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MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

CATERPILLAR®

CATERPILLAR®

SEBU7495-04
December 2006

Operation and Maintenance Manual

953C Track-Type Loader

BBX1-Up (Machine)

i02664628

Maintenance Interval Schedule

SMCS Code: 7000

Ensure that all safety information, warnings, and instructions are read and understood before any operation or any maintenance procedures are performed.

The user is responsible for the performance of maintenance, including all adjustments, the use of proper lubricants, fluids, filters, and the replacement of components due to normal wear and aging. Failure to adhere to proper maintenance intervals and procedures may result in diminished performance of the product and/or accelerated wear of components.

Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, in order to determine the maintenance intervals. Products that operate in severe operating conditions may require more frequent maintenance.

Note: Before each consecutive interval is performed, all maintenance from the previous interval must be performed.

When Required

Every 10 Service Hours or Daily

Every 50 Service Hours or Weekly

Every 100 Service Hours or 2 Weeks

Initial 250 Service Hours

Every 250 Service Hours or Monthly

Every 500 Service Hours or 3 Months

Every 1000 Service Hours

Every 2000 Service Hours

Every 2000 Service Hours or 1 Year

Every Year

Every 3000 Service Hours or 2 Years

Every 3 Years After Date of Installation or Every 5 Years After Date of Manufacture

Every 6000 Service Hours or 3 Years

Every 12 000 Service Hours or 6 Years

i01871925

Backup Alarm - Test (If Equipped)

SMCS Code: 7406-081

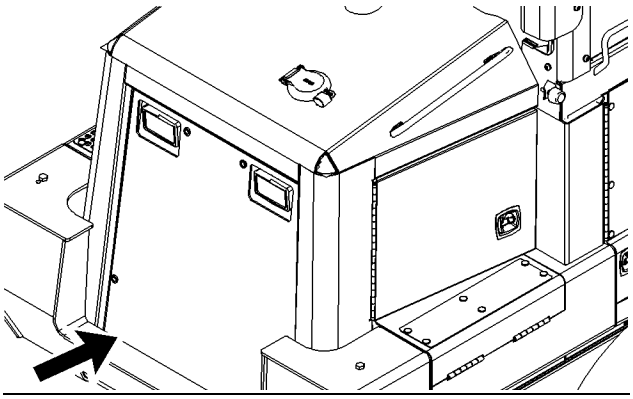

Illustration 90 g00956382

The backup alarm is located at the rear of the machine behind the radiator grill.

Turn the engine start switch to the ON position in order to perform the test.

Move the speed/direction control lever to the REVERSE position.

The backup alarm should sound immediately. The backup alarm should continue to sound until the speed/direction control lever is moved to the NEUTRAL position or to the FORWARD position.

i00529764

Battery - Inspect

SMCS Code: 1401-040

Tighten the battery retainers on all batteries at every 1000 hour interval.

Perform the following procedures at every 1000 hour interval. Check the following areas more often, as required:

- Clean the top of the batteries with a clean cloth.
- Keep the terminals clean and coat the terminals with petroleum jelly.
- Keep the terminal covers in place.

1. Open the battery access covers. The battery access covers are located on both sides of the machine at the rear of the machine.
2. Clean the top of the batteries with a clean cloth. Keep the terminals clean and coated with petroleum jelly. Install the terminal covers after you coat the terminals.
3. Close the battery access covers.

i00993589

Battery - Recycle

SMCS Code: 1401-561

Always recycle a battery. Never discard a battery.

Always return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- Recycling facility

i01897267

Belt - Inspect/Replace

SMCS Code: 1397-040; 1397-510

Inspect the Belt

1. Open the engine compartment access cover that is located on the left hand side of the machine.

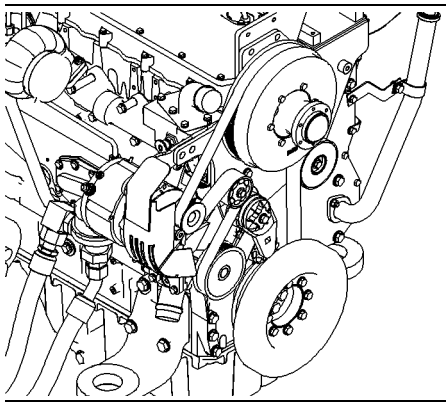

Illustration 91 g00953341

2. Inspect the condition of the belt. Measure the belt deflection. The belt should deflect 13 to 19 mm (.50 to .75 inch) under 110 N (25 lb) of force.

Replace the Belt

Remove the Belt

1. Open the engine compartment access cover that is located on the left hand side of the machine.

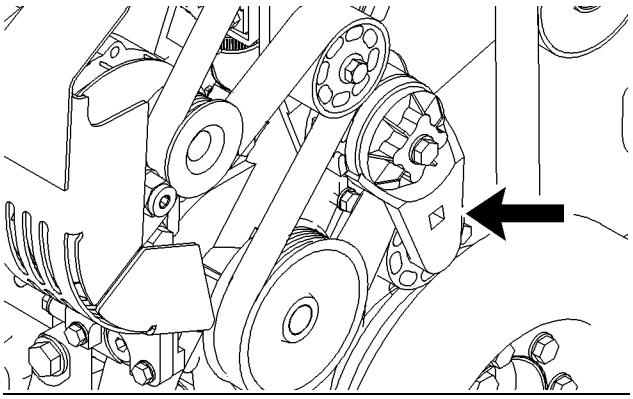

Illustration 92 g00956369

2. Insert a 1/2 inch breaker bar into square hole on the belt tensioner.
3. Push up the 1/2 inch breaker bar in order to remove the tension from the belt.
4. Remove the belt from the pulleys.
5. Remove the belt from the machine.

Install the Belt

1. Install a new belt over the fan.
2. Insert a 1/2 inch breaker bar on the tensioner.
3. Push up the 1/2 inch breaker bar in order to install the new belt on the tensioner.
4. Close the engine compartment access cover that is located on the left hand side of the machine.

i01871932

Bucket Lower Pivot Pin - Lubricate

SMCS Code: 6108-086-PN

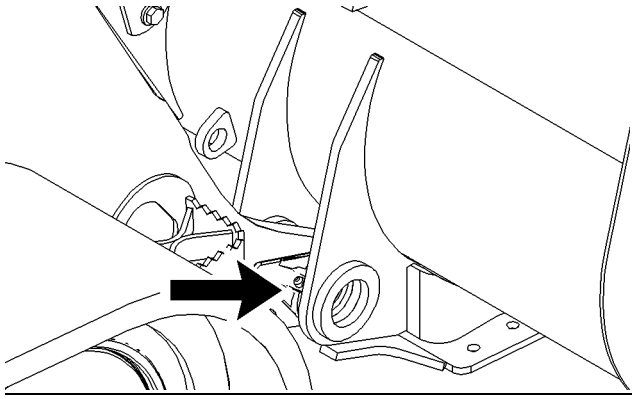

Illustration 93 g00987361

Lubricate two fittings. There is one fitting on each side of the bucket.

i01928050

Bucket Teeth and Cutting Edges - Inspect/Replace

SMCS Code: 6801-040; 6801-510; 6822-040; 6822-510

WARNING

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket tips.

