KENR6018-08 (en-us)
August 2018

Disassembly and Assembly

16M Motor Grader
Machine Systems

B9H 1-UP (Machine)
R9H 1-99999 (Machine)

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards, including human factors that can affect safety. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you verify that you are authorized to perform this work, and have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

A non-exhaustive list of operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. You must not use this product in any manner different from that considered by this manual without first satisfying yourself that you have considered all safety rules and precautions applicable to the operation of the product in the location of use, including site-specific rules and precautions applicable to the worksite. If a tool, procedure, work method or operating technique that is not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that you are authorized to perform this work, and that the product will not be damaged or become unsafe by the operation, lubrication, maintenance or repair procedures that you intend to use.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Cat dealers have the most current information available.

⚠ WARNING

When replacement parts are required for this product Caterpillar recommends using Cat replacement parts.

Failure to follow this warning may lead to premature failures, product damage, personal injury or death.

In the United States, the maintenance, replacement, or repair of the emission control devices and systems may be performed by any repair establishment or individual of the owner's choosing.

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⚠ WARNING

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

To avoid accidental machine starting, turn the battery disconnect switch to the OFF position and remove the key. If the machine is not equipped with a battery disconnect switch, disconnect the battery cables from the battery and tape the battery clamps.

Place a do not operate tag at the battery disconnect switch location to inform personnel that the machine is being worked on.

Disassembly and Assembly Section

i02752200

Centershift Lock Bar and Front Frame Bushings - Remove

SMCS Code: 5221-011; 7050-011-BD

Removal Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-1836	Bearing Puller Adapter	1
	1P-1835	Bearing Puller Adapter	1
	1P-1837	Bearing Puller Adapter	1
	4C-9634	Stud	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1
	6V-3175	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	6V-4035	Sleeve	1

Start By:

a. Remove the lock valve. Refer to Disassembly and Assembly, “Centershift Lock - Remove”.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

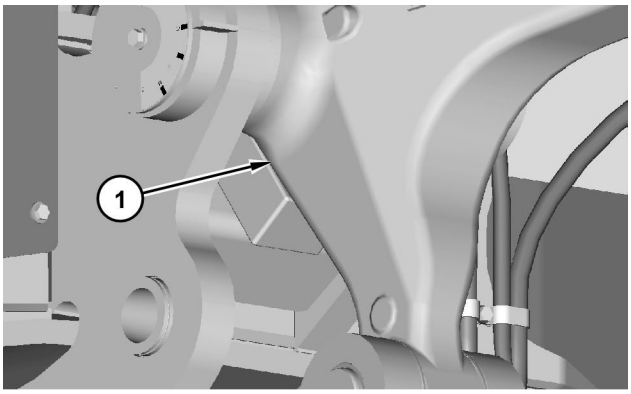

Illustration 1 g01377903

1. Install suitable blocking in order to support blade lift arms (1). Repeat this step for the remaining blade lift arm (1).

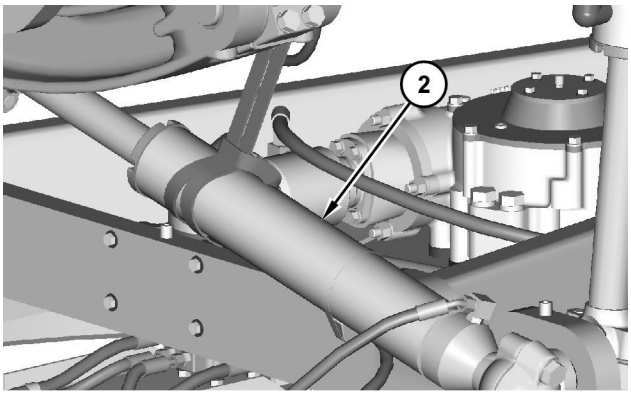

Illustration 2 g01377931

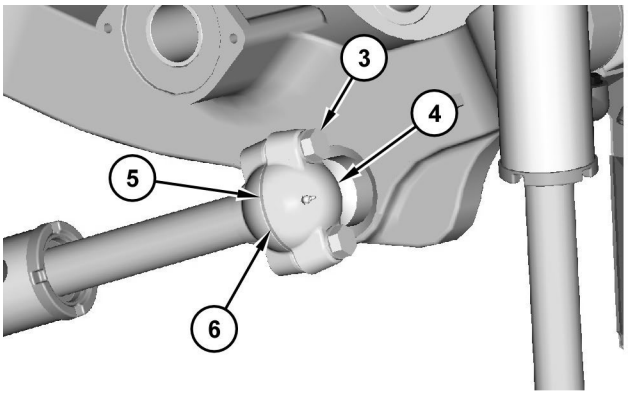

Illustration 3 g01377932

2. Attach a suitable lifting device onto centershift cylinder (2). The weight of centershift cylinder (2) is approximately 50 kg (110 lb).

3. Remove bolts (3), cap (4), inserts (5), and shims (6).

Note: Note the order and the quantity of shims (6) for installation purposes.

4. Retract centershift cylinder (2). Lower centershift cylinder (2) onto the drawbar.

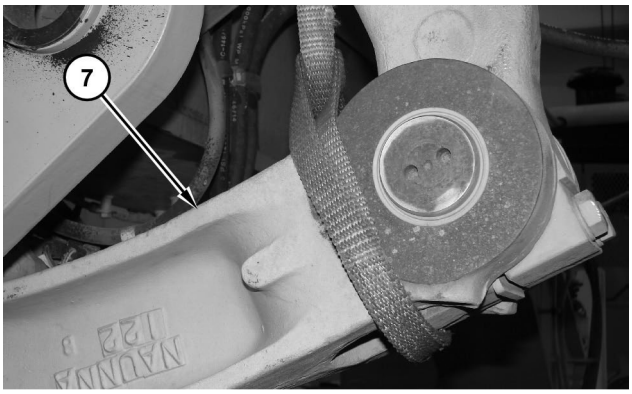

Illustration 4 g01377953

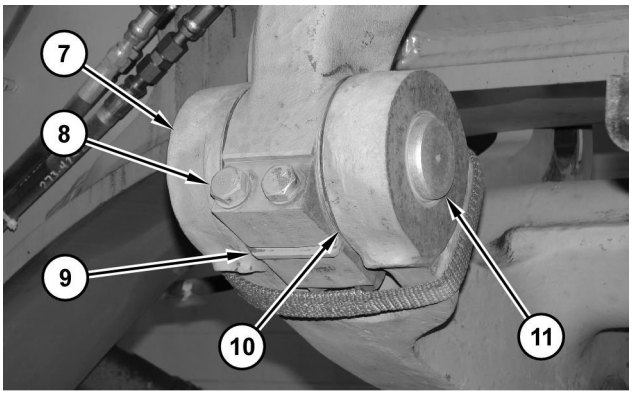

Illustration 5 g01377968

5. Attach a suitable lifting device onto centershift lock bar (7). The weight of centershift lock bar (7) is approximately 125 kg (276 lb).

6. Remove bolts (8) and lock (9).

7. Remove pin (11) and thrust washers (10). Lower centershift lock bar (7) onto the drawbar.

Note: Note the order and the quantity of thrust washers (10) for installation purposes.

8. Repeat Step 5 through Step 7 for the opposite side.

9. Remove centershift lock bar (7).

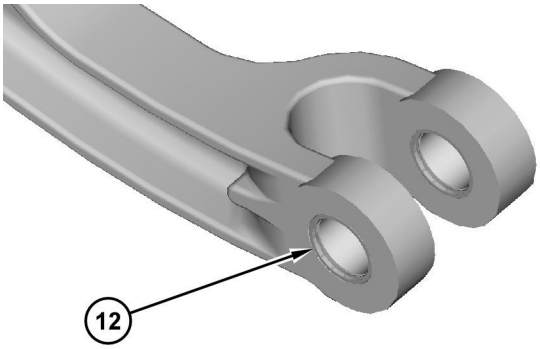

Illustration 6 g01377981

10. Remove seal (12). Repeat this step for the remaining seals (12).

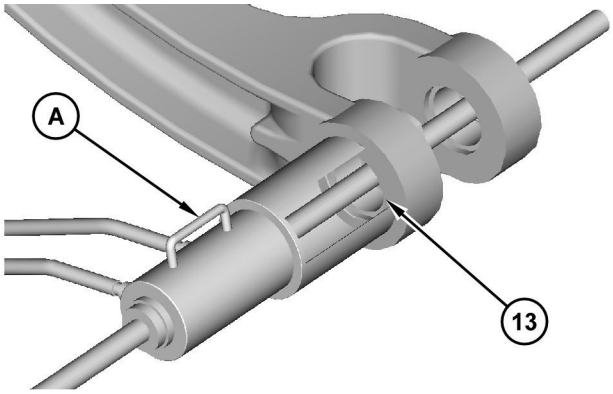

Illustration 7 g01377988

11. Use Tooling (A) in order to remove bearing (13). Repeat this step for the remaining bearings (13).

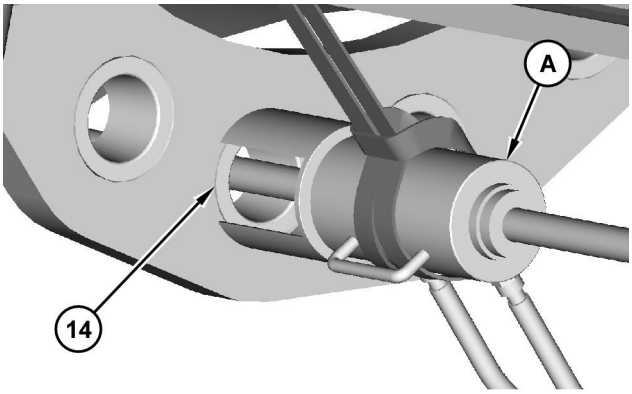

Illustration 8 g01378065

12. Use Tooling (A) and a suitable lifting device in order to remove bushing (14). Repeat this step for the remaining bushings (14).

i05194770

Centershift Lock Bar and Front Frame Bushings - Install

SMCS Code: 5221-011; 7050-012-BD

Installation Procedure

Table 2

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	4C-9634	Stud	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1
	6V-3170	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	5F-7693	Spacer As	1
C	1P-0510	Driver Group	1
D	5P-0960	Grease Cartridge	-
E	1P-1836	Bearing Puller Adapter	1
	1P-1835	Bearing Puller Adapter	1
	1P-1837	Bearing Puller Adapter	1
	4C-9634	Stud	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1
	6V-3175	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1

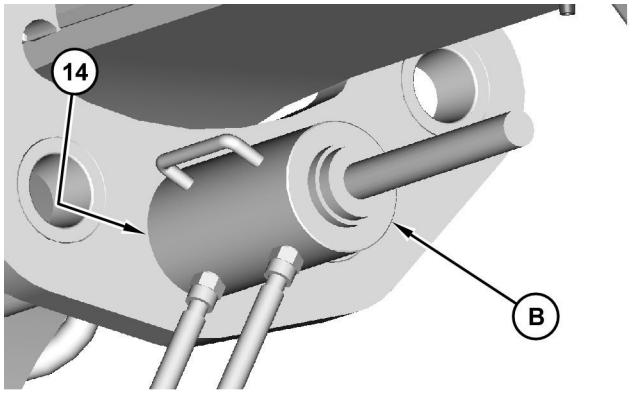

Illustration 9 g01378724

1. Lower the temperature of the bushings (14) to −21° C (−6° F) before installation.

2. Use Tooling (B) in order to Install bushing (14). Repeat this step for the remaining bushings (14).

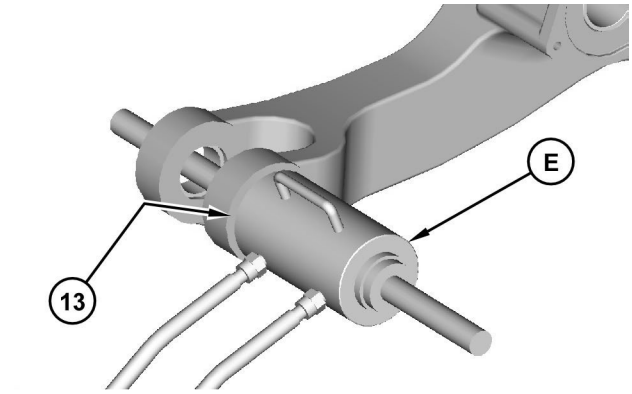

Illustration 10 g01378748

3. Use Tooling (E) in order to install bearing (13). Repeat this step for the remaining bearings (13).

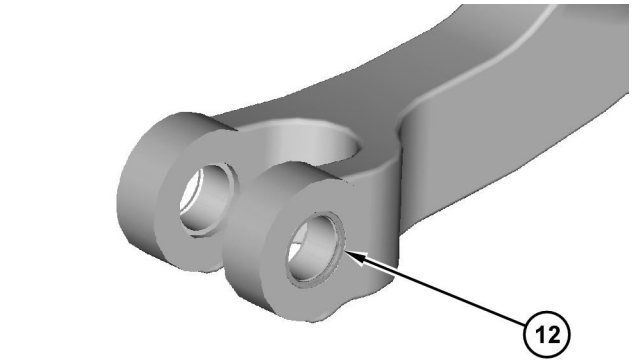

Illustration 11 g01378759

4. Use Tooling (C) in order to install seals (12). Repeat this step for the remaining bearings (12).

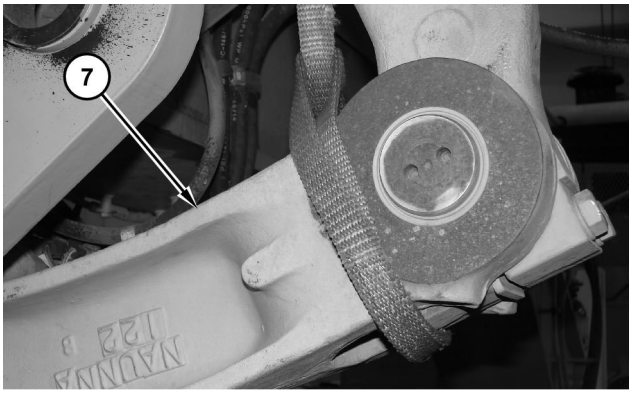

Illustration 12 g01377953

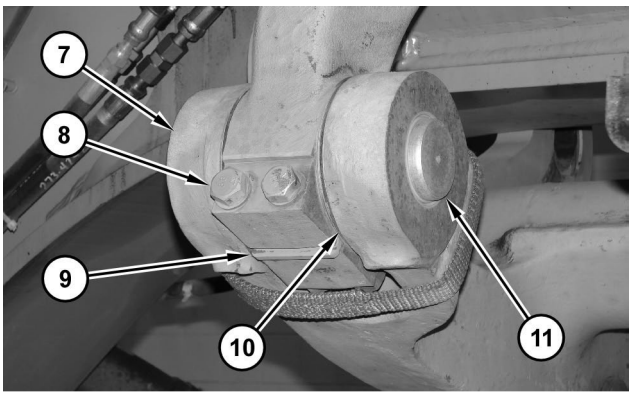

Illustration 13 g01377968

5. Use a suitable lifting device in order to position centershift lock bar (7). The weight of centershift lock bar (7) is approximately 181 kg (400 lb).

6. Install thrust washers (10) and install pin (11).

7. Adjust the quantity of thrust washers (10) in order to obtain a clearance of 2.3 ± 0.8 mm (0.091 ± 0.032 inch) between the centershift lock bar and the lock plate.

8. Install lock (9) and bolts (8). Repeat this step for the opposite side.

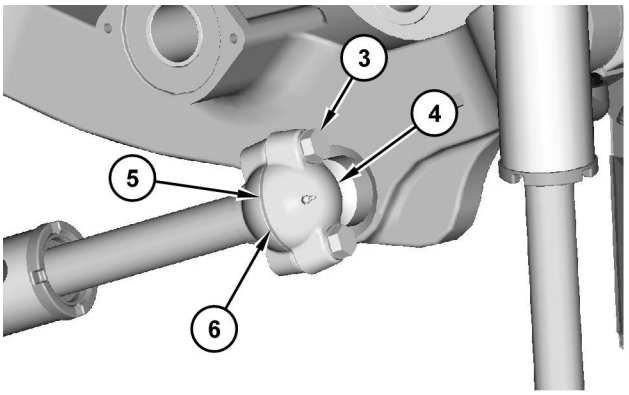

Illustration 14 g01377932

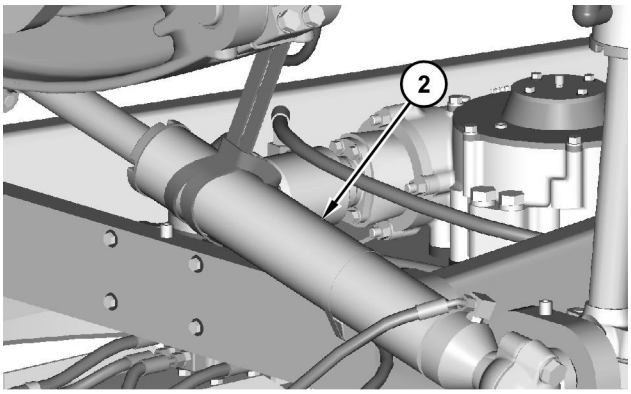

Illustration 15 g01377931

9. Use a suitable lifting device in order to position centershift cylinder (2). The weight of centershift cylinder (2) is approximately 50 kg (110 lb).

10. Extend centershift cylinder (2). Apply Tooling (D) onto inserts (5). Install inserts (5), shims (6), cap (4), and bolts (3).

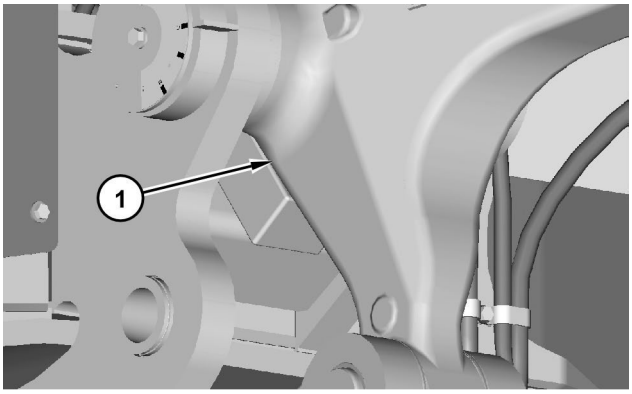

Illustration 16 g01377903

11. Remove the suitable blocking from blade lift arms (1). Repeat this step for the remaining blade lift arm (1).

End By:

a. Install the lock valve. Refer to Disassembly and Assembly, “Centershift Lock - Install”.

i03251187

Duo-Cone Conventional Seals - Install

SMCS Code: 7561-012-SA; 7561-012; 7561-016

Assembly and Installation of Conventional Duo-Cone Seals

This instruction provides the procedure for assembling and installing conventional Duo-Cone Seals.

When the Duo-Cone Seals are installed and assembled, you must use the correct procedures. The Duo-Cone Seal may fail from one or more mistakes that are made during assembly or during installation of the seal components.

Reference: Special Instruction, SEHS8484, “Tool and Specification Chart for Conventional Duo-Cone Seals”

Required Tools

Use the tools in Table 3 in order to correctly measure the spacing of the Duo-Cone Seals after the seals are installed.

Table 3

Required Tools			
Item	**Part Number**	**Description**	**Qty**
10	6V-3075	Dial Indicator	1
11	6V-6167	Contact Point	1
12	3P-1565	Collet Assembly	1
13	165-8958	Dial Indicator Base	1

Correct Assembly of Conventional Duo-Cone Seals

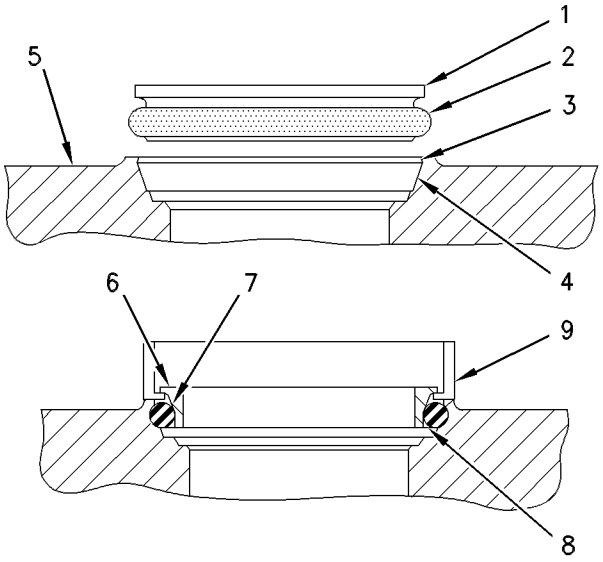

Illustration 17 g00446486

(1) Seal ring
(2) Rubber toric ring
(3) Housing retaining lip
(4) Housing ramp
(5) Seal ring housing
(6) Seal ring face
(7) Seal ring ramp
(8) Seal ring retaining lip
(9) Installation tool

Assembly and Installation Procedure

⚠ WARNING

Avoid prolonged skin contact with isopropyl alcohol. Avoid breathing the vapors in enclosed areas without adequate ventilation and do not smoke.

Isopropyl alcohol is flammable. Do not use near open flame, welding operations, or around heated surfaces exceeding 482°C (900°F).

1. Remove any film, dust or other foreign matter from the following components:

- Rubber toric ring (2)
- Housing ramp (4)
- Seal ring ramp (7)
- Housing retaining lip (3)
- Seal ring retaining lip (8)
- Seal ring housing (5)

Note: Seal rings have very sharp edges. Protective gloves should be worn in order to prevent injury.

Use isopropyl alcohol or other approved cleaning agents. Use a clean lint free cloth for wiping. All components should be completely dry before proceeding.

Note: Never permit oil to contact rubber toric ring (2), housing ramp (4) or seal ring ramp (7) before both seal rings (1) are assembled in the final position.

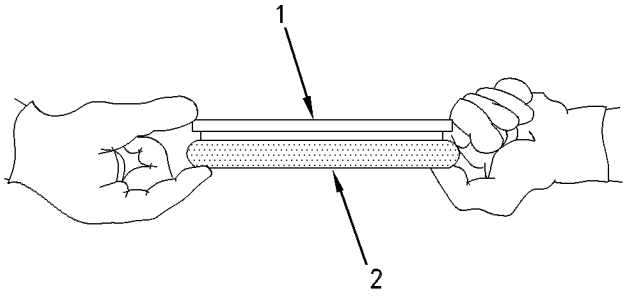

Illustration 18 g00534617

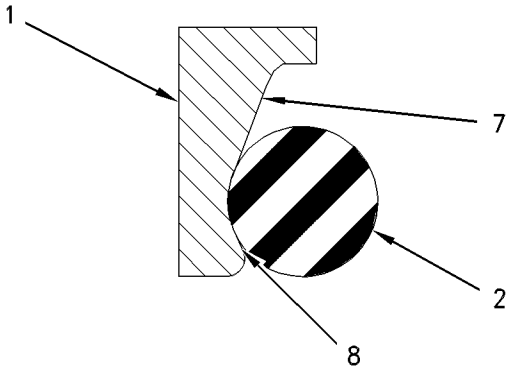

Illustration 19 g00446488

2. Put rubber toric ring (2) on seal ring (1). Make sure that the rubber toric ring is positioned at the bottom of seal ring ramp (7). The rubber toric ring must rest against retaining lip (8). The rubber toric ring must be straight in the seal ring. The rubber toric ring must not be twisted.

Note: Be careful when you are working on the rubber toric ring. Nicks, cuts or scratches may cause leaks.

3. Refer to Special Instruction, SEHS8484, “Tool and Specification Chart for Conventional Duo-Cone Seals” in order to select the proper installation tool.

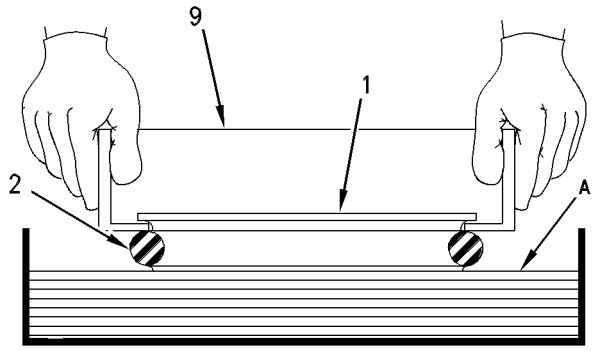

Illustration 20 g00534621

Use towels or a mat (A) that is made of foam in order to aid in the installation of toric ring (2).

4. Use Tooling (9) to install rubber toric ring (2) on seal ring (1). Lightly dampen the lower half of rubber toric ring (2) with an appropriate lubricant. Refer to the “Acceptable Lubricants for Assembly” in this publication for additional information. Use the following procedure in order to dampen the rubber toric ring:

- Wipe the seal with a lint free cloth.
- Place towels or a mat that is made of foam at the bottom of a container. Soak the towels or the mat with the lubricant. Dip the rubber toric seal in the container.

Note: Periodically inspect the installation tool for damage. If necessary, replace the installation tool .

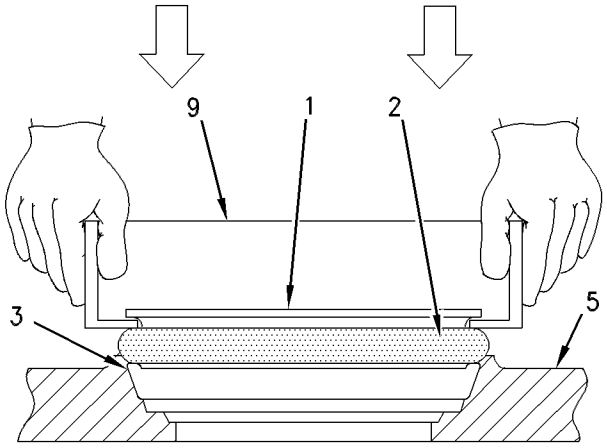

Illustration 21 g00534622

5. Make sure that the lower half of rubber toric ring (2) is still wet. Use Tooling (9) in order to position seal ring (1) and rubber toric ring (2) squarely against seal ring housing (5). Make sure that you use sudden pressure and even pressure when you press a toric ring that has a small diameter. Press rubber toric ring (2) under housing retaining lip (3) that is part of seal ring housing (5). Use the following procedure in order to install a rubber toric ring that has a large diameter:

- Push the rubber toric ring over the seal ring retaining lip on one side.
- Tap the installation tool with a rubber mallet on the opposite side of the rubber toric ring. Tap until the rubber toric ring is past the seal ring retaining lip of the housing.

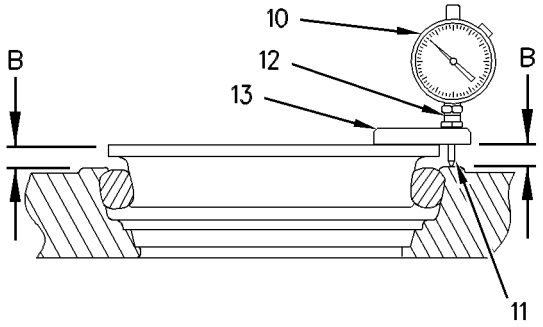

Illustration 22 g00534720

(B) Assembled height
(10) Dial indicator
(11) Contact point
(12) Collet assembly
(13) Dial indicator base (plastic)

6. Check assembled height (B) at four locations that are 90 degrees from each other. Use a calibrated 6V-3075 Dial Indicator and the related tools in Table 3 in order to measure the assembled height. The difference in height must not exceed 1.0 mm (0.04 inch). Refer to Illustration 22 .

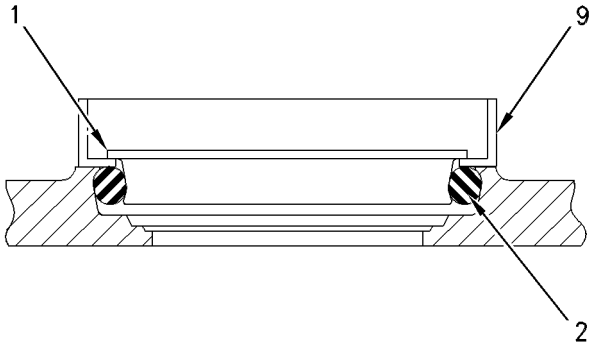

Illustration 23 g00446492

7. Do not adjust the seal ring (1) by pushing on the seal ring or by pulling on the seal ring. Use Tooling (9) in order to push down on the seal.

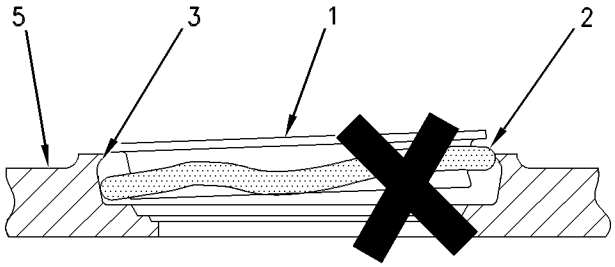

Illustration 24 g00446493

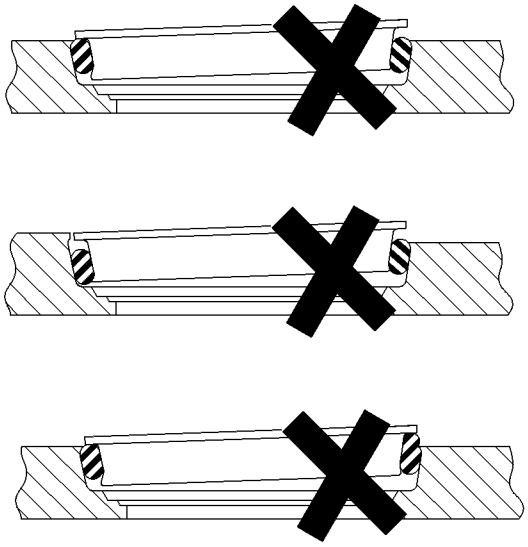

Illustration 25 g00446494

Examples of incorrect assembly

8. Rubber toric ring (2) may twist during installation if the seal is not completely wet or if there are burrs or fins on housing retaining lip (3) that is part of seal ring housing (5). Misalignments, twists and bulges of the rubber toric ring will cause Duo-Cone Seal failures. If correct installation is not obvious, remove the toric ring from the housing and repeat the installation procedure.

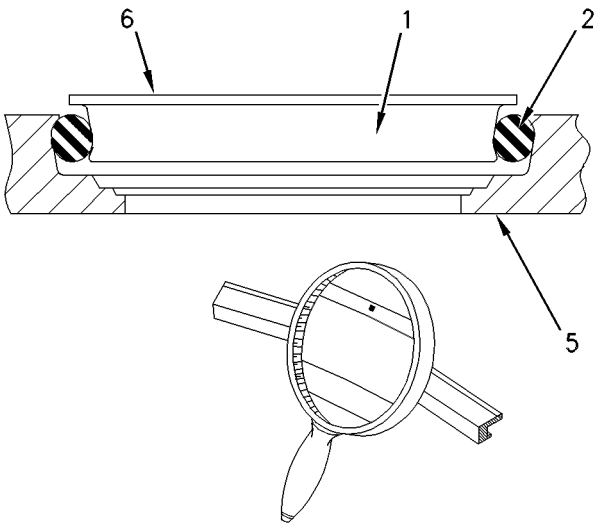

Illustration 26 g00446495

9. Wipe seal ring face (6) that is part of seal rings (1) by using a lint free cloth. No particles of any kind are permissible on the sealing surfaces. A small piece of paper from a paper towel can force apart the seal ring face, which will cause a leak.

Note: Rubber toric ring (2) must never slip on the ramps of seal ring (1) or the ramps of seal ring housing (5). In order to prevent slippage, allow adequate time for evaporation of the lubricant before proceeding with the procedure. Once the rubber toric ring is correctly positioned, the rubber toric ring must roll only on the ramps.

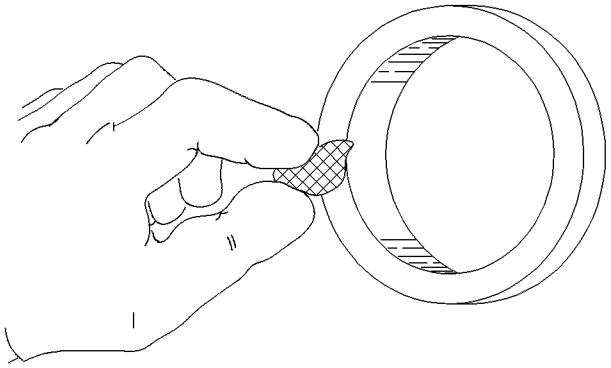

Illustration 27 g00534623

10. Apply a thin film of clean oil on the entire seal ring face of one or both seals. Use a lint free cloth or brush in order to distribute the oil evenly. Be careful not to get any oil on the rubber toric rings. Lubricate the seal faces by using the same oil that was used during assembly. Dye may have been used in the oil that was used during assembly. Use the same kind of oil without dye in order to lubricate the seal faces.

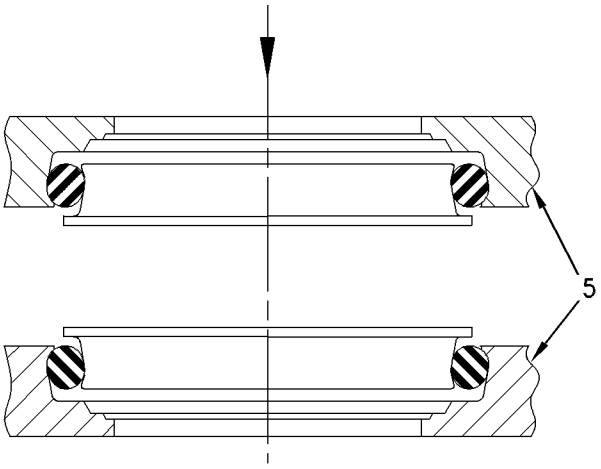

Illustration 28 g00446497

11. Make sure that both seal ring housings (5) are in correct alignment and that the seal ring housings are concentric. Move the parts slowly and move the parts carefully toward each other.

Note: Do not force the seal ring and the seal ring housing together in a sudden manner. The seal component could be scratched or the seal component could be broken if the components are slammed together.

12. Tighten the bolts after the components are in the correct position.

Acceptable Lubricants for Assembly

⚠ WARNING

Avoid prolonged skin contact with isopropyl alcohol. Avoid breathing the vapors in enclosed areas without adequate ventilation and do not smoke.

Isopropyl alcohol is flammable. Do not use near open flame, welding operations, or around heated surfaces exceeding 482°C (900°F).

Note: Do not use any liquid that leaves an oil film. Do not use any liquid that does not evaporate quickly. All of the guidelines for safety and all of the guidelines for disposal must be followed when you use a flammable liquid. The following liquids are acceptable lubricants for assembly:

- Quaker Solvo Clean 68-0
- Houghto-Grind 60 CT
- Isopropyl alcohol

Some seal kits come with silicone toric rings. Silicone toric rings can be chilled for easier installation. This will allow the toric ring to contract for easier installation.

Seals should be placed in a freezer for 5 minutes. Temperature in the freezer should be between −40°C (−40°F) to −18°C (0°F). Chilling should be done prior to installation. Contraction will be sufficient to allow installation. The seals should be allowed to warm to room temperature prior to further assembly.

Result of Incorrect Assembly

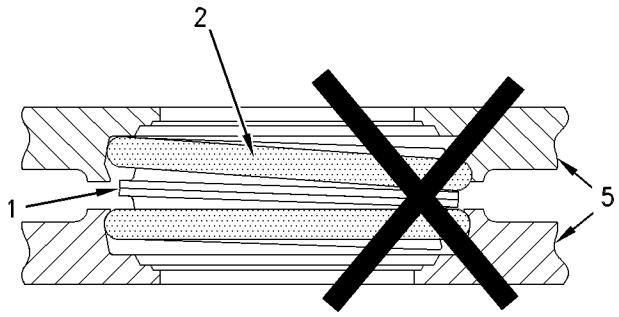

Illustration 29 g00446498

The slipping of the rubber toric ring on the housing ramp or on the seal ring ramp may result in uneven pressure on the seal face. Uneven pressure on the seal face causes galling, scoring, and leakage.

If the rubber toric ring slips at one location but not all the way around the seal ring, the toric ring will twist.

The twisted toric ring could be cocked. Seals that are cocked will cause uneven pressure on the seal face. Seals that are cocked may also cause possible galling, scoring, and leakage.

The twisted toric ring could oscillate when the ring is rotated. Seals that oscillate may allow dirt into the seal joint. This is caused by the pumping action that is created by the toric ring that is oscillating.

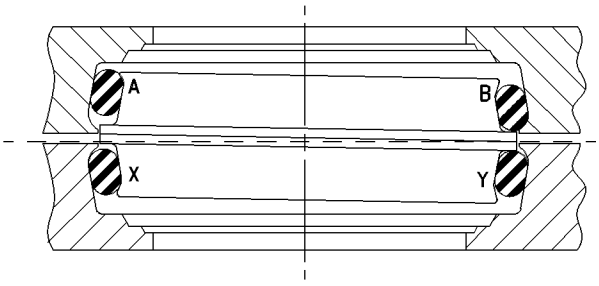

Illustration 30 g00446499

Illustration 30 shows a toric ring that is assembled incorrectly. The upper housing is stationary. The lower housing is rotating.

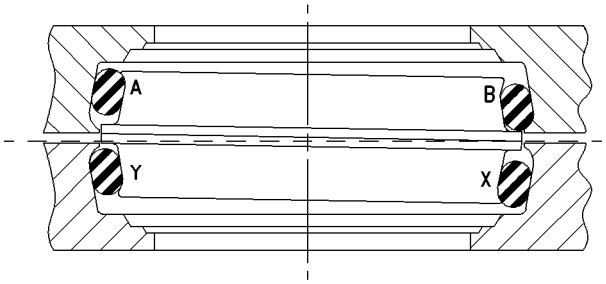

Illustration 31 g00446500

Illustration 31 shows the same seal after the lower housing has rotated 180 degrees. In this position, there will be high pressure at point (B) and at point (X). These points of high pressure may result in galling of the toric rings. There will be low pressure at point (A) and at point (Y) which will result in possible leakage.

i02756603

Hydraulic Tank and Filter - Remove

SMCS Code: 5056-011

Removal Procedure

Start By:

a. Remove the engine enclosure. Refer to Disassembly and Assembly, “Engine Enclosure - Remove”.

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.

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Put identification marks on all hoses, on all hose assemblies, on all harness assemblies, and on all tube assemblies for installation purposes. Plug all hose assemblies and all tube assemblies. This helps to prevent fluid loss, and this helps to keep contaminants from entering the system.

1. Drain the hydraulic system into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, “Capacities - Refill”. Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change”.

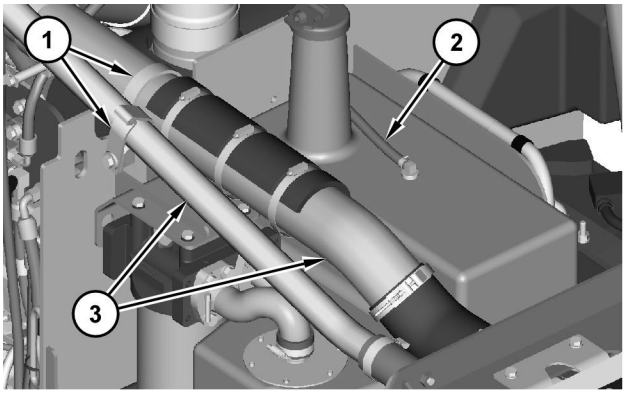

Illustration 32 g01380359

2. Remove clamps (1). Disconnect hose (2). Remove tubes (3).

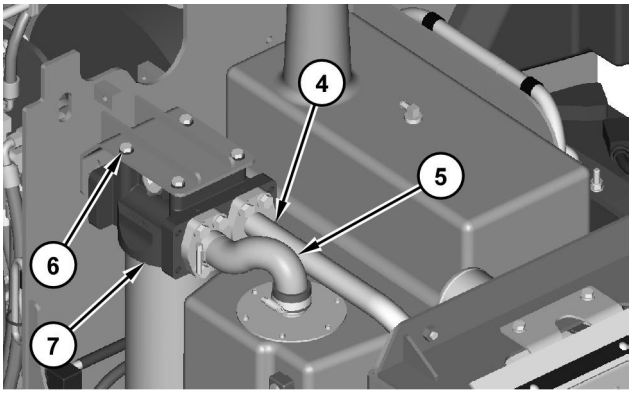

Illustration 33 g01380383

3. Remove tube assembly (4). Disconnect hose (5). Remove bolts (6) in order to remove hydraulic oil filter assembly (7).

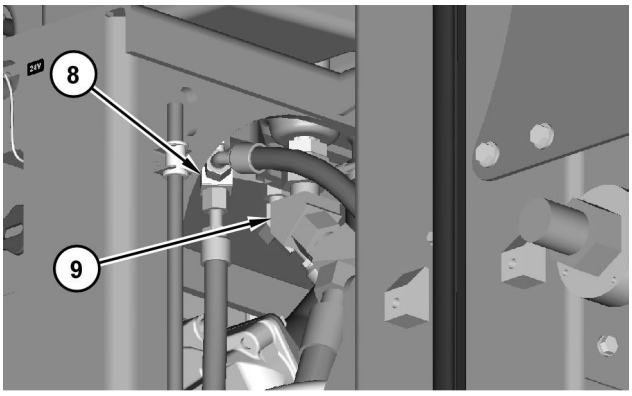

Illustration 34 g01380390

4. Disconnect fitting (8). Disconnect fitting (9).

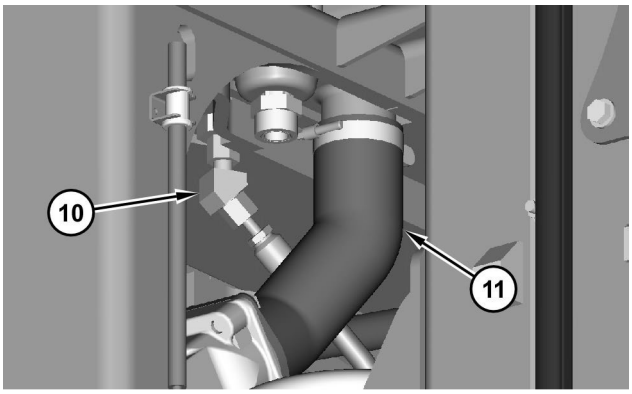

Illustration 35 g01380394

5. Disconnect fitting (10). Disconnect hose (11).

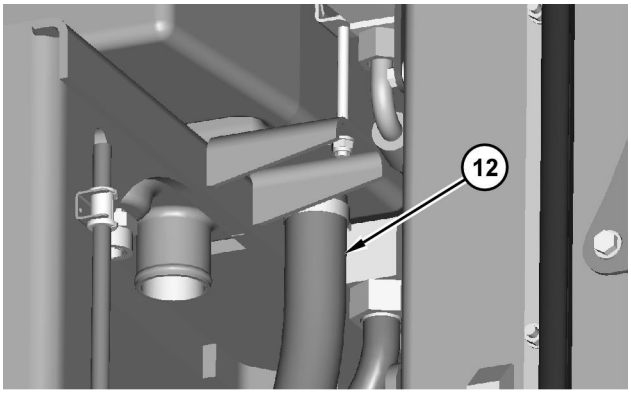

Illustration 36 g01380397

6. Disconnect hose (12).

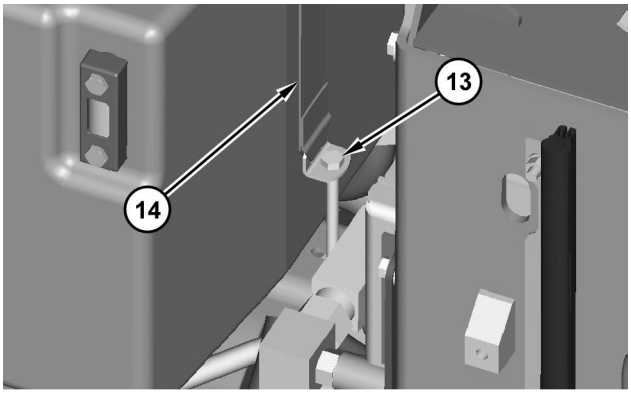

Illustration 37 g01380400

7. Remove bolt (13). Position strap (14) out of the way.

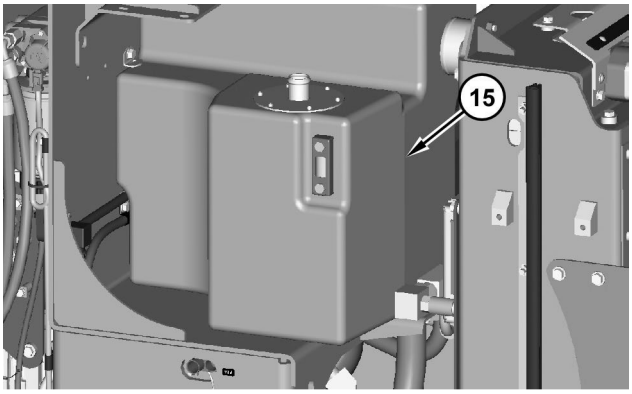

Illustration 38 g01380412

8. Remove hydraulic oil tank (15).

i02724244

Hydraulic Tank and Filter - Disassemble

SMCS Code: 5056-015

Disassembly Procedure

Start By:

a. Remove the hydraulic tank. Refer to Disassembly and Assembly, “Hydraulic Tank - Remove”.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

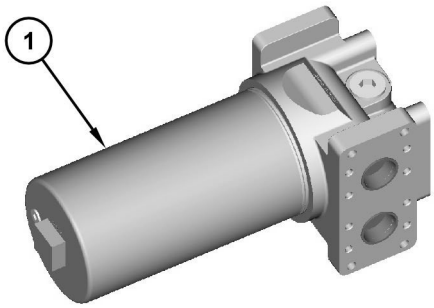

Illustration 39 g01366664

1. Remove filter assembly (1).

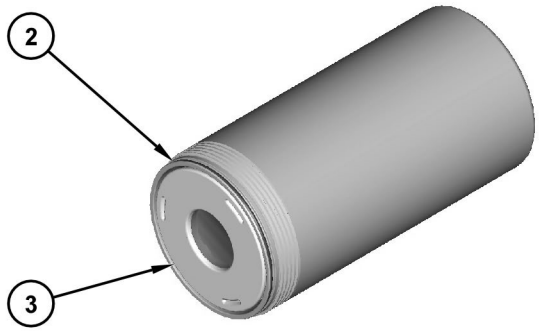

Illustration 40 g01366666

2. Remove O-ring seal (2). Remove filter element (3).

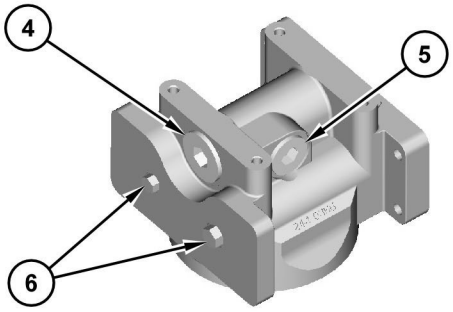

Illustration 41 g01366669

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.

3. Remove plug (4), plug (5), and plugs (6).

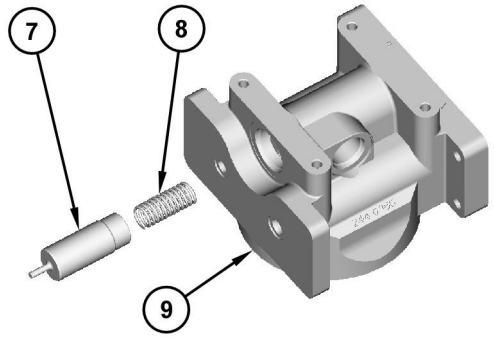

Illustration 42 g01366674

4. Remove spool (7) and spring (8) from filter base (9).

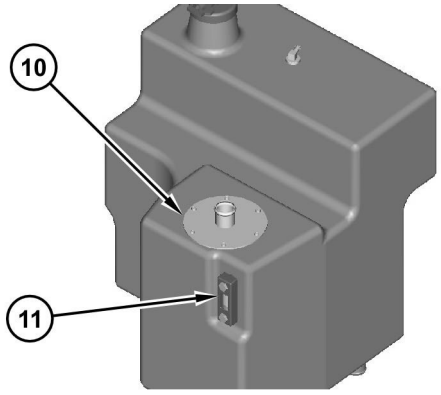

Illustration 43 g01366682

5. Remove tube assembly (10). Remove level gauge (11).

i02724245

Hydraulic Tank and Filter - Assemble

SMCS Code: 5056-016

Assembly Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

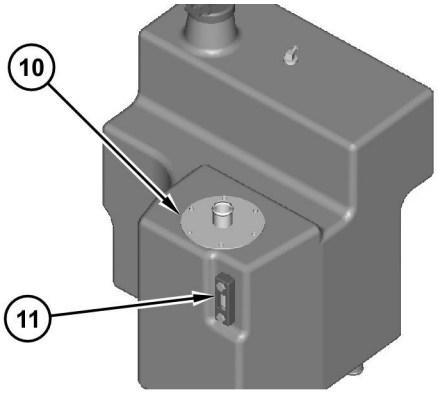

Illustration 44 g01366682

1. Install level gauge (11). Install tube assembly (10).

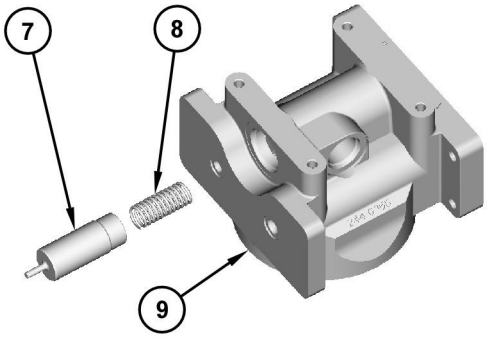

Illustration 45 g01366674

2. Install spring (8) and spool (7) into filter base (9).

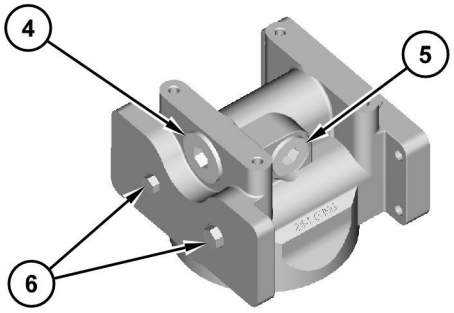

Illustration 46 g01366669

WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

3. Remove plug (4), plug (5), and plugs (6).

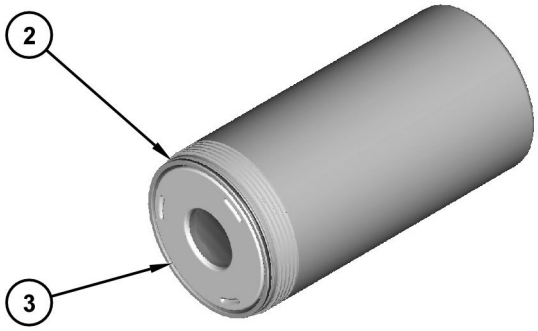

Illustration 47 g01366666

4. Install filter element (3). Lubricate O-ring seal (2) with the fluid that is being sealed. Install O-ring seal (2).

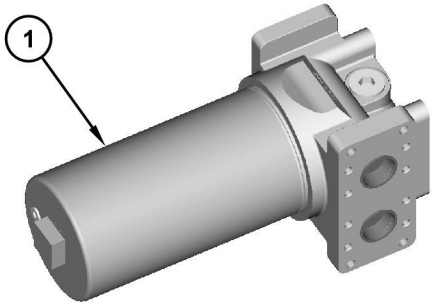

Illustration 48 g01366664

5. Install filter assembly (1). Tighten filter assembly (1) to a torque of 55 ± 5 N·m (41 ± 4 lb ft).

Note: Do not use an air wrench to tighten the filter assembly.

End By:

a. Install the hydraulic tank. Refer to Disassembly and Assembly, “Hydraulic Tank - Install”.

i02756606

Hydraulic Tank and Filter - Install

SMCS Code: 5056-012

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

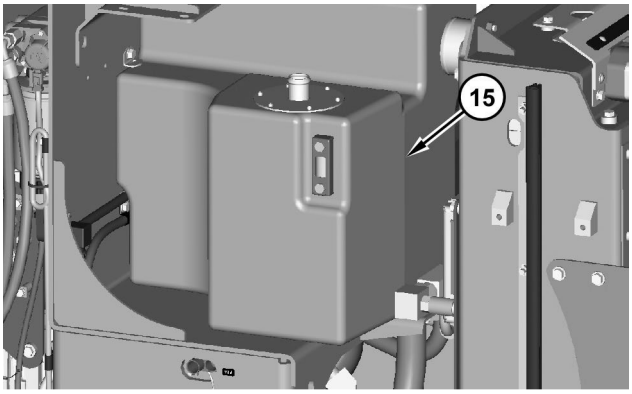

Illustration 49 g01380412

1. Install hydraulic oil tank (15).

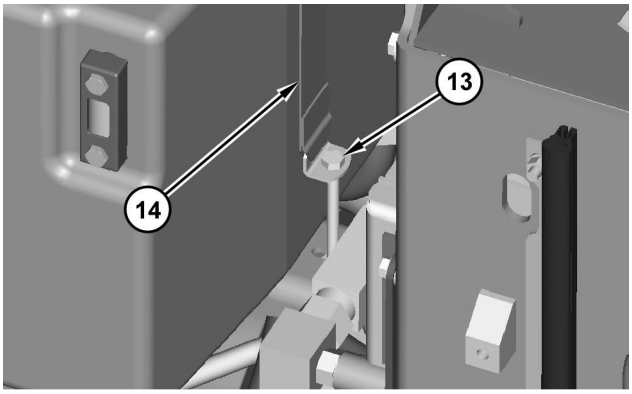

Illustration 50 g01380400

2. Position strap (14) and install bolt (13).

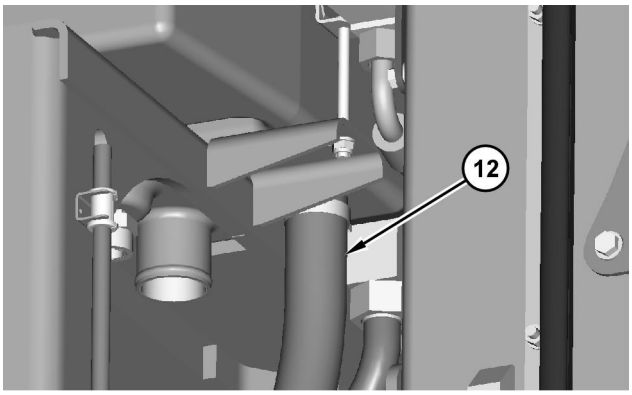

Illustration 51 g01380397

3. Connect hose (12).

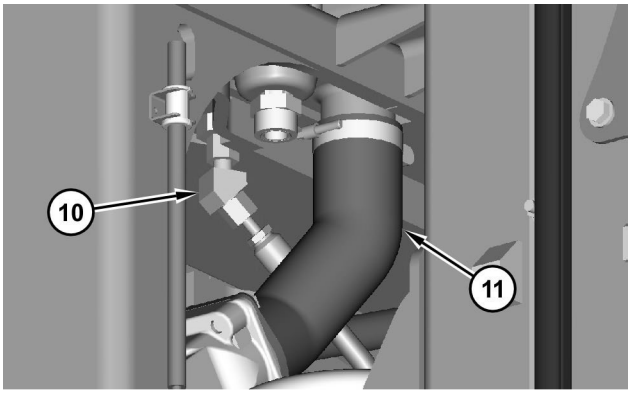

Illustration 52 g01380394

4. Connect hose (11). Connect fitting (10).

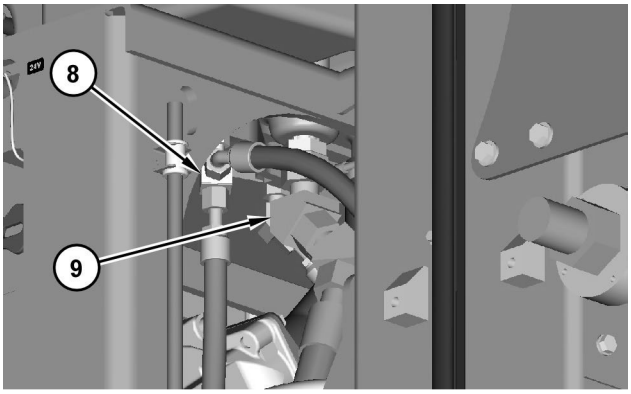

Illustration 53 g01380390

5. Connect fitting (9). Connect fitting (8).

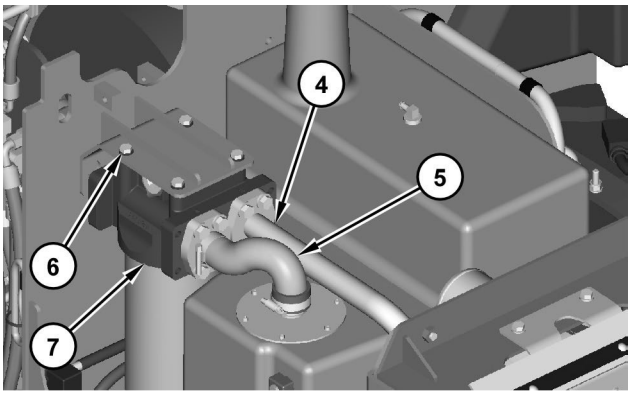

Illustration 54 g01380383

6. Position hydraulic oil filter assembly (7) and install bolts (6). Connect hose (5). Install tube assembly (4).

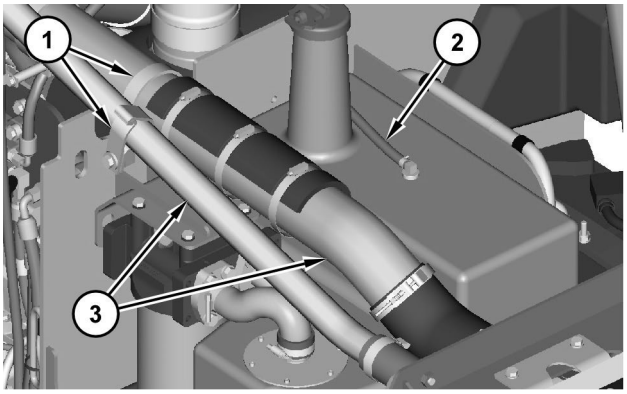

Illustration 55 g01380359

7. Install tubes (3). Connect hose (2). Install clamps (1).

8. Fill the hydraulic tank. Refer to Operation and Maintenance Manual, “Capacities - Refill”. Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change”.

End By:

a. Install the engine enclosure. Refer to Disassembly and Assembly, “Engine Enclosure - Install”.

i02735986

Hydraulic Oil Cooler - Remove and Install

SMCS Code: 1374-010

Removal Procedure

Table 4

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311 - 1362	Vacuum Cap	1

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

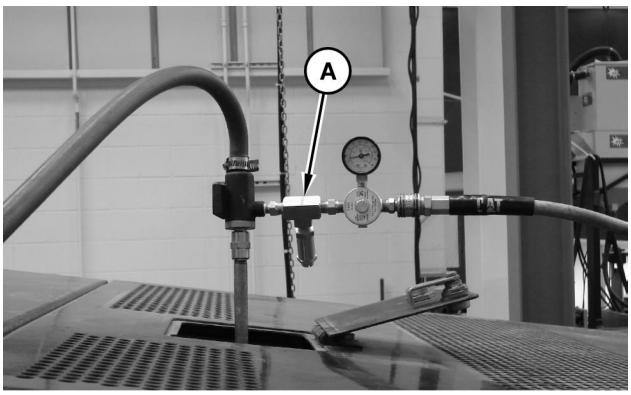

Illustration 56 g01368952

1. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

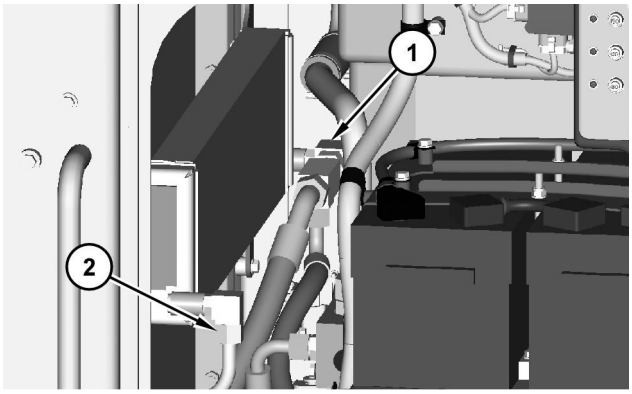

Illustration 57 g01371867

2. Disconnect fitting (1). Disconnect tube assembly (2).

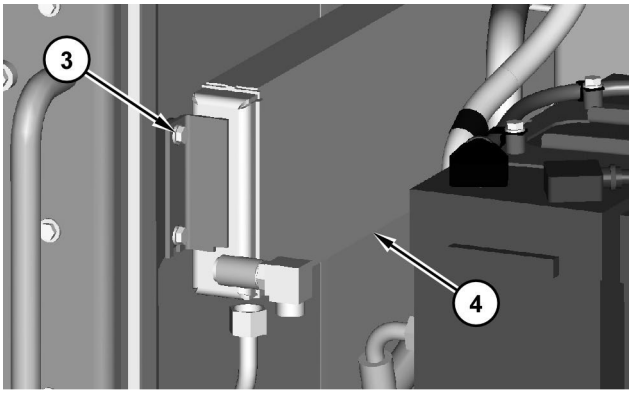

Illustration 58 g01371871

3. Remove bolts (3). Repeat this step for the opposite side.

4. Remove hydraulic oil cooler (4).

Installation Procedure

Table 5

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

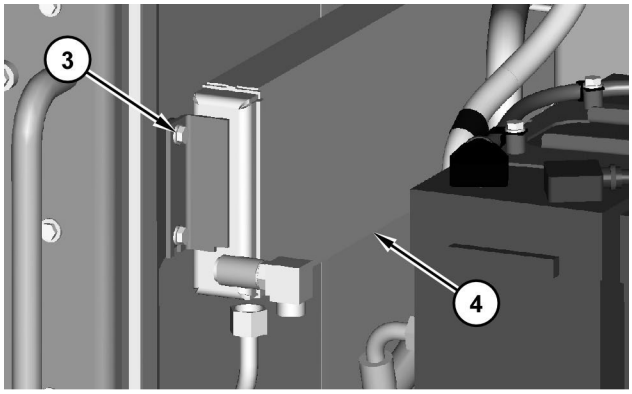

Illustration 59 g01371871

1. Install hydraulic oil cooler (4).

2. Install bolts (3). Repeat this step for the opposite side.

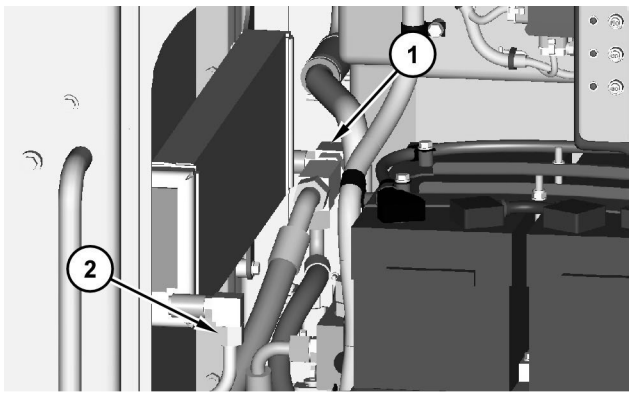

Illustration 60 g01371867

3. Connect tube assembly (2). Connect fitting (1).

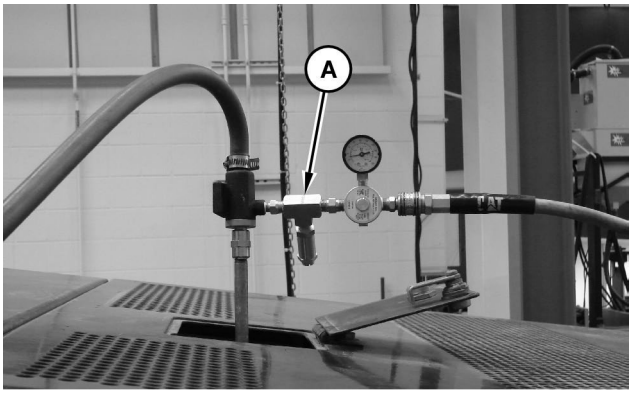

Illustration 61 g01368952

4. Remove Tooling (A).

i06717182

Piston Pump (Hydraulic and Steering) - Remove

SMCS Code: 4306-011; 5070-011

Removal Procedure

Start By:

a. Remove the rear chassis support. Refer to Disassembly and Assembly, “Rear Chassis Support - Remove”.

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

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.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and helps to keep contaminants from entering the system.

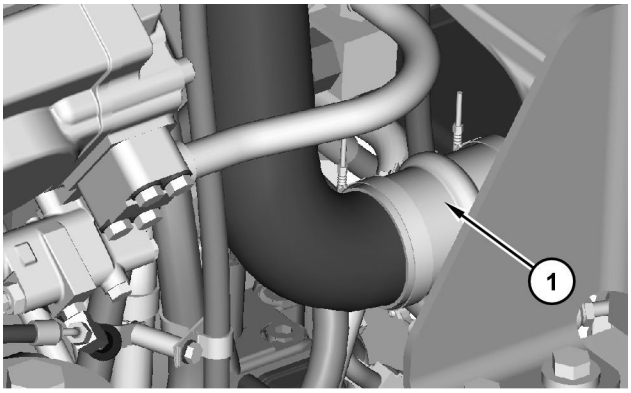

Illustration 62 g01373096

1. Disconnect hose (1).

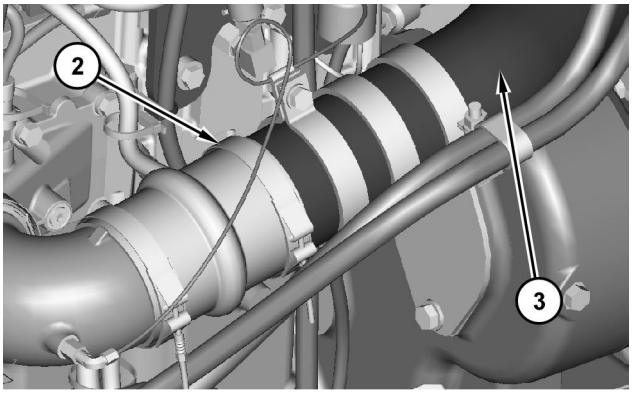

Illustration 63 g01373124

2. Loosen clamp (2). Position tube (3) out of the way.

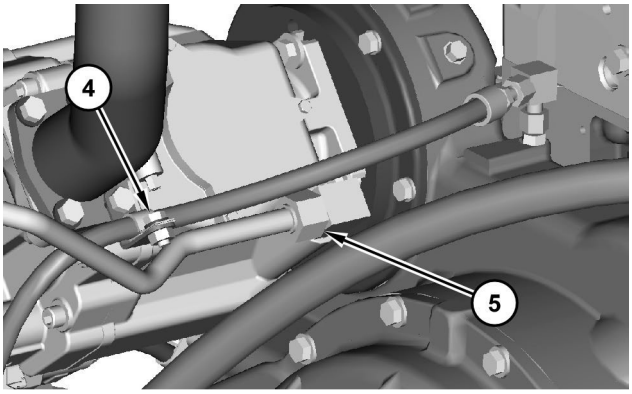

Illustration 64 g01373120

3. Remove clip (4). Remove tube assembly (5).

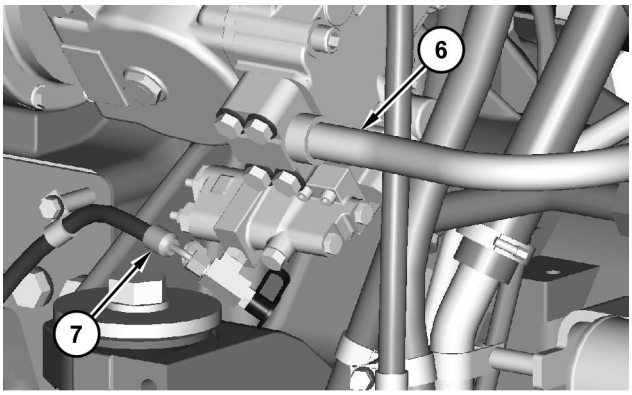

Illustration 65 g01373134

4. Remove tube assembly (6). Disconnect hose assembly (7).

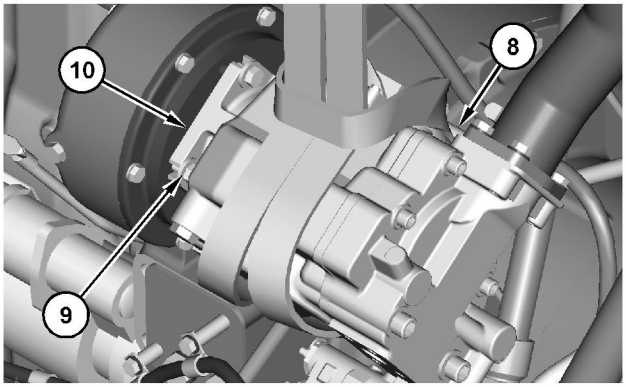

Illustration 66 g06089612

5. Attach a suitable lifting device onto piston pump (8). The weight of piston pump (8) is approximately 73 kg (160 lb).

6. Remove bolts (9) and piston pump (8).

7. Remove gasket (10).

i02649334

Piston Pump (Hydraulic and Steering) - Disassemble

SMCS Code: 4306-015; 5070-015

Disassembly Procedure

Table 6

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-0510	Driver Gp	1
B	1P-1857	Retaining Ring Pliers	1
C	1P-1861	Retaining Ring Pliers	1

Start By:

a. Remove the piston pump. Refer to Disassembly and Assembly, “Piston Pump (Hydraulic and Steering) - Remove”.

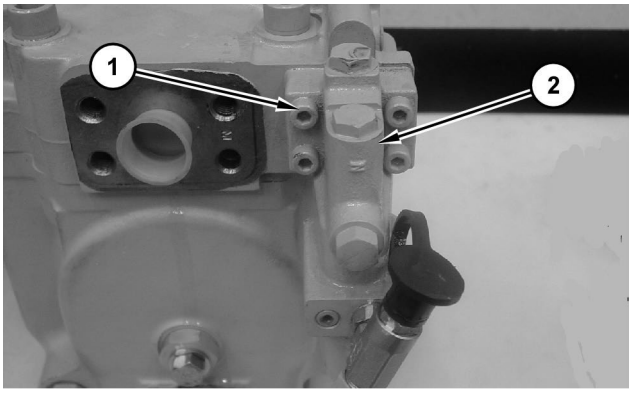

Illustration 67 g01329899

1. Remove bolts (1) and valve (2).

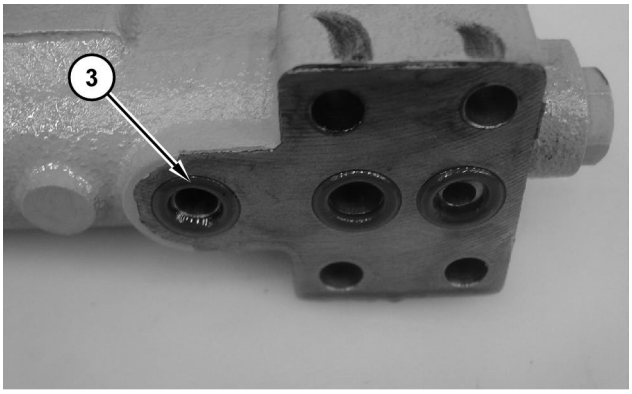

Illustration 68 g01329900

2. Remove O-ring seals (3).

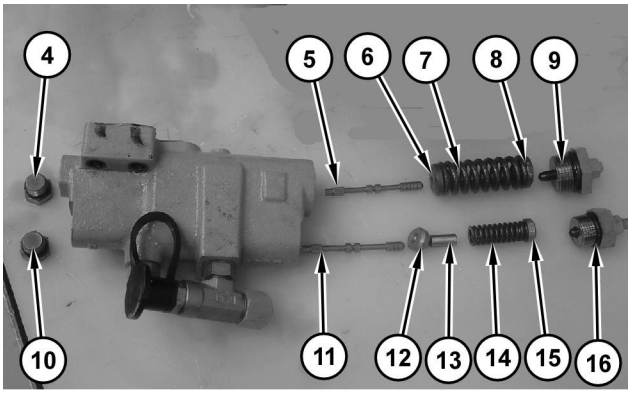

Illustration 69 g01329901

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.

3. Remove plug (9), the O-ring seal, retainer (8), spring (7), retainer (6), spool (5), plug (4), and the O-ring seal.

4. Remove plug (16), the O-ring seal, retainer (15), spring (14), rod (13), retainer (12), spool (11), plug (10), and the O-ring seal.

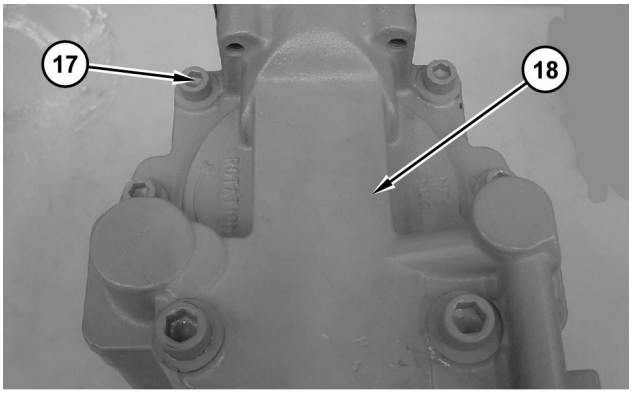

Illustration 70 g01329902

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.

5. Remove bolts (17) and head (18).

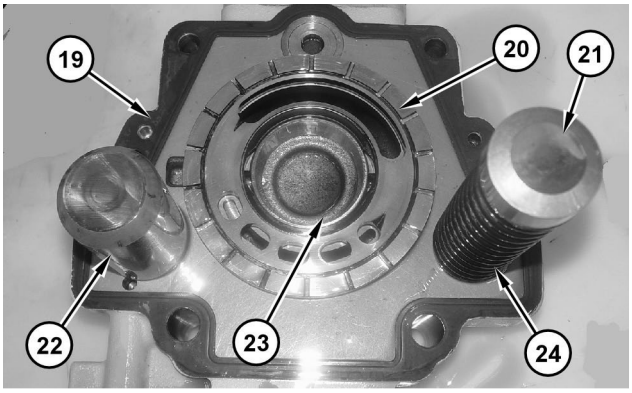

Illustration 71 g01329908

6. Remove piston (22), piston (21), spring (24), gasket (19), port plate (20), and bearing cup (23).

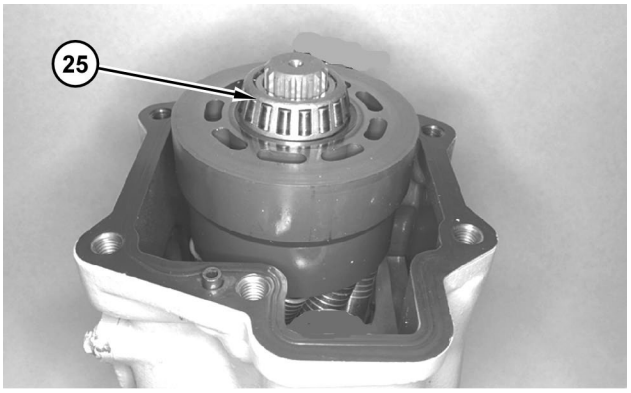

Illustration 72 g01329909

7. Remove bearing cone (25).

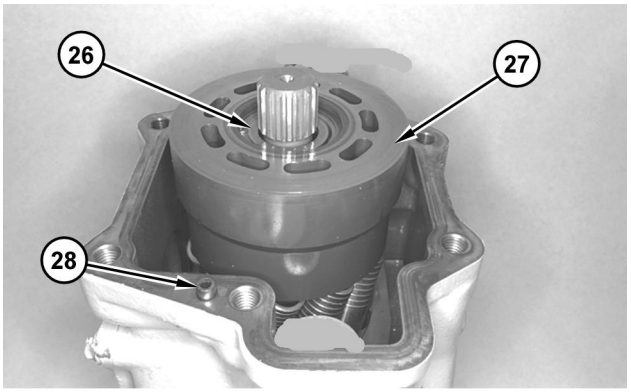

Illustration 73 g01329910

8. Remove shim (26), barrel (27), and dowel (28).

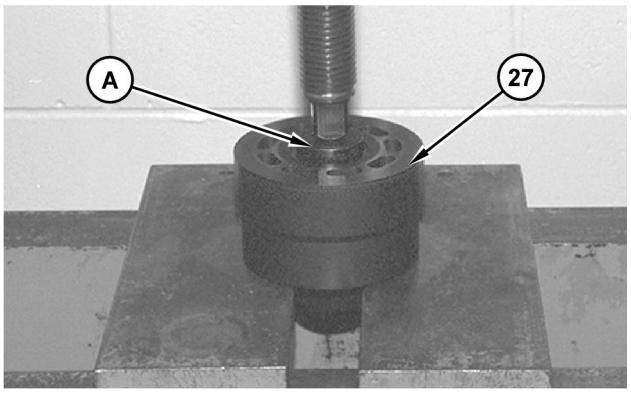

Illustration 74 g01329911

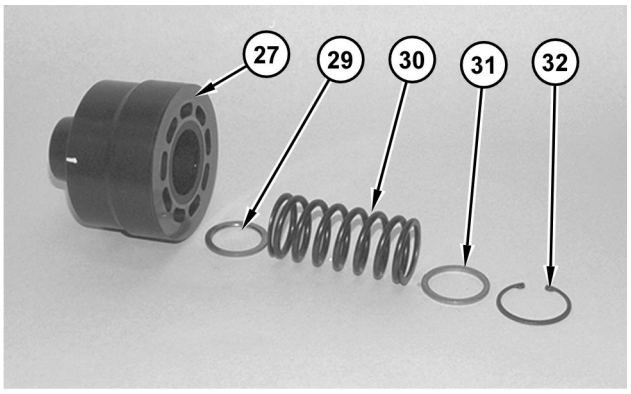

Illustration 75 g01329913

⚠ 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.

9. Use Tooling (A), Tooling (B), and a suitable press in order to remove retaining ring (32) from barrel (27).

10. Remove washer (31), spring (30), and washer (29).

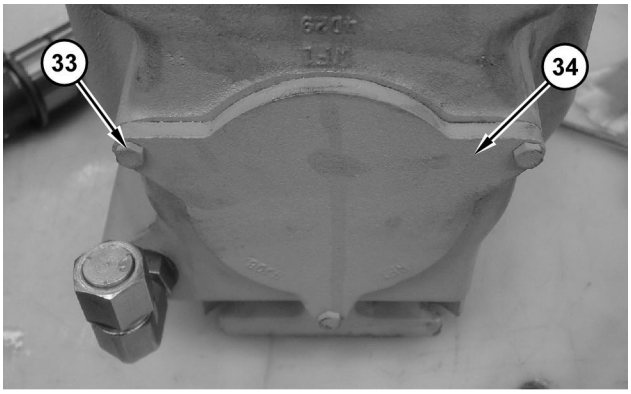

Illustration 76 g01329903

11. Remove bolts (33) and cover (34).

Illustration 77 g01329907

12. Remove O-ring seal (35).

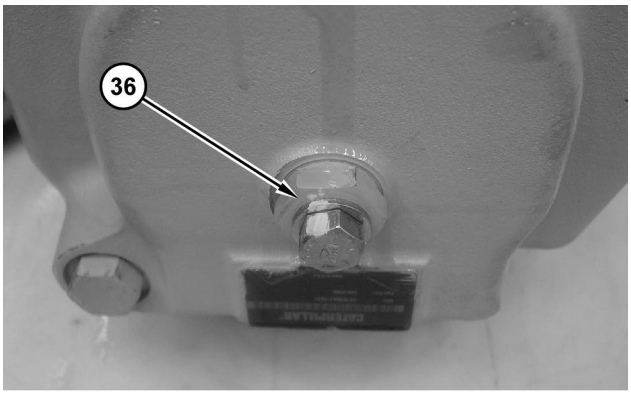

Illustration 78 g01329905

13. Remove plug (36).

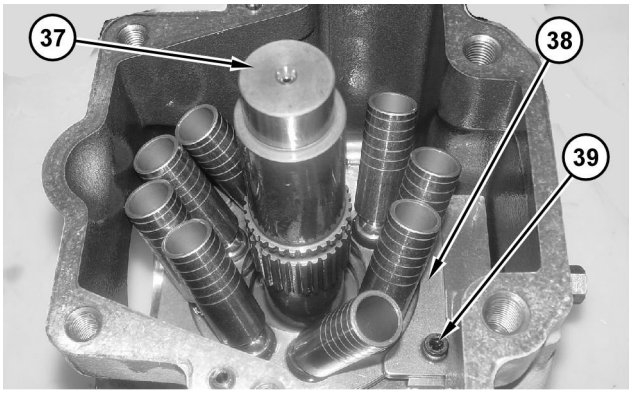

Illustration 79 g01329914

14. Remove shaft (37), bolts (39), and plates (38).

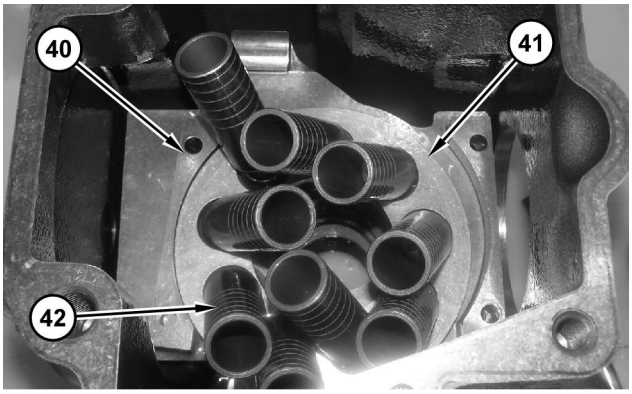

Illustration 80 g01329915

15. Remove plates (40), retainer (41), and pistons (42).

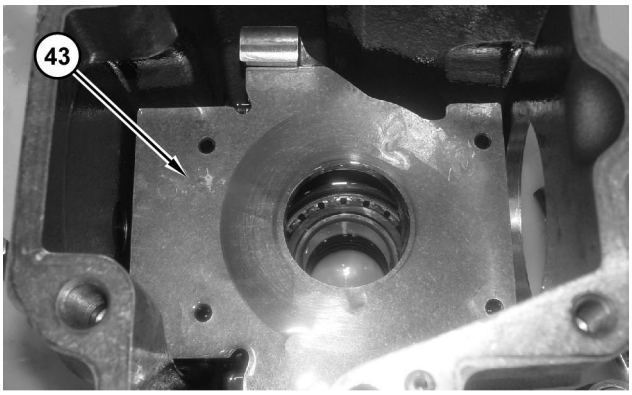

Illustration 81 g01329916

16. Remove swashplate (43).

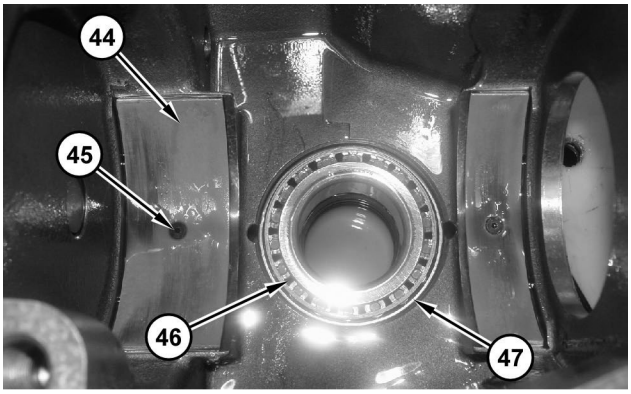

Illustration 82 g01330062

17. Remove screws (45), bearings (44), bearing cone (46), and bearing cup (47).

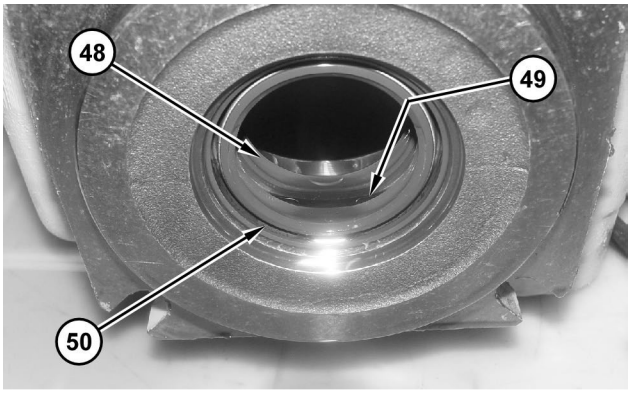

Illustration 83 g01330063

18. Remove lip seal (50).

19. Use Tooling (C) in order to remove retaining ring (49).

20. Remove lip seal (48).

i02649335

Piston Pump (Hydraulic and Steering) - Assemble

SMCS Code: 4306-016; 5070-016

Assembly Procedure

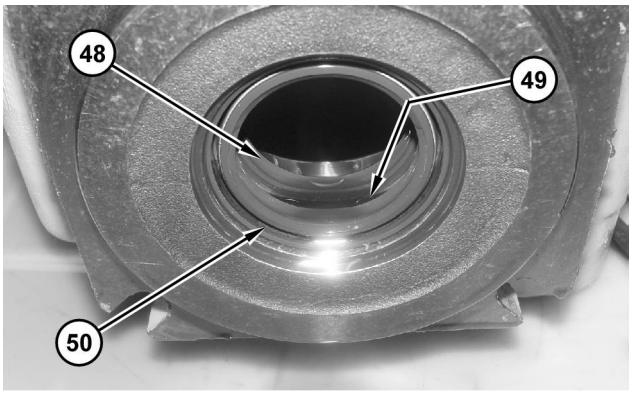

Illustration 84 g01330063

1. Install lip seal (48).

2. Use Tooling (C) in order to install retaining ring (49).

3. Install lip seal (50).

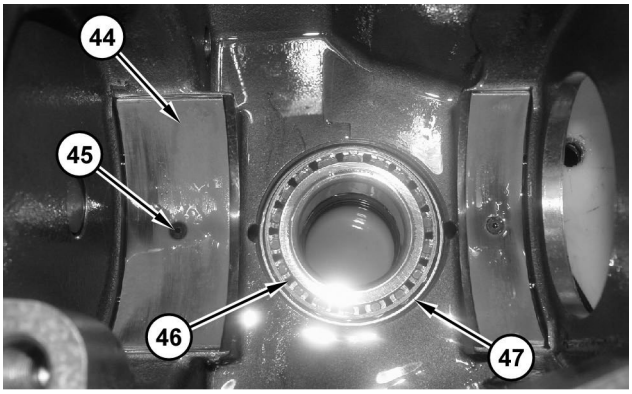

Illustration 85 g01330062

4. Install screws (45), bearings (44), bearing cone (46), and bearing cup (47).

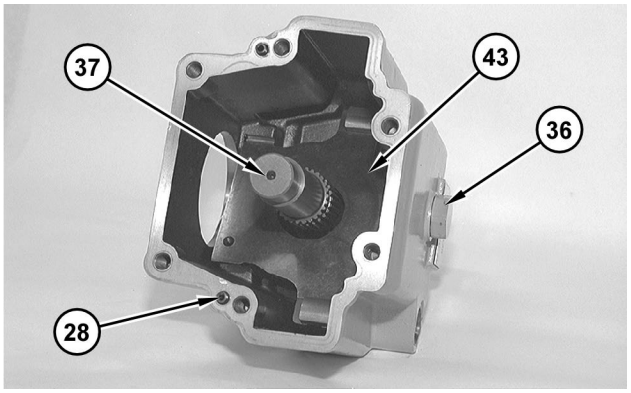

Illustration 86 g01333311

5. Install swashplate (43).

6. Install shaft (37).

7. Install plug (36).

8. Install dowel (28).

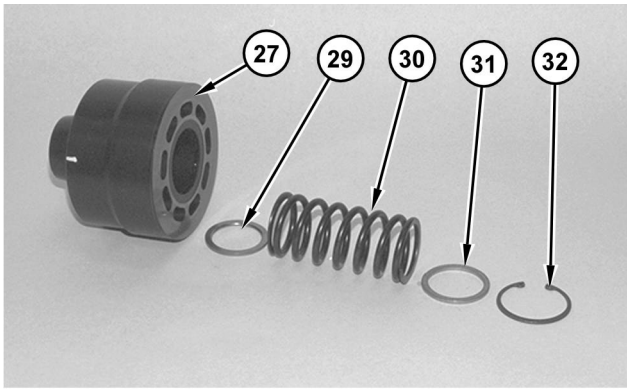

Illustration 87 g01329913

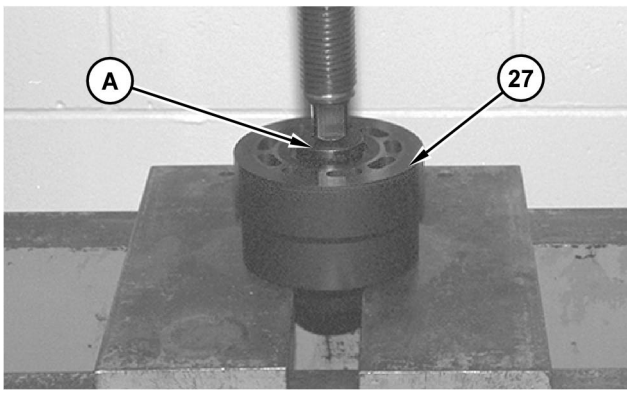

Illustration 88 g01329911

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

9. Install washer (31), spring (30), and washer (29).

10. Use Tooling (A), Tooling (B) and a suitable press in order to install retaining ring (32) onto barrel (27).

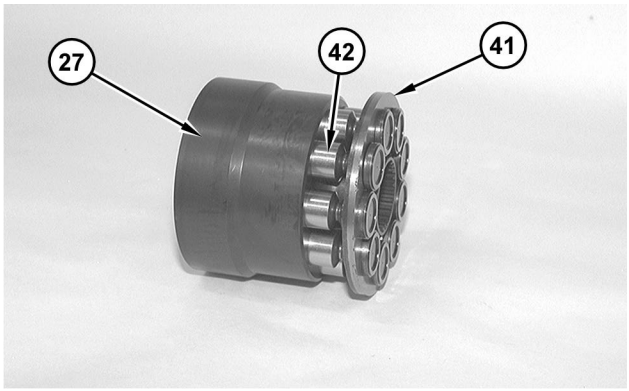

Illustration 89 g01333324

11. Install pistons (42) into retainer (41) and barrel (27).

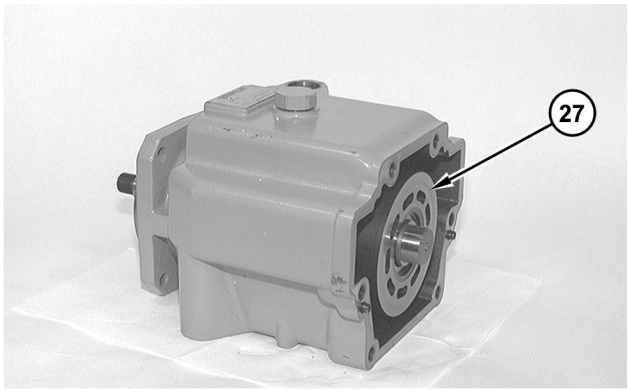

Illustration 90 g01333336

12. Install barrel (27).

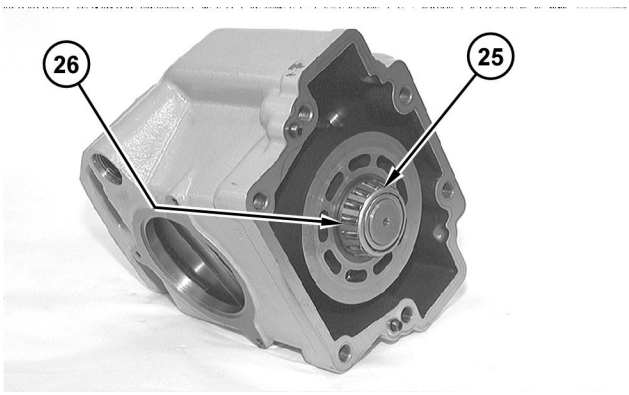

Illustration 91 g01333337

13. Install shim (26) and bearing cone (25).

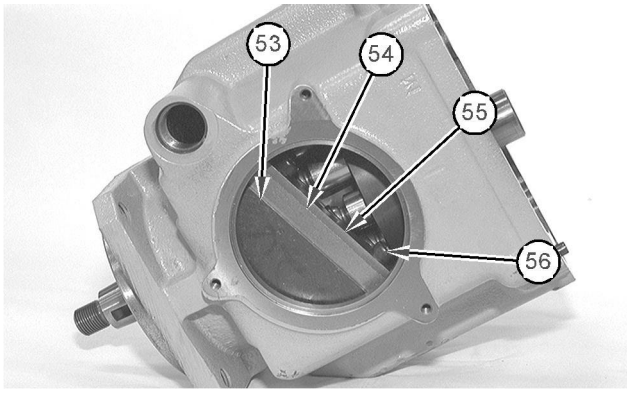

Illustration 92 g01076392

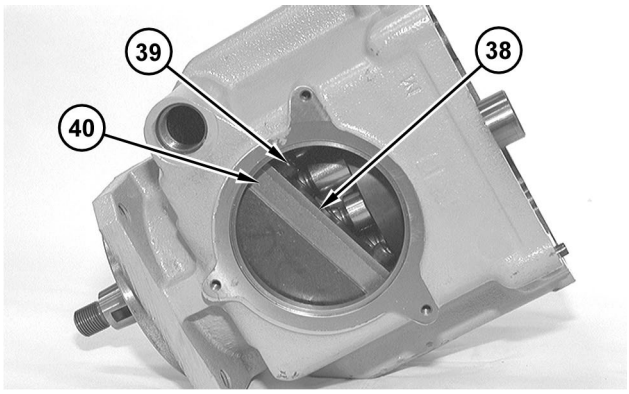

Illustration 93 g01333338

14. Position plates (40) and plates (38).

15. Install bolts (39).

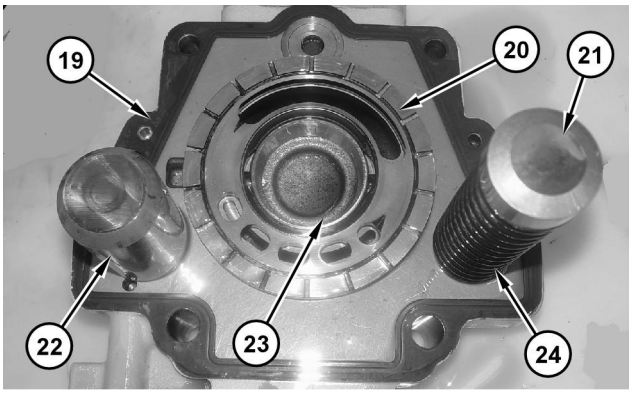

Illustration 94 g01329908

16. Install piston (22), piston (21), spring (24), gasket (19), port plate (20), and bearing cup (23).

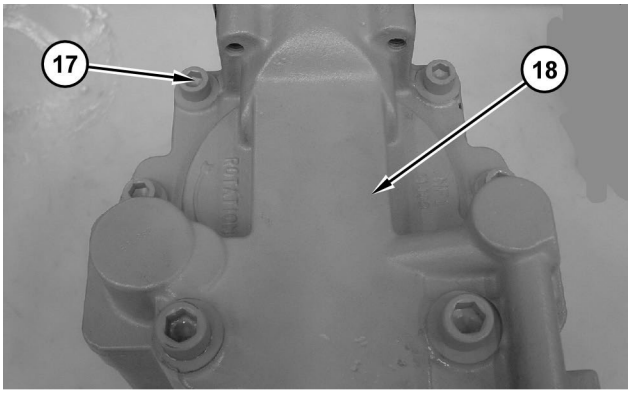

Illustration 95 g01329902

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

17. Install bolts (17) and head (18).

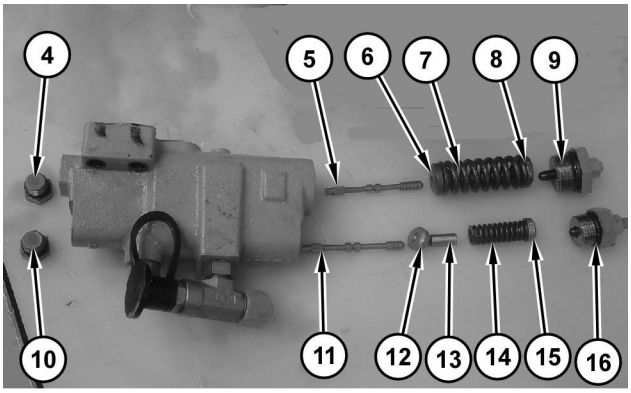

Illustration 96 g01329901

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

18. Install retainer (15), spring (14), rod (13), retainer (12), spool (11), plug (10), and the O-ring seal. Install plug (16) and the O-ring seal.

19. Install retainer (8), spring (7), retainer (6), spool (5), plug (4), and the O-ring seal. Install plug (9) and the O-ring seal.

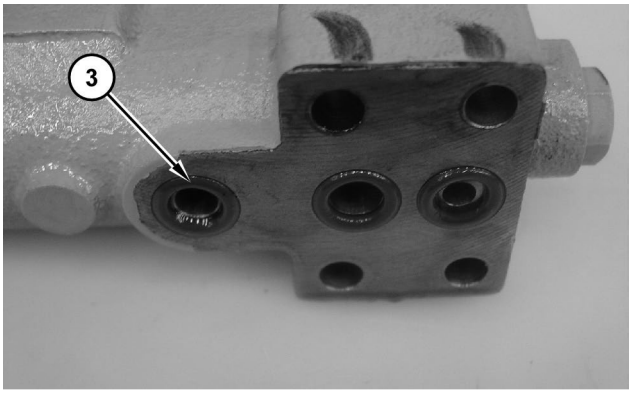

Illustration 97 g01329900

20. Install O-ring seals (3).

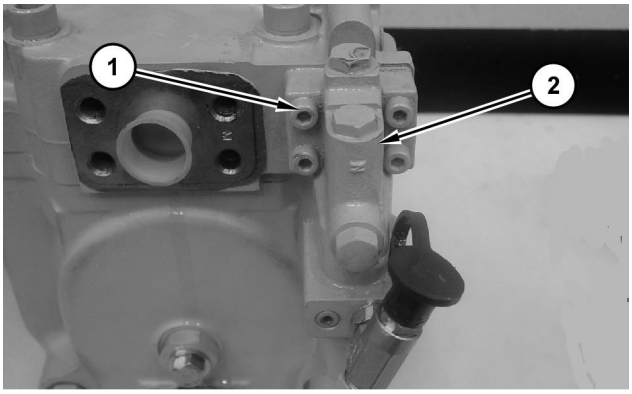

Illustration 98 g01329899

21. Install bolts (1) and valve (2).

End By:

a. Install the piston pump. Refer to Disassembly and Assembly, “Piston Pump (Hydraulic and Steering) - Install”.

i06717100

Piston Pump (Hydraulic and Steering) - Install

SMCS Code: 4306-012; 5070-012

Installation Procedure

Table 7

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	-	3m Fastbond Pressure Sensitive Adhesive 4224NF	-

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Inspect the O-ring seals. Replace the O-ring seals that are worn or damaged.

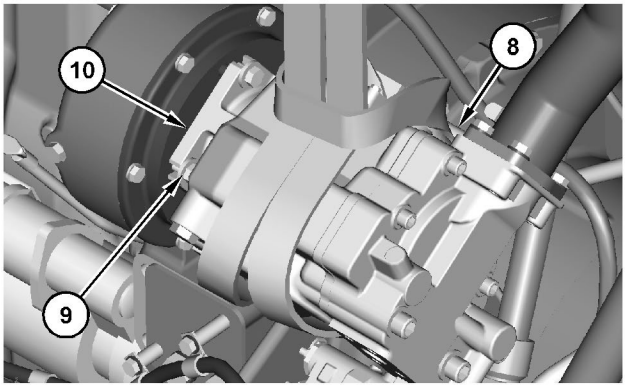

Illustration 99 g06089612

2. Apply Tooling (A) to the pump side of gasket (10) and install gasket (10) onto piston pump (8).

3. Use a suitable lifting device to install piston pump (8). The weight of piston pump (8) is approximately 73 kg (160 lb).

4. Install bolts (9).

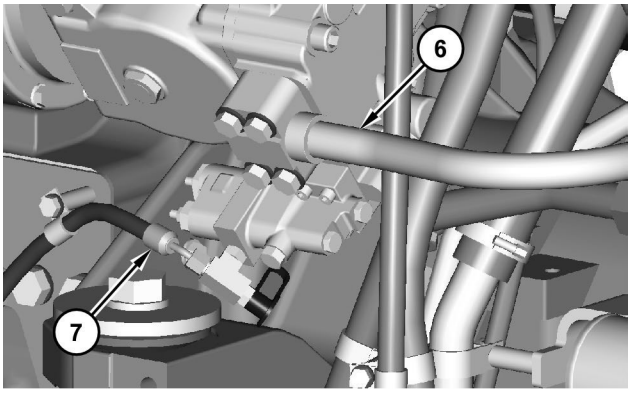

Illustration 100 g01373134

5. Connect hose assembly (7).

6. Install tube assembly (6).

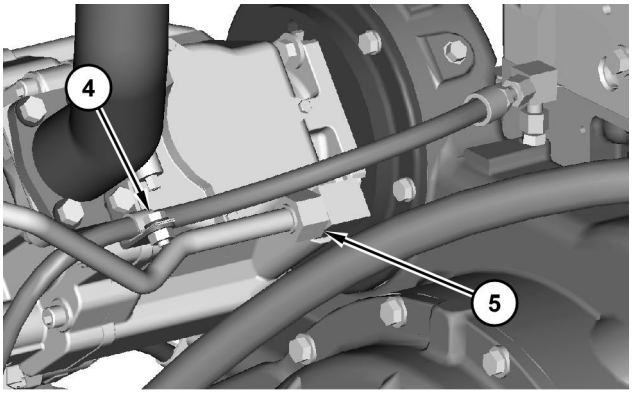

Illustration 101 g01373120

7. Install tube assembly (5). Install clip (4).

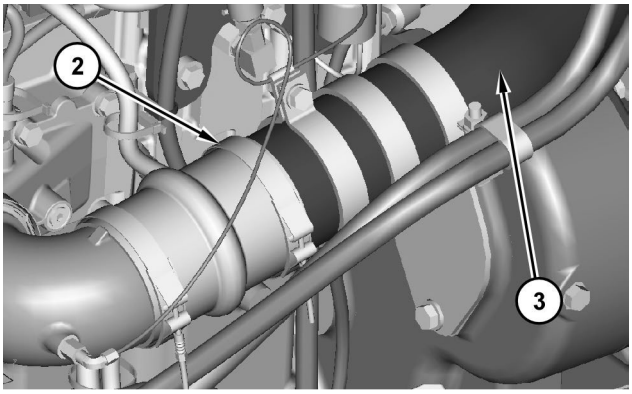

Illustration 102 g01373124

8. Position tube (3). Tighten clamp (2).

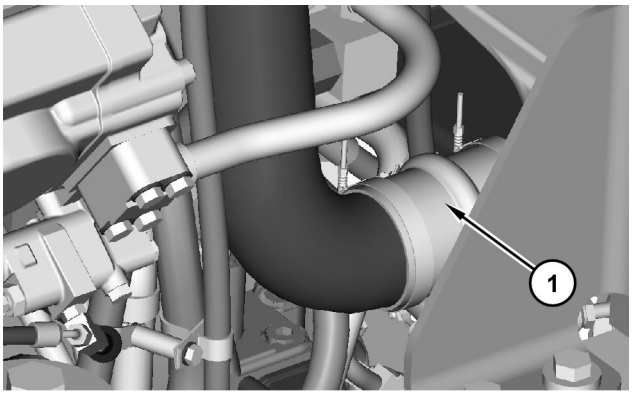

Illustration 103 g01373096

9. Connect hose (1).

End By:

a. Install the rear chassis support. Refer to Disassembly and Assembly, “Rear Chassis Support - Install”.

i02747724

Bank Valve - Remove
(Rear Frame)

SMCS Code: 5051-011

Removal Procedure

Table 8

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Lower the blade to the ground.

2. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

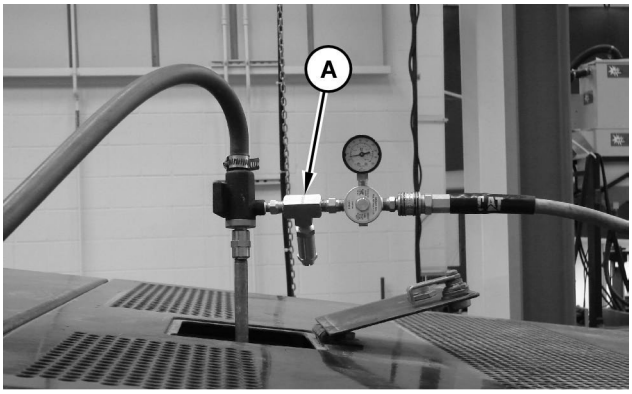

Illustration 104 g01368952

3. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

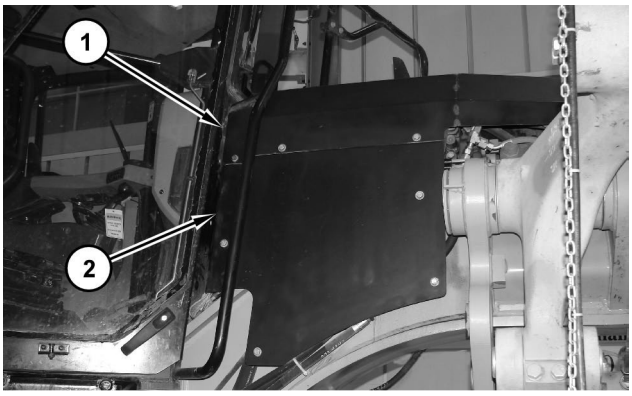

Illustration 105 g01376545

4. Remove cover (1).

5. Remove cover (2). Repeat this step for the cover on the opposite side.

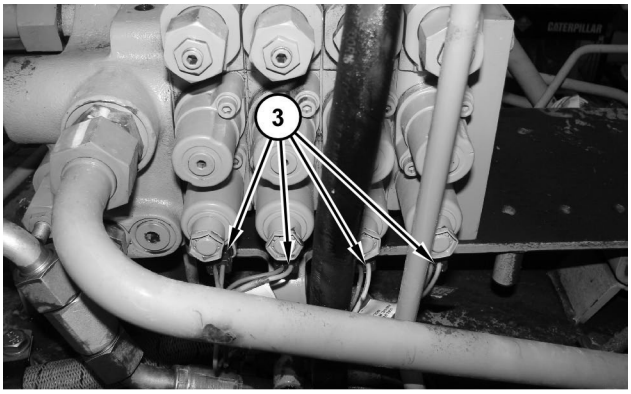

Illustration 106 g01376554

6. Disconnect harness assemblies (3).

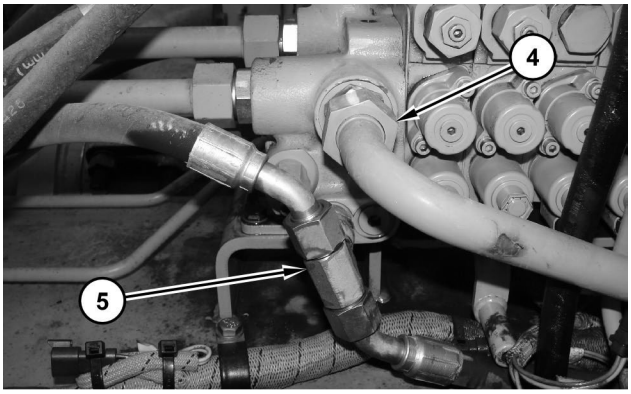

Illustration 107 g01376566

7. Disconnect tube assembly (4). Disconnect fitting (5).

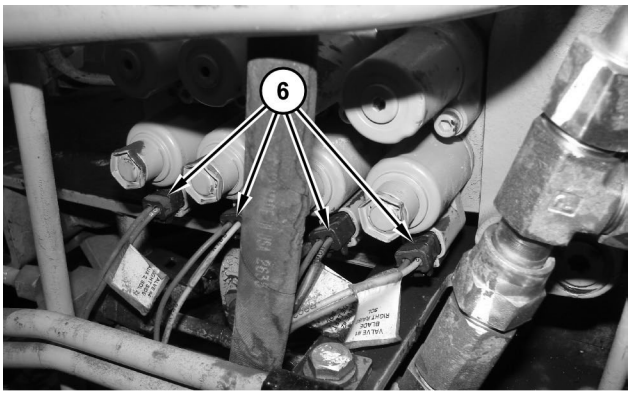

Illustration 108 g01376576

8. Disconnect harness assemblies (6).

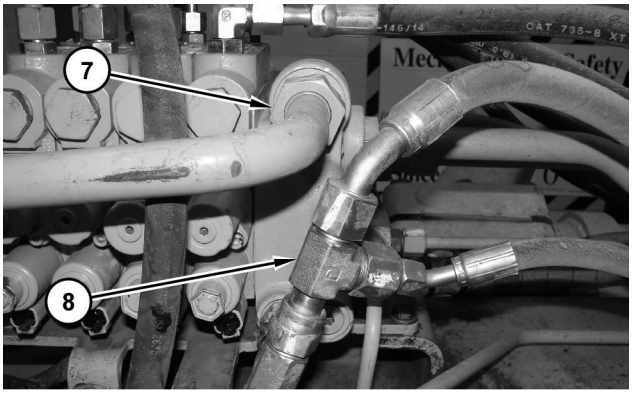

Illustration 109 g01376585

9. Disconnect tube assembly (7). Disconnect fitting (8).

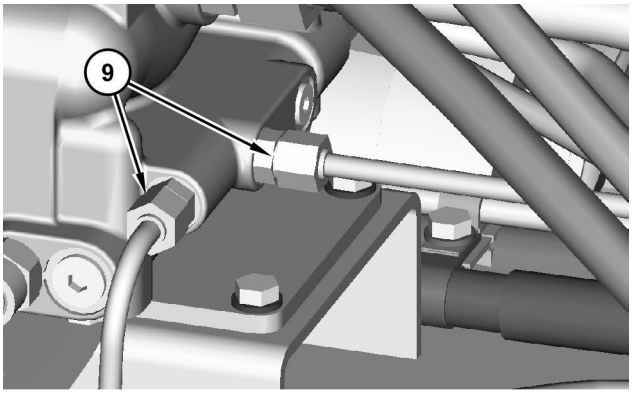

Illustration 110 g01376720

10. Disconnect tube assemblies (9).

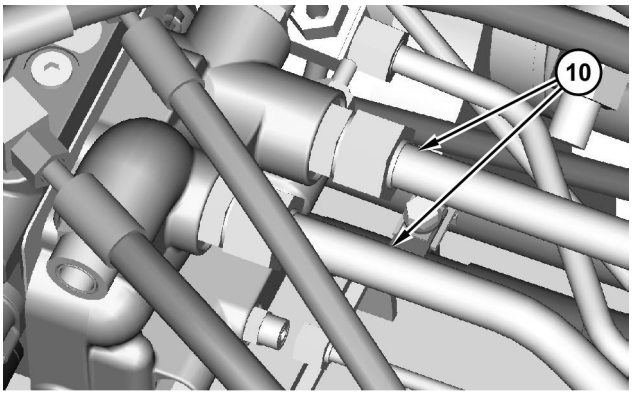

Illustration 111 g01376761

11. Disconnect tube assemblies (10).

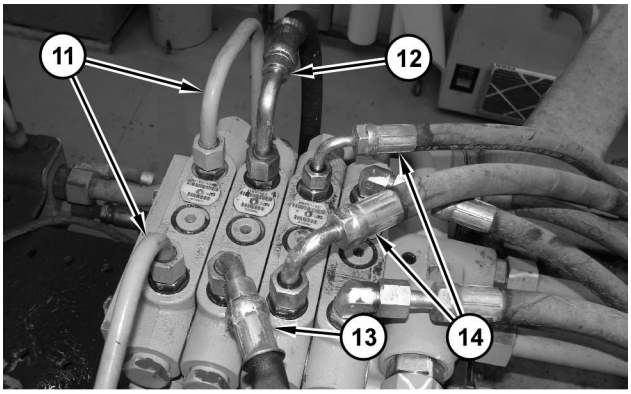

Illustration 112 g01376768

12. Remove tube assemblies (11). Disconnect hose assembly (12) and hose assembly (13). Disconnect hose assemblies (14).

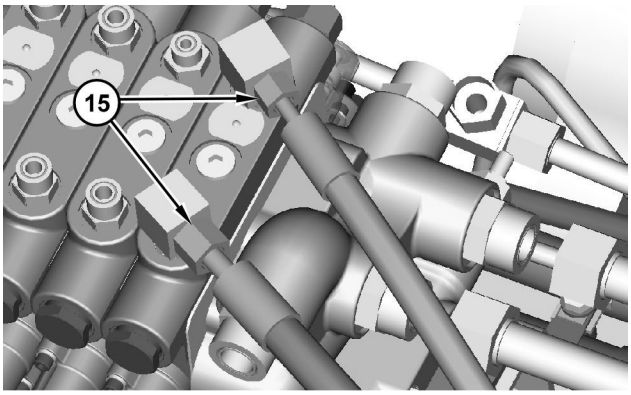

Illustration 113 g01376779

13. Disconnect hose assemblies (15).

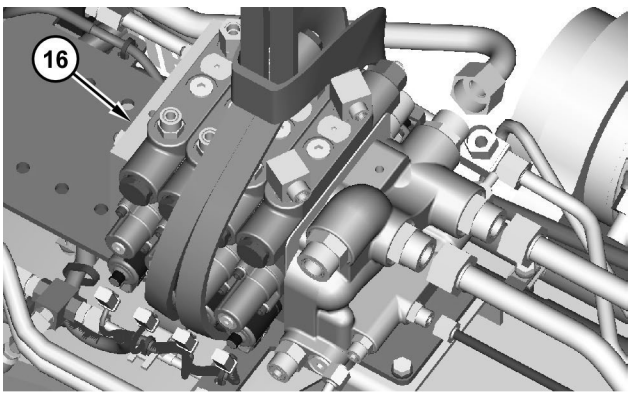

Illustration 114 g01376784

14. Attach a suitable lifting device onto bank valve (16). The weight of bank valve (16) is approximately 50 kg (110 lb).

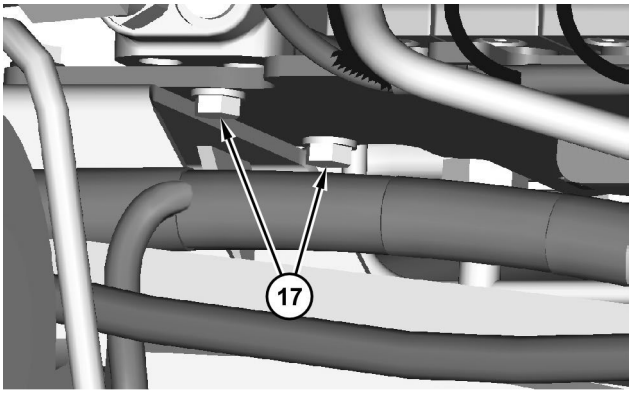

Illustration 115 g01376876

15. Remove bolts (17).

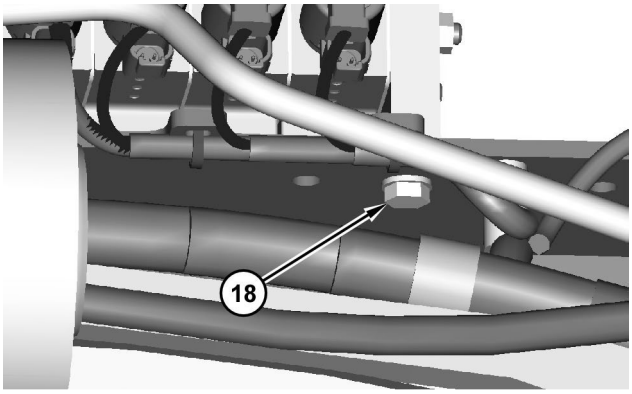

Illustration 116 g01376879

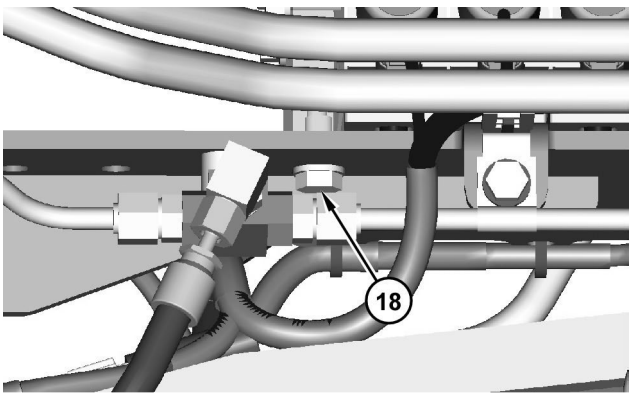

Illustration 117 g01376885

16. Remove bolts (18).

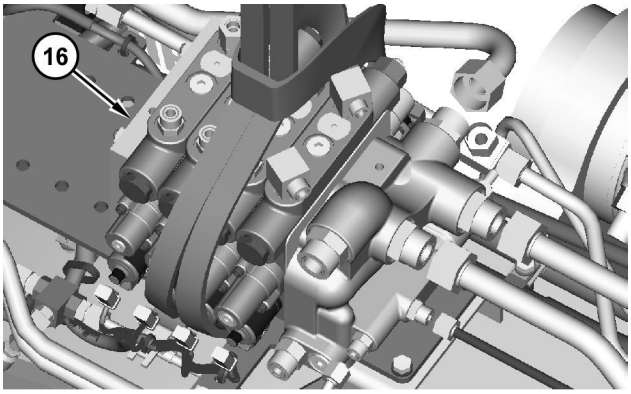

Illustration 118 g01376784

17. Remove bank valve (16).

i02747739

Bank Valve - Remove
(Front Frame)

SMCS Code: 5051-011

Removal Procedure

Table 9

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Lower the blade to the ground.

2. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

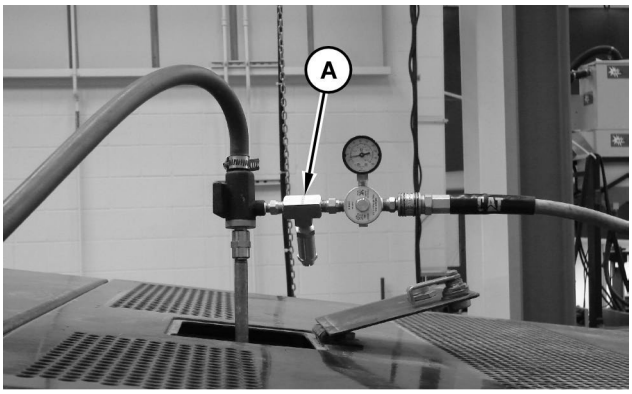

Illustration 119 g01368952

3. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

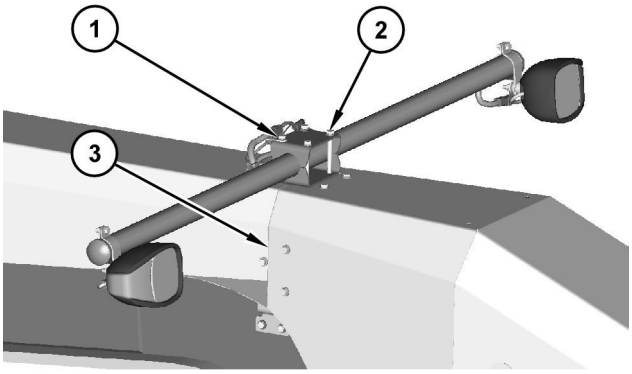

Illustration 120 g01376927

4. Loosen bolts (1). Remove bolts (2). Use two people in order to remove cover (3). The weight of cover (3) is approximately 32 kg (70 lb).

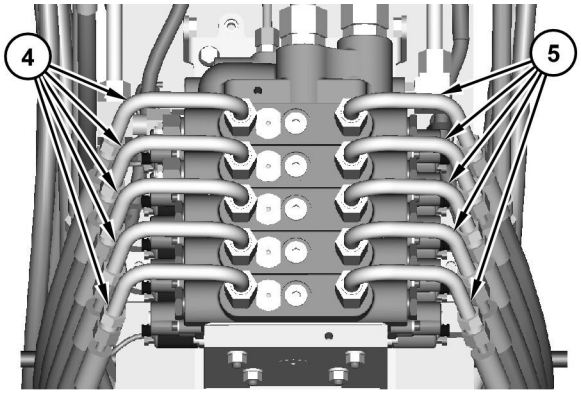

Illustration 121 g01377004

5. Disconnect tube assemblies (4). Disconnect tube assemblies (5).

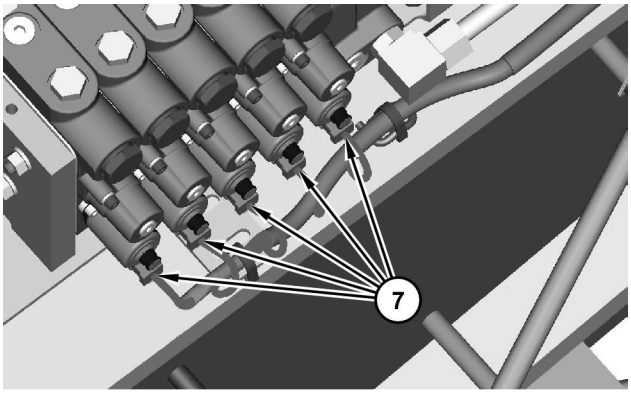

Illustration 122 g01377015

6. Disconnect harness assemblies (7).

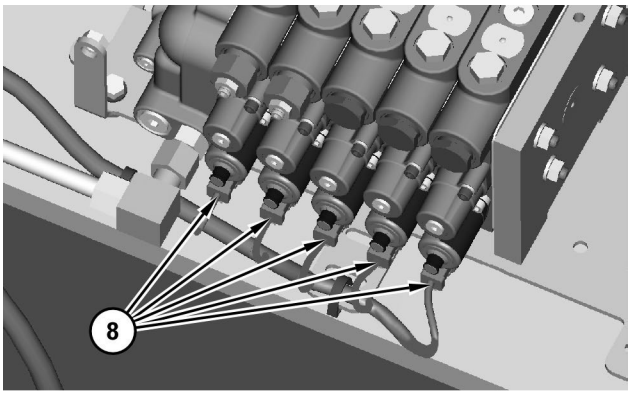

Illustration 123 g01377016

7. Disconnect harness assemblies (8).

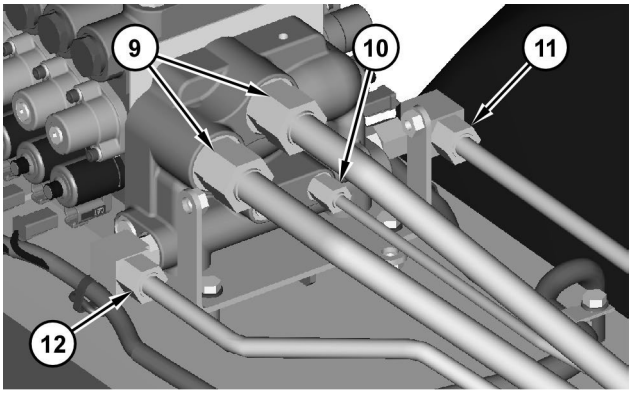

Illustration 124 g01377057

8. Disconnect tube assemblies (9). Disconnect tube assembly (10). Disconnect tube assembly (11). Disconnect tube assembly (12).

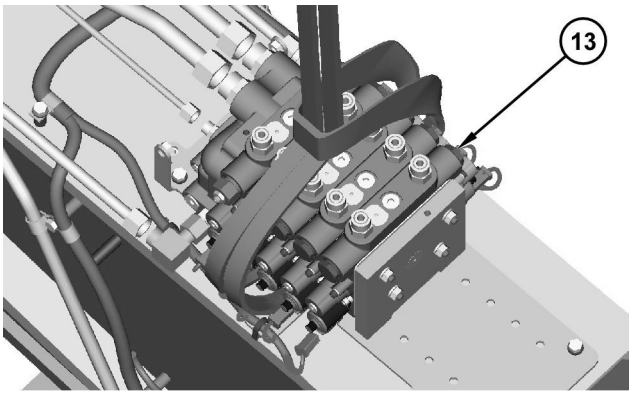

Illustration 125 g01377073

9. Attach a suitable lifting device onto bank valve (13). The weight of bank valve (13) is approximately 60 kg (132 lb).

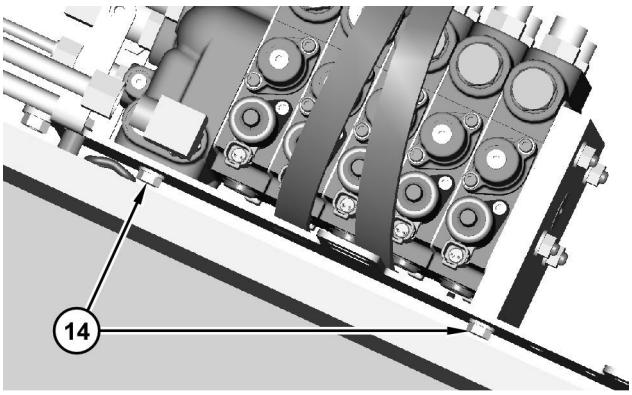

Illustration 126 g01377097

The harness assembly is removed for photographic purposes.

10. Remove bolts (14). Repeat this step for the opposite side.

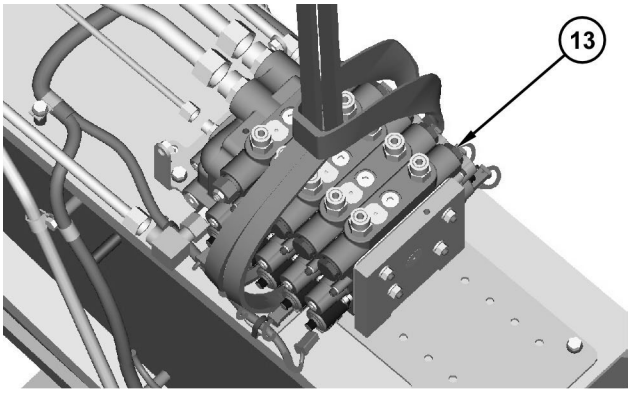

Illustration 127 g01377073

11. Remove bank valve (13).

i02711706

Bank Valve - Disassemble (Rear Frame)

SMCS Code: 5051-015

Disassembly Procedure

Start By:

a. Remove the bank valves. Refer to Disassembly and Assembly, “Bank Valve - Remove”.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Inspect the O-ring seals. Replace the O-ring seals that are worn or damaged.

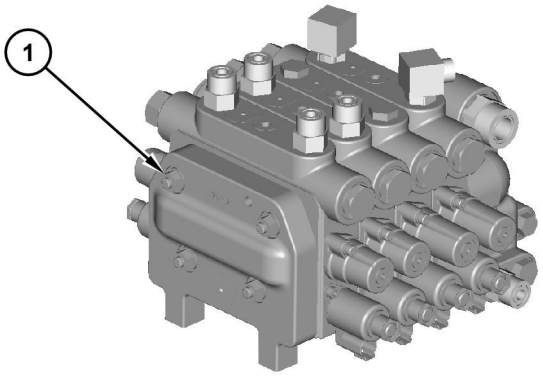

Illustration 128 g01361509

1. Remove nuts (1).

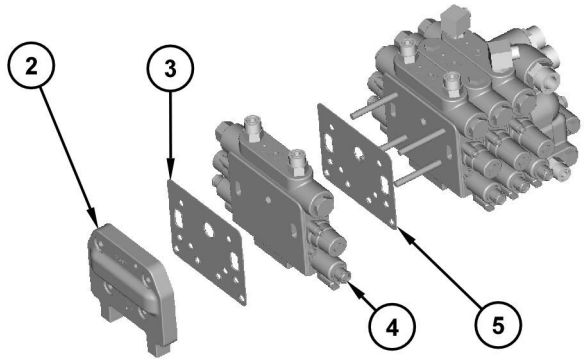

Illustration 129 g01361574

2. Remove cover (2). Remove seal (3).

3. Remove control valve (4). Remove seal (5). Repeat this step for the remaining control valves.

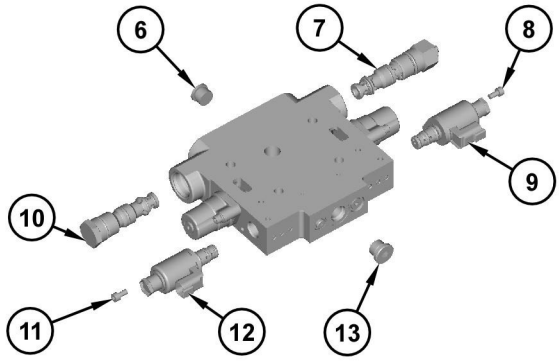

Illustration 130 g01361587

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.

4. Remove plug (6). Remove check valve (7). Remove bolt (8) in order to remove solenoid (9). Remove check valve (10). Remove bolt (11) in order to remove solenoid (12). Remove plug (13).

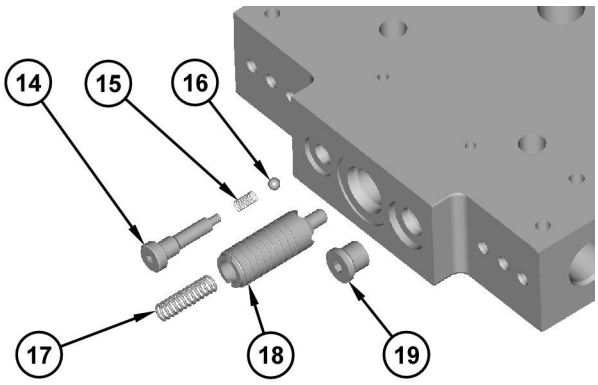

Illustration 131 g01361634

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.

