

16 Implement lift system

16.1	3-point linkage system introduction	16-3
16.1.1	3-point linkage components	16-4
16.1.2	3-point linkage system	16-5
16.2	Position of hydraulic components	16-6
16.2.1	Hydraulic oil reservoir	16-6
16.2.2	Breather	16-7
16.2.3	Magnets	16-7
16.2.4	Oil drain plugs	16-7
16.2.5	Oil level switch	16-8
16.2.6	Oil temperature sensor	16-8
16.2.7	Sight gauge	16-8
16.2.8	Suction screen (charge pump)	16-9
16.2.9	Suction screen (implement pump)	16-9
16.2.10	Implement hydraulic pump	16-10
16.2.11	Steering - priority valve	16-11
16.2.12	3-point linkage control valve	16-11
16.2.13	3-point linkage accumulator	16-12
16.2.14	Lift cylinders	16-12
16.3	3-point linkage control valve	16-13
16.3.1	Hitch control valve in the hold position	16-14
16.3.2	Hitch control valve lower position	16-15
16.3.3	Hitch control valve raise position	16-16
16.3.4	Manual lowering	16-17
16.3.5	3-point linkage accumulator	16-17
16.4	Position of electrical components	16-18
16.4.1	Transmission module	16-18
16.4.2	Armrest module	16-18
16.4.3	Tractor management center	16-18
16.4.4	CAN data link	16-19
16.4.5	Roading lockout switch	16-19
16.4.6	Headland management switch	16-20
16.4.7	3-point linkage lever position sensor	16-21
16.4.8	3-point linkage lift position sensor	16-21
16.4.9	Raise - work switch	16-22
16.4.10	Raise - lower switch	16-22
16.4.11	3-point linkage control solenoids	16-23
16.5	3-point linkage disassembly and assembly	16-24
16.5.1	Remove the 3-point linkage	16-24
16.5.2	Install the 3-point linkage	16-30
16.5.3	Remove the quick hitch	16-35
16.5.4	Install the quick hitch	16-36
16.5.5	Remove the accumulator	16-37
16.5.6	Install the accumulator	16-38
16.5.7	Remove the lift link	16-39
16.5.8	Install the lift link	16-40
16.5.9	Remove the top link	16-41
16.5.10	Install the top link	16-42
16.5.11	Remove the lift arm	16-42
16.5.12	Install the lift arm	16-44
16.5.13	Remove the rockshaft	16-46

16.5.14	Install the rockshaft	16-48
16.5.15	Remove the lift cylinder	16-50
16.5.16	Install the lift cylinder	16-52
16.5.17	Remove the draft arm	16-54
16.5.18	Install the draft arm	16-55
16.6	3-point linkage system testing and adjusting	16-58
16.6.1	Prepare the machine	16-58
16.6.2	Troubleshooting procedure	16-58
16.6.3	Visual inspection	16-59
16.6.4	Test equipment	16-59
16.6.5	Warm the hydraulic oil	16-60
16.6.6	Position of the hydraulic test ports	16-60
16.6.7	Operational checks for the 3-point linkage	16-61
16.6.8	Check for 3-point linkage cylinder drift	16-61
16.6.9	Calibrate the 3-point linkage control valve solenoid	16-61
16.6.10	Calibrate the 3-point linkage sensors	16-66
16.7	3-point linkage troubleshooting	16-69

16.1 3-point linkage system introduction

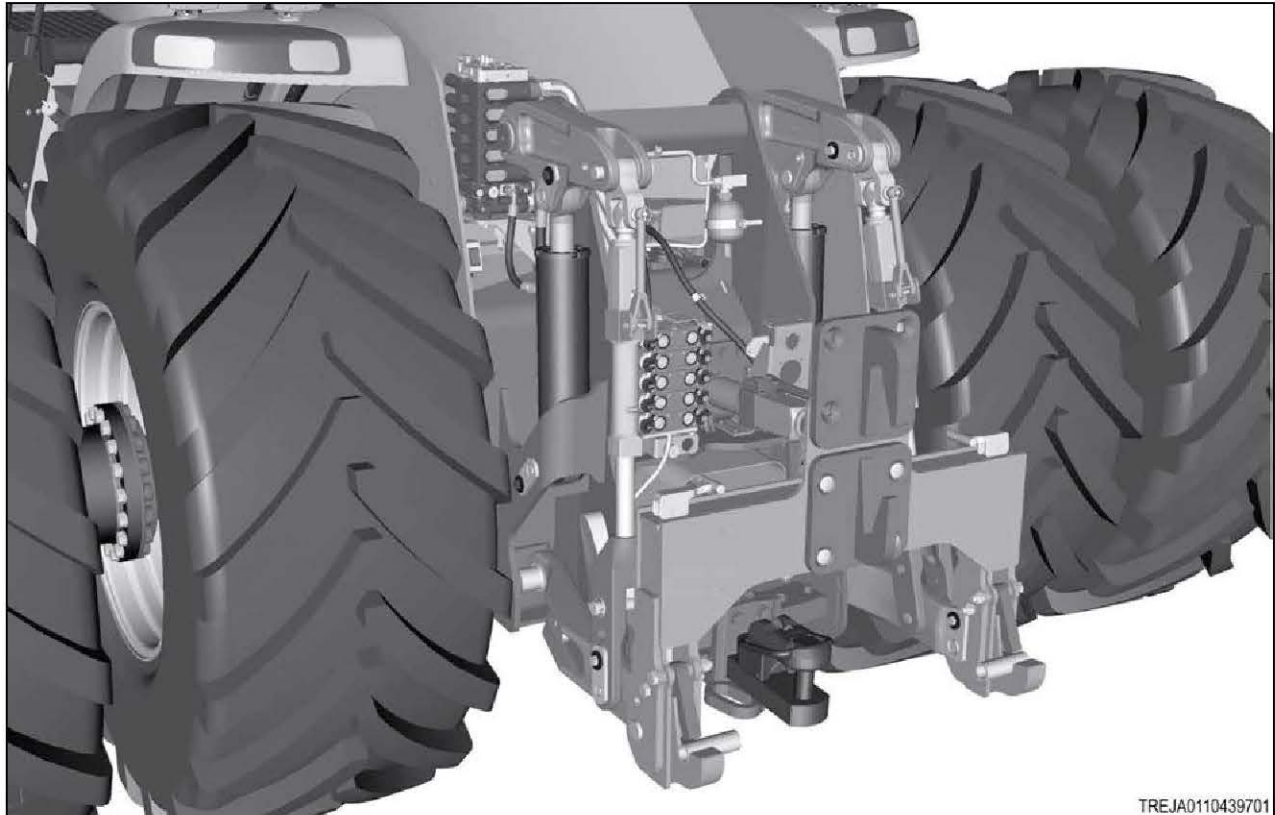


Fig. 1

The 3-point linkage system operates from the same hydraulic flow as the steering and implement systems. The control valve for the 3-point linkage is in the implement valve bank. The control valve controls hydraulic flow to the lift cylinders.

The 3-point linkage system:

- Variable displacement piston pump
- Steering/priority valve
- 3-point linkage control valve
- Hydraulic oil reservoir
- Lift cylinders
- Electrical controls

The tractor management center (TMC) lets the operator change the following parameters:

- Raise limit
- Raise rate
- Lower rate
- Slip sensitivity
- Draft sensitivity

Remote couplers are used with the 3-point linkage configuration. The control valves are mounted in front of the 3-point linkage.

The 3-point linkage has a lift capacity of 8845 kg (19500 lb).

16.1.1 3-point linkage components

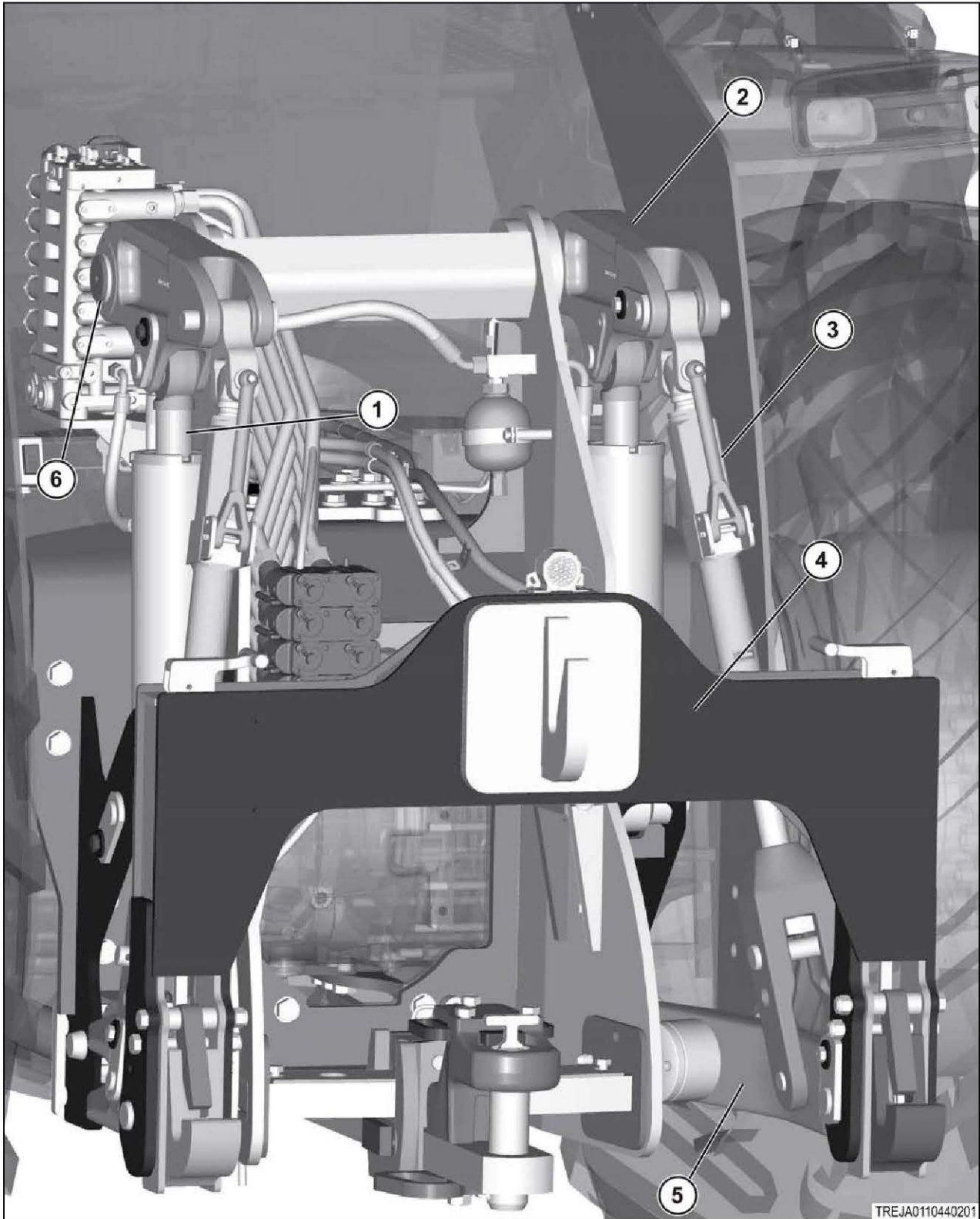


Fig. 2

- 1 Lift cylinder
- 2 Lift arms
- 3 Lift links
- 4 Quick hitch

- 5 Draft arms
- 6 Rockshaft

16.1.2 3-point linkage system

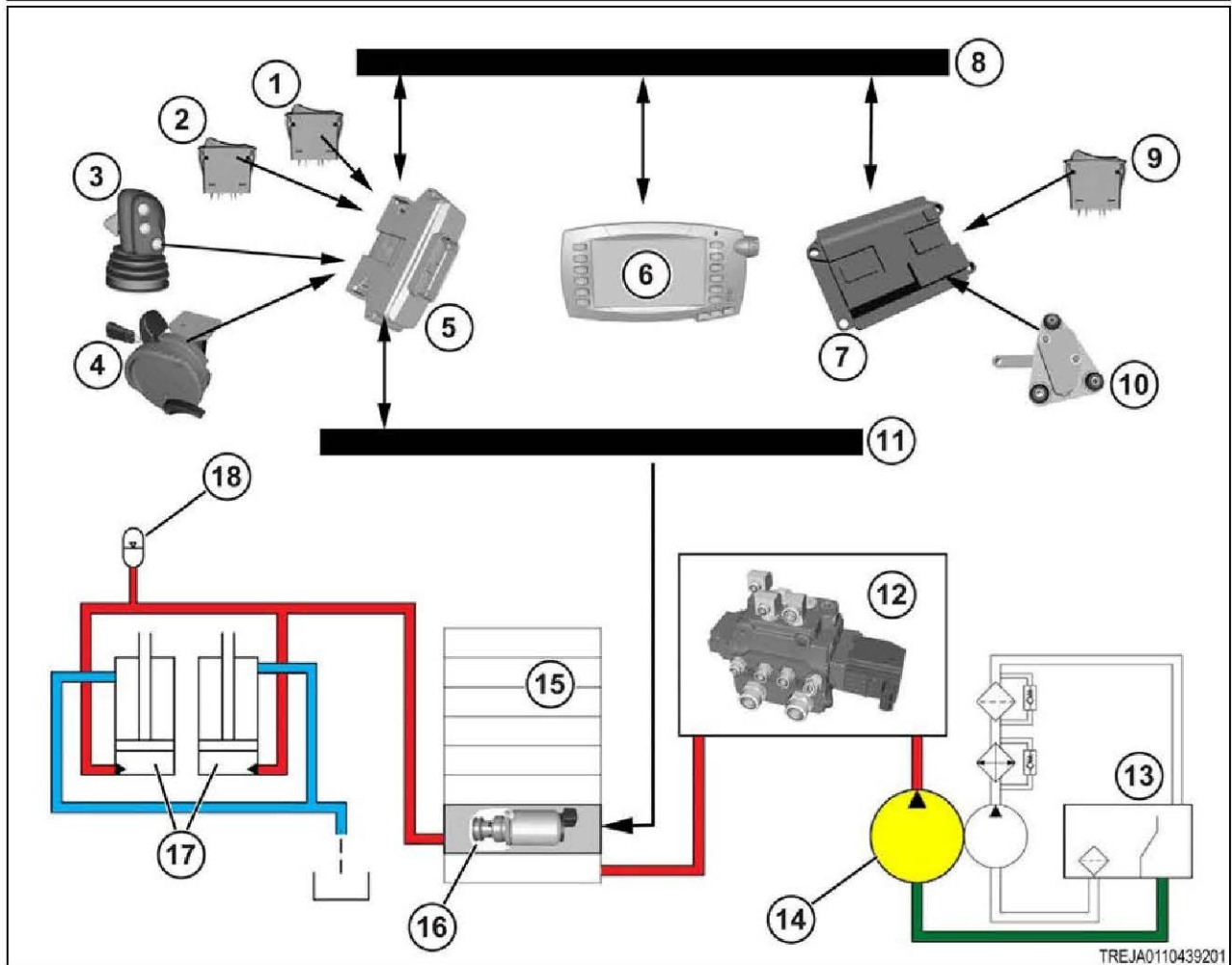


Fig. 3

- 1 Raise/work switch
- 2 Roading lockout switch
- 3 One-Touch switch
- 4 3-point linkage control lever
- 5 Armrest module
- 6 Tractor management center (TMC)
- 7 Transmission module
- 8 Drive train CAN bus
- 9 Raise/lower switch
- 10 Position sensor (lift)
- 11 Auxiliary CAN bus
- 12 Steering/priority valve
- 13 Hydraulic oil reservoir
- 14 Hydraulic pump
- 15 Control valve bank
- 16 3-point linkage solenoids
- 17 3-point linkage lift cylinders
- 18 Accumulator

16.2 Position of hydraulic components

16.2.1 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

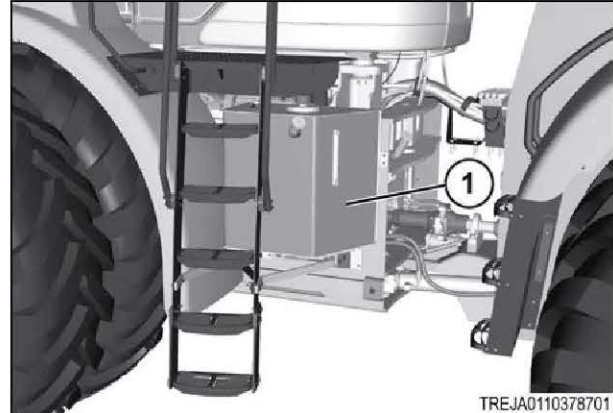


Fig. 4

The oil reservoir consists of the following components:

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

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.



Fig. 5

16.2.2 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.

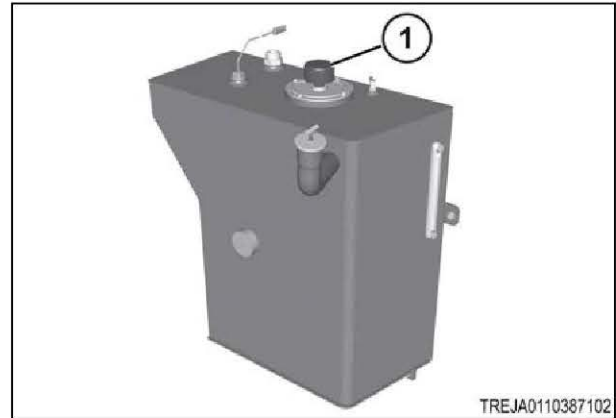


Fig. 6

16.2.3 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.

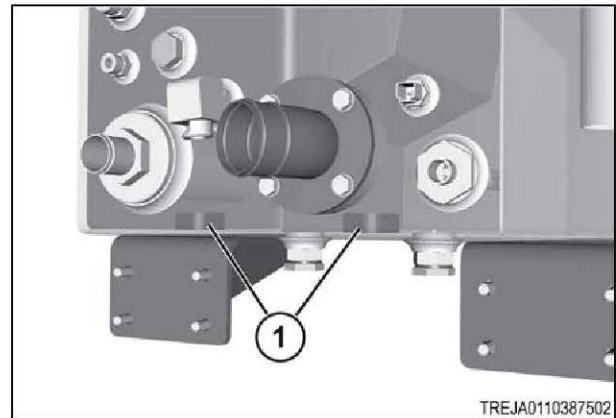


Fig. 7

16.2.4 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.

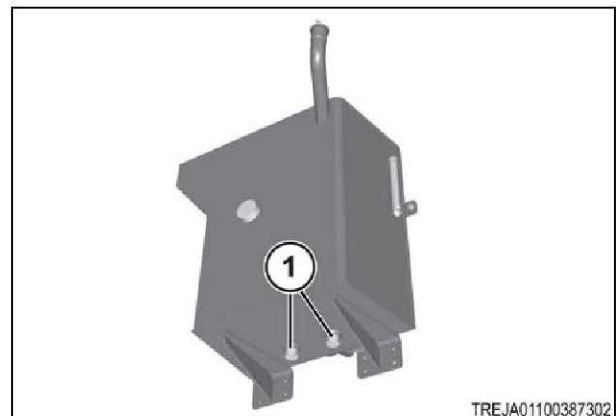


Fig. 8

16.2.5 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.

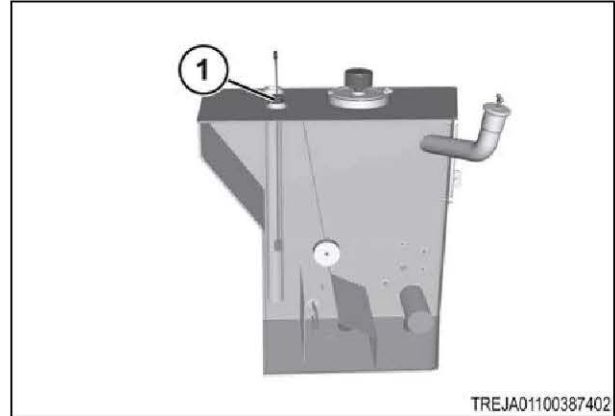


Fig. 9

16.2.6 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.

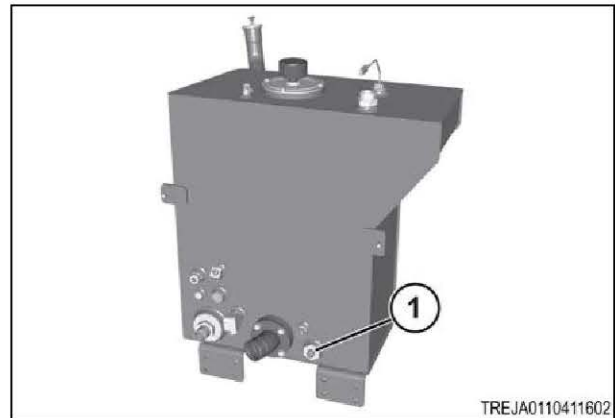


Fig. 10

16.2.7 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.

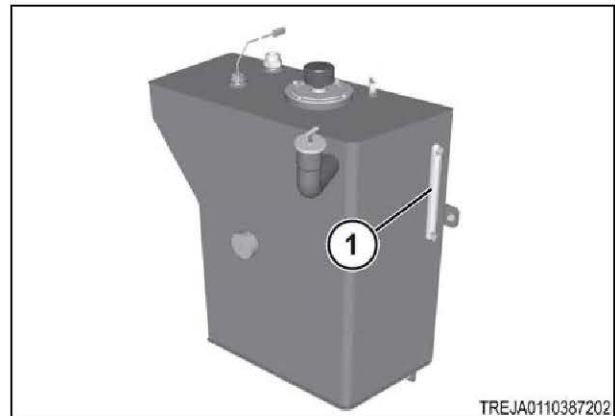


Fig. 11

16.2.8 Suction screen (charge pump)

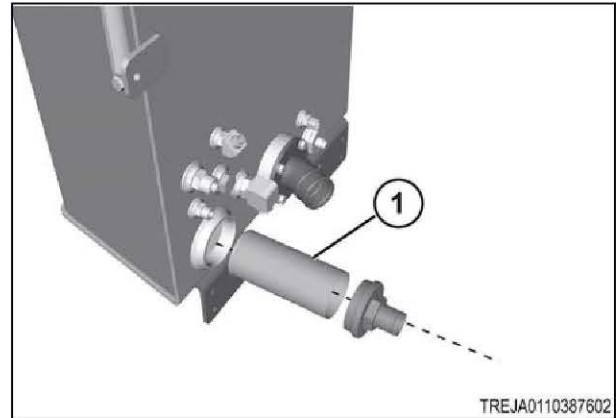


Fig. 12

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.

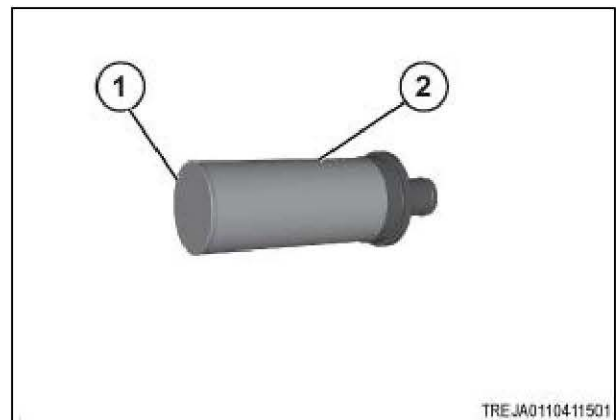


Fig. 13

16.2.9 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.