1. Raise the bucket and block up the bucket. Only block up the bucket to a sufficient height for removing the bucket tips.
2. Shut off the engine.
3. Drive the pin out of the bucket tip from the retainer side of the bucket tip. Remove the bucket tip and the retainer.
4. Clean the adapter, the pin, and the retainer. Install the retainer in the groove.
5. Install a new bucket tip over the retainer in the runner position or in the digger position.
6. Drive the pin through the retainer, through the adapter, and through the bucket tip from the opposite side of the retainer.

7. To change the cutting edges, remove the two bolts and two nuts. Then, remove the cutting edge.

8. Install the new cutting edge, the two bolts and two nuts.

9. Start the engine.

10. Raise the bucket and remove the supporting block. Lower the bucket to the ground.

i01871950

Cab Air Filter - Clean/Replace

SMCS Code: 7342-070-FI; 7342-510-FI

Note: Clean filters more often in dusty conditions.

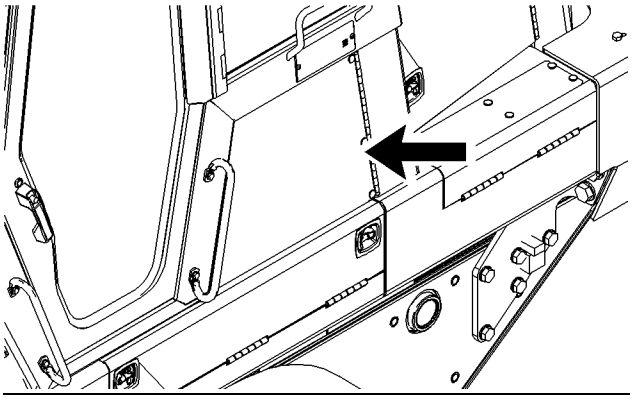

Illustration 94 g00960200

1. Open the engine access door on the left side of the machine.

2. Turn the handle in order to open the door.

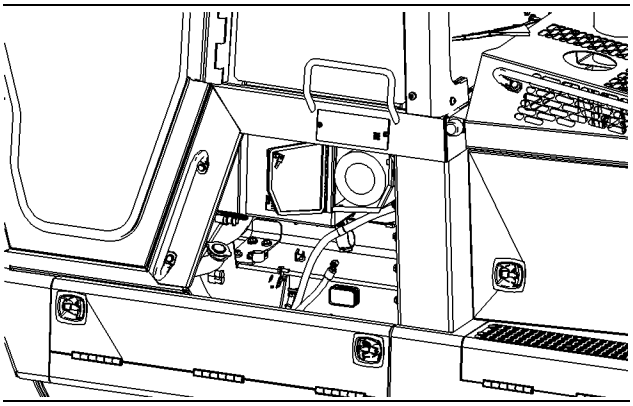

Illustration 95 g00953387

3. Remove the filter element. Install a new filter element or clean the filter element. Clean the filter element with pressure air. Close and latch the door.

4. Close the access door for the engine compartment.

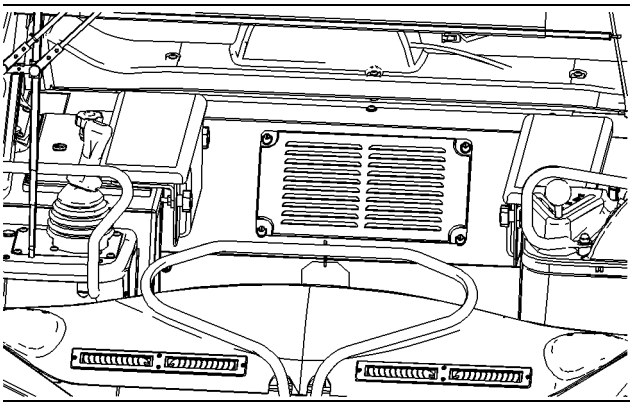

Illustration 96 g00953390

5. Remove the filter element cover that is located in the operator's compartment behind the operator seat.

6. Remove the filter element. Clean the filter element with pressure air.

7. Install the filter element. Install the filter cover.

i01922101

Circuit Breakers and Fuses - Reset/Replace

SMCS Code: 1417-510; 1417-529; 1420-529

Reset Circuit Breakers

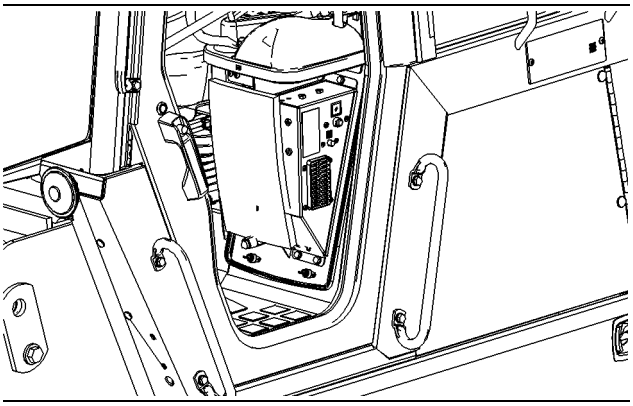

Illustration 97 g00953407

The circuit breakers are located behind the console panel on the left side of the machine.

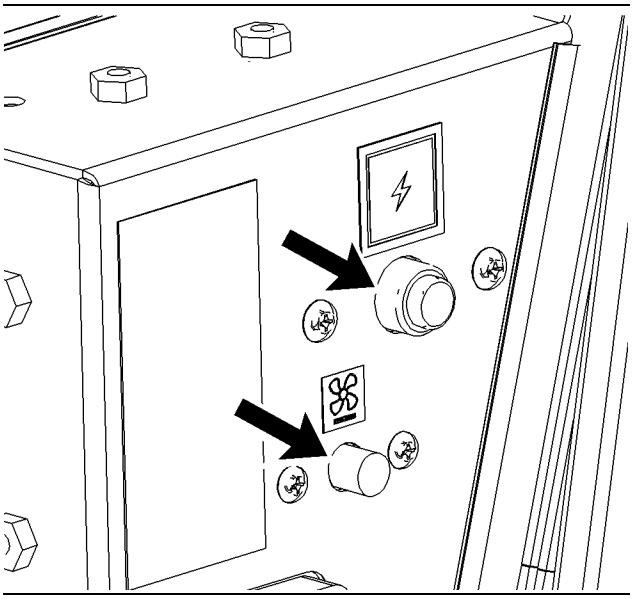

Illustration 98 g00960192

Circuit Breaker Reset – Push in the button in order to reset the circuit breaker. If the electrical system is working properly, the button will remain depressed. If the button does not remain depressed, check the appropriate electrical circuit. Repair the electrical circuit, if necessary.

