7 Brake system

7.1 Service and brake system operation

General information

The section tells the features and the operation of the service brake and the park brake systems. In addition, the major electrical components and the hydraulic components are discussed.

The service and the park brake system use the same hydraulic circuit to do the individual tasks. Oil is drawn from the transmission sump by the rear section of the tri-section pump.

Service brakes

The machine has a hydraulic brake control system that uses pressurized oil from the transmission sump to engage the service brakes. The hydraulic oil from the tri-section pump will charge an accumulator. The pressurized oil from the accumulator is modulated to the service brakes by the service brake control valve.

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 oil to the park brake. The park brake valve uses pressurized oil from the tri-section pump. The park brake is actuated with the transmission control lever. Engage the park brake after stopping the machine.

7.1.1 Service and parking brake system block diagram

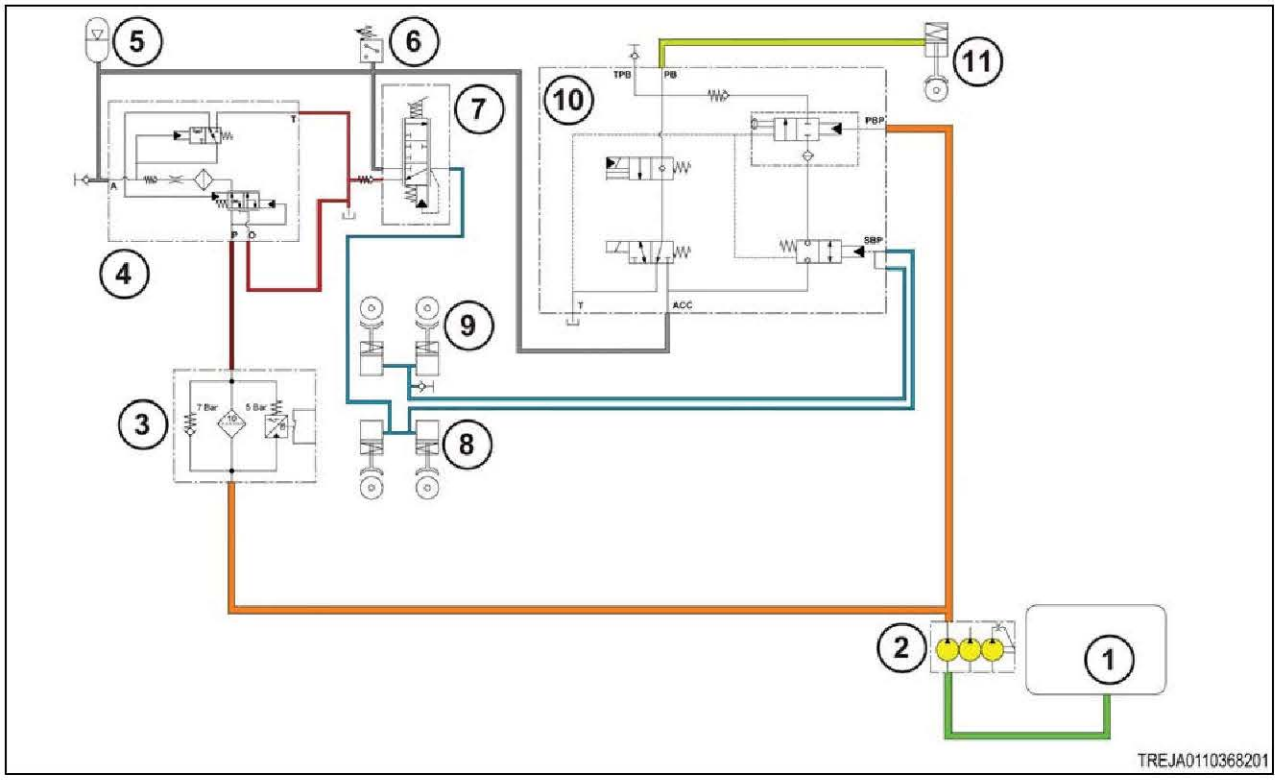

Fig. 1

Callout	Description
1	Transmission sump
2	Tri-suction pump
3	High pressure filter
4	Accumulator charge valve assembly

Callout	Description
5	Accumulator
6	Pressure switch
7	Service brake valve
8	Front service brakes
9	Rear service brakes
10	Park brake valve assembly
11	Park brake

7.1.2 Service brake operation

The hydraulic oil from transmission sump flows to the rear section of the tri-section pump. The flow from pump moves to the high pressure filter. The filter is a 10 micron filter. The filter oil moves to the accumulator charge valve assembly.

During starting, The accumulator charge valve assembly directs oil to the accumulator. When the accumulator is fully charged, the access flow moves to the transmission sump.

Pushing the service brake pedal, the service brake valve lets oil from the accumulator to flow to the front service brakes and the rear service brakes.

The pressure in the accumulator lets full braking power even when the transmission system is not in operation. A fully charged accumulator provides four to six full service brake applications before the accumulator requires recharging.

7.1.3 Parking brake operation

Hydraulic oil from the transmission sump flows to the rear section of the tri-section pump. The flow from the pump moves to the high pressure filter. The filter is a 10

micron filter. Filter oil moves to the accumulator charge valve assembly.

During starting, The accumulator charge valve assembly directs oil to the accumulator. When the accumulator is fully charged, the access flow moves to the transmission sump.

When the park brake releases, the first spool in the park brake valve will shift letting oil to flow from the accumulator to the second spool. The oil moves the check valve in the second spool letting the oil flowing from the accumulator to the park brake.

When the operator engages the park brake, the second spool in the park brake valve shifts letting oil flow from the park brake. The first spool then lets oil to return to the transmission.

7.2 Trailer brake system (optional)

The Trailer brake system operates off of the same hydraulic flow as the steering implement system.

The trailer brake valve (1) receives a signal from the braking system when the operator applies the brake. The trailer brake valve routed the hydraulic flow to the rear coupler and on to the trailer brakes.

Trailer brake system consists of:

- Variable displacement piston pump
- Steering/priority valve
- Trailer brake valve
- hydraulic oil reservoir

The variable displacement piston pump sends the hydraulic flow to the steering/priority valve. The priority flow from the valve is routed into the trailer brake valve.

When the service brake is applied, a load sense signal is sent to the open trailer brake valve. This allows the flow to the trailer brake coupler at the rear of the machine. The hydraulic flow is sent through the coupler, to the trailer brakes, if a trailer is attached.

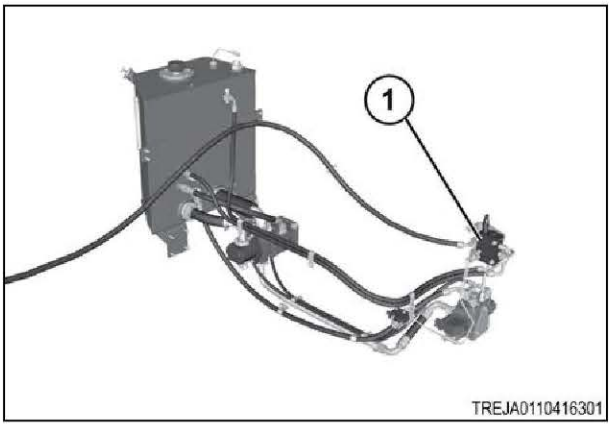

Fig. 2

7.2.1 Implement hydraulic pump

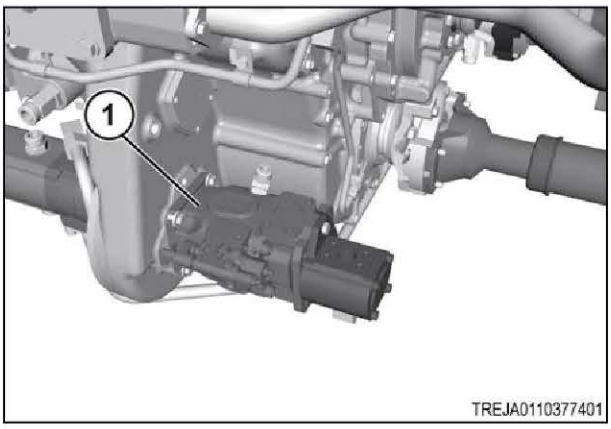

Fig. 3

The implement hydraulic pump (1) is located on the left-hand side of the machine, mounted to the rear of the transmission.

The standard implement hydraulic pump is 63 cm^3 (3.8 in^3) and can of produce a maximum flow of 165 liters/min (43.5 gal/min).

A 85 cm^3 (5.2 in^3) implement hydraulic pump is standard on special application machines. The pump is also available as an option on agricultural machines. The flow rate of the implement hydraulic pump is 223 liters/min (59 gal/min).

The implement hydraulic pump is a variable displacement axial piston pump. The pump has load sensing and pressure compensation. The pump delivers a maximum output pressure of 200 to 206 bar (2900 to 2988 psi).

The hydraulic pump supplies oil to the following components:

- Steering
- Hydraulic control valves
- Hydraulic power beyond (if equipped)
- Hydraulic trailer brakes system (if equipped)

The compensator valve (1) is fastened to the side of the hydraulic pump.

The compensator controls the pump output flow in response to the following systems:

- Load sensing signal (2)
- Implement valve reference signal (3)

The compensator valve also acts as a backup for limiting maximum system pressure.

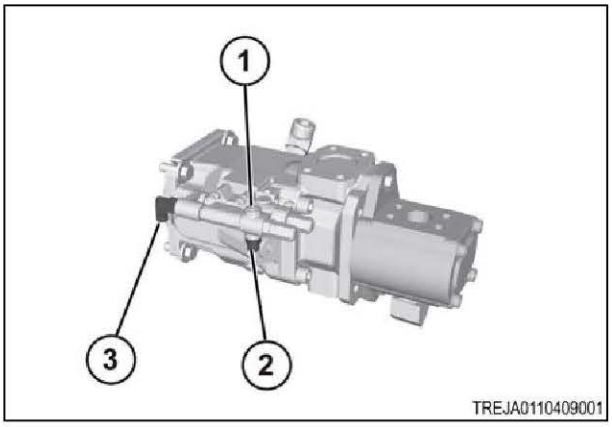

Fig. 4

7.2.2 Steering - priority valve

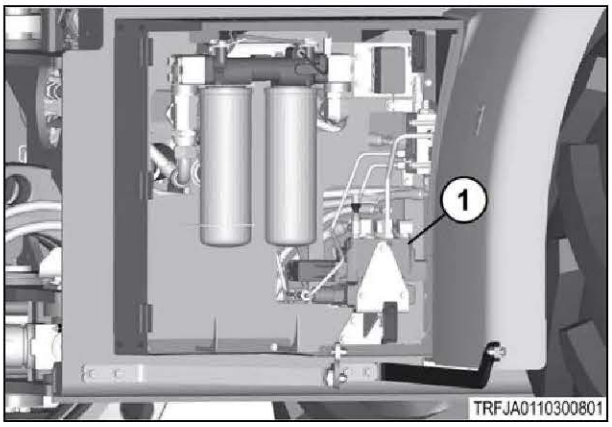

Fig. 5

The steering/priority valve is both a steering and a priority valve built into one unit. The hydraulic flow enters the pressure port at the priority valve portion of the unit. The priority valve directs the flow between the steering and implement circuits. The valve receives a pilot signal from the steering motor, if the flow is required to direct vehicle motion. If there is no signal from the pilot line, the flow is directed out the excess flow port. The hydraulic oil then is directed to the implement system. If there is a signal from the pilot line, the flow continues to the steering valve portion of the unit.

The steering portion of the valve routes the flow from the steering motor to the appropriate steering cylinder. The pilot signal from the incoming hydraulic flow, shuttles the valve to direct the remaining flow toward the steering cylinders. In the electronically enhanced units, the electrical signals operate the solenoids that assist hydraulics in the shuttling spool valve. This directs the flow to the appropriate steering cylinder.

7.2.3 Hydraulic oil reservoir

The oil reservoir (1) is located on the left side of the front section of the machine. The oil reservoir holds filtered oil for the hydraulic pump for steering and implement hydraulic system.

The hydraulic oil reservoir is shared by the following systems:

- Implement hydraulic system
- Steering hydraulic system
- Trailer brake hydraulic system

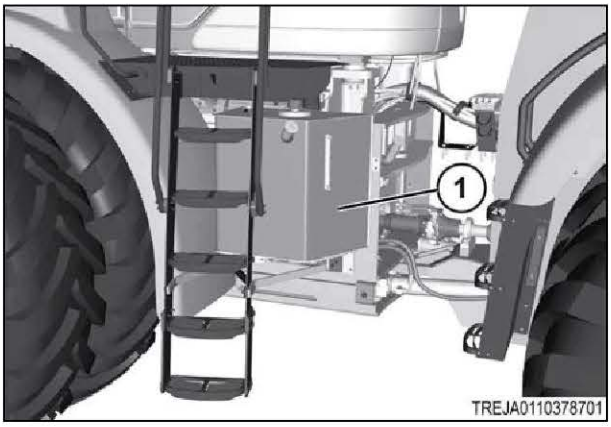

Fig. 7

The oil reservoir consists of the following components:

- Filler cap
- Breather
- Level switch
- Magnets
- Strainer
- Drain plugs
- Reservoir
- Sensor

Fig. 8

The reservoir has two sections. The front is filtered and the rear is not filtered. The oil circulates through the oil cooler and the oil filter by the implement charge gear pump. The hydraulic oil is pulled from the not filtered side by the implement charge pump. The hydraulic oil returns to the filtered side for use by the implement piston pump.

The hydraulic oil reservoir provides system oil for steering, implement and trailer brake hydraulic systems on the machine.

7.2.4 Breather

The breather (1) is located in the top of the hydraulic oil reservoir.

The breather lets air move in and out of the hydraulic oil reservoir.

The breather will filter particles larger than 2 microns.

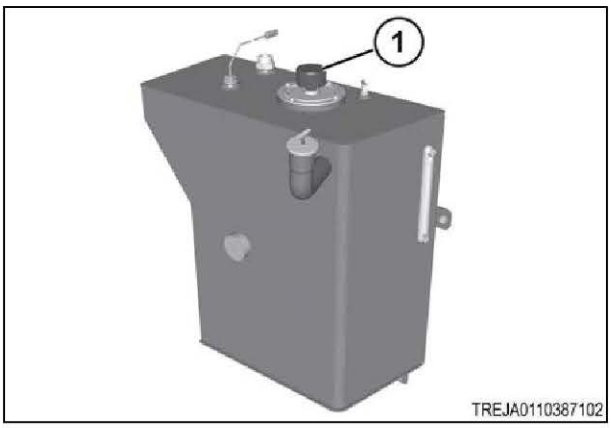

Fig. 9

7.2.5 Magnets

Two magnets (1)are located near the drain plugs in the hydraulic oil reservoir with one magnet in each section.

The magnets will collect small metallic debris in the hydraulic oil.

NOTE:
The image is a cut away view of the reservoir.

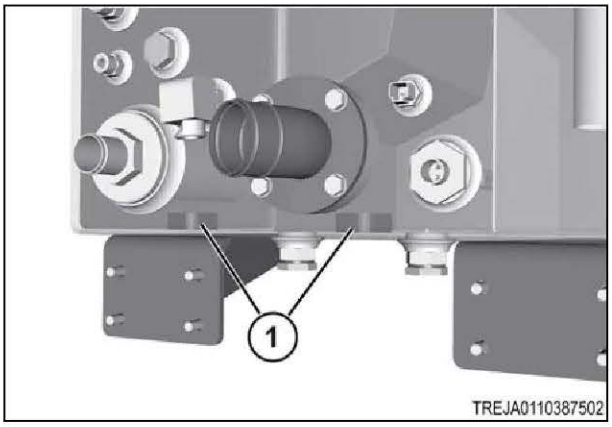

Fig. 10

7.2.6 Oil drain plugs

The hydraulic oil is drained from the reservoir by removing the drain plugs (1).

The drain plugs are located in the bottom of the reservoir. The front drain plug will drain the filtered section, and the rear drain plug will drain the unfiltered section.

See the information for changing the hydraulic oil.

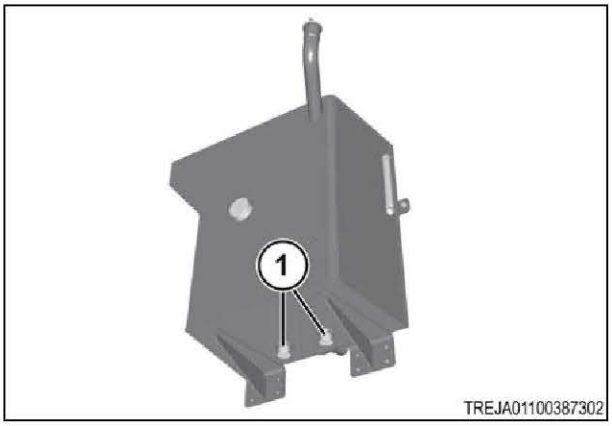

Fig. 11

7.2.7 Oil level switch

The oil level switch (1) is mounted in the top of the reservoir and sends a signal to the tractor management center to notify the machine operator if the oil level drops too low.

NOTE:
The image is a cut away view of the reservoir.

If the alarm sounds, there is a small amount of oil in the oil reservoir. This switch protects the hydraulic pump if there is a loss of oil, by notifying the operator.

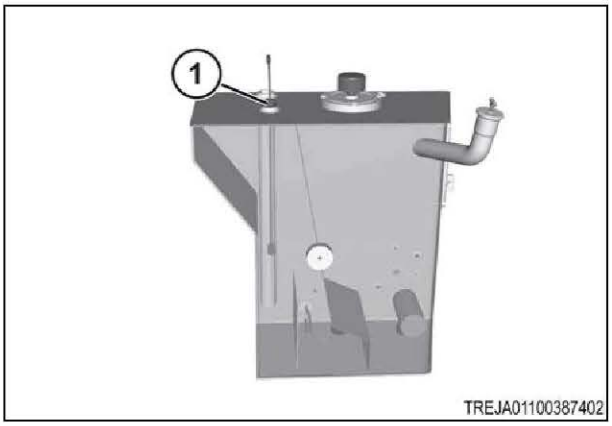

Fig. 12

7.2.8 Oil temperature sensor

The oil temperature sensor (1) is located in the filtered section of the oil reservoir.

The sensor sends a signal to the tractor management center showing the oil temperature to the operator.

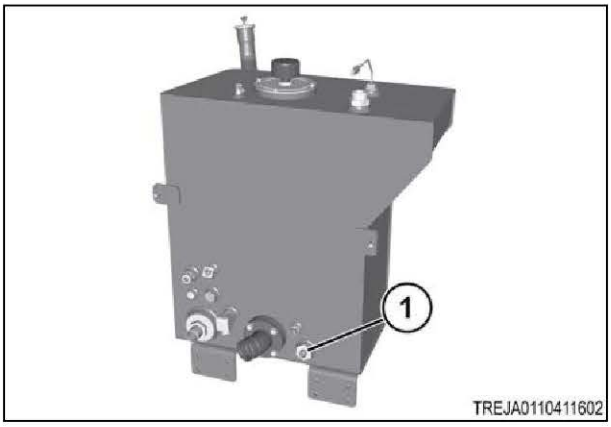

Fig. 13

7.2.9 Sight gauge

(1)

The sight gauge is located at the rear of the reservoir.

NOTE:
If operating the machine on a steep slope, the hydraulic oil level must be maintained at the FULL mark.

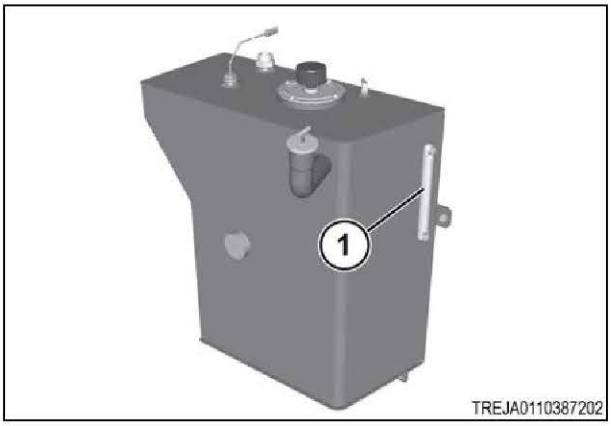

Fig. 14

7.2.10 Suction screen (charge pump)

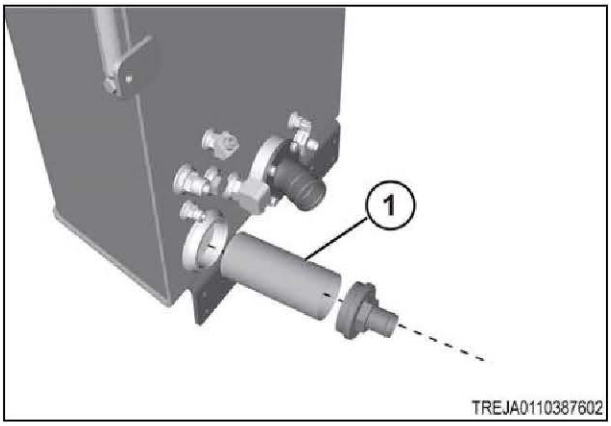

Fig. 15

The 20.7 kPa (3 psi) bypass valve (1) is located at the end of the suction screen (2). If oil is cold during the initial starting, unfiltered oil is allowed to bypass the suction screen.

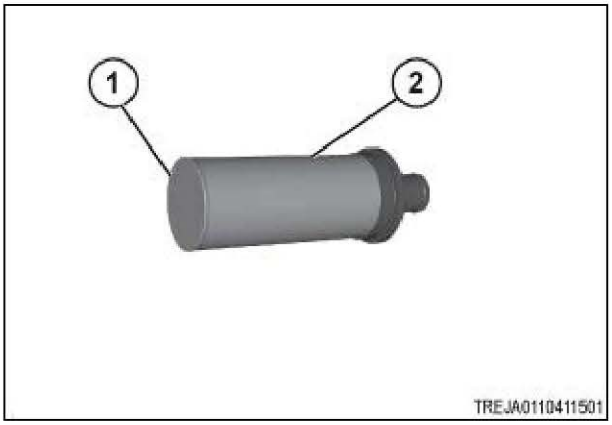

Fig. 16

7.2.11 Suction screen (implement pump)

The suction screen (1) for the implement charge pump is located in the rear section of the hydraulic oil reservoir.

The suction screen will filter particles larger than 200 microns. The suction screen filters all the oil before the oil is routed to the inlet of the charge pump.

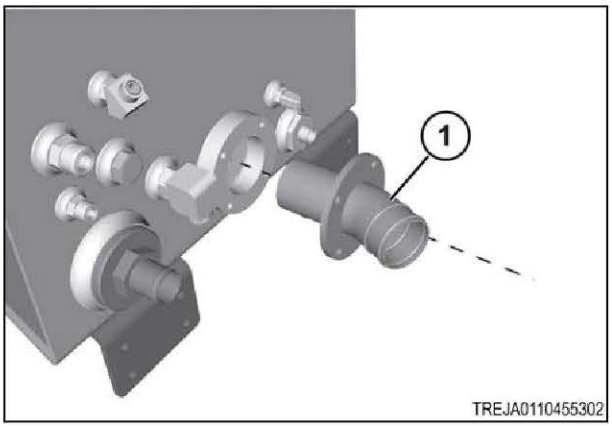

Fig. 17

7.2.12 Trailer brake valve

The trailer brake valve (1) is mounted in the service cabinet compartment on the right-hand side of the machine. The valve is mounted above the steering/ priority valve.

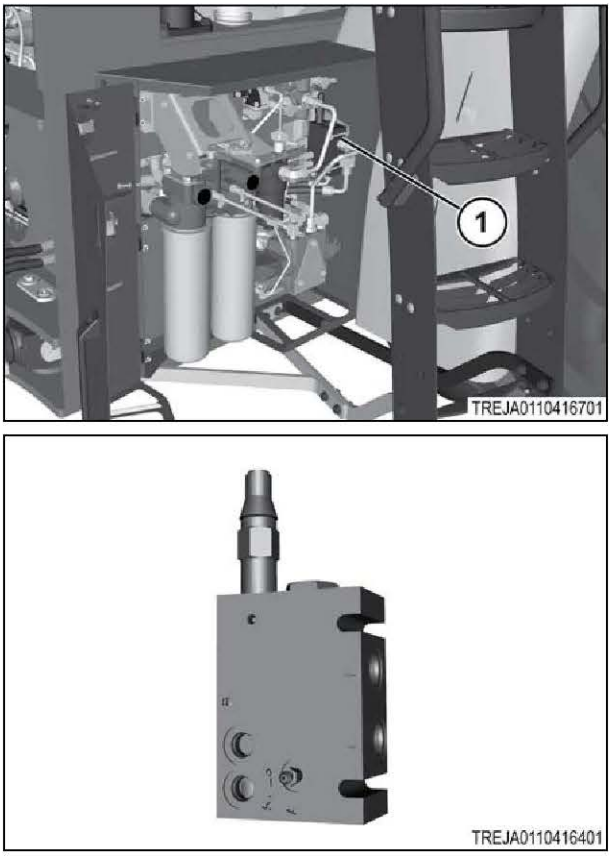

Fig. 18

The trailer brake valve controls the flow of hydraulic flow to the hydraulic brakes on a trailer towed behind the machine.

The hydraulic flow from the variable piston pump is routed through the steering/priority valve and into the P-port of the trailer brake valve. When the service brake is activated, the valve is shifted to let the hydraulic flow to go out the B-port to the brake coupler at the rear of the machine.

When the service brake pressure is removed, the valve shifts back which lets the brake pressure to release through the T-port to the unfiltered side of hydraulic reservoir.

7.2.13 Trailer brake coupler

The trailer brake coupler (1) is mounted to the rear of the machine.

When the service brake is pushed, the hydraulic oil flows through the coupler to the trailer brakes. When the service brakes are released, the hydraulic oil from the trailer brakes flow back through the coupler. The hydraulic oil is routed to the oil reservoir through the trailer brake.

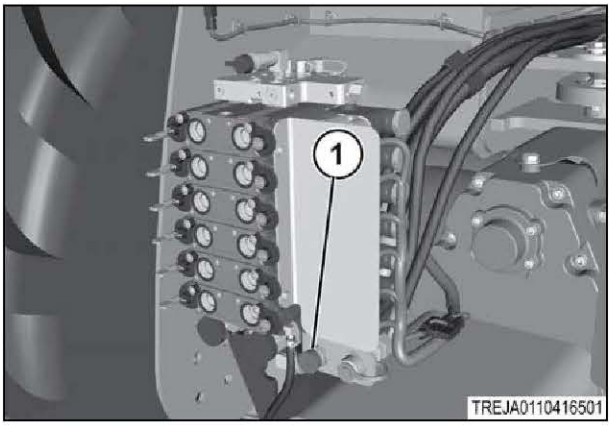

Fig. 19

7.2.14 Trailer brake schematic

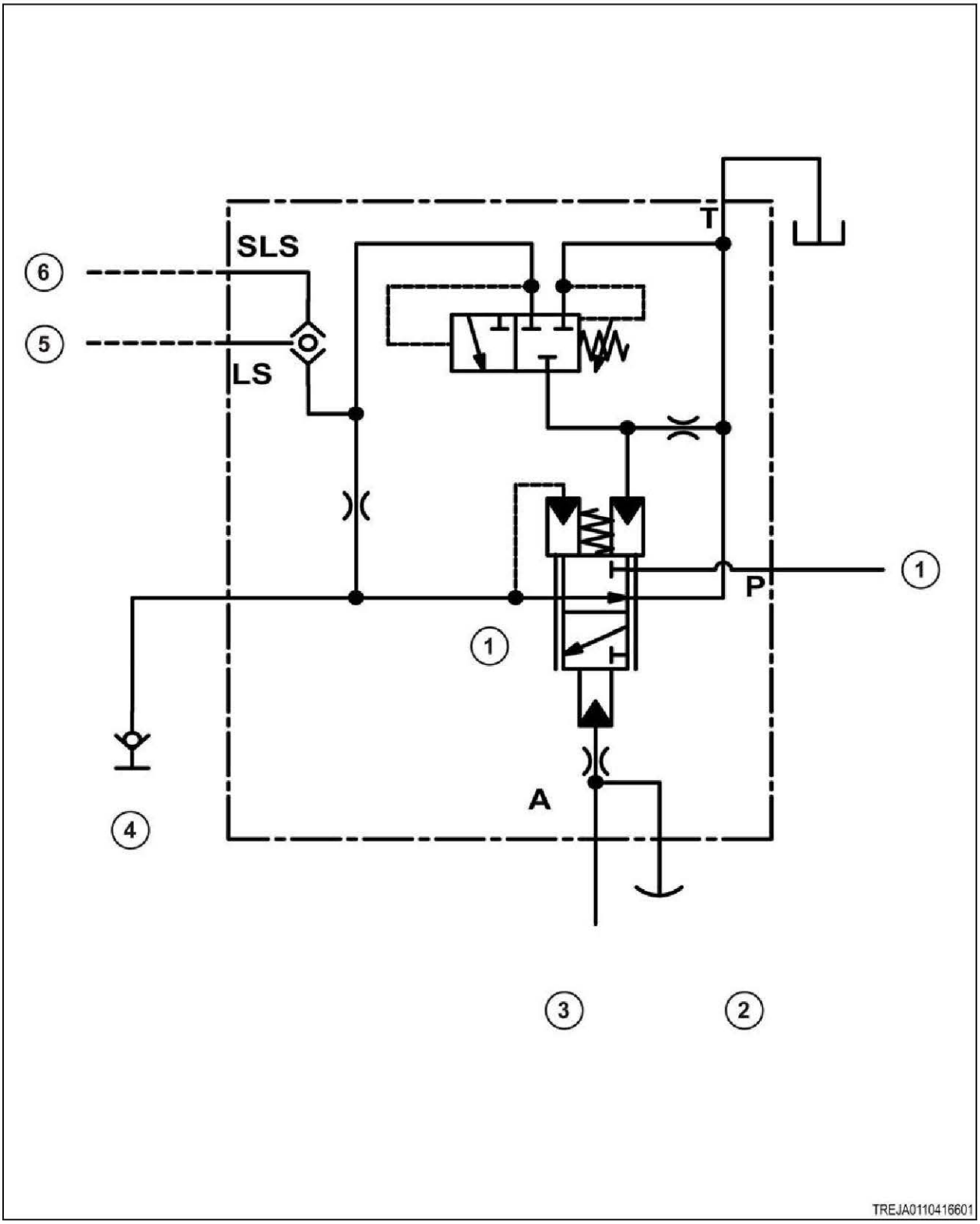

Fig. 20

1. P-port - pressure (from the steering/priority valve)
2. Bleeder fitting
3. A-port - pilot (from sevice brakes)
4. B-port - hydraulic coupler

5. LS-port load sense signal
6. SLS-port - steering load sense signal
7. T-port - to the reservoir

When the service brake is applied, a signal is sent to the A-port. This signal shuttles the valve to let the hydraulic pressure from the P-port to be sent out of the B-port, to the hydraulic coupler. A load sense signal is sent back to the hydraulic pump through the LS-port.

When the pilot pressure is removed, the spring shuttles the valve to the block hydraulic flow from the pump. This lets the pressure in the brakes to be relieved. The hydraulic oil is routed to the reservoir through the T-port.

7.3 Service and parking brake components

7.3.1 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

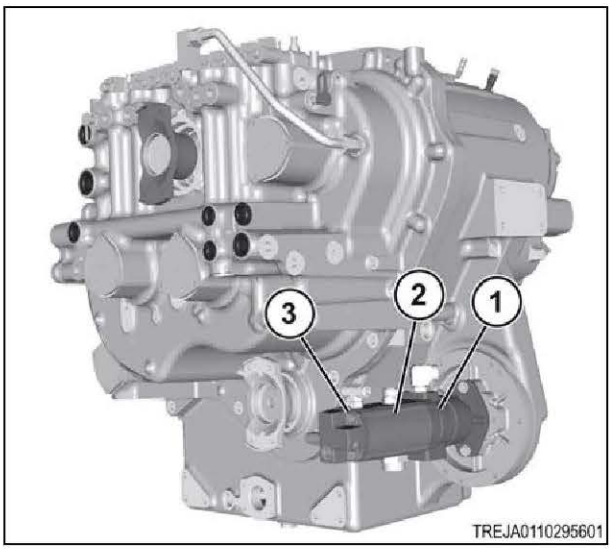

Fig. 21

7.3.2 Brake charge filter

The brake charge filter (1) is on the inner right-hand frame rail next to the transmission filter.

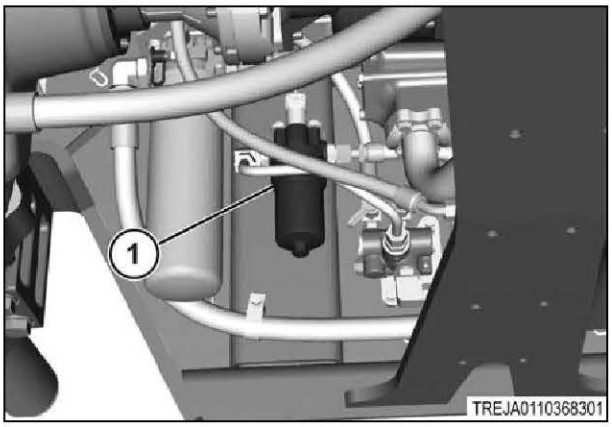

Fig. 22

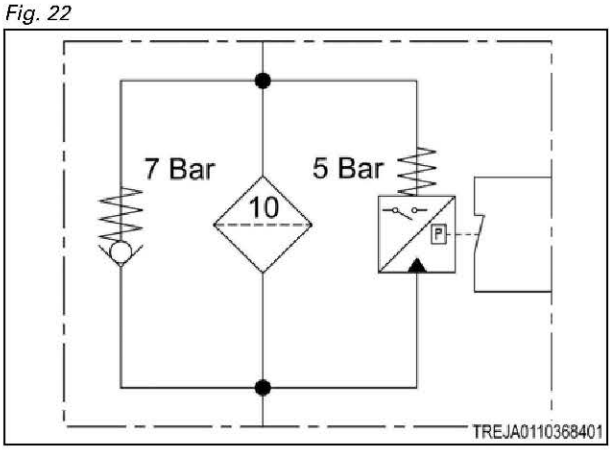

Fig. 23

7.3.3 Brake accumulator charge valve

The accumulator charge valve (1) is on the inner right-hand frame rail. After starting the machine, the accumulator charge valve directs hydraulic oil to charge the accumulator.

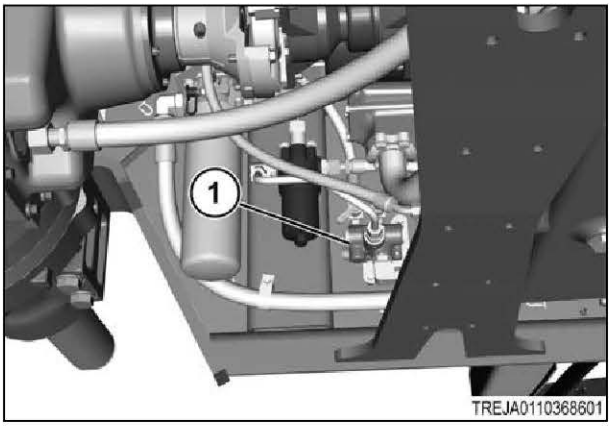

Fig. 24

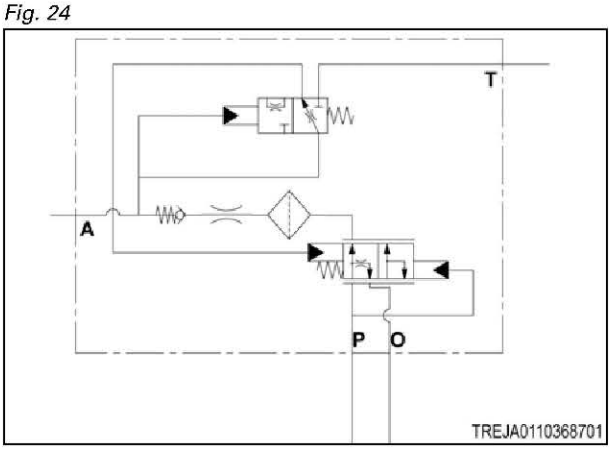

Fig. 25

7.3.4 Accumulator

The accumulator (1)is on the inner right-hand frame rail.

The pressure in the accumulator let full braking power. The accumulator release the park brake. A full accumulator provides four to six full applications of the service brakes before needing charged again.