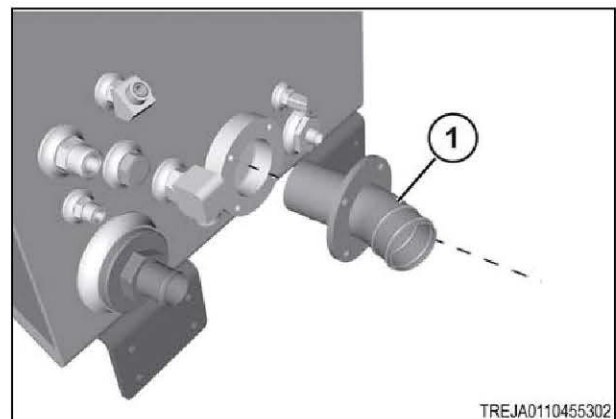


Fig. 14

16.2.10 Implement hydraulic pump

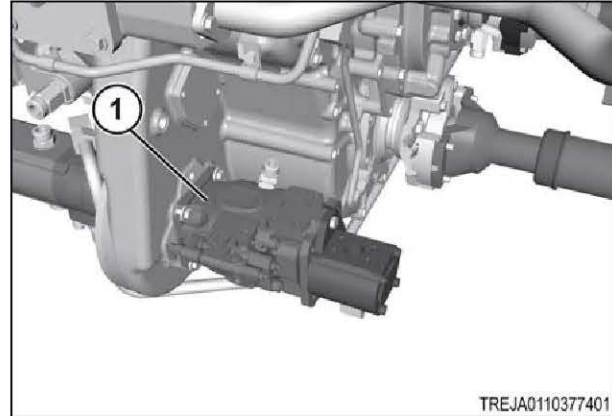


Fig. 15

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 cm³ (3.8 in³) and can produce a maximum flow of 165 liters/min (43.5 gal/min).

A 85 cm³ (5.2 in³) 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.

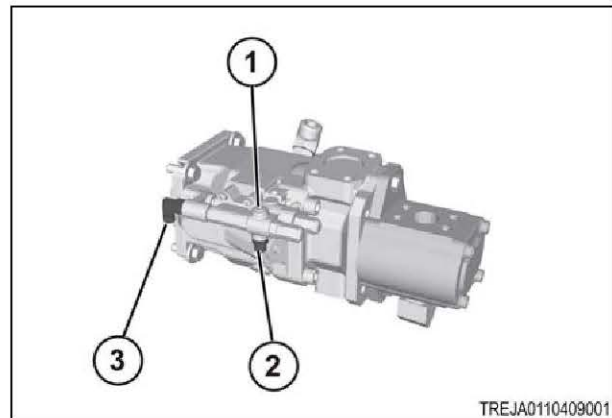


Fig. 16

16.2.11 Steering - priority valve

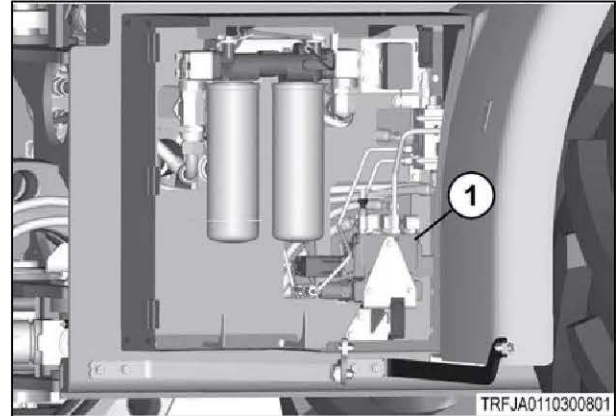


Fig. 17

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.

16.2.12 3-point linkage control valve

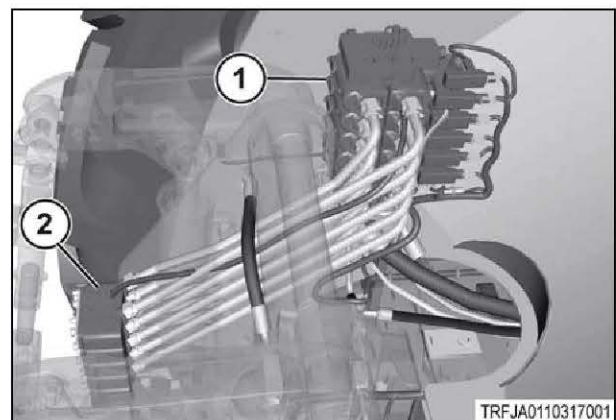


Fig. 19

The location of the 3-point linkage control valve (1) is at the rear of the machine.

Implement valves (2).

The 3-point linkage control valve controls the flow of hydraulic oil to the 3-point linkage lift cylinders.

16.2.13 3-point linkage accumulator

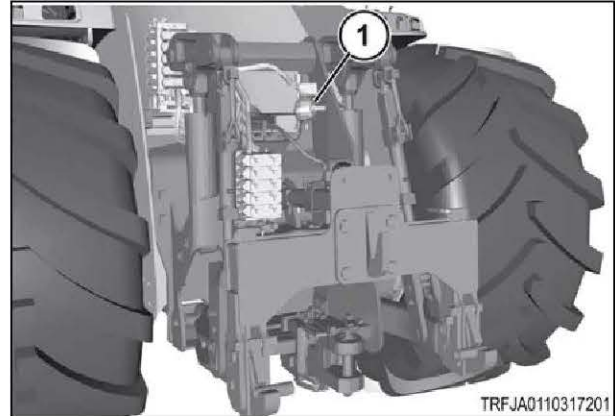


Fig. 20

The accumulator location (1) for the hydraulic system of the 3-point linkage.

The accumulator reduces shock loads in the hydraulic system that can occur when roading heavy implements.

16.2.14 Lift cylinders

The 3-point linkage lift cylinders supply the lifting for the full 3-point linkage.

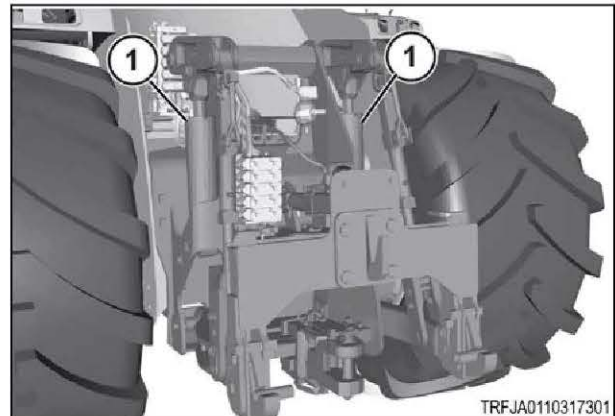


Fig. 21

The rod end of the 3-point linkage lift cylinders (1) fastens to the lift arms. The piston end of the cylinders fastens to the 3-point linkage frame. The 3-point linkage lift cylinders raises the 3-point linkage.

Behind the fastening points the lift capacity of the 3-point linkage lift cylinders 8845 kg (19500 lb) measured at 610 mm (24 in).

16.3 3-point linkage control valve

The 3-point linkage control valve (1) is at the rear of the machine. The 3-point linkage control valve is at the bottom of the hydraulic control valve bank. The 3-point linkage control valve sends and receives hydraulic oil to the 3-point linkage lift cylinders.

The 3-point linkage control valve has the following positions:

- Hold
- Raise
- Lower

The 3-point linkage control valve works in parallel with the remaining valves in the hydraulic control valve bank.

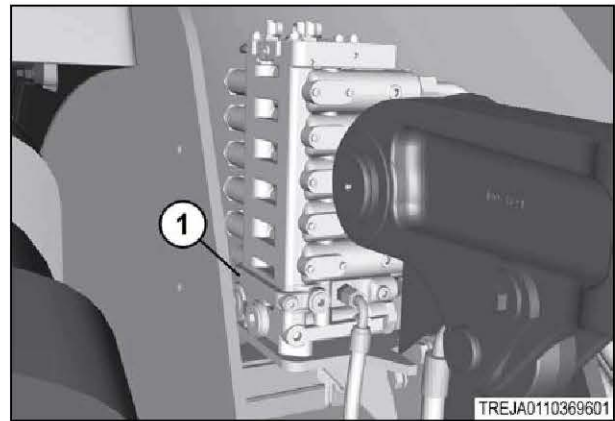


Fig. 22

The main components in the 3-point linkage control valve

Callout	Description
1	Valve body
2	Main spool
3	Solenoid A
4	Solenoid B
5	Poppet valve
6	Compensator
7	Hitch relief valve

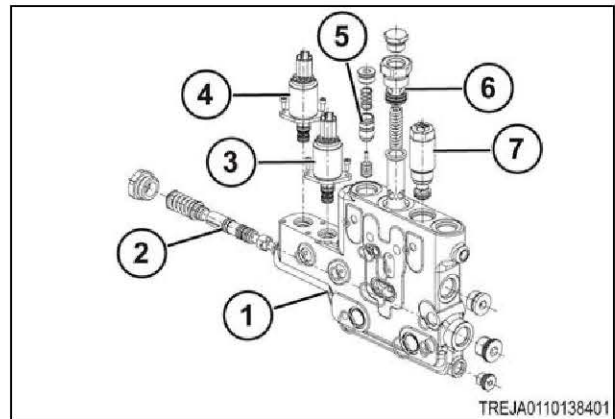


Fig. 23

16.3.1 Hitch control valve in the hold position

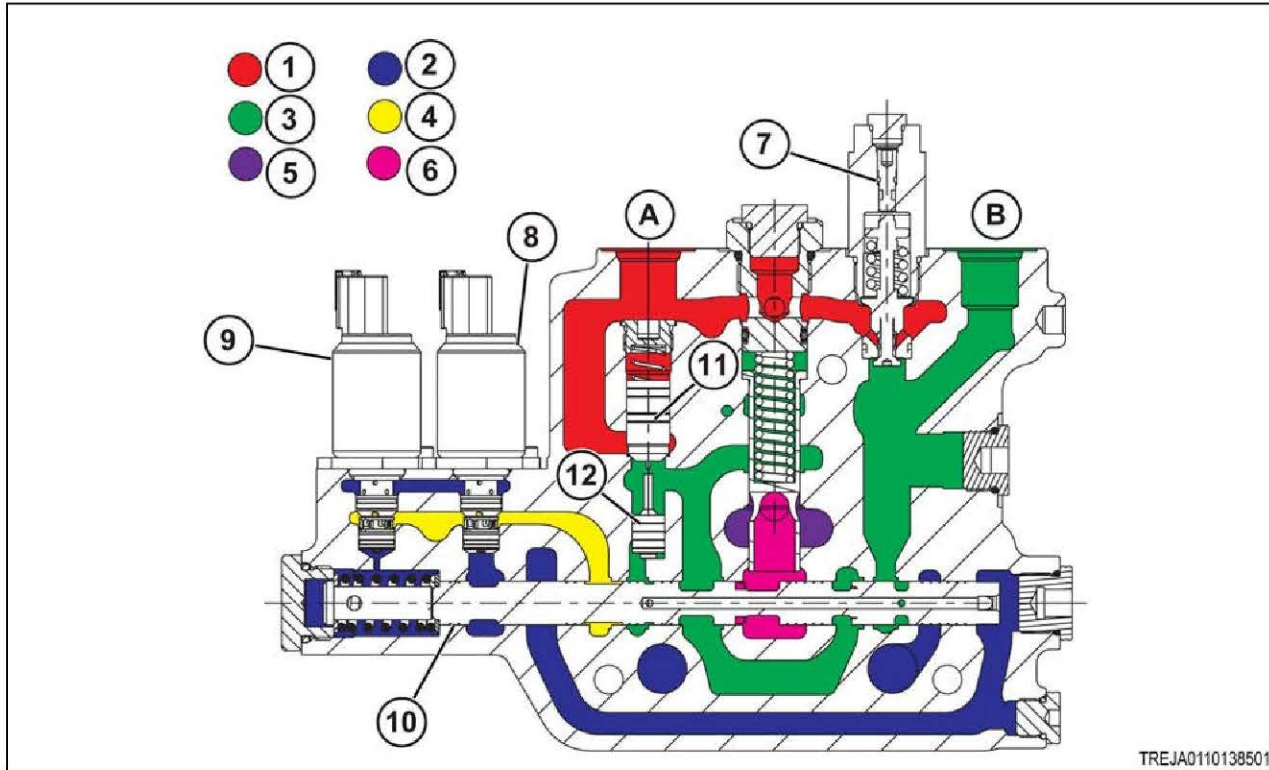


Fig. 24

Callout	Description
1	Pressure
2	Return
3	Sump
4	Pilot
5	Pump pressure
6	Compensated pressure
7	Hitch relief valve
8	Solenoid A
9	Solenoid B
10	Main spool valve
11	Poppet valve
12	Release valve
A	Work port
B	Return port

The conditions for the hitch control valve to be in the hold position are:

- Hitch valve in the neutral position
- Both solenoids off
- Main spool is centered
- Pump pressure is blocked

No hydraulic will flow to the hitch lift cylinders and the return routing is blocked.

16.3.2 Hitch control valve lower position

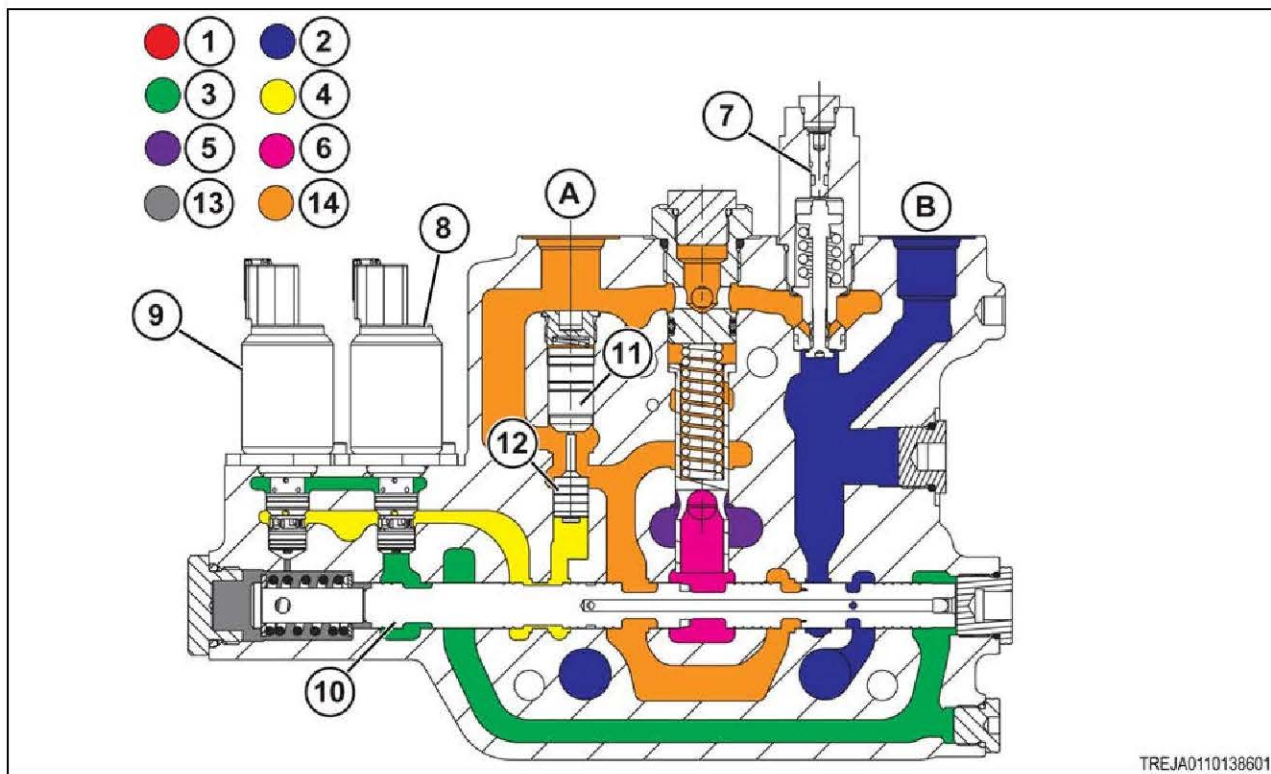


Fig. 25

Callout	Description
1	Pressure
2	Return
3	Sump
4	Pilot
5	Pump pressure
6	Compensated pressure
7	Hitch relief valve
8	Solenoid A
9	Solenoid B
10	Main spool valve
11	Poppet valve
12	Release valve
13	Control pressure
14	Load sense pressure
A	Work port
B	Return port

When the hitch is in the lower position, solenoid B (9) lets the control pressure shift the main spool valve (10) to the right. When the main spool valve is to the right, the pilot pressure moves the release valve (12).

The release valve moves the poppet valve (11) off the seat to release the pressure in work port (A). The released pressure flows to the return port and then to the reservoir.

16.3.3 Hitch control valve raise position

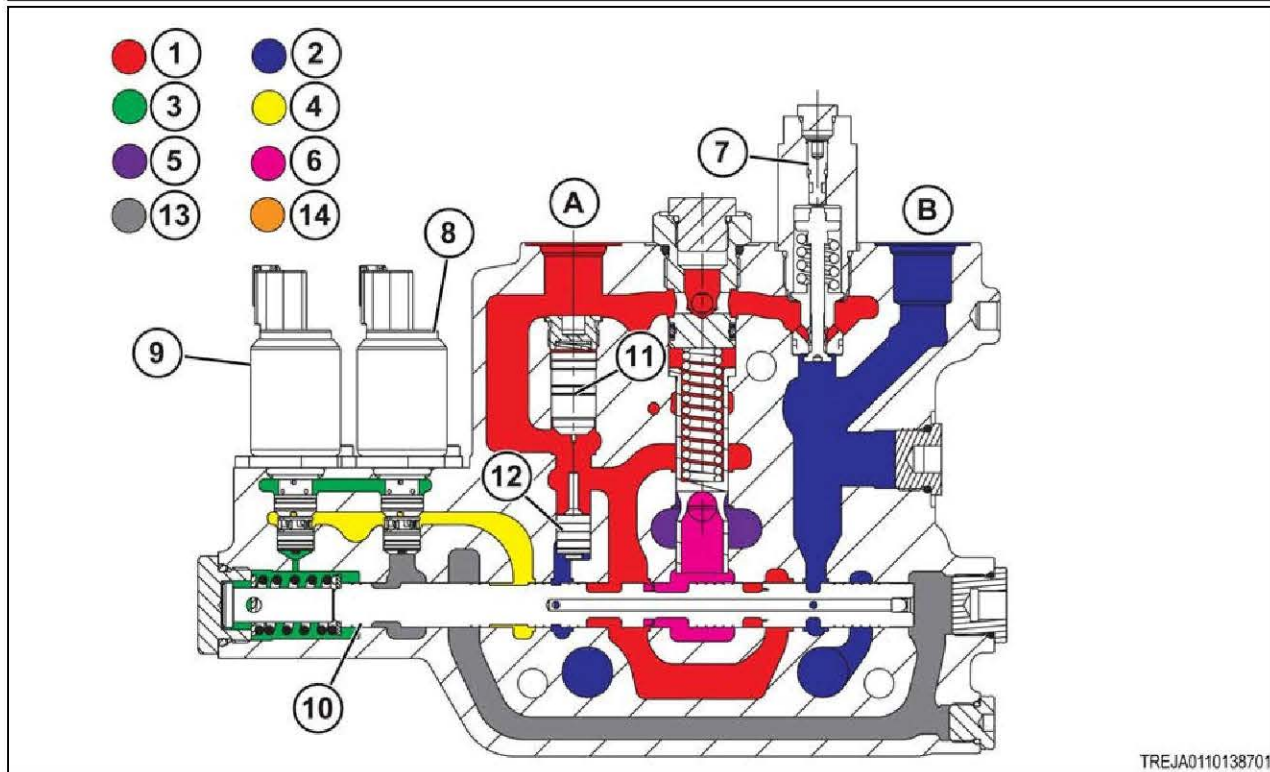


Fig. 26

Callout	Description
1	Pressure
2	Return
3	Sump
4	Pilot
5	Pump Pressure
6	Compensated Pressure
7	Hitch relief valve
8	Solenoid A
9	Solenoid B
10	Main spool valve
11	Poppet valve
12	Release valve
13	Control Pressure
14	Load sense pressure
A	Work port
B	Return port

When the hitch valve is in the raise position, the solenoid A (8) is activated. The solenoid lets the control pressure shift the main spool (10) to the left. When the main spool valve is shifted left, the pump pressure

presses the poppet valve (1) off the seat. This lets the hydraulic flow to the work port (A). The hitch return oil flows to the tank.

16.3.4 Manual lowering

If the engine does not operate, the relief valve (1) can manually lower the 3-point linkage.

The following procedure will actuate the relief valve, permitting the oil to return to the common sump:

1. Remove the protective cap from the relief valve.



WARNING:
Movement of the 3-point linkage and the implements can cause personal injury. Before operating the 3-point linkage, make sure no one is in the area of the implement or the 3-point linkage.

2. Insert the applicable hex wrench into the relief valve.
3. Turn the hex wrench clockwise in small increments until the 3-point linkage begins to lower.
4. When the 3-point linkage is lowered completely, return the relief to the original setting.
5. Replace the protective cover.

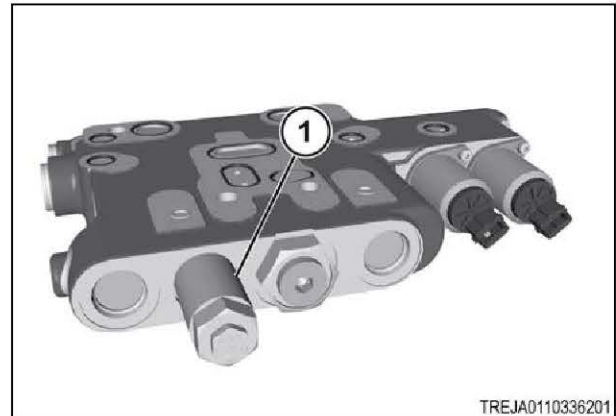


Fig. 27

TREJA0110336201

16.3.5 3-point linkage accumulator

The accumulator (1) is at the -hand side of the hydraulic control valve bank. The accumulator dampens shock load in the 3-point linkage system under heavy loads.

Fig. 28

The accumulator lets the lift cylinders (2) retract to dampen the shock load. Shock loads that cannot be dampened by the accumulator will cause the relief valve open.

The accumulator and the relief valve give protection to the following items:

- 3-point linkage hydraulic system
- 3-point linkage components
- Differential housing

16.4 Position of electrical components

16.4.1 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)

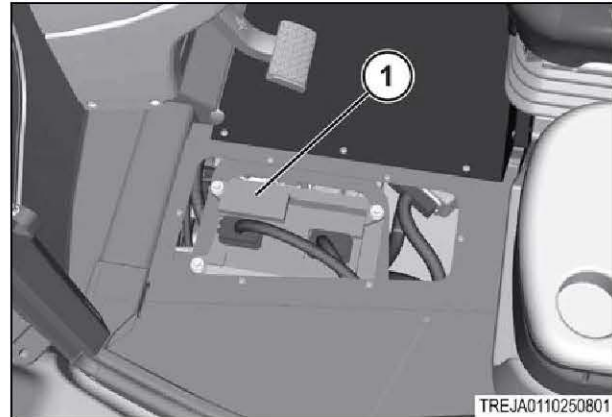


Fig. 29

16.4.2 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.

