

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.

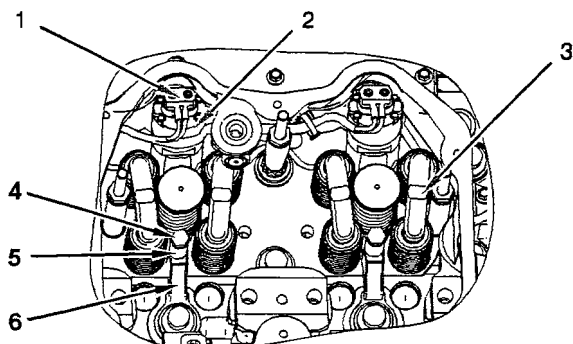


Illustration 9

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.

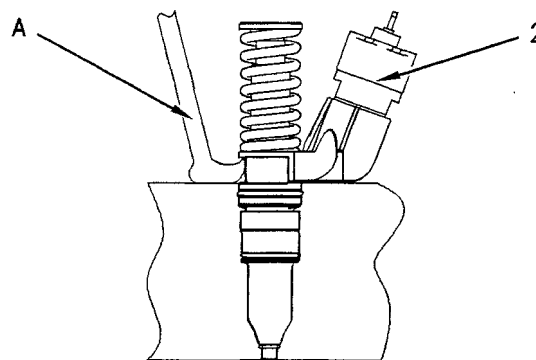


Illustration 10

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.

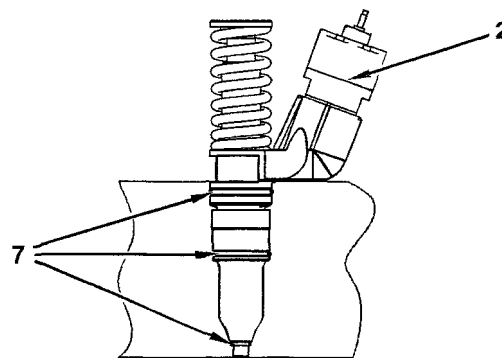


Illustration 11

g01039929

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

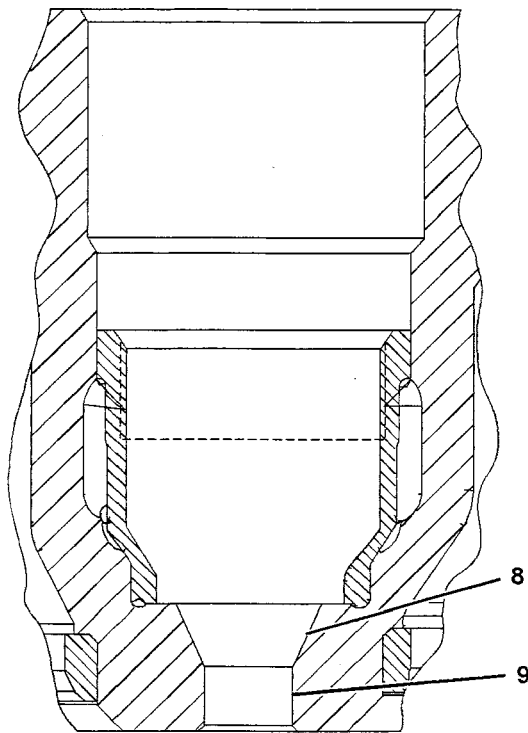


Illustration 12

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.

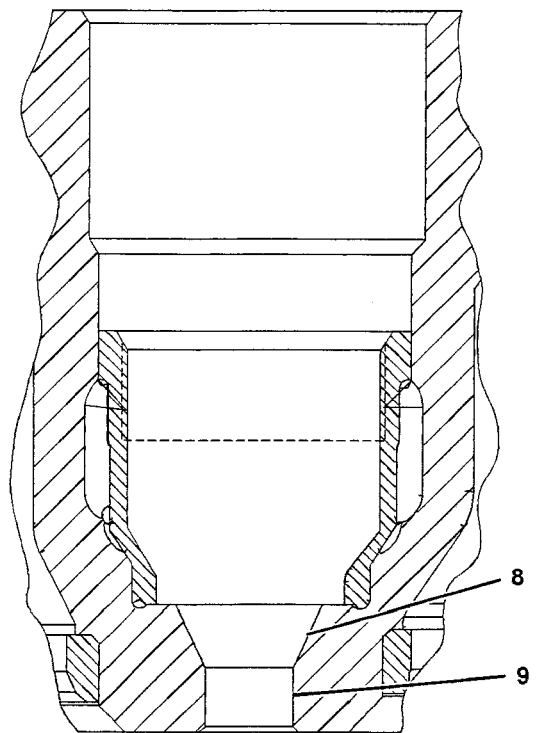


Illustration 13

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).

