6 Drivetrain system

6.1 Transmission system

6.1.1 Transmission introduction

The machine has a power shift transmission. The transmission has 16 forward gears and 4 reverse gears.

The transmission uses nine individual clutch packs on five different transmission shafts. Each clutch pack is controlled by a modulating valve. The transmission module controls the modulating valves. The modulating valves will modulate oil pressure and oil flow to give smooth shifting between gears.

6.1.2 Transmission system

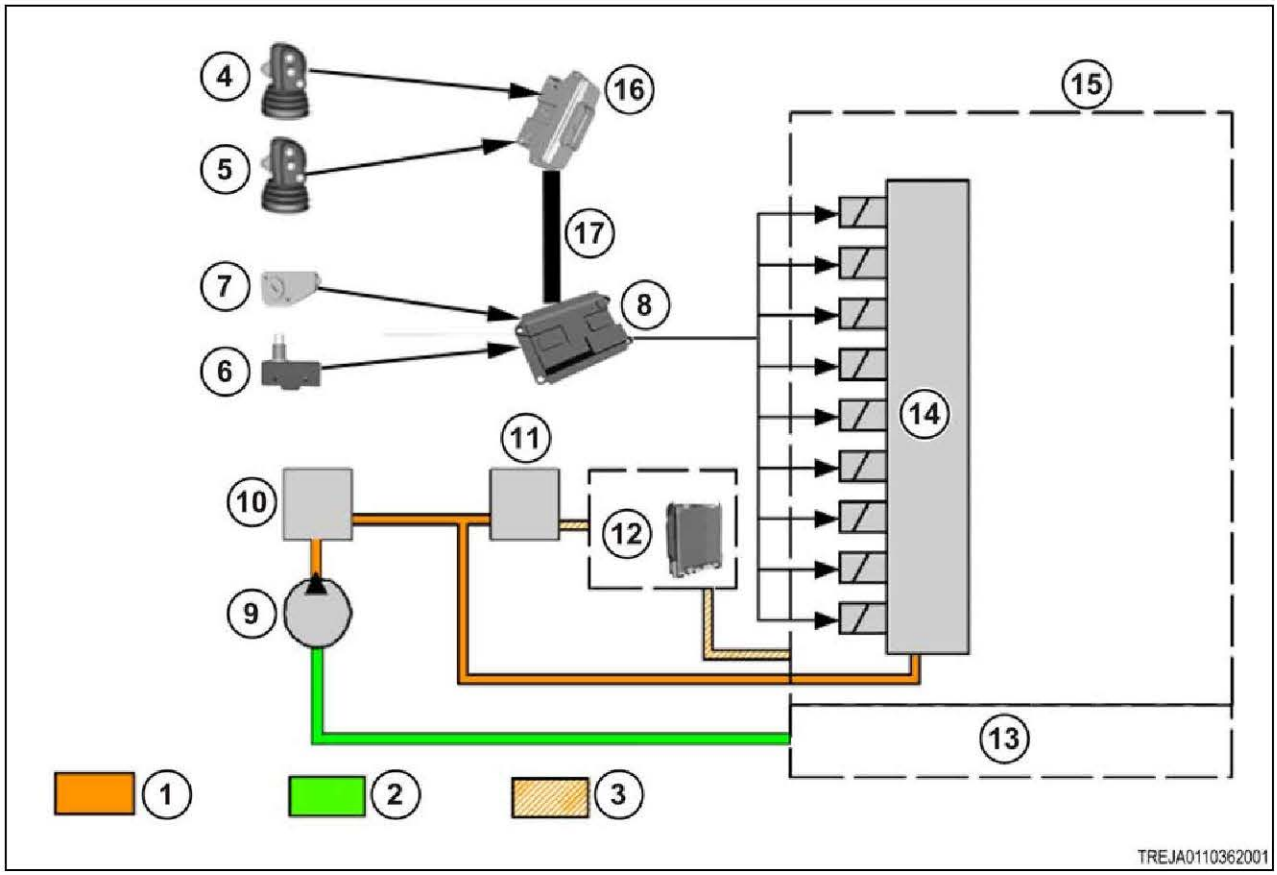

Fig. 1

1 Charge pressure
2 Sump
3 Lubrication pressure
4 One-Touch switch
5 Transmission control lever
6 Inching pedal (switch)
7 Inching pedal (position sensor)
8 Transmission module
9 Tri-section pump
10 Transmission filter
11 Charge pressure relief valve
12 Oil cooler
13 Transmission sump
14 Modulating valves
15 Transmission
16 Module
17 Controller area network (CAN)

The operator can do a transmission function by using the following controls:

- One-Touch switch (4)
- Transmission control lever (5)
- Inching pedal (switch) (6)

The controls will send a signal to the transmission module (8). The transmission module will receive the signals and use the parameters that are set in the tractor management center (TMC).

The transmission module will energize the modulating valves (14) on the transmission (15).

The transmission sump (13) supplies the tri-section pump (9) with oil. The oil goes through the transmission filter (10). The oil then goes to the charge pressure relief valve (11). The charge pressure relief valve controls the oil pressure to 2100 kPa (305 psi). All the additional oil goes through the oil cooler (12). The oil then goes to the transmission to lubricate the clutches.

6.1.3 Transmission hydraulic system

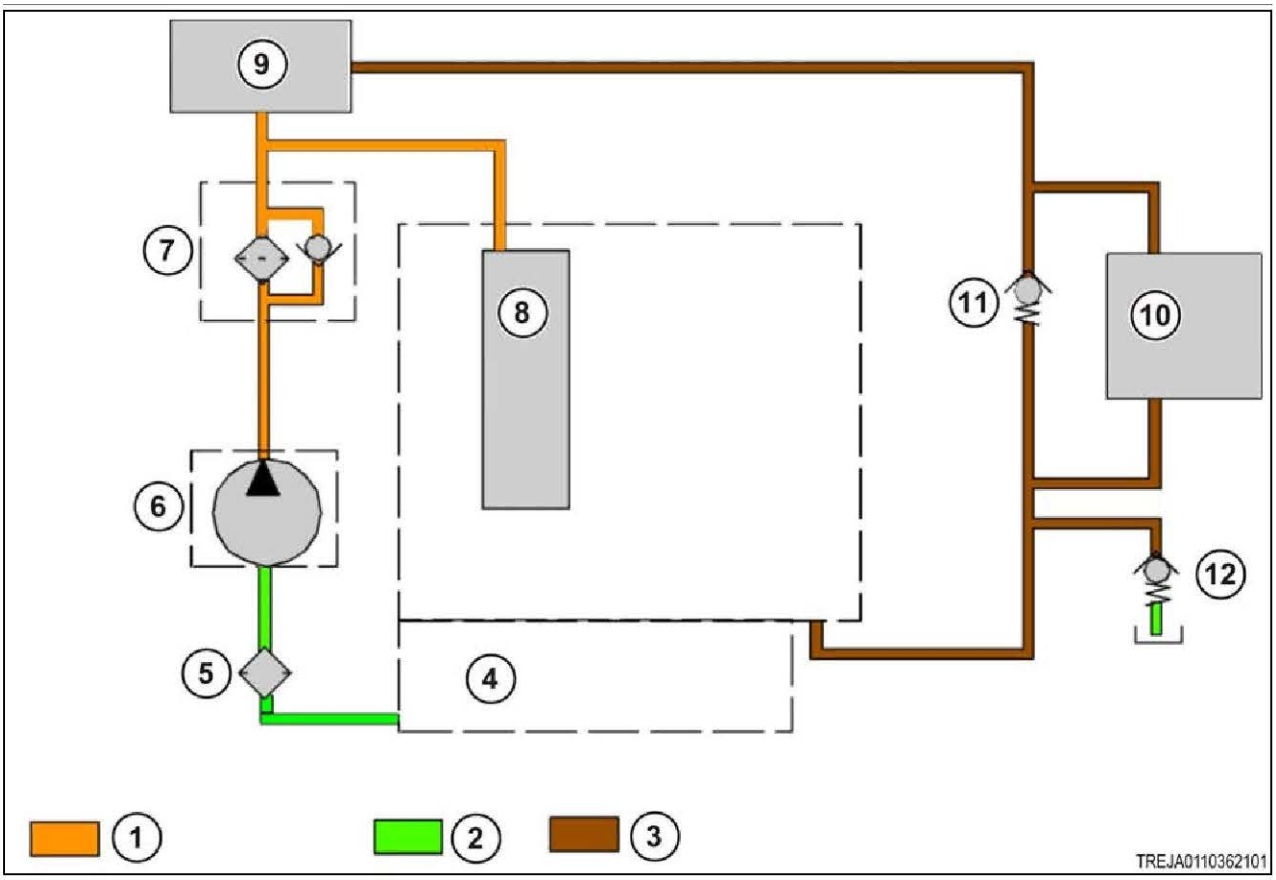

Fig. 2

1 Charge pressure
2 Sump supply
3 Lubrication pressure
4 Transmission sump
5 Suction screen
6 Tri-section pump
7 Transmission filter
8 Modulating valves
9 Charge pressure relief valve
10 Transmission oil cooler
11 Transmission oil cooler bypass valve
12 Transmission lubrication relief valve

Oil from the transmission sump (4) is pulled through the suction screen (5) by the first section of the tri-section pump (6). The suction screen is a 200 micron filter. The transmission oil filter (7) filters the oil from the first section of the charge pump.

The filtered oil is supplied to the following valves:

- Modulating valves (8)
- Charge pressure relief valve (9)

When the the modulating valves are energized, oil flows to the transmission clutches. When the modulating valves are de-energized, oil flows from the charge pressure relief valve to the sump.

The charge pressure relief valve regulates pressure in the transmission hydraulic system to a nominal pressure of 2100 kPa (305 psi).

Additional oil flow from the charge pressure relief valve flows to the implement oil cooler (10). The transmission oil cooler bypass valve (11) will open if there is a 520 kPa (75 psi) pressure drop across the transmission oil cooler. In normal conditions, the transmission oil cooler bypass valve will remain closed. The transmission oil cooler bypass valve can open if there is restriction in the oil cooler or if the oil is very cold.

Oil from the transmission oil cooler flows to the transmission to lubricate the clutches. The transmission lubrication relief valve (12) regulates the lubrication oil pressure to a maximum of 275 kPa (40 psi).

6.1.4 Transmission electrical control system

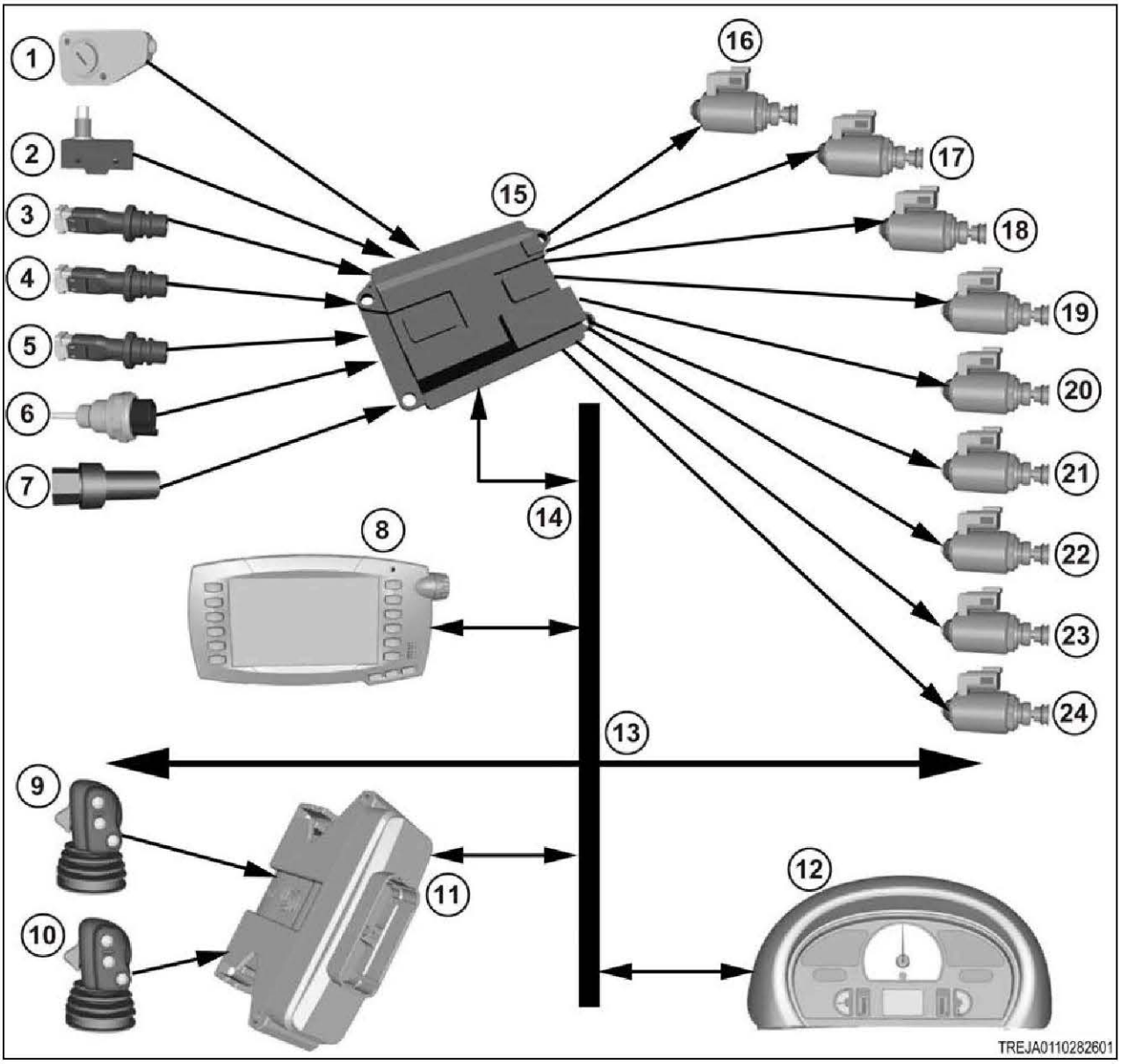

Fig. 3

Transmission electrical system components:

1 Inching pedal position sensor
2 Inching pedal switch
3 Transmission input speed sensor
4 Transmission output speed sensor
5 Transmission output speed sensor
6 Temperature sensor (hydraulic oil)
7 Pressure sensor (charge)
8 Tractor management center (TMC)
9 Transmission control lever
10 One touch switch
11 Armrest module
12 Dash panel cluster
13 To service connector and optional modules
14 Controller area network (CAN) data link
15 Transmission module

16 Modulating valve (transmission No. 1 clutch C)
17 Modulating valve (transmission No. 2 clutch D)
18 Modulating valve (transmission No. 3 clutch E)
19 Modulating valve (transmission No. 4 clutch F)
20 Modulating valve (transmission No. 5 clutch G)
21 Modulating valve (transmission No. 6 clutch B)
22 Modulating valve (transmission No. 7 clutch H)
23 Modulating valve (transmission No. 8 clutch J)
24 Modulating valve (transmission No. 9 clutch A)

The armrest module (11) signals the transmission module (15) the desired function. The transmission module controls the solenoid valves (16-24) for the transmission.

The CAN data link (14) is a serial communication bus that is used to communicate with the following components:

- Engine module
- Transmission module
- Armrest module
- Tractor management center (TMC)
- Dash panel cluster
- Optional modules

The transmission control lever (9) sends a PWM signal to the armrest module (11). The armrest module process the signal to determine the position of the transmission control lever.

The transmission control lever has four positions:

- Park
- Neutral
- Forward
- Reverse

When the transmission control lever is in the park position, a park brake sensor signals the armrest module.

The shift lever has three push button switches. The switches control upshift, downshift, and One touch mode. The armrest module receives signals from the switches. The armrest module signals the transmission module to shift.

The speed sensors (3-5), the temperature sensor (6), and the pressure sensor (7) send signals to the transmission module. The transmission module uses the signals to monitor the conditions of the transmission.

The dash panel cluster (12) and the TMC (8) show the current gear and the selected gear.

6.1.5 Electronic controls

The armrest module receives signals from the input controls. The armrest module sends signals to the transmission module to control the transmission operations.

The transmission module controls the solenoids on the modulating valves. The tractor management center (TMC) and the dash cluster shows the current gear and the selected gear.

6.1.6 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

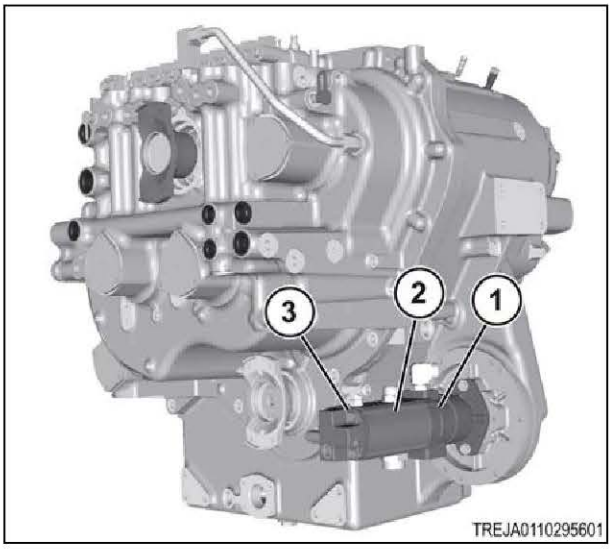

Fig. 4

6.1.7 Transmission charge filter

The transmission charge filter protects the transmission hydraulic system from damaging contamination. The transmission charge filter will clean particles larger than 7.5 microns from the charge oil.

6.1.8 Charge pressure relief valve

The charge pressure relief valve controls the oil pressure to 2100 kPa (305 psi).

6.1.9 Transmission modulating valves

The transmission is equipped with nine modulating valves. The modulating valves are controlled by electronics. The modulating valve supplies oil to the corresponding transmission clutch.

6.2 Transmission

6.2.1 Remove the transmission

Procedure

1. Park the machine on a solid, level surface. Stop the engine, apply the park brake, and take the key with you.

2. Turn the battery disconnect switch to the off position and remove the battery disconnect switch key.

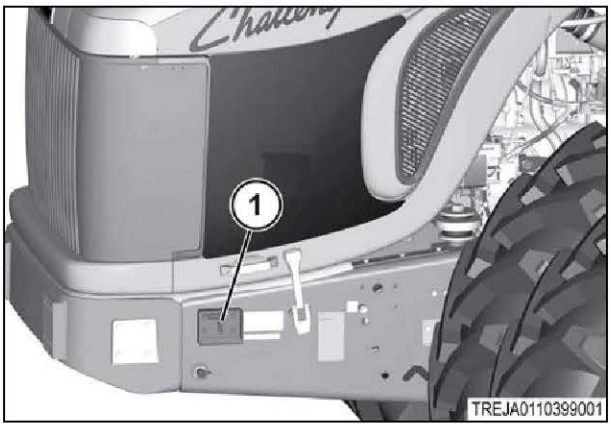

Fig. 5

3. Remove the cab.

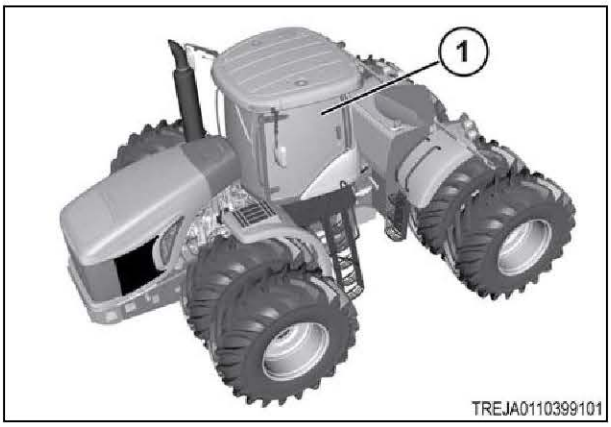

Fig. 6

4. If the machine is equipped with a transmission guard, remove bolts for the transmission guard and remove the transmission guard.

