

Product: INDUSTRIAL ENGINE
Model: C7.1 INDUSTRIAL ENGINE 630
Configuration: C7.1 Industrial Engine 63000001-UP

Disassembly and Assembly C7.1 (Mech) Industrial Engine

Media Number -UENR0615-00

Publication Date -01/05/2012

Date Updated -21/05/2012

i04780451

Fuel Injection Pump - Install - With Boost Control

SMCS - 1251-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	5P-7306	Housing	1
	5P-7305	Engine Turning Tool	1
B	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1
C	230-6284	Timing Pin (Camshaft)	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

NOTICE

Ensure that all adjustments and repairs that are carried out to the fuel system are performed by authorized personnel that have the correct training.

Before beginning ANY work on the fuel system, refer to Operation and Maintenance Manual, "General Hazard Information and High Pressure Fuel Lines" for safety information.

Refer to System Operation, Testing and Adjusting, "Cleanliness of Fuel System Components" for detailed information on the standards of cleanliness that must be observed during ALL work on the fuel system.

1. Inspect the bore in the front housing for damage. If the bore is damaged, replace the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove" for the correct procedure.
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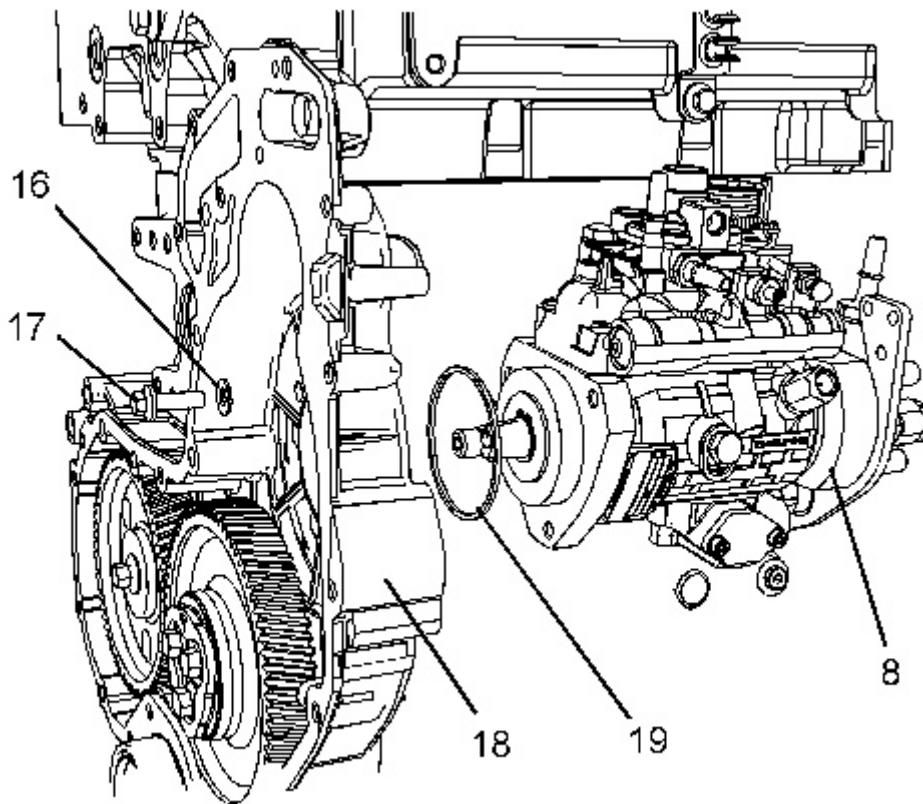


Illustration 1

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2. Install a new O-ring seal (19) to fuel injection pump (8).
3. Install new sealing washers (16) to bolts (17).
4. Carefully install fuel injection pump (8) to front housing (18).

Note: The fuel injection pump should be supported by hand as the bolts are installed.

