

Disassembly and Assembly

2506-15 Industrial Engine

MGA (Engine)
MGB (Engine)
MGD (Engine)

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Disassembly and Assembly Section

Fuel Priming Pump - Remove and Install

i02554756

Removal Procedure

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.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Turn the fuel supply to the "OFF" position.

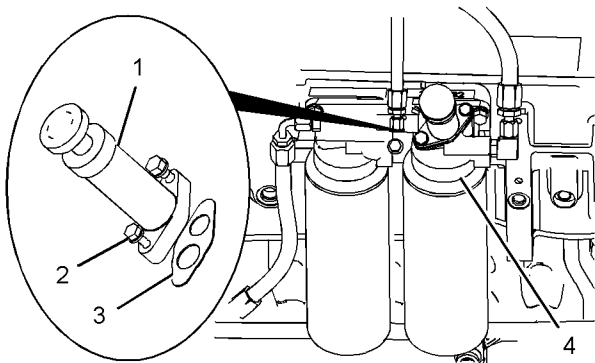


Illustration 1

g01279497

2. Remove bolts (2). Remove fuel priming pump assembly (1) from fuel filter base (4).
3. Remove joint (3) from the fuel priming pump assembly and the fuel filter base.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

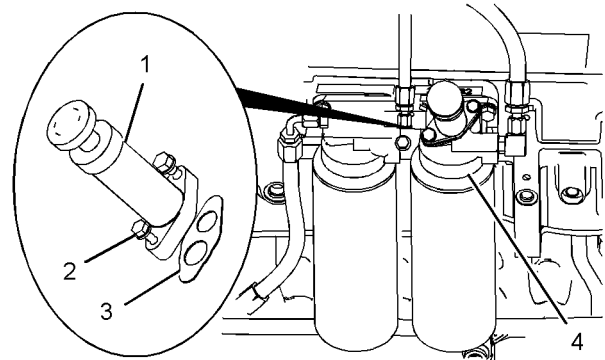


Illustration 2

g01279497

1. Position a new joint (3) on fuel filter base (4).

Note: Ensure correct orientation of the joint.

2. Position the fuel priming pump assembly (1) on the fuel filter base and install bolts (2). Tighten the 1/4" bolt to a torque of 12 N·m (105 lb in). Tighten the 5/16" bolt to a torque of 25 N·m (221 lb in).
3. Turn the fuel supply to the "ON" position.
4. Remove the air from the system. Refer to Systems Operation, Testing and Adjusting, "Fuel System - Prime".

i02554755

Fuel Filter Base - Remove

Removal Procedure

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.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Turn the fuel supply to the "OFF" position.

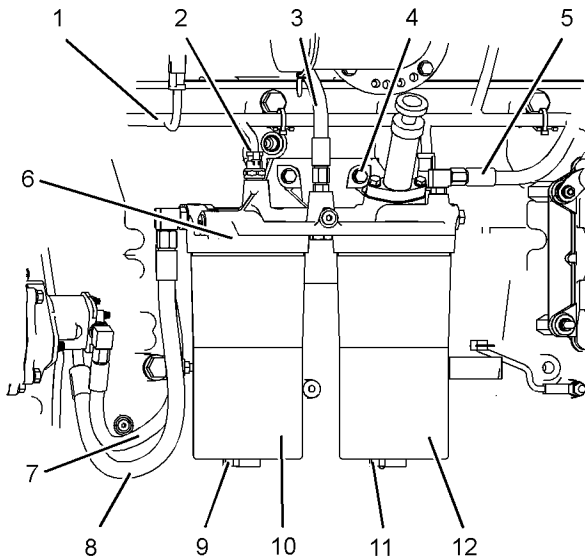


Illustration 3

g01279811

2. Place a suitable container below the fuel filter base in order to drain the fuel from the fuel filter assemblies (10) and (12).
 3. Remove plugs (9) and (11). Allow the fuel to drain.
 4. Disconnect harness assembly (1) from fuel temperature sensor (2).
- Note:** In order to disconnect the harness assembly, slide the locking tab into the unlocked position.
5. Disconnect hose assembly (3). Disconnect hose assembly (5). Disconnect hose assemblies (7) and (8). Plug the open hose assemblies.
 6. Use a suitable tool with a 1/2" square drive in order to remove fuel filter assemblies (10) and (12). Remove the O-ring seals. Remove the fuel filter elements. Refer to Operation and Maintenance Manual, "Fuel Filter - Replace" for more information.
 7. Remove bolts (4). Remove fuel filter base (6).

i02554753

Fuel Filter Base - Disassemble**Disassembly Procedure****Start By:**

- a. Remove the fuel filter base. Refer to Disassembly and Assembly, "Fuel Filter Base - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