5. Remove plug (14). Remove spring (15). Remove ball (16). Remove spring (17). Remove spool (18). Remove plug (19).

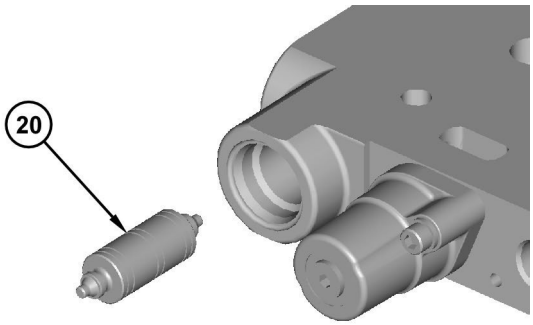

Illustration 132 g01361643

6. Remove pistons (20).

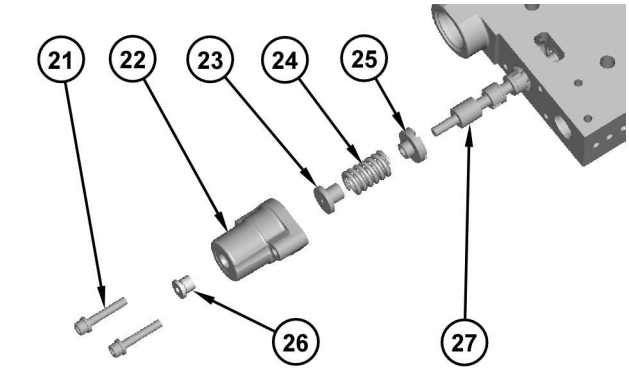

Illustration 133 g01361658

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.

7. Remove bolts (21). Remove cover (22). Remove retainer (23). Remove spring (24). Remove retainer (25). Remove plug (26). Remove spool (27).

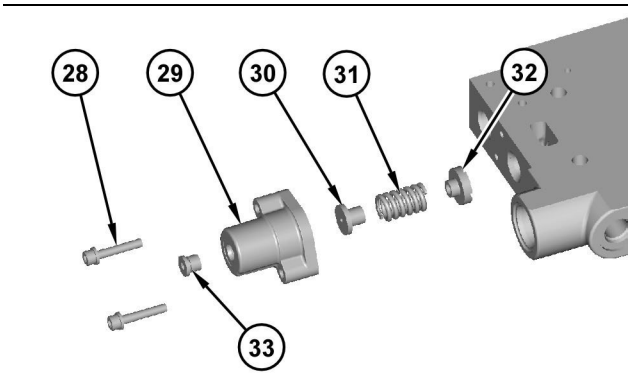

Illustration 134 g01361670

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.

8. Remove bolts (28). Remove cover (29). Remove retainer (30). Remove spring (31). Remove retainer (32). Remove plug (33).

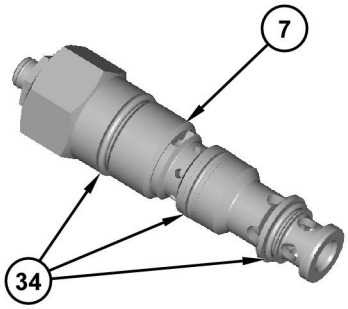

Illustration 135 g01361686

9. Remove O-ring seals (34) from check valve (7).

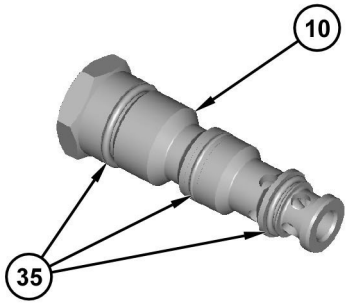

Illustration 136 g01361708

10. Remove O-ring seals (35) from check valve (10).

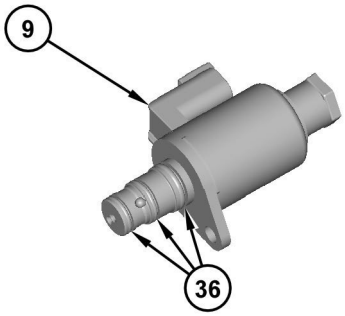

Illustration 137 g01361712

11. Remove O-ring seals (36) from solenoid (9).

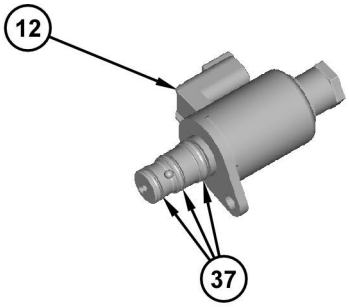

Illustration 138 g01361715

12. Remove O-ring seals (37) from solenoid (12).

13. Repeat Step 3 through Step 12 for the remaining control valves.

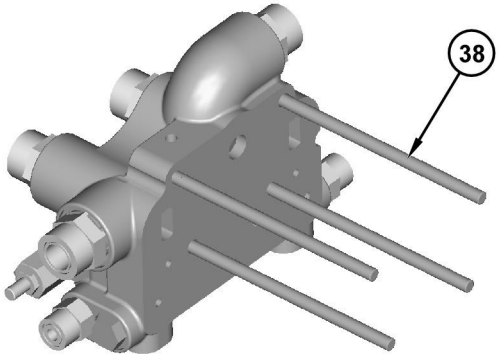

Illustration 139 g01361757

14. Remove tie rods (38).

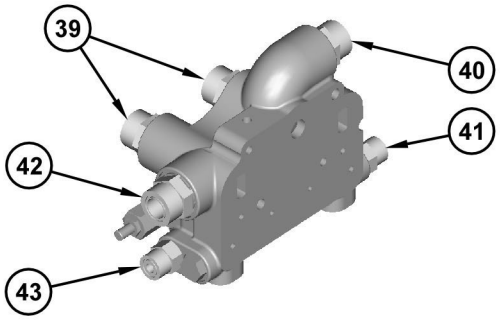

Illustration 140 g01361769

15. Remove fittings (39). Remove fitting (40). Remove fitting (41). Remove fitting (42). Remove fitting (43).

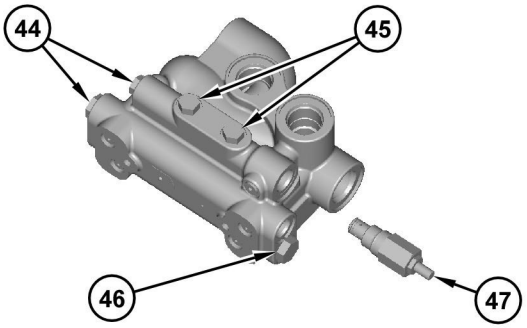

Illustration 141 g01361772

16. Remove plugs (44). Remove plugs (45). Remove plug (46). Remove relief valve (47).

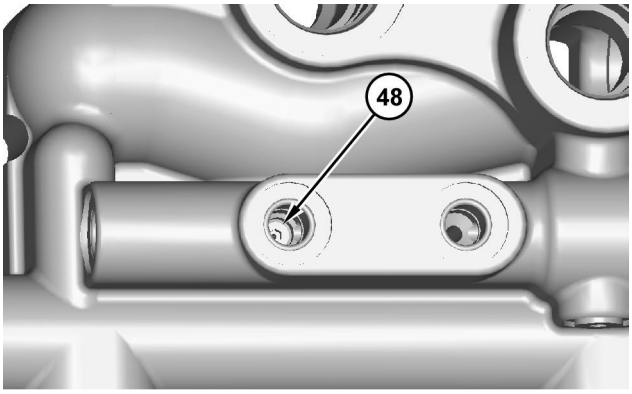

Illustration 142 g01361810

17. Remove orifice (48).

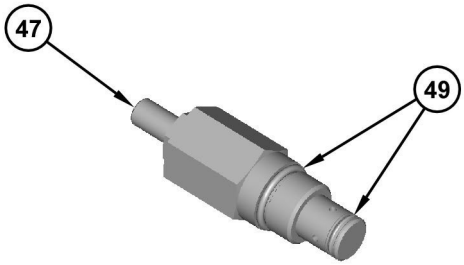

Illustration 143 g01361793

18. Remove O-ring seals (49) from relief valve (47).

i02712425

Bank Valve - Disassemble (Front Frame)

SMCS Code: 5051-015

Disassembly Procedure

Start By:

a. Remove the bank valves. Refer to Disassembly and Assembly, "Bank Valve - Remove".

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Inspect the O-ring seals. Replace the O-ring seals that are worn or damaged.

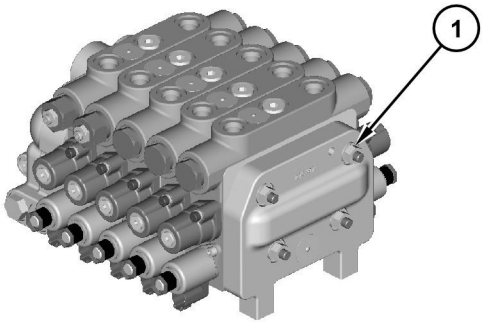

Illustration 144 g01362617

1. Remove nuts (1).

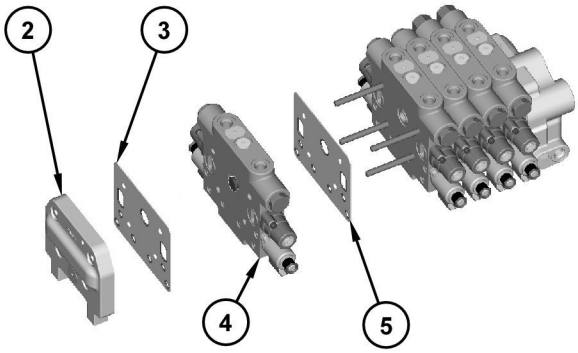

Illustration 145 g01362643

2. Remove cover (2). Remove seal (3).

3. Remove control valve (4). Remove seal (5). Repeat this step for the remaining control valves.

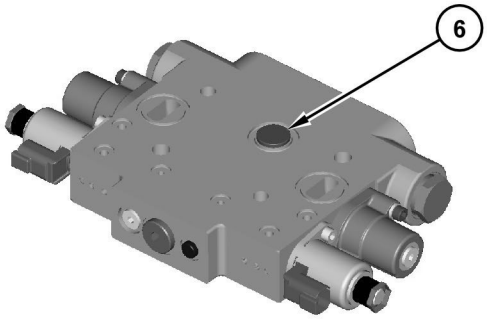

Illustration 146 g01362654

4. Remove plug (6).

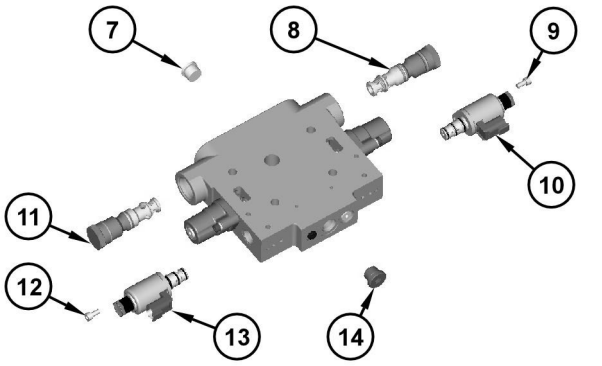

Illustration 147 g01362657

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.

5. Remove plug (7). Remove check valve (8). Remove bolt (9) in order to remove solenoid (10). Remove check valve (11). Remove bolt (12) in order to remove solenoid (13). Remove plug (14).

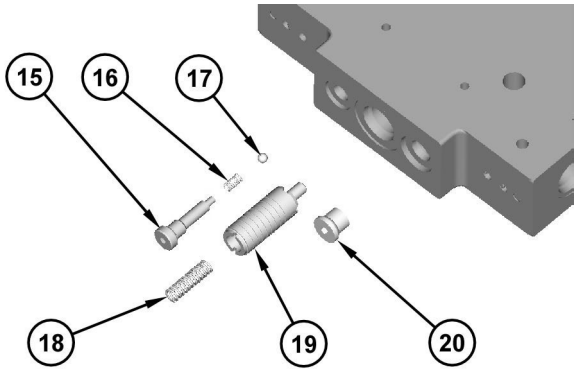

Illustration 148 g01362672

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.

6. Remove plug (15). Remove spring (16). Remove ball (17). Remove spring (18). Remove spool (19). Remove plug (20).

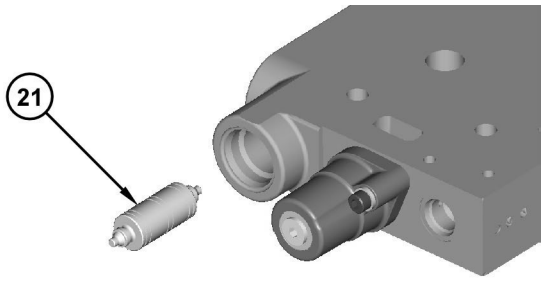

Illustration 149 g01362677

7. Remove pistons (21).

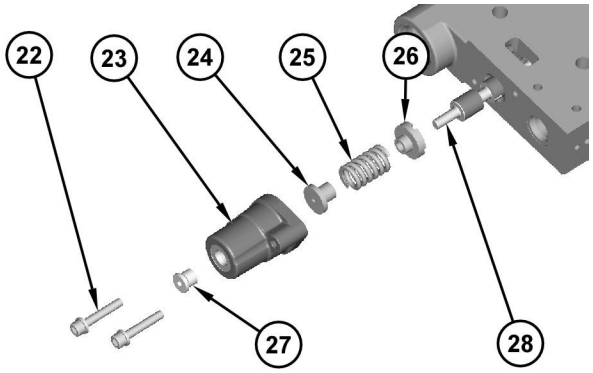

Illustration 150 g01362680

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.

8. Remove bolts (22). Remove cover (23). Remove retainer (24). Remove spring (25). Remove retainer (26). Remove plug (27). Remove spool (28).

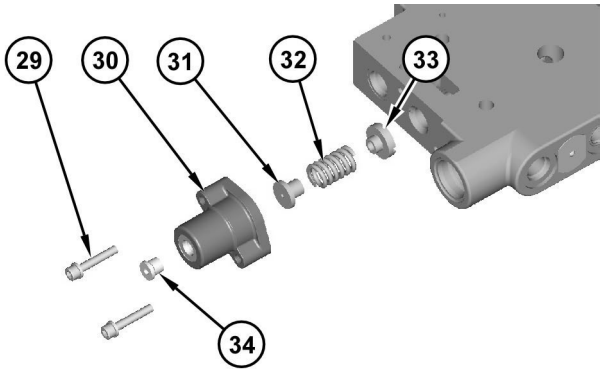

Illustration 151 g01362689

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.

9. Remove bolts (29). Remove cover (30). Remove retainer (31). Remove spring (32). Remove retainer (33). Remove plug (34).

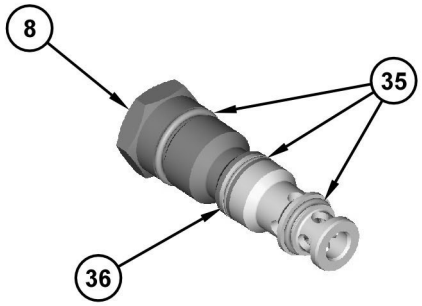

Illustration 152 g01362691

10. Remove O-ring seals (35) and backup ring (36) from check valve (8).

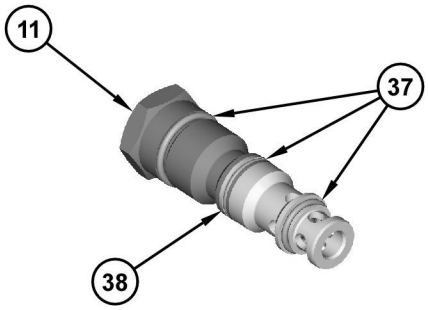

Illustration 153 g01362713

11. Remove O-ring seals (37) and backup ring (38) from check valve (11).

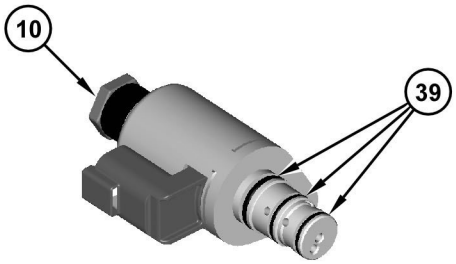

Illustration 154 g01362720

12. Remove O-ring seals (39) from solenoid (10).

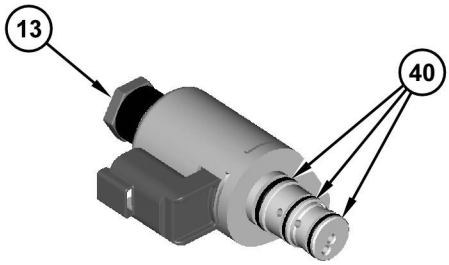

Illustration 155 g01362723

13. Remove O-ring seals (40) from solenoid (13).

14. Repeat Step 5 through Step 13 for the remaining control valves.

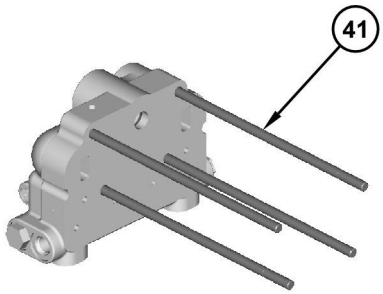

Illustration 156 g01362729

15. Remove tie rods (41).

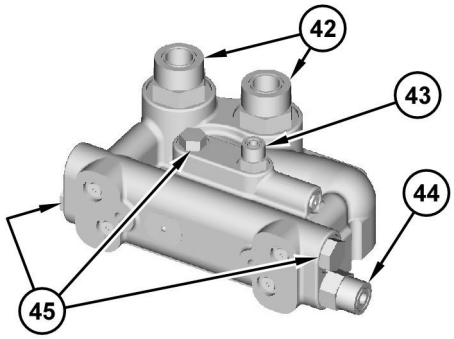

Illustration 157 g01362732

16. Remove fittings (42). Remove fitting (43). Remove fitting (44). Remove plugs (45).

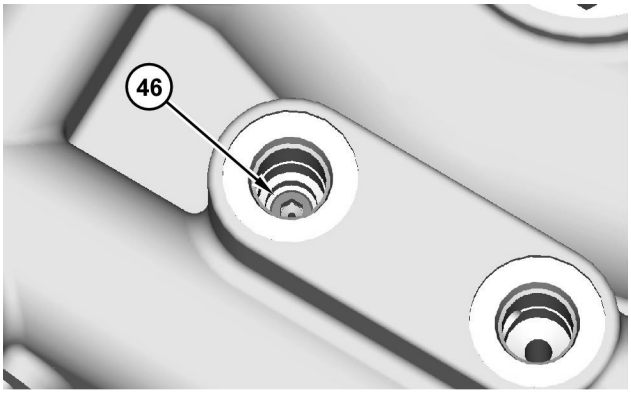

Illustration 158 g01362737

17. Remove orifice (46).

i04342672

Bank Valve - Assemble
(Rear Frame)

SMCS Code: 5051-016

Assembly Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

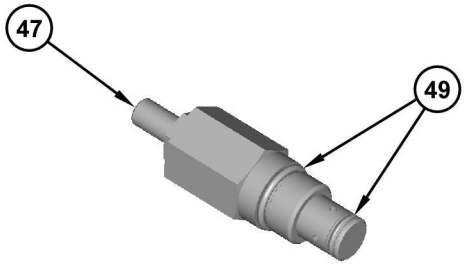

Illustration 159 g01361793

1. Install O-ring seals (49) onto relief valve (47).

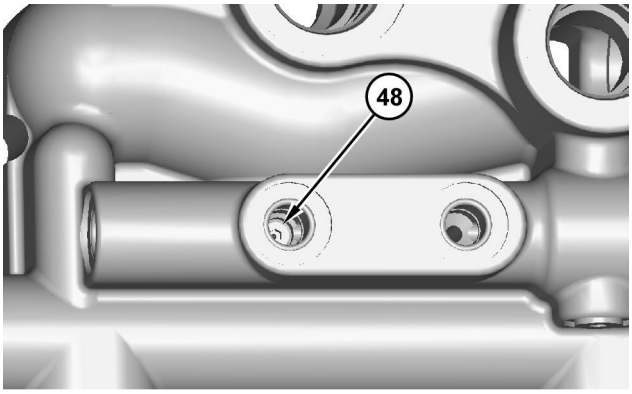

Illustration 160 g01361810

2. Install orifice (48).

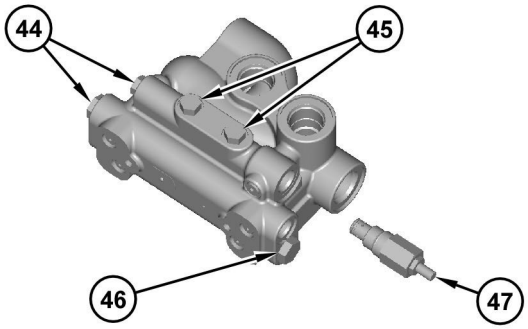

Illustration 161 g01361772

3. Install relief valve (47). Tighten relief valve (47) to a torque of 55 ± 10 N·m (41 ± 7 lb ft). Install plug (46). Install plugs (45). Install plugs (44).

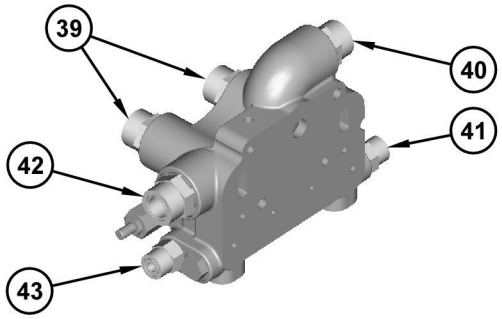

Illustration 162 g01361769

4. Install fitting (43). Install fitting (42). Install fitting (41). Install fitting (40). Install fitting (39).

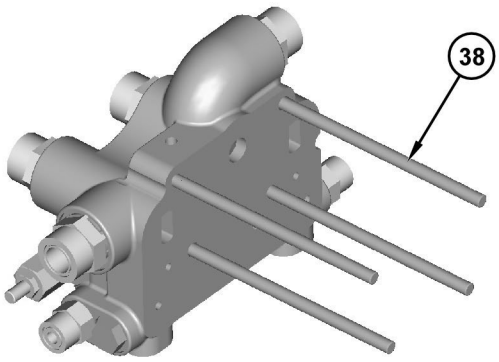

Illustration 163 g01361757

5. Install new tie rods (38).

Note: Do not reuse the tie rods. Replace tie rods (38) when servicing the bank valve.

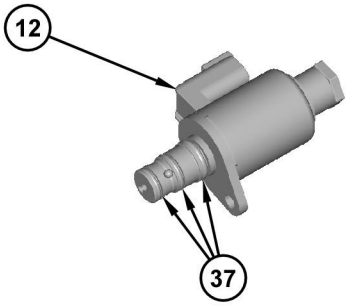

Illustration 164 g01361715

6. Install O-ring seals (37) onto solenoid (12).

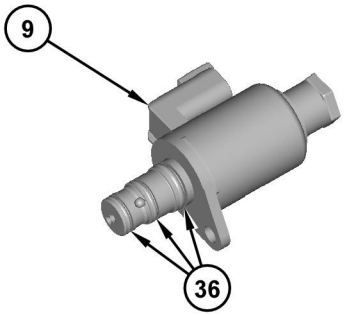

Illustration 165 g01361712

7. Install O-ring seals (36) onto solenoid (9).

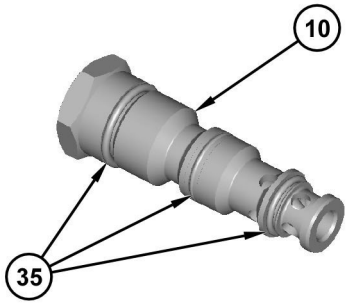

Illustration 166 g01361708

8. Install O-ring seals (35) onto check valve (10).

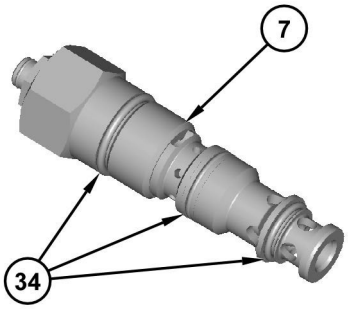

Illustration 167 g01361686

9. Install O-ring seals (34) onto check valve (7).

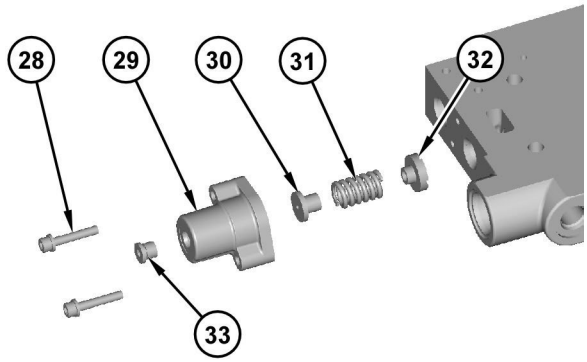

Illustration 168 g01361670

WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

10. Install plug (33). Install retainer (32). Install spring (31). Install retainer (30). Install cover (29). Install bolts (28). Tighten bolts (28) to a torque of 12 ± 3 N·m (9 ± 2 lb ft).

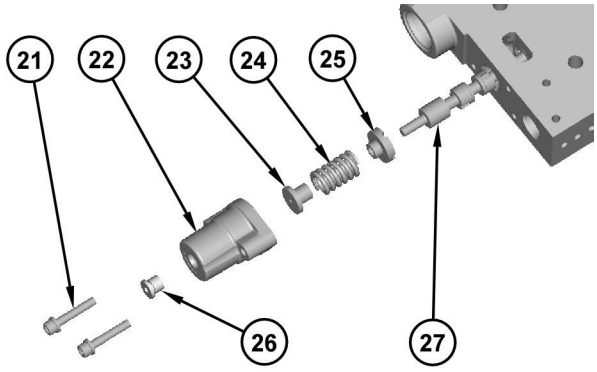

Illustration 169 g01361658

WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

11. Install spool (27). Install plug (26). Install retainer (25). Install spring (24). Install retainer (23). Install cover (22). Install bolts (21). Tighten bolts (21) to a torque of 12 ± 3 N·m (9 ± 2 lb ft).

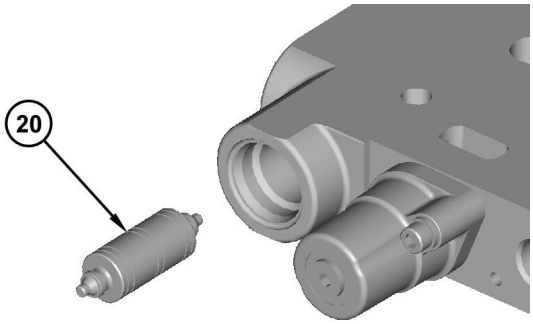

Illustration 170 g01361643

12. Install pistons (20).

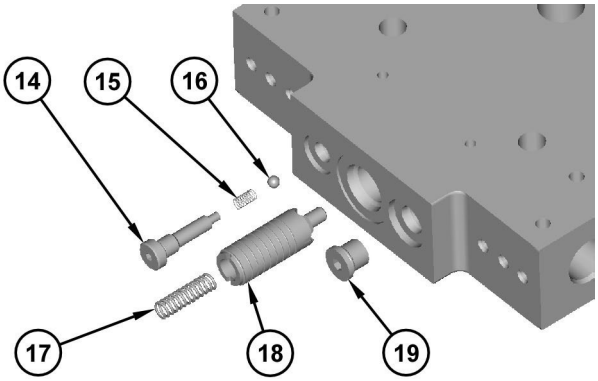

Illustration 171 g01361634

13. Install plug (19). Install spool (18). Install spring (17). Install ball (16). Install spring (15). Install plug (14). Tighten plug (14) to a torque of 5 ± 1 N·m (44 ± 9 lb in).

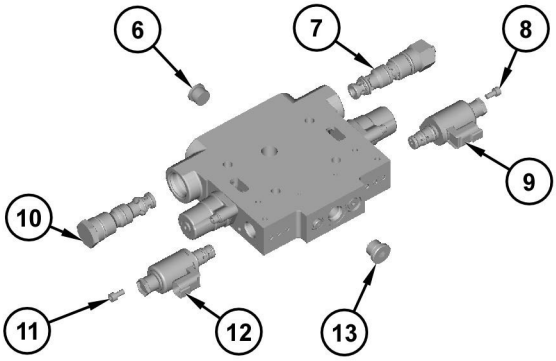

Illustration 172 g01361587

WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

14. Install plug (13). Install solenoid (12). Tighten solenoid (12) to a torque of 5.5 ± 1.5 N·m (49 ± 13 lb in). Install bolt (11). Tighten bolt (11) to a torque of 12 ± 3 N·m (9 ± 2 lb ft). Install check valve (10). Tighten check valve (10) to a torque of 80 ± 15 N·m (59 ± 11 lb ft). Install solenoid (9). Tighten solenoid (9) to a torque of 5.5 ± 1.5 N·m (49 ± 13 lb in). Install bolt (8). Tighten bolt (8) to a torque of 12 ± 3 N·m (9 ± 2 lb ft). Install check valve (7). Tighten check valve (7) to a torque of 80 ± 15 N·m (59 ± 11 lb ft). Install plug (6).

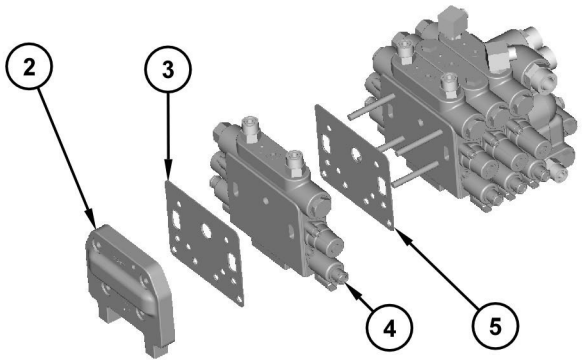

Illustration 173 g01361574

15. Install seal (5). Install control valve (4).

16. Repeat Step 6 through Step 15 for the remaining control valves.

17. Install seal (3). Install cover (2).

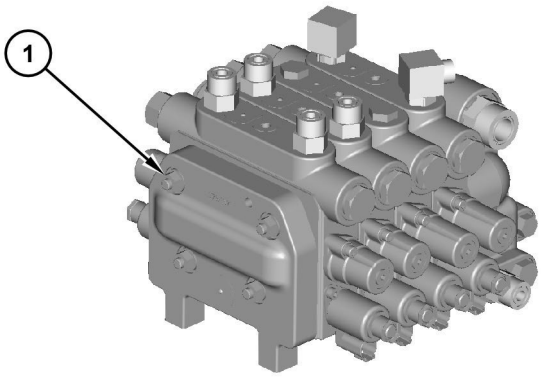

Illustration 174 g01361509

18. Install new nuts (1). Tighten nuts (1) in a crisscross pattern to a torque of 25 ± 2.5 N·m (221.3 ± 22.1 lb in). Ensure that each nut (1) remains torqued to 25 ± 2.5 N·m (221.3 ± 22.1 lb in).

Note: Do not reuse nuts that have been torque turned. Replace nuts (1) when servicing the bank valve.

19. Tighten each nut (1) by an additional 90° ± 10° in the opposite crisscross pattern.

End By:

a. Install the bank valves. Refer to Disassembly and Assembly, “Bank Valve - Install”.

i05508493

Bank Valve - Assemble (Front Frame)

SMCS Code: 5051-016

Assembly Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

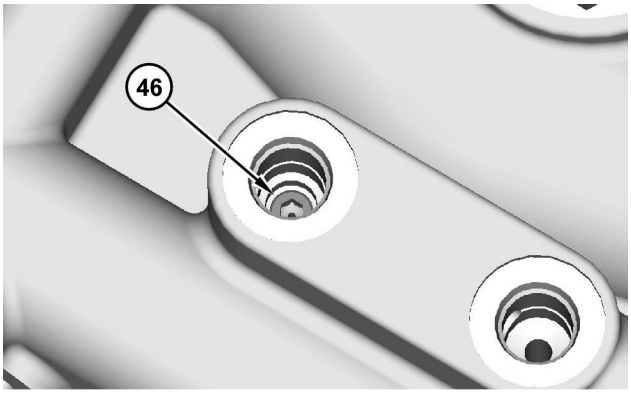

Illustration 175 g01362737

1. Install orifice (46).

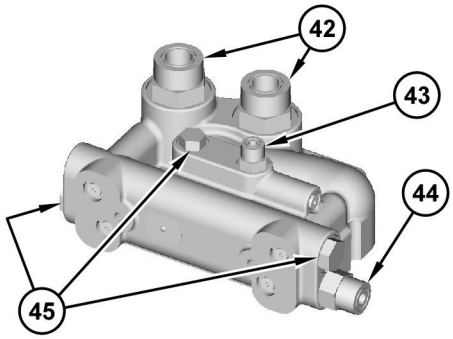

Illustration 176 g01362732

2. Install plugs (45). Install fitting (44). Install fitting (43). Install fittings (42).

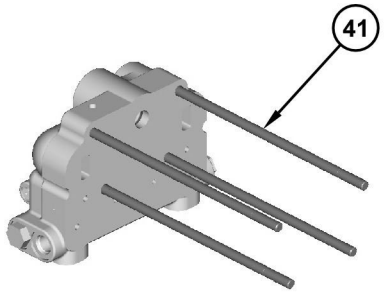

Illustration 177 g01362729

3. Install new tie rods (41).

Note: Do not reuse the tie rods. Replace tie rods (41) when servicing the bank valve.

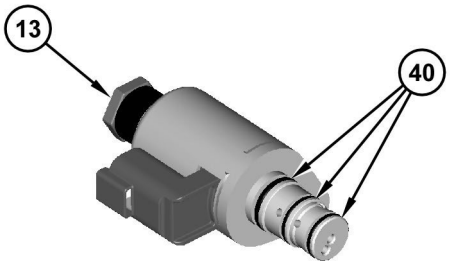

Illustration 178 g01362723

4. Install O-ring seals (40) onto solenoid (13).

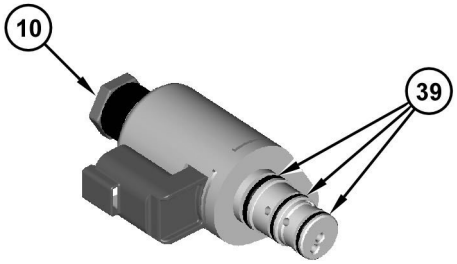

Illustration 179 g01362720

5. Install O-ring seals (39) onto solenoid (10).

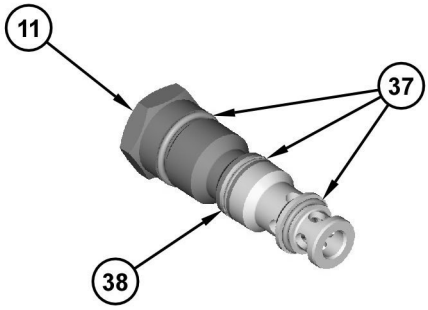

Illustration 180 g01362713

6. Install O-ring seals (37) and backup ring (38) onto check valve (11).

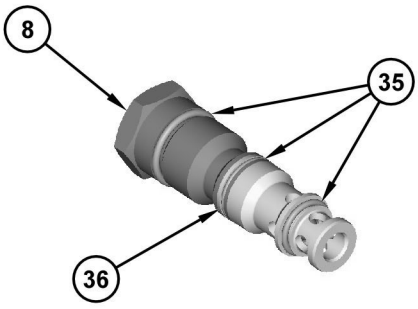

Illustration 181 g01362691

7. Install O-ring seals (35) and backup ring (36) onto check valve (8).

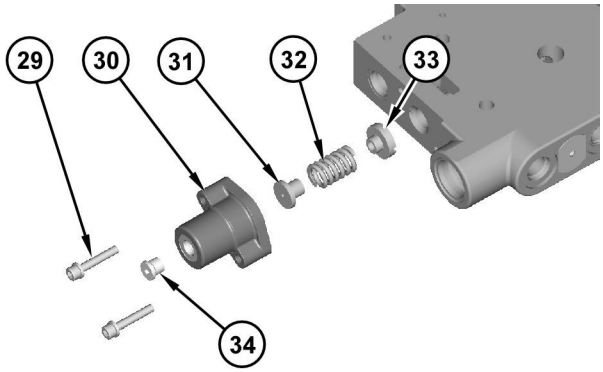

Illustration 182 g01362689

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

8. Install plug (34). Install retainer (33). Install spring (32). Install retainer (31). Install cover (30). Install bolts (29). Tighten bolts (29) to a torque of 12 ± 3 N·m (106 ± 27 lb in).

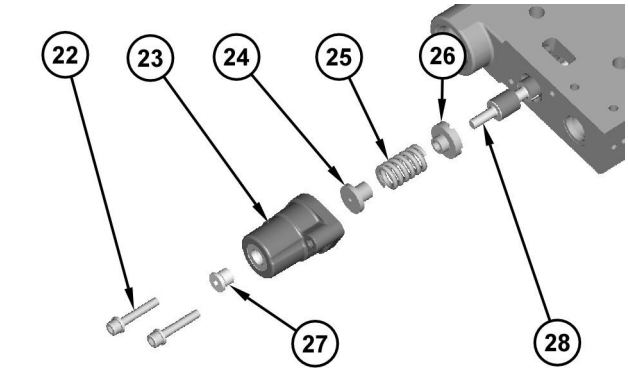

Illustration 183 g01362680

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

9. Install spool (28). Install plug (27). Install retainer (26). Install spring (25). Install retainer (24). Install cover (23). Install bolts (22). Tighten bolts (22) to a torque of 12 ± 3 N·m (106 ± 27 lb in).

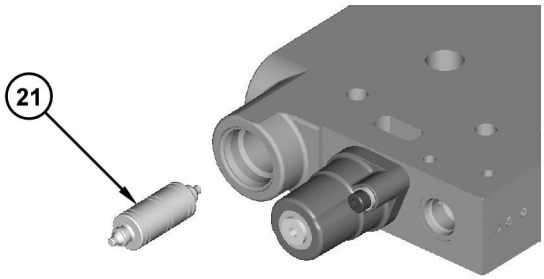

Illustration 184 g01362677

10. Install pistons (21).

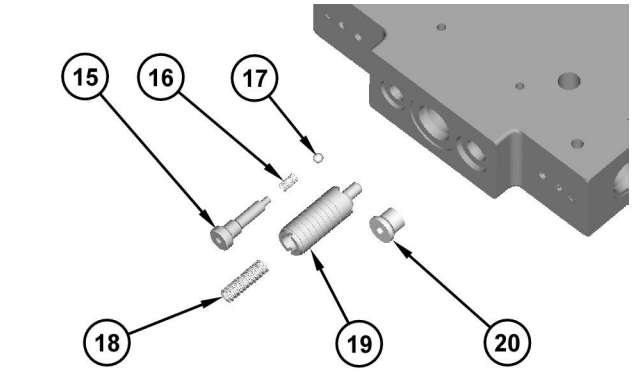

Illustration 185 g01362672

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

11. Install plug (20). Install spool (19). Install spring (18). Install ball (17). Install spring (16). Install plug (15). Tighten plug (15) to a torque of 5 ± 1 N·m (44 ± 9 lb in).

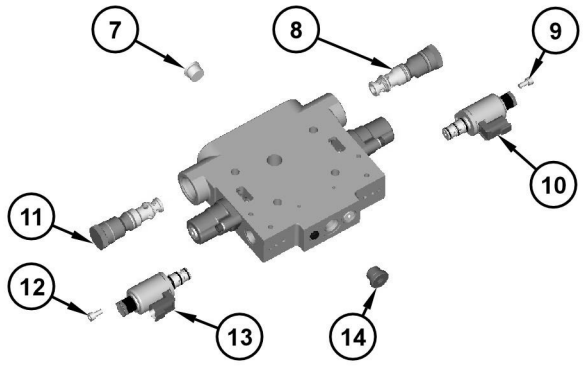

Illustration 186 g01362657

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

12. Install plug (14). Install solenoid (13). Tighten solenoid (13) to a torque of 5.5 ± 1.5 N·m (49 ± 13 lb in). Install bolt (12). Tighten bolt (12) to a torque of 12 ± 3 N·m (106 ± 27 lb in). Install check valve (11). Tighten check valve (11) to a torque of 80 ± 15 N·m (59 ± 11 lb ft). Install solenoid (10). Tighten solenoid (10) to a torque of 5.5 ± 1.5 N·m (49 ± 13 lb in). Install solenoid (9). Install bolt (9). Tighten bolt (9) to a torque of 12 ± 3 N·m (106 ± 27 lb in). Install check valve (8). Tighten check valve (8) to a torque of 80 ± 15 N·m (59 ± 11 lb ft). Install plug (7).

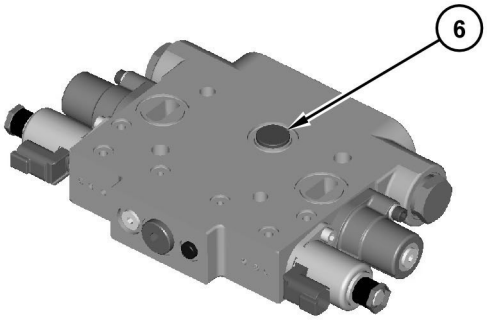

Illustration 187 g01362654

13. Install plug (6).

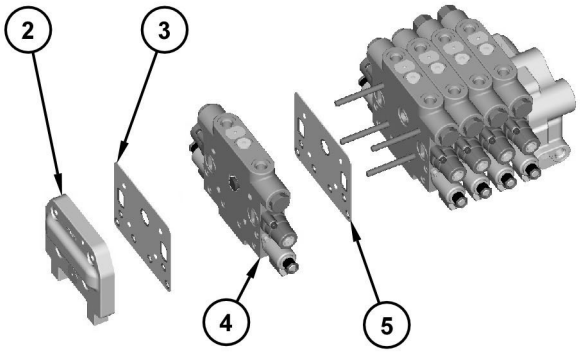

Illustration 188 g01362643

14. Install seal (5). Install control valve (4). Repeat this step for the remaining control valves.

15. Install seal (3). Install cover (2).

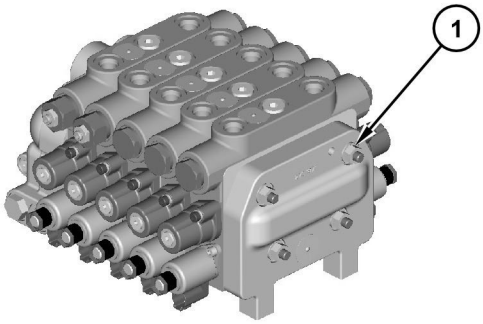

Illustration 189 g01362617

16. Install new nuts (1). Tighten nuts (1) in a crisscross pattern to a torque of 25 ± 2.5 N·m (221.3 ± 22.1 lb in). Ensure that each nut (1) remains torqued to 25 ± 2.5 N·m (221.3 ± 22.1 lb in).

Note: Do not reuse nuts that have been torque turned. Replace nuts (1) when servicing the bank valve.

17. Tighten each nut (1) by an additional 90° ± 10° in the opposite crisscross pattern.

End By:

a. Install the bank valve.

i02747727

Bank Valve - Install
(Rear Frame)

SMCS Code: 5051-012

Installation Procedure

Table 10

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

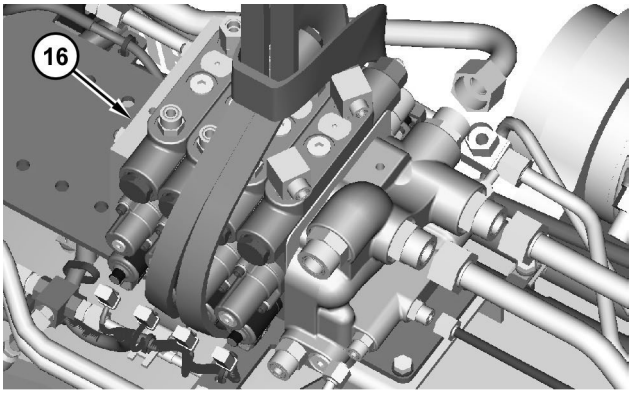

Illustration 190 g01376784

1. Use a suitable lifting device in order to install bank valve (16). The weight of bank valve (16) is approximately 50 kg (110 lb).

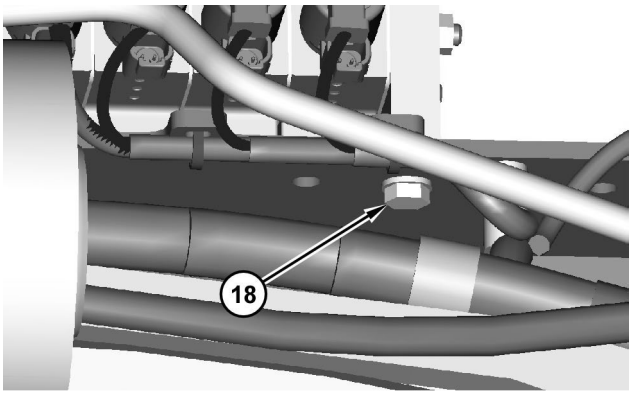

Illustration 191 g01376879

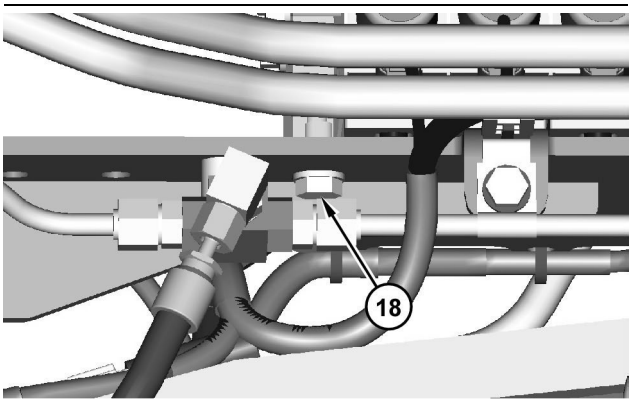

Illustration 192 g01376885

2. Install bolts (18).

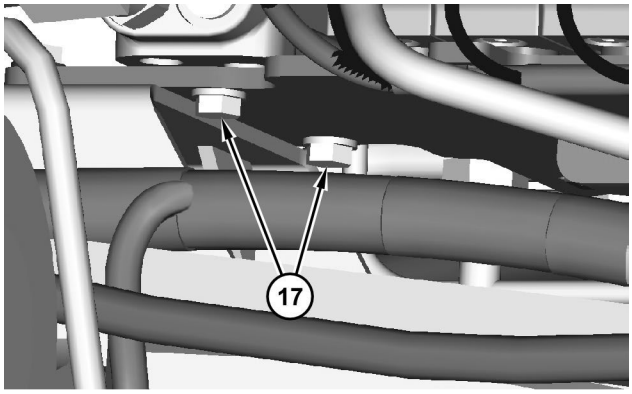

Illustration 193 g01376876

3. Install bolts (17).

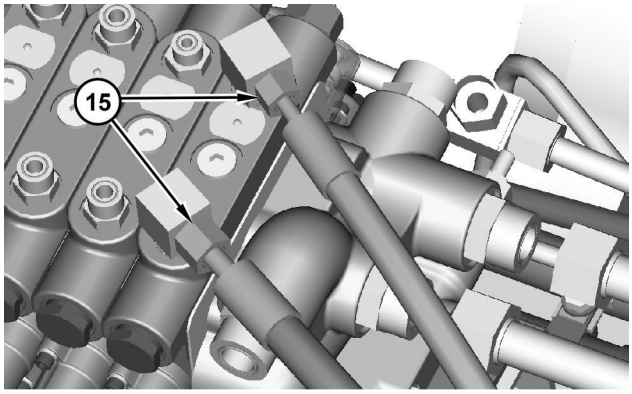

Illustration 194 g01376779

4. Connect hose assemblies (15).

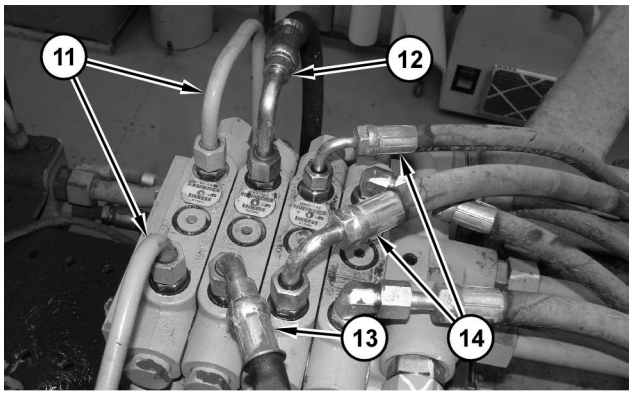

Illustration 195 g01376768

5. Connect hose assemblies (14). Connect hose assembly (13) and hose assembly (12). Install tube assemblies (11).

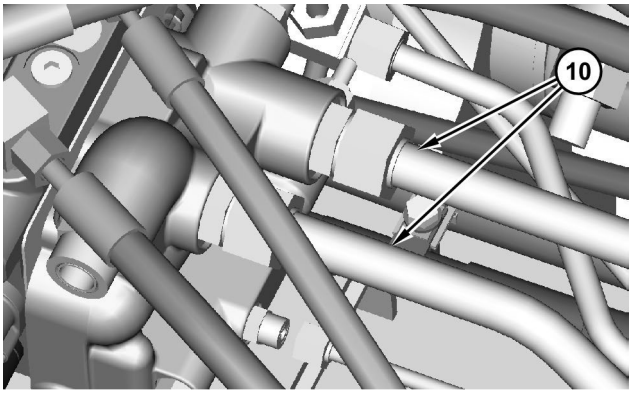

Illustration 196 g01376761

6. Connect tube assemblies (10).

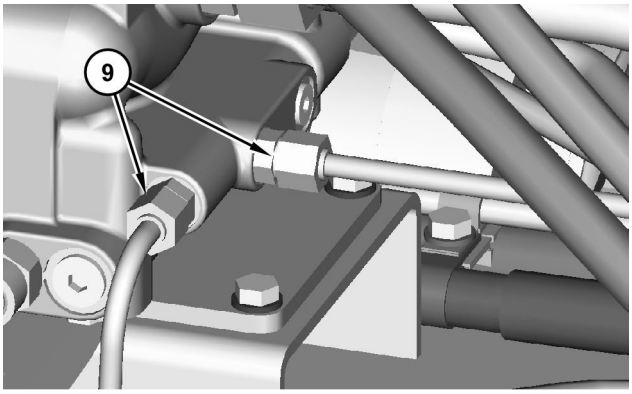

Illustration 197 g01376720

7. Connect tube assemblies (9).

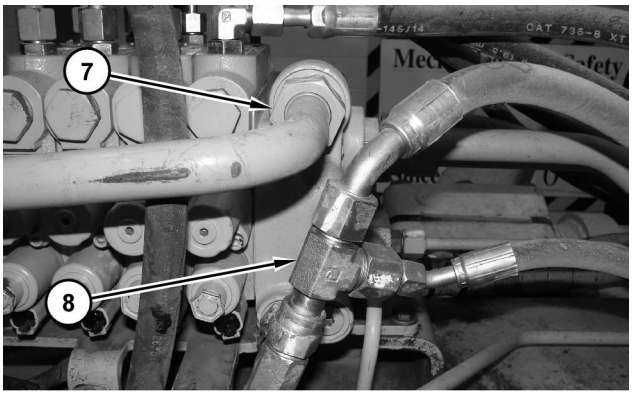

Illustration 198 g01376585

8. Connect fitting (8). Connect tube assembly (7).

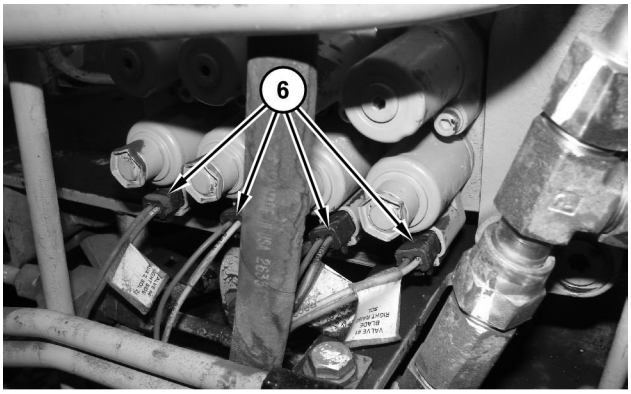

Illustration 199 g01376576

9. Connect harness assemblies (6).

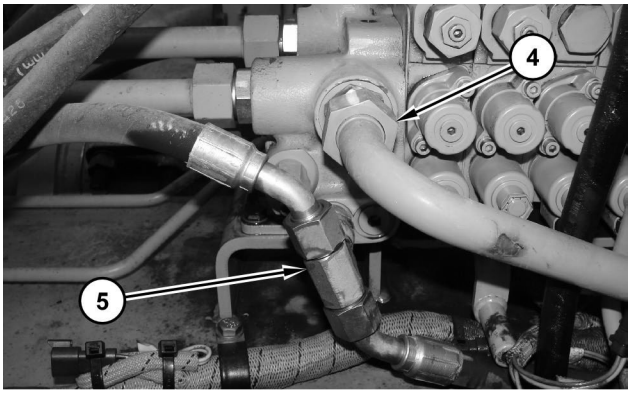

Illustration 200 g01376566

10. Connect fitting (5). Connect tube assembly (4).

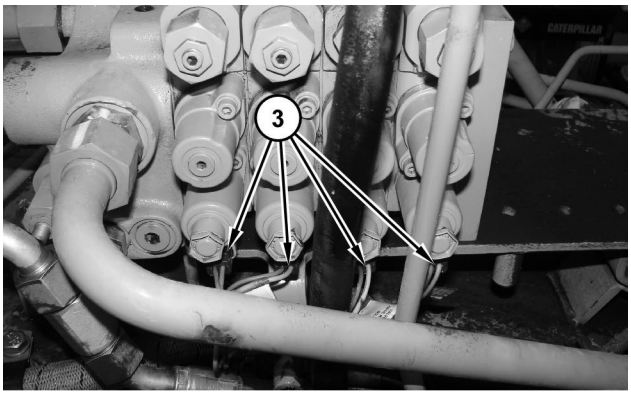

Illustration 201 g01376554

11. Connect harness assemblies (3).

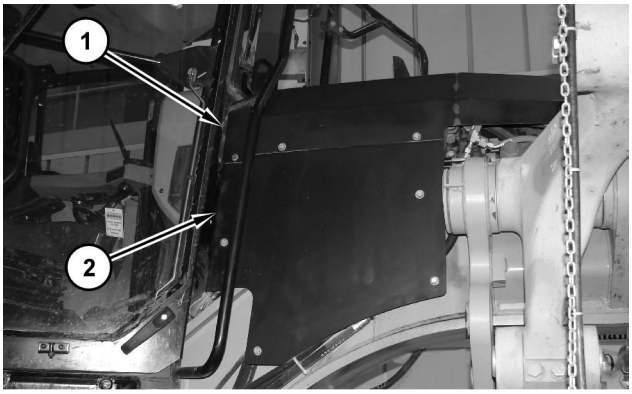

Illustration 202 g01376545

12. Install cover (2). Repeat this step for the cover on the opposite side.

13. Install cover (1).

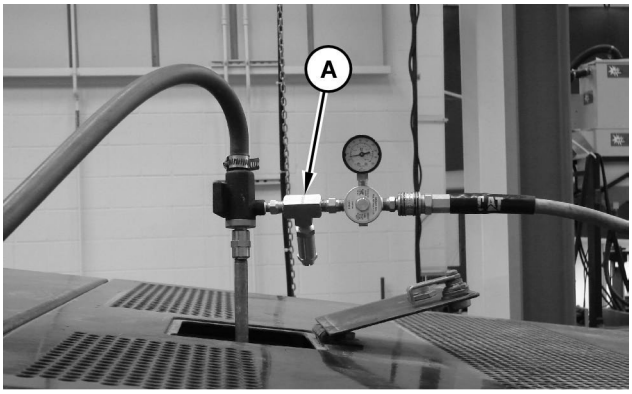

Illustration 203 g01368952

14. Remove Tooling (A).

15. Fill the hydraulic tank. Refer to Operation and Maintenance Manual, “Capacities - Refill”.

i02747754

Bank Valve - Install (Front Frame)

SMCS Code: 5051-012

Installation Procedure

Table 11

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

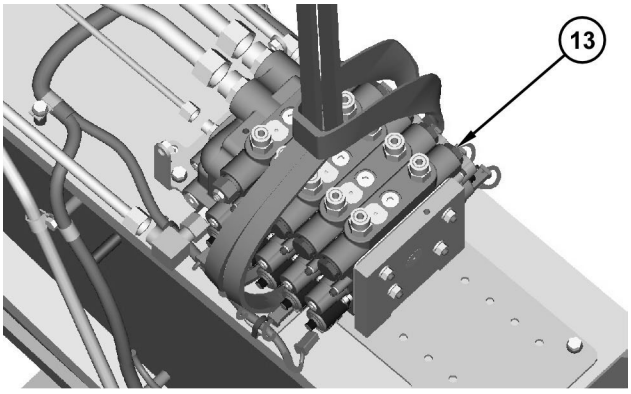

Illustration 204 g01377073

1. Use a suitable lifting device in order to install bank valve (13). The weight of bank valve (13) is approximately 60 kg (132 lb).

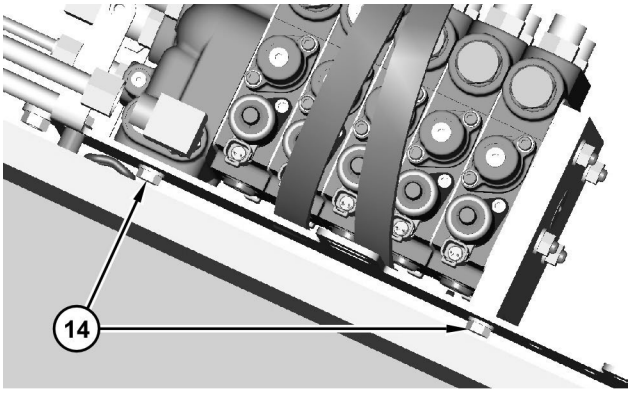

Illustration 205 g01377097

The harness assembly is removed for photographic purposes.

2. Install bolts (14). Repeat this step for the opposite side.

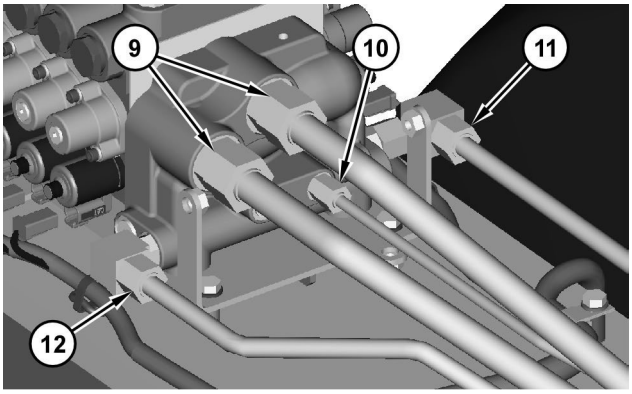

Illustration 206 g01377057

3. Connect tube assembly (12). Connect tube assembly (11). Connect tube assembly (10). Connect tube assemblies (9).

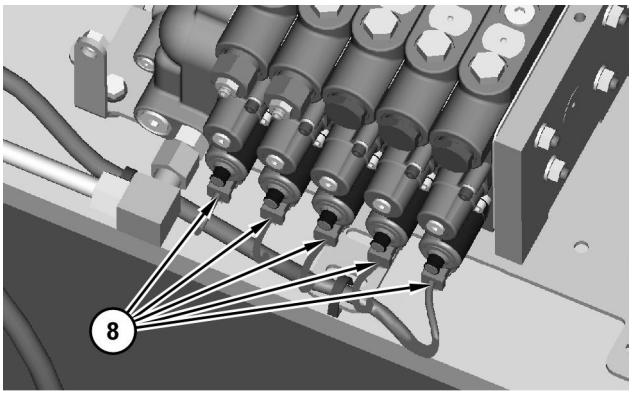

Illustration 207 g01377016

4. Connect harness assemblies (8).

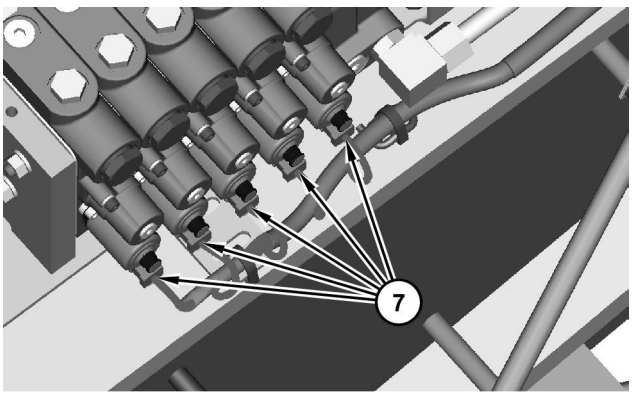

Illustration 208 g01377015

5. Connect harness assemblies (7).

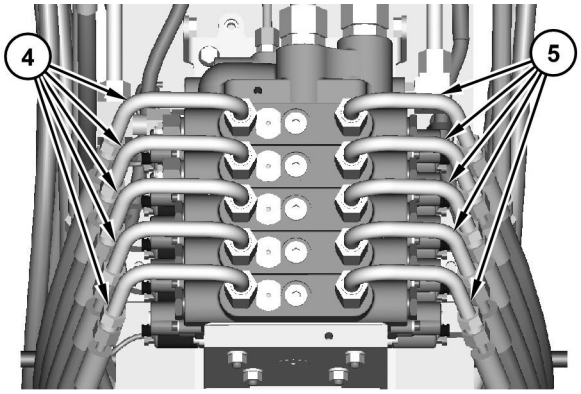

Illustration 209 g01377004

6. Connect tube assemblies (5). Connect tube assemblies (4).

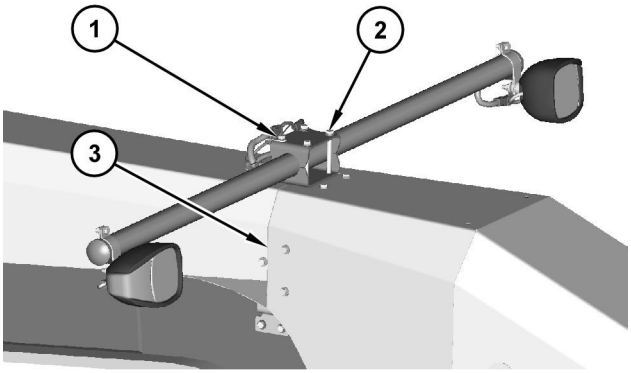

Illustration 210 g01376927

7. Use two people in order to install cover (3). The weight of cover (3) is approximately 32 kg (70 lb). Install bolts (2). Tighten bolts (1).

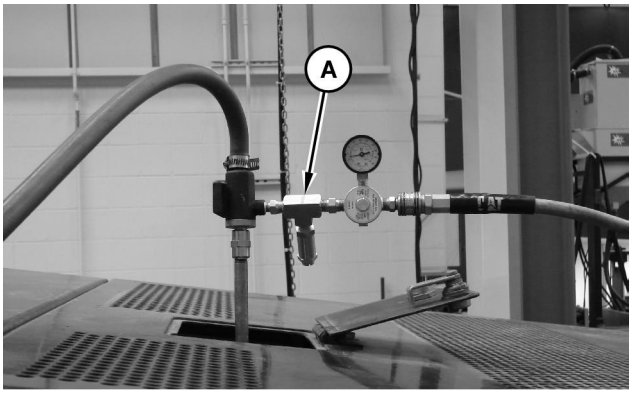

Illustration 211 g01368952

8. Remove Tooling (A).

i02755919

Accumulator (Blade Cushion) - Remove and Install

SMCS Code: 5077-010-B8

Removal Procedure

Table 12

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

Personal injury can result from the sudden release of high pressure oil.

Be sure the engine has been shut off for a minimum of five minutes to ensure that the accumulator pressure is zero.

The accumulator is filled with dry nitrogen. Do not loosen or remove the valve or the cap from the top of the accumulator.

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

Note: Inspect the O-ring seals. Replace the O-ring seals that are worn or damaged.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

2. Connect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

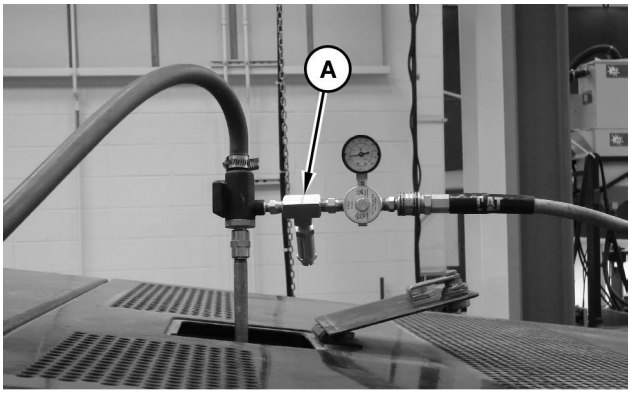

Illustration 212 g01368952

3. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

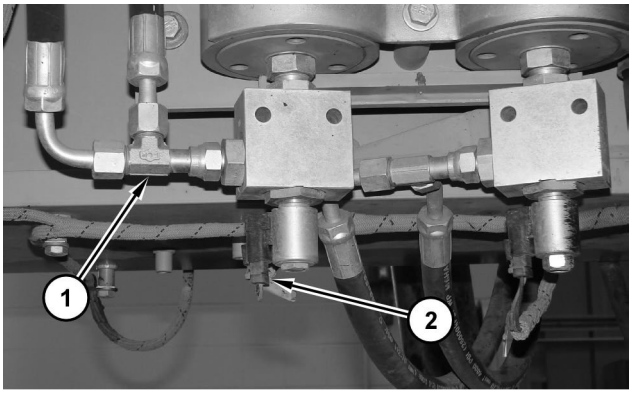

Illustration 213 g01379979

4. Disconnect fittings (1). Disconnect harness assemblies (2).

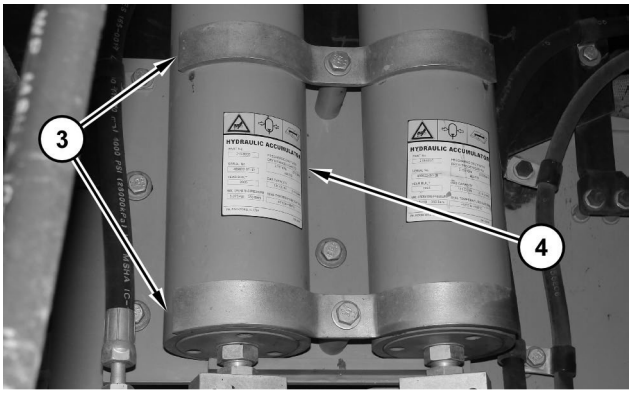

Illustration 214 g01379983

5. Loosen clamps (3). Remove accumulator (4).

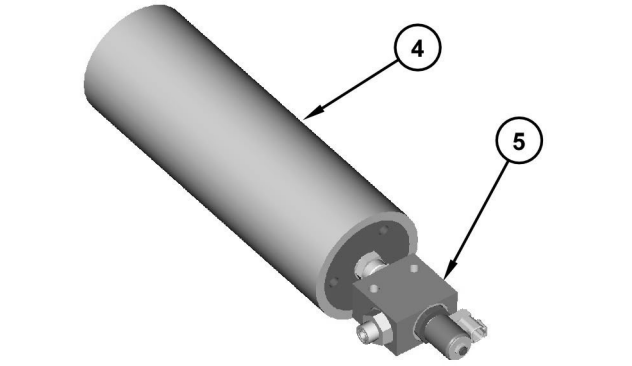

Illustration 215 g01379998

6. Remove manifold (5) from accumulator (4).

7. Repeat Step 4 through Step 6 for the remaining accumulator.

Installation Procedure

Table 13

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

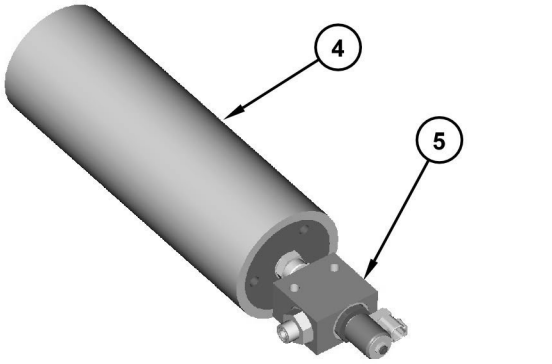

Illustration 216 g01379998

1. Install manifold (5) onto accumulator (4).

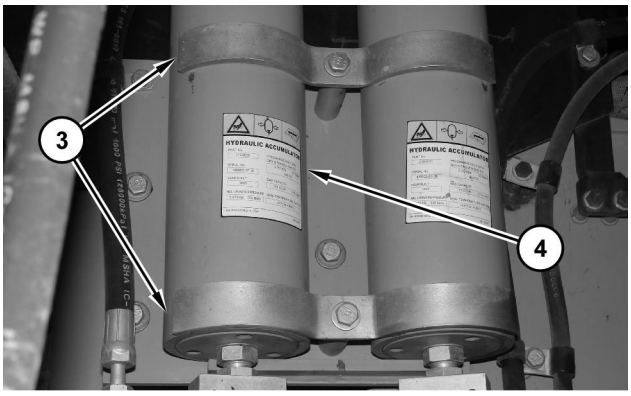

Illustration 217 g01379983

2. Install accumulator (4). Tighten clamps (3).

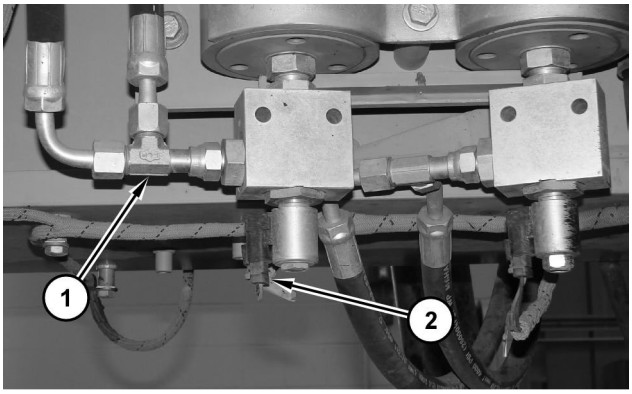

Illustration 218 g01379979

3. Connect harness assemblies (2). Connect fitting (1).

4. Charge the blade cushion accumulator. Refer to Testing and Adjusting, “Accumulator (Blade Cushion) - Test and Charge”.

5. Repeat Step 1 through Step 4 for the remaining accumulator.

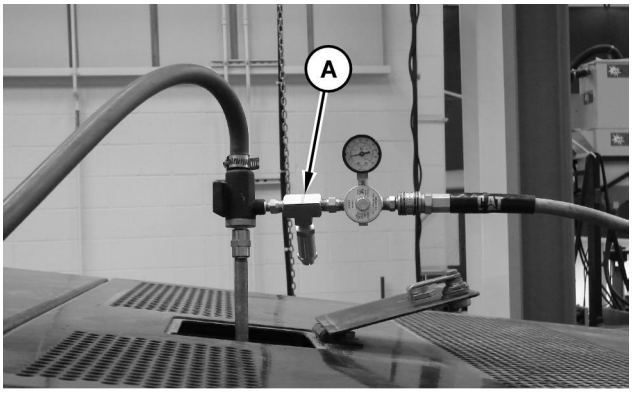

Illustration 219 g01368952

6. Remove Tooling (A).

i02755922

Solenoid Valve (Blade Cushion) - Remove and Install

SMCS Code: 5479-010

Removal Procedure

Table 14

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

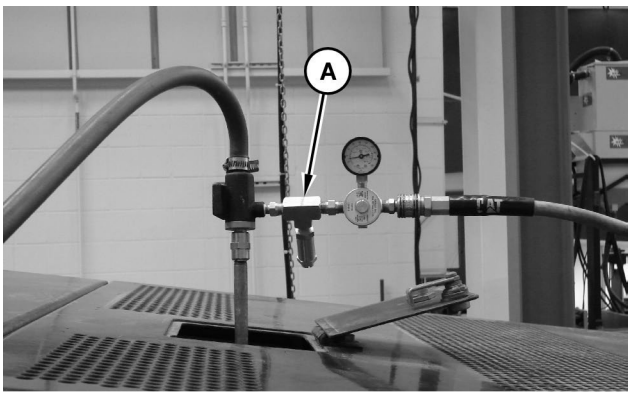

Illustration 220 g01368952

2. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

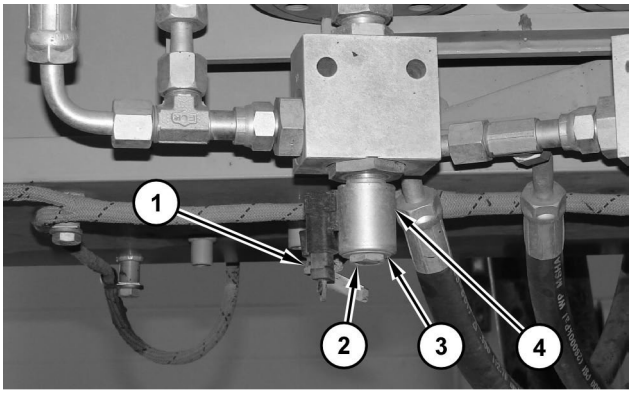

Illustration 221 g01380049

⚠ WARNING

Personal injury can result from the sudden release of high pressure oil.

Be sure the engine has been shut off for a minimum of five minutes to ensure that the accumulator pressure is zero.

The accumulator is filled with dry nitrogen. Do not loosen or remove the valve or the cap from the top of the accumulator.

3. Disconnect harness assembly (1).

4. Remove nut (2), washer (3), and coil assembly (4).

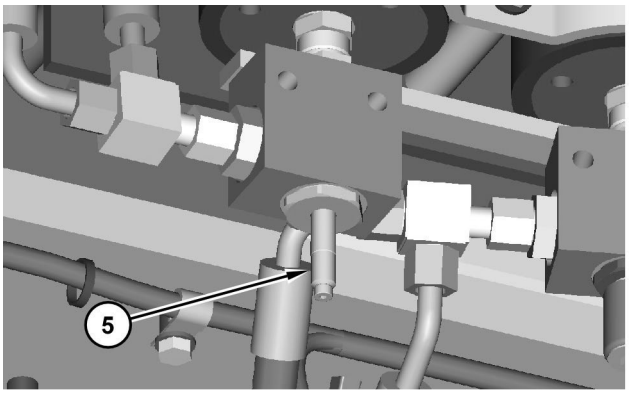

Illustration 222 g01380055

5. Remove cartridge assembly (5).

Installation Procedure

Table 15

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

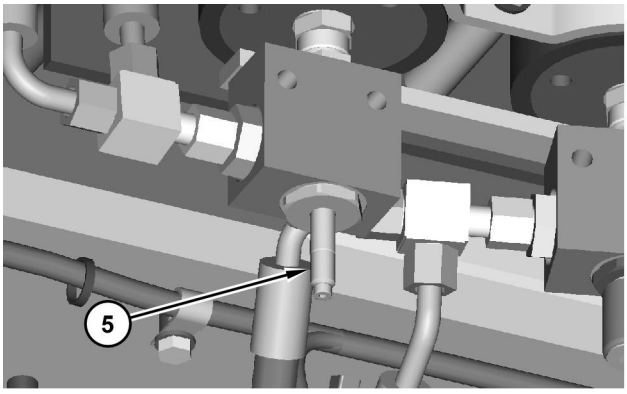

Illustration 223 g01380055

1. Install cartridge assembly (5). Tighten cartridge assembly (5) to a torque of 25 ± 5 N·m (18 ± 4 lb ft).

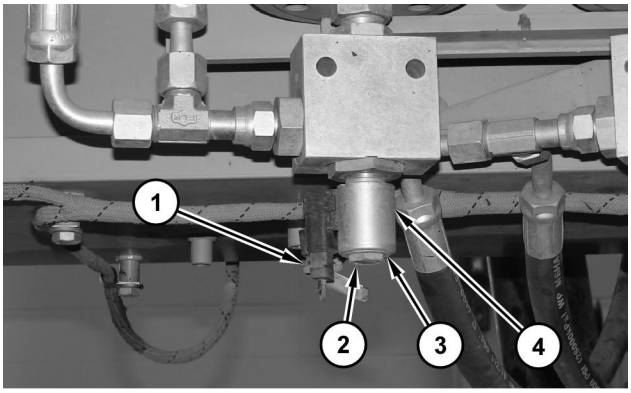

Illustration 224 g01380049

2. Install coil assembly (4), washer (3), and nut (2). Tighten nut (2) to a torque of 9.5 ± 1.5 N·m (84.08 ± 13.28 lb in).

3. Connect harness assembly (1).

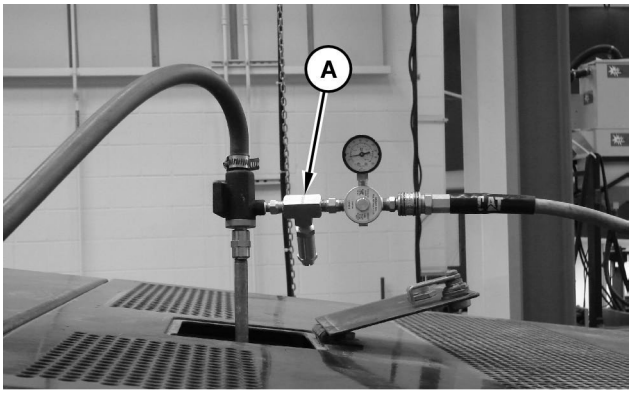

Illustration 225 g01368952

4. Remove Tooling (A).

i02659105

Blade Lift Cylinder - Remove and Install

SMCS Code: 5102-010

Removal Procedure

Table 16

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

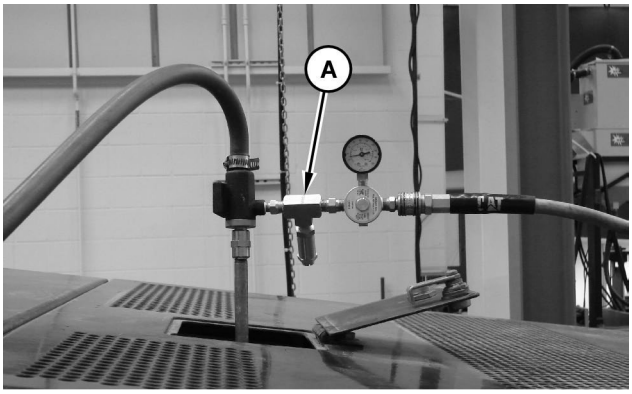

Illustration 226 g01368952

2. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

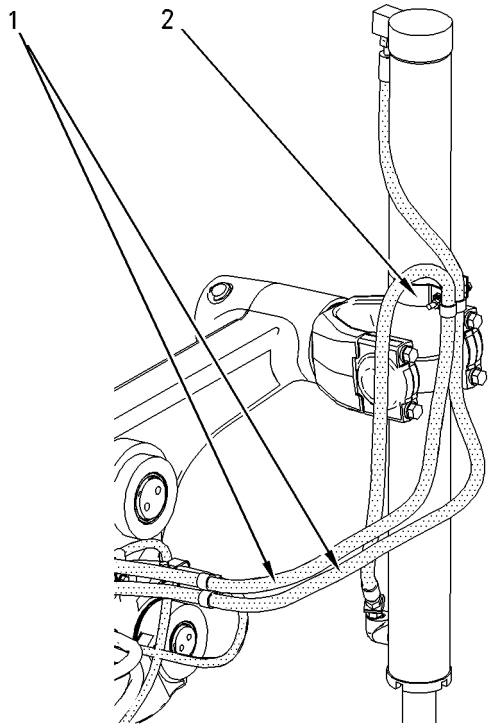

Illustration 227 g00931712

3. Disconnect hose assemblies (1). Remove clamp (2).

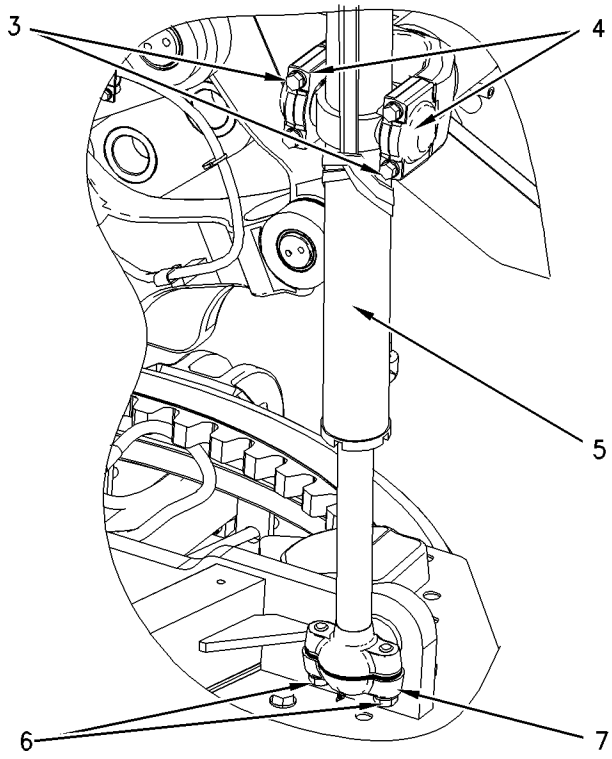

Illustration 228 g00931716

4. Remove bolts (6) and remove cap (7).

Note: Note the shims and inserts for installation purposes.

5. Attach a suitable lifting device to blade lift cylinder (5). The weight of blade lift cylinder (5) is approximately 102 kg (225 lb).

6. Remove bolts (3) and remove blade lift cylinder (5).

7. Remove cap assemblies (4) from blade lift cylinder (5).

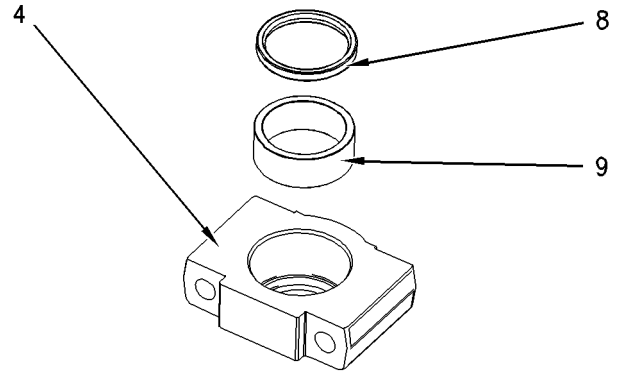

Illustration 229 g00931717

8. Remove seal (8) from cap assembly (4). Remove bearing (9) from cap assembly (4).

9. Repeat Step 8 for the remaining cap assembly.

Disassembly and Assembly Information

Table 17

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	127-4904	Repair Stand	1
C	195-4609	Seal Pick	1
D	7M-7456	Bearing Mount Compound	1
E	1P-0808	Multipurpose Grease	1
F	9U-7868	Spanner Wrench	1
	127-8064	Adjustable Plate	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

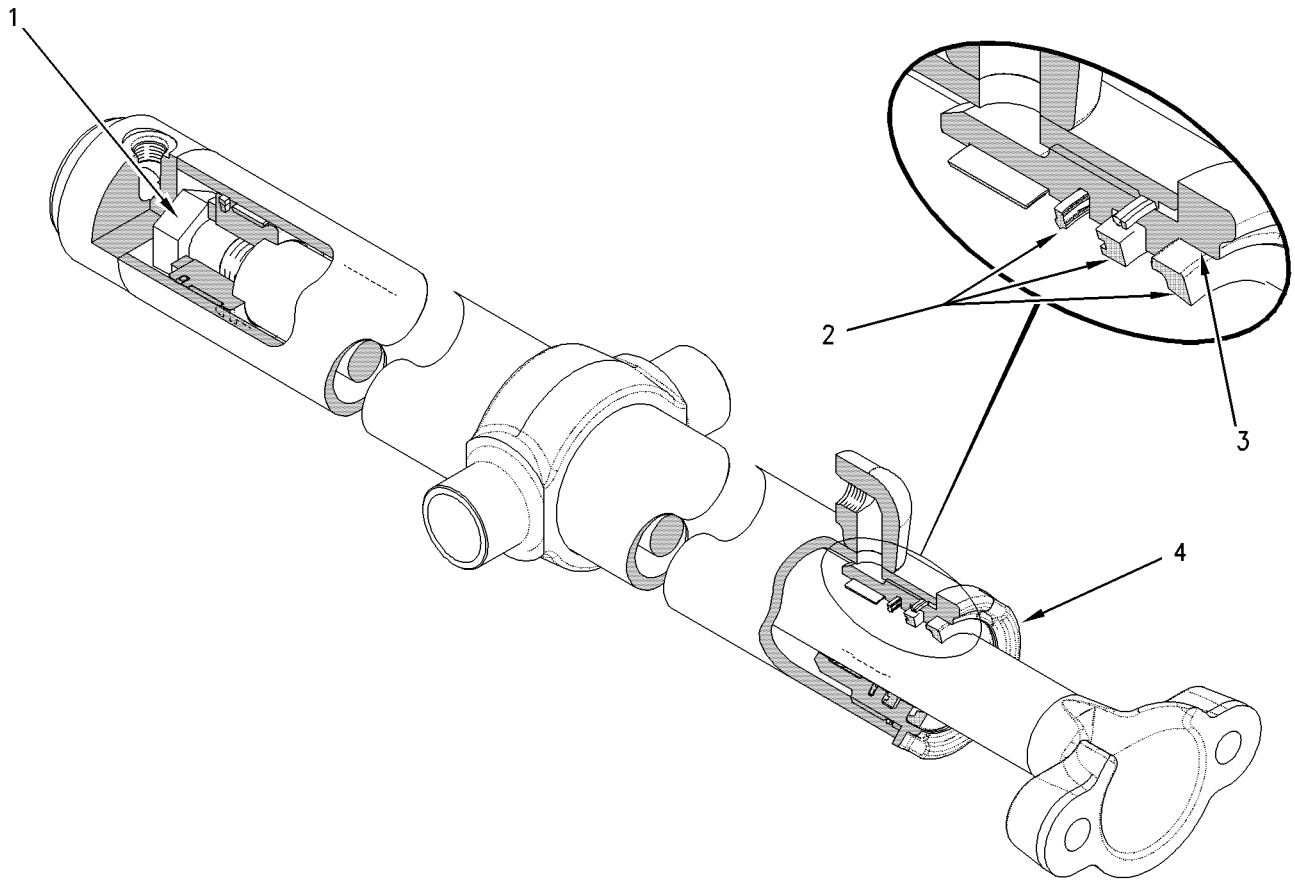

Illustration 230 g00931771

(1) Torque for bolt . . . . . 1800 ± 200 N·m ((1328 ± 148 lb ft))

(1) Use a 46 mm socket in order to remove the bolt.

(2) Lubricate sealing lips with a thin covering of the lubricant that is being sealed.

(3) Apply Tooling (D) to the seal groove prior to assembling the wiper seal.

(4) Torque for head . . . . . 600 ± 130 N·m ((440 ± 95 lb ft))

Note: Lubricate the threads with Tooling (E).

Installation Procedure

Table 18

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**

(continued)

(Table 18, contd)

A	311-1362	Vacuum Cap	1
G	183-3424	Grease Cartridge	1
H	1P-0510	Driver Gp	1

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.

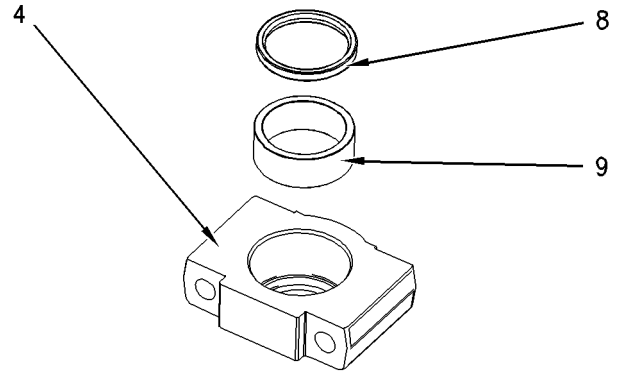

Illustration 231 g00931717

1. Use Tooling (H) (not shown) and a suitable press in order to install bearing (9) in cap assembly (4). Use Tooling (H) (not shown) in order to install seal (8) in cap assembly (4).

2. Repeat Step 1 for the remaining cap assembly.

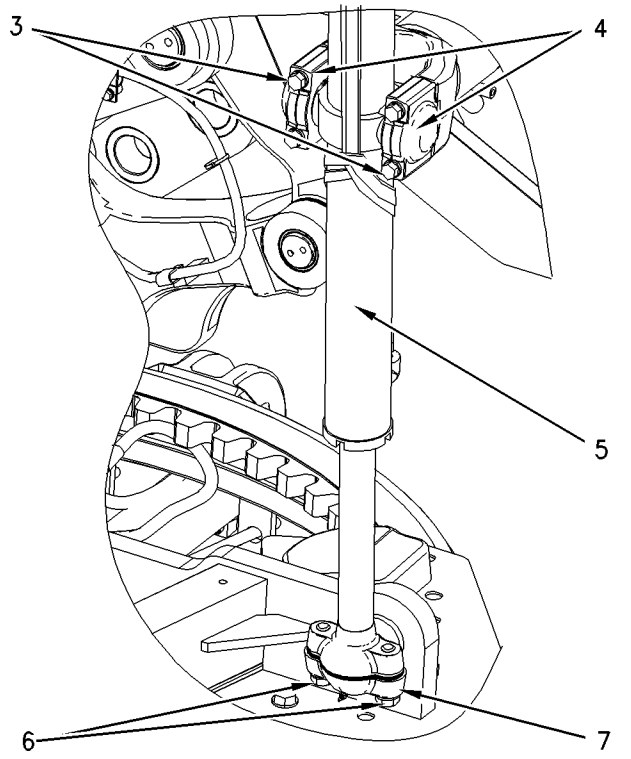

Illustration 232 g00931716

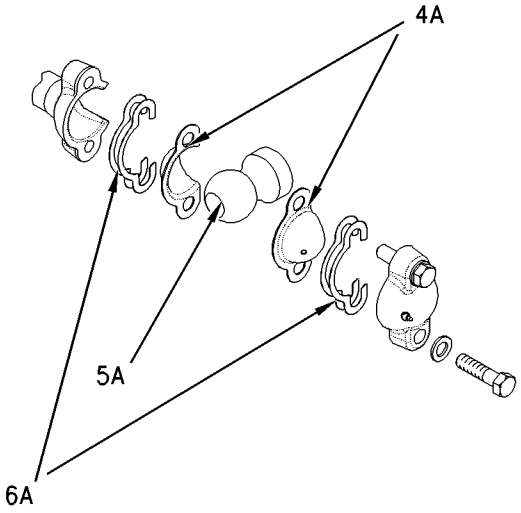

Illustration 233 g00931868

3. Install caps (4) on blade lift cylinder (5).

4. Attach a suitable lifting device to blade lift cylinder (5). The weight of blade lift cylinder (5) is approximately 102 kg (225 lb).

5. Position blade lift cylinder (5) on the machine. Install bolts (4).

6. Apply Tooling (G) between inserts (4A) and ball studs (5A). Install cap (7) and install bolts (6).

Note: As required, use shims (6A) in order to allow the socket to move freely around ball stud (5A). Assemble the same quantity of shims (6A) on both sides of ball stud (5A).

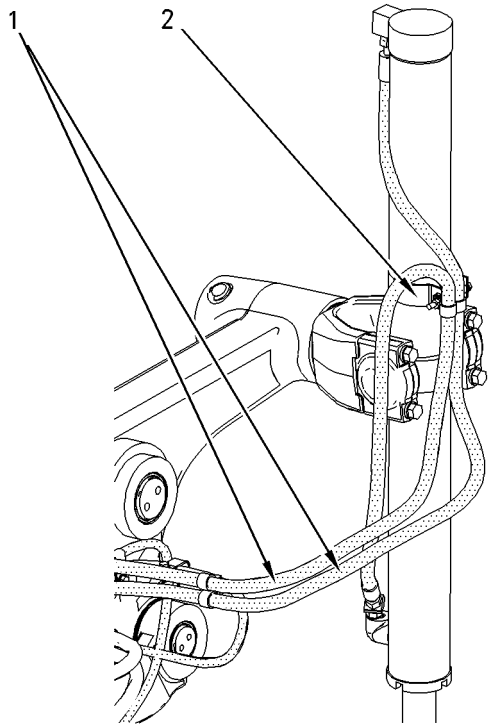

Illustration 234 g00931712

7. Install clamp (2). Connect hose assemblies (1).

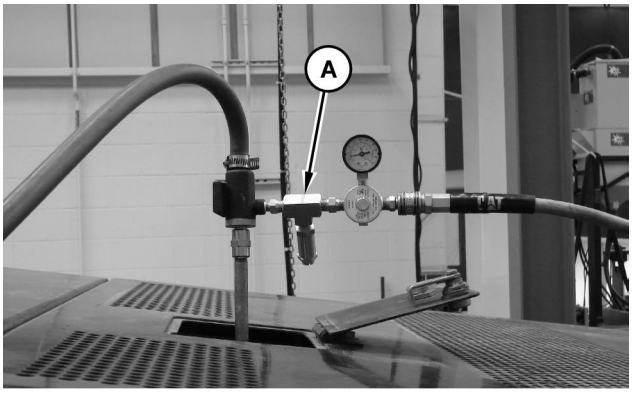

Illustration 235 g01368952

8. Remove Tooling (A).

9. Check the hydraulic oil level. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check” for the correct procedure.

i02659097

Sideshift Cylinder - Remove and Install

SMCS Code: 5804-010

Removal Procedure

Table 19

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

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.

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

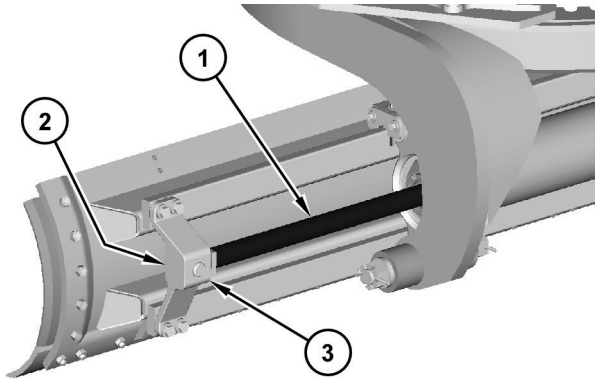

Illustration 236 g01342668

1. Extend side shift cylinder (1) to the left. Move the blade to the FORWARD position.

2. Remove pin (2). Remove bracket (3).

3. Retract side shift cylinder (1).

4. Release the pressure in the system. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

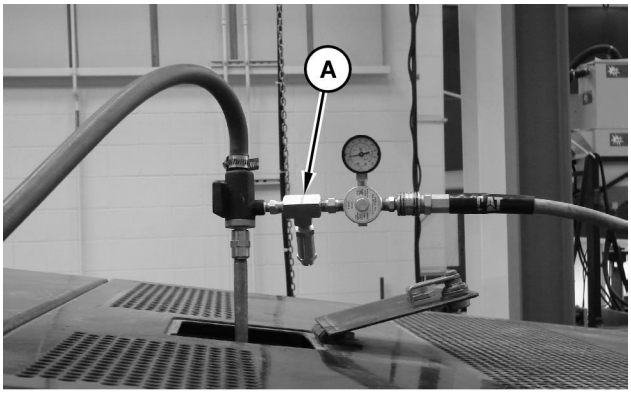

Illustration 237 g01368952

5. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

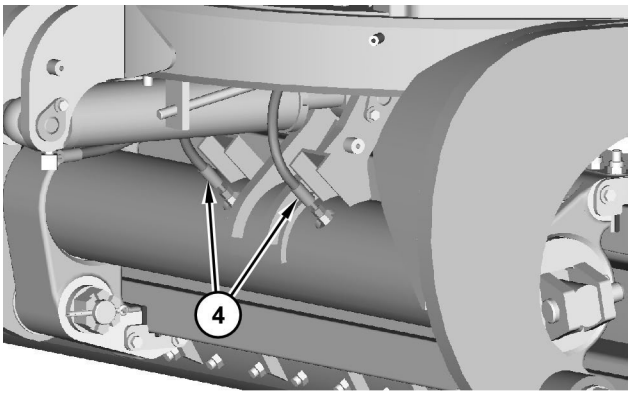

Illustration 238 g01342674

6. Disconnect hose assemblies (4).

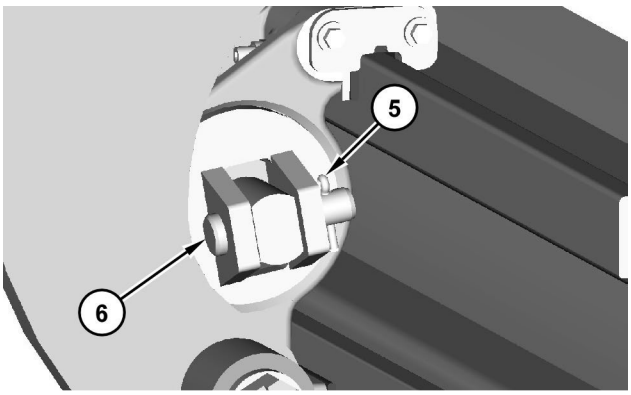

Illustration 239 g01342682

7. Remove cotter pin (5). Remove clevis (6).

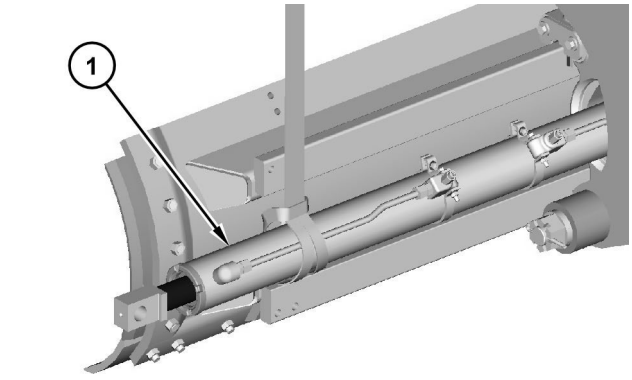

Illustration 240 g01342688

8. Attach a suitable lifting device to sideshift cylinder (1). The weight of sideshift cylinder (1) is approximately 113 kg (250 lb). Slide sideshift cylinder (1) to the left and remove sideshift cylinder (1).

Disassembly and Assembly Information

Table 20

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	127-4904	Hydraulic Cylinder Repair Stand	1
C	7M-7456	Bearing Mount Compound	1
D	1P-0808	Multipurpose Grease	1
E	195-4609	Seal Pick	1
F	9U-7868	Spanner Wrench	1
	127-8064	Adjustable Plate	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

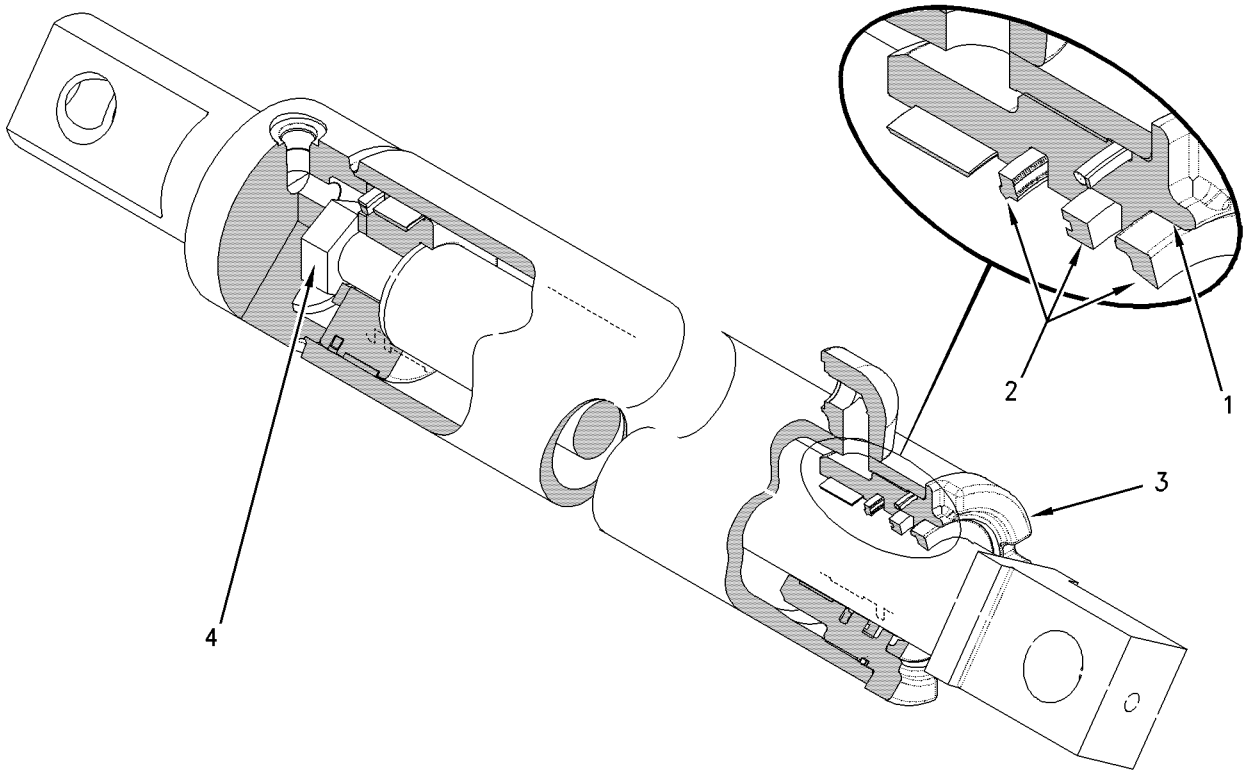

Illustration 241 g00933497

(1) Torque for bolt . . . . . 1800 ± 200 N·m ((1328 ± 148 lb ft))

(1) Apply Tooling (C) to the seal groove prior to assembling the wiper seal.

(2) Lubricate sealing lips with a thin covering of the lubricant that is being sealed.

(3) Torque for head . . . . . 600 ± 130 N·m ((440 ± 95 lb ft))

(4) Use a 46 mm socket to remove the bolt.

Note: Apply Tooling (D) to the threads.

Installation Procedure

Table 21

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

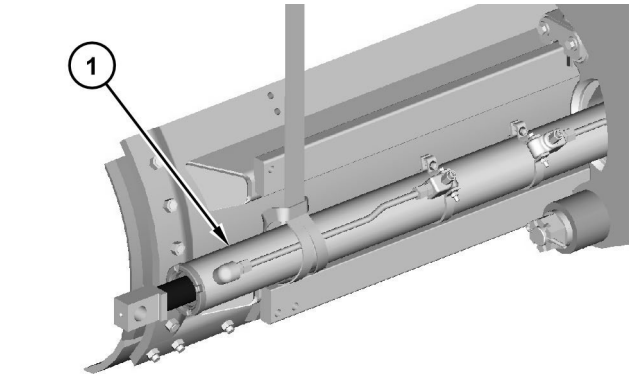

Illustration 242 g01342688

1. Use a suitable lifting device in order to install sideshift cylinder (1). The weight of sideshift cylinder (1) is approximately 113 kg (250 lb).

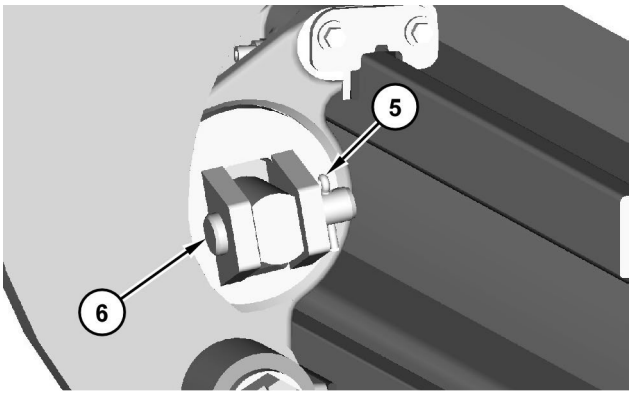

Illustration 243 g01342682

2. Install clevis (6). Install cotter pin (5).

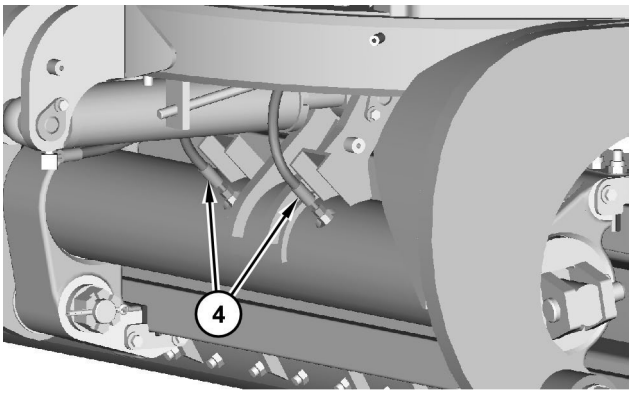

Illustration 244 g01342674

3. Connect hose assemblies (4).

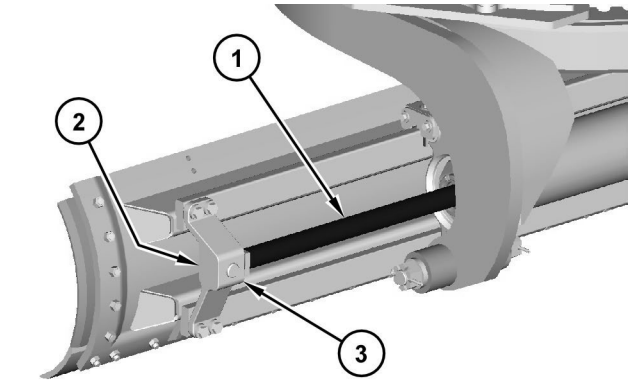

Illustration 245 g01342668

4. Extend side shift cylinder (1) to the left.

5. Install bracket (3). Align side shift cylinder (1) and install pin (2).

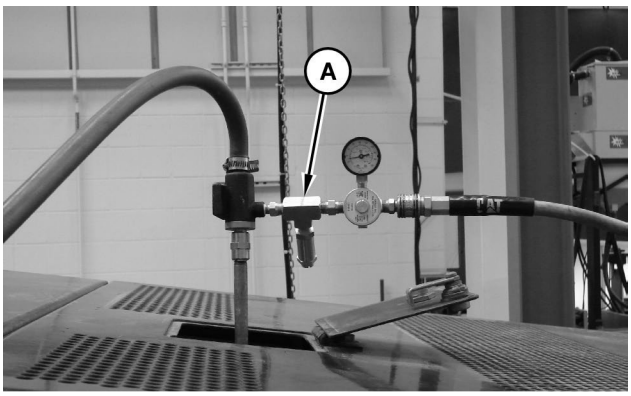

Illustration 246 g01368952

6. Remove Tooling (A).

7. Check the hydraulic oil level. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”.

i06051421

Centershift Cylinder - Remove and Install

SMCS Code: 5223-010

Removal Procedure

Table 22

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

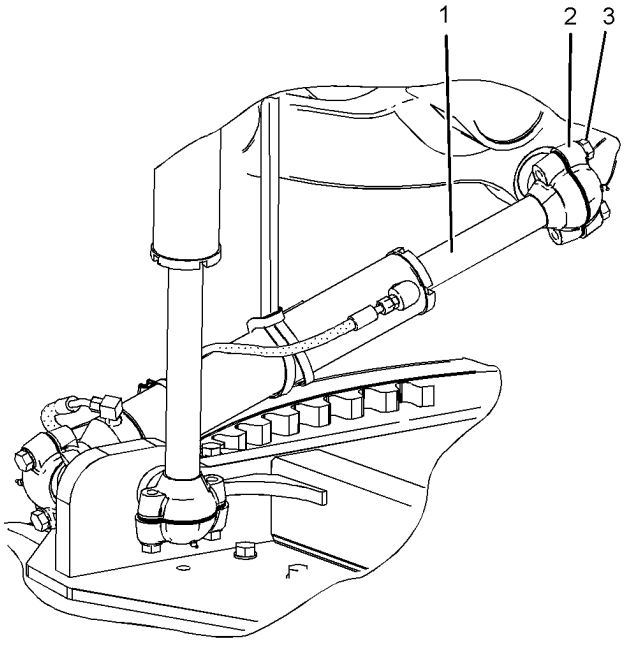

Illustration 247 g01071948

2. Attach a suitable lifting device to centershift cylinder (1). The weight of centershift cylinder (1) is approximately 68 kg (150 lb).

3. Remove bolts (3) and remove cap (2).

Note: Note the shims and inserts for installation purposes.

4. Start the engine and run the engine. Use the hydraulics on the machine in order to retract rod assembly (1).

5. Stop the engine. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

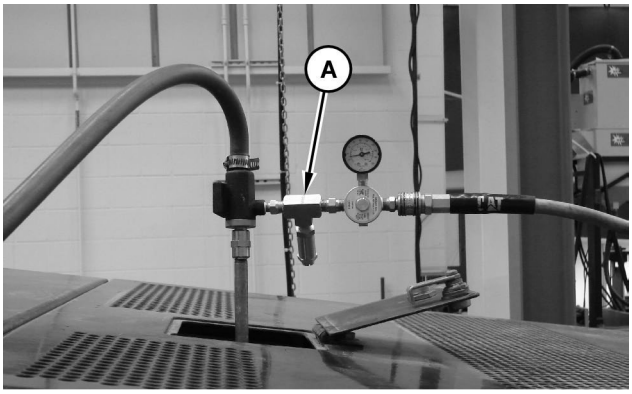

Illustration 248 g01368952

6. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

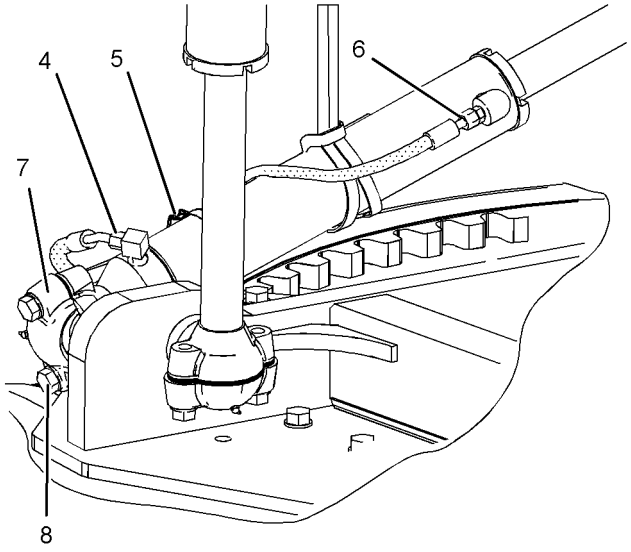

Illustration 249 g01077576

7. Disconnect hose assemblies (4) and (6).

8. Remove clamp (5).

9. Remove bolts (8) and remove cap (7).

Note: Note the shims and inserts for installation purposes.

10. Remove centershift cylinder (1).

Disassembly and Assembly Information

Table 23

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	195-4609	Seal Pick	1
C	7M-7456	Bearing Mount Compound	1
D	1P-0808	Multipurpose Grease	1
E	9U-7868	Spanner Wrench	1
	127-8064	Adjustable Plate	1
F	127-4904	Repair Stand	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

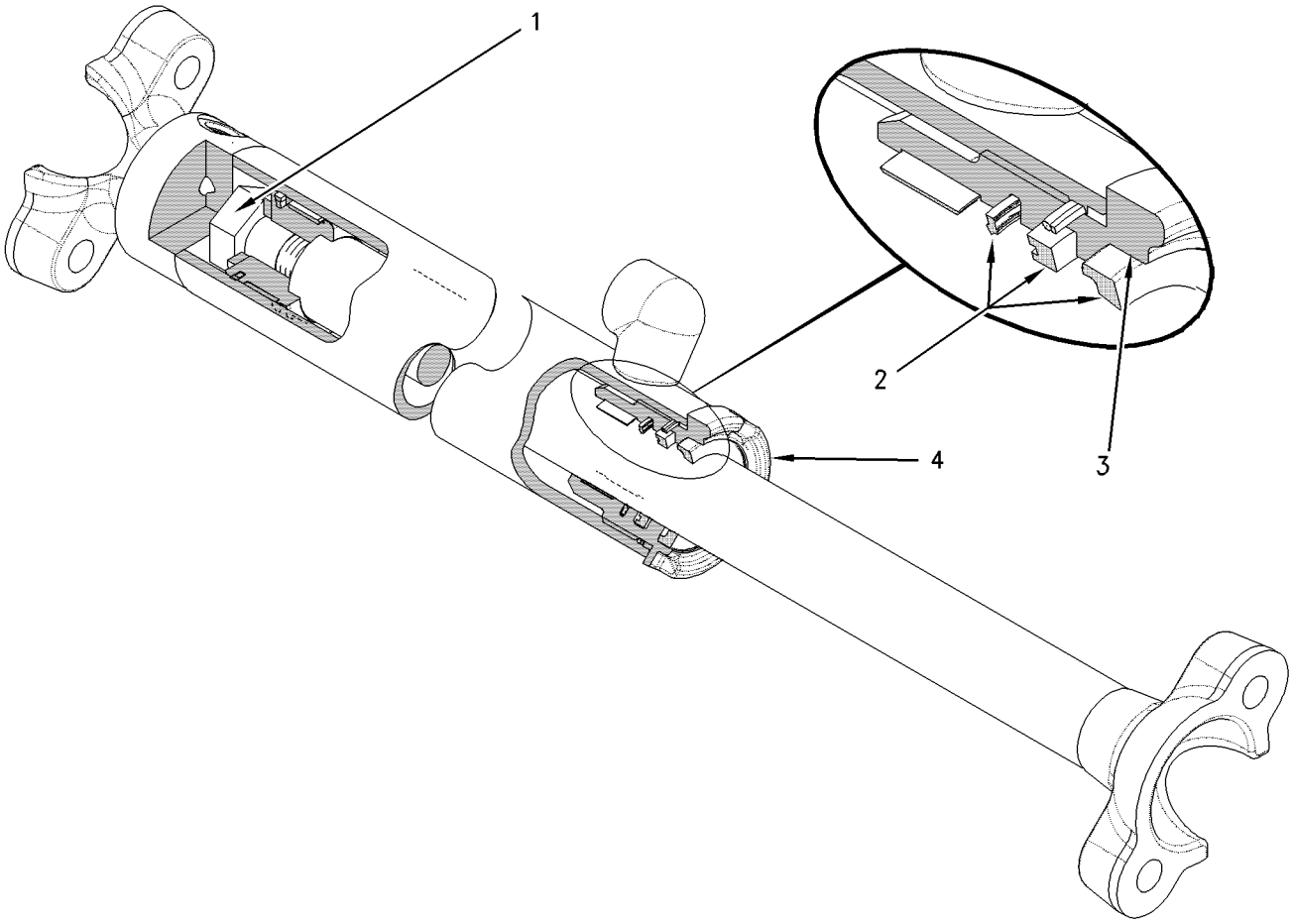

Illustration 250 g00932790

(1) Torque for bolt . . . . . 1800 ± 200 N·m ((1328 ± 148 lb ft))

(1) Use a 46 mm socket in order to remove the bolt.

(2) Lubricate sealing lips with a thin covering of the lubricant that is being sealed.

(3) Apply Tooling (C) to the seal groove prior to assembling the wiper seal.

(4) Torque for head . . . . . 600 ± 130 N·m ((440 ± 95 lb ft))

Note: Lubricate the threads with Tooling (D).

Installation Procedure

Table 24

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**

(continued)

(Table 24, contd)

A	311-1362	Vacuum Cap	1
G	183-3424	Grease Cartridge	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

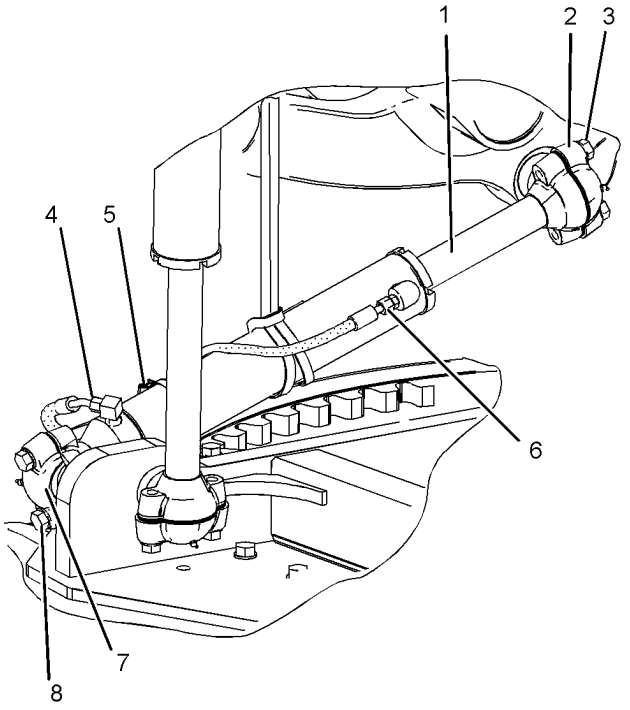

Illustration 251 g01077603

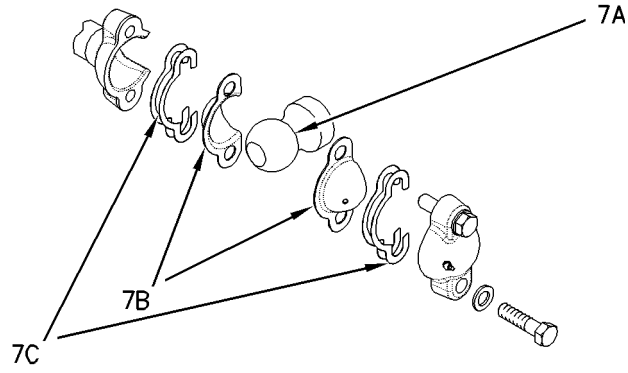

Illustration 252 g03791284

1. Attach a suitable lifting device to centershift cylinder (1). The weight of blade lift cylinder (1) is approximately 68 kg (150 lb).
2. Position centershift cylinder (1) on the machine.
3. Apply Tooling (G) between inserts (7B) and ball studs (7A). Install cap (7) and install bolts (8).

Note: As required, use shims (7C) in order to allow the socket to move freely around ball stud (7A). Assemble the same quantity of shims (7C) on both sides of ball stud (7A).

4. Connect hose assemblies (4) and (6). Install clamp (5).
5. Start the engine and run the engine. Use the hydraulics on the machine in order to extend rod assembly (1).
6. Stop the engine.
7. Apply Tooling (G) between inserts (2B) and ball studs (2A). Install cap (2) and install bolts (3).

Note: As required, use shims (2C) in order to allow the socket to move freely around ball stud (2A). Assemble the same quantity of shims (2C) on both sides of ball stud (2A).

8. Remove the suitable lifting device from centershift cylinder (1).

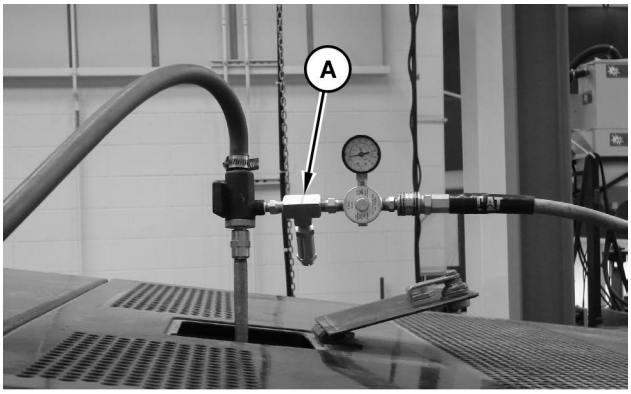

Illustration 253 g01368952

9. Remove Tooling (A).
10. Check the hydraulic oil level. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”.

i02659117

Blade Tip Cylinder - Remove and Install

SMCS Code: 5106-010-BG

Removal Procedure

Table 25

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

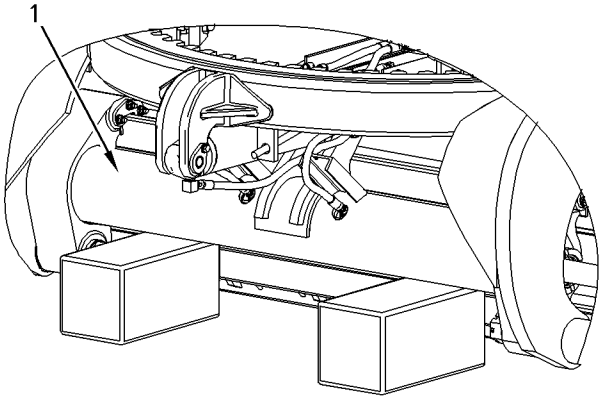

Illustration 254 g00938374

1. Lower blade (1) to the ground. Retract the blade tip cylinder. Place suitable blocking under blade (1) for support.

2. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

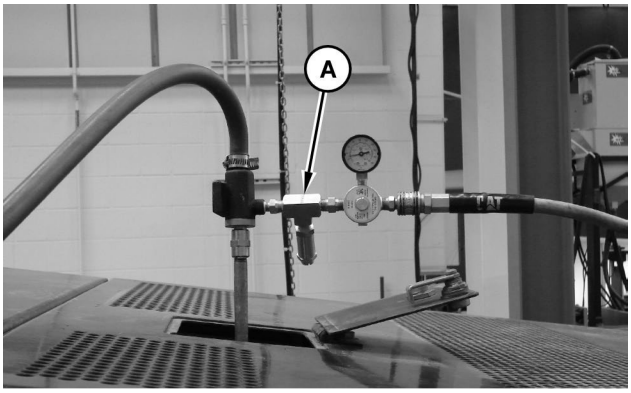

Illustration 255 g01368952

3. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

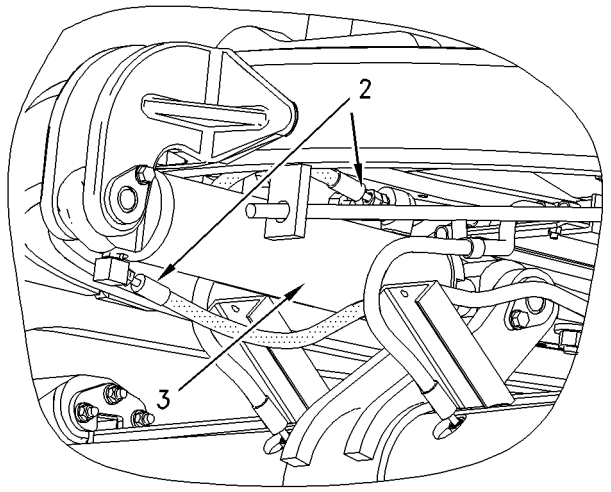

Illustration 256 g00938375

4. Disconnect hose assemblies (2) from blade tip cylinder (3).

5. Attach a suitable lifting device to blade tip cylinder (3). The weight of blade tip cylinder (3) is approximately 40 kg (88 lb).

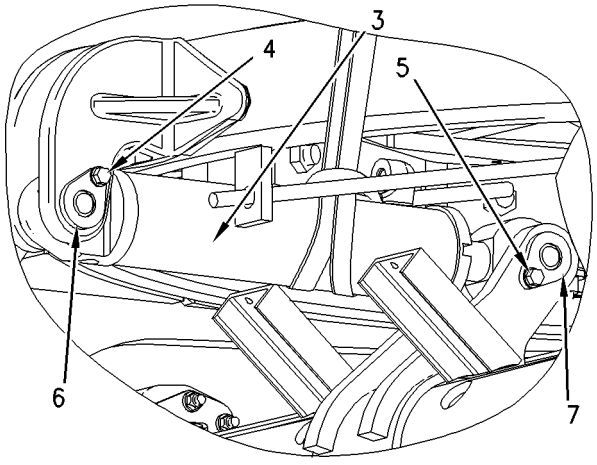

Illustration 257 g00938382

6. Remove bolts (4) and (5). Remove pins (6) and (7). Remove blade tip cylinder (3).

Disassembly and Assembly Information

Table 26

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	127-4904	Repair Stand	1
C	7M-7456	Bearing Mount Compound	1
D	195-4609	Seal Pick	1
E	9U-7868	Spanner Wrench	1
	127-8064	Adjustable Plate	1
F	4C-9633	Puller Stud	1
	1A-1935	Full Nut	1
	6V-3160	Double Acting Cylinder	1
	FT-2802	Puller Plates	1
	1P-0766	Seal Guide	1
	3S-6224	Electric Hydraulic Pump Gp	1
	9S-8536	Ring	1
G	1P-0808	Multipurpose Grease	1
H	1P-0510	Driver Gp	1

WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

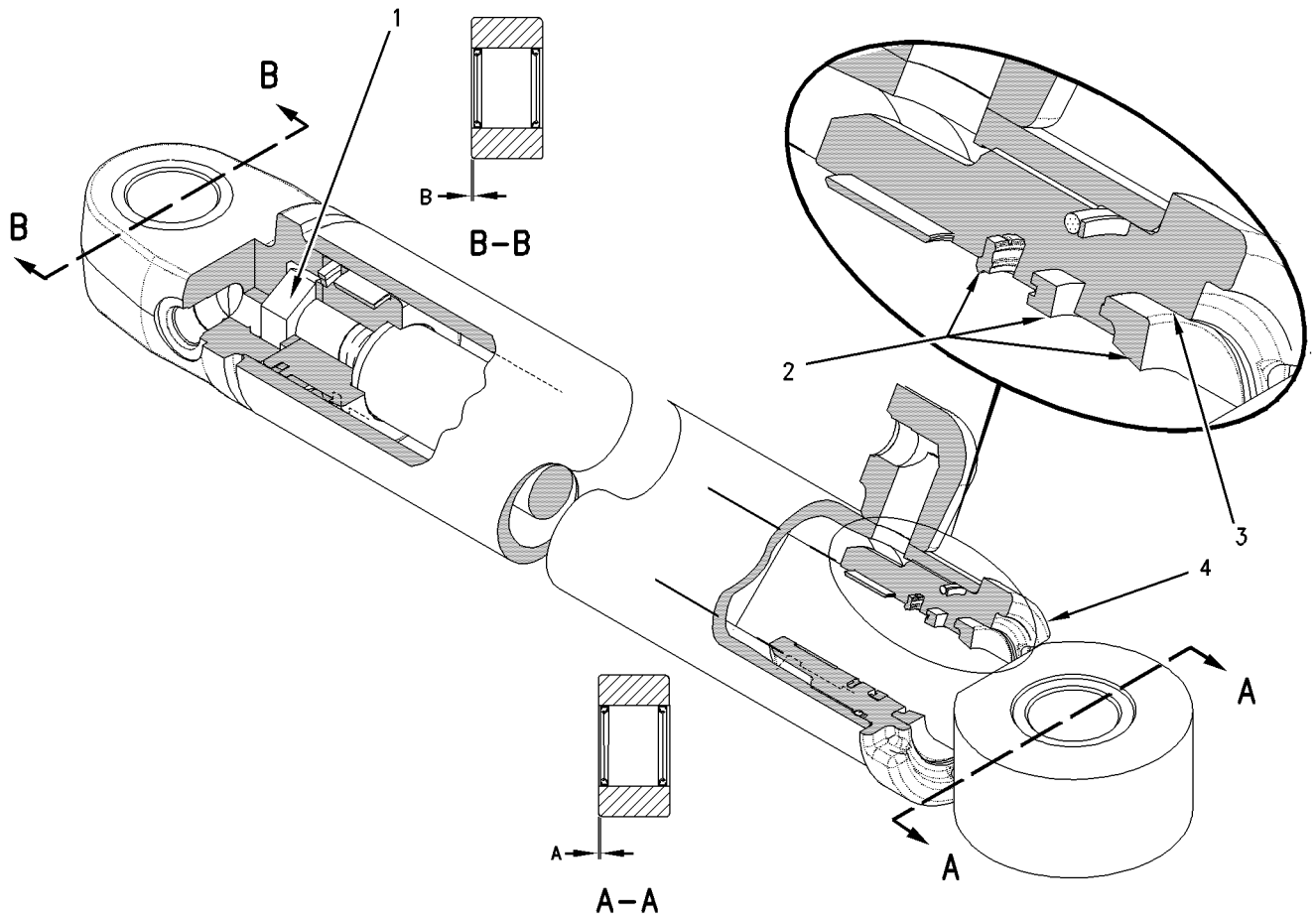

Illustration 258 g00932574

(1) Torque for bolt . . . . . 1800 ± 200 N·m ((1328 ± 148 lb ft))

(2) Lubricate sealing lips with a thin covering of the lubricant that is being sealed.

(3) Apply Tooling (C) to the seal groove prior to assembling the wiper seal.

(4) Torque for head . . . . . 600 ± 130 N·m ((440 ± 95 lb ft))

Note: Lubricate the threads with Tooling (G).

