9 Hydraulic system

9.1 Implement hydraulic system introduction

The machine has a hydraulic system that provides the necessary power to operate attached implements. An optional three-point linkage is available.

The implement hydraulic system has the following hydraulic components:

- Oil reservoir
- Hydraulic oil implement filter
- Oil filter bypass valve
- Implement piston pump
- Hydraulic implement control valves
- Suction screen
- Load sensing blocking valve
- Charge gear pump
- Load sensing relief valve
- Compensator valve
- Steering/Priority valve
- Oil cooler bypass valve
- Hydraulic power beyond (optional)
- Motor case drain (optional)
- Test ports

The implement hydraulic systen has the following electrical components:

- Hydraulic control levers
- Tractor management center (TMC) display
- Machine module
- Armrest module
- Dash cluster
- Roading lockout switch
- Headland management button
- Implement filter bypass switch
- CAN data link
- Oil temperature sensor
- Oil level switch
- Hydraulic control valve solenoids

9.1.1 Implement system

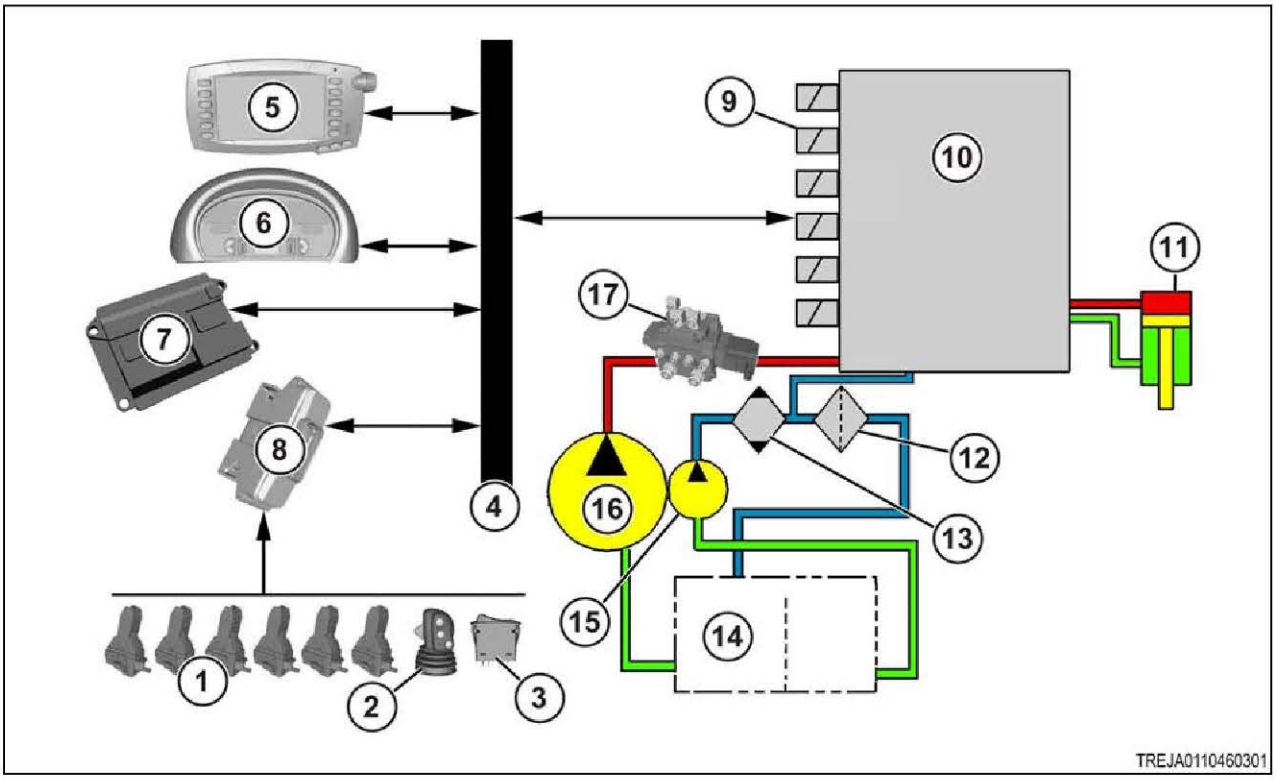

Fig. 1

Callout	Description
1	Hydraulic control levers: one through six
2	Headland management switch
3	Roading lockout switch
4	CAN bus
5	Tractor management center (TMC)
6	Dash cluster
7	Transmission module
8	Armrest module
9	Solenoids
10	Hydraulic control valves
11	Implement
12	Implement oil filter
13	Implement cooler
14	Hydraulic oil reservoir
15	Charge pump
16	Implement hydraulic pump
17	Steering/Priority valve

The operator can start a hydraulic function by using one of the following controls:

- Hydraulic control levers: one through six
- Roading lockout switch
- Headland management switch

The controls send a signal to the armrest module. The module processes the signal and sends the signal to the correct solenoid on the hydraulic control valve bank. The signal can be changed in the TMC for flow rate and for detent time.

The hydraulic control valve sends oil to the implement. The increased demand for oil will cause the hydraulic oil pump to upstroke.

The hydraulic pump is supplied with oil from the oil reservoir. The implement pump draws oil from the oil reservoir. Oil passes through the steering/priority valve and goes to the valve bank. The oil flows to the reservoir going through the implement section of the filter manifold.

Oil from the charge pump flows through the implement oil cooler. The oil flows through the implement section of the filter manifold before flowing to the oil reservoir.

The steering and the trailer brakes have parallel priority over the implement valves.

9.1.2 Implement electronic control system

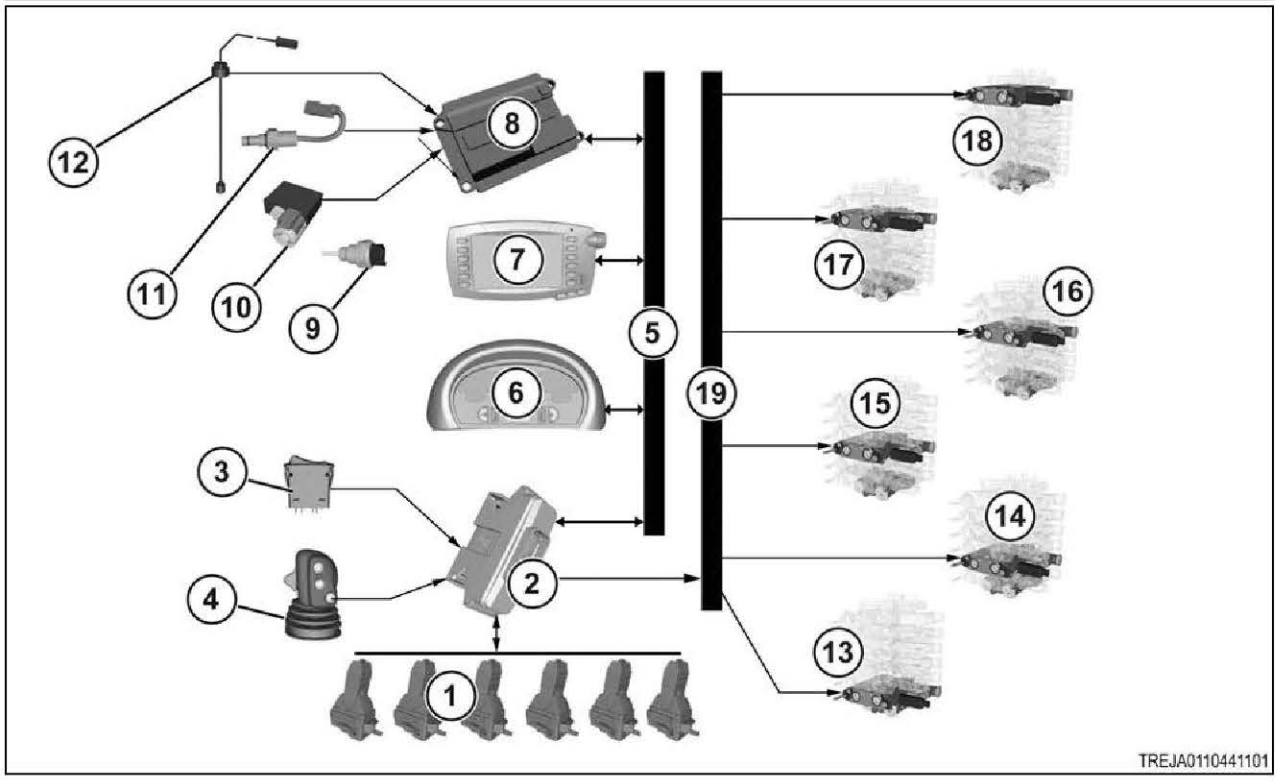

Fig. 2

Call out	Description
1	Hydraulic control levers five to six position sensors
2	Armrest module
3	Roading lockout switch
4	Headland management switch
5	Powertrain CAN bus
6	Dash panel cluster
7	TMC display

Call out	Description
8	Machine module
9	Oil temperature sensor
10	Load sense blocking valve
11	Implement filter bypass switch
12	Oil reservoir level switch
13	Hydraulic control valve one solenoids
14	Hydraulic control valve two solenoids
15	Hydraulic control valve three solenoids
16	Hydraulic control valve four solenoids
17	Hydraulic control valve five solenoids
18	Hydraulic control valve six solenoids
19	Auxiliary CAN bus

The armrest module controls the hydraulic control valves. The hydraulic control valves one through four are standard equipment. The hydraulic control valves five and six are optional equipment.

The CAN data link communicates with the following components:

- Engine module
- Machine module
- Armrest module
- Display module for TMC
- Dash cluster
- Other electronic control components

The hydraulic control lever sends a pulse width modulated signal (PWM) to the armrest module. The module makes sure the signal is operating within range. If the signal is out of range, a diagnostic code will be set. The module processes the signal and sends the signal to the hydraulic control solenoid that is proportionate to the input signal. The hydraulic control solenoid opens the hydraulic valve to let hydraulic oil flow to the implement. The module monitors the circuit for the solenoid valves. If a malfunction in the cicuit is found, a diagnostic code will be set.

Signal sent to the hydraulic control solenoid can be changed by the roading lockout switch or the TMC.

Enabling the roading lockout switch, the module puts the hydraulic control solenoids in hold mode. If a hydraulic control is in float mode, the module the module will continue in float mode. If a hydraulic control is operating in detent mode, the module will complete in detent mode. The hydraulic control will then be put in hold mode.

NOTE:
The roading lockout switch will disable the decelerator pedal and the auto guidance.

the TMC display can be used to set the amount of maximum flow. The maximum flow rate can be set from 0% to 100% on each hydraulic control. The module will reduce the signal to the solenoid by:

- The percent of maximum flow rate
- The position of the hydraulic control lever

The solenoid will open the hydraulic valve to get the desired flow rate set by the module.

9.1.3 Implement hydraulic system

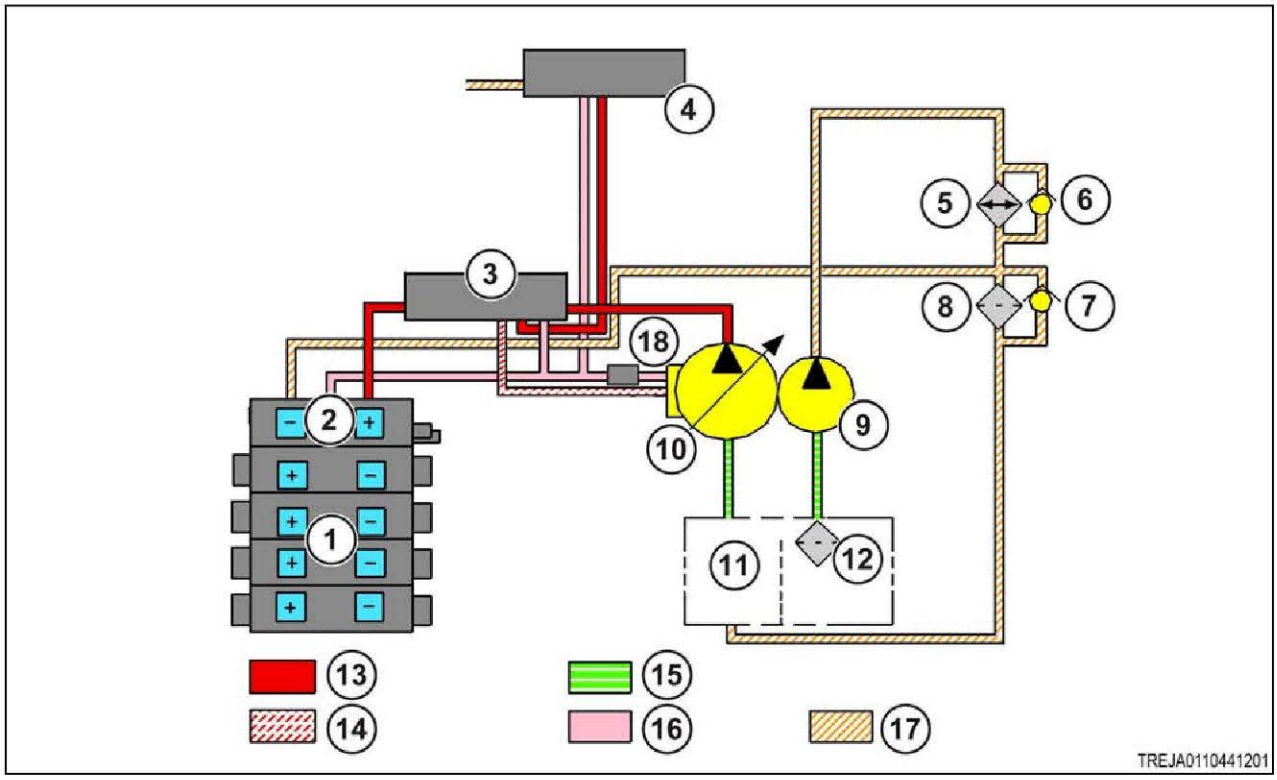

Fig. 3

Call out	Description
1	Hydraulic control valve bank
2	Hydraulic power beyond
3	Steer/Priority valve
4	Trailer brake valve
5	Hydraulic oil cooler
6	Cooler bypass valve
7	Filter bypass valve
8	Hydraulic filter
9	Implement charge gear pump
10	Implement piston pump
11	Oil reservoir
12	Suction screen
13	System pressure
14	Implement valve reference signal
15	Suction
16	Load sense
17	Return and implement charge pressure
18	Load sense blocking valve

Oil from the oil reservoir is pulled by the charge pump. Oil passes through the hydraulic oil cooler before going to the hydraulic filter. The filtered oil tailings to the oil reservoir.

When the implement hydraulic pump demands oil, the oil is pulled from the oil reservoir.

Oil from the hydraulic pump is pulled to the steer/priority valve. The priority lets oil that is not necessary for the steering or the trailer brakes flow to the hydraulic control valve bank. When a hydraulic control valve is selected, the oil goes to the implement. Oil can go around the hydraulic control valve bank to flow directly to the implement through the hydraulic PTO connections.

The return oil from the implement flows through the correct hydraulic control valve before going through the hydraulic filter. If there is demand for oil, the hydraulic pump up strokes to meet the demand. If there is no demand, the hydraulic pump destrokes to reserve power for other operations.

The housing drain oil goes tailings the unfiltered side of the oil reservoir.

The load sensing signal and the pilot supply signal go from the hydraulic pump to control the pump output. The load sensing signal goes through the load sensing relief valve in the hydraulic control valve bank. The relief valve limits the pressure of the load sensing signal to 18100 to 18500 kPa (2625 to 2685 psi). The hydraulic pump has a margin pressure of 2000 to 2200 kPa (290 to 320 psi). The total of the load sensing signal and the margin pressure is the system pressure. The maximum pressure is 20000 to 20600 kPa (2900 to 2988 psi).

The pilot supply signal gives a true representation of the supply pressure as oil enters the hydraulic control valve bank.

Precomensated pressure

The hydraulic control valve bank on the machine uses parallel logic. The parallel logic system operates in one of two modes. The oil flow demand from the attached implement determines the mode of operation for the parallel logic system.

The flow priority can be selected for circuits one and two, causing flow demands for the circuits to be filled. The remaining flow goes to the other circuits.

Condition one

The flow determined by the hydraulic control valve bank is less than the maximum output of the pump.

In condition one, all the hydraulic control valves have an equal possibility to get oil flow. Demands of the hydraulic control valve bank are complete. This is a parallel logic.

Condition two

The flow determined by the hydraulic control valve bank is more than the maximum output of the pump.

If the pump output is exceeded in the parallel logic hydraulic system, the circuits with the lowest pressure are filled first. The circuits with the highest pressure are filled last.

Example

The number one circuit control valve demands 114 liters/min (30 gal/min). Number two hydraulic control valve demands 95 liters/min (25 gal/min). The available pump output is 167 liters/min (44 gal/min).

The oil demand is 38 liters/min (10 gal/min) more than the available pump output.

In the parallel logic hydraulic system:

- Number two hydraulic control valve is filled first
- Number one hydraulic control valve is not fully filled

9.1.4 Implement system control settings

The implement system controls the hydraulic control valves one through six. The hydraulic controls one through four are standard equipment. The hydraulic control valves five and six are optional.

The hydraulic control valves have the following control settings that can be changed in the TMC display:

- Detent time
- Flow rate

Adjusting the detent time

Each hydraulic control valve has an adjustable detent time. The adjustable detent time lets the operator control the length of time of the hydraulic oil flow to the implement. The operator uses the TMC screens to enter the desired detent time. The same detent time can retract detent and can extend detent. The detent time ranges from 0 to 20 sec in one second increments. The detent time is continuous, a (C) displays on the TMC screen. The detent time becomes effective when the operator enters the desired detent time. The detent time is stored between engine operations.

Adjusting the flow rate

Each implement control valve has an adjustable hydraulic flow rate. Adjusting the flow rate lets the operator control the rate of the hydraulic oil flow to the implement. The operator uses the TMC screens to enter the desired flow rate. The flow rate can be adjusted from 0 to 100% in 0.4% increments. The flow rate will become effective when the operator enters the desired flow rate. The flow rate is stored between engine operations.

The flow rate is shown in the TMC as a percentage of the hydraulic pump output.

NOTE:
The maximum flow from an individual hydraulic control valve is 138 liters/min (36.4 gal/min) .

The flow rate for an individual hydraulic control valve can be adjusted in the range of 0 liters/min (0 gal/min) to 138 liters/min (36.4 gal/min) .

Flow rate to pump output comparison

Flow rate	Approximate flow - liters/min (gal/min)
0%	0 liters/min (0 gal/min)
50%	35.6 liters/min (9.4 gal/min)
100%	138 liters/min (36.4 gal/min)

9.2 Implement hydraulic system components

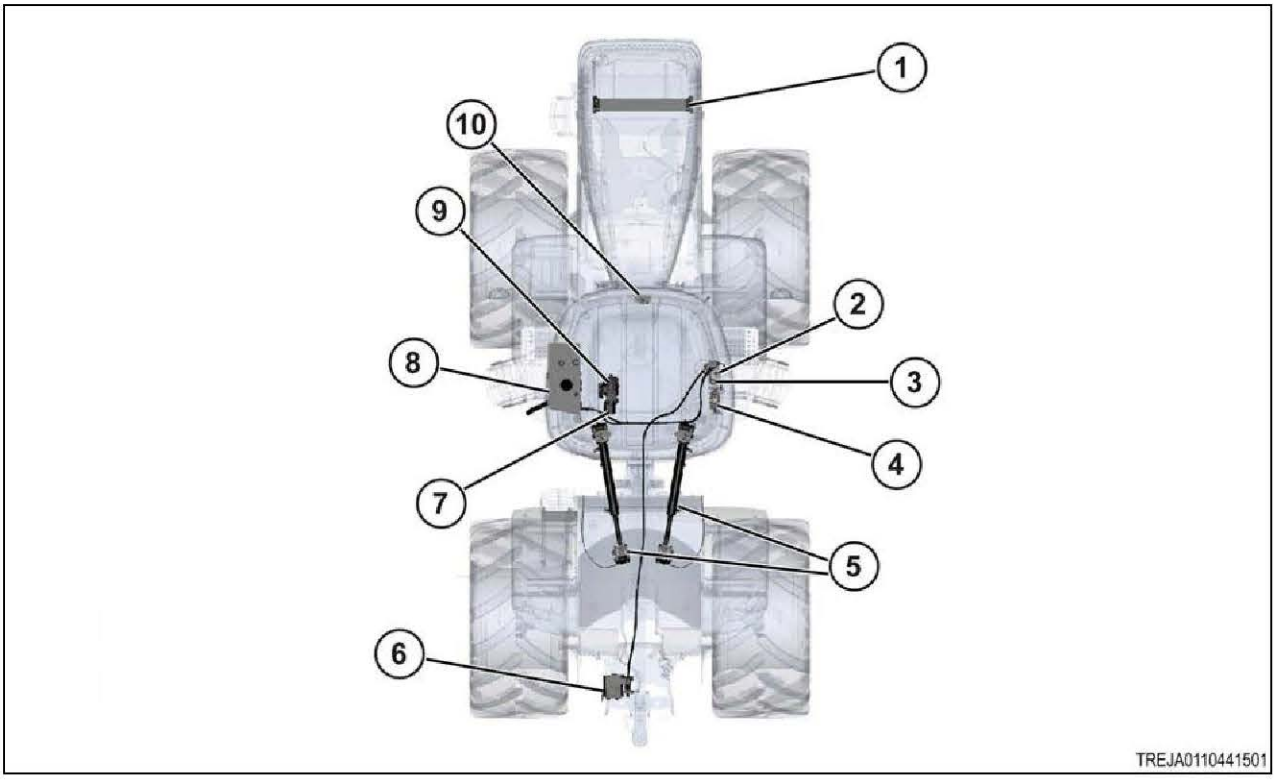

Fig. 4

Call out	Description
1	Oil cooler
2	Trailer brake valve
3	Steering/priority valve
4	Filter assembly
5	Steering cylinders
6	Implement valves
7	Charge gear pump
8	Hydraulic oil reservoir
9	Steering/implement piston pump
10	Steering pilot control

9.2.1 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

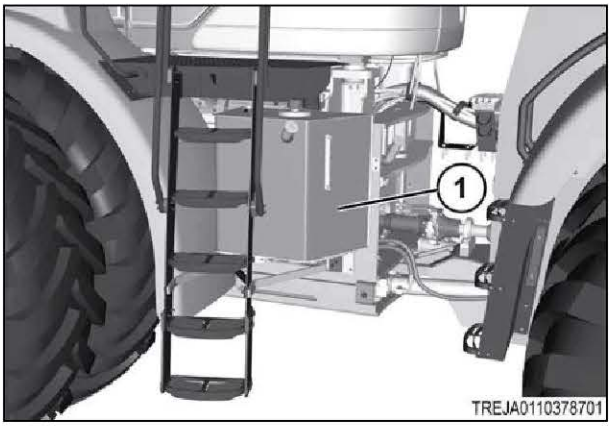

Fig. 5

The oil reservoir consists of the following components:

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

Fig. 6

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.

9.2.2 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.

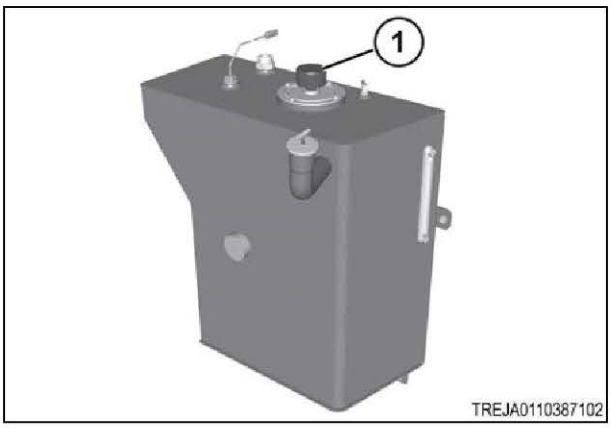

Fig. 7

9.2.3 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.

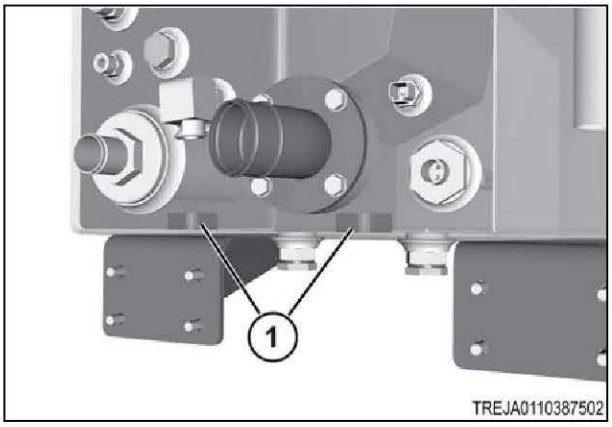

Fig. 8

9.2.4 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.

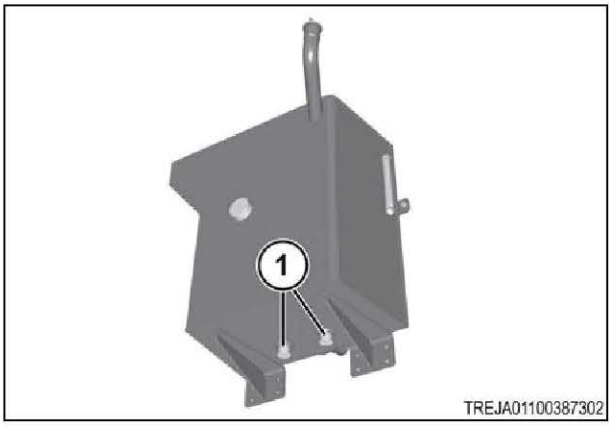

Fig. 9

9.2.5 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.

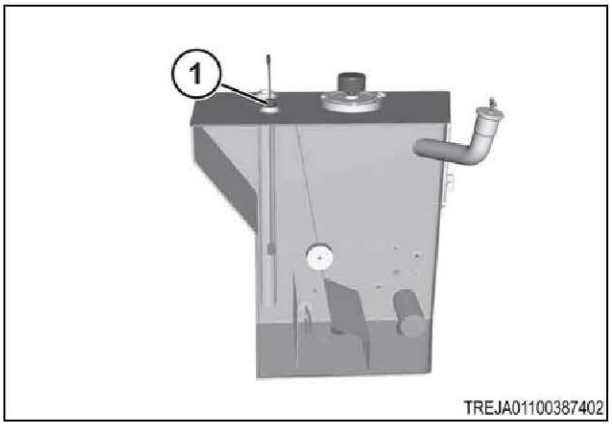

Fig. 10

9.2.6 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.

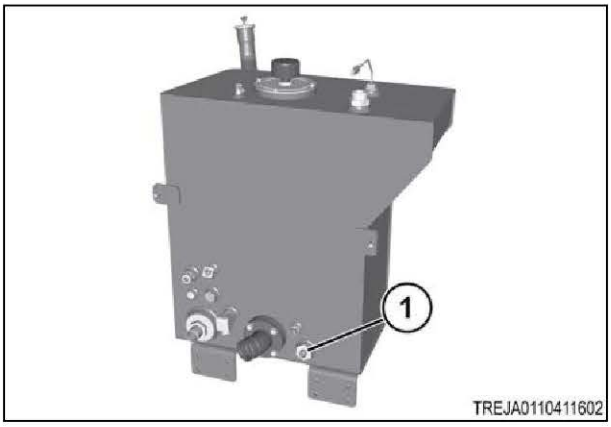

Fig. 11

9.2.7 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.

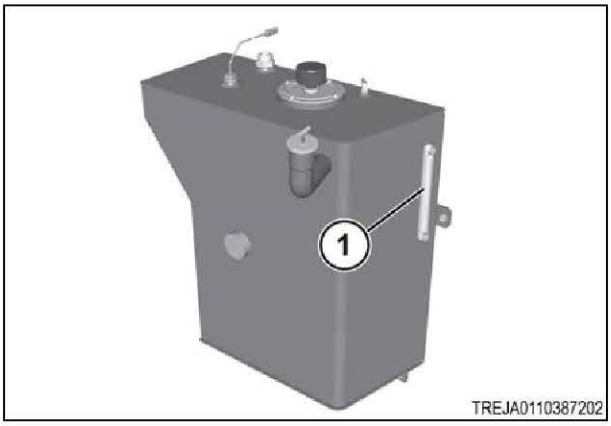

Fig. 12

9.2.8 Suction screen (charge pump)

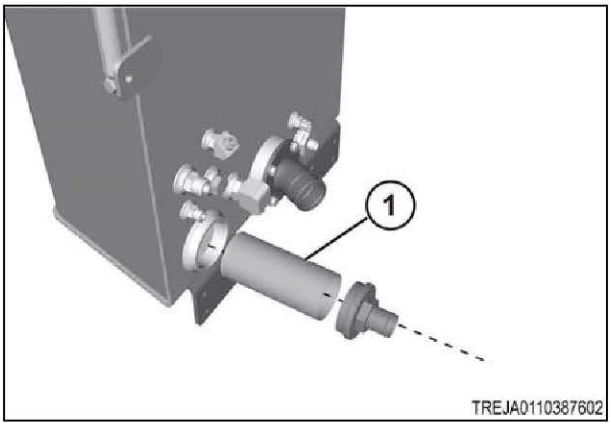

Fig. 13

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.

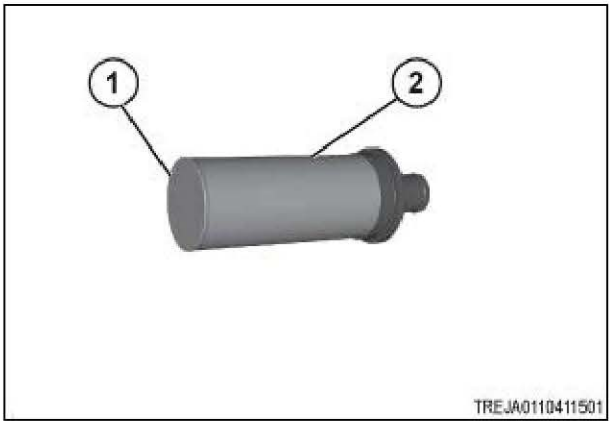

Fig. 14

9.2.9 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.

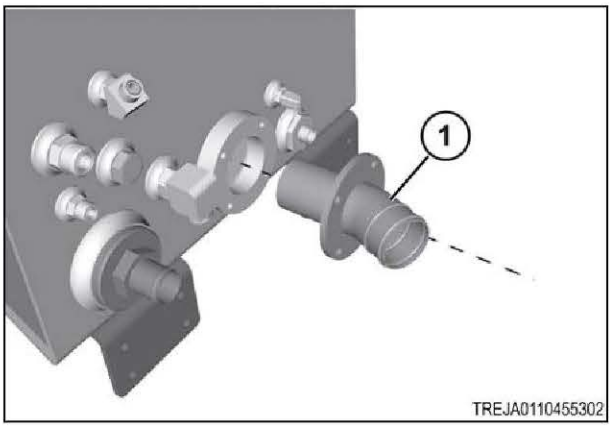

Fig. 15

9.2.10 Implement oil filter

The implement filter is on the right-hand side of the machine in the cabinet. The filter is a 7.5 micron filter.

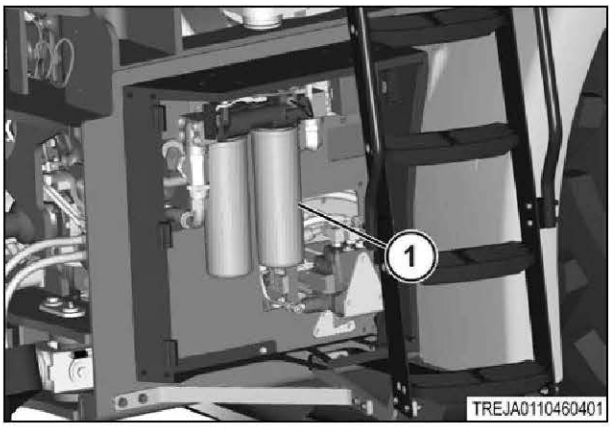

Fig. 16

9.2.11 Implement filter bypass switch

The implement filter bypass switch (1) is located on the right-hand side of the machine on the front section of the machine.

The bypass switch is mounted on the filter base.

The switch signals the module that the implement filter is restricted. A warning will be shown on the tractor management center. An audible alert and warning signal on the dash cluster will be activated.

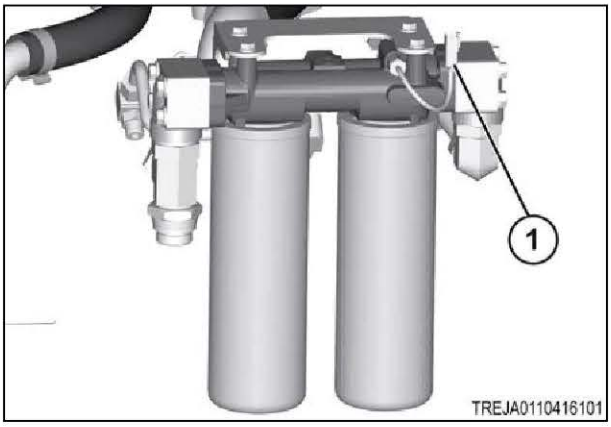

Fig. 17

9.2.12 Implement hydraulic pump

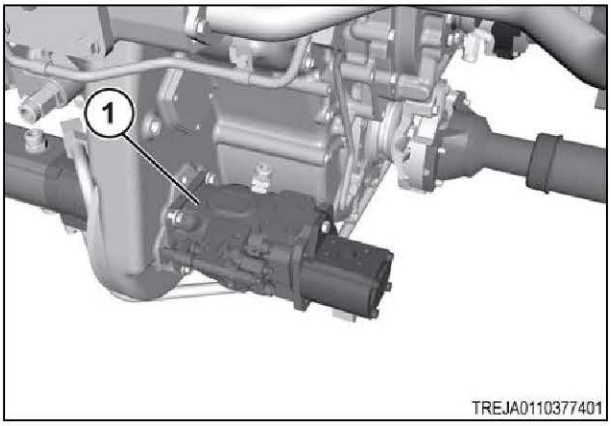

Fig. 18

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.

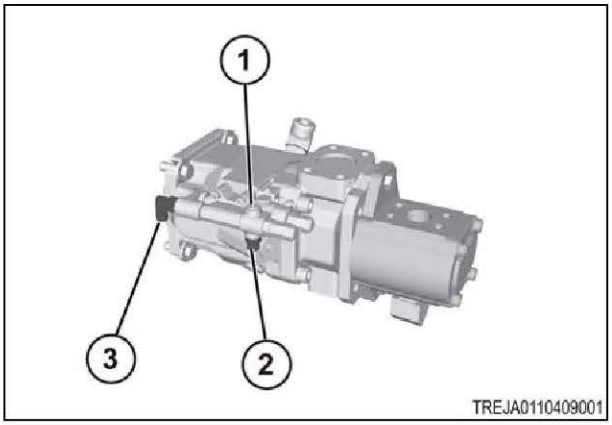

Fig. 19

9.2.13 Hydraulic control valves

The hydraulic control valve bank (1) is at the rear of the machine.

The machine has a minimum of four hydraulic control valves. The hydraulic control valves are controlled electronically. The machine can have a maximum of six hydraulic control valves.

Each hydraulic control valve can supply 0 to 138 l/min (1 to 36.4 gal/min).

Each hydraulic control valve has the these positions:

- Hold
- Extend
- Retract
- Float

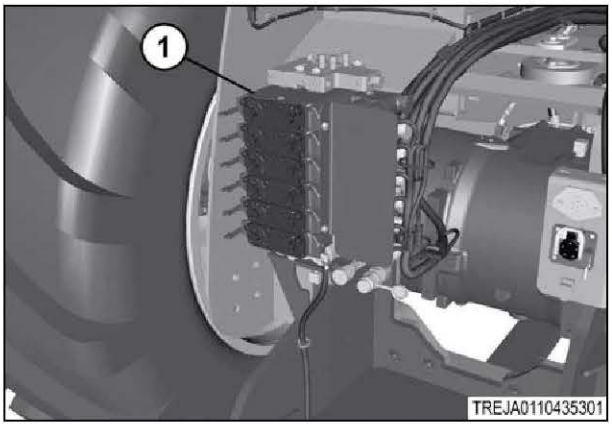

Fig. 20

Callout	Description
1	Supply oil from the hydraulic pump
2	Return oil to the hydraulic filter
3	Implement valve reference signal to the hydraulic pump

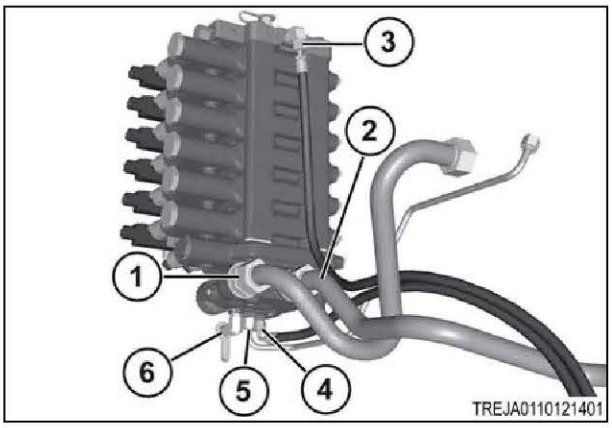

Fig. 21

Callout	Description
4	Load sense signal to the hydraulic pump
5	Load sense signal to the priority valve
6	Load sense test port

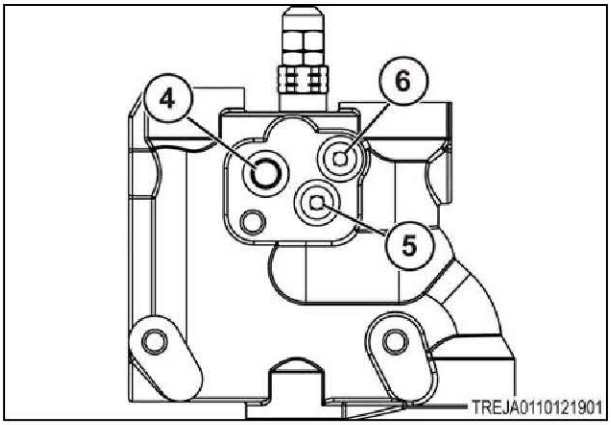

Fig. 22

Valve function - neutral/hold

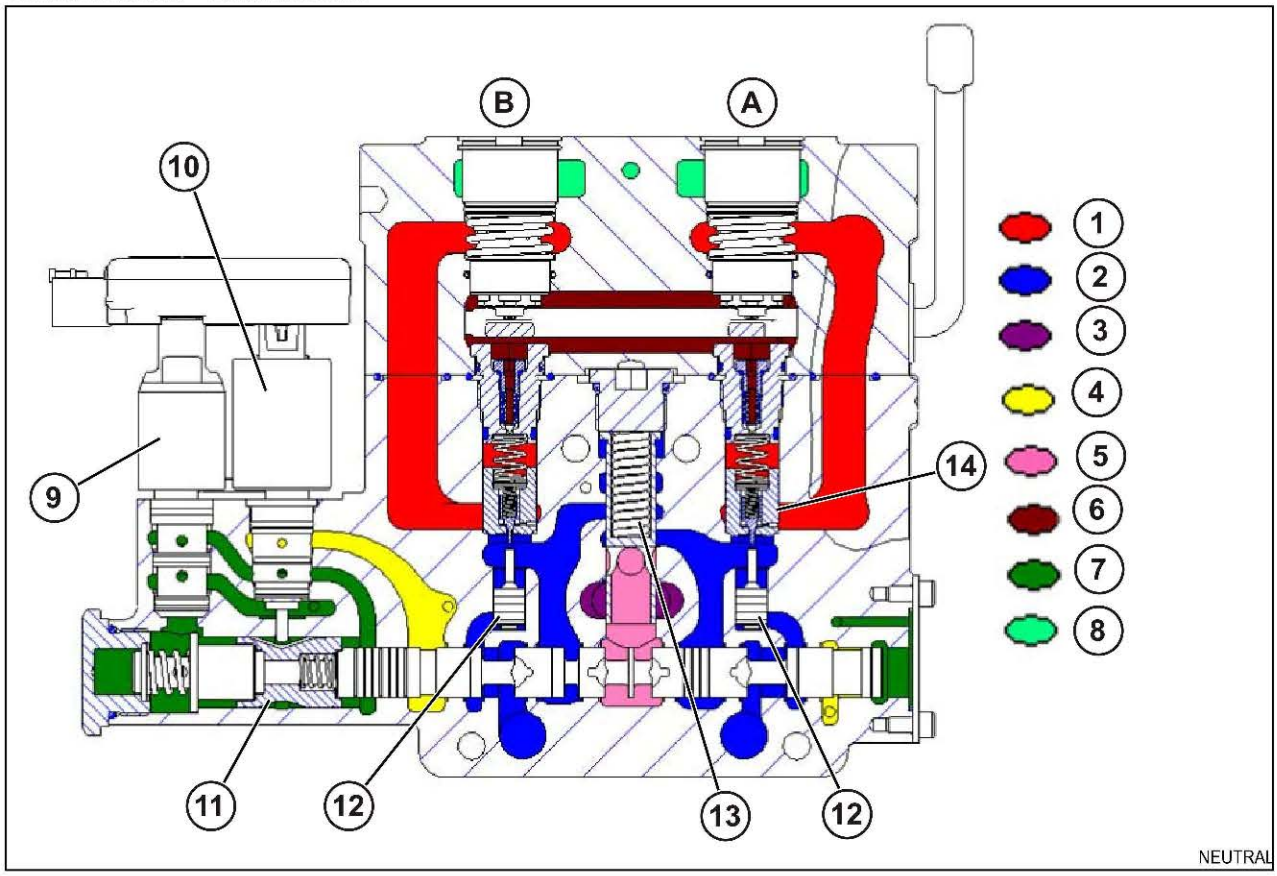

Fig. 23

Callout	Description	Callout	Description
1	Work port pressure	9	On/off solenoid
2	Return pressure	10	Proportional solenoid
3	Pump pressure	11	Main spool valve
4	Pilot pressure	12	Poppet valve
5	Compensated pressure	13	Compensator valve
6	Coupler sump pressure	14	Release valve
7	Pilot sump pressure	A	A-port
8	Dirty oil coupler drain	B	B-port

When the valve is in the hold position the two solenoids (9, 10) are in the off position. The main spool valve (11) is in the center position. The poppet valves (12) are in the seated position.

Valve function - raise/extend

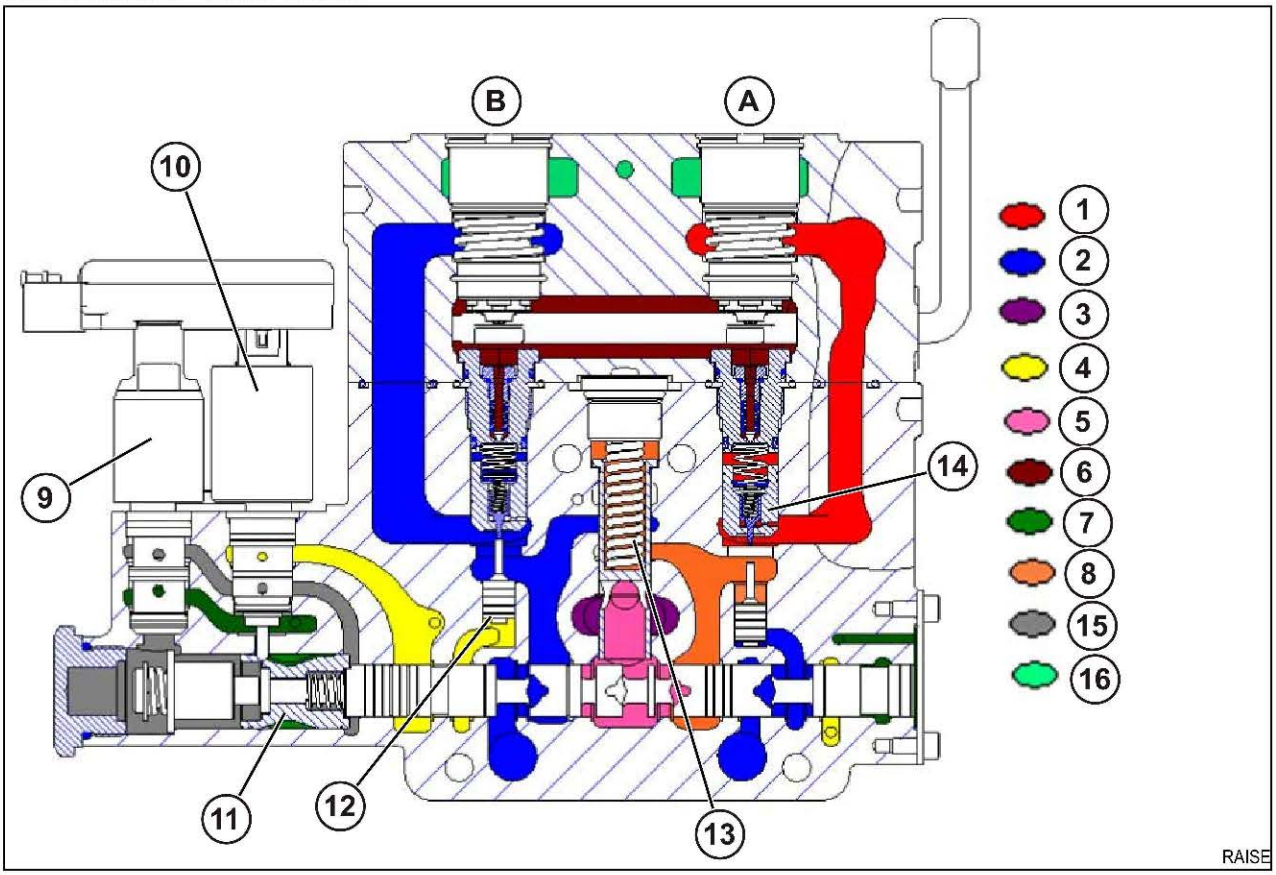

Fig. 24

Callout	Description	Callout	Description
1	Work port pressure	10	Proportional solenoid
2	Return pressure	11	Main spool valve
3	Pump pressure	12	Poppet valve
4	Pilot pressure	13	Compensator valve
5	Compensated pressure	14	Release valve
6	Coupler sump pressure	15	Control pressure
7	Pilot sump pressure	16	Dirty oil coupler drain
8	Load sense pressure	A	A-port
9	On/off solenoid	B	B-port

A pulse width modulation (PWM) is sent to the proportional solenoid (10). The on/off solenoid (9) is activated. The pressure is put on the left and right end of the main spool valve (11) ramp. The spool moves to the right because the left end surface is larger. The proportional solenoid pin rides up the ramp and gives mechanical feedback on the spool valve position. This feedback gives balance between modulation and control pressure.

The pump pressure (3) goes into the right passage. The pump pressure lifts the release valve (14) off the seat. The pressure goes to the coupler in the A-port.

The pilot pressure (4) pushes the left poppet valve (12) to press the release valve pin off the seat, opening the release valve. This lets the return pressure (2) go to the reservoir.

Valve function - lower/retract

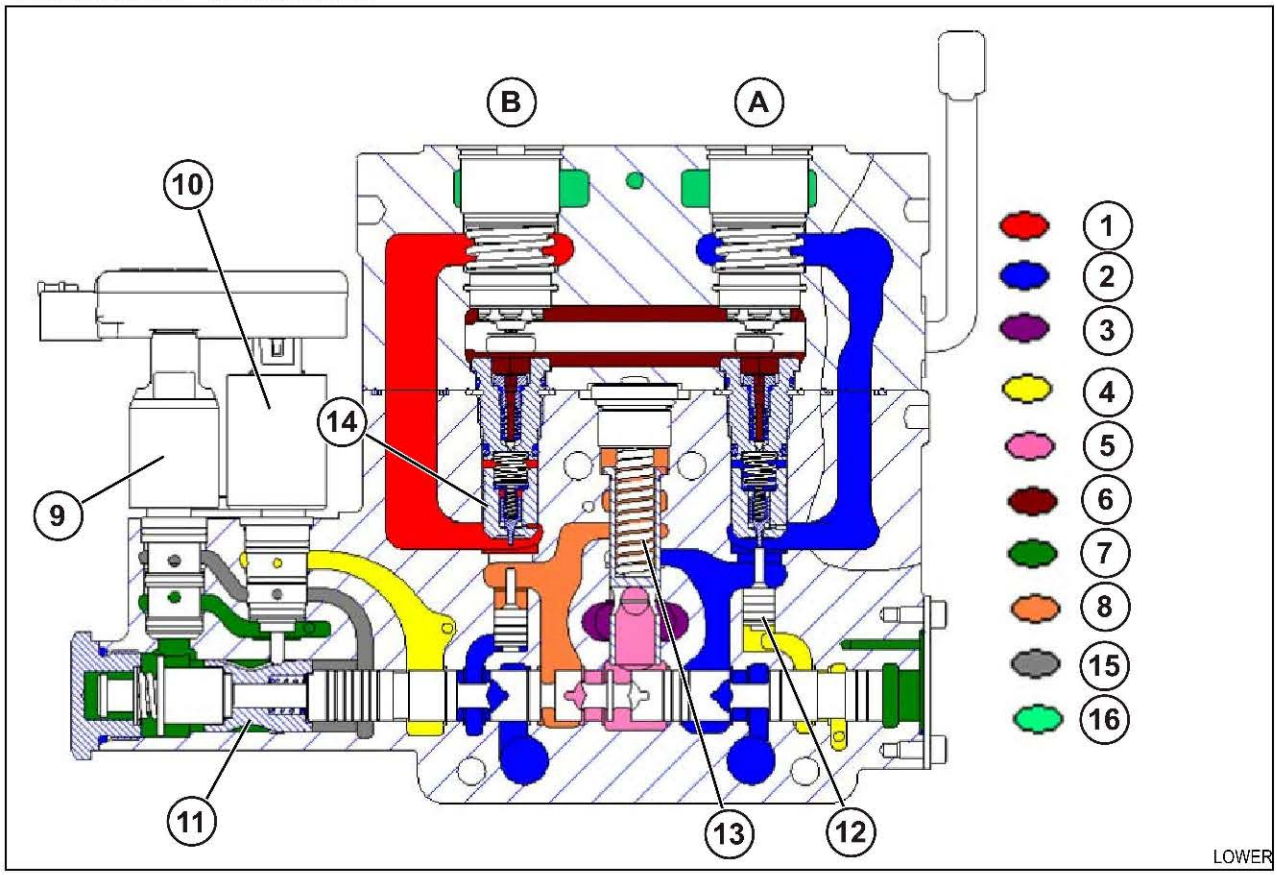

Fig. 25

Callout	Description	Callout	Description
1	Work port pressure	10	Proportional solenoid
2	Return pressure	11	Main spool valve
3	Pump pressure	12	Poppet valve
4	Pilot pressure	13	Compensator valve
5	Compensated pressure	14	Release valve
6	Coupler sump pressure	15	Control pressure
7	Pilot sump pressure	16	Dirty oil coupler drain
8	Load sense pressure	A	A-port
9	On/off solenoid	B	B-port

A pulse width modulation (PWM) is sent to the proportional solenoid (10). The pressure is put on the right end of the main spool valve (11) ramp. The spool moves to the left. The proportional solenoid pin rides up the ramp and gives mechanical feedback on the spool valve position. This feedback gives balance between modulation and control pressure.

The pump pressure (3) goes into the left passage. The pump pressure lifts the release valve (14) off the seat. The pressure goes to the coupler in the B-port.

The pilot pressure (4) pushes the right poppet valve (12) to press the release valve pin off the seat, opening the release valve. This lets the return pressure (2) go to the reservoir.

Valve function - float

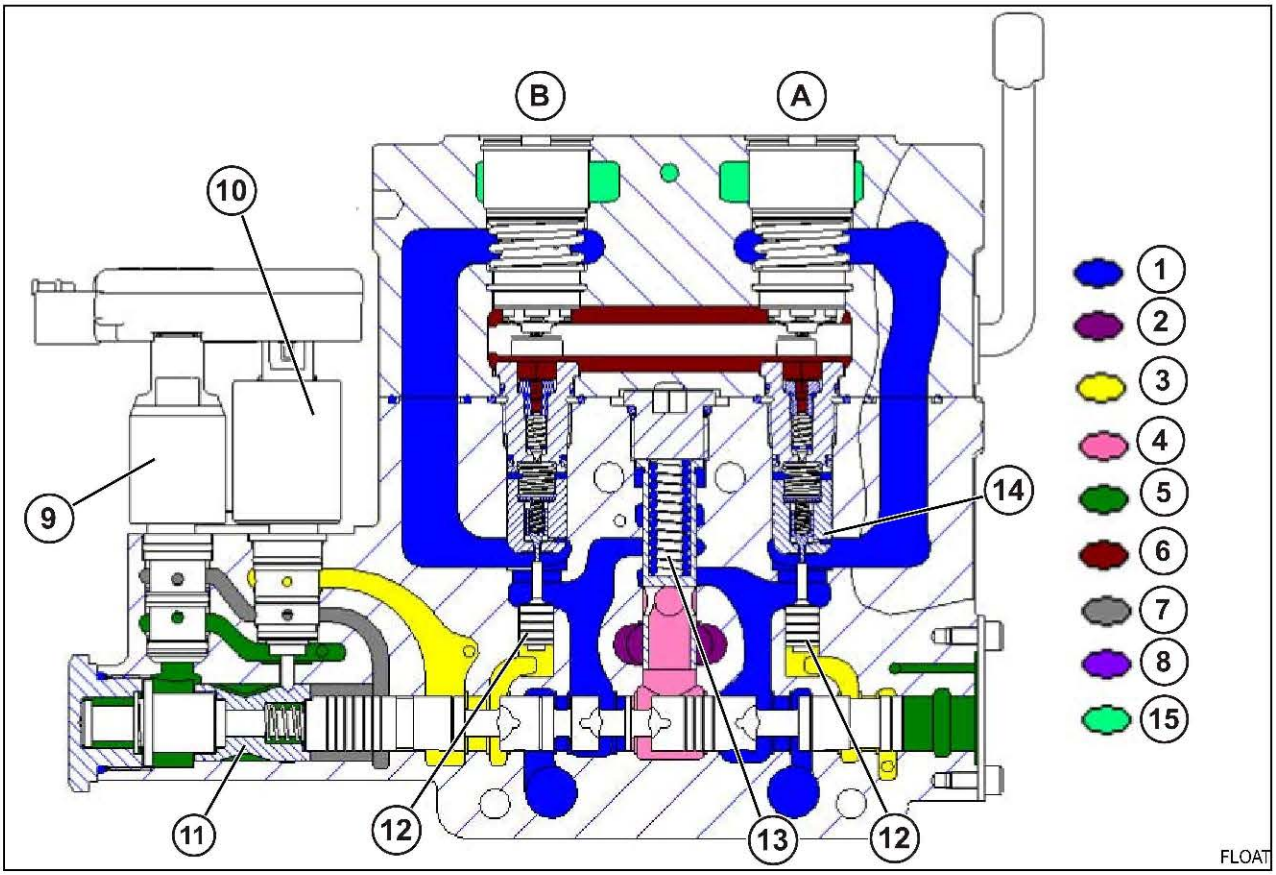

Fig. 26

Callout	Description	Callout	Description
1	Return pressure	10	Proportional solenoid
2	Pump pressure	11	Main spool valve
3	Pilot pressure	12	Poppet valve
4	Compensated pressure	13	Compensator valve
5	Pilot sump pressure	14	Release valve
6	Coupler sump pressure	15	Dirty oil coupler drain
7	Control pressure	-	-
8	Cross relief passage	A	A-port
9	On/off solenoid	B	B-port

A pulse width modulation (PWM) is sent to the proportional solenoid (10) to open fully. The pressure is put on the right end of the main spool valve (11) ramp. This maximum control pressure lets the spool valve move fully to the left end of the bore. The proportional solenoid pin rides up the ramp and gives mechanical feedback on the spool valve position.

The pump pressure (2) is blocked.

The pilot pressure (3) pushes the two poppet valves (12) to press the release valve pins off the seats, opening the release valves. This lets the return pressure (1) go to the reservoir.

9.2.14 Suction screen

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

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

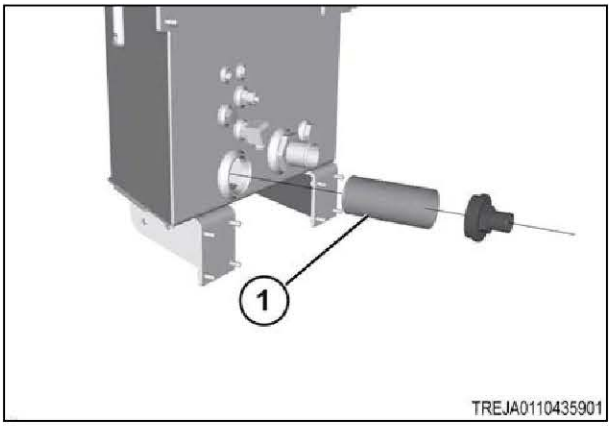

Fig. 27

9.2.15 Load sense blocking valve

The load sense blocking valve (1) is located on the inside front frame section on the right-hand side of the machine. The load sense blocking valve is mounted on the inside of the frame near the oil filter.

The load sense blocking valve prevents the steering/priority valve from being active during the engine starting. This keeps the hydraulic pump for the implement hydraulic system at a low pressure reserve during the engine starting.

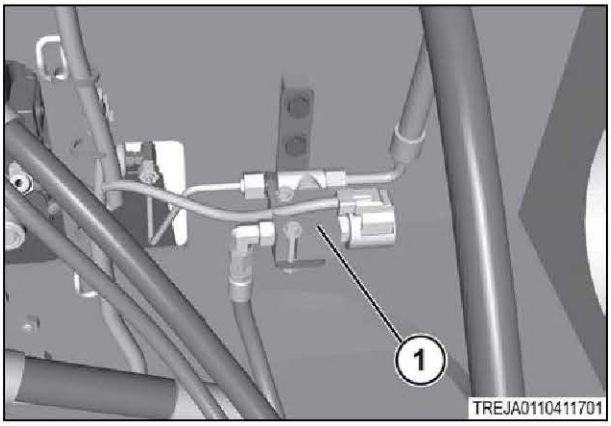

Fig. 28

9.2.16 Charge pump

The charge pump is on the left-hand side of the machine behind the implement hydraulic pump. The charge pump is a 36 cc (2.2 in^3) gear pump.

The charge pump sends oil to the oil filter head. The oil goes to the oil cooler and then returns to the filter head for filtering. The filtered oil goes to the oil reservoir.

The charge pump is driven by the drive shaft that is splined to the implement pump.

Oil from the reservoir enters the charge pump through the inlet. The inlet sends oil to the gear selection of the gear pump. Oil is pushed out of the outlet.

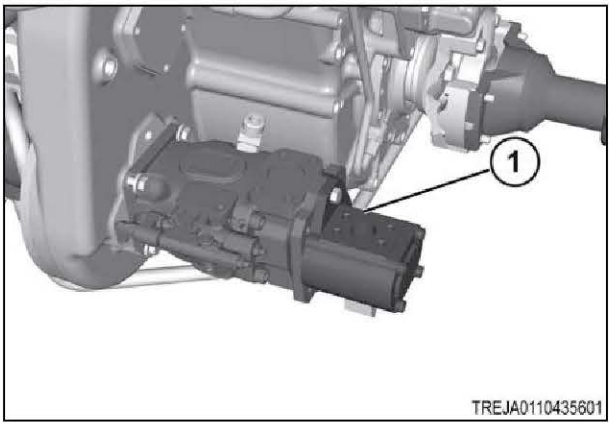

Fig. 29

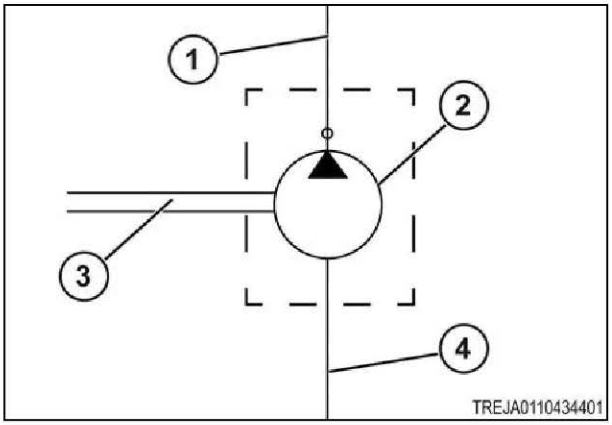

Fig. 30

9.2.17 Steering - priority valve

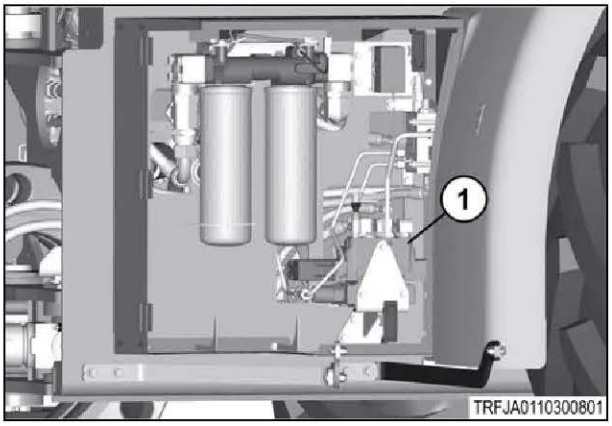

Fig. 31

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.

9.2.18 Load sensing relief valve

The load sensing relief valve (1) is in the bottom of the hydraulic control valve bank.

The load sensing relief valve is for controlling the system pressure. The relief valve is set at 179 to 183 bar (2595 to 2655 psi). The relief valve is adjustable.

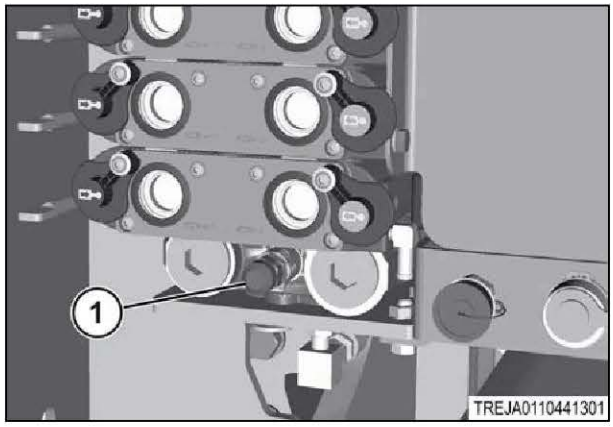

Fig. 33

9.2.19 Implement oil cooler

The implement oil cooler (1) is on the front of the machine. The implement oil cooler is mounted in an assembly with the air cooler, the water cooler, and the condenser.

The implement oil cooler removes heat from the hydraulic oil to:

- keep a good viscosity
- Promote longer oil lubrication life
- Draw heat out of the hydraulic system

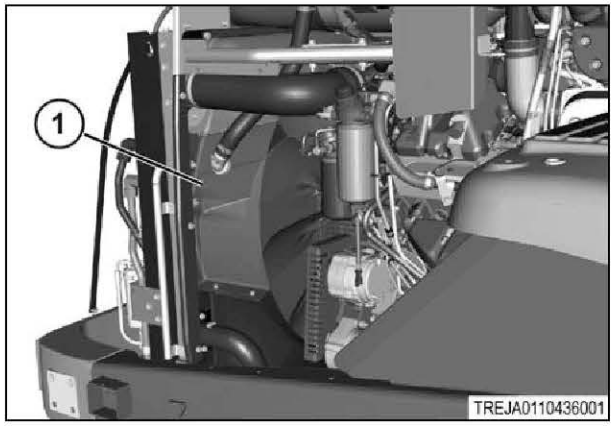

Fig. 34

9.2.20 Oil cooler bypass valve

The oil cooler bypass valve (1) is on the left-hand side of the machine.

