



# Service Repair Manual

## **Model**

416D BACKHOE LOADER

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Product: BACKHOE LOADER

Model: 416D BACKHOE LOADER CXP

Configuration: 416D Backhoe Loader CXP00001-00939 (MACHINE) POWERED BY 3054 Engine

## Disassembly and Assembly

### 416D, 420D, 424D, 428D, 430D, 432D, 438D and 442D Backhoe Loaders Power Train

Media Number -REN3578-12

Publication Date -01/04/2010

Date Updated -13/04/2010

i01504138

## Solenoid Valve (Transmission) - Remove

SMCS - 5479-011-T3

### Removal Procedure for Powershift Transmission Arrangement



Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

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#### NOTICE

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**Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.**

**Dispose of all fluids according to local regulations and mandates.**

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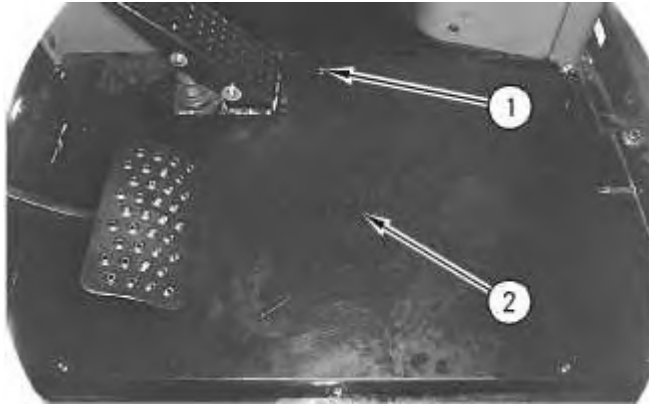


Illustration 1

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1. Remove four bolts (1) and floorplate (2) .

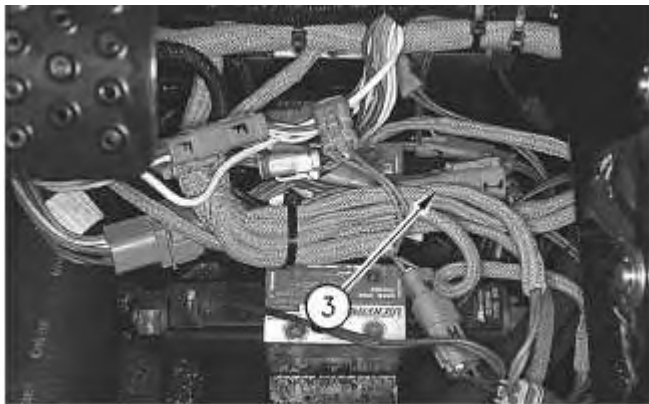


Illustration 2

g00780371

2. Disconnect all the wire harnesses on the three solenoid valves. Remove four plugs and bolts (3) from each of the control valves (4). Remove the three solenoid valves.

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Media Number -REN3578-12

Publication Date -01/04/2010

Date Updated -13/04/2010

i01504064

## Solenoid Valve (Transmission) - Remove

SMCS - 5479-011-T3

### Removal Procedure for Direct Drive Solenoid Valve



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**Note:** The transmission has been removed for photographic purposes.

