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3.1 Axle system operation

3.1.1 Axle introduction

This section describes features and operation of the axle differential lock, axle lubrication, service brakes, and the park brake.

3.1.2 Differential lock

The differential lock system is optional on all machines.

Pressurized oil goes from the first section of the tri-section pump to the differential lock solenoid. When the differential lock solenoid is activated, oil will divide between the front axle and the rear axle. Once the oil reaches the axle, the oil pressure flows through the channels of the carrier and the cover and enters the piston chamber. The piston compresses the intermediate plates and the discs through the stops and splines in the lock unit and the hub. In this clutched position, the input sun gears of the right-hand and the left-hand trumpets turn at the same speed.

3.1.3 Axle lubrication

Lubrication for the axle is supplied by the second section of the tri-section pump. The lubrication is an air/oil mixture. The lubrication comes from a stand pipe in the transmission sump. The stand pipe regulates the air/oil mixture.

3.1.4 Service brakes

The machines have a hydraulic brake control system that uses pressurized oil from the third section of the tri-section pump to engage the service brakes. The pressurized oil from the accumulator is modulated to the service brakes by the brake valves.

3.1.5 Park brake

All machines have a hydraulic park brake on the front axle drive pinion. The park brake is spring applied and hydraulically released. A park brake valve controls the flow of the oil to the park brake. The park brake valve uses pressurized oil from the hydraulic accumulator. The third section of the tri-section pump supplies the hydraulic accumulator.

3.1.6 Final drives

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Theory of operation

The front axle mounts to the frame rails under the engine. A drive shaft that drives off of the front of the transmission and turns the axle. The axle is a three section, double reduction axle. The weight of the axle is approximately 1618 kg (3567 lb).

Description

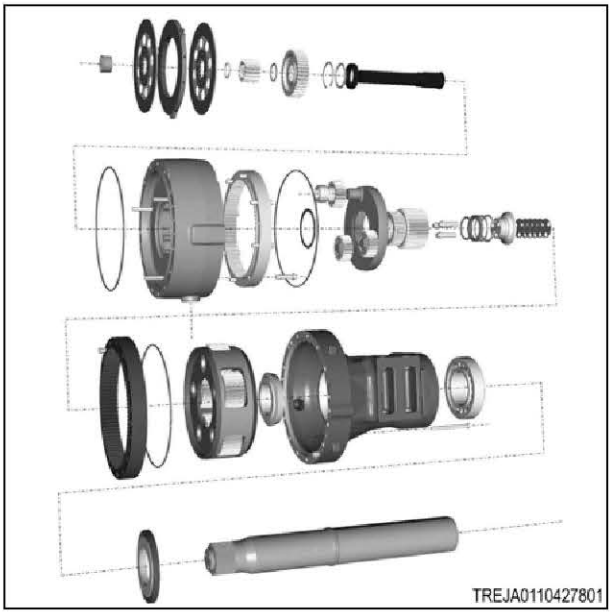

Fig. 1

Exploded view of the final drive.

The final drive housings support the left and the right-hand axle shafts. The final drive housings contain the final drive unit that receives rotation from the differential assembly. Except for the input shafts, both final drive housings are symmetrical and installed on either side of the center housing.

Two tapered roller bearings support the axle shaft. The roller bearings have cups and cones that install opposing each other. The drive unit housing uses a lip seal. The lip seal prevents oil leaking from the housing and prevents contaminates from entering the housing.

The planetary carrier engages the axle shaft which connects to a splined shaft with three planetary gears on the splined shaft. The ring gear and the sun gear engage the three planetary gears.

The ring gear is between the final drive housing and the brake plates and aligned with aligning pins. The sun gear drives the brake discs.

3.1.7 Differential

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Description

The differential bevel gear, moved in rotation by a gearbox output shaft, drives the rear axle.

Two tapered roller bearings that mount in opposition, support the helical drive pinion. The inner bearing cone fits on the drive pinion by force. The cups fit into the intermediate housing and the bearing carrier by force. The outer bearing cone mounts free on the drive pinion. The outer bearing lets shims be fitted when required. The differential assembly rotates on two taper roller bearings. Two lateral carriers support the two taper roller bearings. Bushings center the two lateral carriers and the two lateral carriers fasten to the housing with bolts. Two halves holding four planetary gears and two sun gears form the differential assembly. The drive pinion location is in the intermediate housing. The adjustment of the drive pinion position is carried out by installing the shims between the differential lock carriers, bearings, and the housing. The pre-loading of the bearings is carried out by shim(s) put between the bearing cone and the thrust washer. The pre-loading of the differential assembly is carried out by shim(s) put between the bearing cone and the left-hand carrier. Backlash of the drive pinion and the crownwheel is carried out by using shim(s) put between the cup and the differential half-housing.

Differential Lock

The multidisc lock system location is on the left-hand side of the half-housing and includes:

- A unit housing the discs and the intermediate plates.
- A hub integral via splines with the left-hand final drive input sun gear.
- A cover made up by the piston assembly and supported by taper roller bearings.

The piston chamber lodged in the cover communicates with a channel in the left-hand carrier, permitting low pressure to act upon the piston. Two seal rings make sure oil tightness of circuit.

Operation - Clutched Position

When the differential lock solenoid valve activates, pressure flows through channels in the left-hand carrier and the cover on the unit and enters the piston chamber. The piston compresses the intermediate plates and the discs integral respectively via stops and splines in lock unit and the hub.

In this clutched position, the input sun gears of right-hand and left-hand final drives turn at same speeds.

Operation - Declutched Position

When the pressure is cut, the piston returns, the discs and the intermediate plates are no longer compressed and let the sun gears and the planetary gears to carry out the differential function.

3.2 Differential lock system

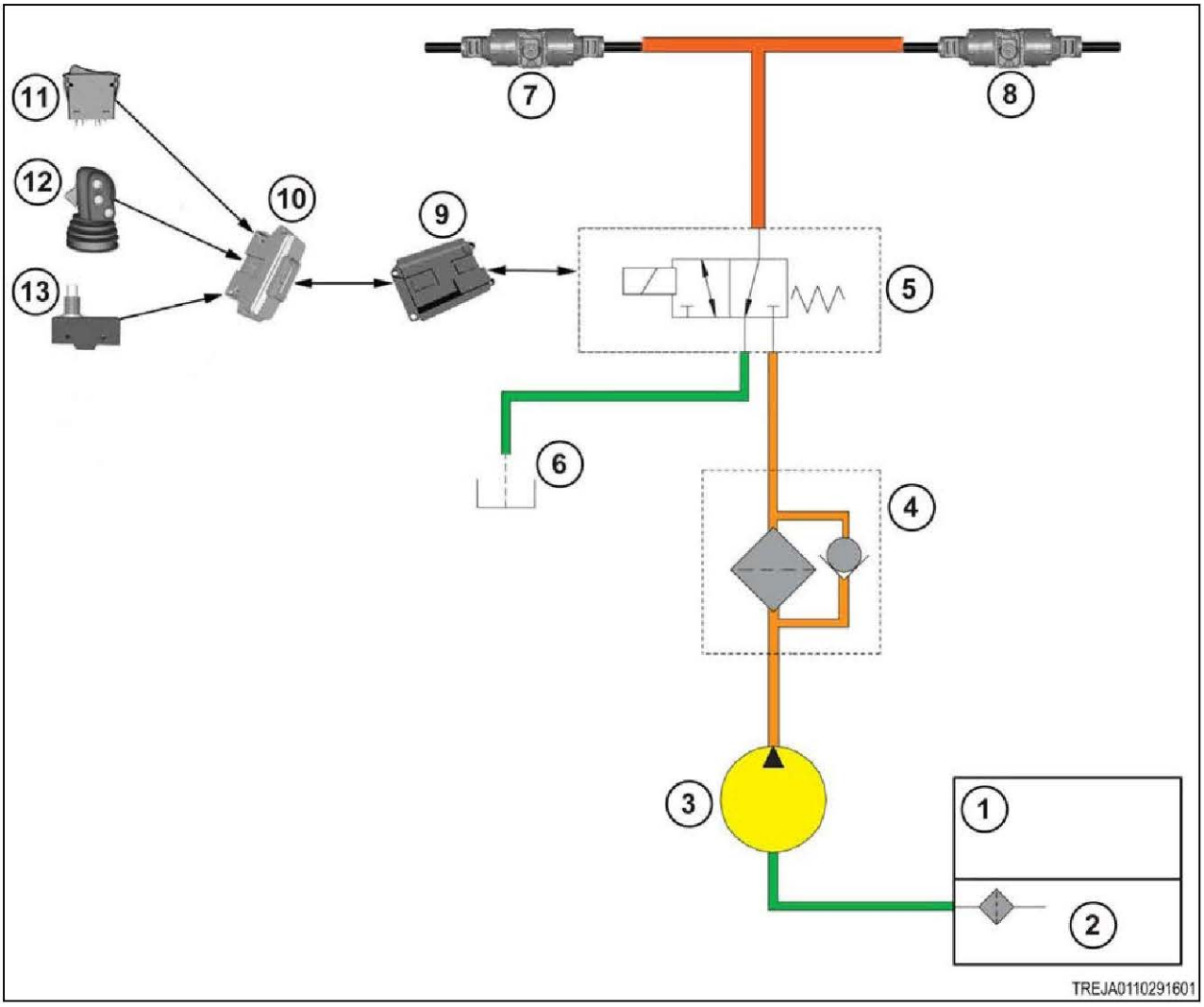

Fig. 2

Block diagram for the differential lock system:

1 Transmission
2 Suction screen
3 First section of the tri-section pump
4 Filter
5 Differential lock solenoid valve
6 Return to the housing
7 Front axle differential
8 Rear axle differential
9 Transmission module
10 Armrest module
11 Differential lock switch
12 One-Touch switch
13 Brake pedal

3.2.1 Electrical components of the differential lock system

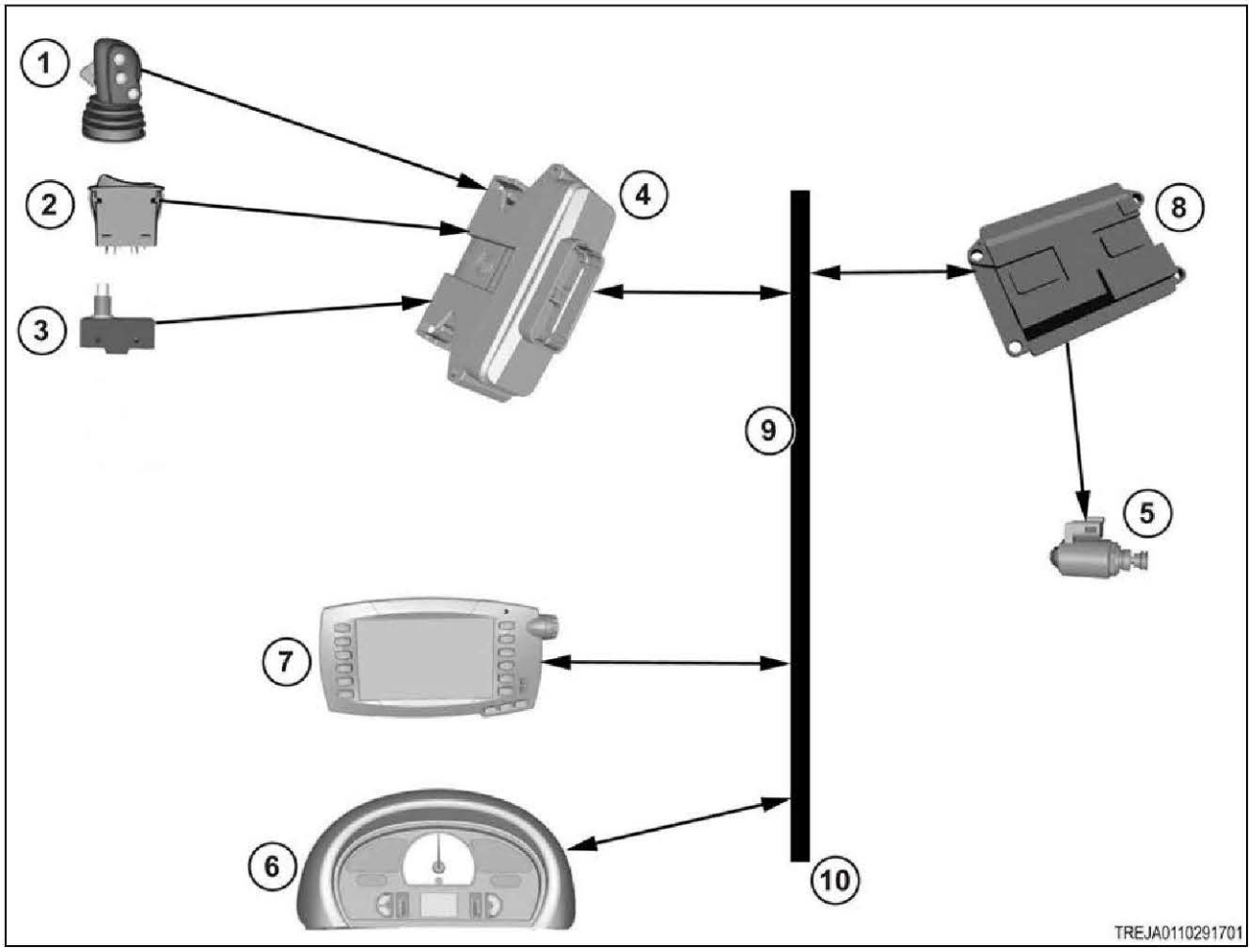

Fig. 3

Electrical block diagram for the differential lock system:

1 One-Touch switch
2 Differential lock switch
3 Brake pedal switch
4 Armrest module
5 Differential lock solenoid valve
6 Dash panel cluster
7 Tractor management center (TMC)
8 Transmission module
9 Controller area network (CAN) data link
10 Optional module and service connector

The CAN data link (9) is a serial communication bus that is used to communicate with the following components:

- Engine module
- Transmission module
- Tractor management center (TMC)
- Auto-Guide receiver, if equipped
- Dash panel cluster
- Other optional modules

The differential lock can be activated by either the differential lock switch (2) or the One-Touch switch (1), if programmed. When either of the switches are activated, an electrical signal is sent to the armrest module

(4). The armrest module sends a signal to the transmission module (8). The transmission module sends an electrical signal to the differential lock solenoid valve (5) to actuate the valve.

The differential lock can be de-activated by either the differential lock switch or the One-Touch switch, if programmed. When either of the operations are activated, an electrical signal is sent to the armrest module. The armrest module sends a signal to the transmission module. The transmission module sends an electrical signal to the differential lock solenoid valve to de-activate the valve.

3.2.2 Differential lock switch

The differential lock switch (1) is on the armrest.

The switch signals the armrest module to engage or disengage the differential lock.

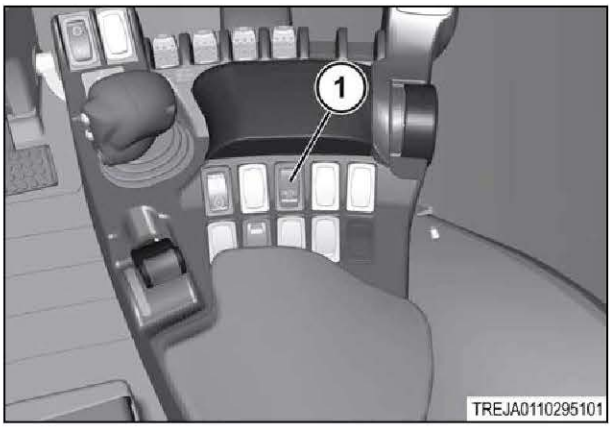

Fig. 4

3.2.3 Brake pedal switch

The brake pedal switch (1) is under the center housing.

When the brake pedal (2) is pressed, the brake switch will actuate and send a signal to the transmission module. The transmission module will send a signal to disengage the differential lock.

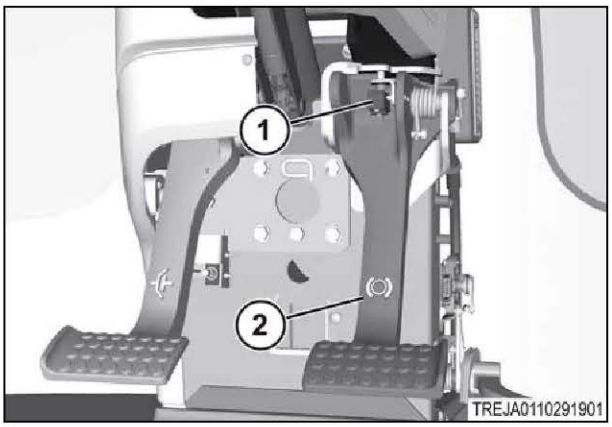

Fig. 5

3.2.4 One-Touch switch

The One-Touch switch (1) is on the transmission control lever.

The switch signals the armrest module that the operator wants to do multiple operations with a single instruction. Engaging or disengaging the differential lock can be one of these operations.

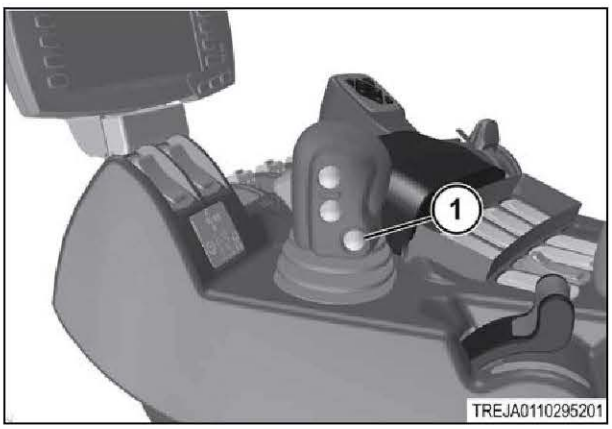

Fig. 6

3.2.5 Differential lock solenoid

The differential lock solenoid (1) is on the right-hand side of the machine in the cabinet behind the front tire.

The differential lock solenoid sends oil to the front and the rear axle differential when actuated.

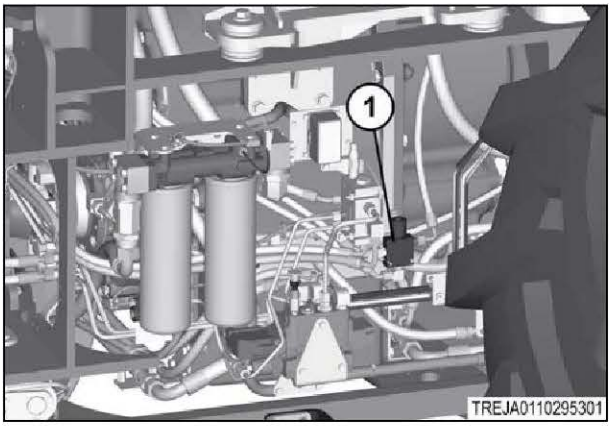

Fig. 7

3.2.6 Hydraulic components of the differential lock system

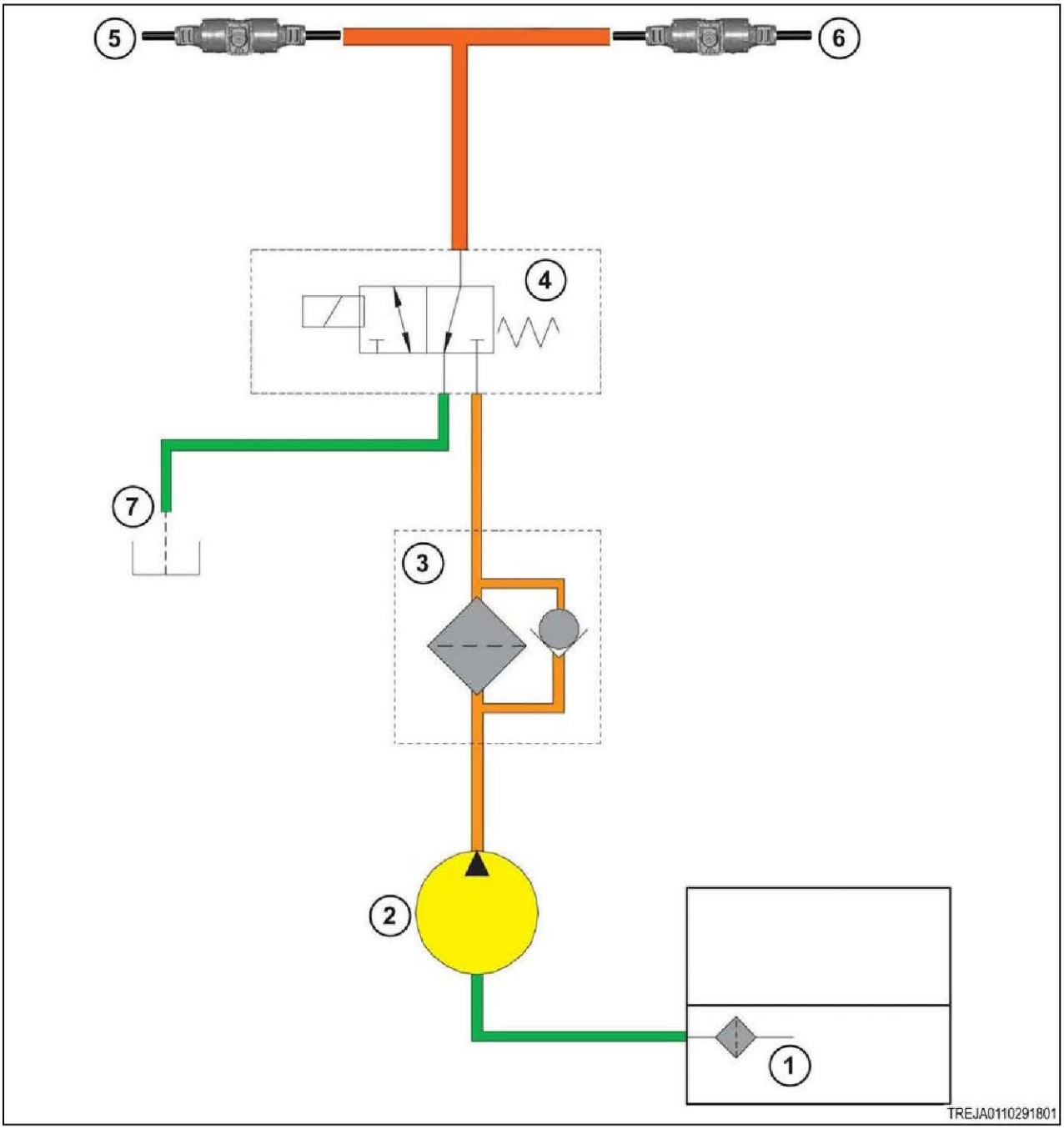

Fig. 8

Block diagram for the differential lock hydraulic system:

Oil from the transmission sump is pulled through the suction screen (1) by the first section of the tri-section pump (2). From the pump, oil goes through the filter (3) and to the differential lock solenoid (4). The oil flow is blocked at the solenoid valve.

When the solenoid valve is energized, the spool shifts open against the spring. The open spool lets the pressurized oil to be split between the front axle differential (5) and the rear axle differential (6).

When the solenoid valve is de-energized, the spring shifts the spool closed to block oil from the pump. When the spool is in the closed position, a routing is made for oil at the axle differentials to return to the transmission housing.

3.2.7 Transmission sump

The transmission oil level must read within the center bubble on the sight gauge.

The transmission pump supplies oil to the following components:

- Transmission
- Differential lock
- Axle
- Service brake
- Park brake

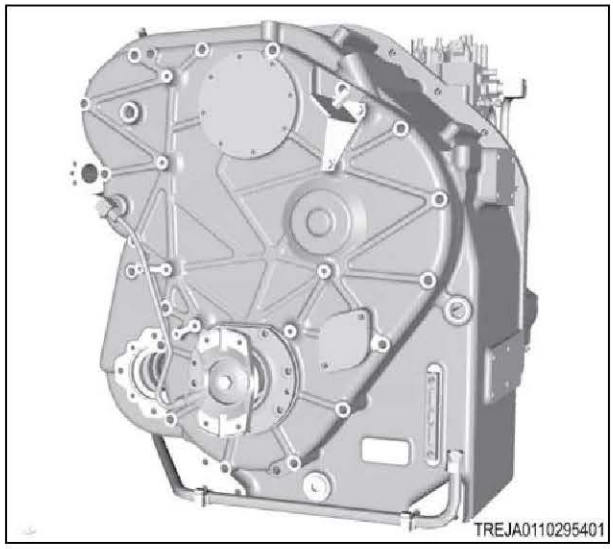

Fig. 9

3.2.8 Suction screen (charge pump)

The suction screen for the charge pump is on the front of the transmission behind the cover (1).

The suction screen filters all the sump oil before the oil goes to the inlet side of the charge pump. The suction screen removes particles larger than 200 microns.

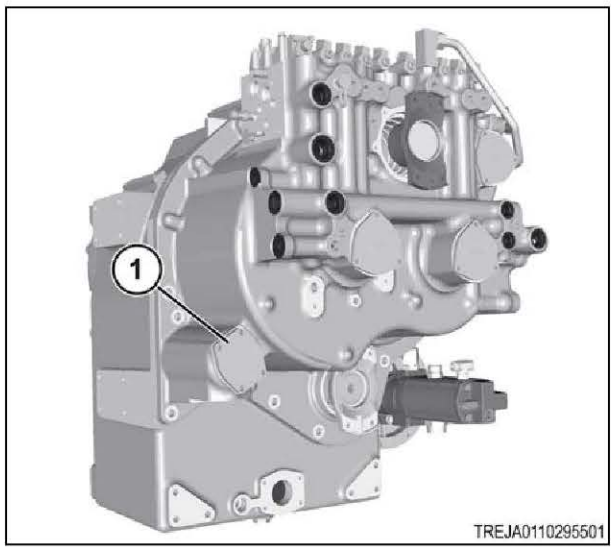

Fig. 10

3.2.9 Tri-section pump

The tri-section pump is on the left-hand side of the transmission. The tri-section pump is a three-section gear pump.

The first section (1) of the tri-section pump supplies oil to the following hydraulic systems:

- Transmission
- Differential lock

The second section (2) of the tri-section pump supplies oil to the following hydraulic systems:

- Axle lubrication

The third section (3) of the tri-section pump supplies oil to the following hydraulic systems:

- Service brakes
- Park brake

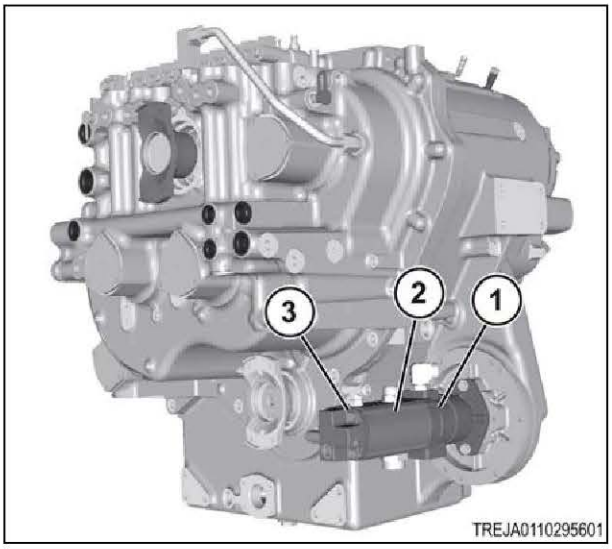

Fig. 11

3.2.10 Transmission oil filter

The transmission oil filter (1) is on the right-hand side of the machine in inside the frame rail behind the front tire.

The transmission oil filter removes contaminants from the oil coming from the first section of the tri-section pump. The oil filter element is a 5 micron filter.

The filtered oil flows to the transmission.

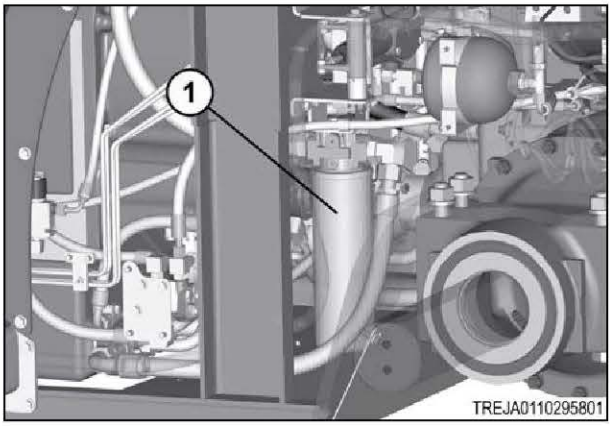

Fig. 12

3.2.11 Transmission oil filter bypass valve

The filter base has a bypass valve (1) and a bypass switch (2). The bypass switch is a normally closed 12 volt switch.

The bypass valve will open with a 469 kPa (68 psi) pressure difference between the inlet pressure and the outlet pressure. If the bypass valve opens, unfiltered oil will flow through the system.

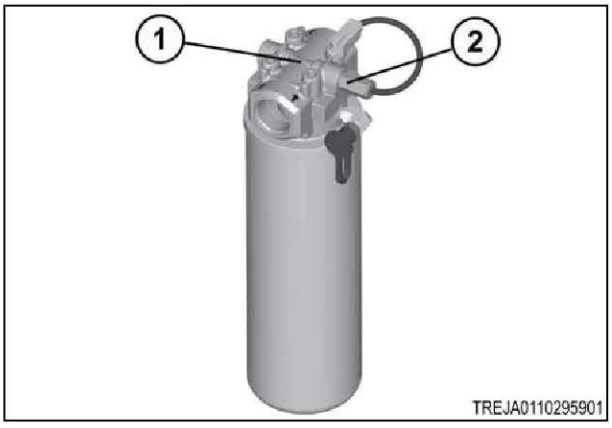

Fig. 13

IMPORTANT:
Do not operate the machine when the transmission oil filter is in bypass mode. Operating the machine in bypass mode can cause damage to the internal components of the machine.
When the bypass switch senses a pressure differential of 248 to 304 kPa (36 to 44 psi), the bypass switch will signal the transmission module. The transmission module will send warning that will show on the tractor management center (TMC) and the dash cluster.

3.2.12 Oil sampling valve

The oil sampling valve (1) is on the filter head. Use the oil sampling valve to get a sample of hydraulic oil for analysis.

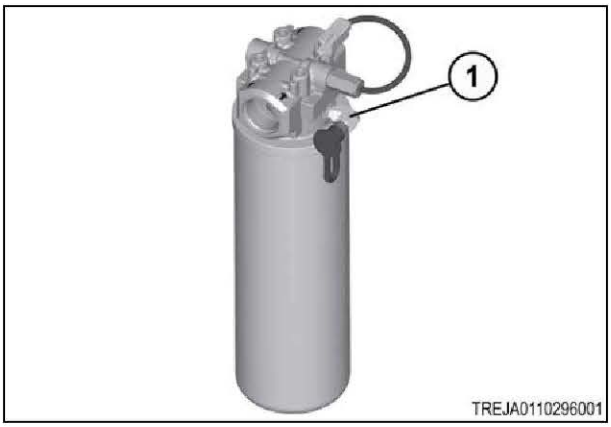

Fig. 14

3.3 Axle lubrication

3.3.1 Axle lubrication system

Lubrication for the axle comes from the second section of the tri-section pump. The lubrication is an air/oil mixture. The lubrication comes from a stand pipe in the transmission sump. The stand pipe regulates the air/oil mixture.

The oil/air mixture goes into the front and the rear axle. Once the oil/air mixture is in the axle, air will separate from the oil and will pressurize the axle. The pressurization in the axle will push oil to the transmission.

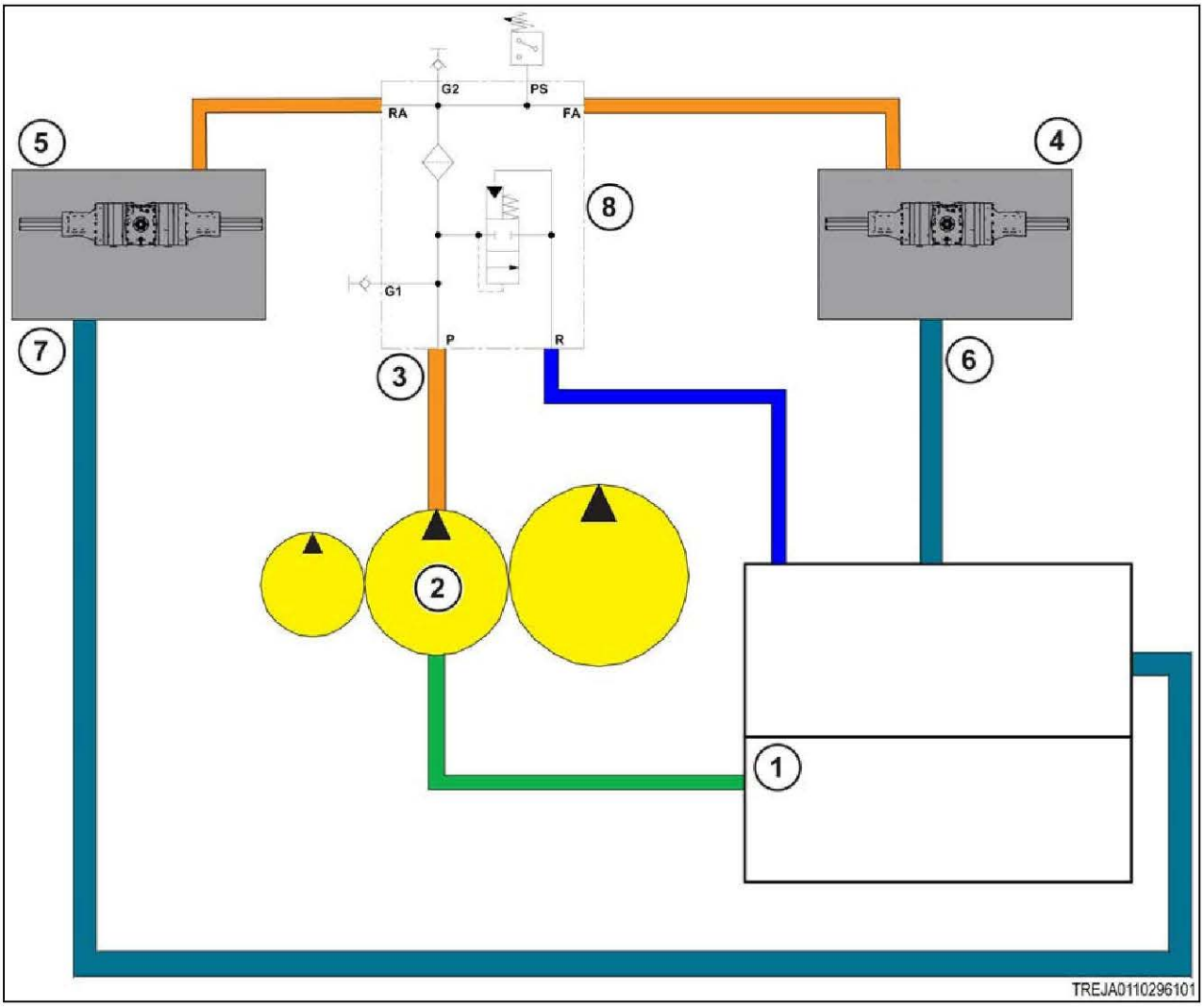

Fig. 15

Block diagram for the axle lubrication system:

1 Transmission sump
2 Tri-section pump
3 Axle lubrication supply line
4 Front axle
5 Rear axle
6 Front axle return line
7 Rear axle return line
8 Axle lubrication filter

The oil/air mixture for the axle lubrication comes from the port (1) in the front of the transmission.

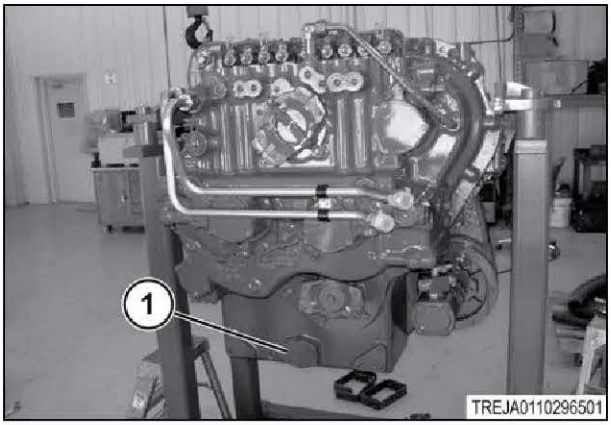

Fig. 16

Inside the transmission there is a stand pipe (1) that directs the oil/air mixture for the axle lubrication. Oil goes through the lower slot (2) and air goes through the upper hole (3). The upper hole is above the transmission oil level, letting air into the system.

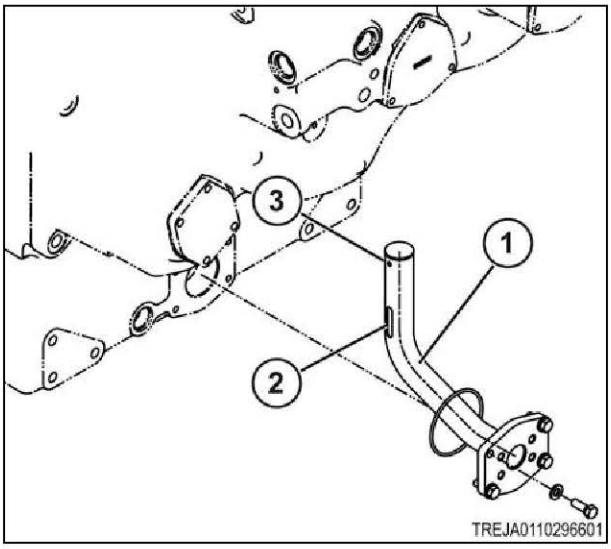

Fig. 17

Oil flows from the outlet port (1) to the axle lubrication filter (2). The oil enters the lubrication filter at the P port. The oil goes through a 25 micron filter element and is divided between the front and the rear axle. The filter head contains a 483 kPa (70 psi) relief valve. If the filter becomes blocked and the pressure increases, the oil will open the relief valve. Oil will return to the transmission through the hose assembly (3).

From the axle lubrication filter, the oil goes through the hose assembly (4) to the front axle and the hose assembly (5) to the rear axle.

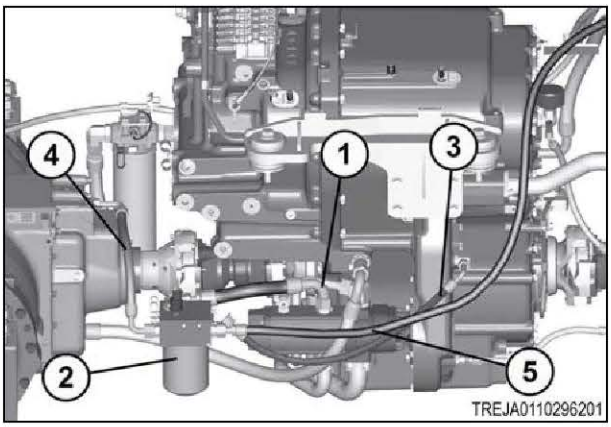

Fig. 18

The oil returns from the front axle through the hose assembly (1) to the transmission (2).

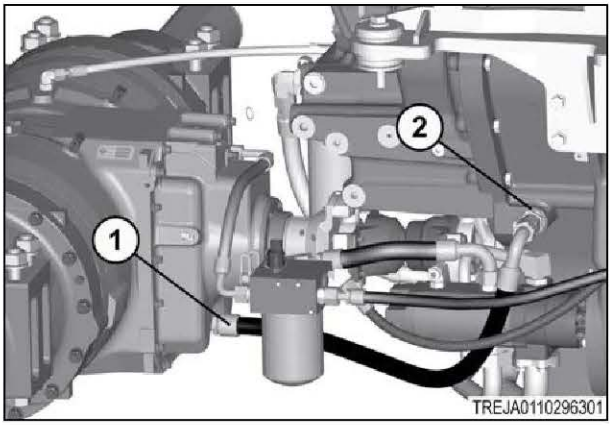

Fig. 19

The oil returns from the rear axle through the hose assembly (1) to the transmission (2).

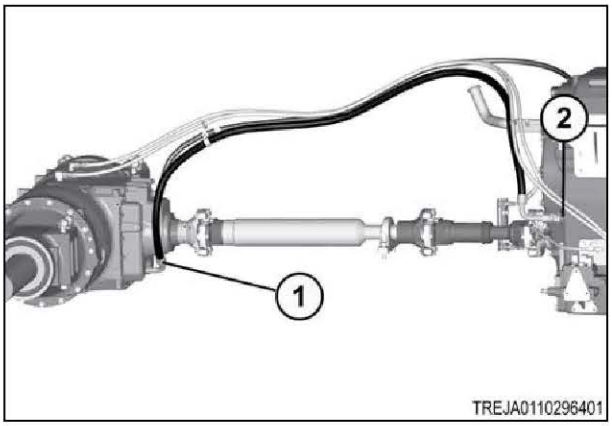

Fig. 20

3.3.2 Tri-section pump

The tri-section pump is on the left-hand side of the transmission. The tri-section pump is a three-section gear pump.

The first section (1) of the tri-section pump supplies oil to the following hydraulic systems:

- Transmission
- Differential lock

The second section (2) of the tri-section pump supplies oil to the following hydraulic systems:

- Axle lubrication

The third section (3) of the tri-section pump supplies oil to the following hydraulic systems:

- Service brakes
- Park brake

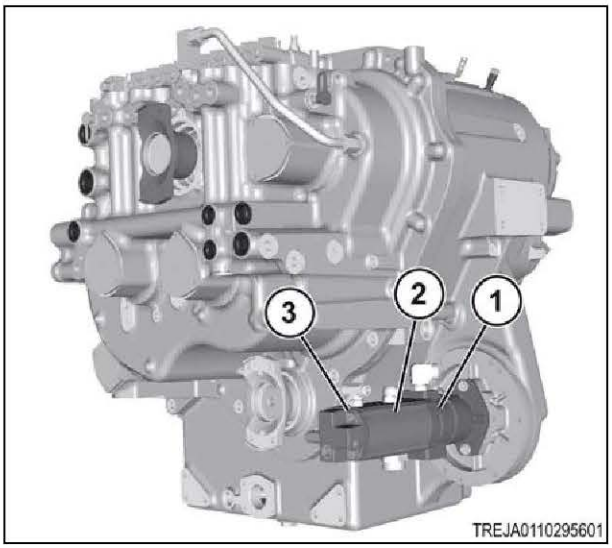

Fig. 21

3.3.3 Axle lubrication filter

The axle lubrication filter is on the left-hand side of the transmission. Oil from the second section of the tri-section pump goes to the P port on the axle lubrication filter. The axle lubrication filter has a 25 micron filter element.

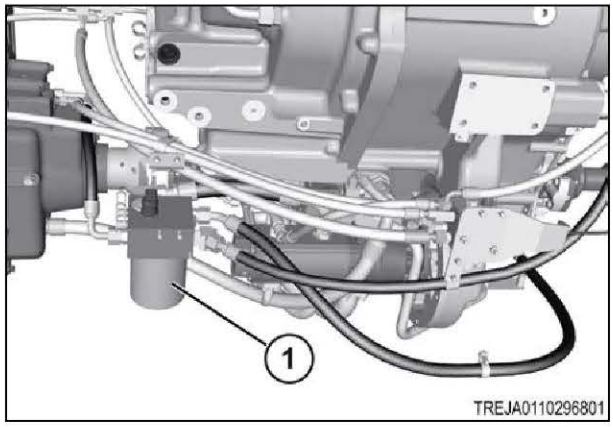

Fig. 22

Relief valve

The relief valve (1) is on the filter head. The relief valve has a breaking pressure of 483 kPa (70 psi).

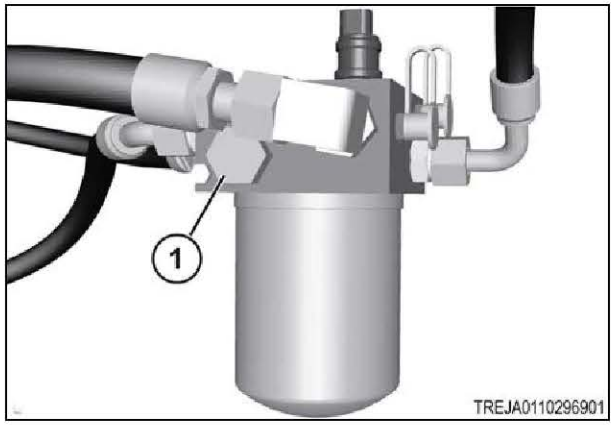

Fig. 23

Pressure switch

The pressure switch (1) is on the filter head. The switch is a normally open pressure switch with an opening adjustment range of 41 to 69 kPa (6 to 10 psi).

The axle lubrication pressure normally ranges from 103 to 415 kPa (15 to 60 psi).

If the lubrication pressure drops to less than 69 kPa (10 psi) the switch will send a signal to the transmission module.

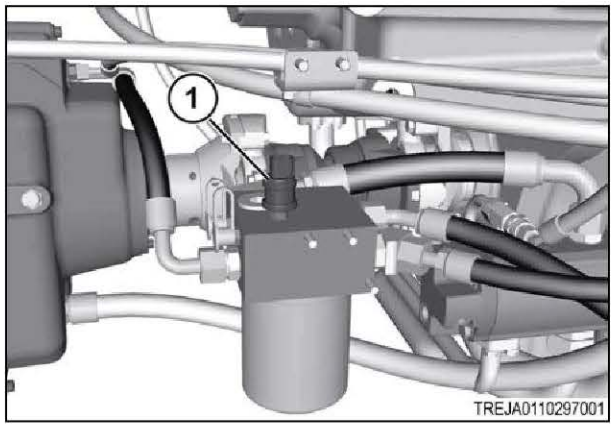

Fig. 24

3.4 Axle components

3.4.1 Remove the front axle

Before starting the procedure

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

Relieve the pressure from the system or component before disconnecting components.

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

IMPORTANT:
Contain all fluids during the performance of inspection, maintenance, doing tests, adjusting, and repair of the machine. Prepare to collect fluids with correct containers before opening any compartment or disassembling any component containing fluids.
Discard all fluids according to local regulations and laws.

Special tools

Description	Part number	Vendor	Where used	Mandatory
Jack stand brackets	1U-7498	Caterpillar dealer network	Drive train system	Mandatory
Axle lifting bracket	AG332299	K-Line	Drive train system	Mandatory

Procedure

1. Completely clean all components to prevent contamination from entering the system.
2. Park the machine on a solid level surface.
3. Stop the engine, apply the parking brake, and take the key with you.
4. Block the rear wheels.
5. Lock the articulation joint in position.
6. Wait for about five minutes for the hydraulic pressure to bleed off.
7. Before removal, fasten identification tags on components for correct installation at assembly. Put caps and plugs on all hoses, fittings, ports, and openings to prevent contamination from entering the system.

8. Remove the plugs (1) to fasten the jack stand brackets to the machine.

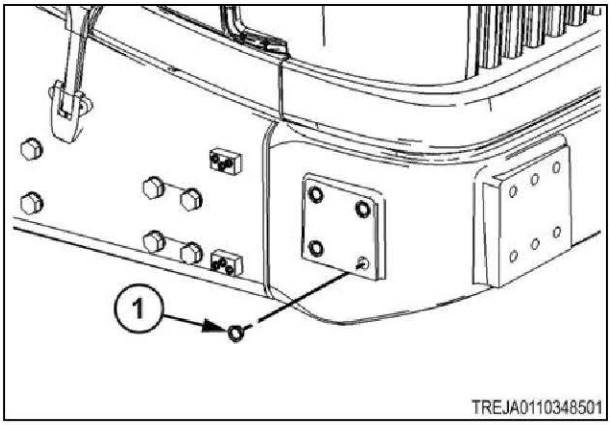

Fig. 25

9. Install jack stand brackets (1) to both sides of the front frame with four bolts (2).

Use jack stand brackets special tools part number 1U-7498.

NOTE:
The lifting device (3), *a jack stand* (4), *and a jack stand bracket are shown for reference*

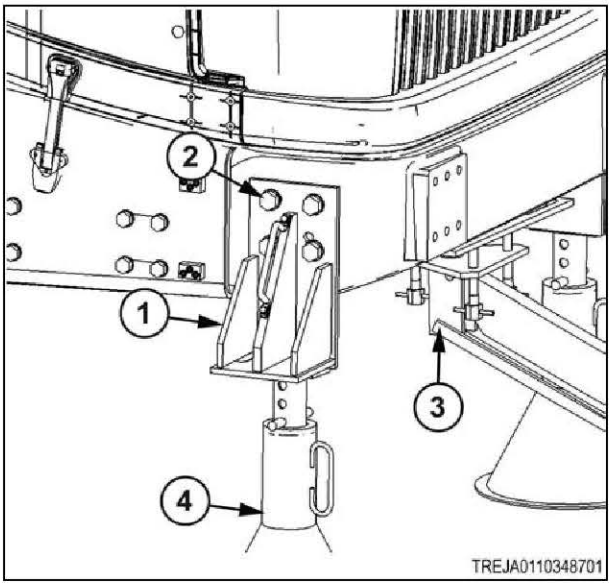

Fig. 26

10. This is the location (1) used for lifting the front of the machine.

IMPORTANT:
Make sure not to lift on the axle or serious damage can occur.

11. Put the correct lifting device under the front frame.

IMPORTANT:
The weight of the machine is approximately 21 300 kg (46 890 lb).

12. Raise the front end of the machine.

13. Install the correct jack stands under the jack stand brackets (1).

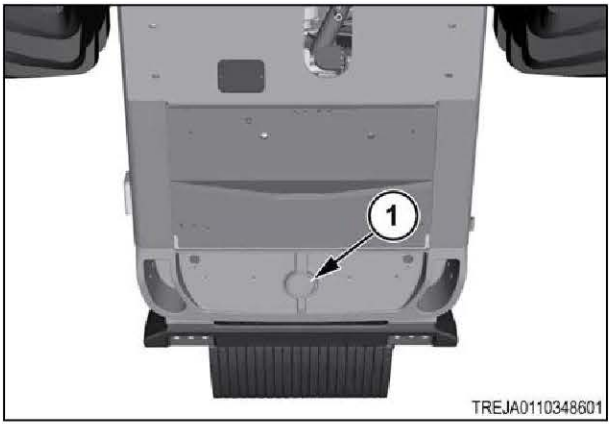

Fig. 27

14. Remove the wheels (1) from the axle.

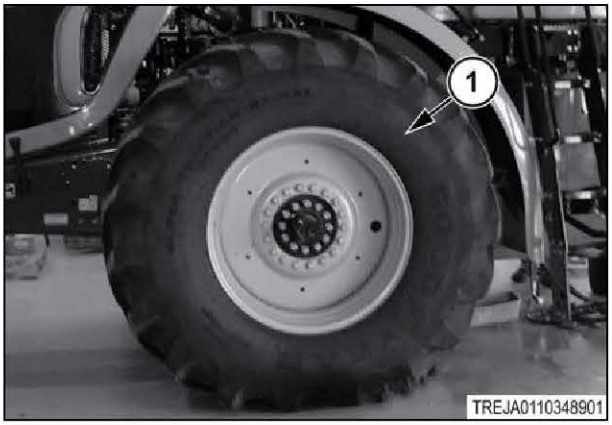

Fig. 28

15. Loosen and remove the four bolts (1) that mount the drive shaft (2) to the front axle (3).

16. Compress the drive shaft to the transmission.

17. Bleed down the brake system.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

Relieve the pressure from the system or component before disconnecting components.

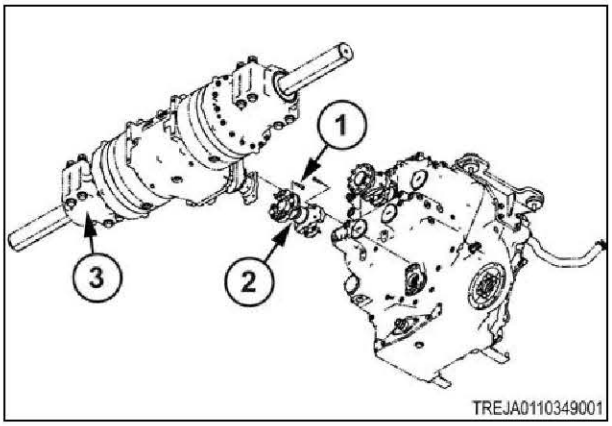

Fig. 29

18. Push the brake pedal multiple times until the low brake accumulator warning shows on the tractor management center.

Continue pushing the brake pedal until all the pressure releases, then hold the last push for approximately ten seconds.

19. Remove the axle lubrication supply line (1).

20. Remove the axle lubrication return line (2).

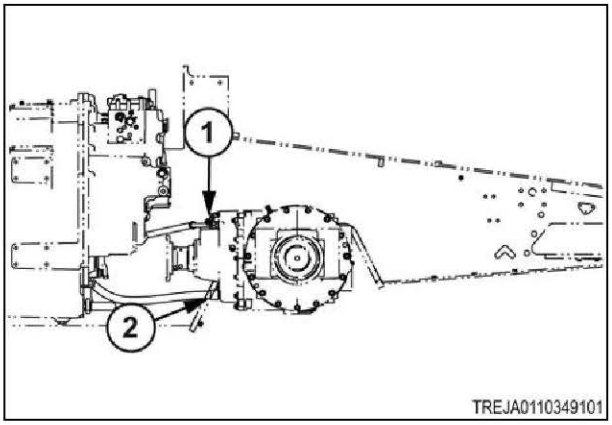

Fig. 30

21. Remove the service brake lines (1).

22. Remove the differential lock line (2).

23. Remove the park brake line (3).

24. Disconnect the electrical harnesses from the axle.

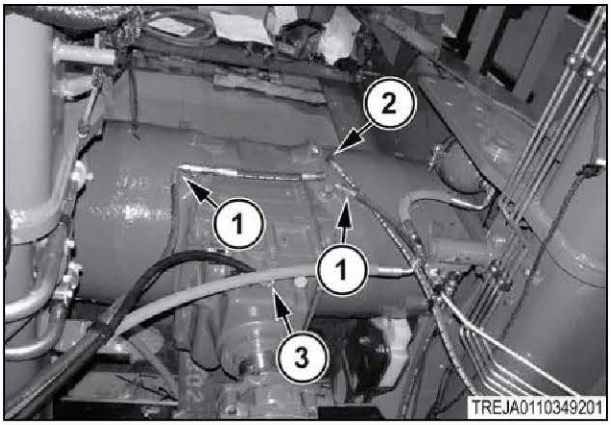

Fig. 31

25. Put an approved container under the axle to catch the axle fluid.

26. Remove the three drain plugs (1) for the center and trumpet compartments.

27. Remove the drain plugs (2) from the service brake compartments.

28. Drain the axle fluid.

29. After the axle fluid is drained, install the drain plugs.

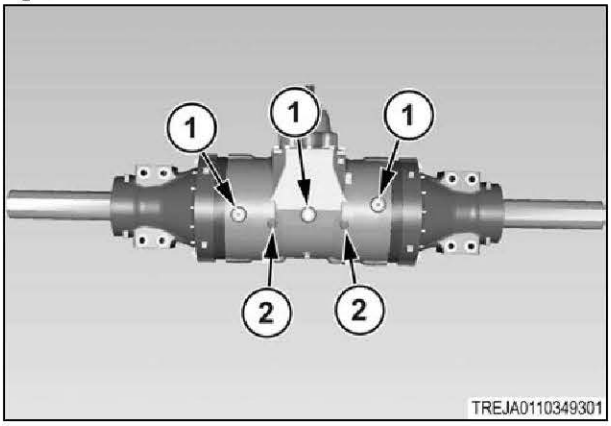

Fig. 32

30. The axle lifting bracket will help in the removal and installation of the axle onto the frame.

The axle lifting bracket special tools part number is AG332299.

31. Use the axle lifting bracket to transport the axles.

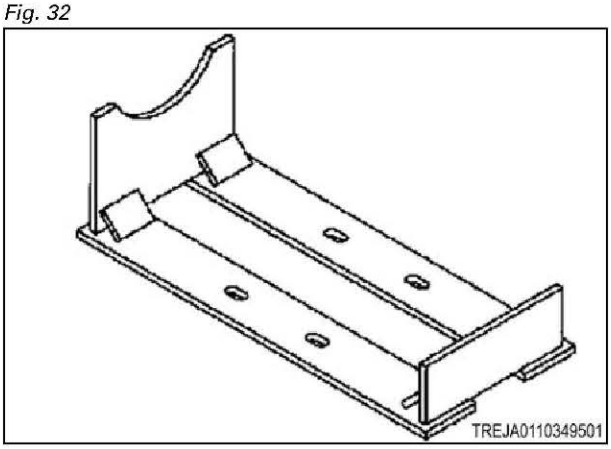

Fig. 33

32. Put the correct lifting device under the axle.

NOTE:
The weight of front axle is approximately 1618 kg (3568 lbs).

33. Fasten the axle to the lifting device.

34. Loosen and remove the four nuts and bolts on each side of the axle.

IMPORTANT:
Can be necessary to apply heat to loosen the nuts. Do not use heated fasteners again.

35. Lower the front axle and then move the front axle forward to clear the frame.

Fig. 34

36. Finish lowering the front axle to the ground.

37. Pull the axle out from the side of the machine.

38. Remove the three bolts (1) that fasten the yoke (2) to the input shaft of the front axle.

39. Remove the yoke.

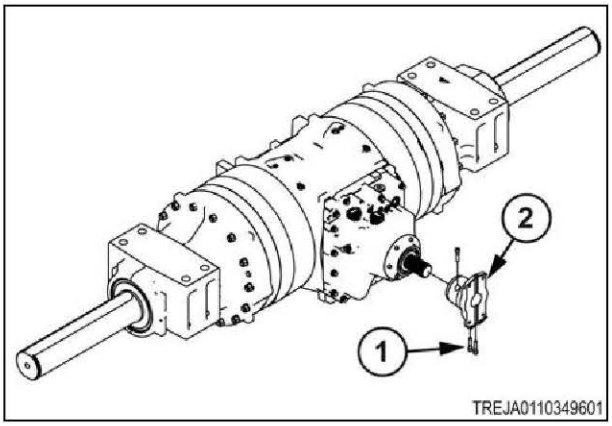

Fig. 35

Related Links

Remove the outside wheel page 14-3
Remove the center wheel page 14-4
Remove the inside wheel page 14-5

3.4.2 Install the front axle

Special tools

Description	Part number	Vendor	Where used	Mandatory
Axle lifting bracket	AG332299	K-Line	Drive train system	Mandatory

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Make sure the rear wheels are blocked.

2. Make sure the articulation joint is locked in position.

3. Make sure that the machine is supported with the correct jack stands (1).

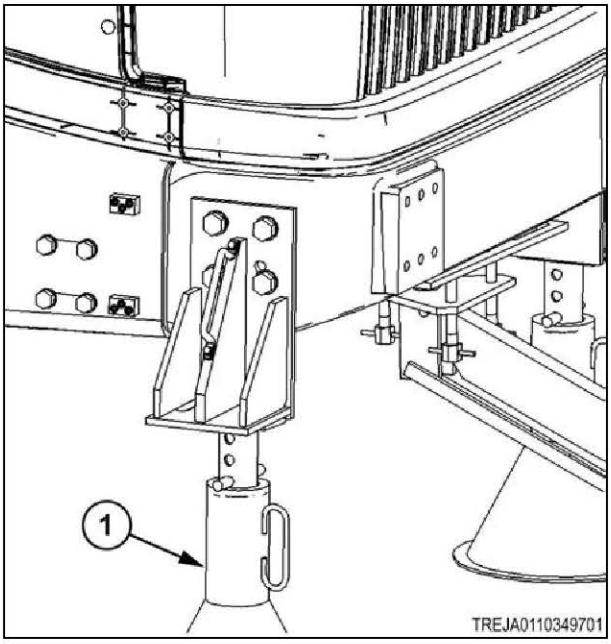

Fig. 36

4. Align the splines of the yoke (1) to align to the splines of the input shaft on the front axle.
5. Slide the yoke on until able to install the bolt (2) through the keyway and tighten on the input shaft.
6. Fasten the yoke with the two bolts (3).

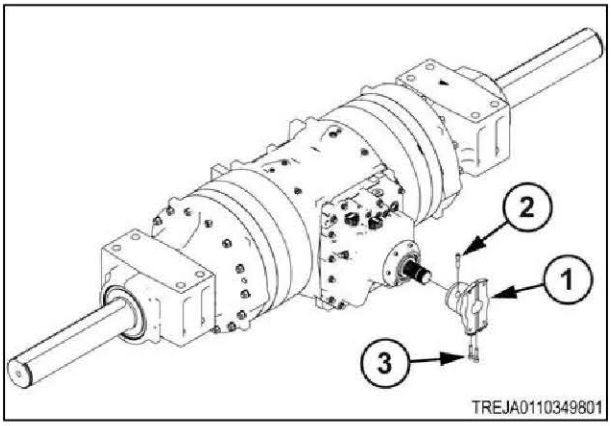

Fig. 37

7. Connect the axle lifting bracket and correct lifting equipment to the front axle.

   IMPORTANT:
   The weight of the front axle is approximately 1618 kg (3568 lb).

8. Move the front axle into position under the machine in front of the wheel wells.
9. Raise the front axle high enough to clear the bottom of the frame.
10. Move the front axle rearward and raise the front axle to the final position.

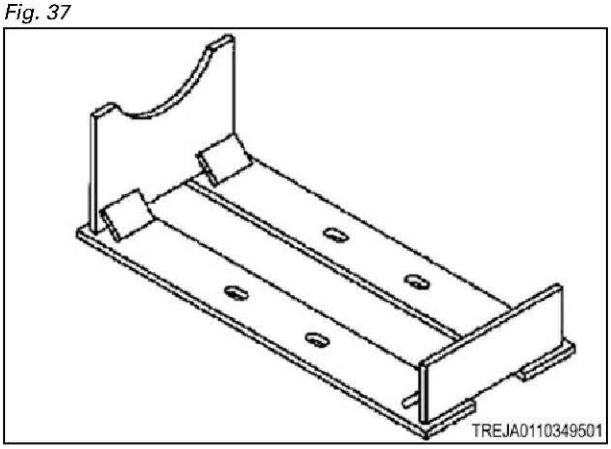

Fig. 38

11. Mount the front axle with the eight bolts with washers (1).

Apply the correct thread locking compound (1) to the threads of the bolts before installing the washers and the nuts (2)

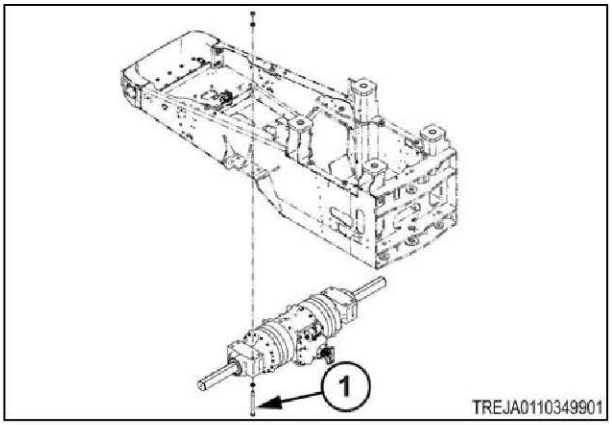

Fig. 39

12. Install the washers and the nuts (2) on both sides of the machine to finger tight before fully tightening the bolts.

Fig. 40

13. Torque the nuts to 350 Nm (258 lbf ft).

14. Tighten the nuts an additional 160° to 180° to get the correct tension.

NOTE: *Do not exceed 2200 Nm (1623 lbf ft).*

Fig. 41

15. Extend the drive shaft (1) and install to the yoke (2) on the input shaft of the front axle.

16. Install the four bolts (3).

Tighten the bolts (3) to 135 to 165 Nm (100 to 122 lbf ft).

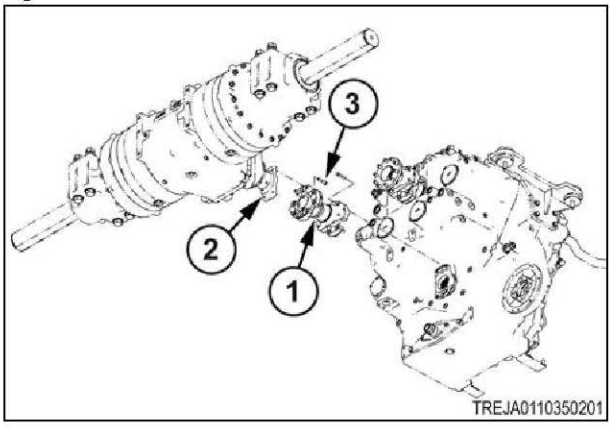

Fig. 42

17. Install the axle lubrication supply line (1).
    The axle lubrication supply line feeds from the outlet port on the middle section of the tri-section pump.
18. Install the axle lubrication return line (2).
    The axle lubrication return line feeds into the transmission on the left-hand side just above the tri-section pump.

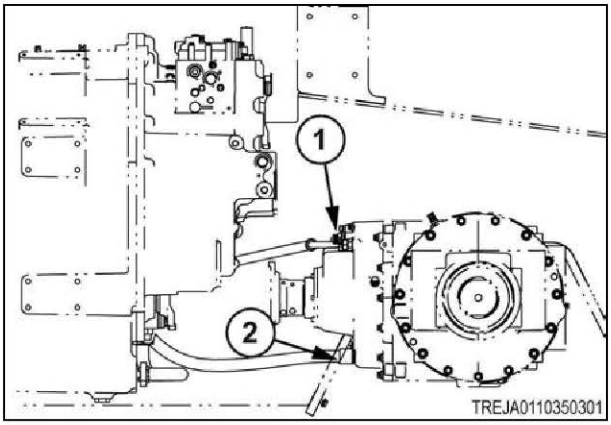

Fig. 43

19. Install the service brake lines (1).
20. Install the differential lock line (2).
21. Install the park brake line (3).
22. Install the electrical harnesses to the front axle.

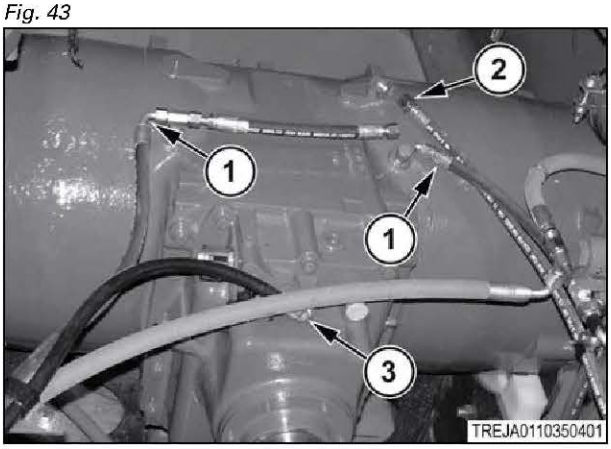

Fig. 44

23. Install the tire and the rim assemblies (1) to the front axle
24. Fill the hydraulic oil to the correct level.
25. Remove all air from the service brake that possibly has entered the system.

Fig. 45

Related Links

Install the inside wheel page 14-8
Install the center wheel page 14-11
Install the outside wheel page 14-13
Lubricant viscosities page 1-18
Purge the service brake page 7-84

3.4.3 Remove the rear axle

Before starting the procedure

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

Relieve the pressure from the system or component before disconnecting components.

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

IMPORTANT:
Contain all fluids during the performance of inspection, maintenance, doing tests, adjusting, and repair of the machine. Prepare to collect fluids with correct containers before opening any compartment or disassembling any component containing fluids.
Discard all fluids according to local regulations and laws.

Special tools

Description	Part number	Vendor	Where used	Mandatory
Jack stand brackets	1U-7498	Caterpillar dealer network	Drive train system	Mandatory
Axle lifting bracket	AG332299	K-Line	Drive train system	Mandatory

Procedure

1. Completely clean all components to prevent contamination from entering the system.
2. Park the machine on a solid level surface.
3. Stop the engine, apply the parking brake, and take the key with you.
4. Block the rear wheels.
5. Lock the articulation joint in position.
6. Wait for about five minutes for the hydraulic pressure to bleed off.
7. Before removal, fasten identification tags on components for correct installation at assembly. Put caps and plugs on all hoses, fittings, ports, and openings to prevent contamination from entering the system.
8. Lock the articulation joint in position.
9. Put the correct lifting device under the rear plate (1).

   IMPORTANT:
   Make sure not to lift on the axle or serious damage can occur.

10. Raise the rear of the machine.

    IMPORTANT:
    The weight of the machine is approximately 21 300 kg (46 890 lb).