(A) Depth of bearing below face . . . . . .17.5 ± 0.5 mm ((0.69 ± 0.02 inch))

(B) Depth of bearing below face . . . . . .11.2 ± 0.5 mm ((0.44 ± 0.02 inch))

Installation Procedure

Table 27

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

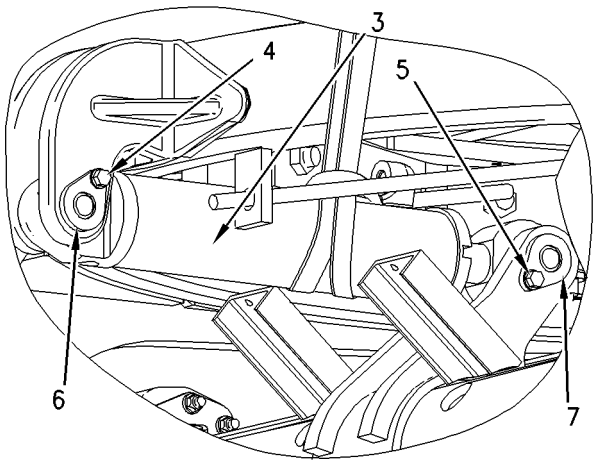

Illustration 259 g00938382

1. Attach a suitable lifting device to blade tip cylinder (3). The weight of blade tip cylinder (3) is approximately 40 kg (88 lb). Install blade tip cylinder (3). Install pins (6) and (7). Install bolts (4) and (5).

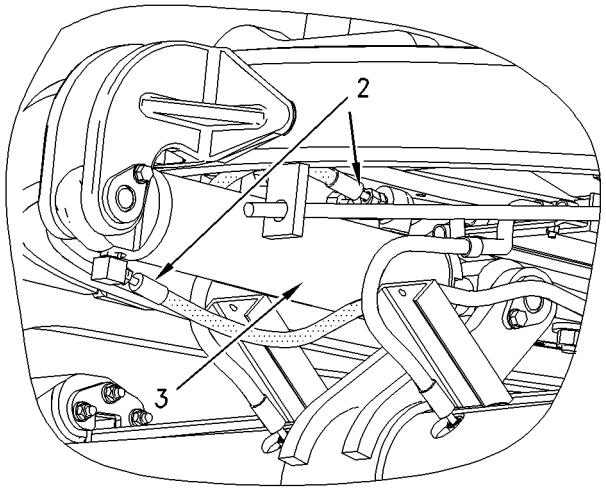

Illustration 260 g00938375

2. Connect hose assemblies (2) on blade tip cylinder (3).

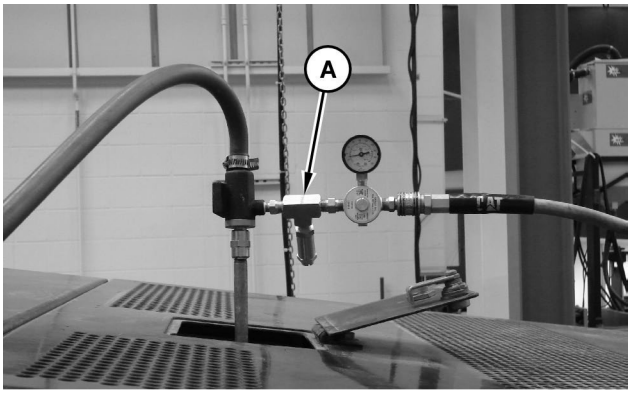

Illustration 261 g01368952

3. Remove Tooling (A).

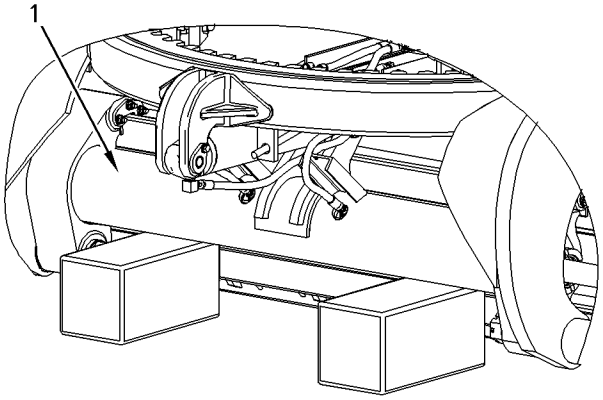

Illustration 262 g00938374

4. Raise blade (1). Remove the suitable blocking from blade (1).

5. Check the hydraulic oil level. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”.

i05772721

Blade - Remove and Install

SMCS Code: 6060-010

Removal Procedure

Table 28

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	138-7575	Link Bracket	1
B	1u-9200	Lever Puller Hoist	1
C	140-7742	Sleeve	2

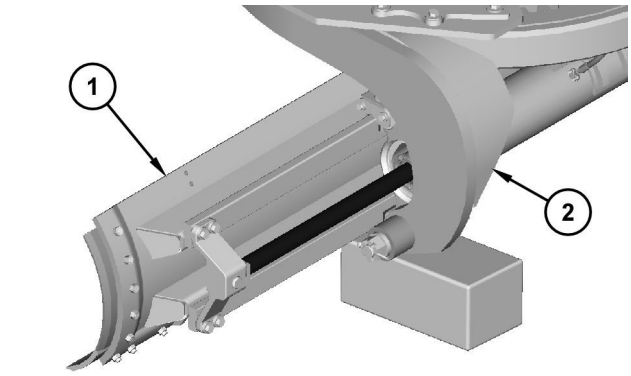

Illustration 263 g01340852

1. Raise blade assembly (1). Use suitable blocking in order to support blade assembly (1) and circle assembly (2) on both sides.

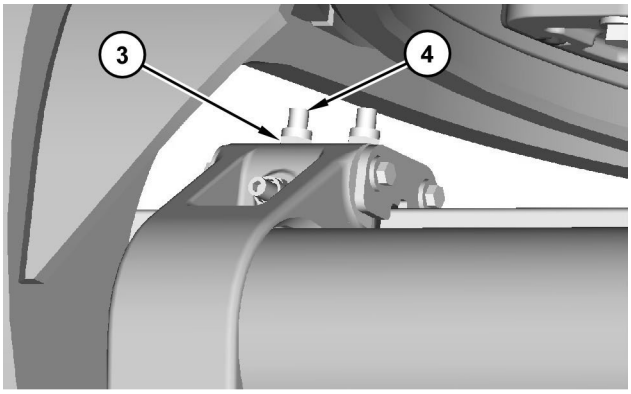

Illustration 264 g01340956

2. Loosen locknuts (3). Loosen setscrews (4). Repeat this step for the opposite side.

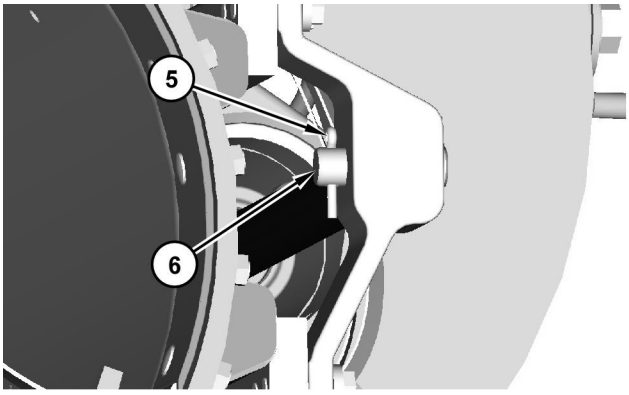

Illustration 265 g01340856

3. Remove cotter pin (5). Remove pin (6).

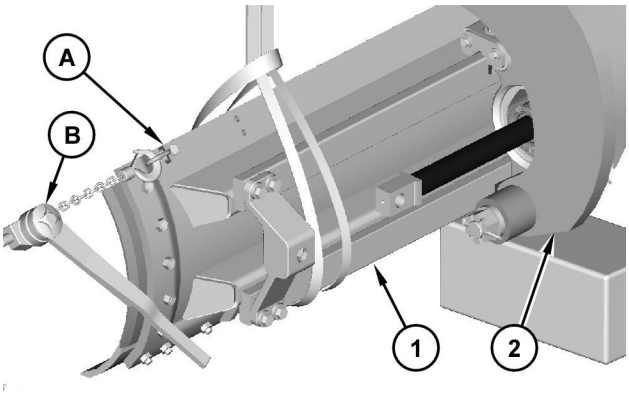

Illustration 266 g01340967

4. Use Tooling (A), Tooling (B), Tooling (C), and a suitable lifting device in order to pull blade assembly (1) from circle assembly (2).

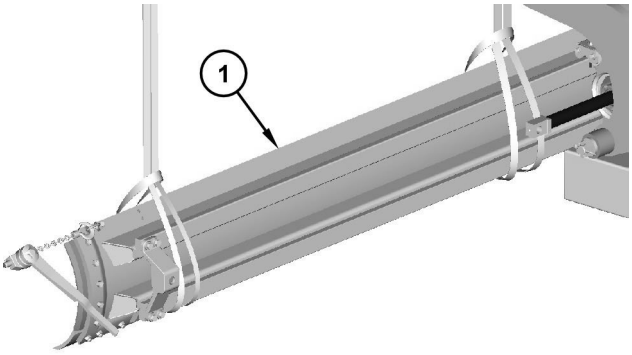

Illustration 267 g01340969

5. Attach Tooling (C) and an additional suitable lifting device onto blade assembly (1). Remove blade assembly (1). The weight of blade assembly (1) is approximately 1492 kg (3289 lb).

6. If necessary, remove the wear strips. Refer to Operation and Maintenance Manual, “Moldboard Wear Strip - Inspect/Adjust/Replace” for the removal procedure.

Installation Procedure

Table 29

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	138-7575	Link Bracket	1
B	1u-9200	Lever Puller Hoist	1
C	140-7742	Sleeve	2

1. If necessary, install the wear strips. Refer to Operation and Maintenance Manual, “Moldboard Wear Strip - Inspect/Adjust/Replace” for the installation and adjustment procedures.

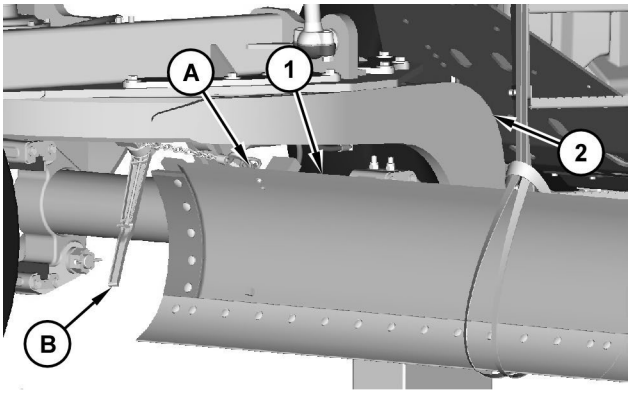

Illustration 268 g01341018

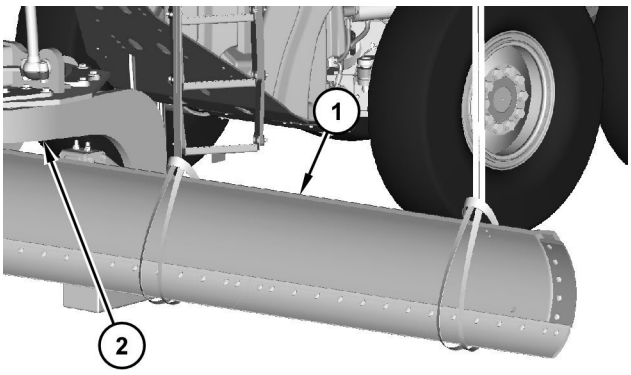

Illustration 269 g01341025

2. Use Tooling (A), Tooling (B), Tooling (C), and two suitable lifting devices in order to position blade assembly (1) onto circle assembly (2). The weight of blade assembly (1) is approximately 1492 kg (3289 lb).

3. Use Tooling (A) and Tooling (B) in order to pull blade assembly (1) into position.

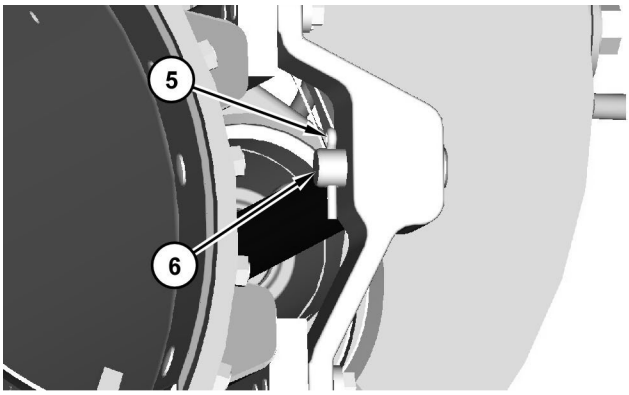

Illustration 270 g01340856

4. Install pin (6). Install cotter pin (5).

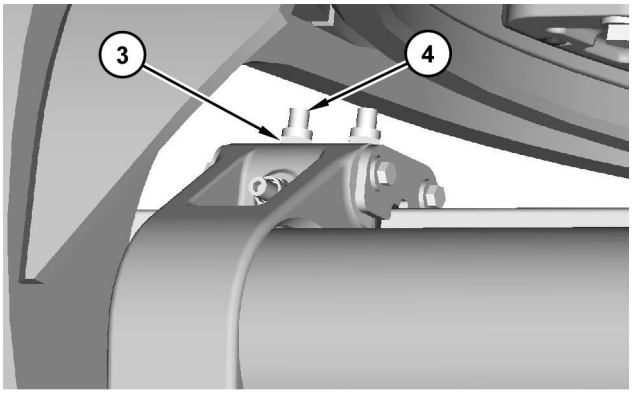

Illustration 271 g01340956

5. Tighten setscrews (4) and locknuts (3) in order to obtain a clearance of 0.13 to 0.89 mm (0.005 to 0.035 inch) between the rails and the wear strips. In order to achieve the minimum clearance, sideshift the blade assembly through the full range.

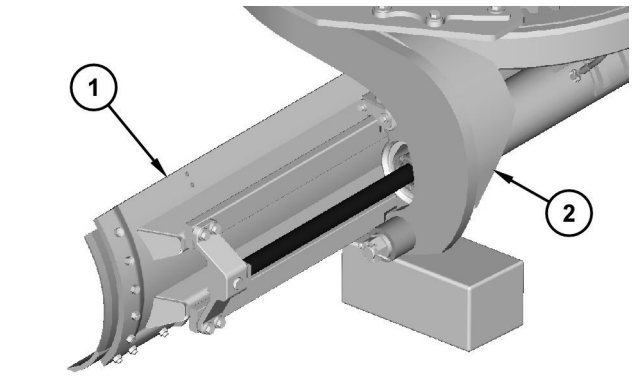

Illustration 272 g01340852

6. Remove the suitable blocking from blade assembly (1) and circle assembly (2). Lower blade assembly (1).

i02758775

Circle - Remove

SMCS Code: 6154-011

Removal Procedure

Table 30

Required Tools			
Tool	Part Number	Part Description	Qty

(continued)

(Table 30, contd)

A	8S-7630	Stand	1
	8S-7621	Tube	1
	8S-7615	Pin	1
	8S-8048	Saddle	1
B	138-7575	Link Bracket	1
C	9U-6600	Hand Hydraulic Pump	1
	9S-8536	Sleeve	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	1P-1835	Bearing Puller Adapter	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1
D	140-7742	Sleeve	2

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

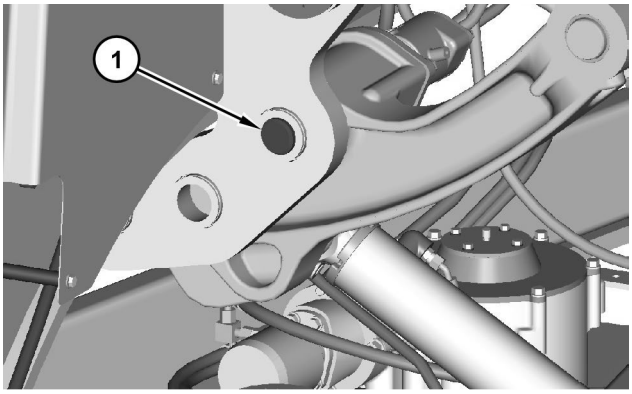

Illustration 273 g01381247

1. Start the engine and run the engine. Operate the machine in order to locate centershift lock pin (1) in the last position on the right hand side of the machine.

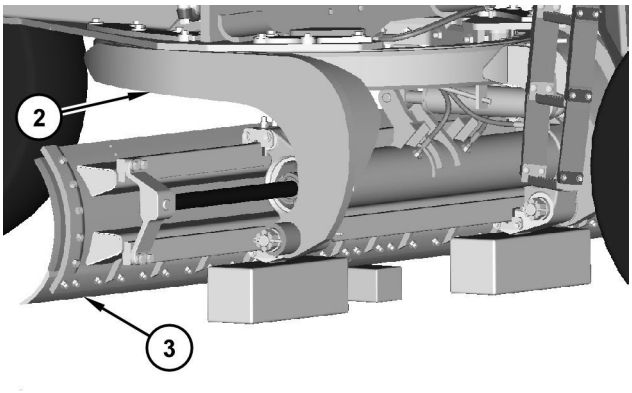

Illustration 274 g01341892

2. Extend blade assembly (3) toward the front of the machine. Rotate circle (2) in order to position blade (3) near the front wheel. Place suitable blocking under circle (2) and blade assembly (3).

3. Stop the engine and release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

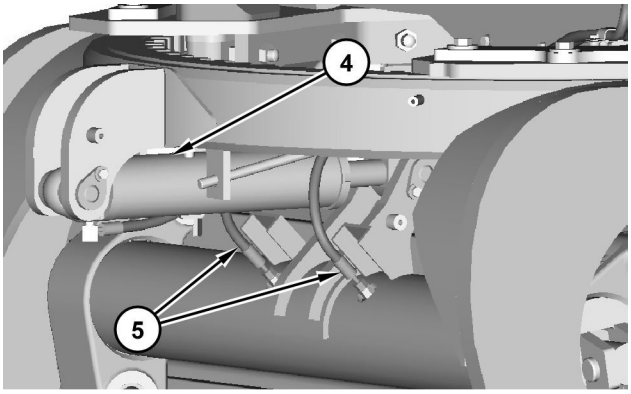

Illustration 275 g01341901

4. Remove blade tip cylinder (4). Refer to Disassembly and Assembly, “Blade Tip Cylinder - Remove and Install”. Disconnect hose assemblies (5).

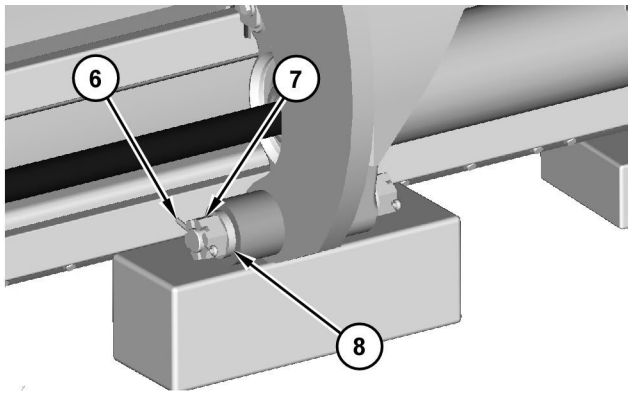

Illustration 276 g01341906

5. Remove cotter pin (6). Remove nut (7) and washers (8).

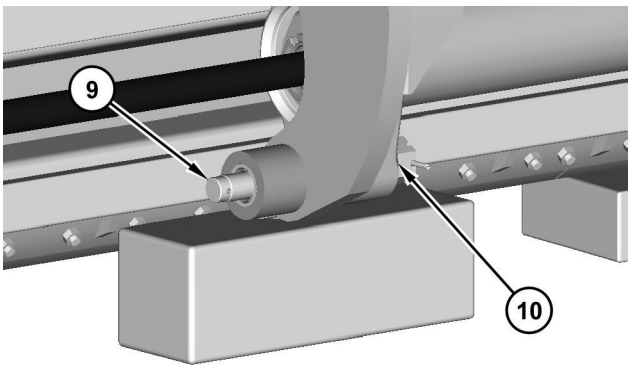

Illustration 277 g01341910

6. Remove pin (9) and washer (10).

7. Repeat Steps 5 through 6 for the opposite side.

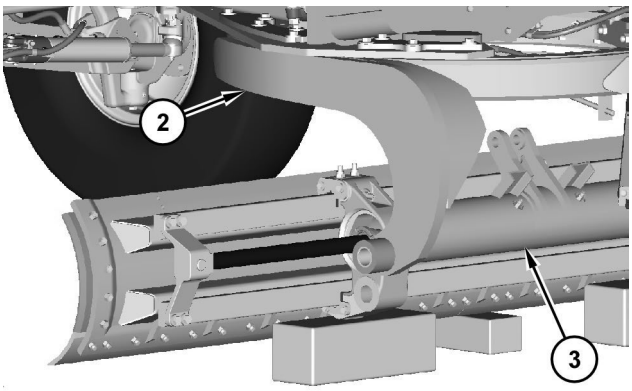

Illustration 278 g01341912

8. Support blade assembly (3) in order to prevent blade assembly (3) from tipping. Start the engine and run the engine. Operate the machine in order to move circle (2) away from blade assembly (3).

9. Stop the engine.

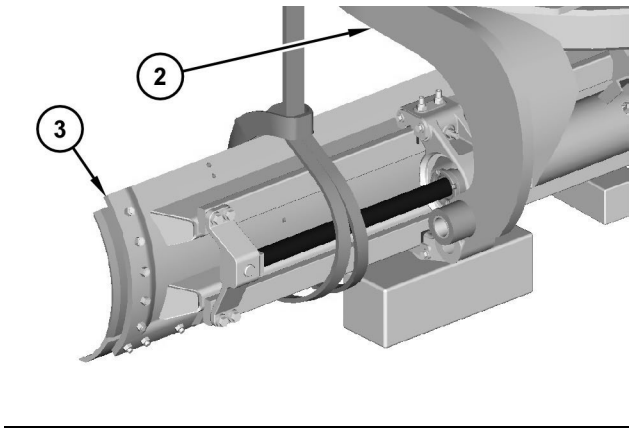

Illustration 279 g01341921

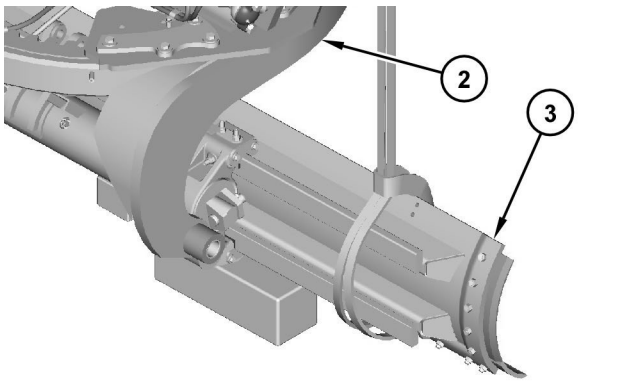

Illustration 280 g01341923

10. Use Tooling (D) and two suitable lifting devices in order to move blade assembly (3) forward. The weight of blade assembly (3) is approximately 2109 kg (4650 lb).

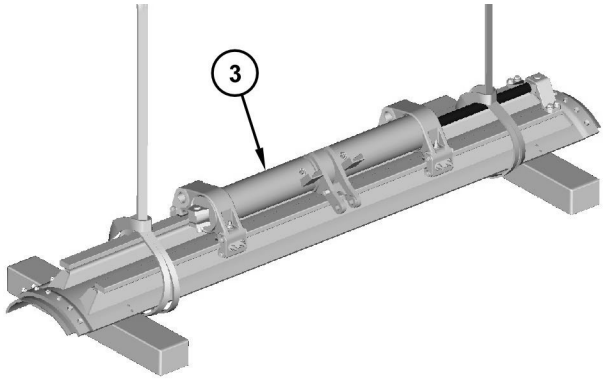

Illustration 281 g01342101

11. Remove blade assembly (3) and position blade assembly (3) onto suitable blocking.

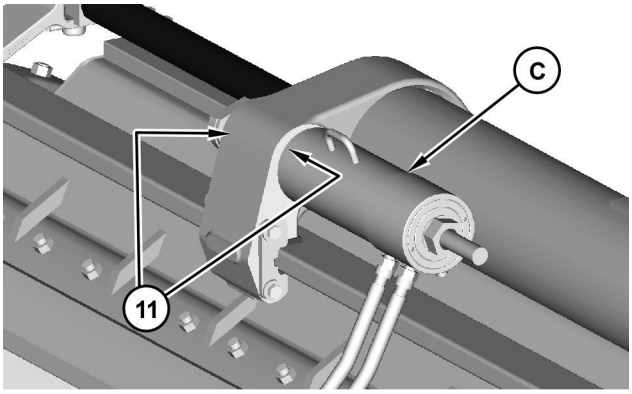

Illustration 282 g01342102

12. Use Tooling (C) in order to remove bearings (11). Repeat this step for the remaining bearings (11).

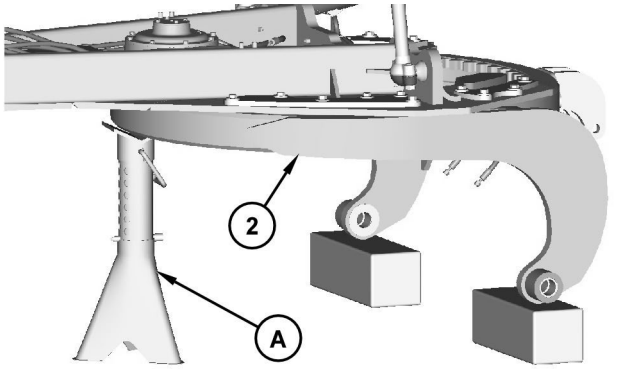

Illustration 283 g01341930

13. Start the engine and run the engine. Operate the machine in order to lower circle (2) on suitable blocking and Tooling (A).

14. Stop the engine and release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

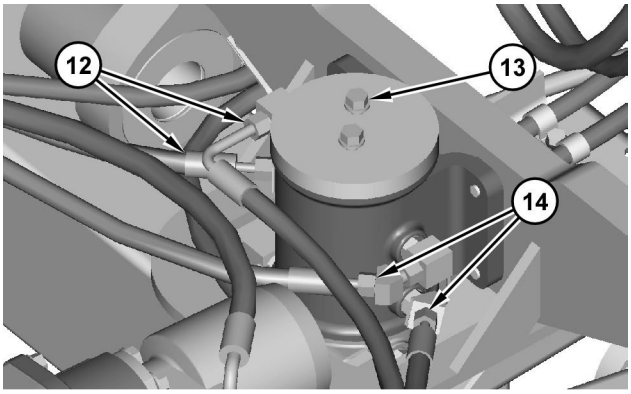

Illustration 284 g01341932

15. Disconnect hose assemblies (12). Disconnect hose assemblies (14). Remove bolt (13).

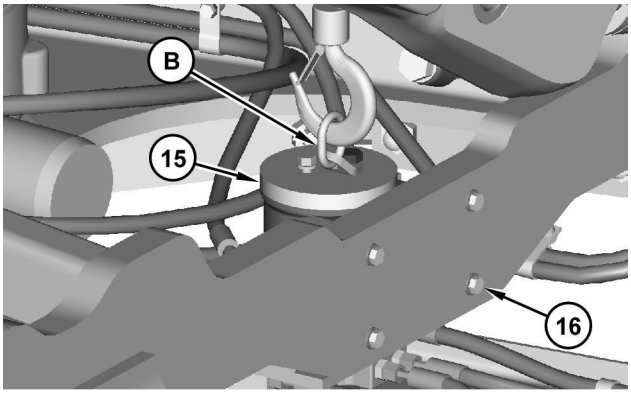

Illustration 285 g01341938

16. Attach Tooling (B) and a suitable lifting device onto swivel (15). The weight of swivel (15) is approximately 41 kg (90 lb).

17. Remove bolts (16) and position swivel (15) out of the way.

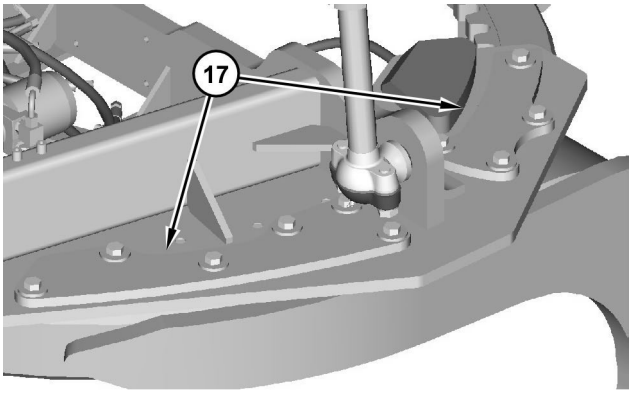

Illustration 286 g01341968

18. Remove plates (17).

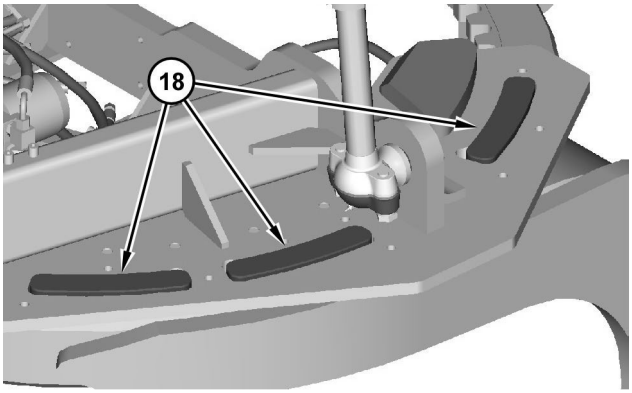

Illustration 287 g01341971

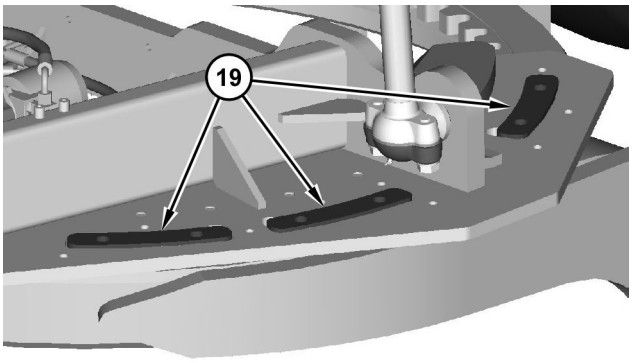

Illustration 288 g01342259

19. Remove shims (18) and wear pads (19).

Note: Note the quantity and the order of shims (18) and wear pads (19) for installation purposes.

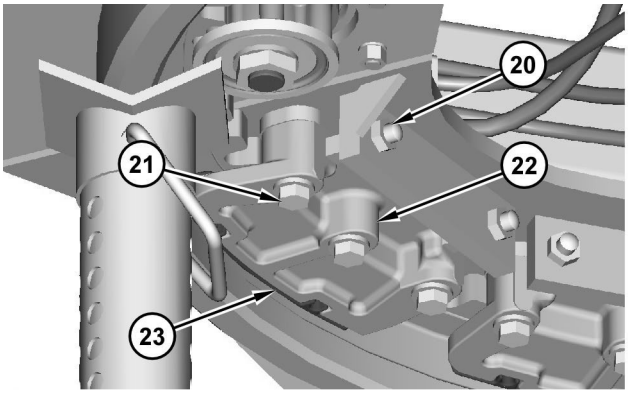

Illustration 289 g01341940

20. Loosen nuts (20). Remove bolts (21). Remove shoes (22) and wear pads (23).

Note: Note the quantity, the order, and the location of shoes (22), and wear pads (23) for installation purposes.

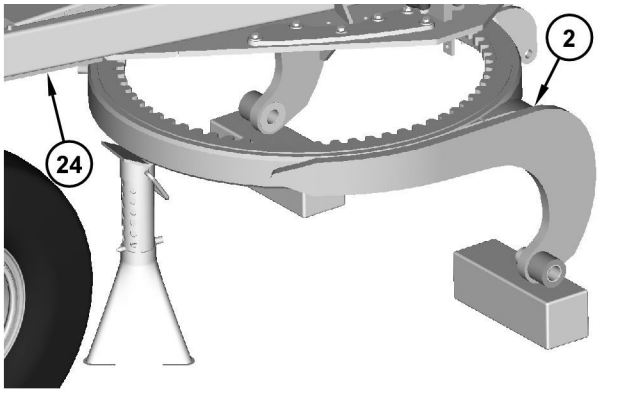

Illustration 290 g01341960

21. Start the engine and run the engine. Use the machine systems in order to separate drawbar (24) from circle (2). The weight of circle (2) is approximately 1179 kg (2600 lb). Stop the engine.

22. Remove circle (2).

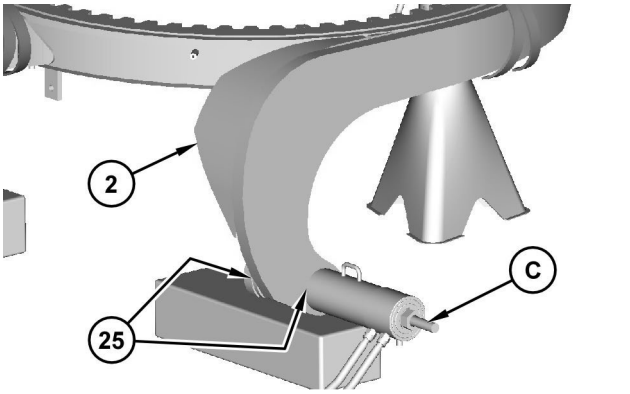

Illustration 291 g01342137

23. Use Tooling (C) in order to remove bearings (25) from circle (2). Repeat this step for the remaining bearings (25).

i03685623

Circle - Install

SMCS Code: 6154-012

Installation Procedure

Table 31

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-7630	Stand	1
	8S-7621	Tube	1
	8S-7615	Pin	1
	8S-8048	Saddle	1
B	138-7575	Link Bracket	1
D	140-7742	Sleeve	2
E	9U-6600	Hand Hydraulic Pump	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	1P-1835	Bearing Puller Adapter	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

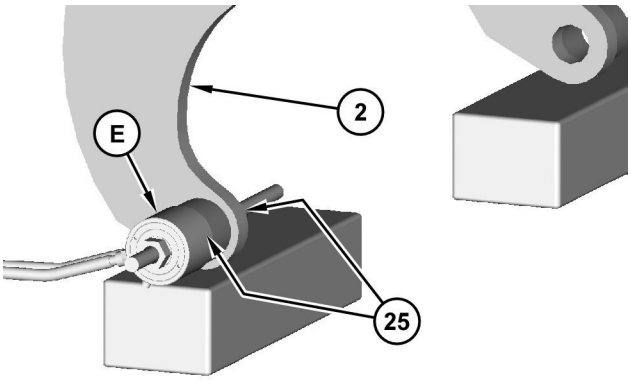

Illustration 292 g01342152

1. Use Tooling (E) in order to install bearings (25) into circle (2). Repeat this step for the remaining bearings (25).

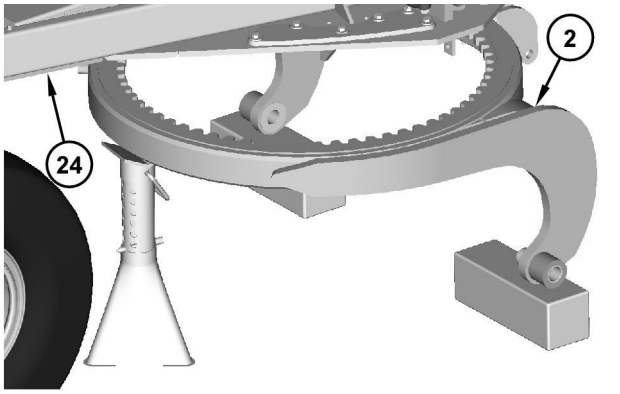

Illustration 293 g01341960

2. Clean the dirt and the grease from the circle drive pinion. Position circle (2) under drawbar (24). Start the engine and run the engine. Use the machine systems in order to position drawbar (24) onto circle (2). Stop the engine.

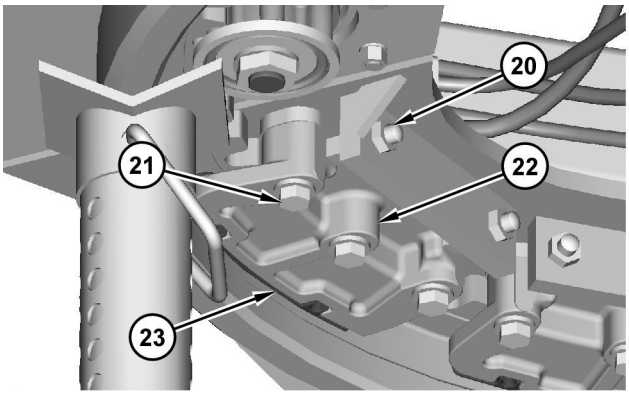

Illustration 294 g01341940

3. Install wear pads (23) and shoes (22). Install bolts (21). Tighten nuts (20).

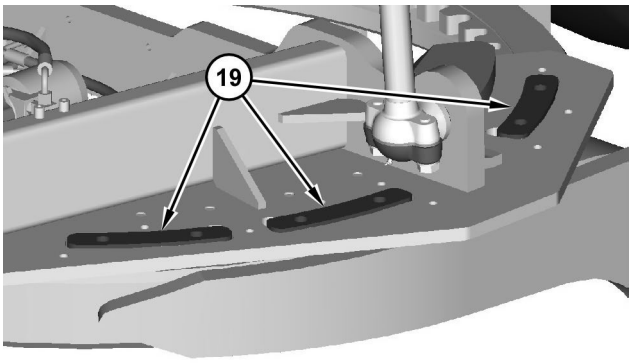

Illustration 295 g01342259

4. Install wear pads (19).

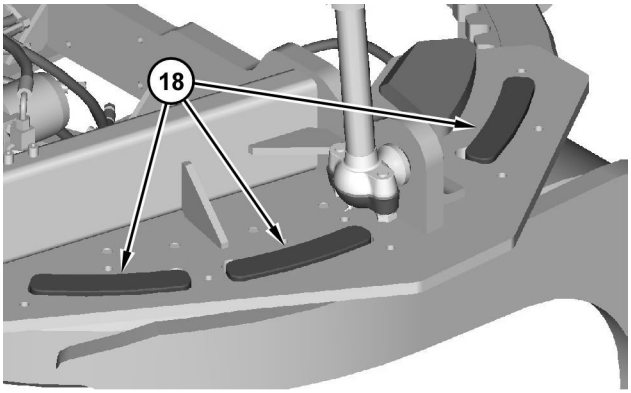

Illustration 296 g01341971

5. Install shims (18).

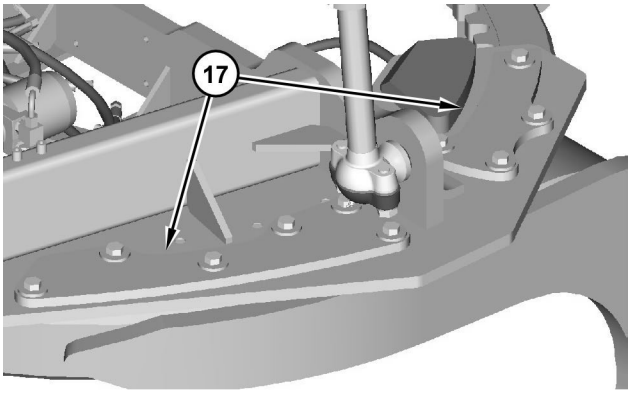

Illustration 297 g01341968

6. Install plates (17).

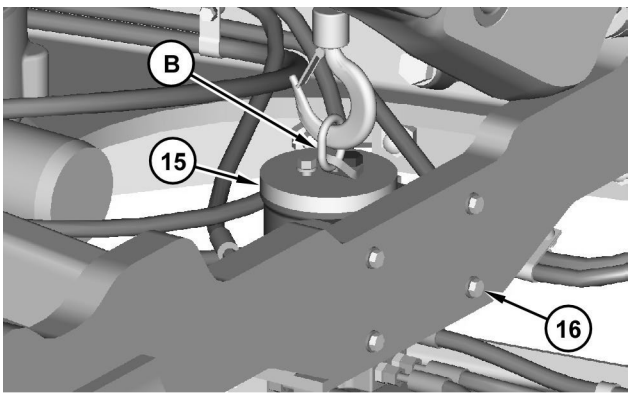

Illustration 298 g01341938

7. Use Tooling (B) and a suitable lifting device in order to position swivel (15). The weight of swivel (15) is approximately 41 kg (90 lb).

8. Install bolts (16).

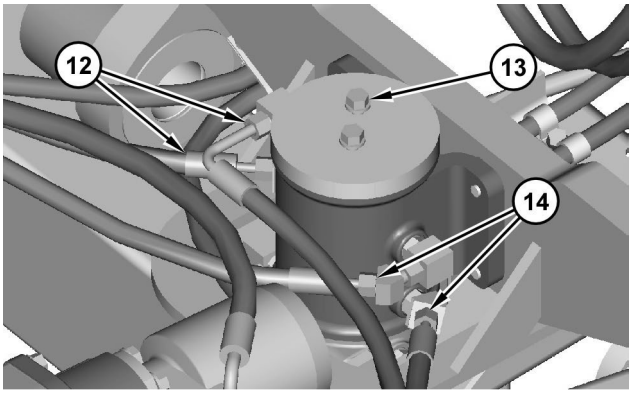

Illustration 299 g01341932

9. Install bolt (13). Connect hose assemblies (14). Connect hose assemblies (12).

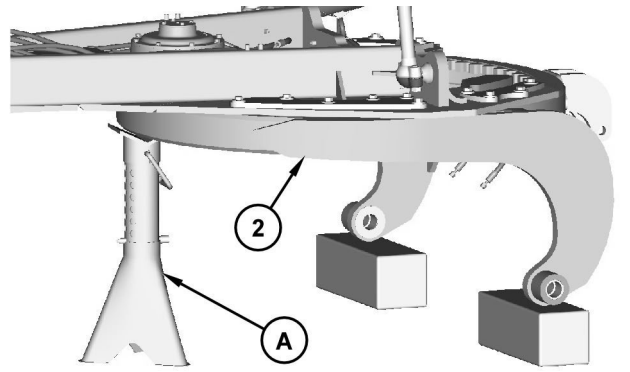

Illustration 300 g01341930

10. Start the engine and run the engine. Operate the machine in order to raise circle (2) and remove Tooling (A). The weight of circle (2) is approximately 1179 kg (2600 lb).

11. Stop the engine and release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

12. Check and adjust the clearances on the circle and the drawbar. Refer to Operation and Maintenance Manual, “Circle Clearances - Check/ Adjust”.

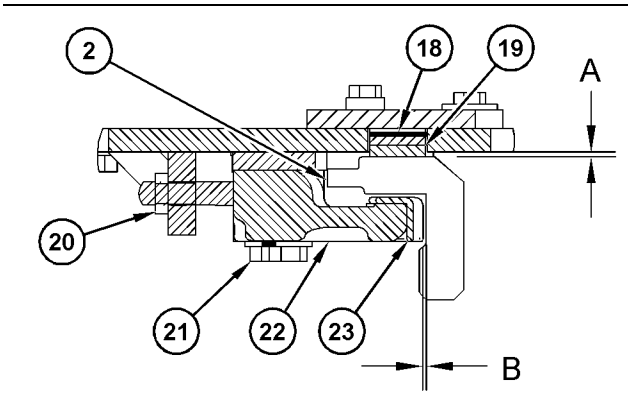

Illustration 301 g01342178

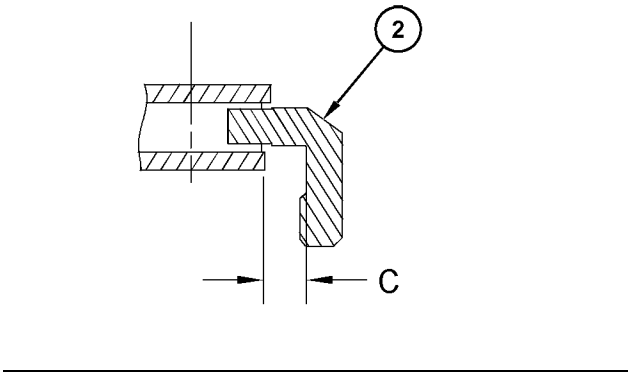

Illustration 302 g01342512

13. Measure Dimension (A) between wear pad (19) and circle (2). Dimension (A) must be no greater than 0.50 mm (0.020 inch). Add or remove shims (18) in order to obtain the correct dimension.

14. Loosen nuts (20) and bolts (21) in order to allow movement in shoes (22). Seat the circle drive pinion in the teeth on circle (2). Move circle (2) in order to obtain dimension (C) with circle (2) in contact with front shoes. Dimension (C) must be 60.5 + 2.50 − 0.50 mm (2.4 + 0.098 − 0.020 inch).

15. Evenly adjust nuts (20) against shoes (22) in order to bring wear pads (23) in contact with circle (2). Back off nuts (20) in order to obtain dimension (B). Dimension (B) must be no greater than 0.80 mm (0.032 inch).

16. Tighten bolts (21) to 920 ± 60 N·m (679 ± 44 lb ft). Tighten nuts (20) to 570 ± 80 N·m (421 ± 59 lb ft).

17. Start the engine and run the engine. Rotate circle (2) through the entire working range and check for binding. Circle (2) must rotate freely.

18. Stop the engine and release the hydraulic system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

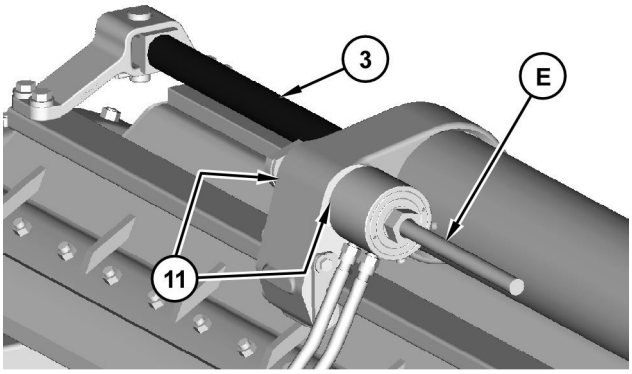

Illustration 303 g01342162

19. Use Tooling (E) in order to install bearings (11) into blade assembly (3). Repeat this step for the remaining bearings (11).

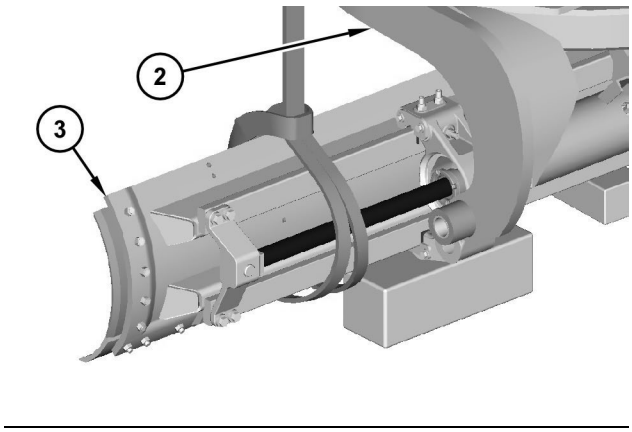

Illustration 304 g01341921

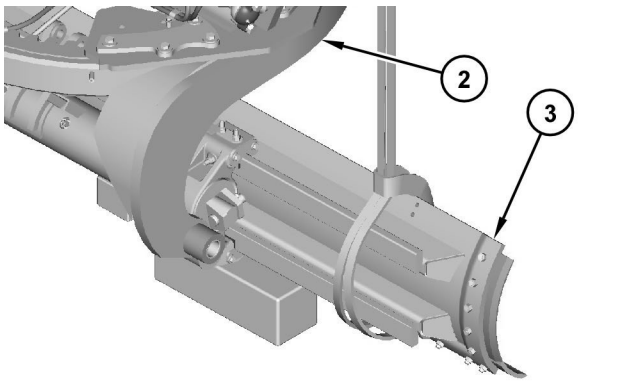

Illustration 305 g01341923

20. Use Tooling (D) and two suitable lifting devices in order to position blade assembly (3). The weight of blade assembly (3) is approximately 2109 kg (4650 lb).

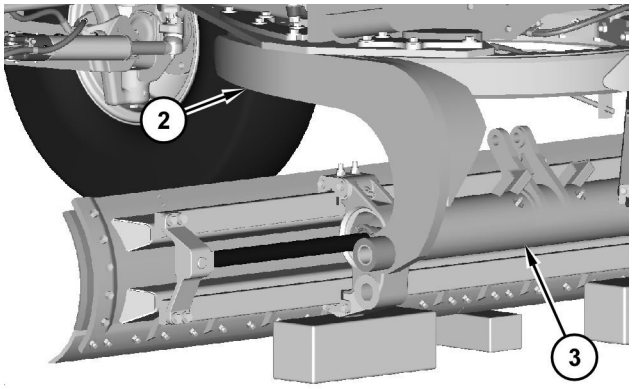

Illustration 306 g01341912

21. Support blade assembly (3) in order to prevent blade assembly (3) from tipping. Start the engine and run the engine. Operate the machine in order to connect blade assembly (3) onto circle (2).

22. Stop the engine.

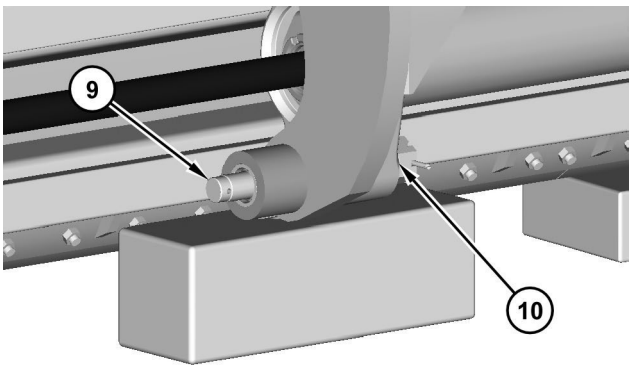

Illustration 307 g01341910

23. Install washer (10) and pin (9). Repeat this step for the opposite side.

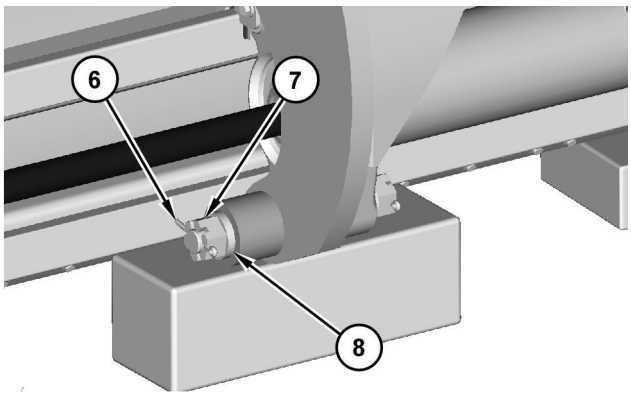

Illustration 308 g01341906

24. Install washer (8) and nut (7). Install cotter pin (6).

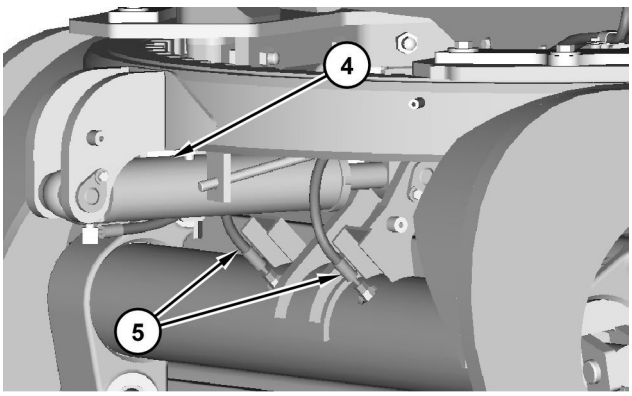

Illustration 309 g01341901

25. Connect hose assemblies (5). Install blade tip cylinder (4). Refer to Disassembly and Assembly, “Blade Tip Cylinder - Remove and Install”.

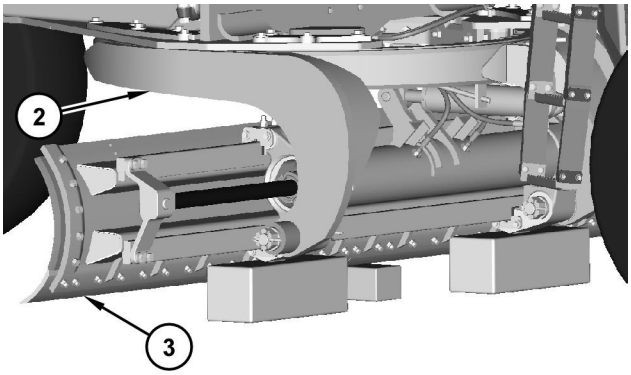

Illustration 310 g01341892

26. Start the engine and run the engine. Raise circle (2) and blade assembly (3) in order to remove the suitable blocking.

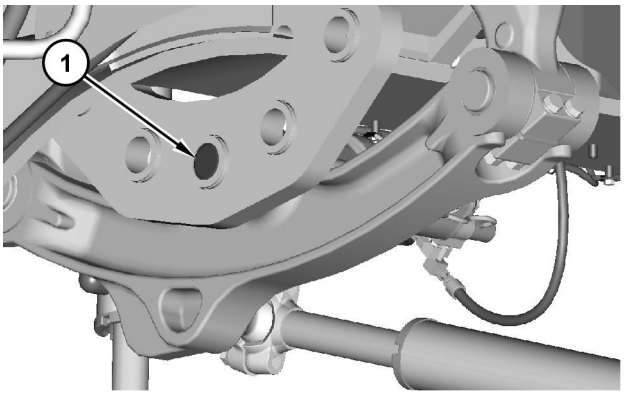

Illustration 311 g01381458

27. Operate the machine in order to locate centershift lock pin (1) in the third position on the right hand side of the machine.

i02759313

Drawbar - Remove

SMCS Code: 6153-011

Removal Procedure

Table 32

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	8S-7630	Stand	1
	8S-7621	Tube	1
	8S-7615	Pin	1

(continued)

(Table 32, contd)

	8S-8048	Saddle	1
B	138-7575	Link Bracket	1
C	138-7575	Link Bracket	3

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.

WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

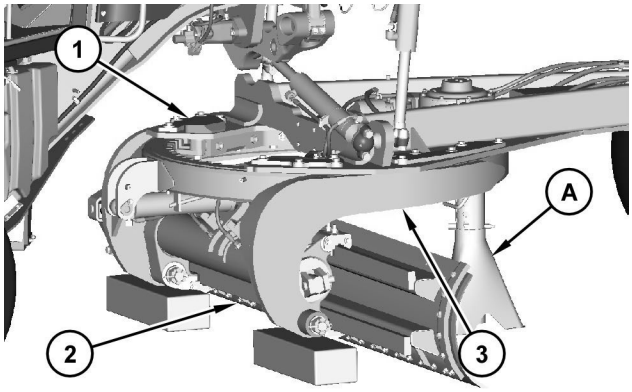

Illustration 312 g01347207

1. Start the engine. Move drawbar (1) as far to the right as possible. Place suitable blocking underneath blade (2) and install Tooling (A) under circle (3).
2. Stop the engine and release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

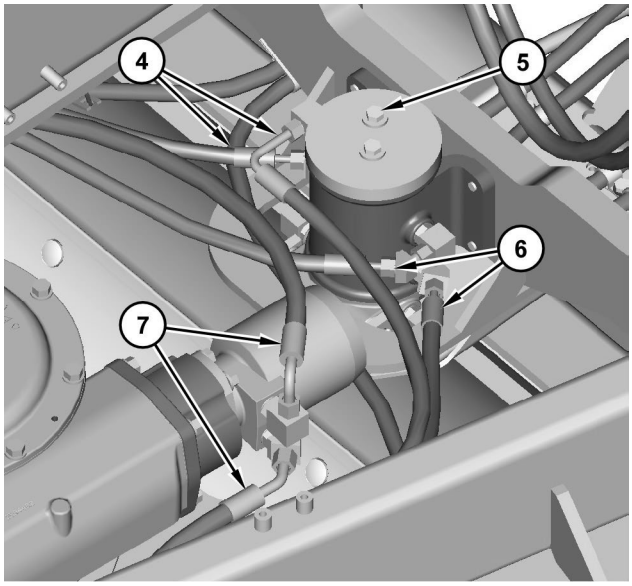

Illustration 313 g01347235

3. Disconnect hose assemblies (4). Remove bolt (5). Disconnect hose assemblies (6). Disconnect hose assemblies (7).

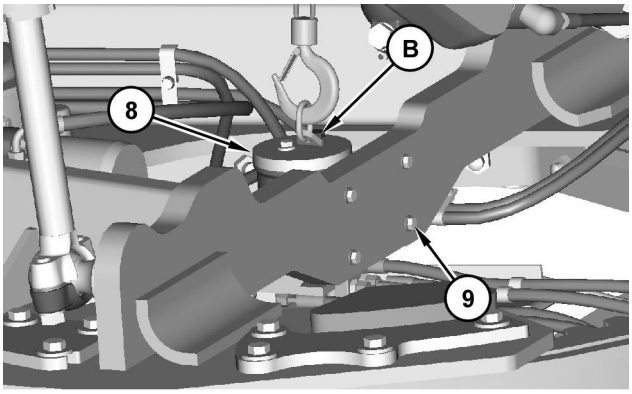

Illustration 314 g01347243

4. Attach Tooling (B) and a suitable lifting device onto swivel (8). The weight of swivel (8) is approximately 41 kg (90 lb).

5. Remove bolts (9) and lower swivel (8).

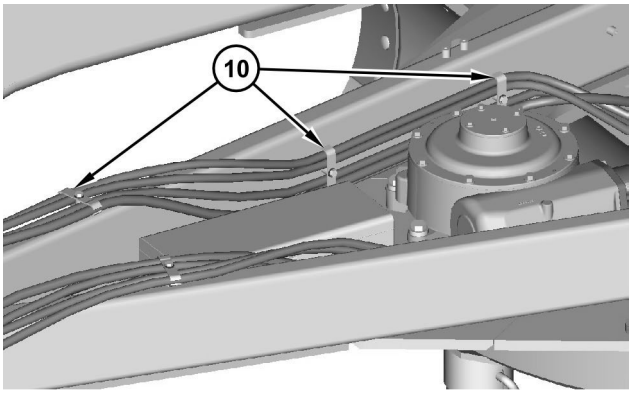

Illustration 315 g01347247

6. Remove clamps (10). Repeat this step for the opposite side of the drawbar.

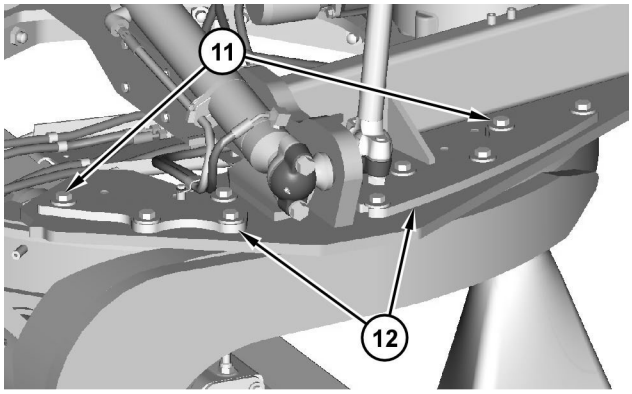

Illustration 316 g01347254

7. Remove bolts (11) and plates (12). Repeat this step for the opposite side of the circle.

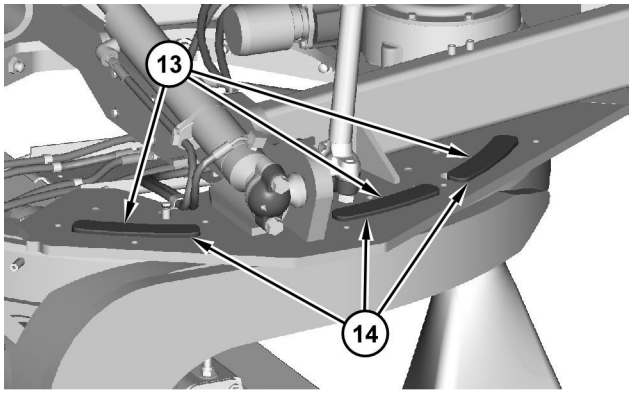

Illustration 317 g01347259

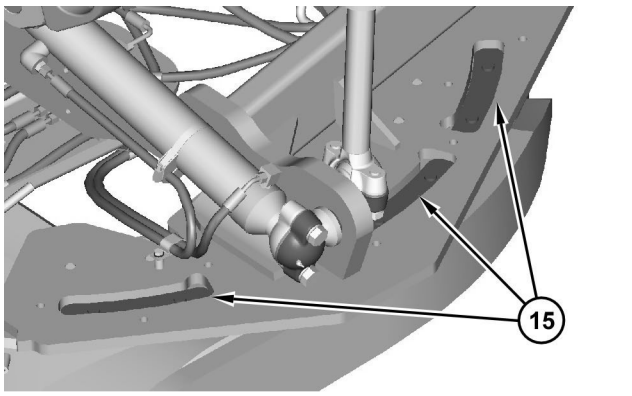

Illustration 318 g01347554

8. Remove shims (13), plates (14), and wear pads (15). Repeat this step for the opposite side of the circle.

Note: Note the quantity and the order of shims (13) and plates (14) for installation purposes.

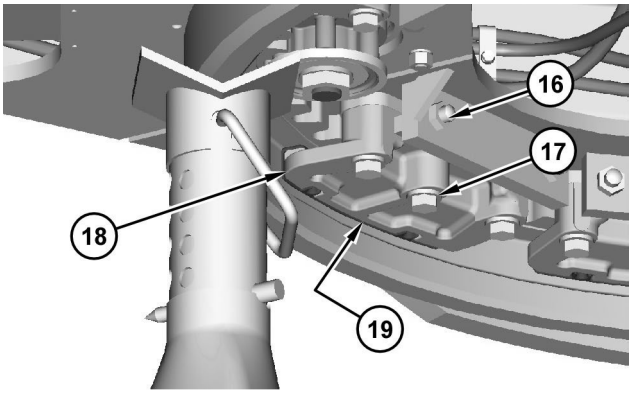

Illustration 319 g01347267

9. Loosen adjusting bolts (16). Remove bolts (17) in order to remove shoe (18) and wear pad (19). Repeat this step for the remaining shoes (18).

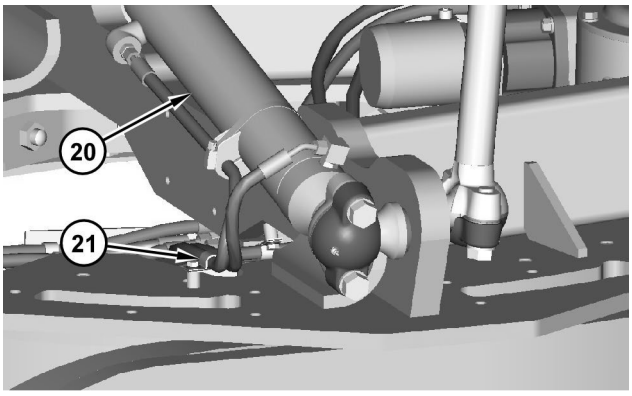

Illustration 320 g01347273

10. Remove centershift cylinder (20). Refer to Disassembly and Assembly, “Centershift Cylinder - Remove and Install”. Remove clip (21).

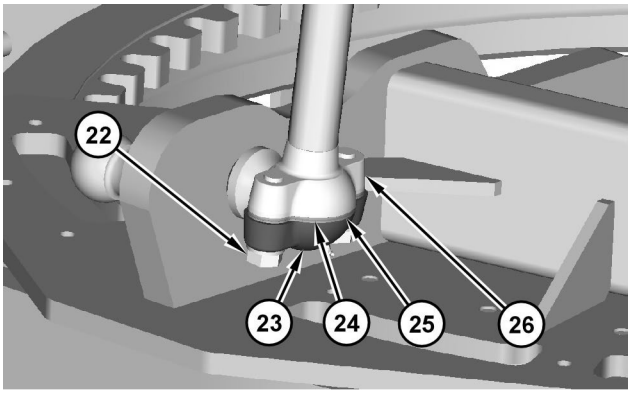

Illustration 321 g01347282

11. Remove bolts (22) and cap (23). Remove shims (24) and inserts (25). Repeat this step for the remaining blade lift cylinder.

Note: Note the quantity and the order of shims (24).

12. Start the engine. Retract blade lift cylinders (26).

13. Stop the engine and release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

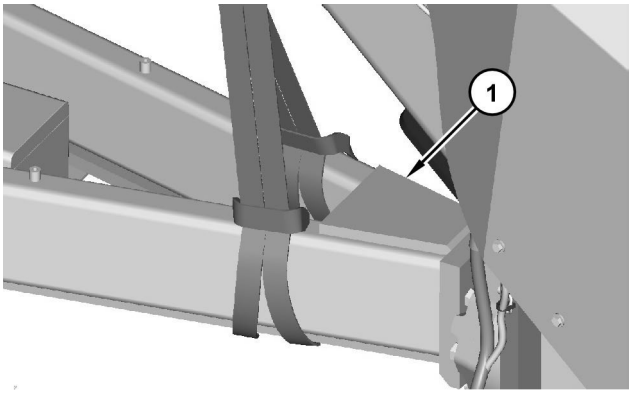

Illustration 322 g01347290

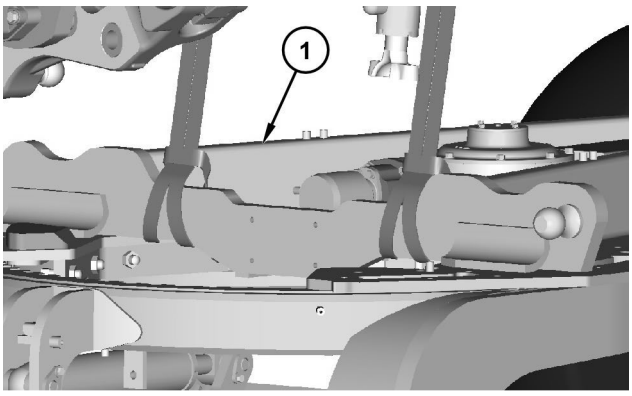

Illustration 323 g01347293

14. Attach a suitable lifting device onto drawbar (1). The weight of drawbar (1) is approximately 1201 kg (2647 lb).

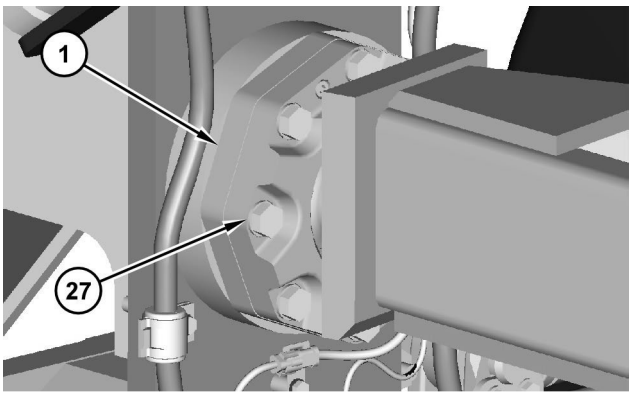

Illustration 324 g01347296

15. Remove bolts (27) in order to remove drawbar (1).

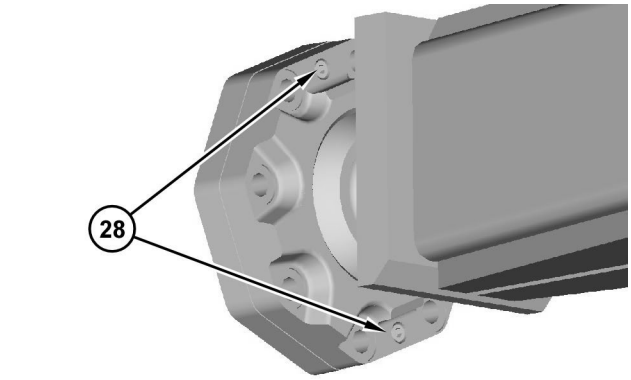

Illustration 325 g01347203

16. Remove bolts (28).

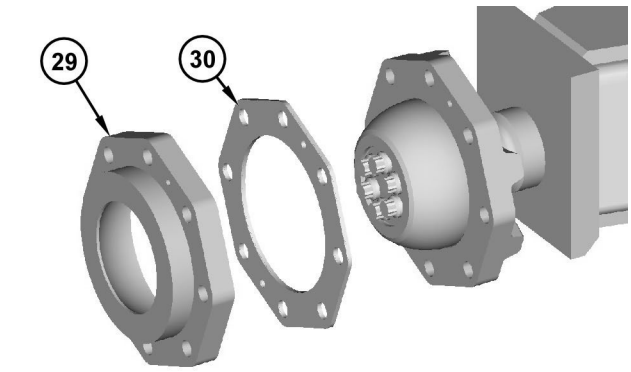

Illustration 326 g01347309

17. Remove adapter (29) and shims (30).

Note: Note the quantity and the order of shims (30).

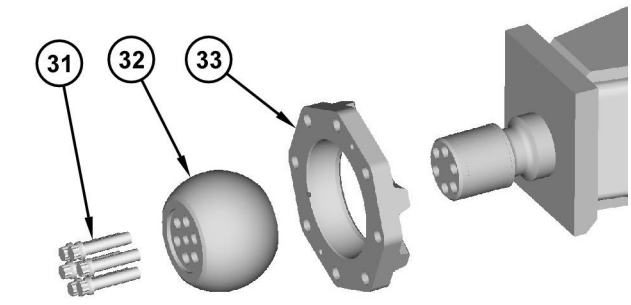

Illustration 327 g01347311

18. Remove bolts (31). Remove ball (32). Remove cap (33).

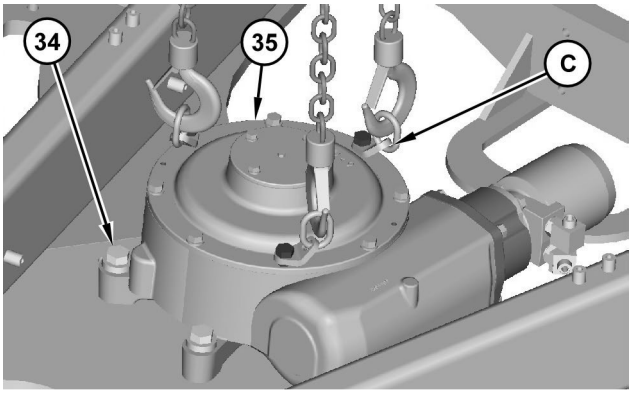

Illustration 328 g01347196

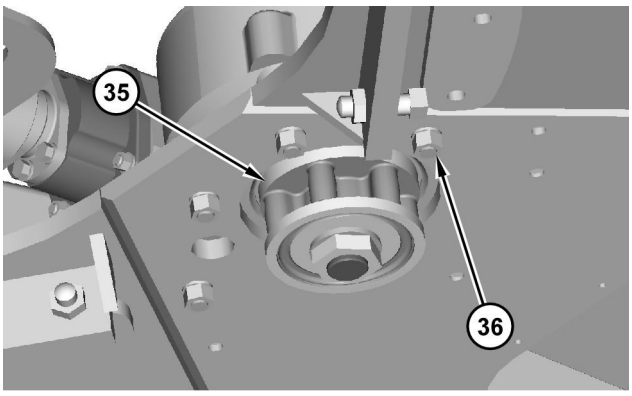

Illustration 329 g01347315

19. Remove bolts (34) and nuts (36). Use Tooling (C) and a suitable lifting device in order to remove circle drive (35). The weight of circle drive (35) is approximately 147 kg (325 lb).

i04033208

Drawbar - Install

SMCS Code: 6153-012

Installation Procedure

Table 33

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	8S-7630	Stand	1
	8S-7621	Tube	1
	8S-7615	Pin	1
	8S-8048	Saddle	1
B	138-7575	Link Bracket	1
C	138-7575	Link Bracket	3
D	183-3424	Grease Cartridge	1

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

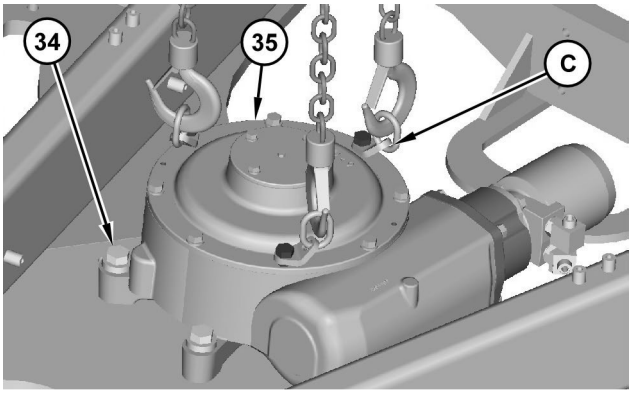

Illustration 330 g01347196

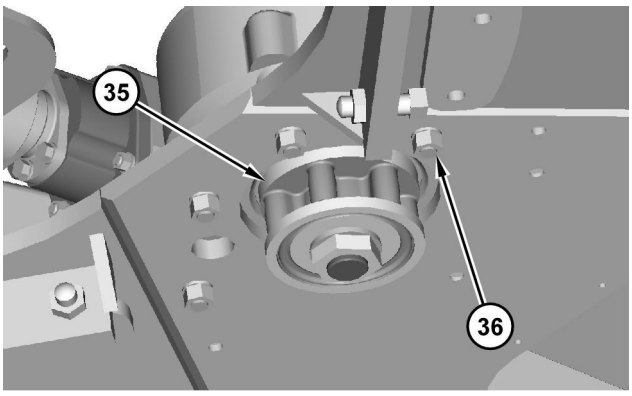

Illustration 331 g01347315

1. Use Tooling (C) and a suitable lifting device in order to install circle drive (35). The weight of circle drive (35) is approximately 147 kg (325 lb).

2. Install nuts (36) and bolts (34). Tighten nuts (36) and bolts (34) to a torque of 485 ± 25 N·m (358 ± 18 lb ft).

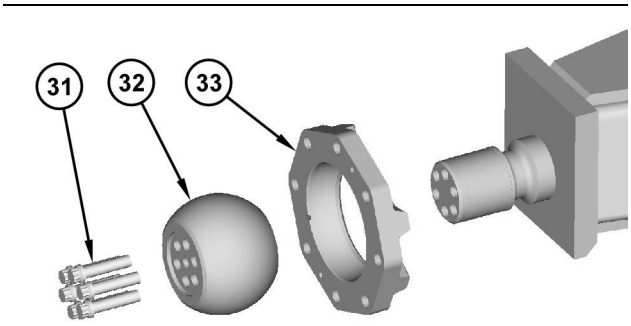

Illustration 332 g01347311

3. Install cap (33). Install ball (32). Install bolts (31). Tighten bolts (31) to a torque of 500 ± 65 N·m (369 ± 48 lb ft).

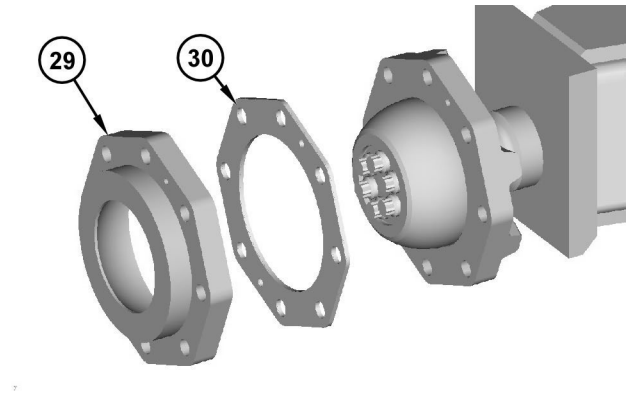

Illustration 333 g01347309

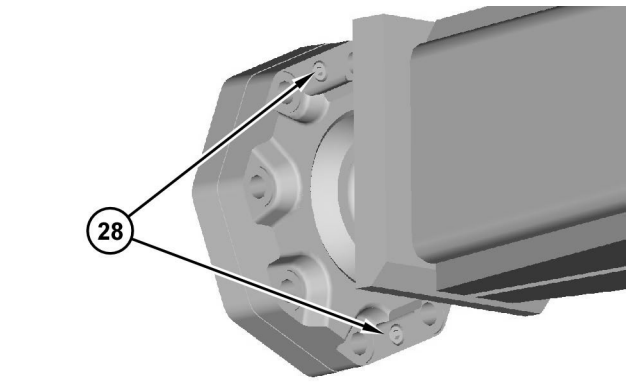

Illustration 334 g01347203

4. Install shims (30). Install adapter (29). Install bolts (28).

Note: Use a number of shims (30) in order to obtain an end play of 0.60 ± 0.20 mm (0.024 ± 0.008 inch).

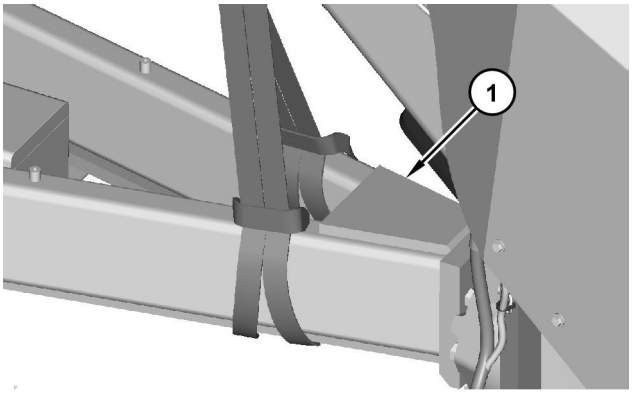

Illustration 335 g01347290

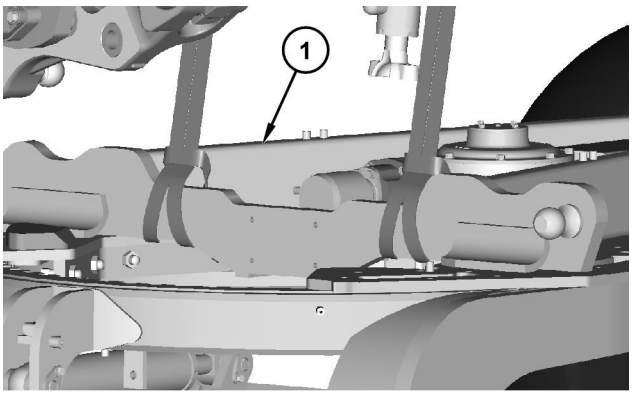

Illustration 336 g01347293

5. Use a suitable lifting device in order to position drawbar (1). The weight of drawbar (1) is approximately 1201 kg (2647 lb).

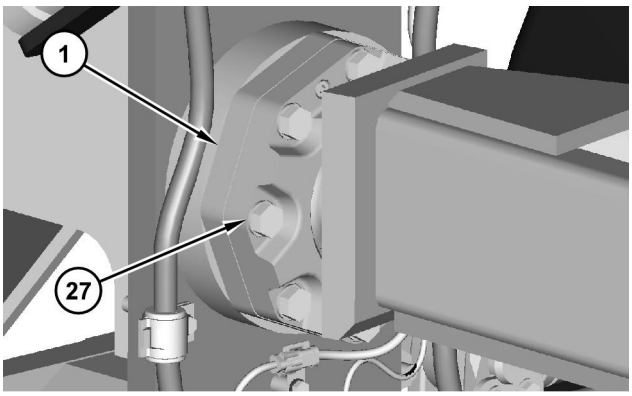

Illustration 337 g01347296

6. Install bolts (27) in order to install drawbar (1). Tighten bolts (27) to a torque of 540 ± 25 N·m (398 ± 18 lb ft).

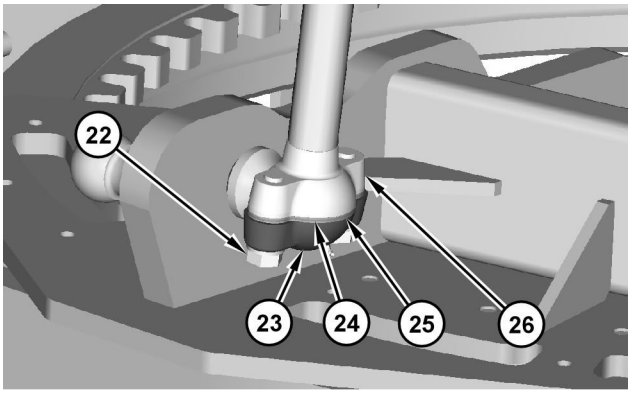

Illustration 338 g01347282

7. Start the engine. Extend blade lift cylinders (26).

8. Stop the engine and release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

9. Apply Tooling (D) onto inserts (25). Install inserts (25), shims (24), cap (23), and bolts (22). Repeat this step for the remaining blade lift cylinder.

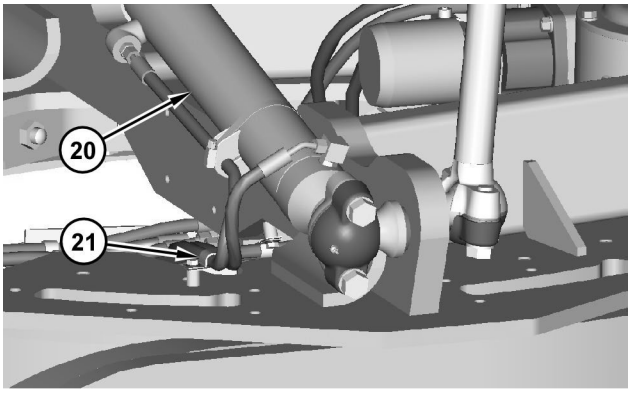

Illustration 339 g01347273

10. Install centershift cylinder (20). Refer to Disassembly and Assembly, “Centershift Cylinder - Remove and Install”. Install clip (21).

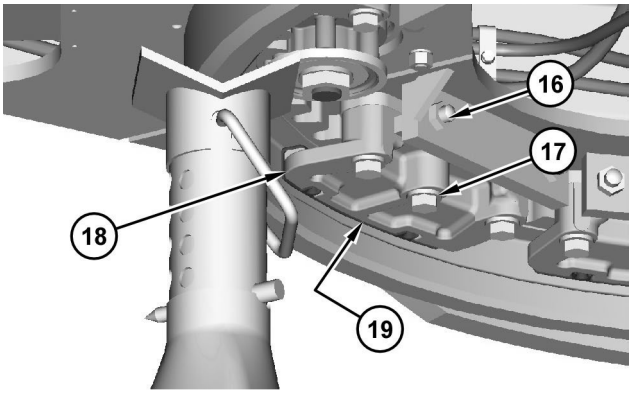

Illustration 340 g01347267

11. Install wear pad (19), shoe (18), and bolts (17). Tighten adjusting bolts (16). Repeat this step for the remaining shoes (18).

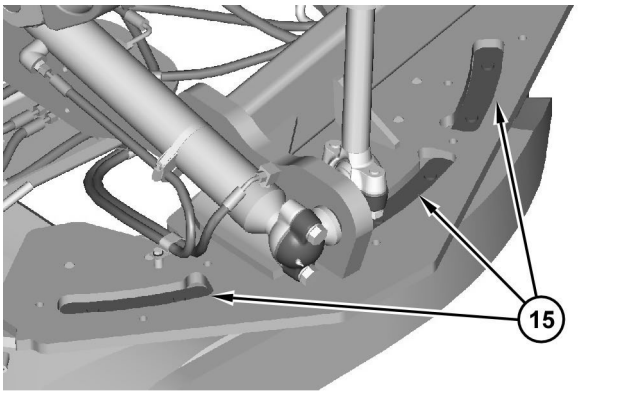

Illustration 341 g01347554

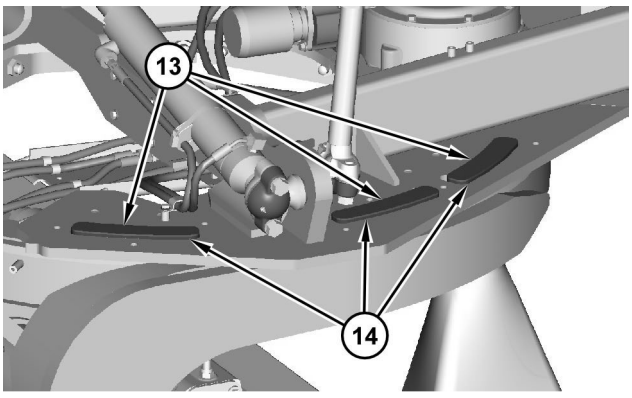

Illustration 342 g01347259

12. Install wear pads (15), plates (14), and shims (13). Repeat this step for the opposite side of the circle.

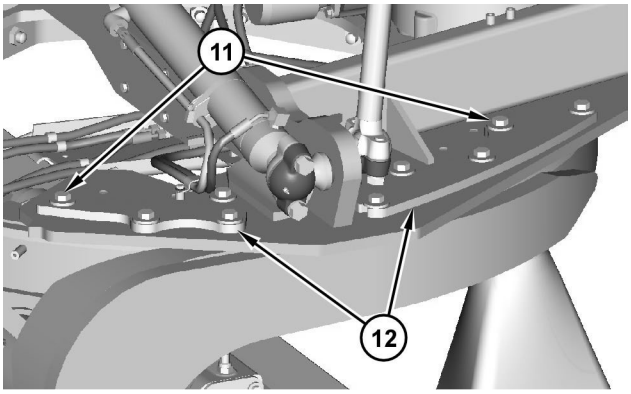

Illustration 343 g01347254

13. Install plates (12) and bolts (11). Repeat this step for the opposite side of the circle.

14. Stop the engine and release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

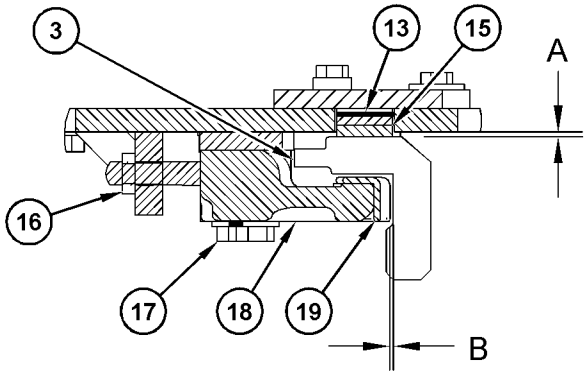

Illustration 344 g01347614

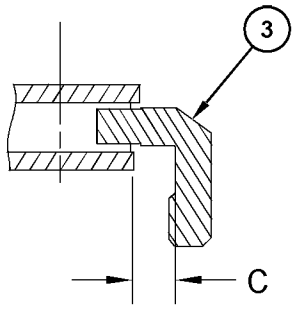

Illustration 345 g01347615

15. Measure Dimension (A) between wear pad (15) and circle (3). Dimension (A) must be no greater than 0.50 mm (0.020 inch). Add or remove shims (13) in order to obtain the correct dimension.

16. Loosen adjusting bolts (16) and bolts (17) in order to allow movement in shoes (18). Seat the circle drive pinion in the teeth on circle (3). Move circle (3) in order to obtain Dimension (C) with circle (3) in contact with front shoes. Dimension (C) must be 60 + 2.50 − 0.50 mm (2.4 + 0.098 − 0.020 inch).

17. Evenly tighten adjusting bolts (16) against shoes (18) in order to bring wear pads (19) in contact with circle (3). Back off adjusting bolts (16) in order to obtain Dimension (B). Dimension (B) must be no greater than 0.80 mm (0.032 inch).

18. Tighten bolts (17) to 920 ± 60 N·m (679 ± 44 lb ft). Tighten nuts (16) to 570 ± 80 N·m (421 ± 59 lb ft).

19. Start the engine and run the engine. Rotate circle (3) through the entire working range and check for binding. Circle (3) must rotate freely.

20. Stop the engine and release the system pressure. Refer to Operation and Maintenance Manual, “system pressure - Release”.

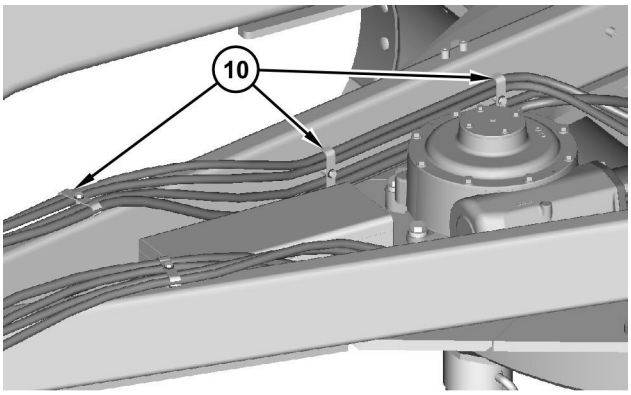

Illustration 346 g01347247

21. Install clamps (10). Repeat this step for the opposite side of the drawbar.

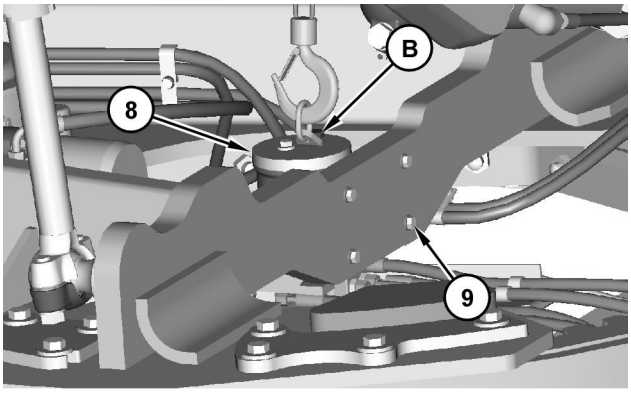

Illustration 347 g01347243

22. Use Tooling (B) and a suitable lifting device in order to raise swivel (8). The weight of swivel (8) is approximately 41 kg (90 lb).

23. Install bolts (9).

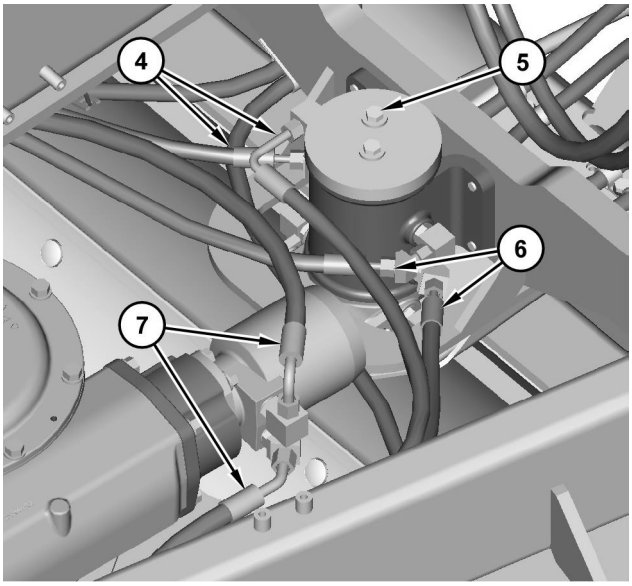

Illustration 348 g01347235

24. Connect hose assemblies (7). Connect hose assemblies (6). Install bolt (5). Connect hose assemblies (4).

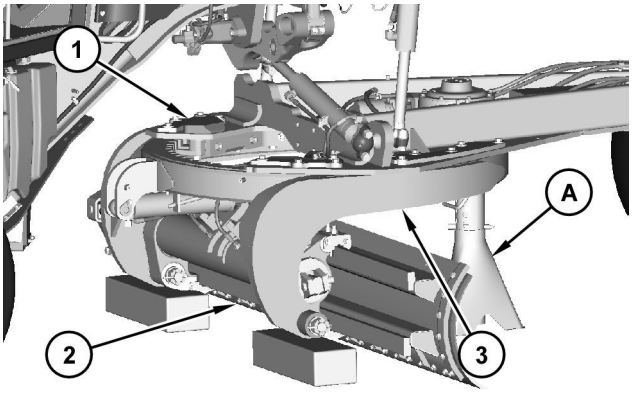

Illustration 349 g01347207

25. Start the engine. Raise drawbar (1) in order to remove the suitable blocking from blade (2) and remove Tooling (A) from circle (3). Move drawbar (1) to the center of the machine and lower the blade to the ground.

26. Stop the engine.

i02760015

Gerotor Motor (Circle Drive) - Remove

SMCS Code: 5082-011; 5206-011

Removal Procedure

Table 34

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

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.

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

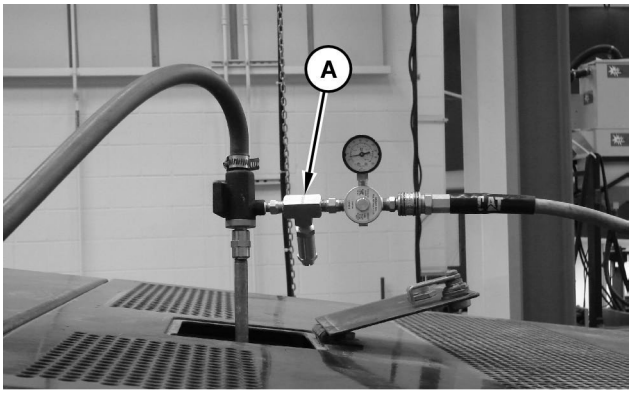

Illustration 350 g01368952

2. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

3. Drain the hydraulic oil from the gerotor motor into a suitable container for storage or disposal.

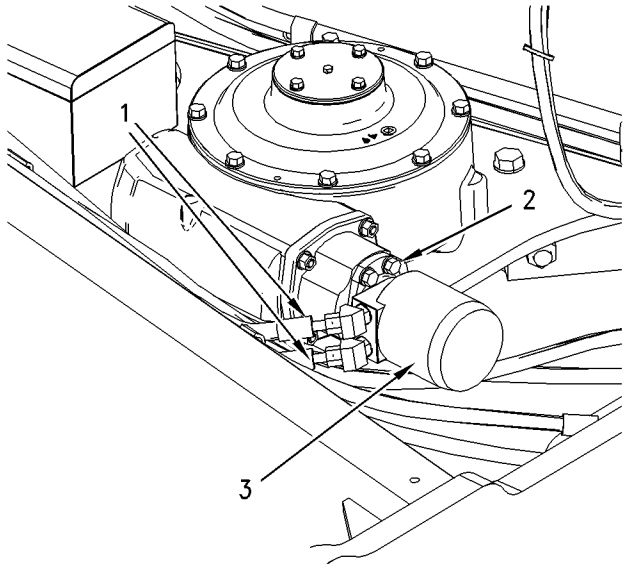

Illustration 351 g00928706

4. Disconnect hose assemblies (1). Remove bolts (2) and remove gerotor motor (3).

i01906556

Gerotor Motor (Circle Drive) - Disassemble

SMCS Code: 5082-015; 5206-015

Disassembly Procedure

Table 35

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-0074	Slide Hammer Puller Gp	1

Start By:

a. Remove the gerotor motor. Refer to Disassembly and Assembly, “Gerotor Motor (Circle Drive) - Remove” for the correct procedure.

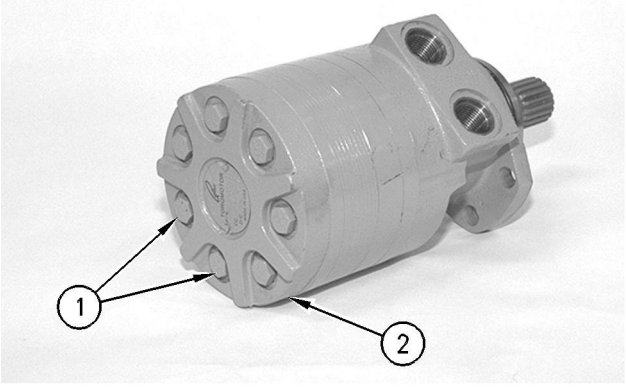

Illustration 352 g00635481

Note: Cleanliness is an important factor. Make sure that the component is clean and free of foreign material prior to the disassembly procedure.

1. Remove bolts (1) and cover (2) from the motor assembly. Remove the O-ring seal from cover (2).

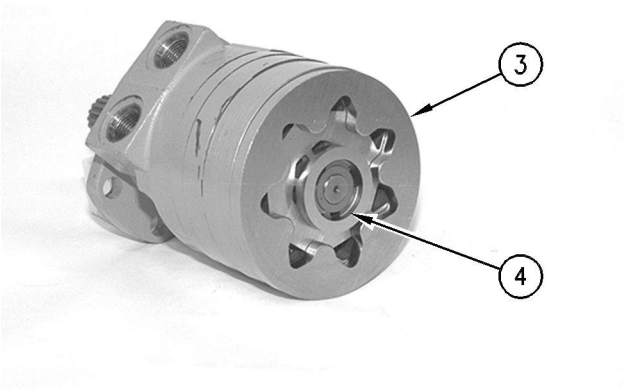

Illustration 353 g00635483

2. Remove outer cover plate (3) and inner plate (4) from the motor assembly.

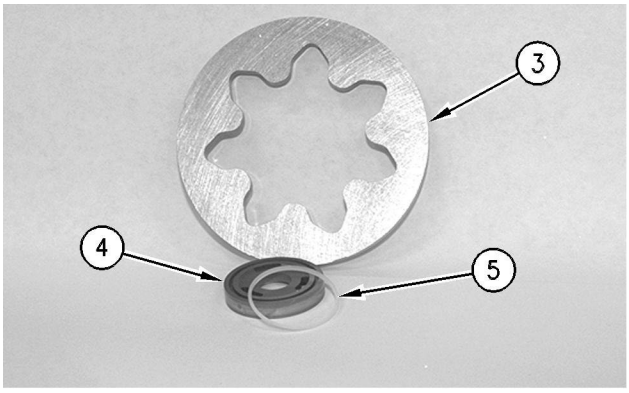

Illustration 354 g00635484

3. Remove seal (5) from inner plate (4).

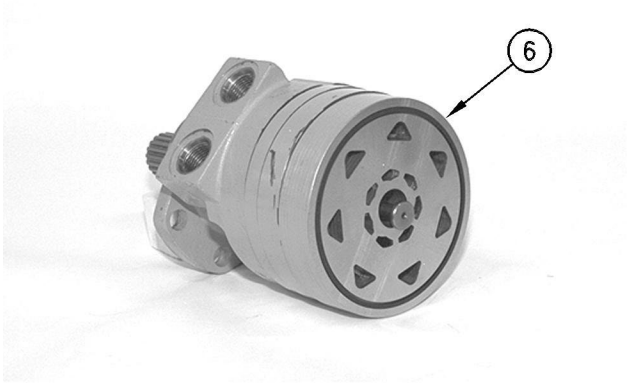

Illustration 355 g00635485

4. Remove manifold (6) from the motor assembly. Remove the O-ring seals that are on both sides of manifold (6).

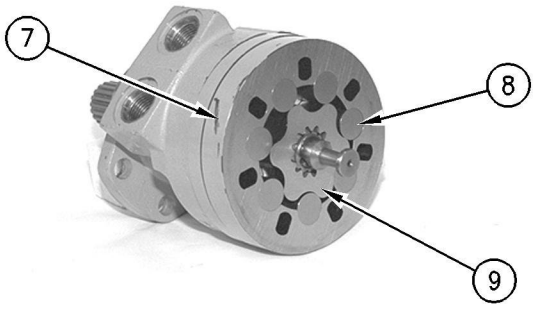

Illustration 356 g00992952

5. Remove outer rotor (7) with the O-ring seal (not shown). Remove the O-ring seal from outer rotor (7).

6. Remove pins (8) and inner rotor (9) from the motor assembly.

Illustration 357 g00635487

7. Remove spacer (10) from the motor assembly.

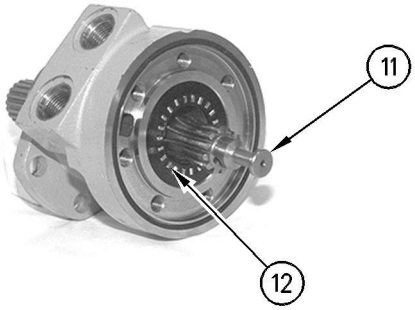

Illustration 358 g00635489

8. Remove link (11) and bearing (12) from the motor assembly.

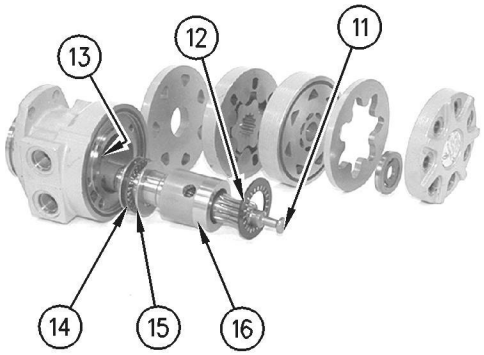

Illustration 359 g00926228

9. Remove shaft (16). If the gerotor motor (circle drive) is equipped with needle bearing (13), use Tooling (A) (not shown) in order to remove needle bearing (13). Remove two races (15) and bearing (14) from the motor assembly.

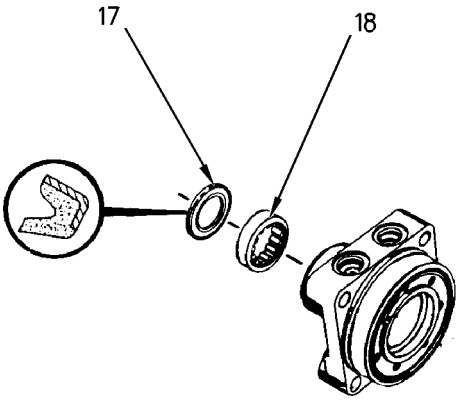

Illustration 360 g00926500

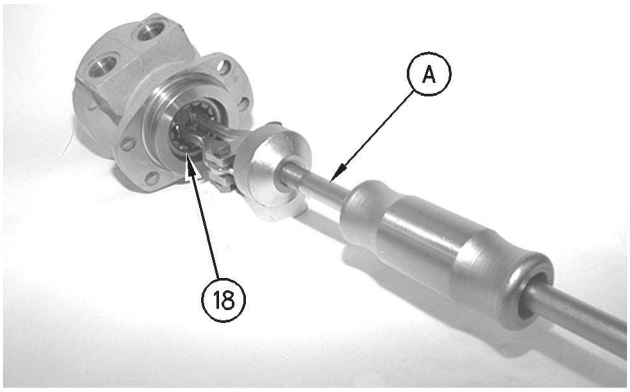

Illustration 361 g00926498

10. Remove lip seal (17). Use Tooling (A) in order to remove bearing (18) from the motor assembly.

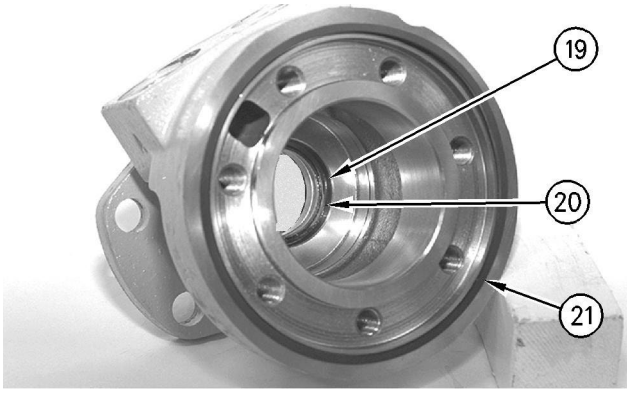

Illustration 362 g00926499

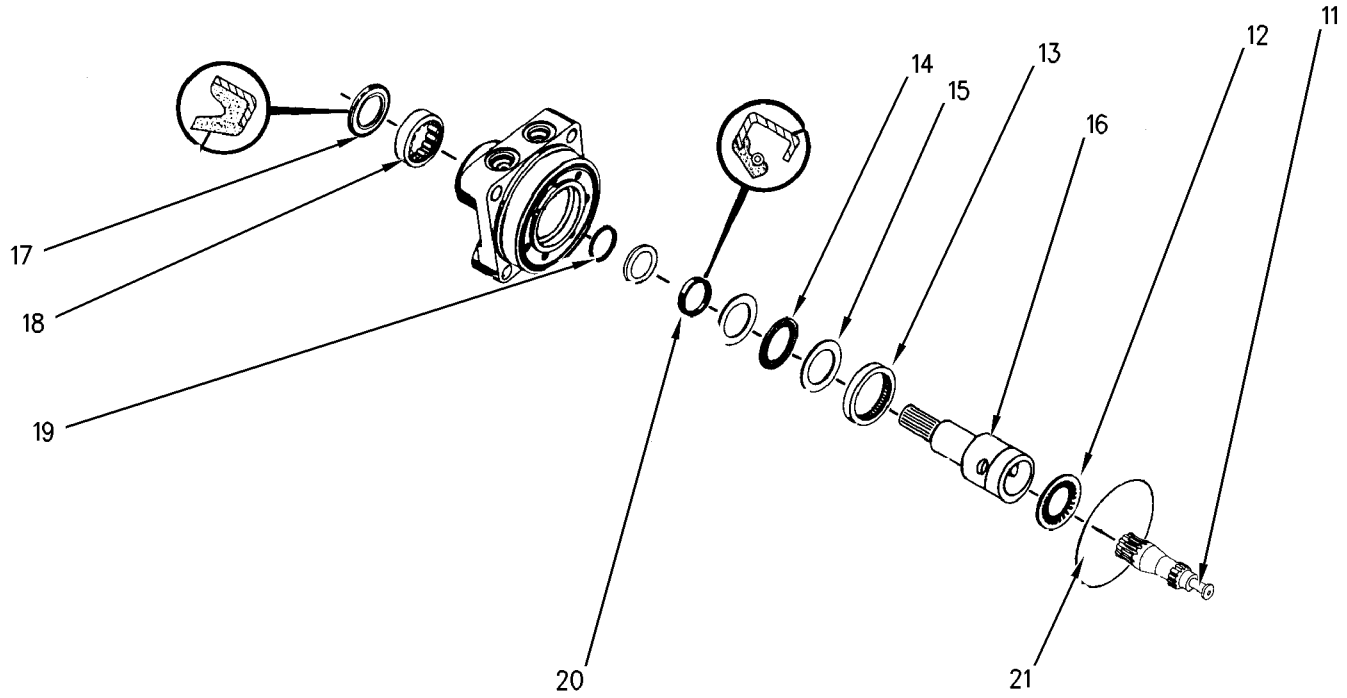

Illustration 363 g00926979

11. Remove backup ring (19) and the shim from the motor assembly. Remove lip seal (20). Remove O-ring seal (21) from the motor assembly.

i06574674

Gerotor Motor (Circle Drive) - Assemble

SMCS Code: 5082-016; 5206-016

Assembly Procedure

Table 36

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-0510	Driver Gp	1

1. Make sure that all of the components of the gerotor motor are clean prior to assembly. During the assembly, check the condition of all the O-ring seals that are used in the motor. If any of the seals are damaged, use new parts for replacement.

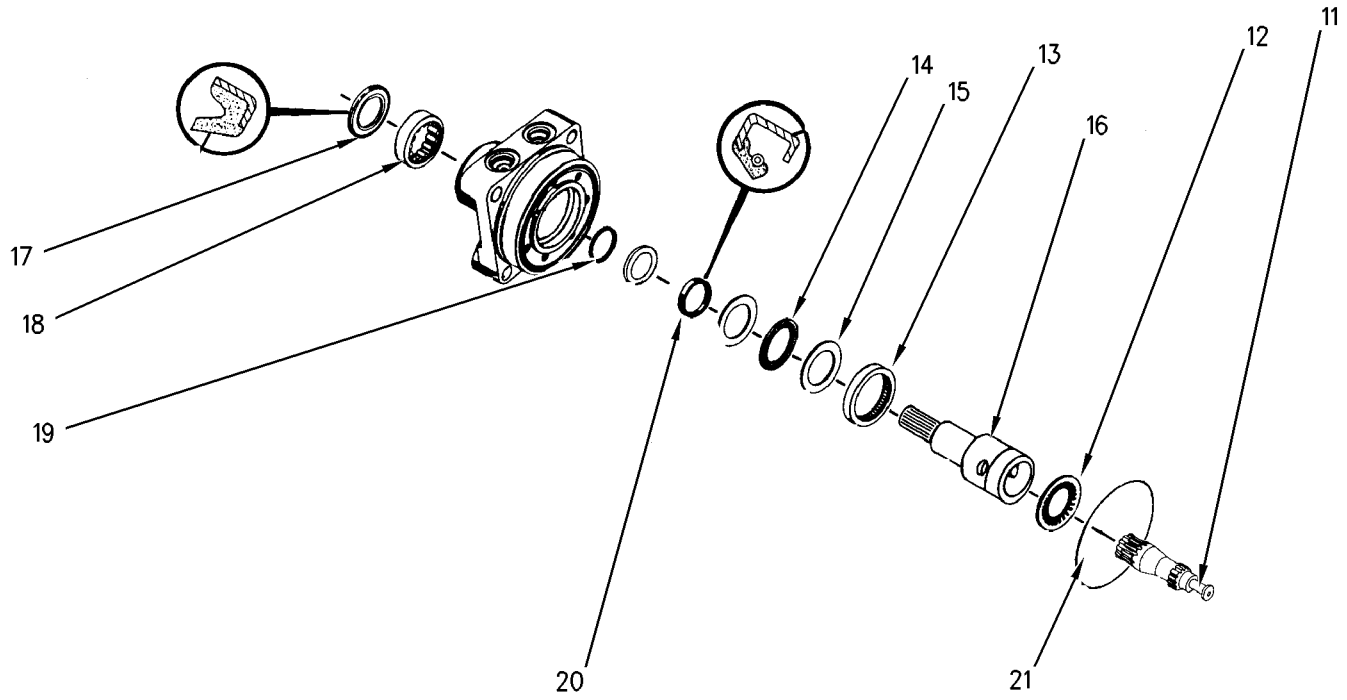

Illustration 364 g00926979

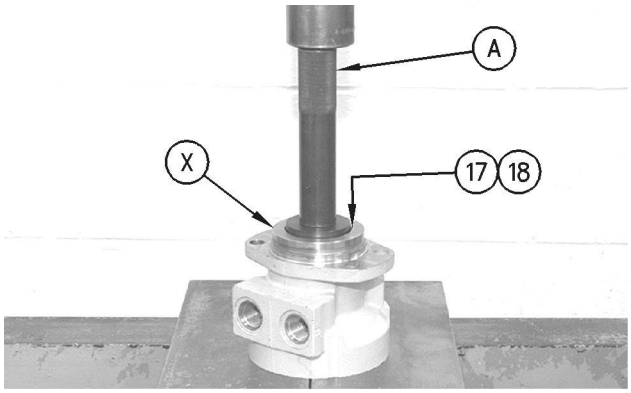

Illustration 365 g00926505

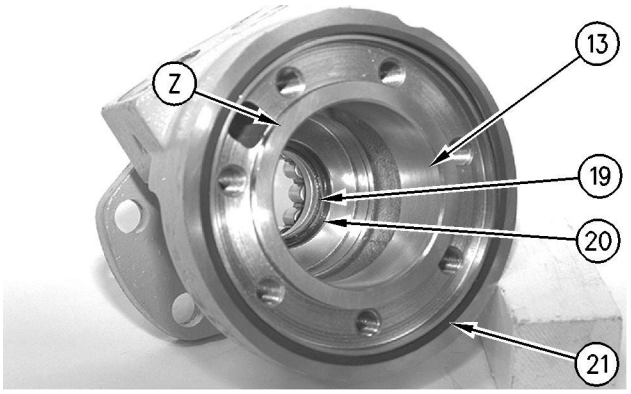

Illustration 366 g00926506

2. Install bearing (18). Use a suitable press to press bearing (18) to a depth of 7.62 mm (0.300 inch) below Surface (X).

3. Install lip seal (17).

4. Install backup ring (19) and the shim to the motor assembly.

5. Install lip seal (20) to the motor assembly.

6. If equipped, install the needle bearing (13) (not shown). Press the needle bearing to a depth of 2.92 mm (0.115 inch) below Surface (Z). Install O-ring seal (21) to the motor assembly.

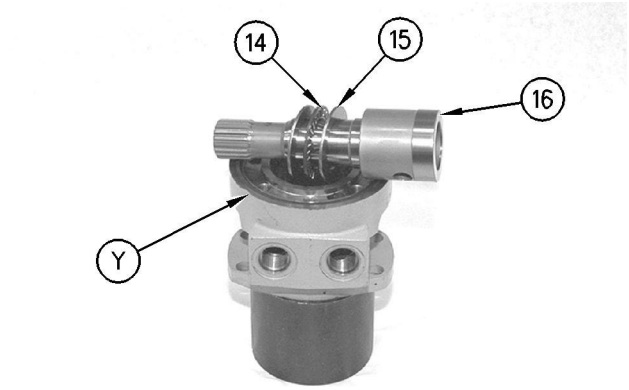

Illustration 367 g00926242

7. Position the motor assembly so that Face (Y) is facing upward. Install two races (15) and bearing (14) to shaft (16), as shown.

8. Install shaft (16) to the motor assembly.

Illustration 368 g00635545

9. Install link (11) and bearing (12) to the motor assembly.

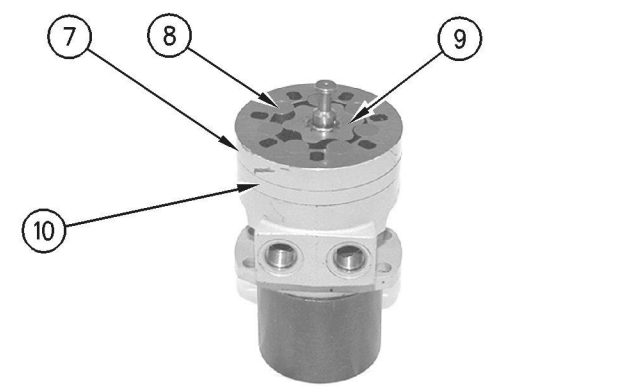

Illustration 369 g00992953

10. Install spacer (10) and inner rotor (9) to the motor assembly.

11. Install the O-ring seal in outer rotor (7). Install pins (8) and outer rotor (7) to the motor assembly.

Illustration 370 g00635552

12. Install the O-ring seals on both sides of manifold (6). Install manifold (6) to the motor assembly.

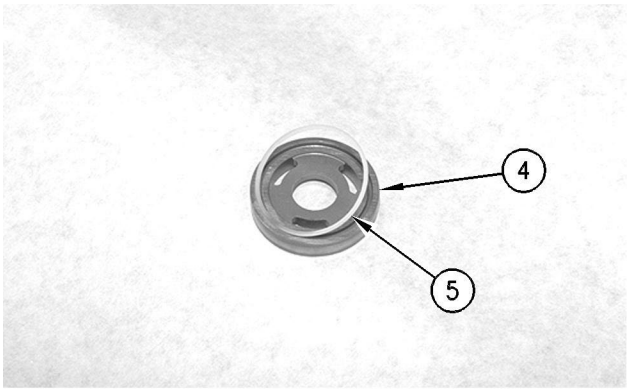

Illustration 371 g00635553

13. Install a new ring (5) to inner plate (4).

Note: Ring (5) is cone-shaped. The cone fits into the groove of inner plate (4).

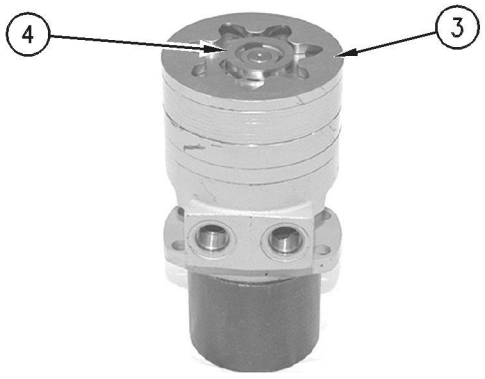

Illustration 372 g00635555

14. Install inner plate (4). The seal ring should face the outer cap. Install outer plate (3) to the motor assembly.

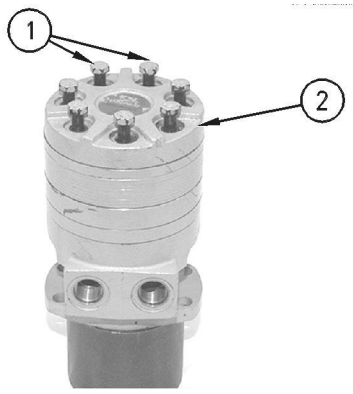

Illustration 373 g00635556

15. Install cap (2) and bolts (1) on to the motor assembly.

16. Tighten bolts (1) to a torque of 68 ± 7 N·m (50 ± 5 lb ft).

End By:

a. Install the gerotor motor. Refer to Disassembly and Assembly, “Gerotor Motor (Circle Drive) - Install” for the correct procedure.

i02760660

Gerotor Motor (Circle Drive) - Install

SMCS Code: 5082-012; 5206-012

Installation Procedure

Table 37

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

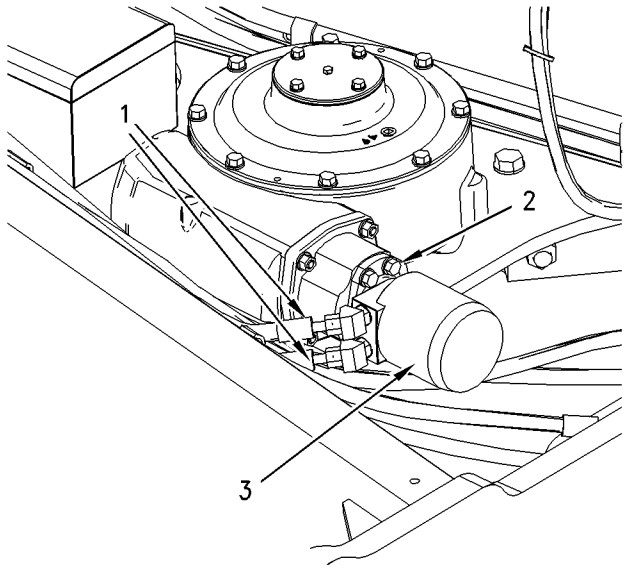

Illustration 374 g00928706

1. Install gerotor motor (3) to the original location. Install bolts (2). Connect hose assemblies (1).

NOTICE
To avoid system damage, make sure that the hydraulic motor is properly filled with hydraulic oil before start-up.

2. Check the fluid level in the hydraulic system. Refer to Operation and Maintenance Manual, SEBU7477, “Hydraulic System Oil Level - Check” for the correct procedure.

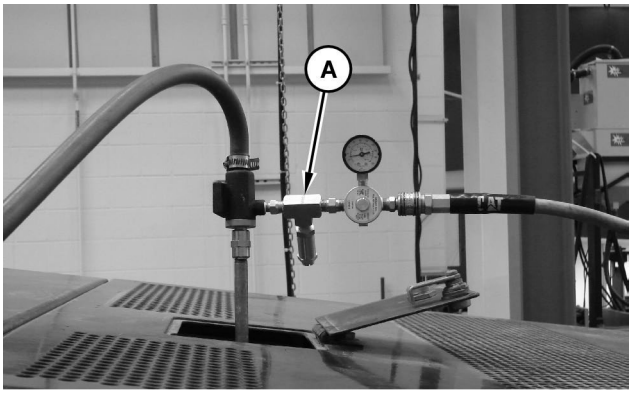

Illustration 375 g01368952

3. Remove Tooling (A).

i05956065

Circle Drive - Remove

SMCS Code: 5207-011

Removal Procedure

Table 38

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	8S-7630	Stand	1
	8S-7621	Tube	1
	8S-7615	Pin	1
	8S-8048	Saddle	1
B	138-7574	Link Bracket	2

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.

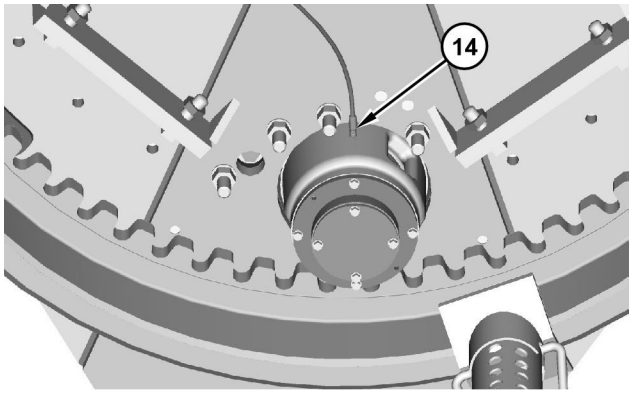

Illustration 376 g03744203

1. Remove plug (14) in order to drain the hydraulic oil from the circle drive. Drain the hydraulic oil into a suitable container for storage or for disposal.

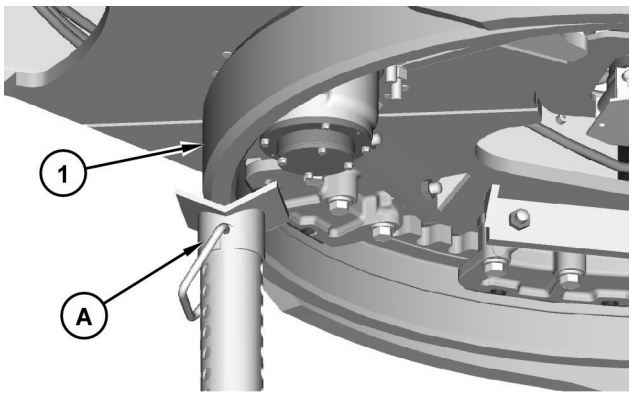

Illustration 377 g01881456

2. Use Tooling (A) in order to support circle (1). The weight of circle (1) is approximately 1179 kg (2600 lb).

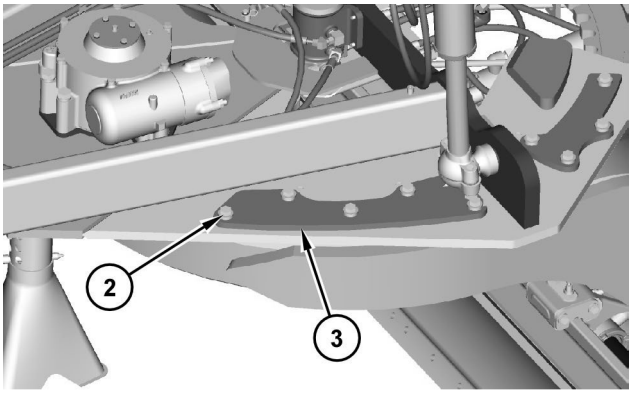

Illustration 378 g01881453

3. Remove bolts (2) and plate (3).

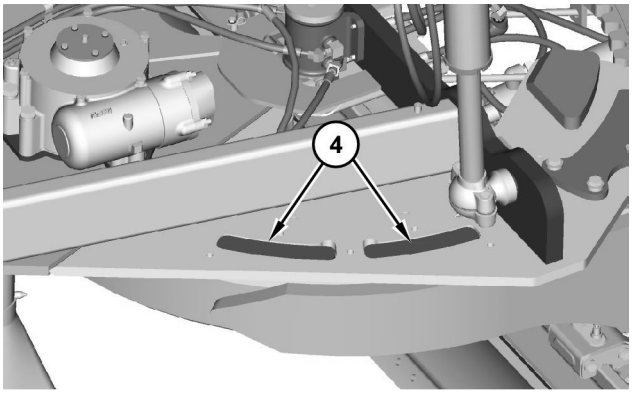

Illustration 379 g01881475

4. Remove shims (4).

Note: Note the quantity of shims for installation purposes.

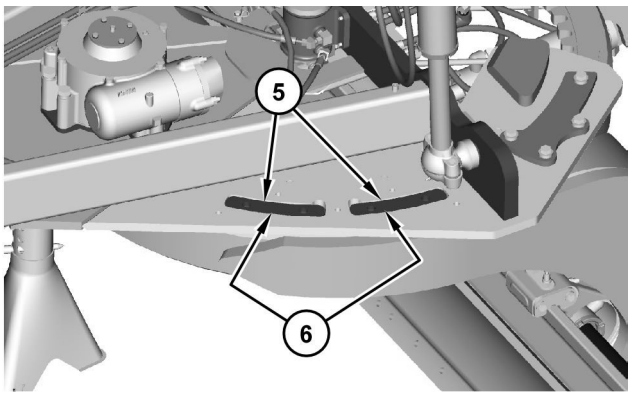

Illustration 380 g01881493

5. Remove plates (5) and wear strips (6).

6. Repeat Step 3 through Step 5 for the remaining shims.

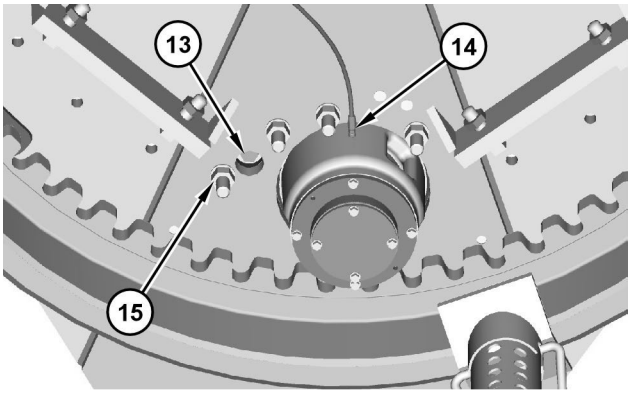

Illustration 381 g01880605

7. Disconnect grease hose assembly (13).

8. Remove nuts (15).

9. Remove the gerotor motor. Refer to Disassembly and Assembly, “Gerotor Motor (Circle Drive) - Remove”.

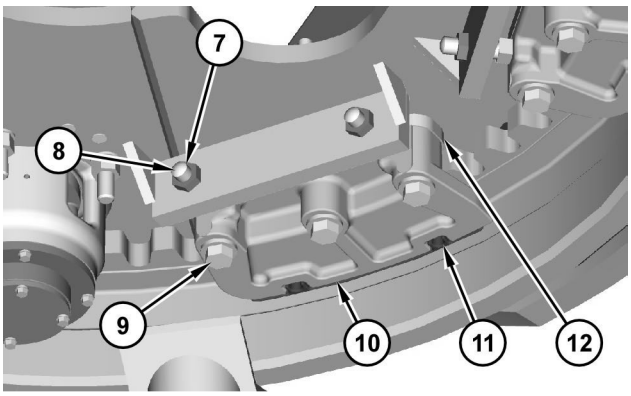

Illustration 382 g01881533

10. Loosen nuts (7) and bolts (8). Remove bolts (9) in order to remove shoe (10), wear strip (11), and plate (12). Repeat this step for the remaining shoes.

11. Ensure that all hydraulic lines are secure and plugged. Start the engine and run the engine. Move the machine backward by approximately 152 mm (6 inch). Use the system hydraulics in order to raise the drawbar 6.35 mm (0.25 inch) This step provides the clearance that is necessary to remove the circle drive.

12. Stop the engine and release system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

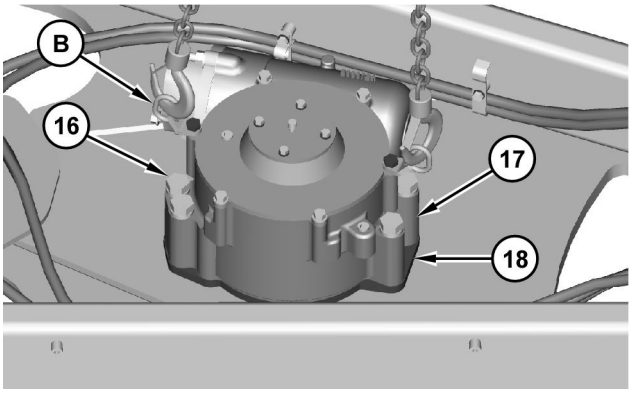

Illustration 383 g01880624

13. Remove bolts (16). Use Tooling (B) and a suitable lifting device in order to remove circle drive (17). The weight of circle drive (17) is approximately 204 kg (450 lb). Remove adapter plate (18).

i05383155

Circle Drive - Disassemble

SMCS Code: 5207-015

Disassembly Procedure

Table 39

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	8H-0663	Bearing Puller Gp	1
B	1P-1836	Bearing Puller Gp	1

Start By:

a. Remove the circle drive. Refer to Disassembly and Assembly, “Circle Drive - Remove”.

Note: Cleanliness is an important factor. Before you begin the disassembly procedure, clean the exterior of the components. Cleaning helps to prevent dirt from entering the internal mechanism. Precision components can be damaged by contaminants or by dirt. Perform disassembly procedures on a clean work surface. Keep components covered and protected at all times.

