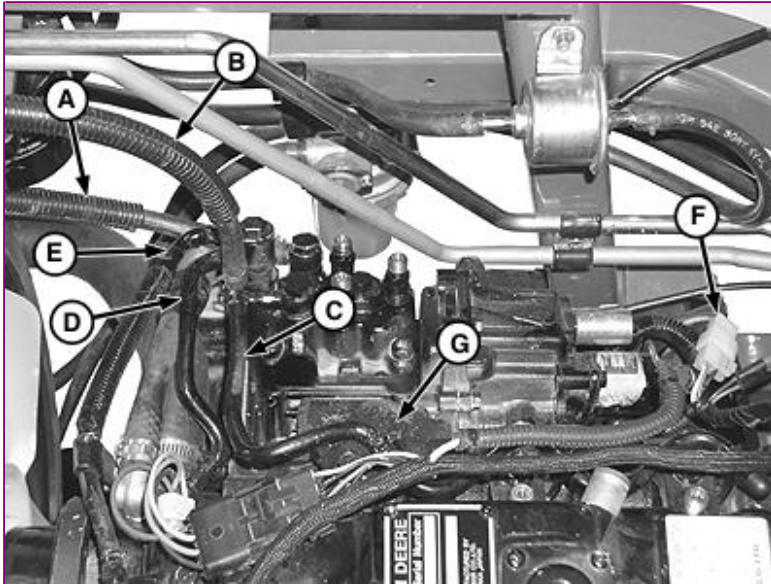
*Rotating the injection pump away from the cylinder block will advance the timing and rotating the injection pump toward the cylinder block will delay the timing.*

Set the pump to the correct timing mark using the calculated number difference between the original and replacement pumps. Adjust timing accordingly using the new timing mark sticker.

4. Hold the pump at the correct timing mark and tighten three pump mounting nuts and cap screw to specification.

Item	Measurement	Specification
Injection Pump Mounting Nuts	Torque	26 N·m 228 lb-in.
Injection Pump Mounting Cap Screw	Torque	26 N·m 228 lb-in.

5. If removed, install timing cover. [See Timing Gear Cover Remove and Install](#) . (Group 0400.)



6. RG13396A-UN: Install Fuel And Coolant Lines

**LEGEND:**

- A - Fuel Inlet Line
- B - Fuel Return Line
- C - Injectors Return Line
- D - Coolant Line
- E - Coolant Line
- F - Fuel Shutoff Solenoid Wire Connector
- G - Foam Spacer

Install spacer (G) between pump and engine block.

7. Connect fuel shutoff solenoid wire connector (F).
8. Connect fuel lines (A, B, and C).
9. Connect coolant lines (D and E).
10. Install intake manifold. [See Intake Manifold Remove and Install](#) . (Group 0400.)
11. Install radiator, fan, and belt.
  - [See Radiator Remove and Install—35D \(S.N. —254999\)](#) . (Group 0510.)
  - [See Radiator Remove and Install—35D \(S.N. 255000—\)](#) . (Group 0510.)
  - [See Radiator Remove and Install—50D \(S.N. —274999\)](#) . (Group 0510.)
  - [See Radiator Remove and Install—50D \(S.N. 275000—\)](#) . (Group 0510.)

# TM2264 - 35D and 50D Excavator

## Fuel Injection Nozzles Remove and Install

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### Fuel Injection Nozzles Remove and Install

#### General Nozzle Service Precautions

Before removal, thoroughly remove all dirt from the cylinder head around fuel injection nozzles. Clean with compressed air to prevent dirt from entering the cylinders. Plug the bore in the cylinder head after each nozzle has been removed. Cap fuel line openings as soon as they are disconnected.

Immediately fit protective caps over the nozzle tips and the line connections to avoid handling damage and getting debris in fuel system.

Do not bend the fuel delivery lines, as this may affect their durability. When loosening the fuel pressure lines, hold male union of nozzle line stationary with a backup wrench.