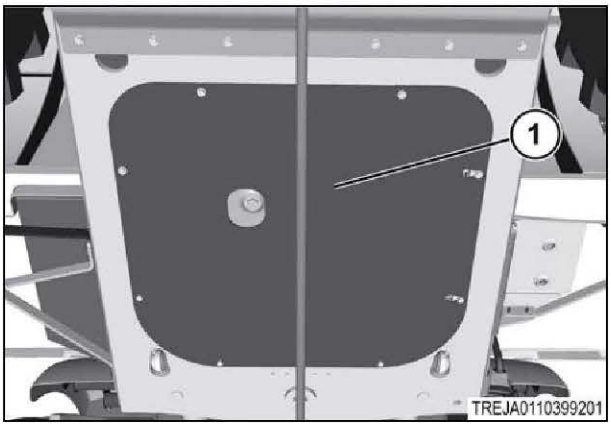

Fig. 7

5. Remove the hydraulic oil.

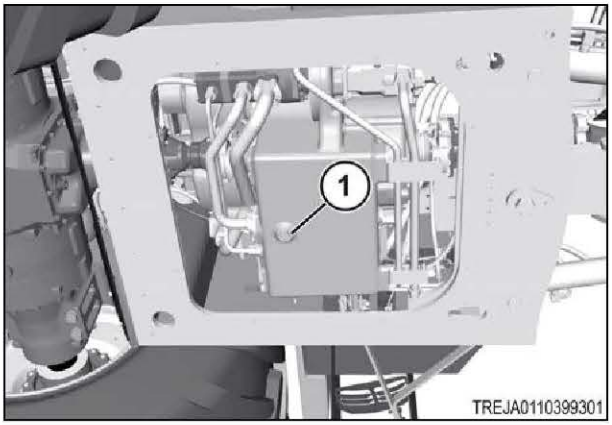

Fig. 8

6. Remove the rear articulation drive shaft.

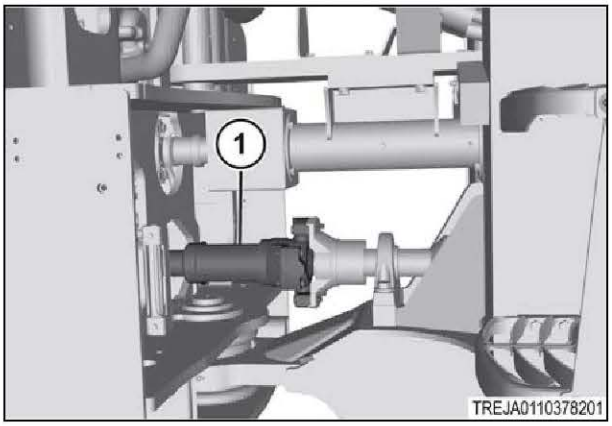

Fig. 9

7. Remove the front drive shaft.

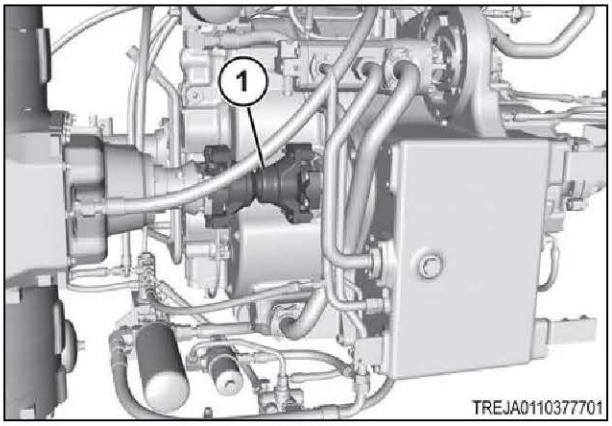

Fig. 10

8. Remove the input drive shaft.

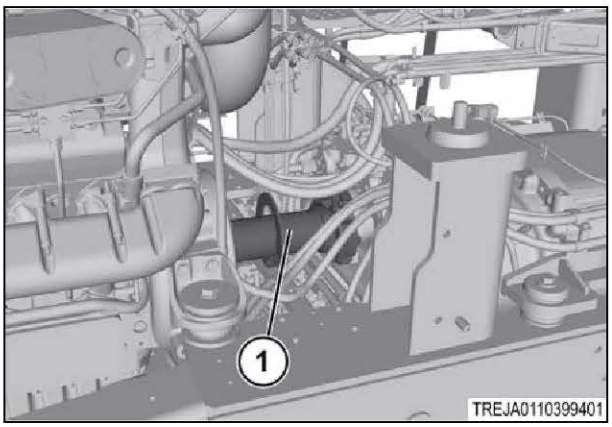

Fig. 11

9. Disconnect the transmission wiring harness (1) from the main wire harness.

10. Disconnect the main wire harness (2) at the splice and fasten the harness out of the way.

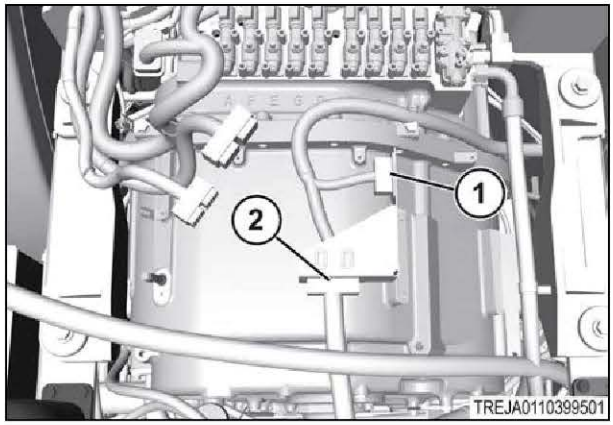

Fig. 12

11. Remove the implement hose (1) from the hydraulic reservoir (2).

12. Remove the transmission supply hose (3) from the transmission.

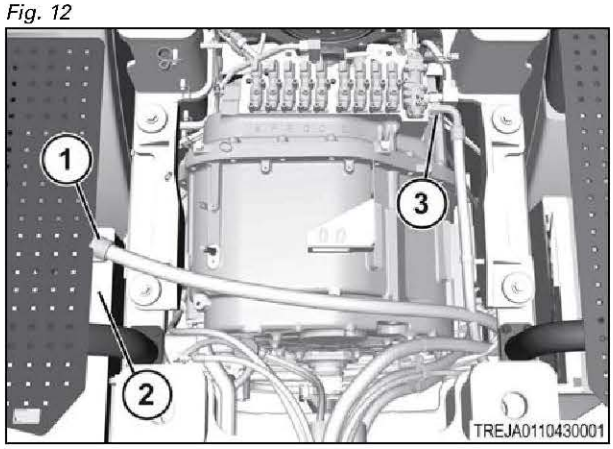

Fig. 13

13. Remove the transmission cooler supply hose (1).

14. Remove the transmission cooler return hose (2).

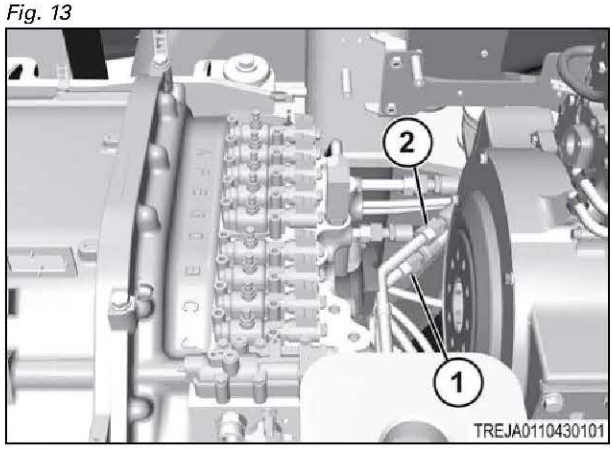

Fig. 14

15. Remove the brake charge supply hose (1).

16. Remove the brake charge return hose (2).

17. Remove the brake return hose (3).

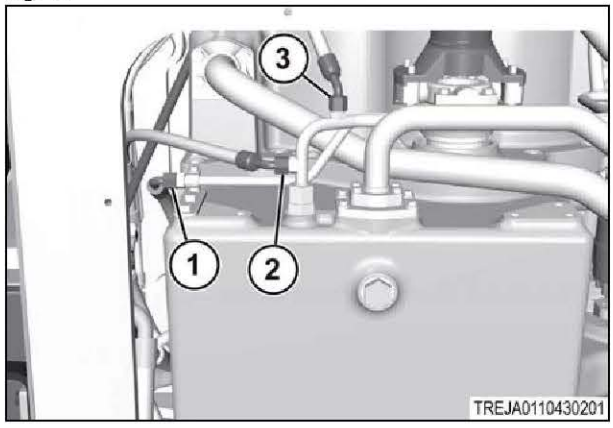

Fig. 15

18. Remove the axle lubrication supply hose (1).

19. Remove the front axle lubrication return hose (2).

20. Remove the park brake return hose (3).

21. Remove the tow override pilot hose (4).

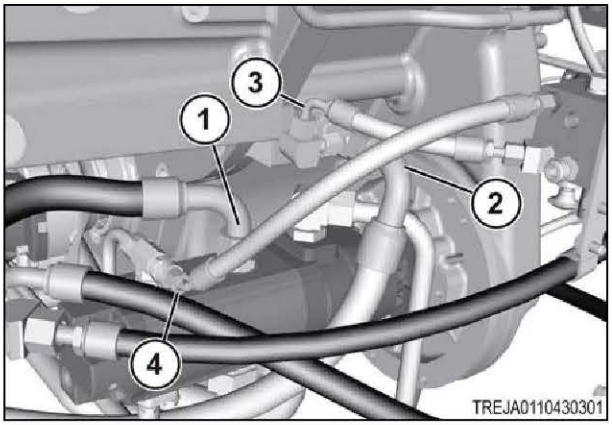

Fig. 16

22. Remove the differential lock return hose (1).

23. Remove the rear axle lubrication return hose (2).

24. Remove the transmission filter supply hose (3).

25. Remove the priority supply hose (4).

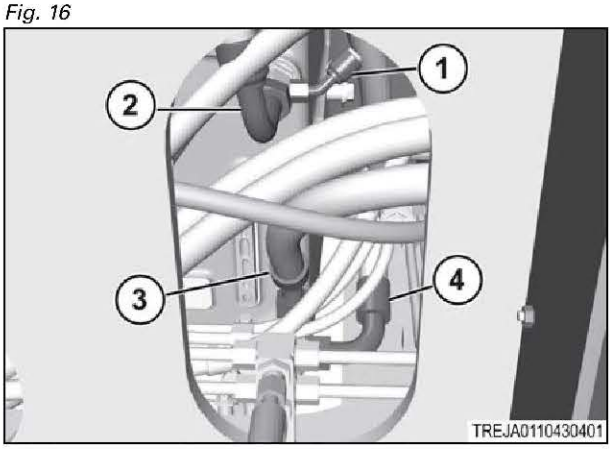

Fig. 17

26. Remove the charge hose (1).

27. Remove the pump case drain hose (2).

28. Remove the pump load sense hose (3).

29. Remove the supply reference hose (4).

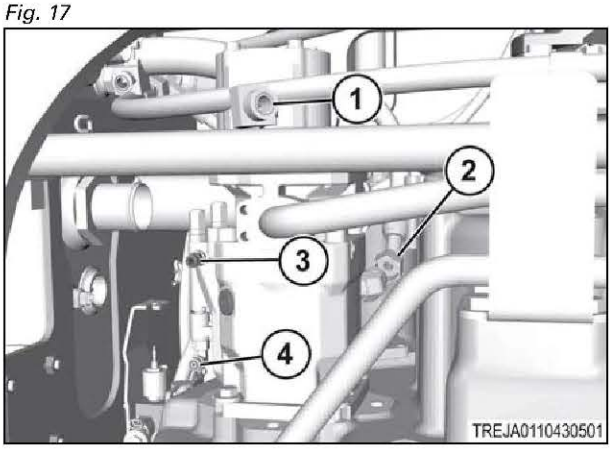

Fig. 18

30. Loosen the hose clamps (1) and remove the hydraulic hoses (2) connecting the transmission to the hydraulic reservoir.

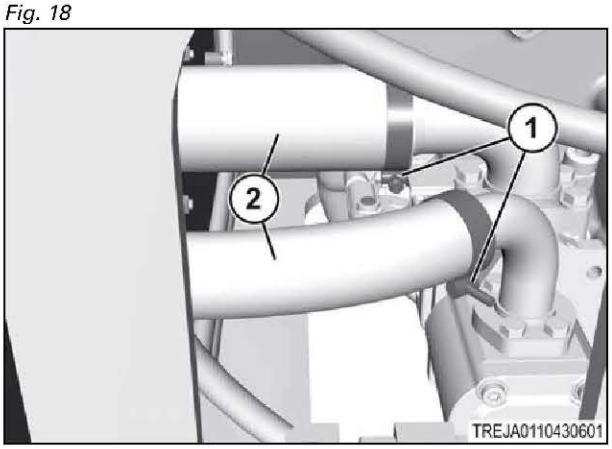

Fig. 19

31. Remove the hoses (1,2) connecting the transmission to the sight gauge.

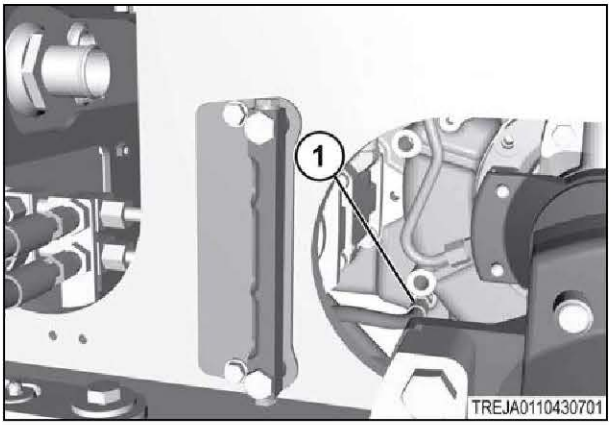

Fig. 20

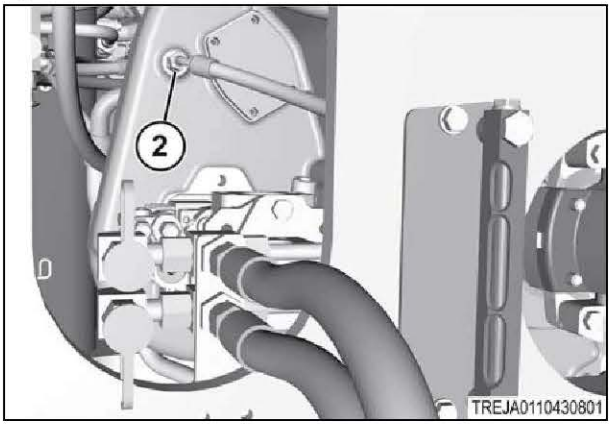

Fig. 21

32. Disconnect the P-clamps (1) holding hoses to the top of the transmission and move the hoses out of the way.

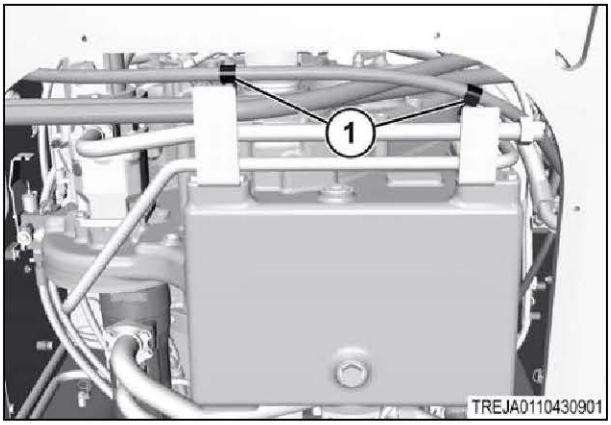

Fig. 22

33. Remove the transmission fill tube bolts (1) and remove the transmission fill tube (2).

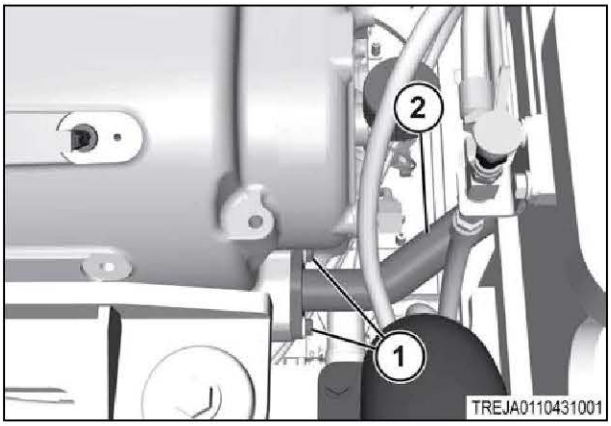

Fig. 23

34. Fasten a correct lifting device to the threaded holes (1) on the top of the transmission.

IMPORTANT:

The weight of the transmission is approximately 1520 kg(3350 lb)

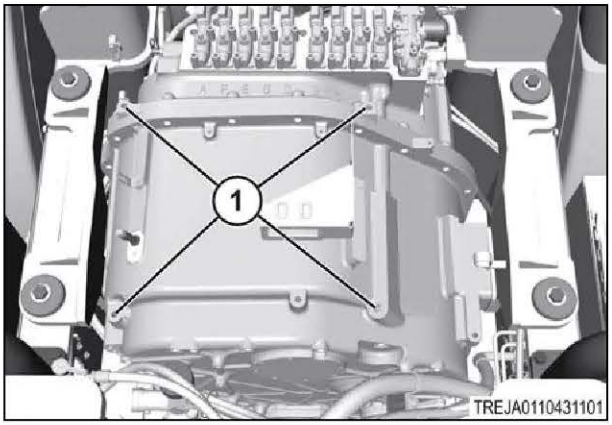

Fig. 24

35. Remove the transmission mounting bolts (1).

36. Remove the transmission.

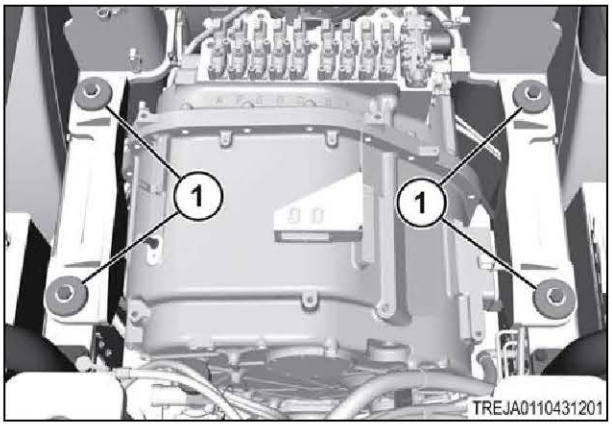

Fig. 25

Related Links

Remove the cab page 11-3
Change the implement and steering system fluid page 9-162
Remove the rear articulation drive shaft page 6-43
Remove the front drive shaft page 6-37
Remove the input drive shaft page 6-40

6.2.2 Install the transmission

Procedure

1. Make sure the mounting surface is clean.

2. Install a correct lifting device to the threaded holes (1) on the top of the transmission.

IMPORTANT:

The weight of the transmission is approximately 1520 kg(3350 lb).

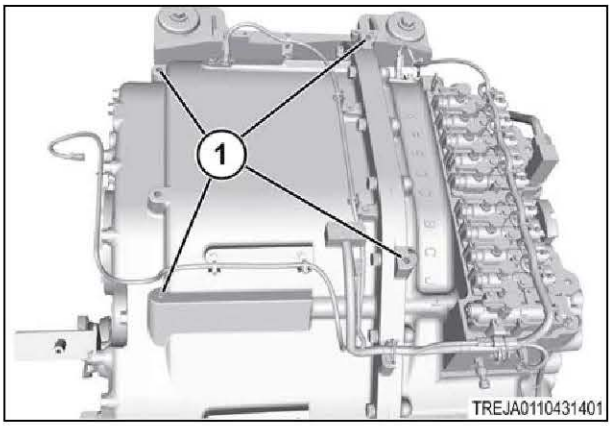

Fig. 26

3. Put the washer (1), stiffener (2), and rubber mount (3) on all four of the mounting points on the frame rail.

4. Use a correct lifting device to carefully lower the transmission (4) into the correct position of the frame rail.

5. Install the rubber mount (5), the stiffener (6), washer (7), and the bolt (8) to all four mounting points.

Tighten the bolts to 460 Nm(339 lbf ft) .

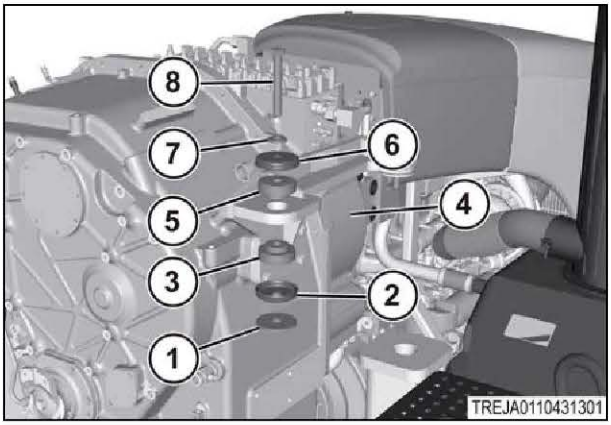

Fig. 27

6. Make sure the mounting surface for the transmission fill tube is clean.

7. Install gasket sealant to the mounting surface and install the transmission fill tube (1) with two bolts and washers (2).

Tighten the bolts to 100 Nm (74 lbf ft).

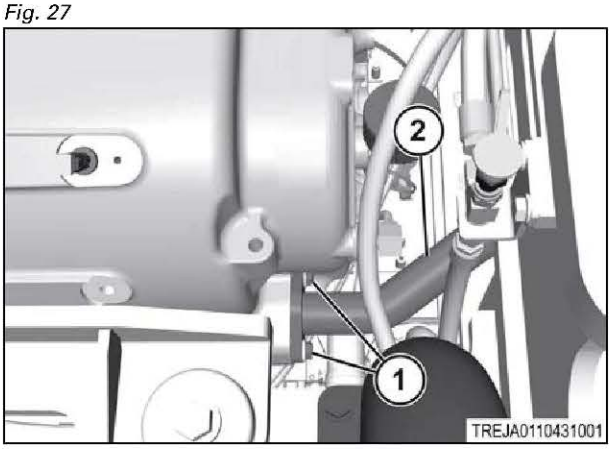

Fig. 28

8. Install P-clamps (1) to the hydraulic hoses and to brackets on top of the transmission.

Tighten the bolts to 100 Nm (74 lbf ft).

