



# Service Repair Manual

## **Models**

303E CR Mini  
Hydraulic Excavator

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[Previous Screen](#)

Product: MINI HYD EXCAVATOR

Model: 303E CR MINI HYD EXCAVATOR SMG

Configuration: 303E CR Mini Hydraulic Excavator SMG00001-UP (MACHINE) POWERED BY C1.3 Engine

## Disassembly and Assembly C1.3 Engine for Caterpillar Built Machines

Media Number -UENR3292-03

Publication Date -01/05/2014

Date Updated -02/02/2017

i05317149

### Governor - Remove

SMCS - 1264-011

### Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1859	Retaining Ring Pliers	1

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#### NOTICE

**Keep all parts clean from contaminants.**

**Contaminants may cause rapid wear and shortened component life.**

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1. Before removing the governor assembly, align the timing marks on all gears on the front of the engine.

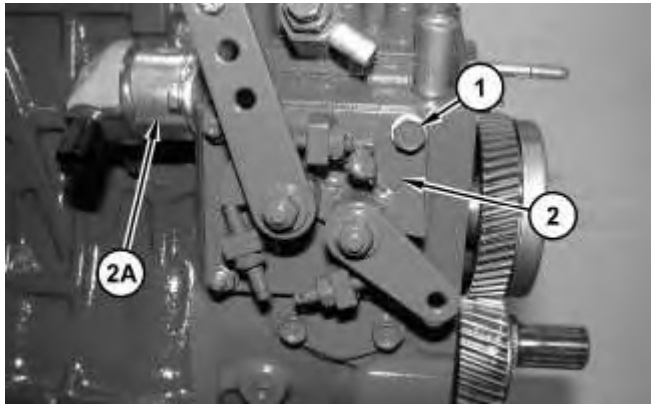


Illustration 2

1. Remove bolts (1) and speed control plate (2). Remove stop solenoid (2A).

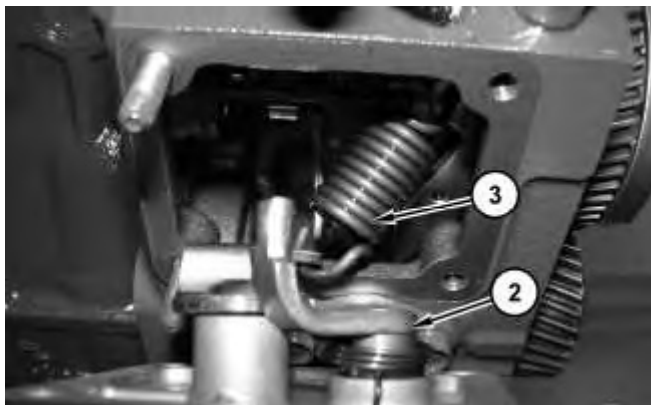
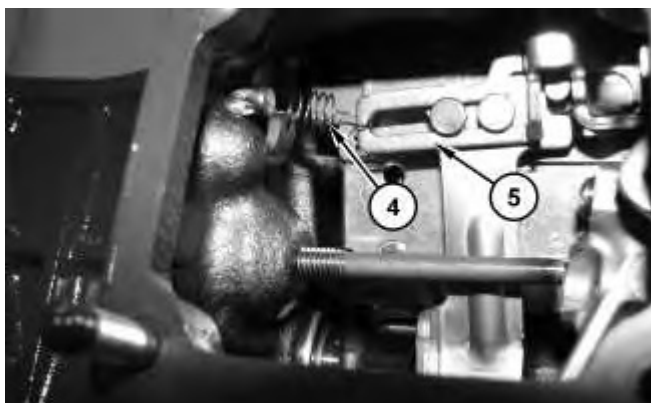


Illustration 3

2. Disconnect governor spring (3) from speed control plate (2). Remove governor spring (3).



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3. Remove start spring (4) from thrust lever (5).