5. Install bolts (17) to fuel injection pump (8) hand tight.
6. Tighten bolts (17) to a torque of 22 N·m (195 lb in).

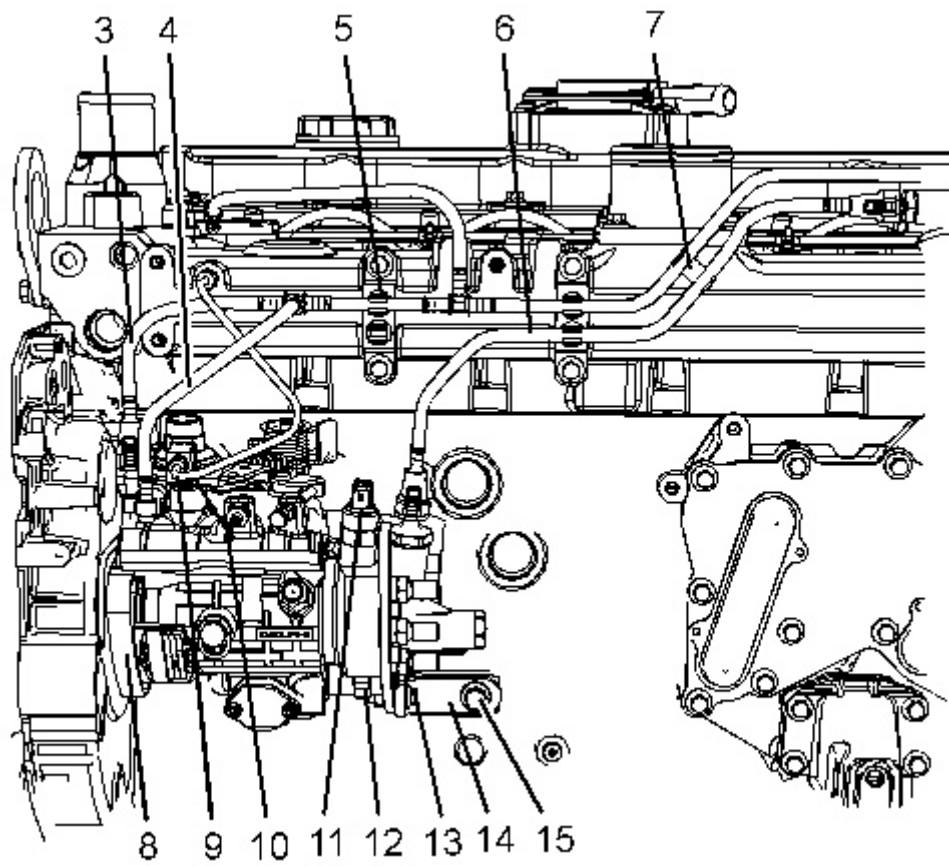


Illustration 2

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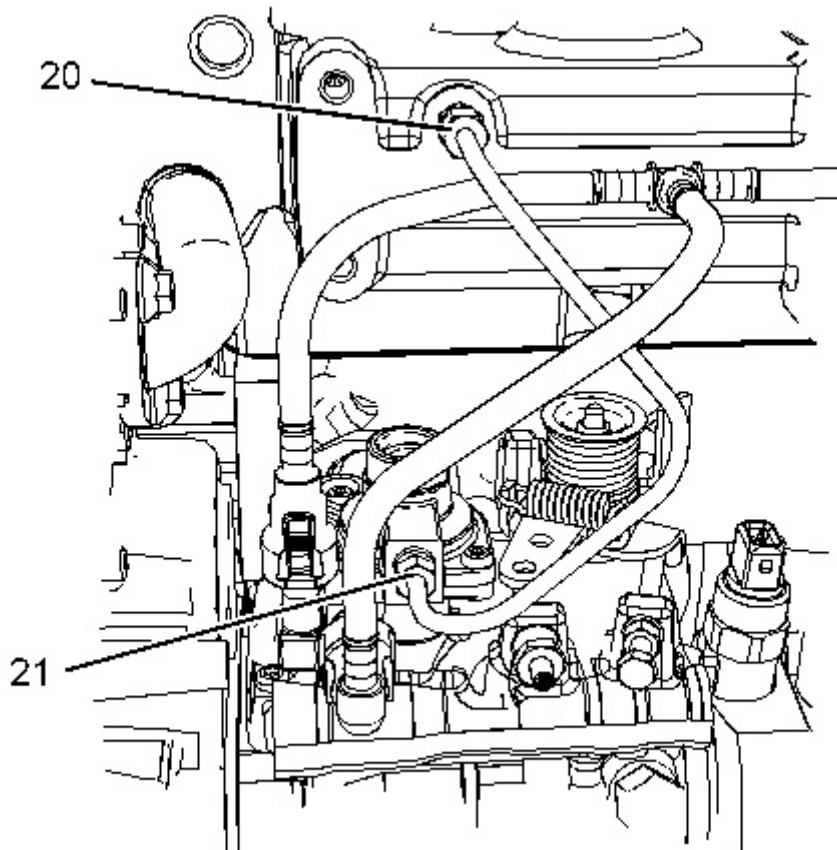
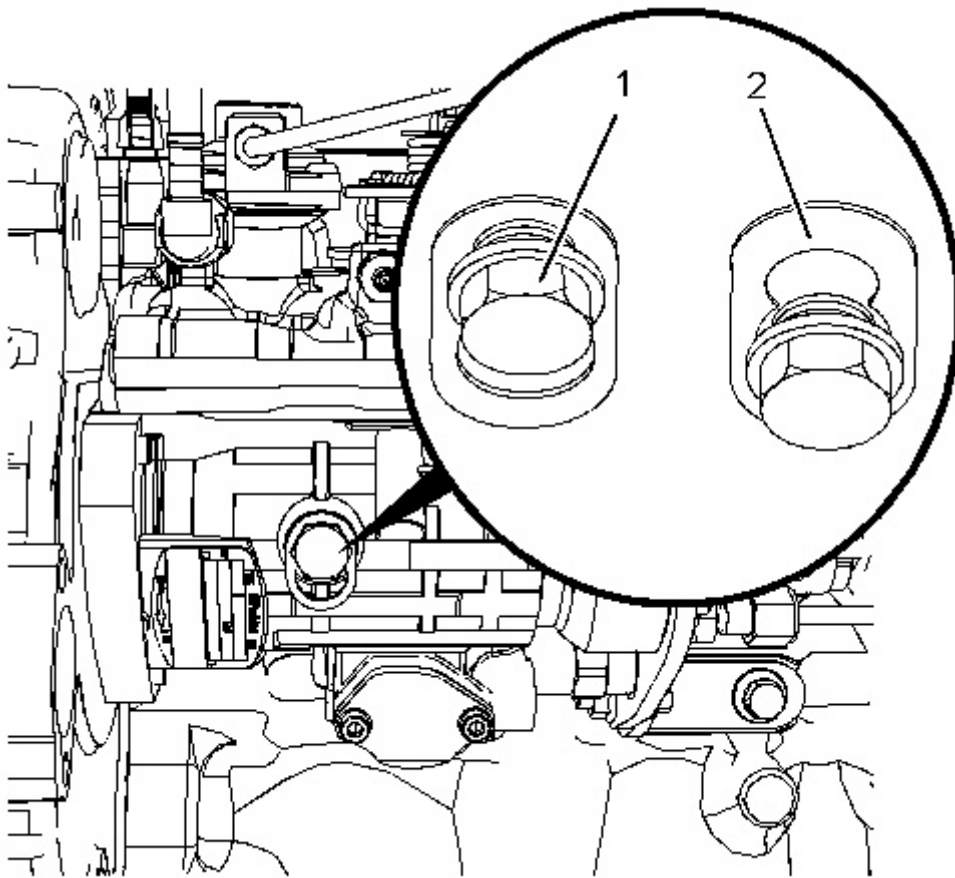


Illustration 3

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7. Position bracket (14) onto the cylinder block and the fuel injection pump. Install bolt (15) to the cylinder block finger tight.
 8. Install the nut and bolt (13) to fuel injection pump (8) finger tight.
 9. Tighten bolts (15) to a torque of 44 N·m (32 lb ft). Tighten the nut and bolt (13) to a torque of 22 N·m (195 lb in).
- Note:** Ensure that the fuel injection pump is not stressed as the bolts for the bracket are tightened.
10. Ensure that the No. 1 cylinder is at top dead center on the compression stroke. Refer to Systems Operation, Testing and Adjusting, "Fuel Injection Timing - Check". If necessary, use Tooling (A) in order to rotate the crankshaft so that number one piston is at the top center position on the compression stroke. Refer to Systems Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
 11. Use Tooling (C) in order to lock the camshaft in the correct position. Use Tooling (B) in order to lock the crankshaft in the correct position.
 12. Install the fuel injection pump gear to fuel injection pump (8). Refer to Disassembly and Assembly, "Fuel Injection Pump Gear - Install".
 13. Remove Tooling (C) and Tooling (B).