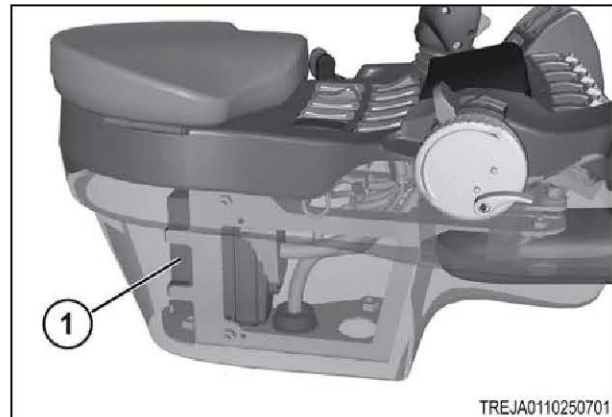


Fig. 30

16.4.3 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.

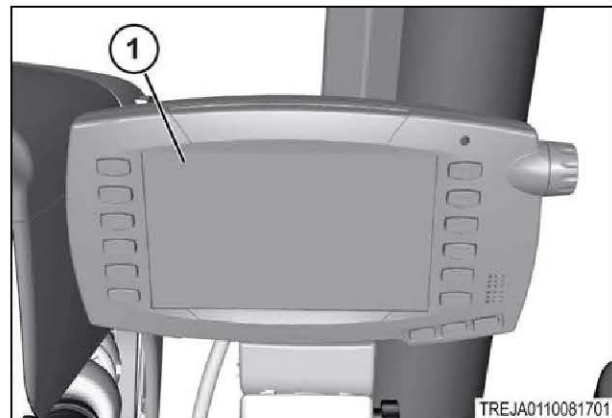


Fig. 31

16.4.4 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

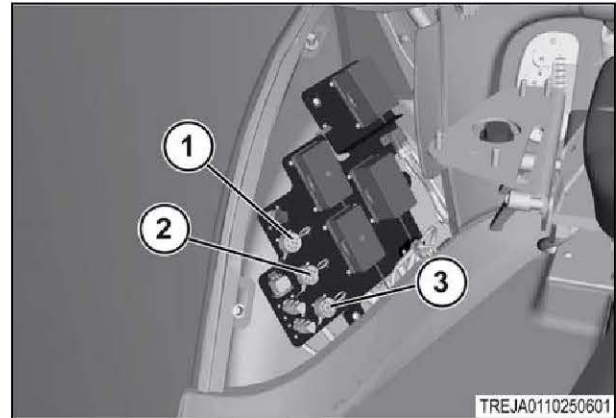


Fig. 32

16.4.5 Rooding lockout switch

The lockout switch has the following positions:

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

The rooding 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



Fig. 33

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 one 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.

16. Implement lift system

- 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.

16.4.6 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.

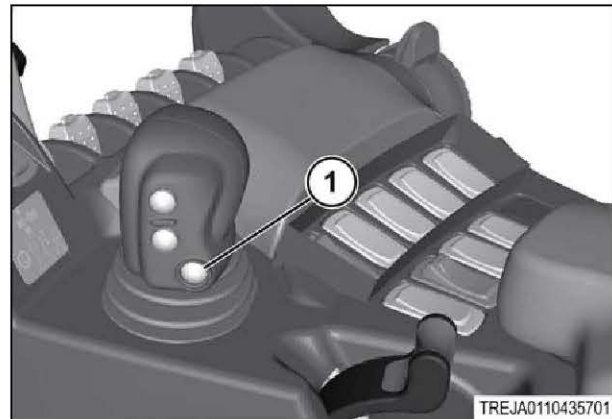


Fig. 34

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.

16.4.7 3-point linkage lever position sensor

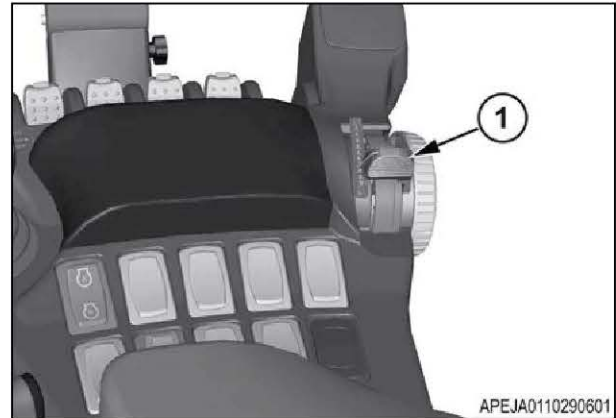


Fig. 35

The location of the hitch lever (1) is on the operator console on the right-hand side of the handrest. The location of the position sensor is at the bottom of the hitch lever.

The hitch lever signals the armrest module that the operator wants to put the 3-point linkage at a specific height.

Use the hitch lever (1) to set the working depth of the 3-point linkage. Pushing the hitch lever toward the forward position signals the armrest module to lower the hitch to a height proportional to the position of the hitch lever.

Pulling the hitch lever toward the rearward position signals the armrest module to raise the hitch to a height that is set within the tractor management center.

The module receives a proportional signal from the hitch lever. The module will send a proportional signal to the correct hydraulic control valves of the 3-point linkage to keep the correct height.

16.4.8 3-point linkage lift position sensor

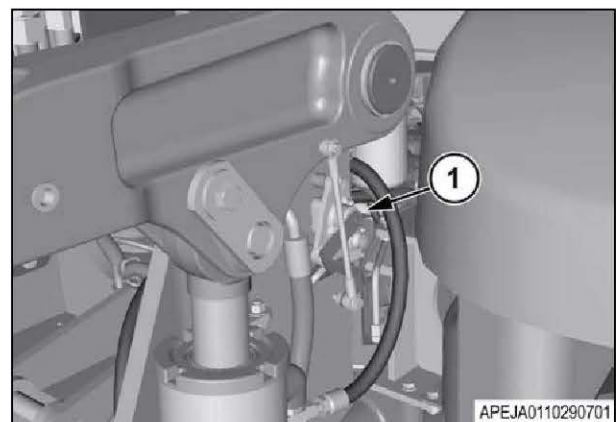


Fig. 36

The location of the position sensor (1) is on the right-hand rear end of the machine. Mounted near the top of the 3-point linkage directly in front of the lift cylinder. Under the base plate of the lever that measures the vertical movement.

The sensor signals the transmission module of the height of the 3-point linkage.

16.4.9 Raise - work switch

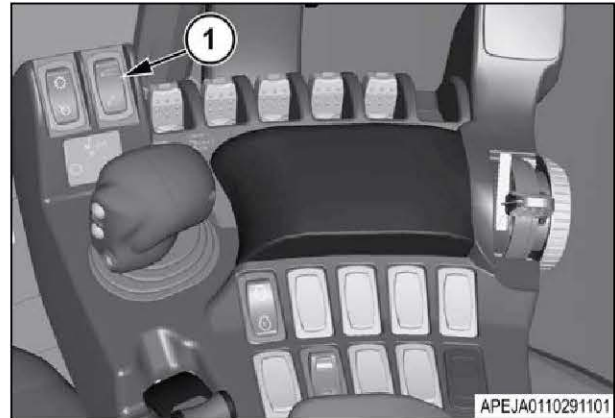


Fig. 37

The location of the raise/work switch (1) is on the console in front of the transmission control lever.

Use the raise/work switch to raise and lower the 3-point linkage by sending a signal to the armrest module.

Pushing the raise position of the switch will raise the 3-point linkage to a height set within the tractor management center. Pushing the work position of the switch will lower the 3-point linkage to a position set by the hitch lever.

16.4.10 Raise - lower switch

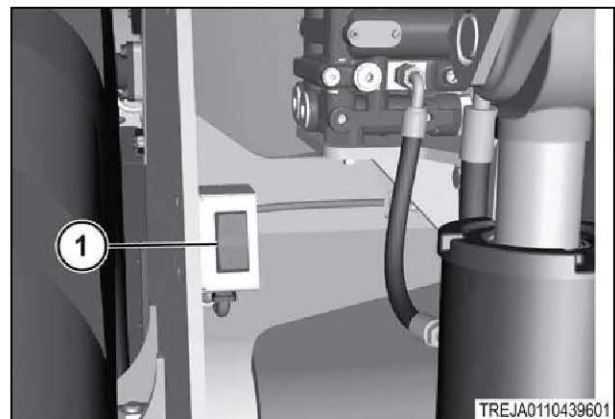


Fig. 38

The raise/lower switch for the 3-point linkage is at the left-hand rear corner of the machine. The raise/lower switch can raise and lower the 3-point linkage to help the operator connect implements to the machine.

16.4.11 3-point linkage control solenoids

- (1) Solenoid A (raise)
- (2) Solenoid B (lower)

Energizing solenoid A raises the hitch. Energizing solenoid B lowers the hitch. The solenoids receive signals from the transmission module. The hydraulic oil leaves the valve from the work port (3) and returns through the either return port (4).

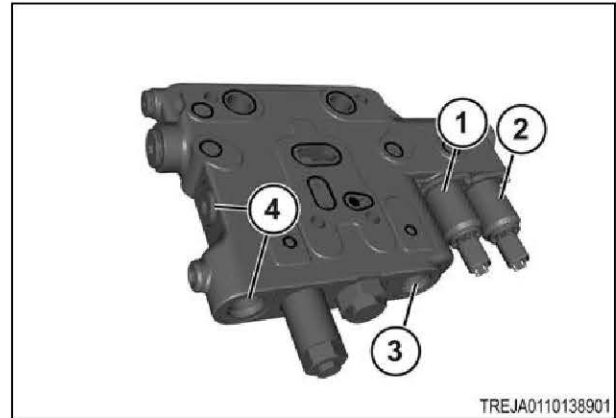


Fig. 39

16.5 3-point linkage disassembly and assembly

16.5.1 Remove the 3-point linkage



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy 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.

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 assembly 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.

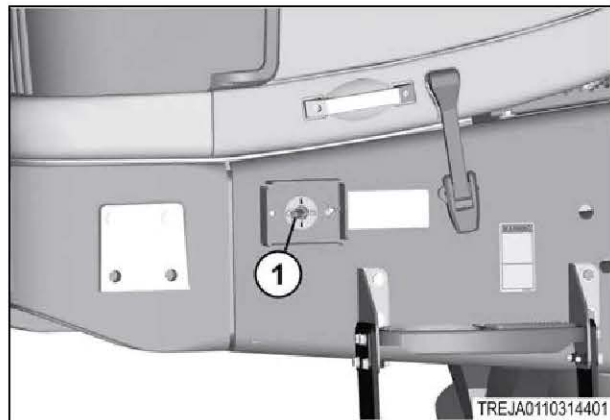


Fig. 40

3. Remove the battery disconnect switch key (1).
4. Relieve all pressure from the hydraulic system.

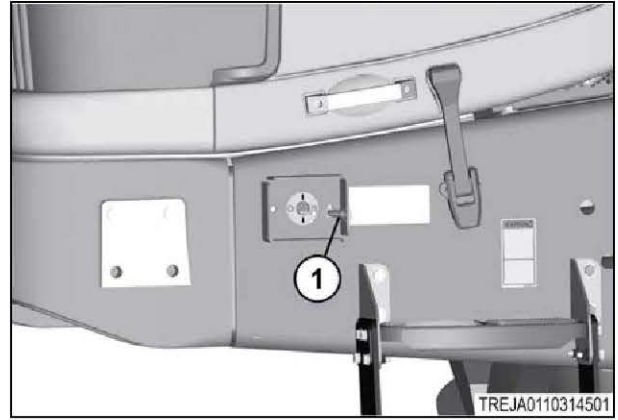


Fig. 41

5. Remove the hardware (1), and the cover plate (2).
6. Set a correct container below the hydraulic tank drain plugs.

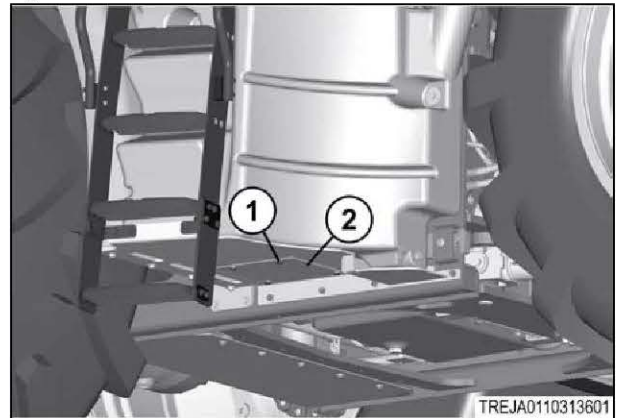


Fig. 42

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.

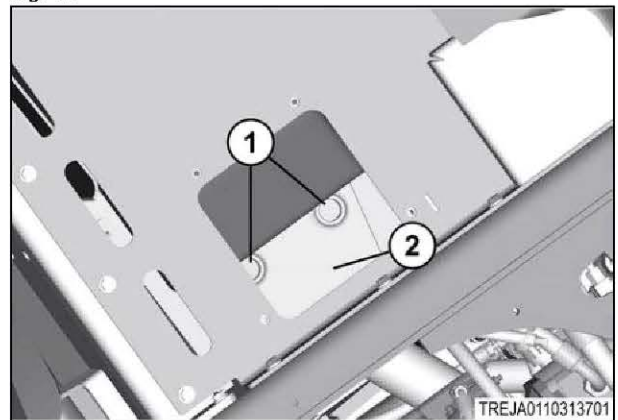


Fig. 43

10. Remove the drawbar (1).

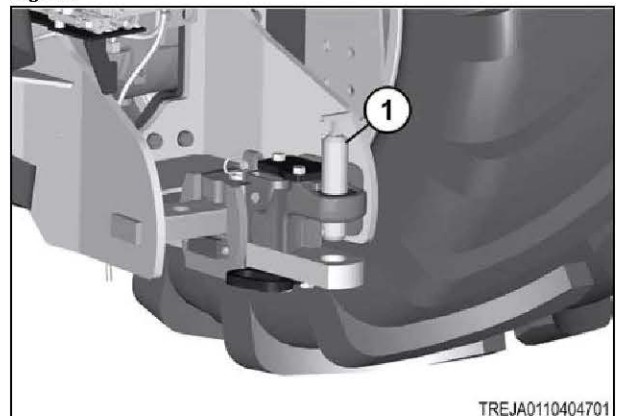


Fig. 44

16. Implement lift system

11. Remove the hardware (1) and the trailer connector bracket assembly (2).

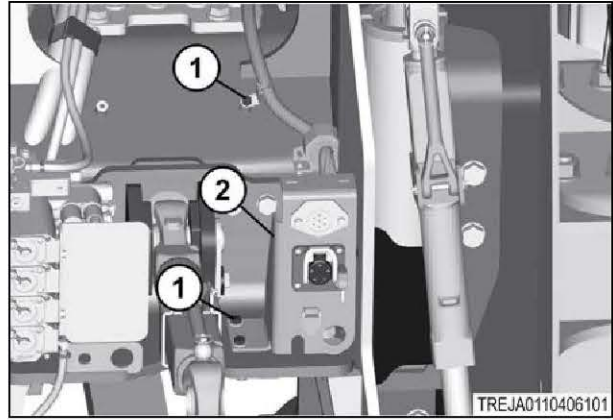


Fig. 45

12. Loosen the hose clamps (1), and remove the hoses (2) from the top and the bottom of the implement valve.
13. Disconnect the hydraulic lines (3).

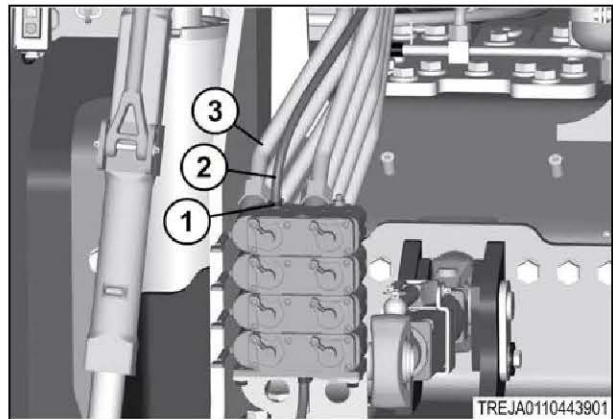


Fig. 46

14. Remove the hardware (1), the implement valve (2), and the implement valve bracket (3).
15. Fasten the correct lifting equipment to the top link assembly.

IMPORTANT:

The weight of the top link assembly is approximately 36 kg (80 lb).

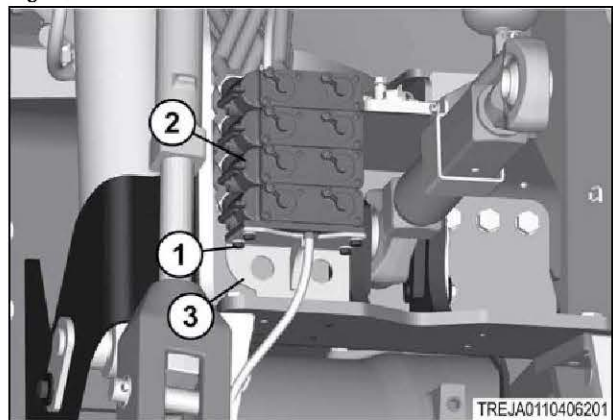


Fig. 47

16. Remove the hardware (1), the pin (2), and the top link assembly (3).
17. Fasten the correct lifting equipment to the top link support.

IMPORTANT:

The weight of the top link support is approximately 50 kg (110 lb).

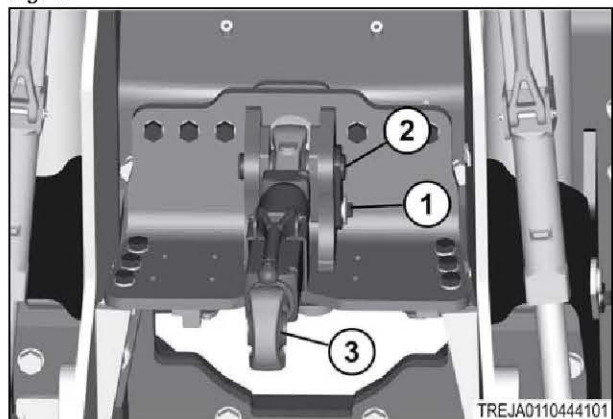


Fig. 48

18. Remove the hardware (1), and the top link support (2).
19. Fasten the correct lifting equipment to the pivot rod assemblies.

IMPORTANT:

The weight of the pivot rod assemblies is approximately 54 kg (119 lb).

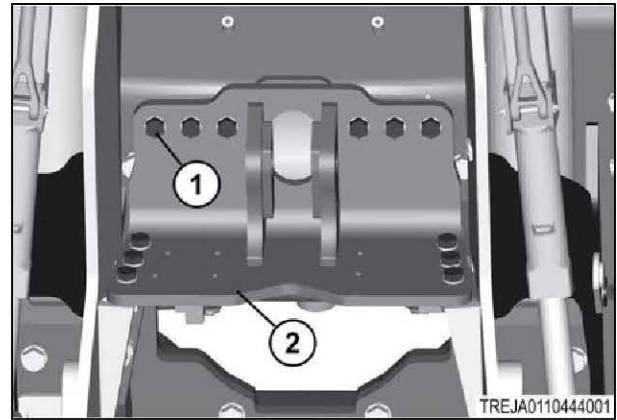


Fig. 49

20. Remove the hardware (1), and the pivot rod assemblies (2).

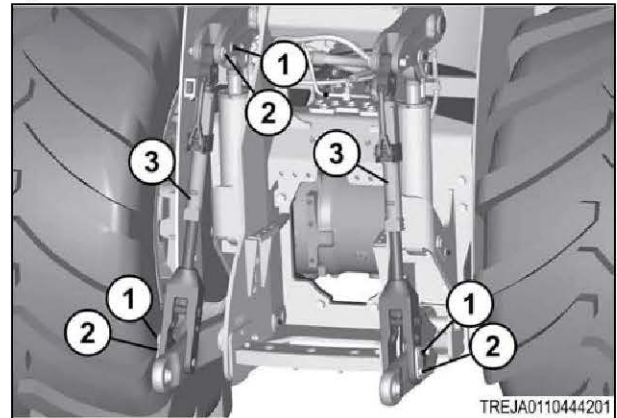


Fig. 50

21. Disconnect the hydraulic hoses (1).
22. Fasten the correct lifting equipment to the cylinder assemblies.

IMPORTANT:

The weight of the cylinder assemblies is approximately 51 kg (113 lb).

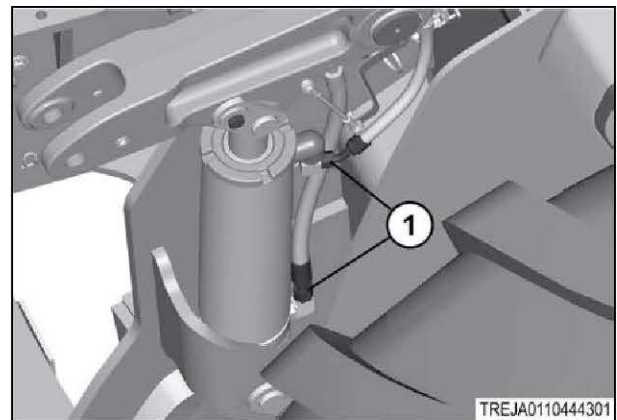


Fig. 51

23. Remove the hardware (1), the pins (2), and the two cylinder assemblies (3).

Slide the bottom pins out far enough to remove the cylinder.

