

Product: INDUSTRIAL ENGINE
Model: C7 INDUSTRIAL ENGINE PRY
Configuration: C7 Engine for Combat and Tactical Vehicles PRY00001-UP

Disassembly and Assembly C7 Engine for Combat and Tactical Vehicles

Media Number -KENR9835-00

Publication Date -01/10/2009

Date Updated -02/10/2009

i03564266

Fuel Priming Pump - Remove and Install

SMCS - 1258-010

Removal Procedure



Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

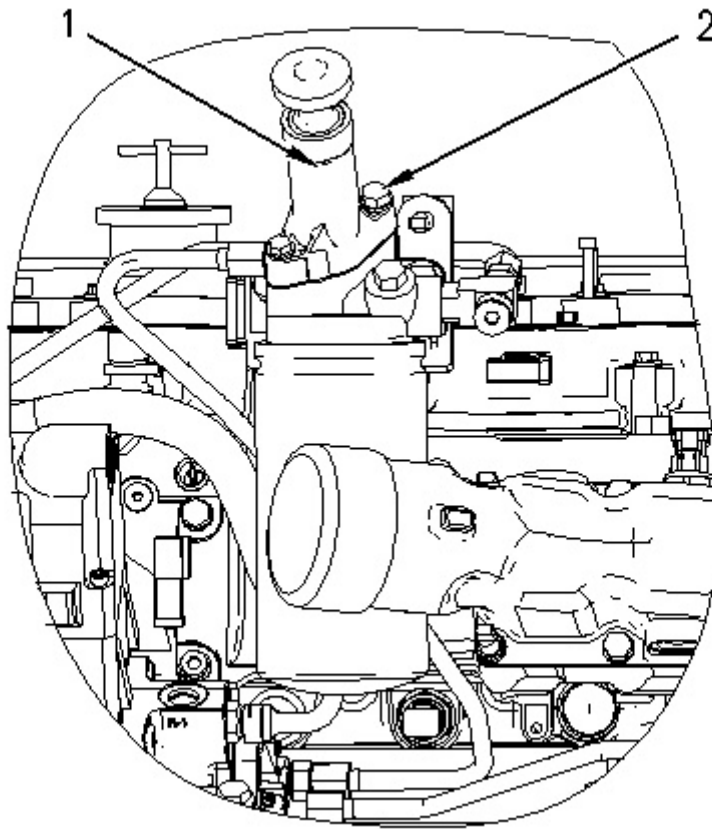


Illustration 1

g00987651

1. Remove bolts (2) .
2. Remove fuel priming pump (1) and the gasket.

Installation Procedure

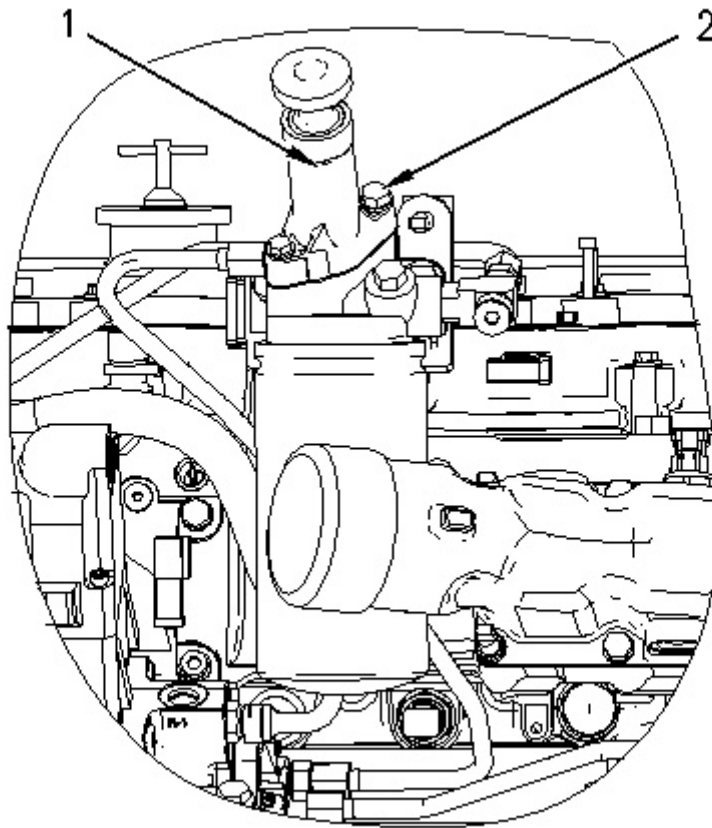


Illustration 2

g00987651

1. Position the gasket and fuel priming pump (1) on the fuel filter base.
 2. Install bolts (2). Tighten bolts (2) to a torque of 25 ± 6 N·m (18 ± 4 lb ft).
-

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Fuel Filter Base - Remove and Install

SMCS - 1262-010

Removal Procedure



Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

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Dispose of all fluids according to local regulations and mandates.

