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Perkins®
THE HEART OF EVERY GREAT MACHINE

Disassembly and Assembly

4008-30 Industrial Engine

SD8 (Engine)

Table of Contents

Disassembly and Assembly Section

Fuel Transfer Pump - Remove and Install (Lift Pump) 4
Fuel Manifold (Rail) - Remove and Install (Engine Oil and Fuel Rail)....5
Governor - Remove (Electronic Control Unit)....11
Governor - Install (Electronic Control Unit) 12
Governor Actuator - Remove and Install 13
Fuel Injection Control Linkage - Remove 20
Fuel Injection Control Linkage - Install 25
Fuel Injector - Remove 30
Fuel Injector - Install 31
Fuel Injector Sleeve - Remove 33
Fuel Injector Sleeve - Install 34
Air Cleaner - Remove and Install 37
Turbocharger - Remove....40
Turbocharger - Install 45
Air Lines - Remove and Install (Turbocharger Compressor Outlet Tube Assemblies)....53
Exhaust Manifold - Remove and Install 63
Exhaust Elbow - Remove and Install 73
Inlet Manifold - Remove 76
Inlet Manifold - Install 79
Inlet and Exhaust Valves - Remove and Install....82
Inlet and Exhaust Valve Guides - Remove and Install 85
Engine Oil Filter Base - Remove....86
Engine Oil Filter Base - Install 88
Engine Oil Cooler - Remove....90
Engine Oil Cooler - Disassemble 93
Engine Oil Cooler - Assemble 94
Engine Oil Cooler - Install 95
Engine Oil Relief Valve - Remove and Install (Engine Oil Pressure Regulator)....98
Engine Oil Relief Valve - Remove and Install (Engine Oil Cooler) 100
Engine Oil Pump - Remove....102
Engine Oil Pump - Disassemble 104
Engine Oil Pump - Assemble....105
Engine Oil Pump - Install....107
Water Pump - Remove 110
Water Pump - Disassemble 111
Water Pump - Assemble 112
Water Pump - Install....113
Water Temperature Regulator Housing - Remove and Install (Thermostat Housing)....114
Engine Support (Front) - Remove and Install (Back plate)....117
Flywheel - Remove....119
Flywheel - Install 121
Crankshaft Rear Seal - Remove and Install 123
Flywheel Housing - Remove and Install 124
Vibration Damper and Pulley - Remove and Install (Twin Vibration Dampers)....127
Crankshaft Front Seal - Remove and Install....132
Gear Group (Front) - Remove 133
Gear Group (Front) - Install 134
Housing (Front) - Remove (Timing Case) 137
Housing (Front) - Install (Timing Case)....138
Crankcase Breather - Remove and Install 141
Valve Mechanism Cover - Remove and Install (Rocker Box Cover) 144
Valve Mechanism Cover Base - Remove and Install (Rocker Box)....145
Rocker Arm and Shaft - Remove 147
Rocker Arm - Disassemble....148
Rocker Arm - Assemble 149
Rocker Arm and Shaft - Install....151
Cylinder Head - Remove....152
Cylinder Head - Install 155
Lifter Group - Remove (Cam Followers)....158
Lifter Group - Disassemble (Cam Followers) 158
Lifter Group - Assemble (Cam Followers)....160
Lifter Group - Install (Cam Followers)....161
Camshaft - Remove 162
Camshaft - Install 163
Camshaft Bearings - Remove 164
Camshaft Bearings - Install 165
Engine Oil Pan - Remove 166
Engine Oil Pan - Install 168
Cylinder Liner - Remove 170
Cylinder Liner - Install....171
Piston Cooling Jets - Remove and Install 173
Pistons and Connecting Rods - Remove....175
Pistons and Connecting Rods - Disassemble 177
Pistons and Connecting Rods - Assemble....178
Pistons and Connecting Rods - Install....181
Crankshaft Main Bearings - Remove and Install ..184
Crankshaft - Remove....186
Crankshaft - Install 187
Crankshaft Gear - Remove and Install 190
Bearing Clearance - Check 191
Coolant Temperature Switch - Remove and Install 192
Engine Oil Pressure Switch - Remove and Install 193
Engine Oil Pressure Switch - Remove and Install (Alternator Warning Lamp) 194
Temperature Sensor (Exhaust) - Remove and Install (Exhaust Temperature Thermocouples)....195
Engine Speed Sensor - Remove and Install (Overspeed Sensor) 196
Engine Speed Sensor - Remove and Install (Engine Speed for Governor Control) 198
Boost Pressure Sensor - Remove and Install....199
V-Belts - Remove and Install (Fan Drive Belts)....200
Alternator Belt - Remove and Install 203
Alternator - Remove and Install (Battery Charging Alternator)....204
Alternator - Remove and Install (Battery Charging Alternator Drive)....207
Electric Starting Motor - Remove and Install 212

Index Section

Index....215

Disassembly and Assembly Section

i06513480

Fuel Transfer Pump - Remove and Install

(Lift Pump)

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.

Dispose of all fluids according to local regulations and mandates.

1. Turn the fuel supply to the “OFF” position.

2. Switch OFF battery charger (if installed) or the disconnect the mains supply and disconnect the negative lead from the batteries.

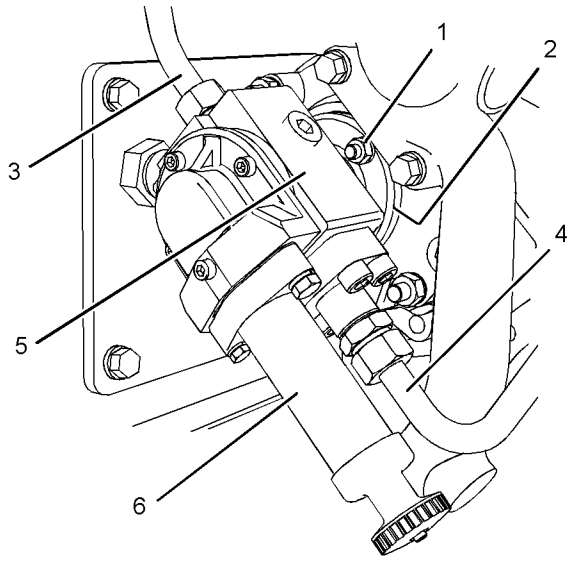

Illustration 1 g01429930

3. Disconnect tube assembly (3) from fuel lift pump (5). Cap all open tube assembly and connection.

4. Disconnect tube assembly (4) from fuel lift pump (5). Cap all open tube assembly and connection.

5. Remove nuts (1) and remove fuel lift pump (5) from the engine oil pump.

6. Remove gasket (2) (not shown).

7. If necessary, remove fuel priming pump (6) from fuel lift pump (5). Refer to Disassembly and Assembly, “Fuel Priming Pump - Remove and Install” for the correct procedure.

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the gasket surfaces of the fuel lift pump and the engine oil pump are clean and free from damage. Inspect the seal and inspect the drive for the fuel lift pump for wear or damage.

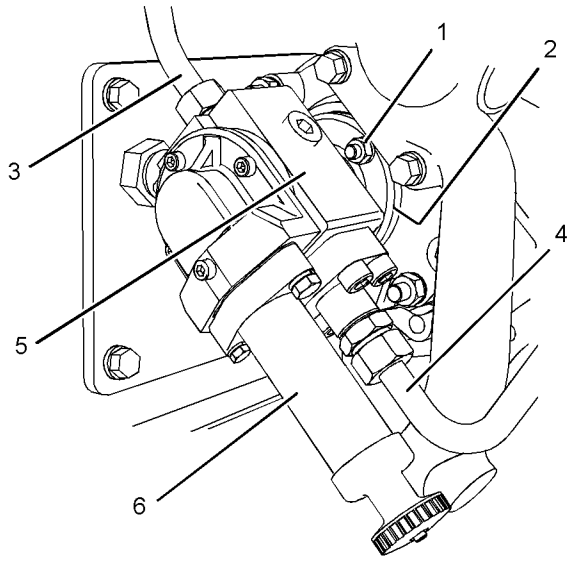

Illustration 2 g01429930

2. If necessary, install fuel priming pump (6) to fuel lift pump (5). Refer to Disassembly and Assembly, “Fuel Priming Pump - Remove and Install” for the correct procedure.

3. Position a new gasket (2) (not shown) onto the engine oil pump. Lubricate the drive for the fuel lift pump and the seal in the engine oil pump with clean engine oil.

4. Install fuel lift pump (5) on the engine oil pump. Install nuts (1). Tighten the nuts to a torque of 25 N·m (18 lb ft).

Note: Ensure that the shaft of the fuel lift pump is aligned with the drive in the rear of engine oil pump.

5. Remove the cap from tube assembly (3) and connection. Connect the tube assembly from fuel lift pump (5).

6. Remove the cap from tube assembly (4) and connection. Connect the tube assembly from fuel lift pump (5).

7. Tighten the tube nut for tube assembly (4) to a torque of 68 N·m (50 lb ft).

8. Tighten the tube nut for tube assembly (3) to a torque of 68 N·m (50 lb ft).

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

10. Switch ON battery charger (if installed) or the connect the mains supply and connect the negative lead to the batteries.

11. Remove the air from the fuel system. Refer to Operation and Maintenance Manual, “Fuel System - Prime” for the correct procedure.

i06541716

Fuel Manifold (Rail) - Remove and Install

(Engine Oil and Fuel Rail)

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.

Dispose of all fluids according to local regulations and mandates.

1. Switch OFF battery charger (if installed) or the disconnect the mains supply and disconnect the negative lead from the batteries.

2. Turn the fuel supply to the OFF position.

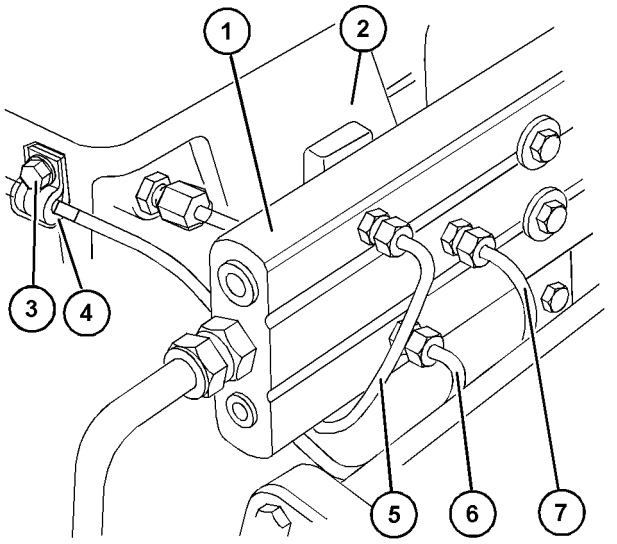

Illustration 3 g06009914
Typical example

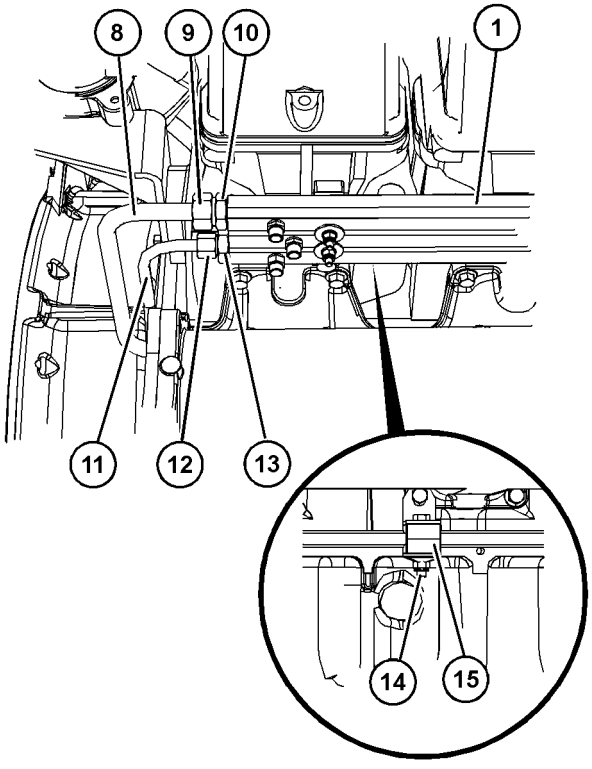

Illustration 4 g06009972

3. Remove bolt (3) from clip (4).

4. Use a suitable tool to hold connections for tube assembly (5), tube assembly (6), and tube assembly (7).

5. Disconnect tube assembly (5), tube assembly (6), and tube assembly (7) from engine oil rail (1) and valve mechanism cover base (2).