14. Install the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Install" for the correct procedure.
15. Install a new seal (10) (not shown) to tube assembly (9).
16. Connect tube assembly (9) to fuel injection pump (8) and the cylinder head.
17. Tighten tube nut (20) to a torque of 8 N·m (71 lb in).
18. Tighten tube nut (21) to a torque of 6 N·m (53 lb in).
19. Remove the plugs from fuel injection pump (8).
20. Remove the caps from plastic tube assembly (3), plastic tube assembly (4), and plastic tube assembly (6).
21. Connect plastic tube assembly (3), plastic tube assembly (4), and plastic tube assembly (4) to fuel injection pump (8).
22. Install plastic tube assembly (3), plastic tube assembly (5), and plastic tube assembly (6) to clips (5) and clip (7).
23. Connect the OEM harness assemblies to solenoid (11) and solenoid (12).



24. Loosen locking screw (1). Rotate spacer (2) in order to allow locking screw (1) to tighten against spacer (2). Tighten locking screw (1) to a torque of 12 N·m (106 lb in).

Note: Ensure that the fuel injection pump is in the unlocked position.

25. Turn the fuel supply to the OFF position.
26. Turn the battery disconnect switch to the ON position.
27. Remove the air from the fuel system. Refer to Operation and Maintenance Manual, "Fuel System - Prime" for the correct procedure.

End By:

- a. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure .
-

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i04780457

Fuel Injection Pump Gear - Remove

SMCS - 1251-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-7336	Crankshaft Turning Tool	1
A ⁽²⁾	5P-7305	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1
D	-	Puller (Three Leg)	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Start By:

- a. Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install".

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

NOTICE

Keep all parts clean from contaminants.

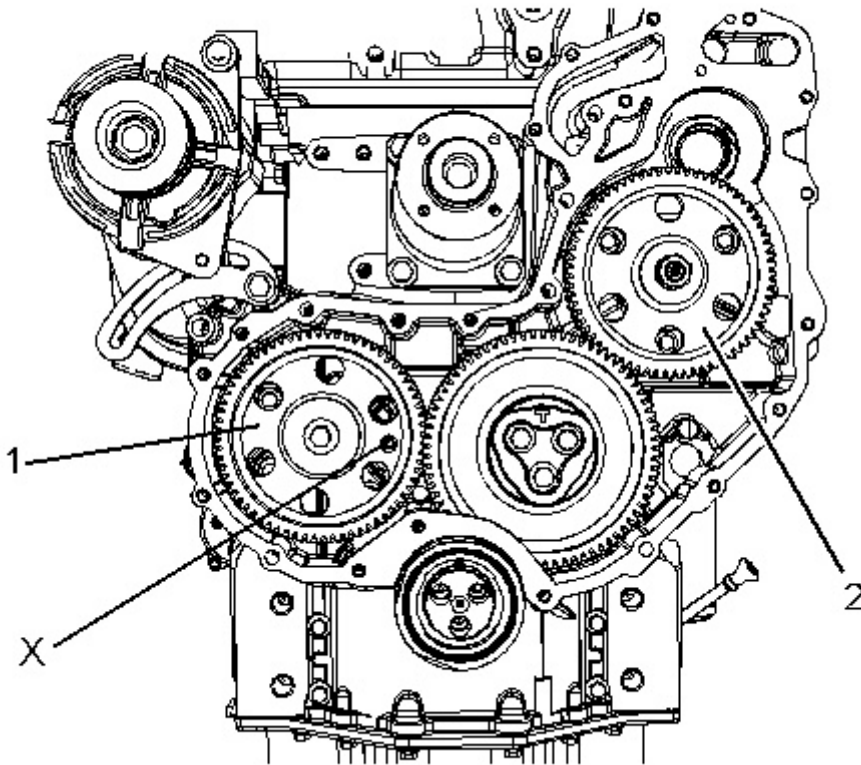
Contaminants may cause rapid wear and shortened component life.

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.

Dispose of all fluids according to local regulations and mandates.

Note: Care must be taken in order to ensure that the fuel injection pump timing is not lost during the removal of the fuel pump gear. Carefully follow the procedure in order to remove the fuel pump gear.