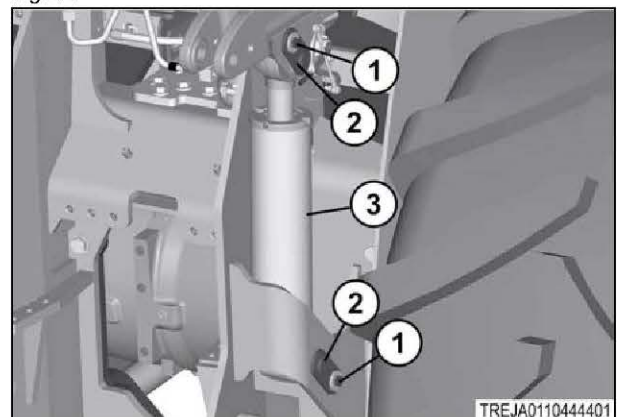


Fig. 52

24. Disconnect the hydraulic hoses (1).

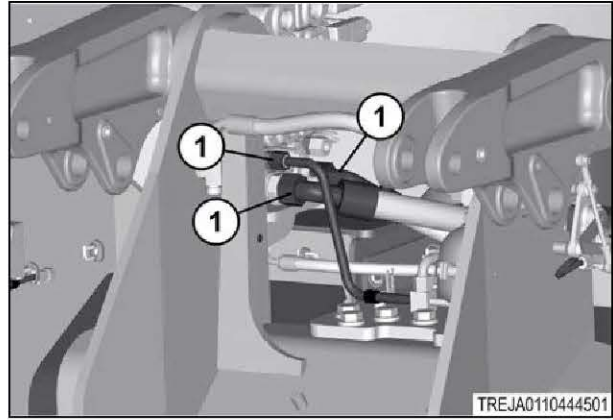


Fig. 53

25. Remove the hardware (1), and the hitch valve (2).

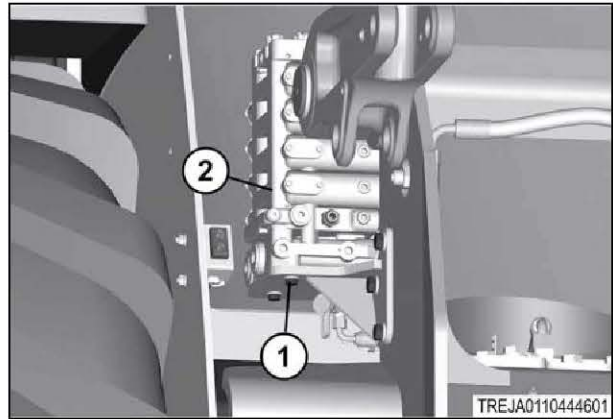


Fig. 54

26. Remove the hardware (1), and the hitch valve plate (2).

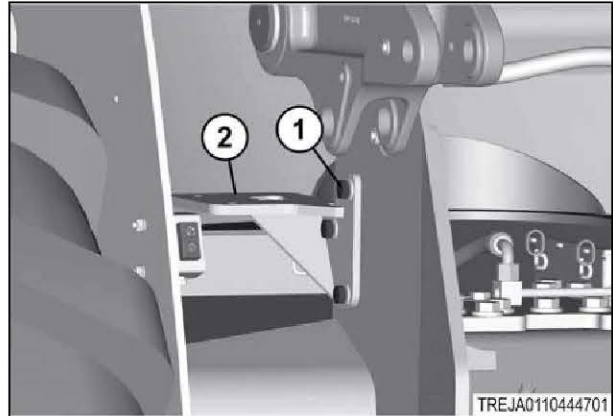


Fig. 55

27. Remove the hardware (1), the two bottom link pins (2), and the two bottom links (3).

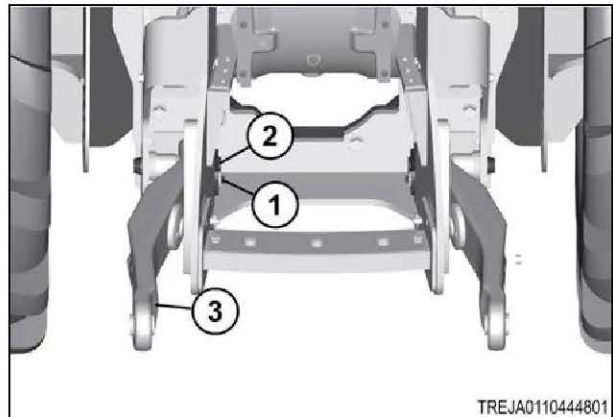


Fig. 56

- 28. Disconnect the hydraulic line (1).
- 29. Remove the hardware (2), and the hose clamps (3).
- 30. Fasten the correct lifting equipment to the hitch frame.

IMPORTANT:

The weight of the hitch frame is approximately 50 kg (110 lb).

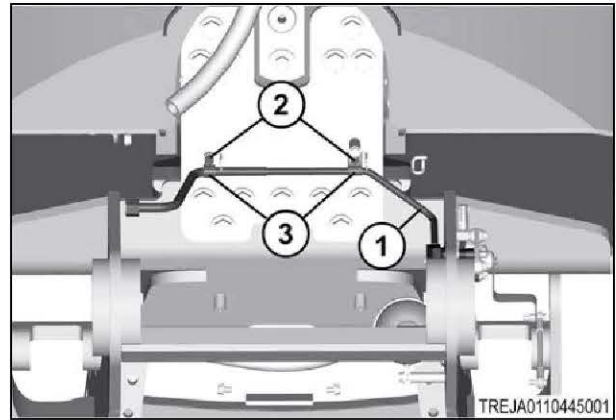


Fig. 57

- 31. Remove the hardware (1), and the hitch frame mounting plate (2).

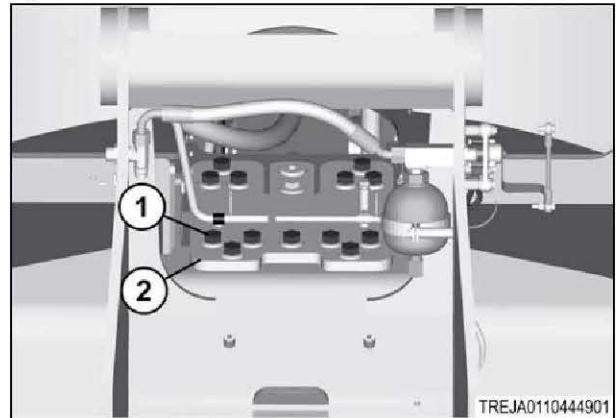


Fig. 58

- 32. Remove the hardware (1), and the two hitch braces (2).

NOTE: *Keep the shims that were installed.*

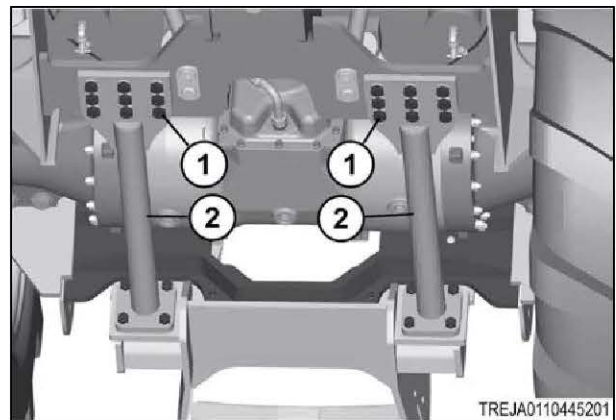


Fig. 59

- 33. Remove the hardware (1), and the hitch frame (2).

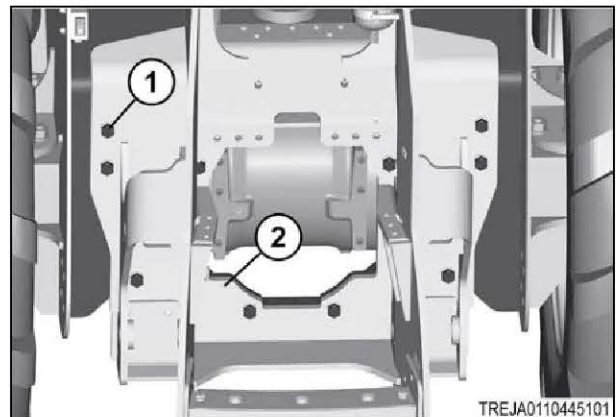


Fig. 60

Related Links

[Remove the drawbar](#) page 17-3

16.5.2 Install the 3-point linkage**IMPORTANT:**

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

Procedure

1. Fasten the correct lifting equipment to the hitch frame.

IMPORTANT:

The weight of the hitch frame is approximately 50 kg (110 lb).

2. Install the hitch frame (2) with the hardware (1).

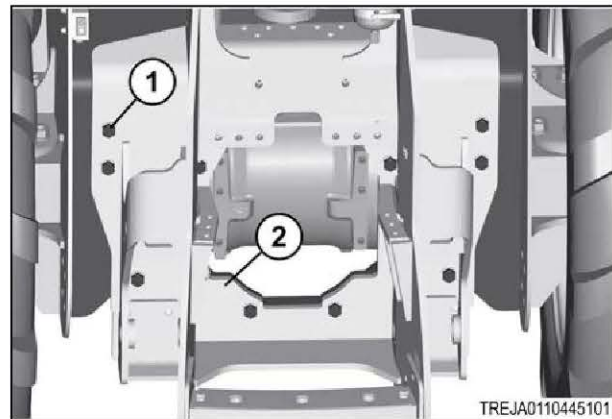


Fig. 61

3. Install the two hitch braces (2) with the hardware (1).

NOTE: Install shims as needed.

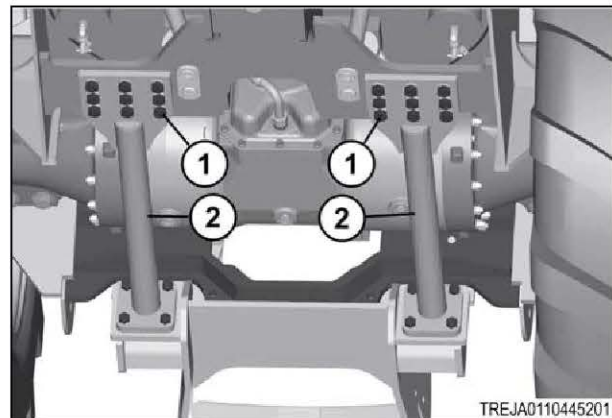


Fig. 62

4. Install the hitch frame mounting plate (2) with the hardware (1).

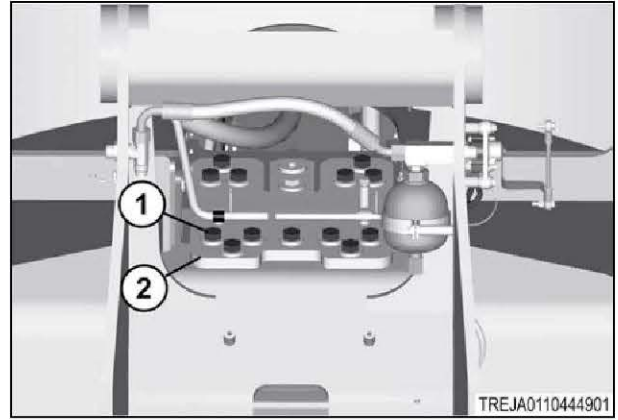


Fig. 63

5. Connect the hydraulic line (1).
6. Install the hose clamps (3) with the hardware (2).

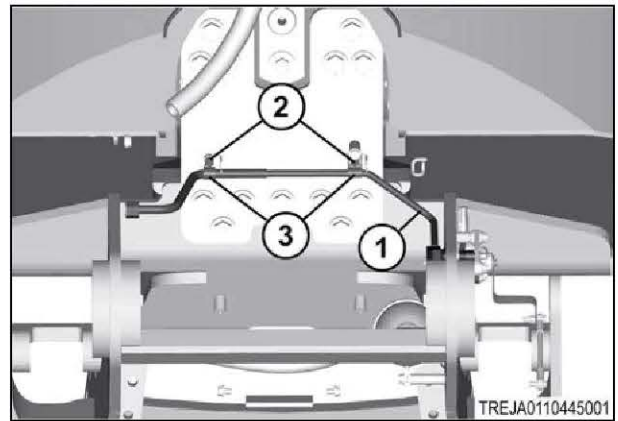


Fig. 64

7. Install the two bottom links (3), and the two bottom link pins (2), with the hardware (1).

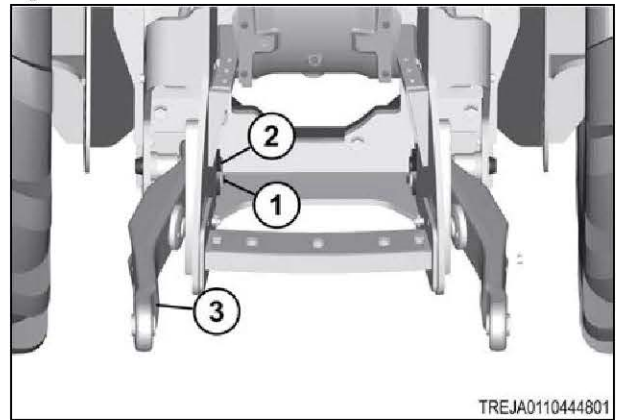


Fig. 65

8. Install the hitch valve plate (2) with the hardware (1).

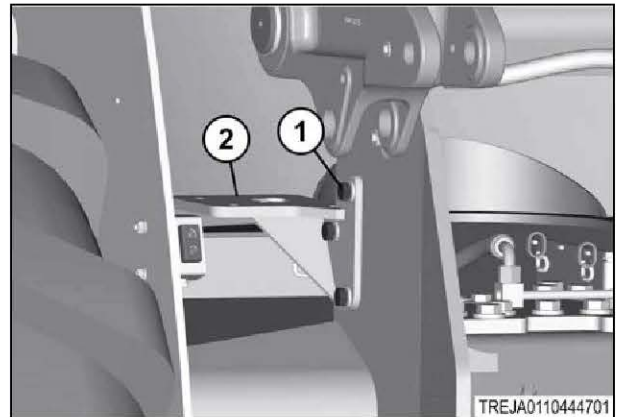


Fig. 66

16. Implement lift system

9. Install the hitch valve (2) with the hardware (1).

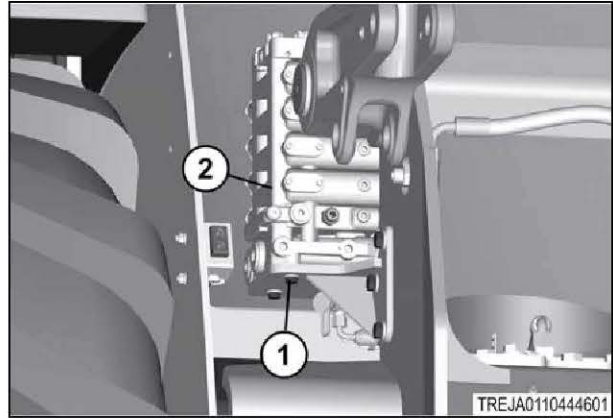


Fig. 67

10. Connect the hydraulic hoses (1).
11. Fasten the correct lifting equipment to the cylinder assemblies.

IMPORTANT:

The weight of each cylinder assembly is approximately 51 kg (113 lb).

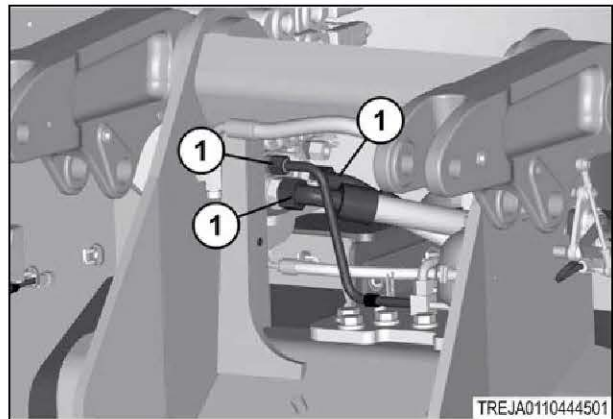


Fig. 68

12. Install the two cylinder assemblies (3), and the four pins (2), with the hardware (1).
13. Fasten the correct lifting equipment to the pivot rod assemblies.

IMPORTANT:

The weight of each pivot rod assembly is approximately 54 kg (119 lb).

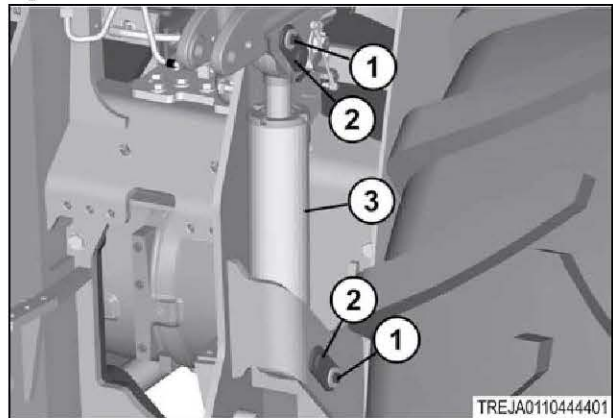


Fig. 69

14. Install the two pivot rod assemblies (3), and the four pins (2), with the hardware (1).
15. Fasten the correct lifting equipment to the top link support.

IMPORTANT:

The weight of the top link support is approximately 50 kg (110 lb).

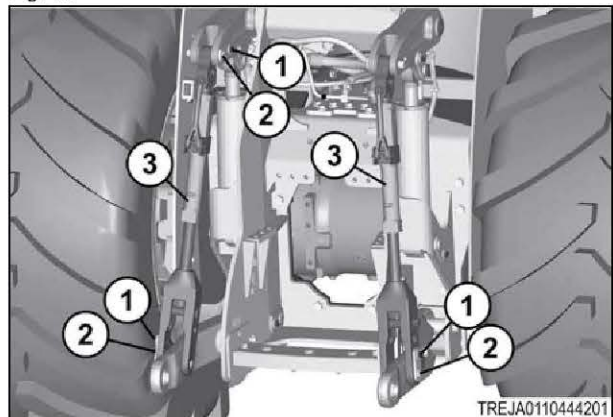


Fig. 70

16. Install the top link support (2) with the hardware (1).
17. Fasten the correct lifting equipment to the top link assembly.

IMPORTANT:

The weight of the top link assembly is approximately 36 kg (80 lb).

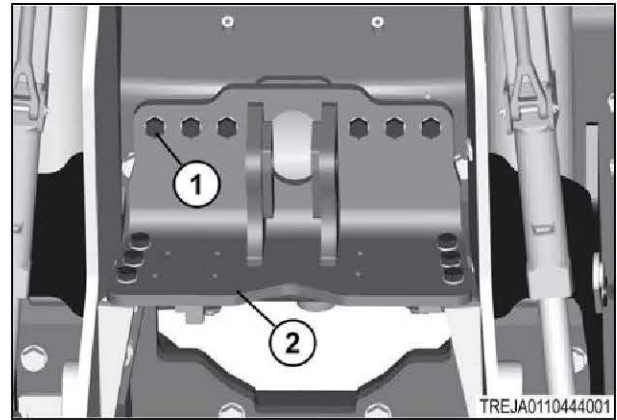


Fig. 71

18. Install the top link assembly (3), and the pin (2), with the hardware (1).

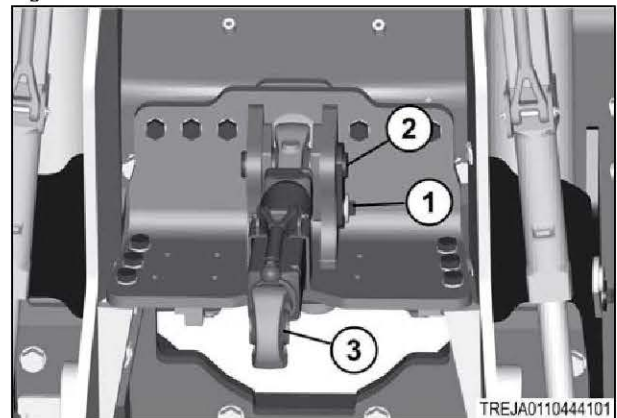


Fig. 72

19. Install the implement valve bracket (3), and the implement valve (2), with the hardware (1).

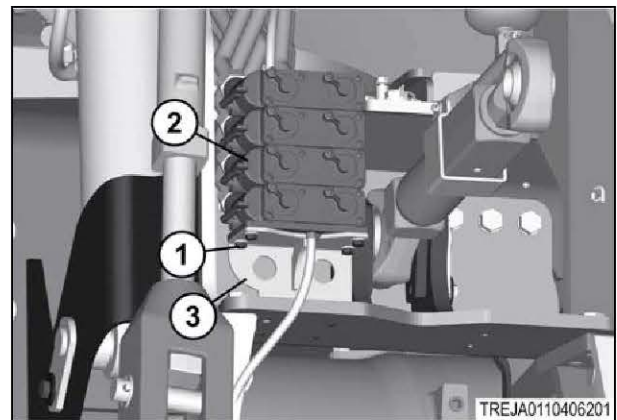


Fig. 73

20. Connect the hoses (2) to the top and the bottom of the implement valve with the hose clamps (1).
21. Connect the hydraulic lines (3).

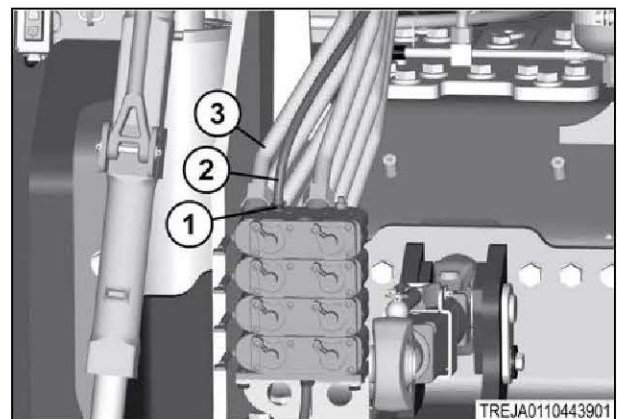


Fig. 74

16. Implement lift system

22. Install the trailer connector bracket assembly (2), and the clip with the hardware (1).

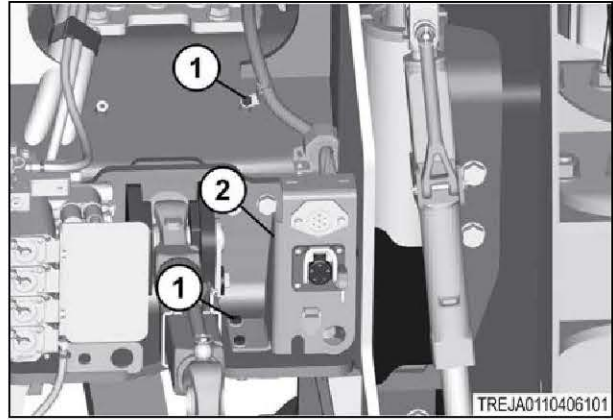


Fig. 75

23. Install the drawbar (1).

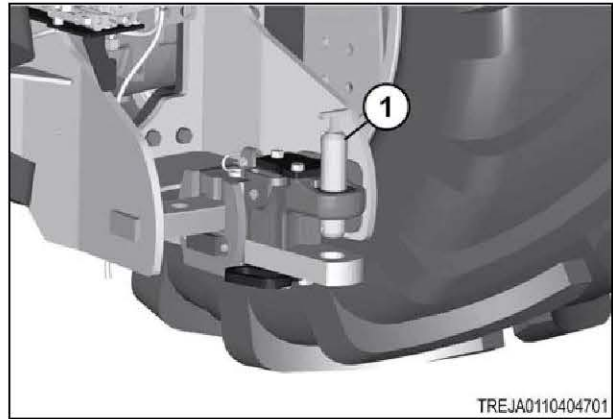


Fig. 76

24. Install the two drain plugs (1) in the bottom of the hydraulic oil reservoir (2).

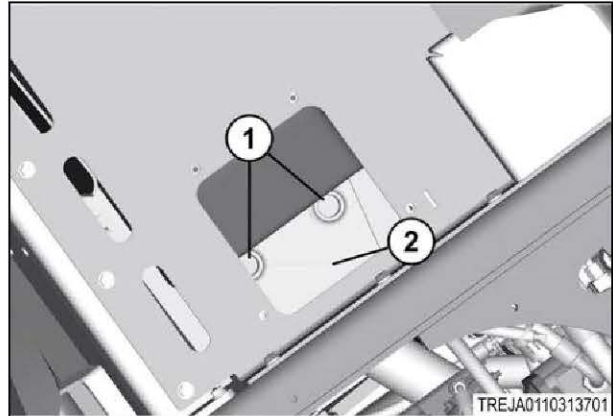


Fig. 77

25. Install the cover plate (2) with the hardware (1).
26. Fill the hydraulic oil reservoir with the correct type and the correct amount of hydraulic oil.

