



Disassembly and Assembly

3406E On-Highway Engine

1MM1-Up (Engine)
2WS1-Up (Engine)

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 **WARNING**

Accidental machine starting can cause injury or death to personnel working on the machine.

To avoid accidental machine starting, turn the battery disconnect switch to the OFF position and remove the key. If the machine is not equipped with a battery disconnect switch, disconnect the battery cables from the battery and tape the battery clamps.

Place a do not operate tag at the battery disconnect switch location to inform personnel that the machine is being worked on.

Disassembly and Assembly Section

Fuel Priming Pump - Remove and Install

i02022754

SMCS Code: 1258-010

Removal Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

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 Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

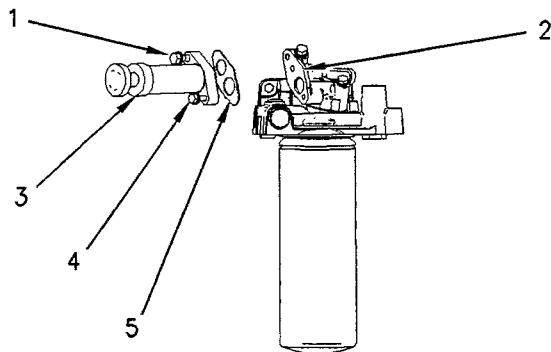


Illustration 1

g01002542

1. Remove bolt (1) and bolt (4). Remove fuel priming pump (3) from fuel filter base (2).
2. Remove gasket (5) for the fuel priming pump and the fuel filter base.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

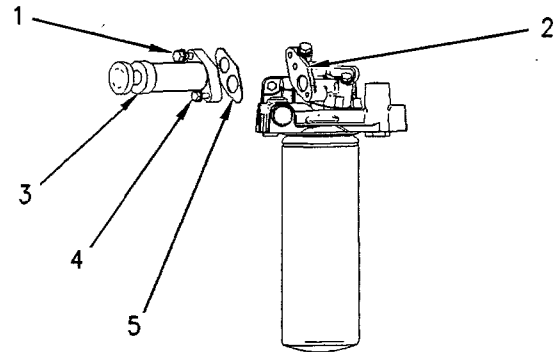


Illustration 2

g01002542

1. Ensure that gasket (5) is in position for the fuel priming pump.
2. Put fuel priming pump (3) in position on fuel filter base (2). Install bolt (1) and bolt (4).

i02110352

Fuel Filter Base - Remove and Install

SMCS Code: 1262-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	2P-8250	Strap Wrench	1

NOTICE

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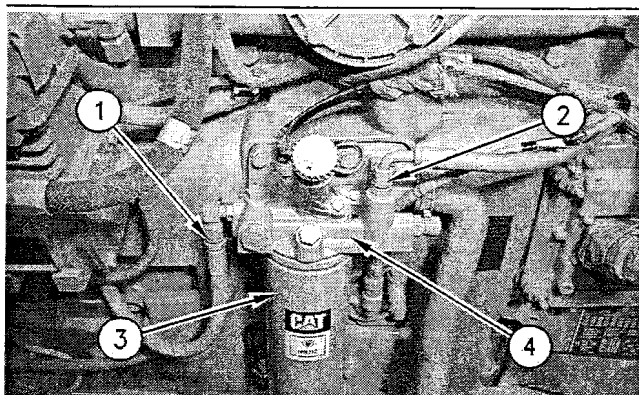


Illustration 3

g00516824

1. Turn the fuel supply to the "OFF" position.
2. Disconnect hose assemblies (1) and (2).
3. Use Tooling (A) to remove fuel filter (3) from the fuel filter base.
4. Remove the bolts that fasten the fuel filter base to the engine. Remove fuel filter base (4).

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

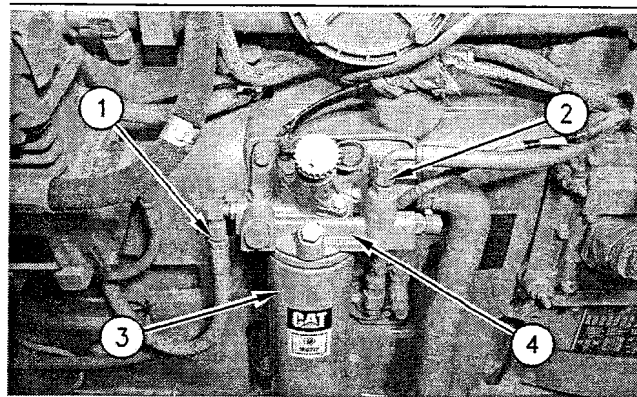


Illustration 4

g00516824

1. Install fuel filter base (4) on the engine.
2. Install fuel filter (3) on the fuel filter base. Follow the directions on the fuel filter for the correct installation procedure.
3. Connect hose assemblies (1) and (2) to the fuel filter base.
4. Turn the fuel supply to the "ON" position.
5. Remove the air from the system. Refer to Testing and Adjusting, "Fuel System - Prime".

i02110363

Fuel Transfer Pump - Remove

SMCS Code: 1256-011

Removal Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

i01990706

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.