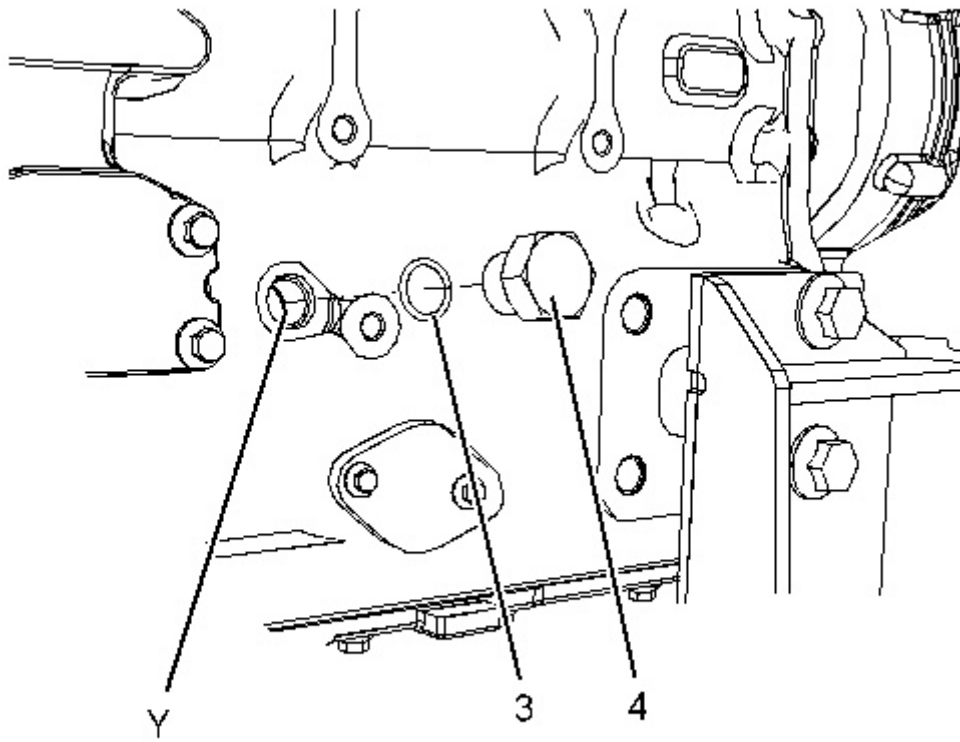


Illustration 2

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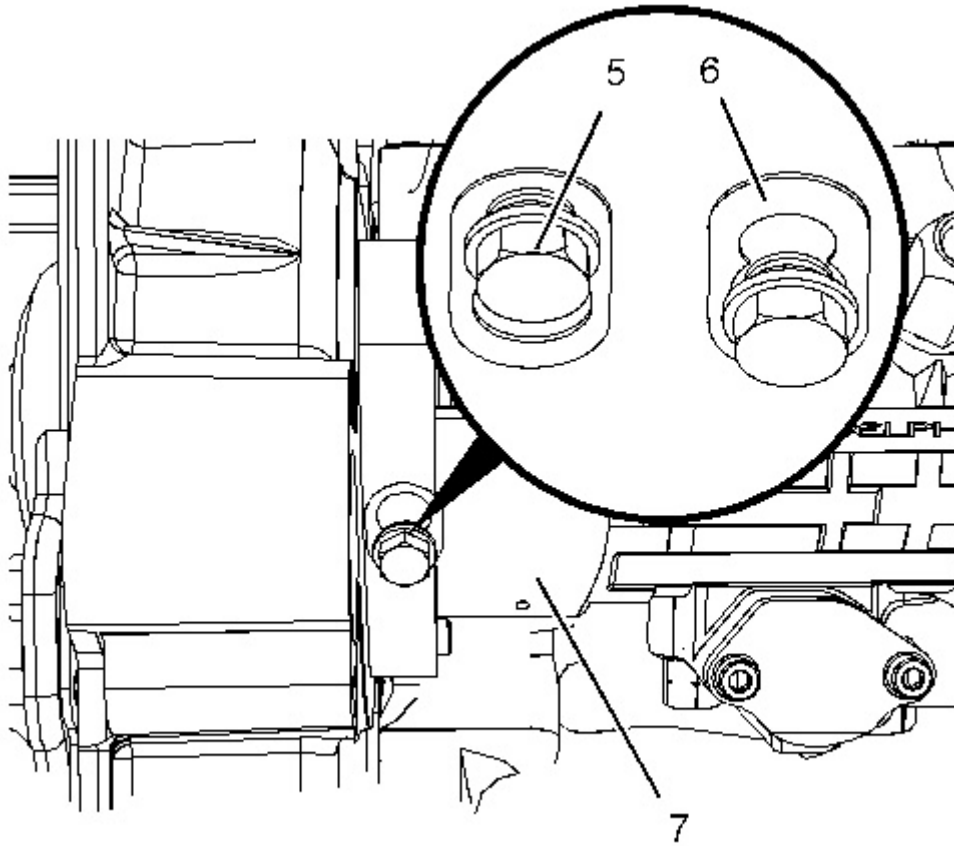


Illustration 3
With Electronic Governor

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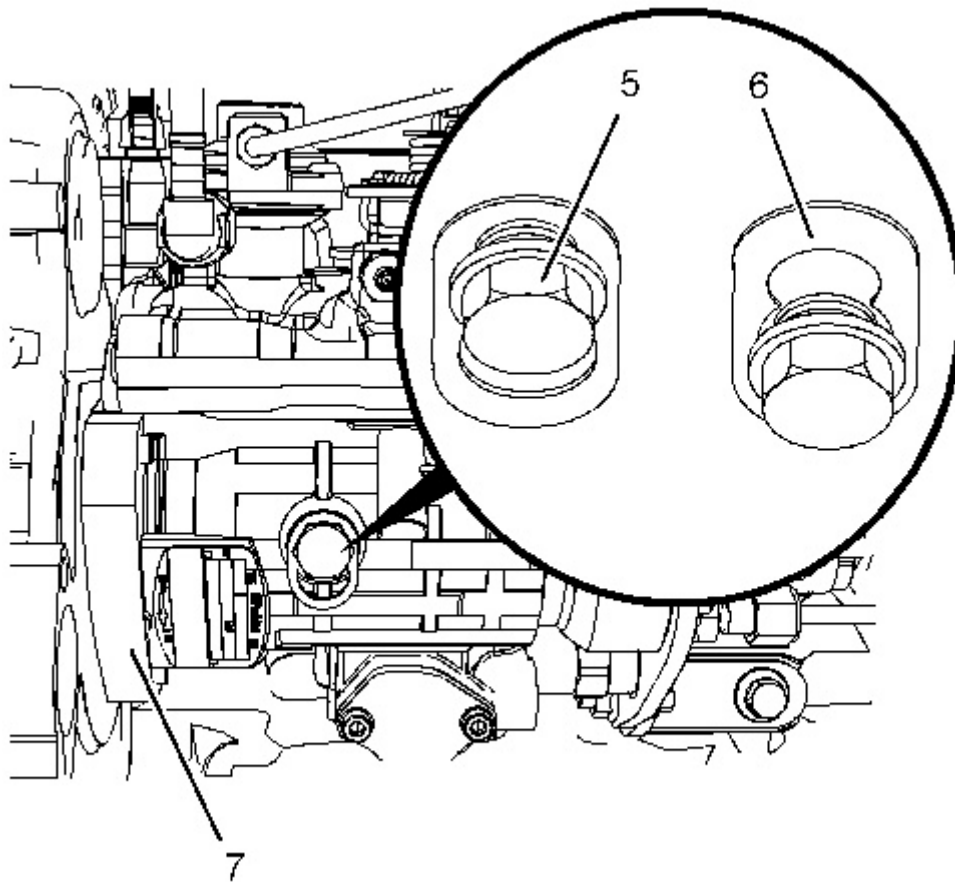


Illustration 4
With Boost Control

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1. Remove plug (4) from the cylinder block. Remove O-ring seal (3) from plug (4).
 2. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston".
 3. Install Tooling (B) through Hole (X) in camshaft gear (1) into the front housing. Use Tooling (B) in order to lock the camshaft in the correct position.
 4. Install Tooling (C) into Hole (Y) in the cylinder block. Use Tooling (C) in order to lock the crankshaft in the correct position.
- Note:** Do not use excessive force to install Tooling (C). Do not use Tooling (C) to hold the crankshaft during repairs.
5. Apply sufficient pressure to fuel injection pump gear (2) in a counterclockwise direction in order to remove the backlash. Lock fuel injection pump (2) in this position.