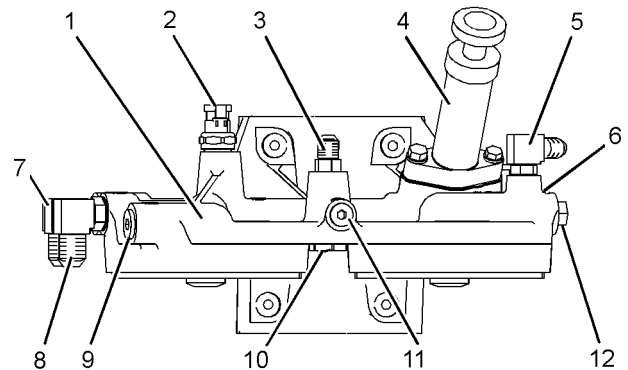


Illustration 4

g01279898

1. Remove fuel priming pump (4) from fuel filter base assembly (1). Refer to Disassembly and Assembly, "Fuel Priming Pump - Remove and Install".
2. Remove fuel temperature sensor (2) from fuel filter base assembly (1). Refer to Disassembly and Assembly, "Fuel Temperature Sensor - Remove and Install".
3. Remove fuel bypass valve (6) from fuel filter base assembly (1). Remove the O-ring seals from the fuel bypass valve.
4. Remove fuel check valve (10) from fuel filter base assembly (1). Remove the O-ring seals from the fuel check valve.
5. Remove connections (3), (5), (7) and (8) from fuel filter base assembly (1). Remove the O-ring seals from the connections.
6. Remove plugs (9), (11) and (12) from fuel filter base assembly (1). Remove the O-ring seals from the plugs.

i02554752

Fuel Filter Base - Assemble

Assembly Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the filter base is clean and free from damage. If necessary, replace the filter base.

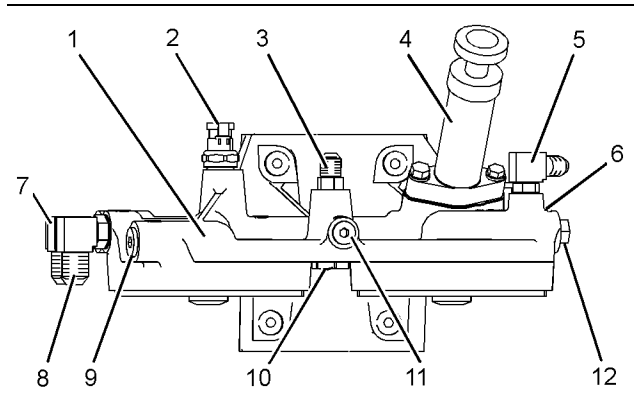


Illustration 5

g01279898

2. Install new O-ring seals to plugs (9), (11) and (12). Install the plugs to fuel filter base assembly (1). Tighten plug (9) to a torque of 41 N·m (30 lb ft). Tighten plugs (11) and (12) to a torque of 15 N·m (11 lb ft).
 3. Install new O-ring seals to connections (3), (5), (7) and (8). Install the connections to fuel filter base assembly (1). Tighten connections (3), (5) and (7) to a torque of 15 N·m (11 lb ft). Tighten connection (8) to a torque of 41 N·m (30 lb ft).
- Note:** Ensure correct orientation of the connections.
4. Install new O-ring seals to fuel bypass valve (6). Install the fuel bypass valve to fuel filter base assembly (1). Tighten fuel bypass valve (6) to a torque of 35 N·m (26 lb ft).
 5. Install new O-ring seals to fuel check valve (10). Install the fuel check valve in fuel filter base assembly (1). Tighten the fuel check valve to a torque of 35 N·m (26 lb ft).

6. Install fuel temperature sensor (2) to fuel filter base assembly (1). Refer to Disassembly and Assembly, "Fuel Temperature Sensor - Remove and Install".
7. Install fuel priming pump (4) to fuel filter base assembly (1). Refer to Disassembly and Assembly, "Fuel Priming Pump - Remove and Install".

