Table of Contents

⚠ Attachments

Only use attachments that are recommended by Terex.

Make sure that all necessary guards and protective equipment are in place and functioning prior to operating any attachment.

Wear protective glasses and protective equipment as required by conditions or as recommended in the attachment specific operation manual.

Ensure that all personnel are far enough away from the work area so they will not be struck by flying objects.

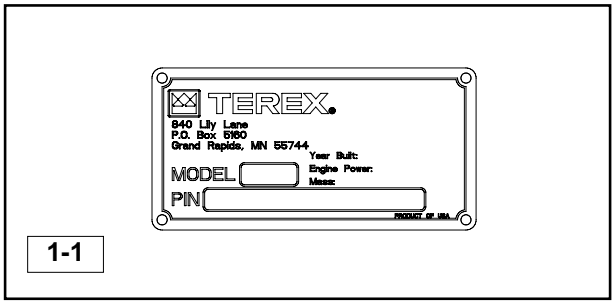
Stay clear of the cutting edges, pinching surfaces or crushing surfaces of the attachment while performing any attachment maintenance, testing or adjustments.

⚠ Machine Labels and Decals

Labels and decals placed on the machine provide safety information and operating instructions. Familiarize yourself with the location and significance of these labels to ensure your safety.

Product Identification Number

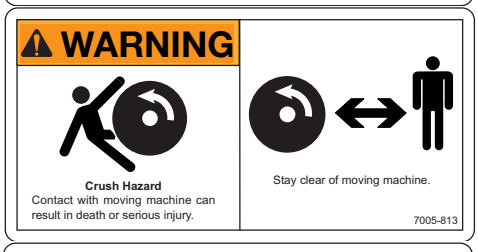
The Product Identification Number (PIN) is located on the front of the cab enclosure (figure 1-1). Always provide the PIN when contacting the dealer about parts, service, warranty or accessories. No warranty claims will be processed unless the PIN is provided.

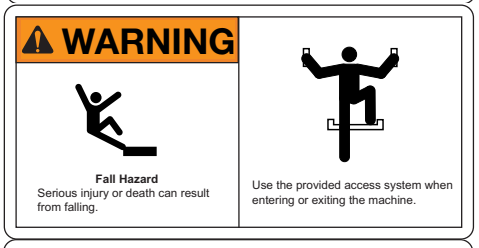


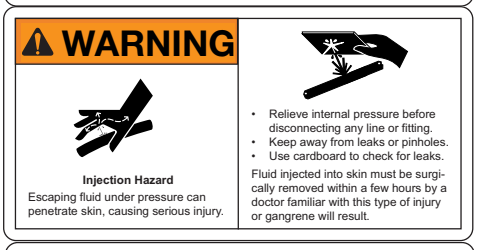
1-1

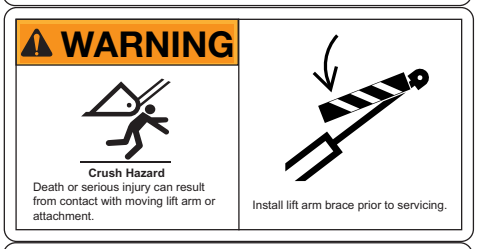
Safety Label Examples

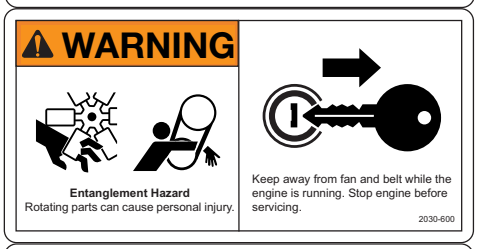
Examples of the labels and decals displayed on the machine are shown on this page.

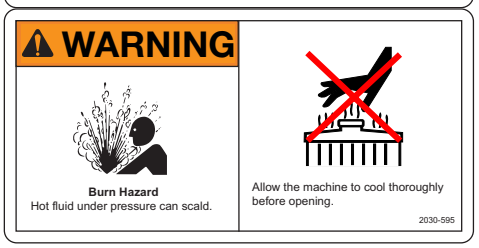












2. Technical Specifications & Service Tools

TSR-50/60 single speed / flow

Engine (TSR 50)
- Model: Perkins 404D-22
- Displacement: 2.2 liter
- Gross horsepower: 50 hp (37.3 kW)
- Torque: 105 lb-ft., 143 Nm
- Idle rpm: 1175 (low idle), 2800 (high idle)
- Average water /thermostat temperature: 190°F, 87.8°C

Engine (TSR 60)
- Model: Perkins 404D-22 T
- Displacement: 2.2 liter
- Gross horsepower: 60 hp (44.7 kW)
- Torque: 140 lb-ft., 190 Nm
- Idle rpm: 1175 (low idle), 2800 (high idle)
- Average water /thermostat temperature: 190°F, 87.8°C

Drive Pumps
- Model: A22VG (38.5cc) tandem (Rexroth)
- Displacement: 2.349 in3/rev (38.5 cc/rev)
- Relief pressure: 5500 psi (380 bar)
- Flow: 28 gpm (106 lpm) @ 2800 rpm (high idle)

