



# Service Repair Manual

## **Model**

416D BACKHOE LOADER

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Product: BACKHOE LOADER

Model: 416D BACKHOE LOADER BKG

Configuration: 416D Backhoe Loader BKG00001-01299 (MACHINE) POWERED BY 3054 Engine

## Disassembly and Assembly

### 416D, 420D, 424D, 428D, 430D, 432D, 438D and 442D Backhoe Loaders Machine Systems

Media Number -REN3585-11

Publication Date -01/09/2009

Date Updated -28/09/2009

i01440718

## Pilot Valve (Loader) - Remove

SMCS - 5059-011-JL

### Removal Procedure

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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.

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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**WARNING**

At operating temperature, the hydraulic oil is hot and under pressure. Hot oils can cause burns.

To prevent possible personal injury, release the pressure in the implement hydraulic circuit (boom, stick, bucket, and swing), travel circuits, and the hydraulic oil tank at the filler cap before any hydraulic lines or components are disconnected or removed.

**Remove the filler cap only when the engine is stopped and the filler cap is cool enough to touch.**

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## **NOTICE**

**Keep all parts clean from contaminants.**

**Contamination of the hydraulic system with foreign material will reduce the service life of the hydraulic system components.**

**To prevent contaminants from entering the hydraulic system, always plug or cap the lines, fittings, or hoses as they are disconnected. Cover any disassembled components and clean them properly before assembly.**

**Clean the hydraulic system properly after any major component exchange or especially after a component failure, to remove any contamination.**

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**Note:** A hydraulic oil sample should be obtained before any maintenance is performed in order to establish the system contaminant level. Refer to Fluid Analysis Laboratory Guide, SEBF3116, "Obtaining an Oil Sample for S·O·S Analysis" for the correct sampling procedure. Refer to Operation and Maintenance Manual, "Sampling Interval and Location of Sampling Valve" for the correct location.

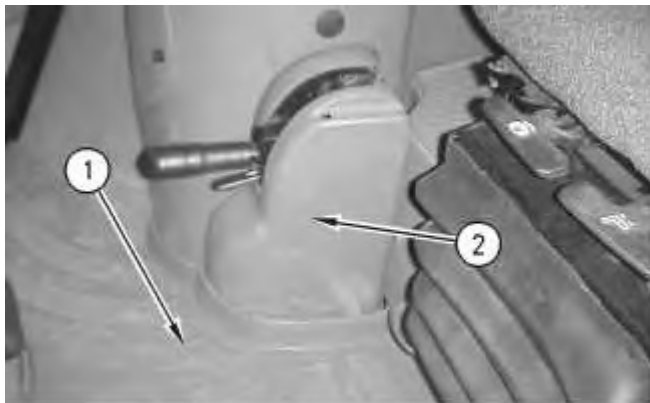


Illustration 1

g00754568

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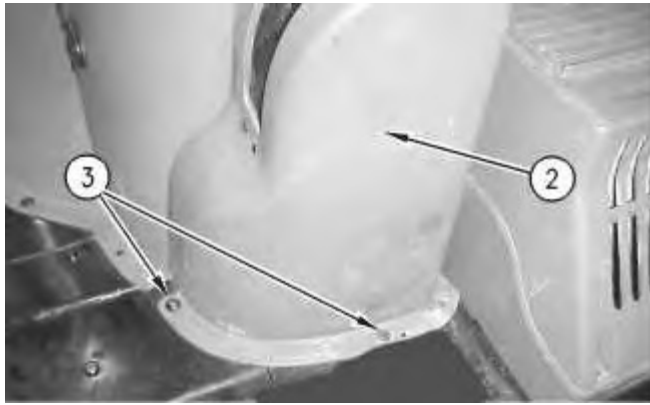


Illustration 2

g00754564

1. Pull floormat (1) away from cover (2) in order to expose screws (3) .
2. Remove screws (3) and cover (2) .

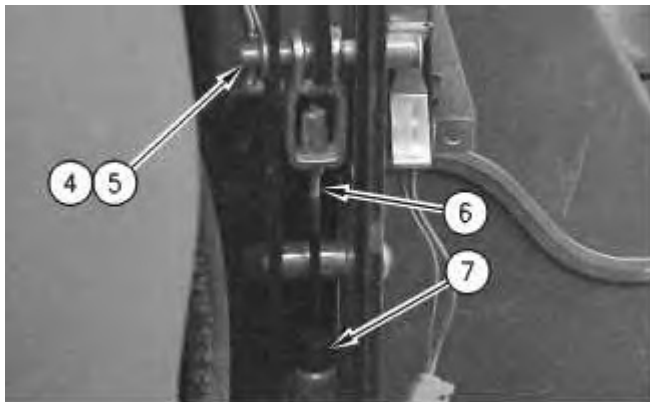
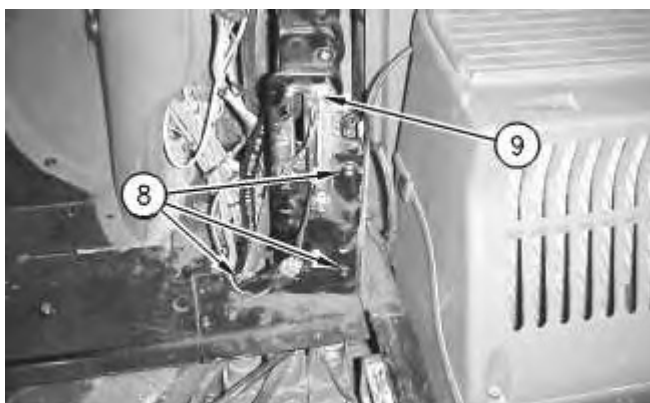