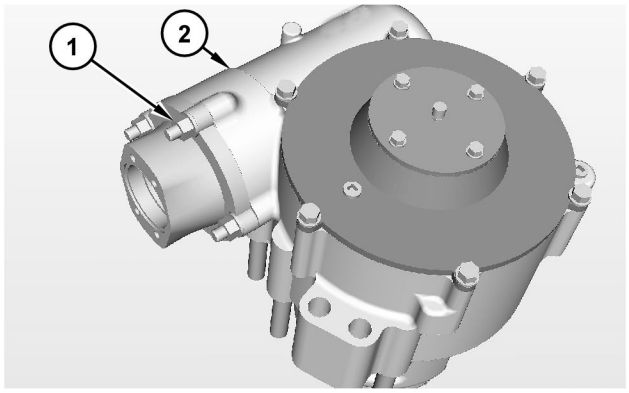

Illustration 384 g01449947

1. Remove nuts (1) from housing (2).

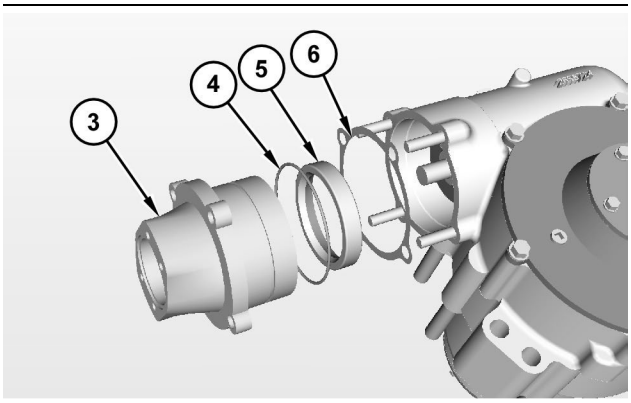

Illustration 385 g01449989

2. Remove adapter (3), O-ring seal (4), bearing cup (5), and shims (6).

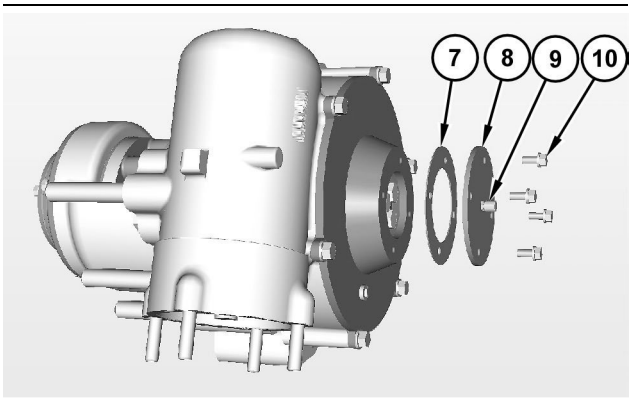

Illustration 386 g01450019

3. Remove fitting (9).

4. Remove bolts (10).

5. Remove cover (8) and remove gasket (7).

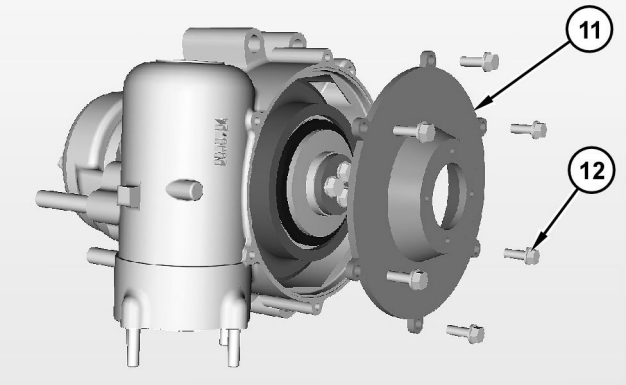

Illustration 387 g01450034

6. Remove bolts (12) and remove cover (11).

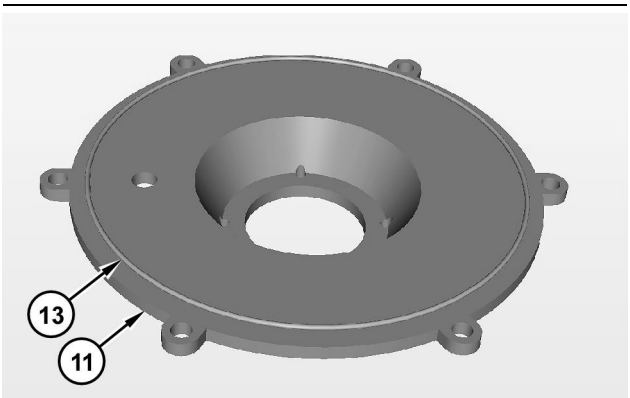

Illustration 388 g01450040

7. Remove O-ring seal (13) from cover (11).

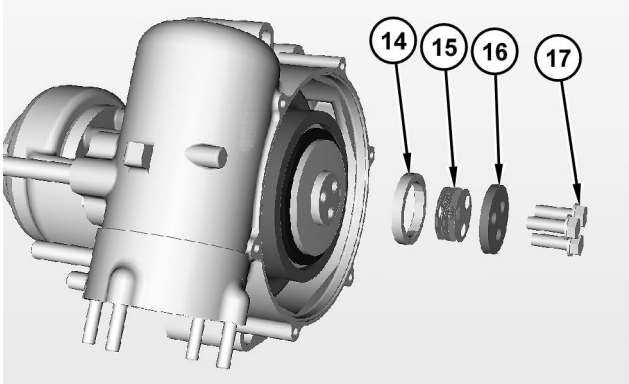

Illustration 389 g01450051

8. Remove bolts (17).

9. Remove plate (16), shims (15), and spacer (14).

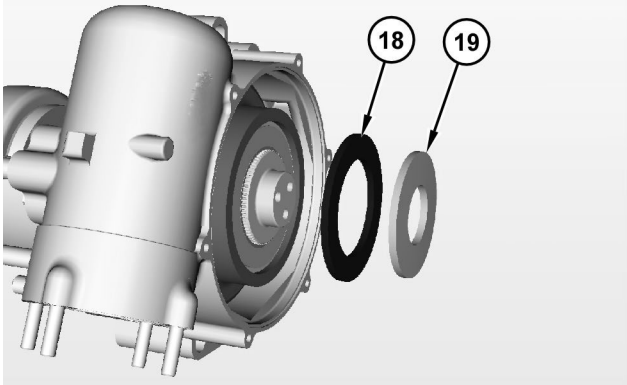

Illustration 390 g01450064

10. Remove spring disc (19) and remove spacer (18).

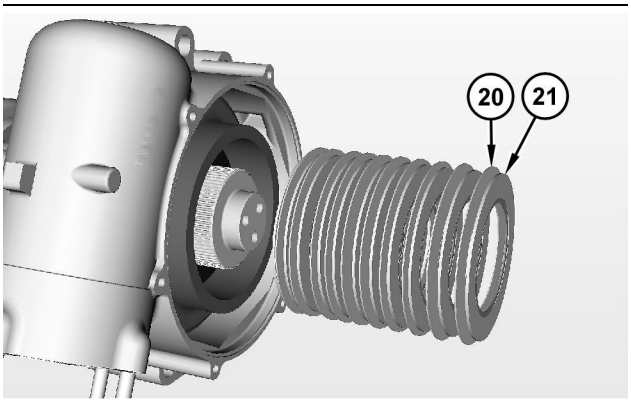

Illustration 391 g01450065

11. Remove disks (21) and plates (20).

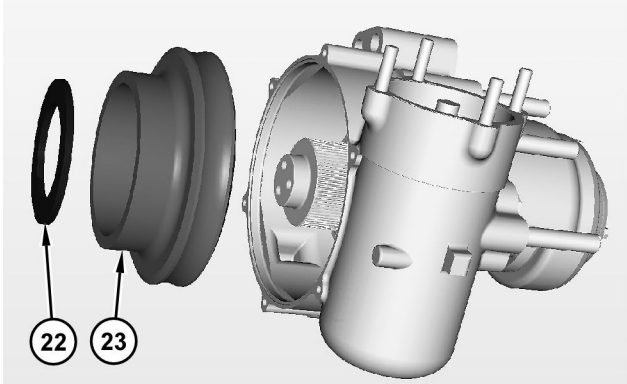

Illustration 392 g01450212

12. Reposition the circle drive.

13. Remove spacer (22) and remove worm gear (23).

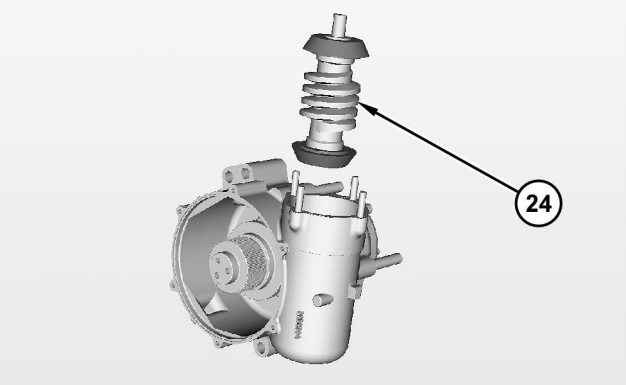

Illustration 393 g01450215

14. Remove worm (24).

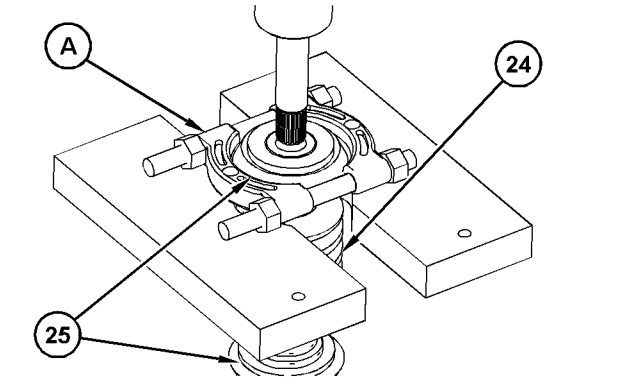

Illustration 394 g01450221

15. Use Tooling (A) and a suitable press in order to remove bearings (25) from worm (24).

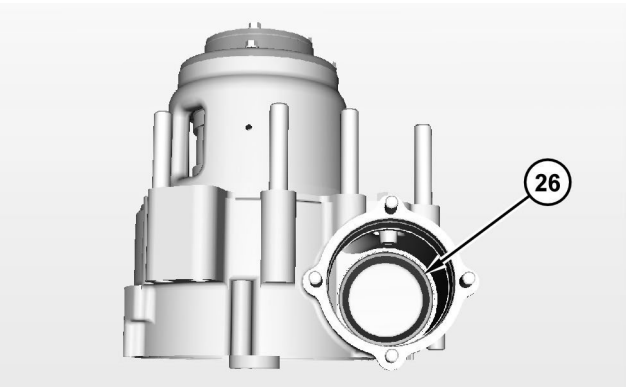

Illustration 395 g01450218

16. Remove bearing cup (26).

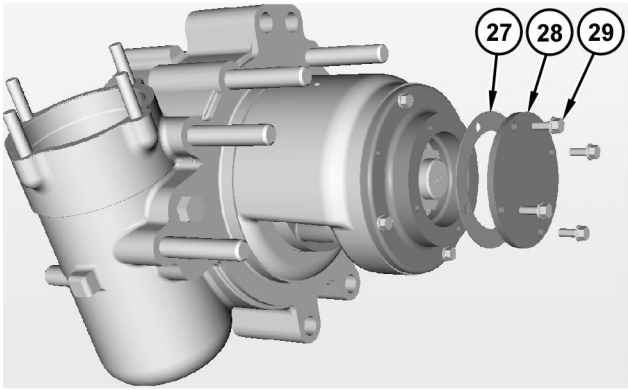

Illustration 396 g01450383

17. Remove bolts (29), cover (28), and gasket (27).

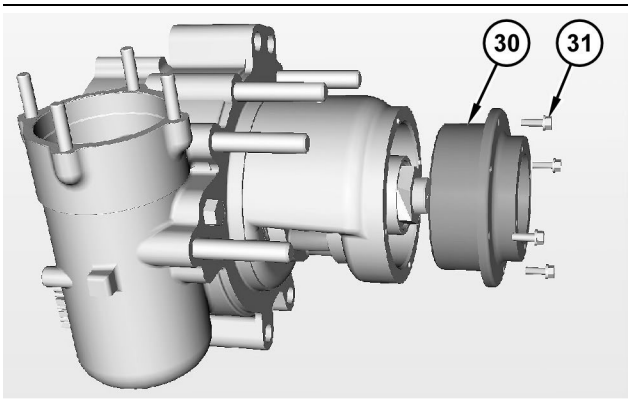

Illustration 397 g01450396

18. Remove bolts (31) and remove cage assembly (30).

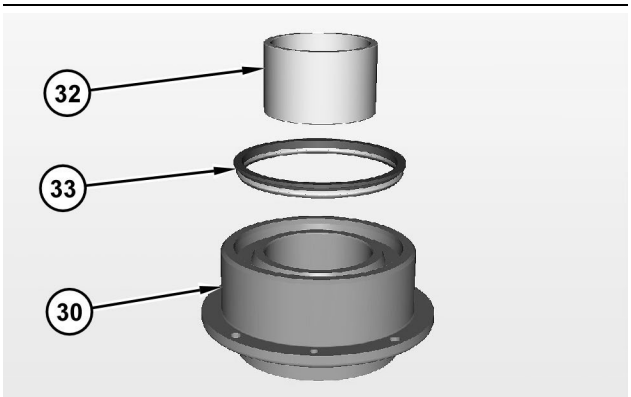

Illustration 398 g01450399

19. Remove Duo-cone seal gp (33) and sleeve bearing (32) from cage assembly (30).

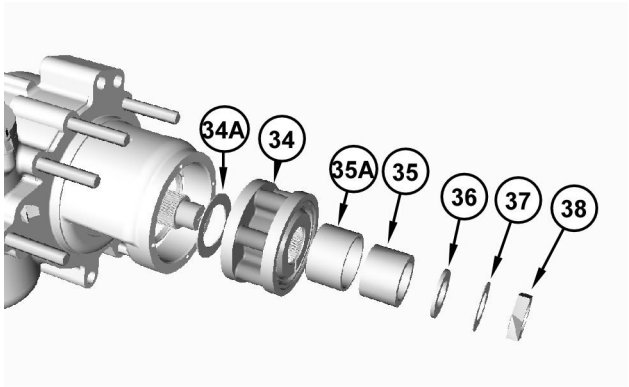

Illustration 399 g03405325

20. Bend the locking tab on nut lock (37) away from nut (38).

21. Remove nut (38), nut lock (37), spacer (36), collar (35), collar (35A), circle drive pinion (34), and the thrust washer (34A).

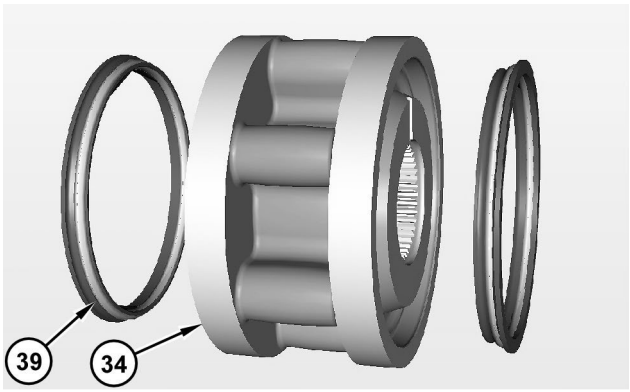

Illustration 400 g01450409

22. Remove both Duo-cone seal gp (39) from circle drive pinion (34).

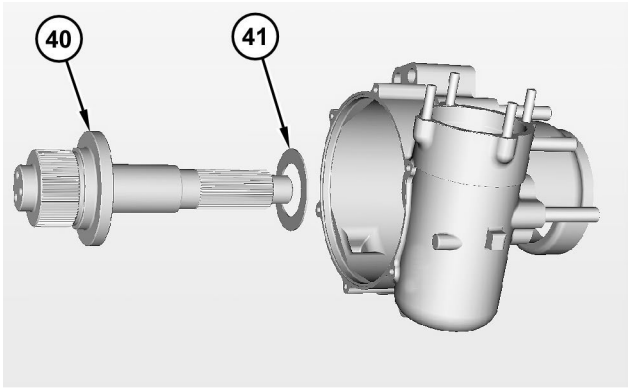

Illustration 401 g01450412

23. Remove drive pinion shaft (40) and thrust washer (41).

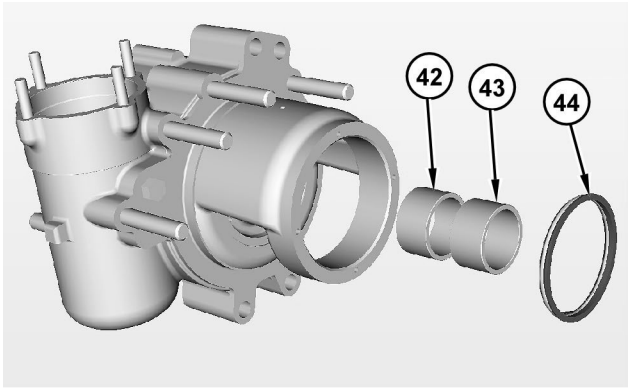

Illustration 402 g01450416

24. Remove Duo-cone seal gp (44).

25. Use Tooling (B) and a suitable press in order to remove sleeve bearing (42) and sleeve bearing (43).

i06285355

Circle Drive - Assemble

SMCS Code: 5207-016

Assembly Procedure

Table 40

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	138-7575	Link Bracket	1
B	-	Loctite 253	1

Note: Cleanliness is an important factor. Before assembly, thoroughly clean all parts in cleaning fluid. Allow the parts to air dry. Do not use wiping cloths or rags to dry parts. Lint may be deposited on the parts which may cause trouble. Inspect all parts. If any parts are worn or damaged, use new parts for replacement. Dirt and other contaminants can damage the precision component. Perform assembly procedures on a clean work surface. Keep components covered and protected at all times.

Note: Check the O-ring seals, the gaskets, and the seals for wear or for damage. Replace the components, if necessary.

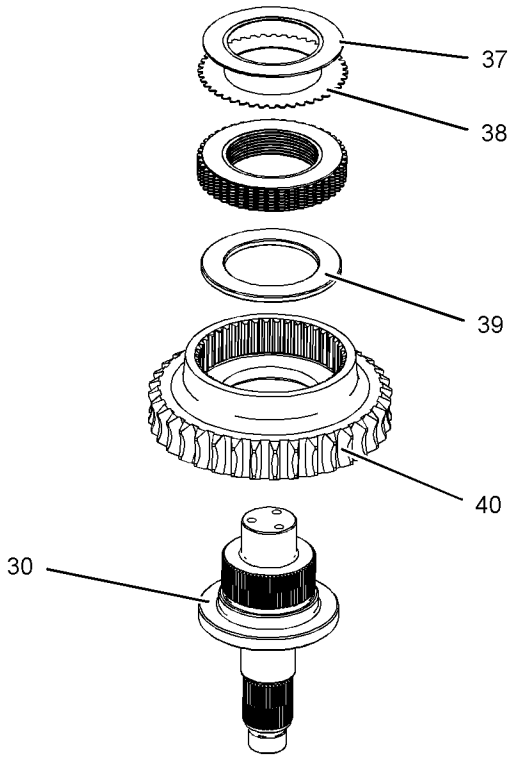

Illustration 403 g01072517

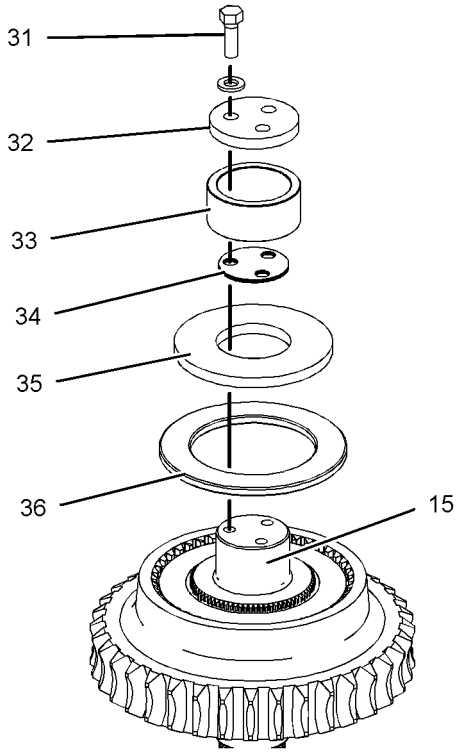

Illustration 404 g01072789

1. Install gear (40) on shaft (30). Install spacer (39). Install friction disks 37 and discs 38 . Install spacer (36) and spring (35). Install spacer (33) and retainer (32). Torque bolts (31) to 150 ± 20 N·m (110 ± 15 lb ft). Remove bolts after 45 minutes in order to add shims.

Note: If the bolts are removed before 45 minutes, the clutch disks will not be properly compressed. Also the clutch setting will not be at the appropriate torque resistance.

2. Measure the distance between the top of the shaft (30) and the top of the spacer (33). Install shims (34) as necessary to obtain a distance of 2.54 ± 0.25 mm (0.100 ± 0.01 inch). Install retainer (32).

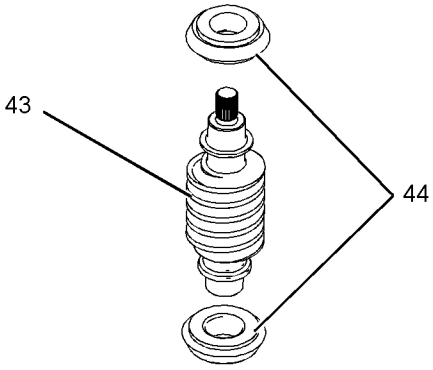

Illustration 405 g01072657

3. Raise the temperature of bearing cones (44). Install bearing cones (44) onto worm assembly (43).

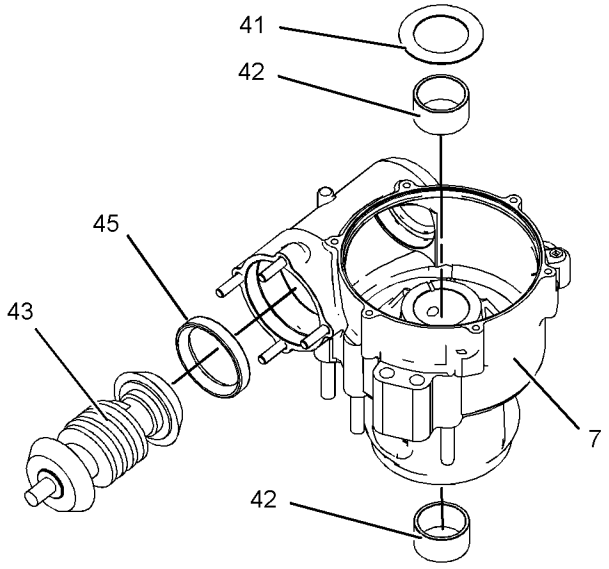

Illustration 406 g01072656

4. Lower the temperature of bearing cup (45). Install bearing cup (45) into housing (7).

5. Lower the temperature of bearing (42). Install bearing (42) to a depth of 2.0 ± 0.5 mm (.079 ± .020 inch) below the face. Install thrust washer (41). Install worm assembly (43) into housing (7).

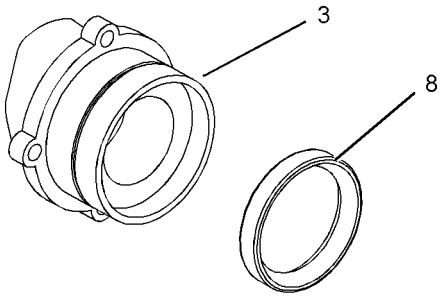

Illustration 407 g01072465

6. Lower the temperature of bearing cup (8) and install bearing cup (8) into adapter (3).

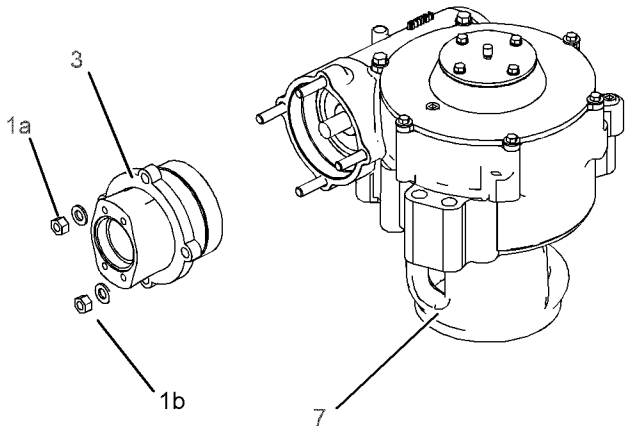

Illustration 408 g03885656

7. Torque nut (1A) to 20 N·m (15 lb ft) and nut (1B) 40 N·m (30 lb ft). Then Torque nut (1A) to 80 N·m (60 lb ft) and nut (1B)80 N·m (60 lb ft). Then Torque nut (1A) to 130 N·m (96 lb ft) and nut (1B) 130 N·m (96 lb ft) rotate the worm 3 revolutions then back off the nuts.

8. Torque nut (1A) to 20 N·m (15 lb ft) and nut (1B) 40 N·m (30 lb ft) then torque nut (1A) to 40 N·m (30 lb ft) rotate the worm 3 revolutions.

9. Torque nut (1A) to 40 N·m (30 lb ft) and nut (1B) 40 N·m (30 lb ft). Measure the average gap between the housing and adapter at the locations being torqued. Subtract 0.065 ± 0.065 mm (0.0026 ± 0.0026 inch) to obtain the desire shim pack thickness.

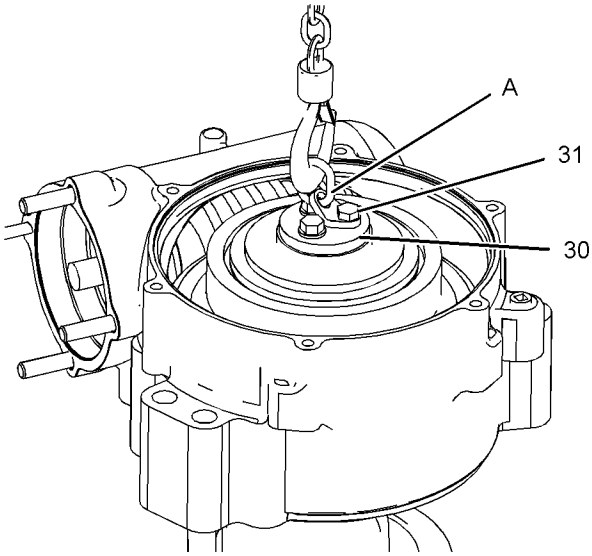

Illustration 409 g01072796

10. Remove adapter assembly (3) and set aside with shim pack (6).

Install Tooling (A) and bolts (31). Attach a suitable lifting device to Tooling (A). The weight of the shaft assembly is approximately 32 kg (70 lb). Install shaft assembly (30), as shown. Remove Tooling (A). Install washers and bolts (31) . Tighten bolts (31) to a torque of 150 ± 20 N·m (110 ± 14 lb ft). Torque bolts (31) to a torque of 240 ± 40 N·m (177 ± 30 lb ft). Re torque bolts (31) to a torque 240 ± 40 N·m (177 ± 30 lb ft).

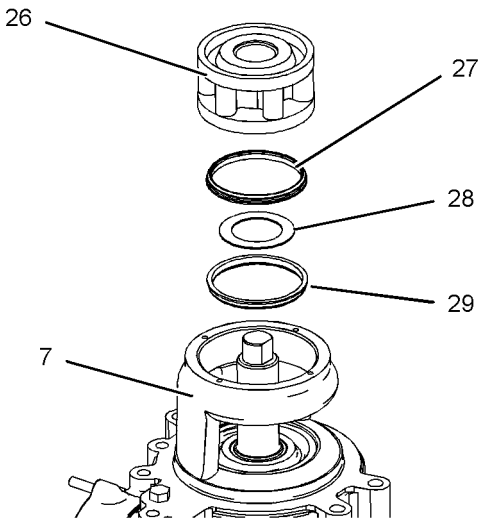

Illustration 410 g01077943

11. Install Duo-cone (27) onto pinion (26). Install Duo-cone (29) onto housing (7). Install washer (28) and install pinion (26). Refer to Disassembly and Assembly, "Duo Cone Conventional Seals - Install".

Note: Guarantee that there is a thin film of oil on both Duo-cone rings before installing the pinion assembly. Failure to oil will result in damaged Duo-cone seals.

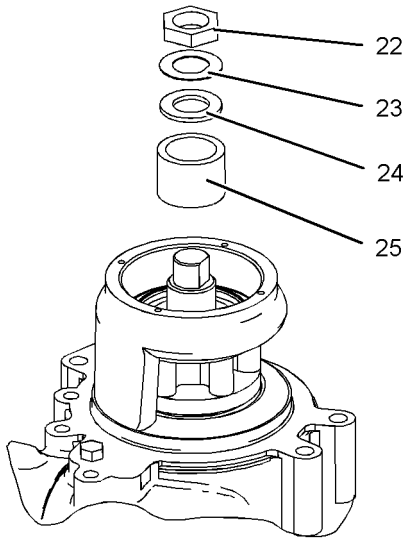

Illustration 411 g01077940

12. Install collar (25), spacer (24), lock (23), and nut (22). Tighten nut (22) to a torque of 325 ± 27 N·m (240 ± 20 lb ft). Bend lock tab (23) onto nut (22).

13. Install Duo-cone (27) onto the other side of the pinion (26).

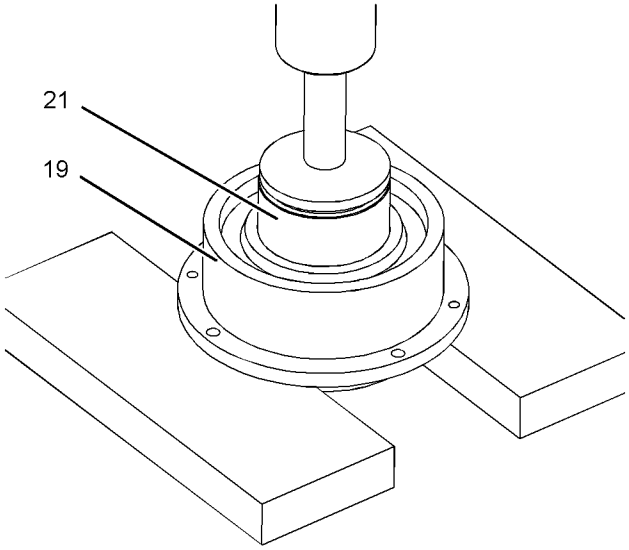

Illustration 412 g01078043

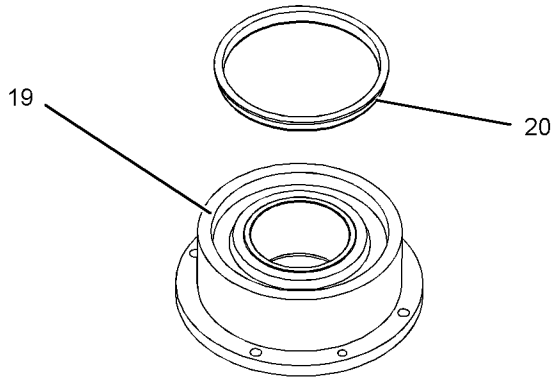

Illustration 413 g01077897

14. Use a suitable press in order to install bearing (21) into cage (19). Install bearing (21) until bearing (21) is flush with the surface of cage (19).

15. Install Duo-cone (20) onto cage assembly (19).

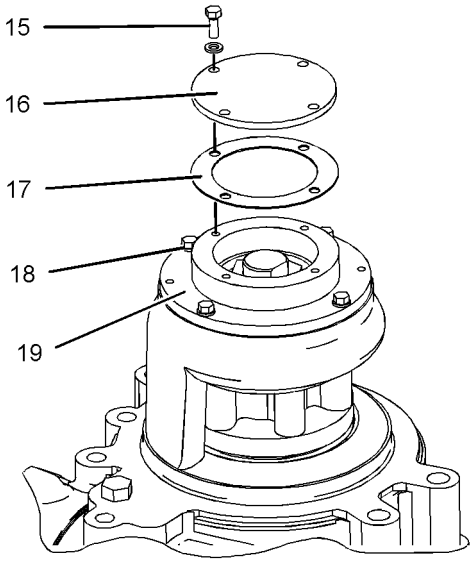

Illustration 414 g01078046

16. Install cage assembly (19). Install bolts (18). Install new gasket (17), cover (16) , washers, and bolts (15).

Note: Guarantee that there is a thin film of oil on both Duo-cone rings before installing the pinion assembly. Failure to oil will result in damaged Duo-cone seals.

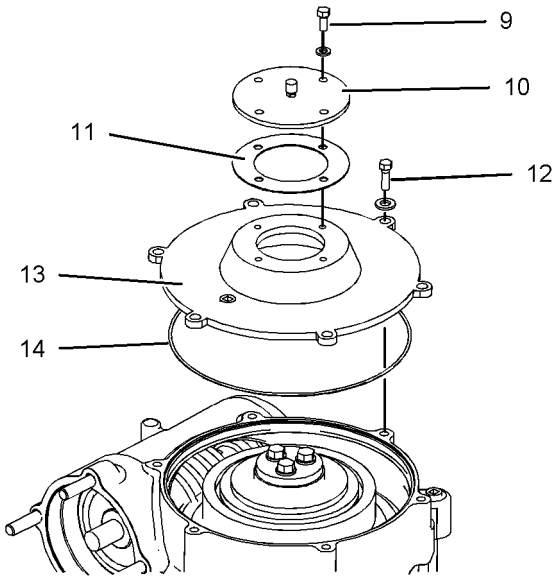

Illustration 415 g01072470

17. Install seal (14) and cover (13). Apply Tooling (B) to bolts (12). Install bolts (12). Install gasket (11) and cover (10). Install washers and bolts (9).

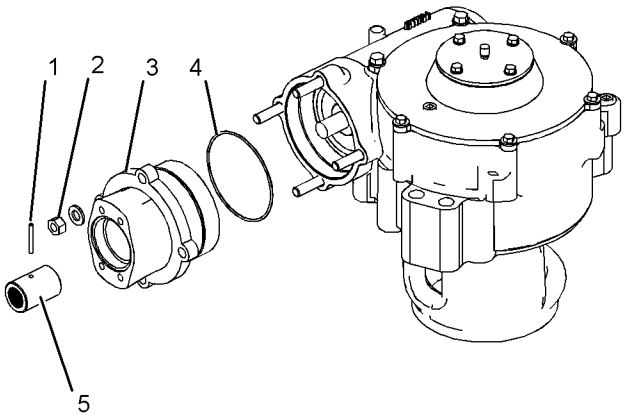

Illustration 416 g01079003

18. Lubricate seal (4) with the lubricant that is being sealed. Install seal (4). Install adapter (3) and nuts (2). Install coupling (5) and pin (1).

End By:

a. Install the circle drive.

i07038630

Circle Drive - Assemble

SMCS Code: 5207-016

Assembly Procedure

Table 41

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
C	1P-0520	Driver Gp	1
D	8H-8581	Feeler Gauge	1
E	6V-2012	Depth Micrometer	1
F	-	Loctite 243	-
G	-	Loctite 277	-
H	FT-3338	Coupling	1

Note: Cleanliness is an important factor. Before assembly, thoroughly clean all parts in cleaning fluid. Allow the parts to air dry. Do not use wiping cloths or rags to dry parts. Lint may be deposited on the parts which may cause trouble. Inspect all parts. If any parts are worn or damaged, use new parts for replacement. Dirt and other contaminants can damage the precision component. Perform assembly procedures on a clean work surface. Keep components covered and protected always.

Note: Lubricate all the thrust washers, bearings, and seals with the lubricant that is being sealed.

Note: Check the O-ring seals, the gaskets, and the seals for wear or for damage. Replace the components, if necessary.

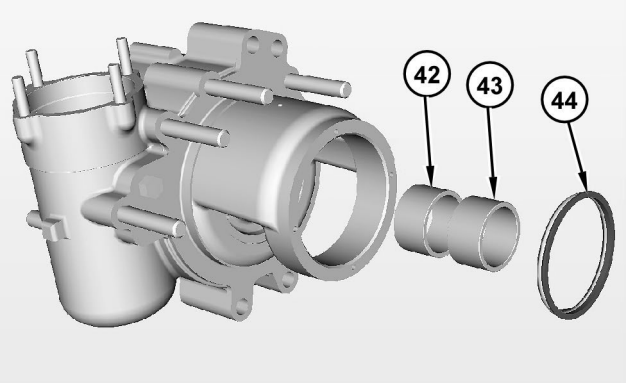

Illustration 417 g01450416

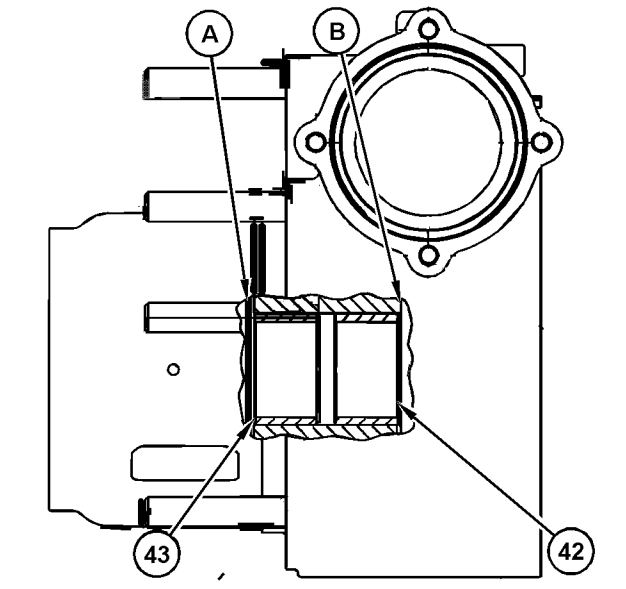

Illustration 418 g01450618

1. Lower the temperature of bearing (42). Use Tooling (C) to Install bearing (42) to a depth of 3 ± 1 mm (0.12 ± 0.04 inch) below face (B).

2. Lower the temperature of bearing (43). Use Tooling (C) to install bearing (43) to a depth of .8 ± .8 mm (0.03 ± 0.03 inch) below face (A).

3. Install Duo-cone seal gp (44). Refer to Disassembly and Assembly, “Duo-Cone Conventional Seals - Install”.

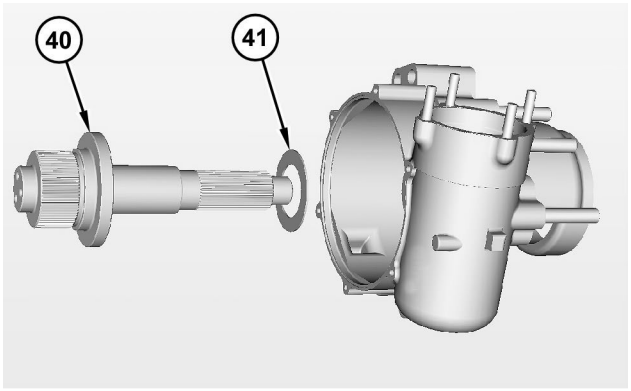

Illustration 419 g01450412

4. Position thrust washer (41) onto drive pinion shaft (40). Lubricate the bearing surfaces of drive pinion shaft (40) with the lubricant that is being used. Install the drive pinion shaft (40).

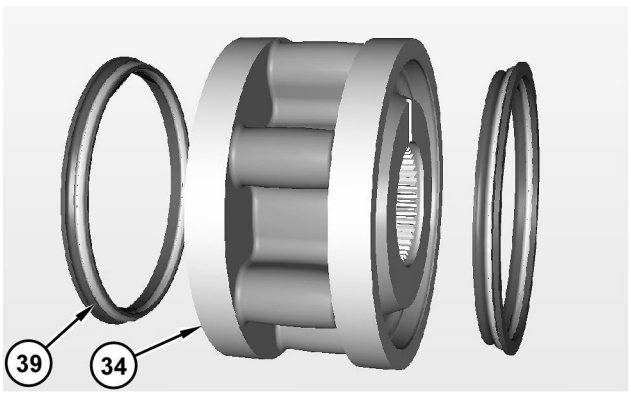

Illustration 420 g01450409

5. Install Duo-cone seal gp (39) onto circle drive pinion (34). Refer to Disassembly and Assembly, “Duo-Cone Conventional Seals - Install”.

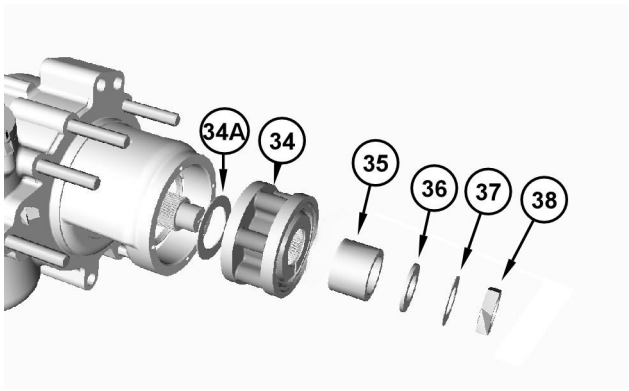

Illustration 421 g03736352

6. Install thrust washer (34A), circle drive pinion (34), collar (35), spacer (36), new nut lock (37), and nut (38).

7. Apply Tooling (G) to the threads of nut (38). Tighten nut (38) to a torque of 325 ± 27 N·m (240 ± 20 lb ft).

8. Bend the tab on nut lock (37) over nut (38).

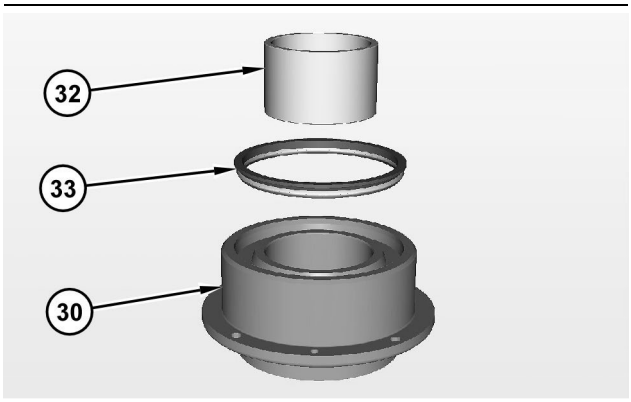

Illustration 422 g01450399

9. Lower the temperature of bearing sleeve (32). Use Tooling (C) to install bearing sleeve (33) into cage assembly (30).

10. Install Duo-cone seal gp (33). Refer to Disassembly and Assembly, “Duo-Cone Conventional Seals - Install”.

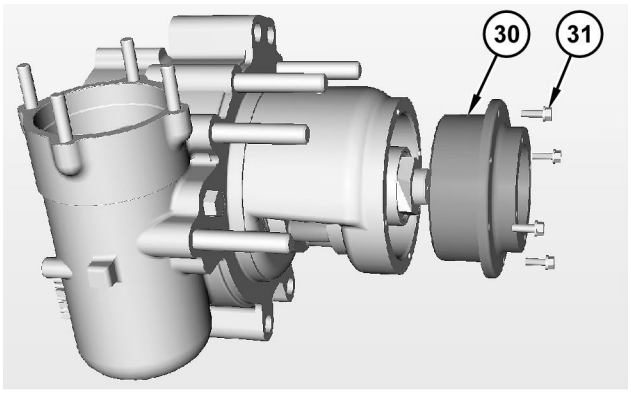

Illustration 423 g01450396

11. Position cage assembly (30) and install bolts (31).

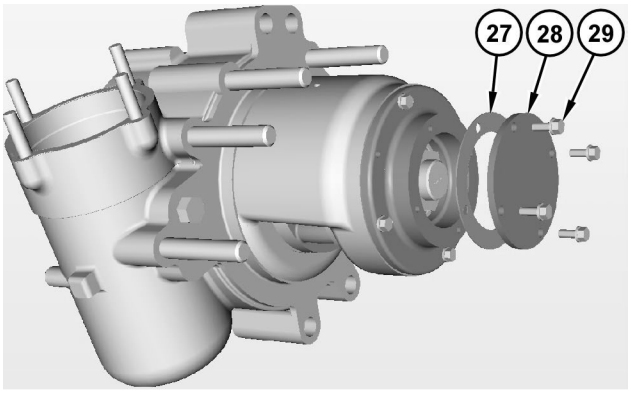

Illustration 424 g01450383

12. Position gasket (27) and cover (28).

13. Install bolts (29).

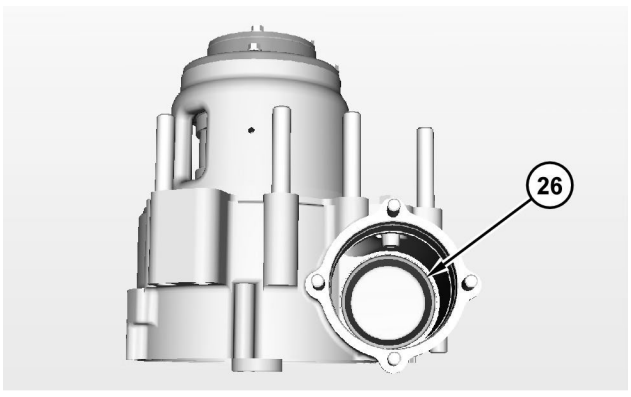

Illustration 425 g01450218

14. Lower the temperature of bearing cup (26). Use Tooling (C) to install bearing cup (26).

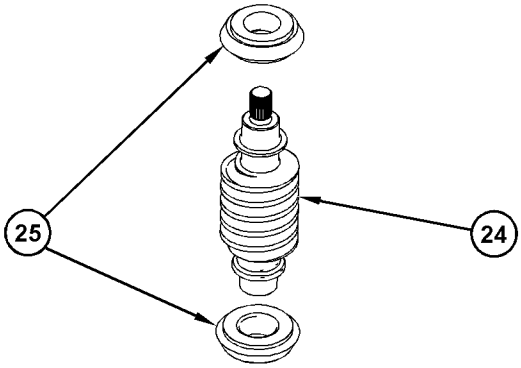

Illustration 426 g01451775

15. Raise the temperature of bearings (25). Install new bearings (25) onto worm (24).

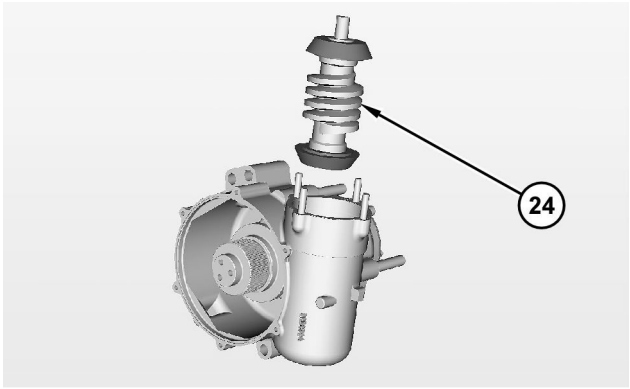

Illustration 427 g01450215

16. Install worm (24).

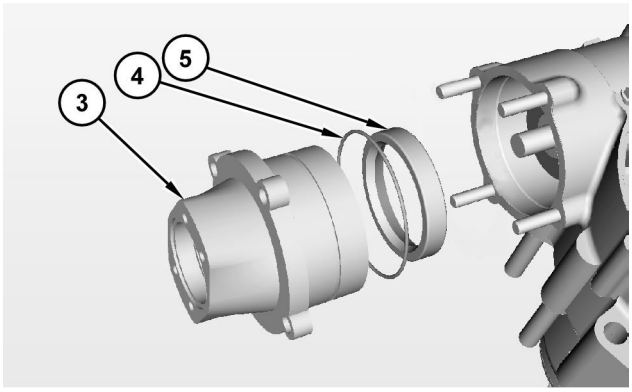

Illustration 428 g01501791

17. Lower the temperature of bearing cup (5). Use Tooling (C) to install bearing cup (5) into adapter (3). Install O-ring seal (4) on to adapter (3).

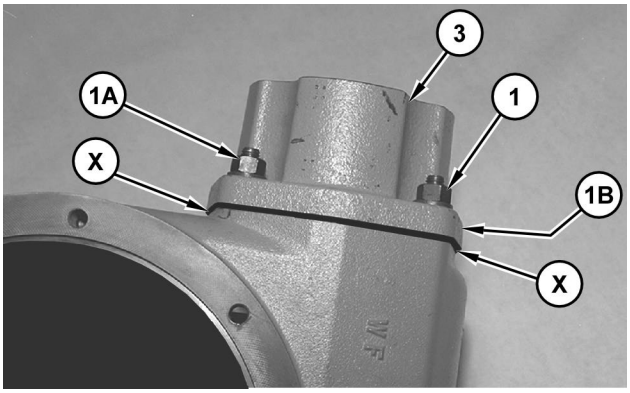

Illustration 429 g03778098

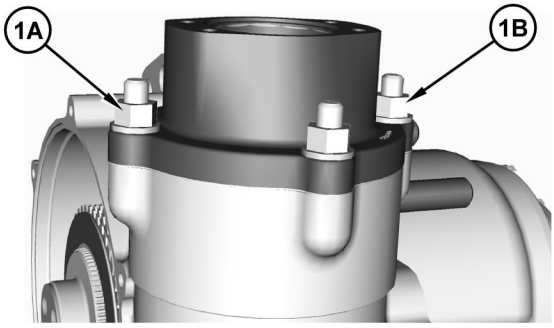

Illustration 430 g03779065

18. Install adapter (3) and tighten nuts (1) hand tight.

19. Torque nut (1A) to 20 N·m (15 lb ft) and nut (1B) 40 N·m (30 lb ft). Then Torque nut (1A) to 80 N·m (60 lb ft) and nut (1B)80 N·m (60 lb ft). Then Torque nut (1A) to 130 N·m (96 lb ft) and nut (1B) 130 N·m (96 lb ft) rotate the worm 3 revolutions with Tooling (H) then back off the nuts.

20. Torque nut (1A) to 20 N·m (15 lb ft) and nut (1B) 40 N·m (30 lb ft) then torque nut (1A) to 40 N·m (30 lb ft) rotate the worm 3 revolutions with Tooling (H).

21. Torque nut (1A) to 40 N·m (30 lb ft) and nut (1B) 40 N·m (30 lb ft). Measure the average gap between the housing and adapter at locations (X) being torqued. Subtract 0.065 ± 0.05 mm (0.0025 ± 0.002 inch) to obtain the desire shim pack thickness.

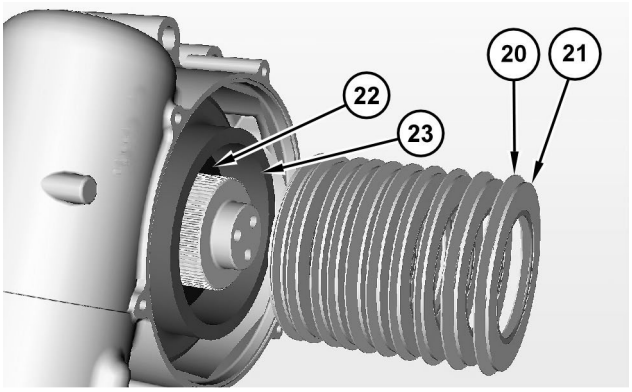

Illustration 431 g03885070

22. Install worm gear (23) and install spacer (22).

23. Install disks (21) and install plates (20).

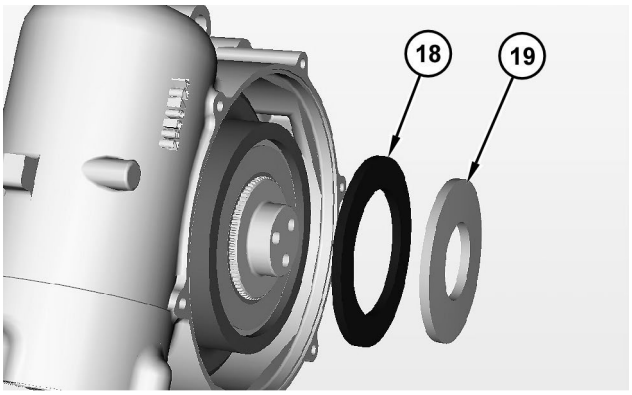

Illustration 432 g01451189

24. Install spacer (18) and spring disc (19).

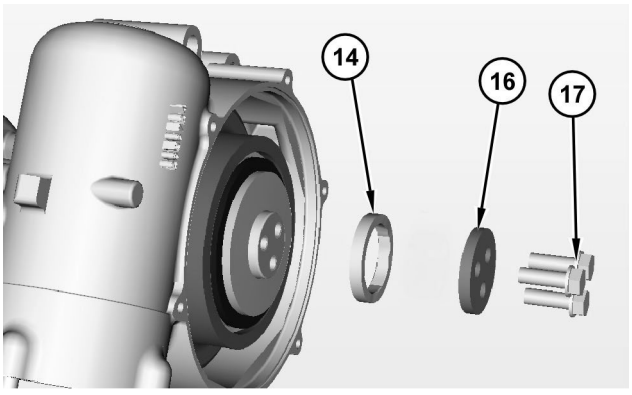

Illustration 433 g03890595

25. Install spacer (14), plate (16), and bolts (17).

Note: If bolts (17) are half inch bolts, then tighten bolts (17) to a torque of 130 ± 10 N·m (96 ± 7 lb ft).

Note: If bolts (17) are M16, then tighten bolts (17) to 150 ± 20 N·m (110 ± 15 lb ft) .

26. Wait 45 minutes, then remove bolts (17), plate (16).

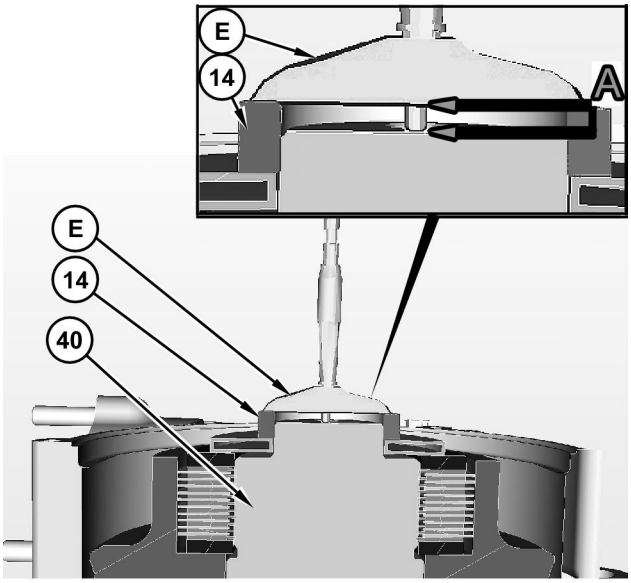

Illustration 434 g01451304

This cutaway view is of the circle drive.

27. Reposition the circle drive, as shown. Position Tooling (E), as shown.

28. Use Tooling (E) to obtain dimension (A). Dimension (A) is the distance between the top of spacer (14) to the face of drive pinion shaft (40).

29. Subtract 2.54 ± 0.25 mm (0.1000 ± 0.0098 inch) from dimension (A). The calculated dimension will be the thickness of shim pack (15).

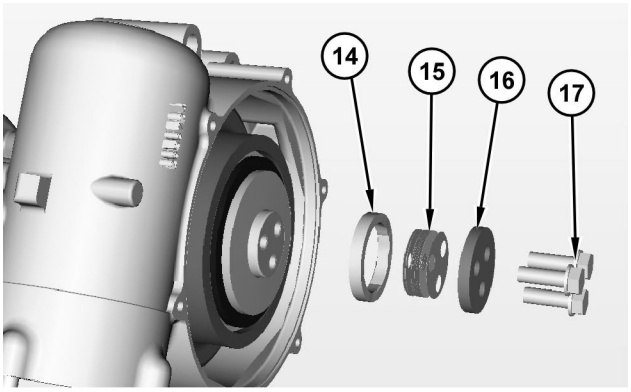

Illustration 435 g01451225

30. Install shims (15). The shim thickness was previously calculated in Step 29.

31. Install plate (16), and bolts (17).

Note: If bolts (17) are half inch bolts, then tighten bolts (17) to a torque of 130 ± 10 N·m (96 ± 7 lb ft).

Note: If bolts (17) are M16, then tighten bolts (17) to an initial torque of150 ± 20 N·m (110 ± 15 lb ft) . Perform final torque for bolts (17) to 240 ± 40 N·m (177 ± 30 lb ft) two times.

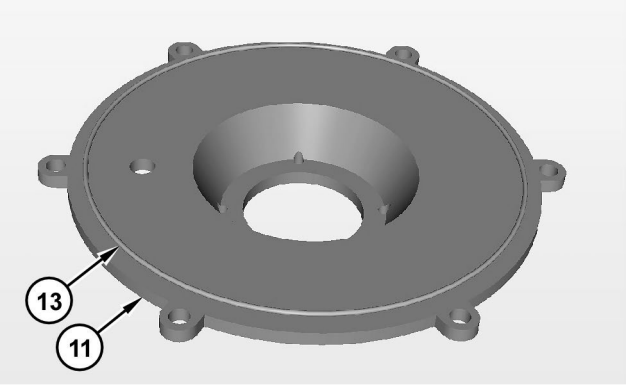

Illustration 436 g01450040

32. Install O-ring seal (13) onto cover (11).

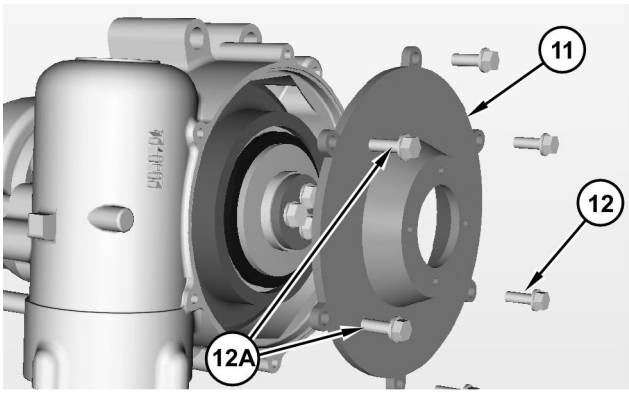

Illustration 437 g03801296

33. Install cover (11) and install four bolts (12). Apply Tooling (F) to bolts (12A) and install bolts (12A), as shown.

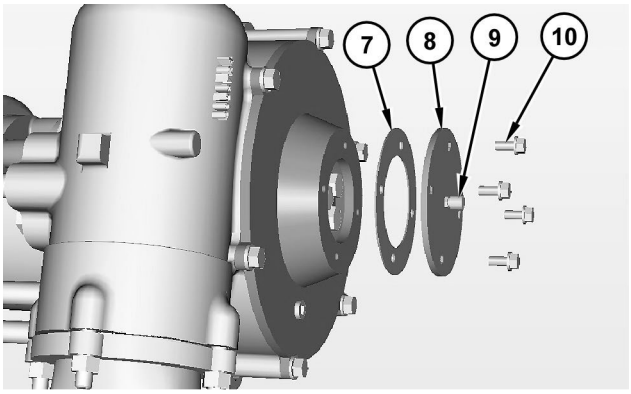

Illustration 438 g01451246

34. Install gasket (7), cover (8), bolts (10), and fitting (9).

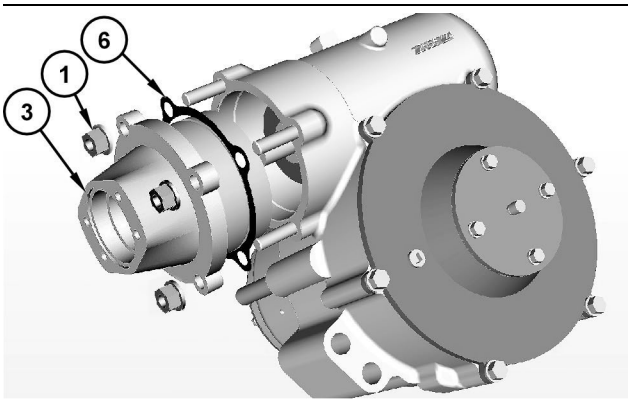

Illustration 439 g01501849

35. Remove adapter (3).

36. Install shims (6). The shim thickness was previously calculated in Step 21.

37. Install adapter (3). Install nuts (1) and the washers. Tighten nuts (1) to a torque of 215 ± 40 N·m (160 ± 40 lb ft).

End By:

a. Install the circle drive. Refer to Disassembly and Assembly, “Circle Drive - Install”.

i05891121

Circle Drive - Install

SMCS Code: 5207-012

Installation Procedure

Table 42

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	8S-7630	Stand	1
	8S-7621	Tube	1
	8S-7615	Pin	1
	8S-8048	Saddle	1
B	138-7574	Link Bracket	2

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

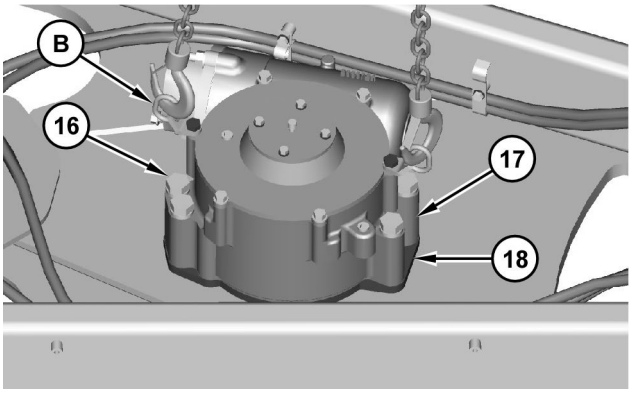

Illustration 440 g01880624

1. Install adapter plate (18). Use Tooling (B) and a suitable lifting device in order to install circle drive (17). The weight of circle drive (17) is approximately 204 kg (450 lb). Install bolts (16). Tighten bolts (16) to a torque of 850 ± 25 N·m (627 ± 18 lb ft).

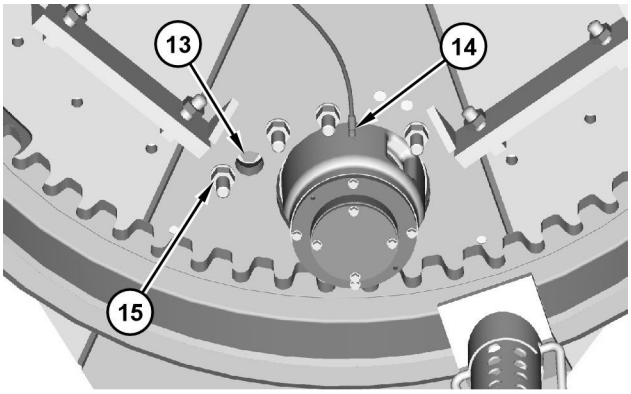

Illustration 441 g01880605

2. Install nuts (15). Tighten nuts (15) to a torque of 850 ± 25 N·m (627 ± 18 lb ft). Install plug (14). Connect grease hose assembly (13).

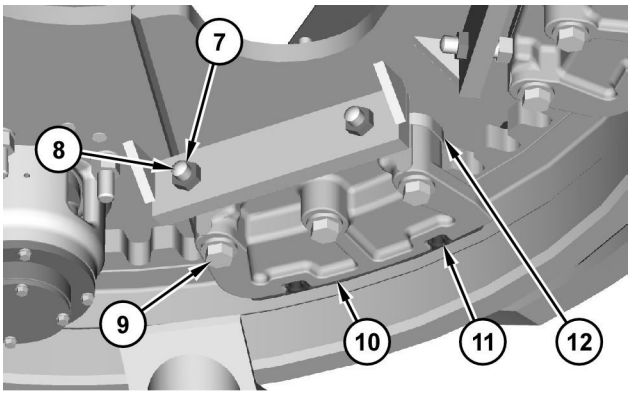

Illustration 442 g01881533

3. Ensure that all hydraulic lines are secure and plugged. Start the engine and run the engine. Move the machine forward until the gear of the circle is in contact with the pinion of the circle drive. Use the system hydraulics to lower the drawbar onto the circle.

4. Stop the engine and release system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

5. Install plate (12), wear strip (11), and shoe (10). Install bolts (9). Tighten bolts (8) and nuts (7). Repeat this step for the remaining shoes.

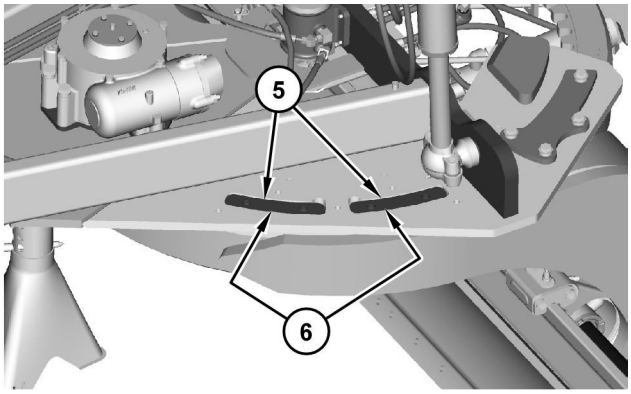

Illustration 443 g01881493

6. Install wear strips (6) and plates (5).

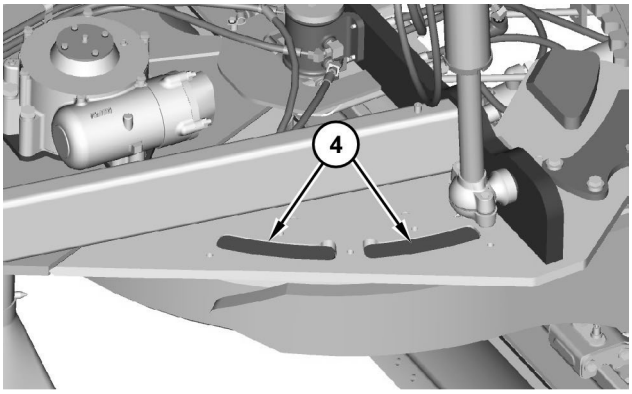

Illustration 444 g01881475

7. Install shims (4).

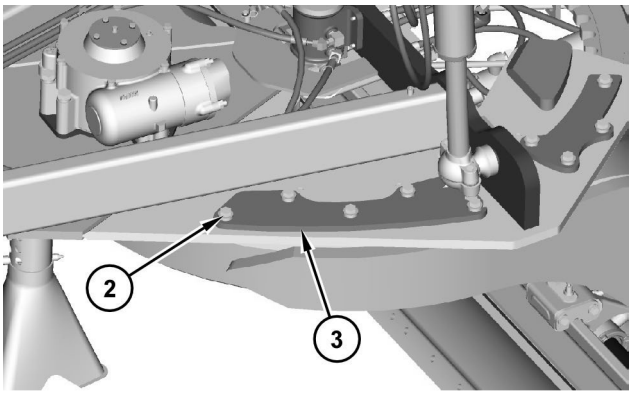

Illustration 445 g01881453

8. Install plate (3) and bolts (2).

9. Repeat Step 6 through Step 8 for the remaining shims.

10. Refer to Operation and Maintenance Manual, “Circle Clearances - Check/Adjust” in order to set the clearances for the circle.

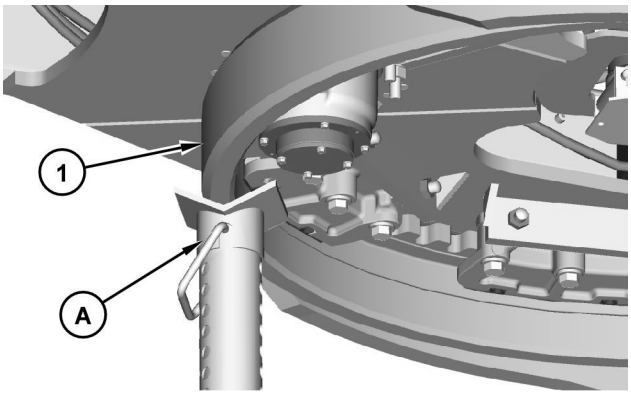

Illustration 446 g01881456

11. Remove Tooling (A) from circle (1).

End By:

a. Install the gerotor motor. Refer to Disassembly and Assembly, “Gerotor Motor (Circle Drive) - Install”. Fill the circle drive with final drive and axle oil. Refer to Operation and Maintenance Manual, “Lubricant Viscosities”.

i02673745

Swivel - Remove

SMCS Code: 5060-011

Removal Procedure

Table 43

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1
B	138-7575	Link Bracket	1

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.

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

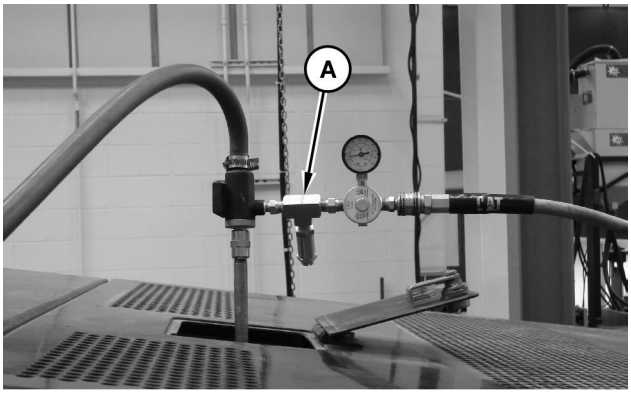

Illustration 447 g01368952

2. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

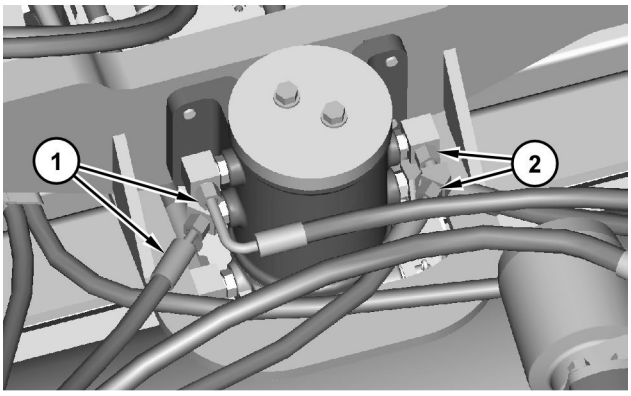

Illustration 448 g01342880

3. Disconnect hose assemblies (1) and hose assemblies (2).

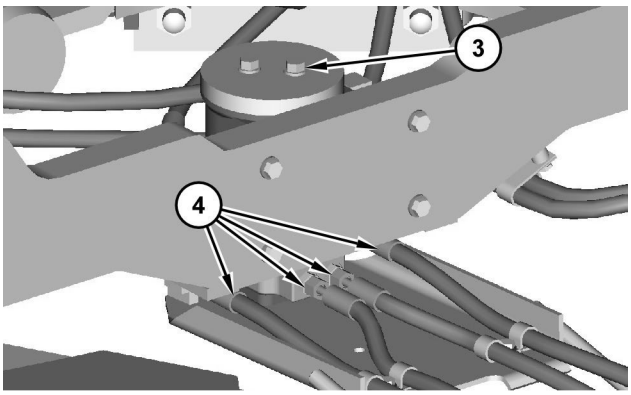

Illustration 449 g01342884

4. Remove bolt (3). Disconnect hose assemblies (4).

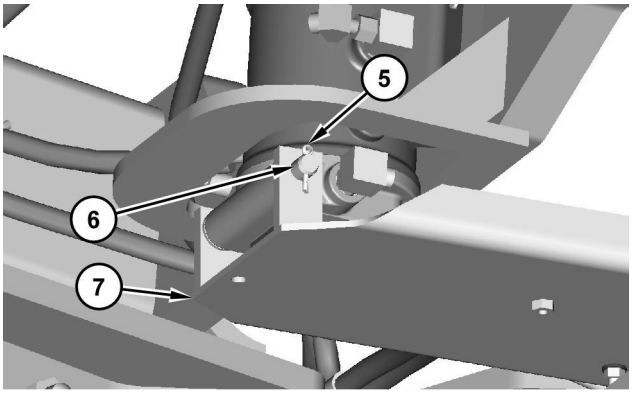

Illustration 450 g01342888

5. Remove cotter pin (5). Remove pin (6). Lower bracket (7).

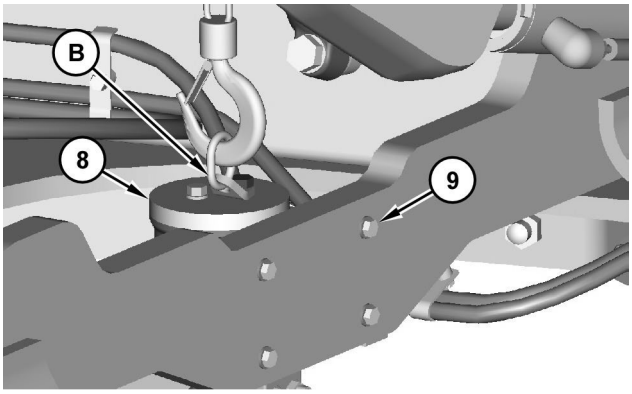

Illustration 451 g01342891

6. Attach Tooling (B) and a suitable lifting device onto swivel (8). The weight of swivel (8) is approximately 39 kg (85 lb).

7. Remove bolts (9). Remove swivel (8).

i02798002

Swivel - Disassemble

SMCS Code: 5060-015

Disassembly Procedure

Start By:

a. Remove the swivel. Refer to Disassembly and Assembly, "Swivel - Remove".

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.

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.

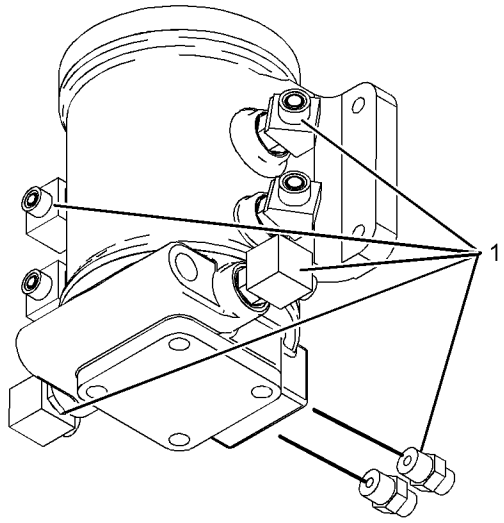

Illustration 452 g01398137

1. Remove all fittings (1).

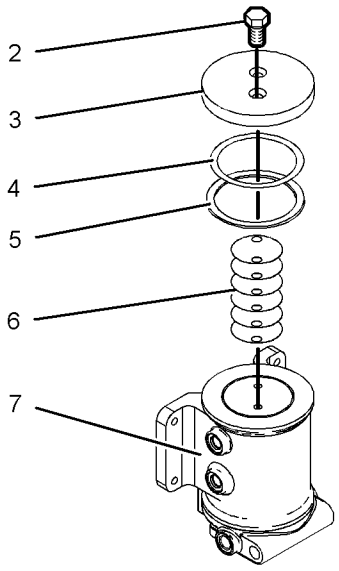

Illustration 453 g01398036

2. Remove bolts (2) and remove retainer (3).

3. Remove seal (4) and seal (5) from swivel assembly (7).

4. Remove shims (6) from swivel assembly (7).

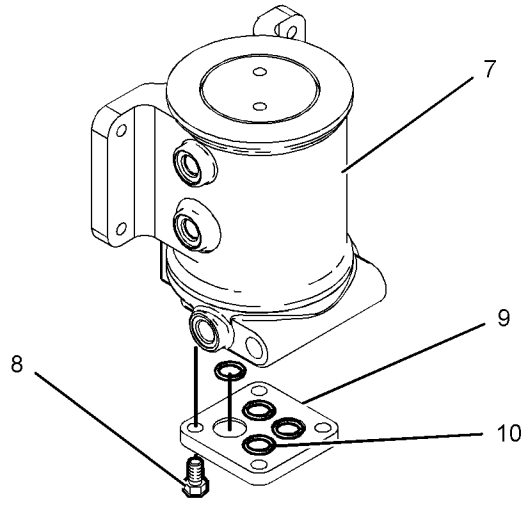

Illustration 454 g01398044

5. Remove bolts (8). Remove cover (9) from swivel assembly (7).

6. Remove O-ring seals (10) from cover (9).

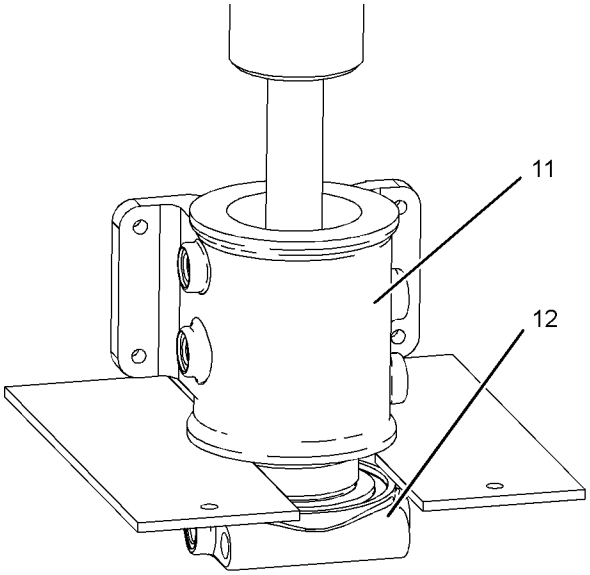

Illustration 455 g01398139

7. Separate rotor (12) from body (11).

8. Use a suitable press in order to remove rotor (12) from body (11).

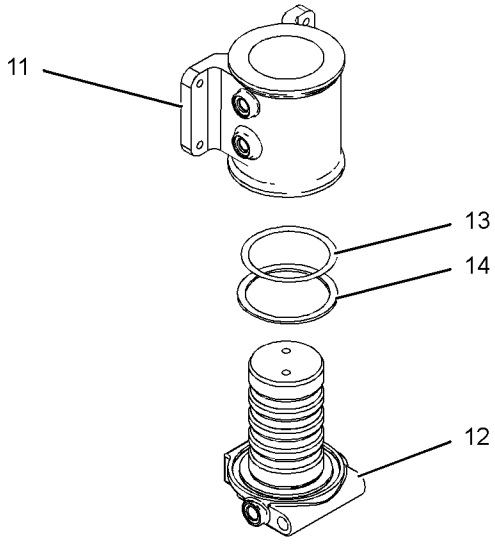

Illustration 456 g01398143

9. Remove seal (13) from rotor (12).

10. Remove seal (14) from rotor (12).

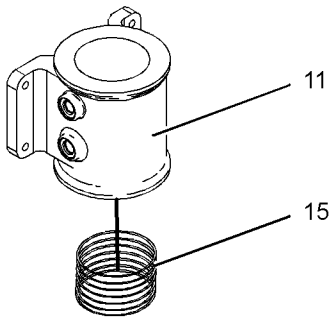

Illustration 457 g01398146

11. Remove seals (15) from body (11).

i02798336

Swivel - Assemble

SMCS Code: 5060-016

Assembly Procedure

Table 44

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1U-7234	Feeler Gauge	1

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.

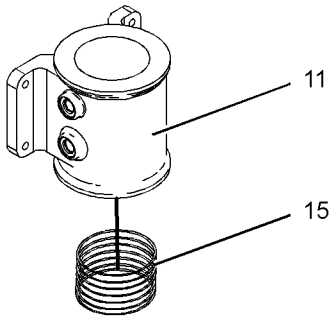

Illustration 458 g01398146

1. Install seals (15) in body (11). Lubricate seals (15) with the lubricant that is being sealed.

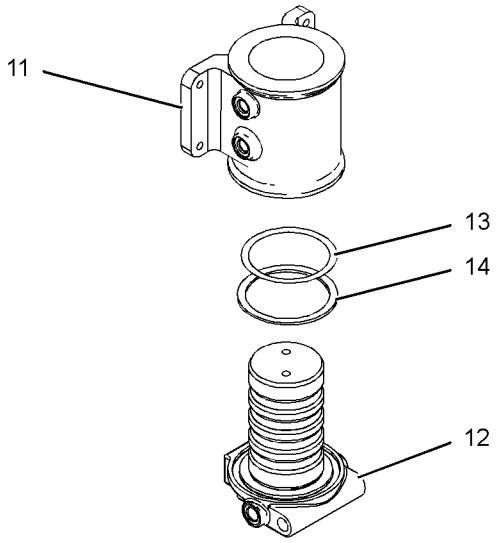

Illustration 459 g01398143

2. Install seal (14) on rotor (12). Lubricate seals (14) with the lubricant that is being sealed.

3. Install seal (13) on rotor (12). Lubricate seals (13) with the lubricant that is being sealed.

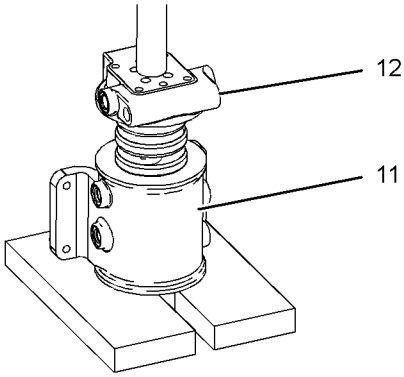

Illustration 460 g01398152

4. Use a suitable press in order to install rotor (12) in body (11).

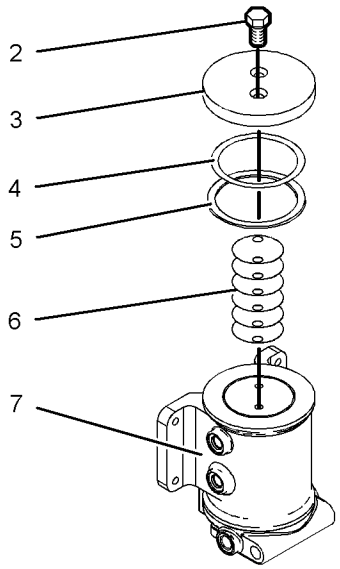

Illustration 461 g01398036

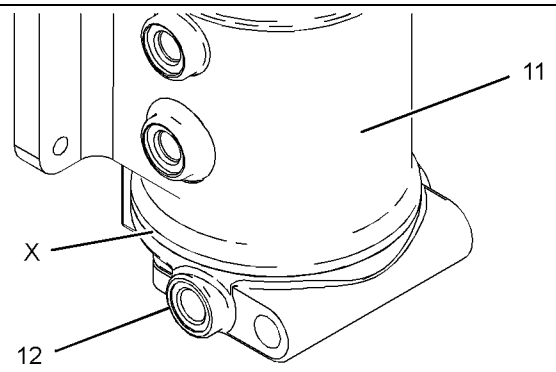

Illustration 462 g01398166

5. Install seals (4) and (5) into swivel assembly (7). Lubricate seals (4) and (5) with the lubricant that is being sealed.

6. Install retainer (3) and install bolt (2).

7. Use Tooling (A) in order to measure Area (X). Area (X) is the clearance between rotor (12) and body (11). The measurement must be 0.13 to 0.50 mm (0.005 to 0.020 inch).

Note: Remove bolts (2) and retainer (3). Use shims (6) in order to obtain the correct clearance.

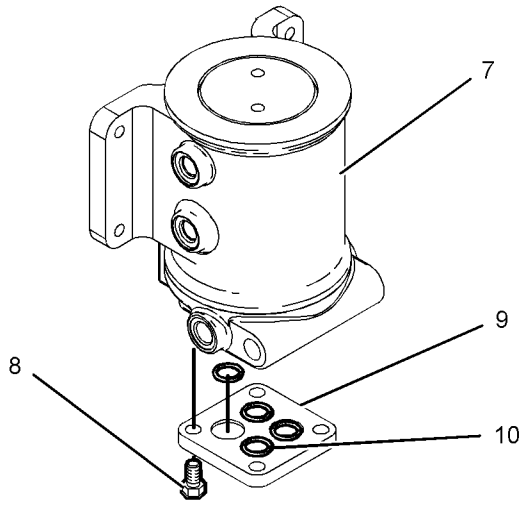

Illustration 463 g01398044

8. Install O-ring seals (10) in cover (9). Lubricate O-ring seals (10) with the lubricant that is being sealed.

9. Install cover (9) and bolts (8) to swivel assembly (7).

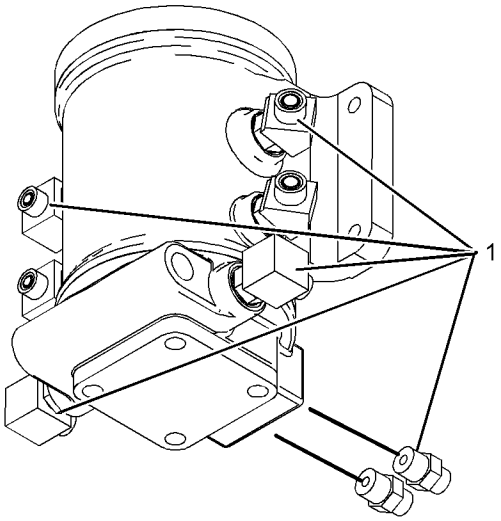

Illustration 464 g01398137

10. Install fittings (1).

End By:

a. Install the swivel. Refer to Disassembly and Assembly, “Swivel - Install”.

i02673746

Swivel - Install

SMCS Code: 5060-012

Installation Procedure

Table 45

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1
B	138-7575	Link Bracket	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

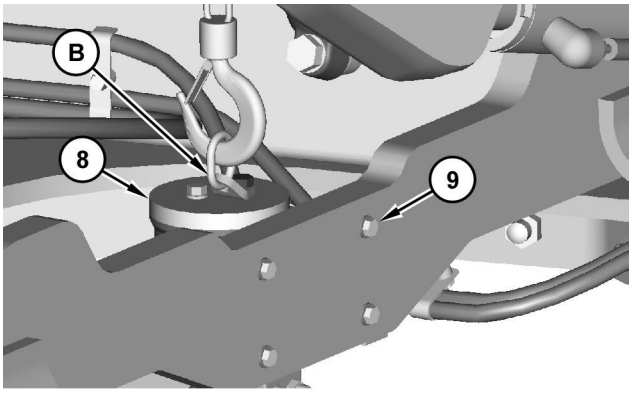

Illustration 465 g01342891

1. Use Tooling (A) and a suitable lifting device in order to install swivel (8). The weight of swivel (8) is approximately 39 kg (85 lb).

2. Install bolts (9).

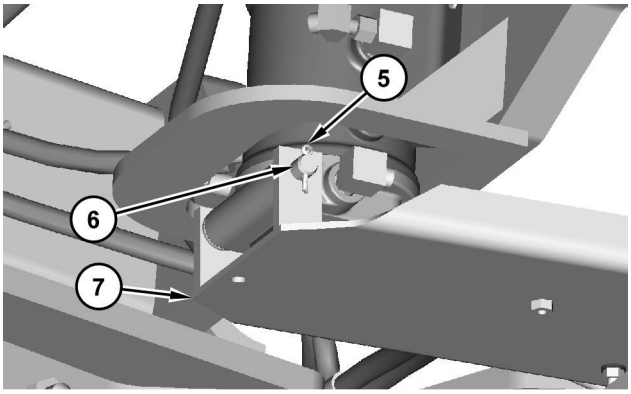

Illustration 466 g01342888

3. Raise bracket (7). Install pin (6). Install cotter pin (5).

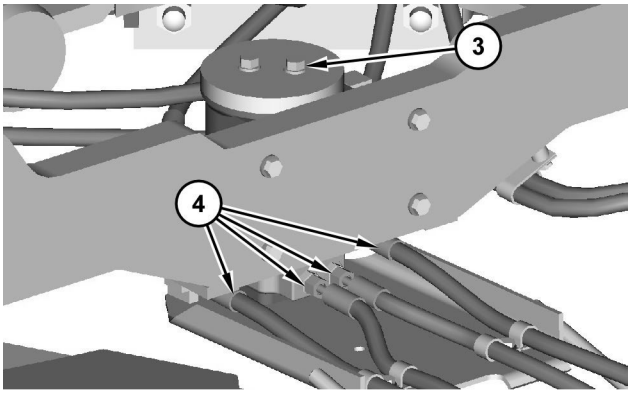

Illustration 467 g01342884

4. Connect hose assemblies (4). Install bolt (3).

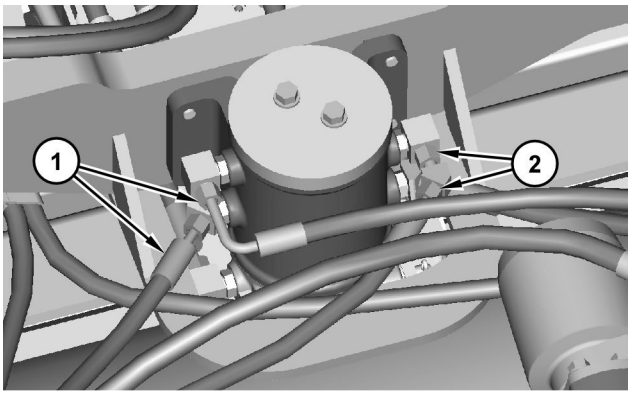

Illustration 468 g01342880

5. Connect hose assemblies (2) and hose assemblies (1).

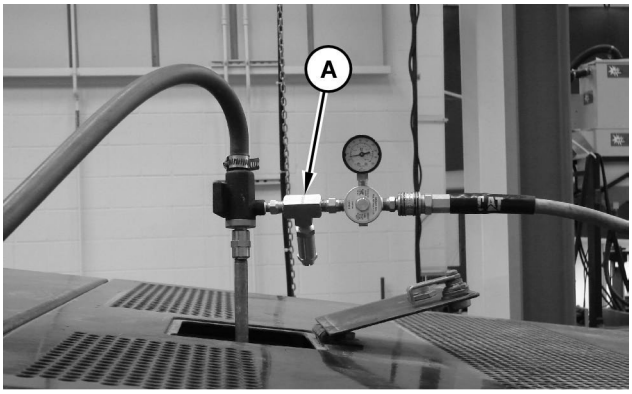

Illustration 469 g01368952

6. Remove Tooling (A).

7. Check the level of the hydraulic system. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check” for the correct procedure.

i02753793

Solenoid Valve (Centershift Lock) - Remove and Install

SMCS Code: 5221-010-JV; 5479-010

Removal Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Lower the blade to the ground. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

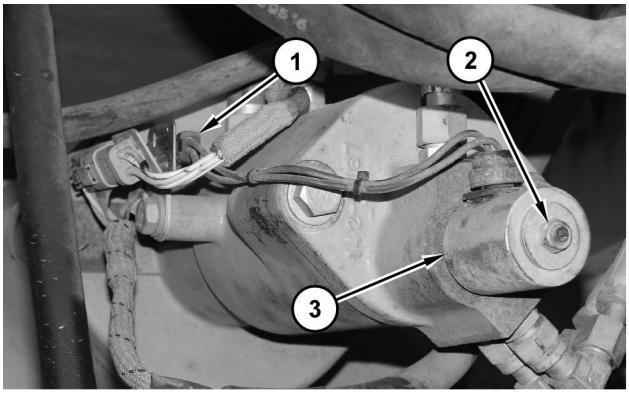

Illustration 470 g01378895

2. Disconnect harness assembly (1). Remove nut (2). Remove coil assembly (3).

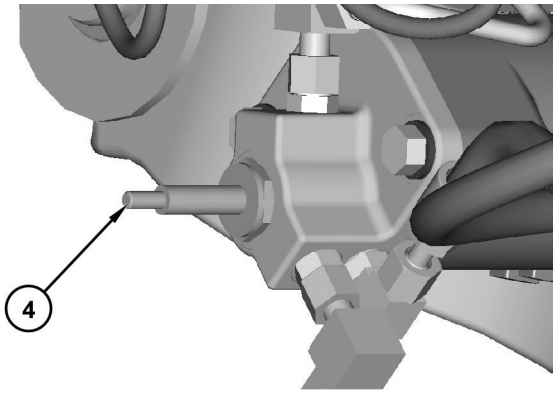

Illustration 471 g01379007

3. Remove cartridge (4).

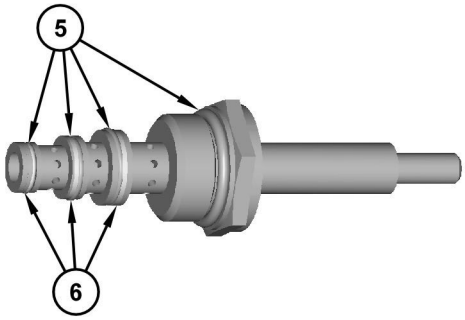

Illustration 472 g01379012

4. Remove O-ring seals (5). Remove rings (6).

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

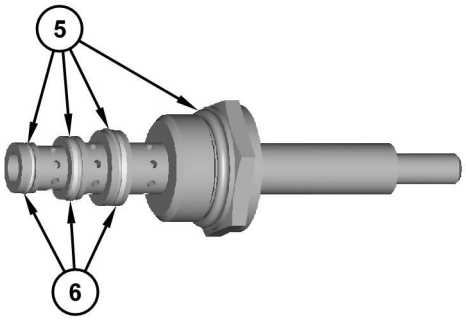

Illustration 473 g01379012

1. Install rings (6). Install O-ring seals (5).

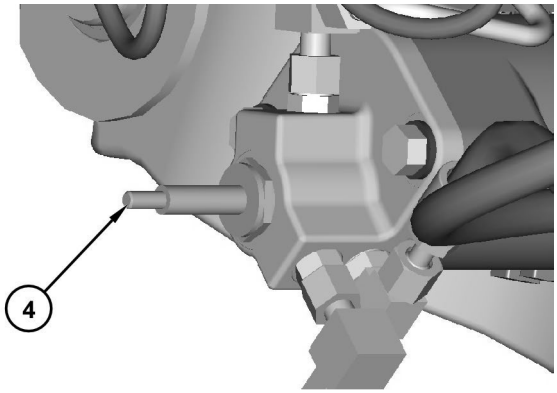

Illustration 474 g01379007

2. Install cartridge (4). Tighten cartridge (4) to a torque of 115 ± 7 N·m (85 ± 5 lb ft).

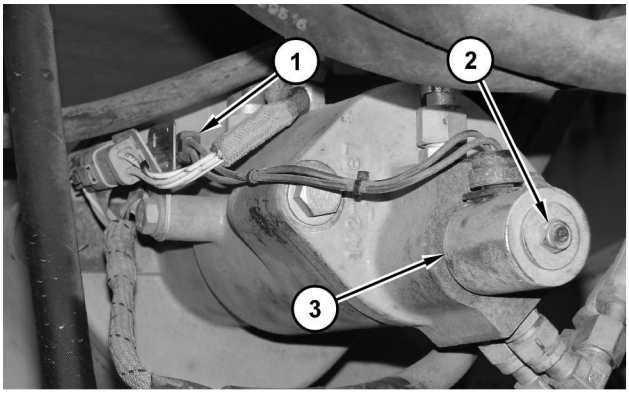

Illustration 475 g01378895

3. Install coil assembly (3). Install nut (2). Tighten nut (2) to a torque of 9 ± .5 N·m (80 ± 5 lb in). Connect harness assembly (1).

i02753659

Centershift Lock - Remove

SMCS Code: 5221-011

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Lower the blade to the ground. Retract the centershift lock pin. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

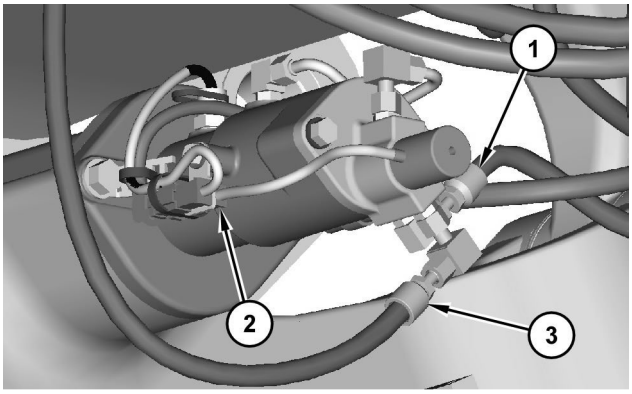

Illustration 476 g01378820

2. Disconnect hose assembly (1). Disconnect harness assemblies (2). Disconnect hose assembly (3).

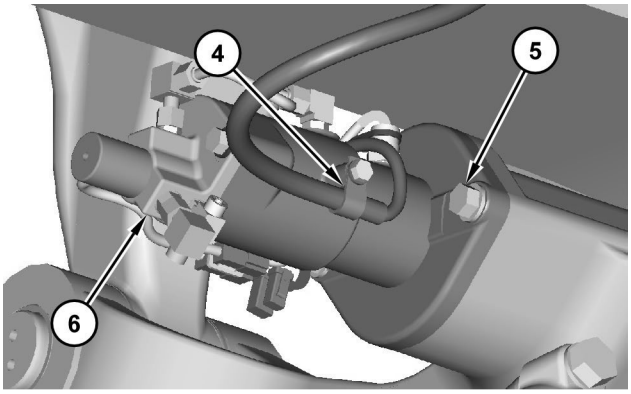

Illustration 477 g01378826

3. Remove clip (4). Remove bolts (5). Use two people in order to remove centershift lock (6). The weight of centershift lock (4) is approximately 20 kg (44 lb).

i02753713

Centershift Lock - Disassemble

SMCS Code: 5221-015

Disassembly Procedure

Start By:

a. Remove the centershift lock. Refer to Disassembly and Assembly, “Centershift Lock - Remove”.

b. Remove the solenoid valve. Refer to Disassembly and Assembly, “Solenoid Valve (Centershift Lock) - Remove and Install”.

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.

Note: Inspect the O-ring seals. Replace O-ring seals that are worn or damaged.

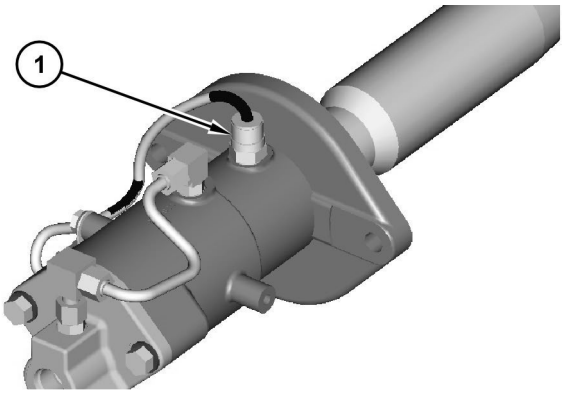

Illustration 478 g01378852

1. Remove switch (1).

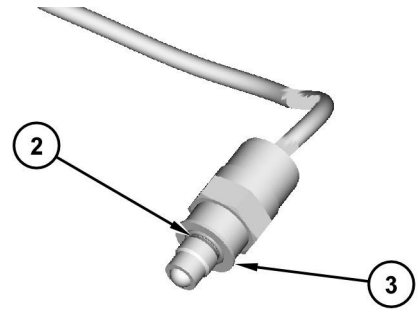

Illustration 479 g01378857

2. Remove O-ring seal (2). Remove shims (3).

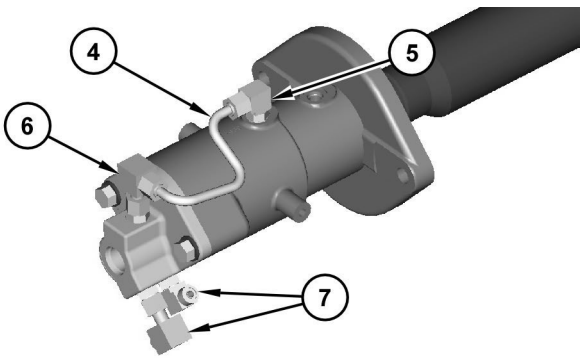

Illustration 480 g01378860

3. Remove tube assembly (4). Remove fitting (5). Remove fitting (6). Remove fittings (7).

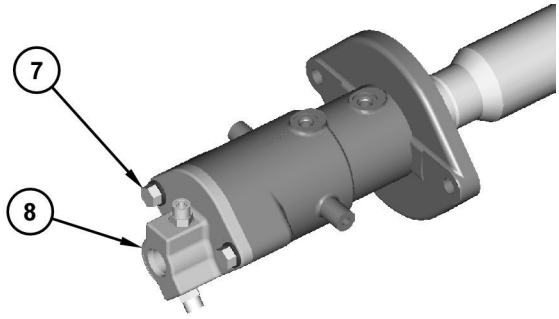

Illustration 481 g01378870

4. Remove bolts (7). Remove cap (8).

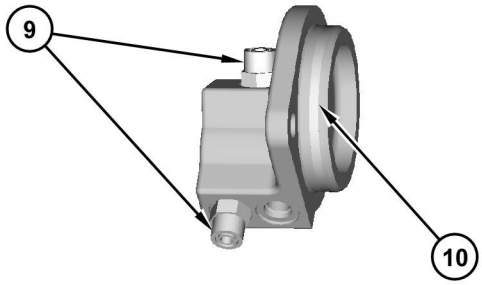

Illustration 482 g01378874

5. Remove fittings (9). Remove seal (10).

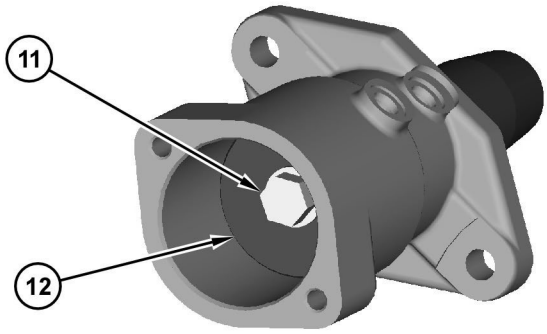

Illustration 483 g01378879

6. Remove bolt (11). Remove piston (12).

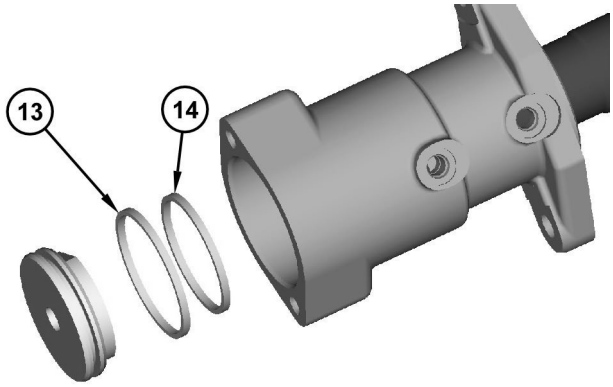

Illustration 484 g01378880

7. Remove seal (13). Remove ring (14).

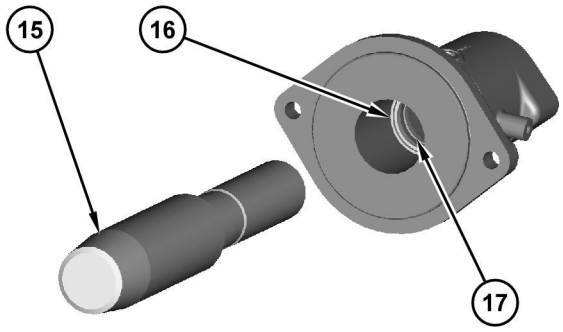

Illustration 485 g01378881

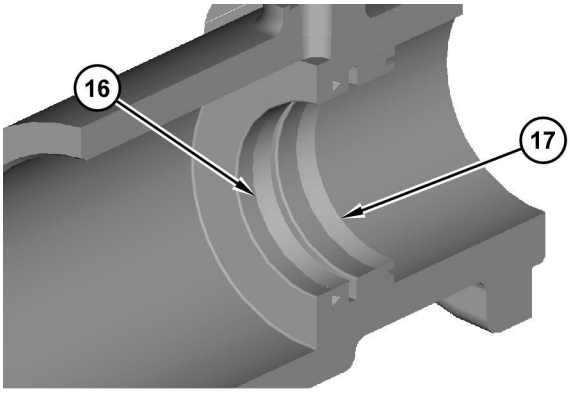

Illustration 486 g01378884

8. Remove pin (15). Remove seal (16). Remove seal (17).

i02753710

Centershift Lock - Assemble

SMCS Code: 5221-016

Assembly Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

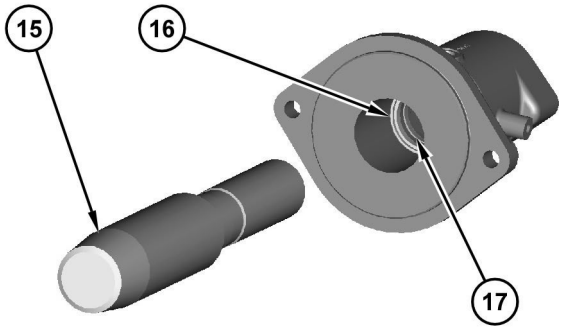

Illustration 487 g01378881

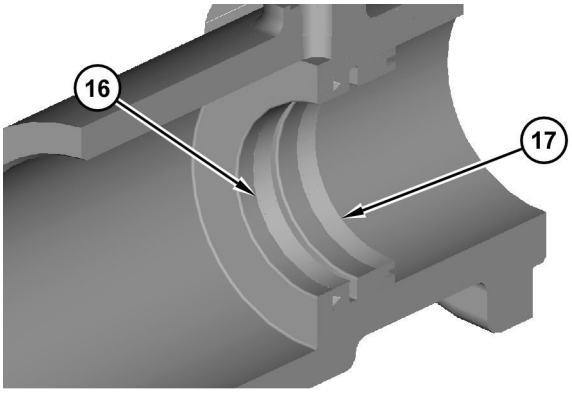

Illustration 488 g01378884

1. Install seal (17). Install seal (16). Install pin (15).

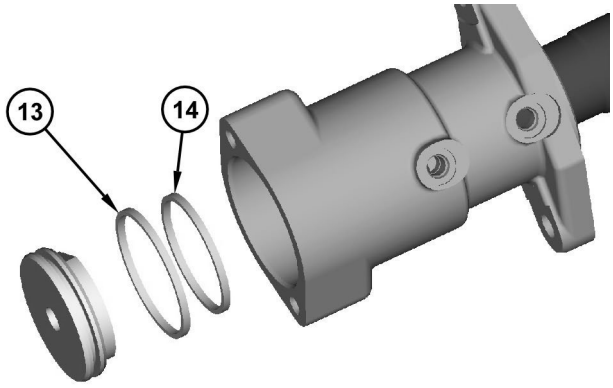

Illustration 489 g01378880

2. Install ring (14). Install seal (13).

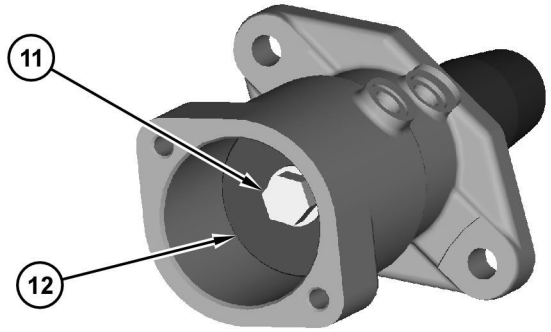

Illustration 490 g01378879

3. Install piston (12). Install bolt (11).

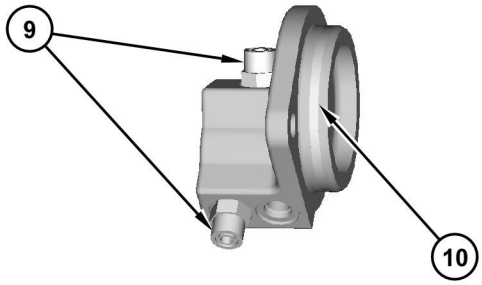

Illustration 491 g01378874

4. Install seal (10). Install fittings (9).

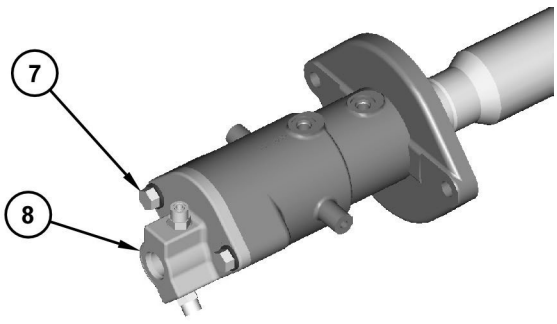

Illustration 492 g01378870

5. Install cap (8). Install bolts (7).

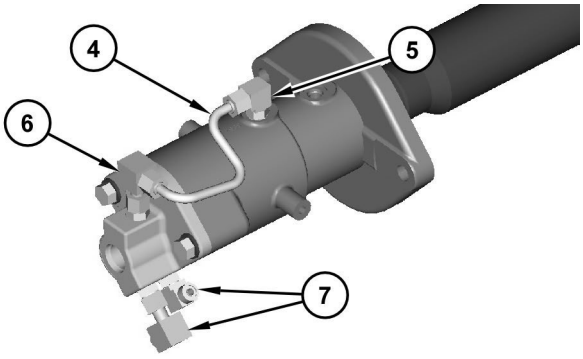

Illustration 493 g01378860

6. Install fittings (7). Install fitting (6). Install fitting (5). Connect tube assembly (4).

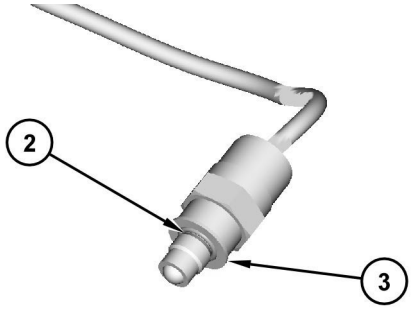

Illustration 494 g01378857

7. Install shims (3). Install O-ring seal (2).

Note: Use a minimum number of shims to allow the switch to be turned by a half turn after the circuit is opened.

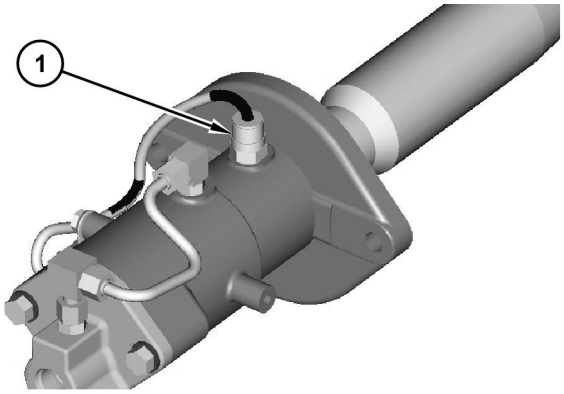

Illustration 495 g01378852

8. Install switch (1). Tighten switch (1) to a torque of 9.5 ± 0.5 N·m (84 ± 4 lb in).

End By:

a. Install the solenoid valve. Refer to Disassembly and Assembly, “Solenoid Valve (Centershift Lock) - Remove and Install”.

b. Install the centershift lock. Refer to Disassembly and Assembly, “Centershift Lock - Install”.

i02753663

Centershift Lock - Install

SMCS Code: 5221-012

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

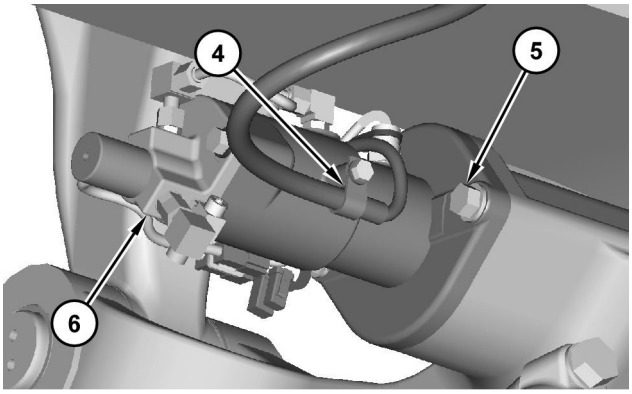

Illustration 496 g01378826

1. Use two people in order to Install centershift lock (6). The weight of centershift lock (4) is approximately 20 kg (44 lb). Install bolts (5). Install clip (4).

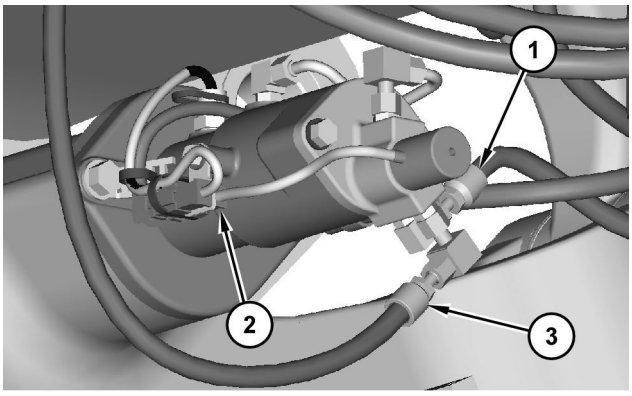

Illustration 497 g01378820

2. Connect hose assembly (3). Connect harness assemblies (2). Connect hose assembly (1).

i02753954

Blade Lift Arm - Remove

SMCS Code: 5219-011; 5222-011

Removal Procedure

Table 46

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	4C-9634	Puller Stud	1
	1P-1839	Bearing Puller Adapter	1

(continued)

(Table 46, contd)

	1P-1836	Bearing Puller Adapter	1
	9U-6832	Nut	1
	6V-3170	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	6V-4035	Sleeve	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Illustration 498 g01379099

1. Attach a suitable lifting device to cylinder (1). The weight of cylinder (1) is approximately 91 kg (200 lb). Remove bolts (2). Position cylinder (1) against the frame.

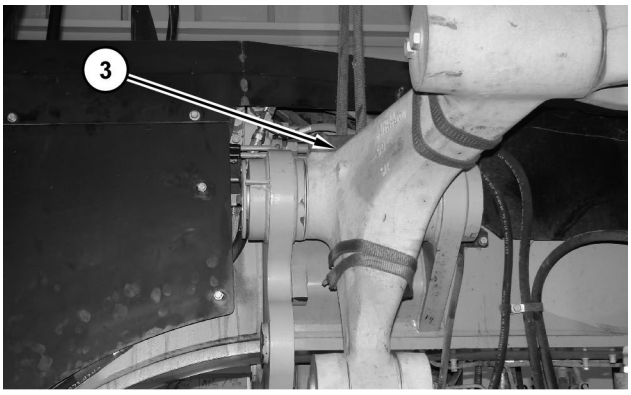

Illustration 499 g01379104

2. Attach two suitable lifting devices onto arm assembly (3). The weight of arm assembly (3) is approximately 186 kg (410 lb).

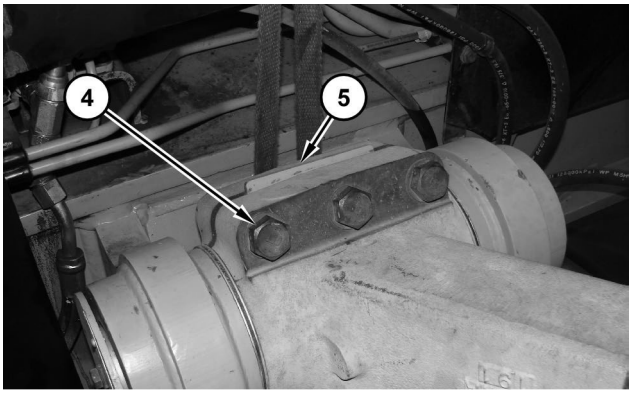

Illustration 500 g01379116

3. Remove bolts (4) and lock (5).

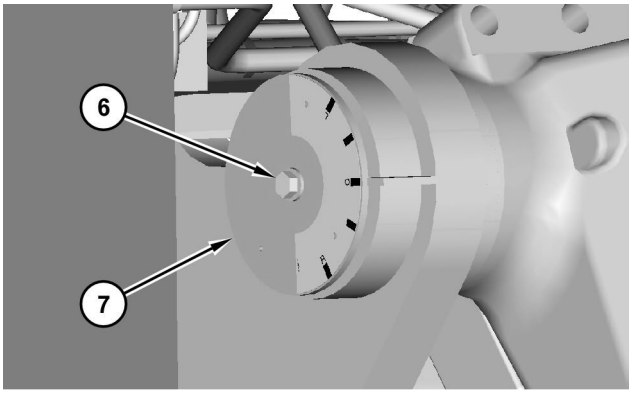

Illustration 501 g01379124

4. Remove bolts (6) and plate (7).

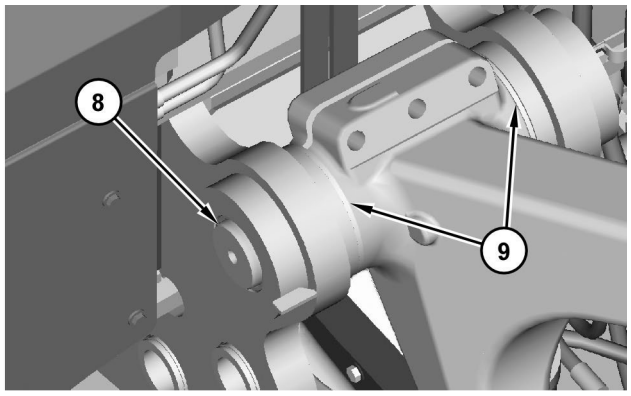

Illustration 502 g01379129

5. Remove pin (8) and thrust washers (9).

Note: Note the order and the quantity of thrust washers (9).

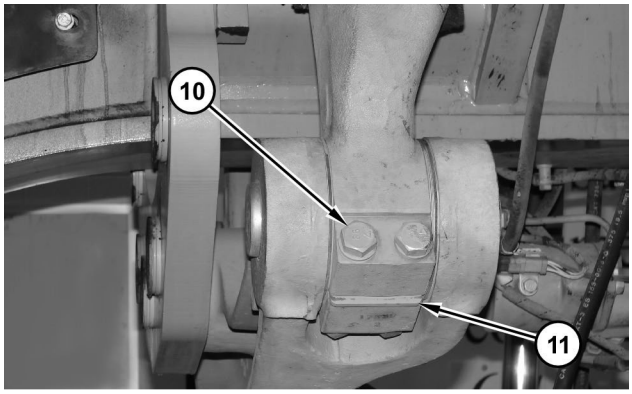

Illustration 503 g01379147

6. Remove bolts (10) and lock (11).

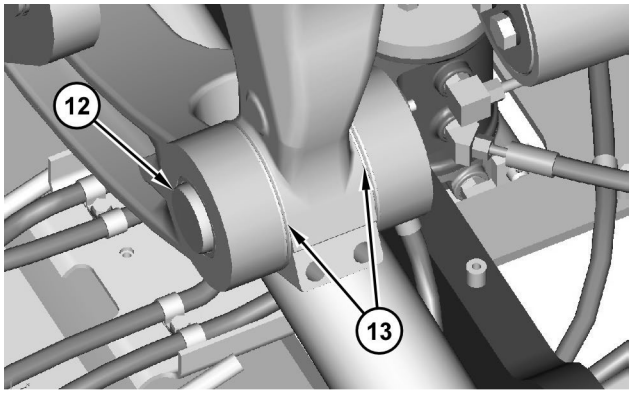

Illustration 504 g01379155

7. Remove pin (12) and thrust washers (13).

Note: Note the order and the quantity of thrust washers (13).

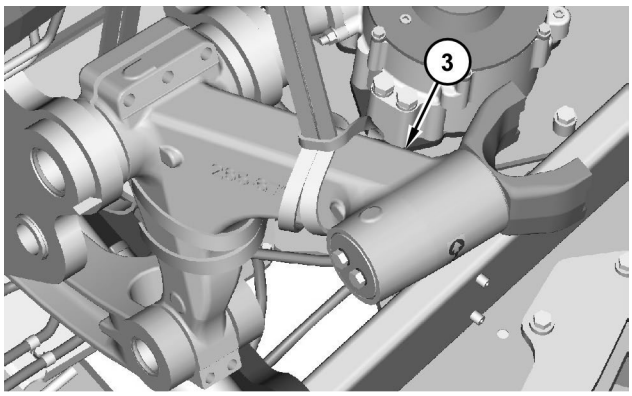

Illustration 505 g01379220

8. Remove arm assembly (3).

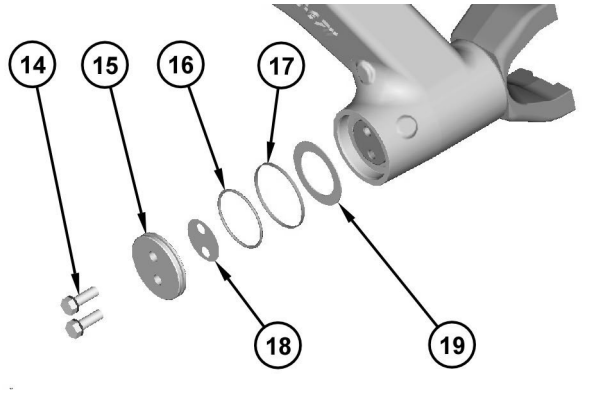

Illustration 506 g01379234

9. Remove bolts (14) and retainer (15). Remove seal (17) and O-ring seal (16). Remove shims (18). Remove thrust washers (19).

Note: Note the quantity and the order of shims (18) and thrust washers (19).

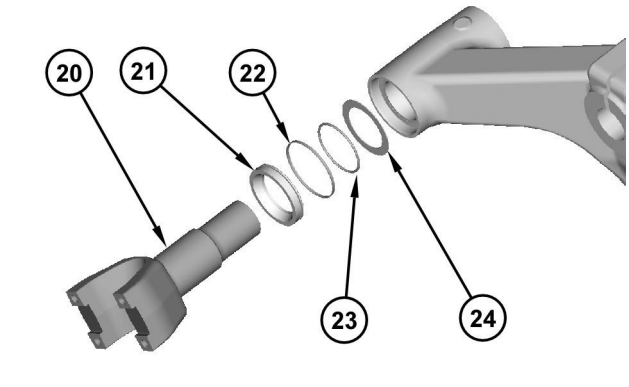

Illustration 507 g01379242

10. Remove yoke (20). Remove ring (21). Remove seal (22) and O-ring seal (23). Remove thrust washers (24).

Note: Note the quantity and the order of thrust washers (24).

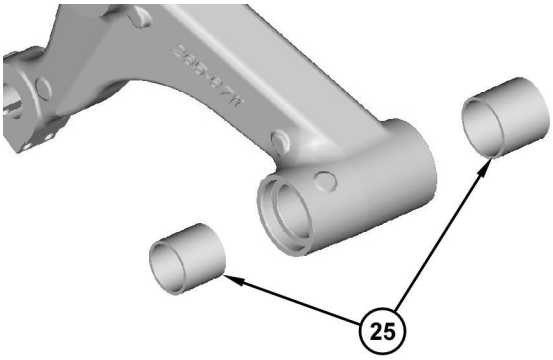

Illustration 508 g01379246

11. Remove bearings (25).

Note: If bearings (25) are removed, replace bearings (25).

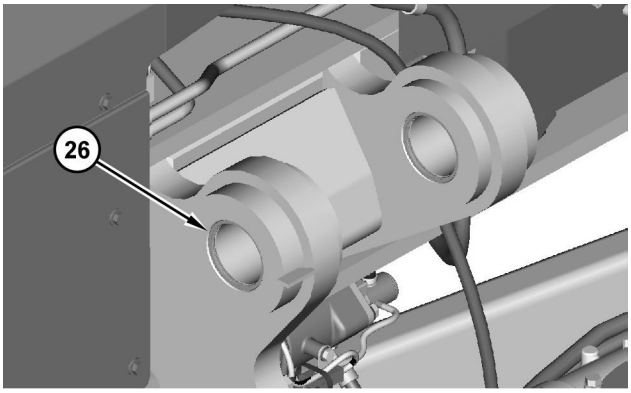

Illustration 509 g01379256

12. Remove lip seal (26). Repeat this step for the remaining lip seals (26).

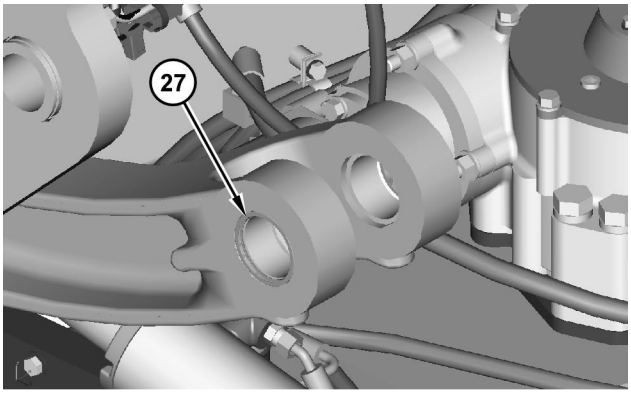

Illustration 510 g01379258

13. Remove lip seal (27). Repeat this step for the remaining lip seals (27).

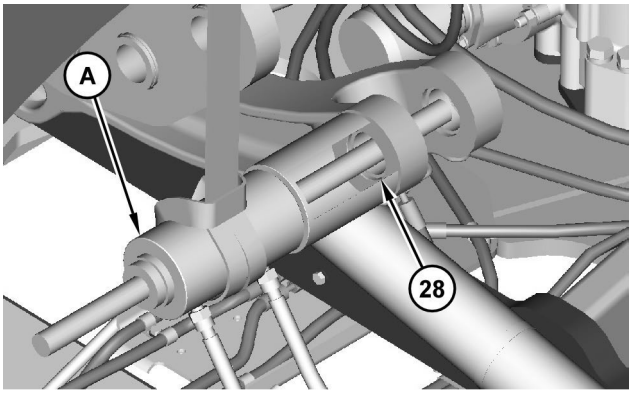

Illustration 511 g01379263

14. Use Tooling (A) and a suitable lifting device in order to remove bearing (28). Repeat this step for the remaining bearing (28).

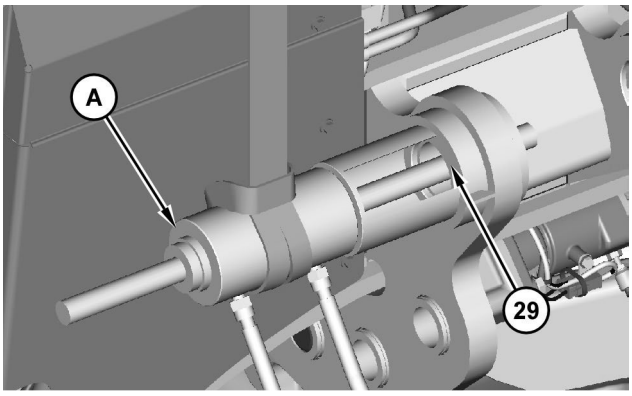

Illustration 512 g01379267

15. Use Tooling (A) and a suitable lifting device in order to remove bearing (29). Repeat this step for the remaining bearing (29).

i02754398

Blade Lift Arm - Install

SMCS Code: 5219-012; 5222-012

Installation Procedure

Table 47

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	4C-9634	Puller Stud	1
	1P-1836	Bearing Puller Adapter	1

(continued)

(Table 47, contd)

	1P-1839	Bearing Puller Adapter	1
	9U-6832	Nut	1
	6V-3170	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
C	1P-0510	Driver Gp	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

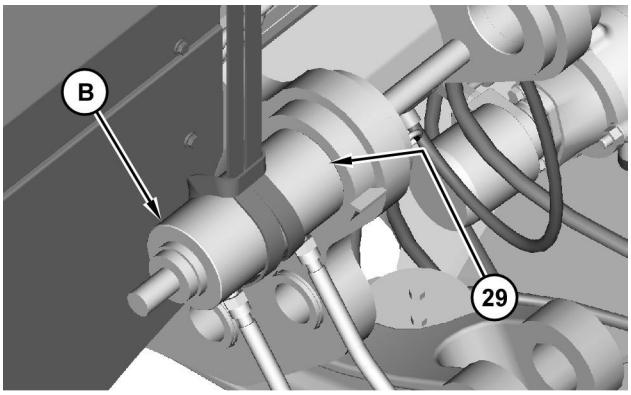

Illustration 513 g01379343

1. Lower the temperature of bearing (29). Use Tooling (B) and a suitable lifting device in order to install bearing (29). Repeat this step for the remaining bearing (29).

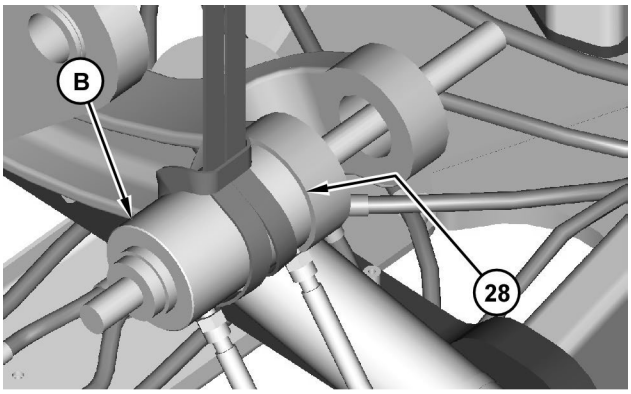

Illustration 514 g01379361

2. Lower the temperature of bearing (29). Use Tooling (B) and a suitable lifting device in order to install bearing (28). Repeat this step for the remaining bearing (28).

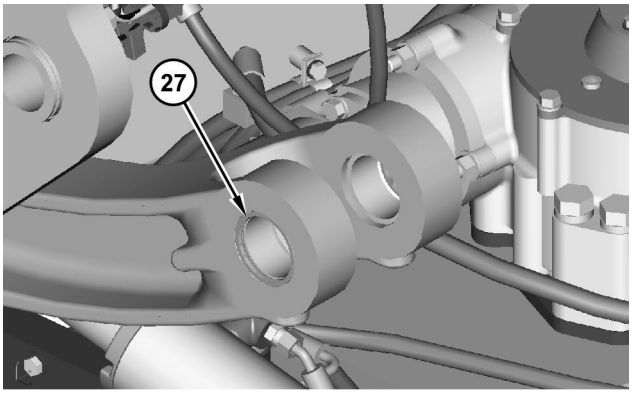

Illustration 515 g01379258

3. Use Tooling (C) in order to install lip seal (27). Repeat this step for the remaining lip seals (27).

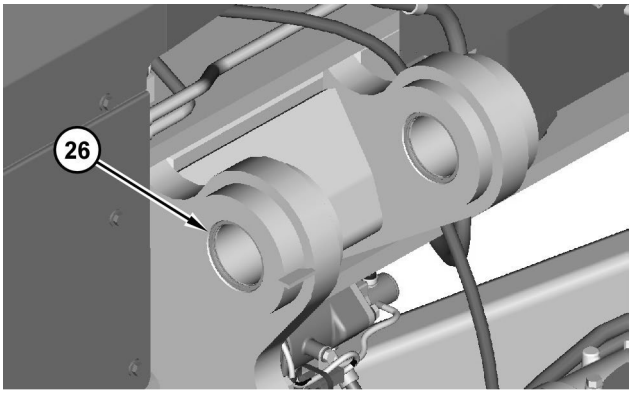

Illustration 516 g01379256

4. Use Tooling (C) in order to install lip seal (26). Repeat this step for the remaining lip seals (26).

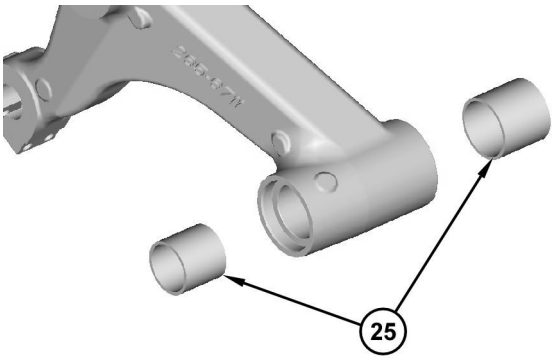

Illustration 517 g01379246

5. Lower the temperature of new bearings (25). Install new bearings (25).

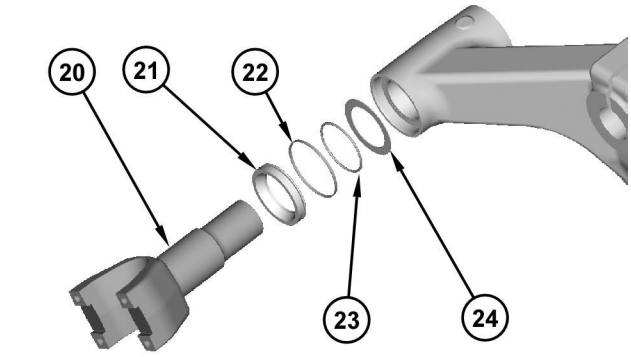

Illustration 518 g01379242

6. Install O-ring seal (23) and seal (22) onto ring (21). Install ring (21) onto yoke (20). Install thrust washers (24). Install yoke (20).