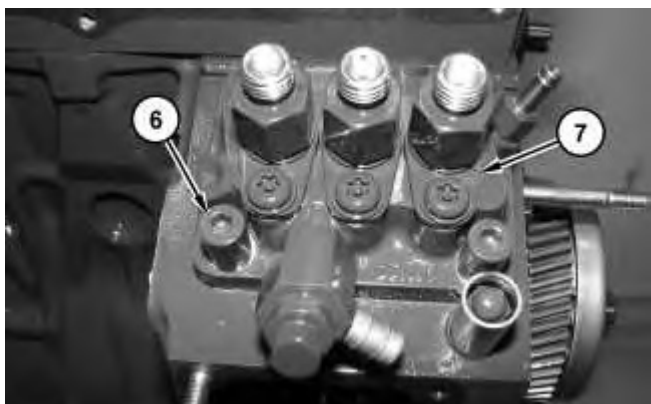


Illustration 5

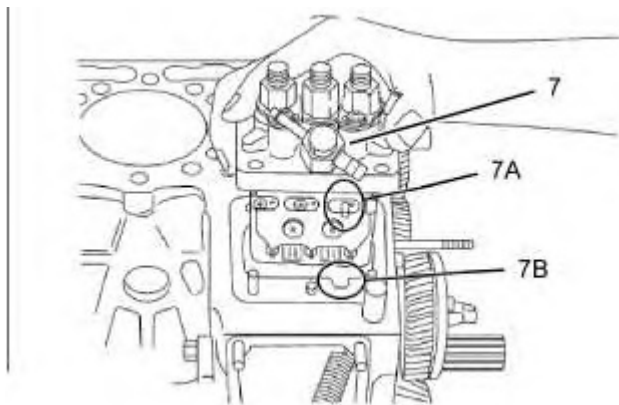


Illustration 6

4. Remove bolts (6) and injector pump (7). Align the control rack pin (7A) with the notch in the crankcase (7B).



Illustration 7

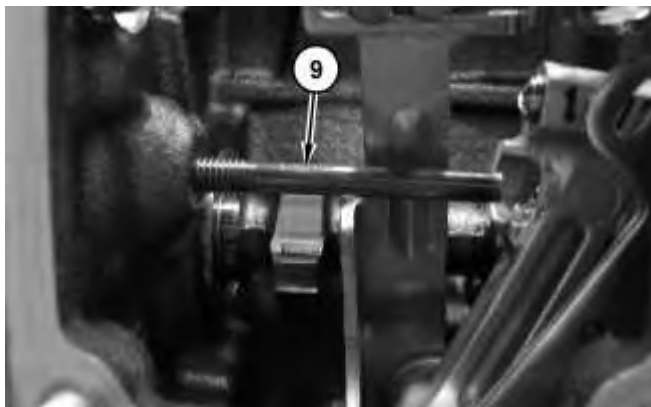
5. Remove plug (8).



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Illustration 8

g03370176

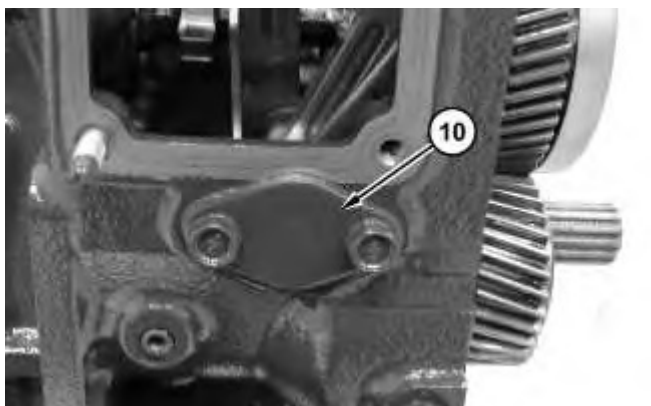


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Illustration 9

g03370186

6. Measure the height of max torque limiter (8) from block and record for installation purposes. Remove max torque limiter (8).



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Illustration 10

g03370189

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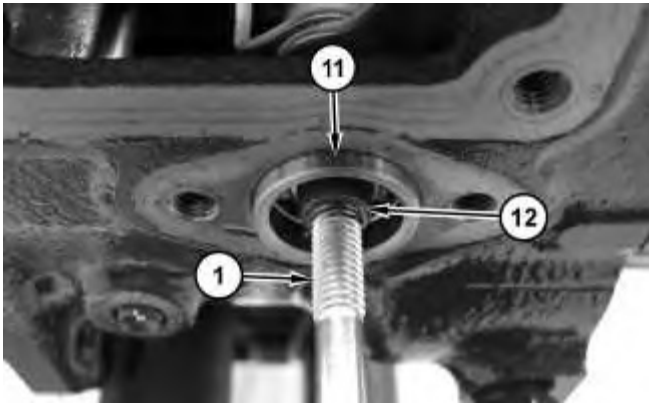