The accumulator has a charge pressure of 7239 kPa (1050 psi). The accumulator has a service pressure of 19 995 kPa (2900 psi)). The accumulator has a bursting pressure of 84 000 kPa (12 174 psi).

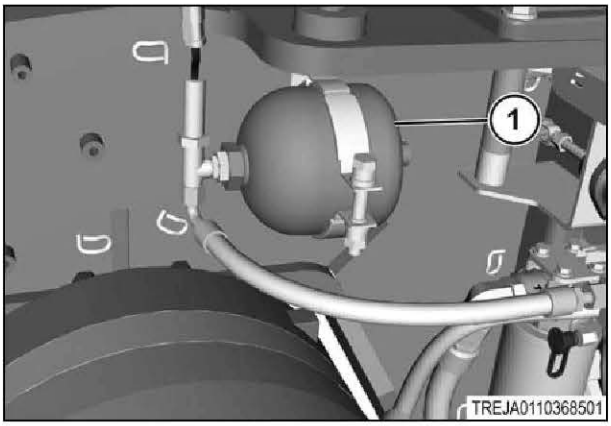

Fig. 26

7.3.5 Accumulator pressure switch

The accumulator pressure switch (1) is next to the accumulator (2) on the inner right-hand side of the frame rail.

Actuation pressure	10700 kPa (1552 psi) max
Deactuation pressure	8423 to 9497 kPa (1222 to 1378 psi)
Contact (A-B) position	Normally open below deactuation pressure
Contact (A-C) position	Normally closed below deactuation pressure

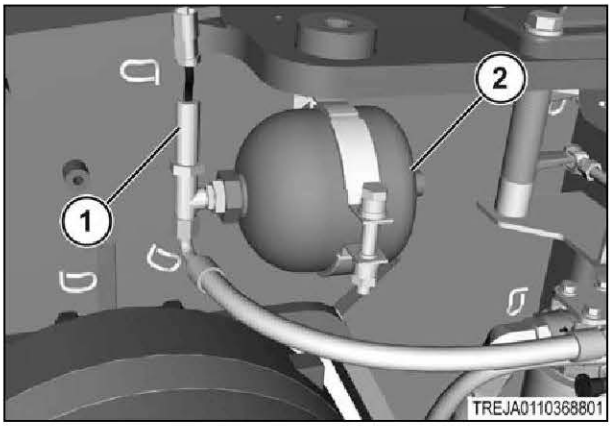

Fig. 27

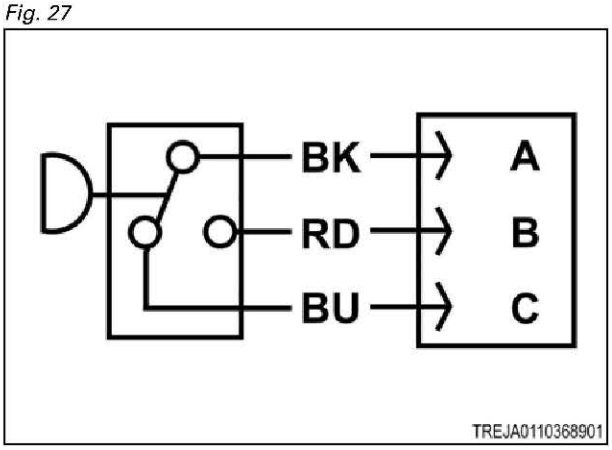

Fig. 28

7.3.6 Service brake valve

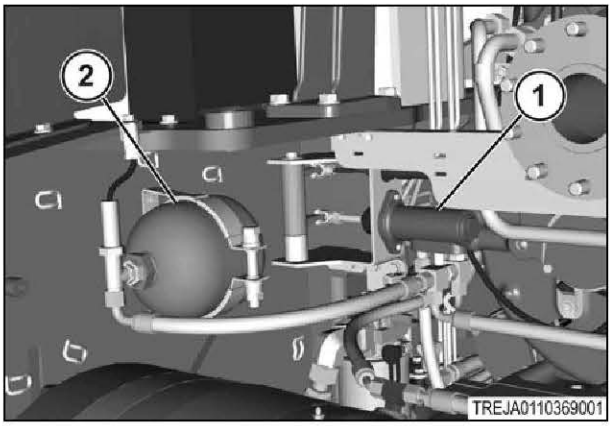

Fig. 29

The service brake valve (1) is to the right of the accumulator (2) on the inner right-hand frame rail.

When the service brake pedal is pressed, the service brake valve lets hydraulic oil flow from the brake accumulator to the service brake.

The following are the locations on the service brake valve(1):

- (2) Port to the tank (T port)
- (3) Port to the service brakes (A port)
- (4) Port from the service brake accumulator (P port)

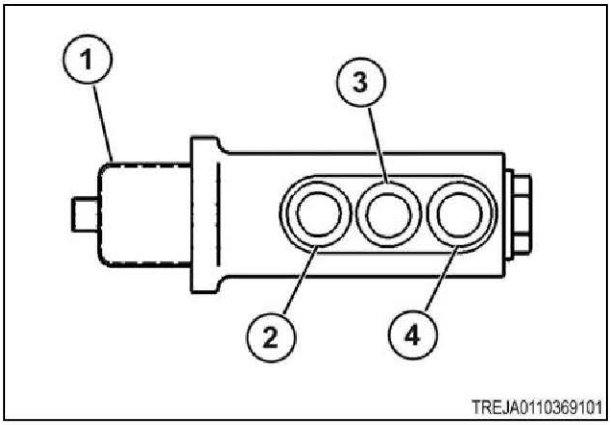

Fig. 30

Application of the service brake

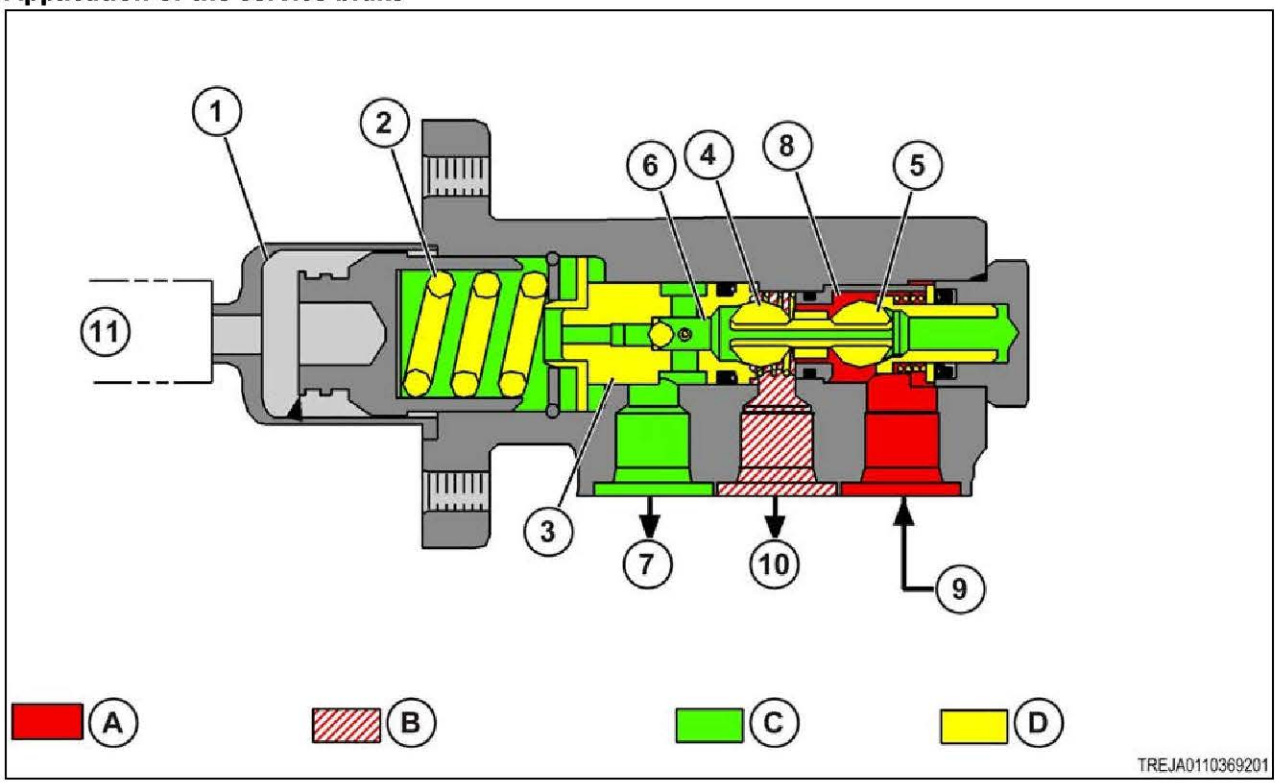

Fig. 31

Call out	Description
A	System pressure
B	First pressure reduction
C	Sump
D	Activated components
1	Linkage
2	Spring
3	Piston
4	Seat
5	Ball valve

Call out	Description
6	Passage
7	To tank
8	Seat
9	From accumulator
10	To service brakes
11	Brake pedal

When the operator presses the service brake pedal, the linkage (1) pushes on the pressure regulating the spring (2). The pressure regulating the spring (2) pushes the piston (3). The piston (3) pushes the seat (4) against the ball valve (5). This procedure closes off the passage (6) from the tank port (7).

At same time, the ball valve (5) is removed from the seat(8). The hydraulic oil from the accumulator flows past the ball valve (5) and to the service brakes (10).

As pressure to the brakes increases, the pressure pushes on the seat (4). The seat (4) then moves against the force of the pressure regulating the spring (2) until the hydraulic oil flow from the accumulator stops.

The pressure holds in the brake system until the brake pedal is pressed more or the brake pedal is released. If the operator reduces the brake pressure, the oil flows from the service brake (10) to the tank port (7) . The oil flows until the pressure regulating the spring (2) balances the hydraulic reaction against the seat (4). The flow to the tank port (7) stops, and the new brake line pressure is maintained.

The amount of force is applied to the service brake pedal is directly proportional to the brake line pressure. This relationship provides feel when the operator applies the brakes on the machine.

7.3.7 Service brakes

The service brakes (1) are in the left-hand and the right-hand trumpets in the front and rear axles.

The machine uses oil cooled multi-disc brakes. The service brake pedal activates the brakes in the front and rear axle at the same time.

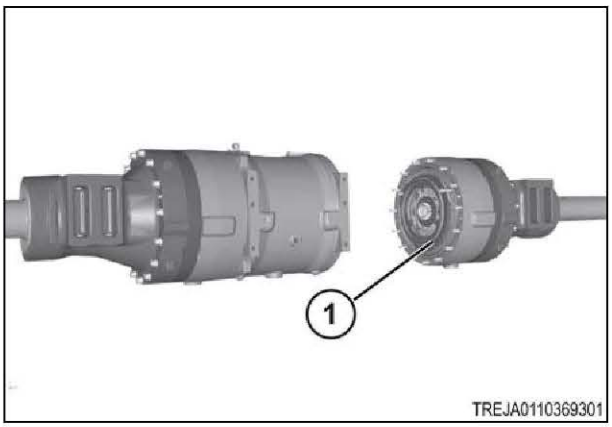

Fig. 32

7.3.8 Park brake valve

The park brake valve (1) is on the inner left-hand frame rail.

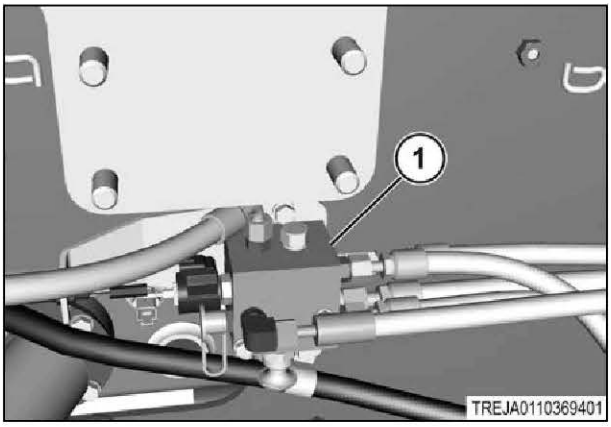

Fig. 33

The solenoid valves are an on/off valve. The machine module sends a signal to valves to actuate the park brake.

The solenoid valves control the flow of the hydraulic oil to the park brake.

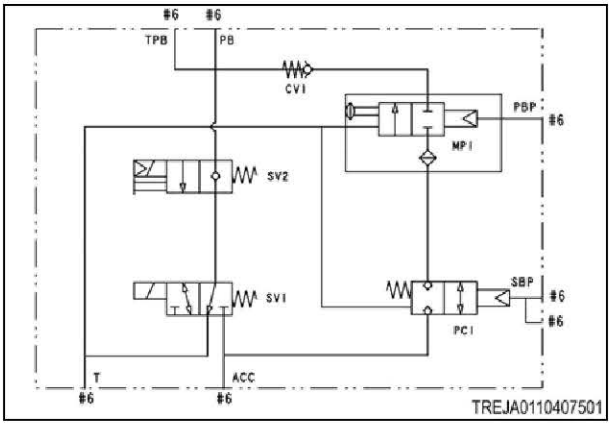

Fig. 34

Solenoid 1 (SV 1)	Solenoid 2 (SV 2)	Parking brake status
OFF	OFF	HOLD
OFF	ON	ENGAGEMENT
ON	OFF	RELEASED
ON	ON	RELEASED

The machine module monitors the solenoid valves for a fault. If a fault is found, the machine module logs the diagnostic code in the memory. The machine module engages the park brake after the machine stops. If the fault was a short to the ground on the SV 2, the park brake cannot release.

7.3.9 Park brake valve - engaged

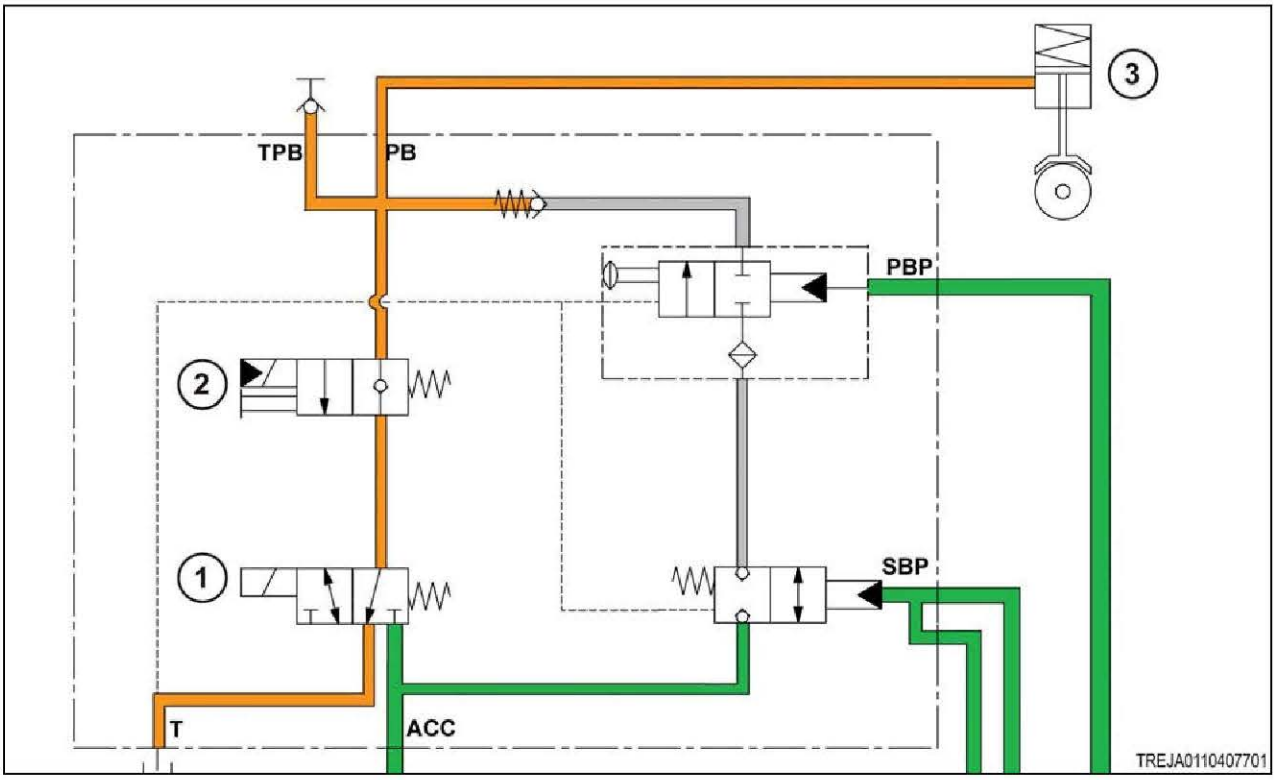

Fig. 35

An electrical signal goes to the machine module when the park brake lever is put to the park position. The machine module sends an electrical signal to the park brake valve. The solenoid valve (2) engergizes and shifts over to let oil from the park brake (3) to flow to the solenoid valve (1). The solenoid valve (1) is in a de-energized state and will let the oil return to the transmission. The solenoid valve (1) will also block the oil from the accumulator.

7.3.10 Parking brake valve - released

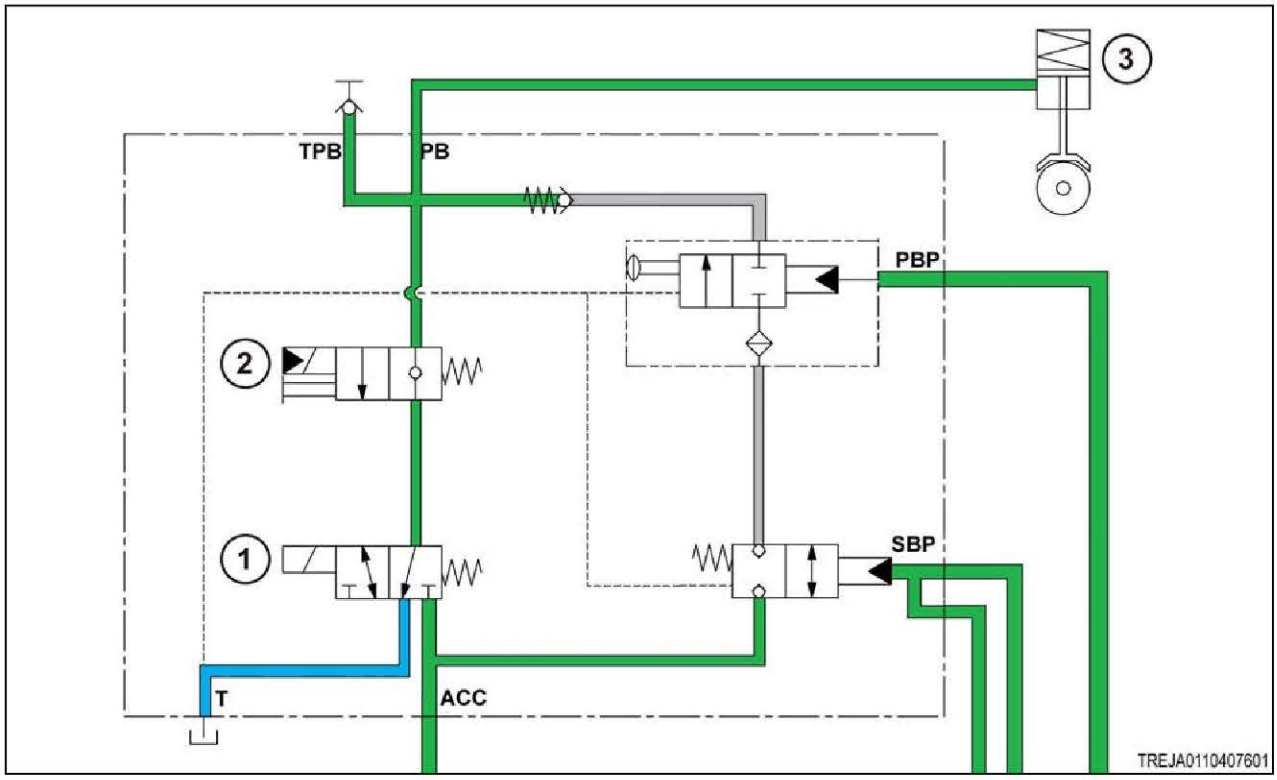

Fig. 36

A electrical signal goes to the machine module when the park brake lever moves out of the park position. The machine module sends an electrical signal to the park brake valve. The solenoid valve (1) energizes and shifts over to let oil from the accumulator to flow to the next solenoid valve (2). The solenoid valve (2) will be in a de-energized state. When oil reaches the solenoid valve (2), the oil will go through the check valve and travel out to the release park brake (3).

7.3.11 Parking brake valve - released with a non-operating engine

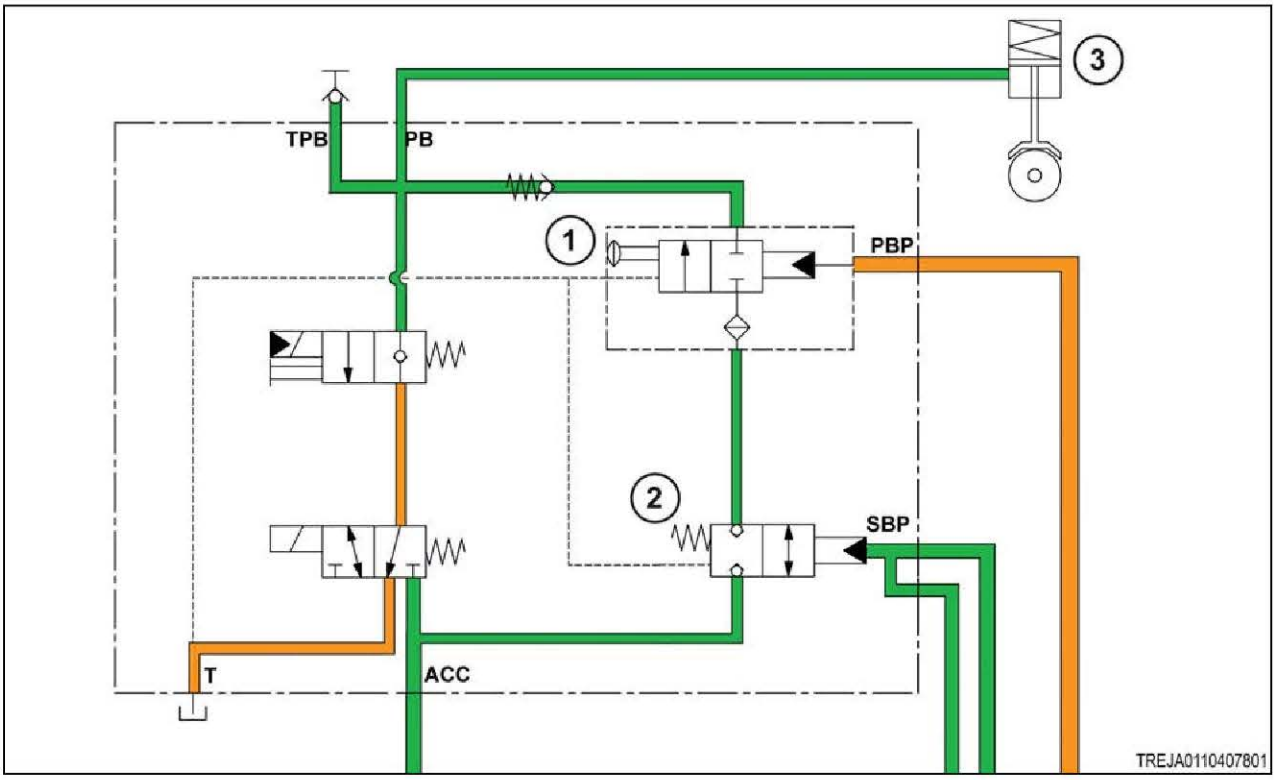

Fig. 37

The park brake can release if there is enough charge pressure in the accumulator in not operating machines.

The lever on the bottom of the park brake valve must be pushed in to shift the manual valve (1) over. The park brake valve is on the inner left-hand frame rail.

The service brake pedal inside the cab must be pressed down. Pressing down the pedal causes the balanced poppet valve (2) to shift over. When the poppet valve shifts over the oil in the accumulator goes to the park brake(3.)

7.3.12 Solenoid valve 1 (SV1)

Solenoid valve features:

- 3-way
- Direct acting
- Spool type
- Screw-in hydraulic directional valve

The valve lets flow go from port (2) to the port (1) while blocking at port (3) when the valve is not energized.

The valve spool shifts open from port (3) to the port (2) while blocking port (1) when the valve is energized.

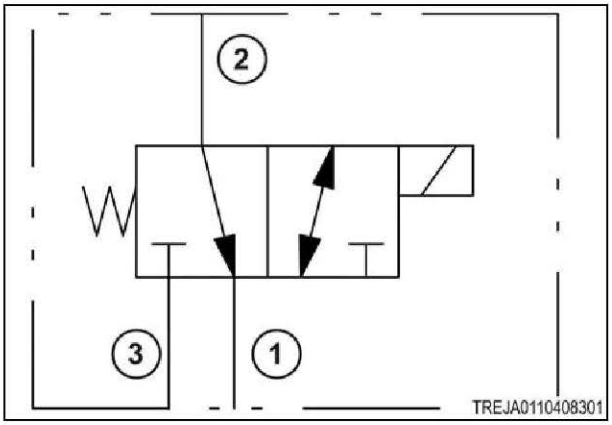

Fig. 38

7.3.13 Solenoid valve 2 (SV2)

Solenoid valve features:

- 2-way
- poppet-type
- screw in hydraulic cartridge valve
- Y-type manual override standard
- Solenoid-operated

The valve is for blocking or load holding devices. The devices are for low flow circuits with pull only manual override requirements for handles or cable linkage.

The valve is a check valve when not energized. The valve lets flow from port (1) to port (2) while blocking the flow from port (2) to port (1).

When the valve is energized, the valve poppet lifts to open the flow route from port (2) to port (1). The flow from port (1) to port (2) is reduced.

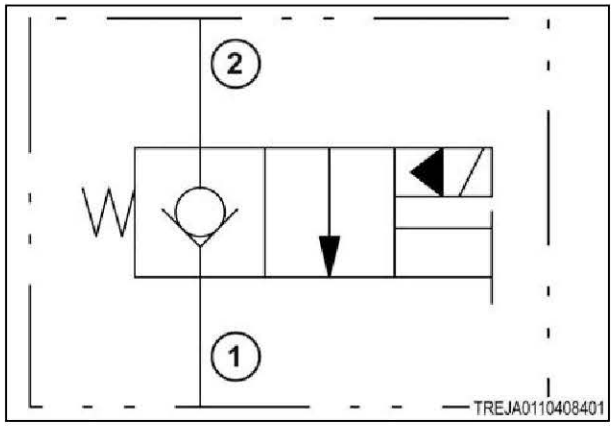

Fig. 39

7.3.14 Check valve 1 (CV1)

The valve is a screw-in, cartridge type, hydraulic check valve for a blocking or load-holding device.

The cartridge valve lets flow from the port (1) to the port (2) while normally blocking the flow in the opposite direction. The cartridge valve has a guide check which is closed until sufficient pressure is applied at the port (1) to open port (2).

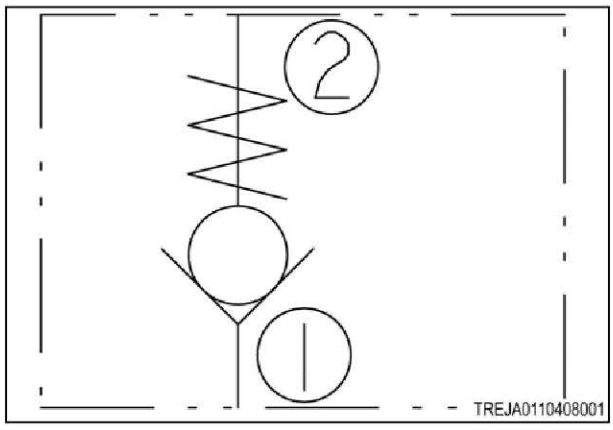

Fig. 40

7.3.15 Manual pull valve (MP1)

The valve has the following features:

- 3-way
- 2 position
- Manual pull to shift
- Directional hydraulic cartridge

The valve lets flow from the port (3) to port (2) in the neutral position. In the actuated position, the valve blocks the flow between the port (3) and the port (2) when the valve is manually pulled or piloted.

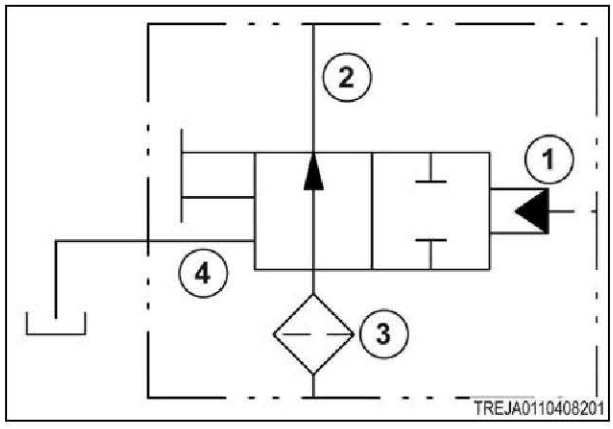

Fig. 41

7.3.16 Pilot operated check valve (PC1)

The pilot operated check valve is a normally closed, balanced poppet, switch element.

The pilot pressure at the port (3) shifts the valve to the open position. Port (1) and port (2) are fully sealed from port (3) and port (4). Port (1) and port (2) are hydraulically balanced.

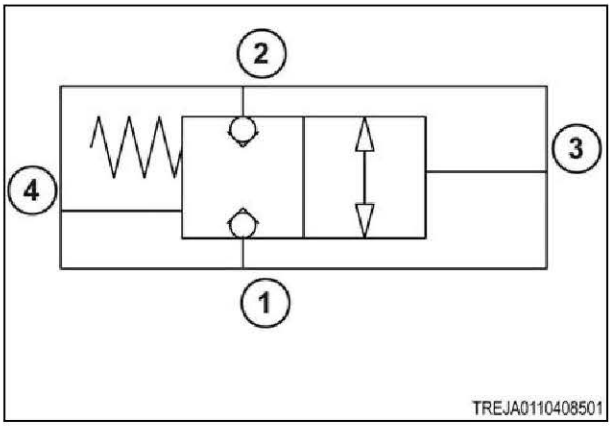

Fig. 42

7.3.17 Park brake

The park brake (1) is on the drive pinion for the front axle.

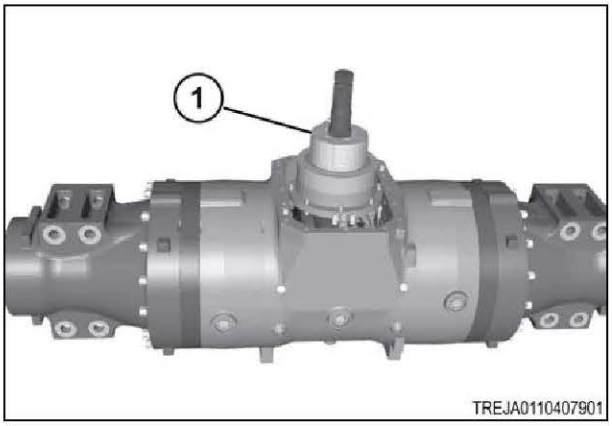

Fig. 43

7.4 Electrical components of park brake system

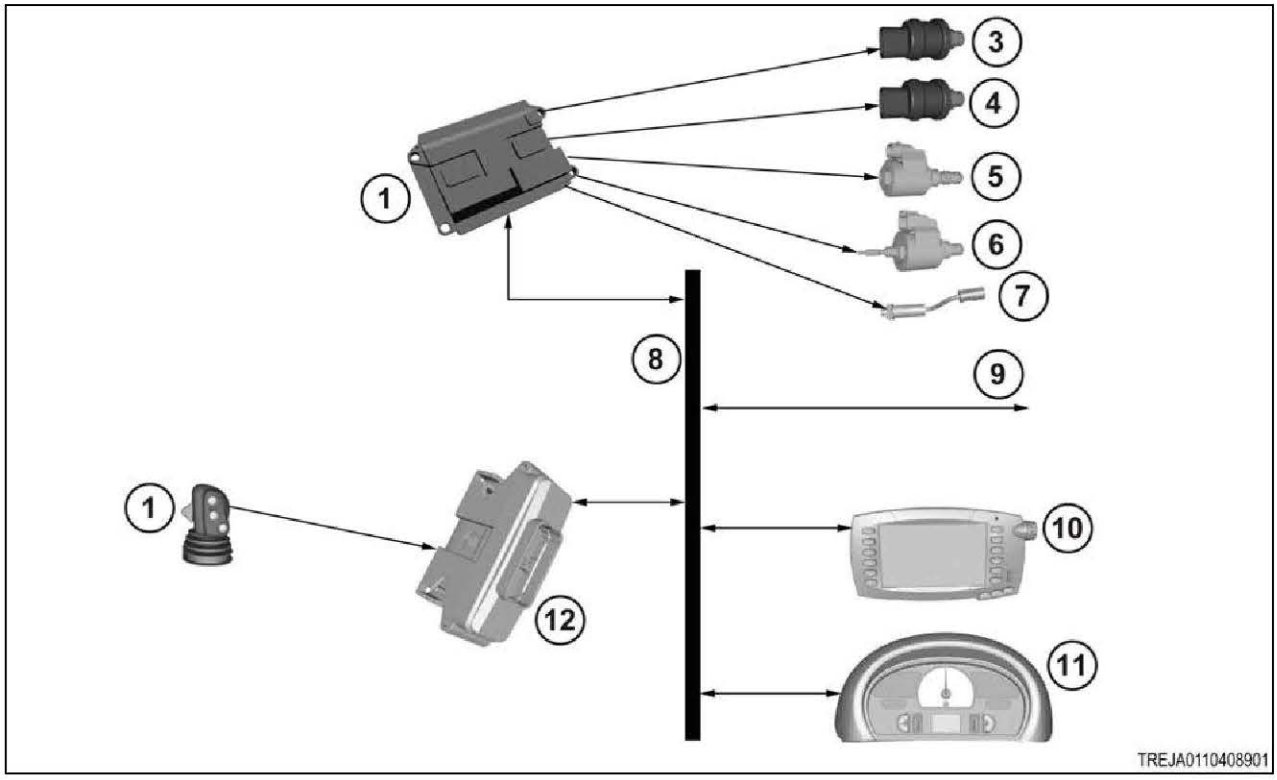

Fig. 44

Callout	Description
1	Transmission module
2	Park brake switch
3	Brake wear switch
4	Brake pressure switch
5	Park brake solenoid valve 1
6	Park brake solenoid 2
7	Brake accumulator pressure switch
8	CAN Data link
9	Optional electronic control module and service connector
10	Tractor management center (TMC)
11	Dash panel cluster
12	Armrest module

The park brake switch is active when the shift lever for the transmission control is in the park position.

A signal goes to the armrest module when the park brake switch is activated. The armrest module signals the transmission module. The machine module acutates the park brake by controlling the solenoid valves for the park brake.

IMPORTANT:
Premature park brake wear or park brake brake failure will occur if the park brake engages while the machine is still moving.

NOTE:
The transmission module can automatically energize the park brake after the machine has come to a stop to prevent injury if a problem is found.

The CAN data link 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
- Caterpillar electronic technician (ET)
- Other optional modules

7.5 Position of electronic components for the parking brake system

The electronic system for the park brake consists of the following components:

- Gear selector (park brake)
- CAN data link
- Transmission module
- Armrest module
- Solenoid valves (park brake)

7.5.1 Gear selector

The park brake control is part of the gear selector (1). The park brake engages when the gear selector shifts to the right.