6. Repeat Step 3 through Step 5 to remove the remaining tube assembly (5), tube assembly (6), and tube assembly (7) from engine oil rail (1) and valve mechanism cover base (2).

7. Remove nut and bolts (14) from clamps (15). If necessary, follow Step 7 to remove remaining nuts and bolt and clamps.

8. Use a suitable tool to hold connection (10) and loosen tube nut (9). Disconnect tube assembly (8) from the connection.

9. Use a suitable tool to hold connection (13) and loosen tube nut (12). Disconnect tube assembly (11) from the connection.

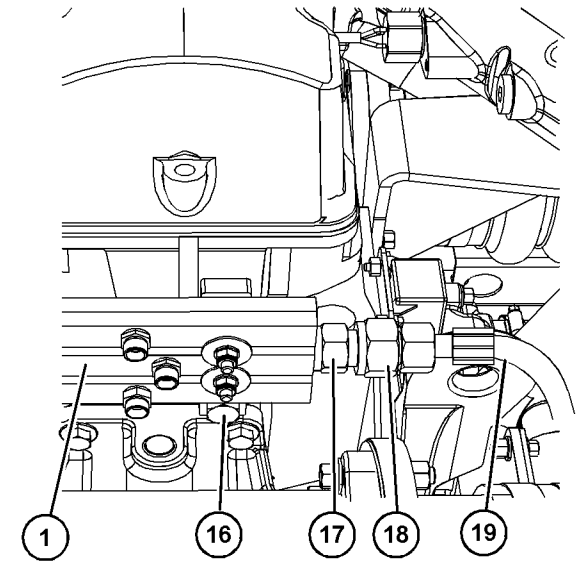

Illustration 5 g06009992

10. Use a suitable tool to hold connection (17) and loosen tube nut (18). Disconnect hose assembly (19) from the connection.

11. Remove bolts (16) from engine oil rail (1). Remove the engine oil rail from the cylinder heads

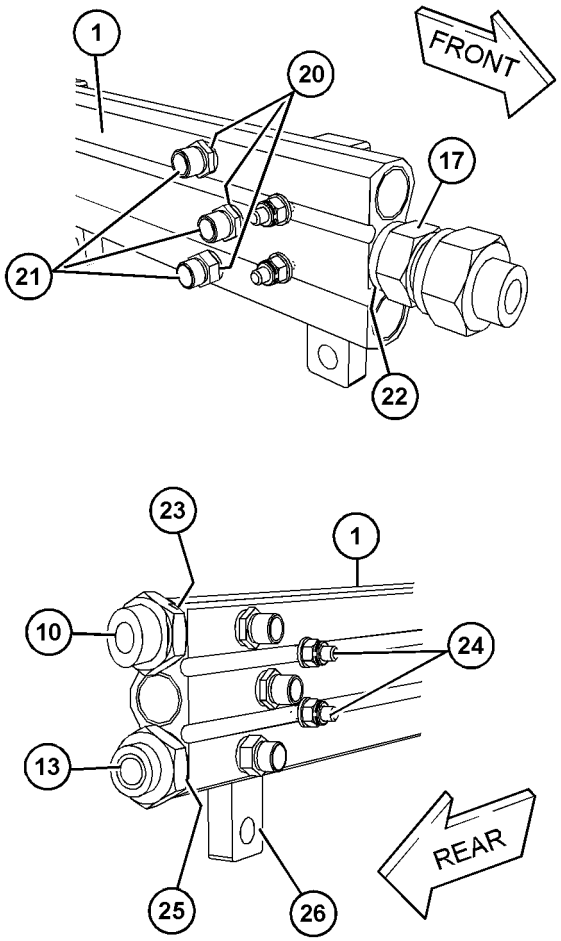

Illustration 6 g06010119

Front and rear sections of engine oil rail and fuel rail

12. Follow Step 12.a through Step 12.j to disassembly the engine oil rail.

a. Remove connections (21) from engine oil rail (1).

b. Remove sealing washers (20) (not shown) from connections (21).

c. Repeat Step 12.a through Step 12.b to remove remaining connections (21) from engine oil rail (1).

d. Remove connection (17) from engine oil rail (1).

e. Remove sealing washers (20) (not shown).

f. Remove connection (10) and connection (13) from engine oil rail (1).

g. Remove sealing washer (23) (not shown) and sealing washer (25).

h. Make temporary marks on bracket (26) and engine oil rail (1) for installation purposes.

i. Remove nuts and bolts (24) and remove bracket (26) from engine oil rail (1).

j. If necessary, repeat Step 12.h through Step 12.j to remove remaining bracket (26) from engine oil rail (1).

Installation Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	-	Loctite 542 Thread and Nut Lock	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that all components for engine oil rail and fuel rail are free from wear, damage, or restriction. Replace any component that is worn, damaged, or restricted.

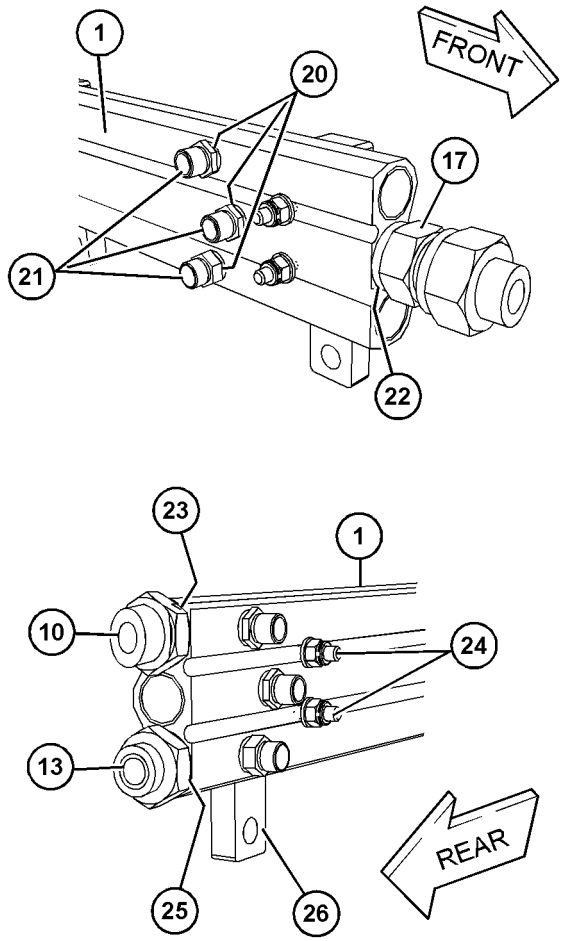

Illustration 7 g06010119

Front and rear sections of engine oil rail and fuel rail

2. Follow Step 2.a through Step 2.k to disassembly the engine oil rail.

a. Position bracket (26) onto engine oil rail (1). Ensure that the bracket is correctly orientated on the engine oil rail.

b. Install nuts and bolts (24) to bracket (26). Hand tighten the nuts and bolts.

c. If necessary, repeat Step 2.a through Step 2.b to install remaining bracket (26) to engine oil rail (1).

d. Install a new sealing washer (23) (not shown) and a new sealing washer (25) to connection (10) and connection (13).

e. Apply Tooling (A) to the threads of connection (10) and connection (13).

f. Install connection (10) and connection (13) to engine oil rail (1). Tighten the connections to a torque of 35 N·m (26 lb ft).

g. Install new sealing washers (20) (not shown) to connections (21).

h. Apply Tooling (A) to the threads of connections (21). Install the connection to engine oil rail (1). Tighten the connection to a torque of 15 N·m (133 lb in).

i. If necessary, repeat Step 2.g through Step 2.k to install remaining connections (21) to engine oil rail (1).

j. Install a new seal washer (22) to connection (17).

k. Apply Tooling (A) to the threads of connection (17) and install the connection Tighten the connection to a torque of 35 N·m (26 lb ft).

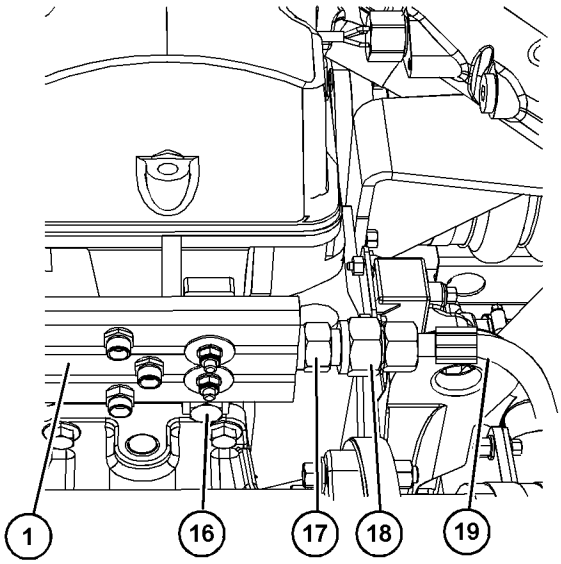

Illustration 8 g06009992

3. Position engine oil rail (1) onto the cylinder heads. Install bolts (16) hand tight.

4. Connect hose assembly (19) to connection (17). Use a suitable tool to hold the connection and tighten tube nut (18) to a torque of 35 N·m (26 lb ft). Ensure that connection(17) is not moved as the tube nut (18) is tightened.

Note: Ensure that the hose assembly is not contacting any other engine components.

