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MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

CATERPILLAR®

CATERPILLAR®

KEBU6641
November 1992

Operation & Maintenance Manual

RR-250 Road Reclaimer
SS-250 Soil Stabilizer

6DD222-Up
6ED216-Up

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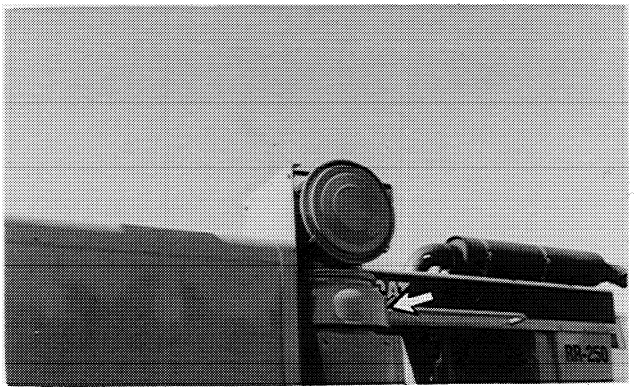
* First Perform Previous Service Hours Items

When Required

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Engine Air Intake System

Clean the Air Intake



Check the air inlet hood screen for accumulation of trash and dirt.

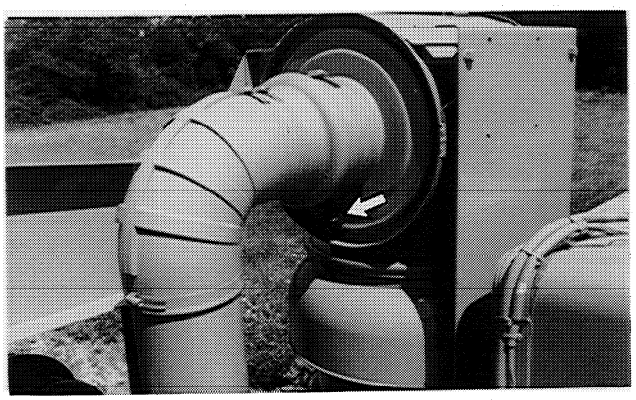
1. Remove the screen if dirty.

2. Clean with pressure air.

3. Install the screen.

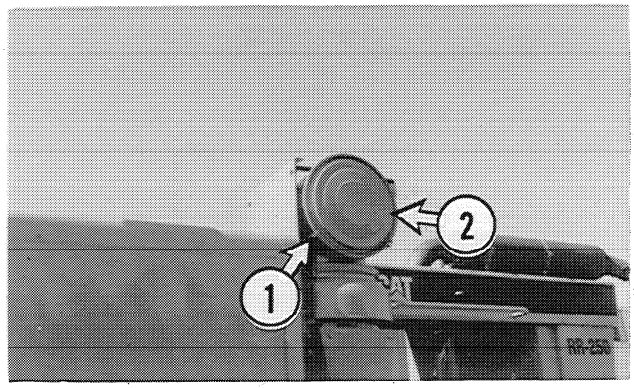
Service the Filter Elements

NOTICE
Service the air cleaner only with the engine stopped. Engine damage could result.



Service the air cleaner if the yellow piston in the filter element indicator moves into the red zone with the engine running at high idle. Stop the engine.

Service the Primary Element



1. Loosen fasteners (1), cover (2) and the primary element.

2. Clean the inside of the air cleaner housing.

3. Clean and inspect the primary element. See Cleaning Primary Elements.

4. Install a clean primary element.

5. Clean and install cover (2). Attach fasteners (1).

If the yellow piston in the filter element indicator moves into the red zone after starting the engine, or the exhaust smoke is still black after installation of a clean primary filter element, install a new primary filter element.

The primary element should be replaced after being cleaned a maximum of six times. Replace the element once a year even though it has not been cleaned six times.

Change the Secondary Element

NOTICE

Always replace the secondary filter element. Never attempt to reuse it by cleaning.

The secondary filter element should be replaced at the time the primary element is serviced for the third time.

The secondary filter element should also be replaced if the yellow piston in the filter element indicator enters the red zone after installation of a clean primary element, or if the exhaust smoke is still black.

1. Remove the cover and the primary element.

2. Remove the wing nut and secondary element.

3. Cover the air inlet opening. Clean the inside of the air cleaner housing.

4. Clean out any dust or debris in the filter outlet.

5. Uncover the air inlet opening. Install a new secondary element.

6. Tighten the wing nut finger tight only. Do not use a tool to tighten the wing nut.

7. Install the primary element and cover.

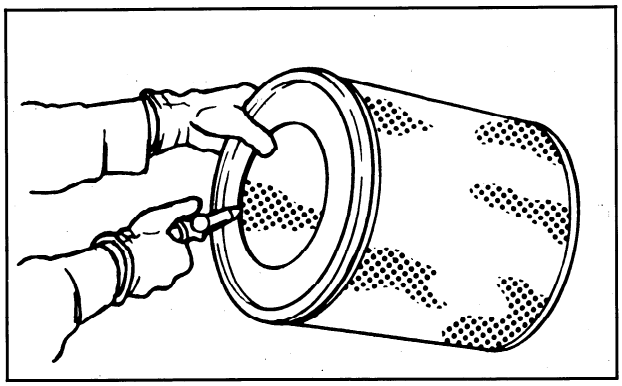
Cleaning Primary Elements

NOTICE

Do not clean the filter elements by bumping or tapping them. Do not use filter elements with damaged pleats, gaskets or seals. Engine damage can result.

Make sure the cleaned filter elements are completely dry before installing into the filter housing. Water remaining in the elements can cause false indications of contamination in Scheduled Oil Sampling test results.

Filter elements can be cleaned with pressure air - 205 kPa (30 psi) maximum, pressure water - 280 kPa (40 psi) maximum, or detergent washing.



1. Direct air or water along the pleats inside and outside of filter element.

The element can be washed in warm water and nonsudsing household detergent. Rinse inside and outside the pleats and air dry fully.

2. Inspect the filter elements after cleaning. Do not use a filter element with damaged pleats, gaskets or seals.

3. Wrap and store the clean filter elements in a clean, dry place.

Rotor Clutch

Adjust

Refer to: "Rotor Clutch Bearing Adjustment", in KENR1619, RR-250 Road Reclaimer And SS-250 Soil Stabilizer Vehicle Systems, Systems Operation, Testing & Adjusting, for the proper adjustment procedure.

Cooling System

Replace Coolant If Dirty

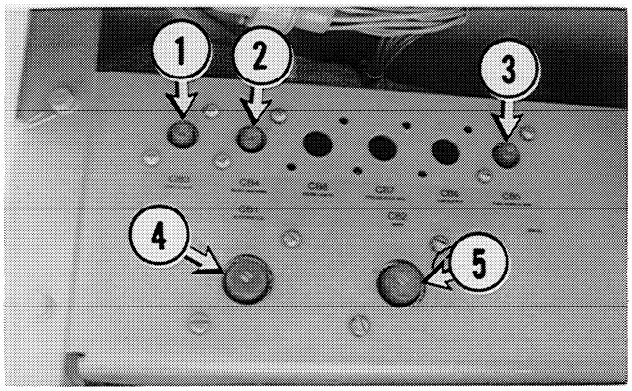
See "Every 3000 Service Hours or 2 Years".

Circuit Breakers

Reset

A junction box is located beneath the operator's control panel.

Circuit Breaker Reset – Push the button in to reset the circuit breakers. If working properly, button will stay depressed. If the button does not stay in, or comes out shortly after being reset, have appropriate electrical circuit checked.



Engine Start (1) – 10 amps.

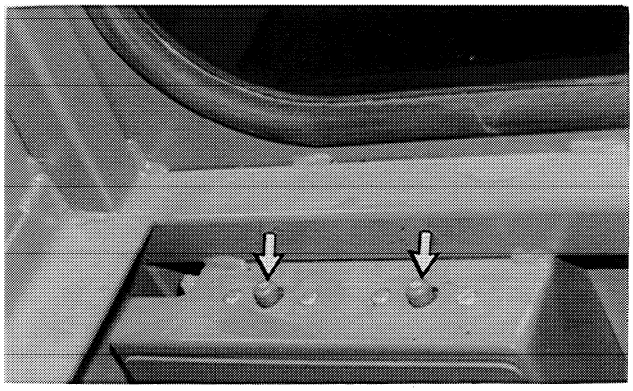
Basic Machine (2) – 10 amps.

Fuel, Horn and Alarm (3) – 10 amps.

Alternator (4) – 80 amps.

Main (5) – 80 amps.

Cab Circuit Breakers (If Equipped)

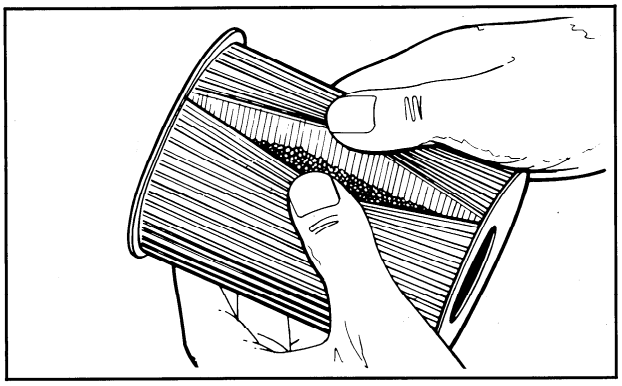


Windshield Wiper – 15 amps.

Fan – 15 amps.

Filter Inspection

Inspect Used Filter for Debris



Element with debris

Use a 4C5084 Filter Cutter (formerly 6V7905) to cut the filter element open. Spread pleats apart and inspect the element for metal and other debris. An excessive amount of debris in the filter element can indicate a possible failure.

Use a magnet to differentiate between ferrous and non-ferrous metals found in the filter element.

Ferrous metals can indicate wear on the steel and cast iron parts.

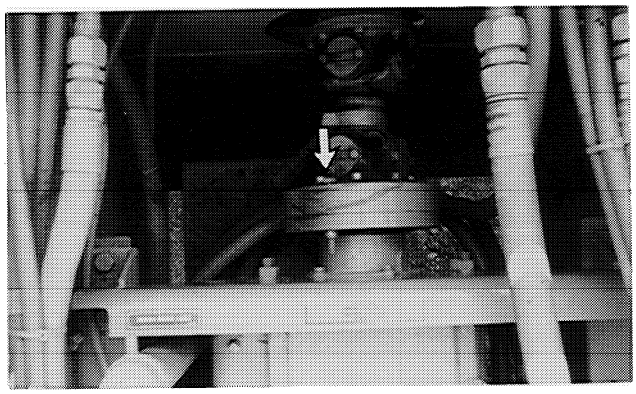
Non-ferrous metals can indicate wear on the aluminum parts of the engine, such as main, rod and/or turbocharger bearings.

Due to normal wear and friction, it is not uncommon to find small amounts of debris in the filter element. Consult your Caterpillar dealer to arrange for further analysis if an excessive amount of debris is found.

Use of an oil filter element not recommended by Caterpillar can result in severe engine damage to engine bearings, crankshaft and other parts. This can result in larger particles in unfiltered oil entering the lubricating system and causing damage.