11. Install the correct jack stands under the rear frame (2).

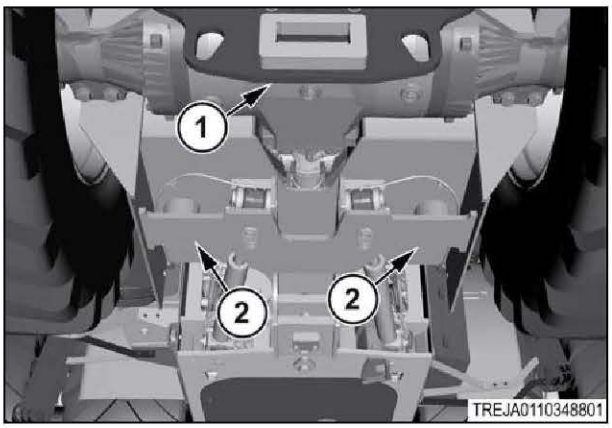

Fig. 46

12. Remove the wheels from the rear axle.

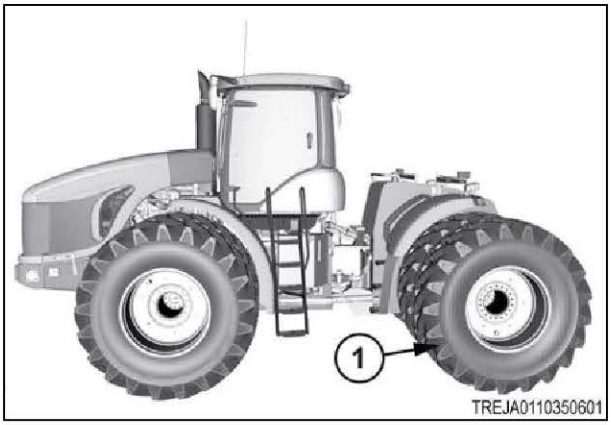

Fig. 47

13. Loosen and remove the four bolts (1) that mount the drive shaft (2) to the rear axle (3).

14. Loosen and remove the bolts and washers (4) that hold the carrier bearing (5).

15. Compress the drive shaft to the transmission.

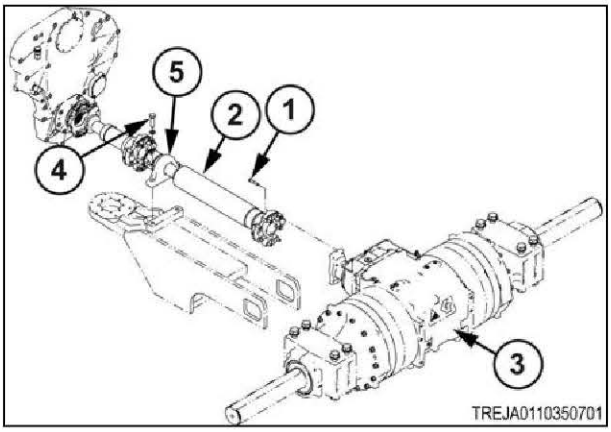

Fig. 48

16. Before the removal of the axle, pull out the drawbar.

17. Remove the hardware (1).

18. Remove the two drawbar pin(2).

19. Release the locking device and remove the pin (3).

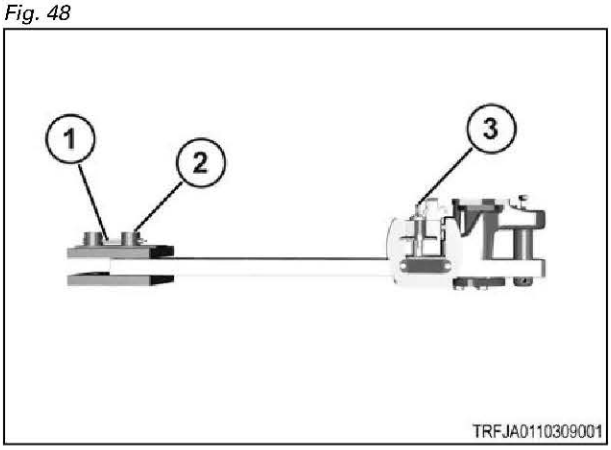

Fig. 49

20. Use the correct lifting device and remove the drawbar (1).

21. Bleed down the brake system.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

Relieve the pressure from the system or component before disconnecting components.

22. Push the brake pedal multiple times until the low brake accumulator warning shows on the tractor management center.

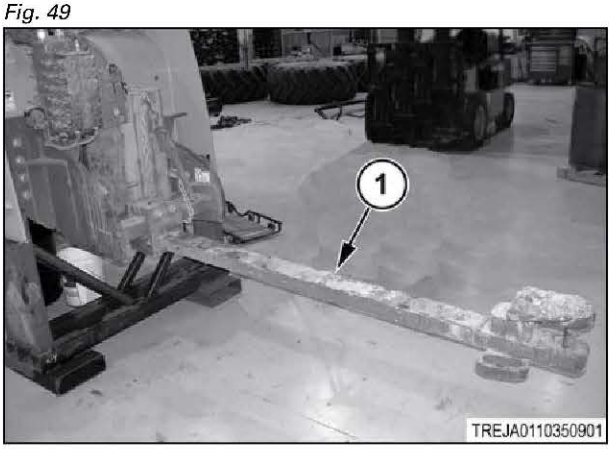

Fig. 50

23. Continue pushing the brake pedal until all the pressure releases, then hold the last push for approximately ten seconds.

24. Remove the axle lubrication supply line (1) and the axle lubrication return line (2).

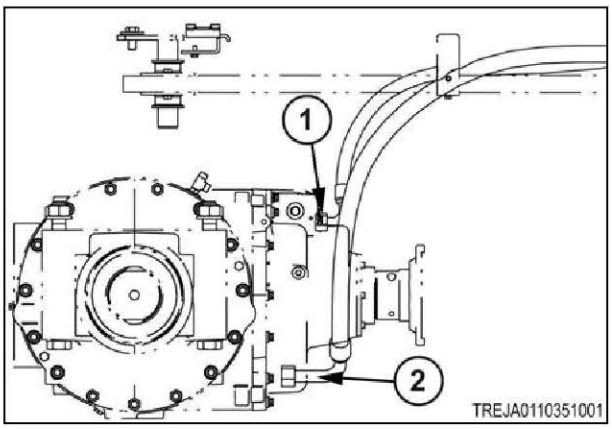

Fig. 51

25. Remove the service brake supply line (1) and the locking differential line (2).

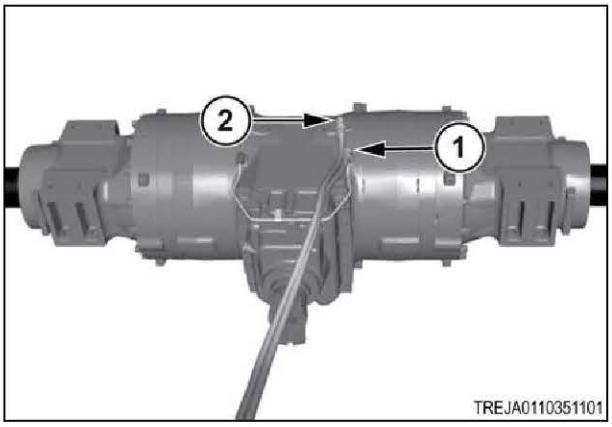

Fig. 52

26. Put an approved container under the axle to catch the axle fluid.

27. Remove the three drain plugs (1) for the center and trumpet compartments.

28. Remove the drain plugs (2) from the service brake compartments.

29. Drain the axle fluid.

30. After the axle fluid is drained, install the drain plugs.

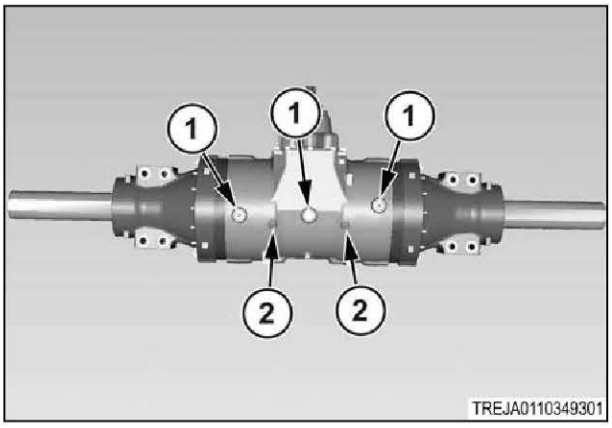

Fig. 53

31. The axle lifting bracket will help in the removal and the installation of the axle onto the frame.

The axle lifting bracket special tools part number is AG332299.

32. To transport the axles, use the axle lifting bracket.

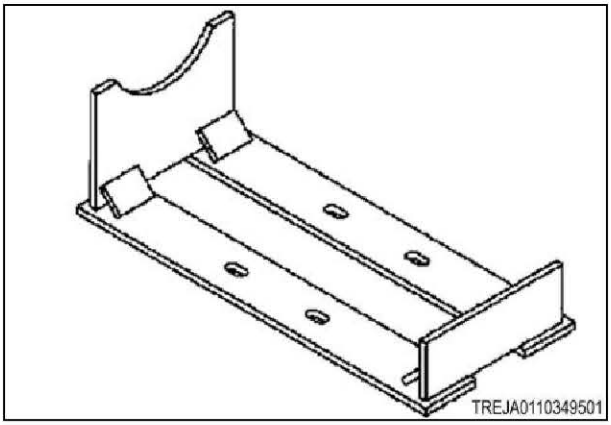

Fig. 54

33. Put the correct lifting device under the axle.

IMPORTANT:
The weight of the rear axle is approximately 1618 kg (3568 lb).

34. Fasten the axle to the lifting device.

35. Loosen the eight nuts and washers (1) that fasten the axle (2) to the frame.

NOTE:
If necessary, apply heat to loosen the nuts. Do not use heated fasteners again.

36. Remove the nuts and washers (1) and remove the eight bolts with the washers (3).

37. Slowly lower the axle (2) to the ground.

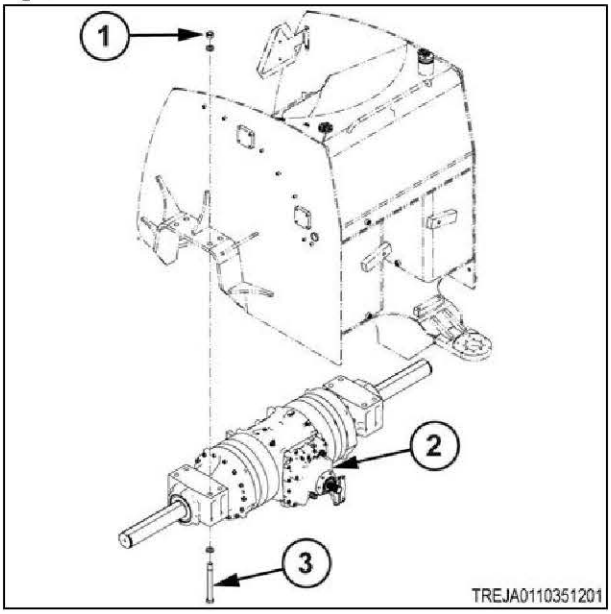

Fig. 55

38. Pull the axle (1) out from the side of the machine.

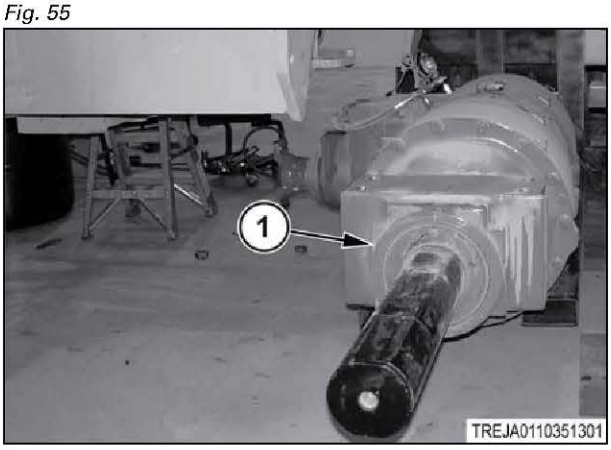

Fig. 56

39. Remove the bolt (1) and bolts (2) that fasten the yoke (3).

40. Remove the yoke.

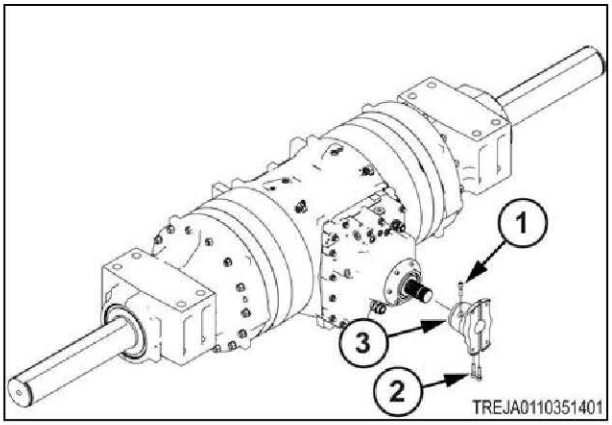

Fig. 57

Related Links

Remove the outside wheel page 14-3
Remove the center wheel page 14-4
Remove the inside wheel page 14-5

3.4.4 Install the rear axle

Special tools

Description	Part number	Vendor	Where used	Mandatory
Axle lifting bracket	AG332299	K-Line	Drive train system	Mandatory

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Make sure the rear wheels are blocked.

2. Make sure the articulation joint is locked in position.

3. Make sure the machine is supported with the correct jack stands .

4. Make sure the correct jack stands are installed under the rear frame (1).

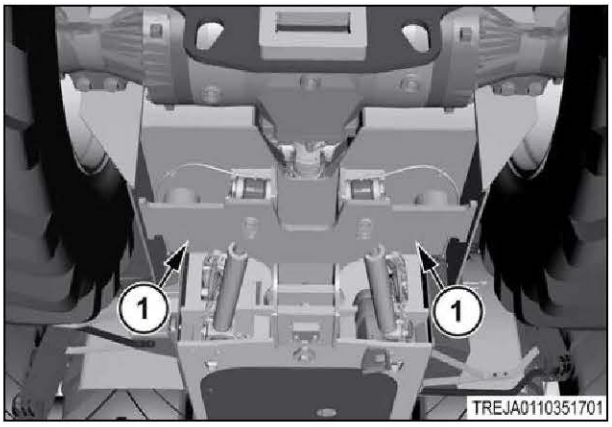

Fig. 58

5. Align the splines of the yoke (1) to the splines of the input shaft on the rear axle.

6. Slide the yoke on until able to install the bolt (2) through the keyway and tighten on the input shaft.

7. Fasten the yoke with the two bolts (3).

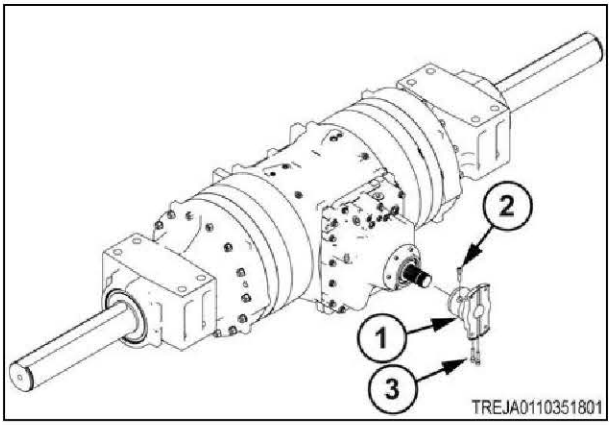

Fig. 59

8. Fasten the axle lifting bracket and correct lifting equipment to the rear axle.

IMPORTANT:
The weight of rear axle is approximately 1618 kg (3568 lb).

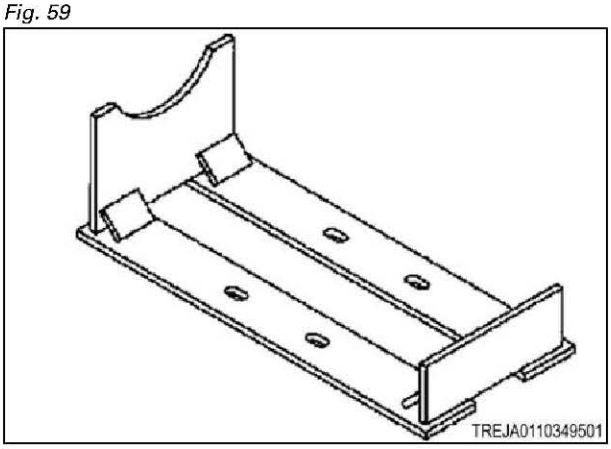

Fig. 60

9. Move the axle under the machine.

10. Raise the axle into position under the frame using the correct lifting device .

11. Mount the axle (1) with the eight bolts (2) and the washers .

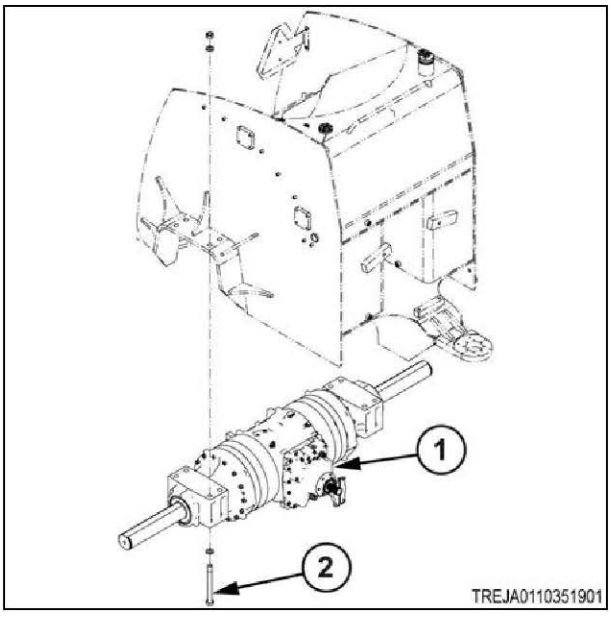

Fig. 61

12. Apply the correct thread locking compound to the threads of the bolts before installing the washers and the nuts (1).

13. Install the washers and the nuts (1) on both sides of the machine to finger tight before fully tightening the bolts.

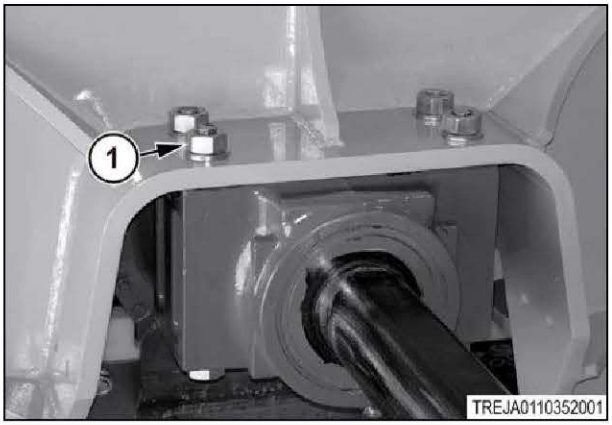

Fig. 62

14. Torque the nuts to 350 Nm (258 lbf ft).

15. Tighten the nuts an additional 160° to 180° to get the correct tension.

NOTE: *Do not exceed 2200 Nm (1623 lbf ft).*

16. Install the tire and the rim assemblies.

See the information for the tire and rim assembly installation .

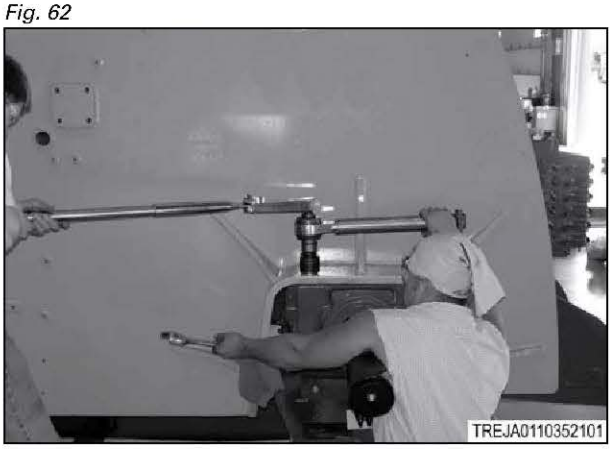

Fig. 63

17. Extend the drive shaft (1) and install to the yoke (2) on the input shaft of the rear axle (3).

18. Install the four bolts (4).

Tighten the bolts (4) to 135 to 165 Nm (100 to 122 lbf ft).

19. Install the carrier bearing (5) with two bolts (6).

Tighten the bolts (6) to 660 to 690 Nm (487 to 509 lbf ft).

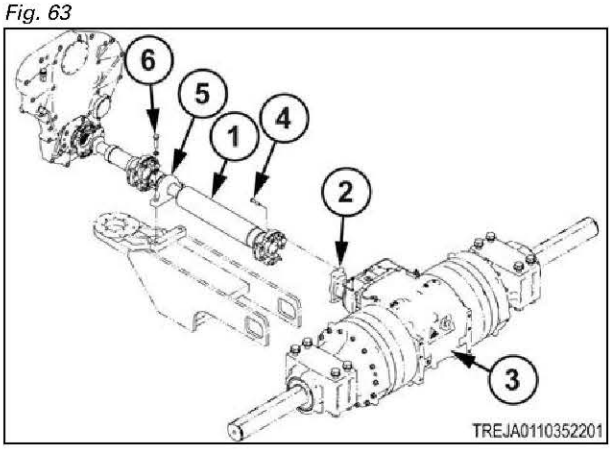

Fig. 64

20. Install the axle lubrication supply line (1) to the supply port on the rear axle.

The axle lubrication supply line feeds from the outlet port on the middle section of the tri-section pump.

21. Install the axle lubrication return line (2) to the return port on the rear axle.

The axle lubrication return line feeds into the rear, right-hand side of the transmission just above the sight gauge.

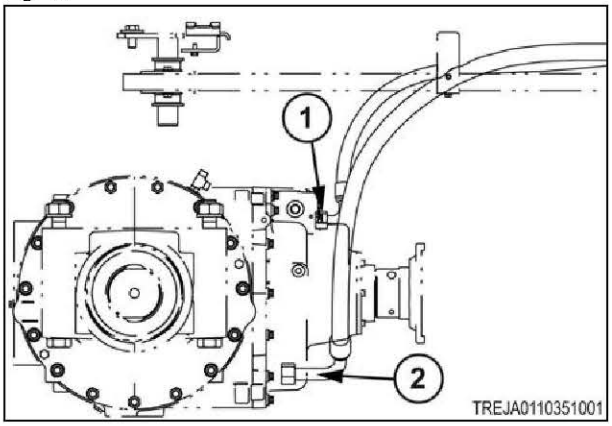

Fig. 65

22. Install the service brake supply line (1) and the locking differential line (2).

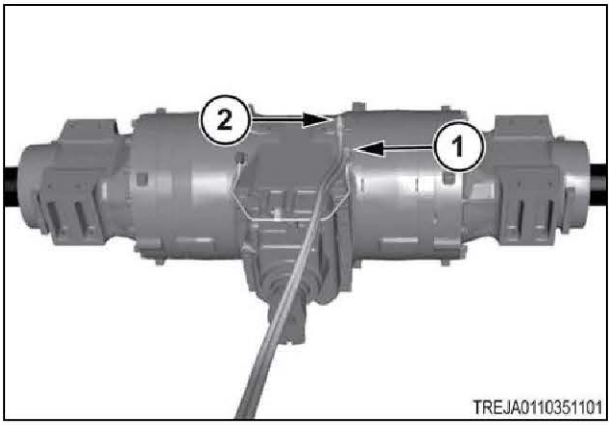

Fig. 66

23. Install the drawbar.

24. Install the drawbar pin (1) with the two drawbar pin retainers (2).

25. Fasten with two bolts with washers (3).

26. Install the pin (4) and lock the pin in position.

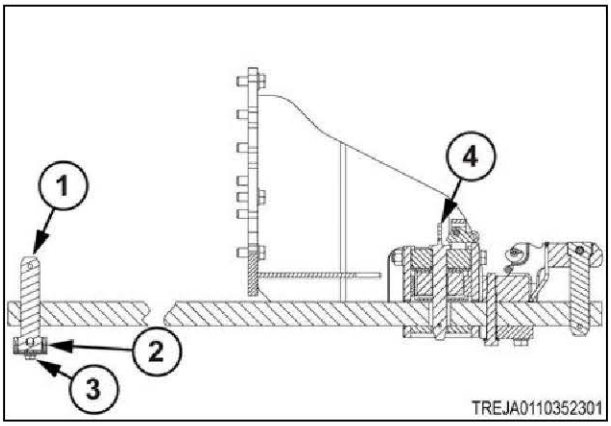

Fig. 67

27. Install the tire and the rim assemblies (1) to the rear axle.

See the information for the tire and rim assembly installation

28. Lower the machine to the ground.

29. Fill the hydraulic oil to the correct level.

See the specifications for the correct type and quantity of transmission oil.

30. Remove all air from the service brake that possibly has entered the system.

See the information for purging the service brake.

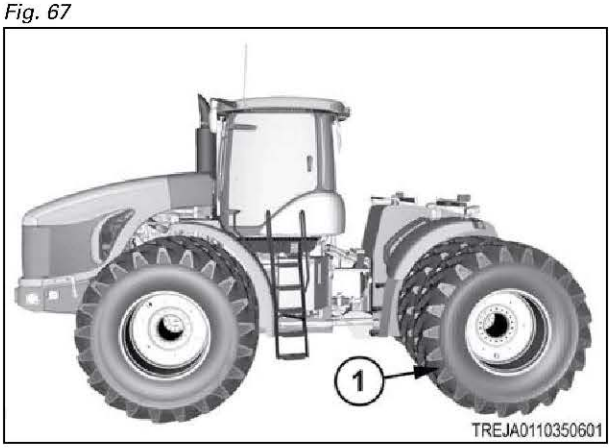

Fig. 68

3.4.5 Remove the tri-section pump

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Before starting the removal procedure, fully clean the outside of the components. This will help in preventing dirt from entering internal mechanism.

IMPORTANT:
Put identification marks on all hoses, all hose assemblies, all wires, and all tube assemblies for installation purposes. Use plugs on all hose assemblies and all tube assemblies. This prevents fluid loss and keeps contaminants from entering the system.

2. Have the correct container ready for draining the fluids.

3. Drain the transmission fluid before removing the pump.

4. Drain the oil into an approved container by removing the oil plug (1).

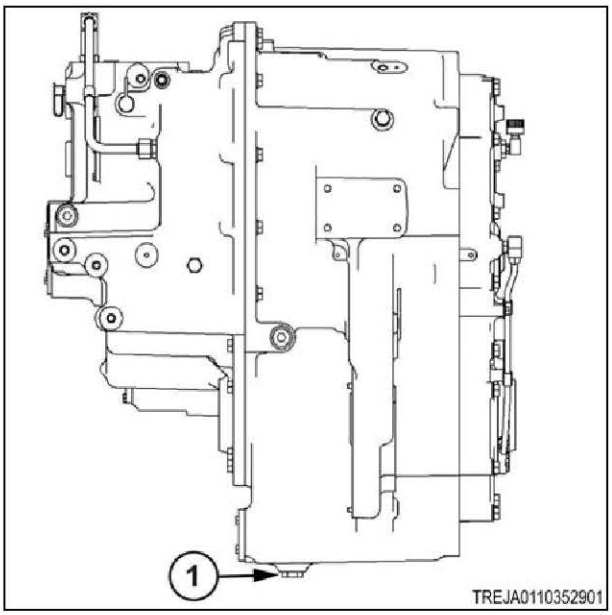

Fig. 69

5. Remove the supply line (1) from the rear section of the tri-section pump.

6. Remove the outlet lines (2) connected to the tee on the outlet port on the rear section of the tri-section pump.

NOTE:
Use the rear section of the pump for the service and the parking brake circuit.

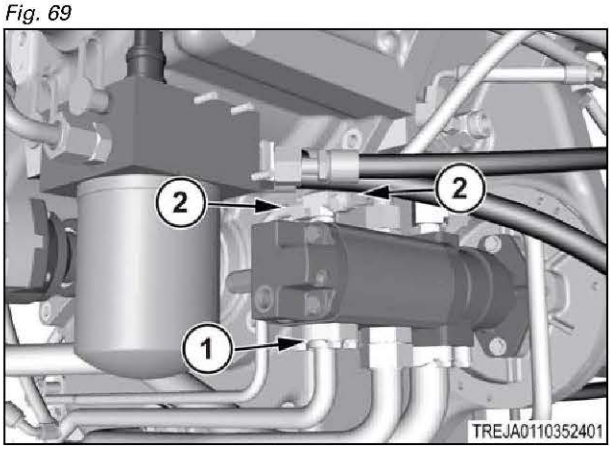

Fig. 70

7. Remove the supply line (1) from the middle section of the tri-section pump.

8. Remove the outlet line (2) from the outlet port on the middle section of the tri-section pump.

NOTE:
Use the middle section of the pump for the axle lubrication circuit.

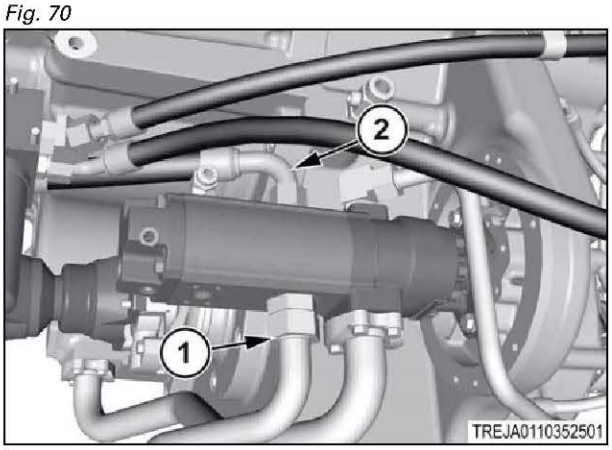

Fig. 71

9. Remove the supply line (1) to from the front section of the tri-section pump.

10. Remove the outlet line (2) from the outlet port on the front section of the tri-section pump.

NOTE:
Use the front section of the pump for the differential lock and the transmission lubrication circuit.

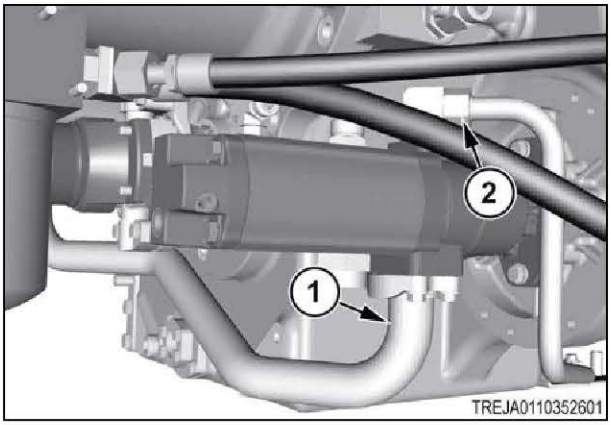

Fig. 72

11. Connect correct lifting equipment, support the pump (1), and remove the two bolts and washers (2).

IMPORTANT:
The weight of the pump is approximately 20 kg (44 lb).

12. Remove the pump and the O-ring (3).

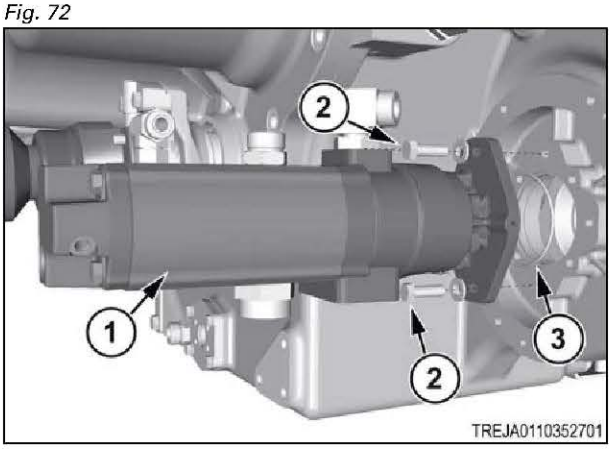

Fig. 73

13. Remove the straight connector (1), the tee (2), straight connector (3), and the elbow (4).

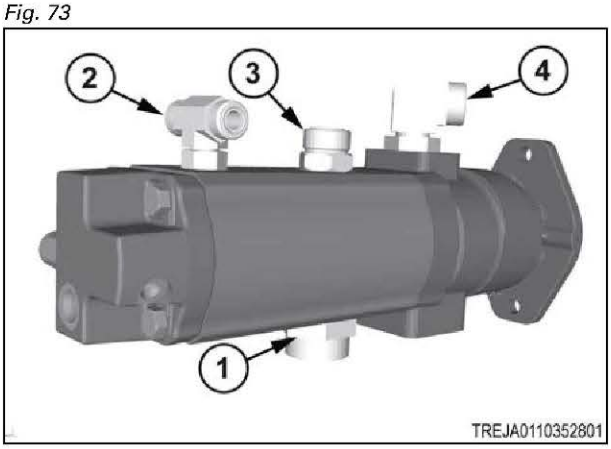

Fig. 74

3.4.6 Disassemble the tri-section front pump

The tri-section pump contains three separate pumps assembled together.

The front section of the tri-section pump is shown disassembled in this view.

The middle section and the rear section are shown assembled.

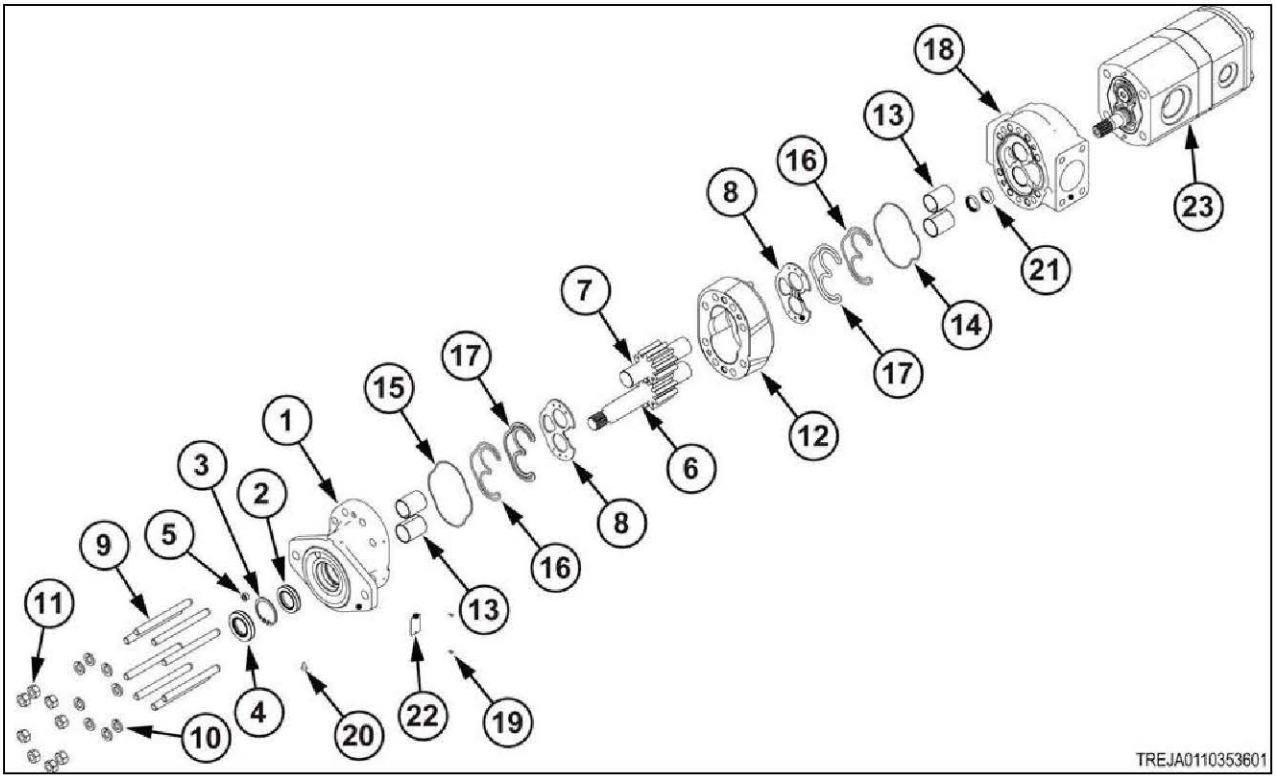

Fig. 75

(1) Front cover
(2) Inner shaft seal
(3) Internal retaining ring
(4) Outer shaft seal
(5) Plug npt w/0.0465 orifice
(6) Drive gear
(7) Driven gear
(8) Wear plate
(9) Stud
(10) Lock washer
(11) Nut
(12) Center section
(13) Bushing
(14) O-ring
(15) O-ring
(16) E-ring seal
(17) E-ring retainer
(18) Port section
(19) Drive screw
(20) Weep hole plug
(21) Shaft seal
(22) Nameplate
(23) Middle and rear pump sections

Procedure

1. Contain all fluids during inspection, maintenance, testing, adjusting, and repair of the machine. Prepare to contain fluids with correct containers before opening any disassembling any component containing fluids. Discard all fluids according to local compartment or regulations and laws.
2. Very important to work in a clean work area when repairing the hydraulic products.
3. Plug the ports and wash the outside of the pump with the correct cleaning solvent before continuing.
4. Remove the port plugs and then drain the oil from the pump into the correct container.
5. Do not mark the outside of the pump before disassembly.

   The front cover, the center section, and the rear cover all have notches cast into the edges of these parts.
6. Line up the notches of these three parts for the correct assembly and for the correct rotation of the pump.
7. If equipped, remove the key from the drive shaft.
8. Fasten the pump across the protected ports in a large vise or holding fixture with the shaft end up.

9. Loosen and remove the eight nuts (1) and the lock washers from the stud bolts.

10. Remove the pump from the vise and put the pump on a clean work bench.

11. Use a plastic mallet to disconnect the front cover from the pump.

The two dowel pins which align the front cover, the center section, and the rear cover are a tight fit.

The parts will require the use of a plastic mallet to disconnect these parts.

Fig. 76

IMPORTANT:
Do not use a screwdriver and or other tools to disconnect these parts.

12. Remove the front cover.

13. Identify the intersecting teeth of the drive and the driven gears before removing from the pump.

14. Carefully remove the drive gear (1) from the pump and put the drive gear on a clean work bench.

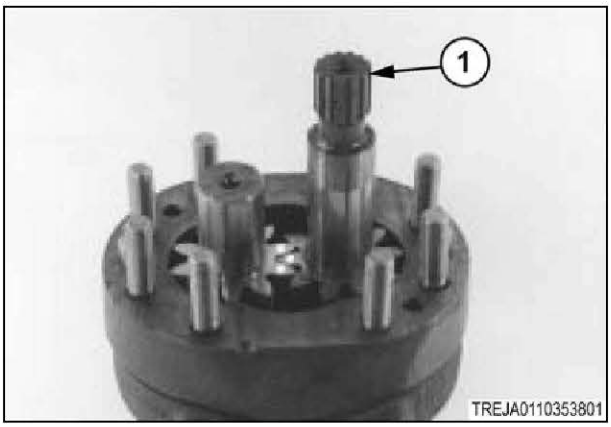

Fig. 77

15. Remove the driven gear (1) from the pump and put the driven gear on a clean work bench.

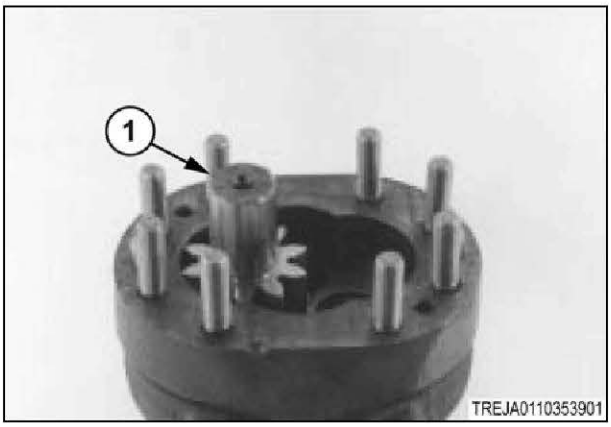

Fig. 78

16. Remove the center section (1) from the pump.

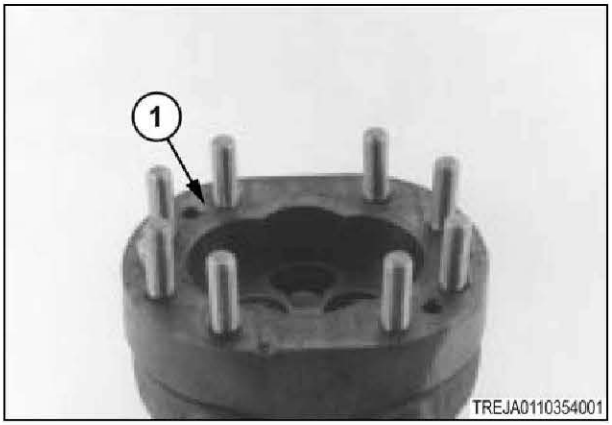

Fig. 79

17. Remove the eight studs (1) from the rear cover.

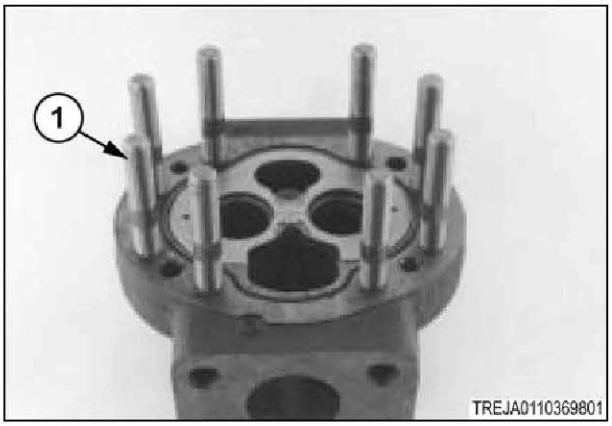

Fig. 80

18. Remove the wear plate (1) from the rear cover.

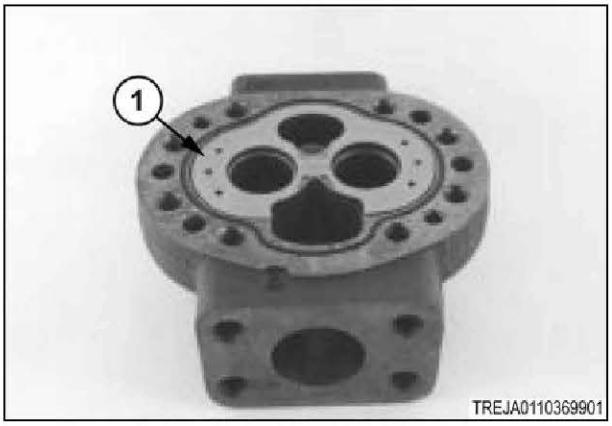

Fig. 81

19. Remove the seal retainer (1) from the rear cover and discard.

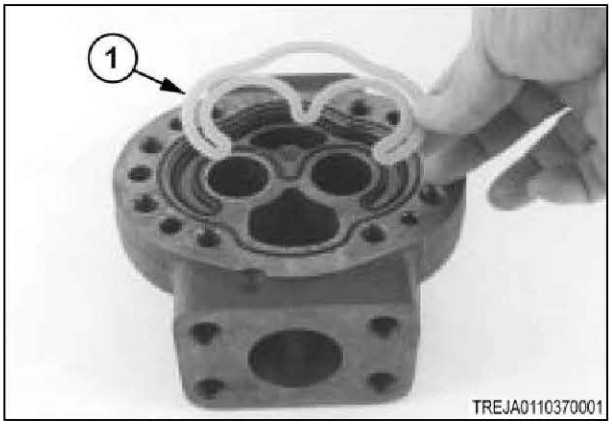

Fig. 82

20. Remove the seal gland (1) from the rear cover and discard.

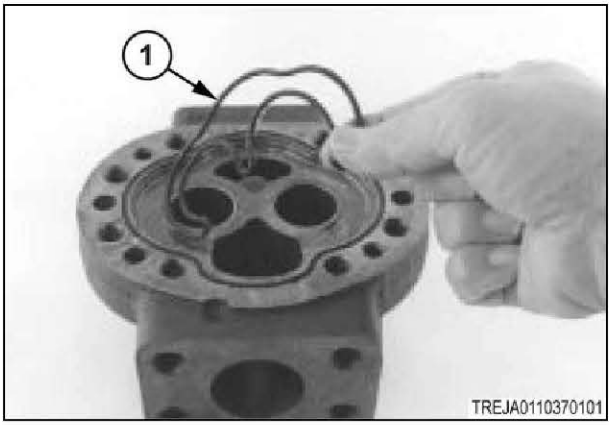

Fig. 83

21. Remove the square cross section O-ring (1) from the rear cover and discard.

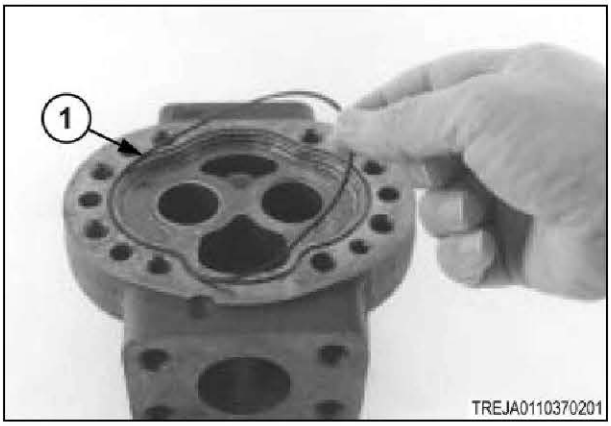

Fig. 84

22. Remove the wear plate (1) from the front cover.

23. Remove the rubber plug from the seal leakage hole.

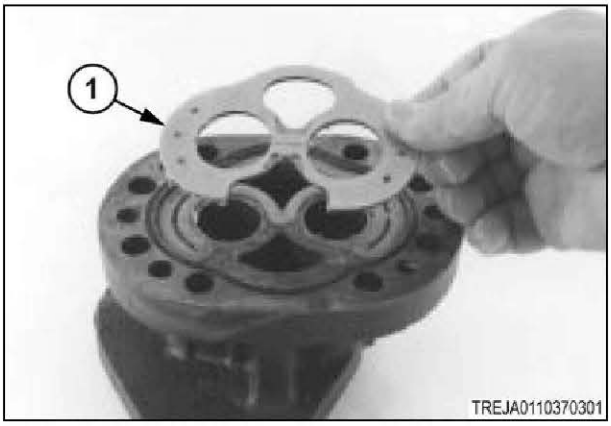

Fig. 85

24. Remove the seal retainer (1) from the front cover and discard.

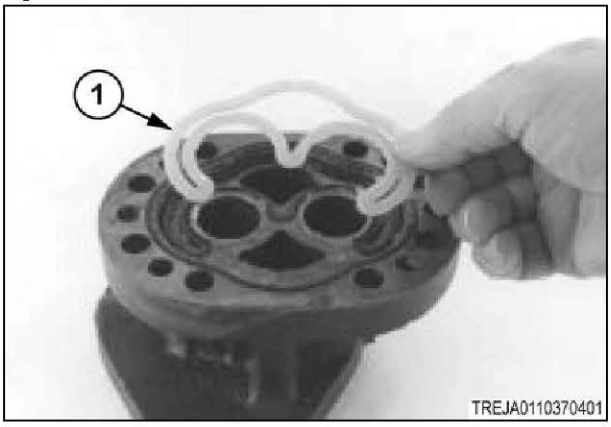

Fig. 86

25. Remove the seal gland (1) from the front cover and discard.

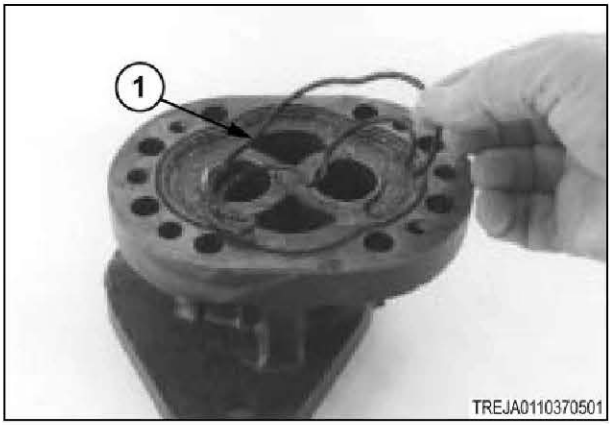

Fig. 87

26. Remove the square cross section O-ring (1) from the front cover and discard.

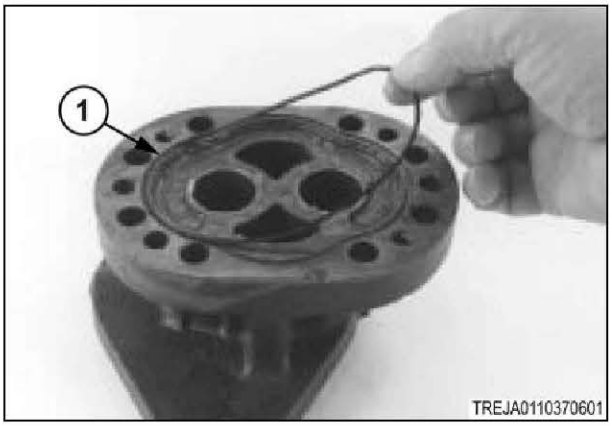

Fig. 88

27. If equipped, remove the seal retainer from the front cover.

28. Use a screwdriver or a seal removal tool to remove the shaft seal from the front cover.

29. Clean and dry all parts completely before inspection.

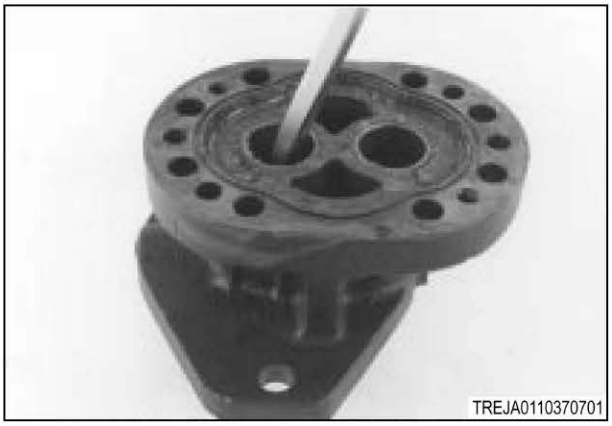

Fig. 89

30. Inspect all parts for damage.

It is not not necessary to inspect the seals.

Replace the seals with new seals.

31. Check the drive gear spline damage.

It is not not necessary to inspect the seals.

32. Inspect the gear journals for damage and changes in color.

Any changes of color in the shaft requires the replacement of the drive gear.

33. Inspect the gear teeth for damage. Replace if necessary.

Light stoning of the teeth is permitted to remove the sharp edges.

Fig. 90

34. Inspect the gear face of both drive gears and the driven gears for damage.

If the face edge of the gear teeth are sharp, the gear teeth will cut into the wear plates.

35. Replace the gears if any damage on the face of the gears has occurred.

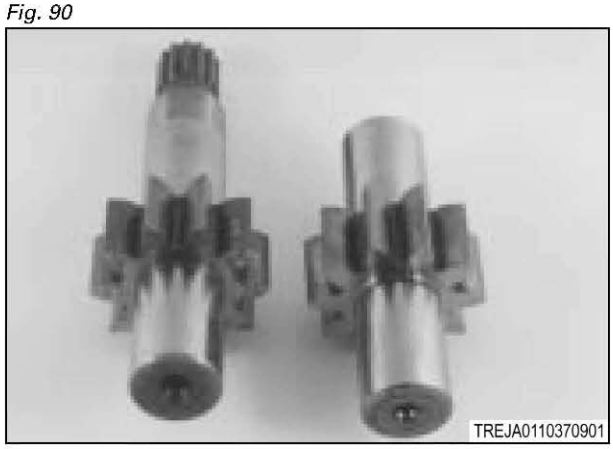

Fig. 91

36. Inspect the bearings in the front cover for damage and movement of the bearings.

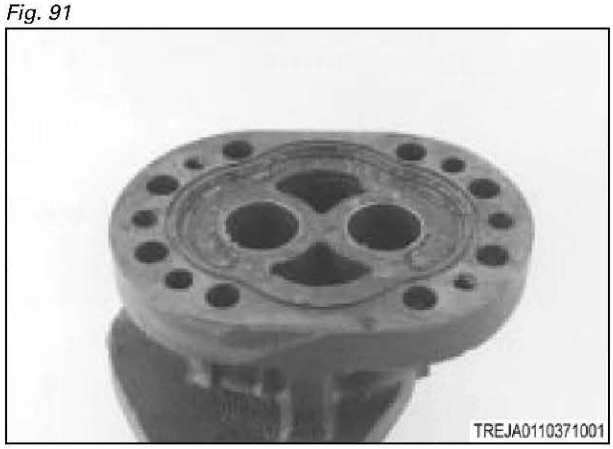

Fig. 92

37. Inspect the bearings in the rear cover for damage and movement of the bearings.

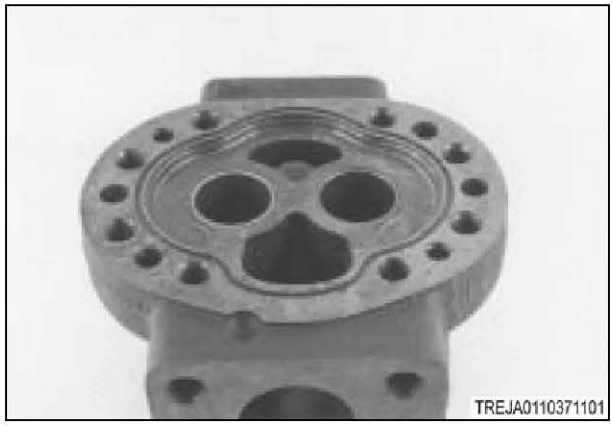

Fig. 93

38. Inspect the gear pockets inside the center section.

It is normal for the surface inside the gear housing to show a clean wipe on the inside gear pocket wall on the intake side.

There must not be excessive damage.

Fig. 94

39. Inspect the bronze side of both wear plates (1) for erosion, pitting, scratches, or scoring. Replace if damaged.

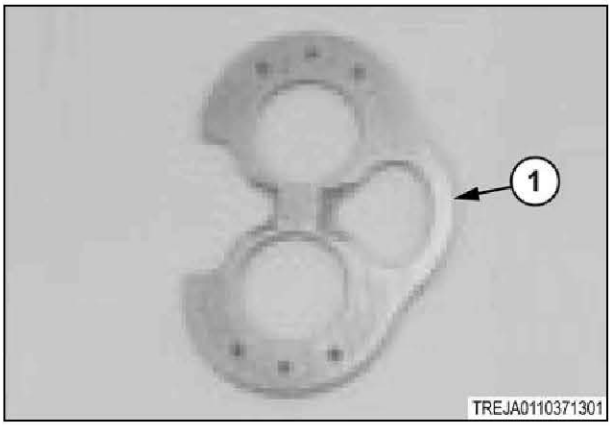

Fig. 95

3.4.7 Disassemble the tri-section rear pump

The tri-section pump contains three separate pumps assembled together.

The rear and the midle sections of the tri-section pump are shown disassembled in this view. The front section is not shown.

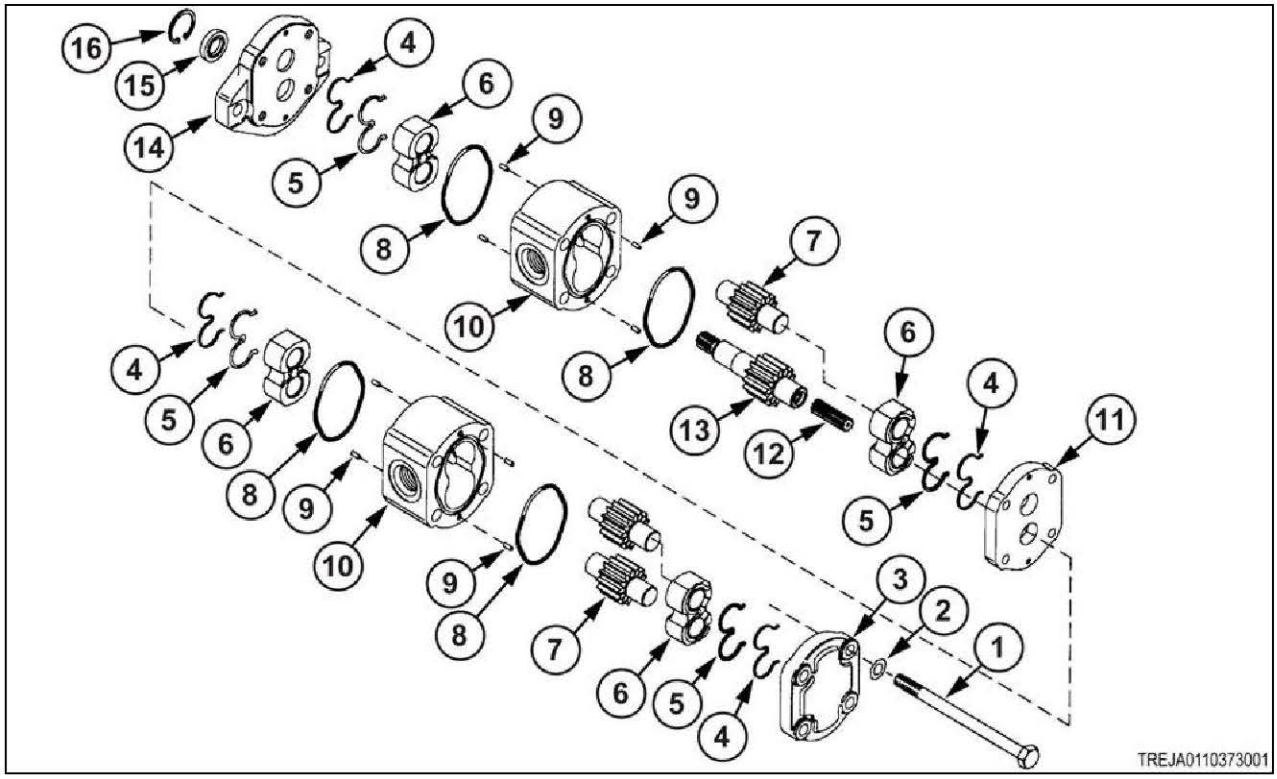

Fig. 96

(1) Bolt
(2) Spacer
(3) End cover
(4) Backup ring
(5) E-seal
(6) Bearing block
(7) Driven gear
(8) O-ring
(9) Dowel pin
(10) Gear housing
(11) Distance plate
(12) Coupling
(13) Drive gear
(14) Mounting flange
(15) Shaft seal
(16) Retaining ring

Procedure

1. Contain all fluids during inspection, maintenance, testing, adjusting, and repair of the machine. Prepare to contain fluids with correct containers before opening any disassembling any component containing fluids. Discard all fluids according to local compartment or regulations and laws.
2. Very important to work in a clean work area when repairing the hydraulic products.
3. Plug the ports and wash the outside of the pump with the correct cleaning solvent before continuing.
4. Remove the port plugs and then drain the oil from the pump into the correct container.
5. Use a permanent marker to make a line across the mounting flange, the gear housing, and the end cover.

   This will make sure of the correct assembly and the correct rotation of the pump.
6. If equipped, remove the key from the drive shaft.

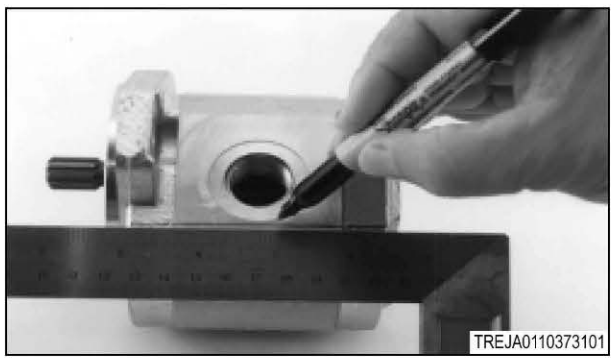

Fig. 97

7. Fasten the mounting flange in a protected jaw vise with the pump shaft turned down.
8. Loosen the four metric hex head bolts.
9. Remove the pump from the vise and put the pump on a clean work bench.
10. Remove the four hex head bolts and the spacers, if equipped.

Fig. 98

11. Lift and remove the end cover (1).

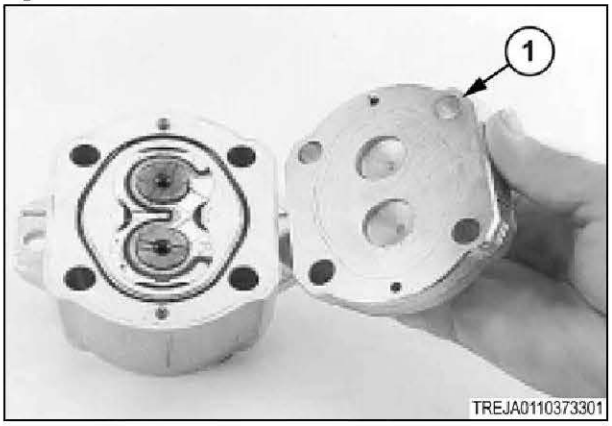

Fig. 99

12. Carefully remove the gear housing (1) and put the gear housing on a clean work bench.

    Make sure the rear bearing block remains on the drive and the idler shafts.

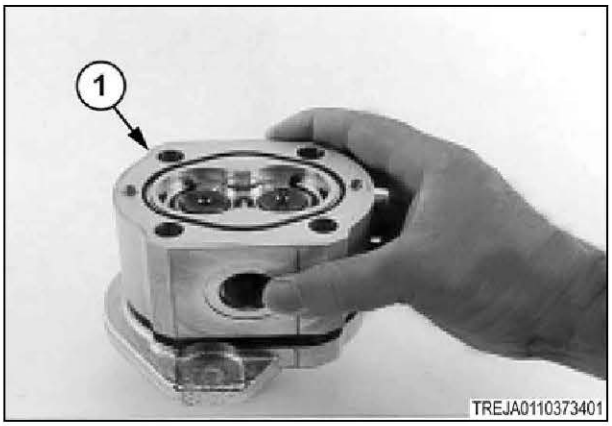

Fig. 100

13. Remove the rear bearing block (1) from the drive and the idler shafts.

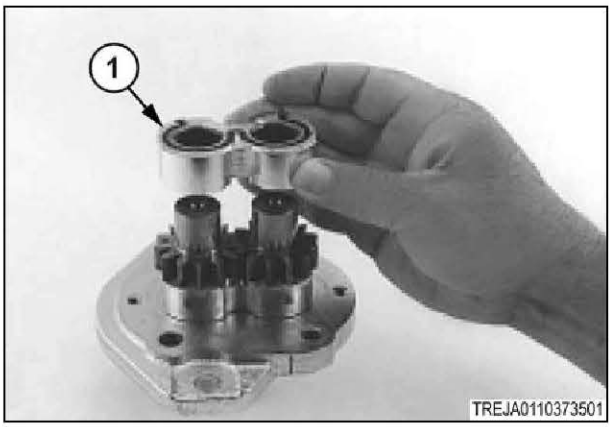

Fig. 101

14. Remove the driven gear from the front bearing block.

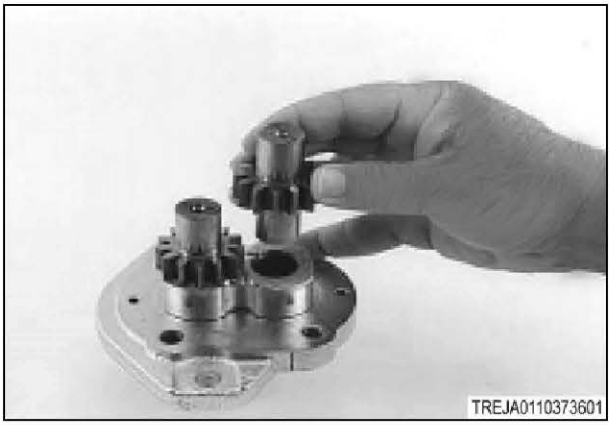

Fig. 102

15. Remove the drive gear from the mounting flange.

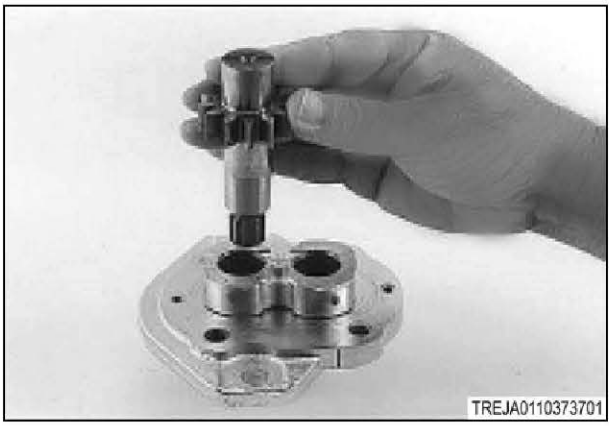

Fig. 103

16. Remove the front bearing block.

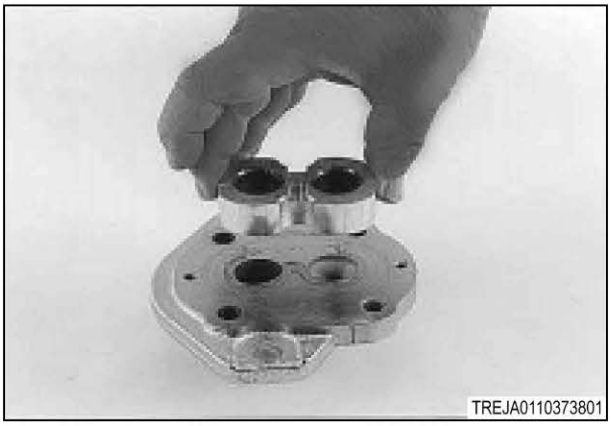

Fig. 104

17. Turn the mounting flange over with the shaft seal up.

18. Remove the retaining ring.

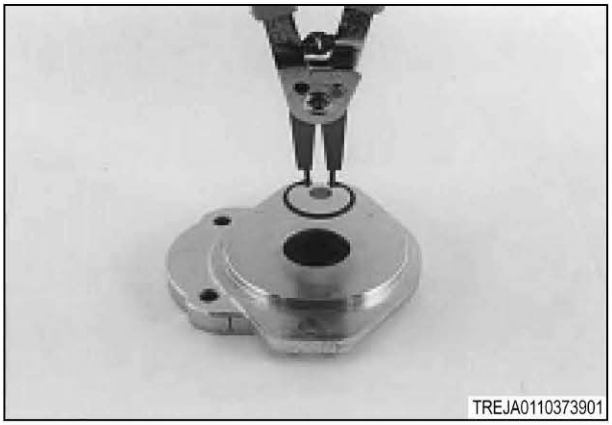

Fig. 105

19. Remove the oil seal from the mounting flange.

Make sure not to damage the seal bore.

20. Remove the dowel pins from the gear housing.

Do not lose the dowel pins.

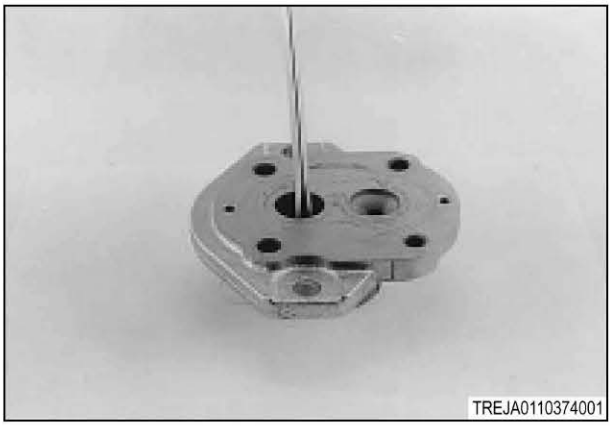

Fig. 106

21. Remove the seals from both bearing blocks and discard.

22. Clean and dry all parts completely before inspection.

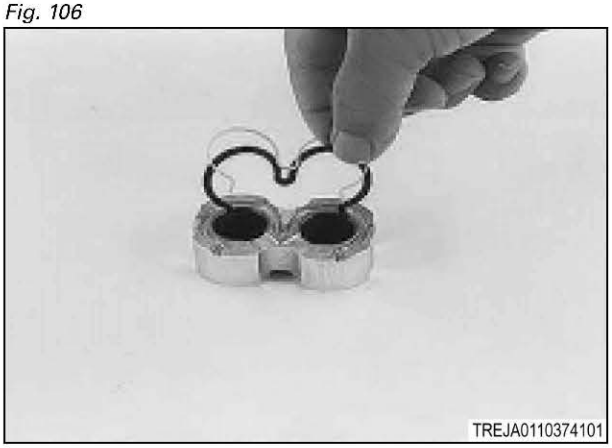

Fig. 107

23. Inspect the parts for damage.

It is not not necessary to inspect the seals.