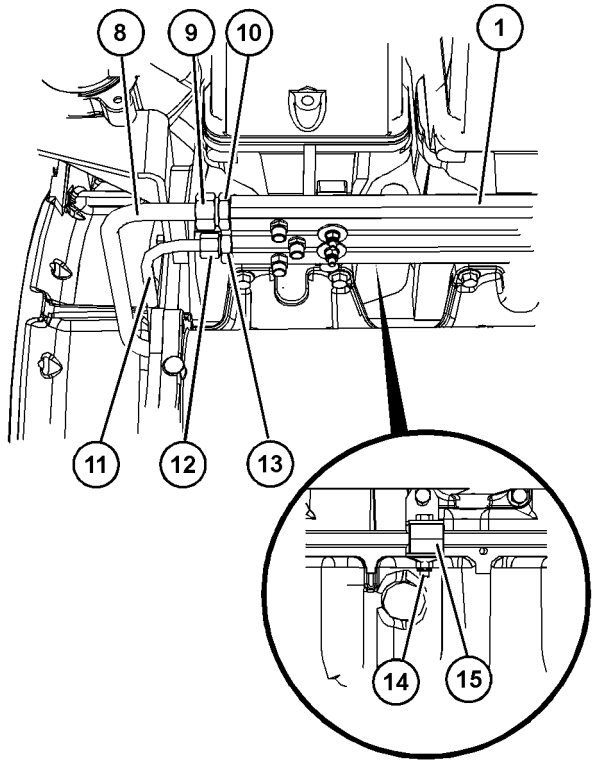

Illustration 9 g06009972

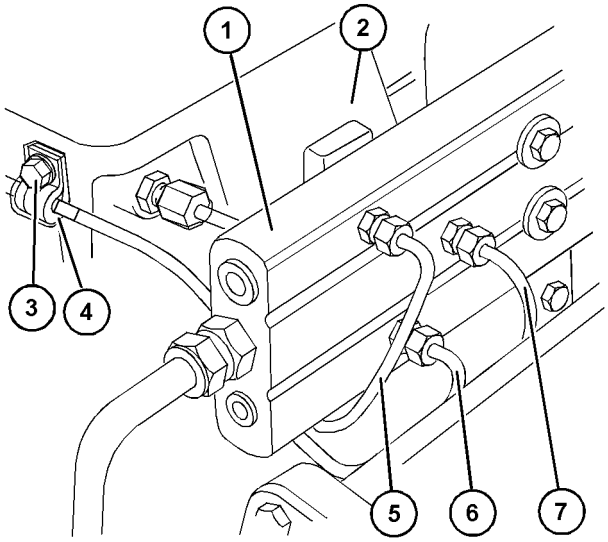

Illustration 10 g06009914

5. Connect tube assembly (11) to connection (13). Tighten tube nut (12) hand tight.

6. Connect tube assembly (8) to connection (10). Tighten tube nut (9) hand tight.

7. Position clamps (15) onto tube assembly (11) and tube assembly (8). Install nut and bolts (14) hand tight. If necessary, repeat Step 7 to install remaining clamps.

8. Connect tube assembly (5), tube assembly (6), and tube assembly (7) to engine oil rail (1) and valve mechanism cover base (2) hand tight.

9. Install bolt (3) to clip (4) hand tighten.

10. Repeat Step 8 through Step 9 to install remaining tube assembly (5), tube assembly (6), and tube assembly (7) to engine oil rail (1) and valve mechanism cover base (2).

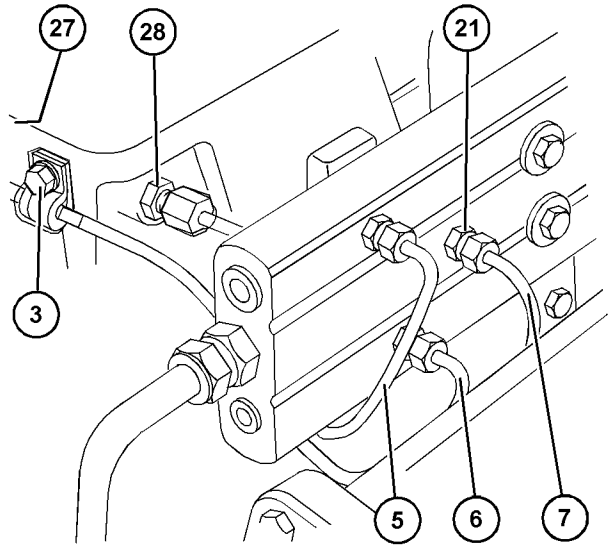

Illustration 11 g06010416

Typical example

11. Use a suitable tool to hold connections (21) and tighten the tube nuts for tube assembly (5), tube assembly (6), and tube assembly (7). Tighten the tube nuts to a torque of 15 N·m (133 lb in).

12. Use a suitable tool to hold connection (27) (not shown) and connection (28). Tighten the tube nuts for tube assembly (5), tube assembly (6), and tube assembly (7). Tighten the tube nuts to a torque of 15 N·m (133 lb in).

13. Tighten bolt (3) to a torque of 41 N·m (30 lb ft).

14. Repeat Step 11 through Step 13to tighten remaining tube nut for tube assembly (5), tube assembly (6), and tube assembly (7).

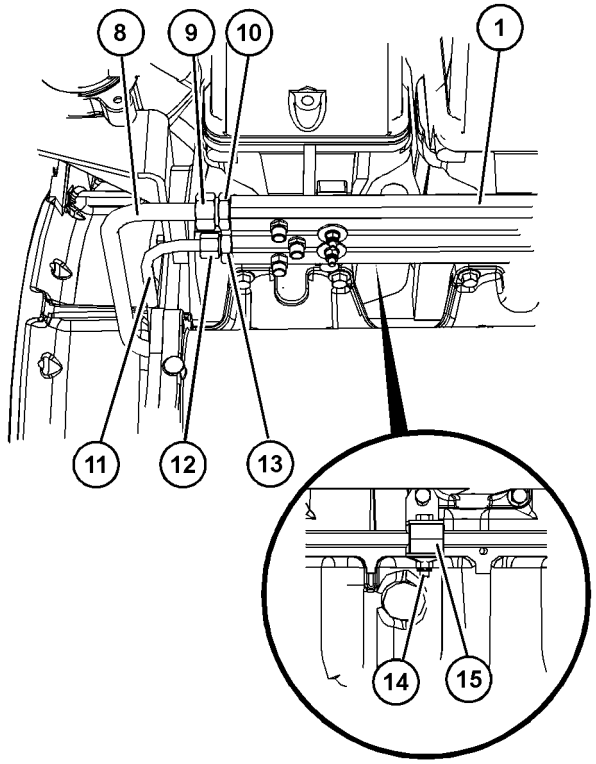

Illustration 12 g06009972

15. Use a suitable tool to hold connection (13) and tighten tube assembly (11) to a torque of 40 N·m (30 lb ft).

16. Use a suitable tool to hold connection (13) and tighten tube assembly (11) to a torque of 100 N·m (74 lb ft).

17. Tighten nut and bolt (14) to a torque of 25 N·m (221 lb in). Repeat Step 17 to tighten the remaining nuts and bolts.

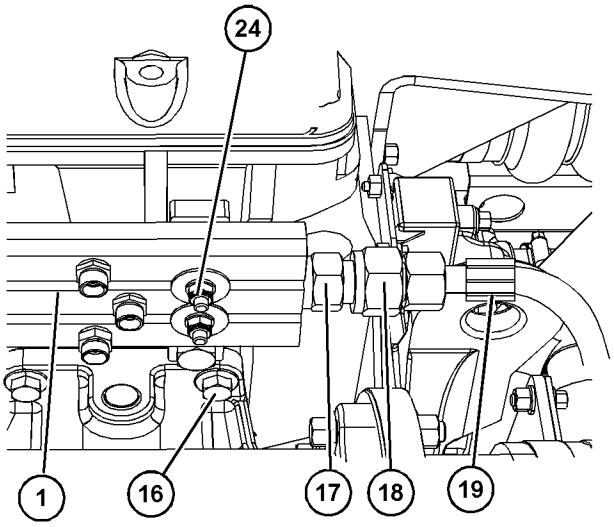

Illustration 13 g06010418

18. Use a suitable tool to hold connection (17) and tighten tube nut (18) for hose assembly (19) to a torque of 100 N·m (74 lb ft).

19. Tighten bolts (16) for engine oil rail (1) to a torque of 47 N·m (35 lb ft). Ensure that the tube assemblies and the hose assembly are not strained as the bolts are tightened.

20. Tighten nuts and bolts (24) for engine oil rail (1) to a torque of 25 N·m (18 lb ft).

21. Turn the battery disconnect switch to the ON position.

22. Switch ON battery charger (if installed) or the connect the mains supply and connect the negative lead to the batteries.

23. Before starting the engine after either engine oil rail removal and installation or an overhaul of the engine. Refer to Operation and Maintenance Manual, Before Starting Engine for the correct procedure. **This procedure should be read in full before starting of the engine.**

i06513475

Governor - Remove

(Electronic Control Unit)

Removal Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

⚠ WARNING

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

To avoid accidental engine starting, disconnect the battery cable from the negative (−) battery terminal. Completely tape all metal surfaces of the disconnected battery cable end in order to prevent contact with other metal surfaces which could activate the engine electrical system.

Place a Do Not Operate tag at the Start/Stop switch location to inform personnel that the equipment is being worked on.

1. Switch OFF battery charger (if installed) or the disconnect the mains supply and disconnect the negative lead from the batteries.

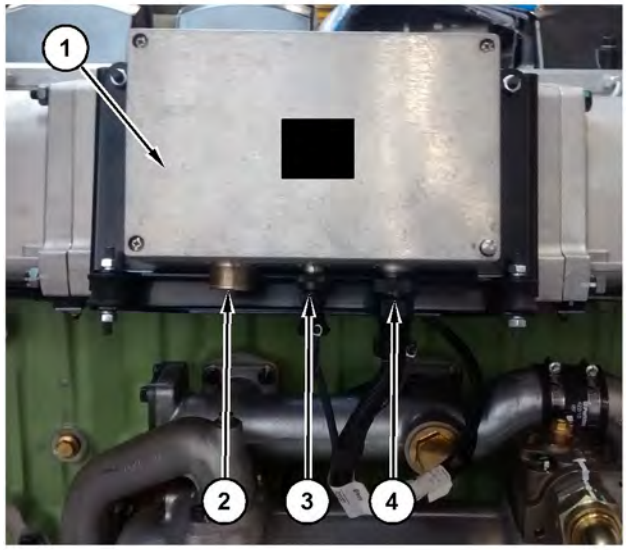

Illustration 14 g06030162
Typical example

2. Mark temporary marks on harness assembly (2), harness assembly (3), and harness assembly (4).

3. Disconnect Original Equipment Manufacture (OEM) harness assembly (2) from governor control unit (1). Refer to the OEM for the correct procedure.

4. Disconnect harness assembly (3) and harness assembly (4) from governor control unit (1).

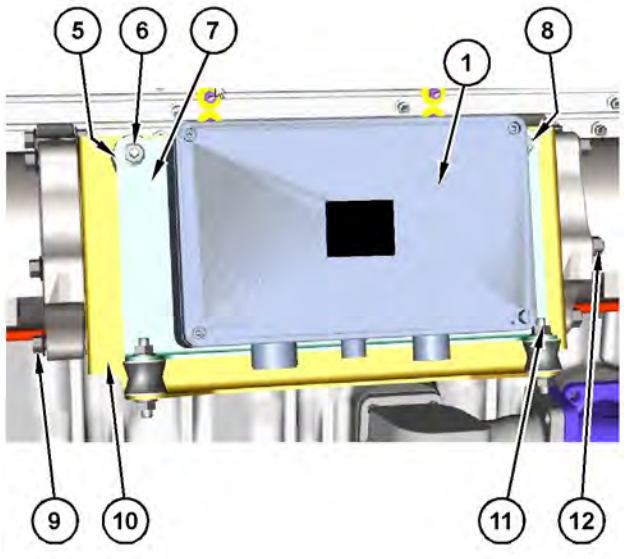

Illustration 15 g06030160

5. Remove nuts (6) and nuts (11) from bracket (7)

6. Remove bracket (7) and governor control unit (1) from rubber mounts (5).

7. If necessary, follow Step 7 through Step 7.c to remove bracket (10) from the inlet manifold.

a. Remove nuts and bolts (9) and nuts and bolts (12) from bracket (10).

b. Remove bracket (10) from the inlet manifold.

c. If necessary, remove nuts (8) from rubber mounts (5). Remove the rubber mounts from bracket (10).