Illustration 11

g03370193

7. Remove plate (10). Use bolt (1) in order to pull shaft (12) and bearing collar (11) from the governor housing.



Illustration 12

g03370379

8. Remove fork lever assembly (13) from the governor housing.

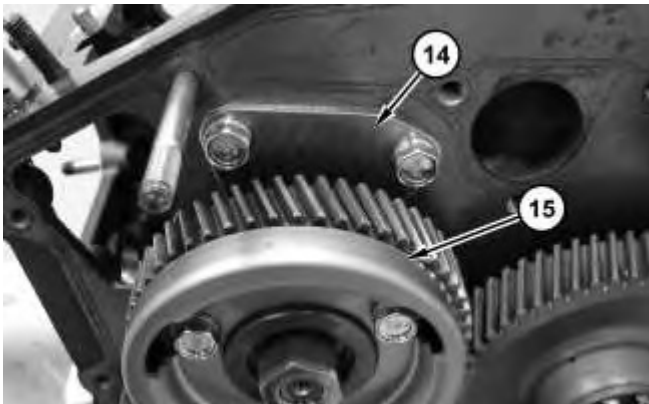


Illustration 13

g03370397

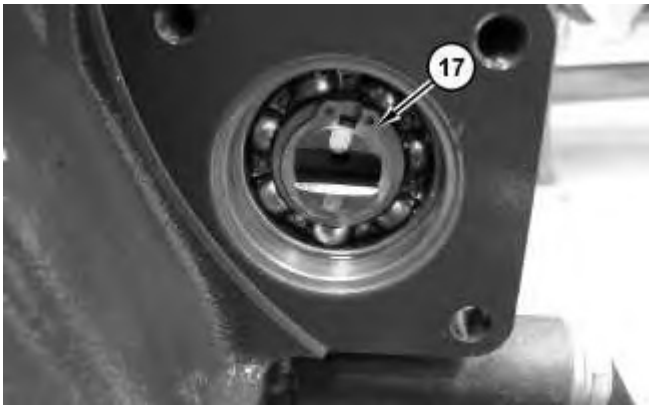
9. Remove fuel camshaft stopper (14) and fuel camshaft gear assembly (15).



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Illustration 14

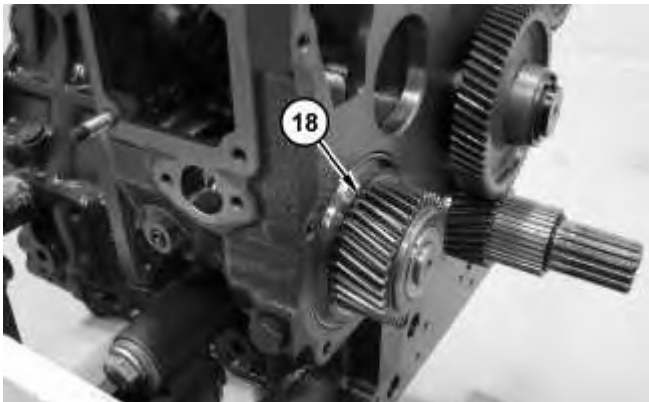
g03370400



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Illustration 15

g03370402

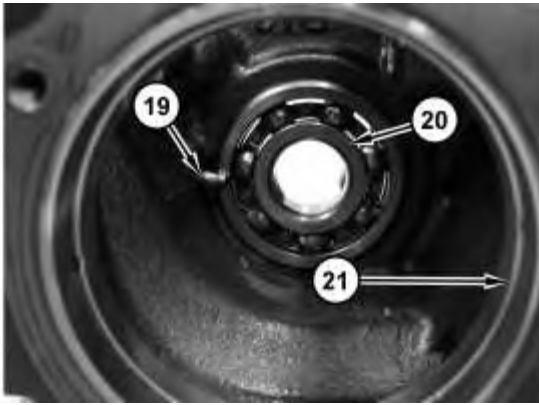


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Illustration 16

g03370401

10. Remove plug (16). Using Tooling (A) remove retaining ring (17). Remove governor shaft and gear assembly (18).
-



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Illustration 17

g03370504

11. Remove setscrew (19) and bearing (20). Remove bearing (21).

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Product: MINI HYD EXCAVATOR

Model: 303E CR MINI HYD EXCAVATOR SMG

Configuration: 303E CR Mini Hydraulic Excavator SMG00001-UP (MACHINE) POWERED BY C1.3 Engine

**Disassembly and Assembly  
C1.3 Engine for Caterpillar Built Machines**

Media Number -UENR3292-03

Publication Date -01/05/2014

Date Updated -02/02/2017

i05318443

## Governor - Install

SMCS - 1264-012

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1859	Retaining Ring Pliers	1
B	442-0744	Bushing Tool	1
C	-	Loctite 593 Silicone Sealer	

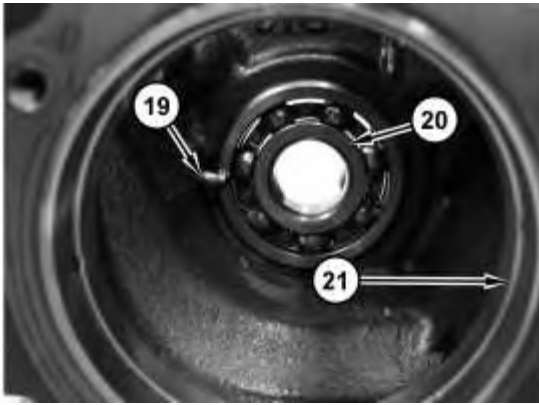
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**NOTICE**

**Keep all parts clean from contaminants.**

**Contaminants may cause rapid wear and shortened component life.**

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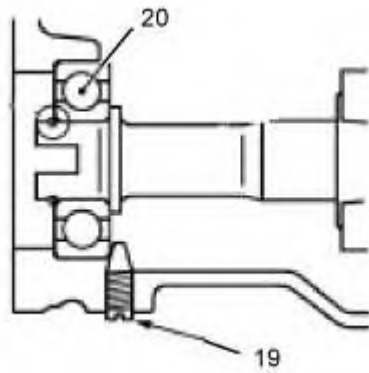