Charge Pump
- Displacement @ 1.098 in3/rev (18 cc/rev)
- Relief pressure: 400-450 psi (2758-3103 kPa)
- Flow: 13.5 gpm (51.1 lpm) @2800 rpm

Drive Motors
- Model: Rexroth MCR3
- Displacement: 24.4 in3/rev (400 cc/rev)

Controls (Joysticks)
- Model: Rexroth R908353009 (LH)
- Model: Rexroth R908352996 (RH)
- Type: Pilot

Auxiliary Pump
- Model: Barnes Haladex
- Type: Gear pump
- Displacement: 1.343 in3/rev (22 cc/rev)
- Aux. Flow: 17.4 gpm (65.9 lpm) @ 2800 rpm
- Aux. Flow Relief Pressure: 3300 psi (22,750 kPa)
- LS (Standby) Pressure: 218 psi (1,503 kPa)
- Cooling/filtering: Oil is filtered at all times and is cooled at all times with the exception of an 80 psi cooler bypass valve to prevent excessive pressure in the cooling system when the oil is cold.

Lift Arm Control Valve
- Make: Husco
- Model: 9610-CXX

Oil Cooler
- Operating pressure: 150 psi (1034 kPa)
- Bypass relief pressure: 80 psi (689 kPa)
- Hot oil sending unit: 225°F (107.2°C)
- Avg. oil operating temp. 50-60°F / 28-33°C above ambient.
  (High flow application 80°F / 44°C above ambient.)

Critical Torque Specs
- Drive Pump Mounting Bolts
  -- 85 ft-lb. w/Blue Loctite
- Wheel Lug Nuts
  -- 150 ft-lb.+ / - 8 / 203 Nm -Dry
- Drive Motor Mounting Bolts
  -- 88 ft-lbs. / 119 Nm -Dry
- Pod Mounting Bolts
  -- 150 ft-lb.+ / - 8 / 203 Nm -Dry
- Front/Rear Drive Sprocket Retaining Bolts
  -- 190 ft-lb. / 258 Nm -Dry
- Center (Drive Motor) Sprocket Retaining Bolts
  -- 65 ft-lb. / 88 Nm -Dry

