



Service Repair Manual

Models

325-A 325 325L EXCAVATOR

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Product: EXCAVATOR

Model: 325-A EXCAVATOR 8NL

Configuration: 325, 325L TRACK TYPE EXCAVATORS 8NL00001-UP (MACHINE) POWERED BY 3116 ENGINE

Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders

Media Number -SEN3611-18

Publication Date -01/05/2009

Date Updated -27/05/2009

i01928419

Governor - Install

SMCS - 1264-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	136-4149	Governor Pliers ⁽¹⁾	1
B	128-8827	Pin ⁽¹⁾	1
	1U-7523	Pin Pilot ⁽¹⁾	1

⁽¹⁾ This tool is part of the **128-8822** Governor Tool Group.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: For more information on the governor, refer to Service Manual, SENR6454, "3114, 3116, & 3126 Engine Governors". The Service Manual, SENR6454 requires the use of a **1U-7326** Governor Calibration Bench. For information on reusability of components in the governor, refer to Guideline For Reusable Parts And Salvage Operations, SEBF8434, "3100 Governor Inspection and General Information for Mechanical Governor Groups Used in 3114, 3116, and 3126 Engines Equipped with Mechanical Unit Injectors (MUI)".



Illustration 1

g00673178

1. Apply lubricant to the new O-ring seal (1). Install new O-ring seal (1) in the cylinder head.

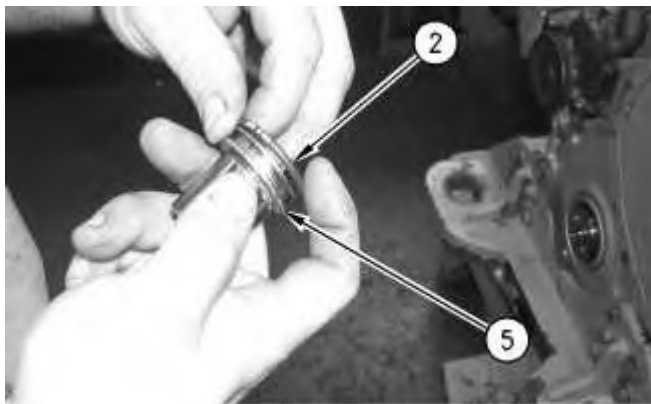


Illustration 2

g00672733

2. Apply lubricant to the new O-ring seal (2). Install new O-ring seal (2) on the tube assembly (5).

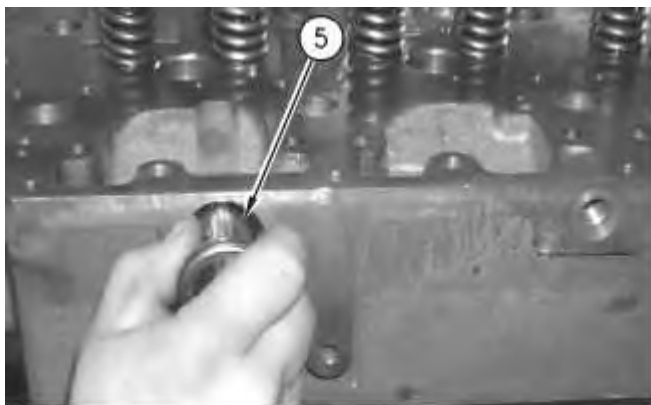


Illustration 3

g00672742

3. Install the O-ring seal and tube assembly (5) in the cylinder head.
-

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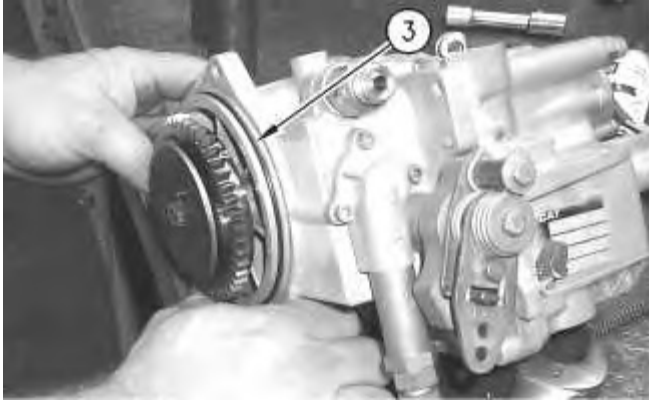