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Illustration 1

g03370555

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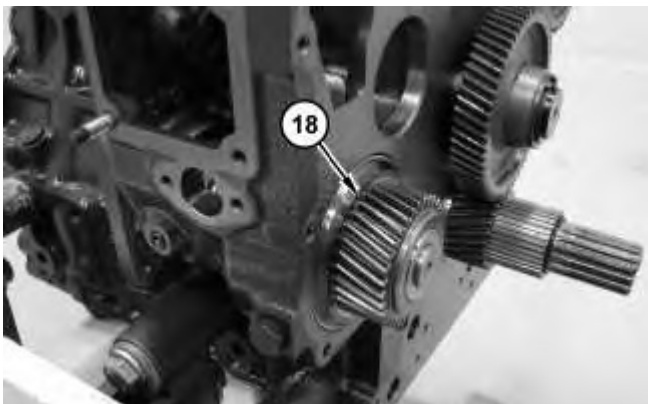
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Illustration 2

g03381410

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1. Install bearing (20). Apply Tooling (C) to set screw (19). Install set screw (19) until the tapered part contacts the bearing (20) as shown. Using Tooling (B), install bearing (21).
- 

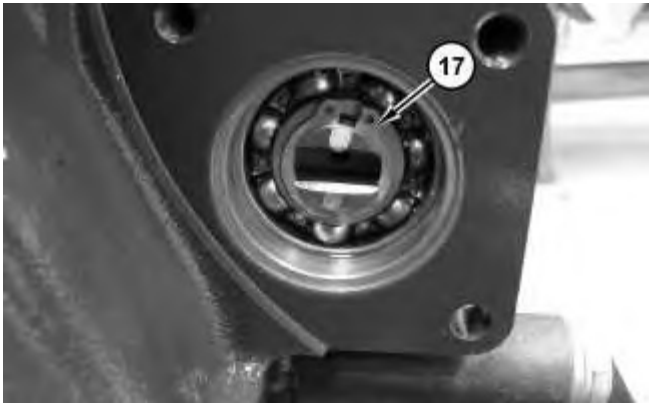


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Illustration 3

g03370558

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Illustration 4

g03370578

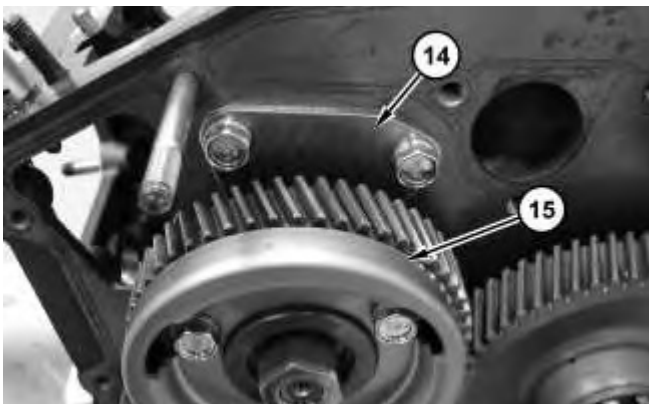


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Illustration 5

g03370582

2. Install governor shaft and gear assembly (18). Install retaining ring (17) on shaft. Install plug (16).



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Illustration 6

g03370616

3. Install fuel camshaft gear assembly (15). Make sure to line up timing marks on gears upon installation. Install fuel camshaft stopper (14).
-



Illustration 7

g03370617

4. Install fork lever assembly (13) into the governor housing.

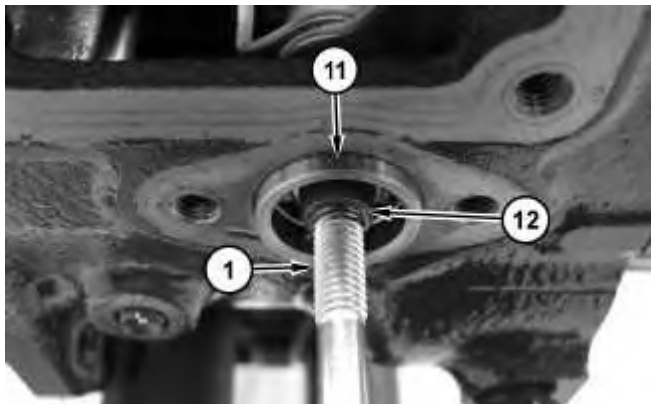


Illustration 8

g03370618

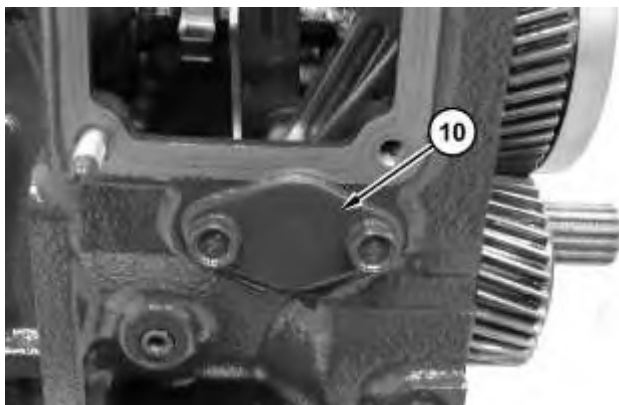


Illustration 9

g03370620

5. Use bolt (1) in order to install shaft (12) into the governor housing and fork lever assembly (13). Install bearing collar (11). Install plate (10).