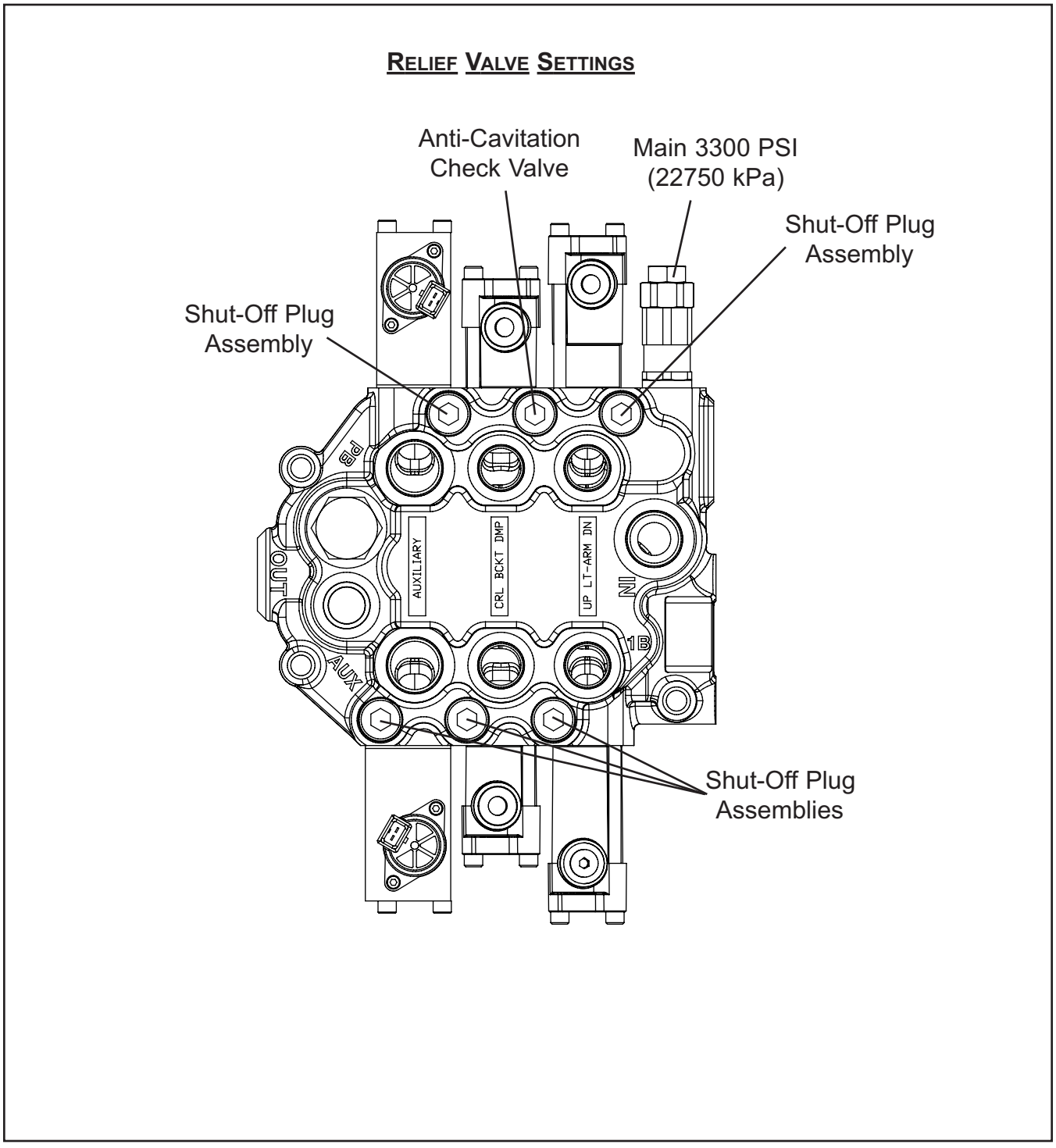
Service Tools

Listed below are common service tools which are identified and utilized in the service procedures described in this manual. Use tools recommended by Terex whenever possible to reduce risk of injury and or machine damage during service.

- Heavy Duty Hydraulic Jack (5-ton rating)
- Test Gauge Kit (TEREX P/N: 0402-935)
- Ratchet Strap
- Long Pry Bar(s)

Lift Arm Control Valve

Figure 3-5 TSR-50-60 Lift Arm Control Valve



4. Maintenance

Chapter Overview

This chapter provides information on general maintenance procedures for the TSR-50-60. If there is an issue that requires troubleshooting, refer to Chapter 16, Troubleshooting.

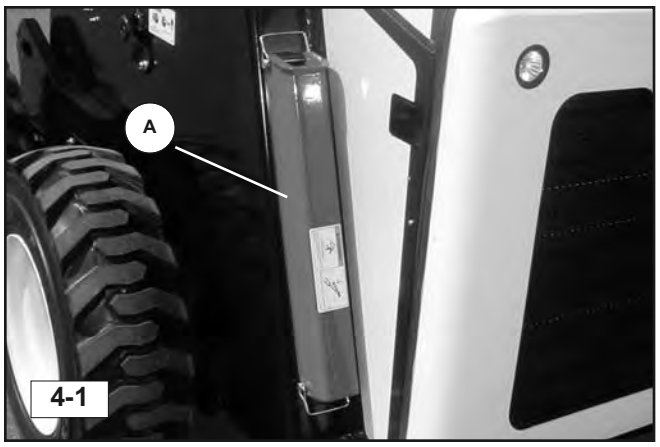
Personal Safety

Improper or incomplete maintenance/repair of a Skid Steer Loader can be dangerous and may result in machine damage, injury or even death.

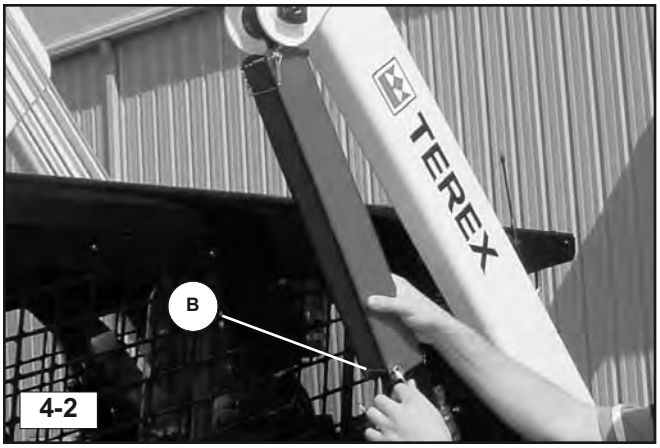
Do not attempt to perform any type of repair or maintenance on a Skid Steer Loader until you have read and fully understood the information in this manual.

Refer to the Operation and Maintenance manual for instructions regarding proper machine operation techniques before operating any Skid Steer Loader.

Prior to performing any type of service work on a Skid Steer Loader, read and understand Chapter 1 (Product Safety) for personal safety information.



4-1



4-2

Lift Arm Brace

The lift arm brace (item A, figure 4-1) is intended to keep service personnel safe when it is necessary to work on a machine with the lift arms in the raised position. It is not safe to rely on the hydraulic system to hold the lift arms in the raised position just as it is not safe to crawl under a machine supported only by a jack. The lift arm brace is used to support the weight of the lift arms much like jack stands are used to mechanically support vehicle weight.

To install the lift arm brace:

1. Park the machine on level ground in a safe area for performing service work.
2. Remove any attachments that may be fastened to the quick attach.
3. Have an assistant remove the retaining pins (item B, figure 4-2) securing the lift arm brace and remove it from the machine.
4. Make sure bystanders are clear of the lift arms, then raise them to the upper limit.
5. Have an assistant Install the brace around the cylinder shaft as shown and reinstall the pins to secure it to the cylinder.
6. Lower the lift arms slowly until they come to rest on the brace.
7. It is now safe to shut the engine off and exit the machine.