In order to lock fuel injection pump (7), loosen locking screw (5) in the fuel injection pump. Slide spacer (6) into the locked position. Tighten locking screw (5) against the shaft of the fuel injection pump to a torque of 15 N·m (133 lb in).

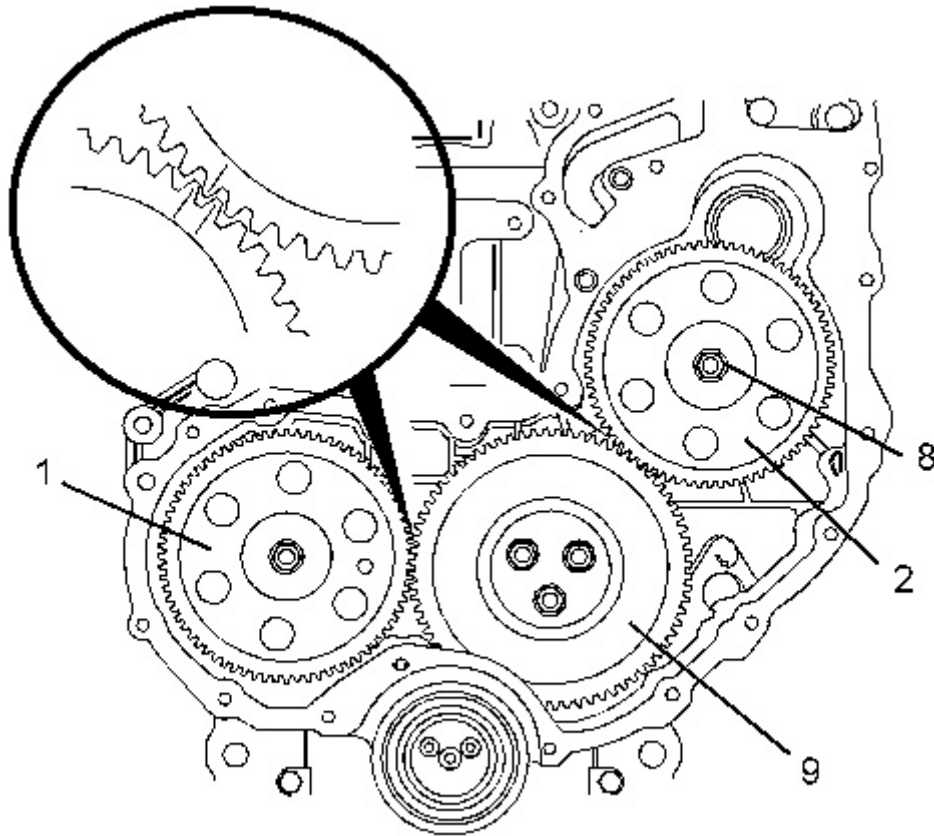


Illustration 5

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6. Mark gear (1), gear (2) and gear (9) in order to show alignment.

Alignment of timing marks

Note: Identification will ensure that the gears can be installed in the original alignment.

7. Loosen nut (8) for the fuel pump gear.
 8. Install Tooling (D) through three holes in gear (2). Tighten Tooling (D) until gear (2) is released.
 9. Remove Tooling (D) from gear (2).
 10. Remove nut (8) and the washer from fuel pump gear (3). Remove the gear (2).
-

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i04780456

Fuel Injection Pump Gear - Install

SMCS - 1251-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-7336	Crankshaft Turning Tool	1
A ⁽²⁾	5P-7305	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: The fuel injection pump must remain locked until the procedure instructs you to unlock the fuel injection pump.