Replace the seals with new seals.

24. Inspect the drive shaft spline.

The photo shows the drive shaft spline.

25. Check the drive shaft spline for damage.

No damage permitted on the drive shaft spline in the seal area.

Some change in color on the drive shaft spline is permitted.

Fig. 108

26. Inspect the drive gear shaft and the idler gear shaft

27. Inspect the drive gear shaft and the idler gear shaft at the bearing points and the seal area for damage.

28. Inspect the gear face for damage.

If the face edge of the gear teeth are sharp, the gear teeth will cut into the bearing blocks.

If damage has occurred, replace the parts.

Fig. 109

29. Inspect the bearing blocks.

30. Inspect the bearing blocks for damage on the surfaces which are in contact with the gears.

31. Inspect the bearings for excessive damage.

32. Inspect the area inside the gear housing.

It is normal for the surface inside the gear housing to show a clean wipe on the inside surface on the intake side.

There must not be excessive damage.

Fig. 110

3.4.8 Assemble the tri-section front pump

The tri-section pump contains three separate pumps assembled together.

The front section of the tri-section pump is shown disassembled in this view.

The middle section and the rear section are shown assembled.

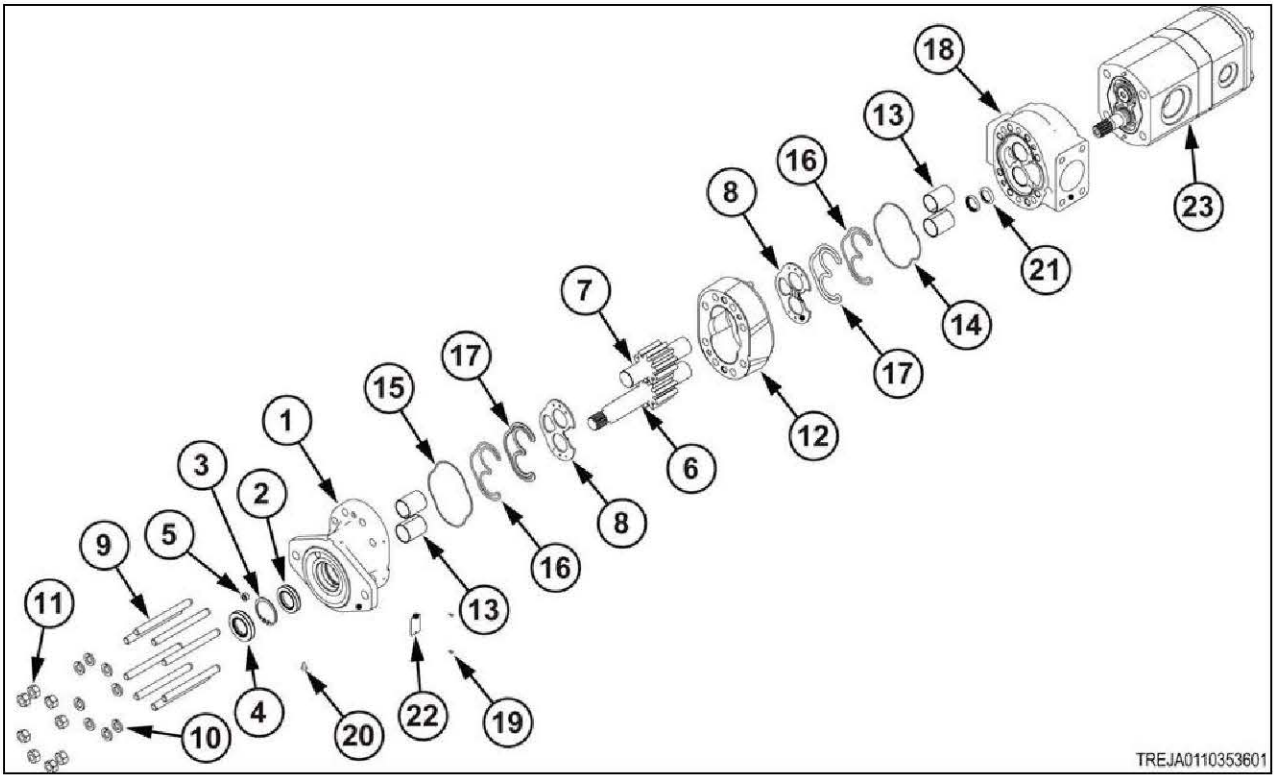

Fig. 111

(1) Front cover
(2) Inner shaft seal
(3) Internal retaining ring
(4) Outer shaft seal
(5) Plug npt w/0.0465 orifice
(6) Drive gear
(7) Driven gear
(8) Wear plate
(9) Stud
(10) Lock washer
(11) Nut
(12) Center section
(13) Bushing
(14) O-ring
(15) O-ring
(16) E-ring seal
(17) E-ring retainer
(18) Port section
(19) Drive screw
(20) Weep hole plug
(21) Shaft seal
(22) Nameplate
(23) Middle and rear pump sections

General Information

It is important that the relationship of the front cover, the center section and the rear cover is correct.

Notches cast into the outside surface of the three parts must align for the correct assembly of the front pump.

Failure to correctly assemble the pump will cause low flow, low pressure, and possible damage to the pump.

IMPORTANT:
During assembly of the front pump, all parts must be lightly lubricated with clean hydraulic fluid or an approved assembly fluid.
Use small amounts of graphite grease to hold the seal retainer and the seal in position during assembly.

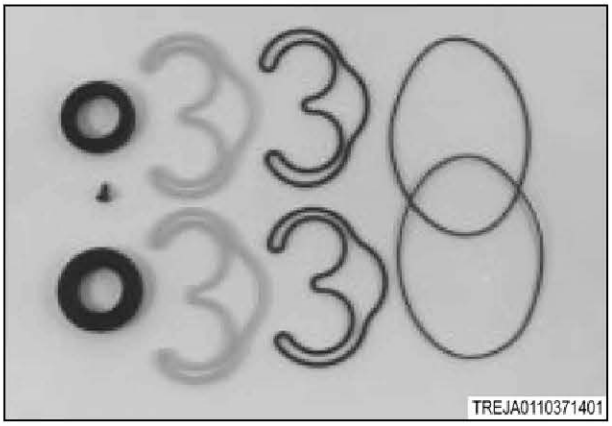

Fig. 112

IMPORTANT:
The pump is not bi-rotational and the shaft rotation cannot reverse.

Assembly

IMPORTANT:
New seal glands, seal retainers, square cross section O-rings, and shaft seals must be installed during assembly of the pump.
Seal kits which contain the parts, are available for the pumps.

Contents of a typical seal repair kit.

Procedure

1. Install the new shaft seal in the front cover.

Make sure the spring loaded member of the shaft seal faces the inner side of the pump.

The photo shows the front cover.

Fig. 113

2. Press the shaft seal into the seal bore until the shaft seal reaches the bottom of the bore.

Use equal pressure to prevent the shaft seals from not aligning or causing damage to the shaft seal.

3. Hold the shaft seal in position with the retaining ring if applicable.

4. Apply graphite grease to the shaft seal after installation.

5. Assembling a two shaft seal assembly.

6. Install the first shaft seal and the internal retaining ring as instructed in the paragraph above.

7. Install a new outer shaft seal which has a larger outside diameter in the seal cavity.

Make sure the spring loaded member of the shaft seal faces the inner side of the pump.

Use equal pressure to prevent the shaft seals from not aligning or causing damage to the shaft seal.

8. Press the seal until installed correctly.

9. Put the rear cover on a clean work bench with the seal cavity area turned up.

The photo shows the rear cover.

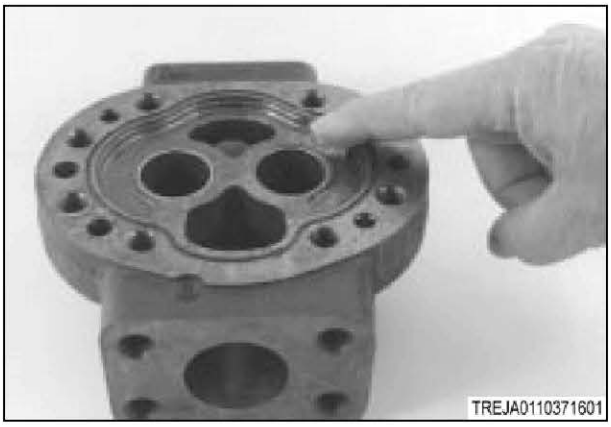

Fig. 114

10. Apply graphite grease to the seal cavity to hold the seals in position.

11. Apply graphite grease to the seal gland and the plastic seal retainer.

The photo shows the seal gland and the plastic seal retainer.

12. Carefully install the seal gland in the groove in the seal retainer.

Make sure the seal gland installs completely in the seal retainer.

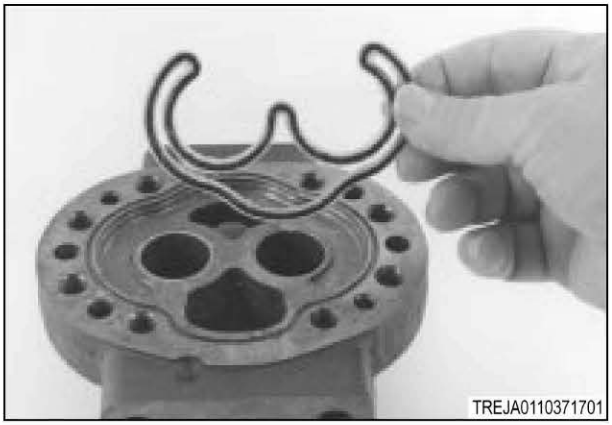

Fig. 115

13. Install the assembled seal gland and the seal retainer into the cavity in the rear cover.

The photo shows the installation of the seal gland and the plastic seal retainer.

14. Carefully press the assembly into position until completely installed in the machined recess.

The position is important for the correct installation of the bronze wear plate.

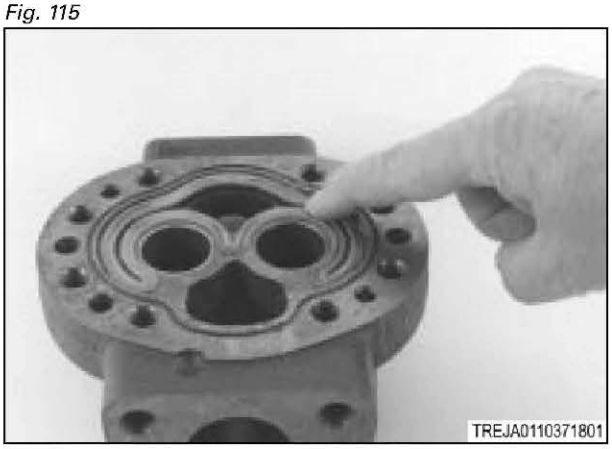

Fig. 116

15. Lubricate the bronze face of the wear plate (1) and install over the seal retainer.

The photo shows the installation of the wear plate.

The bronze face will be next to the gears and then flush with the surface of the rear cover when correctly assembled.

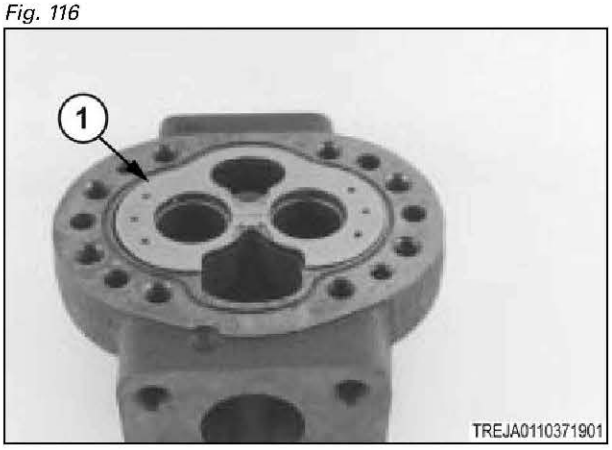

Fig. 117

16. Apply graphite grease to the square cross section O-ring and carefully install in the groove in the rear cover.

The photo shows the installation of the O-ring.

Make sure the O-ring does not twist in the groove.

The O-ring must be flat in the groove or the pump will leak at the seam.

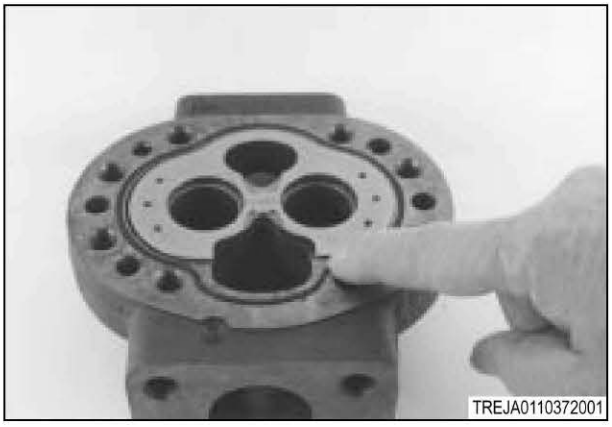

Fig. 118

17. Install the eight studs (1) in the rear cover.

The course thread end of the studs thread into the rear cover.

The photo shows the installation of the studs.

18. Tighten the eight studs to 33.9 to 47.5 Nm (25 to 35 lbf ft).

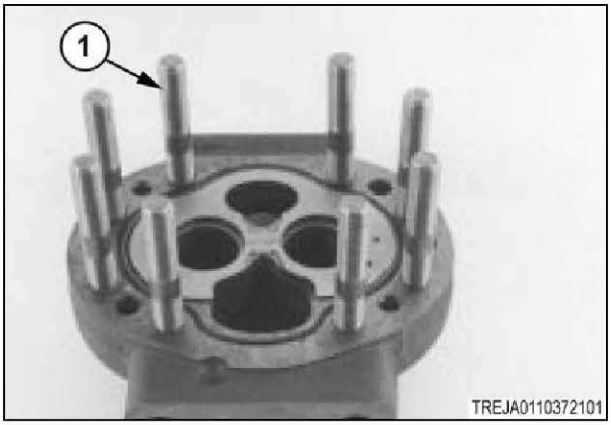

Fig. 119

19. Install the center section (1) over the studs.

Make sure the notches in the rear cover and the center section are aligned.

The photo shows the installation of the center section.

20. Use a plastic mallet to install the center section because of the tight fit of the dowel pins.

Hold the wear plate in position while tapping the center section.

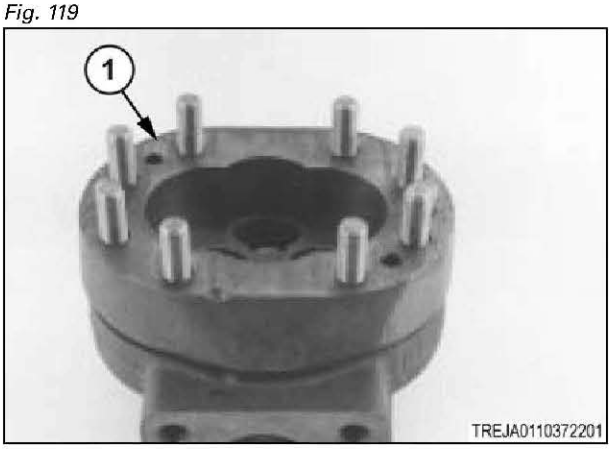

Fig. 120

21. Lubricate the drive gear and the driven gear.

The photo shows the installation of the drive gear and the driven gear.

22. Install the drive gear and the driven gear in the correct bearings in the rear cover.

23. Align the gear teeth.

Fig. 121

24. Put the front cover on a clean work bench with the seal cavity area turned up.

The photo shows the front cover.

25. Apply graphite grease to the seal cavity to hold the seals in position.

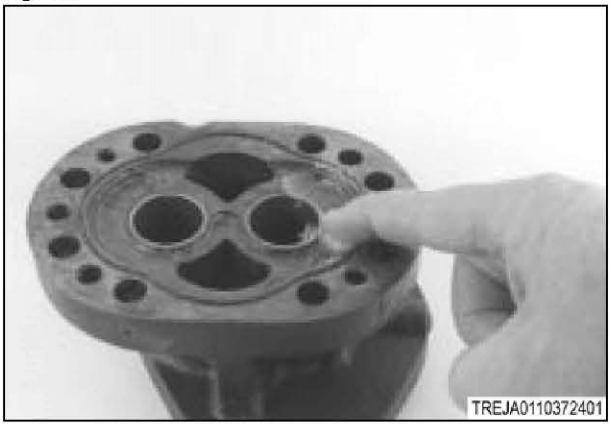

Fig. 122

26. Apply graphite grease to the seal gland and the plastic seal retainer.

The photo shows the seal gland and the plastic seal retainer.

27. Carefully install the seal gland in the groove in the plastic seal retainer.

Make sure the seal gland installs completely in the plastic seal retainer.

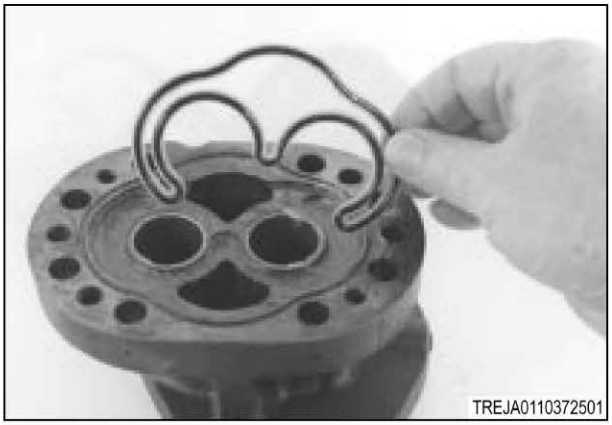

Fig. 123

28. Install the assembled seal gland and the seal retainer in the cavity in the front cover.

The photo shows the installation of the seal gland and the plastic seal retainer.

29. Carefully press the assembly into position until completely installed in the machined recess.

The position is important for the correct installation of the bronze wear plate.

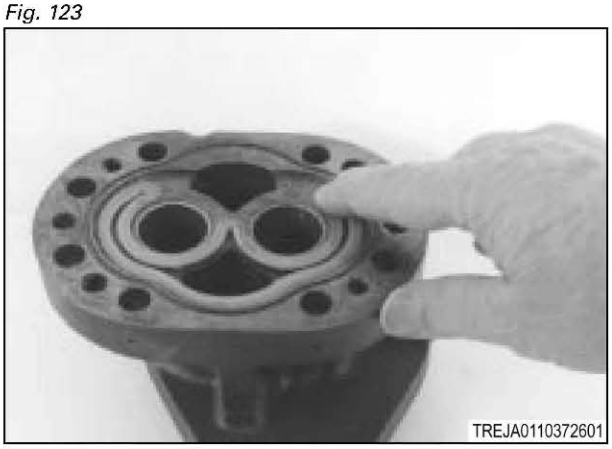

Fig. 124

30. Apply graphite grease to the square cross section O-ring.

The photo shows the installation of the O-ring.

31. Carefully install the O-ring in the groove in the front cover.

Make sure the O-ring does not twist in the groove.

The O-ring must be flat in the groove or the pump will leak at the seam.

Fig. 125

32. Lubricate the steel side of the bronze wear plate with graphite grease and install over the seal retainer.

The bronze face will be next to the gears and then flush with the surface of the front cover when correctly installed.

The photo shows the installation of the wear plate.

Fig. 126

33. If the drive shaft end has a keyway, install the seal sleeve.

If the drive shaft has splines, the splines can be wrapped with thin tape.

The photo shows the pump with the shaft end up.

Fig. 127

34. Carefully slide the front cover over the drive shaft and the studs.

35. Engage the front cover over the dowel pins.

36. Press the front cover until fully installed against the center section.

37. Make sure all the notches are in alignment.

The pump is not assembled correctly if the notches are not aligned.

38. Make sure the seals and the wear plate have stayed in the correct position.

39. Install the lock washers and the nuts (1) on the studs.

Tighten the nuts to 88 to 101 Nm (65 to 75 lbf ft).

40. Remove the seal sleeve or the tape.

41. Put a small amount of clean oil in the inlet of the pump.

42. Rotate the drive shaft one revolution away from the inlet .

The drive shaft must not show interference during rotation.

43. The breakaway torque to turn the drive shaft must not be more than 47.5 Nm (35 lbf ft) after assembly.

44. The name plate location is on the end cover.

The name plate contains the assembly date code and the model number.

The photo shows a name plate.

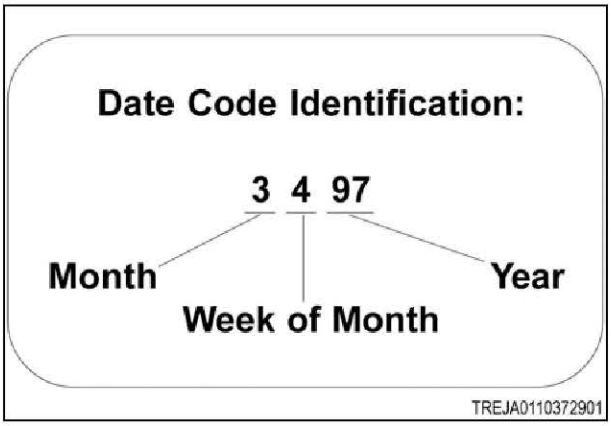

Fig. 128

3.4.9 Assemble the tri-section rear pump

Rear pump assembly

Exploded view

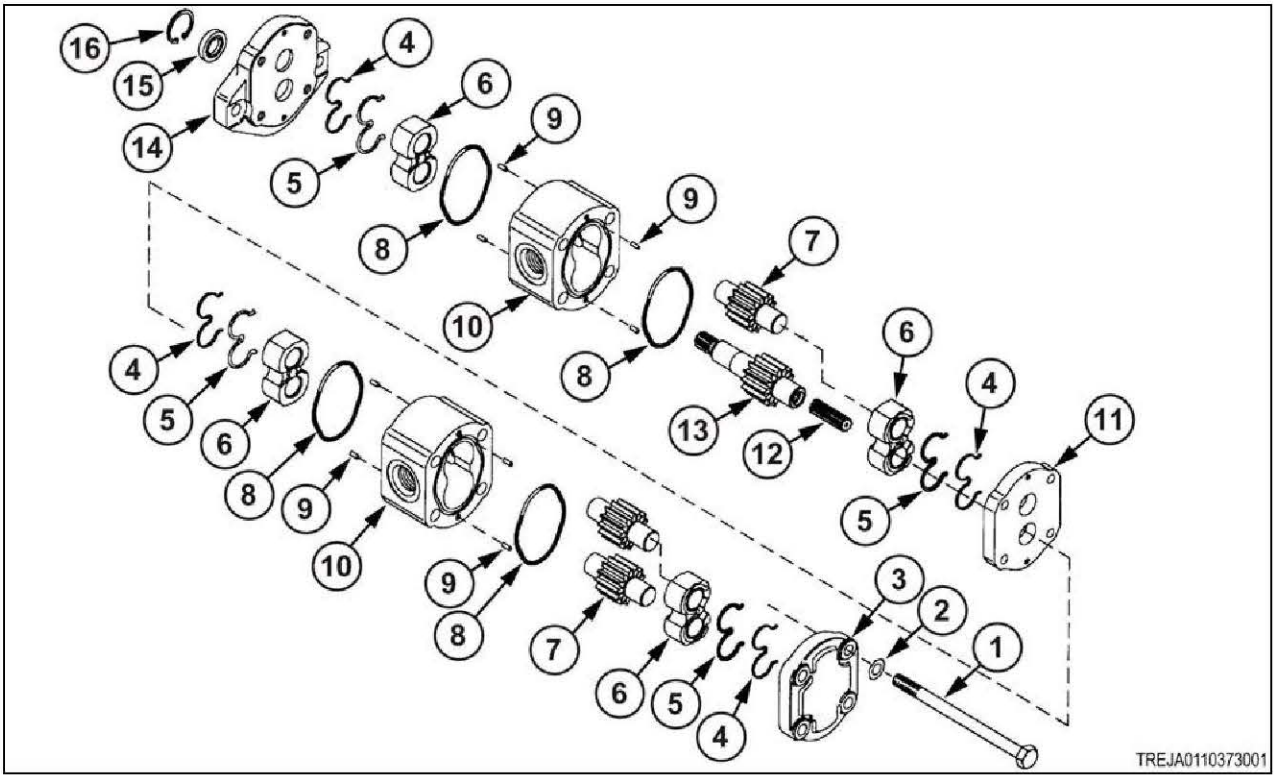

Fig. 129

(1) Bolt
(2) Spacer
(3) End cover
(4) Backup ring
(5) E-seal
(6) Bearing block
(7) Driven gear
(8) O-ring
(9) Dowel pin
(10) Gear housing
(11) Distance plate
(12) Coupling
(13) Drive gear
(14) Mounting flange
(15) Shaft seal
(16) Retaining ring

General Information

It is important that the relationship of the mounting flange, bearing blocks, and the gear housing is correct.

Failure to correctly assemble the pump will cause low flow, low pressure and possible damage to the pump.

IMPORTANT:
During assembly of the pump, all parts must be lightly lubricated with clean hydraulic fluid or an approved assembly fluid.
Use small amounts of graphite grease to hold the seal retainer and the seal in position during assembly.

IMPORTANT:
The pump is not bi-rotational and the shaft rotation cannot reversed.

Assembly

IMPORTANT:
New seals must be installed during assembly of the pump.

Procedure

1. Install the new shaft seal in the mounting flange with the part number side turned away from the mounting flange.

   The photo shows the installation of the shaft seal.

2. Press the shaft seal into the seal bore until the shaft seal reaches the bottom of the bore.

   Use equal pressure to prevent the shaft seals from not aligning or causing damage to the shaft seal.

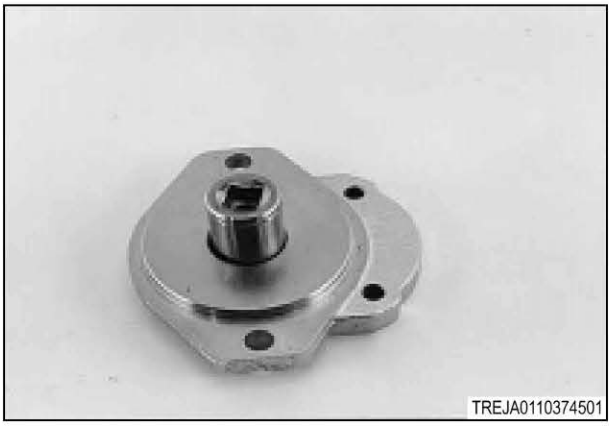

Fig. 130

3. Install the retaining ring into the groove in the seal bore of the mounting flange.

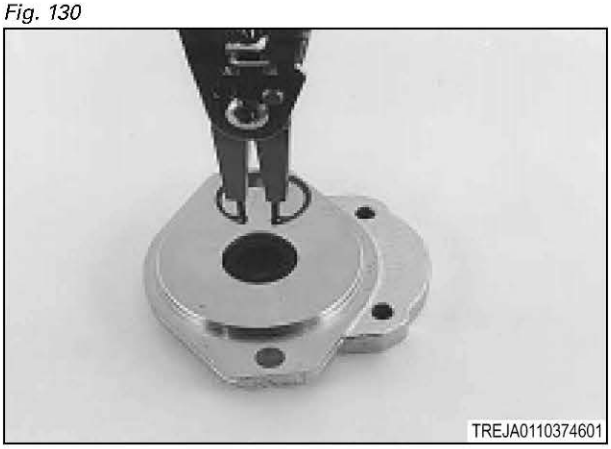

Fig. 131

4. Put the front and the rear bearing blocks on a clean surface with the E-seal grooves turned up.
5. Apply petroleum jelly in the grooves.
6. Apply petroleum jelly to the front and the rear bearing block E-seals.

   This will help keep the seals in position during assembly.

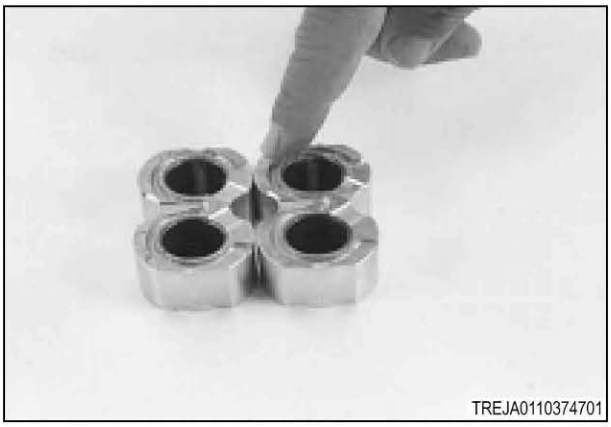

Fig. 132

7. Put the E-seals, flat side up, into the grooves in both bearing blocks.
8. Carefully put the backup ring, flat side up, in the groove the E-seal made and in the bearing block groove.

   The backup ring in the pump is symmetrical.
9. Put the mounting flange, with the shaft seal side down, on a clean flat surface.
10. Apply petroleum jelly to the face of the front bearing block.

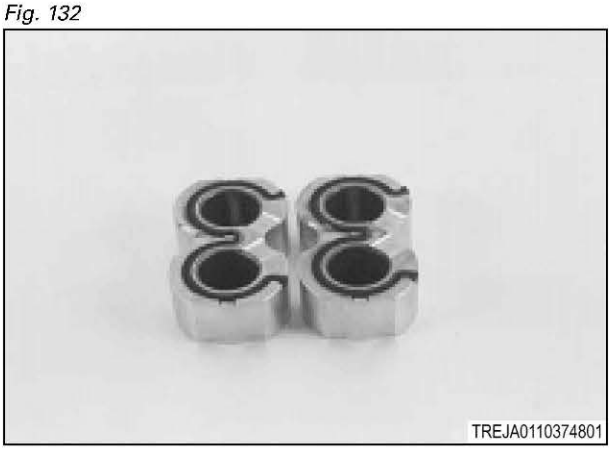

Fig. 133

11. Insert the drive end of the drive shaft through the bearing block. The E-seal in the bearing block must be away from the gear teeth.

12. Install the seal sleeve over the drive shaft and carefully slide the drive shaft through the shaft seal.

13. Remove the seal sleeve from the shaft.

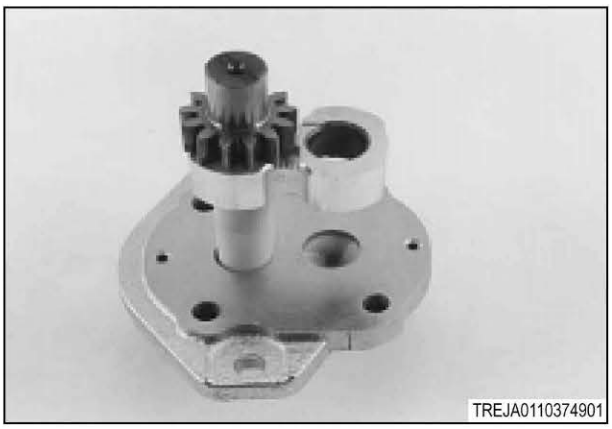

Fig. 134

14. Install the idler gear shaft in the remaining position in the bearing block.

15. Apply clean oil to the face of the drive and the idler gears.

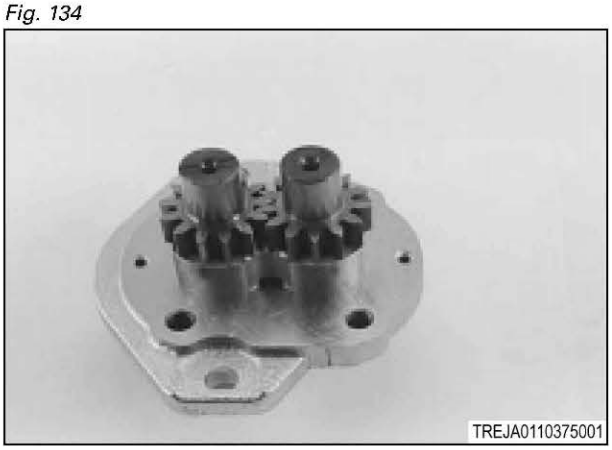

Fig. 135

16. Pick up the rear bearing block with the seal side up.

The open end of the E-seal must point to the intake side of the pump.

The photo shows the installation of the rear bearing block.

17. Put the rear bearing block over the drive and the idler gear shafts.

18. Install two dowel pins in the holes in the mounting flange.

19. Install two long dowel pins through the gear housing if a multiple section pump.

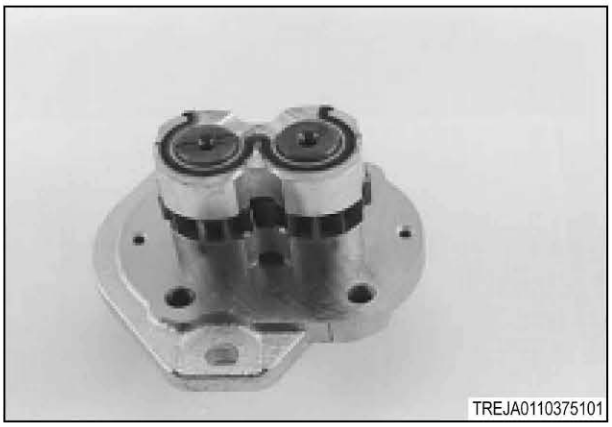

Fig. 136

20. Apply petroleum jelly in the grooves on both sides of the gear housing.

21. Apply petroleum jelly to the new O-rings and install the O-rings in the grooves.

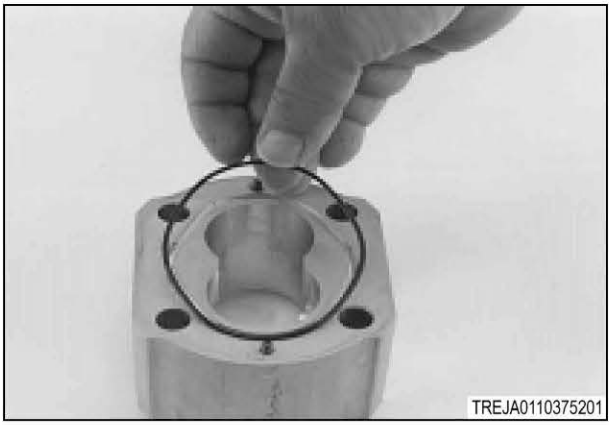

Fig. 137

22. Carefully slide the gear housing over the rear bearing block assembly.

23. Slide the gear housing down until the gear housing engages the dowel pins.

24. Use your hands to press the gear housing into position.

Do not force or use any tool.

25. Make sure the intake port in the housing is on the same side as the open end of the E-seal.

26. Make sure the lines on the mounting flange and the gear housing are in alignment.

Fig. 138

27. Make sure the surface of the rear bearing block is below the face of the gear housing.

IMPORTANT:

If the rear bearing block sits higher than the rear face of the gear housing, then the E-seal or the O-ring have shifted out of the groove.

Remove the gear housing and then check the seal installation.

28. Install the two remaining dowel pins in the rear of the gear housing, if applicable.

The photo shows the installation of the end cover.

29. Put the end cover over the rear of the pump.

30. Install the four spacers and the hex head bolts through the bolt holes in the end cover, if applicable.

Fig. 139

31. Hand tighten the hardware.

Fig. 140

32. Put the mounting flange of the pump in the protected jaw vise.

33. Alternately tighten the bolts to 92.2 to 99 Nm (68 to 73 lbf ft).

34. Remove the pump from the vise.

35. Put a small amount of clean oil in the inlet of the pump.

36. Rotate the drive shaft away from the inlet one revolution.

37. If the drive shaft shows interference then assemble the pump, disassemble the pump and check for assembly problems .

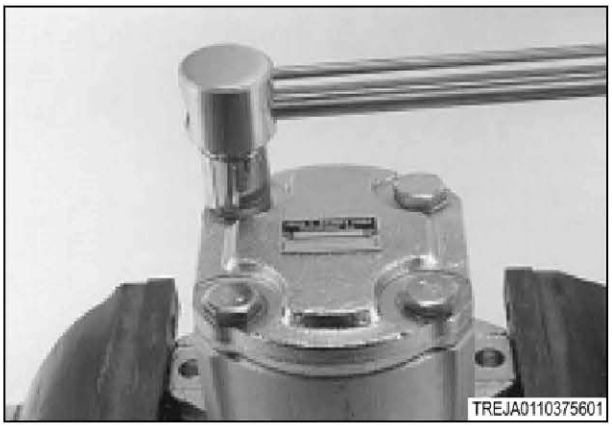

Fig. 141

38. The name plate location is on the end cover.

The name plate contains the assembly date code and the model number.

The photo shows a name plate.

Fig. 142

39. The photo shows the name plate with the date code identification.

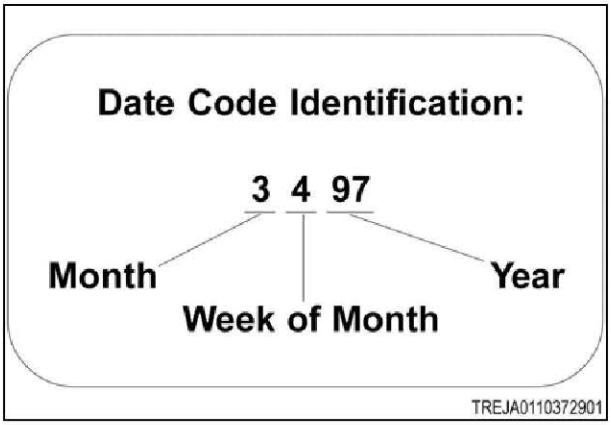

Fig. 143

3.4.10 Prepare the pump for service

Procedure

1. If a shop test stand is available, follow the procedure for testing assembled pumps.

1. Mount the pump on the test stand.
2. Make sure that the correct level of clean oil is available in the reservoir.
3. Check the suction line for leaks and obstructions.
4. Start the pump and run for three minutes at zero pressure.
5. Intermittently put the pump under load to 34.47 BAR (500 psi) for three minutes.
6. Intermittently put the pump under load to 68.95 BAR (1000 psi) for three minutes.
7. Intermittently put the pump under load to 37.90 BAR (2000 psi) for three minutes.
8. Remove the pump from the test stand.
9. Check for movement of the drive shaft.
10. Check the pump for signs of external leakage.

2. If a shop test stand is not available, follow the procedure for testing assembled pumps.

1. For engine driven pumps, mount the pump on the equipment.
2. Operate the pump at 1/2 engine speed at zero pressure for three minutes.
3. By operating the control valve, build pressure intermittently for three minutes.
4. Increase the engine speed to full throttle and build pressure intermittently for three minutes.
5. Stop the engine and check the pump for external leaks.

3.4.11 Install the tri-section pump

Procedure

1. Install the elbow (1) to the pump (2).
2. Turn the elbow to a 45° angle(A) as shown .
   Tighten to 300 to 330 Nm (221 to 243 lbf ft).
3. Install the straight connector (3) to the pump (2).
   Tighten to 300 to 330 Nm (221 to 243 lbf ft).
4. Install the tee (4) to the pump (2).
   Tighten to 140 to 154 Nm (103 to 113 lbf ft).
5. Install the straight connector (5) to the pump (2).
   Tightento 415 to 455 Nm (306 to 336 lbf ft).
6. Install the O-ring (6) to the pump (2).

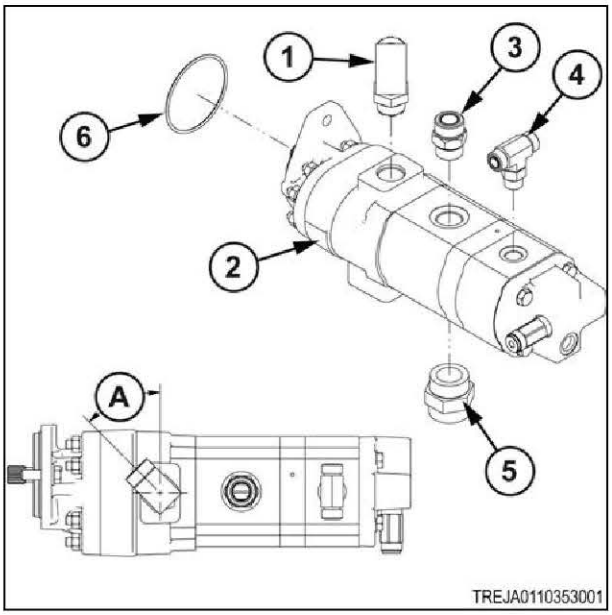

Fig. 144

7. Connect correct lifting equipment. Put the pump in position (1), and install with two bolts with washers (2).

   IMPORTANT:
   The weight of pump is approximately 20 kg (44 lb).

8. Tighten the bolts to 80 to 120 Nm (59 to 89 lbf ft).

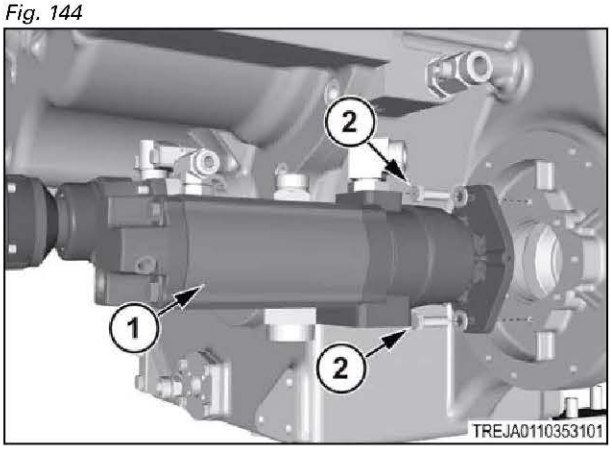

Fig. 145

9. Install the supply line (1) to the front section of the tri-section pump with a split flange.
10. Tighten the bolts (2) to 80 to 120 Nm (59 to 89 lbf ft).
11. Install the outlet line (3) to the elbow on the front section of the tri-section pump.
    Tighten to 150 to 180 Nm (11 to 133 lbf ft).

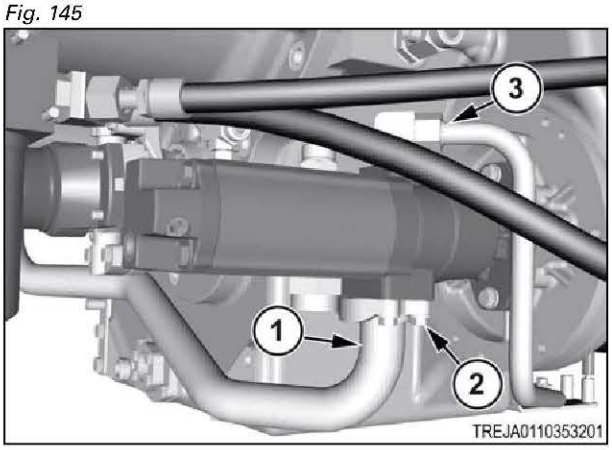

Fig. 146

12. Install the supply line (1) to the middle section of the tri-section pump.
Tighten to 225 to 265 Nm (166 to 196 lbf ft).

13. Install the hose assembly (2) to the outlet port on the tri-section pump.
Tighten to 165 to 180 Nm (122 to 133 lbf ft).

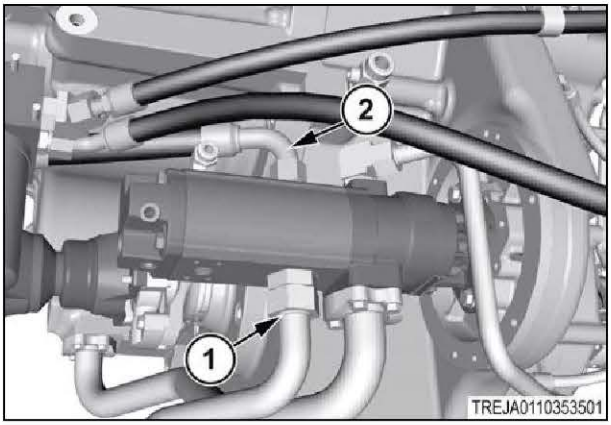

Fig. 147

14. Install the supply line (1) to the rear section of the tri-section pump.
Tighten to 110 to 140 Nm (81 to 103 lbf ft).

15. Install the brake charge tube assembly (2) to the tee (3).
Tighten to 50 to 60 Nm (37 to 45 lbf ft).

16. Install the hose assembly (4) that runs to the tow override valve.
Tighten to 50 to 60 Nm (37 to 45 lbf ft).

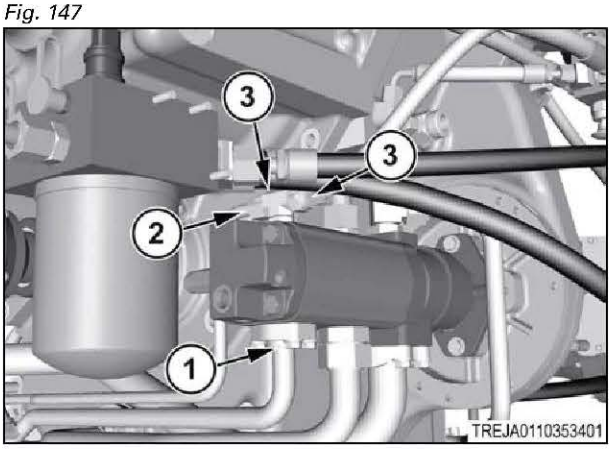

Fig. 148

17. Install the drain plug (1) in the bottom of the transmission.

18. Fill the transmission to the correct oil level.

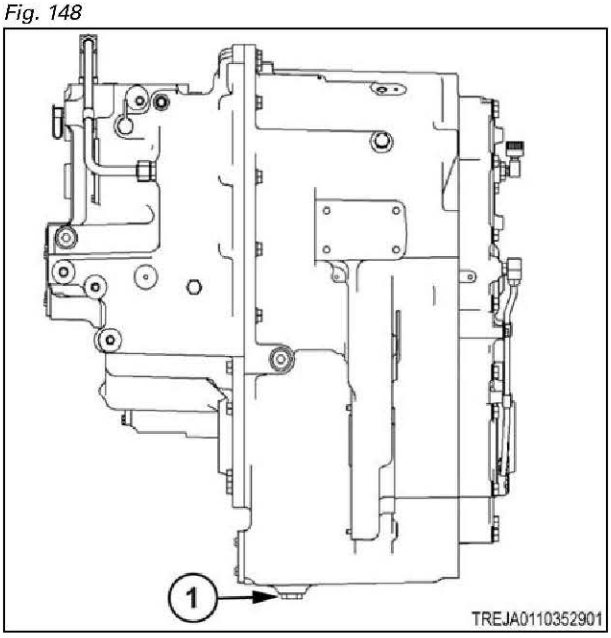

Fig. 149

Related Links

Do a check of the power train fluid level - daily page 6-55

3.4.12 Remove the differential lock solenoid valve

Procedure

1. Clean the external components before starting the removal procedure.

2. Put identification marks on all hoses, all hose assemblies, all wires, and all the tube assemblies for installation purposes.
3. Plug all hose assemblies and all tube assemblies.
4. Remove the tube assembly (1) from the differential lock solenoid.
5. Remove the hose assembly (2) from the bottom of the differential lock solenoid.
6. Disconnect the electrical connector (3) from the differential lock solenoid.

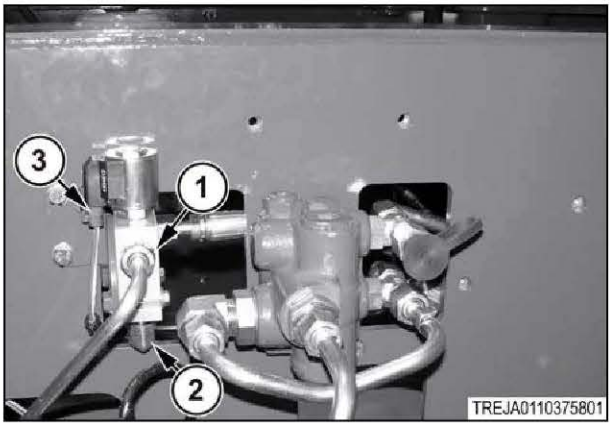

Fig. 150

7. Remove the tee (1) from the rear of the differential lock solenoid valve (2).
8. Remove the two bolts (3) that fasten the differential lock solenoid valve (2) to the bracket.
9. Remove the differential lock solenoid valve (3).

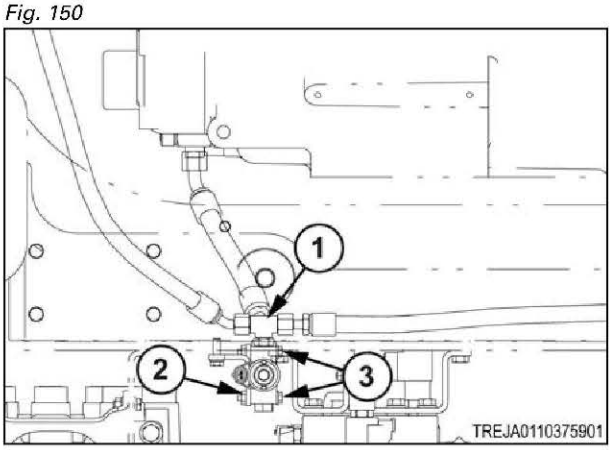

Fig. 151

3.4.13 Disassemble the differential lock solenoid valve

Procedure

1. Remove the nut (1) and the coil (2).
2. Remove the valve (3) from the body.

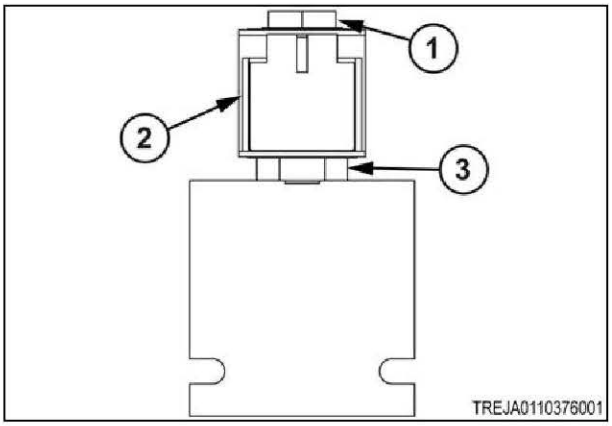

Fig. 152

3. Remove the seals (1) from the valve.

NOTE:
The valve shown with the coil installed.

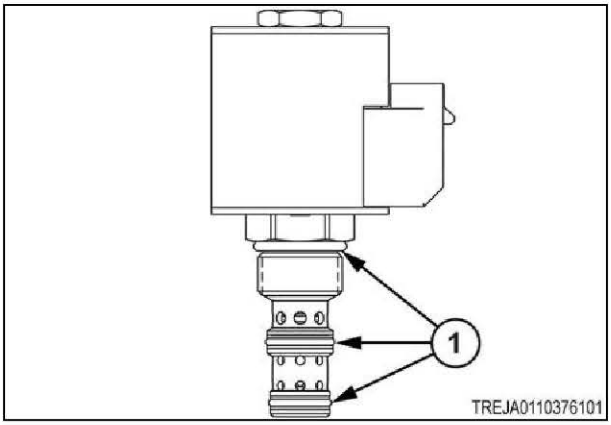

Fig. 153

3.4.14 Assemble the differential lock solenoid valve

Procedure

1. Install the seals (1) to the valve.

NOTE: *The valve shown with the coil installed.*

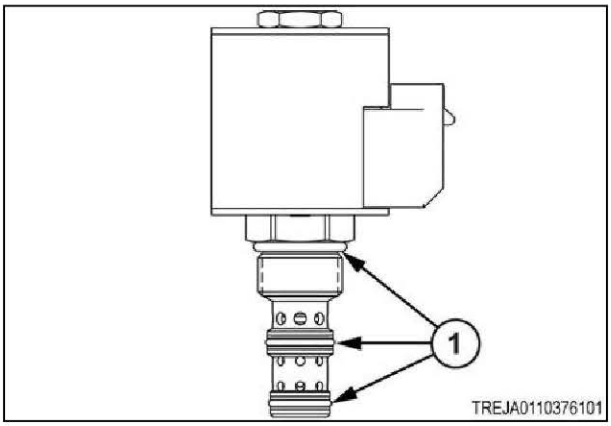

Fig. 154

2. Install the differential lock solenoid to the valve body and tighten the nut (3).

   Tighten to 27 Nm (20 lbf ft).

3. Install the coil (2) and fasten with the coil nut (1).

   Tighten to 6.8 Nm (5 lbf ft).

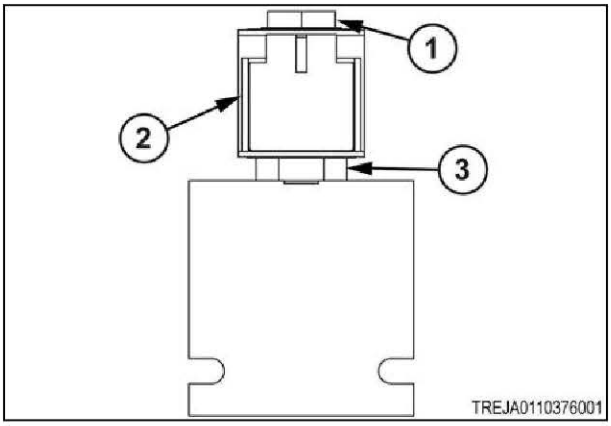

Fig. 155

3.4.15 Install the differential lock solenoid valve

Procedure

1. Install the differential lock solenoid (2) to the bracket using the two bolts (3).
   Tighten to 12 to 15 Nm (9 to 11 lbf ft).
2. Install the tee (1) to the differential lock solenoid (2).
   Tighten to 25 to 28 Nm (18 to 20 lbf ft).

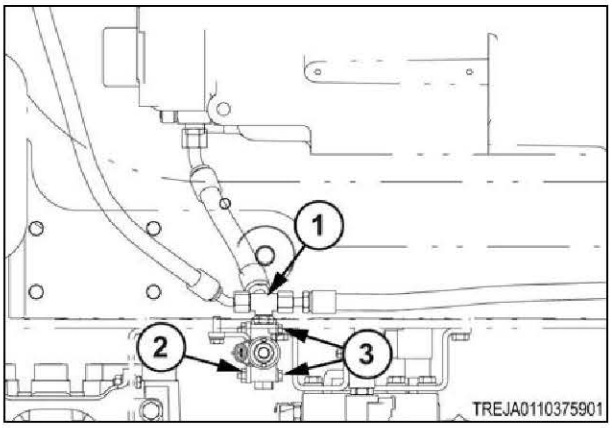

Fig. 156

3. Install the hose assembly (2) to the bottom of the differential lock solenoid.
   Tighten to 55 to 60 Nm (41 to 45 lbf ft).
4.
5. Install the tube assembly (1) to the differential lock solenoid.
   Tighten to 41 to 45 Nm (30 to 33 lbf ft).
6. Connect the electrical harness (3) to the differential lock solenoid valve.

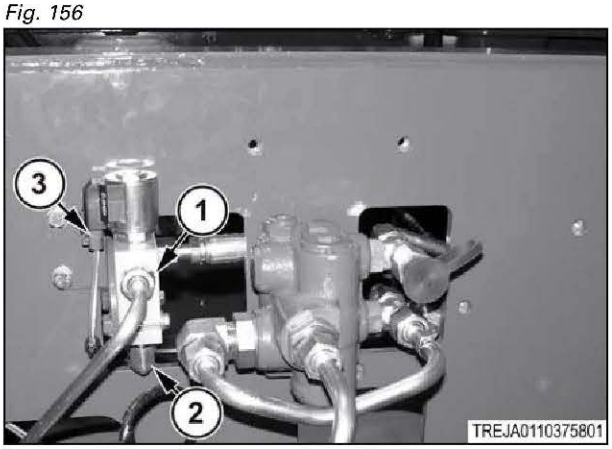

Fig. 157

3.4.16 Remove the axle lubrication filter housing

WARNING: Machine movement hazard.

Personal injury or machine damage can occur.

Park the machine on a solid level surface. Lower all implements to the ground. Stop the engine, apply the park brake, and take the key with you.

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

WARNING: Hydraulic fluid under pressure can penetrate the skin or eyes.

Serious personal injury, blindness, or death can occur.

Relieve the pressure from the system or component before disconnecting components. Wear personal protective gear while working on the machine or equipment. Use a piece of cardboard to check for leaks. Never use your hand.

Procedure

1. Clean the external components before starting the removal procedure.
2. Contain all fluids during the performance of inspection, maintenance, testing, adjusting and the repair of the machine.

3. Prepare to contain fluid with the correct container before opening any compartment or disassembling any component containing fluids.
4. Discard all fluids according to the local regulations and the mandates.
5. Put identification marks on all hoses, all hose assemblies, all wires, and all the tube assemblies for installation purposes.
6. Plug all hose assemblies and all tube assemblies.
7. Park the machine on a solid, level surface.
8. Apply the park brake, stop the engine, and take the key with you.
9. Disconnect the harness (1) from the axle lubrication pressure switch.

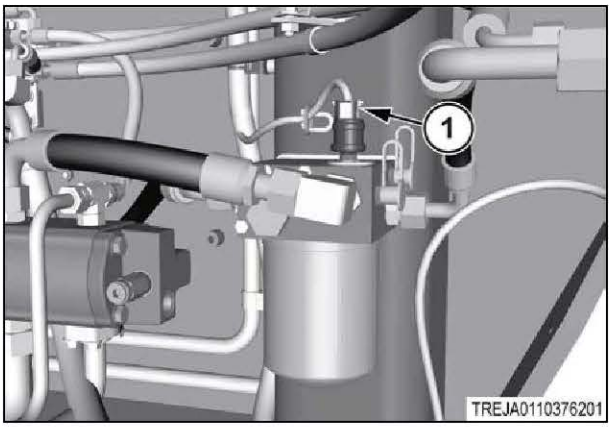

Fig. 158

10. Disconnect the pressure line (1) from the axle lubrication filter.

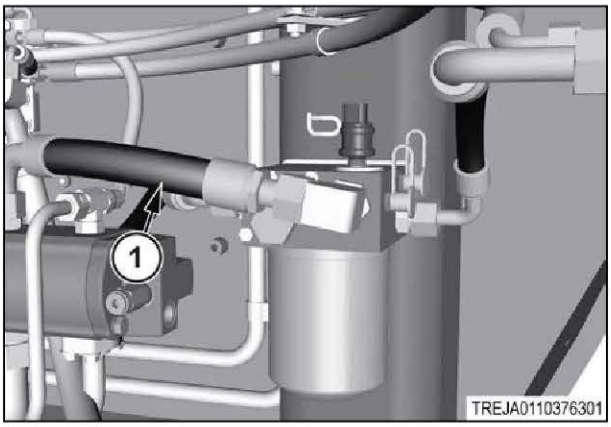

Fig. 159

11. Disconnect the front axle lubrication line (1) from the axle lubrication filter.

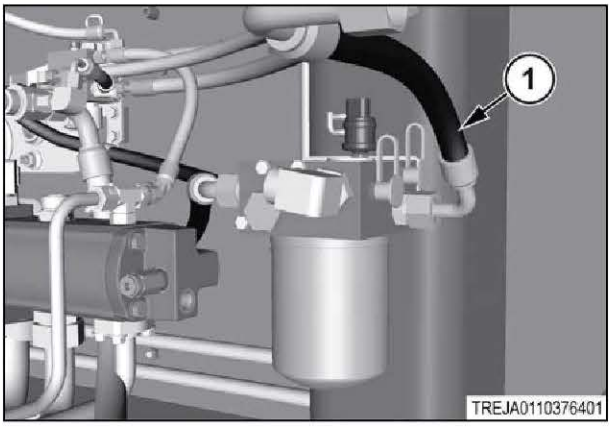

Fig. 160

12. Disconnect the rear axle lubrication line (1) from the axle lubrication filter.

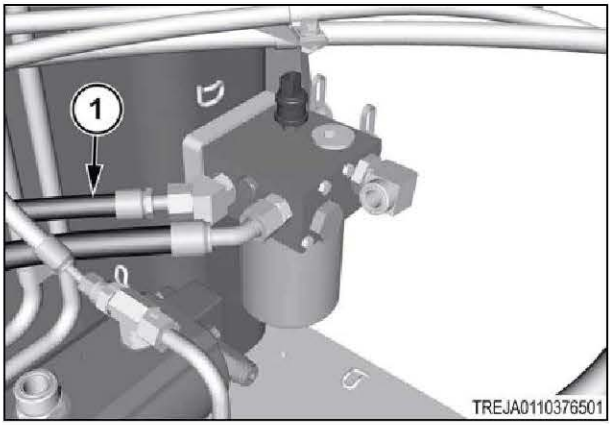

Fig. 161

13. Disconnect the transmission return line (1) from the axle lubrication filter.

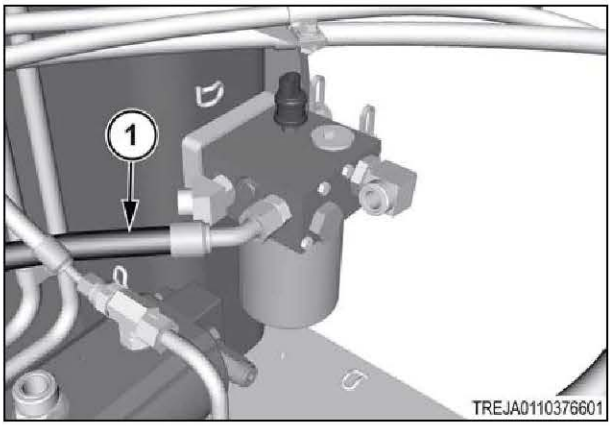

Fig. 162

14. Loosen and remove the three bolts (1) that fasten the axle lubrication filter to the frame.

15. Remove the axle lubrication filter.

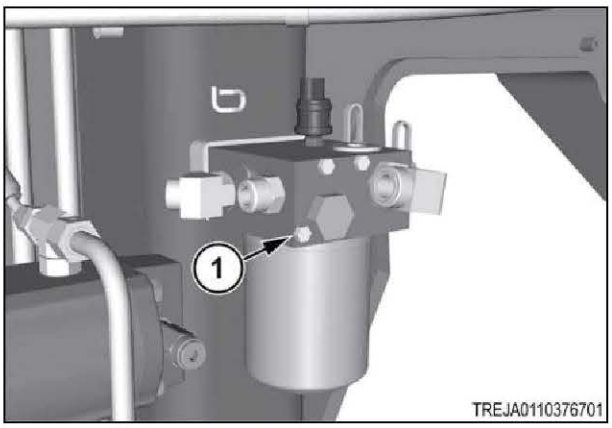

Fig. 163

16. Loosen and remove the filter (1) from the filter head.

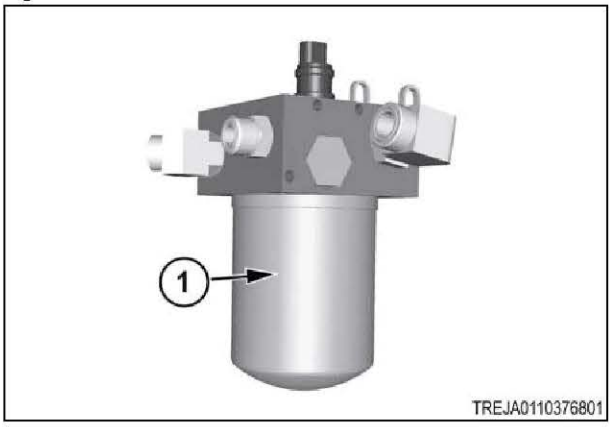

Fig. 164

17. Loosen and remove the pressure switch (1) from the PS port.

18. Loosen and remove the plug (2) from the SV port.

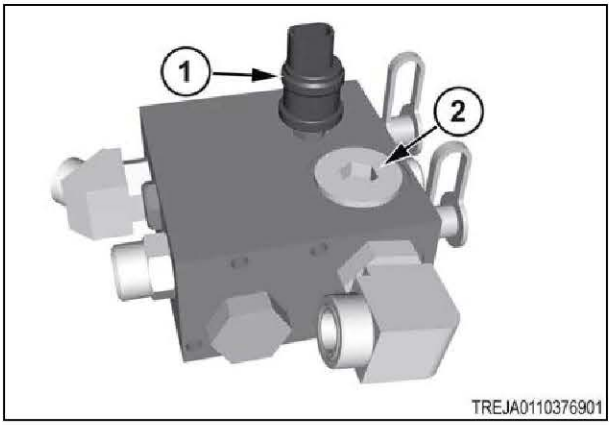

Fig. 165

19. Loosen and remove the 90° elbow (1) from the P port.

20. Loosen and remove the plug (2) from the RV2 port.

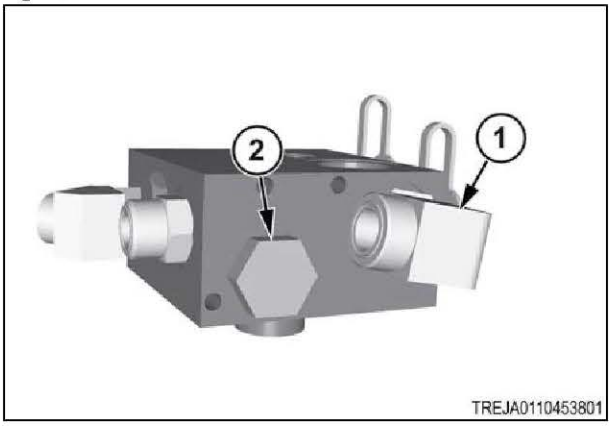

Fig. 166

21. Loosen and remove the straight connector (1) from the R port.

22. Loosen and remove the 45° elbow (2) from the RA port.

23. Loosen and remove the plug (3) from the RV1 port.

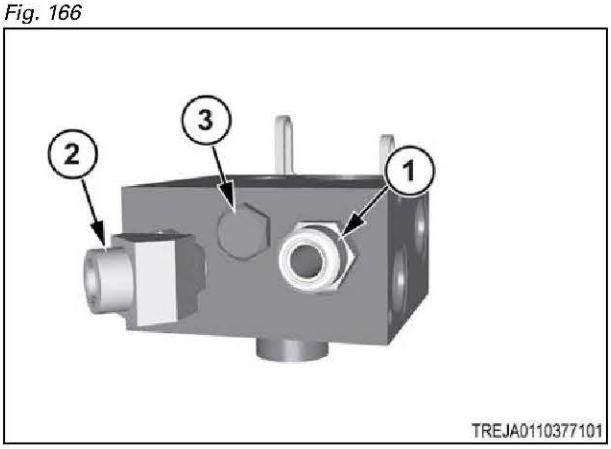

Fig. 167

24. Remove the dust caps (1) from the test nipples.

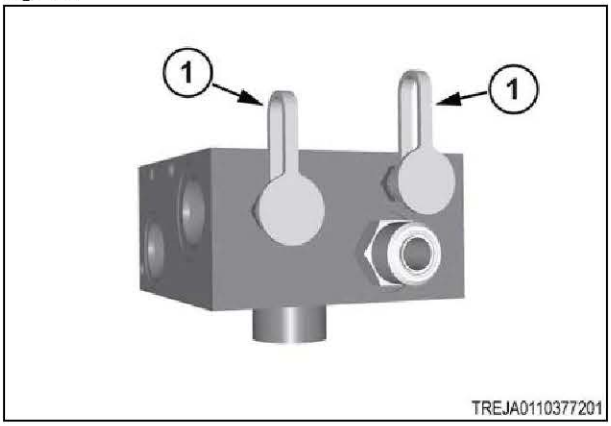

Fig. 168

25. Loosen and remove the straight fitting (1) from the FA port.
26. Loosen and remove the test nipple (2) from the G2 port.
27. Loosen and remove the test nipple (3) from the G1 port.

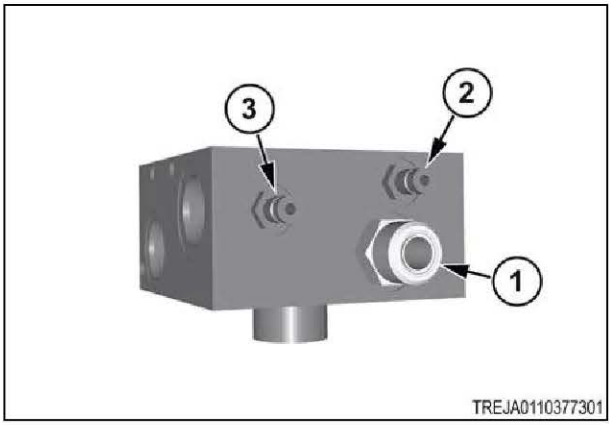

Fig. 169

3.4.17 Install the axle lubrication filter housing

Procedure

1. Make sure all the hydraulic parts and the area working in are clean.

   Contaminants will damage the hydraulic system.