If the oil pressure differential across the hydraulic oil cooler passes 345 kPa (50 psi), the oil cooler bypass valve diverts the oil around the oil cooler.

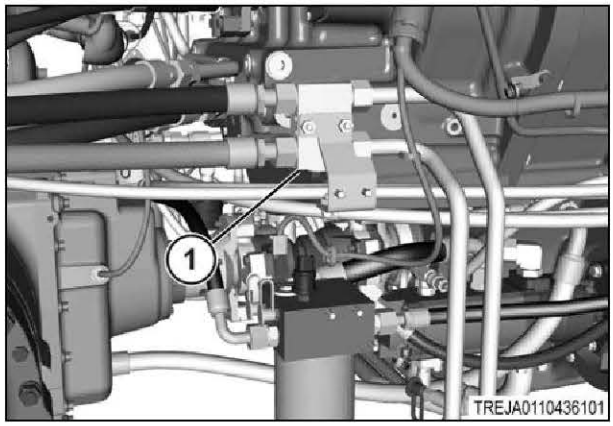

Fig. 35

9.2.21 Case drain

The case drain return port (1) is at the rear of the machine. If the machine has a three-point linkage, the case drain return port will be on the rear right-hand side of the machine.

The case drain port serves as the return for the case drain oil from the hydraulic components that are on the implements.

The case drain return port is for the following types of oil:

- Low pressure oil
- Low volume oil

The flow capacity for the case drain return port is 20 liters/min (5.3 gal/min).

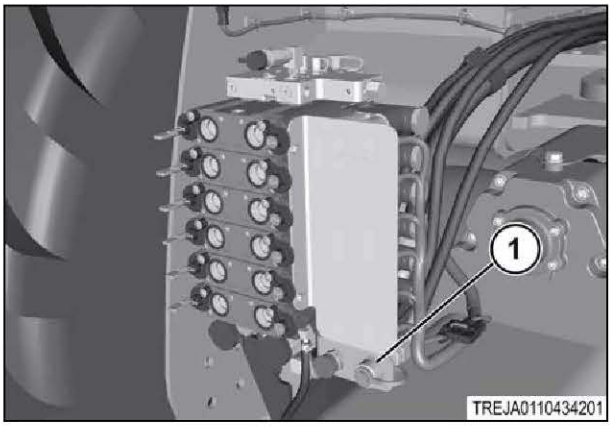

Fig. 36

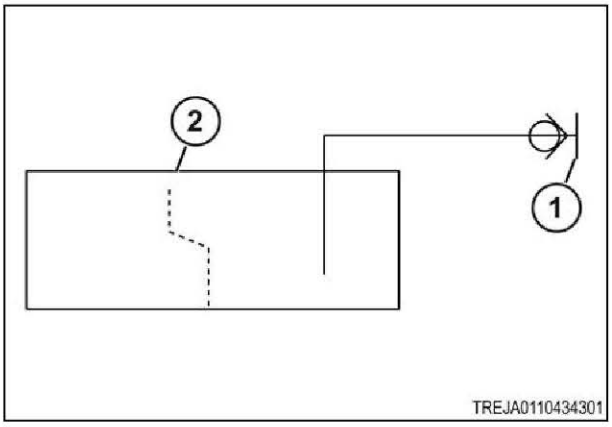

Fig. 37

9.2.22 Hydraulic power beyond

The hydraulic power beyond is in the hydraulic control bank. The couplers are:

- (1) Pressure
- (2) Return
- (3) Load sensing signal

The couplers are available in the following sizes:

- 12.7 mm(1/2 in) for continuous flow less than 16 gal/min.
- 19.05 mm(3/4 in) for continuous flow more than 16 gal/min.

12.7 mm(1/2 in) or 19.05 mm(3/4 in) return couplers are also available to use as low pressure return.

The hydraulic power beyond lets the hydraulic pump flow to route the hydraulic control valve bank. The implements that are connected to the hydraulic power beyond get the desired oil flow before the implements are connected to the hydraulic control valve bank.

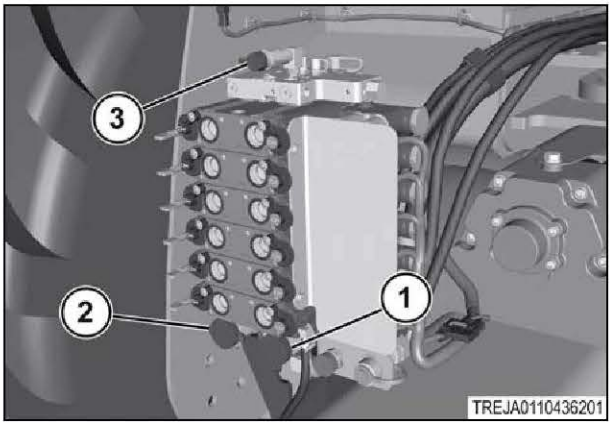

Fig. 38

The hydraulic power beyond work in parallel with the hydraulic control valve bank.

The hydraulic power beyond is not in the precomensated pressure system.

The hydraulic power beyond provides continuous flow of oil when the engine is operating. Implements have a control valve attached to the hydraulic power beyond.

9.2.23 Test ports

The following test ports are on the top cover of the hydraulic control valve bank:

- (1) Supply pressure
- (2) Pilot pressure
- (3) Return oil pressure

Test port (1) measures the actual pump output flowing to the manifold of the hydraulic control valve bank. Test port (2) measures the pilot pressure in the hydraulic control valve bank. Test port (3) measures the pressure in the return oil circuit.

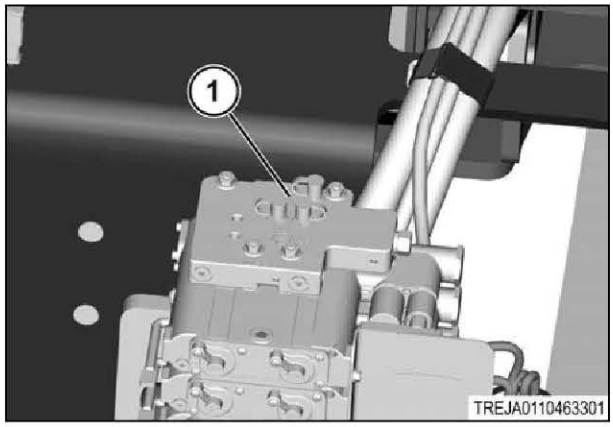

Fig. 39

Test port (1) measures the pressure of the load signal flowing to the hydraulic pump.

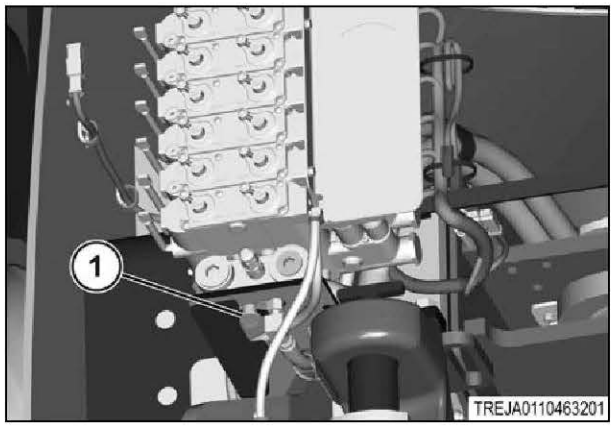

Fig. 40

The hydraulic cooler test port (1) measures the pressure differential across the hydraulic oil cooler.

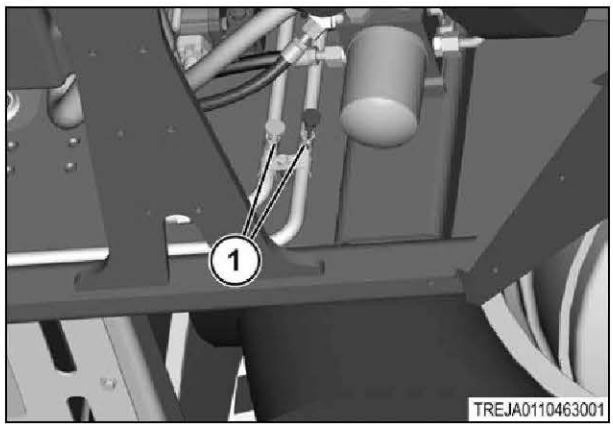

Fig. 41

The cylinder test ports (1) measure the pressure to the articulation cylinders.

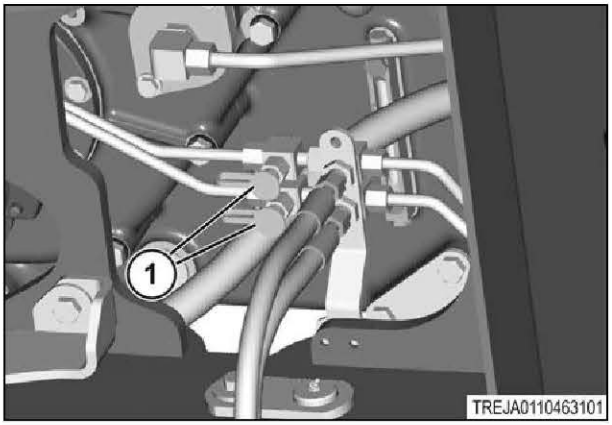

Fig. 42

9.2.24 Hydraulic control levers

The hydraulic control levers (1 through 6) for the implement system are in the console.

The levers send a pulse width modulation (PWM) signal to the armrest module. The armrest module sends the signal through the auxiliary CAN bus network.

The flow rate and the detent time can be adjusted for each valve in the TMC.

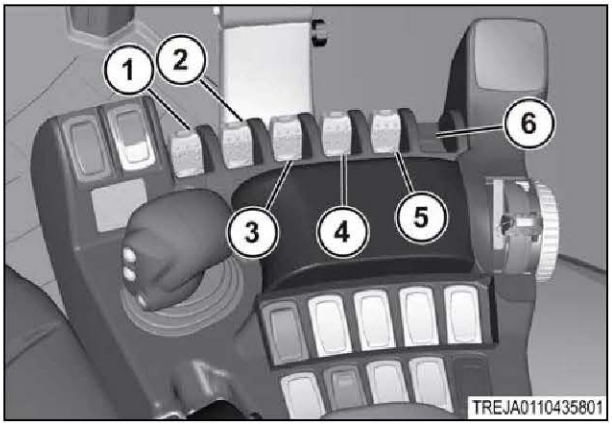

Fig. 43

9.2.25 Tractor management center

The tractor management center (TMC) (1) is on the console in front of the hydraulic control levers.

The TMC lets the operator adjust the following operations for the 3-point linkage system:

- Raising speed
- Lowering speed
- Maximum height
- Draft control
- Slip control

See the operator's manual for a detailed description of the TMC screens for the 3-point linkage system.

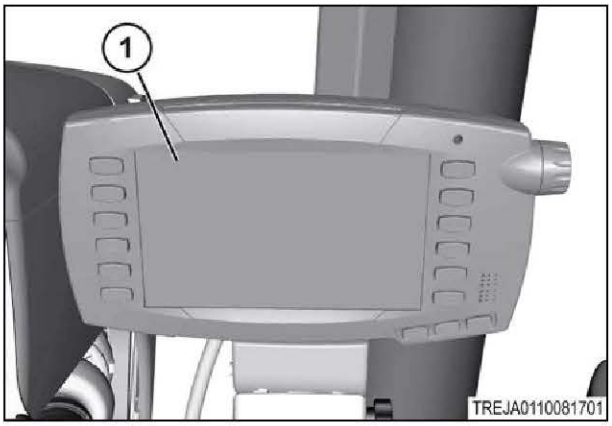

Fig. 44

9.2.26 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)

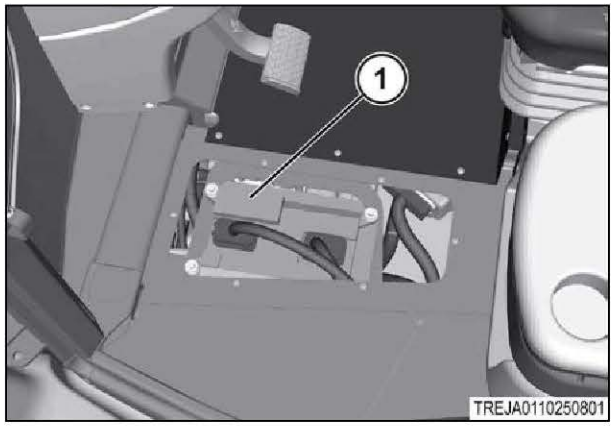

Fig. 45

9.2.27 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.

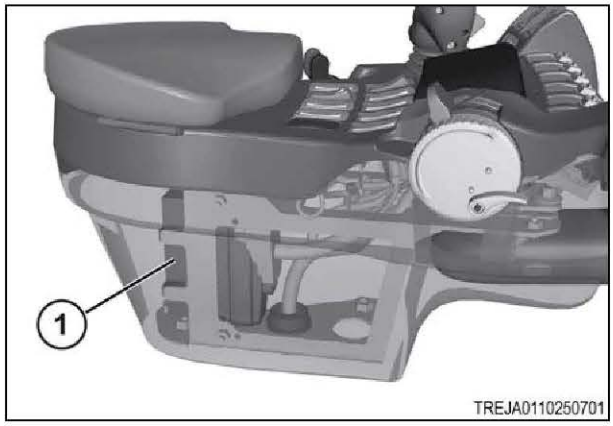

Fig. 46

9.2.28 Dash cluster

The dash cluster (1) contains warning lamps that show the operator the current condition of the machine.

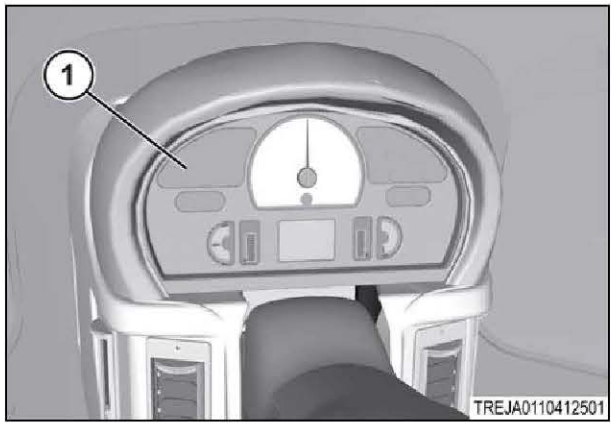

Fig. 47

9.2.29 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

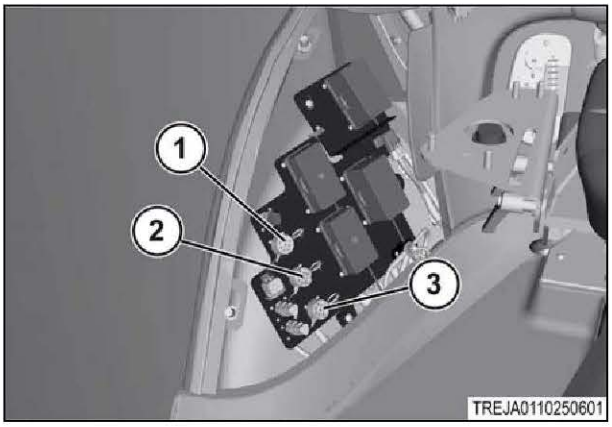

Fig. 48

9.2.30 Roading lockout switch

The lockout switch has the following positions:

- (1) Lock position
- (2) Unlock position

The roading lockout switch is for when the machine is on the road.

The switch signals the armrest module that the operator wants to disable the following features:

- Hydraulic control valves
- Decelerator pedal
- Auto guidance
- Hitch
- Steerable hitch

When the switch is in the lock position, the module puts all the implement functions in the hold mode. The implements get put in the hold mode unless on of the following modes is being performed:

- Float - When the switch is in the lock position and a hydraulic lever is in the float mode, the module remains in float mode. When the hydraulic lever is moved out of float mode, the module will put the implement function in hold mode.

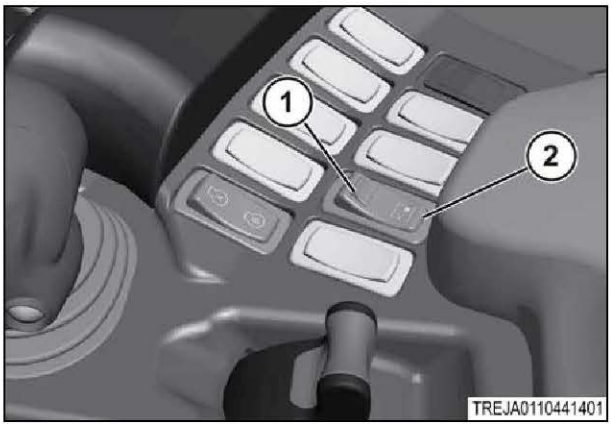

Fig. 49

- Detent - When the switch is in the lock position and a hydraulic lever is in detent mode, then the module remains in detent mode. When the hydraulic lever is:
  - Moved out of the hold position
  - The time has expired in detent mode

  the module puts the implement in hold mode.

9.2.31 Headland management switch

The headland management switch is on the shift handle. The headland management switch lets multiple operations to be performed with a single instruction.

The headland management switch has two modes of operation:

- Shift mode
- One-Touch mode.

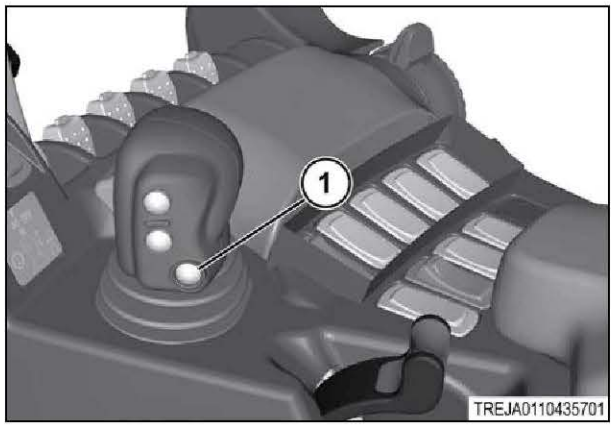

Fig. 50

Shift mode

Shift mode is only active if there are no One-Touch actions that are programmed. Shift mode lets the transmission to automatically shift a programmed number of gears.

Shift mode will be disabled when the One-Touch mode is active. To activate the shift mode after using the one-touch, it is necessary to clear the One-Touch.

One-Touch mode

One-Touch mode will record a sequence of operations for:

- Raise sequence
- Work sequence

At the end of the first pass through the field, the operator enables the record mode. One-Touch mode will store the operations being performed. The One-Touch mode also stores the time of each operation.

The recorded sequence of operations can be performed by pressing the One-Touch button.

The following operations can be recorded and performed in One-Touch mode:

- Transmission upshift
- Transmission downshift
- Engine speed RPM increase or decrease
- Hydraulic control extend detent
- Hydraulic control retract detent
- Hydraulic control float
- PTO on/off control
- Area articulation in performance monitor on/off control

The power management mode disengages when the One-Touch is active.

9.2.32 Solenoid valves (hydraulic control valves)

The hydraulic control valves (1) are on the rear of the machine. The solenoid valves (2) are on the right-hand side of the hydraulic control valves.

The hydraulic control valves control the flow of the hydraulic oil to the components on the implement. There are two solenoids for each hydraulic control valve:

- On/Off
- Proportional

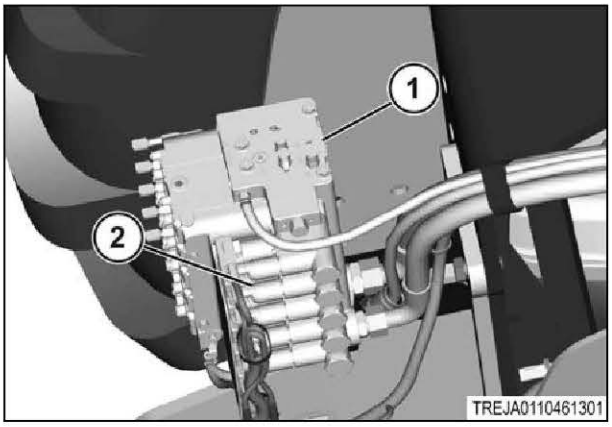

Fig. 51

9.2.33 Hydraulic control valve - exploded view

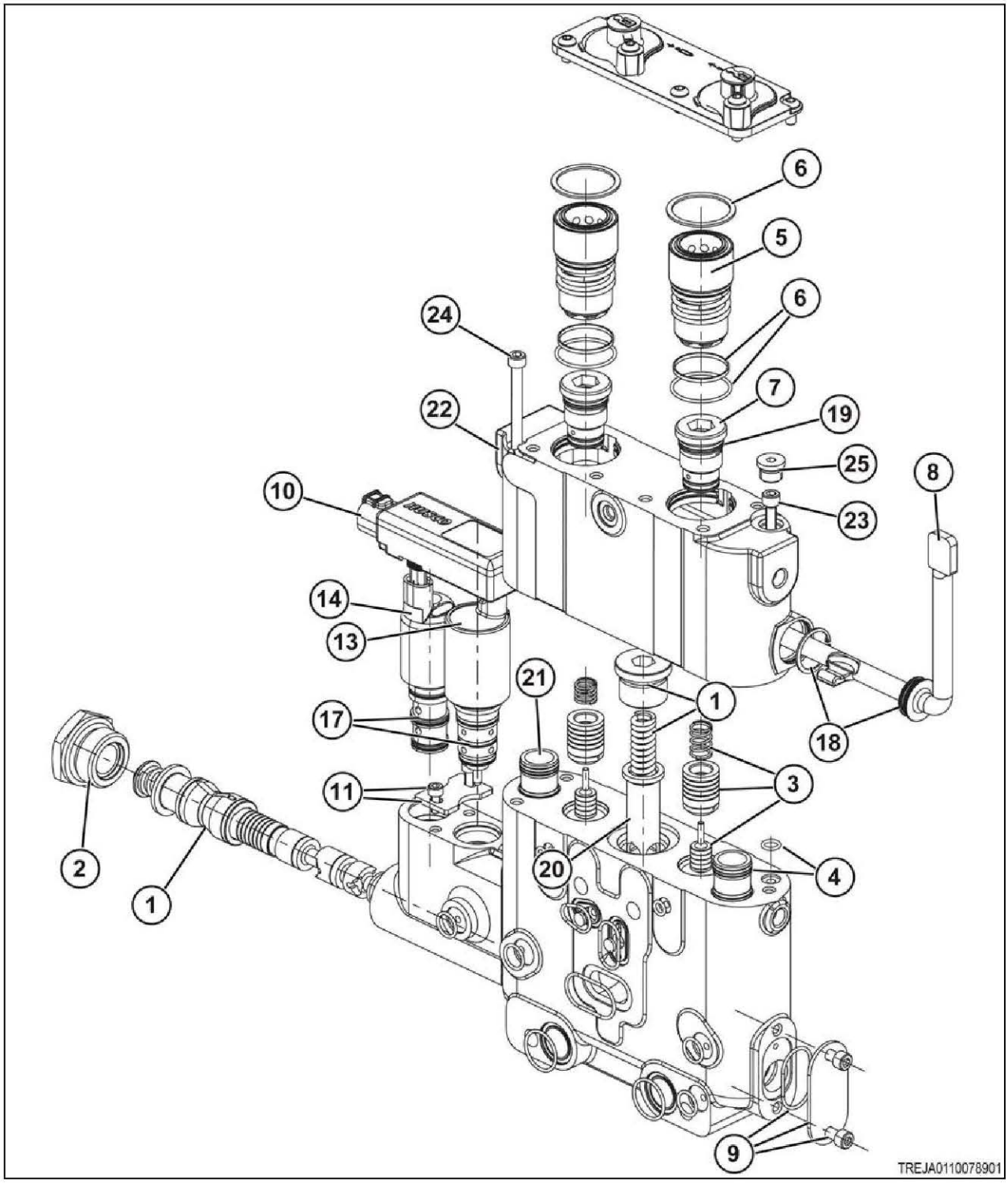

Fig. 52

Item	Description	Item	Description
1	Valve control kit	14	Direct solenoid kit
2	Plug kit	15	Dust cover kit
3	Poppet valve	16	Dust cover seal kit
4	Coupler interface seal kit	17	Valve seal kit

Item	Description	Item	Description
5	Coupler kit	18	Handle seal kit
6	Coupler seal kit	19	Relief valve seal kit
7	Relief valve kit	20	Compensator spool kit
8	Handle kit	21	Sleeve kit
9	Seal plate kit	22	Coupler block, 1/2, top/mid kit
10	Husco LSVC electrical group	23	Bolt - M6x1THDx20
11	Clamp kit	24	Bolt - M6x1THDx85
12	Compression spring, standard kit	25	Plug assembly - 1/2-20 HX socket
13	Proportional solenoid kit		

9.2.34 Hydraulic control valve inlet cut away

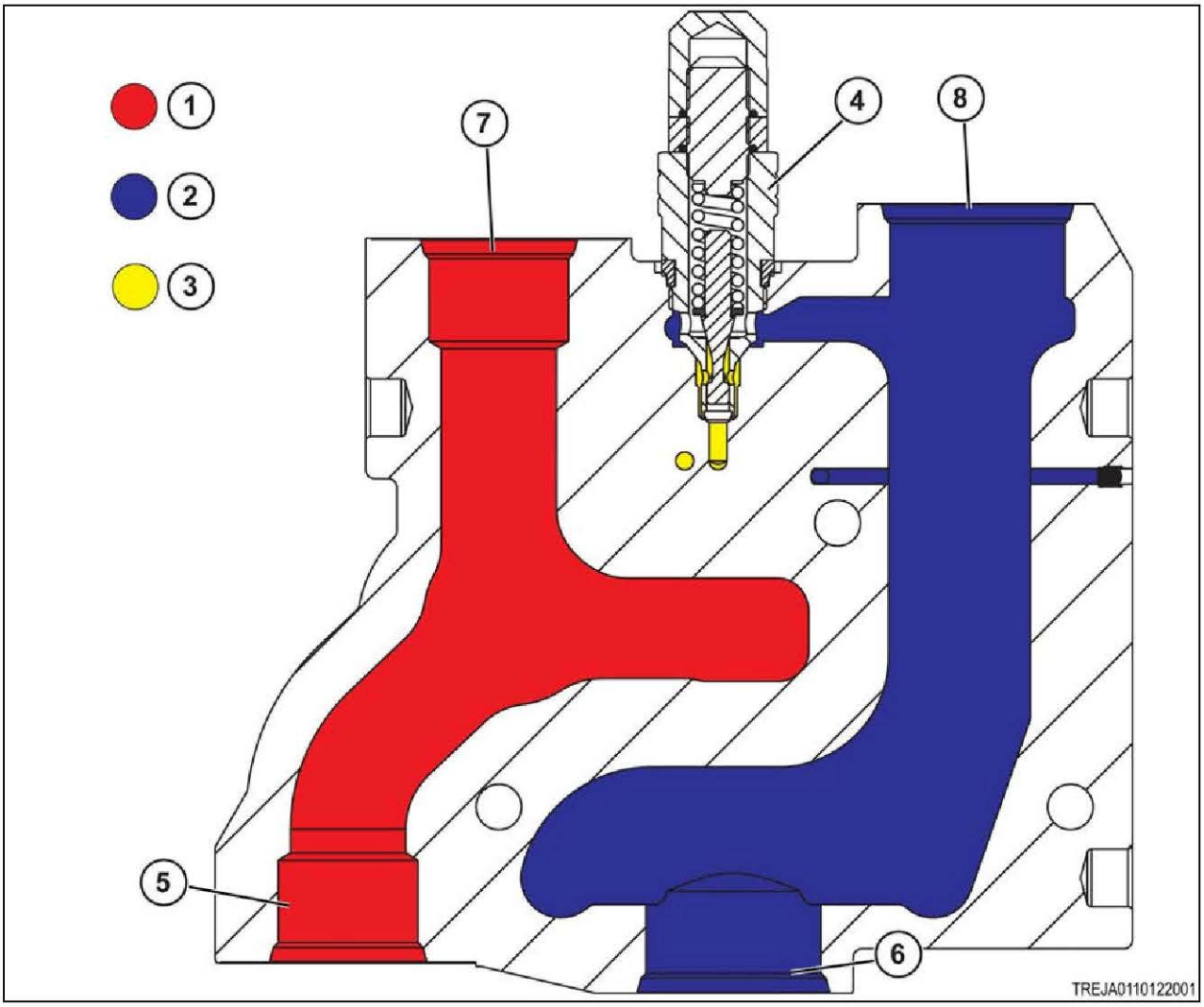

Fig. 53

1 Pressure
2 Return
3 Load sense
4 Load sense relief valve
5 Pressure inlet
6 Pressure outlet

7 Pressure port - power beyond, if equipped
8 Return port - power beyond, if equipped

Pump pressure from the priority valve enters at the pressure inlet (5). If the load sense signal is more than 183 bar (2654 psi), the load sense relief valve (4) will open to release the pressure to the return port.

9.2.35 Valve stack top cap

The valve stack top cap (1) is on top of the valve stack and contains the test ports (2) and a pressure reducing valve (3).

The valve stack top cap has a 1 bar (15 psi) check valve in the sump return port.

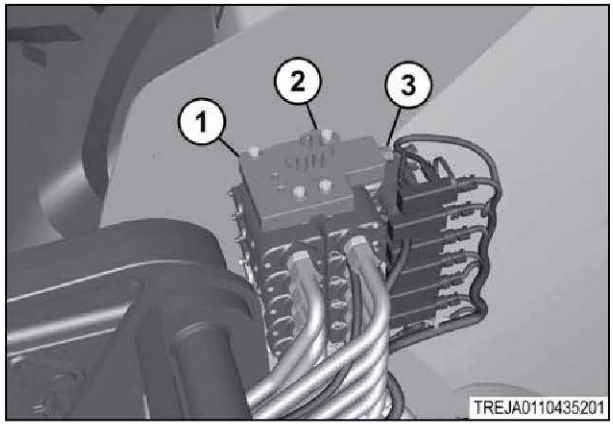

Fig. 54

The top cap contains a pressure reducing valve (1), a sump check valve (2), and test ports (3).

The ports in the top cap:

P Pump pressure
PS Pilot pressure
R Return pressure
LS Load sense
T Tank

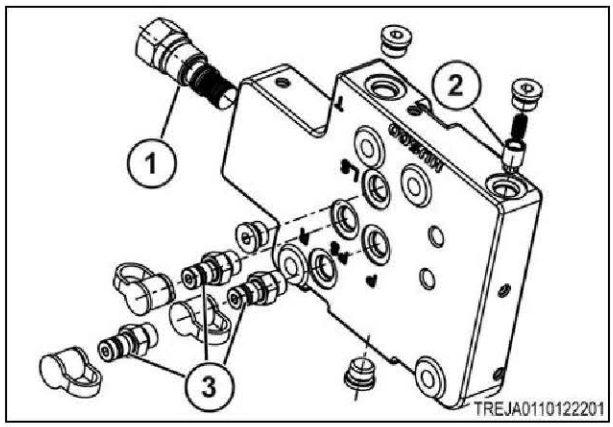

Fig. 55

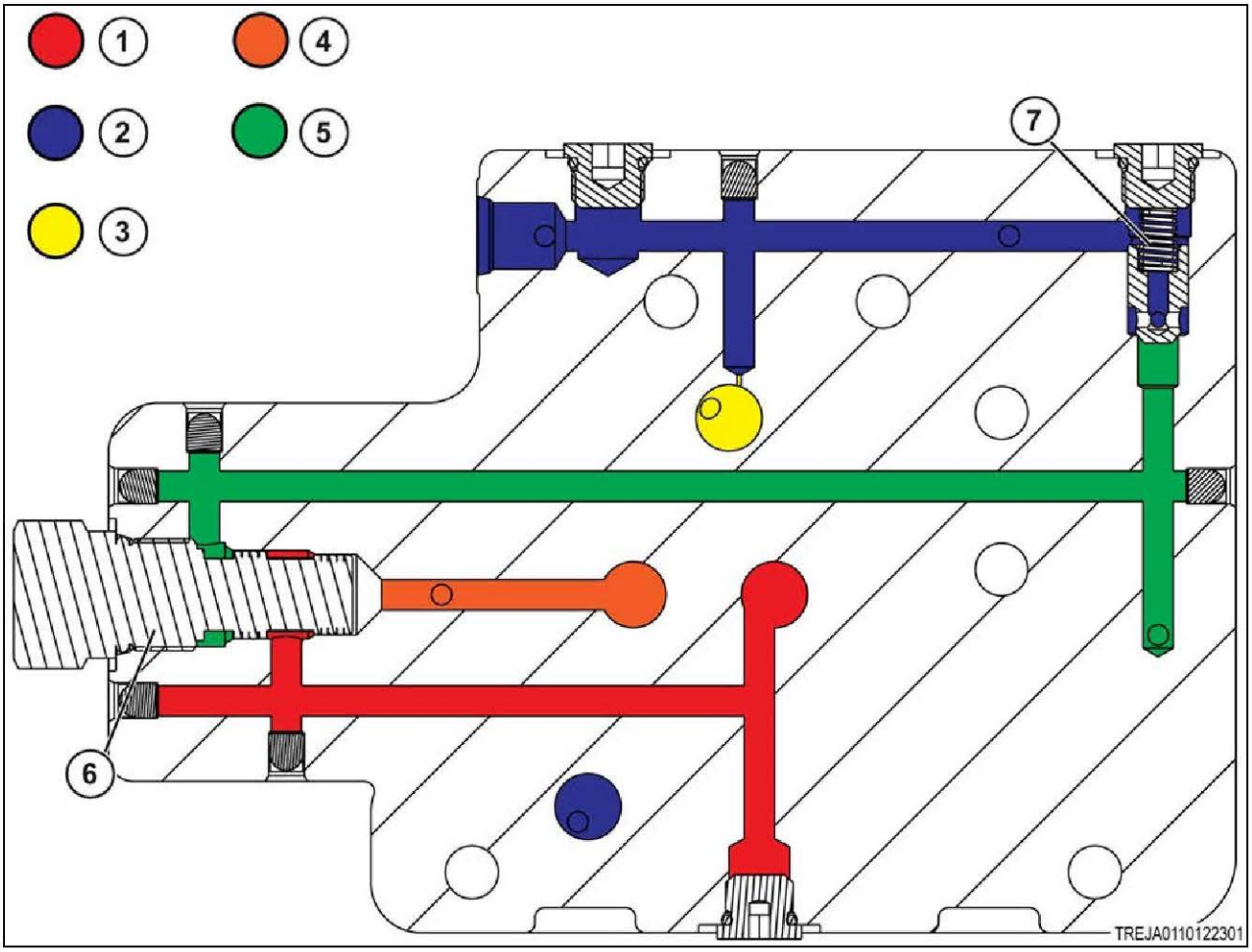

Fig. 56

1 Pressure
2 Return
3 Power beyond load sense
4 Pilot pressure
5 Pilot sump
6 Pressure reducing valve
7 Sump check valve

The pressure reducing valve is set at 2700 to 3300 kPa (392 to 479 psi). The pilot pressure opens the pressure reducing valve which directs flow through the stack as pump pressure. This valve keeps a constant pressure at the valve stack and lets the pump adjust for pressure loss in the hydraulic system.

9.3 Hydraulic system disassembly and assembly

9.3.1 Remove the gear pump

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:
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. Disassemble the components 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.

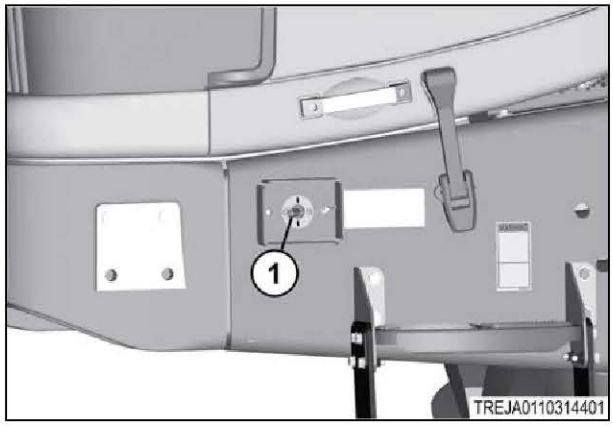

Fig. 57

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

4. Relieve all pressure from the hydraulic system.

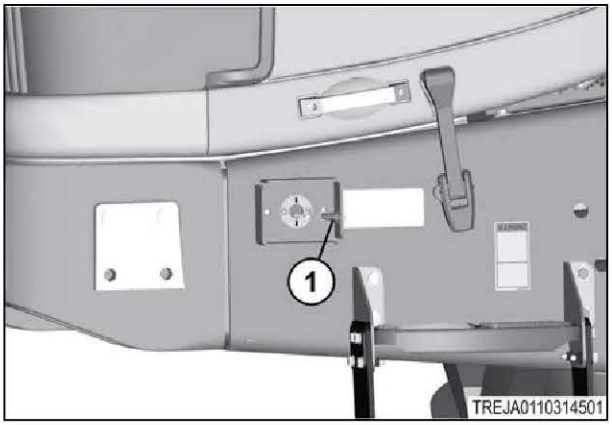

Fig. 58

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

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

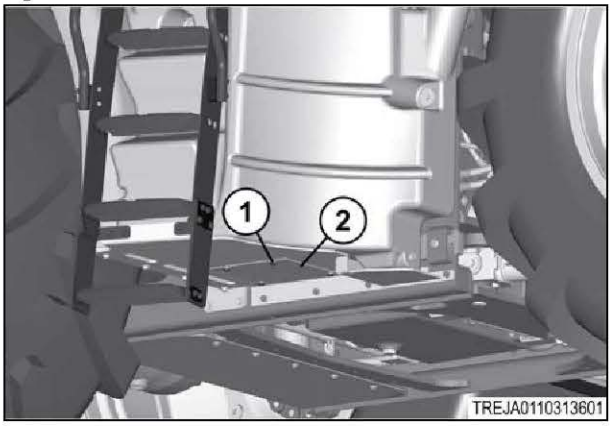

Fig. 59

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.

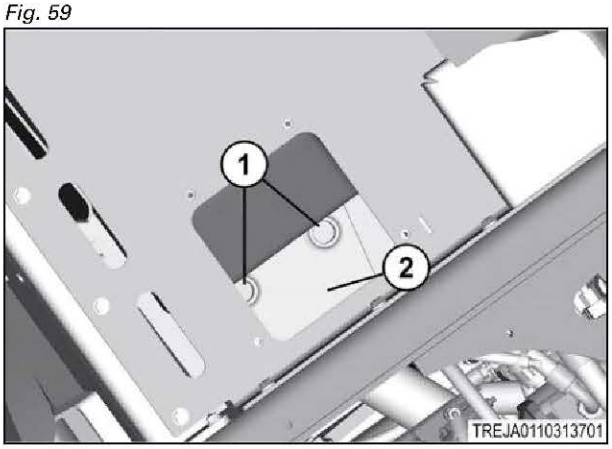

Fig. 60

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

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

11. Remove the hardware (2).

12. Loosen the hardware (3).

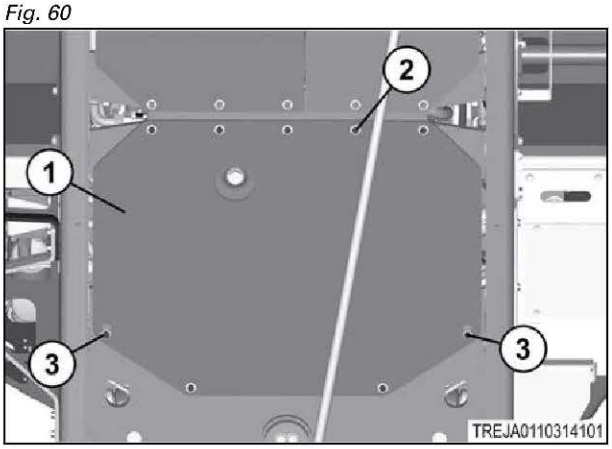

Fig. 61

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).

15. Use the correct lifting equipment to remove the transmission guard.

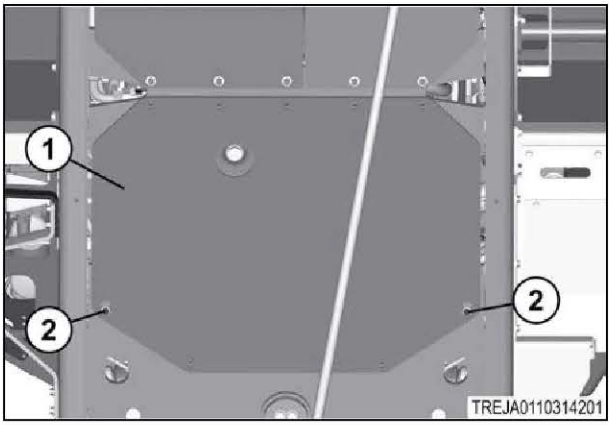

Fig. 62

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

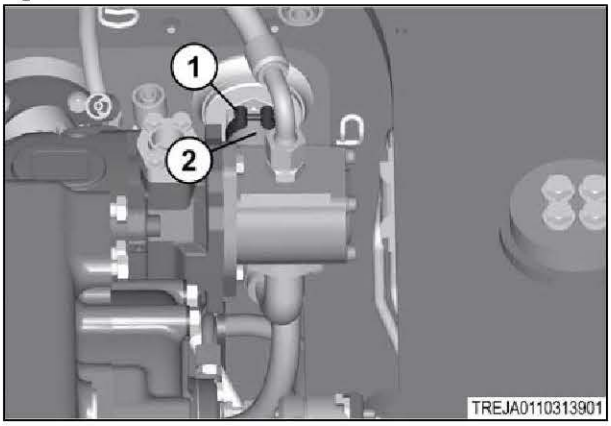

Fig. 63

17. Disconnect the hydraulic hose (1).

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

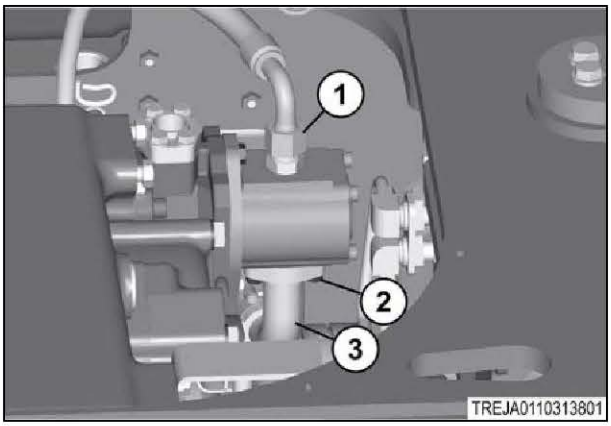

Fig. 64

19. Remove the hardware (1), and the gear pump (2).

20. Remove the O-ring.

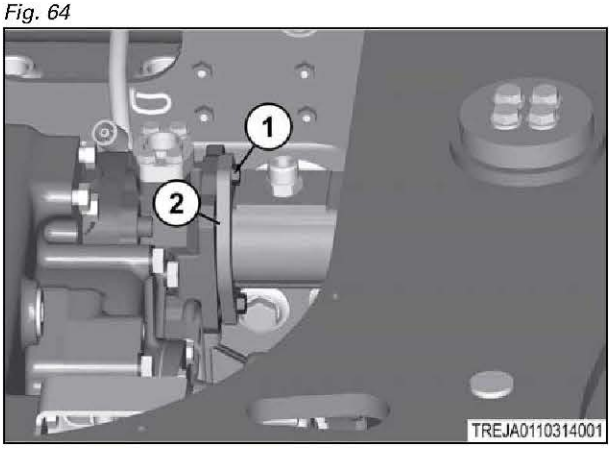

Fig. 65

9.3.2 Disassembling the gear pump

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

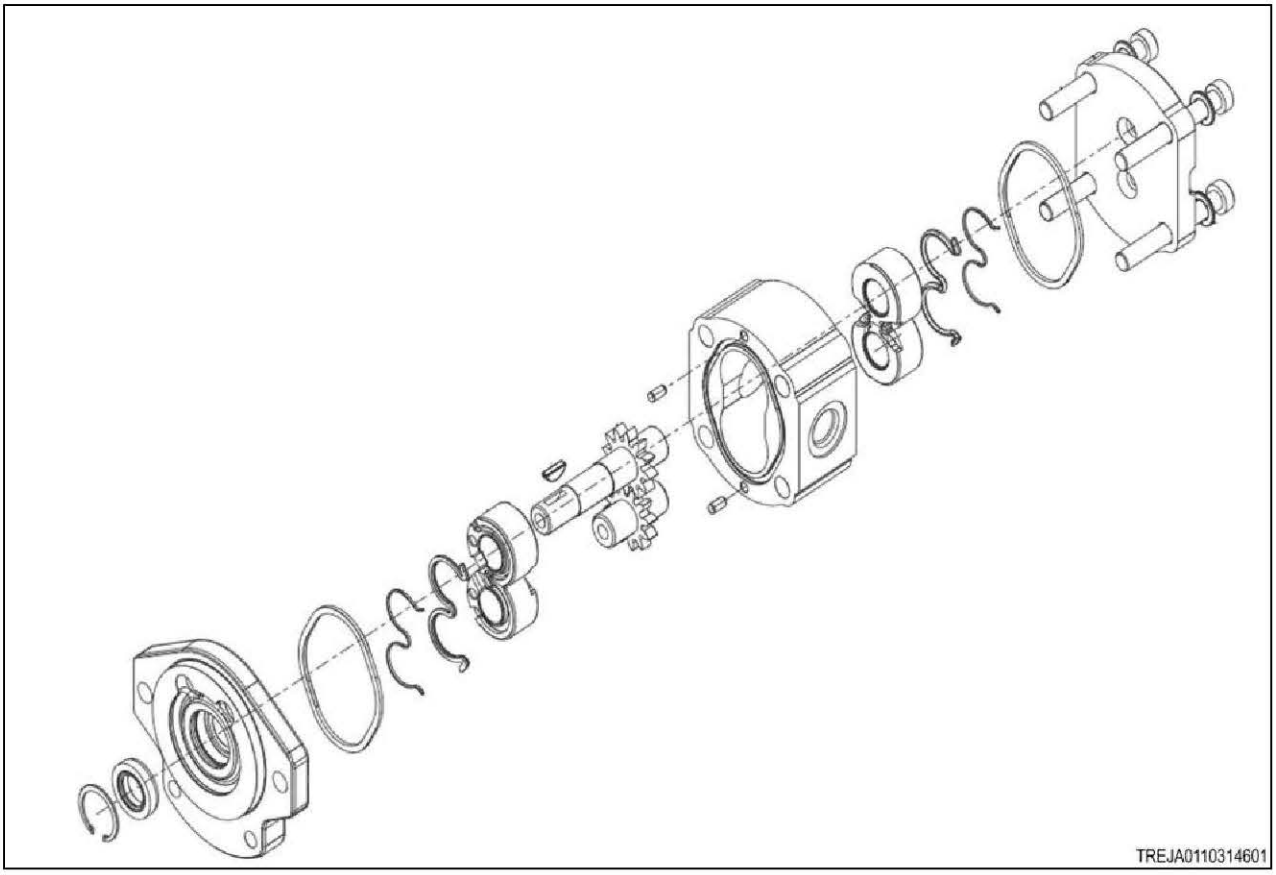

Fig. 66

1. Exploded view of the gear pump.

2. Clean the outside of the pump completely. Make alignment marks on the body and the covers to help in assembly.

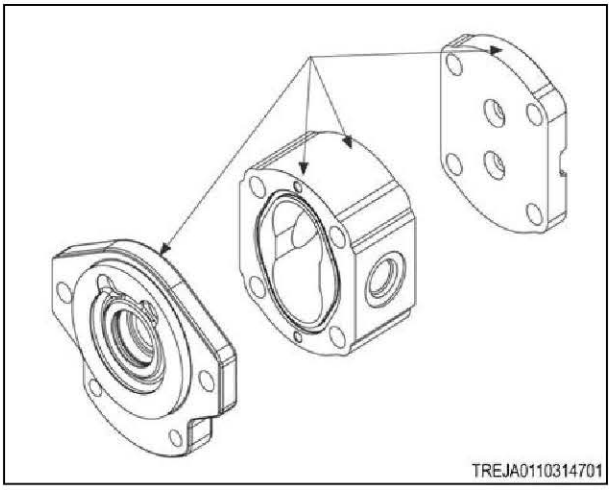

Fig. 67

3. Mount the gear pump in a vise with light pressure on the front cover ears with the shaft pointing down. Remove the four bolts from the rear cover.

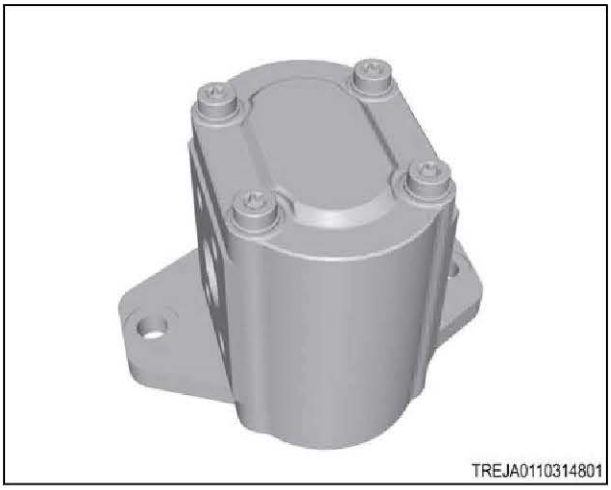

Fig. 68

4. Disconnect the rear cover (1) from the body (2).

NOTE:
The marks must line up for assembly.

5. Remove the seal (3) and discard.

6. Put a mark on each bearing block (4) with a marker to identify the correct position in the body(2).

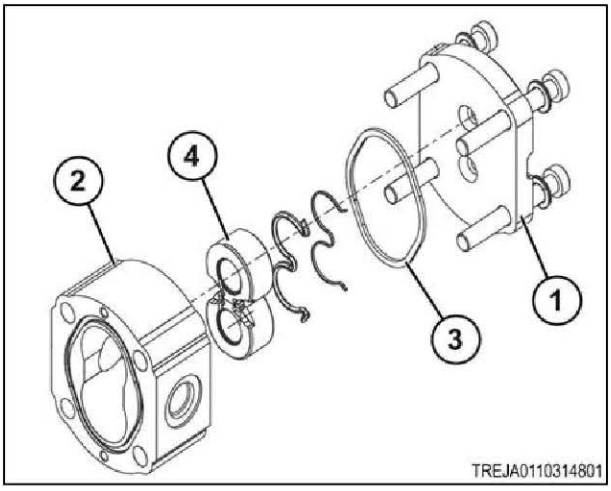

Fig. 69

7. Remove the clip (1) and lift out the bearing block (2), the drive gear (3), and the driven gear (4).

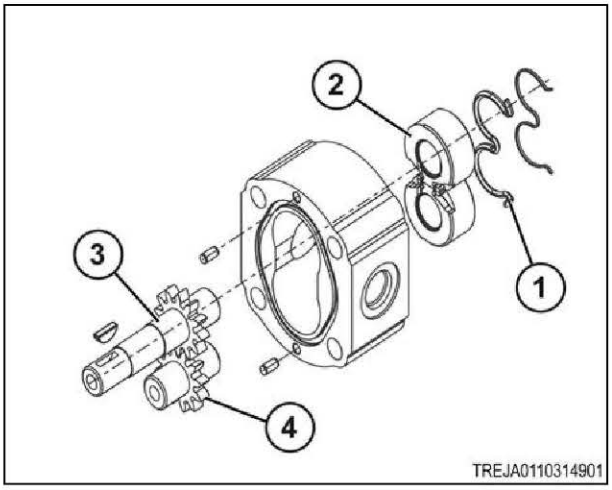

Fig. 70

8. Disconnect the body (1) from the front cover (2). Remove and discard static seal (3). Put a mark on each bearing block (4) with a marker to identify the position in the body.

NOTE:
The marks must line up for assembly.

CAUTION:
When disconnecting the body from the front cover, put one hand under the body in case the front bearing block falls out.

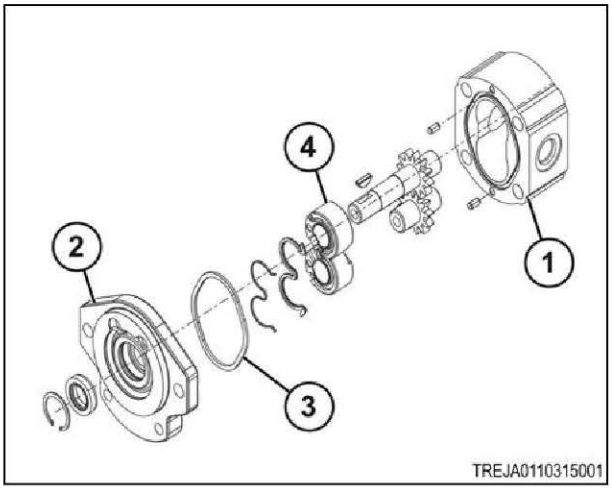

Fig. 71

9. Remove the snap ring (1) from the front cover (2).

10. Remove the shaft seal (3) by carefully removing with a screwdriver. Discard the shaft seal.

CAUTION:
Take care not to damage the shaft seal bore when removing the shaft seal. A damaged seal bore will cause seal leakage.

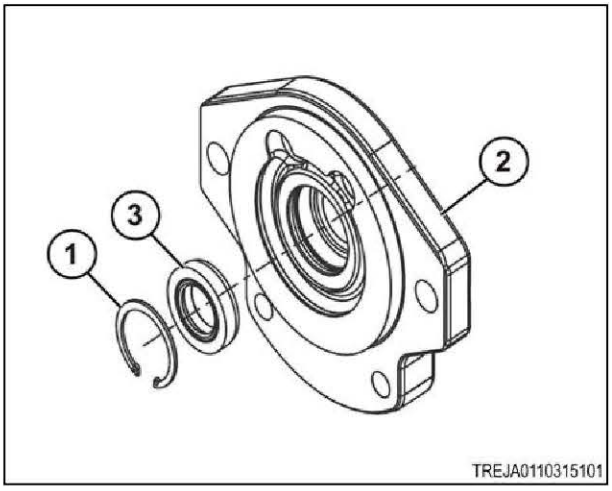

Fig. 72

11. Remove and discard the anti-extrusion seal (1) and pressure loading seal (2) from each bearing block (3).

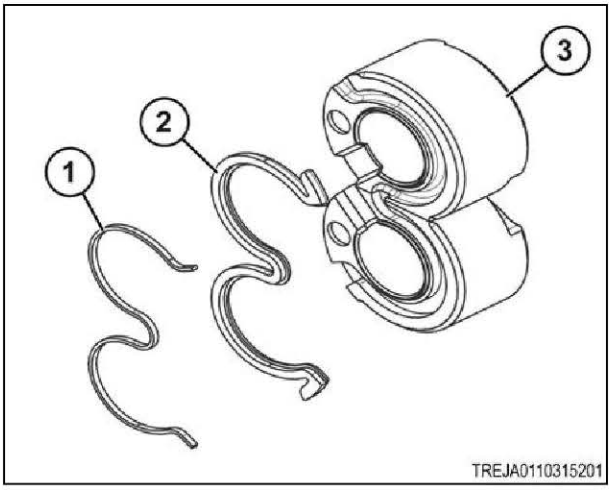

Fig. 73

9.3.3 Assemble the gear pump

NOTE:
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. Rotate the front cover (1) so the shaft seal bore is on top.

2. Press the shaft seal (2) in the bore.

CAUTION:
Take care not to damage the shaft seal bore when installing the shaft seal. A damaged seal bore will cause seal leakage.

3. Fill the area between the two lips of the seal with compatible grease.

4. Install the snap ring (3) into the groove of the front cover.

5. Install the dowel pins in the front cover holes.

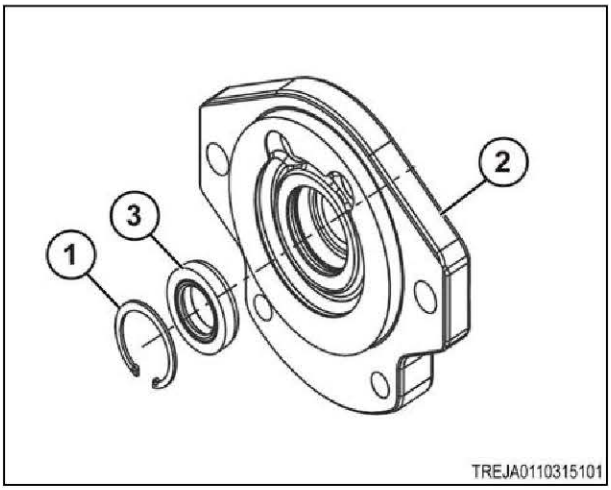

Fig. 74

6. Apply a small amount of grease in the static seal groove of the body.

7. Install a new static seal (1) into the groove.

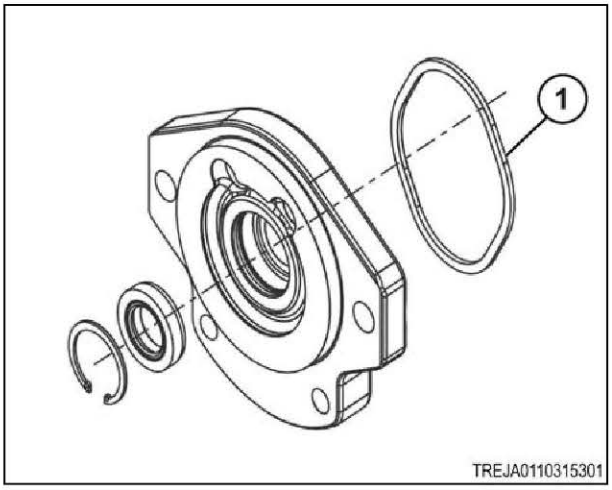

Fig. 75

8. Apply a small amount of grease to the seal groove of the front bearing block (3).

9. Install the new pressure loading seal (2) and the new anti-extrusion seal (1) in the groove.

10. Insert the bearing block in the body. Make sure the load seal and the anti-extrusion seal are installed correctly.

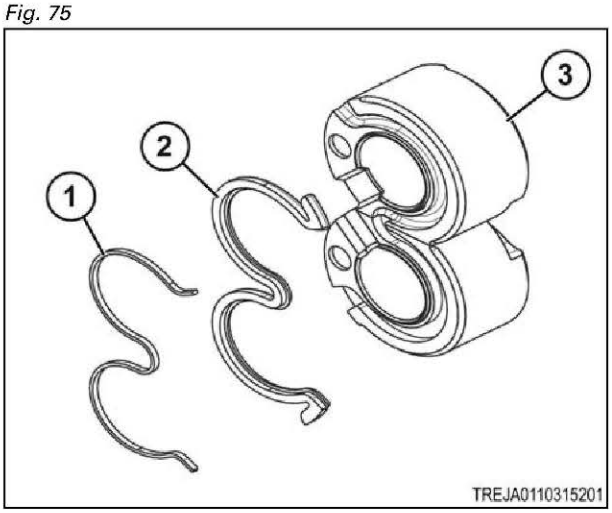

Fig. 76

11. Install the front cover (2) on the body (1).

NOTE:
Align the marks for assembly.

12. Align the dowel pins with the holes in the cover and the body.

NOTE:
The marks made during disassembly must line up during assembly.

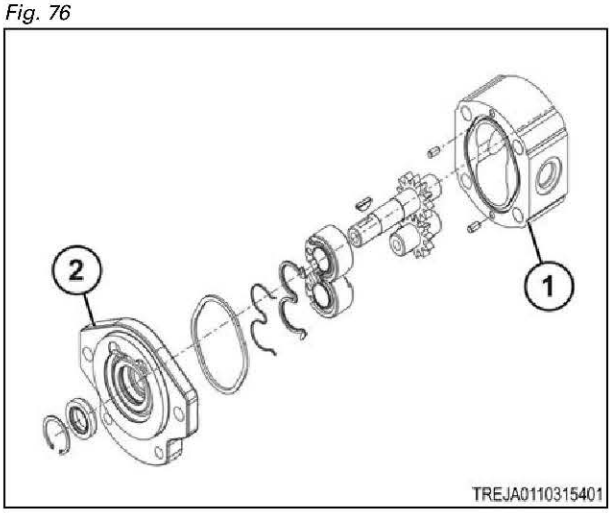

Fig. 77

13. Install the drive gear (1), and the bearing block (2). Do not damage the shaft seal (3).

14. Install the driven gear (4).

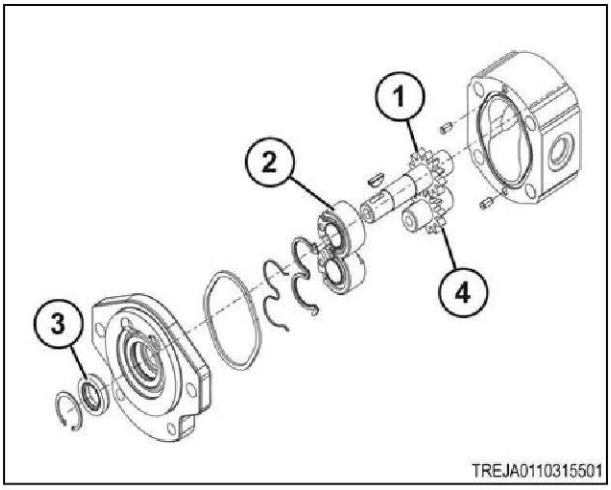

Fig. 78

15. Put a small amount of grease in the seal groove of the rear bearing block (3).

16. Install the pressure loading seal (2) and the anti-extrusion seal (1) in the groove.

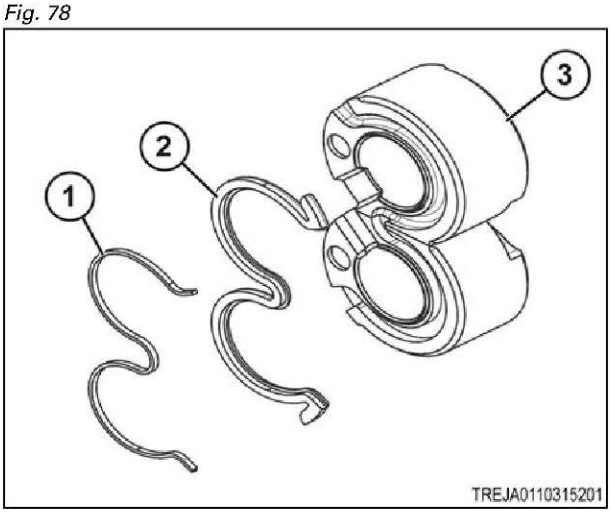

Fig. 79

17. Insert the rear bearing block (1) in the body (2).

NOTE:
Make sure the load seal and the anti-extrusion seal are positioned correctly.

NOTE:
The marks made during disassembly must line up during assembly.