Shear Pin

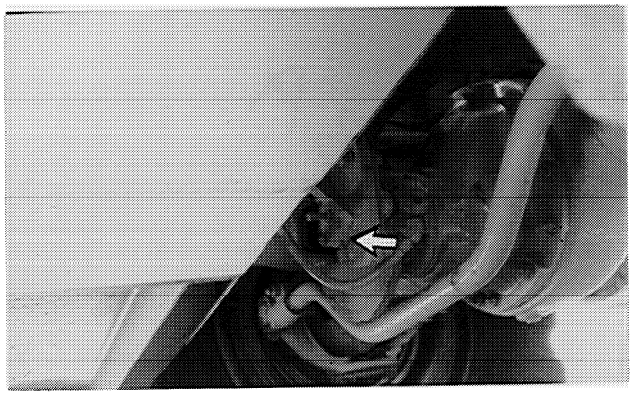
Replace



1. Align the holes in the flanges for the shear pin.
2. Remove the broken shear pin.
3. Install the new shear pin.

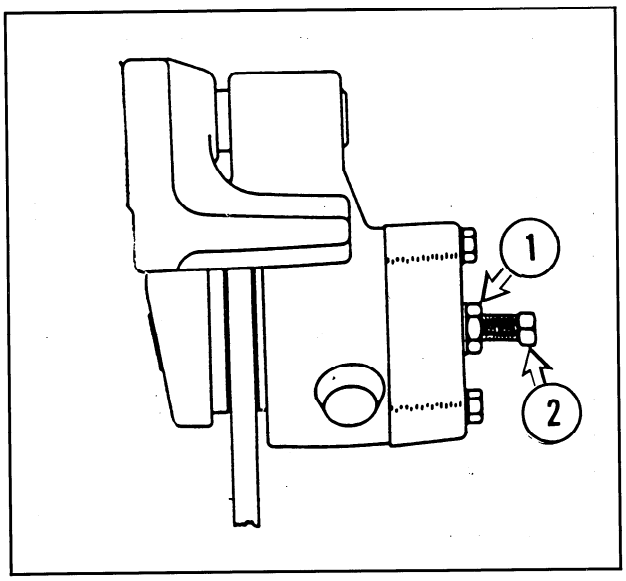
Parking Brake

Lubricate



Lubricate one fitting if the parking brake does not engage or disengage properly.

Adjust



The parking brake is a disc type, spring applied and pressure released arrangement. When the brake is released there should be no more than .30 mm (.012 in) clearance between the disc and the lining. To check this adjustment, follow the procedure outlined below.

1. Start the machine and lower the rotor to the ground.
2. Block the front wheels.
3. Release the parking brake.
4. Use a .30 mm (.012 in) feeler gauge to check the clearance between the disc and the pad.

5. Loosen locknut (1).

6. Tighten or loosen adjusting screw (2) until the proper clearance is achieved.

7. Hold the adjusting screw in place and tighten the locknut.

Restart Engine (For machines with rotor torque limiter)

NOTICE

Failure to restart engine after a stall from hitting a hard object can result in damage to the turbocharger.

When the machine is equipped with the rotor torque limiter, be sure the engine is restarted immediately after an object is struck hard enough to stall the engine. If the engine is not restarted immediately, damage to the turbocharger can result.

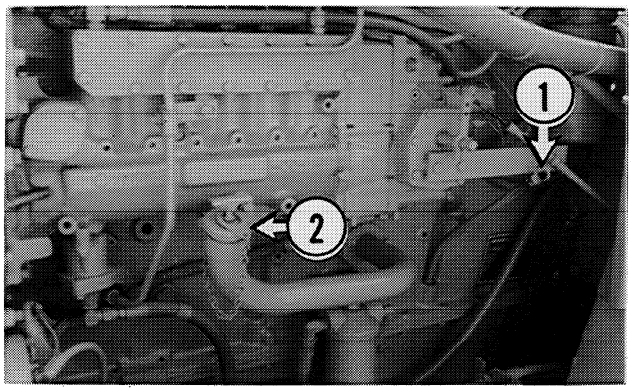
Every 10 Service Hours or Daily

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Engine Oil

Check the Oil Level

NOTICE
Do not overfill the crankcase. Engine damage can result.



1. With the engine stopped, maintain the oil level between the "L" and the "F" marks on the ENGINE STOPPED side of dipstick (1).

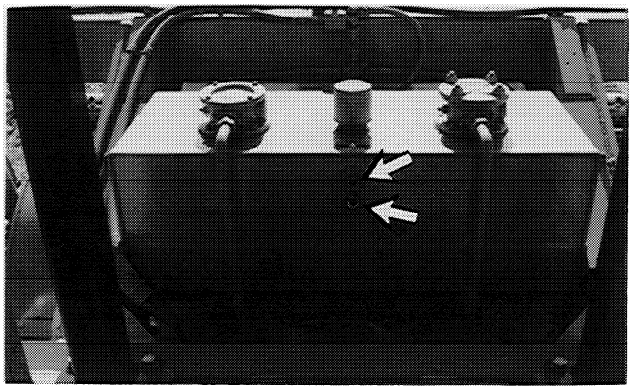
With the engine running, maintain the oil level between the "L" and the "F" marks on the LOW IDLE side of dipstick (1).

2. Remove oil fill cap (2) and add oil if necessary.

3. Clean and install fill cap (2).

Hydraulic System

Check the Oil Level

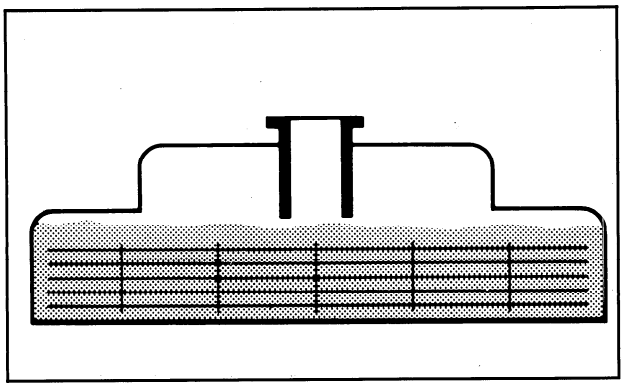


1. Maintain the oil level between the two sight gauges.

NOTE: Allow for expansion of the hydraulic oil. Do not overfill.

Radiator

Look at the Coolant Level



1. Remove the radiator cap slowly to relieve pressure.

2. Maintain the coolant level to within 13 mm (.5 in) of the bottom of the fill pipe. If it is necessary to add coolant daily, check for leaks.

3. Inspect the cap and cap seal for damage, deposits or foreign material. Clean the cap with a clean cloth or replace the cap if it is damaged.

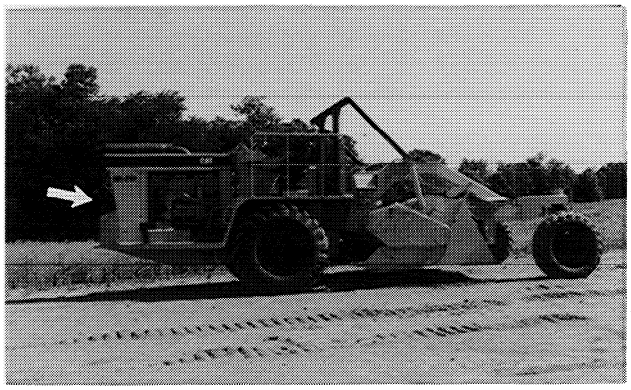
4. Install the cap.

5. Inspect the radiator core for debris and clean if necessary.

Compressed air is preferred, but high pressure water or steam can be used to remove dust, leaves and general debris from a radiator. Clean as required by condition of radiator.

Hydraulic Oil Cooler

Inspect the Core



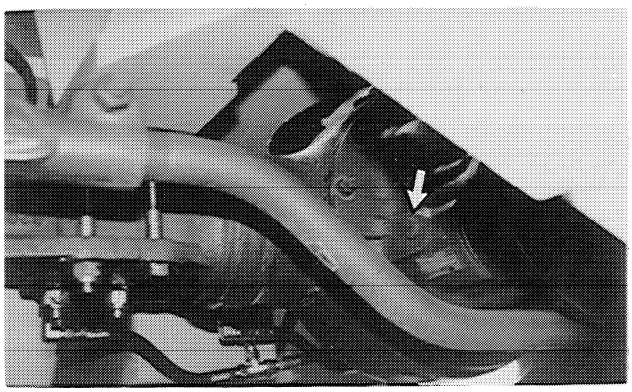
The hydraulic oil cooler is located at the front of the machine.

Compressed air is preferred, but high pressure water or steam can be used to remove dust, leaves and general debris from a core. Clean as required by condition or core.

Refer to "Know Your Cooling System", for the complete procedure and instructions.

Axle

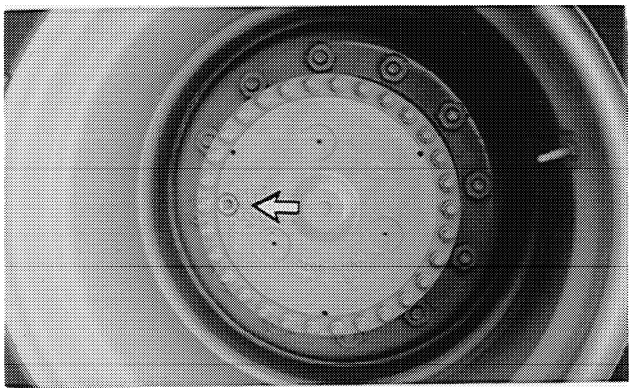
Check Oil Levels



1. Remove the check/fill plug.

2. If lubricant does not flow from the plug port, add lubricant until the check/fill plug level is reached.

3. Install the check/fill plug.

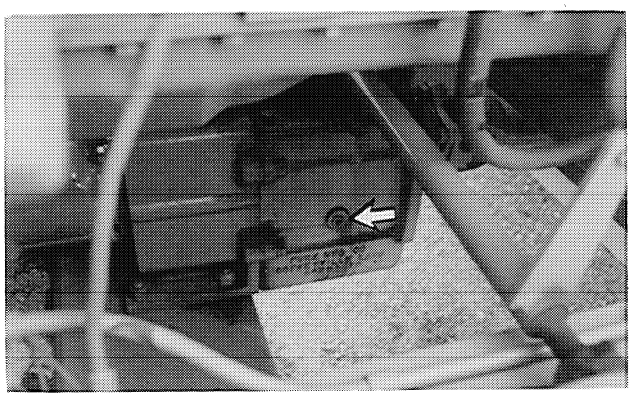


4. With the machine on a level surface, line up the oil level line so that it is parallel with the ground.

5. Remove the check/ fill plug and add lubricant if necessary.

Propel Transmission

Check Oil Level



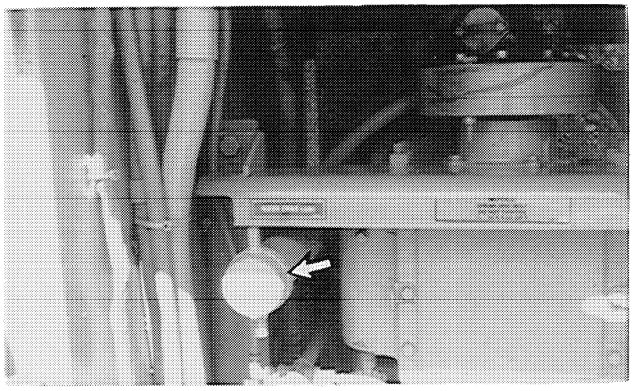
1. Remove the check/fill plug.