1. **IMPORTANT:**

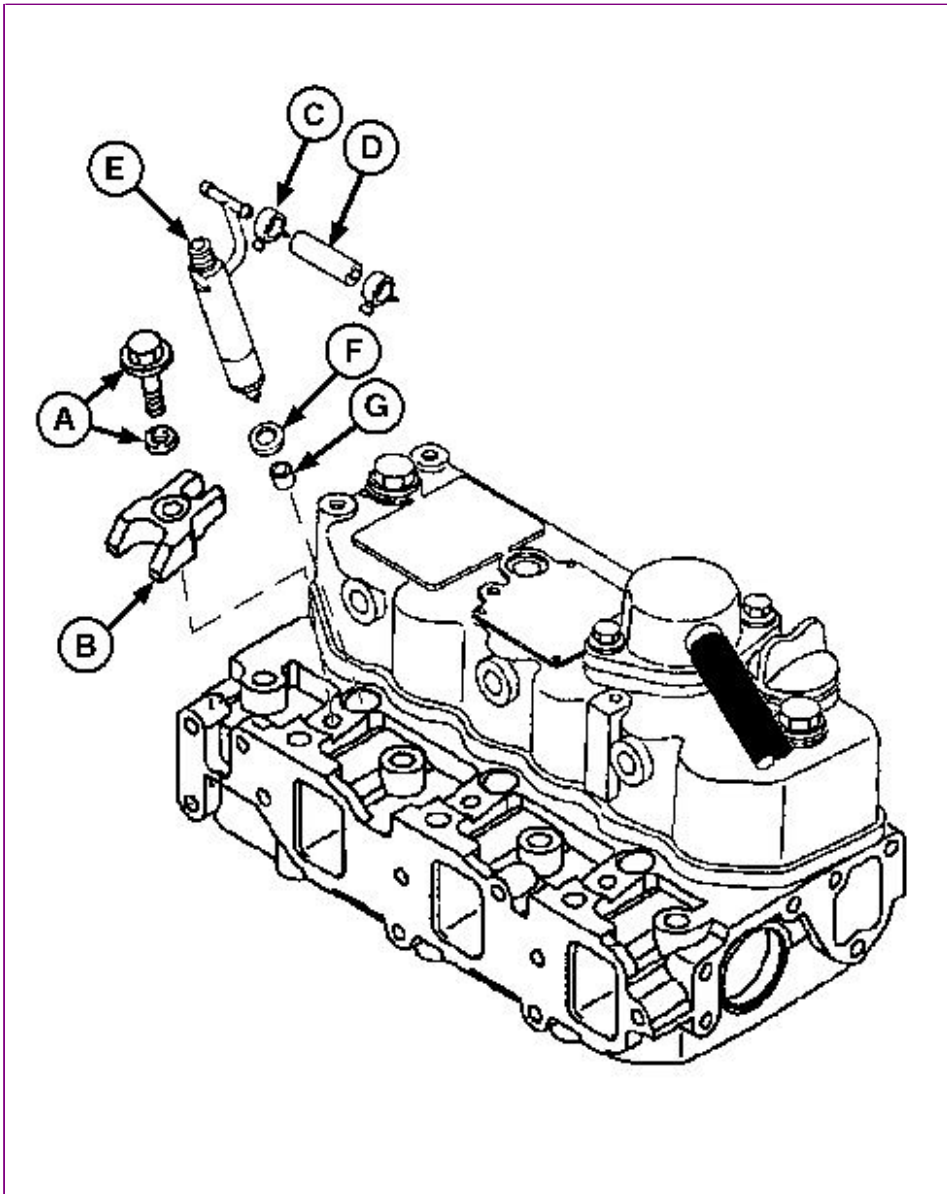
**Never steam clean or pour cold water on injection pump while the pump is running or warm. Doing so can damage the pump.**

Clean the injection pump lines and area around the nozzles using a parts cleaning solvent or steam cleaner.

**NOTE:**

*Nozzles are matched to the cylinders. If removing more than one nozzle, tag each nozzle, according to the cylinder from which it was removed.*

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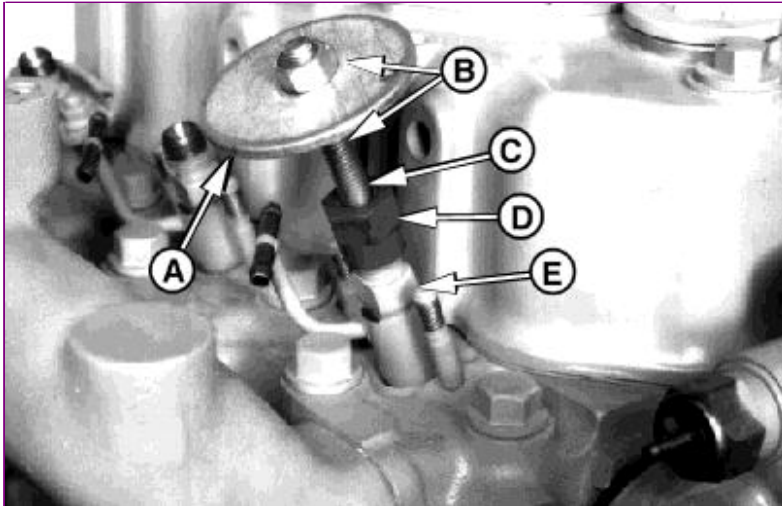
2. RG13407-UN: Fuel Injector Components

LEGEND:

- A - Cap Screw and Washer
- B - Retaining Plate
- C - Hose Clamp
- D - Leak-Off Hose
- E - Injection Nozzle
- F - Ring
- G - Heat Protector

Loosen fuel injection line connectors-to-nozzles slightly to release pressure in the fuel system.