End By:

- a. Install the fuel filter base. Refer to Disassembly and Assembly, "Fuel Filter Base - Install".

i02554754

Fuel Filter Base - Install

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

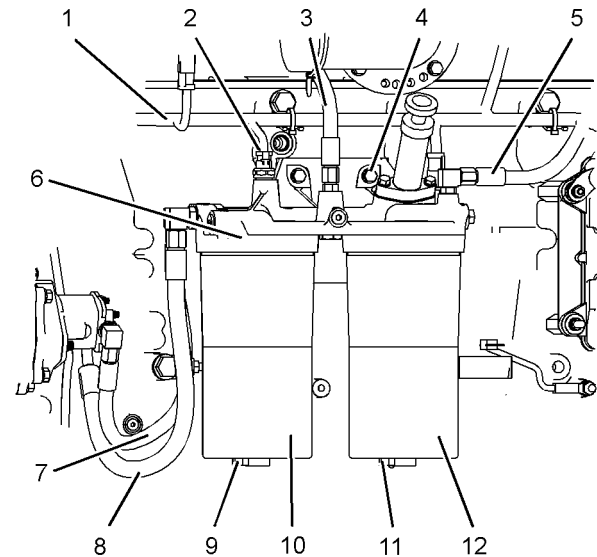


Illustration 6

g01279811

1. Position fuel filter base (6) and install bolts (4). Tighten the bolts to a torque of 47 N·m (35 lb ft).
2. Install new O-ring seals and new fuel filter elements to fuel filter assemblies (10) and (12). Use a suitable tool with a 1/2" square drive in order to install the fuel filter assemblies.

Install new O-ring seals to plugs (9) and (11).
Install the plugs to fuel filter assemblies (10) and (12).

Refer to Operation and Maintenance Manual,
“Fuel Filter - Replace” for more information.

3. Connect hose assemblies (3), (5), (7) and (8).
4. Connect harness assembly (1) to fuel temperature sensor (2). Slide the locking tab into the locked position.
5. Turn the fuel supply to the “ON” position.
6. Remove the air from the system. Refer to Systems Operation, Testing and Adjusting, “Fuel System - Prime”.

i02554761

Fuel Transfer Pump - Remove

Removal Procedure

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.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Turn the fuel supply to the “OFF” position.
2. Place a suitable container below the fuel transfer pump in order to catch any fuel that might be spilled.

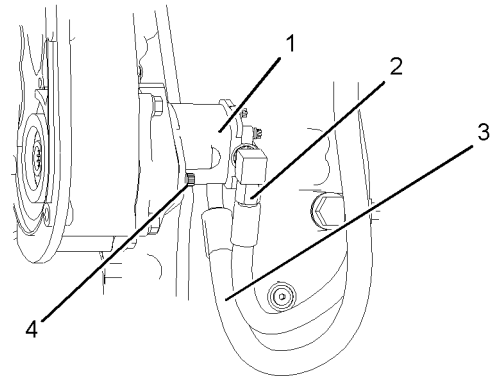


Illustration 7

g01280901

3. Disconnect hose assemblies (2) and (3) from fuel transfer pump (1). Plug the open hose assemblies.
4. Remove bolts (4) and remove fuel transfer pump (1).
5. Remove the O-ring seal from fuel transfer pump (1).

i02554849

Fuel Transfer Pump - Install

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the fuel transfer pump is clean and free from damage.

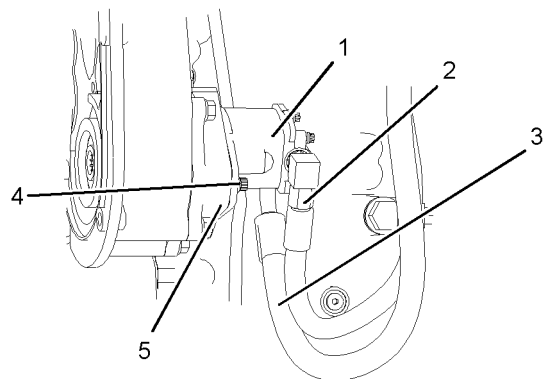


Illustration 8

g01280943

2. Lubricate a new O-ring seal with clean engine oil. Install the O-ring seal to fuel transfer pump (1).

3. Position fuel transfer pump (1) on pump drive (5).

Note: Ensure that the splines on the shaft of the fuel transfer pump are correctly engaged into the pump drive.

4. Install bolts (4). Tighten the bolts to a torque of 47 N·m (35 lb ft).

5. Remove the plugs from the hose assemblies. Connect hose assemblies (2) and (3) to fuel transfer pump (1).

6. Turn the fuel supply to the “ON” position.

7. Remove the air from the fuel system. Refer to Systems Operation, Testing and Adjusting, “Fuel System - Prime”.

i02554720

Electronic Unit Injector - Remove

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	27610288	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.