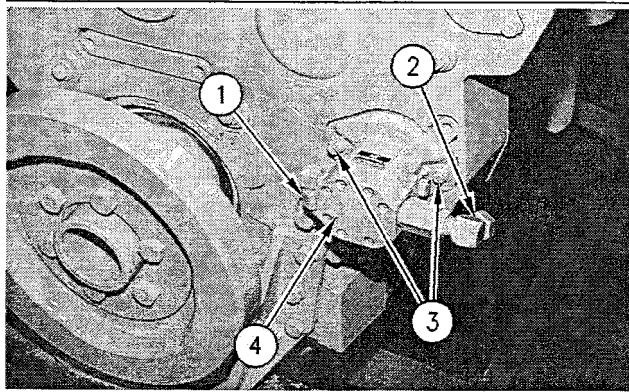


Illustration 5

g00488104

1. Disconnect hose assemblies (1) and (2). Plug and cap all openings in order to prevent debris and contamination from entering the system.
2. Remove bolts (3) and fuel transfer pump (4).

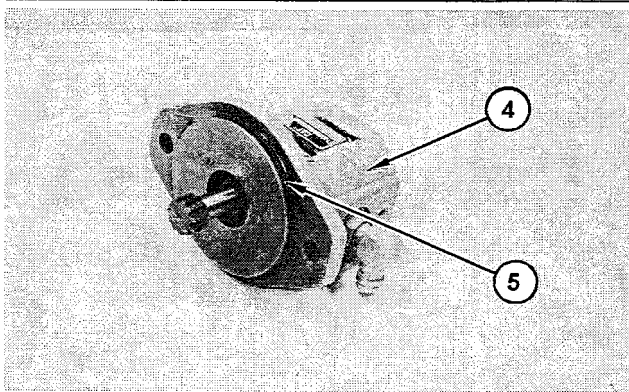


Illustration 6

g01039865

3. Check the condition of O-ring seal (5) on fuel transfer pump (4). If the O-ring seal is worn or damaged, use a new part for replacement.

Fuel Transfer Pump - Install

SMCS Code: 1256-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

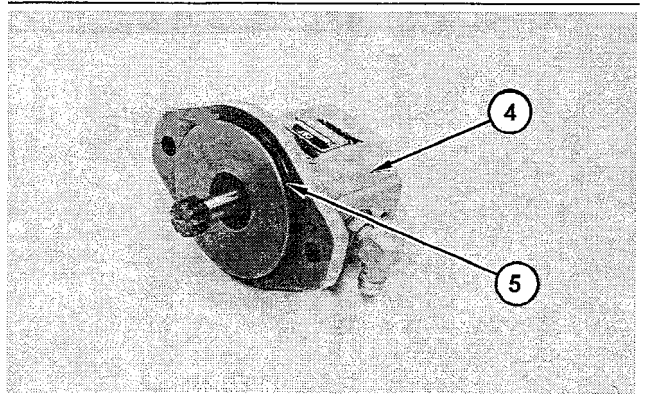


Illustration 7

g01039865

1. Install O-ring seal (5) on fuel transfer pump (4). Apply clean engine oil to O-ring seal (5).

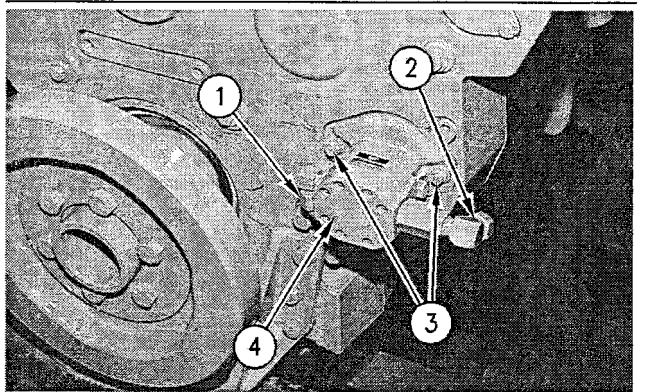


Illustration 8

g00488104

2. Position fuel transfer pump (4). Install bolts (3).
3. Remove the caps from the openings for the hose assemblies. Connect hose assemblies (1) and (2).