3. Loosen line clamp(s) and remove fuel injection lines.
  4. Remove clamps (C) and leak-off hoses (D).
  5. Remove cap screw and washer (A) and retaining plate (B).
  6. Remove injection nozzle (E), ring (F), and TEFLON® heat protector (G). If ring and protector stay in cylinder head, thread a cap screw into protector and pull from cylinder head.
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7. M82126A-UN: If Nozzles Stick in Cylinder Head

LEGEND:

- A - Large Flat Washer
- B - Nut (2 used)
- C - Cap Screw
- D - Old Injection Line Nut
- E - Injection Nozzle

If nozzles are stuck in cylinder head:

Grind the head of a cap screw (C) so it fits inside a nut from an old injection line (D).

Use two nuts (B) to attach a large flat washer (A) to the cap screw.

Install assembly onto nozzle and use a puller and slide hammer to pull nozzle from cylinder head.

8. Test injection nozzles. [Perform Fuel Injection Nozzle Check](#) . (Group 9010-25.)
9. Installation is done in the reverse order of removal.
10. Tighten retaining plate nuts.

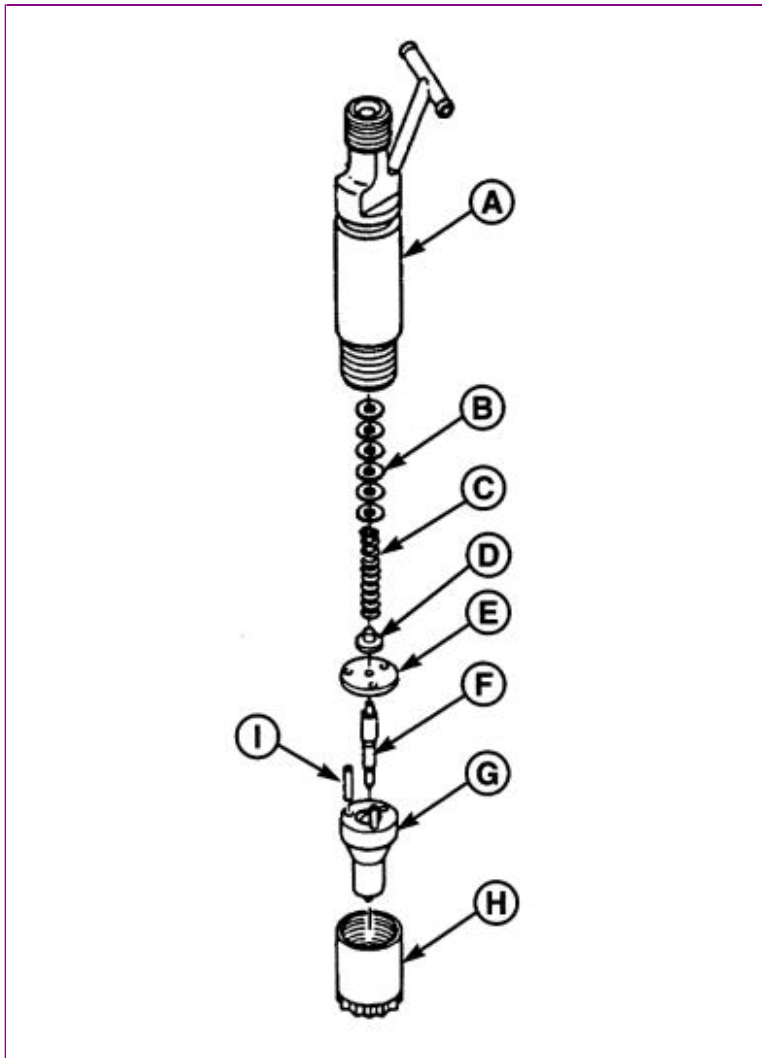
Item	Measurement	Specification
Fuel Injection Retaining Plate Cap Screw	Torque	24—28 N·m 212—248 lb-in



# TM2264 - 35D and 50D Excavator Fuel Injection Nozzles Disassemble and Assemble

## Fuel Injection Nozzles Disassemble and Assemble

### Fuel Injection Nozzles Disassemble



RG11097A-UN: Hole-Type Nozzle

#### LEGEND:

- A - Injector Body
- B - Shims
- C - Spring
- D - Spring Seat
- E - Separator Plate
- F - Nozzle Valve
- G - Nozzle Body
- H - Retaining Nut
- I - Index Pin (2 used)

#### *NOTE:*

*If servicing more than one nozzle, keep parts for each nozzle separate from one another.*