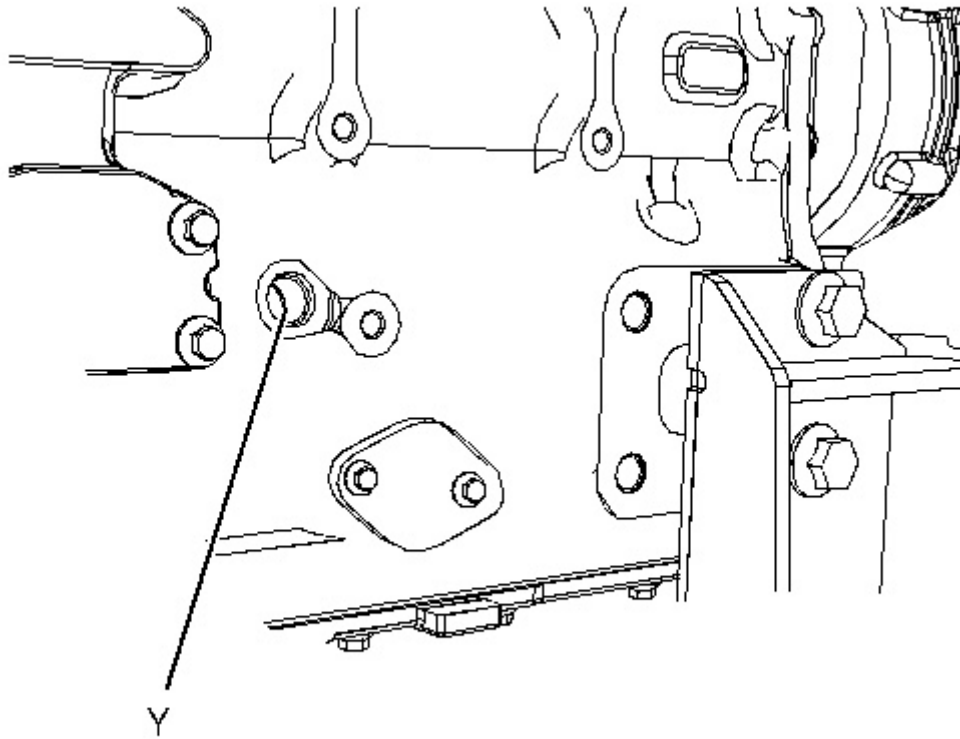


Illustration 1

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1. If necessary, use Tooling (A) to ensure that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston".
 2. Ensure that Tooling (C) is installed in Hole (Y) in the cylinder block. Use Tooling (C) in order to lock the crankshaft in the correct position.
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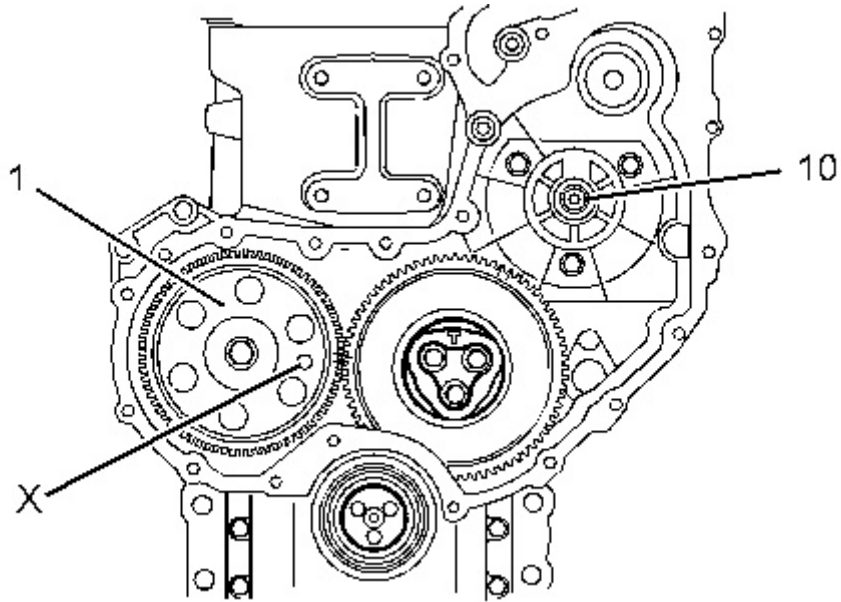


Illustration 2

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3. Ensure that Tooling (B) is installed into Hole (X) in camshaft gear (1).
 4. Ensure that shaft (10) of the fuel injection pump is clean and free from damage.
 5. Ensure that the fuel injection pump is locked in the correct position. Refer to Disassembly and Assembly, "Fuel Injection Pump - Install".
 6. Ensure that the fuel pump gear is clean and free from wear or damage. If necessary, replace the fuel pump gear.
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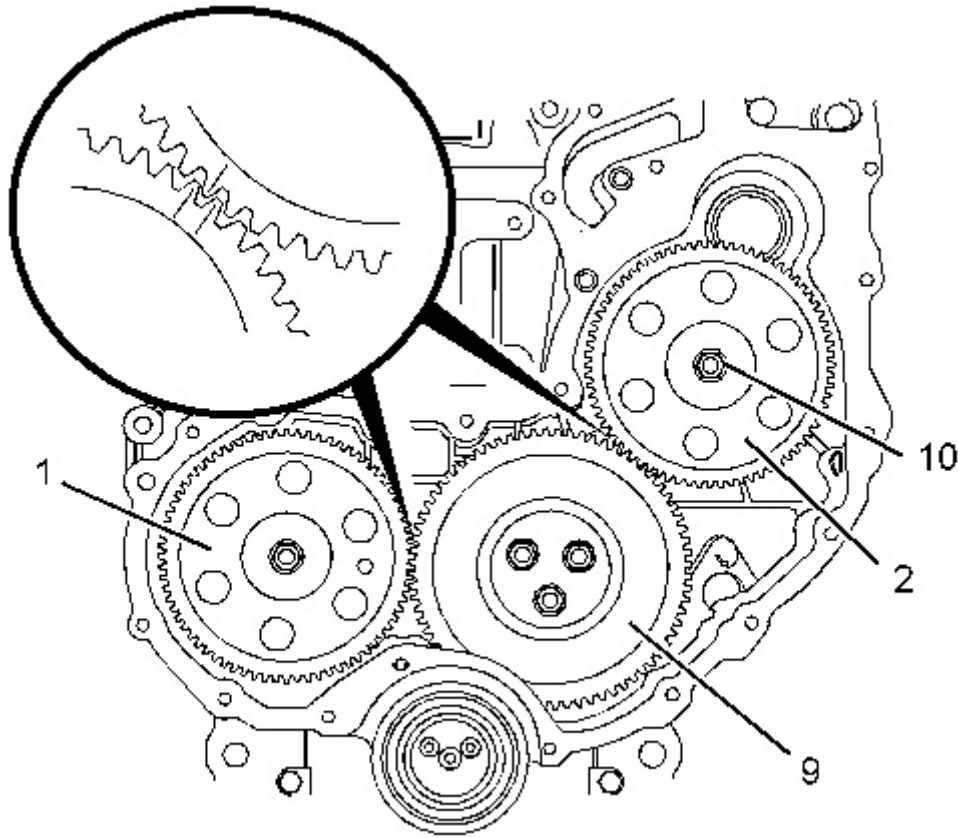