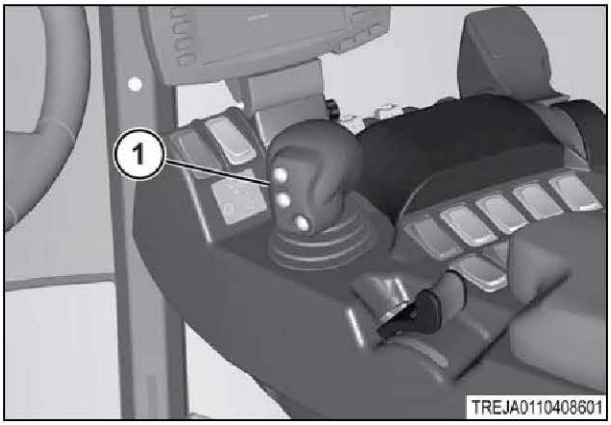

Fig. 45

7.5.2 CAN data link

There are three controller area network (CAN) busses in the machine. The connectors to these busses are:

1 Powertrain bus
2 Auxiliary bus
3 ISO bus

The CAN data link is located in the wire harness. The connectors for the CAN data link are located in the cab wall on the right-hand side of the seat. The CAN data link communicates with the following components:

- Armrest module
- Transmission module
- Display module for the Tractor Management Center (TMC)
- Dash panel cluster
- Other electronic components

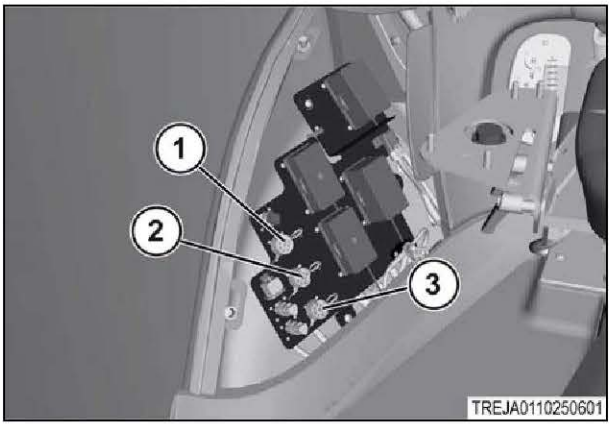

Fig. 46

7.5.3 Transmission module

The transmission module (1) is located in the floor of the cab. The transmission module communicates with the armrest module, the dash cluster, and the Tractor Management Center (TMC) through the controller area network (CAN) BUS network.

The transmission module controls the following components:

- Transmission
- Steering
- Parking brake
- Power take off (PTO)

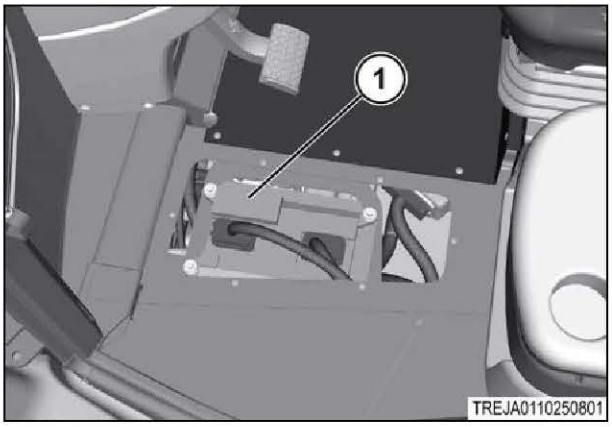

Fig. 47

7.5.4 Armrest module

The armrest module (1) is located in the console below the armrest. The switches and levers located in the console communicate directly to the armrest module. The armrest module then communicates to the transmission module, the dash cluster, and the Tractor Management Center (TMC) using the powertrain controller area network (CAN) BUS network.

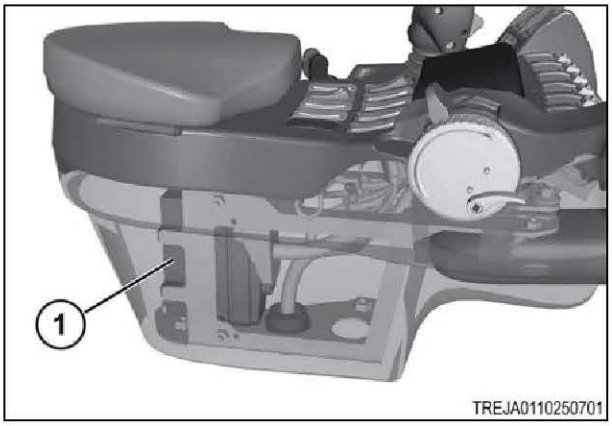

Fig. 48

7.5.5 Solenoid valve (parking brake)

The solenoid valves for the park brake are on the inner left-hand frame rail. The solenoid valves control the flow of hydraulic oil to the park brake.

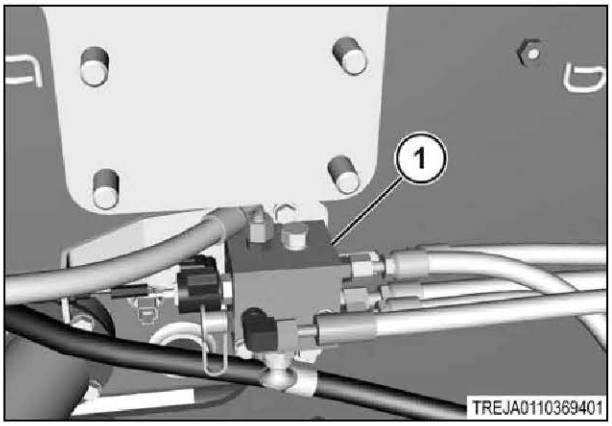

Fig. 49

7.6 Brake system disassembly and assembly

7.6.1 Remove the brake charge filter

The brake charge filter is on the inner right-hand frame rail near the front axle.

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.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

Procedure

1. Park the machine on a solid, level surface and engage the park 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 tube assembly (1).
5. Disconnect the hose (2).

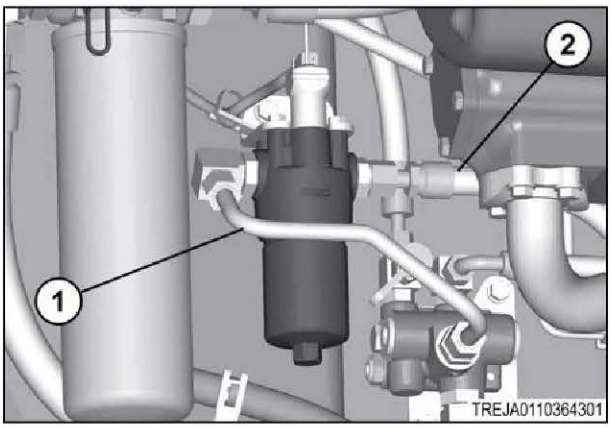

Fig. 50

6. Disconnect the filter pressure differential indicator (1) from the harness.
7. Remove the bolts (2).
8. Remove the brake charge filter assembly from the bracket.

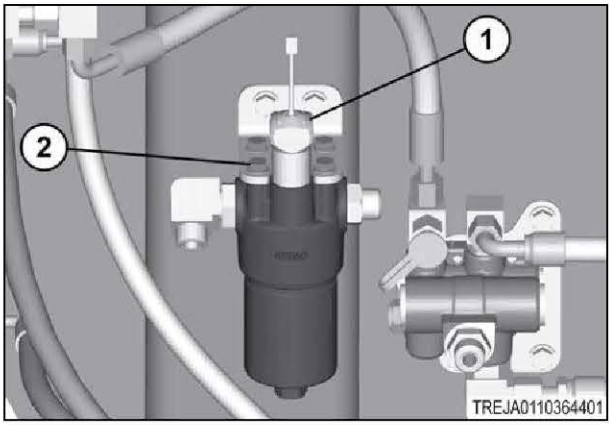

Fig. 51

7.6.2 Install the brake charge filter

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 straight fitting (1).
   Tighten to 175 to 205 Nm (129 to 151 lbf ft).
2. Install the elbow fitting (2).
   Tighten to 175 to 205 Nm (129 to 151 lbf ft).
3. Install the filter pressure differential indicator (3).
   Tighten to 33 Nm (24 lbf ft).

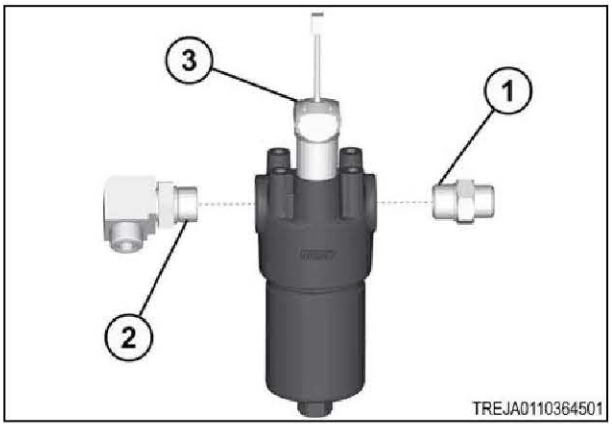

Fig. 52

4. Install the brake charge filter assembly to the bracket with the bolts (2).
   Tighten to 38 to 56 Nm (28 to 42 lbf ft).
5. Connect the filter pressure differential indicator (1) to the harness.

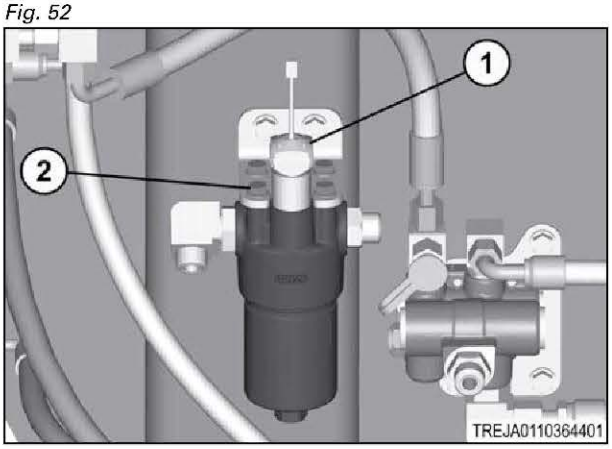

Fig. 53

6. Install the tube assembly (1).
   Tighten to 55 Nm (41 lbf ft).
7. Install the hose (2).
   Tighten to 55 Nm (41 lbf ft).
8. Remove any air from the system, if necessary.
9. Check the system for leaks.

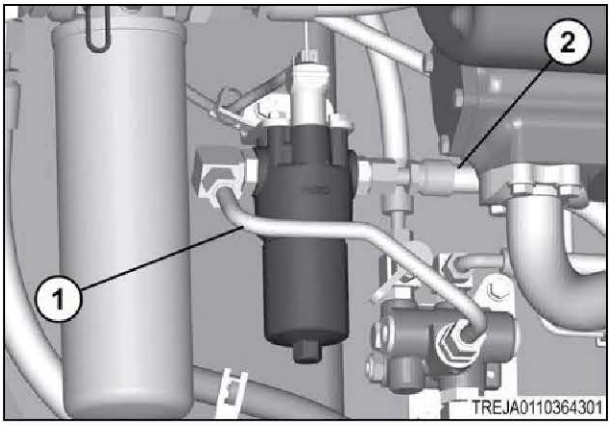

Fig. 54

Related Links

Purge the service brake page 7-84

7.6.3 Remove the brake accumulator charge valve

The brake accumulator charge valve is on the inner right-hand frame rail near the front axle.

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 contamination 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.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

Procedure

1. Park the machine on a solid, level surface and engage the park brake.
2. Stop the engine. Turn the key to the on position.
3. Relieve the pressure in the brake system by pressing the brake pedal multiple times.
   The low brake accumulator will show on the tractor management center (TMC).
4. Continue pressing the brake pedal until there is no pressure.
5. Press and hold the brake pedal for approximately 10 seconds.
6. Turn the key start switch to the off position and take the key with you.
7. Let the machine become cool.

8. Disconnect the tube assembly (1).
9. Disconnect the hose (2).
10. Disconnect the hose (3).
11. Disconnect the hose (4).

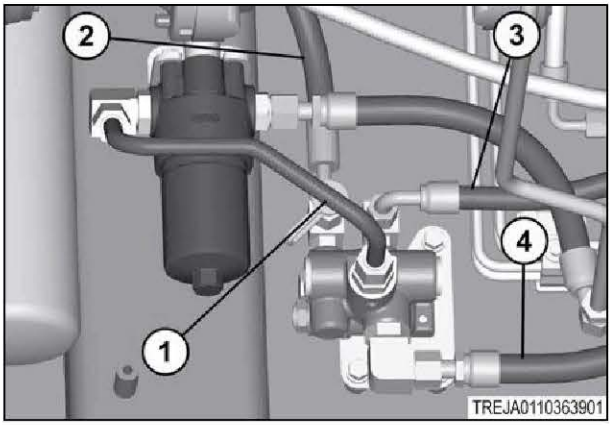

Fig. 55

12. Remove the bolts (1).
13. Remove the brake accumulator charge valve assembly from the frame rail.

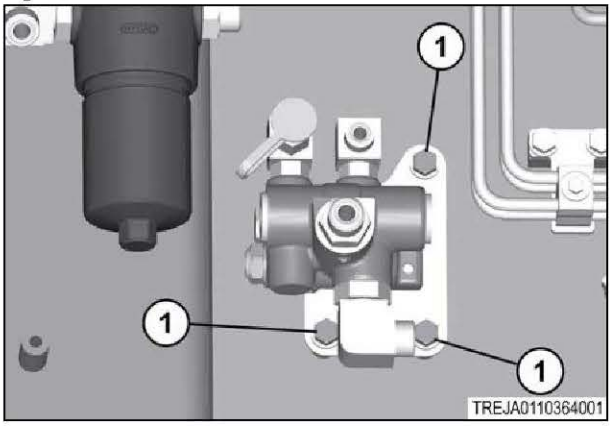

Fig. 56

14. Remove the bolts (1).
15. Disconnect the brake accumulator charge valve assembly from the bracket.

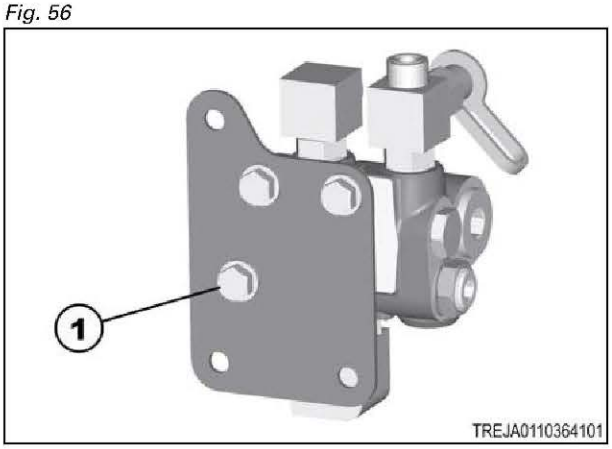

Fig. 57

7.6.4 Install the brake accumulator charge 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 elbow fitting (1).
   Tighten to 190 to 205 Nm (140 to 151 lbf ft).
2. Install the adapter fitting (2).
   Tighten to 190 to 205 Nm (140 to 151 lbf ft).
3. Install the elbow fitting (3).
   Tighten to 82 to 90 Nm (60 to 66 lbf ft).
4. Install the tee fitting (4).
   Tighten to 82 to 90 Nm (60 to 66 lbf ft).
5. Install the quick disconnect nipple (5) with the nut (6).
   Tighten the nut to 55 to 60 Nm (41 to 45 lbf ft).
6. Install the dust cap (7).

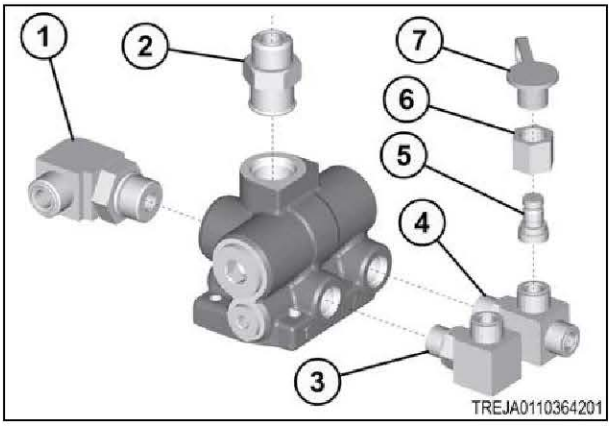

Fig. 58

7. Install the brake accumulator charge valve to the bracket with the bolts (1).

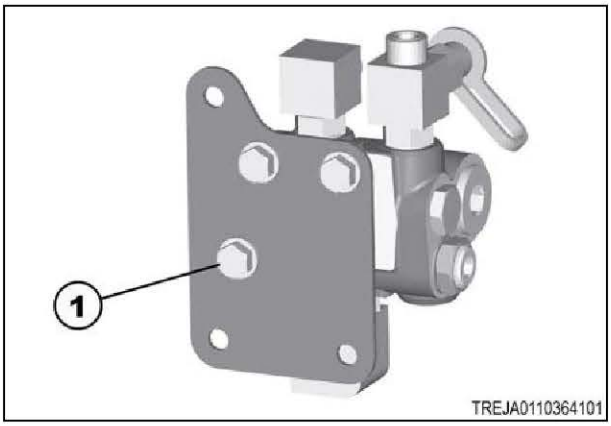

Fig. 59

8. Install the bracket to the frame rail with the bolts (1).

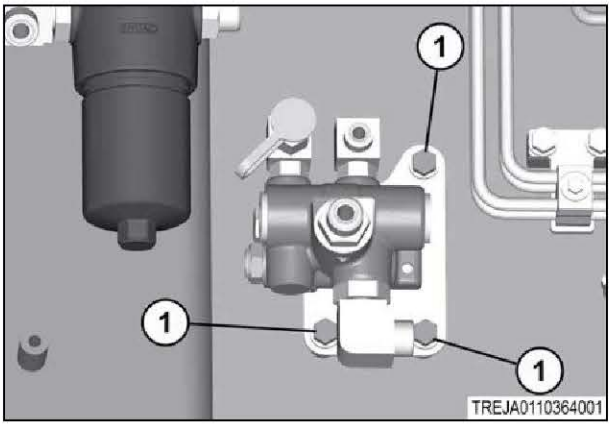

Fig. 60

9. Connect the hose (2).
10. Connect the hose (3).
11. Connect the hose (4).
12. Connect the tube assembly (1).
13. Remove the air from the service brake system.
14. Check for leaks.

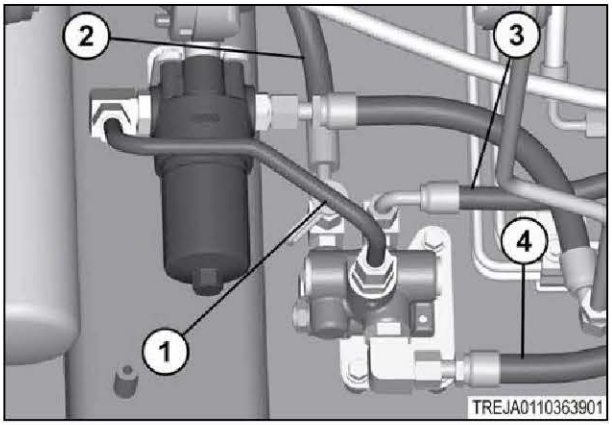

Fig. 61

Related Links

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7.6.5 Remove the brake accumulator

The brake accumulator is on the inner right-hand frame rail near the front axle.

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.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

Procedure

1. Park the machine on a solid, level surface and engage the park brake.
2. Stop the engine. Turn the key to the on position.
3. Relieve the pressure in the brake system by pressing the brake pedal multiple times.
   The low brake accumulator alert will show on the tractor management center (TMC).
4. Continue pressing the brake pedal until there is no pressure.
5. Press and hold the brake pedal for approximately 10 seconds.
6. Turn the key start switch to the off position and take the key with you.
7. Let the machine become cool.

8. Disconnect the brake accumulator pressure switch (1) from the harness.

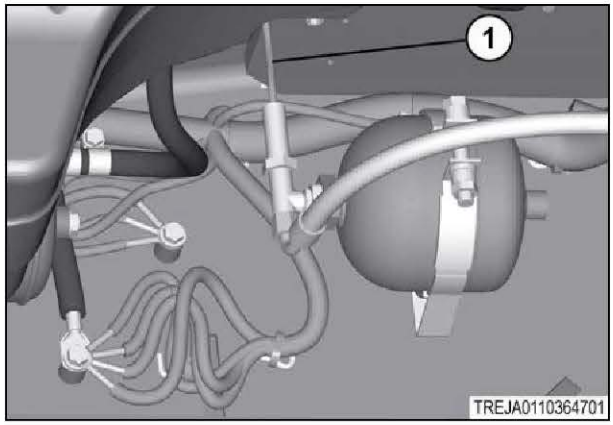

Fig. 62

9. Disconnect the hose assembly (1).

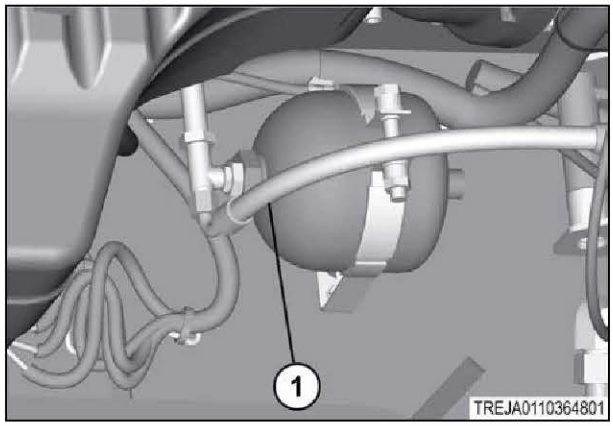

Fig. 63

10. Remove the bolts (1).

11. Remove the brake accumulator assembly from the frame rail.

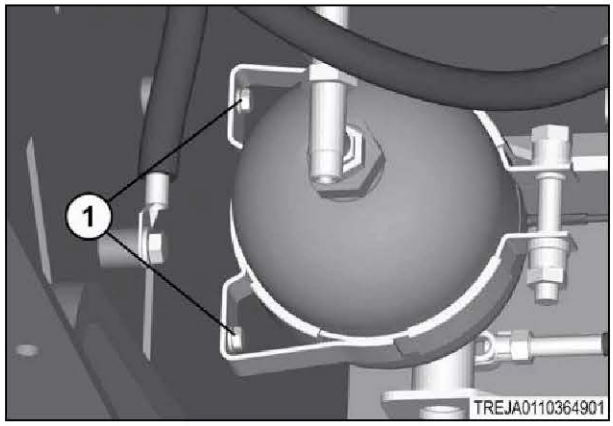

Fig. 64

7.6.6 Install the brake accumulator

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 straight adapter (1) into the brake accumulator.
   Tighten to 140 to 144 Nm (103 to 113 lbf ft).
2. Install the tee fitting (3) to the straight adapter.
   Tighten to 55 to 60 Nm (41 to 45 lbf ft).
3. Install the accumulator pressure switch (4) with the O-ring (5) to the tee fitting.
4. Install the band clamp bracket to the brake accumulator.

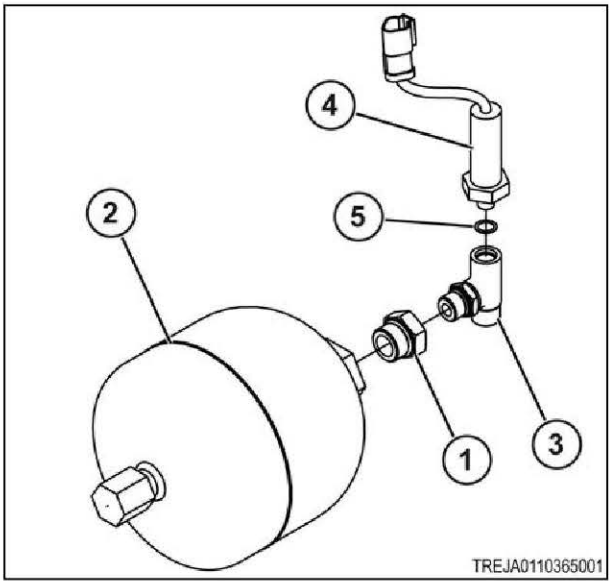

Fig. 65

5. Put the brake accumulator assembly into position on the frame rail.
6. Install the bolts (1).
   Tighten to 21 to 35 Nm (16 to 26 lbf ft).

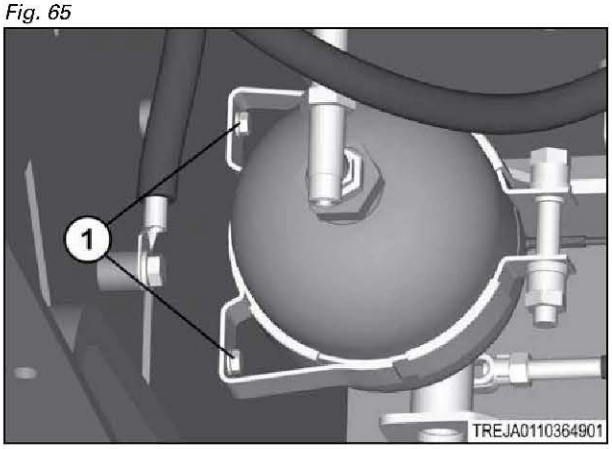

Fig. 66

7. Connect the hose assembly (1).
   Tighten to 55 to 60 Nm (41 to 45 lbf ft).

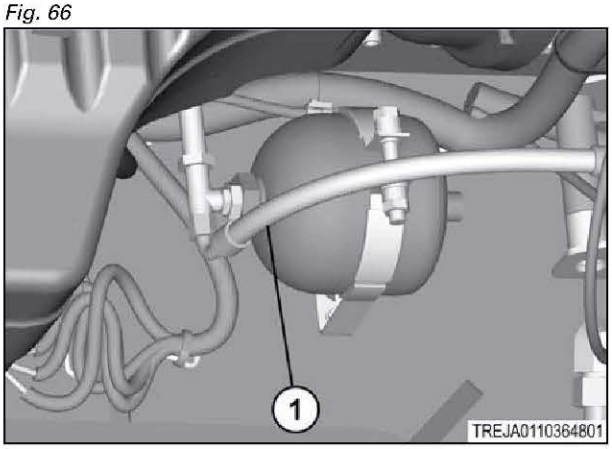

Fig. 67

8. Connect the brake accumulator pressure switch (1) to the harness.
9. Remove the air from the service brake system.
10. Check for leaks.

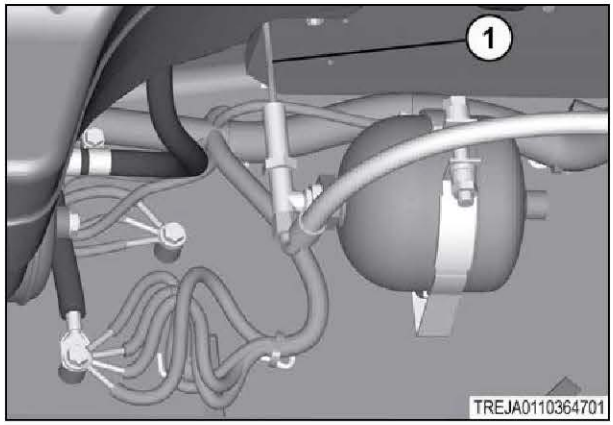

Fig. 68

Related Links

Purge the service brake page 7-84

7.6.7 Remove the brake accumulator switch

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.

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.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

Procedure

1. Park the machine on a solid, level surface and apply the park brake.
2. Stop the engine. Turn the key to the on position.
3. Relieve the pressure in the brake system by pressing the brake pedal multiple times.
   The low brake accumulator will show on the tractor management center (TMC).
4. Continue pressing the brake pedal until there is no pressure.
5. Press and hold the brake pedal for approximately 10 seconds.
6. Turn the key start switch to the off position and take the key with you.
7. Let the machine become cool.

8. Disconnect the brake accumulator pressure switch (1) from the harness.

9. Remove the brake accumulator switch from the tee fitting.

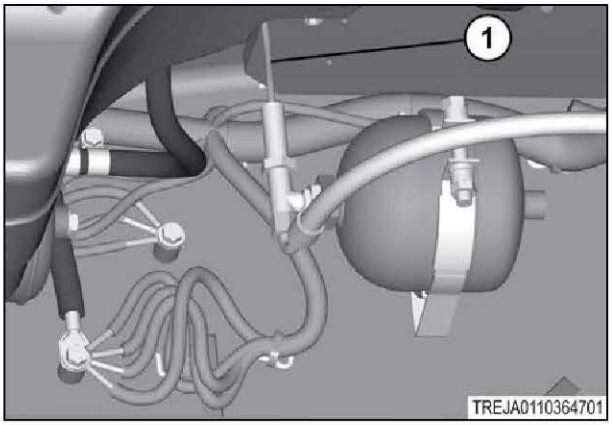

Fig. 69

7.6.8 Install the brake accumulator switch

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. Connect the brake accumulator switch(1) to the tee fitting.

2. Connect the brake accumulator pressure switch to the harness.

3. Remove the air from the service brake system.

4. Check for leaks.

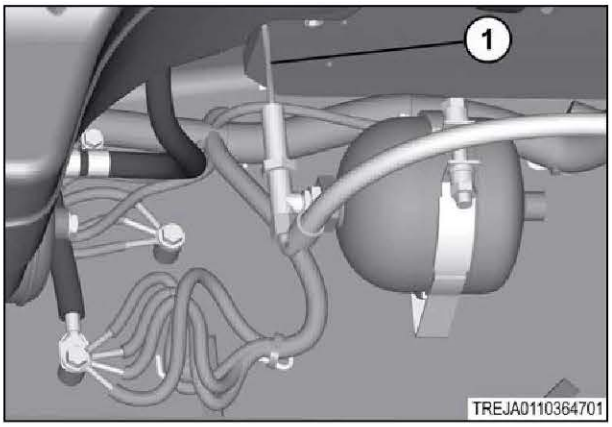

Fig. 70

Related Links

Purge the service brake page 7-84

7.6.9 Remove the service brake valve

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.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

Procedure

1. Park the machine on a solid, level surface and engage the park brake.
2. Stop the engine. Turn the key to the on position.
3. Relieve the pressure in the brake system by pressing the brake pedal multiple times.
   The low brake accumulator will show on the tractor management center (TMC).
4. Continue pressing the brake pedal until there is no pressure.
5. Press and hold the brake pedal for approximately 10 seconds.
6. Turn the key start switch to the off position and take the key with you.
7. Let the machine become completely cool.
8. Disconnect the hose assembly (1).
9. Disconnect the hose assembly (2).
10. Disconnect the tee fitting and the hose assembly from the tee fitting (3).

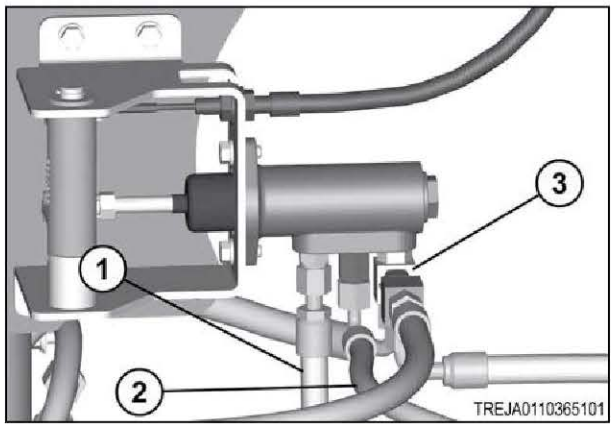

Fig. 71

11. Remove the spring retainer pin (1).
12. Remove the bolts (2).
13. Remove the service brake valve assembly from the bracket.

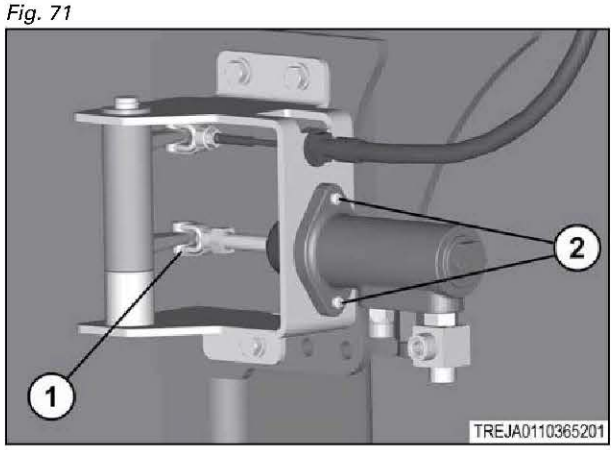

Fig. 72

7.6.10 Install the service brake valve

Before starting the procedure

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 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 tee fitting (1).
   Tighten to 74 to 90 Nm (54 to 66 lbf ft).
2. Install the fitting (2).
   Tighten to 74 to 90 Nm (54 to 66 lbf ft).
3. Install the check valve (3).
   Tighten to 74 to 90 Nm (54 to 66 lbf ft).

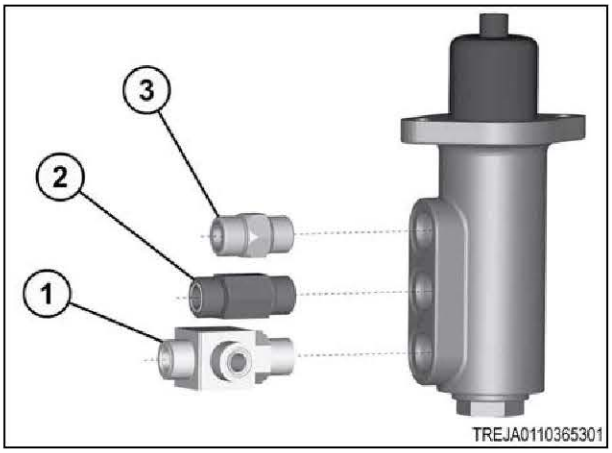

Fig. 73

4. Put the service brake valve assembly into position and install the two bolts (2).
   Tighten to 45 to 65 Nm (34 to 48 lbf ft).
5. Install the stem to the bracket with the spring retainer pin (1).

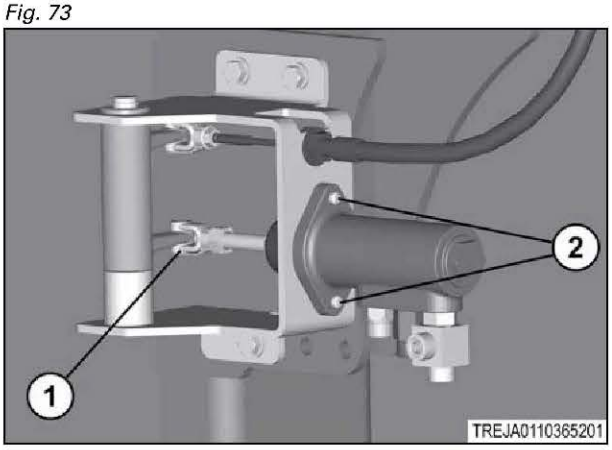

Fig. 74

6. Install the tank return hose assembly (1) to the T port.
   Tighten to 55 to 60 Nm (41 to 45 lbf ft).
7. Install the brake hose assembly (2) to the B port.
   Tighten to 55 to 60 Nm (41 to 45 lbf ft).
8. Install the tee fitting to the tee fitting (3) in the P port.
9. Connect the remaining hoses to the tee fitting.
10. Remove the air from the service brake system.
11. Check for leaks.

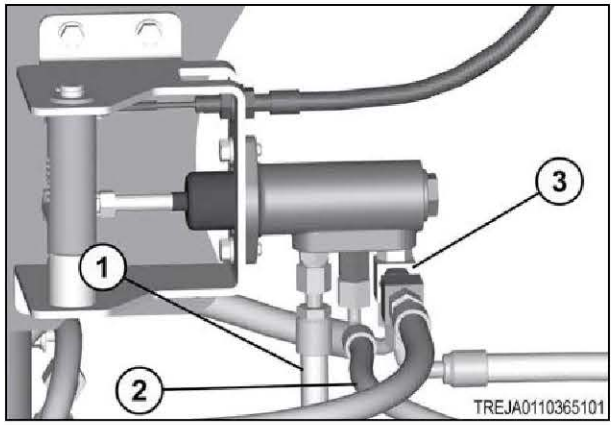

Fig. 75

Related Links

Purge the service brake page 7-84

7.6.11 Remove the parking brake valve

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.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

Procedure

1. Park the machine on a solid, level surface and engage the parking brake.
2. Stop the engine. Turn the key to the on position.
3. Relieve the pressure in the brake system by pressing the brake pedal multiple times.
   The low brake accumulator alert will show on the tractor management center (TMC).
4. Continue pressing the brake pedal until there is no pressure.
5. Press and hold the brake pedal for approximately ten seconds.
6. Turn the key start switch to the off position and take the key with you.
7. Let the machine become completely cool.
8. Disconnect the harness from the park brake valve.