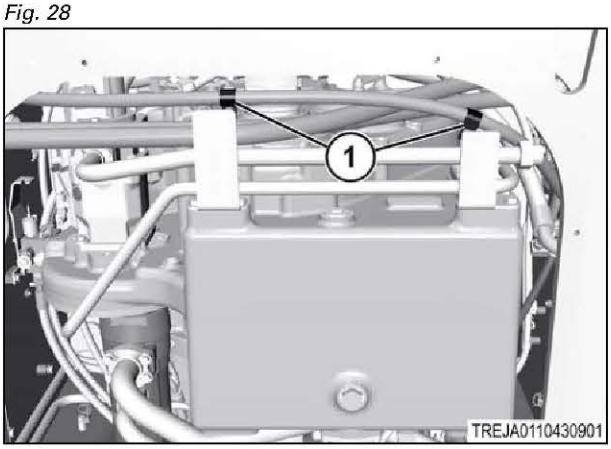

Fig. 29

9. Install the hoses (1,2) to the sight gauge.

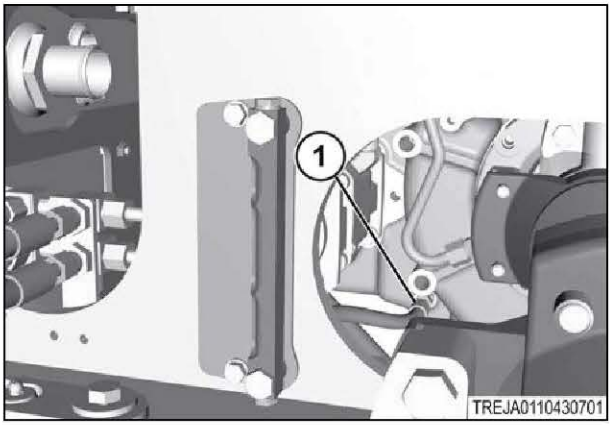

Fig. 30

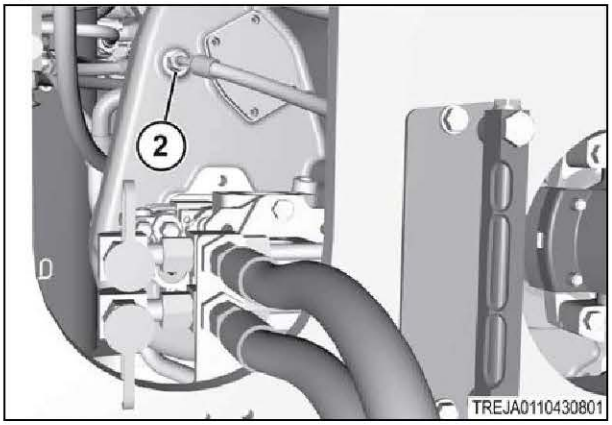

Fig. 31

10. Install the hydraulic hoses (1) that connect the transmission to the hydraulic reservoir with hose clamps (2).

Tighten the hose clamps to 11 Nm (97 lbf in).

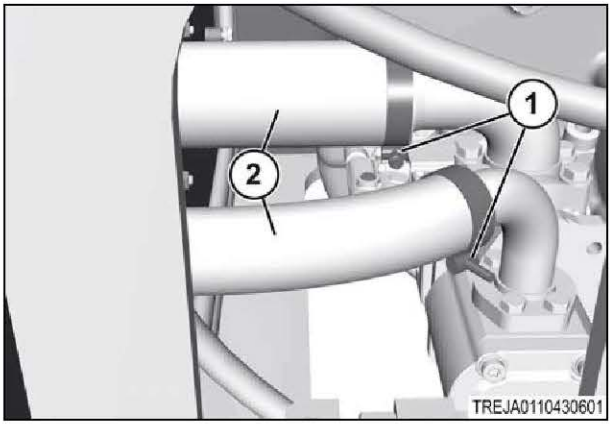

Fig. 32

11. Install the charge hose (1).

12. Install the pump case drain hose (2).

13. Install the pump load sense hose (3).

14. Install the supply reference hose (4).

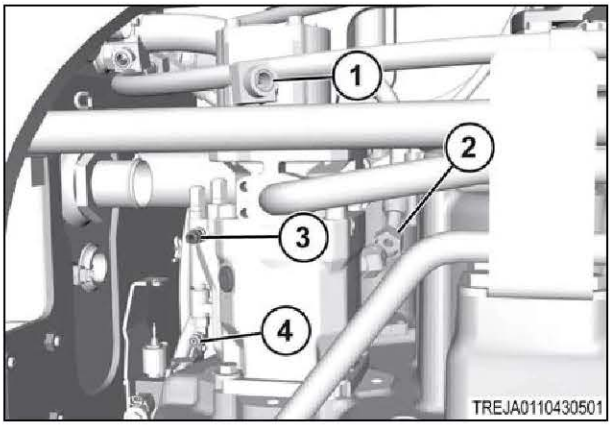

Fig. 33

15. Install the differential lock return hose (1).

16. Install the rear axle lubrication return hose (2).

17. Install the transmission filter supply hose (3).

18. Install the priority supply hose (4).

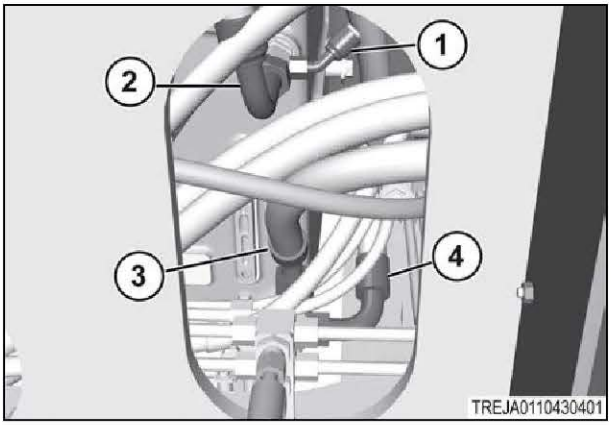

Fig. 34

19. Install the axle lubrication supply hose (1).

20. Install the front axle lubrication return hose (2).

21. Install the park brake return hose (3).

22. Install the tow override pilot hose (4).

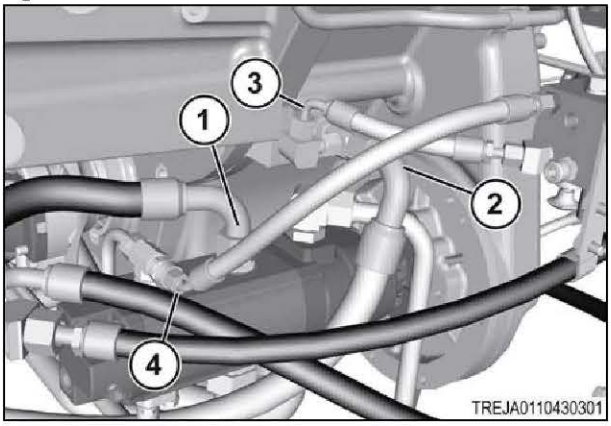

Fig. 35

23. Install the brake charge supply hose (1).

24. Install the brake charge return hose (2).

25. Install the brake return hose (3).

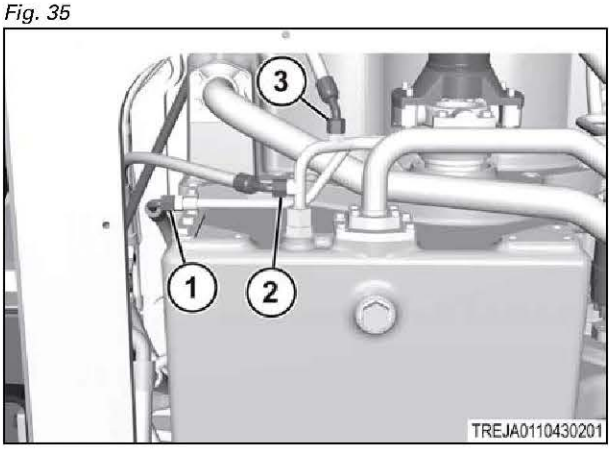

Fig. 36

26. Install the transmission cooler supply hose (1).

27. Install the transmission cooler return hose (2).

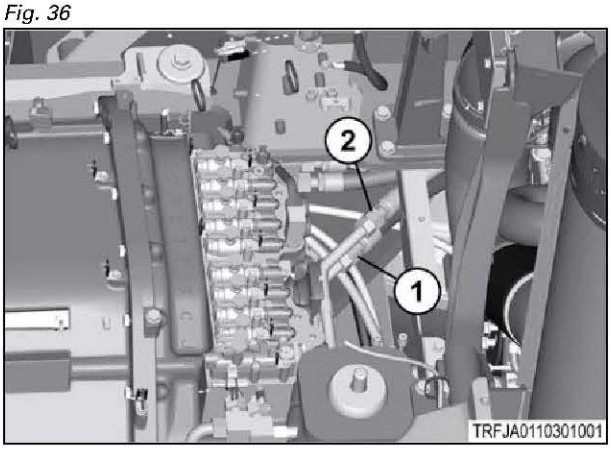

Fig. 37

28. Install the implement hose (1) to the hydraulic reservoir (2).

29. Install the transmission supply hose (3) to the transmission.

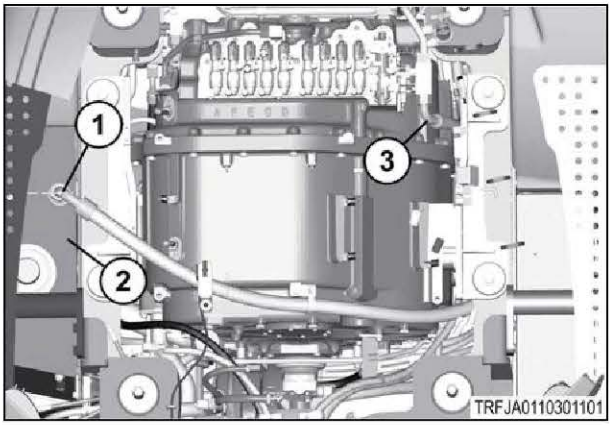

Fig. 38

30. Connect the transmission wire harness (1) to the main wire harness.

31. Connect the main wire harness (2) at the splice.

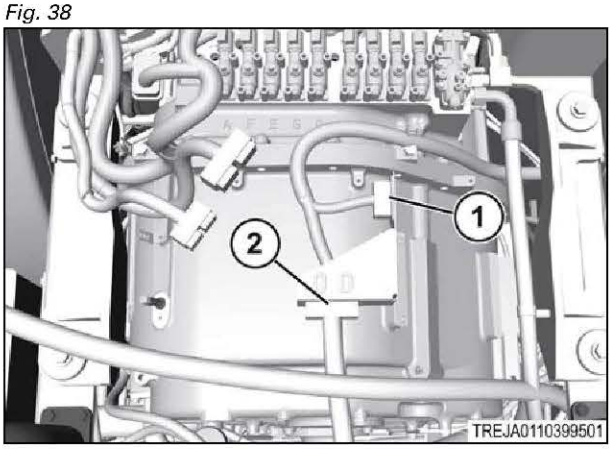

Fig. 39

32. Install the input drive shaft (1).

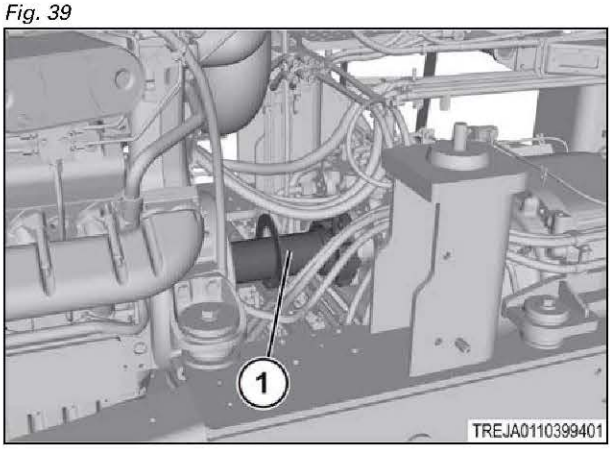

Fig. 40

33. Install the front drive shaft (1).

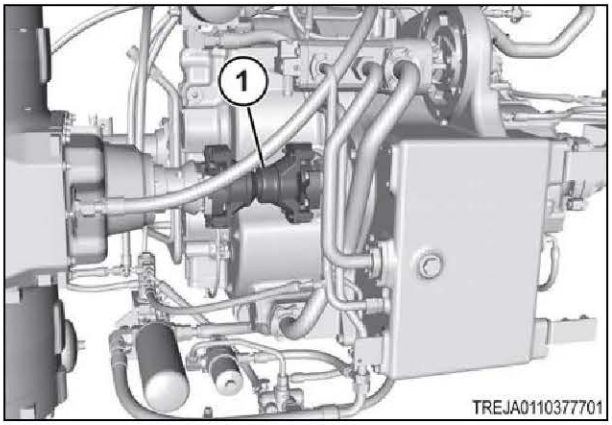

Fig. 41

34. Install the rear articulation drive shaft (1).

35. Fill the transmission with hydraulic oil through the transmission fill tube.

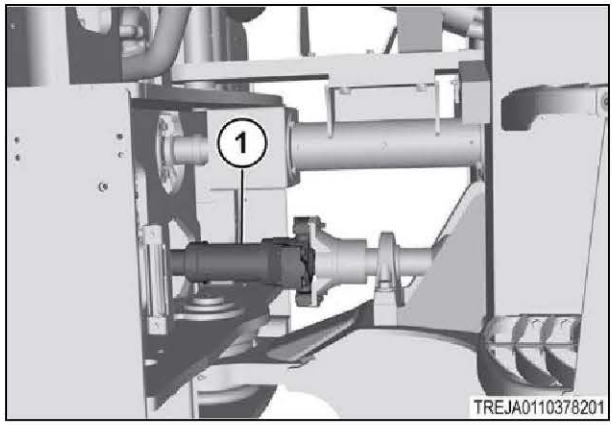

Fig. 42

36. If the machine is equipped with a transmission guard, install the transmission guard (1) with bolts and washers.

Tighten the bolts to 100 Nm (74 lbf ft).

IMPORTANT:
The weight of the transmission guard is approximately 72 kg (158 lb).

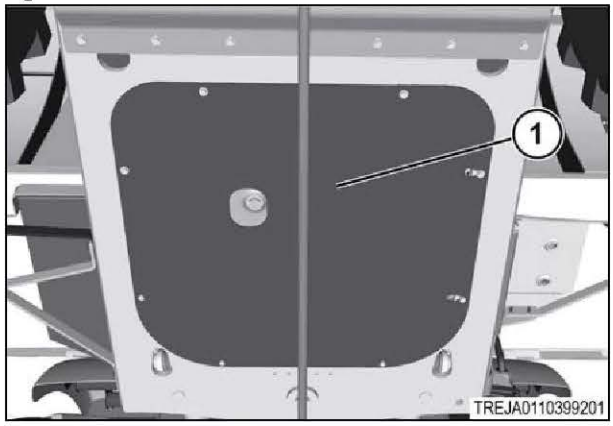

Fig. 43

37. Install the cab (1).

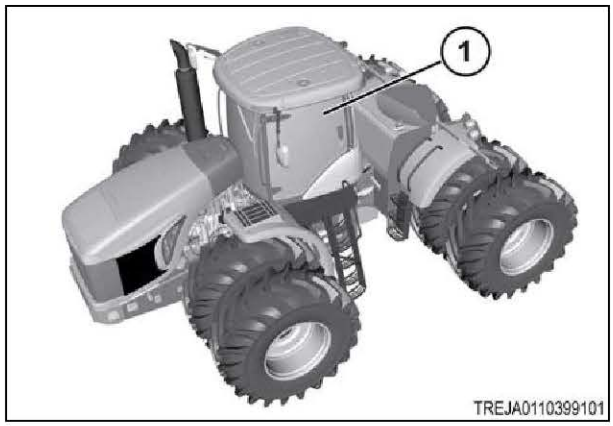

Fig. 44

Related Links

Install the input drive shaft page 6-42
Install the front drive shaft page 6-39
Install the rear drive shaft page 6-51
Lubricant viscosities page 1-18
Install the cab page 11-7

6.3 Drivetrain components

6.3.1 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).

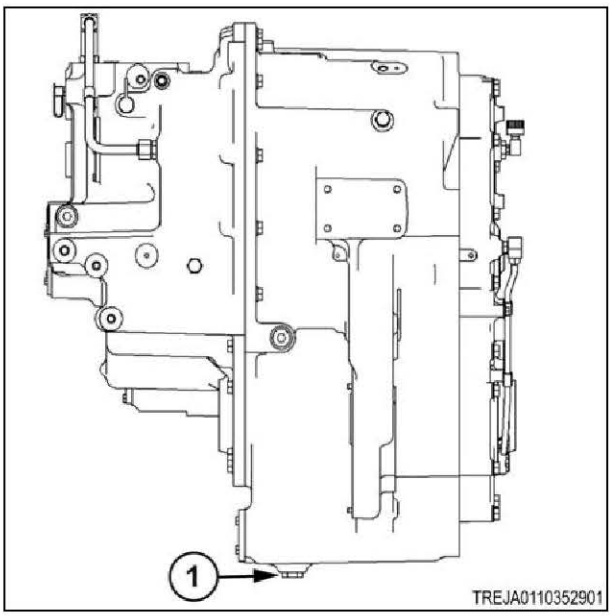

Fig. 45

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.

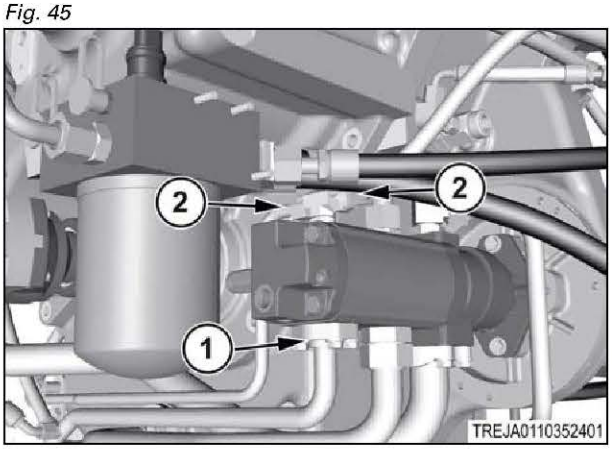

Fig. 46

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.

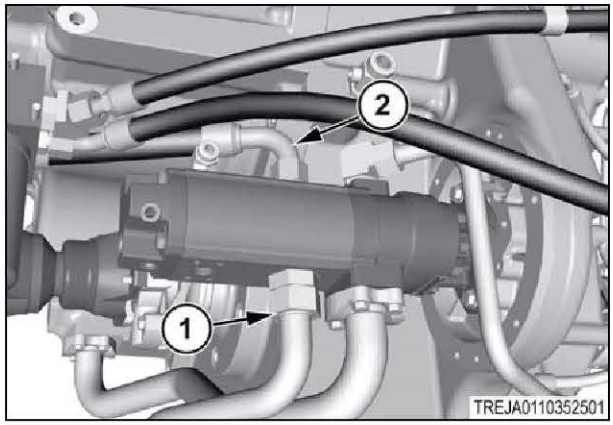

Fig. 47

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.

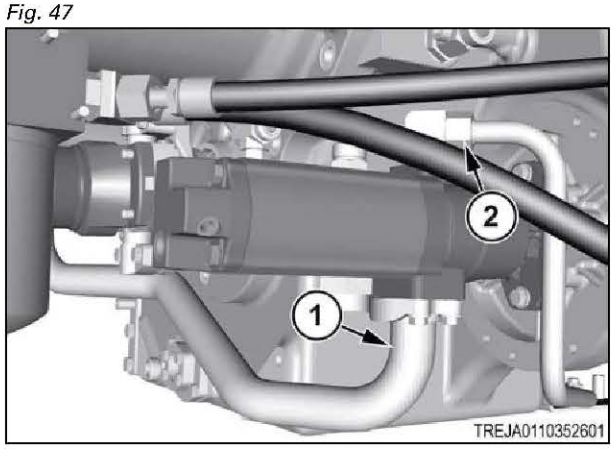

Fig. 48

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).

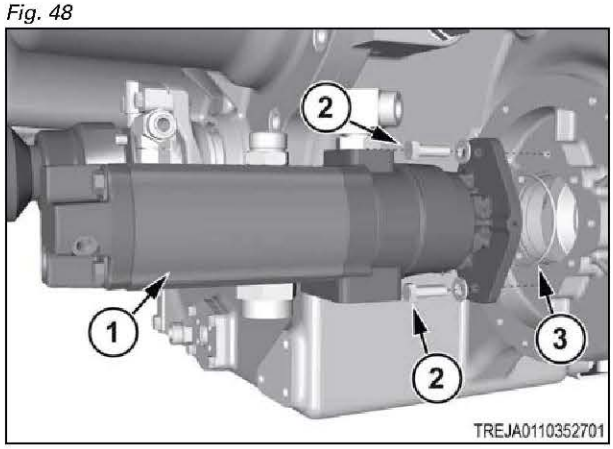

Fig. 49

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

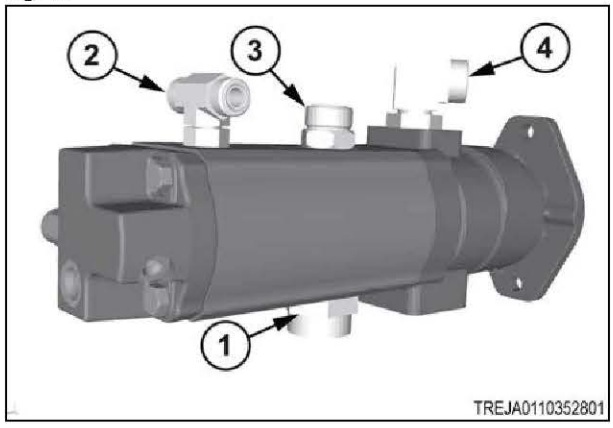

Fig. 50

6.3.2 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).