Replace Fuses

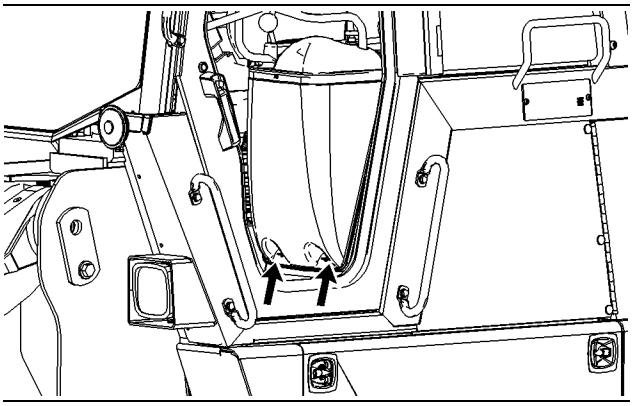

Illustration 99 g00954503

The fuses are located inside the left hand console cover. Remove the two clips in order to remove the cover.

Fuses – Fuses protect the electrical system from damage that is caused by overloaded electrical circuits. Replace a fuse if the element separates. If the fuse of a particular electrical system requires frequent replacement, check the electrical circuit. Repair the electrical circuit, if necessary.

NOTICE
Always replace fuses with the same type and capacity fuse that was removed. Otherwise, electrical damage could result.

NOTICE
If it is necessary to replace fuses frequently, an electrical problem may exist.

Contact your Caterpillar dealer.

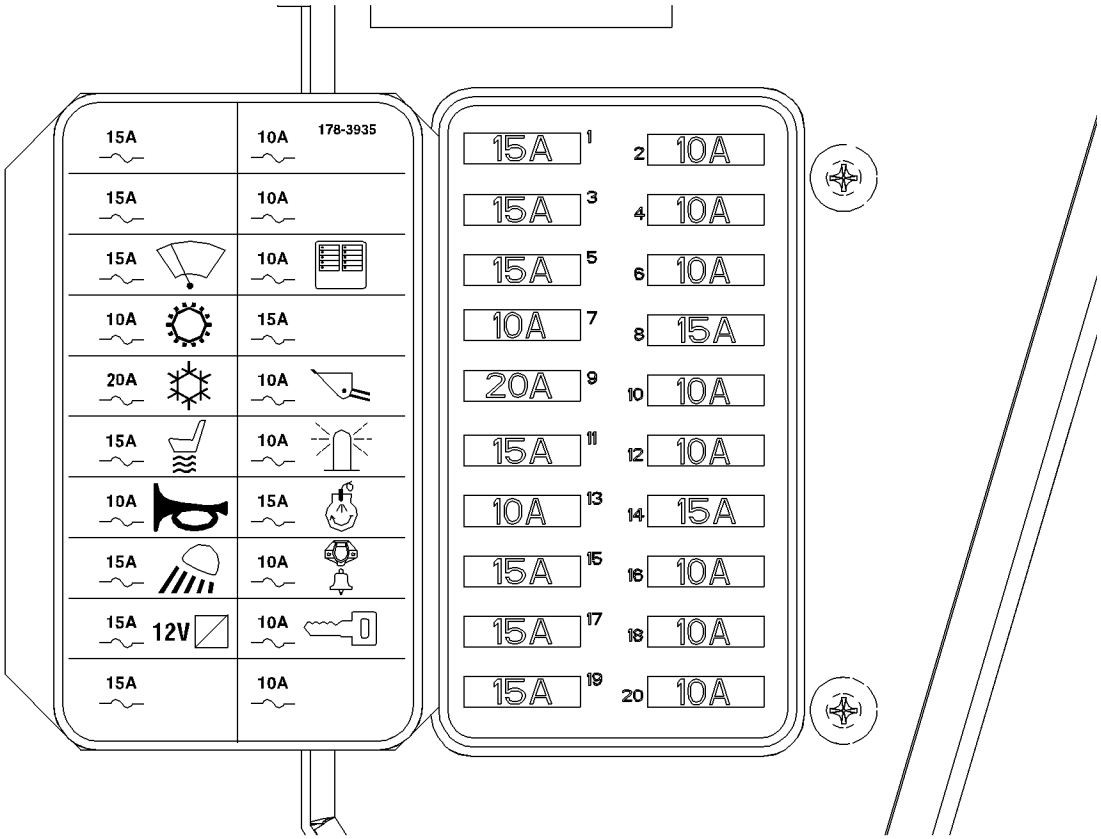

Illustration 100 g00954489

Spare (1) – 15 Amp

Spare (2) – 10 Amp

Spare (3) – 15 Amp

Spare (4) – 10 Amp

Front and Rear Windshield Wiper/Washer (5) – 15 Amp

Electronic Monitoring System (6) – 10 Amp

Transmission (7) – 10 Amp

Spare (8) – 15 Amp

Air Conditioner (9) – 20 Amp

Bucket (10) – 10 Amp

Seat (11) – 15 Amp

Beacon (12) – 10 Amp

Horn (13) – 10 Amp

Note: The dome lamp and the display backlight on the monitoring system also use this fuse.

Electronic Fuel Injection (14) – 15 Amp

Flood Lamp Group (15) – 15 Amp

MSS and Product Link (16) – 10 Amp

Note: The machine security system and the product link also use this fuse.

12 Volt Power Terminal (17) – 15 Amp

Note: The power converter and the radio also use this fuse.

Key Start Switch (18) – 10 Amp

Spare (19) – 115 Amp

Spare (20) – 10 Amp

i01872012

Coolant Sample (Level 1) - Obtain

SMCS Code: 1395-008; 1395-554

Note: Level 1 results may indicate a need for Level 2 Analysis.