Illustration 3

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7. Install fuel pump gear (2) to shaft (10) of the fuel injection pump. Ensure that the timing marks on gear (1), gear (2), and gear (9) are in alignment and that the mesh of the gears is correct.
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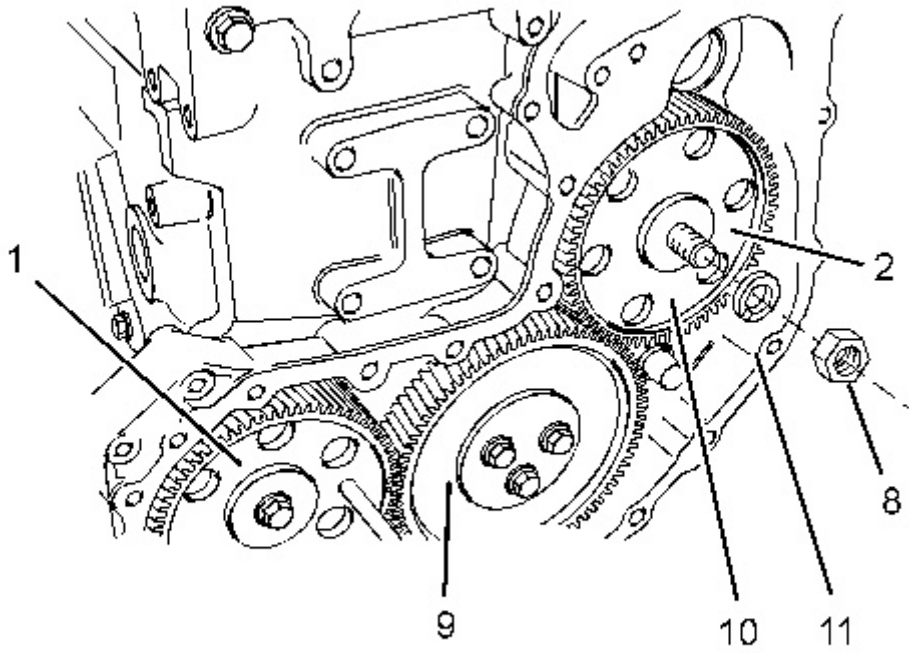


Illustration 4

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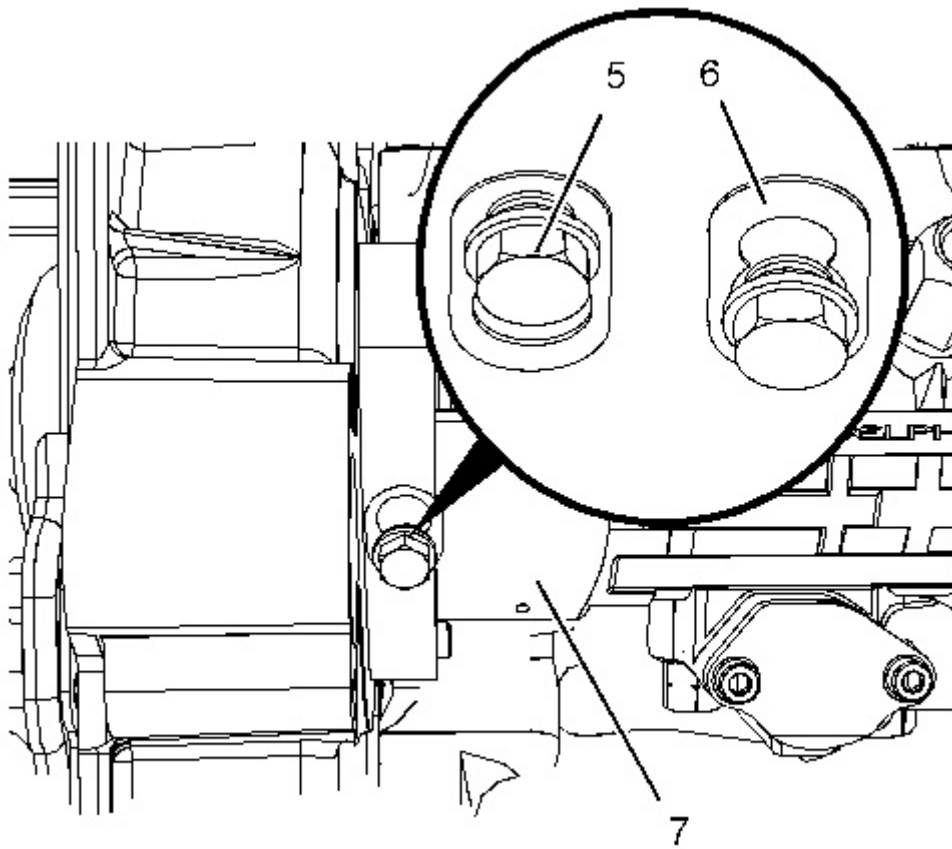


Illustration 5
With Electronic Governor

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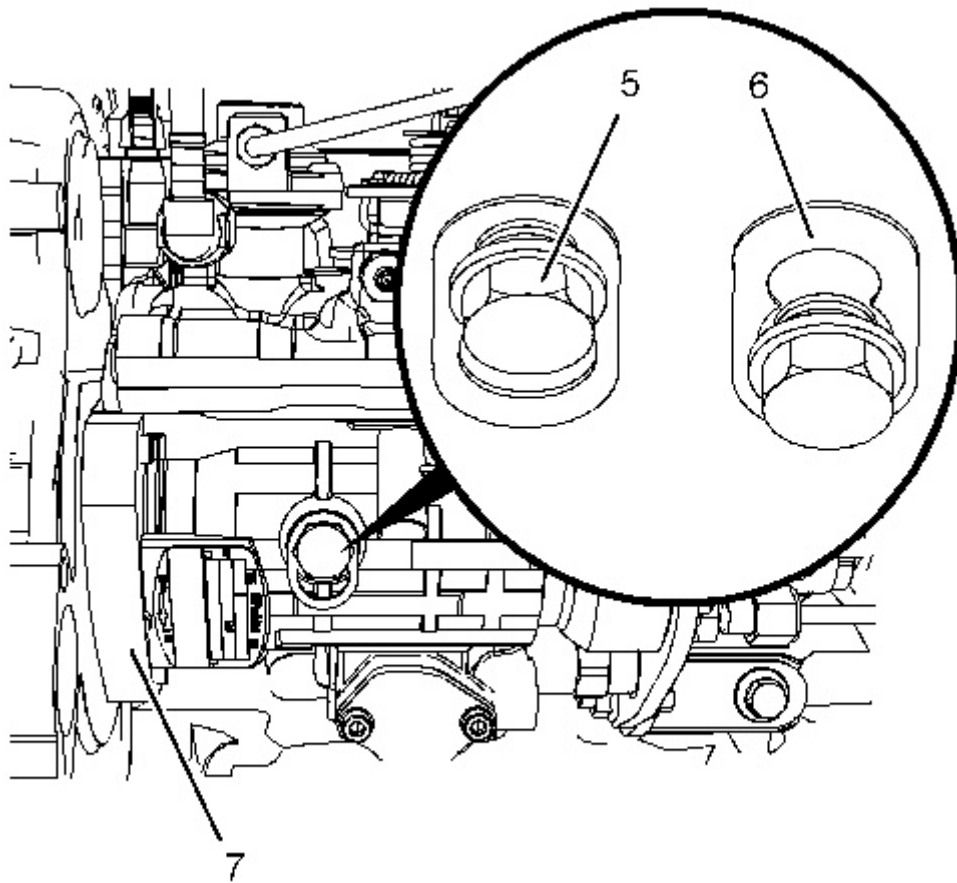