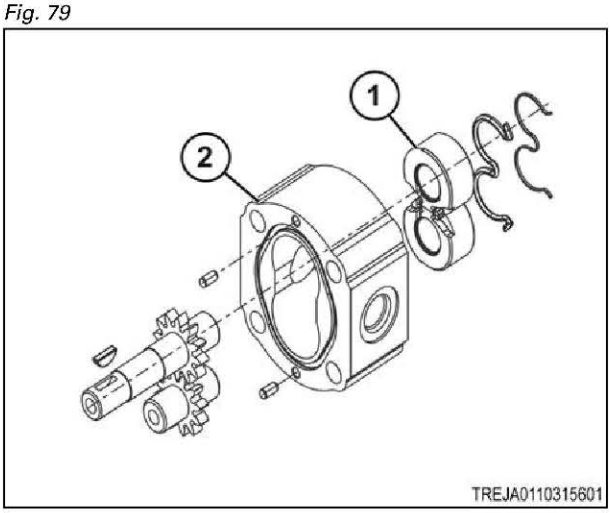

Fig. 80

18. Install the new static seal (1) in the seal groove on the rear side of the body (2).

19. Set the rear cover (3) on the body.

20. Align the marks on the body and the rear cover.

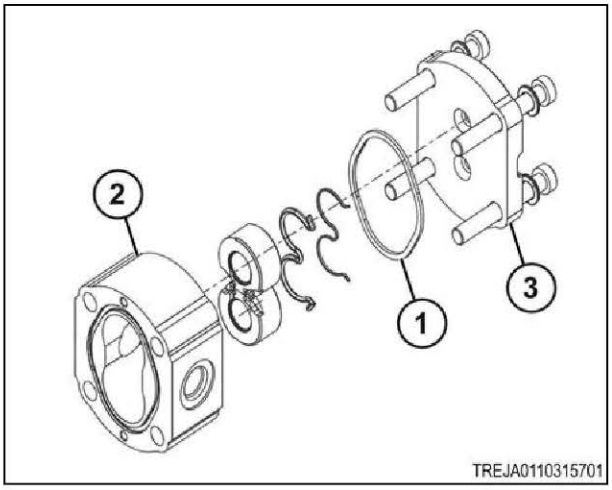

Fig. 81

21. Mount the gear pump in a vise, with the shaft pointing down. Apply light pressure on the front cover ears. Install the four bolts on the rear cover.

Tighten to 55 to 63 Nm (41 to 46 lbf ft).

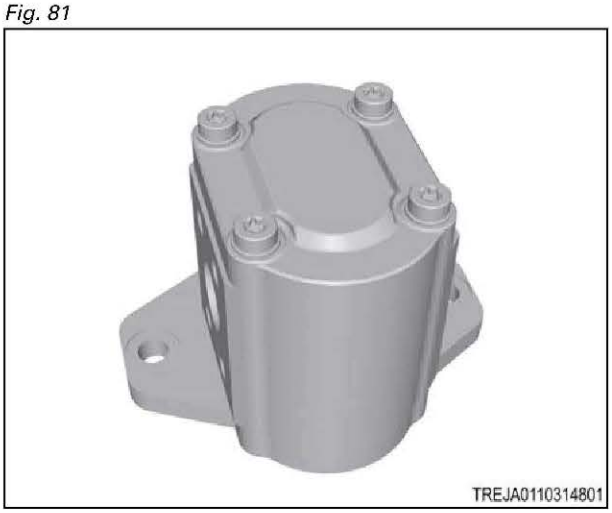

Fig. 82

9.3.4 Install the gear pump

Procedure

1. Install the O-ring on the gear pump (2).

2. Install the gear pump (2) with the hardware (1).

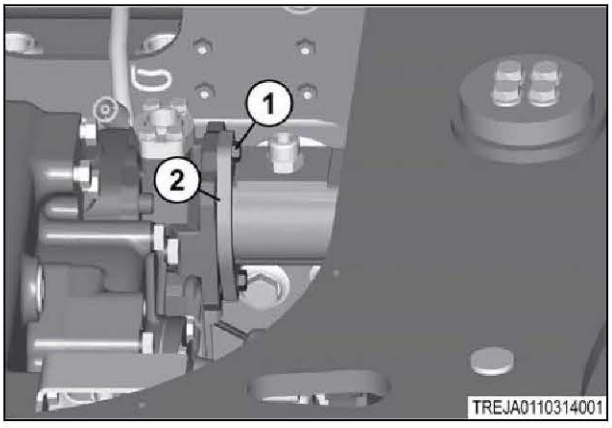

Fig. 83

3. Connect the hydraulic hose (1).

4. Install the hydraulic hose fitting (3) with the hardware (2).

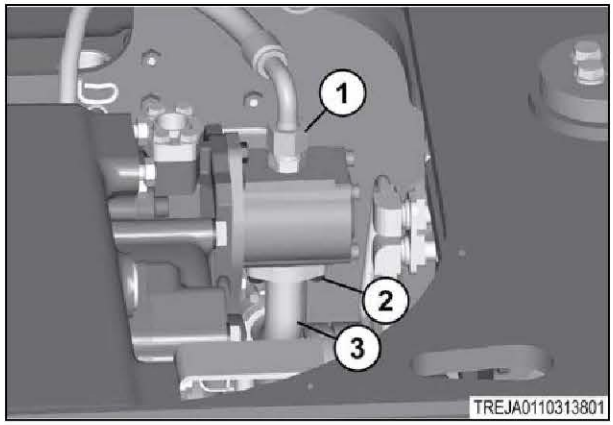

Fig. 84

5. Connect the hydraulic hose (2) with the hose clamp (1).

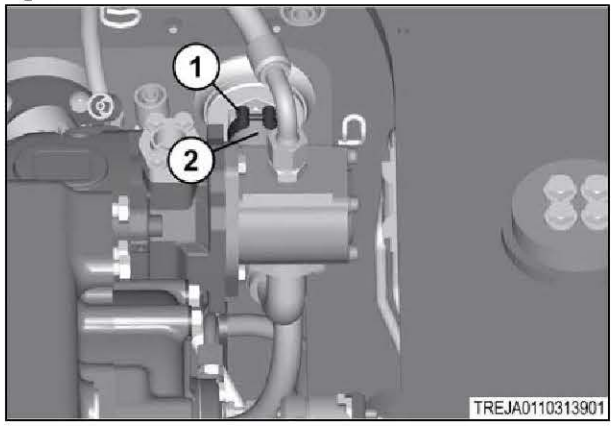

Fig. 85

6. If the machine is equipped with a transmission guard, use correct lifting equipment to put the transmission guard in position. Align the large holes are over the hardware (2).

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

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

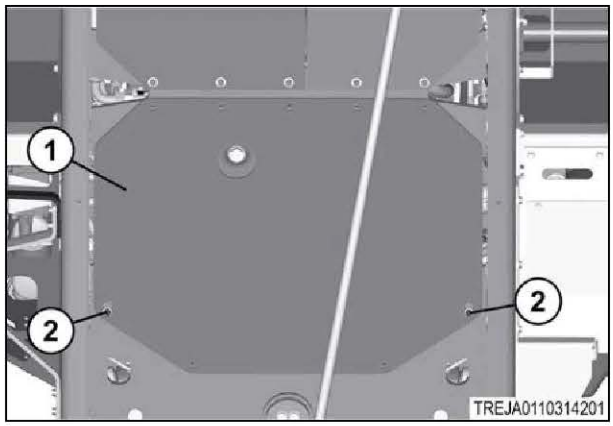

Fig. 86

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

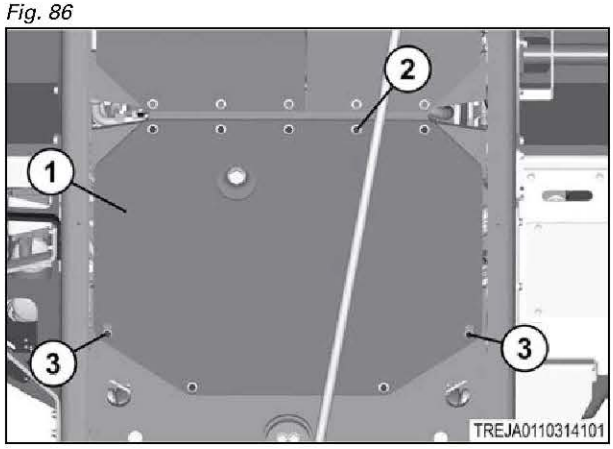

Fig. 87

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

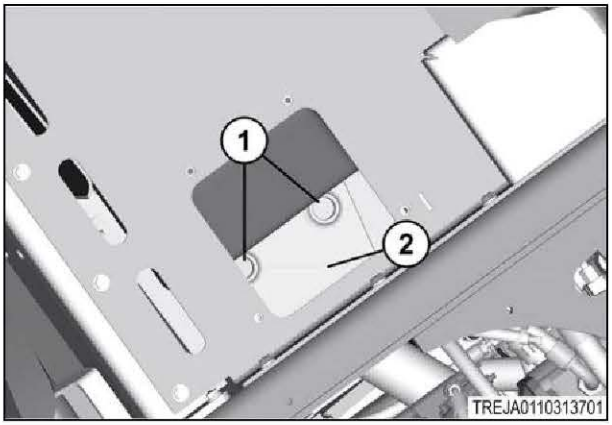

Fig. 88

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

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

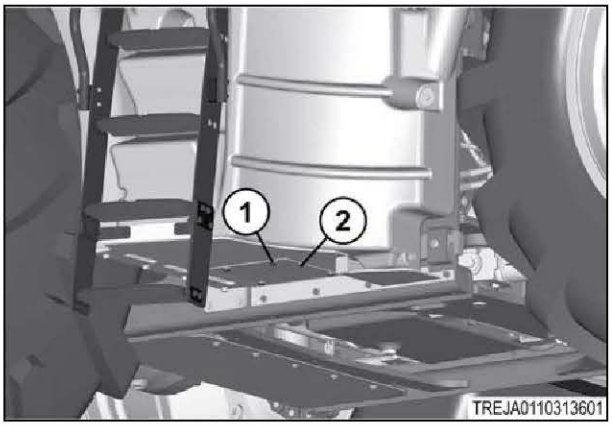

Fig. 89

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

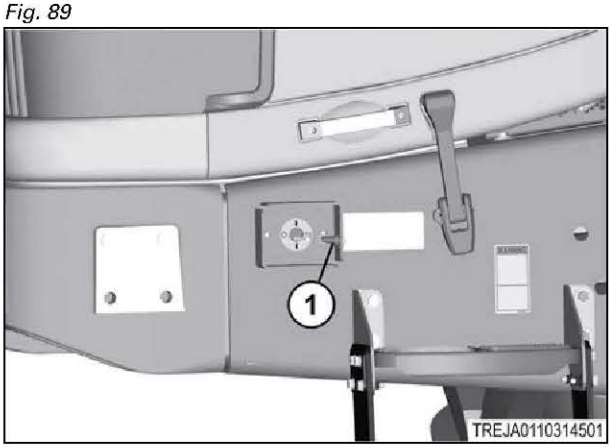

Fig. 90

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

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

14. Check for leaks. Check the hydraulic reservoir for the correct oil level.

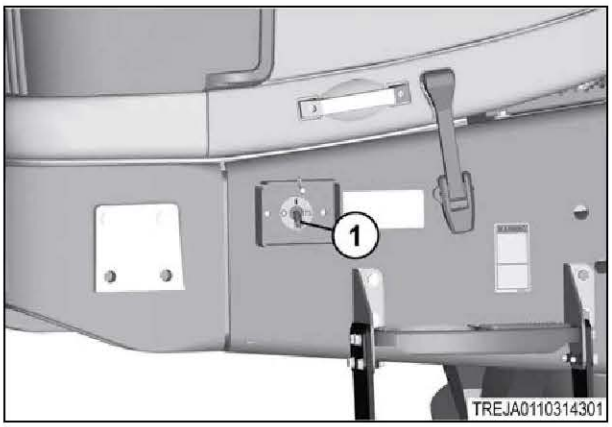

Fig. 91

Related Links

Lubricant viscosities page 1-18

9.3.5 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.

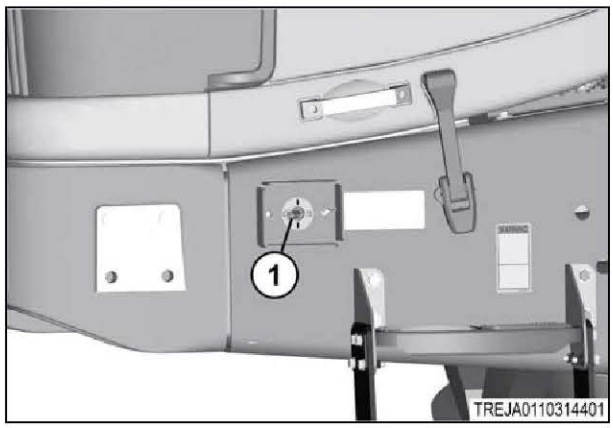

Fig. 92

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

4. Relieve all pressure from the hydraulic system.

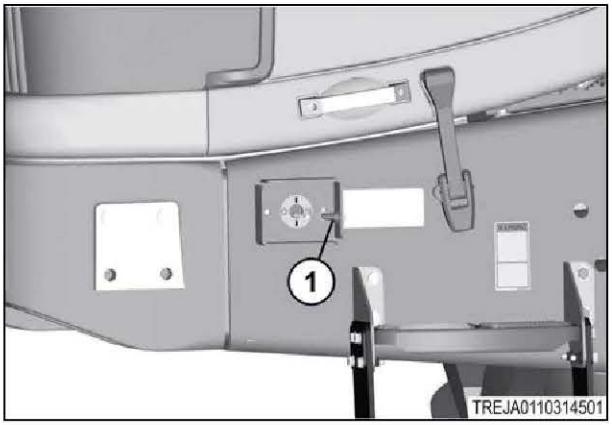

Fig. 93

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

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

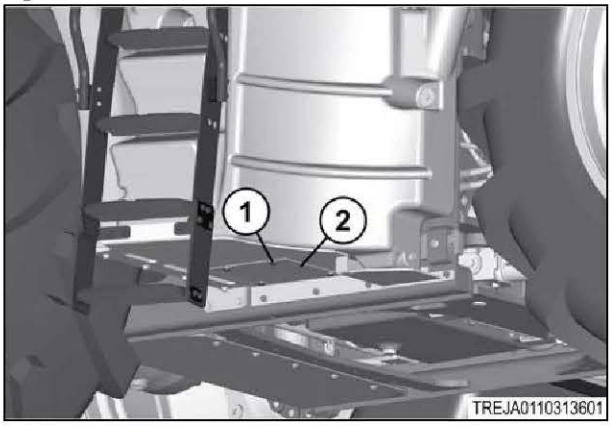

Fig. 94

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.

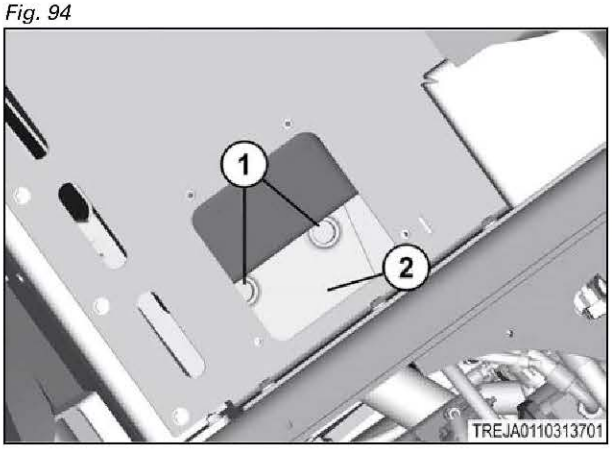

Fig. 95

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).

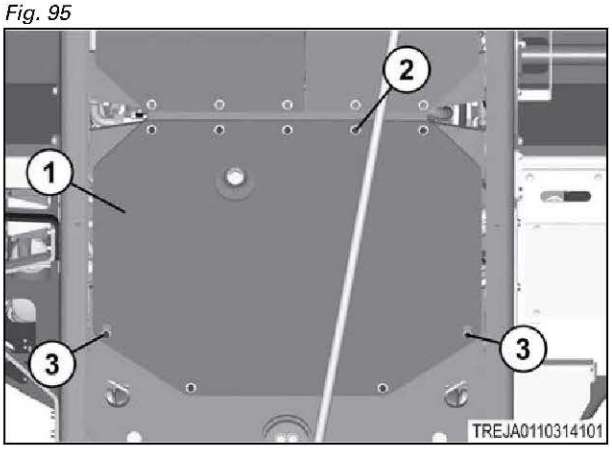

Fig. 96

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.

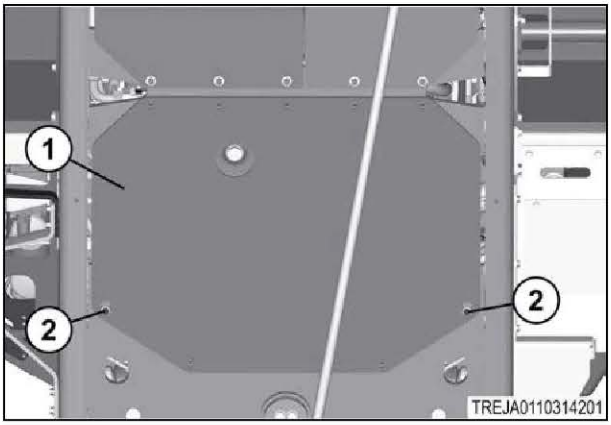

Fig. 97

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

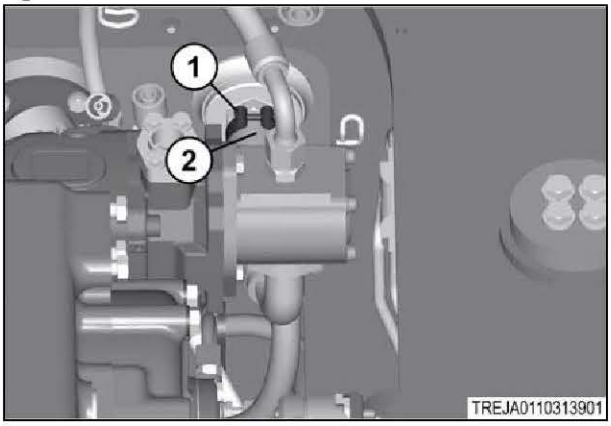

Fig. 98

16. Disconnect the hydraulic hose (1).

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

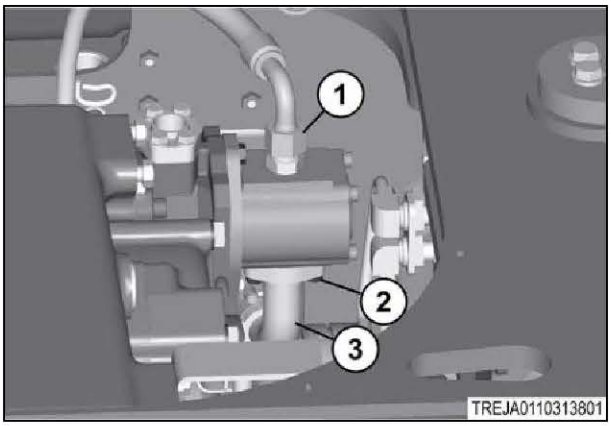

Fig. 99

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

19. Remove the O-ring.

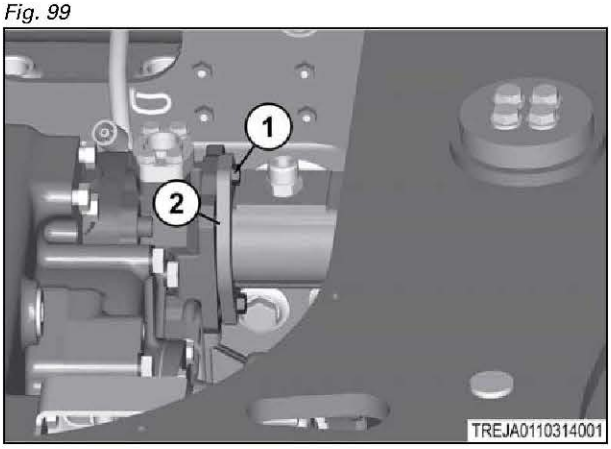

Fig. 100

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

21. Remove the hose (3).

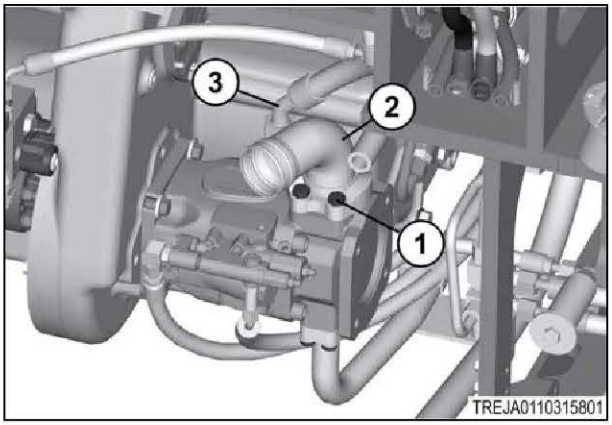

Fig. 101

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

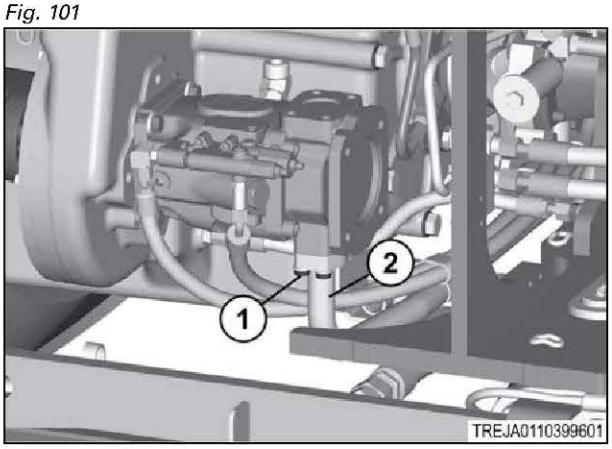

Fig. 102

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).

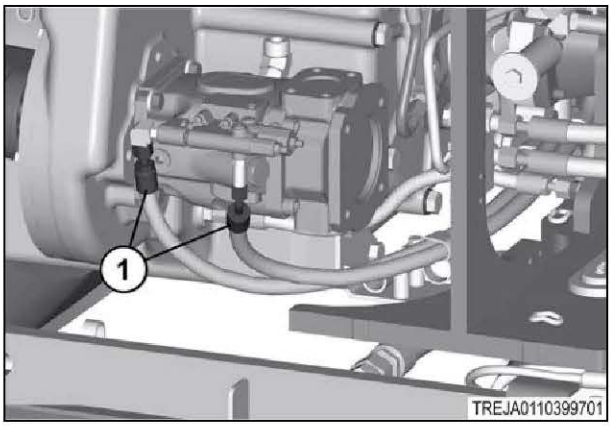

Fig. 103

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

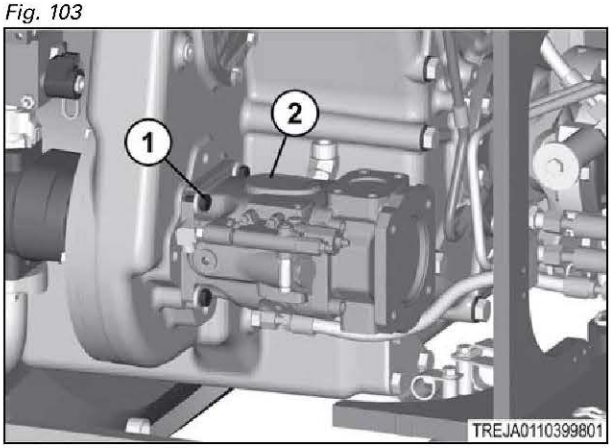

Fig. 104

9.3.6 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).

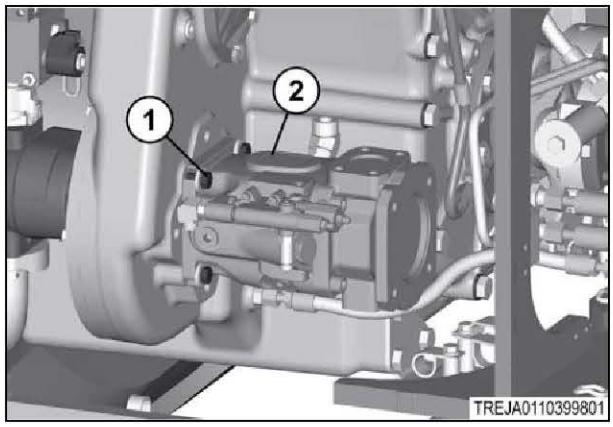

Fig. 105

6. Connect the hydraulic hoses (1).

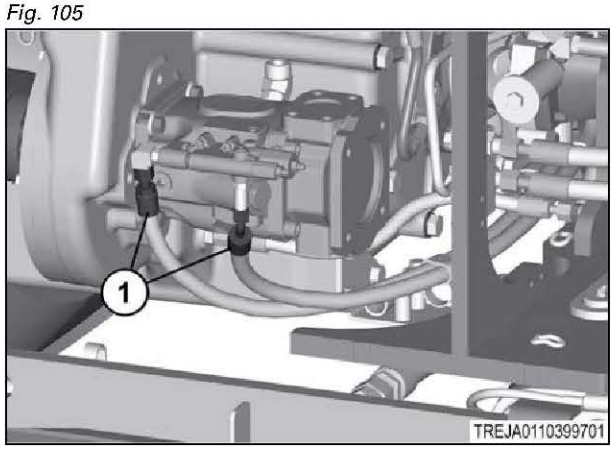

Fig. 106

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

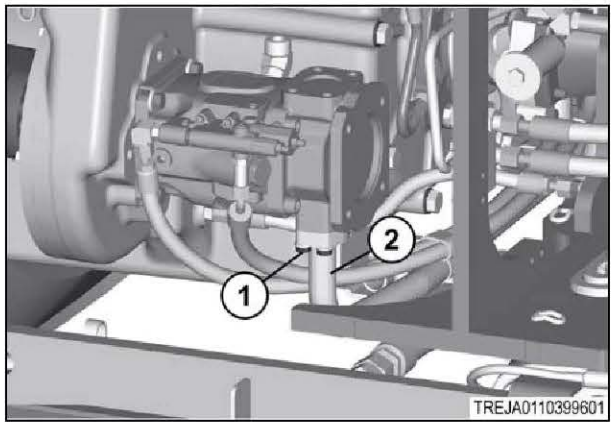

Fig. 107

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

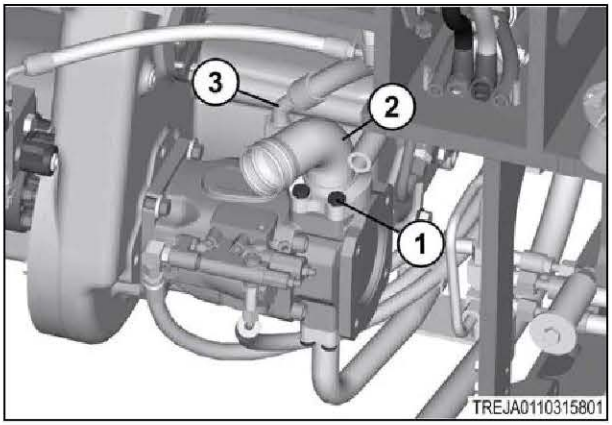

Fig. 108

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).

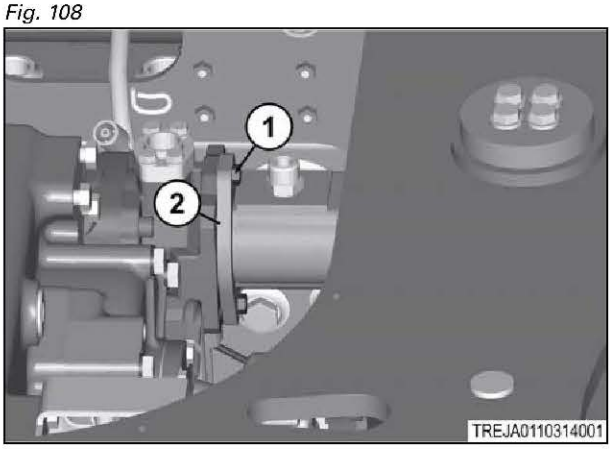

Fig. 109

14. Connect the hydraulic hose (1).
15. Connect the hose fitting (3), with the hardware (2).

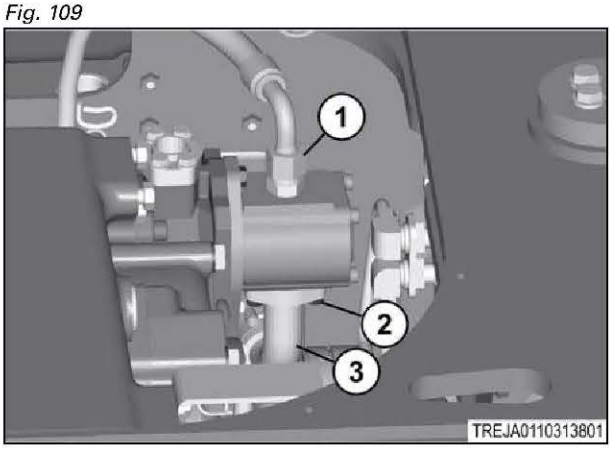

Fig. 110

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

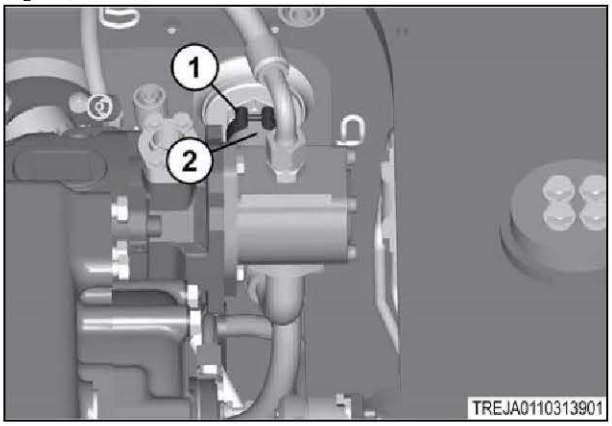

Fig. 111

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).

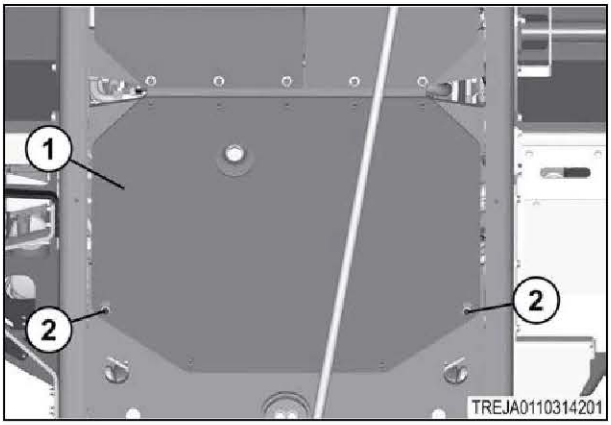

Fig. 112

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).

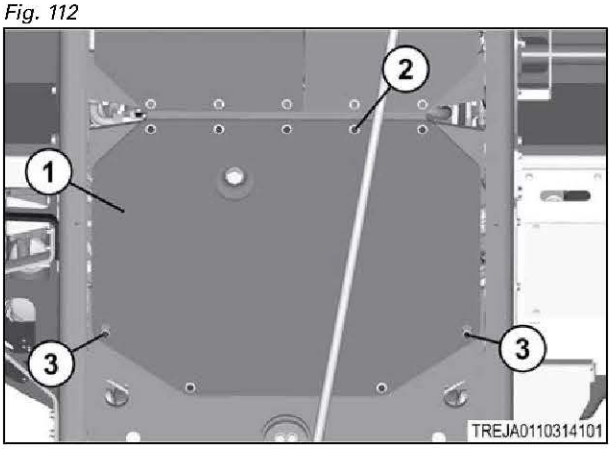

Fig. 113

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.

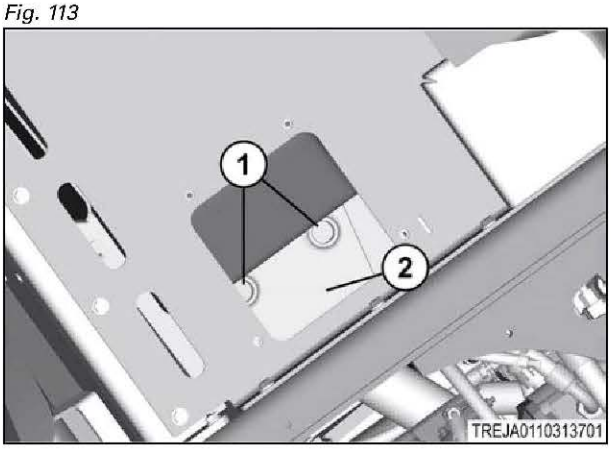

Fig. 114

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

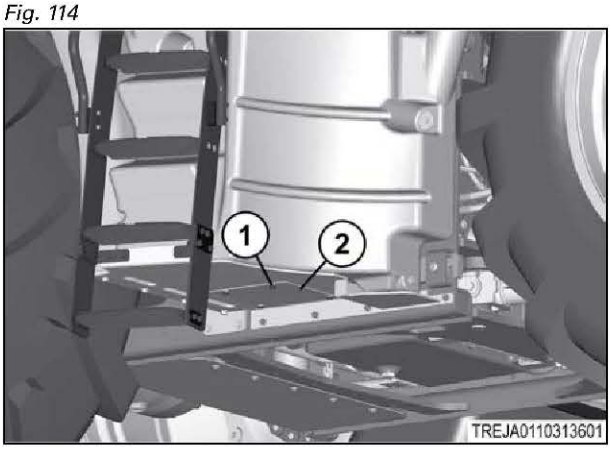

Fig. 115

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

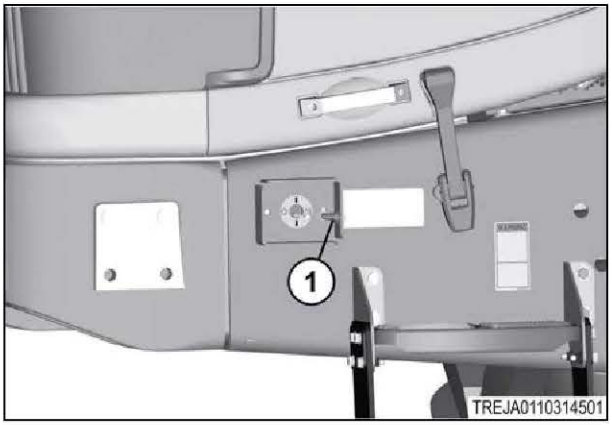

Fig. 116

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.

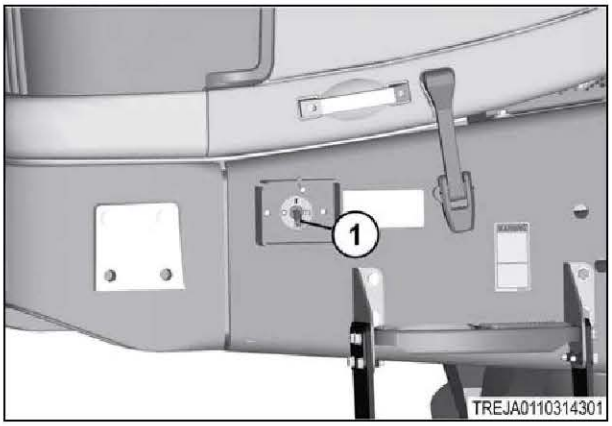

Fig. 117

27. Check for leaks.

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

Related Links

Lubricant viscosities page 1-18

9.3.7 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.

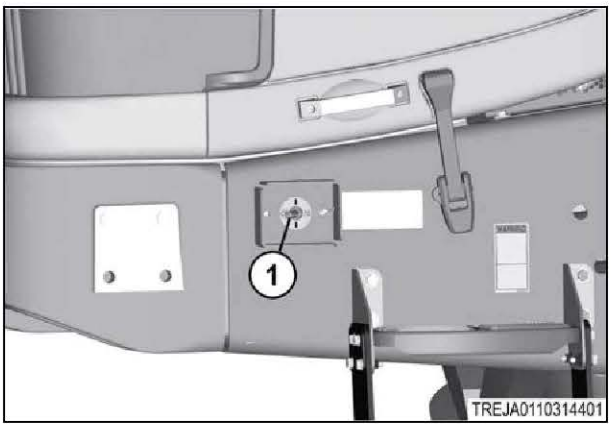

Fig. 118

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

4. Relieve all pressure from the hydraulic system.

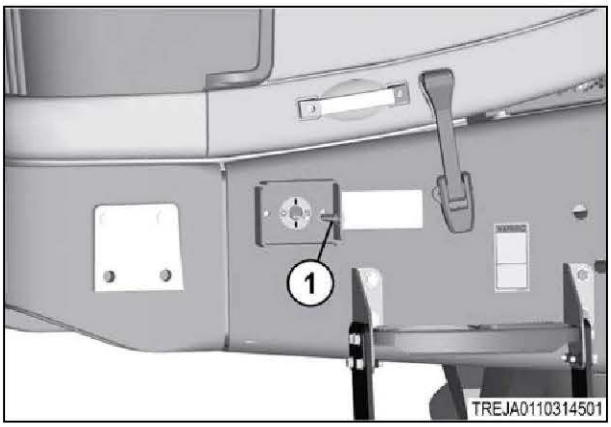

Fig. 119

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

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

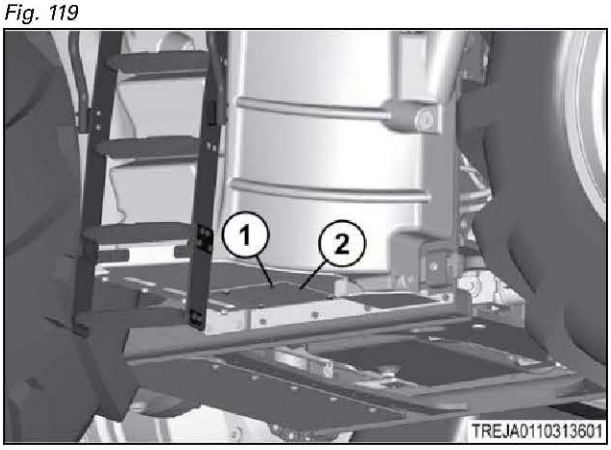

Fig. 120

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.

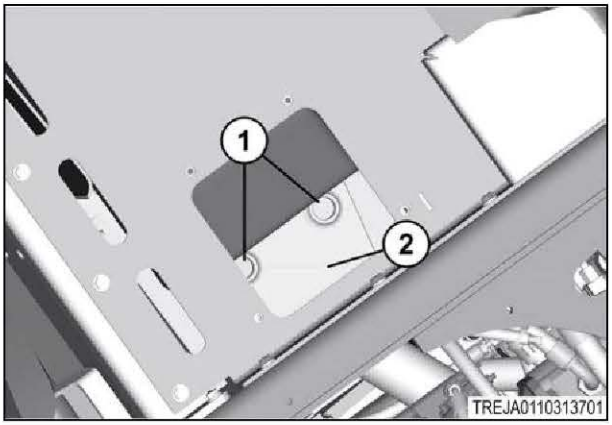

Fig. 121

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).

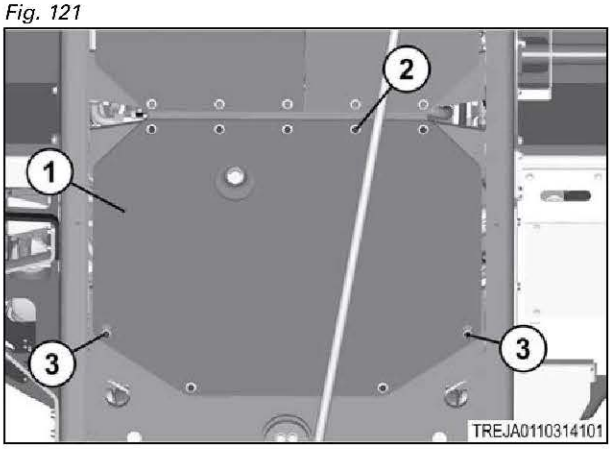

Fig. 122

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.

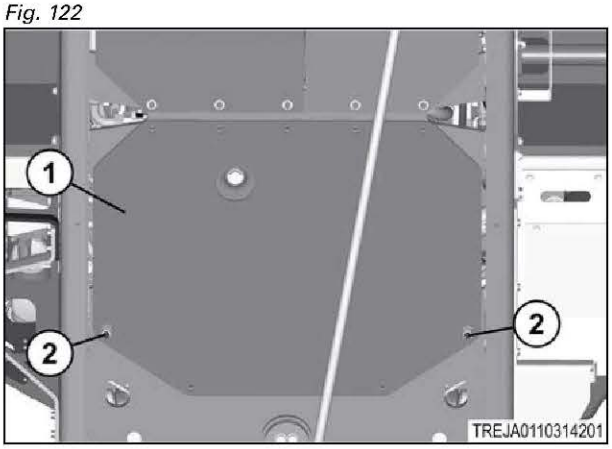

Fig. 123

15. Disconnect the hydraulic hoses (1).

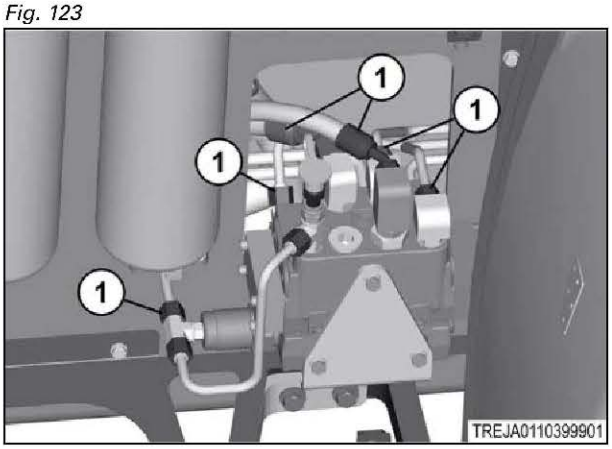

Fig. 124

16. Disconnect the hydraulic hoses (1).

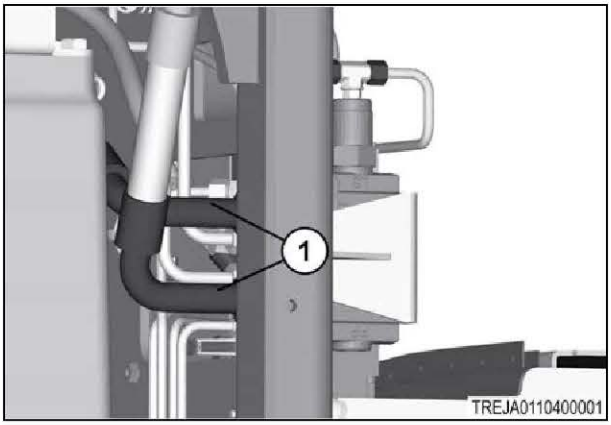

Fig. 125

17. Disconnect the hydraulic hoses (1).

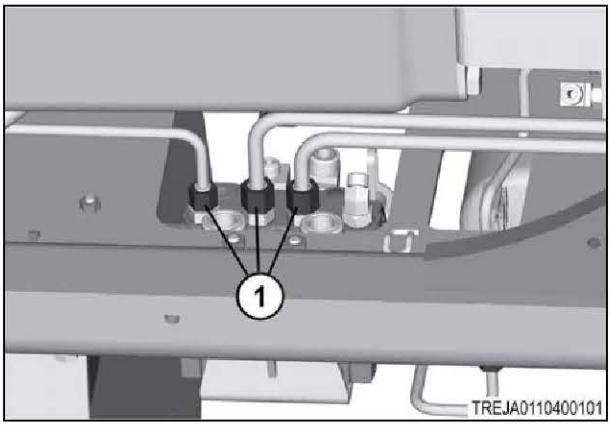

Fig. 126

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

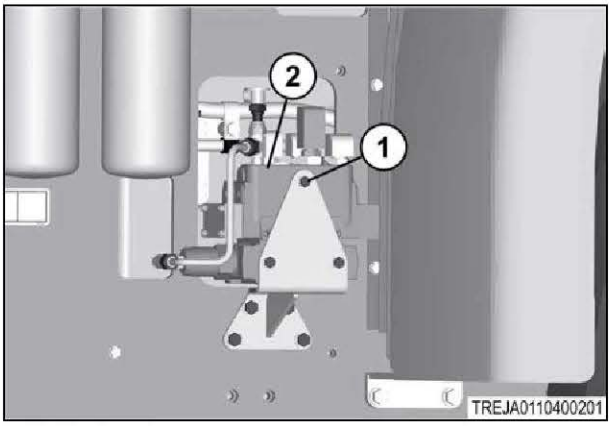

Fig. 127

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

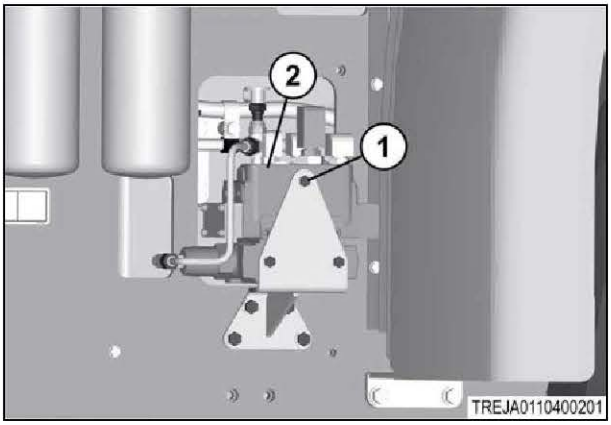

Fig. 128

9.3.8 Install the steering and priority valve

Procedure

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

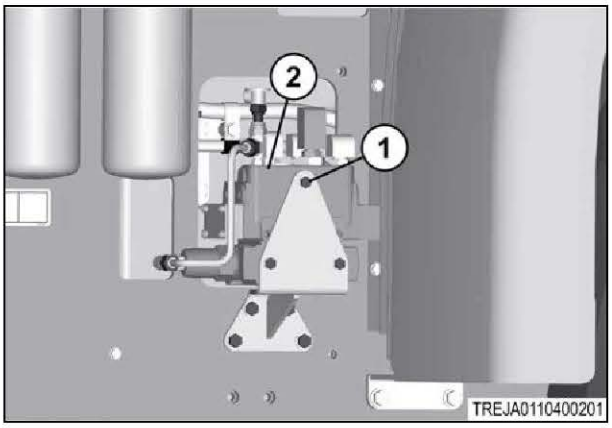

Fig. 129

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

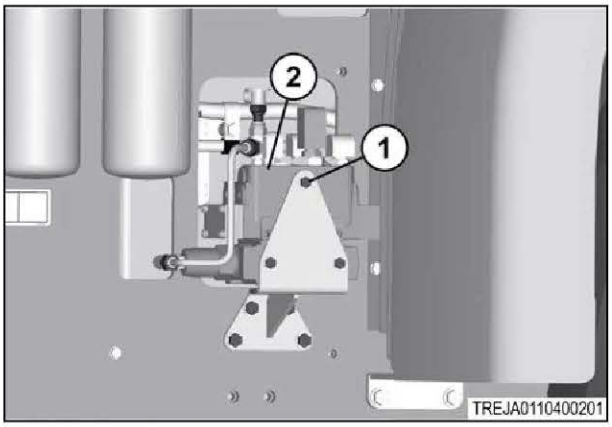

Fig. 130

3. Connect the hydraulic hoses (1).

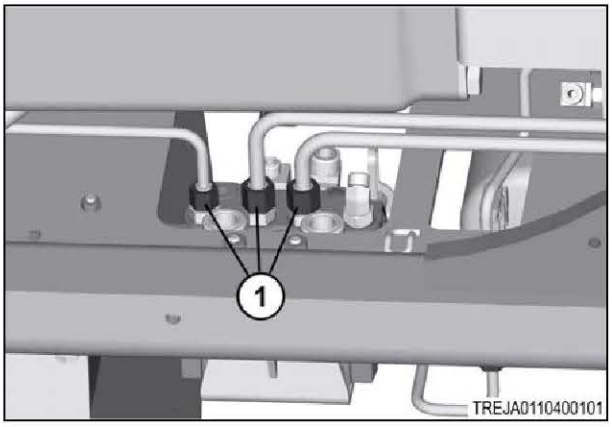

Fig. 131

4. Connect the hydraulic hoses (1).

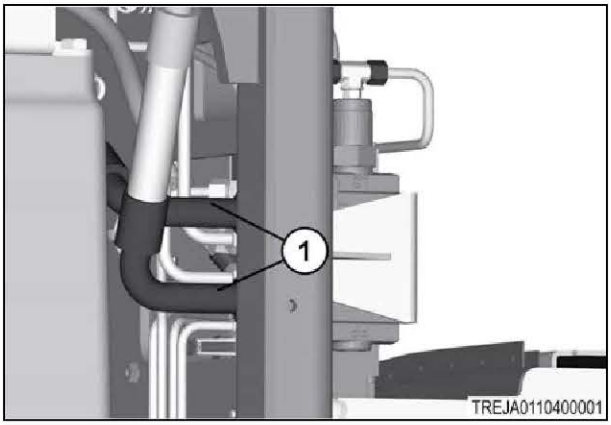

Fig. 132

5. Connect the hydraulic hoses (1).

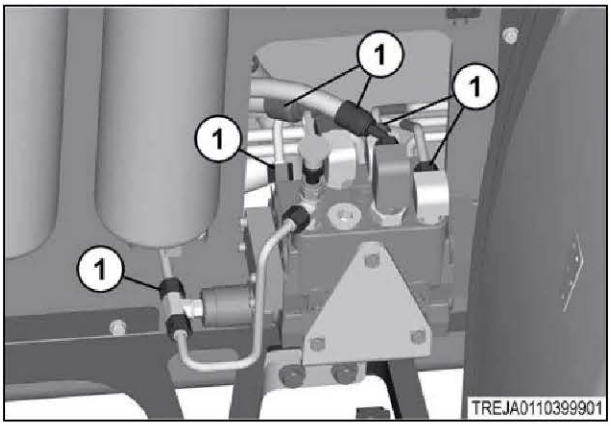

Fig. 133

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.

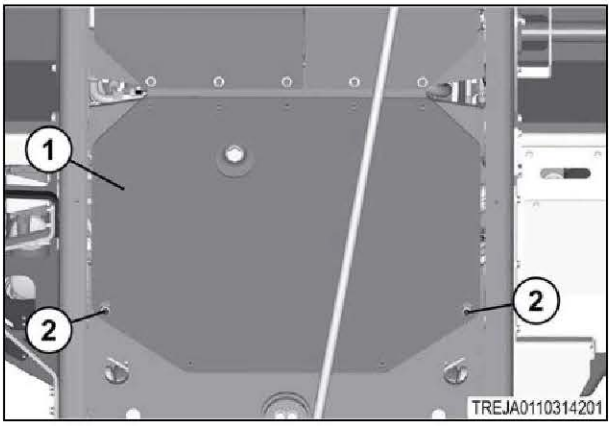

Fig. 134

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

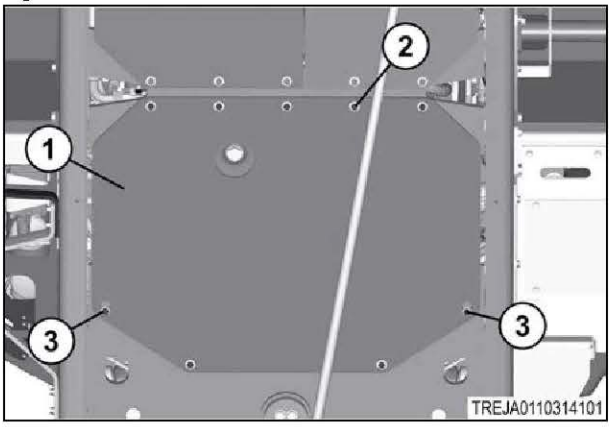

Fig. 135

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.

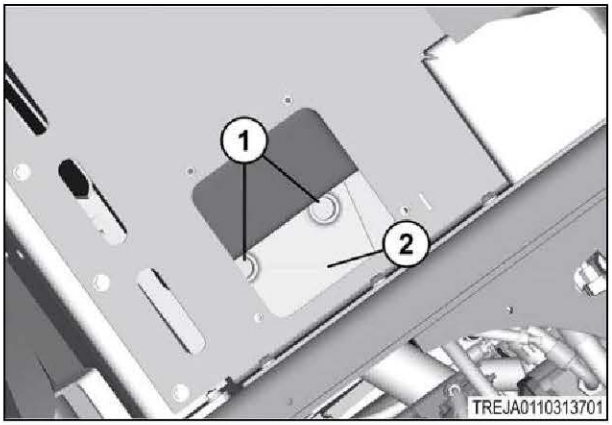

Fig. 136

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

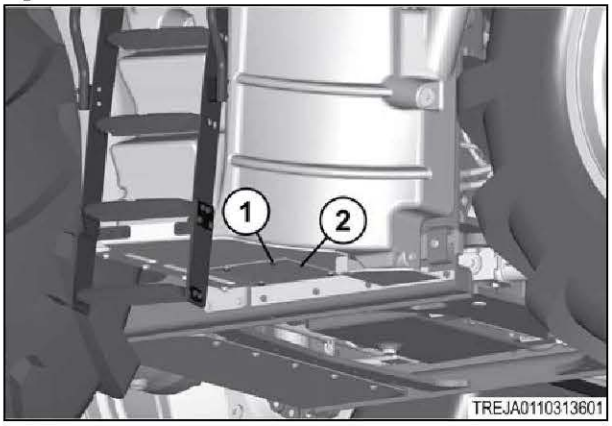

Fig. 137

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

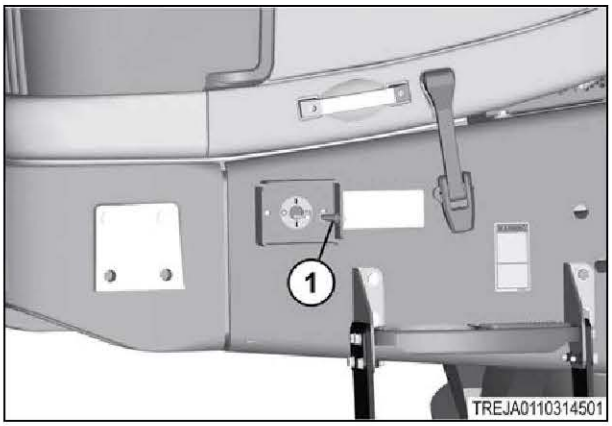

Fig. 138

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.

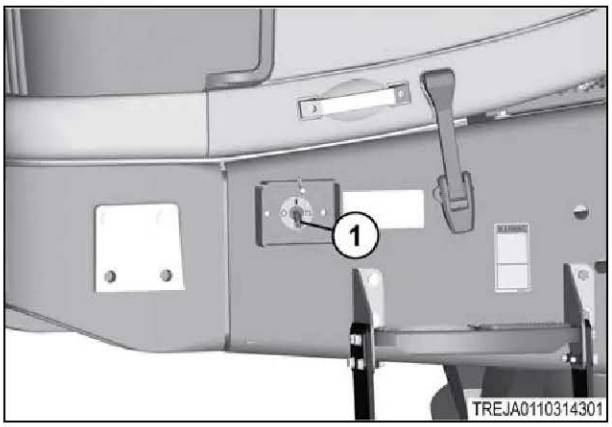

Fig. 139

Related Links

Lubricant viscosities page 1-18

9.3.9 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.

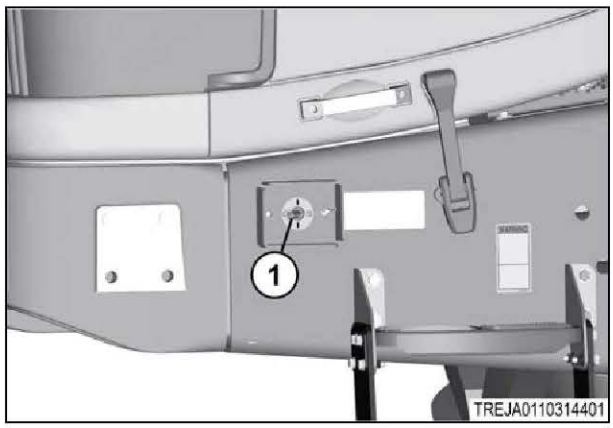

Fig. 140

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

4. Relieve all pressure from the hydraulic system.

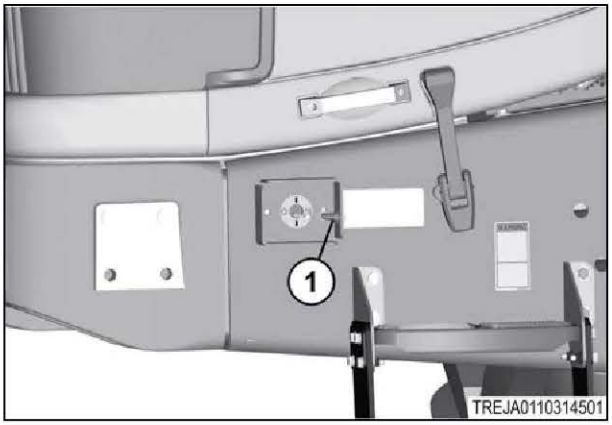

Fig. 141

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

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

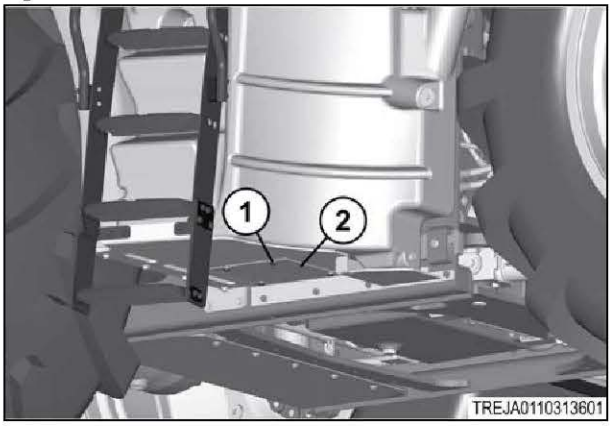

Fig. 142

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.

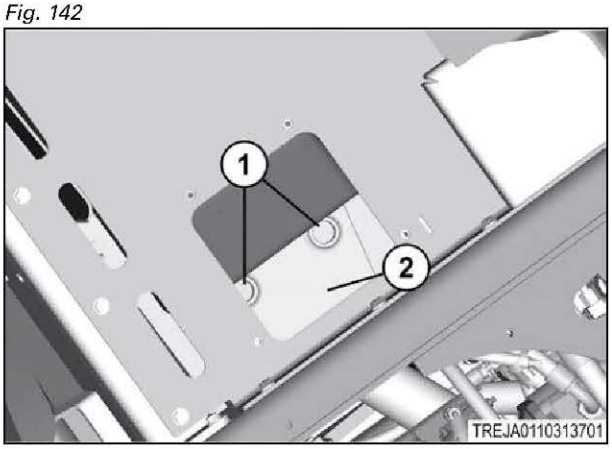

Fig. 143

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).

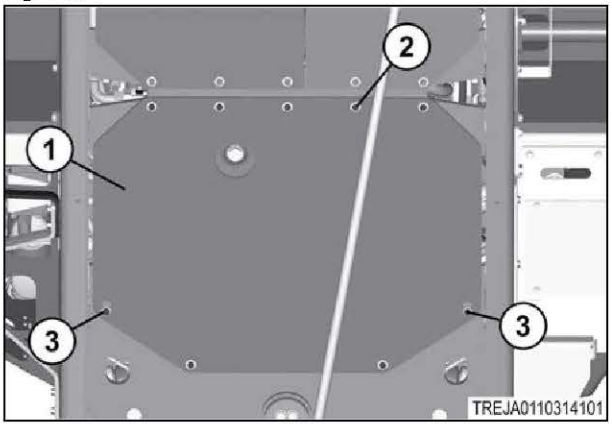

Fig. 144

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

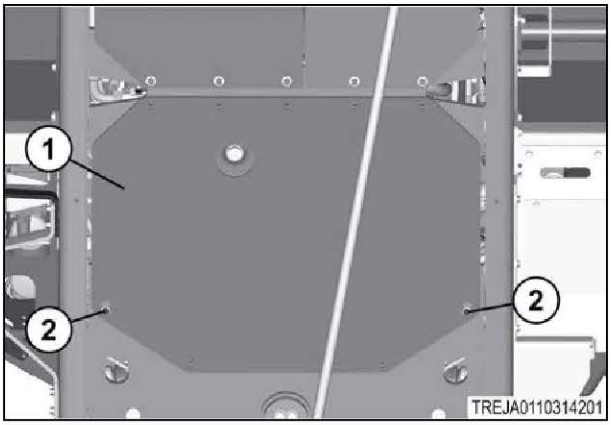

Fig. 145

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

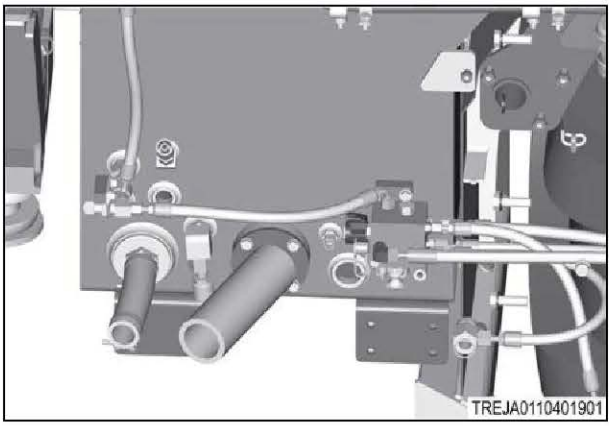

Fig. 146

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.

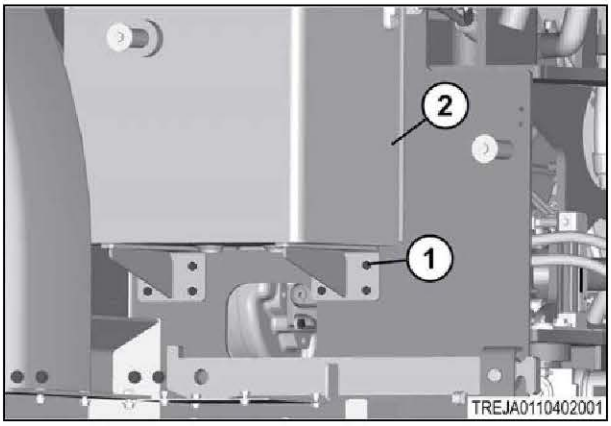

Fig. 147

9.3.10 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.