2. If lubricant does not flow from the plug port, add lubricant until the check/fill plug level is reached.

3. Install the check/fill plug.

Rotor Drive Cooling Oil Reservoir

Check the Oil Level



1. Remove the fill cap and visually check the oil level. Add lubricant as necessary.

Bearing Reservoir

Check the Oil Level

1. Remove the fill plug and visually check the oil level. Add lubricant as necessary.

Tires

Check Pressure – Inspect For Wear

Check the tires daily for proper inflation and abnormal wear. Check the wheel lug nuts for looseness and tighten if necessary.

If the tire pressure is low, check and repair any leaks. The inflation pressure for each of the front tires is 166 kPa (24 psi). The inflation pressure for each of the rear tires is 124 kPa (18 psi).

Rotor Chaincase

Check the Oil Level

1. Start the engine and lower the rotor to the ground.
2. Remove the check plug from the rotor chaincase.
3. If oil does not flow from the plug port, fill the chaincase to the check plug level.
4. Clean and install the check plug.
5. Repeat Steps 2 through 4 on the other chaincase.

Rotor Bits and Bit Holders

Check/inspect

The rotor bits should be checked for excessive wear and replaced anytime the distance from the holders to the tip of the bit (normal wear) or to the end of the supporting metal (carbide tip exposed) is 32 mm (1.25 in) or less.

At the same time the bits are checked, also check the bit holders for breaks or cracks. Replace as necessary.

Replacing A Rotor Bit

When the bits get worn they should be changed as a group so that all of the bits are approximately the same length. If a single bit is longer then those around it, that single bit will wear faster and may be broken off when the bit hits the surface being cut. Keep worn bits on hand to replace broken bits. Always try to replace a broken bit with a bit that is close to the same length as the bits surrounding it.

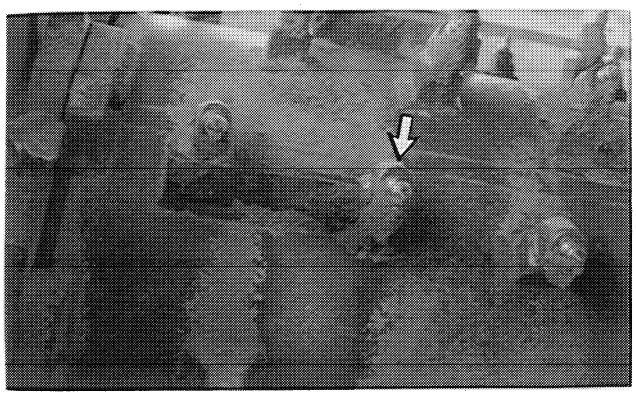
⚠ WARNING

Inadvertent engagement of the rotor could cause personal injury. Stop the engine and remove the key from the key start switch.

To Remove a Bit

1. Clear all personnel from around the machine.
2. Start the engine and raise the hood and rotor.
3. Rotate the rotor until the bit is accessible. Disengage the rotor clutch.
4. Attach the chaincase chains to the frame.
5. Raise the door and install the lock bar. Stop the engine.
6. Insert the tip of a drive pin into the opening of the bit holder. Strike the drive pin with a hammer to drive the bit out.
7. Position the new bit in the holder and drive it into place with a hammer. Be sure the keeper spring is engaged with the holder.

To Replace A Damaged Bit Holder



⚠ WARNING

Inadvertent engagement of the rotor could cause personal injury. Use a lock to lockout the rotor clutch lever in the disengaged position. Stop the engine and remove the key from the key start switch.

Metal that has been ground or cut with a torch will be hot and could cause serious burns if touched. Do not touch the bit holder or rotor drum until they have cooled.

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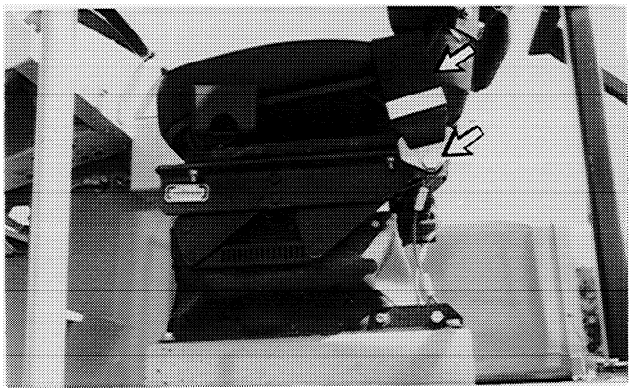
1. Use a torch or grinder to cut the bit holder from the drum.

2. Grind the surface of the drum smooth.

3. Position and weld the new bit holder on the rotor drum.

Seatbelt

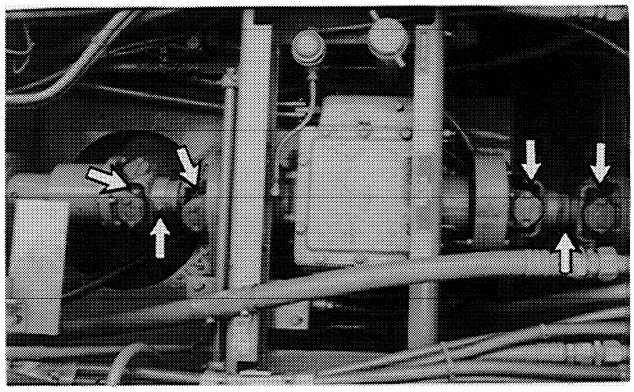
Inspect



Inspect the seat belt and mounting hardware for wear, damage and looseness. Repair as necessary.

Rotor Drive Shafts

Lubricate



Lubricate six fittings.

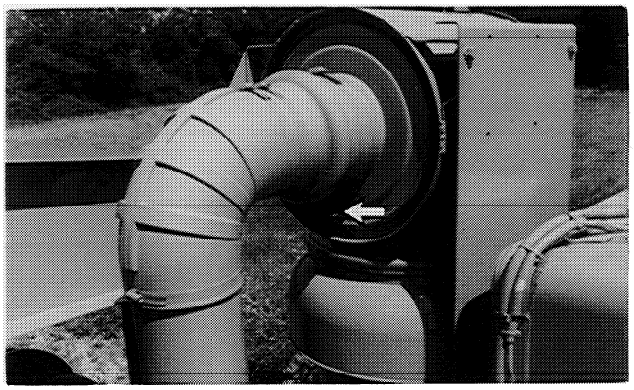
Walk-Around Inspection

Inspect the Machine

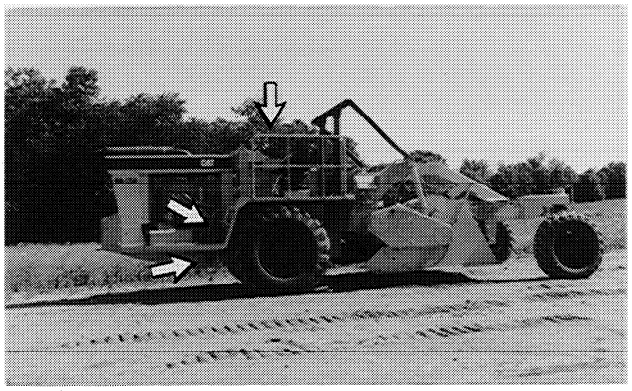
NOTICE

Accumulated grease and oil on a machine is a fire hazard. Remove this debris with steam cleaning or high pressure water, at least every 1000 hours or each time any significant quantity of oil is spilled on a machine.

NOTE: Keep a close watch for leaks. If leaking is observed, find the source and correct the leak. Check the fluid levels more frequently than the recommended periods if leaking is suspected or observed.



Service the air cleaner when the red strip is visible in the indicator.



Inspect the steps, walkways and handholds for their condition and cleanliness.

Inspect the operator's compartment for cleanliness. Keep it clean.

Inspect the lights (if equipped) for broken bulbs and lenses. Replace if broken.

Inspect and remove any trash build up in the engine compartment.

Inspect the cooling system for leaks, faulty hoses and trash build up. Correct any leaks and remove any trash from the radiator.

Inspect all engine attachment belts for worn cracked or frayed edges. Replace if worn, cracked, frayed or broken.

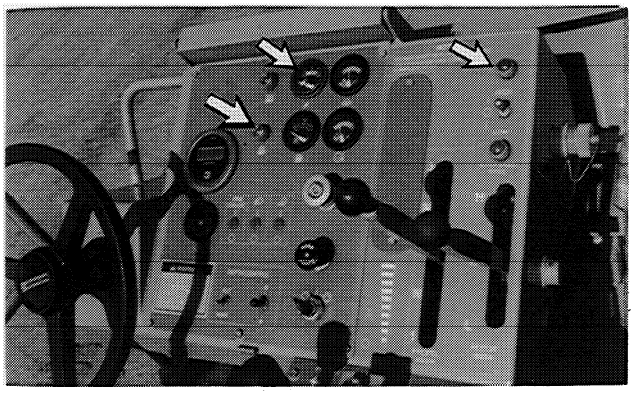
Inspect the hydraulic system for leaks. Inspect the tank, cylinder rod seals, hoses, tubes, plugs, joints and fittings. Correct any leaks.

Inspect all steps and handholds for condition and cleanliness. Check the Rollover Protective Structure (ROPS) for damage and loose bolts.

Be sure the covers and guards are firmly in place. Inspect for damage.

Indicators and Gauges

Test for Proper Function



Look for broken gauge lenses or indicator lights, switches, etc.

Start the engine.

Look for inoperative gauges.

Turn all machine lights on (if equipped). Check for proper operation.

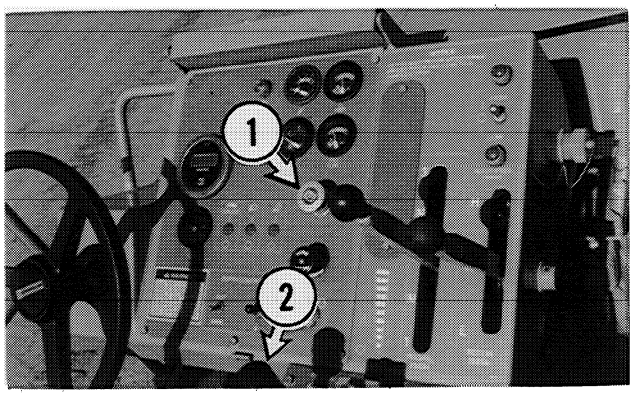
Depress the horn button to test for proper operation.

Stop the engine.

Make any needed repairs before operating.

Back-up Alarm

Test

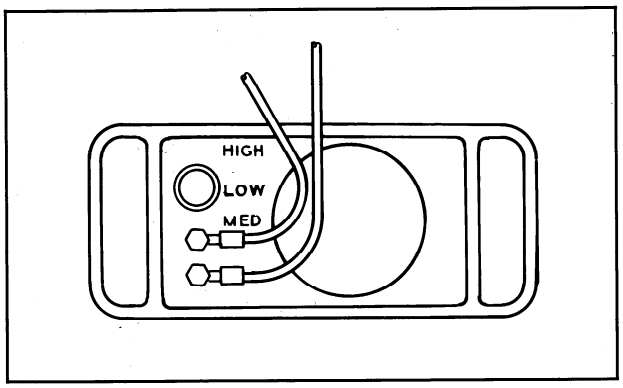


1. Start the engine and engage parking brake (1).

2. Move propel lever (2) just slightly towards reverse. Do not move the lever to full reverse to avoid moving the machine.