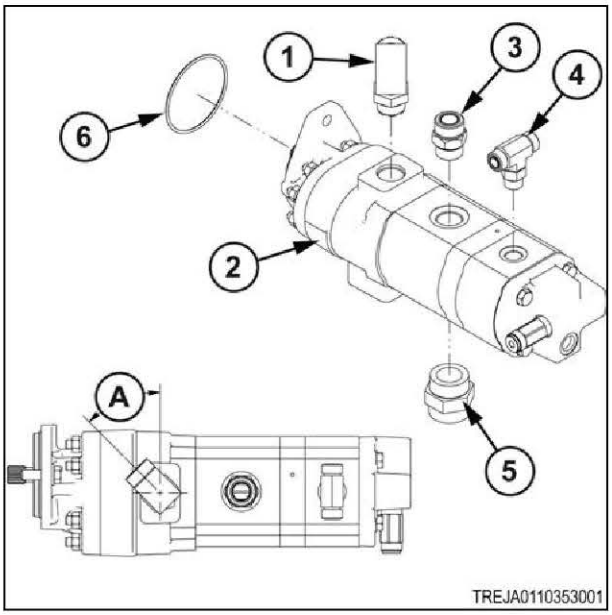

Fig. 51

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).

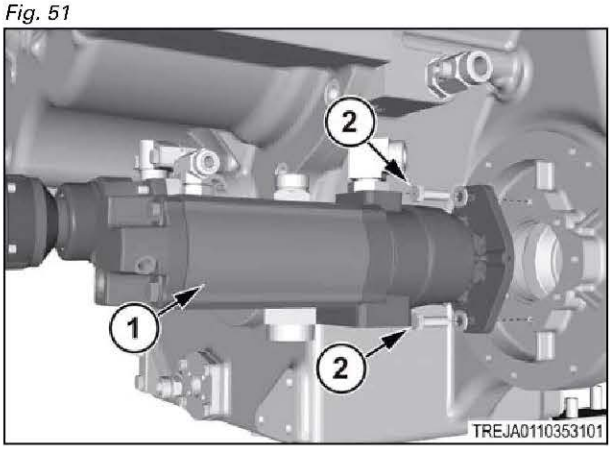

Fig. 52

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).

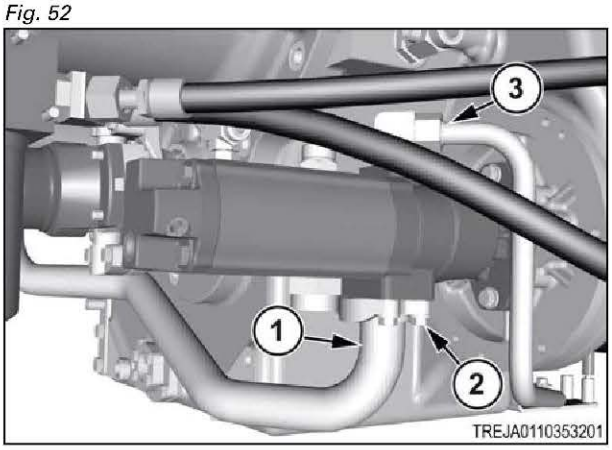

Fig. 53

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).

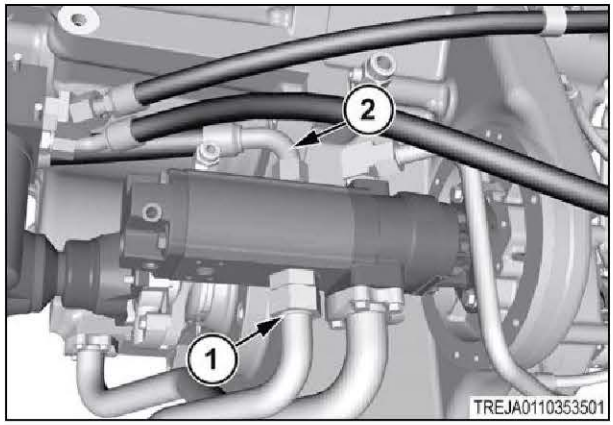

Fig. 54

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).

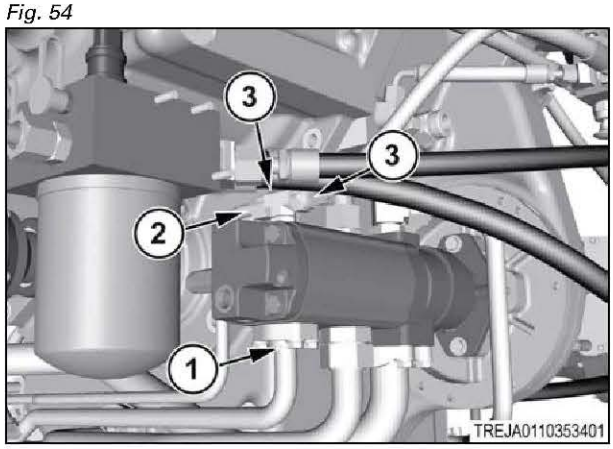

Fig. 55

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

18. Fill the transmission to the correct oil level.

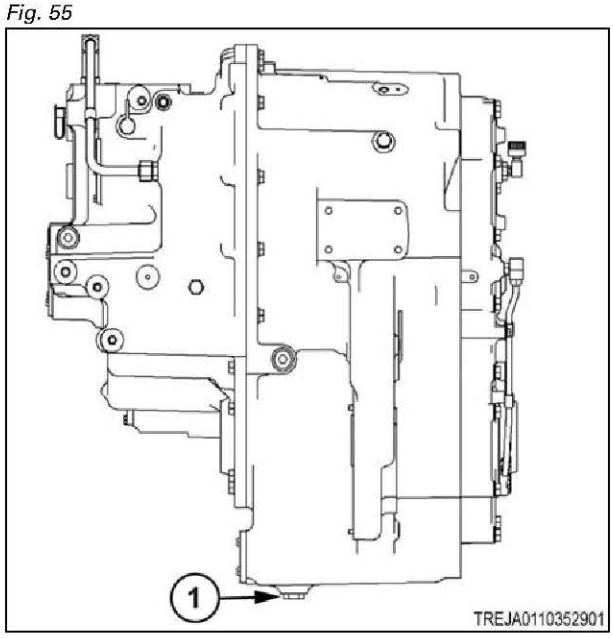

Fig. 56

Related Links

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

6.3.3 Remove a transmission clutch modulating valve

The procedure is the same for all the transmission clutch modulating valves.

Before starting the procedure

IMPORTANT:
Make sure to contain all fluids during inspection, maintenance, testing, adjusting, and repair of the machine. Contain the fluids with the correct containers before opening any compartment or disassembling any component containing fluids. Discard all fluids according to laws, regulations, and mandates.

IMPORTANT:
Put identification marks on all hoses, hose assemblies, wires, and on all line assemblies for installation purposes. Close all openings. This can prevent fluid loss and will prevent contaminants from entering the system.

IMPORTANT:
Clean components are important. Before starting a disassembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Park the machine on a solid, level surface and engage the parking brake.
2. Turn the key start switch to the off position and take the key with you.
3. Let the machine become cool.
4. Disconnect the harness assembly (1).
5. Remove the bolts (2).
6. Remove the transmission clutch modulating valve (3) and the O-ring from the transmission.

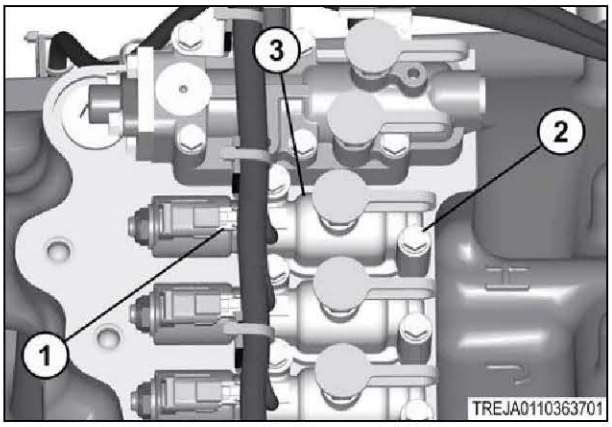

Fig. 57

6.3.4 Disassemble a transmission clutch modulating valve

Procedure

1. Remove the transmission clutch modulating valve.
2. Remove the nut (1) and the washer (2).
3. Remove the coil assembly (3).
4. Remove the cartridge (4) and the O-ring.
5. Remove the test port (5).
6. Remove the O-ring (6).

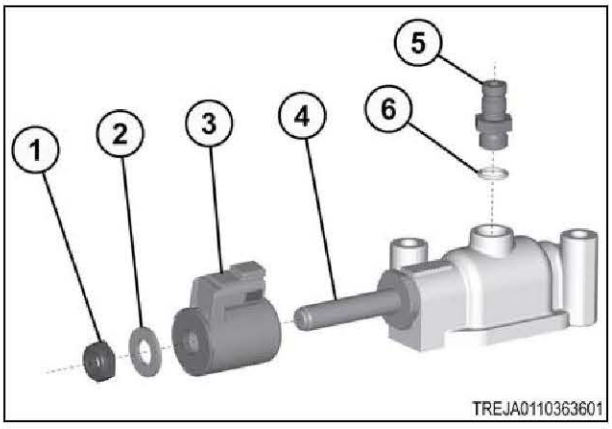

Fig. 58

Related Links

Remove a transmission clutch modulating valve page 6-23

6.3.5 Assemble a transmission clutch modulating valve

Procedure

1. Lubricate the O-ring.
2. Install the O-ring for the cartridge.
3. Install the cartridge (4).
   Tighten the cartridge to 45 to 55 Nm (33 to 41 lbf ft).
4. Install the coil assembly (3).
5. Install the washer (2) and the nut (1).
   Tighten the nut to 11 to 15 Nm (9 to 11 lbf ft).
6. Install the test port (5) with the O-ring (6).
7. Install the transmission clutch modulating valve.

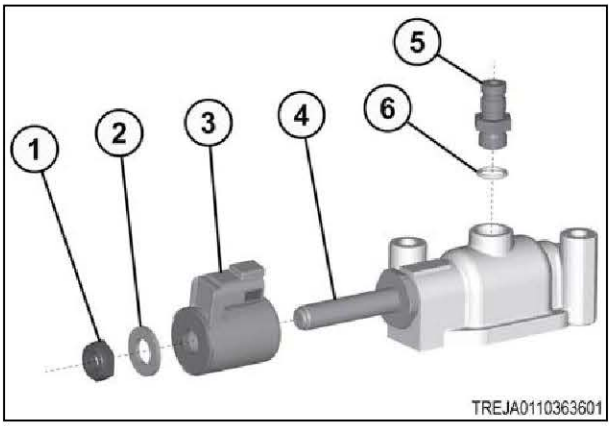

Fig. 59

Related Links

Install a transmission clutch modulating valve page 6-25

6.3.6 Install a transmission clutch modulating valve

The procedure is the same for all the transmission clutch modulating valves.

Before starting the procedure

NOTE:
Clean components are important. Before starting an assembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Install the transmission clutch modulating valve assembly (3) with the bolts (2).
   Tighten the bolts to 26 to 34 Nm (19 to 25 lbf ft).
2. Connect the harness assembly (1).

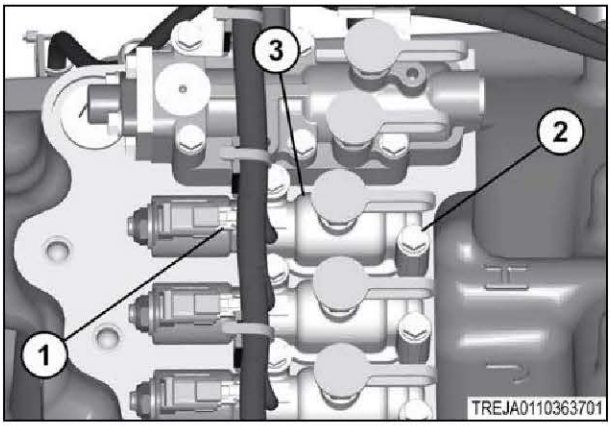

Fig. 60

6.3.7 Remove the transmission lubrication relief valve

Before starting the procedure

NOTE:
Clean components are important. Before starting a disassembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Remove the plug (1).

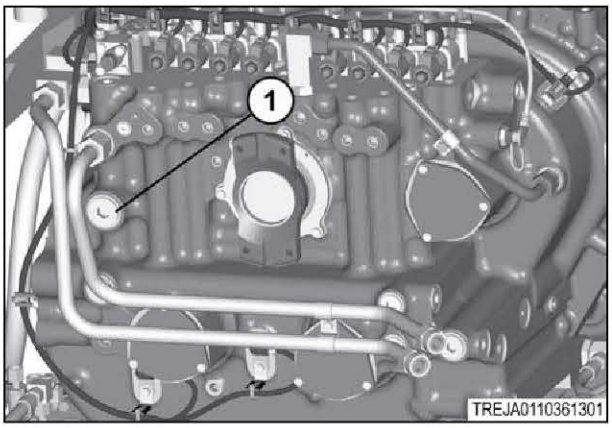

Fig. 61

2. Remove the O-ring (1).

3. Remove the retaining ring (2).

4. Remove the relief valve (3).

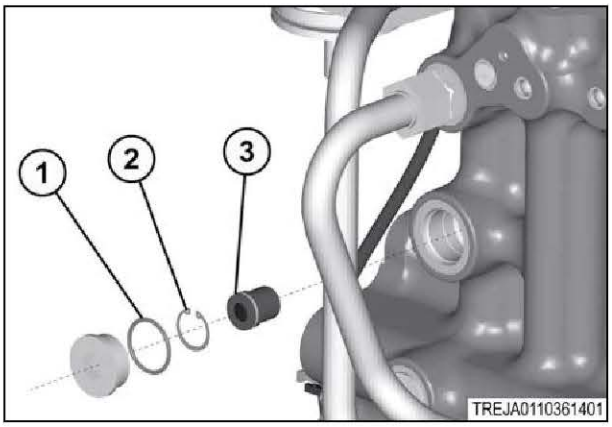

Fig. 62

6.3.8 Installing the transmission lubrication relief valve

Before starting the procedure

NOTE:
Clean components are important. Before starting an assembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Install the relief valve (3).
2. Install the retaining ring (2).
3. Install a new O-ring (1).

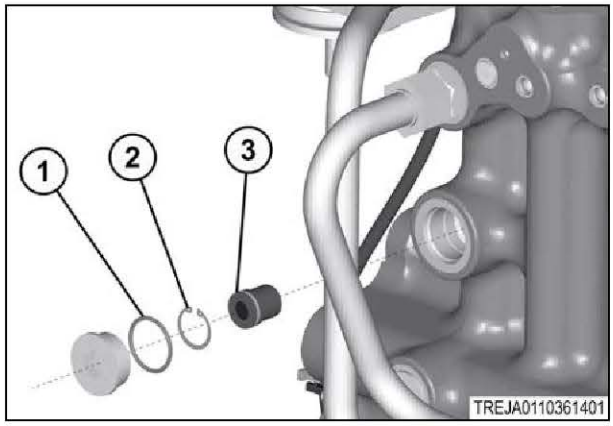

Fig. 63

4. Install the plug (1).

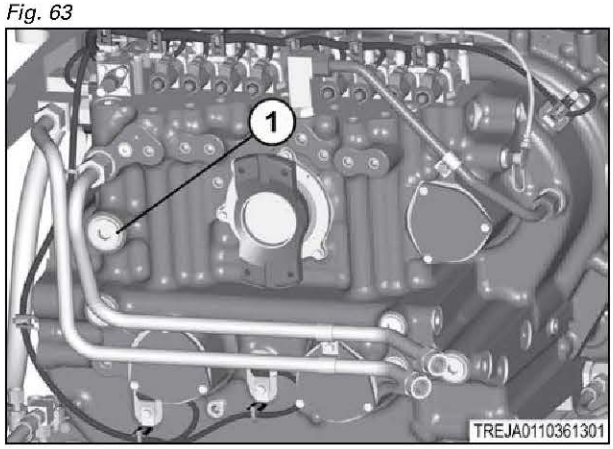

Fig. 64

6.3.9 Remove the charge pressure relief valve

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: In some illustrations and photos, the shields or guards are removed for clarity.

Contact with moving parts can cause personal injury or death.

Never operate the machine with any shields or guards removed or in poor working condition.

IMPORTANT:
Make sure to contain all fluids during inspection, maintenance, testing, adjusting, and repair of the machine. Contain the fluids with the correct containers before opening any compartment or disassembling any component containing fluids. Discard all fluids according to laws, regulations, and mandates.

NOTE:
Put identification marks on all hoses, hose assemblies, wires, and on all line assemblies for installation purposes. Close all openings. This can prevent fluid loss and will prevent contaminants from entering the system.

NOTE:
Clean components are important. Before starting a disassembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Turn the key start switch to the off position and take the key with you.
4. Make sure to let the machine cool.
5. Relieve all pressure from the hydraulic system.
6. Remove the six bolts (1).
7. Remove the charge pressure relief valve (2) from the machine.

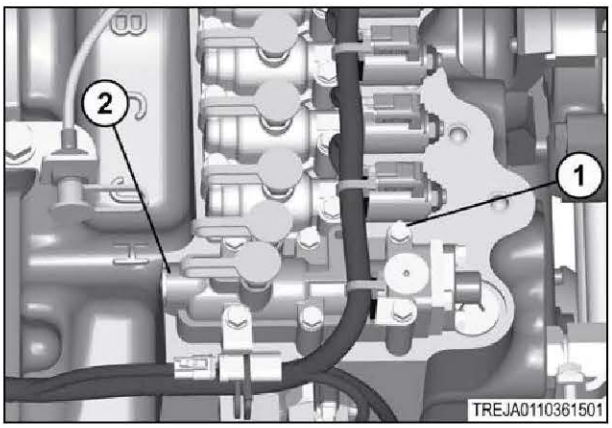

Fig. 65

6.3.10 Install the charge pressure relief valve

Before starting the procedure

NOTE:
Clean components are important. Before starting an assembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Put the charge pressure relief valve (2) into position.
2. Install the six bolts (1).

   Tighten the bolts to 26 to 34 Nm (19 to 25 lbf ft).

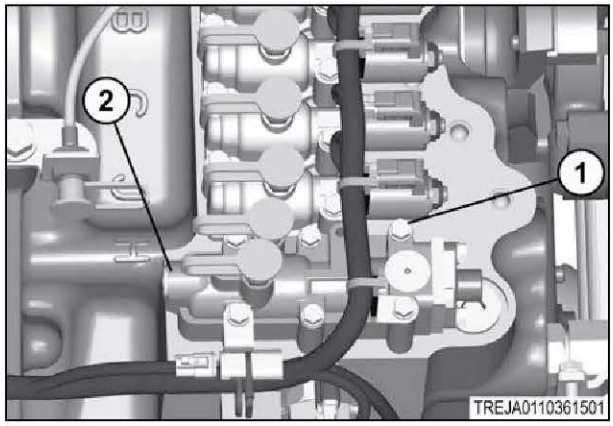

Fig. 66

6.3.11 Remove the charge pressure sensor

Before starting the procedure

IMPORTANT:
Make sure to contain all fluids during inspection, maintenance, testing, adjusting, and repair of the machine. Contain the fluids with the correct containers before opening any compartment or disassembling any component containing fluids. Discard all fluids according to laws, regulations, and mandates.

IMPORTANT:
Put identification marks on all hoses, hose assemblies, wires, and on all line assemblies for installation purposes. Close all openings. This can prevent fluid loss and will prevent contaminants from entering the system.

IMPORTANT:
Clean components are important. Before starting a disassembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Park the machine on a solid, level surface.
2. Stop the engine, apply the parking brake, and take the key with you.
3. Disconnect the harness assembly (1).
4. Remove the charge pressure sensor (2).

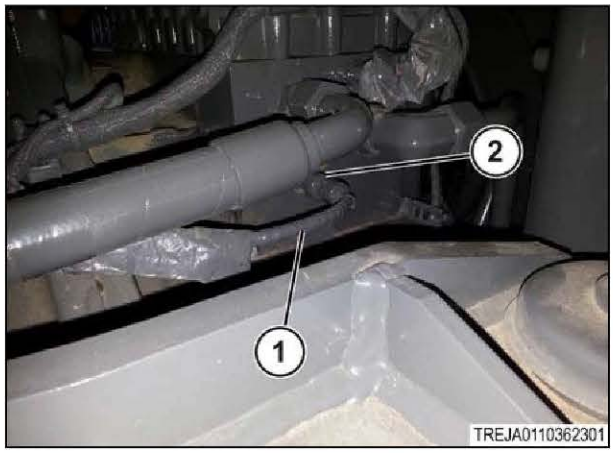

Fig. 67

6.3.12 Installing the charge pressure sensor

Before starting the procedure

IMPORTANT:
Clean components are important. Before starting an assembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

NOTE:
Check the O-rings for wear or damage. Replace the components, if necessary.