Illustration 4

g00673180

4. Apply lubricant to the new O-ring seal (3). Install new O-ring seal (3) on the governor.



Illustration 5

g00673182

5. Place the governor in position on the engine.

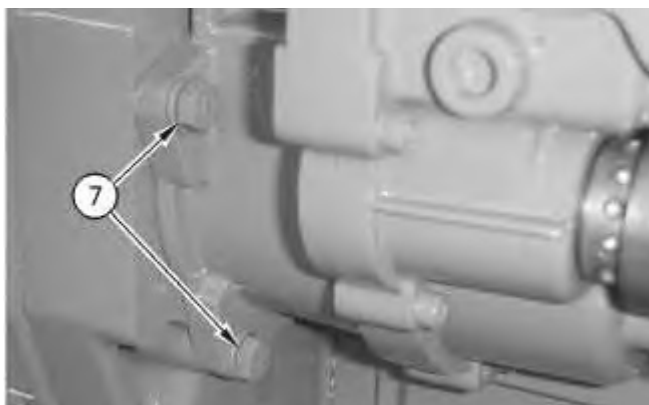


Illustration 6

g00613563

6. Install the washers and bolts (7) that hold the governor in place.

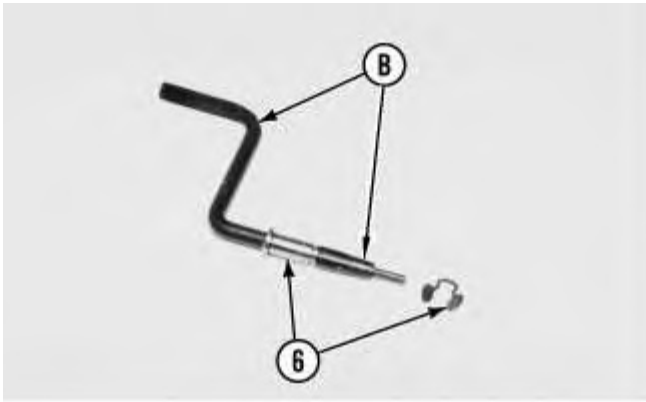


Illustration 7

g00672755

7. Install clevis pin (6) in Tooling (B).

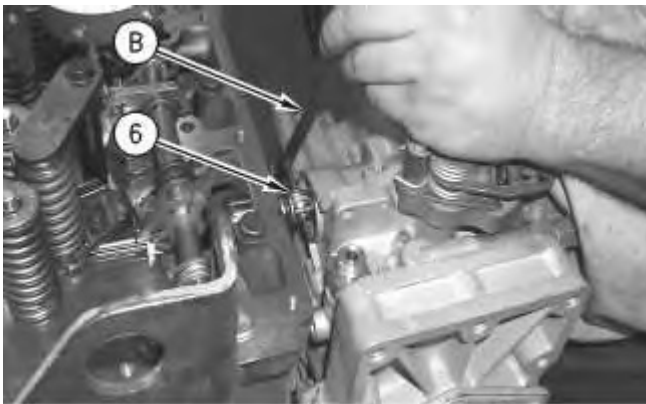
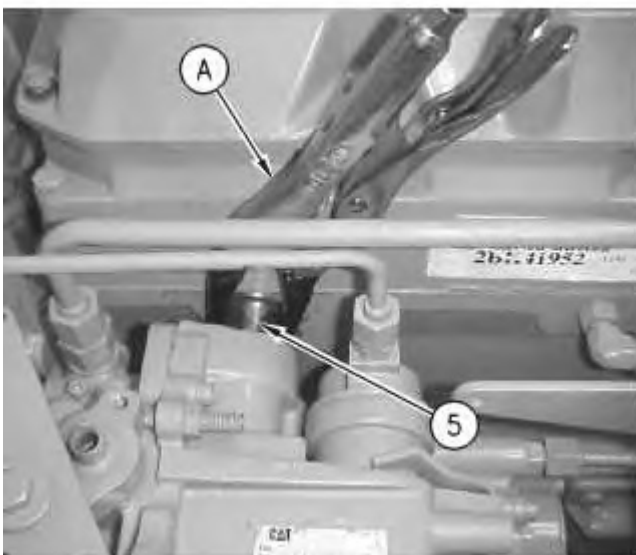


Illustration 8

g00672752

8. Use Tooling (B) to install clevis pin (6) and the clip.
9. Check the fuel setting adjustment. Refer to Testing and Adjusting, SENR5118.



10. Use Tooling (A) to slide tube assembly (5) into the governor.



Illustration 10

g00613071

11. Install clip (4).

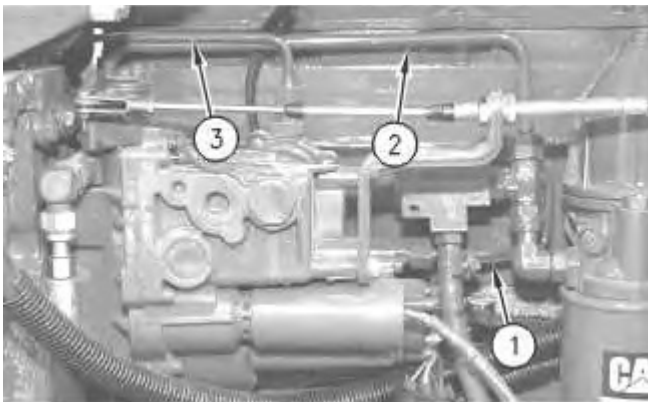


Illustration 11

g00613041

12. Install oil tube assembly (1). Install tube assembly (2) and tube assembly for fuel ratio control (3), if equipped. Plug and cap all connections.
13. Install the governor control cable.