Illustration 3

g00759591

3. Remove clip (4) and pin (5). Squeeze clip (7) together. Pull cable (6) out of the parking brake assembly.



4. Remove three bolts (8) and parking brake lever assembly (9) .



Illustration 5

5. Disconnect six lines (10) from the pilot valve (loader).



Illustration 6

6. Disconnect wiring harness (11) .
-

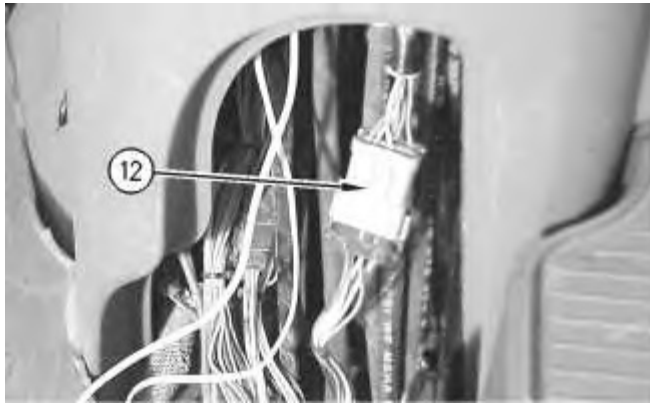


Illustration 7

g00754585

7. Disconnect wiring harness (12) .



Illustration 8

g00754593

8. Unfasten four clips (13) in order to retract the boot.



Illustration 9

g00754588

9. Retract boot (14) from the pilot valve (loader).

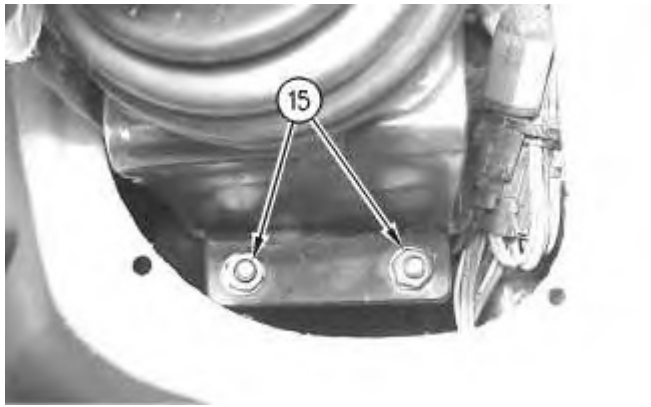


Illustration 10

g00754605

10. Remove two nuts and washers (15) from the bracket.

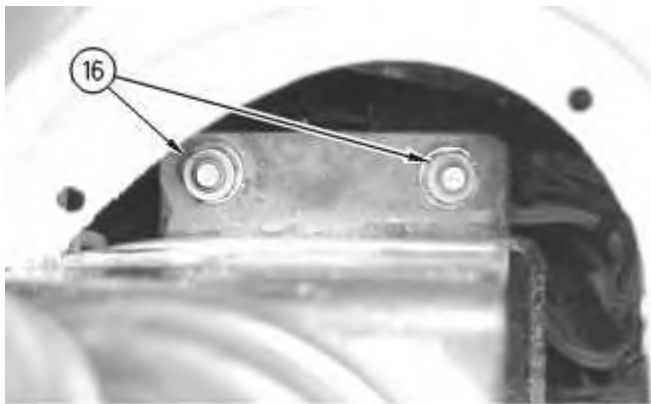


Illustration 11

g00756698

11. Remove two nuts and washers (16) from the other side of the bracket.



12. Lift pilot valve (loader) (17) from the console.

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Thu Sep 5 17:26:54 UTC+0800 2019

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Product: BACKHOE LOADER

Model: 416D BACKHOE LOADER BKG

Configuration: 416D Backhoe Loader BKG00001-01299 (MACHINE) POWERED BY 3054 Engine

## Disassembly and Assembly

### 416D, 420D, 424D, 428D, 430D, 432D, 438D and 442D Backhoe Loaders Machine Systems

Media Number -REN3585-11

Publication Date -01/09/2009

Date Updated -28/09/2009

i01445277

## Pilot Valve (Loader) - Disassemble

SMCS - 5059-015-JL

### Disassembly Procedure

#### Start By:

- A. Remove the pilot valve (loader) from the cab. Refer to Disassembly and Assembly, "Pilot Valve (Loader) - Remove" in this manual.

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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.

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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#### NOTICE

Keep all parts clean from contaminants.

**Contamination of the hydraulic system with foreign material will reduce the service life of the hydraulic system components.**

**To prevent contaminants from entering the hydraulic system, always plug or cap the lines, fittings, or hoses as they are disconnected. Cover any disassembled components and clean them properly before assembly.**

**Clean the hydraulic system properly after any major component exchange or especially after a component failure, to remove any contamination.**

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**Note:** Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes.

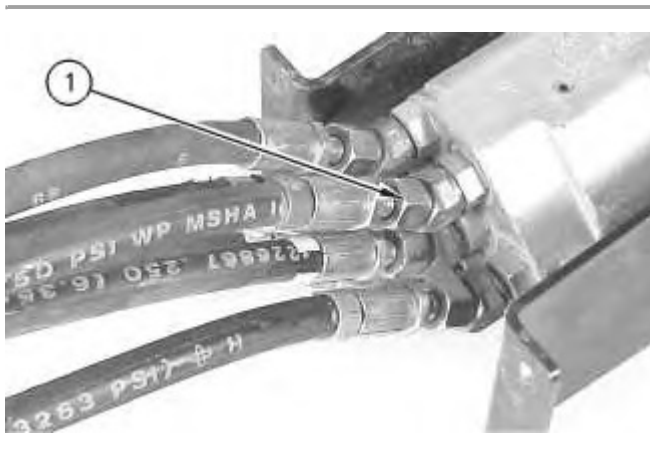


Illustration 1

g00756741

1. Remove six hydraulic lines (1) from the pilot valve.



Illustration 2

g00756743

2. Retract boot (2) in order to remove joystick (3) .

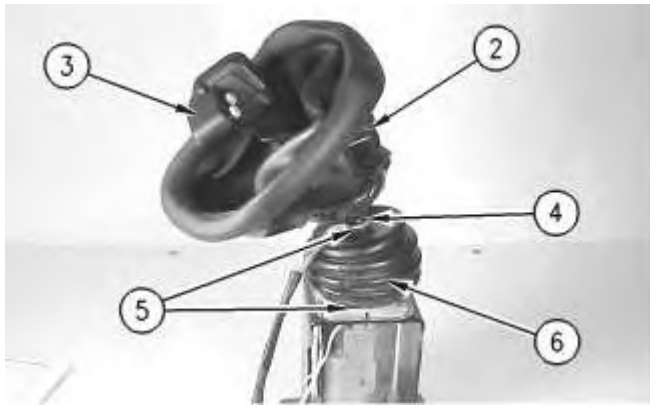


Illustration 3

g00757063

3. Loosen nut (4) and remove boot (2) and joystick (3) .

4. Remove two tie straps (5) in order to remove boot (6) .

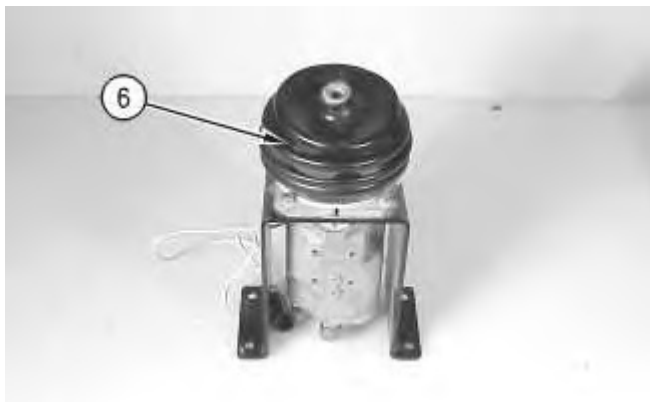


Illustration 4

g00757066

5. Remove boot (6) .

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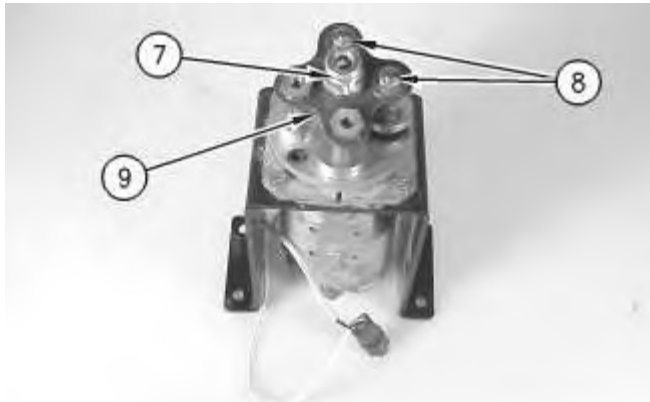