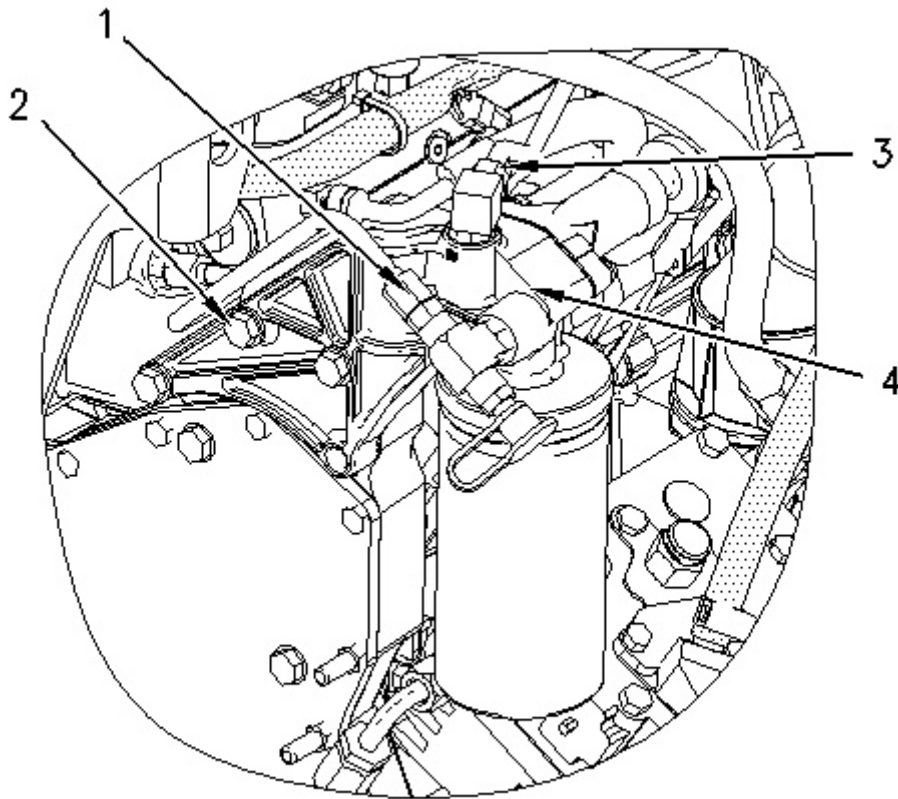


Illustration 1

g00987754

1. Disconnect tube assembly (1) and tube assembly (3) .
2. Remove bolts (2) .
3. Remove fuel filter base (4) .

Installation Procedure

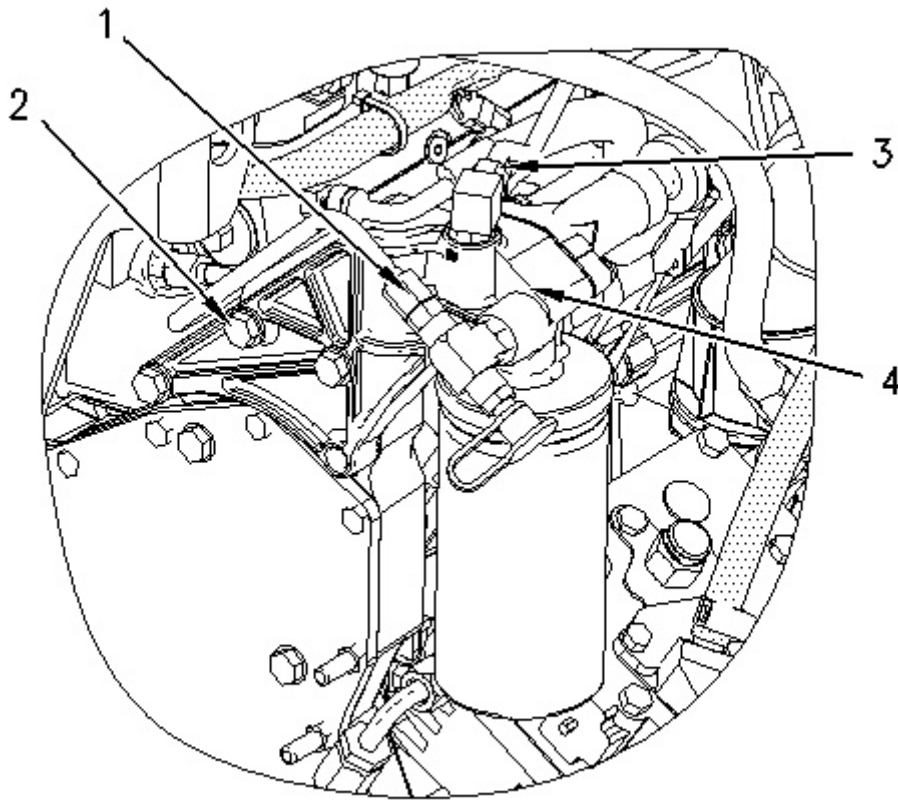


Illustration 2

g00987754

1. Position fuel filter base (4) on the engine.
 2. Install bolts (2) .
 3. Connect tube assembly (1) and tube assembly (3) .
-

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i03564297

Fuel Transfer Pump - Remove

SMCS - 1256-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	218-8171	Bolt	1

Start By:

- A. Remove the unit injector hydraulic pump. Refer to Disassembly and Assembly, "Unit Injector Hydraulic Pump - Remove".