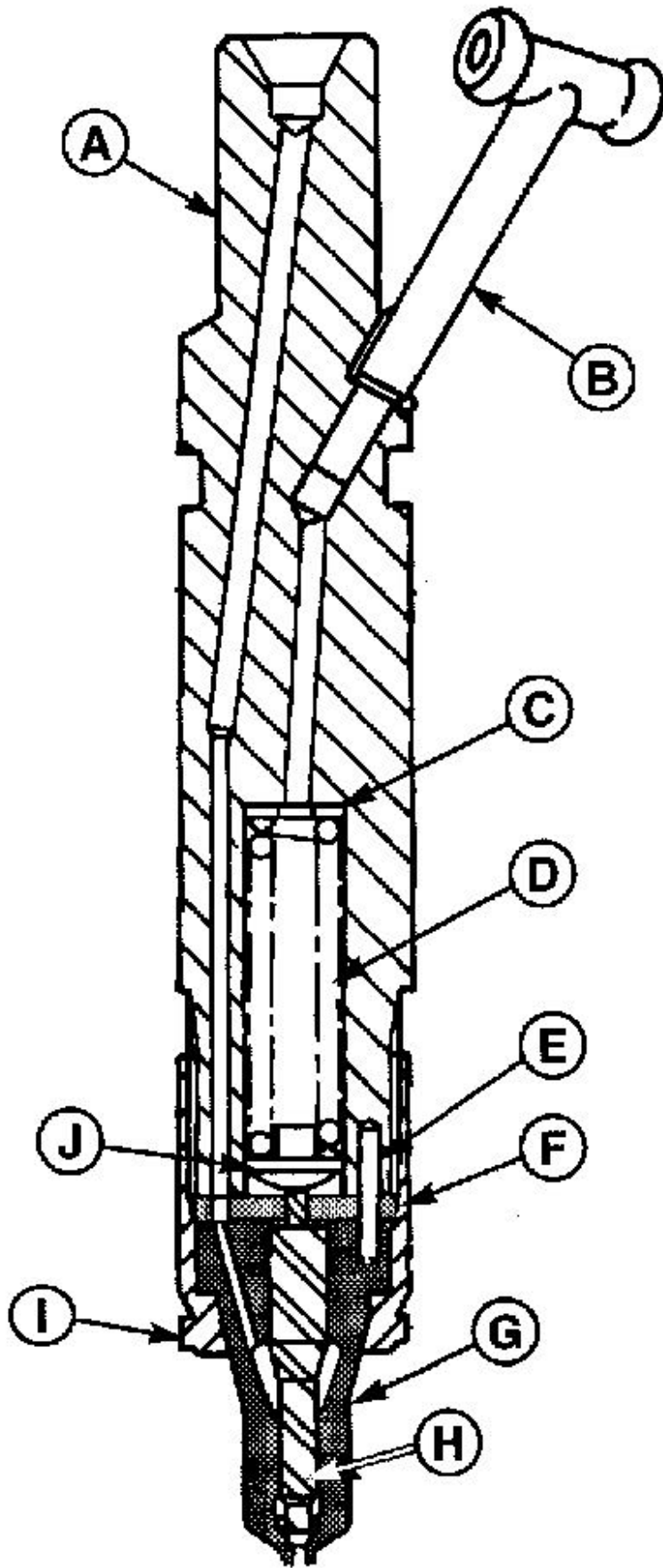
1. Disassemble fuel injection nozzles.

2. **IMPORTANT:**

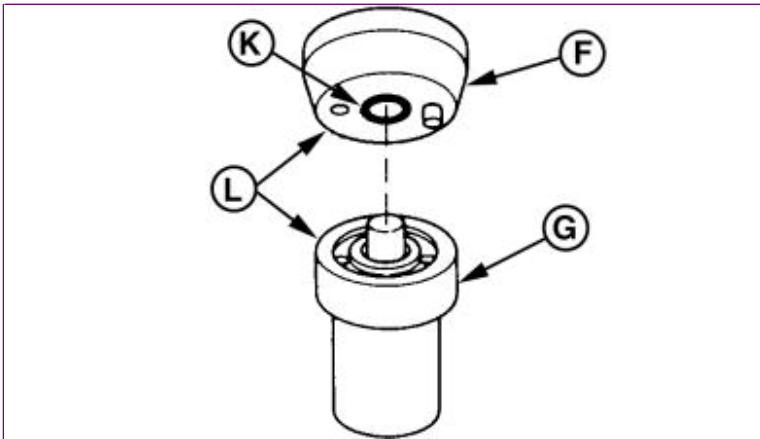
**If injection nozzles are disassembled to be cleaned, the same number and thickness of shims must be installed.**

Clean and inspect nozzle components.

## **Fuel Injection Nozzles Clean and Inspect**



M37684A-UN: Injection Nozzles



M82326B-UN: Nozzle Body, Separator Plate, Contact & Sealing Surfaces

**LEGEND:**

- A - Injector Body
- B - Fuel Return Pipe
- C - Shims
- D - Spring
- E - Index Pin
- F - Separator Plate
- G - Nozzle Body
- H - Nozzle Valve
- I - Retaining Nut
- J - Spring Seat
- K - Nozzle Contact Surfaces
- L - Sealing Surfaces

**NOTE:**

*To clean nozzles properly, JDF13B Nozzle Cleaning Kit is recommended. The cleaning kit is available through the John Deere SERVICEGARD™ Catalog.*