Procedure

1. Install the charge pressure sensor (2). Tighten to 8 to 12 Nm (6 to 9 lbf ft).
2. Connect the harness assembly (1).

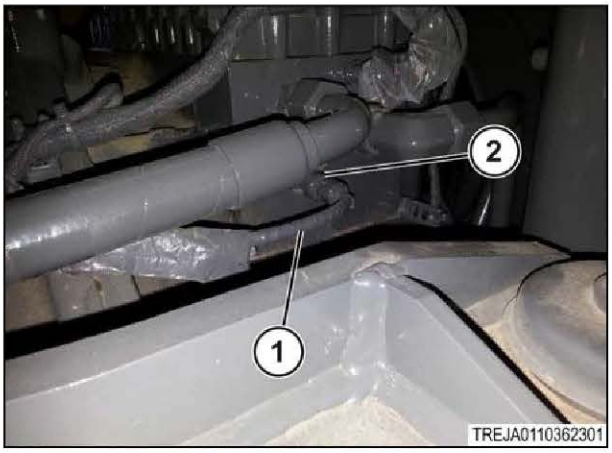

Fig. 68

6.3.13 Removing the transmission oil cooler bypass valve

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: In some illustrations and photos, the shields or guards are removed for clarity.

Contact with moving parts can cause personal injury or death.

Never operate the machine with any shields or guards removed or in poor working condition.

IMPORTANT:
Make sure to contain all fluids during inspection, maintenance, testing, adjusting, and repair of the machine. Contain the fluids with the correct containers before opening any compartment or disassembling any component containing fluids. Discard all fluids according to laws, regulations, and mandates.

IMPORTANT:
Put identification marks on all hoses, hose assemblies, wires, and on all line assemblies for installation purposes. Close all openings. This can prevent fluid loss and will prevent contaminants from entering the system.

IMPORTANT:
Clean components are important. Before starting a disassembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Remove the charge pressure relief valve.
2. Remove the transmission oil cooler bypass valve (1).

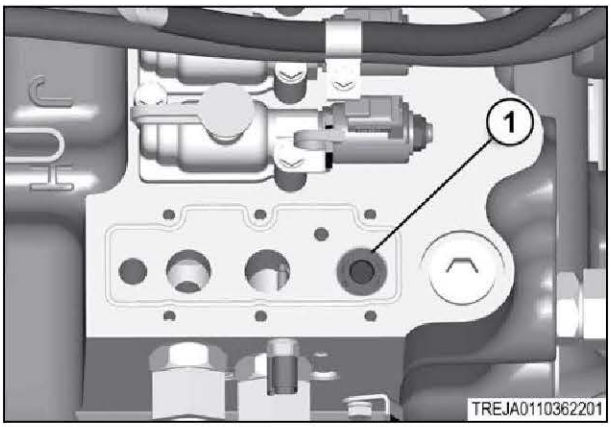

Fig. 69

Related Links

Remove the charge pressure relief valve page 6-27

6.3.14 Install the transmission oil cooler bypass valve

Before starting the procedure

IMPORTANT:
Clean components are important. Before starting an assembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Install the transmission oil cooler bypass valve (1).
2. Install the charge pressure relief valve.

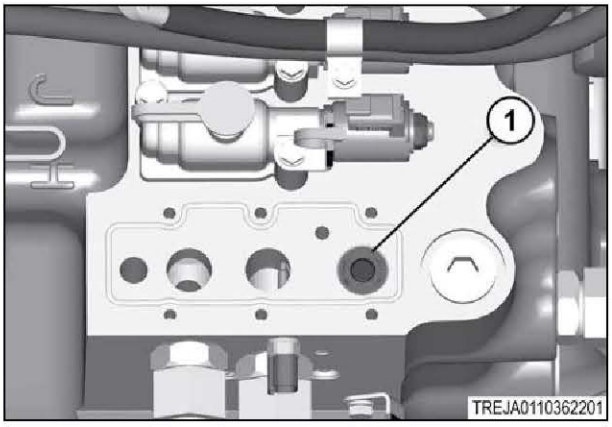

Fig. 70

Related Links

Install the charge pressure relief valve page 6-28

6.3.15 Removing the transmission oil temperature sensor

Before starting the procedure

IMPORTANT:
Make sure to contain all fluids during inspection, maintenance, testing, adjusting, and repair of the machine. Contain the fluids with the correct containers before opening any compartment or disassembling any component containing fluids. Discard all fluids according to laws, regulations, and mandates.

IMPORTANT:
Put identification marks on all hoses, hose assemblies, wires, and on all line assemblies for installation purposes. Close all openings. This can prevent fluid loss and will prevent contaminants from entering the system.

IMPORTANT:
Clean components are important. Before starting a disassembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Park the machine on a solid, level surface and apply the parking brake.
2. Turn the key start switch to the off position and take the key with you.
3. Disconnect the harness assembly (1).
4. Remove the transmission oil temperature sensor (2).

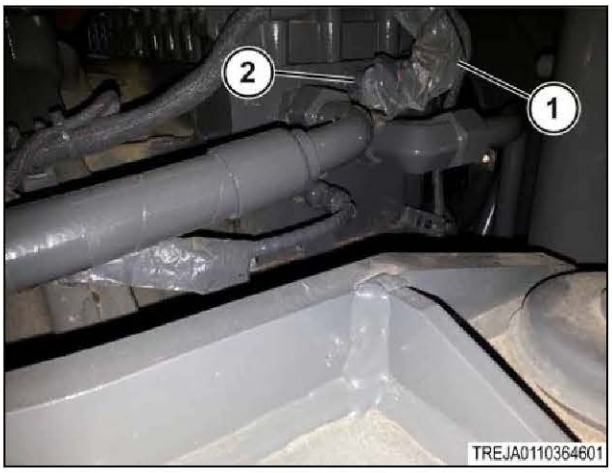

Fig. 71

6.3.16 Install the transmission oil temperature sensor

Before starting the procedure

IMPORTANT:
Clean components are important. Before starting an assembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

IMPORTANT:
Check the O-rings for wear or damage. Replace the components, if necessary.

Procedure

1. Install the transmission oil temperature sensor (2).
   Tighten to 17 to 23 Nm (13 to 17 lbf ft).
2. Connect the harness assembly (1).

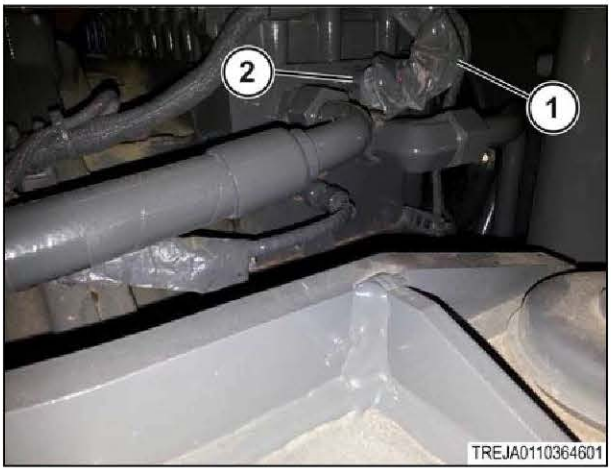

Fig. 72

6.3.17 Remove the input speed sensors

Before starting the procedure

NOTE:
Put identification marks on all hoses, hose assemblies, wires, and on all line assemblies for installation purposes. Close all openings. This can prevent fluid loss and will prevent contaminants from entering the system.

NOTE:
Clean components are important. Before starting a disassembly procedure, completely clean all components. Contaminants can damage precision components.

Procedure

1. Park the machine on a solid, level surface and engage the parking brake.
2. Turn the key start switch to the off position and take the key with you.

3. Disconnect the harness assemblies (1).

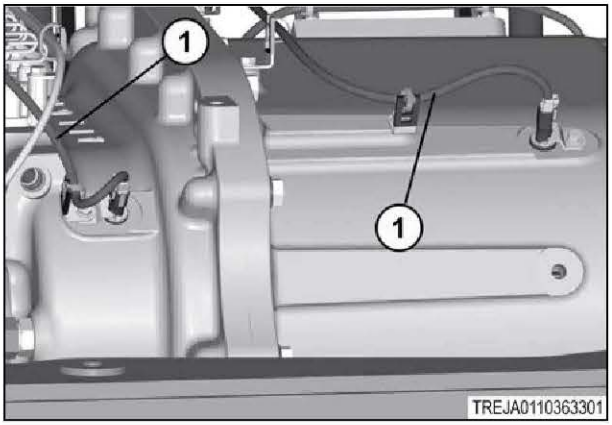

Fig. 73

4. Remove the bolt (1).
5. Remove the front input speed sensor (2).

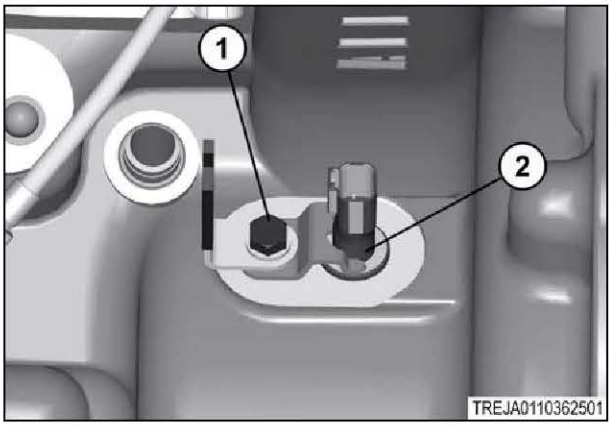

Fig. 74

6. Remove the bolt (1).
7. Remove the rear input speed sensor (2).

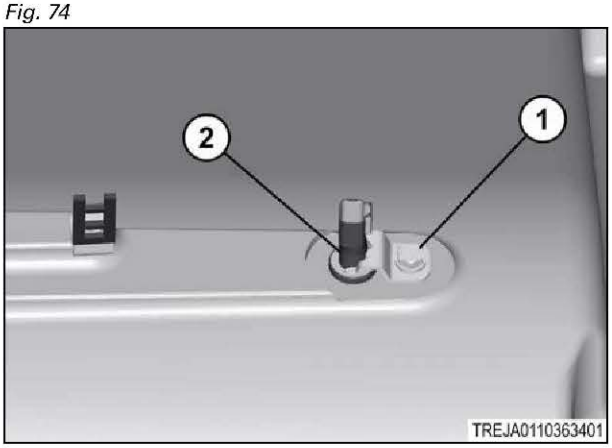

Fig. 75

6.3.18 Install the input speed sensors

Before starting the procedure

IMPORTANT:
Clean components are important. Before starting an assembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Install the front input speed sensor (2).
2. Put the bracket and the clip in position and install the bolt (1).

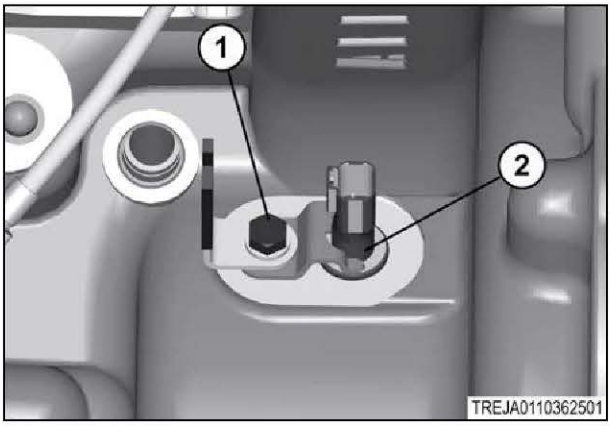

Fig. 76

3. Install the rear input speed sensor (2).
4. Put the bracket in position and install the bolt (1).

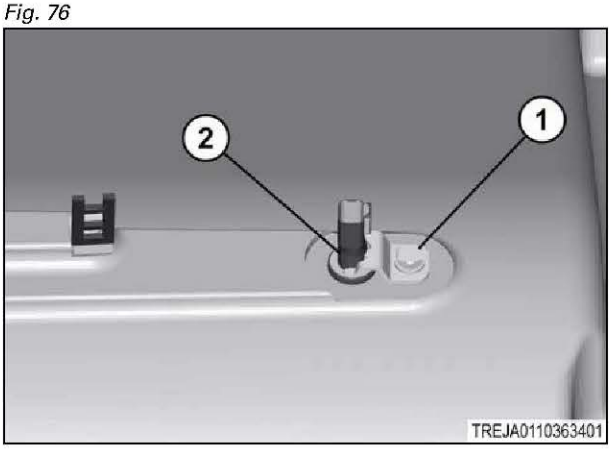

Fig. 77

5. Connect the harness assemblies (1).

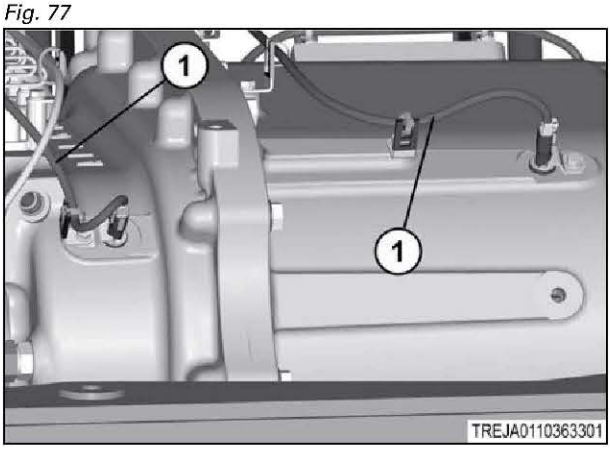

Fig. 78

6.3.19 Remove the output speed sensors

Before starting the procedure

IMPORTANT:
Clean components are important. Before starting a disassembly procedure, completely clean all components. Contaminants can damage precision components.

Procedure

1. Park the machine on a solid, level surface and engage the parking brake.
2. Turn the key start switch to the off position and take the key with you.

3. Disconnect the harness assembly (1).

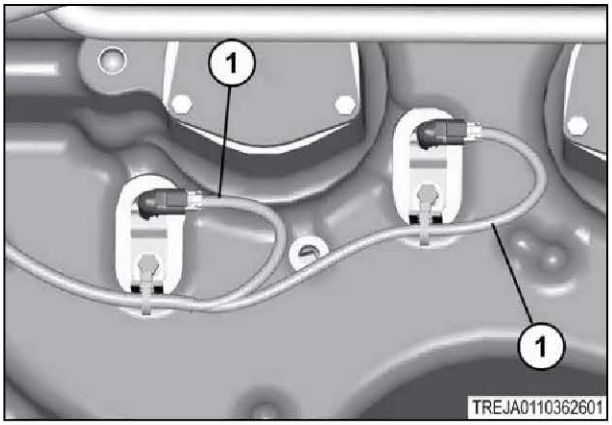

Fig. 79

4. Remove the bolts(2).

5. Remove the output speed sensors (3).

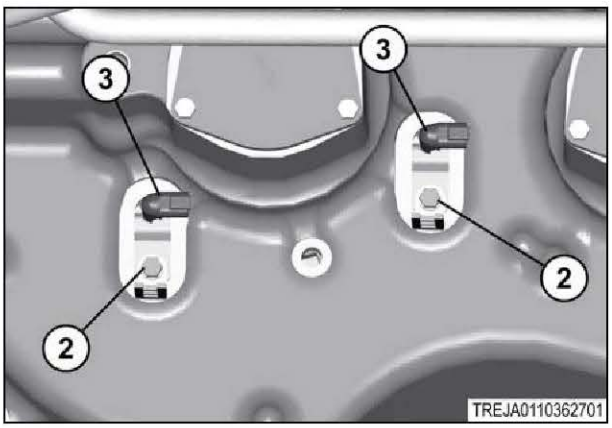

Fig. 80

6.3.20 Install the output speed sensors

Before starting the procedure

IMPORTANT:
Clean components are important. Before starting an assembly procedure, completely clean all components. Contaminants can damage precision components. Do the assembly procedures on a clean work surface. Keep the components covered and protected always.

Procedure

1. Install the output speed sensors(3).

2. Put the brackets and the clips in position. Install the bolts (2).

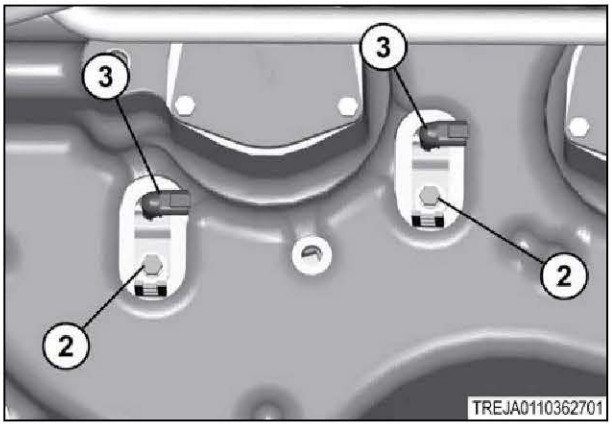

Fig. 81

3. Connect the harness assemblies (1).

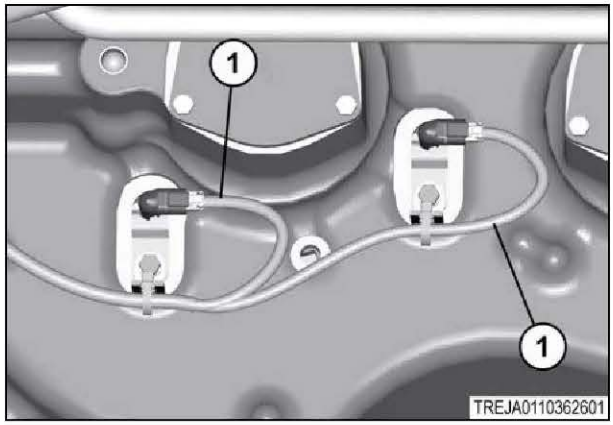

Fig. 82

6.3.21 Remove the front drive shaft

Procedure

1. Park the machine on a solid, level surface. Stop the engine, apply the parking brake, and take the key with you.

2. Use a correct lifting device to support the front drive shaft (1).

   IMPORTANT:
   The weight of the front drive shaft is approximately 34 kg (76 lb).

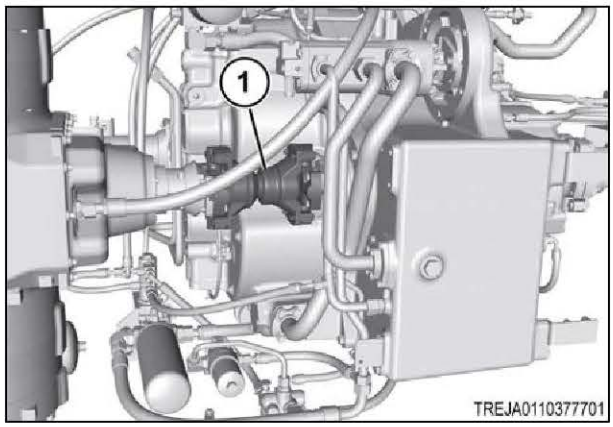

Fig. 83

3. Remove the bolts (2) that connect the front drive shaft to the yoke on the front axle.

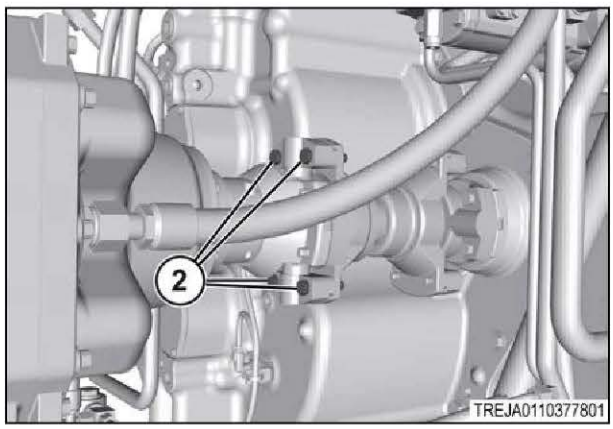

Fig. 84

4. Remove the bolts (3) that connect the front drive shaft to the yoke on the transmission.
5. Remove the front drive shaft.

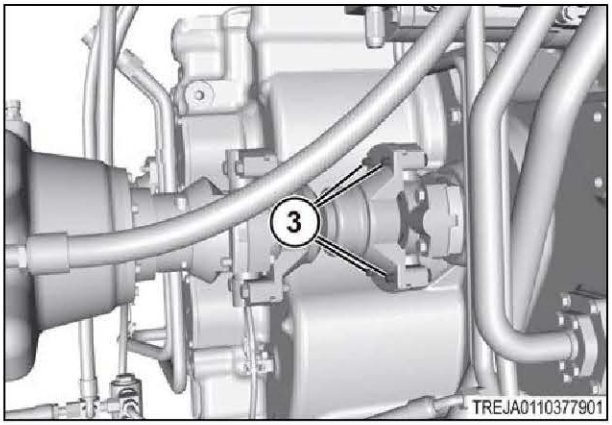

Fig. 85

6.3.22 Disassemble the front drive shaft

Procedure

1. Remove the bolts (1).
2. Remove the universal joints (2) on both ends of the input drive shaft.
3. Disconnect the input drive shaft and remove the slip joint seal (3).