i02097659

Electronic Unit Injector - Remove

SMCS Code: 1290-011

Removal Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	5F-4764	Pry Bar	1

Start By:

- a. Remove the rocker arms and the rocker arm shaft. Refer to Disassembly and Assembly, "Rocker Arm and Shaft - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

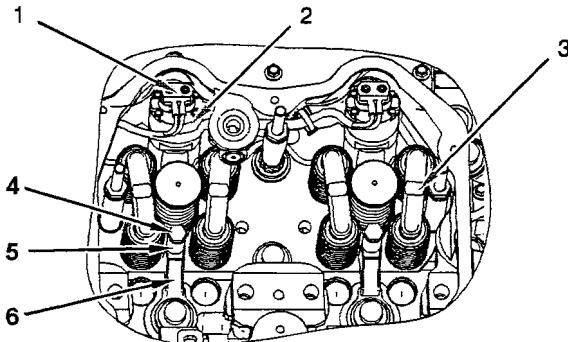


Illustration 9

g01026993

1. Disconnect harness assembly (1) from electronic unit injector (2).
2. Remove bridge assemblies (3).

NOTICE

Do not reuse the injector hold down bolts. New injector hold down bolts must be used.

NOTICE

If the injector hold down bolt is loose during the removal procedure, inspect the injector bore for wear and debris. Replace the clamp and spacer.

3. Remove bolt (4), spacer (5), and clamp (6).
4. Place an identification mark on the electronic unit injectors for installation purposes. Each electronic unit injector must be reinstalled in the original electronic unit injector sleeve.

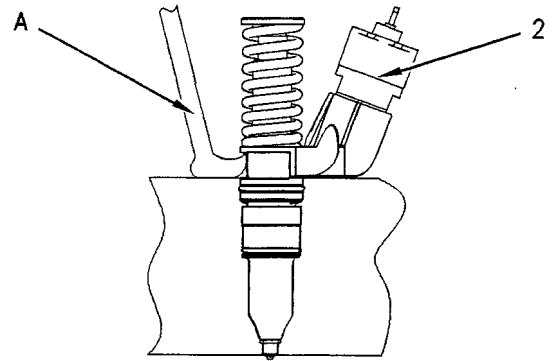


Illustration 10

g00996395

5. Use Tooling (A) in order to pry beneath the base and free electronic unit injector (2).
6. Remove electronic unit injector (2) from the cylinder head.

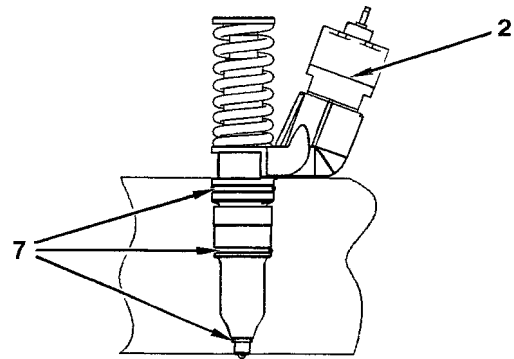


Illustration 11

g01039929

7. Remove O-ring seals (7) from electronic unit injector (2).

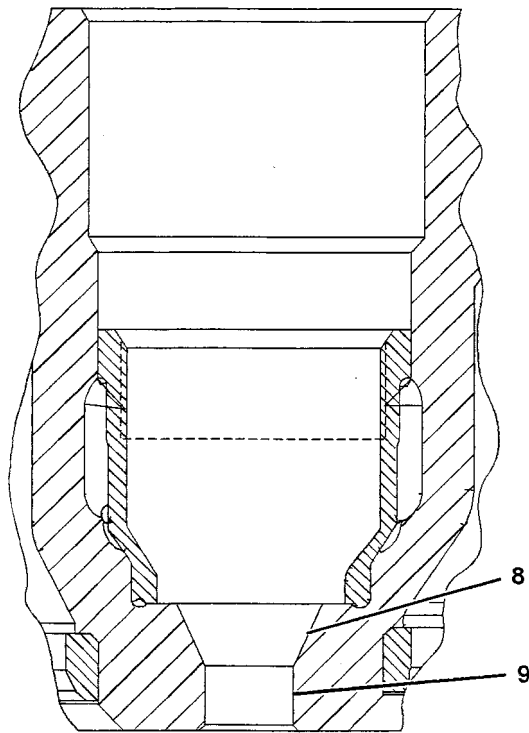


Illustration 12

g01054374

8. Inspect electronic unit injector seat (8) and electronic unit injector bore (9).

i02095281

Electronic Unit Injector - Install

SMCS Code: 1290-012

Installation Procedure

Table 3

Required Tools			
Tool	Part Number	Part Description	Qty
B	9U-6862	Tapered Brush	1
C	9U-6863	Small Bore Brush	1
D	9U-7237	Brush Extension	1
E	8T-2998	Lubricant	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