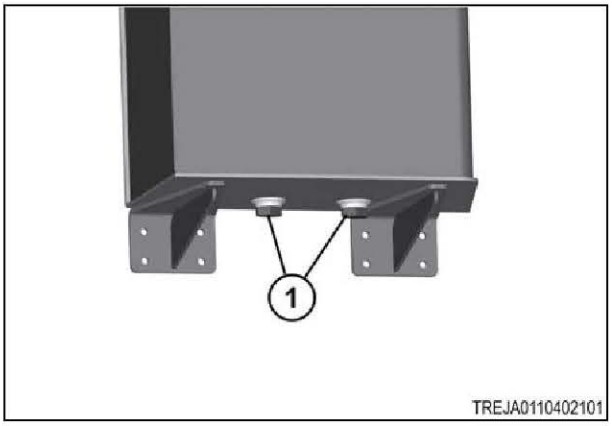

Fig. 148

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

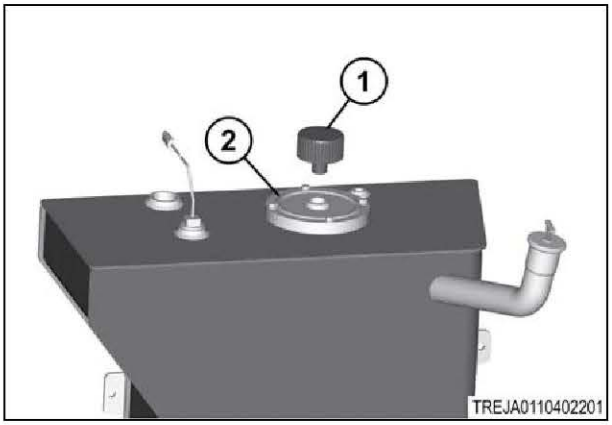

Fig. 149

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

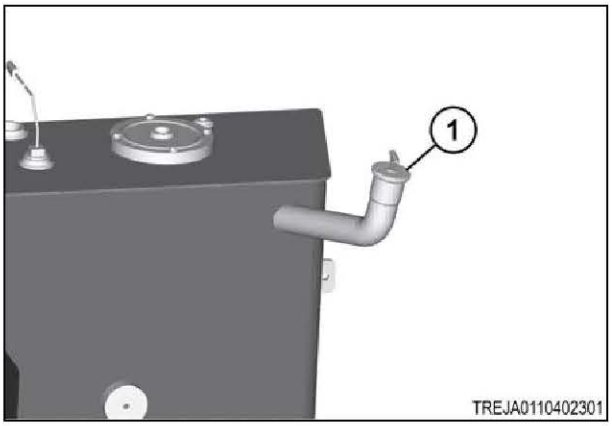

Fig. 150

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

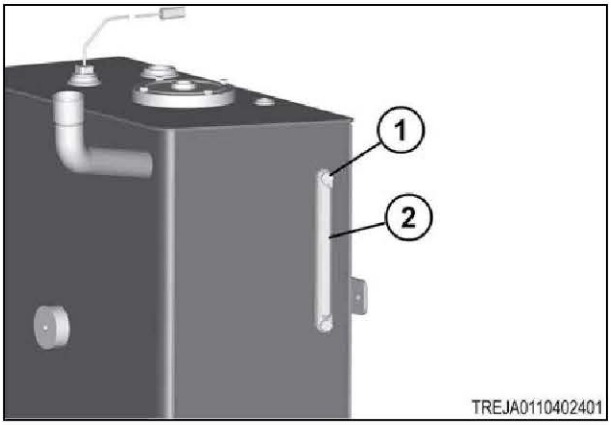

Fig. 151

5. Remove the oil level switch (1).

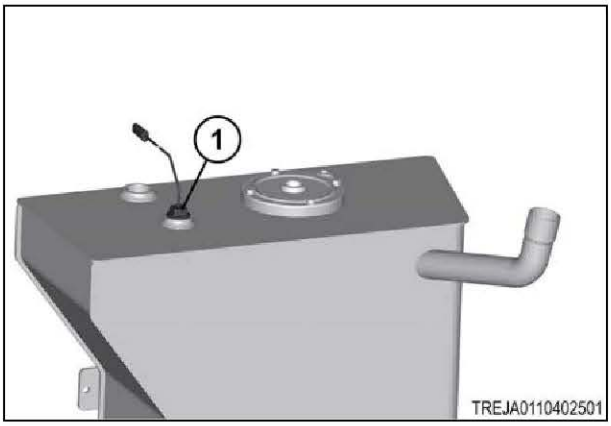

Fig. 152

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

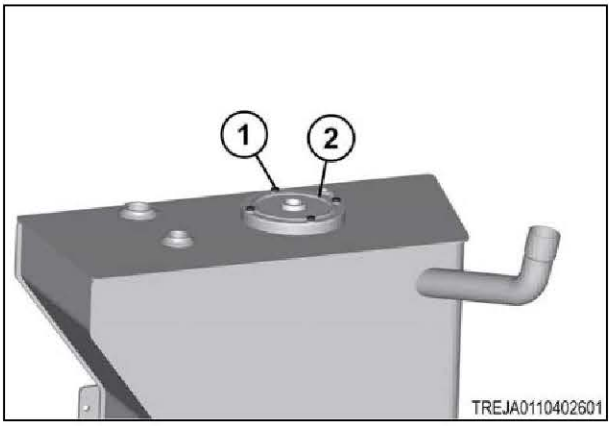

Fig. 153

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

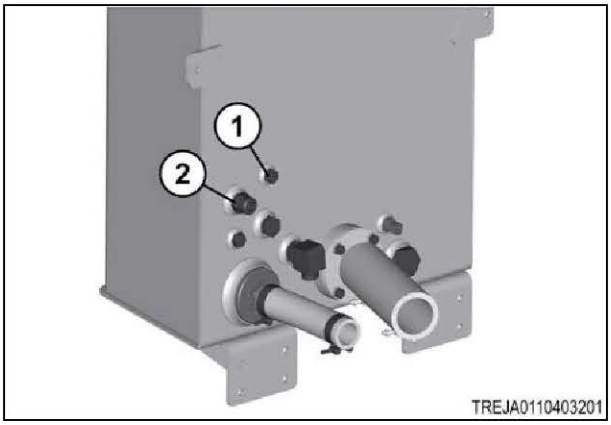

Fig. 154

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

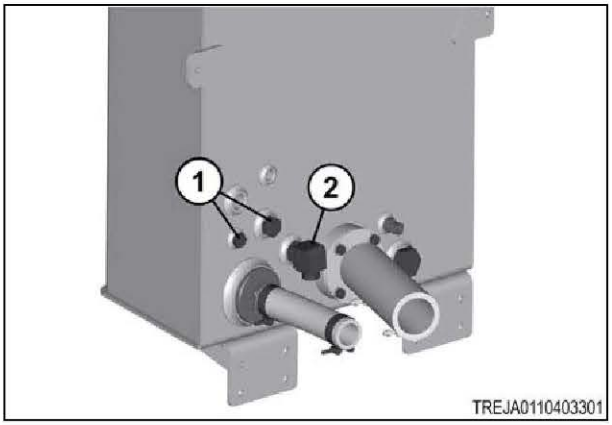

Fig. 155

9. Remove the plug (1).

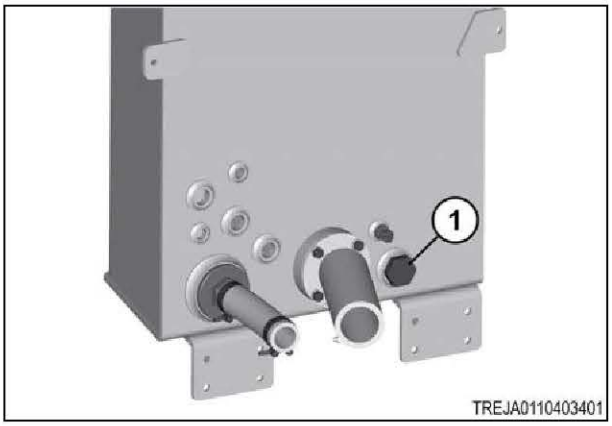

Fig. 156

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

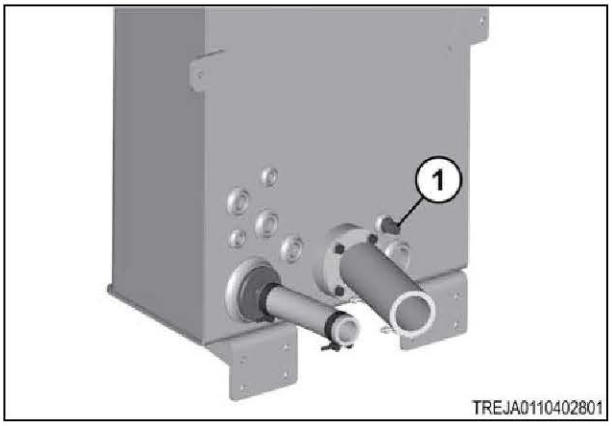

Fig. 157

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

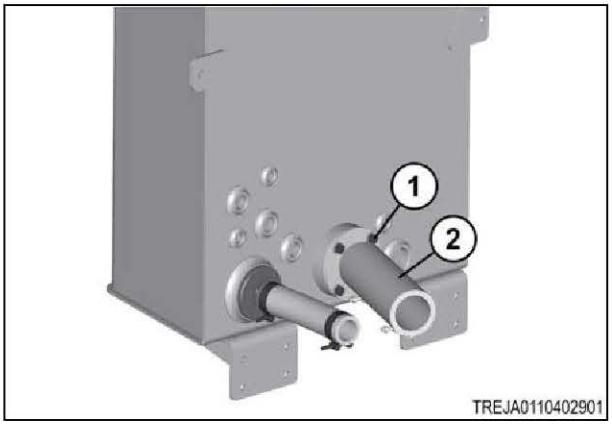

Fig. 158

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

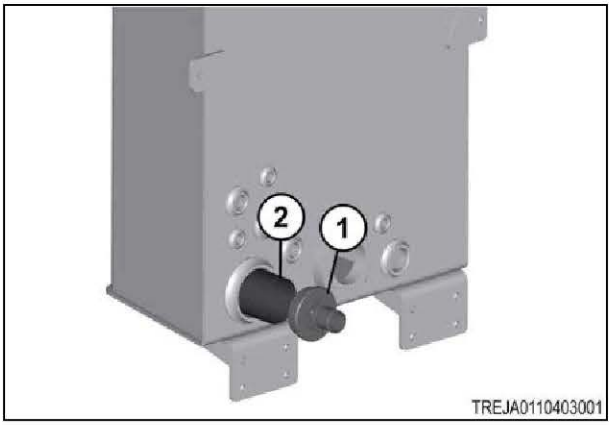

Fig. 159

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

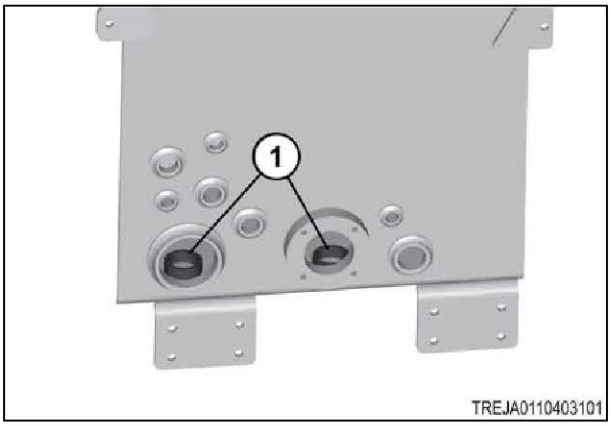

Fig. 160

9.3.11 Assemble the hydraulic oil reservoir

Procedure

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

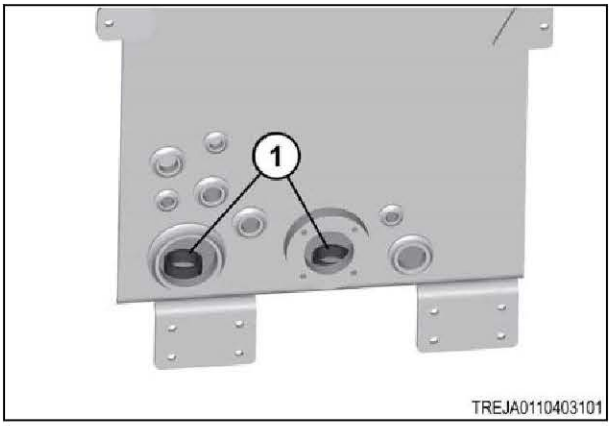

Fig. 161

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

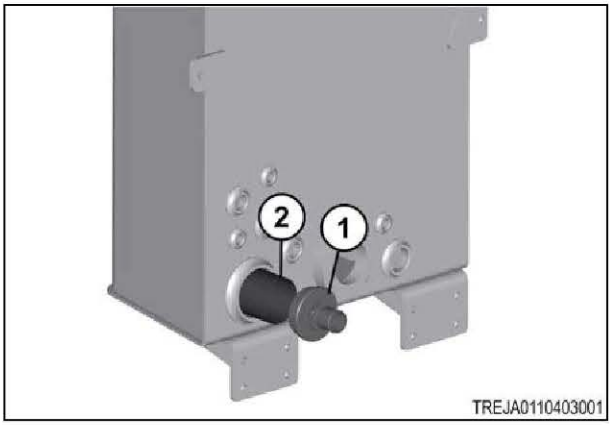

Fig. 162

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

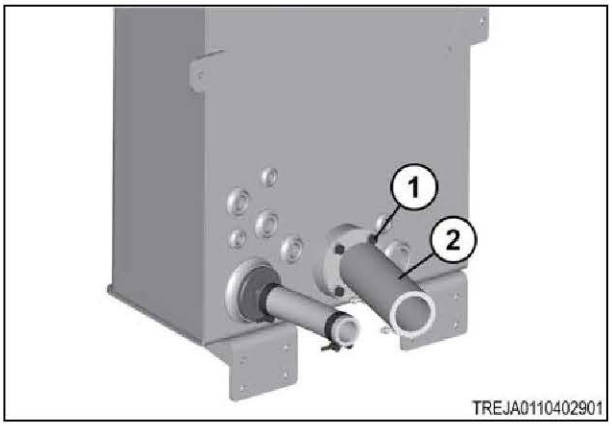

Fig. 163

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).

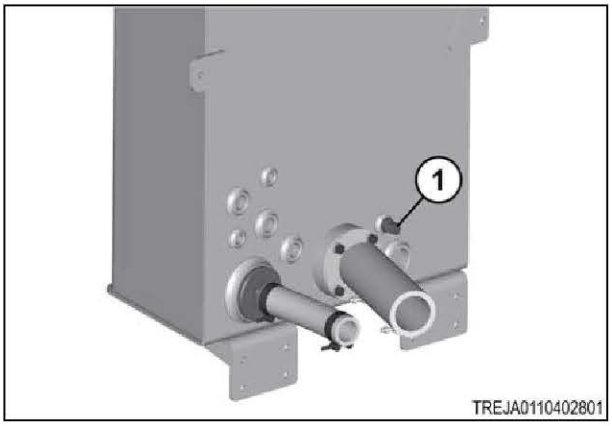

Fig. 164

6. Install the plug (1).

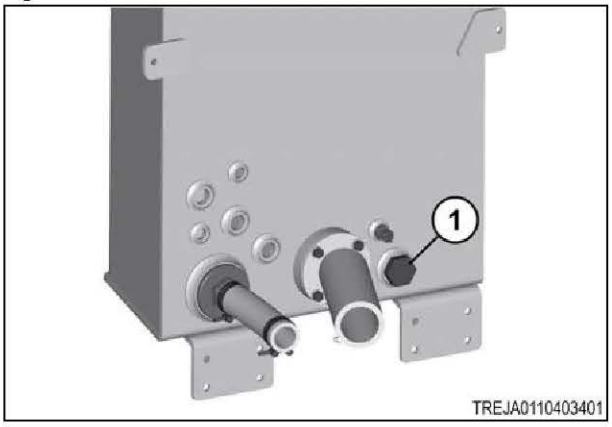

Fig. 165

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

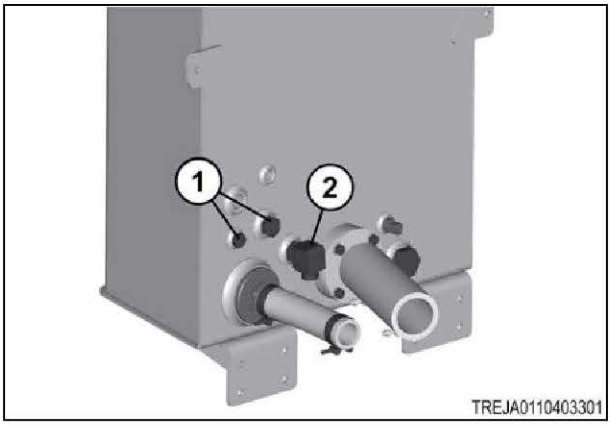

Fig. 166

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).

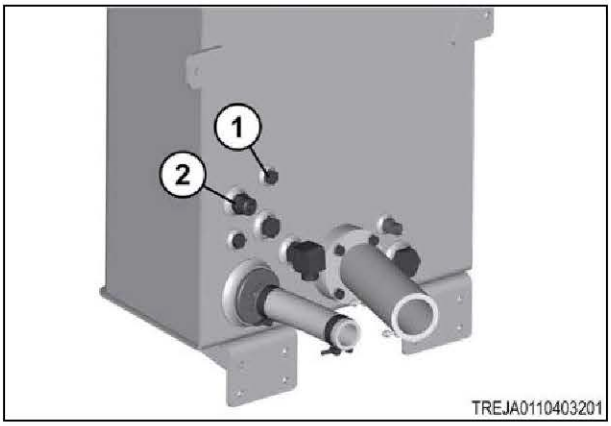

Fig. 167

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

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

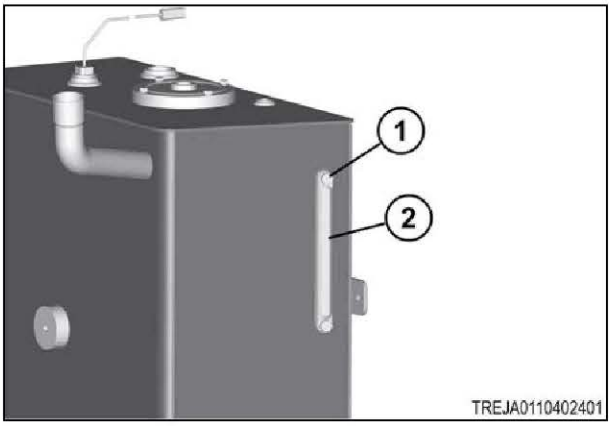

Fig. 168

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).

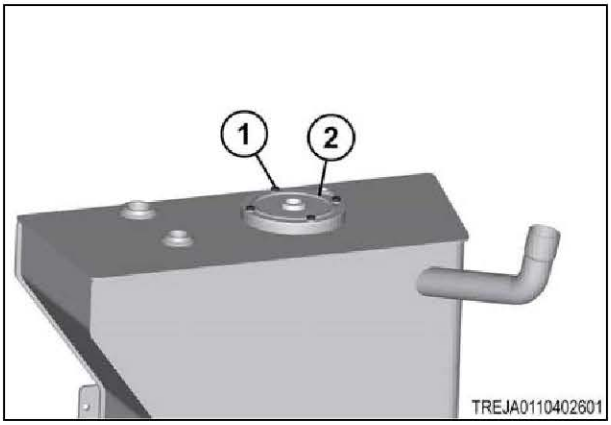

Fig. 169

11. Install the oil level switch (1).
Tighten the switch to 48 Nm (35 lbf ft).

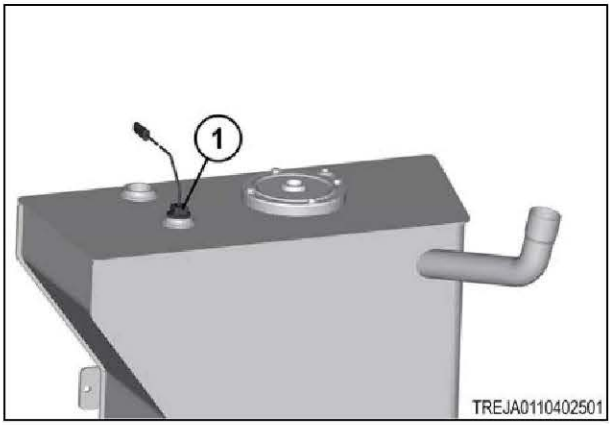

Fig. 170

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

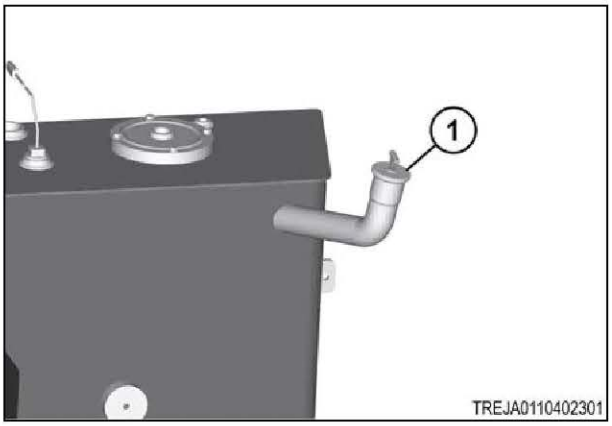

Fig. 171

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

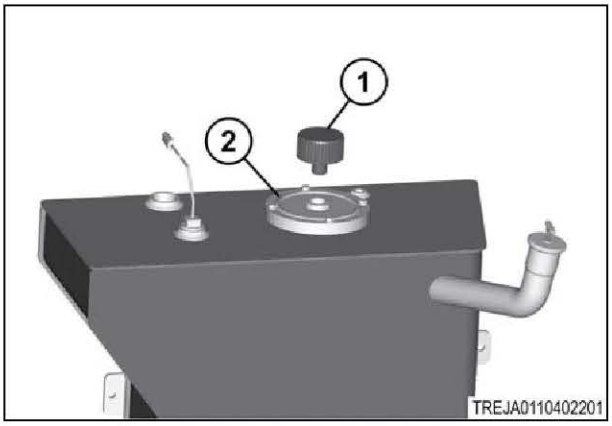

Fig. 172

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).

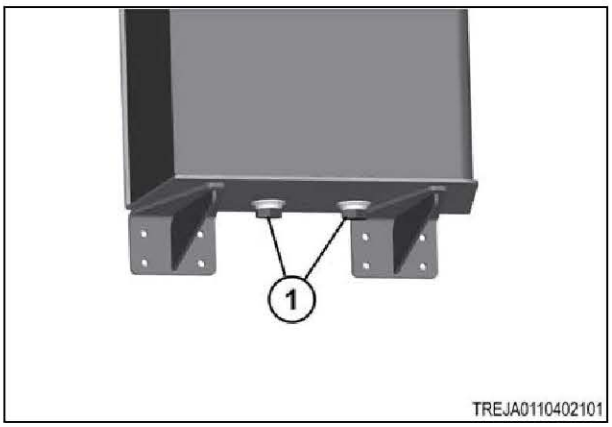

Fig. 173

9.3.12 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).

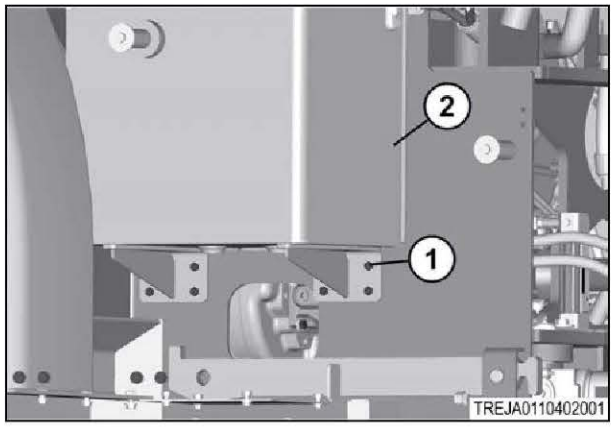

Fig. 174

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

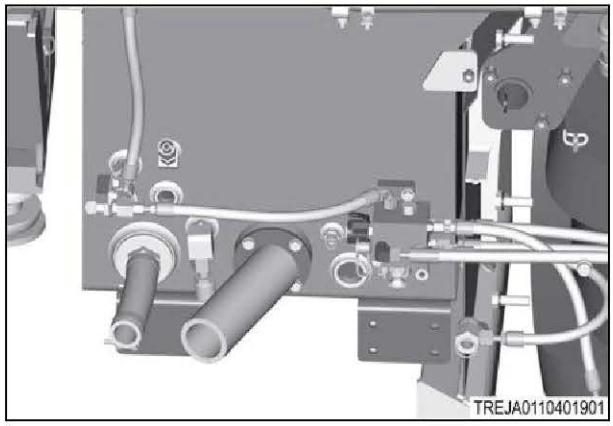

Fig. 175

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).

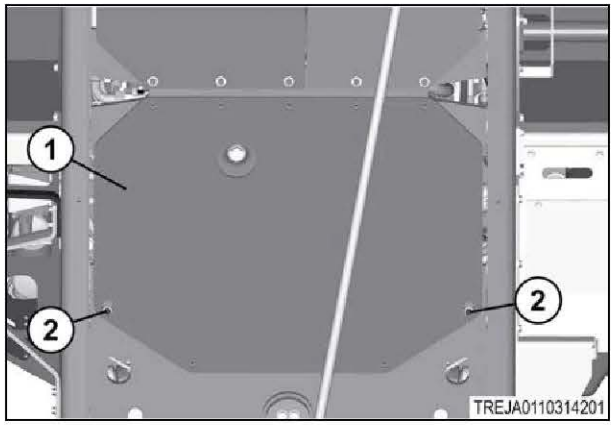

Fig. 176

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

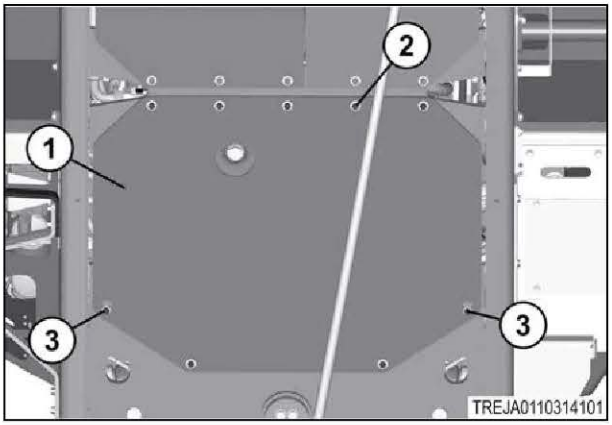

Fig. 177

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

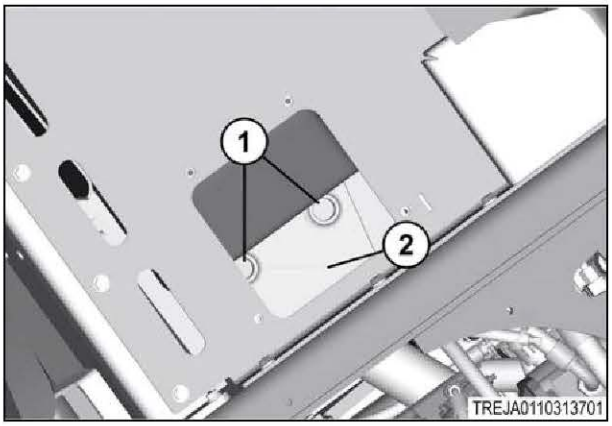

Fig. 178

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

8. Fill the hydraulic oil reservoir with hydraulic oil.

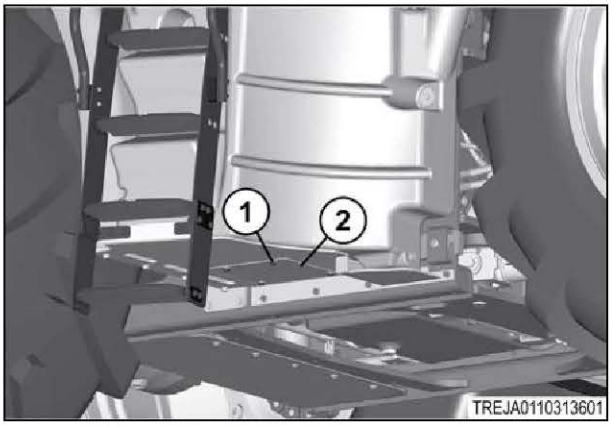

Fig. 179

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

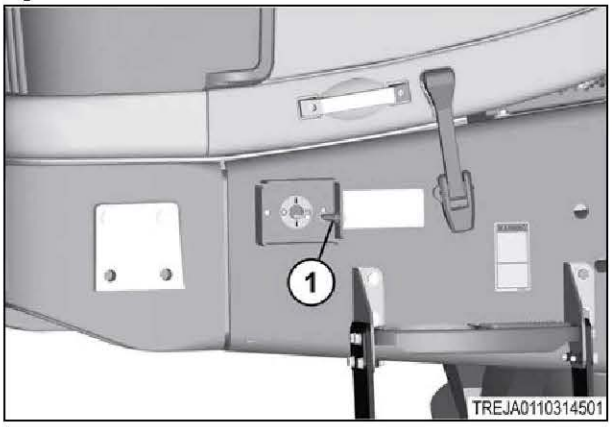

Fig. 180

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.

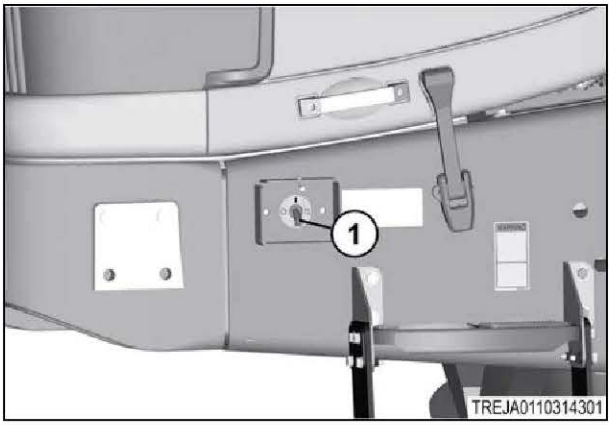

Fig. 181

Related Links

Lubricant viscosities page 1-18

9.3.13 Remove the hydraulic oil filter manifold (steering - implement)

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.

NOTE:
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.

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

NOTE:
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.

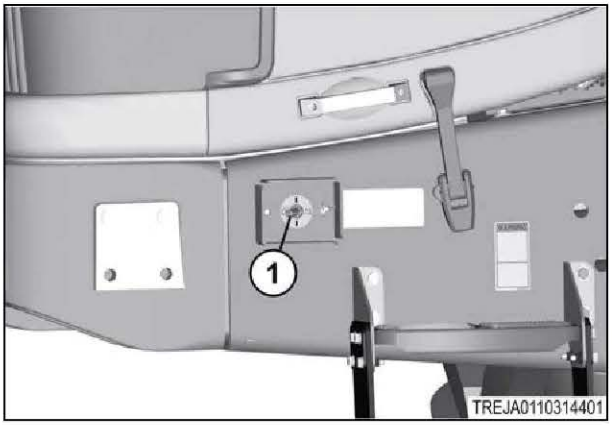

Fig. 182

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

4. Relieve all pressure from the hydraulic system.

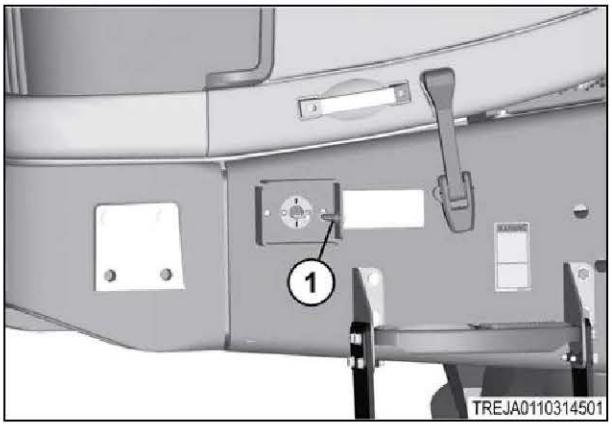

Fig. 183

5. If the machine is equipped with a transmission guard (1), remove the hardware (2), and loosen the hardware (3).

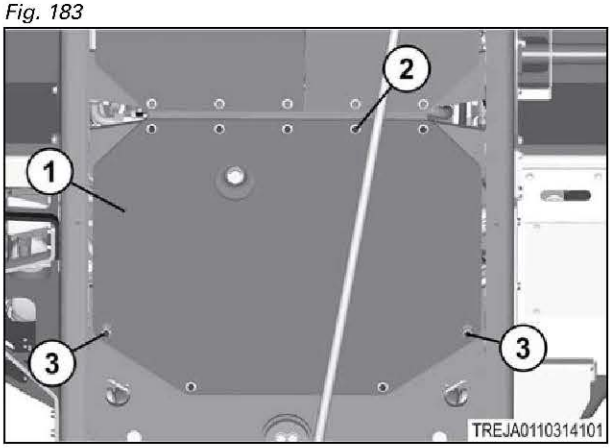

Fig. 184

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

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

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

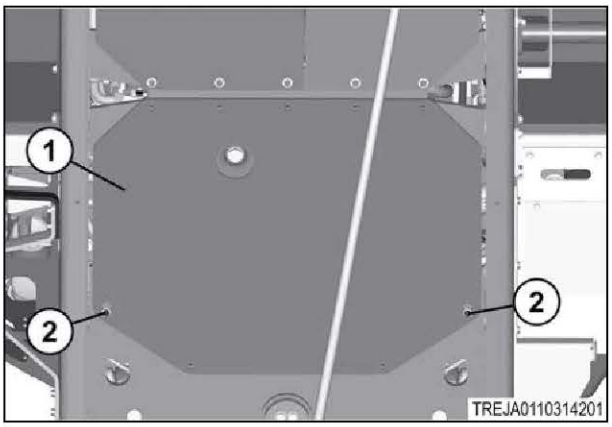

Fig. 185

8. Remove the implement cooler return hose (1).

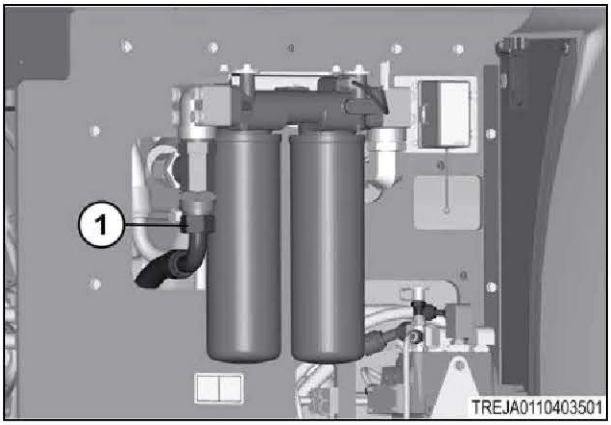

Fig. 186

9. Remove the implement valve return hose (1).

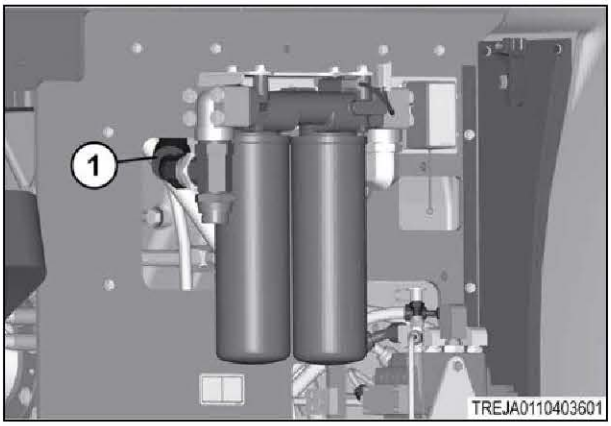

Fig. 187

10. Remove the implement filter return hose (1).

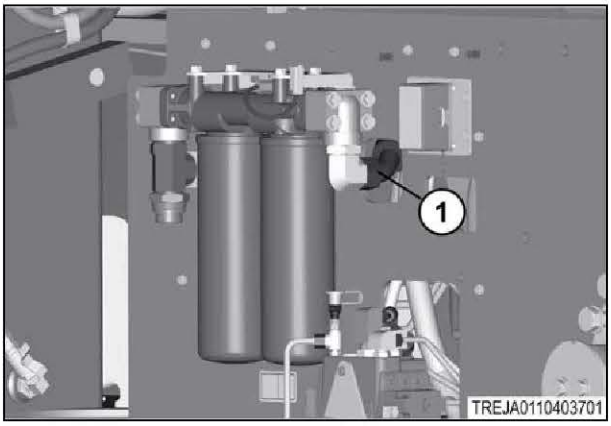

Fig. 188

11. Disconnect the pressure switch wire harness (1).

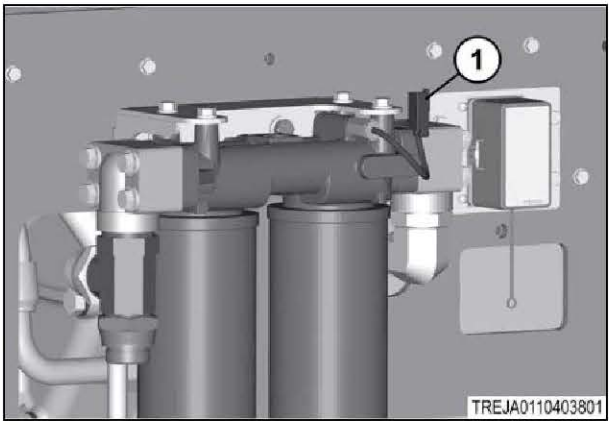

Fig. 189

12. Remove the hardware (1) and the hydraulic oil filter manifold.

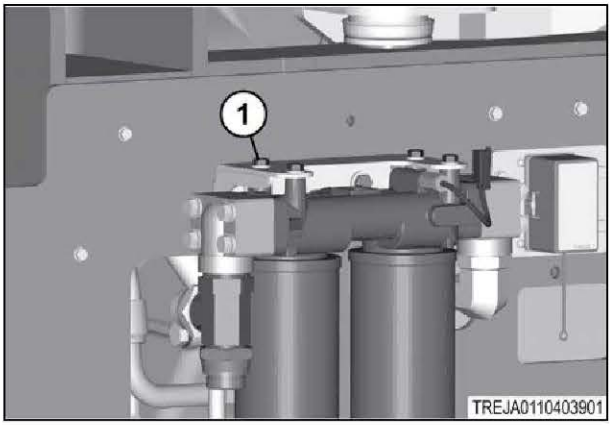

Fig. 190

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

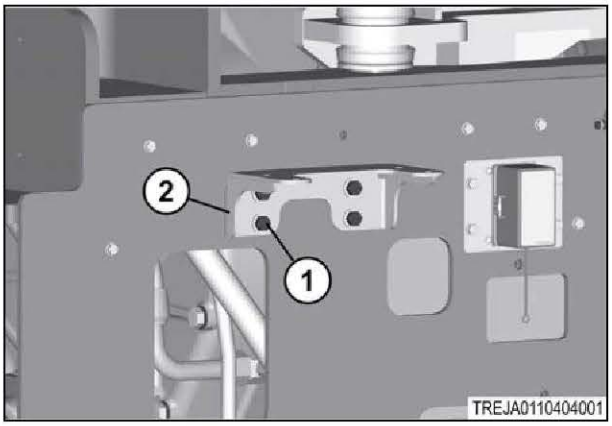

Fig. 191

9.3.14 Install the hydraulic oil filter manifold (steering - implement)

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

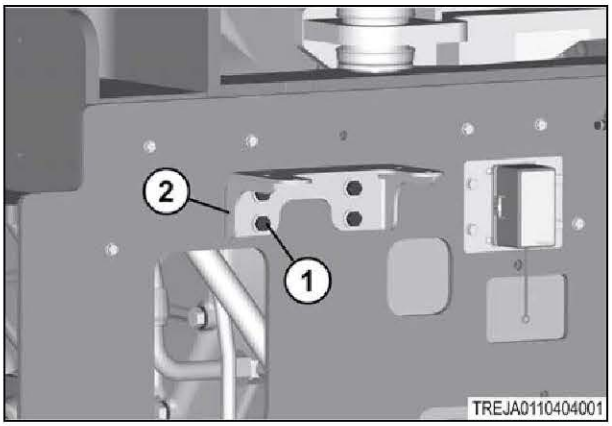

Fig. 192

2. Install the hydraulic oil filter manifold with the hardware (1).

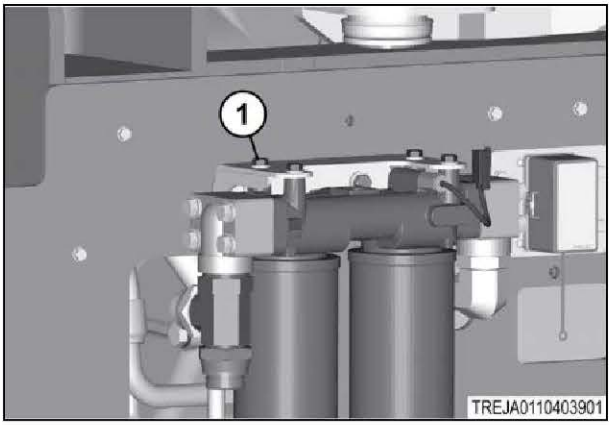

Fig. 193

3. Connect the pressure switch wire harness (1).

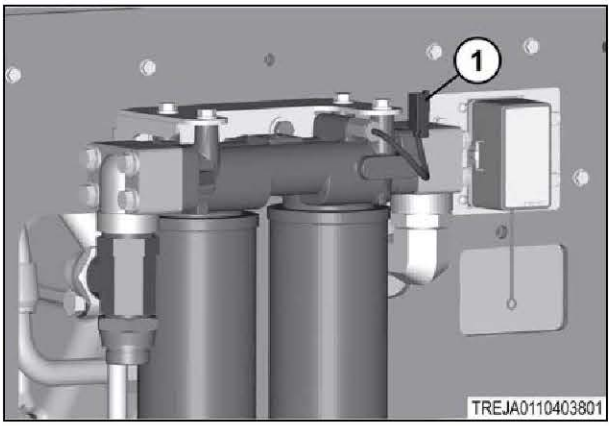

Fig. 194

4. Install the implement filter return hose (1).

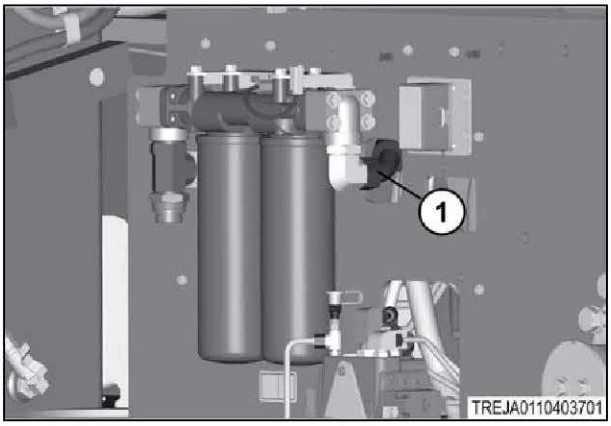

Fig. 195

5. Install the implement valve return hose (1).

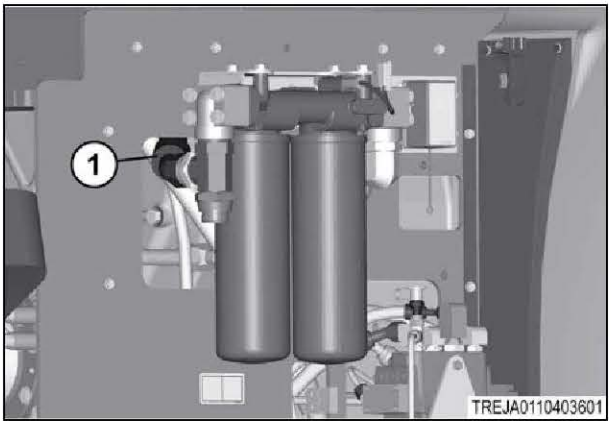

Fig. 196

6. Install the implement cooler return hose (1).

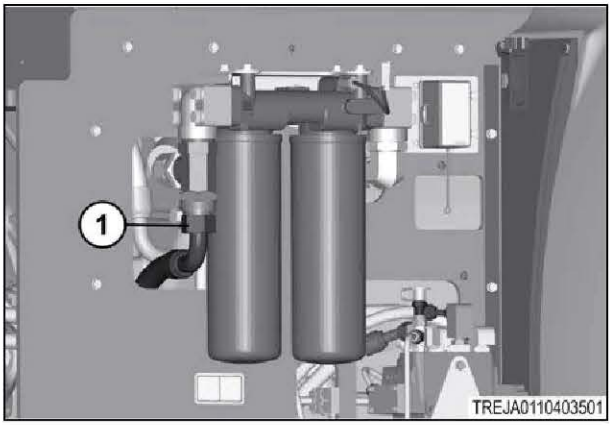

Fig. 197

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

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

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

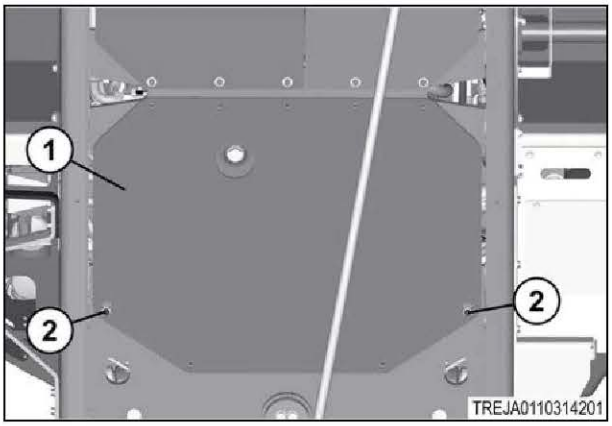

Fig. 198

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

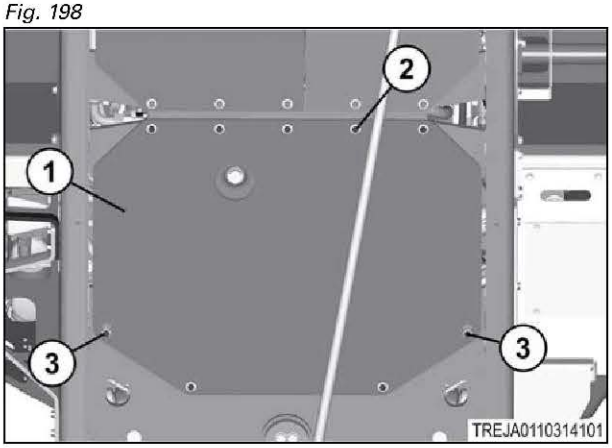

Fig. 199

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

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

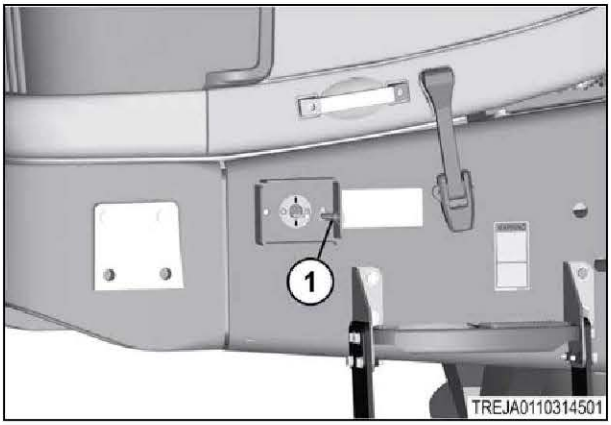

Fig. 200

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

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

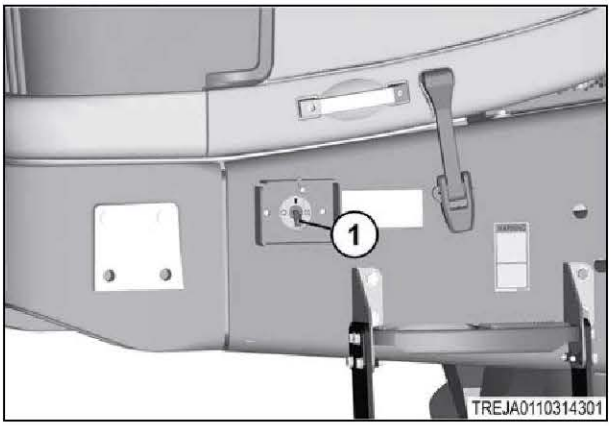

Fig. 201

9.3.15 Remove the load sense blocking 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.

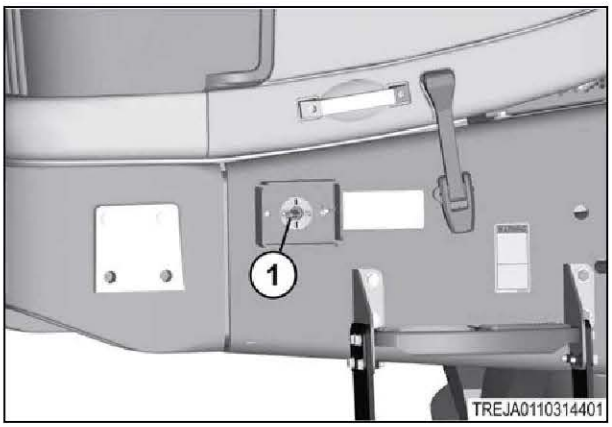

Fig. 202

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

4. Relieve all pressure from the hydraulic system.

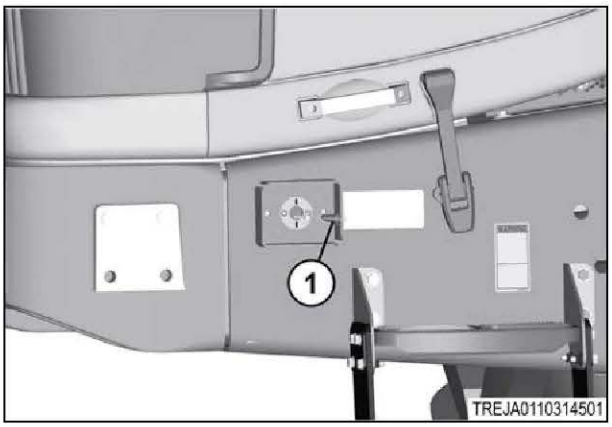

Fig. 203

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

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

6. Remove the hardware (2).

7. Loosen the hardware (3).

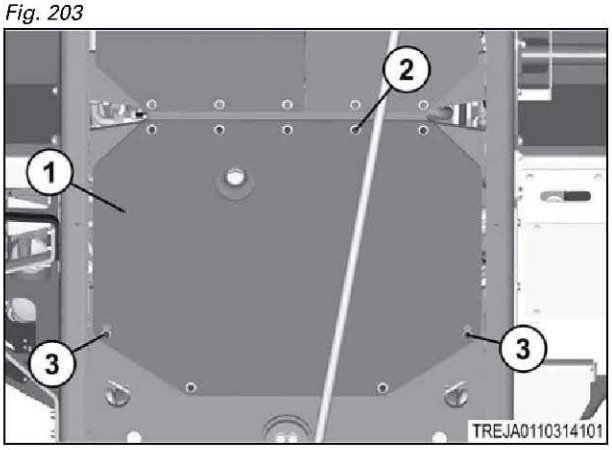

Fig. 204

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

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

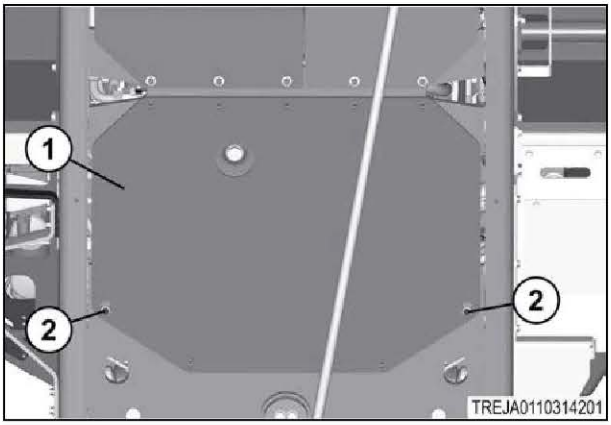

Fig. 205

10. Disconnect the wire harness (1) from the solenoid.

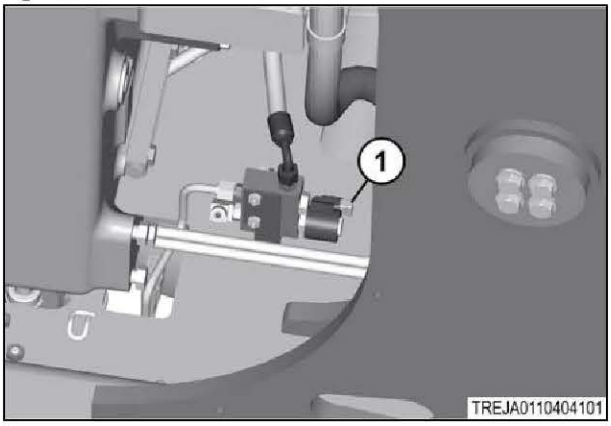

Fig. 206

11. Disconnect the steering and priority valve line (1).

12. Disconnect the pump LS hose (2) and the implement valve LS hose (3).

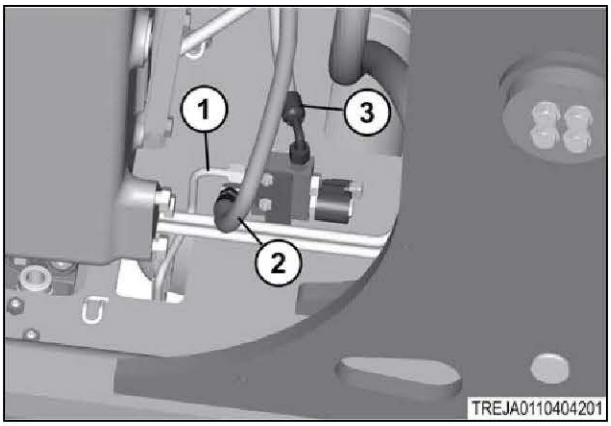

Fig. 207

13. Remove the hardware (1) and the load sense blocking valve (2).

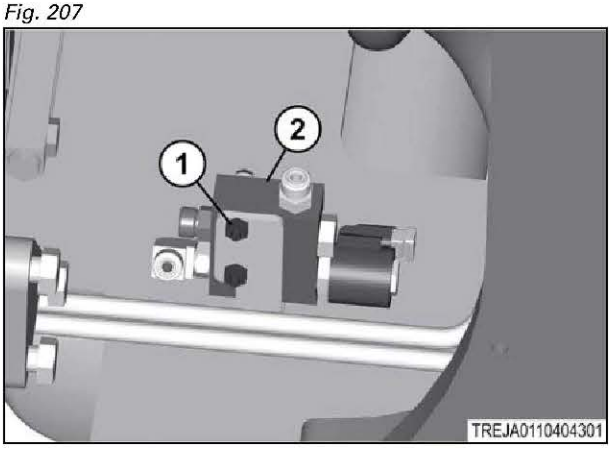

Fig. 208

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

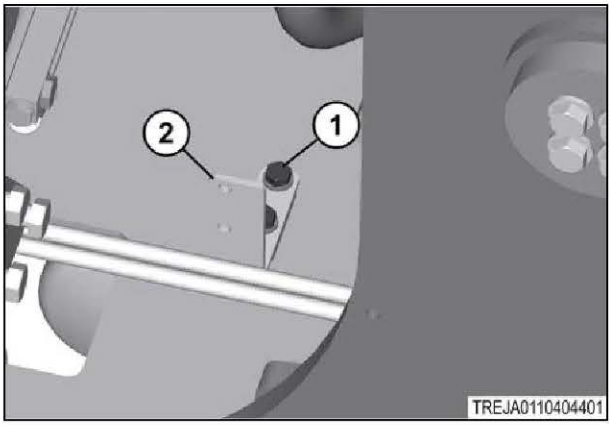

Fig. 209

9.3.16 Installing the load sense blocking valve

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

Tighten the hardware to 55 Nm (41 lbf ft).

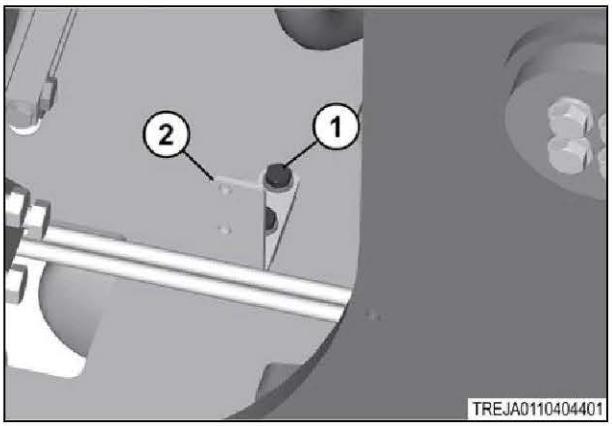

Fig. 210

2. Install the load sense blocking valve (2) with the hardware (1).

3. Connect the pump LS hose (2) and the implement valve LS hose (3).

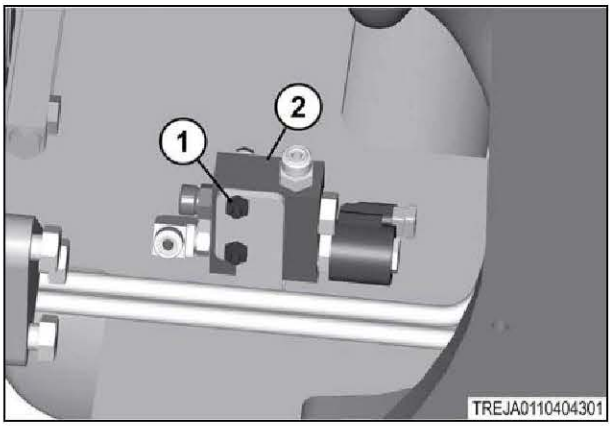

Fig. 211

4. Connect the steering/priority valve line (1).

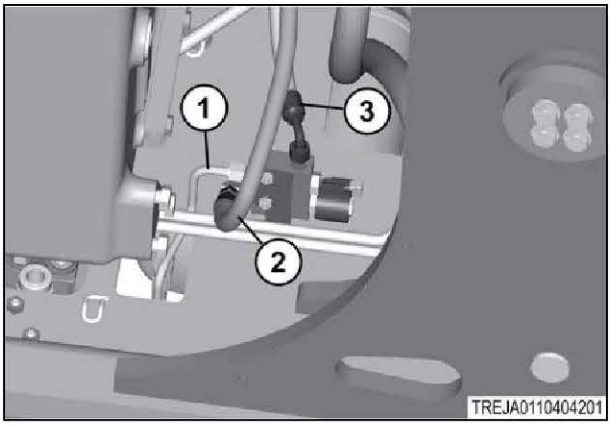

Fig. 212

5. Connect the wire harness (1) to the solenoid.

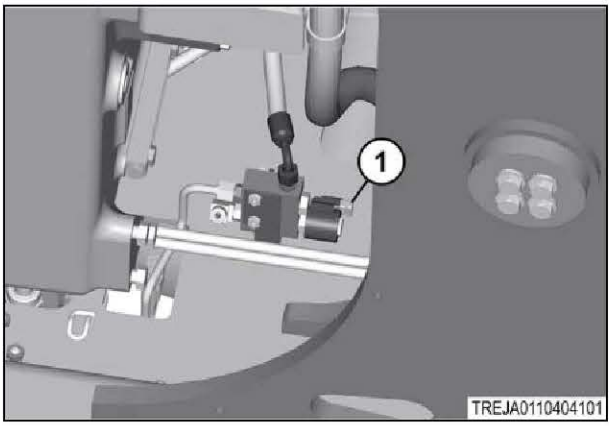

Fig. 213

6. If the machine is equipped with a transmission guard (1), support the transmission guard with correct lifting equipment. Install the transmission guard so the large holes are over the hardware (2).

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

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

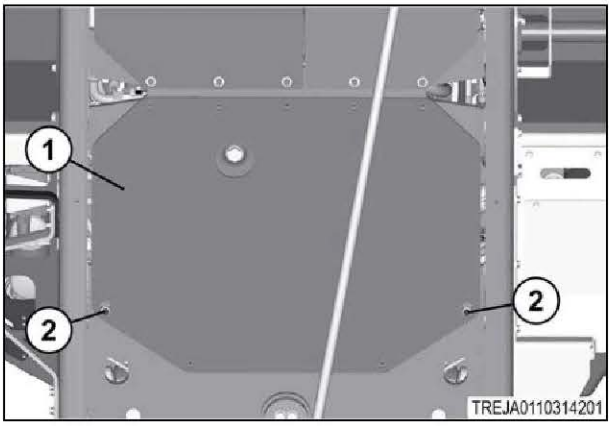

Fig. 214

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

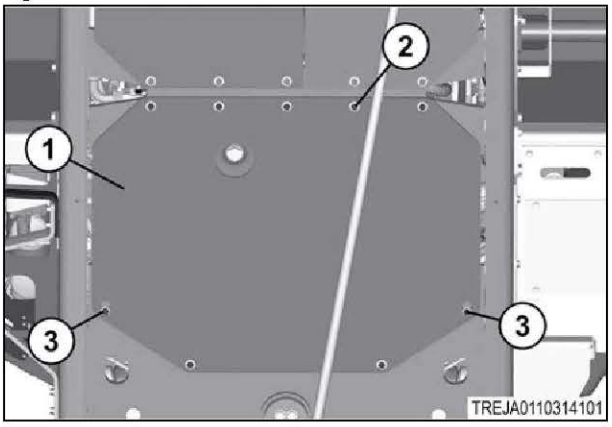

Fig. 215

9. Fill the hydraulic oil reservoir with the hydraulic oil.

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

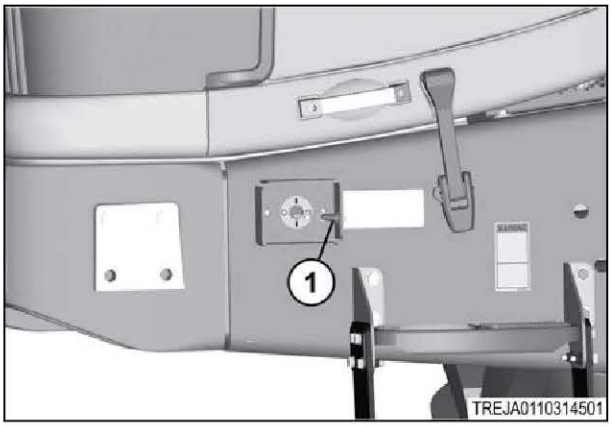

Fig. 216

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

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

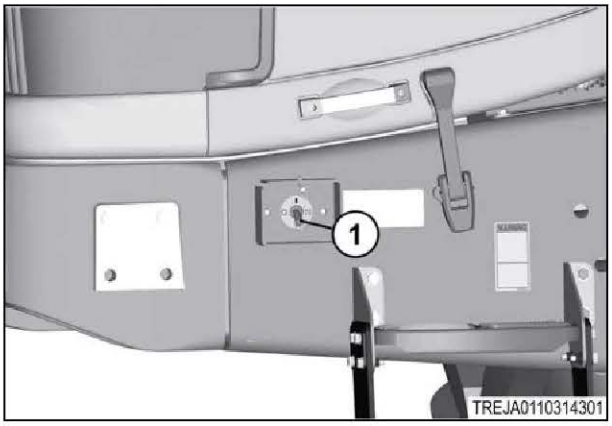

Fig. 217

Related Links

Lubricant viscosities page 1-18

9.3.17 Removing the implement control valves - drawbar configuration

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

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.

WARNING: Crushing hazard.

Personal injury or death can occur.

Safely support the machine and implement on a hard level surface.

NOTE:
Make sure all fluids are contained during the repair of the machine. Be prepared to contain fluid with a correct container before opening any component or removing any component containing fluid. Dispose of all fluids according to the local regulations.