2. Install the straight fitting (1) in the FA port.
3. Install the test nipple (2) in the G2 port.
4. Install the test nipple (3) in the G1 port.

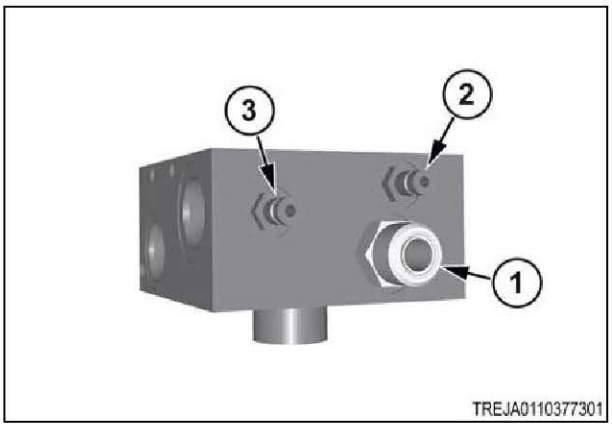

Fig. 170

5. Install the dust caps (1) to the test nipples.

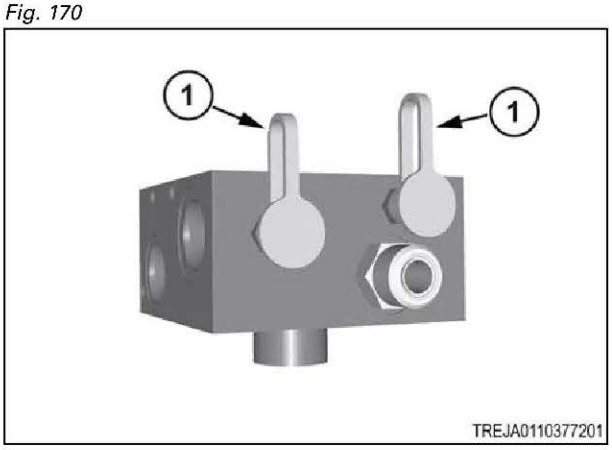

Fig. 171

6. Install the straight connector (1) in the R port.
7. Install the 45° elbow (2) in the RA port.
8. Install the plug (3) in the RV1 port.

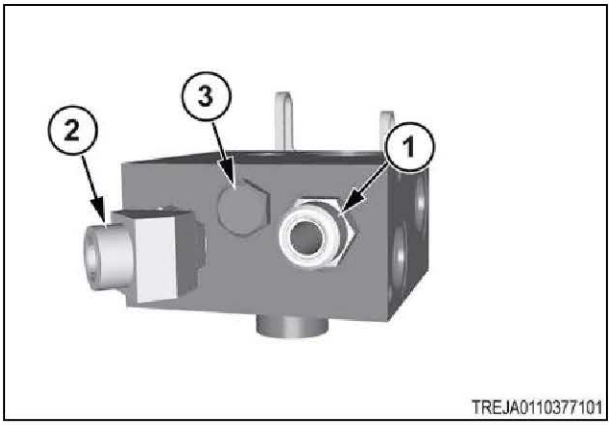

Fig. 172

9. Install the 90° elbow (1) in the P port.
10. Install the plug (2) in the RV2 port.

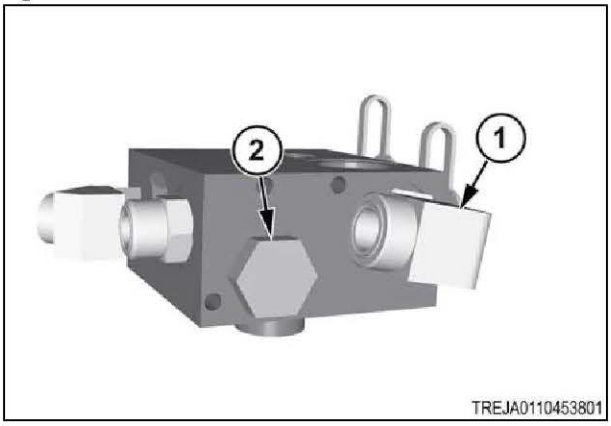

Fig. 173

11. Install the axle lubrication pressure switch (1) in the PS port.
12. Install the plug (2) in the SV port.

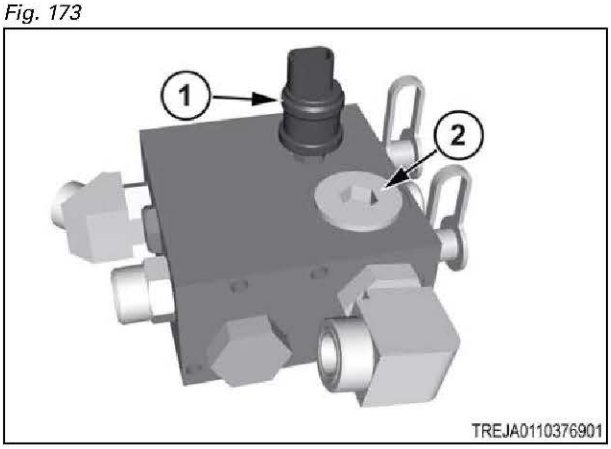

Fig. 174

13. Install the filter (1) on the axle lubrication filter housing.

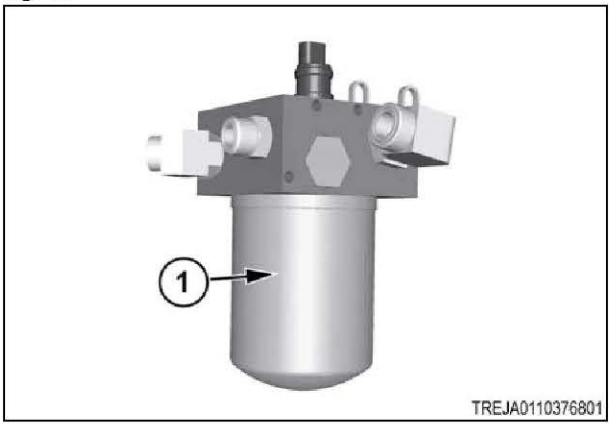

Fig. 175

14. Install the axle lubrication filter housing to the frame using the three bolts (1).

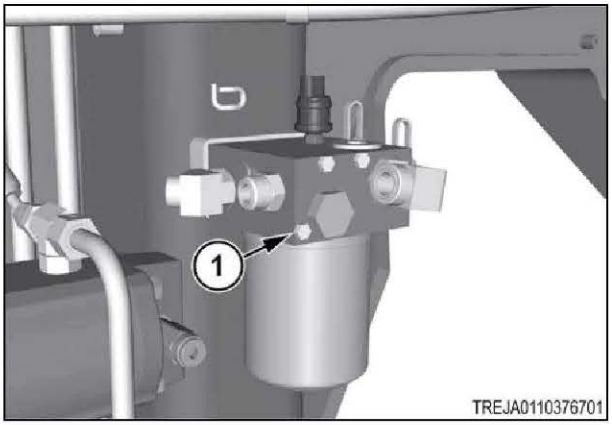

Fig. 176

15. Install the transmission return line (1) to the R port on the axle lubrication filter housing.

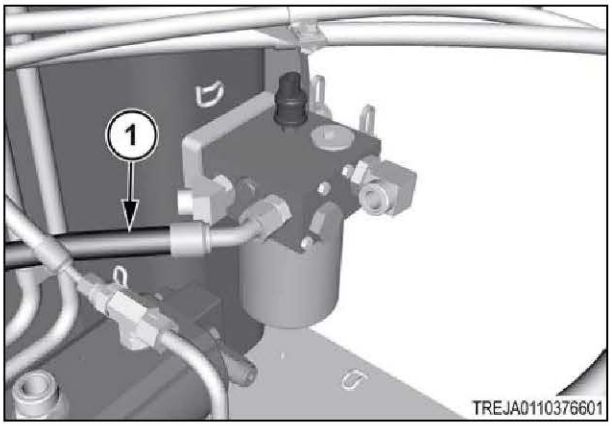

Fig. 177

16. Install the rear axle lubrication line (1) to the RA port on the axle lubrication filter housing.

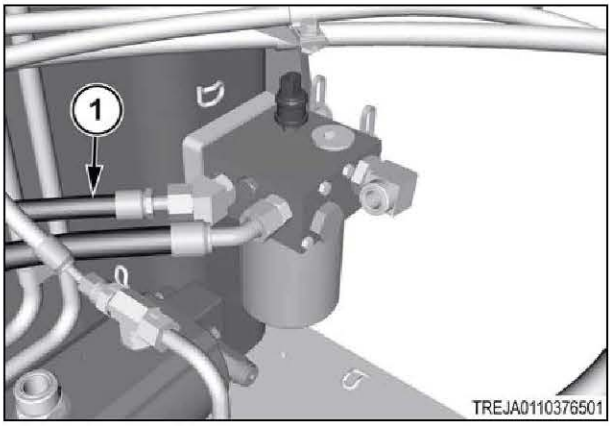

Fig. 178

17. Install the front axle lubrication line (1) to the FA port on the axle lubrication filter housing.

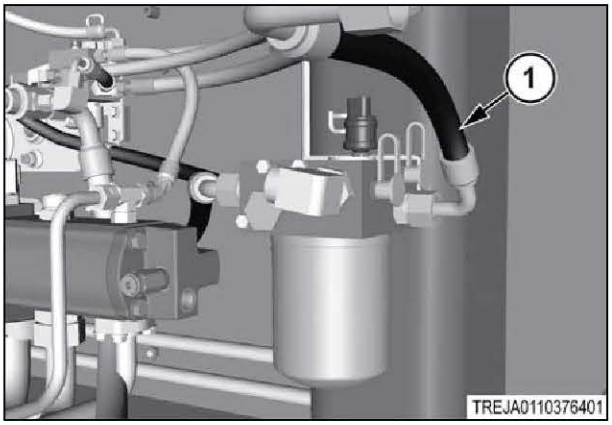

Fig. 179

18. Install the pressure line (1) to the P port on the axle lubrication filter housing.

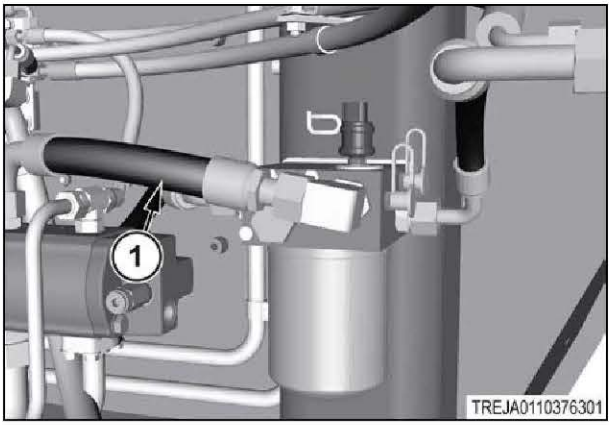

Fig. 180

19. Install the harness (1) to the axle lubrication pressure switch.

20. Fill the hydraulic system with approved oil to replace any oil loss during the installation.

21. Replace the filter element after 50 hours of operation or earlier if the axle lubrication low pressure warning shows.

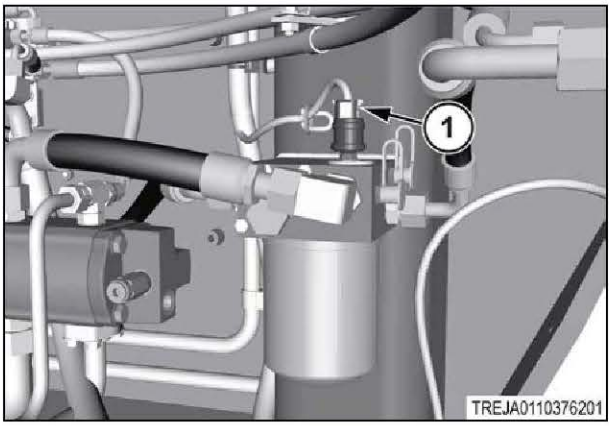

Fig. 181

Related Links

Lubricant viscosities page 1-18

3.4.18 Remove the lubrication filter pressure switch

Procedure

1. Disconnect the harness (1) from the lubrication filter pressure switch.

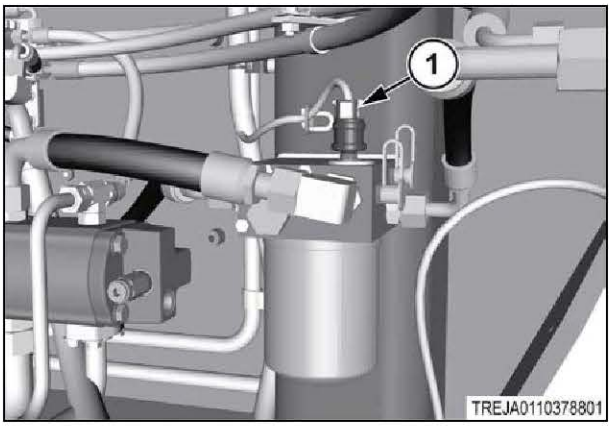

Fig. 182

2. Remove the lubrication filter pressure switch (1) from the lubrication filter.

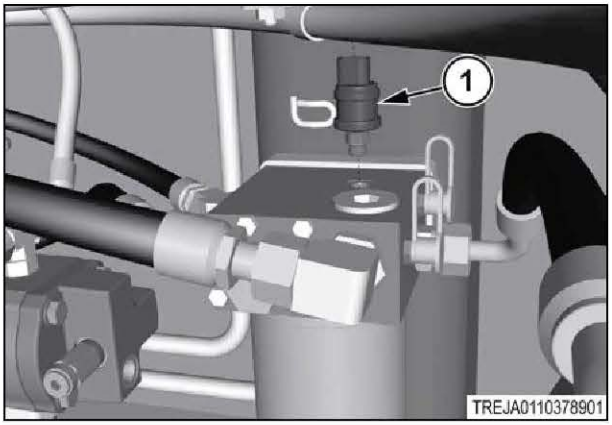

Fig. 183

3.4.19 Install the lubrication filter pressure switch

Procedure

1. Install the lubrication filter pressure switch (1) in the axle lubrication filter.

   Tighten to 43 to 51 Nm (31 to 39 lbf ft).

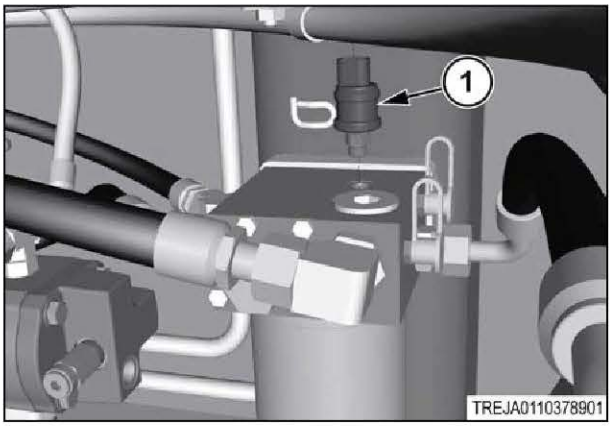

Fig. 184

2. Connect the harness (1) to the lubrication filter pressure switch.

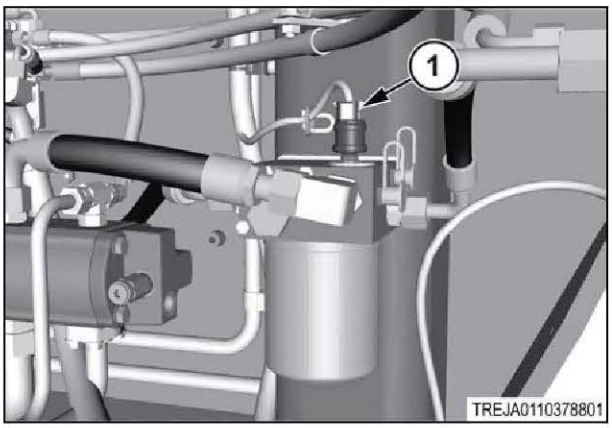

Fig. 185

3.4.20 Remove the cassette seal

Procedure

1. Have the correct container available for all fluid removal.

2. Remove the wheels and the hubs to get access to the cassette seal.

   NOTE:
   It is not necessary to remove the axle from the machine to replace the cassette seal.

3. Remove the drain plugs from the bottom side of the final drive to drain the final drive and the service brakes.

4. Drain approximately 18.9 to 22.7 L (5 to 6 gallons). Install the drain plugs.

5. Use a seal removal tool to remove the cassette seal (1).

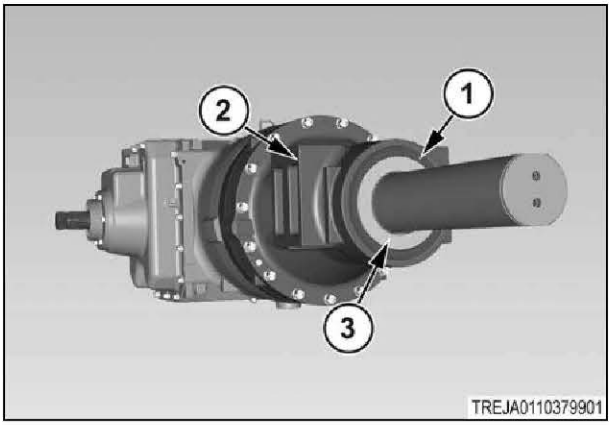

Fig. 186

6. Make sure not to make any marks on the final drive (2) or the bushing (3).

Related Links

Remove the outside wheel page 14-3
Remove the center wheel page 14-4
Remove the inside wheel page 14-5

3.4.21 Install the cassette seal

Special tools

Description	Part number	Vendor	Where used	Mandatory
Seal installation tool	AG332301	K-Line	Drive train system	Mandatory

Procedure

1. Clean the groove of the seal on the final drive (1) and the bushing (2).

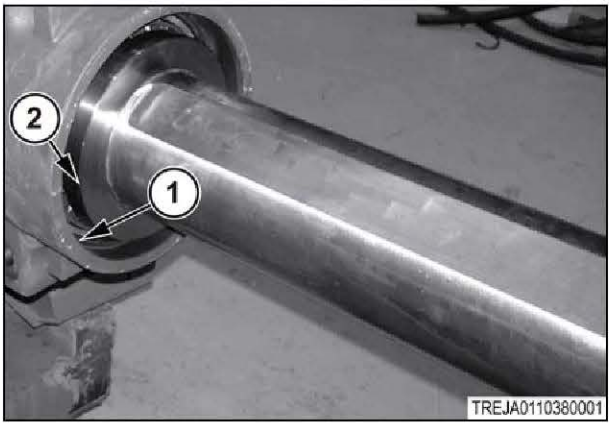

Fig. 187

2. Apply the correct thread locking compound (1) to the external diameter of the seal (2).

3. Lubricate the internal diameter with transmission oil.

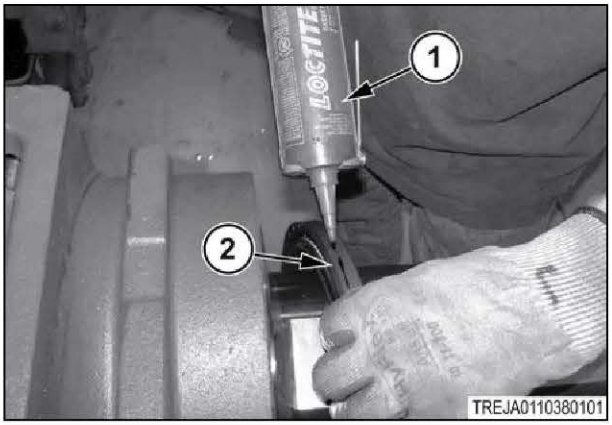

Fig. 188

4. Install the cassette seal (1) to the final drive.

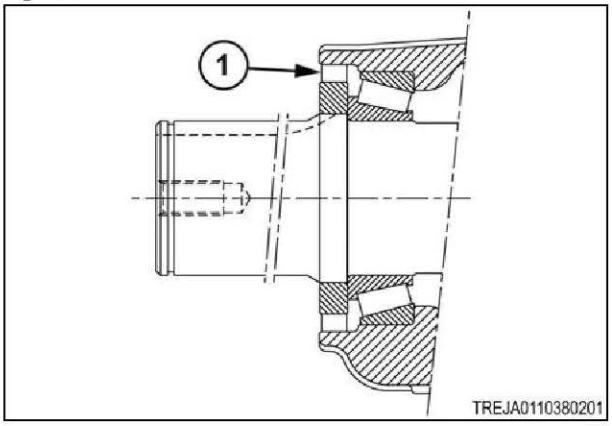

Fig. 189

5. Use the seal installation tool (1) to get the correct depth of the seal installation.

   Seal installation tool special tool part number AG332301.

6. Use the seal installation tool (1) to keep the alignment of the inner and the outer seal members.

7. Remove any remaining thread locking compound.

8. Install the wheel assembly.

9. Fill the transmission to the correct level with oil.

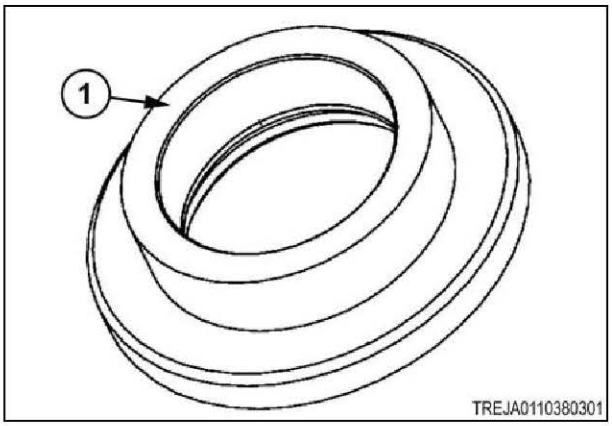

Fig. 190

   Oil from the transmission will automatically fill the axle to the correct level.

10. Road test the machine and check the seal for oil leaks.

Related Links

Install the inside wheel page 14-8
Install the center wheel page 14-11
Install the outside wheel page 14-13
Lubricant viscosities page 1-18
Do a check of the power train fluid level - daily page 6-55

3.4.22 Remove the final drive

Special tools

Description	Part number	Vendor	Where used	Mandatory
Final drive lifting bracket	AG332313	K-Line	Drive train system	Mandatory

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Park the machine on a solid, level surface.
2. Apply the park brake, stop the engine, and take the key with you.
3. Remove the axle from the machine.
4. Put the axle on a stand rated for the weight of the axle.

   NOTE:
   The weight of the front axle is approximately 1618 kg (3568 lbs).
5. Contain all fluids during the performance of inspection, maintenance, testing, adjusting and the repair of the machine.

Result

6. Discard all fluids according to the local regulations and the mandates.

Result

7. Prepare to contain fluid with the correct container.
8. Remove the oil plugs (1).
9. Drain the oil from the bottom of the axle.

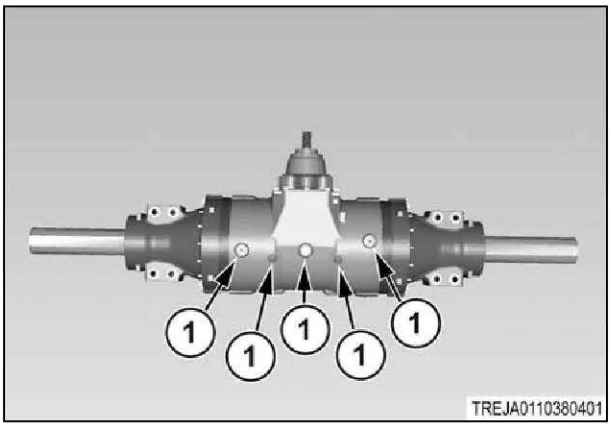

Fig. 191

10. Remove the nuts and the washers (1) that fasten the final drive to the center section.

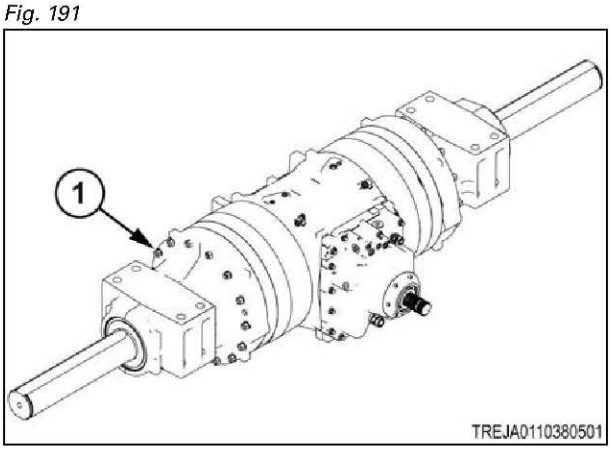

Fig. 192

11. Use the final drive lifting bracket for the removal of the final drive.

    Final drive lifting bracket special tool part number is AG332313.

    The final drive lifting bracket lets the horizontal removal and the installation of the final drive assemblies to the differential housing.

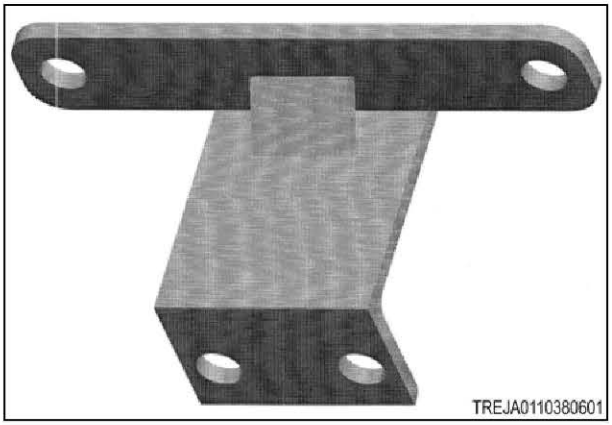

Fig. 193

12. Prepare to contain fluid with the correct container.
13. Put a tray under the final drive where the final drive will disconnect from the center section.
14. Catch any remaining oil left in the axle.
15. Install the final drive lifting bracket (1) to the final drive housing to help in the removal of the final drive housing.
16. Use the correct lifting device (2) with the final drive lifting bracket.
17. Remove the final drive housing from the differential.

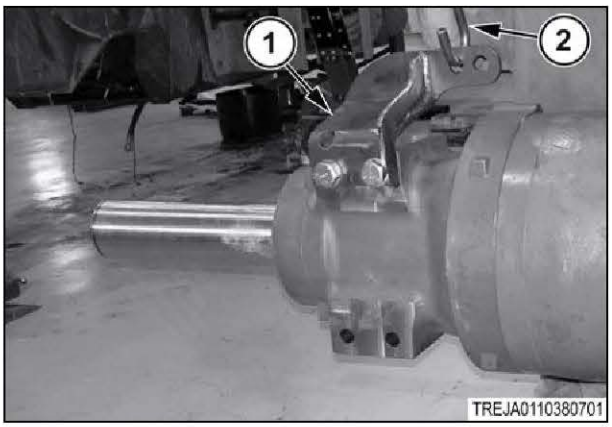

Fig. 194

Related Links

Remove the front axle page 3-18
Remove the rear axle page 3-25

3.4.23 Install the final drive

Special tools

Description	Part number	Vendor	Where used	Mandatory
Final drive lifting bracket	AG332313	K-Line	Drive train system	Mandatory

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Make sure that the seal in between the final drive housing (1) and the differential (2) is in good condition and in position.

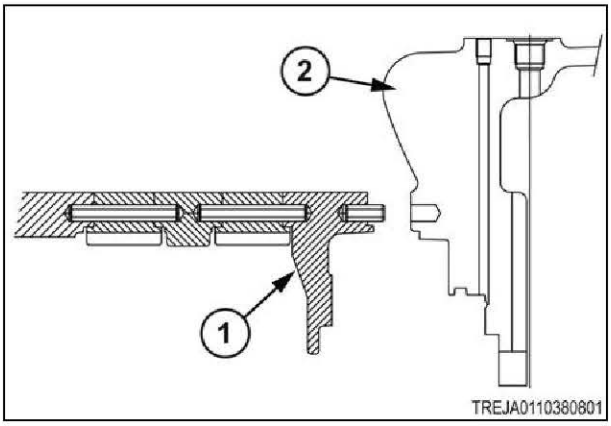

Fig. 195

2. Use the final drive lifting bracket for installing the final drive.

   Final drive lifting bracket special tool part number is AG332313.

   The final drive lifting bracket permits the horizontal removal and the installation of the final drive assemblies to the differential housing.

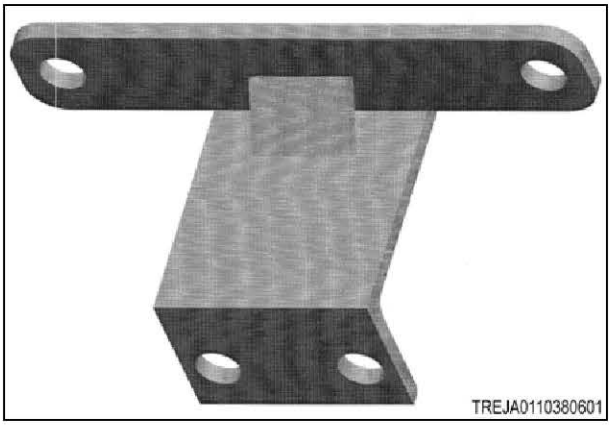

Fig. 196

3. Install the final drive lifting bracket (1) to the final drive housing to help in the lifting of the final drive.

4. Connect correct lifting equipment (2) to the final drive lifting bracket.

   IMPORTANT:

   The weight of the final drive housing is approvimately 3310.47 kg (7298.34 lbs).

5. Install the final drive housing to the differential.

   IMPORTANT:
   Carefully install the final drive to the differential lock side to prevent the damage to the ring seal.

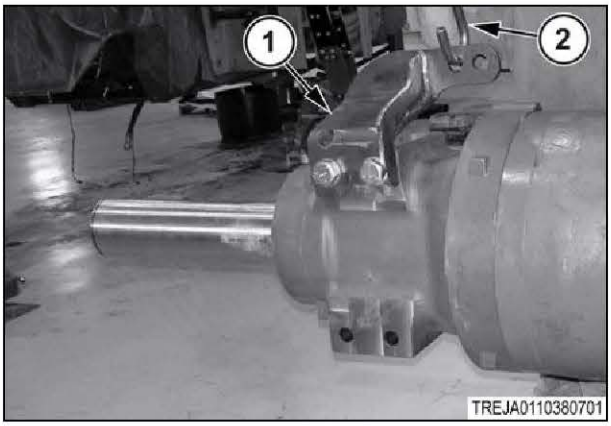

Fig. 197

6. Apply the thread locking compound to the threads.

7. Fasten the final drive with the nuts and the washers (1).

   Tighten to 250 Nm (184 lbf ft).

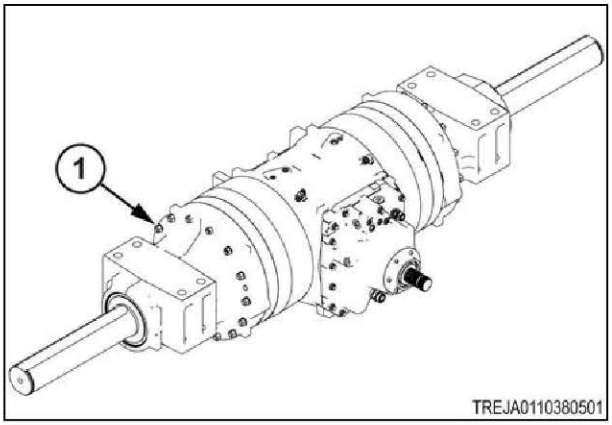

Fig. 198

3.5 Final drive disassembly

3.5.1 Disassemble the final drive

Special tools

Description	Part number	Vendor	Where used	Mandatory
Sun gear lifting rod	AG332281	K-Line	Drive train system	Mandatory
Axle final reduction lifting tool	AG332283	K-Line	Drive train system	Mandatory
Final drive planetary lifting bracket	AG332282	K-Line	Drive train system	Mandatory

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Put the final drive (1) in a vertical position with the input shaft at the top.

2. Use the correct support (2) to fasten the final drive assembly in position.

   NOTE:
   The wheel hub is shown as a support in the photo.

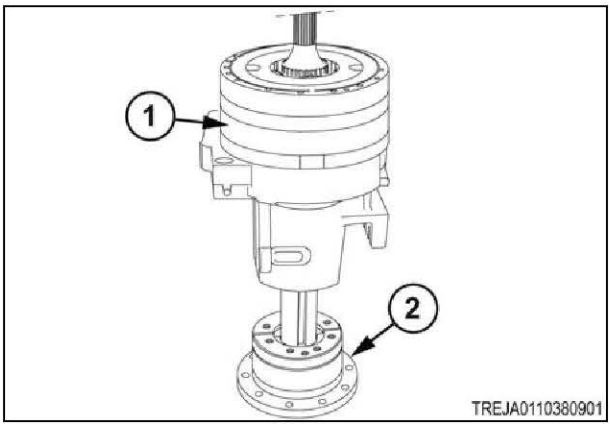

Fig. 199

3. Remove the spacer (1).

   Only use the spacer on the final drive located on the differential lock housing side, opposite of the bevel gear.

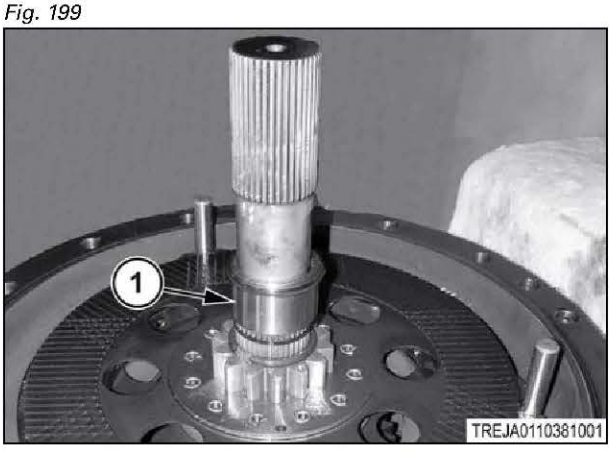

Fig. 200

4. Move the spacer (1) to a safe area and put in the order of the disassembly for installation.

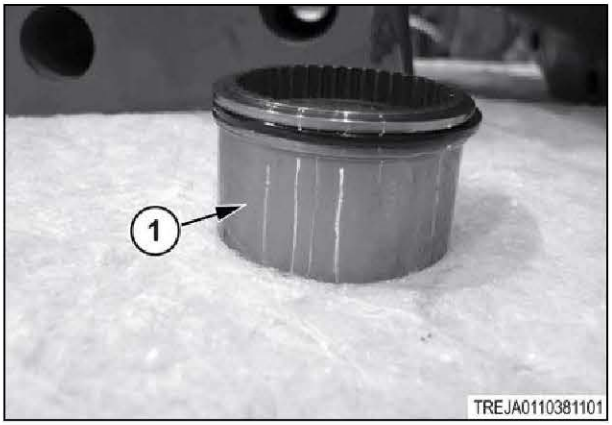

Fig. 201

5. The photo shows the brakes installed in the final drive housing.

Fig. 202

6. Remove the brake disc (1).

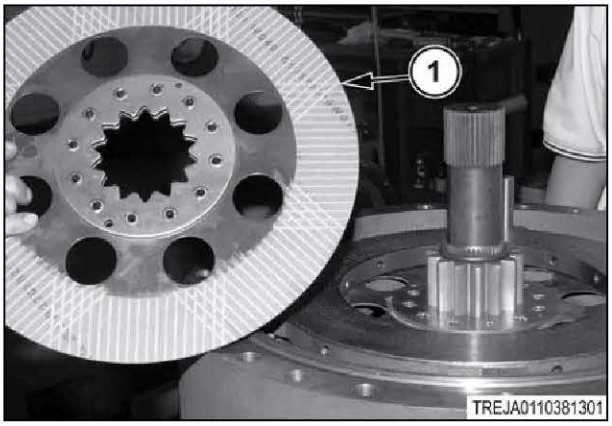

Fig. 203

7. Remove the brake plate (1).

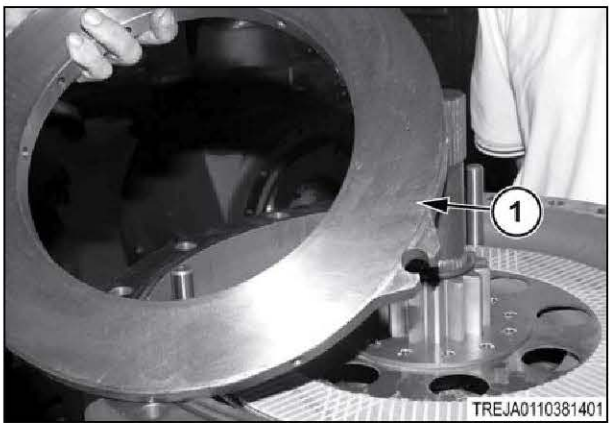

Fig. 204

8. Remove the brake disc (1).

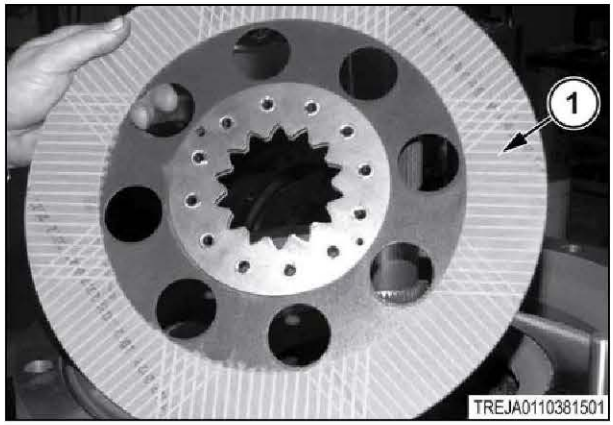

Fig. 205

9. Move the brake discs (1) and the brake plate (2) to a safe area.

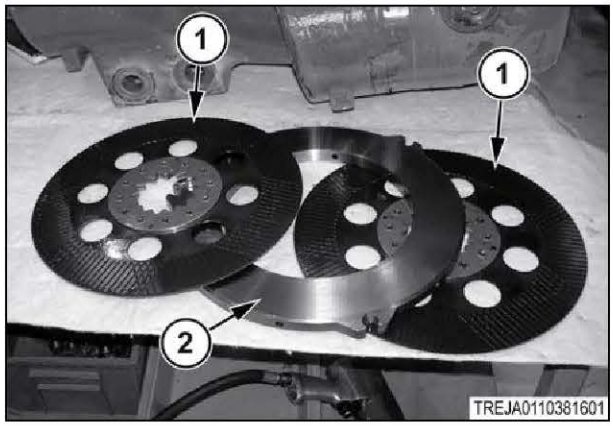

Fig. 206

10. Remove the retaining clip (1).

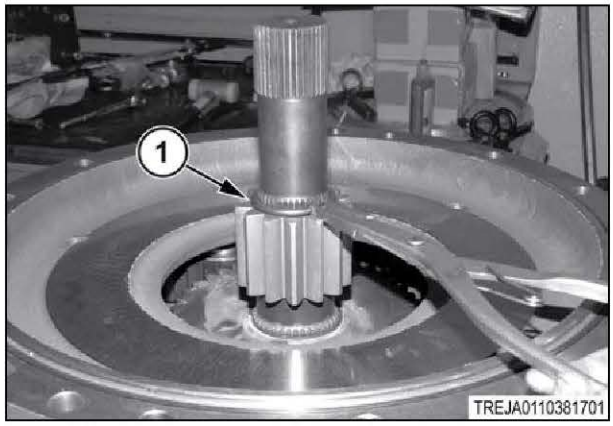

Fig. 207

11. Remove the splined gear (1).

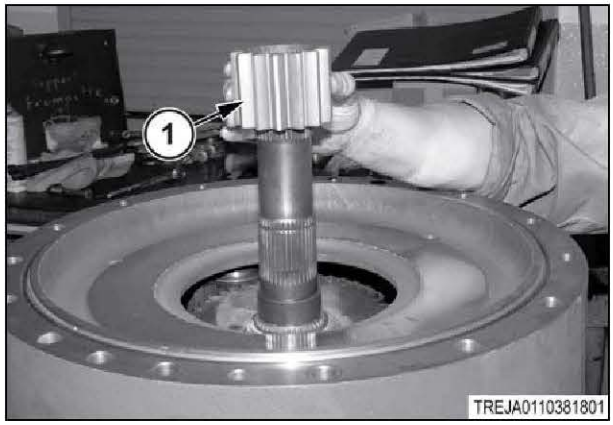

Fig. 208

12. Remove the retaining ring (1).

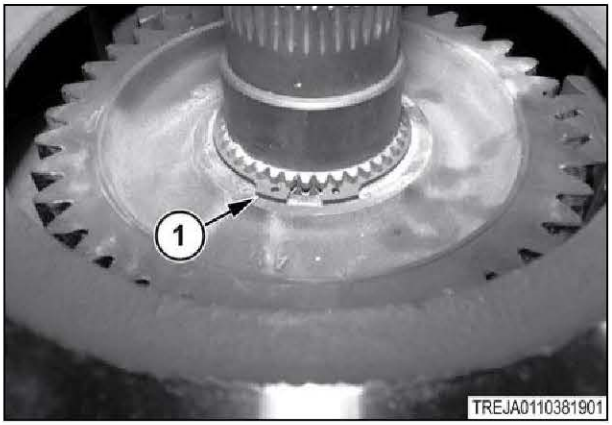

Fig. 209

13. Use a sun gear lifting rod (1) to help in the removal of the primary sun gear.

NOTE:
Sun gear lifting rod special tool part number is AG332281.
This part number includes two lifting rods.

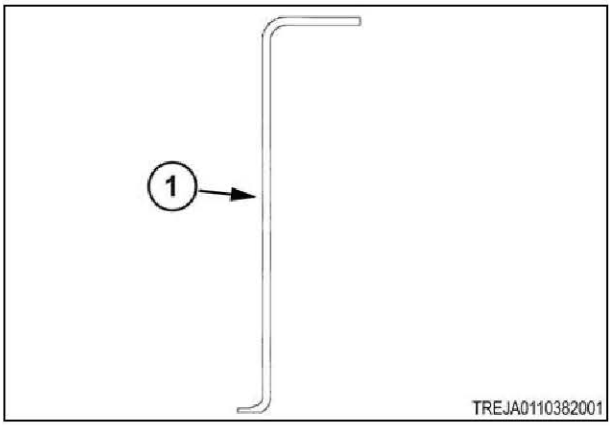

Fig. 210

14. Use the sun gear lifting rod (1) to remove the primary sun gear (2).

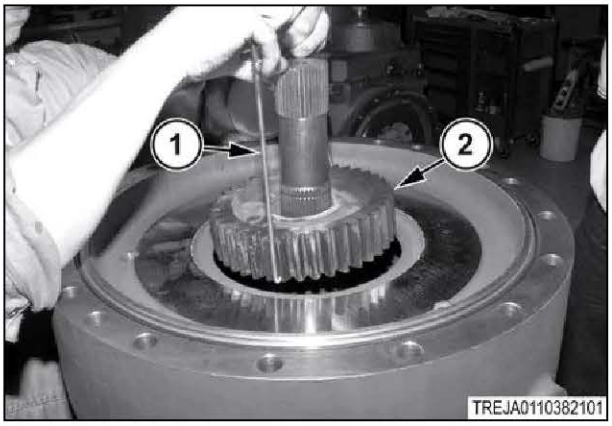

Fig. 211

15. Remove the retaining ring (1).

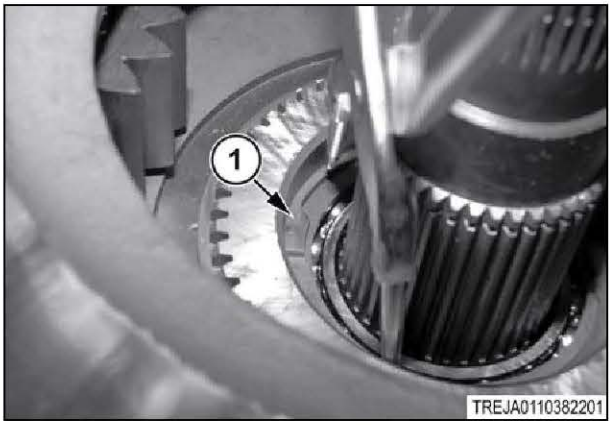

Fig. 212

16. Remove the input shaft (1), the retaining ring (2), and the washer (3).

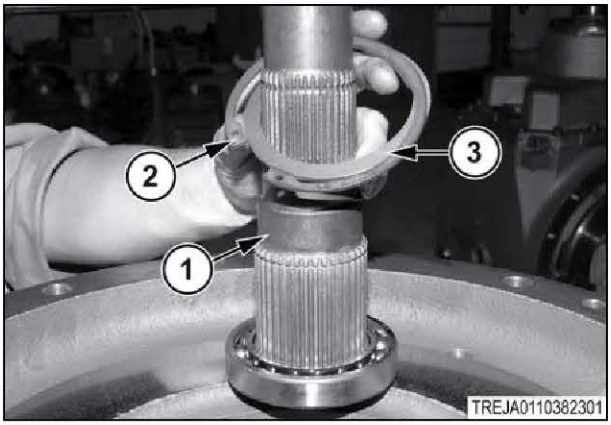

Fig. 213

17. Remove the two bolts (1) that fasten the ring gears together.

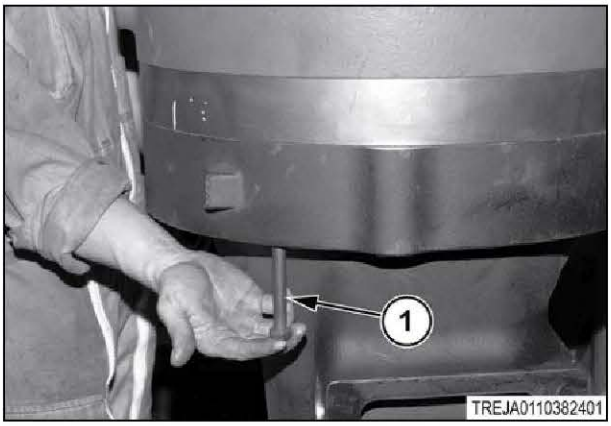

Fig. 214

18. Use the axle final reduction lifting tool (1) for removing and installing the primary ring gear.

NOTE:
Axle final reduction lifting tool part number is AG332283.

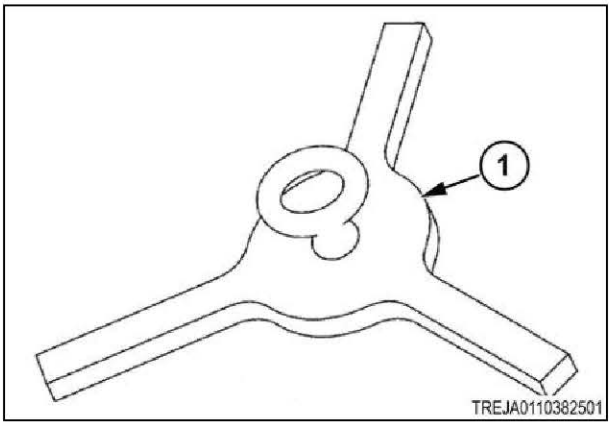

Fig. 215

19. Put the axle final reduction lifting tool. lifting bracket (1) behind the primary ring gear.

20. Remove the primary ring gear with the correct lifting device (2).

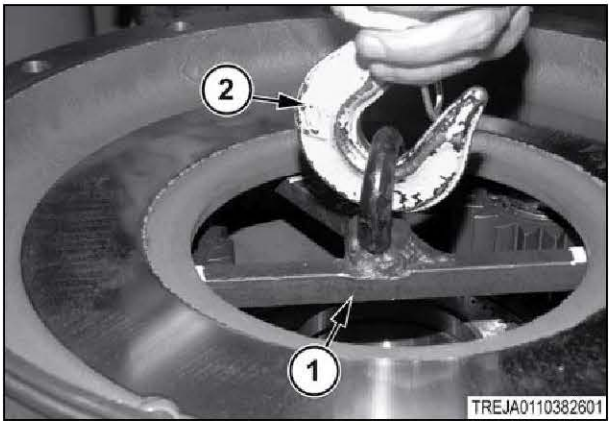

Fig. 216

21. Move the primary ring gear (1) to a safe location.

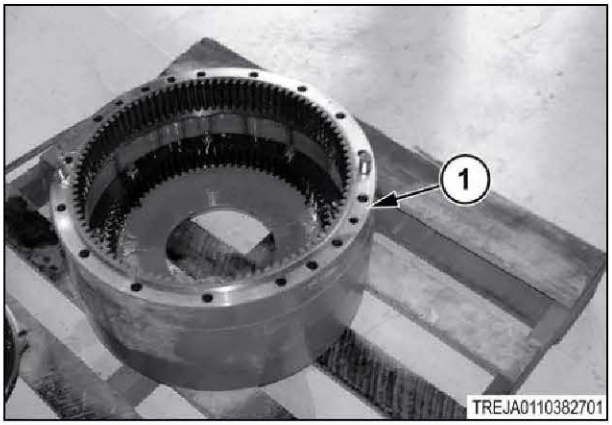

Fig. 217

22. Remove the retaining ring (1).

23. Remove the primary planetary carrier (2).

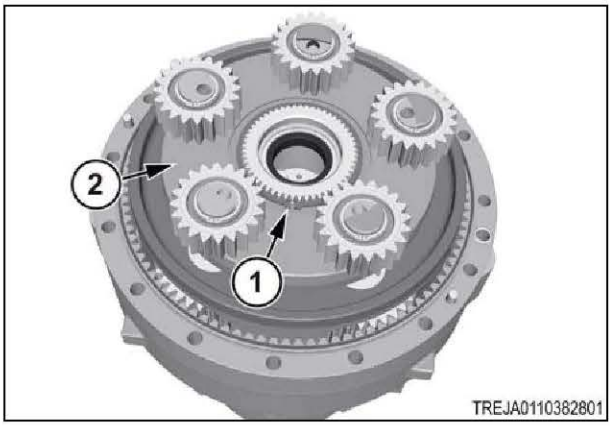

Fig. 218

24. Move the primary planetary carrier (1) to a safe location.

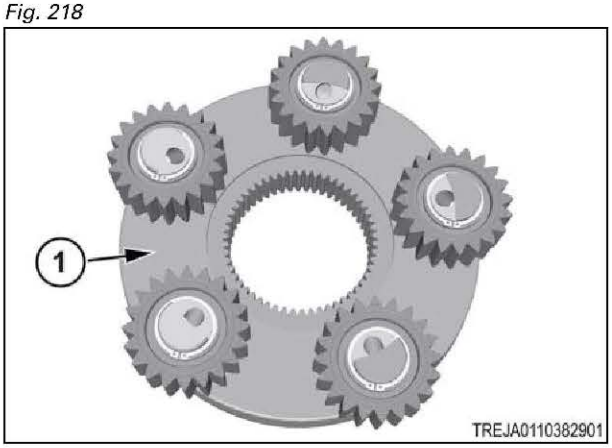

Fig. 219

25. Remove the retaining ring (1).

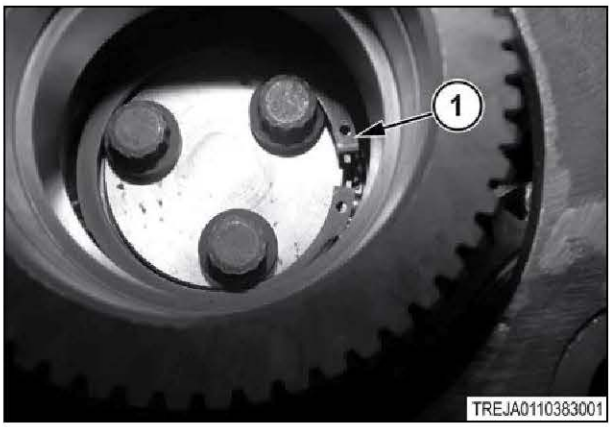

Fig. 220

26. Remove the secondary sun gear (1).

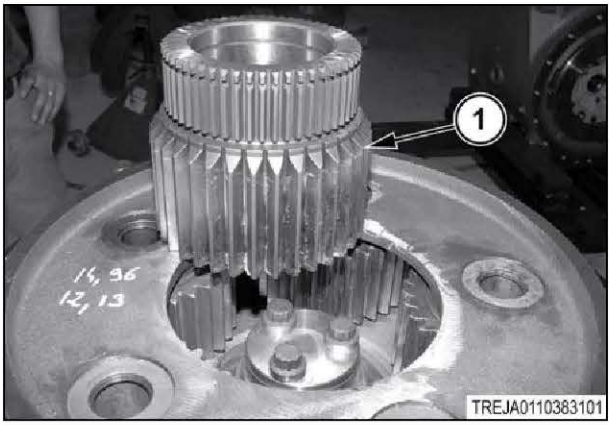

Fig. 221

27. Move the secondary sun gear (1) to a safe location.

Fig. 222

28. Remove the retaining ring (3), the thrust washer (2), and the bearing (1), from the sun gear (4).

NOTE:
There is approximate 0.65 mm (0.026 in)gap between the bearing and the sun gear.

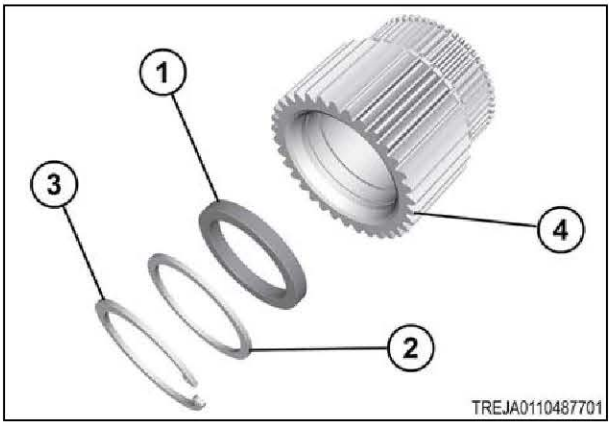

Fig. 223

29. Remove the three bolts (1) that fasten the retaining cap and the shims (2) to the axle shaft.

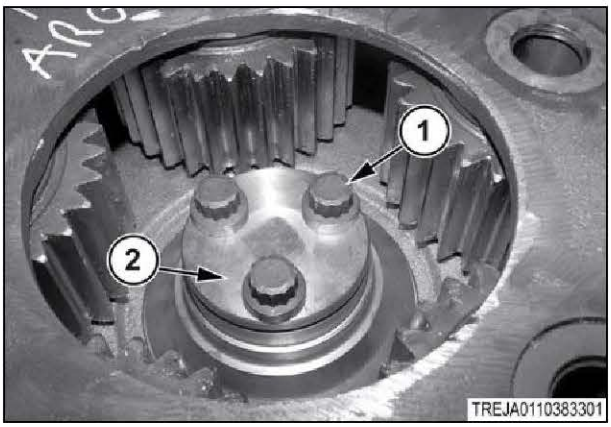

Fig. 224

30. Remove the retaining cap (1) with the shims (2).

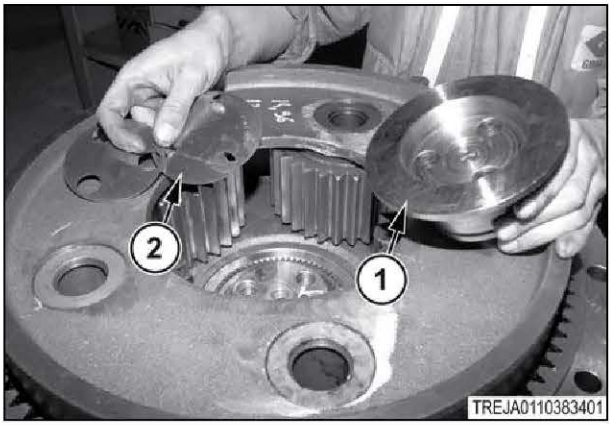

Fig. 225

31. Use the final drive planetary lifting bracket (1) for removing and installing the secondary planetary carrier.

NOTE:
Final drive planetary lifting bracket part number is AG332282.

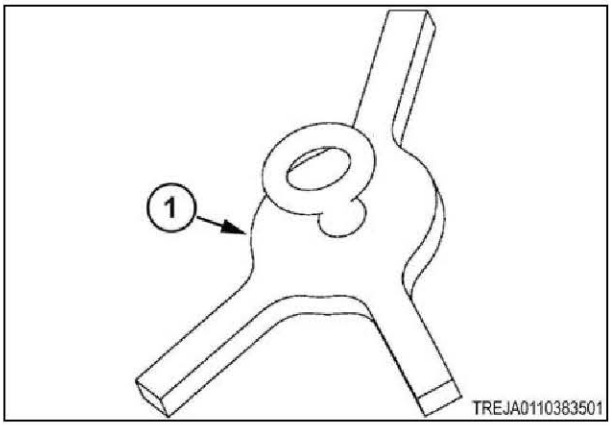

Fig. 226

32. Install the final drive planetary lifting bracket (1) to the secondary planetary carrier.

33. Remove the secondary planetary carrier () with the correct lifting device.

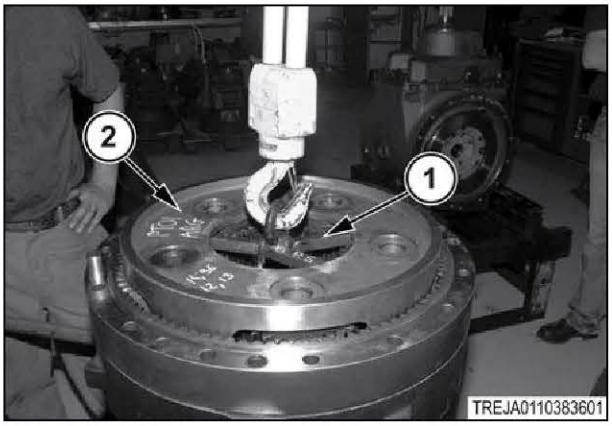

Fig. 227

34. Move the secondary planetary carrier (1) to a safe location.

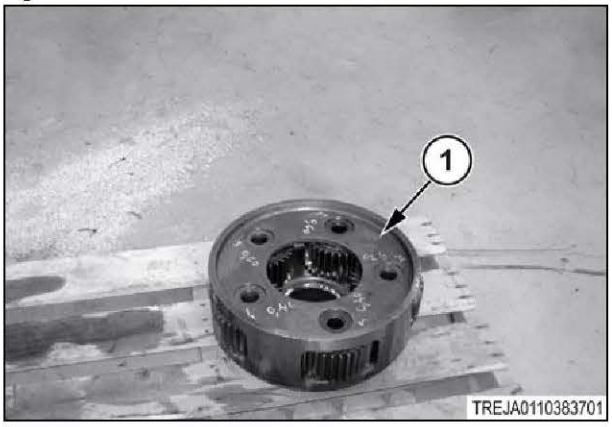

Fig. 228

35. Remove the secondary ring gear (1).

Fig. 229

3.5.2 Disassemble the primary planetary carrier

Procedure

1. Remove the retaining rings (1) and remove the five planetary gears (2).

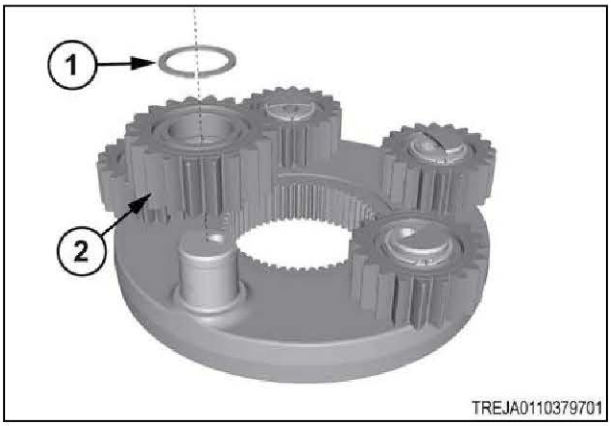

Fig. 230

2. Inspect the planetary gears and the roller bearings. Replace both with new if either is damaged or worn. The roller bearing will be destroyed during removal from the planetary gear.

Cut the inner race with a small angle grinder to remove the bearing rollers (1).

3. Cut out the snap ring that fastens the roller bearing in the planetary gear (2).

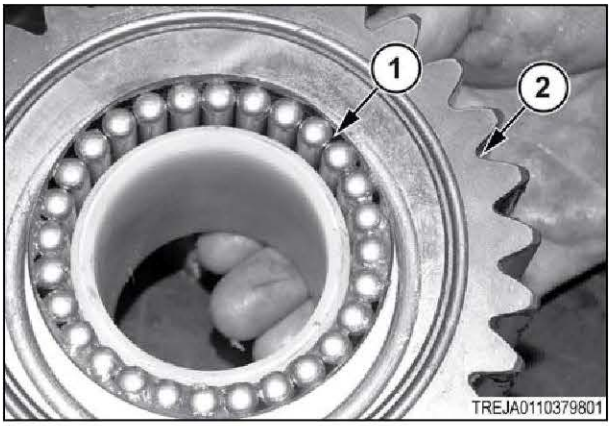

Fig. 231

3.5.3 Disassemble the secondary planetary carrier

Procedure

1. Remove the locking bolt and the spacer (1).

Fig. 232

2. Use a snap ring removal tool to open the ends of the snap ring (1).

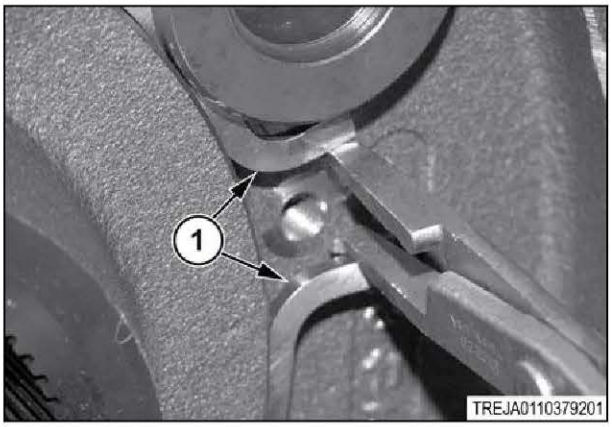

Fig. 233

3. Remove the snap ring (1).

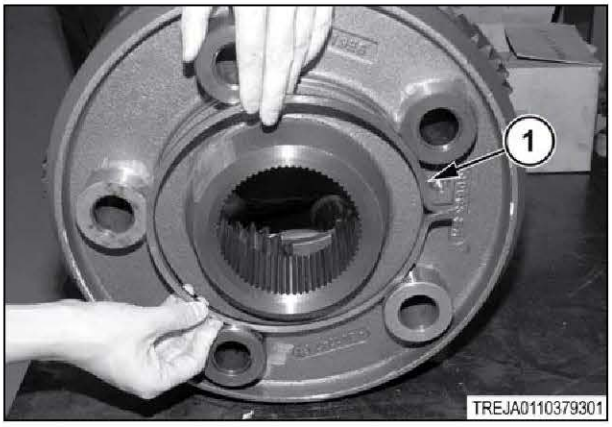

Fig. 234

4. Drive out and remove the pins (1).

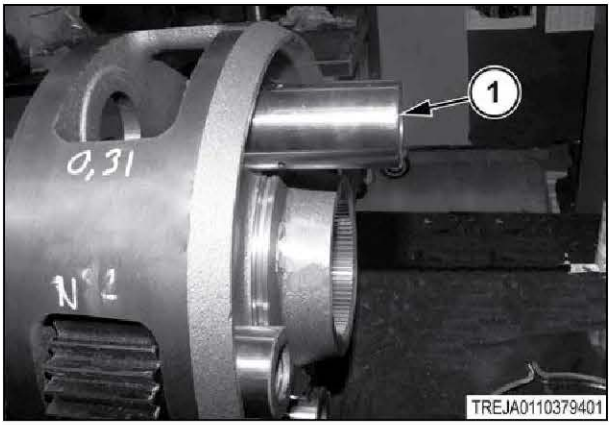

Fig. 235

5. Remove the planetary gears (1).

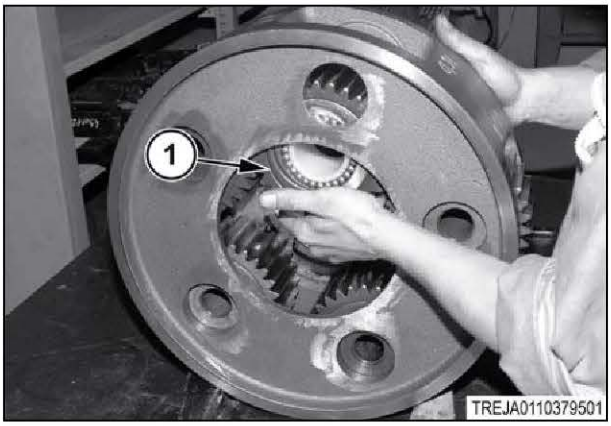

Fig. 236

6. Remove the two rows of the needle bearings (1), the thrust washers (2), and the spacer (3).

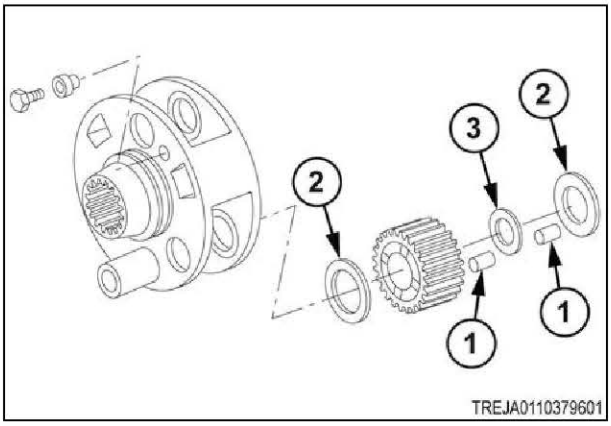

Fig. 237

3.5.4 Disassemble the axle shaft bearings

Procedure

1. Connect correct lifting equipment to the final drive housing.

2. Raise the final drive housing (1) off of the axle shaft (2) far enough to get access to the bearing cone.

   IMPORTANT:
   When removing the shaft, the cassette seal will be destroyed .

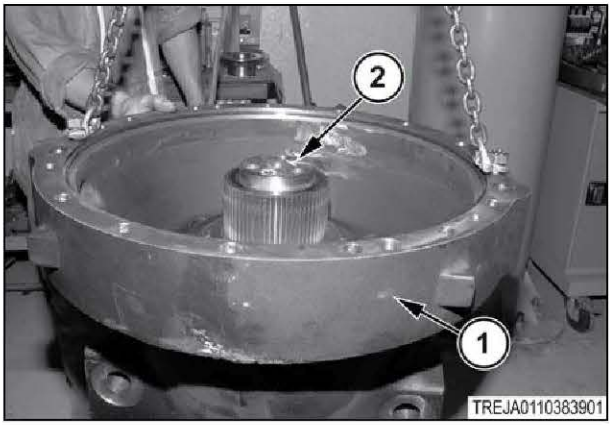

Fig. 238

3. Remove the bearing cone (1) from the final drive housing.

4. Remove the final drive housing from the axle shaft.

Fig. 239

5. Use a 9 t10 US ton press to remove the bearing cone (1), the spacer, and the ring from the axle shaft (2).

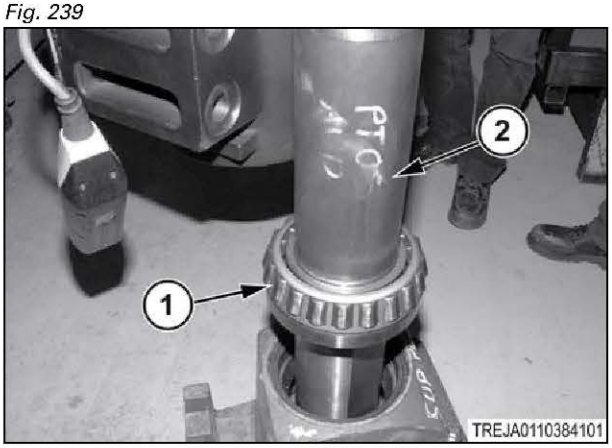

Fig. 240

3.6 Final drive assembly

3.6.1 Assemble the axle shaft bearings

Special tools

Description	Part number	Vendor	Where used	Mandatory
Axle rolling torque bracket	AG332314	K-Line	Drive train system	Mandatory

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Clean and inspect all components.

   Replace any parts found to be bad.

2. Put the axle shaft (1) on a correct support device .

3. Apply assembly grease to the O-ring(2). Put the O-ring on the axle shaft.

   IMPORTANT:
   Do not stretch the O-ring.