9. Disconnect the hose assembly (1).

10. Disconnect the hose assembly (2).

11. Disconnect the hose assembly (3).

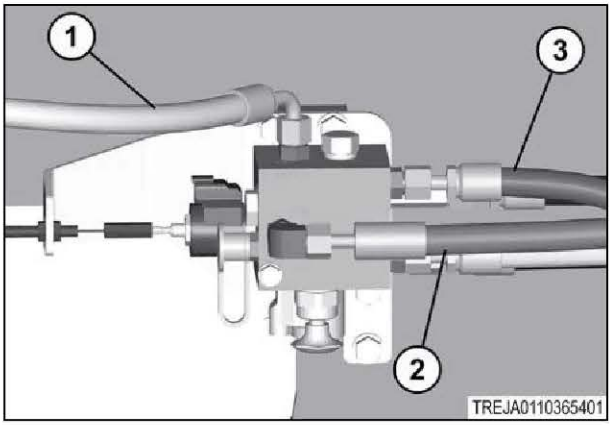

Fig. 76

12. Disconnect the hose assembly (1).

13. Disconnect the hose assembly (2).

14. Disconnect the hose assembly (3).

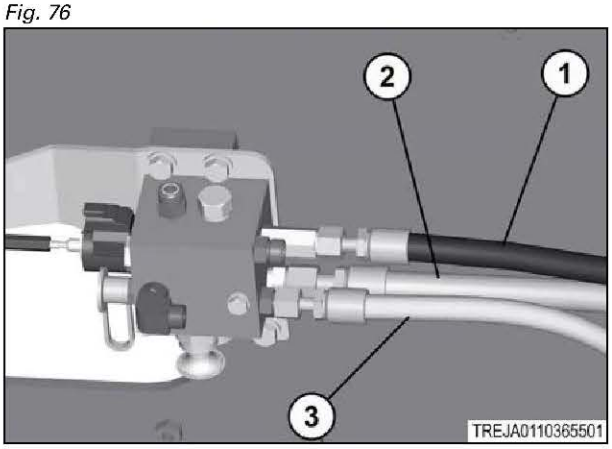

Fig. 77

15. Disconnect the park brake cable assembly (1).

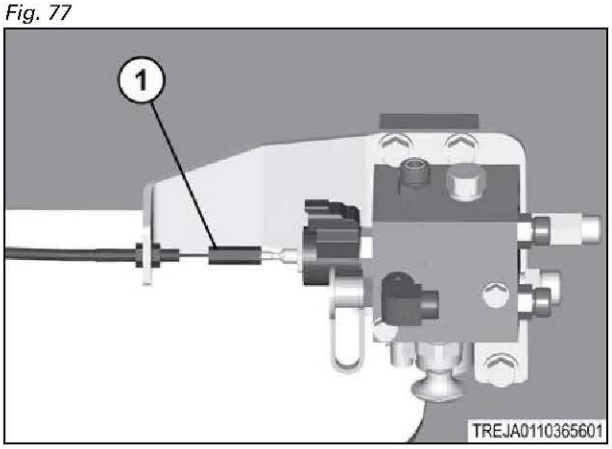

Fig. 78

16. Remove the bolts (1).

17. Remove the parking brake valve from the bracket.

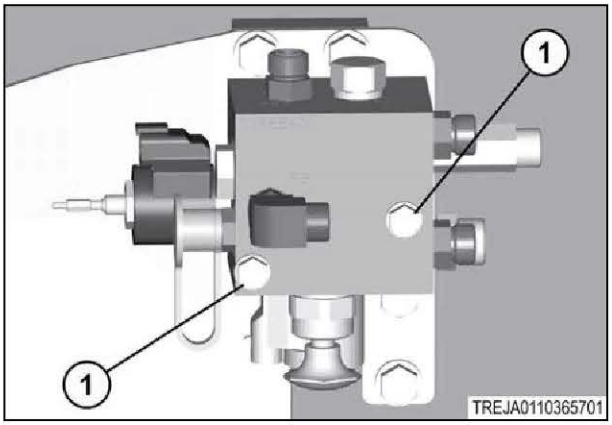

Fig. 79

7.6.12 Install the parking brake valve

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 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 fitting (1) into the SBP port.
   Tighten to 25 to 28 Nm (18 to 20 lbf ft).
2. Install the fitting (2) into the PBP port.
   Tighten to 25 to 28 Nm (18 to 20 lbf ft).
3. Install the fitting (3) into the SBP port.
   Tighten to 25 to 28 Nm (18 to 20 lbf ft).
4. Install the fitting (4) into the ACC port.
   Tighten to 25 to 28 Nm (18 to 20 lbf ft).
5. Install the fitting (5) into the T port.
   Tighten to 25 to 28 Nm (18 to 20 lbf ft).
6. Install the fitting (6) into the PB port.
   Tighten to 25 to 28 Nm (18 to 20 lbf ft).
7. Install the test port (7) into the TPB port.
   Tighten to 25 to 28 Nm (18 to 20 lbf ft).
8. Install the dust cap (8) onto the test port.
9. Put the parking brake valve into position on the bracket and install the bolts (1).
   Tighten to 19 to 33 Nm (14 to 24 lbf ft).

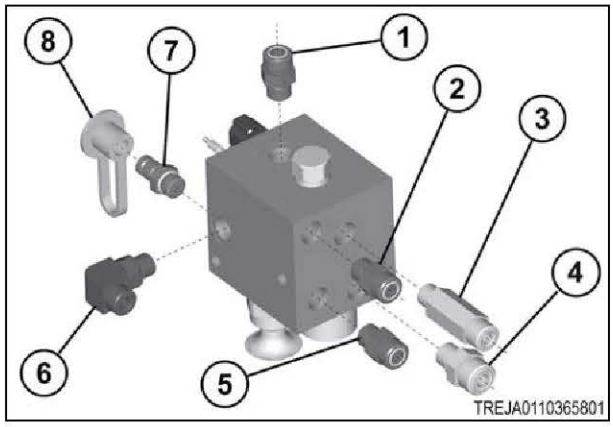

Fig. 80

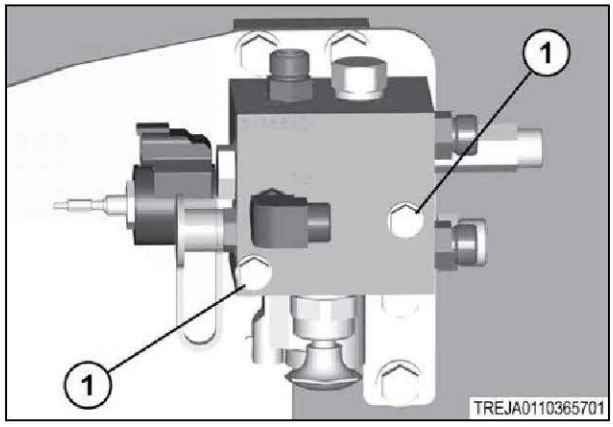

Fig. 81

10. Connect the parking brake cable assembly (1).

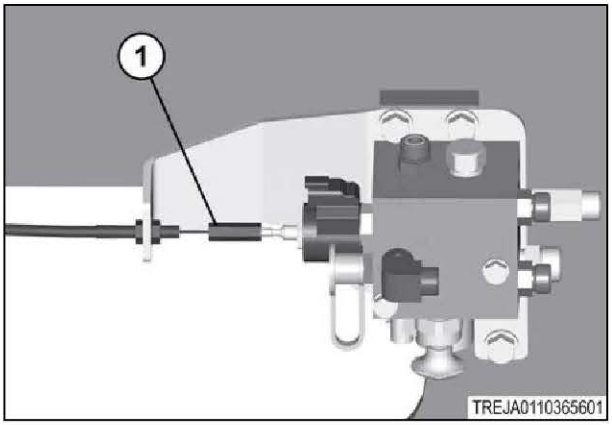

Fig. 82

11. Connect the hose assembly (1).
Tighten to 40 to 44 Nm (30 to 33 lbf ft).

12. Connect the hose assembly (2).
Tighten to 55 to 60 Nm (41 to 45 lbf ft).

13. Connect the hose assembly (3).
Tighten to 40 to 44 Nm (30 to 33 lbf ft).

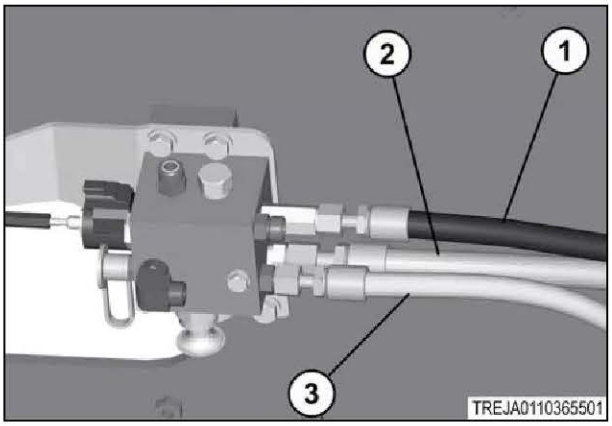

Fig. 83

14. Connect the hose assembly (1).
Tighten to 55 to 60 Nm (41 to 45 lbf ft).

15. Connect the hose assembly (2).
Tighten to 40 to 44 Nm (30 to 33 lbf ft).

16. Connect the hose assembly (3).
Tighten to 40 to 44 Nm (30 to 33 lbf ft).

17. Connect the harness to the parking brake valve.

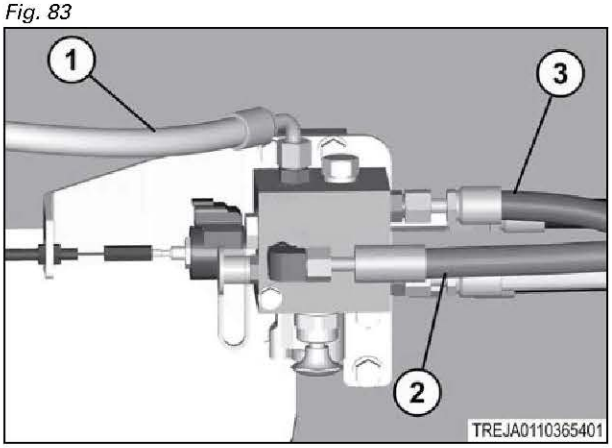

Fig. 84

7.6.13 Remove the parking brake wear indicator

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).

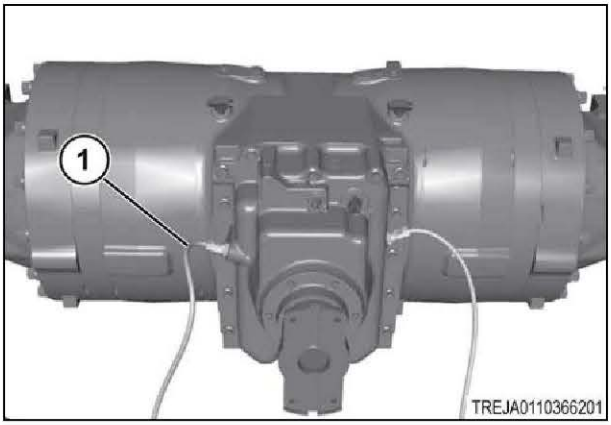

Fig. 85

4. Remove the parking brake wear indicator (1).
   There is a small pin/plunger between the parking brake wear indicator and the parking brake piston. Remove the pin/plunger with a small magnet.

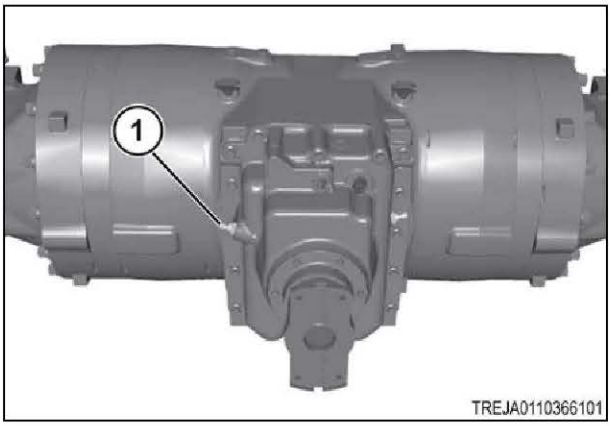

Fig. 86

7.6.14 Install the parking brake wear indicator

Procedure

1. Use a small magnet to install the pin/plunger into the axle assembly.
2. Install the parking brake wear indicator (1).
   Tighten to 35 Nm (26 lbf ft).

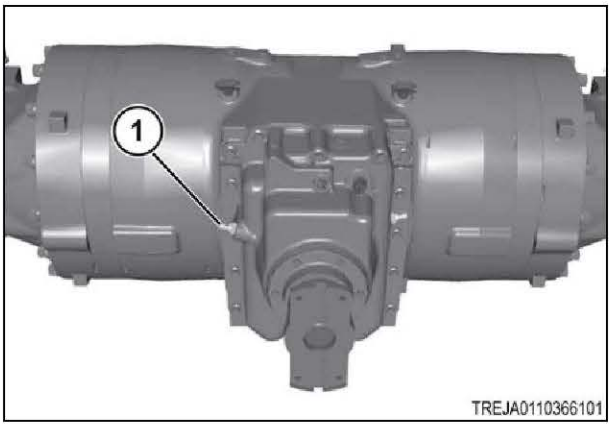

Fig. 87

3. Connect the harness assembly (1) to the parking brake wear indicator.

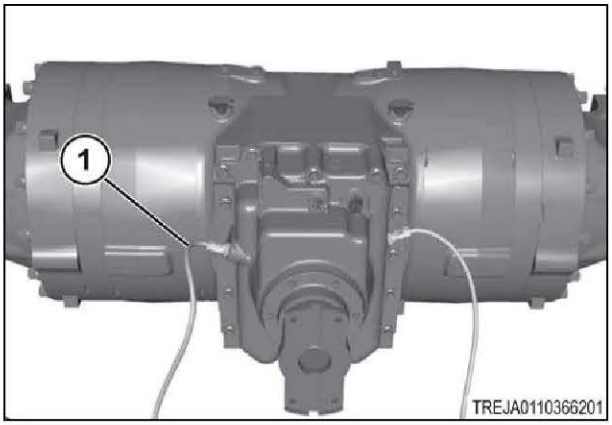

Fig. 88

7.6.15 Remove the parking brake pressure switch

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).

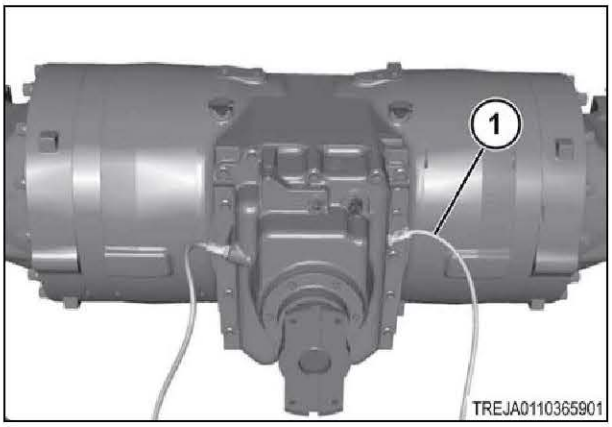

Fig. 89

4. Remove the parking brake pressure switch (1).

   There is a small pin/plunger between the parking brake pressure switch and the parking brake piston. Remove the pin/plunger with a small magnet.

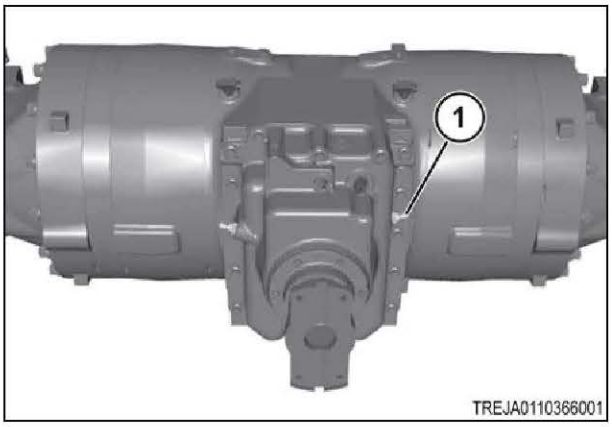

Fig. 90

7.6.16 Install the parking brake pressure switch

Procedure

1. Use a small magnet to install the pin/plunger into the axle assembly.

2. Install the parking brake pressure switch (1). Tighten to 35 Nm (26 lbf ft).

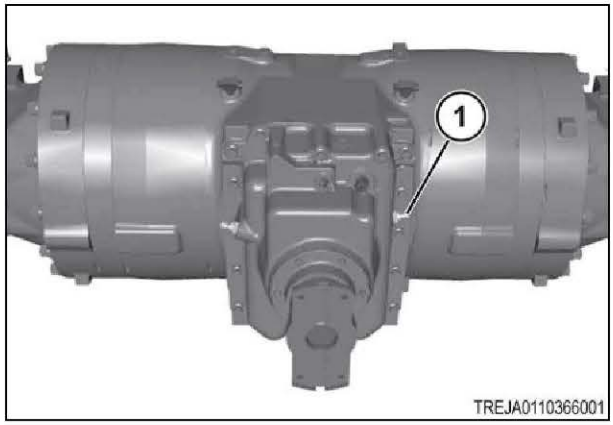

Fig. 91

3. Connect the harness assembly (1) to the parking brake pressure switch.

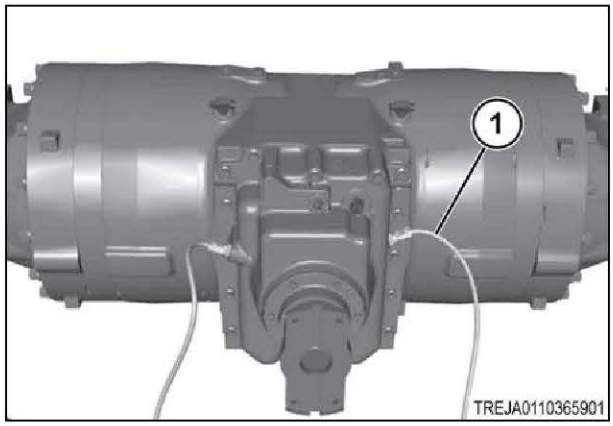

Fig. 92

7.6.17 Remove the steering and implement pump

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.

IMPORTANT:
Before removal, fasten identification tags on the components for correct installation at assembly. Put caps and plugs on all hoses, fittings, and ports to prevent contamination from entering the system.

IMPORTANT:
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.

IMPORTANT:
Completely clean all components to prevent contamination from entering the system. Contamination can damage the precision components. Perform disassembly procedures on a clean work surface. Put a clean cloth on top of the components.

Procedure

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

2. Turn the battery disconnect switch key (1) counterclockwise to disconnect the battery power.

   NOTE:
   The battery disconnect switch is shown in the off position.

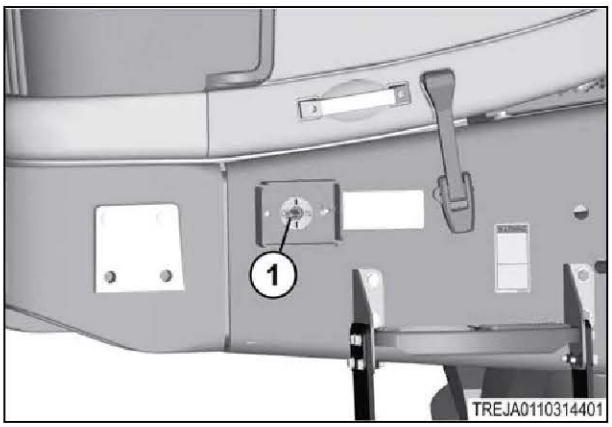

Fig. 93

3. Remove the battery disconnect switch key (1).

4. Relieve all pressure from the hydraulic system.

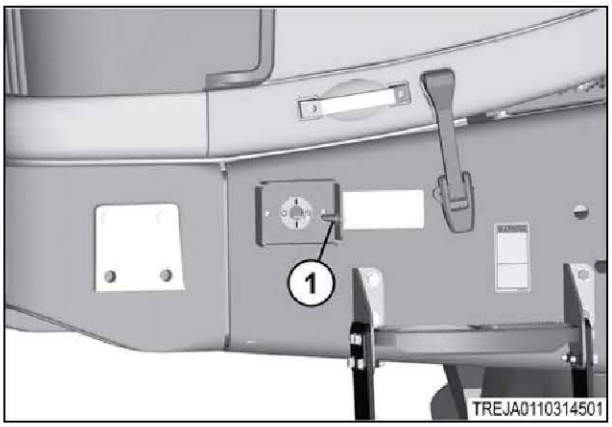

Fig. 94

5. Remove the hardware (1), and the cover plate (2).

6. Set a correct container below the hydraulic tank drain plugs.

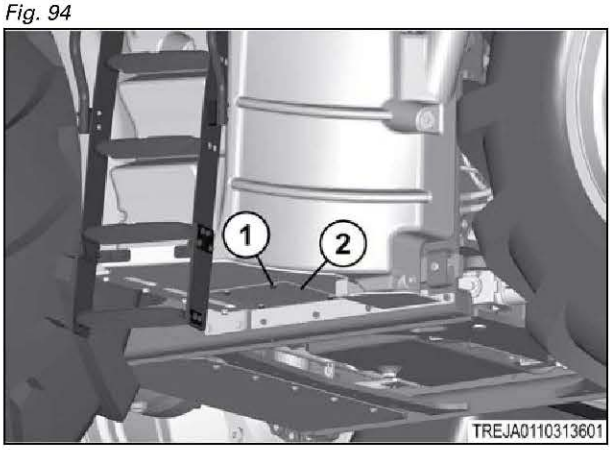

Fig. 95

7. Remove the two drain plugs (1) from the bottom of the hydraulic oil reservoir (2).

8. Drain the hydraulic oil.

9. Install the drain plugs when empty.

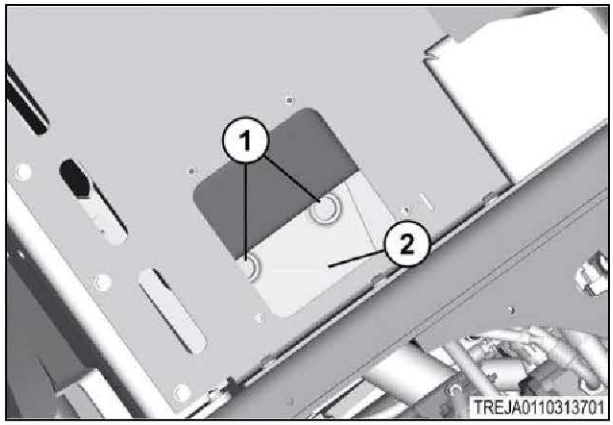

Fig. 96

10. If the machine is equipped with a transmission guard (1) support the transmission guard with correct lifting equipment.

IMPORTANT:
The weight of the transmission guard is approximately 57 kg (125 lb).

11. Remove the hardware (2).

12. Loosen the hardware (3).

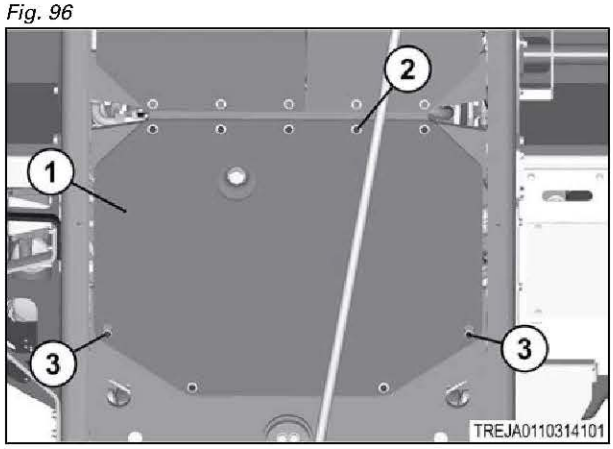

Fig. 97

13. Let the transmission guard (1) rest on the hardware (2) and the correct lifting equipment.

14. Slide the transmission guard so the large holes are over the hardware (2) and remove the transmission guard.

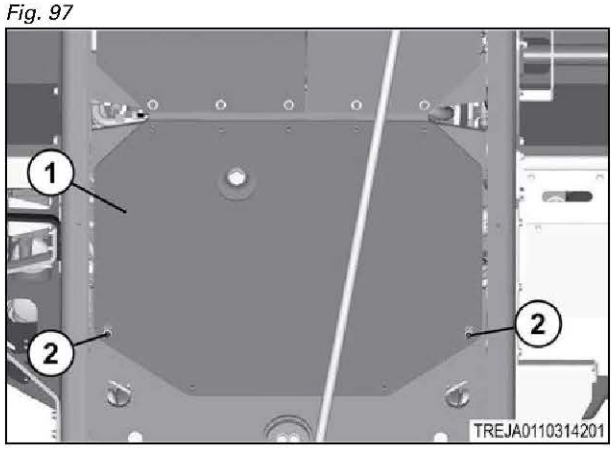

Fig. 98

15. Loosen the hose clamp (1) and disconnect the hydraulic hose (2).

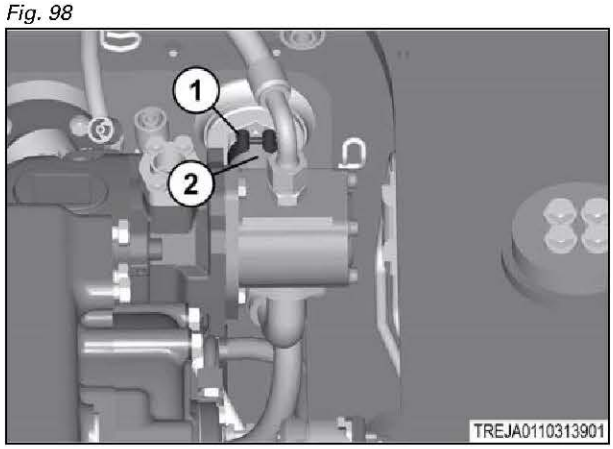

Fig. 99

16. Disconnect the hydraulic hose (1).

17. Remove the hardware (2) and the hydraulic hose fitting (3).

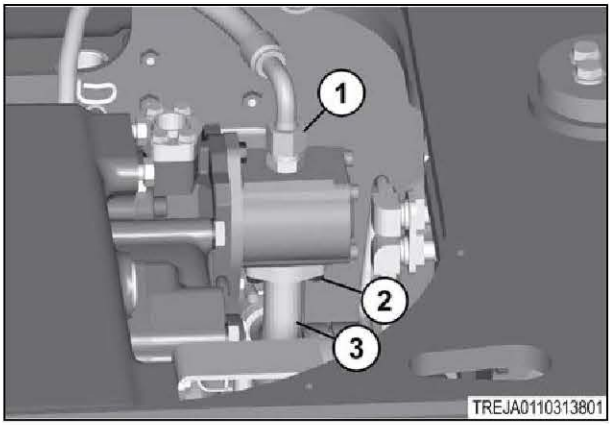

Fig. 100

18. Remove the hardware (1) and the gear pump (2).

19. Remove the O-ring.

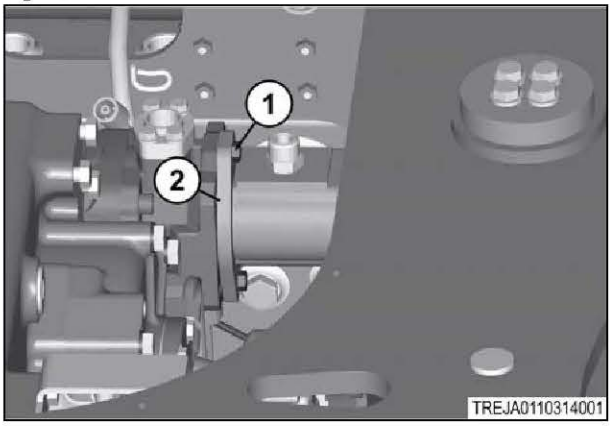

Fig. 101

20. Remove the hardware (1) and the fitting (2).

21. Remove the hose (3).

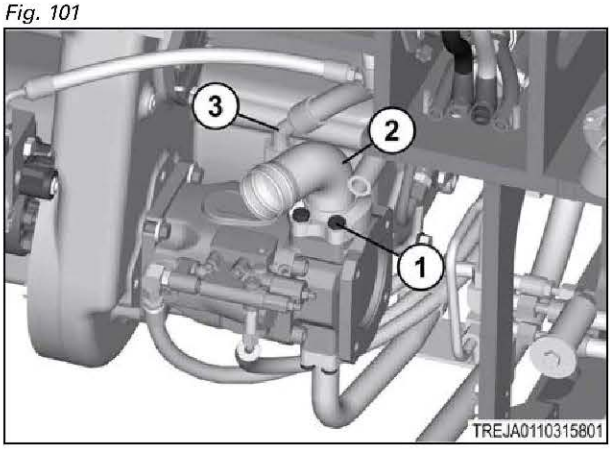

Fig. 102

22. Remove the hardware (1) and the fitting (2).

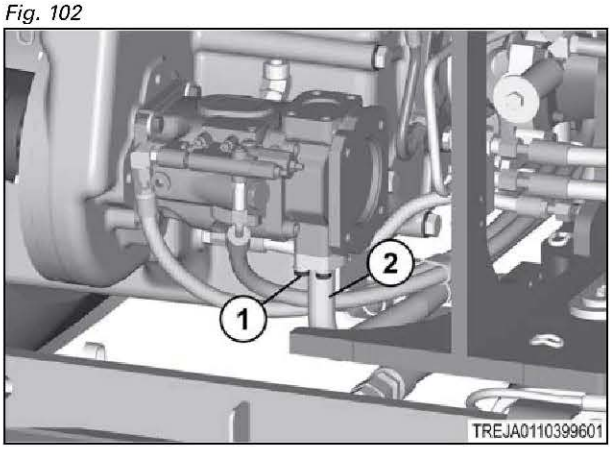

Fig. 103

23. Remove the hardware (1) and the fitting (2).

24. Support the implement pump with correct lifting equipment.

IMPORTANT:
The weight of the implement pump is approximately 46 kg (102 lb).

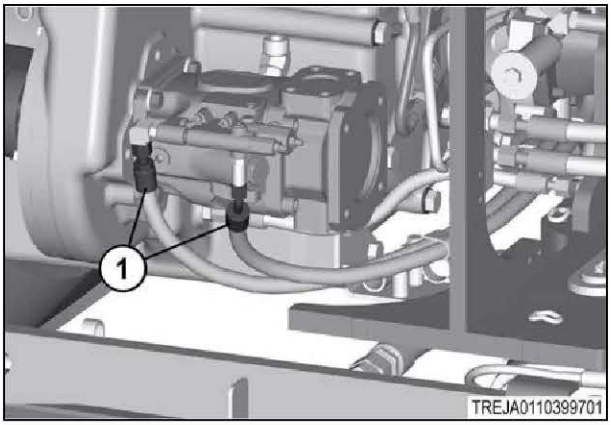

Fig. 104

25. Remove the hardware (1) and the implement pump (2).

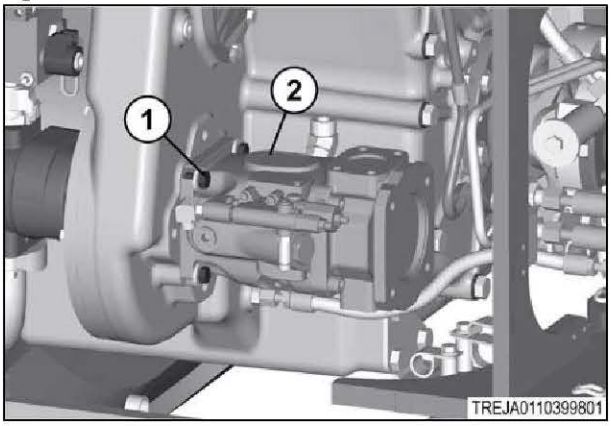

Fig. 105

7.6.18 Install the steering - implement pump

IMPORTANT:
Fully clean all components to prevent contamination from entering the system. Contamination can damage the precision components. Perform disassembly procedures on a clean work surface. Put a clean cloth on top of the components.

Procedure

1. Check the driveshaft splines for damage, and for a flat and clean mounting surface.

2. Place the O-ring on the implement pump (2).

3. Support the implement pump with correct lifting equipment.

IMPORTANT:
The weight of the implement pump is approximately 46 kg (102 lb).

4. Slide the implement pump (2) on the drive shaft splines.

5. Fasten with the hardware (1).
Tighten the hardware to 100 Nm (74 lbf ft).

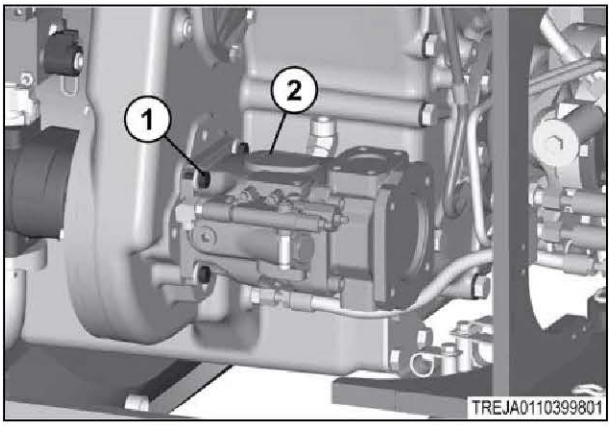

Fig. 106

6. Connect the hydraulic hoses (1).

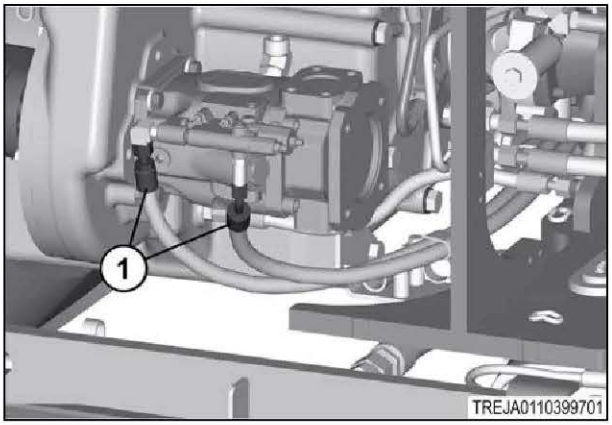

Fig. 107

7. Connect the fitting (2) with the hardware (1).

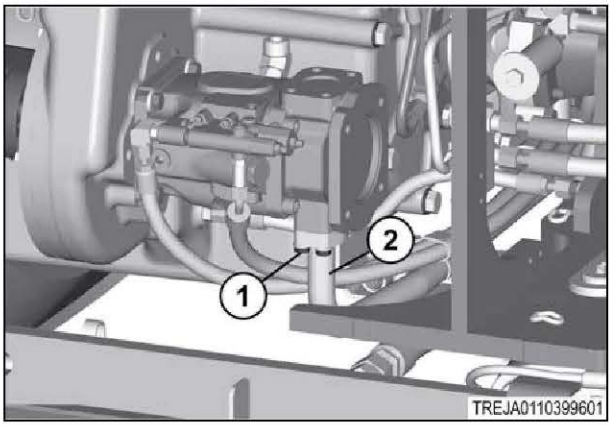

Fig. 108

8. Install the O-ring.
9. Connect the fitting (2) with the hardware (1).
10. Connect the hose (3).

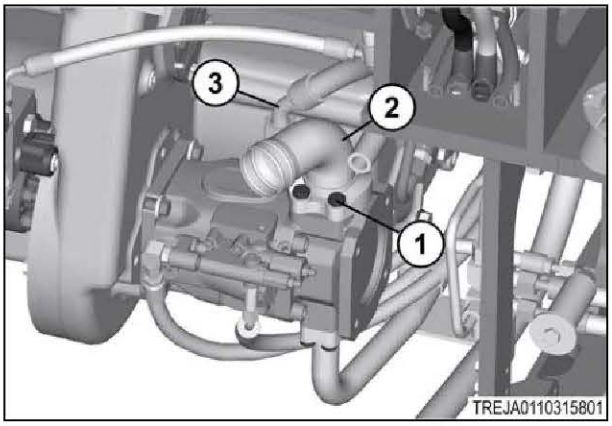

Fig. 109

11. Install the O-ring.

    IMPORTANT:
    Make sure the splines engage correctly before forcing the pumps together.