1. Remove anti-corrosive grease from new or reconditioned nozzles by washing them thoroughly in diesel fuel.

2. **IMPORTANT:**

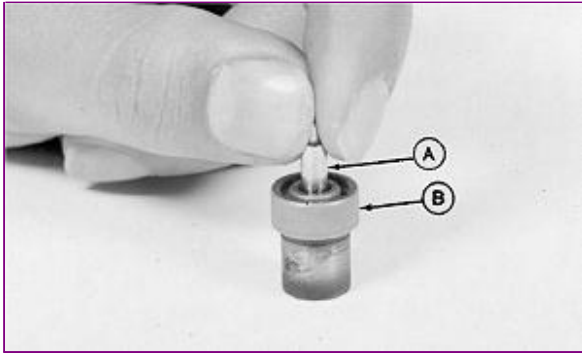
**Never use a steel brush to clean nozzles as this will distort the spray hole.**

Remove carbon from used nozzles, and clean by washing in diesel fuel. If parts are coated with hardened carbon or lacquer, it may be necessary to use a brass wire brush (supplied in nozzle cleaning kit).

3. After removing carbon or lacquer from the exterior of nozzle, inspect sealing surfaces between separator plate and nozzle body for nicks or scratches.
4. Inspect condition of separator plate and nozzle body. Contact area of separator plate (both parts) must not be scored or pitted. Use an inspection magnifier to aid in making the inspection.
5. Check nozzle contact surface on separator plate for wear. If contact surface is more than specification, replace nozzle assembly.

Item	Measurement	Specification
Fuel Injection Nozzle Contact Surface	Size	0.10 mm 0.0039 in.

6. Inspect the piston (large) part of nozzle valve to see that it is not scratched or scored and that lower (tip) end of valve is not broken. If any of these conditions are present, replace the nozzle assembly.



7. M35919-UN: Nozzle Valve & Body

**LEGEND:**

- A - Nozzle Valve
- B - Nozzle Body

Further inspect the nozzle assembly by performing a slide test. Use the following procedure:

- a. Dip the nozzle valve in clean diesel fuel. Insert valve (A) in nozzle body (B).
- b. Hold nozzle vertical, and pull valve out about 1/3 of its engaged length as shown.
- c. Release valve. Valve should slide down to its seat by its own weight.

Replace nozzle assembly if the valve does not slide freely to its seat.

## Fuel Injection Nozzles Assemble

1. Assembly is done in the reverse order of disassembly.
2. Tighten retaining nut (H) to specification.

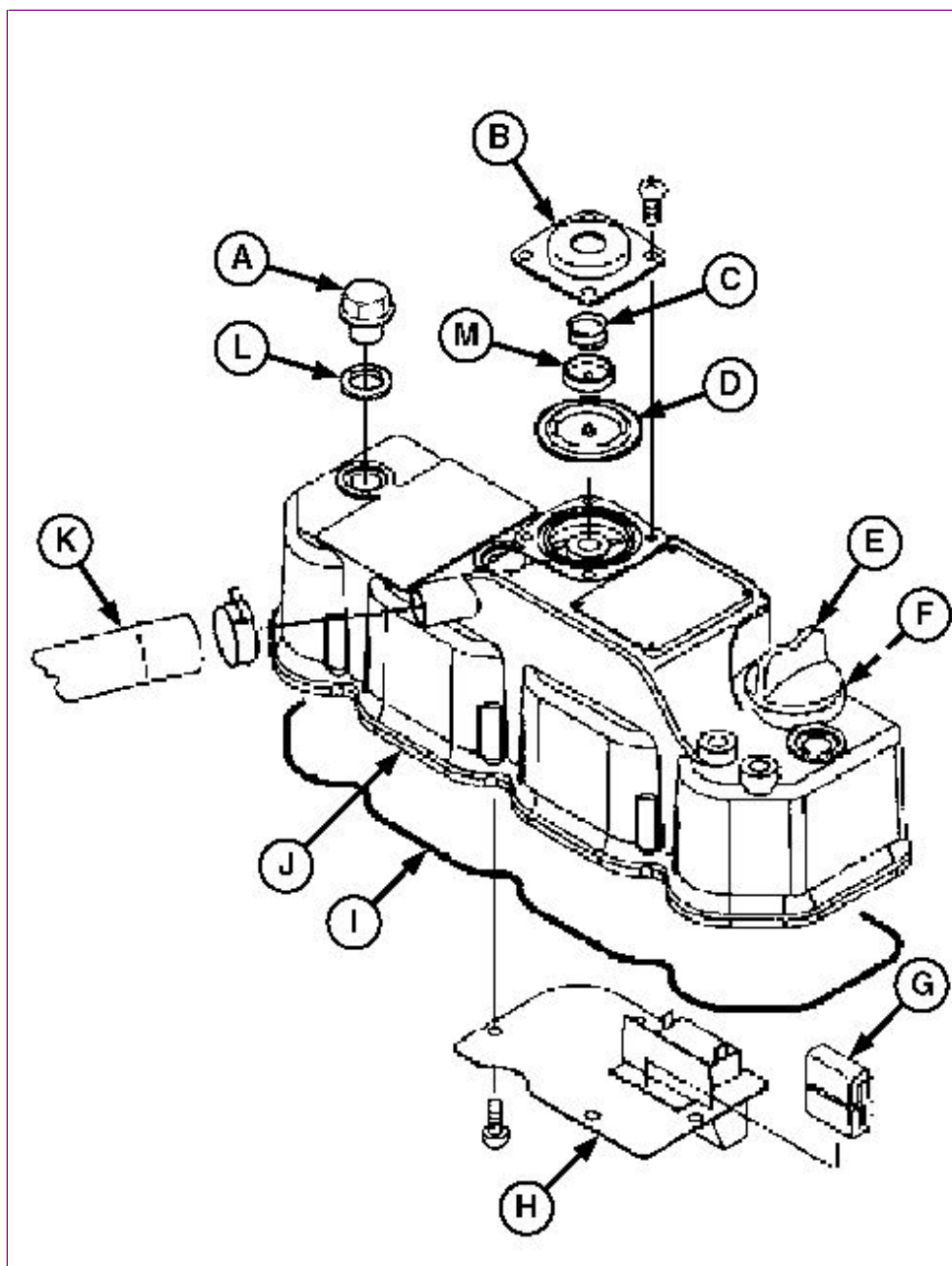
Item	Measurement	Specification
Fuel Injection Nozzle Retaining Nut	Torque	43 N·m 31 lb-ft