NOTE:
The components must be clean before removing the component. Cleaning the parts before removal prevents dirt from entering the system.

NOTE:
Put identification marks on all the lines, the hoses, and the tubes. Seal all the lines, the hoses, and the tubes to prevent fluid loss and to prevent contamination in the system.

Procedure

1. Mark and disconnect the wiring harness from the valve solenoid controllers.

2. Loosen the hose clamp and disconnect the bottom drain hose (1).

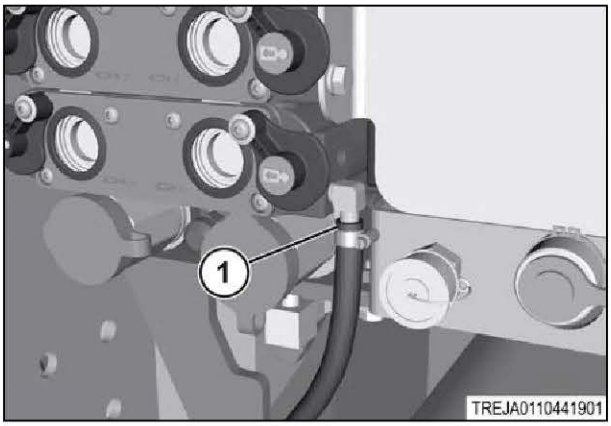

Fig. 218

3. Loosen the hose clamp and disconnect the top drain hose (1).

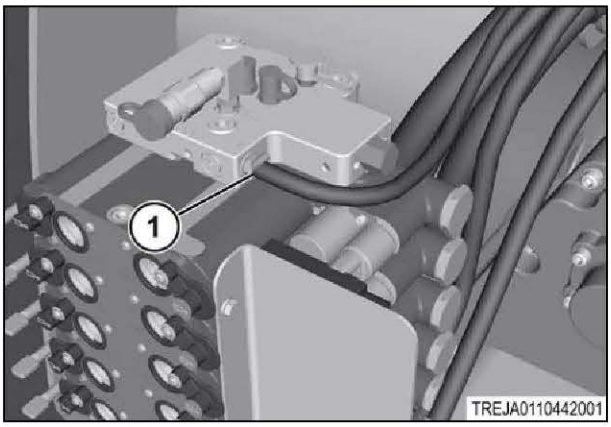

Fig. 219

4. Mark and disconnect the pump supply hose (1) and the return hose (2).

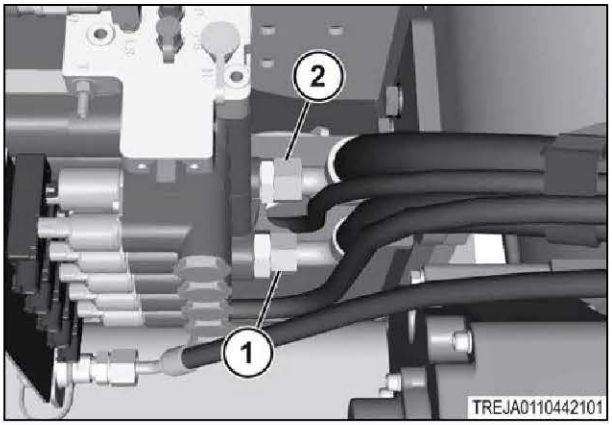

Fig. 220

5. Remove the two bolts (1) holding the trailer brake assembly and the motor house drain assembly to the valve stack mount. Move the assemblies out of the way.

   NOTE:
   The trailer brakes and the motor house drain are optional to the machine.

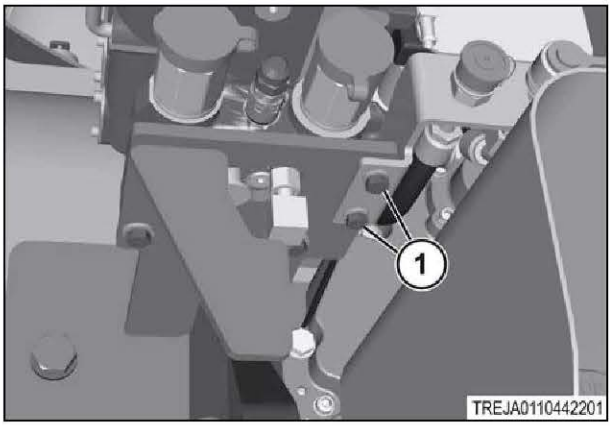

Fig. 221

6. Disconnect the load sense hose (1).

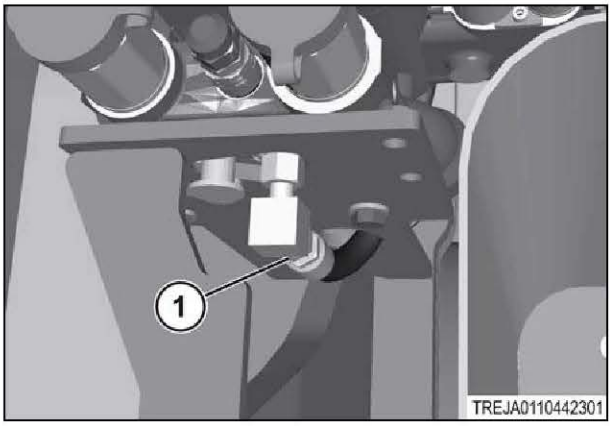

Fig. 222

7. Connect a correct lifting device and remove the three bolts (1) holding the valve bank to the mount.

8. Remove the valve bank

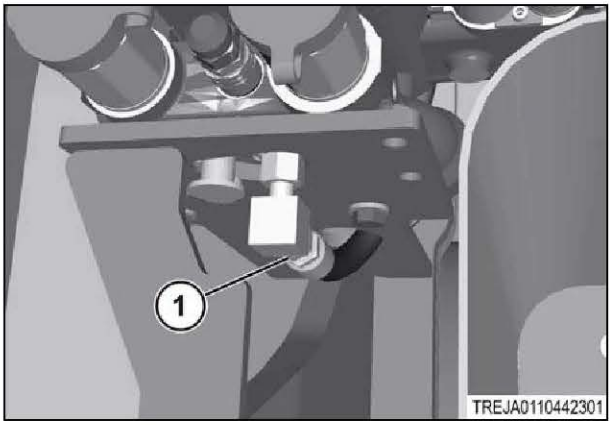

Fig. 223

9.3.18 Installing the implement control valves - drawbar configuration

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

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.

WARNING: Crushing hazard.

Personal injury or death can occur.

Safely support the machine and implement on a hard level surface.

NOTE:
Make sure all fluids are contained during the repair of the machine. Be prepared to contain fluid with a correct container before opening any component or removing any component containing fluid. Dispose of all fluids according to the local regulations.

NOTE:
The components must be clean before removing the component. Cleaning the parts before removal prevents dirt from entering the system.

NOTE:
Put identification marks on all the lines, the hoses, and the tubes. Seal all the lines, the hoses, and the tubes to prevent fluid loss and to prevent contamination in the system.

Procedure

1. Connect a correct lifting device to the valve bank .
2. Put the valve bank on the mount, secure with three bolts (1).

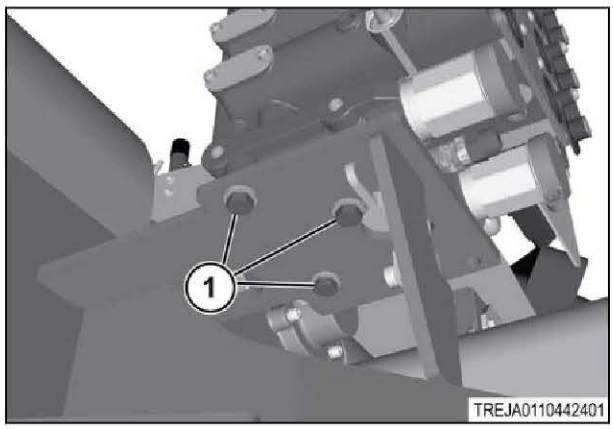

Fig. 224

3. Connect the load sense hose (1).

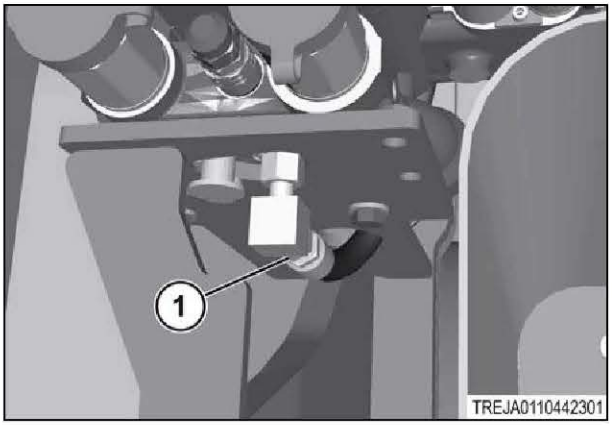

Fig. 225

4. Connect the bracket connecting the trailer brake assembly and the motor house drain assembly to the valve bank mount with two bolts (1).

NOTE:
The trailer brake assembly and the motor house drain assembly are optional to the machine.

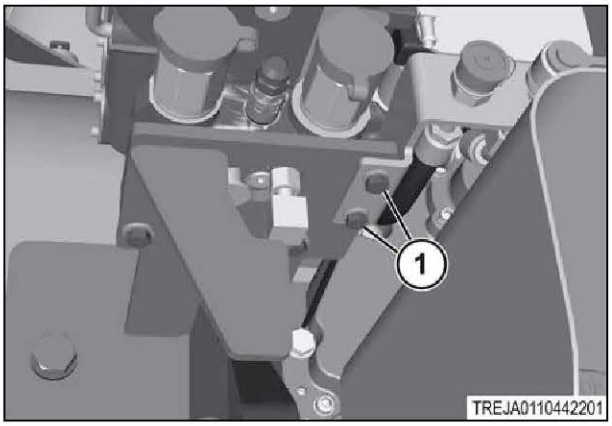

Fig. 226

5. Connect the pump supply hose (1) and the return hose (2).

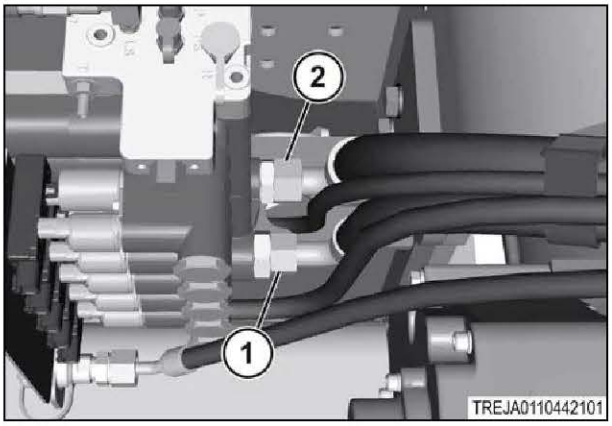

Fig. 227

6. Connect the top drain hose (1) and tighten the hose clamp.

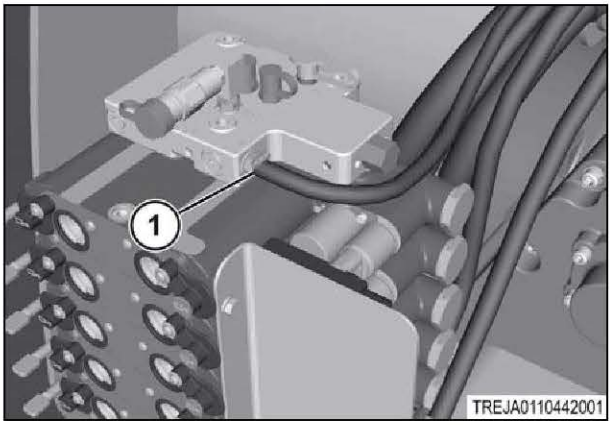

Fig. 228

7. Connect the bottom drain hose (1) and tighten the hose clamp.

8. Connect the wiring harness to the valve solenoid controllers (1).

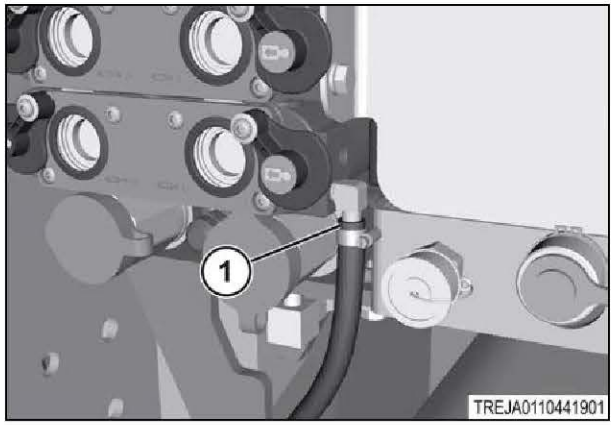

Fig. 229

9.3.19 Removing the implement control valves - 3-point linkage configuration

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

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.

WARNING: Crushing hazard.

Personal injury or death can occur.

Safely support the machine and implement on a hard level surface.

NOTE:
Make sure all fluids are contained during the repair of the machine. Be prepared to contain fluid with a correct container before opening any component or removing any component containing fluid. Dispose of all fluids according to the local regulations.

NOTE:
The components must be clean before removing the component. Cleaning the parts before removal prevents dirt from entering the system.

NOTE:
Put identification marks on all the lines, the hoses, and the tubes. Seal all the lines, the hoses, and the tubes to prevent fluid loss and to prevent contamination in the system.

Procedure

1. Mark and disconnect the wiring harness from the valve solenoid controllers (1).
2. Loosen the hose clamps and disconnect the drain hoses (2).
3. Disconnect the power beyond load sense hose (3), if equipped.

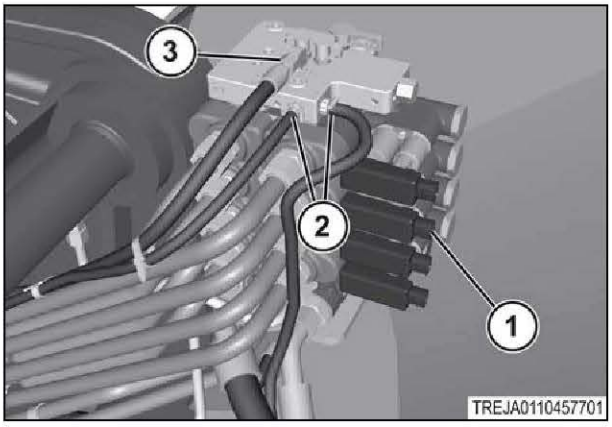

Fig. 230

4. Disconnect the pressure and the return tubes (1).

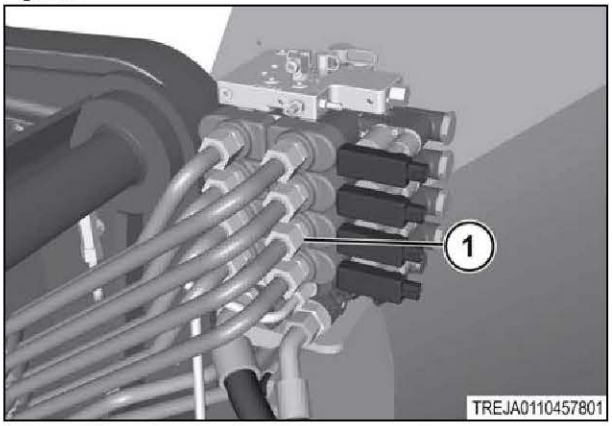

Fig. 231

5. Disconnect the hitch pressure (1) and the return (2) lines. Disconnect the supply hose (3) and the return hose (4).

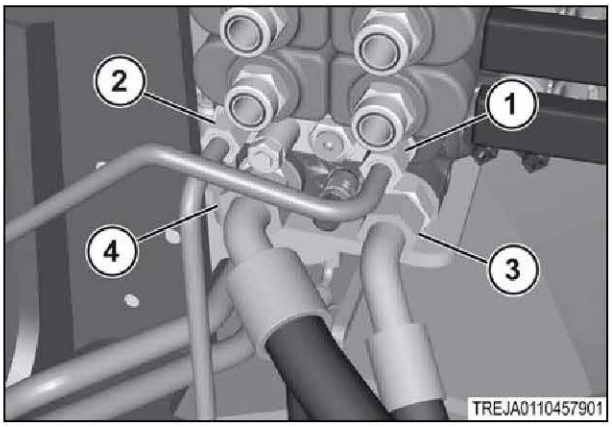

Fig. 232

6. Disconnect the power beyond pressure (1) and the return tubes (2), if equipped. Disconnect the hitch return lines (3).

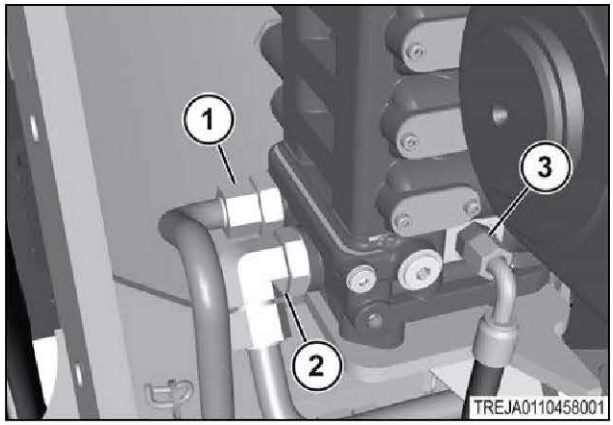

Fig. 233

7. Disconnect the load sense line (1) from the bottom of the valve bank.

8. Connect a correct lifting device to the valve bank.

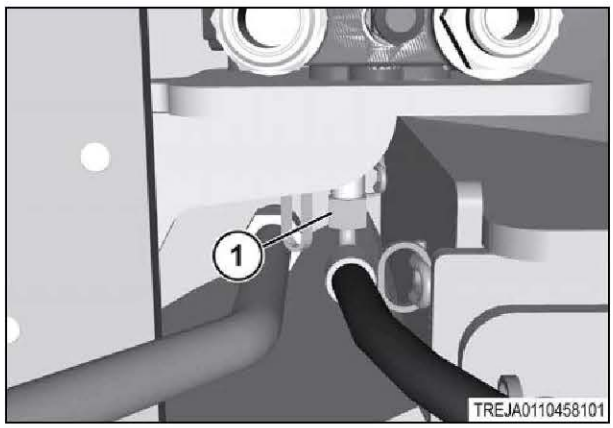

Fig. 234

9. Remove the three bolts (1) holding the valve bank to the mounting plate.

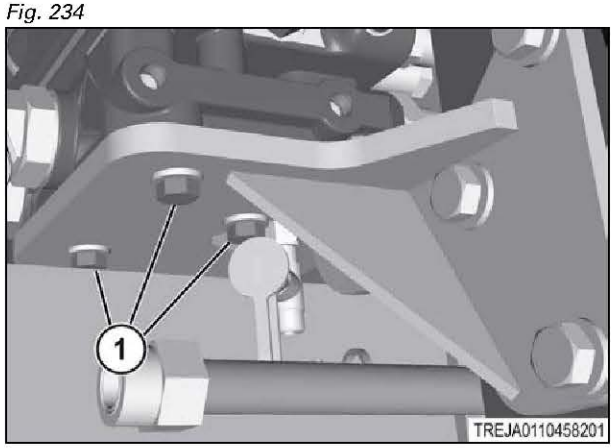

Fig. 235

9.3.20 Installing the implement control valves - 3-point linkage configuration

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

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.

WARNING: Crushing hazard.

Personal injury or death can occur.

Safely support the machine and implement on a hard level surface.

NOTE:
Make sure all fluids are contained during the repair of the machine. Be prepared to contain fluid with a correct container before opening any component or removing any component containing fluid. Dispose of all fluids according to the local regulations.

NOTE:
The components must be clean before removing the component. Cleaning the parts before removal prevents dirt from entering the system.

NOTE:
Put identification marks on all the lines, the hoses, and the tubes. Seal all the lines, the hoses, and the tubes to prevent fluid loss and to prevent contamination in the system.

Procedure

1. Connect the correct lifting device to the valve bank.
2. Put the valve bank on the mounting plate.
3. Connect the valve bank to the mounting plate with three bolts (1).

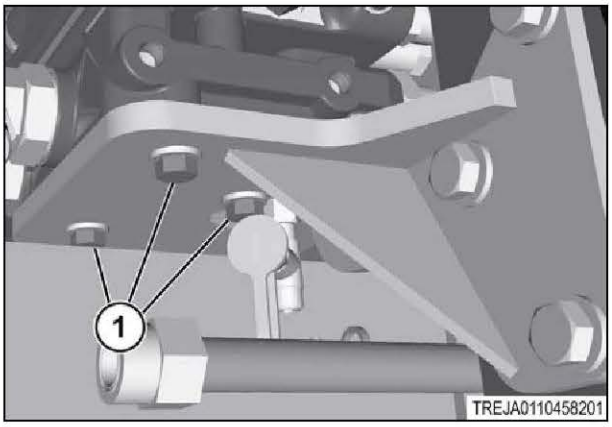

Fig. 236

4. Connect the load sense line (1) to the bottom of the valve bank.

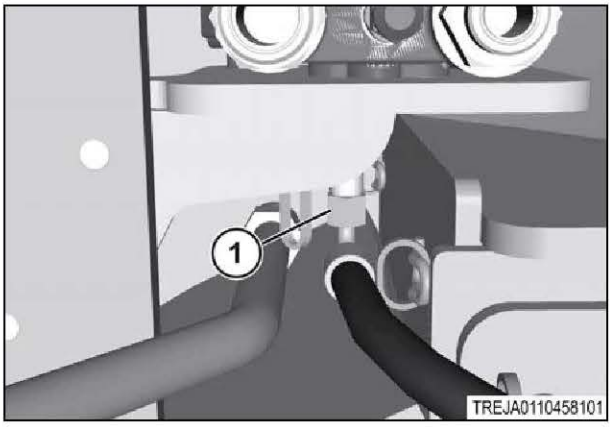

Fig. 237

5. Connect the power beyond pressure tube (1) and the return tubes (2).

NOTE:
The power beyond is optional for this machine.

6. Connect the hitch return line (3).

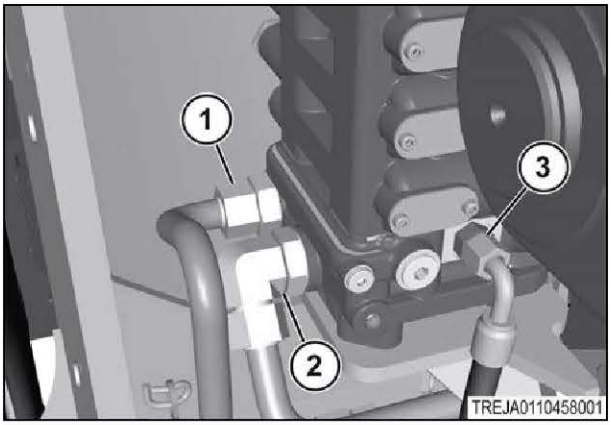

Fig. 238

7. Connect the hitch pressure line (1) and the return pressure line (2). Connect the pump supply hose (3) and the return hose (4).

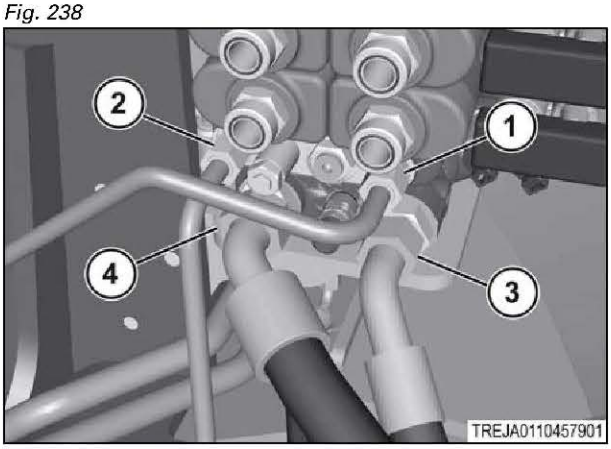

Fig. 239

8. Connect the pressure tubes and the return tubes (1).

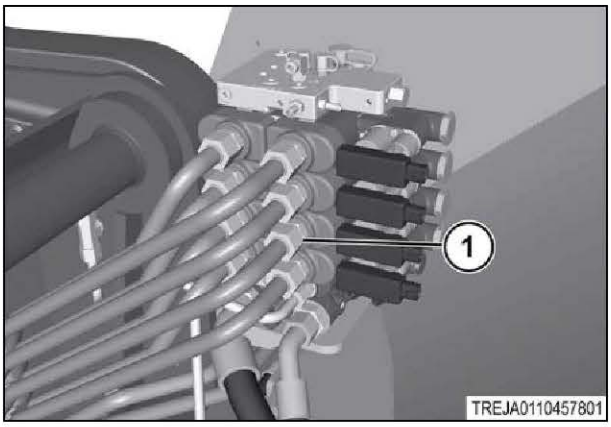

Fig. 240

9. Connect the wiring harness to the valve solenoid controllers (1). Connect the drain hoses (2) and tighten the hose clamps. Connect the power beyond the load sense hose (3), if equipped.

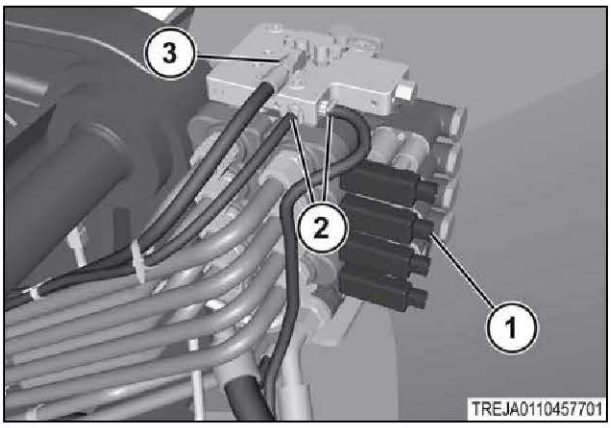

Fig. 241

9.3.21 Disassemble the hydraulic control valve bank

Before starting the procedure

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

Procedure

1. Remove the nuts (1) holding the top cap section on the studs.

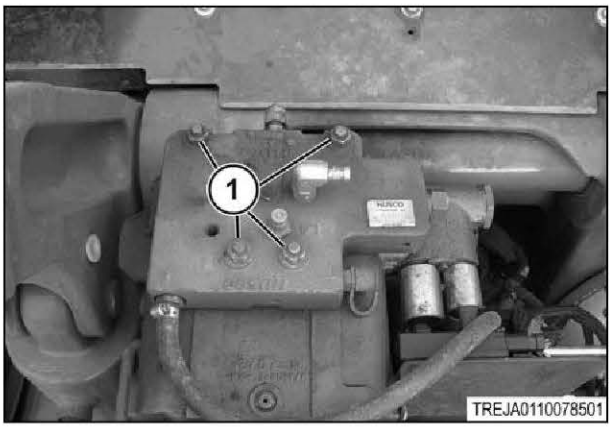

Fig. 242

2. Remove the top cap section (1).

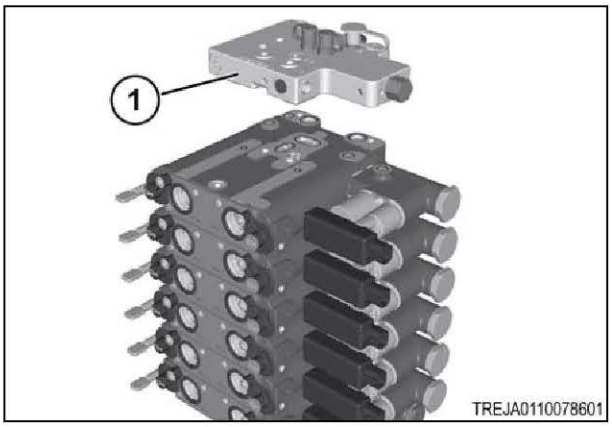

Fig. 243

3. Remove the individual control valve sections (1).

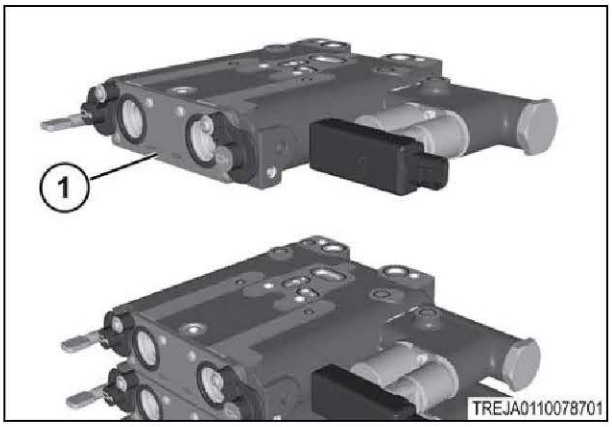

Fig. 244

4. Remove the hitch control valve (1) from the power beyond base (2).

5. Remove the studs from the power beyond base.

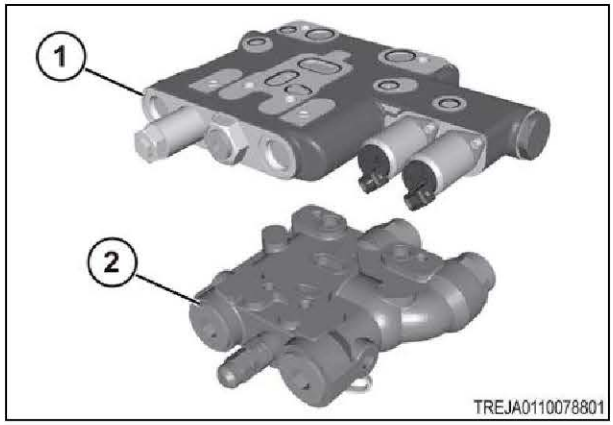

Fig. 245

9.3.22 Assemble the hydraulic control valve bank

Before starting the procedure

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

NOTE:
Check all O-ring seals for wear and damage. If necessary, replace the O-ring seals.

NOTE:
Cartridges, solenoids, spools, and valves are not serviceable. Cartridges, solenoids, and valves can be replaced. Replace the hydraulic valve if the spools are worn or damaged.

Procedure

1. Install the hitch control valve (1) to the power beyond base (2).

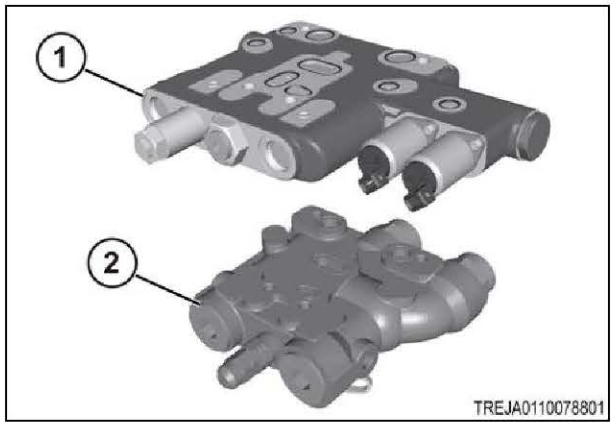

Fig. 246

2. Install the individual control valve sections (1) onto the studs. Make sure all the O-rings are in the correct position.

   NOTE:
   The machines come equipped with four hydraulic control valve sections. The five and six section valve banks are optional.

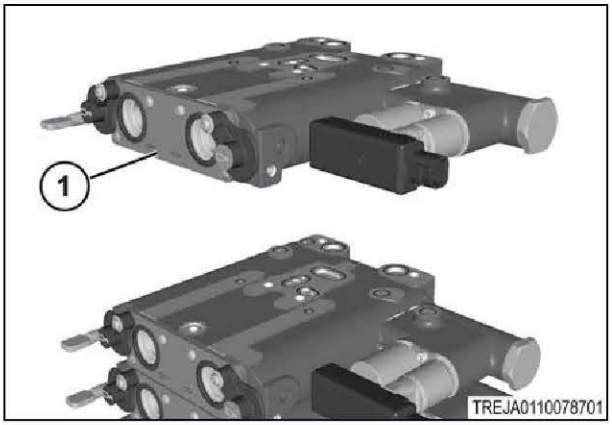

Fig. 247

3. Install the top cap section (1).

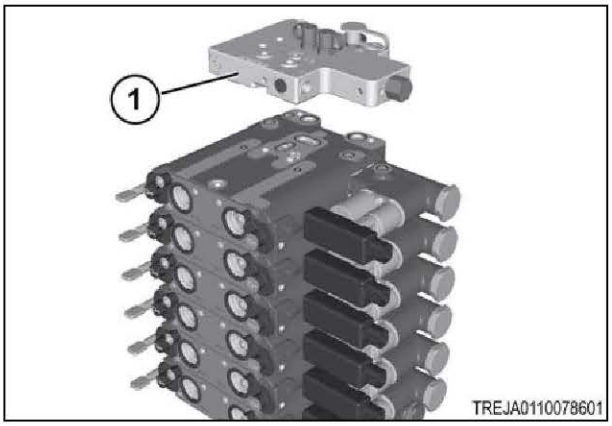

Fig. 248

4. Tighten the nuts (1) to 50 Nm (37 lbf ft).

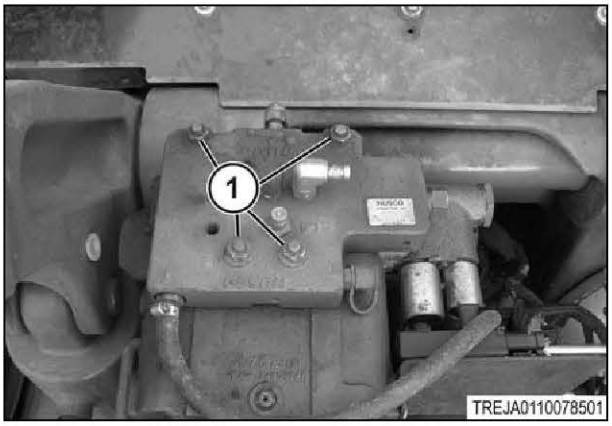

Fig. 249

9.3.23 Disassemble a hydraulic control valve

Before starting the procedure

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

Procedure

1. Remove the screws (1) holding the port doors (2) and the face plate (3) onto the coupler section (4).

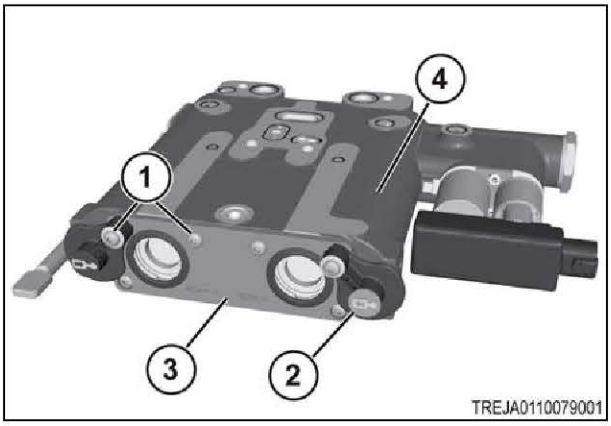

Fig. 250

2. Remove the face plate (1) to get access to the couplers (2).

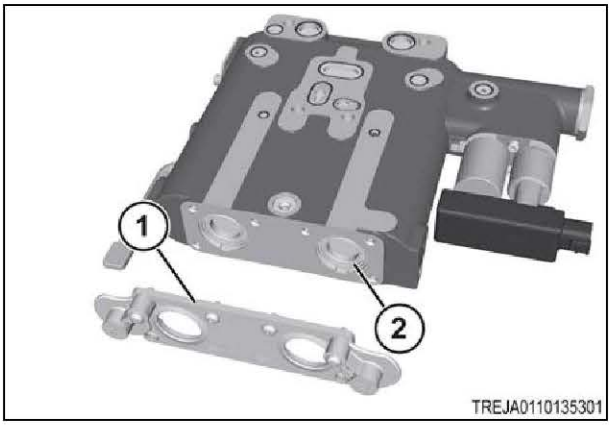

Fig. 251

3. Remove the gasket (1) with the face plate (2).

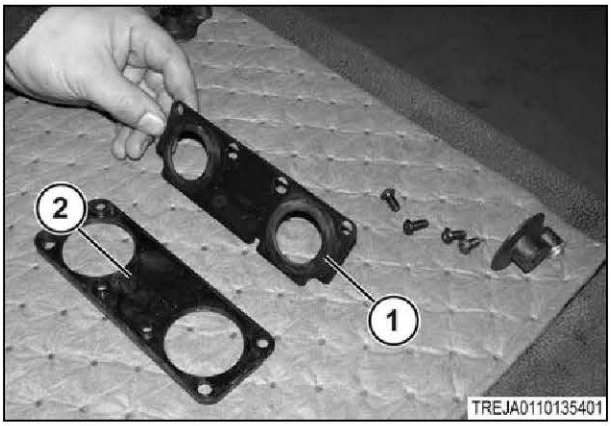

Fig. 252

4. Remove the retainer ring (1).

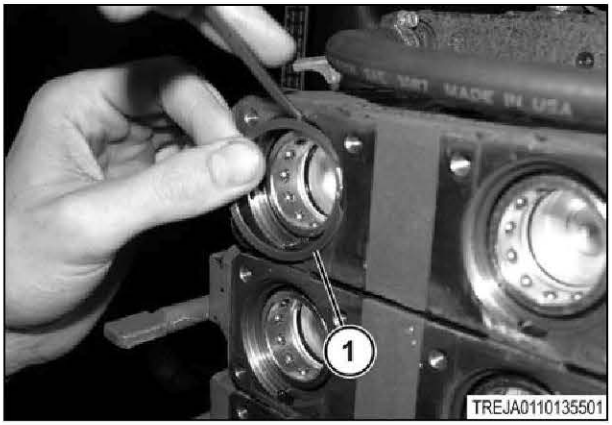

Fig. 253

5. Press down on the lever (1) to eject the couplers (2).

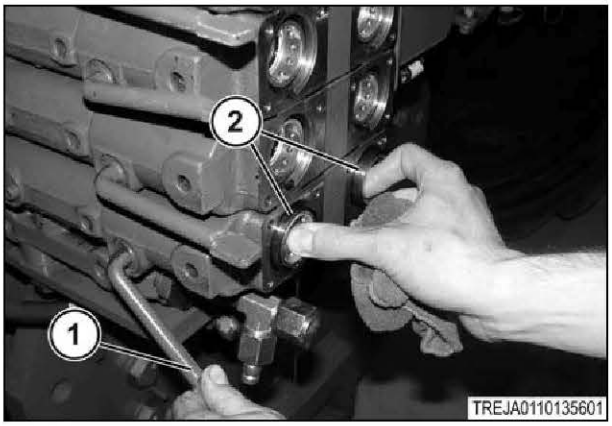

Fig. 254

6. Remove the couplers (1).

NOTE:
Prepare to catch and contain the fluids in an approved container.

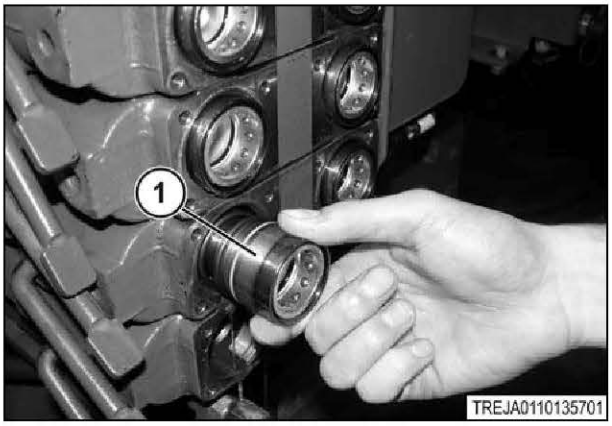

Fig. 255

7. Remove the retainer ring (1) holding the lever (2).

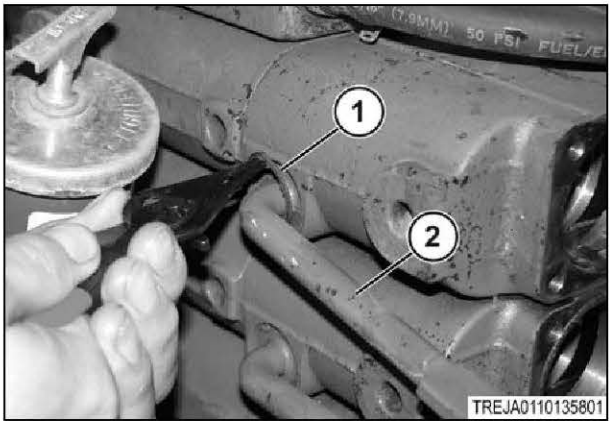

Fig. 256

8. Remove the lever (1).

NOTE:
Prepare to catch and contain the fluids in an approved container.

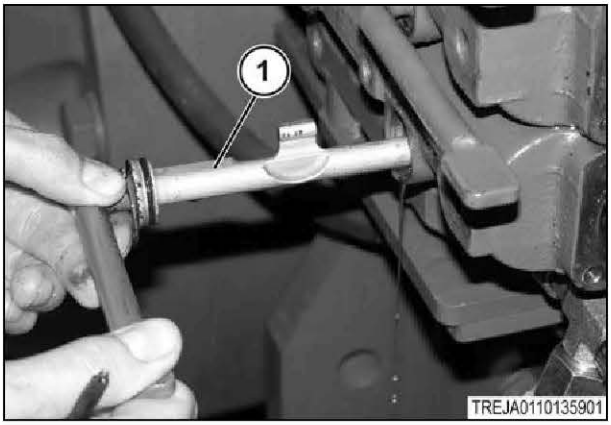

Fig. 257

9. Loosen the valve (1) with a hex wrench.

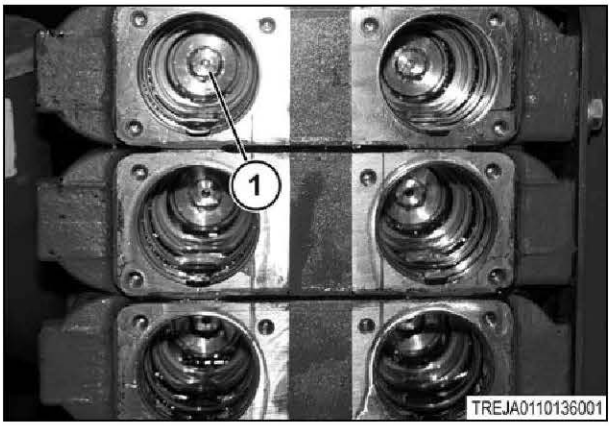

Fig. 258

10. Remove the valve (1).

NOTE:
The coupler section will be free from the valve once both valves are loose.

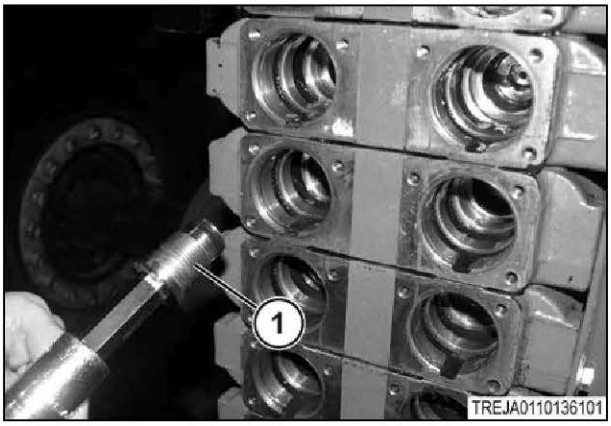

Fig. 259

11. Make sure to catch the poppet springs (1) when removing the coupler section from the valve section.

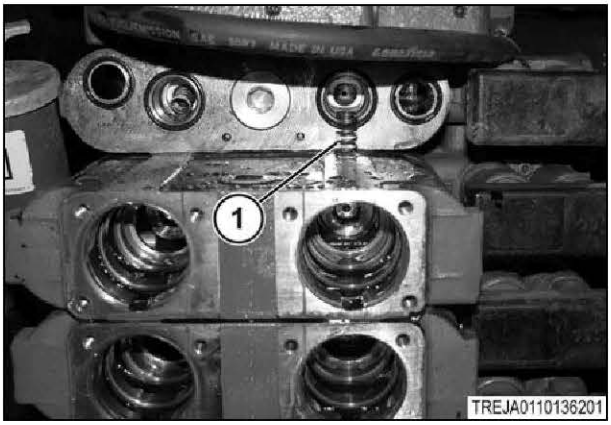

Fig. 260

12. Remove the controller (1) from the directional solenoid (2) and the proportional solenoid (3).

13. Remove the screws (4) holding the clamp (5).

14. Lift the solenoids out of the control valve.

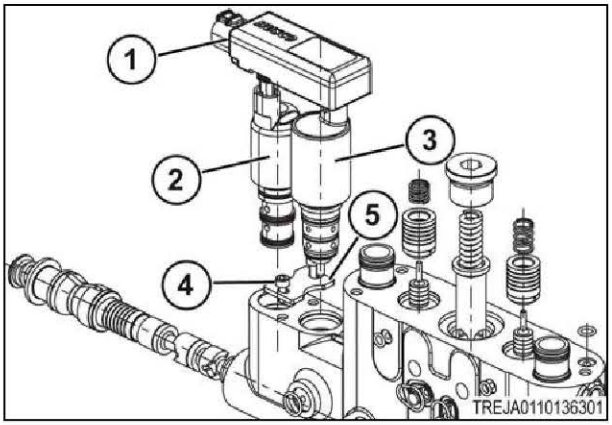

Fig. 261

15. Remove the poppet valve assemblies (1).

16. Remove the sleeves (2).

17. Remove the plug (3) and the compensator assembly (4).

18. Remove the O-ring (5).

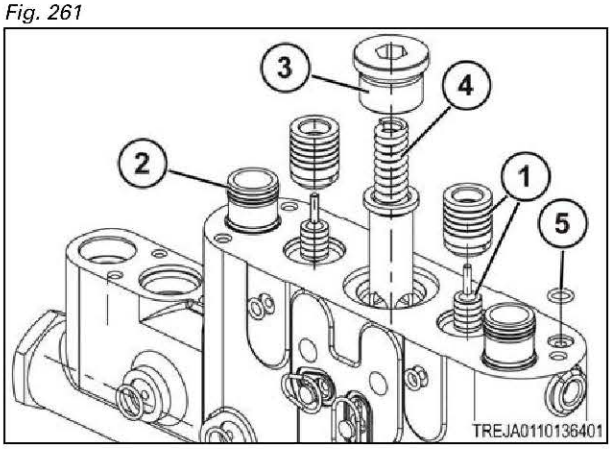

Fig. 262

19. Remove the plug (1) and the main spool valve (2).

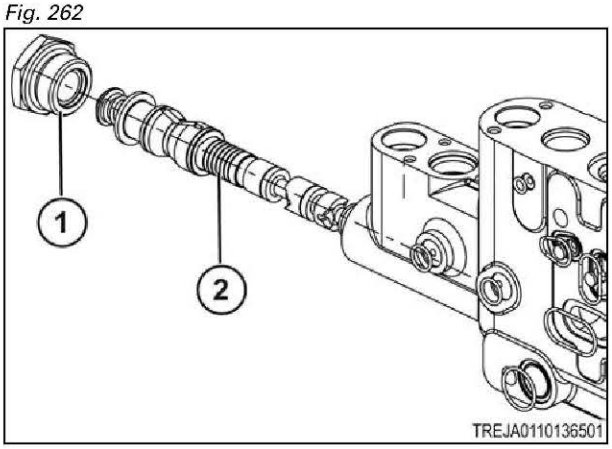

Fig. 263

20. Remove the screws (1) holding the cover plate (2) and the gasket (3).

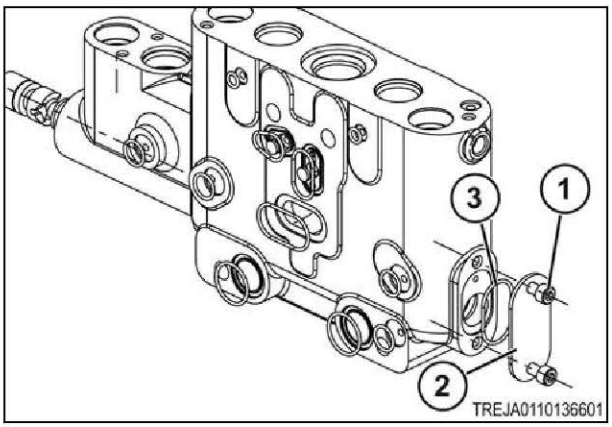

Fig. 264

9.3.24 Assemble a hydraulic control valve

Before starting the procedure

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

Procedure

1. Replace all the O-rings. Make sure the dime valves are in good condition.

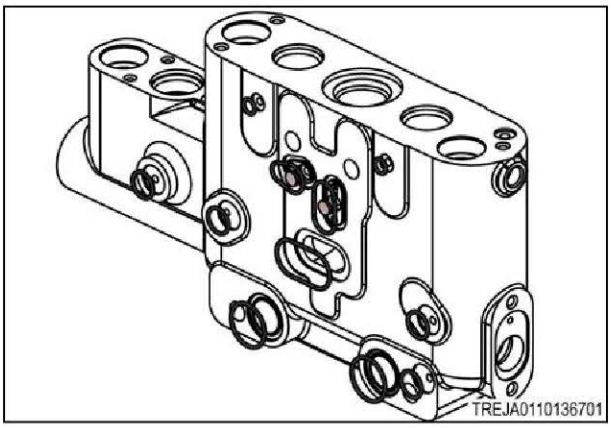

Fig. 265

2. Position the cover plate (2) and the new gasket (3).
3. Tighten the screws (2) to 8.5 to 10.5 Nm (6.3 to 7.7 lbf ft).

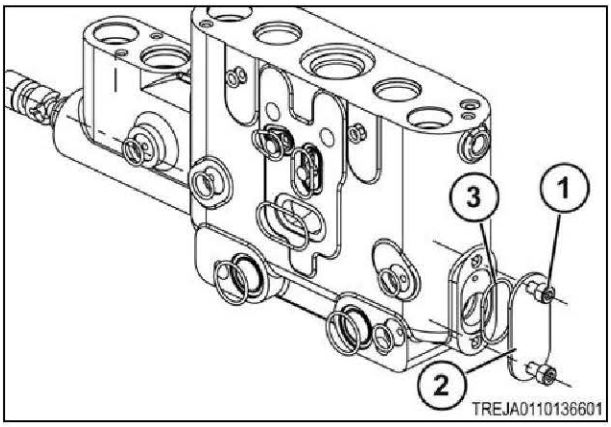

Fig. 266

4. Install the main spool valve (2) and the plug (1).

   NOTE:
   The slot in the spool must face toward the solenoids.
5. Tighten the plug to 89.4 to 111.2 Nm (66 to 82 lbf ft).

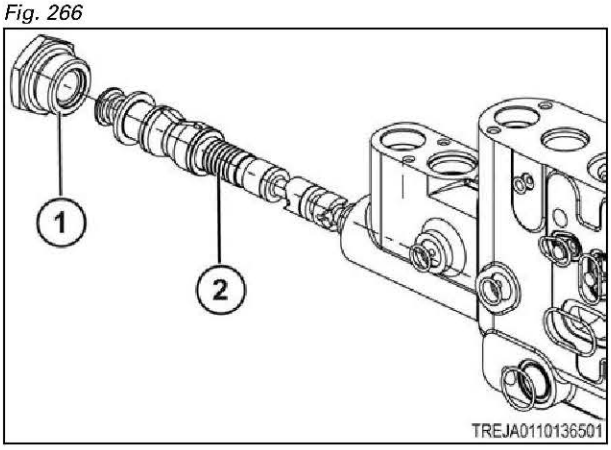

Fig. 267

6. Install the poppet valve assemblies (1).
7. Install the sleeves (2).
8. Install the plug (3) and the compensator assembly (4).
9. Install the O-ring (5).

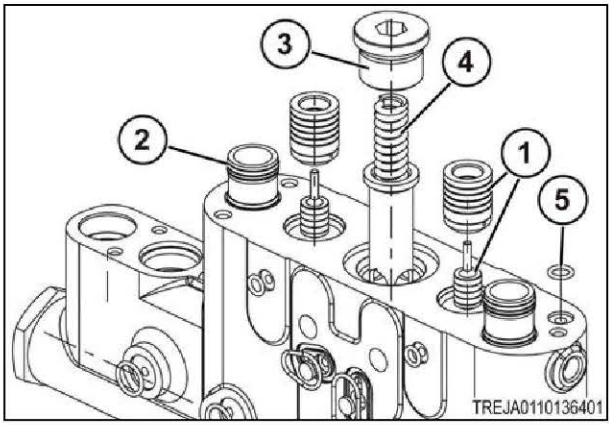

Fig. 268

10. Insert the directional solenoid (2) and the proportional solenoid (3) into the correct valve ports. Secure with the clamp (5) and the screws (4).
11. Install the controller (1) onto the directional solenoid (2) and the proportional solenoid (3).

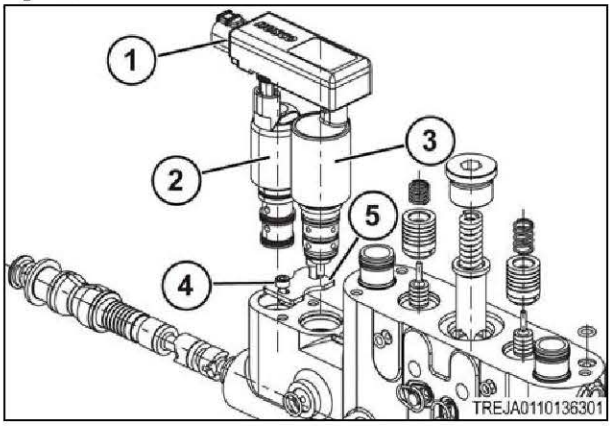

Fig. 269

12. Put the poppet springs (1) into the correct position.

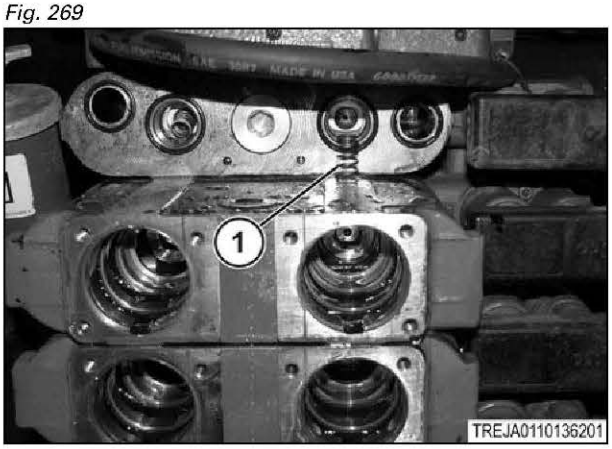

Fig. 270

13. Put the coupler section to the valve section and install the valve (1) with a hex wrench. Tighten the valves to 73 to 89 Nm (54 to 66lbf ft).

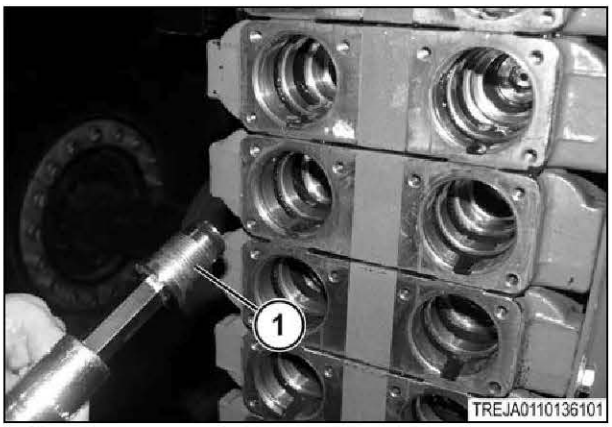

Fig. 271

14. Install and tighten the bolts (1) to 8.5 to 10.5 Nm (6.3 to 7.7 lbf ft).

15. Install and tighten the plug (2) to 4.5 to 5.5 Nm (3.3 to 4.1 lbf ft).

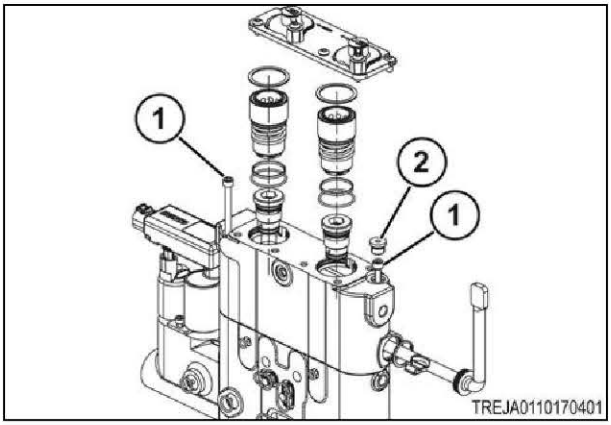

Fig. 272

16. Install the lever (1).

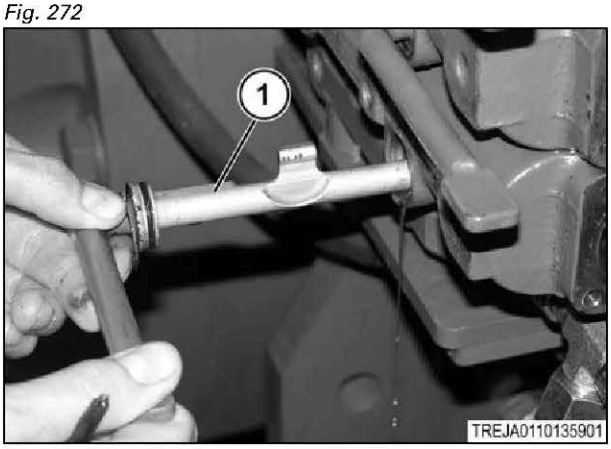

Fig. 273

17. Install the retainer ring (1) to secure the lever (2).

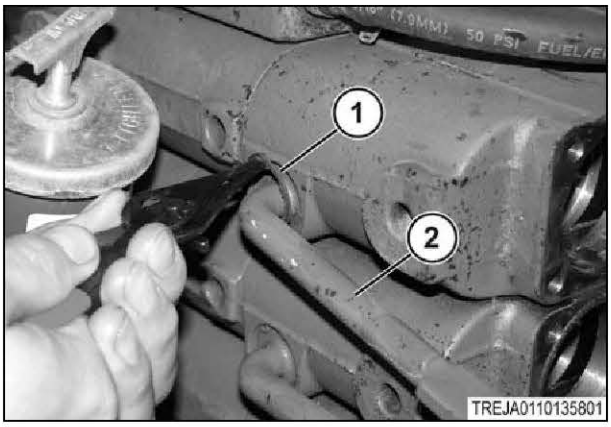

Fig. 274

18. Press down on the lever (1)and install the couplers (2) and seals.

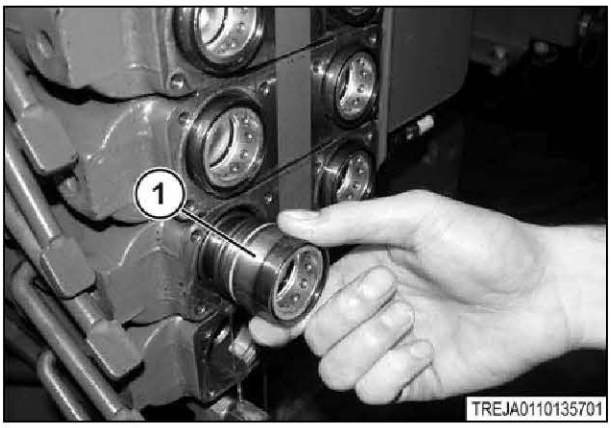

Fig. 275

19. Press the couplers (1) into the coupler section and raise the levers (2) to hold the couplers.

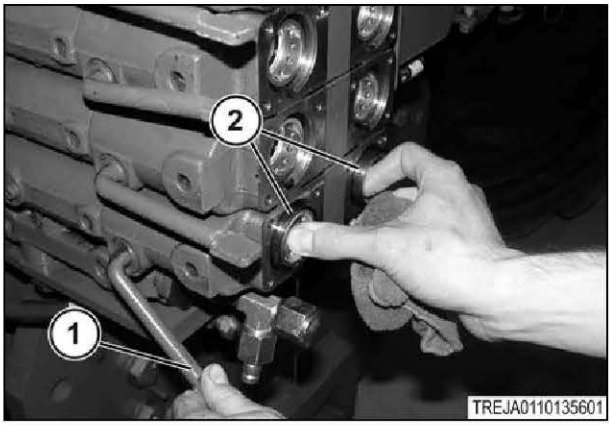

Fig. 276

20. Install the retainer ring (1).

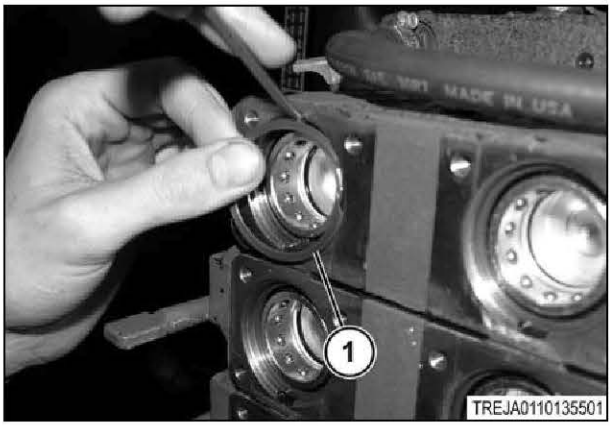

Fig. 277

21. Install the face plate (2) with the gasket (1).

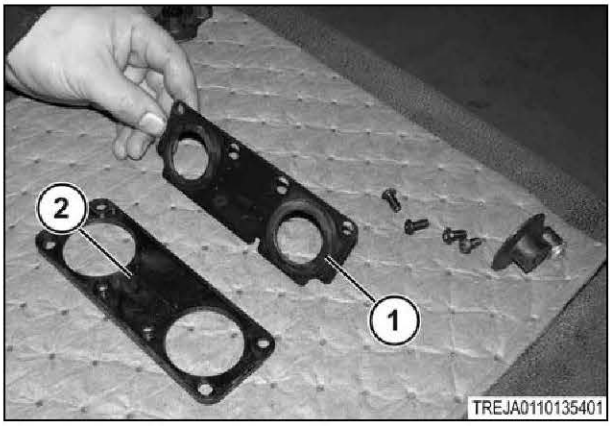

Fig. 278

22. Put the face plate (1) over the couplers (2).

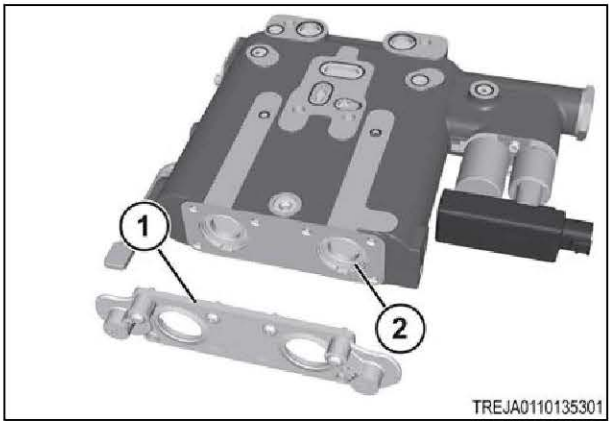

Fig. 279

23. Install the screws (1) holding the port doors (2) and the face plate (3) onto the coupler section (4). Tighten the screws to 4.5 to 5.5 Nm (3.3 to 4.1 lbf ft).