The alarm should start to sound immediately. It will continue to sound until the travel lever is moved to STOP or forward.

The back-up alarm is located on the rear of the machine.



The sound level can be adjusted by moving the adjustment on back of alarm to meet operating requirements. The alarm is set at the highest sound level when shipped from the factory. The setting should remain on high, unless the job-site requires a lower level.

4. Move the propel lever to the STOP position.

5. Stop the engine.

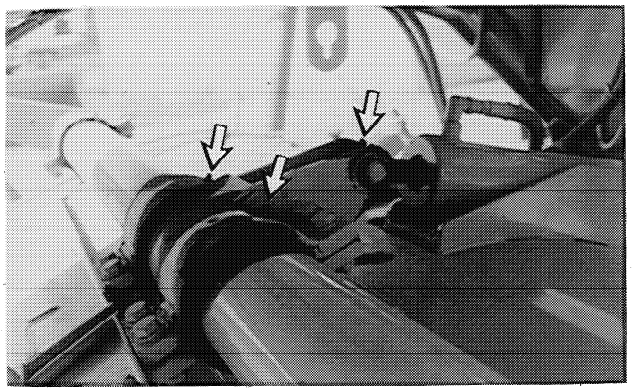
Hood Cylinder

Lubricate

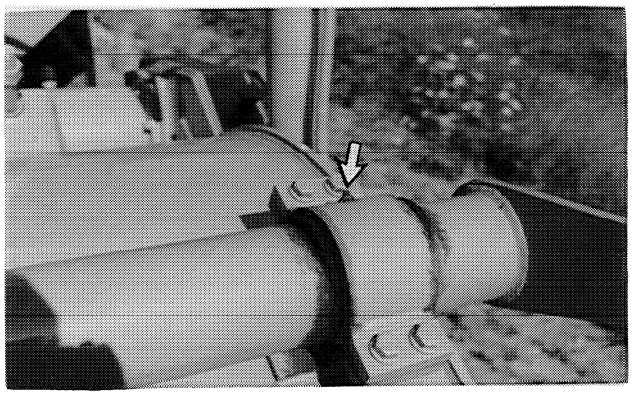
Lubricate two fittings.

Hood Torque Tube

Lubricate



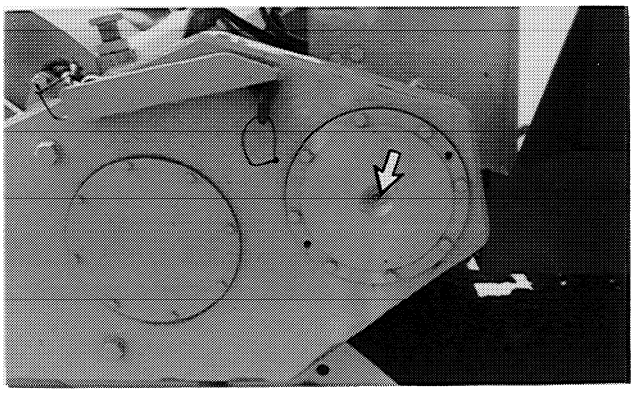
Lubricate three fittings.



Lubricate one fitting at each end of the torque tube.

Chaincase Shaft Bearings

Lubricate



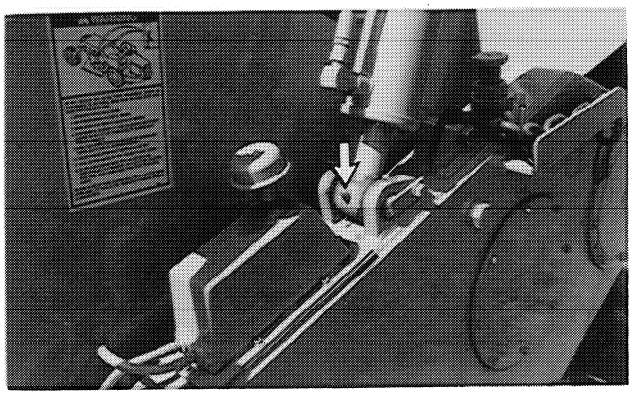
NOTICE

Do not use more lubrication than specified on the chaincase shaft bearings. Too much grease will cause a build up of sludge in the chaincase.

Lubricate one fitting at each side of the machine. Use one to three pumps from a manual grease gun. If it appears a sludge is starting to build up in the chaincase, increase the service interval from 10 to 15 service hours.

Chaincase Lift Cylinders

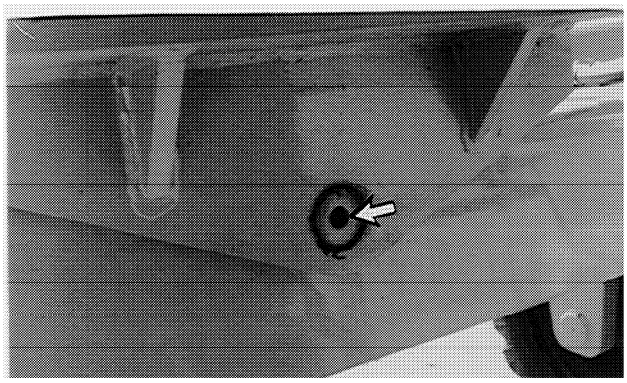
Lubricate



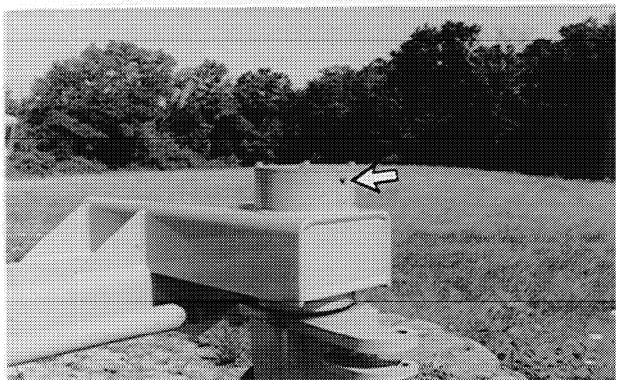
Lubricate one fitting at each end of both cylinders.

Rear Bolster Pivot Pins

Lubricate



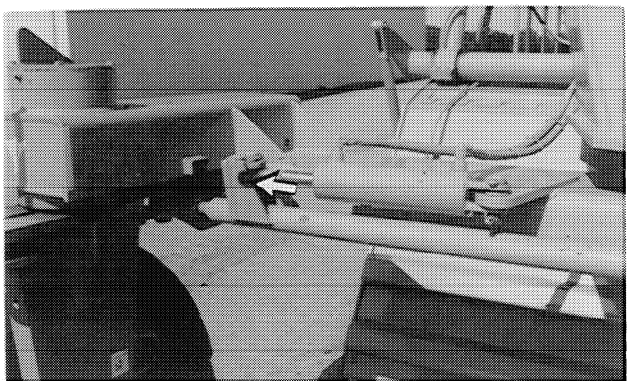
Lubricate one fitting.



Lubricate one fitting on each side.

Rear Steer Cylinder (If Equipped)

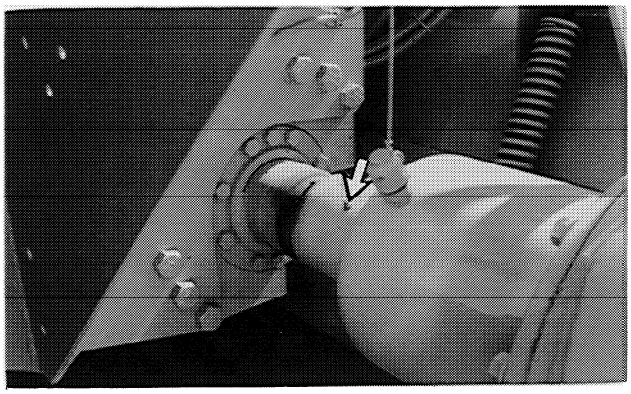
Lubricate



Lubricate one fitting.

Chaincase Supports

Lubricate



Lubricate two fittings.

Initial 25 Service Hours

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Ground Drive Suction Filter

Change

See, "Every 125 Service Hours".

Auxiliary Return Filter

Change

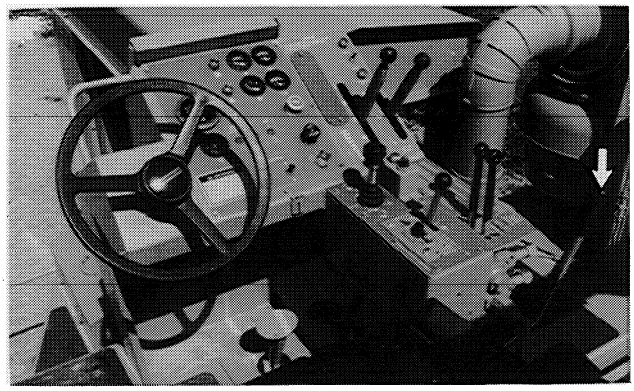
See, "Every 125 Service Hours".

Initial 50 Service Hours

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Rotor Clutch Lever

Check Force Required To Engage Clutch



Check the force (at the hand grip lever) required to engage the clutch. If the force required is not 180-200 N (40-45 lb), refer to "Rotor Clutch Plate Pressure Adjustment" in KENR1619, RR-250 Road Reclaimer And SS-250 Soil Stabilizer Vehicle Systems, Systems Operation, Testing & Adjusting, for the adjustment procedure.

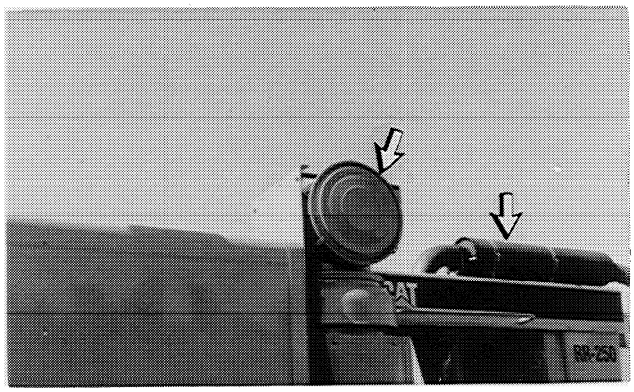
Every 50 Service Hours or Weekly

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Engine Air System

Check Intake and Exhaust Systems

NOTICE
Intake air leaks allow dirt entry into the engine which greatly accelerates engine wear.



Check all clamps, bolts and ducting on the engine intake and exhaust systems. Make repairs as required to prevent leaks and to ensure air cleaners and mufflers are securely mounted.