Obtain the sample of the coolant as close as possible to the recommended sampling interval. The recommended sampling interval for Level 1 Coolant Analysis is every 500 service hours. In order to receive the full effect of S·O·S analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

- Complete the information on the label for the sampling bottle before you begin to take the samples.
- Keep the unused sampling bottles stored in plastic bags.
- Keep the lids on empty sampling bottles until you are ready to collect the sample.
- Place the sample in the mailing tube immediately after obtaining the sample in order to avoid contamination.
- Never collect samples from expansion bottles.
- Never collect samples from the drain for a system.

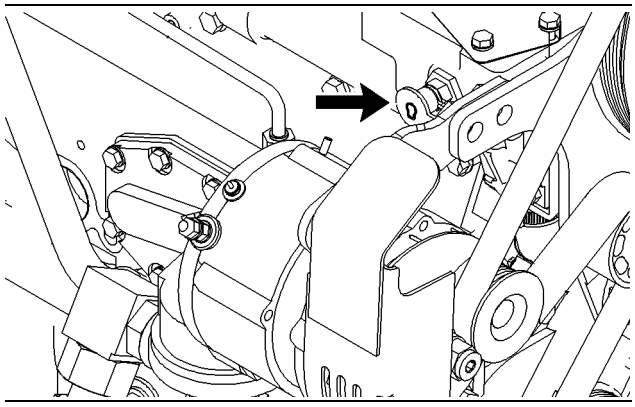

Illustration 101 g00964291

⚠ WARNING

Pressurized System: Hot coolant can cause serious burns. To open the cooling system filler cap, stop the engine and wait until the cooling system components are cool. Loosen the cooling system pressure cap slowly in order to relieve the pressure.

1. The machine needs to be operated in order to circulate the coolant. Collect the sample after a normal workday. Collect the samples from one to two hours after the engine has been shut off.

2. Start the engine momentarily in order to circulate the coolant again.

3. Shut off the engine.

4. The sampling valve for the cooling system is located on the left side of the machine above the water pump.

5. Do not allow dirt or other contaminants to enter the sampling bottle. Fill the sampling bottle three-fourths from the top. Do not fill the bottle completely.

6. Place the sampling bottle with the completed label into the mailing tube.

i01872023

Coolant Sample (Level 2) - Obtain

SMCS Code: 1395-008; 1395-554

Obtain the sample of the coolant as close as possible to the recommended sampling interval. The recommended sampling interval for Level 2 Coolant Analysis is every year. In order to receive the full effect of S·O·S analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

- Complete the information on the label for the sampling bottle before you begin to take the samples.
- Keep the unused sampling bottles stored in plastic bags.
- Keep the lids on empty sampling bottles until you are ready to collect the sample.
- Place the sample in the mailing tube immediately after obtaining the sample in order to avoid contamination.
- Never collect samples from expansion bottles.
- Never collect samples from the drain for a system.

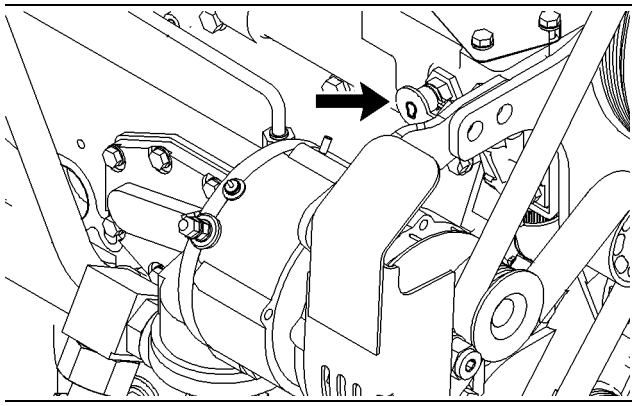

Illustration 102 g00964291

⚠ WARNING

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1. The machine needs to be operated in order to circulate the coolant. Collect the sample after a normal workday. Collect the samples from one to two hours after the engine has been shut off.

2. Start the engine momentarily in order to circulate the coolant again.

3. Shut off the engine.

4. The sampling valve for the cooling system is located on the left side of the machine above the water pump.

5. Do not allow dirt or other contaminants to enter the sampling bottle. Fill the sampling bottle three-fourths from the top. Do not fill the bottle completely.

6. Place the sampling bottle with the completed label into the mailing tube.

i01905179

Cooling System Extended Life Coolant - Change

SMCS Code: 1350-044; 1395-044

⚠ WARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove cooling system pressure cap slowly to relieve pressure only when engine is stopped and cooling system pressure cap is cool enough to touch with your bare hand.

Do not attempt to tighten hose connections when the coolant is hot, the hose can come off causing burns.

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

NOTICE
Mixing ELC with other products reduces the effectiveness of the ELC and shortens the ELC service life. Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specification for premixed or concentrate coolants. Use only Caterpillar ELC Extender with Caterpillar ELC. Failure to follow these recommendations can result in shortened cooling system component life.

Some engines utilize Extended Life Coolant (ELC).

Reference: See the Operation and Maintenance Manual, “Maintenance Interval Schedule” for the proper service interval.

If an ELC was previously used, flush the cooling system with clean water. No other cleaning agents are required.

Change the engine coolant more frequently if you find any of the following conditions:

- The cooling system is heavily contaminated.
- The engine overheats.
- You observe foaming in the radiator.
- Fuel has contaminated the cooling system.
- The cooling system contains non-Caterpillar products.

It is important to replace the water temperature regulator in order to avoid unexpected failure. This is a good preventive maintenance practice that reduces the chances of unscheduled downtime.

NOTICE
Operating a machine with a faulty temperature regulator can cause severe engine damage due to overheating of the engine or overcooling of the engine.

NOTICE
Failure to replace the water temperature regulator on a regularly scheduled basis could cause severe engine damage.

Note: In a situation that only requires the water temperature regulator to be replaced, drain the coolant from the cooling system so that the level of the coolant is below the regulator housing.