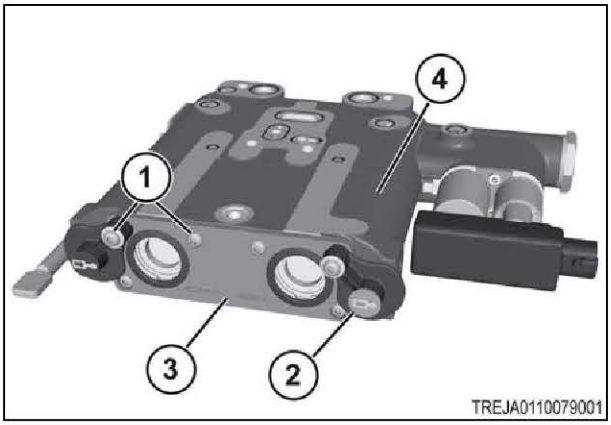

Fig. 280

9.3.25 Remove the implement oil cooler

Before starting the procedure

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

WARNING: Contact with refrigerant is a hazard. Refrigerant can cause frostbite and other serious injury.

Serious personal injury can occur.

Keep face and hands away to help prevent injury. Protective goggles must be worn when refrigerant lines are opened. Release fittings slowly in an well ventilated area. Do not inhale the refrigerant.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

NOTE: *Before removal, put identification tags on the components for correct installation at assembly. Put covers and plugs on all hoses, fittings, and ports to prevent contamination from the system.*

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

NOTE: *Fully clean all parts to keep contamination from the system. Contamination can damage the precision parts. Complete the disassembly steps on a clean surface. Put clean material on top of the parts.*

NOTE: *Use only certified technicians and equipment to service the air conditioning system.*

NOTE: *When opening the air conditioning system, replace the receiver-dryer. See the information for removing/installing the receiver-dryer.*

Procedure

1. Park the machine on a solid, level surface.

2. Apply the parking brake, stop the engine, and take the key with you.

3. Turn off the battery disconnect switch.

4. Remove the battery disconnect switch key.

5. Remove the engine cover.

6. Remove the hardware (1) and the cover plate (2).

7. Install a hose to the radiator drain valve (3) and put through the access hole.

8. Set a correct container under the radiator drain hose. Loosen the radiator drain valve (3) and drain the engine coolant.

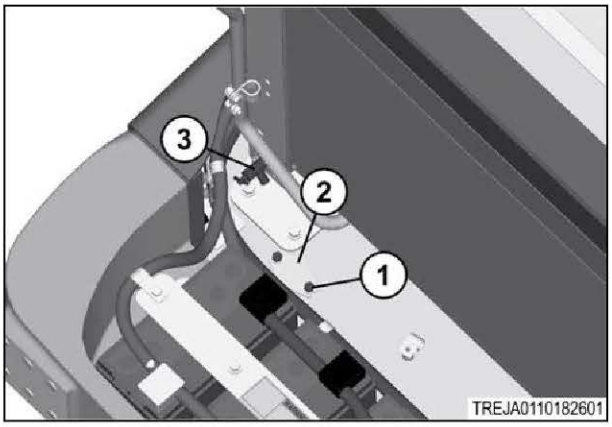

Fig. 281

9. Remove the hardware (1, 3) and the right fan guard (2).

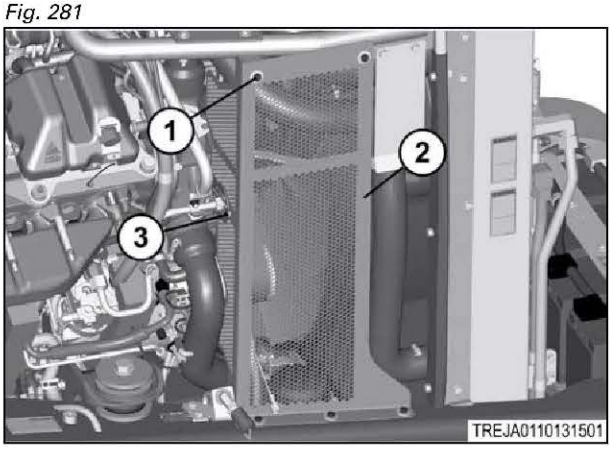

Fig. 282

10. Remove the hardware (1) and the left fan guard (2).

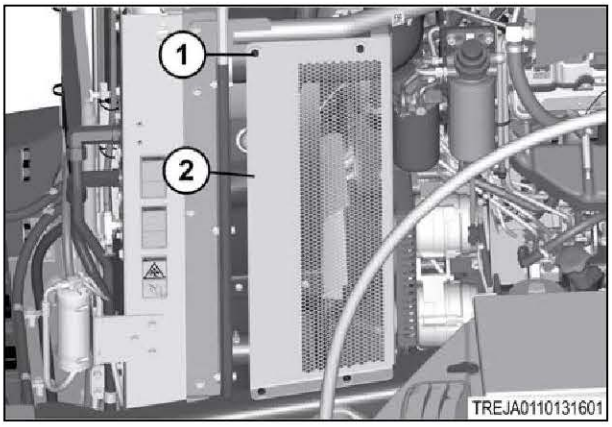

Fig. 283

11. Loosen the hose clamps (1) and disconnect the left charge air cooler hose (2).

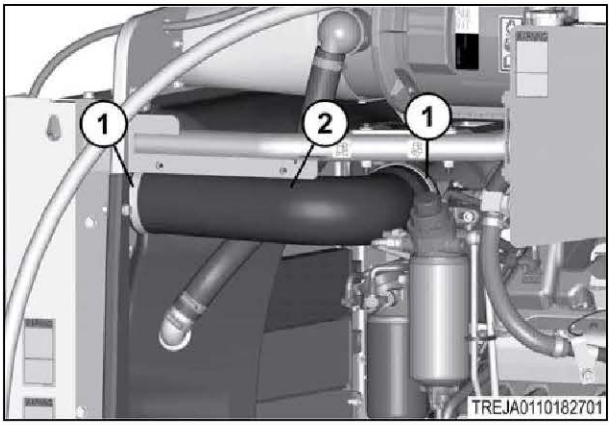

Fig. 284

12. Loosen the hose clamp (1) and disconnect the right charge air cooler hose (2).

13. Remove the hardware (3) and the hose clamp (4).

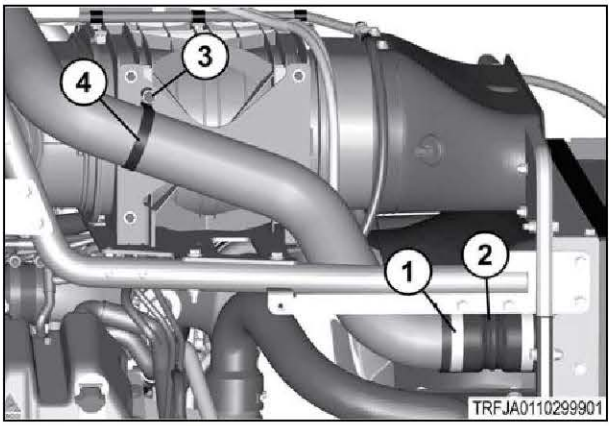

Fig. 285

14. Disconnect the two wire harnesses (1) from the air filter assembly.

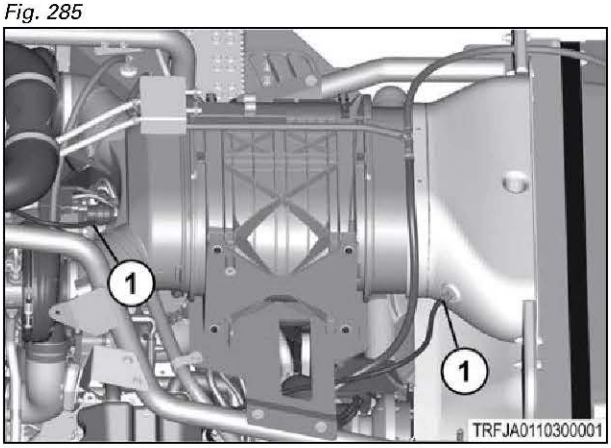

Fig. 286

15. Loosen the hose clamps (1) and disconnect the turbocharger inlet tubes (2).

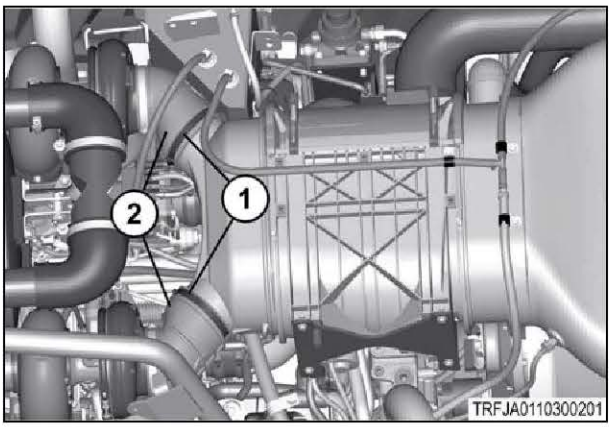

Fig. 287

16. Loosen the two hose clamps (1) and disconnect the two hoses (2).

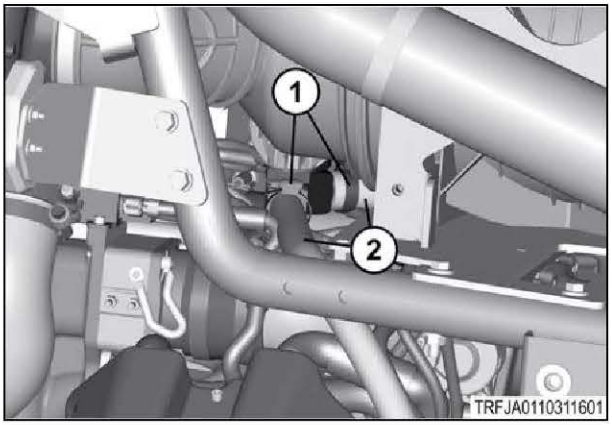

Fig. 288

17. Remove the hardware (1), the hose clips (2), and the doser expansion tank bracket (3).

18. Loosen the two hose clamps (4), and disconnect the two hoses.

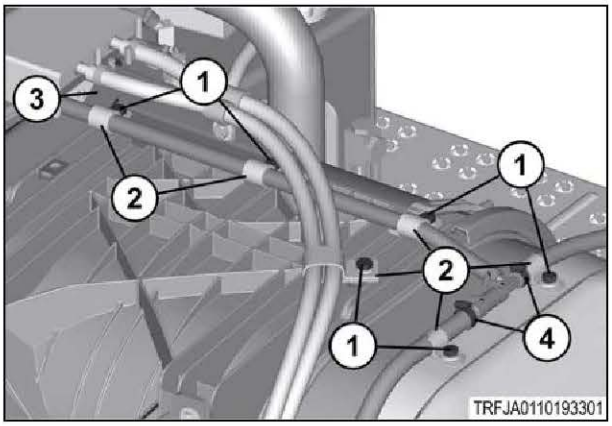

Fig. 289

19. Remove the hardware (1), and the air filter nozzle (2).

20. Remove the hardware (3), and the plastic seals (4).

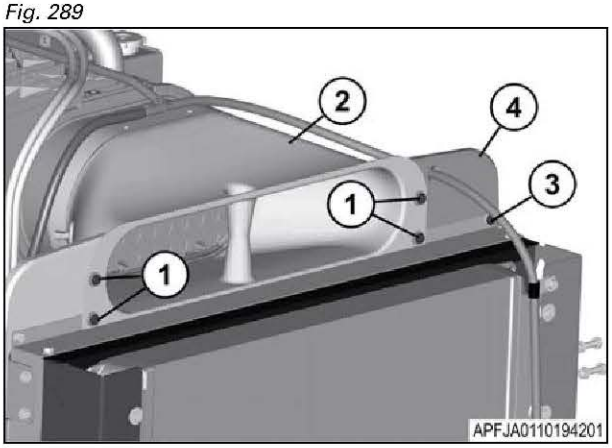

Fig. 290

21. Loosen the hose clamp (1) and disconnect the dust ejector tube (2).

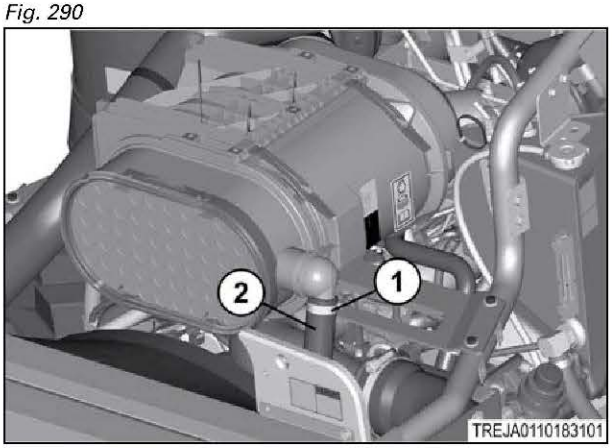

Fig. 291

22. Remove the hardware (1) and the air filter assembly (2).

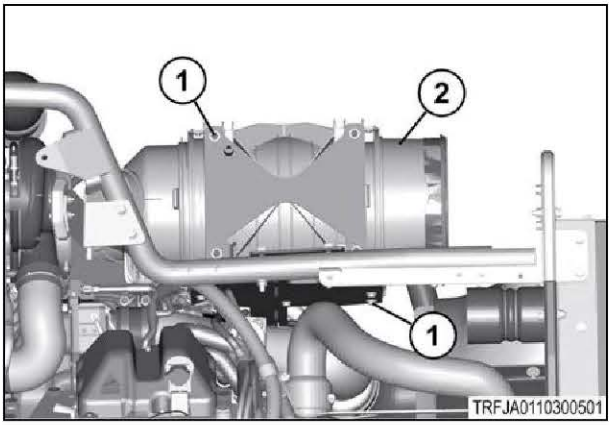

Fig. 292

23. Remove the hardware (1), and the hose clips (2).

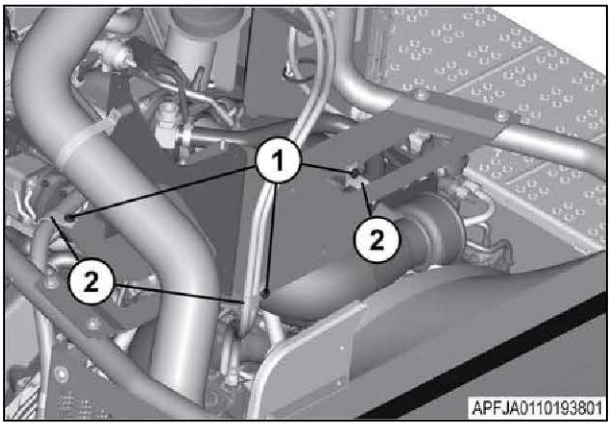

Fig. 293

24. Remove the hardware (1) and the air filter bracket (2).

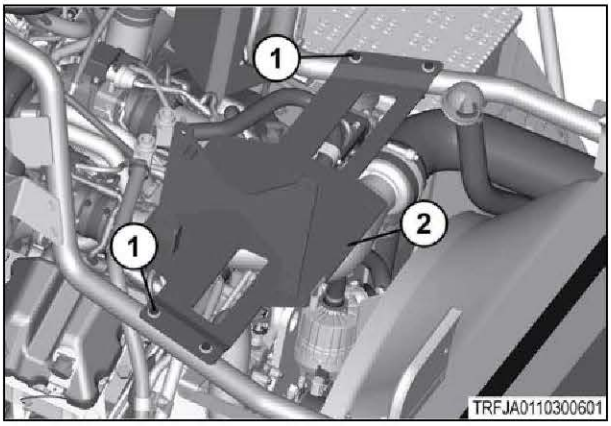

Fig. 294

25. Remove the hardware (1), the hose clamp (2), and the bracket (3).

26. Loosen the hose clamps (4) and disconnect the inlet radiator hose (5).

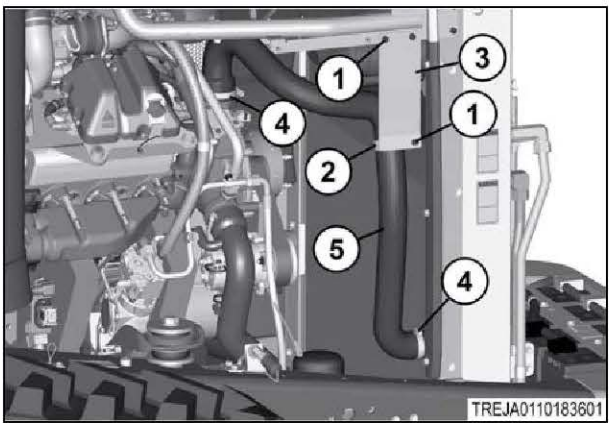

Fig. 295

27. Remove the hardware (1) and the hose clamp (2).

28. Loosen the hose clamps (3) and disconnect the outlet radiator hose (4).

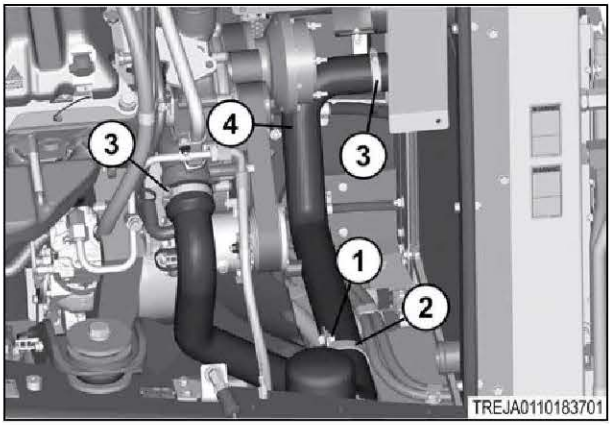

Fig. 296

29. Remove the hardware (1) and the right support bracket (2).

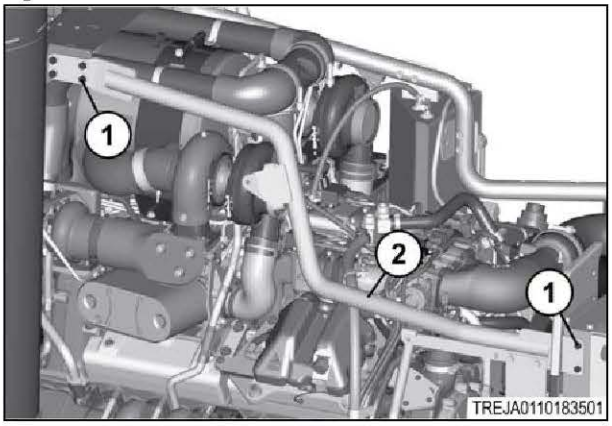

Fig. 297

30. Loosen the hose clamps (1) and disconnect the hoses (2) from the expansion tank.

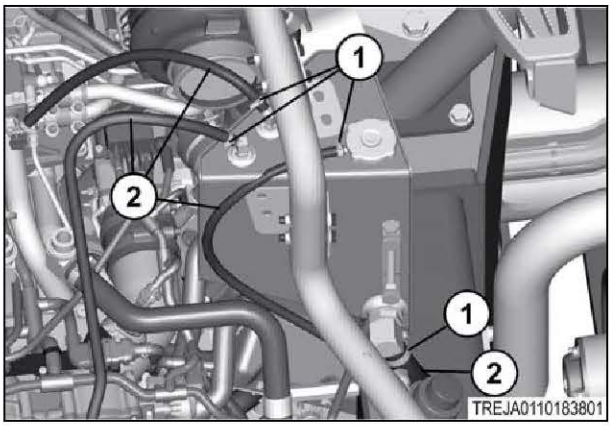

Fig. 298

31. Remove the hardware (1) and the expansion tank (2).

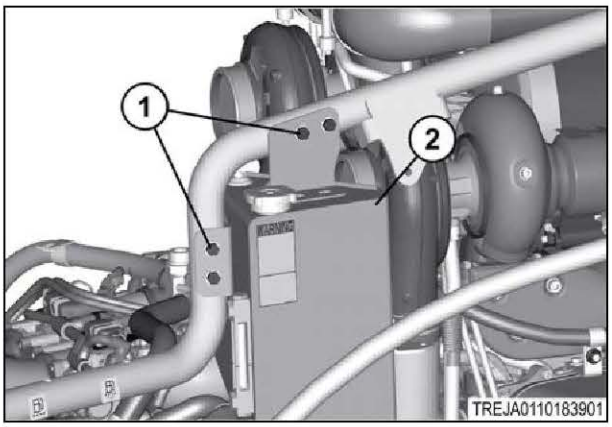

Fig. 299

32. Remove the hardware (1) and the left support bracket (2).

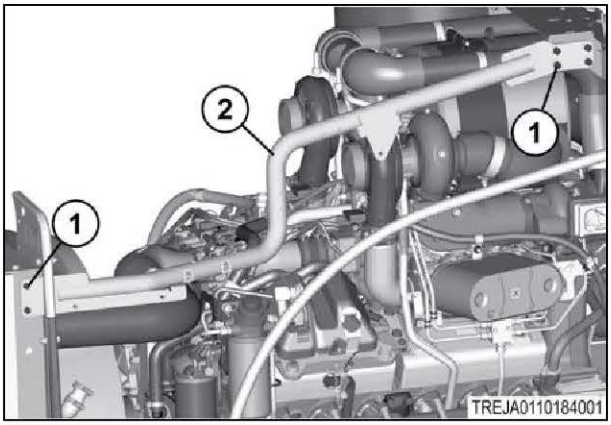

Fig. 300

33. Remove the batteries (1).

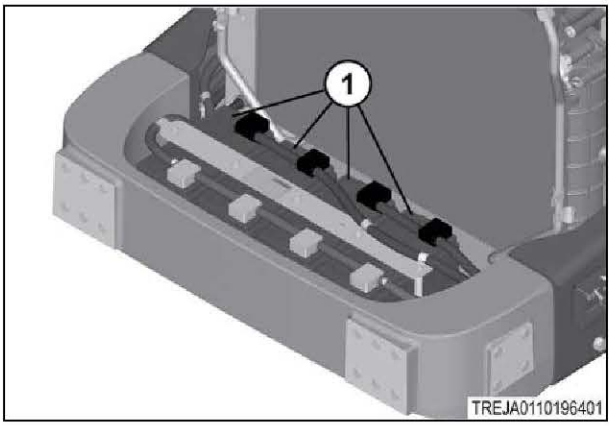

Fig. 301

34. Remove the hardware (1) and the two side seal brackets (2) with seals.

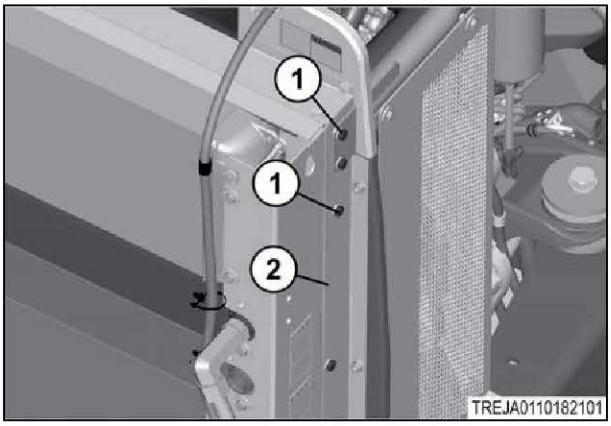

Fig. 302

35. Remove the hardware (1) and the top seal bracket (2) with seal.

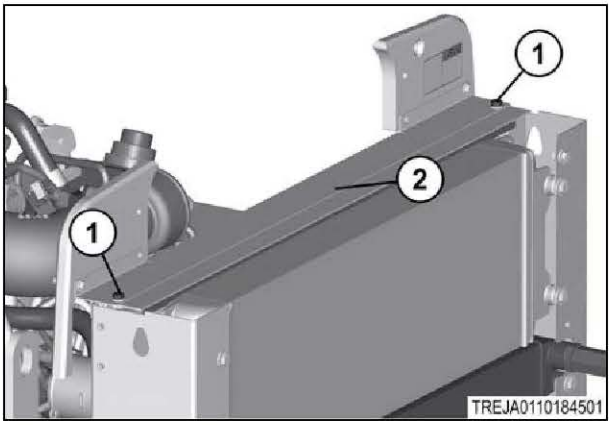

Fig. 303

36. Remove the hardware (1) and the air conditioning receiver-dryer bracket (2).

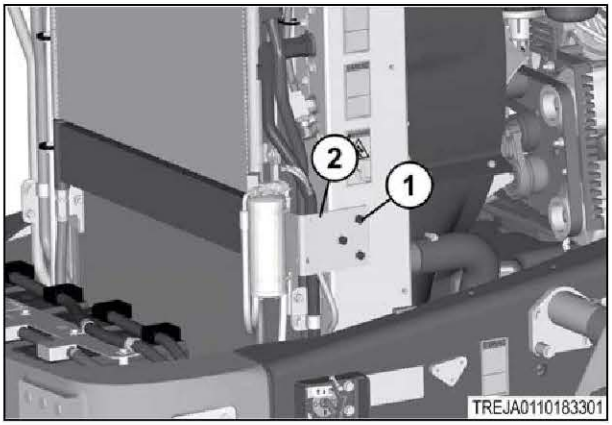

Fig. 304

37. Remove the hardware (2) and put the air conditioning condenser/fuel cooler assembly (3) to the side.

38. Disconnect the hydraulic hoses (1).

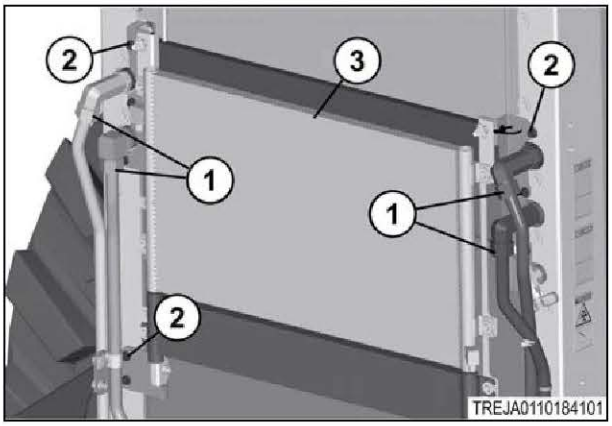

Fig. 305

39. Remove the hardware (1) and the fan shroud (2).

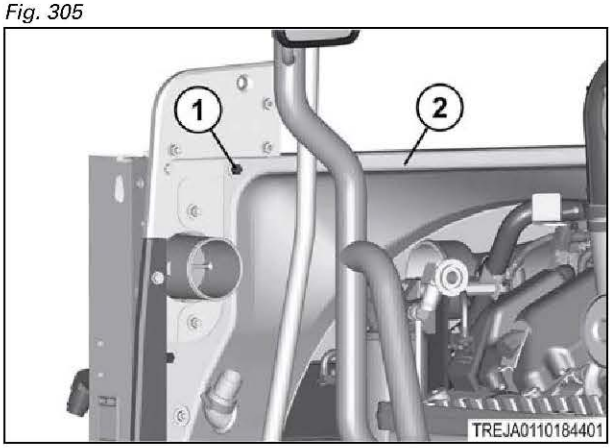

Fig. 306

40. Connect the correct lift equipment (1) to the cooling package.

IMPORTANT: *The weight of the cooling package is approximately 179 kg (395 lb).*

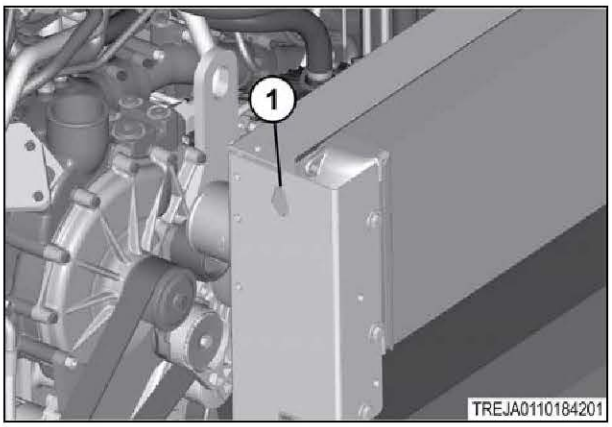

Fig. 307

41. Remove the hardware (1) and the cooling package (2).

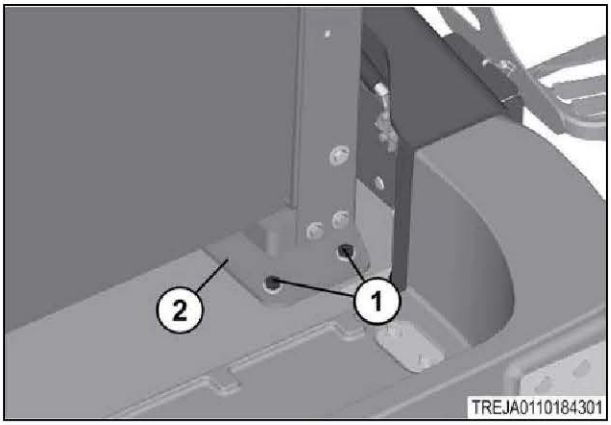

Fig. 308

42. Remove the hardware (1) and the bottom and top cross members (2).

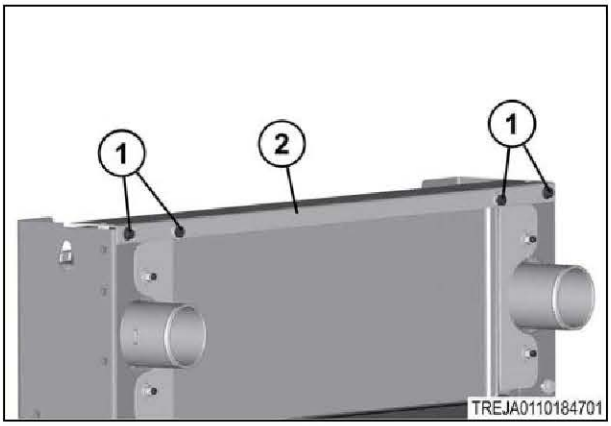

Fig. 309

43. Remove the hardware (1) and the two side channels (2).

44. Remove the implement oil cooler (3).

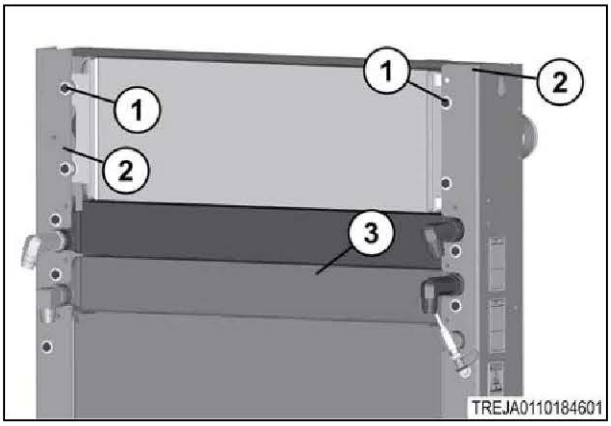

Fig. 310

Related Links

Remove the engine cover page 13-3
Remove the batteries page 10-22

9.3.26 Install the implement oil cooler

Procedure

1. Use the hardware (1), to install the foam seals and the implement oil cooler (3), to the two side channels (2).

NOTE: *Make sure the foam seals are in the correct location. Replace if worn.*

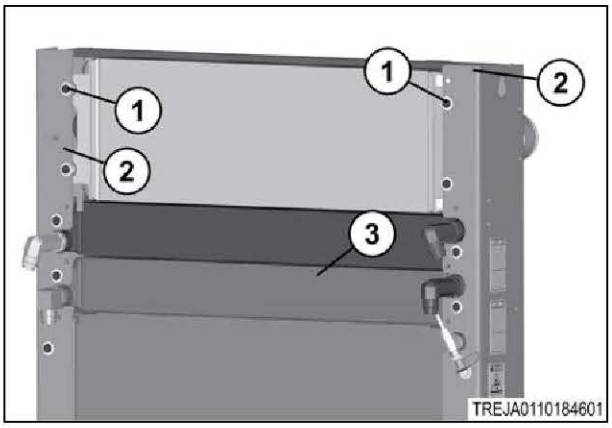

Fig. 311

2. Use the hardware (1) to install the bottom and the top cross members (2).

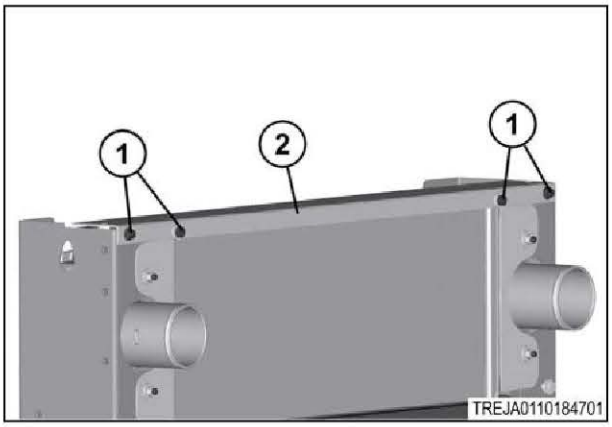

Fig. 312

3. Connect the correct lift equipment (1) to the cooling package.

IMPORTANT: *The weight of the cooling package is approximately 179 kg (395 lb).*

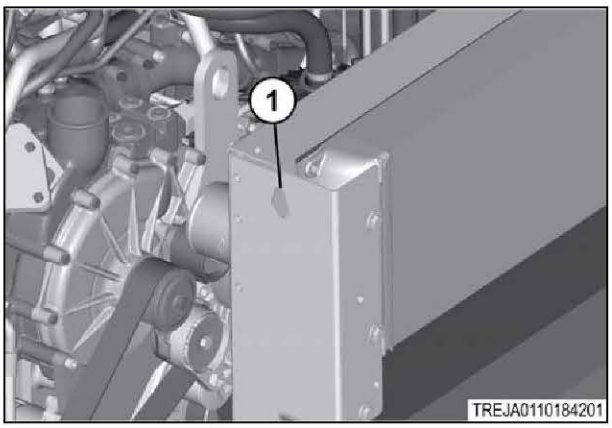

Fig. 313

4. Use the hardware (1) to install the cooling package (2).

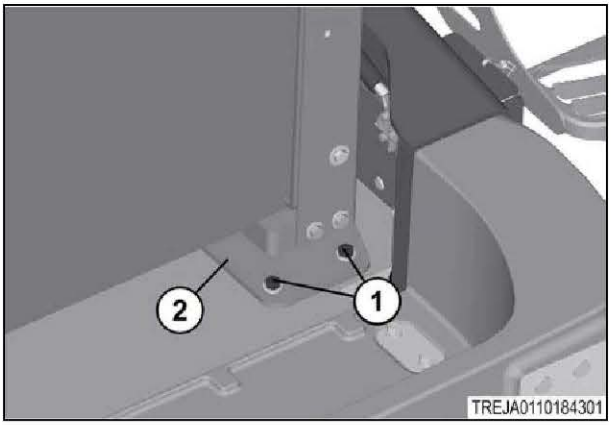

Fig. 314

5. Use the hardware (1) to install the fan shroud (2).

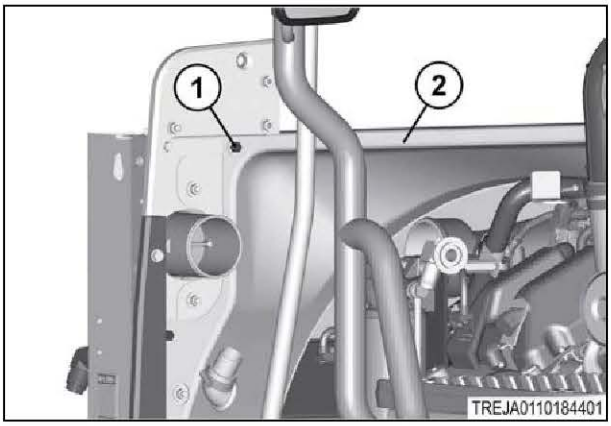

Fig. 315

6. Use the hardware (2) to install the air conditioning condenser/fuel cooler assembly (3).

7. Connect the hydraulic hoses (1).

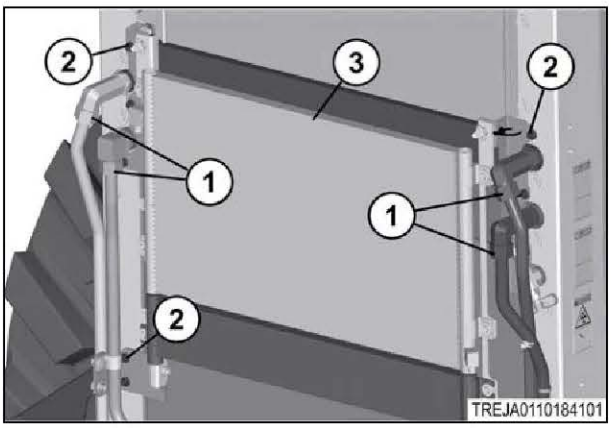

Fig. 316

8. Use the hardware (1) to install the air conditioning receiver-dryer bracket (2).

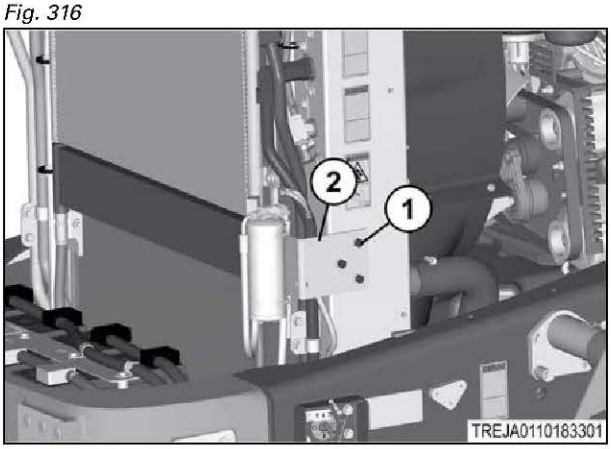

Fig. 317

9. Use the hardware (1) to install the seal, and the top seal bracket (2).

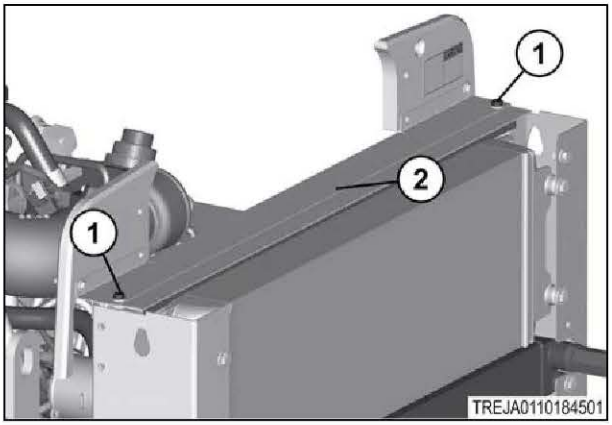

Fig. 318

10. Use the hardware (1) to install the seals, and the two side seal brackets (2).

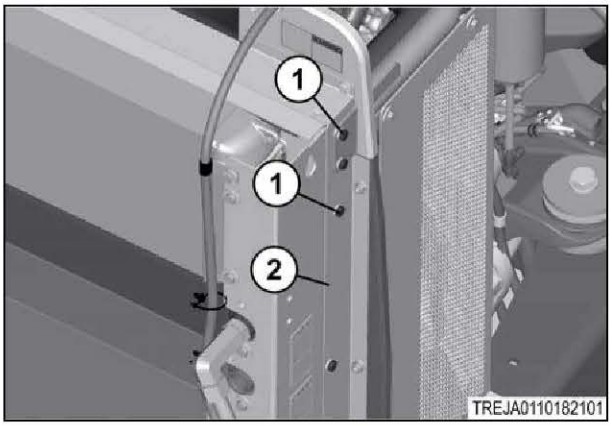

Fig. 319

11. Install the batteries (1).

See the information for installing the batteries.

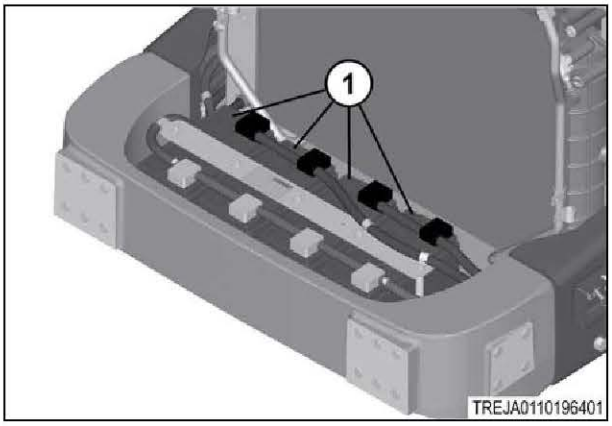

Fig. 320

12. Use the hardware (1) to install the left support bracket (2).

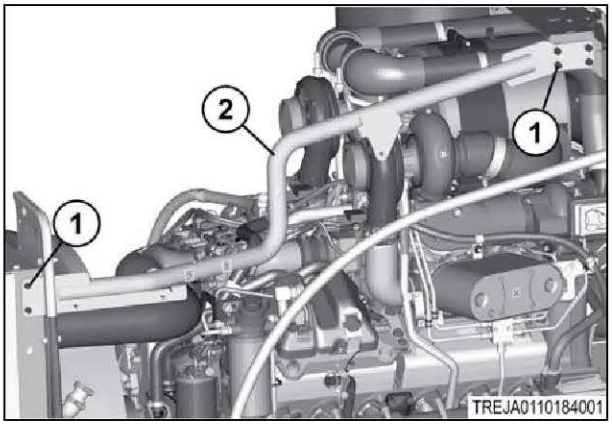

Fig. 321

13. Use the hardware (1) to install the expansion tank (2).

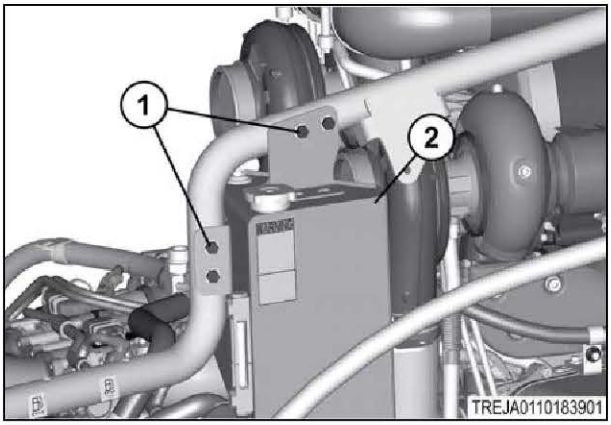

Fig. 322

14. Use the hose clamps (1) to connect the hoses (2) to the expansion tank.

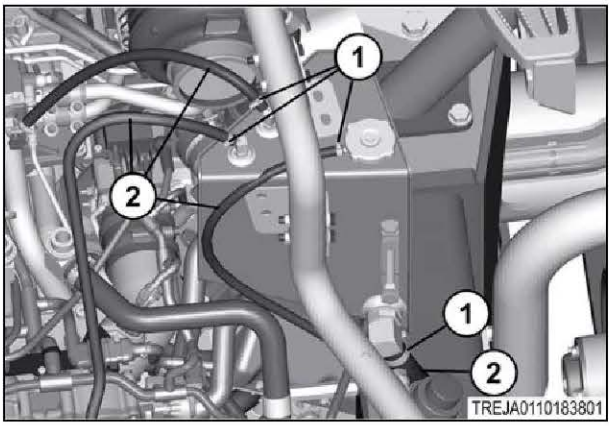

Fig. 323

15. Use the hardware (1) to install the right support bracket (2).

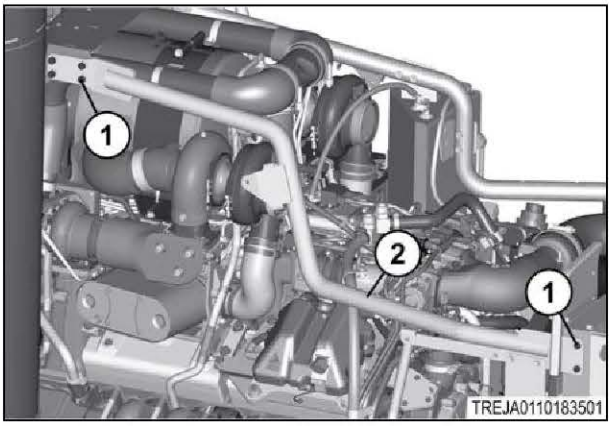

Fig. 324

16. Use the hose clamps (3) to connect the outlet radiator hose (4).

17. Use the hardware (1) to install the hose clamp (2).

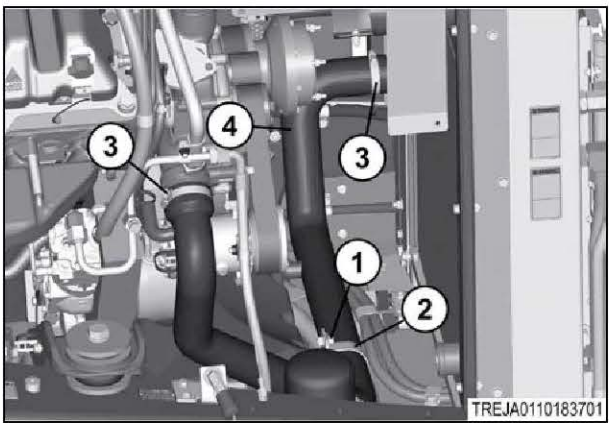

Fig. 325

18. Use the hose clamps (4) to connect the inlet radiator hose (5).

19. Use the hardware (1) to install the bracket (3) and the hose clamp (2).

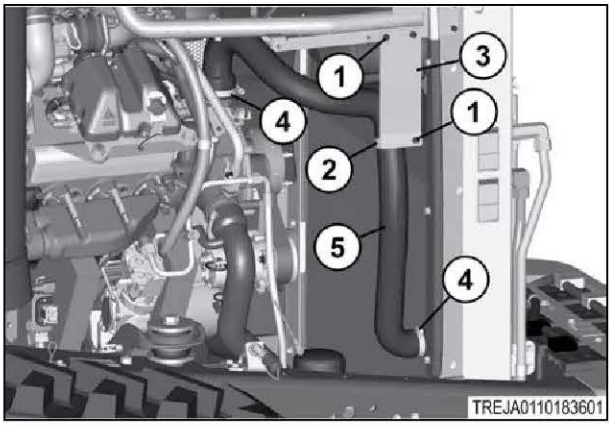

Fig. 326

20. Use the hardware (1) to install the air filter assembly mount (2).

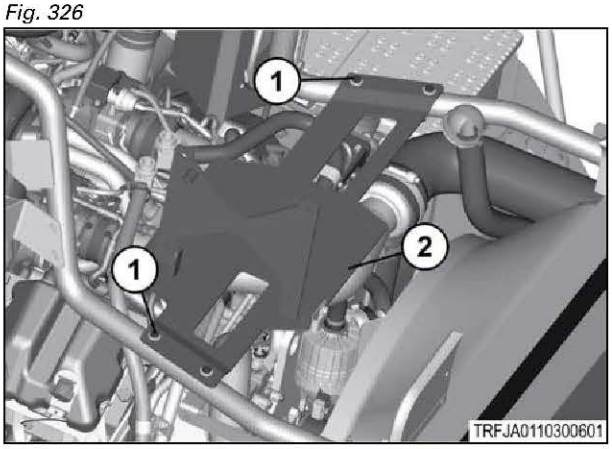

Fig. 327

21. Use the hardware (1), to install the hose clips (2).

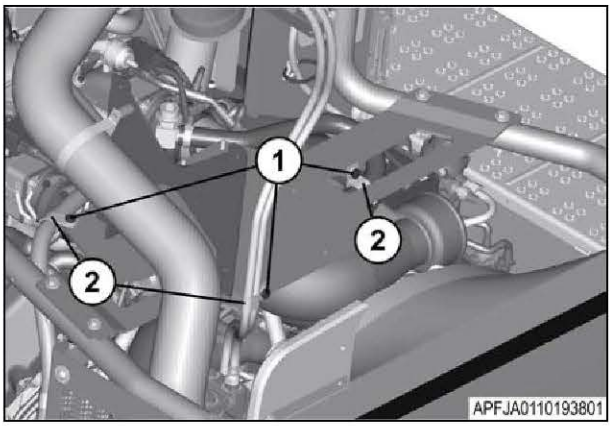

Fig. 328

22. Use the hardware (1) to install the air filter assembly (2).

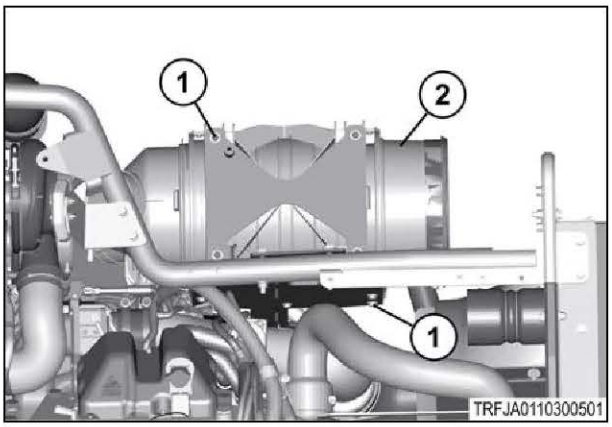

Fig. 329

23. Use the hose clamp (1) to connect the dust ejector tube (2).

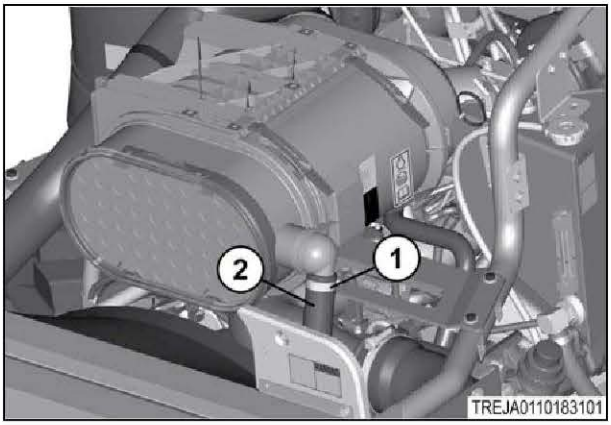

Fig. 330

24. Use the hose clamps (1) to connect the turbocharger inlet tubes (2).

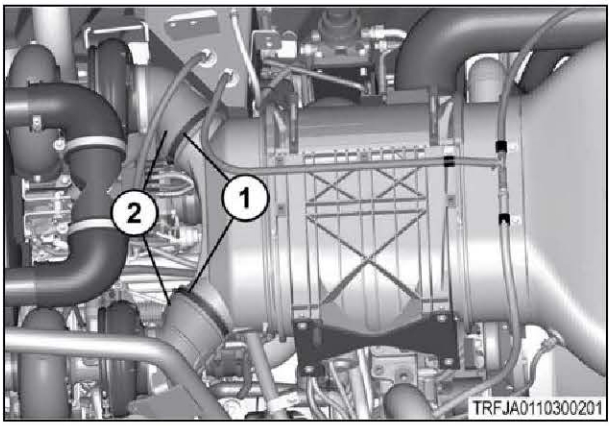

Fig. 331

25. Connect the two wire harnesses (1) to the air filter.

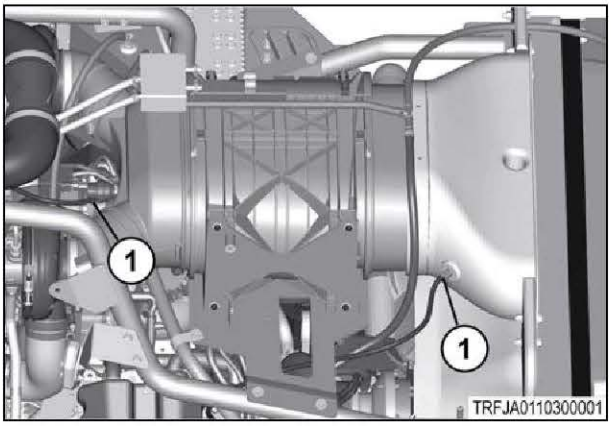

Fig. 332

26. Use the hardware (1), to install the hose clips (2), and the doser expansion tank bracket (3).

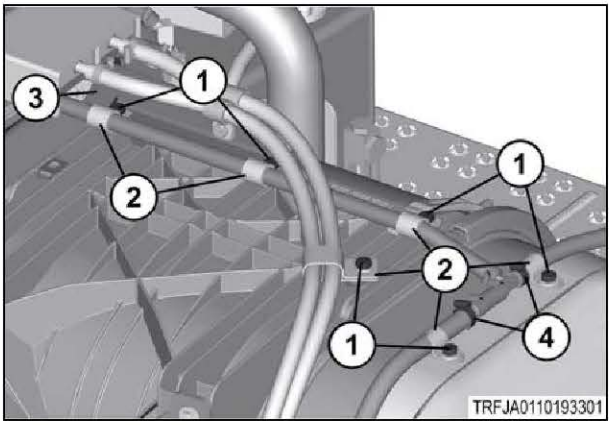

Fig. 333

27. Use the hardware (1) to install the air filter nozzle (2).

28. Use the hardware (3), to install the plastic seals (4).

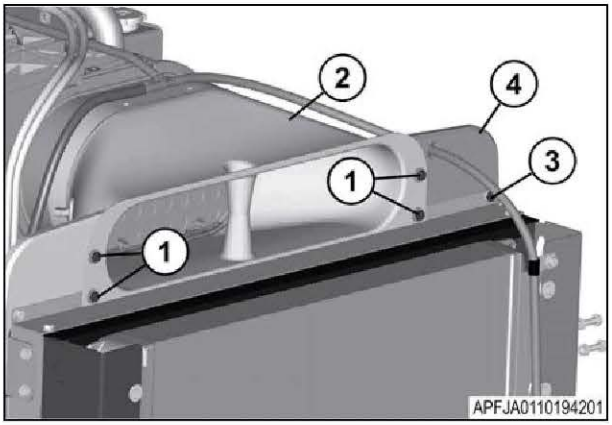

Fig. 334

29. Use the tube clamps (1) to install the right charge air cooler tube (2).

30. Use the hardware (3) to install the clamp (4).

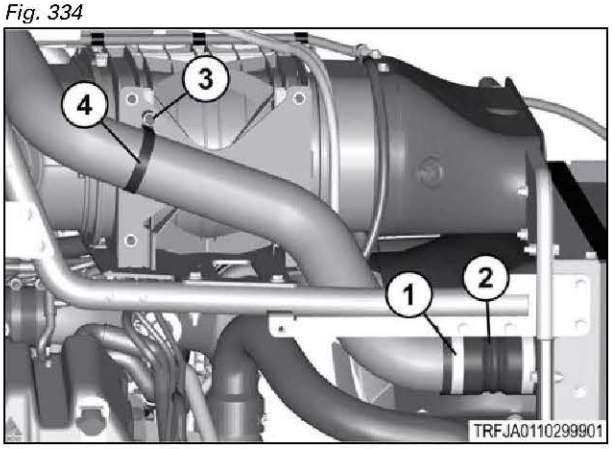

Fig. 335

31. Use the tube clamps (1) to install the left charge air cooler tube (2).

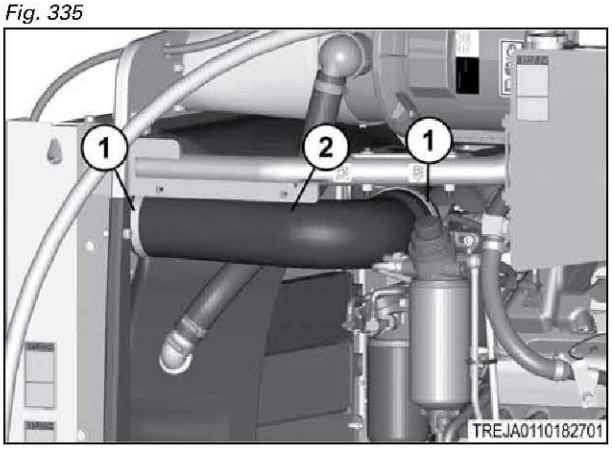

Fig. 336

32. Use the hardware (1) to install the left fan guard (2).

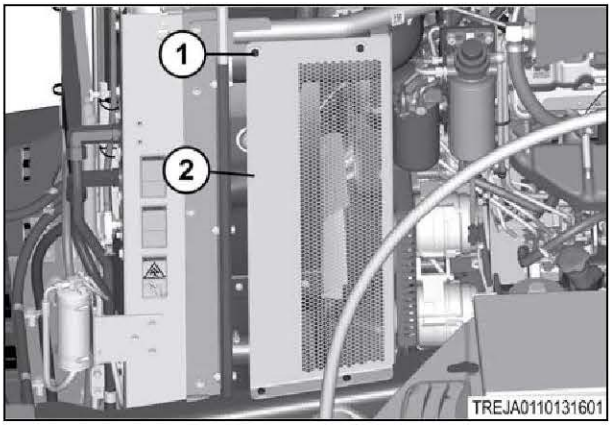

Fig. 337

33. Use the hardware (1, 3) to install the right fan guard (2).

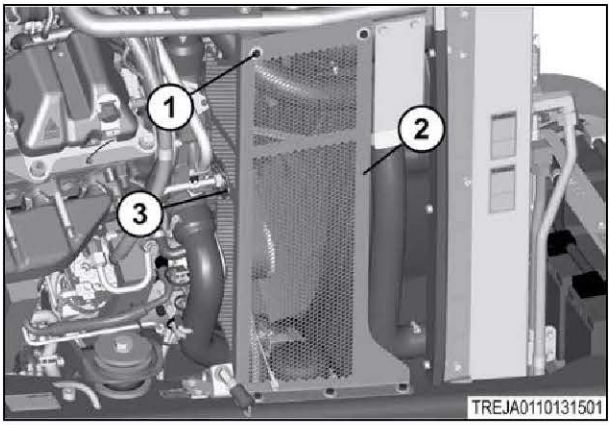

Fig. 338

34. Remove the drain hose and tighten the drain valve (3).

35. Use the hardware (1) to install the cover plate (2).

36. Fill the radiator with the correct type and quantity of engine coolant.

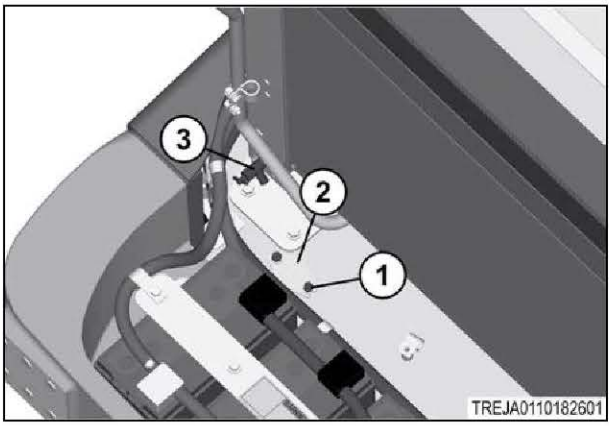

Fig. 339

37. Install the engine cover.

38. Install the battery disconnect switch key.

39. Turn on the battery disconnect switch (1).

Related Links

Install the engine cover (MY2015 and earlier) page 13-16
Fill capacities page 1-18
Coolant quality requirements page 2-239
Install the batteries page 10-23
Refill the cooling system page 2-149

9.3.27 Remove the implement oil cooler bypass valve

Before starting the procedure

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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

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

Contact with moving parts can cause personal injury or death.

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

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

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

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

Procedure

1. Disconnect and cap the cooler supply lines (1).

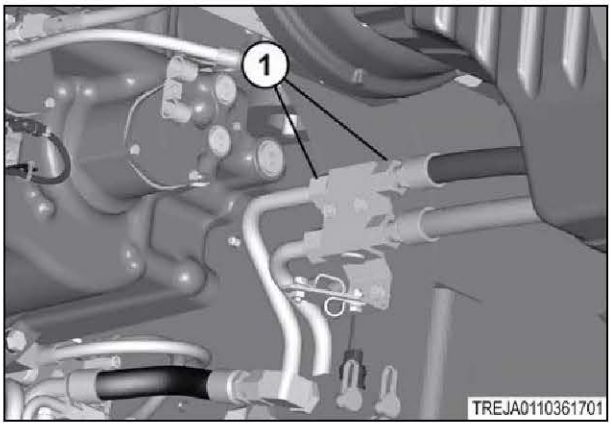

Fig. 340

2. Disconnect and cap the cooler return lines (1).

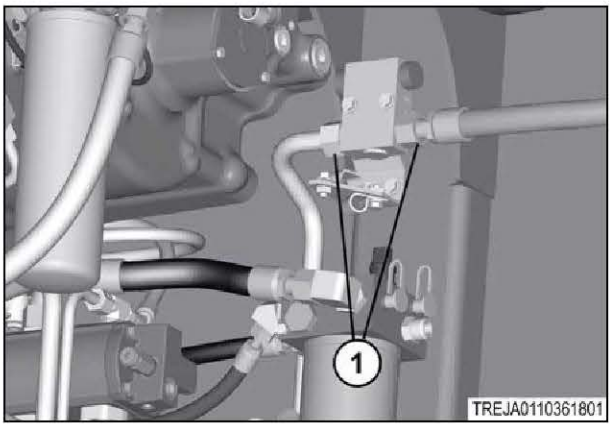

Fig. 341

3. Remove the bolts (1).

4. Remove the implement oil cooler bypass valve from the bracket.

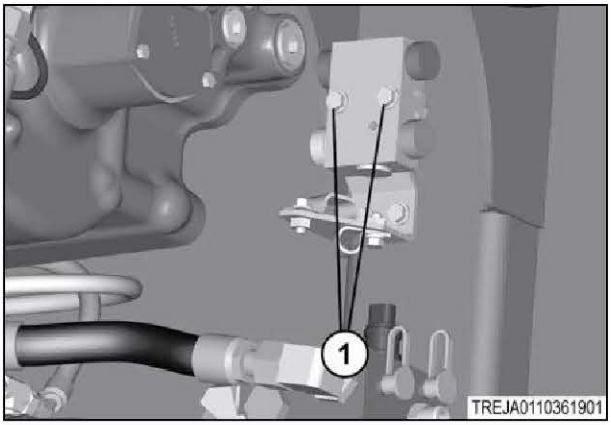

Fig. 342

9.3.28 Install the implement oil cooler bypass valve

Before starting the procedure

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

Procedure

1. Put the implement oil cooler bypass valve in position on the bracket and install the bolts (1).

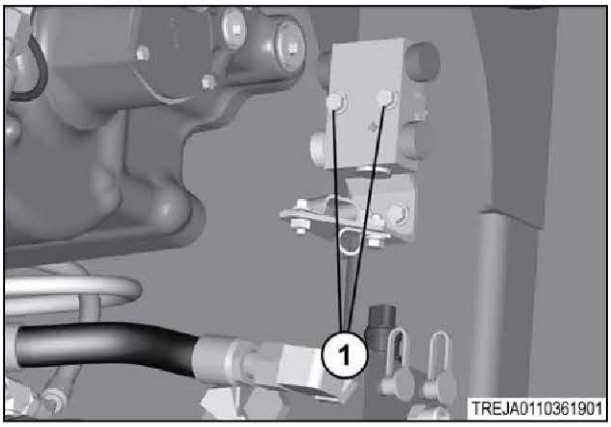

Fig. 343

2. Connect the oil cooler return lines (1).

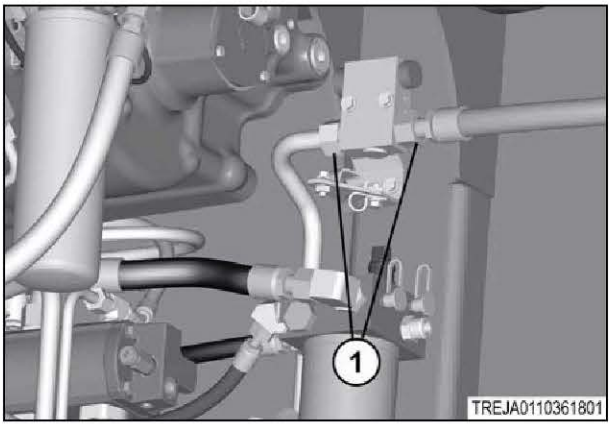

Fig. 344

3. Connect the oil cooler supply lines (1).

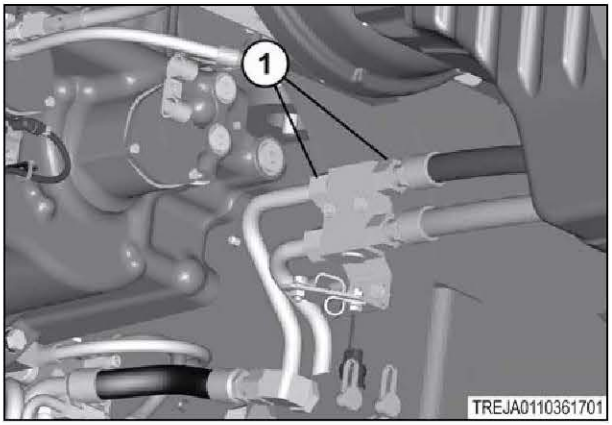

Fig. 345

9.4 Hydraulic system testing and adjusting

9.4.1 Prepare the machine

Procedure

1. Move the machine to a smooth horizontal location.
2. Lower all implements to the ground and lower the 3-point linkage to the ground.
3. Put the transmission control lever into the park position.
4. Heat the oil to a minimum temperature of 60° C (140° F).
5. Move all hydraulic control levers through the float position to release the hydraulic 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.