End By:

- a. Install the fuel shutoff solenoid. Refer to Disassembly and Assembly, "Fuel Shutoff Solenoid - Remove and Install".

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Product: EXCAVATOR

Model: 325-A EXCAVATOR 8NL

Configuration: 325, 325L TRACK TYPE EXCAVATORS 8NL00001-UP (MACHINE) POWERED BY 3116 ENGINE

Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders

Media Number -SEN3611-18

Publication Date -01/05/2009

Date Updated -27/05/2009

i01928445

Fuel Injection Control Linkage - Remove

SMCS - 1298-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	136-4149	Governor Pliers	1

Start By:

- Remove the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



Illustration 1

g00613071

1. Remove clip (4). Clip (4) is located between the governor and the cylinder head.

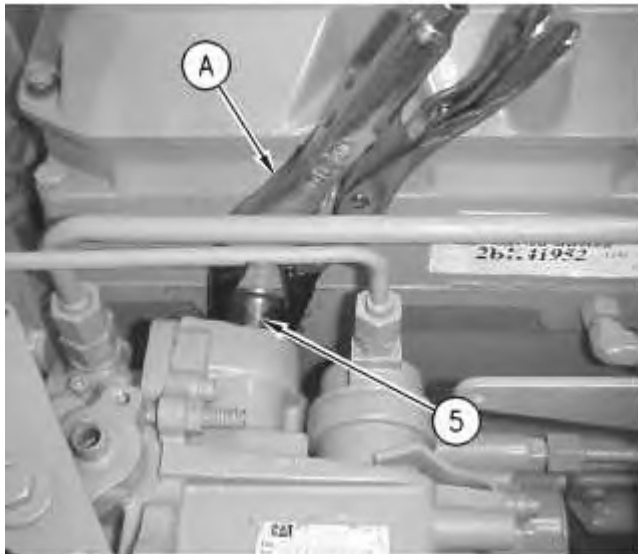


Illustration 2

g00655975

2. Use Tooling (A) to slide tube assembly (5) into the cylinder head.



Illustration 3

g00613149

3. Remove the clip and use Tooling (A) to remove the clevis pin (6). Clevis pin (6) connects the governor to the control lever of the fuel injection control linkage.

Note: Clevis pin (6) must stay with the governor in order to be adjusted.

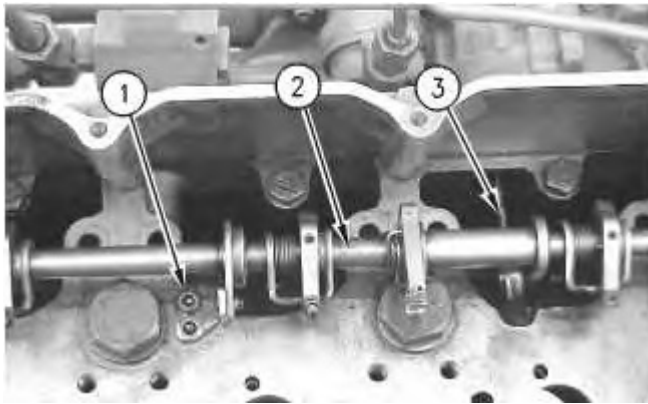


Illustration 4

g00630566

4. Remove bolts (1) and remove fuel injection control linkage (2). Control lever (3) connects the fuel injection control linkage (2) to the governor.

Note: For information on the inspection procedure for control lever (3), refer to Special Instruction, REHS0601, "Inspection and Modification of the 102-7459 Fuel Injection Control Linkage and the 4P-9048 Fuel Injection Control Linkage".

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Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders

Media Number -SEN3611-18

Publication Date -01/05/2009

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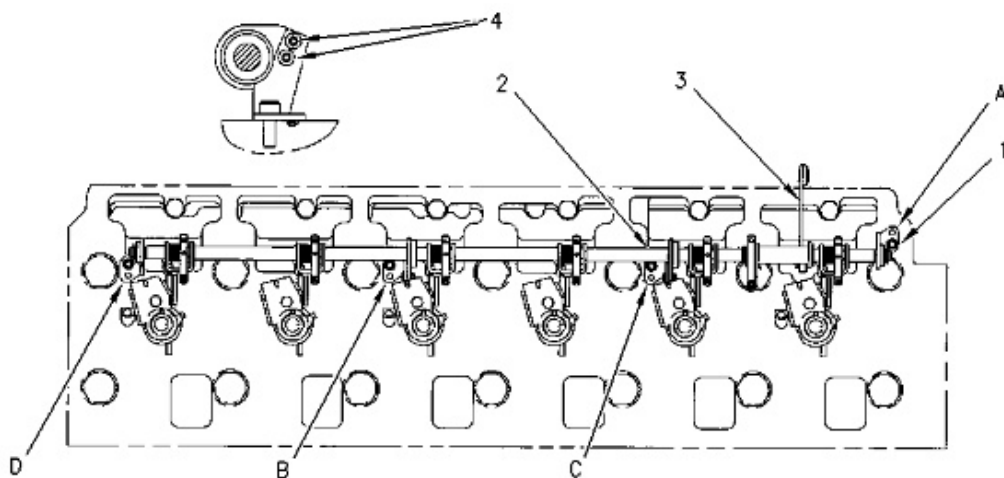
Fuel Injection Control Linkage - Install