Fig. 241

4. Press the bushing (1) into position on the axle shaft (2).

   IMPORTANT:
   Make sure the O-ring remains in position.

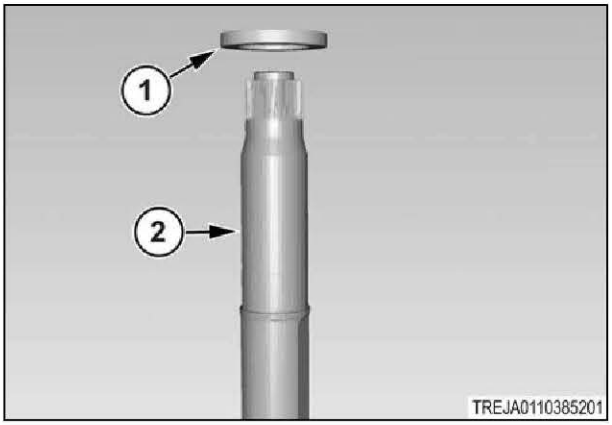

Fig. 242

5. Warm the bearing (1) to 140 °C (284 °F).

   IMPORTANT:
   Make sure to use protective gloves that protect from the heat of the bearing.

   Slide the heated bearing onto the axle shaft (2).

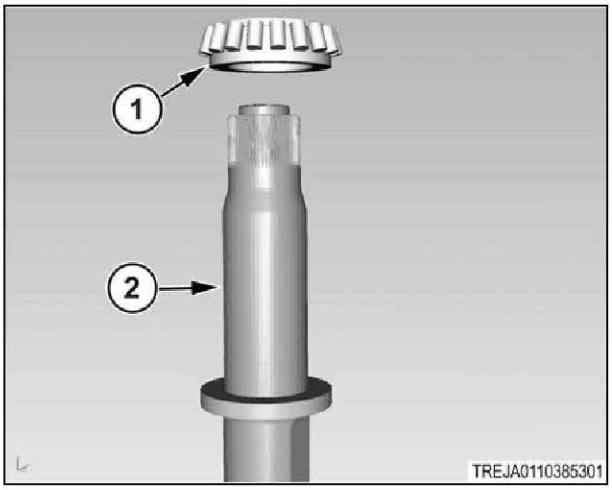

Fig. 243

6. Clean and check the components.
7. Replace any parts found to be bad.
8. Use transmission oil to lubricate the bores which will hold the cups (1,2) in the final drive housing .
9. Insert the cups (1,2) into the correct bores.

   IMPORTANT:
   This is not a press install, but the cups will require a light tapping to install correctly.

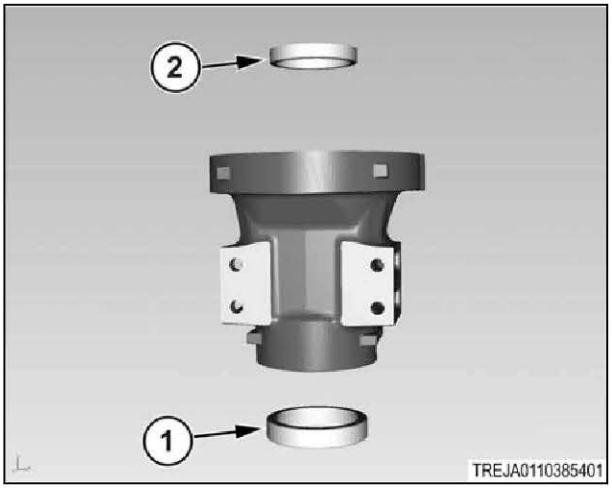

Fig. 244

10. Install the special tool in the final drive housing, Connect correct lifting equipment to the final drive housing.

Can measure the rolling torque of the final drive assembly.

Can safely lift the final drive assembly from the horizontal position to the vertical position.

Axle rolling torque bracket special tools part number is AG332314.

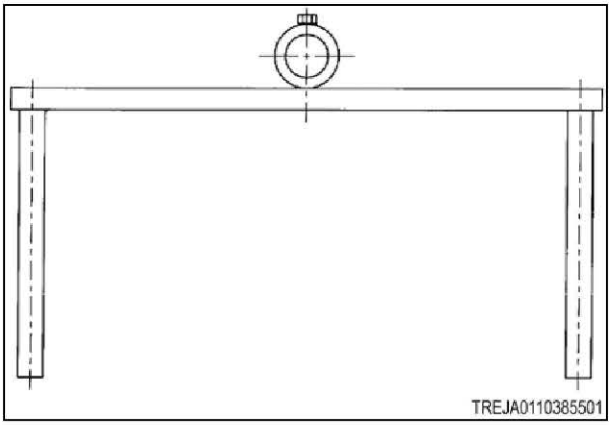

Fig. 245

11. Lower the final drive housing (1) installed with cups onto the prepared shaft (2).

Fig. 246

12. Install the inner bearing (1) onto the axle shaft (2).

To slide the bearing onto the shaft use light tapping..

Fig. 247

13. Apply assembly grease to the the main O-ring (1) and install to the final drive housing.

Install the smaller O-rings (2) for oil lubrication passages to the final drive housing .

IMPORTANT:
Correctly seat the O-rings.

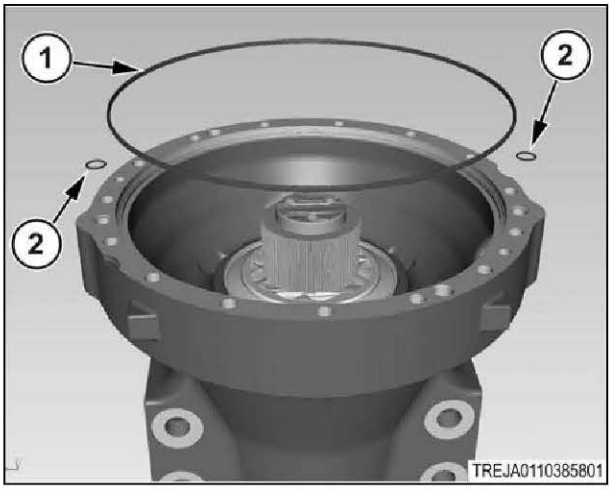

Fig. 248

3.6.2 Shim the axle shaft bearings

Special tools

Description	Part number	Vendor	Where used	Mandatory
Final drive planetary lifting bracket	AG332282	K-Line	Drive train system	Mandatory
Axle Rolling Torque Bracket	AG332314	K-Line	Drive train system	Mandatory

Procedure

1. Use the Final drive planetary lifting bracket (1) for removing and installing the secondary planetary carrier.

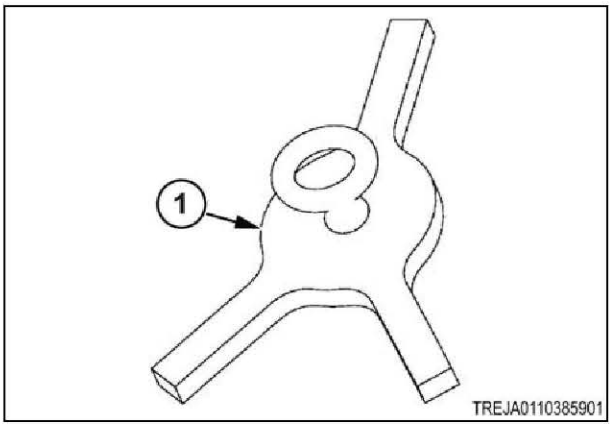

Fig. 249

2. Install the secondary planetary carrier (1) to the final drive housing (2) using the correct lifting device.

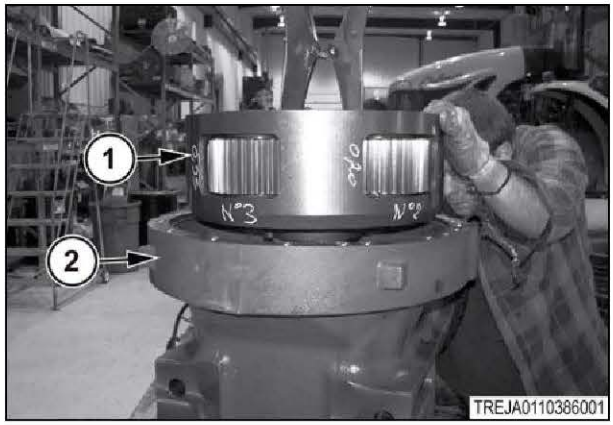

Fig. 250

3. Rotate the final drive housing (1) five times to make sure the bearing is seated.

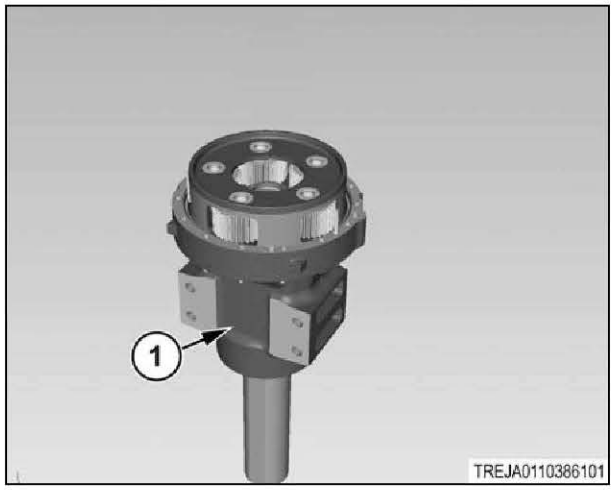

Fig. 251

4. Select the shim stack (1) thickness which measures approximately 3.302 mm (0.130 in).

   NOTE: *Make sure the shims are clean and free from grit and oil.*

5. Measure the shim stack with a micrometer and record this measurement.

6. Install enough shims under the axle retention cap (2) so there is slack in the bearings when tightened.

7. Install the axle retention cap, lock washers, and bolts.

   Tighten to 100 to 120 Nm (136 to 163 lbf ft).

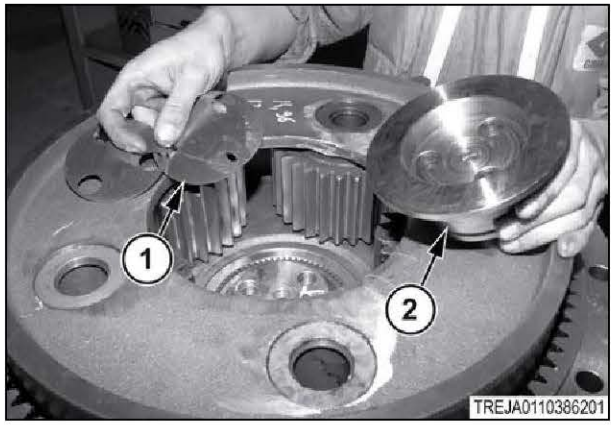

Fig. 252

8. The photo shows the axle retention cap (1) with the shims installed on the axle shaft.

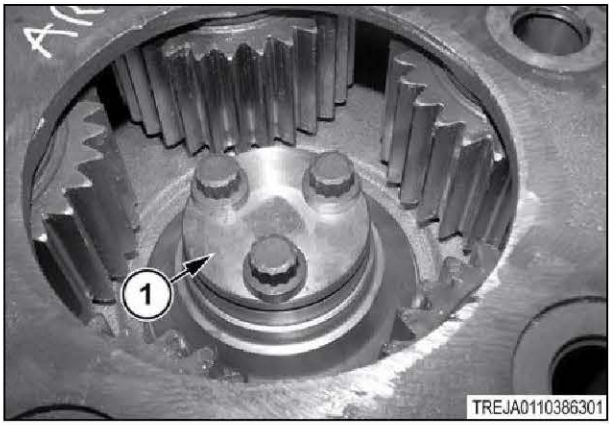

Fig. 253

9. Use the axle rolling torque bracket to raise the final drive housing.

NOTE:
Use the axle rolling torque bracket to measure the rolling torque of the final drive assembly.

Use the axle rolling torque bracket to lift the final drive assembly from the horizontal position to the vertical position.

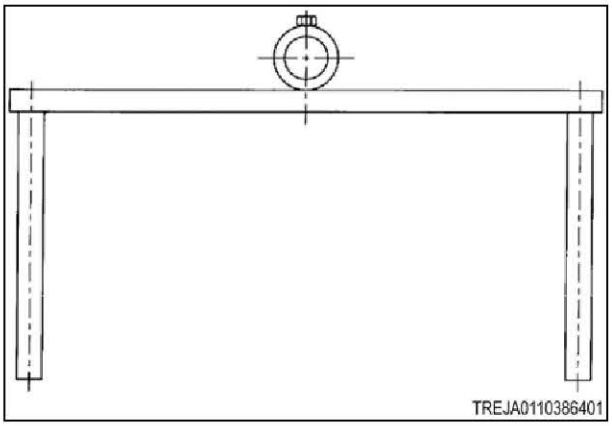

Fig. 254

10. Raise the final drive housing with the correct lifting equipment.

Raise until the bottom bearing in the final drive housing supports the weight of the axle shaft.

11. Rotate the axle shaft five times to make sure the bearing is seated.

12. Set the axle down on the axle shaft.

Fig. 255

13. Put a dial indicator (1) on the final drive and measure off of the retaining cap.
14. Set the dial indicator to 0.
15. Raise the final drive housing up and rotate five times to make sure the bearing is seated.
16. Record the measurement taken off the dial indicator.
17. Calculate the amount of free play in the shim pack.

    Subtract the measurement taken off the dial indicator from the initial shim pack measurement.

    This measurement will be amount of free play in the shim pack.

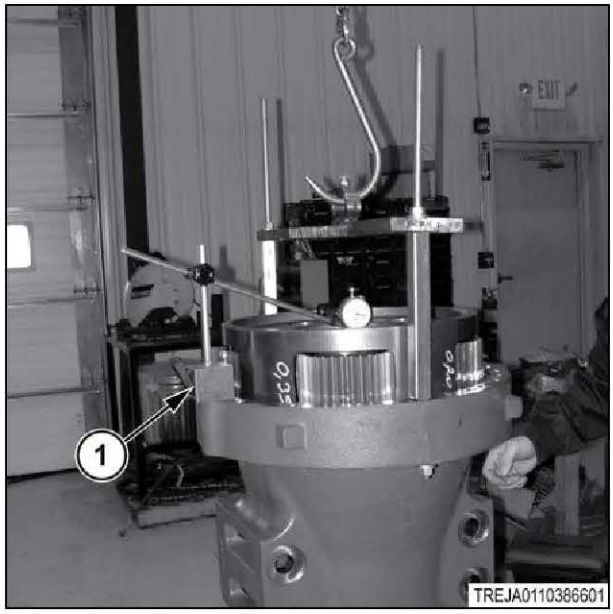

Fig. 256

18. Subtract the minimum preload 0.0254 mm (0.001 in) from the measured shim pack free play.

    The measurement will be the maximum shim stack permitted.
19. Subtract the maximum preload 0.127 mm (0.005 in) from the measured shim pack free play.

    The measurement will be the minimum shim stack permitted.
20. Install the correct size shim pack below the cap

    Tighten the three retaining bolts to 320 Nm (236 lbf ft).
21. Rotate the axle housing five times to make sure the bearing is seated.
22. Check the bearing adjustment.
23. Measure and record the rolling torque without the seals or the ring gear installed.

    The rolling torque must be between 8 to 11 Nm (70 to 100 inf lb).

Example		
Initial shim stack	A	3.3782 mm (0.133 in)
Recorded reading from the dial indicator	B	0.7112 mm (0.028 in)
Free play in the shim pack: (A-B=C)	C	2.667 mm (0.105 in)
Minimum preload	D	0.0254 mm (0.001 in)
Maximum shim stack: (C-D=E)	E	2.6416 mm (0.104 in)

Fig. 257

Example		
Maximum preload	F	0.127 mm (0.005 in)
Minimum shim stack: (C-F=G)	G	2.54 mm (0.100 in)
Shim #1		2.0066 mm (0.079 in)
Shim #2		0.2794 mm (0.011 in)
Shim #3		0.2794 mm (0.011 in)
Shim #4		0.000 mm (0.000 in)
Shim stack thickness		2.5654 mm (0.101 in)

3.6.3 Assemble the secondary planetary carrier

Procedure

1. Lubricate two rows of needle bearings (1) with white grease.
2. Install the two rows of needle bearings between the two spacers (2).

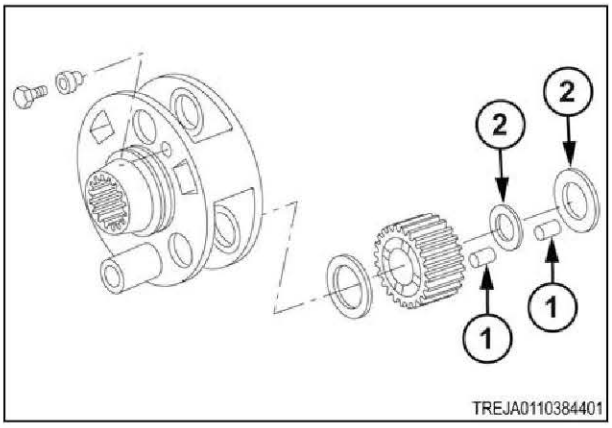

Fig. 258

3. Use the special tool (1) to hold the needle bearing in position during assembly.

Fig. 259

4. Install the planetary gears (1).

NOTE:
Special tool (2) *in position during assembly.*

5. Turn the gear where the groove in the face of the gear is away from axle shaft.

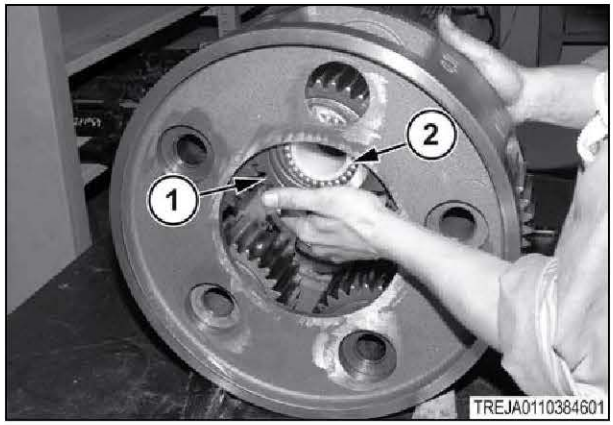

Fig. 260

6. Install a 1.5 mm (0.059 in) shim against the row of the needle bearings on the differential side.

NOTE:
Where possible shim to the minimum tolerance.

7. Use a thickness gauge to determine the thickness of the shims (1) necessary for a clearance of between 0.15 to 0.6 mm (0.006 to 0.0236 in)on each planetary gear.

8. Retract the pins and put the shim(s) in position.

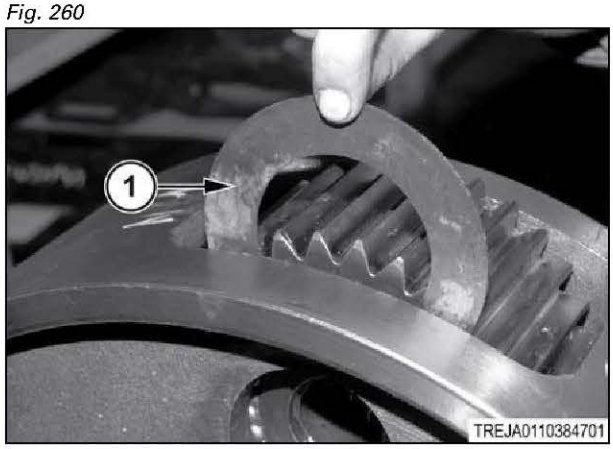

Fig. 261

9. Carefully drive in the pins (1).

NOTE:
The process of driving the pins in will remove the special tool used to fasten the needle bearing in position.

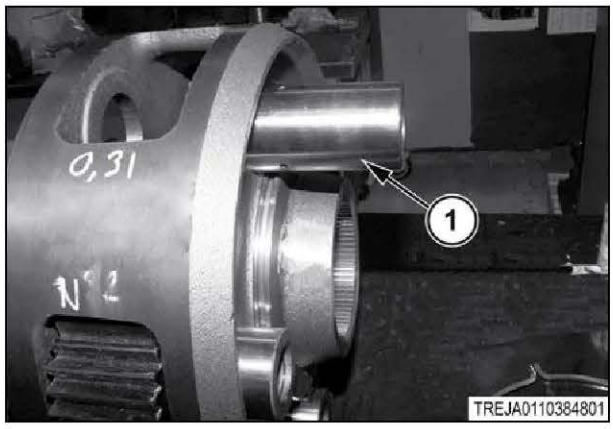

Fig. 262

10. Install the retaining ring (1).

This retaining ring holds planetary pins in position.

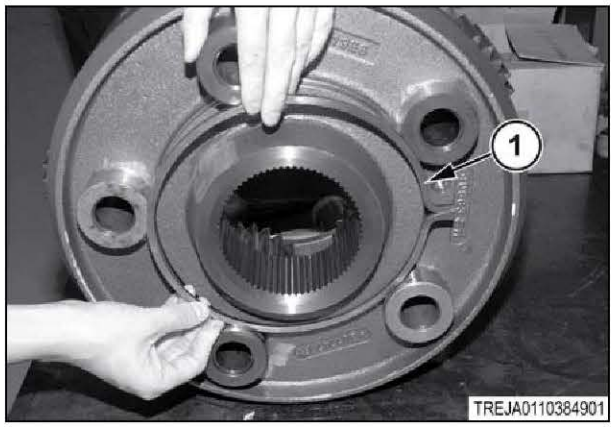

Fig. 263

11. Install the bolt and the spacer (1) to fasten the snap ring.

Tighten the bolt to 34 to 50 Nm (26 to 37 lbf ft) .

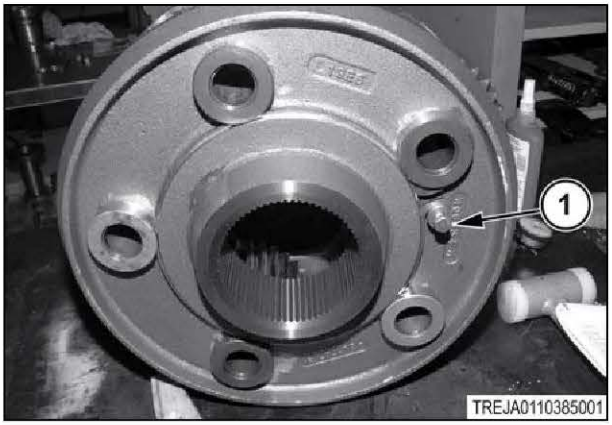

Fig. 264

3.6.4 Assemble the primary planetary carrier

Procedure

1. Install the roller bearing (1) into the primary planetary gears (2).

Carefully remove the sleeve so the snap ring can set into the groove on the primary planetary gear.

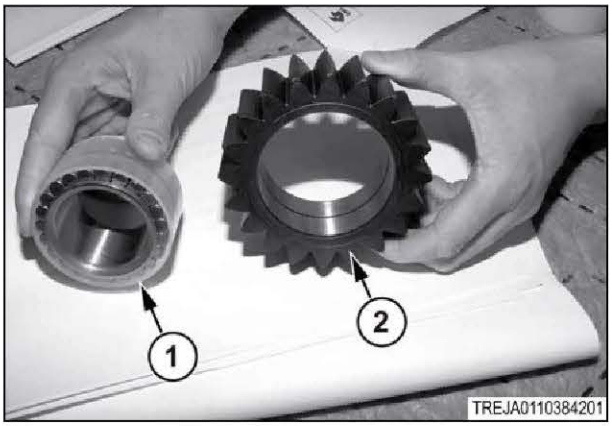

Fig. 265

2. Rotate the primary planetary gear (1) so the groove in the face is toward the groove on the shaft.

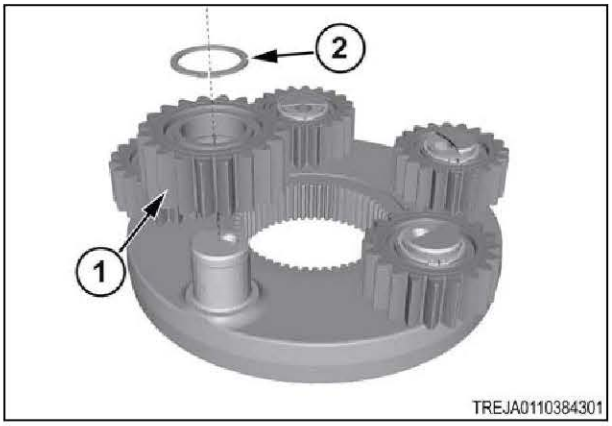

Fig. 266

3. Install the primary planetary gears on the primary planetary carrier.

4. Fasten the primary planetary gears with the retaining rings (2).

3.6.5 Assemble the final drive

Procedure

1. Clean and check all components.

2. Replace any parts found to be bad.

3. Install the four alignment pins (1).

4. Put the longer alignment pin in the hole on the top side of the axle.

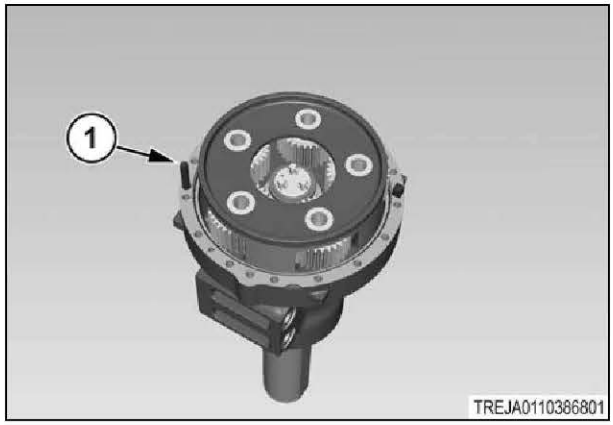

Fig. 267

5. Install the secondary ring gear (1) to the final drive housing.

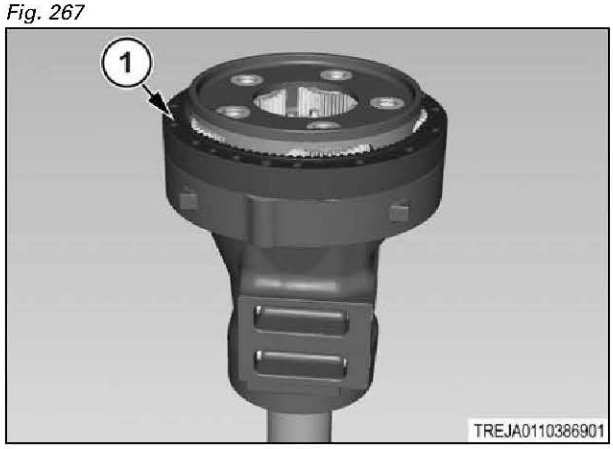

Fig. 268

6. Install the bearing (1), thrust washer (2), and the retaining ring (3) in the sun gear (4).

NOTE:
There is approximate 0.65 mm (0.026 in)gap between the bearing and the sun gear.

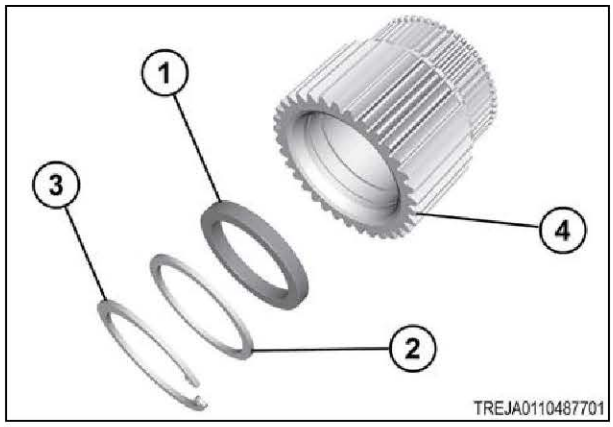

Fig. 269

7. Install the secondary sun gear (1) to the axle shaft.

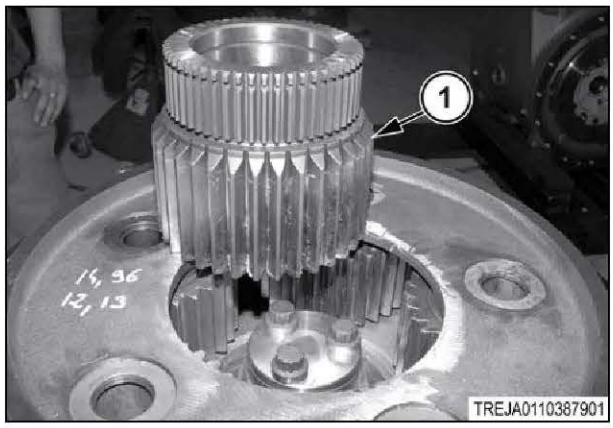

Fig. 270

8. Fasten the secondary sun gear with the retaining ring (1).

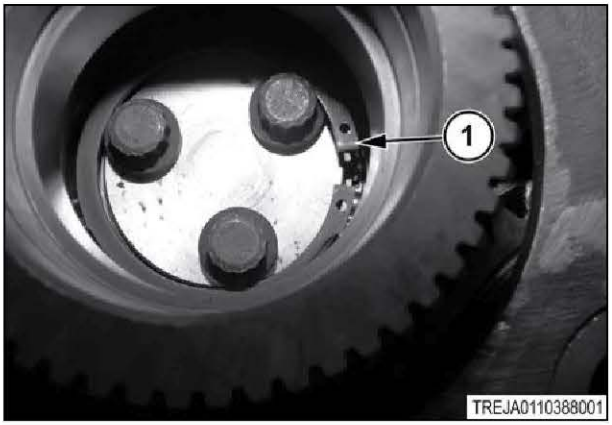

Fig. 271

9. Put the primary planetary carrier (1) on the secondary sun gear.
10. Turn the planetary gears to engage.
11. Fasten the planetary gear with the retaining ring (2).

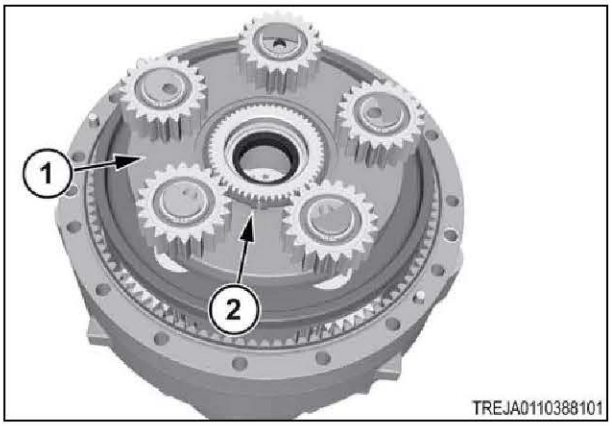

Fig. 272

12. Install the O-rings (1) to the ring gear.
13. Make sure the O-rings are seated correctly.
14. Use the alignment pin (2) to help the installation of the primary ring gear.

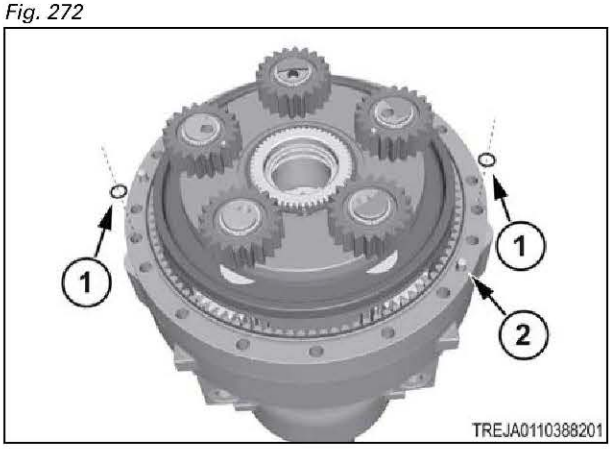

Fig. 273

15. Install the O-ring (1) to the bottom of the primary ring gear (2) with assembly grease.

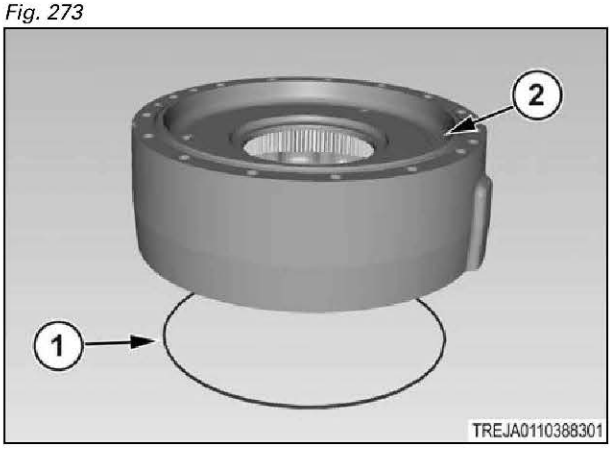

Fig. 274

16. Install the special tool (1) behind the primary ring gear (2).

17. Using a correct lifting device move the primary ring gear into position on the secondary ring gear.

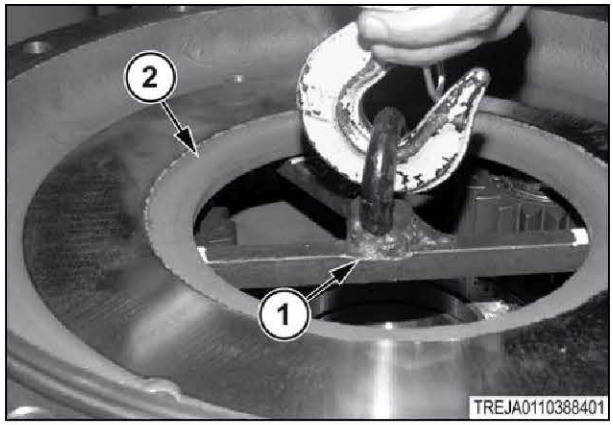

Fig. 275

18. Install the two bolts (1) that fasten the final drive, the secondary ring gear, the spacer, and the primary ring gear together.

Tighten the bolts to 105 Nm (77 lbf ft).

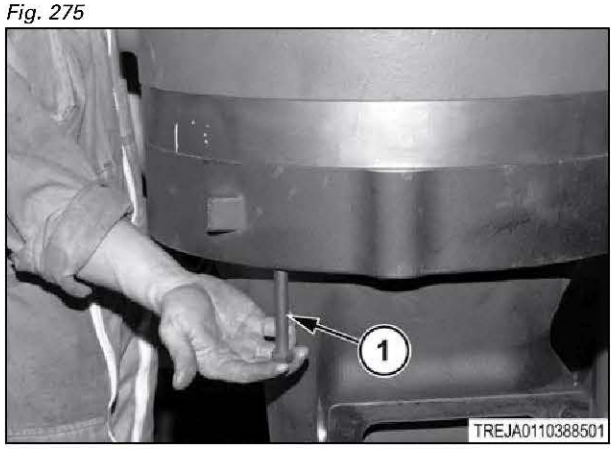

Fig. 276

19. Heat the bearing (1) to 140 °C (284 °F) for installation.

20. Install the bearing (1) on the input shaft (2).

21. Slide the bearing on the input shaft (2) by hand with a glove on.

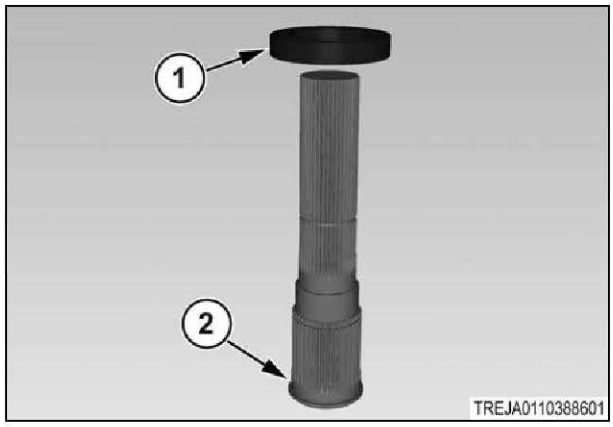

Fig. 277

22. Install one of the final drive input shafts (1) with the retaining ring (2) and the washer (3).

NOTE:
There is a long and a short final drive input shaft. The long input shaft installs to the lock side of the differential. The short input shaft installs to the bevel gear side of the differential.

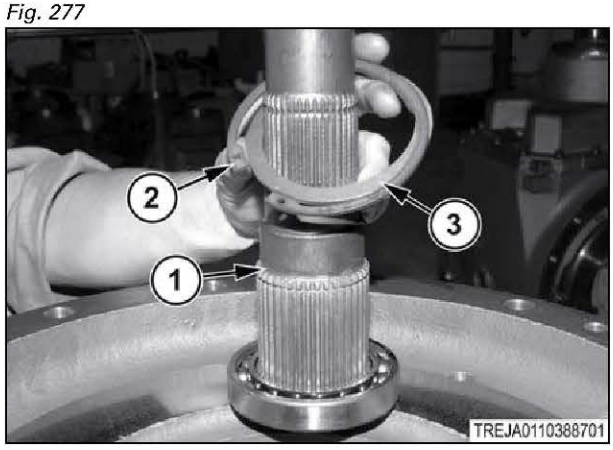

Fig. 278

23. Fasten the final drive input shaft (1) with the retaining ring (2).

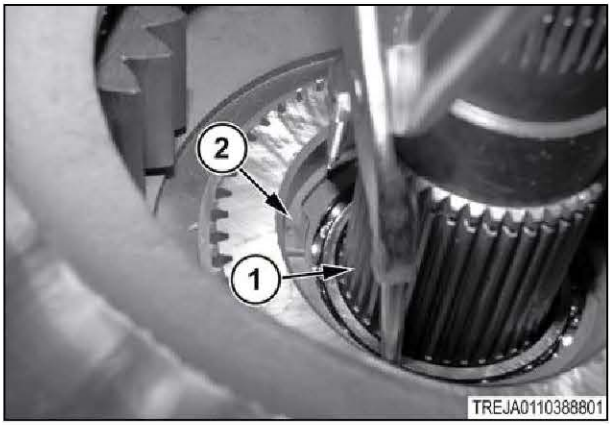

Fig. 279

24. Install the primary sun gear (1).

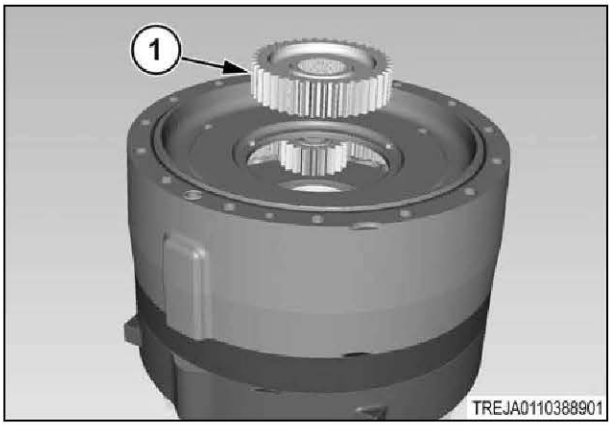

Fig. 280

25. Fasten the primary sun gear with the retaining ring (1).

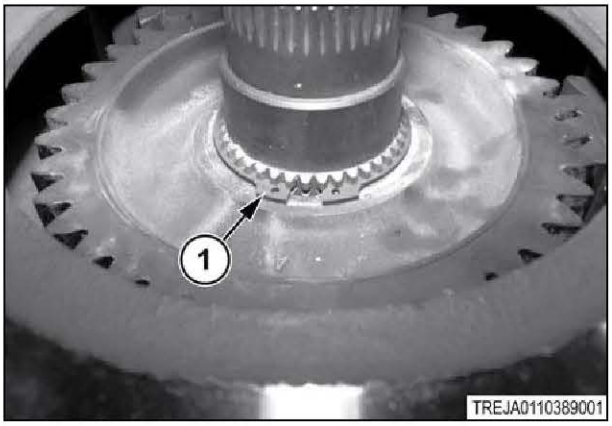

Fig. 281

26. Install the splined gear (1).

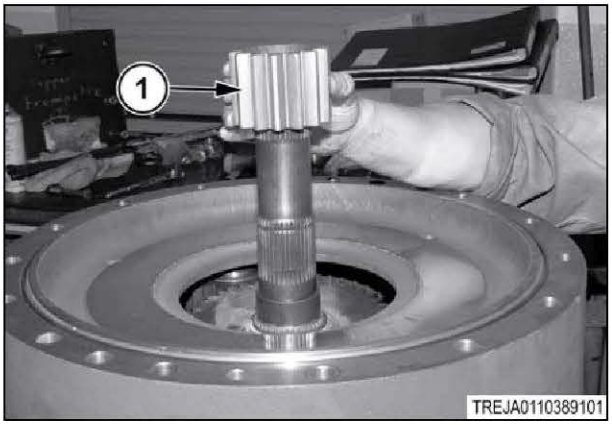

Fig. 282

27. Fasten the splined gear (1) with the retaining ring (2).

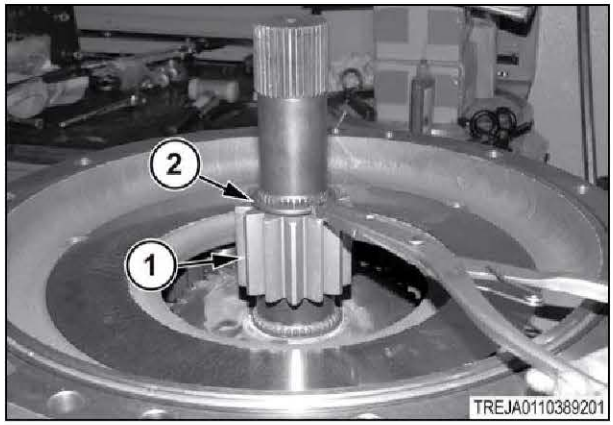

Fig. 283

28. Install the O-ring (1) to the input shaft (2) with assembly grease.

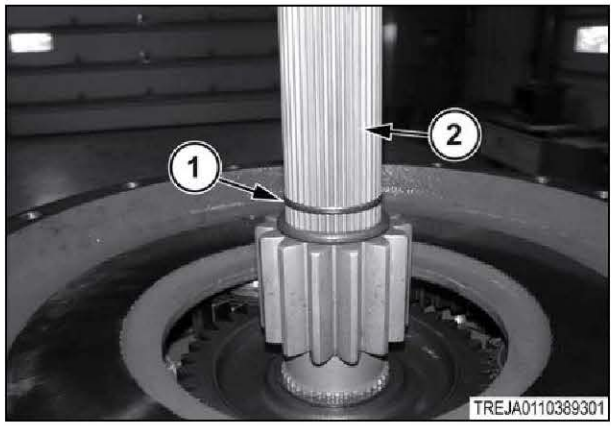

Fig. 284

29. Install the alignment pins (1) to the guide brake discs and the brake plate.

30. Install the alignment pin (2) with a hole through the center toward the top of the differential housing.

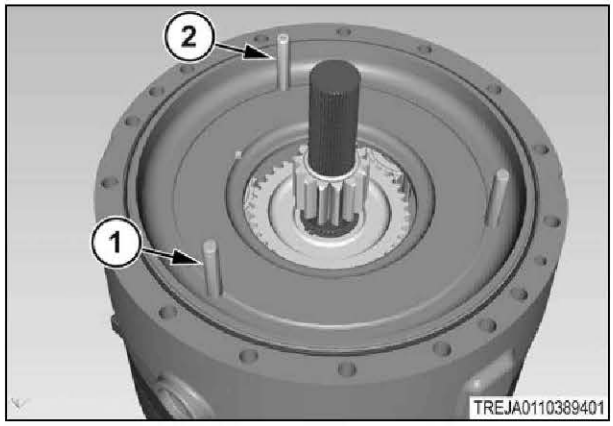

Fig. 285

31. Install the brake disc (1).

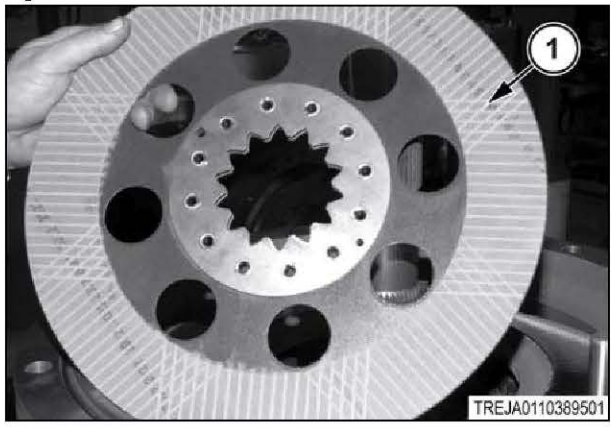

Fig. 286

32. Install the brake plate (1).

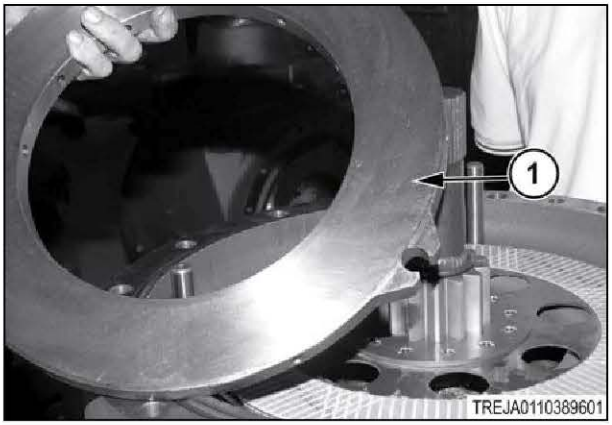

Fig. 287

33. Install the second brake disc (1).

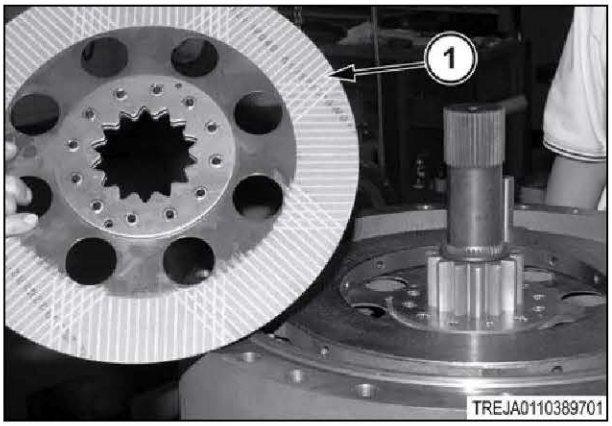

Fig. 288

34. Brakes installed in the final drive housing.

Fig. 289

35. Install the ring seal (1) to the spacer (2) with assembly grease.

36. Use the correct amount of grease to keep the ring seal compressed during assembly.

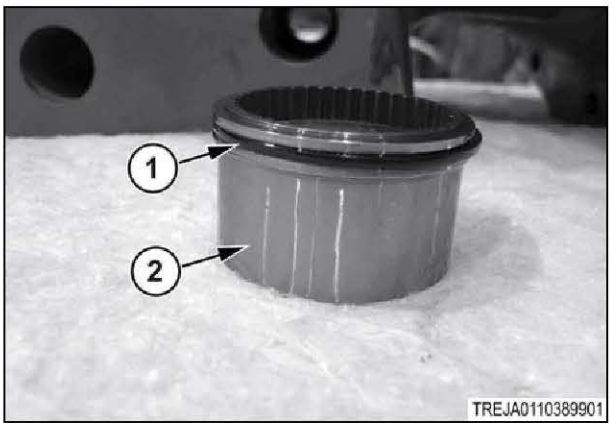

Fig. 290

37. Install the spacer (1).

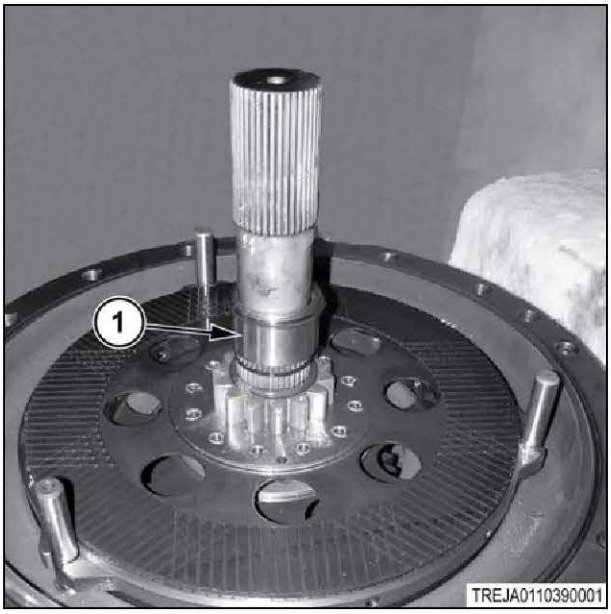

Fig. 291

38. Install the main O-ring (1) to the primary ring gear with assembly grease.

39. Install the main O-ring vertically or the O-ring will tilt during assembly and result in a leak.

40. Make sure the O-rings are seated correctly.

41. Install the smaller O-rings (2) to the ring gear for oil lubrication passages.

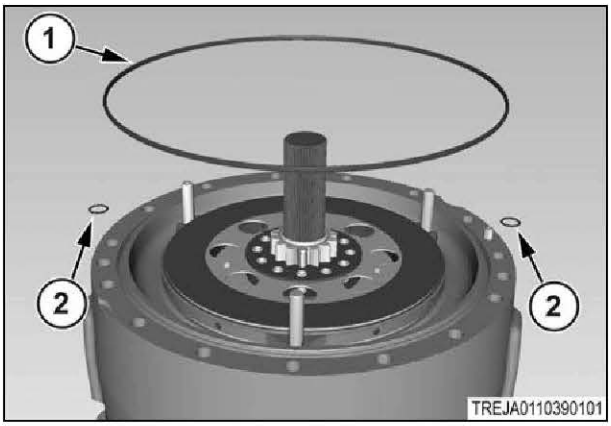

Fig. 292

3.7 Differential disassembly

3.7.1 Exploded view of the differential

Exploded view of the differential

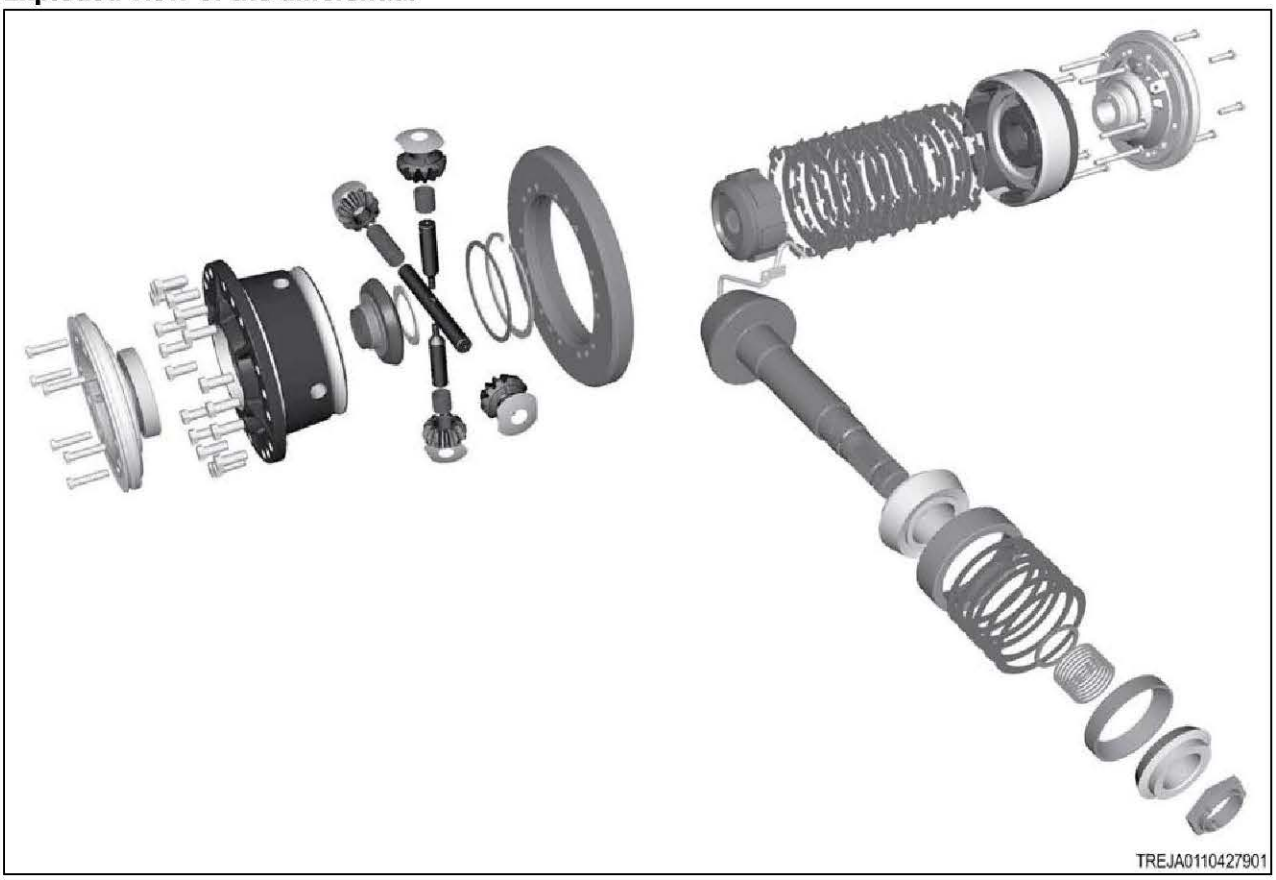

Fig. 293

3.7.2 Remove the drive pinion

Procedure

1. Remove the three bolts (1) that fasten the yoke (2) to the input shaft of the front axle.
2. Remove the yoke (2).

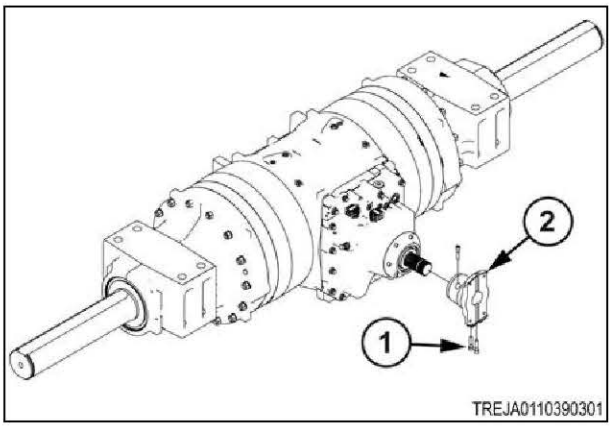

Fig. 294

3. Loosen and remove the bolts (1) that mount the housing.

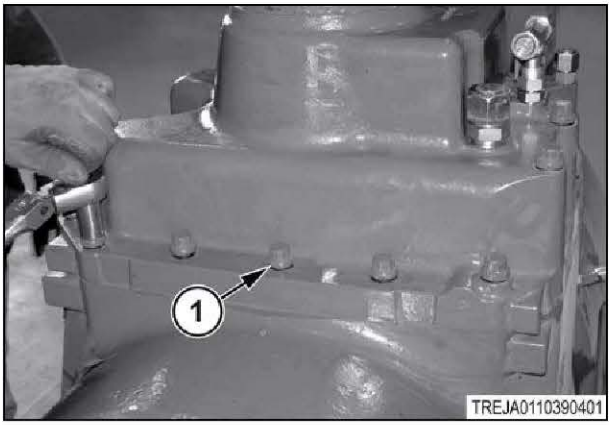

Fig. 295

4. Loosen and remove the bolts (1) that fasten the deflector (2).

5. Remove the deflector (2).

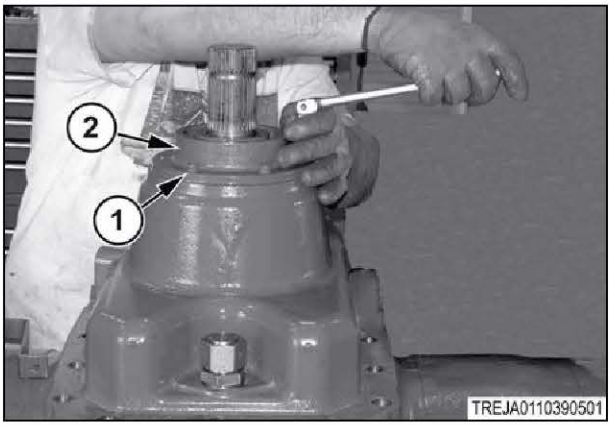

Fig. 296

6. Install the correct lifting chain (1) on the drive pinion housing with the two bolts (2).

7. Lift the drive pinion housing off the differential with the correct lifting device.

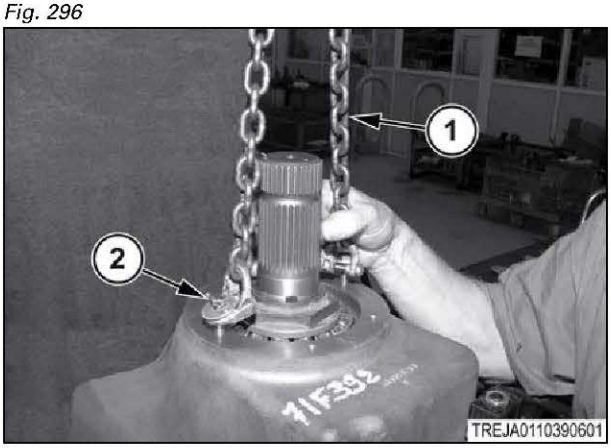

Fig. 297

8. Remove the bolt (1) and the oil lubrication pipe (2).

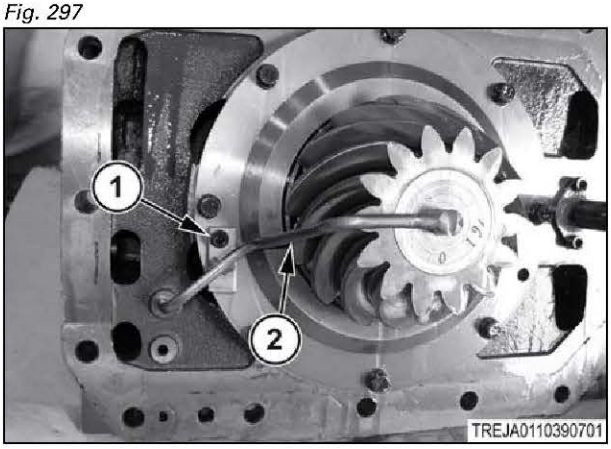

Fig. 298

9. Remove the oil return tube (1) from the drive pinion housing.

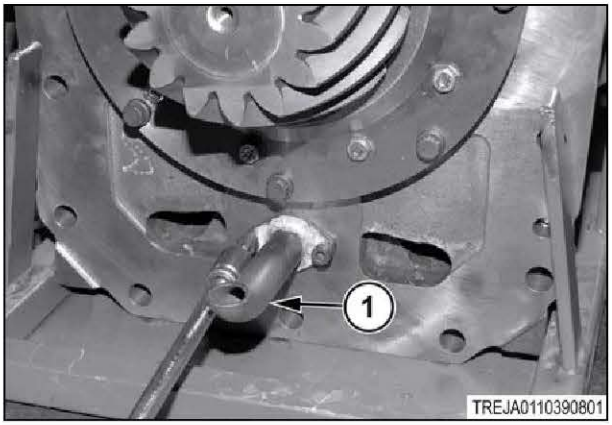

Fig. 299

3.7.3 Disassemble the drive pinion

Procedure

1. Remove the lifting chain from the drive pinion housing.

2. Remove the nut (1) from the drive pinion.

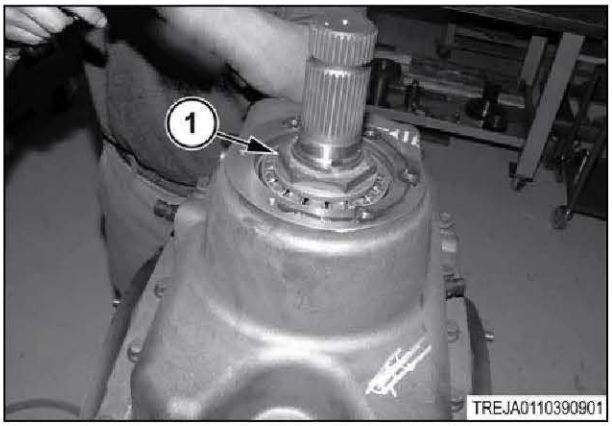

Fig. 300

3. Pull out the drive pinion (1) from the inner drive pinion housing.

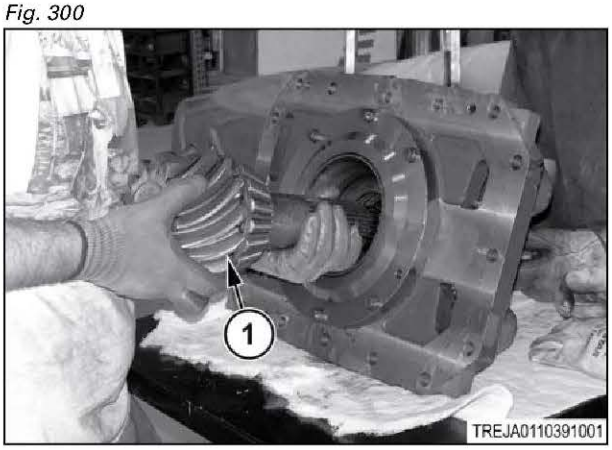

Fig. 301

4. Remove the bearing (1) from the drive pinion (2).

NOTE:
The bearing cup will slide in and out easily without using a press.
The bearing cone will take approximately a 9 t (10 US ton) press to remove.

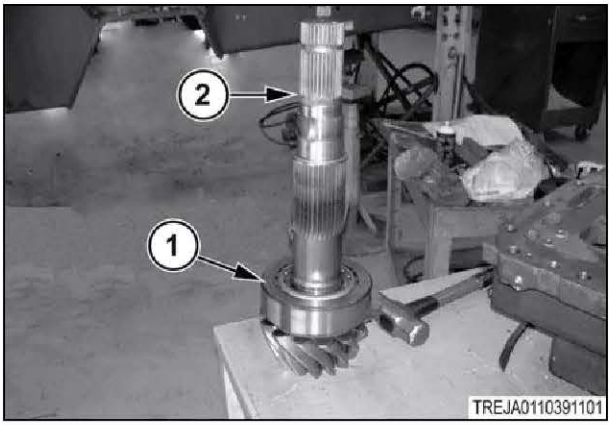

Fig. 302

5. Remove the outer bearing (1) and the shims (2) from the drive pinion housing.

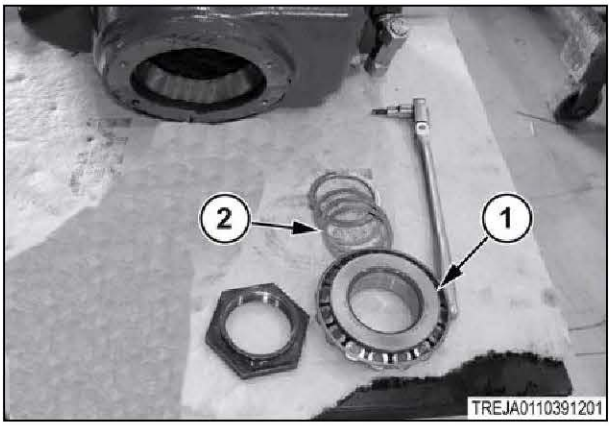

Fig. 303

3.7.4 Disassemble the park brake

Procedure

1. Remove the bolts (1) from the bearing carrier (2).

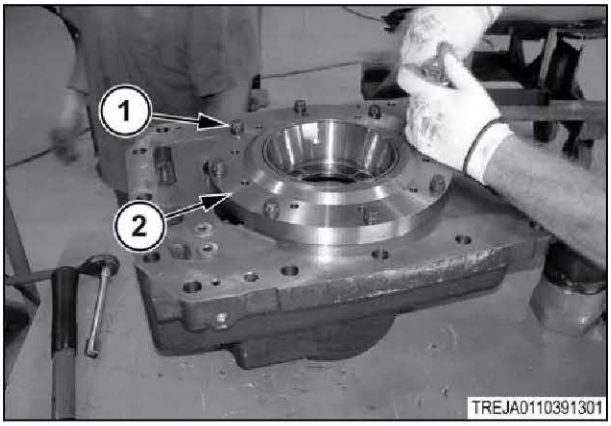

Fig. 304

2. Remove the bearing carrier (1).

Fig. 305

3. Removal of the bearing carrier (1) will permit access to the park brake intermediate plates (2) and the friction discs.