Draining the Coolant System

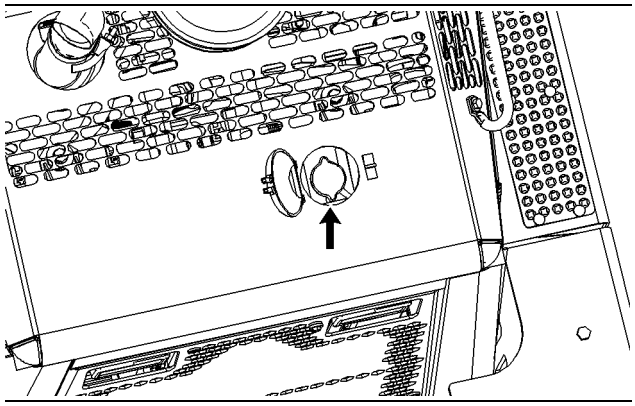


Illustration 103 g00953490

1. Slowly loosen the radiator cap in order to relieve system pressure. Remove the radiator cap.

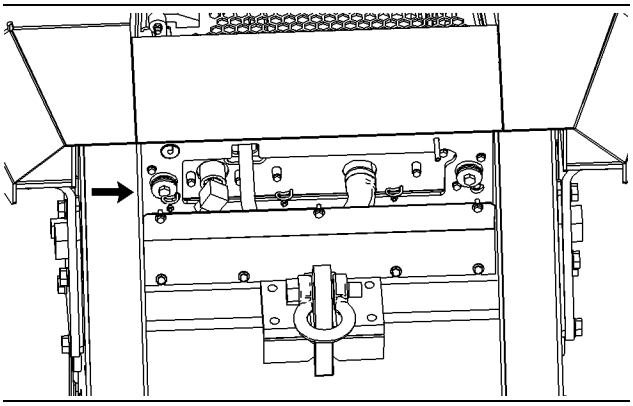


Illustration 104 g00991973

2. The access plate for the drain hose is located at the rear of the machine under the bottom radiator guard. Remove the bolts and the access plate.

3. Pull the drain hose for the radiator from the opening.

4. The drain valve is under the radiator. Open the drain valve. Allow the coolant to drain into a suitable container.

5. Close the drain valve. Fill the system with a solution which consists of clean water and of cooling system cleaner. The concentration of the cooling system cleaner should be 6 to 10 percent.

6. Start the engine. Run the engine for 90 minutes. Stop the engine. Drain the cleaning solution into a suitable container.

7. While the engine is stopped, flush the system with water. Flush the system until the draining water is clear.

8. Close the drain valve. Replace the drain hose and the access plate.

9. Add the coolant solution.

10. Start the engine. Run the engine without the radiator cap until the thermostat opens and the coolant level stabilizes.

11. Maintain the coolant level within 13 mm (.5 inches) of the bottom of the filler pipe.

12. If the gasket is damaged, replace the radiator cap. Install the radiator cap.

13. Stop the engine.

i02644101

Cooling System Extended Life Coolant Extender - Add

SMCS Code: 1350; 1352-544-NL; 1395-544-NL

When a Caterpillar Extended Life Coolant (ELC) is used, an extender must be added to the cooling system. See the Operation and Maintenance Manual, “Maintenance Interval Schedule” for the proper service interval. The amount of extender is determined by the cooling system capacity.

Table 8

RECOMMENDED AMOUNT OF EXTENDER BY COOLING SYSTEM CAPACITY	
Cooling System Capacity	**Recommended Amount of Extender**
22 to 30 L (6 to 8 US gal)	0.57 L (.60 qt)
30 to 38 L (8 to 10 US gal)	0.71 L (.75 qt)
38 to 49 L (10 to 13 US gal)	0.95 L (1 qt)
49 to 64 L (13 to 17 US gal)	1.18 L (1.25 qt)

Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the cooling system capacity.

NOTICE
Do not add any Extended Life Coolant (ELC) Extenders to the cooling system for this machine after the reduction or complete depletion of nitrites in the coolant sample.

Adding ELC Extender to the cooling system with depleted nitrites has undesirable results. The pH level increases to a high level and an odor of ammonia appears.

The cooling system will stabilize and continue to function normally after the complete depletion of nitrite. Add ELC Extender on the scheduled maintenance interval only.

For additional information about adding an extender, see Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”, “Extended Life Coolant (ELC)” or consult your Caterpillar dealer.

i01872305

Cooling System Level - Check

SMCS Code: 1353-535-FLV; 1395-535-FLV

The machine is equipped with a sensor in the radiator tank. The monitoring system is equipped with a indicator for the coolant level.

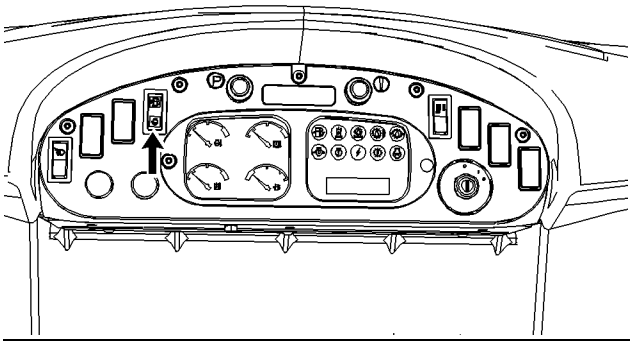


Illustration 105 g00994075

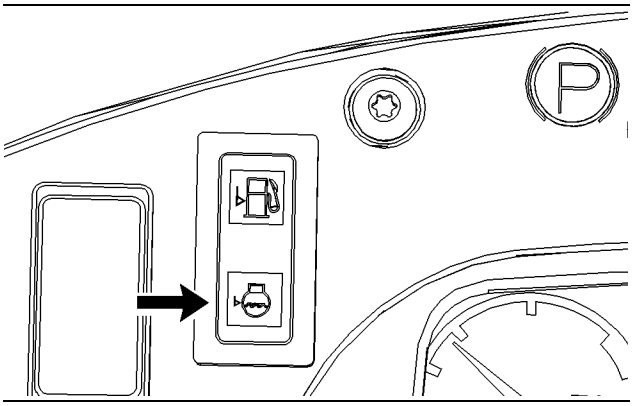


Illustration 106 g00994074

1. Turn the key to the ON position.
2. The monitoring system goes through a start-up procedure when the key is turned to the ON position. The self testing feature verifies that the modules of the monitoring system are operating properly. The amount of time for the self testing feature is approximately three seconds.
3. If the coolant system is low the indicator will illuminate for approximately twenty seconds.

i01922762

Cooling System Water Temperature Regulator - Clean/Replace

SMCS Code: 1355-070; 1355-510; 1393

Replace the thermostat on a regular basis in order to reduce the chance of unscheduled downtime and of problems with the cooling system.

A new thermostat should be installed after the cooling system has been cleaned. Install the thermostat while the cooling system is completely drained or while the cooling system coolant is drained to a level that is below the thermostat housing.

NOTICE
Failure to replace the engine's thermostat on a regularly scheduled basis could cause severe engine damage.

Note: If you are only installing a new thermostat, drain the cooling system coolant to a level that is below the thermostat housing.