Note: Tooling (A) is required for replacement of the fuel transfer pump.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

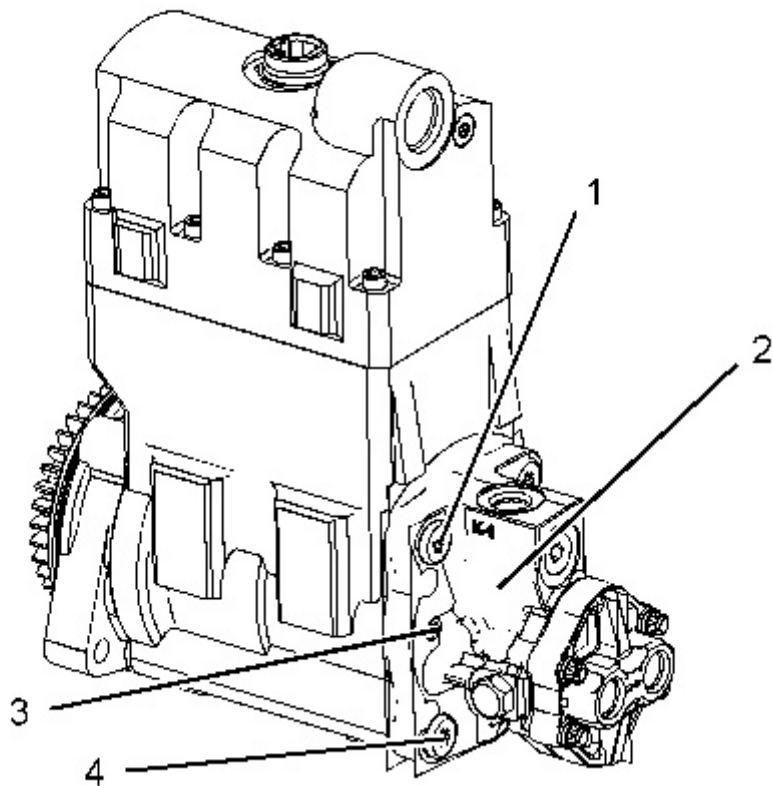


Illustration 1

g01123057

1. Mount the unit injector hydraulic pump in a vertical position on a work bench.

Note: Failure to maintain a vertical position results in misalignment of the internal components.

2. Remove bolts (3) .
3. Remove tie bolt (1) that is located in the top left corner of the pump first.
4. Replace tie bolt (1) with Tooling (A) .

Note: Tooling (A) has an undersized bolt head. Tooling (A) will prevent the body of the unit injector hydraulic pump from separating during service.

5. Tighten Tooling (A) to a torque of 10 N·m (89 lb in).
 6. Start with tie bolt (4) in the lower left corner and remove the remainder of the bolts from fuel transfer pump (2) .
 7. Remove fuel transfer pump (2) .
-

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i03564299

Fuel Transfer Pump - Install

SMCS - 1256-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	218-8171	Bolt	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