Illustration 5

g00757069

6. Remove nut (7) .
7. Remove two nuts and washers (8). Remove plate (9) .



Illustration 6

g00757074

8. Remove two receptacle assemblies (10) from the plate.

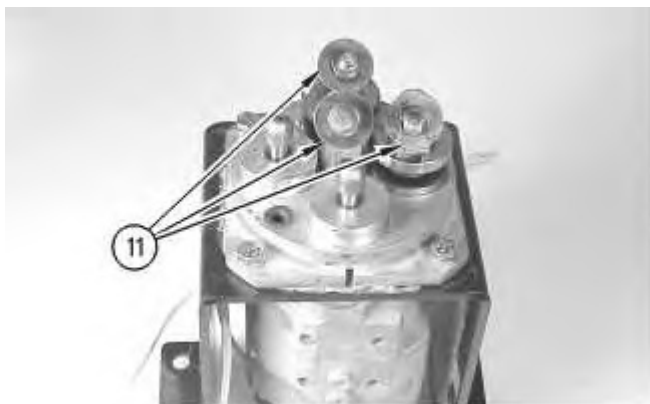


Illustration 7

g00757075

9. Remove three washers (11) .

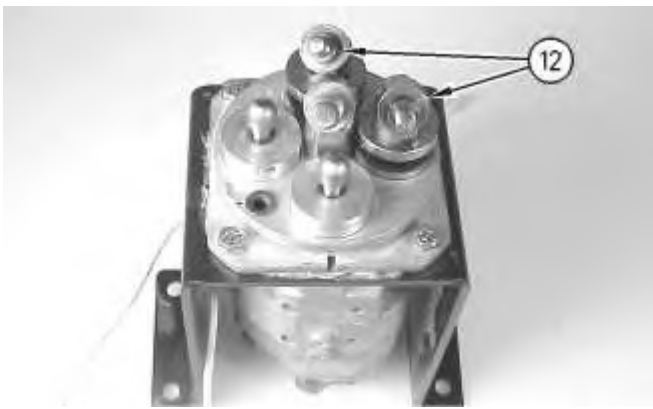


Illustration 8

g00757076

10. Remove two joints (12) .

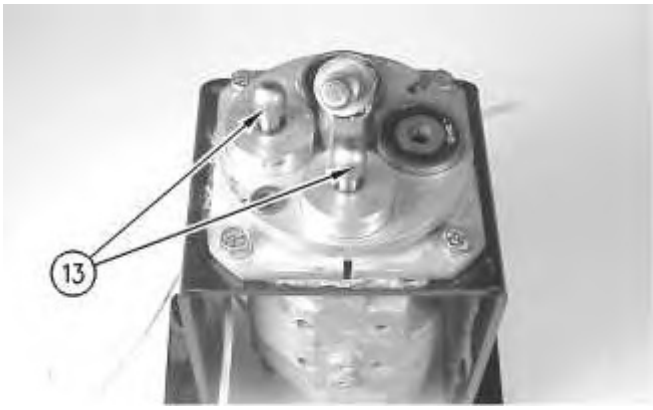
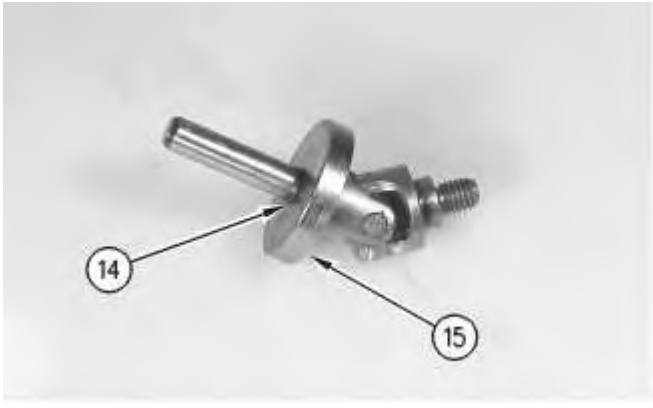


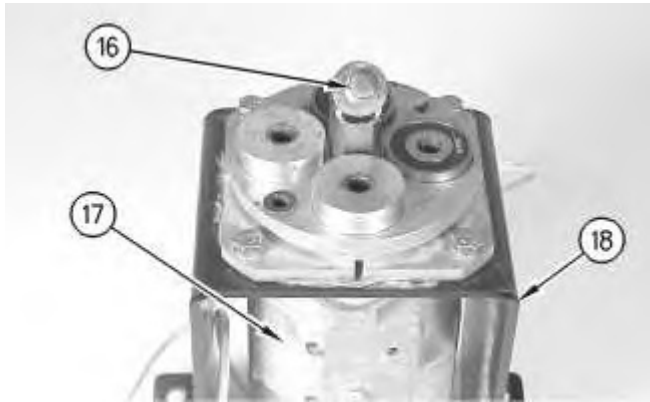
Illustration 9

g00757078

11. Remove two plungers (13) .



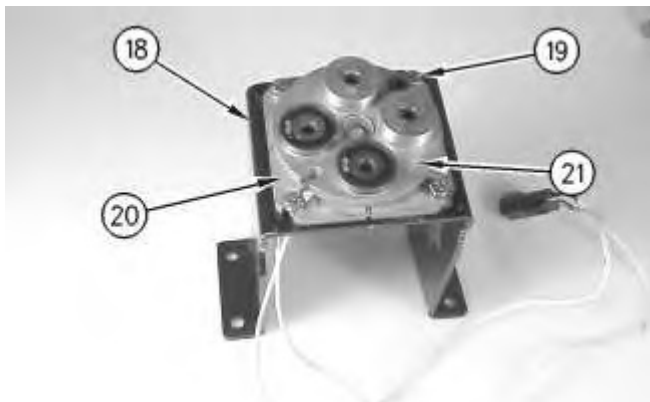
12. Remove retainer (14) and spacer (15) from the joint assembly.
13. Repeat Step 12 for the other joint assembly.