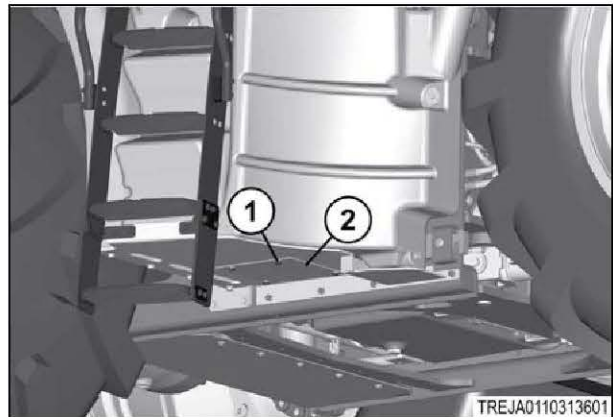


Fig. 78

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

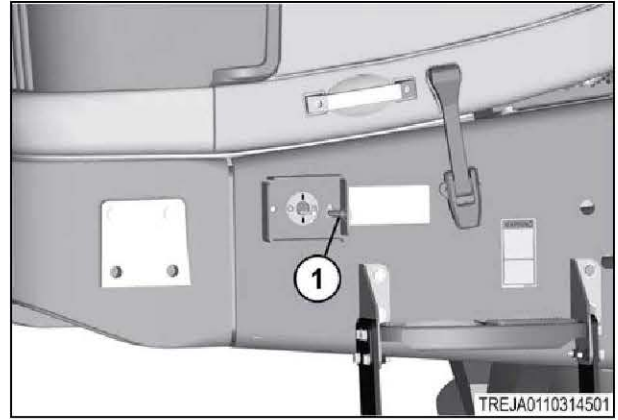


Fig. 79

28. 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. 80

Related Links

[Install the drawbar](#) page 17-5

[Lubricant viscosities](#) page 1-18

16.5.3 Remove the quick hitch

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.

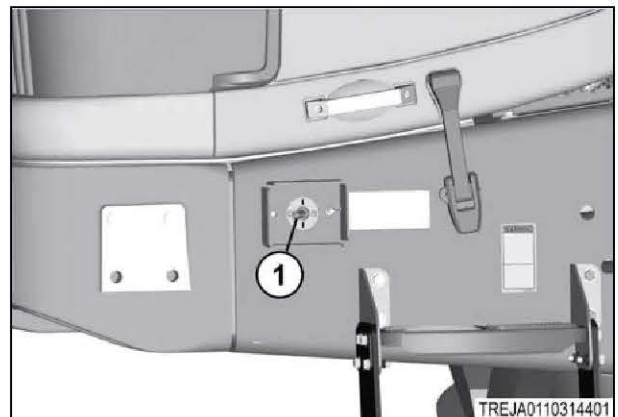


Fig. 81

16. Implement lift system

3. Remove the battery disconnect switch key (1).
4. Fasten the correct lifting equipment to the special application hitch.

IMPORTANT:

The weight of the quick hitch is approximately 120 kg (265 lb).

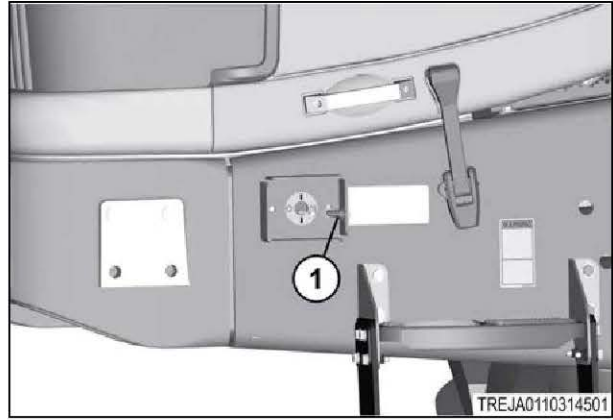


Fig. 82

5. Remove the hardware (1), the connector pins (2), and the quick hitch (3).

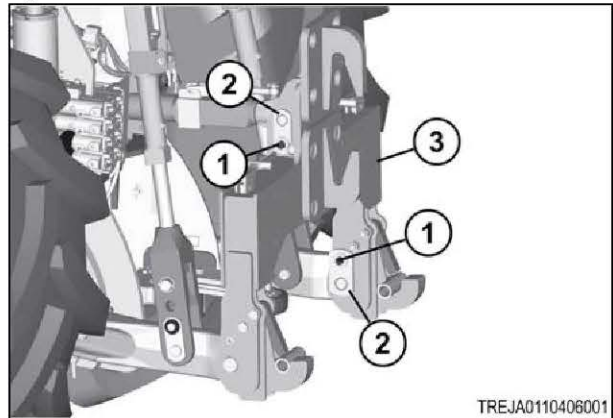


Fig. 83

16.5.4 Install the quick hitch

Procedure

1. Fasten the correct lifting equipment to the special application hitch.

IMPORTANT:

The weight of the special application hitch is approximately 120 kg (265 lb).

2. Install the quick hitch (3), the connector pins (2), with the hardware (1).

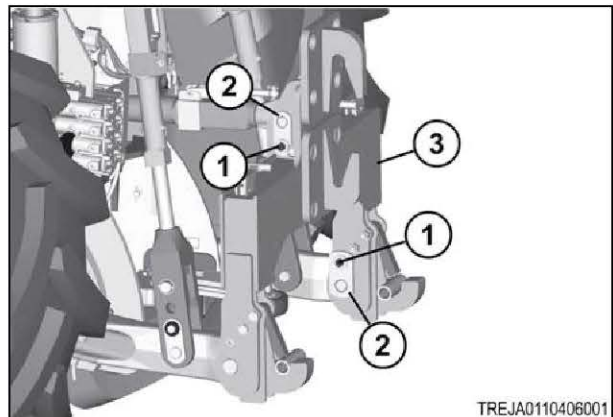


Fig. 84

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

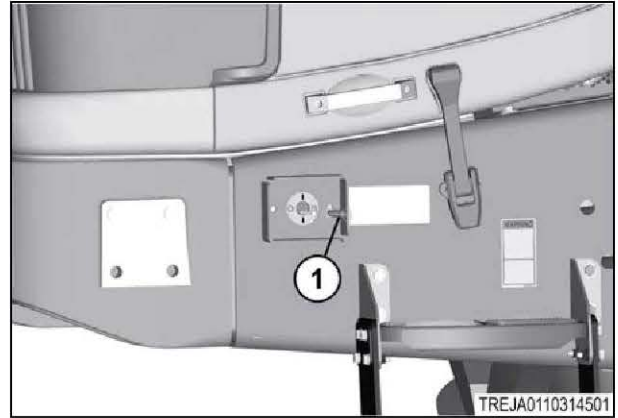


Fig. 85

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

NOTE:

The battery disconnect switch is shown in the on position.

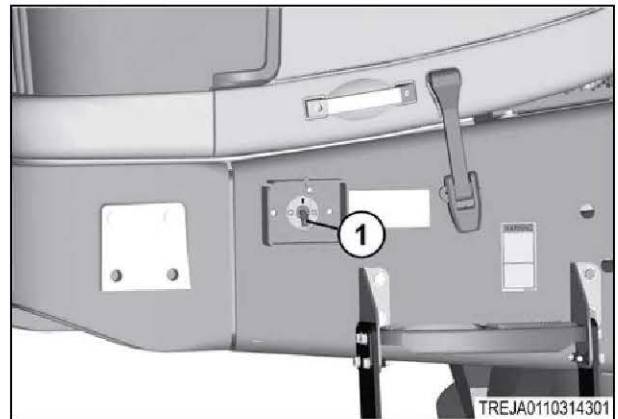


Fig. 86

16.5.5 Remove the accumulator

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.



DANGER: High pressure hazard. Accumulator valve.

Severe injury or death can occur.

Do not drop the accumulator. If the charging valve breaks off, the accumulator will be propelled at a high rate of speed.

IMPORTANT:

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

Procedure

1. Completely clean all components to prevent contamination from entering the system.
2. Park the machine on a solid level surface.
3. Lower the linkage all the way down.

16. Implement lift system

4. Stop the engine, apply the parking brake, and take the key with you.
5. Wait for about five minutes for the hydraulic pressure to bleed off.
6. Before removal, fasten identification tags on components for correct installation at assembly.
7. Put caps and plugs on all hoses, fittings, ports, and openings to prevent contamination from entering the system.
8. Disconnect the hydraulic hose (1).

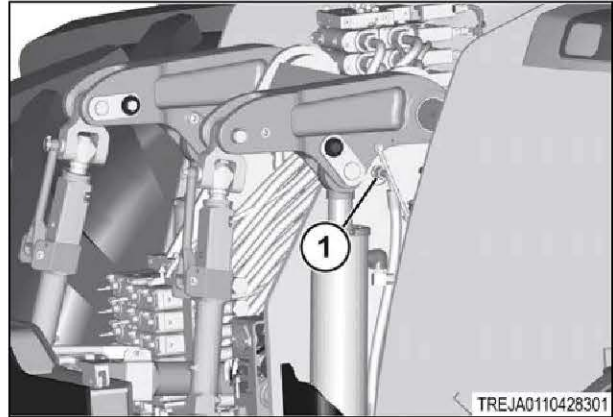


Fig. 87

9. Disconnect the hydraulic line (1).
10. Disconnect the fitting (2) from the chassis
11. Remove the bolt (3).
12. Remove the accumulator (4).

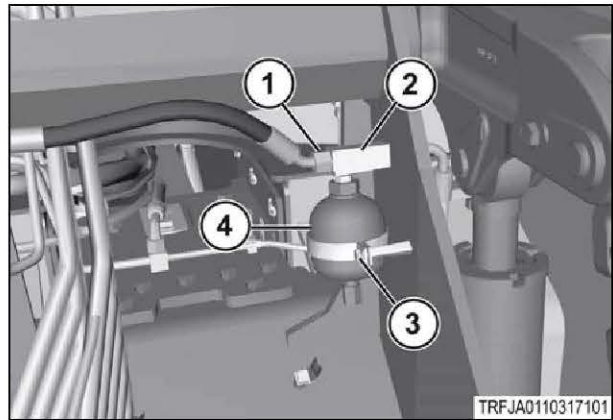


Fig. 88

16.5.6 Install the accumulator

Before starting the procedure



DANGER: High pressure hazard. Accumulator valve.

Severe injury or death can occur.

Do not drop the accumulator. If the charging valve breaks off, the accumulator will be propelled at a high rate of speed.

Procedure

1. Completely clean all components to prevent contamination from entering the system.

2. Fasten the accumulator (4) to the chassis with the bolt (3).
3. Fasten the fitting (2) to the chassis.
4. Connect the hydraulic line (1) to the fitting.

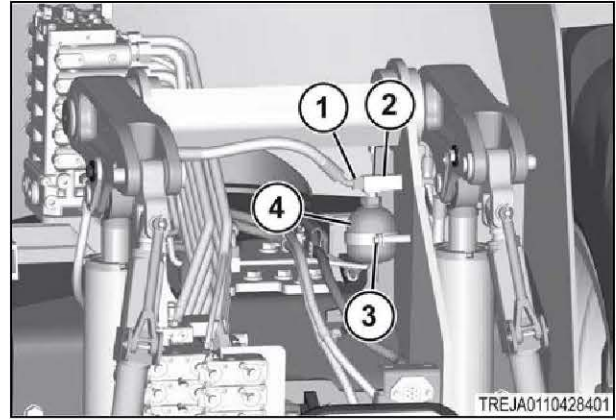


Fig. 89

5. Connect the hydraulic hose (1).
6. Check the level of the hydraulic oil and add hydraulic oil as necessary.
7. Start the engine and run at idle.

IMPORTANT:

Make sure pumps are full of hydraulic oil and monitor the hydraulic oil pressure gauge at starting. If the hydraulic oil pressure gauge does not show pressure within 20 seconds 2.5 cm (1.0 in), stop the machine. Check the hydraulic oil level in the pump cases and hydraulic reservoir. Add hydraulic oil as necessary.

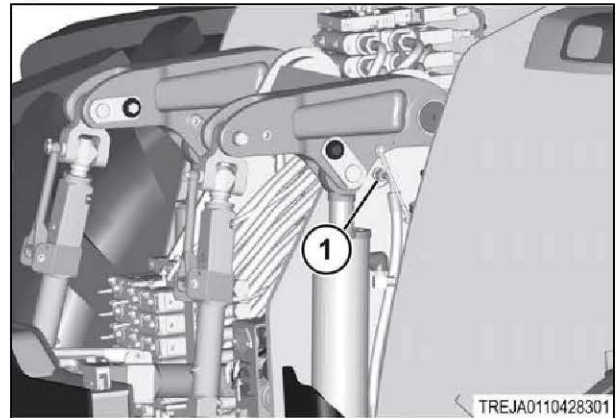


Fig. 90

8. Inspect the machine for leaks.



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.

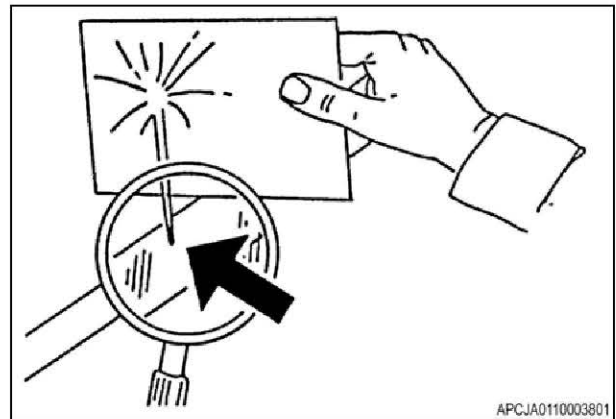


Fig. 91

Related Links

[Lubricant viscosities](#) page 1-18

16.5.7 Remove the lift link

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Remove the pin (3) that holds the lift link (1).
2. Remove the hardware (2) that holds the pin.
3. Repeat the procedure for the other lift link.

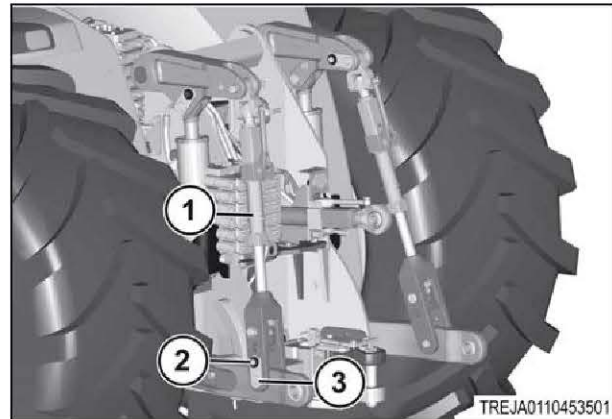


Fig. 92

4. Fasten the correct lifting equipment to the lift link (1).
5. Remove the hardware (2) that holds the pin.
6. Remove the pin (3) that holds the lift link.
7. Remove the lift link.
8. Repeat the procedure for the other lift link.

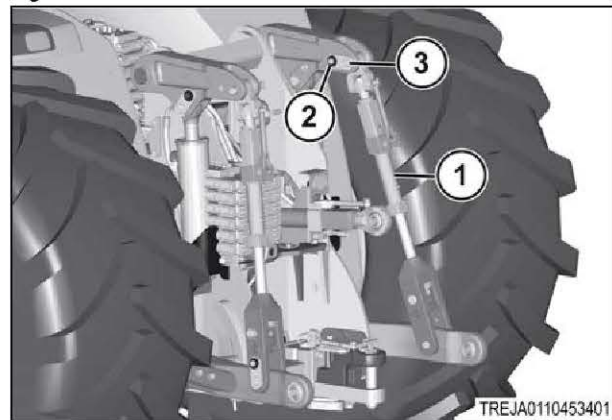


Fig. 93

16.5.8 Install the lift link**Before starting the procedure**

WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Fasten the correct lifting equipment to the lift link (1).

IMPORTANT:

The weight of the lift link is approximately 54 kg (119 lb).

2. Put the lift link into position.
3. Install the pin (3).
4. Install the hardware (2) that fastens the pin.
5. Repeat the procedure for the other lift link.

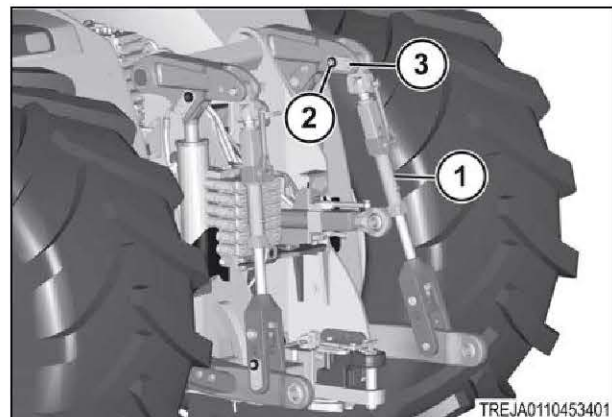


Fig. 94

6. Put the lift link (1) into position.
7. Install the pin (3).
8. Install the hardware (2) that fastens the pin.
9. Repeat the procedure for the other lift link.

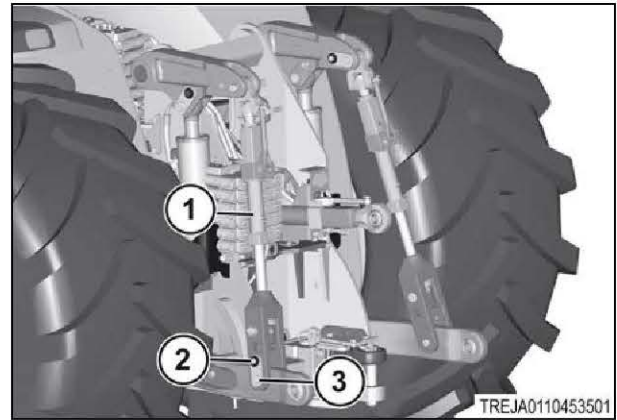


Fig. 95

16.5.9 Remove the top link

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Remove the quick hitch (1).

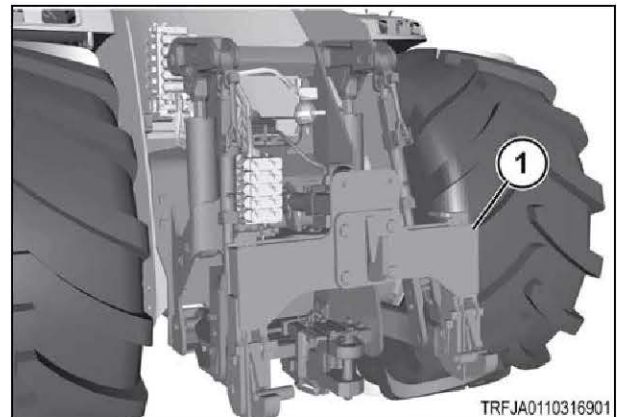


Fig. 96

2. Fasten the correct lifting equipment to the top link (1).
3. Remove the hardware (2) that fastens the pin (3).
4. Remove the pin that fastens the top link.

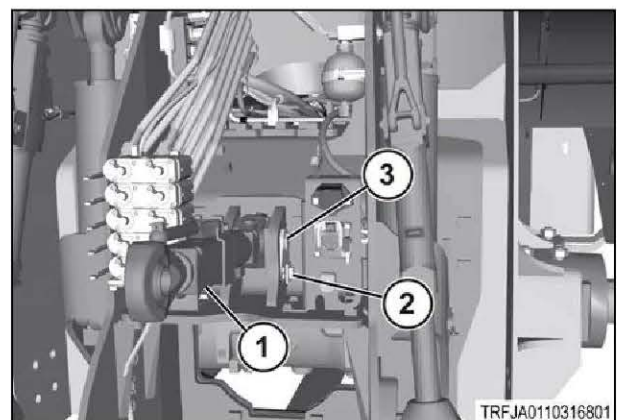


Fig. 97

Related Links

Remove the quick hitch page 16-35

16.5.10 Install the top link

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Fasten the correct lifting equipment to the top link (1).
2. Put the top link into position.
3. Install the pin (3) that fastens the top link.
4. Install the hardware (2) that fastens the pin.

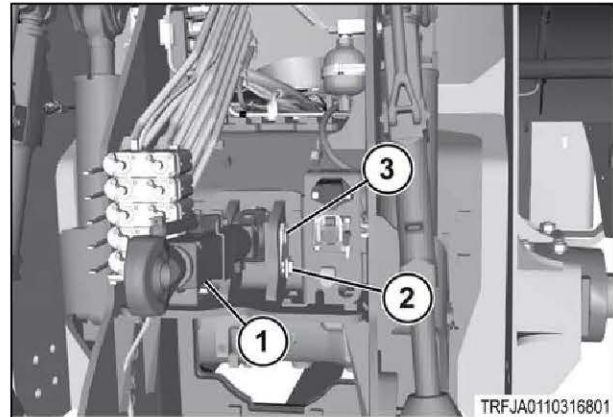


Fig. 98

5. Install the quick hitch (1).

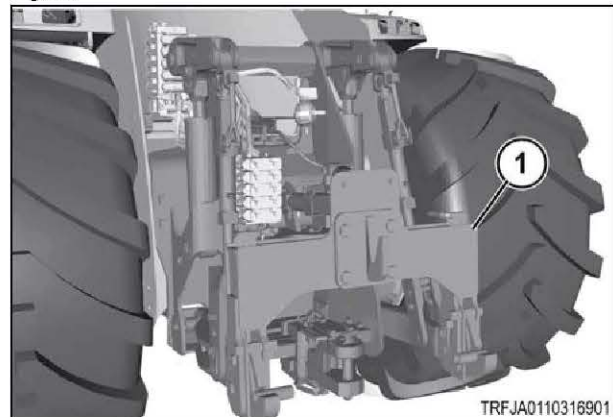


Fig. 99

Related Links

[Install the quick hitch](#) page 16-36

16.5.11 Remove the lift arm

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Remove the hardware (2) that holds the pin (3).
2. Remove the pin.
3. Set the lift link (1) out of the way.
4. Repeat the procedure for the other lift link.

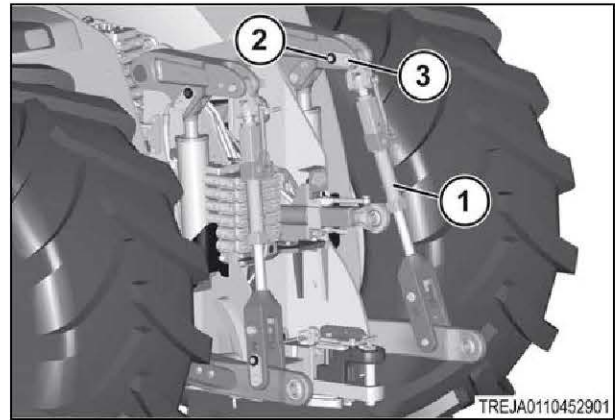


Fig. 100

5. Remove the bolt (1) that fastens the height sensor control arm (2) to the lift arm (3).

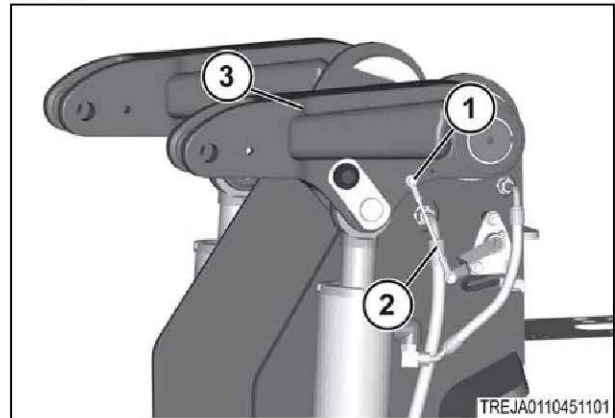


Fig. 101

6. Fasten correct lifting equipment to the lift arm (1).

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

7. Remove the hardware (2) that holds the pin (3).
8. Remove the pin (3).
9. Fasten correct lifting equipment to the lift cylinder (4) to prevent the lift cylinder from falling.

IMPORTANT:

The weight of the lift cylinder is approximately 60 kg (133 lb).