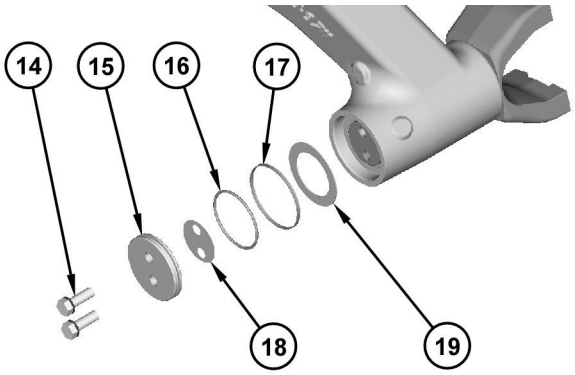

Illustration 519 g01379234

7. Install O-ring seal (16) and seal (17) onto retainer (15). Install thrust washers (19). Install shims (18). Use a number of shims (18) to obtain a maximum end play of 0.250 mm (0.0098 inch). Install retainer (15). Install bolts (14).

Note: The yoke must rotate freely.

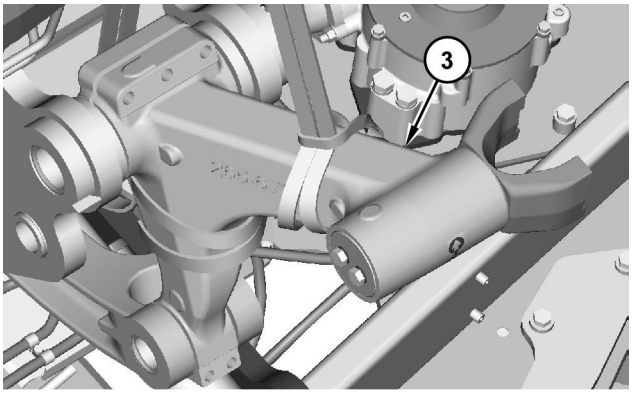

Illustration 520 g01379220

8. Use two suitable lifting devices in order to install arm assembly (3). The weight of arm assembly (3) is approximately 182 kg (410 lb).

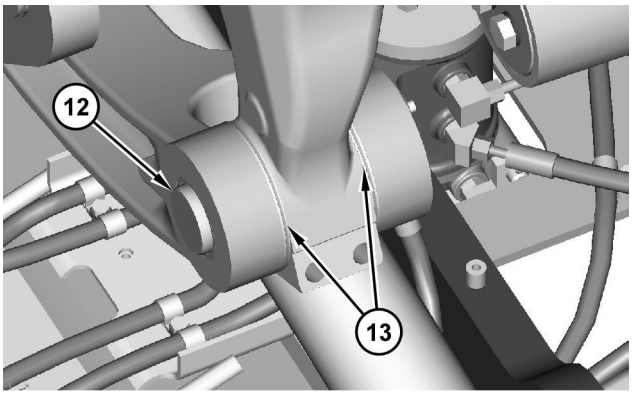

Illustration 521 g01379155

9. Position thrust washers (13). Install pin (12).

Note: The clearance between the centershift lock bar and the lock plate must be 2.3 ± 0.8 mm (0.09 ± 0.03 inch).

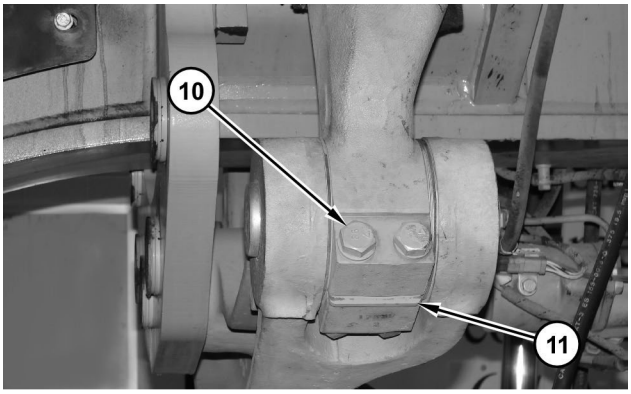

Illustration 522 g01379147

10. Install lock (11) and bolts (10).

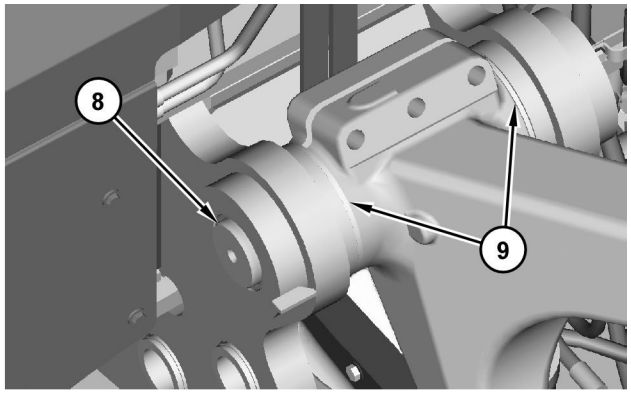

Illustration 523 g01379129

11. Position thrust washers (9). Install pin (8).

Note: The clearance between the centershift lock bar and the lock plate must be 2.3 ± 0.8 mm (0.09 ± 0.03 inch).

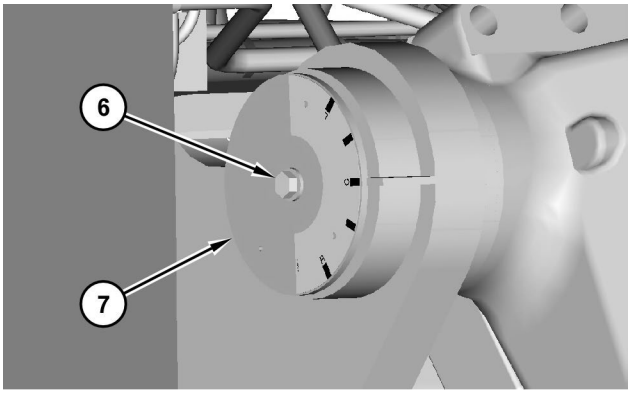

Illustration 524 g01379124

12. Install plate (7) and bolt (6). Tighten bolt (6) to a torque of 115 ± 10 N·m (85 ± 7 lb ft).

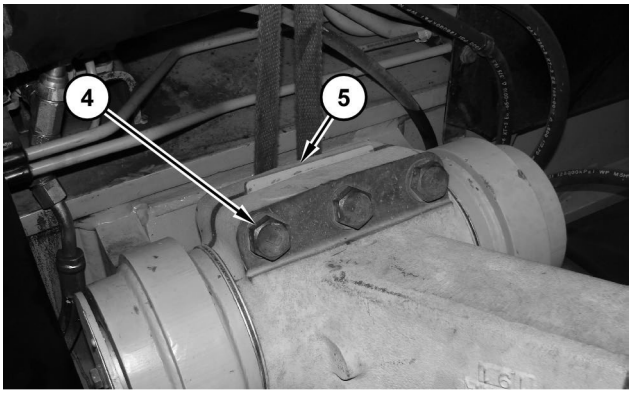

Illustration 525 g01379116

13. Install lock (5) and bolts (4).

Illustration 526 g01379099

14. Use a suitable lifting device in order to position cylinder (1). The weight of cylinder (1) is approximately 91 kg (200 lb). Install bolts (2).

i02756130

Articulation Cylinder - Remove and Install

SMCS Code: 5265-010

Removal Procedure

Table 48

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

⚠ WARNING

Personal injury can result from the sudden release of high pressure oil.

Be sure the engine has been shut off for a minimum of five minutes to ensure that the accumulator pressure is zero.

The accumulator is filled with dry nitrogen. Do not loosen or remove the valve or the cap from the top of the accumulator.

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

Note: Inspect the O-ring seals. Replace the O-ring seals that are worn or damaged.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

2. Connect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

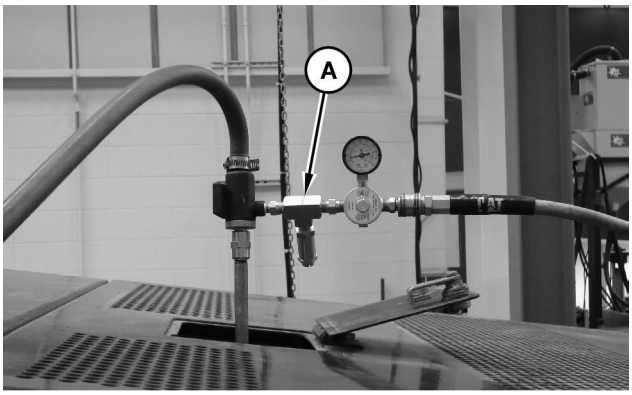

Illustration 527 g01368952

3. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

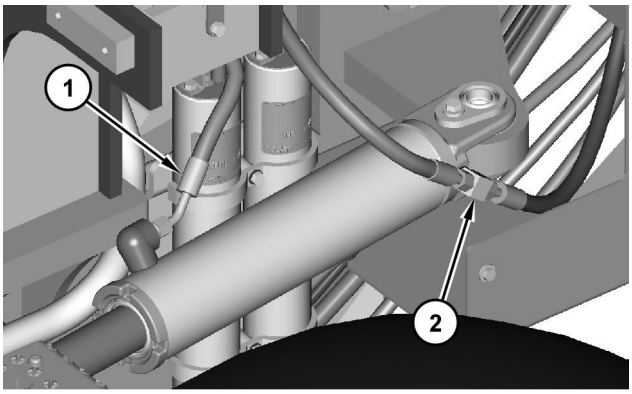

Illustration 528 g01380117

4. Disconnect hose assembly (1). Disconnect fitting (2).

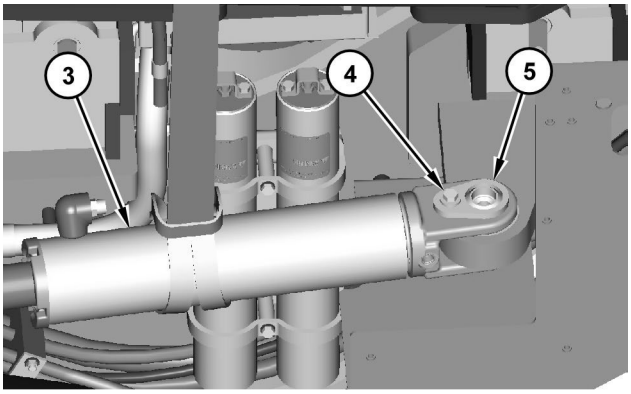

Illustration 529 g01380124

5. Attach a suitable lifting device onto articulation cylinder (3). The weight of articulation cylinder (3) is approximately 54 kg (120 lb). Remove bolt (4). Remove pin assembly (5).

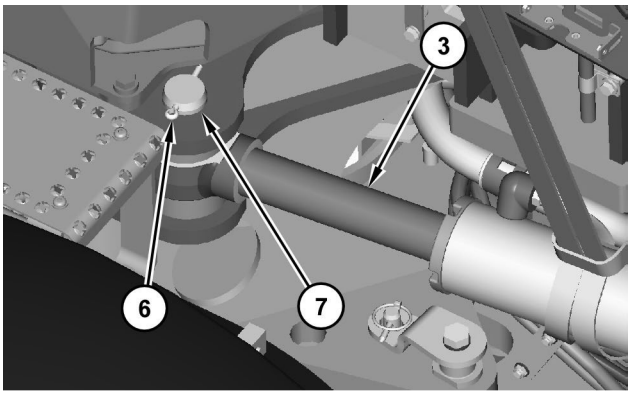

Illustration 530 g01380166

6. Remove cotter pin (6). Remove pin assembly (7). Remove articulation cylinder (3).

Disassembly and Assembly Information

Table 49

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
C	127-4904	Hydraulic Cylinder Repair Stand	1
D	1P-0510	Driver Gp	1
E	195-4609	Seal Pick	1
F	1P-0808	Multipurpose Grease	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

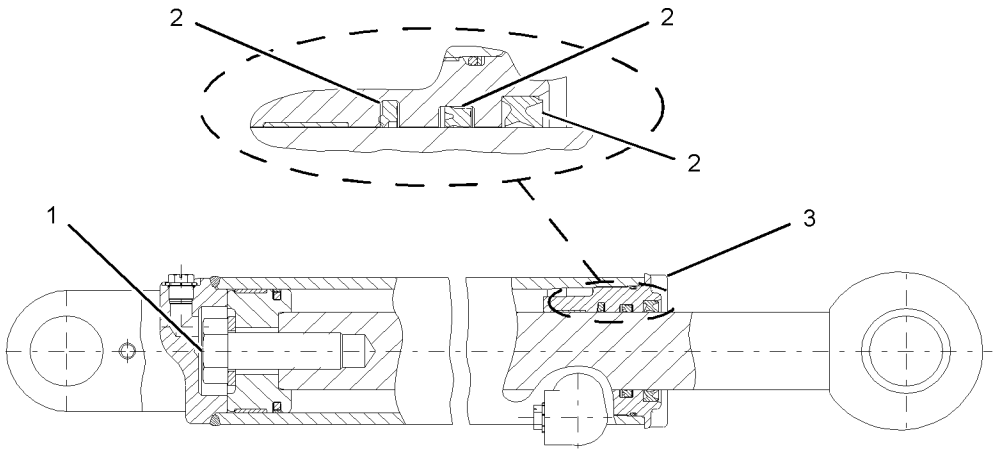

Illustration 531 g01380239

(1) Torque for bolt . . . . . 1800 ± 200 N·m ((1328 ± 148 lb ft))

(1) Use a 46 mm socket in order to tighten bolt (1).

(2) Lubricate sealing lips with a thin covering of the lubricant that is being sealed.

Note: Lubricate the threads with Tooling (F) and torque head (3) to 600 ± 130 N·m (440 ± 95 lb ft).

Installation Procedure

Table 50

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

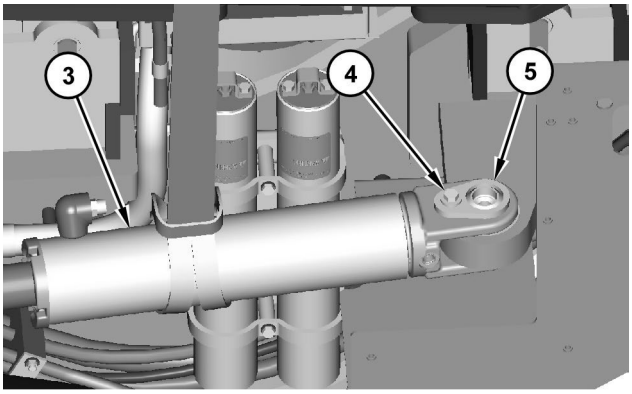

Illustration 532 g01380124

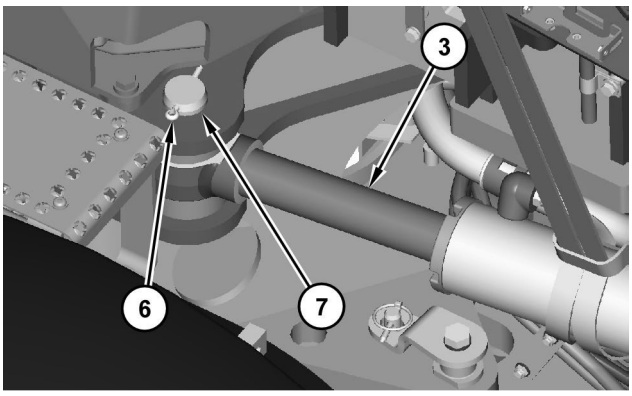

Illustration 533 g01380166

1. Use a suitable lifting device in order to install articulation cylinder (3). The weight of articulation cylinder (3) is approximately 54 kg (120 lb). Install pin assembly (5). Install bolt (4).

2. Install pin assembly (7). Install cotter pin (6).

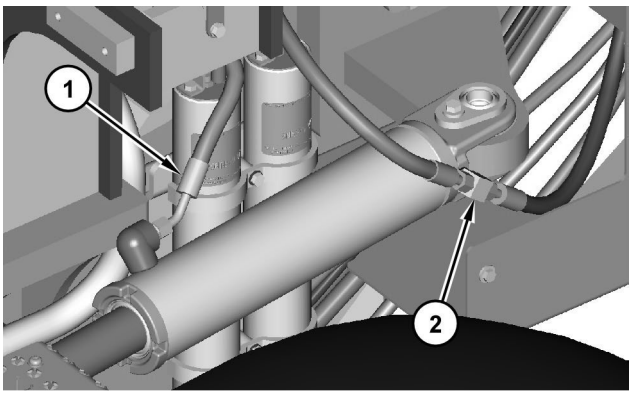

Illustration 534 g01380117

3. Connect fitting (2). Connect hose assembly (1).

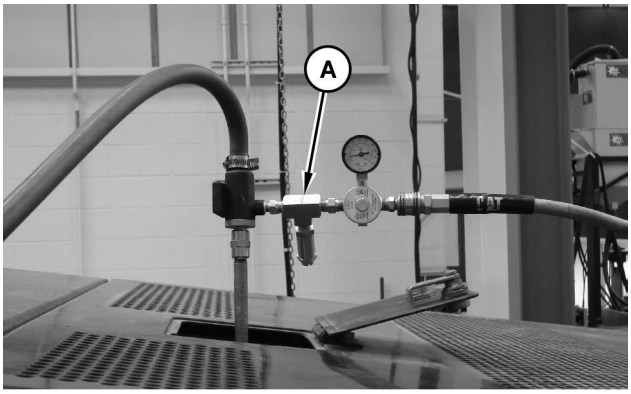

Illustration 535 g01368952

4. Remove Tooling (A).

5. Disconnect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

i02658800

Ripper Lift Cylinder - Remove and Install

SMCS Code: 5352-010

Removal Procedure

Table 51

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1
B		Forcing Screw 1/2 by 13 NC by 4 inch	2

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

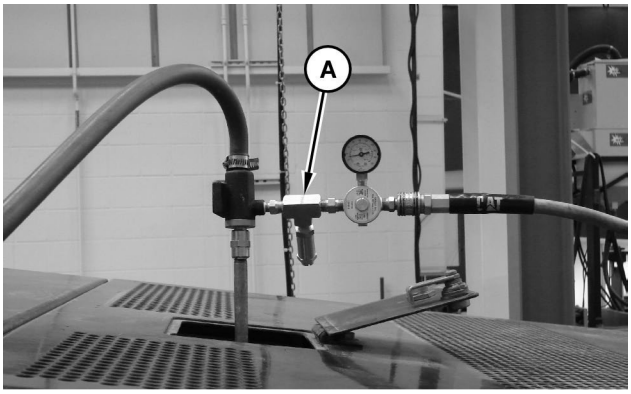

Illustration 536 g01368952

2. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

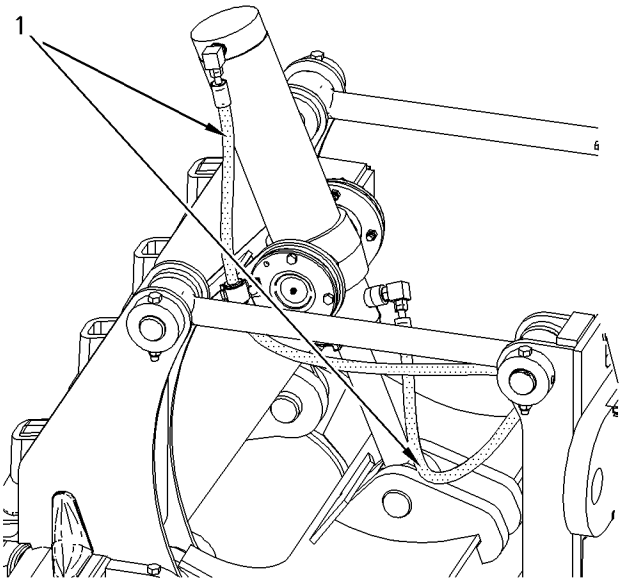

Illustration 537 g00931998

3. Disconnect hose assemblies (1).

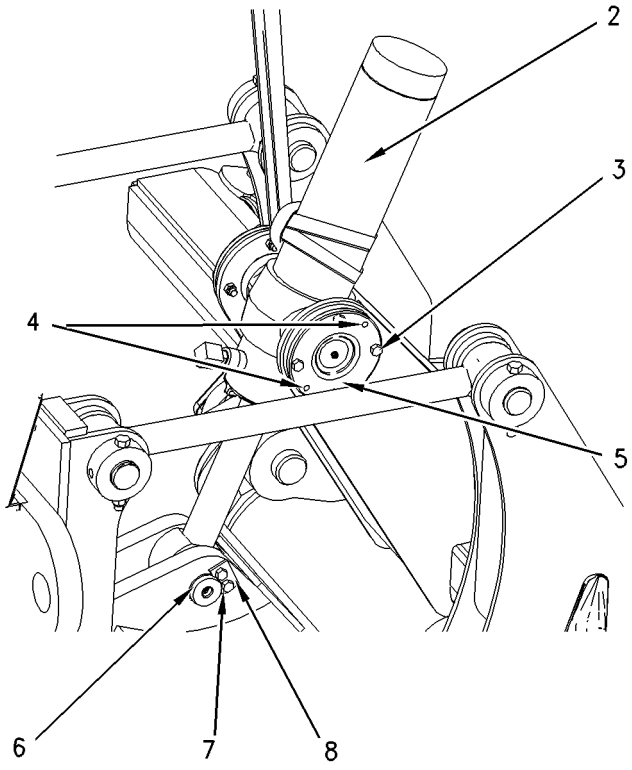

Illustration 538 g00931993

4. Attach a suitable lifting device to ripper lift cylinder (2). The weight of ripper lift cylinder (2) is approximately 91 kg (200 lb).

5. Remove bolts (3). Install Tooling (B) in holes (4). Remove bearing trunnion (5).

6. Repeat Step 5 for the opposite side.

7. Remove bolts (7) and remove plate (8).

8. Remove pin (6).

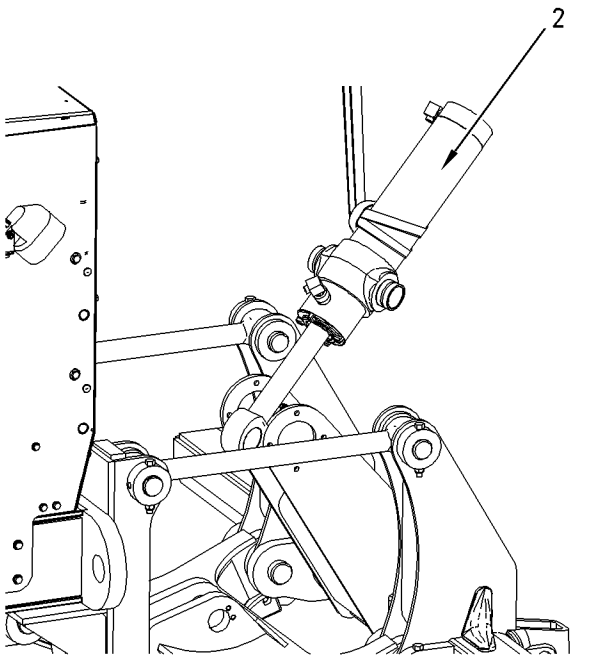

Illustration 539 g00931999

9. Remove ripper lift cylinder (2).

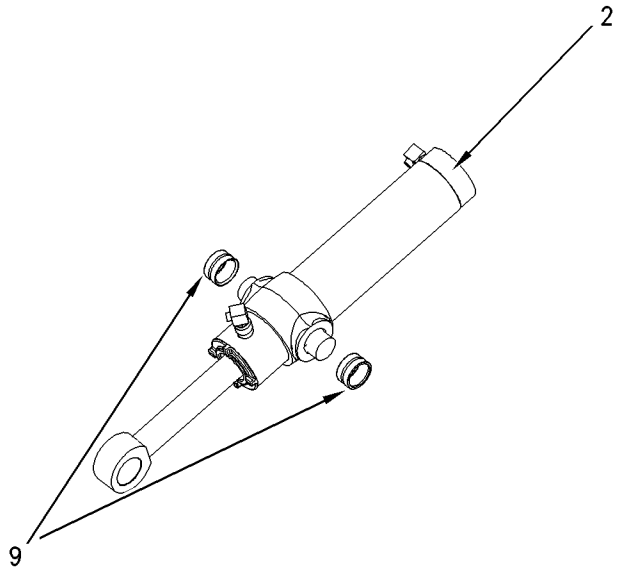

Illustration 540 g00931994

10. Remove bearings (9) from ripper lift cylinder (2).

Disassembly and Assembly Information

Table 52

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
C	127-4904	Repair Stand	1
D	195-4609	Seal Pick	1
E	7M-7456	Bearing Mount Compound	1
F	1P-0808	Multipurpose Grease	1
G	9U-7868	Spanner Wrench	1
	127-8064	Adjustable Plate	1
H	2P-8301	Seal Guide	1
J	1P-1835	Bearing Puller Adapter	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	9U-6832	Nut	1
	5F-7693	Spacer As	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

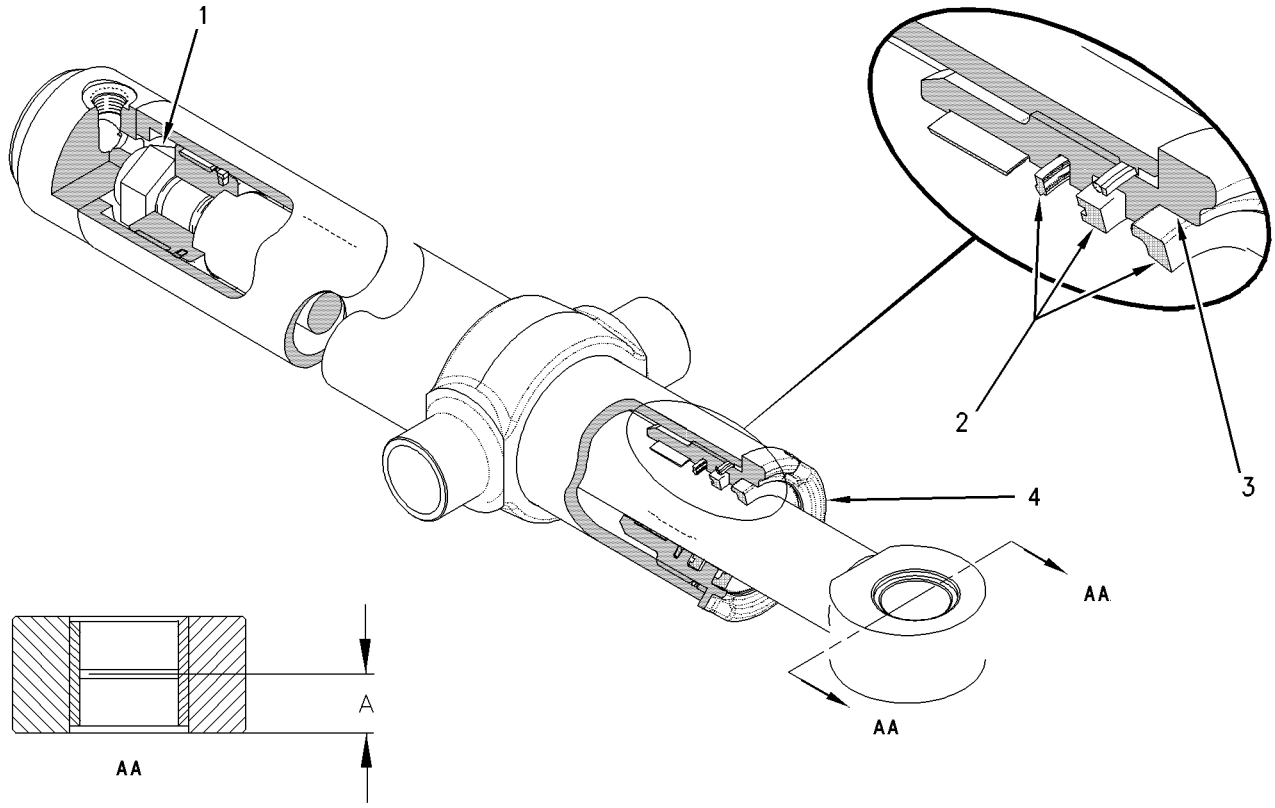

Illustration 541 g00931997

(A) Dimension from the face to the center of the grease groove . . . . . 31.75 ± 0.80 mm ((1.250 ± 0.032 inch))

(1) Use a 2 and 9/16 inch socket in order to remove the nut.

(1) Torque for nut . . . . . 3000 ± 300 N·m ((2213 ± 221 lb ft))

Note: Lubricate the threads with Tooling (F).

(2) Lubricate sealing lips with a thin covering of the lubricant that is being sealed.

(3) Apply Tooling (E) to the seal groove prior to assembling the wiper seal.

(4) Torque for head . . . . . 600 ± 130 N·m ((440 ± 95 lb ft))

Note: Lubricate the threads with Tooling (F).

Installation Procedure

Table 53

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

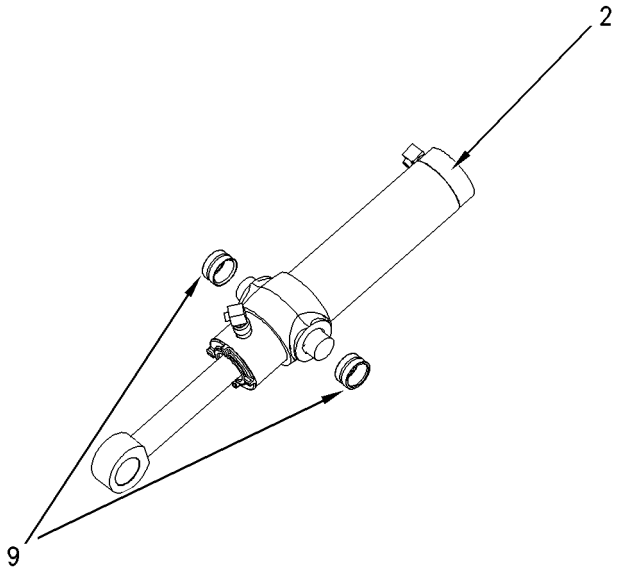

Illustration 542 g00931994

1. Raise the temperature of bearings (9). Install bearings (9) on ripper lift cylinder (2).

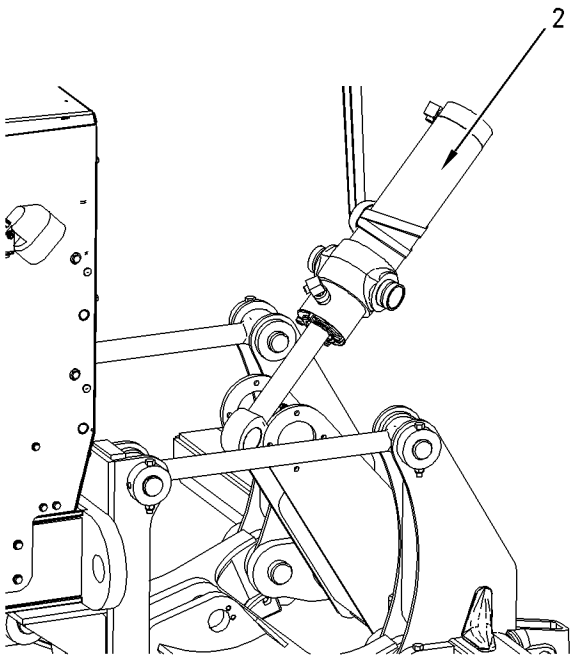

Illustration 543 g00931999

2. Attach a suitable lifting device to ripper lift cylinder (2). The weight of ripper lift cylinder (2) is approximately 91 kg (200 lb). Position cylinder (2) on the machine.

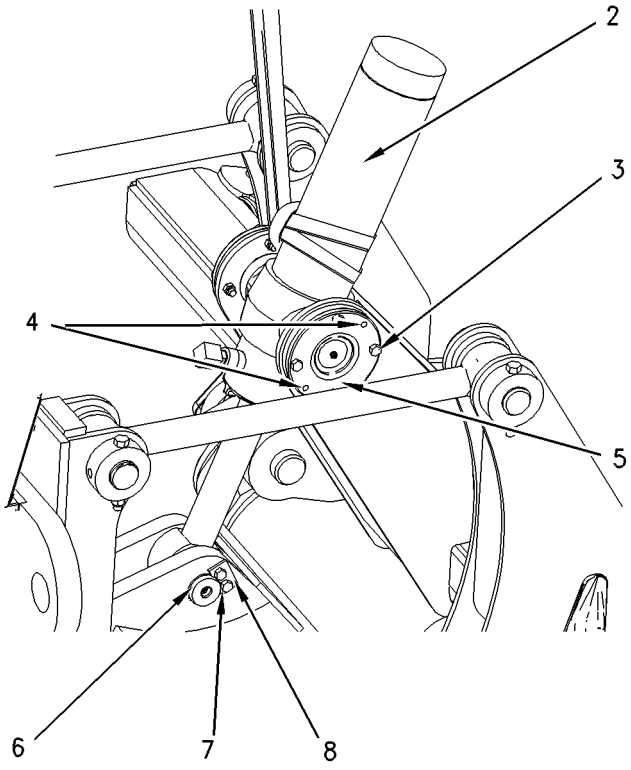

Illustration 544 g00931993

3. Install pin (6).

4. Install plate (8) and install bolts (7).

5. Install bearing trunnion (5). Install bolts (3).

Note: Holes (4) are threaded for Tooling (A).

6. Repeat Step 5 for the opposite side.

7. Remove the suitable lifting device from ripper lift cylinder (2).

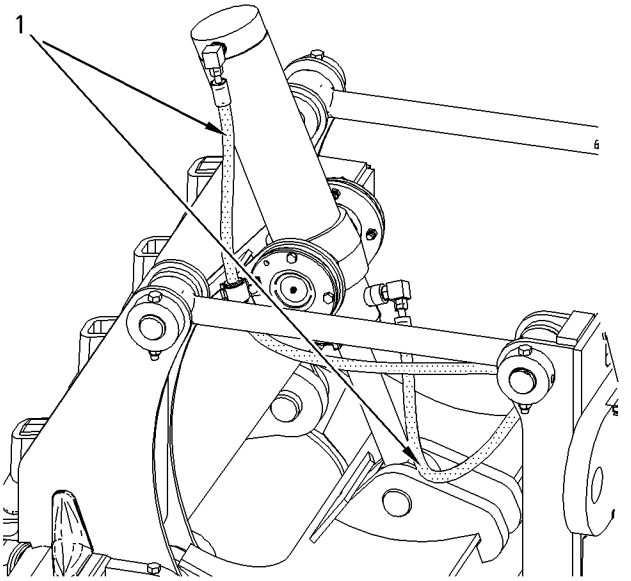

Illustration 545 g00931998

8. Connect hose assemblies (1).

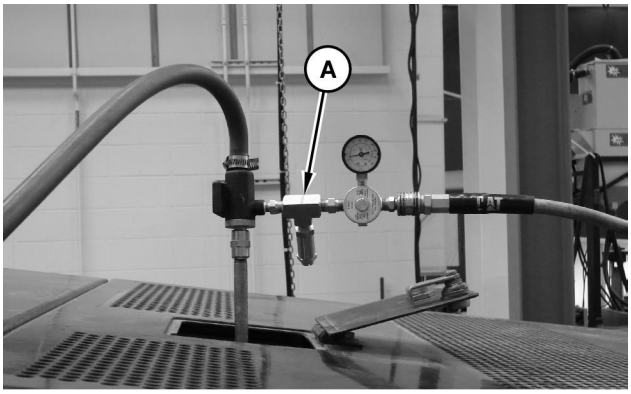

Illustration 546 g01368952

9. Remove Tooling (A).

10. Check the hydraulic oil level. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”.

i02761953

Ripper - Remove

SMCS Code: 6325-011

Removal Procedure

Table 54

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1U-9202	Lever Puller Hoist	1
B	180-3032	Repair Stand	2
C	1U-7505	Hydraulic Jack	1
D	1P-1834	Bearing Puller Adapter	1
	4C-9633	Puller Stud	1
	6V-3160	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	9U-6833	Full Nut	1
	5F-7693	Spacer As	1
E	1P-1835	Bearing Puller Adapter	1
	4C-9633	Puller Stud	1
	6V-3160	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	9U-6833	Full Nut	1
	5F-7693	Spacer As	1

Start By:

a. Remove the ripper lift cylinder. Refer to Disassembly and Assembly, “Ripper Lift Cylinder - Remove and Install”.

b. Remove the bottom guard. Refer to Disassembly and Assembly, “Bottom Guard - Remove and Install”.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

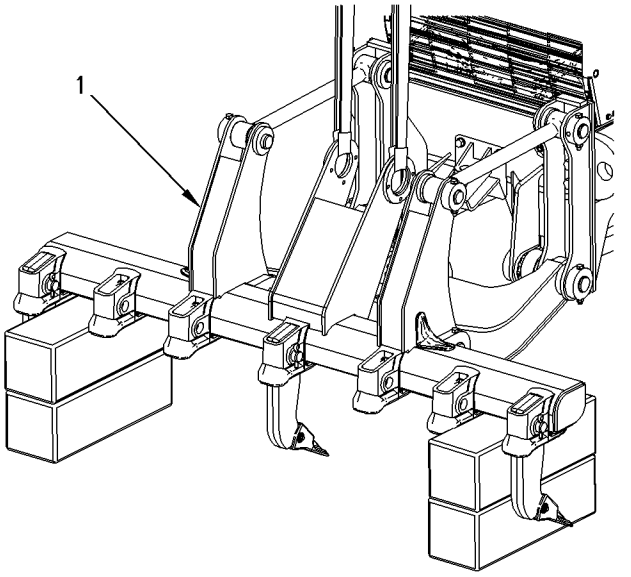

Illustration 547 g00933791

1. Attach a suitable lifting device to ripper (1). The weight of ripper (1) is approximately 1406 kg (3100 lb). Raise ripper (1). Install suitable blocking under ripper (1). Lower ripper (1) on the blocking.

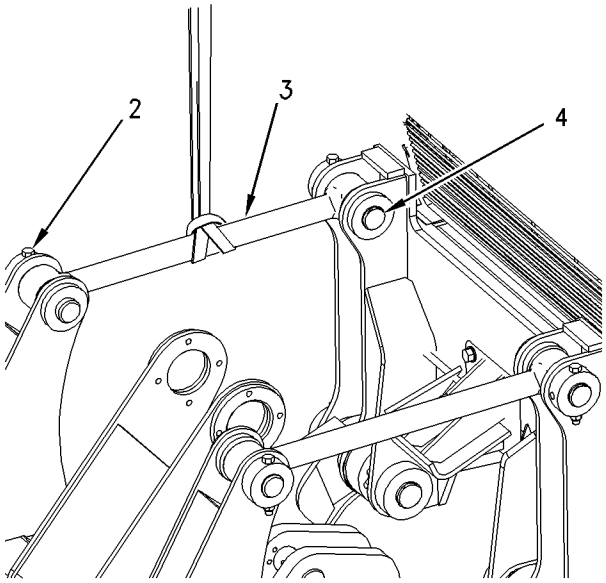

Illustration 548 g00933795

2. Remove bolts (2).

3. Attach a suitable lifting device to link assembly (3). The weight of link assembly (3) is approximately 30 kg (65 lb). Remove pins (4) and remove link assembly (3). Repeat this step for the opposite side.

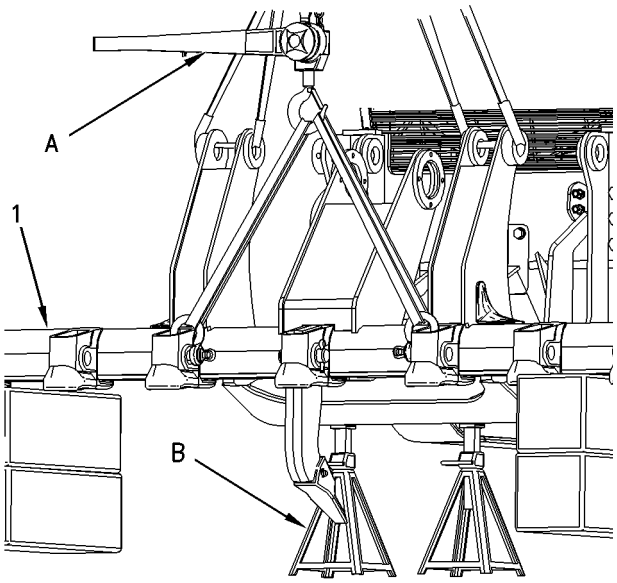

Illustration 549 g00933797

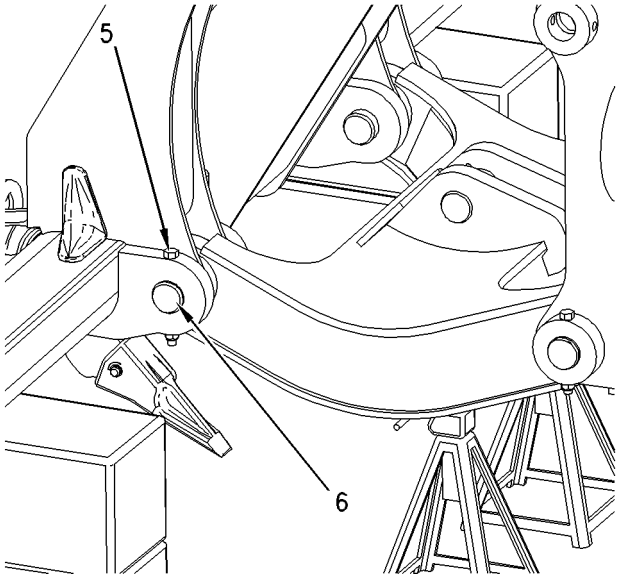

Illustration 550 g00933802

4. Attach Tooling (A) and a suitable lifting device to ripper (1). Raise ripper (1) and install Tooling (B).

5. Remove bolt (5) and pin (6). Repeat this step for the opposite side. Remove ripper (1).

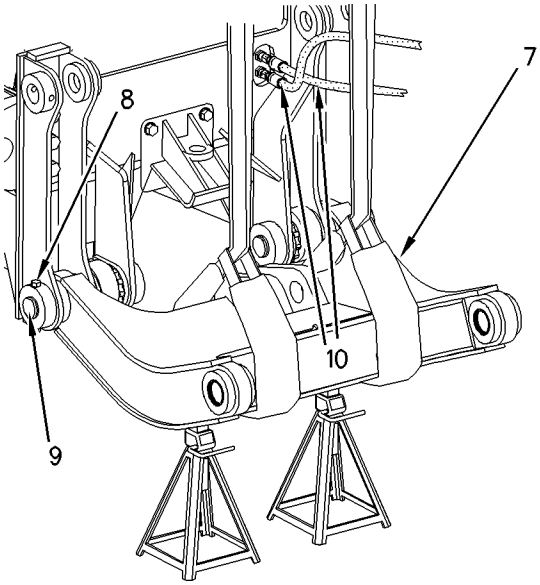

Illustration 551 g00933803

6. Attach a suitable lifting device to link assembly (7). The weight of link assembly (7) is approximately 329 kg (725 lb).

7. Remove bolt (8) and remove pin (9). Repeat this step for the opposite side. Remove link assembly (7). Remove hose assemblies (10).

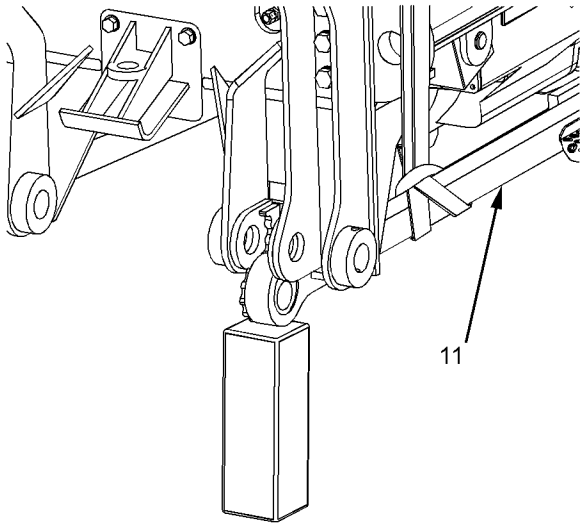

Illustration 552 g01343113

8. Attach a suitable lifting device to link assembly (11). The weight of link assembly (11) is approximately 102 kg (225 lb).

9. Use a prybar to move link assembly (11) to the side and lower on suitable blocking. Repeat this step for the opposite side.

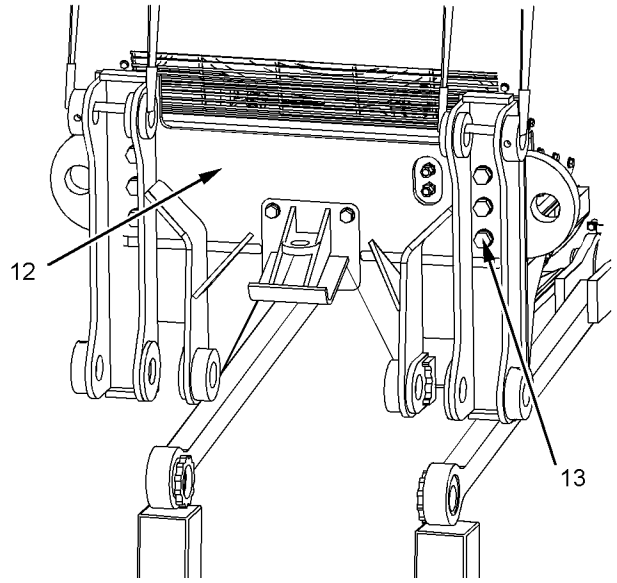

Illustration 553 g01343120

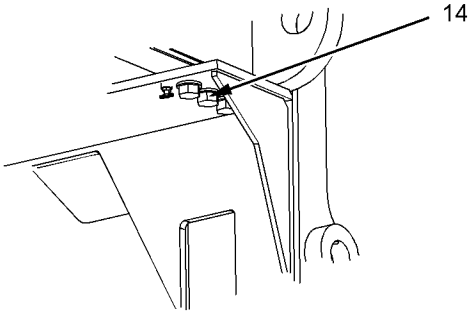

Illustration 554 g01343126

10. Attach a suitable lifting device to plate assembly (12). The weight of plate assembly (12) is approximately 148 kg (325 lb). Remove bolts (13). Repeat this step for the opposite side.

11. Remove bolts (14). Repeat this step for the opposite side. Remove plate assembly (12).

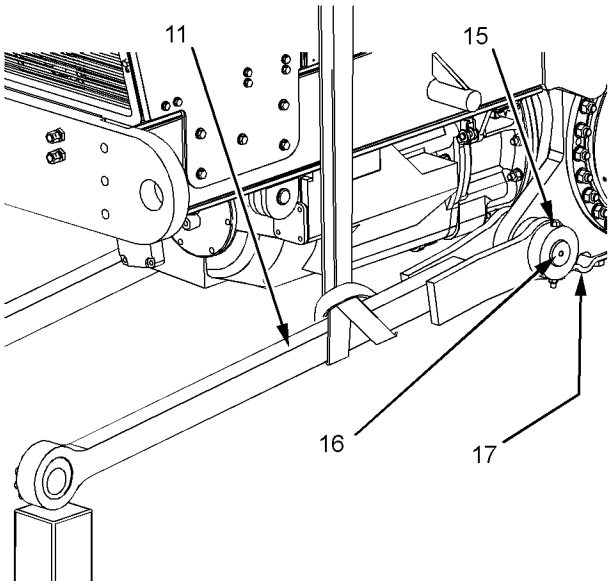

Illustration 555 g01343132

12. Attach a suitable lifting device to link assembly (11). The weight of link assembly (11) is approximately 102 kg (225 lb). Apply tension in order to support link assembly (11).

13. Remove bolt (15).

14. Drive pin (16) toward tandem housing (17) (not shown) and remove link assembly (11).

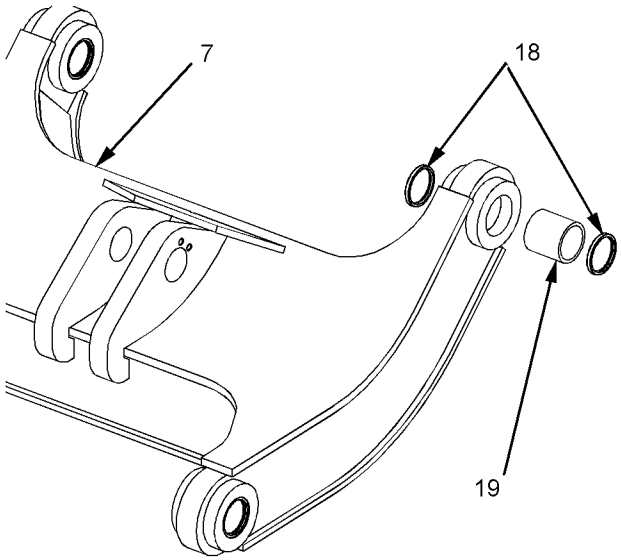

Illustration 556 g01343133

15. Remove seals (18) from link assembly (7).

16. Use Tooling (D) to remove bearing (19) from link assembly (7). Repeat this step for the remaining bearings.

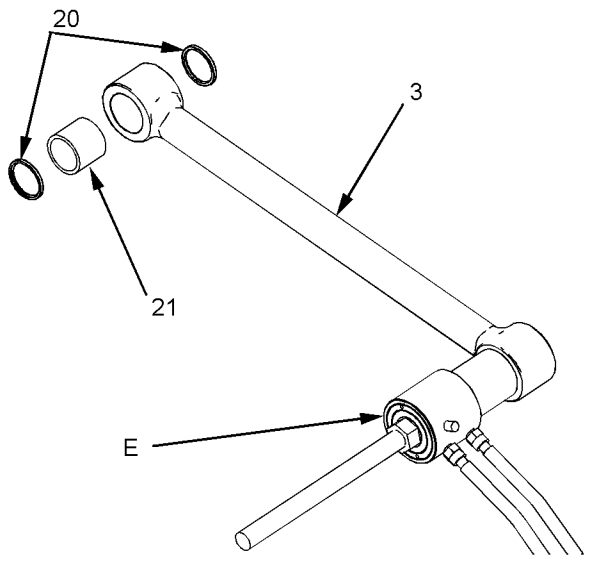

Illustration 557 g01343134

17. Remove seals (20) from link assembly (3). Repeat this step for the opposite end of the link. Repeat this step of the remaining link.

18. Use Tooling (E) in order to remove bearing (21). Repeat this step for the opposite end of the link. Repeat this step for the remaining link.

i02761959

Ripper - Install

SMCS Code: 6325-012

Installation Procedure

Table 55

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1U-9202	Lever Puller Hoist	1
B	180-3032	Repair Stand	2
C	1U-7505	Hydraulic Jack	1
D	1P-1834	Bearing Puller Adapter	1
	4C-9633	Puller Stud	1
	6V-3160	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	9U-6833	Full Nut	1
	5F-7693	Spacer As	1

(continued)

(Table 55, contd)

E	1P-1835	Bearing Puller Adapter	1
	4C-9633	Puller Stud	1
	6V-3160	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	9U-6833	Full Nut	1
	5F-7693	Spacer As	1
F	1P-0510	Driver Gp	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

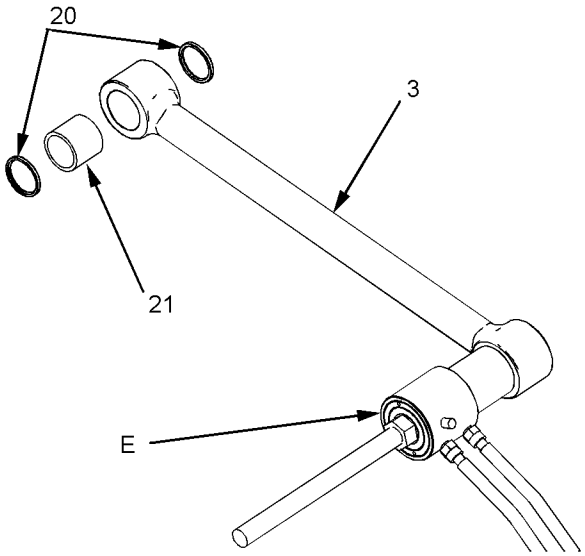

Illustration 558 g01343134

1. Use Tooling (E) in order to install bearing (21). Repeat this step for the opposite end of the link.

2. Use Tooling (F) in order to Install seals (20) in link assembly (3). Repeat this step for the opposite end of the link. Repeat this step for the remaining link.

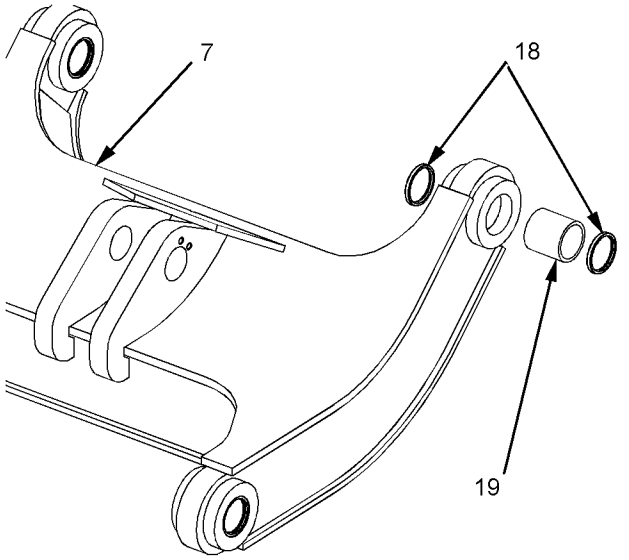

Illustration 559 g01343133

3. Use Tooling (D) in order to install bearing (19) in link assembly (7). Repeat this step for the remaining bearings.

4. Use Tooling (F) in order to install seals (18).

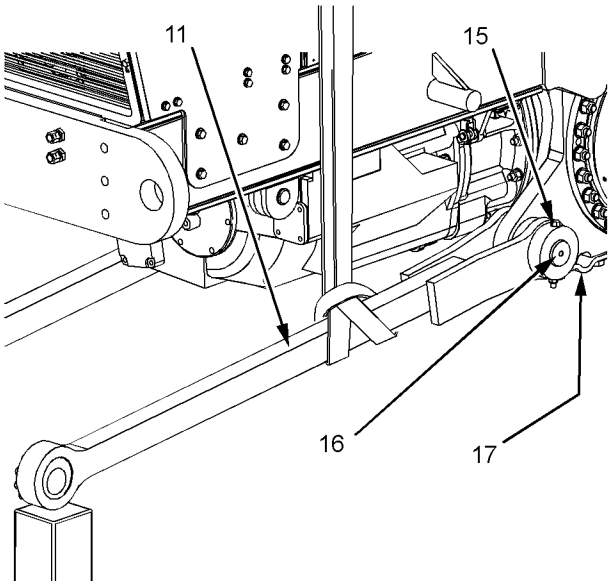

Illustration 560 g01343132

5. Attach a suitable lifting device to link assembly (11). The weight of link assembly (11) is approximately 102 kg (225 lb). Apply tension in order to support link assembly (11).

6. Install link assembly (11). Install pin (16). Drive pin (16) away from tandem housing (not shown).

7. Install bolt (15). Install suitable blocking.

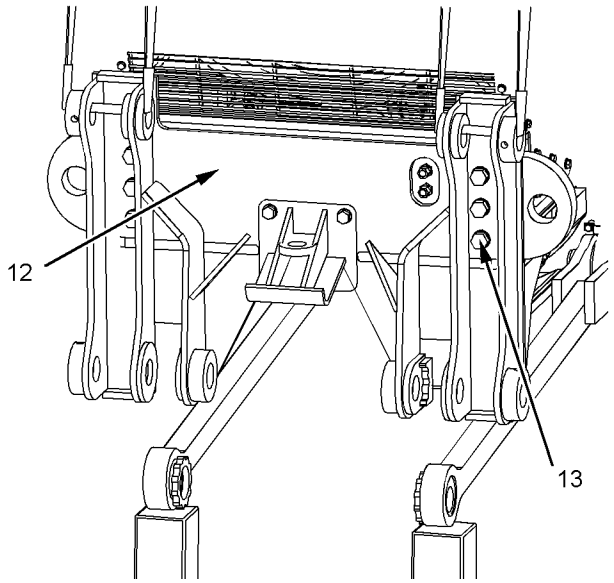

Illustration 561 g01343120

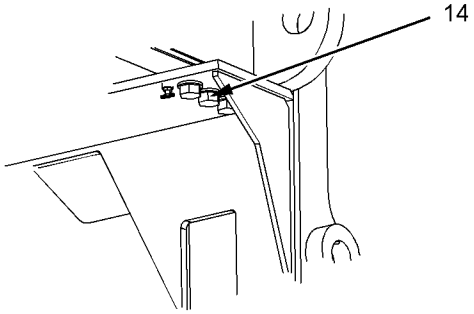

Illustration 562 g01343126

8. Attach a suitable lifting device to plate assembly (12). The weight of plate assembly (12) is approximately 148 kg (325 lb). Install plate assembly (12). Install bolts (14). Install bolts (13). Repeat this step for the opposite side.

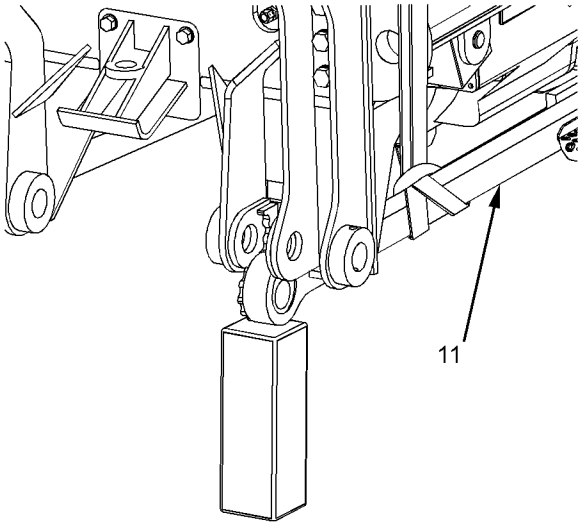

Illustration 563 g01343113

9. Attach a suitable lifting device to link assembly (11). The weight of link assembly (11) is approximately 102 kg (225 lb).

10. Position link assembly (11) to the original location. Remove the blocking.

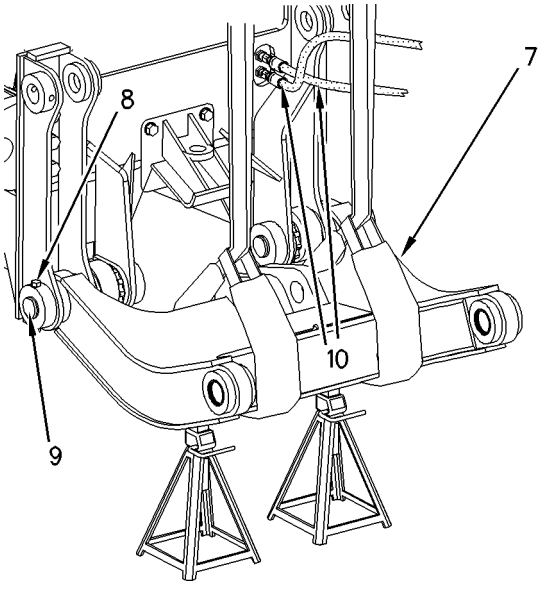

Illustration 564 g00933803

11. Attach a suitable lifting device to link assembly (7). The weight of link assembly (7) is approximately 329 kg (725 lb).

12. Install link assembly (7). Install pin (9) and install bolt (8). Install hose assemblies (10). Repeat this step for the opposite side.

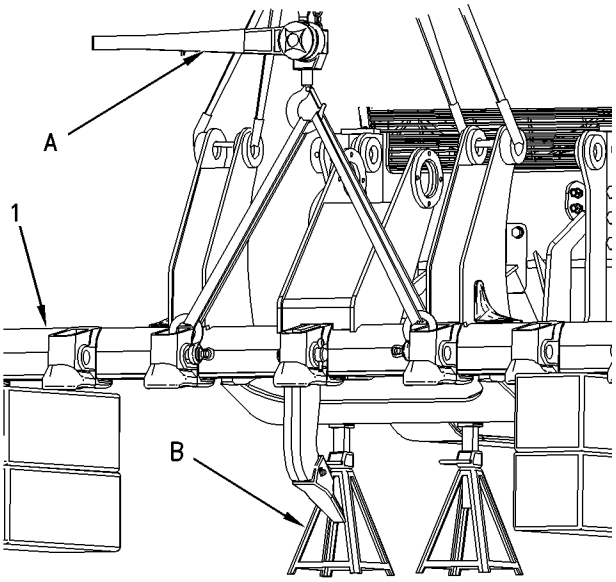

Illustration 565 g00933797

13. Attach Tooling (A) and a suitable lifting device to ripper (1). Raise ripper (1).

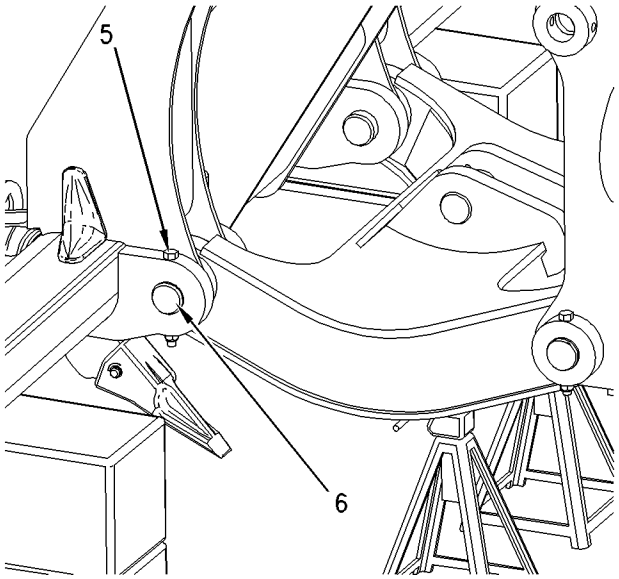

Illustration 566 g00933802

14. Install ripper (1). Install pin (6) and bolt (5). Repeat this step for the opposite side. Remove Tooling (B).

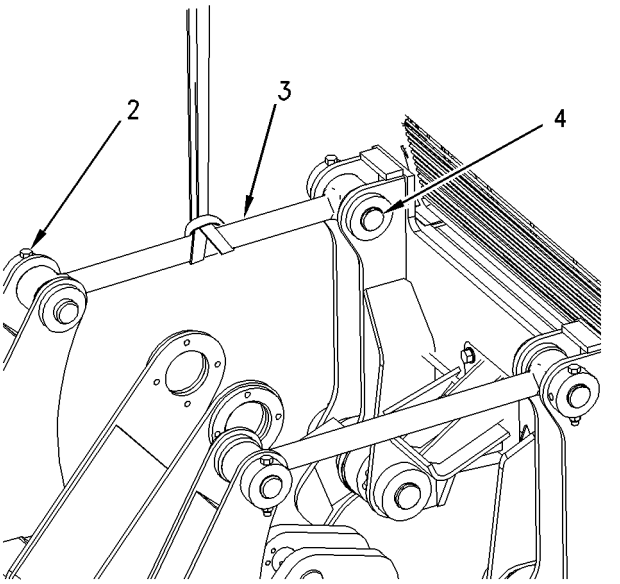

Illustration 567 g00933795

15. Attach a suitable lifting device to link assembly (3). The weight of link assembly is approximately 30 kg (65 lb). Install link assembly (3) and pins (4). Repeat this step for the opposite side.

16. Install bolts (2). Repeat this step for the opposite side.

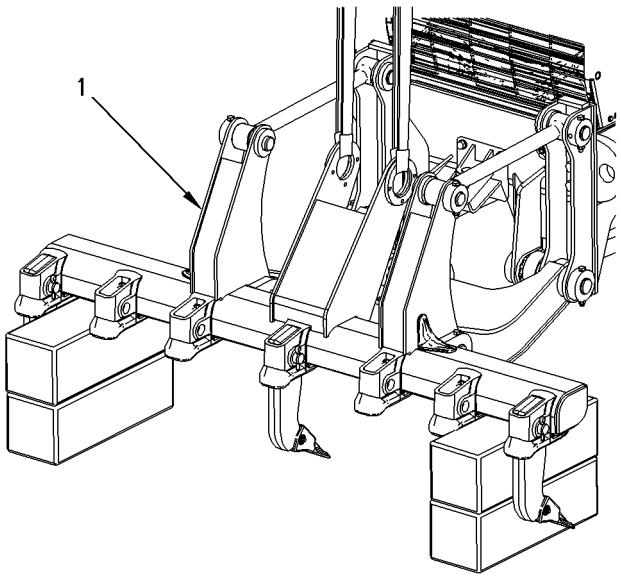

Illustration 568 g00933791

17. Attach a suitable lifting device to ripper (1). The weight of ripper (3) is approximately 1406 kg (3100 lb). Raise ripper (1). Remove suitable blocking under ripper (1).

End By:

a. Install the bottom guard. Refer to Disassembly and Assembly, “Bottom Guard - Remove and Install”.

b. Install the ripper lift cylinder. Refer to Disassembly and Assembly, “Ripper Lift Cylinder - Remove and Install”.

i07391006

Front Axle - Remove

SMCS Code: 3282-011-FR

Removal Procedure

Table 56

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	504-9826	Lift Gp (60Hz)(1)	1
	OR		
	504-9827	Lift Gp (50Hz)(2)	1
B	1P-1836	Bearing Puller Adapter	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	9U-7217	Sleeve	1
	9U-6832	Nut	1
C	140-7742	Sleeve	2
D	8S-7615	Pin	2
	283-1495	Stand Assembly	2
	8S-7611	Tube	2

(1) High-Voltage (480V) Low-Voltage (240V)
(2) High-Voltage (400V) Low-Voltage (200V)

Start By:

a. Remove the front wheels.

b. Remove the wheel lean bar.

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.

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

2. Drain the hydraulic system into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, “Capacities - Refill”. Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change”.

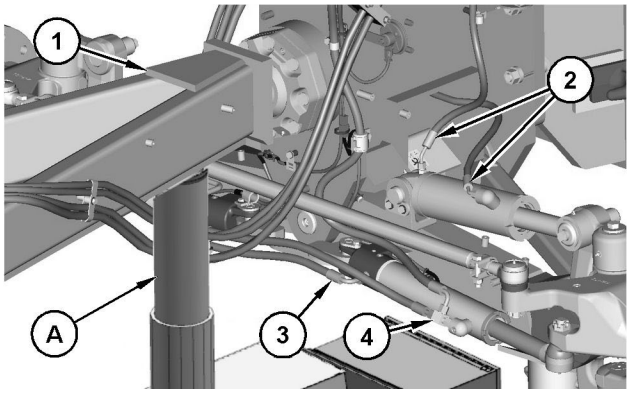

Illustration 569 g06305803

3. Install Tooling (A) under drawbar (1). Disconnect hose assemblies (2). Disconnect hose assembly (3). Disconnect fitting (4). Repeat this step for the opposite side.

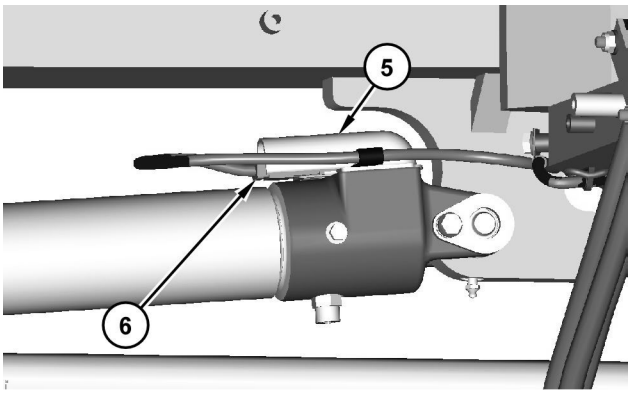

Illustration 570 g01381052

4. Remove cover (5). Disconnect harness assembly (6) and remove the connecting hardware. Repeat this step for the opposite side.

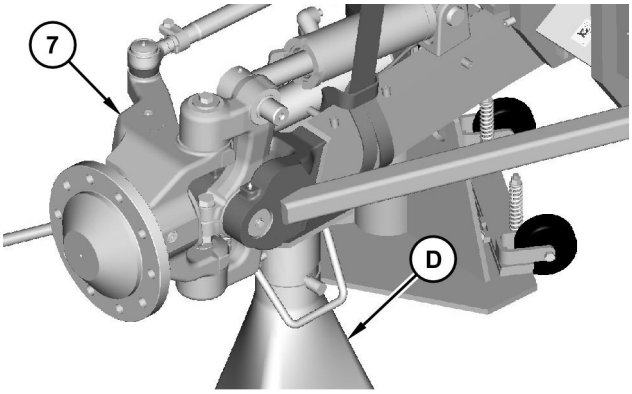

Illustration 571 g01381076

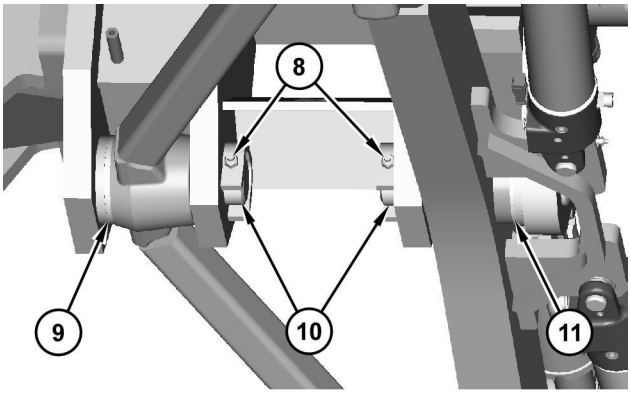

Illustration 573 g01381083

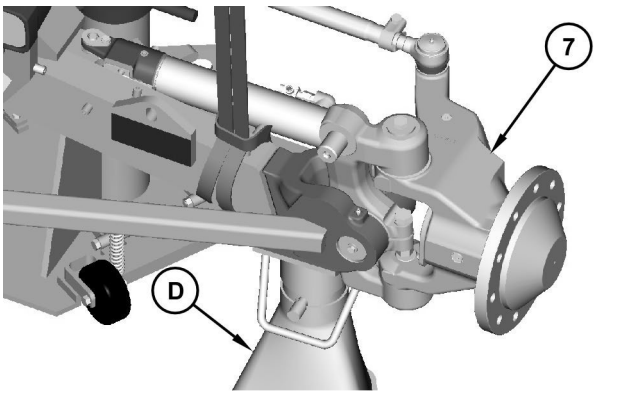

Illustration 572 g01381077

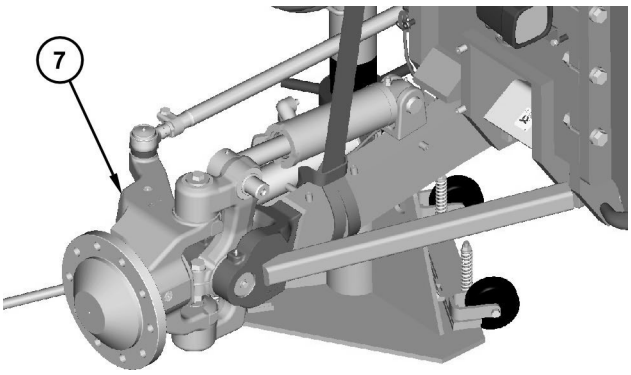

Illustration 574 g01381090

5. Attach Tooling (C) and a suitable lifting device to front axle (7). Raise front axle (7) to remove Tooling (D). The weight of front axle (7) is approximately 907 kg (2000 lb).

6. Remove bolts (8). Remove pins (10), washers (9), and washers (11). Remove front axle (7).

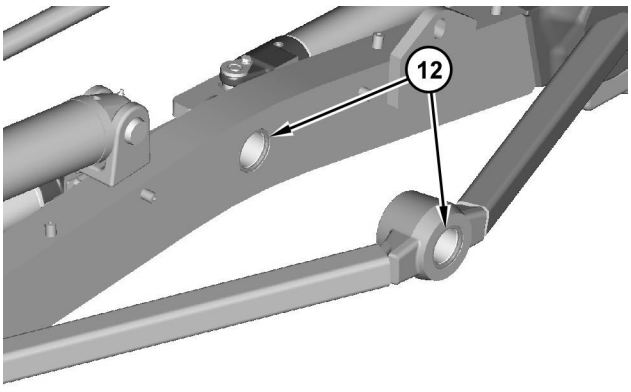

Illustration 575 g01381091

7. Remove seals (12). Repeat this step for the remaining seals (12).

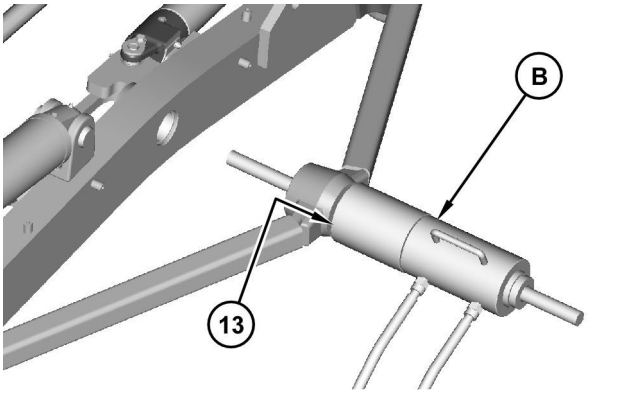

Illustration 576 g01381092

8. Use Tooling (B) to remove bearings (13). Repeat this step for the remaining bearings (13).

i07391015

Front Axle - Install

SMCS Code: 3282-012-FR

Installation Procedure

Table 57

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	504-9826	Lift Gp (60Hz)(1)	1
	OR		
	504-9827	Lift Gp (50Hz)(2)	1
C	140-7742	Sleeve	2
D	8S-7615	Pin	2
	283-1495	Stand Assembly	2
	8S-7611	Tube	2
E	1P-1836	Bearing Puller Adapter	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	3S-6224	Electric Hydraulic Pump Gp	1
	9U-6832	Nut	1
F	1P-0510	Driver Gp	1

(1) High-Voltage (480V) Low-Voltage (240V)
(2) High-Voltage (400V) Low-Voltage (200V)

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

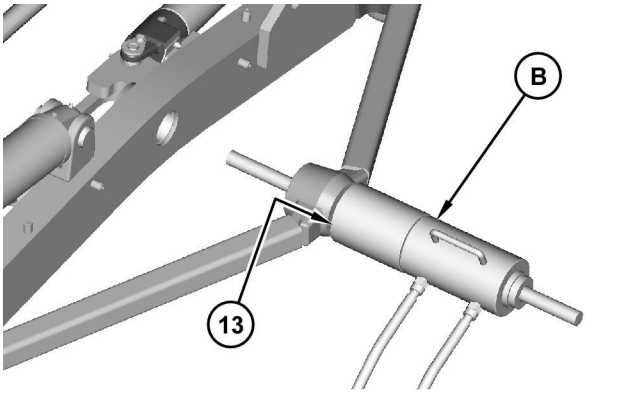

Illustration 577 g01381092

1. Lower the temperature of bearings (13). Use Tooling (E) to install bearings (13). Install bearings (13) to a depth of 8.7 ± 0.4 mm (0.343 ± 0.016 inch). Repeat this step for the remaining bearing (13).

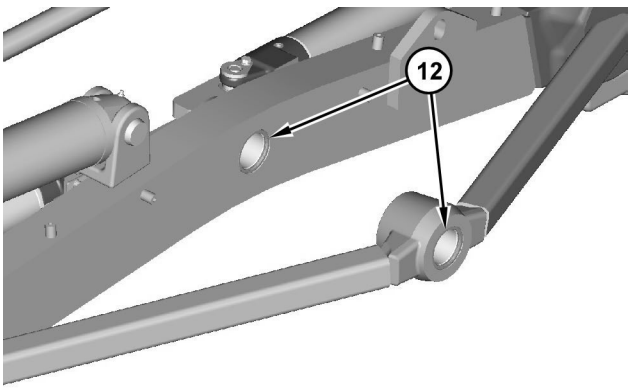

Illustration 578 g01381091

2. Use Tooling (F) to install seal (12). Repeat this step for the remaining seals (12).

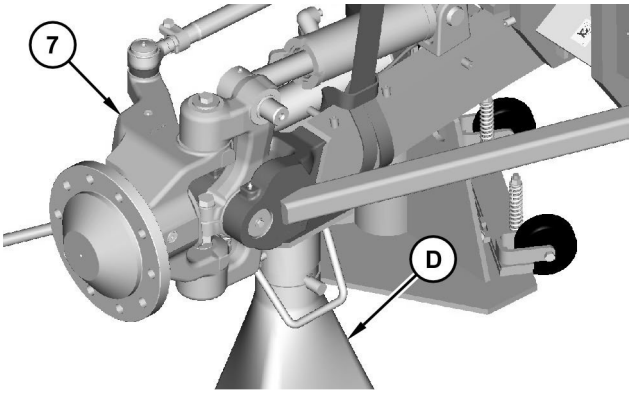

Illustration 579 g01381076

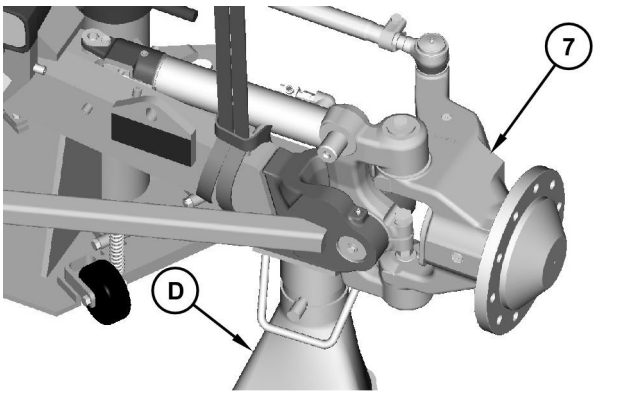

Illustration 580 g01381077

3. Use Tooling (C) and two suitable lifting devices to position front axle (7). The weight of front axle (7) is approximately 907 kg (2000 lb). Install Tooling (D).

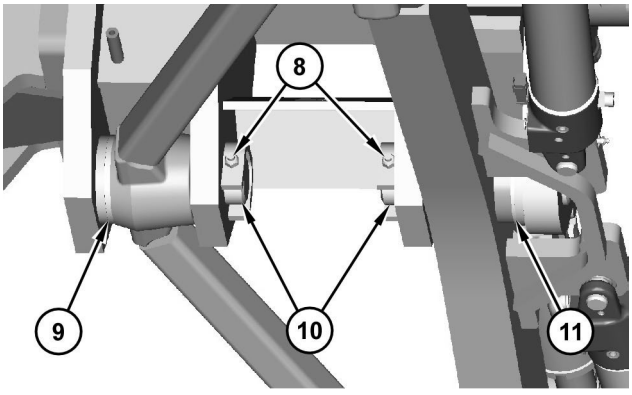

Illustration 581 g01381083

4. Install washers (11), washers (9), pins (10), and bolts (8).

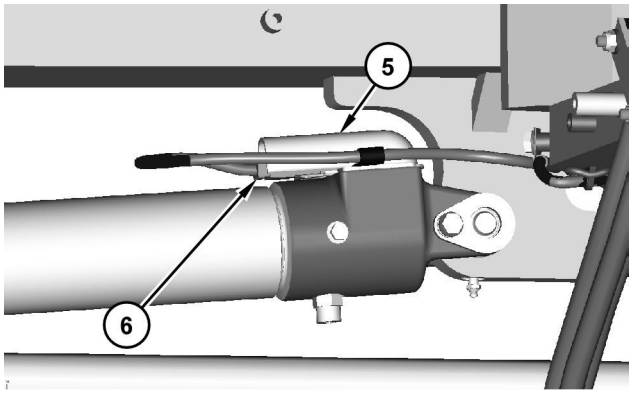

Illustration 582 g01381052

5. Connect harness assembly (6) and the connecting hardware. Install cover (5). Repeat this step for the opposite side.

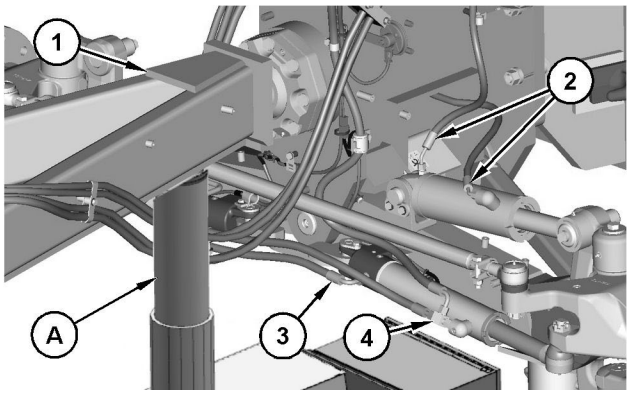

Illustration 583 g06305803

6. Connect fitting (4). Connect hose assembly (3). Connect hose assemblies (2). Repeat this step for the opposite side.

7. Remove Tooling (A) from drawbar (1).

8. Fill the hydraulic system. Refer to Operation and Maintenance Manual, “Capacities - Refill”. Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change”.

End By:

a. Install the wheel lean bar.

b. Install the front wheels.

i03801250

Spindle Housing - Remove

SMCS Code: 4002-011; 4205-011

Removal Procedure

Table 58

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	3S-1356	Full Nut	1
B	123-4370	Puller Stud	1
	6V-7742	Full Nut	1
	8T-4994	Hard Washer	1
	1U-5230	Hand Hydraulic Pump	1
	316-1496	Hydraulic Puller	1
	5P-4197	Spacer	1
C	1P-0510	Driver Gp	1

Start By:

a. Remove the wheel. Refer to Disassembly and Assembly, “Wheel - Remove and Install”.

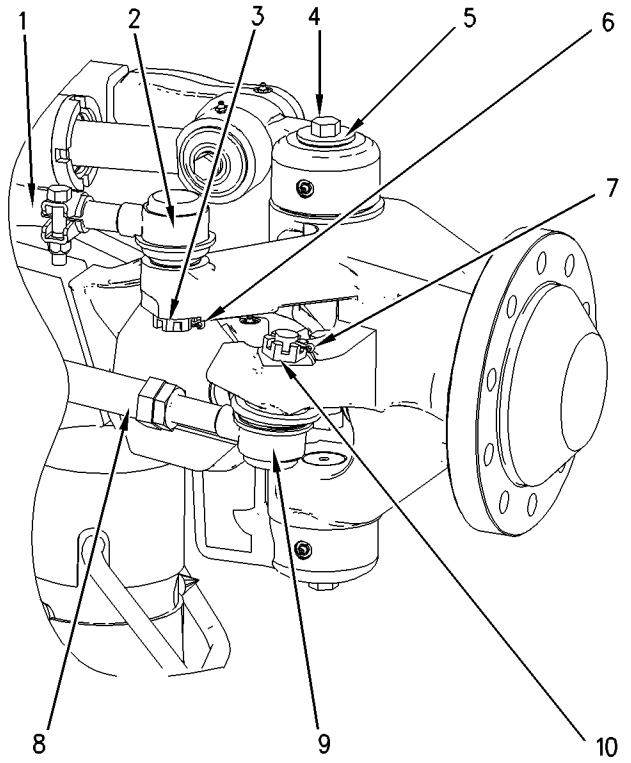

Illustration 584 g00933872

1. Remove cotter pin (6). Remove nut (3). Install Tooling (A) (not shown). Break the taper on tie rod (2). Position link (1) to the side.

2. Remove cotter pin (7). Remove nut (10). Install Tooling (A) (not shown). Break the taper on tie rod (9). Position steering cylinder (8) to the side.

3. Remove bolts (4) and washers (5).

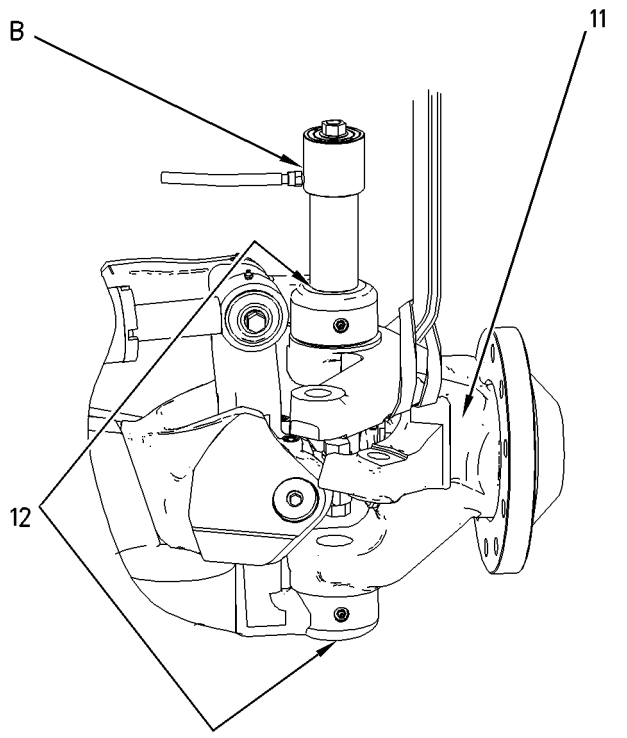

Illustration 585 g00933873

4. Attach a suitable lifting device to housing assembly (11). The weight of housing assembly (11) is approximately 136 kg (300 lb). Use Tooling (B) in order to remove pins (12). Remove housing assembly (11).

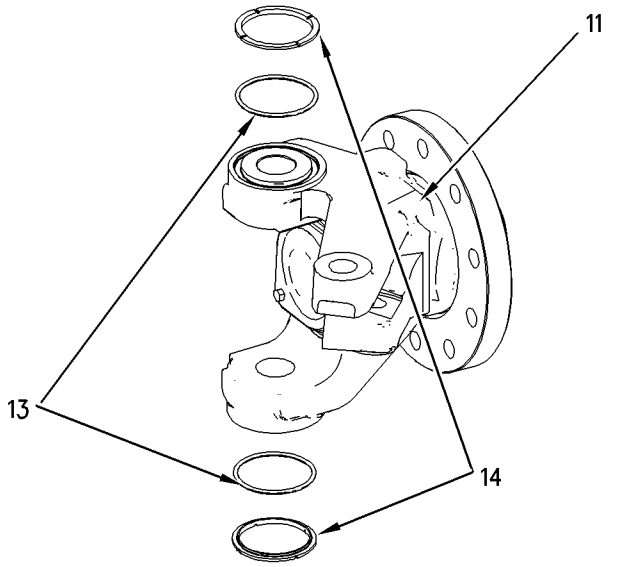

Illustration 586 g00933875

5. Remove seals (14) and O-ring seals (13) from housing assembly (11).

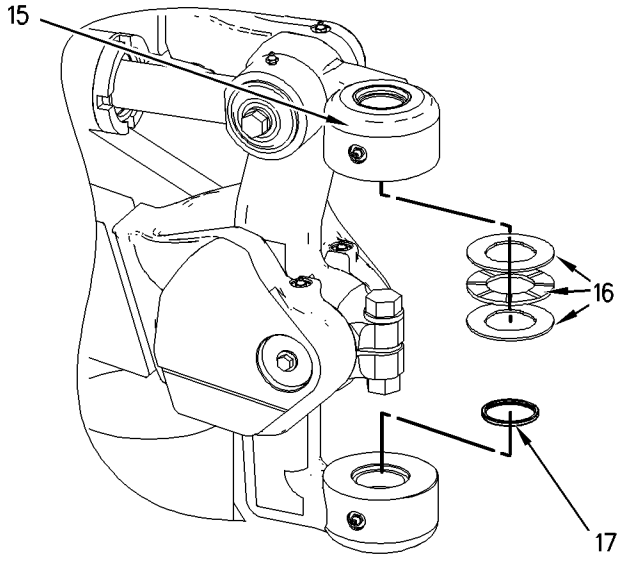

Illustration 587 g00933878

6. Remove thrust washers (16) and seal (17) from arm assembly (15).

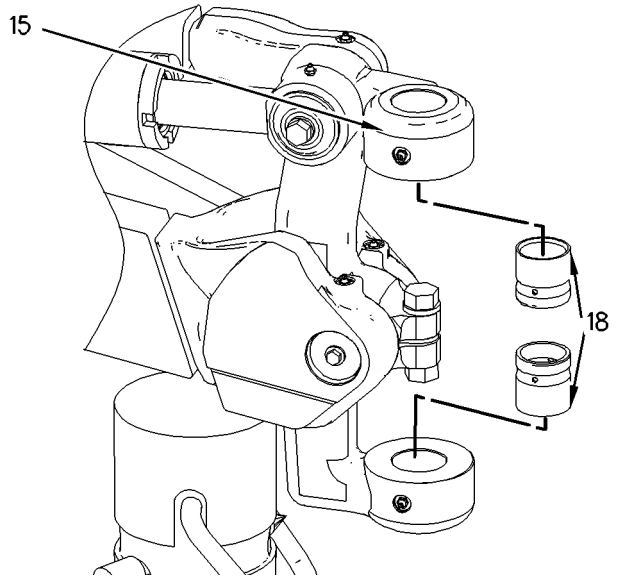

Illustration 588 g00933869

7. Use Tooling (C) (not shown) in order to remove bearings (18) from arm assembly (15).

i04411383

Spindle Housing - Install

SMCS Code: 4002-012; 4205-012

Installation Procedure

Table 59

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	6V-3160	Double Acting Cylinder	1
	5P-2145	Adapter	1
	4C-9633	Puller Stud	1
	5P-8250	Washer	1
	9U-6833	Nut	1
	9U-6600	Hand Hydraulic Pump	1
C	1P-0510	Driver Gp	1
D	360-6965	Single Acting Cylinder	1
	1U-5230	Hand Hydraulic Pump	1

(continued)

(Table 59, contd)

	1H-3107	Push-Puller Tool Gp	1
	1H-3109	Leg	2
	8J-8089	Spacer	1
E	6V-9451	Arm	1
	275-2148	Adapter	1

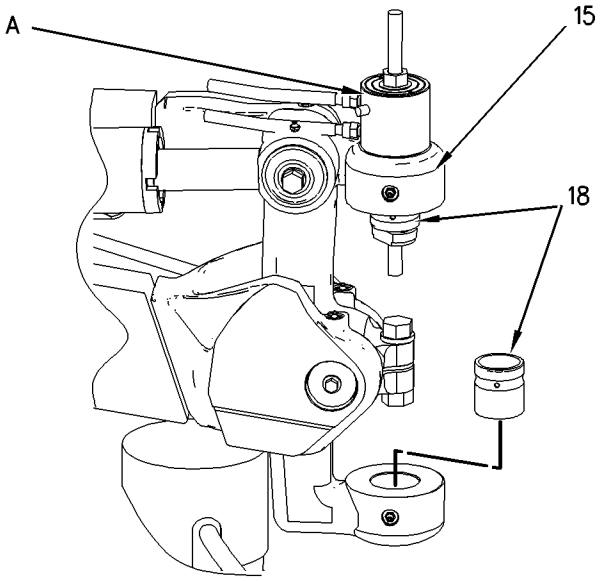

Illustration 589 g00934211

1. Lower the temperature of bearings (18). Use Tooling (A) in order to install bearings (18) in arm assembly (15).

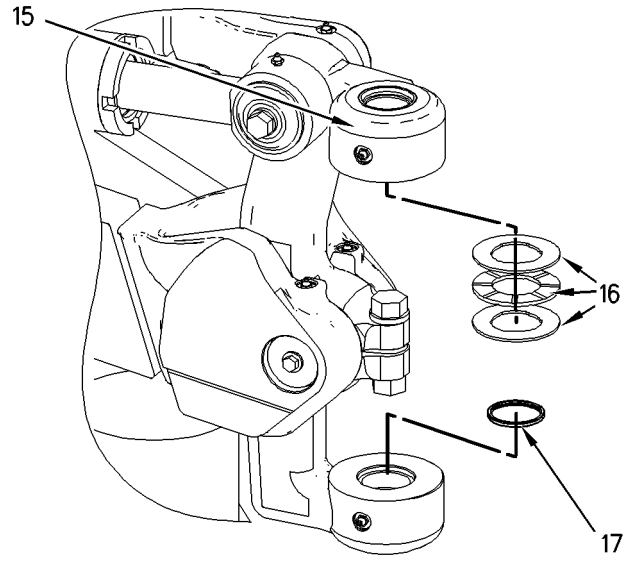

Illustration 590 g00934215

2. Use Tooling (C) in order to install seal (17) in arm assembly (15). Install thrust washers (16).

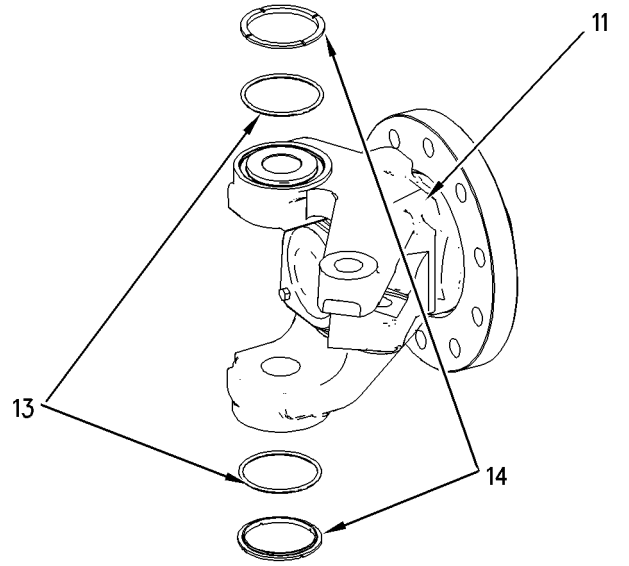

Illustration 591 g00934214

3. Install O-ring seals (13) in housing assembly (11) and install seals (14).

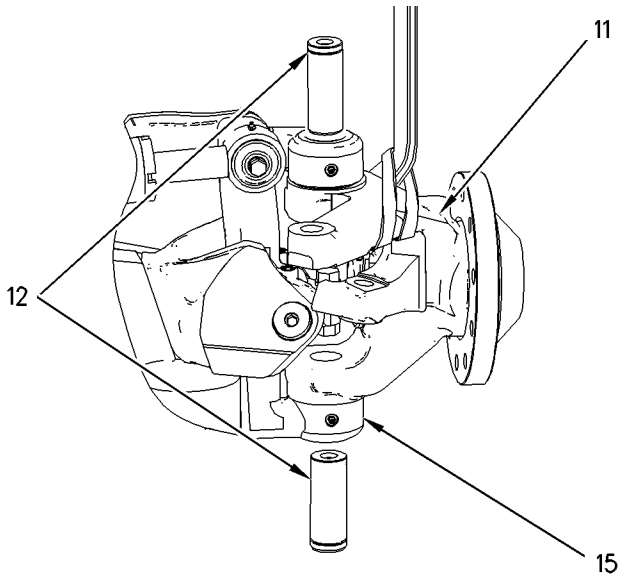

Illustration 592 g00934305

4. Attach a suitable lifting device to housing assembly (11). The weight of housing assembly (11) is approximately 136 kg (300 lb). Position housing assembly (11) on arm assembly (15). Lower the temperature of pins (12).

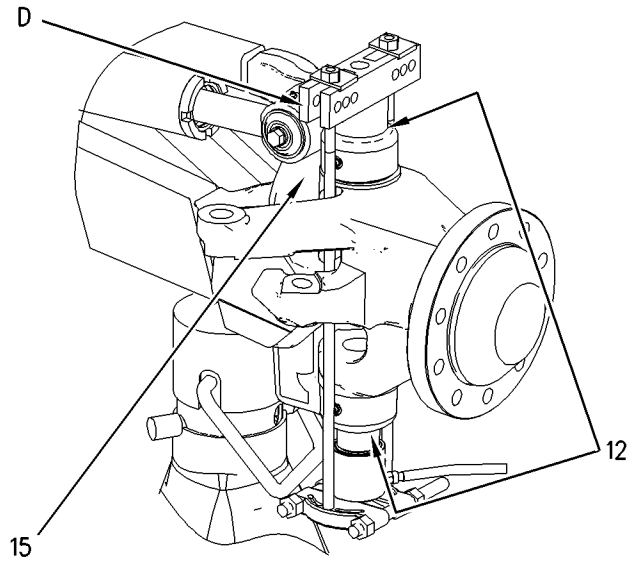

Illustration 593 g00934210

The lifting device is removed for clarity.

5. Use Tooling (D) in order to install pins (12) to a dimension of 2.0 ± 0.5 mm (0.08 ± 0.02 inch) above arm assembly (15). Remove the suitable lifting device.

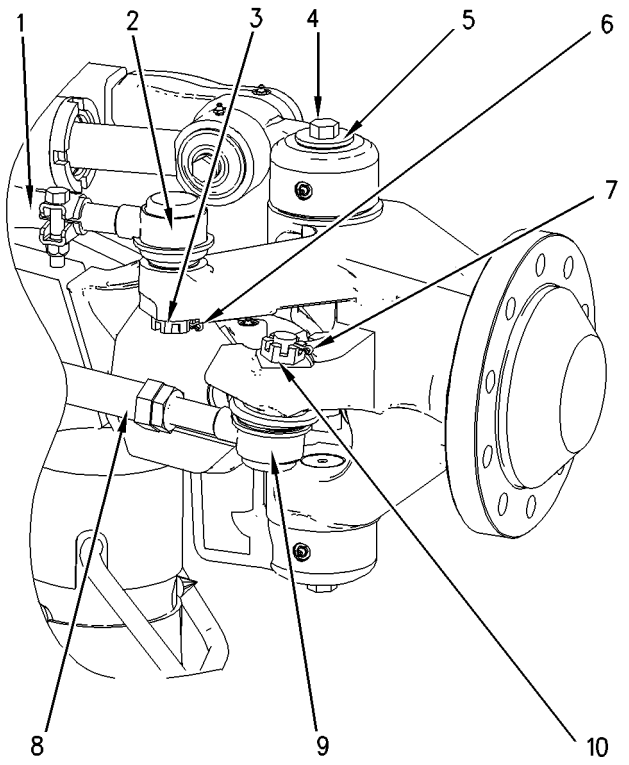

Illustration 594 g00934212

6. Install washers (5) and bolts (4).

7. Install steering cylinder (8). Install nut (10) on tie rod (9). Use Tooling (E) (not shown) to tighten nut (10) to 220 ± 14 N·m (162 ± 10 lb ft). Install cotter pin (7).

8. Install link (1). Install nut (3) on tie rod (2). Use a standard wrench and Tooling (E) (not shown) to tighten nut (3) to 220 ± 14 N·m (162 ± 10 lb ft). Install cotter pin (6).

End By:

a. Install the wheel. Refer to Disassembly and Assembly, “Wheel - Remove and Install”.

i05298244

Sleeve Bearing - Remove

SMCS Code: 7551-011-ZV

Removal Procedure

Table 60

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**

(continued)

(Table 60, contd)

A	5P-2145	Adapter	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	9U-6600	Hand Hydraulic Pump	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1
	9S-5565	Pin Puller Sleeve As	1

Start By:

a. Remove the wheel lean bar. Refer to Disassembly and Assembly, “Wheel Lean Bar - Remove and Install”.

b. Remove the spindle housing. Refer to Disassembly and Assembly, “Spindle Housing - Remove”.

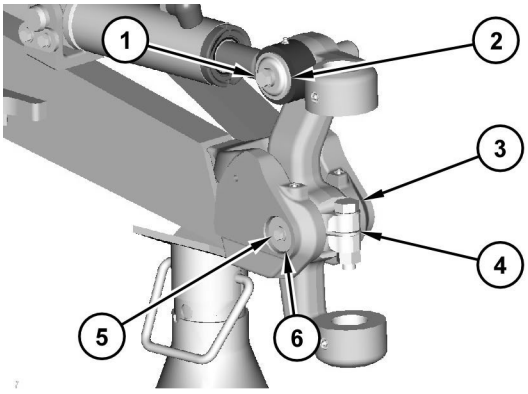

Illustration 595 g01347825

1. Remove bolt (1) and retainer (2). Remove bolts (3) and lock (4). Remove bolt (5) and washer (6).

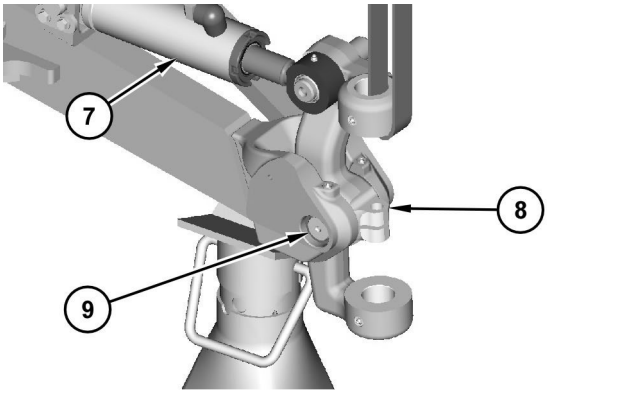

Illustration 596 g01347821

2. Attach a suitable lifting device to arm assembly (8). The weight of arm assembly (8) is approximately 45 kg (100 lb). Remove pin (9). Rotate the bottom of arm assembly (8) upward and disconnect arm assembly (8) from cylinder (7).

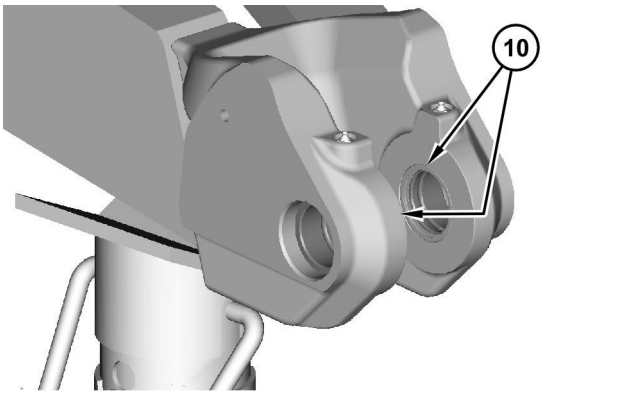

Illustration 597 g01347823

3. Remove lip seals (10).

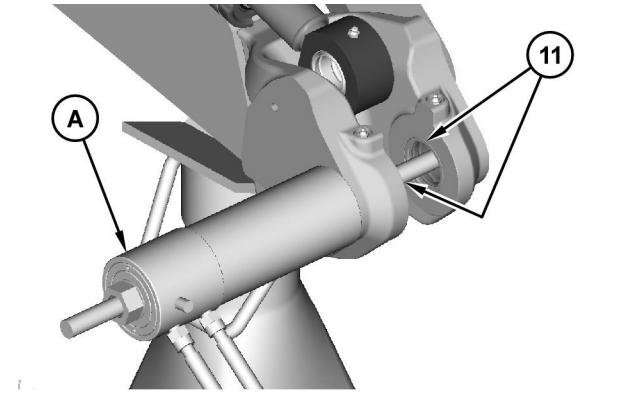

Illustration 598 g01347822

4. Use Tooling (A) in order to remove bearings (11).

i02682993

Sleeve Bearing - Install

SMCS Code: 7551-012-ZV

Installation Procedure

Table 61

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	5P-2145	Adapter	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	9U-6600	Hand Hydraulic Pump	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1
C	1P-0510	Driver Gp	1

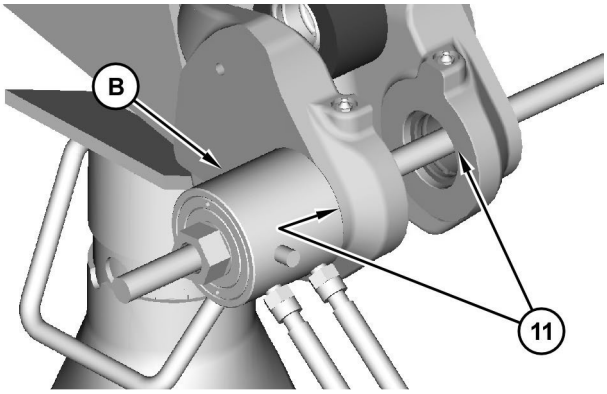

Illustration 599 g01347829

1. Use Tooling (B) in order to install bearings (11).

Note: Install bearings (11) to a depth of 7.20 ± 0.40 mm (0.284 ± 0.016 inch) below the inside surfaces of the axle assembly.

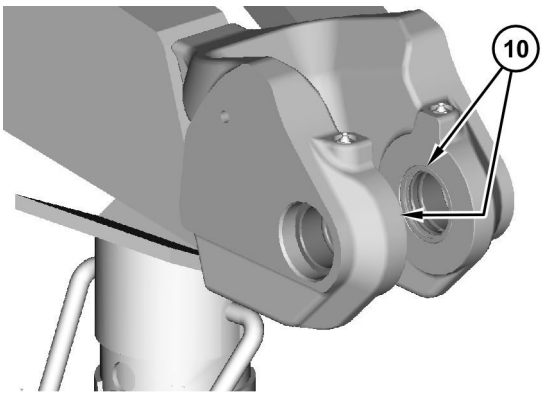

Illustration 600 g01347830

2. Use Tooling (C) in order to install lip seals (10).

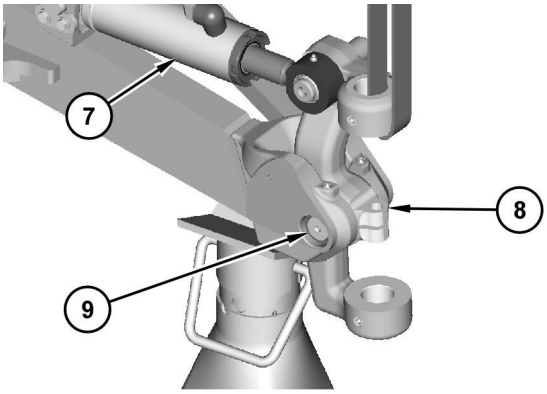

Illustration 601 g01347827

3. Use a suitable lifting device in order to position arm assembly (8). The weight of arm assembly (8) is approximately 45 kg (100 lb). Install pin (9). Rotate the bottom of arm assembly (8) upward and connect arm assembly (8) onto cylinder (7).

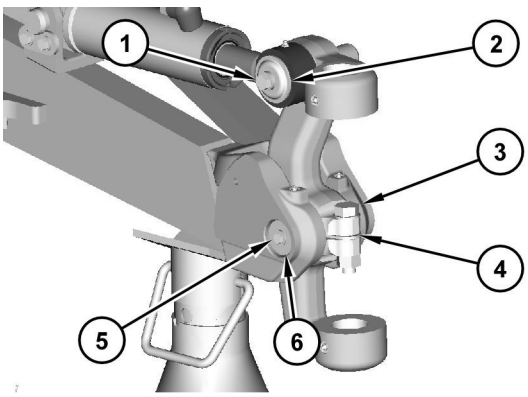

Illustration 602 g01347831

4. Install washer (6) and bolt (5). Install lock (4) and bolts (3). tighten bolts (3) to a torque of 698 ± 27 N·m (515 ± 20 lb ft). Install retainer (2) and bolt (1).

Note: The gap between the rod end of the wheel lean cylinder and retainer (2) must be 0.76 mm (0.030 inch).

End By:

a. Install the spindle housing. Refer to Disassembly and Assembly, “Spindle Housing - Install”.

b. Install the wheel lean bar. Refer to Disassembly and Assembly, “Wheel Lean Bar - Remove and Install”.

i02664809

Tie Rod (Steering) - Remove and Install

SMCS Code: 4318-010

Removal Procedure

Table 62

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	3S-1356	Full Nut	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

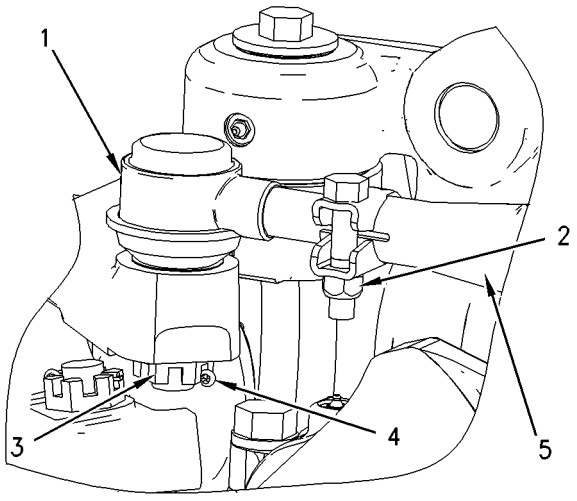

Illustration 603 g00931288

1. Remove cotter pin (4). Remove nut (3).

2. Loosen the bolt and nut (2). Install Tooling (A) on tie rod (1). Break the taper on tie rod (1).

3. Remove Tooling (A).

4. Remove tie rod (1) from link (5).

Note: For installation purposes, count and record the number of threads that are showing on tie rod (1).

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

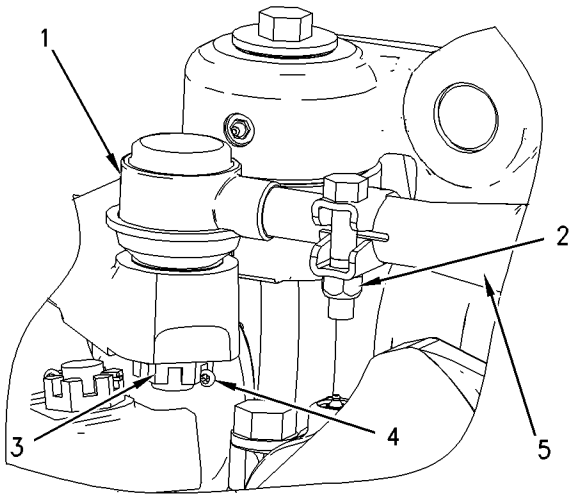

Illustration 604 g00931288

1. Install tie rod (1) on link (5).

Note: Refer to the removal procedure for the recorded number of threads on tie rod (1).

2. Tighten the bolt and nut (2). Tighten nut (2) to a torque of 75 ± 7 N·m (55 ± 5 lb ft).

3. Install nut (3). Tighten nut (3) to a torque of 220 ± 14 N·m (162 ± 10 lb ft). Align the slots for the installation of cotter pin (4).

4. Adjust the axle toe-in. Refer to Systems Operation, Testing and Adjusting, “Axle Toe-In (Front) - Adjust”.

i07279232

Wheel - Remove and Install (Front Wheel)

SMCS Code: 4201-010; 4208-010; 4209-010

Removal Procedure

Table 63

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	504-9791	Lift Gp (60 Hz)(1)	1
	OR		
	504-9793	Lift Gp (50 Hz)(2)	1
B	8S-7615	Pin	2
	283-1495	Stand Assembly	2
	8S-7611	Tube	2

(1) High-Voltage (480V) Low-Voltage (240V)
(2) High-Voltage (400V) Low-Voltage (200V)

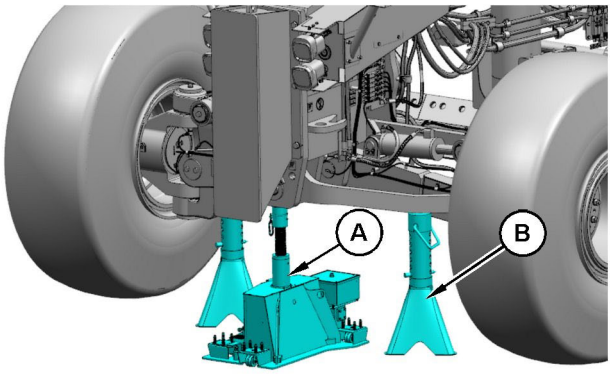

Illustration 605 g06286533

1. Position Tooling (A) as shown in Illustration 605 to raise the front of the machine until the front tires are off the ground. Refer to Tool Operating Manual, NEHS1303, “Lift Group (Stand - 25 Ton)” for more information on Tooling (A). Use Tooling (B) to support both sides of the front axle.

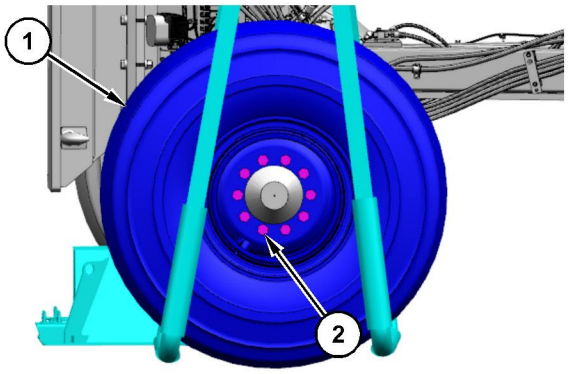

Illustration 606 g06271801

2. Attach a suitable lifting device onto front wheel (1). Remove bolts (2). Remove front wheel (1) from the spindle hub. The weight of front wheel (1) is approximately 340 kg (750 lb). Repeat this step for the remaining front wheel.

Installation Procedure

Table 64

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	504-9791	Lift Gp (60 Hz)(1)	1
	OR		
	504-9793	Lift Gp (50 Hz)(2)	1
B	8S-7615	Pin	2
	283-1495	Stand Assembly	2
	8S-7611	Tube	2

(1) High-Voltage (480V) Low-Voltage (240V)
(2) High-Voltage (400V) Low-Voltage (200V)

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

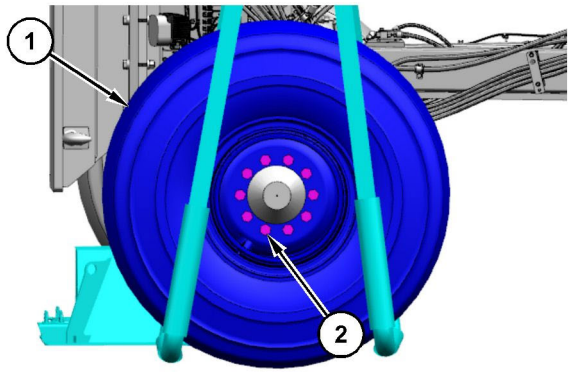

Illustration 607 g06271801

1. Use a suitable lifting device to install front wheel (1) onto the spindle hub. The weight of front wheel (1) is approximately 340 kg (750 lb). Install bolts (2). Tighten bolts (2) to a torque of 1800 ± 200 N·m (1328 ± 148 lb ft). Repeat this step for the remaining front wheel.

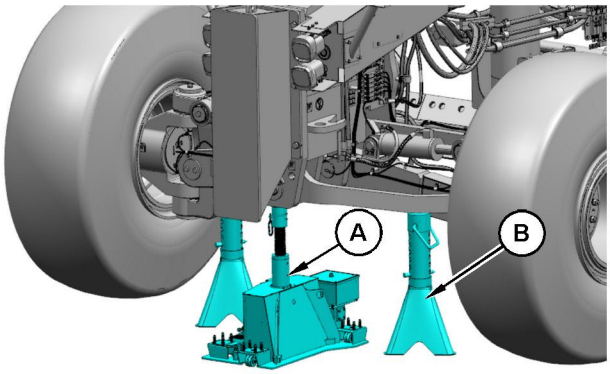

Illustration 608 g06286533

2. Use Tooling (A) to raise the machine. Refer to Tool Operating Manual, NEHS1303 for more information on Tooling (A). Remove Tooling (B). Lower the machine to the ground and remove Tooling (A).

i07391044

Wheel Lean Bar - Remove and Install

SMCS Code: 5225-010

Removal Procedure

Table 65

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	504-9826	Lift Gp (60Hz)(1)	1
	OR		
	504-9827	Lift Gp (50Hz)(2)	1
B	1P-1832	Bearing Pulling Adapter	1
	4C-9633	Puller Stud	1
	3S-6224	Electric Hydraulic Pump Gp	1
	6V-3160	Double Acting Cylinder	1
	5F-7353	Washer	1
	9U-6833	Nut	1

(1) High-Voltage (480V) Low-Voltage (240V)
(2) High-Voltage (400V) Low-Voltage (200V)

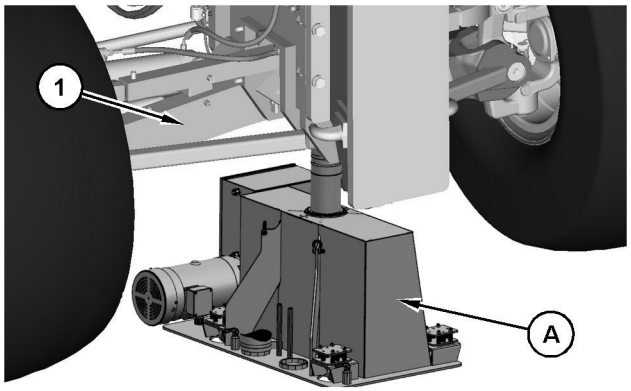

Illustration 609 g06305828

1. Position Tooling (A) as shown. Use Tooling (A) to support front axle (1).

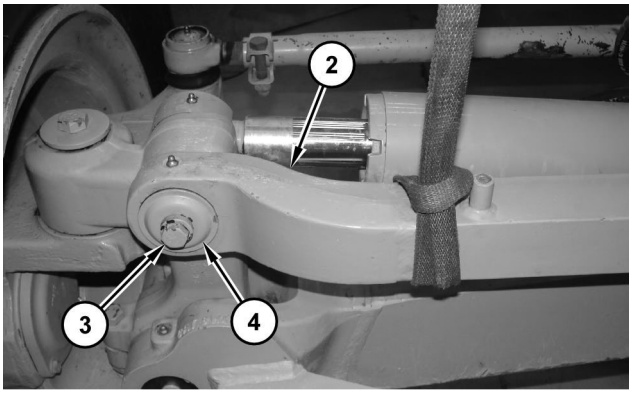

Illustration 610 g01380749

2. Attach a suitable lifting device onto both ends of wheel lean bar (2). The weight of wheel lean bar (2) is approximately 77 kg (170 lb).

3. Remove bolt (3) and retainer (4). Repeat this step for the opposite end.

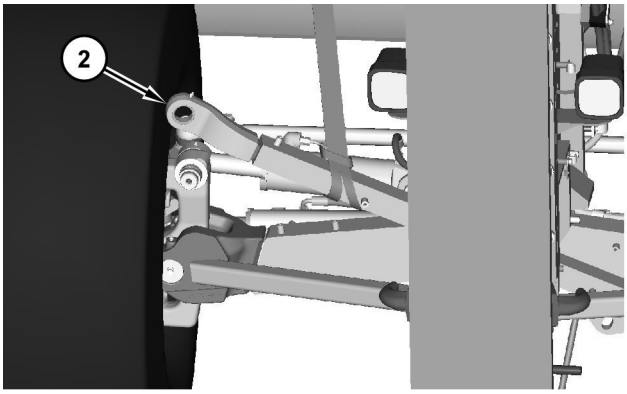

Illustration 611 g01380763

4. Remove wheel lean bar (2).

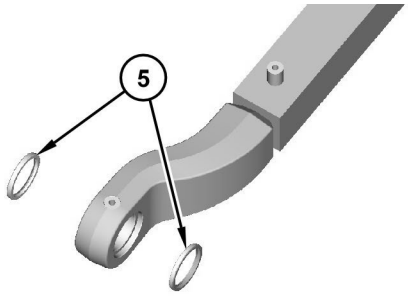

Illustration 612 g01380764

5. Remove lip seals (5). Repeat this step for the remaining lip seals.

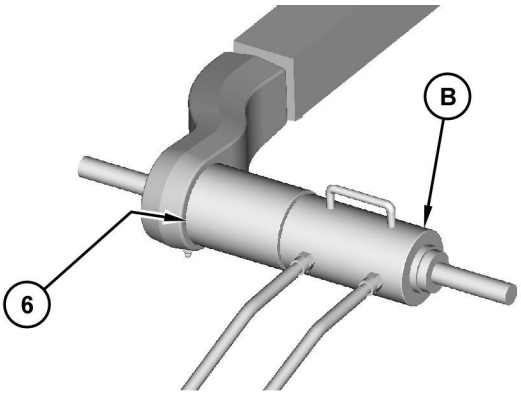

Illustration 613 g01380769

6. Use Tooling (B) to remove bearing (6). Repeat this step for the remaining bearing.

Installation Procedure

Table 66

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	504-9826	Lift Gp (60Hz)(1)	1
	OR		
	504-9827	Lift Gp (50Hz)(2)	1
C	1P-1832	Bearing Pulling Adapter	1
	4C-9633	Puller Stud	1
	3S-6224	Electric Hydraulic Pump Gp	1
	6V-3160	Double Acting Cylinder	1
	5F-7353	Washer	1
	9U-6833	Nut	1
D	1P-0510	Driver Gp	1

(1) High-Voltage (480V) Low-Voltage (240V)
(2) High-Voltage (400V) Low-Voltage (200V)

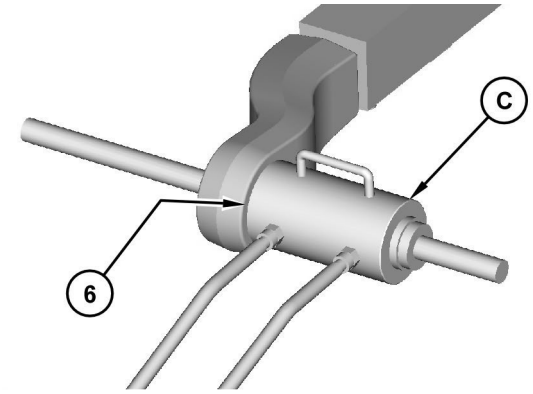

Illustration 614 g01380782

1. Use Tooling (C) to install bearing (6). Repeat this step for the remaining bearing.

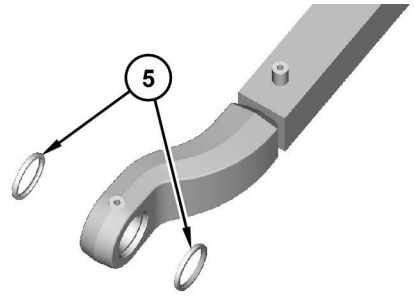

Illustration 615 g01380764

2. Use Tooling (D) to install lip seals (5). Repeat this step for the remaining lip seals.

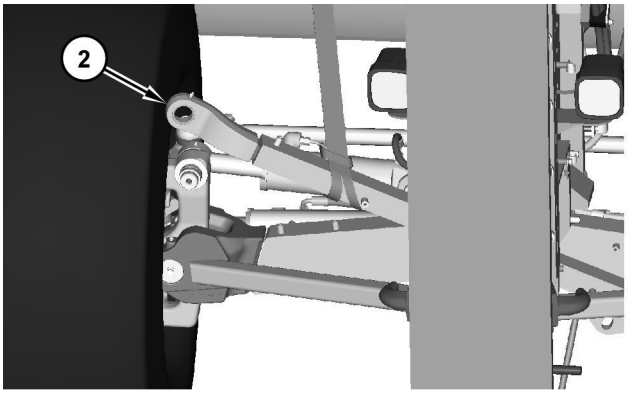

Illustration 616 g01380763

3. Use a suitable lifting device to install wheel lean bar (2). The weight of wheel lean bar (2) is approximately 77 kg (170 lb).

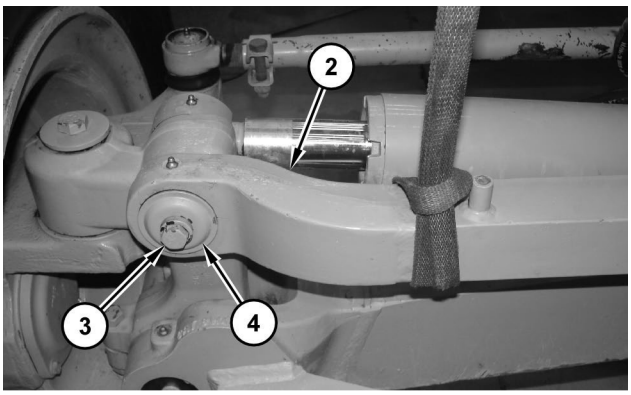

Illustration 617 g01380749

4. Install retainer (4) and bolt (3). Repeat this step for the opposite end.

Note: The gap between retainers (4) and wheel lean bar (2) must be a minimum of 1.45 mm (0.057 inch).

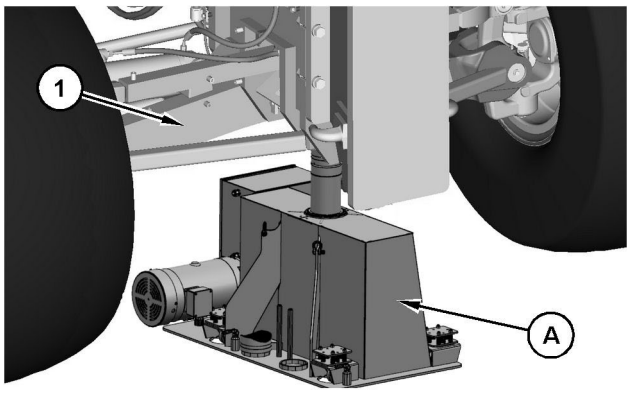

Illustration 618 g06305828

5. Remove Tooling (A) from front axle (1).

i03602463

Wheel Lean Arm and Axle Bushings - Remove

SMCS Code: 5225-011

Removal Procedure

Table 67

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-1835	Adapter	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	9U-6600	Hand Hydraulic Pump	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1
	9S-5565	Pin Puller Sleeve As	1

Start By:

a. Remove the spindle housing. Refer to Disassembly and Assembly, “Spindle Housing - Remove”.

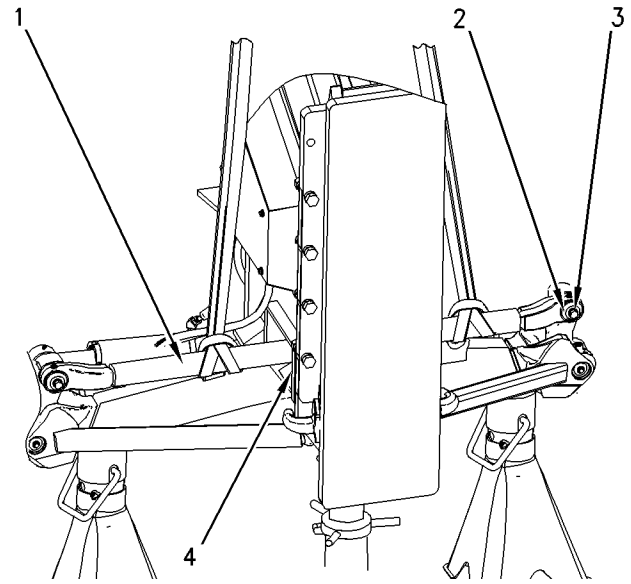

Illustration 619 g00935249

1. Attach a suitable lifting device to bar assembly (1). The weight of bar assembly (1) is approximately 80 kg (176 lb). Remove bolts (3) and washers (2). Remove bar assembly (1) and lower bar assembly (1) to front frame assembly (4).

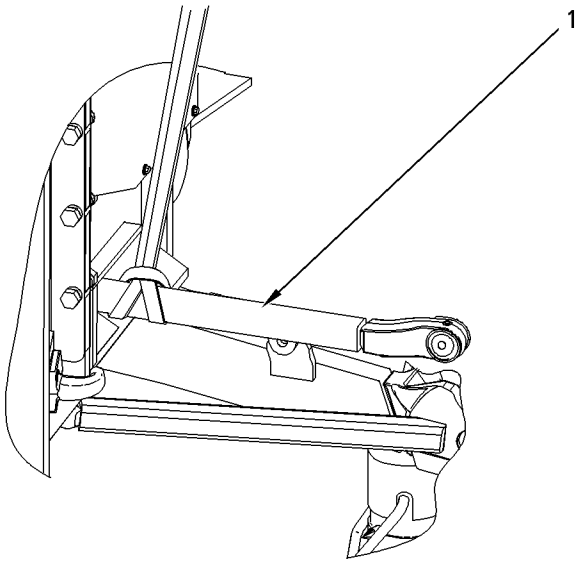

Illustration 620 g00935259

2. Remove one of the lifting slings from bar assembly and remove bar assembly (1) from the machine.

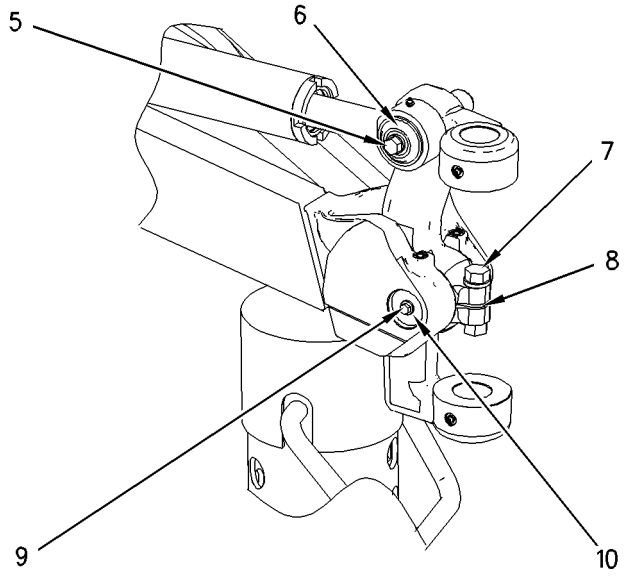

Illustration 621 g00935427

3. Remove bolt (5) and washer (6). Remove bolts (9) and washers (10). Remove bolt (7) and lock (8).

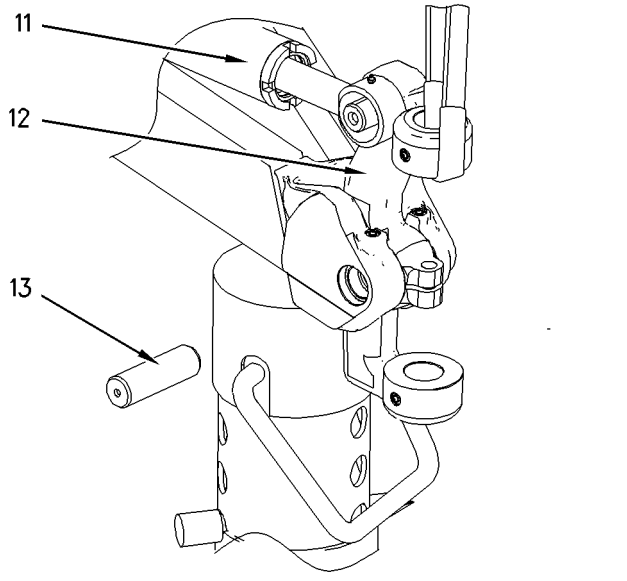

Illustration 622 g00935254

4. Attach a suitable lifting device to arm assembly (12). The weight of arm assembly (12) is approximately 50 kg (110 lb). Remove pin (13). Rotate the bottom of arm assembly (12) upward and remove arm assembly (12) from cylinder (11).