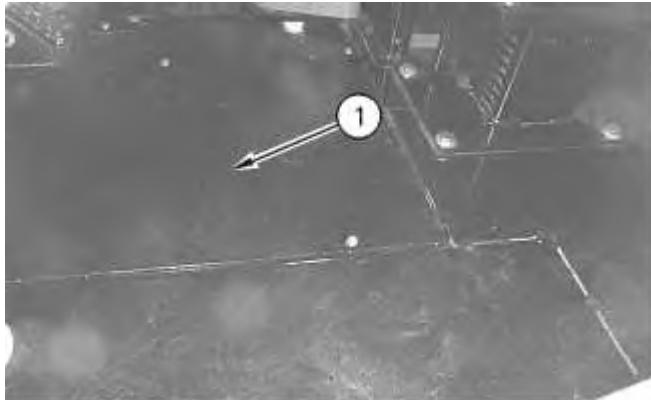


Illustration 1

g00780351

1. Remove the floorplate.

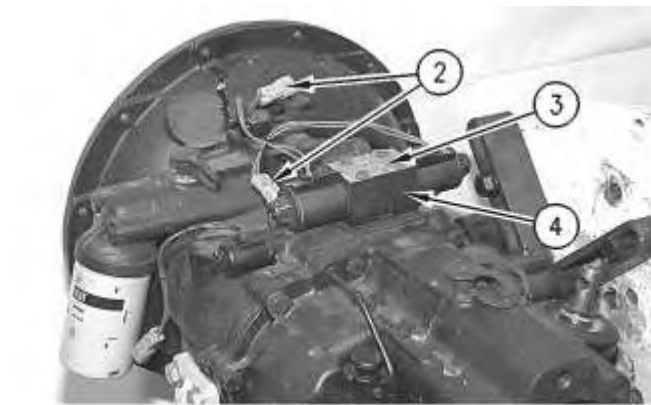


Illustration 2

g00780353

2. Disconnect wiring harness (2) .
  3. Remove four caps (3) and bolts under each cap.
  4. Remove transmission solenoid valve (4) .
-



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Illustration 3

g00780356

5. Check the four O-rings (5) for wear. Replace the O-rings if the O-rings are in poor condition.

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## Disassembly and Assembly

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Media Number -REN3578-12

Publication Date -01/04/2010

Date Updated -13/04/2010

i01504076

## Solenoid Valve (Transmission) - Disassemble

SMCS - 5479-015-T3

### Disassembly Procedure

#### Start By:

- A. Remove the transmission solenoid valve. Refer to Disassembly and Assembly, "Solenoid Valve (Transmission) - Remove".

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**Note:** Cleanliness is an important factor. Before the disassembly procedure, the exterior of the component should be thoroughly cleaned. This will help to prevent dirt from entering the internal mechanism.

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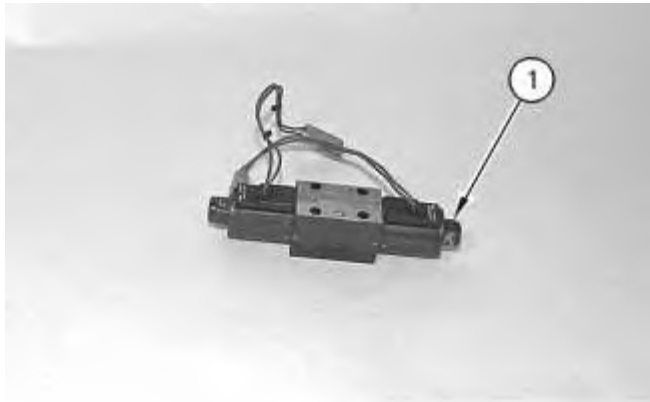


Illustration 1

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1. Remove nut (1) .

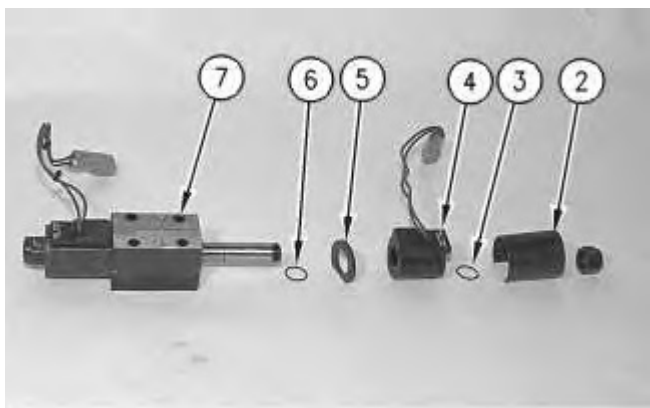


Illustration 2

g00763380

2. Remove cover (2), O-ring seal (3), solenoid (4), washer (5), and O-ring seal (6) from valve body (7) .
3. Repeat Steps 1 and 2 for the opposite side of the transmission solenoid valve.

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Media Number -REN3578-12

Publication Date -01/04/2010

Date Updated -13/04/2010

i01504046

## Solenoid Valve (Transmission) - Assemble

SMCS - 5479-016-T3

### Assembly Procedure

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**Note:** Cleanliness is an important factor. Before assembly, all parts should be thoroughly cleaned in cleaning fluid. Allow the parts to air dry. Wiping cloths or rags should not be used to dry parts. Lint may be deposited on the parts which may cause later trouble. Inspect all parts. If any parts are worn or damaged, use new parts for replacement.

**Note:** O-rings, gaskets, and seals should always be replaced. A used O-ring may not have the same sealing properties as a new O-ring. Use **1U-6396** O-Ring Assembly Compound during the assembly procedure.