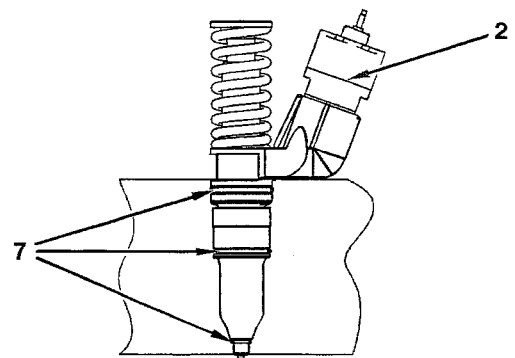


Illustration 14

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).

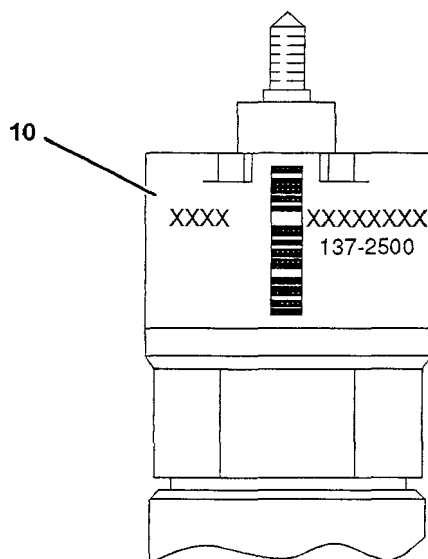


Illustration 15

g01019373

NOTICE

When a fuel injector group's electronic injector code 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.

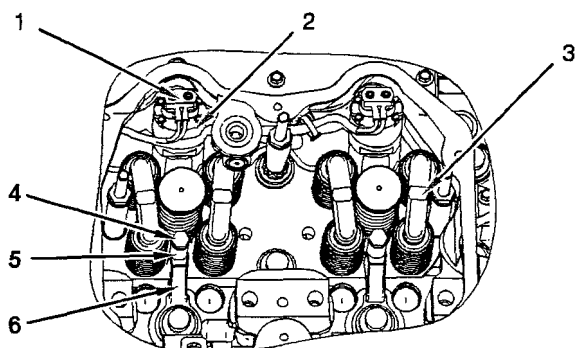


Illustration 16

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".

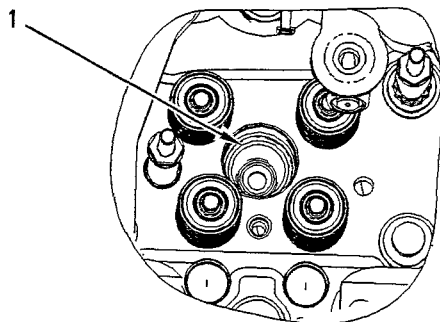


Illustration 17

g01002969

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

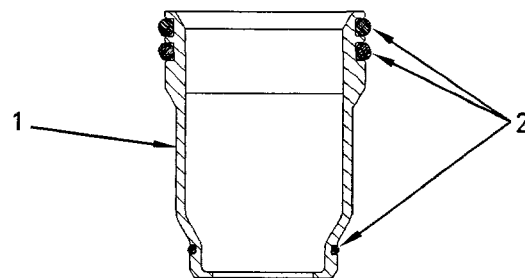


Illustration 18

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.

NOTICE

Before starting installation ensure that the unit injector sleeve and the cylinder head bore for the unit injector sleeve are completely free of oil, dirt, and sealant debris.

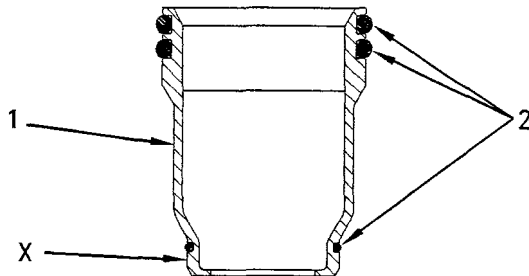


Illustration 19

g01003258

2. Install new O-ring seals (2) on unit injector sleeve (1).

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

3. Apply Tooling (E) to the contact surface of unit injector sleeve (1) on the surface that is marked "X".
4. Lubricate O-ring seals (2) with clean engine oil.
5. Install Tooling (C) into the threads of unit injector sleeve (1).
6. Position Tooling (C) and unit injector sleeve (1) in the cylinder head. Use care not to damage the O-ring seals on the unit injector sleeve.