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Illustration 11

14. Remove joint (16) .
15. Separate valve body (17) from bracket (18) .



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Illustration 12

16. Remove four bolts (19) from bracket (18) .
  17. Remove plate (20) and plate (21) .
-

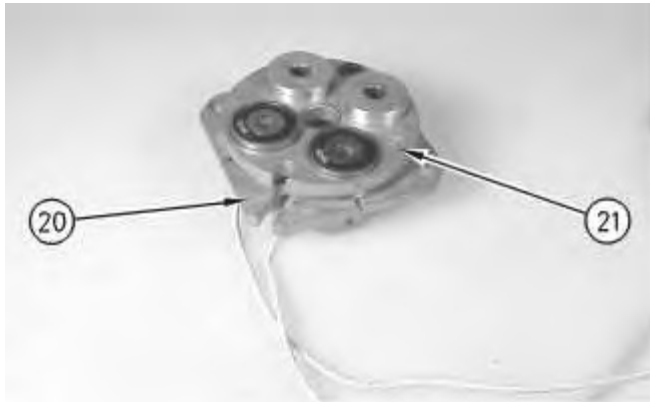


Illustration 13

g00757100

18. Separate plate (20) and plate (21) .

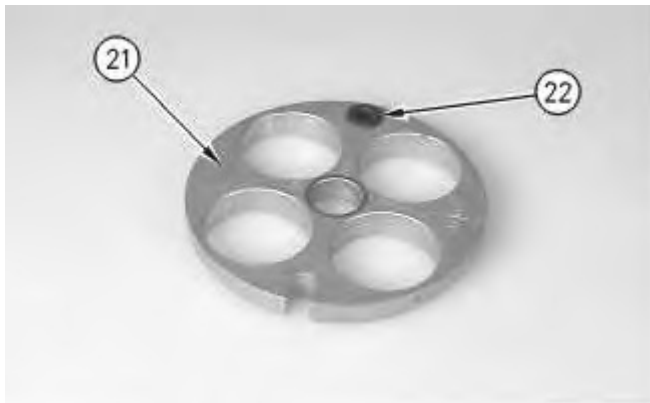


Illustration 14

g00757103

19. Remove grommet (22) from plate (21) .

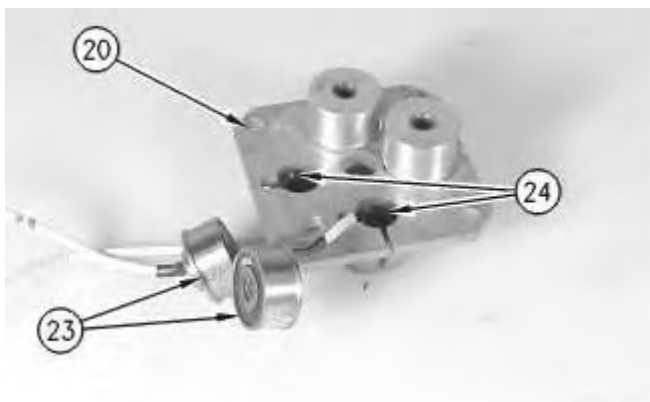


Illustration 15

g00757107

20. Remove two coils (23) from plate (20) .

21. Remove two grommets (24) from plate (20) .

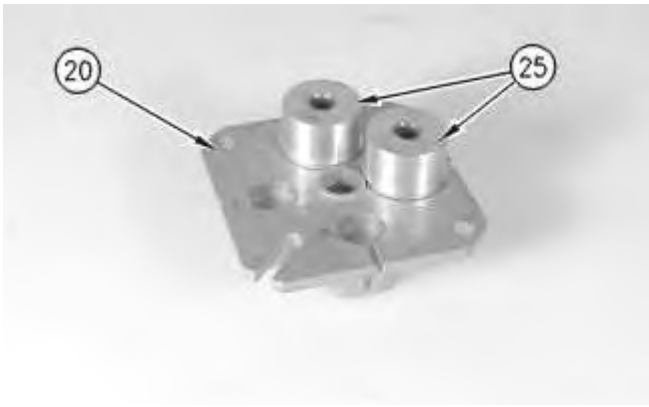


Illustration 16

g00757125

22. Remove two guides (25) from plate (20) .

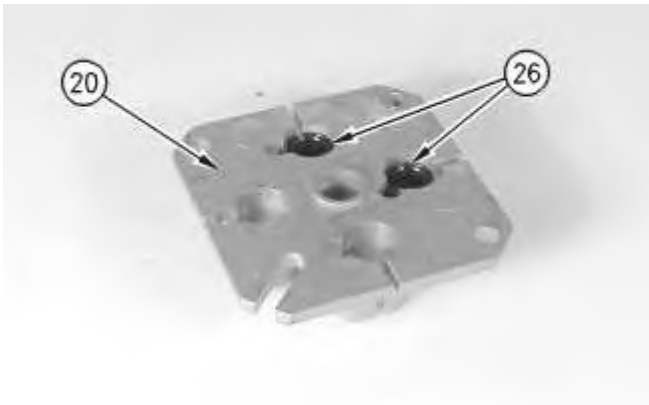
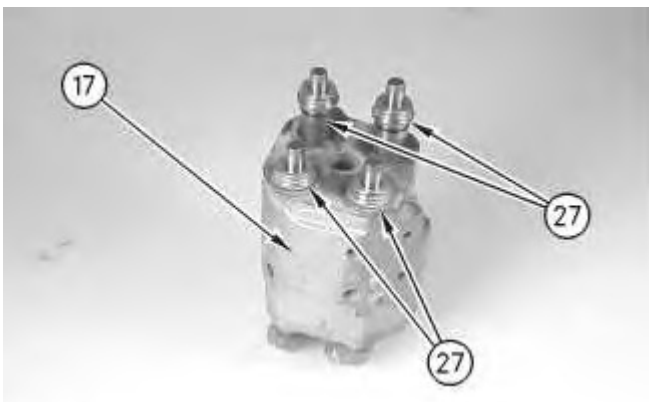