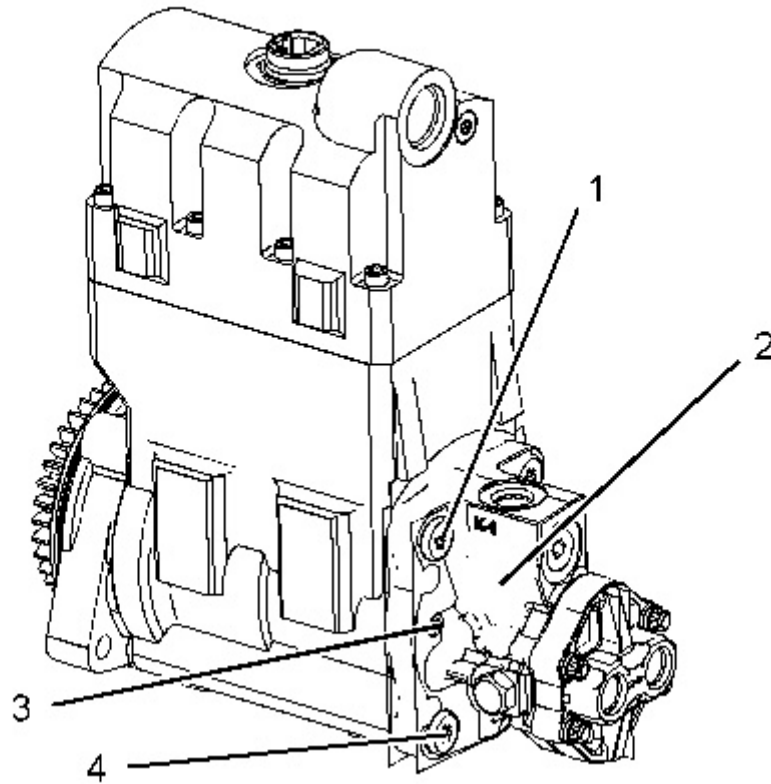


Illustration 1

g01123057

1. Position fuel transfer pump (2) on the unit injector hydraulic pump. Be sure to align the drive tang of the fuel transfer pump to the drive slot in the end of the pump shaft.
2. Install tie bolts (4). Tighten the bolts to a snug fit.
3. Remove Tooling (A) that is located in the upper left hole and install remaining tie bolt (1) to a snug fit.
4. Install bolts (3) for fuel transfer pump (2). Tighten the bolts to a snug fit.
5. Start in the lower left corner of the unit injector hydraulic pump and tighten tie bolts (4) to a torque of $28 \pm 2 \text{ N}\cdot\text{m}$ ($21 \pm 1 \text{ lb ft}$) in a crisscross pattern. Torque the bolts again.
6. Tighten bolts (3) to a torque of $8.0 \pm 0.4 \text{ N}\cdot\text{m}$ ($71 \pm 4 \text{ lb in}$).

End By: Install the unit injector hydraulic pump. Refer to Disassembly and Assembly, "Unit Injector Hydraulic Pump - Install".

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i04887528

Unit Injector - Remove

SMCS - 1290-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	152-1057	Fuel Injector Installer As	1
B	274-9198	Leg	2
C	-	1/2 inch drive breaker bar	1

Start By:

- A. Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

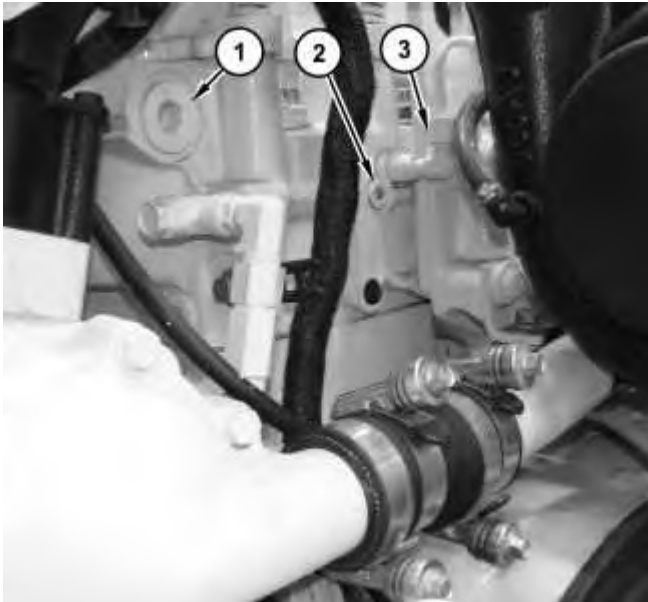


Illustration 1

g03007076

1. Drain the coolant, oil, and fuel from the cylinder head. Remove the oil galley plug (1) , fuel galley plug (2) , and coolant line (3) .

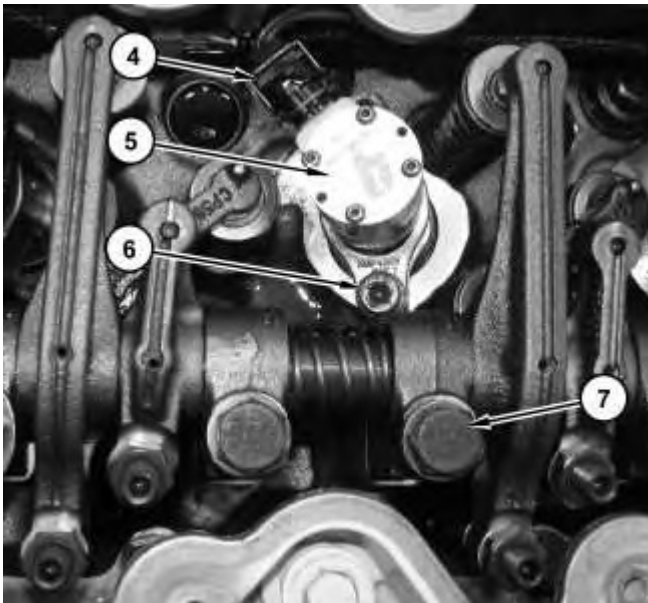


Illustration 2

g03007480

2. Disconnect harness assembly (4) .
3. Remove socket head bolts (6) from unit injector (5) , and remove rocker shaft bolt (7) .