12. Slide the gear pump in to engage the splines.
13. Fasten the gear pump (2) with the hardware (1).

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

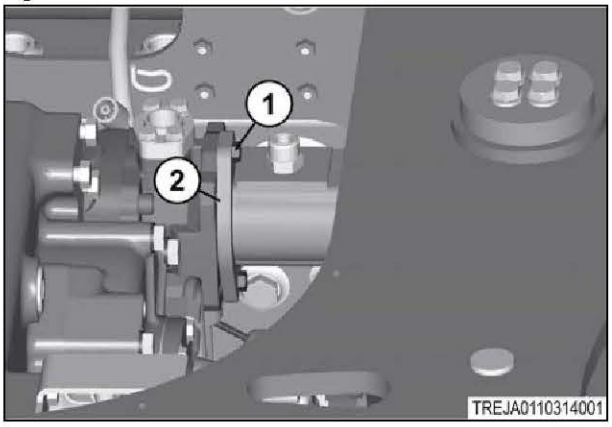

Fig. 110

14. Connect the hydraulic hose (1).

15. Connect the hose fitting (3), with the hardware (2).

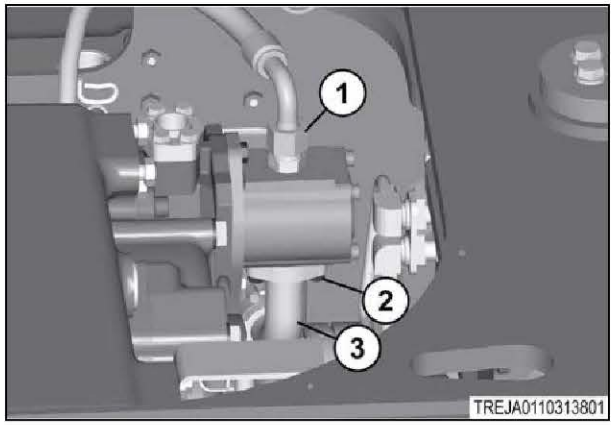

Fig. 111

16. Connect the hydraulic hose (2), with the hose clamp (1).

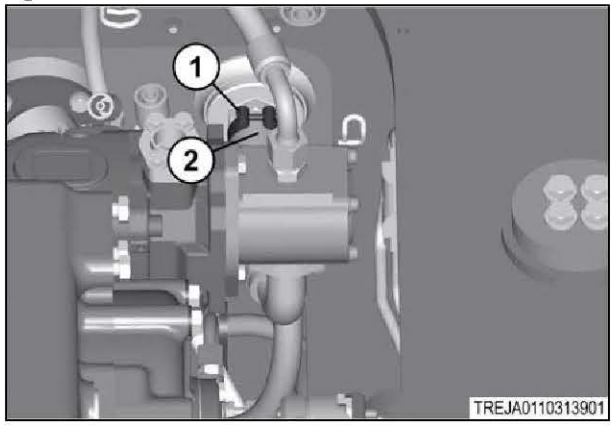

Fig. 112

17. If the machine is equipped with a transmission guard, install the two bolts (2) and leave the hardware loose.

18. Use correct lifting equipment to support the transmission guard.

IMPORTANT:
The weight of the transmission guard is approximately 57 kg (125 lb).

19. Slide the transmission guard (1) over the two bolts (2).

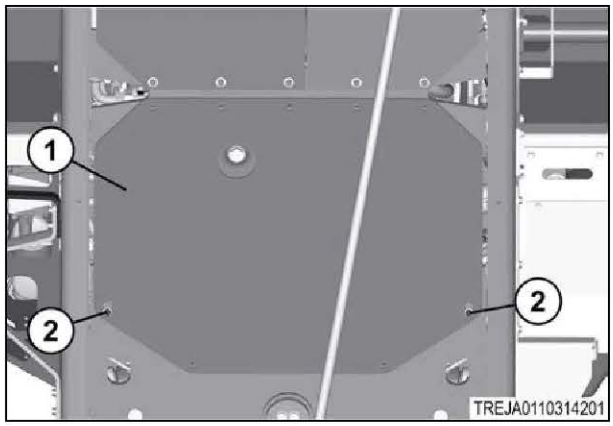

Fig. 113

20. Install the bolts (2) for the transmission guard (1).

21. Tighten the hardware (2, 3).

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

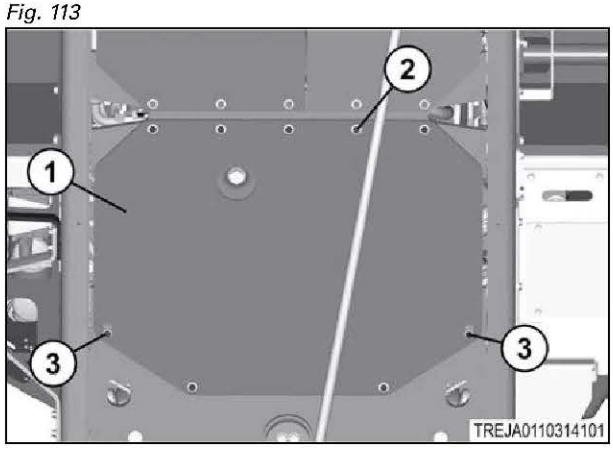

Fig. 114

22. Install the two drain plugs (1) with O-rings to the bottom of the hydraulic oil reservoir (2).

23. Fill the hydraulic reservoir with hydraulic oil.

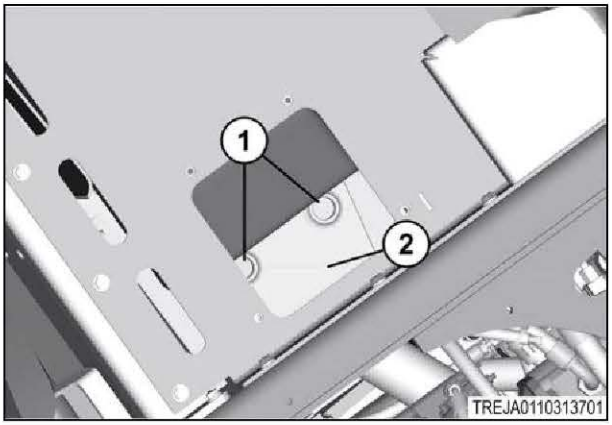

Fig. 115

24. Install the cover plate (2) with the hardware (1).

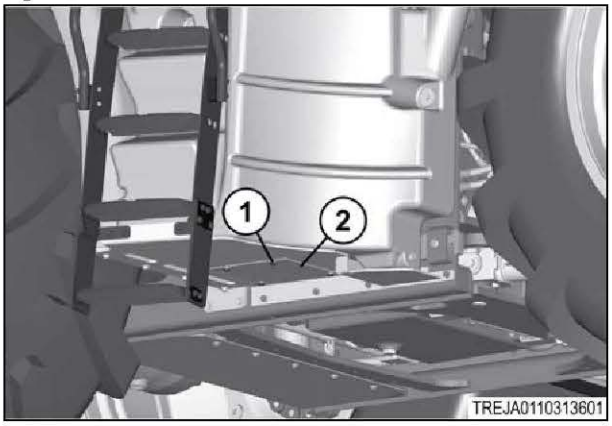

Fig. 116

25. Install the battery disconnect switch key (1).

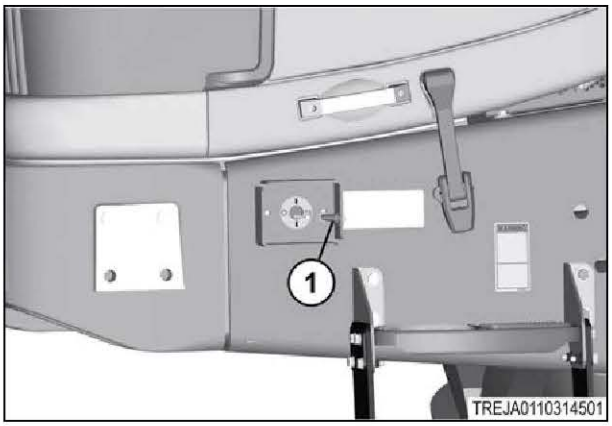

Fig. 117

26. Turn the battery disconnect switch key (1) clockwise to connect the battery power.

NOTE:
The battery disconnect switch is shown in the on position.

27. Check for leaks.

28. Check the hydraulic reservoir for the correct oil level.

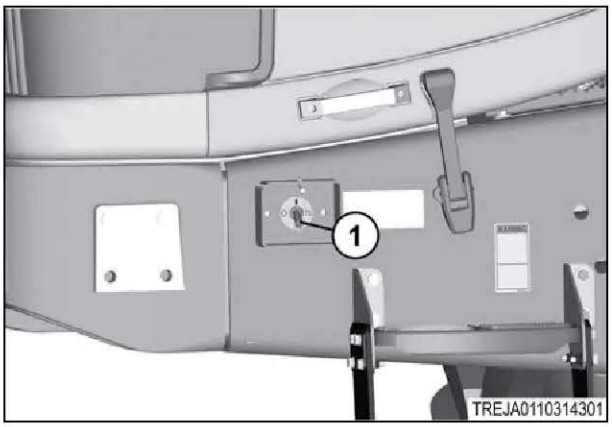

Fig. 118

Related Links

Lubricant viscosities page 1-18

7.6.19 Remove the steering and priority valve

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.

IMPORTANT:
Before removal, fasten identification tags on the components for correct installation at assembly. Put caps and plugs on all hoses, fittings, and ports to prevent contamination from entering the system.

IMPORTANT:
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.

IMPORTANT:
Completely clean all components to prevent contamination from entering the system. Contamination can damage the precision components. Perform disassembly procedures on a clean work surface. Put a clean cloth on top of the components.

Procedure

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

2. Turn the battery disconnect switch key (1) counterclockwise to disconnect the battery power.

   NOTE:
   The battery disconnect switch is shown in the off position.

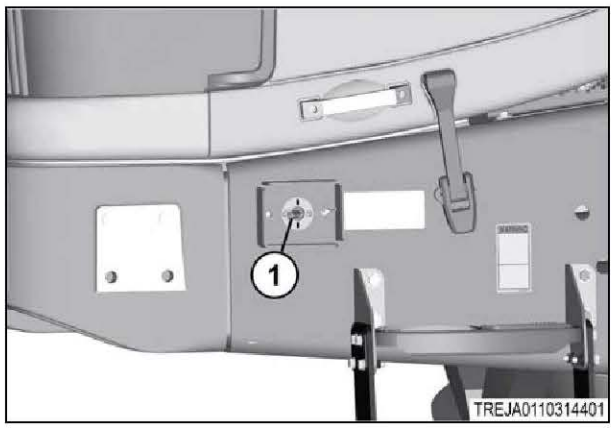

Fig. 119

3. Remove the battery disconnect switch key (1).

4. Relieve all pressure from the hydraulic system.

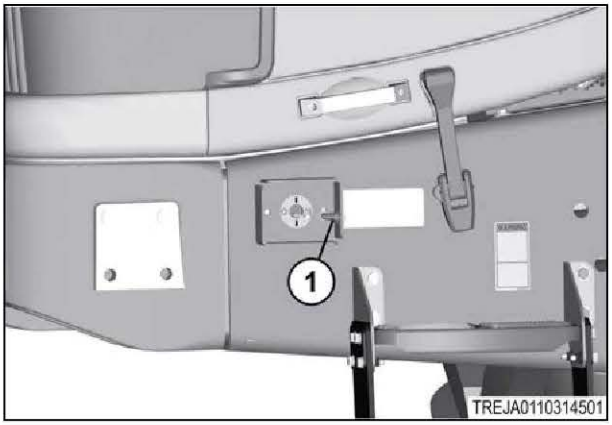

Fig. 120

5. Remove the hardware (1), and the cover plate (2).

6. Set a correct container below the hydraulic tank drain plugs.

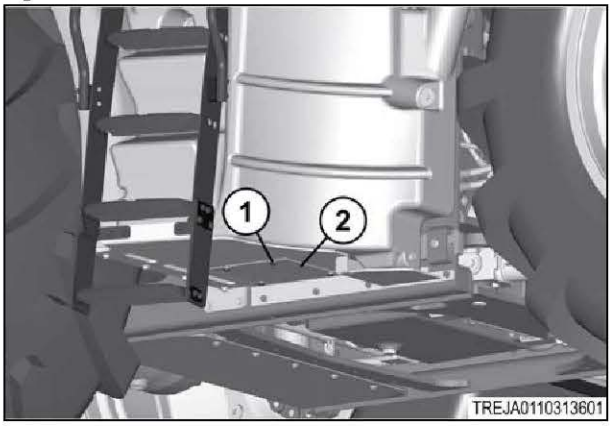

Fig. 121

7. Remove the two drain plugs (1) from the bottom of the hydraulic oil reservoir (2).

8. Drain the hydraulic oil.

9. Install the drain plugs when the hydraulic reservoir is empty.

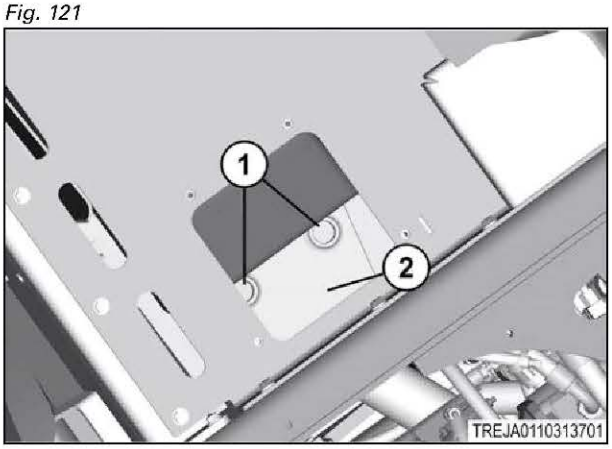

Fig. 122

10. If the machine is equipped with a transmission guard, support the transmission guard with correct lifting equipment.

    IMPORTANT:
    The weight of the transmission guard is approximately 57 kg (125 lb).

11. Remove the hardware (2).

12. Loosen the hardware (3).

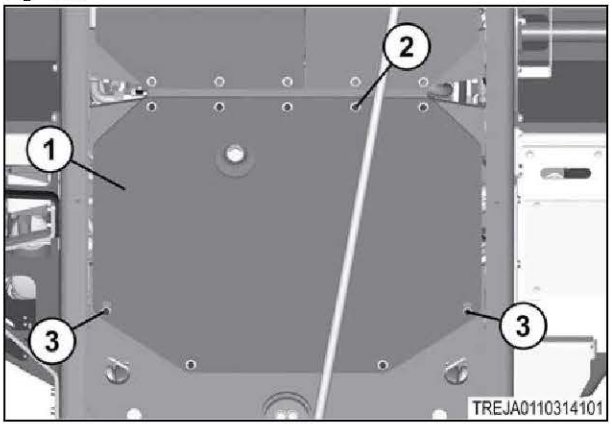

Fig. 123

13. Let the transmission guard (1) rest on the hardware (2).

14. Slide the transmission guard so the large holes are over the hardware (2). Use the lifting equipment to remove the transmission guard.

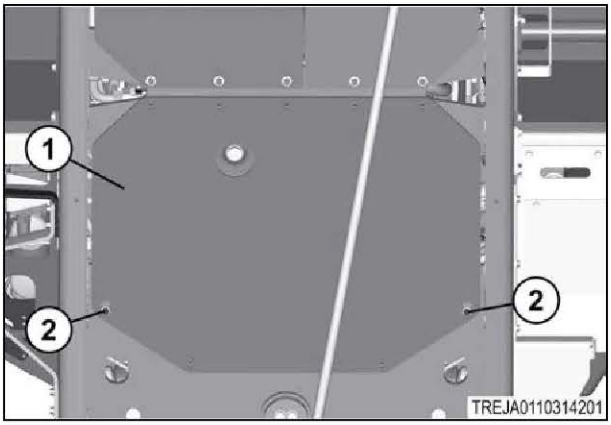

Fig. 124

15. Disconnect the hydraulic hoses (1).

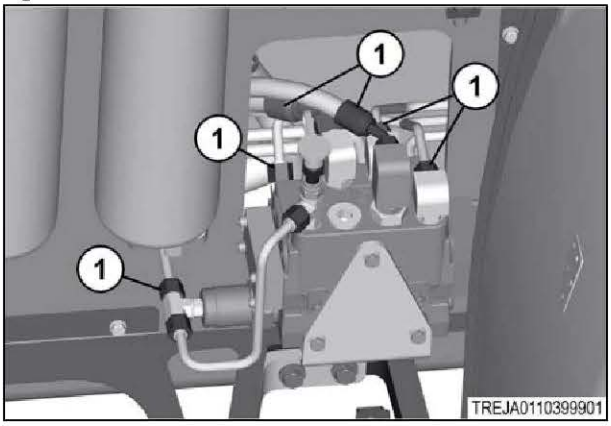

Fig. 125

16. Disconnect the hydraulic hoses (1).

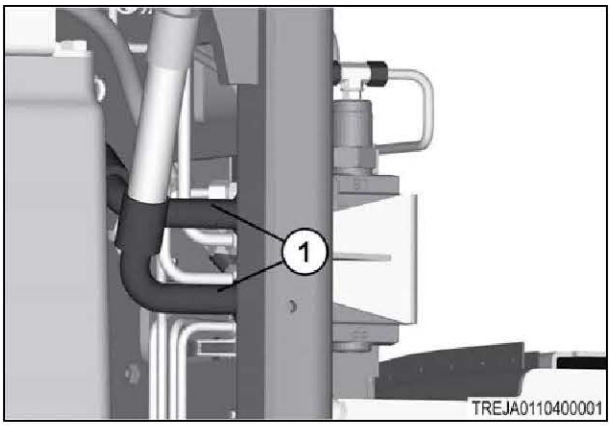

Fig. 126

17. Disconnect the hydraulic hoses (1).

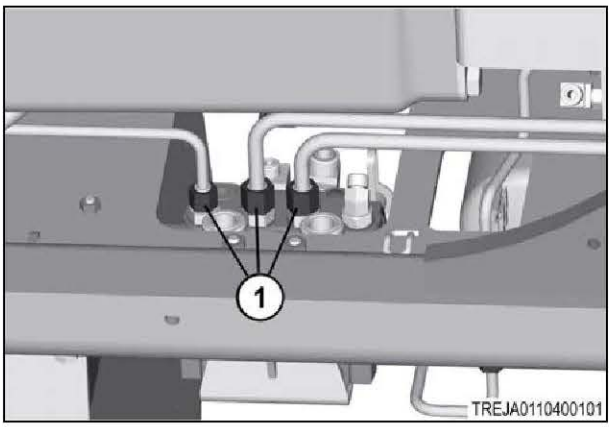

Fig. 127

18. Remove the hardware (1) and the steering and priority valve.

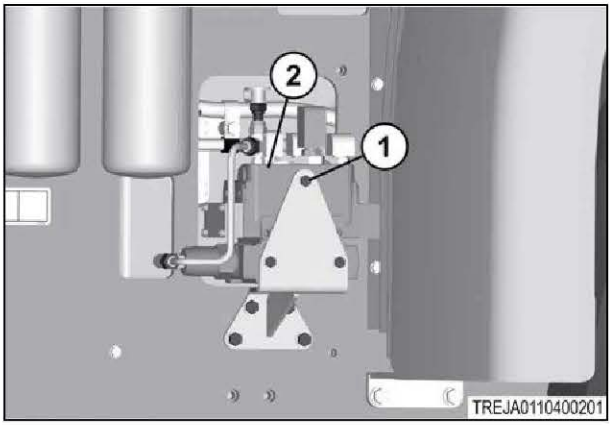

Fig. 128

19. Remove the hardware (1) and the mounting bracket (2).

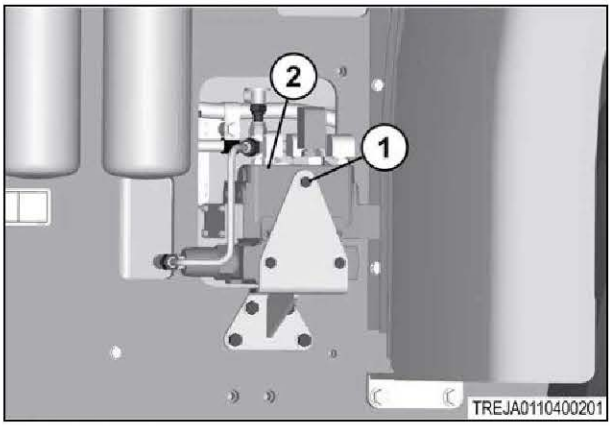

Fig. 129

7.6.20 Install the steering and priority valve

Procedure

1. Install the mounting bracket (2) with the hardware (1).

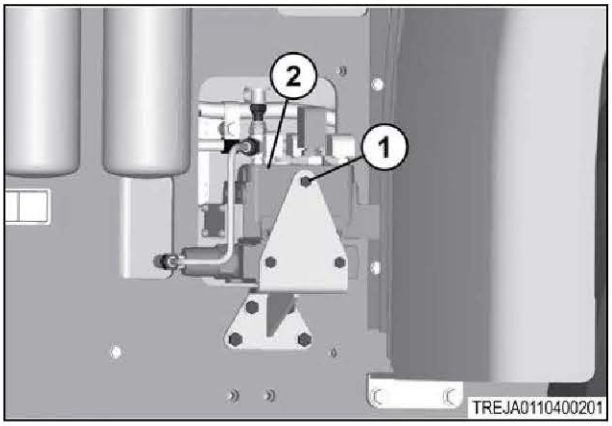

Fig. 130

2. Install the steering and priority valve (2) with the hardware (1).

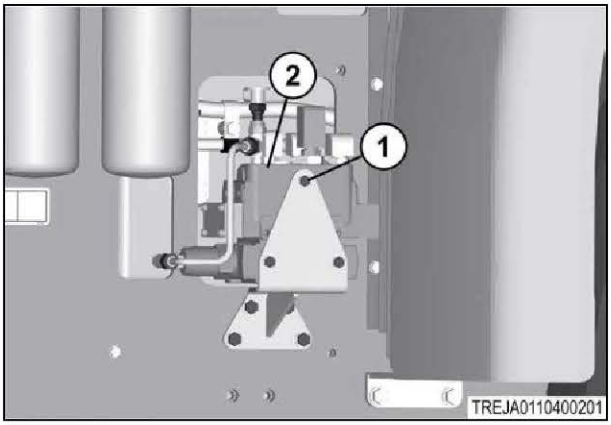

Fig. 131

3. Connect the hydraulic hoses (1).

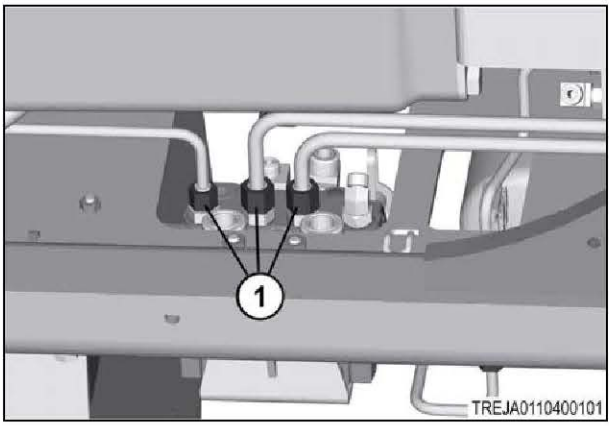

Fig. 132

4. Connect the hydraulic hoses (1).

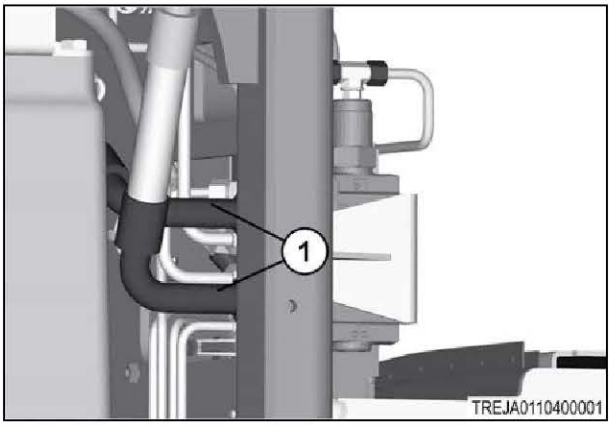

Fig. 133

5. Connect the hydraulic hoses (1).

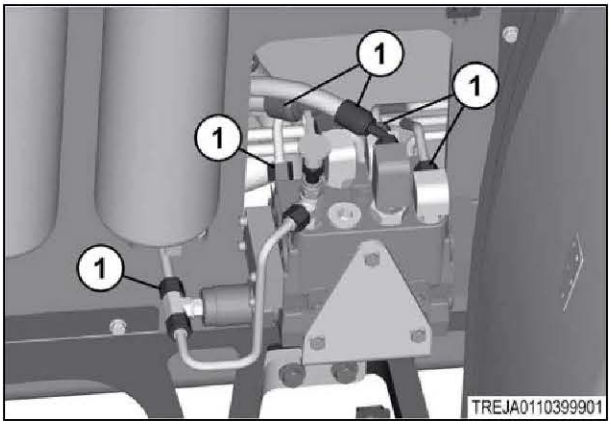

Fig. 134

6. If the machine is equipped with a transmission guard (1), support the transmission guard with the correct lifting equipment.

   IMPORTANT:
   The weight of the transmission guard is approximately 57 kg (125 lb).

7. Install the large holes in the transmission guard over the hardware (2).

8. Slide the transmission guard onto the bolts.

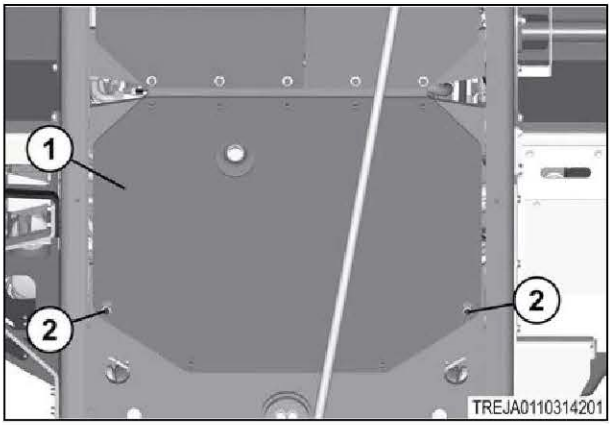

Fig. 135

9. Install the hardware (2) and tighten the hardware (2, 3) on the transmission guard (1).

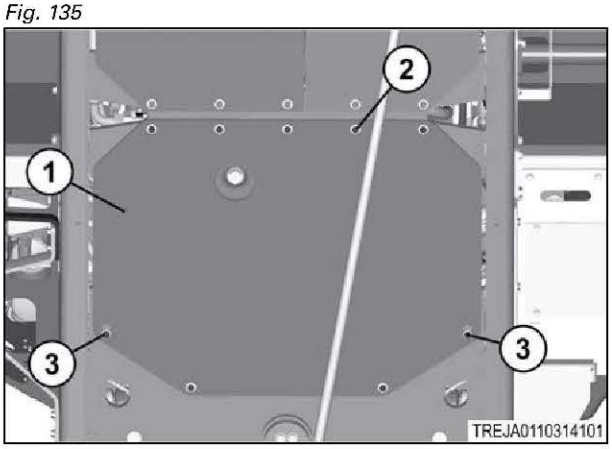

Fig. 136

10. Install the two drain plugs (1) in the hydraulic oil reservoir (2).

11. Fill the hydraulic oil reservoir with the correct type and the correct amount of hydraulic oil.

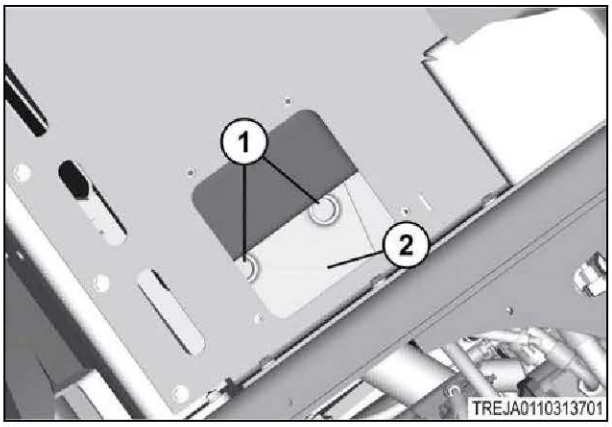

Fig. 137

12. Install the cover plate (2) with the hardware (1).

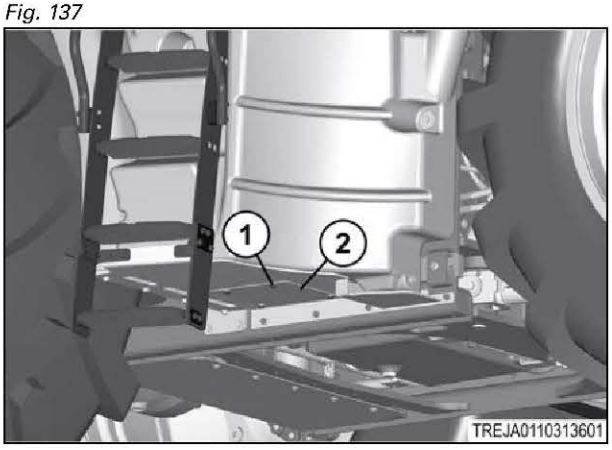

Fig. 138

13. Install the battery disconnect switch key (1).

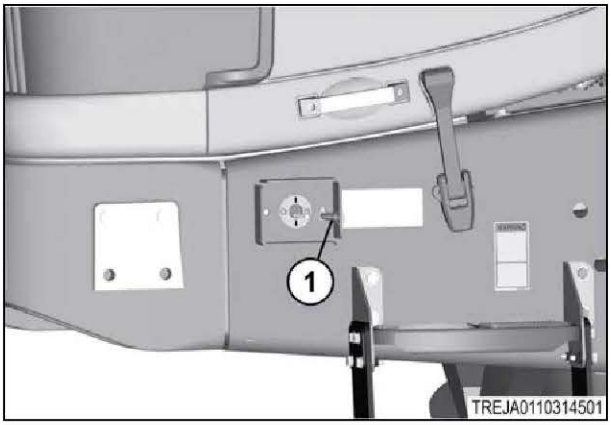

Fig. 139

14. Turn the battery disconnect switch key (1) clockwise to connect the battery power.

NOTE:
The battery disconnect switch is shown in the on position.

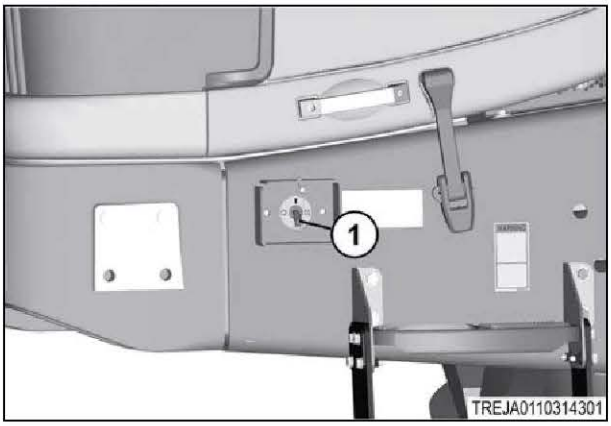

Fig. 140

Related Links

Lubricant viscosities page 1-18

7.6.21 Remove the hydraulic oil reservoir

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.

IMPORTANT:
Before removal, fasten identification tags on the components for correct installation at assembly. Put caps and plugs on all hoses, fittings, and ports to prevent contamination from entering the system.

IMPORTANT:
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.

IMPORTANT:
Completely clean all components to prevent contamination from entering the system. Contamination can damage the precision components. Perform disassembly procedures on a clean work surface. Put a clean cloth on top of the components.

Procedure

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

2. Turn the battery disconnect switch key (1) counterclockwise to disconnect the battery power.

   NOTE:
   The battery disconnect switch is shown in the off position.

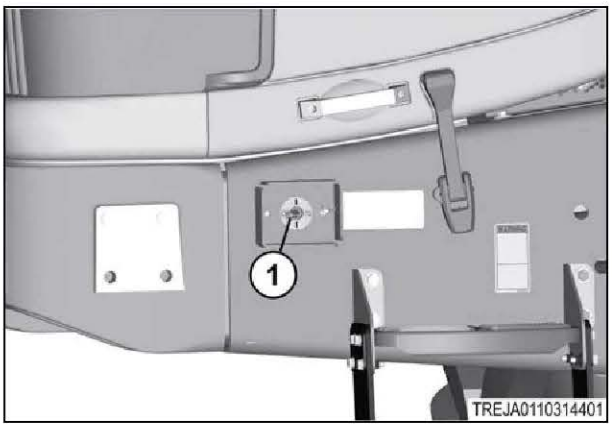

Fig. 141

3. Remove the battery disconnect switch key (1).

4. Relieve all pressure from the hydraulic system.

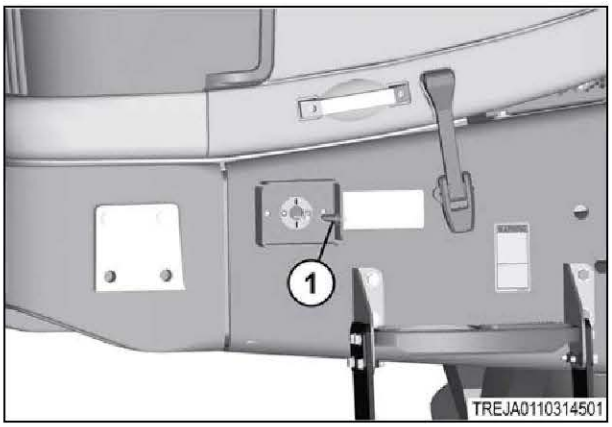

Fig. 142

5. Remove the hardware (1), and the cover plate (2).

6. Set a correct container below the drain plugs on the hydraulic reservoir.

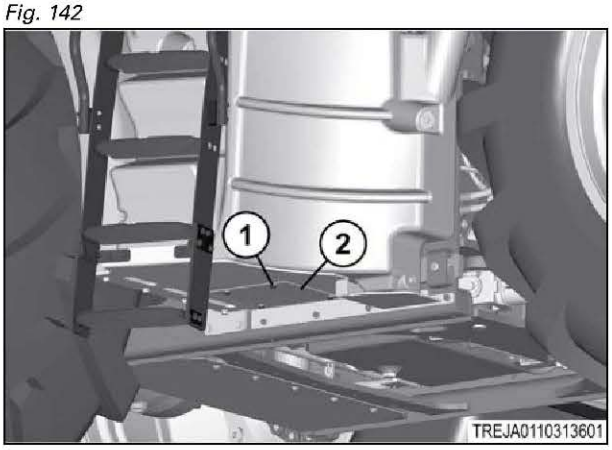

Fig. 143

7. Remove the two drain plugs (1) from the bottom of the hydraulic oil reservoir (2).

8. Drain the hydraulic oil.

9. Install the drain plugs when the reservoir is empty.

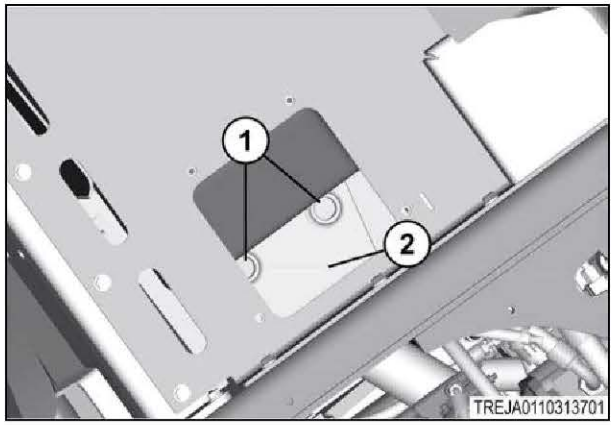

Fig. 144

10. If the machine is equipped with a transmission guard (1) support the transmission guard with correct lifting equipment.

IMPORTANT:
The weight of the transmission guard is approximately 57 kg (125 lb).