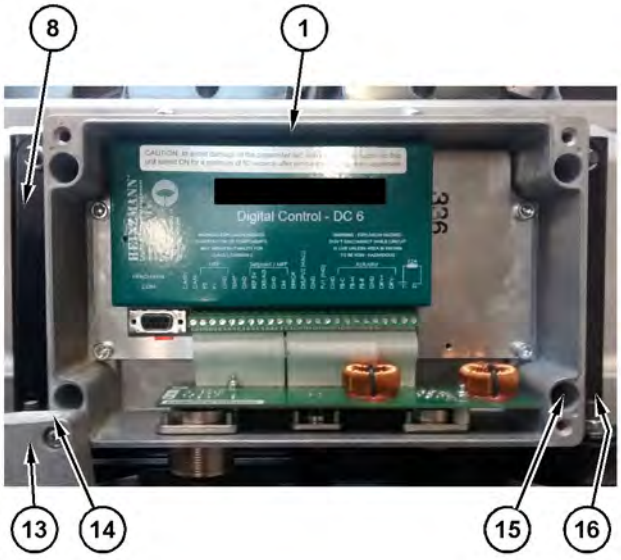

Illustration 16 g06030155

8. If necessary, follow Step 8.a through Step 8.c to remove governor control unit (1) from bracket (7).

a. Remove screws (14) and remove cover (13) from governor control unit (1).

b. Remove Allen head bolts and nuts (15) from governor control unit (1).

c. Remove governor control unit (1) from bracket (8). Remove washers (16) (not shown).

Note: Note the position of the washer for installation purposes.

i06513476

Governor - Install
(Electronic Control Unit)

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that all components of the governor control unit are free from wear or damage. If necessary, replace any component that is worn or damaged.

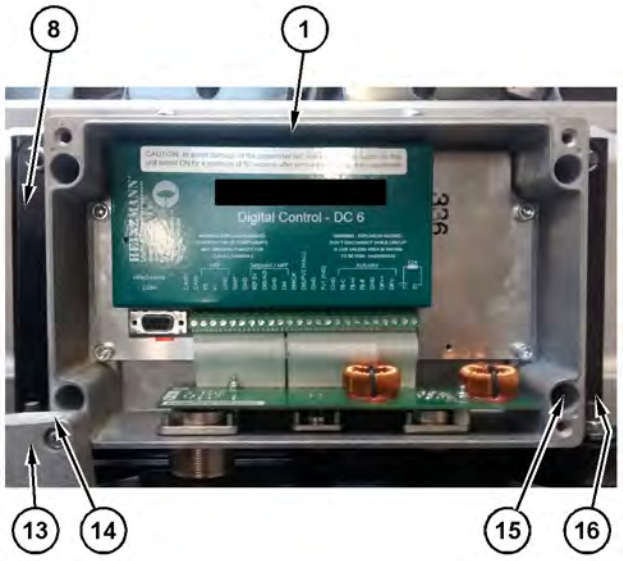

Illustration 17 g06030155

2. If necessary, follow Step 2.a through Step 2.d to install governor control unit (1) to bracket (7).

a. Position governor control unit (1) onto bracket (8). Position washers (16) (not shown) between the governor control unit and the bracket.**Ensure that the washers are correctly positioned between the governor control unit and the bracket.**

b. Install Allen head bolts and nuts (15) to governor control unit (1). Ensure that the washers remain between the governor control unit and the bracket.

c. Tighten Allen head bolts and nuts (15) to a torque of 10 N·m (89 lb in).

d. Install cover (13) to governor control unit (1). Install screws (14)and hand tight the screws.

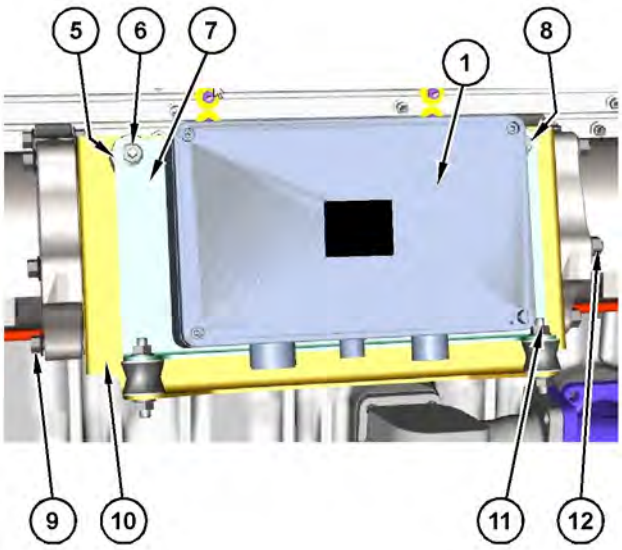

Illustration 18 g06030160

3. If necessary, follow Step 3.a through Step 3.c to install bracket (10) to the inlet manifold.

a. If necessary, install rubber mounts (5) to bracket (10) and install nuts (8) to the rubber mounts. Tighten the nuts to a torque of 25 N·m (18 lb ft). Ensure that the rubber mounts are not strained as the nuts are tightened.

b. Install bracket (10) to the inlet manifold. Install nuts and bolts (9) and nuts and bolts (12) to the bracket.

c. Tighten nuts and bolts (9) to a torque of 50 N·m (35 lb ft)

4. Install bracket (7) and governor control unit (1) to rubber mounts (5).

5. Install nuts (6) and nuts (11) to bracket (7). Tighten the nuts to a torque of 25 N·m (18 lb ft). Ensure that the rubber mounts are not strained as the nuts are tightened.

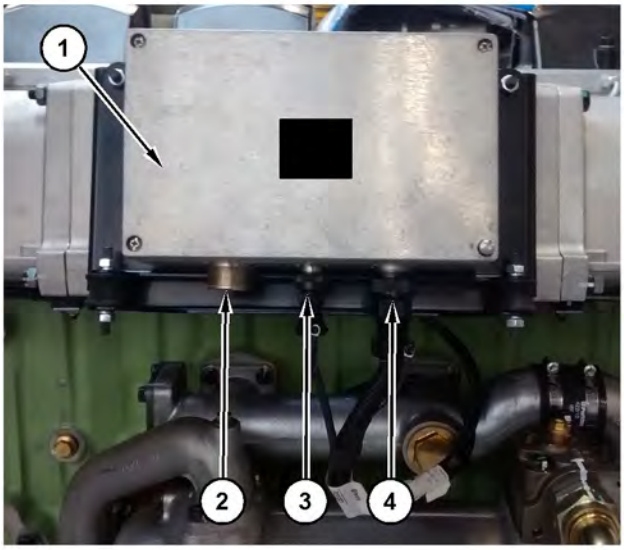

Illustration 19 g06030162
Typical example

6. Connect Original Equipment Manufacture (OEM) harness assembly (2) to governor control unit (1). Refer to the OEM for the correct procedure.

7. Connect harness assembly (3) and harness assembly (4) to governor control unit (1).

8. If a replacement electronic governor control unit has been installed, the feedback for the governor must be calibrated. Refer to Special Instruction, “Pandoras Digital Governor” for the correct procedure.

9. Switch ON battery charger (if installed) or the connect the mains supply and connect the negative lead to the batteries.

i06513477

Governor Actuator - Remove and Install

Removal Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

⚠ WARNING

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

To avoid accidental engine starting, disconnect the battery cable from the negative (−) battery terminal. Completely tape all metal surfaces of the disconnected battery cable end in order to prevent contact with other metal surfaces which could activate the engine electrical system.

Place a Do Not Operate tag at the Start/Stop switch location to inform personnel that the equipment is being worked on.

Removal of Governor Actuator

1. Switch OFF battery charger (if installed) or the disconnect the mains supply and disconnect the negative lead from the batteries.

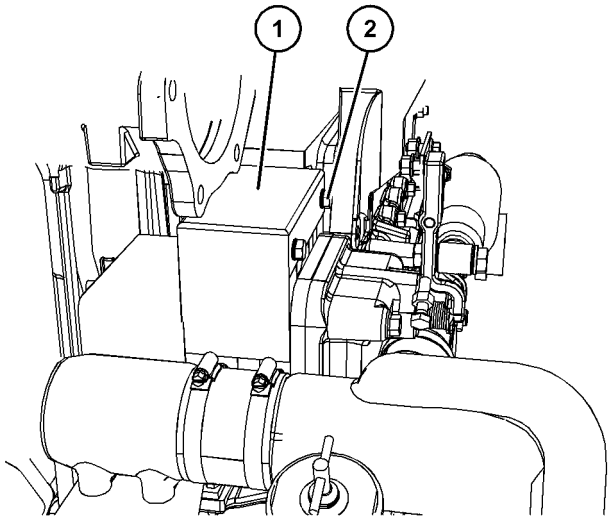

Illustration 20 g06015805

2. Remove bolts (2) from guard (1). Remove the guard.

⚠ WARNING

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

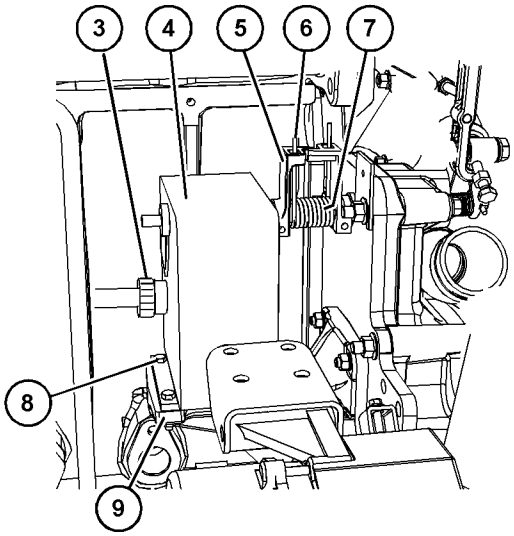

Illustration 21 g06015816

Tube assemblies not shown for clarity

3. Disconnect harness assembly (3) from governor actuator (4).

4. Remove nuts and bolts (8) from governor actuator (4).

5. Slide governor actuator (4) rearward and disconnect spring (6) from lever (5).

6. Remove governor actuator (4) from bracket (9).

7. Remove spring (6) and sleeve (7) (not shown) from the shaft.

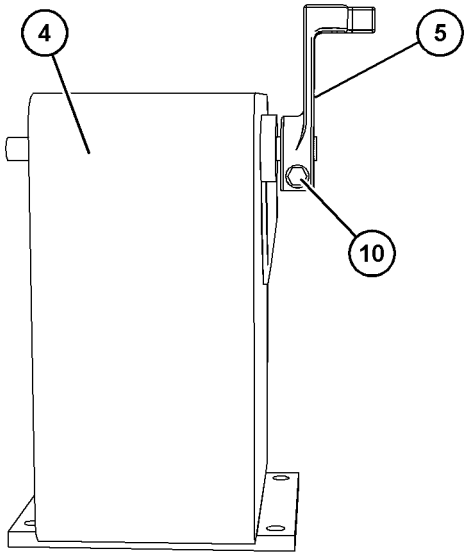

Illustration 22 g06016108

8. If necessary, remove self-locking nut and bolt (10) from lever (5). Remove the lever from governor actuator (4).

Note: Make temporary marks on the lever and the shaft of the governor actuator for installation purposes.