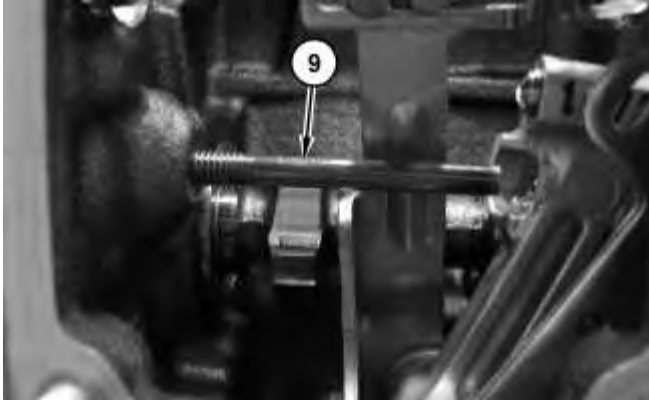


Illustration 10

g03370636



Illustration 11

g03370637

6. Install max torque limiter (9) to the Pre measured height recorded from disassembly.



Illustration 12

g03370639

7. Apply Tooling (C) on plug (8). Install plug (8).

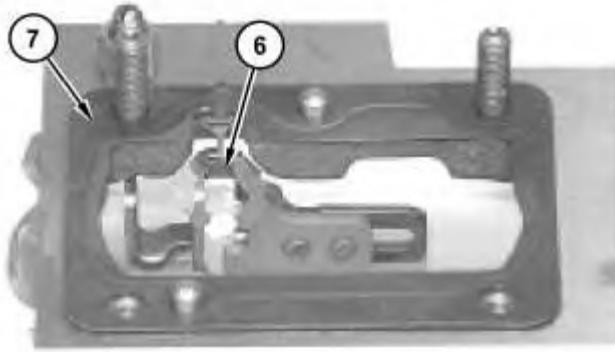


Illustration 13

g03381440



Illustration 14

g03370640

**Note: Addition or reduction of shims 0.05 mm (0.002 inch) delays or advances the injection timing by approximately 0.0087 rad (0.5). In disassembling and replacing, be sure to use the same thickness of new shims that are being replaced.**

8. Place new shims (7) to the amount of thickness recorded from the removal procedure. When installing injection pump (6) insert the rack pin into the groove (6) of the thrust lever on the fork. Install injector pump (5). Install the bolts.