3. After assembly is complete, test injection nozzle. [Perform Fuel Injection Nozzle Check](#) . (Group 9010-25.)



# TM2264 - 35D and 50D Excavator Rocker Arm Cover Remove and Install

## Rocker Arm Cover Remove and Install



RG13393-UN: Rocker Arm Cover

### LEGEND:

- A - Special Nut (3 used)
- B - Diaphragm Cover
- C - Spring
- D - Diaphragm
- E - Oil Filler Cap
- F - Gasket
- G - Baffle
- H - Baffle Plate
- I - Gasket
- J - Rocker Arm Cover
- K - Crankcase Breather Tube
- L - O-Ring

## M - Spring Plate

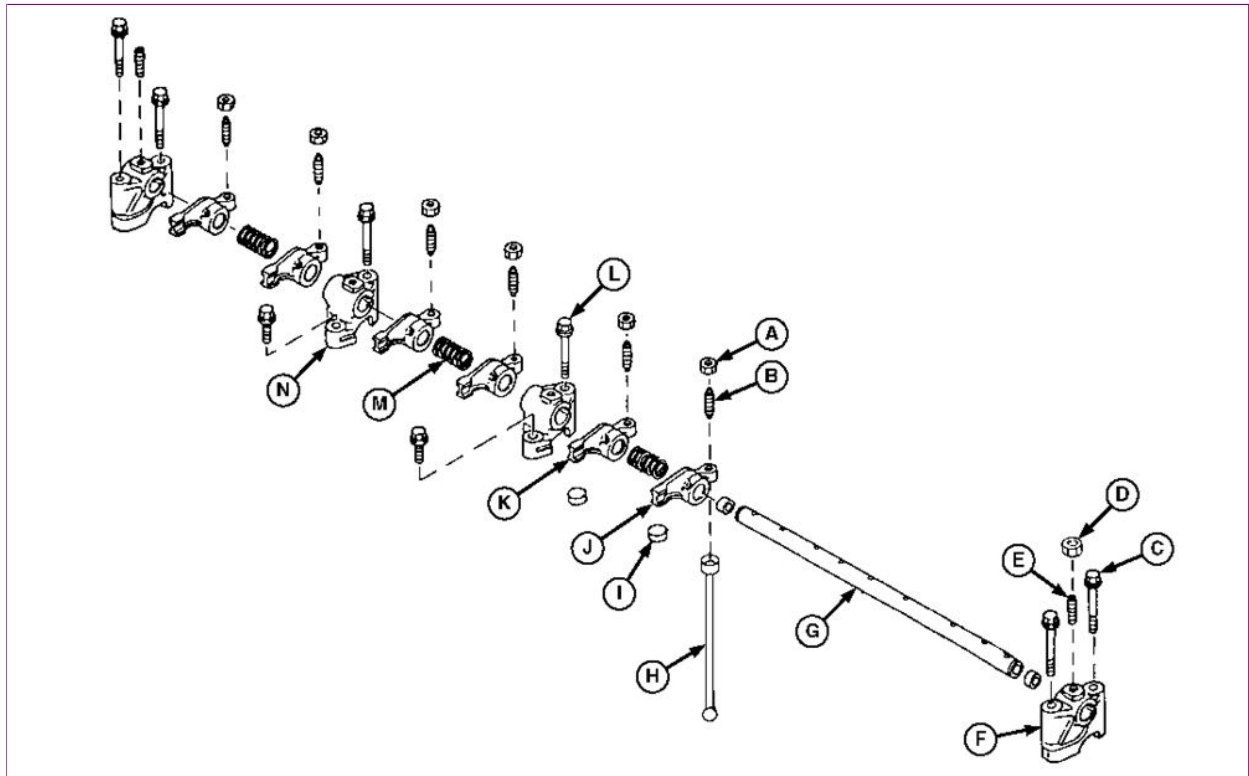
1. Remove the special nuts (A).
2. Disconnect crankcase breather tube (K).
3. Remove rocker arm cover (J) from cylinder head.
4. Remove diaphragm cover (B).
5. Remove and inspect spring (C) and diaphragm (D). Replace if damaged or deteriorated.
6. Remove baffle plate (H) and baffle (G).
7. Wash baffle in solvent and blow dry with compressed air. Replace baffle if it is damaged or deteriorated.
8. Install baffle and baffle plate.
9. Install diaphragm, spring plate (M), spring, and diaphragm cover.
10. Inspect gasket (I) and O-rings (L) before reinstalling rocker arm cover. Replace if damaged.
11. Clean cylinder head surface and install rocker arm cover on cylinder head. Install special nuts and tighten to specification.