1. Turn the fuel supply to the OFF position.

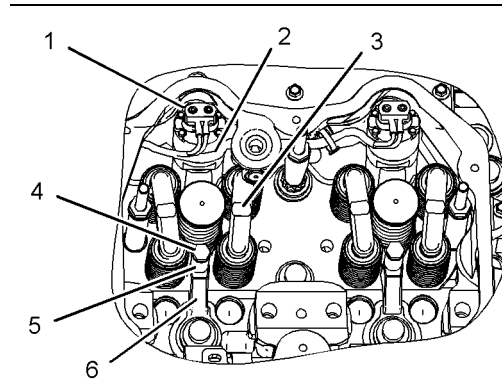


Illustration 9

g01150587

2. Disconnect harness assembly (1) from electronic unit injector (2).

3. Remove valve bridges (3).

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.

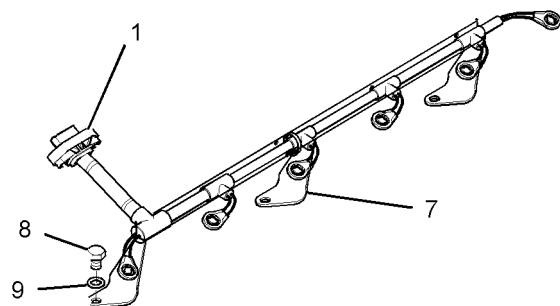


Illustration 10

g01284035

4. Remove bolts (8) and washers (9). Remove harness assembly (1) and support bracket (7) as a unit.

5. Remove bolt (4) and spacer (5).

6. Place an identification mark on electronic unit injector (2) for installation purposes. Each electronic unit injector must be reinstalled in the original location in the cylinder head.

i02554719

Electronic Unit Injector - Install

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
B	GE50028	Vacuum Pump	1
	GE50046	Fluid Sampling Bottle	1
	GE50030	Tube 7.9 mm (0.31 inch) OD	1
C	-	Large Bore Brush	1
D	27610308	Surface Reconditioning Pad	1
E	27610296	Torque Wrench	1

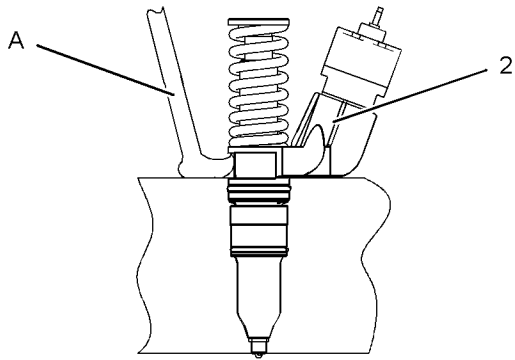


Illustration 11

g01073439

7. Use Tooling (A) to pry beneath the base and free electronic unit injector (2).
8. Remove electronic unit injector (2) and clamp (6) from the cylinder head.

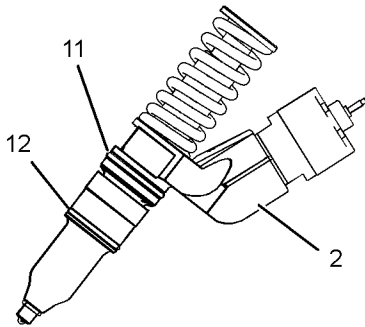


Illustration 12

g01284341

9. Remove O-ring seals (11) and (12) from electronic unit injector (2).

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Use Tooling (D) to clean the carbon deposit from the inside of the electronic unit injector sleeve.
2. Use Tooling (B) to remove the fuel and oil from the cylinder. Evacuate as much fuel and oil as possible from the cylinder before installing the electronic unit injector. Several evacuations may be necessary.

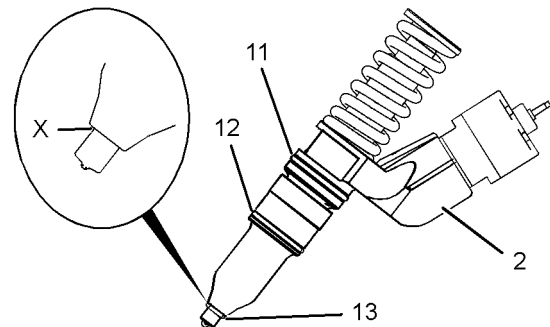


Illustration 13

g01284074

3. Ensure that seat area (X) on the electronic unit injector is clean and free carbon.
4. Install new O-ring seals (11) and (12) on the electronic unit injector. Lubricate the O-ring seals with clean engine oil.

5. Install a new O-ring seal (13) on the electronic unit injector.

Note: O-ring seal (13) should be installed dry.

NOTICE

If a replacement electronic unit injector is installed, the calibration code must be programmed into the electronic control module. Refer to Troubleshooting Guide, "Injector Trim File" for more information.