Illustration 17

g00757126

23. Remove two grommets (26) from plate (20) .



24. Remove four plunger assemblies (27) from valve body (17) .

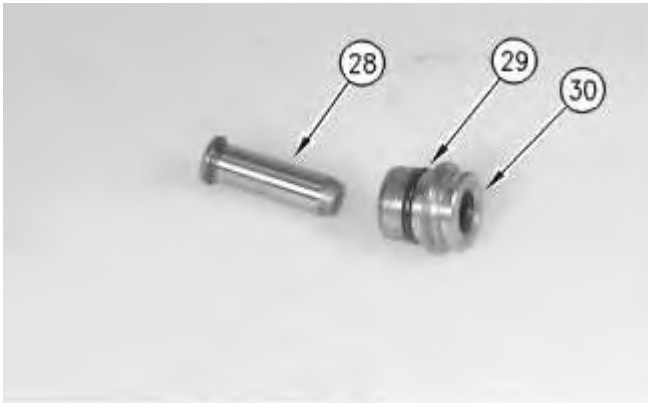


Illustration 19

25. Remove plunger (28) and O-ring (29) from guide (30) .
26. Repeat Step 25 for the remaining plunger assemblies.

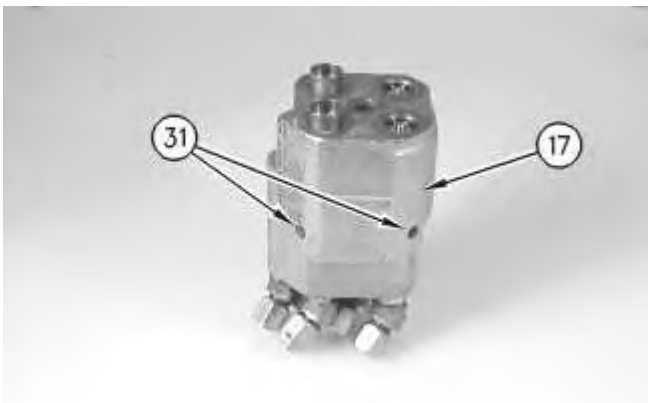


Illustration 20

27. Remove two set screws (31) from valve body (17) .
-

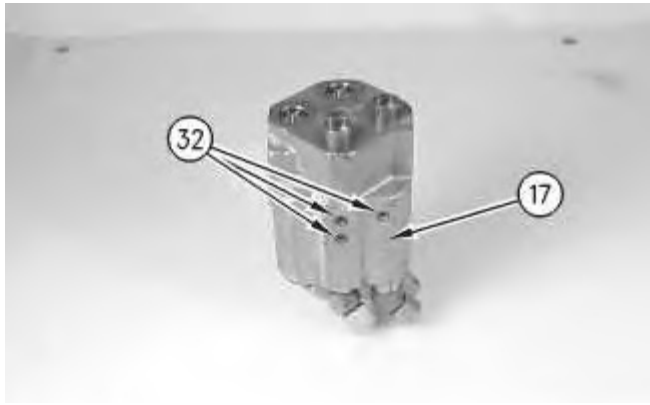


Illustration 21

g00759933

28. Remove three set screws (32) from valve body (17) .

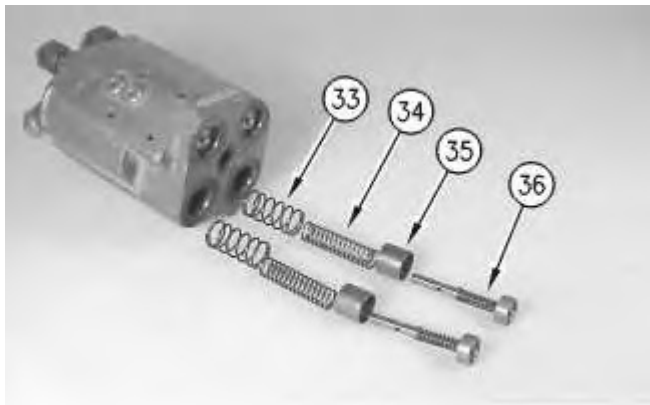
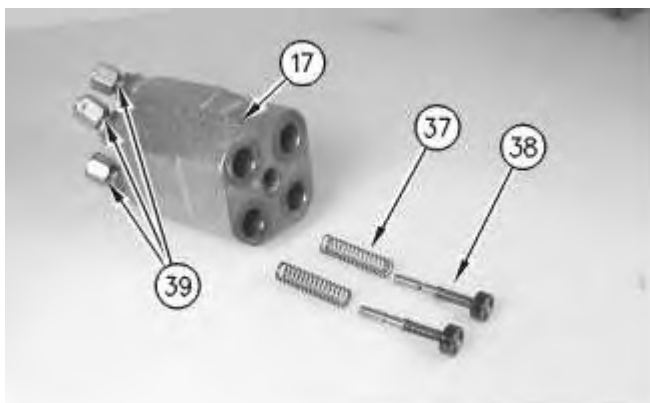


Illustration 22

g00757133

Ports with magnetic coils

29. Remove two regulators (36), two cylinders (35), two springs (34), and two springs (33) .



30. Remove two regulators (38) and two springs (37) .

31. Remove six fittings (39) from valve body (17) .

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Configuration: 416D Backhoe Loader BKG00001-01299 (MACHINE) POWERED BY 3054 Engine

## Disassembly and Assembly

### 416D, 420D, 424D, 428D, 430D, 432D, 438D and 442D Backhoe Loaders Machine Systems

Media Number -REN3585-11

Publication Date -01/09/2009

Date Updated -28/09/2009

i01452767

## Pilot Valve (Loader) - Assemble

SMCS - 5059-012-JL

### Assembly Procedure

**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. All disassembly and all assembly procedures must be performed on a clean work surface and in a clean hydraulic area. Keep cleaned parts covered and protected at all times.