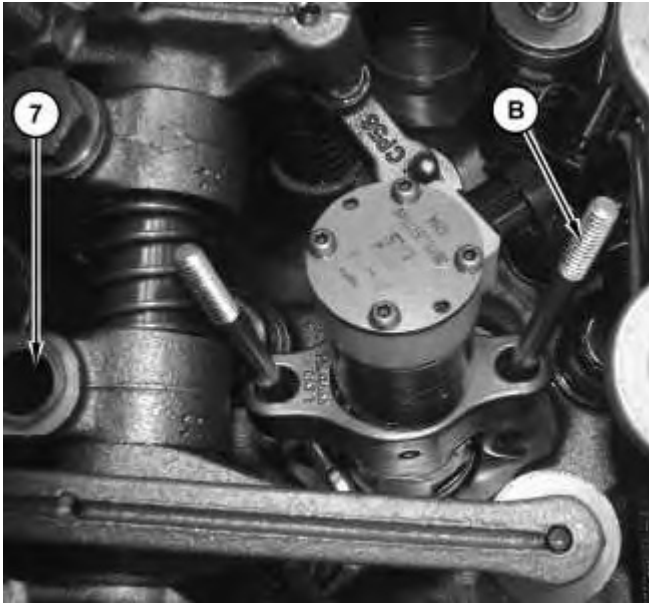


Illustration 3

g03008760

4. Install Tooling (B) .

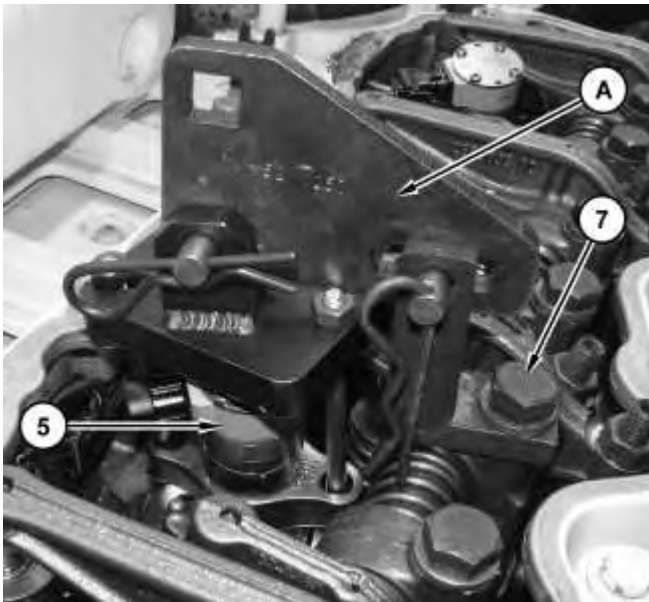


Illustration 4

g03008918

5. Install Tooling (A) and then hand tighten rocker shaft bolts (7) . Use Tooling (C) to pry up on Tooling (A) and remove the injector (5) .

Note: Do not use a wire brush on the tip of the unit injector. Damage to the unit injector will occur.