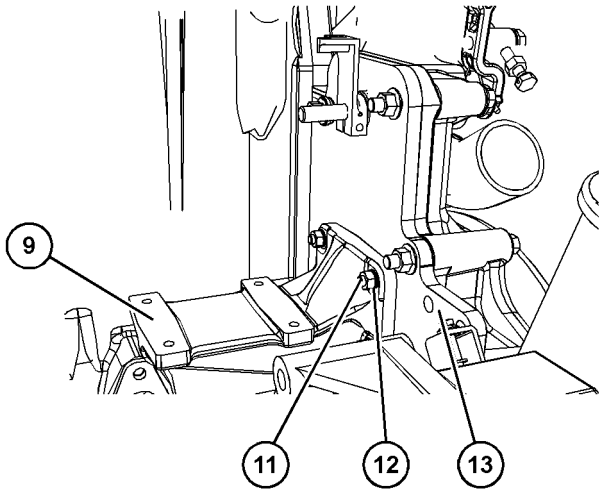

Illustration 23 g06016110

Tube assemblies not shown for clarity

9. If necessary, follow Step 9.a through Step 9.b to remove bracket (9).

a. Remove nuts (12) from bracket (9). Remove the bracket from suspension plate (13).

b. If necessary, remove studs (11) from suspension plate (13).

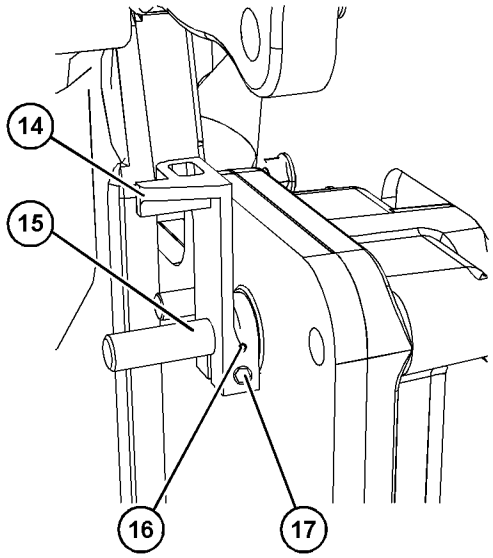

Illustration 24 g06029181

10. If necessary, follow Step 10.a through Step 10.c to remove lever (14) from shaft (15). **Do not remove the lever unless the lever is damaged, the oil seal or shaft require replacing.**

a. Remove nut and bolt (17) from lever (14).

b. Use a suitable tool to remove pin (16) from lever (14). Support shaft (15) as the pin is removed.

c. Remove lever (14) from shaft (15).

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

⚠ WARNING

For safe operation and the ability to stop the engine, ensure that the governor actuator will return the fuel injectors to the “NO FUEL” position.

Failure to stop the engine may result in personal injury or death.

Table 2

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	-	Loctite 542 Thread and nut lock	1
B	-	Loctite C5-A Anti-Sieze Compound	1

1. Ensure all components of the governor actuator and mounting bracket are free from wear or damage. Replace any component that is worn or damaged.

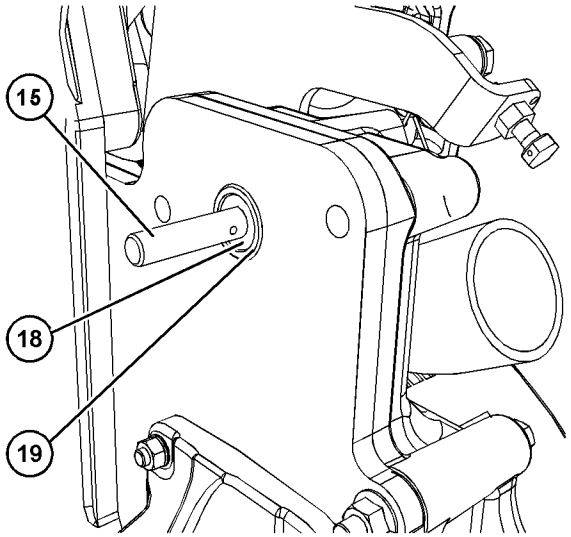

Illustration 25 g06029222

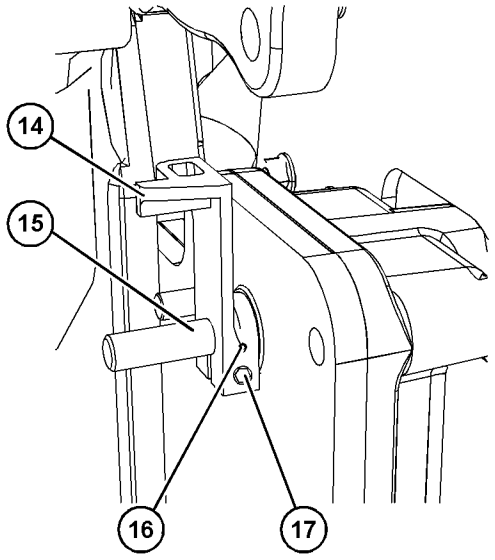

Illustration 26 g06029181

2. If lever (15) was removed and the lever is not going to be replaced with a new assembly. Inspect oil seal (18) is not leaking or damaged. if the oil seal is leaking or damaged, follow Step 3.c through Step 2.g to install a new oil seal.

a. Use as suitable tool to remove oil seal (18) from housing (19). Ensure that shaft (15) is not damaged as the oil seal is removed.

b. Ensure that shaft (15) and housing (19) is free from burrs or damage.

c. Lubricate a new oil seal (18) with clean engine oil. Carefully position the oil seal over shaft (15) and use a suitable tool to install the oil seal into housing (19). Ensure that the oil seal is correctly installed into the housing.

d. Install lever (14) onto shaft (15) and install nut and bolt (17).

e. Align the hole in lever (14) for pin (16) and position a new pin into the lever. Use a suitable tool to install the pin into the lever. Support shaft (15) as the pin is installed.

f. Tighten nut and bolt (17) to a torque of 10 N·m (89 lb in).

g. Ensure that there is end play between lever (15) and the housing.

3. If lever (14) was removed due to wear, damage, or shaft (15) replacement. Follow Step 3.c through Step 3.g to install new lever (14) assembly to shaft (15).

a. Inspect oil seal (18) is not leaking or damaged. if the oil seal is leaking or damaged, follow Step 3.c through Step 2.g to install a new oil seal.

b. Ensure that shaft (15) is free from wear or damage. If the shaft is worn or damaged. Refer to the correct section of Disassembly and Assembly, Fuel Injection Control Linkage - Remove and Disassembly and Assembly, Fuel Injection Control Linkage - Install for the correct procedure.

c. Use as suitable tool to remove oil seal (18) from housing (19). Ensure that shaft (15) is not damaged as the oil seal is removed.

d. Ensure that shaft (15) and housing (19) is free from burrs or damage.

e. Lubricate a new oil seal (18) with clean engine oil. Carefully position the oil seal over shaft (15) and use a suitable tool to install the oil seal into housing (19). Ensure that the oil seal is correctly installed into the housing.

f. Install a new lever (14) to shaft (15).

g. Loosely install nut and bolt (17) to lever (14). After the new lever has been installed, install the remaining components for the governor actuator before installing pin (16)to lever (14). **Refer to section Adjustment and Set Up Procedure for a New Governor Actuator Lever.**

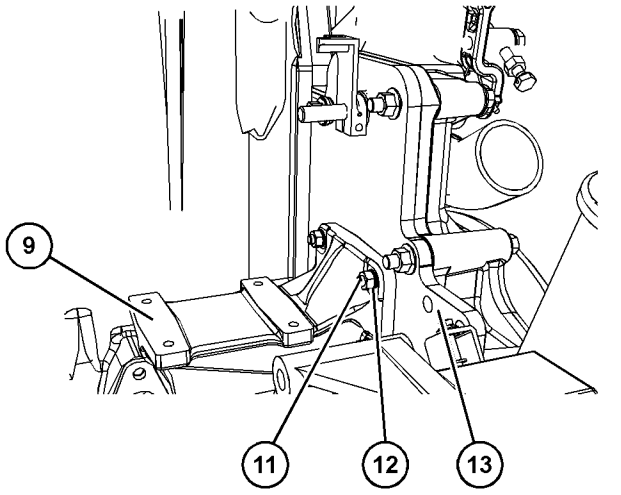

Illustration 27 g06016110

4. If necessary, follow Step 9.a through Step 4.c to install bracket (9).

a. If necessary, apply Tooling (A) to the threads of studs (11). Install the studs to suspension plate (13) and tighten the studs securely.

b. Position bracket (9) onto suspension plate (13).

c. Install nuts (12) to bracket (9). Tighten the nuts to a torque of 25 N·m (18 lb ft).

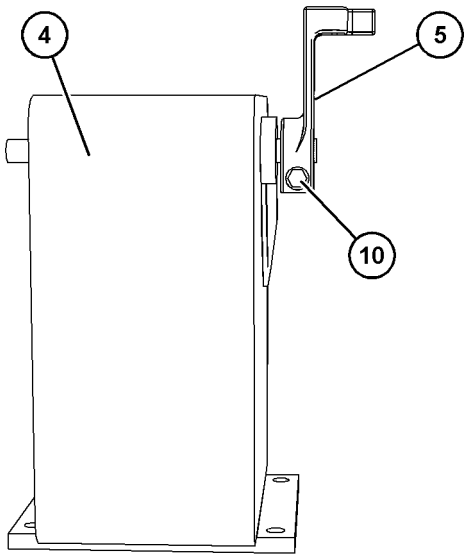

Illustration 28 g06016108

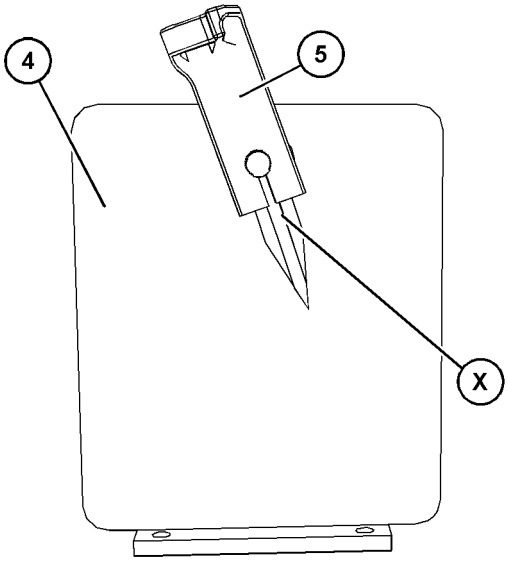

Illustration 29 g06016130

5. If necessary, follow Step 5.a through Step 5.b to install lever(5).

a. Position lever (5) on the shaft of governor actuator (4). Ensure that the lever is aligned as in Position (X) as shown in Illustration 29 .

b. Install self-locking nut and bolt (10)to lever (5). Tighten the self-locking nuts and bolts to a torque of 10 N·m (89 lb in).