Do not work on or near the machine with the lift arms in the raised position unless the lift arm brace has been correctly installed.

To remove the lift arm brace:

1. Start the machine and raise the lift arms until they are clear of the brace.
2. Once clear, have an assistant remove the brace from the cylinder and stow it on the machine with the pins.
3. Once the brace has been stowed and the assistant is clear of the lift arms, lower the arms to the ground and shut the engine off to complete the procedure.

Engine Oil/Filter Change

Regular oil changes are necessary to maintain a strong running engine. Terex recommends a normal oil change interval of 250 hours or every six months. This recommendation has been made to help ensure proper lubrication during operation and to prolong engine life under typical operating conditions.

To change the oil and filter:

1. Start and run the engine for a few minutes to warm the oil.
2. Shut the machine down according to the procedure in section 5.13 of the operation and maintenance manual and allow the machine to cool before per forming this procedure.
3. Remove the large bolt (oil drain plug) in the floor of the chassis to the right of the oil pan and route the engine oil drain hose through it.
4. Place a suitable container under the engine oil drain plug.
5. Open the rear door and hood to access the engine compartment.
6. Lift the drain valve tab upward and then rotate it counter clockwise in the slot as shown figure 4-27. Drain the oil into a suitable catch container.
7. Remove engine oil filter . Upon removal, make sure the filter gasket is still present on the filter. If not, remove it from the filter port (on the engine) prior to installing the new filter to prevent leaks (fig. 4-28).

NOTICE

If the old filter gasket is not removed from the filter head and the new filter is installed on top of it, an oil leak will result when the engine is started. If unnoticed, the engine can run itself out of oil causing engine failure.

8. Prepare new filter by applying fresh oil on the exposed gasket surface and install the new filter.
9. Thread the new filter onto the filter head. Tighten the filter by hand as instructed by the label located on the filter or filter box.
10. Reverse steps 3 and 4 to close the drain valve and store the hose.
11. Remove the oil filler cap and fill the engine crankcase with Terex 10W-30 Heavy Duty Engine Oil (capacity: 11.2 quarts (10.6 gal) including filter) (fig. 4-29).
12. Install the oil filler cap.
13. Perform a visual inspection to make sure the drain plug, filter and oil filler cap are in place and tight.
14. Start the engine and watch the display to ensure the oil pressure guage needle rises into the green zone (or warning light goes out) shortly after startup indicating oil pressure.
15. Once oil pressure has been verified, have an assistant visually inspect the machine for engine oil leaks. If none are found, shut the engine down and exit the machine.
16. Perform the oil level check procedure.
17. Dispose of the used oil and filter according to mandates.

6. Operator Enclosure

Chapter Overview

This chapter provides information on the assembly and disassembly of the operator enclosure assembly. If there is an issue that requires troubleshooting, refer to Chapter 16, Troubleshooting.

Personal Safety

Improper or incomplete maintenance/repair of a Skid Steer Loader can be dangerous and may result in machine damage, injury or death.

Do not attempt to perform any type of repair or maintenance on a Skid Steer Loader until you have read and fully understood the information in this manual. Refer to the Operation and Maintenance manual for instructions regarding proper machine operation techniques before operating any Skid Steer Loader.

Prior to performing any type of service work on a Skid Steer Loader, read and understand Chapter 1 (Product Safety) for personal safety information.

Machine Preparation

Accidental machine starting can cause injury or death to personnel working on a Skid Steer Loader.

As a precaution, disconnect the battery cables from the battery terminals, tape the battery clamps and remove the key from the ignition switch prior to performing any service work on a Skid Steer Loader.

Place a “Do Not Operate” tag prominently on the machine to inform personnel that the machine is being worked on.

Removal and Installation

Removal and installation procedures are provided for the following operator enclosure components.

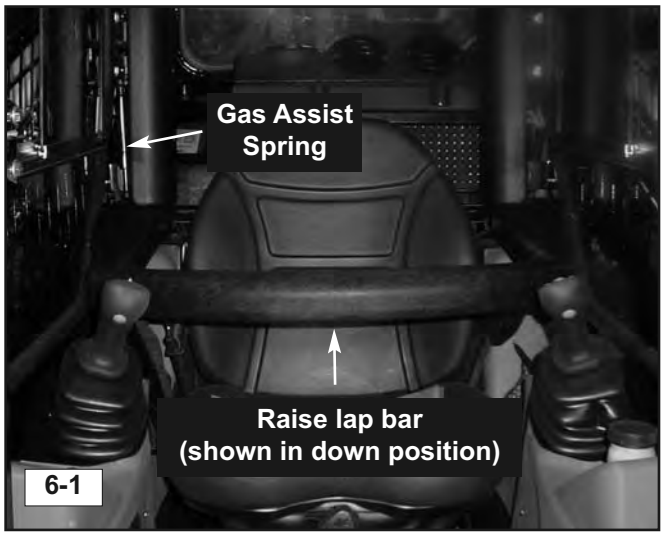
- Lap Bar Gas Spring
- Dash Pod Cover
- Side Panels
- Seat
- Headliner

Note: Procedures are provided for only the operator enclosure components listed above. However, exploded parts diagrams exist in the TSR-50-60 Parts manuals to serve as visual aids in the removal or installation of other operator enclosure components.