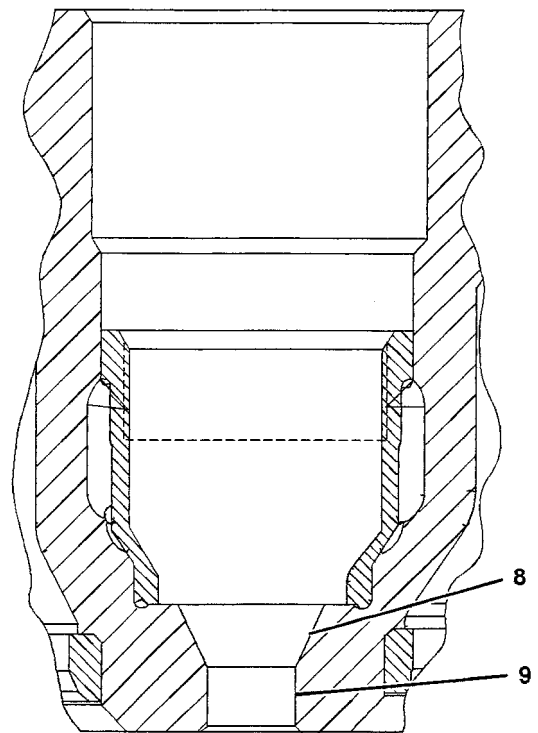


Illustration 13

g01054374

1. Use Tooling (B) and Tooling (D) in order to clean electronic unit injector seat (8).
2. Use Tooling (C) and Tooling (D) in order to clean electronic unit injector bore (9).

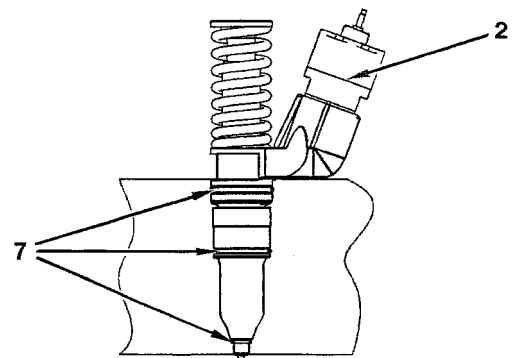


Illustration 14

g01039929

NOTICE

Do not reuse O-ring seals. New O-ring seals must be used.

3. Install O-ring seals (7). Lubricate the top two O-ring seals with a 50/50 mixture of clean engine oil and Tooling (E).

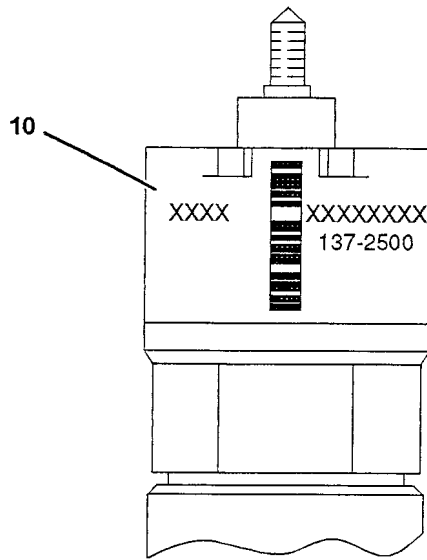


Illustration 15

g01019373

NOTICE

When a fuel injector group is serviced, the new fuel injector group's electronic injector code must be programmed into the engine's personality module software by using the calibration menu on the Electronic Service Tool. If the new fuel injector group's electronic code is not entered, the previous fuel injector group's characteristics are assumed.

If it is not possible to immediately reprogram the electronic injector code of the injector into the personality module software, the engine will not be severely harmed. The new electronic injector code should be reprogrammed as quickly as possible in order to optimize engine performance.

4. The injector code (10) will be used later if the injectors have been changed. Write down injector code (10) which is located on the solenoid.