<b>Item</b>	<b>Measurement</b>	<b>Specification</b>
Rocker Arm Cover Special Nuts	Torque	18 N·m 156 lb-in.

# TM2264 - 35D and 50D Excavator Rocker Arm Shaft Assembly Repair

## Rocker Arm Shaft Assembly Repair

### Rocker Arm Shaft Disassemble



1. RG13416-UN: Rocker Arm Shaft Assembly

#### LEGEND:

- A - Nut
- B - Adjusting Screw
- C - Mounting Cap Screw
- D - Nut
- E - Stud
- F - Rocker Arm End Support
- G - Rocker Arm Shaft
- H - Push Rod
- I - Valve Cap
- J - Intake Valve Rocker Arm
- K - Exhaust Valve Rocker Arm
- L - Mounting Cap Screw
- M - Rocker Arm Shaft Spring
- N - Rocker Arm Center Support

Remove rocker arm cover. [See Rocker Arm Cover Remove and Install](#) . (Group 0400.)

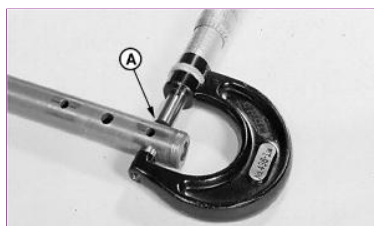
2. Remove rocker arm end support mounting cap screws (C).
3. Remove rocker arm center support mounting cap screws (L).
4. Lift rocker arm assembly from cylinder head and set on bench.
5. **NOTE:**

*When disassembling the rocker arm assembly, replace components in same location on rocker arm shaft they were removed from.*

Slide rocker arm assembly components off rocker arm shaft while noting positions for reassembly.

6. Lift push rods (H) from cylinder head and note order of removal for reassembly in same positions in head.

### Rocker Arm Shaft Inspect



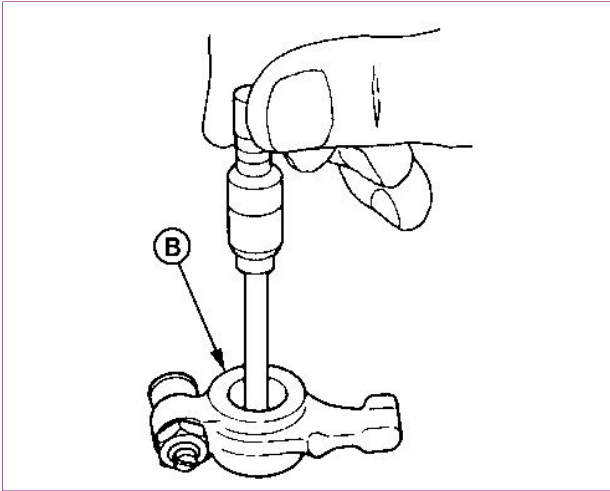
1. M35262A-UN: Measure Rocker Arm Shaft Outer Diameter

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**NOTE:**

**If there is no response to click on the link above, please download the PDF document first and then click on it.**



M82022A-UN: Measuring Rocker Arm ID

**LEGEND:**

- A - Rocker Arm Shaft
- B - Rocker Arm

Measure outer diameter of rocker arm shaft (A) at each rocker arm location.

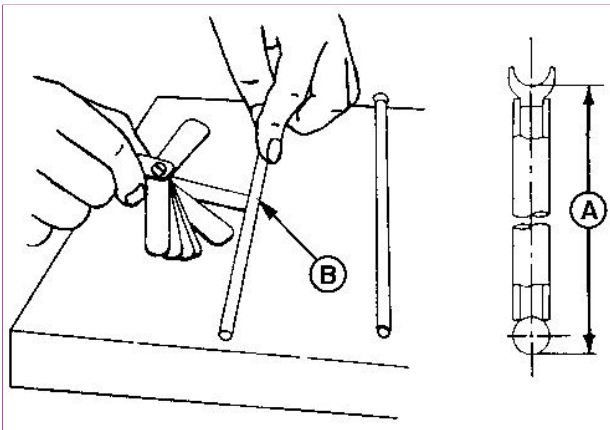
Item	Measurement	Specification
Rocker Arm Shaft	OD	15.97—15.98 mm 0.6286—0.6293 in.
	Wear Limit	15.95 mm 0.6280 in.