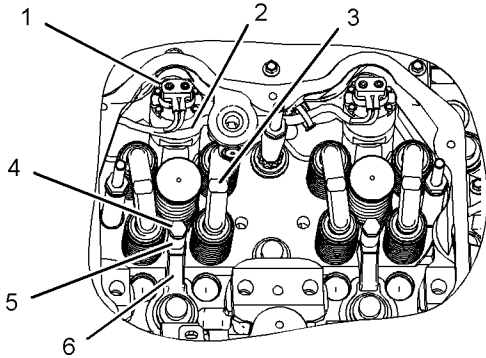


Illustration 14

g01150587

6. Install clamp (6) to electronic unit injector (2). Install electronic unit injector (2) into the original location in the cylinder head.
7. Install spacer (5) and bolt (4). Tighten bolt (4) to a torque of 55 N·m (41 lb ft).

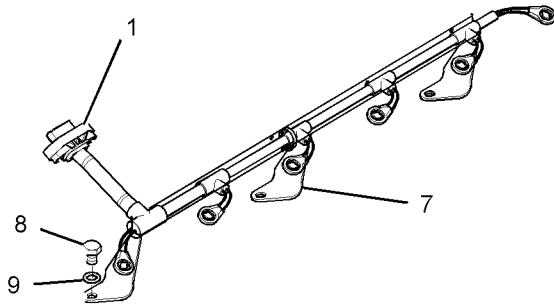


Illustration 15

g01284035

8. Install harness assembly (1) and support bracket (7) as a unit. Install bolts (8) and washers (9). Tighten bolts (8) to a torque of 105 N·m (77 lb ft).
9. Connect harness assembly (1) to electronic unit injector (2). Use Tooling (E) to tighten the nuts to a torque of 2.5 N·m (22 lb in).
10. Install bridge assemblies (3) in the respective locations.

Note: Ensure that used valve bridges are reinstalled in the original location and the original orientation. Do not interchange the location or the orientation of used valve bridges.

11. Install the rocker arms and the rocker arm shaft. Refer to Disassembly and Assembly, "Rocker Arm and Shaft - Install".
12. Turn the fuel supply to the "ON" position.
13. Remove the air from the fuel system. Refer to Systems Operation, Testing and Adjusting, "Fuel System - Prime".

i02554722

Electronic Unit Injector Sleeve - Remove

Removal Procedure

Table 3

Required Tools			
Tool	Part Number	Part Description	Qty
A	GE50021	Injector Sleeve Tool	1

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".

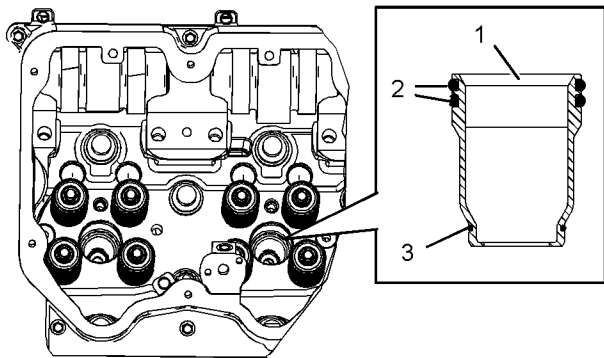


Illustration 16

g01076133

2. Install Tooling (A) in electronic unit injector sleeve (1).
3. Tighten the nut on Tooling (A) until the electronic unit injector sleeve is pulled free of the cylinder head.
4. Remove O-ring seals (2) and O-ring seal (3) from electronic unit injector sleeve (1).

i02554721

Electronic Unit Injector Sleeve - Install

Installation Procedure

Table 4

Required Tools			
Tool	Part Number	Part Description	Qty
A	GE50021	Injector Sleeve Tool	1
B	GE50023	Tapered Brush	1
	GE50024	Small Bore Brush	1
	GE50022	End Brush	1
C	CV60893	Retaining Compound	1

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 electronic unit injector sleeve.

NOTICE

Ensure that the electronic unit injector sleeve and the cylinder head bore are completely free of oil, dirt, and sealant debris.

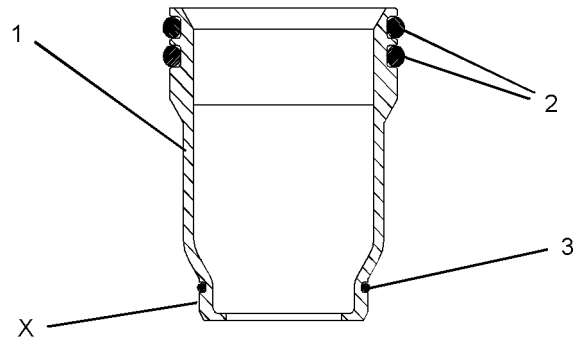


Illustration 17

g01043165

2. Install new O-ring seals (2) and (3) to electronic unit injector sleeve (1).

Note: Do not apply Tooling (C) to the cylinder head surfaces. Apply Tooling (C) to the electronic unit injector sleeve only.