Lap Bar Gas Spring

Removal

Required Tools
Blade Type Screwdriver



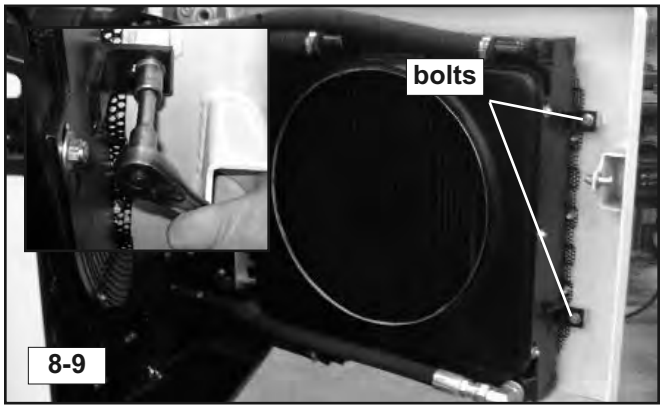
1. Raise the lap bar to minimize tension on the lap bar gas spring during removal and installation (fig. 6-1).

⚠ Fluids and machine components can be HOT! Allow the machine to cool thoroughly prior to performing maintenance or service to avoid the possibility of burns.

3. Loosen and disconnect the lower cooler hose and allow hydraulic fluid to drain in a suitable container. Cap and plug the line and cooler opening upon disassembly (fig. 8-7).

4. Loosen and disconnect the lower radiator hose and allow antifreeze to drain in a suitable container. Plug the line and radiator opening upon disassembly (fig 8-8).

5. Repeat step 3 & 4 to disconnect the upper radiator and cooler hoses.



6. Remove two bolts that secure the radiator / cooler to the surface of the rear door (fig. 8-9).

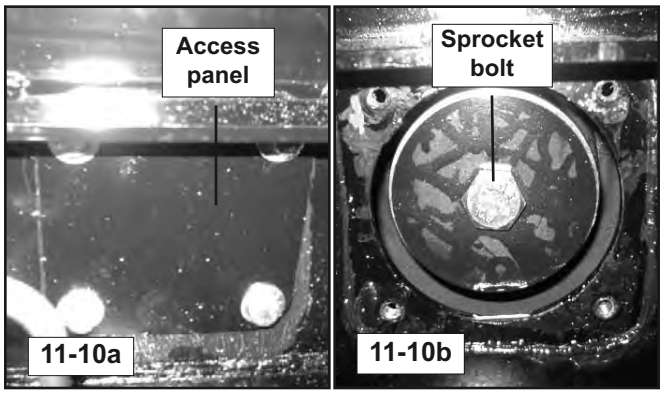
7. Support the weight of the radiator with a suitable mechanical lifting device, then begin removing the upper and lower shoulder bolts that secure the radiator / cooler hinges to the to the rear door hinges as shown in figure 8-10.

8. Remove the radiator/cooler from the machine.

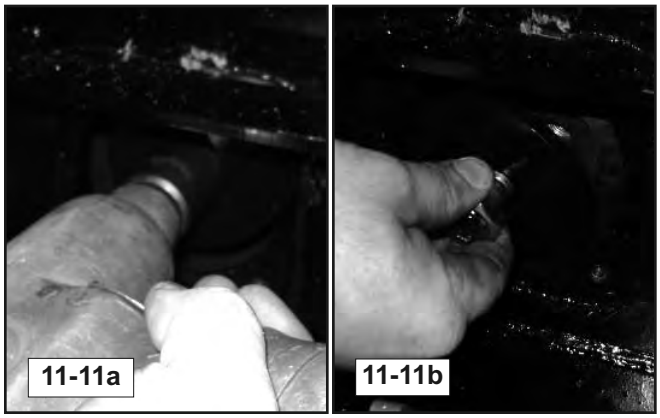
Installation

1. To install the radiator / cooler, reverse the removal procedure.

2. Refill antifreeze and hydraulic oil levels as needed.

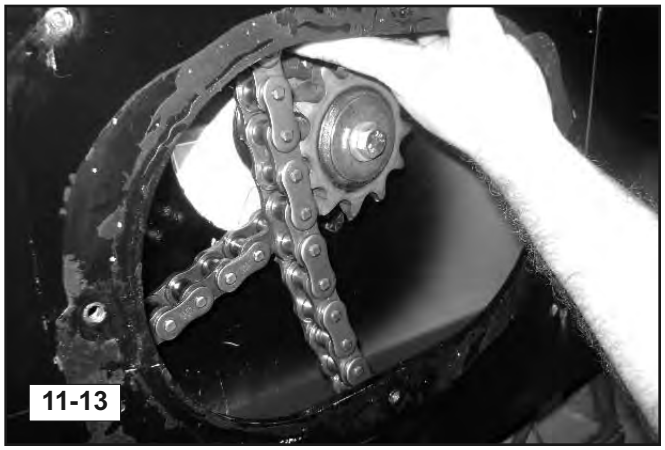


4. Remove the sprocket access panel (fig. 11-10a), located next to the drive motor on the inside of the chassis, to gain access to the sprocket bolt (fig. 11-10b).