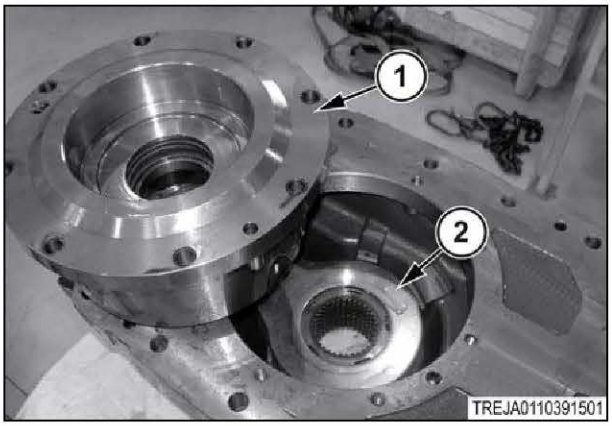

Fig. 306

4. Remove the transfer tube (1) from the drive pinion housing.

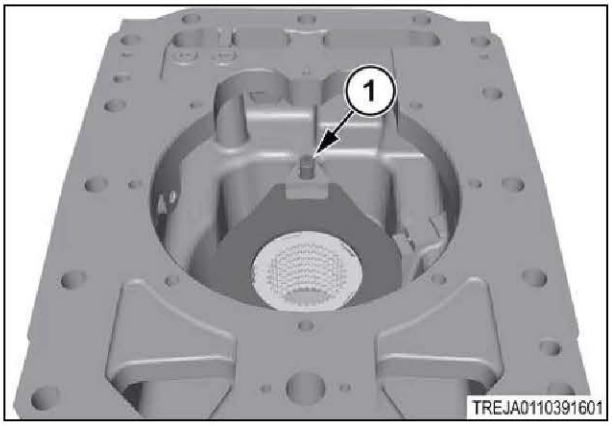

Fig. 307

5. Remove the O-rings (1) from the transfer tube (2).

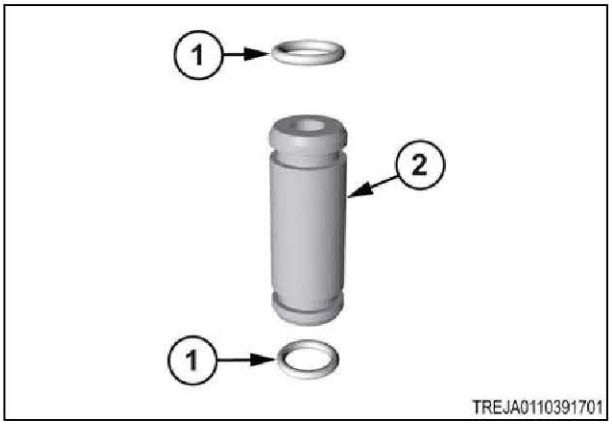

Fig. 308

6. Remove all the intermediate plates (1) and the friction discs (2) from the drive pinion housing (3).

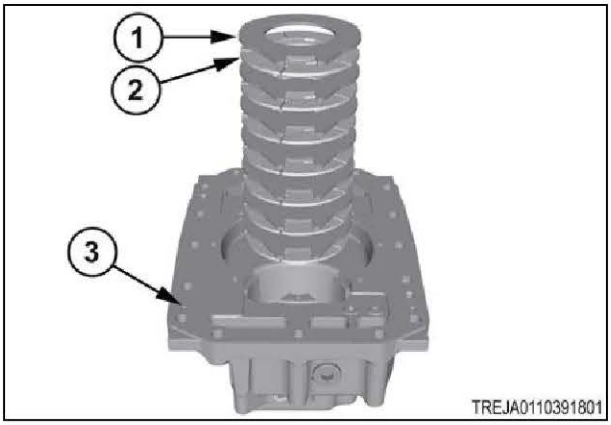

Fig. 309

7. The park brake friction discs and the intermediate plates removed.

Fig. 310

8. Remove the bolts (1), the spacer (2) and the shims (3) to disassemble the bearing carrier.

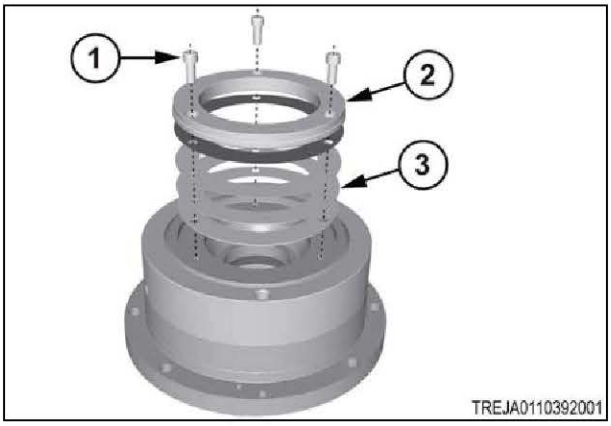

Fig. 311

9. Turn the bearing carrier over.

10. Remove the ten bolts (1).

11. Remove the bearing carrier (2).

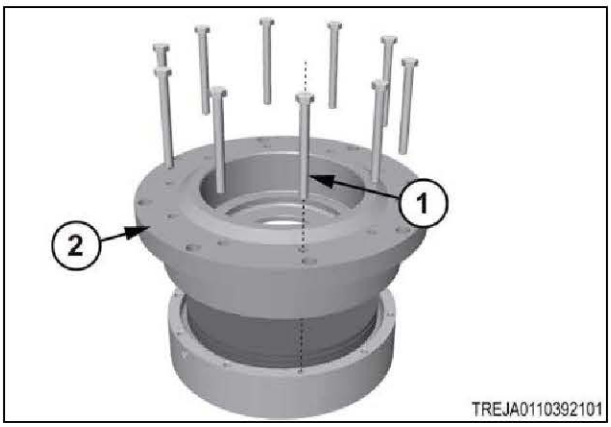

Fig. 312

12. Remove the roll pin (1).

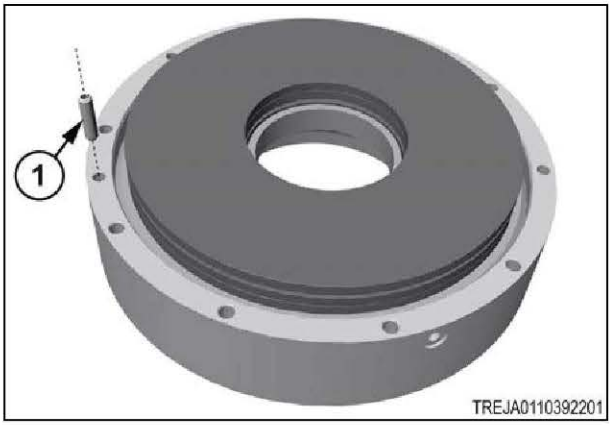

Fig. 313

13. Remove the spring kit (1).

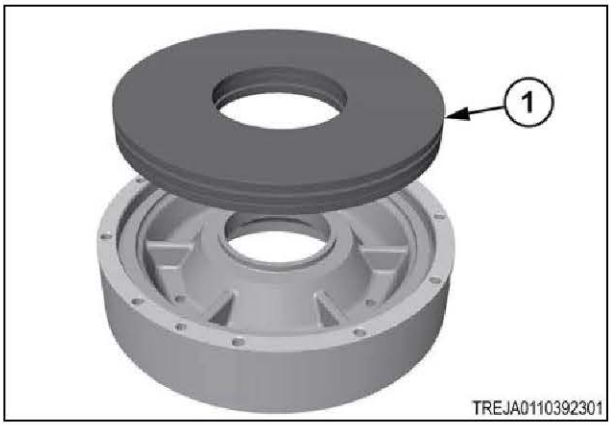

Fig. 314

14. Remove the piston (1).

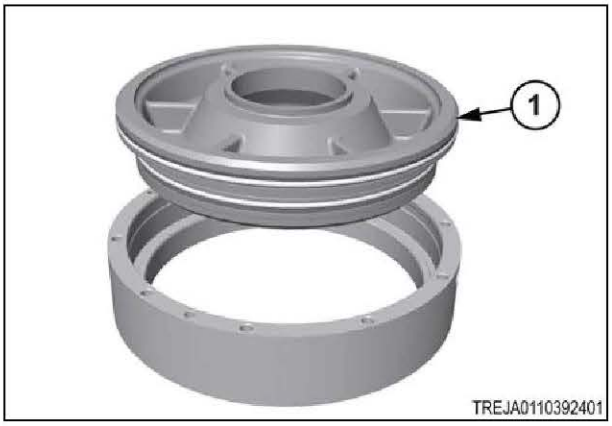

Fig. 315

15. Remove the small ring (1) from the piston (2).

16. Remove the small O-ring (3) from the piston.

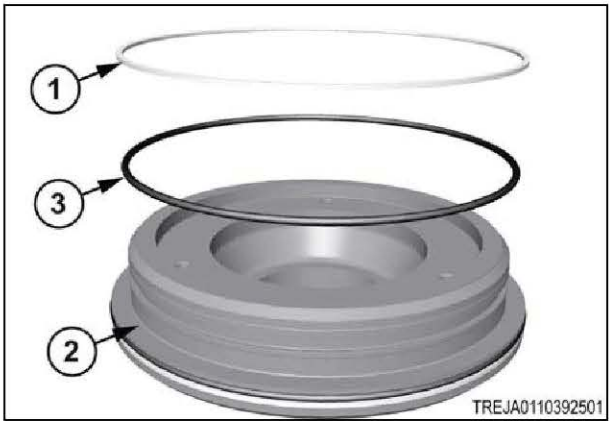

Fig. 316

17. Remove the large O-ring (1) from the piston (2).

18. Remove the large ring (3) from the piston.

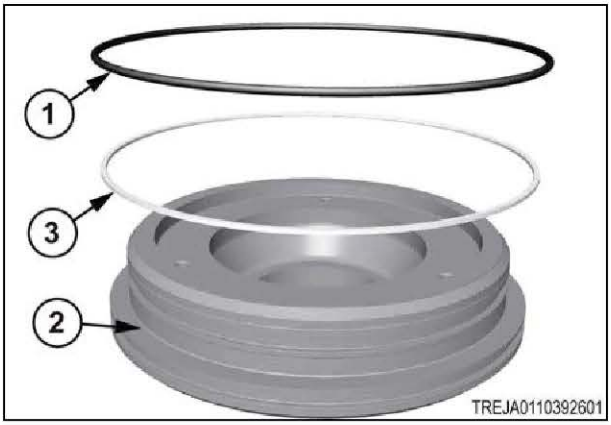

Fig. 317

3.7.5 Remove the left-hand carrier

Procedure

1. Remove the brake piston (1).

Be careful not to damage the brake piston seals.

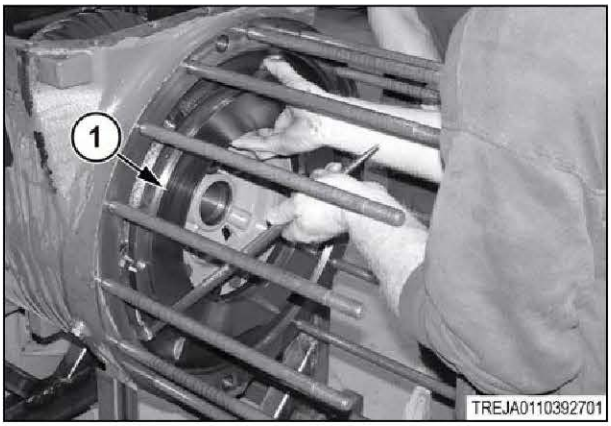

Fig. 318

2. Remove the oil lubrication tube (1).

Result

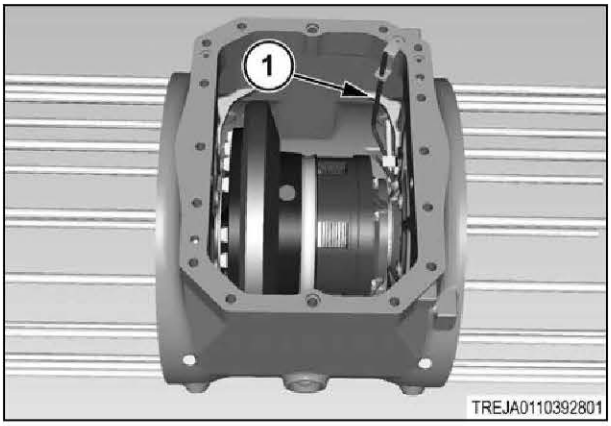

Fig. 319

3. Remove the elbow (1) that supplies oil to the multidisc lock assembly.

Result

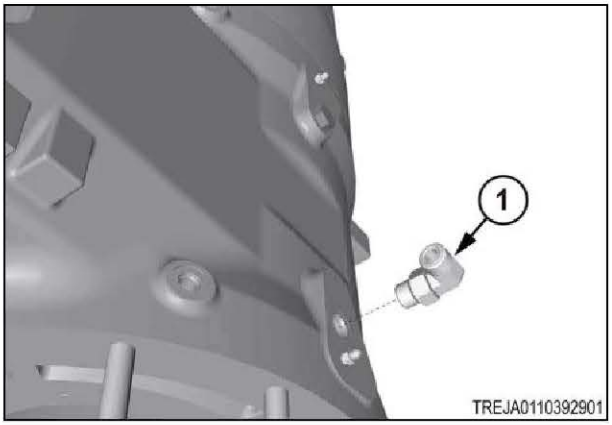

Fig. 320

4. Remove the oil tube (1) out through the port for the elbow.

Result

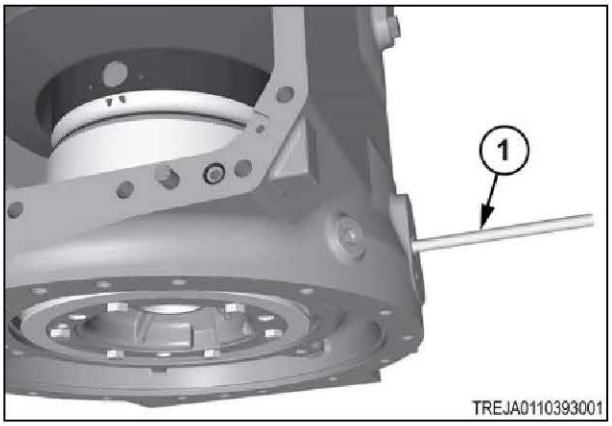

Fig. 321

5. Use the correct lifting strap (1) to support the differential unit.

Result

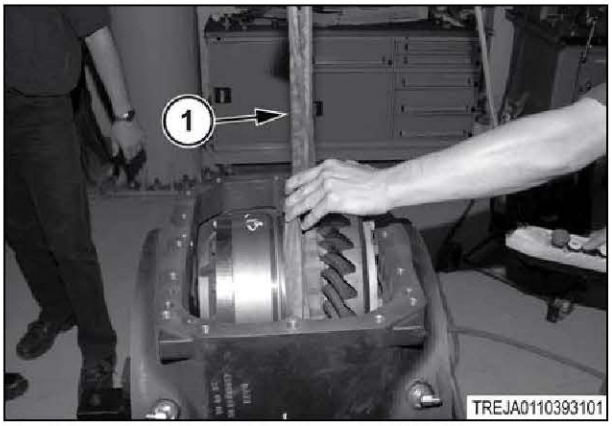

Fig. 322

6. Remove the six bolts (1) that fasten the left-hand carrier.

Result

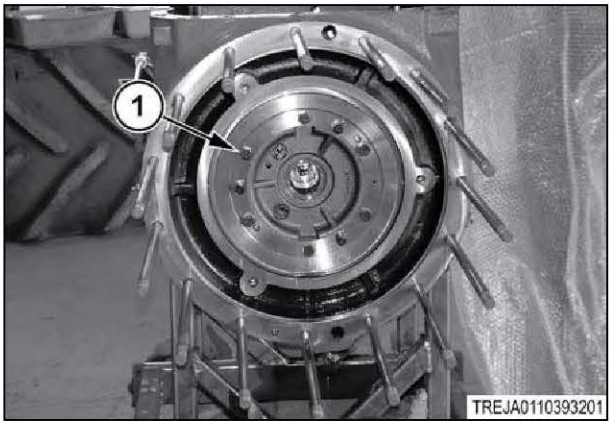

Fig. 323

7. Remove the left-hand carrier (1).

Result

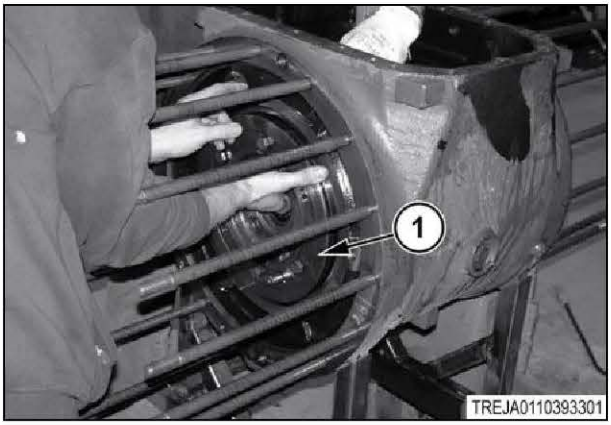

Fig. 324

8. The left-hand carrier (1) removed.

Result

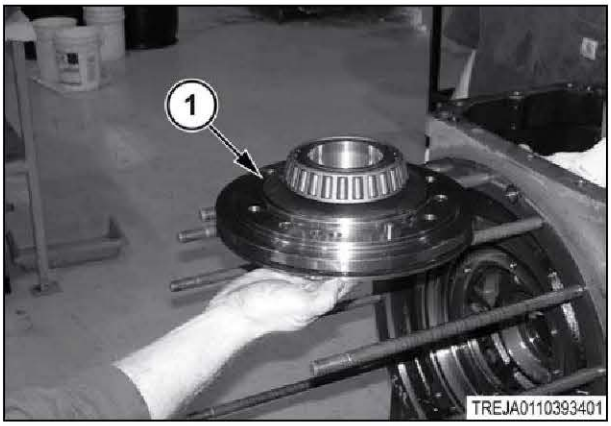

Fig. 325

3.7.6 Disassemble the right-hand carrier

The right-hand carrier being as looking at the pinion.

Procedure

1. Remove the centering bushing (1) from the right-hand carrier.

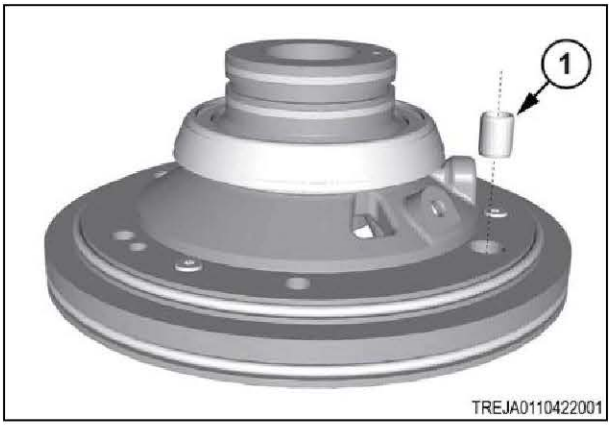

Fig. 326

2. Remove the ring seals (1) from the carrier.

3. Remove the ring seals (2) from the carrier.

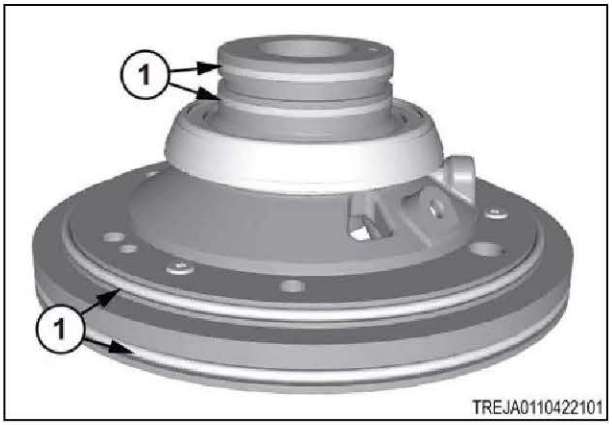

Fig. 327

4. Remove the bearing (1) and the shims (2) from the carrier.

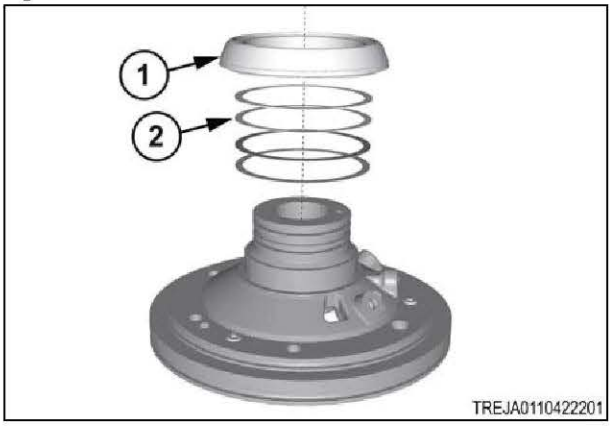

Fig. 328

5. Loosen and remove the set screw (1).

6. Remove the nut (2), the bushing (3), the bolt (4), and the spring (5).

7. Remove the remaining two brake retract pistons.

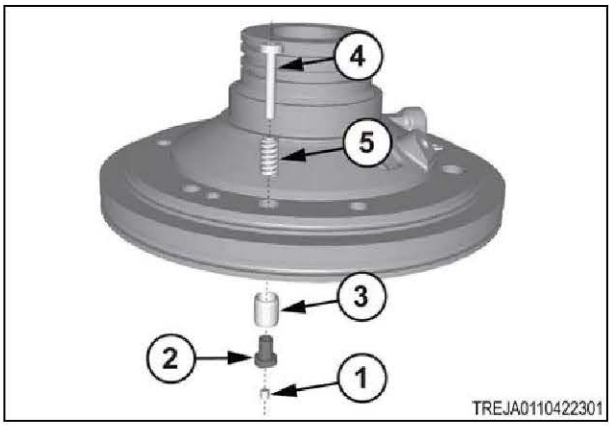

Fig. 329

8. Remove the plug (1) from the port on the carrier (2).

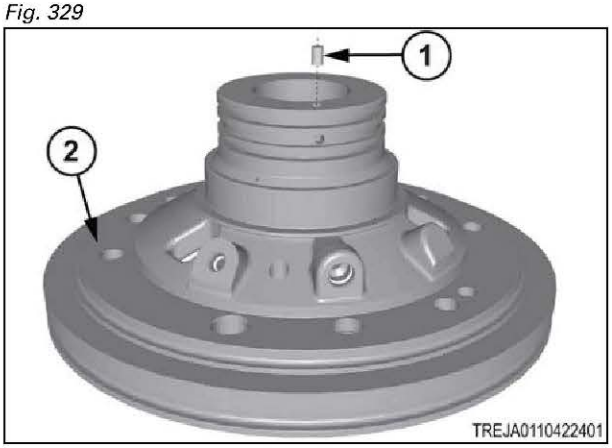

Fig. 330

9. Remove the plug (1) from the port on the carrier (2).

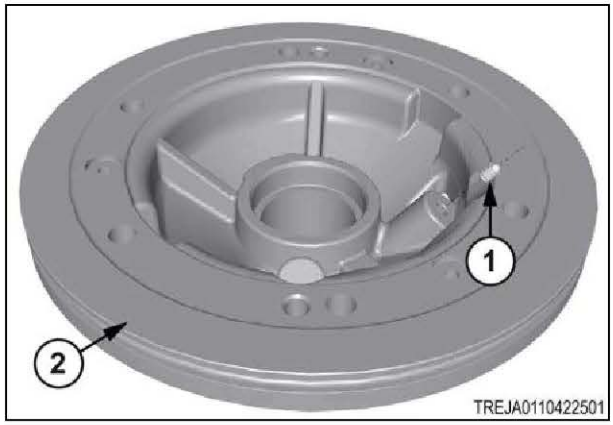

Fig. 331

3.7.7 Disassemble the left-hand carrier

The left-hand carrier being as looking at the pinion.

Procedure

1. Remove the centering bushing (1) from the left-hand carrier.

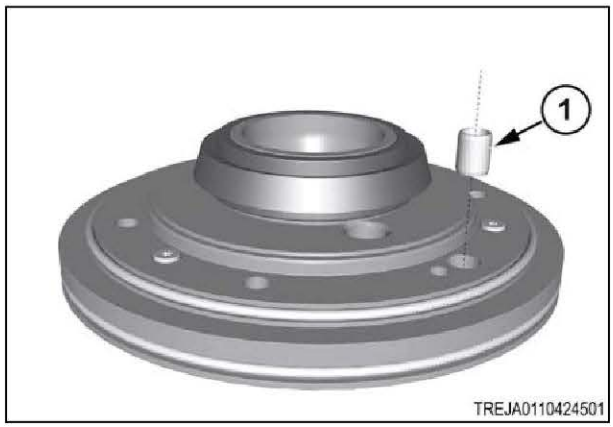

Fig. 332

2. Remove the ring seals (1) from the carrier.

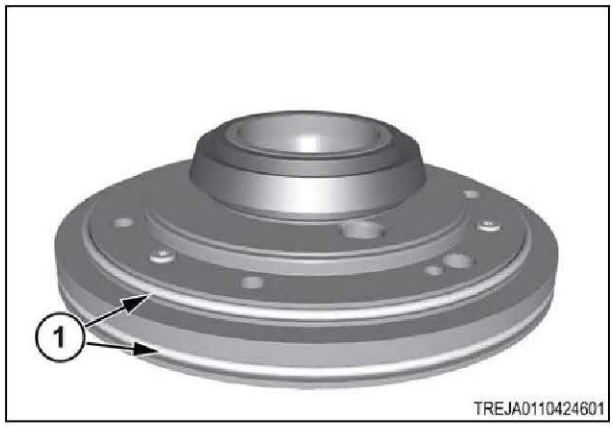

Fig. 333

3. Remove the bearing (1) and the shims (2) from the carrier.

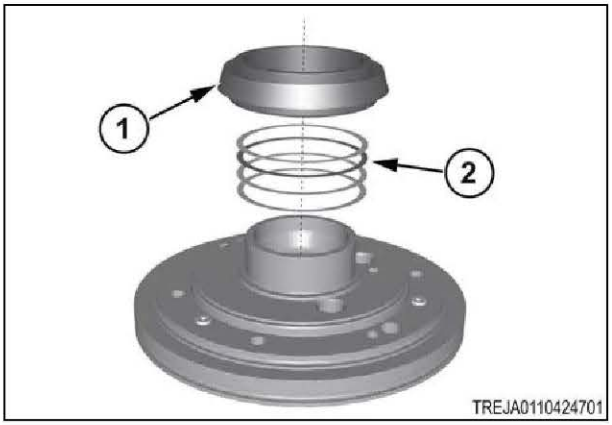

Fig. 334

4. Loosen and remove the set screw (1).
5. Remove the nut (2), the bushing (3), the bolt (4), and the spring (5).
6. Remove the two remaining brake retract pistons.

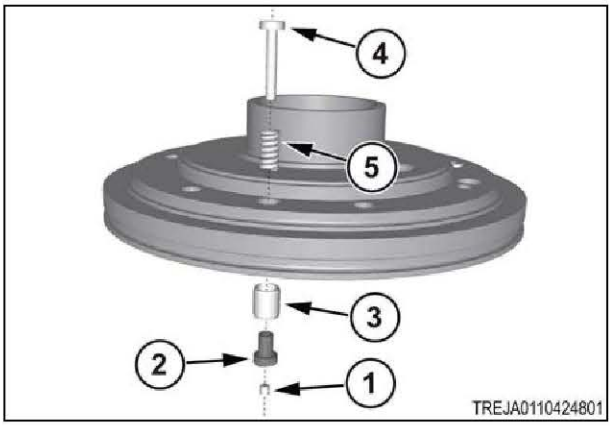

Fig. 335

3.7.8 Remove the differential unit

Procedure

Use the correct lifting device to remove the differential unit (1) after the removal of the carriers.

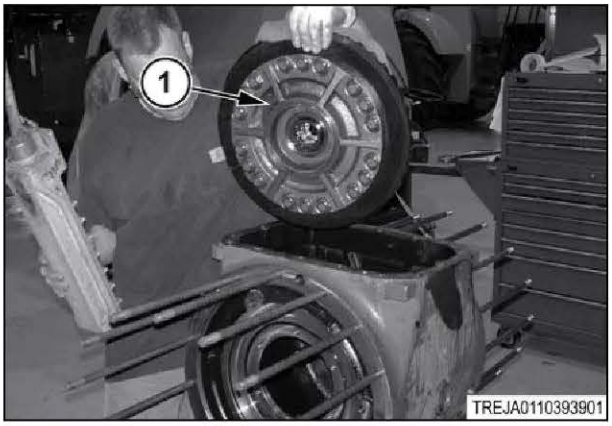

Fig. 336

3.7.9 Disassemble the differential half-housing

Procedure

1. Loosen and remove the eight bolts (1) that fasten the cover (2).

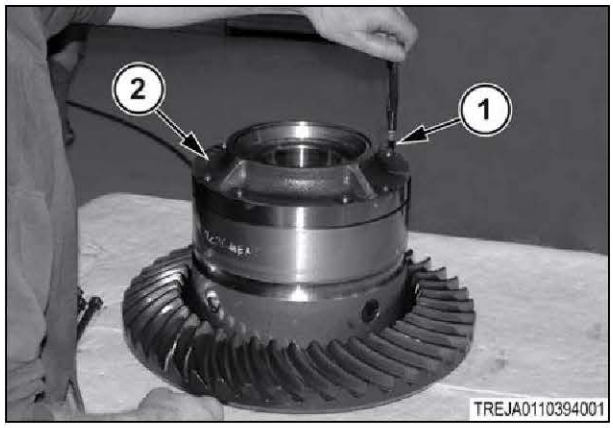

Fig. 337

2. Remove the cover (1) and set to the side.

Fig. 338

3. Remove the discs and the intermediate plates (1).

Fig. 339

4. Remove the sun gear (1) that holds the disc and the intermediate plates.

Fig. 340

5. Remove the bolts (1), the bevel gear, (2) and the differential half-housing (3).

IMPORTANT:
The bevel gear and the pinion are a matched set and must be replaced in pairs.
Be careful not to mix between the front and the rear axle assemblies.

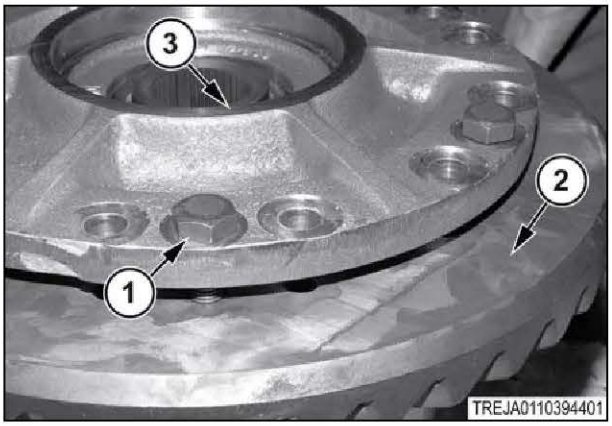

Fig. 341

6. Find the bolts (1) that fasten the gear shaft.

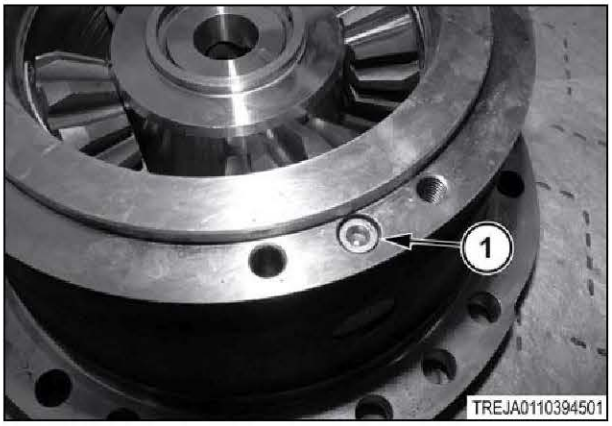

Fig. 342

7. Remove the bolts.

There will be one bolt for each gear.

Fig. 343

8. After the bolts have been removed there will be a pin (1) for each gear to remove.

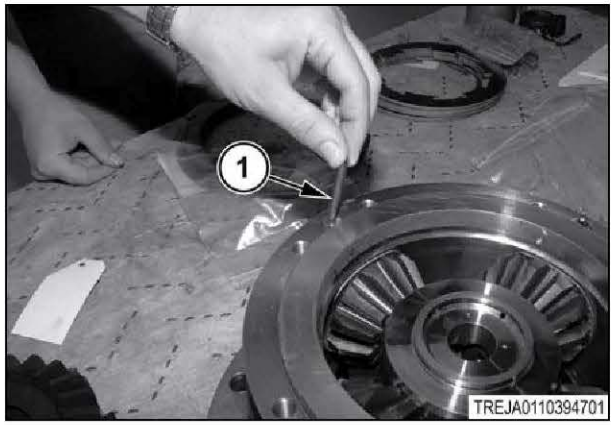

Fig. 344

9. Pull the shaft (1) out after the removal of the pin.

Each gear will have a shaft.

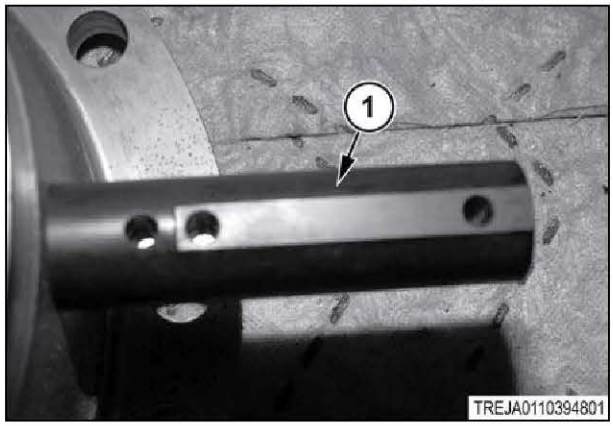

Fig. 345

10. Remove the gear (1) after the removal of the shaft.

There are four gears.

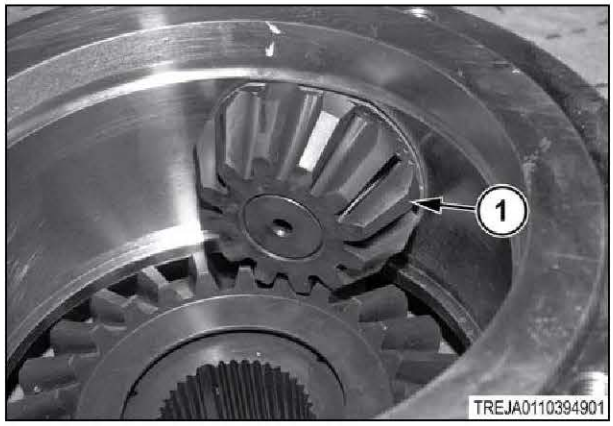

Fig. 346

11. Remove the washer (1) after the removal of the gear.

Each gear has a washer.

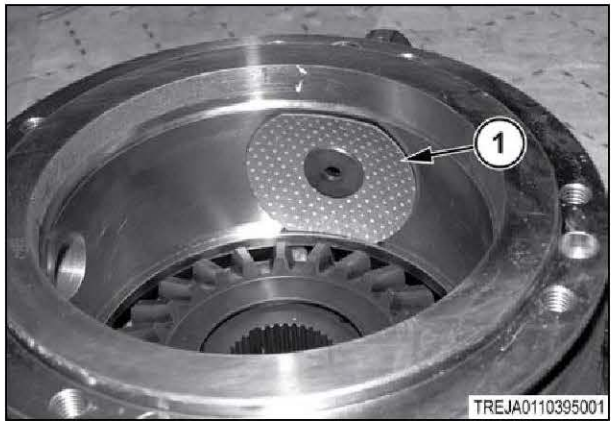

Fig. 347

12. Remove the bevel gear (1).

Fig. 348

13. The bevel gear (1) with the thrust washers (2) removed.

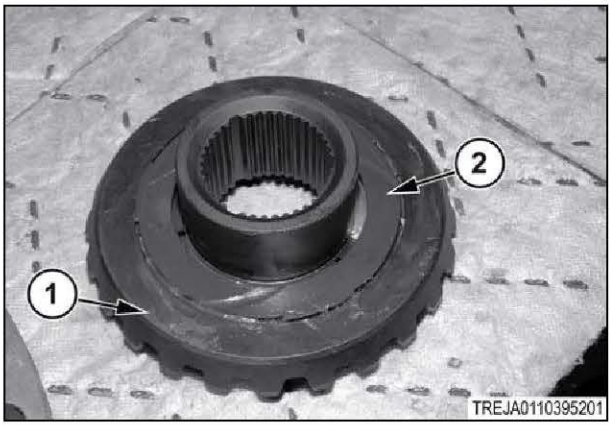

Fig. 349

3.7.10 Disassemble the needle bearing half-housing

Procedure

1. Loosen and remove the eight bolts (1) that fasten the cover (2).

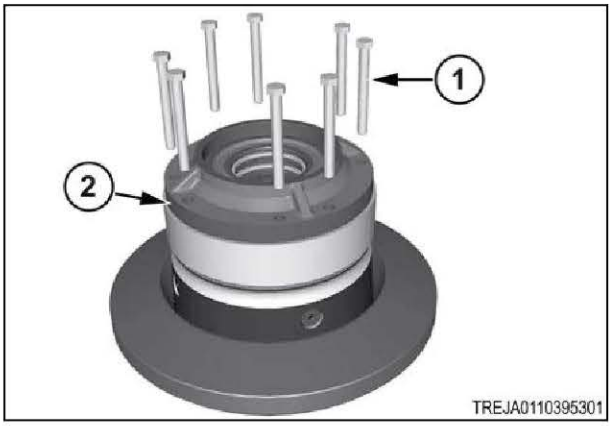

Fig. 350

2. Remove the cover (1) and set to the side.

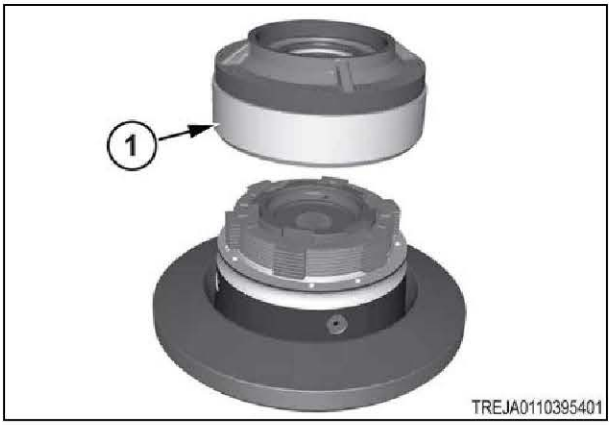

Fig. 351

3. Remove all the discs (1) and the intermediate plates (2).

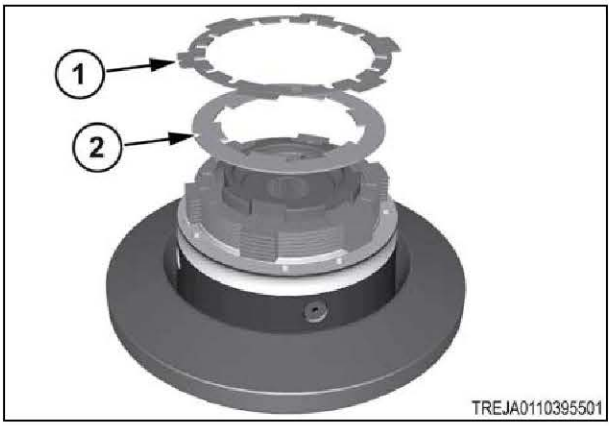

Fig. 352

4. Remove the sun gear (1) that the disc and the intermediate plates sit on.

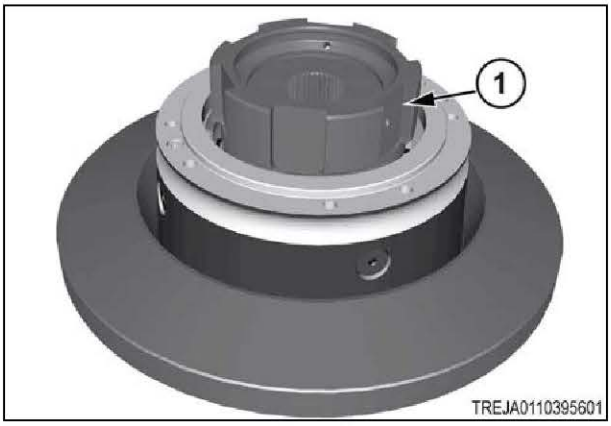

Fig. 353

5. Remove the 18 bolts (1), the bevel gear (2) and the differential half-housing (3).

NOTE:
The bevel gear and the pinion are a matched set.
Replace the bevel gear and the pinion in pairs.
Be careful not to mix between the front and the rear axle assemblies.

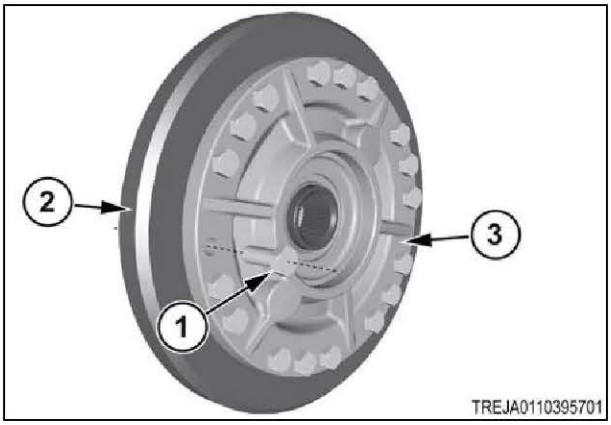

Fig. 354

6. Remove the retaining ring (1) and the spacer (2).

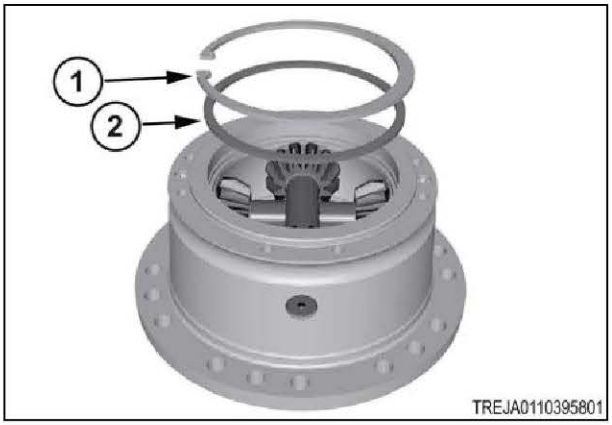

Fig. 355

7. Remove the bolts (1) that fasten the two short gear shafts.

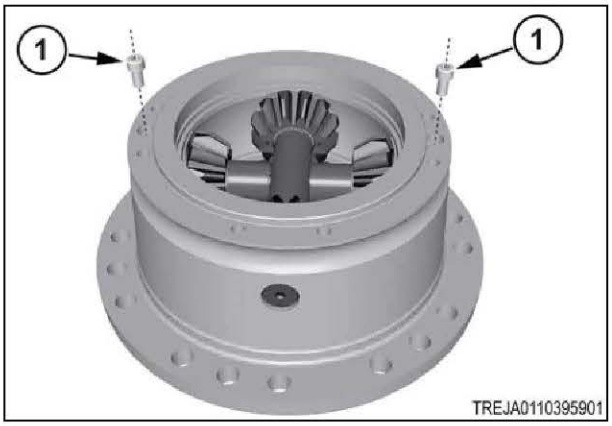

Fig. 356

8. Remove the pins (1) that fasten the two short gear shafts.

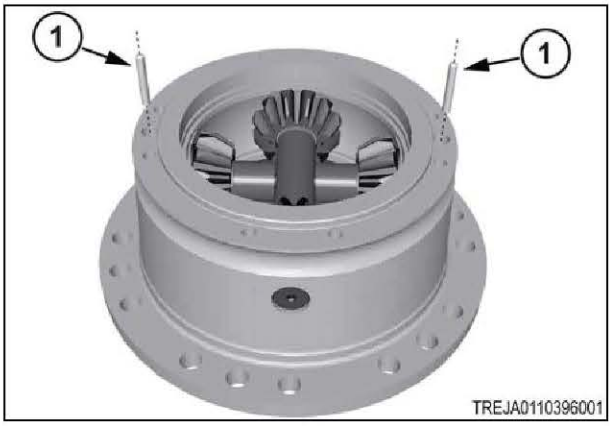

Fig. 357

9. Remove the short gear shaft (1).

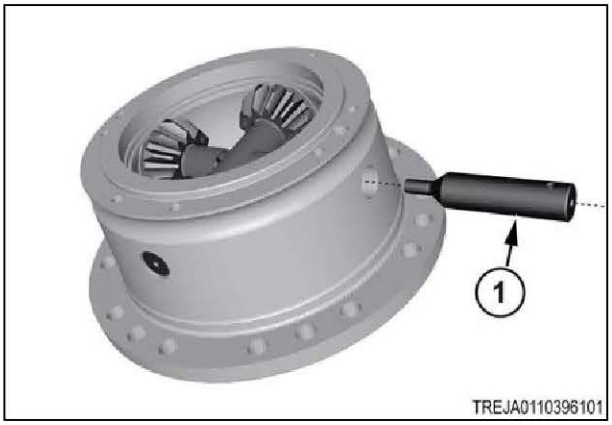

Fig. 358

10. Remove the short gear shaft spacer (1).

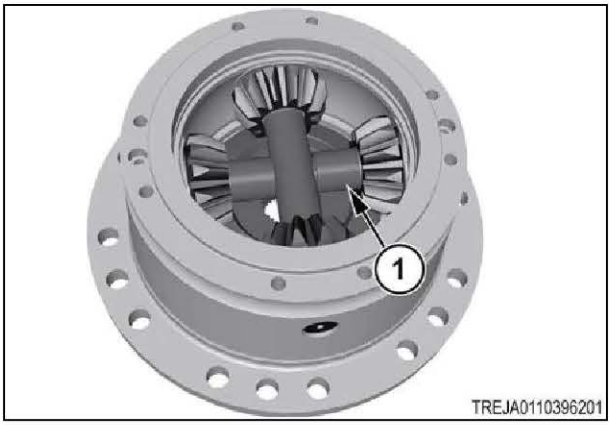

Fig. 359

11. Remove the gear with the bearing (1).

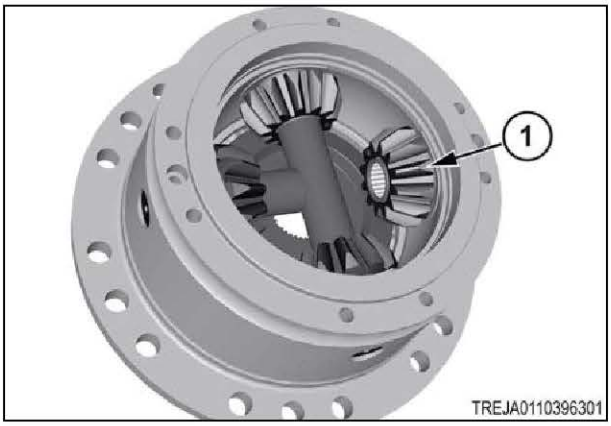

Fig. 360

12. Disassemble the bearing spacers (1) and the bearing (2) from the gear (3).

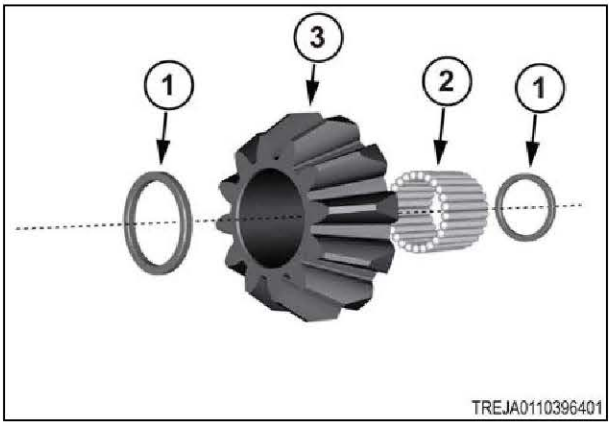

Fig. 361

13. Remove the washer (1) from the housing.

14. Repeat this procedure for the opposite side short gear shaft (2).

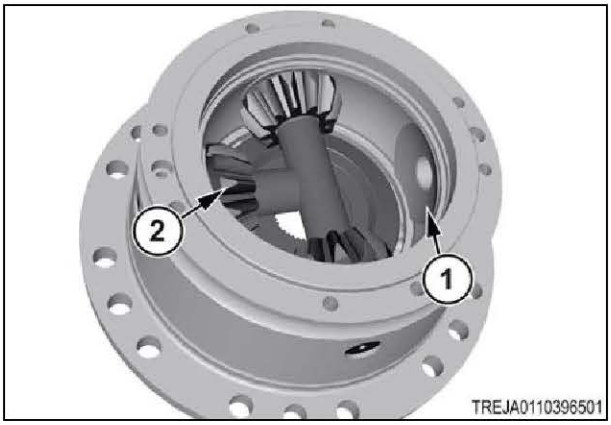

Fig. 362

15. Remove the long gear shaft (1).

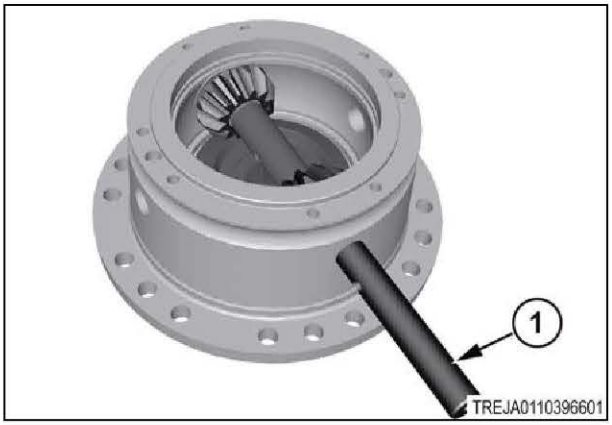

Fig. 363

16. Remove the long gear shaft spacer (1).

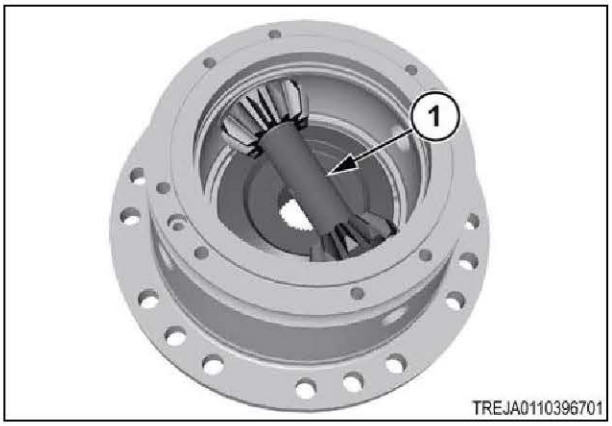

Fig. 364

17. Remove the gears with the bearings (1).

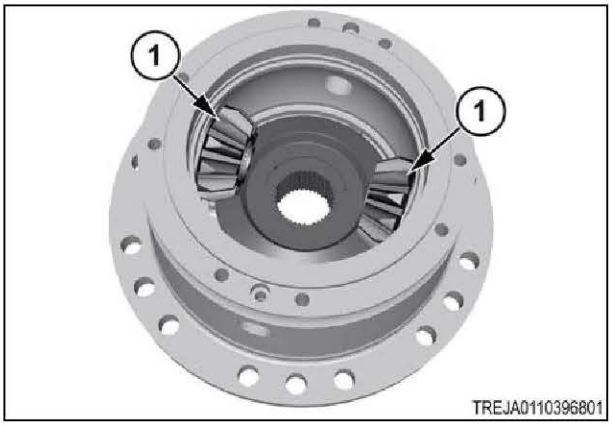

Fig. 365

18. Remove the two thrust washers (1).

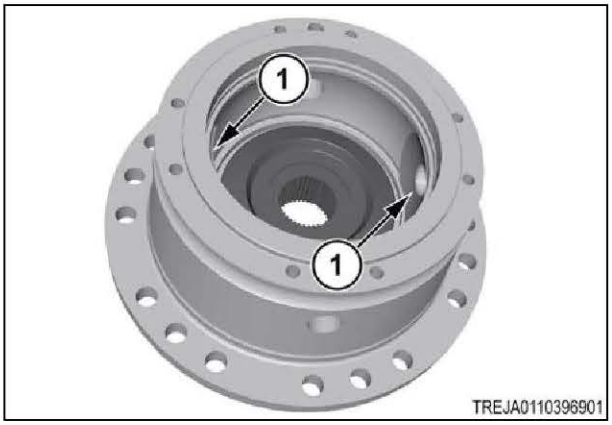

Fig. 366

19. Disassemble the bearing spacers (1) and the bearing (2) from the gear (3).

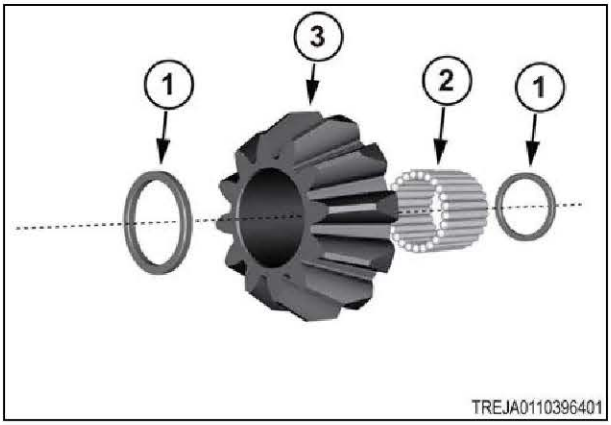

Fig. 367

20. Remove the bevel gear (1) and the thrust washer (2) from the housing (3).

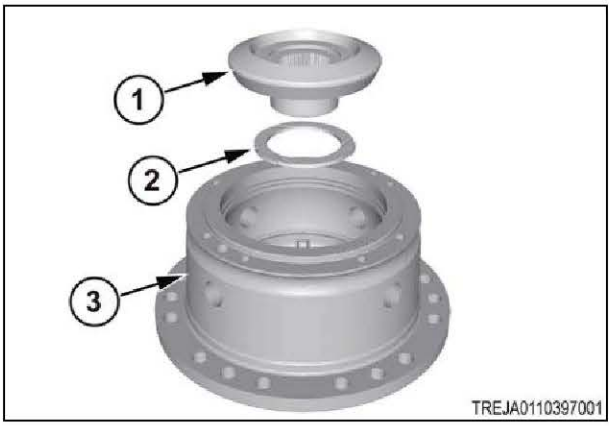

Fig. 368

3.8 Differential assembly

3.8.1 Exploded view of the differential

Exploded view of the differential

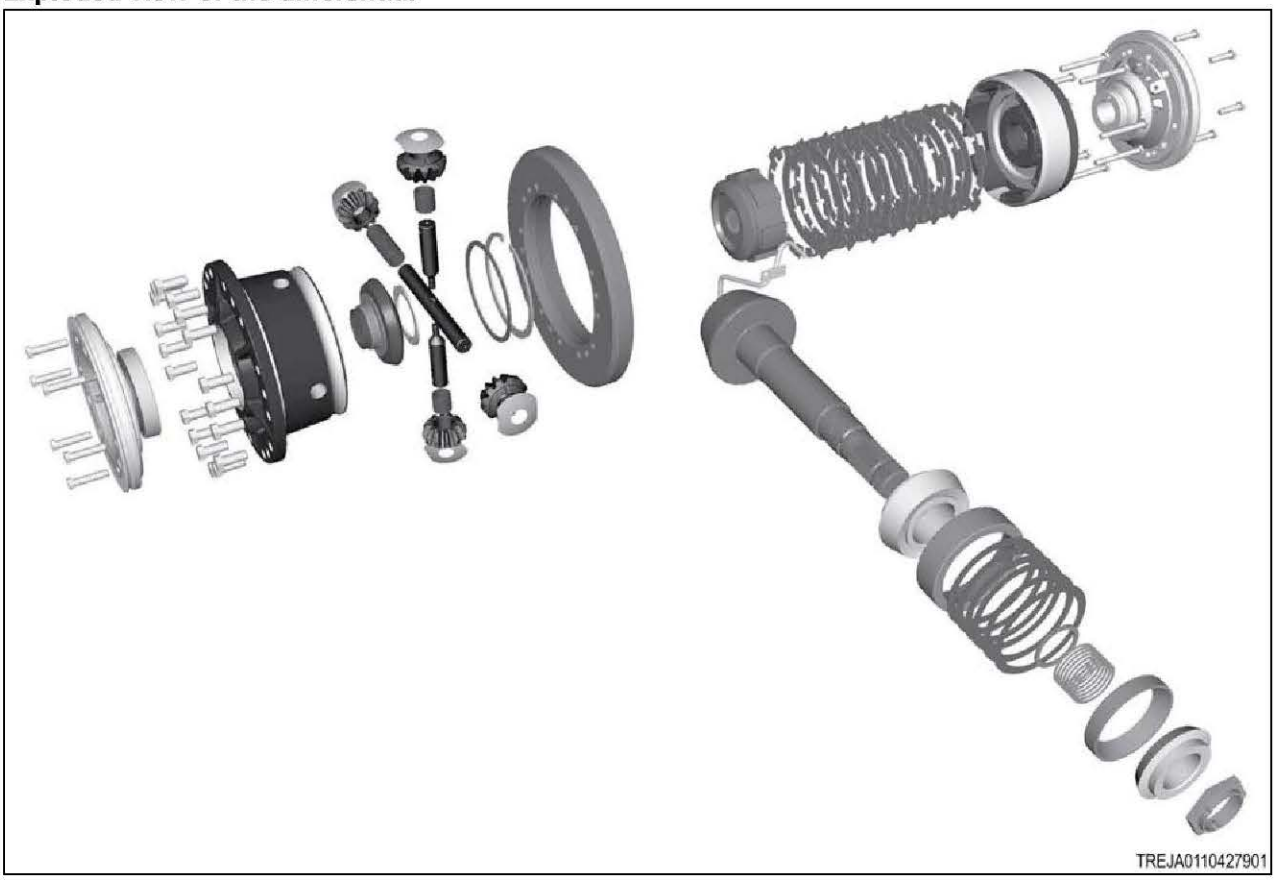

Fig. 369

3.8.2 Assemble the differential half-housing

Procedure

1. Install the bevel gear (1) with the thrust washers.

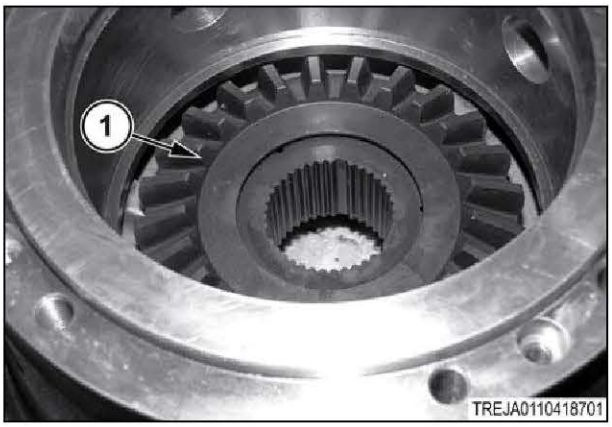

Fig. 370

2. Install one of the shafts (1) for the gear installation.

There is a total of four shafts.

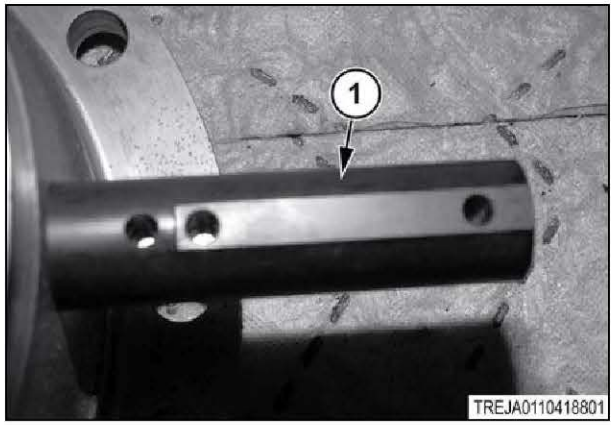

Fig. 371

3. Install the shaft until flush to the inner of the housing.

4. Install the washer (1) on the shaft.

There will be one washer for each shaft.

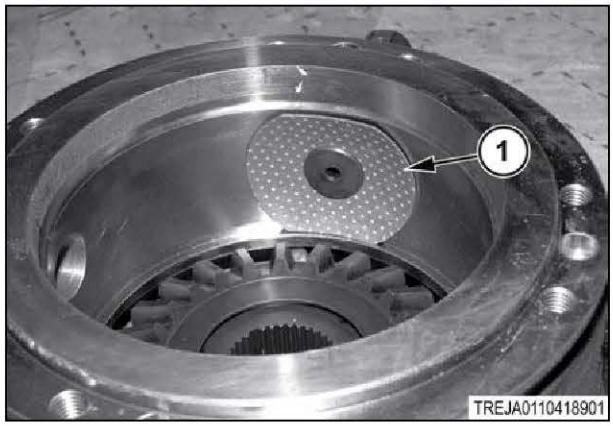

Fig. 372

5. Install the gear (1) on the shaft and press the shaft into the gear until the shaft is flush.

6. Repeat this procedure for the other three shafts.

Fig. 373

7. Install the pin (1) for each shaft.

This pin fastens the shaft in position.

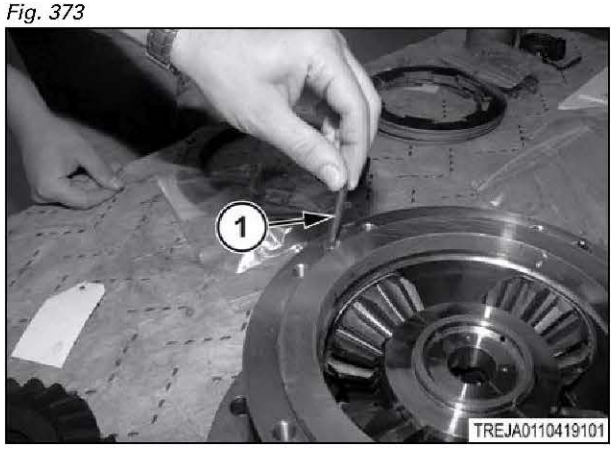

Fig. 374

8. The photo shows the pin (1) not fully installed.

Fig. 375

9. Apply thread locking compound to the threads of the bolts (1) that will fasten the pins.

Fig. 376

10. Install the bolt to fasten the four pins.

Fig. 377

11. Tighten the bolts to 28 Nm (21lbf ft).

Fig. 378

12. The photo shows the bolts (1) installed.

Fig. 379

13. Install the housing (1) that the disc and the intermediate plates sit on.

Fig. 380

14. Install the rivet to the plug port.

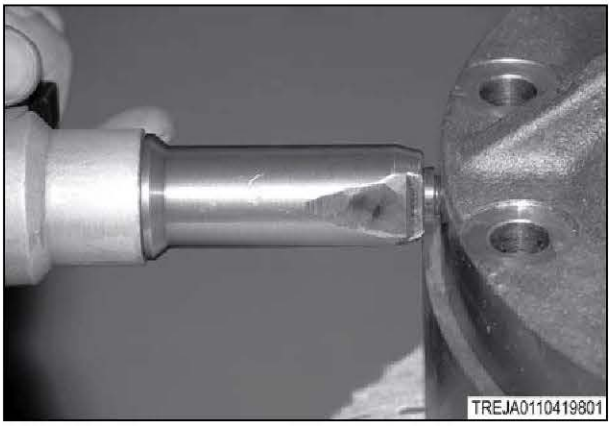

Fig. 381

15. The photo shows the rivet (1) installed.

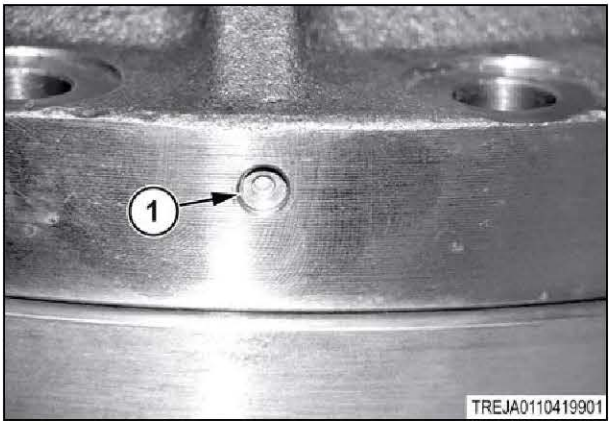

Fig. 382

16. Clean and check the components.
17. Replace any damaged parts.
18. Check the hydraulic channels for blockage in the cover (1).
19. Lubricate and install the new O-rings (2,3) on the piston (4).
20. Insert the piston by tapping around the pistons rim with a plastic hammer.
21. After installation check the seals for damage and replace in necessary.
22. Put the unit (5) in position.
23. Apply thread locking compound to the bolts (6).

    Tighten the bolts to 130 Nm (96 lbf ft).
24. Put the hub (7) in position.

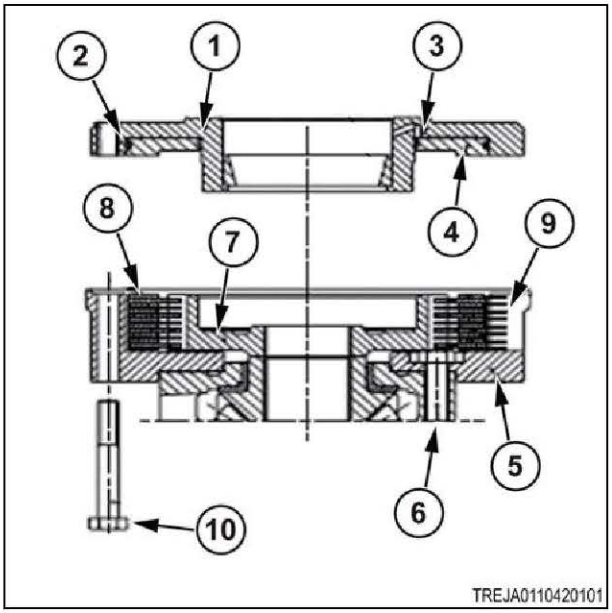

Fig. 383

25. Assemble the intermediate plates (8) and the discs (9).
26. Put the cover (1) installed with the piston (4) in position.
27. Apply thread locking compound to the bolts (10).

    Tighten the bolts to 105 Nm (77 lbf ft).
28. Manually check the discs and the intermediate plates for any interferences.
29. Install the differential half-housing (1) and the bevel gear (2) with the bolts (3).

    Tighten the bolts to 175 Nm (129 lbf ft).

    IMPORTANT:
    The bevel gear and the pinion are a matched set. Replace the bevel gear and the pinion in pairs.
    Be careful not to mix between the front and the rear axle assemblies.

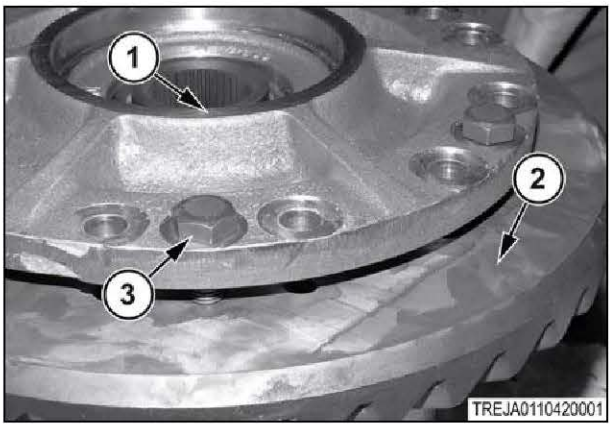

Fig. 384

3.8.3 Assemble the needle bearing half-housing

Procedure

1. Clean and check the components.
2. Replace all damaged parts.

3. Install the bevel gear (1) and the thrust washers (2) in the housing (3).

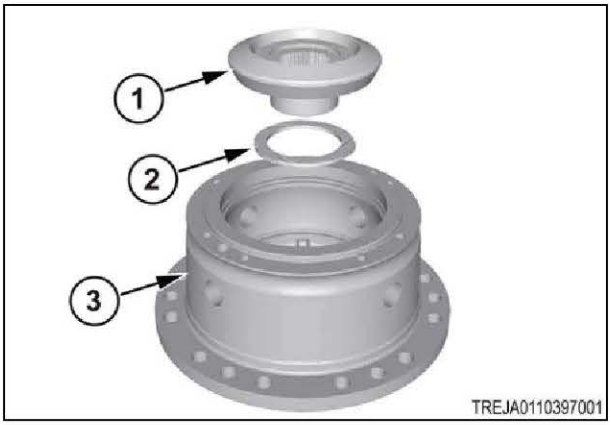

Fig. 385

4. Install the long gear shaft (1) into the housing.

5. Align the hole (2) with the short gear shaft hole (3) on the housing.

IMPORTANT:
Make sure the long gear shaft is installed in the correct hole.
The short gear shaft hole contains a vertical passage for the pin to fasten the the short gear shaft.

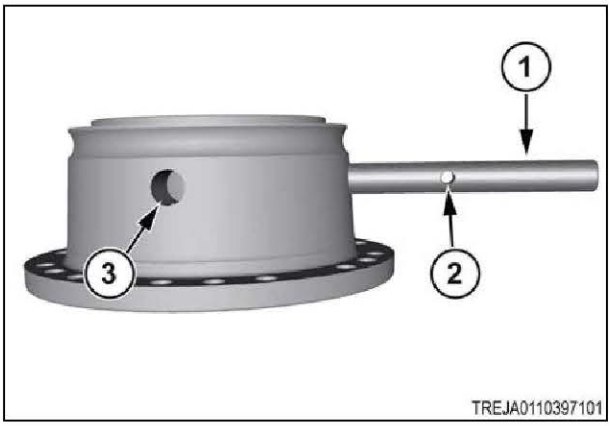

Fig. 386

6. Install the long gear shaft (1) until flush to the inner face of the housing.

7. Install the washer (2) on the shaft.

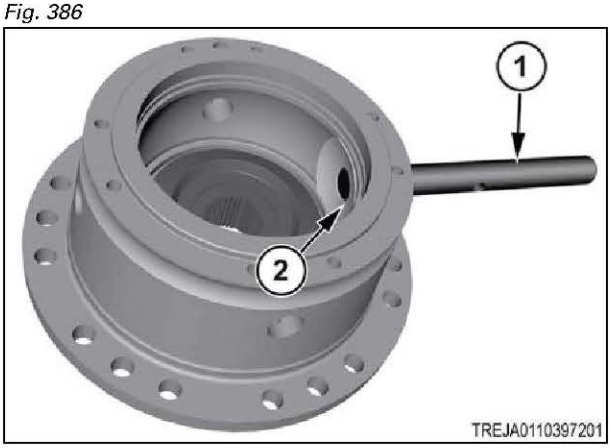

Fig. 387

8. Install the bearings(2) into both gears(3) for the long gear shaft. Use assembly grease.

9. Install a bearing spacer (1) on both sides of each gear.

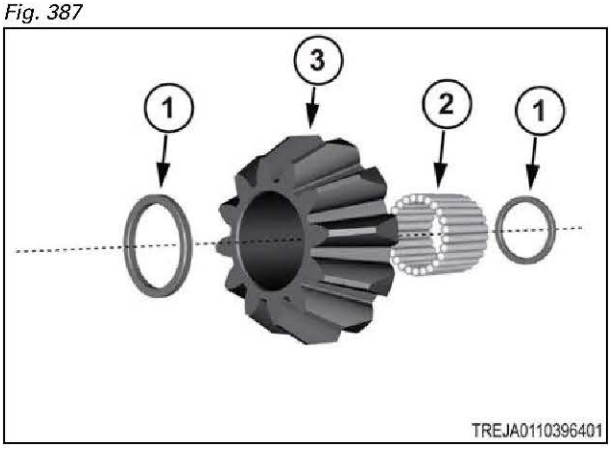

Fig. 388

10. Install a gear assembly (1) on the shaft (2).

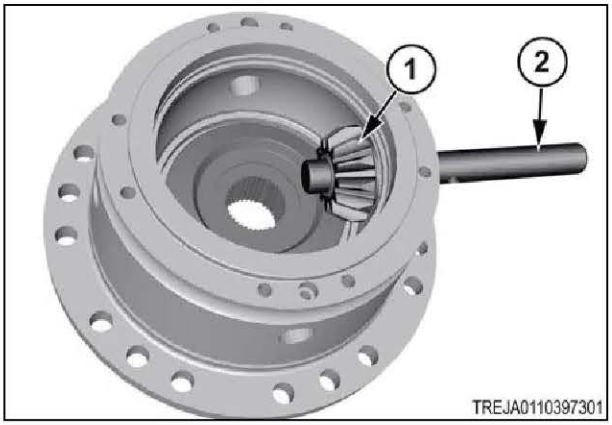

Fig. 389

11. Install the long gear shaft (1) through the long gear shaft spacer (2).

IMPORTANT:
Make sure the hole in the spacer and the long gear shaft aligns with the short gear shafts.