SMCS - 1298-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	136-4149	Governor Pliers ⁽¹⁾	1
B	128-8827	Pin ⁽¹⁾	1
	1U-7523	Pin Pilot ⁽¹⁾	1
C	1U-6675	Spring Compressor ⁽¹⁾	6
D	128-8822	Fuel System and Governor Tool Gp	1

⁽¹⁾ This tool is part of the **128-8822** Governor Tool Group.


Note: For information on the inspection procedure for control lever (3), refer to Special Instruction, REHS0601, "Inspection and Modification of the 102-7459 Fuel Injection Control Linkage and the 4P-9048 Fuel Injection Control Linkage".

1. Loosen setscrews (4) on each bracket.
 2. Install fuel control linkage (2) and install bolts (1). Use the following sequence in order to tighten the bolts.
 3. Tighten bracket (A) and (D) to a torque of $12 \pm 3 \text{ N}\cdot\text{m}$ ($106 \pm 27 \text{ lb in}$).
 4. Tighten brackets (B) and (C) to a torque of $12 \pm 3 \text{ N}\cdot\text{m}$ ($106 \pm 27 \text{ lb in}$).
 5. Position brackets (B) and (C) in order to allow free rotation of the fuel control rod.
 6. Use a 2.5 mm (0.10 inch) wrench to tighten setscrews (4). Tighten the setscrews to a torque of $3.5 \pm 0.2 \text{ N}\cdot\text{m}$ ($31 \pm 2 \text{ lb in}$). Do not overtighten the setscrews. Ensure that the control rod rotates freely.
 7. The control rod should rotate freely when a force of 4.4 N (1 lb) or less is applied to control lever (3).
-

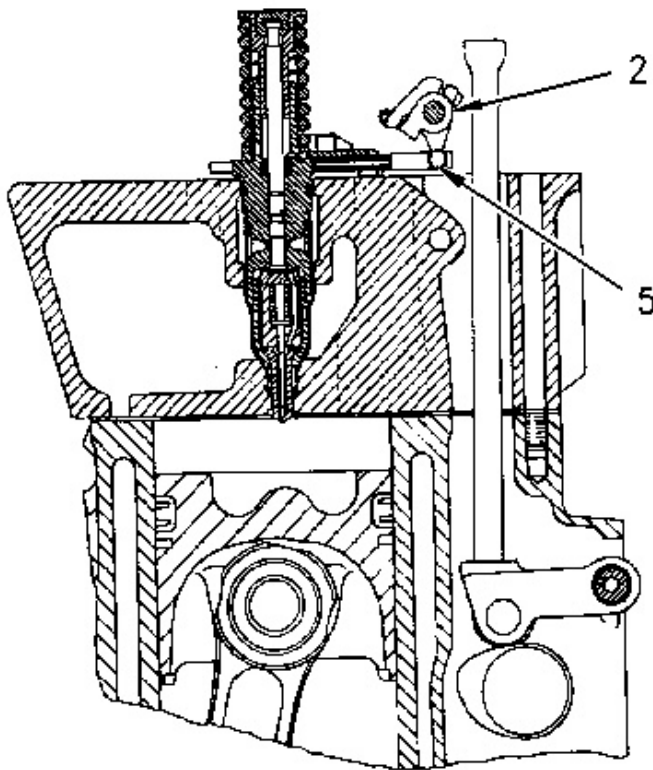


Illustration 2

g00750163

8. Rotate the unit injectors in order to engage the injector rack bar (5) with the fuel injection control linkage (2).

Note: If the unit injectors are not installed, refer to the Disassembly and Assembly, "Unit Injector - Install".

9. Install Tooling (C) on the unit injectors and compress the springs.

Note: For the procedure to install Tooling (C), refer to Tool Operating Manual, NEHS0610, "Using the 128-8822 Tool Group on 3114, 3116, and 3126 Engines with Mechanical Unit Injectors (MUI)".