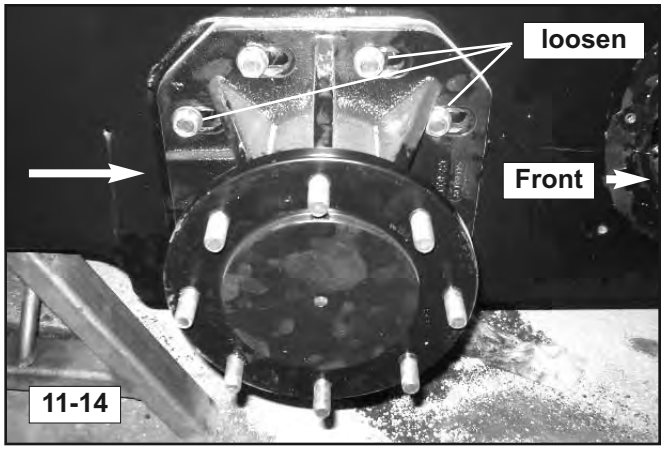


5. Remove sprocket bolt to free sprocket for removal (fig. 11-11 a & b).

6. Remove bolts that secure the wheel pod to chassis and attach a hoist to support the weight of the pod. Remove the wheel pod as shown (fig. 11-12).

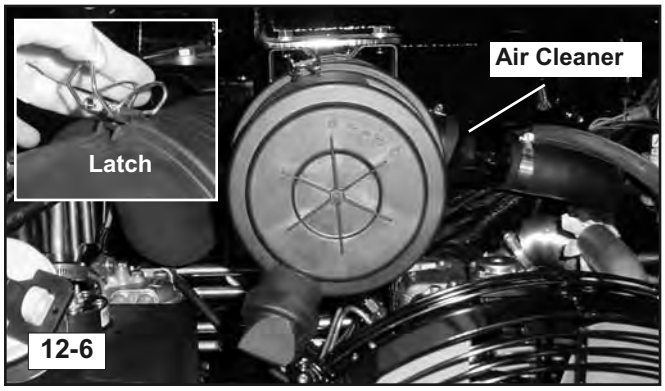


7. Pull on the chain to increase slack. Lift the chain over and off of the drive sprocket (fig.11-13).



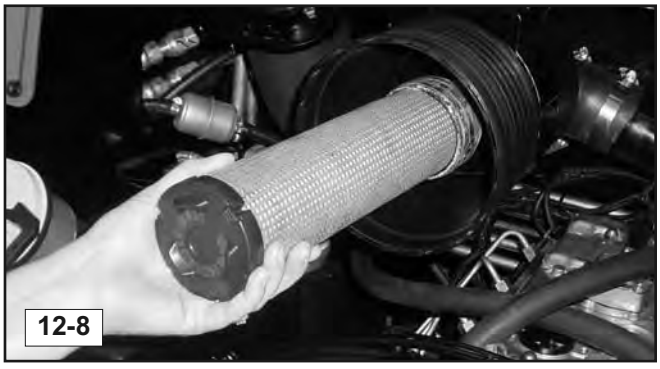
8. Complete steps 4-5 on the rear wheel pod. The rear wheel pod does not need to be removed but it does need to be loosened and moved forward to increase slack in the chain (fig. 11-14).

9. Remove drive motor sprocket bolt (fig 11-15).

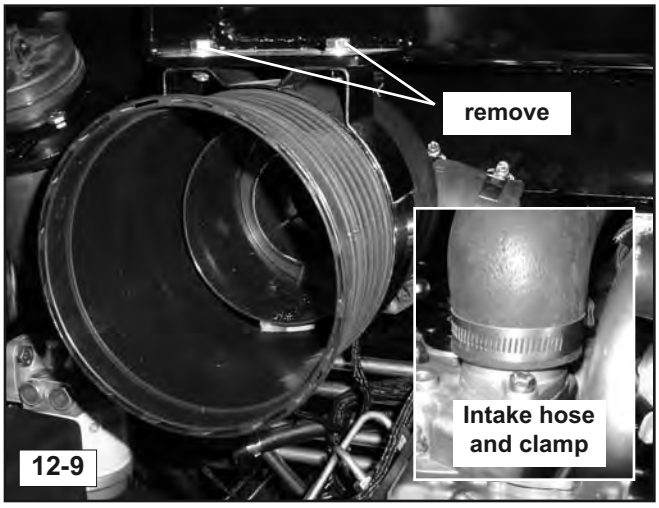


3. Locate the air cleaner enclosure in the upper left corner of the engine compartment (when viewed from the rear) and open the upper and lower latches to remove the cover (fig. 12-6).