3. Apply a small continuous bead of Tooling (C) to surface (X) of electronic unit injector sleeve (1).
4. Lubricate O-ring seals (2) with clean engine oil.
5. Position Tooling (A) and the electronic unit injector sleeve in the cylinder head. Use care not to damage the O-ring seals on the electronic unit injector sleeve.
6. Use Tooling (A) to install electronic unit injector sleeve (1) in the cylinder head.

Note: Ensure that the electronic unit injector sleeve is properly seated in the cylinder head.

7. Remove Tooling (A). Use a clean towel and remove excess Tooling (C).
8. Fill the cooling system with coolant. Refer to Operation and Maintenance, "Refill Capacities" for the cooling system capacity.

End By:

- a. Install the electronic unit injectors. Refer to Disassembly and Assembly, "Electronic Unit Injector - Install".

i02554785

Turbocharger - Remove

Removal Procedure

Start By:

- a. Remove the exhaust elbow. Refer to Disassembly and Assembly, "Exhaust Elbow - Remove and Install".

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.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

-
1. Disconnect the air hoses for the turbocharger inlet and for the turbocharger outlet.

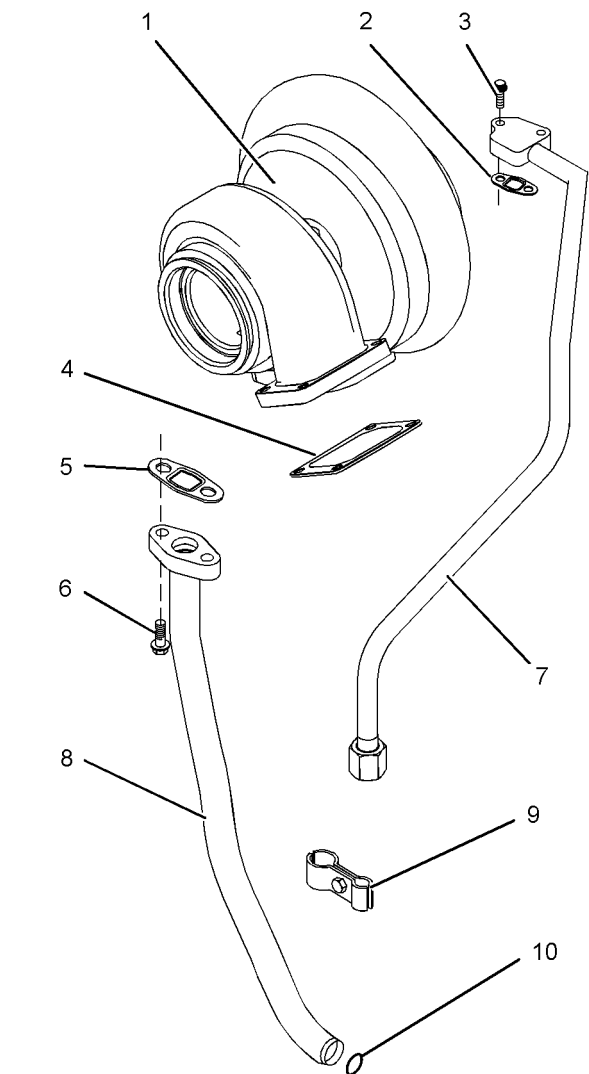


Illustration 18

g01283022

2. Follow Steps 2.a through 2.c in order to remove the tube assembly (7) for the oil feed.
 - a. Remove tube clamp (9) that secures tube assembly (7) to tube assembly (8). Note the position of the clamp.
 - b. Disconnect tube assembly (7) from the engine oil filter base.
 - c. Remove bolts (3). Remove tube assembly (7) and joint (2) from turbocharger (1).
3. Follow Steps 3 through 3.c in order to remove the tube assembly (8) for the oil drain.
 - a. Remove bolts (6).