**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.

**Note:** Apply a light film of hydraulic oil to all components before assembly.

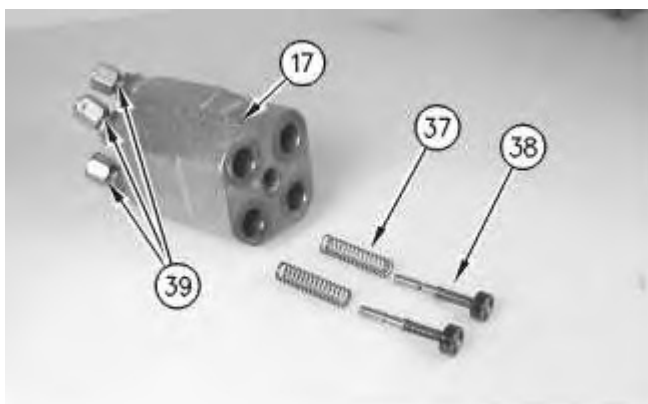


Illustration 1

g00757134

1. Install six fittings (39) into valve body (17) .
2. Install two springs (37) and two regulators (38) .

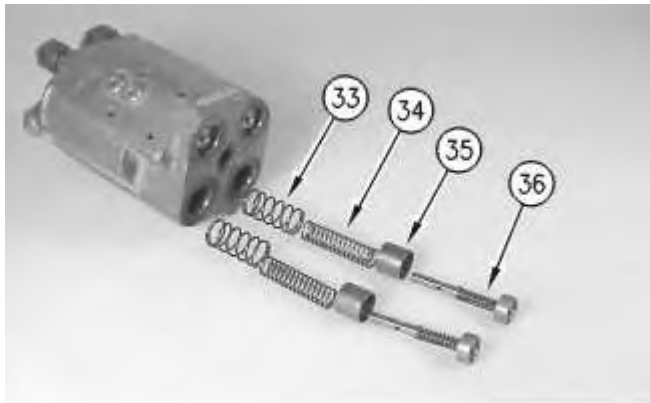


Illustration 2

g00757133

3. Install two springs (33), two springs (34), two cylinders (35), and two regulators (36) into the valve body.

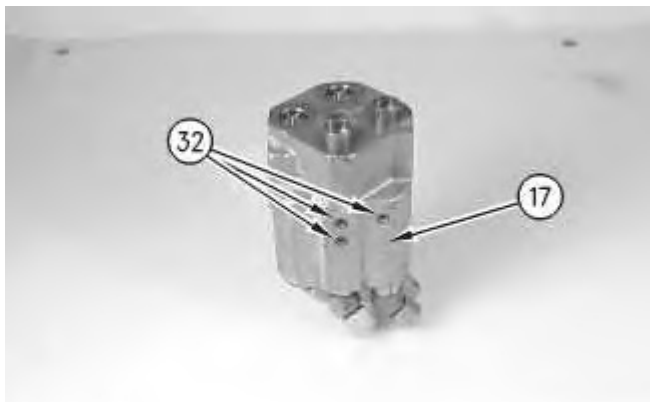


Illustration 3

g00759933

4. Install three set screws (32) into valve body (17) .
-

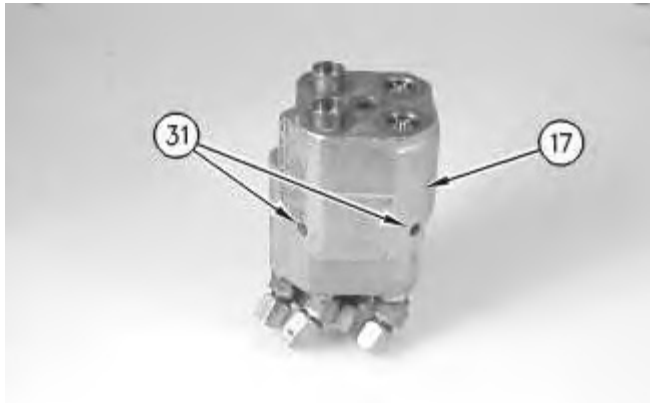


Illustration 4

g00759930

5. Insert two set screws (31) into valve body (17) .

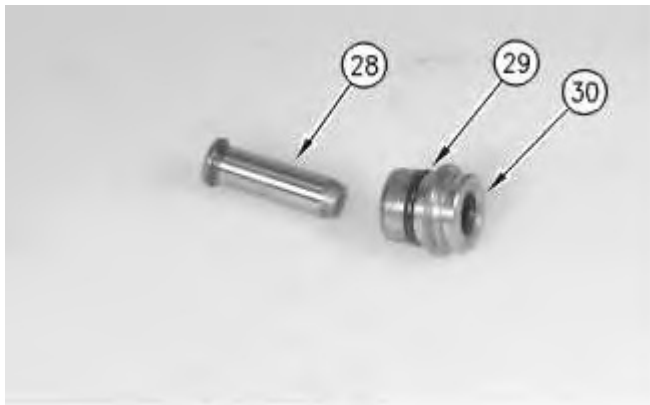
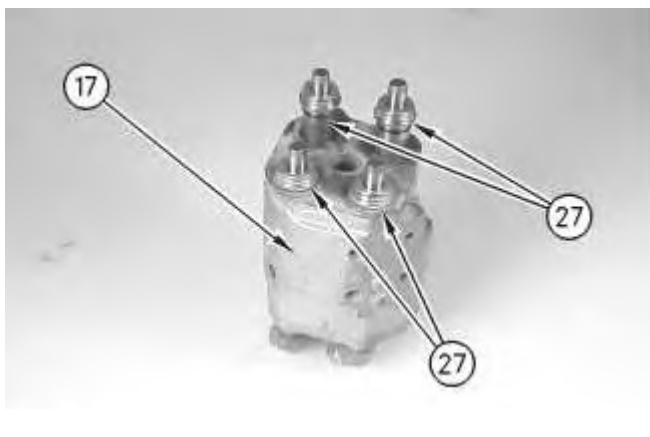


Illustration 5

g00757129

6. Install O-ring (29) on guide (30) .
7. Insert plunger (28) into guide (30) .
8. Repeat Step 6 and Step 7 in order to assembly the remaining plunger assemblies.