6. Stop the engine and remove the key.
7. Remove the applicable guards.

9.4.2 Troubleshooting procedure

Do the visual checks on the machine. If the problem is not identified, do the mechanical system tests. If the mechanical system tests do not identify the problem, do the electrical system tests.

For additional aid in resolving a problem, see the troubleshooting information for possible causes of a known problem.

One or more cause can exist for a problem. The troubleshooting information will give specific inspections and instrument tests. The inspections and instrument tests will help identify the most common causes.

Use the six steps to start troubleshooting the machine

1. Know the machine
2. Understand the symptom
3. Make sure the symptom is correctly identified
4. Determine the possible causes
5. Narrow down the possible causes
6. Test the system

Know the machine

Understand the operation of the machine. Know if the symptom is characteristic of normal operation or if the symptom is an indication of a component failure.

Read the systems operation information to understand the systems of the machine. Make sure to understand the system interactions on the machine.

Understand the system

Question the operator about the problem:

- Inquire about the performance of the machine before the symptoms occurred.
- Determine the time of the first time the symptoms occurred.
- Determine the operating conditions at the time of the symptoms.
- Inquire with the operator about the sequence of events before the system symptoms occurred. Determine the order of the events.

- Inquire with the operator about the steps taken to troubleshoot the machine.
- Inquire about the history of the repairs of the machine.
- Inquire about the preventive maintenance of the machine.
- Inspect the machine.
- Look for problems.
- Notice any odors in the air that are not normal.
- Listen for noises that are not normal.

Check the symptom

Operate the machine. When possible, repeat the conditions that caused the symptoms. Check the gauges inside the cab. Note any unusual odors in the air. Listen for any noises that are not normal.

Determine the possible causes

After gathering the information, create a list of possible causes. Determine the subsystem that is the cause of the symptoms. Use the list of possible causes in troubleshooting the systems.

Reduce the list of possible causes

Make a list of the possible causes in order of likeliengine cover. Identify the possible causes that are easy to check. When possible, remove possible causes that are easy to check.

Test the system

Use the service tests to make sure of the cause of the symptoms. After identifying the cause, repair the component and test the system again.

9.4.3 Visual inspection

The following is a list of visual inspections:

- Measure the oil level.
- Check for air in the oil through the sight gauge next to the power take-off shaft immediately after stopping the machine.
- Check for particles in the filter element. Use a magnet to disconnect the metal particles from nonmetal particles. Bronze color particles can indicate clutch failure. Brass particles or shiny steel particles can indicate pump failure. Rubber particles can indicate seal and/or hose failure.
- Inspect all the oil lines and the connections for damage and leaks.
- Inspect the control linkages for broken and damaged components.

9.4.4 Test equipment

Hydraulic test procedures can be performed using appropriate pressure gauges.

9.4.5 Warm the hydraulic oil

Procedure

1. Install the hose assembly (1) into the quick coupler of any hydraulic control valve.
2. Put the hydraulic control lever in the extend detent position.
3. Adjust the valve (2) to heat the hydraulic oil.

   NOTE:
   During a diagnosis an any of the hydraulic systems, remember that correct oil flow and correct pressure are necessary for correct operation. Resistance of oil flow causes oil pressure. Oil temperature must be a minimum 60° C (140° F). The temperature of the hydraulic oil is on the information screen of the tractor management center.

Fig. 346

9.4.6 Position of the hydraulic test ports

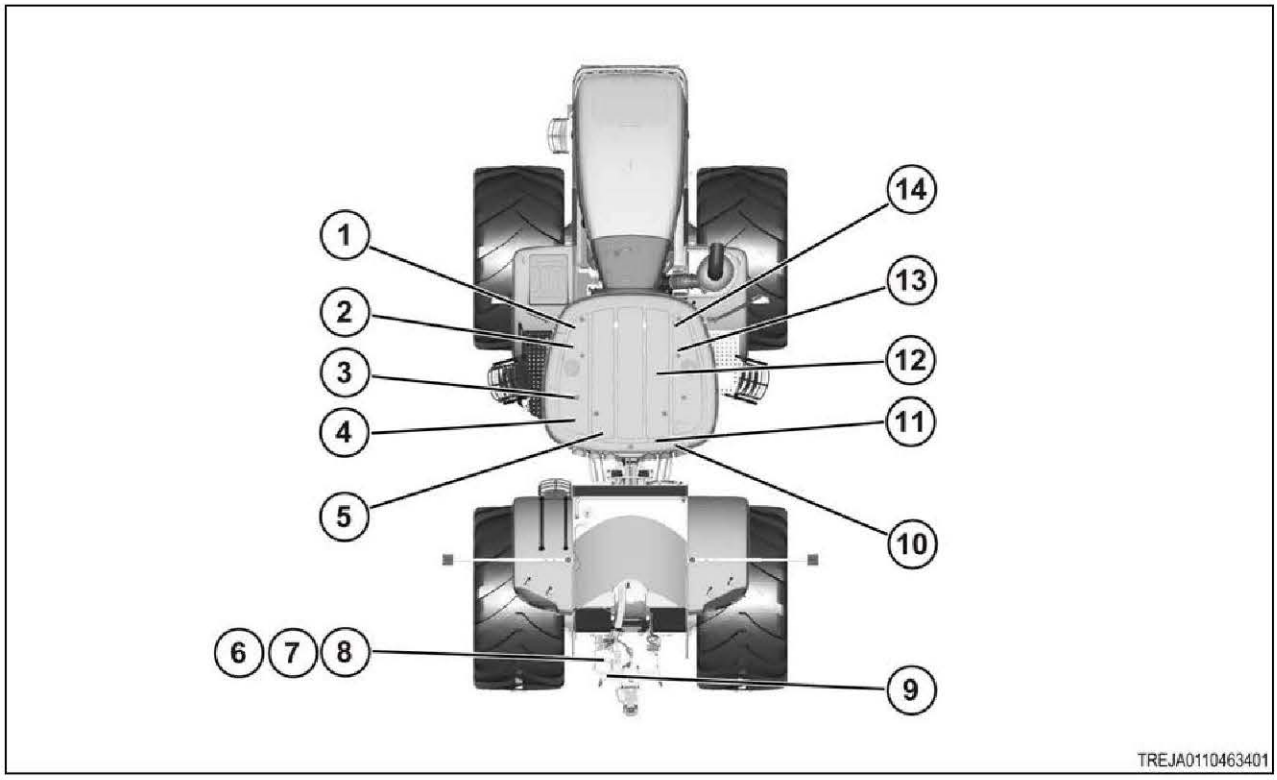

Fig. 347

Callout	Description
1	Hydraulic cooler test ports
2	Axle lubrication test ports
3	Park brake pressure test port
4	Park brake pressure test port
5	PTO pressure test port

Callout	Description
6	Supply pressure test port
7	Pilot pressure test port
8	Return oil test port
9	Load signal test port
10	Cylinder test ports
11	PTO lubrication test port
12	Remote transmission pressure test port
13	Brake pressure test port
14	Transmission filter test port

9.4.7 Complete the low pressure standby test

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Warm the oil to 65 ± 7° C (149 ± 13° F).
4. Turn the key start switch to the off position and take the key with you.
5. Relieve all pressure from the hydraulic system.
6. Connect the appropriate pressure gauge to the pressure port quick disconnect.

   IMPORTANT:
   Do not move any hydraulic control levers. Leave the hydraulic control levers in the hold position to prevent damage to the pressure gauge.
7. Start the engine. Operate the engine at 1000 ± 10 RPM.
8. Check the pressure values. See the values for the pump options.

Implement valve supply pressure	3800 ± 300 kPa (551 ± 44 psi)
Implement valve load sense (LS) pressure	250 ± 250 kPa (36 ± 36 psi)
Steering valve load sense (LS) pressure	1400 ± 400 kPa (203 ± 58 psi)
Implement valve pilot pressure	3150 ±350 kPa (457 ± 51 psi)
Implement valve return pressure	40 ± 30 kPa (22 ± 14.5 psi)
Implement cooler in pressure	150 ± 75 kPa (22 ± 11 psi)

Standard pump option (85 cc)

Implement valve supply pressure	3900 ± 300 kPa (565 ± 44 psi)
Implement valve load sense (LS) pressure	250 ± 250 kPa (36 ± 36 psi)
Steering valve load sense (LS) pressure	1400 ± 400 kPa (203 ± 58 psi)
Secondary implement pump supply pressure	1000 ± 300 kPa (145 ± 44 psi)

Implement valve pilot pressure	3150 ± 350 kPa (457 ± 51 psi)
Implement valve return pressure	40 ± 30 kPa (22 ± 14.5 psi)
Implement cooler in pressure	150 ± 75 kPa (22 ± 11 psi)

High flow pump option (2 X 63 cc)

9.4.8 Complete the high pressure standby test

Procedure

1. Park the machine on a solid, level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Heat the oil to 65 ± 7° C (149 ± 13° F).
4. Turn the key start switch to the off position and take the key with you.
5. Relieve all pressure from the hydraulic system.
6. Connect appropriate pressure gauge to the pressure port.
7. Start the engine. Operate the engine at 2100 ± 10 RPM.
8. Extend one valve at 100% flow command with no hoses connected or the connected hoses blocked.

   The implement valve supply pressure must be set at 20000 ± 300 kPa (2900 ± 44 psi) by adjusting the implement load sense (LS) relief valve.

Implement valve load sense (LS) pressure	17600 ± 500 kPa (2552 ± 73 psi)
Steering valve load sense (LS) pressure	1400 ± kPa (203 ± 58 psi)
Secondary implement pump supply pressure (2 X 63 cc pump option only)	1000 ± 300 kPa (145 ± 44 psi)
Implement valve pilot pressure	3150 ± 350 kPa (457 ± 51 psi)
Implement valve return pressure	60 ± 40 kPa (9 ± 6 psi)
Implement cooler in pressure	375 ± 100 kPa (54 ± 15 psi)

9. Extend two valves at 100% flow command with no hoses connected or the connected hoses blocked.

   The maximum implement valve supply pressure must be 20,800 kPa (3017 psi). Adjust the implement valve supply pressure, if necessary.

Implement valve load sense (LS) pressure	17800 ± 700 kPa (2581 ± 101 psi)
Steering valve load sense (LS) pressure	1400 ± 400 kPa (203 ± 58 psi)
Secondary implement pump supply pressure (2 X 63 cc pump option only)	1000 ± 300 kPa (145 ± 44 psi)
Implement valve pilot pressure	3150 ± 350 kPa (457 ± 51 psi)

9.4.9 Complete the margin pressure test - standard pump

Before starting the procedure

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.

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.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Warm the oil to 65 +/- 7° C (149 +/- 13° F).
4. Set the section 3 flow command to 50%.
5. Relieve all pressure from the hydraulic system.
6. Turn the key start switch to the off position and take the key with you.
7. Connect a loop line with an adjustable relief valve to section 3. Set the implement valve supply pressure to 10350 +/- 1000 kPa (1500 psi +/- 145 psi).
8. Connect the appropriate pressure gauges to the pressure port quick disconnect and the load sense port quick disconnect.
9. Start the engine. Operate the engine at 1500 +/- 10 RPM.
10. Move the hydraulic control lever to the extend position.
11. Record the margin pressure.

    NOTE:
    The margin pressure is the difference between the implement valve supply pressure and the implement valve load sense pressure. The margin must be set to 2100 +/- 100 kPa (305 +/- 15 psi).
12. Adjust the margin pressure, as necessary.

9.4.10 Adjust the margin pressure - standard pump

Before starting the procedure

Do the test for the margin pressure for the standard pump.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Turn the key start switch to the off position and take the key with you.
4. Find the flow compensator spool (1) on the compensator valve.

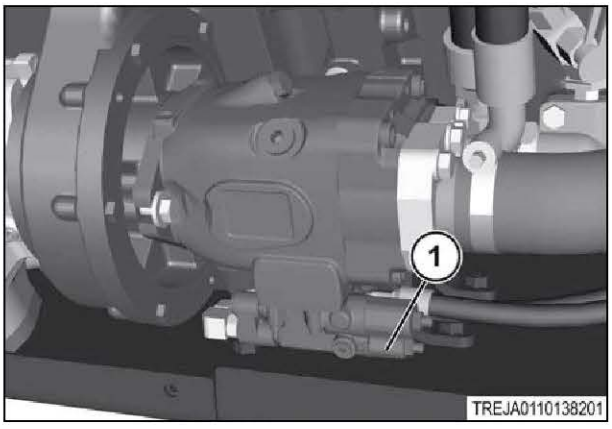

Fig. 348

5. Loosen the locking nut (2).
6. Rotate the adjustment screw (3) to adjust the margin pressure.

   NOTE:
   Rotating the adjustment screw clockwise will increase the margin pressure.
   Rotating the adjustment screw counterclockwise will decrease the margin pressure.
7. Tighten the locking nut.
8. Do the margin pressure testing procedure for the standard pump to check the adjustment.

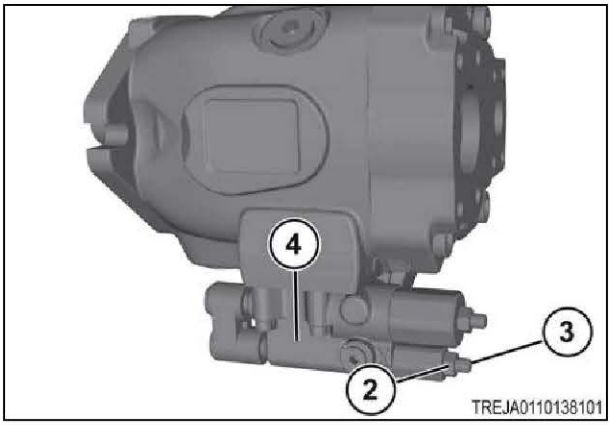

Fig. 349

Related Links

Complete the margin pressure test - standard pump page 9-129

9.4.11 Complete the margin pressure test - high flow pump

Before starting the procedure

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.

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.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the park brake.
3. Warm the oil to 65 +/- 7° C (149 +/- 13° F).
4. Set the section 3 flow command to 50%.
5. Relieve all pressure from the hydraulic system.
6. Turn the key start switch to the off position and take the key with you.

   IMPORTANT:
   The high flow pump option requires setting the margin pressure for each pump separately. Set the secondary pump (2) *margin pressure before setting the primary pump* (1) *margin pressure.*
7. Connect a loop line with an adjustable relief valve to section 3. Set the implement valve supply pressure to 10350 +/- 1000 kPa (1500 psi +/- 145 psi).

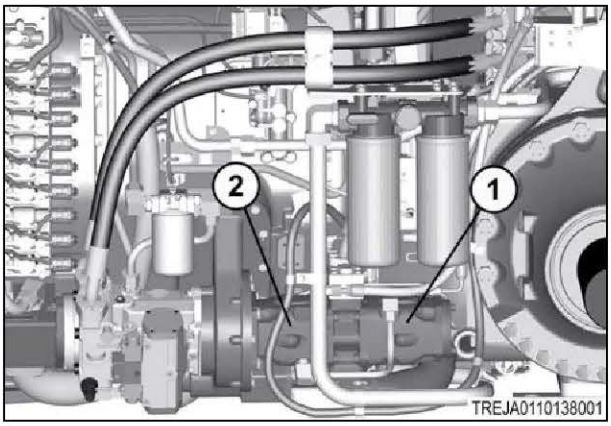

Fig. 350

8. Connect the appropriate pressure gauges to the secondary pump supply pressure port (1) and the load sense port.
9. Reduce the primary pump margin so the primary pump is not active. Loosen the jam. Decrease the margin adjustment (3) for the primary pump 4 to 6 turns.
10. Record the primary pump adjustment.
11. Tighten the jam nut.
12. Start the engine. Operate the engine at 1500 +/- 10 RPM.
13. Move the hydraulic control lever to the extend position.
14. Record the secondary pump margin pressure.

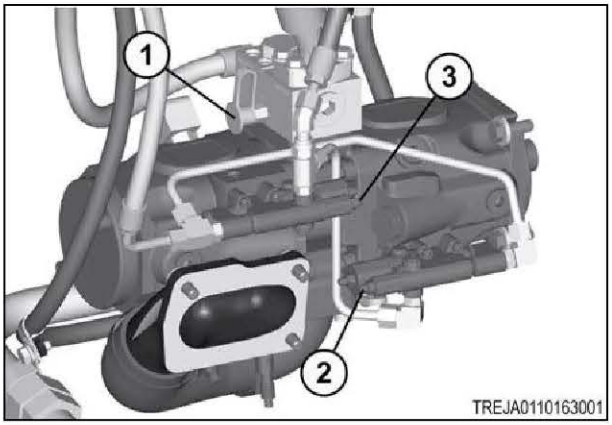

Fig. 351

NOTE:
The margin pressure is the difference between the secondary pump supply pressure and the implement valve load sense pressure. The margin must be set to 2100 +/- 100 kPa (305 +/- 15 psi).

15. Adjust the secondary pump margin pressure, as necessary.
16. Turn the key start switch to the off position and take the key with you.
17. Connect the appropriate pressure gauges to the pressure port quick disconnect and the load sense port quick disconnect.
18. Start the engine. Operate the engine at 1500 +/- 10 RPM.
19. Move the hydraulic control lever to the extend position.
20. Record the margin pressure.

NOTE:
The margin pressure is the difference between the implement valve supply pressure and the implement valve load sense pressure. The margin must be set to 2500 +/- 100 kPa (363 +/- 15 psi).

21. Adjust the margin pressure for the primary pump, as necessary.

9.4.12 Adjust the margin pressure - high flow pump

Before starting the procedure

Do the testing the margin pressure procedure for the high flow pump.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Turn the key start switch to the off position and take the key with you.

4. Reduce the primary pump margin so the primary pump (1) is not active. Loosen the jam nut. Decrease the margin adjustment for the primary pump 4 to 6 turns.

5. Record the primary pump adjustment.

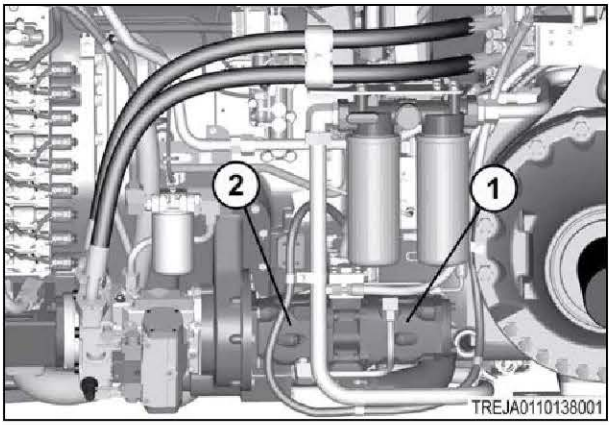

Fig. 352

6. Tighten the jam nut.

7. Find the flow compensator spool on the compensator valve for the secondary pump (2).

8. Loosen the jam nut.

9. Rotate the adjustment screw (2) to adjust the margin pressure.

   NOTE:
   Rotating the adjustment screw clockwise will increase the margin pressure.
   Rotating the adjustment screw counterclockwise will decrease the margin pressure.

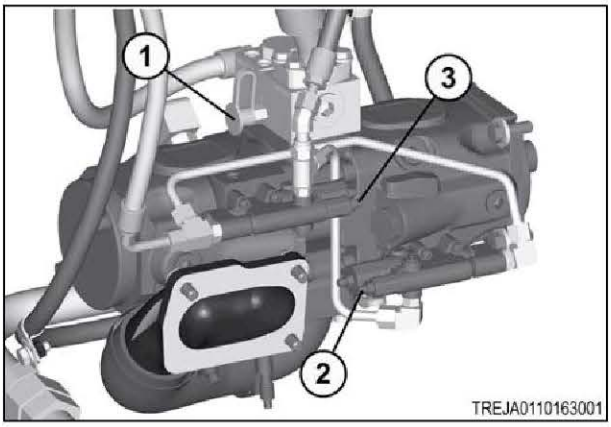

Fig. 353

10. Do the margin pressure testing procedure for the high flow pump to check the adjustment.

    NOTE:
    Adjust the secondary pump margin pressure to 2100 kPa +/- 100 kPa (305 +/- 15 psi).

11. Tighten the jam nut.

12. Do the margin pressure testing procedure to make sure the adjustment is correct.

13. Adjust the primary pump margin pressure to the original position (4 to 6 turns).

14. Do the margin pressure testing procedure for the high flow pump to check the adjustment.

    NOTE:
    Adjust the primary pump margin pressure to 2500 kPa +/- 100 kPa (363 +/- 15 psi).

15. Tighten the jam nut.

16. Do the margin pressure testing procedure to make sure the adjustment is correct.

Related Links

Complete the margin pressure test - high flow pump page 9-131

9.4.13 Test the high pressure stall

Before starting the procedure

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.

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.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Heat the oil to 65 +/- 7° C (149 +/- 13° F).
4. Turn the key start switch to the off position and take the key with you.
5. Relieve all pressure from the hydraulic system.
6. Connect a correct pressure gauge to the pressure port on the hydraulic control valve bank.
7. Start the engine. operate the engine at high idle.
8. Move and hold a hydraulic control lever in the extend position.

   The pressure will read 19700 to 20300 kPa (2857 to 2944 psi). This is the high pressure stall.

   If the high pressure stall reading is not correct, make sure the margin pressure is correct.

   If the margin pressure is correct, adjust the load sensing relief valve.
9. Repeat step 8, as necessary to get the correct high pressure stall value.

9.4.14 Test the high pressure cutoff

Before starting the procedure

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.

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.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Heat the oil to 65 +/- 7° C (149 +/- 13° F).
4. Turn the key start switch to the off position and take the key with you.
5. Relieve all pressure from the hydraulic system.
6. Connect appropriate pressure gauge to the pressure port.
7. Move and hold a hydraulic control lever in the extend position.

   Result

   The pressure will read 20000 to 20600 kPa (2900 to 2988 psi).
8. Rotate the load sensing relief valve clockwise completely.

Result

The pressure will read 22500 to 23500 kPa (3265 to 3405 psi). This is the cutoff pressure.

9. Release the hydraulic control lever.
10. If the high pressure cutoff pressure is not correct, adjust the compensator spool on the hydraulic pump.

NOTE:
If the high pressure cutoff is adjusted correctly, the load sensing relief valve must be adjusted.

11. Rotate the load sensing relief valve in the counterclockwise direction.

9.4.15 Test the implement valve stall pressure - single section

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Turn the key start switch to the off position and take the key with you.
4. Relieve all pressure from the hydraulic system.
5. Connect the appropriate pressure gauge to the test ports.
6. Set all valve sections to 100% flow command.
7. Set all valve sections to zero second detent time.
8. Set all valve sections to receive priority on the tractor management center (TMC).
9. Connect all sections to the test stand flow meter.
10. Start the engine and set the engine speed to 2100 ± 10 RPM.
11. When doing the test, make sure each implement lever corresponds with the correct port on the implement valve. Make sure the valve actuation feedback on the TMC is correct.
12. Close the test stand blocking valve.
13. Actuate each implement lever into the extend and retract positions for a minimum five seconds to check for leaks. Make sure each implement valve section meets the following pressure requirements:
    - Section flow must be 0.
    - Implement valve supply pressure must be 20000 ± 400 kPa (2900 ± 58 psi)
    - Implement valve load sense (LS) pressure must be 17900 ± 600 kPa (2595 ± 87 psi)
    - Coupler out pressure must be 20000 ± 400 kPa (2900 ± 58 psi)
    - Coupler in pressure must be less than 300 kPa (44 psi)
    - Elevated oil reservoir (EOR) pressure must be 60 ± 30 kPa (9 ± 4 psi)
    - Implement valve pilot pressure must be 3150 ± 350 kPa (457 ± 51 psi)
    - Implement valve return pressure must be 100 ± 50 kPa (15 ± 7 psi)

9.4.16 Test the implement valve stall pressure - all sections

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Turn the key start switch to the off position and take the key with you.

4. Relieve all pressure from the hydraulic system.
5. Connect the appropriate pressure gauge to the test ports.
6. Set all valve sections to 100% flow command.
7. Set all valve sections to zero second detent time.
8. Set all valve sections to receive priority on the tractor management center (TMC).
9. Connect all sections to the test stand flow meter.
10. Start the engine and set the engine speed to 2100 ± 10 RPM.
11. When doing the test, make sure each implement lever corresponds with the correct port on the implement valve. Make sure the valve actuation feedback on the TMC is correct.
12. Close the test stand blocking valve.
13. Actuate each implement lever into the extend and retract positions for a minimum five seconds to check for leaks. Make sure each implement valve section meets the following pressure requirements:
    - Section flow must be 0.
    - Implement valve supply pressure must be 20000 ± 400 kPa (2900 ± 58 psi)
    - Implement valve load sense (LS) pressure must be 17900 ± 600 kPa (2595 ± 87 psi)
    - Coupler out pressure must be 20000 ± 400 kPa (2900 ± 58 psi)
    - Coupler in pressure must be less than 300 kPa (44 psi)
    - Elevated oil reservoir (EOR) pressure must be 60 ± 30 kPa (9 ± 4 psi)
    - Implement valve pilot pressure must be 3150 ± 350 kPa (457 ± 51 psi)
    - Implement valve return pressure must be 100 ± 50 kPa (15 ± 7 psi)

9.4.17 Test the implement valve section flow - standard implement valve

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Turn the key start switch to the off position and take the key with you.
4. Relieve all pressure from the hydraulic system.
5. Connect the appropriate pressure gauge to the test ports.
6. Set all valve sections to 100% flow command.
7. Set all valve sections to zero second detent time.
8. Set all valve sections to receive priority on the tractor management center (TMC).
9. Connect all sections to the test stand flow meter.
10. Start the engine and set the engine speed to 2100 ± 10 RPM.
11. When doing the test, make sure each implement lever corresponds with the correct port on the implement valve. Make sure the valve actuation feedback on the TMC is correct.
12. Actuate each implement lever to the extend and retract positions for three seconds. Make sure each implement valve section meets the following requirements:
    - Valve section flow must be 140 ± 10 L/min (37 ± 2.6 gal/min)
    - Implement valve supply pressure must be set to 10350 ± 1000 kPa (1500 ± 145 psi) using the test stand relief adjustment
    - Coupler out pressure must be 6500 ± 2500 kPa (942 ± 362 psi)

- Coupler in pressure must be 3350 ± 800 kPa (486 ± 116 psi)
- Elevated oil reservoir (EOR) pressure must be 60 ± 30 kPa (9 ± 4 psi)
- Implement valve pilot pressure must be 3150 ± 350 kPa (457 ± 51 psi)
- Implement valve return pressure must be 300 ± 125 kPa (43.5 ± 18 psi)

9.4.18 Test the implement valve section flow - high flow implement valve

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Turn the key start switch to the off position and take the key with you.
4. Relieve all pressure from the hydraulic system.
5. Connect the appropriate pressure gauge to the test ports.
6. Set all valve sections to 100% flow command.
7. Set all valve sections to zero second detent time.
8. Set all valve sections to receive priority on the tractor management center (TMC).
9. Connect all sections to the test stand flow meter.
10. Start the engine and set the engine speed to 2100 ± 10 RPM.
11. When doing the test, make sure each implement lever corresponds with the correct port on the implement valve. Make sure the valve actuation feedback on the TMC is correct.
12. Actuate each implement lever to the extend and retract positions for three seconds. Make sure each implement valve section meets the following requirements:
    - Valve section flow must be 160 ± 10 L/min (42 ± 2.6 gal/min).
    - Implement valve supply pressure must be set to 14500 ± 1000 kPa (2100 ± 145 psi) using the test stand relief adjustment
    - Coupler out pressure must be 7750 ± 2500 kPa (1124 ± 362 psi)
    - Coupler in pressure must be 5500 ± 1500 kPa (798 ± 217 psi)
    - Elevated oil reservoir (EOR) pressure must be 60 ± 30 kPa (9 ± 4 psi)
    - Implement valve pilot pressure must be 3150 ± 350 kPa (457 ± 51 psi)
    - Implement valve return pressure must be 360 ± 125 kPa (52 ± 18 psi)

9.4.19 Test the implement valve float function

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Turn the key start switch to the off position and take the key with you.
4. Relieve all pressure from the hydraulic system.
5. Connect the correct pressure gauge to the test ports.
6. Set all valve sections to 100% flow command.
7. Set all valve sections to zero second detent time.

8. Set all valve sections to receive priority on the tractor management center (TMC).
9. Connect all sections to the test stand flow meter.
10. Start the engine and set the engine speed to 2100 ± 10 RPM.
11. When doing the test, make sure each implement lever is connected to the correct port on the implement valve. Make sure the valve actuation feedback on the TMC is correct.
12. Actuate each lever into the float position.

    The workport pressure must be less than 200 kPa (30 psi).
13. Check the float position feedback on the TMC display. Make sure there is no flow from any of the implement valve sections.

9.4.20 Adjust the load sense relief 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.

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.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Lower all implements and the 3-point linkage to the ground.
4. Heat the oil to 65 +/- 7° C (149 +/- 13° F).
5. Relieve all the hydraulic pressure.
6. Turn the key start switch to the off position and take the key with you.
7. Connect an appropriate pressure gauge to the test port (1).
8. Start the engine. Operate the engine at high idle.
9. Extend one of the implement valves with no connections at 100% flow command.
10. Record the pressure.

    NOTE: *The pressure will be 19700 to 23000 kPa (2857 to 3336 psi) if the load sense relief valve is adjusted correctly.*

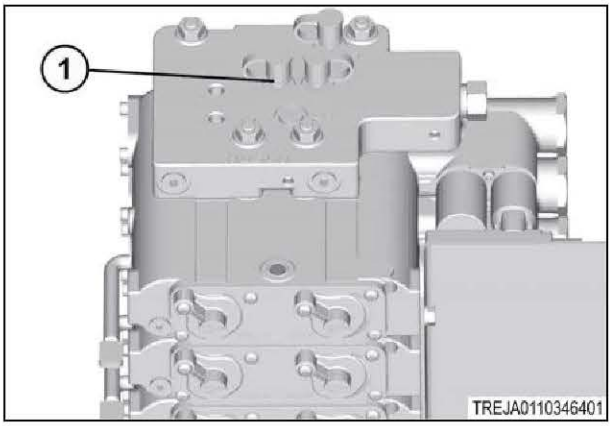

Fig. 354

11. If the pressure is not correct, adjust the load sense relief valve (1).
12. Loosen the lock nut.
13. Turn the adjusting screw to change the system pressure.

    NOTE:
    Turn the adjusting screw clockwise to increase the system pressure.
    Turn the adjusting screw counterclockwise to decrease the system pressure.
14. Tighten the lock nut.
15. Check the adjustment. Adjust the load sense relief valve, as necessary.

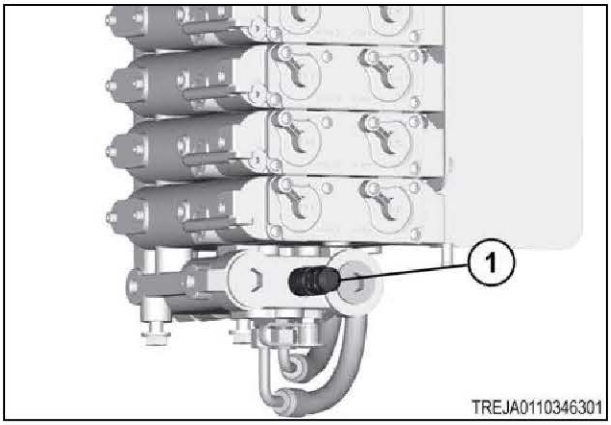

Fig. 355

9.4.21 Test the implement valve pilot pressure

Before starting the procedure

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.

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.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Heat the oil to 65 +/- 7° C (149 +/- 13° F).
4. Turn the key start switch to the off position and take the key with you.
5. Relieve all pressure from the hydraulic system.
6. Connect a correct pressure gauge to the pilot pressure port on the hydraulic control valve bank.
7. Start the engine. Operate the engine at high idle.
8. Move and hold a hydraulic control lever in the extend position.

   The pressure will read 2800 to 3500 kPa (407 to 508 psi).

   The pilot pressure setting is not adjustable.

9.4.22 Do a check of the implement hydraulics operation

Before starting the procedure

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.

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.

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Heat the oil to 65 +/- 7° C (149 +/- 13° F).
4. Extend and retract the implement valve cylinders multiple times.
5. Watch the implement cylinders as the rods move. Movement of the cylinder rods must be smooth and regular.
6. Listen for noise from the hydraulic pump.
7. Let the implement cylinders travel to the full stroke in each direction.
8. Put each hydraulic control valve in the hold position when the implement is in the raised position. Watch for excessive cylinder rod movement.

   Drift can be caused by the following conditions:

   - Leakage of oil past the piston seals
   - Too much clearance between the main spool and the valve body

9.4.23 Hydraulic control valve module

Diagnosis and Repair

Hydraulic control valve module (1)

Interchanging the hydraulic control valve modules can help diagnose problems. The hydraulic control valves cannot be permanently interchanged because of specific calibration values.

Example:

Implement valve switch number 3 will always control the module that came off the implement valve number 3, regardless of where the module is located. The number 3 switch and the number 3 module are tied to each other.

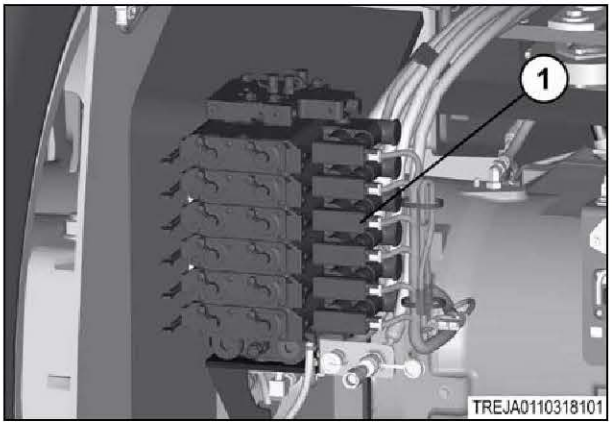

Fig. 356

Calibration

Calibration values are stored in each module. Each module is calibrated at the valve factory to work with the solenoids and the valve.

Calibration values are programmed into each module. The valve factory keeps a record of each valve stack assembled. There is an identification decal on each valve stack.

The valve will operate correctly if the original calibration values are installed in the replacement module.

If a module is damaged, try to get the calibration values for the valve. The calibration values are used for programming the replacement module for the valve assembly.

If the original calibration values are not available, use the identification decal to get the calibration values from the manufacturer's database.

Adding new valve sections

If additional valves are installed on a machine, the modules on the new valves will already have calibration values installed in the modules.

Keep all valve components as clean as possible during installation. Only use new O-ring kits.

Switches in the cab must be installed in the correct position. After installing the switches, use EDT to configure the machine for a new number of hydraulic control valves.

After the machine configuration, only one valve section can be added at one time.

Example:

A four section valve stack is being changed to a six section valve stack. Only connect the number five valve module to the CAN bus until the armrest module identifies the number five module. After the number five implement valve is identified, connect the number six valve module to the CAN bus at the module. Configure the number six implement valve to the switch and save the settings.

Recalibrating the implement valve module

If an implement valve module or solenoids are replaced and the original calibration values are not available or if calibration drift is not correct:

- Option 1:

  Using load sense values: technicians can adjust the calibration values with EDT and monitoring load sense pressure. Monitor load sense pressure to find the initial flow starting values. Enter a measured 99% flow value to set the top end.
- Option 2:

  Using a flow meter (more accurate): this method gives the precision necessary when using laser leveling systems. Technicians can adjust the calibration vales with EDT and a flow meter. Use the flow meter values to find the initial flow values (0 to 0.05 liters/min (0 to 0.013 gal/min)). Select the values that will give a 99% flow value from a valve assembly to set the maximum flow desired.

Flow priority operations

Flow priority selection: any implement valve can be selected through the Tractor Management Center (TMC) to receive priority flow. Only one valve must be selected as a priority function during operation.

Flow testing an implement pump: it is possible to select more than one implement valves as a priority function. The option is available so technicians can test the maximum flow output from the implement pump. Select valves one and three as priority and let the flow through these two valves to get maximum flow.

NOTE:
One valve cannot handle the maximum pump output.

9.4.24 Configure and sequence

Procedure

1. Locate the access panel (1) in the cab.
2. Remove the panel.

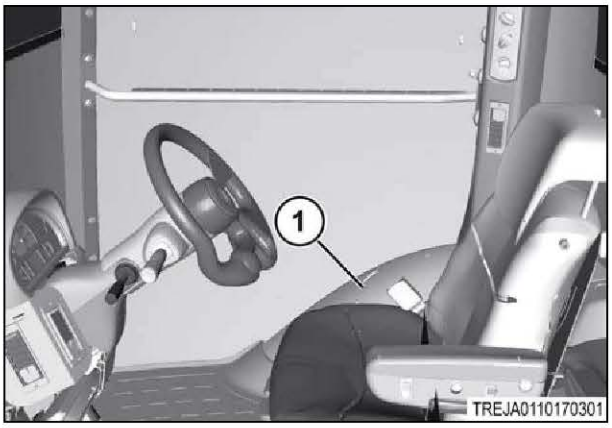

Fig. 357

3. Connect AGCO EDT to the middle connector (1).

   IMPORTANT:
   Setting the sequence and calibration of additional valve sections will be the same for all machine models.
   EDT will ask the model of the machine.
   It is required to enter the number of any additional valve sections being added.
   Additional valve sections need to be electrically connected, resequenced, and calibrated at one time.

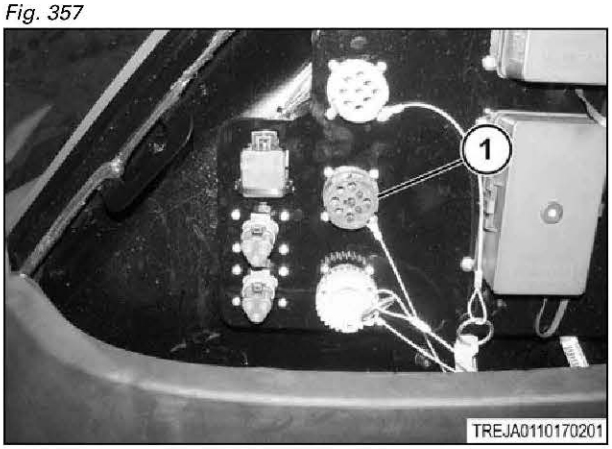

Fig. 358

4. Connect the harness to any additional valve section one at a time.
5. Open EDT. Select Challenger.
6. Select the machine model.
7. Make sure the connection in the cab is secure.

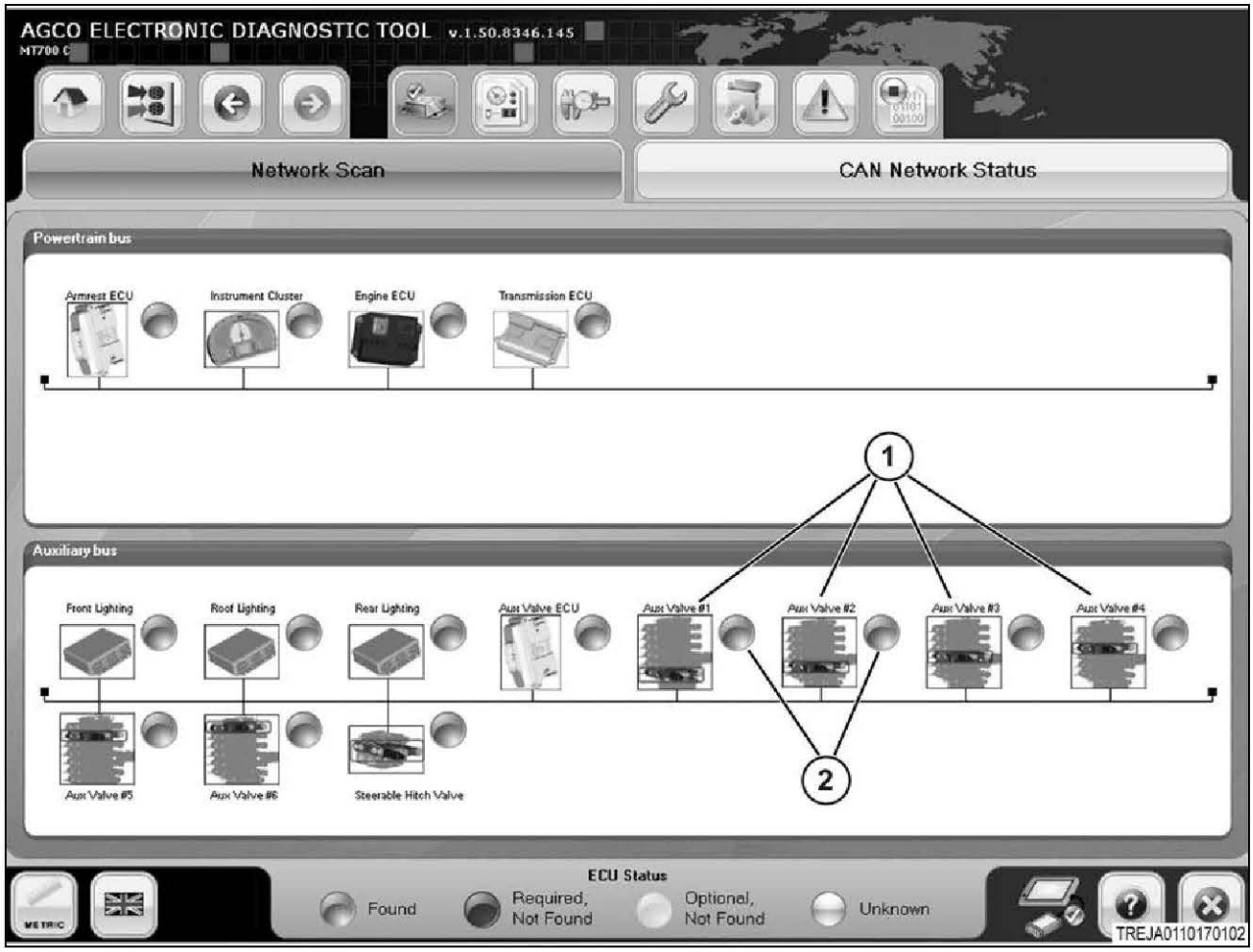

Fig. 359

8. The network scan will show auxiliary valves (1) and the indicators (2) will be green if the auxiliary valves are communicating.

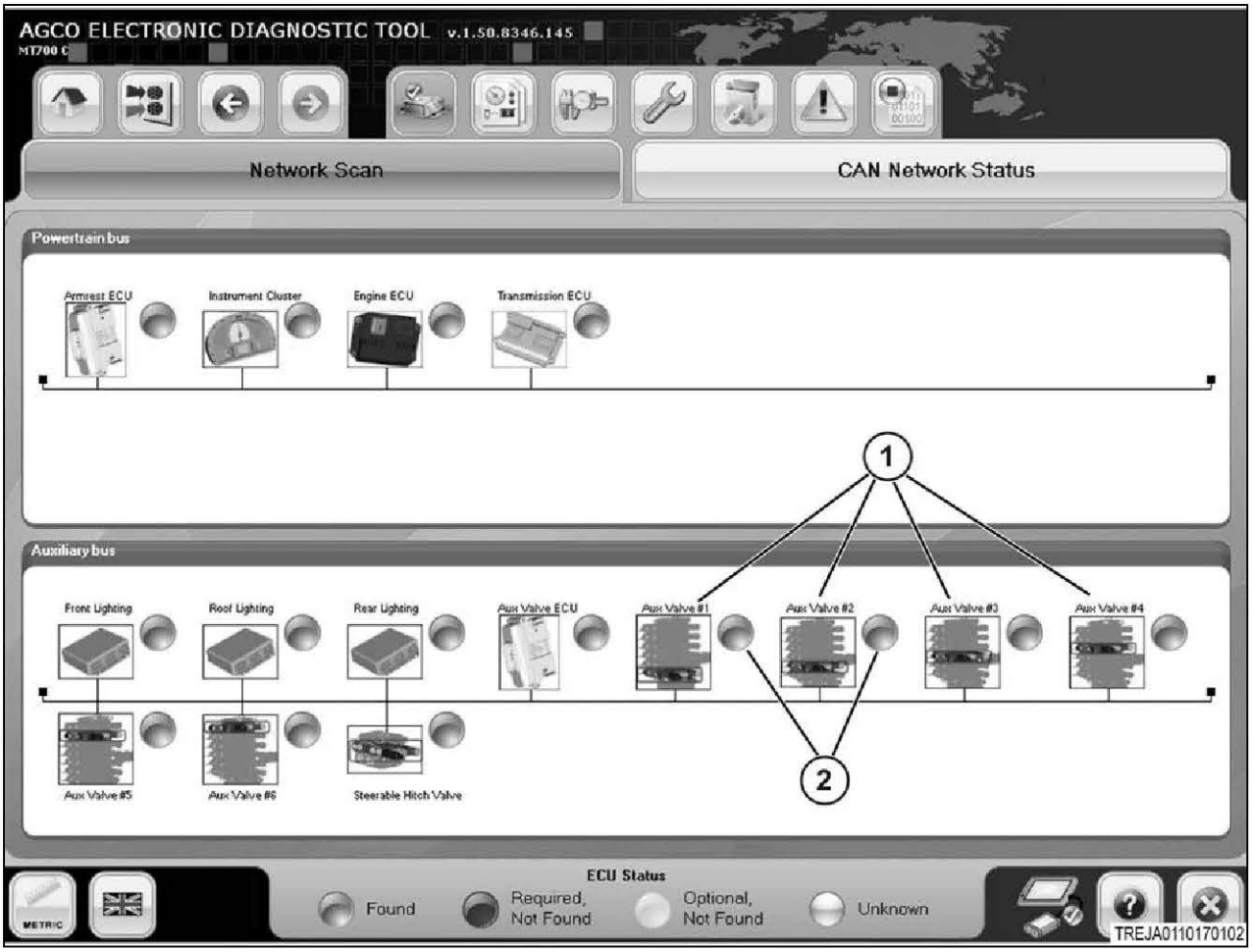

Fig. 360

9. Press the wrench icon (1).

10. After selecting the vehicle configuration (2), press start (3).

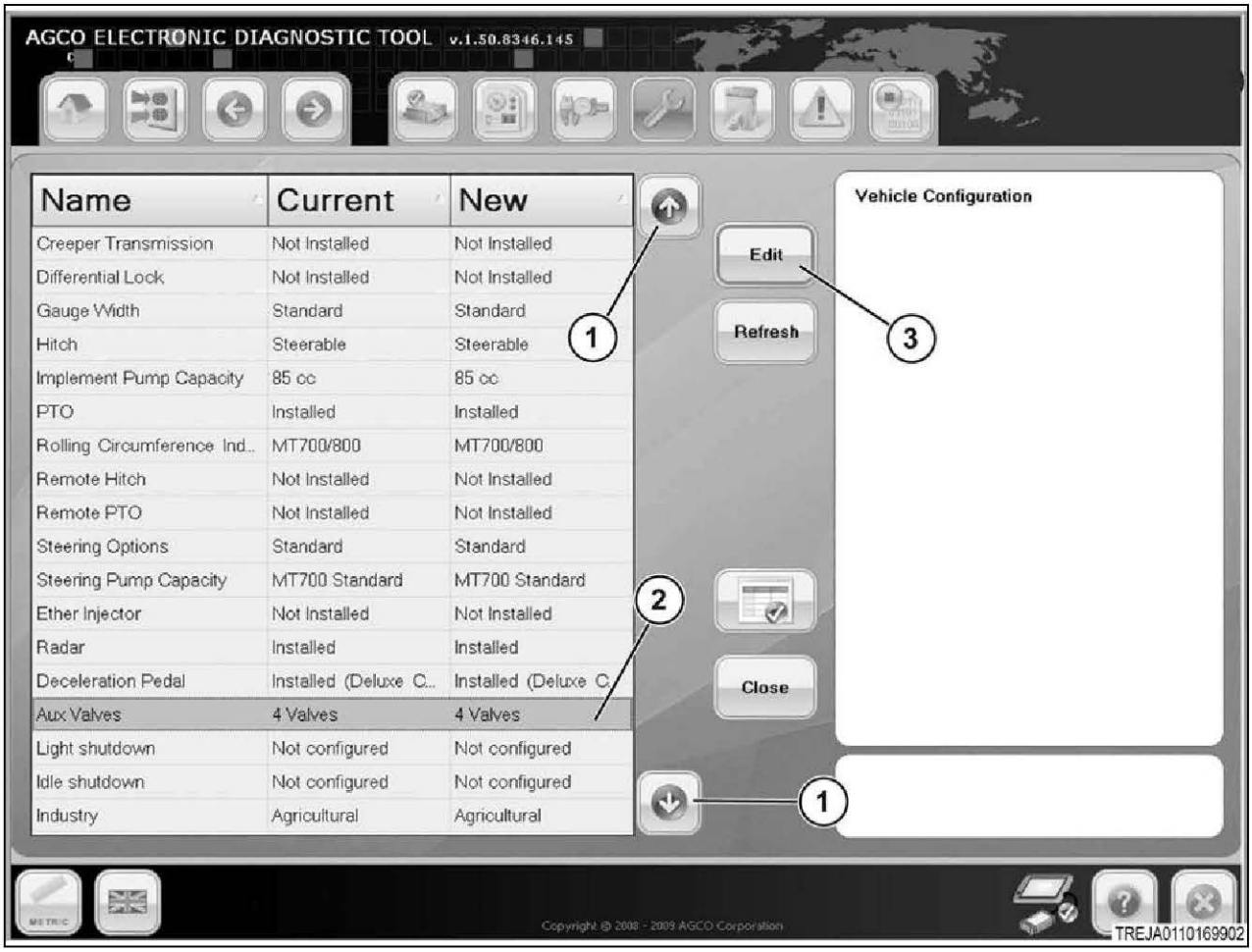

Fig. 361

11. Use the blue arrows (1) to scroll up or scroll down.

12. Highlight auxiliary valves (2).

13. To change the number of valves, select edit (3).

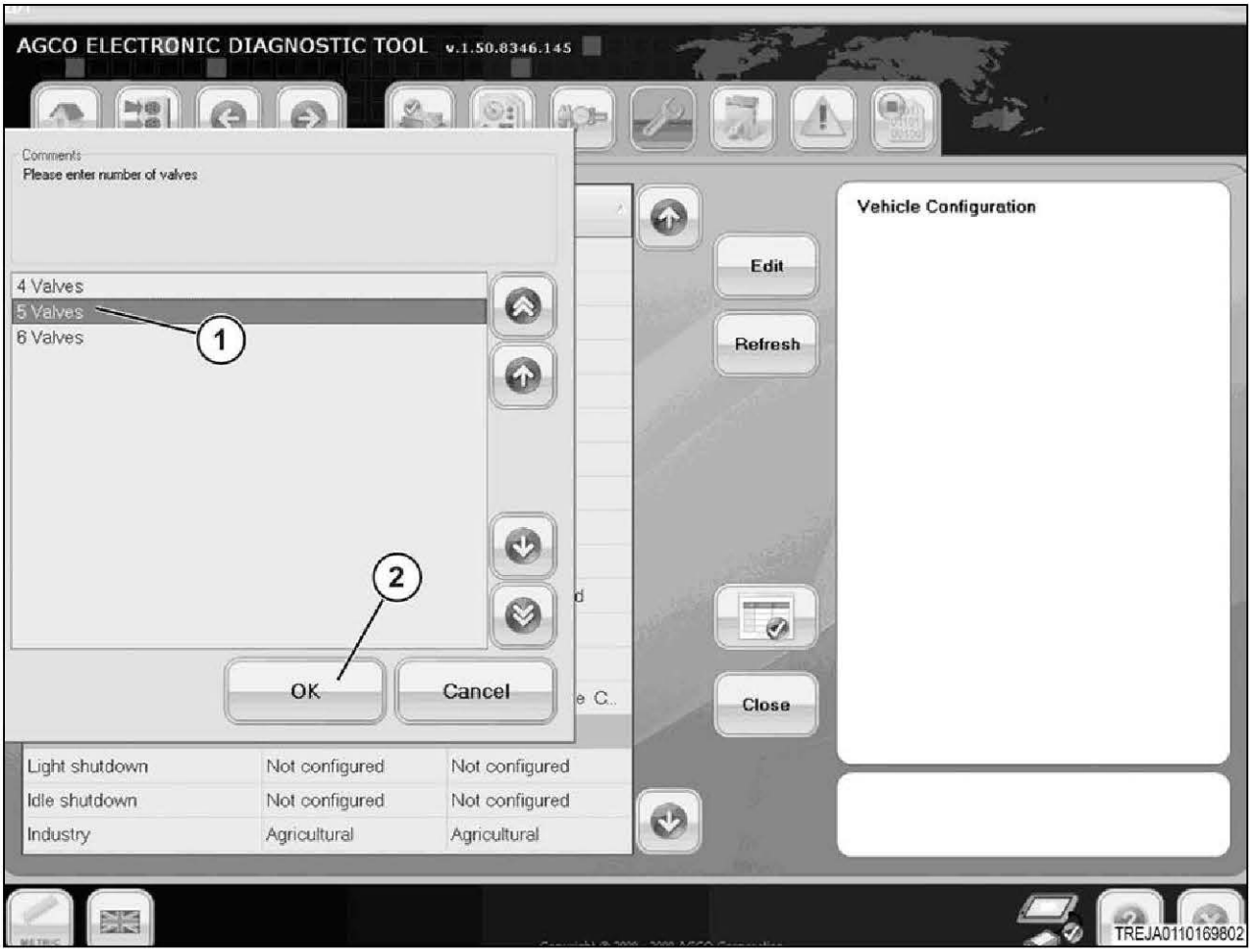

Fig. 362

14. Highlight the number of valves (1).

15. Select OK (2).

16. See the current configuration and the new configuration.

Fig. 363

17. Select the icon with the green mark (1) to change the configuration.

NOTE:
Both the current and new configuration will be the same.