⚠ WARNING

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

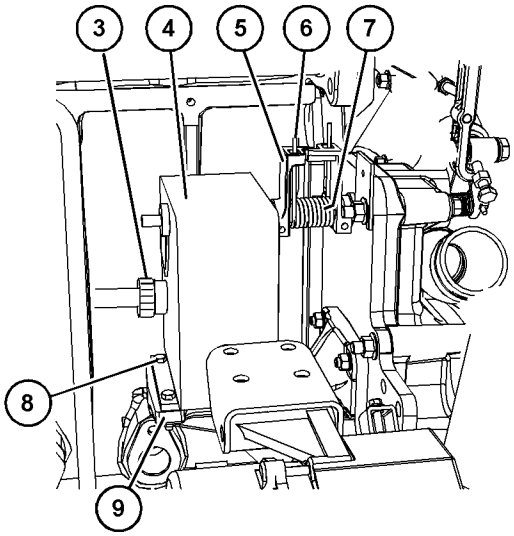

Illustration 30 g06015816

Tube assemblies not shown for clarity

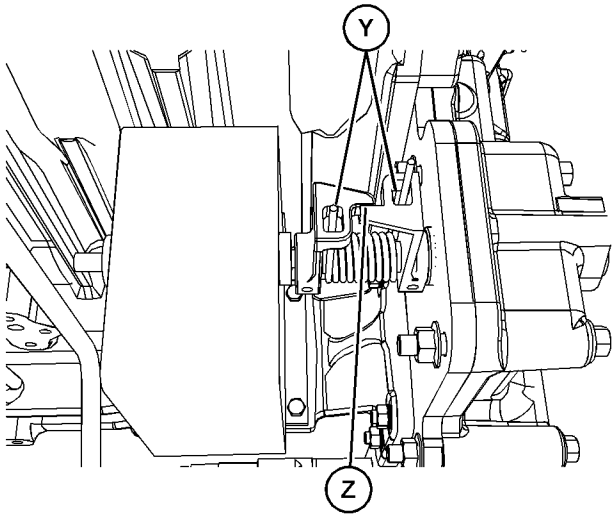

Illustration 31 g06016228

Position (Y) of the spring in levers

Position (Z) of both in levers

6. Apply Tooling (B) to the inner part of sleeve (7) (not shown).

7. Install spring (6) to the shaft and into the lever. Refer to Illustration 31 for the correct position.

8. Install sleeve (7) (not shown) to the spring and the shaft.

9. Position governor actuator (4) onto bracket (9). Install lever (5) to spring (6). Ensure that the levers are correctly installed, refer to 31 for the correct position.

10. Slide governor actuator (4) forward. Install bolts and nuts (8) to the governor actuator. Tighten the nuts and bolts hand tight. Ensure that the governor actuator has an equal distance across the back with the bracket.

11. Tighten nuts and bolts (8) to a torque of 10 N·m (89 lb in).

Note: Ensure that the governor actuator, move freely without binding.

12. Connect harness assembly (3) to governor actuator (4).

Adjustment and Set Up Procedure for a New Governor Actuator Lever

Table 3

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
C	21825617	Dial Indicator Group	1
	-	Magnetic Base and Stand	1

Illustration 32 g06030208

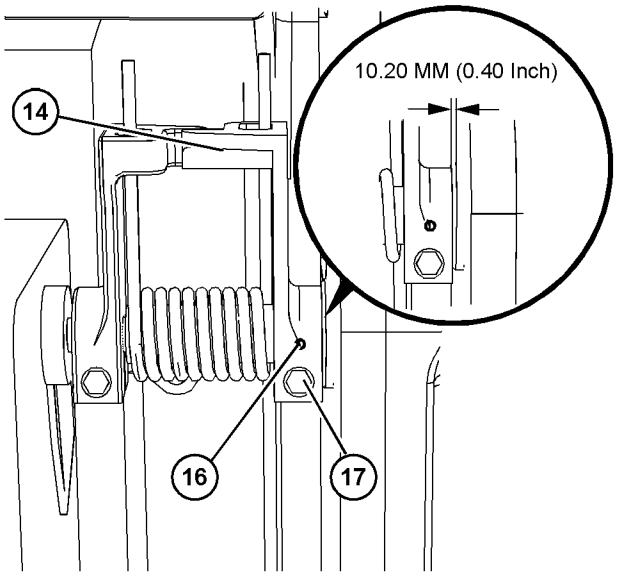

Illustration 33 g06029648

1. Follow Step 1.a through Step 1.f to adjust and set up a new lever (14).

a. Set the governor actuator to the zero position. Position a 4 mm (0.158 inch) spacer (20) between the two levers of the lever assembly. Refer to Illustration 32 for the correct position.

b. Position a 0.3 mm to 0.5 mm (0.012 inch to 0.020 inch) feeler gauge between lever (14) and oil seal housing. Refer to 29 for the correct position.

c. Tighten nut and bolt (17) to a torque of 10 N·m (89 lb in). Use Tooling (C) to check the end play of the lever (14). Ensure that the end play is between 0.3 mm to 0.5 mm (0.012 inch to 0.020 inch). If the end play is not between 0.3 mm to 0.5 mm

(0.012 inch to 0.020 inch). Loosen the nut and bolt and repeat Step 1.c to achieve the correct end play.

d. Remove spacer (20) from between the two levers of the lever assembly.

e. After the end play has been set, use a 4 mm (0.158 inch) drill to drill through pin (16) hole in lever (14) and the shaft.

f. Use a suitable tool to install pin (16)to lever (14). Support the shaft as the pin is installed.

Installation Procedure for Guard

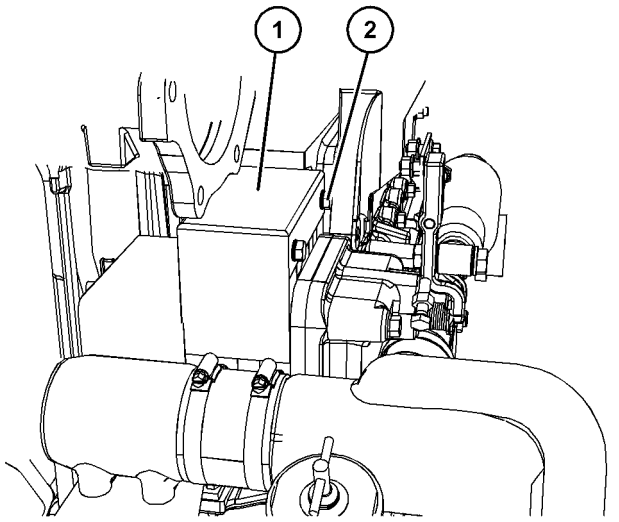

Illustration 34 g06015805

1. Install guard (1) and install bolts (2). Tighten the bolts to a torque of 25 N·m (18 lb ft).

2. Switch ON battery charger (if installed) or the connect the mains supply and connect the negative lead to the batteries.

3. Calibrate the operation of the governor actuator and the governor electronic control unit. Refer to Operation and Maintenance Manual, “Governor Actuator - Check” for more information.

i06513469

Fuel Injection Control Linkage - Remove

Removal Procedure

Start By:

a. Remove the rocker assemblies. Refer to Disassembly and Assembly, “Rocker Arm and Shaft - Remove” for the correct procedure.

b. Remove the cam followers. Refer to Disassembly and Assembly, “Lifter Group - Remove” for the correct procedure.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Removal of the Upper Fuel Injection Control Linkage and the Setting of the Governor Actuator

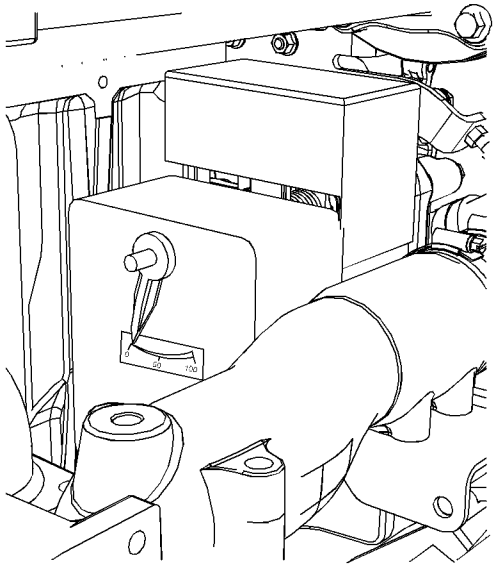

Illustration 35 g06015056

The ZERO FUEL position on the governor actuator

1. Set the governor actuator to the ZERO FUEL position.

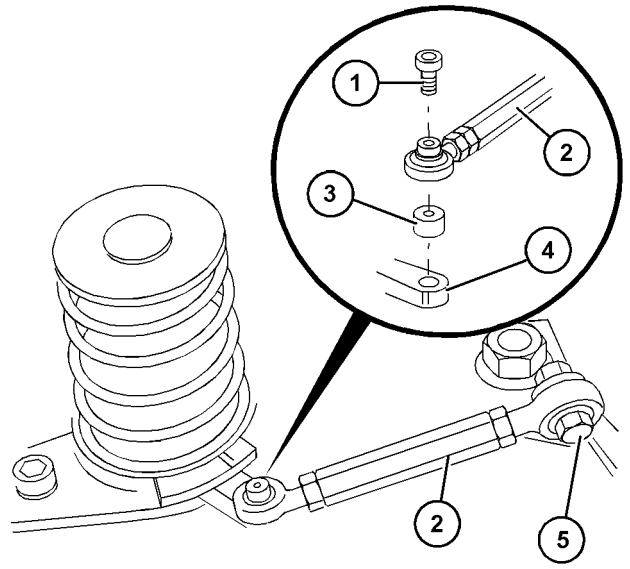

Illustration 36 g06015060

2. Remove Allen head bolt (1) for link (2) from fuel injector lever(4). Ensure that the fuel injector lever is not strained as the Allen head bolt is removed.