NOTICE

Ensure that the unit injector sleeve is properly seated in the cylinder head. The tool and the unit injector sleeve will "RING" when the unit injector sleeve is fully seated in the bore in the cylinder head.

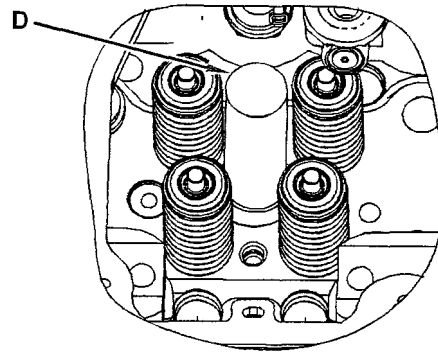


Illustration 20

g01027804

7. Use Tooling (D) and a hammer to install the unit injector sleeve.
8. Use a clean towel to remove any excessive retaining compound.
9. 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".

i02110374

Turbocharger - Remove

SMCS Code: 1052-011

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.

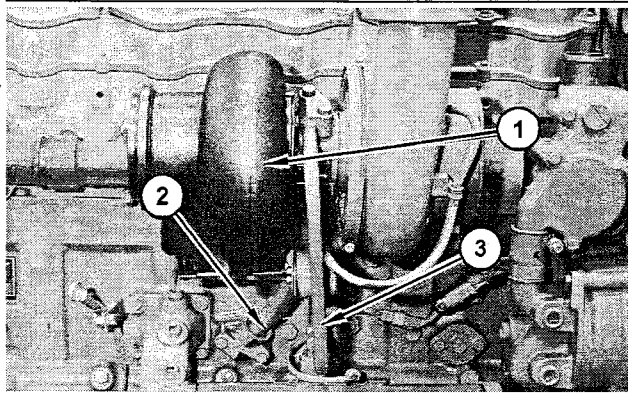


Illustration 21

g01031556

1. Remove tube assemblies (2) and (3) from turbocharger (1). Check the condition of the O-ring seals on tube assemblies (2) and (3). Use new parts for replacement if the O-ring seals are worn or damaged.