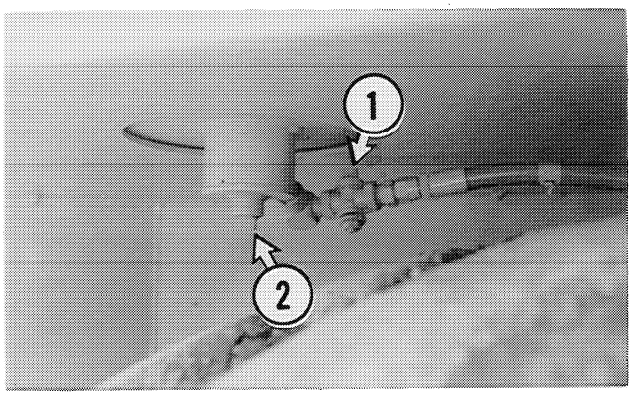
Fuel Tank

Drain Water and Sediment

⚠ WARNING

Diesel fuel is volatile and could ignite or explode, causing serious burns and injuries from flying objects. Never smoke or have an open flame while working on the fuel system.

NOTE: Dispose of drained material according to local regulations.



Allow the machine to stand at least fifteen minutes after adding fuel or after operation to let water and sediment settle.

1. Close valve (1) below the fuel tank on the right side of the machine.

2. Remove plug (2) and allow water and sediment to drain.

3. Install plug (2).

4. Open valve (1).

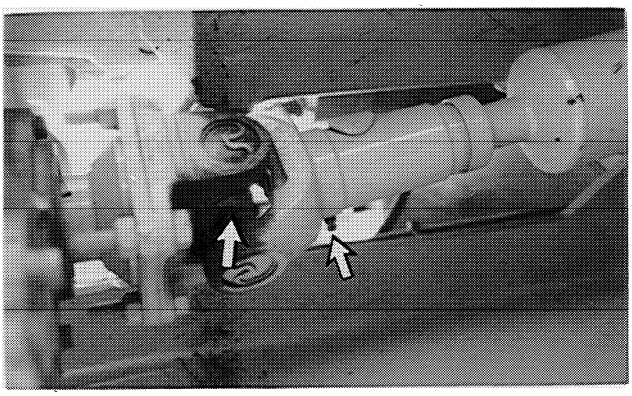
Shift Pivot Arm and Lever

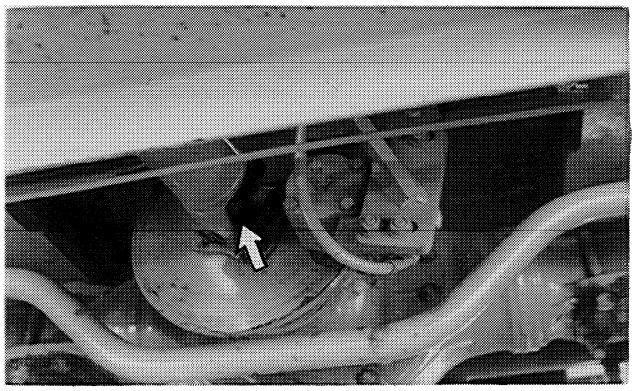
Lubricate

Lubricate one fitting.

Axle Drive Shaft

Lubricate

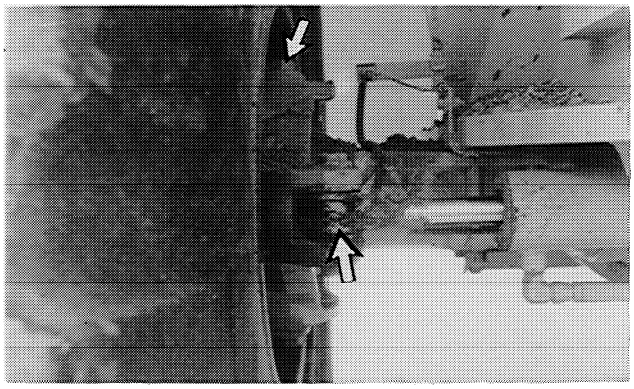


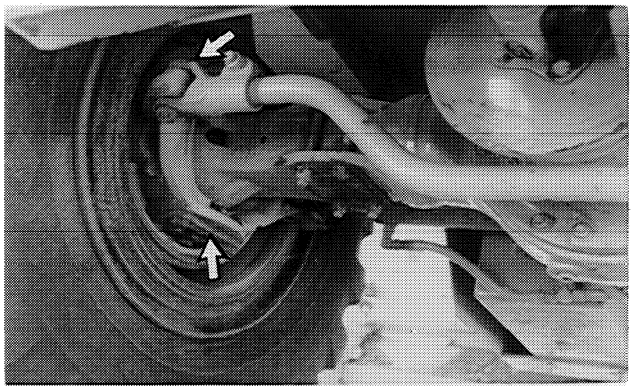


Lubricate three fittings.

Axle Tie Rod and Steer Cylinder

Lubricate

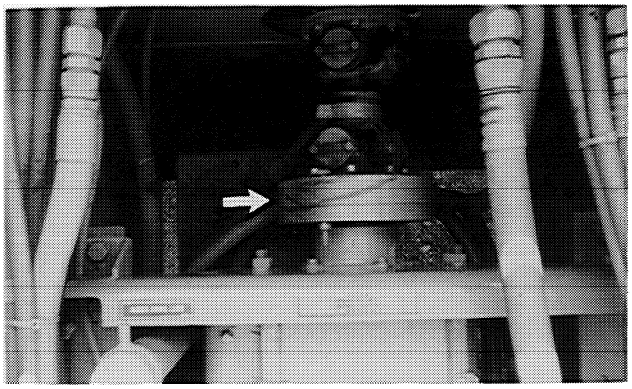




Lubricate four fittings at each side.

Shear Disc Bushing

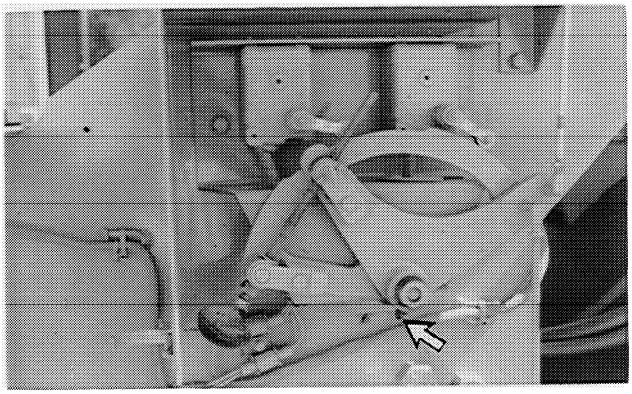
Lubricate



Lubricate one fitting.

Depth Gauge Pivot

Lubricate



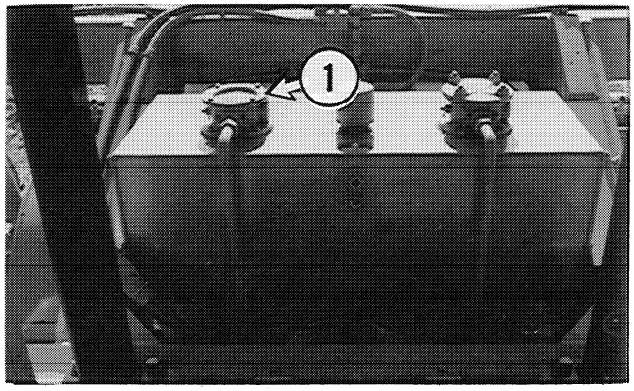
Lubricate one fitting.

Every 125 Service Hours or 2 Weeks

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Propel System Suction Filter

Change



⚠ WARNING

Hot hydraulic oil can cause burns. Allow the machine to stand idle until the tank is cool enough to touch with your hands.

1. Remove the hydraulic tank cap to relieve pressure in the tank. Install the hydraulic tank cap.

2. Remove cap assembly (1).

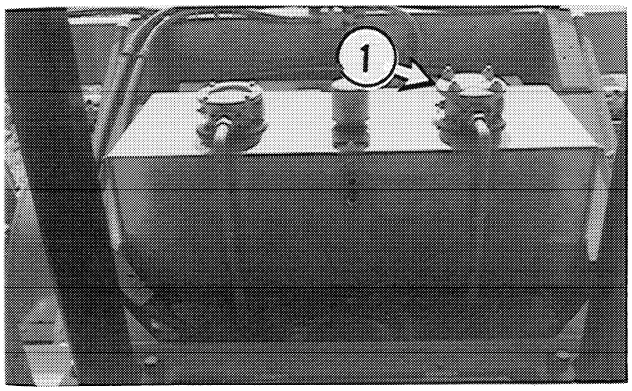
3. Remove the spring, filter element and center rod from the filter enclosure assembly.

4. Install a new filter element. Install the center rod and spring.

5. Install the cap assembly.

Auxiliary Return Filter

Change



⚠ WARNING

Hot hydraulic oil can cause burns. Allow the machine to stand idle until the tank is cool enough to touch with your hands.

1. Remove the hydraulic tank cap to relieve pressure in the tank. Install the hydraulic tank cap.

2. Remove cap assembly (1).

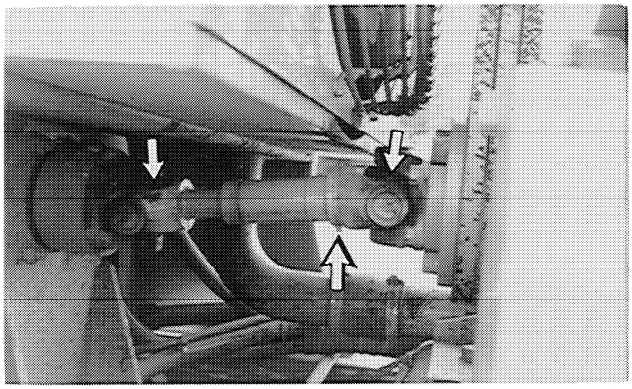
3. Remove the spring and filter element from the filter enclosure assembly.

4. Install a new filter element. Install the spring.

5. Install the cap assembly.

Pump Drive Shaft

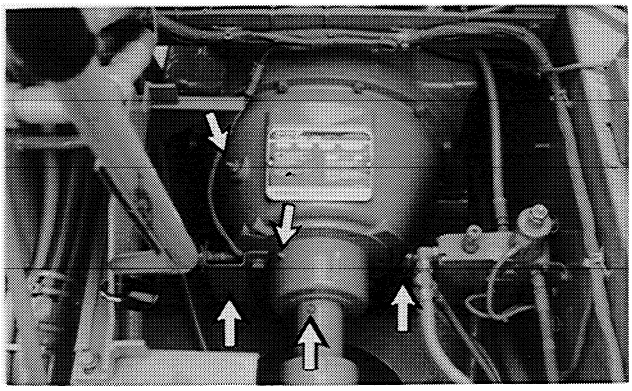
Lubricate



Lubricate three fittings.