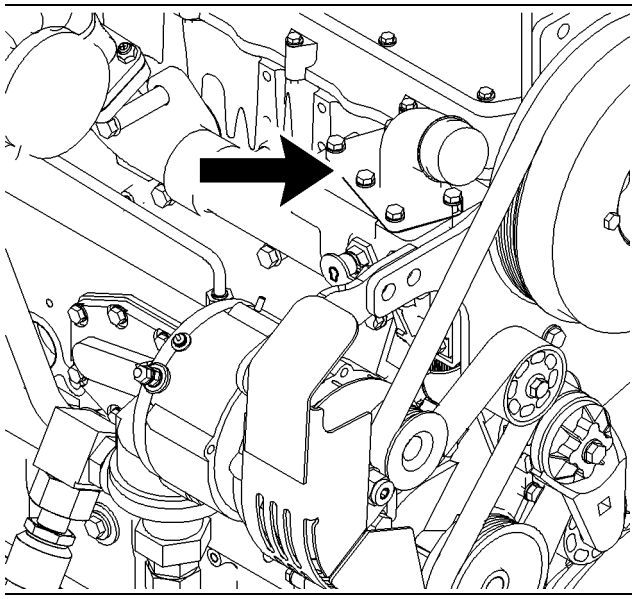


Illustration 107 g00992002

1. Loosen the hose clamp and remove the hose from the elbow. Disconnect the hose assembly from the thermostat housing assembly.
2. Remove the bolts from the elbow. Remove the elbow and the thermostat housing assembly.
3. Remove the gasket, the thermostat, and the seal from the thermostat housing.

NOTICE
A used thermostat can be installed if the thermostat conforms to test specifications, and the thermostat is not damaged. Do not install a used thermostat that has excessive buildup or deposits.

NOTICE
Since Caterpillar engines incorporate a shunt design cooling system, it is mandatory to always operate the engine with a thermostat.

Depending on load, failure to operate with a thermostat could result in either an overheating or an overcooling condition.

NOTICE
If the thermostat is installed incorrectly, it will cause the engine to overheat.

4. Install a new seal in the thermostat housing. Install a new thermostat and a new gasket. Install the thermostat housing on the engine cylinder head.

5. Install the elbow and the hose. Tighten the hose clamp.

i01872361

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1051-070-PY; 1051-510-PY; 1054-070-PY; 1054-510-PY

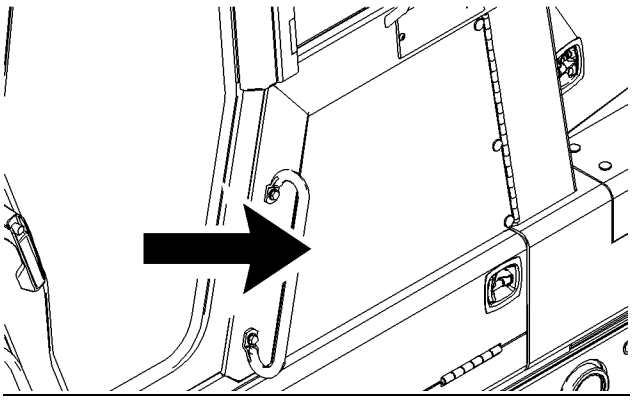


Illustration 108 g00987525

1. Open the front access door on the left side of the machine.

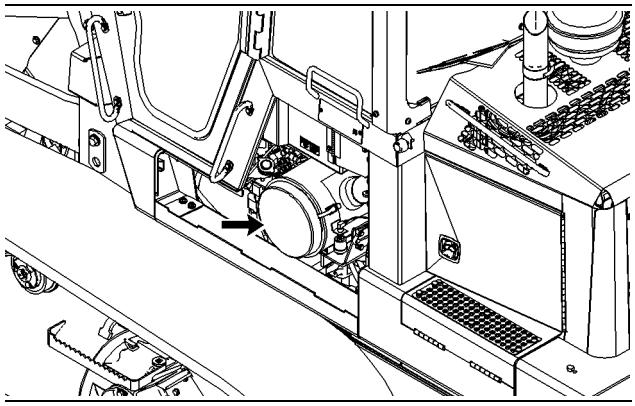


Illustration 109 g00953702

2. Remove the air cleaner cover.

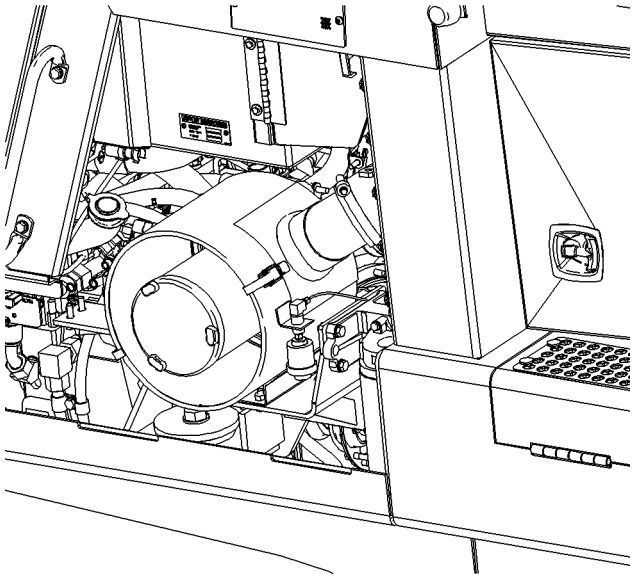


Illustration 110 g00953704

3. Clean the inside of the air cleaner housing.

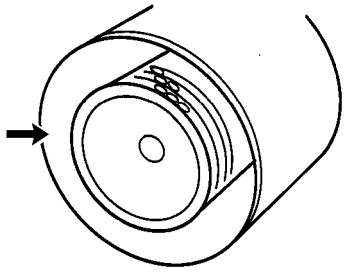


Illustration 111 g00275463

4. Remove the primary filter element from the air cleaner housing.

5. Inspect the primary element. If the pleats, the gaskets, or the seals are damaged, discard the element. Replace a damaged primary element with a clean primary element.

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.

6. If the primary element is not damaged, clean the primary element.

The filter elements can be cleaned by using the following method:

- Pressure air

When you use pressure air, the maximum air pressure is 205 kPa (30 psi).

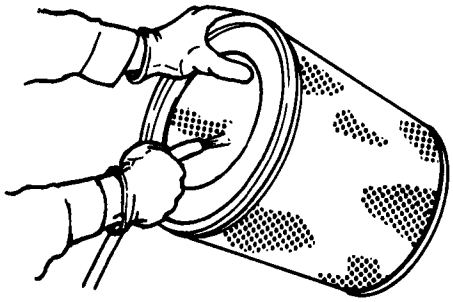


Illustration 112 g00275460

7. When you clean the inside pleats and the outside pleats, direct the air along the pleats.

8. Inspect the filter elements after you clean the filter elements. Do not use a filter if the pleats, the gaskets or the seals are damaged.