10. Repeat the procedure for the other lift arm.

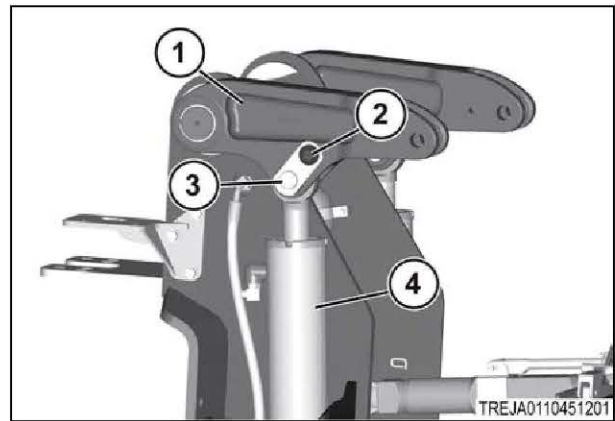


Fig. 102

16. Implement lift system

11. Remove the retaining ring (2) that fastens the lift arm (1) to the rockshaft (3).
12. Repeat the procedure for the other lift arm.

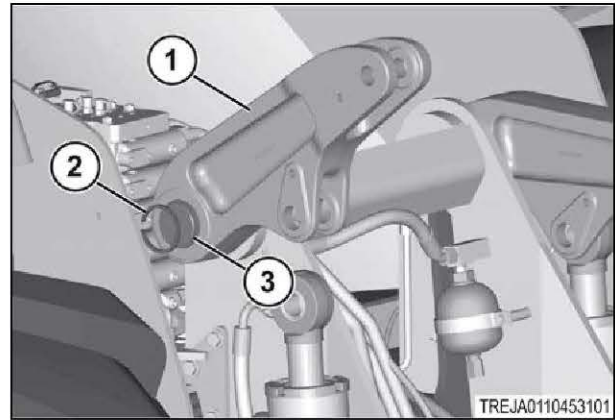


Fig. 103

13. With the correct lifting equipment fastened to the lift arm, remove the lift arm (1) from the rockshaft (2).

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

14. Repeat the procedure for the other lift arm.

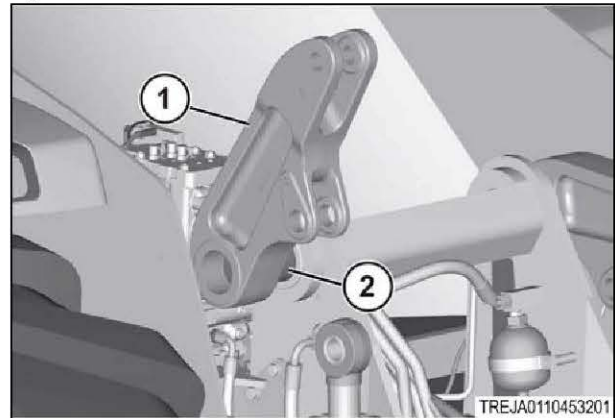


Fig. 104

16.5.12 Install the lift arm

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Fasten the correct lifting equipment to the lift arm (1).

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

2. Install the lift arm onto the rockshaft (2).
3. Repeat the procedure for the other lift arm.

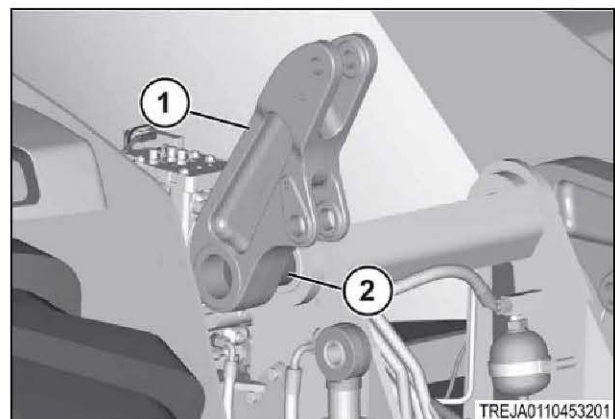


Fig. 105

4. Install the retaining ring (2) that fastens the lift arm (1) to the rockshaft (3).
5. Repeat the procedure for the other lift arm.
6. Fasten correct lifting equipment to the lift arm (1)

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

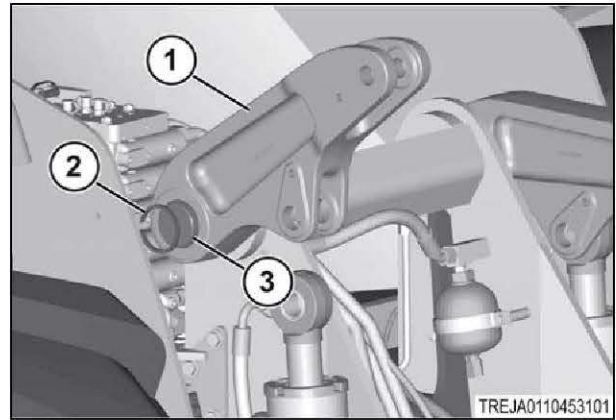


Fig. 106

7. Install the lift arm (1) onto the lift cylinder (4).
8. Install the pin (3).
9. Install the hardware (2) that fastens the pin.
10. Repeat the procedure for the other lift arm.



Fig. 107

11. Install the bolt (1) that fastens the height sensor control arm (2) to the lift arm (3).

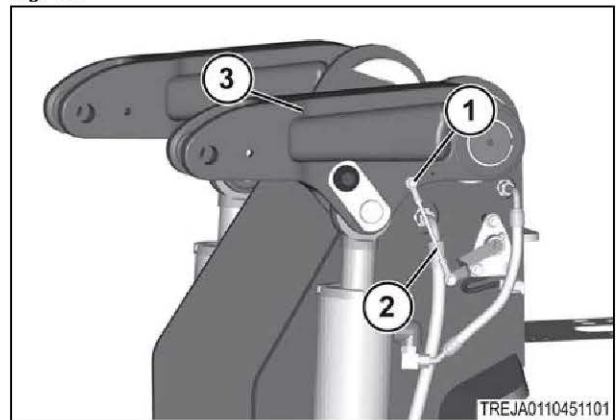


Fig. 108

12. Put the lift link (1) into position.
13. Install the pin (3).
14. Install the hardware (2) that holds the pin.
15. Repeat the procedure for the other lift link.

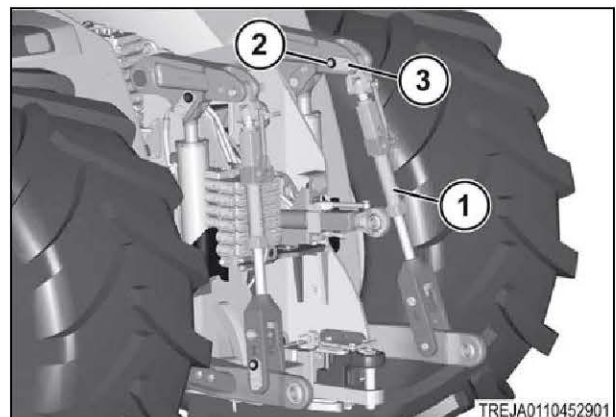


Fig. 109

16.5.13 Remove the rockshaft

Before starting the procedure



WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.



WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Remove the 3-point linkage from the machine.

2. Remove the hardware (1) that fastens the pin.
3. Remove the pin (2).
4. Set the lift link (3) out of the way.
5. Repeat the procedure for the other lift link.

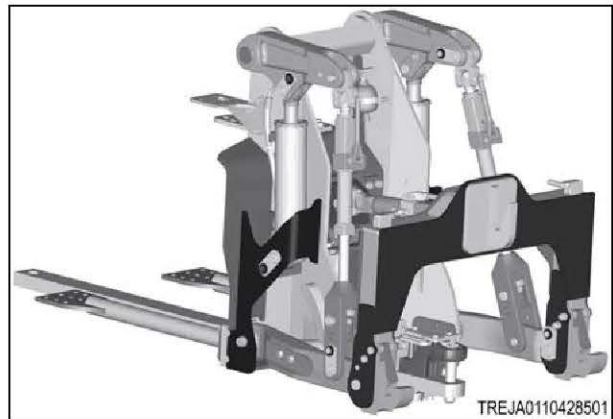


Fig. 110

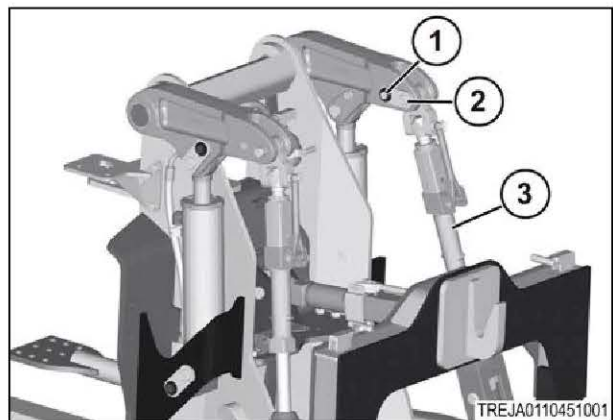


Fig. 111

6. Remove the bolt (1) that fastens the height sensor control arm (2) to the lift arm (3).

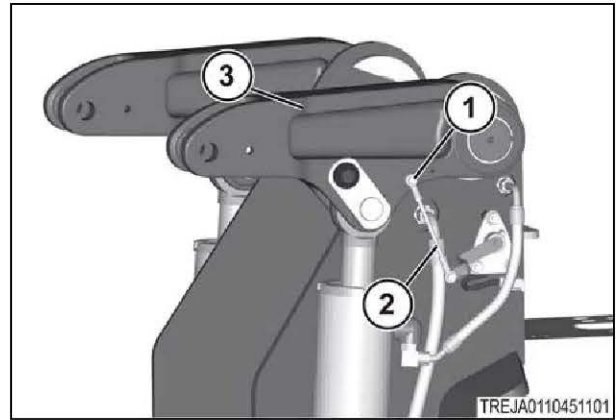


Fig. 112

7. Fasten the correct lifting equipment to the lift arms (1) and the lift cylinders (4).

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

IMPORTANT:

The weight of the lift cylinder is approximately 60 kg (133 lb).

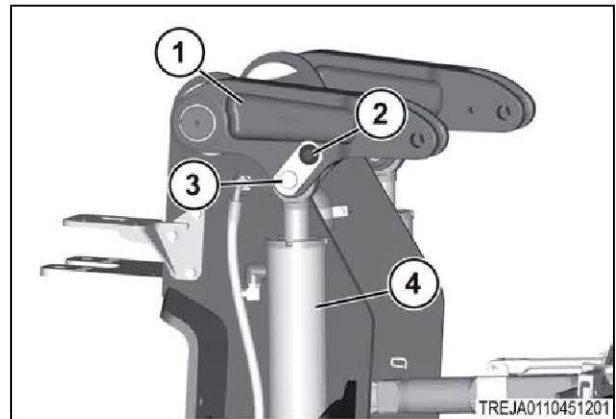


Fig. 113

8. Remove the hardware (2) that fastens the pin.
9. Remove the pin (3).
10. Set the lift cylinder out of the way.
11. Repeat the procedure for the other lift cylinder.
12. Fasten the correct lifting equipment to the lift arm (1).

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

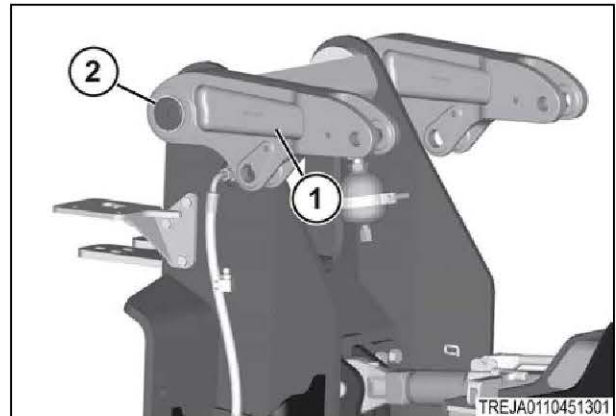


Fig. 114

13. Remove the retaining ring (2).
14. Slide the lift arm off of the rockshaft.
15. Repeat the procedure for the other lift arm.

16. Implement lift system

- 16. Remove the thrust washers (1).
- 17. Slide the rockshaft (2) part of the way out of the housing.
- 18. Fasten the correct lifting equipment to the rock shaft, and remove the rockshaft.

IMPORTANT:

The weight of the rock shaft is approximately 42 kg (93 lb).

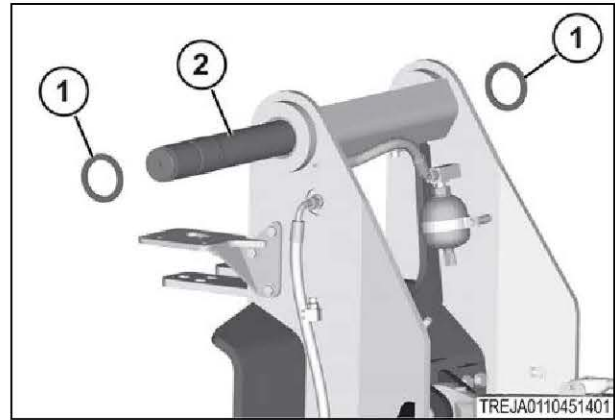


Fig. 115

- 19. Remove the lip seals (1), and the bushing (2)
- 20. Repeat the procedure for the other side.

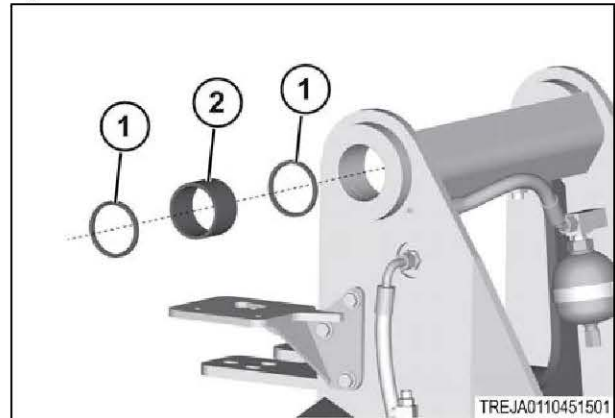


Fig. 116

Related Links

[Remove the 3-point linkage](#) page 16-24

16.5.14 Install the rockshaft

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

- 1. Install the lip seals (1) and the the bushing (2).
- 2. Repeat the procedure for the other side.

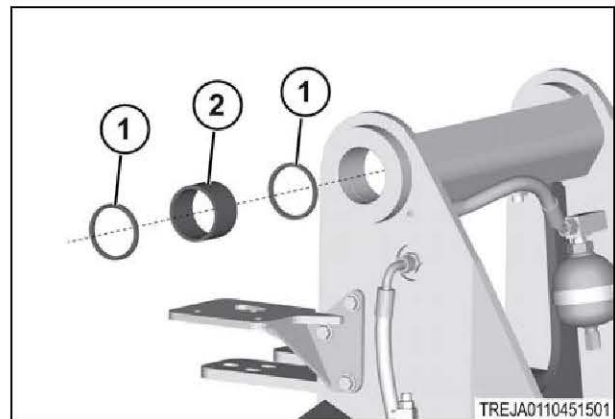


Fig. 117

3. Fasten the correct lifting equipment to the rockshaft (2).

IMPORTANT:

The weight of the rock shaft is approximately 42 kg (93 lb).

4. Install the rockshaft and the thrust washers (1).

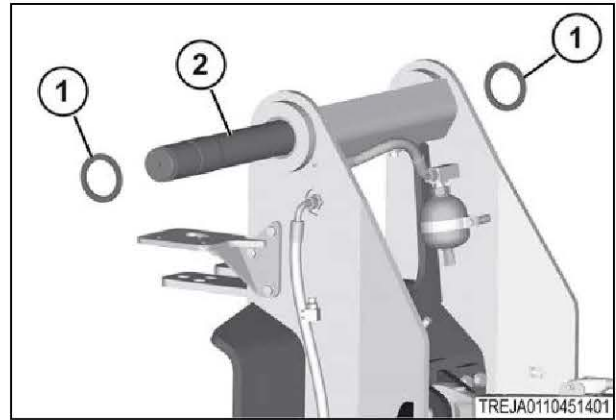


Fig. 118

5. Fasten the correct lifting equipment to the lift arm (1).

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

6. Slide the lift arm onto the rockshaft and install the retaining ring (2).
7. Repeat the procedure for the other lift arm.

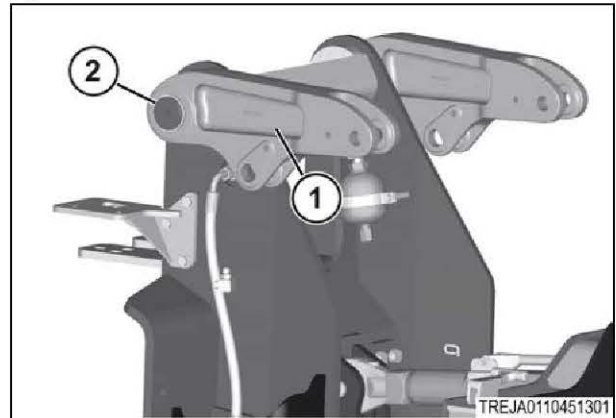


Fig. 119

8. Fasten the correct lifting equipment to the lift arm (1) and the lift cylinder (4).

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

IMPORTANT:

The weight of the lift cylinder is approximately 60 kg (133 lb).

9. Set the lift cylinder into the lift arm.
10. Fasten the lift cylinder with the pin (3) and fasten the pin with the hardware (2).
11. Fasten the height sensor control arm (2) to the lift arm (3) with the bolt (1).
12. Repeat the procedure for the other lift arm.

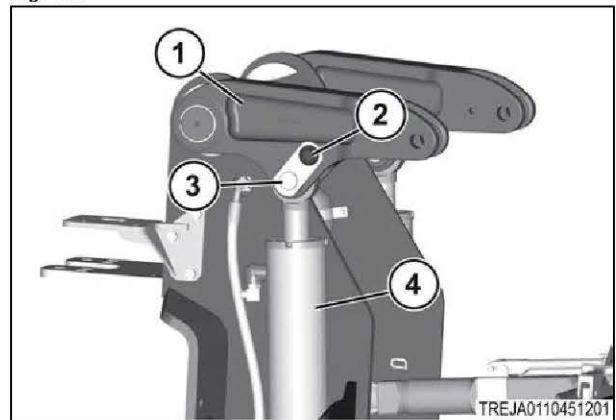


Fig. 120

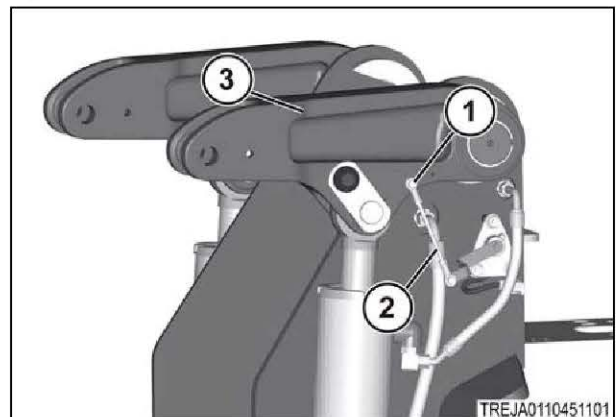


Fig. 121

16. Implement lift system

- 13. Install the lift link (3) into the lift arm.
- 14. Fasten the lift link with the pin (2) and fasten the pin with the hardware (1).

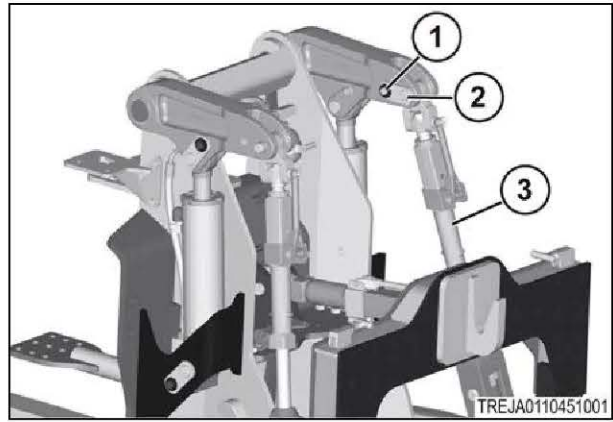


Fig. 122

- 15. Install the 3-point linkage on the machine.



Fig. 123

Related Links

[Install the 3-point linkage](#) page 16-30

16.5.15 Remove the lift cylinder

Before starting the procedure



WARNING: Hot components can burn.

Severe personal injury can result.

Let the engine and components cool before doing maintenance.



WARNING: Pressurized gases or fluids can be hazards.

Personal injury can result.

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



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

IMPORTANT:

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

Procedure

- 1. Completely clean all components to prevent contamination from entering the system.
- 2. Park the machine on a solid level surface.

3. Stop the engine, apply the parking brake, and take the key with you.
4. Wait for about five minutes for the hydraulic pressure to bleed off.
5. Before removal, fasten identification tags on components for correct installation at assembly.
6. Put caps and plugs on all hoses, fittings, ports, and openings to prevent contamination from entering the system.
7. Remove the hardware (1) that holds the pin.
8. Remove the pin (2).
9. Set the lift link (3) out of the way.
10. Repeat the step for the other lift link.

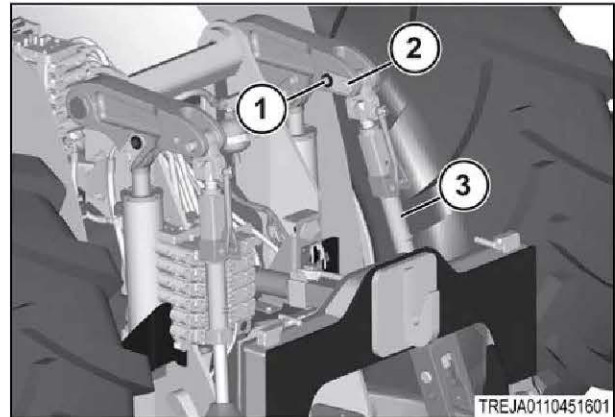


Fig. 124

11. Remove the bolt (1) holding the height sensor control arm (2) to the lift arm (3).

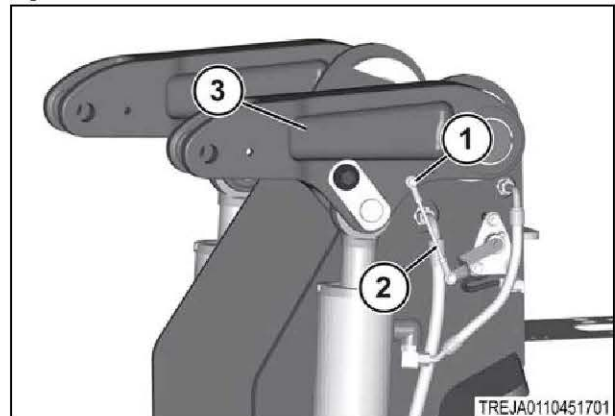


Fig. 125

12. Fasten the correct lifting equipment to the lift arm (1).

IMPORTANT:

The weight of the lift arm is approximately 53 kg (116 lb).

13. Disconnect the hose assemblies (4).
14. Remove the hardware (2) that fastens the pin.
15. Remove the pin (3).
16. Remove the lift arm from the rod end of the lift cylinder (5).