9. Install four plunger assemblies (27) into valve body (17) .

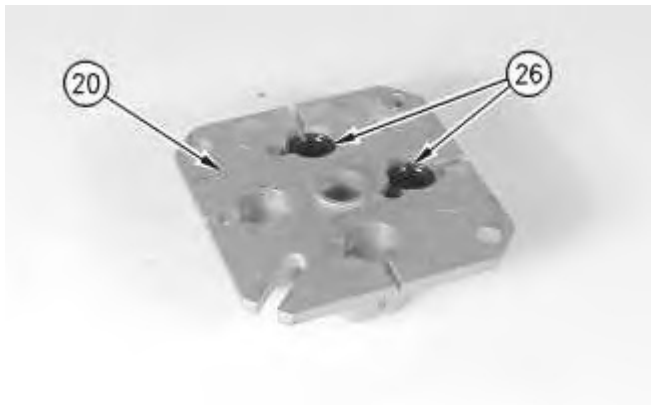


Illustration 7

10. Install two grommets (26) into plate (20) .

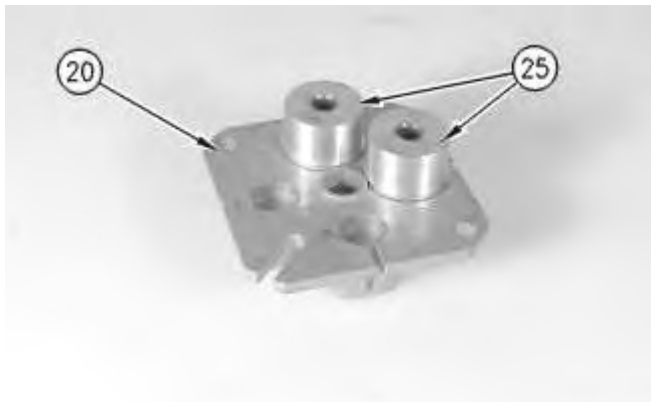


Illustration 8

11. Install two guides (25) into plate (20) .
-

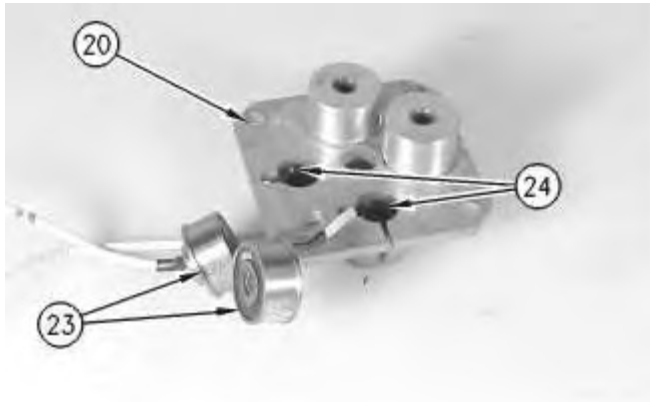


Illustration 9

g00757107

12. Install two grommets (24) and two coils (23) into plate (20) .

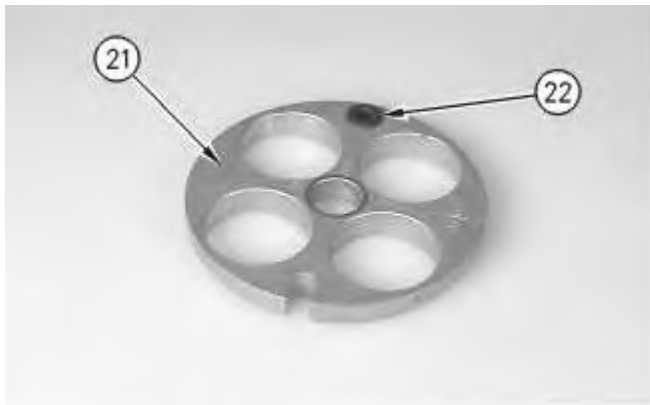


Illustration 10

g00757103

13. Install grommet (22) into plate (21) .

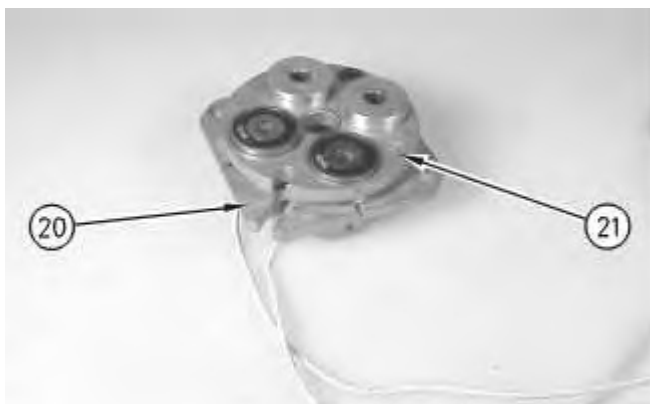


Illustration 11

g00757100

14. Place plate (20) on plate (21). Align the slotted sections of each plate.

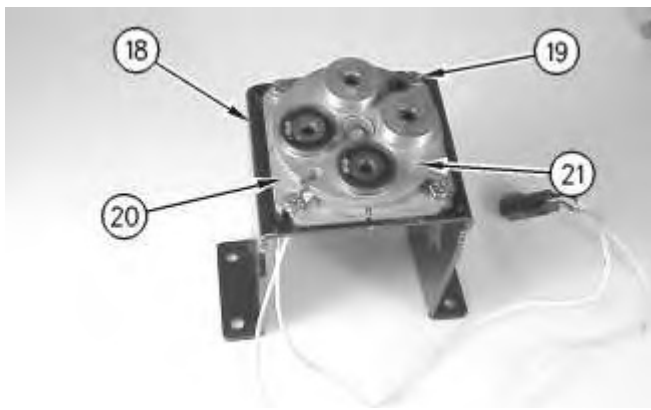


Illustration 12

g00757094

15. Install plate (20) and plate (21) on bracket (18) .
16. Install four bolts (19) .

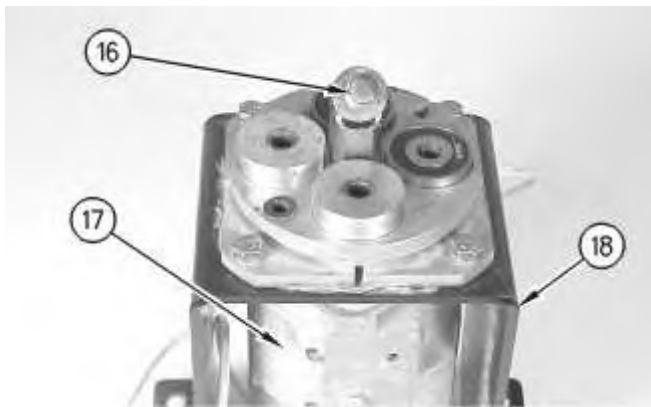


Illustration 13

g00757089

17. Install bracket (18) on valve body (17) .
  18. Install joint (16).
-

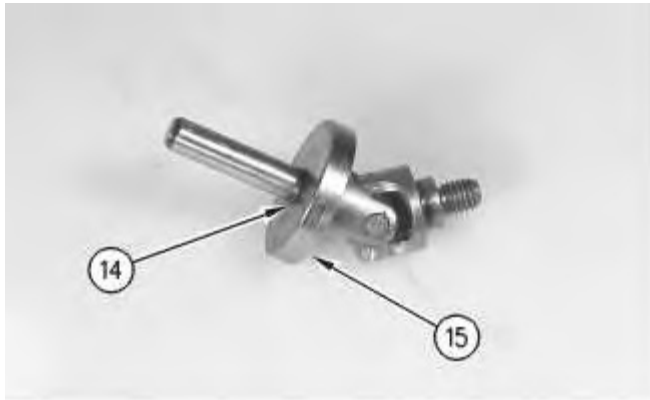


Illustration 14

g00757086

19. Install spacer (15) and retainer (14) on the joint assembly.
20. Repeat Step 19 in order to assemble the remaining joint assembly.