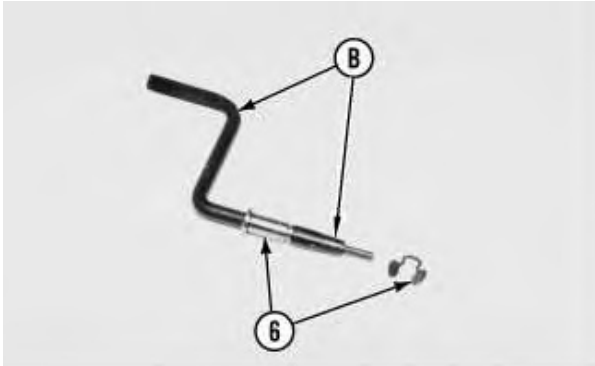


Illustration 3

g00672755

10. Install clevis pin (6) in Tooling (B). Clevis pin (6) attaches the control lever (3) to the governor.

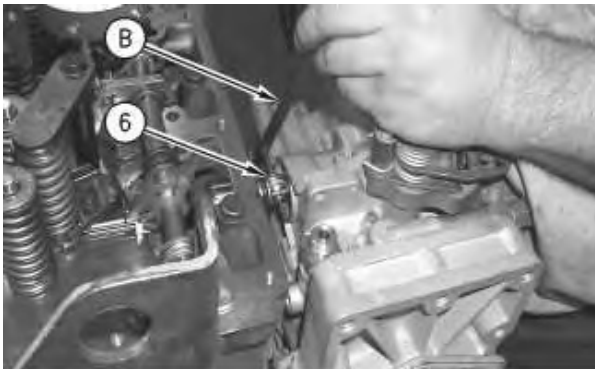


Illustration 4

g00672752

11. Use Tooling (B) to install clevis pin (6) and the clip.
12. Use Tooling (D) to set the unit injector synchronization.

Note: For the procedure to use Tooling (D), refer to Tool Operating Manual, NEHS0610, "Using the 128-8822 Tool Group on 3114, 3116, and 3126 Engines with Mechanical Unit Injectors (MUI)".

13. Remove Tooling (C) from the unit injectors.
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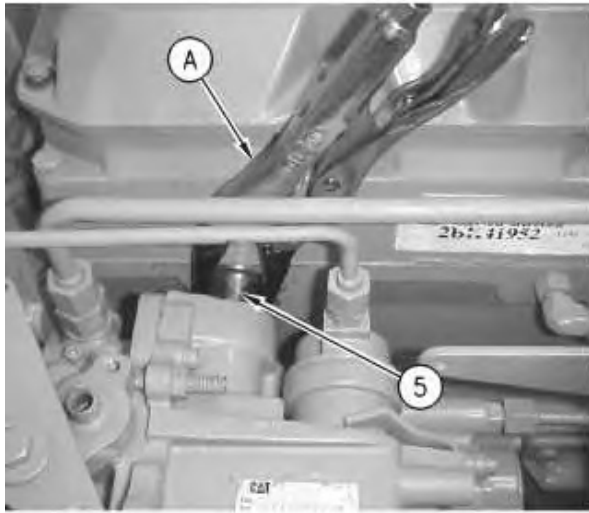


Illustration 5

g00655975

14. Use Tooling (A) to slide tube assembly (5) into the governor.



Illustration 6

g00613071

15. Install clip (4).

End By:

- a. Install the rocker arm assemblies and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".

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Product: EXCAVATOR

Model: 325-A EXCAVATOR 8NL

Configuration: 325, 325L TRACK TYPE EXCAVATORS 8NL00001-UP (MACHINE) POWERED BY 3116 ENGINE

Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders

Media Number -SEN3611-18

Publication Date -01/05/2009

Date Updated -27/05/2009

i05919358

Unit Injector - Remove

SMCS - 1290-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	5P-0302	Bar	1

Start By:

- Remove the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".

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, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