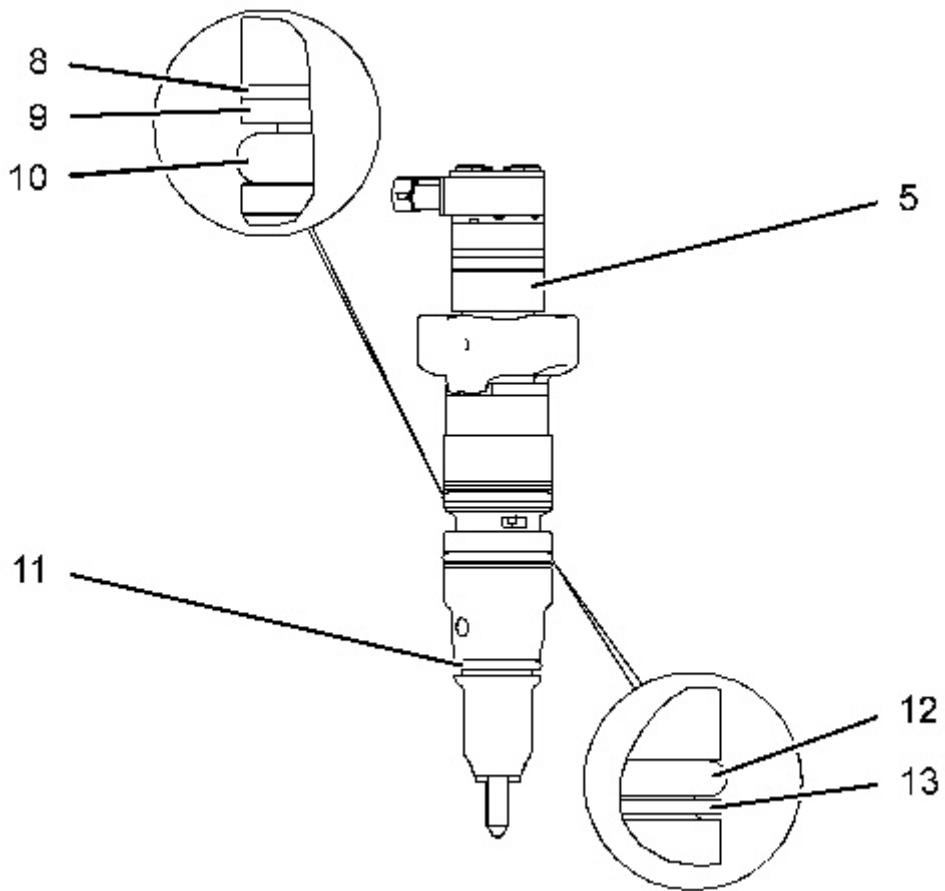


Illustration 5

g03009616

6. Remove O-ring seal (10) , O-ring seal (11) , and O-ring seal (12) from unit injector (5) .
 7. Remove backup ring (8) , backup ring (9) , and backup ring (13) .
-

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i03564340

Unit Injector - Install

SMCS - 1290-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	152-1057	Fuel Injector Installer As	1
C	272-1149	Leg	2
D	-	Scotch Brite	1
E	149-2955	Seal Protector	1
F	149-2956	Seal Installer	1
G	1U-5718	Vacuum Pump	1
	4C-4057	Bottle Assembly	1
	169-7372	Clear Plastic Tubing	1
H	9U-5470	Reamer	1
J	4C-6161	Tube Brush	1
K	9U-6862	Tapered Brush	1
L	4C-6774	Vacuum Gun Kit	1
M	4C-5027	Tap Wrench	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Evacuate as much fuel and oil as possible from the cylinder head before installing the unit injector. Several evacuations may be necessary. Use Tooling (G) to remove the fuel and oil from the cylinder.

Note: Tooling (L) is available to clean loose material from the sleeve bore and the cylinder.

2. Clean the carbon from the sleeve, the sleeve bore and the end of the unit injector. Clean the carbon from the seat area that is inside of the cylinder head. A fine grade of Tooling (D) is preferred. Clean the carbon from the cylinder head. If the sleeve of the unit injector has been removed from the engine, use Tooling (H) to remove only carbon from the surface of the sleeve. If the sleeve of the unit injector is installed in the engine, use Tooling (J) to clean the carbon deposit from the inside of the sleeve.

The following procedure is the preferred method of cleaning the sleeve bore.

Place a 38 mm (1.5 inch) square piece of Scotch Brite material on the end of Tooling (K). Twist Tooling (K) with Tooling (M) against the lower surface of the sleeve bore.

The surface should be cleaned until the surface is smooth and shiny. The entire sleeve bore should be cleaned in order to remove any loose carbon particles.

Note: Tooling (L) is available to clean loose material from the sleeve bore and the cylinder.

NOTICE

The correct procedures and tooling specifications must always be used. Failure to follow any of the procedures may result in damage, malfunction, or possible engine failure.

NOTICE

The O-ring seals and the backup rings must be installed in the correct orientation. Damaged seals will result in excessive oil consumption or excessive leakage under the valve cover. Use care to prevent nicks or damage to the seals.