- b. Remove tube assembly (8) and joint (5).
 - c. Remove O-ring seal (10) from tube assembly (8).
4. Attach a suitable lifting device to turbocharger (1). The weight of the turbocharger is approximately 30 kg (66 lb).
 5. Remove the fasteners for the turbocharger. Use the lifting device to remove turbocharger (1) from the exhaust manifold. Remove gasket (4).

i02554784

Turbocharger - Install

Installation Procedure

Table 5

Required Tools			
Tool	Part Number	Part Description	Qty
A	CV60889	Anti-Seize Compound	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

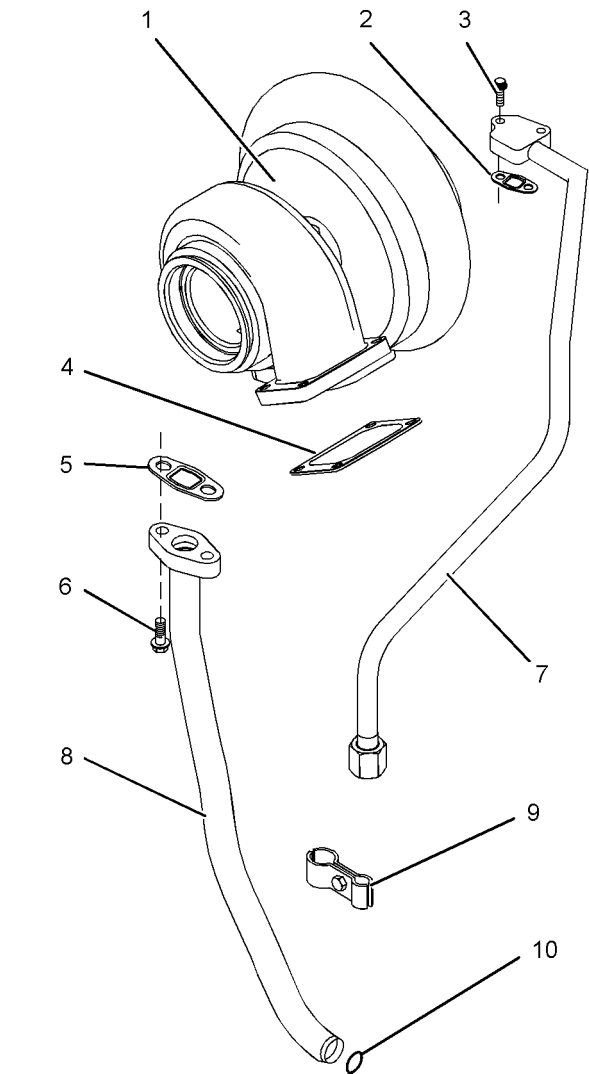


Illustration 19

g01283022

1. Clean the mating surfaces of the exhaust manifold. Position a new gasket (4) on the exhaust manifold.
2. Attach a suitable lifting device to turbocharger (1). The weight of turbocharger is approximately 30 kg (66 lb). Use the lifting device to install turbocharger (1) onto the exhaust manifold.
3. Apply Tooling (A) to the threads of the exhaust manifold bolts. Install the bolts and install locknuts finger tight.
4. Install a new O-ring seal (10) to tube assembly (8). Install tube assembly (7) and new joint (5). Install bolts (6) finger tight.
5. Install tube assembly (7) and a new joint (2). Install bolts (3) finger tight. Connect the lower end of tube assembly (7) to the engine oil filter base.

6. Install tube clamp (9) to tube assembly (7) to tube assembly (8).

Note: Ensure that the clamp is installed in the correct position.

7. Tighten the fasteners for the turbocharger to a torque of 55 N·m (41 lb ft).
8. Tighten the bolts for tube assemblies (7) and (8) to a torque of 47 N·m (35 lb ft).
9. Connect the air hoses for the turbocharger inlet and for the turbocharger outlet.

i02554739

Exhaust Manifold - Remove and Install

Removal Procedure

Start By:

- a. Remove the turbocharger. Refer to Disassembly and Assembly, "Turbocharger - Remove".
- b. Remove the water temperature regulator housing. Refer to Disassembly and Assembly, "Water Temperature Regulator Housing - Remove and Install".

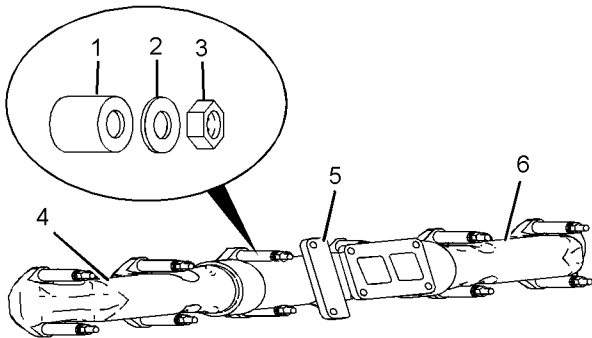


Illustration 20

g01283599

1. Remove locknuts (3), washers (2) and spacers (1).
2. Remove exhaust manifolds (4), (5) and (6).

Note: Remove manifolds as one assembly.