18. Close the screen by selecting the close button (2).

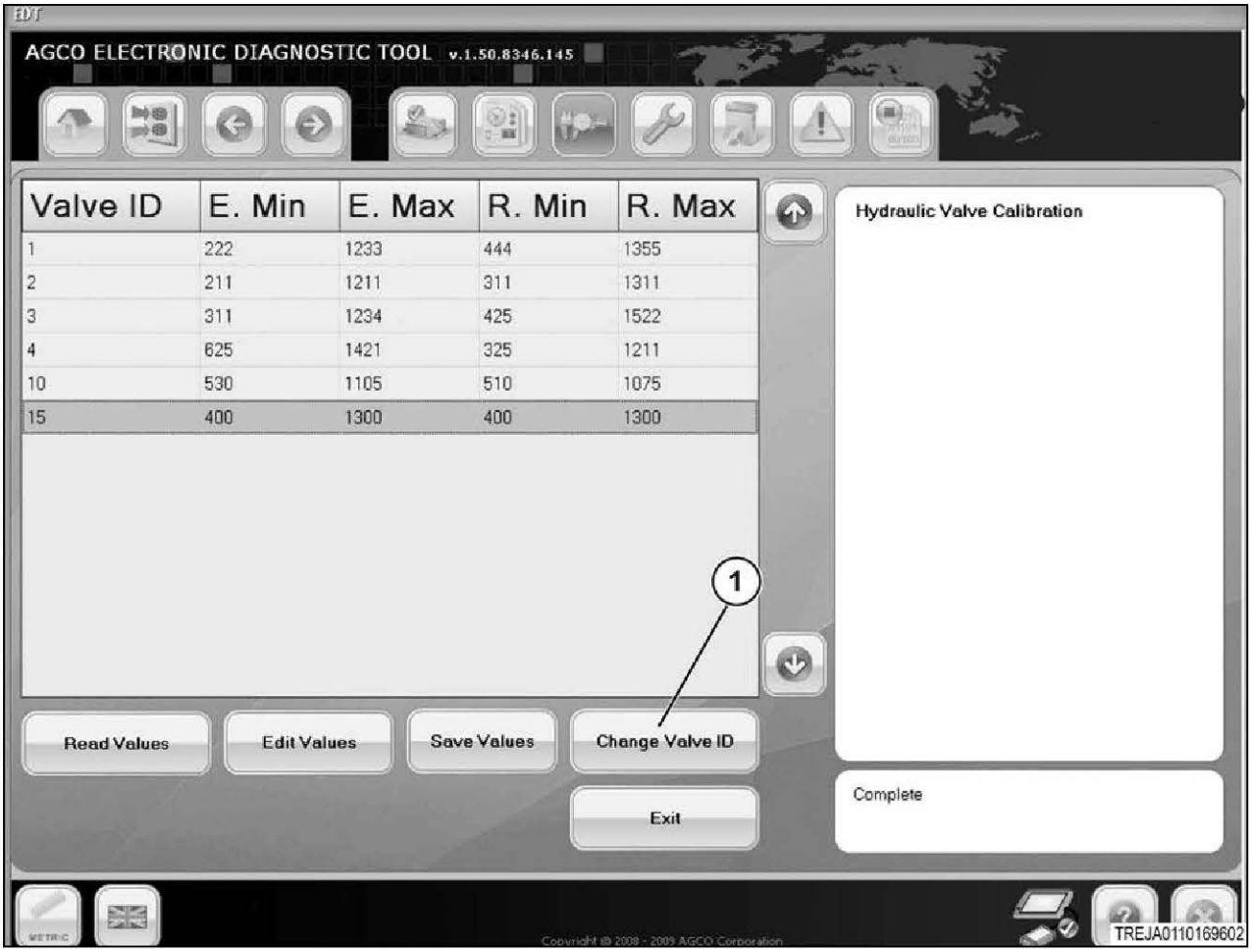

Fig. 364

19. Select the change valve ID button (1).

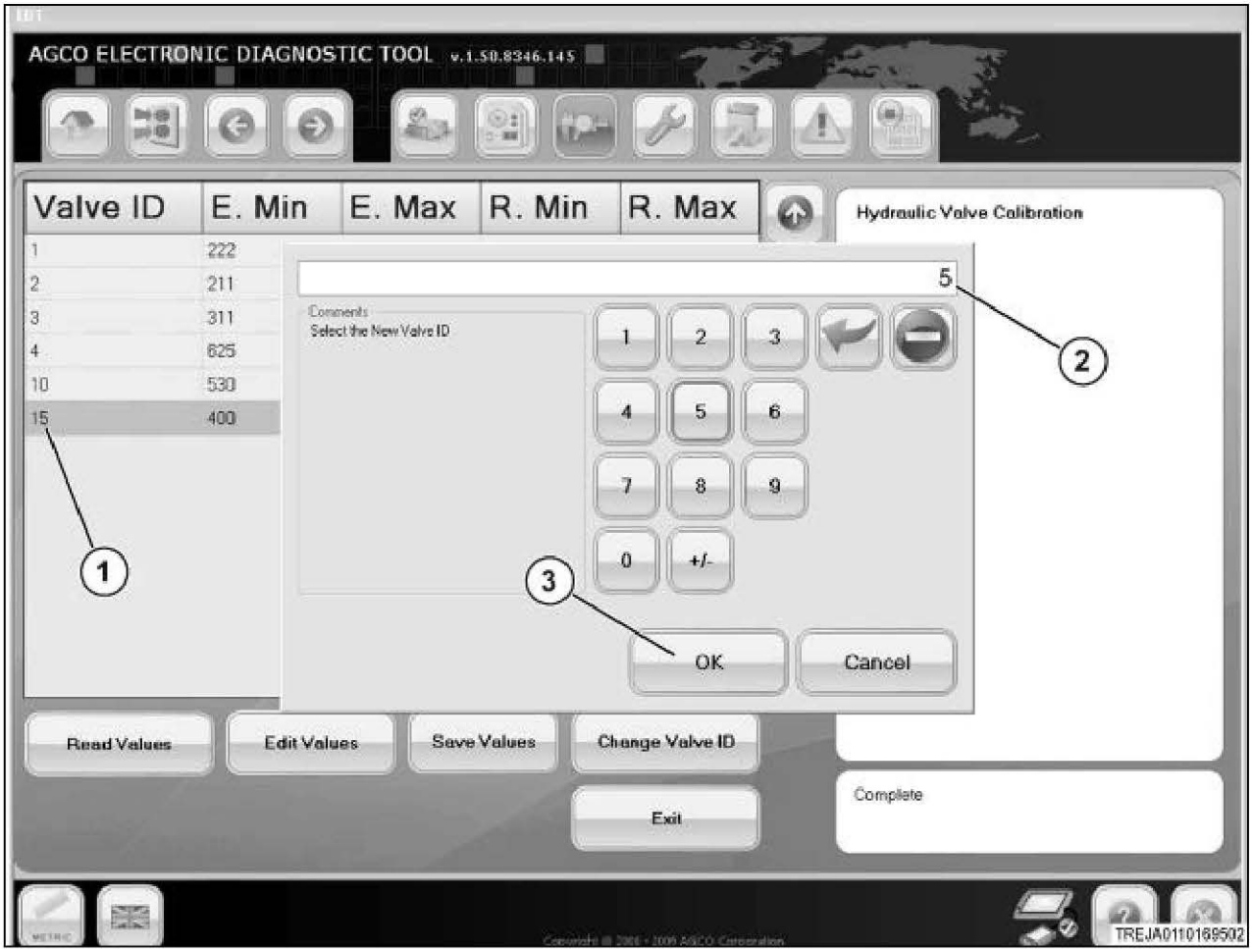

Fig. 365

20. Highlight the valve ID (1) and enter the new value (2).

21. Select OK (3).

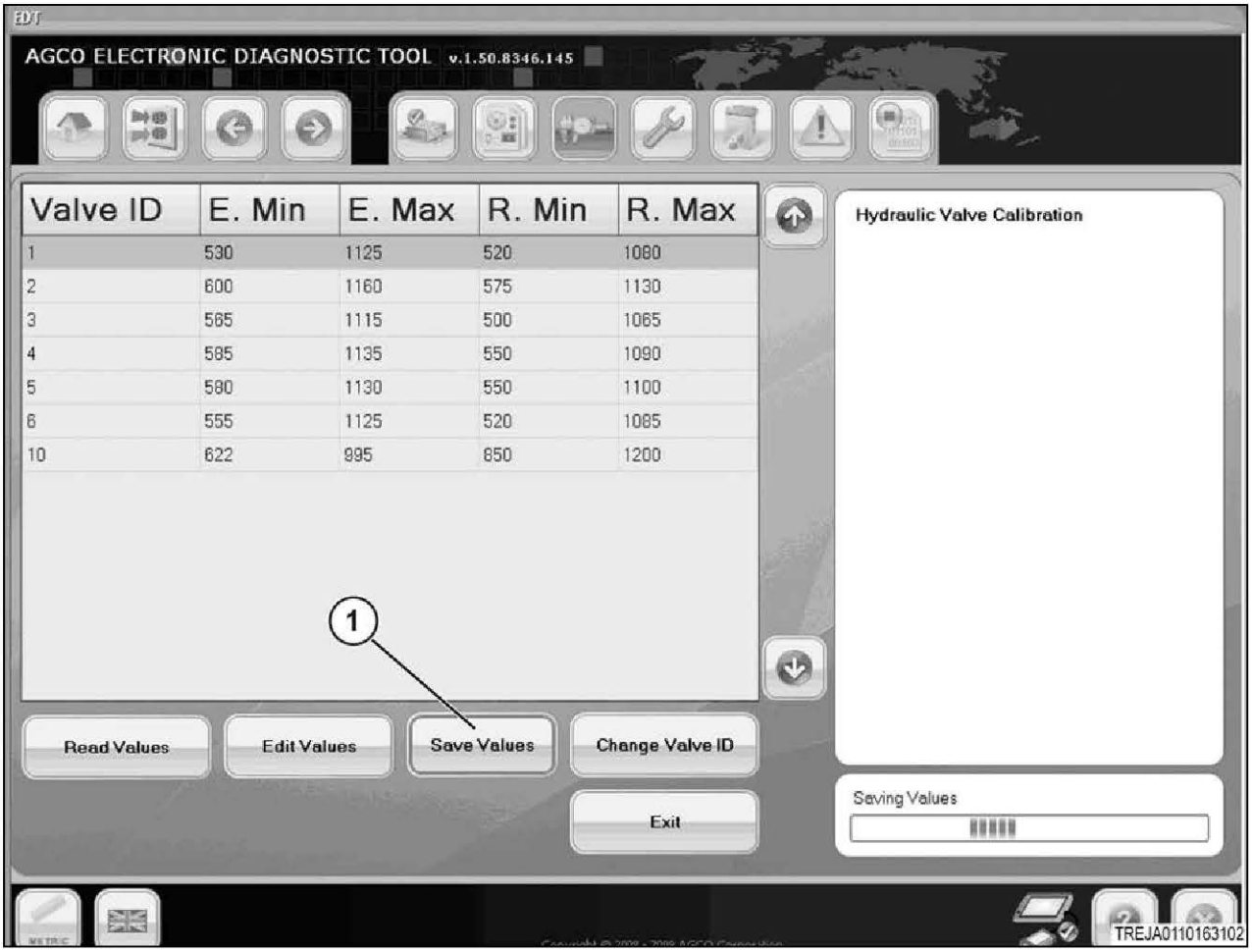

Fig. 366

22. After editing the values, select save values (1).

23. Use this procedure to calibrate any additional valve sections, if equipped.

9.4.25 Calibrate the valve sections

Procedure

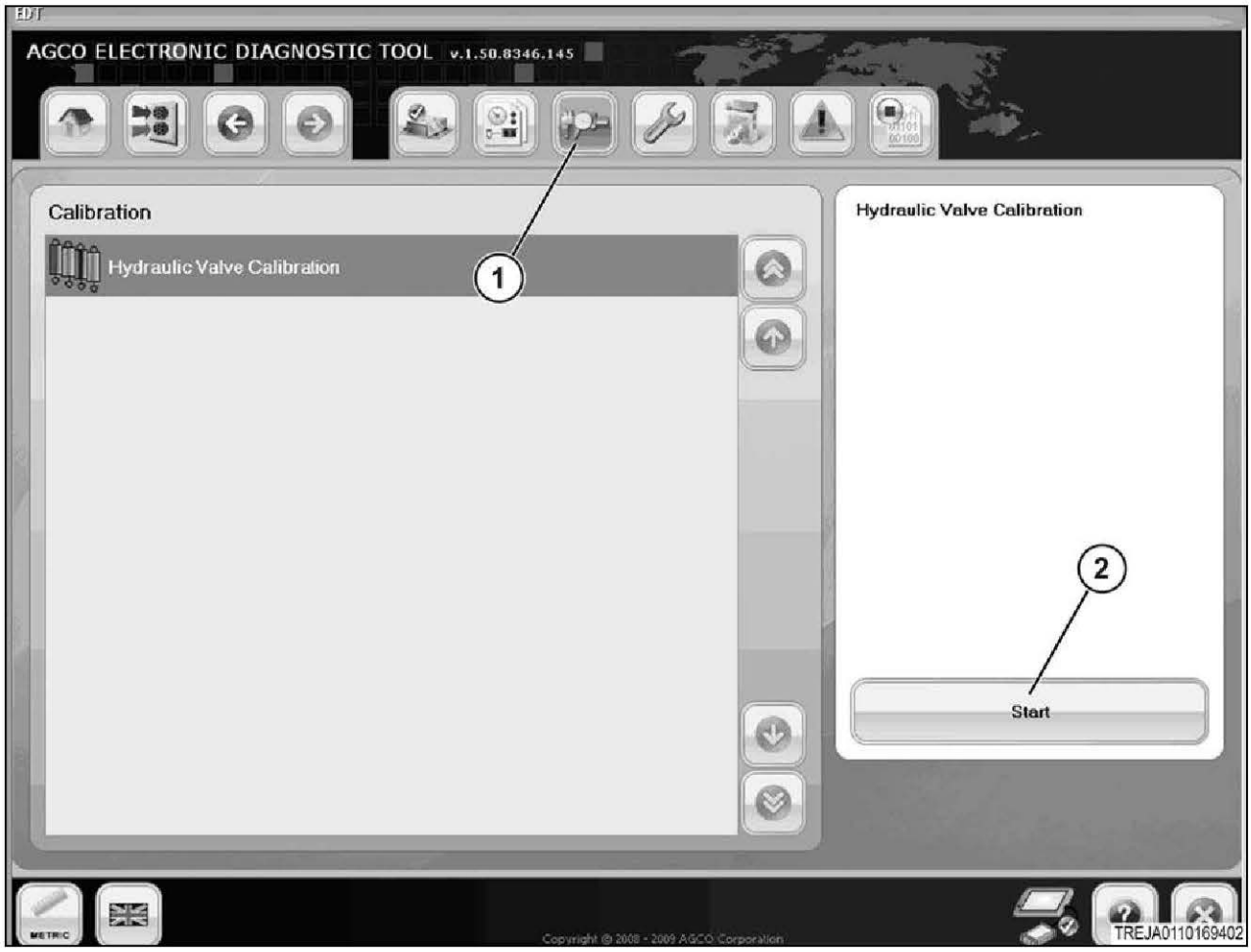

Fig. 367

1. Press the calibration icon (1).
2. Press start (2).

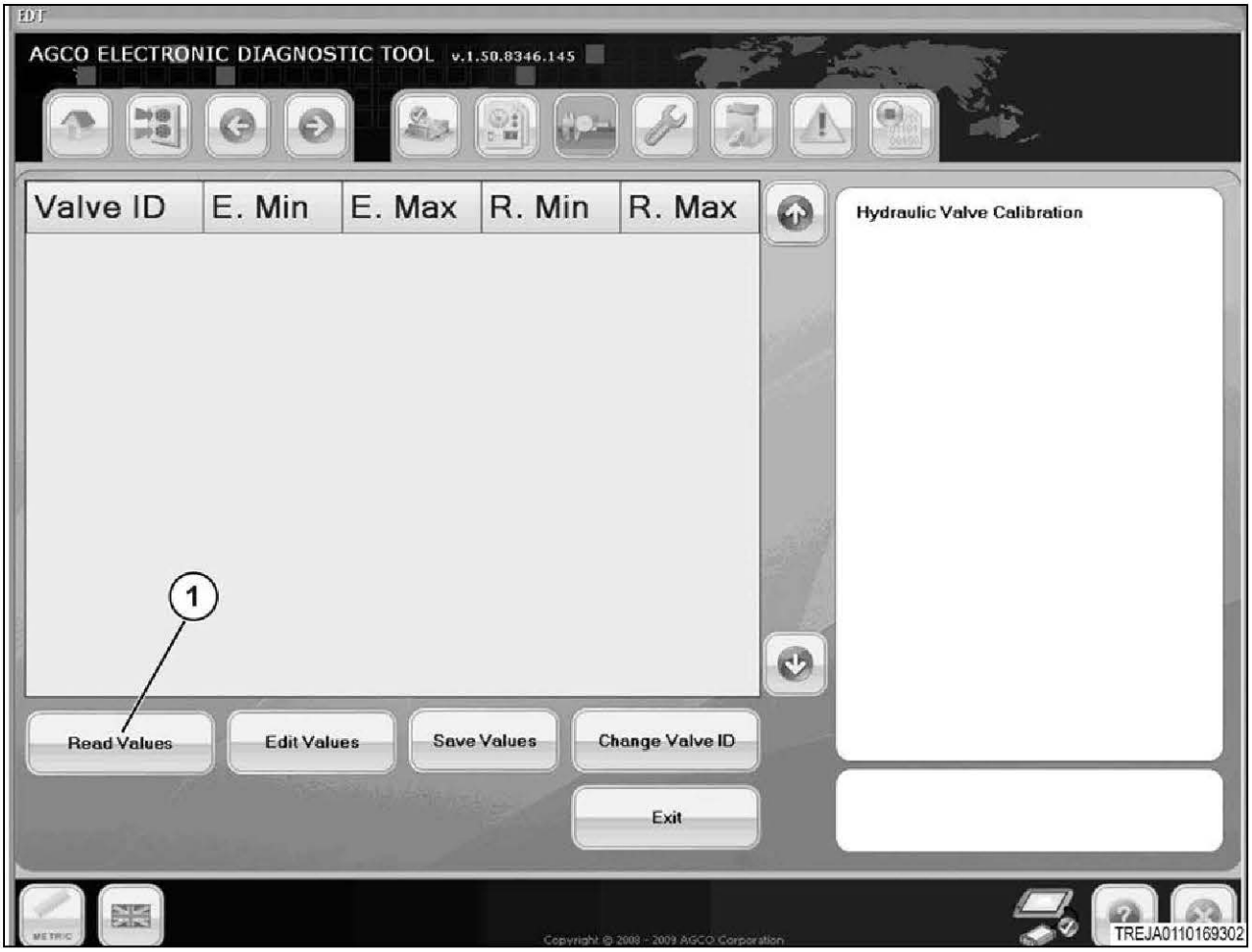

Fig. 368

3. To see the calibration values, select the read values button (1).

4. Wait for the EDT to load the values into the table.

NOTE:
Complete will show when all the values are loaded.

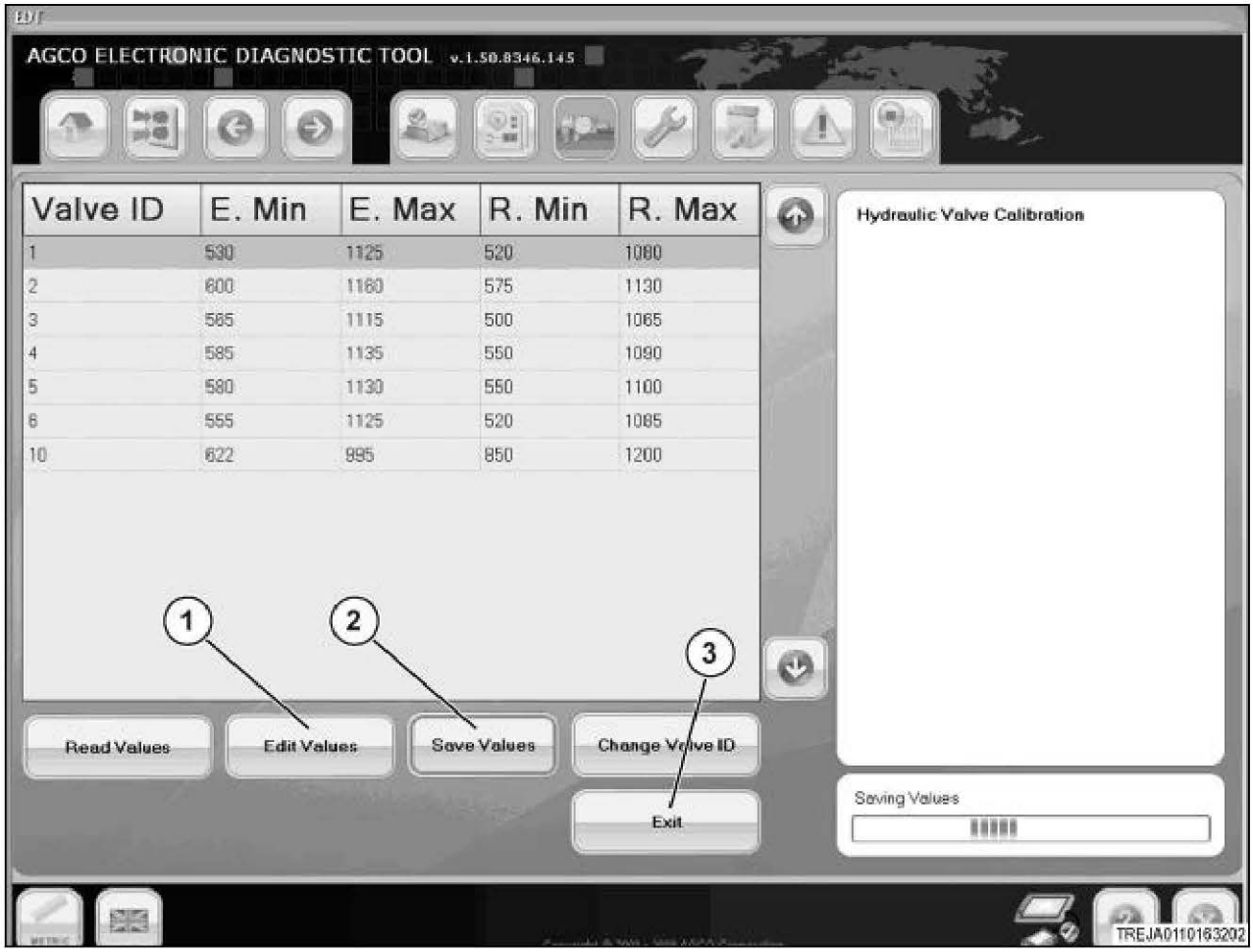

Fig. 369

5. Edit values (1) as necessary.

6. Save the values (2).

7. Press exit (3).

8. Contact AGCO Technical Service and Support for the correct calibration values for the new valves or if the calibration values are lost.

9.4.26 Flash the software

Procedure

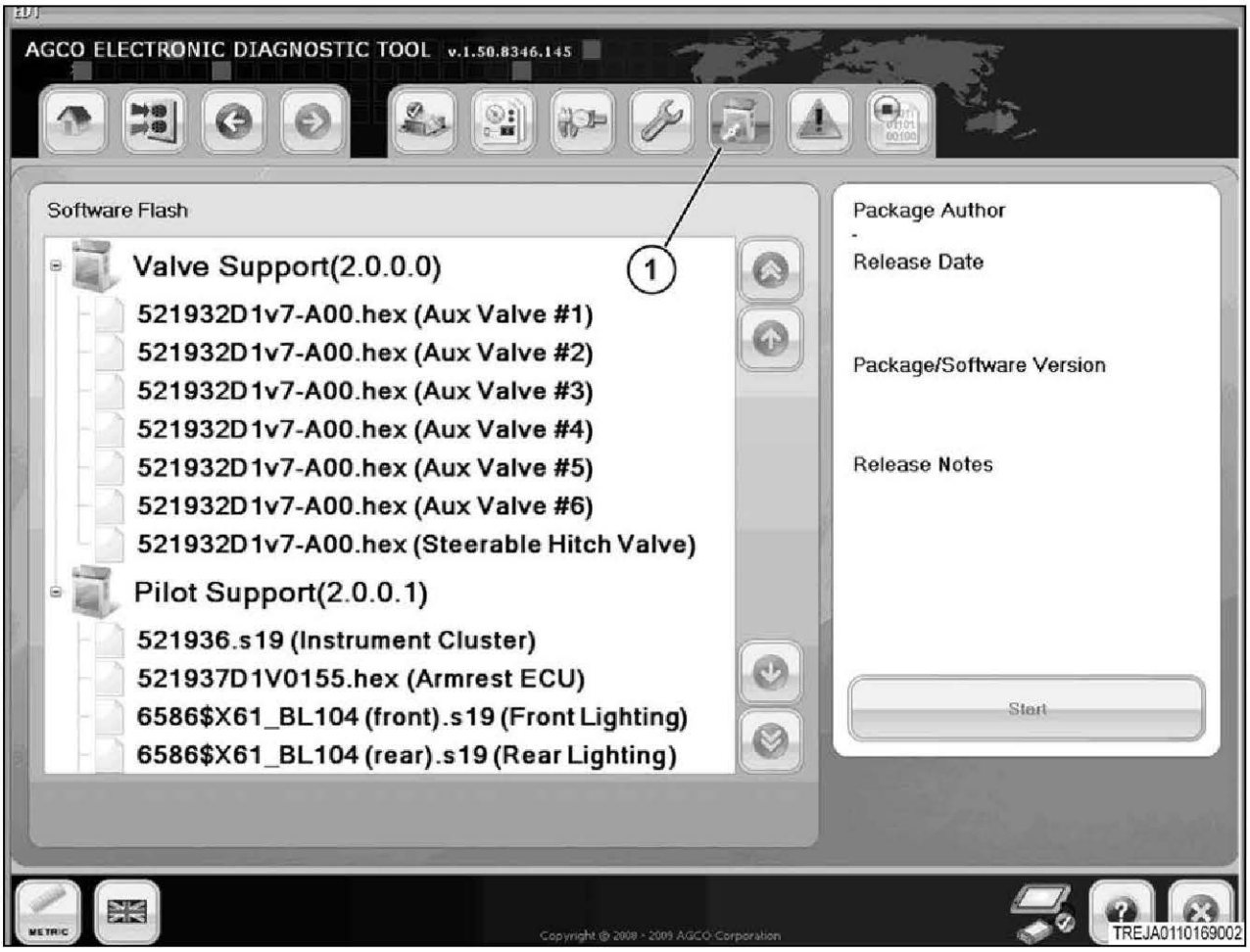

Fig. 370

1. Press the icon (1) to flash the software.
2. Select the flash version.

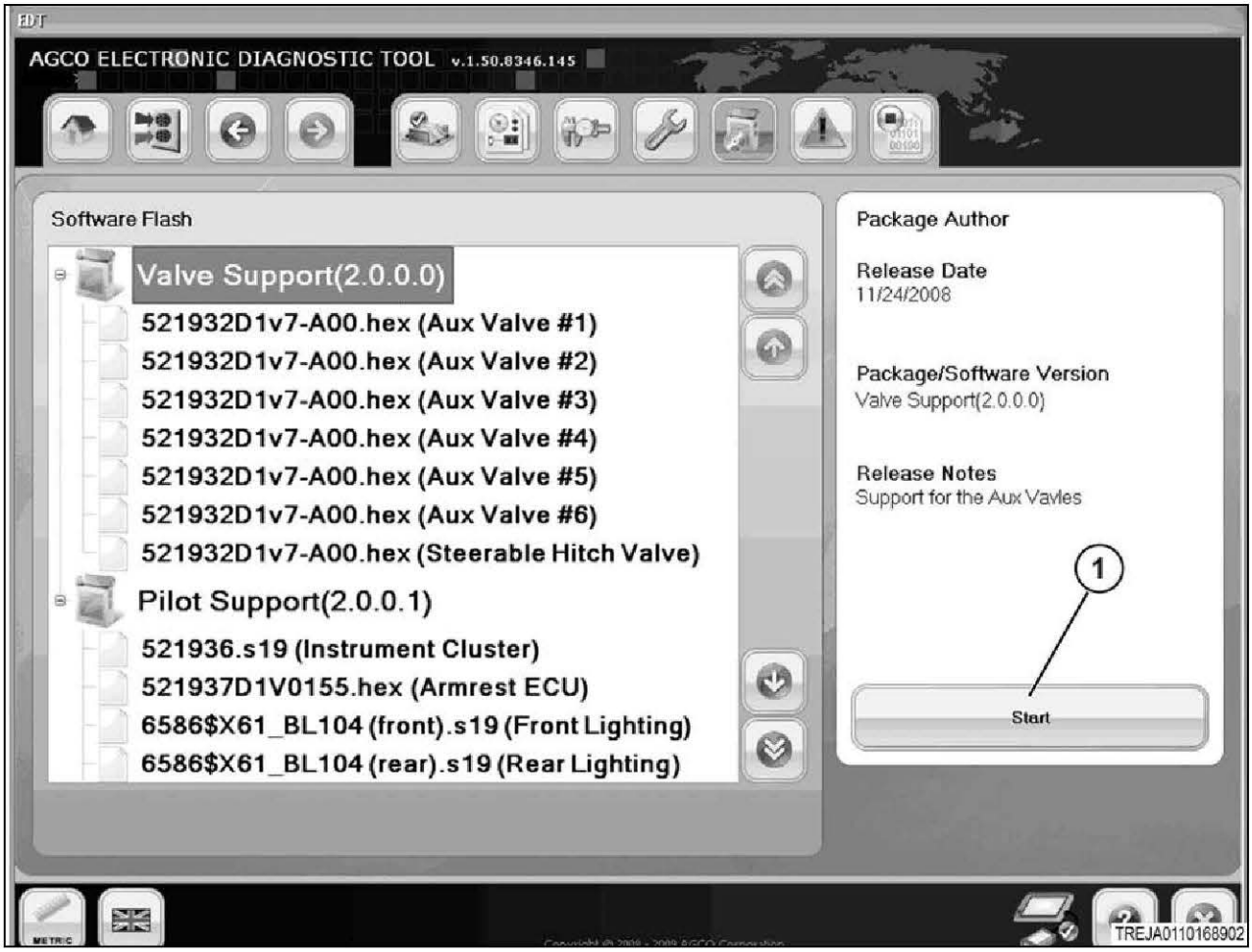

Fig. 371

3. Press start (1) to start.

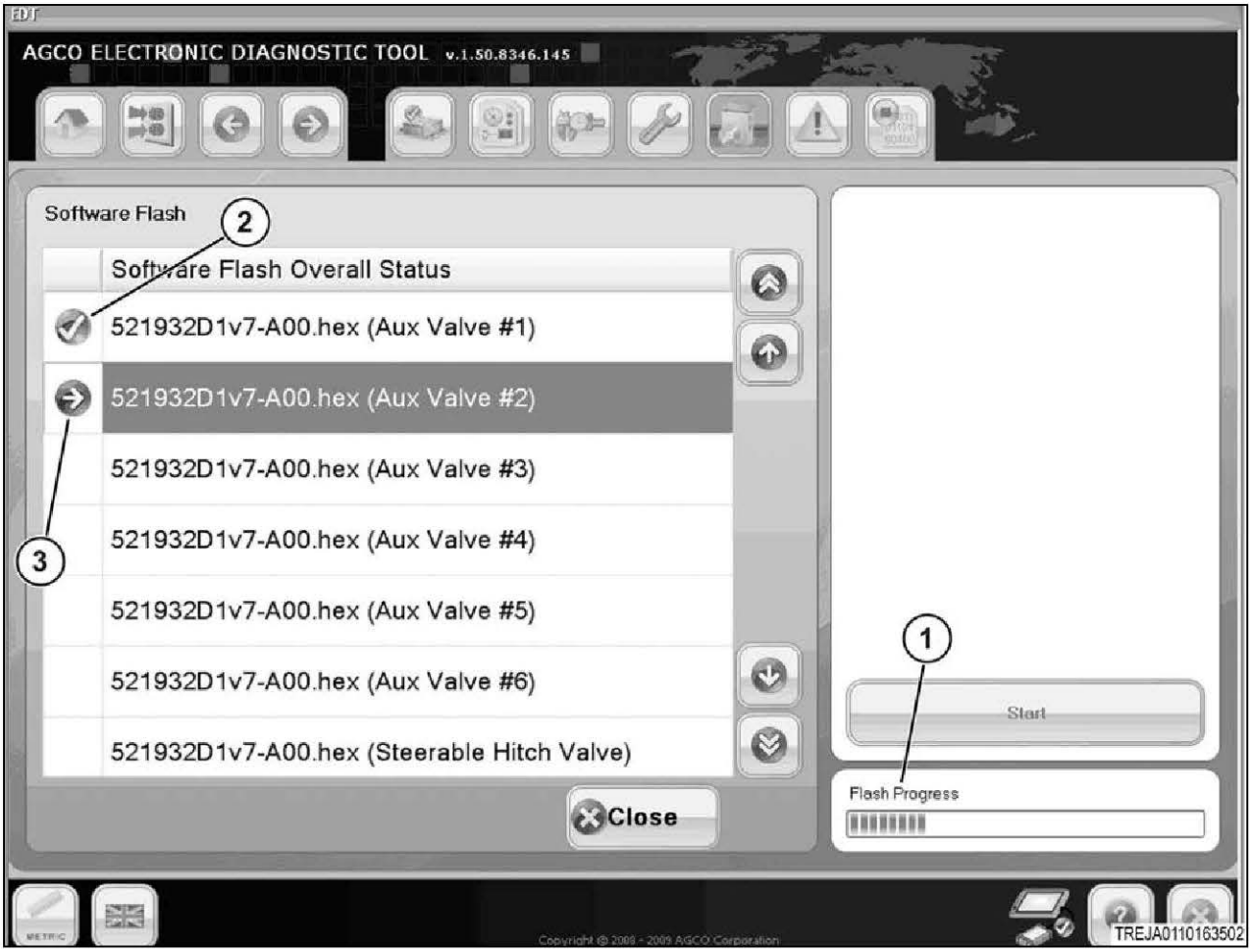

Fig. 372

4. The bar will show the flash progress (1).
5. If the flash is successful, the green circle (2) will show.
6. If the flash fails, the red circle (3) will show.

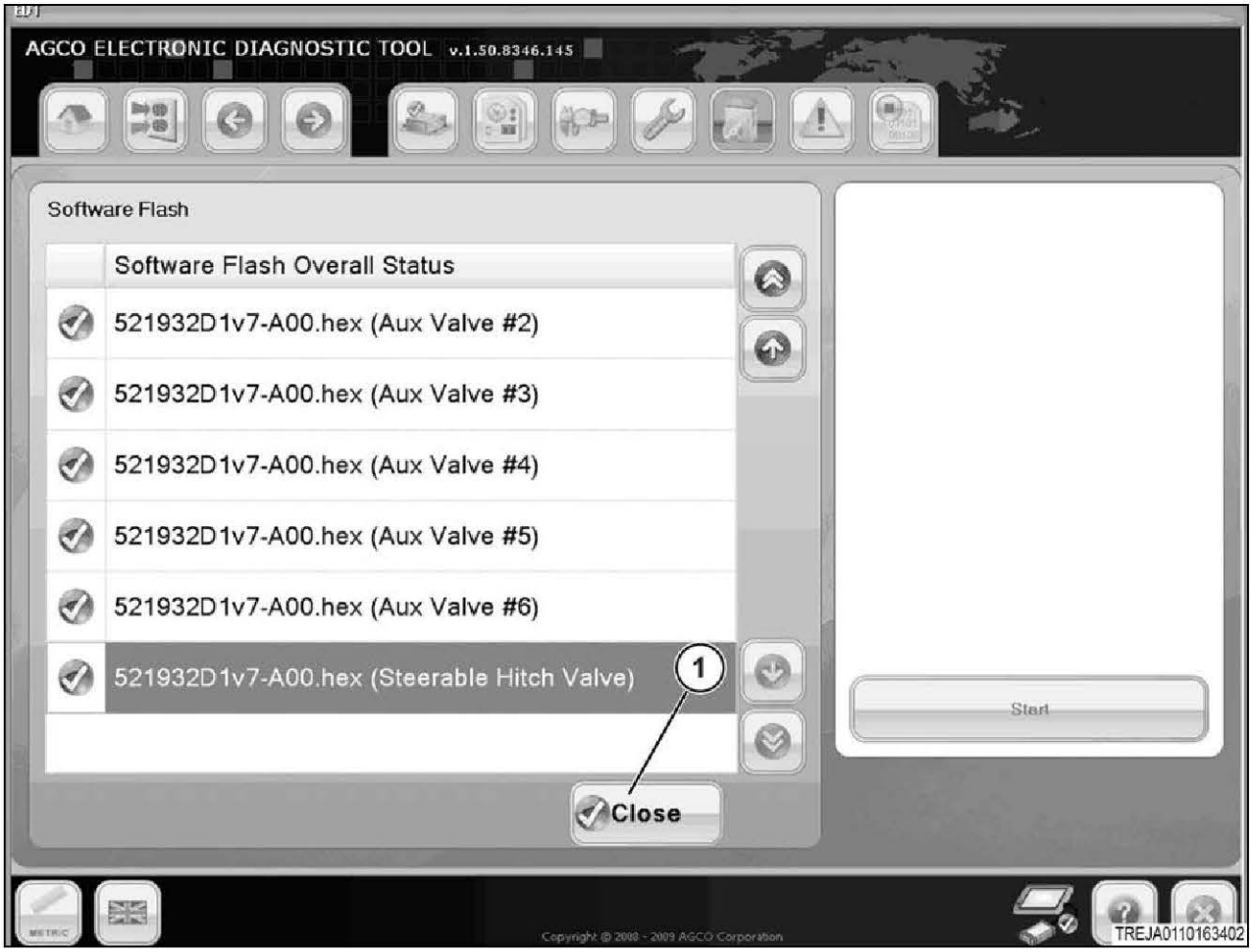

Fig. 373

7. When the flashing is complete, press close (1) to exit.

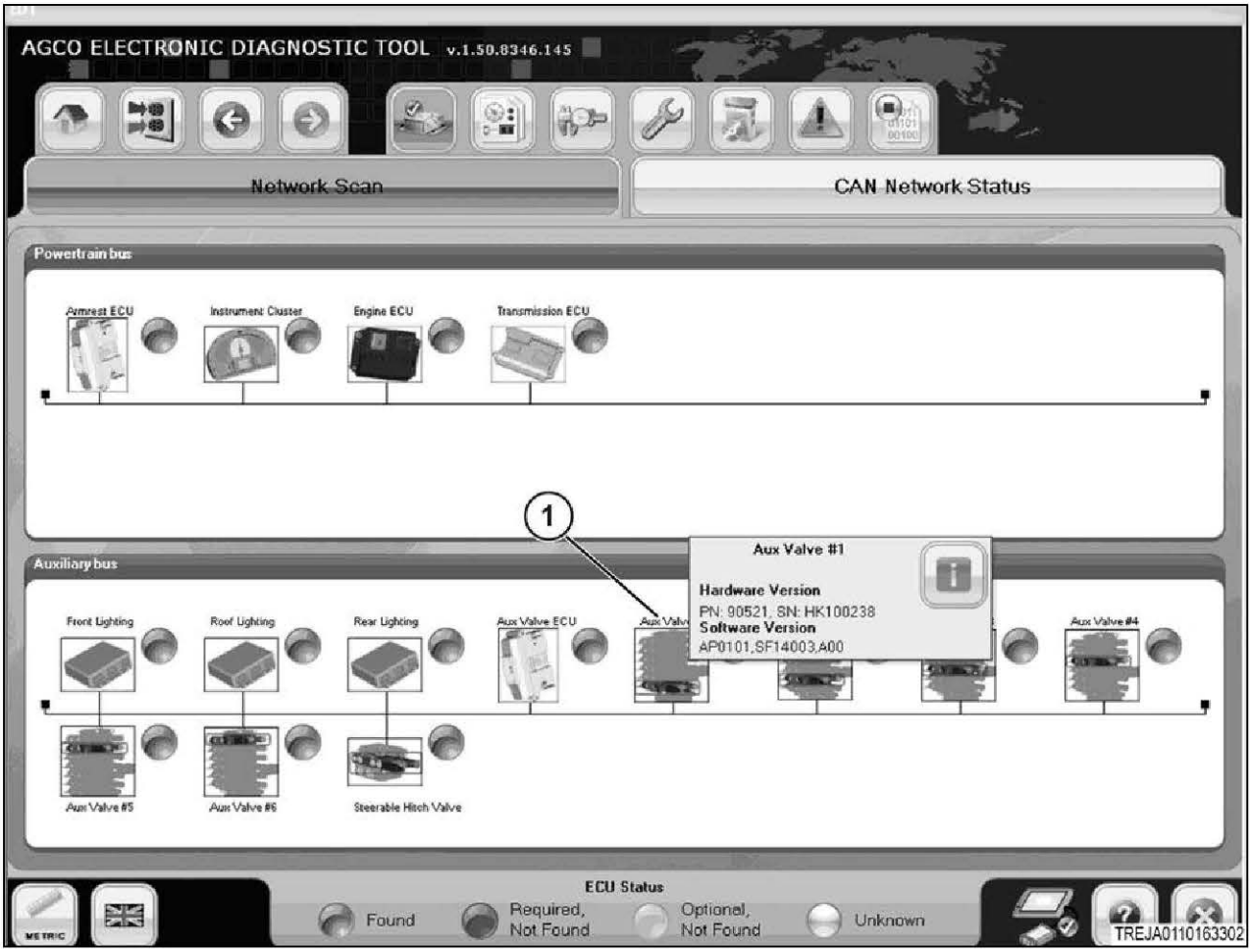

Fig. 374

8. The hardware version and the software version will show by selecting a valve (1).

9.4.27 Complete the sequence and calibration process

Procedure

1. Close the Electronic Diagnostic Tool (EDT) and power off the computer.

2. Disconnect the adapter cable from the diagnostic connector (1) in the electrical panel.

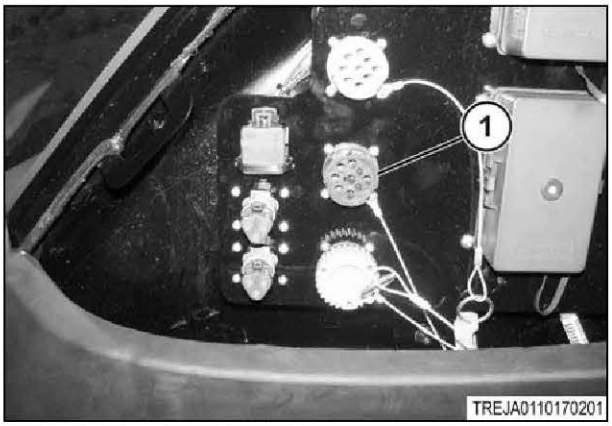

Fig. 375

3. Install the access panel (1).

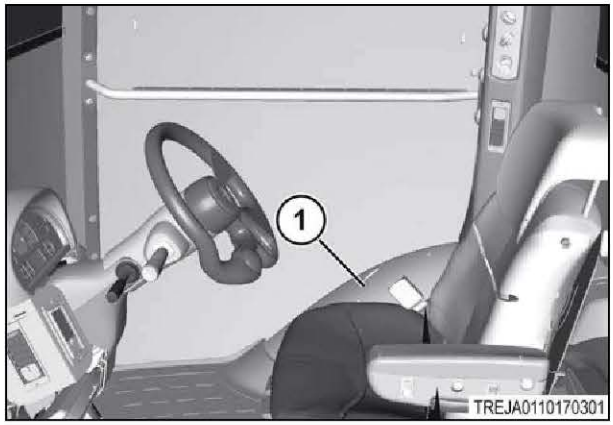

Fig. 376

9.4.28 Test the implement oil cooler pressure

CAUTION: Machine movement hazard. Hydraulic pressure release.

Personal injury or machine damage can occur.

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

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

NOTE:

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

Procedure

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

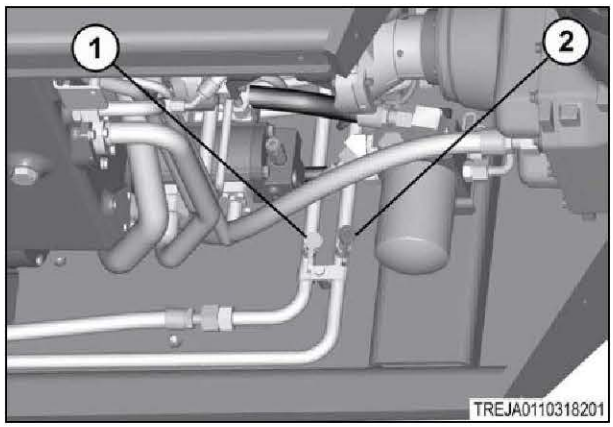

Fig. 377

Related Links

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

9.4.29 Test the implement oil cooler bypass valve pressure

CAUTION: Machine movement hazard. Hydraulic pressure release.

Personal injury or machine damage can occur.

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

WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.

NOTE:

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

Procedure

1. Park the machine on a hard level surface.
2. Move the transmission control lever into the neutral position and engage the parking brake.
3. Warm the oil to a minimum temperature of 60° C (140° F).
4. Turn the key start switch to the off position and take the key with you.
5. Move all the hydraulic control levers through the float position to relieve hydraulic pressure.
6. Stop the engine and remove the key.
7. Disconnect and cap the oil cooler hoses (1) to the oil cooler.

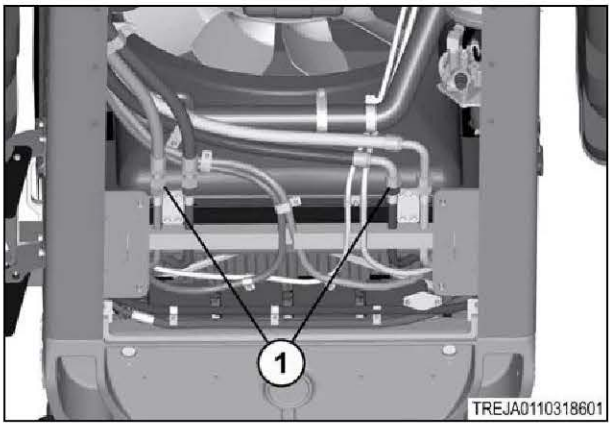

Fig. 378

8. Connect the correct tools to the quick disconnect pressure taps (1) and (2).

9. Start the engine. Run the engine at high idle.

10. Make sure all of the hydraulic control levers are in the hold position.

11. The difference between the gauges will be approximately 310 to 380 kPa (45 to 55 psi) if the hydraulic oil cooler bypass valve is operating correctly.

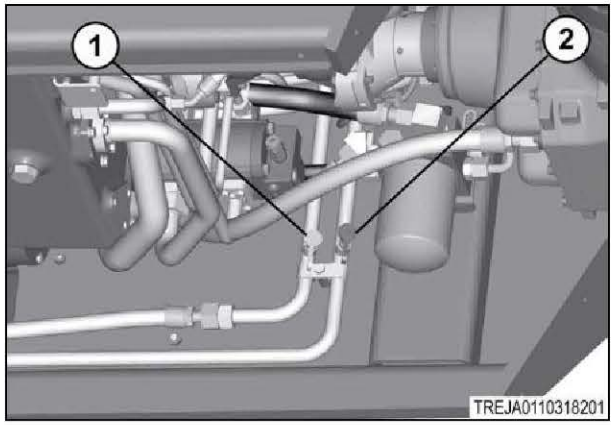

Fig. 379

9.5 Hydraulic system maintenance

9.5.1 Do a check of the implement and steering system fluid level

The implement and steering system operates the following functions: Remote Implement Valves, Machine Steering, Hydraulic Trailer Braking (if equipped), and 3-point linkage (if equipped).

The implement and steering system requires the use of an SAE 10W30 transmission/hydraulic oil that meets the AGCO 821XL specification.

Procedure

1. Check the hydraulic oil every ten service hours or daily.
2. Park the machine on a level surface when checking the fluid. Stop the engine, apply the parking brake, and take the key with you.
3. Before starting the machine check that the fluid level is at the full mark (1).
4. If the fluid level is at or below the add mark, add fluid to the reservoir.
5. Make sure the fluid level is within the operating range of the sight gauge with the engine operating and the implements raised. If not add fluid.

   NOTE:
   3.8 L (1 gal) of fluid raises the level in the sight glass approximately 20 mm (0.79 in).

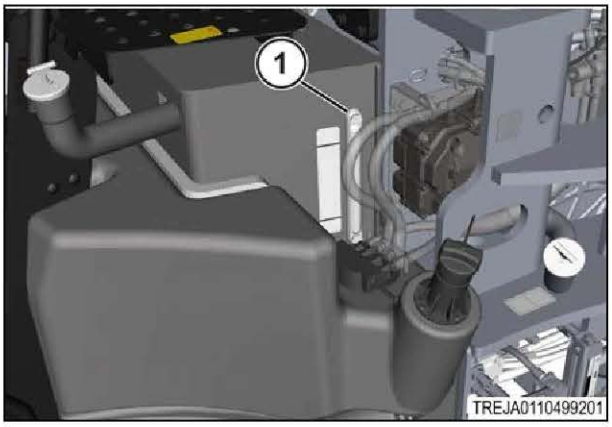

Fig. 380

6. The normal fluid level (1) with the engine off.
7. The normal fluid level (2) with the engine on.

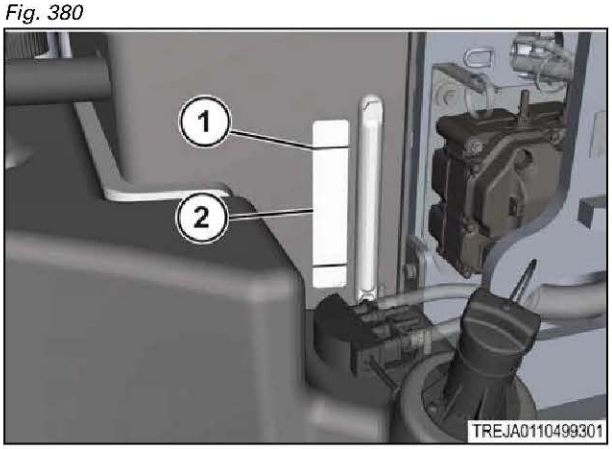

Fig. 381

9.5.2 Change the implement and steering system fluid

WARNING:
Hot oil and hot components can cause personal injury. Do not let hot oil or hot components to contact the skin.
The machine uses an isolated fluid circuit for the implement and steering systems. The implement and steering system circuit always remains separate. The implement and steering system requires the use of an SAE 10W30 transmission/hydraulic oil that meets the requirements of the AGCO 821XL specification. The implement and steering system operates the following: Remote Implement Valves, Machine Steering, Hydraulic Trailer Braking (if equipped), and 3-point linkage (if equipped).

NOTE:
The implement and steering system holds approximately 171 L (45 gal) when completely empty. The system will not be completely empty when changing the fluid. The amount that will be drained will be approximately 121 L (32 gal).

.

NOTE:
Care must be taken to ensure that fluids are contained during the performance of the inspection, maintenance, testing, adjusting, and repair of the machine. Be prepared to contain the fluid with suitable containers before opening any compartment or disassembling any components containing fluids. Discard of all fluids according to local regulations and mandates.

Procedure

1. Start and operate the machine for a period of five to ten minutes.
2. Park the machine on a level surface when checking the fluid.
3. Stop the engine, apply the park brake, and take the key with you.
4. Let the oil cool for five minutes before working on the system.
5. Slowly remove the filler cap (1) to remove any pressure that is in the system.

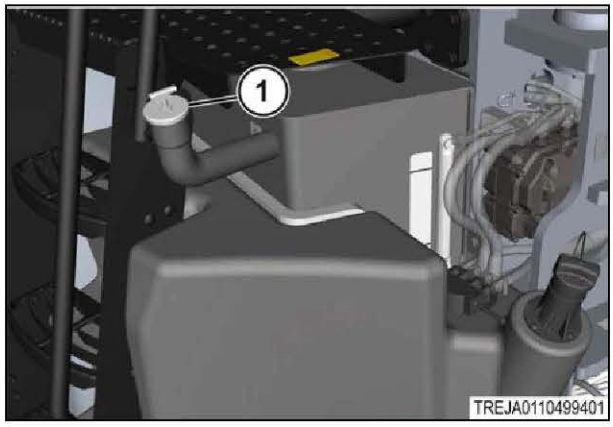

Fig. 382

6. Remove the bolts (1) for the access plate below the DEF tank.

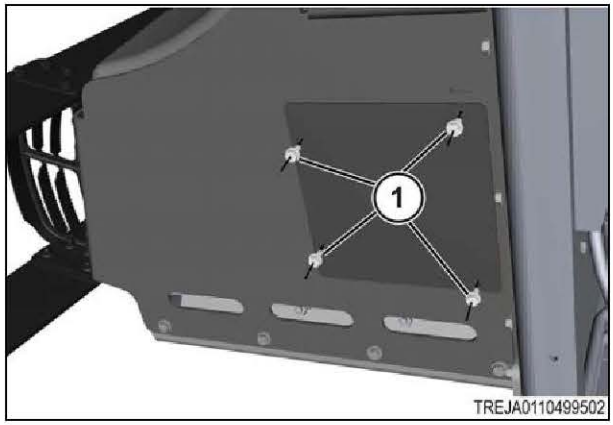

Fig. 383

7. Remove the access plate (1).

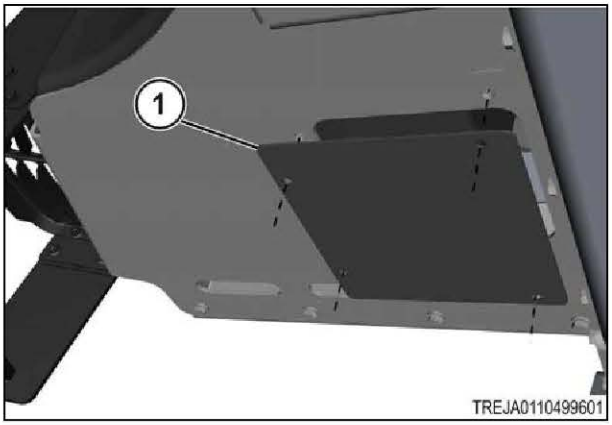

Fig. 384

8. Remove the reservoir plugs (1).

9. Let the oil drain into the correct container.

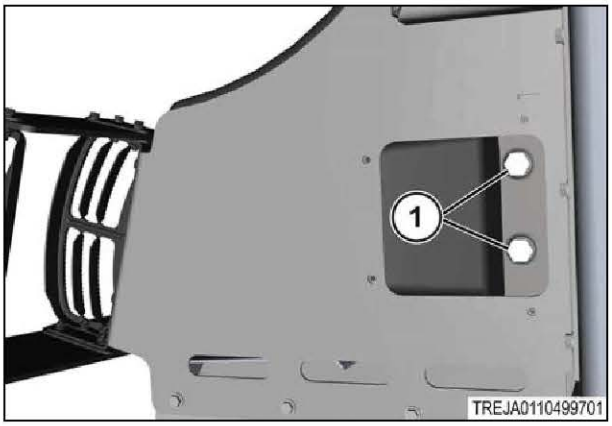

Fig. 385

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

11. Remove the implement and steering system filters (1).

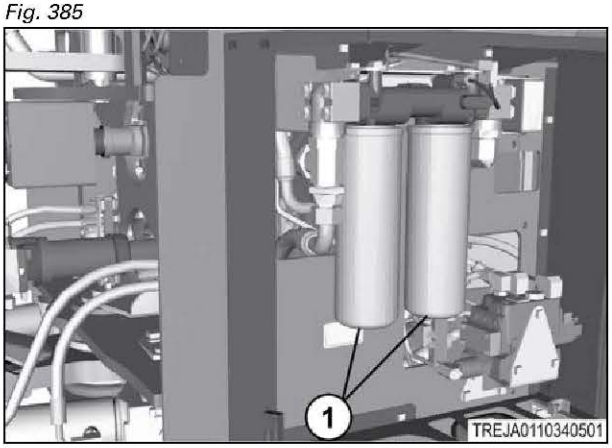

Fig. 386

12. Apply a thin layer of oil to the seal on the filters (1).

13. Install the filters by hand.

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

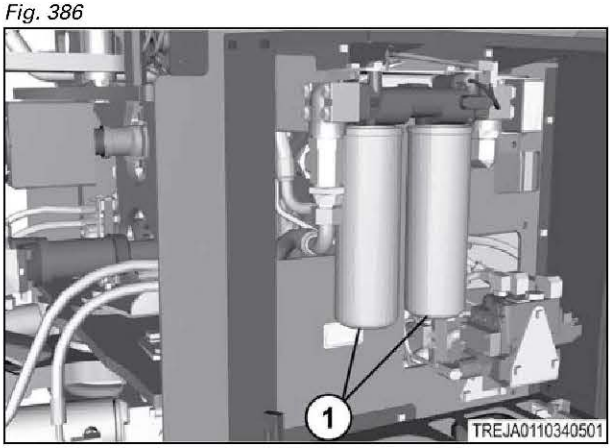

Fig. 387

15. Apply a thin layer of oil to the drain plugs (1) and install to the reservoir.

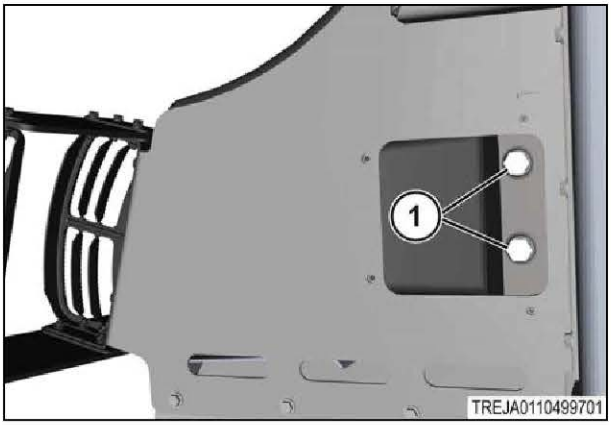

Fig. 388

16. Fill the reservoir until fluid level is at the full mark (1) on the sight gauge.

NOTE:
Approximately 121 L (32 gal) of oil will be necessary.

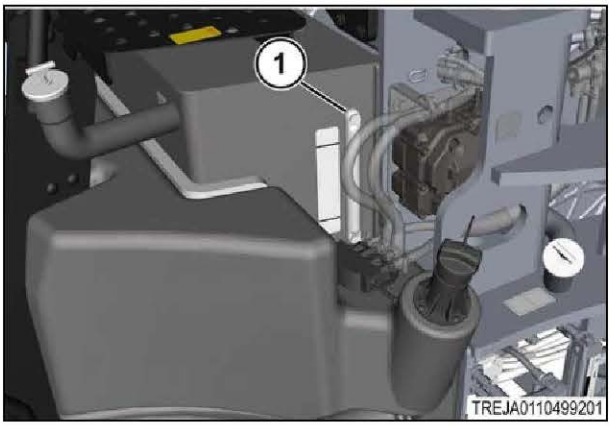

Fig. 389

9.5.3 Clean the breather (hydraulic reservoir)

Procedure

1. Loosen and remove the breather (1).

2. Clean the breather in clean nonflammable solvent.

3. Install the breather

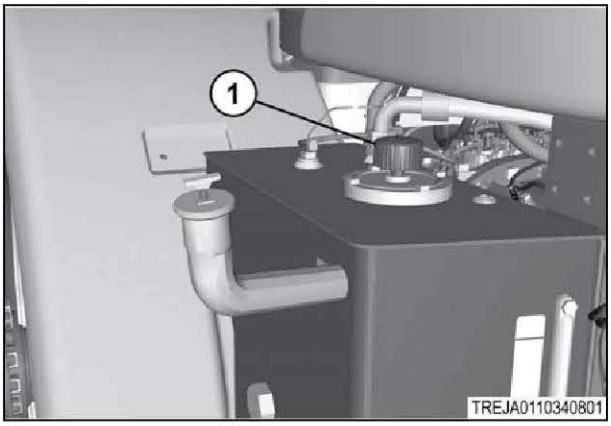

Fig. 390

9.5.4 Replace the implement filters

NOTE:
Replace the filter after every 1500 service hours.

Procedure

1. Access the filters (1) in the cabinet on the right-hand side of the machine.
2. Put a oil pan below the filter to contain any oil that can spill.
3. Loosen the filter from the filter base. Check the filter for debris.
4. Clean the sealing surface on the filter base. Remove all the seal that can remain from the used filter.
5. Apply a thin layer of oil to the seal on the new filter.
6. Install the new filter by hand. When the filter seals to the filter base, tighten the filter an additional 270°

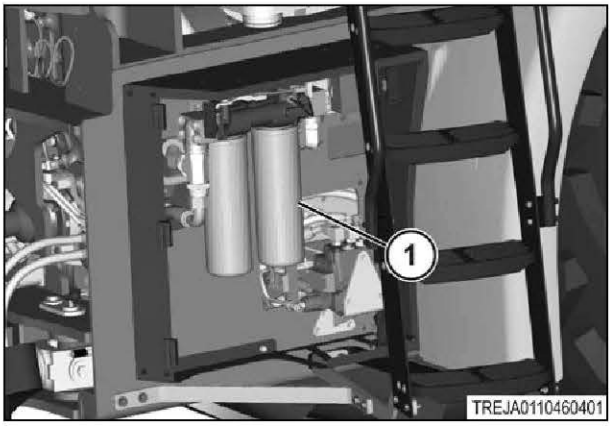

Fig. 391

9.5.5 Service the suction screen

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

NOTE:
The implement and steering system holds approximately 171 L (42 gal) when completely empty. When changing the fluid it is not possible to completely drain the system. The amount that will be drained will be approximately 121 L (32 gal).

.

NOTE:
Care must be taken to be sure that fluids are contained during the performance of the inspection, maintenance, testing, adjusting, and repair of the machine. Be prepared to contain the fluid with correct containers before opening any compartment or disassembling any components containing fluids. Discard of all fluids according to local regulations and mandates.

Procedure

1. Park the machine on a level surface when checking the fluid.
2. Stop the engine, apply the parking brake, and take the key with you.
3. Let the oil cool for five minutes before working on the system.

4. Slowly remove the filler cap (1) to remove any pressure that is in the system.

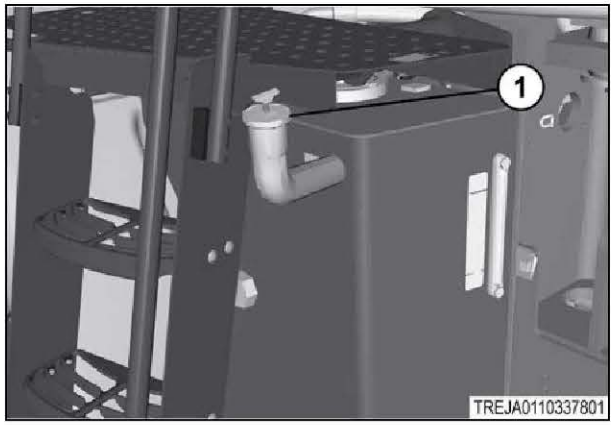

Fig. 392

5. Remove the reservoir plugs (1).
6. Let the oil drain into the correct container.

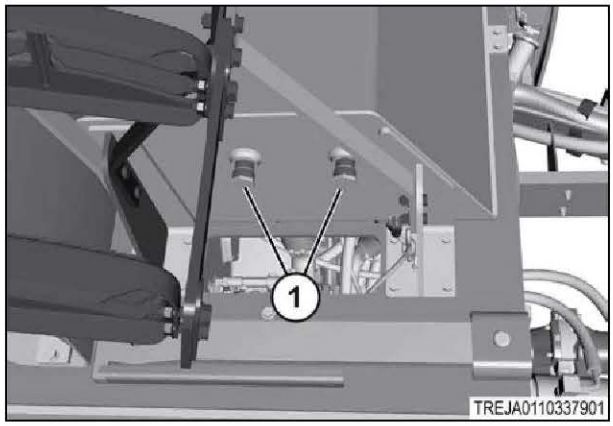

Fig. 393

7. Set an oil pan below the hydraulic tank screen. When replacing the screen, a small amount of oil will be lost.
8. Loloosen the clamp (1).
9. Remove the hose assembly (2) from the screen (3).

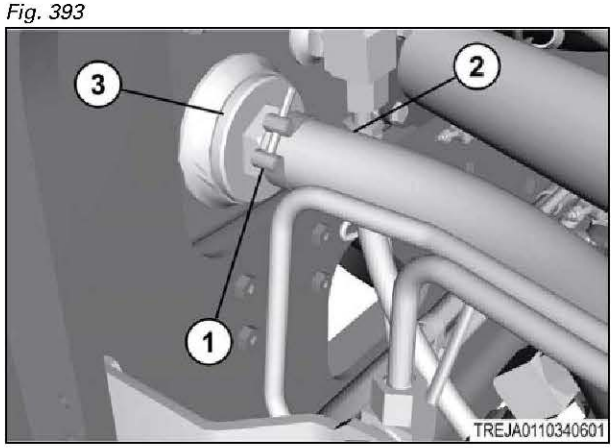

Fig. 394

10. Remove the screen (1) from the reservoir.
11. Wash the screen in a clean, nonflammable solvent and inspect for any damage.
12. Replace a damaged screen with a new screen.
13. Install the clean suction screen into the reservoir.

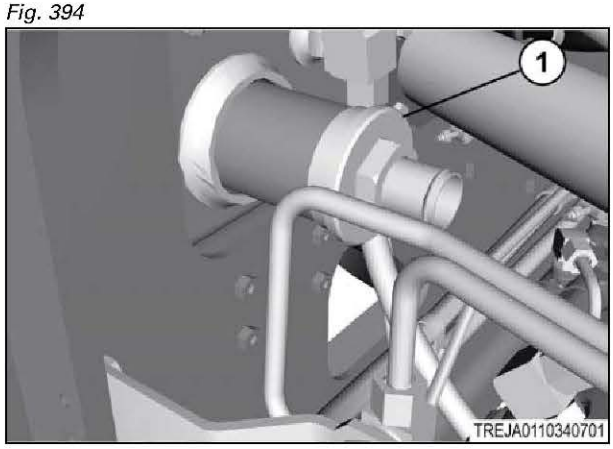

Fig. 395

14. Install the hose assembly (2) on the screen (3) with the clamp (3).

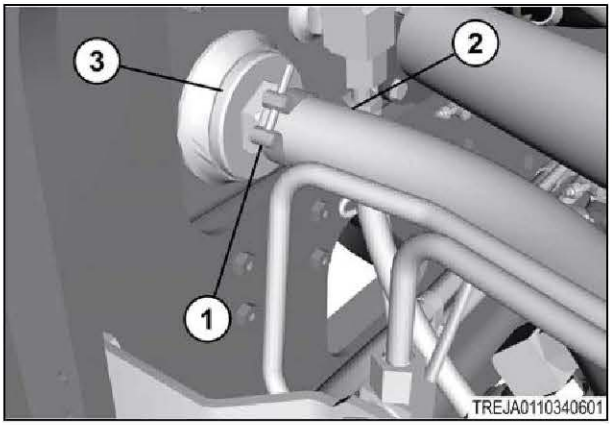

Fig. 396

15. Fill the reservoir until fluid level is at the full mark (1) on the sight gauge.

NOTE:
Approximately 121 L (32 gal) of oil will be necessary.

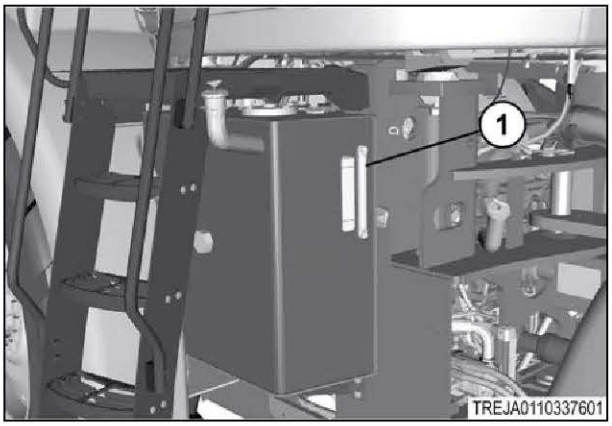

Fig. 397

9.6 Hydraulic troubleshooting

Hydraulic oil overheats	
Cause(s)	**Solution(s)**
The hydraulic system oil level is low or high.	Check the hydraulic system oil level. If necessary, adjust the oil level.
Using incorrect oil viscosity.	Use the correct oil viscosity in the hydraulic system.
The radiator screen, the oil cooler, or the radiator is plugged.	Clean the radiator screen, oil cooler, and the radiator.
Flow control is not correctly adjusted.	Adjust the flow control to lower the flow.
The oil cooler bypass valve is stuck in the open position.	Replace the valve.
Air in the oil.	Find location of the entry of air into the system. Repair the components or replace the components, if necessary.
Implement is not connected correctly.	Adjust flow controls on machine rather than implement.
Crossover relief valve and the pressure override relief valve in the steering pump, are malfunctioning.	See your dealer.
The hydraulic oil filters are plugged.	Replace the hydraulic oil filters.
Charge relief valve is malfunctioning.	See your dealer

Complete hydraulic system does not operate	
Cause(s)	**Solution(s)**
Hydraulic system oil level is low.	Check the hydraulic system oil level. If the oil level is low, add oil.
Suction screen for charge pump is restricted.	Clean the suction screen.
Hydraulic oil filters are restricted.	Replace the hydraulic oil filters.
Hydraulic system is malfunctioning.	See your dealer.
Lockout switch for the hydraulic control valves is activated.	Press the lockout switch to actuate the hydraulic control valves.

Hydraulic control valve does not extend or retract	
Cause(s)	**Solution(s)**
A solenoid is not working on the hydraulic control valve.	See your dealer.
Lockout switch for the hydraulic control valves is activated.	Press the lockout switch to actuate the hydraulic control valves.

Implement hoses will not connect	
Cause(s)	**Solution(s)**
Using incorrect male connectors.	Replace connectors with ISO 5675 standard connectors. Connectors are available from dealer.

Remote attachment does not operate	
Cause(s)	**Solution(s)**
Hoses are not completely connected.	Correctly attach the hoses
Hydraulic load exceeds capacity of the system	Reduce the hydraulic load or use correct size of cylinder
Lockout switch is disabling implement hydraulic system.	Push the lockout switch again.