Replace rocker arm shaft if less than wear limit.

2. Measure inner diameters of rocker arms (B) and supports.

Item	Measurement	Specification
Rocker Arm Shaft Support	ID	16.00—16.02 mm 0.630—0.631 in.
	Wear Limit	16.09 mm 0.633 in.
Rocker Arm Shaft-to-Rocker Arm and Shaft Support Clearance	Wear Limit	0.14 mm 0.006 in.

Replace rocker arms or supports if ID is more than wear limit.



3. M82023A-UN: Measure Length and Bending of Push Rod

**LEGEND:**

- A - Push Rod Length
- B - Push Rod Bend

Measure length (A) and bending (B) of push rod.

Item	Measurement	Specification
Push Rod	Length	178.2—178.75 mm 7.018—7.037 in.
Push Rod Bend	Wear Limit	0.03 mm 0.001 in.

Replace push rod if not within specifications.



## Rocker Arm Shaft Assemble

1. **NOTE:**

*Lubricate all parts with clean oil during assembly.*

Install push rods in cylinder head with ball-shaped end down in head. Push rods should be in same locations they were removed from.

2. Assemble rocker arm assembly components in the reverse order of removal.
3. Place rocker arm assembly on cylinder head. Align rocker arms with valves and push rods. Align rocker arm end supports and center supports with corresponding holes in head.
4. Install rocker arm support mounting cap screws and torque to specification.

Item	Measurement	Specification
Rocker Arm Support Cap Screws	Torque	26 N·m 230 lb-in.

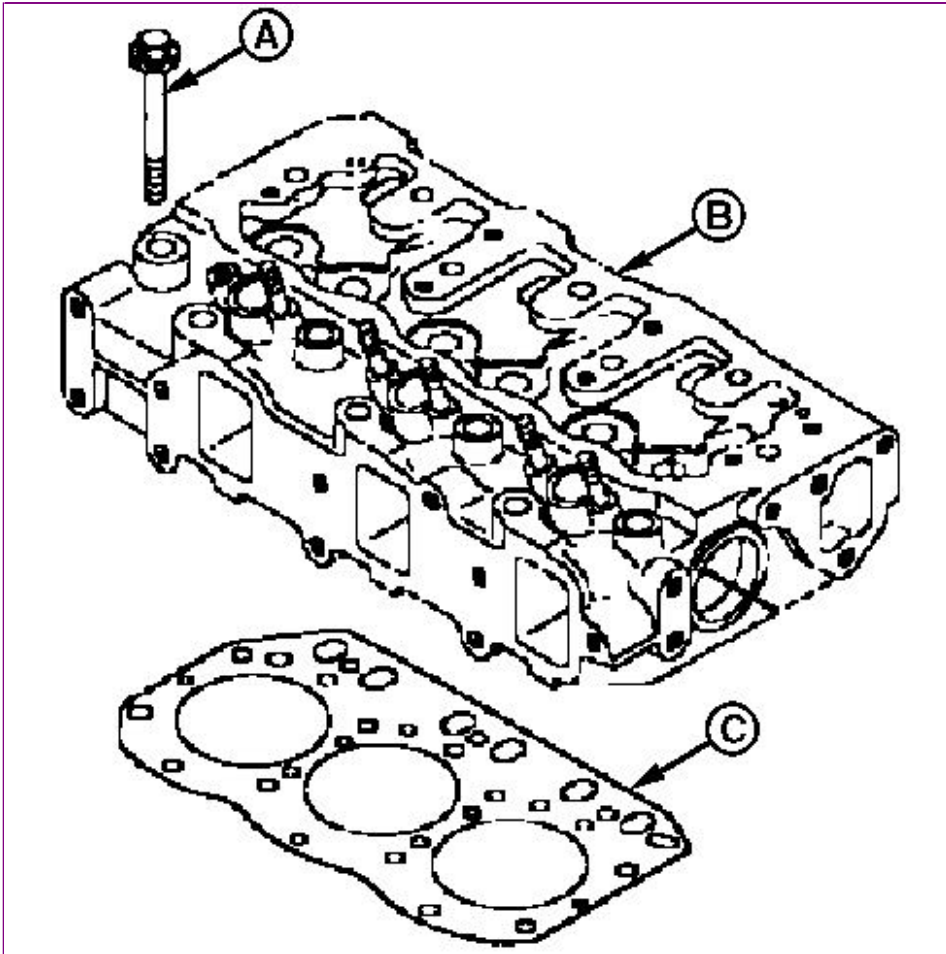
5. Adjust valve clearance. [See Engine Valve Lash \(Clearance\) Check and Adjustment](#) . (Group 9010-25.)

# TM2264 - 35D and 50D Excavator Cylinder Head Remove and Install

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## Cylinder Head Remove and Install

### Cylinder Head Remove



T207557-UN: Cylinder Head Remove and Install