11. Remove the hardware (2).

12. Loosen the hardware (3).

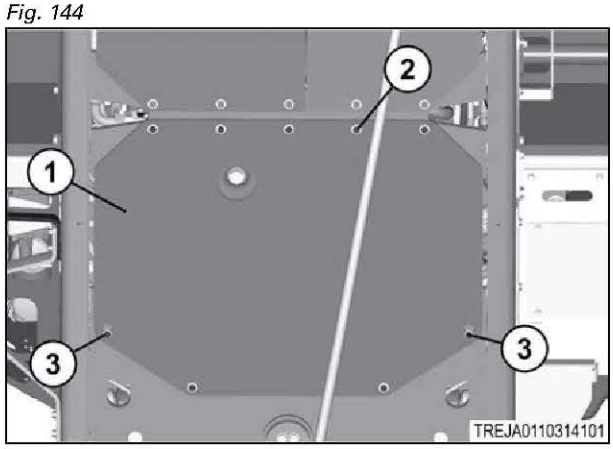

Fig. 145

13. Slide the transmission guard (1) so the large holes are over the hardware (2) and remove the transmission guard.

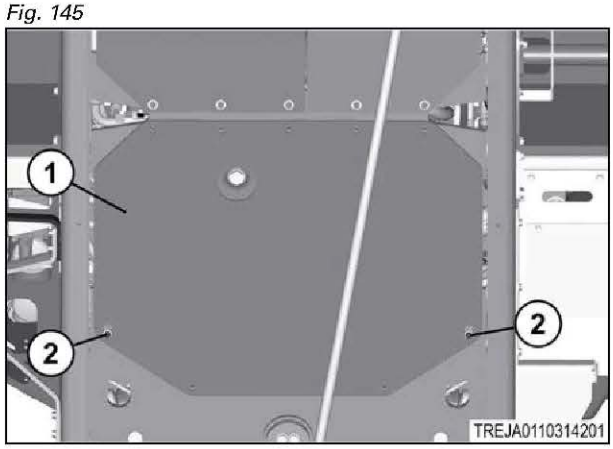

Fig. 146

14. Disconnect all hoses and the electrical connections from the hydraulic oil reservoir.

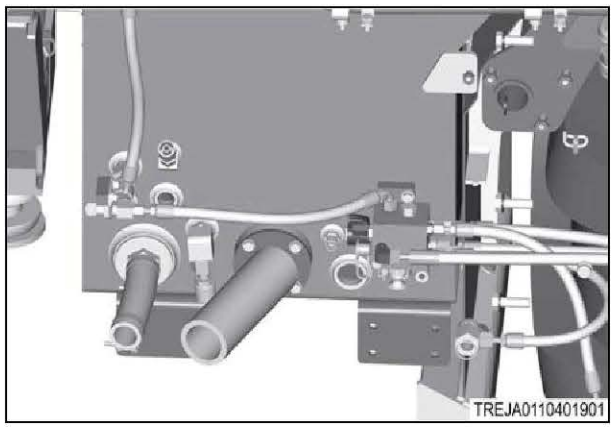

Fig. 147

15. Support the hydraulic oil reservoir (2) with correct lifting equipment and remove the hardware (1).

    IMPORTANT:
    The weight of the hydraulic oil reservoir is approximately 84 kg (185 lb).

16. Use the lifting equipment and remove the hydraulic reservoir.

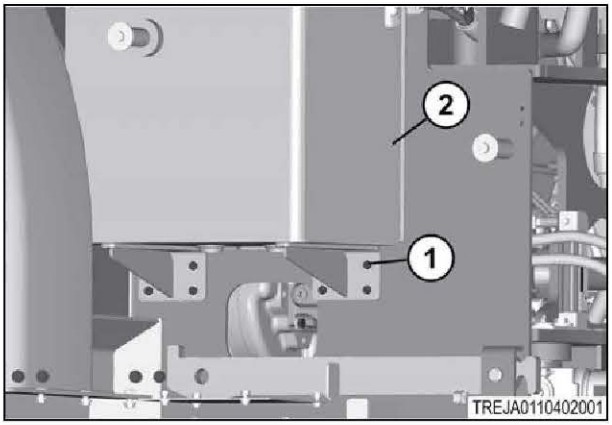

Fig. 148

7.6.22 Disassemble the hydraulic oil reservoir

IMPORTANT:
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.

IMPORTANT:
Completely clean all components to prevent contamination from entering the system. Contamination can damage the precision components. Complete the disassembly procedures on a clean work surface. Put a clean cloth on top of the components.

Procedure

1. Remove the two drain plugs (1) from the bottom of the hydraulic oil reservoir.

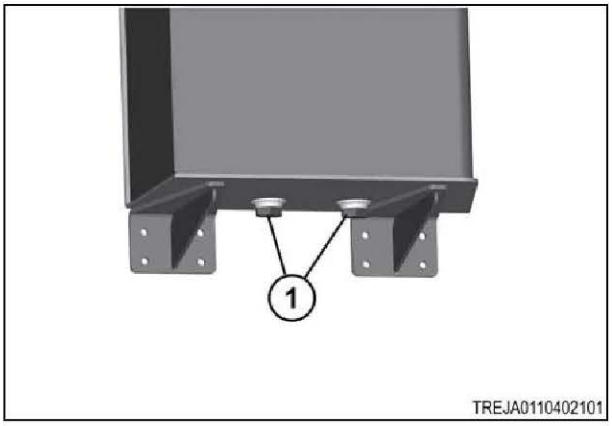

Fig. 149

2. Remove the breather (1) from the cover (2).

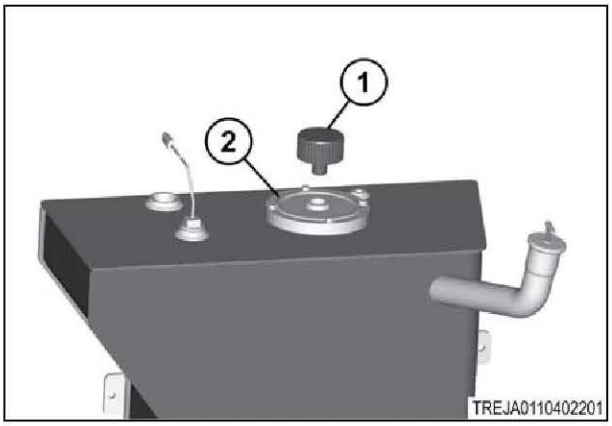

Fig. 150

3. Remove the fill cap (1) from the fill tube.

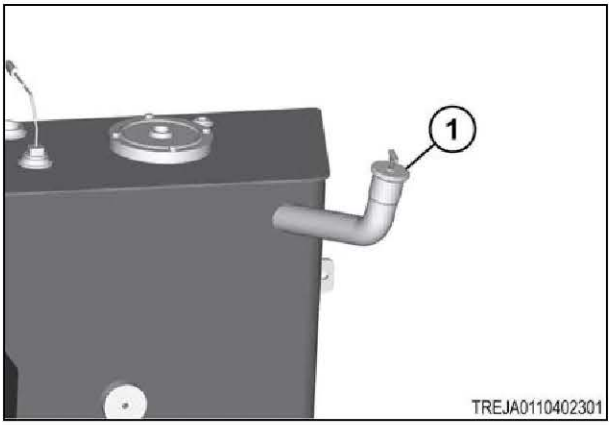

Fig. 151

4. Remove the hardware (1) and the sight gauge (2).

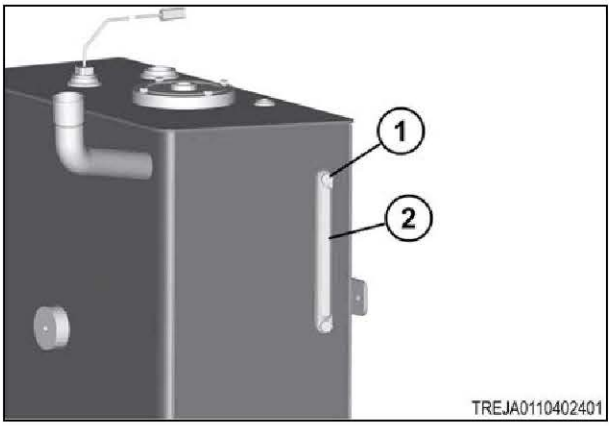

Fig. 152

5. Remove the oil level switch (1).

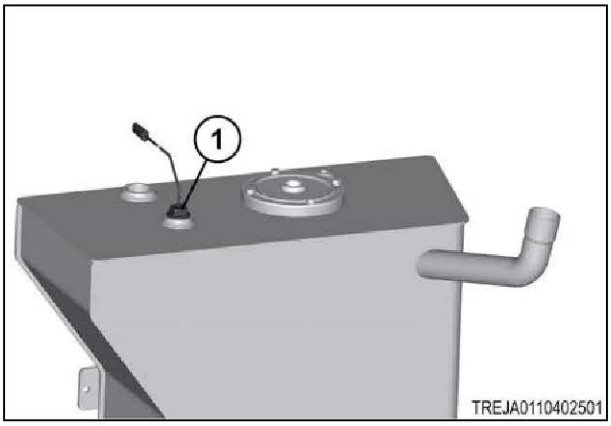

Fig. 153

6. Remove the hardware (1), the cover (2), and the O-ring.

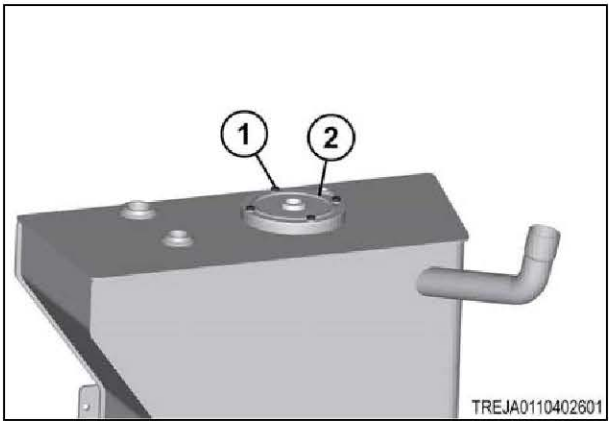

Fig. 154

7. Remove the plug (1) and the connector (2).

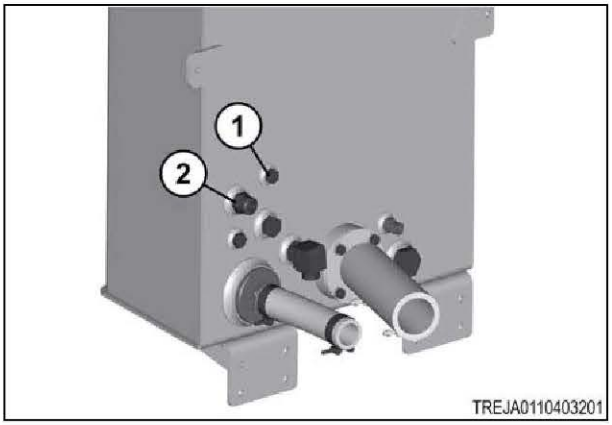

Fig. 155

8. Remove the plugs (1) and the elbow (2).

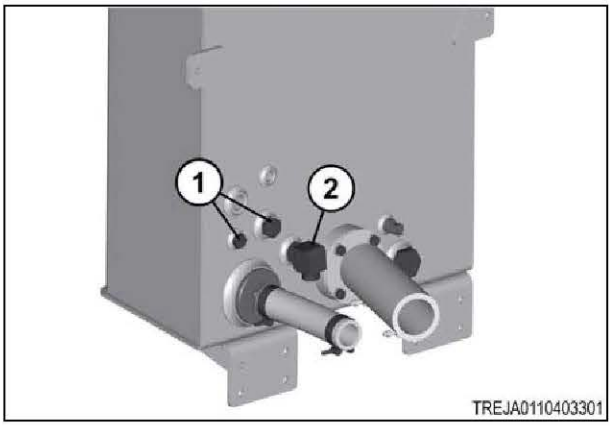

Fig. 156

9. Remove the plug (1).

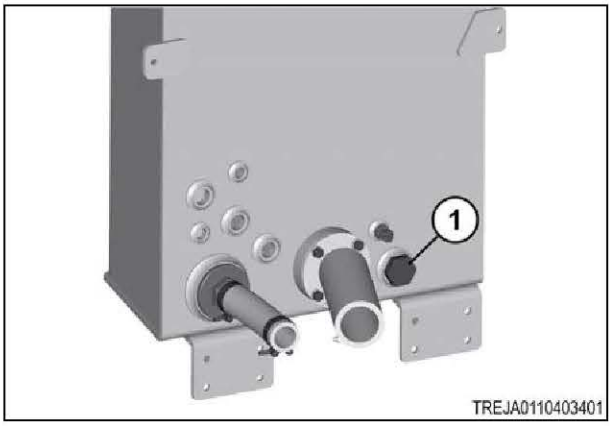

Fig. 157

10. Remove the hydraulic oil temperature sensor (1).

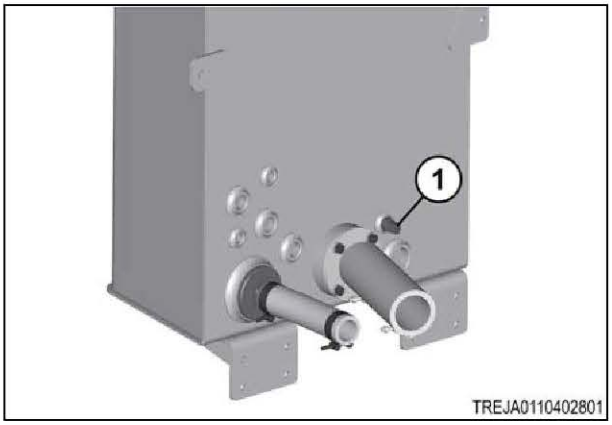

Fig. 158

11. Remove the hardware (1) and the tube fitting (2).

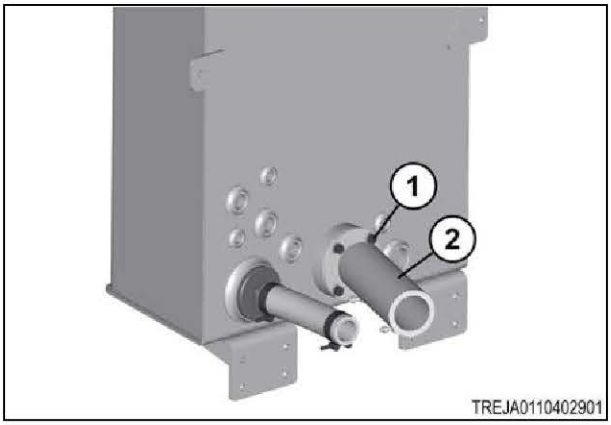

Fig. 159

12. Remove the fitting (1) and the oil suction screen (2).

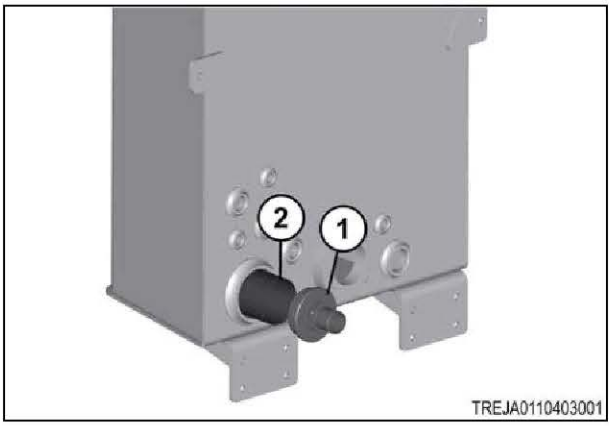

Fig. 160

13. Remove the two magnets (1) from inside the hydraulic oil reservoir. Remove the magnets through the two large fitting ports.

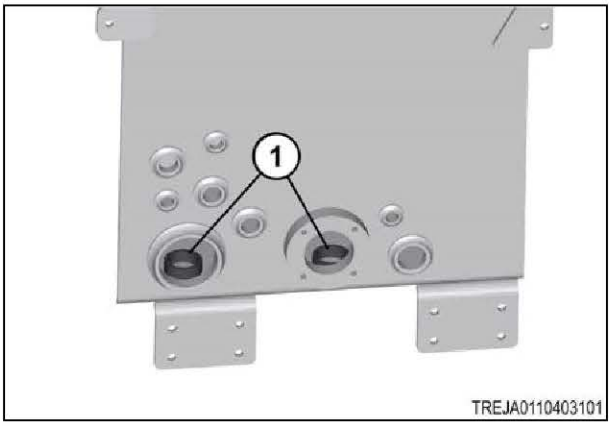

Fig. 161

7.6.23 Assemble the hydraulic oil reservoir

Procedure

1. Install the two magnets (1) to the bottom of the hydraulic oil reservoir.

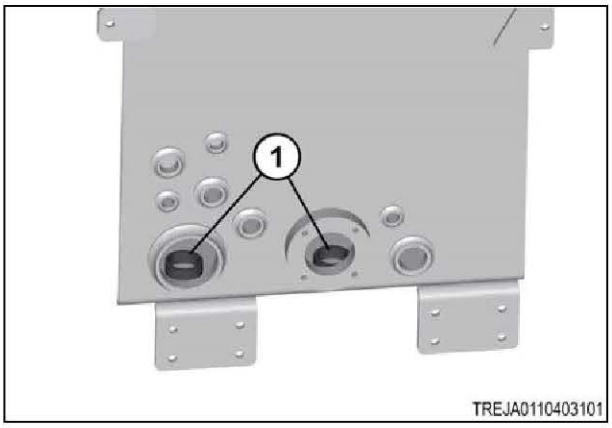

Fig. 162

2. Install the oil suction screen (2) and the fitting (1).

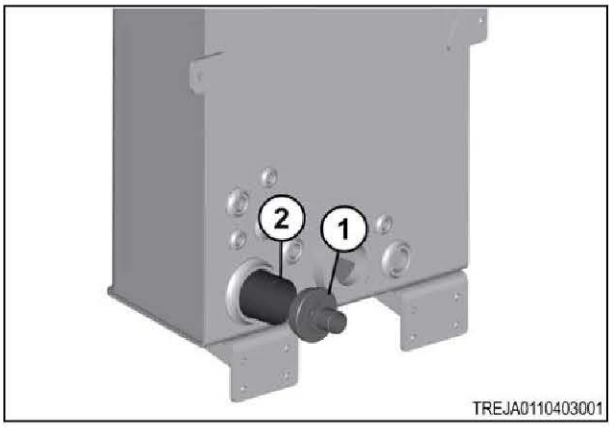

Fig. 163

3. Install a new O-ring. Install the tube fitting (2) with the hardware (1).

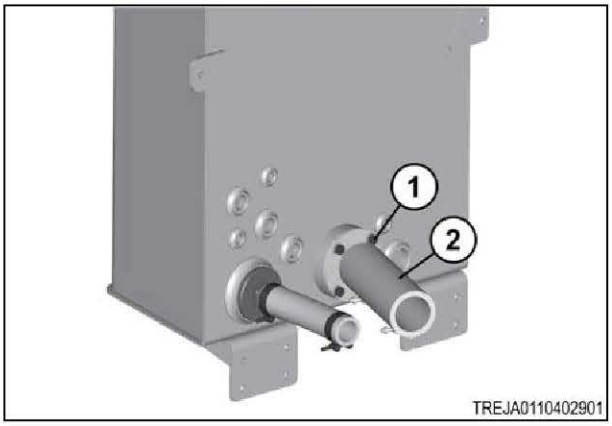

Fig. 164

4. Apply thread locking compound to the threads of the temperature sensor.

5. Install the temperature sensor (1).

   NOTE:
   Tighten the temperature sensor to approximately 15 to 25 Nm (11 to 19 lbf ft).

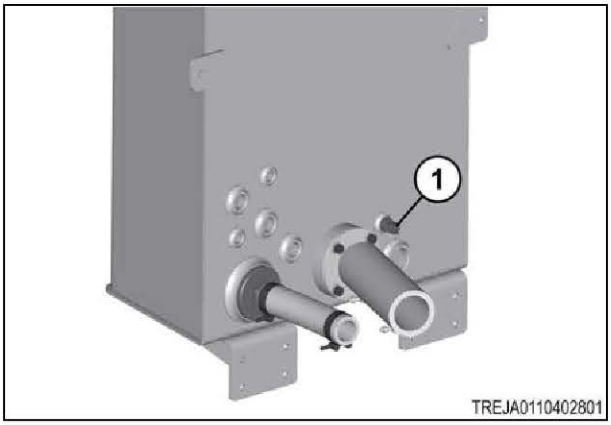

Fig. 165

6. Install the plug (1).

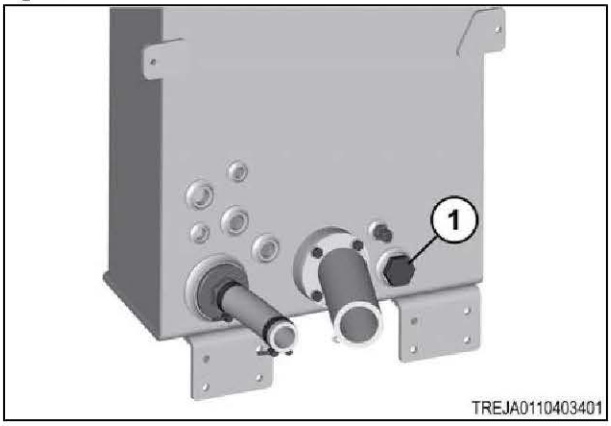

Fig. 166

7. Install the plugs (1) and the elbow (2).

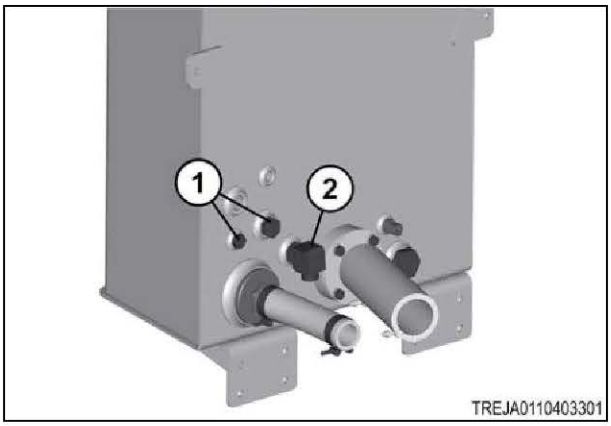

Fig. 167

8. Install the plug (1) and the connector (2).

   Tighten the plug to 126 to 154 Nm (93 to 113 lbf ft).

   Tighten the connector to 54 to 66 Nm (40 to 48 lbf ft).

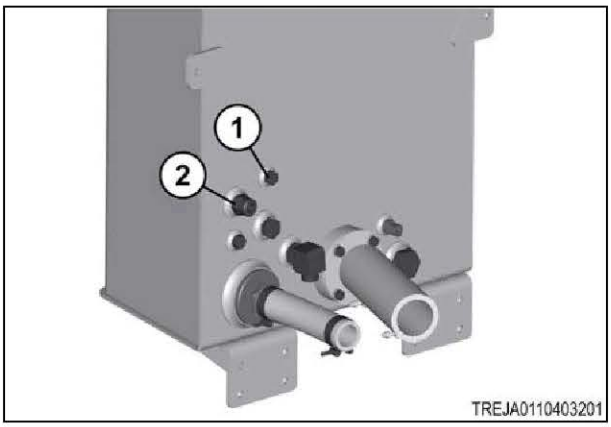

Fig. 168

9. Install the sight gauge (2) with the hardware (1).

Tighten the hardware to 5.4 Nm (4 lbf ft).

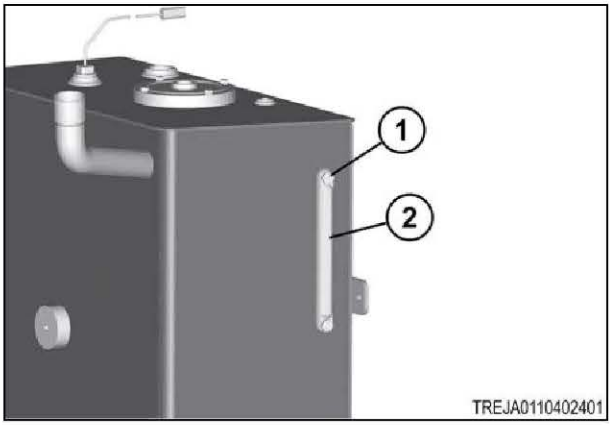

Fig. 169

10. Install a new O-ring on the cover. Install the cover (2) with the hardware (1).

Tighten the hardware to 21 to 35 Nm (16 to 26 lbf ft).

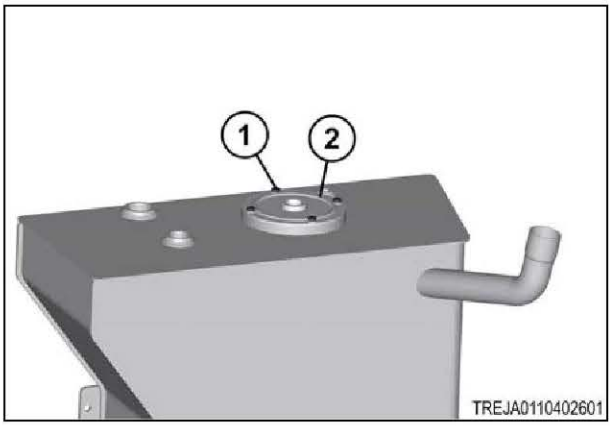

Fig. 170

11. Install the oil level switch (1).

Tighten the switch to 48 Nm (35 lbf ft).

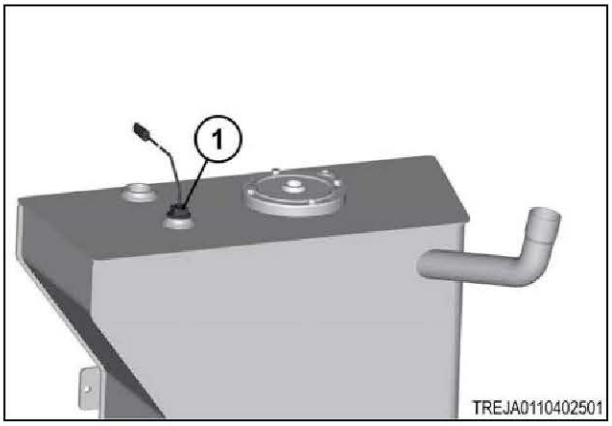

Fig. 171

12. Install the fill cap (1) to the fill tube.

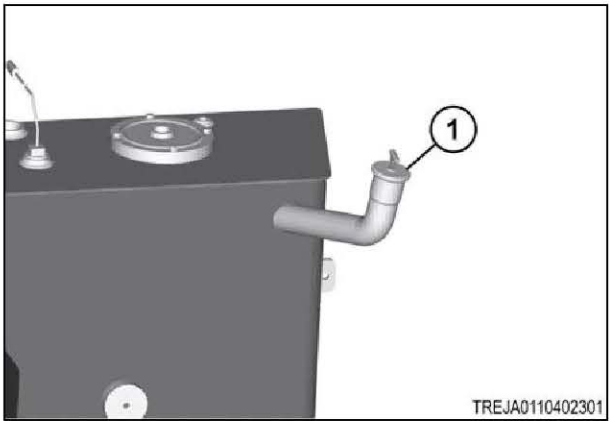

Fig. 172

13. Install the breather (1) to the cover (2).

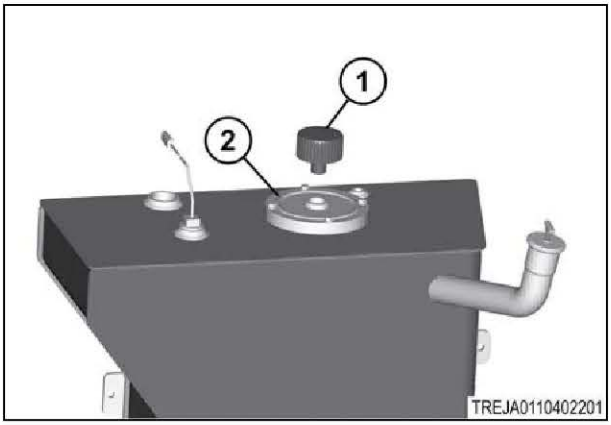

Fig. 173

14. Install the two drain plugs (1) to the bottom of the hydraulic oil reservoir.

Tighten the drain plugs to 190 to 230 Nm (140 to 170 lbf ft).

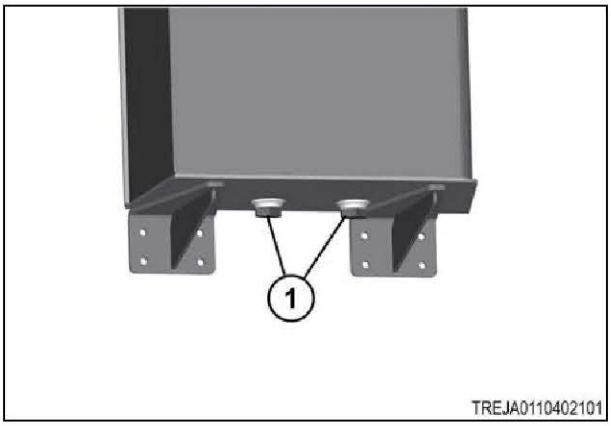

Fig. 174

7.6.24 Install the hydraulic oil reservoir

IMPORTANT:
Completely clean all components to prevent contamination from entering the system. Contamination can damage the precision components. Perform disassembly procedures on a clean work surface. Put a clean cloth on top of the components.

NOTE:
Make sure the hydraulic oil reservoir is free of water and solvent.

Procedure

1. Put the hydraulic oil reservoir (2) into position using correct lifting equipment. Install the hardware (1).

IMPORTANT:
The weight of the hydraulic oil reservoir is approximately 84 kg (185 lb).

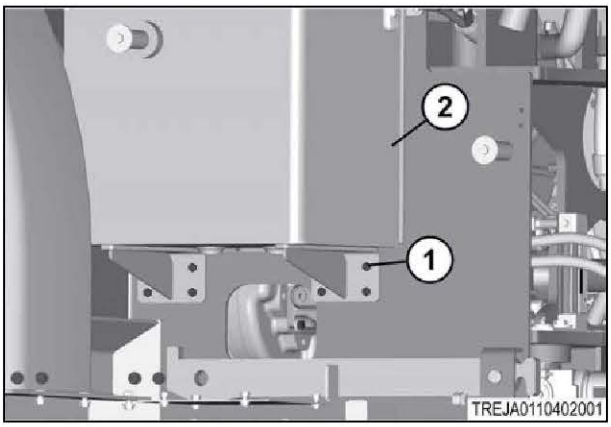

Fig. 175

2. Connect all the hoses and the electrical connections to the hydraulic oil reservoir.

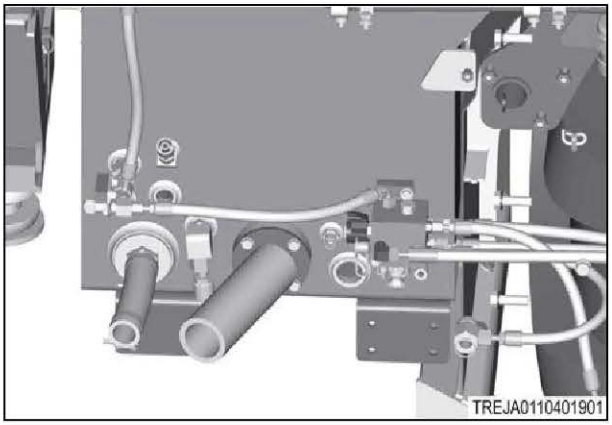

Fig. 176

3. If the machine is equipped with a transmission guard (1), use correct lifting equipment to put the transmission guard into position. Make sure the large holes are over the hardware (2).

   IMPORTANT:
   The weight of the transmission guard is approximately 57 kg (125 lb).

4. Slide the transmission guard (1) onto the hardware (2).

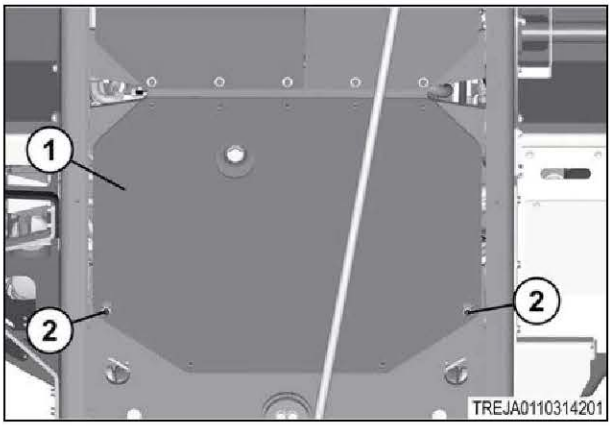

Fig. 177

5. Install the transmission guard (1) with the hardware (2, 3).

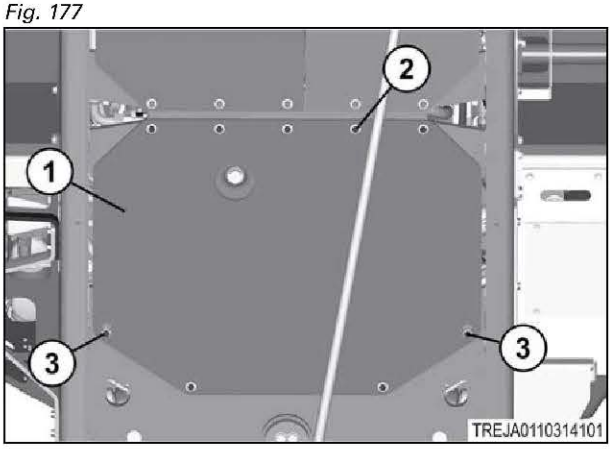

Fig. 178

6. Install the two drain plugs (1) to the bottom of the hydraulic oil reservoir (2).

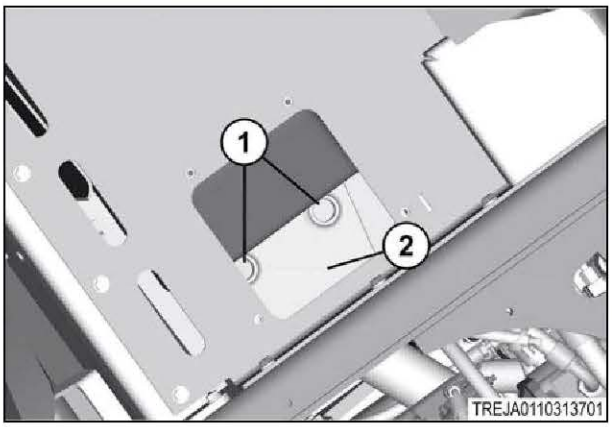

Fig. 179

7. Install the cover plate (2) with the hardware (1).

8. Fill the hydraulic oil reservoir with hydraulic oil.

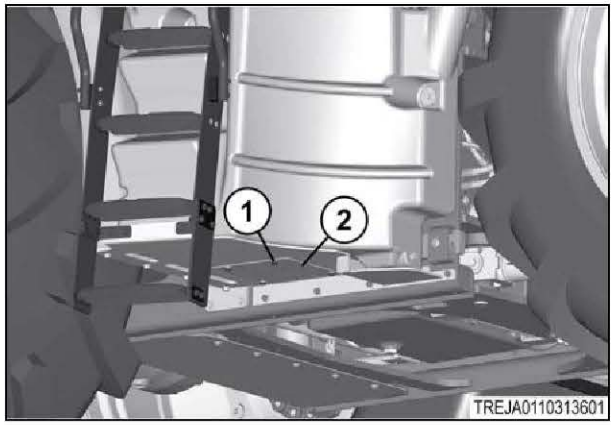

Fig. 180

9. Install the battery disconnect switch key (1).

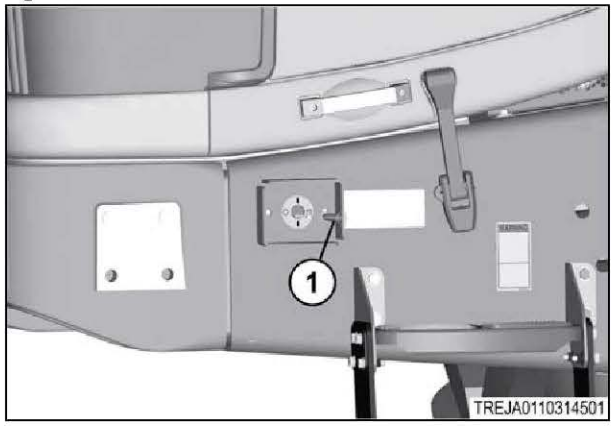

Fig. 181

10. Turn the battery disconnect switch key (1) clockwise to connect the battery power.

    NOTE:
    The battery disconnect switch is shown in the on position.

11. Check for leaks.

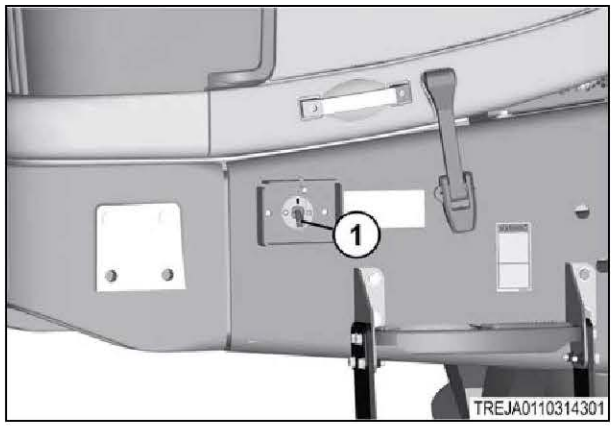

Fig. 182

Related Links

Lubricant viscosities page 1-18

7.6.25 Remove the trailer brake valve

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: 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.