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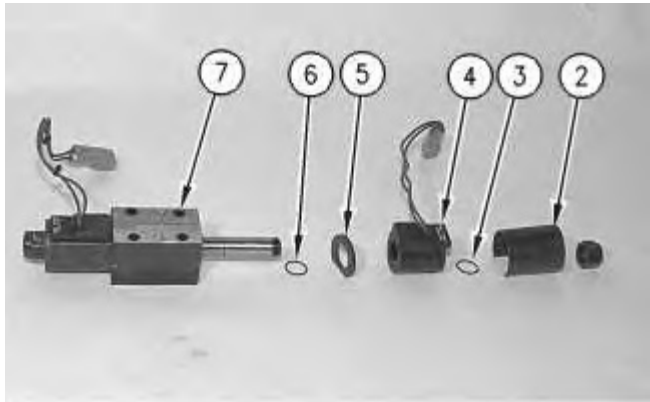


Illustration 1

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1. Install O-ring seal (6), washer (5), solenoid (4), O-ring seal (3), and cover (2) on valve body (7) .

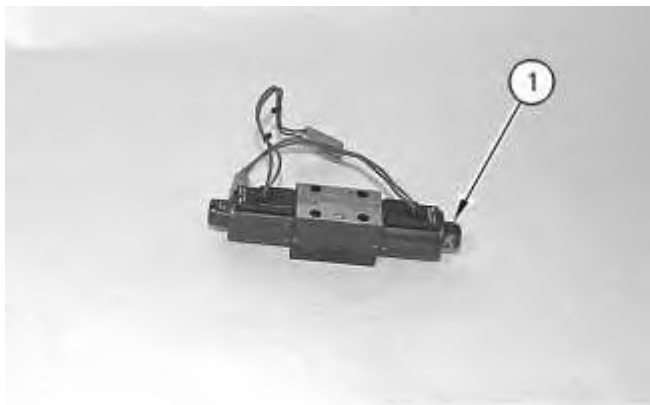


Illustration 2

g00763378

2. Install nut (1). Tighten nut (1) to a torque of  $5.6 \pm .6$  N·m ( $49.6 \pm 5.3$  lb in).
3. Repeat Steps 1 and 2 for the opposite side of the transmission solenoid valve.

**End By:** Install the transmission solenoid valve. Refer to Disassembly and Assembly, "Solenoid Valve (Transmission) - Install".

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Publication Date -01/04/2010

Date Updated -13/04/2010

i01504174

## Solenoid Valve (Transmission) - Install

SMCS - 5479-012-T3

### Installation Procedure for Direct Drive Solenoid Valve



## WARNING

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**Note:** The transmission has been removed for photographic purposes.



Illustration 1

g00780356

1. Check the four O-rings (5) for wear. Replace the O-rings if the O-rings are in poor condition.
2. Install four caps (3) and bolts under each cap.