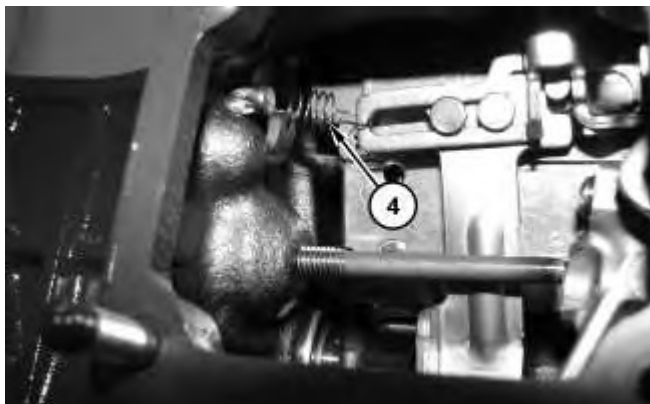


Illustration 15

g03370658

9. Install start spring (4) onto the thrust lever.

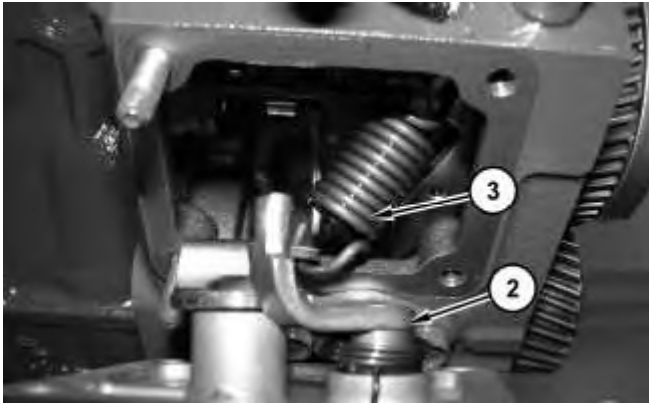


Illustration 16

g03370659

10. Install governor spring (3). Connect governor spring (3) to speed control plate (2).

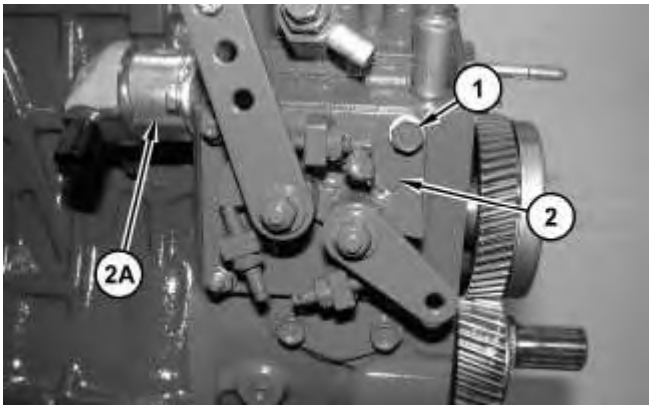


Illustration 17

g03370660

11. Place Tooling (C) onto the mounting surface of speed control plate (2). Install speed control plate (2). Install bolts (1). Place Tooling (C) on stop solenoid (2A). Install stop solenoid (2A).

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Product: MINI HYD EXCAVATOR

Model: 303E CR MINI HYD EXCAVATOR SMG

Configuration: 303E CR Mini Hydraulic Excavator SMG00001-UP (MACHINE) POWERED BY C1.3 Engine

## Disassembly and Assembly C1.3 Engine for Caterpillar Built Machines

Media Number -UENR3292-03

Publication Date -01/05/2014

Date Updated -02/02/2017

i05319637

# Fuel Injection Pump - Remove and Install

SMCS - 1251-010

## Removal Procedure

### Start By:

- a. Remove fuel injection lines.

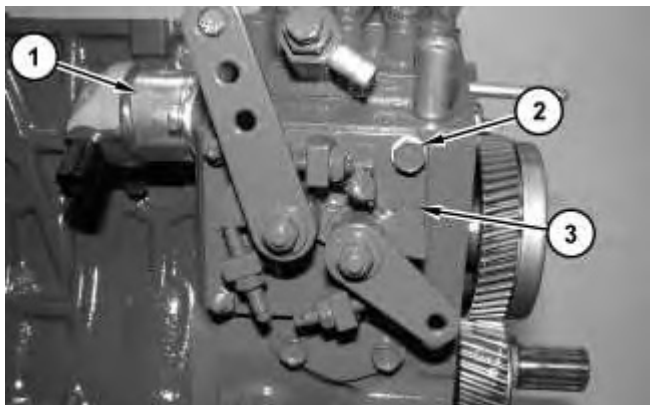


Illustration 1

g03371180

1. Remove solenoid (1). Remove bolts (2) and speed control plate (3).

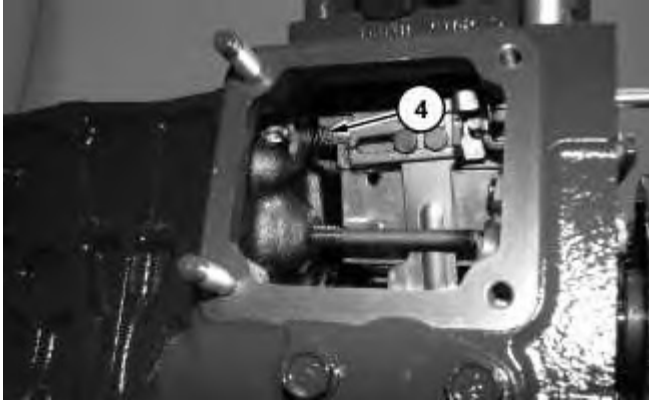


Illustration 2

g03371184

2. Remove start spring (4).

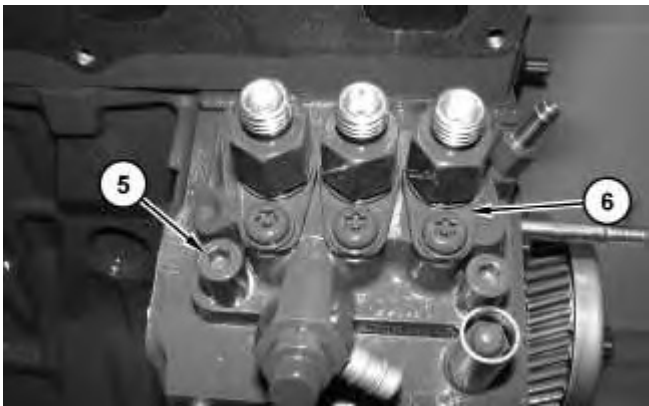


Illustration 3

g03371170



Illustration 4

g03371249

3. Remove bolts (5) and fuel injection pump (6).
4. When removing the injection pump, align the control rack pin with the notch.
5. Remove shims (7) from under fuel injection pump (6). Record the number and thickness of shims (7) for installation purposes.