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

IMPORTANT:
Make sure fluids are contained. Be prepared to put fluid in correct containers.

NOTE:
Make sure the component and area around the component are clean to prevent contamination.

NOTE:
Put identification marks on all the lines, hoses, wires, and tubes for installation purposes. Plug all the lines, hoses, and tubes. This prevents fluid loss and contamination.

The trailer brake valve (1) is located in the service cabinet on the right-hand side of the machine behind the front tire.

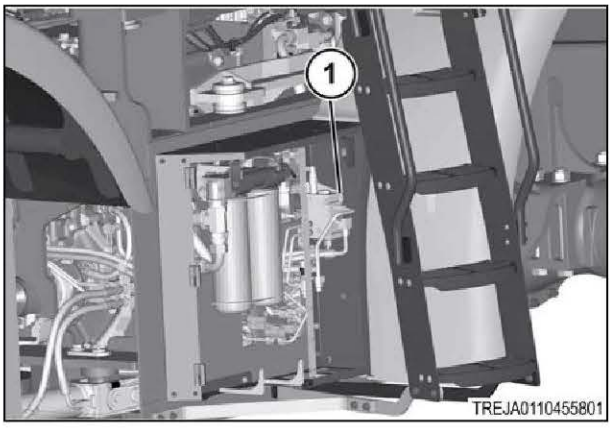

Fig. 183

Procedure

1. Remove the hose from the trailer brake work port (1) from the trailer brake valve.
2. Remove the hose from the load sense port (2) from the trailer brake valve.
3. Remove the hose from the steering load sense port (3) from the trailer brake valve.
4. Remove the hose from the tank port (4) from the trailer brake valve.
5. Remove the hose from the pump supply port (5) from the trailer brake valve.

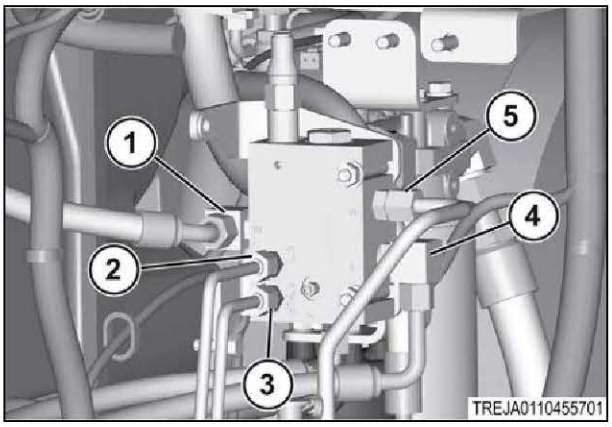

Fig. 184

6. Remove the two nuts (1) that fasten the trailer brake valve to the mounting bracket.

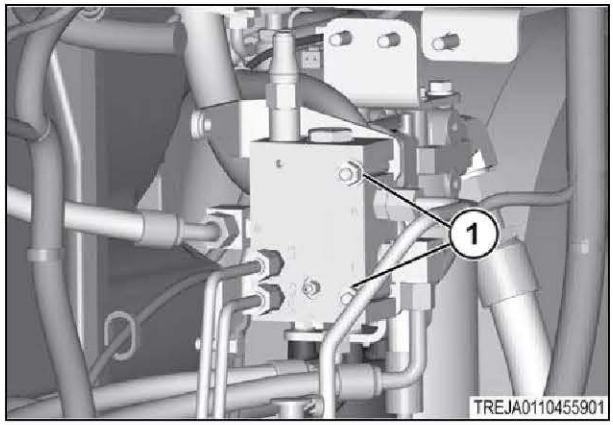

Fig. 185

7.6.26 Install the trailer brake valve

Before starting the procedure

Relieve the system hydraulic pressure before loosening any hydraulic connections.

Relieve the hydraulic pressure in the service brake accumulator.

Before opening the hydraulic system, prepare a container with enough capacity to hold the hydraulic fluid.

Remove any component which prevents the installation of the kit parts.

NOTE: *Fluid under high pressure can cause injury.*

Death or serious injury can result.

Wear hand and eye protection.

Procedure

1. Install the two nuts (1) that fasten the trailer brake valve to the mounting bracket.

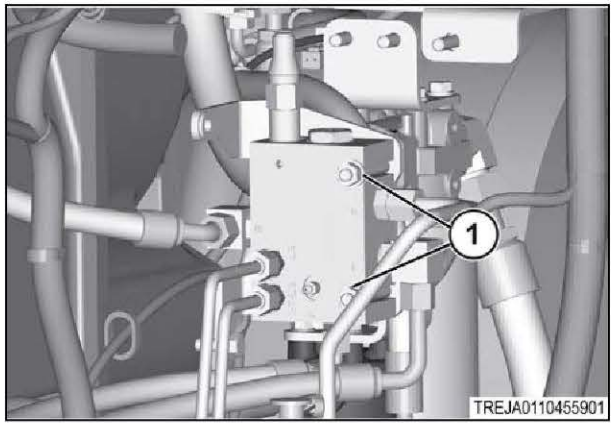

Fig. 186

2. Connect the hose to the trailer brake work port (1) to the trailer brake valve.
3. Connect the hose to the load sense port (2) to the trailer brake valve.
4. Connect the hose to the steering load sense port (3) to the trailer brake valve.
5. Connect the hose to the tank port (4) to the trailer brake valve.
6. Connect the hose to the pump supply port (5) to the trailer brake valve.

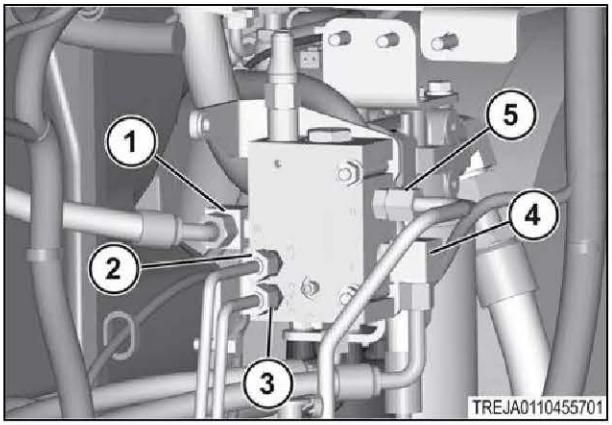

Fig. 187

After finishing the procedure

Fill the system with approved hydraulic oil.

Clean the work area and prepare to start the machine to check for leaks.

CAUTION:
Hydraulic fluid under pressure can enter the skin or eyes and cause serious personal injury or death.

Use a piece of cardboard or wood to find leaks. Wear safety goggles for eye protection.

Hydraulic fluid injected into the skin must be immediately removed.

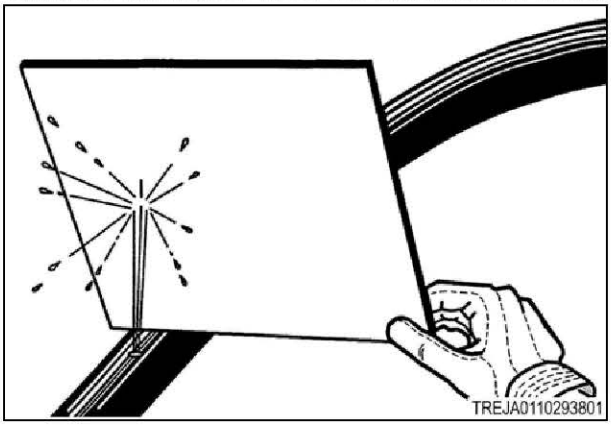

Fig. 188

Start the engine and check for leaks.

Stop the engine and remove the key.

Correct any problems.

ATTENTION: *Make sure the machine is in working order before returning to normal operation.*

Failure to do so can cause serious personal injury or death.

Related Links

Lubricant viscosities page 1-18

7.6.27 Remove the trailer brake coupler

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: 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.

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

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

IMPORTANT:
Put identification marks on all the lines, hoses, wires, and tubes for installation purposes. Plug all the lines, hoses, and tubes. This prevents fluid loss and contamination.

IMPORTANT:
Make sure the component and area around the component are clean to prevent contamination.

The trailer brake valve (1) is located in the service cabinet on the right-hand side of the machine behind the front tire.

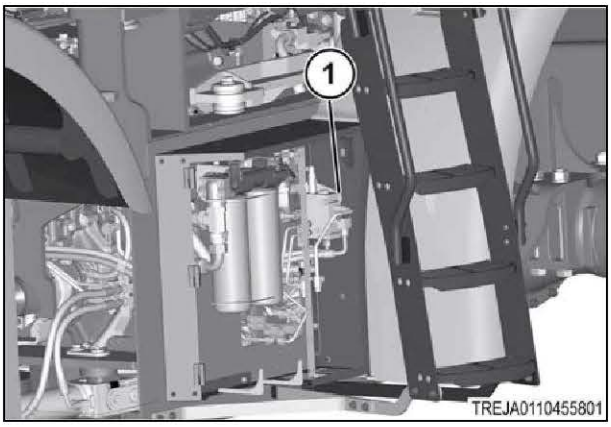

Fig. 189

Procedure

1. Remove the hose from the trailer brake work port (1) from the trailer brake valve (2).

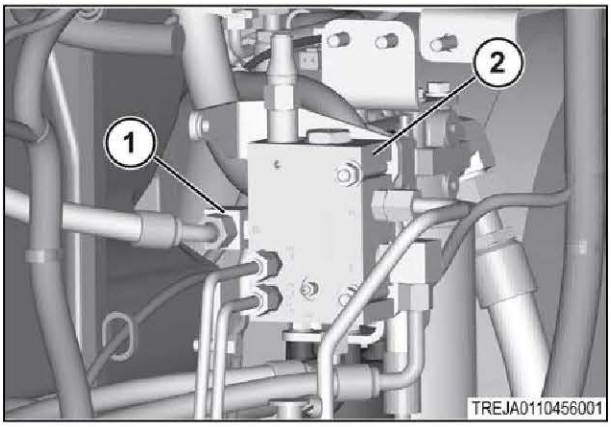

Fig. 190

2. Remove the coupler assembly(1) from the power beyond bracket (2).

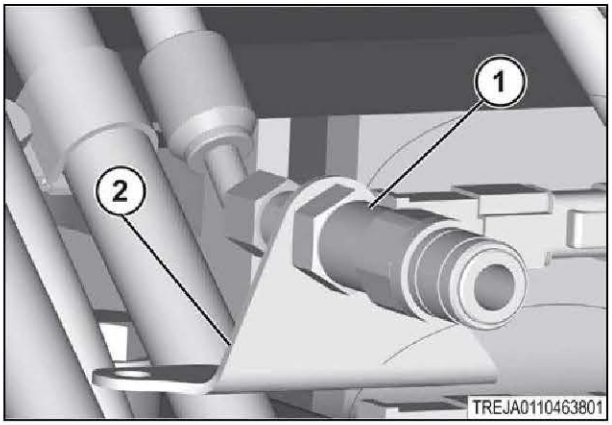

Fig. 191

3. Remove the hose from the hose wrap(1) located under the step (2) to the rear of the cab.

4. Remove the trailer brake coupler hose (3) from the machine.

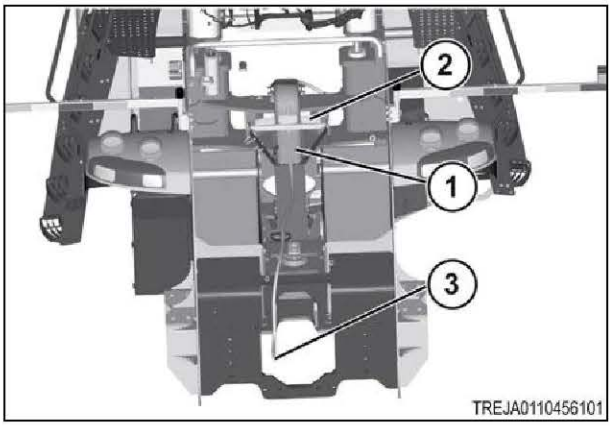

Fig. 192

7.6.28 Install the trailer brake coupler

Before starting the procedure

Relieve the system hydraulic pressure before loosening any hydraulic connections.

Relieve the hydraulic pressure in the service brake accumulator.

Before opening the hydraulic system, prepare a container with enough capacity to hold the hydraulic fluid.

Remove any component which prevents the installation of the kit parts.

NOTE: *Fluid under high pressure can cause injury.*

Death or serious injury can result.

Wear hand and eye protection.

Procedure

1. Put the trailer brake coupler hose (3) through the hose wrap (1). The hose wrap is located under the step (2) to the rear of the cab.

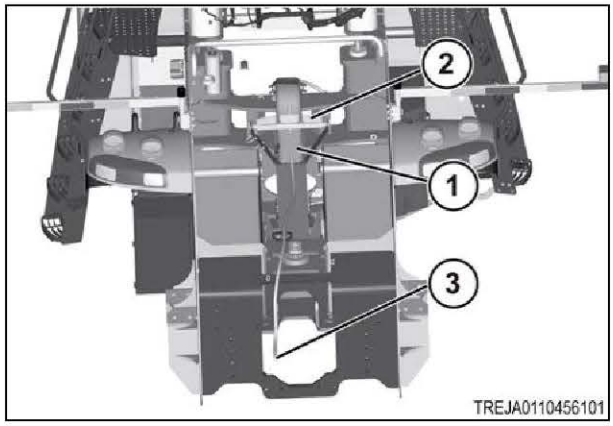

Fig. 193

2. Install the coupler assembly (1) to the power beyond bracket.

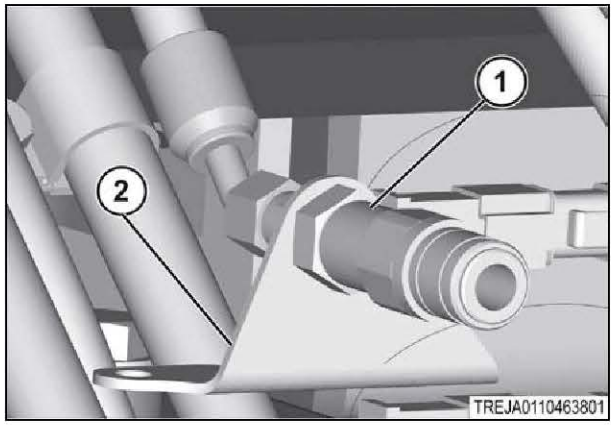

Fig. 194

3. Connect the hose assembly (1) to the power beyond bracket (2).

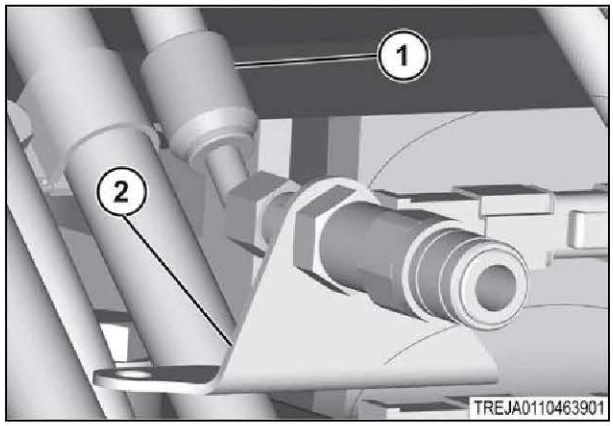

Fig. 195

4. Connect the hose to the trailer brake work port (1) on the trailer brake valve (2).

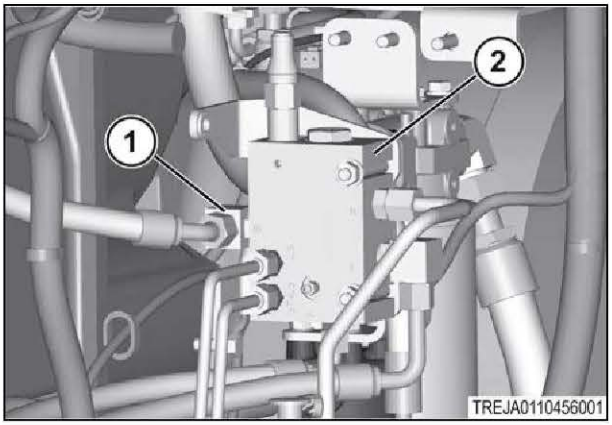

Fig. 196

After finishing the procedure

Fill the system with approved hydraulic oil.

Clean the work area and prepare to start the machine to check for leaks.

CAUTION:
Hydraulic fluid under pressure can enter the skin or eyes and cause serious personal injury or death.

Use a piece of cardboard or wood to find leaks. Wear safety goggles for eye protection.

Hydraulic fluid injected into the skin must be immediately removed.

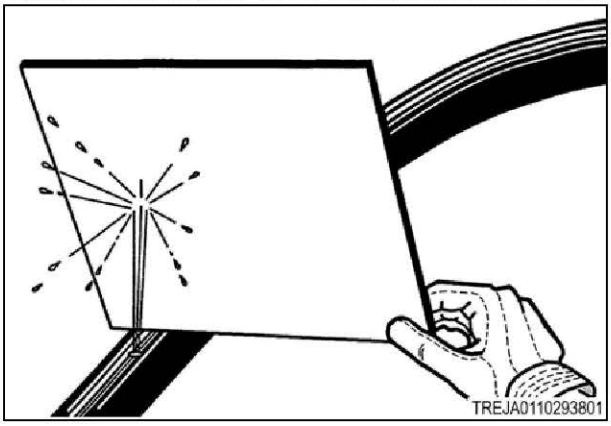

Fig. 197

Start the engine and check for leaks.

Stop the engine and remove the key.

Correct any problems.

ATTENTION: *Make sure the machine is in working order before returning to normal operation.*

Failure to do so can cause serious personal injury or death.

Related Links

Lubricant viscosities page 1-18

7.7 Brake system testing and adjusting

7.7.1 Brake troubleshooting

Soft pedal when the engine is not operating	
Cause(s)	**Solution(s)**
Incorrectly adjusted brake cable	See your dealer

Pedal bottoms out when the engine is not operating	
Cause(s)	**Solution(s)**
Damaged brake cable	See your dealer

Pedal moves too far when the engine is operating	
Cause(s)	**Solution(s)**
Incorrectly adjusted brake cable	See your dealer

Accumulator low pressure warning	
Cause(s)	**Solution(s)**
Leakage in the brake valve	See your dealer
The brake piston is leaking	See your dealer
Leakage in the brake lines	See your dealer

Accumulator charges frequently	
Cause(s)	**Solution(s)**
Leakage in the brake valve	See your dealer
The brake piston is leaking	See your dealer
Incorrect accumulator charge	See your dealer
Damaged brake valve	See your dealer
Air in the brake system	See your dealer

Unsatisfactory service brake performance	
Cause(s)	**Solution(s)**
Air in the brake system	See your dealer
Incorrectly adjusted brake cable	See your dealer
Worn brake discs	See your dealer
Leakage in the brake system	See your dealer

7.7.2 Tri-section pump troubleshooting

Pump trouble	Probable cause	Remedy
Pump does not make full pressure	1. System relief valve set too low or is leaking 2. Oil viscosity is too low 3. Pump is worn out 4. Seal retainer O-ring crimped	1. Check the system relief valve for correct setting 2. Change to the correct viscosity oil 3. Repair or replace the pump 4. Disassemble the pump and check the O-ring
Pump will not supply oil	1. Reservoir is low or empty 2. Suction strainer obstruction 3. Pump shaft rotation is not correct	1. Fill the reservoir to the correct level 2. Clean the suction strainer 3. Check for the correct rotation of the pump shaft
Pump noise caused by cavitation	1. Oil viscosity is too high 2. Oil suction filter obstruction 3. Suction line too small or has obstruction	1. Change to the correct viscosity oil 2. Clean the oil suction filter 3. Clean the suction line and check for the correct size

Pump trouble	Probable cause	Remedy
Oil heating	1. Oil supply is low 2. Contaminated oil 3. Setting of the relief valve is not correct 4. Oil viscosity is too low	1. Fill the reservoir to the correct level 2. Drain the reservoir and fill with clean oil 3. Set the relief valve setting to the correct pressure 4. Change to the correct viscosity oil
Foaming oil	1. Low oil level 2. Air leaking into the suction line 3. Oil type is not correct	1. Fill the reservoir to the correct level 2. Tighten the fittings and check the condition of the suction line 3. Drain the reservoir and fill with correct oil
Shaft seal leakage	1. Worn shaft seal or cut seal lip 2. Worn shaft in the seal area 3. Pump shaft rotation is not correct	1. Replace the shaft seal 2. Replace the drive shaft and the seal 3. Check for the correct rotation of the pump shaft

7.7.3 Accumulator troubleshooting

Accumulator charging cycle repeats frequently

Problem	Solution
Leaking accumulator lines or fittings	Check the lines and fittings for leaks
Accumulator gas charge setting is not correct	Check the accumulator gas charge
Obstruction in the line to the accumulator	Replace the line
Faulty charge valve	Replace the charge valve

Accumulator charges but does not reach high limit

Problem	Solution
No oil or low oil level in the reservoir	Check the oil level
Pump is worn or is not supplying full pressure	Check the pump
Relief valve leak or is set too low	Check the relief valve
Faulty charge valve	Replace the charge valve

Accumulator charging time is too long

Problem	Solution
No oil or low oil level in the reservoir	Check the oil level
Relief valve setting is too low	Check the relief valve setting
Pump is worn or is not supplying full pressure	Check the pump
Faulty charge valve	Replace the charge valve

Accumulator fails to start charging

Problem	Solution
No oil or low oil level in the reservoir	Check the oil level
Worn or faulty pump	Check the pump pressure and flow
Relief valve setting is not correct	Check the relief valve setting
Air in the accumulator line	Bleed the accumulator line
Faulty charge valve	Replace the charge valve

Rapid cycling of the charging valve

Problem	Solution
Accumulator gas charge setting is not correct	Check the accumulator gas charge
Faulty charge valve	Replace the charge valve

Flow through the valve is not correct

Problem	Solution
Bad pump	Check the pump pressure and delivery
Relief valve setting is not correct	Check the relief valve setting
Line obstruction	Replace the lines
Faulty charge valve	Replace the charge valve

7.7.4 Purge the service brake

Procedure

1. Park the machine on a solid, level surface.
2. Lower all implements to the ground.
3. Lower the 3-point linkage.

4. Make sure the transmission control lever (1) is in the park position.
5. Heat the drive train oil to a minimum of 20 °C (68 °F).
6. Slowly press the brake pedal to one third of the brake pedal range. Repeat for ten cycles to fill the brake lines.
7. Turn the engine off and turn the key to the accessory position.

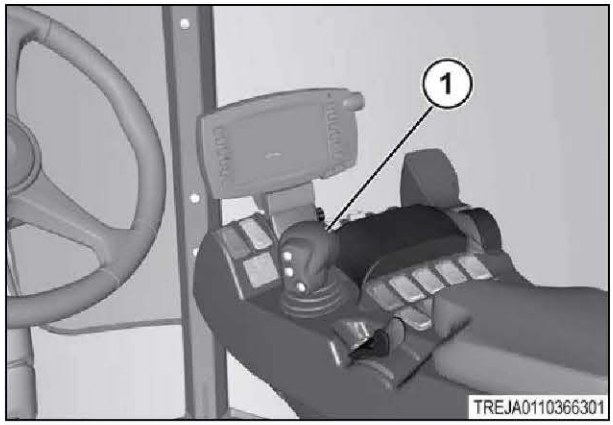

Fig. 198

8. Push the tow-override knob (1) up.
9. Slowly press the brake pedal to approximately two thirds of the total brake pedal range. Hold the position for approximately 20 seconds.

   The low brake accumulator warning will show on the tractor management center (TMC).
10. Release the brake pedal.
11. Start the engine and let the accumulator charge completely.

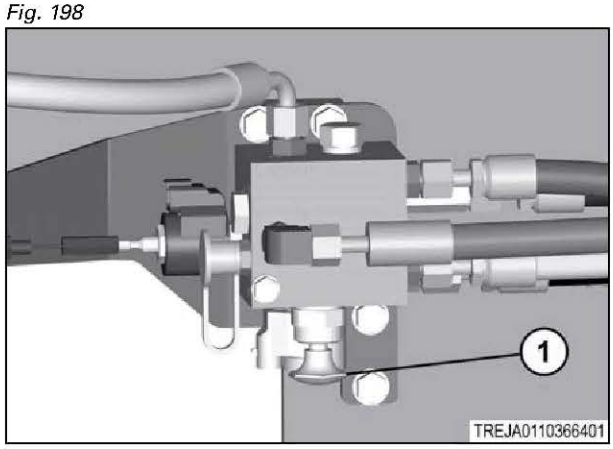

Fig. 199

12. Connect clear plastic tubes to the bleed ports on top of the front axle.
13. Put the ends of the clear plastic tubes into an approved container.
14. Open the purge screws (1).
15. Press the brake pedal to get enough flow to push the air from the system.
16. Release the brake pedal for 30 seconds after clear oil flows from the clear plastic tubes.
17. Press the brake pedal until clear oil flows from the clear plastic tubes.
18. Release the brake pedal.

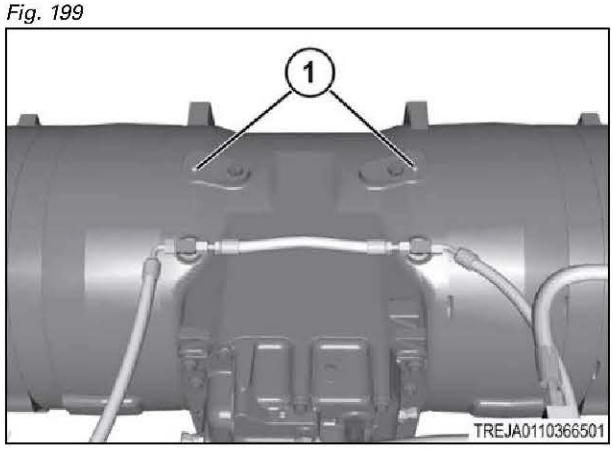

Fig. 200

19. Close the purge screws before air gets into the purge lines.

20. Connect clear plastic tubes to the bleed ports on top of the rear axle.
21. Put the ends of the clear plastic tubes into an approved container.
22. Open the purge screws (1).
23. Press the brake pedal to get enough flow to push the air from the system.
24. Release the brake pedal for 30 seconds after clear oil flows from the clear plastic tubes.
25. Press the brake pedal until clear oil flows from the clear plastic tubes.
26. Release the brake pedal.

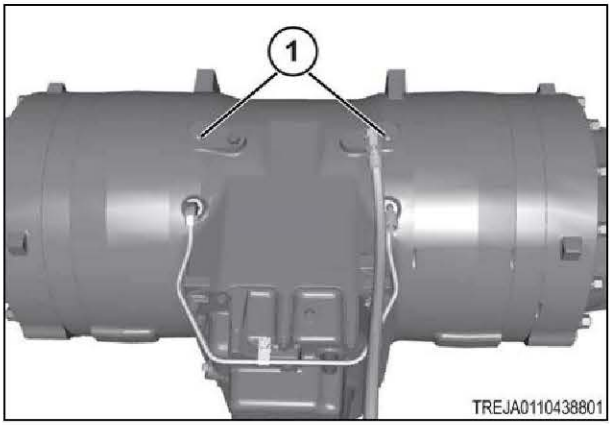

Fig. 201

27. Close the purge screws before air gets into the purge lines.
28. Connect a clear plastic tube to the test port (1) below the left-hand rear corner of the cab.
29. Put the end of the clear plastic tube into an approved container.
30. Press the brake pedal to get enough flow to push the air from the system.
31. Release the brake pedal for 30 seconds after clear oil flows from the clear plastic tube.
32. Press the brake pedal until clear oil flows from the clear plastic tube.
33. Release the brake pedal and disconnect the clear plastic tube.

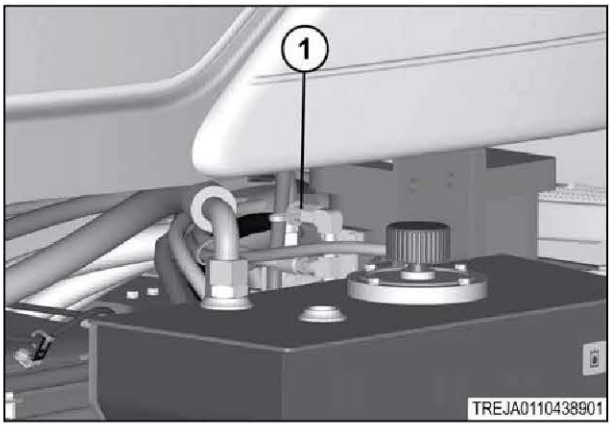

Fig. 202

34. Turn off the engine.
35. Check the service brake system for leaks.
36. Do the purge procedure for the hydraulic trailer brakes, if equipped.

7.7.5 Bleed the brake system 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: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

Procedure

1. Park the machine on a solid, level surface.
2. Put the transmission control lever in the park position.
3. Block the wheels to prevent machine movement.
4. Turn the engine off.

5. Turn the key to the accessory position.
6. Press the brake pedal (1) multiple times until the low brake accumulator warning shows on the tractor management center (TMC).
7. Continue pressing the brake pedal until there is no pressure in the brake system.
8. Press and hold the brake pedal for approximately ten seconds.

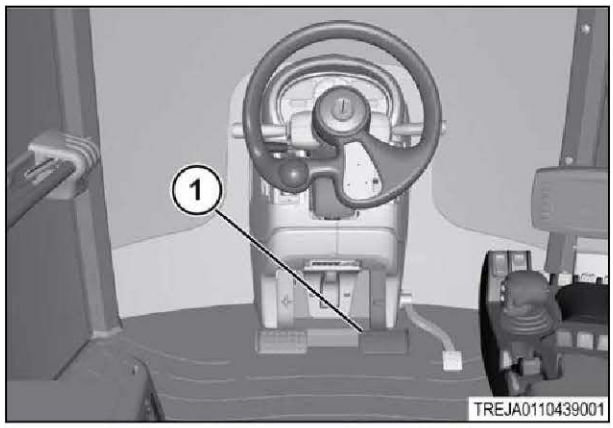

Fig. 203

7.7.6 Bleed the trailer brakes

IMPORTANT:
Bleeding air from the braking system is necessary any time the braking system is opened. Air in the braking system will not let the brakes release correctly and can cause damage to the braking system.

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

The trailer brake control valve is located on the left-hand side of the powertrain above the axle final drive housing.

Before starting the procedure

Two 1.07 m (3.5 ft) pieces of clear hose are necessary to bleed the service brake. The hoses must have an inside diameter of 9.5 mm (0.4 in) (0.38 in).

Procedure

1. Park the machine on a solid, level surface.
2. Lower all implements and the 3-point linkage to the ground.
3. Make sure the transmission control lever is in the park position.
4. Heat the oil to a minimum temperature of 20 °C (68 °F).
5. Stop the engine, apply the park brake, and take the key with you.
6. Connect a clear plastic tube to the bleed screw.
7. Put the discharge of the clear plastic tubes into a container of clean oil or into the powertrain fill tube. The end of the clear plastic tubes must be below the oil level.
8. Open the bleed screw.
9. Start the engine.
10. Press the brake pedal to get enough flow to get the air from the system.
11. When clear oil flows from the tube, close the bleed screw.
12. For hydraulic trailer brakes:
    a) Connect a bleed line to the trailer brake supply coupler at the rear of the machine.
    b) Put the discharge of the clear plastic tubes into a container of clean oil or into the transmission fill tube. The end of the clear plastic tubes must be below the oil level.

c) Press the brake pedal to get enough flow to get the air from the system.
d) When the air has left the system, remove the bleed line from the trailer brake supply coupler at the rear of the machine.

13. Stop the engine.

7.8 Brake system maintenance

7.8.1 Replace the brake charge filter element

Procedure

1. Park the machine on a solid, level surface.
2. Make sure the transmission control lever is in the park position.
3. Remove the pressure from the brake system.
4. Remove the filter bowl (1) from the filter head (2).
5. Replace the filter element in the filter bowl.
6. Install the filter bowl into the filter head.