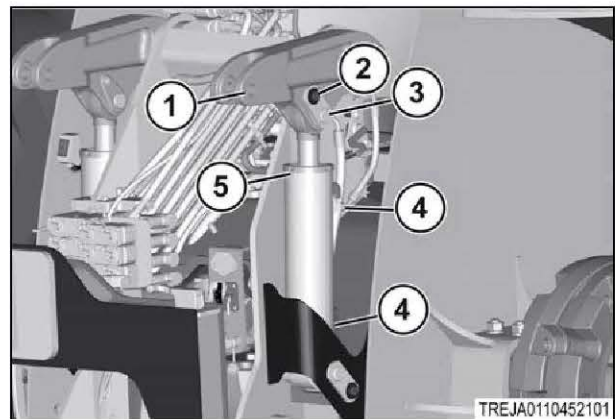


Fig. 126

16. Implement lift system

17. Put the lift arm out of the way (1).
18. Fasten the lift arm to prevent the lift arm from falling.
19. Repeat this procedure for the other lift arm.

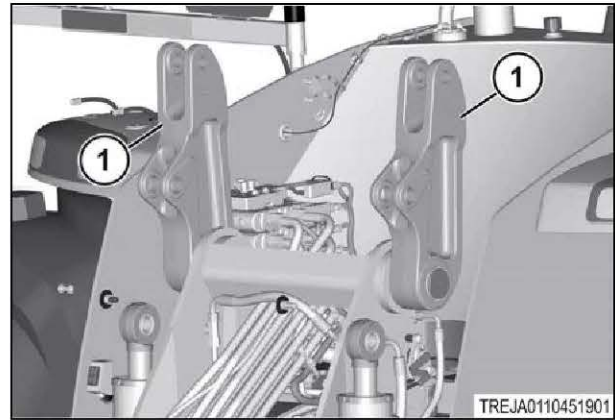


Fig. 127

20. Fasten the correct lifting equipment to the lift cylinder (1).

IMPORTANT:

The weight of the lift cylinder is approximately 60 kg (133 lb).

21. Remove the hardware (3) that fastens the pin.
22. Remove the pin (2).
23. Remove the lift cylinder.

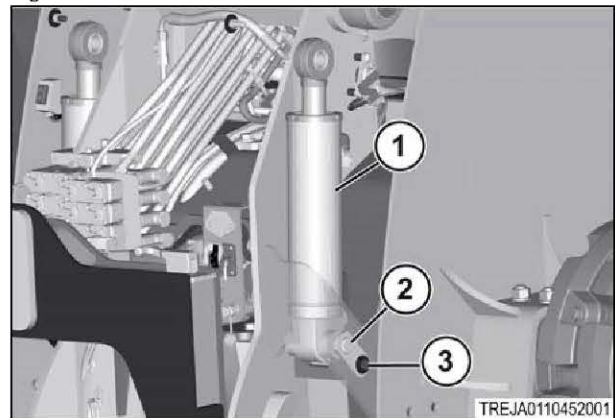


Fig. 128

16.5.16 Install the lift cylinder

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Completely clean all components to prevent contamination from entering the system.
2. Fasten the correct lifting equipment to the lift cylinder (1).

IMPORTANT:

The weight of the lift cylinder is approximately 60 kg (133 lb).

3. Install the lift cylinder.
4. Fasten the lift cylinder with the pin (2) and fasten the pin with the hardware (3).

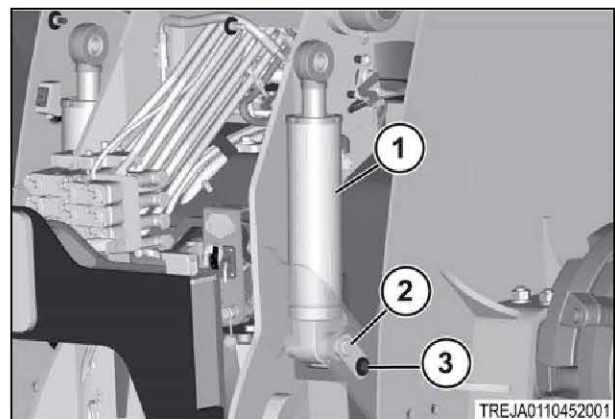


Fig. 129

5. Fasten the correct lifting equipment to the lift arm (1).

IMPORTANT:

The weight of the lift arm cylinder is approximately 53 kg (116 lb).

6. Lower the lift arm.

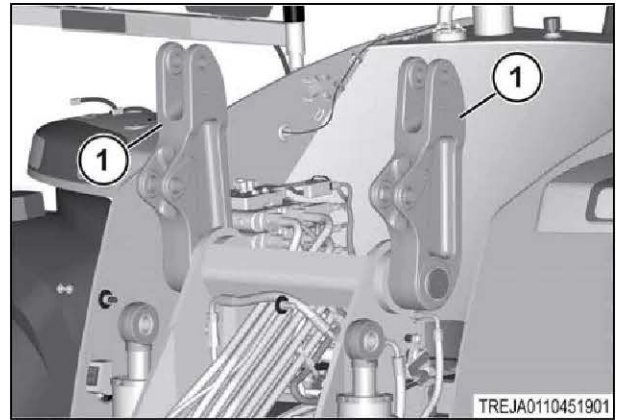


Fig. 130

7. Install the lift arm (1) on the rod end of the lift cylinder (5).
8. Fasten the lift cylinder with the pin (3) and fasten the pin with the hardware (2).
9. Connect the hose assemblies (4).
10. Repeat the procedure for the other lift cylinder.

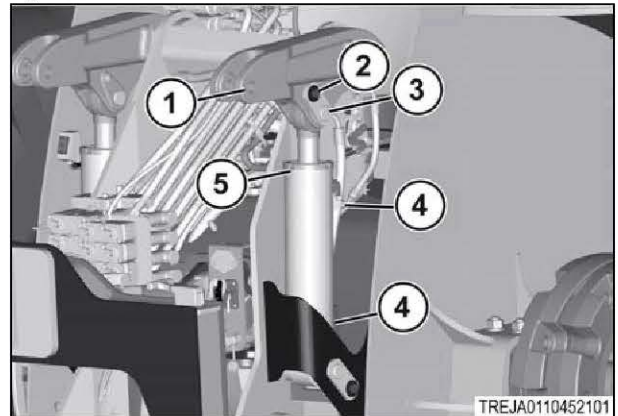


Fig. 131

11. Fasten the height sensor control arm (2) to the lift arm (3) with the bolt (1).

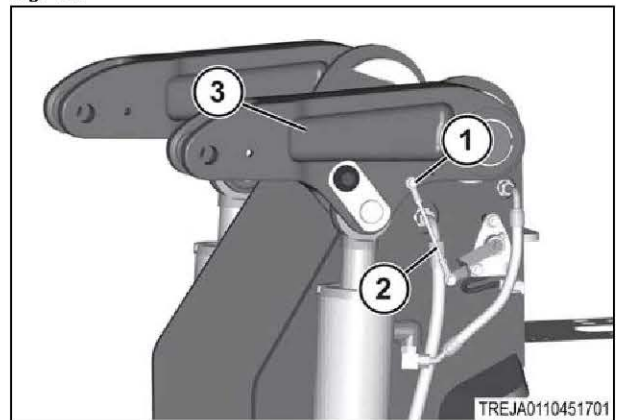


Fig. 132

12. Put the lift link (3) in the original location.
13. Fasten the upper link with the pin (2) and fasten the pin with the hardware (1).
14. Repeat the procedure for the other lift link.
15. Check the level of the hydraulic oil and add hydraulic oil as necessary.
16. Start the engine and run at idle.

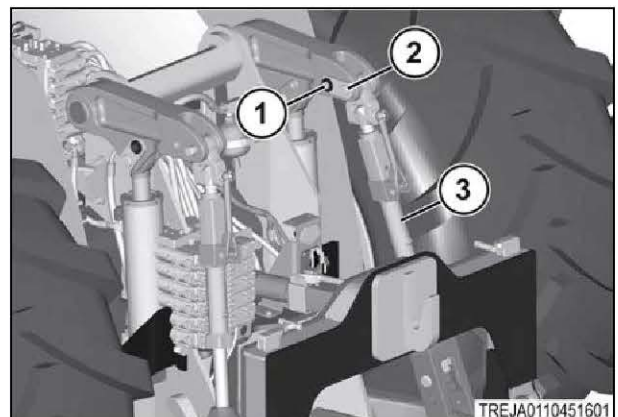


Fig. 133

IMPORTANT:

Make sure pumps are full of hydraulic oil and monitor the hydraulic oil pressure gauge at starting. If the hydraulic oil pressure gauge does not show pressure within 20 seconds 2.5 cm (1.0 in), stop the machine. Check the hydraulic oil level in the pump cases and hydraulic reservoir. Add hydraulic oil as necessary.

17. Inspect the machine for leaks.



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.

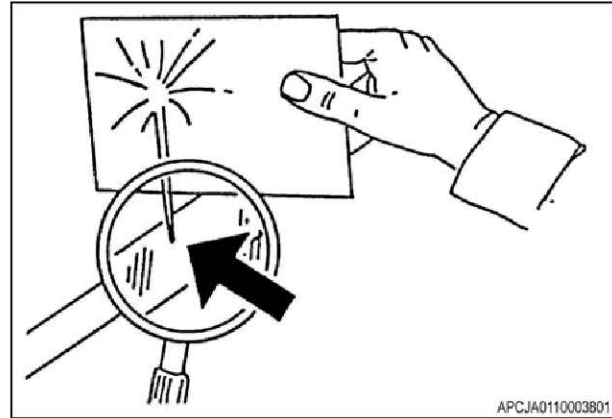


Fig. 134

Related Links

[Lubricant viscosities](#) page 1-18

16.5.17 Remove the draft arm

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Remove the hardware (3) that holds the pin.
2. Remove the pin (4) from the draft arm (2).
3. Set the lift link (1) out of the way.
4. Repeat the step for the other lift link.

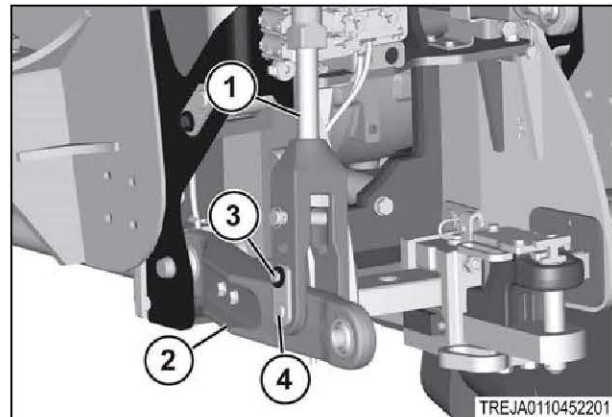


Fig. 135

5. Remove the hardware (3) that holds the pin.
6. Remove the pin (4) that fastens the draft arm (1) to the frame (2).
7. Remove the draft arm.
8. Repeat the step for the other draft arm.

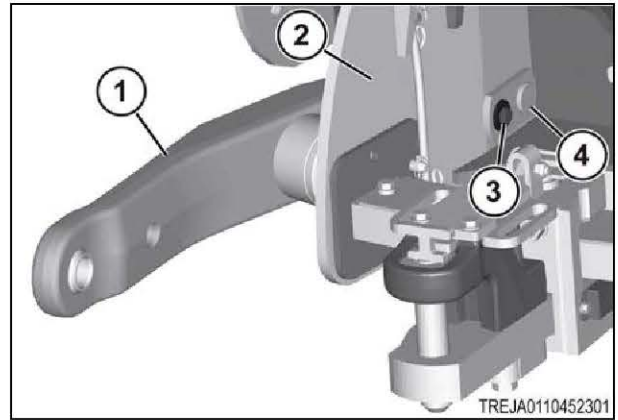


Fig. 136

9. Remove the washers (2) and the spacer (3) from the draft arm (1).
10. Repeat the step for the other draft arm.

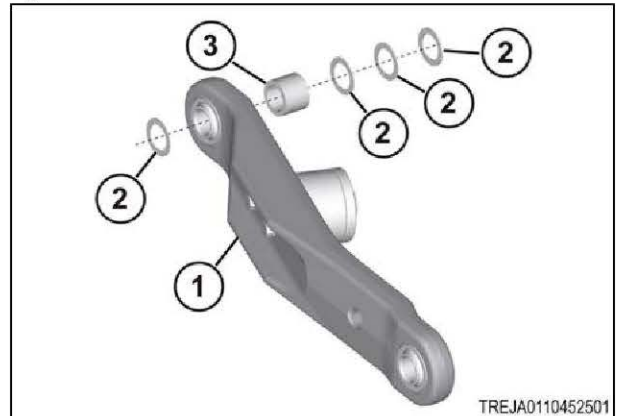


Fig. 137

11. Remove the hardware (2,3) that fastens the spacer (4) and the block guide (5) to the draft arm (1).
12. Repeat the step for the other draft arm.

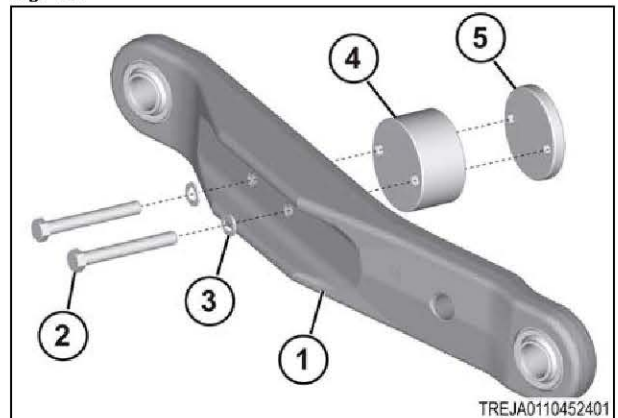


Fig. 138

16.5.18 Install the draft arm

Before starting the procedure



WARNING: Components can be heavy.

Severe injury can result from improper lifting technique.

Use appropriate lifting equipment for heavy components.

Procedure

1. Use the hardware (2,3), to install the draft arm (1), the spacer (4), and the block guide (5).
2. Do the step again for the other draft arm.

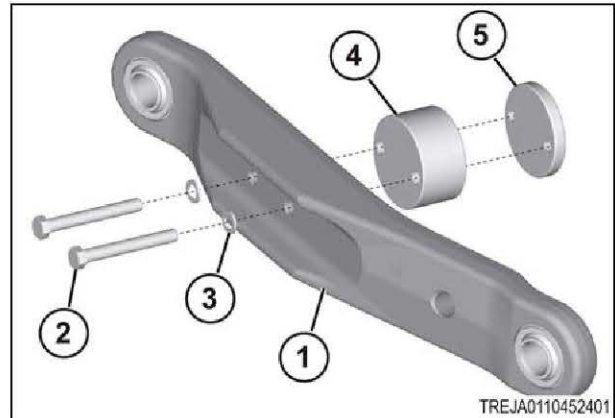


Fig. 139

3. Install the washers (2) and the spacer (3) to the draft arm (1).

NOTE: Use the quantity of washers necessary to fill the space.

4. Do the step again for the other draft arm.

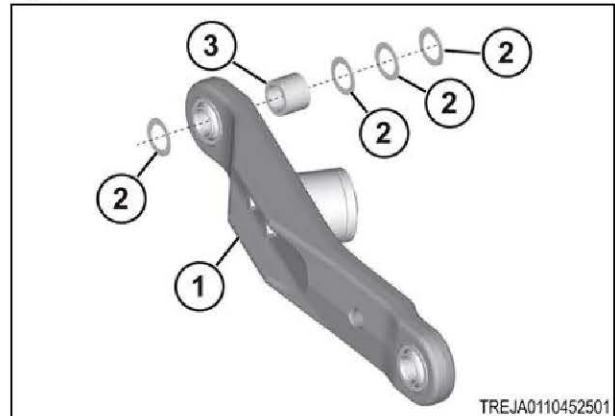


Fig. 140

5. Install the pin (1) part way in to hold the washers (2) and the spacer (3).
6. Do the step again for the other draft arm.

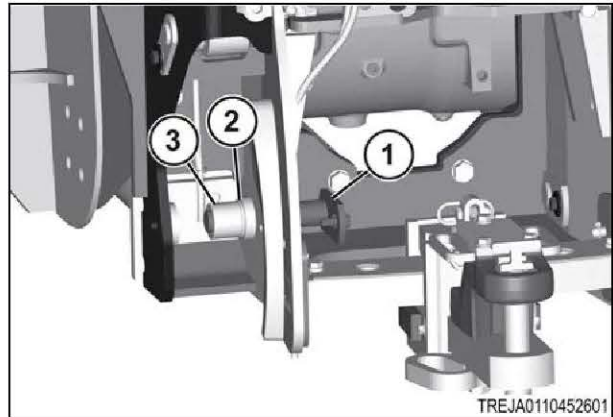


Fig. 141

7. Attach the correct lift equipment to the draft arm (1).

IMPORTANT:

The weight of the draft arm is approximately 78.27 kg (172.55 lb).

8. Align the draft arm (1) with the pin (2).
9. Put one washer (3) on the pin and push the pin through the draft arm.
10. Do the step again for the other draft arm.

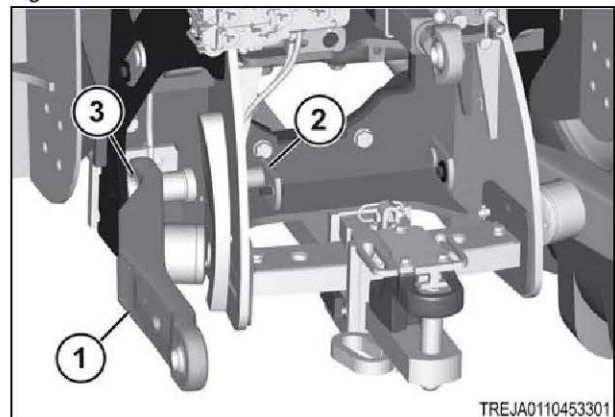


Fig. 142

11. Use the hardware (3) to install the pin (4) to the frame (2). The pin holds the draft arm (1) in position.
12. Do the step again for the other draft arm.

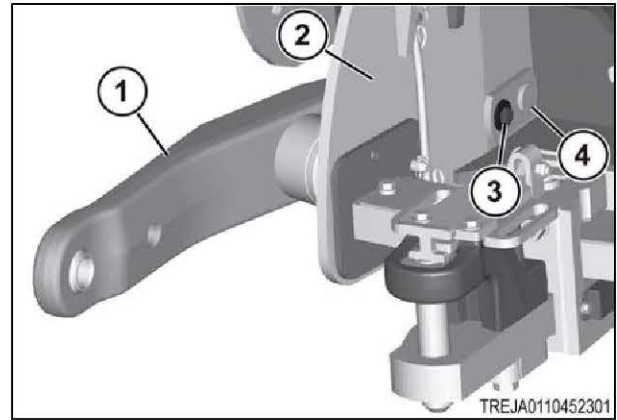


Fig. 143

13. Align the lift link (1) with the draft arm.
14. Use the hardware (3) to install the pin (4) to the draft arm (2).
15. Do the step again for the other draft arm.

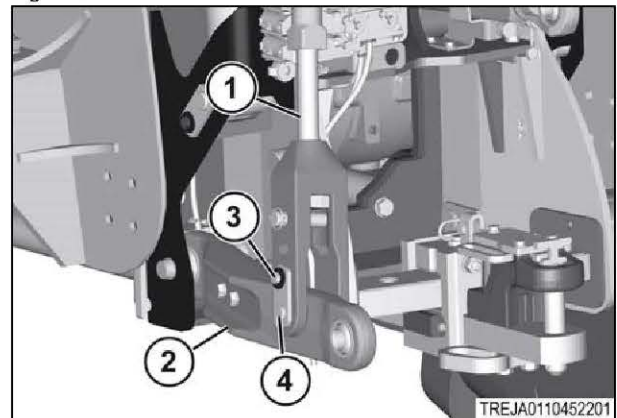


Fig. 144

16.6 3-point linkage system testing and adjusting

16.6.1 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.

16.6.2 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 likelihood. 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.

16.6.3 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.

16.6.4 Test equipment

Hydraulic test procedures can be performed using appropriate pressure gauges.

16.6.5 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 on 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. 145

16.6.6 Position of the hydraulic test ports

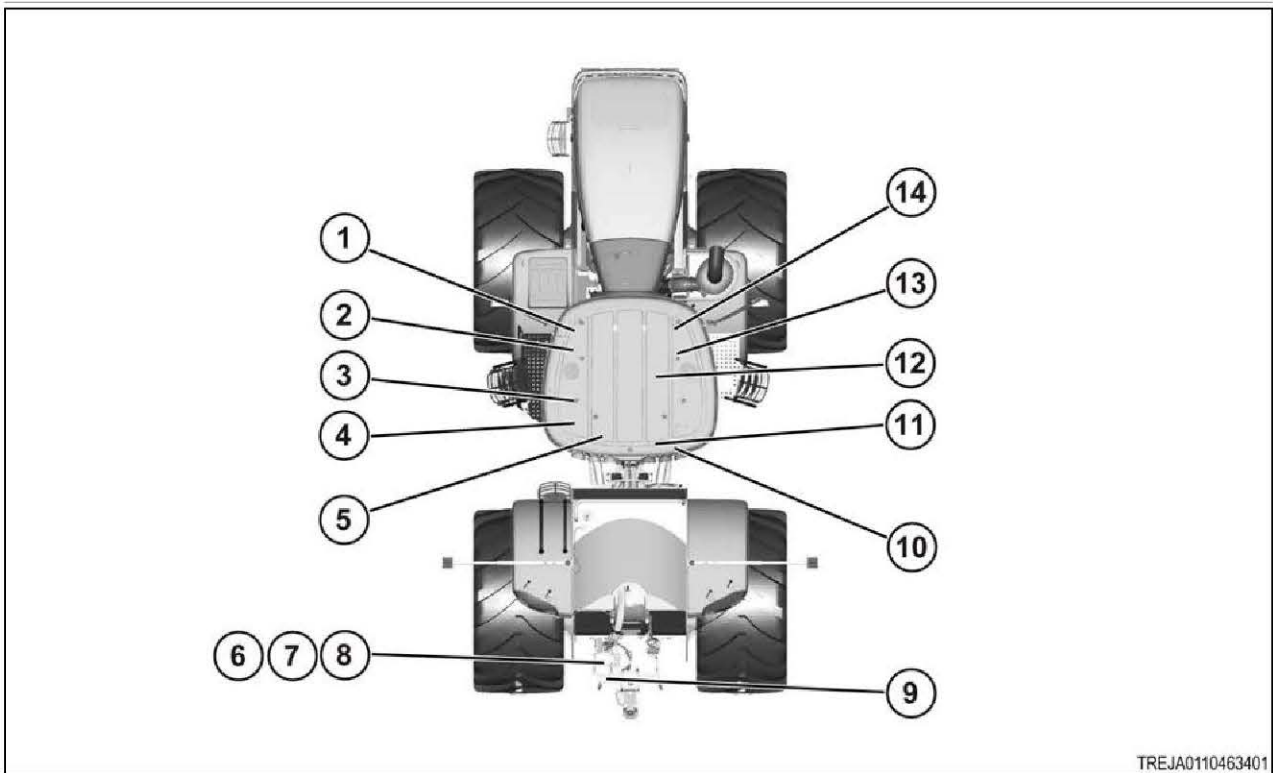


Fig. 146

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

16.6.7 Operational checks for the 3-point linkage



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.

Use the operational checks to find leaks in the 3-point linkage system. Operational checks can detect a faulty 3-point hitch control valve or a faulty hydraulic pump.

Warm the hydraulic oil to a minimum temperature of 55 to 75° C (131 to 167° F).

Extend and retract the 3-point linkage lift cylinders several times.

- Lift cylinders must be smooth and regular
- Listen for noise from the pump
- Relief valve setting
- Check for excessive lift cylinder rod drift

Drift in the 3-point linkage lift cylinders can be caused by:

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

16.6.8 Check for 3-point linkage cylinder drift

Procedure

1. Load the 3-point linkage with 2270 kg (5000 lb).
2. Fully raise the 3-point linkage.
3. The table shows the amount of drift for the 3-point linkage that can be permitted.