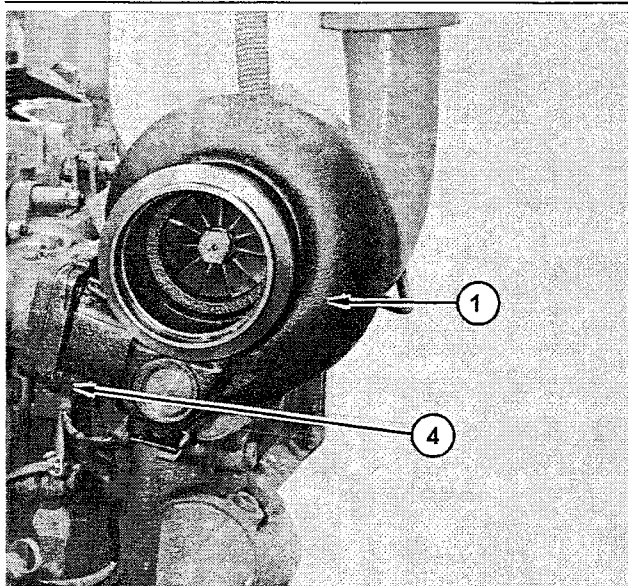


Illustration 22

g01031557

2. Attach a suitable lifting device to turbocharger (1).

3. Remove bolts (4) and turbocharger (1). The weight of the turbocharger is approximately 34 kg (75 lb).

i02010962

Turbocharger - Disassemble

SMCS Code: 1052-015

Disassembly Procedure**NOTICE**

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

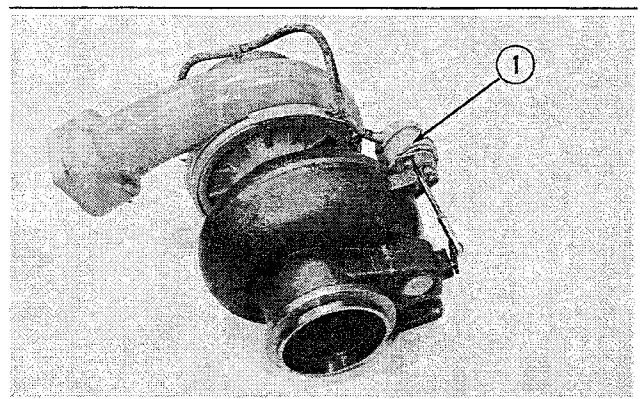


Illustration 23

g00513698

1. Position the turbocharger on a bench. Remove clamp (1) from waste gate.

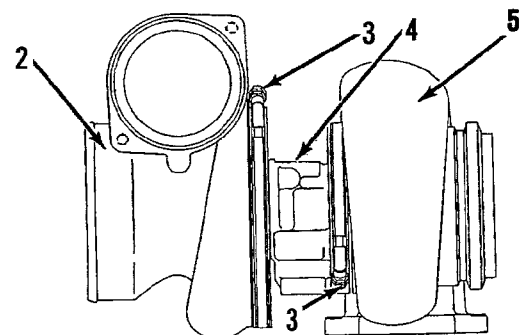


Illustration 24

g00513699

2. Loosen the nuts on V-band clamps (3).
3. Separate the compressor housing (2) and turbine housing (5) from turbocharger cartridge (4).

NOTICE

Do not attempt to disassemble the turbocharger cartridge assembly or wastegate. Do not remove the compressor wheel. The turbocharger cartridge assembly and the wastegate are not field serviced, and should be replaced only as a unit.

4. Check condition of all components. Use new parts to replace worn or damaged parts.

i01991697

Turbocharger - Assemble

SMCS Code: 1052-016

Assembly Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Compressor housing must go straight on the turbocharger assembly without tilting. Tilting may cause compressor blade to tip, or the compressor shaft can be damaged.

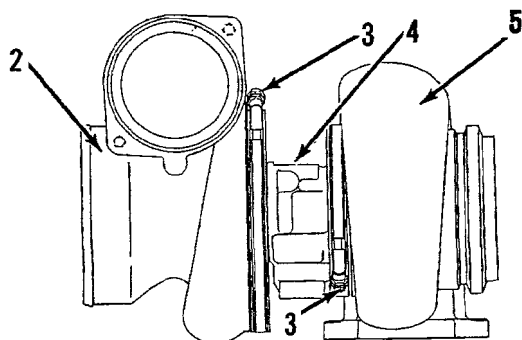


Illustration 25

g00513699

1. Check condition of all components. Use new parts to replace worn or damaged parts.
2. Connect compressor housing (2) and turbine housing (5) to turbocharger cartridge (4).
3. Tighten the nuts on V-band clamps (3) to a torque of 14 ± 3 N·m (10 ± 2 lb ft). Use a soft hammer to lightly hit around the diameter of band clamps (3).

4. Tighten the nuts on V-band clamps (3) again. Tighten to a torque of 14 ± 3 N·m (10 ± 2 lb ft).

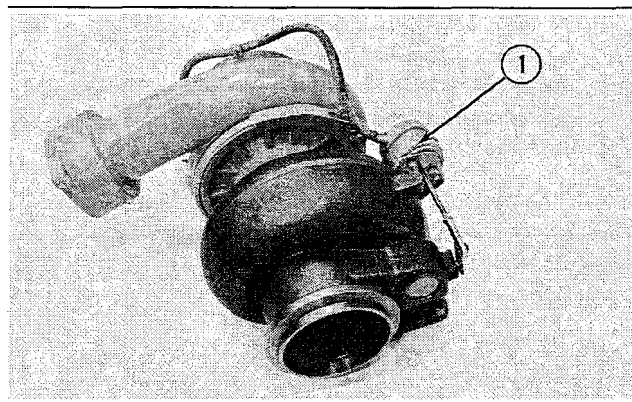


Illustration 26

g00513698

5. Install clamp (1) on waste gate.

i00978262

Turbocharger - Install

SMCS Code: 1052-012

Installation 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 machine. 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 in Caterpillar machines.

Dispose of all fluids according to local regulations and mandates.