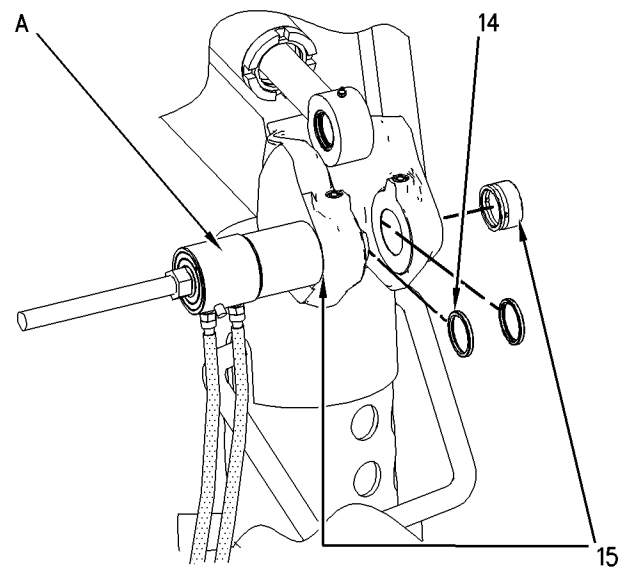

Illustration 623 g00935253

5. Remove seals (14). Use Tooling (A) in order to remove bearings (15).

i02757476

Wheel Lean Arm and Axle Bushings - Install

SMCS Code: 5225-012

Installation Procedure

Table 68

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	1P-1835	Adapter	1
	4C-9634	Puller Stud	1
	6V-3170	Double Acting Cylinder	1
	9U-6600	Hand Hydraulic Pump	1
	9U-6832	Nut	1
	4K-0684	Hard Washer	1
C	1P-0510	Driver Gp	1

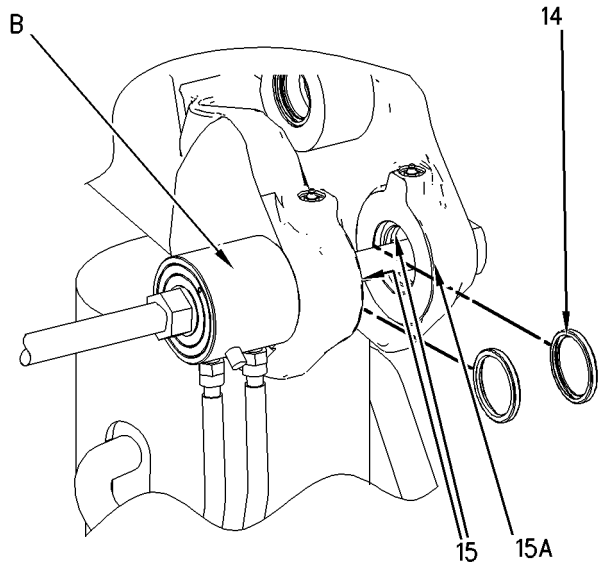

Illustration 624 g00935851

1. Use Tooling (B) in order to install bearings (15).

Note: Install bearings (15) 5.6 ± .4 mm (.221 ± .016 inch) below the inside surfaces of axle assembly (15A).

2. Use Tooling (C) (not shown) in order to install seals (14).

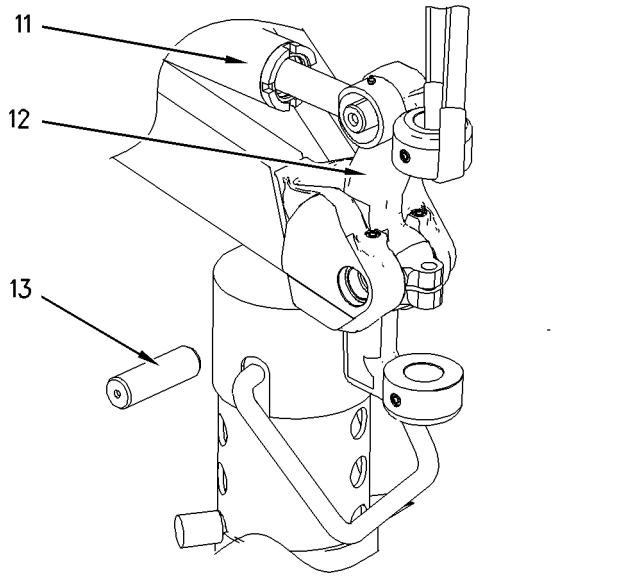

Illustration 625 g00935859

3. Attach a suitable lifting device to arm assembly (12). The weight of arm assembly (12) is approximately 50 kg (110 lb). Install arm assembly (12) on cylinder (11) and rotate the bottom of arm assembly (12) downward. Install pin (13).

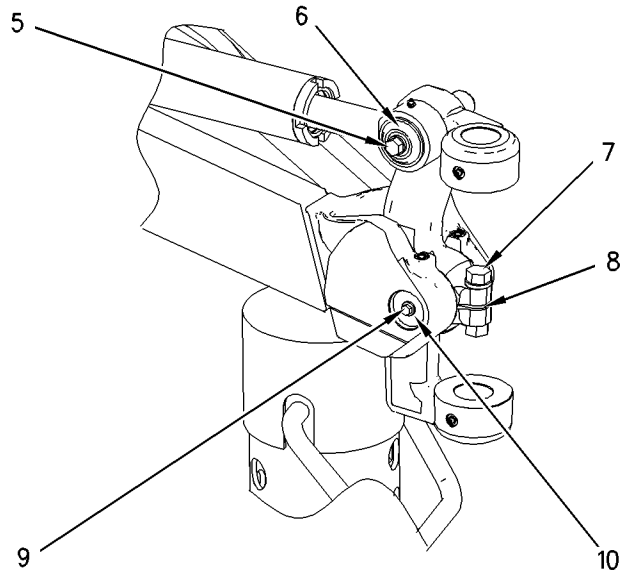

Illustration 626 g00935860

4. Install washer (6) and bolt (5). Install washers (10) and bolts (9). Install lock (8) and bolt (7).

Note: The dimension between the rod end of the wheel lean cylinder and washer (6) must be 0.76 mm (0.030 inch).

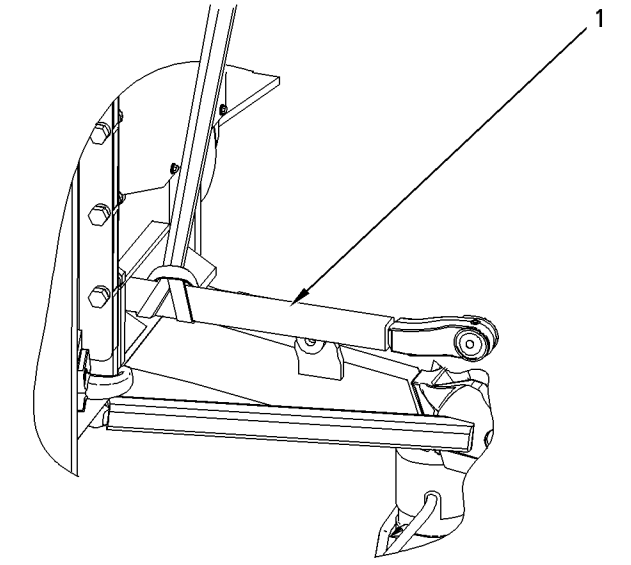

Illustration 627 g00935861

5. Attach a suitable lifting device to bar assembly (1). The weight of bar assembly (1) is approximately 80 kg (176 lb). Position bar assembly (1) on the machine. Lower bar assembly (1) on front frame assembly (4).

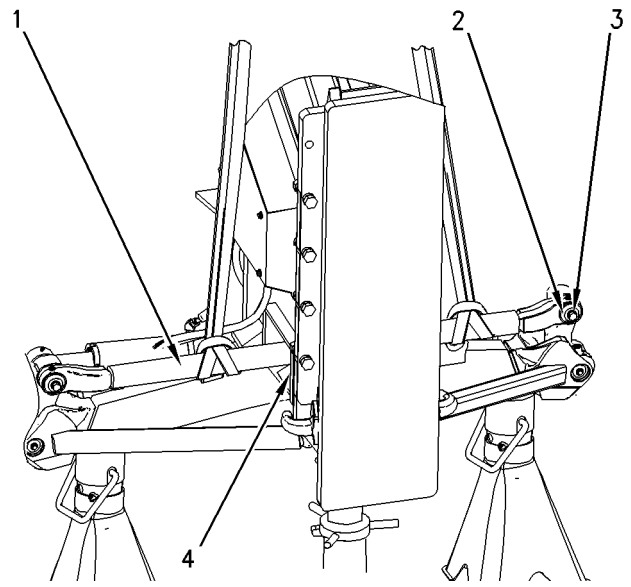

Illustration 628 g00935862

6. Install a second lifting sling on bar assembly (1) and install bar assembly (1) onto front frame assembly (4). Install washers (2) and bolts (3).

End By:

a. Install the spindle housing. Refer to Disassembly and Assembly, “Spindle Housing - Install”.

i02746866

Wheel Lean Cylinder - Remove and Install

SMCS Code: 5211-010

Removal Procedure

Table 69

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

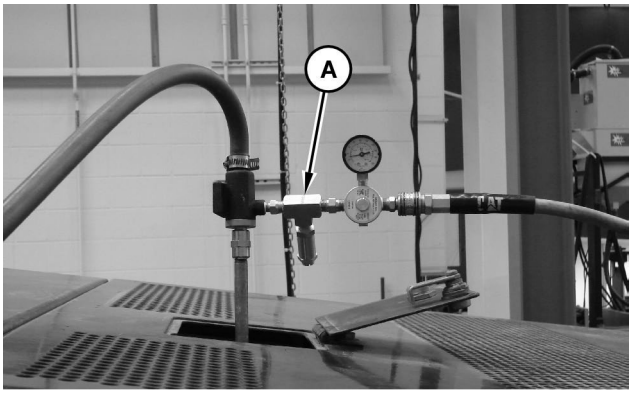

Illustration 629 g01368952

2. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

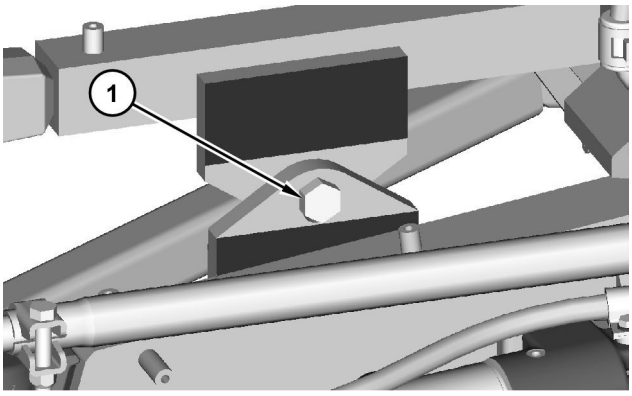

Illustration 630 g01375796

3. Install the wheel lean bolt and nut (1).

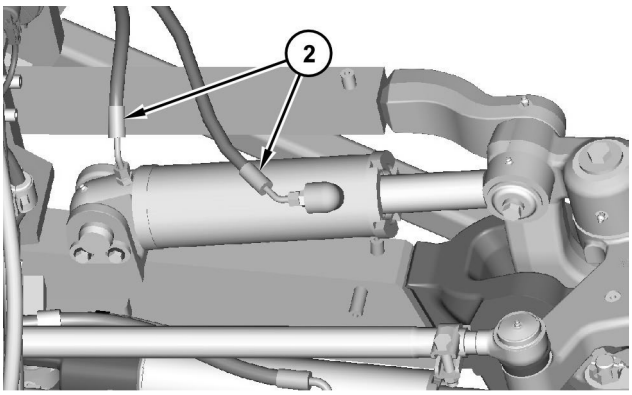

Illustration 631 g01375799

4. Disconnect hose assemblies (2).

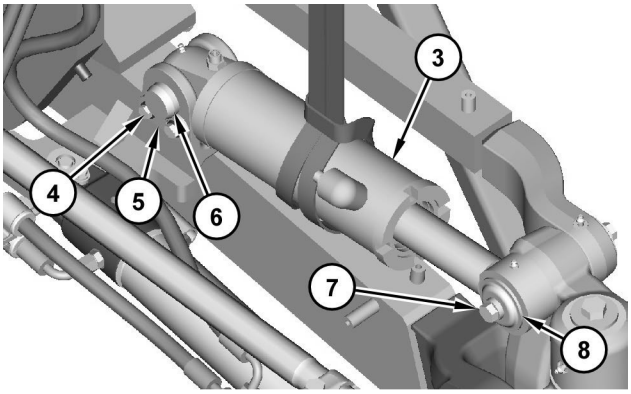

Illustration 632 g01375800

5. Attach a suitable lifting device to wheel lean cylinder (3). The weight of wheel lean cylinder (3) is approximately 32 kg (70 lb).

6. Remove bolts (4) and retention plate (5).

7. Remove pin (6). Use a suitable lifting device in order to raise the head end of wheel lean cylinder (3) upward.

8. Remove bolt (7) and retainer (8).

9. Remove wheel lean cylinder (3).

Disassembly and Assembly Information

Table 70

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	127-4904	Repair Stand	1
C	195-4609	Seal Pick	1
D	7M-7456	Bearing Mount Compound	1
E	1P-0808	Multipurpose Grease	1
F	9U-7868	Spanner Wrench	1
	127-8064	Adjustable Plate	1
G	1P-0510	Driver Gp	1
H	5P-2145	Bearing Puller Adapter	1
	4C-9633	Puller Stud	1
	6V-3160	Double Acting Cylinder	1
	1A-1935	Full Nut	1
	9S-5565	Pin Puller Sleeve As	1
	3S-6224	Electric Hydraulic Pump Gp	1

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

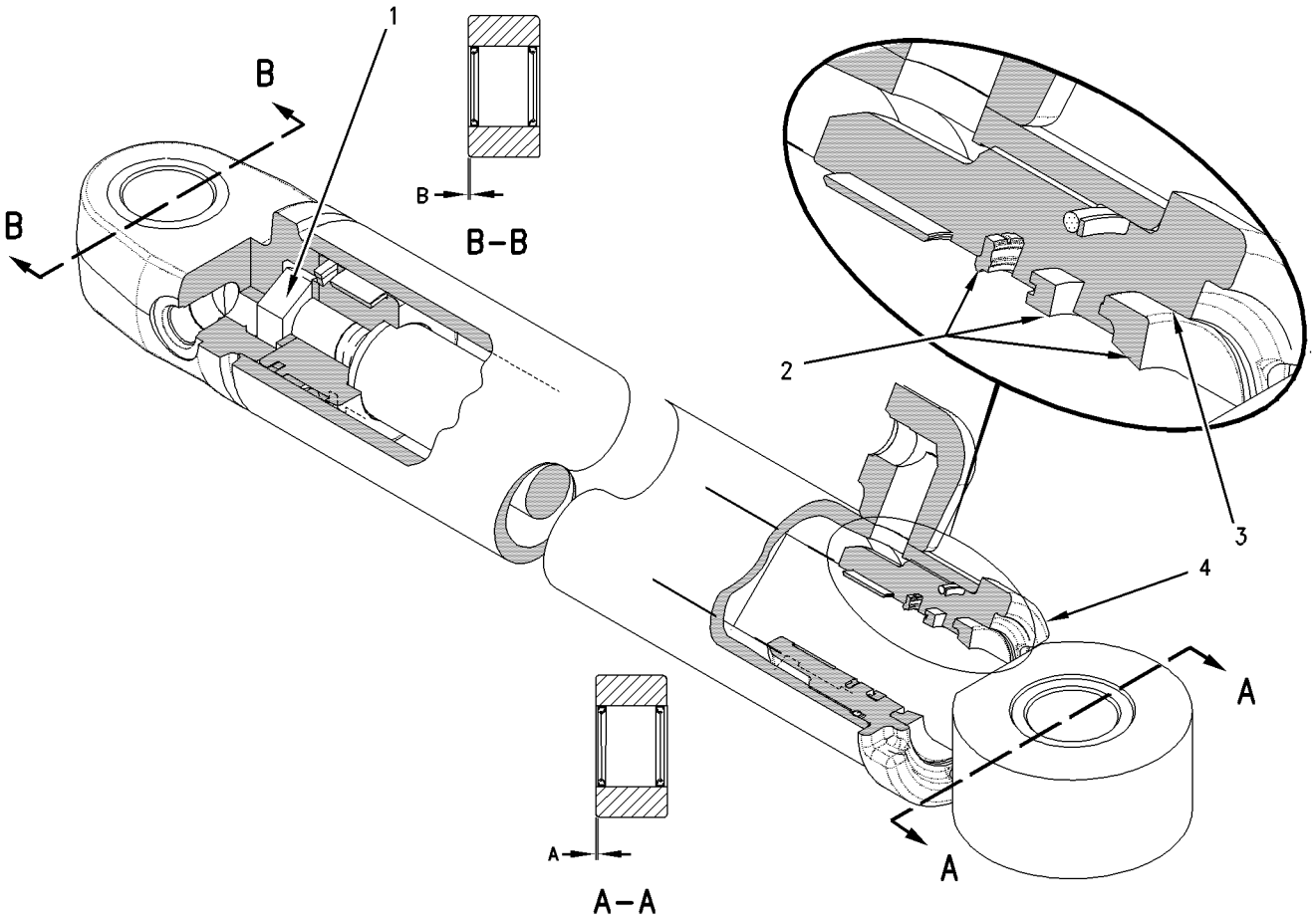

Illustration 633 g00932574

(A) Dimension from the face to the bearing
. . . . . 7.80 ± .50 mm ((0.307 ± 0.020 inch))

(B) Dimension from the face to the bearing
. . . . . 8.30 ± .50 mm ((0.327 ± 0.012 inch))

(1) Torque for bolt . . . . . 1800 ± 200 N·m
((1328 ± 148 lb ft))

(1) Use a 46 mm socket in order to remove the bolt.

(2) Lubricate sealing lips with a thin covering of the lubricant that is being sealed.

(3) Apply Tooling (D) to the seal groove prior to assembling the wiper seal.

(4) Torque for head . . . . . 600 ± 130 N·m
((440 ± 95 lb ft))

Note: Lubricate the threads with Tooling (E).

Installation Procedure

Table 71

Required Tools			
Tool	Part Number	Part Description	Qty
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

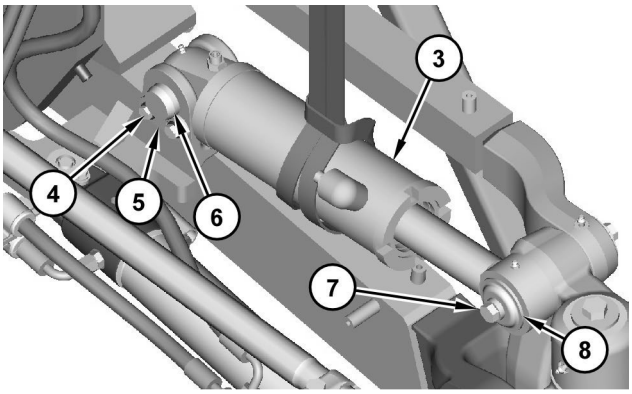

Illustration 634 g01375800

1. Use a suitable lifting device in order to position wheel lean cylinder (3). The weight of wheel lean cylinder (3) is approximately 32 kg (70 lb).

2. Install retainer (8) and bolt (7).

Note: The gap between the rod end of wheel lean cylinder (3) and retainer (8) must be 0.76 mm (0.030 inch).

3. Lower the head end of wheel lean cylinder (3) downward. Install pin (6).

4. Install retention plate (5) and bolts (4).

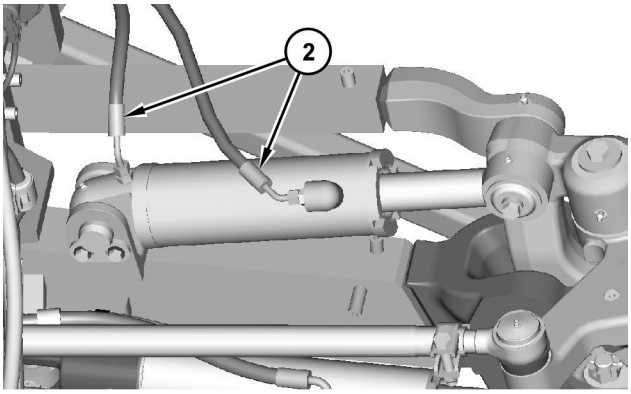

Illustration 635 g01375799

5. Connect hose assemblies (2).

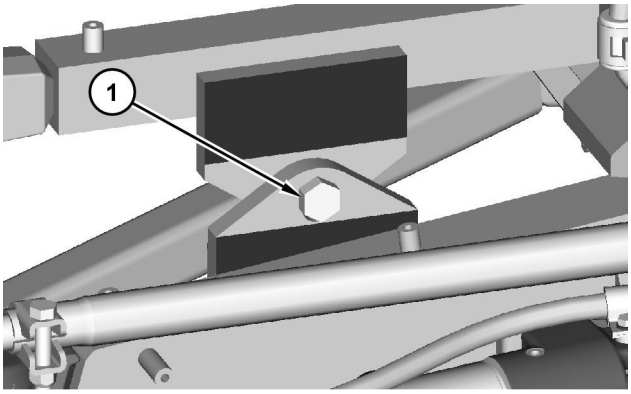

Illustration 636 g01375796

6. Remove the wheel lean bolt and nut (1).

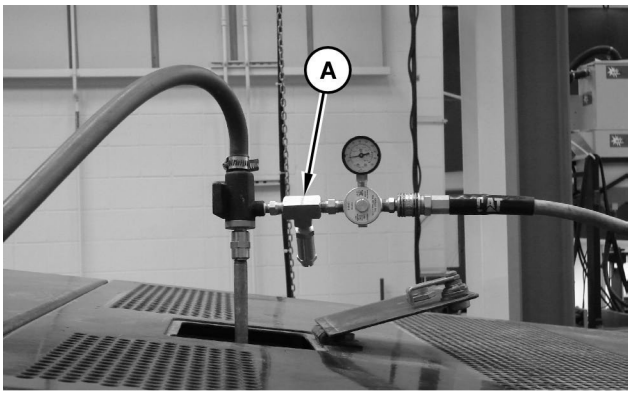

Illustration 637 g01368952

7. Remove Tooling (A).

8. Check the hydraulic oil level. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”.

i02992066

Steering Cylinder - Remove and Install

SMCS Code: 4303-011-ZL; 4303-011-QS; 4303-011

Removal Procedure

Table 72

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

Start By:

a. Connect the steering frame lock. Refer to Disassembly and Assembly, “Steering Frame Lock - Separate and Connect”.

⚠ WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

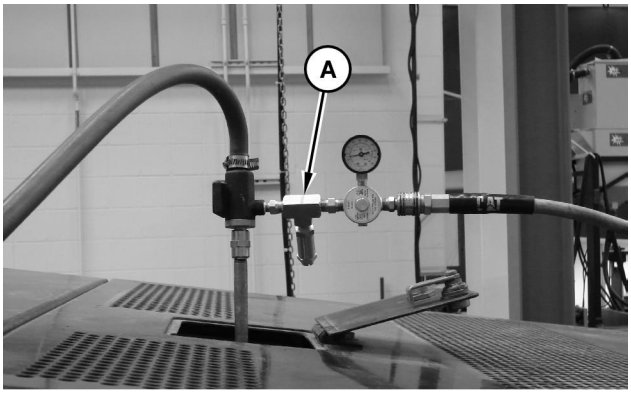

Illustration 638 g01368952

2. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

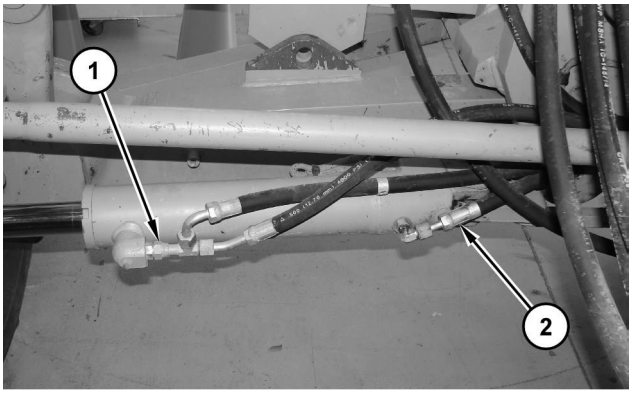

Illustration 639 g01376251

3. Disconnect fitting (1). Disconnect hose assembly (2).

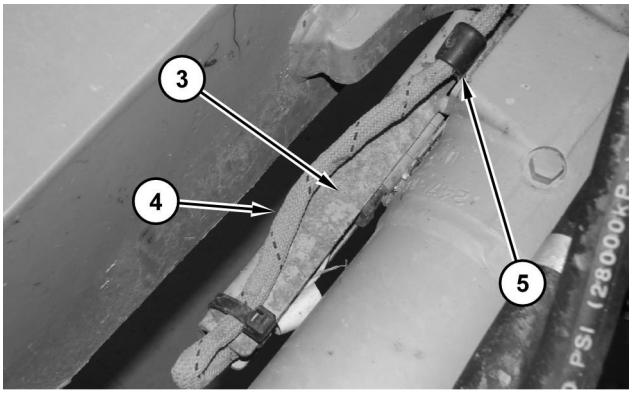

Illustration 640 g01376256

4. Remove cover (3). Disconnect harness assembly (4). Remove clips (5).

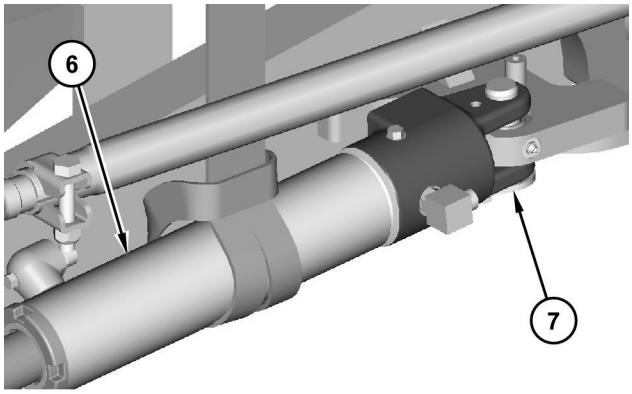

Illustration 641 g01376268

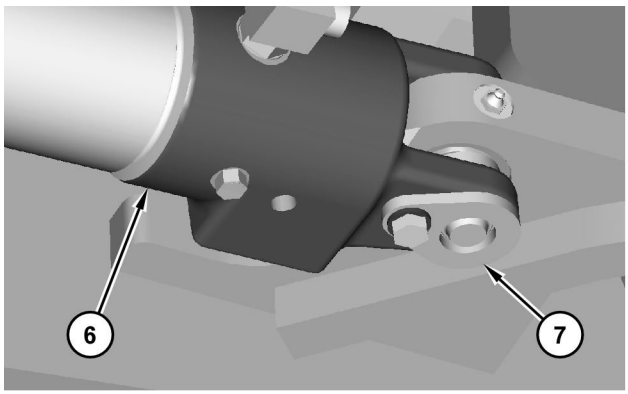

Illustration 642 g01376269

5. Attach a suitable lifting device onto steering cylinder (6). The weight of steering cylinder (6) is approximately 20 kg (44 lb). Remove pin assembly (7).

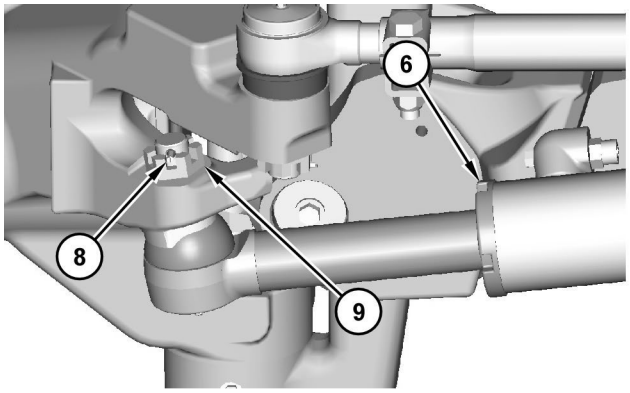

Illustration 643 g01376274

6. Remove cotter pin (8). Remove nut (9). Remove steering cylinder (6).

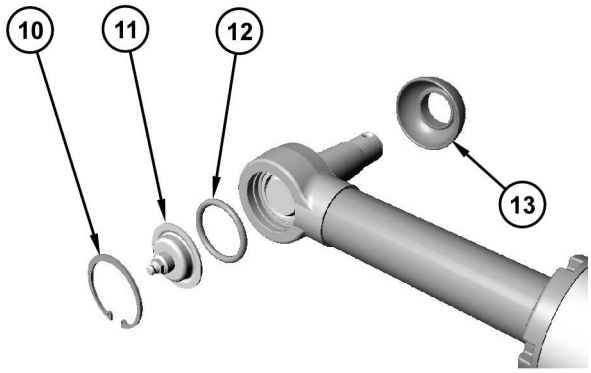

Illustration 644 g01491113

7. Remove retaining ring (10). Remove cap assembly (11). Remove O-ring seal (12). Remove boot (13).

8. Repeat Step 1 through Step 7 for the remaining steering cylinder.

Sensor Removal Procedure

Table 73

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	4C-5649	Threaded Adapter	1
	1P-0074	Slide Hammer Puller Gp	1

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

Note: The Illustrations that are shown in the following Steps demonstrate the correct removal procedure for the sensor assembly, and these Illustrations may not represent the exact cylinder that is on your machine.

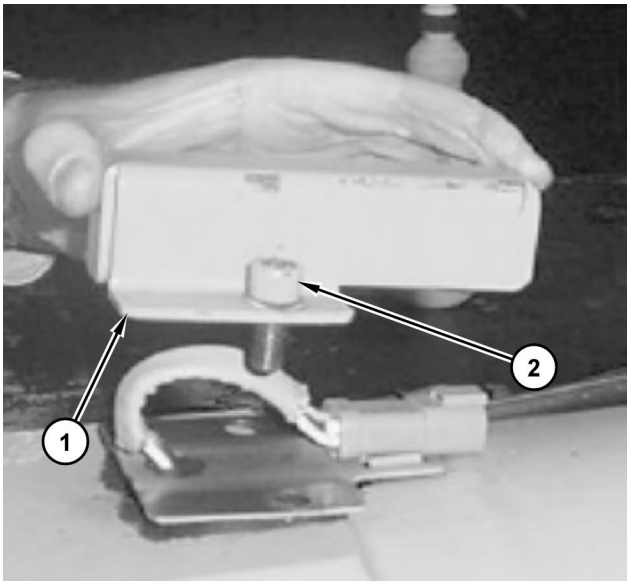

Illustration 645 g01151971

1. Remove bolts (2) and cover (1).

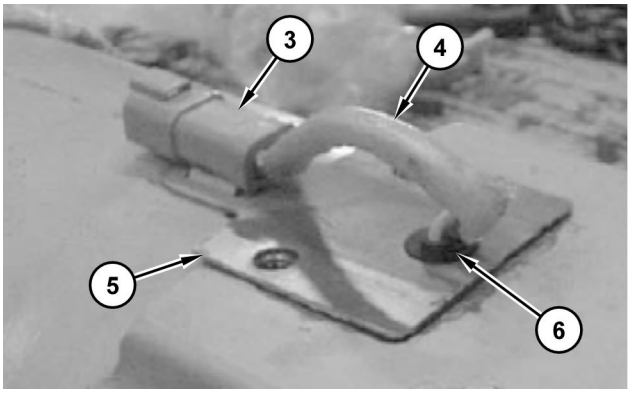

Illustration 646 g01151970

2. Remove connector assembly (3) and sleeve (4) from the harness assembly.

3. Remove plate (5) and grommet (6).

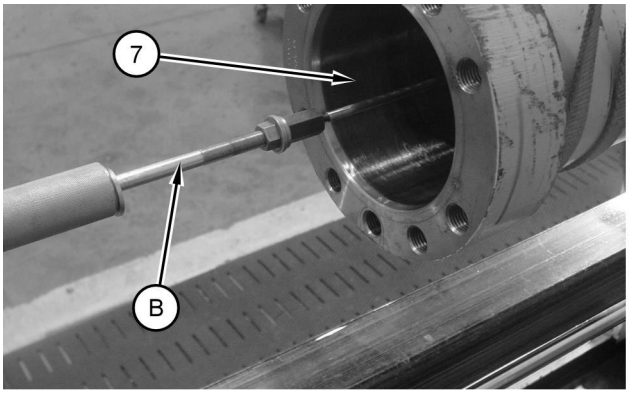

Illustration 647 g01370084

4. Install Tooling (B) to sensor assembly (7).

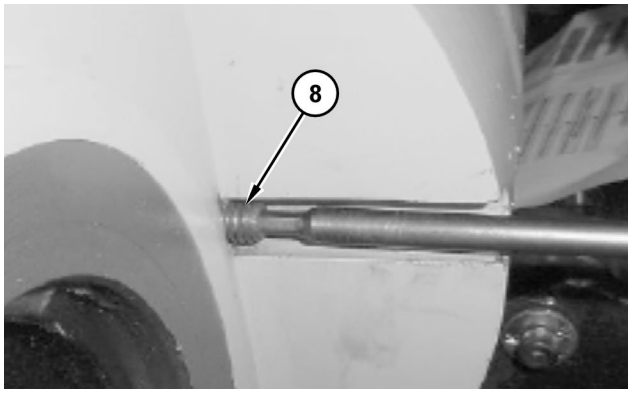

Illustration 648 g01151955

5. Remove screw (8) and discard screw (8).

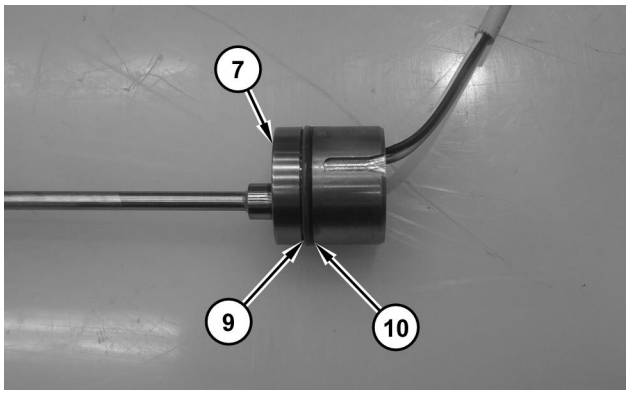

Illustration 649 g01152067

6. Remove sensor assembly (7).

7. Remove O-ring seal (9) and backup ring (10) from sensor assembly (7).

Note: For pistons that are retained with a nut, refer to the following instructions for the removal of the magnet.

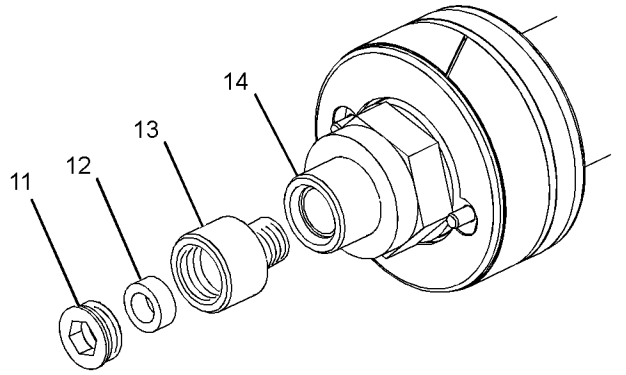

Illustration 650 g01154825

8. Remove retainer (11) and magnet (12) from carrier (13).

9. Remove carrier (13) from rod (14).

Note: For pistons that are retained with a bolt, refer to the following instructions for the removal of the magnet.

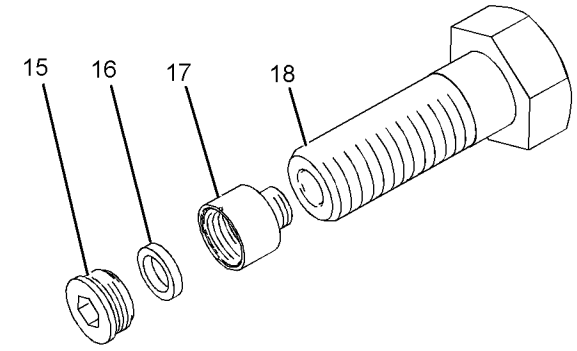

Illustration 651 g01154827

10. Remove retainer (15) and magnet (16) from carrier (17).

11. Remove carrier (17) from bolt (18).

Sensor Installation Procedure

Table 74

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
C	265-4177	Installation Kit(1)	1
D	264-4181	Sleeve(1)	1
E	265-4208	Wire Assembly(1)	1
F	154-9731	Thread Lock Compound	1
G	6V-6640	Sealant	1
H	155-0695	Thread Lock Compound	1

(1) Part of 265-4177 Installation Kit

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: The Illustrations that are shown in the following Steps demonstrate the correct installation procedure for the sensor assembly, and these Illustrations may not represent the exact cylinder that is on your machine.

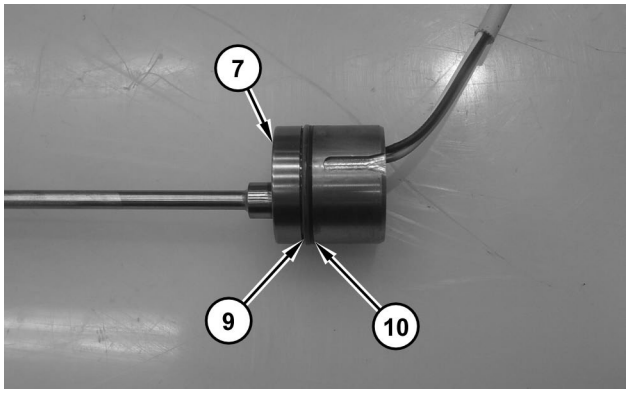

Illustration 652 g01152067

1. Lubricate backup ring (10) and O-ring seal (9) with the lubricant that is being sealed. Install backup ring (10) and O-ring seal (9) on sensor assembly (7).

Note: Install backup ring (10) so that the split in backup ring (10) is in alignment with the slotted notch on the side of sensor assembly (7).

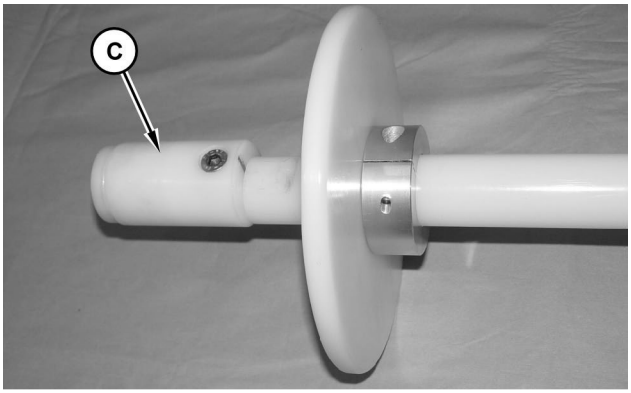

Illustration 653 g01370088

2. Assemble Tooling (C), as shown. Refer to Tool Operating Manual, NEHS0935.

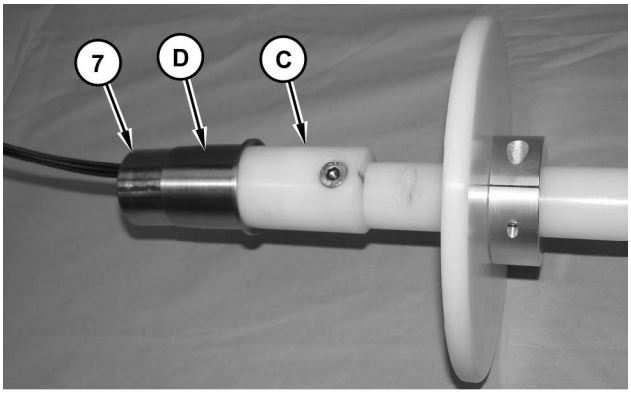

Illustration 654 g01370090

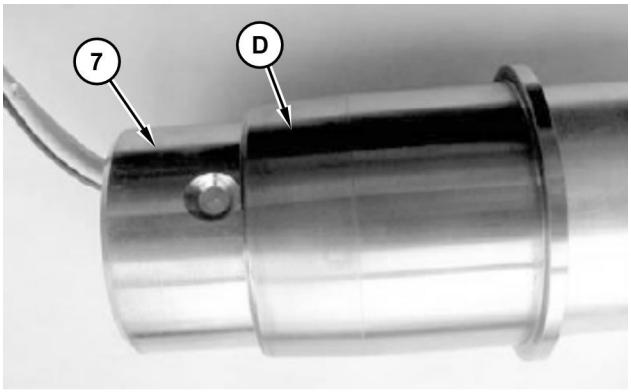

Illustration 655 g01370093

3. Install sensor assembly (7) into Tooling (C).

4. Slide Tooling (D) over sensor assembly (7) until Tooling (D) has cleared the dimple in the side of sensor assembly (7), as shown.

Note: If Tooling (D) is installed to the point which exposes the O-ring seal on sensor assembly (7), continue pulling sensor assembly (7) through Tooling (D) and repeat Steps 3 and 4. This will help prevent cutting the O-ring seal with Tooling (D).

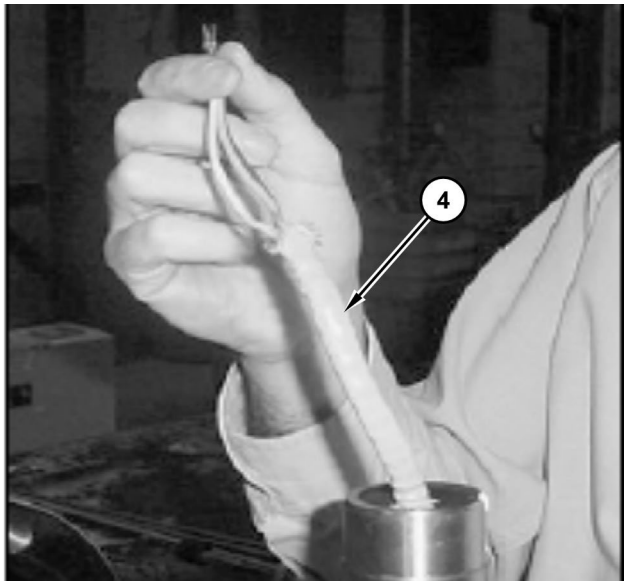

Illustration 656 g01151972

5. Install sleeve (4) over the harness assembly.

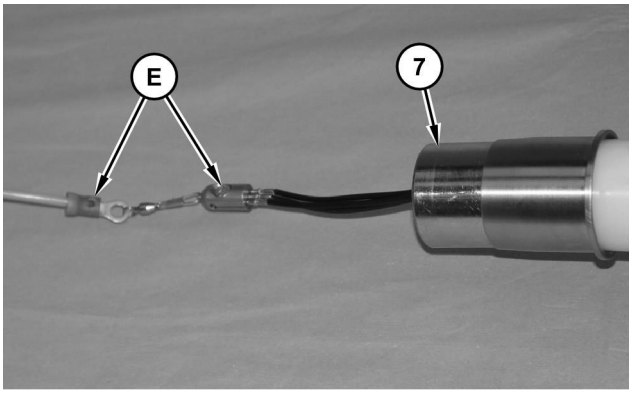

Illustration 657 g01370094

6. Start by threading Tooling (E) through the wire passage of the cylinder. Continue threading Tooling (E) through the cylinder and secure Tooling (E) to the wires of sensor assembly (7), as shown.

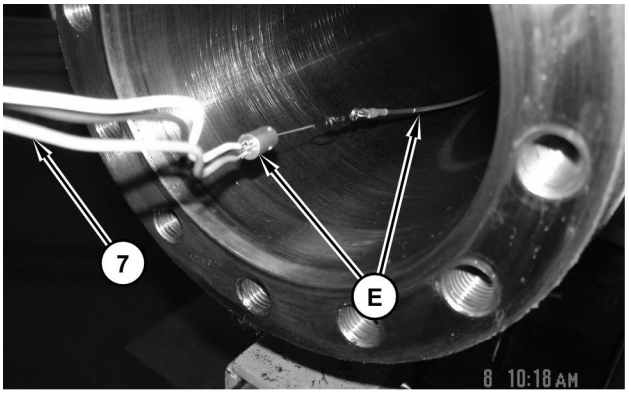

Illustration 658 g01370099

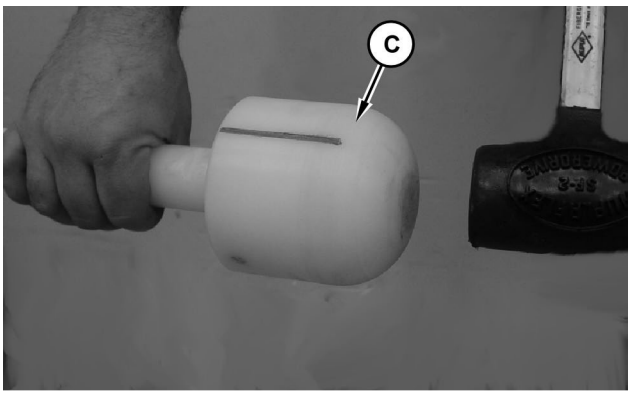

Illustration 659 g01370102

7. With the help of another person, use Tooling (C) and Tooling (E) to guide the sensor assembly into position.

Note: Use the alignment marks on Tooling (C) to ensure proper alignment of the sensor assembly into the counterbore. The sensor assembly should be installed with the alignment marks that are found on Tooling (C) toward the TOP, or in line with the wire passage in the cap if the wire passage is not in a vertical position.

8. Use Tooling (C) to push the sensor assembly into the counterbore until the pin engages the slot on the side of the sensor assembly. Make sure that the sensor assembly has engaged the counterbore correctly. Gently try to rotate Tooling (C) in both directions in order to ensure proper engagement of the sensor assembly.

9. Use a suitable mallet and Tooling (C) to tap the sensor assembly into the counterbore until the sensor assembly rests against the face of the counterbore.

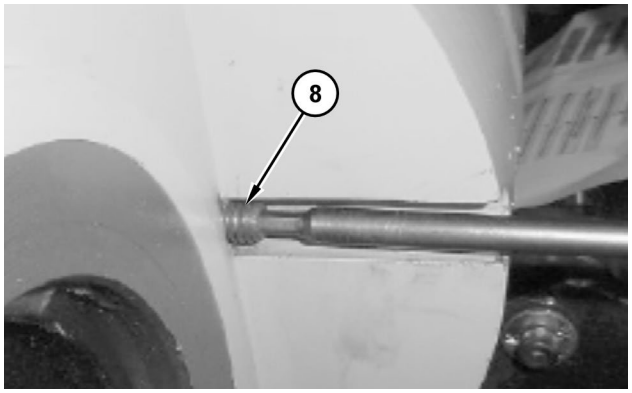

Illustration 660 g01151955

10. Apply Tooling (F) to set screw (8). Install set screw (8). Tighten set screw (8) to a torque of 25 ± 6 N·m (18 ± 4 lb ft).

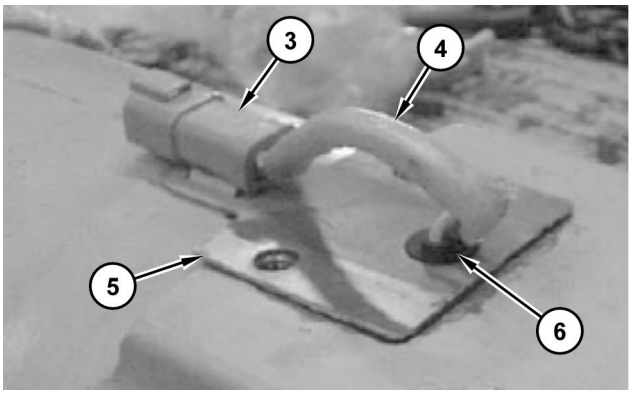

Illustration 661 g01151970

11. Install grommet (6).

12. Apply Tooling (G) to the mating surface of plate (5) and install plate (5).

13. Install sleeve (4) and connector assembly (3).

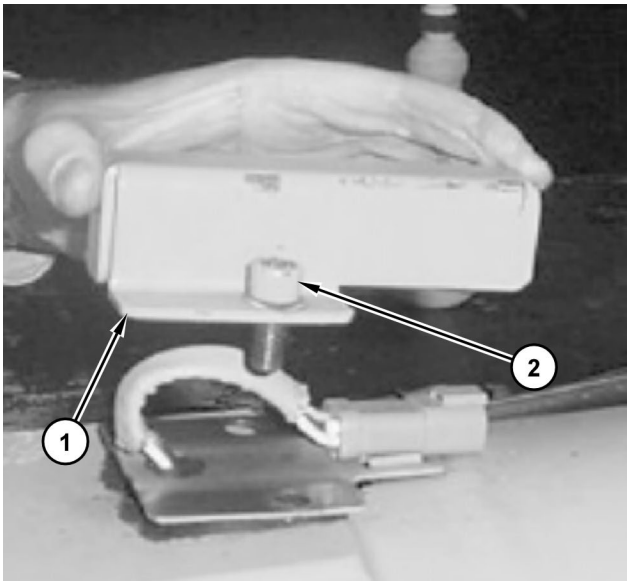

Illustration 662 g01151971

14. Install cover (1) and bolts (2).

Note: For pistons that are retained with a nut, refer to the following instructions for the installation of the magnet.

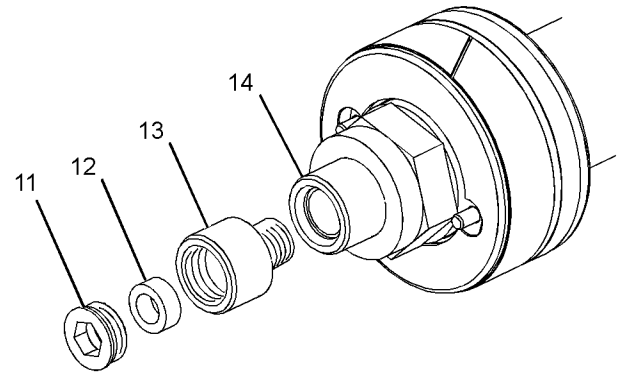

Illustration 663 g01154825

15. Apply Tooling (H) to the threads of carrier (13) and install carrier (13) into rod (14). Tighten carrier (13) to a torque of 35 ± 5 N·m (26 ± 4 lb ft).

16. Install magnet (12) into carrier (13).

17. Apply Tooling (H) to retainer (11) and install retainer (11) into carrier (13). Tighten retainer (11) to a torque of 35 ± 5 N·m (26 ± 4 lb ft).

Note: For pistons that are retained with a bolt, refer to the following instructions for the installation of the magnet.

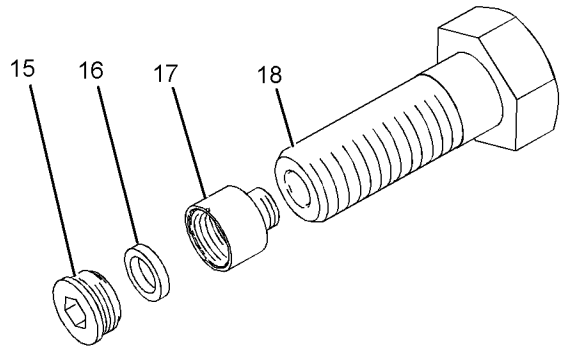

Illustration 664 g01154827

18. Apply Tooling (H) to the threads of carrier (17) and install carrier (17) into bolt (18). Tighten carrier (17) to a torque of 35 ± 5 N·m (26 ± 4 lb ft).

19. Install magnet (16) into carrier (17).

20. Apply Tooling (H) to the threads of retainer (15) and install retainer (15) into carrier (17). Tighten retainer (15) to a torque of 35 ± 5 N·m (26 ± 4 lb ft).

Disassembly and Assembly Information

Table 75

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
J	127-4904	Repair Stand	1
K	195-4609	Seal Pick	1
L	7M-7456	Bearing Mount Compound	1
M	1P-0808	Multipurpose Grease	1
N	9U-7868	Spanner Wrench	1
	127-8064	Adjustable Plate	1
P	155-0695	Thread Lock Compound	-
R	8T-3198	Sleeve	1

WARNING

Cylinders equipped with lock valves can remain pressurized for very long periods of time, even with the hoses removed.

Failure to relieve pressure before removing a lock valve or disassembling a cylinder can result in personal injury or death.

Ensure all pressure is relieved before removing a lock valve or disassembling a cylinder.

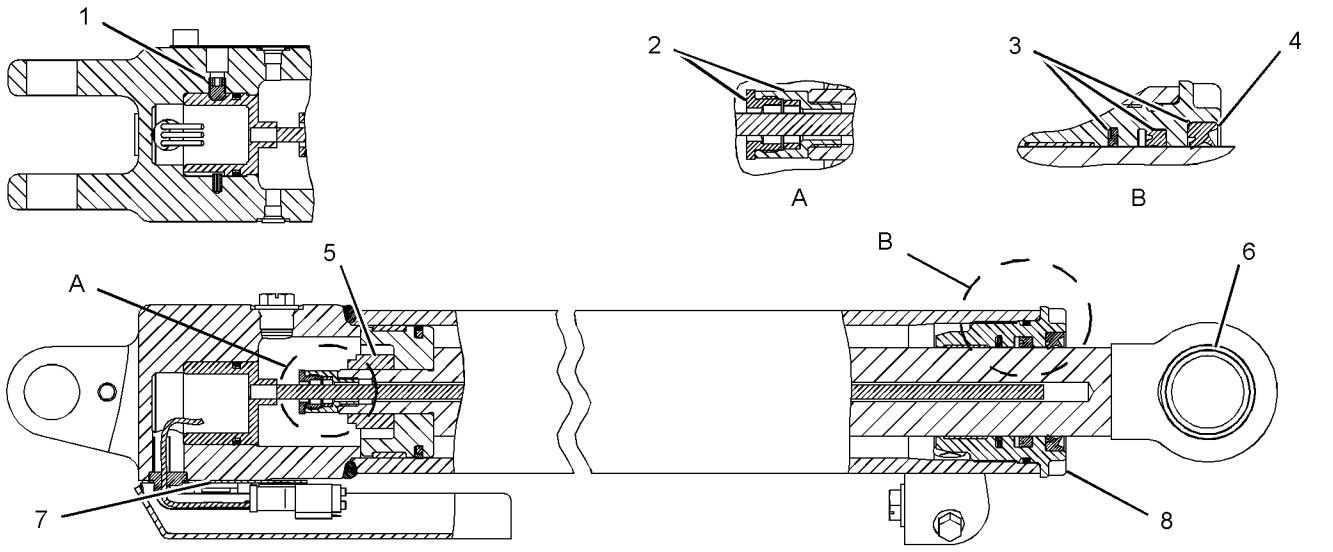

Illustration 665 g01367442

(1) Tighten the set screw to a torque of 25 ± 3 N·m (221 ± 27 lb in).

(2) Apply Tooling (P) to the carrier and the retainer prior to installation. Tighten the carrier to a torque of 35 ± 5 N·m (310 ± 44 lb in). Tighten the retainer to a torque of 35 ± 5 N·m (310 ± 44 lb in).

(3) Lubricate the seals with the lubricant that is being sealed.

(4) Apply Tooling (L) to the wiper seal prior to installation.

(5) Tighten the nut to a torque of 600 ± 20 N·m (443 ± 15 lb ft).

(6) Use a suitable press to remove the bearing and the ball stud. Use a suitable press and Tooling (R) to install the bearingand the ball stud.

(7) Apply Tooling (P) to the bottom of the plate prior to installation.

(8) Apply Tooling (M) to the threads of the head prior to installation. Use Tooling (N) to tighten the head to a torque of 600 ± 130 N·m (443 ± 96 lb ft).

Installation Procedure

Table 76

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

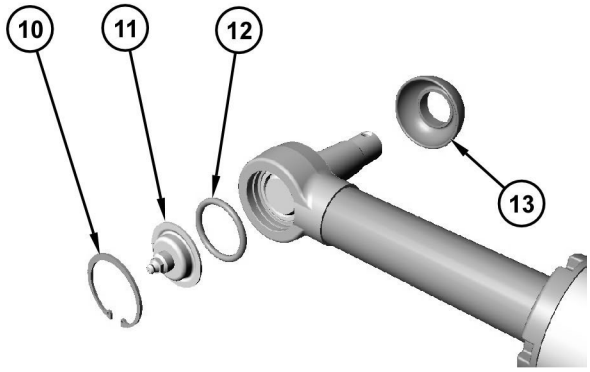

Illustration 666 g01491113

1. Install boot (13). Install O-ring seal (12). Install cap assembly (11). Install retaining ring (10).

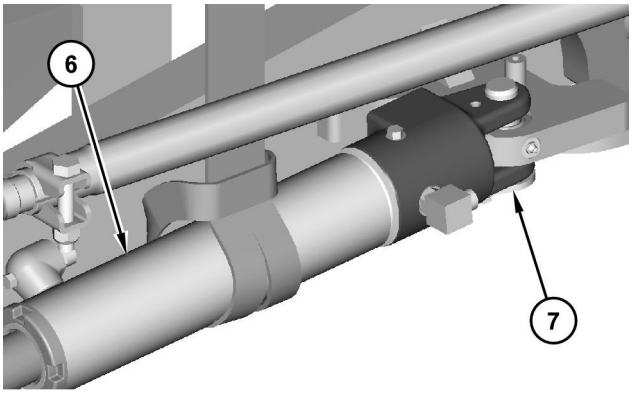

Illustration 667 g01376268

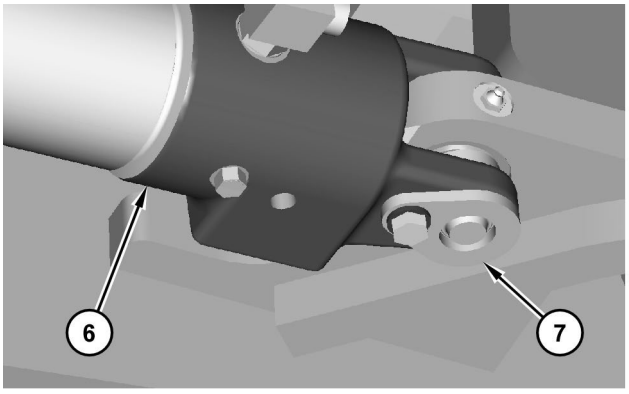

Illustration 668 g01376269

2. Use a suitable lifting device in order to install steering cylinder (6). The weight of steering cylinder (6) is approximately 20 kg (44 lb). Install pin assembly (7).

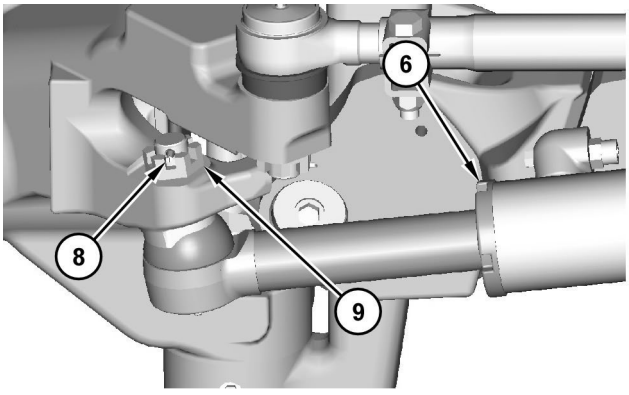

Illustration 669 g01376274

3. Install nut (9). Tighten nut (9) to 220 ± 14 N·m (162 ± 10 lb ft). Align nut (9) with the hole that is in the rod end. Install cotter pin (8).

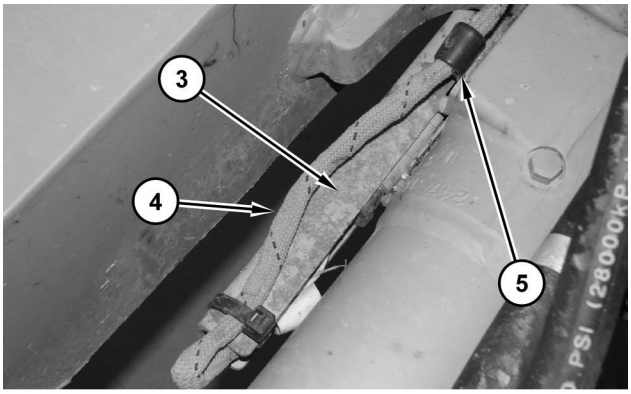

Illustration 670 g01376256

4. Connect clips (5). Connect harness assembly (4). Install cover (3).

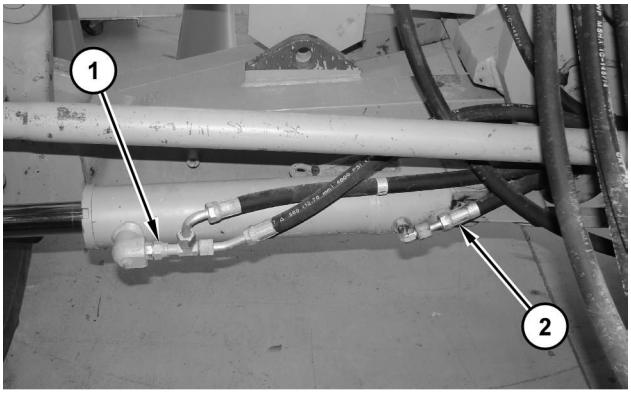

Illustration 671 g01376251

5. Connect hose assembly (2). Connect fitting (1).

6. Repeat Step 1 through Step 5 for the remaining steering cylinder.

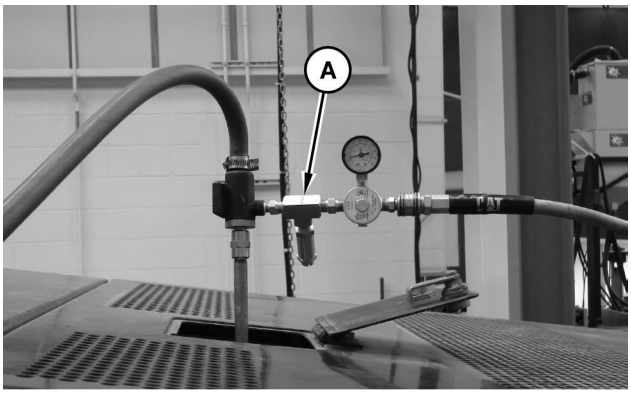

Illustration 672 g01368952

7. Remove Tooling (A).

8. **THE PARAMETERS FOR THE LENGTH OF THE CYLINDER AND THE TRIM FILES FOR THE POSITION SENSOR FOR BOTH OF THE STEERING CYLINDERS MUST BE CONFIGURED IN THE ECM BEFORE OPERATING THE MACHINE.** Refer to Testing and Adjusting, “Electronic Control Module (ECM) - Configure” and Testing and Adjusting, “Electronic Control Module (ECM) - Replace”.

9. Check the hydraulic oil level. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”.

i06639172

Steering Control Valve (with Secondary Steering) - Remove and Install

SMCS Code: 4307-010

Removal Procedure

Start By:

a. Release the system pressure.

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

1. Drain the hydraulic oil. Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change” for the correct draining and filling procedures.

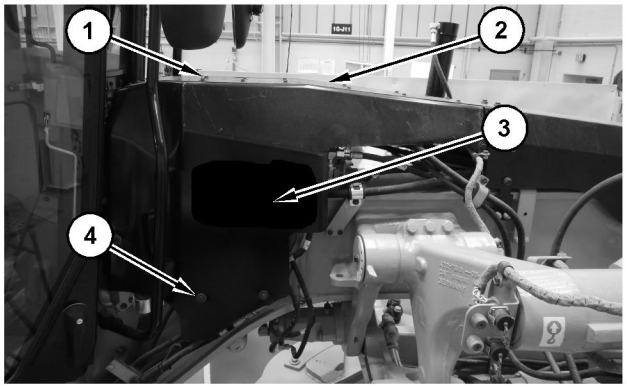

Illustration 673 g06053854

2. Remove bolts (1) and plate (2). Remove nuts (4) and cover (3). Repeat for the opposite side.

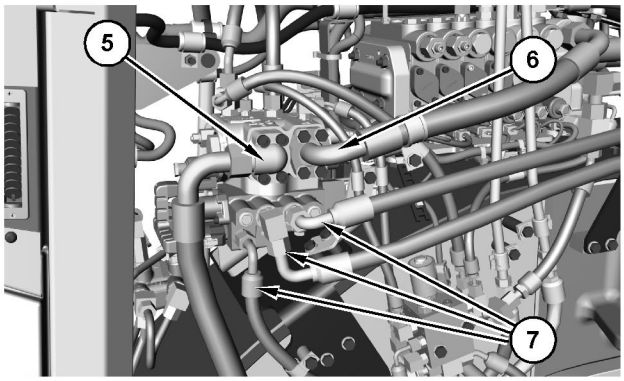

Illustration 674 g06056670

3. Disconnect hose assemblies (5), (6), and (7).

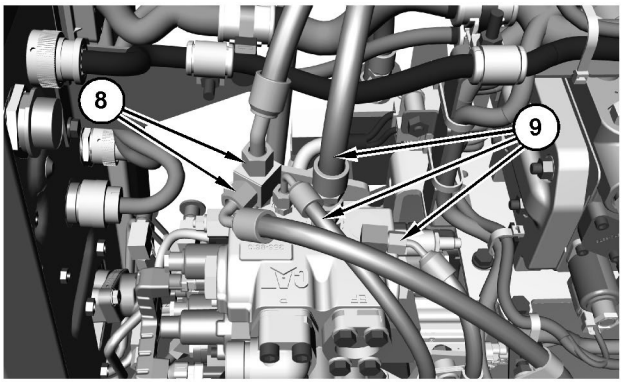

Illustration 675 g06056674

4. Disconnect hose assemblies (8) and (9).

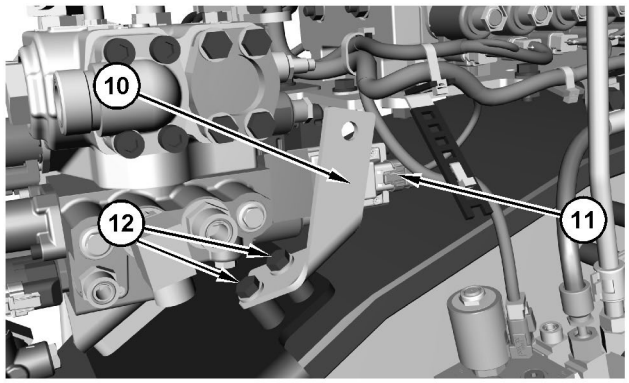

Illustration 676 g06056685

5. Remove bolts (12) and plate (10). Disconnect harness assembly (11).

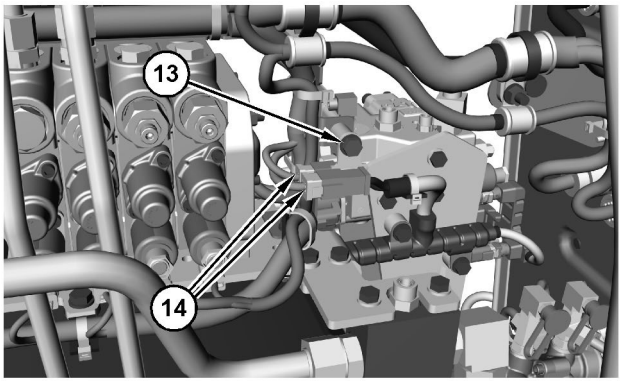

Illustration 677 g06056690

6. Remove bolt (13). Disconnect harness assemblies (14).

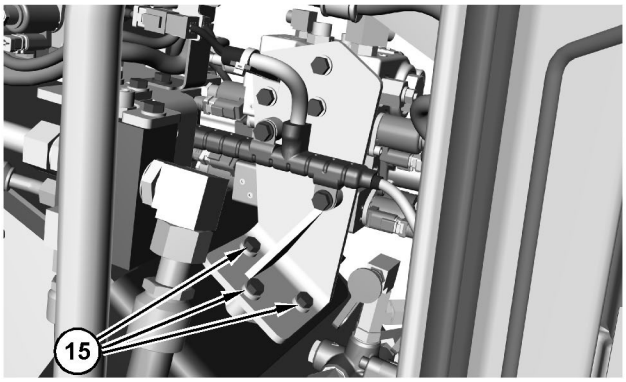

Illustration 678 g06056693

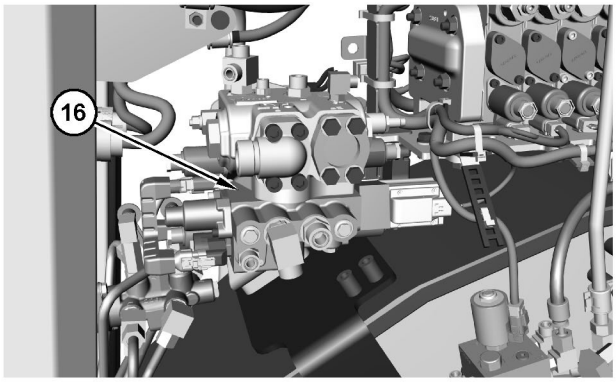

Illustration 679 g06056694

7. Remove mounting bolts (15).

8. Use two people to remove steering control valve (with secondary steering) (16). The weight of steering control valve (with secondary steering) (16) is approximately 25 kg (55 lb).

Installation Procedure

1. Install steering control valve (with secondary steering) (16) in the reverse order of removal.

a. Tighten nuts (4) to a torque of 15 ± 3 N·m (133 ± 27 lb in).

b. Tighten bolts (1) to a torque of 15 ± 3 N·m (133 ± 27 lb in).

i06585654

Steering Control Valve (with Secondary Steering) - Disassemble

SMCS Code: 4307-015-SST

Disassembly Procedure

Start By:

a. Remove steering control valve.

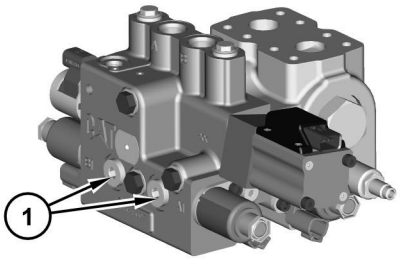

Illustration 680 g03446353

1. Remove plugs (1).

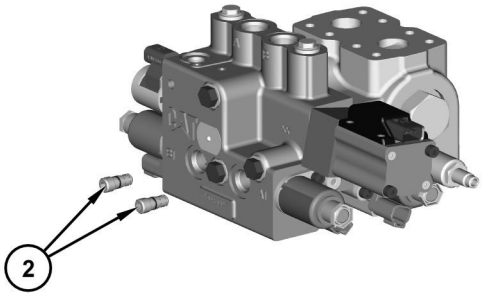

Illustration 681 g03446354

2. Remove shuttle valves (2).

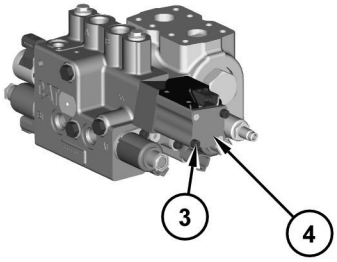

Illustration 682 g03446356

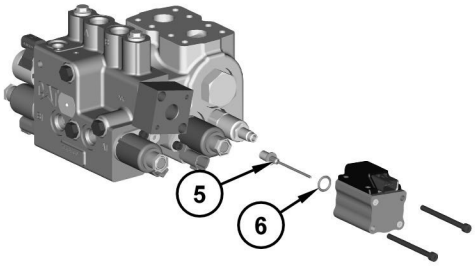

Illustration 683 g03446357

3. Remove bolts (3), sensor (4), and O-ring seal (6). Remove probe (5).

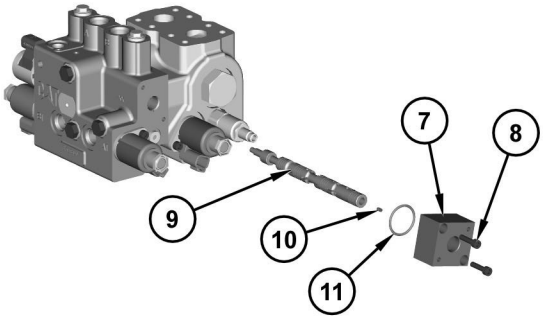

Illustration 684 g03446358

4. Remove bolts (8) and housing (7). Remove O-ring seal (11) and plug (10). Remove stem (9).

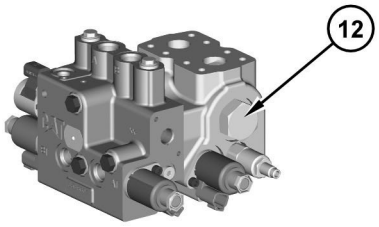

Illustration 685 g03446360

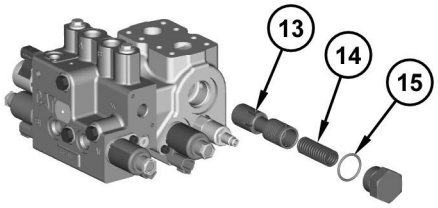

Illustration 686 g03448040

⚠ 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.

5. Remove plug (12) and O-ring seal (15). Remove spring (14) and spool (13).

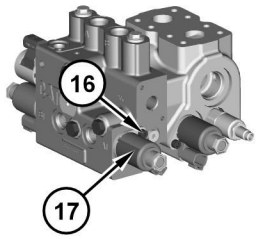

Illustration 687 g03448010

6. Remove bolt (16) and solenoid valve (17).

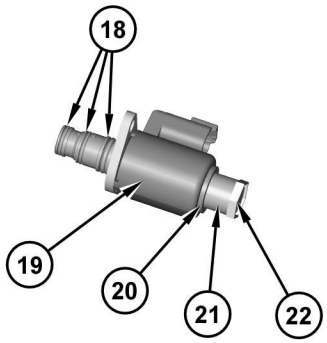

Illustration 688 g03448116

7. Remove O-ring seals (18). Remove nut (22), spacer (21), washer (20), and coil assembly (19).

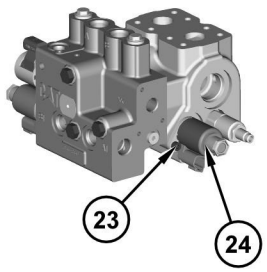

Illustration 689 g03448118

8. Remove bolt (23) and solenoid valve (24).

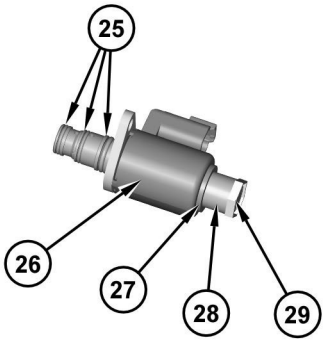

Illustration 690 g03448482

9. Remove O-ring seals (25). Remove nut (29), spacer (28), washer (27), and coil assembly (26).

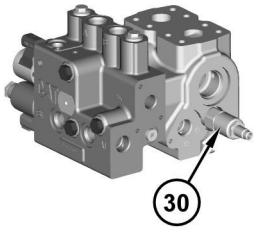

Illustration 691 g03448120

10. Remove relief valve (30).

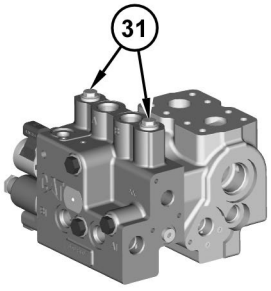

Illustration 692 g03448122

11. Remove relief valves (31).

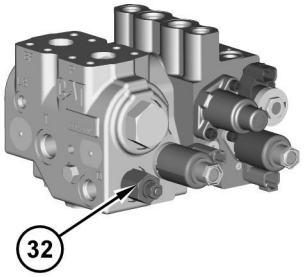

Illustration 693 g03448587

12. Remove pressure valve (32).

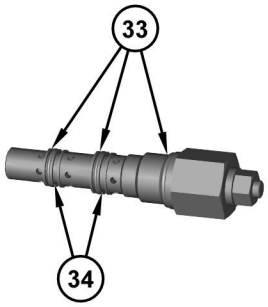

Illustration 694 g03448590

13. Remove O-ring seals (33) and backup rings (34).

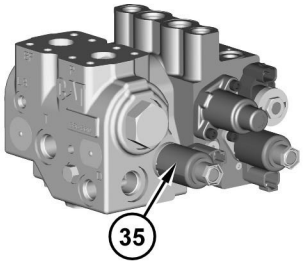

Illustration 695 g03448591

14. Remove solenoid valve (35).

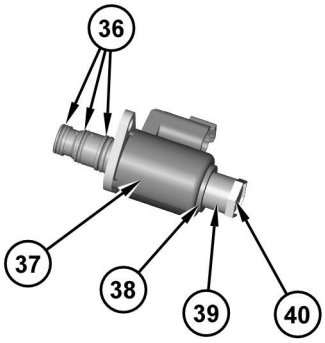

Illustration 696 g03448989

15. Remove O-ring seals (36). Remove nut (40), spacer (39), washer (38), and coil assembly (37).

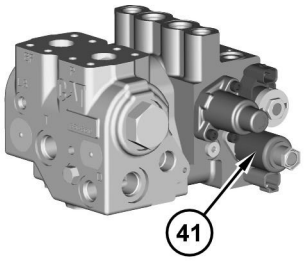

Illustration 697 g03448996

16. Remove solenoid valve (41).

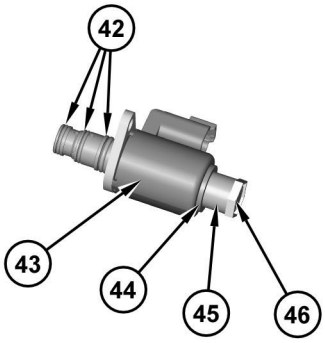

Illustration 698 g03449061

17. Remove O-ring seals (42). Remove nut (46), spacer (45), washer (44), and coil assembly (43).

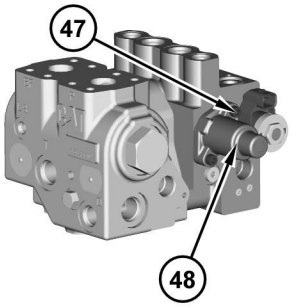

Illustration 699 g03448997

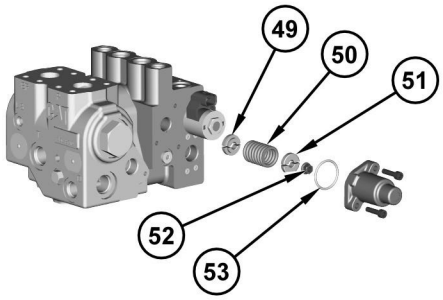

Illustration 700 g03448998

⚠ 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.

18. Remove bolts (47) and cover (48). Remove O-ring seal (53) and flange (52). Remove retainers (51), spring (50), and retainers (49).

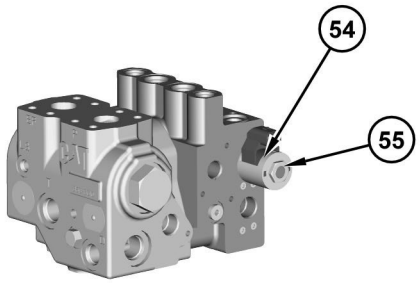

Illustration 701 g03449117

19. Remove nut (55) and coil assembly (54).

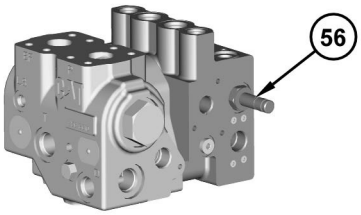

Illustration 702 g03450124

20. Remove cartridge assembly (56).

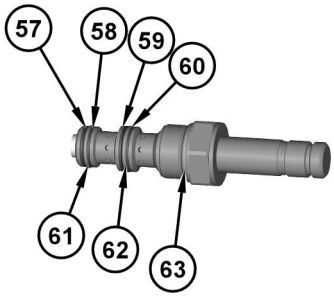

Illustration 703 g03448999

21. Remove backup ring (57), O-ring seal (61), and backup ring (58). Remove backup ring (59), O-ring seal (62), and backup ring (60). Remove O-ring seal (63).

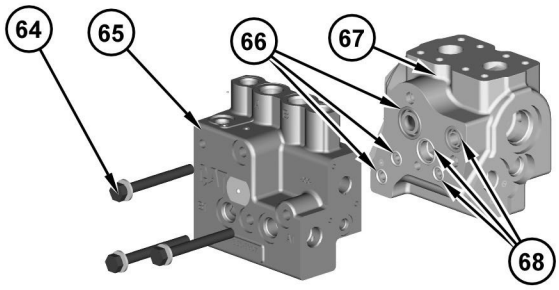

Illustration 704 g03449884

22. Remove bolts (64). Separate control valve (65) from priority valve (67). Remove O-ring seals (66) and (68).

i06585655

Steering Control Valve (with Secondary Steering) - Assemble

SMCS Code: 4307-016-SST

Assembly Procedure

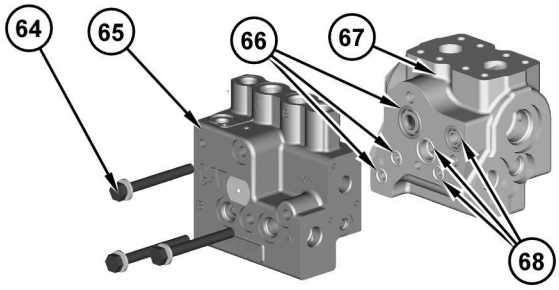

Illustration 705 g03449884

1. Install O-rings seals(68) and (66). Position priority valve (67) onto control valve (65) and install bolts (64).

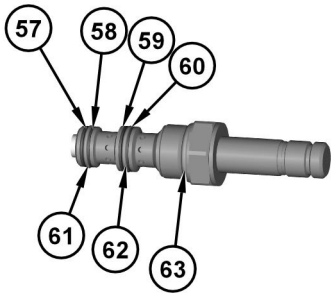

Illustration 706 g03448999

2. Install O-ring seals (63). Install backup ring (60), O-ring seals (62), and backup ring (59). Install backup ring (58), O-ring seals (61), and backup ring (57).

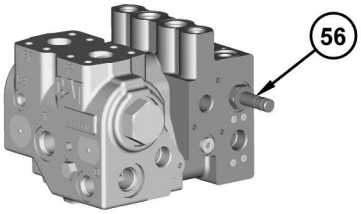

Illustration 707 g03450124

3. Install cartridge assembly (56). Tighten cartridge assembly to a torque of 24 ± 3 N·m (212 ± 27 lb in).

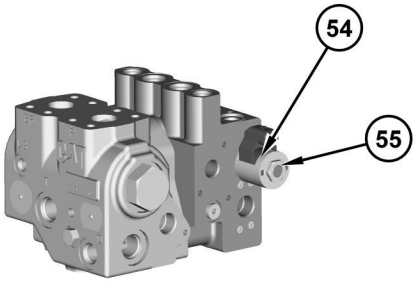

Illustration 708 g03449117

4. Install coil assembly (54) and nut (55). Tighten nut (55) to a torque of 5.3 ± 1.5 N·m (47 ± 13 lb in).

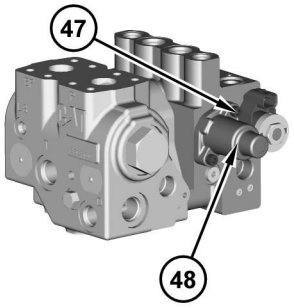

Illustration 709 g03448997

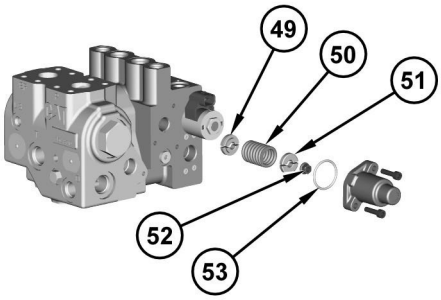

Illustration 710 g03448998

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

5. Install retainers (49), spring (50), and retainers (51). Install flange (52) and O-ring (53). Install cover (48) and bolts (47).

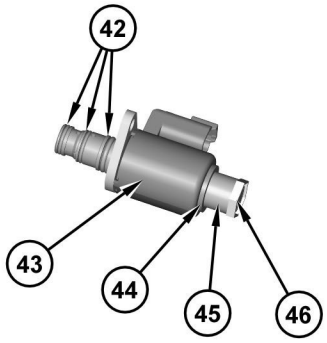

Illustration 711 g03449061

6. Install coil assembly (43), washer (44), spacer (45), and nut (46). Tighten nut (46) to a torque of 5.5 ± 1.5 N·m (47 ± 13 lb in). Install O-rings seals (42).

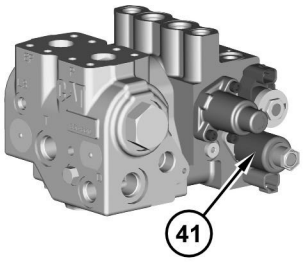

Illustration 712 g03448996

7. Install solenoid valve (41).

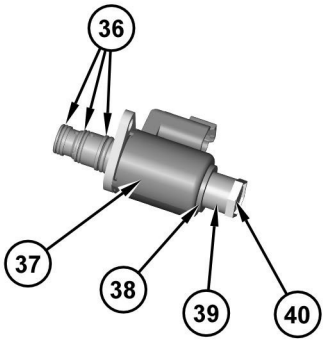

Illustration 713 g03448989

8. Install coil assembly (37), washer (38), spacer (39), and nut (40). Tighten nut (40) to a torque of 5.5 ± 1.5 N·m (47 ± 13 lb in). Install O-rings seals (36).

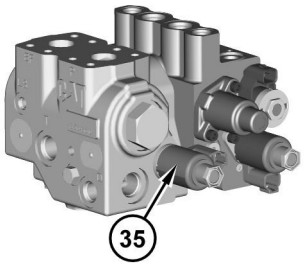

Illustration 714 g03448591

9. Install solenoid valve (35).

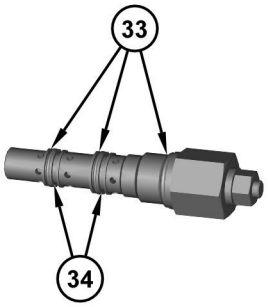

Illustration 715 g03448590

10. Install backup rings (34) and O-rings seals (33).

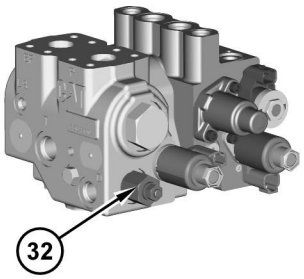

Illustration 716 g03448587

11. Install pressure valve (32). Tighten pressure valve (32) to a torque of 60 ± 5 N·m (44 ± 4 lb ft).

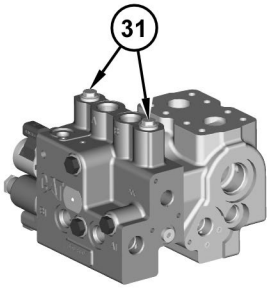

Illustration 717 g03448122

12. Install relief valves (31). Tighten relief valves (31) to a torque of 33 ± 3 N·m (24 ± 2 lb ft).

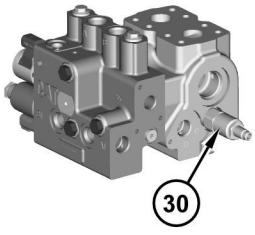

Illustration 718 g03448120

13. Install relief valve (30). Tighten relief valve (30) to a torque of 28 ± 2 N·m (21 ± 2 lb ft).

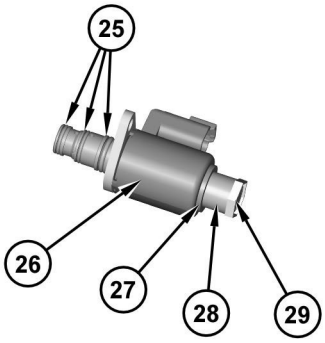

Illustration 719 g03448482

14. Install coil assembly (26), washer (27), spacer (28), and nut (29). Tighten nut (29) to a torque of 5.5 ± 1.5 N·m (47 ± 13 lb in). Install O-ring seals (25).

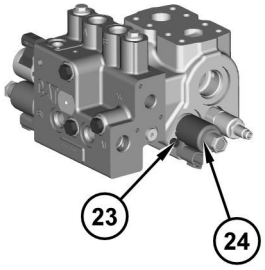

Illustration 720 g03448118

15. Install solenoid valve (24) and bolt (23).

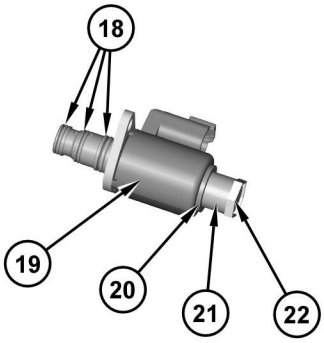

Illustration 721 g03448116

16. Install coil assembly (19), washer (20), spacer (21), and nut (22). Tighten nut (22) to a torque of 5.5 ± 1.5 N·m (47 ± 13 lb in). Install O-rings seals (18).

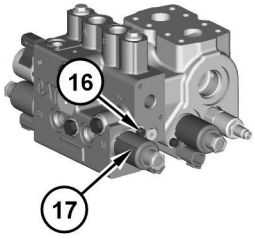

Illustration 722 g03448010

17. Install solenoid valve (17) and bolt (16).

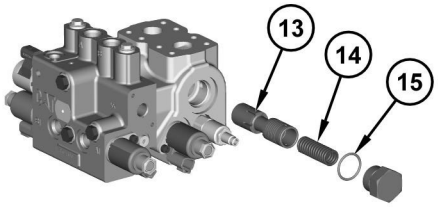

Illustration 723 g03448040

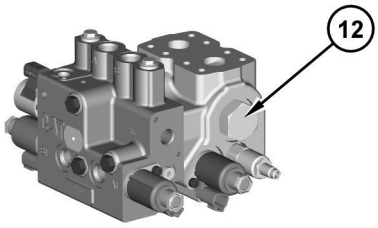

Illustration 724 g03446360

WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

18. Install spool (13) and spring (14). Install O-ring seals (15) and plug (12). Tighten plug (12) to a torque of 350 ± 53 N·m (258 ± 39 lb ft).

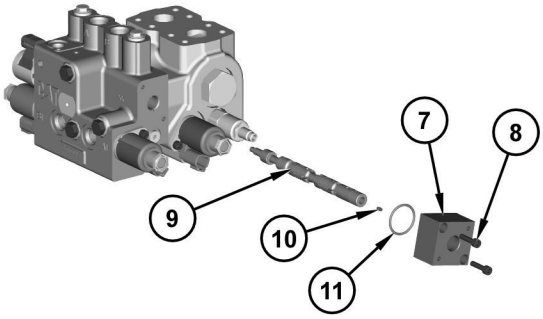

Illustration 725 g03446358

19. Install stem (9). Install plug (10) and O-ring seals (11). Install housing (7) and bolts (8).

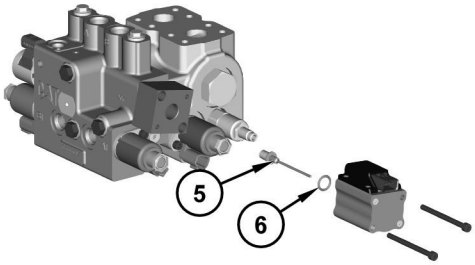

Illustration 726 g03446357

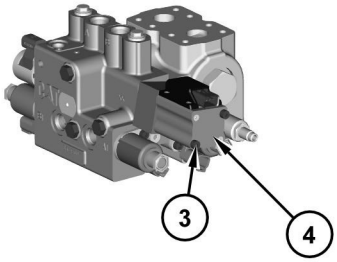

Illustration 727 g03446356

20. Install probe (5). Tighten probe (5) to a torque of 12 ± 3 N·m (106 ± 27 lb in). Install O-ring seals (6), sensor (4), and bolts (3). Tighten bolts (3) to a torque of 7 ± 2 N·m (62 ± 18 lb in).

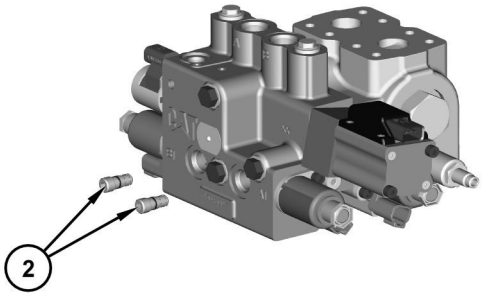

Illustration 728 g03446354

21. Install shuttle valves (2). Tighten shuttle valves (2) to a torque of 16 ± 3 N·m (142 ± 27 lb in).

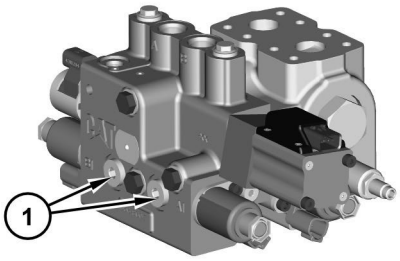

Illustration 729 g03446353

22. Install plugs (1).

End By:

a. Install steering control valve.

i04080653

Control Manifold (Steering Backup) - Remove and Install

SMCS Code: 5051-010; 5264-010; 5479-010-PS

Removal Procedure

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.

⚠ WARNING

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.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Put identification on all lines and on all hoses for installation purposes. Plug all lines and all hoses. This helps to prevent fluid loss and helps to keep contaminants from entering the system.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

2. Connect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock - Separate and Connect”.

3. Engage the parking brake.

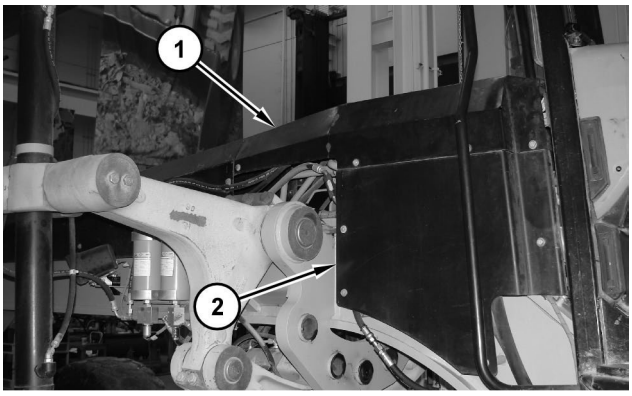

Illustration 730 g01379630

4. Remove cover (1).

5. Remove cover (2). Repeat this step for the opposite side.

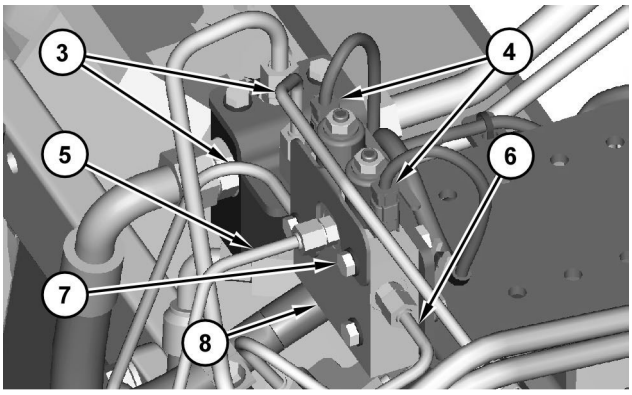

Illustration 731 g01379888

6. Disconnect tube assemblies (3). Disconnect harness assemblies (4). Disconnect tube assembly (5) and tube assembly (6).

7. Remove bolts (7). Remove control manifold (8).

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

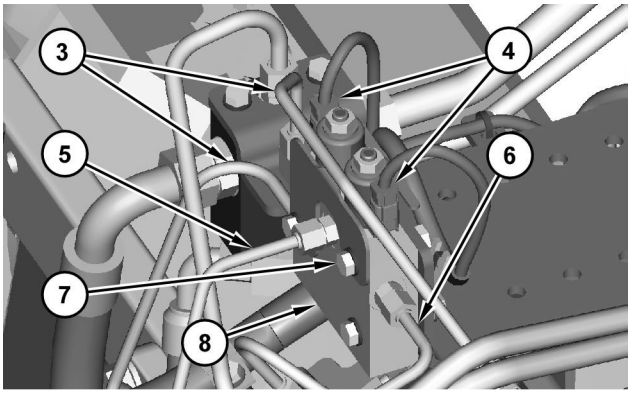

Illustration 732 g01379888

1. Install control manifold (8). Install bolts (7). Connect tube assembly (6) and tube assembly (5). Connect harness assemblies (4). Connect tube assemblies (3).

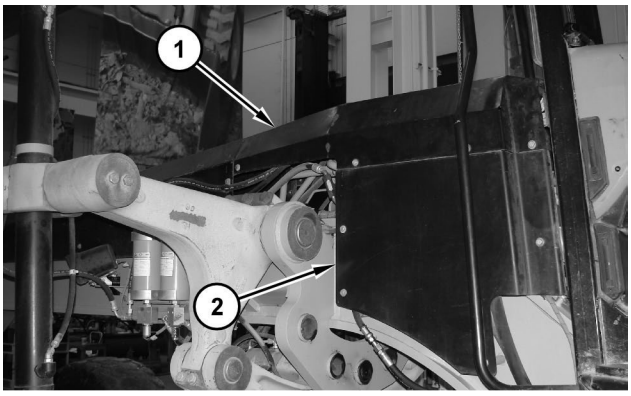

Illustration 733 g01379630

2. Install cover (2). Repeat this step for the opposite side.

3. Install cover (1).

4. Disengage the parking brake.

5. Separate the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock - Separate and Connect”.

6. Test the steering backup control manifold. Refer to Testing and Adjusting, “Control Manifold (Steering Backup) - Test”.

i02775768

Control Manifold (Steering Backup) - Disassemble

SMCS Code: 5051-015; 5264-015; 5479-015-PS

Disassembly Procedure

Start By:

a. Remove the control manifold. Refer to Disassembly and Assembly, “Control Manifold - Remove”.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

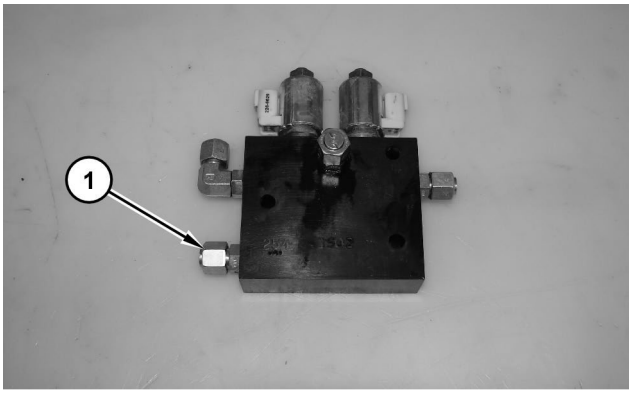

Illustration 734 g01387205

1. Remove fitting (1).

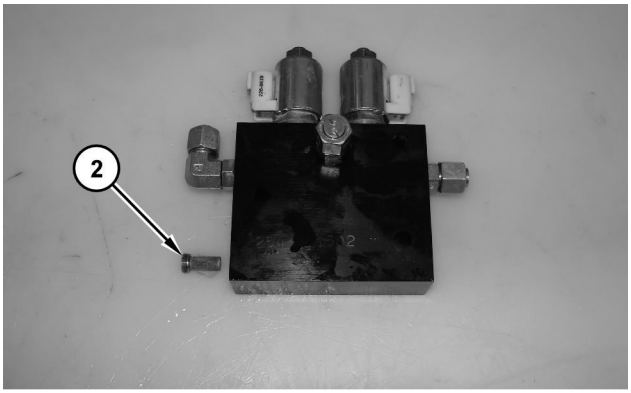

Illustration 735 g01387208

2. Remove screen (2).

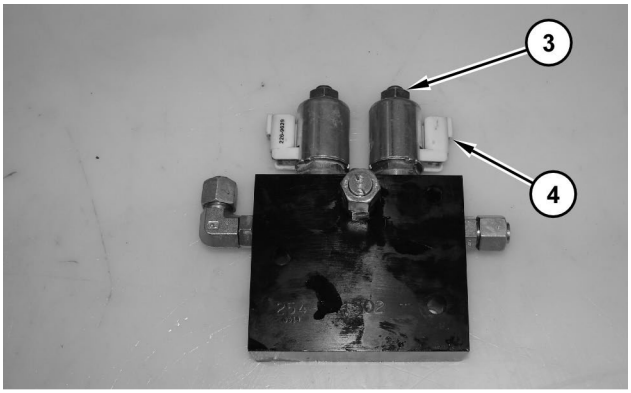

Illustration 736 g01387211

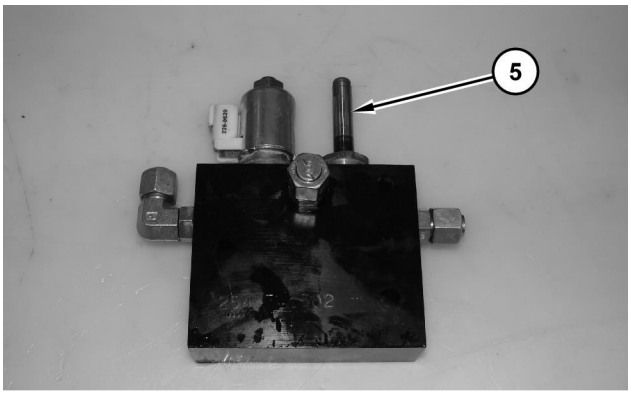

Illustration 737 g01387216

3. Remove nut (3) and the washer. Remove coil assembly (4). Remove cartridge assembly (5). Repeat this step for the remaining solenoid assembly.

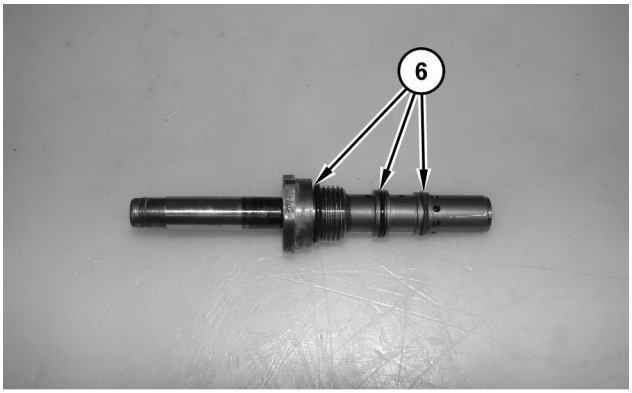

Illustration 738 g01387225

4. Remove O-ring seals (6).

i02775772

Control Manifold (Steering Backup) - Assemble

SMCS Code: 5051-016; 5264-016; 5479-016-PS

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

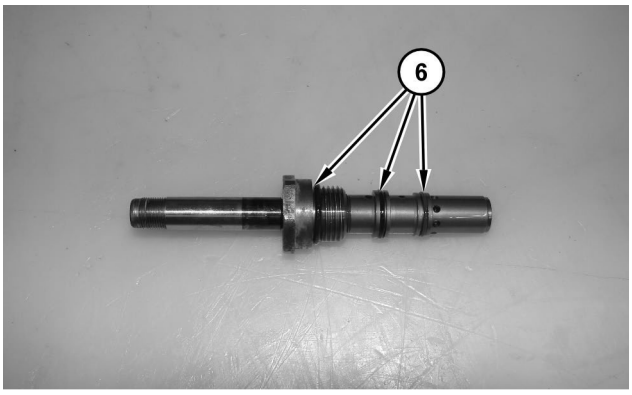

Illustration 739 g01387225

1. Install O-ring seals (6).

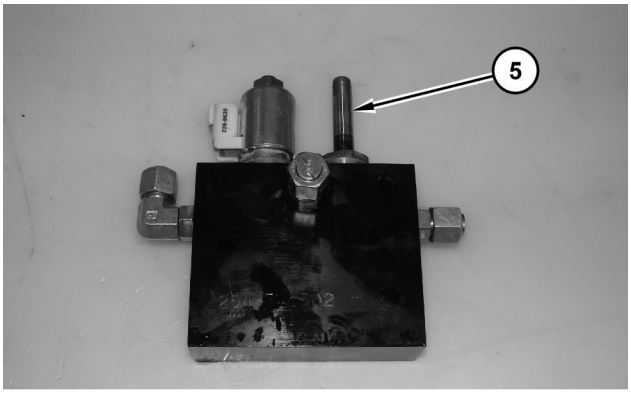

Illustration 740 g01387216

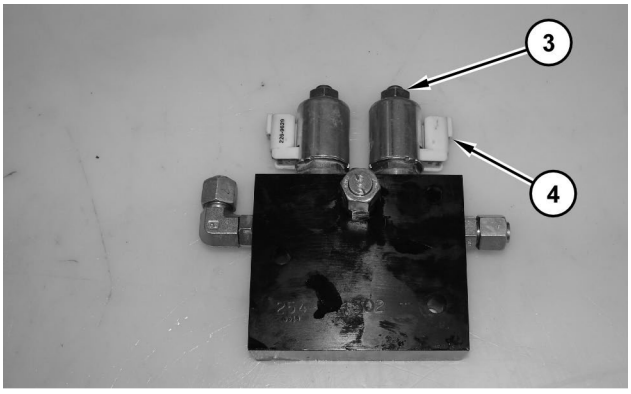

Illustration 741 g01387211

2. Install cartridge assembly (5). Tighten cartridge assembly (5) to a torque of 50 ± 5 N·m (37 ± 4 lb ft). Install coil assembly (4). Install the washer and nut (3). Tighten nut (3) to a torque of 13 ± 1.5 N·m (10 ± 1 lb ft). Repeat this step for the remaining solenoid assembly.

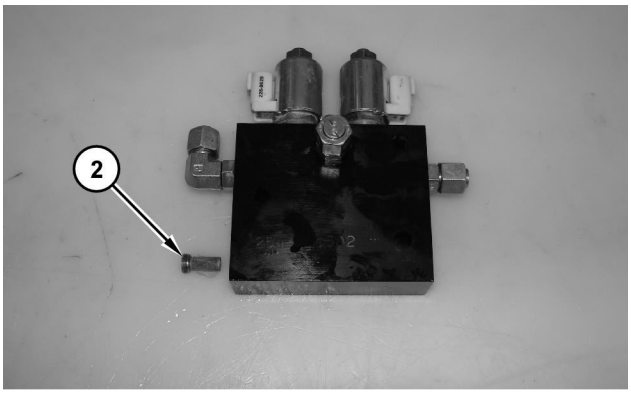

Illustration 742 g01387208

3. Install screen (2).

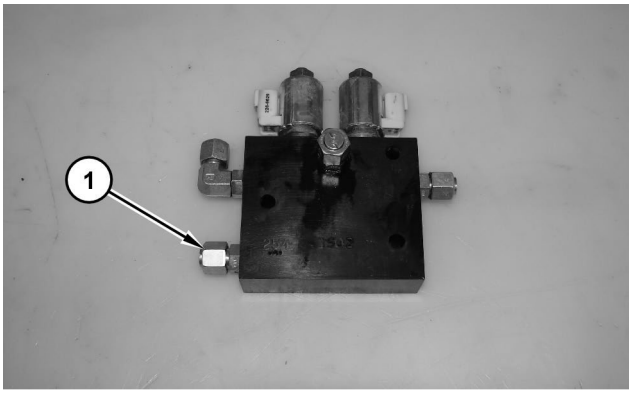

Illustration 743 g01387205

4. Install fitting (1).

End By:

a. Install the control manifold. Refer to Disassembly and Assembly, "Control Manifold - Install".

i02755828

Brake Accumulator - Remove and Install

SMCS Code: 4263-010

Removal Procedure

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.

⚠ WARNING

Personal injury can result from the sudden release of high pressure oil.

Be sure the engine has been shut off for a minimum of five minutes to be sure that the accumulator pressure is zero.

The accumulator is filled with dry nitrogen. Do not loosen or remove the valve or cap from the top of the accumulator. A purge screw at the bottom of the accumulator can be used to release the pressure that is left in the system.

⚠ WARNING

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.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Put identification on all lines and on all hoses for installation purposes. Plug all lines and all hoses. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Release the system pressure. Refer to Operation and Maintenance Manual, "System Pressure - Release".

2. Connect the steering frame lock. Refer to Operation and Maintenance Manual, "Steering Frame Lock".

3. Engage the parking brake.

Illustration 744 g01379928

4. Remove guard (1).

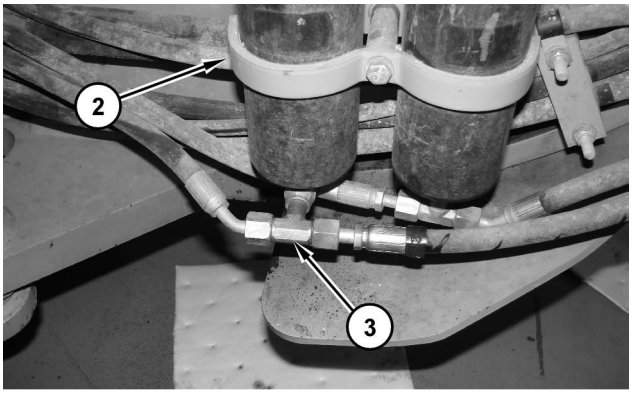

Illustration 745 g01379938

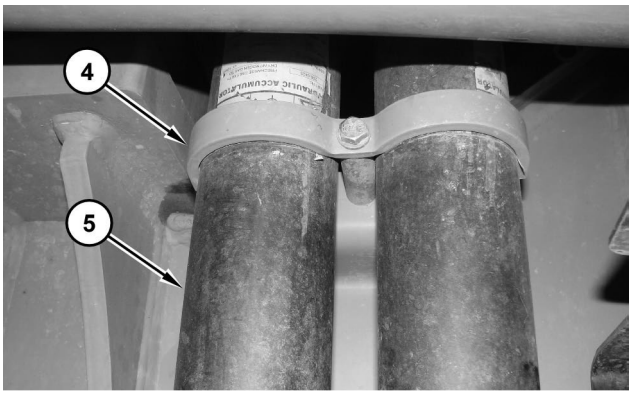

Illustration 746 g01379959

5. Disconnect fitting (3). Loosen clamp (2).

6. Loosen clamp (4). Remove accumulator (5).

7. Repeat Step 5 through Step 6 for the remaining accumulator.

Installation Procedure

⚠ WARNING

Personal injury or death can result from improper accumulator charging.

Dry nitrogen is the only gas approved for use in the accumulator. Charging the accumulator with oxygen gas will cause an explosion. This danger will not happen if nitrogen cylinders with standard CGA Compressed Gas Association, Inc.Number 580 connections are used.

When ordering nitrogen gas, be sure that the cylinders are equipped with CGA Number 580 Connections. Do not use color codes or other methods of identification to tell the difference between nitrogen and oxygen cylinders.

Never use an adapter to connect your nitrogen charging group to a valve outlet used on both nitrogen, oxygen or other gas cylinders. Be sure you use dry nitrogen (99.8 % purity).

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

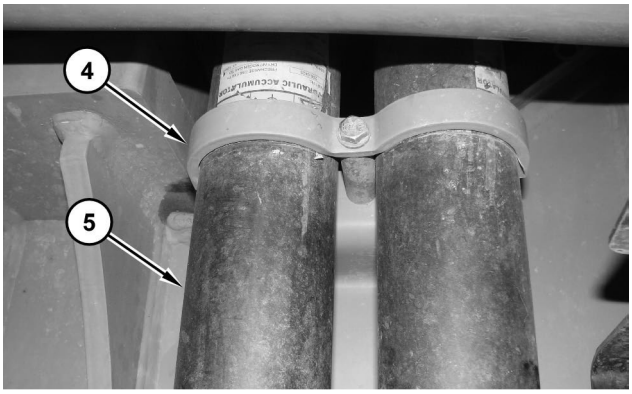

Illustration 747 g01379959

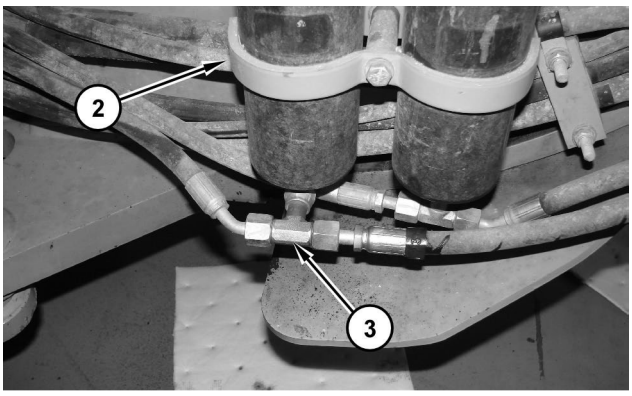

Illustration 748 g01379938

1. Install accumulator (5). Tighten clamp (4). Tighten clamp (2). Connect fitting (3).

2. Charge the brake accumulator. Refer to Testing and Adjusting, “Brake Accumulator (Service) - Test and Charge”.

3. Repeat Step 1 through Step 2 for the remaining accumulator.

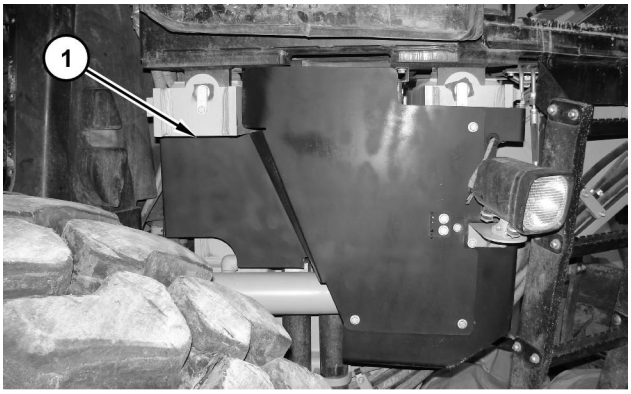

Illustration 749 g01379928

4. Install guard (1).

5. Disengage the parking brake.

6. Separate the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock - Separate and Connect”.

i02752131

Secondary Steering Pump and Motor - Remove and Install

SMCS Code: 4324-010

Removal Procedure

Table 77

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

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.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Connect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

2. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

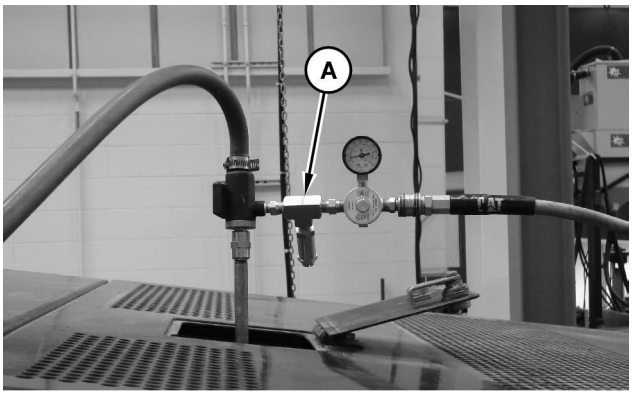

Illustration 750 g01368952

3. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

4. Turn the battery disconnect switch to the OFF position. Refer to Operation and Maintenance Manual, “Battery Disconnect Switch”.

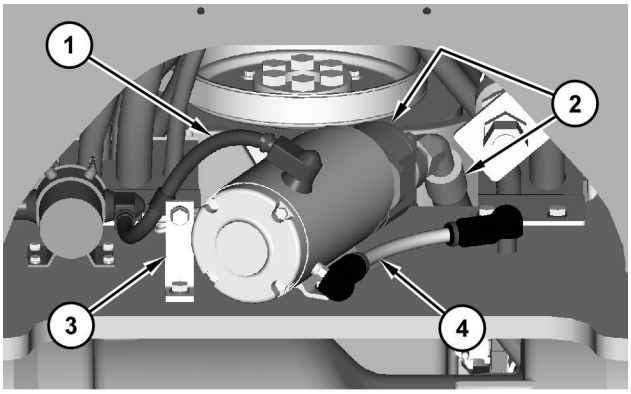

Illustration 751 g01377853

5. Disconnect cable assembly (1). Disconnect hose assemblies (2). Remove bracket (3). Disconnect cable assembly (4).

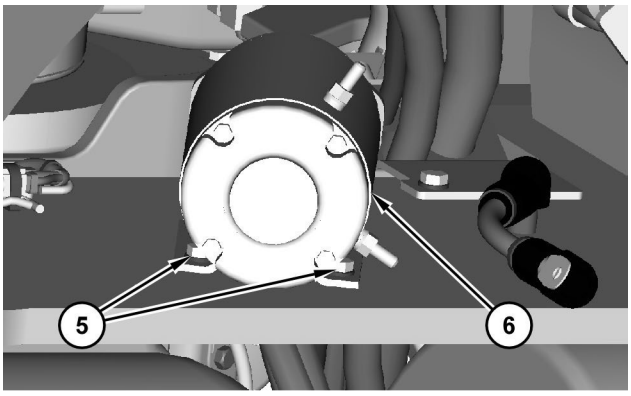

Illustration 752 g01377866

6. Remove bolts (5). Use two people in order to remove secondary steering pump and motor (6). The weight of secondary steering pump and motor (6) is approximately 27 kg (60 lb).

Installation Procedure

Table 78

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

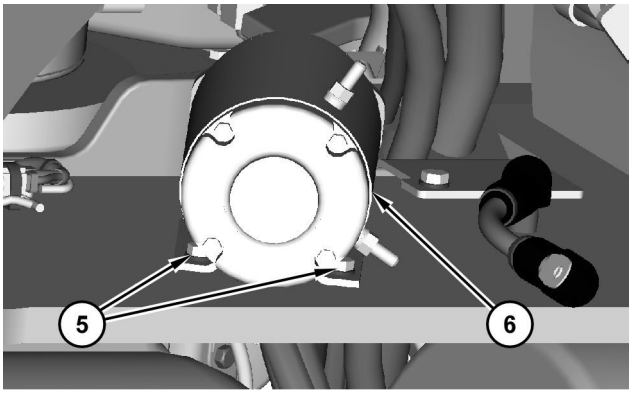

Illustration 753 g01377866

1. Use two people in order to install secondary steering pump and motor (6). The weight of secondary steering pump and motor (6) is approximately 27 kg (60 lb). Install bolts (5).

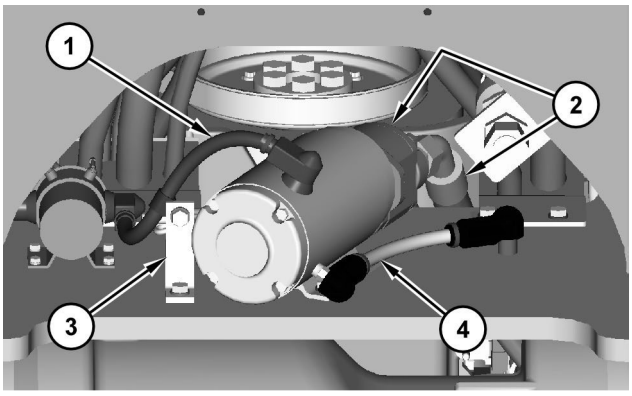

Illustration 754 g01377853

2. Connect cable assembly (4). Install bracket (3). Connect hose assemblies (2). Connect cable assembly (1).

3. Turn the battery disconnect switch to the ON position. Refer to Operation and Maintenance Manual, “Battery Disconnect Switch”.

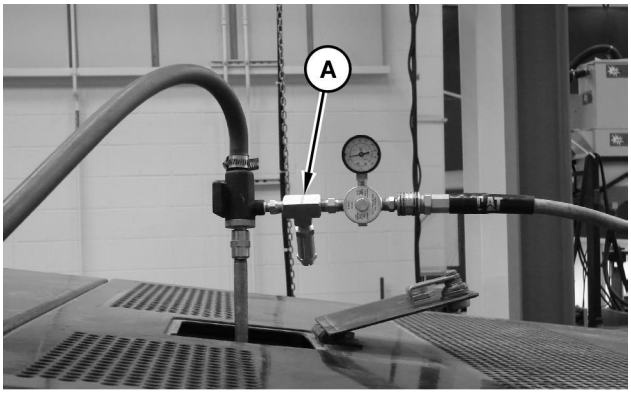

Illustration 755 g01368952

4. Remove Tooling (A).

5. Separate the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

i02654787

Bottom Guard - Remove and Install

SMCS Code: 7153-010

Removal Procedure

Table 79

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1U-7505	Hydraulic Jack	1

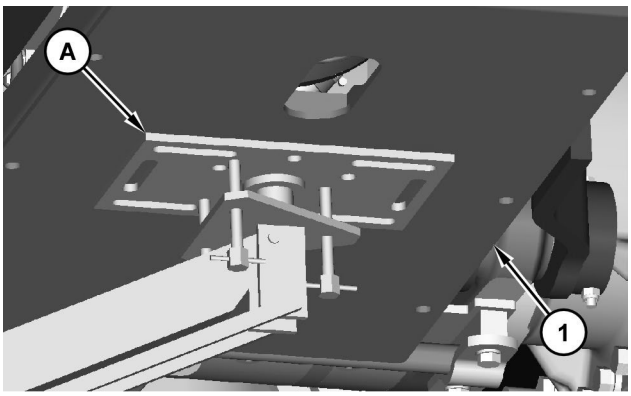

Illustration 756 g01333251

1. Position Tooling (A) under bottom guard (1). The weight of bottom guard (1) is approximately 114 kg (250 lb).

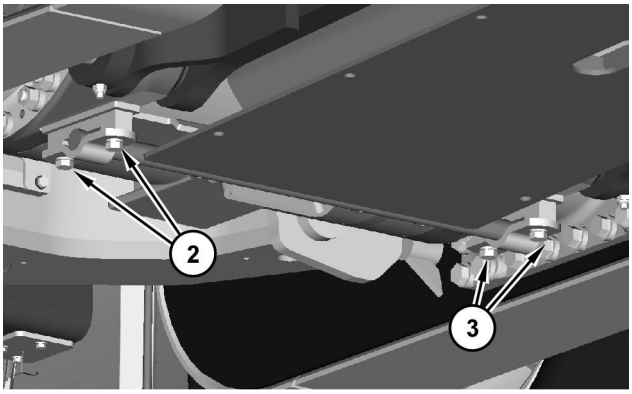

Illustration 757 g01333268

2. Remove bolts (2). Remove bolts (3).

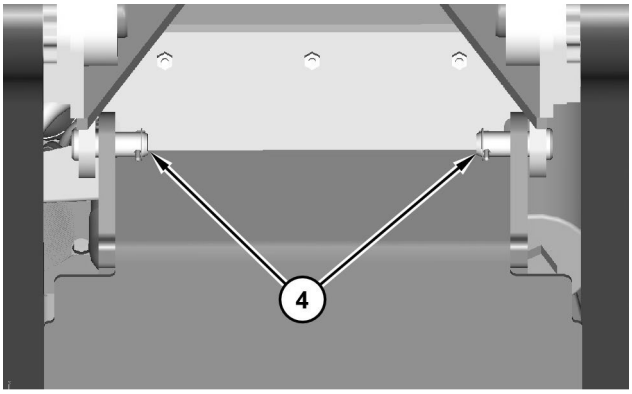

Illustration 758 g01333275

3. Remove pins (4).

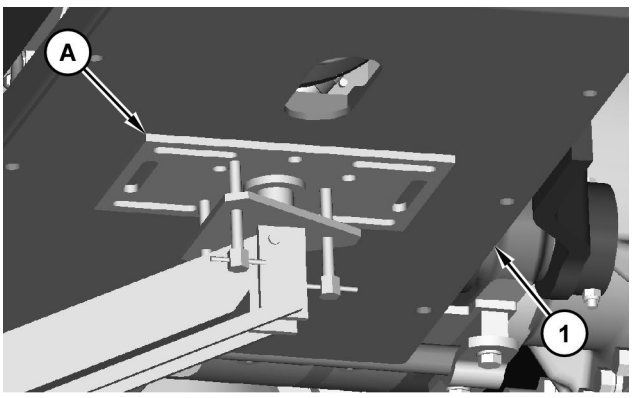

Illustration 759 g01333251

4. Use Tooling (A) in order to remove bottom guard (1).

Installation Procedure

Table 80

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1U-7505	Hydraulic Jack	1

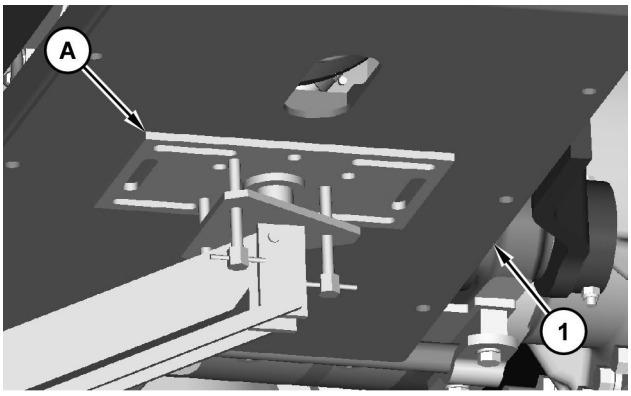

Illustration 760 g01333251

1. Use Tooling (A) in order to install bottom guard (1). The weight of bottom guard (1) is approximately 114 kg (250 lb).

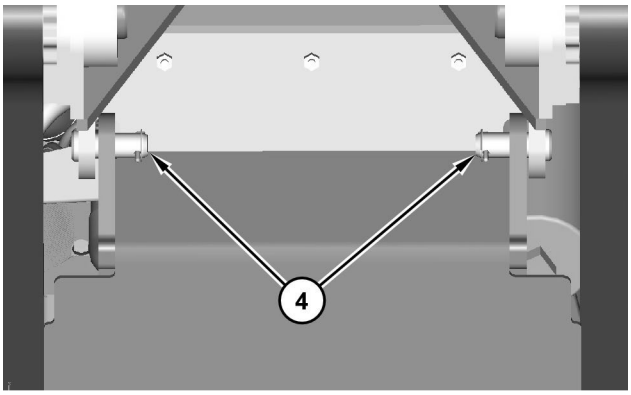

Illustration 761 g01333275

2. Install pins (4).

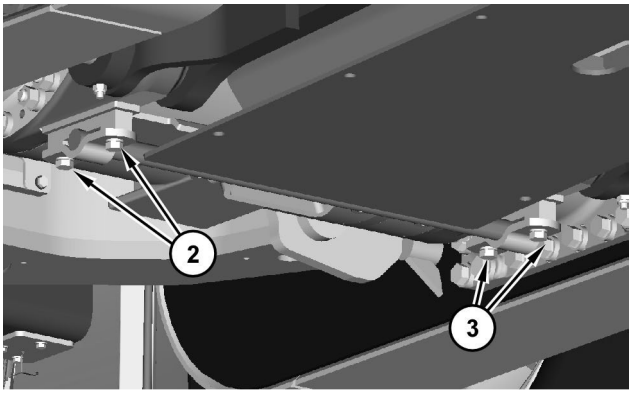

Illustration 762 g01333268

3. Install bolts (3). Install bolts (2).

i02760032

Piston Pump (Hydraulic Fan) - Remove

SMCS Code: 1387-011-QP; 5070-011-HFN

Removal Procedure

Table 81

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

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.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

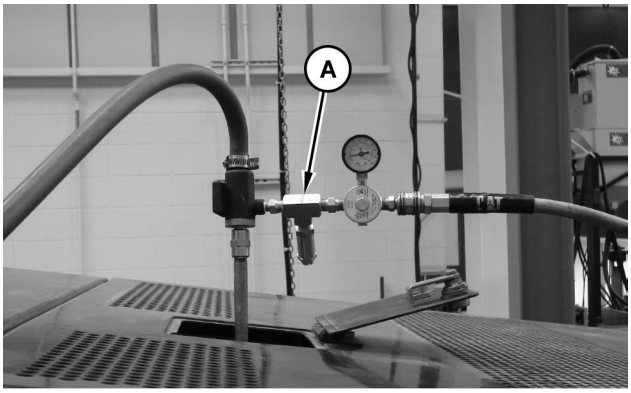

Illustration 763 g01368952

1. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

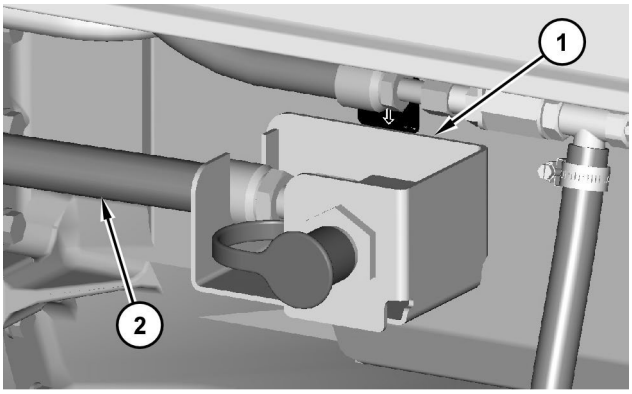

Illustration 764 g01381611

2. Disconnect bracket (1) and position hose assembly (2) out of the way.

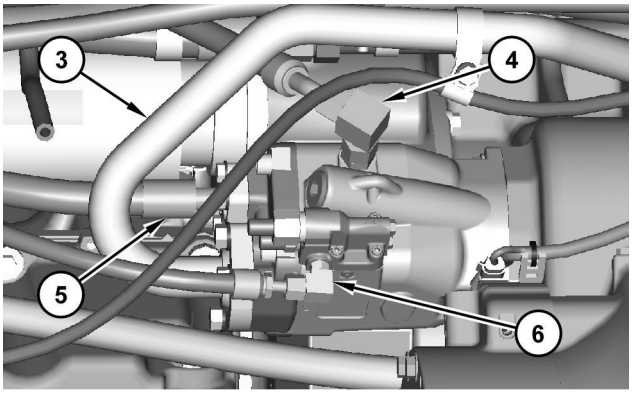

Illustration 765 g01381613

3. Disconnect tube assembly (3). Disconnect fitting (4). Disconnect hose assembly (5). Disconnect fitting (6).

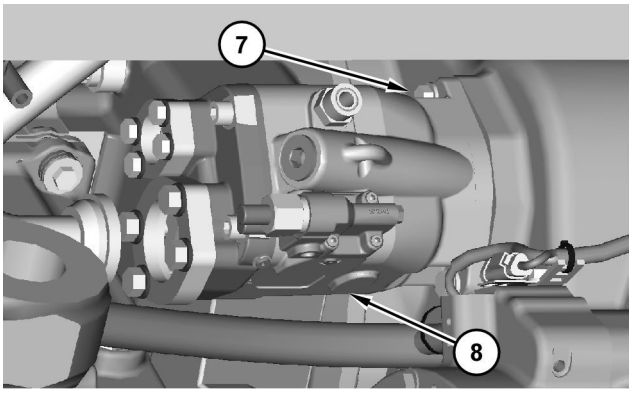

Illustration 766 g01381634

4. Remove bolts (7). Use two people in order to remove piston pump (8). The weight of piston pump (8) is approximately 25 kg (55 lb).