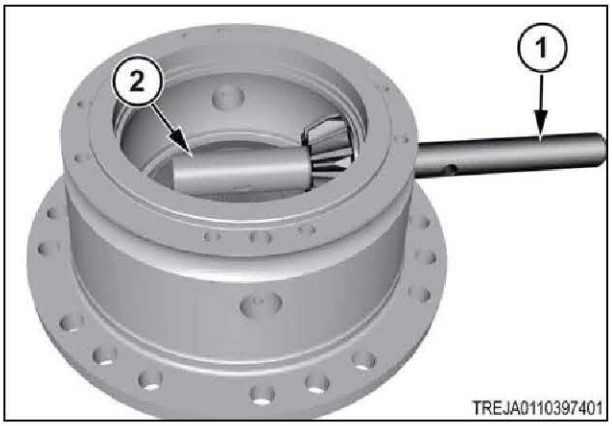

Fig. 390

12. Install the long gear shaft (1) through the gear, the bearing, (2) and the washer (3).

13. Install the long gear shaft until the center hole aligns with the short gear shafts.

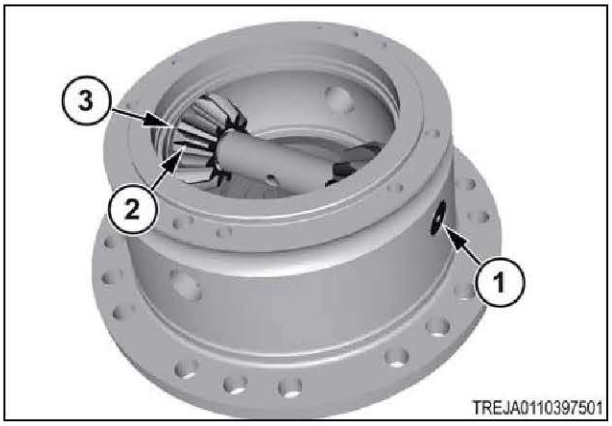

Fig. 391

14. Install the short gear shaft (1) until flush to the inner face of the housing.

15. Install the washer (2) on the shaft.

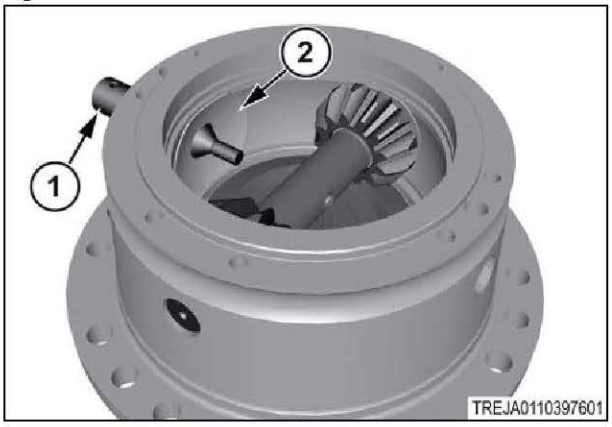

Fig. 392

16. Assemble the bearings to both gears for the short gear shafts.

17. Install the bearings (2) and the inner gear (3) using assembly grease.

18. Install the bearing spacers (1).

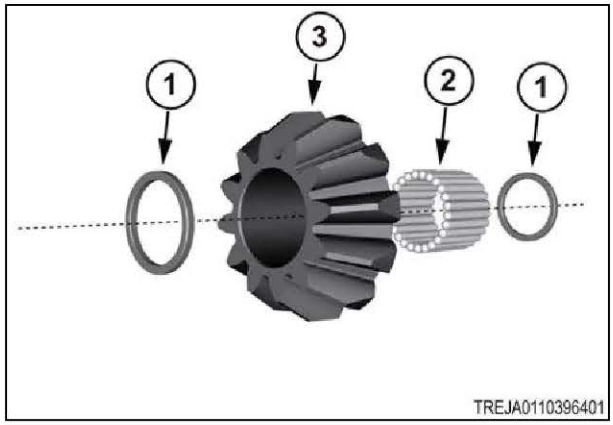

Fig. 393

19. Install the gear with the bearing assembly (1) on the shaft (2).

IMPORTANT:
Make sure to align the hole on the short gear shaft with the pin hole to fasten the shaft.

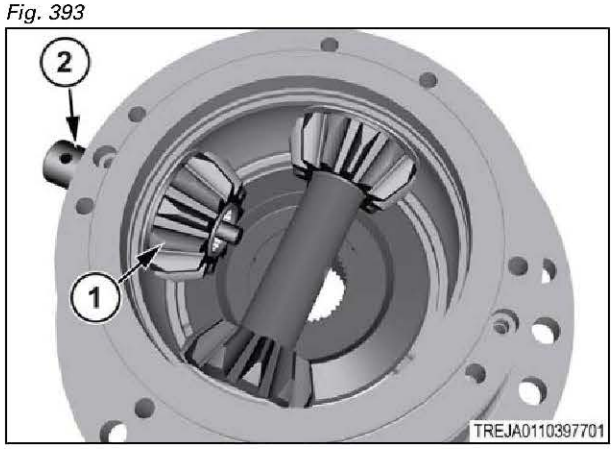

Fig. 394

20. Install the short gear shaft through the short gear shaft spacer (1).

21. Align the short gear shaft with the hole in the long gear shaft (2).

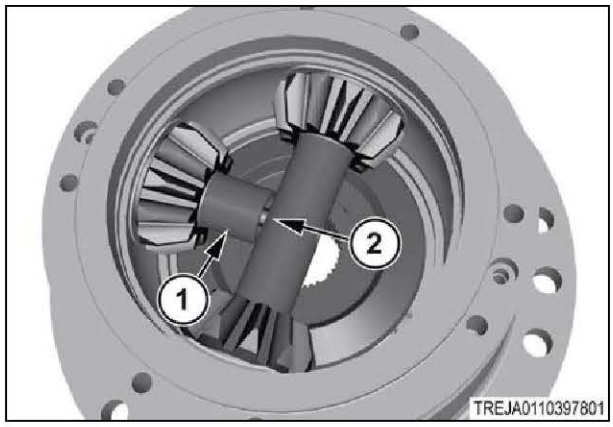

Fig. 395

22. Install the opposite side short gear shaft (1) until flush with the inner face of the housing.

23. Install the washer (2) on the shaft.

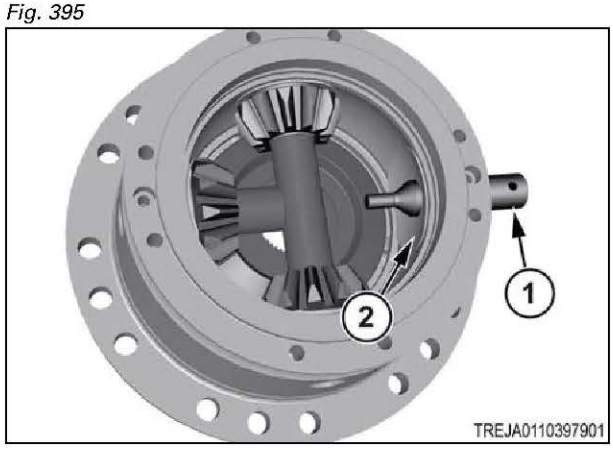

Fig. 396

24. Install the gear with the bearing (1) on the shaft (2).

IMPORTANT:
Make sure to align the hole on the short gear shaft with the pin hole to fasten the shaft.

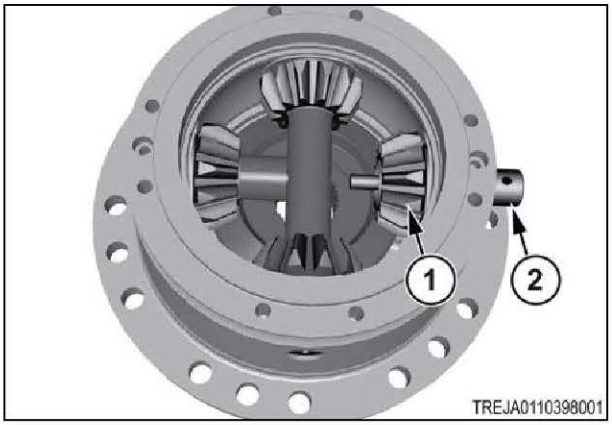

Fig. 397

25. Install the short gear shaft through the short gear shaft spacer (1).

26. Align the short gear shaft with the hole in the long gear shaft (2).

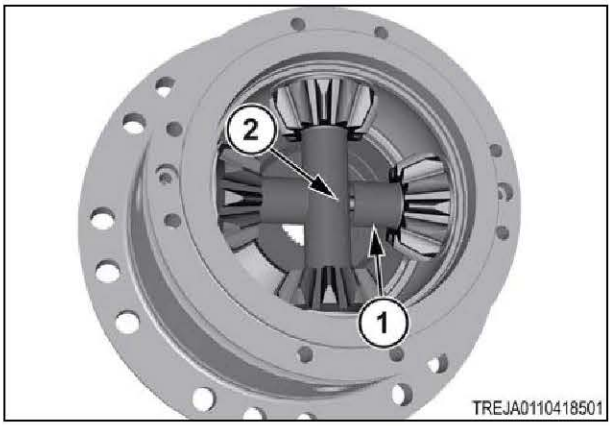

Fig. 398

27. Install the pins (1) to fasten the two short gear shafts in position.

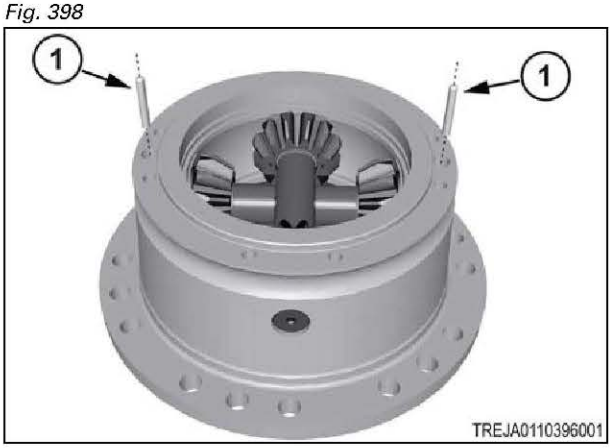

Fig. 399

28. Apply thread locking compound to the bolts (1) that fasten the pins.

29. Install the bolts.

Tighten the bolts to 28 Nm (21lbf ft).

Fig. 400

30. Install the spacer (2) and the retaining ring (1).

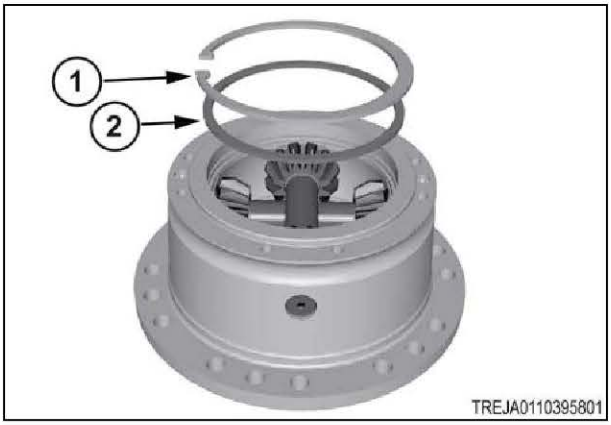

Fig. 401

31. Install the differential half-housing (3) and the bevel gear (2) with the bolts (1).

Tighten the bolts to 175 Nm (129 lbf ft).

IMPORTANT:
Bevel gear and pinion are a matched set. Replace the bevel gear and the pinion in pairs.
Be careful not to mix between the front and the rear axle assemblies.

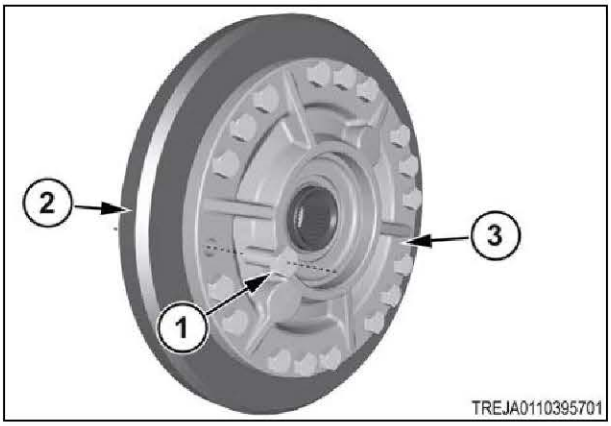

Fig. 402

32. Install the sun gear (1) that the discs and the intermediate plates sit on.

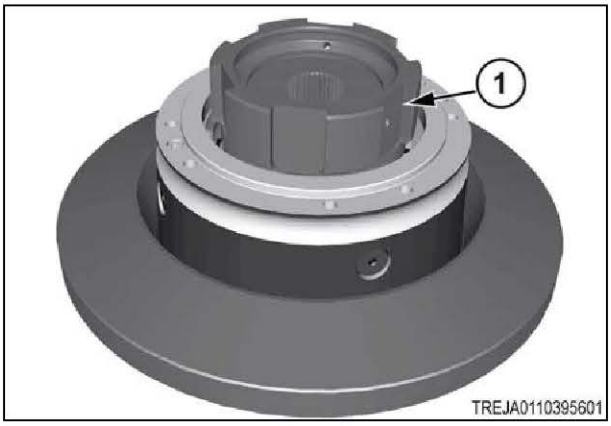

Fig. 403

33. Install the discs (2) and the intermediate plates (1).

34. Continue installing all the discs and the intermediate plates.

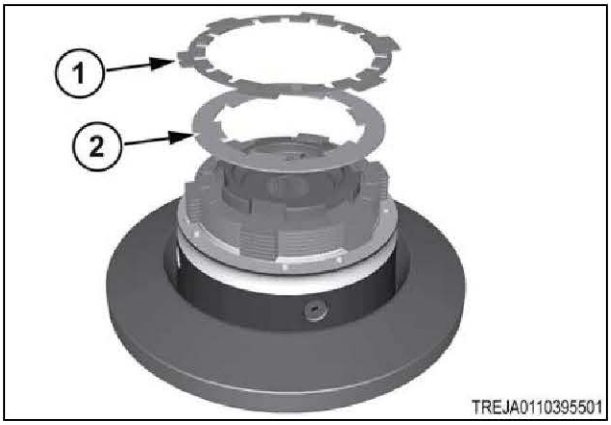

Fig. 404

35. Clean and check the components.

36. Replace all damaged parts.

37. Check the hydraulic channels in the cover (1) for blockages.

38. Install the O-rings (2) to the cover.

39. Insert the piston (3) by tapping around the pistons rim with a plastic hammer.

40. After installation check the seals for damage and replace if necessary.

41. Install the bushing (4) and the thrust washer (5).

42. Put the cover (1) installed with the piston in position.

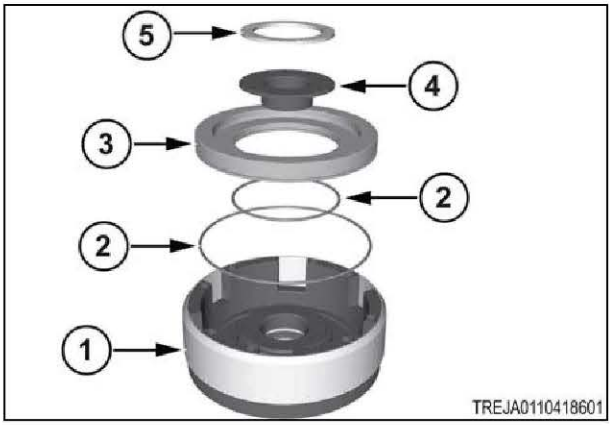

Fig. 405

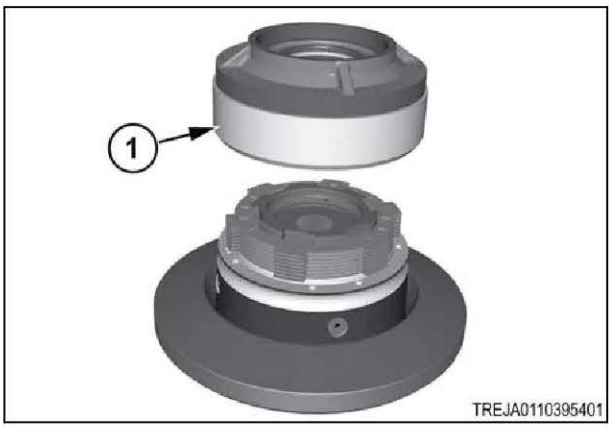

Fig. 406

43. Apply thread locking compound to the threads of the bolts (1).

Tighten the bolts to 105 Nm (77 lbf ft).

44. Manually check the discs and the intermediate plates for interference.

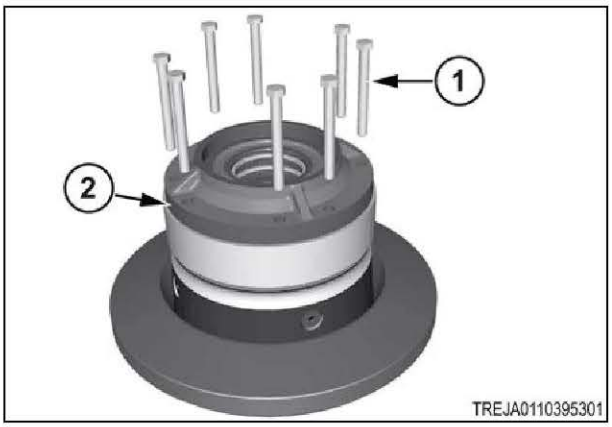

Fig. 407

3.8.4 Install the differential unit

Procedure

1. Use the correct lifting device to lower the differential unit (1) into the center housing.
2. Hold the differential unit in the correct position the final housings.

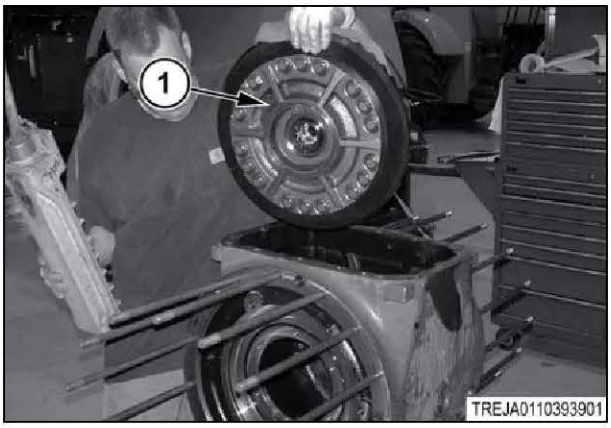

Fig. 408

3.8.5 Assemble the left-hand carrier

The left-hand carrier being as looking at the pinion.

Procedure

1. Apply thread locking compound to the threads of the bolt (1).
2. Install the bolt, the spring (2), the bushing (3), and the nut (4) to the left-hand carrier (5).

   Tighten the bolt to 1 Nm (0.74 lbf ft).

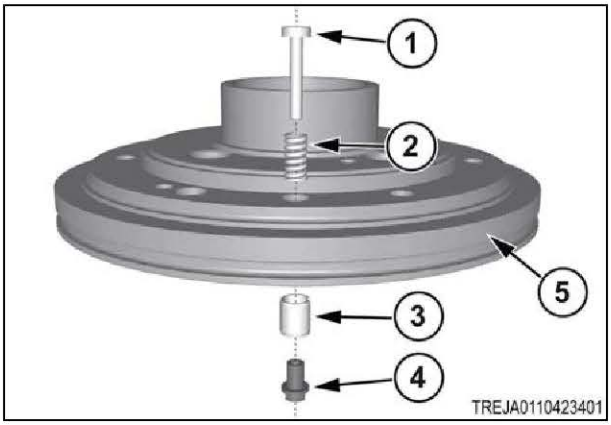

Fig. 409

3. Loosen the bolt (1) approximately 432 to 480 degrees (or about 1 to 1-1/4 turns).

   The measurement (2) between the head of the bolt (1) and the spring (3) must be 0.90 to 1.00 mm (0.035 to 0.039 in)

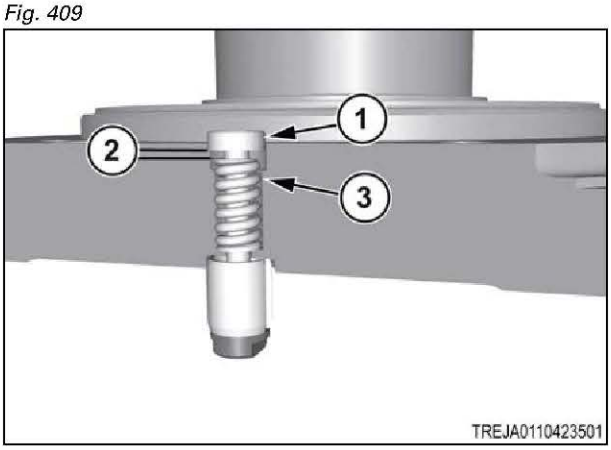

Fig. 410

4. Apply thread locking compound to the set screw (1).

5. Install the set screw.

   Tighten the set screw to 5 Nm (3.69 lbf ft).

6. Install the remaining two brake retract pistons.

7. Make sure to push the brake piston all the way into the ring piston chamber during installation.

   The brakes will adjust to the correct clearance after applying the brakes

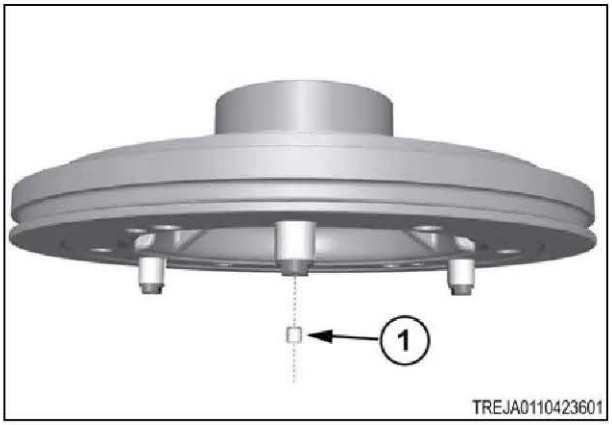

Fig. 411

8. Install the shims (1) and the bearing (2) to the left-hand carrier (3).

   IMPORTANT:
   Do not install any shims before setting the bevel gear position.
   Determine the quantity of shims by the setting bevel gear position procedure.

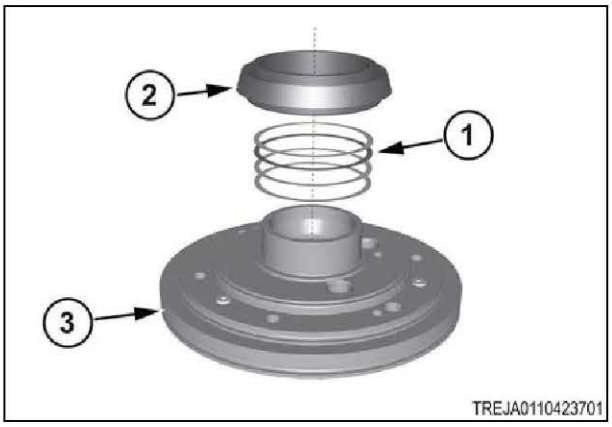

Fig. 412

9. Install the ring seals (1) on the left-hand carrier and apply assembly grease.

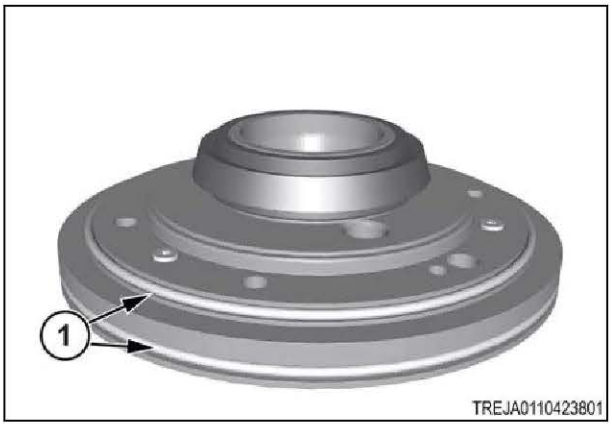

Fig. 413

10. Install the centering bushing (1) to the left-hand carrier.

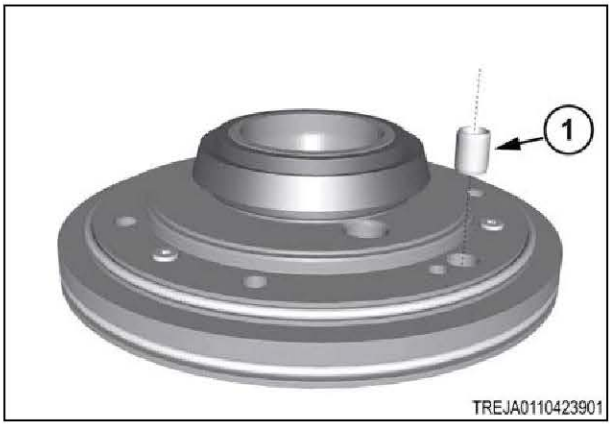

Fig. 414

Related Links

Set the bevel gear position page 3-145

3.8.6 Assemble the right-hand carrier

The location of the right-hand carrier is on the right-hand side while looking at the pinion.

Procedure

1. Install the plug (1) in the port on the carrier (2).

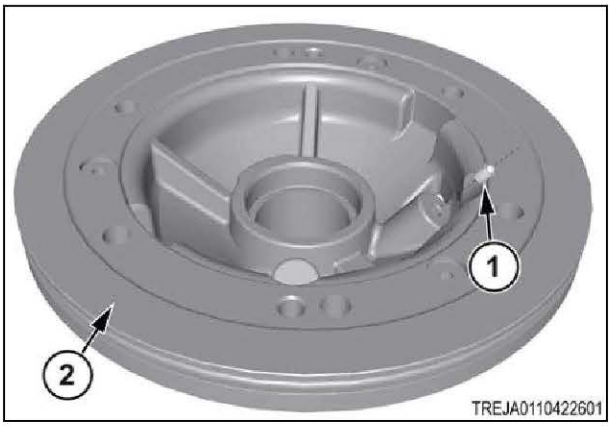

Fig. 415

2. Install the plug (1) in the port on the carrier (2).

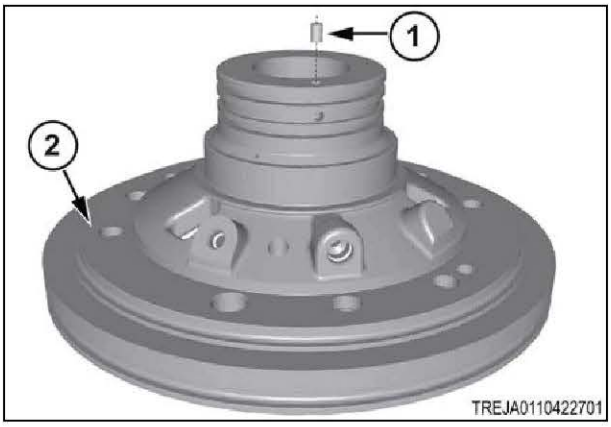

Fig. 416

3. Apply the correct thread locking compound or equivalent to the threads of the bolt (1).
4. Install the bolt, the spring (2), the bushing (3), and the nut (4) to the carrier (5).

   Tighten the bolt to 1 Nm (8.85 lbf in).

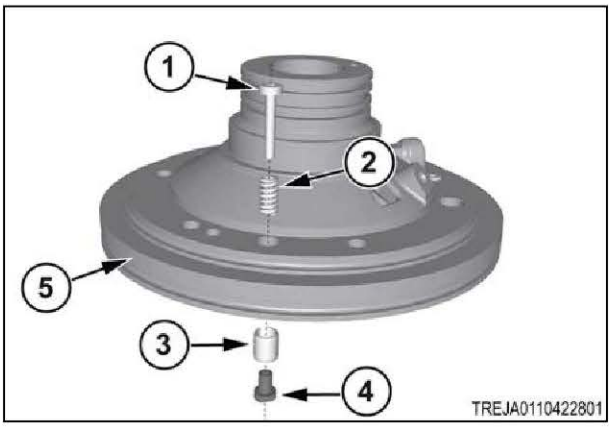

Fig. 417

5. Loosen the bolt (1) approximately 432 to 480 degrees (or about 1 to 1-1/4 turns).

The measurement (2) between the head of the bolt (1) and the spring (3) must be 0.90 to 1.00 mm 0.035 to 0.039 in

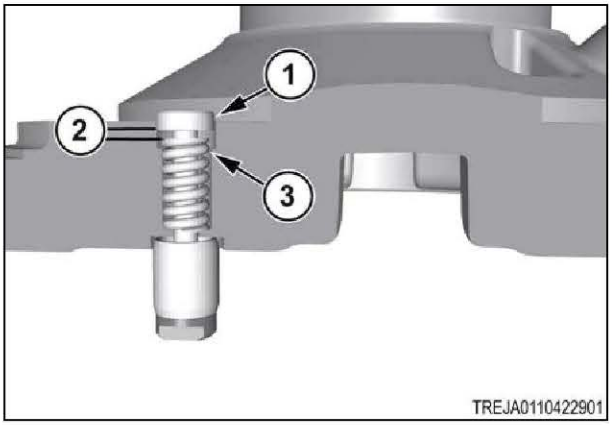

Fig. 418

6. Apply the correct thread locking compound or equivalent to the set screw (1).

7. Install the set screw

Tighten the set screw to 5 Nm (44.25 lbf in).

8. Install the remaining two brake retract pistons.

9. Make sure to push the brake piston all the way into the ring piston chamber during installation.

The brakes will adjust to the correct clearance after applying the brakes

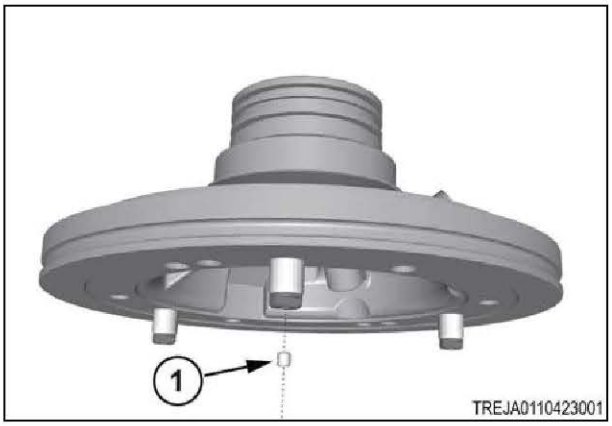

Fig. 419

10. Install the shims (2) and the bearing (1) to the carrier (3).

IMPORTANT:
Do not install any shims before setting the bevel gear position.
Determine the quantity of shims by the setting bevel gear position procedure.
See the information for the setting bevel gear position procedure.

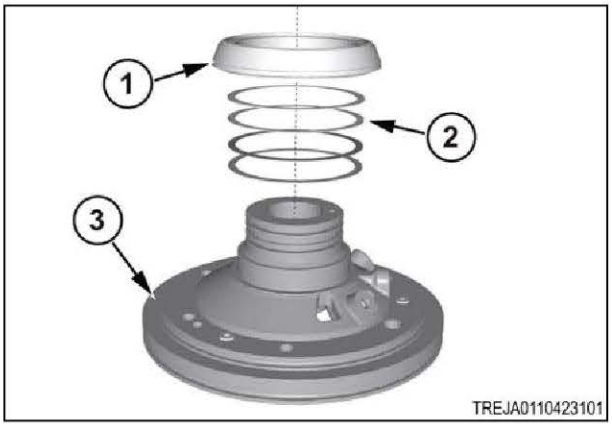

Fig. 420

11. Install the ring seals (1) on the carrier and apply assembly grease.

12. Install the ring seals (2) on the carrier and apply assembly grease.

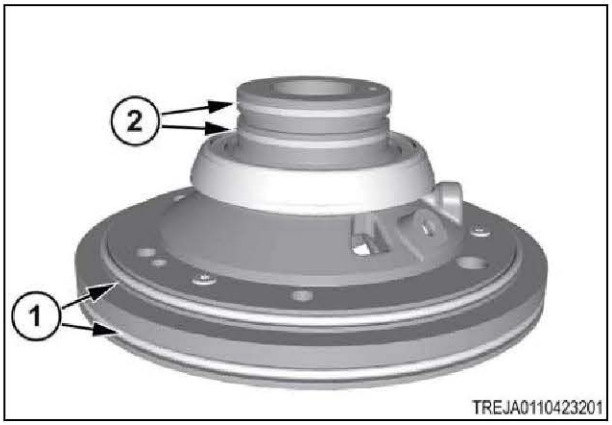

Fig. 421

13. Install the centering bushing (1) to the right-hand carrier.

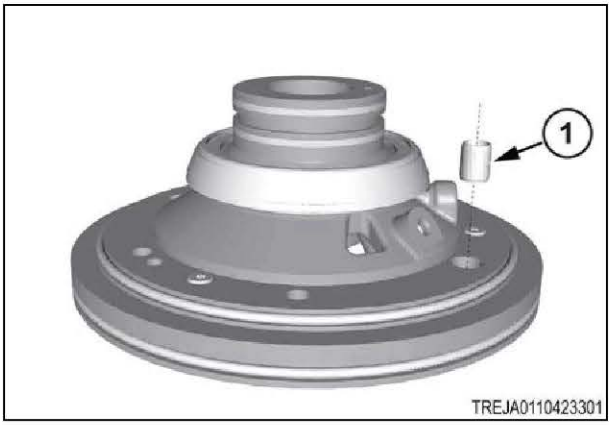

Fig. 422

3.8.7 Set the bevel gear position

Procedure

1. Put the differential support on the table with the bearing installed.

2. Put the differential assembly on the differential support as shown.

3. Rotate the differential a minimum of ten revolutions to install the bearing.

4. Measure dimension (A) as shown below with a straightedge and a caliper or with another correct measuring method.

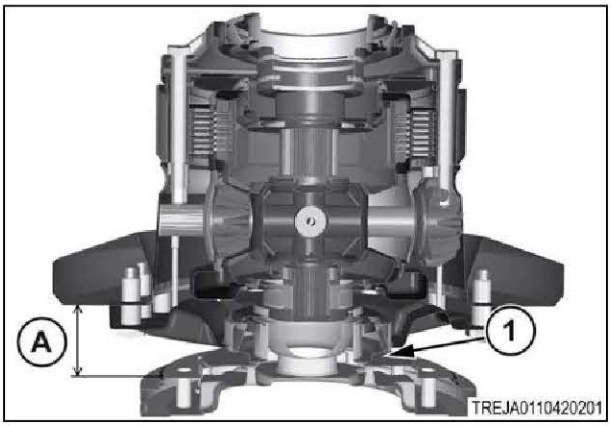

Fig. 423

- Shim Thickness = (60.314 mm-A) + 0.064 mm-V ((2.375 in-A) + 0.0025 in-V)
- V = Machining Variation (Value is stamped on OD of bevel gear)
- Shim stack thickness (1) must be within 0.04 mm (0.0016 in) of calculated value for shim thickness.

3.8.8 Set the differential bearing preload

IMPORTANT:
If the center housing, the bevel gear, the taper roller bearings, and the carriers have been replaced, install the shims for the differential unit.
Make sure the shim(s) used for the backlash have been installed in the half-housing and the cup.

Procedure

1. Install the bevel gear side differential support (1) with the shims determined in the setting bevel gear position procedure.

   See the information for setting bevel gear position.

   Do not lubricate the bearing.

2. Install the differential lock side differential support (2) with no shims under the bearing cup.

   Do not lubricate the bearing.

3. Rotate the differential assembly ten revolutions to make sure the bearing is seated.

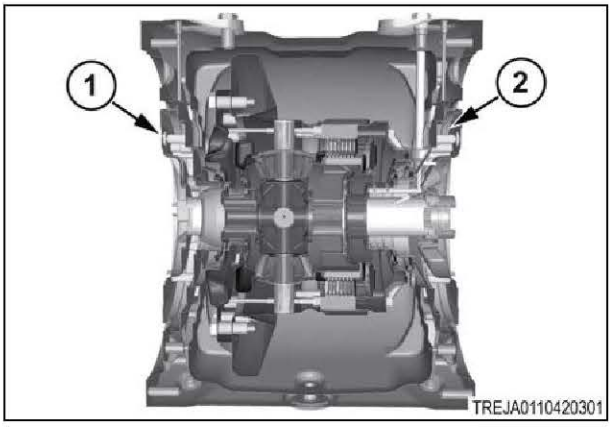

Fig. 424

4. Set up a dial indicator to measure against the rear side of the bevel gear.
5. Push the differential in the direction of the bevel gear and then zero the dial indicator.
6. Push the differential to the opposite direction and read the axial play from the dial indicator.
7. Record this dimension as (L).
8. Select a shim pack that fits between these two values:
   - Shim Pack min = L+0.05 mm (0.002 in)
   - Shim Pack max = L+0.15 mm (0.006 in)
9. Install the shim pack behind the bearing cup and assemble the differential.

3.8.9 Install the left-hand carrier

Procedure

1. The photo shows the left-hand carrier (1) ready for installation.

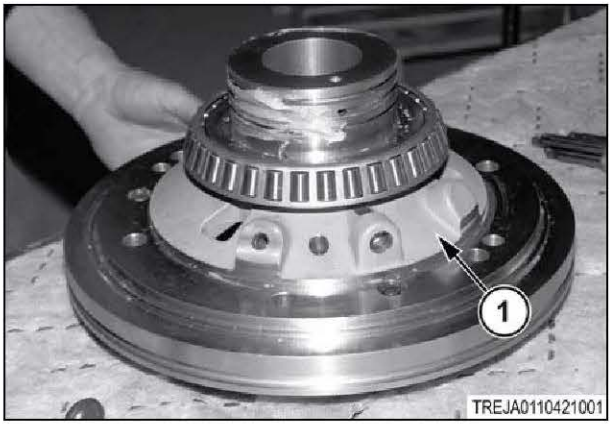

Fig. 425

2. Install the guide pins (1). Using the guide pins, install the carrier (2) to the center housing.

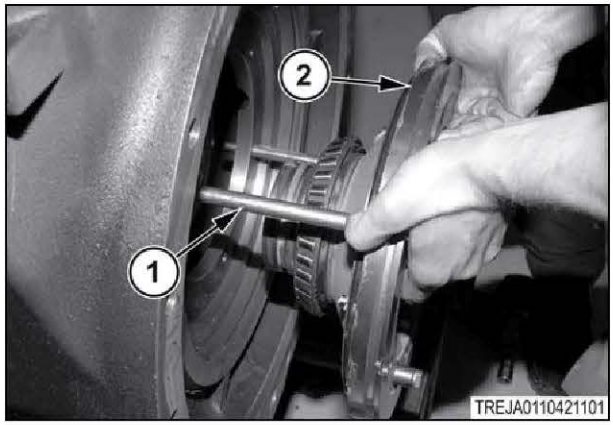

Fig. 426

3. Fasten the carrier with the bolts (1) and remove the guide pins (2).

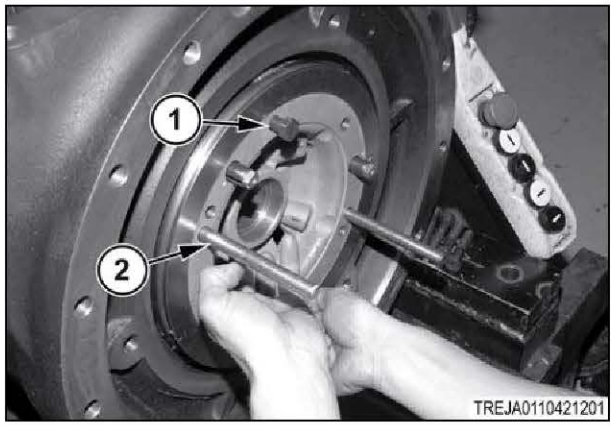

Fig. 427

4. Tighten the bolts (1) evenly and alternately to 115 Nm (85 lbf ft).

5. Manually check the rotation of the differential assembly.

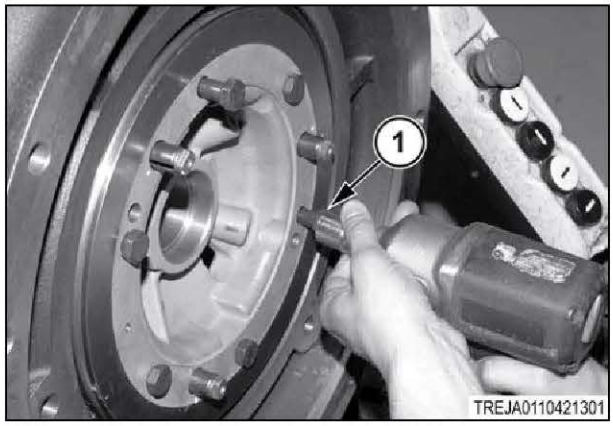

Fig. 428

6. Install the piston (1) to the carrier.

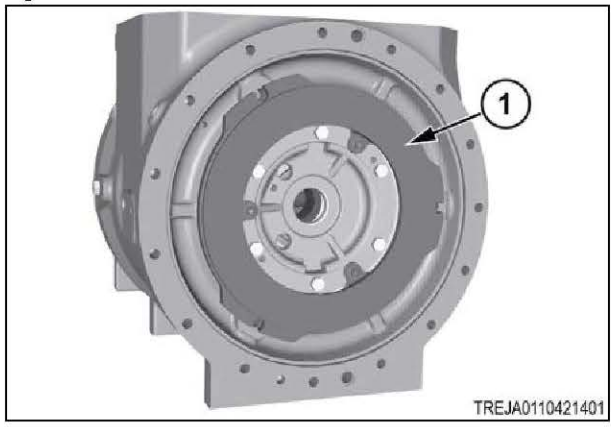

Fig. 429

3.8.10 Do a test of the service brake

Do this procedure directly after the carrier installation.

Procedure

1. Install the pins (1) and the piston (2) on the left-hand side of the differential.

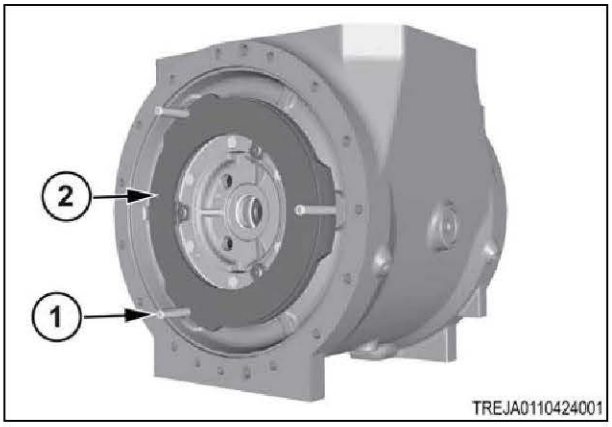

Fig. 430

2. Install the pins (1) and the piston (2) on the right-hand side of differential.

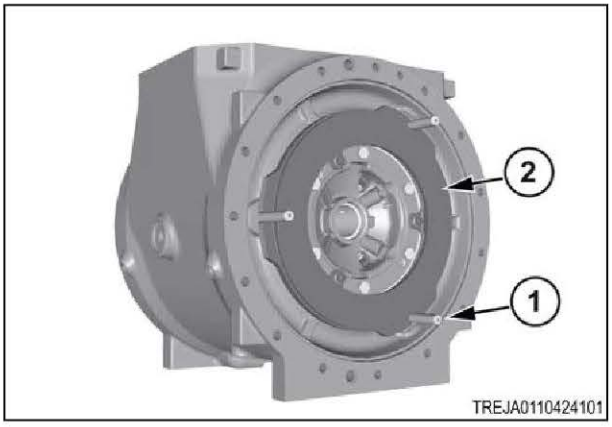

Fig. 431

3. Install the air line (1) to the port for the service brake.

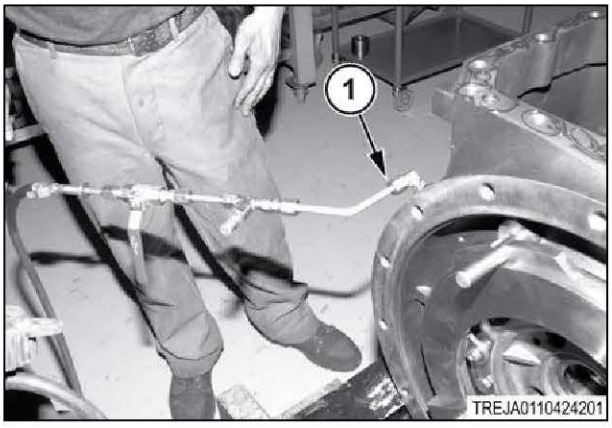

Fig. 432

4. Fasten a bar to the brake discs. (1).

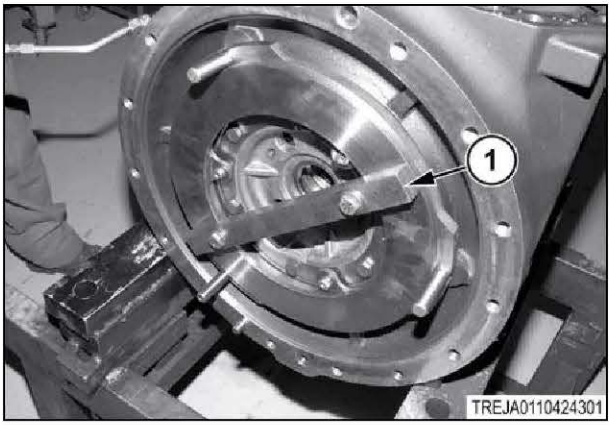

Fig. 433

5. Install a pressure gauge (1) to the air line.
6. Supply approximately 483 kPa (70 psi) of air pressure to the service brakes.
7. Check if the brakes will hold pressure.

   Replace the seals in the carrier if there is a loss of pressure.

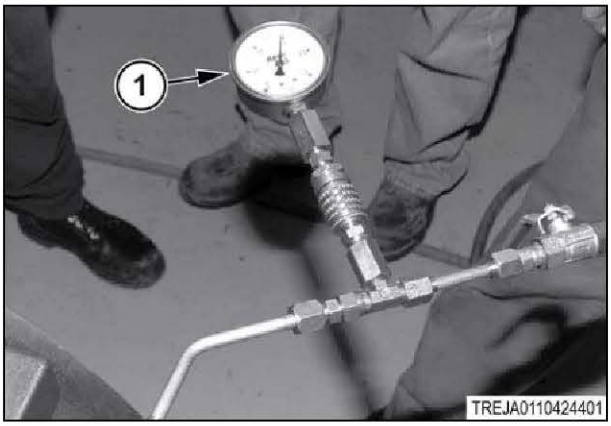

Fig. 434

3.8.11 Assemble the drive pinion

Procedure

1. Install the bearing carrier (1) to the drive pinion housing (2).

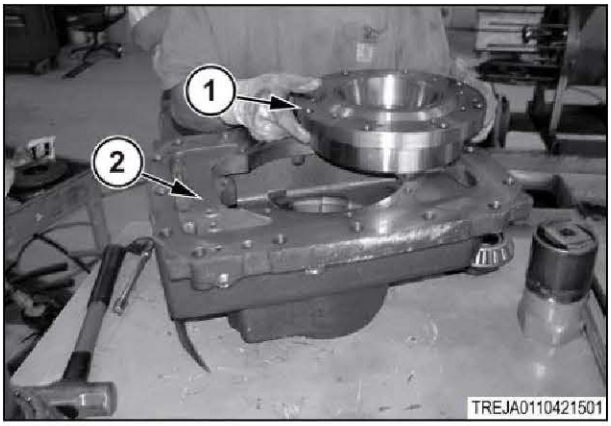

Fig. 435

2. Install the guide pins (1) to the housing to help in the bearing carrier installation.

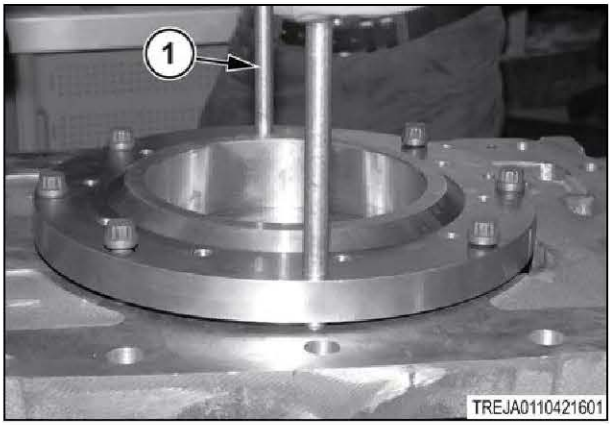

Fig. 436

3. Apply the thread locking compound to the threads of the bolts.

4. Fasten the bearing carrier (1) with the bolts (2).

   Tighten the bolts to 100 to 130 Nm (74 to 96 lbf ft).

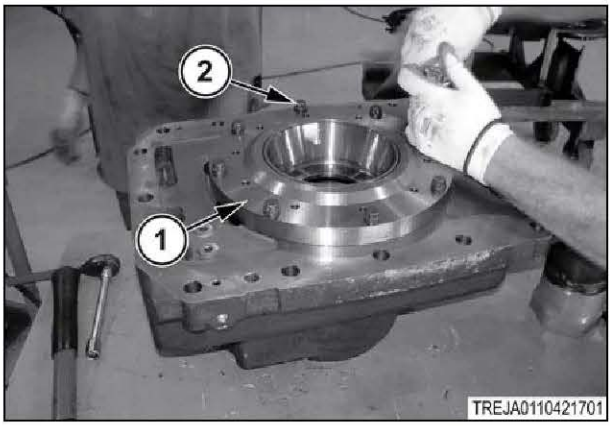

Fig. 437

5. Install the bearing cup (1) to the drive pinion housing.

Fig. 438

6. Press the bearing (1) onto the drive pinion (2).

   IMPORTANT:
   This process will require approximately a 9 t (10 US ton) press to press the bearing on.

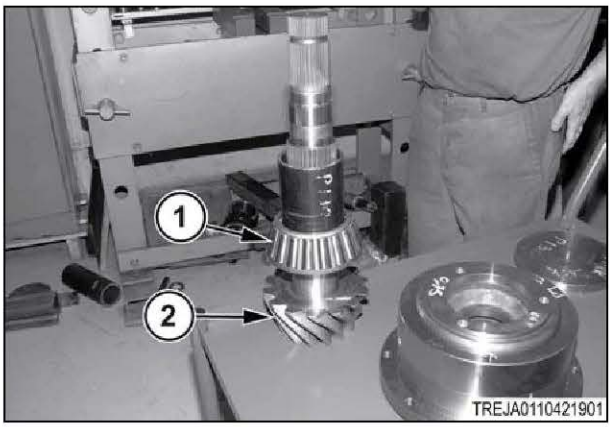

Fig. 439

3.8.12 Set the pinion position

IMPORTANT:
It is necessary to adjust the position of the drive pinion before the installation of shims for the taper roller bearings.
Do not change this adjustment without adjusting the installation of shims to the drive pinion bearings.

Procedure

1. Install the drive pinion (1) into the pinion housing (2).

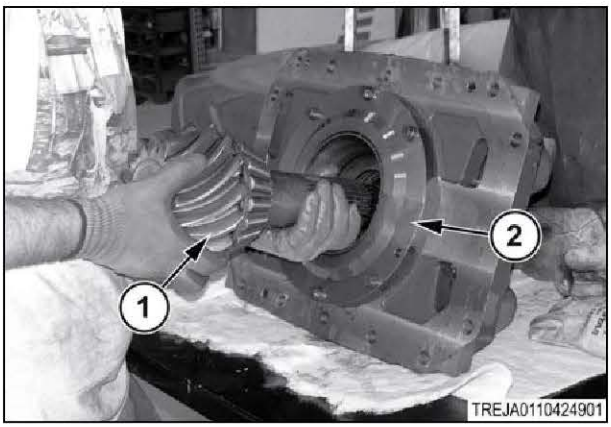

Fig. 440

2. Load axially (1) to 100 daN (225 lbf).
3. Rotate under load a minimum of ten turns to make sure the bearing is seated before taking the measurement.

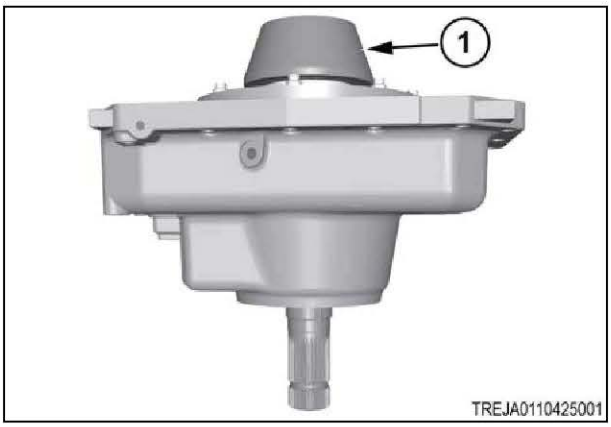

Fig. 441

4. Measure dimension (Y).
5. Use the following formula to determine the shim pack thickness: S = 43-Y-V
   - S = Shim Pack Thickness
   - Y = Distance Measured
   - V = Variation Value Engraved in End of Pinion Shaft
6. Add the shims behind the bearing cup (1) per the (S) dimension found using the formula.

   NOTE:
   The (S) dimension can be within the range of plus or minus 0.03 mm (0.001181099 in).

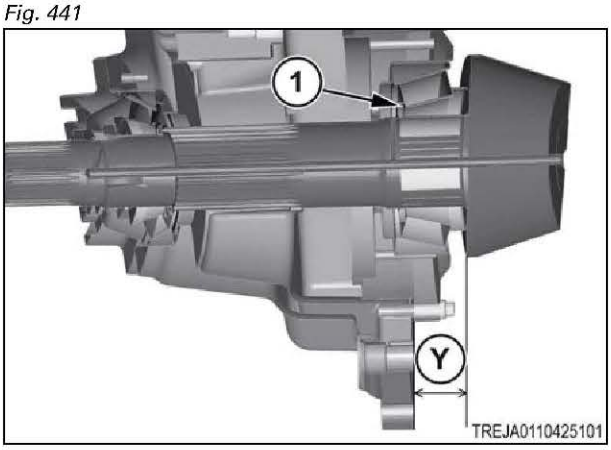

Fig. 442

7. Remove the drive pinion from the pinion housing.
8. Install the determined shim pack (1) to the drive pinion (2).
9. Install the drive pinion to the pinion housing.

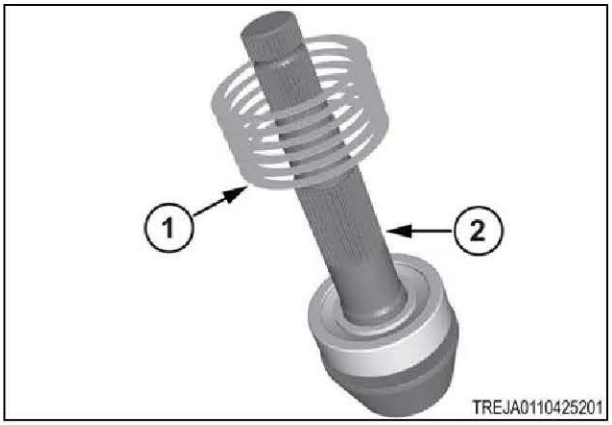

Fig. 443

3.8.13 Set the pinion bearing preload

Special tools

Description	Part number	Vendor	Where used	Mandatory
Input yoke wrench plate	AG332284	K-Line	Drive train system	Mandatory
Pinion nut wrench	AG332302	K-Line	Drive train system	Mandatory

Procedure

1. Install the spacer and enough shims (1) to the drive pinion (2) to have end play in the assembly.
2. Record the shim pack thickness (S).

   IMPORTANT:
   The park brake discs must not be installed for this step.

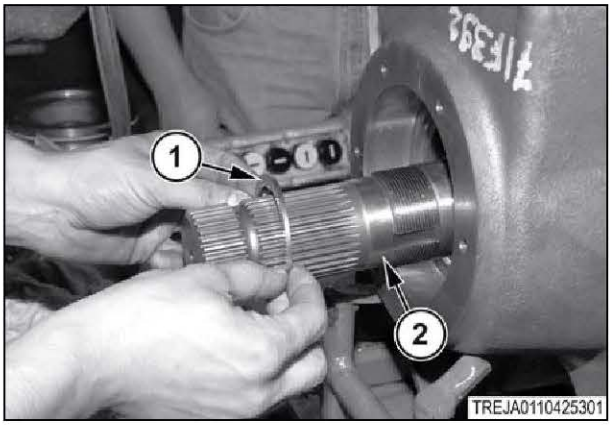

Fig. 444

3. Install the bearing (1) onto the drive pinion (2).

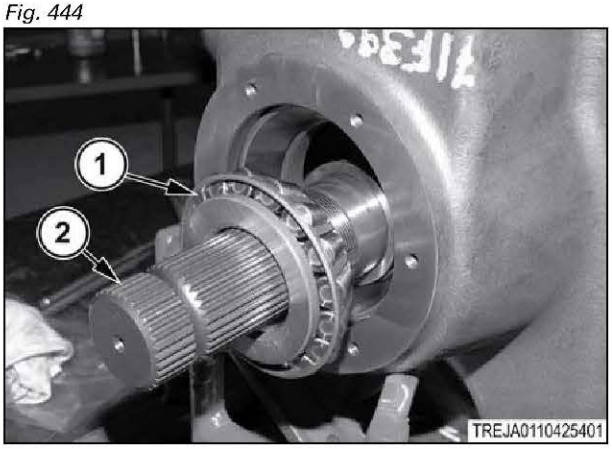

Fig. 445

4. Install the pinion nut (1) onto the drive pinion (2).

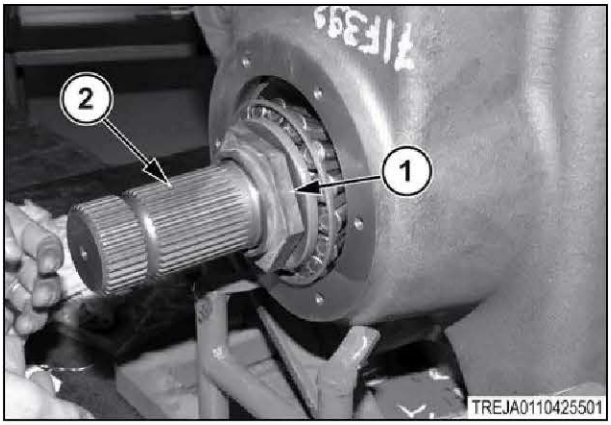

Fig. 446

5. Install the yoke(1) onto the drive pinion.

Fig. 447

6. Fasten the input yoke wrench plate to the input yoke to hold the pinion shaft while tightening the pinion nut.

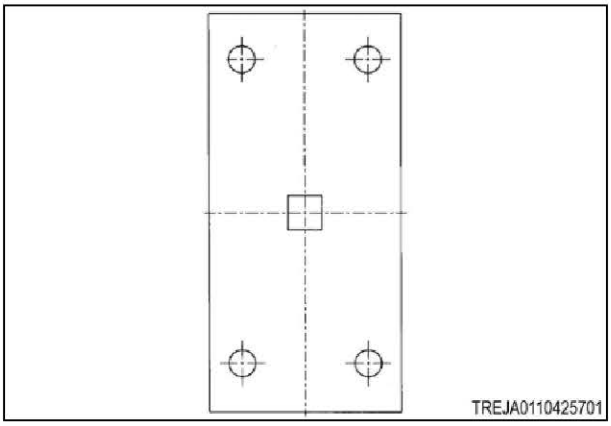

Fig. 448

7. Use the pinion nut wrench to tighten the pinion nut.

Tighten the pinion nut to 250 Nm (184 lbf ft).

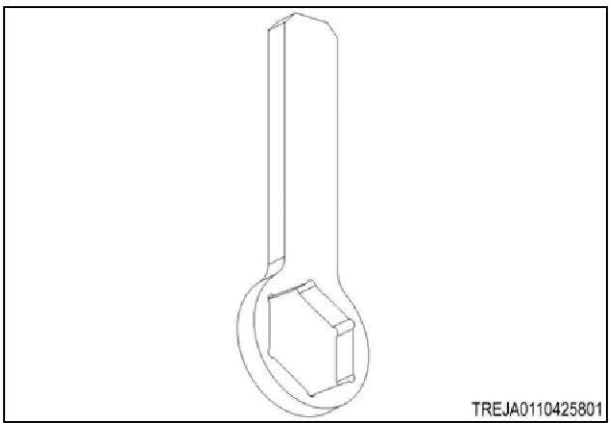

Fig. 449

8. Load axially (1) to 100 daN (225 lbf).
9. Rotate under load a minimum of ten turns to make sure the bearing is seated before taking the measurement.
10. Set the dial indicator at the opposite end of the pinion shaft and then zero the dial indicator.
11. Load axially (2) to 100 daN (225 lbf).
12. Rotate under load a minimum of ten turns to make sure the bearing is seated.
13. Record axial play (A).
14. Calculate the shim pack thickness:
    - S-A-P max = Max Shim Pack Thickness
    - S-A-P min = Min Shim Pack Thickness
    - P max = 0.02 mm (0.0008 in)
    - P min = 0.10 mm (0.004 in)
15. Install the shim pack to the thickness determined.

    Tighten the nut to 250 Nm (184 lbf ft).
16. Check the rolling torque.

    The rolling torque must be 2 to 7 Nm (18 to 62 lbf in).

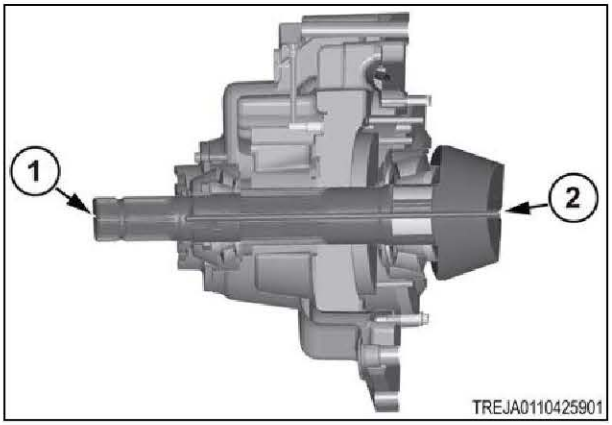

Fig. 450

3.8.14 Do a check of the backlash in the pinion shaft

Procedure

1. Measure the backlash by putting a dial indicator tangent to the shaft and against the slot (1) in the shaft.
2. Rotate the shaft until the shaft stops against the gear tooth.
3. Zero the dial indicator.
4. Rotate the shaft in the opposite direction until the shaft stops against the other gear tooth .

   The resistance can be felt by hand.
5. Prevent the differential from turning by not pushing the rotation.

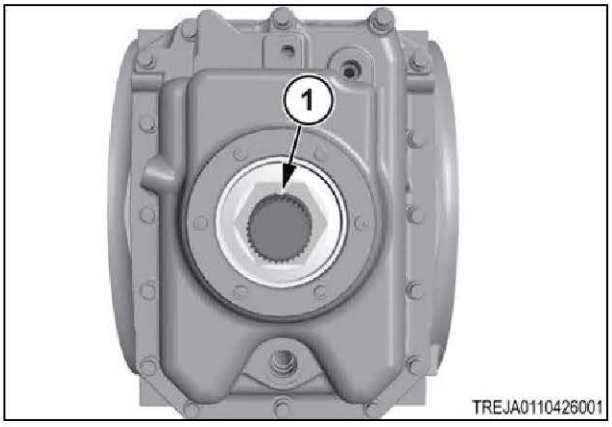

Fig. 451

The backlash must be from 0.061 to 0.185 mm (0.002 to 0.006 in).

- To reduce the backlash:

  Remove the shims from the differential lock side shim pack.

  Add the equal thickness to the bevel gear side shim pack to keep the differential bearing preload value.
- To increase the backlash:

  Add the shims to the differential lock side shim pack.

  Remove the equal thickness from the bevel gear side shim pack to keep the differential bearing preload value.

6. Install the park brake discs.

   See the information for the park brake assembly section.

7. Remove the nut and apply thread locking compound to the threads.

   Tighten the nut to 400 to 500 Nm (295 to 369 lbf ft).

8. Dimple the outer end of the nut in all three slots of the pinion shaft to prevent loosening.

Fig. 452

3.8.15 Assemble the park brake

NOTE: *Special tool AG332310 is used in this procedure.*

Procedure

1. The park brake alignment tool aligns the park brake plates and friction discs during assembly so that the pinion shaft can be easily installed.

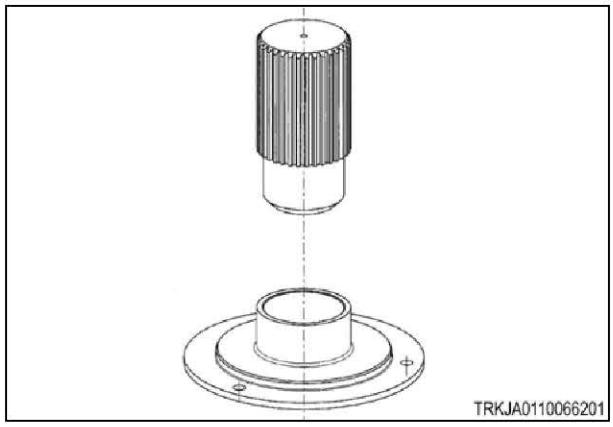

Fig. 453

2. Install the park brake alignment tool (1) to aid in the park brake discs installation. Secure with three bolts (2).

   NOTE: *Use special tool AG332310 to aid in the park brake disc installation.*

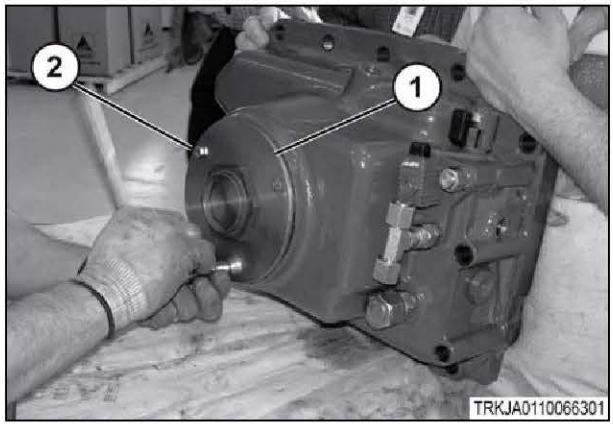

Fig. 454

3. Install the friction disc (1) inside of the drive pinion housing with the aid of the special tool (2).

   NOTE: *The first friction disc contacts the drive pinion cast housing.*

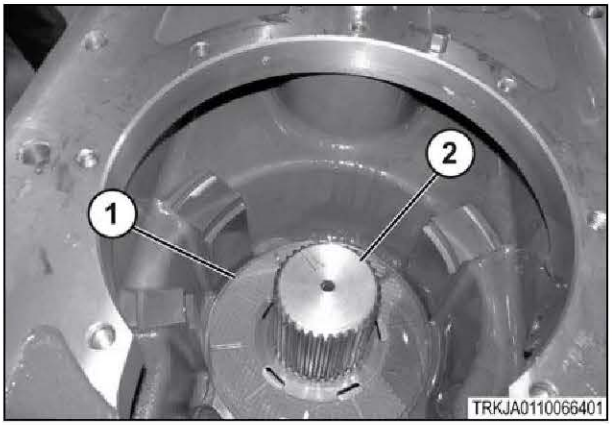

Fig. 455

4. Install the park brake intermediate plate (1) next with the aid of the special tool (2).

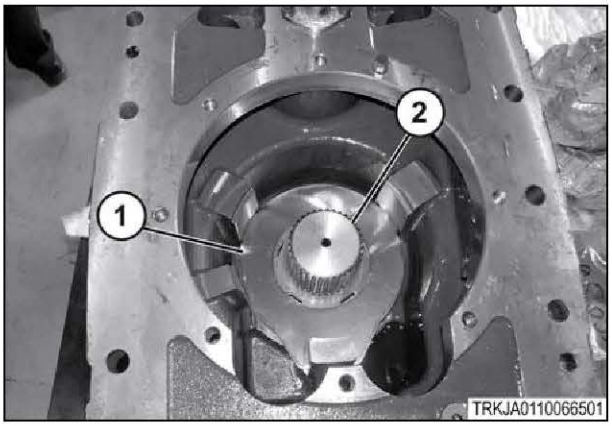

Fig. 456

5. Continue alternately stacking friction discs (2) and intermediate plates (1) until a total of eight friction discs and eight intermediate plates are installed in the housing (3).