4. Remove the primary element (fig. 12-7)



5. Once the primary element has been removed, the secondary element should be visible, remove it.



6. Loosen the clamp on the air intake hose and disconnect the hose from the engine (fig. 12-9).
7. Remove the bolts securing the air cleaner housing to the chassis, then remove it from machine (fig. 12-9).

Installation

1. To install the air cleaner assembly reverse the air cleaner removal procedure.

Engine

Required Tools
Combination/Socket Wrenches
Tie Down or Ratchet Strap
Forklift/Engine Hoist

Removal

1. Perform the battery, air cleaner, auxiliary pump, and tandem pump removal procedures (found in chapters 11and 12 of this manual).
2. Raise and support the hood as described on page 7-4 and open the rear door on page 7-5 to access engine compartment.
3. Remove the fan and fan guard assemblies as described on page 8-1 of this manual.
4. Raise and support the operator enclosure (cab) as described on page 4-2 of this manual.
5. Perform the exhaust removal procedure on page 12-2 of this manual.
6. Perform the air cleaner removal procedure on page 12-3 of this manual.

13. Quick Attach

Chapter Overview

This chapter provides removal and installation procedures for the quick attach and associated components.

Personal Safety

Improper or incomplete maintenance/repair of a Skid Steer Loader can be dangerous and may result in machine damage, injury or death.

Do not attempt to perform any type of repair or maintenance on a Skid SteerLoader until you have read and fully understood the information in this manual. Refer to the Operation and Maintenance manual for instructions regarding proper machine operation techniques before operating any Skid Steer Loader.

Prior to performing any type of service work on a Skid Steer Loader, read and understand Chapter 1 (Product Safety) for personal safety information.

Machine Preparation

Accidental machine starting can cause injury or death to personnel working on a Skid Steer Loader.

As a precaution, disconnect the battery cables from the battery terminals, tape the battery clamps and remove the key from the ignition switch prior to per-forming any service work on a Skid Steer Loader.

Place a “Do Not Operate” tag prominently on the machine to inform personnel that the machine is being worked on.

Removal and Installation

Removal and installation procedures are provided for the following quick attach components.

- Quick Attach locking Pin Assemblies
- Quick Attach Pivot Pins

Note: Procedures are provided for only those quick attach components listed above. However, exploded parts diagrams exist in the TSR 50-60 Parts manual to serve as visual aids in the assembly and disassembly of other system components.

Locking Pin Assembly

Removal

Required Tools
Combination/Open End/Socket Wrenches Mechanical Supports

Remove any attachment, lower or safely support the lift arms and make sure the hydraulic oil is cool before removing any components or lines. Hot or pressurized oil can cause personal injury.

1. Rest the lift arms on mechanical support to provide clearance for quick attach disassembly (fig. 13-1).

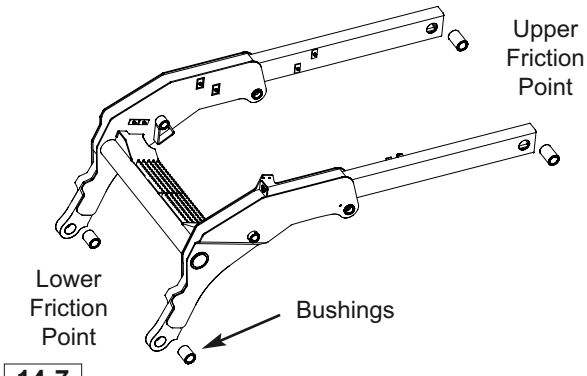
Lift Cylinder/Tilt Cylinder Installation

1. To install the lift/tilt cylinder, reverse the removal procedure.
2. Add grease to loader pin zerks to ensure proper lubrication of bushings.

Lift Arm Bushing Removal and Installation

Required Tools
Combination/Open End/Socket Wrenches **Hydraulic Caps/Plugs (various sizes)** **Mechanical Supports**

Lift Arm Bushing Placement (figure 14-7)

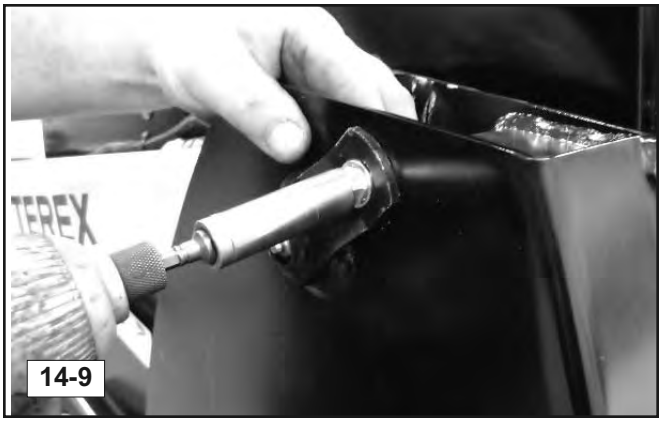


14-7

Upper Friction Points:

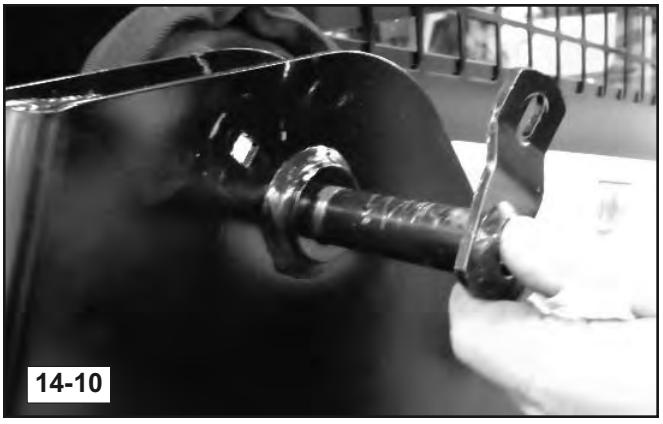
14-8

1. Lower the lift arm to the loader stops. Then attach suitable lifting device as shown in figure 14-8.
2. Turn the engine start switch to the OFF position and remove the key to avoid accidental start.



14-9

3. Remove the bolts that secure the lift arm pins to from each side of the chassis (fig. 14-9).



14-10

4. Remove the pins from each side of the chassis (fig. 14-10).

14-11

5. Raise the lifting device until arm has cleared the chassis and the hydraulic hoses. Use a pry bar to guide the lift arm upward if necessary as shown in figure 14-11.
6. Inspect the bushings for wear according to the procedure in page 4-14 of this manual. If it is determined that replacement is needed, continue onto step 7 of this procedure.

NOTICE

Disassembly of hydraulic components should only be performed by factory trained personnel experienced in the disassembly and repair of hydraulic components. Components should not be serviced during the warranty period without written instruction from the Terex service department. Component disassembly during this period may void the manufacturer's warranty.

15. Hydraulic Component Service Procedures

Chapter Overview

This chapter provides information on inspection, disassembly and assembly of major hydraulic components.

Personal Safety

Improper or incomplete maintenance/repair of a Skid Steer Loader can be dangerous and may result in machine damage, injury or death.

Do not attempt to perform any type of repair or maintenance on a Skid Steer Loader until you have read and fully understood the information in this manual. Refer to the Operation and Maintenance manual for instructions regarding proper machine operation techniques before operating any Skid Steer Loader.

Prior to performing any type of service work on a Skid Steer Loader, read and understand Chapter 1 (Product Safety) for personal safety information.

Machine Preparation

Accidental machine starting can cause injury or death to personnel working on a Skid Steer Loader.

As a precaution, disconnect the battery cables from the battery terminals, tape the battery clamps and remove the key from the ignition switch prior to performing any service work on a Skid Steer Loader.

Place a "Do Not Operate" tag prominently on the machine to inform personnel that the machine is being worked on.

NOTICE

When servicing any hydraulic component, keep in mind that any scratches or damage that can be felt with a fingernail on surfaces that parts move, slide, roll or rotate upon indicate a need for part replacement.

Hydraulic components must be kept extremely clean to ensure proper function and service life. Do not assemble any components that have not been inspected for damage and thoroughly cleaned prior to assembly.

The hydraulic system fluid should be changed following any hydraulic component service according to the procedure described on page 4-12.

Disassembly & Assembly

Disassembly and assembly procedures are provided for the following components:

- Hydraulic Cylinders
- Lift Arm Control Valve
- Drive motor
- Drive Pump
- Auxiliary Pump

Note: Procedures are provided for only those components listed above. However, exploded parts diagrams exist in the TSR 50-60 parts manuals to serve as visual aids in the assembly and disassembly of other system components.

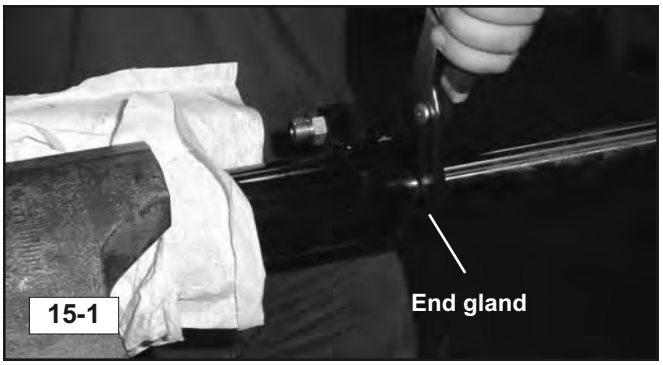
Hydraulic Lift/Tilt Cylinders Seal Kit

Disassembly

Required Tools
Bench Vise
Pipe Wrench
Socket or Impact Wrench
Screwdriver (blade type)
Rubber or Dead Blow Hammer

Note: When servicing cylinders, the attached components must be supported in a manner that allows the cylinders to be safely removed and installed. (lift arms & quick attach)

1. With machine off and cool and with hydraulic actuators relaxed, disconnect and cap hoses from the cylinder(s) to be serviced.



15-1

2. Secure the cylinder into a vice and remove the end gland by turning counter clockwise with channel lock pliers. Be sure to have a container to catch draining hydraulic fluid (fig. 15-1).