Rotor Clutch Collar, Bearings & Release Lever

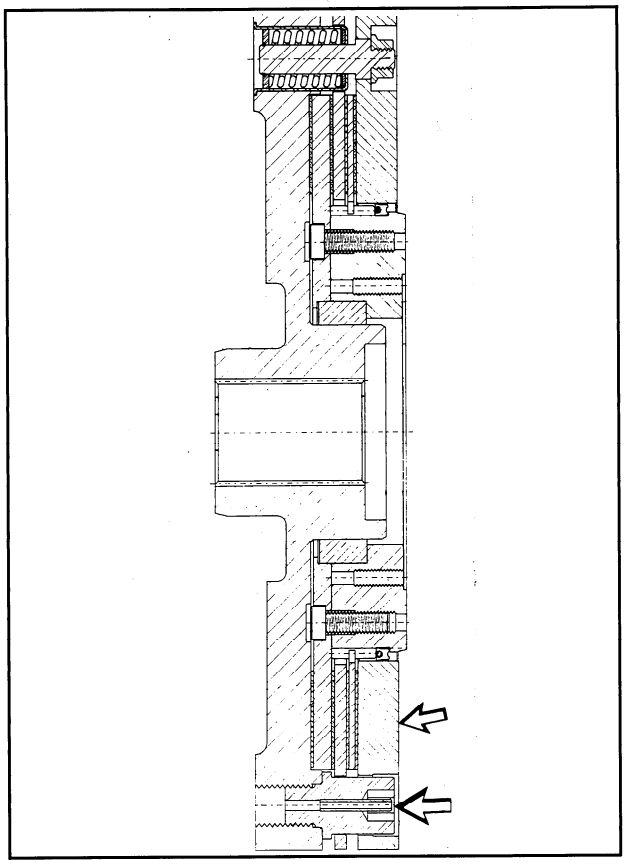
Lubricate



Lubricate five fittings.

Rotor Torque Limiter (If Equipped)

Check wear indicator



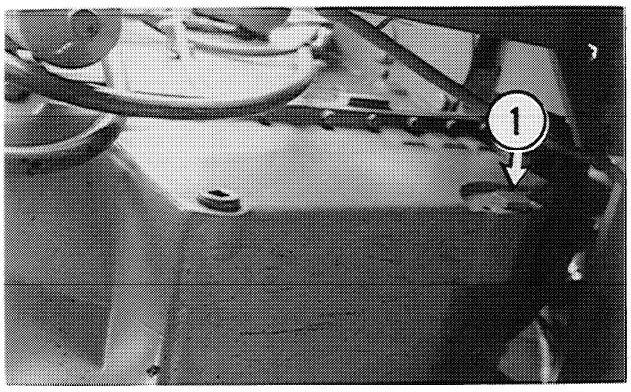
When the indicator is flush with the surface of the clutch, the clutch must be rebuilt.

Every 250 Service Hours or Monthly

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Engine Oil and Filters

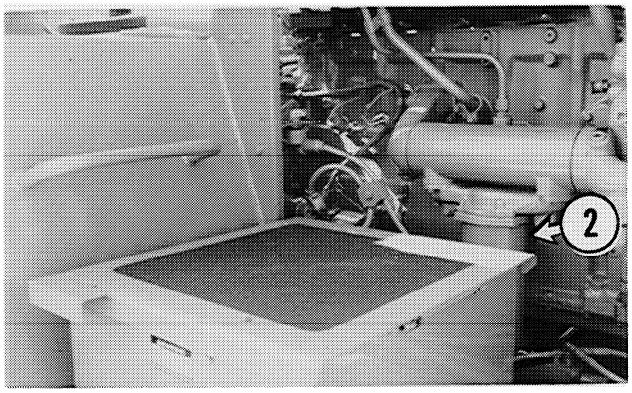
Change the Oil and Filters



⚠ WARNING

Hot oil or components can cause burns if they contact skin. Use caution when draining oil or changing filters.

1. Remove crankcase drain plug (1). Allow the oil to drain. Clean and install crankcase drain plug (1).

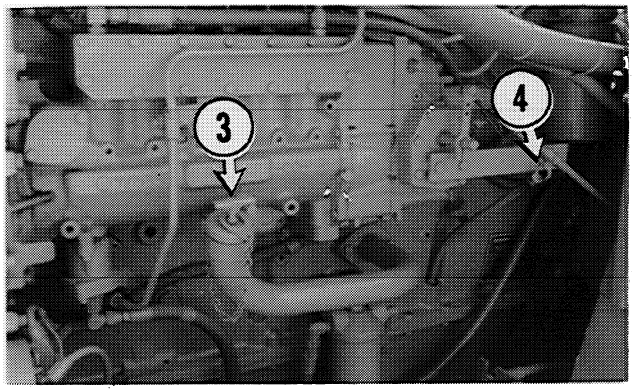


2. Remove and discard filter elements (2) with a strap-type wrench. Refer to Filter Inspection in the When Required section.

3. Clean the filter housing bases. Make sure all of the old filter gaskets are removed.

4. Apply a light coat of engine oil to the gaskets of the new filters.

5. Install the new filters by hand. When the gasket contacts the filter base, tighten the filter three-quarters of a turn more.



6. Remove oil fill plug (3). Fill the crankcase with new oil. See the Lubricant Viscosities and Refill Capacities. Clean and install oil fill plug (3).

7. Start the engine and allow the oil to warm. Check for leaks.

8. Stop the engine.

9. Wait 10 minutes to allow the oil to drain back into the crankcase. Check the oil level. With the engine stopped, maintain the oil level between the "L" and the "F" marks on the ENGINE STOPPED side of dipstick (4).

With the engine running, maintain the oil level between the "L" and the "F" marks on the LOW IDLE side of dipstick (4).

Engine Valve Lash

Adjust

Adjust valve lash on new and reconditioned engines at first oil change and then every 2000 service hours. See, "Every 2000 Service Hours or 1 Year".

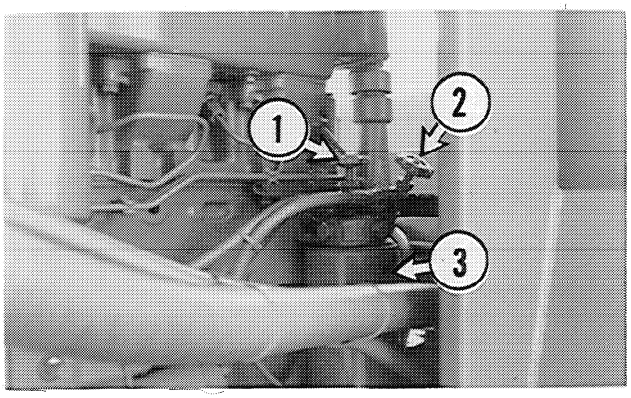
Cooling System

Replace Supplemental Coolant Additive Element

Refer to the Cooling System Specifications section of this manual for all cooling system requirements.

Use the 8T5296 Test Kit to check for concentration.

NOTICE
Excessive additive (greater than the recommended 6% initial fill) together with concentrations of anti-freeze greater than 60% cause deposits to form and can result in radiator tube blockage and overheating.



1. Close coolant inlet valve (1) and outlet valve (2). Remove and discard element (3).

2. Clean the element mounting base. Make sure all of the old gasket is removed.

3. Replace with a new Caterpillar maintenance element.

4. Coat the gasket of the new element with a thin film of engine oil.

5. Install and turn the element until the seal contacts the base, then tighten three-quarters of a turn more.

6. Open inlet valve (1) and outlet valve (2).

7. Remove the fill cap.

8. Start the engine and check for leaks. Allow the coolant level to stabilize.

9. Add premixed coolant if necessary to bring the coolant to within 13 mm (.5 in) below the bottom of the fill pipe.

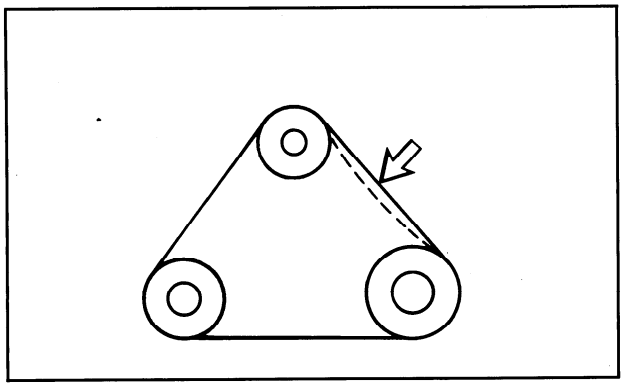
Belts

Inspect Fan, Alternator and Transmission Lube Pump Belts

For maximum engine performance and utilization of your engine, inspect the belts for wear and cracking. Check and adjust the belt tension to minimize belt slippage which will decrease belt life and cause poor performance of alternator and any driven equipment.

1. Inspect the condition of the belts.

2. Inspect the tension of the alternator belt.

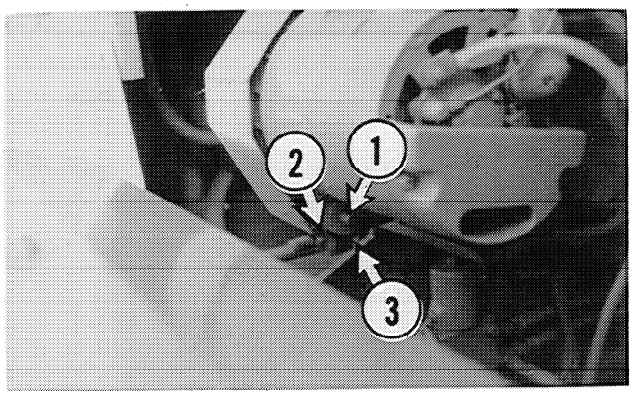


To check the alternator and fan belt tension, apply a 110 N (25 lb) force midway between the pulleys. Correctly adjusted belts will deflect 10 to 15 mm (.4 to .6 in).

If new belt(s) are installed, check belt adjustment again, after 30 minutes of operation. For multiple belt drive applications, always replace belts in matched sets.

If only one belt of a matched set is replaced, it will carry more of a load than the belts not replaced since the older belts are stretched. The additional load on the new belt could cause it to break.

Alternator Belt Adjustment



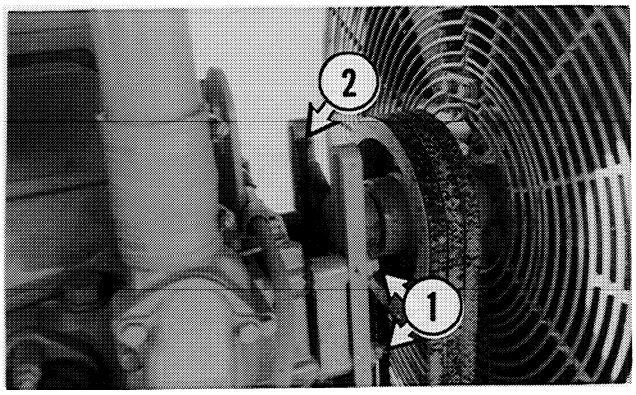
1. Loosen bolt (1).

2. Loosen jam nut (2).

3. Turn adjusting nut (3) to obtain the proper adjustment.

4. Tighten jam nut (2) and bolt (1).

Fan Belt Adjustment



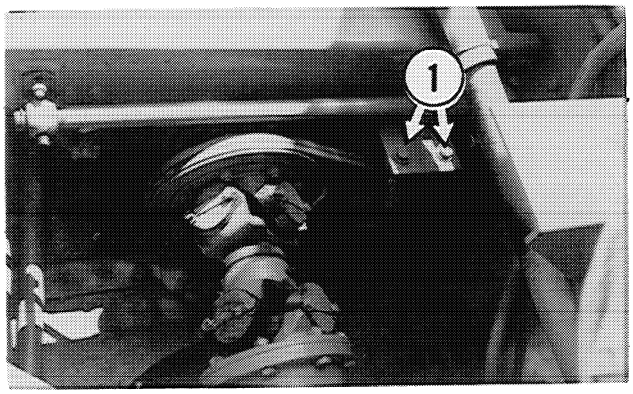
1. Loosen bolts (1).