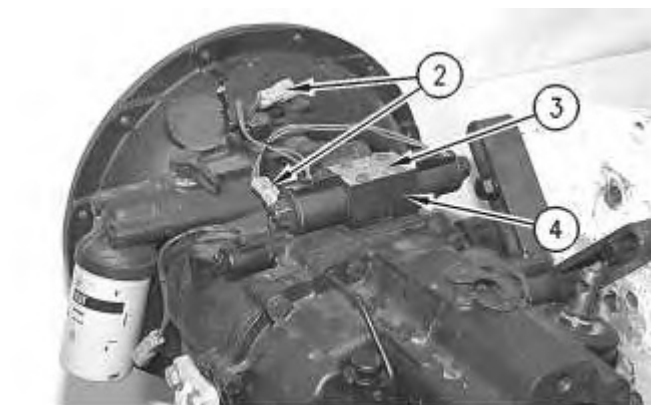


Illustration 2

g00780353

3. Connect wiring harness (2) .
4. Install the transmission solenoid valve (4) .

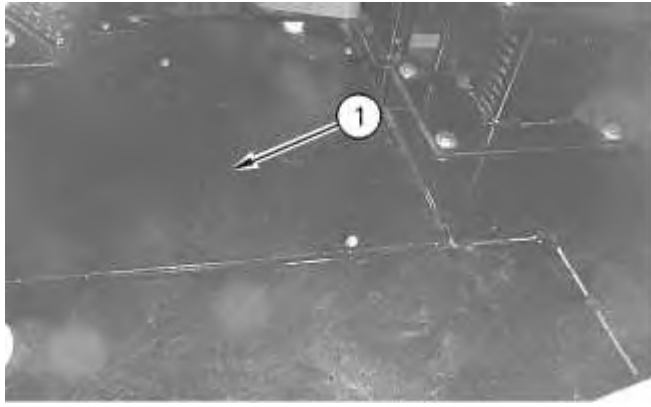


Illustration 3

g00780351

5. Install the floorplate (1) .

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i01504185

## Solenoid Valve (Transmission) - Install

SMCS - 5479-012-T3

### Installation Procedure for Powershift Transmission Arrangement



#### WARNING

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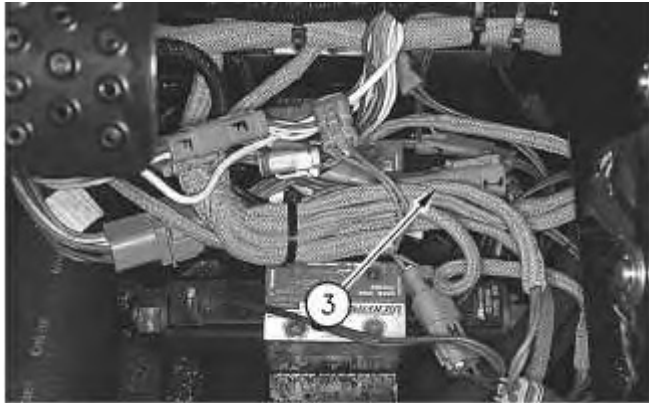


Illustration 1

g00780371

1. Connect all the wire harnesses on the three solenoid valves. Install four plugs and bolts (3) from each of the control valves (4). Install the three solenoid valves.

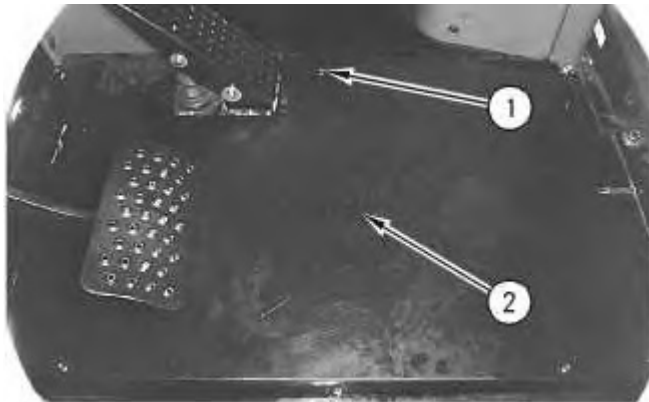


Illustration 2

g00780369

2. Install four bolts (1) and floorplate (2) .

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i01457233

## Transmission (Direct Drive) - Remove

SMCS - 3030-011-DD

### Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-7640	Stand	2
	8S-7611	Tube	2
	8S-7615	Pin	2
B	1U-9760	Jack Stand	2
C	1U-7505	Transmission Jack	1
D	1U-7558	Mounting Brackets	2
E	FT-2535	Engine Support Bar Assembly	1

#### Start By:

- A. Remove the front drive shaft. Refer to Disassembly and Assembly, "Drive Shaft (Front) - Remove and Install".
- B. Remove the rear drive shaft. Refer to Disassembly and Assembly, "Drive Shaft (Rear) - Remove and Install".
- C. Remove the piston pump. Refer to Disassembly and Assembly, RENR3585, "Piston Pump (Implement and Steering) - Remove".
  1. Use a suitable lifting device in order to raise the machine to a height of 91.4 mm (36 inch) between the ground and the side step.