3. Remove spacer (3).

4. Remove nut and bolt (5). Remove link (2).

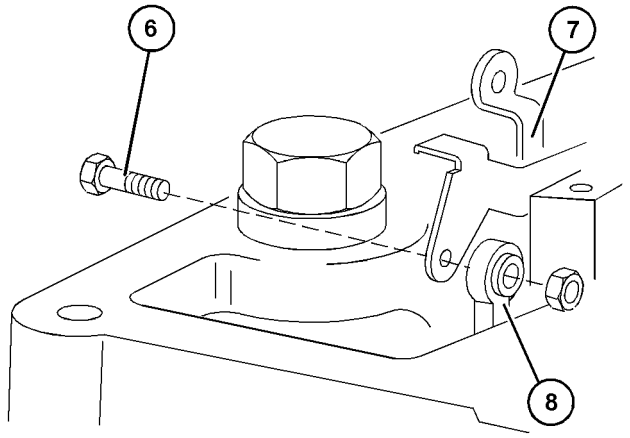

Illustration 37 g06015064

5. Remove locking nut and bolt (6). Disconnect rod (8) from break-back lever (7).

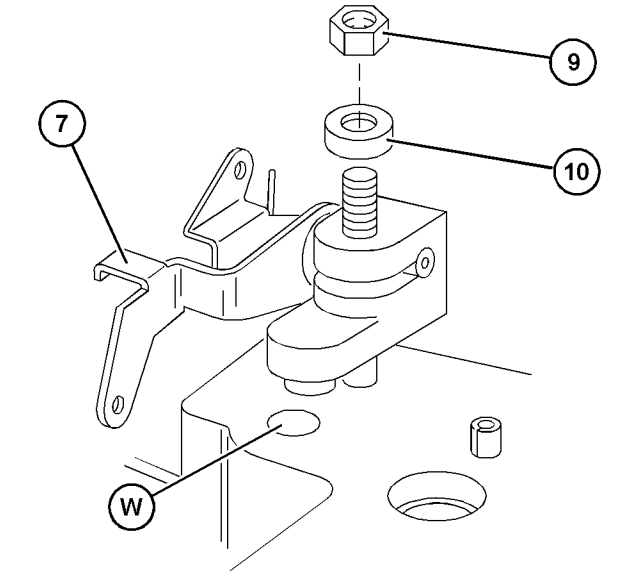

Illustration 38 g06015071

6. If necessary, remove locking nut (9) and spacer (10). Remove break-back lever (7) from the cylinder head. Note position of dowel Hole (W) in cylinder head for the break-back lever.

Removal of the Stop Control Solenoid and the Stop Lever from the Timing Case

1. Remove the governor actuator. Refer to Disassembly and Assembly, “Governor Actuator - Remove and Install” for the correct procedure.

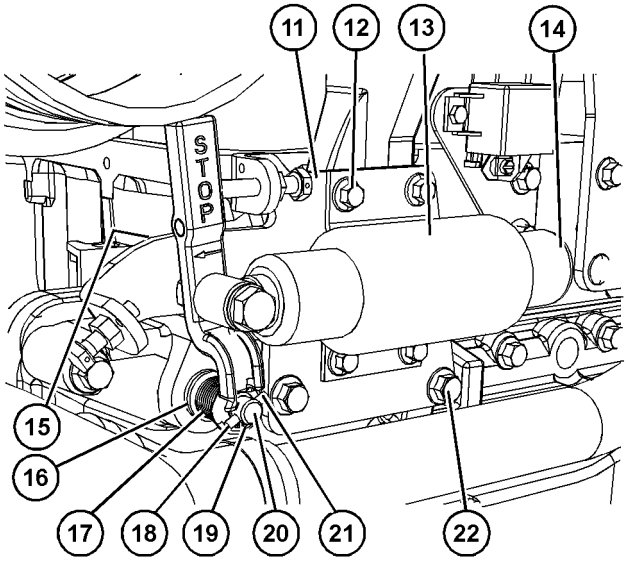

Illustration 39 g06015102

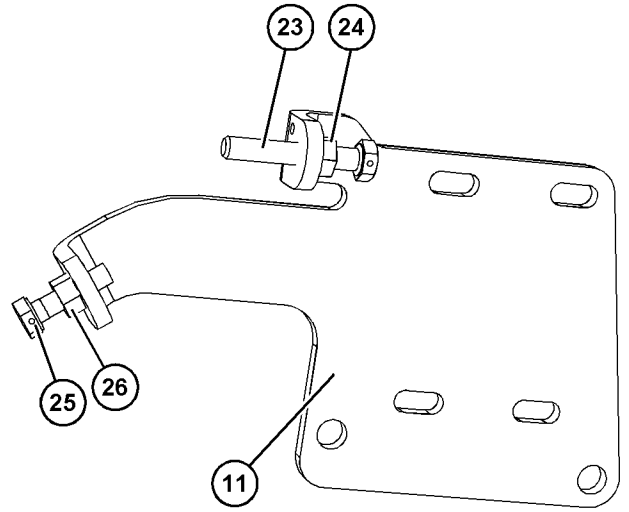

Illustration 40 g06015156

2. Disconnect harness assembly (14) from solenoid (13).

3. Compress the plunger on stop solenoids (13). Use suitable cable straps to secure the plunger in the compressed position

4. Remove bolts (12) from solenoid (13). Remove solenoid from bracket (11).

5. Remove pin (18) from shaft (20). Support the shaft as the pin is removed

6. Remove circlip (19) from shaft (20)

7. Remove lever (21) from shaft (20). As the shaft is removed disconnect spring (17) from pin in the timing case.

8. Remove spring (17) and washers (16) from shaft (20). Note the orientation of the spring and also the number of washers for installation purposes.

9. if necessary, remove nuts and bolts (22) from bracket (11). Remove the bracket and bracket (15) (not shown) from the timing case.

Note: Make temporary mark on the suspension plate to show the position of (15) (not shown) for installation purposes. Note position of thick washer on bracket (15) (not shown).

10. If necessary, follow Step 10.a through Step 10.d to disassemble bracket (11).

a. Measure the distance of bolt (23) for installation purposes.

b. Loosen lock nut (24) and remove bolt (23) from bracket (11).

c. Measure the distance of bolt (25) for installation purposes.

d. Loosen lock nut (26) and remove bolt (25) from bracket (11).

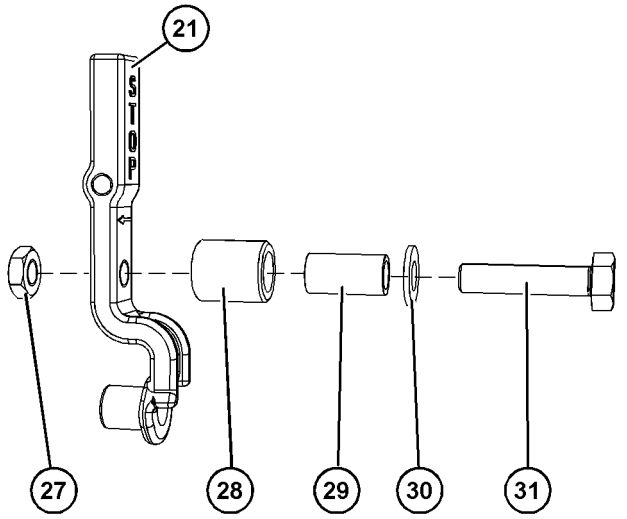

Illustration 41 g06015170

11. If necessary, follow Step 11.a through Step 11.b to disassemble lever (21).

a. Remove nut (27) and bolt (31)from lever (21).

b. Remove bush (28), bush (29), and washer (30) from bolt (31). Note the position of all components.

Removal of the Fuel Injection Control Linkage from the Crankcase

1. Remove the Housing Front (Timing Case). Refer to Disassembly and Assembly, “Housing (Front) (Timing Case) - Remove” for the correct procedure.

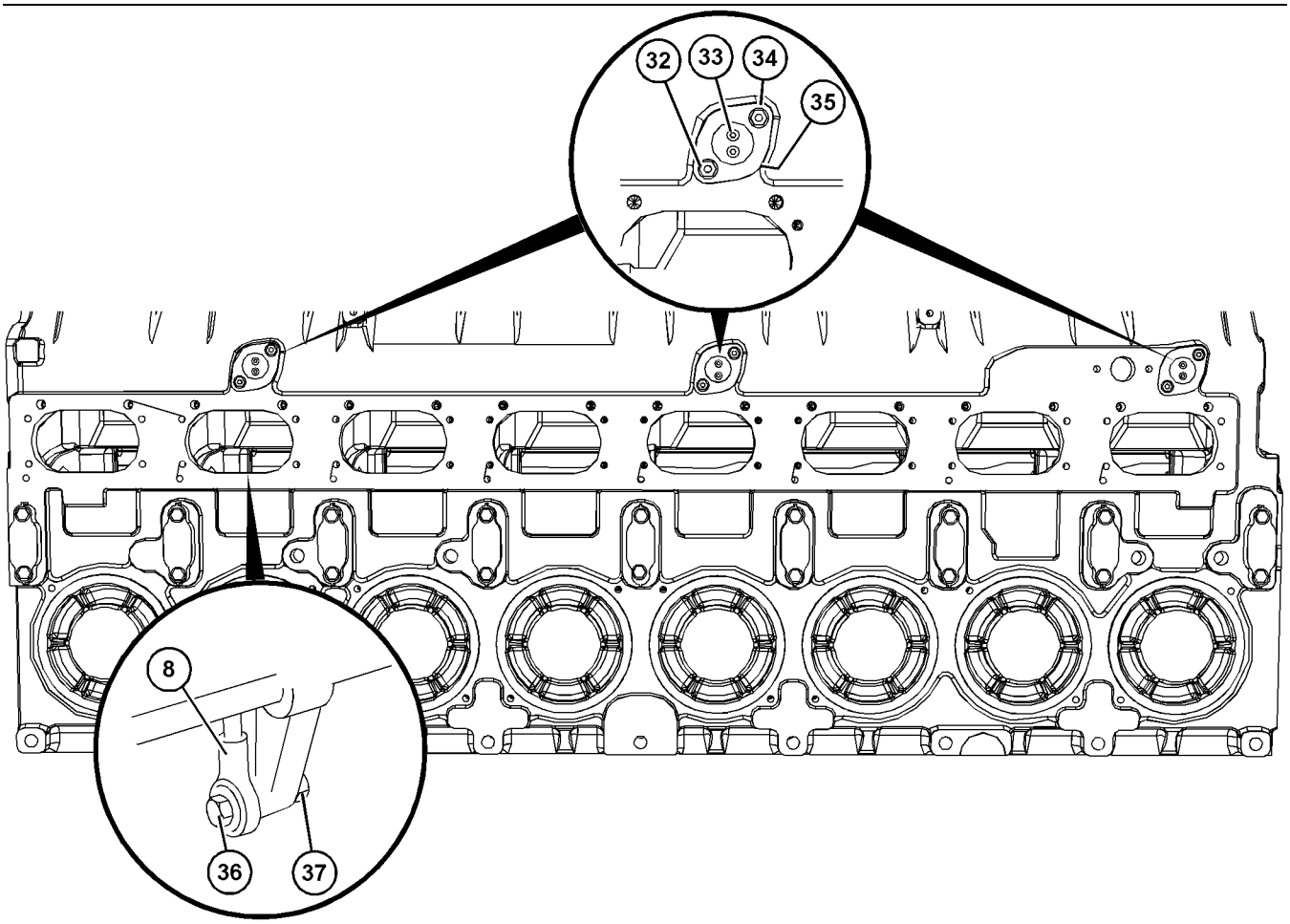

Illustration 42 g06015514

2. Remove locking nut (37) and bolt (36) from rod (8). If necessary, remove rod (8). Repeat Step 2 to remove the remaining locking nut, and bolt, and rods.

3. Remove nuts (32) from plate (34).

4. Remove Allen head bolts (33) from plate (34). Remove the plate from the cylinder block. Remove O-ring seal (35) (not shown).