2. Turn adjusting bolt (2) to adjust the tension on the belts.

3. When the correct belt tension is obtained, tighten the mounting bolts.

4. Recheck the belt adjustment.

Transmission Lube Pump Belt Adjustment



1. Loosen bolts (1).

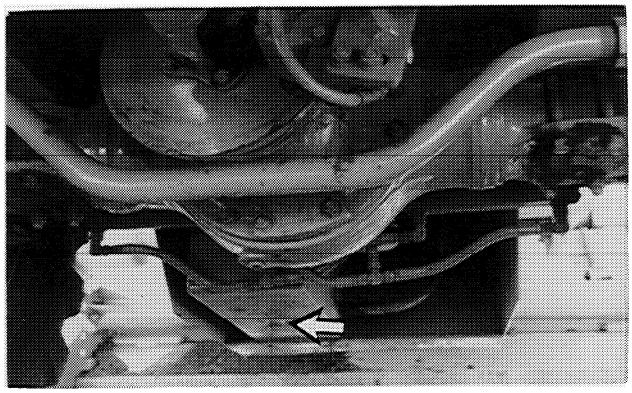
2. Use a prybar to hold tension on the lube pump.

3. When the correct belt tension is obtained, tighten the mounting bolts.

4. Recheck the belt adjustment.

Rotor Drive Cooling Oil Reservoir

Change oil



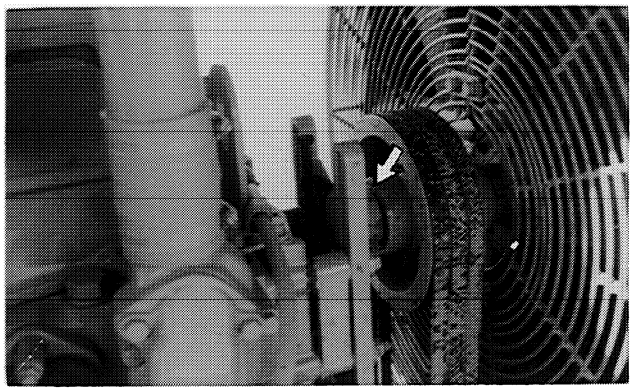
1. Remove the drain plug and allow the oil to drain.

2. Install the drain plug.

3. Fill the reservoir with lubricant that meets the requirements in Lubrication Specifications.

Fan Bearing

Lubricate



Lubricate one fitting.

Batteries

Check Electrolyte Level

BATTERY ELECTROLYTE CHART	
Battery	**Interval**
Conventional	100 Hour
Low Maintenance	250 Hours
Maintenance Free	None Required

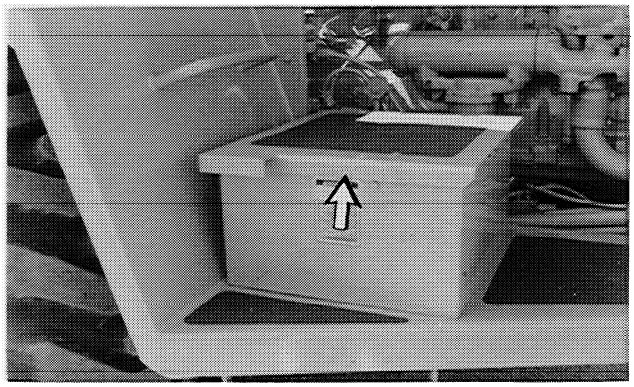
Tighten the battery retainers every 1000 hours on all batteries.

Check the following at least every 1000 hours, and more often as conditions require:

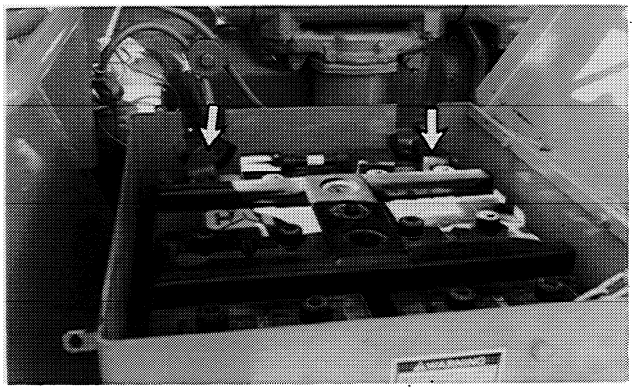
- Clean the top of the batteries with a clean cloth.
- Keep the terminals clean and coated with petroleum jelly.

At the proper charging rate, in a moderate climate, a battery should not require more than 30 cc (1 ounce) of water per cell per week.

Check the cells weekly in extreme temperatures, cell water usage could be higher.



1. Open the battery access cover located on the right, front of the machine.



2. Clean the battery surface with a clean cloth. Keep the terminals clean and coated with petroleum jelly. Install the post cover after coating.

3. Inspect the electrolyte level in each battery cell (except maintenance free batteries). Maintain the level to the bottom of the fill openings with distilled water. If distilled water is not available, use clean drinking water.

4. Close the access cover.

Replacement of Battery, Battery Cable or Disconnect Switch

1. Turn the engine start switch to OFF. Turn all switches to the OFF position.

2. Turn the battery disconnect switch key to OFF and remove the key.

3. Disconnect the negative (–) battery cable, at the battery disconnect switch, that is connected to the machine frame.

NOTE: Do not allow the disconnected battery cable to contact the disconnect switch.

4. Disconnect the negative (–) battery cable at the battery.

5. Make necessary repairs or battery replacement.

6. Connect the negative (–) battery cable at the battery.

7. Connect the battery cable at the battery disconnect switch.

8. Install the key and turn the battery disconnect switch to ON.

Every 500 Service Hours or 3 Months

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

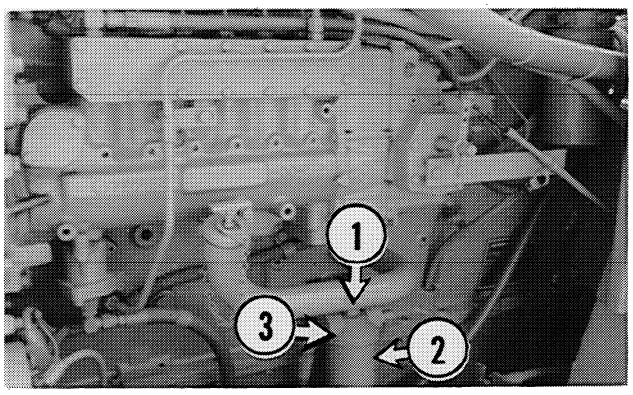
Fuel System

Clean and Change Filters

NOTICE
Do not fill fuel filters with fuel before installing them. Contaminated fuel will cause accelerated wear to fuel system parts.

Wash the Primary Filter Element

1. Close the fuel shutoff valves located under the fuel tank.



Typical Example

2. Loosen filter housing retaining nut (1).

3. Remove case (2) and remove the element from the case.

4. Wash the element and case in clean, nonflammable solvent.

5. Dry the element using pressure air - 205 kPa (30 psi) maximum.

6. Clean filter case base (3).

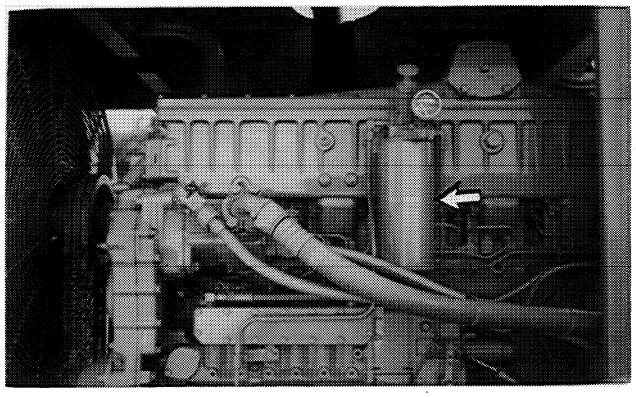
7. Inspect the seal. Replace it if it is damaged.

8. Insert the clean element into case (2).

9. Install the element and case (2) onto base (3).

10. Tighten filter housing retaining nut (1) to a torque of 24 ± 4 N•m (18 ± 3 lb ft).

Change Secondary Fuel Filters



1. Remove and discard the filter element.

2. Clean the filter mounting base. Be sure all of the old seal is removed.

3. Coat the seal of a new filter with clean diesel fuel.

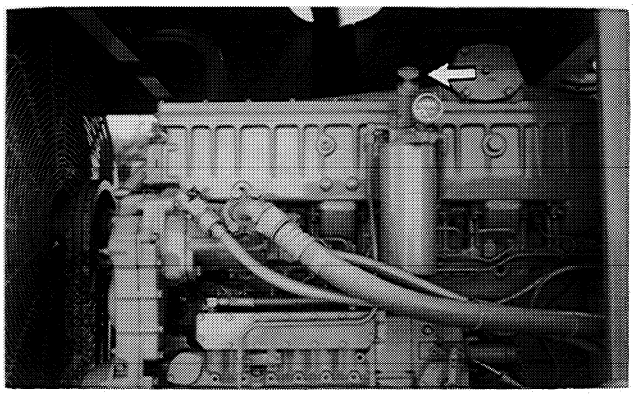
4. Install the new filter by hand. When the seal contacts the base, tighten ¾ turn more.

There are rotation-index marks 90° apart on the filter. Use them as a guide for proper tightening.

5. Open the fuel shutoff valves located under the fuel tank.

6. Prime the fuel system. Refer to the next topic.

Priming the Fuel System



1. Unlock and pull out the priming pump plunger.

2. Operate the pump to fill the new filters with fuel. Continue pumping until resistance is felt, indicating the filters are full of fuel.

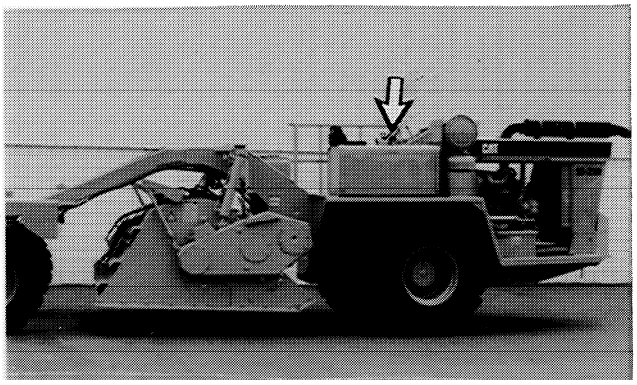
3. Push the priming pump plunger down and lock it.

4. Start the engine and look for leaks around the filters.

If the engine fails to start or continues to misfire or smoke, further purging is necessary. With the engine running, or with the use of the priming pump, loosen the fuel line nuts, one at a time, several times in succession and allow fuel to flow until free of air bubbles. Use two wrenches to avoid breaking fuel lines. Tighten the fuel line nuts.