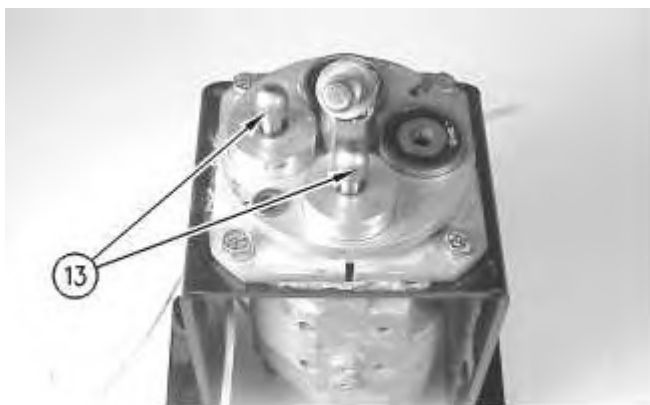


Illustration 15

g00757078

21. Install two plungers (13) into the valve body.

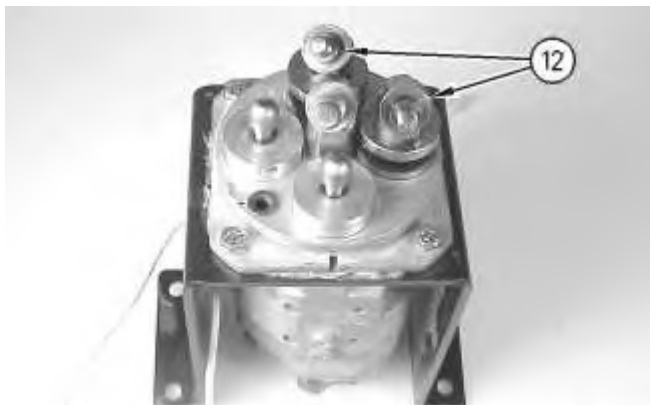


Illustration 16

g00757076

22. Install two joints (12) into the coil assemblies.

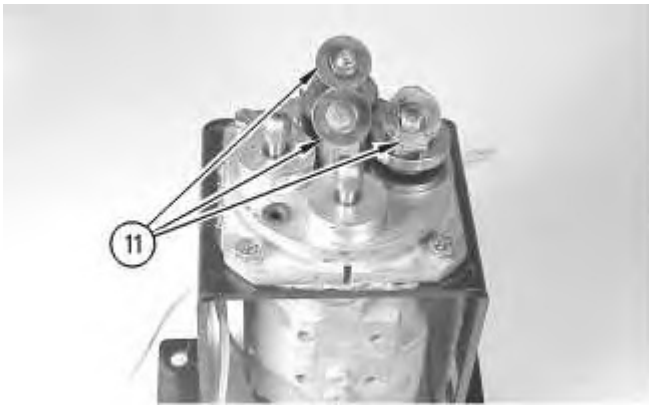


Illustration 17

g00757075

23. Install three washers (11) .

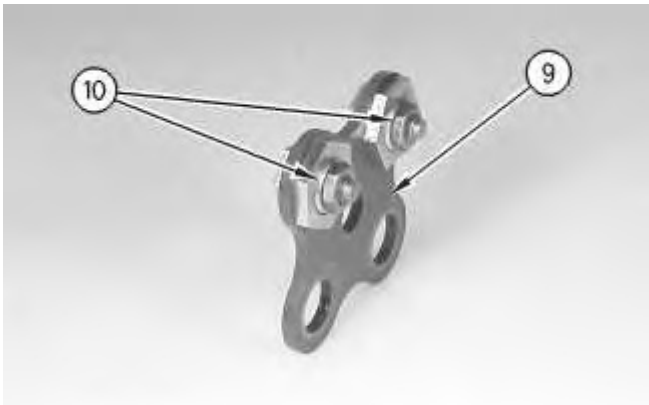
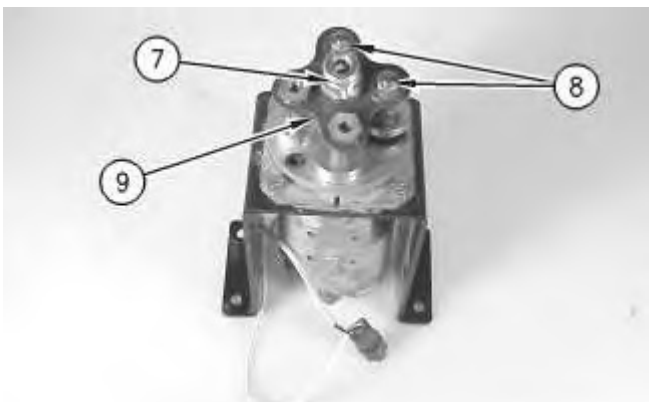


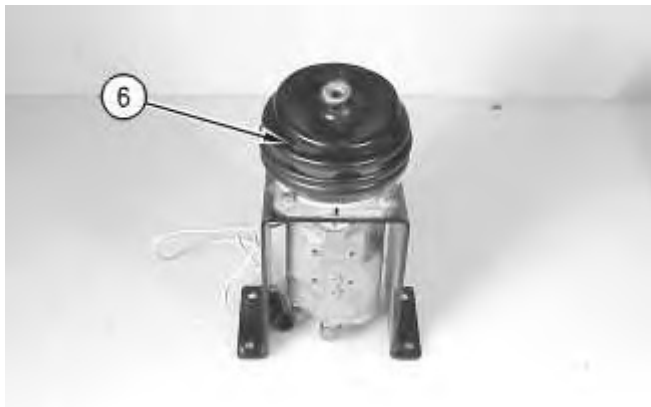
Illustration 18

g00760074

24. Install two receptacle assemblies (10) in plate (9) .



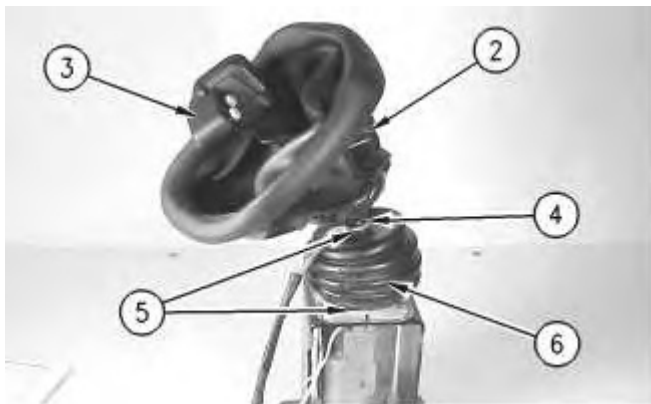
25. Install plate (9) .
26. Install two nuts and washers (8) .
27. Install nut (7) .



---

Illustration 20

28. Install boot (6) .



---

Illustration 21

29. Install two tie straps (5) in order to secure boot (6) .
  30. Install joystick (3) and boot (2) .
  31. Tighten nut (4) .
-



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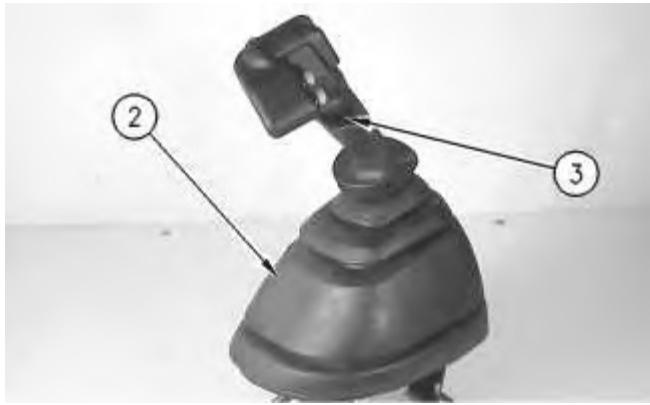


Illustration 22

g00756743

32. Cover the valve body with boot (2) .

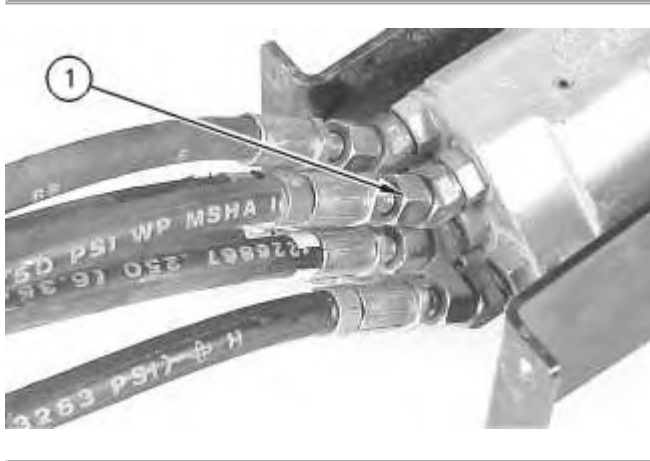


Illustration 23

g00756741

33. Attach six hydraulic lines (1) to the pilot valve.

**End By:** Install the pilot valve in the cab. Refer to Disassembly and Assembly, "Pilot Valve (Loader) - Install" in this manual.

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