5. Repeat Step 3 through Step 4 to remove remaining plate (34).

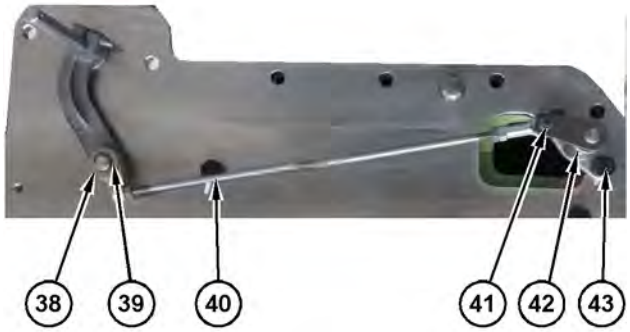

Illustration 43 g06030187

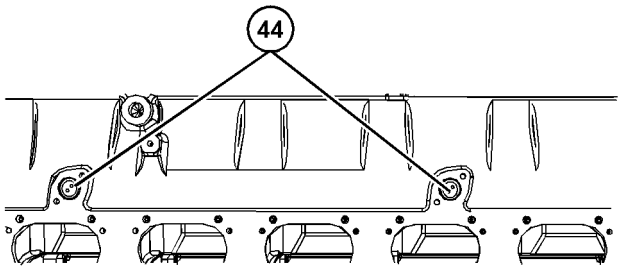

Illustration 44 g06015528

6. Remove circlip (39) and washer (38) from rod (40).

7. Remove locking nut and bolt (41) from rod (40) and remove the rod.

Note: Note the orientating of the rod for installation purposes.

8. Remove bolts (43) from linkage rod housing (42).

9. Push supports (44) for fuel injection control linkage (42) from the cylinder block and carefully remove the assembly of the fuel injection control linkage from the cylinder block.

i06513471

Fuel Injection Control Linkage - Install

Installation of the Fuel Injection Control Linkage from the Crankcase

Table 4

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	-	Loctite C5-A Anti-Sieze Compound	1
B	-	LOCTITE 542	1

1. Ensure all components the fuel injection control linkage are free from wear or damage. Replace any component that is worn or damaged.

2. Lubricate all the bearing surfaces of the fuel injection control linkage and rods with clean engine oil.

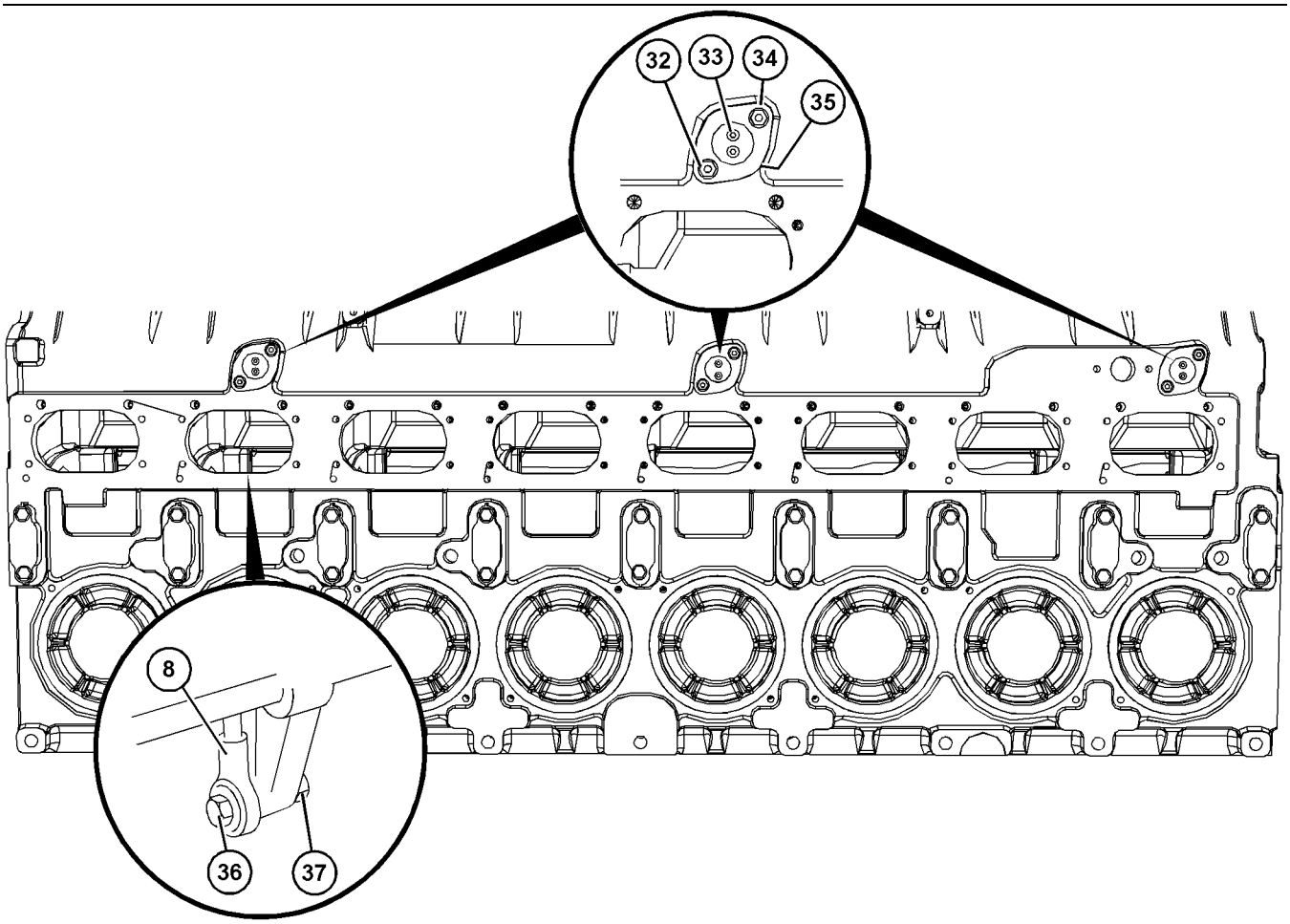

Illustration 45 g06015514

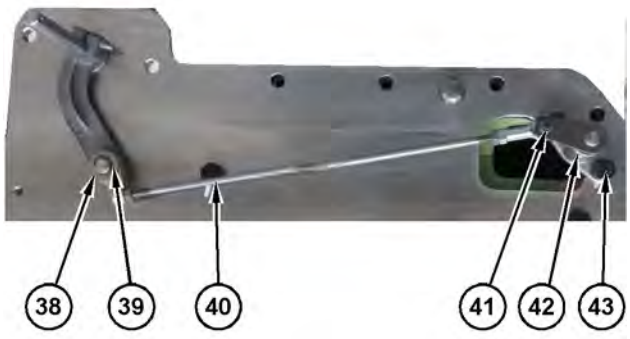

Illustration 46 g06030187

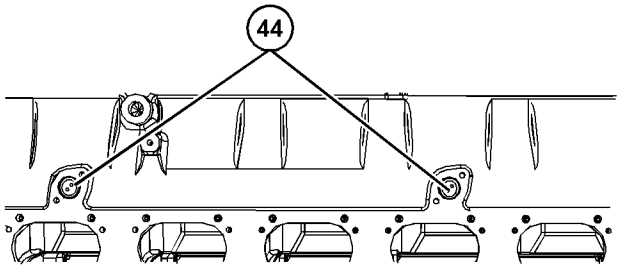

Illustration 47 g06015528

3. Carefully install the assembly of fuel injection control linkage (42) into from the cylinder block. Push supports (44) for fuel injection control linkage into the cylinder block. Ensure that the supports for fuel injection control linkage are correctly located into the cylinder block.

4. Install bolts (43) to linkage rod housing (42). Hand tighten the bolts.

5. Install a new O-ring seal (35) (not shown) to supports (44) for fuel injection control linkage.

6. Position plate (34) onto support (44) for fuel injection control linkage.

7. Install Allen head bolts (33) to plate (34). Install nuts (32) to the plate. Hand tighten the nuts and the Allen head bolts.

8. Repeat Step 5 through Step 7 to install remaining plate (34).

9. Tighten nuts (32) to a torque of 50 N·m (35 lb ft).

Tighten Allen head bolts (33) to a torque of 8 N·m (70 lb in).

Tighten bolts (43) to a torque of 50 N·m (35 lb ft)

Note: Ensure that the fuel injection control linkage is free to rotate after the nuts, bolts, and Allen head bolts have been tightened.

10. Install rod (40) to the lever and the fuel injection control linkage. Ensure that the rod is correctly orientated.

11. Install locking nut and bolt (41) to the rod. Hand tighten the nut and bolt.

12. Install washer (38) onto rod (40) and install circlip (39). Ensure that the circlip is correctly seated in to the groove.

13. Tighten locking nuts and bolts (41) to a torque of 8 N·m (70 lb in).

14. If necessary, install rod (8) into the cylinder block.

15. Position rod (8) onto fuel injection control linkage (42). Install bolt (36) and locking nut bolt (37). Tighten the locking nut bolt to a torque of 8 N·m (70 lb in).

16. Repeat Step 14 through Step 15 to install the remaining rods, bolts, and locking nuts.

17. Install the Housing Front (Timing Case). Refer to Disassembly and Assembly, “Housing (Front) (Timing Case) - Remove” for the correct procedure.

Installation of the Stop Control Solenoid and the Stop Lever to the Timing Case

1. Ensure all components of the stop control solenoid and the stop lever are free from wear or damage. Replace any component that is worn or damaged.

2. Lubricate all the bearing surfaces of the stop lever.

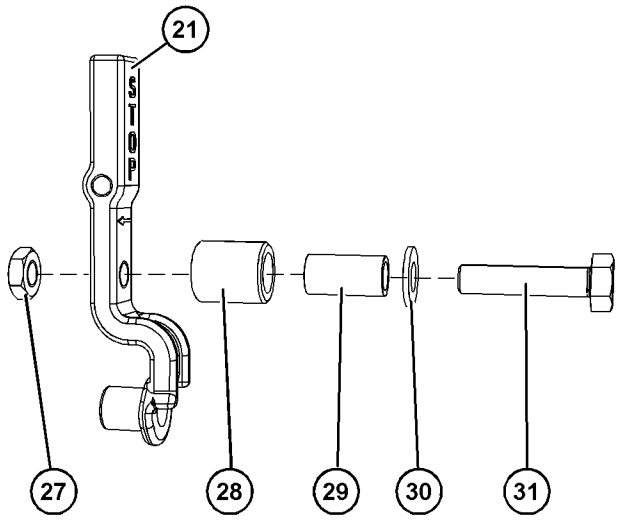

Illustration 48 g06015170

3. If necessary, follow Step 3.a through Step 3.d to assemble lever (21).

a. Apply Tooling (A) to bush (29) Install the bush into bush (28). Position washer (30) onto bolt (31).

b. Install bolt (31) and washer (30) to bush (29).

c. Install bolt (31) to lever (21). Apply Tooling (B) to the threads of the bolt. Install nut (27)to the bolt.

d. Tighten the nut (27) and bolt (31) to a torque of 47 N·m (35 lb ft). Ensure the bush (28)rotates freely after the nut and bolt has been tightened.