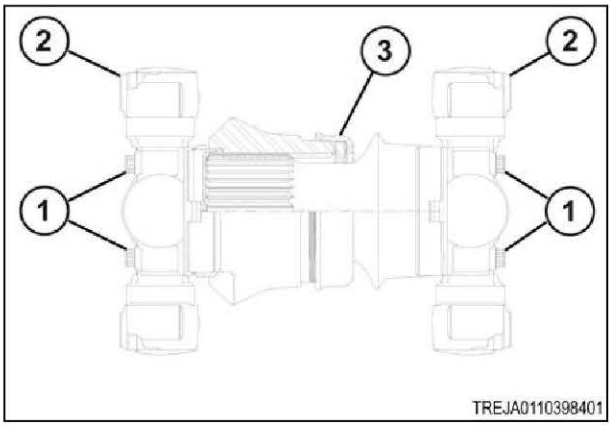

Fig. 86

6.3.23 Assemble the front drive shaft

Procedure

1. Install the slip joint seal assembly (3) and connect the front drive shaft.
2. Install the universal joints (2) on both ends of the front drive shaft with bolts (1).
   Tighten the bolts to 150 Nm (111 lbf ft).

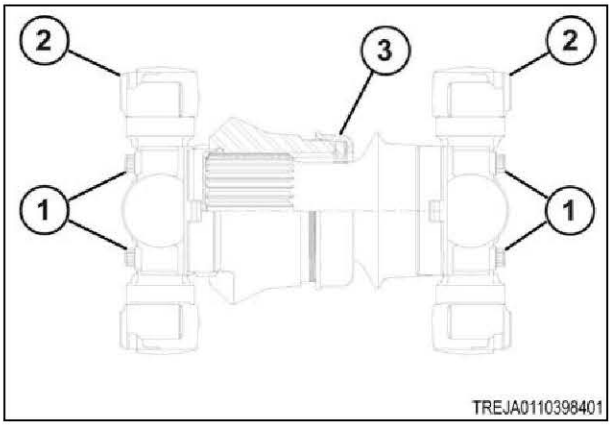

Fig. 87

6.3.24 Install the front drive shaft

Procedure

1. Use a correct lifting device to support the front drive shaft (1). Move the front drive shaft into position.

   NOTE:
   The weight of the front drive shaft is approximately 34 kg (76 lb).

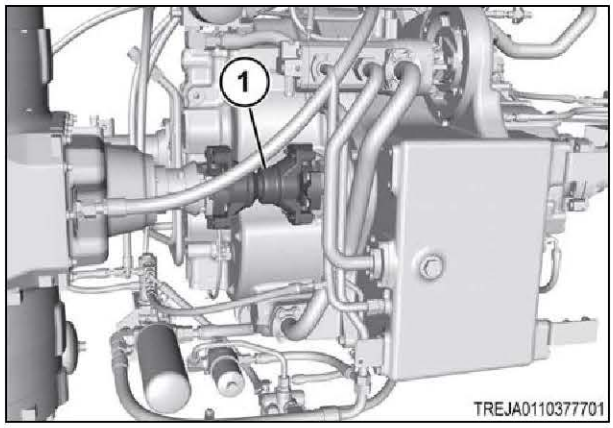

Fig. 88

2. Loosely install the bolts (2) that mount the front drive shaft to the front axle yoke.

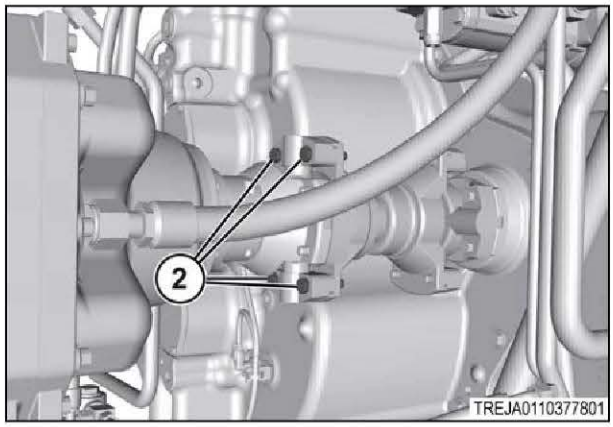

Fig. 89

3. Install the bolts (3) that mount the front drive shaft to the yoke on the transmission.

   Tighten the bolts to 150 Nm (111 lbf ft).

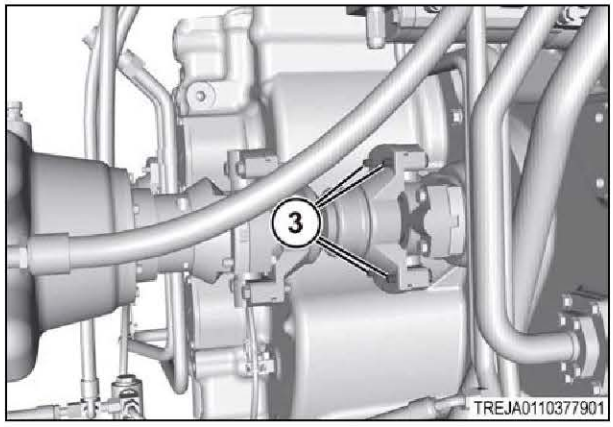

Fig. 90

4. Tighten the bolts (2) that mount the front drive shaft to the front axle yoke.
   Tighten the bolts to 150 Nm (111 lbf ft).

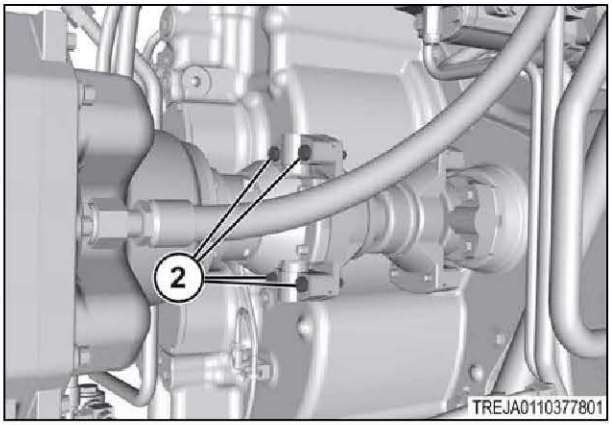

Fig. 91

6.3.25 Remove the input drive shaft

Procedure

1. Park the machine on a solid, level surface. Stop the engine, apply the parking brake, and take the key with you.
2. Use the correct lifting device to support the input drive shaft.

   IMPORTANT:
   The weight of the input drive shaft is approximately 17 kg (37 lb.)

3. Remove the ten bolts (1) and washers that mount the input drive shaft to the engine flywheel.

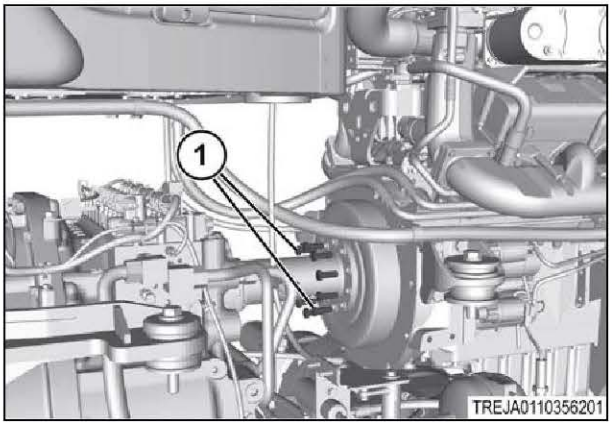

Fig. 92

4. Remove the four bolts (2) that fasten the input drive shaft to the yoke.

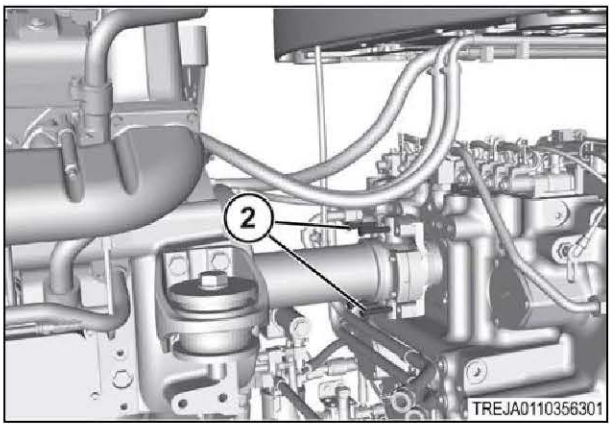

Fig. 93

5. Remove the input drive shaft.

6.3.26 Disassemble the input drive shaft

Procedure

1. Remove the bolts (1), and the input drive shaft (2).

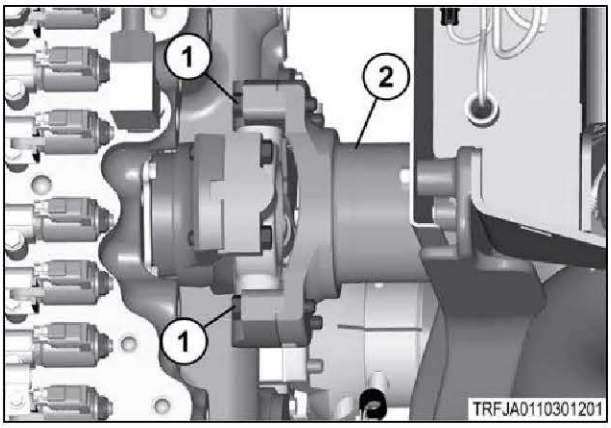

Fig. 94

2. Remove the bolts (1), the U-joint blocks (2), and the U-joint (3).

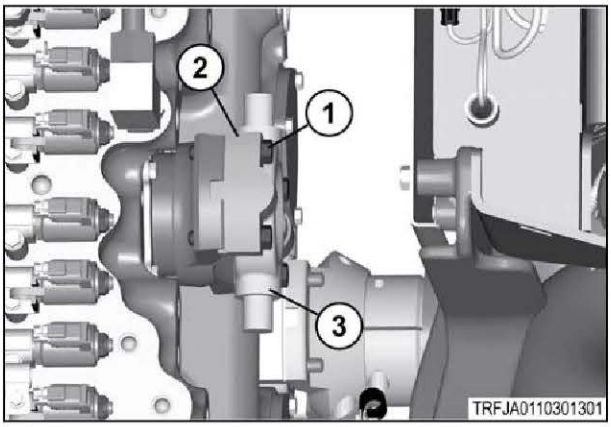

Fig. 95

6.3.27 Assemble the input drive shaft

Procedure

1. Use the bolts (1), and the U-joint blocks (2) to install the U-joint (3) to the input yoke.
   Tighten the bolts to 150 Nm(111 lbf ft).

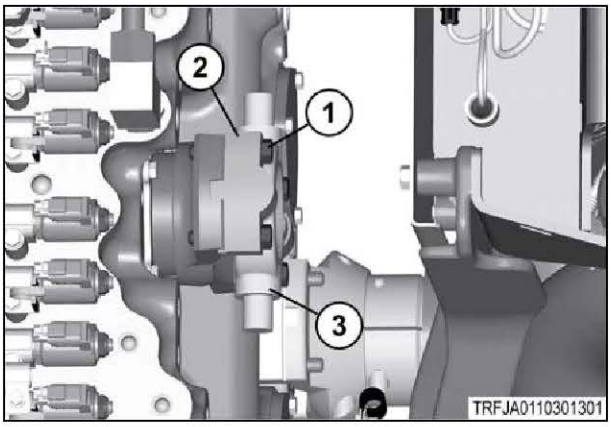

Fig. 96

2. Use the bolts (1), to install the input drive shaft (2).

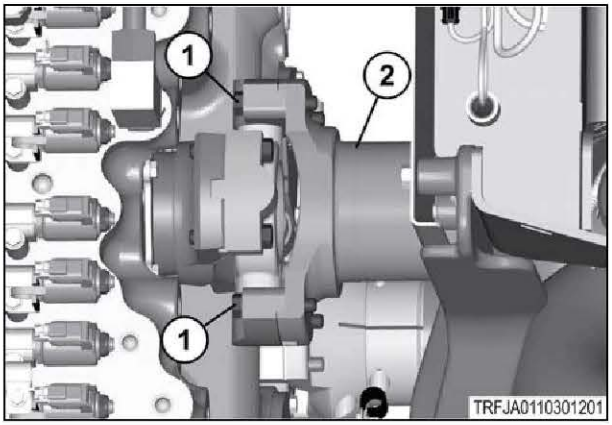

Fig. 97

6.3.28 Install the input drive shaft

Procedure

1. Use the correct lifting device to support the input drive shaft.

   NOTE:
   The weight of the input drive shaft is approximately 17 kg (37 lb)

2. Move the input drive shaft into position.

3. Loosely install the ten bolts (1) and washers that mount the input drive shaft to the engine flywheel.

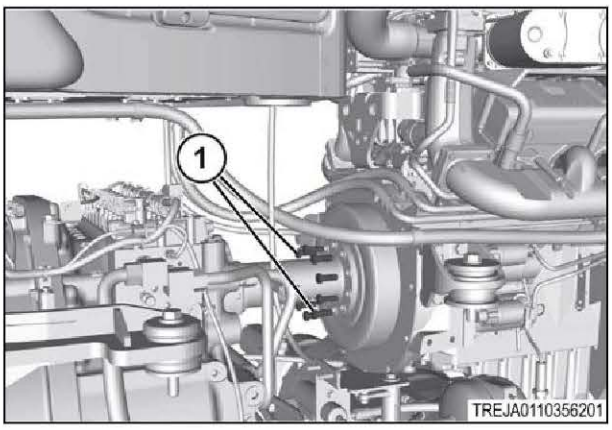

Fig. 98

4. Install the four bolts (2) that fasten the input drive shaft to the yoke.

   Tighten the four bolts to 150 Nm (111 lbf ft).

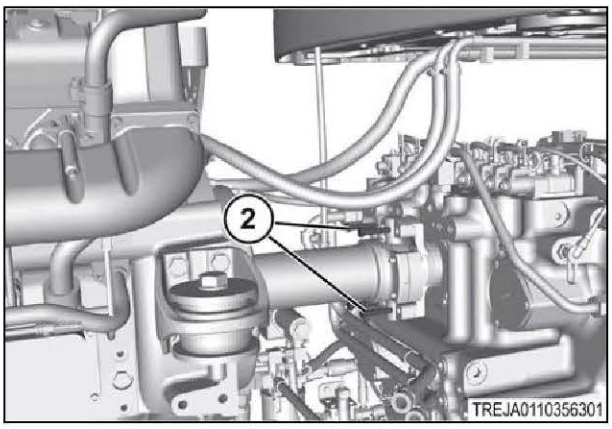

Fig. 99

5. Tighten the ten bolts (3) that mount the input drive shaft to the engine flywheel.

   Tighten the ten bolts to 270 Nm (199 lbf ft).

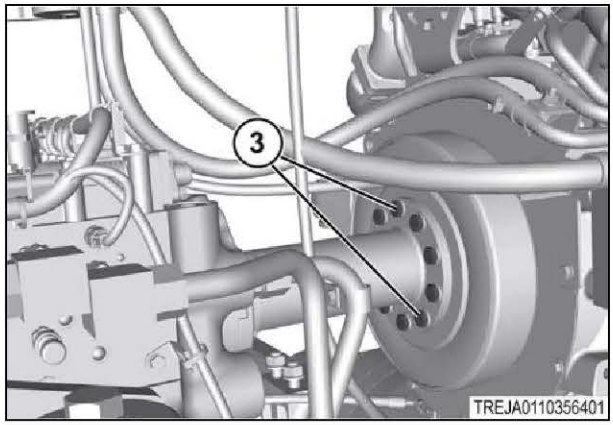

Fig. 100

6.3.29 Remove the rear articulation drive shaft

Procedure

1. Park the machine on a solid, level surface. Stop the engine, apply the parking brake, and take the key with you.

2. Use a correct lifting device to support the rear articulation drive shaft.

   IMPORTANT:

   The weight of the rear articulation drive shaft is approximately 52 kg(114 lb).

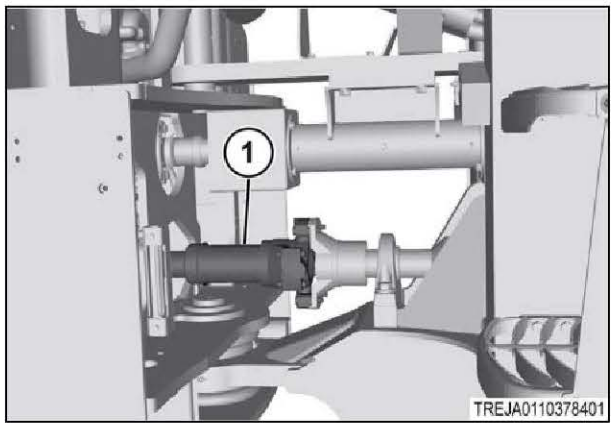

Fig. 101

3. Remove the bolts (2) that connect the rear articulation drive shaft to the transmission.

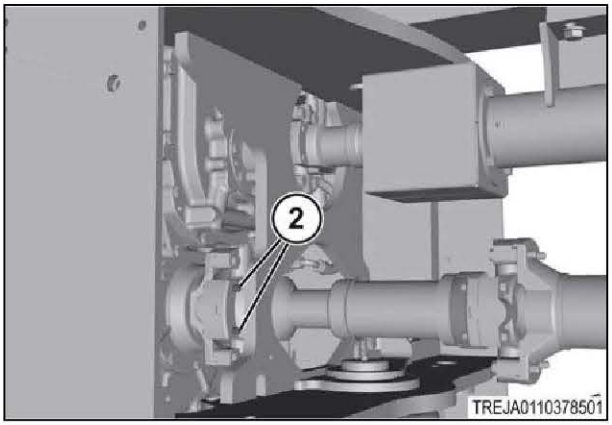

Fig. 102

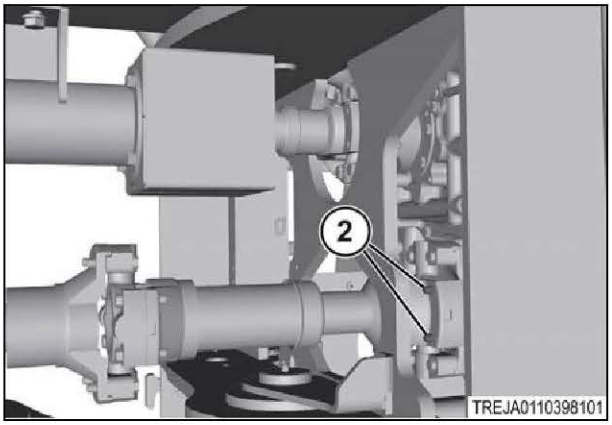

Fig. 103

4. Remove the bolts (3) that connect the rear articulation drive shaft to the rear drive shaft.

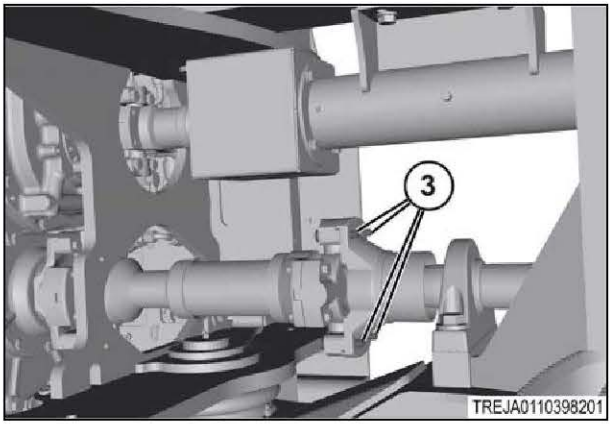

Fig. 104

5. Remove the rear articulation drive shaft.

6.3.30 Disassemble the rear articulation drive shaft

Procedure

1. Remove the bolts (1).
2. Remove the universal joints (2).
3. Disconnect the rear articulation drive shaft and remove the slip joint seal (3).

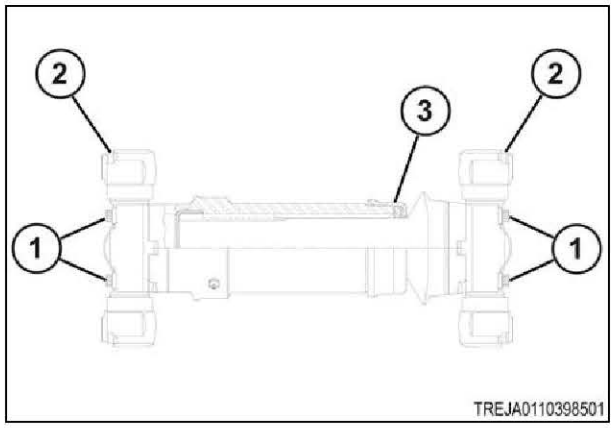

Fig. 105

6.3.31 Assemble the rear articulation drive shaft

Procedure

1. Install the slip joint seal assembly (3) and connect the rear articulation drive shaft.
2. Install the universal joints (2) on both ends of the rear articulation drive shaft with bolts (1).
   Tighten the bolts to 150 Nm (111 lbf ft).