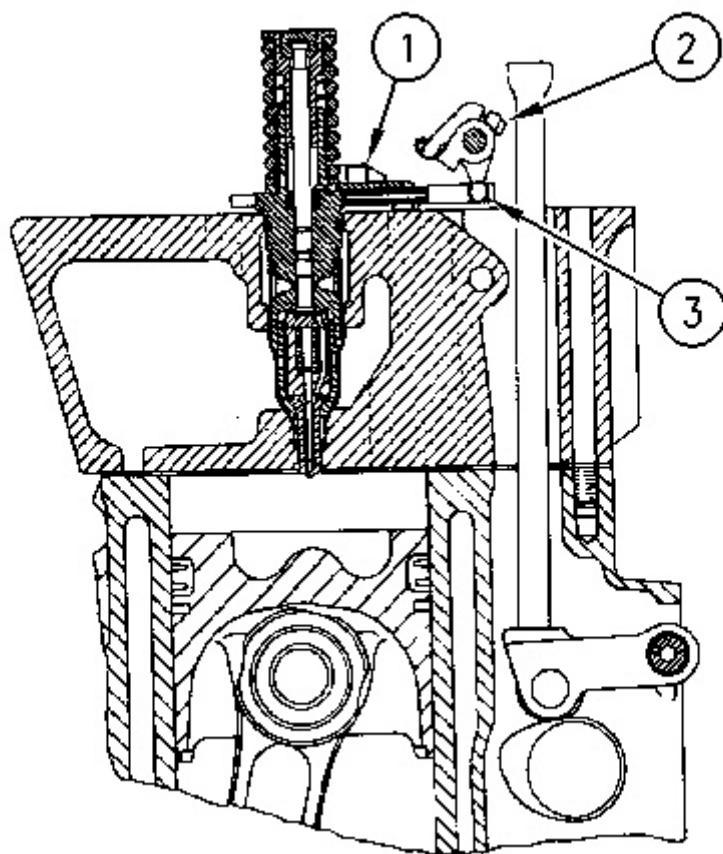


Illustration 1

g00775441



Illustration 2

g00625237

1. Remove fuel injector hold-down bolt (1) .

Note: Do not pry on the injector hold-down bracket. Damage to the unit injector could occur. The unit injector has a notch on the opposite side of the rack. This notch is used for prying the unit injector loose. Some fuel injector racks move freely when the spring is not compressed. Do not move the fuel injector rack without compressing the fuel injector spring slightly. Damage may occur to the unit injector.

2. Use Tooling (A) to loosen the unit injector. Rotate the unit injector in order to disengage injector rack bar (3) from fuel injection control linkage (2) .
3. Remove the unit injector. Ensure that two O-ring seals are on the unit injector.

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Product: EXCAVATOR

Model: 325-A EXCAVATOR 8NL

Configuration: 325, 325L TRACK TYPE EXCAVATORS 8NL00001-UP (MACHINE) POWERED BY 3116 ENGINE

Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders

Media Number -SEN3611-18

Publication Date -01/05/2009

Date Updated -27/05/2009

i05919370

Unit Injector - Install

SMCS - 1290-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
B	4C-5553	Injector Seat Cleaning Brush	1
C	173-1530	Injector Seating Tool	1
D	143-2099	Unit Injector Tool Group (Sleeve Replacement)	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Inspect the unit injector sleeve for pitting and for carbon tracking. Used unit injector sleeves do not need to be reamed unless the seated area is pitted or eroded. If the seated area has excessive carbon deposits, the used unit injector sleeves need to be reamed. Refer to Tool Operating Manual, NEHS0675, "Using the 143-2099 Sleeve Replacement Tool Group on 3114, 3116, and 3126 Engines". Use Tooling (D) to ream injector sleeves.
2. Inspect the condition of the O-ring seals on the unit injector. Replace the seals, if necessary.

3. Lubricate the O-ring seals with clean engine oil.

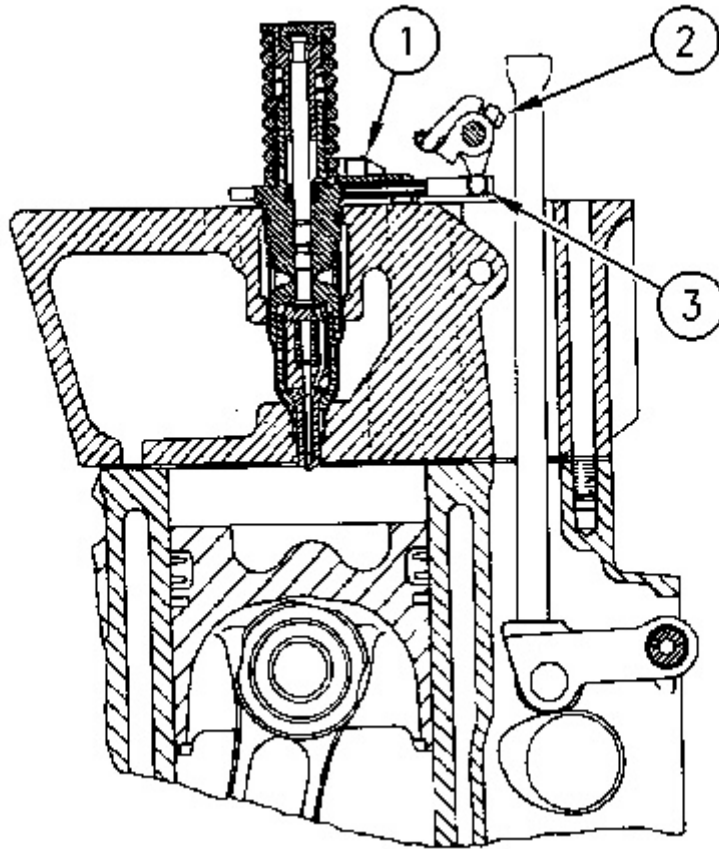


Illustration 1

g00775441

4. Position the unit injector in the cylinder head and rotate the unit injector in order to engage injector rack bar (3) with fuel injection control linkage (2) . Push down on the unit injector and ensure that the unit injector is properly seated in the cylinder head.