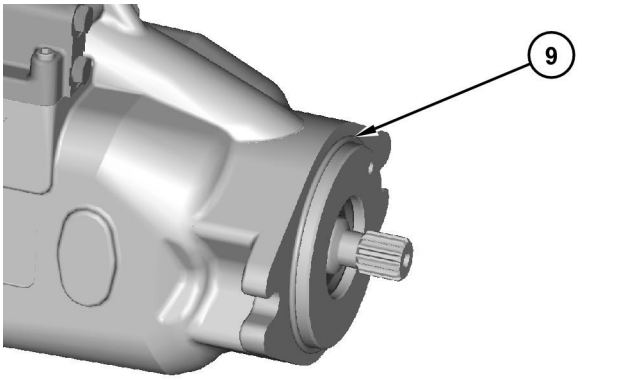

Illustration 767 g01381663

5. Remove O-ring seal (9).

i02779707

Piston Pump (Hydraulic Fan) - Disassemble

SMCS Code: 1387-015-QP; 5070-015-HFN

Disassembly Procedure

Start By:

a. Remove the pump. Refer to Disassembly and Assembly, “Piston Pump (Hydraulic Fan) - Remove”.

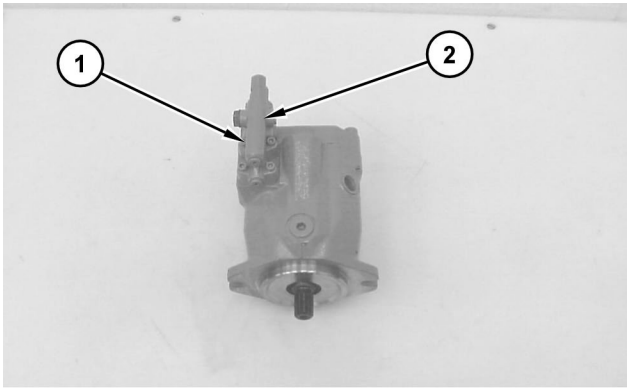

Illustration 768 g01374689

1. Remove bolts (1) and controller (2).

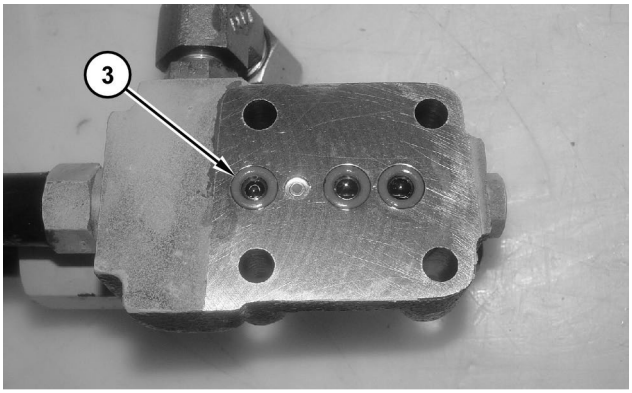

Illustration 769 g01374690

2. Remove O-ring seals (3).

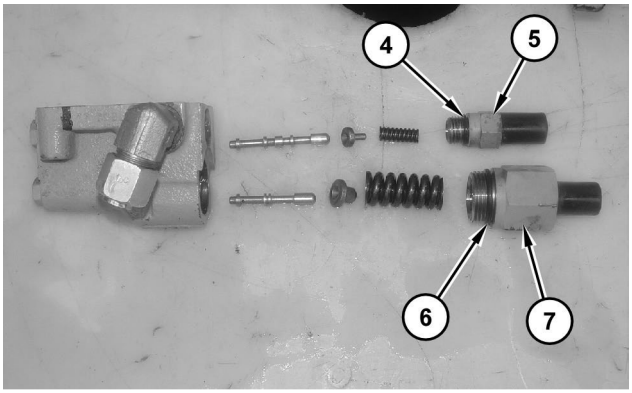

Illustration 770 g01374691

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.

3. Remove valve (5), valve (7), O-ring seal (4), and O-ring seal (6).

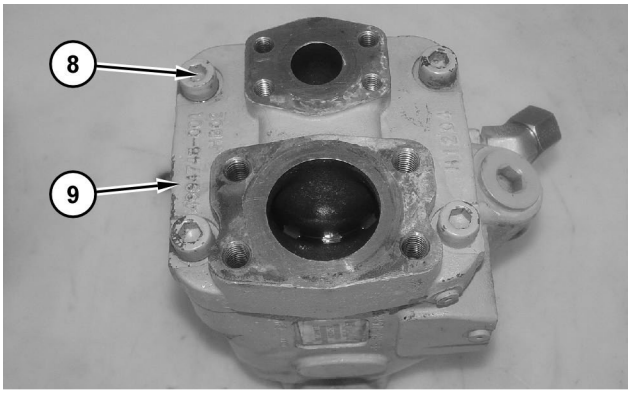

Illustration 771 g01374692

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.

4. Remove bolts (8) and head (9).

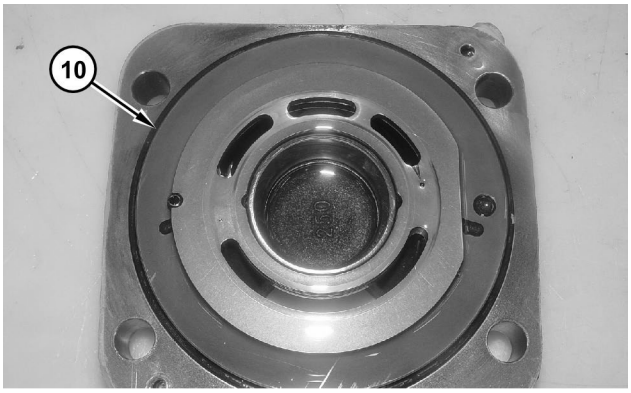

Illustration 772 g01374694

5. Remove O-ring seal (10).

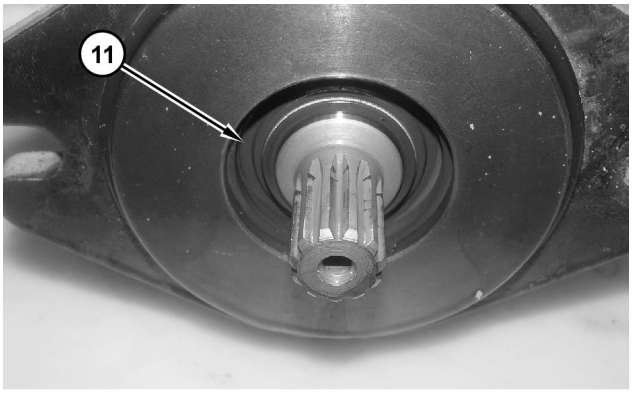

Illustration 773 g01374726

6. Remove lip seal (11).

i02779721

Piston Pump (Hydraulic Fan) - Assemble

SMCS Code: 1387-016-QP; 5070-016-HFN

Assembly Procedure

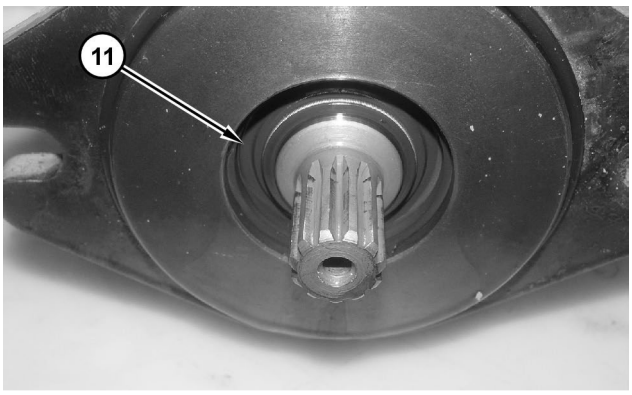

Illustration 774 g01374726

1. Install lip seal (11).

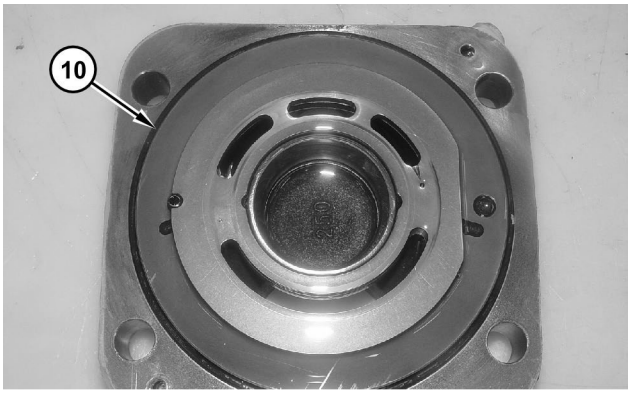

Illustration 775 g01374694

2. Install O-ring seal (10).

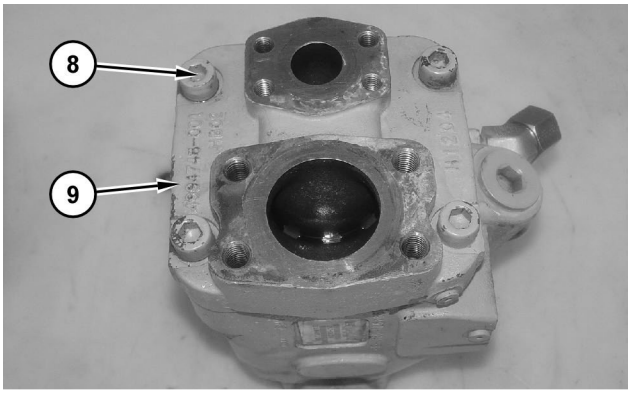

Illustration 776 g01374692

⚠ 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.

3. Install head (9) and bolts (8).

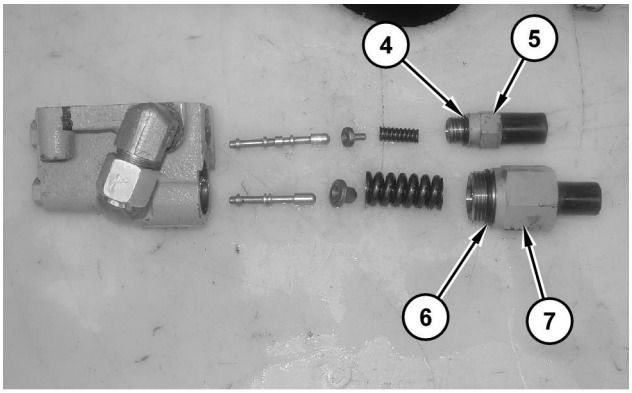

Illustration 777 g01374691

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.

4. Install O-ring seal (4), O-ring seal (6), valve (5), and valve (7).

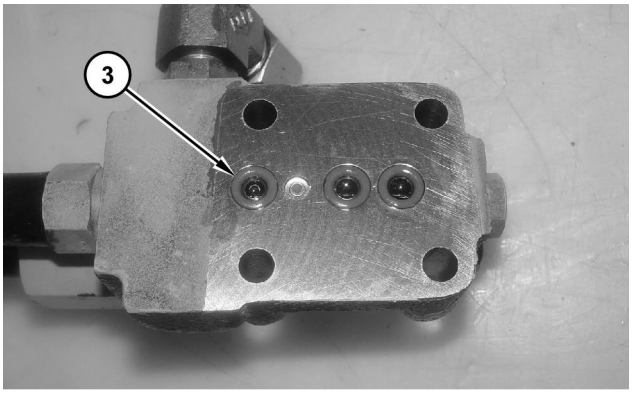

Illustration 778 g01374690

5. Install O-ring seals (3).

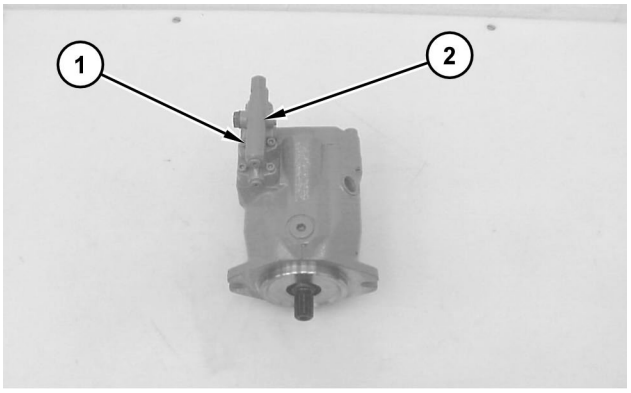

Illustration 779 g01374689

6. Install controller (2) and bolts (1).

End By:

a. Install the pump. Refer to Disassembly and Assembly, “Piston Pump (Hydraulic Fan) - Install”.

i02760033

Piston Pump (Hydraulic Fan) - Install

SMCS Code: 1387-012-QP; 5070-012-HFN

Installation Procedure

Table 82

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Inspect the O-ring seals. Replace O-ring seals that are worn or damaged.

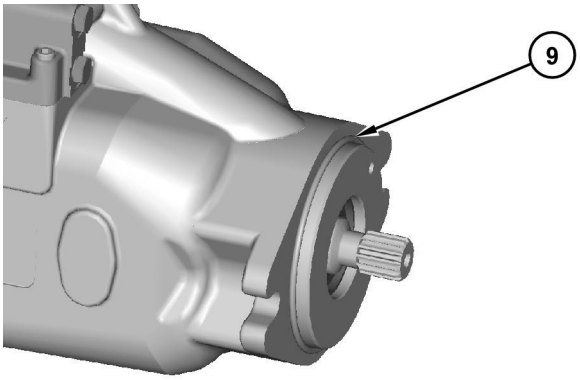

Illustration 780 g01381663

1. Install O-ring seal (9).

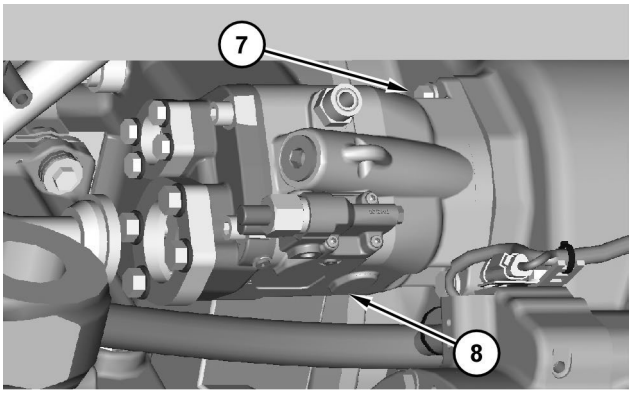

Illustration 781 g01381634

2. Use two people in order to install piston pump (8). The weight of piston pump (8) is approximately 25 kg (55 lb). Install bolts (7).

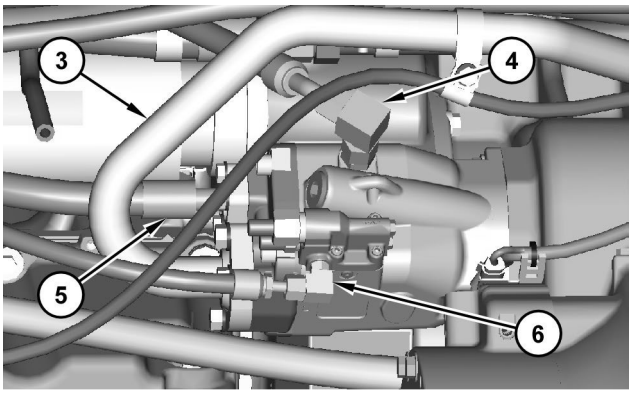

Illustration 782 g01381613

3. Connect fitting (6). Connect hose assembly (5). Connect fitting (4). Connect tube assembly (3).

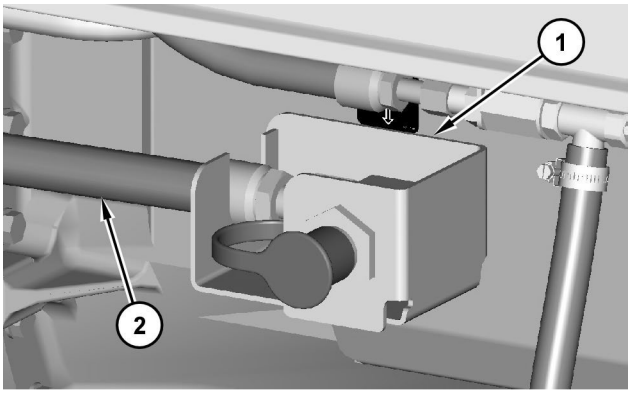

Illustration 783 g01381611

4. Position hose assembly (2) and connect bracket (1).

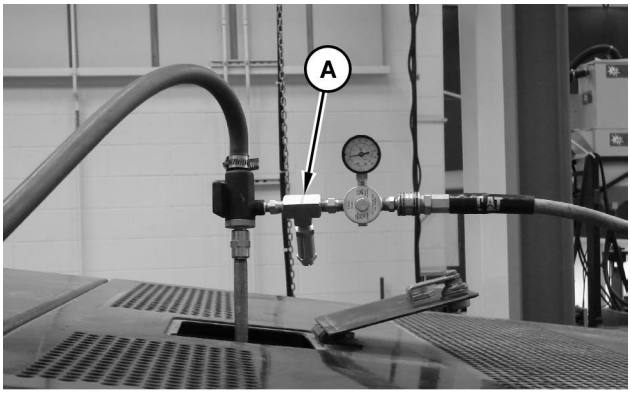

Illustration 784 g01368952

5. Remove Tooling (A).

i02736786

Fan and Gear Motor (Hydraulic Fan) - Remove

SMCS Code: 1356-011-MW; 1386-011-GT; 5061-011-HFN

Removal Procedure

Table 83

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

⚠ WARNING

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 work tools have been lowered to the ground, and the 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.

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.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

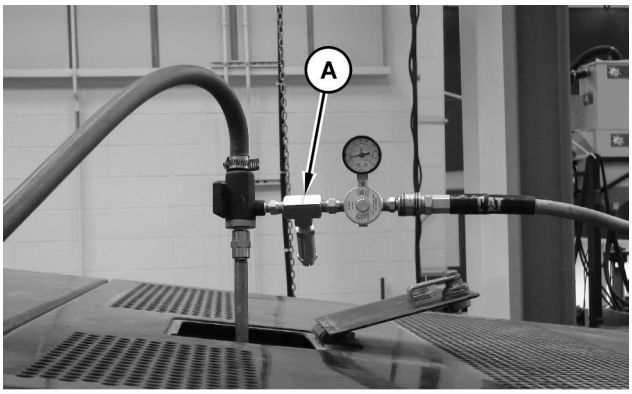

Illustration 785 g01368952

1. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

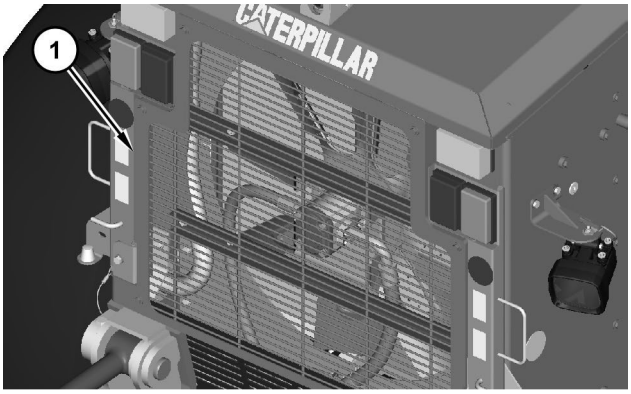

Illustration 786 g01372232

2. Remove fan guard (1).

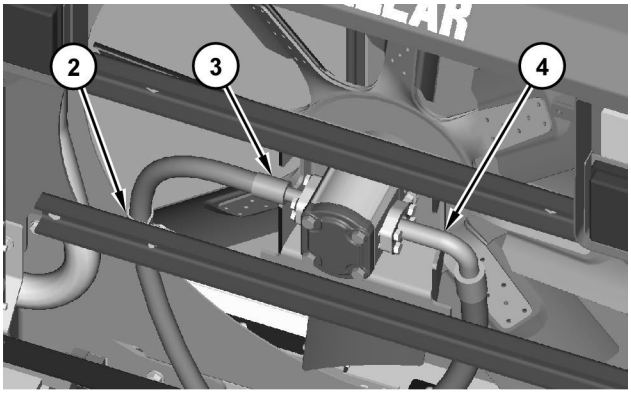

Illustration 787 g01372236

3. Remove clip (2). Disconnect hose assembly (3). Disconnect hose assembly (4).

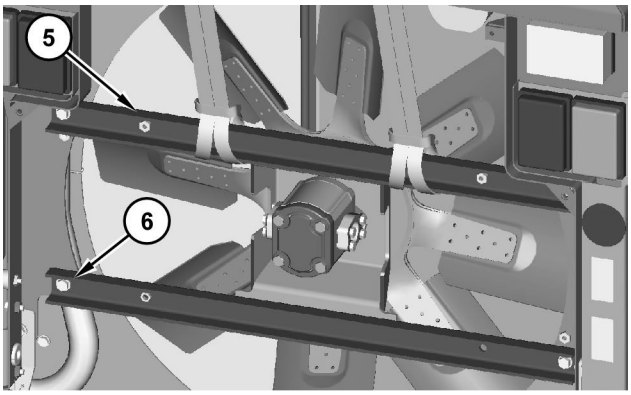

Illustration 788 g01372251

4. Attach two suitable lifting devices onto fan and gear motor (5). The weight of fan and gear motor (5) is approximately 32 kg (70 lb).

5. Remove bolts (6). Remove fan and gear motor (5).

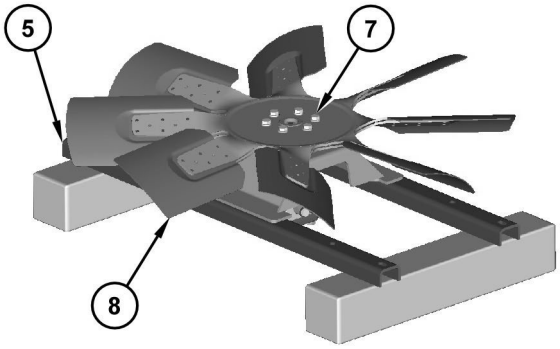

Illustration 789 g01372454

6. Position fan and gear motor (5) onto suitable blocking. Remove bolts (7) in order to remove spider assembly (8).

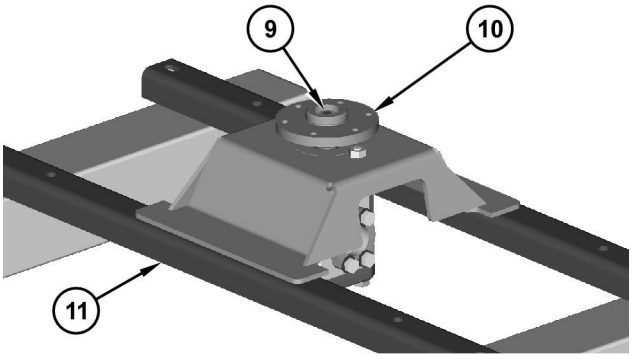

Illustration 790 g01372472

7. Remove nut (9). Remove adapter (10).

8. Use two people in order to turn over gear motor (11) and the mounting support. The weight of gear motor (11) and the mounting support is approximately 27 kg (60 lb).

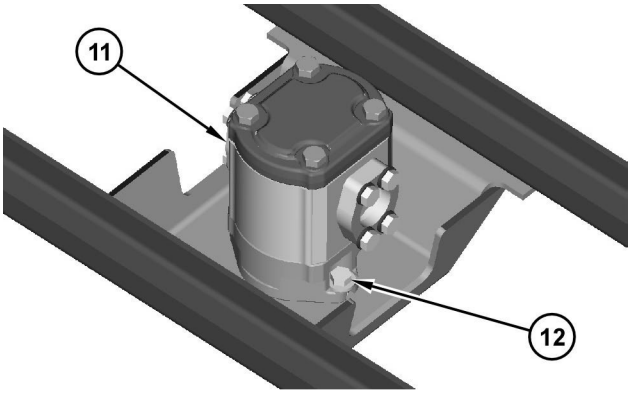

Illustration 791 g01372475

9. Remove bolts (12). Remove gear motor (11).

i02742785

Gear Motor (Hydraulic Fan) - Disassemble

SMCS Code: 1386-015-GT; 5061-015

S/N: B9H1–Up

Disassembly Procedure

Table 84

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-1857	Retaining Ring Pliers	1

Start By:

a. Remove the gear motor. Refer to Disassembly and Assembly, “Gear Motor (Hydraulic Fan) - Remove”.

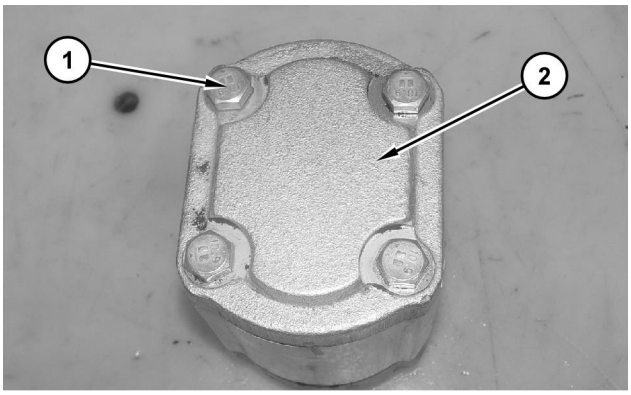

Illustration 792 g01374894

1. Remove bolts (1) and cover (2).

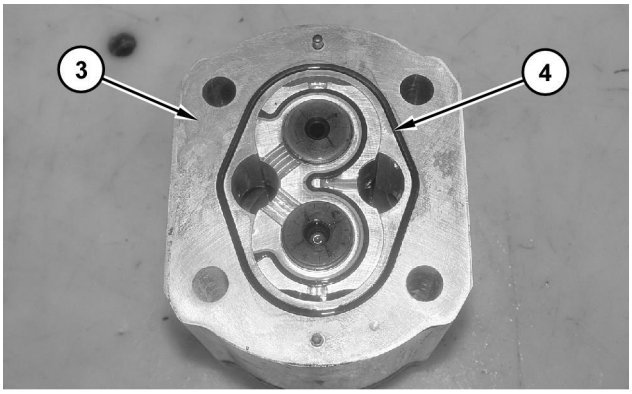

Illustration 793 g01374895

2. Remove housing (3) and O-ring seal (4).

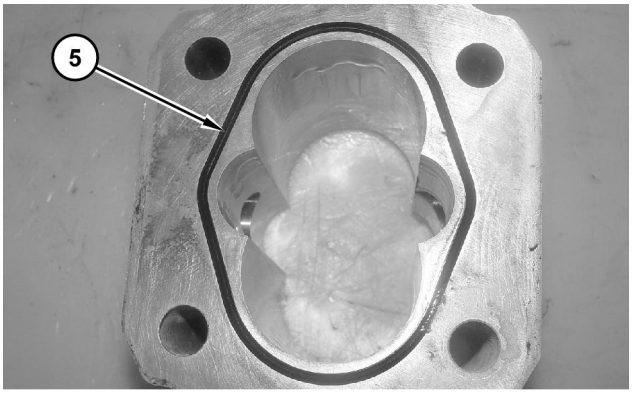

Illustration 794 g01374896

3. Remove O-ring seal (5).

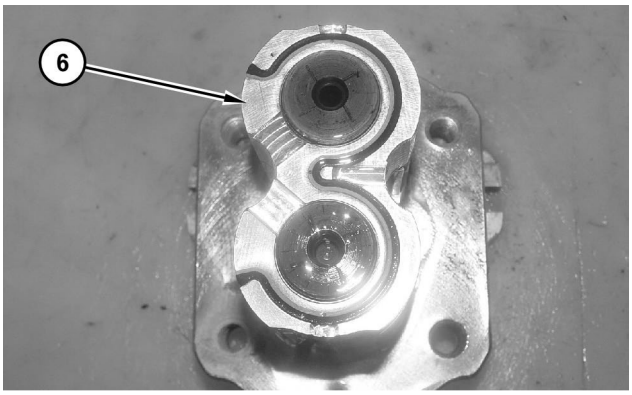

Illustration 795 g01374897

4. Remove bearing (6).

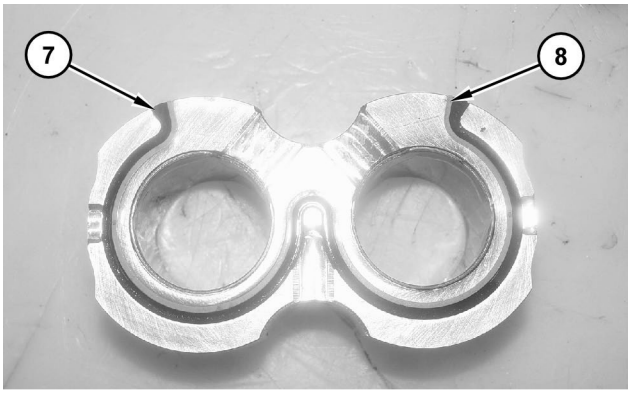

Illustration 796 g01374898

5. Remove seal (7) and seal (8).

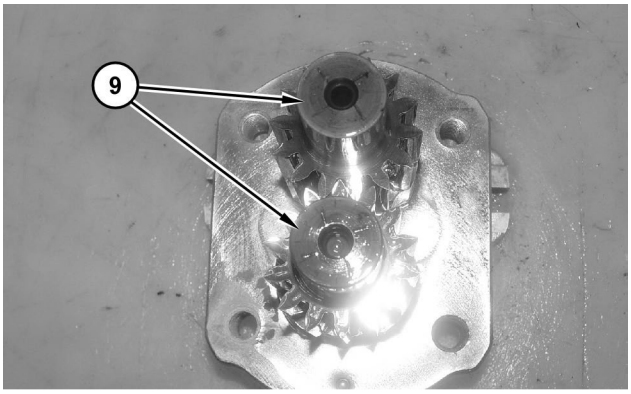

Illustration 797 g01374899

6. Remove gears (9).

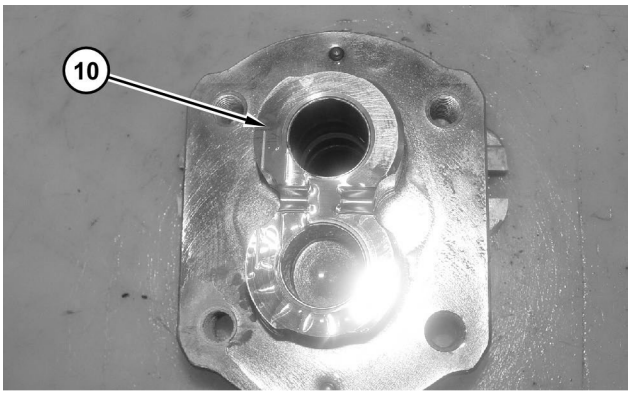

Illustration 798 g01374900

7. Remove bearing (10).

Illustration 799 g01374901

8. Remove seal (11) and seal (12).

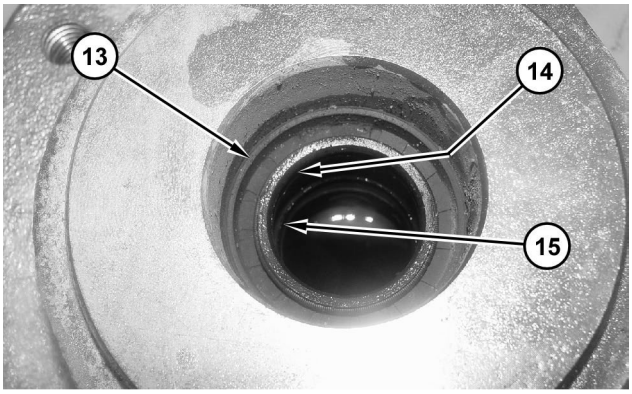

Illustration 800 g01374902

9. Remove lip seal (13).

10. Use Tooling (A) in order to remove retaining ring (14).

11. Remove lip seal (15).

i03894797

Gear Motor (Hydraulic Fan) - Disassemble

SMCS Code: 1386-015-GT; 5061-015

Disassembly Procedure

Table 85

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-1858	Retaining Ring Pliers	1

Start By:

a. Remove the gear motor. Refer to Disassembly and Assembly, "Fan and Gear Motor (Hydraulic Fan) - Remove".

Note: Cleanliness is an important factor. Before you begin the disassembly procedure, the exterior of the components should be thoroughly cleaned. This will help to prevent dirt from entering the internal mechanism. Precision components can be damaged by contaminants or by dirt. Perform disassembly procedures on a clean work surface. Keep components covered and protected at all times.

Note: Put identification marks on pumps and motors for assembly purposes.

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.

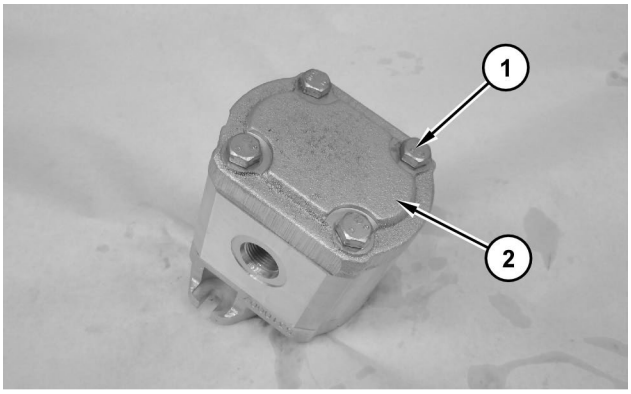

Illustration 801 g01701014

1. Remove bolts (1) and cover (2).

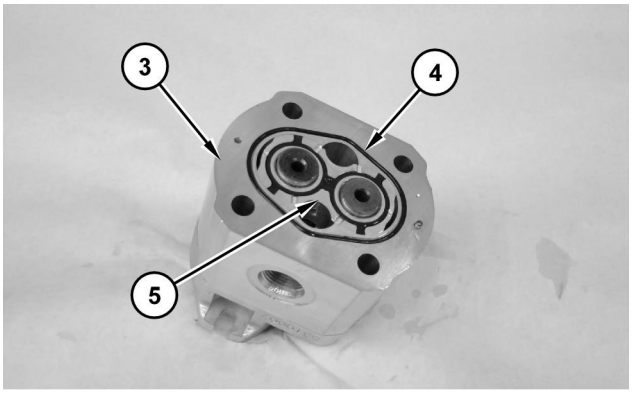

Illustration 802 g01701016

Note: Mark the orientation of bushing (5) and housing (3) for assembly purposes.

2. Remove bushing (5). Remove housing (3).

3. Remove O-ring seal (4) from housing (3). Repeat for the opposite side.

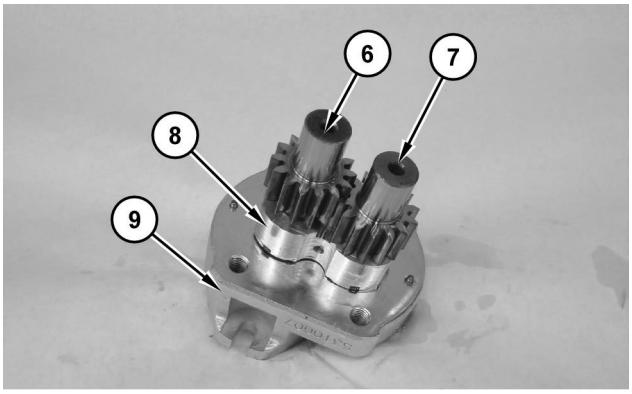

Illustration 803 g01701018

Note: Note the orientation of bushing (8) and adapter (9) for use during the assembly process.

4. Remove gear assembly (6), gear assembly (7), and bushing (8) from adapter (9).

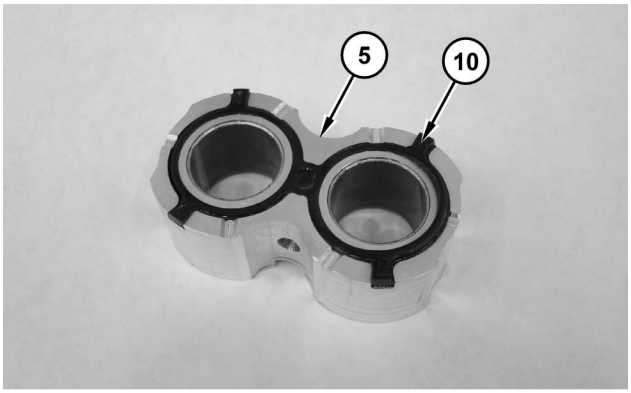

Illustration 804 g01701017

5. Remove seal (10) from bushing (5). Repeat for the other bushing.

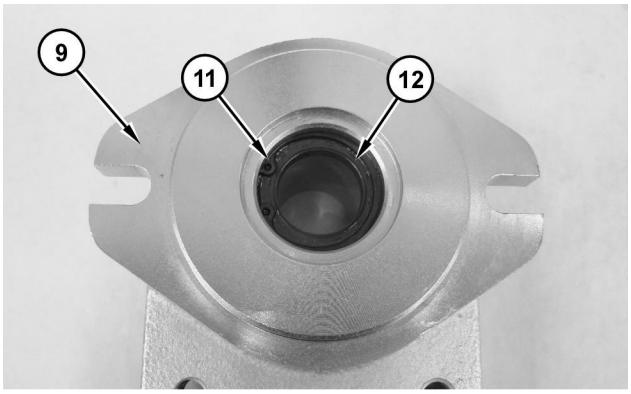

Illustration 805 g01701021

6. Use Tooling (A) in order to remove retaining ring (11). Remove shaft seal (12) from adapter (9).

i02742788

Gear Motor (Hydraulic Fan) - Assemble

SMCS Code: 1386-016-GT; 5061-016

S/N: B9H1–Up

Assembly Procedure

Table 86

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-1857	Retaining Ring Pliers	1

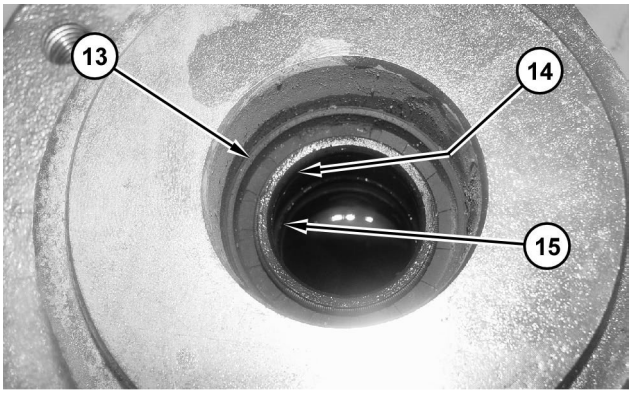

Illustration 806 g01374902

1. Install lip seal (15).

2. Use Tooling (A) in order to install retaining ring (14).

3. Install lip seal (13).

Illustration 807 g01374901

4. Install seal (11) and seal (12).

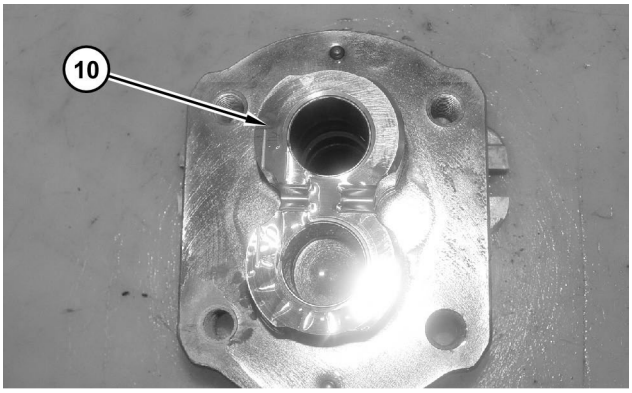

Illustration 808 g01374900

5. Install bearing (10).

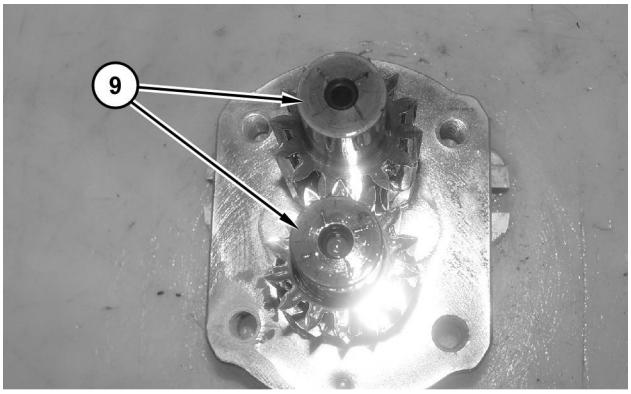

Illustration 809 g01374899

6. Install gears (9).

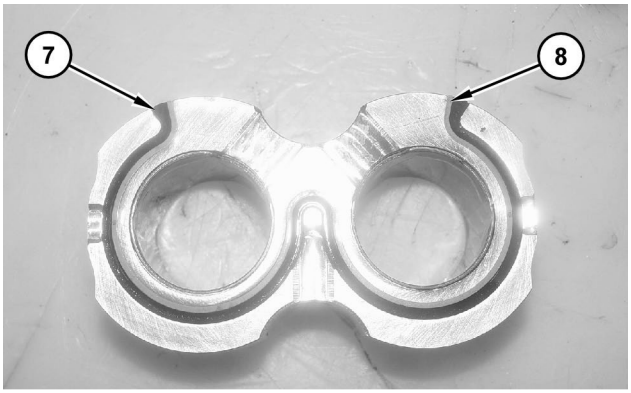

Illustration 810 g01374898

7. Install seal (7) and seal (8).

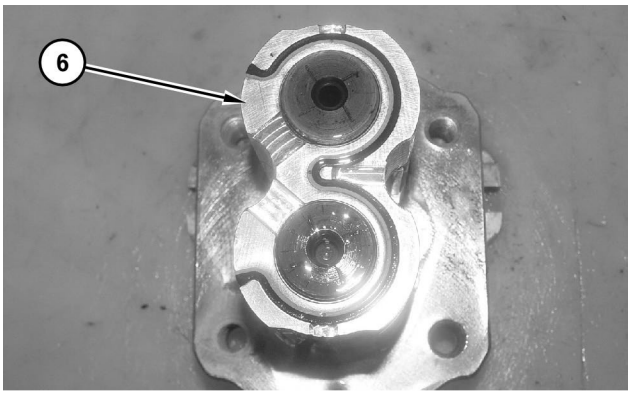

Illustration 811 g01374897

8. Install bearing (6).

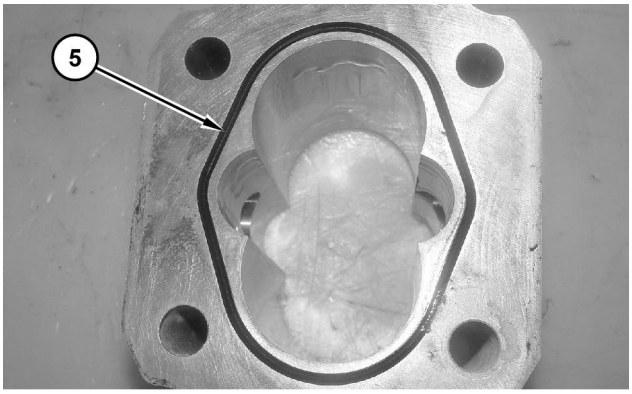

Illustration 812 g01374896

9. Install O-ring seal (5).

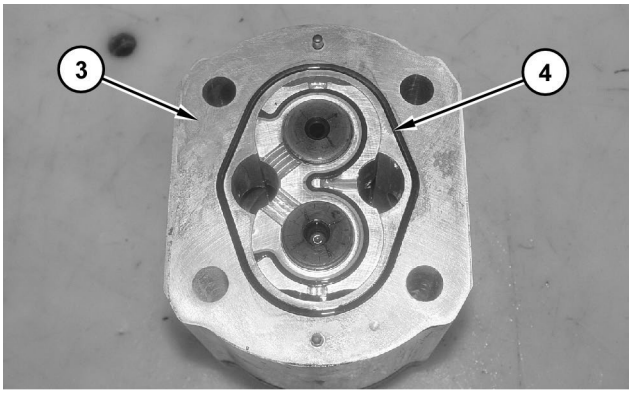

Illustration 813 g01374895

10. Install housing (3) and O-ring seal (4).

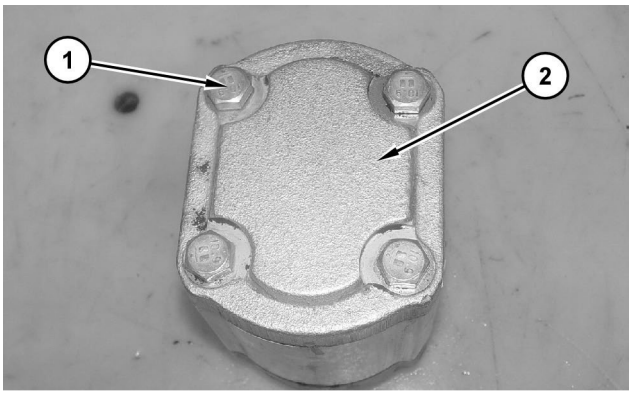

Illustration 814 g01374894

11. Install cover (2) and bolts (1).

End By:

a. Install the gear motor. Refer to Disassembly and Assembly, “Gear Motor (Hydraulic Fan) - Install”.

i03894741

Gear Motor (Hydraulic Fan) - Assemble

SMCS Code: 1386-016-GT; 5061-016

Assembly Procedure

Table 87

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-1858	Retaining Ring Pliers	1
B	1P-0510	Driver Gp	1

Note: Cleanliness is an important factor. Before assembly, thoroughly clean all parts in cleaning fluid. Allow the parts to air dry. Do not use wiping cloths or rags to dry parts. Lint may be deposited on the parts which may cause trouble. Inspect all parts. If any parts are worn or damaged, use new parts for replacement. Dirt and other contaminants can damage the precision component. Perform assembly procedures on a clean work surface. Keep components covered and protected at all times.

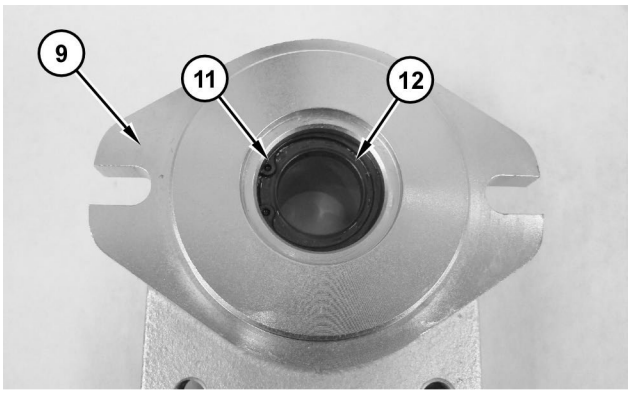

Illustration 815 g01701021

1. Use Tooling (B) to install shaft seal (12) into adapter (9). Use Tooling (A) in order to install retaining ring (11).

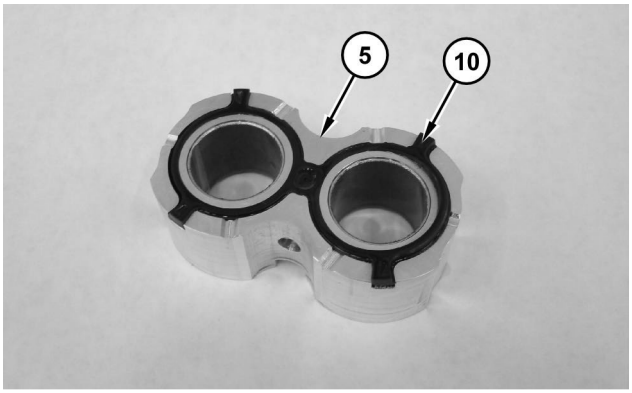

Illustration 816 g01701017

2. Install seals (10) into bushing (5). Repeat for the other bushing.

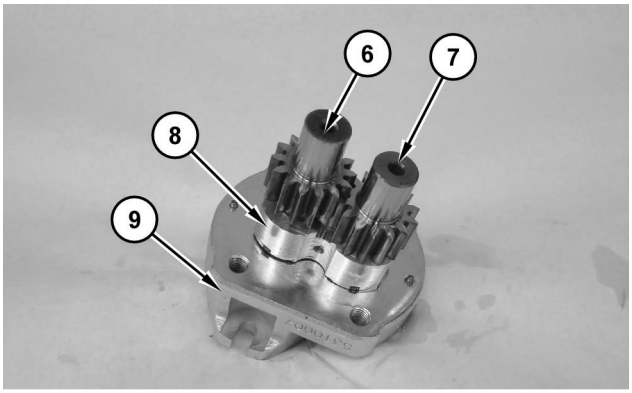

Illustration 817 g01701018

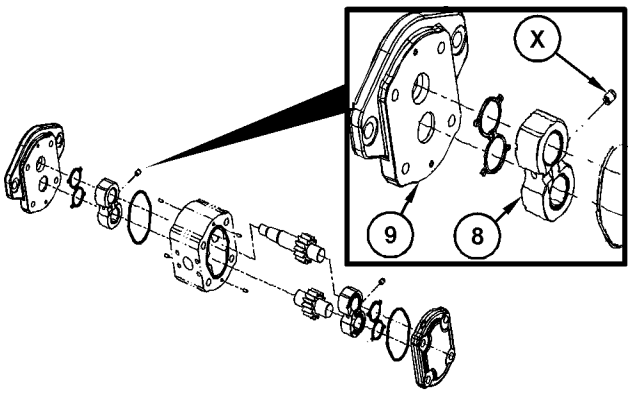

Illustration 818 g02138254

View showing the orientation of the check valve.

3. Install gear assembly (6), gear assembly (7), and bushing (8) into adapter (9).

Note: Orient check valve (X) and bushing (8) in relation to adapter (9).

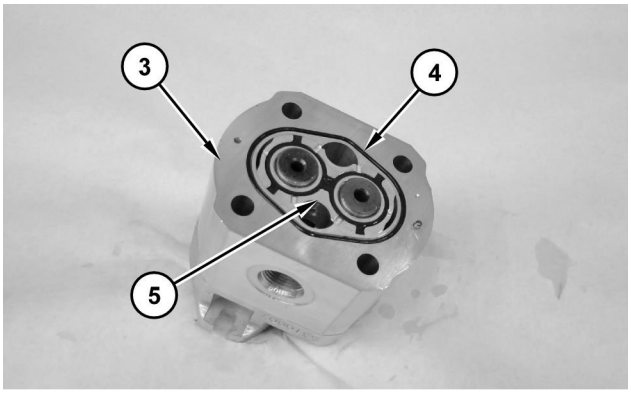

Illustration 819 g01701016

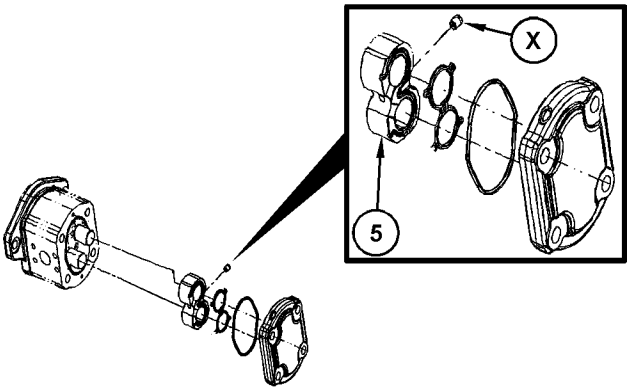

Illustration 820 g02138266

View showing the orientation of the check valve.

4. Install O-ring seal (4) into housing (3). Repeat for the opposite side.

5. Install housing (3). Install bushing (5).

Note: Orient check valve (X) and bushing (5).

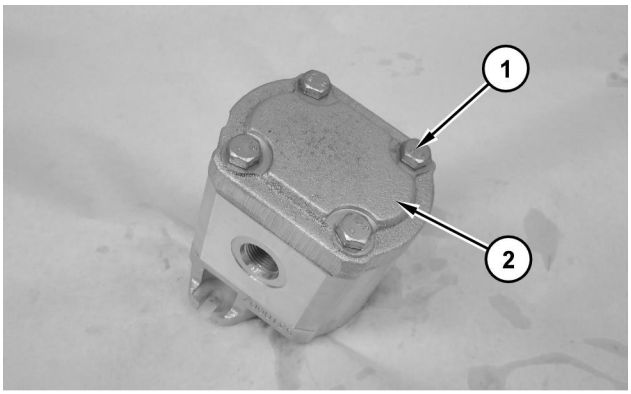

Illustration 821 g01701014

6. Install cover (2) and bolts (1). Tighten bolts (1) to a torque of 92 to 99 N·m (68 to 73 lb ft).

End By:

a. Install the gear motor. Refer to Disassembly and Assembly, “Fan and Gear Pump (Hydraulic Fan) - Install”.

i02736788

Fan and Gear Motor (Hydraulic Fan) - Install

SMCS Code: 1356-012-MW; 1386-012-GT; 5061-012-HFN

Installation Procedure

Table 88

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1
B	9S-3263	Thread Lock Compound	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

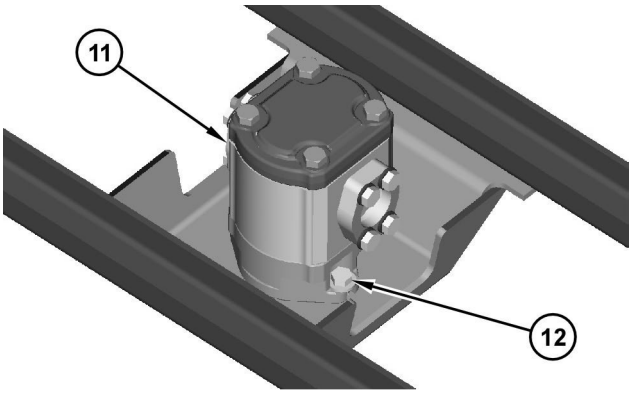

Illustration 822 g01372475

1. Install gear motor (11). Install bolts (12).

2. Use two people in order to turn over gear motor (11) and the mounting support. The weight of gear motor (11) and the mounting support is approximately 27 kg (60 lb).

3. Apply Tooling (B) onto the shaft of gear motor (11).

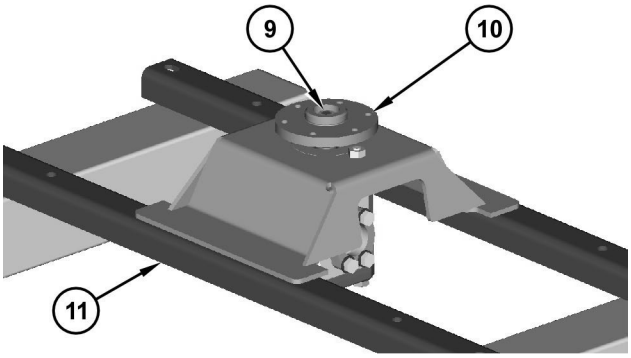

Illustration 823 g01372472

4. Install adapter (10). Install a new nut (9) and a new washer.

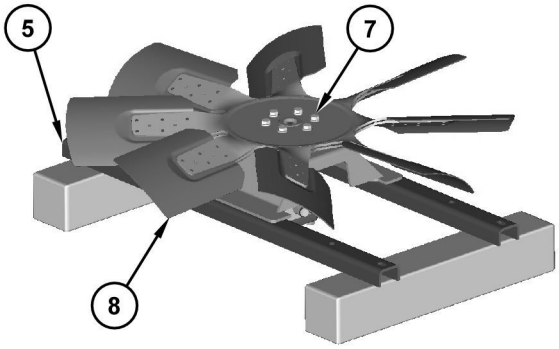

Illustration 824 g01372454

5. Install spider assembly (8) onto fan and gear motor (5). Install bolts (7).

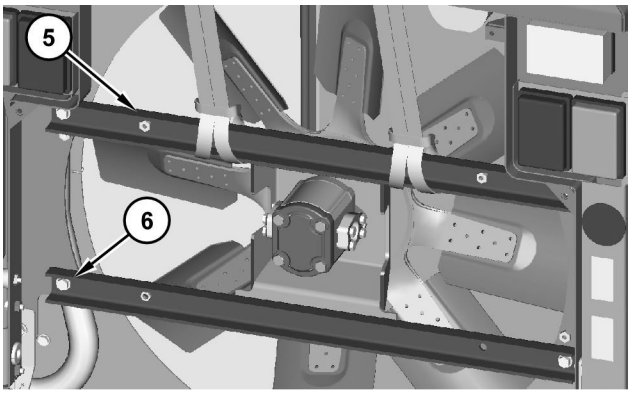

Illustration 825 g01372251

6. Use two suitable lifting devices in order to install fan and gear motor (5). The weight of fan and gear motor (5) is approximately 32 kg (70 lb).

Note: The clearance between the fan blades and the fan shrouds must be a minimum of 5 mm (0.2 inch).

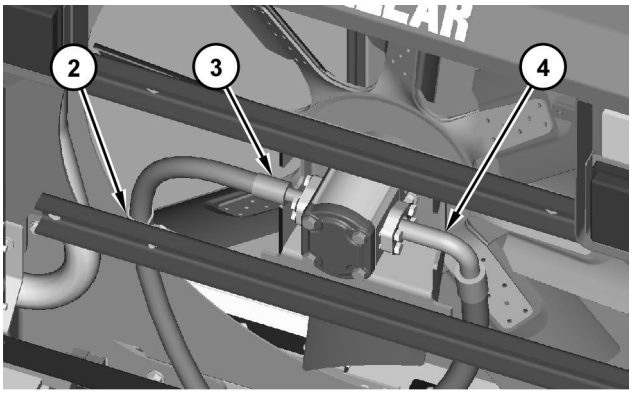

Illustration 826 g01372236

7. Connect hose assembly (4). Connect hose assembly (3). Install clip (2).

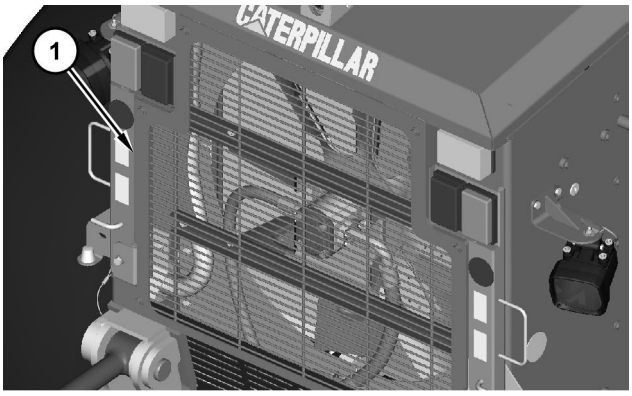

Illustration 827 g01372232

8. Install fan guard (1).

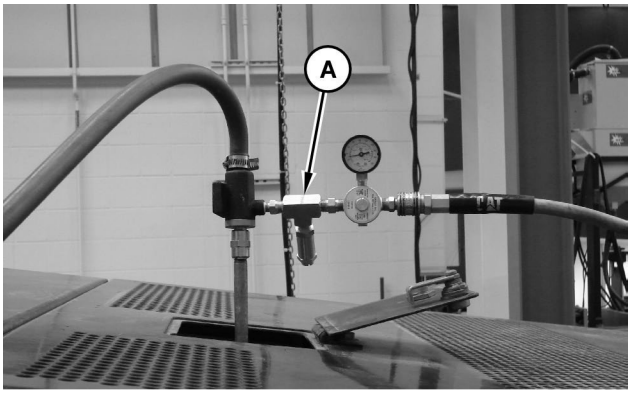

Illustration 828 g01368952

9. Remove Tooling (A).

i02761995

Solenoid Valve and Manifold (Hydraulic Fan) - Remove and Install

SMCS Code: 5264-010; 5479-010

Removal Procedure

Table 89

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

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.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

⚠ WARNING

Hydraulic oil pressure can remain in the hydraulic system on this machine after the engine and pump have been stopped. Serious injury can result if this pressure is not released before any service is done on the hydraulic systems. In order to prevent possible injury, release the hydraulic system pressure before working on any fitting, hose, or hydraulic component.

Lower all attachments to the ground before service is started. If the hydraulic system must be serviced, tested, or adjusted with the attachment in the raised position, the attachments and lift cylinders must be supported properly.

Always move the machine to a location away from the travel of other machines. Be sure that other personnel are not near the machine when the engine is running and tests or adjustments are being made.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

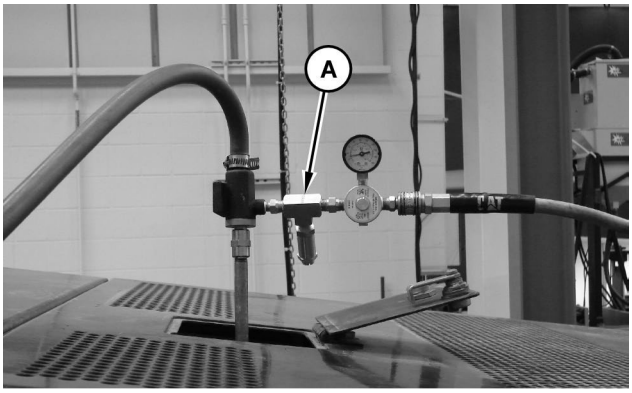

Illustration 829 g01368952

2. Install Tooling (A) onto the hydraulic tank. Attach an air supply hose onto Tooling (A). Apply 138 kPa (20 psi). This procedure will pull a vacuum on the hydraulic system.

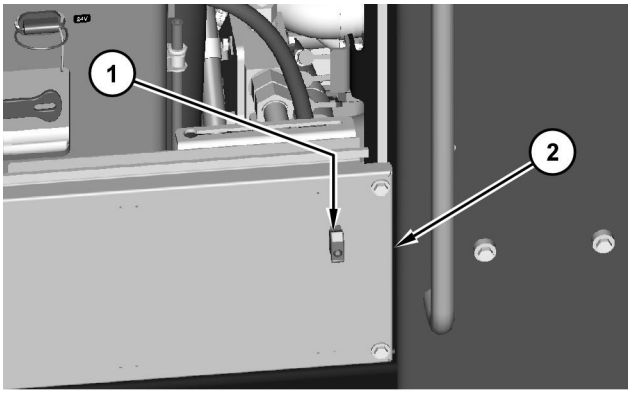

Illustration 830 g01382496

3. Disconnect harness assembly (1). Remove panel (2).

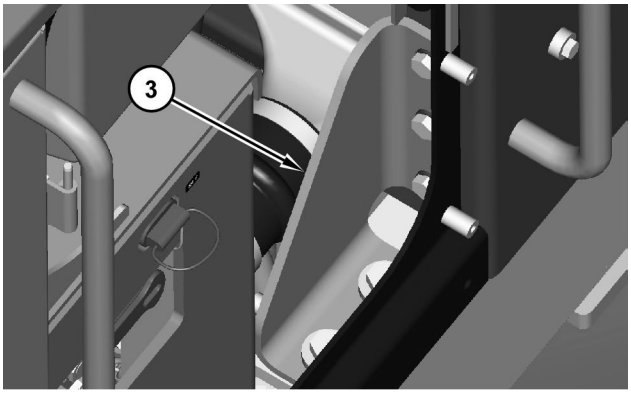

Illustration 831 g01382500

4. Remove bracket (3).

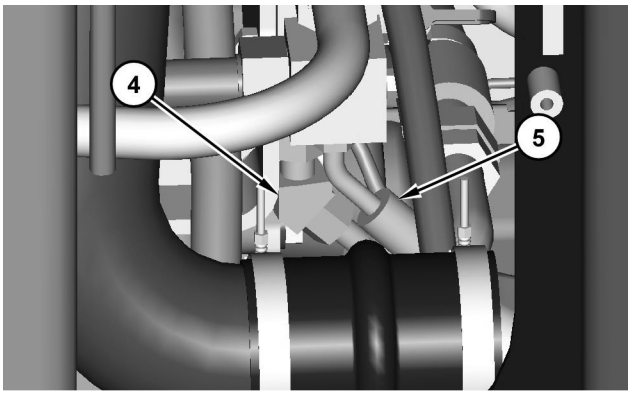

Illustration 832 g01382507

5. Disconnect fitting (4). Disconnect hose assembly (5).

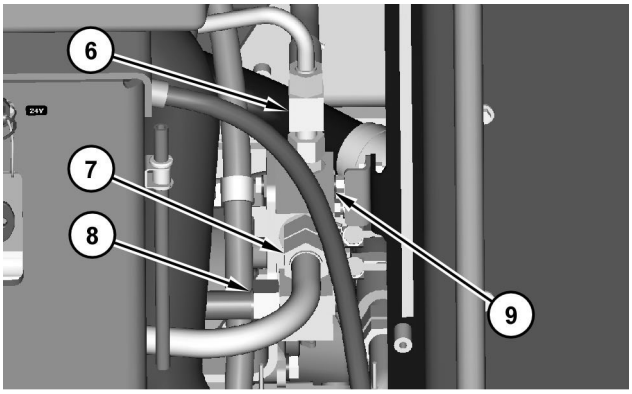

Illustration 833 g01382511

6. Disconnect fitting (6). Disconnect tube assembly (7). Disconnect tube assembly (8). Remove solenoid valve and manifold (9).

Installation Procedure

Table 90

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	311-1362	Vacuum Cap	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

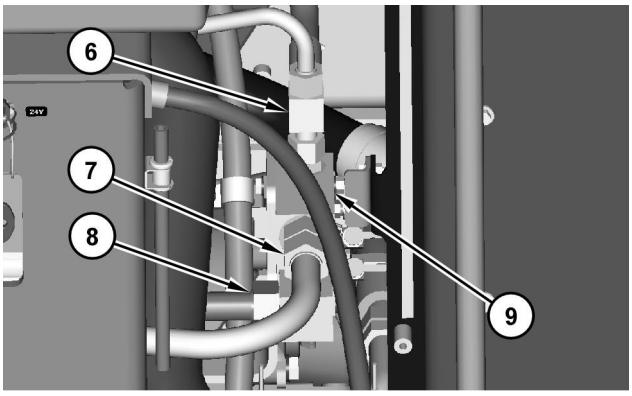

Illustration 834 g01382511

1. Install solenoid valve and manifold (9). Connect tube assembly (8). Connect tube assembly (7). Connect fitting (6).

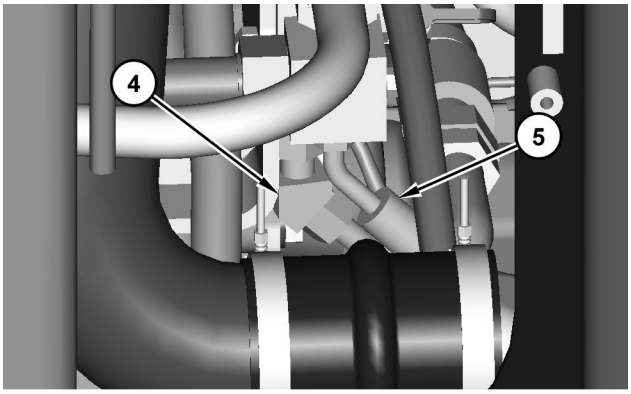

Illustration 835 g01382507

2. Connect hose assembly (5). Connect fitting (4).

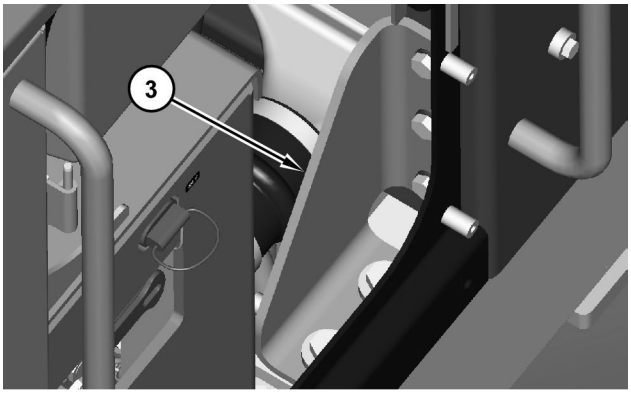

Illustration 836 g01382500

3. Install bracket (3).

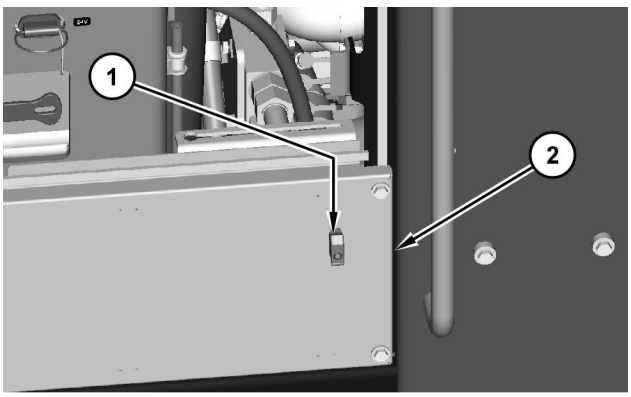

Illustration 837 g01382496

4. Install panel (2). Connect harness assembly (1).

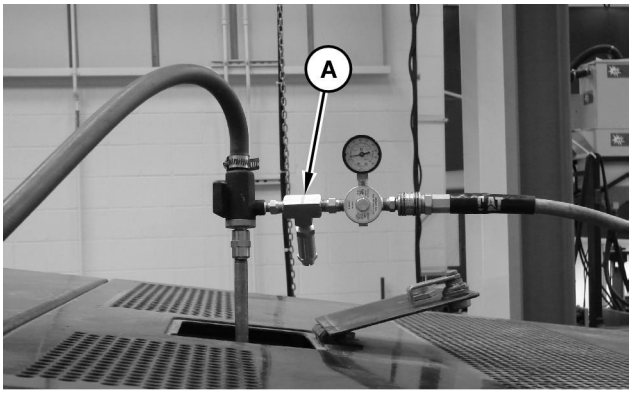

Illustration 838 g01368952

5. Remove Tooling (A).

i02772089

Window Wiper and Wiper Motor (Front) - Remove and Install

SMCS Code: 7305-010-MQ

Removal Procedure

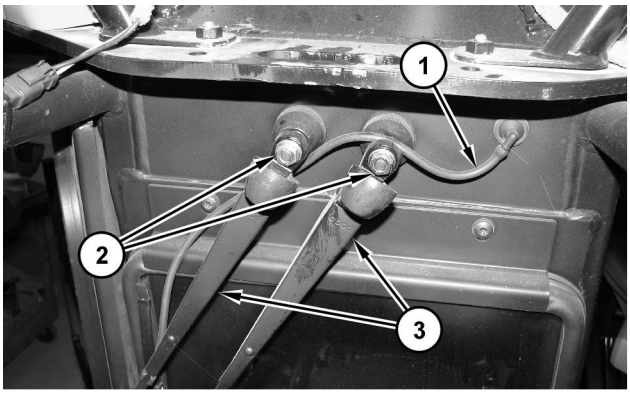

Illustration 839 g01358281

1. Disconnect hose (1). Remove nuts (2). Remove window wiper (3).

Note: Mark the position of window wiper (3) for installation purposes.

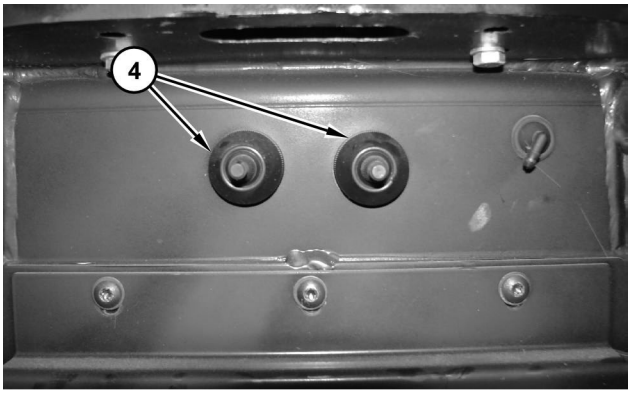

Illustration 840 g01358287

2. Remove caps (4).

Illustration 841 g01358301

3. Remove mirror (5).

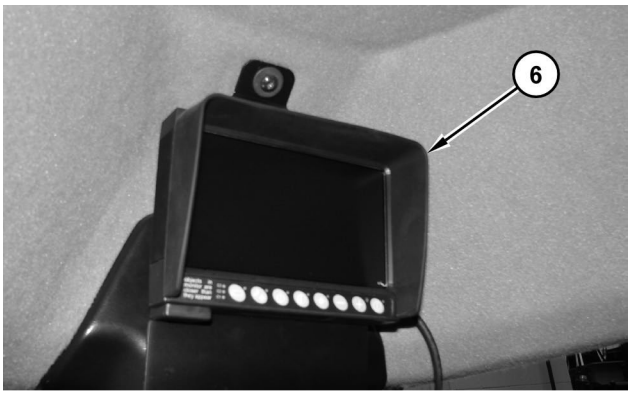

Illustration 842 g01358307

4. Remove control assembly (6).

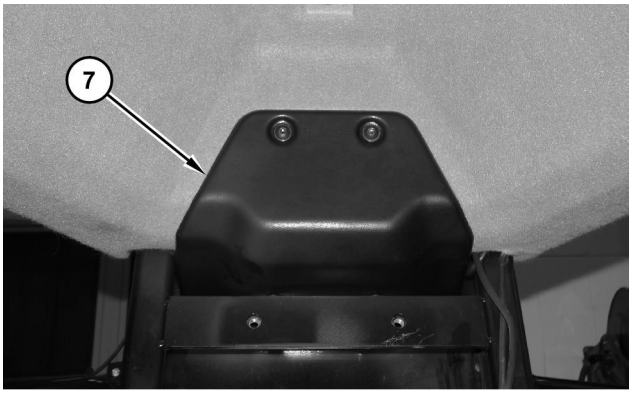

Illustration 843 g01358310

5. Remove cover (7).

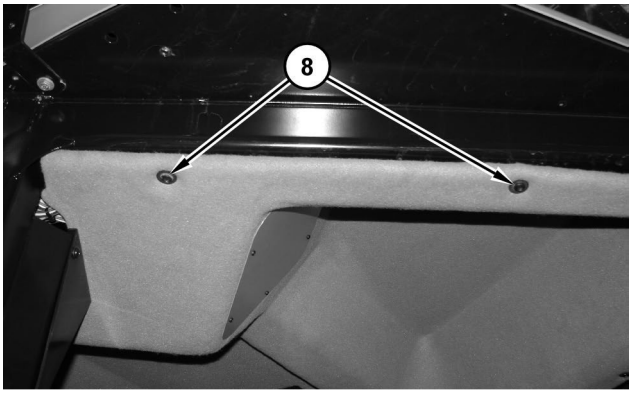

Illustration 844 g01358311

6. Remove screws (8).

Illustration 845 g01358344

7. Disconnect harness assembly (9).

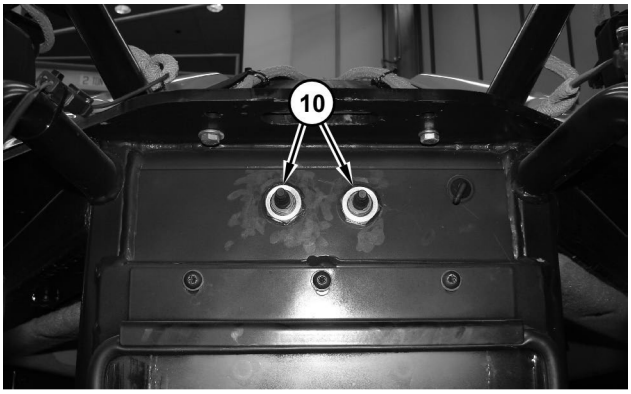

Illustration 846 g01358377

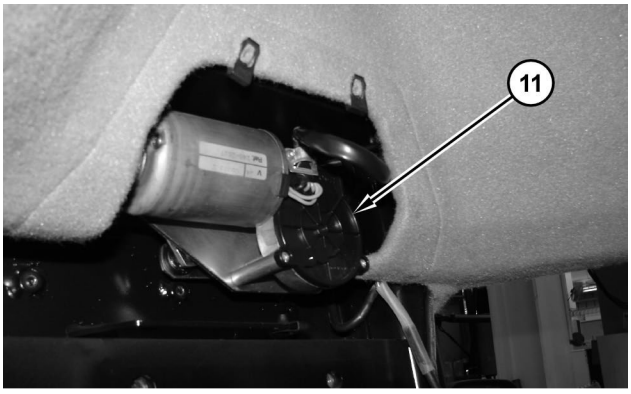

Illustration 847 g01358396

8. Remove nuts (10) in order to remove wiper motor (11).

Installation Procedure

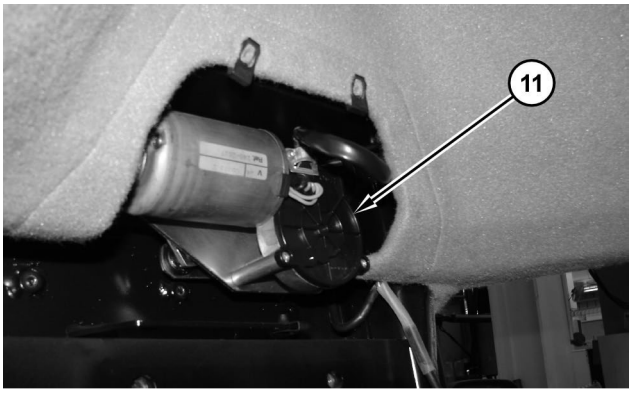

Illustration 848 g01358396

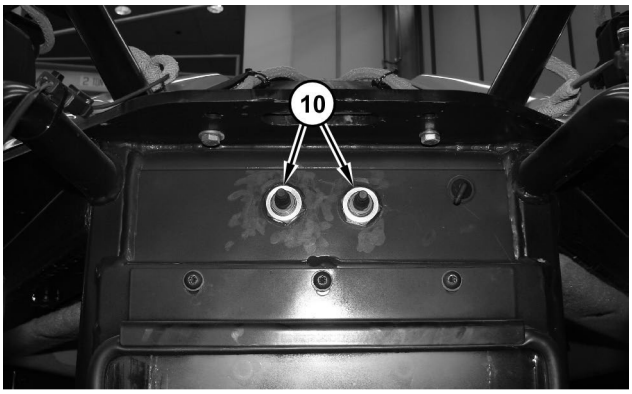

Illustration 849 g01358377

1. Position wiper motor (11). Install nuts (10). Tighten nuts (10) to a torque of 38 ± 2 N·m (28 ± 2 lb ft).

Illustration 850 g01358344

2. Connect harness assembly (9).

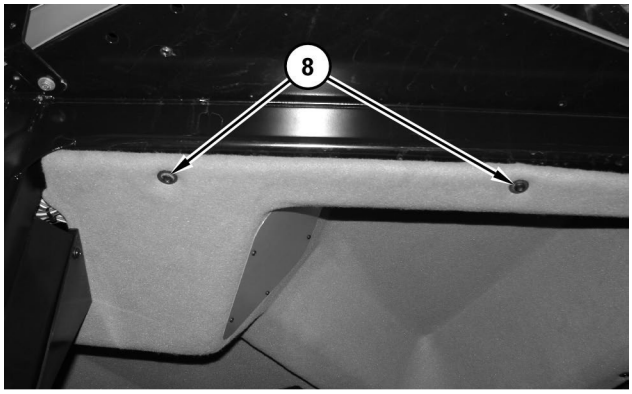

Illustration 851 g01358311

3. Install screws (8).

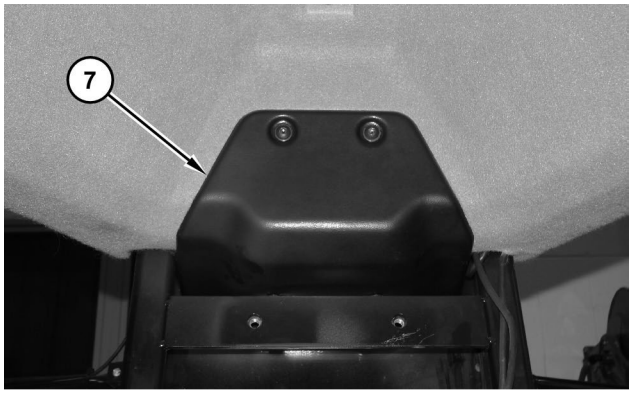

Illustration 852 g01358310

4. Install cover (7).

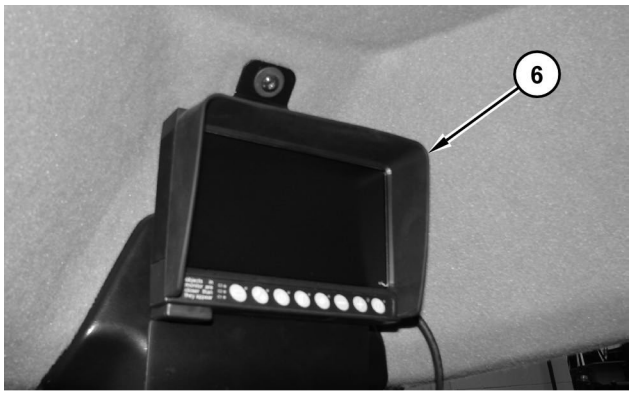

Illustration 853 g01358307

5. Install control assembly (6).

Illustration 854 g01358301

6. Install mirror (5).

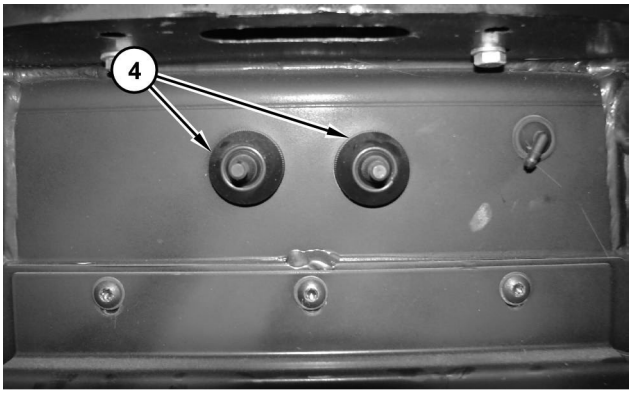

Illustration 855 g01358287

7. Install caps (4).

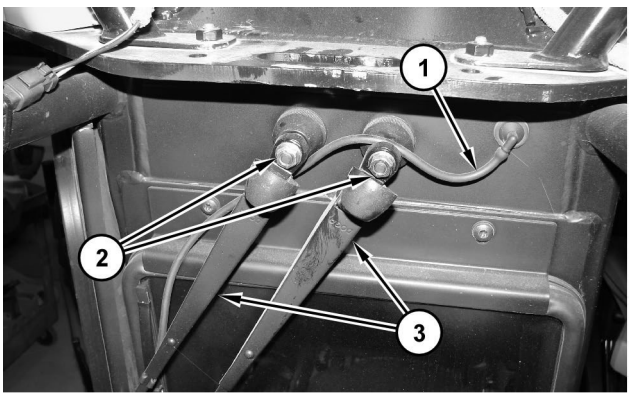

Illustration 856 g01358281

8. Install window wiper (3). Install nuts (2). Tighten nuts (2) to a torque of 23 ± 1 N·m (17 ± 1 lb ft). After approximately thirty minutes, tighten nuts (2) to a torque of 23 ± 1 N·m (17 ± 1 lb ft).

Note: Nuts (2) must maintain a torque of 12 N·m (9 lb ft) minimum.

9. Connect hose (1).

i02772092

Window Wiper and Wiper Motor (Rear) - Remove and Install

SMCS Code: 7305-010-MQ

Removal Procedure

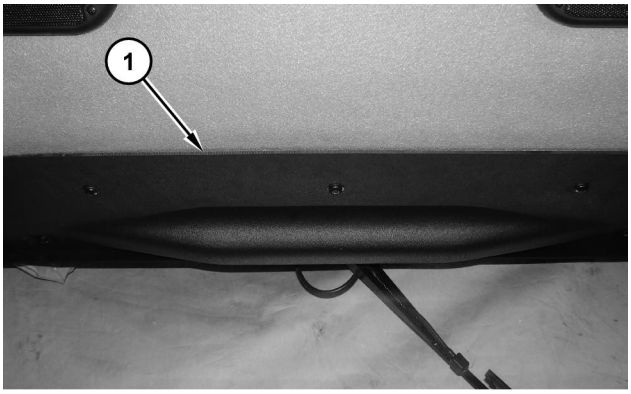

Illustration 857 g01358585

1. Remove cover (1).

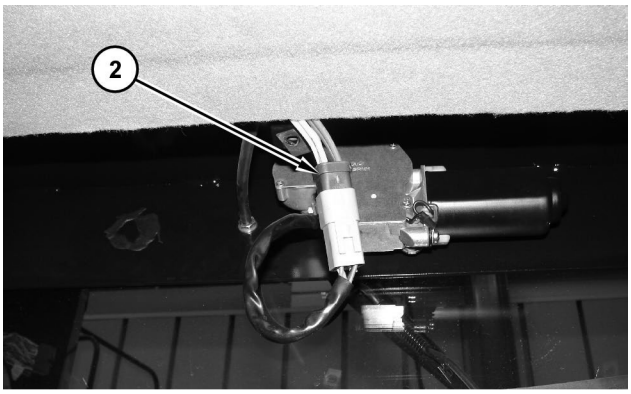

Illustration 858 g01358616

2. Disconnect harness assembly (2).

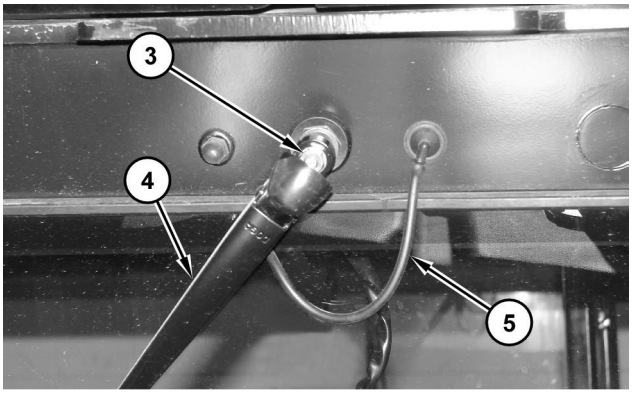

Illustration 859 g01358622

3. Remove nut (3). Remove window wiper (4). Disconnect hose (5).

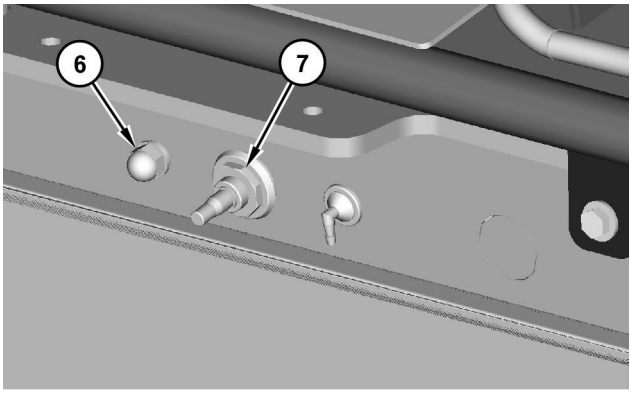

Illustration 860 g01358685

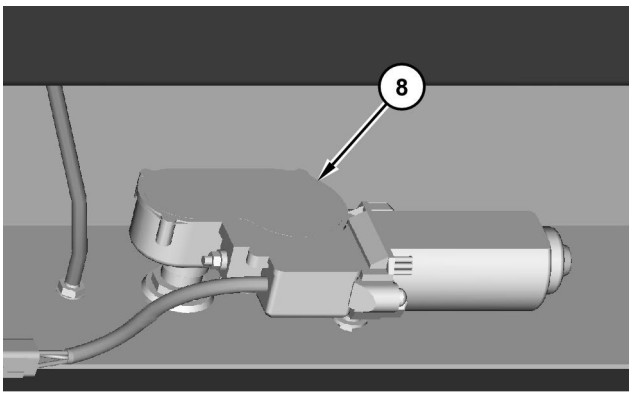

Illustration 861 g01358692

4. Remove nut (6) and nut (7) in order to remove wiper motor (8).

Installation Procedure

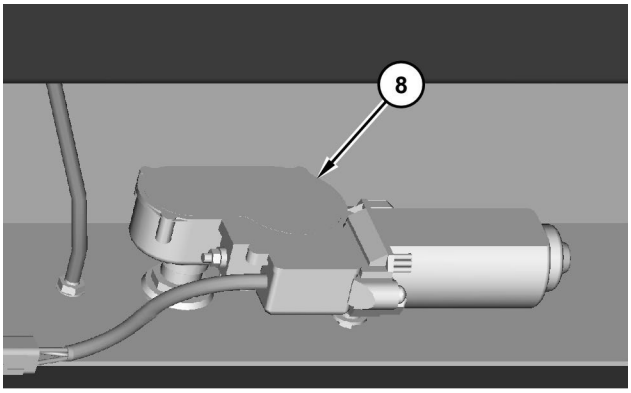

Illustration 862 g01358692

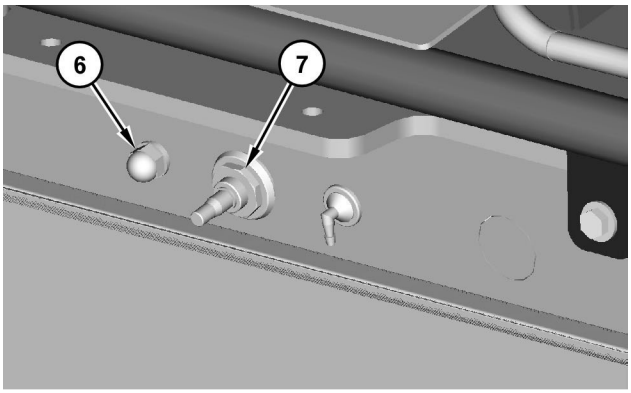

Illustration 863 g01358685

1. Install nut (7). Tighten nut (7) to a torque of 9 ± 1 N·m (80 ± 9 lb in). Install nut (6). Tighten nut (6) to a torque of 7.5 ± 1.5 N·m (66.4 ± 13.3 lb in).

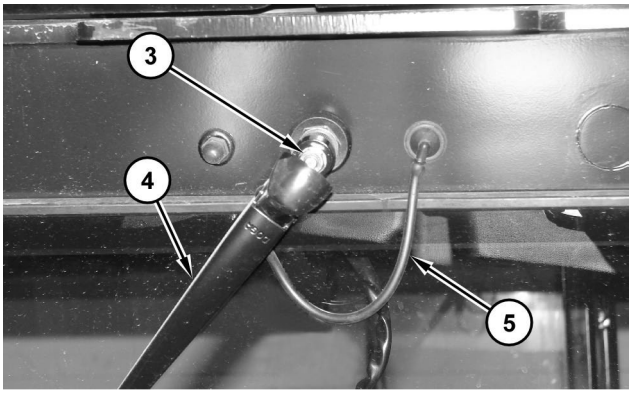

Illustration 864 g01358622

2. Install window wiper (4). Connect hose (5). Install nut (3). Tighten nut (3) to a torque of 23 ± 1 N·m (17 ± 1 lb ft). After approximately thirty minutes, tighten nut (3) to a torque of 23 ± 1 N·m (17 ± 1 lb ft).

Note: Nut (3) must maintain a torque of 12 N·m (9 lb ft) minimum.

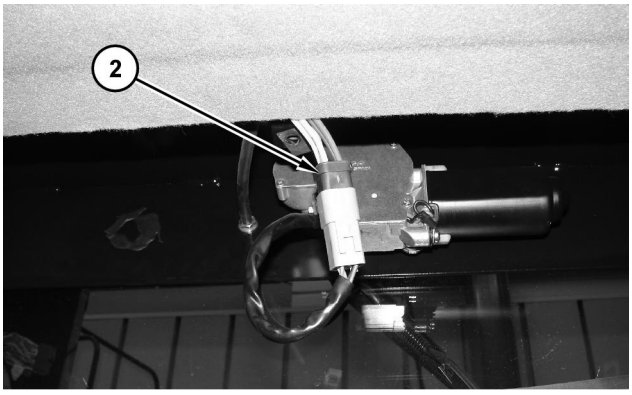

Illustration 865 g01358616

3. Connect harness assembly (2).

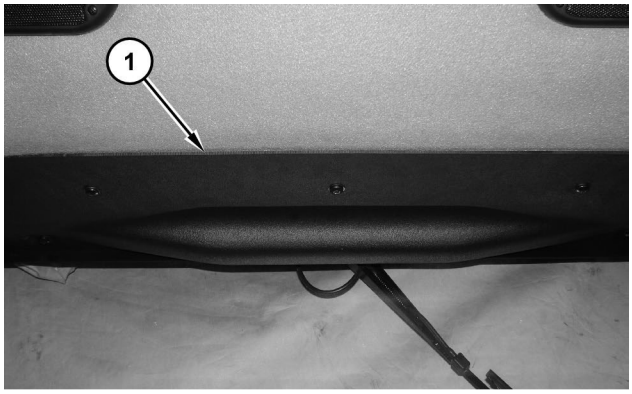

Illustration 866 g01358585

4. Install cover (1).

i02710656

Joystick Control - Remove and Install

SMCS Code: 3168-010; 4343-010; 5063-010; 5705-010

Removal Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

Illustration 867 g01360459

1. Remove cover (1).

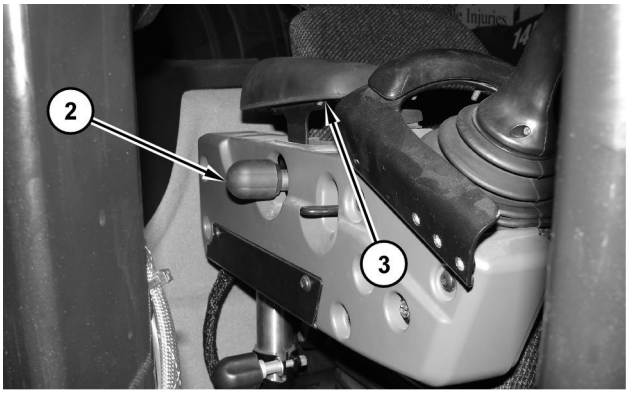

Illustration 868 g01360467

2. Loosen knob (2) in order to raise armrest (3).

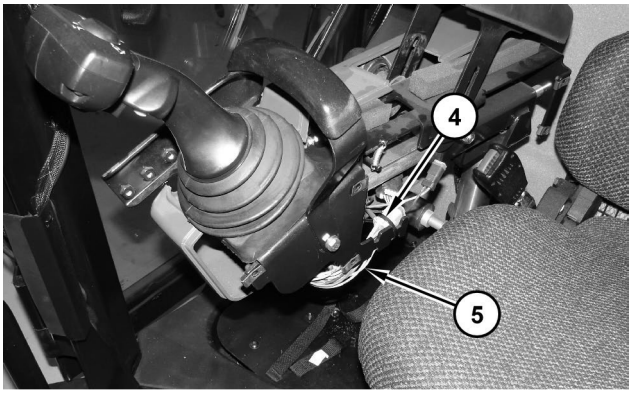

Illustration 869 g01360469

3. Remove cable strap (4) in order to position harness assembly (5) out of the way.

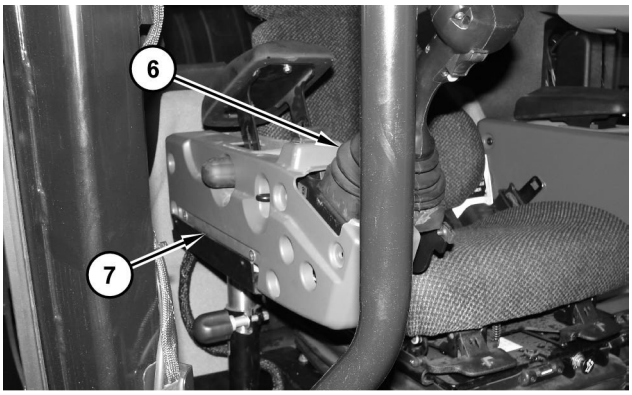

Illustration 870 g01360502

4. Lift protective boot (6). Remove cover (7).

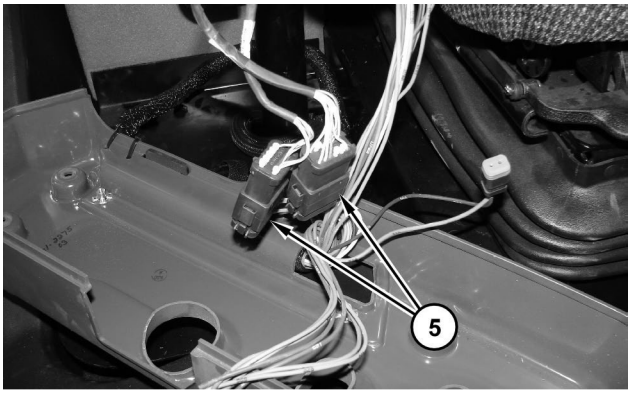

Illustration 871 g01360500

5. Disconnect harness assemblies (5).

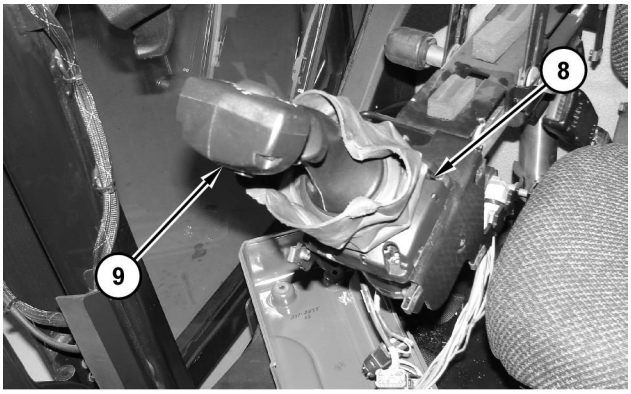

Illustration 872 g01360510

6. Remove screws (8). Remove joystick control (9).

7. Repeat Step 1 through Step 6 for the remaining joystick control.

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

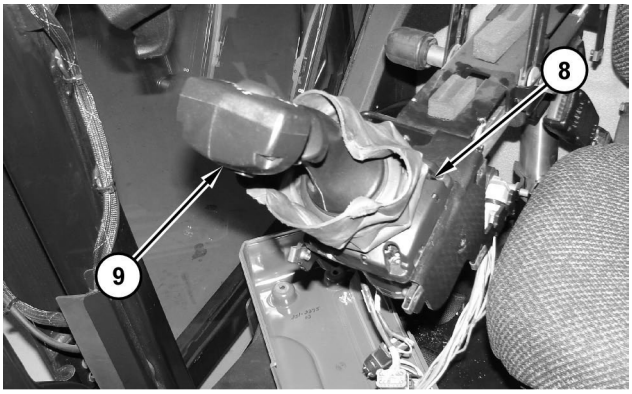

Illustration 873 g01360510

1. Install joystick control (9). Install screws (8).

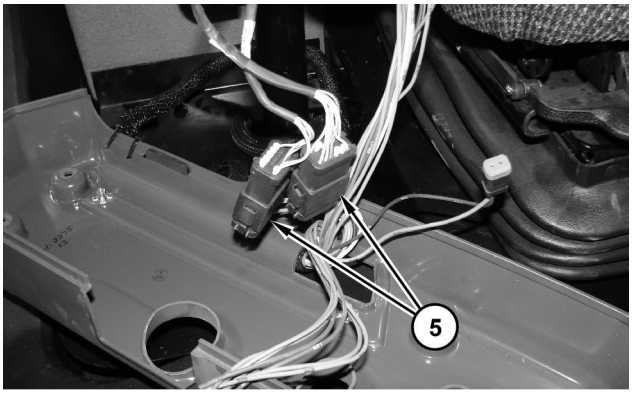

Illustration 874 g01360500

2. Connect harness assemblies (5).

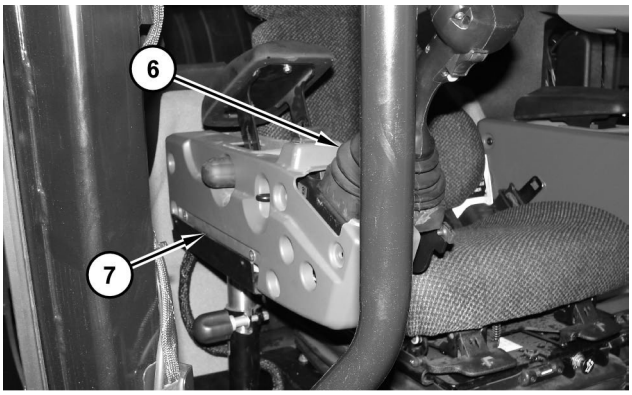

Illustration 875 g01360502

3. Install cover (7). Lower protective boot (6).

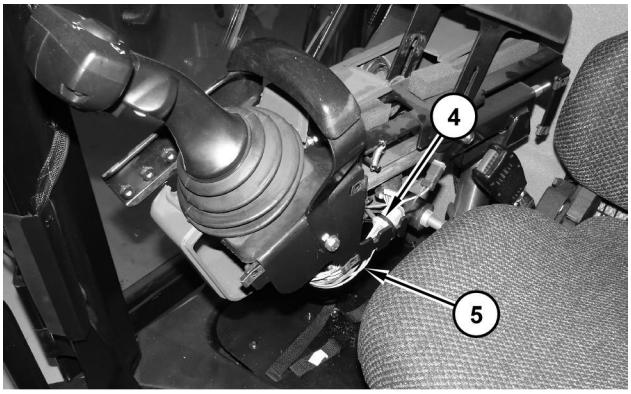

Illustration 876 g01360469

4. Position harness assembly (5) and install cable strap (4).

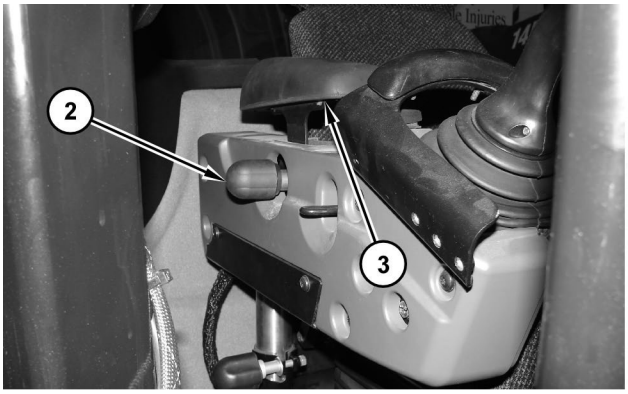

Illustration 877 g01360467

5. Lower armrest (3) and tighten knob (2).

Illustration 878 g01360459

6. Install cover (1).

7. Repeat Step 1 through Step 6 for the remaining joystick control.

i02707933

Seat - Remove and Install

SMCS Code: 7312-010

Removal Procedure

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

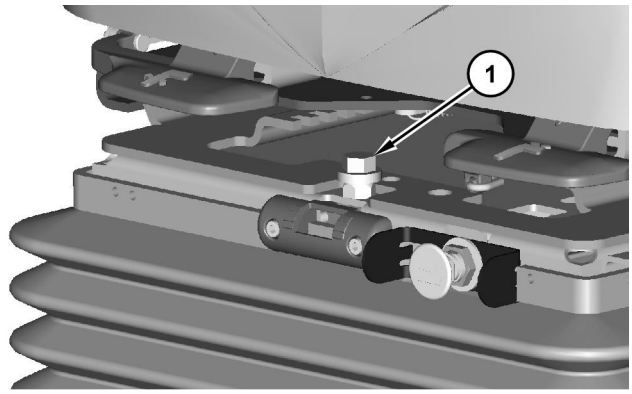

Illustration 879 g01359322

1. Remove bolt (1).

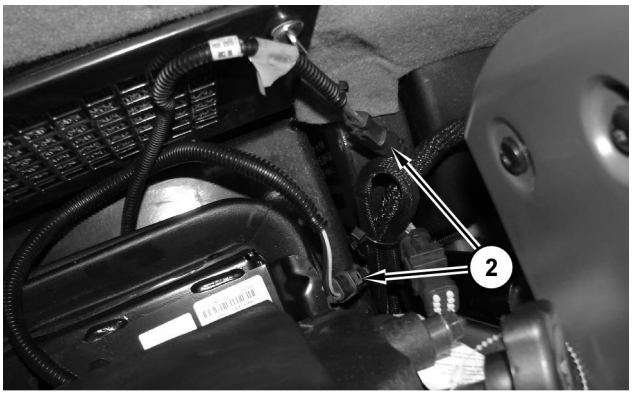

Illustration 880 g01358976

2. Disconnect harness assemblies (2).

Illustration 881 g01359013

3. Remove seat (3). The weight of seat (3) is approximately 16 kg (35 lb).

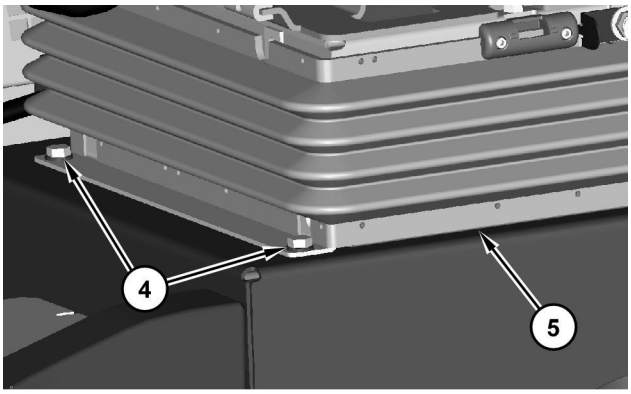

Illustration 882 g01358978

4. Remove bolts (4). Repeat this step for the opposite side.

5. Use two people in order to remove seat suspension assembly (5). The weight of seat suspension assembly (5) is approximately 45 kg (100 lb).

Installation Procedure

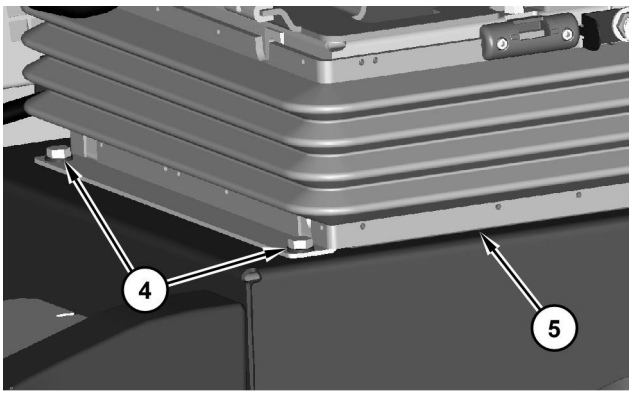

Illustration 883 g01358978

1. Use two people in order to install seat suspension assembly (5). The weight of seat suspension assembly (5) is approximately 45 kg (100 lb).

2. Install bolts (4). Repeat this step for the opposite side.

Illustration 884 g01359013

3. Install seat (3). The weight of seat (3) is approximately 16 kg (35 lb).

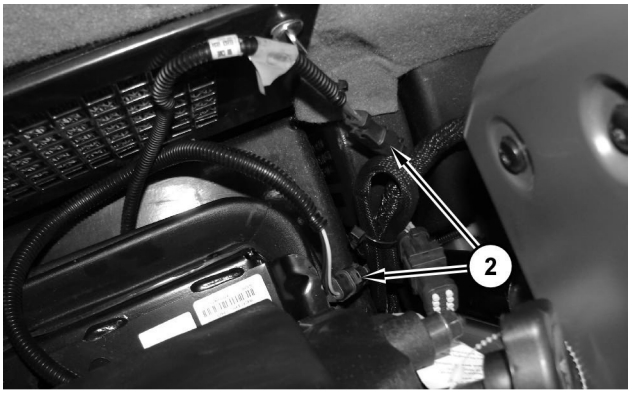

Illustration 885 g01358976

4. Connect harness assemblies (2).

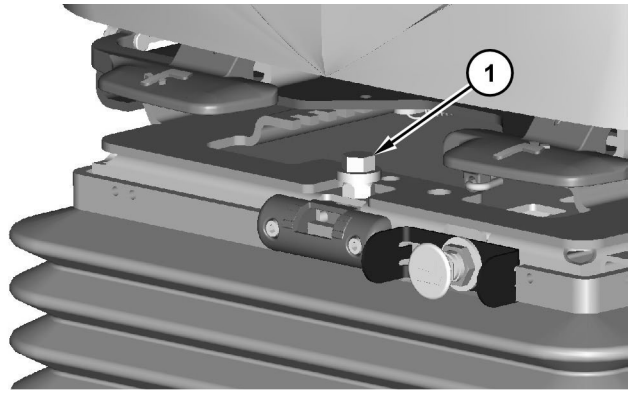

Illustration 886 g01359322

5. Install bolt (1).

i06660672

Cab - Remove

SMCS Code: 7301-011; 7325-011

Removal Procedure

Table 91

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1U-9200	Lever Puller Hoist	1
B	140-7742	Sleeve	2

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Connect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

⚠ WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

2. Recover the air conditioner refrigerant from the air conditioner system. Refer to Service Manual, SENR5664, “Air Conditioning and Heating Systems with R-134a Refrigerant” for the correct procedure. Refer to Special Publication, NEDG5065, “Air Conditioning Tools” for the correct tools.

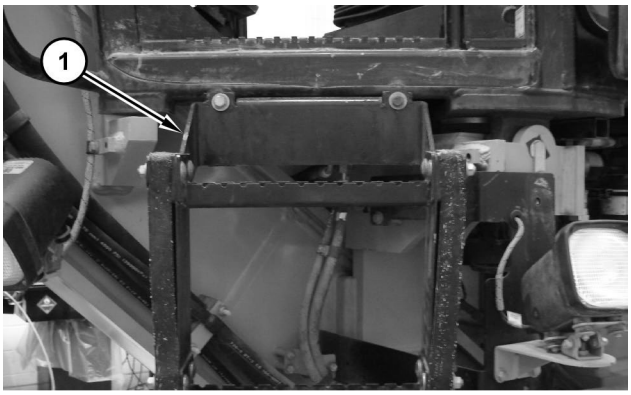

Illustration 887 g01377297

3. Remove ladder (1). Repeat this step for the opposite side.

Illustration 888 g01377374

4. Remove cover (2). Repeat this step for the opposite side.

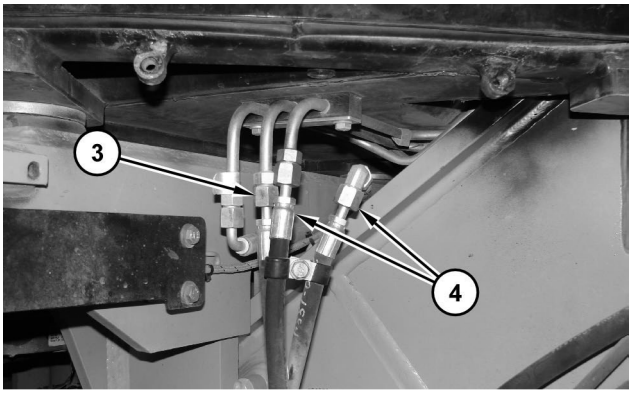

Illustration 889 g01377308

5. Disconnect hose assembly (3) and hose assemblies (4).

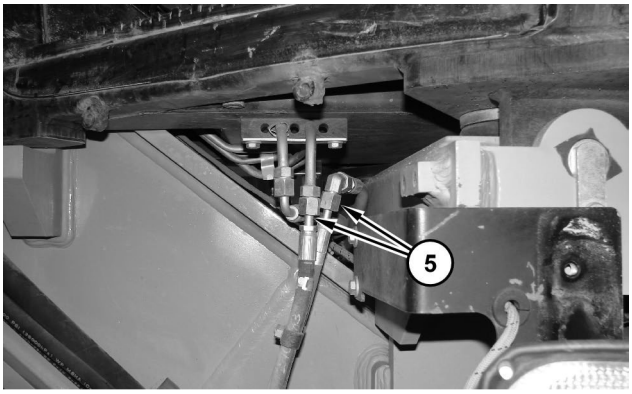

Illustration 890 g01377315

6. Disconnect hose assemblies (5).

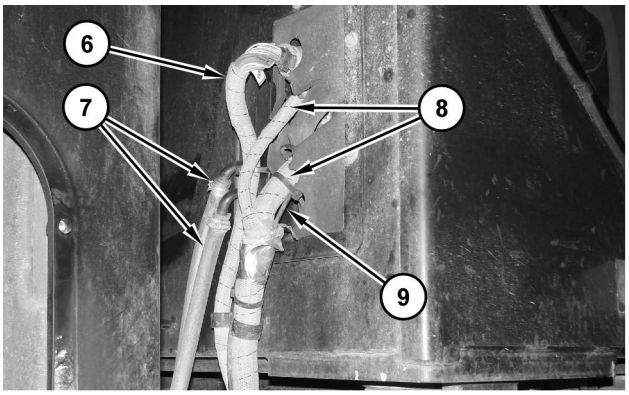

Illustration 891 g01377322

7. Disconnect harness assembly (6). Disconnect hoses (7). Disconnect harness assemblies (8). Disconnect harness assembly (9).

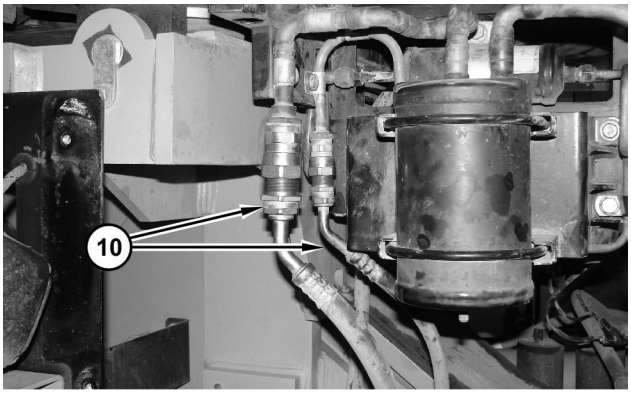

Illustration 892 g01377331

8. Disconnect hose assemblies (10).

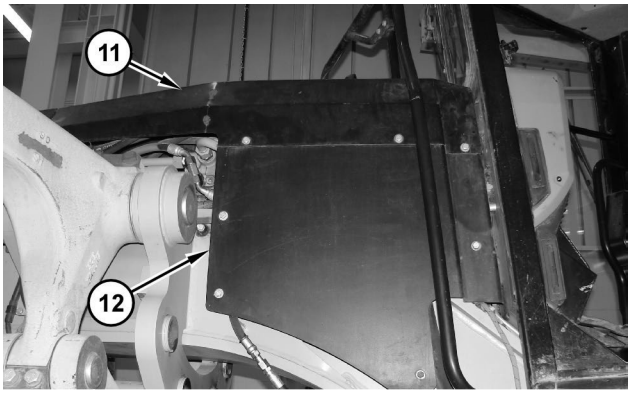

Illustration 893 g01377378

9. Remove cover (11).

10. Remove cover (12). Repeat this step for the opposite side.

Illustration 894 g01377333

11. Disconnect ground strap (13).

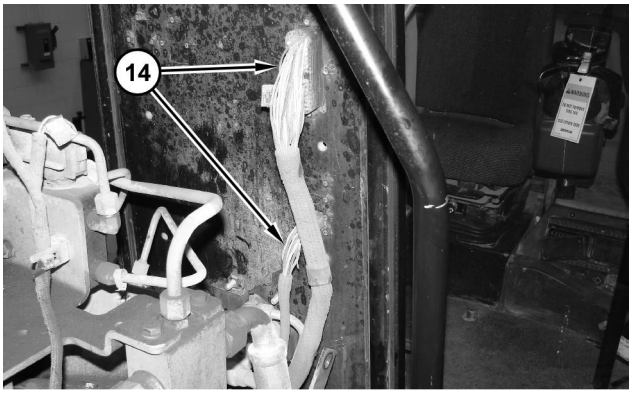

Illustration 895 g01377335

12. Disconnect harness assemblies (14).

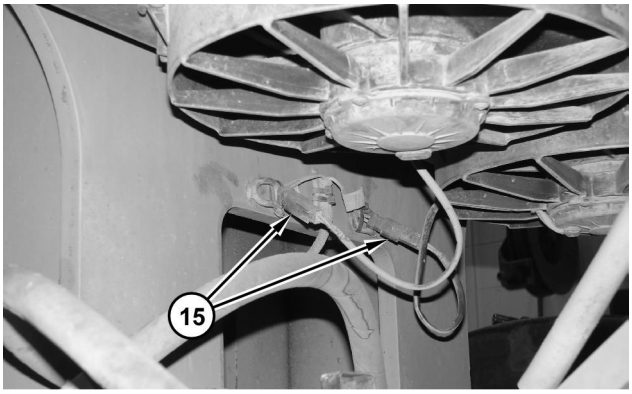

Illustration 896 g01377340

13. Disconnect harness assemblies (15).

Illustration 897 g01377826

14. Attach Tooling (A), Tooling (B), and two suitable lifting devices onto cab (16). The weight of cab (16) is approximately 1500 kg (3310 lb).

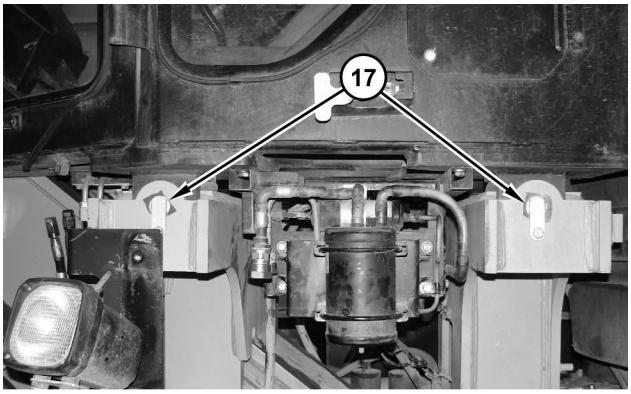

Illustration 898 g01377347

15. Remove pin assemblies (17). Repeat this step for the opposite side.

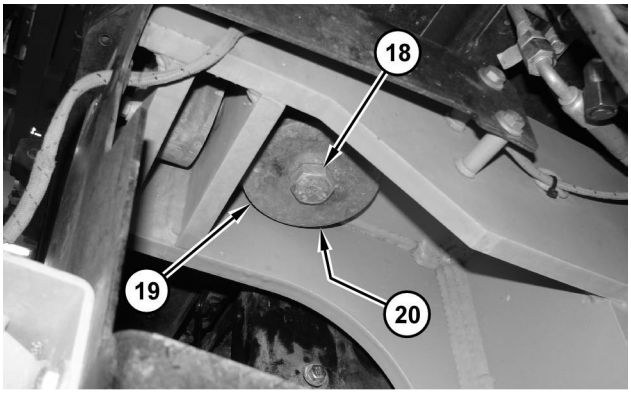

Illustration 899 g01377353

16. Remove bolt (18), washer (19), and mount assembly (20). Repeat this step for the remaining mount assemblies (20).

Illustration 900 g01377831

17. Remove cab (16).

i06660683

Cab - Install

SMCS Code: 7301-012; 7325-012

Installation Procedure

Table 92

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1U-9200	Lever Puller Hoist	1
B	140-7742	Sleeve	2

Illustration 901 g01377826

1. Use Tooling (A), Tooling (B), and two suitable lifting devices to install cab (16). The weight of cab (16) is approximately 1500 kg (3310 lb).

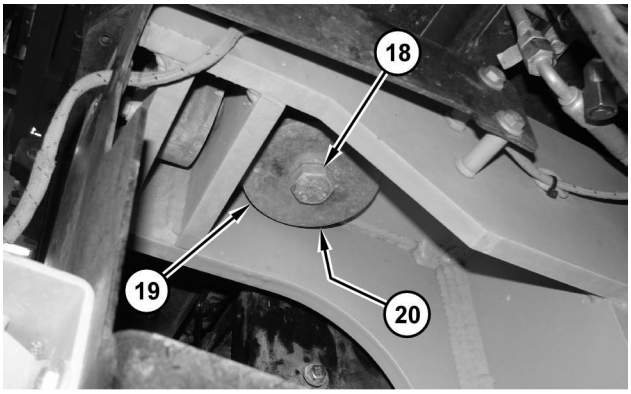

Illustration 902 g01377353

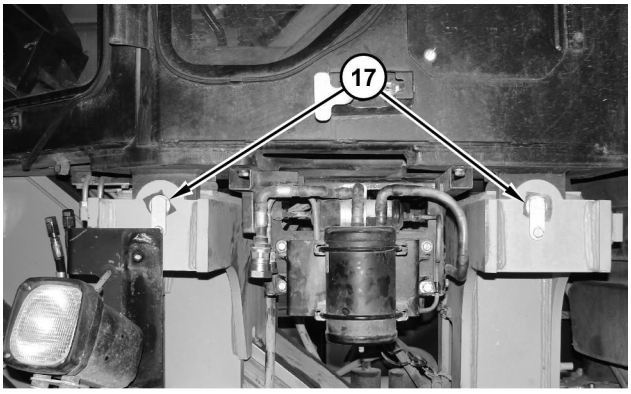

Illustration 903 g01377347

2. Install mount assembly (20), washer (19), and bolt (18) hand tight. Repeat this step for the remaining mount assemblies (20).

3. Install pin assemblies (17). Repeat this step for the opposite side.

4. Tighten bolts (18) to a torque of 200 N·m (148 lb ft) in a cross pattern.

5. Tighten bolts (18) to a final torque of 800 N·m (590 lb ft) in the following sequence.

a. Right Front Bolt

b. Right Rear Bolt

c. Left Rear Bolt

d. Left Front Bolt

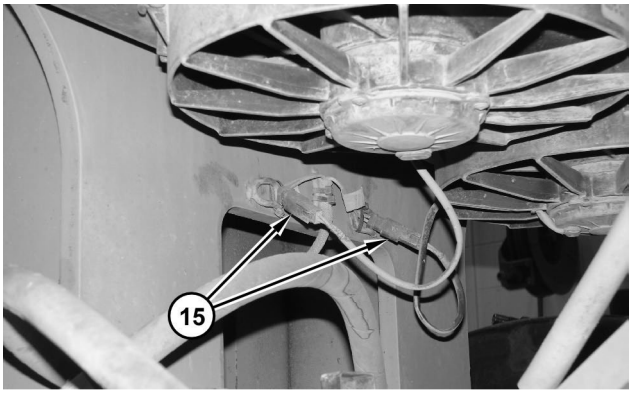

Illustration 904 g01377340

6. Connect harness assemblies (15).

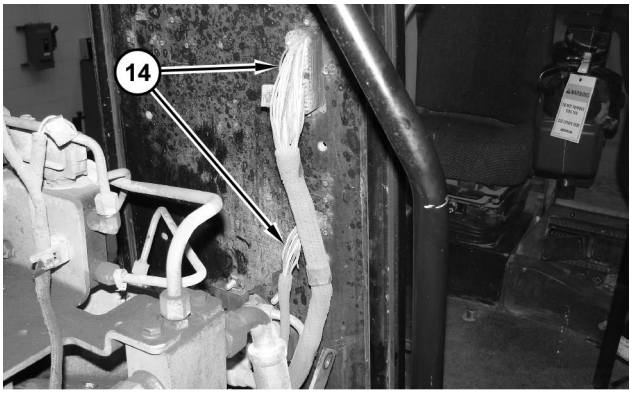

Illustration 905 g01377335

7. Connect harness assemblies (14).

Illustration 906 g01377333

8. Connect ground strap (13).

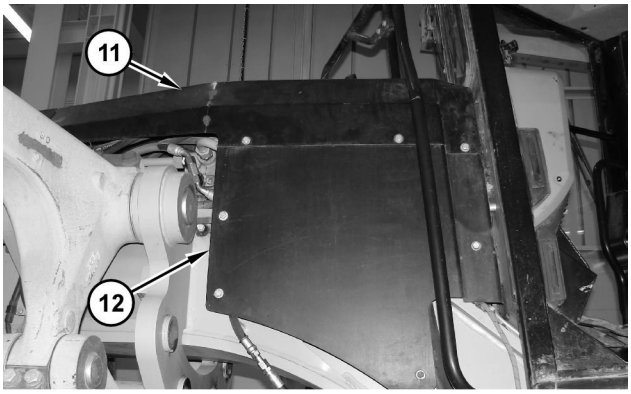

Illustration 907 g01377378

9. Install cover (12). Repeat this step for the opposite side.

10. Install cover (11).

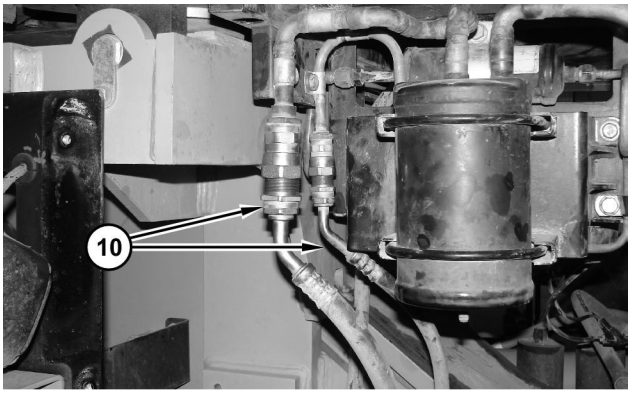

Illustration 908 g01377331

11. Connect hose assemblies (10).

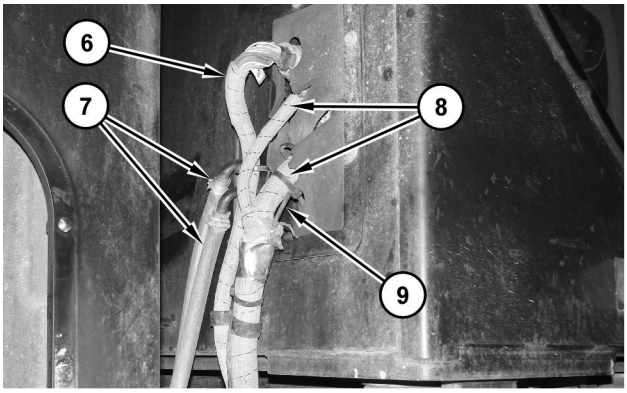

Illustration 909 g01377322

12. Connect harness assembly (9). Connect harness assemblies (8). Connect hoses (7). Connect harness assembly (6).

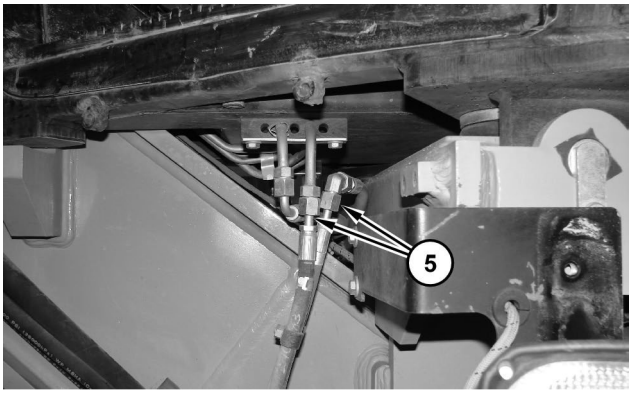

Illustration 910 g01377315

13. Connect hose assemblies (5).

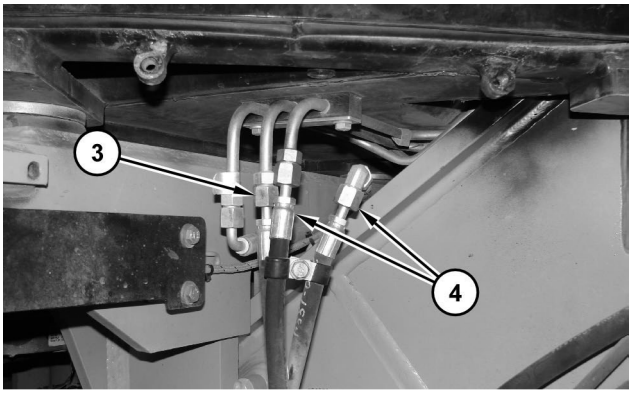

Illustration 911 g01377308

14. Connect hose assemblies (4) and hose assembly (3).

Illustration 912 g01377374

15. Install cover (2). Repeat this step for the opposite side.

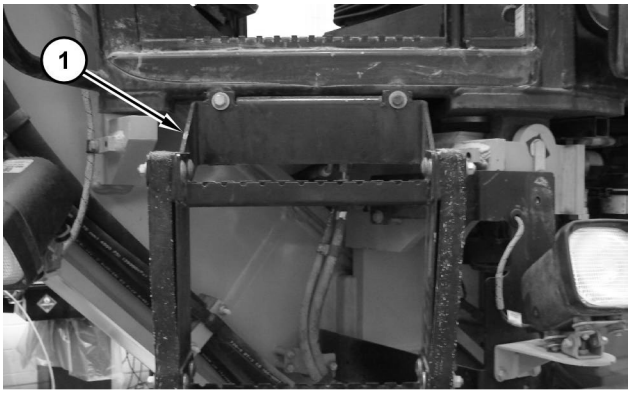

Illustration 913 g01377297

16. Install ladder (1). Repeat this step for the opposite side.

17. Separate the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

18. Charge the air conditioner system. Refer to Service Manual, SENR5664, “Air Conditioning and Heating Systems with R-134a Refrigerant” for the correct procedure. Refer to Special Publication, NEDG5065, “Air Conditioning Tools” for the correct tools.

i05520831

Evaporator Coil and Heater Coil - Remove and Install

SMCS Code: 7304-010-COI; 7343-010

Removal Procedure

Start By:

a. Remove the seat.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Drain the coolant from the cooling system into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, “Cooling System Coolant (ELC) - Change”.