## Installation Procedure

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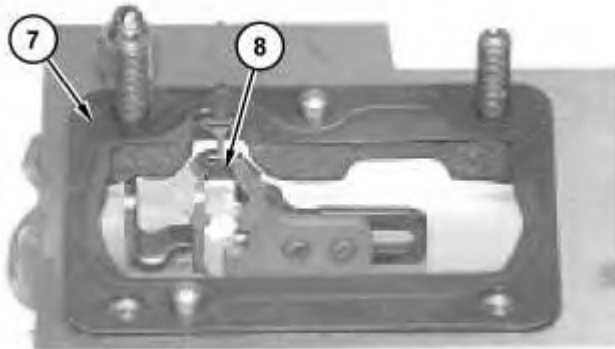


Illustration 5

g03371238

1. Place new shims (7) to the amount of thickness recorded from the removal procedure. When installing injection pump (6) align the control rack pin with the notch. Insert the rack pin into groove (8) of the thrust lever on the fork.

**Note: Addition or reduction of shims 0.05 mm (0.002 inch) delays or advances the injection timing by approximately 0.0087 rad (0.5). In disassembling and replacing, be sure to use the same thickness of new shims that are being replaced.**

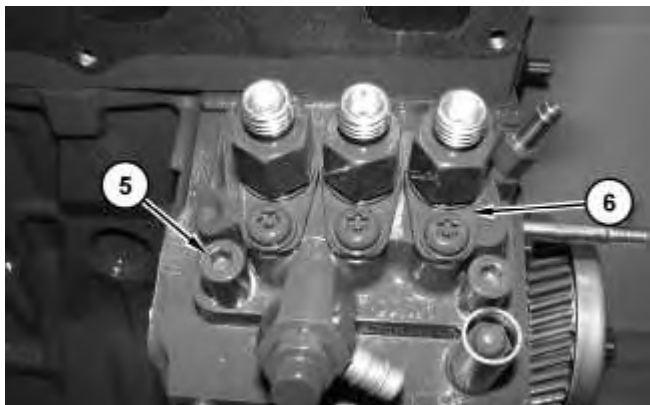


Illustration 6

g03371259

2. Install fuel injection pump (6). Install bolts (5).
-

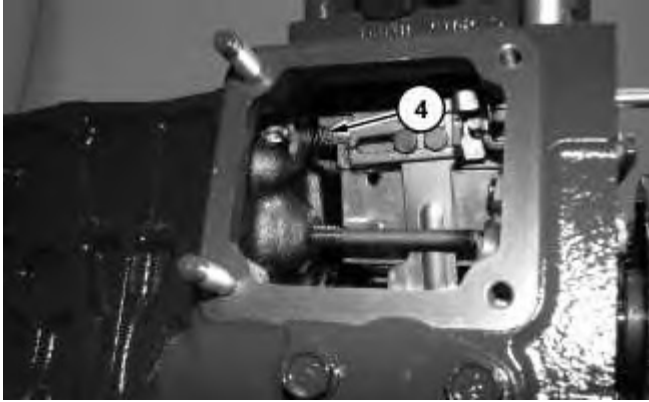


Illustration 7

g03371269

3. Install start spring (4).

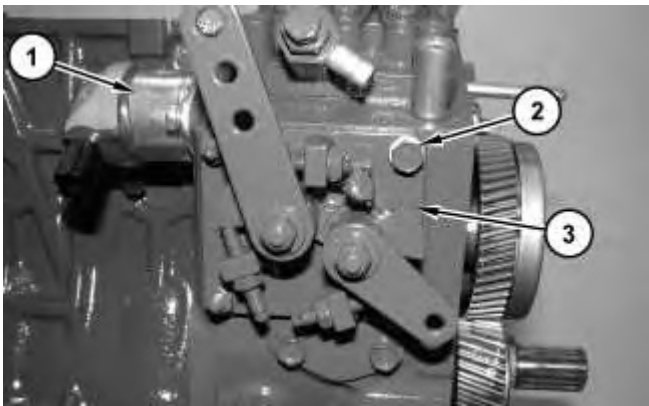


Illustration 8

g03371286

4. Install speed control plate (3) and bolts (2). Install solenoid (1).

**End By:**

- a. Install the fuel injection lines.

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Product: MINI HYD EXCAVATOR

Model: 303E CR MINI HYD EXCAVATOR SMG

Configuration: 303E CR Mini Hydraulic Excavator SMG00001-UP (MACHINE) POWERED BY C1.3 Engine

## Disassembly and Assembly

### C1.3 Engine for Caterpillar Built Machines

Media Number -UENR3292-03

Publication Date -01/05/2014

Date Updated -02/02/2017

i05350824

## Fuel Injector - Remove and Install

SMCS - 1290-010

### Removal Procedure

#### Start By:

- a. Remove the fuel injection lines

**Note:** Use caution in removing the line fittings on the fuel injection pump. Hold the fuel injector line fitting stationary to avoid turning and causing leaks from the fuel injector pump.