Note: Do not use fuel injector hold-down bolt (1) to pull the unit injector into the cylinder head.

5. Install a new fuel injector hold-down bolt (1) in the hold-down bracket for the unit injector. Tighten fuel injector hold-down bolt (1) to a torque of 12 ± 3 N·m (106 ± 27 lb in).

Note: Do not overtighten fuel injector hold-down bolt (1) . Excessive torque may cause damage to the unit injector and the unit injector may seize.

6. Refer to the Tool Operating Manual, NEHS0738, "Using the 173-1530 Injector Seating Tool Group on 3114, 3116, and 3126 MUI or 3126 HEUI 2-Valve Engines" for the remaining steps on installing the unit injector.

7. Synchronize the unit injectors. Refer to Testing and Adjusting, "Unit Injector Synchronization - Adjust".

End By: Install the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".

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Product: EXCAVATOR

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Configuration: 325, 325L TRACK TYPE EXCAVATORS 8NL00001-UP (MACHINE) POWERED BY 3116 ENGINE

Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders

Media Number -SEN3611-18

Publication Date -01/05/2009

Date Updated -27/05/2009

i01928597

Unit Injector Sleeve - Remove

SMCS - 1713-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	143-2099	Unit Injector Tool Group	1

Start By:

- Remove the unit injector. Refer to Disassembly and Assembly, "Unit Injector - Remove".

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, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

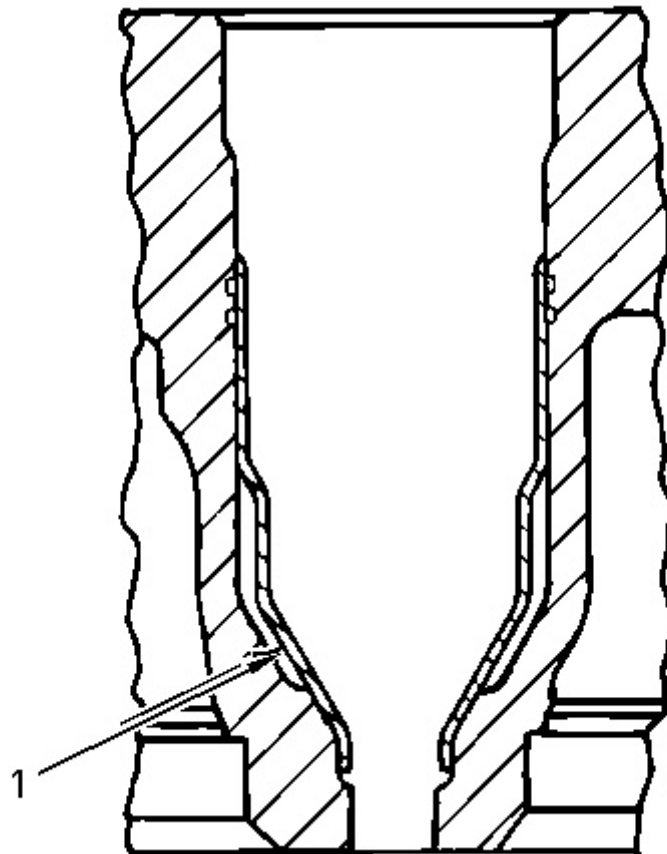


Illustration 1

g00627676

1. Use Tooling (A) to remove unit injector sleeve (1) from the cylinder head. Refer to Tool Operating Manual, NEHS0675, "Using the **143-2099** Sleeve Replacement Tool Group on 3114, 3116, and 3126 Engines" for the correct procedure.

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Model: 325-A EXCAVATOR 8NL

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Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders

Media Number -SEN3611-18

Publication Date -01/05/2009

Date Updated -27/05/2009

i01928606

Unit Injector Sleeve - Install

SMCS - 1713-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	143-2099	Unit Injector Tool Group	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