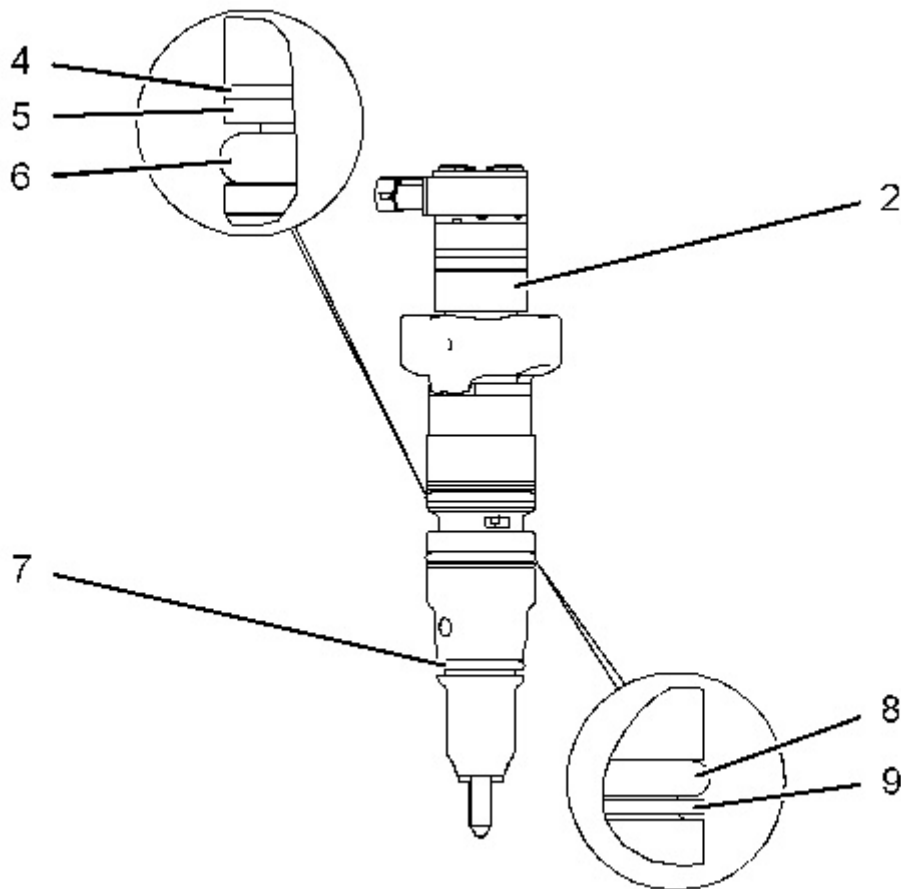


Illustration 1

g01123753

3. Lubricate O-ring seal (6), O-ring seal (7), O-ring seal (8), and the sleeve bore of the unit injector sparingly with clean engine oil.
4. Use Tooling (E) and Tooling (F) to install backup ring (4), backup ring (5), O-ring seal (6), backup ring (9), and O-ring seal (8) .
5. Install O-ring seal (7) .
6. Lubricate the O-ring seals and the backup rings on the unit injector with clean engine oil before installation.

Note: Proper installation of the unit injector is very important. Damage to the upper high pressure seals can cause excessive oil leakage under the valve cover. This may cause the engine not to start due to a low actuation pressure. Damage to the lower high pressure seals may allow high pressure oil to leak into the fuel supply passage. This will result in excessive oil consumption.

Note: Do not hit or strike the unit injector during installation.

7. Record the serial number for the injector and the injector confirmation code. When you install a new unit injector the E-Trim value must be programmed into the Engine Control Module. For more information, refer to Troubleshooting, "Injector Code - Calibrate".
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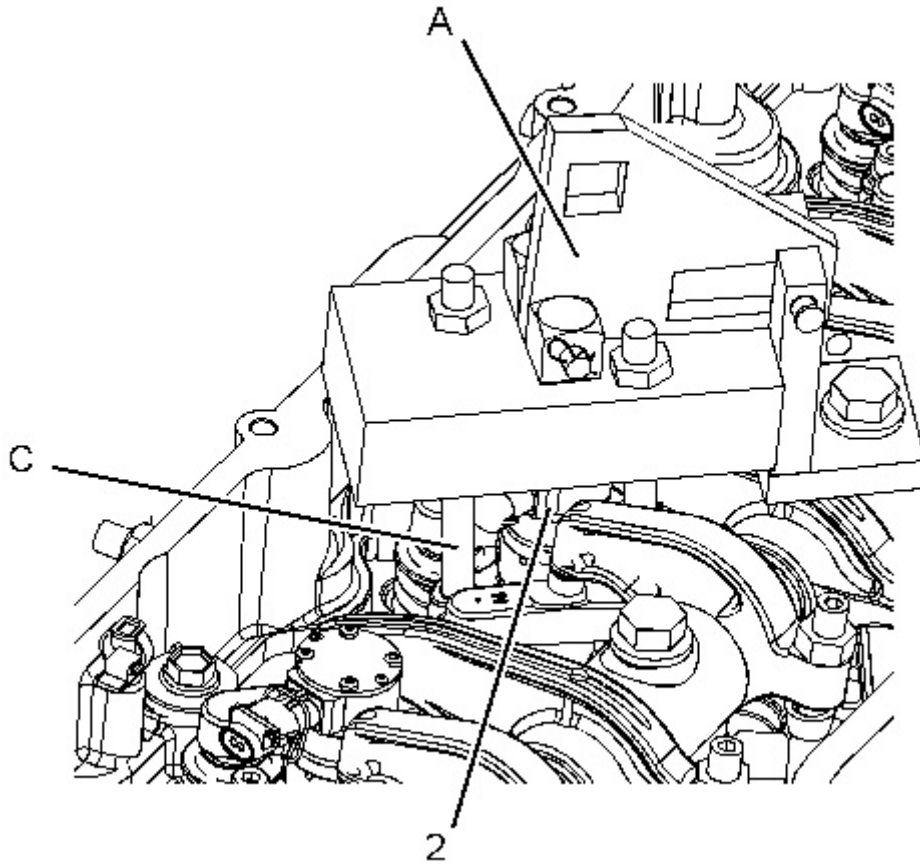