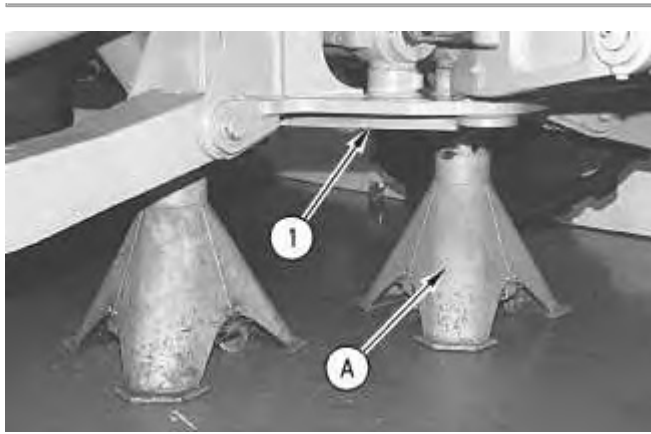


Illustration 1

g00760888

2. Place tooling (A) under rear frame (1) .

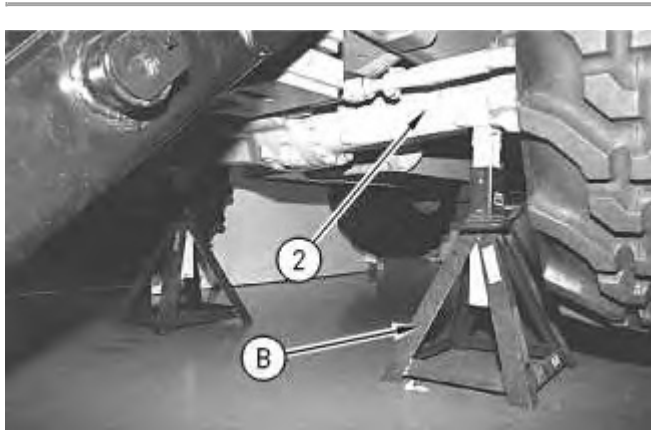
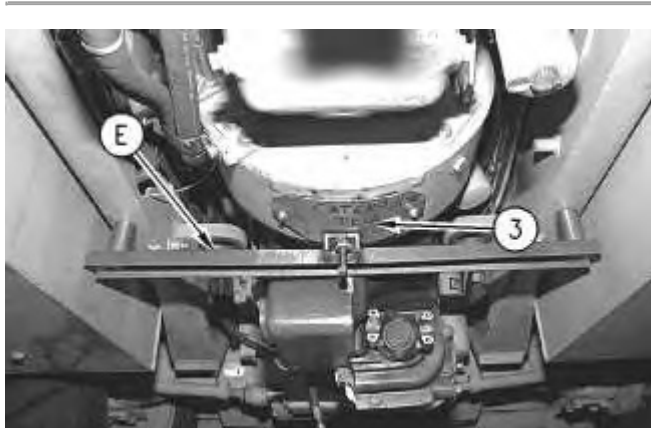


Illustration 2

g00760890

3. Place tooling (B) under front axle (2) .



4. Remove inspection plate (3). Install tooling (E) in order to support the engine.



Illustration 4

g00762357

5. Remove plug (4) and drain the transmission oil into a suitable container. The capacity of the transmission is 18.5 L (4.9 US gal).

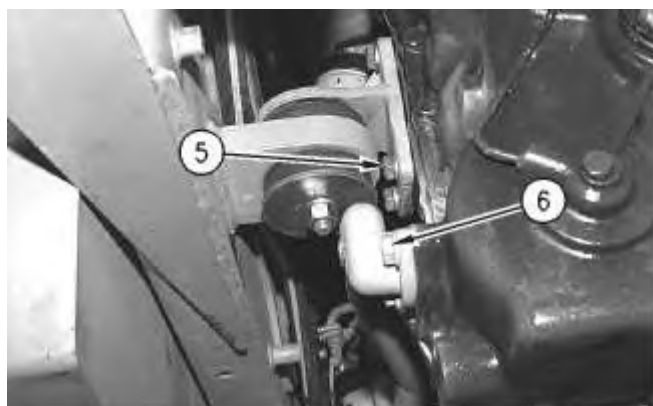


Illustration 5

g00762358

6. Remove four bolts (5) .
  7. Repeat Step 6 for the opposite side.
  8. Remove two bolts (6) .
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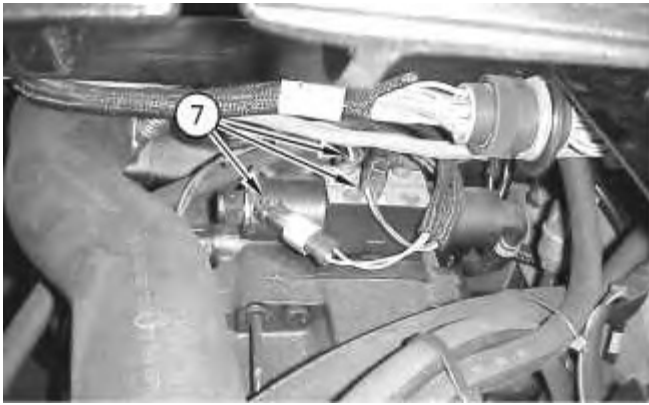