9. Cover the clean filter elements. Store the elements in a clean, dry location.

A primary element may be cleaned for a maximum of six times. Also replace the primary element if the primary element has been used for one year.

10. Install a clean primary filter element.

11. Clean the cover and install the cover.

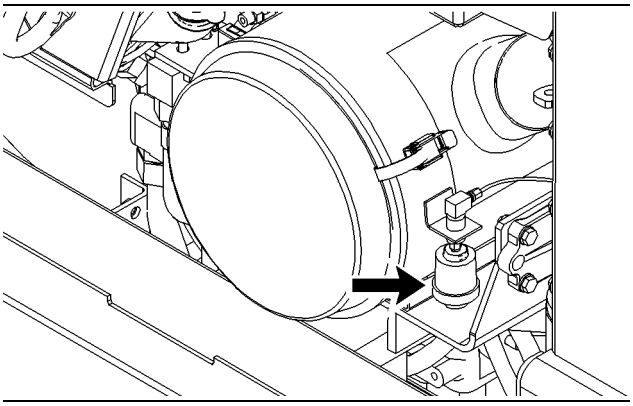


Illustration 113 g00956742

12. Reset the filter element indicator.

13. Start the engine. If the yellow piston in the filter element indicator moves into the red zone, install a new primary filter element. Also if the exhaust smoke is black, install a new primary filter element.

14. Close the access door.

i01872402

Engine Air Filter Secondary Element - Replace

SMCS Code: 1051-510-SE; 1054-510-SE

NOTICE
Always replace the secondary element. Do not attempt to reuse it by cleaning. Engine damage could result.

Note: Replace the secondary filter element when you service the primary element for the third time. If a clean primary element has been installed and the filter element indicator still enters the red zone, replace the secondary filter element. Also if the exhaust smoke remains black and a clean primary filter element has been installed, replace the secondary filter element.

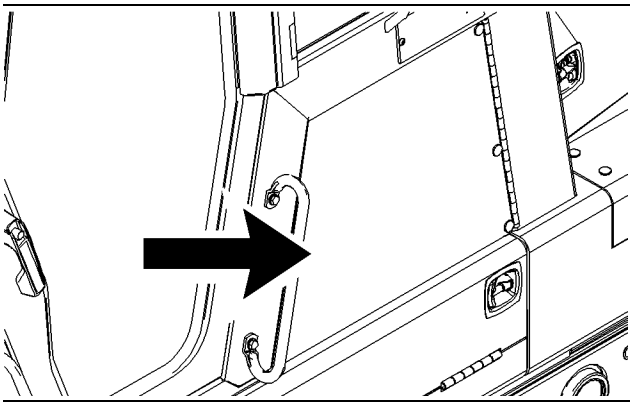


Illustration 114 g00987525

1. Open the front access cover on the left side of the machine.
2. Remove the housing cover and the primary element.
3. Thoroughly clean the inside of the air cleaner housing prior to removing the secondary element in order to prevent dust from contaminating the engine.

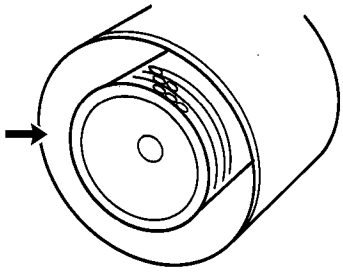


Illustration 115 g00275463

4. Remove the secondary element.
5. Install a new secondary element.
6. Install the primary element and the air cleaner housing cover.
7. Close the access door.

i01872425

Engine Air Precleaner - Clean

SMCS Code: 1050-070

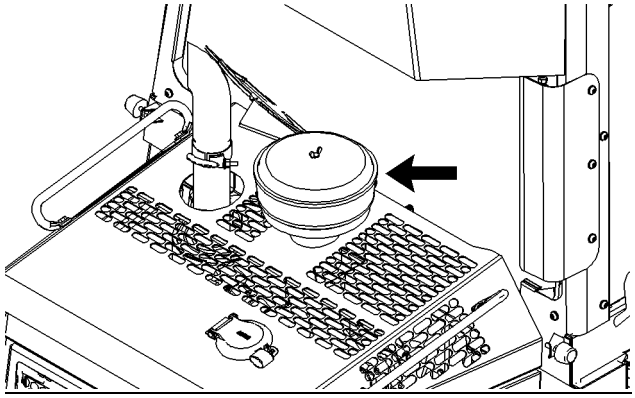


Illustration 116 g00953722

1. Inspect the air inlet for dirt and for trash.
2. Remove the bowl. Clean the bowl.
3. Inspect the precleaner tube for dirt and for dust.
4. Clean the precleaner tube with pressure air if the precleaner tube is dirty.

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

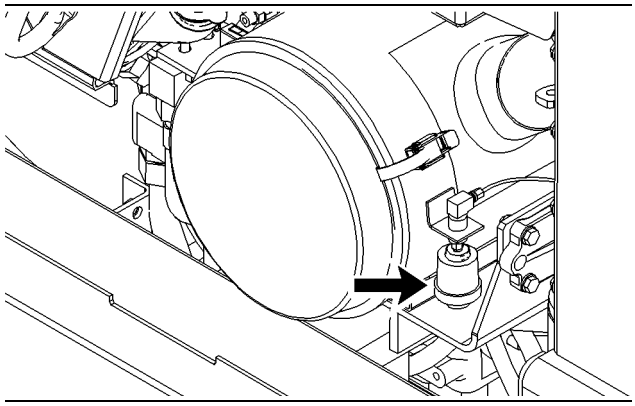


Illustration 117 g00956742

Run the engine at high idle. If the yellow piston in the filter element indicator enters the red zone, stop the engine and service the air cleaner .