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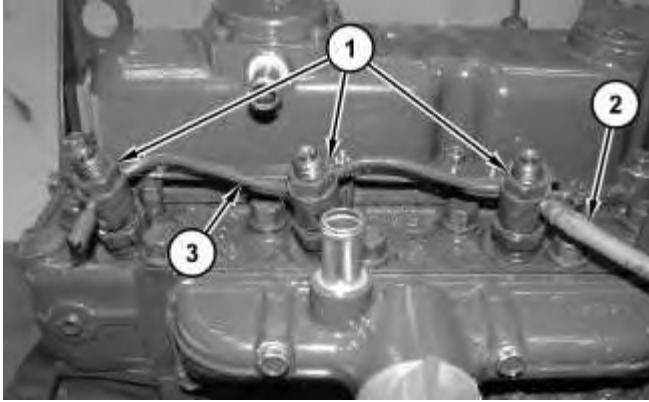
#### NOTICE

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.

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Illustration 1

g03389378

1. Remove hose (2). Remove nuts (1) that holds overflow pipe (3). Remove overflow pipe (3).

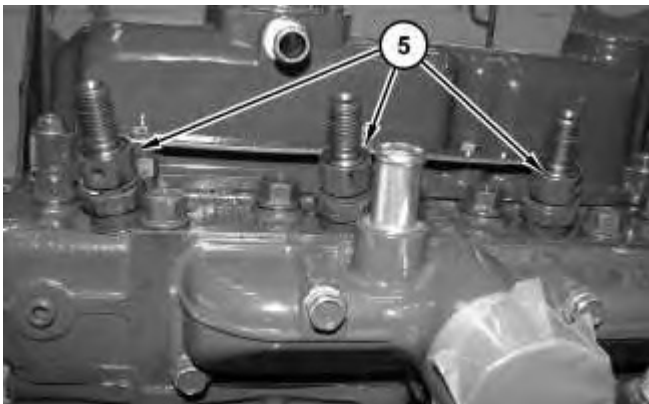


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Illustration 2

g03389404

2. Remove copper washers (4).



---

Illustration 3

g03389412

3. Remove fuel injectors (5).
-



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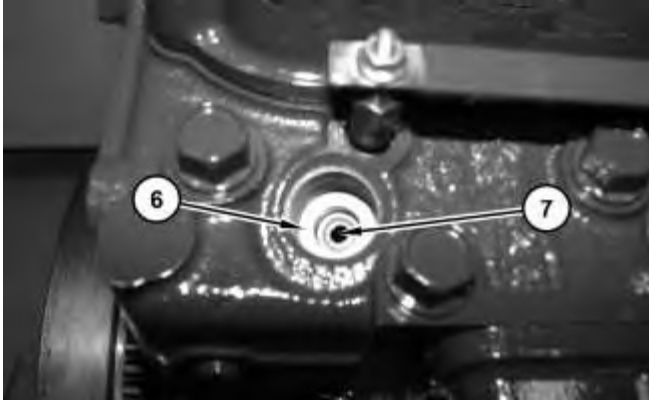


Illustration 4

g03389436

4. Remove copper gasket (6) and heat seal (7).

## Installation Procedure

**Note:** Replace copper gasket (6) and heat seal (7) with new upon installation.

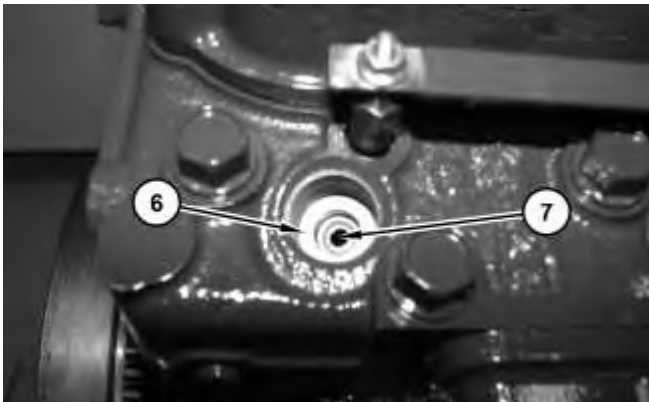


Illustration 5

g03389445

1. Place heat seal (7) and copper gasket (6) in the cylinder head.

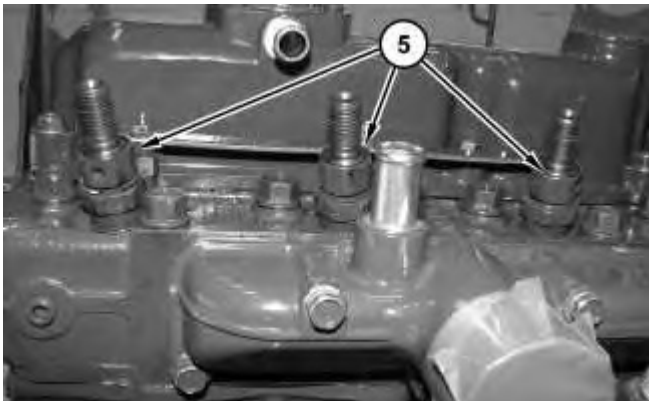


Illustration 6

g03389452

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