3. Remove the exhaust manifold gaskets.
4. Remove exhaust manifolds (4) and (6) from exhaust manifold (5).

5. If necessary, remove the taperlock studs from the cylinder head.

Installation Procedure

Table 6

Required Tools			
Tool	Part Number	Part Description	Qty
A	CV60889	Anti-Seize Compound	-

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Install the taperlock studs in the cylinder head and tighten to a torque of 35 N·m (26 lb ft).

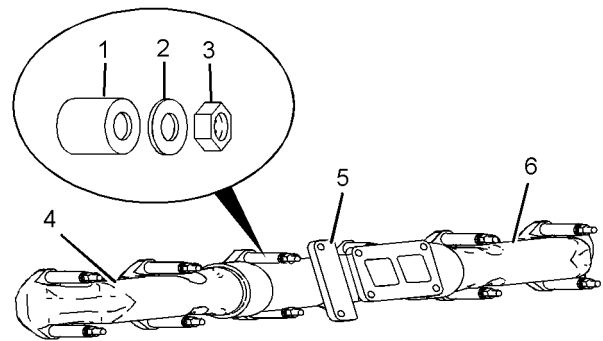


Illustration 21

g01283599

2. Assemble exhaust manifolds (4), (5) and (6).
3. Install the exhaust manifold gaskets onto the taperlock studs.
4. Install the assembly of the exhaust manifolds on the taperlock studs.

Note: Ensure that the holes in exhaust manifolds are centralized with the taperlock studs.

5. Apply Tooling (A) to the threads of the taperlock studs. Install spacers (1), washers (2) and locknuts (3).

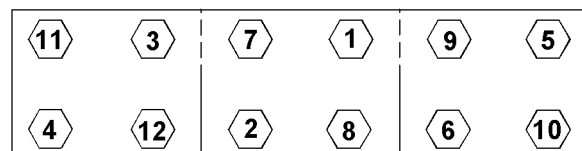


Illustration 22

g01100255

6. Tighten the locknuts in a numerical sequence that is shown in Illustration 22. Tighten the locknuts to a torque of 38 N·m (28 lb ft).

End By:

- a. Install the water temperature regulator housing. Refer to Disassembly and Assembly, "Water Temperature Regulator Housing - Remove and Install".
- b. Install the turbocharger. Refer to Disassembly and Assembly, "Turbocharger - Install".

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Exhaust Elbow - Remove and Install

Removal Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

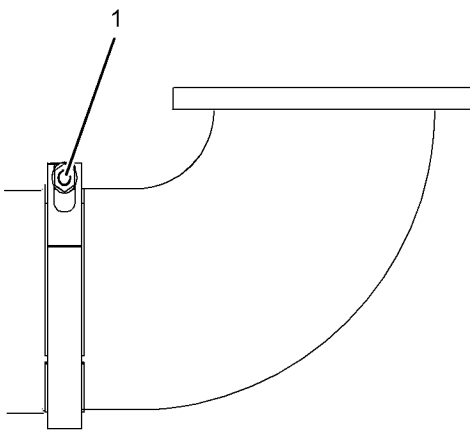


Illustration 23

g01296103

1. Use an allen wrench in order to loosen clamp (1) that secures the exhaust elbow.
2. Remove the exhaust elbow and the clamp from the turbocharger.

Installation Procedures

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

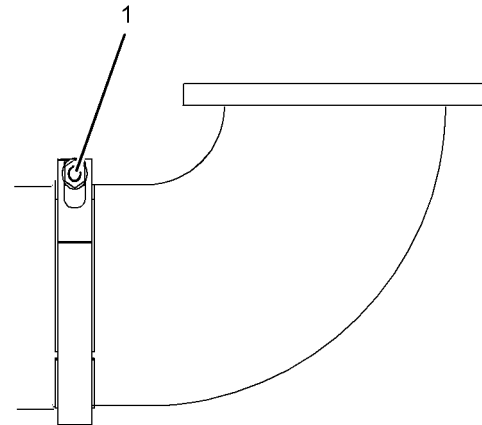


Illustration 24

g01296103

1. Thoroughly clean the exhaust elbow and the outlet of the turbocharger. Inspect the components for wear or damage. Replace any components that are worn or damaged.
2. Position clamp (1) and install the exhaust elbow to the turbocharger. Ensure correct orientation of the band clamp.
3. Tighten the allen head bolt to a torque of 13.5 N·m (10 lb ft).

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Inlet and Exhaust Valve Springs - Remove and Install

Removal Procedure

Table 7

Required Tools			
Tool	Part Number	Part Description	Qty
A	CH11148	Engine Turning Tool	1
B	GE50026	Valve Spring Compressor	1



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