Illustration 6

g00762561

9. Disconnect three electrical connectors (7) .

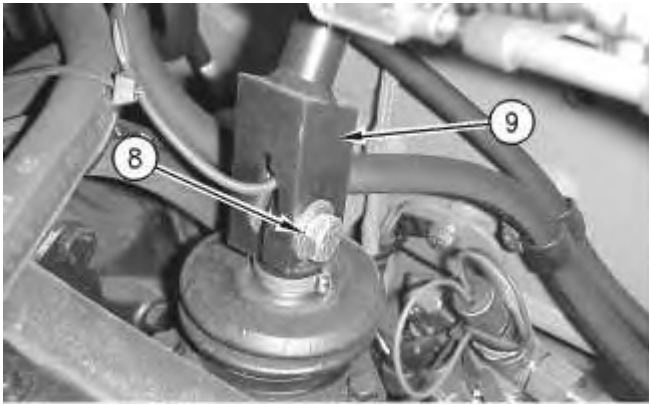


Illustration 7

g00762562

10. Loosen bolt (8) and slide rod assembly (9) off the transmission lever.

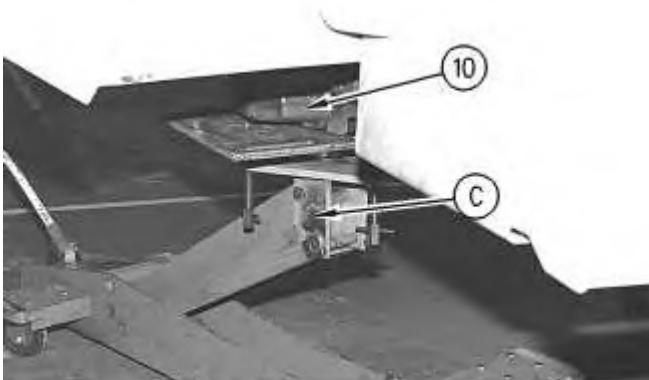


Illustration 8

g00762359



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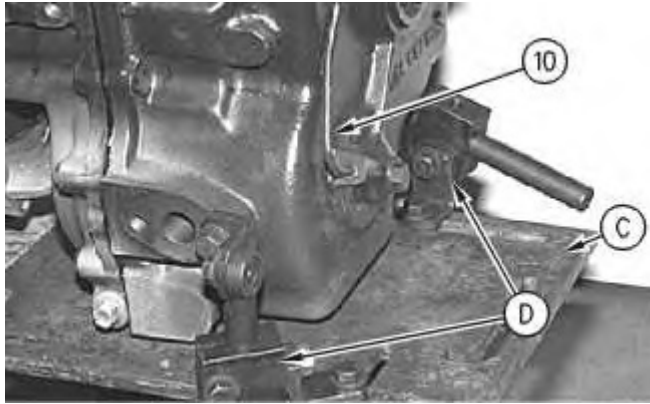


Illustration 9

g00762473

11. Support transmission (10) with tooling (C), as shown.
12. Attach tooling (D) to tooling (C) and transmission (10) in order to maintain a good balance.

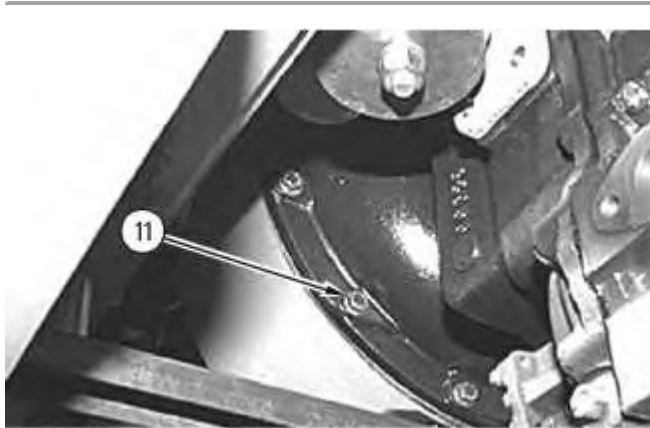


Illustration 10

g00762479

13. Remove fourteen bolts (11) .
14. Carefully move transmission (10) away from the engine in order to clear the torque converter. Lower transmission (10) to the ground. The weight of transmission (10) is 185 kg (408 lb).

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