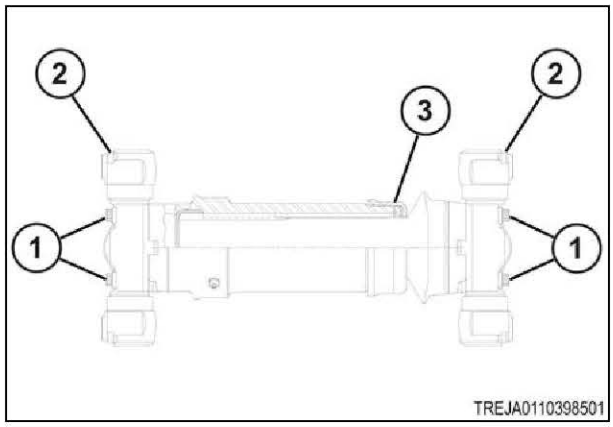

Fig. 106

6.3.32 Install the rear articulation drive shaft

Procedure

1. Use a correct lifting device to support the rear articulation drive shaft.

   IMPORTANT:

   The weight of the rear articulation drive shaft is approximately 52 kg(114 lbs).

2. Move the rear articulation drive shaft (1) into position.

IMPORTANT:
Make sure the rear articulation drive shaft is installed in the correct direction.

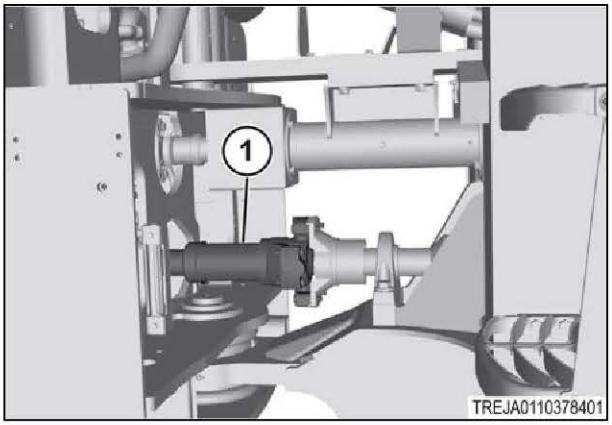

Fig. 107

3. Install the bolts(2, 3) for the rear articulation drive shaft.

NOTE:
Tighten the bolts to 150 Nm(111 lbf ft).

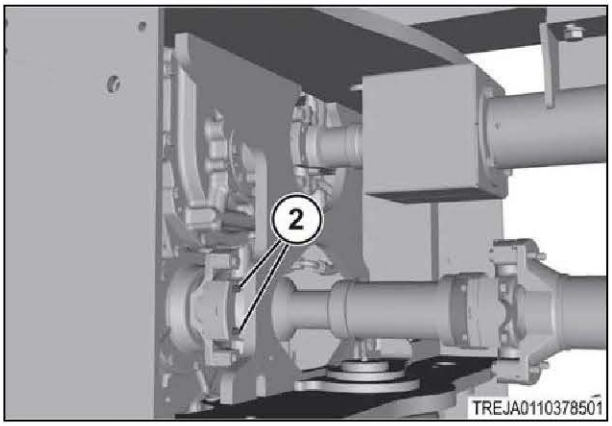

Fig. 108

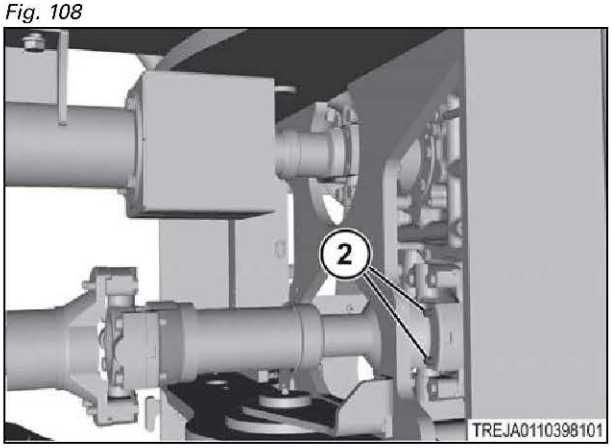

Fig. 109

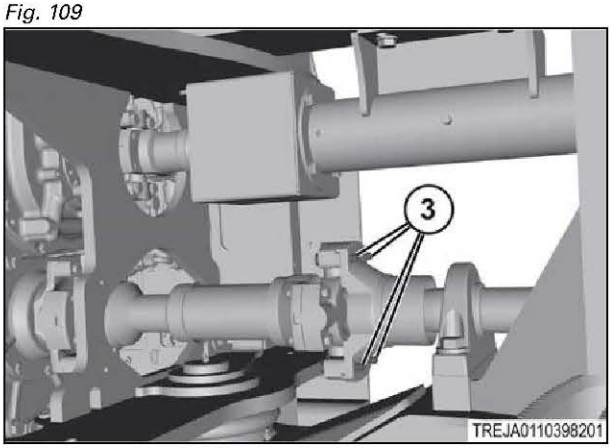

Fig. 110

6.3.33 Remove the rear drive shaft

Procedure

1. Park the machine on a solid, level surface. Stop the engine, apply the parking brake, and take the key with you.

2. Remove the articulation drive shaft.

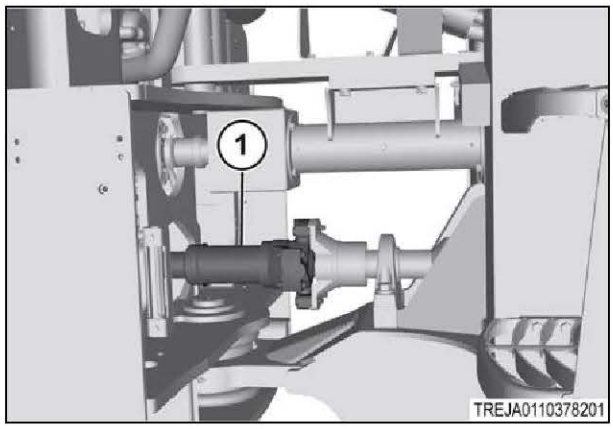

Fig. 111

3. Use a correct lifting device to support the rear drive shaft (2).

   IMPORTANT:
   The weight of the rear drive shaft is approximately 98 kg(216 lb).

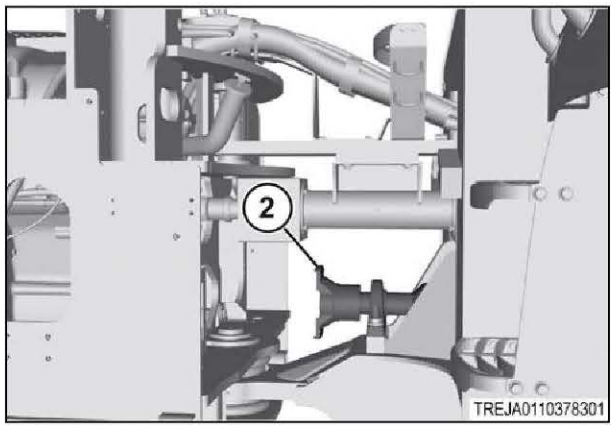

Fig. 112

4. Remove the four bolts (3) that connect the rear drive shaft to the rear axle.

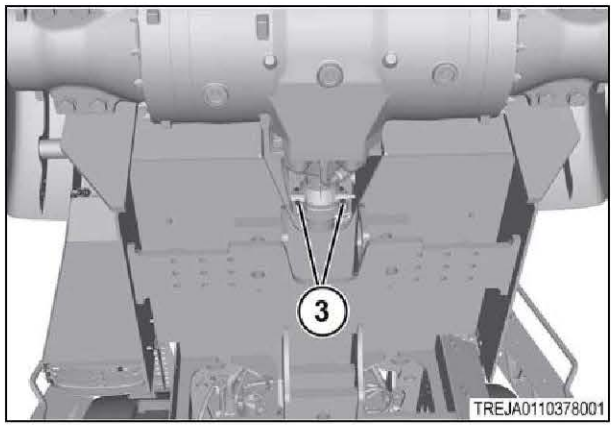

Fig. 113

5. Remove the two bolts (4) for the carrier bearing.

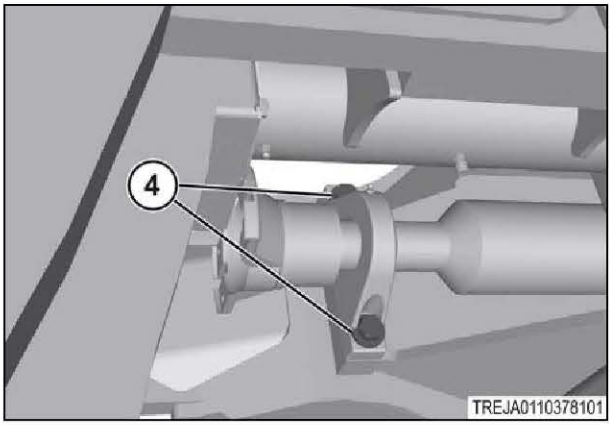

Fig. 114

6. Remove the rear drive shaft.

Related Links

Remove the rear articulation drive shaft page 6-43

6.3.34 Disassemble the rear drive shaft

Procedure

1. Remove the lock nut (1) and the yoke (2).

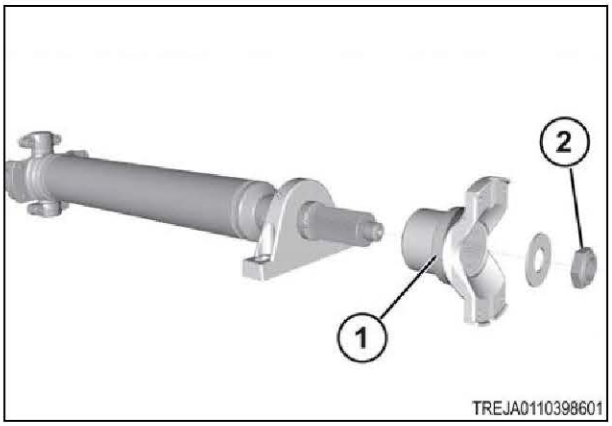

Fig. 115

2. Remove the jam nut and the set screw (3) from the carrier bearing (4).

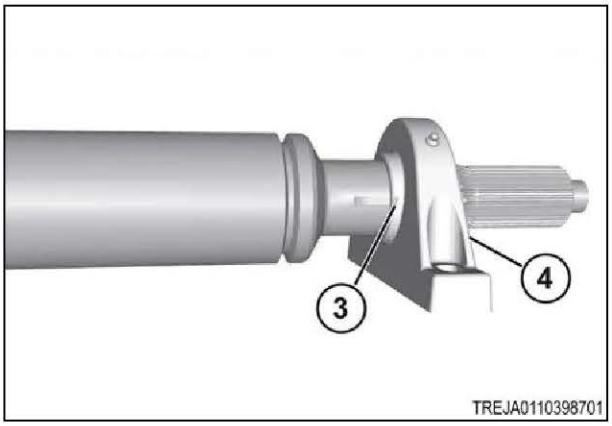

Fig. 116

3. Slide the carrier bearing (5) off the rear drive shaft (6).

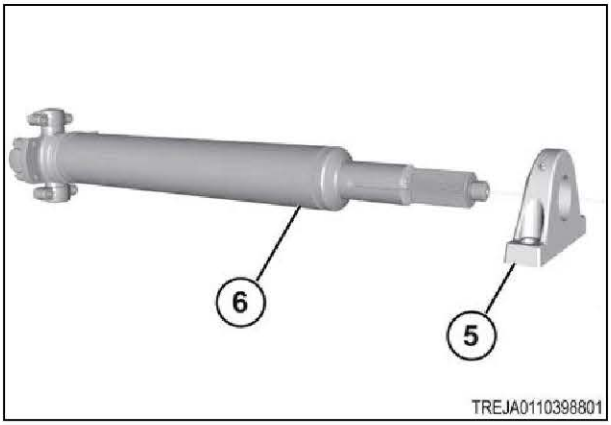

Fig. 117

4. Remove the bolts (7).
5. Remove the universal joint (8).

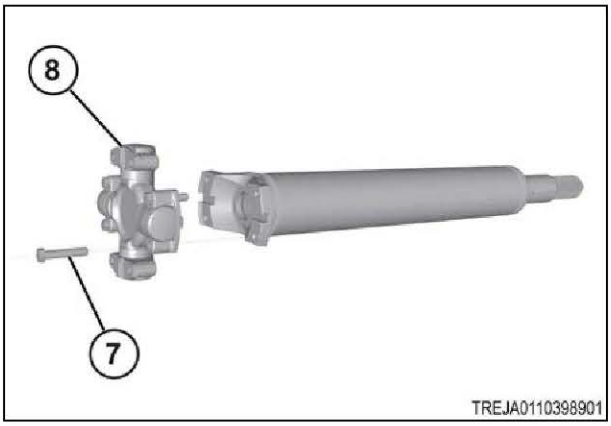

Fig. 118

6.3.35 Assemble the rear drive shaft

Procedure

1. Install the universal joint (8) with bolts (7). Tighten the bolts to 150 Nm (111 lbf ft).

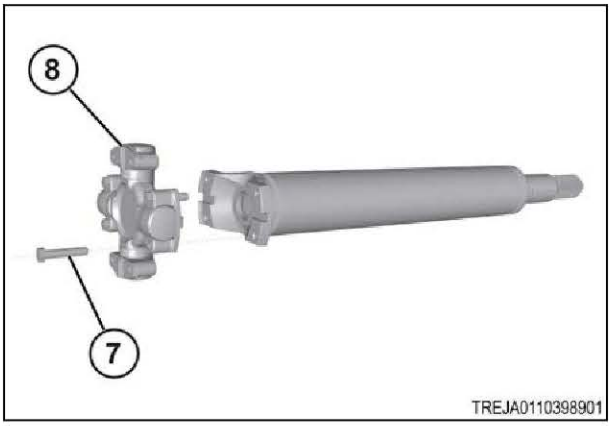

Fig. 119

2. Put antiseize on the inside of the carrier bearing (5).

3. Install the carrier bearing to the rear drive shaft (6).

   The center line of the carrier bearing must be 61.12 mm (2.4 in) from the stub end to the rear drive shaft.

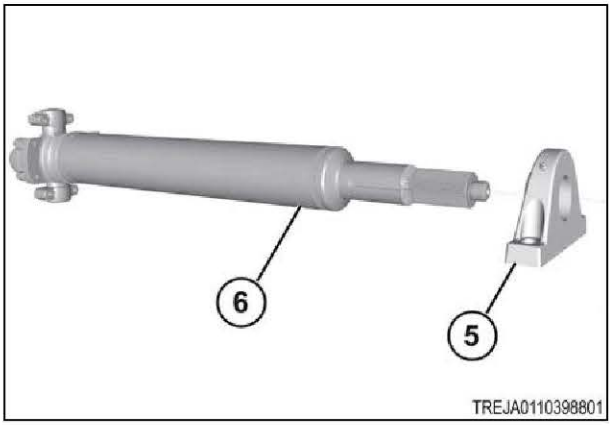

Fig. 120

4. Install the set screw (3) to the carrier bearing (4) on the rear drive shaft.

   IMPORTANT:
   Do not completely tighten the set screw to the rear drive shaft. The set screw must move in the keyway on the rear drive shaft.

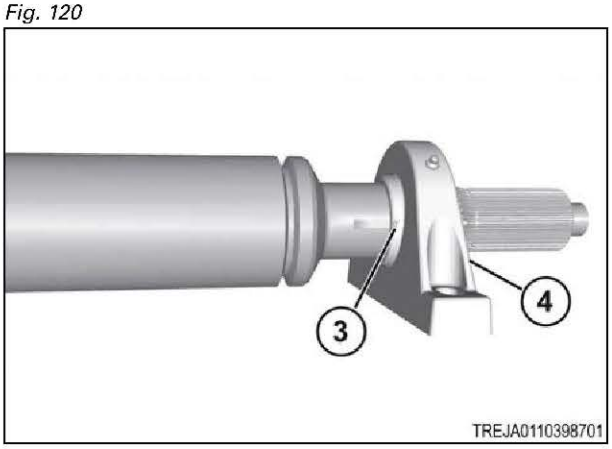

Fig. 121

5. Install the yoke (1) on to the rear drive shaft perpendicular to the welded yoke on the opposite end of the rear drive shaft.

6. Install the washer and the lock nut (2).

   Tighten the lock nut to 357 Nm (263 lbf ft).

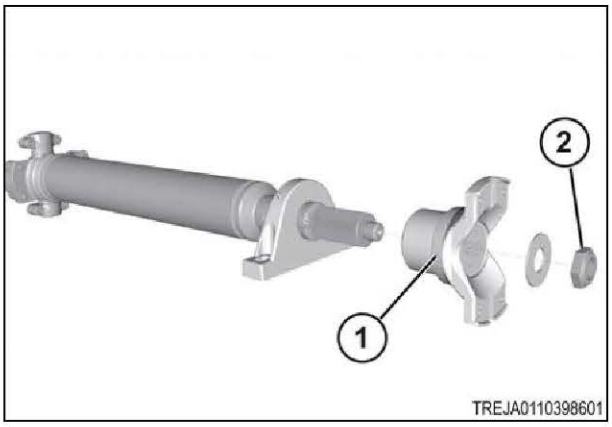

Fig. 122

6.3.36 Install the rear drive shaft

Procedure

1. Use a correct lifting device to support and move the rear drive shaft (2) into position.

   IMPORTANT:
   The weight of the rear drive shaft is approximately 98 kg(216 lb)

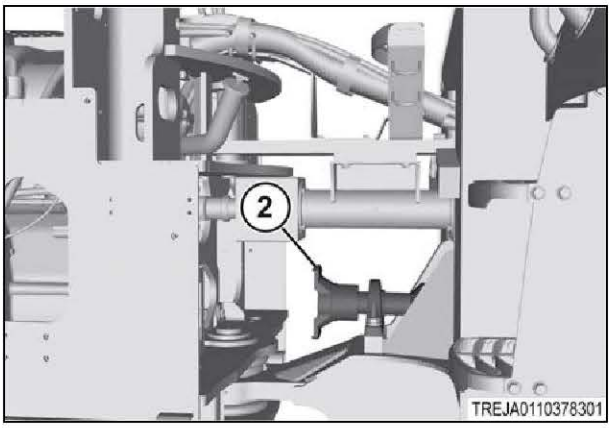

Fig. 123

2. Install the four bolts (3) that connect the rear drive shaft to the rear axle.

   Tighten the bolts to 150 Nm(111 lbf ft).

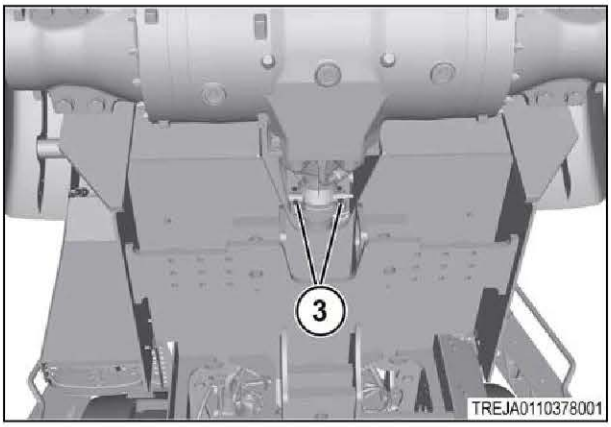

Fig. 124

3. Install the carrier bearing with the two bolts (4).

   Tighten the bolts to 675 Nm(498 lbf ft).

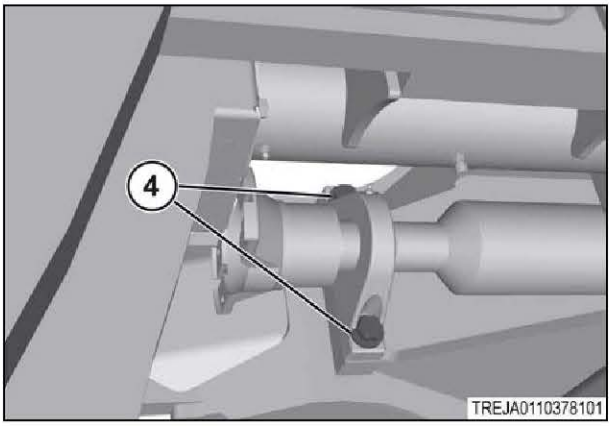

Fig. 125

6.4 Transmission troubleshooting

Machine will not move after starting engine	
Cause(s)	**Solution(s)**
The correct sequence was not performed for the operation procedure.	Move the transmission control lever to the neutral position or the park position. Next, move the transmission control lever to the forward or reverse position.

Inching operations unsatisfactory when using inching clutch control	
Cause(s)	**Solution(s)**
The transmission clutches are out of calibration.	See your dealer.
The inching pedal is out of calibration	Perform pedal calibration

Shifts are rough.	
Cause(s)	**Solution(s)**
The transmission clutches are out of calibration.	See your dealer.

Transmission will not operate	
Cause(s)	**Solution(s)**
There is a displayed fault code. The fault code indicates that the transmission is malfunctioning.	See your dealer.