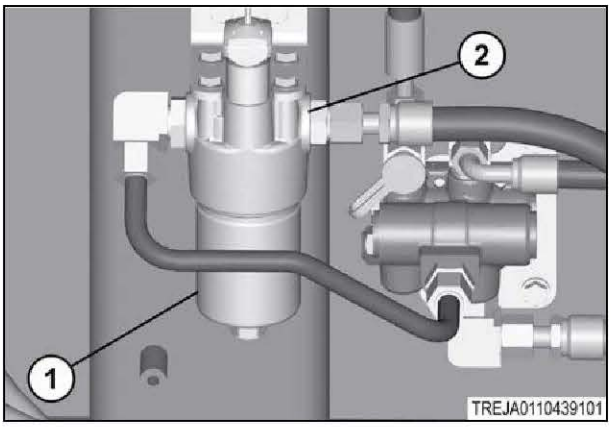

Fig. 204

Related Links

Bleed the brake system pressure page 7-86

7.9 Brake system specifications

7.9.1 Brake charge filter

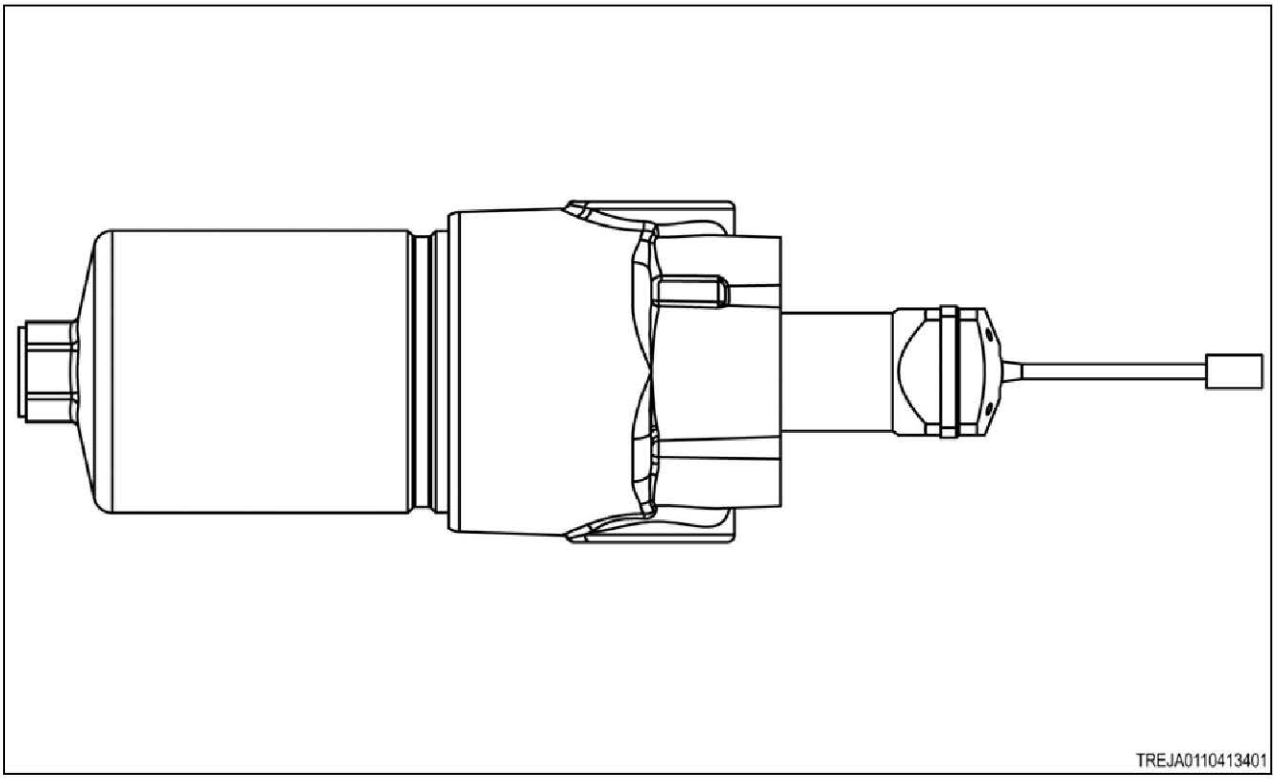

Fig. 205

Filter specifications	
Max operating pressure	210 BAR(3045 psi)
Rated flow	68.14 L/min(18 gal/min)
Element pressure differential rating	17 BAR(250 psi)
Bypass cracking pressure	7 BAR(100 psi)
Ports	-12 STOR
Filtration rating	10 Micron

Differential indicator specifications	
Trip pressure	5 Bar(72 psi)differential
Electrical connector	Deutsch DTO4-2P
Installation Torque	33 Nm(24 lbf ft)
Normally closed	Yes

7.9.2 Accumulator charge valve

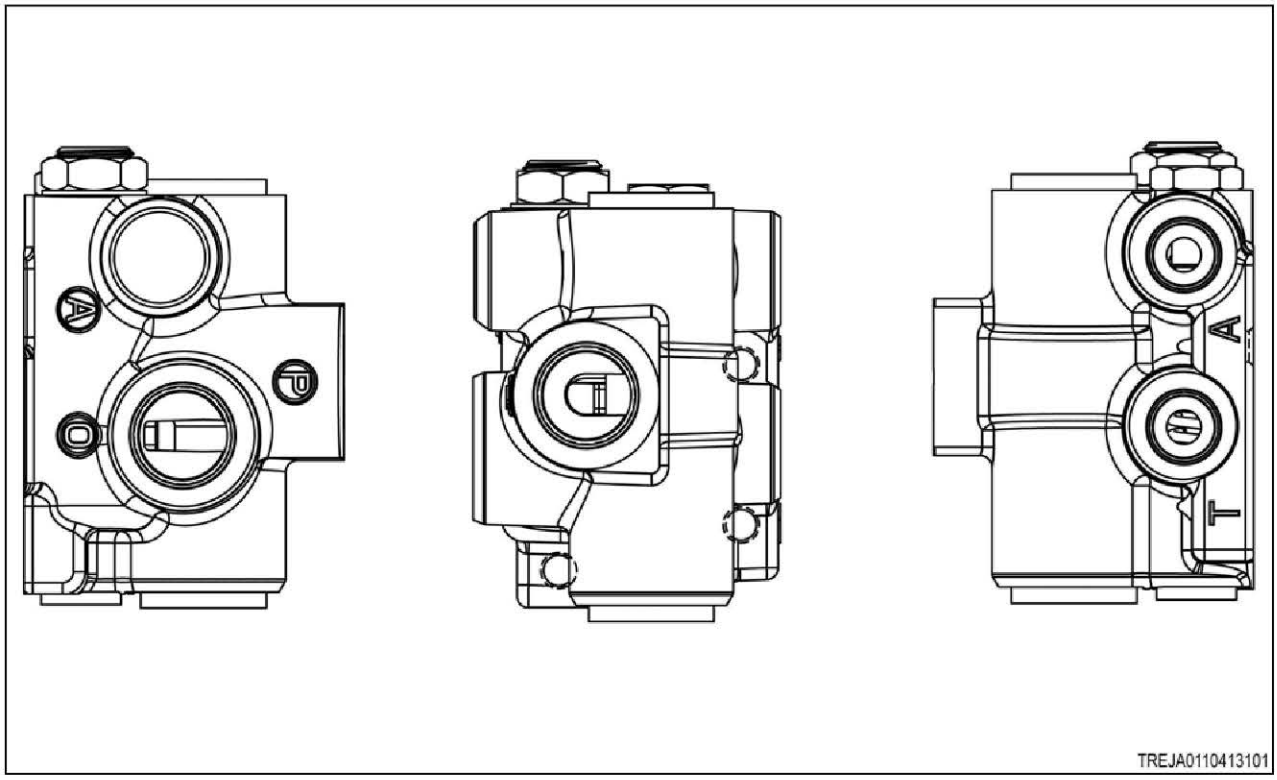

Fig. 206

Performance characteristics	
System relief valve	Between 172 to 207 BAR (2500 to 3000 psi)
Accumulator charging limits	Low limit 112 to 118 BAR (1625 to 1725 psi) High limit 156 to 162 BAR (2250 to 2350 psi)
Recommended system flow	8 to 114 L/min (2 to 30 gal/min)
Flow thru pressure drop	Approximately 5 BAR at 57 L/min (70 psi at 15 gal/min) with 14 centistroke oil
Accumulator charge rate	8.33 to 12.11 L/min at 18.62 kPa (2.2 to 3.2 gal/min at 1000 psi)
Internal filtration	54 micron or better
External filtration	10 micron or better is required

7.9.3 Accumulator

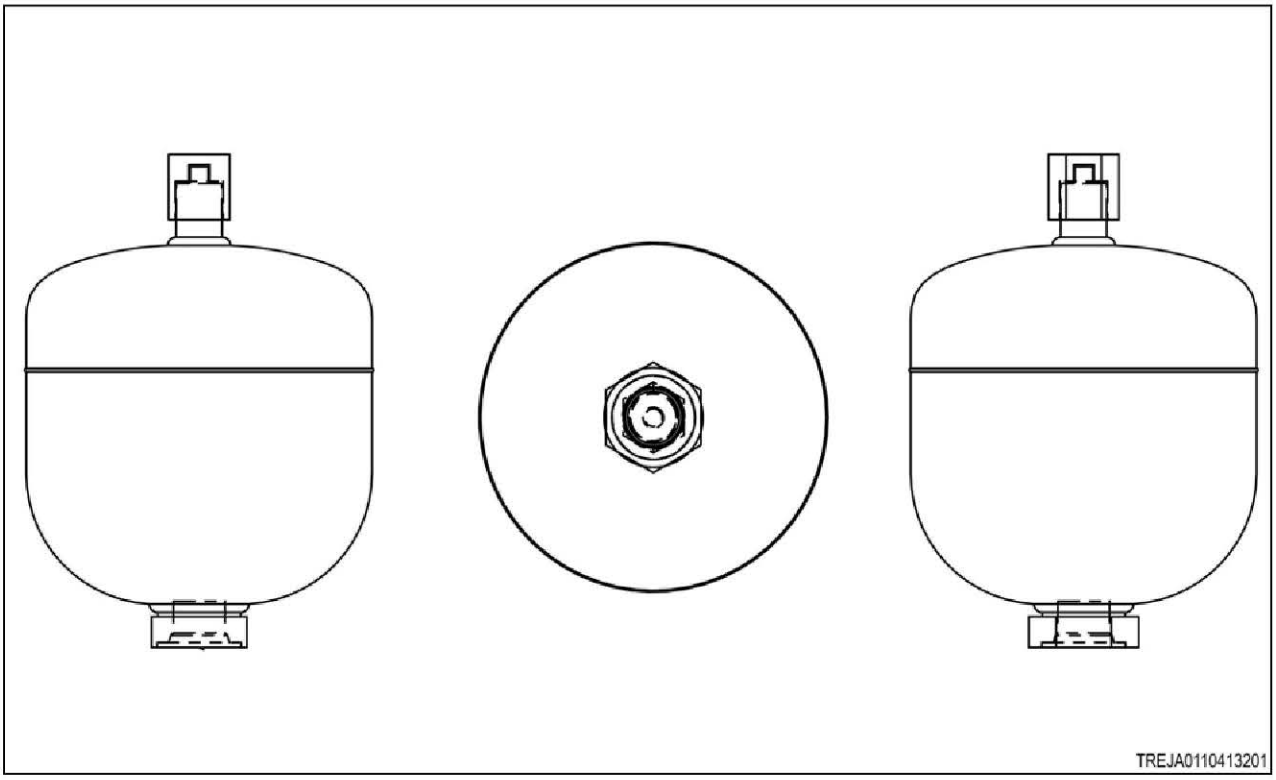

Fig. 207

General	
Charging medium	Dry nitrogen
Internal volume	2 000 ml
Gas compartment	122 cu in
Operating temperature	-40 to 90 °C(40 to 194 °F)

Pressure	
Charged	7 239 kPa (1 050 psi)
Service	19 995 kPa (1 050 psi)
Bursting	84 000 kPa (12 174 psi)

Safety factor ratio	
Charged	11.6:1
Service	4.2:1

7.9.4 Accumulator pressure switch

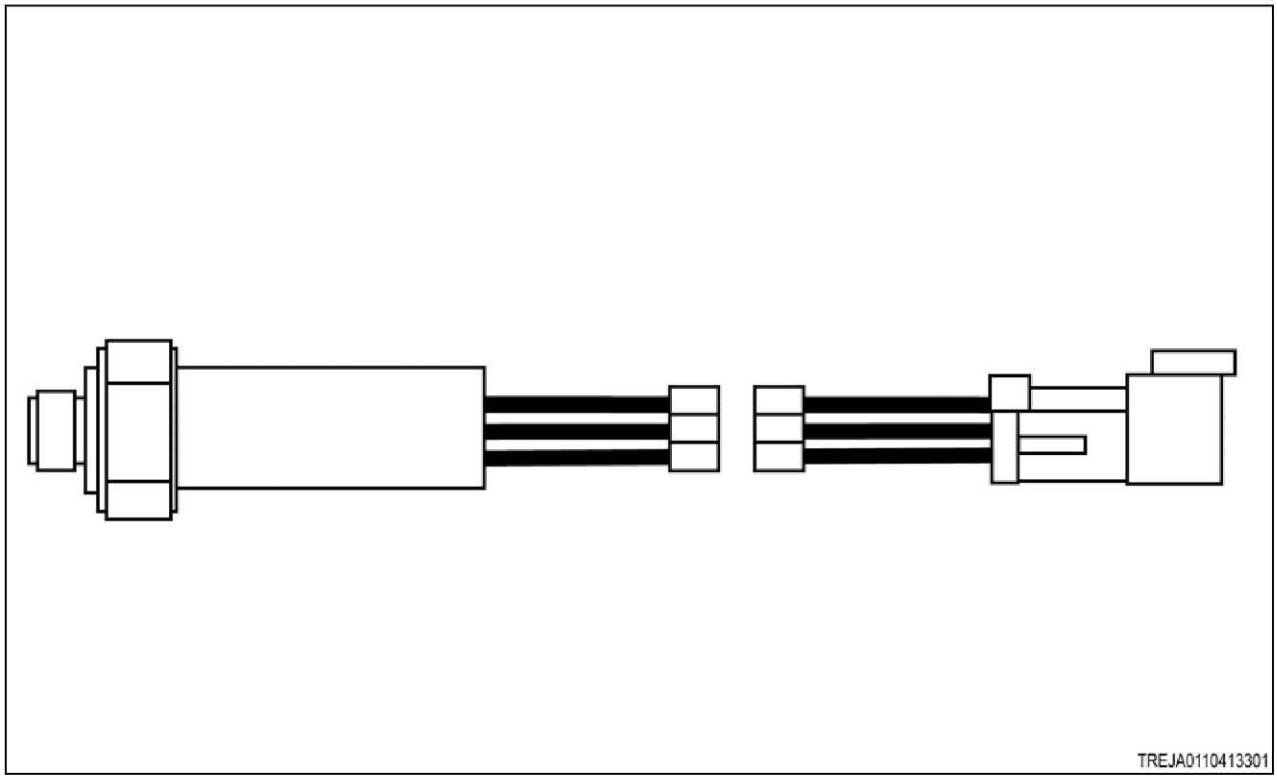

Fig. 208

Actuation pressure	-40 to 121 °C (-40 to 250 °F)	10 700 kPa (1 552 psi)
Deactuation pressure	-40 to 121 °C (-40 to 250 °F)	8 423 to 9 497 kPa (1 222 to 1378 psi)
Current rating	Voltage drop	100 mV at 2.5 MA Max
	Current	1.5 A resistive at 28 VDC Max
		1.5 A Inductive at 28 VDC Max
		0.25 A Lamp at 28 VDC Max
Breakdown voltage	750 VDC terminal to terminal	
	1 000 VDC terminal to housing	
Contact (A-B) position	Normally open below deactuation pressure	
Contact (A-C) position	Normally closed below deactuation pressure	
Operations	10 000 mechanical and electrical cycles	
Continuous pressure	20 700 kPa (3 002 psi)	
Proof pressure, static	34 500 kPa (5 004 psi)	
Burst pressure, static	68 900 kPa (9 993 psi)	
Temperature range, operating	at -40 to 121 °C (-40 to 250 °F)	
Vibration rating	18 to 1 000 Hz, 10g	
Environmental sealing	sealed against water spray and dust, impervious to oil, fuel, and salt	
Medium	Oil, fuel, air	

7.9.5 Service brake valve

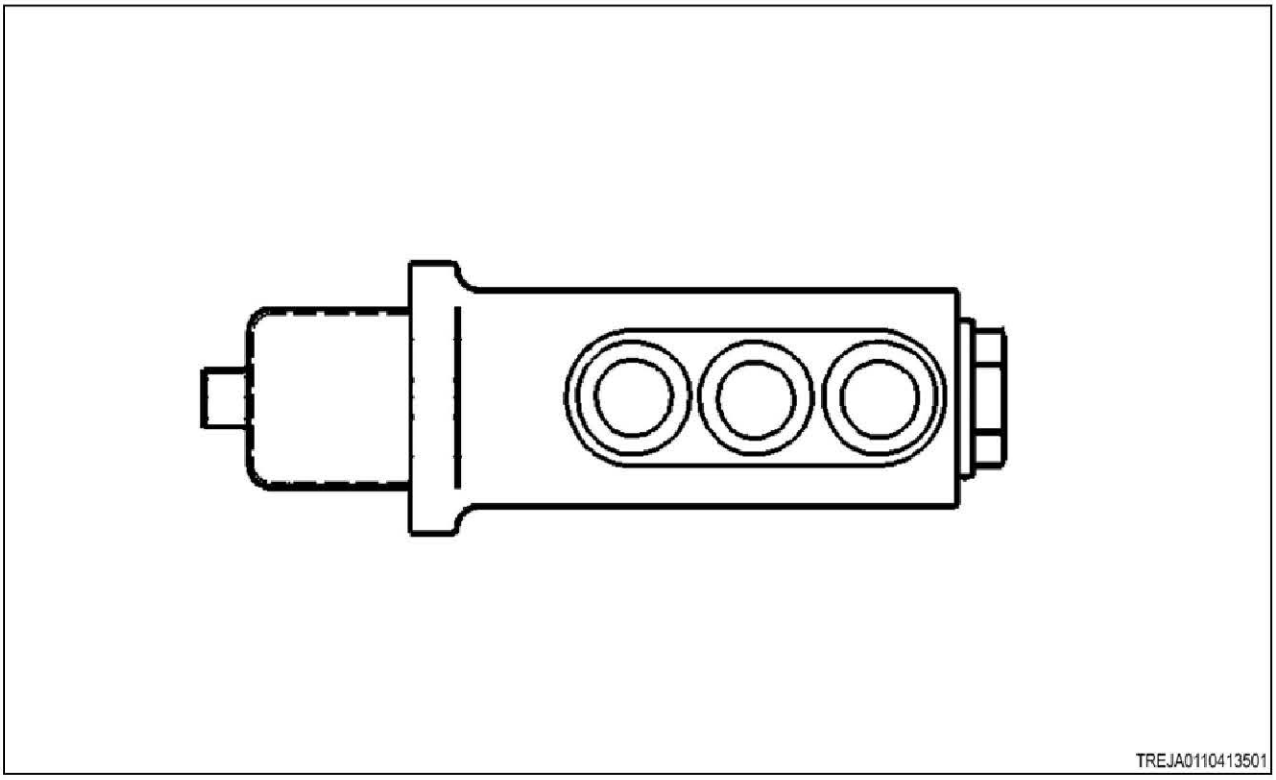

Fig. 209

Specifications	
Minimum brake line pressure	4481 to 5171 kPa(650 to 750 psi)
Actuation force	4826 kPa(700 psi)
Brake line pressure	2002 N450 lbf)

7.9.6 Park brake valve

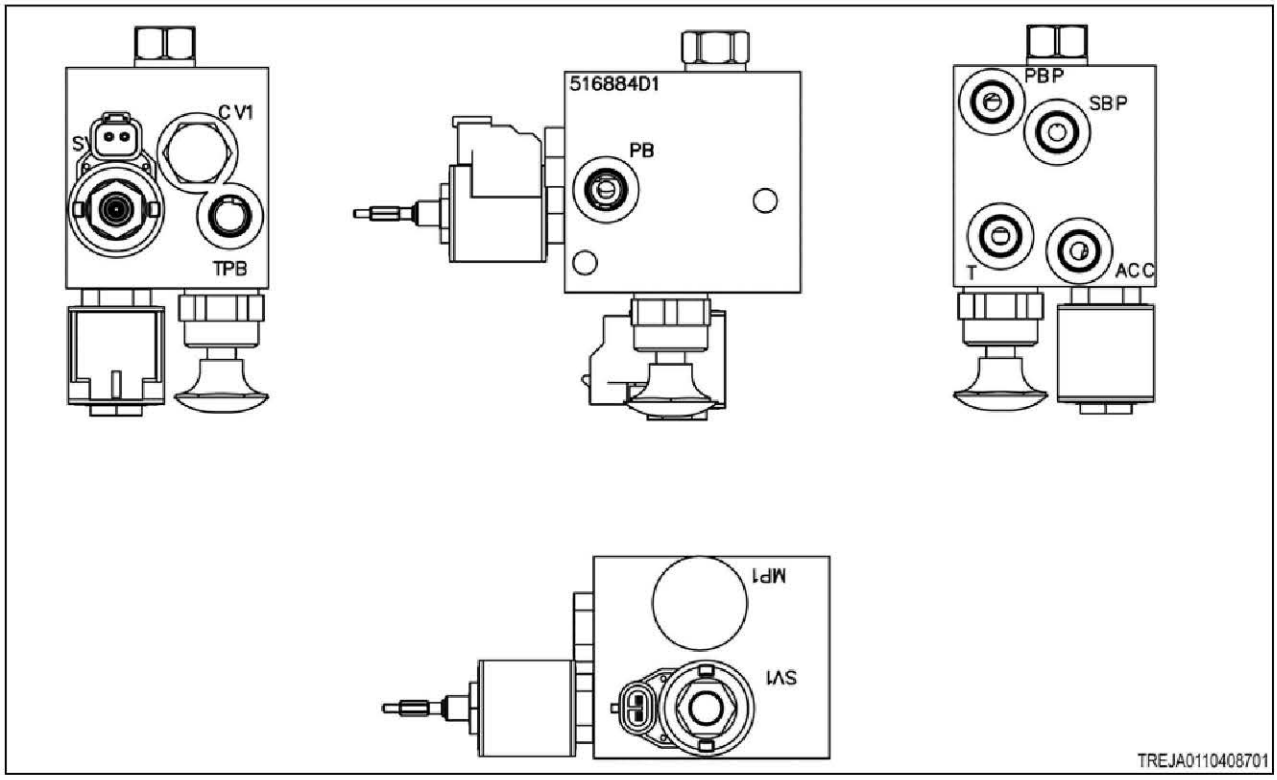

Fig. 210

General	
Port sizes	#6 Ports, 9/16-18 UNF-2B Thread
Body material	6061-T6 Aluminum, Anodized gold

Service components	
SV1	3-way solenoid valve
SV2	Manual 2-way solenoid valve
CV1	Check valve
MP1	Manual valve
PC1	Balanced poppet valve

7.9.7 Solenoid valve 1 (SV1)

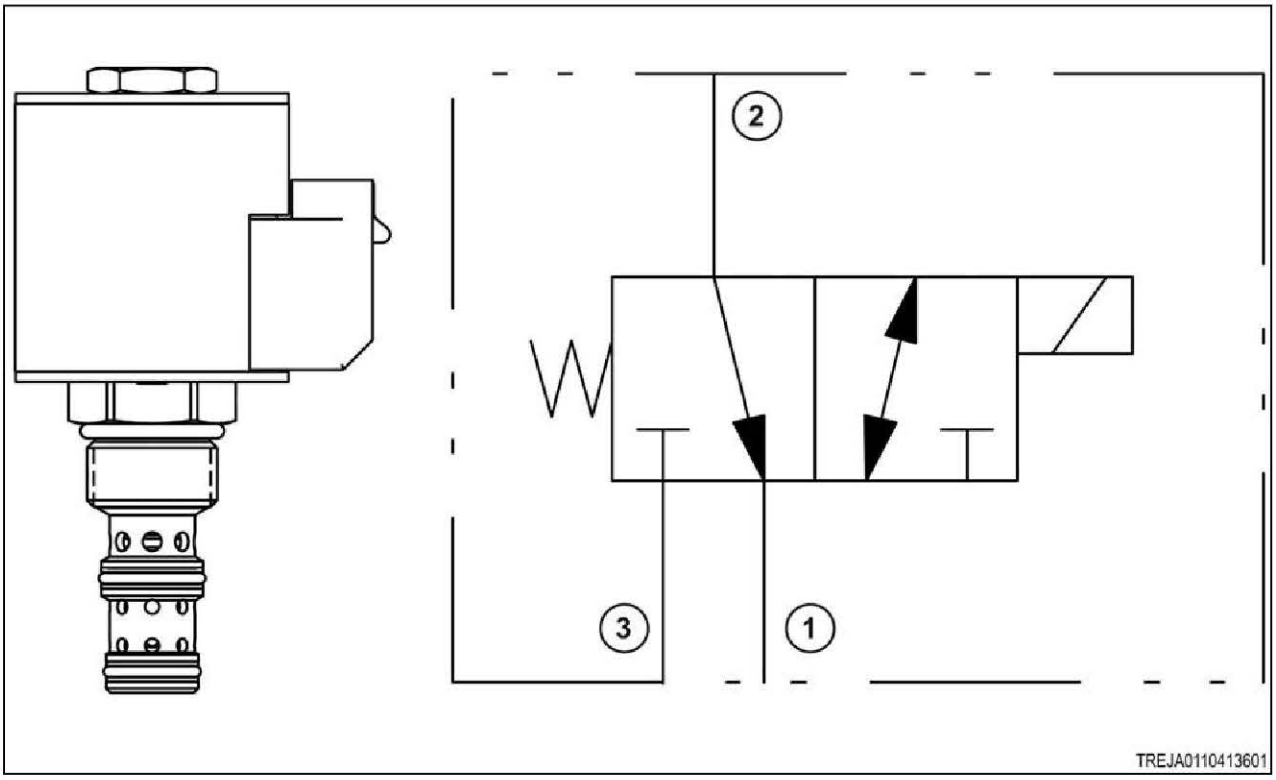

Fig. 211

Ratings		
Operating pressure	207 BAR(3000 psi)	
Internal leakage		
	Port (3) De-energized	82 cc/min(5 cu. in./min) max at 207 BAR(3000 psi)
	Port (1) Energized	164 cc/min(10 cu. in./min) max at 207 BAR(3000 psi)
Temperature	-40 to 120 °C(-40 to 148 °F)	
Materials	Steel with hardened work surfaces zinc-plated exposed	
	Seals and back-up rings	Buna-N

7.9.8 Solenoid valve 2 (SV2)

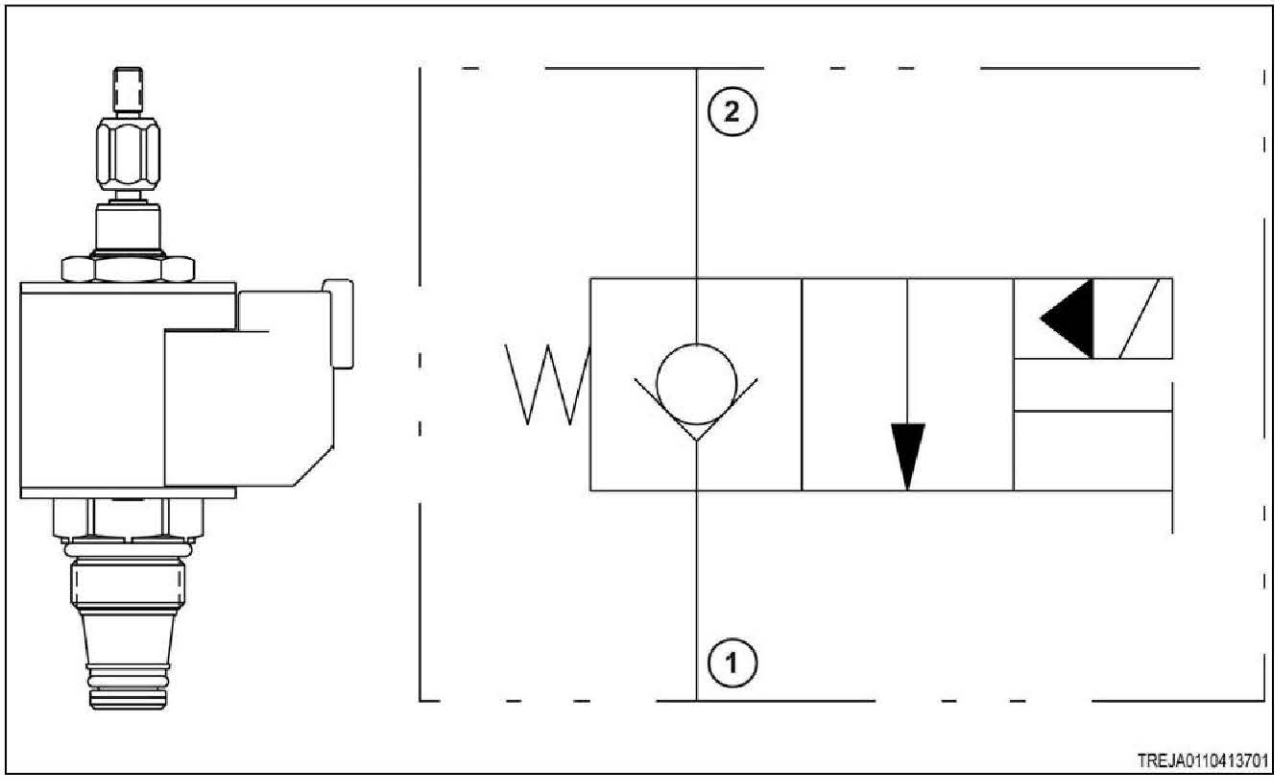

Fig. 212

Ratings		
Operating pressure	207 BAR(3000 psi)	
Temperature	-40 to 120 °C(-40 to 148 °F)	
Materials	Steel with hardened work surfaces zinc-plated exposed	
	Seals	Buna-N
	Back-up rings	Teflon

7.9.9 Check valve 1 (CV1)

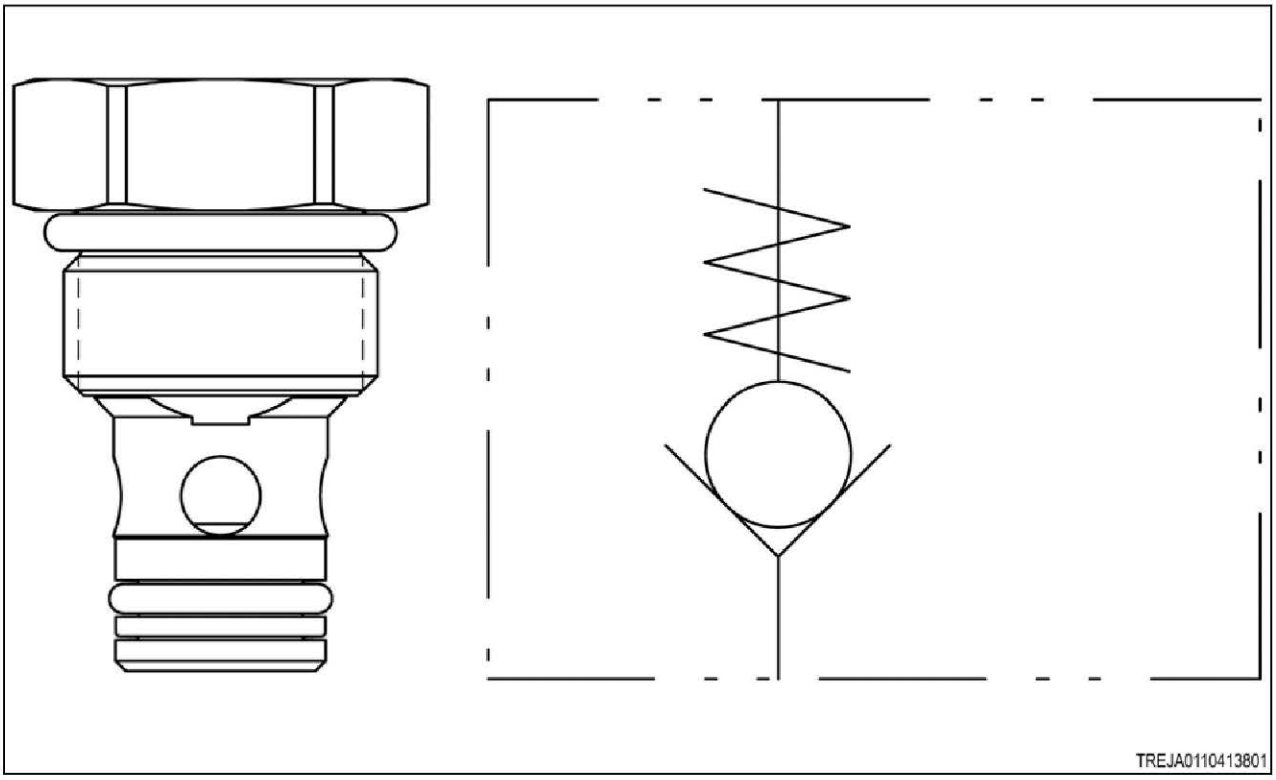

Fig. 213

Rating		
Maximum operating pressure	241 BAR(3500 psi)	
Maximum internal leakage	0.10 ml/min(2 drops/min) at 241 BAR(3500 psi)	
Temperature	-40 to 120 °C-40 ro 148 °F	
Materials	Steel with hardened work surfaces zinc-plated exposed	
	Seals	Buna-N

7.9.10 Manual pull valve (MP1)

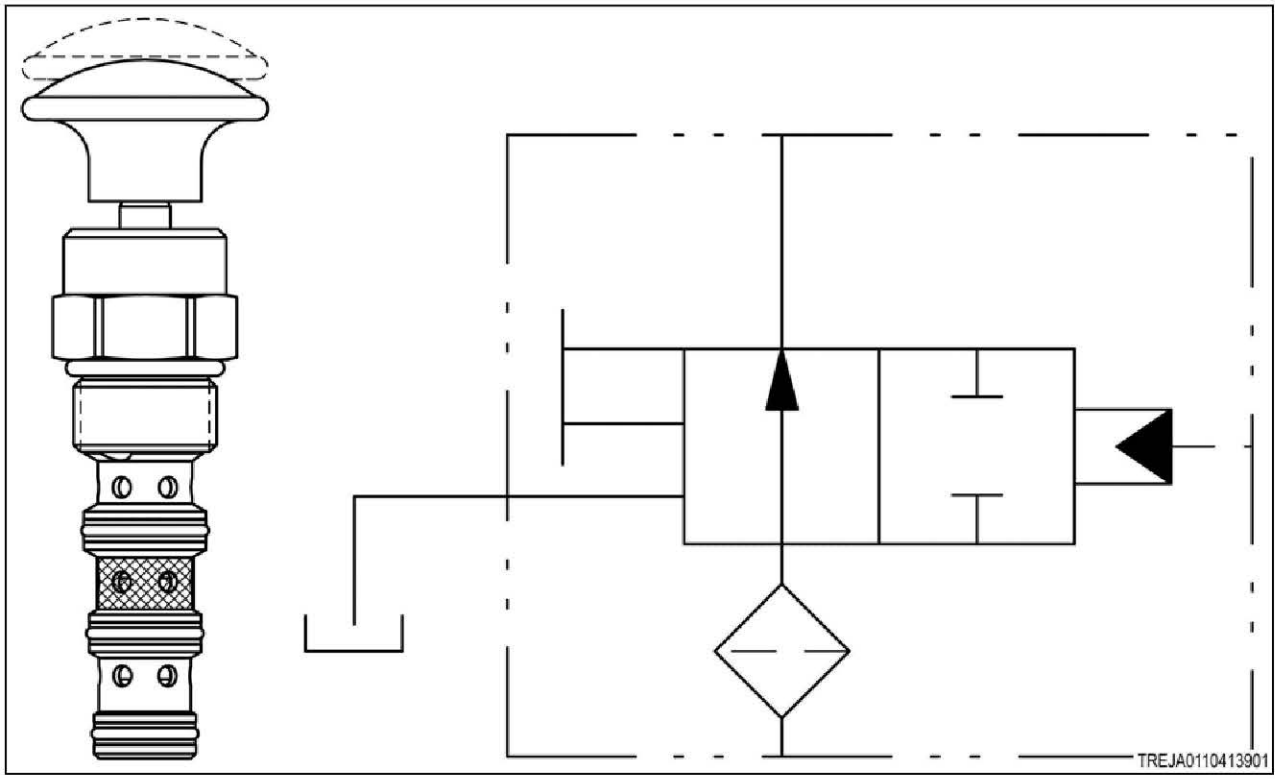

Fig. 214

Ratings		
Maximum operating pressure	241 BAR(3500 psi)	
Temperature	-40 to 120 °C(-40 to 148 °F)	
Materials	Steel with hardened work surfaces zinc-plated exposed	
	Seals	Buna-N

7.9.11 Pilot operated check valve (PC1)

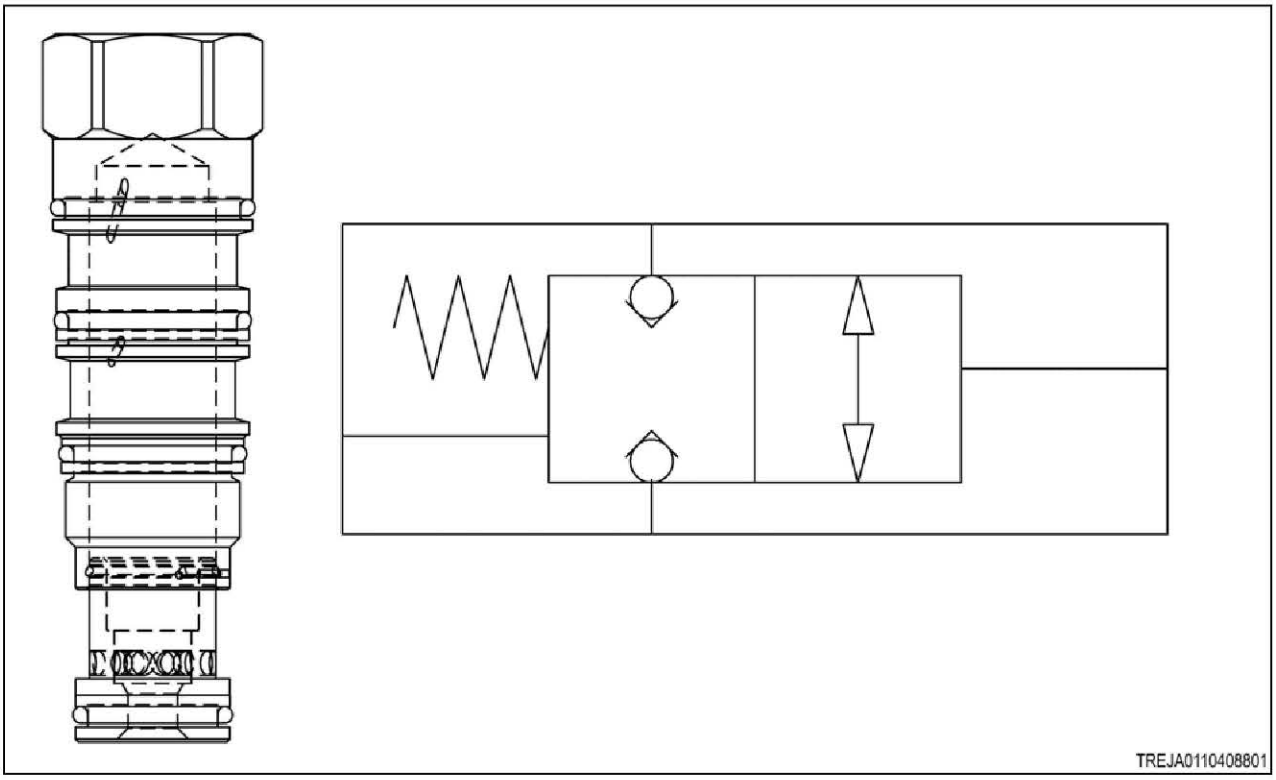

Fig. 215

Ratings	
Maximum Operating pressure	350 BAR (5000 psi)
Minimum pilot pressure	30 BAR (400 psi) Valve reseats at 10 BAR (145 psi)
Maximum internal leakage	5 drops at 350 BAR (5000 psi)
Seals	Buna-N