Fuel Tank Cap And Fill Screen

Clean

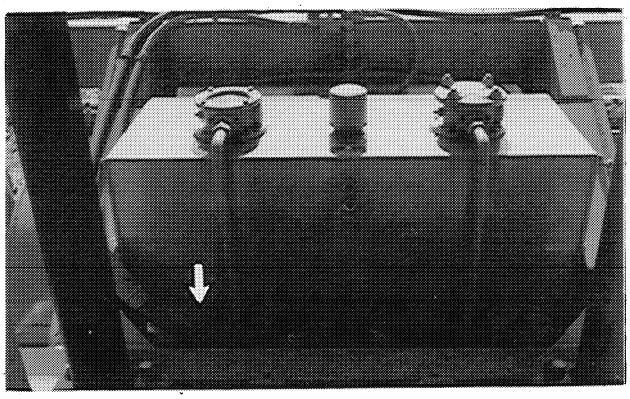


Clean the fuel tank cap and fill screen.

Hydraulic System

Change oil and filters

When changing the hydraulic oil, cleanliness must be kept in mind at all times. Perform the work in a clean area. Use clean tools, keep your hands clean, and clean the outside of the hydraulic tank before putting the machine back in service.



⚠ WARNING

At operating temperature, the hydraulic oil can cause serious burns. Let the machine stand idle until the oil has cooled and you are able to touch the hydraulic tank with your hand.

1. Remove the drain plug from the bottom of the tank and allow the oil to drain.

2. Pour a small amount of clean hydraulic oil in the tank to clean out the bottom of the tank.

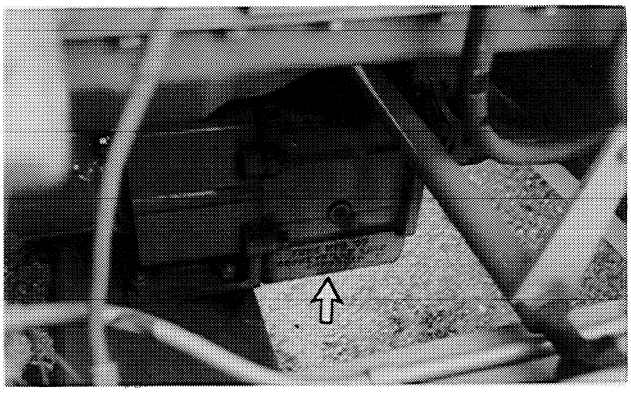
3. Install the drain plug.

4. Fill the hydraulic tank with clean hydraulic oil that meets the requirements given in "Lubricant Specifications".

5. Change the propel system suction and auxiliary return filter elements. See, "Every 250 Service Hours".

Propel Transmission

Change oil



⚠ WARNING

Hot oil or components can cause burns if they contact skin. Use caution when draining oil. Allow machine to stand idle until the transmission case is cool enough to touch with your hand.

1. Remove drain plug (1) and allow the oil to drain.

2. Install drain plug (1).

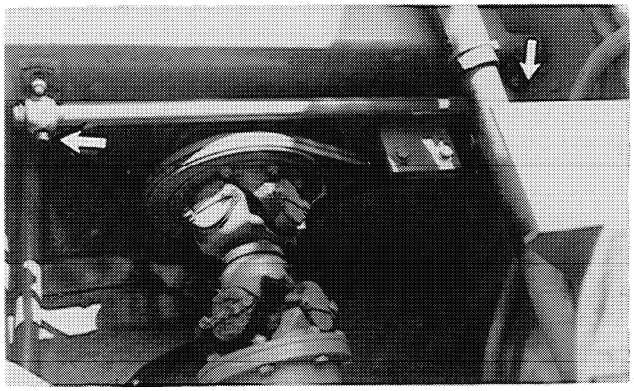
3. Fill the transmission with lubricant meeting the requirements in "Lubricant Specifications".

Every 1000 Service Hours or 6 Months

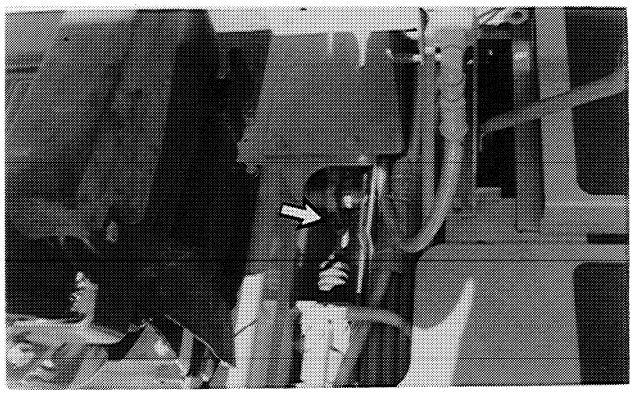
You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Transmission Shift Linkage

Lubricate

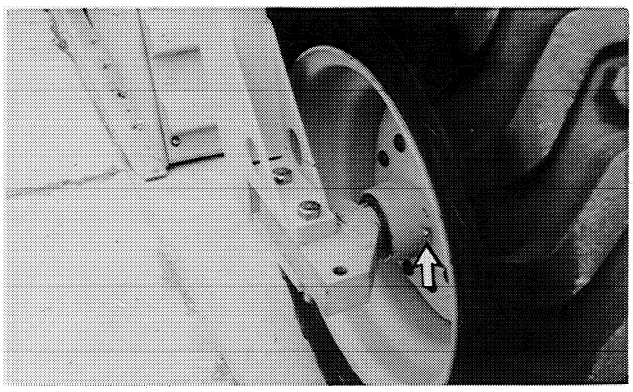


Lubricate three fittings.



Rear Wheel Hub Bearings

Lubricate



Lubricate two fittings.

Rollover Protective Structure (ROPS)

Inspect

Inspect the rollover protective structure for cracks, broken welds, loose bolts, excessive wear and damage. Repair as necessary.

Every 2000 Service Hours or 1 Year

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Engine Valve Lash

Adjust

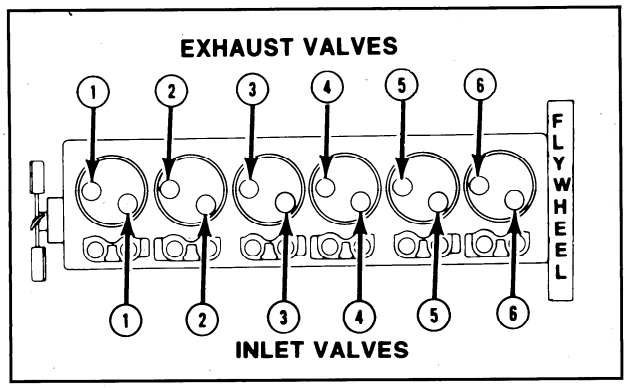
⚠ WARNING

To prevent possible injury, do not use the starter motor to turn the flywheel.

Hot engine components can cause burns. Allow additional time for the engine to cool before measuring valve clearance.

NOTICE

Measure the valve lash with the engine stopped. To obtain an accurate measurement, allow at least 20 minutes for the valves to cool to engine cylinder head and block temperature.



Adjust the valve clearance to within ± .08 mm (.003 in) of the valve clearance setting given in the chart.

VALVE CLEARANCE SETTING	
Intake	.38 mm (.015 in)
Exhaust	.76 mm (.030 in)

Refer to the Service Manual or your Caterpillar dealer for the complete valve adjustment procedure.

NOTE: After setting the valve clearances and before installing the valve covers, check the valve rotators. Refer to the following topic.

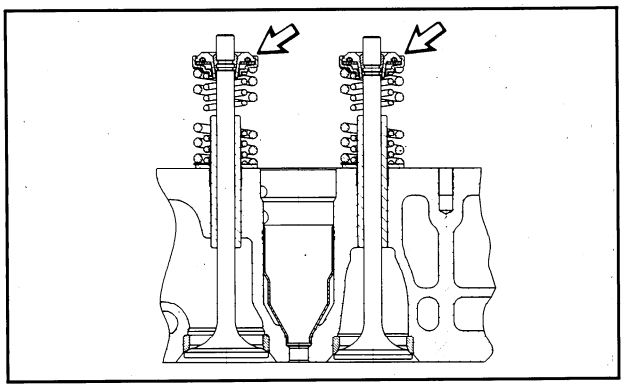
Engine Valve Rotators

Check

⚠ WARNING

When inspecting the valve rotators, protective glasses or face shield and protective clothing must be worn, to prevent being burned by hot oil spray.

1. Start the engine and run at low idle.



2. Watch the top surface on each valve rotator. Each valve rotator should turn slightly each time the valve closes.

If a valve fails to rotate, contact your Caterpillar dealer.

Every 3000 Service Hours or 2 Years

You must read and understand the warnings and instructions contained in the Safety section of this manual, before performing any operation or maintenance procedures.

Cooling System Coolant

Change Coolant/Clean System

⚠ WARNING

At operating temperature, engine coolant is hot and under pressure.

Steam can cause personal injury.

Check coolant level only when engine is stopped and radiator is cool enough to touch with your hand.

Remove filler cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with skin and eyes to prevent personal injury.

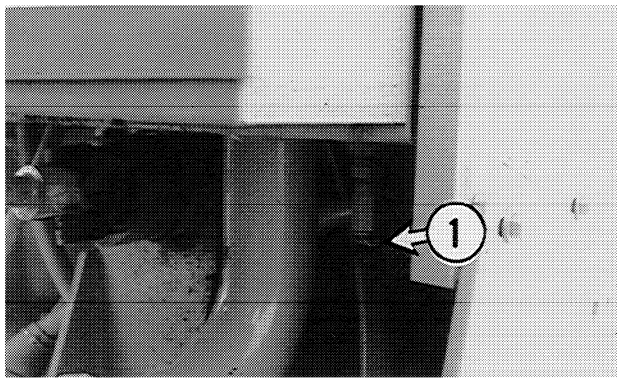
NOTICE

Do not change the coolant until you read and understand the material in the "Cooling System Specifications" section.

All water is corrosive at engine operating temperature. Use either Caterpillar Cooling System Conditioner Liquid or the coolant conditioner element to treat either plain water or ethylene glycol antifreeze solution. Never use both liquid cooling system conditioner and the coolant conditioner element at the same time.

Do not use Caterpillar Cooling System Conditioner or coolant conditioner elements with Dowtherm 209 Full Fill Coolant.

Drain the coolant earlier whenever the coolant is dirty or foaming is observed.



1. Remove the radiator cap slowly to relieve pressure.

2. Open drain valve (1) and allow the coolant to drain.

3. Close drain valve (1). Fill the system with clean water and a 6 to 10% concentration of cooling system cleaner.

4. Start and run the engine for 90 minutes. Stop the engine and drain the cleaning solution.

5. Flush the system with water, with the engine stopped, until the draining water is clear.

6. Close drain valve (1).

7. Add the coolant solution. See "Cooling System Specifications and Lubricant Viscosities and Refill Capacities".

NOTE: Do not add supplemental coolant additive or change element at this time, unless you are not using Caterpillar Antifreeze which contains additive.

8. Start the engine and operate it with the radiator cap off, until the thermostat opens and the level stabilizes.

9. Maintain the coolant level to within 13 mm (.5 in) of the bottom of the fill pipe.

10. Install the radiator cap.

11. Stop the engine.