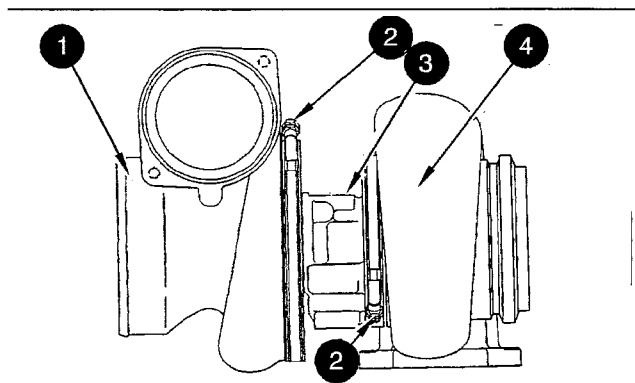


Illustration 27

g00513535

Typical Example

1. Loosen V-band clamps (2) enough to allow the compressor housing (1) and turbine housing (4) to rotate.

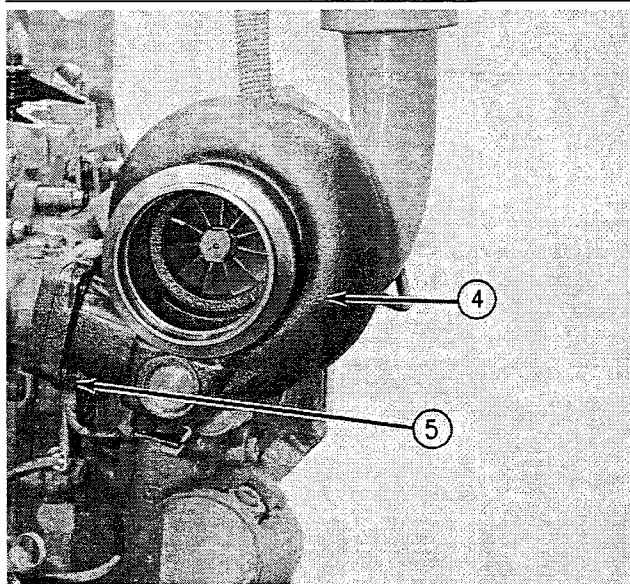


Illustration 28

g00513574

2. Use 5P-3931 Anti-Seize Compound on the turbocharger to manifold bolts (5).

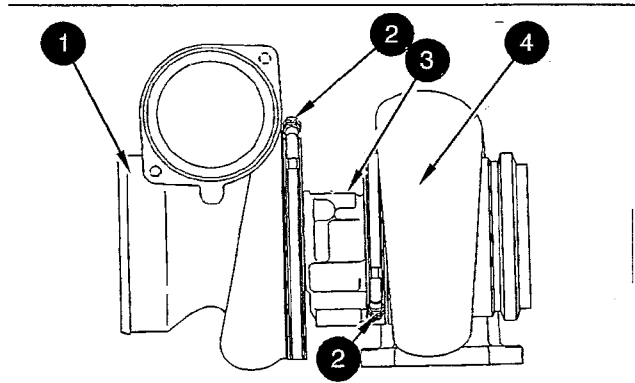


Illustration 29

g00513535

3. Align compressor housing (1) and turbine housing (4). Install the bolts(5) in the turbocharger and the manifold. Do not tighten bolts completely.
4. Tighten V-band clamp (2) to a torque of $14 \pm 3 \text{ N}\cdot\text{m}$ ($10 \pm 2 \text{ lb ft}$).
5. Tighten manifold bolts (5) to $55 \pm 5 \text{ N}\cdot\text{m}$ ($41 \pm 4 \text{ lb ft}$).
6. Position the compressor housing (1) so the air outlet is zero degrees from top vertical.
7. Install the V-band clamp (2) to 90 ± 10 degrees outboard from the bottom vertical.
8. Tighten V-band clamp (2). Tighten the nuts to a torque of $14 \pm 3 \text{ N}\cdot\text{m}$ ($10 \pm 2 \text{ lb ft}$). Use a soft hammer to lightly hit around the diameter of the band clamps (2).

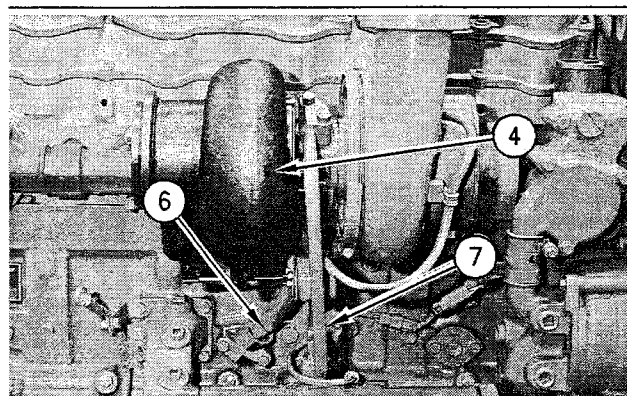


Illustration 30

g00513622

9. Install tube assembly (6) and (7).

i01806198

Exhaust Manifold - Remove and Install

SMCS Code: 1059-010

Removal Procedure

Start By:

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