⚠ WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

2. Recover the air conditioner refrigerant from the air conditioner system. Refer to Service Manual, SENR5664, “Air Conditioning and Heating Systems with R-134a Refrigerant” for the procedure. Refer to Dealer Service Tool Catalog, NENG2500, “Air Conditioning Tools” for the correct tools.

Illustration 914 g01359450

3. Remove screws (1) and position fuse panel (2) out of the way.

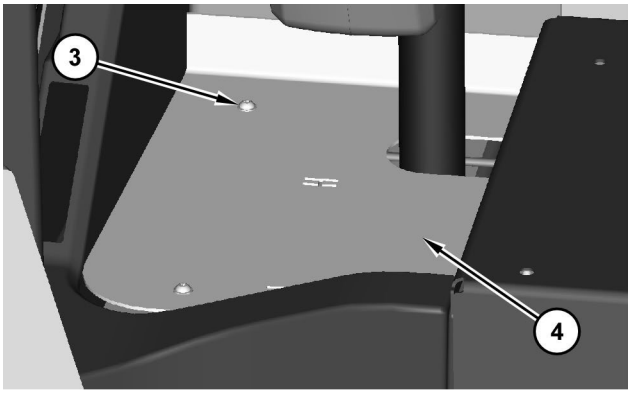

Illustration 915 g01359470

4. Remove screws (3) and plate (4).

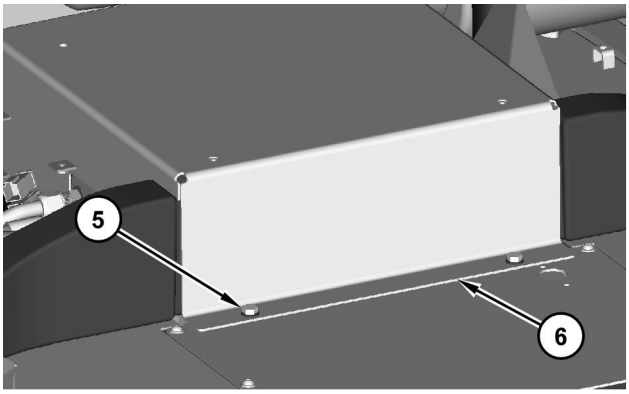

Illustration 916 g01359438

5. Remove bolts (5) in order to remove support assembly (6).

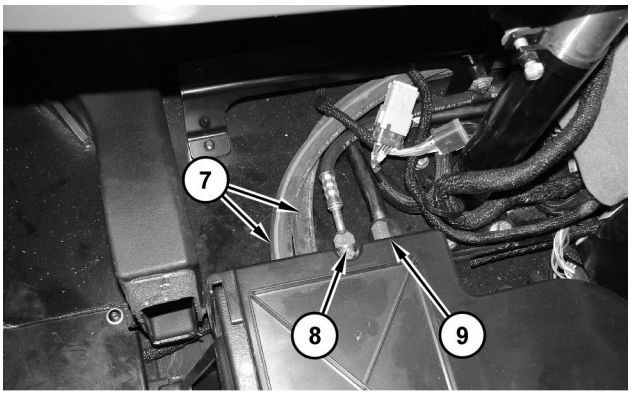

Illustration 917 g01359488

6. Disconnect hoses (7). Disconnect hose assembly (8). Disconnect tube assembly (9).

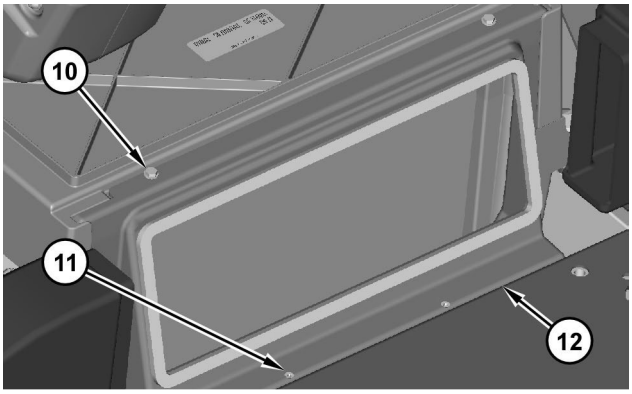

Illustration 918 g01359559

7. Remove bolts (10) and screws (11). Remove duct (12).

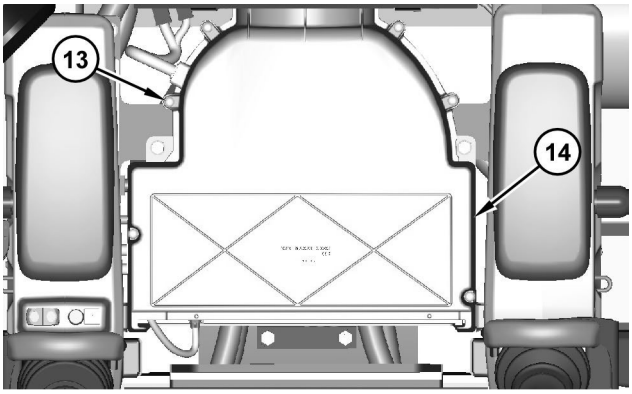

Illustration 919 g01359583

8. Remove screws (13) in order to remove case (14).

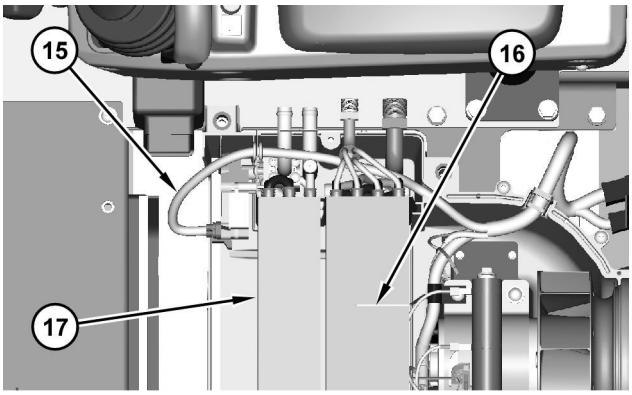

Illustration 920 g01359597

9. Disconnect harness assembly (15). Position harness assembly (15) out of the way. Position thermostat (16) out of the way.

10. Remove air conditioner and heater coil assembly (17).

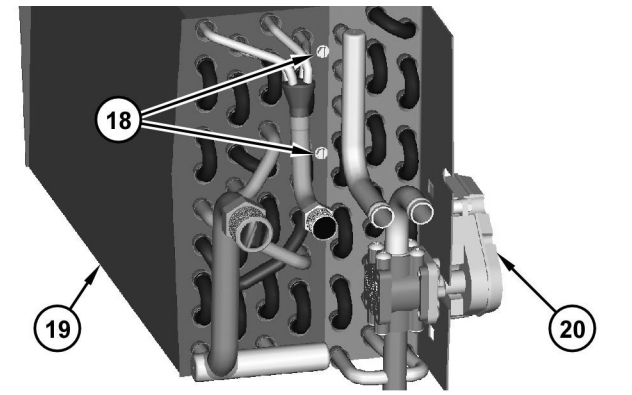

Illustration 921 g01359604

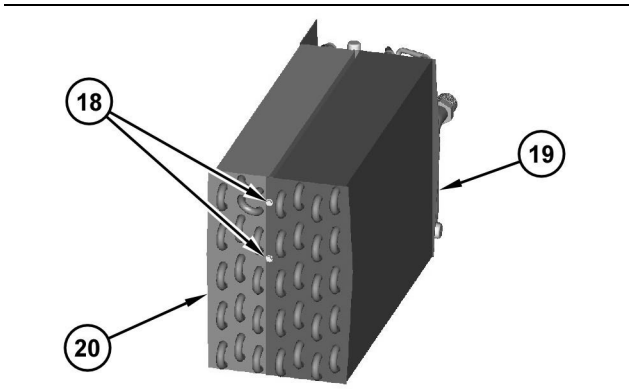

Illustration 922 g01359605

11. Remove screws (18) in order to separate air conditioner coil (19) and heater coil (20).

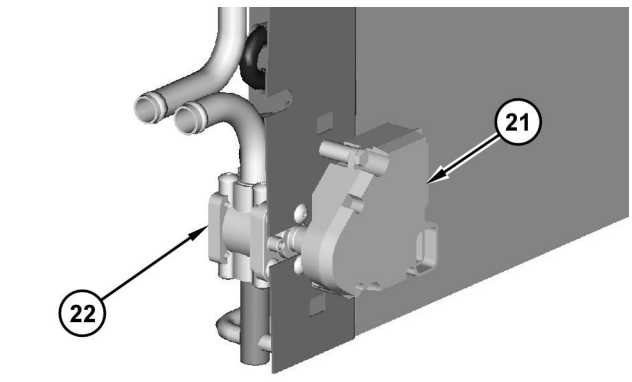

Illustration 923 g01359614

12. Remove actuator (21). Remove water valve (22).

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

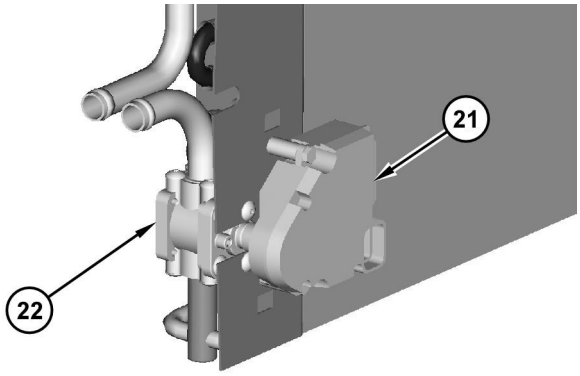

Illustration 924 g01359614

1. Install water valve (22). Install actuator (21).

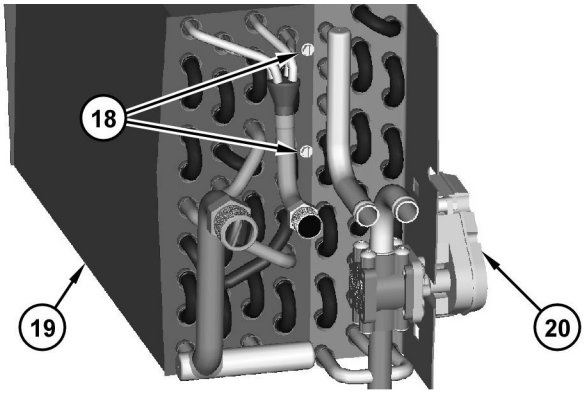

Illustration 925 g01359604

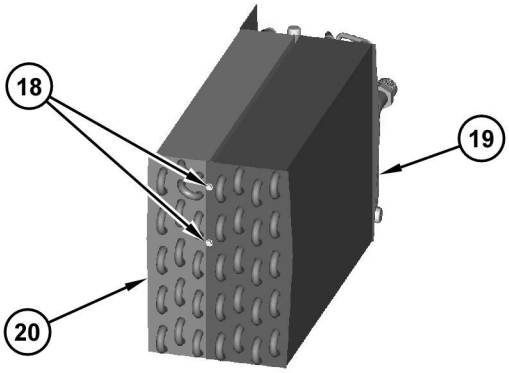

Illustration 926 g01359605

2. Install screws (18) in order to install air conditioner coil (19) onto heater coil (20).

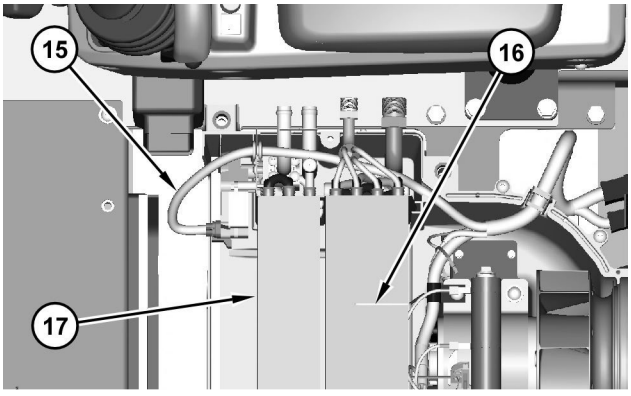

Illustration 927 g01359597

3. Install air conditioner and heater coil assembly (17).

4. Position thermostat (16). Connect harness assembly (15).

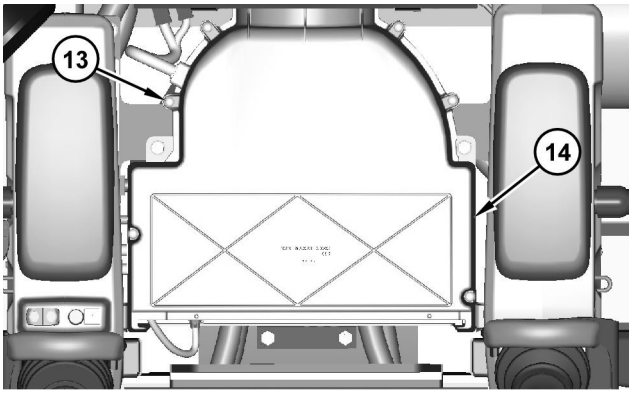

Illustration 928 g01359583

5. Install case (14) and install screws (13).

Note: Ensure that the foam insulation is positioned correctly.

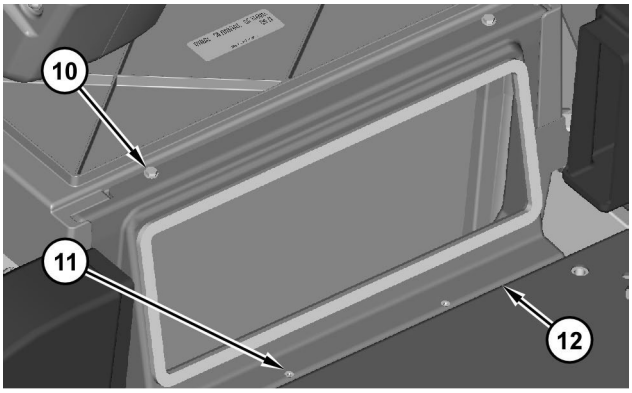

Illustration 929 g01359559

6. Install duct (12). Install screws (11) and bolts (10).

Note: Ensure that the foam insulation is positioned correctly.

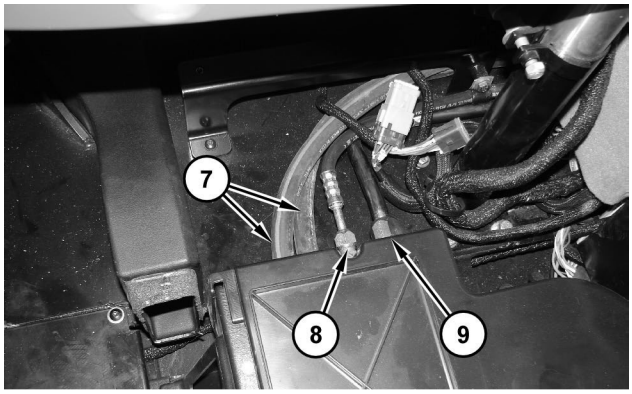

Illustration 930 g01359488

7. Connect tube assembly (9). Connect hose assembly (8). Connect hoses (7).

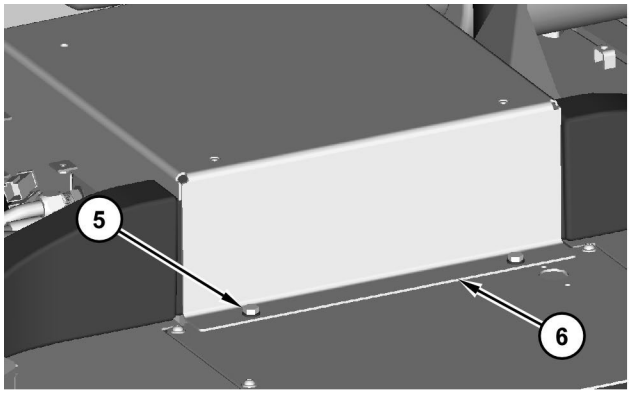

Illustration 931 g01359438

8. Install support assembly (6). Install bolts (5).

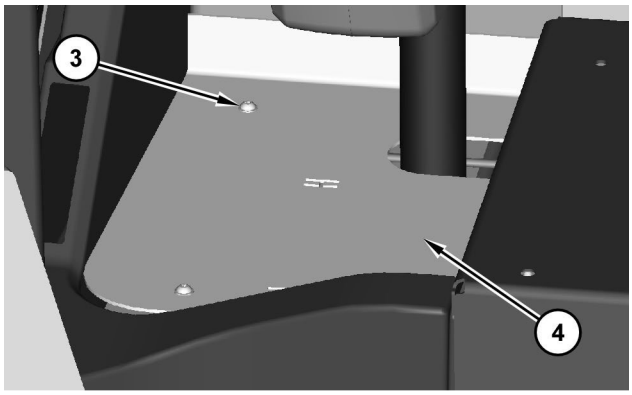

Illustration 932 g01359470

9. Install plate (4). Install screws (3).

Illustration 933 g01359450

10. Position fuse panel (2) and install screws (1).

11. Charge the air conditioner refrigerant from the air conditioner system. Refer to Service Manual, SENR5664, “Air Conditioning and Heating Systems with R-134a Refrigerant” for the procedure. Refer to Dealer Service Tool Catalog, NENG2500, “Air Conditioning Tools” for the tools.

12. Fill the cooling system. Refer to Operation and Maintenance Manual, “Cooling System Coolant (ELC) - Change”.

End By:

a. Install the seat.

i02708718

Blower Motor (Air Conditioner and Heater) - Remove and Install

SMCS Code: 7304-010-FM; 7309-010-FM; 7320-010-FM

Removal Procedure

Start By:

a. Remove the seat. Refer to Disassembly and Assembly, “seat - Remove and Install”.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

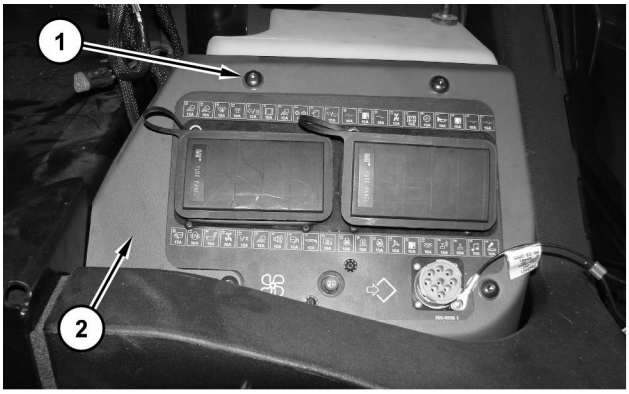

Illustration 934 g01359711

1. Remove screws (1) and position fuse panel (2) out of the way.

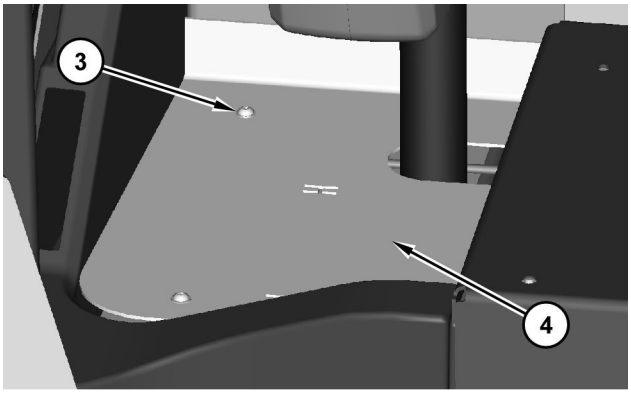

Illustration 935 g01359671

2. Remove screws (3) and remove plate (4).

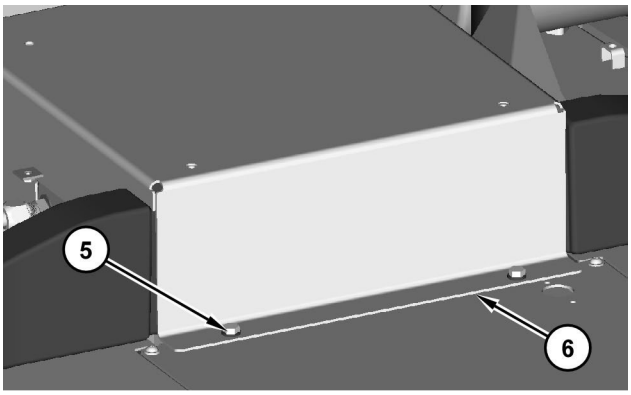

Illustration 936 g01359732

3. Remove bolts (5). Remove support assembly (6).

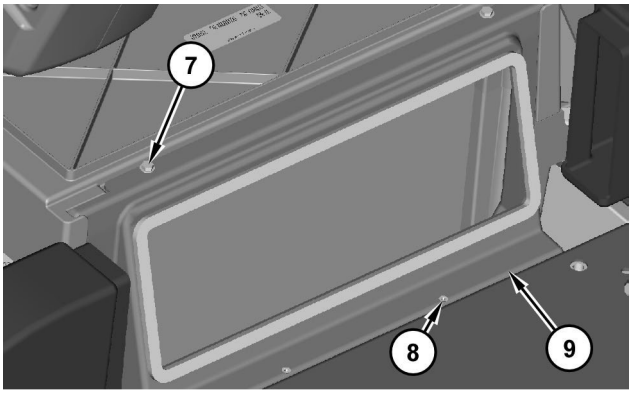

Illustration 937 g01359737

4. Remove bolts (7) and screws (8). Remove duct (9).

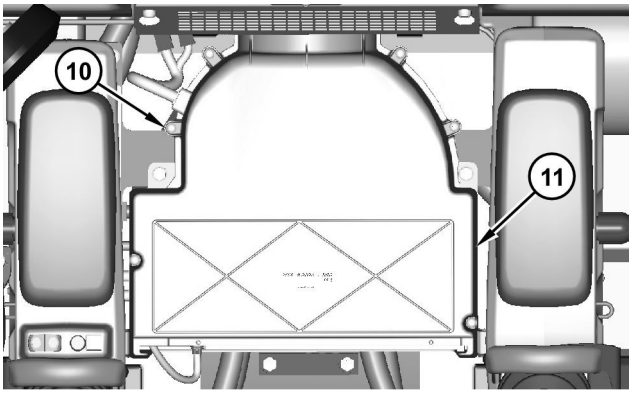

Illustration 938 g01359741

5. Remove screws (10) in order to remove case (11).

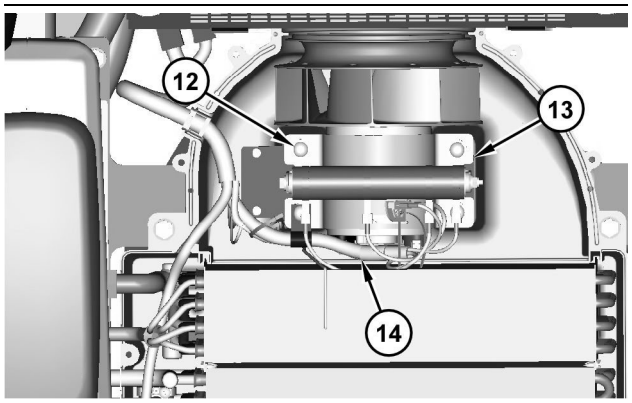

Illustration 939 g01359747

6. Remove screws (12) and position resistor assembly (13) and harness assembly (14) out of the way.

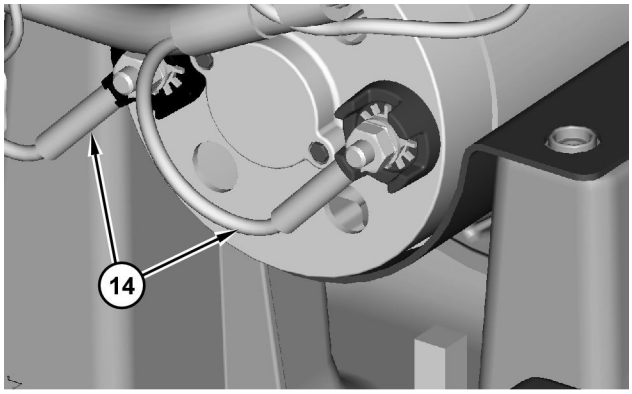

Illustration 940 g01359760

7. Disconnect harness assembly (14).

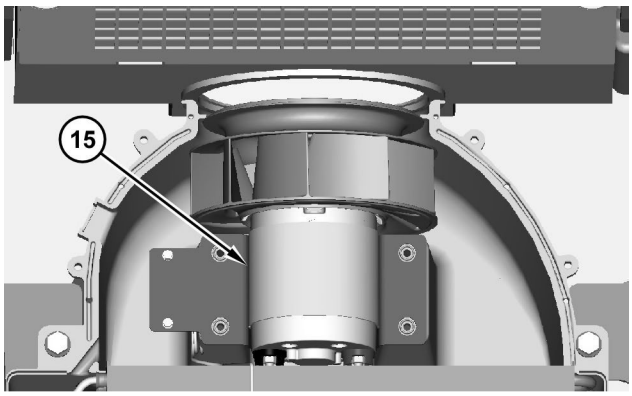

Illustration 941 g01359771

8. Remove blower motor (15).

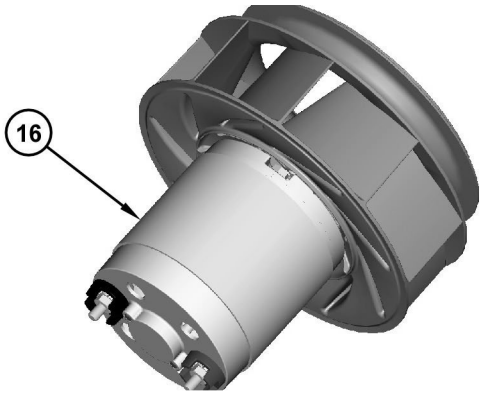

Illustration 942 g01359786

9. Inspect gasket (16) for wear or damage. Replace gasket (16), if necessary.

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

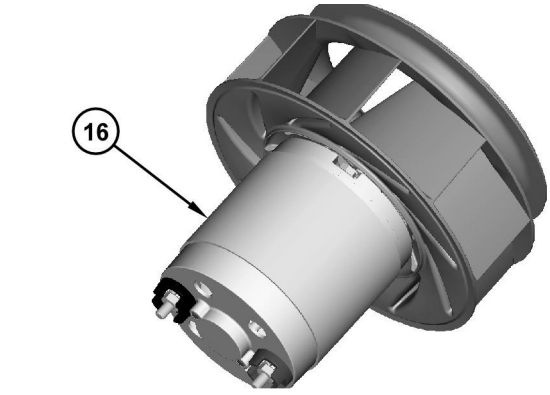

Illustration 943 g01359786

1. Install a new gasket (16), if necessary.

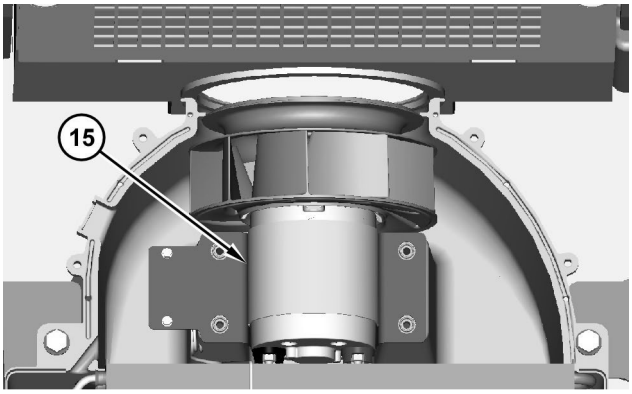

Illustration 944 g01359771

2. Install blower motor (15).

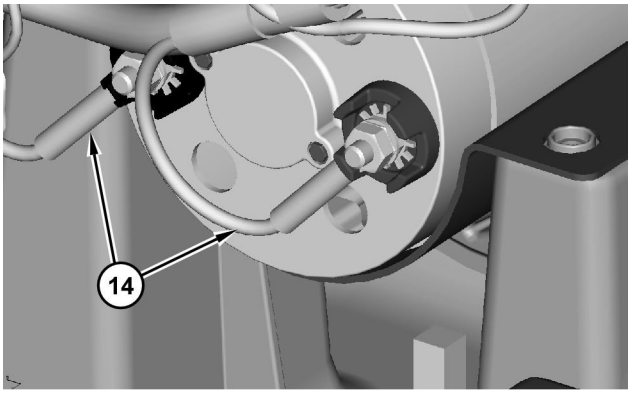

Illustration 945 g01359760

3. Connect harness assembly (14).

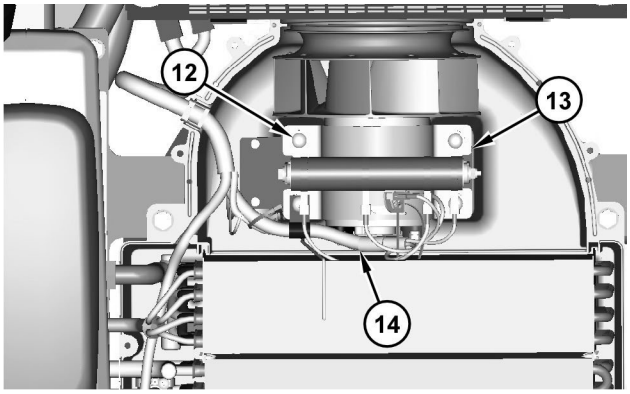

Illustration 946 g01359747

4. Position harness assembly (14) and resistor assembly (13). Install screws (12).

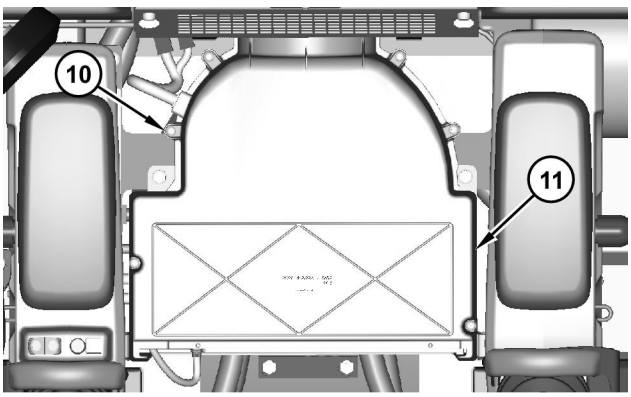

Illustration 947 g01359741

5. Install case (11). Install screws (10).

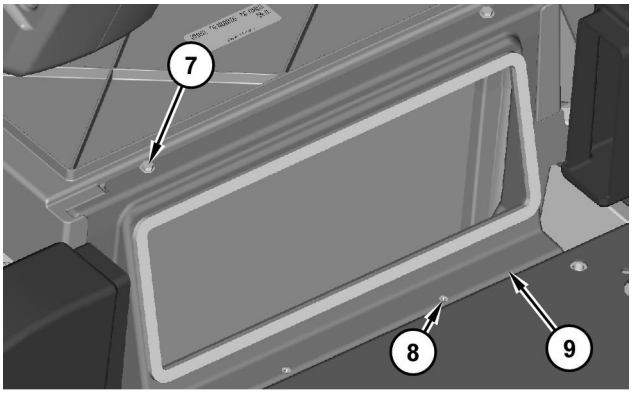

Illustration 948 g01359737

6. Install duct (9). Install screws (8) and bolts (7).

Note: Ensure that the foam insulation is positioned correctly.

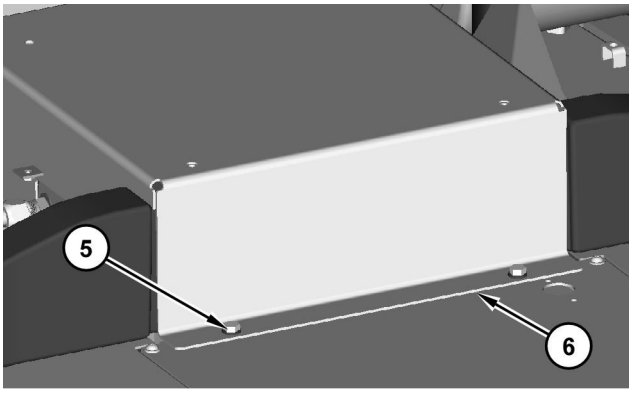

Illustration 949 g01359732

7. Install support assembly (6). Install bolts (5).

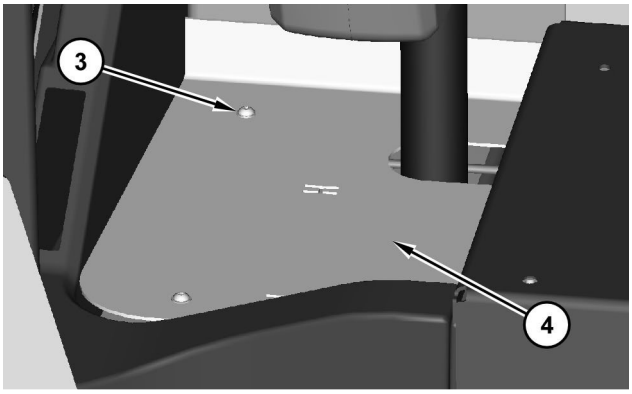

Illustration 950 g01359671

8. Install plate (4). Install screws (3).

Illustration 951 g01359711

9. Position fuse panel (2). Install screws (1).

End By:

a. Install the seat. Refer to Disassembly and Assembly, “seat - Remove and Install”.

i02766798

Fuel Tank - Remove

SMCS Code: 1273-011

Removal Procedure

Start By:

a. Remove the engine enclosure. Refer to Disassembly and Assembly, “Engine Enclosure (Hood) - Remove”.

b. Remove the secondary steering motor. Refer to Disassembly and Assembly, “Secondary Steering Pump and Motor - Remove and Install”.

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.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Connect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

2. Drain the fuel tank into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, “Fuel Tank Water and Sediment - Drain”.

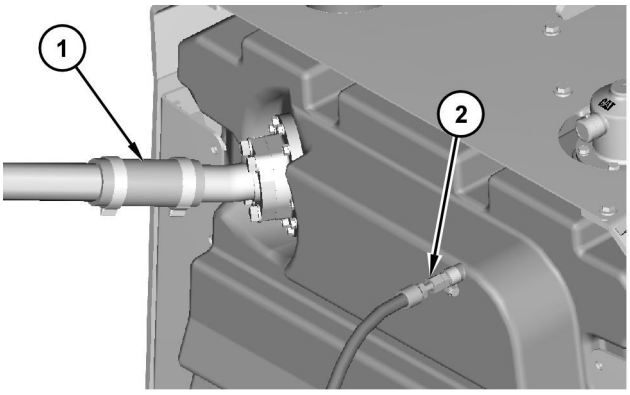

Illustration 952 g01384401

3. Remove hose (1). Disconnect hose assembly (2).

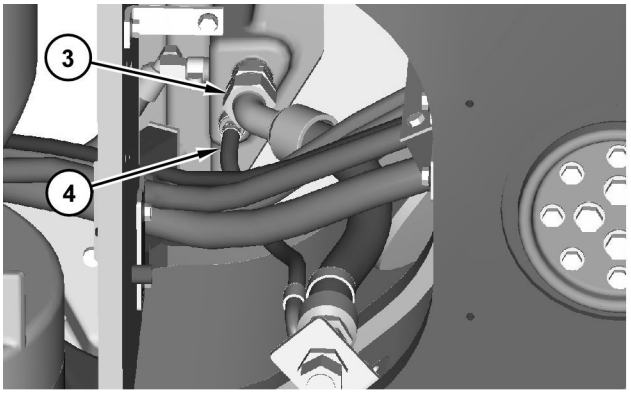

Illustration 953 g01384405

4. Disconnect hose assembly (3). Disconnect hose (4).

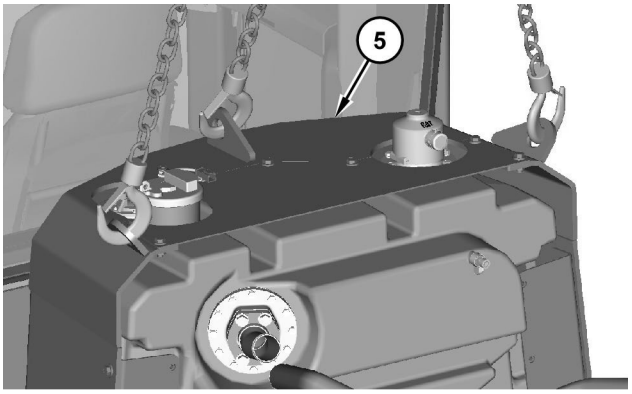

Illustration 954 g01384453

5. Attach a suitable lifting device onto fuel tank (5). The weight of fuel tank (5) is approximately 231 kg (510 lb).

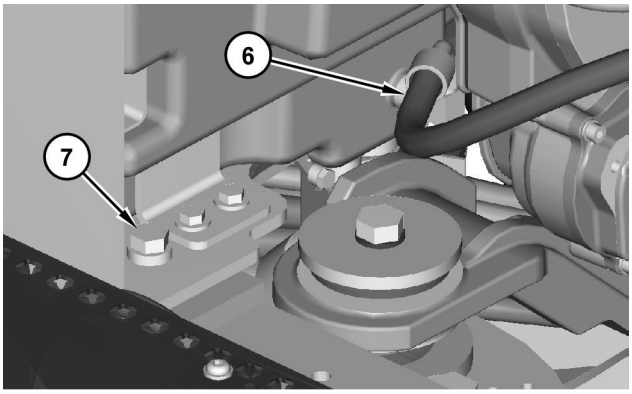

Illustration 955 g01384412

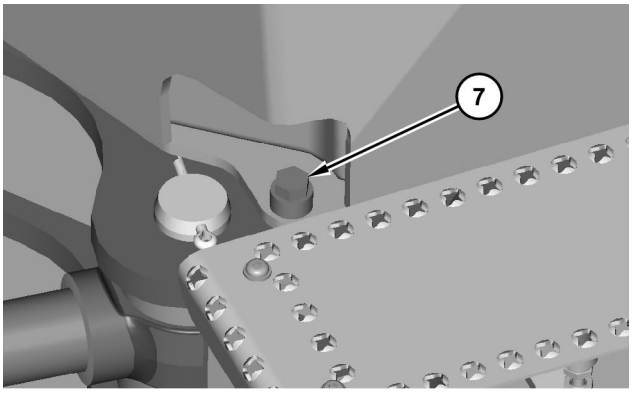

Illustration 956 g01386121

6. Disconnect hose assembly (6).

7. Remove bolts (7). Repeat this step for the opposite side.

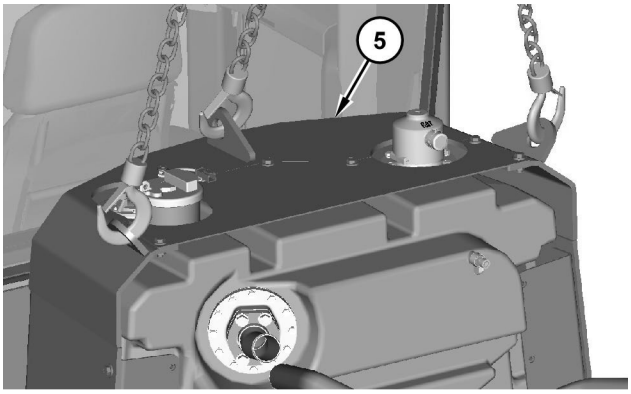

Illustration 957 g01384453

8. Remove fuel tank (5).

i02766800

Fuel Tank - Install

SMCS Code: 1273-012

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

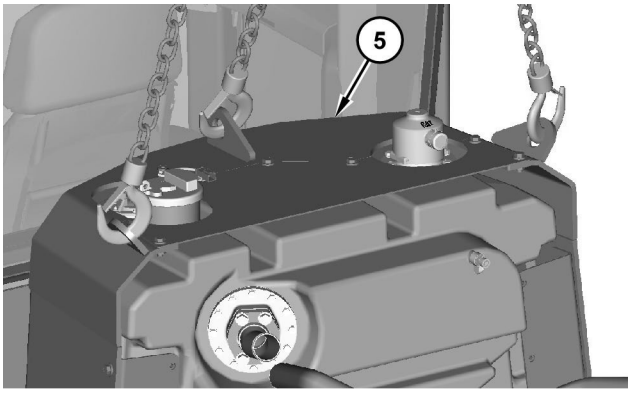

Illustration 958 g01384453

1. Use a suitable lifting device in order to install fuel tank (5). The weight of fuel tank (5) is approximately 231 kg (510 lb).

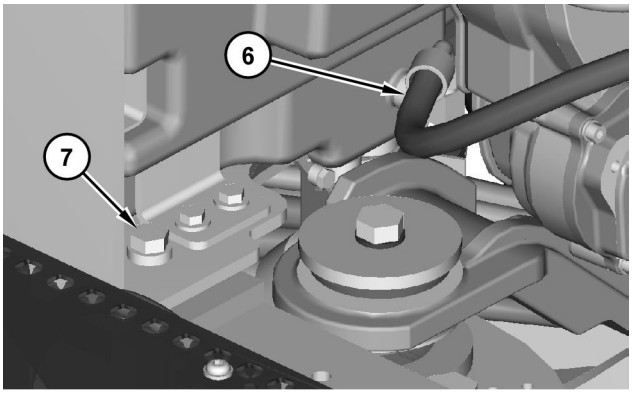

Illustration 959 g01384412

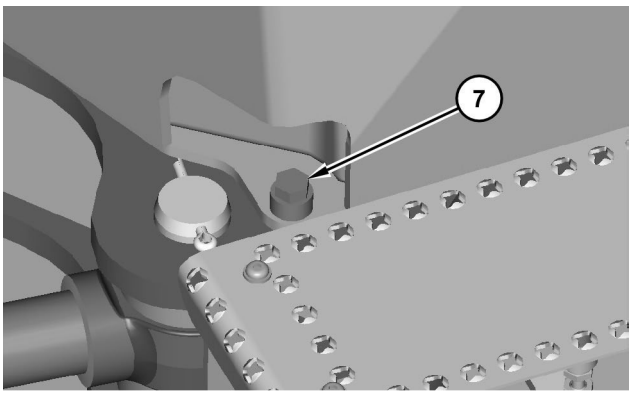

Illustration 960 g01386121

2. Install bolts (7). Repeat this step for the opposite side.

3. Connect hose assembly (6).

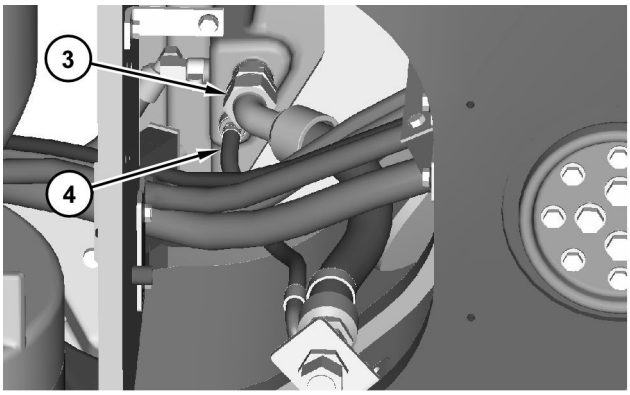

Illustration 961 g01384405

4. Connect hose (4). Connect hose assembly (3).

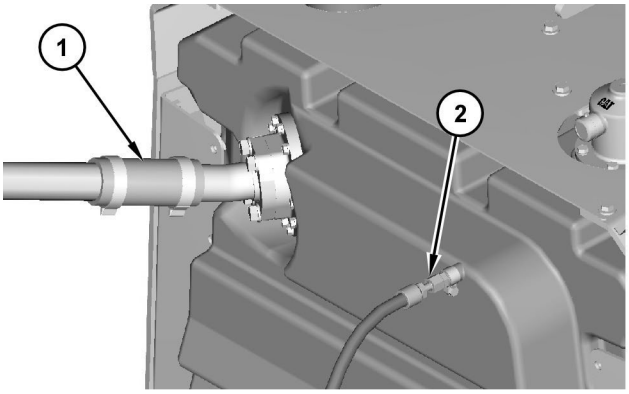

Illustration 962 g01384401

5. Connect hose assembly (2). Install hose (1).

6. Fill the fuel tank. Refer to Operation and Maintenance Manual, “Capacities - Refill”.

End By:

a. Install the secondary steering motor. Refer to Disassembly and Assembly, “Secondary Steering Pump and Motor - Remove and Install”.

b. Install the engine enclosure. Refer to Disassembly and Assembly, “Engine Enclosure (Hood) - Install”.

i07248836

Front Frame from Rear Frame (Articulating Hitch) - Separate

SMCS Code: 7051-076; 7057-011; 7100-011

Separation Procedure

Table 93

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	425-0952	Chock	8
B	504-9790	Lift Gp (60 Hz)(1)	2
	OR		
	504-9792	Lift Gp (50 Hz)(2)	2
C	439-5575	Hydraulic Jack	1
D	1P-1837	Bearing Puller Adapter	1
	1P-1839	Bearing Puller Adapter	1
	6V-3170	Double Acting Cylinder	1

(continued)

(Table 93, contd)

	4C-9634	Puller Stud	1
	4K-0684	Hard Washer	1
	9U-6832	Nut	1
	FT-2549	Sleeve	1
E	1P-1837	Bearing Puller Adapter	1
	1P-1838	Bearing Puller Adapter	1
	6V-3170	Double Acting Cylinder	1
	4C-9634	Puller Stud	1
	4K-0684	Hard Washer	1
	9U-6832	Nut	1
	8B-7555	Adapter	2
	0S-1602	Bolt	2
F	6V-3142	Plate	1

(1) High-Voltage (480V) Low-Voltage (240V)
(2) High-Voltage (400V) Low-Voltage (200V)

Start By:

a. Remove the ripper.

b. Remove the engine enclosure.

c. Remove the drive shaft.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and helps to keep contaminants from entering the system.

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.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Connect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

2. Lower the blade to the ground.

3. Turn the battery disconnect switch into the OFF position. Refer to Operation and Maintenance Manual, “Battery Disconnect Switch”.

⚠ WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

⚠ WARNING

Follow the recommended procedure for removal and installation of tires and or wheel assemblies.

Ensure that the machine and tire and or wheel assembly are properly supported at all times.

Improper procedures that are used to remove and install tires and or wheel assemblies can result in personal injury or death.

4. Recover the air conditioner refrigerant from the air conditioner system. Refer to Service Manual, SENR5664, “Air Conditioning and Heating Systems with R-134a Refrigerant” for the correct procedure. Refer to Dealer Service Tool Catalog, NENG2500, “Air Conditioning Tools” for the correct tools.

5. Release the system pressure. Refer to Operation and Maintenance Manual, “System Pressure - Release”.

6. Drain the hydraulic system into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, “Capacities - Refill”. Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change”.

7. Drain the engine coolant into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, “Cooling System Extended Life Coolant - Change”.

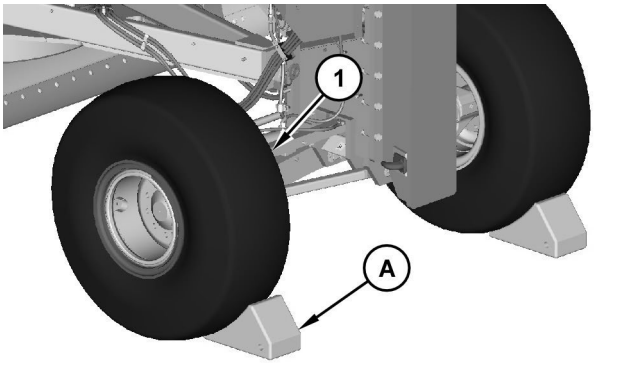

Illustration 963 g01382865

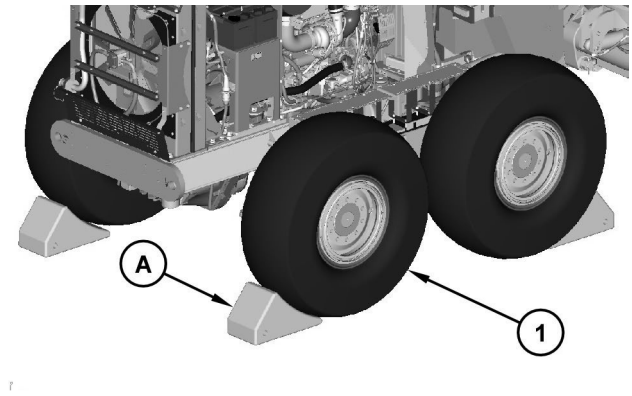

Illustration 964 g01382869

8. Use Tooling (A) to chock wheels (1). Repeat this step for the opposite side.

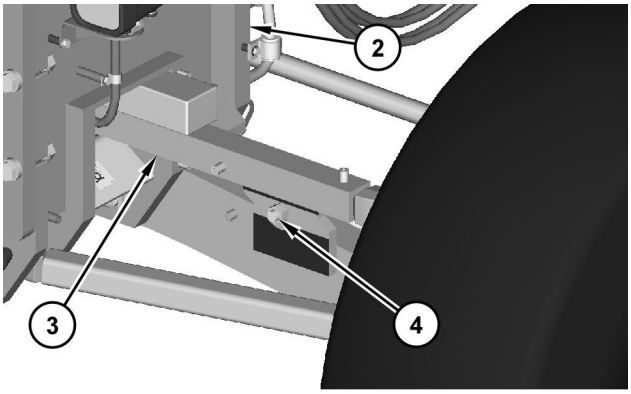

Illustration 965 g01382973

9. Install suitable blocking between front frame (2) and wheel lean bar (3). Install lock pin (4).

Illustration 966 g01382978

10. Remove guard (5). Repeat this step for the opposite side.

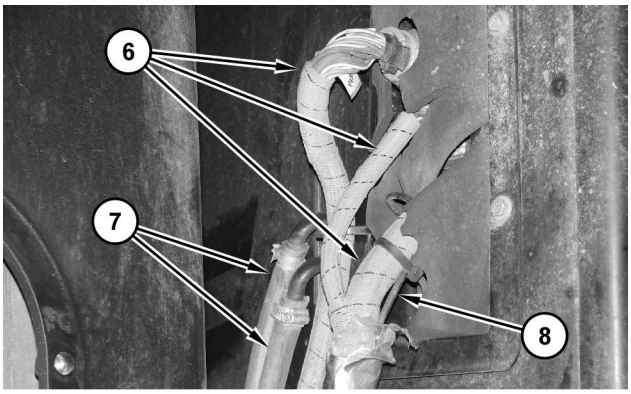

Illustration 967 g01383014

11. Disconnect harness assemblies (6) and remove the connecting hardware. Disconnect hoses (7). Disconnect harness assembly (8).

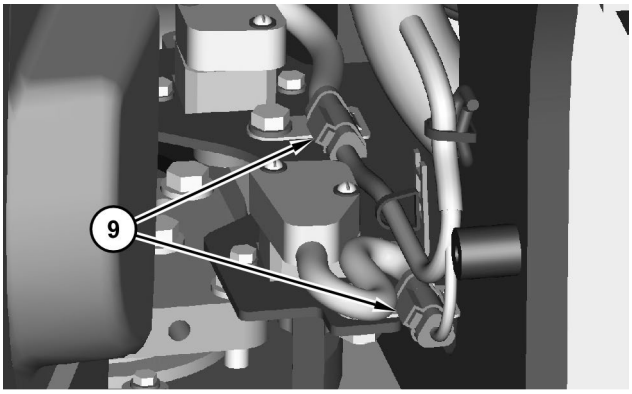

Illustration 968 g01383018

12. Disconnect harness assemblies (9) and remove the connecting hardware.

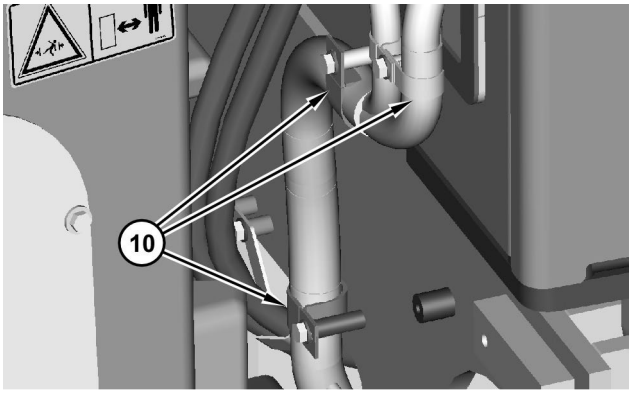

Illustration 969 g01383069

13. Remove clips (10).

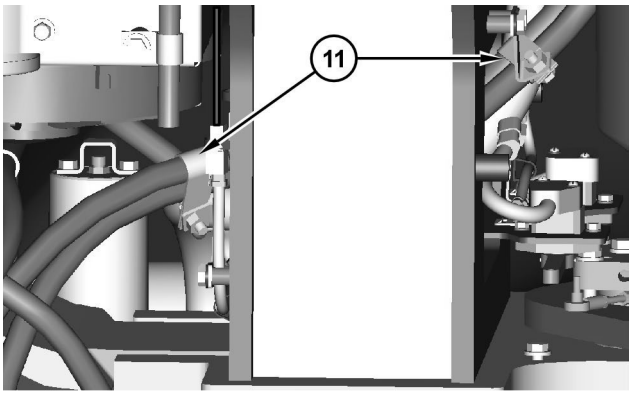

Illustration 970 g01383079

14. Remove clips (11).

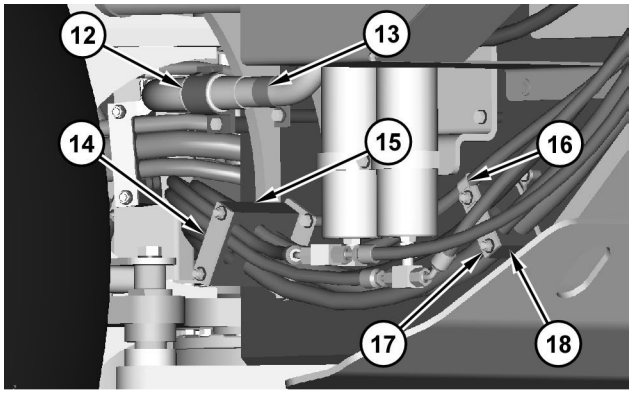

Illustration 971 g01383083

15. Remove clips (12) and clip (13). Remove plate (14) and blocks (15). Remove clip (16). Remove plate (17) and blocks (18).

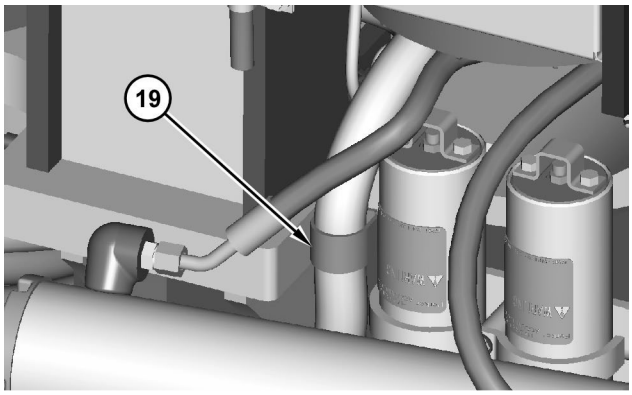

Illustration 972 g01383104

16. Remove clip (19).

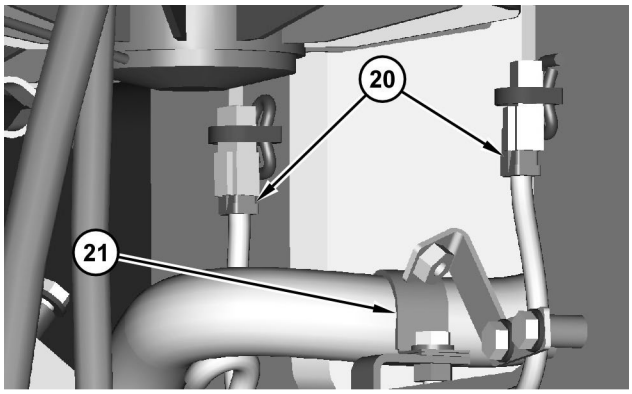

Illustration 973 g01383110

17. Disconnect harness assemblies (20). Remove clip (21).

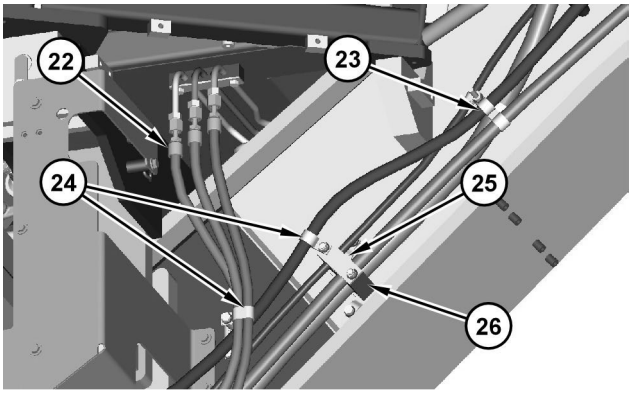

Illustration 974 g01383127

18. Disconnect hose assembly (22). Remove clips (23) and clips (24). Remove plate (25) and blocks (26).

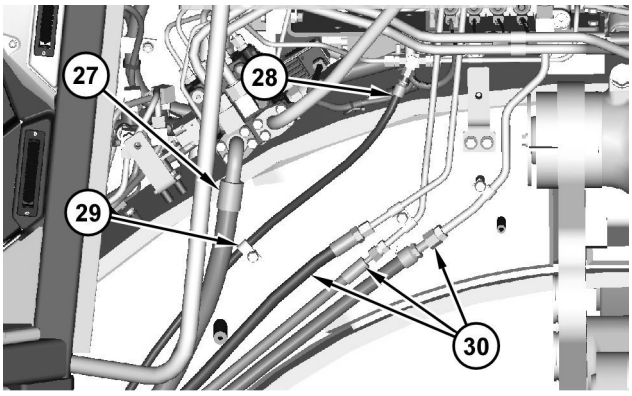

Illustration 975 g01383130

19. Disconnect hose assembly (27) and hose assembly (28). Remove clip (29). Disconnect hose assemblies (30).

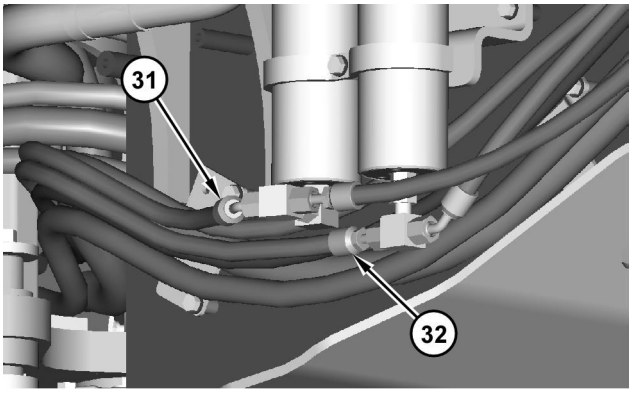

Illustration 976 g01383150

20. Disconnect hose assembly (31) and hose assembly (32).

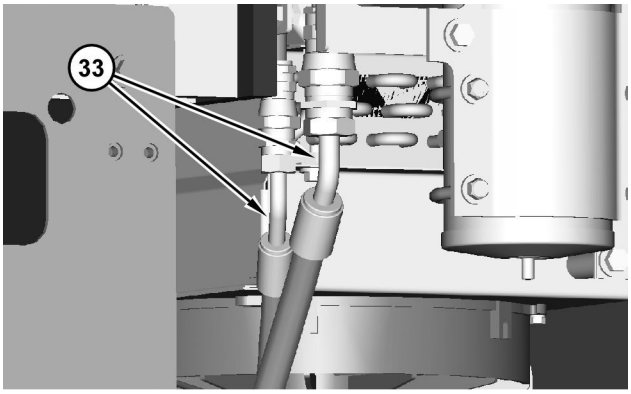

Illustration 977 g01383157

21. Disconnect hose assemblies (33).

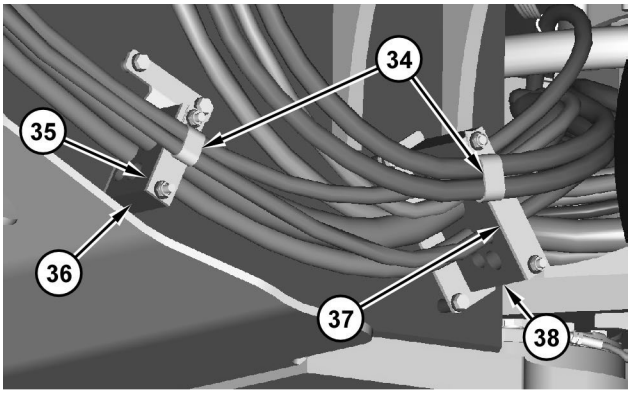

Illustration 978 g01383161

22. Remove clips (34). Remove plate (35) and blocks (36). Remove plate (37) and blocks (38).

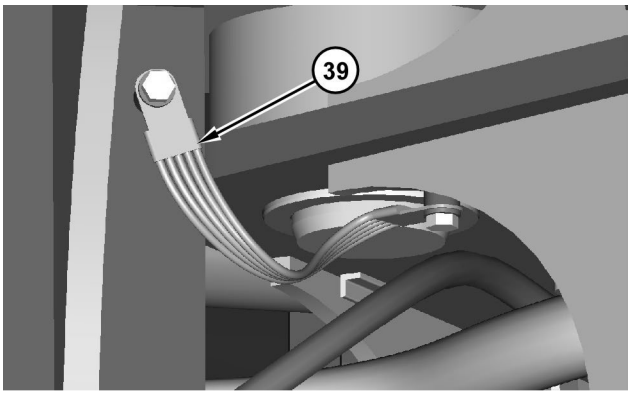

Illustration 979 g01383175

23. Disconnect ground strap (39).

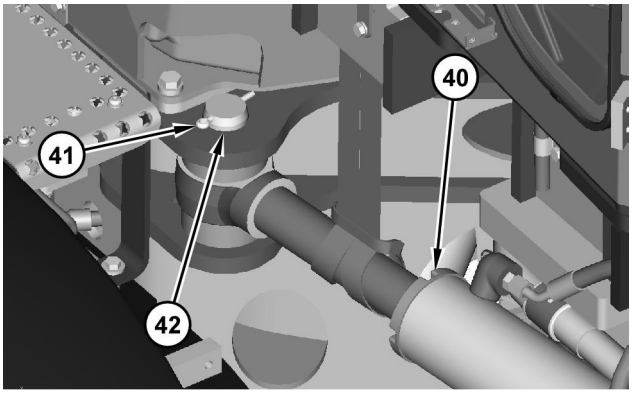

Illustration 980 g01383176

24. Attach a suitable lifting device onto articulation cylinder (40). Remove cotter pin (41). Remove pin assembly (42). Position articulation cylinder (40) out of the way. Repeat this step for the remaining articulation cylinder (40).

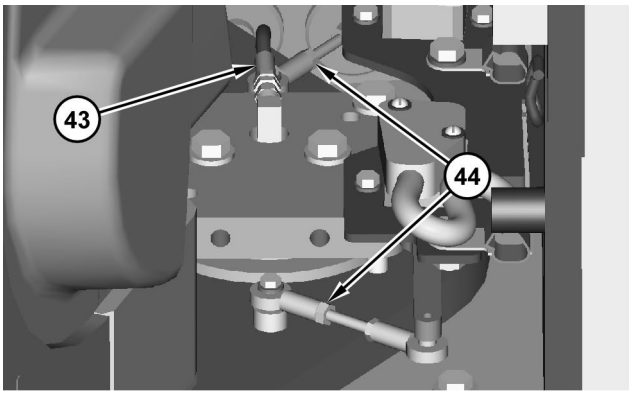

Illustration 981 g01383360

25. Disconnect hose assembly (43). Disconnect link assemblies (44).

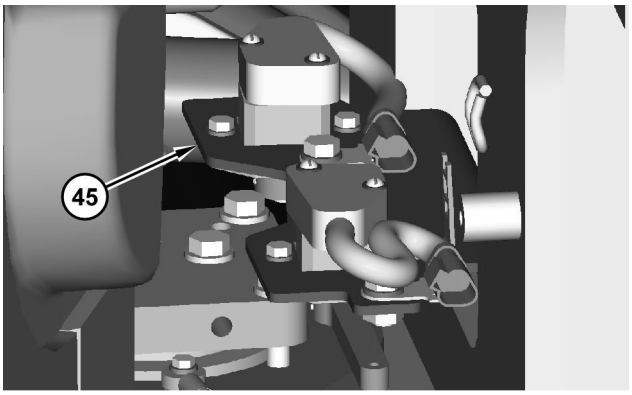

Illustration 982 g01383374

26. Remove bracket assembly (45).

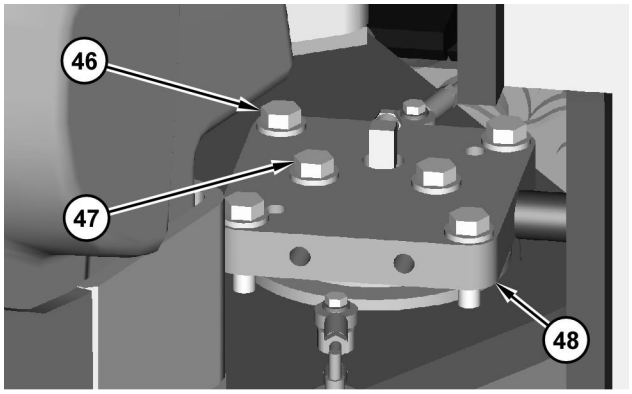

Illustration 983 g01383378

27. Remove bolts (46). Remove bolts (47). Remove cover (48).

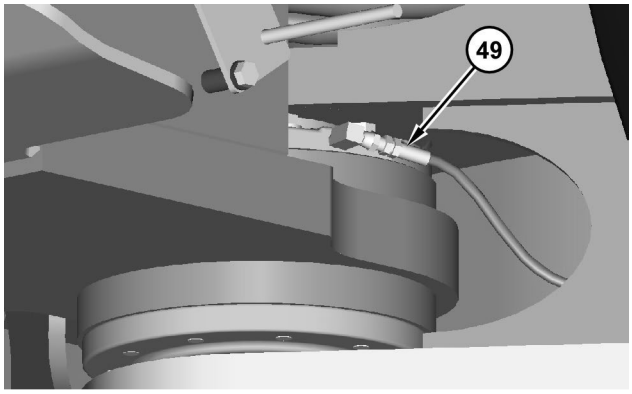

Illustration 984 g01383619

28. Disconnect hose assembly (49).

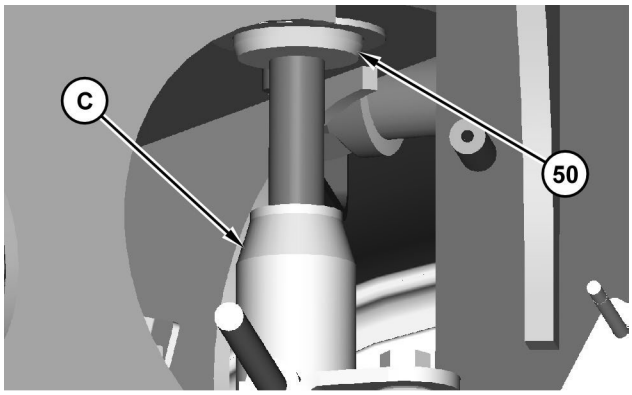

Illustration 985 g01383432

29. Use Tooling (C) and a suitable lifting device to remove pin (50).

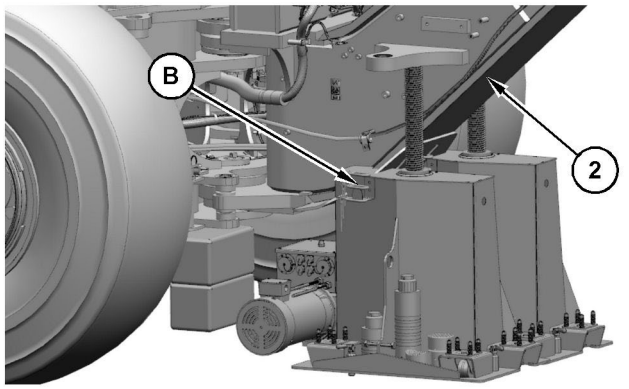

Illustration 986 g06265486

Typical Example

30. Position Tooling (B) and suitable blocking to support front frame (2) as shown in Illustration 986 . Refer to Tool Operating Manual, NEHS1303 for more information on Tooling (B).

31. Disconnect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

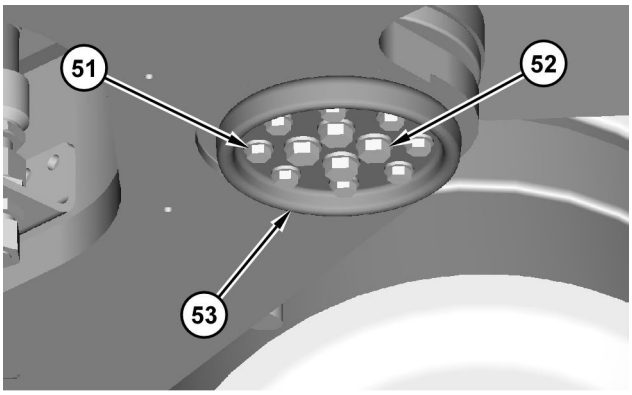

Illustration 987 g01383449

32. Remove bolts (51) and bolts (52). Remove lock plate (53).

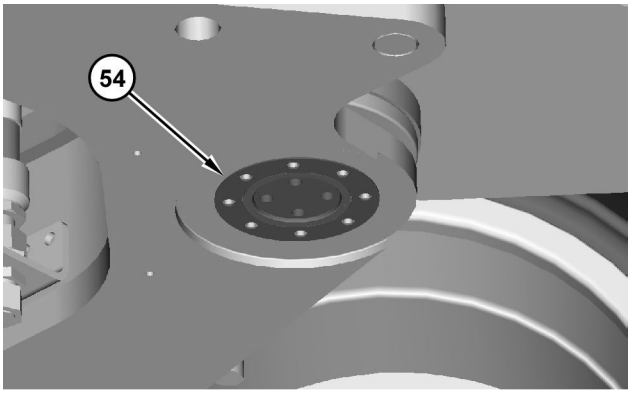

Illustration 988 g01383454

33. Remove shims (54).

Note: Note the quantity and the order of shims (54) for installation purposes.

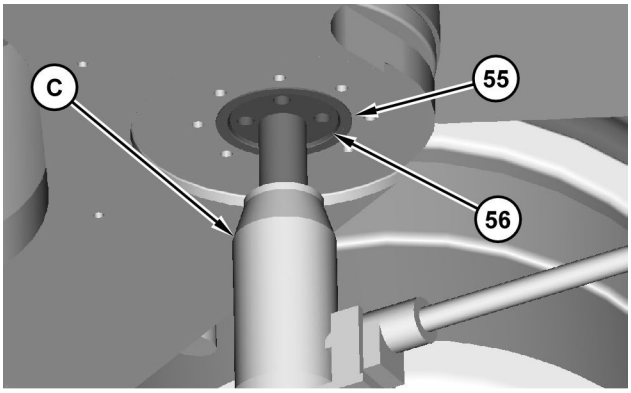

Illustration 989 g01383462

34. Remove spacer (55). Use Tooling (C) to remove pin (56).

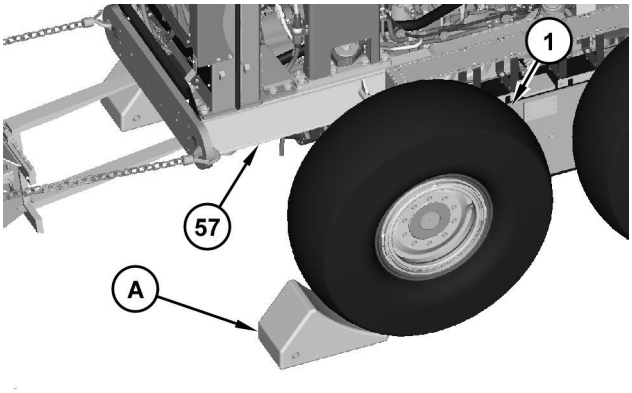

Illustration 990 g01383497

35. Position a suitable lift truck at the rear of rear frame (57). Attach two suitable lifting devices onto the rear frame and the forks. Remove Tooling (A) from rear wheels (1).

36. Use the suitable lift truck to separate rear frame (56) from the front frame.

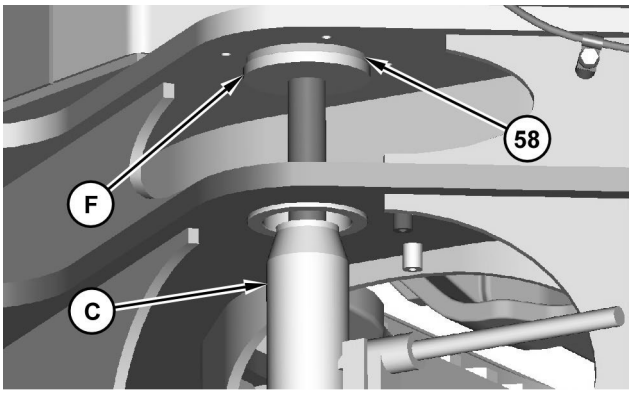

Illustration 991 g01383541

37. Use Tooling (C) and Tooling (F) to remove collar (58).

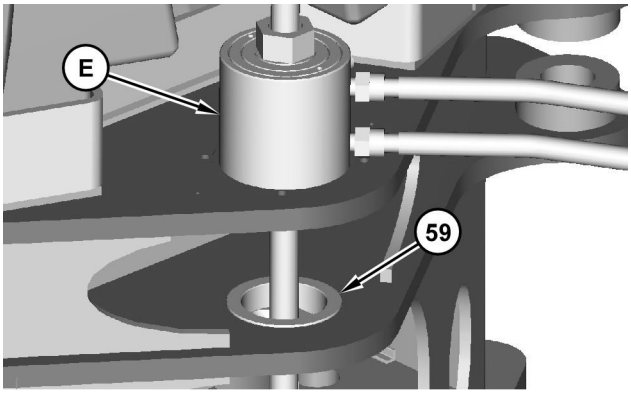

Illustration 992 g01383543

38. Use Tooling (E) to remove bearing sleeve (59).

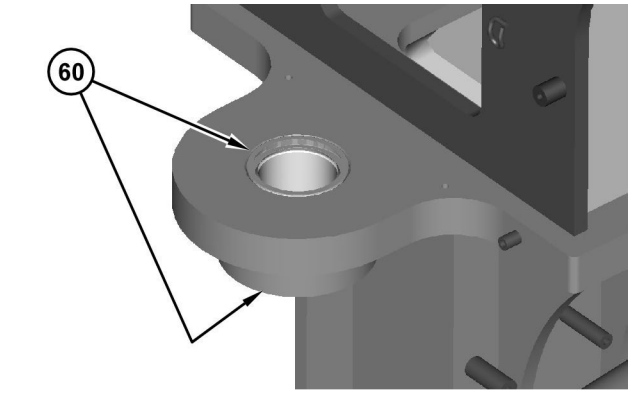

Illustration 993 g01383553

39. Remove lip seals (60).

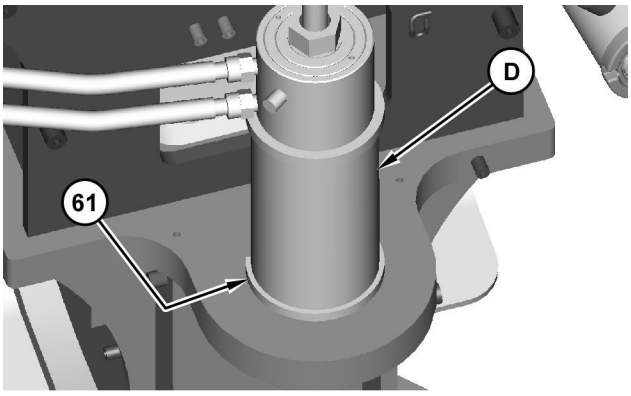

Illustration 994 g01383558

40. Use Tooling (D) to remove bearing (61).

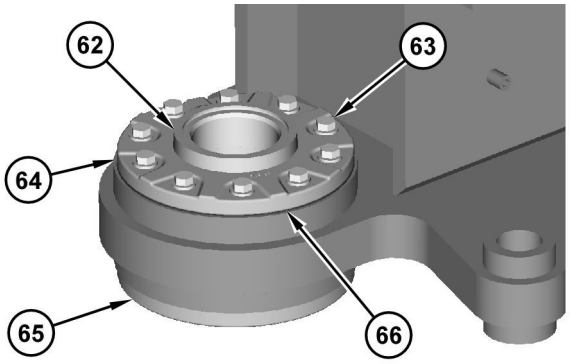

Illustration 995 g01383564

41. Remove spacer (62). Remove bolts (63). Remove lower cap (65). Remove upper cap (64). Remove shims (66).

Note: Note the quantity and the order of shims (66) for installation purposes.

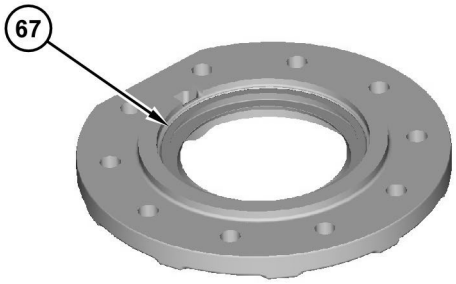

Illustration 996 g01383568

42. Remove lip seal (67).

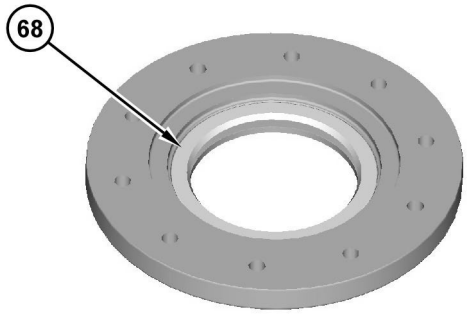

Illustration 997 g01383572

43. Remove lip seal (68).

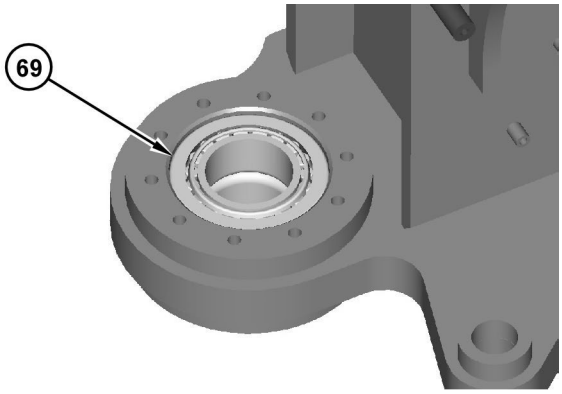

Illustration 998 g01383579

44. Remove bearing assembly (69).

i07415242

Front Frame to Rear Frame (Articulating Hitch) - Connect

SMCS Code: 7051-077; 7057-012; 7100-012

Connection Procedure

Table 94

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	425-0952	Chock	8
B	504-9790	Lift Gp (60Hz)(1)	2
	OR		
	504-9792	Lift Gp (50Hz)(2)	2
C	1P-1837	Bearing Puller Adapter	1
	1P-1838	Bearing Puller Adapter	1
	6V-3170	Double Acting Cylinder	1
	4C-9634	Puller Stud	1
	4K-0684	Hard Washer	1
	9U-6832	Nut	1
	8B-7555	Adapter	2
	0S-1602	Bolt	2
D	-	Loctite 243	-
E	1P-0510	Driver Gp	1
	1P-0520	Driver Gp	1

(1) High-Voltage (480V) Low-Voltage (240V)
(2) High-Voltage (400V) Low-Voltage (200V)

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

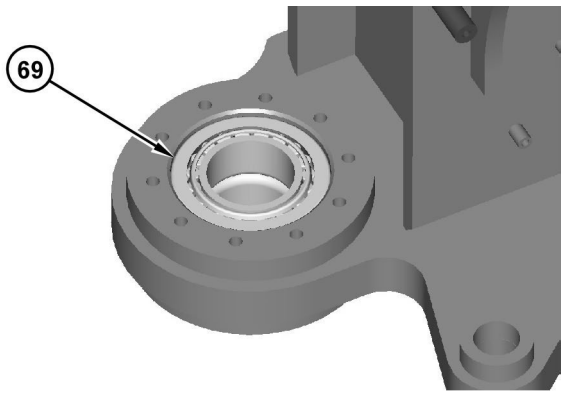

Illustration 999 g01383579

1. Lower the temperature of bearing assembly (69). Install bearing assembly (69).

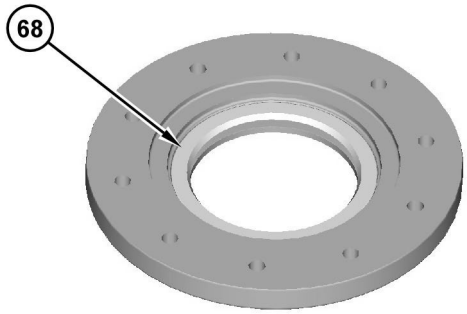

Illustration 1000 g01383572

2. Install lip seal (68).

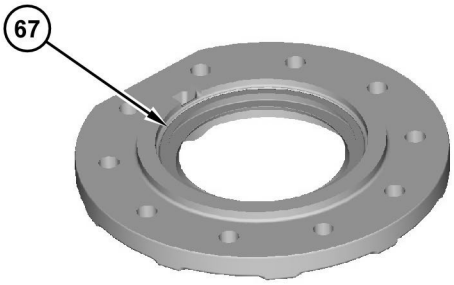

Illustration 1001 g01383568

3. Install lip seal (67).

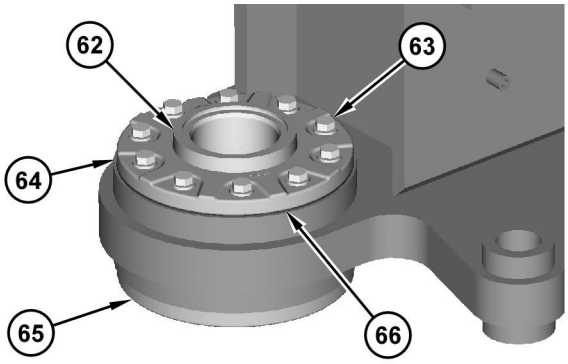

Illustration 1002 g01383564

4. Install upper cap (64). Position lower cap (65). Install four of bolts (63) that are spaced equally. Tighten four of bolts (63) in a diagonal pattern by an equal number of turns to a torque of 88 ± 7 N·m (65 ± 5 lb ft). Ensure that lower cap (65) is flush with the frame. Measure the gap between upper cap (64) and the frame at each of the four bolts and record the measurement. Remove upper cap (64). Install few shims (66) that is equal in thickness to the gap between upper cap (64) and the frame. Install upper cap (64). Install bolts (63). Install spacer (62).

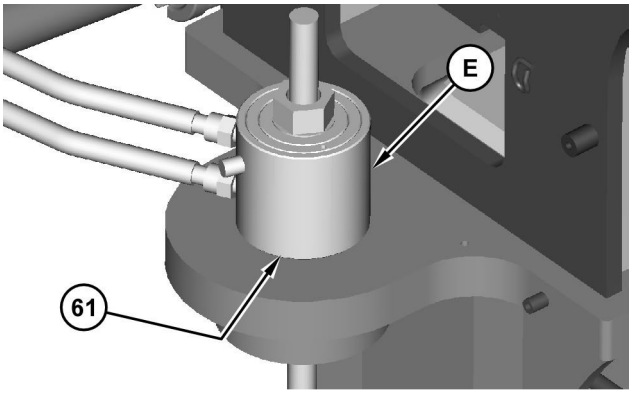

Illustration 1003 g01383622

5. Lower the temperature of bearing (61). Use Tooling (C) to install bearing (61) to a depth of 12.7 ± 0.5 mm (0.50 ± 0.02 inch).

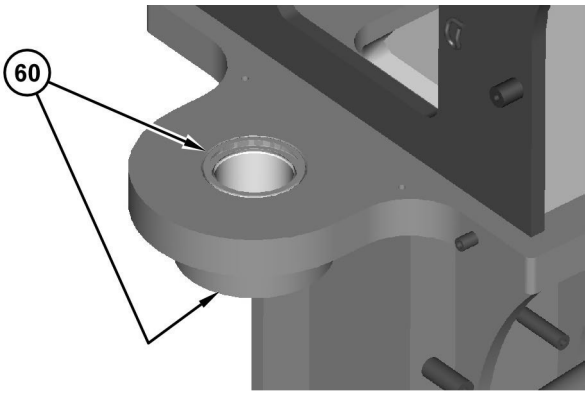

Illustration 1004 g01383553

6. Lubricate lip seals (60) with the lubricant that is being sealed. Use Tooling (E) to install lip seals (60).

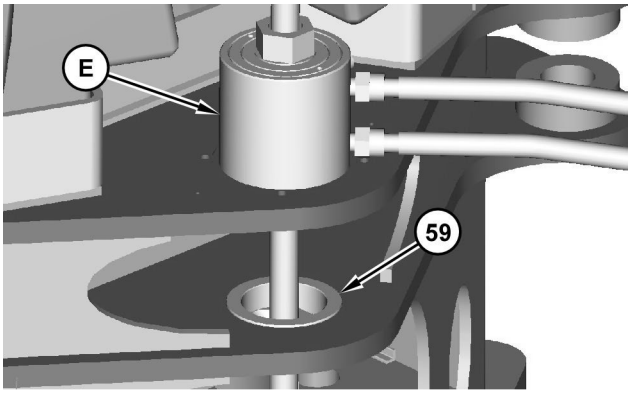

Illustration 1005 g01383543

7. Lower the temperature of bearing sleeve (59) to −57° to minus 68°C (−71° to minus 122°F). Use Tooling (C) to install bearing sleeve (59).

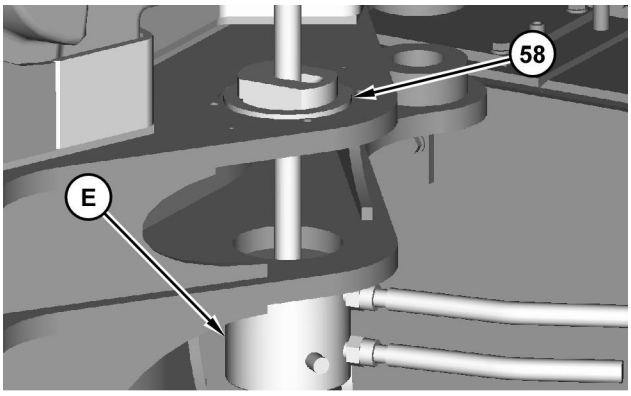

Illustration 1006 g01383626

8. Use Tooling (C) to install collar (58).

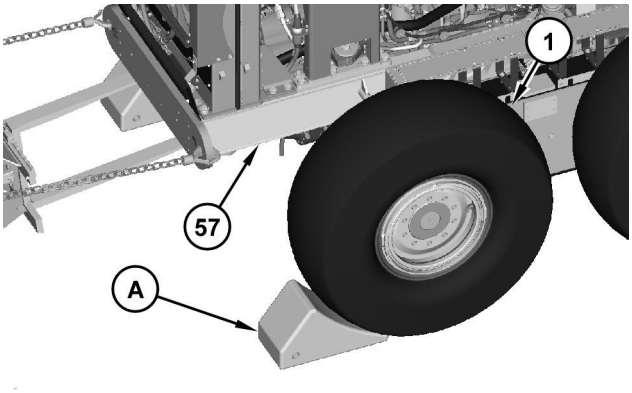

Illustration 1007 g01383497

9. Position a suitable lift truck at the rear of rear frame (57). Attach two suitable lifting devices onto the rear bumper and the forks. Use the suitable lift truck to connect rear frame (57) to the front frame. Install Tooling (A) to chock rear tires (1).

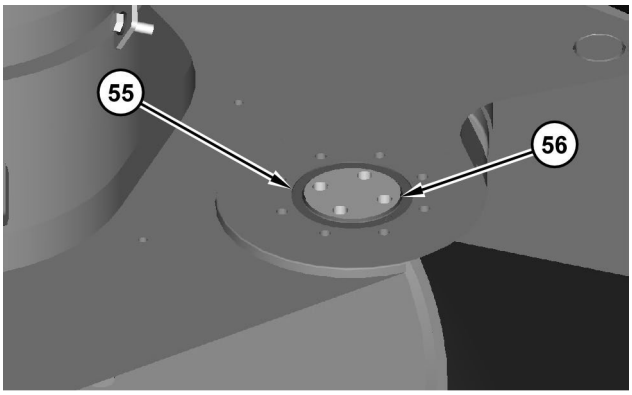

Illustration 1008 g01383711

10. Install pin (56). Install spacer (55).

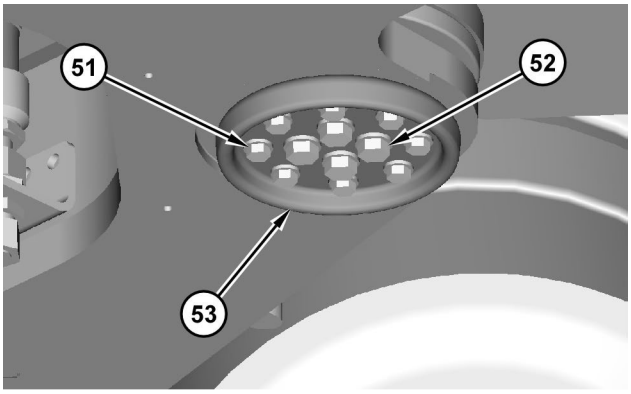

Illustration 1009 g01383449

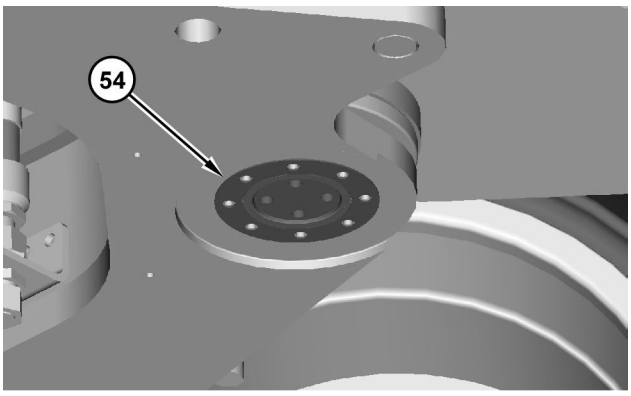

Illustration 1010 g01383454

11. Install lock plate (53). Apply Tooling (D) onto bolts (52). Install two of bolts (52) that are 180 degrees opposite. Tighten two of bolts (52) to a torque of 135 ± 14 N·m (100 ± 10 lb ft). Measure the gap between lock plate (53) and the frame in four places and record the measurements. Remove lock plate (53). Install few shims (54) that are equal in thickness to the minimum gap measurement minus 0.25 mm (0.010 inch). Install lock plate (53). Install bolts (52). Tighten bolts (52) to a torque of 240 N·m (177 lb ft). Install bolts (51). Tighten bolts (51) to a torque of 105 ± 20 N·m (77 ± 15 lb ft).

12. Connect the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

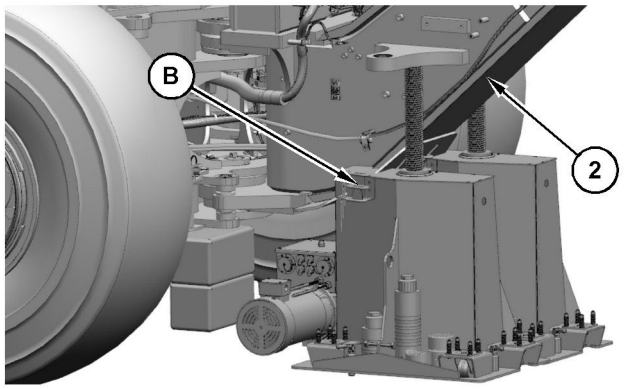

Illustration 1011 g06265486
Typical Example

13. Remove Tooling (B) and suitable blocking from front frame (2). Refer to Tool Operating Manual, NEHS1303, “Lift Group (Stand - 25 Ton)” for more information on Tooling (B).

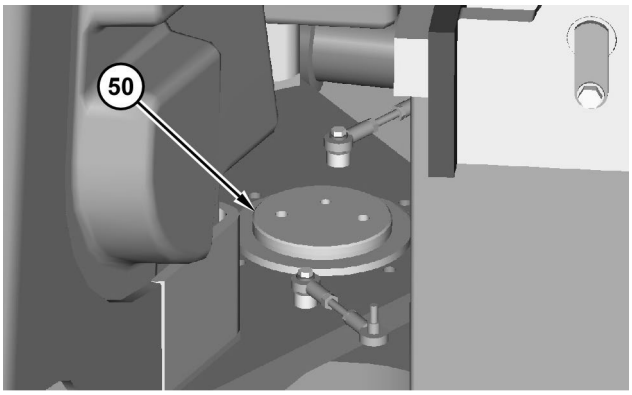

Illustration 1012 g01383717

14. Install pin (50).

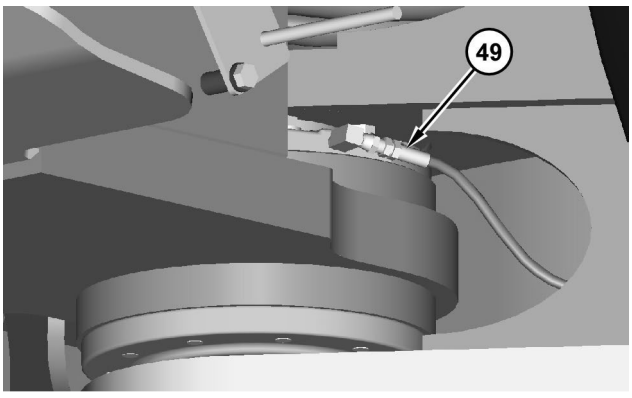

Illustration 1013 g01383619

15. Connect hose assembly (49).

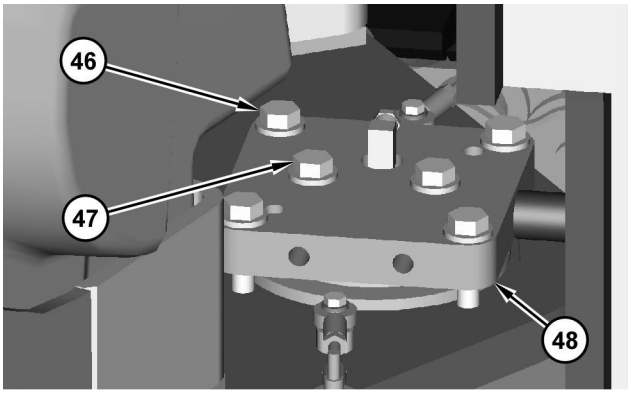

Illustration 1014 g01383378

16. Install cover (48). Install bolts (46). Tighten two of bolts (46) that are diagonal from each other by an equal number of turns. Tighten the remaining bolts (46) by an equal number of turns. Install bolts (47). Tighten bolts (47) to a torque of 105 ± 20 N·m (77 ± 15 lb ft). Connect hose assembly (18).

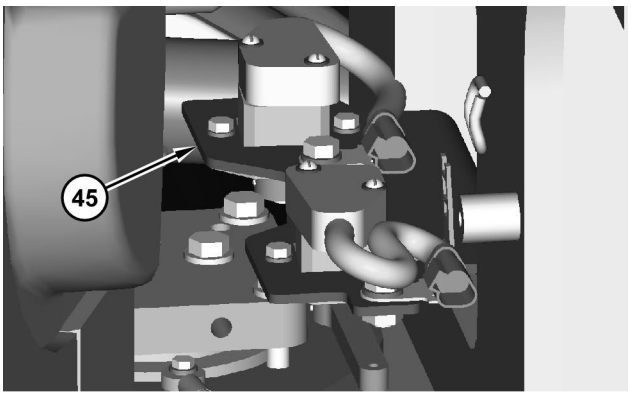

Illustration 1015 g01383374

17. Install bracket assembly (45).

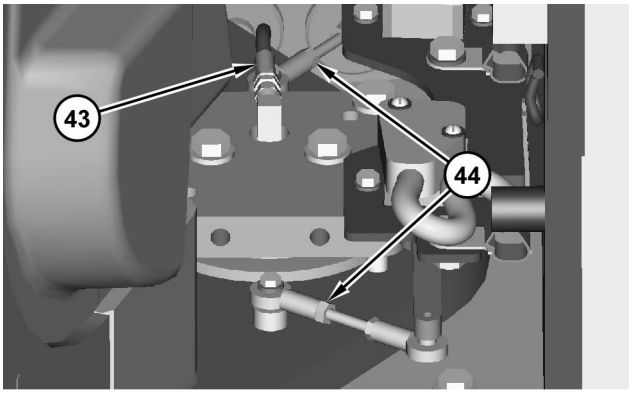

Illustration 1016 g01383360

18. Connect link assemblies (44). Connect hose assembly (43).

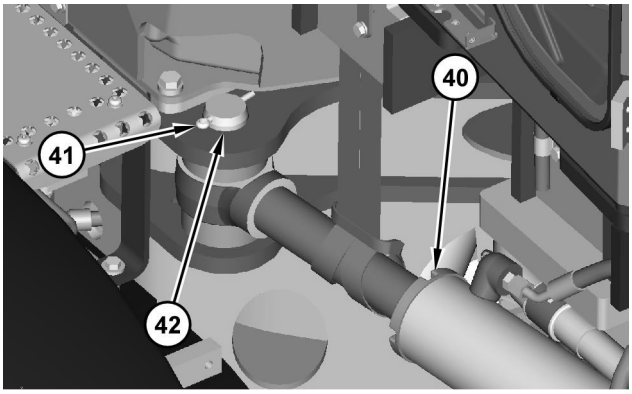

Illustration 1017 g01383176

19. Use a suitable lifting device to position articulation cylinder (40). Install pin assembly (42). Install cotter pin (41). Repeat this step for the remaining articulation cylinder (40).

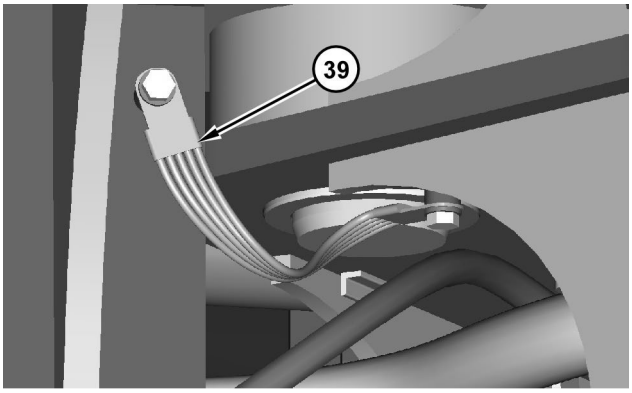

Illustration 1018 g01383175

20. Connect ground strap (39).

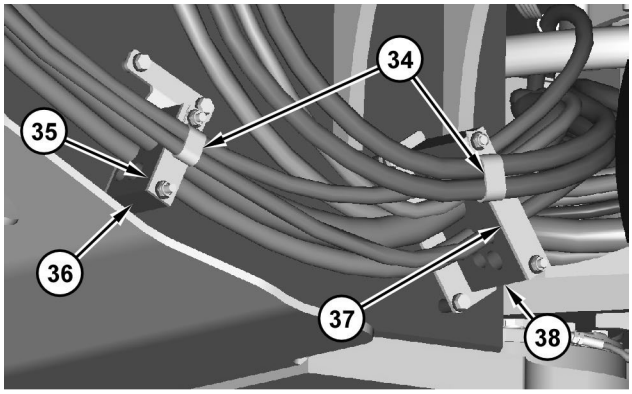

Illustration 1019 g01383161

21. Install blocks (38) and plate (37). Install blocks (36) and plate (35). Install clips (34).

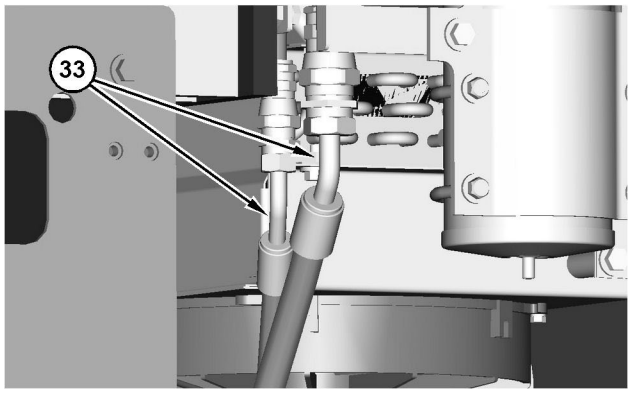

Illustration 1020 g06314481

22. Connect hose assemblies (33).

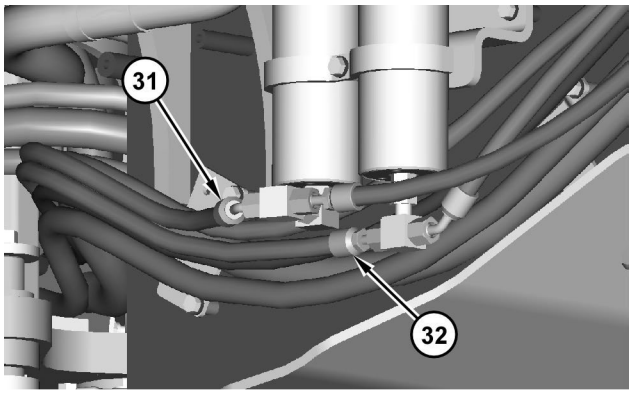

Illustration 1021 g01383150

23. Connect hose assembly (32) and hose assembly (31).

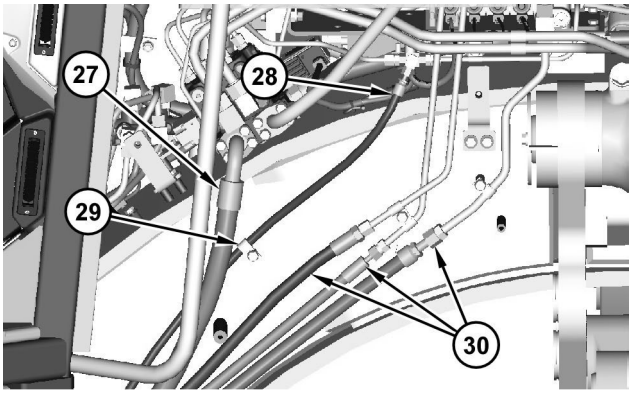

Illustration 1022 g01383130

24. Connect hose assemblies (30). Install clip (29). Connect hose assembly (28) and hose assembly (27).

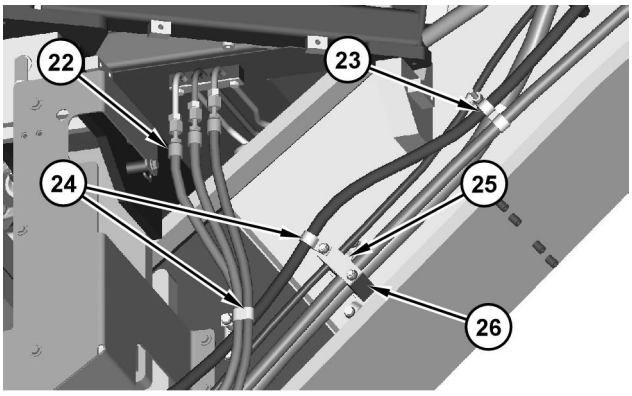

Illustration 1023 g01383127

25. Install blocks (26) and plate (25). Install clips (24) and clips (23). Connect hose assembly (22).

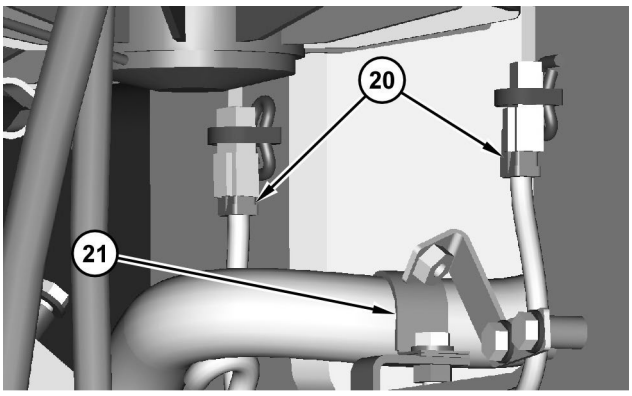

Illustration 1024 g01383110

26. Install clip (21). Connect harness assemblies (20).

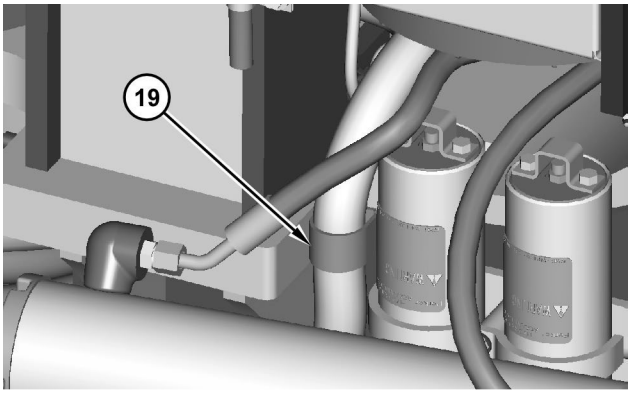

Illustration 1025 g01383104

27. Install clip (19).

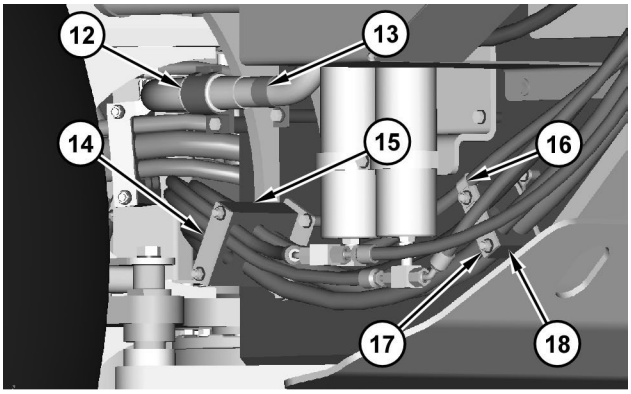

Illustration 1026 g01383083

28. Install blocks (18) and plate (17). Install clip (16). Install blocks (15) and plate (14). Install clips (13) and clip (12).

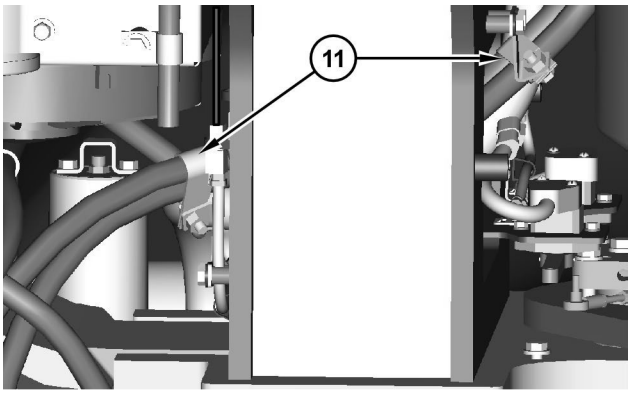

Illustration 1027 g01383079

29. Install clips (11).

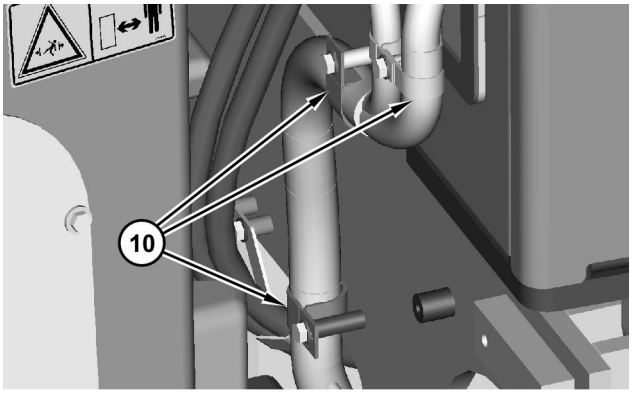

Illustration 1028 g01383069

30. Install clips (10).

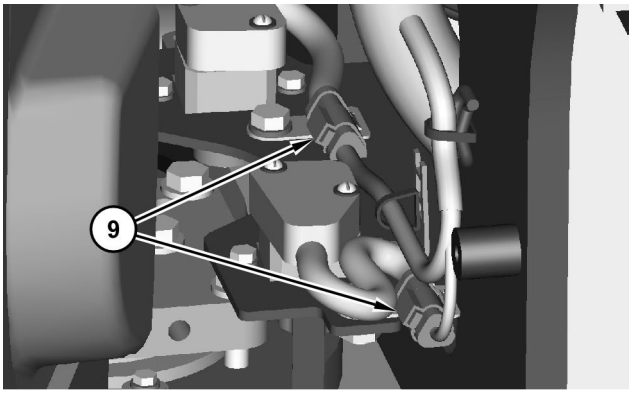

Illustration 1029 g01383018

31. Connect harness assemblies (9) and install the connecting hardware.

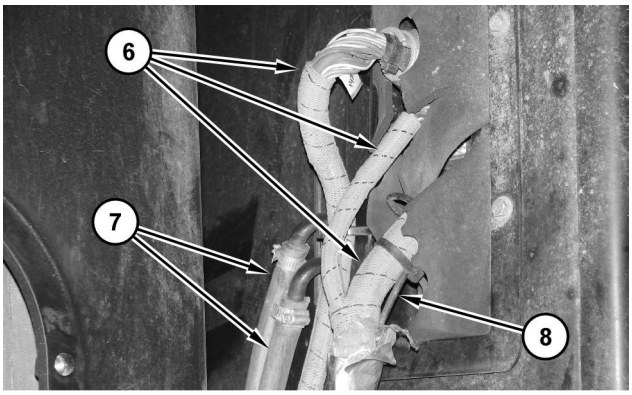

Illustration 1030 g01383014

32. Connect harness assembly (8). Connect hoses (7). Connect harness assemblies (6) and install the connecting hardware.

Illustration 1031 g01382978

33. Install guard (5). Repeat this step for the opposite side.

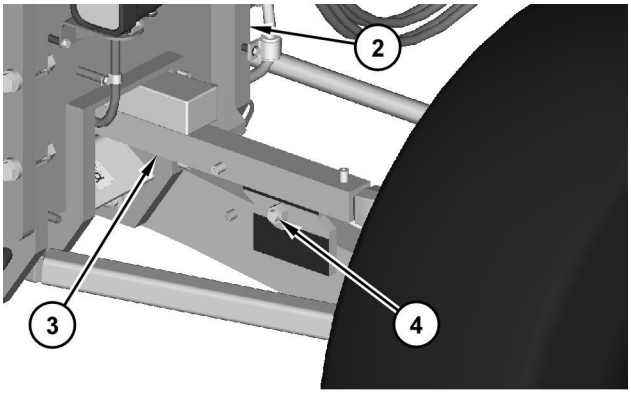

Illustration 1032 g01382973

34. Remove lock pin (4). Remove the suitable blocking from wheel lean bar (3) and front frame (2).

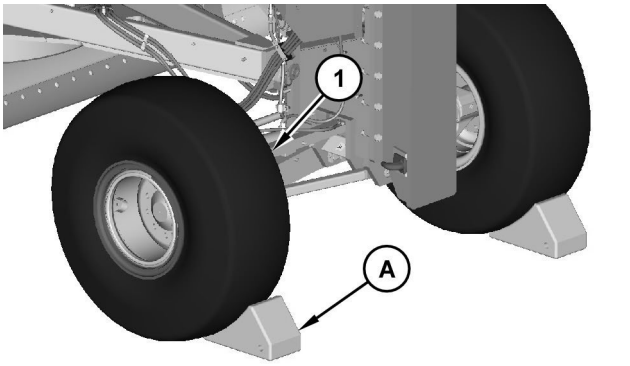

Illustration 1033 g01382865

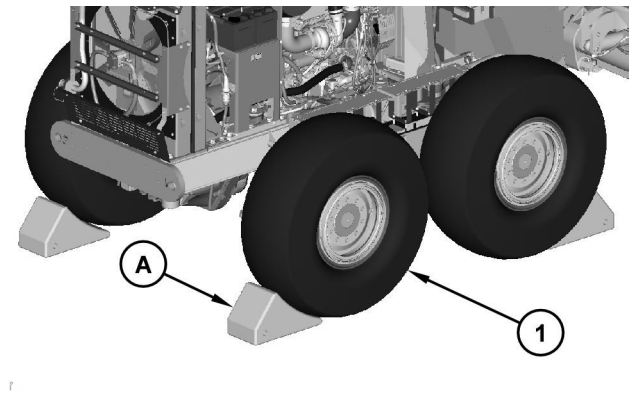

Illustration 1034 g01382869

35. Remove Tooling (A) from wheels (1). Repeat this step for the opposite side.

36. Fill the engine coolant. Refer to Operation and Maintenance Manual, “Cooling System Extended Life Coolant - Change”.

37. Fill the hydraulic system. Refer to Operation and Maintenance Manual, “Capacities - Refill”. Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change”.

38. Charge the air conditioning system. Refer to Service Manual, SENR5664, “Air Conditioning and Heating Systems with R-134a Refrigerant” for the correct procedure. Refer to Dealer Service Tool Catalog, NENG2500, “Air Conditioning Tools” for the correct tools.

Turn the battery disconnect switch to the ON position. Refer to Operation and Maintenance Manual, “Battery Disconnect Switch”.

End By:

a. Install the drive shaft.

b. Install the engine enclosure.

c. Install the ripper.

i03646206

Wheel Spindle - Remove (Front Wheel)

SMCS Code: 4234-011

Removal Procedure

Table 95

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	5P-2968	Adapter	1
B	1P-2322	Combination Puller	1
C	138-7576	Link Bracket	1

Start By:

a. Remove the front wheels. Refer to Disassembly and Assembly, “Wheel - Remove and Install”.

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.

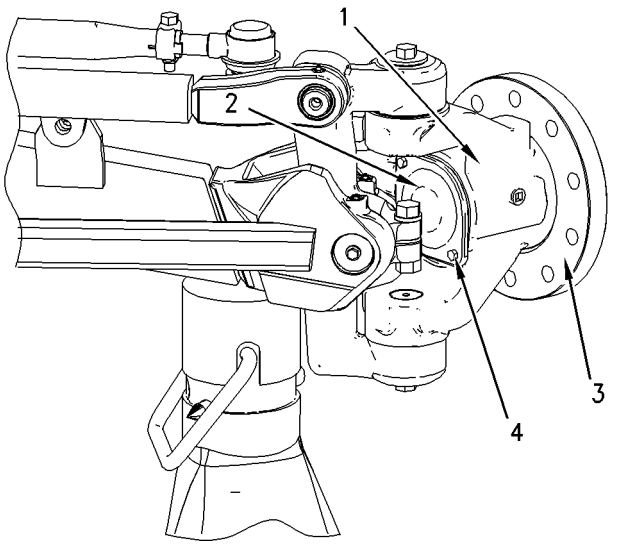

Illustration 1035 g00932128

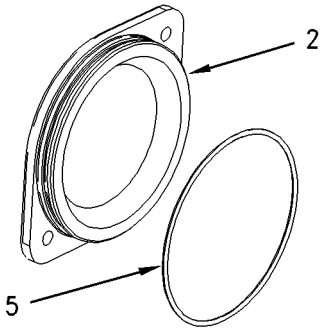

Illustration 1036 g00932130

1. Remove bolts (4) and cover (2) from wheel spindle housing (1). Drain the oil from wheel spindle (3) into a suitable container for storage or disposal.

2. Remove O-ring seal (5) from cover (2).

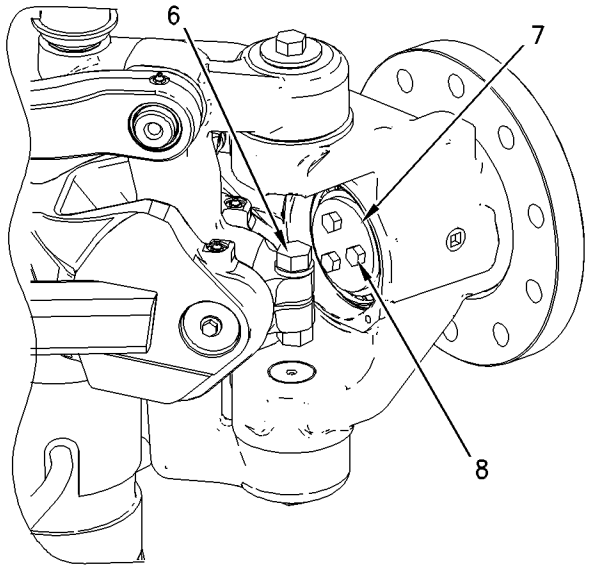

Illustration 1037 g00932134

3. Remove bolts (8), retainer (7), and the shims.

4. Loosen bolt (6).

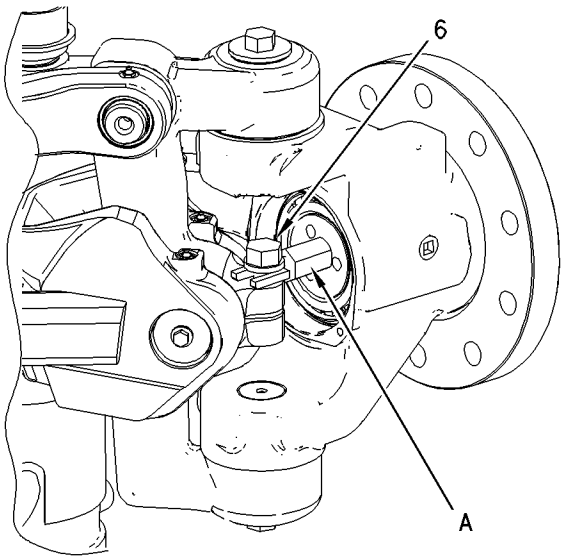

Illustration 1038 g00932136

5. Install Tooling (A) under the head of bolt (6).

6. Tighten bolt (6) in order to secure Tooling (A) in position.

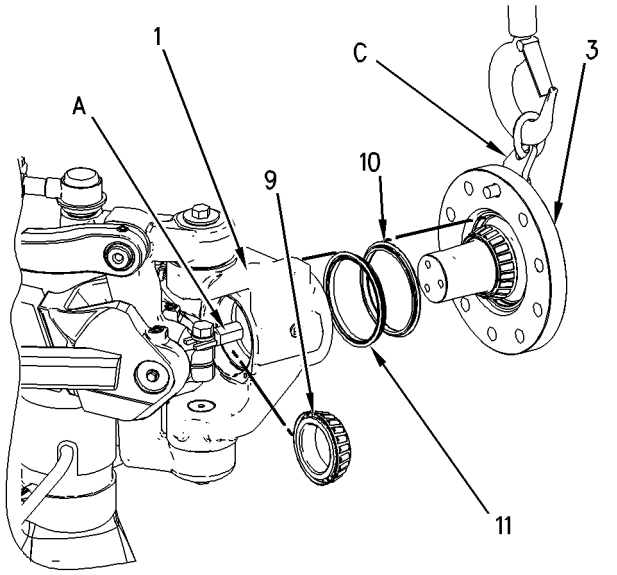

Illustration 1039 g00932151

7. Fasten Tooling (C) and a suitable lifting device onto wheel spindle (3). Tighten Tooling (A) against the shaft of the wheel spindle in order to force the spindle outward. Hit the flange of the wheel spindle with a hammer in order to assist Tooling (A) in forcing the spindle out of the spindle housing. Repeat this step until wheel spindle (3) is loose from bearing cone (9).

8. Remove wheel spindle (3) from the wheel spindle housing. The weight of wheel spindle (3) is approximately 57 kg (125 lb).

9. Remove Duo-Cone seal (10) from wheel spindle (3). Remove Duo-Cone seal (11) from wheel spindle housing (1).

10. Remove Tooling (A) and bearing cone (9) from wheel spindle housing (1).

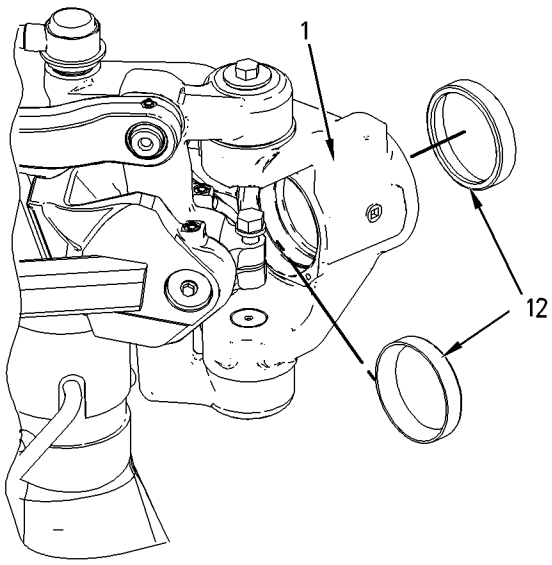

Illustration 1040 g00932188

11. Remove bearing cups (12) from the wheel spindle housing.

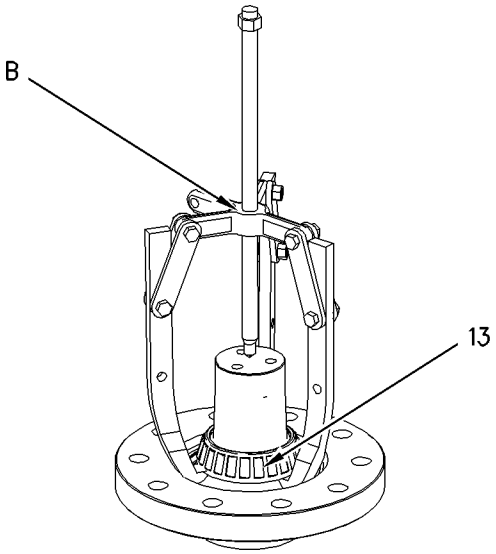

Illustration 1041 g00932189

12. Use Tooling (B) in order to remove bearing cone (13) from wheel spindle (3).

13. Repeat this procedure for the remaining wheel spindle.

i03383221

Wheel Spindle - Install

SMCS Code: 4234-012

Installation Procedure

Table 96

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
C	138-7576	Link Bracket	1
D	169-0503	Installation Kit	1
	1U-8698	Duo-Cone Seal Installer As	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

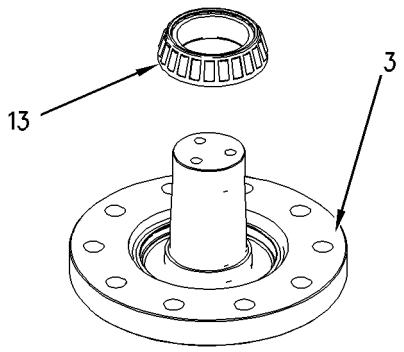

Illustration 1042 g00932196

1. Raise the temperature of bearing cone (13). Install bearing cone (13) on wheel spindle (3).

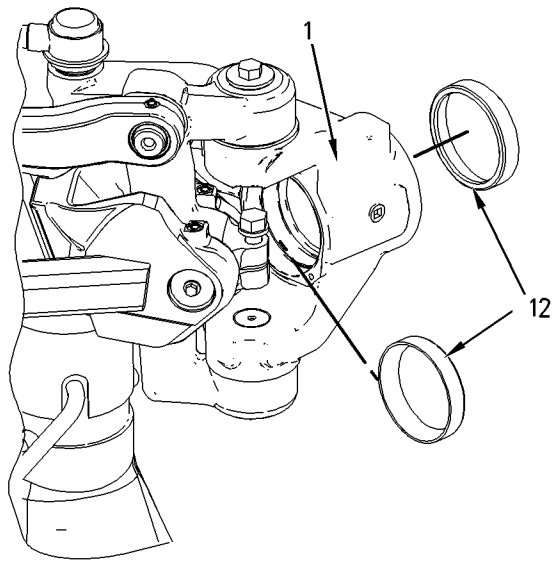

Illustration 1043 g00932188

2. Lower the temperature of bearing cups (12). Install bearing cups (12) in wheel spindle housing (1).

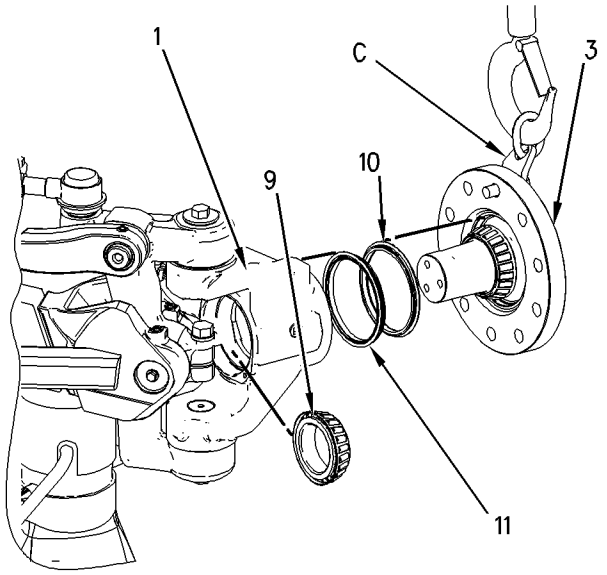

Illustration 1044 g00935653

3. Use Tooling (D) in order to install Duo-Cone seal (10) in wheel spindle (3). Refer to Disassembly and Assembly, “Duo-Cone Conventional Seals - Seals”.

4. Use Tooling (D) in order to install Duo-Cone seal (11) in wheel spindle housing (1). Refer to Disassembly and Assembly, “Duo-Cone Conventional Seals - Seals”.

5. Use Tooling (C) and a suitable lifting device in order to install wheel spindle (3). The weight of wheel spindle (3) is approximately 57 kg (125 lb).

6. Install bearing cone (9) in wheel spindle (3).

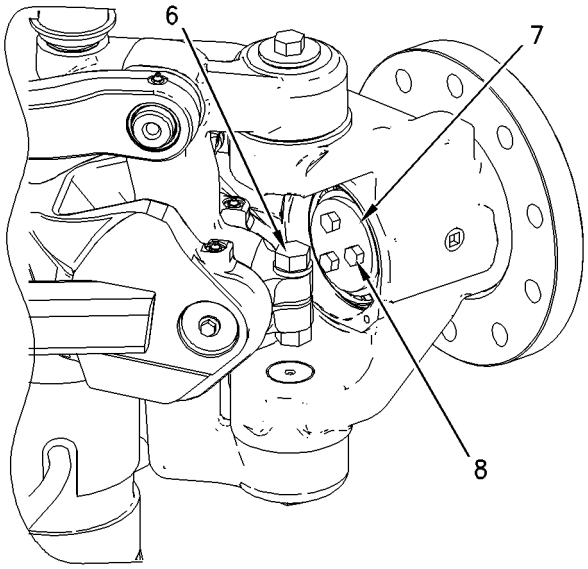

Illustration 1045 g00932134

7. Position retainer (7) and the shims on wheel spindle (3). Install bolts (8). Tighten bolts (8) to a torque of 125 ± 7 N·m (92 ± 5 lb ft). Tighten bolt (6).

8. Rotate the spindle assembly two to three times. Measure the rolling torque that is required to rotate the spindle assembly. Add or remove shims until a rolling torque of 7 to 20 N·m (5 to 15 lb ft) is obtained.

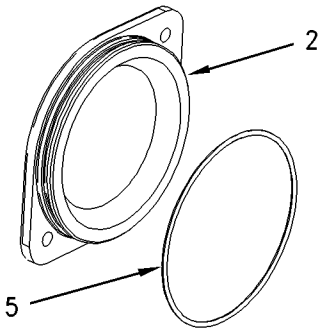

Illustration 1046 g00932130

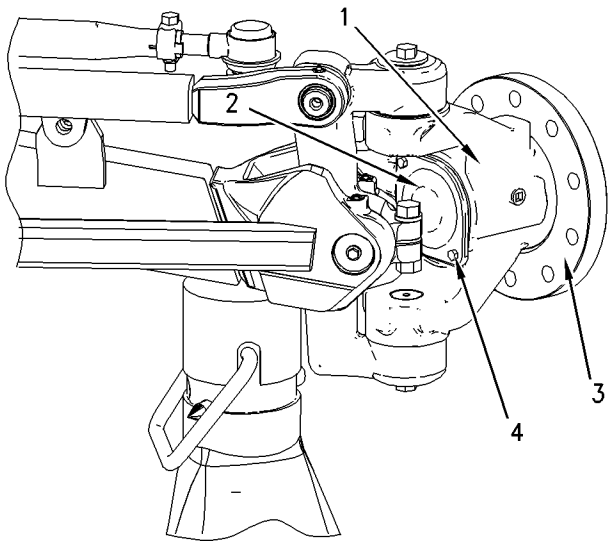

Illustration 1047 g00932128

9. Install O-ring seal (5) in cover (2).

10. Position cover (2) on wheel spindle housing (1).

11. Install bolts (4) that hold cover (2) in the wheel spindle housing.

12. Fill the wheel spindle with oil. Refer to Operations and Maintenance, “Wheel Bearing Oil (Front) - Change”.

End By:

a. Install the front wheels. Refer to Disassembly and Assembly, “Wheel - Remove and Install”.

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