Illustration 2

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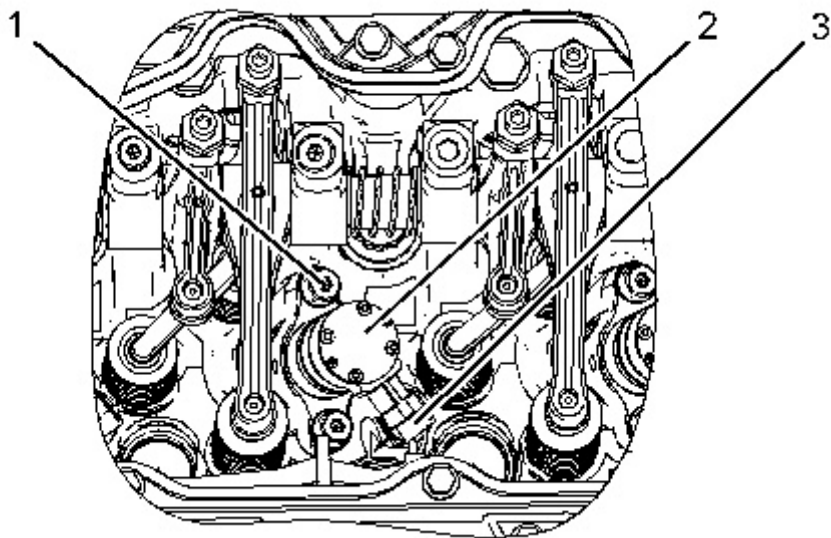


Illustration 3

g01123748

8. Use Tooling (A) and Tooling (C) to install unit injector (2) into the cylinder head.

9. Install socket head bolt (1) on the exhaust side of the bracket. Tighten the exhaust side of socket head bolt (1) until the bolt is seated. Tighten the inlet side of socket head bolt (1) to a torque of $12 \pm 1 \text{ N}\cdot\text{m}$ ($9 \pm 1 \text{ lb ft}$).
10. Connect harness assembly (3) .

End By: Install the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".

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i03564344

Unit Injector Sleeve - Remove

SMCS - 1713-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-3042	Plug Tap	1
B	9U-6858	Bridge Plate	1
	221-9778	Puller Stud	1
	4K-0367	Full Nut	1
	5P-8247	Hard Washer	1
	9U-6877	Thrust Bearing	1
C	221-9803	Rubber Stopper	1

Start By:

- A. Remove the unit injectors. Refer to Disassembly and Assembly, "Unit Injector - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Drain the coolant from the cooling system into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change".
2. Position Tooling (C) at the bottom of the unit injector sleeve.

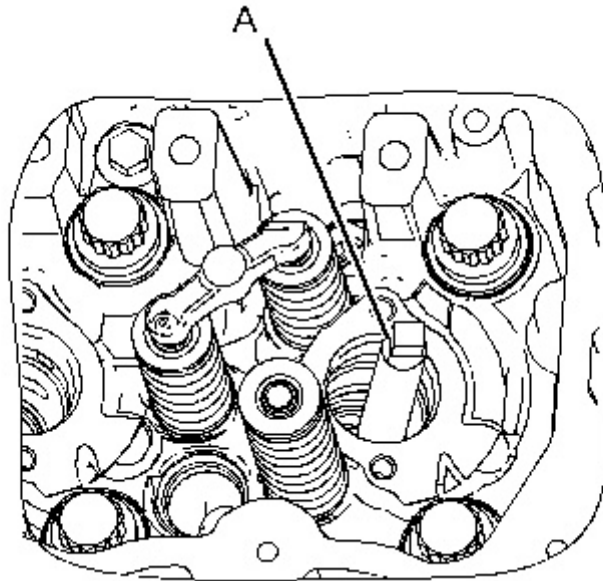


Illustration 1

g01123847

3. Coat Tooling (A) with clean grease. Use Tooling (A) to cut threads into the unit injector sleeve.

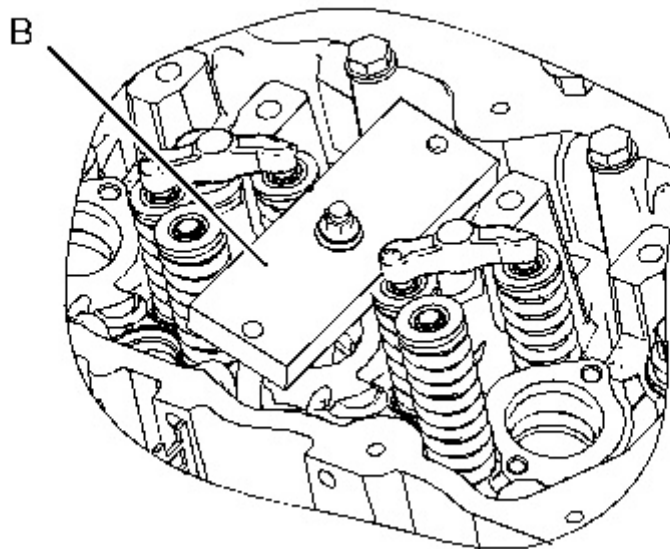


Illustration 2

g01123850

4. Use Tooling (B) to remove the unit injector sleeve.

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i03564347

Unit Injector Sleeve - Install

SMCS - 1713-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
D	221-9777	Sleeve Installer	1
E	4C-9506	Retaining Compound	1
F	4C-5552	Large Bore Brush	1
G	6V-6640	Sealant	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Thoroughly clean the unit injector sleeves and the bores for the unit injectors. Tooling (F) may be used on the bores.
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