Illustration 6
With Boost Control

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8. Install a new spring washer (11) and install nut (8) to shaft (10) of the fuel injection pump. Apply sufficient pressure to fuel injection pump gear (2) in a counterclockwise direction in order to remove the backlash. Tighten nut (8) to a torque of 24 N·m (212 lb in).
 9. In order to unlock fuel injection pump (7), loosen locking bolt (5) in the fuel injection pump. Slide spacer (6) into unlock position. Tighten locking bolt (5) against the spacer to a torque of 12 N·m (106 lb in). The spacer will prevent the locking bolt from tightening against the shaft of the fuel injection pump.
 10. Remove Tooling (B) and Tooling (C).
 11. Tighten nut (8) to a torque of 90 N·m (66 lb ft).
 12. Ensure that the backlash for gear (1), gear (2) and gear (9) is within specified values. Refer to the Specifications, "Gear Group (Front)" for further information.
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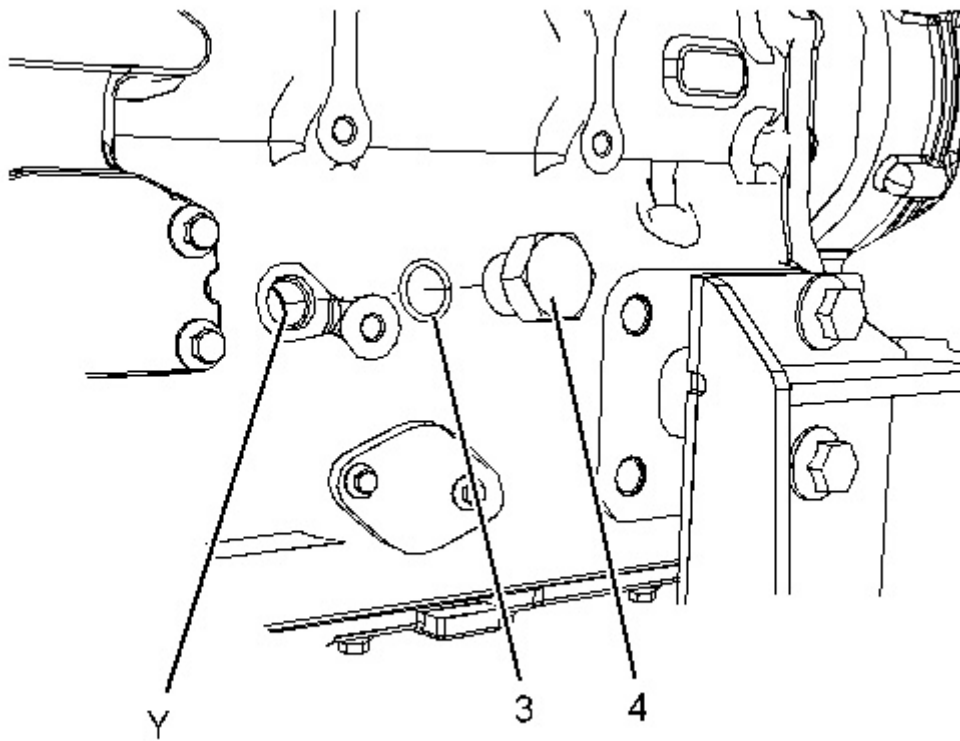


Illustration 7

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13. Install a new O-ring seal (3) to plug (4). Install plug (4) to the cylinder block. Tighten plug (4) to a torque of 21 N·m (186 lb in).
14. Lubricate the teeth of the gears with clean engine oil.

End By:

- a. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install".
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i07432260

Fuel Injector - Remove

SMCS - 1290-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Laser 4044 Fuel Injector Puller	1
B	422-7170	Capping Kit	1

Start By:

- a. Remove the fuel injection lines.

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.

Dispose of all fluids according to local regulations and mandates.

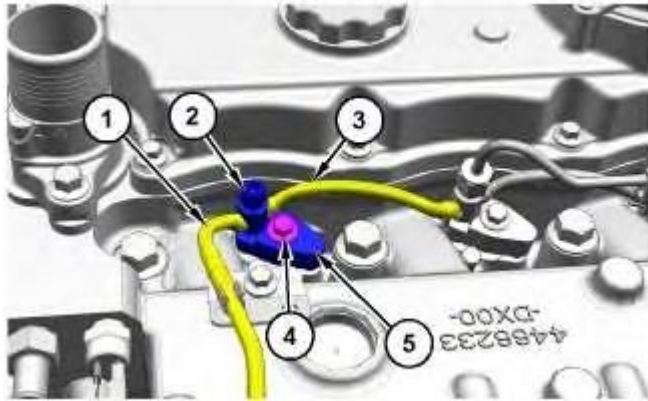


Illustration 1

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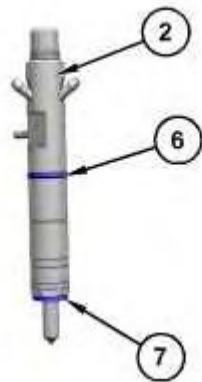


Illustration 2

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1. Disconnect hose assembly (1) and hose (3) from fuel injector (2).
 2. Use Tooling (B) to plug fuel injector (2).
 3. Remove bolt (4) and clamp (5) from fuel injector (2).
 4. Use Tooling (A) to remove fuel injector (2) from the cylinder head. Remove fuel injector (2).
 5. Remove O-ring seal (6) and seat washer (7) from fuel injector (2).
 6. If necessary, repeat Step 1 through Step 5 to remove the remaining fuel injectors.
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