Transmission oil pressures low	
Cause(s)	**Solution(s)**
Not enough oil in the system.	Fill the system with oil.
The oil supply to the charge pump is restricted or blocked.	Clean suction screen.

Transmission lube pressure is low.	
Cause(s)	**Solution(s)**
The relief valve for the transmission lube is malfunctioning.	See your dealer.

Transmission shifted to neutral.	
Cause(s)	**Solution(s)**
Overload on engine.	Shift down, increase engine rpm.

Inching pedal has diagnostic or is physically not returning to the released position.	
Cause(s)	**Solution(s)**
Inching pedal sensor out of adjustment.	See your dealer.

Power train oil overheat during transport	
Cause(s)	**Solution(s)**
Excessive oil level in power train system.	Drain excess oil from axles and transmission per instruction in the maintenance section.

6.5 Drivetrain system test and adjust

6.5.1 Test the implement oil cooler pressure

CAUTION: Machine movement hazard. Hydraulic pressure release.

Personal injury or machine damage can occur.

Stand clear of the machine and components when releasing hydraulic pressure.

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

NOTE:

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

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the park brake.
3. Turn the key start switch to the off position and take the key with you.
4. Move all the hydraulic control levers through the float position to relieve hydraulic pressure.
5. Stop the engine and remove the key.
6. Connect the correct tools to the quick disconnect pressure taps (1) and (2). The tools will read the inlet and the outlet pressure of the hydraulic oil cooler.
7. Start the engine. Operate the engine at high idle.
8. Make sure all the hydraulic control levers are in the hold position.
9. The difference between the gauges will be approximately 310 to 380 kPa (45 to 55 psi).
10. If the pressure differential is not correct, do the pressure test for the hydraulic oil cooler bypass valve.

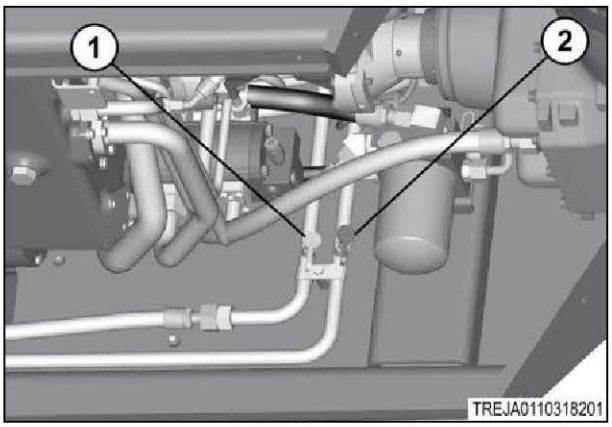

Fig. 126

Related Links

Test the implement oil cooler bypass valve pressure page 5-103

6.6 Drive train maintenance

6.6.1 Do a check of the power train fluid level - daily

The power train requires the use of an SAE 10W30 hydraulic oil that meets the AGCO 821XL specification.

Procedure

1. Park the machine on a level surface when checking the fluid. Stop the engine, apply the park brake, and take the key with you.
2. Before starting the engine, check that the fluid level is visible in the sight gauge (1).
3. Do not start the engine if fluid level is not visible in the sight gauge. Add fluid until level is visible in the bottom of the sight gauge before starting the engine.

   IMPORTANT:
   DO NOT overfill. An overfull system can make a system become too hot during high speed travel.

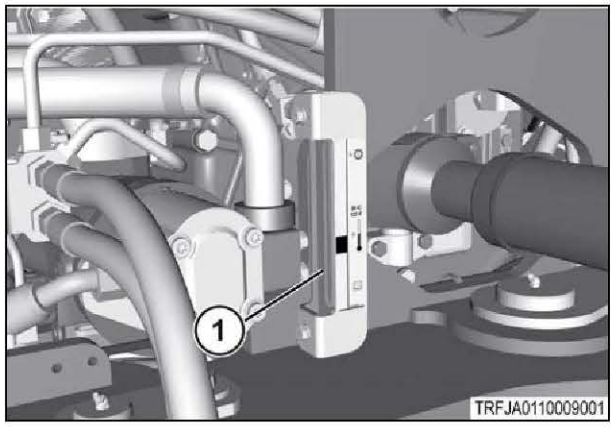

Fig. 127

6.6.2 Change the power train system fluid

WARNING:
Hot oil and hot components can cause personal injury. Do not let hot oil or hot components contact the skin.
The machine uses an isolated fluid circuit for the power train systems. The power train requires the use of an SAE 10W30 transmission/hydraulic oil that meets the requirements of the AGCO 821XL specification. The power train system operates the following operations:

- *Transmission control, cooling, and lubrication*
- *Axle cooling and lubrication*
- *Braking and differential lock activation (if equipped)*
- *Power take-off lubrication and control (if equipped)*

NOTE:
The power train holds approximately 185 L (48 gal) when completely empty. When changing the fluid, it is not possible to completely drain the powertrain. The amount drained will be approximately 170 L (45 gal).
.

NOTE:
Contain all fluids during inspection, maintenance, testing, adjustment, and repair of the machine. Before opening or disassembling any component containing fluids, prepare to contain fluids by having the correct containers available. Discard fluids according to local regulations and laws.

Procedure

1. Start and operate the machine for a period of five to ten minutes.
   This will let the machine warm up the oil.
2. Park the machine on a level surface when checking the fluid.
3. Stop the engine, apply the parking brake, and take the key with you.

4. Remove the fill cap lock (1).
5. Slowly remove the fill cap (2).

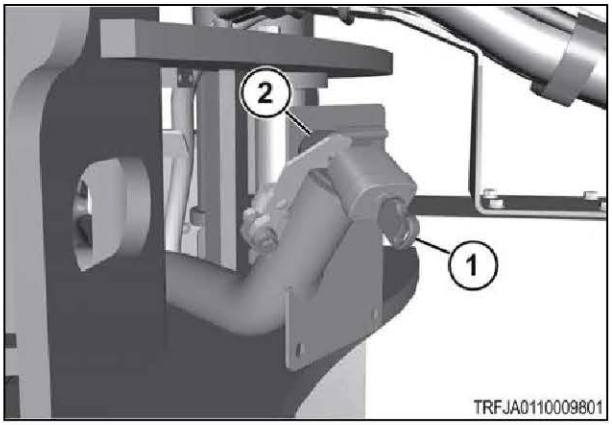

Fig. 128

6. Remove the transmission drain plug (1).
7. Let the oil drain into the correct container.

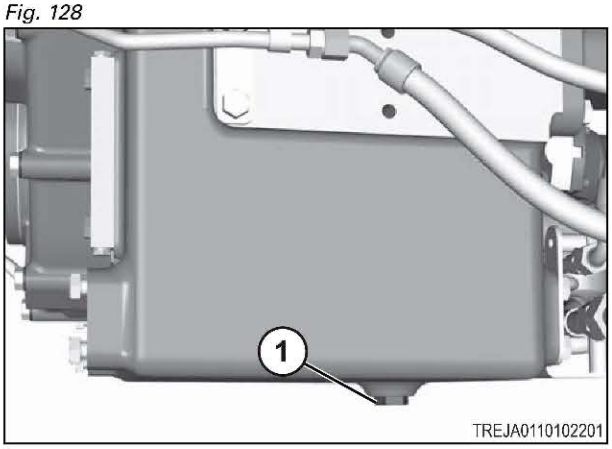

Fig. 129

8. Remove the five oil plugs (1) from the front axle. Let the oil drain into the correct container.

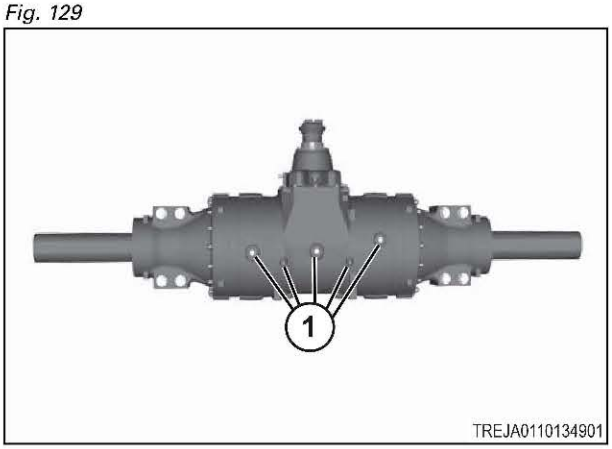

Fig. 130

9. Remove the five oil plugs (1) from the rear axle. Let the oil drain into the correct container.

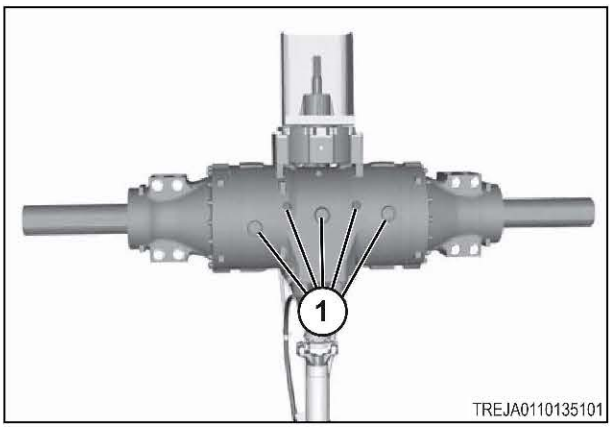

Fig. 131

10. Set an oil pan below the filters. When replacing the filters, a small amount of oil will be lost.

11. Remove the power train system filter (1).

12. Remove the high pressure brake filter (2).

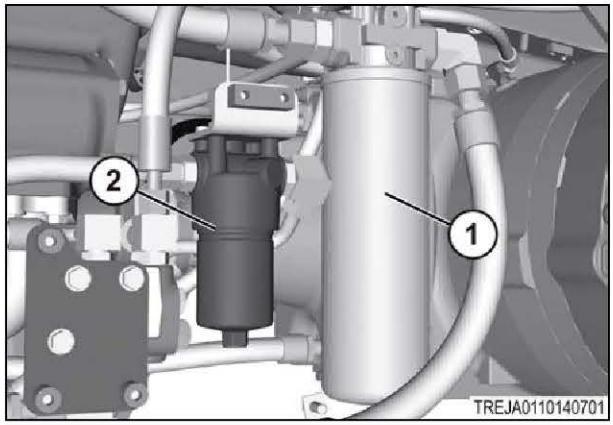

Fig. 132

13. Set an oil pan below the filter. When replacing the filter, a small amount of oil will be lost.

14. Remove the axle lubrication filter (1).

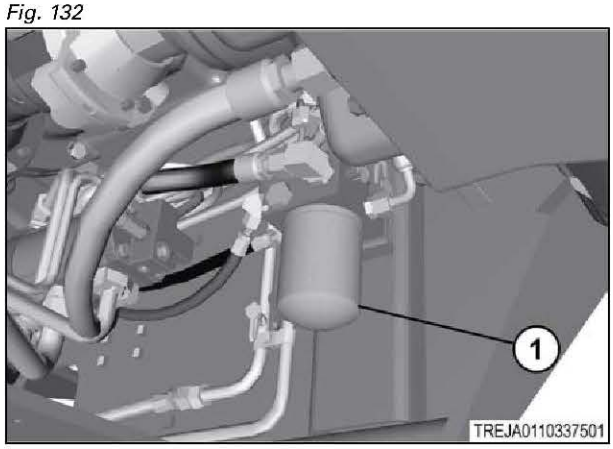

Fig. 133

15. Find the suction screen (1) at the front of the transmission.

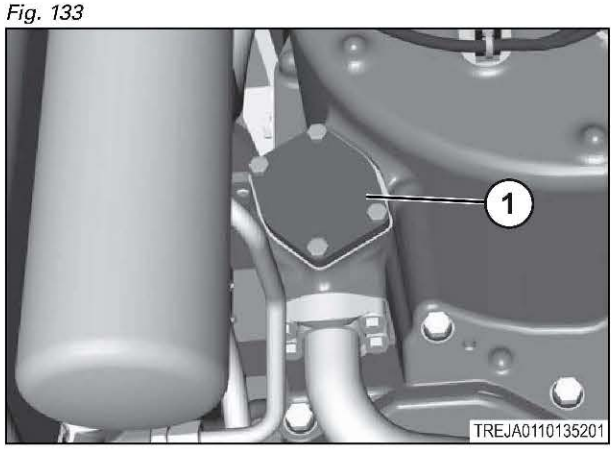

Fig. 134

16. Remove the mounting hardware (1) from the end cover (2).

17. Remove the suction screen (3) from the housing.

18. Wash the screen in a clean, nonflammable solvent and inspect for any damage.

19. Replace a damaged screen with a new screen.

20. Install the clean suction screen into the housing.

21. Install the end cover with the mounting hardware.

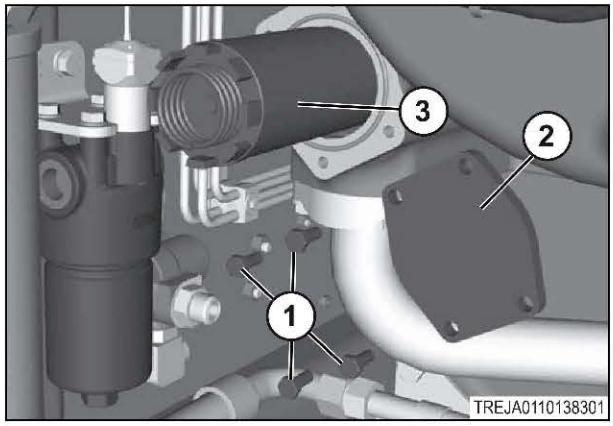

Fig. 135

22. Apply a thin layer of oil to the seal on the power train system filter (1) and high pressure brake filter (2).

23. Install the filters by hand.

24. When the filter seal contacts the filter base, tighten the filter elements by an additional 270 degrees.

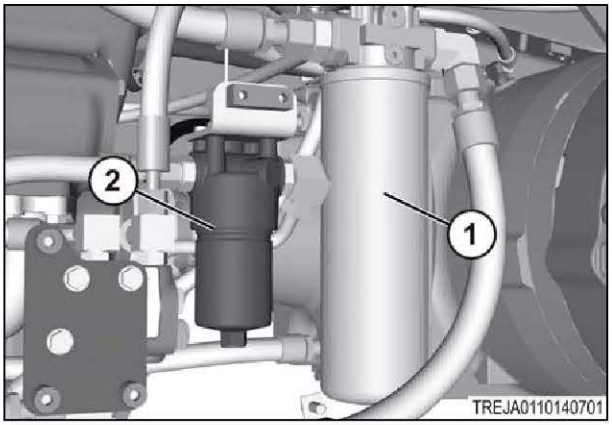

Fig. 136

25. Apply a thin layer of oil to the seal on the axle lubrication filter (1).

26. Install the filter by hand.

27. When the filter seal contacts the filter base, tighten the filter elements by an additional 270 degrees.

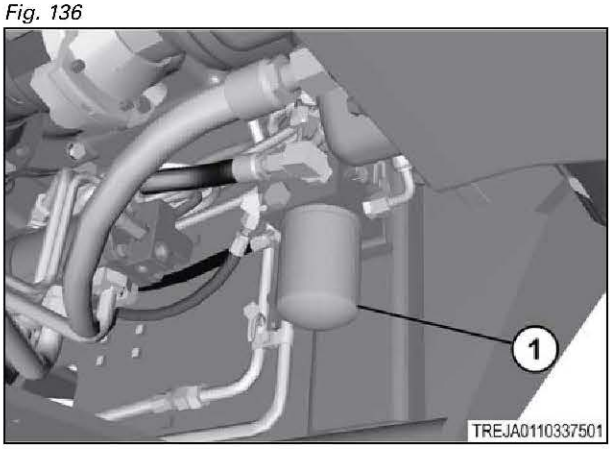

Fig. 137

28. Apply a thin layer of oil to the drain plugs (1) and install the five oil plugs to the front axle.

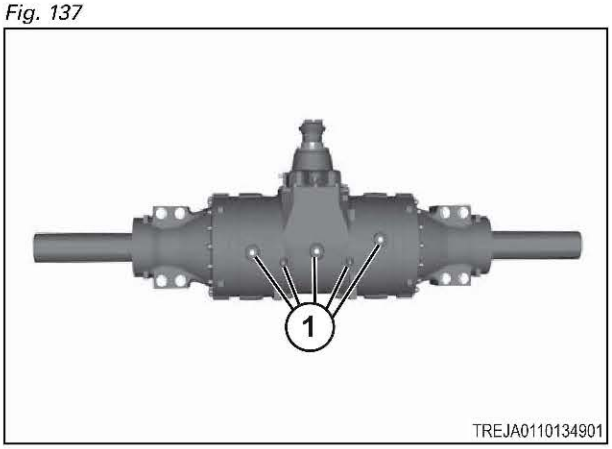

Fig. 138

29. Apply a thin layer of oil to the drain plugs (1) and install the five oil plugs to the rear axle.

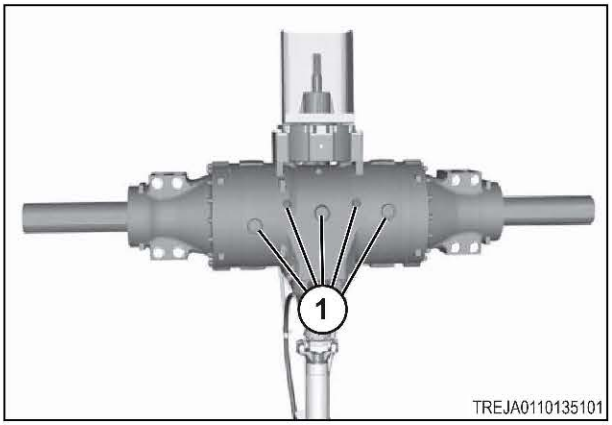

Fig. 139

30. Apply a thin layer of oil to the drain plug (1) and install the transmission drain plug (1).

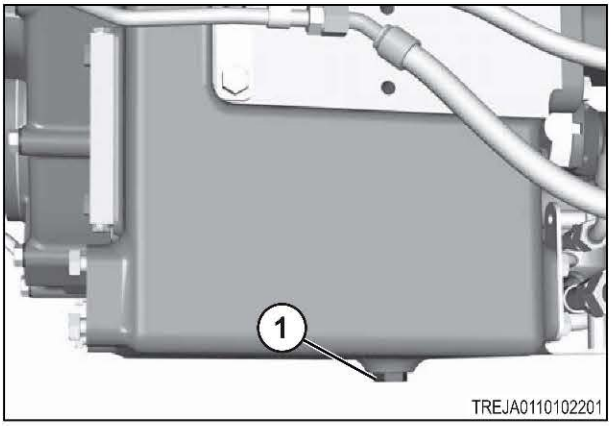

Fig. 140

31. Add SAE 10W30 transmission/hydraulic oil that meets the requirements of the AGCO 821XL specification through the transmission oil fill tube (1).

NOTE:
The approximate amount of oil necessary is 170 L (45 gal). Do not overfill.

32. Follow the power train oil level checking procedure to adjust the final oil level.

IMPORTANT:
DO NOT overfill. An overfull system can make a system become too hot during high speed travel.

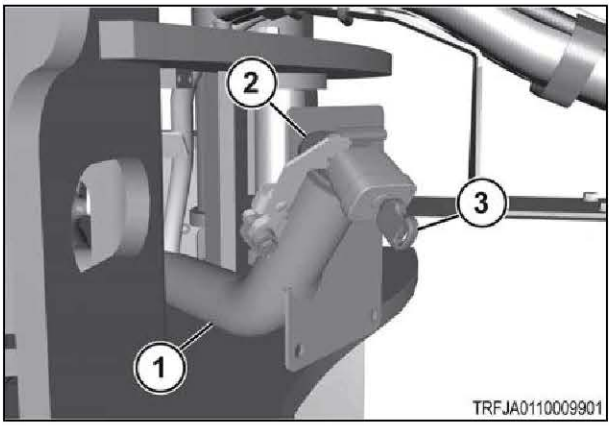

Fig. 141

33. Install the fill cap (2).

34. Install the fill cap lock (3).

Related Links

Do a check of the power train fluid level - daily page 6-55
Lubricant viscosities page 1-18

6.6.3 Clean the breather (transmission)

Procedure

1. Clean the breather as required.

2. Find the breather, on the rear of the transmission.

3. Loosen and remove the breather (1).

4. Clean the breather in clean nonflammable solvent.

5. Install the breather

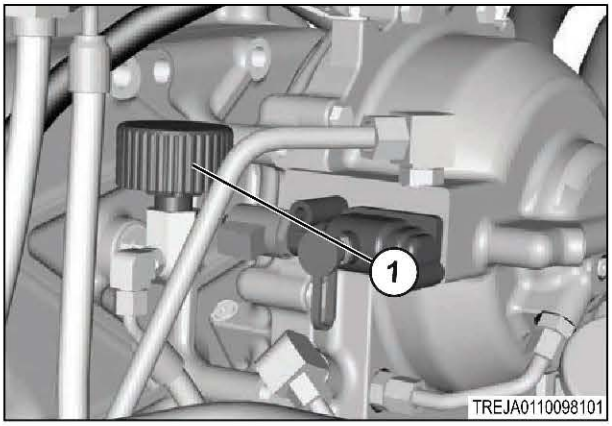

Fig. 142