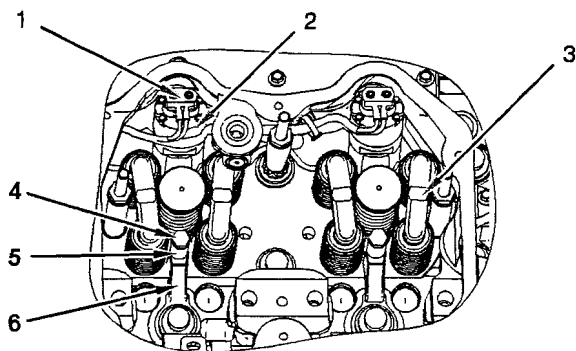


Illustration 16

g01026993

5. Install electronic unit injector (2) into the original location in the cylinder head.
6. Install clamp (6) and spacer (5).

NOTICE

Do not reuse the injector hold down bolts. New injector hold down bolts must be used.

NOTICE

If the injector hold down bolt is loose during the removal procedure, inspect the injector bore for wear and debris. Replace the clamp and spacer.

7. Install bolt (4). Tighten bolt (4) according to the following procedure.
 - a. Tighten the bolt for the electronic unit injector to 50 ± 10 N·m (37 ± 7 lb ft).
 - b. Loosen the bolt until you can turn the bolt by hand.
 - c. Tighten the bolt for the electronic unit injector again to 50 ± 10 N·m (37 ± 7 lb ft).
8. Install bridge assemblies (3) in the respective locations.
9. Connect harness assembly (1) on electronic unit injector (2). Install the nuts. Tighten the nuts to a torque of 2.5 ± 0.25 N·m (22 ± 2 lb in).
10. Install the rocker arms and the rocker arm shaft. Refer to Disassembly and Assembly, "Rocker Arm and Shaft - Install".
11. Adjust the height of the electronic unit injector. Refer to Testing and Adjusting, "Electronic Unit Injector - Adjust" for information on adjusting the height of the injector.
12. Calibrate the electronic unit injector.
 - a. Connect Cat ET to the service tool connector.
 - b. Turn the keyswitch to the ON position.
 - c. Open the "Injector Codes Calibration" in "Calibrations" under the "Service" menu on Cat ET.
 - d. Enter the new injector trim code for the electronic unit injector in each cylinder.

i01983465

Electronic Unit Injector Sleeve - Remove

SMCS Code: 1713-011

Removal Procedure

Table 4

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	128-7889	Bridge Puller	1
	221-9778	Puller Stud	1
	9U-6877	Thrust Bearing	1
	5P-8247	Hard Washer	1
	4K-0367	Nut	1

(1) Part of the 9U-6891 Injector Tool Group

Start By:

- a. Remove the electronic unit injectors. Refer to Disassembly and Assembly, "Electronic 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 engine. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change".

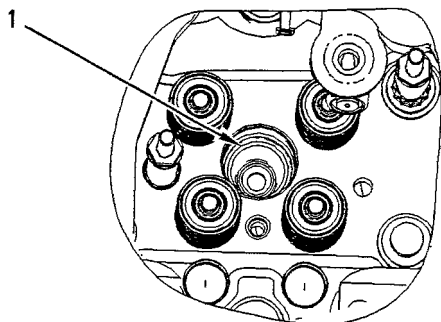


Illustration 17

g01002969

2. Use Tooling (A) to remove unit injector sleeve (1).

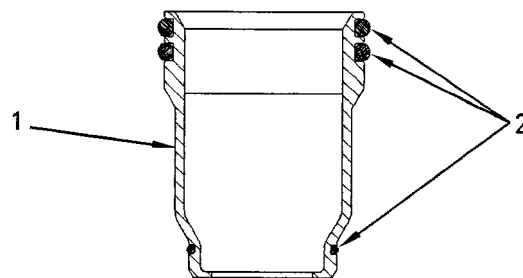


Illustration 18

g00948616

3. Remove O-ring seals (2) from unit injector sleeve (1).

i02015805

Electronic Unit Injector Sleeve - Install

SMCS Code: 1713-012

Installation Procedure

Table 5

Required Tools			
Tool	Part Number	Part Description	Qty
B	9U-6862	Tapered Brush	1
	9U-6863	Small Bore Brush	1
	9U-7244	End Brush	1
	9U-7237	Brush Extension	1
	4C-5552	Large Bore Brush	1
C ⁽¹⁾	221-9778	Puller Stud	1
D ⁽¹⁾	9U-7258	Driver Cap	1
E	4C-9507	Retaining Compound	-

(1) Part of the 9U-6891 Injector Tool Group

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Use Tooling (B) to clean the bore in the cylinder head for the unit injector sleeve.