3-point linkage cylinder drift	
Temperature	Drift in 5 minutes
49 °C (120 °F)	0 to 4 mm (0 to 0.16 in)

16.6.9 Calibrate the 3-point linkage control valve solenoid

Procedure

1. Connect the Electric Diagnostic Tool (EDT) to the machine.

NOTE: *The screens may be different than shown.*

2. Select Challenger icon.



Fig. 147

3. Select tractors.

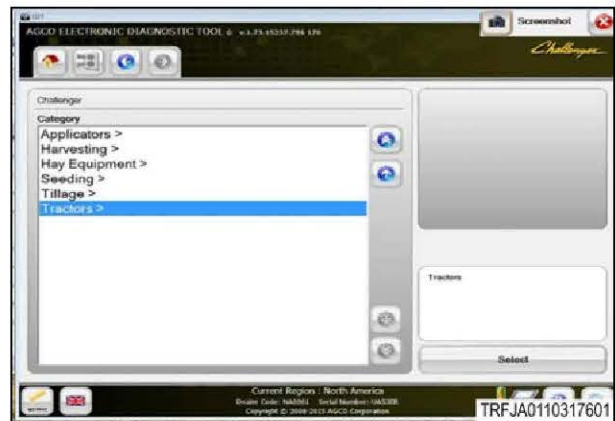


Fig. 148

4. Select the correct machine model series.



Fig. 149

5. Select the Auto-Guide™ option.

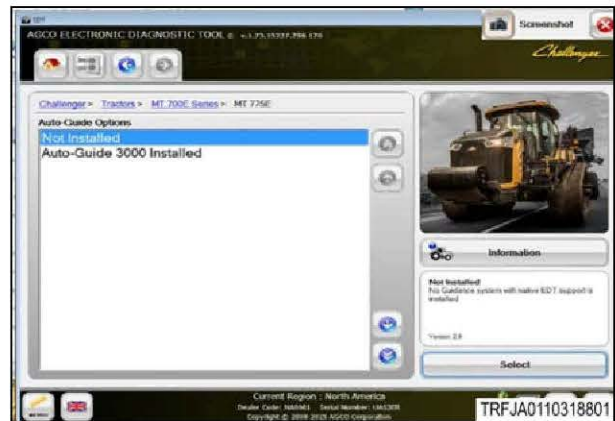


Fig. 150

6. Select the correct connection. If on an E series select the power train, hydraulics and lighting option and then click the select connection.



Fig. 151

7. If on a C series or D series select Cab Diagnostic Connector then click on select connection

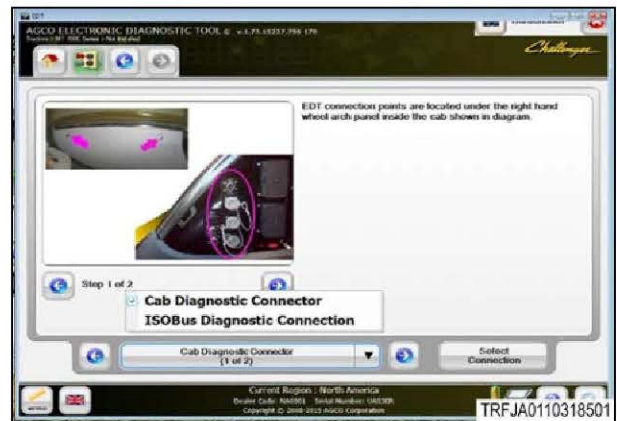


Fig. 152

8. Once connected the network scan screen will appear.
 - a) Select the caliper icon at the top of the EDT screen.

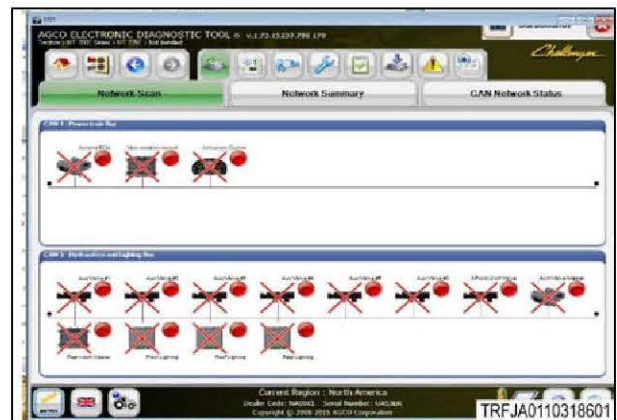


Fig. 153

9. When the caliper is selected the calibration selection screen will appear.
 - a) Select the Start button lower right-hand corner.

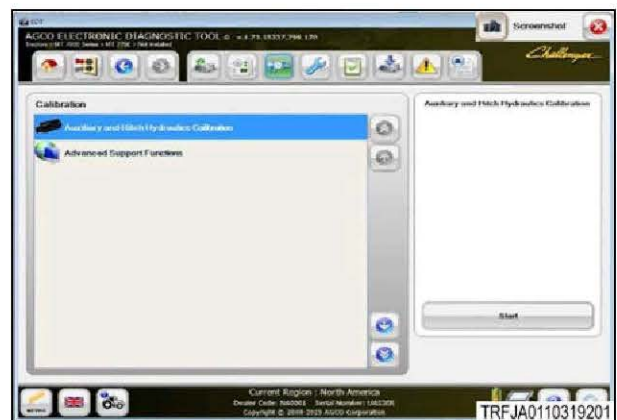


Fig. 154

16. Implement lift system

10. EDT will then read the configuration information stored in the tractor electronics.
 - a) Click on the Continue button.

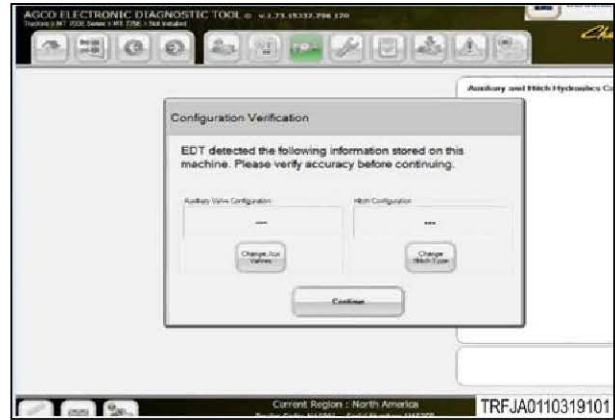


Fig. 155

11. EDT will retrieve the existing valve calibration values.

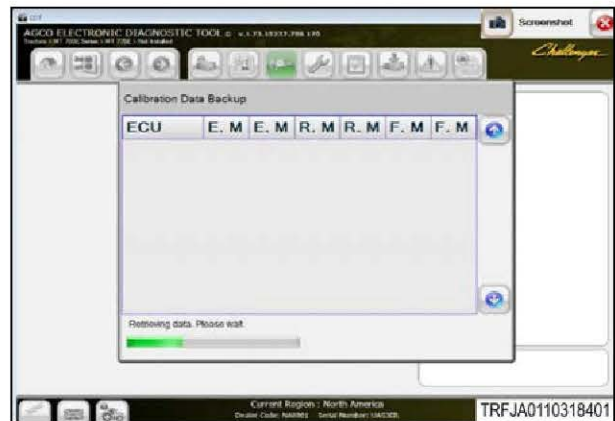


Fig. 156

12. EDT will bring up the ECU assign screen.
 - a) Click on Exit button in the lower right-hand corner.

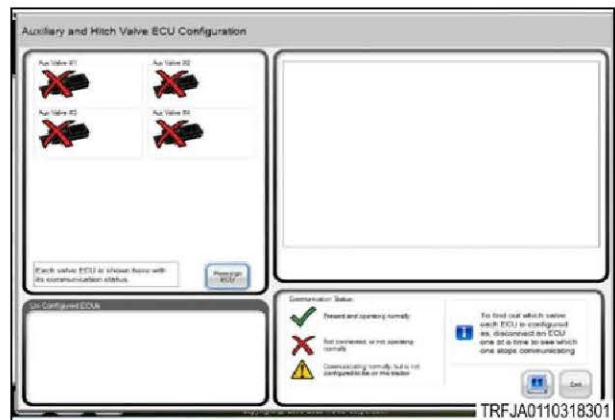


Fig. 157

13. EDT will then bring up the calibration screen.
 - a) Select the valve to set calibrations to.
 - b) EDT will read the calibrations currently stored in each valve ECM.
 - c) Click on Look up Calibration Values button.



Fig. 158

14. Enter valve stack serial number.



Fig. 159

15. EDT will show a picture of the location of the serial number plate of the valve stack.



Fig. 160

16. Select the pencil and paper icon to bring up the valve stack serial number entry screen



Fig. 161

17. Select apply to selected valve to install the calibration values.

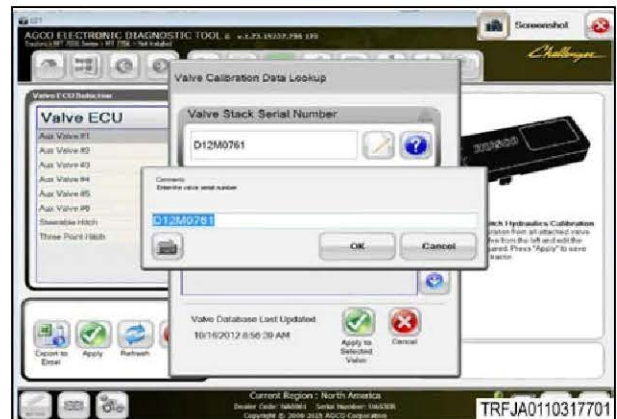


Fig. 162

16.6.10 Calibrate the 3-point linkage sensors

Calibrate the 3-point linkage control valve solenoid when:

- Components have been replaced
- Module has been replaced
- Normal wear occurs

Required tools

The Caterpillar Electronic Technician service tool (ET) is used to do the calibration procedures. A message on the ET screen will give instructions for the calibration procedure. See the ET manual for more information.

Procedure

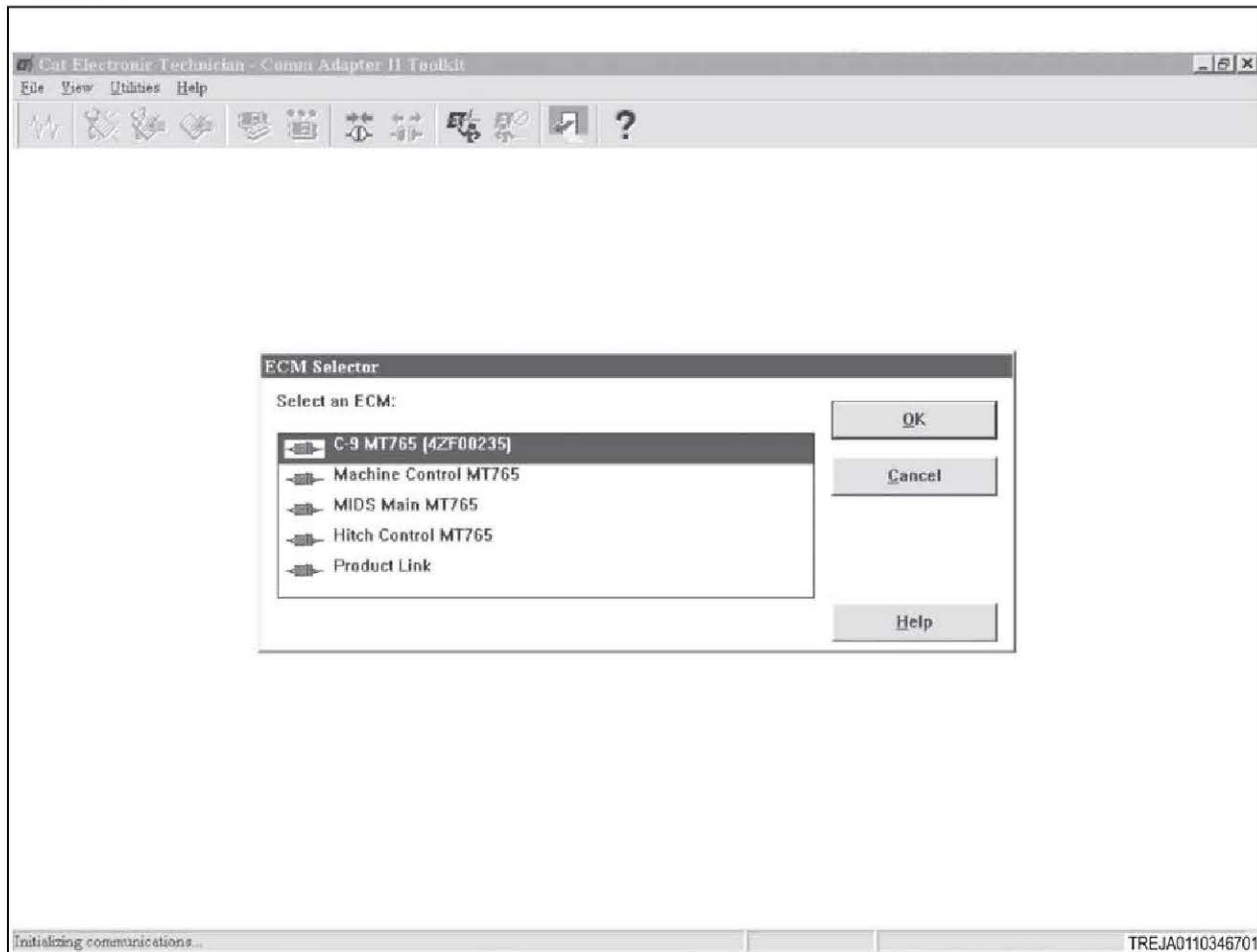


Fig. 163

1. Connect ET to the machine.

NOTE:

When connected, ET will show the modules on the machine.

2. Select hitch control.

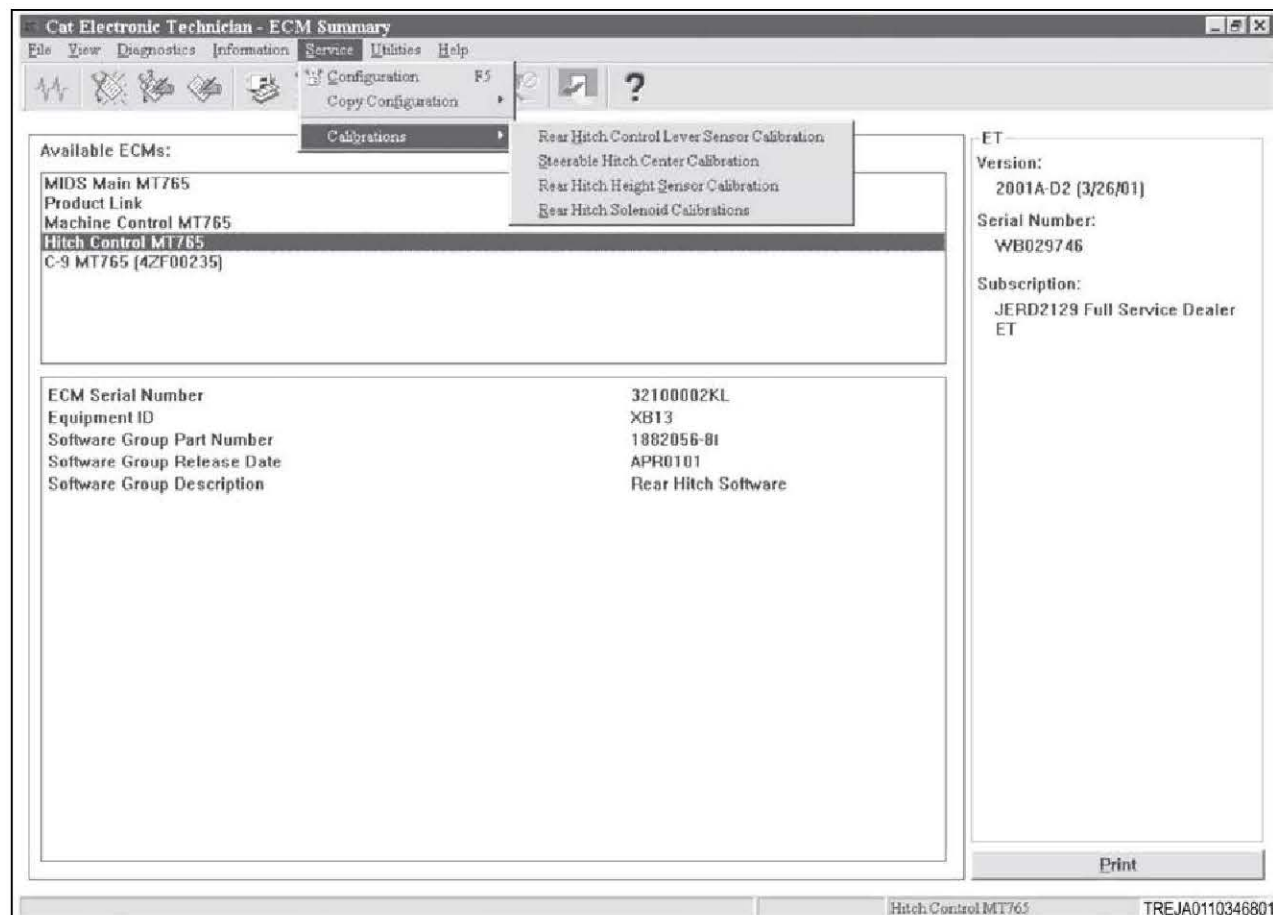


Fig. 164

3. Select service from the menu bar.
4. Select calibrations from the service drop-down menu.

NOTE:

Another drop-down menu will show. The menu will show each available calibration.

5. Select the rear hitch height sensor calibration or select rear hitch control lever sensor calibration.

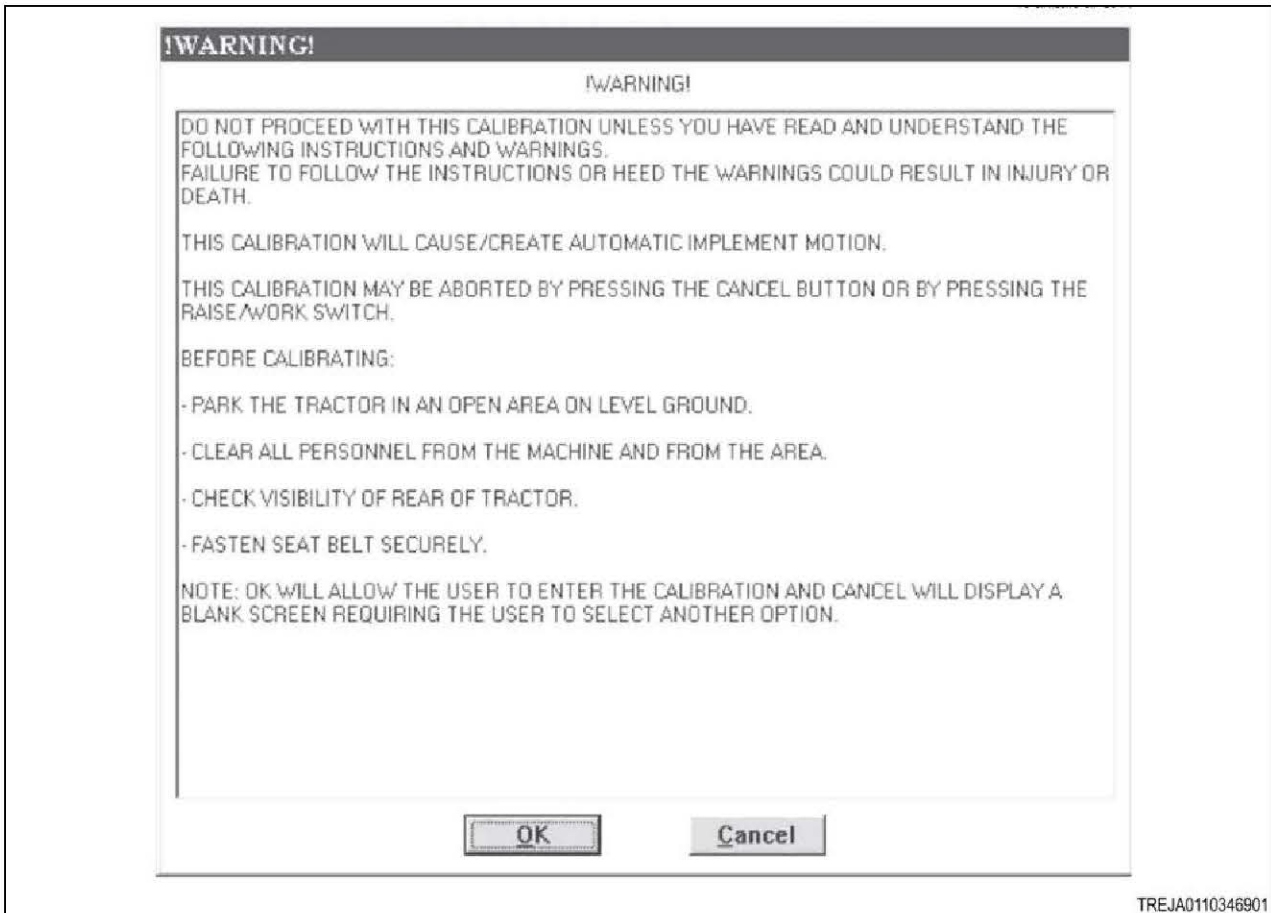


Fig. 165

6. Select OK after reading the Warning carefully.
7. Follow all the instructions on ET to complete the calibration procedures.

NOTE:

The calibration will require conditions to be set before the start of the calibration. For example, set the transmission control lever to park. The user must make sure that all the conditions are correct.

16.7 3-point linkage troubleshooting

3-point linkage does not move when moving control lever	
Cause(s)	Solution(s)
3-point linkage is not phased with the control lever.	Capture the hitch. See Capturing the steerable 3-point linkage
Excessive load on 3-point linkage.	Reduce load on 3-point linkage.
Fast raise/lower switch is in raise position.	Move fast raise/lower switch to lower position.
Raise limit is not correctly adjusted.	Adjust raise limit.
3-point linkage position sensor malfunctioning.	See your dealer.
Hydraulic system is not supplying oil flow or pressurized oil to 3-point linkage lift cylinders.	See your dealer.

External position control switches on the fender do not function	
Cause(s)	Solution(s)
Transmission control lever is not in the park position.	Put the transmission control lever in the park position.
Raise/lower switch for 3-point linkage is in raise position.	Move raise/lower switch for 3-point linkage to lower position.
3-point linkage control lever is in the wrong position.	Move the 3-point linkage control lever all the way forward.

3-point linkage does not raise fully	
Cause(s)	Solution(s)
Raise limit is not set correctly.	Adjust the raise limit.

3-point linkage lowers too slowly or raises too slowly	
Cause(s)	Solution(s)
Incorrectly set lower rate control.	Adjust the lower rate control.
Incorrectly set raise rate control.	Adjust the raise rate control.

Response to the draft load is too slow	
Cause(s)	Solution(s)
Incorrectly adjusted draft sensitivity.	Adjust the draft sensitivity.
Lower rate is too slow or raise rate is too slow.	Adjust lower rate control or adjust raise rate control.
Implement is malfunctioning.	See the operator's manual for implement.

Response to the draft load is too fast	
Cause(s)	Solution(s)
Incorrectly adjusted draft sensitivity.	Adjust the draft sensitivity.