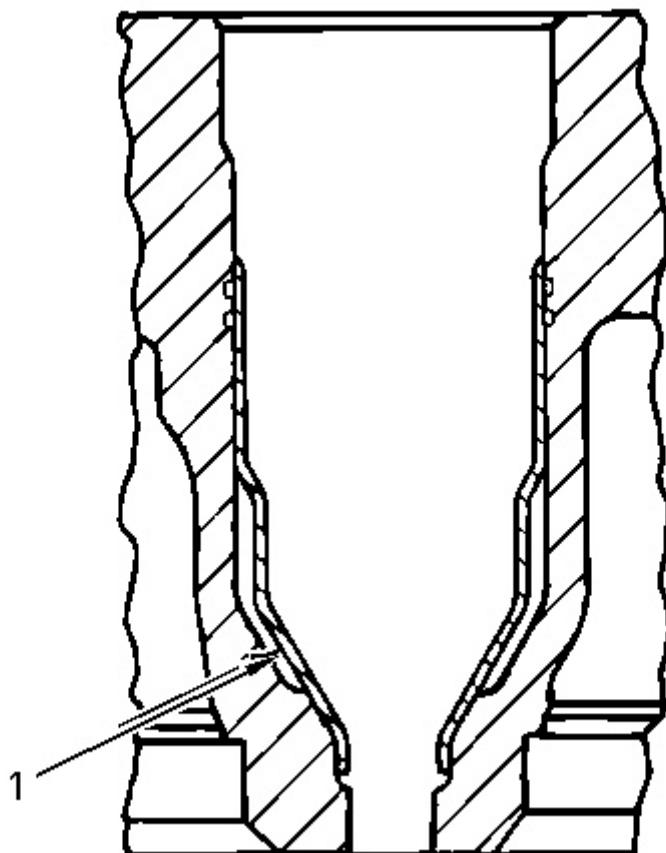


Illustration 1

g00627676

1. Inspect the condition of the existing sleeve and ream out the existing sleeve, if necessary. When you are replacing the existing injector sleeve, use a new brass sleeve. It is not necessary to ream the new brass sleeves. Use Tooling (A) to install unit injector sleeve (1) into the cylinder head. Refer to Tool Operating Manual, NEHS0675, "Using the **143-2099** Sleeve Replacement Tool Group on 3114, 3116, and 3126 Engines" for the correct procedure.

End By:

- a. Install the unit injector. Refer to Disassembly and Assembly, "Unit Injector - Install".

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Product: EXCAVATOR

Model: 325-A EXCAVATOR 8NL

Configuration: 325, 325L TRACK TYPE EXCAVATORS 8NL00001-UP (MACHINE) POWERED BY 3116 ENGINE

Disassembly and Assembly**446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders**

Media Number -SEN3611-18

Publication Date -01/05/2009

Date Updated -27/05/2009

i01928645

Turbocharger - Remove

SMCS - 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, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.



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Note: For information on the reusability of components of the turbocharger, refer to Guideline For Reusable Parts And Salvage Operations, SEBF8018, "Turbochargers". For information on the salvage of components of the turbocharger, refer to Guideline For Reusable Parts And Salvage Operations, SEBF8071, "Procedures to Salvage Turbocharger Components".

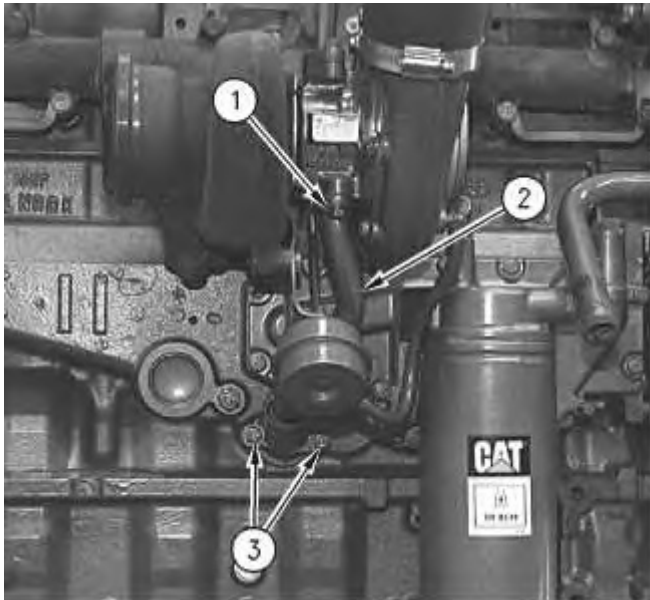


Illustration 1

g00617515

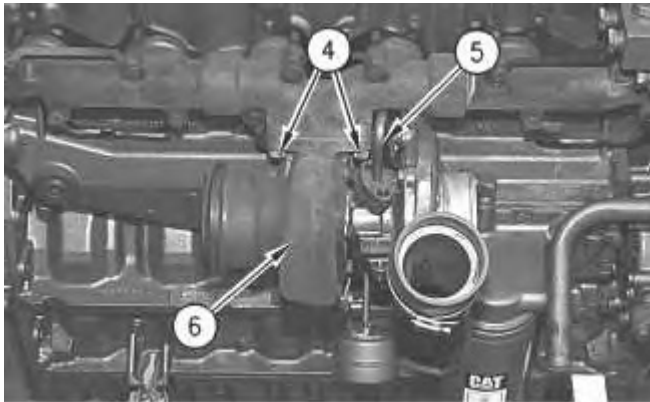


Illustration 2

g00617565

1. Disconnect oil supply tube assembly (5) from turbocharger (6).
2. Remove bolts (1) and disconnect oil drain tube assembly (2) from turbocharger (6).
3. Remove bolts (3).
4. Remove locknuts (4).
5. Remove turbocharger (6) and the gasket from the exhaust manifold.

Note: Place index marks on the turbocharger cartridge and the housing.

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