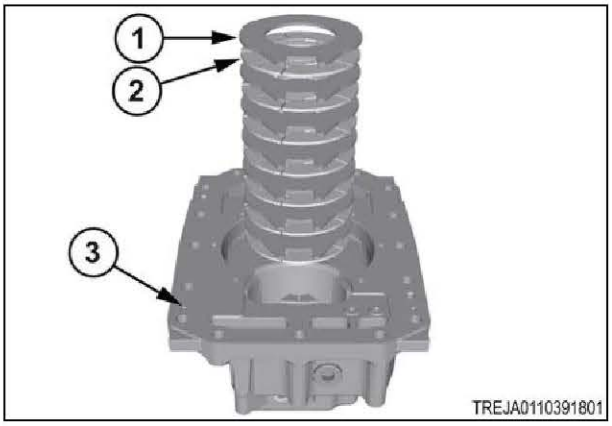

Fig. 457

6. Follow the instructions for assembling the bearing carrier if needed.

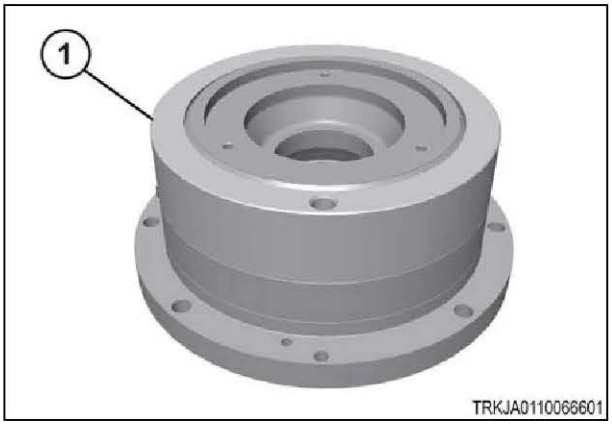

Fig. 458

7. **NOTE:** *Soak ring (3) in 80° C (175° F) oil prior to installation to make the ring more pliable and easier to install.*

   Install the large ring (3) and large o-ring (1) to the piston (2).

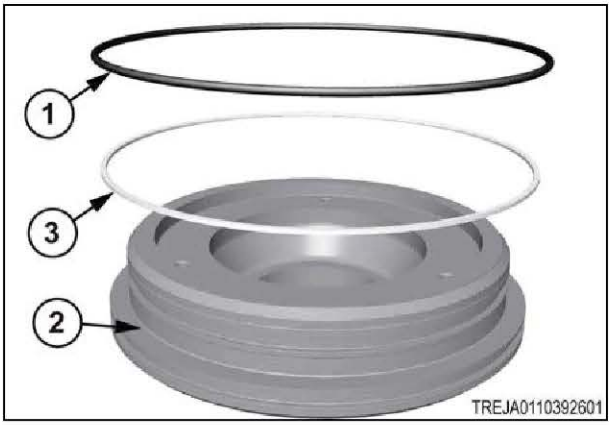

Fig. 459

8. **NOTE:** *Soak ring (1) in 80° C (175° F) oil prior to installation to make the ring more pliable and easier to install.*

   Install the small o-ring (3) and small ring (1) to the piston (2).

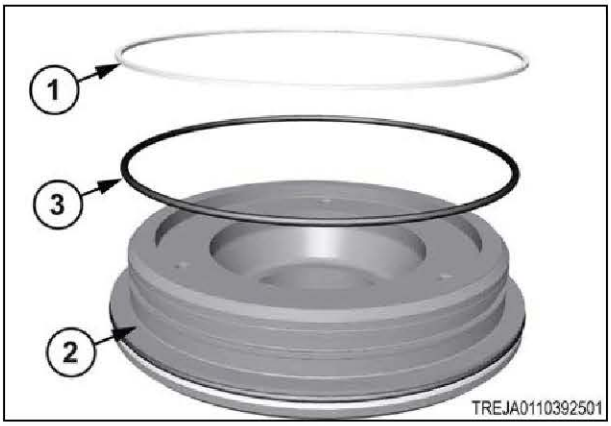

Fig. 460

9. Make sure the o-rings (1) and rings (2) are installed in the correct orientation on the piston as shown. The order of the parts is critical to correct functioning and durability of the park brake.

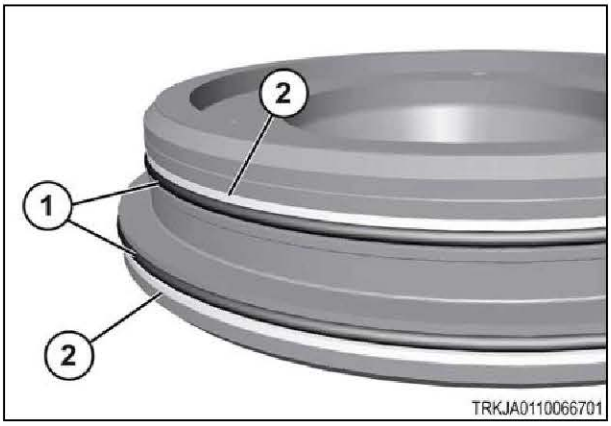

Fig. 461

10. Install the piston (1) to the piston chamber.

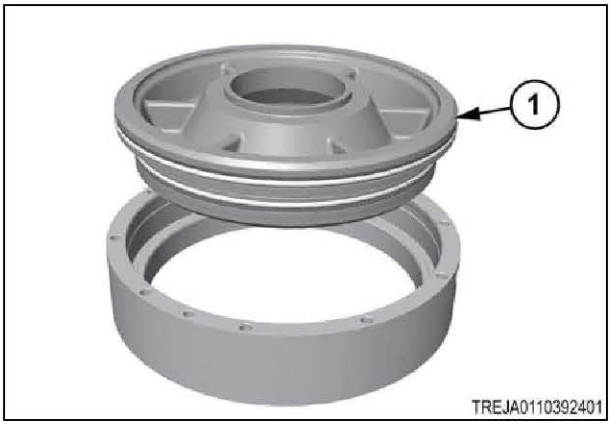

Fig. 462

11. Install the spring kit (1) to the piston.

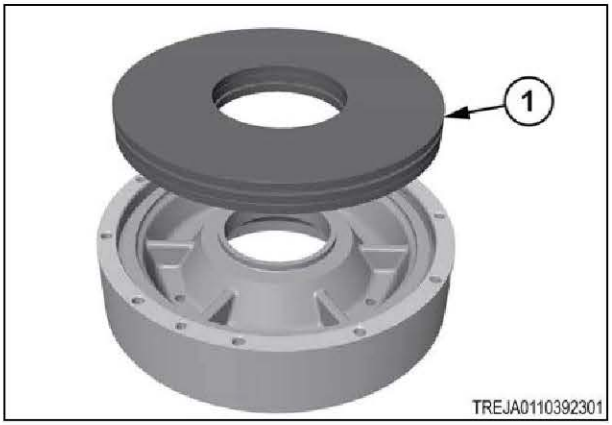

Fig. 463

12. Install the roll pin (1).

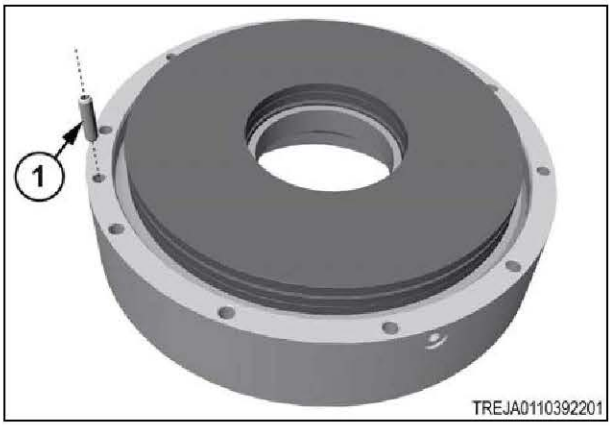

Fig. 464

13. Use an assembly tool to compress the springs prior to tightening the bolts. Do not use bolts to compress the spring pack.

14. Apply Loctite® 242 or equivalent to bolts (1) prior to installation.

15. Install the carrier (2) to the piston chamber with ten bolts (1).

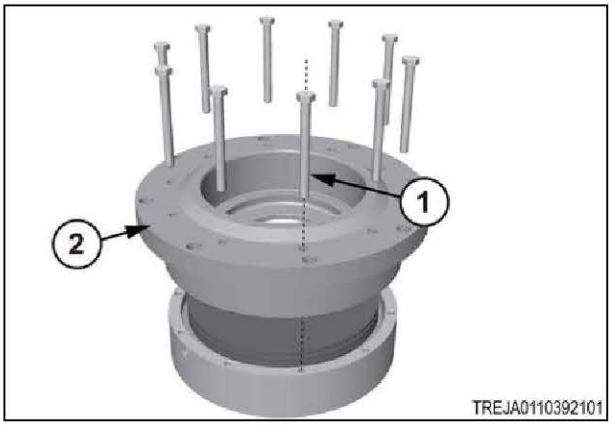

Fig. 465

16. Turn the bearing carrier over.

17. Install the appropriate amount of shims (3) to the bearing carrier to allow the correct clearance between the spacer (2) and the park brake discs.

18. Tighten the bolts (1). Clearance will be tested after the bearing carrier is installed.

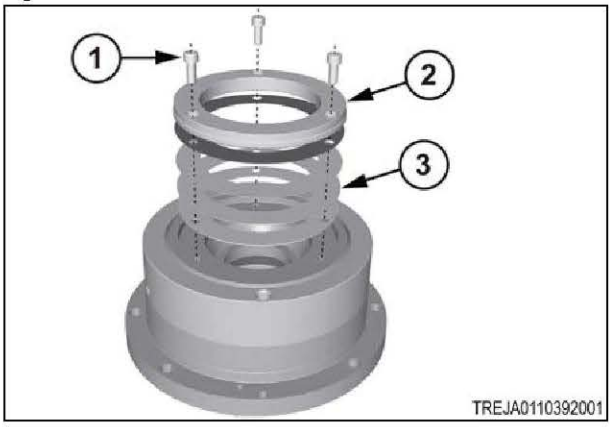

Fig. 466

19. Install o-rings (1) to the transfer tube (2).

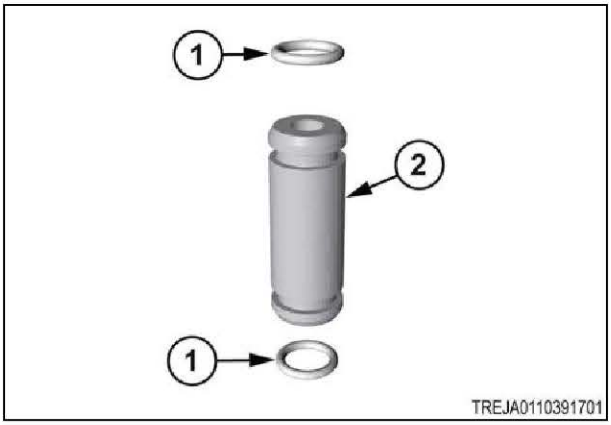

Fig. 467

20. Install the transfer tube (1) to the drive pinion housing.

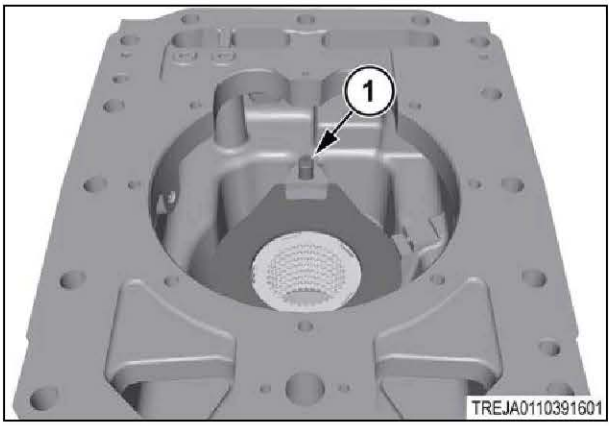

Fig. 468

21. Install the bearing carrier (1) to the drive pinion housing.

Fig. 469

22. Install guide pins (1) to the housing to aid in the bearing carrier installation.

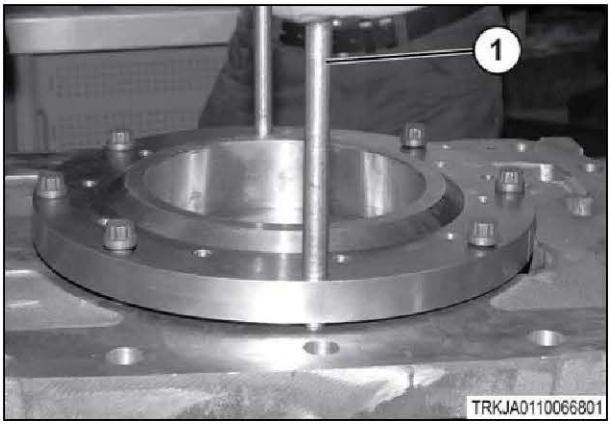

Fig. 470

23. Secure the bearing carrier (2) with bolts (1) and tighten to 100 to 130 Nm (74 to 96 lbf ft).

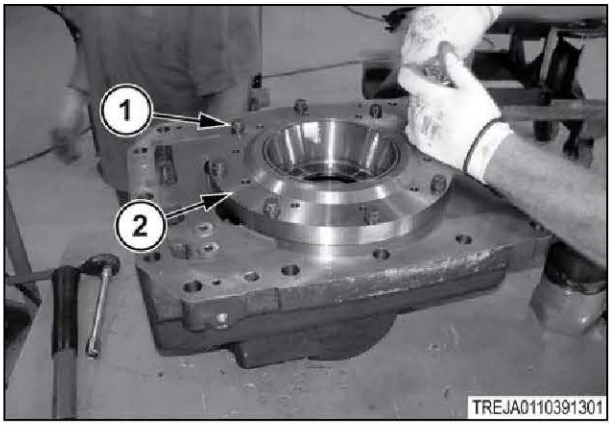

Fig. 471

24. Measure clearance (A) between the spacer (1) and the park brake discs (2) after pressurization of the park brake assembly. Acceptable clearance is 1.5 to 1.7 mm (0.05905494 to 0.06692893 in).

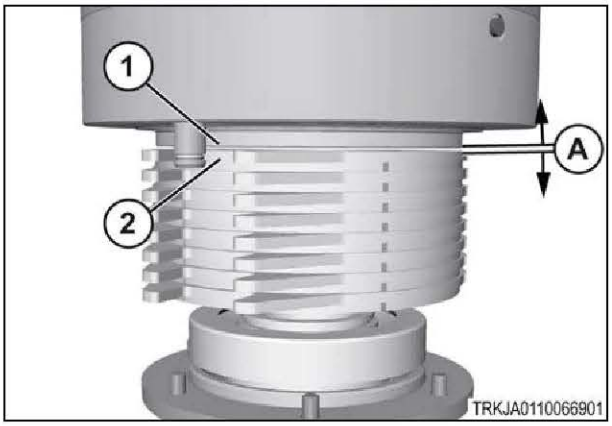

Fig. 472

25. If clearance fails to measure within the acceptable range add or remove shims (3) as needed and retest.

26. If clearance measures within the acceptable range install spacer (2) apply Loctite® 242 or equivalent to the bolts (1) and tighten.

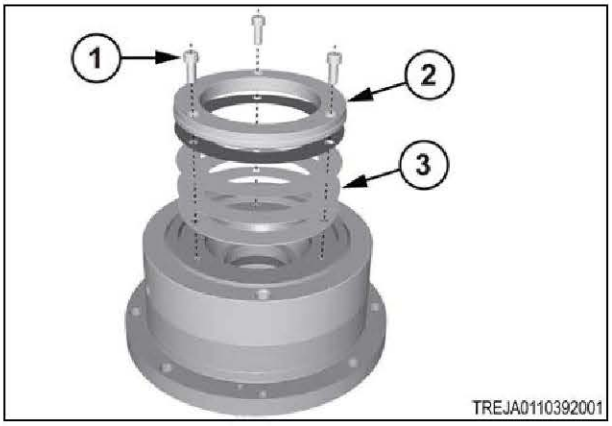

Fig. 473

27. Reinstall bearing carrier (2). Apply Loctite® 242 or equivalent to the threads of the bolts (1) and tighten to 100 to 130 Nm (74 to 96 lbf ft).

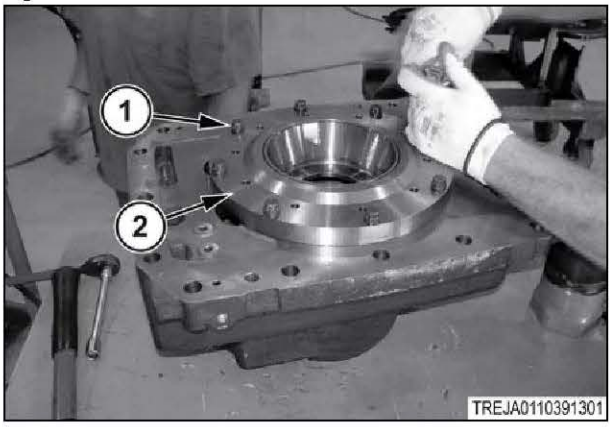

Fig. 474

After finishing the procedure

Park Brake Assembly Test Parameters

1. Park brake must hold 4000 Nm (2950 lbf ft) of torque with park brake at zero.
2. Pressure required to unlock park brake must be between 50 to 70 bar (725 to 1015 psi).
3. The unlocked sensor must be on when park brake pressure is greater than 90 bar (1305 psi).
4. The wear sensor must be off.
5. Cycle the park brake for ten cycles.
6. Park brake chamber must not leak when pressurized to 200 bar (2900 psi).

3.8.16 Install the drive pinion

Procedure

1. Connect correct lifting equipment (1) to the drive pinion housing.

   IMPORTANT:

   The weight of the drive pinion housing is approximately 250.14 kg (551.46 lbs).

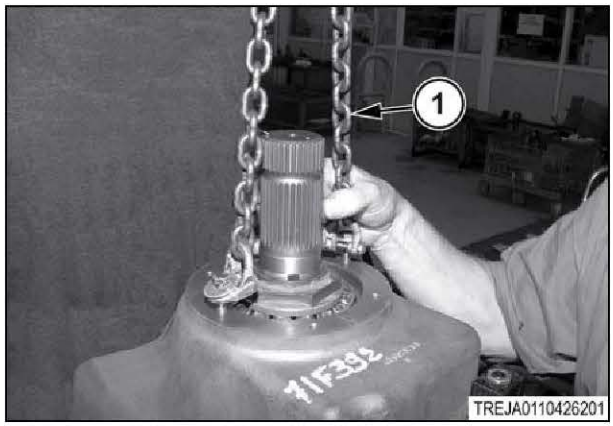

Fig. 475

2. Install the lubrication tube (1) to the drive pinion housing.

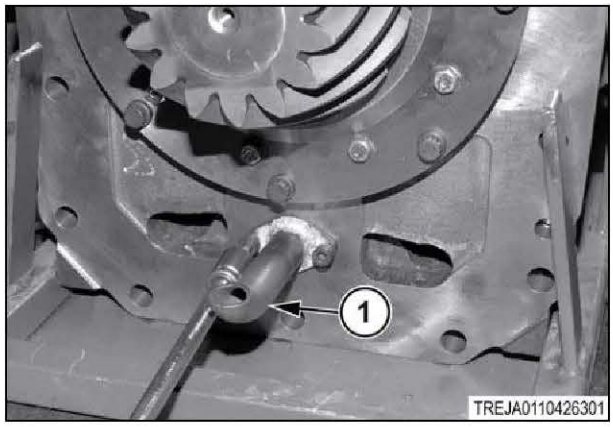

Fig. 476

3. Install the pipe (1) to the drive pinion housing.

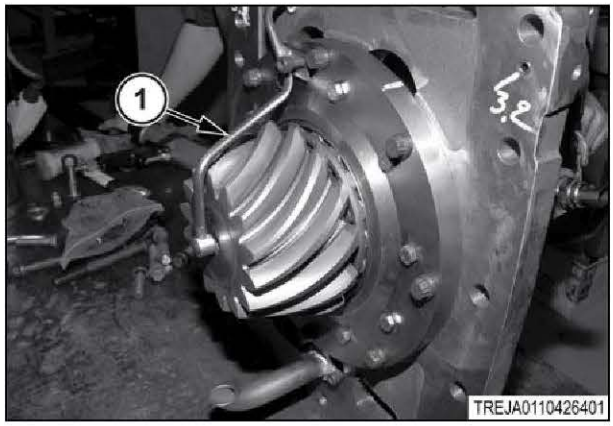

Fig. 477

4. Install the oil lubrication tube (1) if not already installed.

IMPORTANT:
There must only be light contact between the drive pinion housing and the lubrication tube.

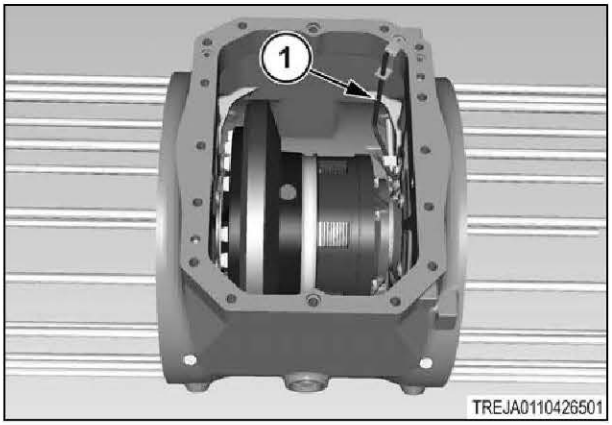

Fig. 478

5. Install the guide pins (1) in the differential to help in the drive pinion housing installation.

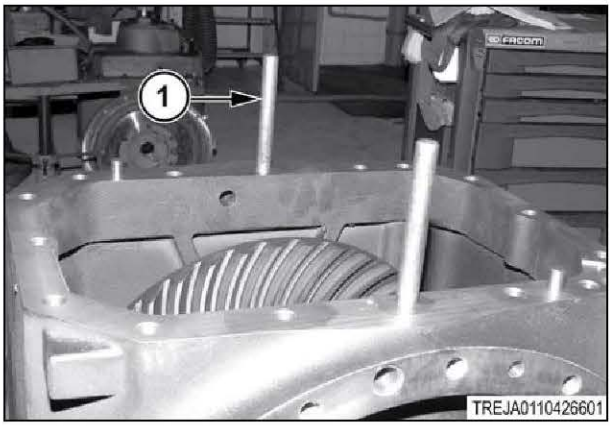

Fig. 479

6. Apply the correct thread locking compound or equivalent to the housing.

Fig. 480

7. Carefully lower the drive pinion housing (1) onto the differential.

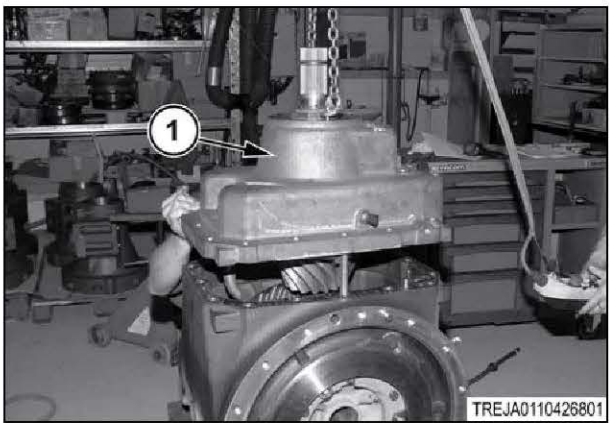

Fig. 481

8. Carefully mount the drive pinion housing (1).

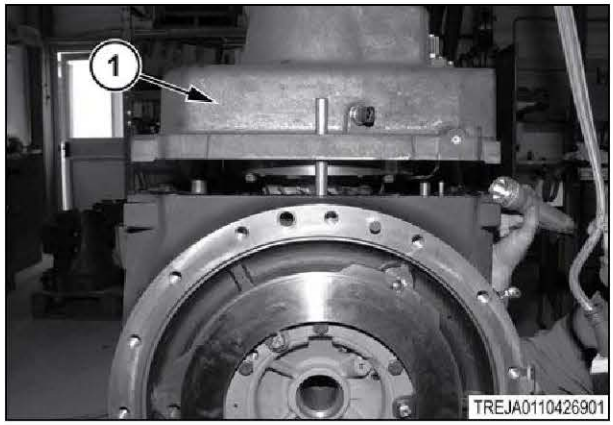

Fig. 482

9. Fasten the drive pinion housing (1) to the center section with the bolts (2).

Tighten the bolts to 280 Nm (207 lbf ft).

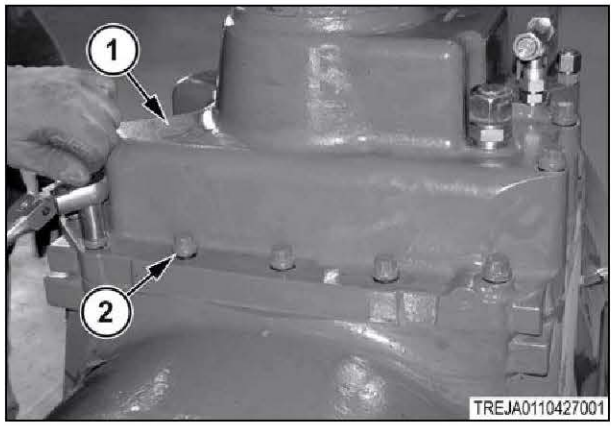

Fig. 483

10. Remove the bolt (1) and remove the correct lifting equipment (2).

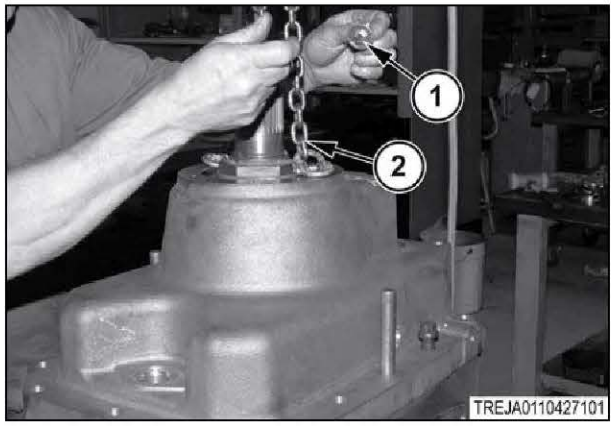

Fig. 484

11. Install the deflector (1) with the new seals installed using the bolts (2).

Tighten the bolts to 33 Nm (24 lbf ft).

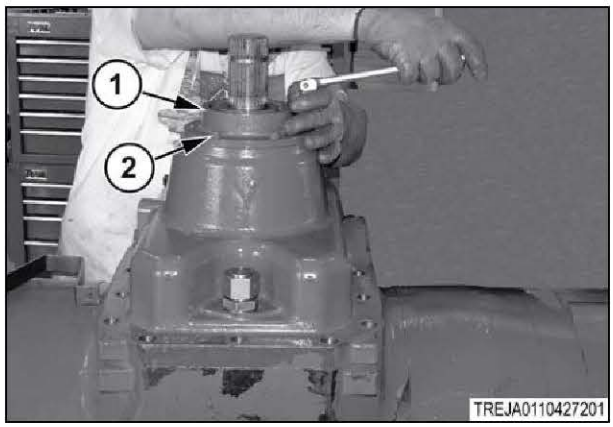

Fig. 485

3.8.17 Install the differential studs

Procedure

Apply the correct thread locking compound or equivalent to the threads of the studs (1) before tightening.

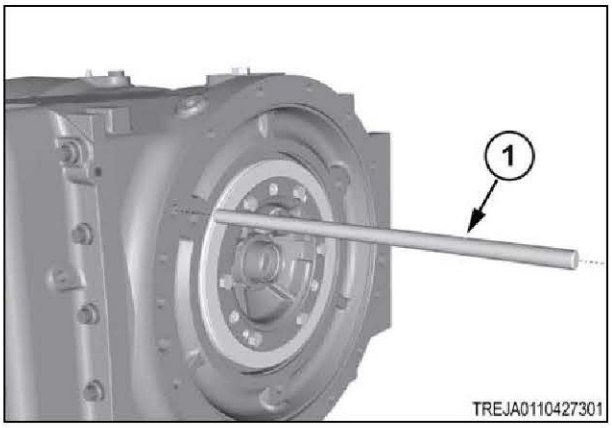

Fig. 486

3.9 Axle maintenance

3.9.1 Replace the axle lubrication filter

Procedure

1. Remove the axle lubrication filter (1) from the filter head (2).
2. Put the new axle lubrication filter into the filter head and tighten.
3. Change the axle lubrication filter at the same time as the transmission fluid.
4. Change the transmission fluid at the initial 250 hours and every 1,000 hours after.

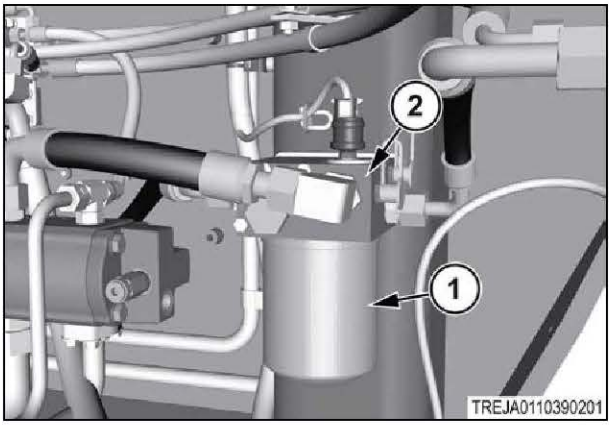

Fig. 487

3.9.2 Remove the cassette seal

Procedure

1. Have the correct container available for all fluid removal.
2. Remove the wheels and the hubs to get access to the cassette seal.

   NOTE:
   It is not necessary to remove the axle from the machine to replace the cassette seal.
3. Remove the drain plugs from the bottom side of the final drive to drain the final drive and the service brakes.
4. Drain approximately 18.9 to 22.7 L (5 to 6 gallons). Install the drain plugs.
5. Use a seal removal tool to remove the cassette seal (1).

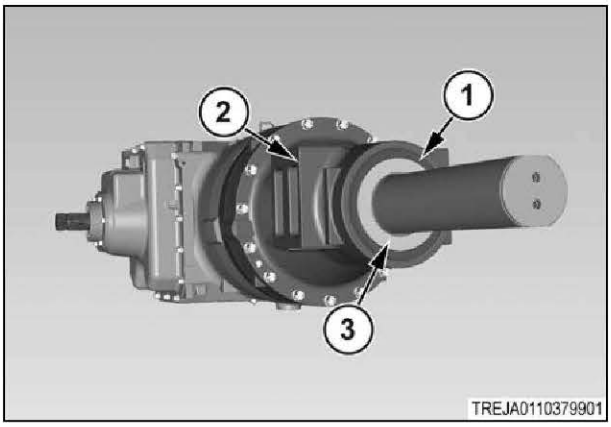

Fig. 488

6. Make sure not to make any marks on the final drive (2) or the bushing (3).

Related Links

Remove the outside wheel page 14-3
Remove the center wheel page 14-4
Remove the inside wheel page 14-5

3.9.3 Install the cassette seal

Special tools

Description	Part number	Vendor	Where used	Mandatory
Seal installation tool	AG332301	K-Line	Drive train system	Mandatory

Procedure

1. Clean the groove of the seal on the final drive (1) and the bushing (2).

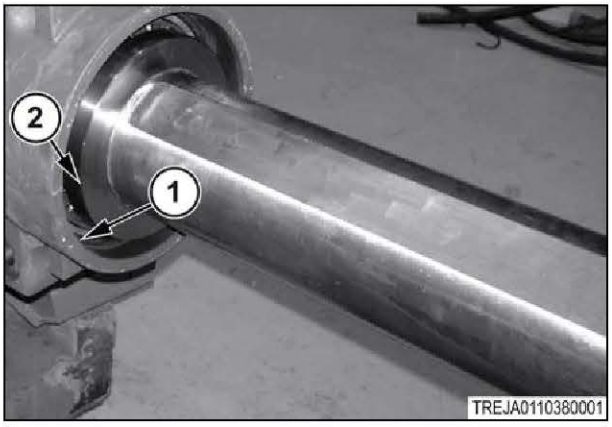

Fig. 489

2. Apply the correct thread locking compound (1) to the external diameter of the seal (2).
3. Lubricate the internal diameter with transmission oil.

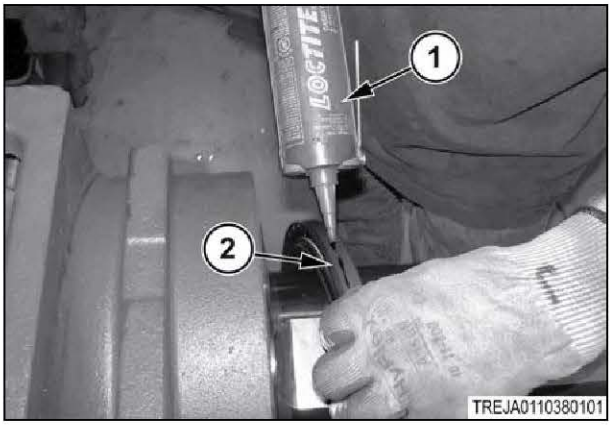

Fig. 490

4. Install the cassette seal (1) to the final drive.

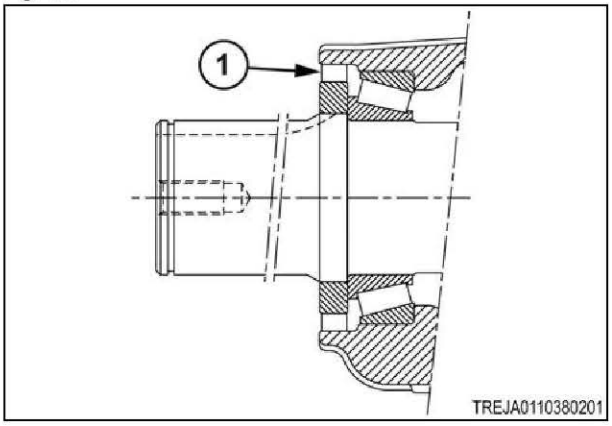

Fig. 491

5. Use the seal installation tool (1) to get the correct depth of the seal installation.

   Seal installation tool special tool part number AG332301.

6. Use the seal installation tool (1) to keep the alignment of the inner and the outer seal members.

7. Remove any remaining thread locking compound.

8. Install the wheel assembly.

9. Fill the transmission to the correct level with oil.

   Oil from the transmission will automatically fill the axle to the correct level.

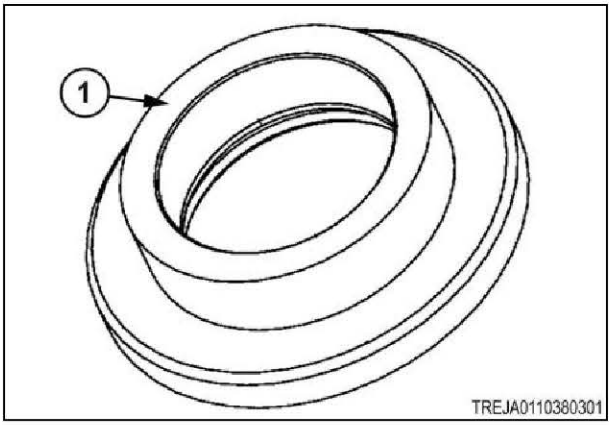

Fig. 492

10. Road test the machine and check the seal for oil leaks.

Related Links

Install the inside wheel page 14-8
Install the center wheel page 14-11
Install the outside wheel page 14-13
Lubricant viscosities page 1-18
Do a check of the power train fluid level - daily page 6-55

3.10 Axle testing and adjusting

3.10.1 Air test the axle

Special tools

Description	Part number	Vendor	Where used	Mandatory
Axle pressure tool	332316	K-Line	Drive train system	Mandatory

Procedure

1. Check the axle for air leaks after repairing the axle.
2. Remove the plug (1) from the top of the differential.

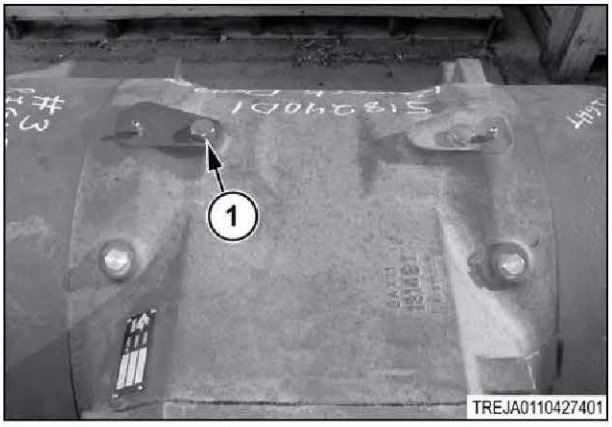

Fig. 493

3. Install the axle pressure tool (1) to the port of the removed plug.

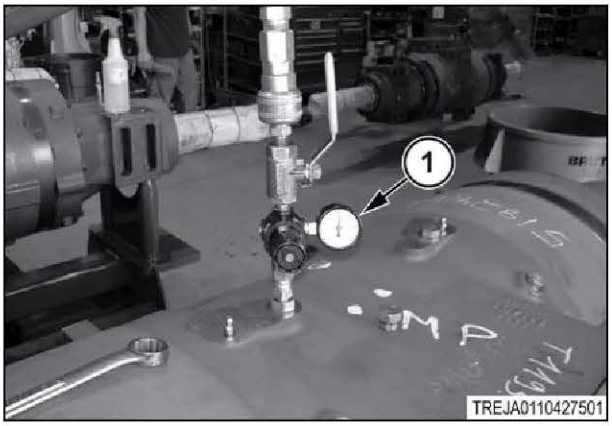

Fig. 494

4. Make sure valve is closed on the axle pressure tool (1).
5. Install the air line (2) to the axle pressure tool (1).
6. Supply 34 to 48 kPa (5 to 7 psi) of air pressure to the axle.

   IMPORTANT:
   Do not supply more than the specified amount air pressure to the axle. The seals can be damaged.

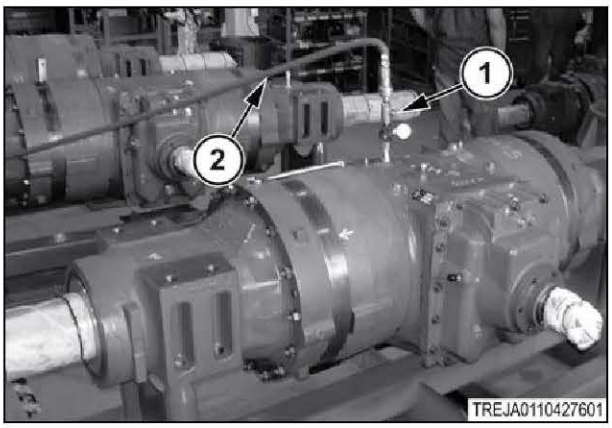

Fig. 495

7. Spray the seams of the axle with water (1) mixed with soap.
8. Check for air bubbles.
9. Disconnect the air line (2) when complete and remove the axle pressure tool (3).

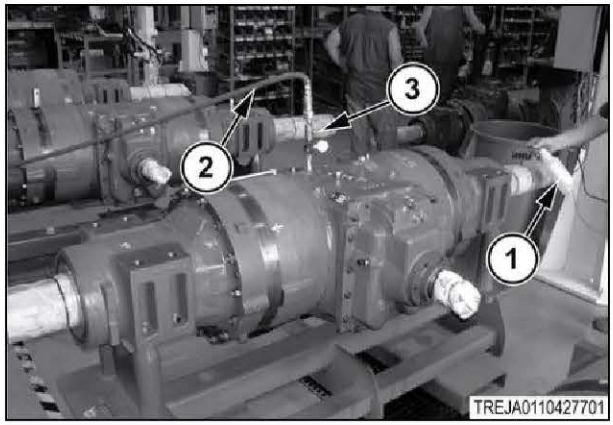

Fig. 496

10. Install the plug (1) to the top of the differential.

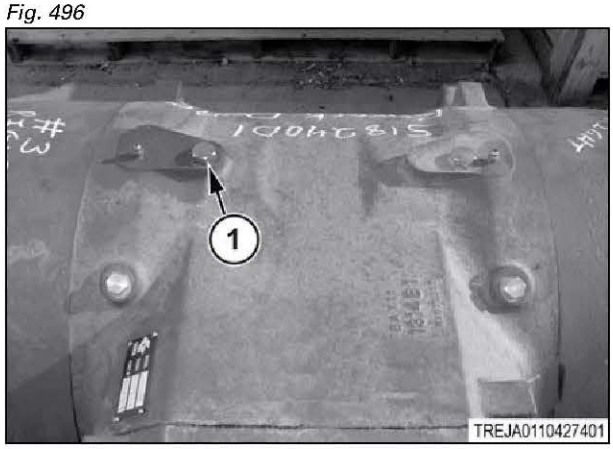

Fig. 497

3.10.2 Set the bevel gear position

Procedure

1. Put the differential support on the table with the bearing installed.
2. Put the differential assembly on the differential support as shown.
3. Rotate the differential a minimum of ten revolutions to install the bearing.
4. Measure dimension (A) as shown below with a straightedge and a caliper or with another correct measuring method.
   - Shim Thickness = (60.314 mm-A) + 0.064 mm-V ((2.375 in-A) + 0.0025 in-V)
   - V = Machining Variation (Value is stamped on OD of bevel gear)
   - Shim stack thickness (1) must be within 0.04 mm (0.0016 in) of calculated value for shim thickness.

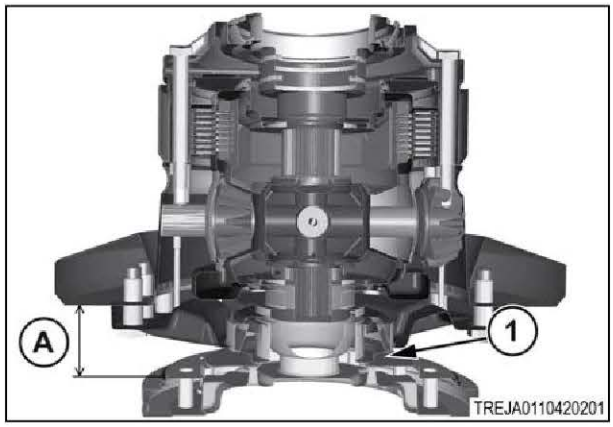

Fig. 498

3.10.3 Set the differential bearing preload

IMPORTANT:
If the center housing, the bevel gear, the taper roller bearings, and the carriers have been replaced, install the shims for the differential unit.
Make sure the shim(s) used for the backlash have been installed in the half-housing and the cup.

Procedure

1. Install the bevel gear side differential support (1) with the shims determined in the setting bevel gear position procedure.

   See the information for setting bevel gear position.

   Do not lubricate the bearing.

2. Install the differential lock side differential support (2) with no shims under the bearing cup.

   Do not lubricate the bearing.

3. Rotate the differential assembly ten revolutions to make sure the bearing is seated.

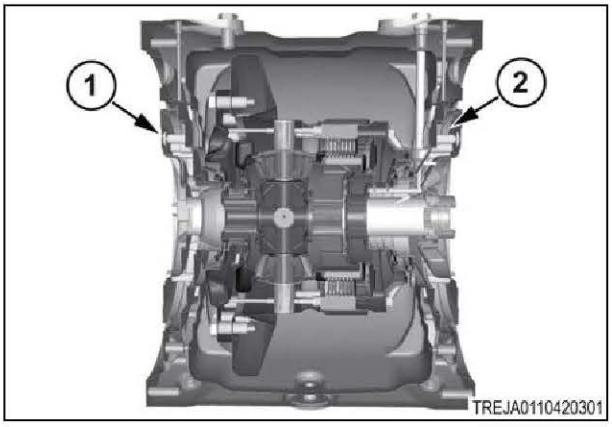

Fig. 499

4. Set up a dial indicator to measure against the rear side of the bevel gear.
5. Push the differential in the direction of the bevel gear and then zero the dial indicator.
6. Push the differential to the opposite direction and read the axial play from the dial indicator.
7. Record this dimension as (L).
8. Select a shim pack that fits between these two values:
   - Shim Pack min = L+0.05 mm (0.002 in)
   - Shim Pack max = L+0.15 mm (0.006 in)
9. Install the shim pack behind the bearing cup and assemble the differential.

3.10.4 Do a test of the service brake

Do this procedure directly after the carrier installation.

Procedure

1. Install the pins (1) and the piston (2) on the left-hand side of the differential.

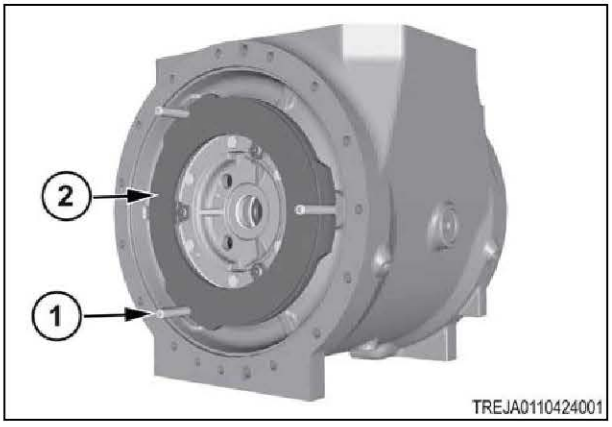

Fig. 500

2. Install the pins (1) and the piston (2) on the right-hand side of differential.

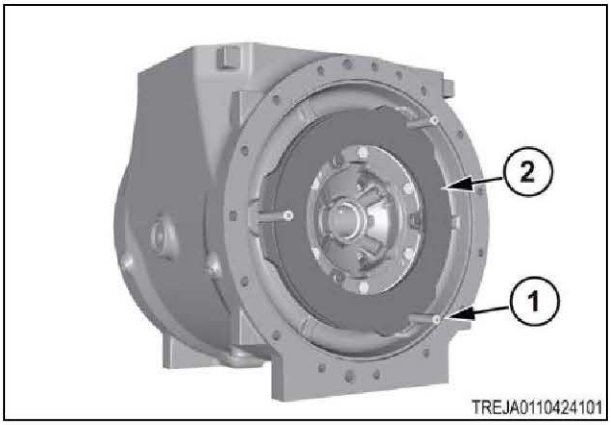

Fig. 501

3. Install the air line (1) to the port for the service brake.

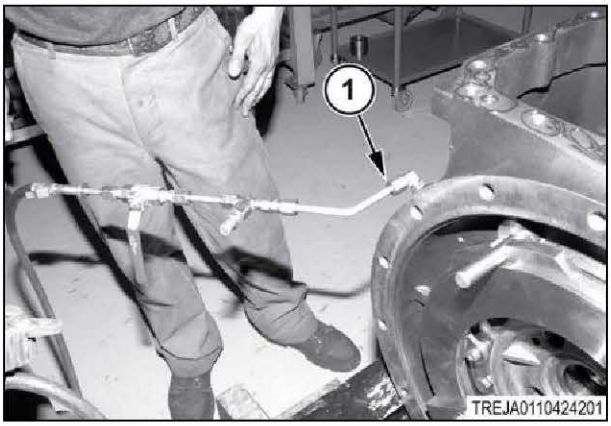

Fig. 502

4. Fasten a bar to the brake discs. (1).

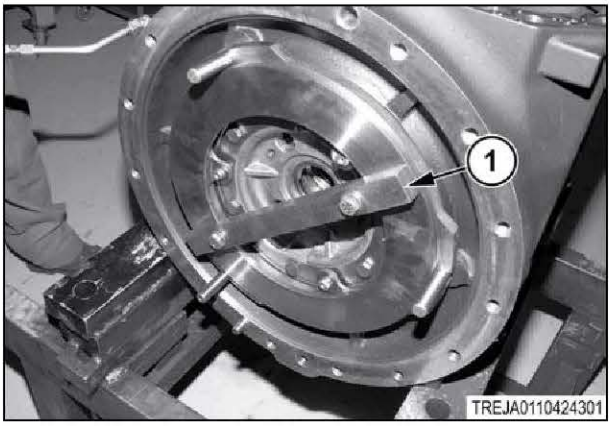

Fig. 503

5. Install a pressure gauge (1) to the air line.

6. Supply approximately 483 kPa (70 psi) of air pressure to the service brakes.

7. Check if the brakes will hold pressure.

Replace the seals in the carrier if there is a loss of pressure.

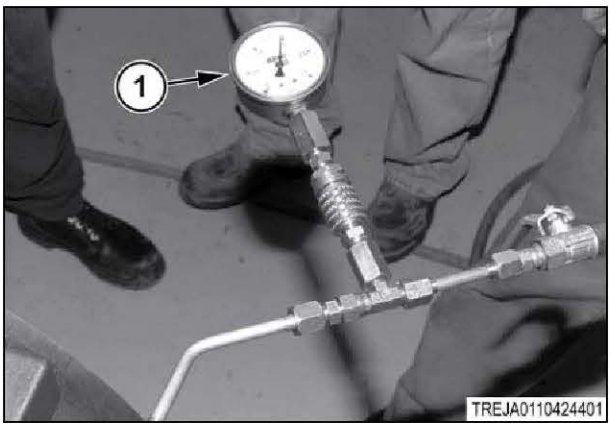

Fig. 504

3.10.5 Set the pinion position

IMPORTANT:
It is necessary to adjust the position of the drive pinion before the installation of shims for the taper roller bearings.
Do not change this adjustment without adjusting the installation of shims to the drive pinion bearings.

Procedure

1. Install the drive pinion (1) into the pinion housing (2).

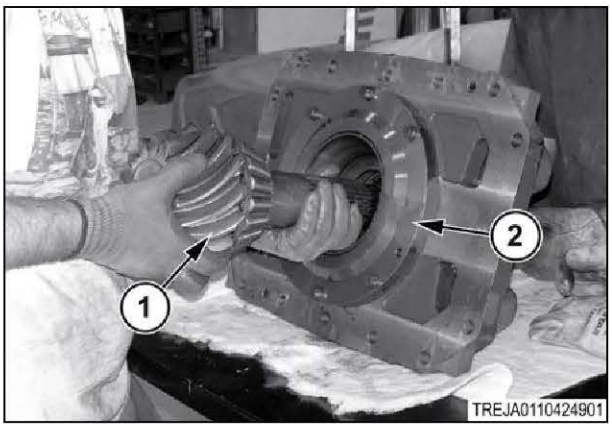

Fig. 505

2. Load axially (1) to 100 daN (225 lbf).
3. Rotate under load a minimum of ten turns to make sure the bearing is seated before taking the measurement.

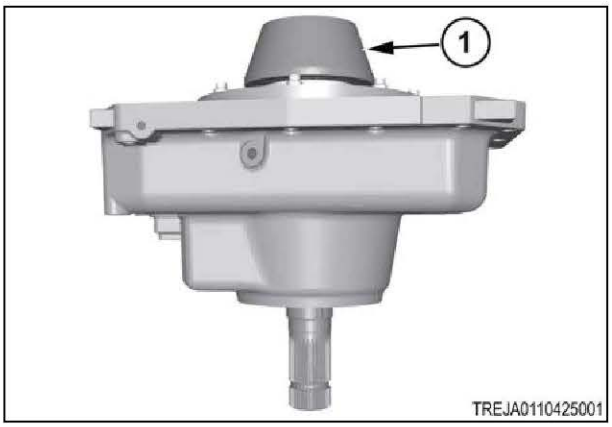

Fig. 506

4. Measure dimension (Y).
5. Use the following formula to determine the shim pack thickness: S = 43-Y-V
   - S = Shim Pack Thickness
   - Y = Distance Measured
   - V = Variation Value Engraved in End of Pinion Shaft
6. Add the shims behind the bearing cup (1) per the (S) dimension found using the formula.

   NOTE:
   The (S) dimension can be within the range of plus or minus 0.03 mm (0.001181099 in).

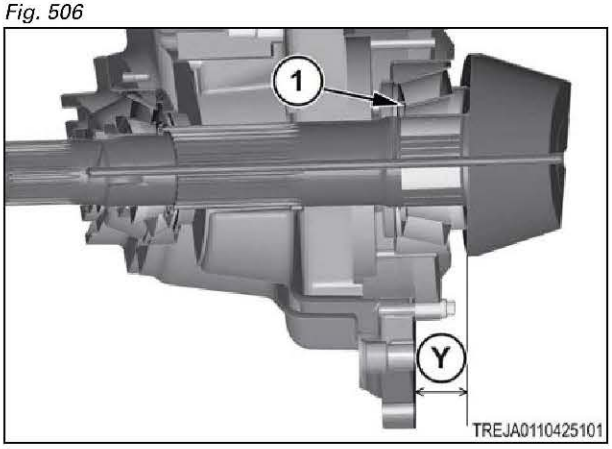

Fig. 507

7. Remove the drive pinion from the pinion housing.
8. Install the determined shim pack (1) to the drive pinion (2).
9. Install the drive pinion to the pinion housing.

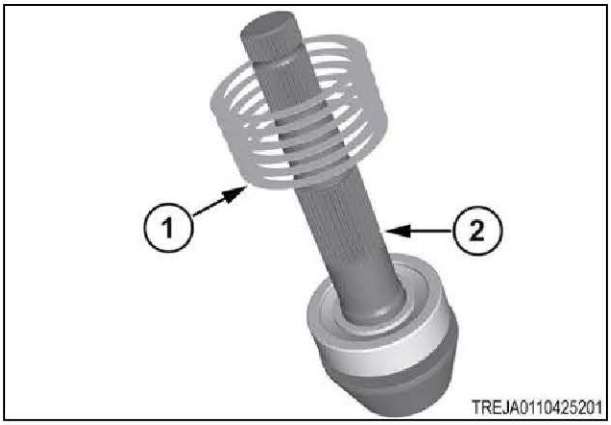

Fig. 508

3.10.6 Set the pinion bearing preload

Special tools

Description	Part number	Vendor	Where used	Mandatory
Input yoke wrench plate	AG332284	K-Line	Drive train system	Mandatory
Pinion nut wrench	AG332302	K-Line	Drive train system	Mandatory

Procedure

1. Install the spacer and enough shims (1) to the drive pinion (2) to have end play in the assembly.
2. Record the shim pack thickness (S).

   IMPORTANT:
   The park brake discs must not be installed for this step.

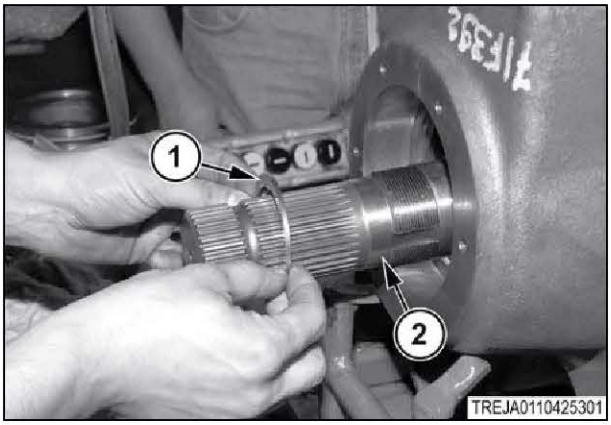

Fig. 509

3. Install the bearing (1) onto the drive pinion (2).

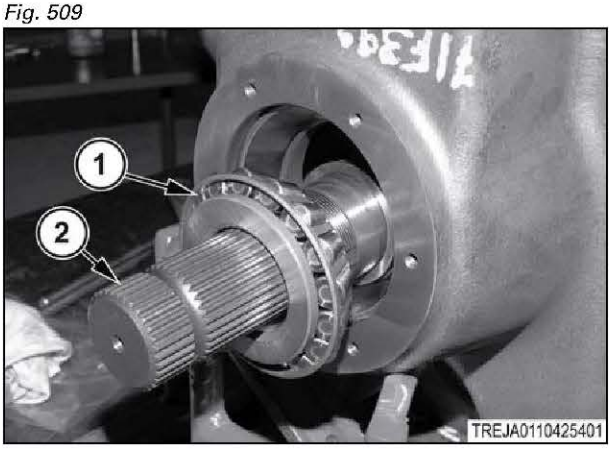

Fig. 510

4. Install the pinion nut (1) onto the drive pinion (2).

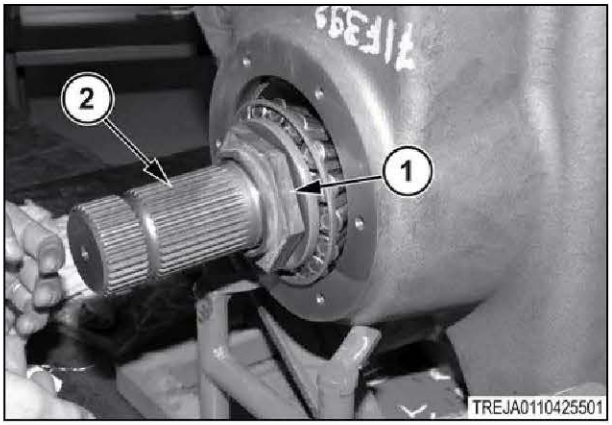

Fig. 511

5. Install the yoke(1) onto the drive pinion.

Fig. 512

6. Fasten the input yoke wrench plate to the input yoke to hold the pinion shaft while tightening the pinion nut.

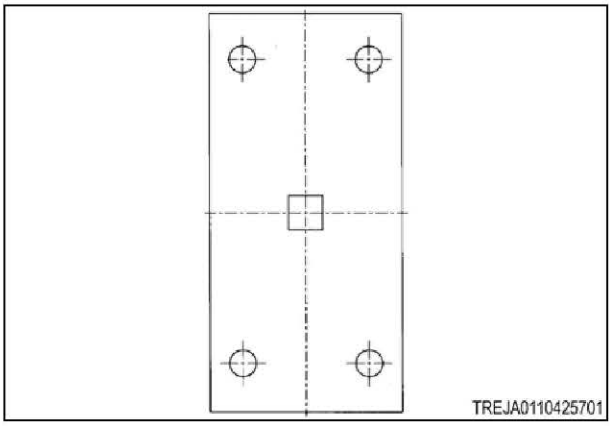

Fig. 513

7. Use the pinion nut wrench to tighten the pinion nut.

Tighten the pinion nut to 250 Nm (184 lbf ft).

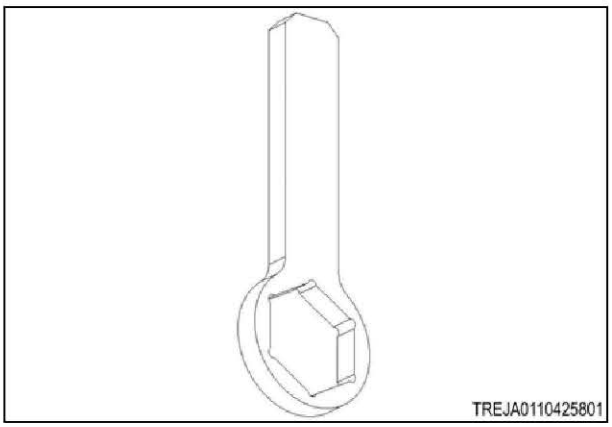

Fig. 514

8. Load axially (1) to 100 daN (225 lbf).

9. Rotate under load a minimum of ten turns to make sure the bearing is seated before taking the measurement.

10. Set the dial indicator at the opposite end of the pinion shaft and then zero the dial indicator.

11. Load axially (2) to 100 daN (225 lbf).

12. Rotate under load a minimum of ten turns to make sure the bearing is seated.

13. Record axial play (A).

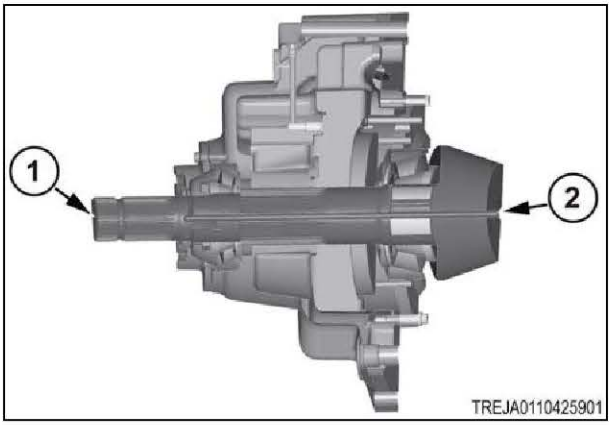

Fig. 515

14. Calculate the shim pack thickness:
    - S-A-P max = Max Shim Pack Thickness
    - S-A-P min = Min Shim Pack Thickness
    - P max = 0.02 mm (0.0008 in)
    - P min = 0.10 mm (0.004 in)

15. Install the shim pack to the thickness determined.

    Tighten the nut to 250 Nm (184 lbf ft).

16. Check the rolling torque.

    The rolling torque must be 2 to 7 Nm (18 to 62 lbf in).

3.11 Axle comnponent specifications

3.11.1 Tri-section pump

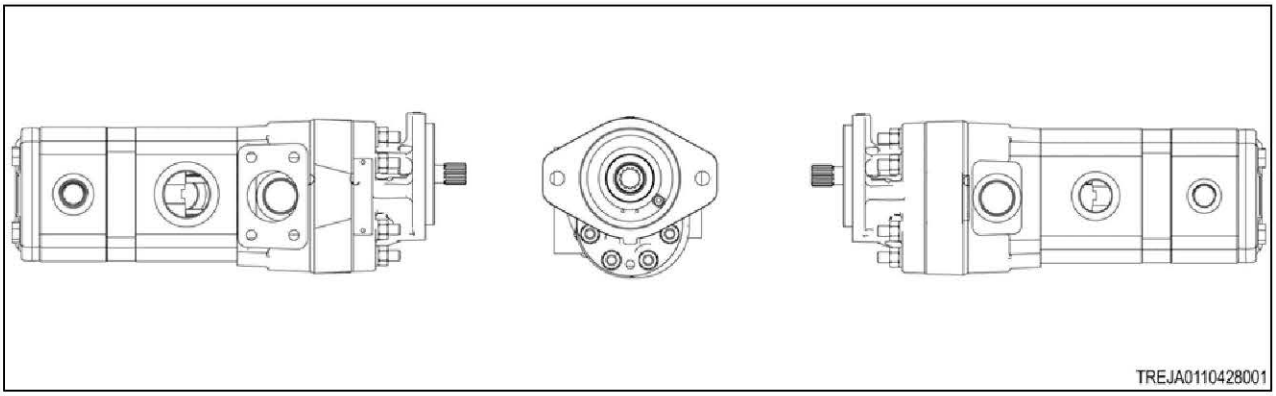

Fig. 516

General	MT900 series
Model	G201509 triple pump
Mount	wet
Mount	SAE b 2 bolt
Seals	Buna
Design	Sealed between section
Options	0.0465 orifice bleed into pilot

Pump shaft	MT900 series
Drive shaft	SAE b 13 tooth spline
Shaft seals	Double
Rotation	Clockwise

1st pump section	MT900 series
Inlet port	2.00 split flange, m12 X 1.75
Displacement per revolution	62 cc (3.77 cu in)
Outlet port	1-5/16 - 12 SAE #16

2nd pump section	MT900 series
Inlet port	1-7/8 - 12 SAE #24
Displacement per revolution	48 cc (2.94 cu in)
Outlet port	1-5/16 - 12 SAE #16

3rd pump section	MT900 series
Inlet port	1-1/16 - 12 SAE #12
Displacement per revolution	16 cc (0.98 cu in)
Outlet port	7/8 - 14 SAE #10

3.11.2 Axle lubrication filter

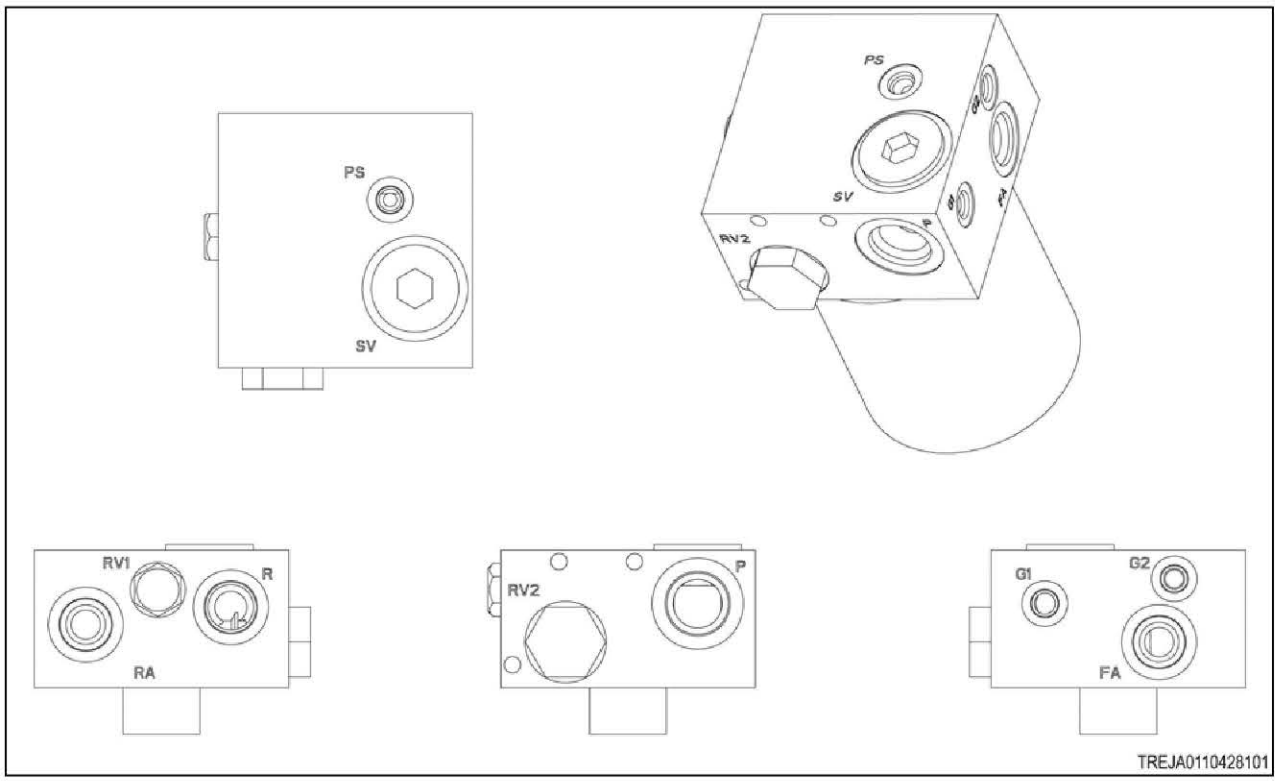

Fig. 517

Filter specifications	MT900 series
Type	Spin on
Size	25 micron absolute

3.11.3 Axle lubrication pressure switch

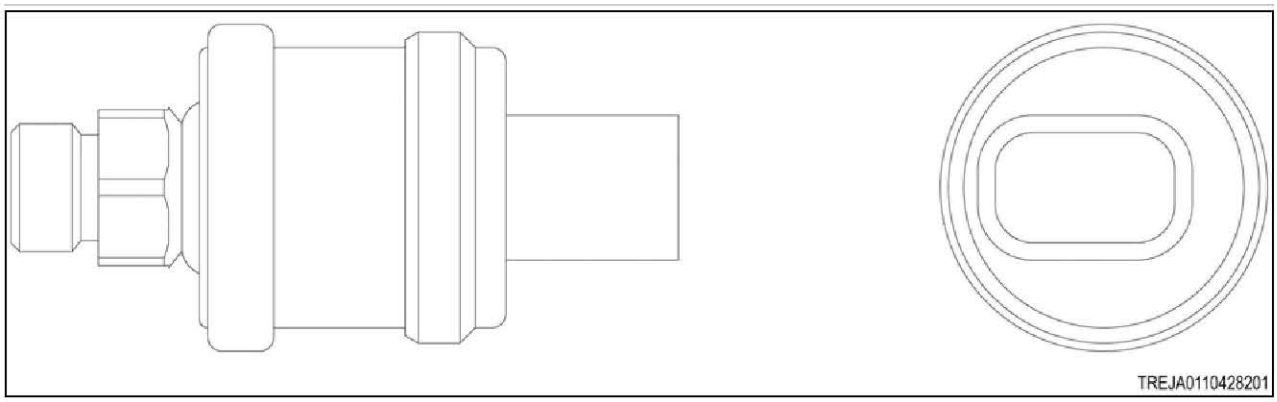

Fig. 518

Specifications	MT900 Series
Single circuit	Yes
Normally open pressure switch	Yes
Opening adjustment range	41 to 69 kPa (6 to 10 psi)