i01906252

Engine Crankcase Breather - Clean

SMCS Code: 1317-070

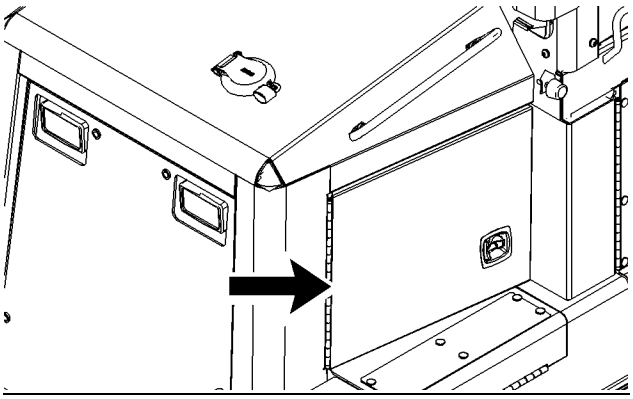


Illustration 118 g00987539

1. The access door is located on the right side of the machine. Open the access door.

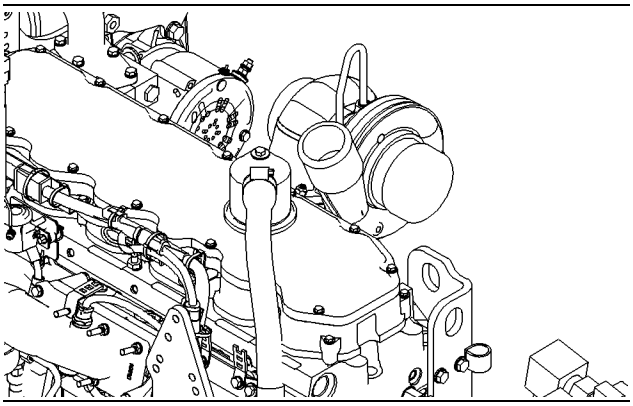


Illustration 119 g00953743

2. Loosen the breather outlet hose clamps. Remove the hose from the breather cover.

3. Loosen the breather inlet hose clamp. Remove the engine crankcase breather.

4. Check the condition of the cover seal. Replace the cover seal if the cover seal is damaged.

5. Wash the breather element and the breather element cover assembly in a clean, nonflammable solvent.

6. Shake the breather element until the breather element is dry. You may also use pressure air to dry the breather element.

7. Check the condition of the hose. Replace the hose if the hose is damaged.

8. Install the breather element cover assembly.

9. Install the hose and the breather outlet hose clamps.

10. Close the access door.

i01906262

Engine Oil Level - Check

SMCS Code: 1302-535-FLV; 1326-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE
Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

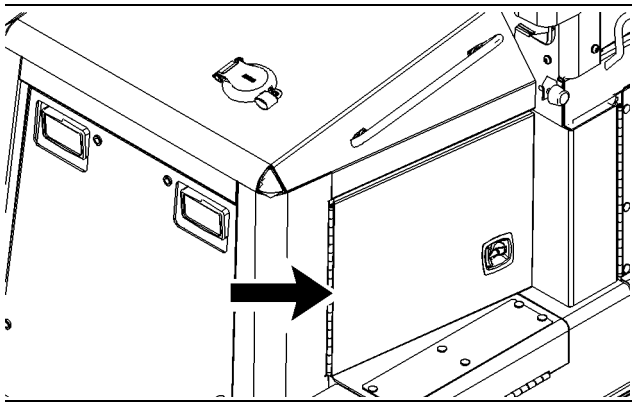


Illustration 120 g00987539

1. Open the rear access door that is on the right side of the machine behind the operator's compartment.

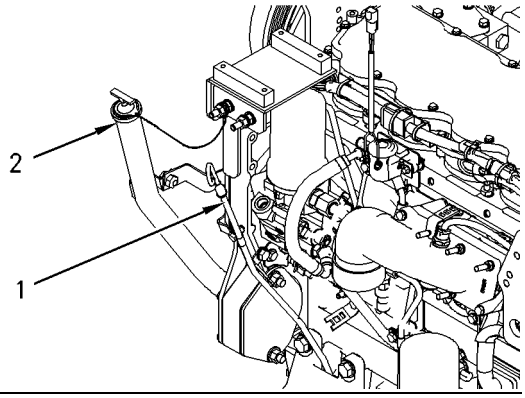


Illustration 121 g00991459

2. Check the dipstick (1) while the engine is stopped. Maintain the oil level between the “LOW” mark and the “FULL” mark.

Note: When you operate the machine on severe slopes, the oil level in the engine crankcase must be at the “FULL” mark on the dipstick.

3. Remove oil filler cap (2). If necessary, add oil.

4. Clean the oil filler cap and install the oil filler cap.

5. Close the access door.

i01905243

Engine Oil Sample - Obtain

SMCS Code: 1000-008; 7542-008

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact the skin.

Obtain the Sample and the Analysis

In addition to a good preventive maintenance program, Caterpillar recommends using S·O·S oil analysis at regular scheduled intervals in order to monitor the condition of the engine and the maintenance requirements of the engine.

Each oil sample should be taken when the oil is warm and when the oil is well mixed in order to ensure that the sample is representative of the oil that is in the crankcase.

Obtain the S·O·S Sample

NOTICE
Always use a designated pump for oil sampling, and use a separate designated pump for coolant sampling. Using the same pump for both types of samples may contaminate the samples that are being drawn. This contaminate may cause a false analysis and an incorrect interpretation that could lead to concerns by both dealers and customers.

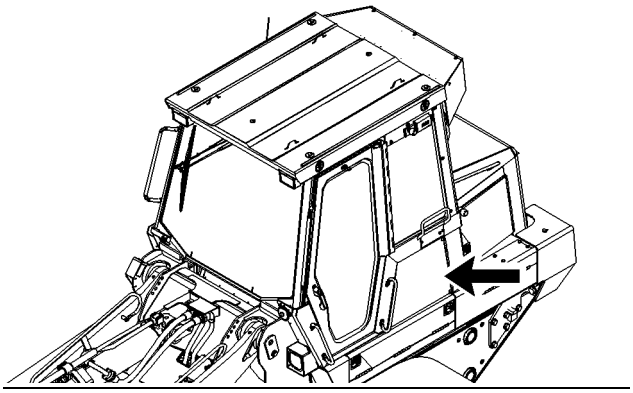


Illustration 122 g00964427

Open the access door on the right side of the machine.

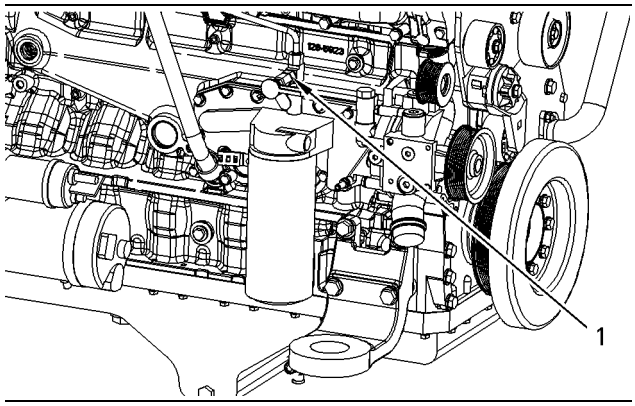


Illustration 123 g00992801

Sampling valve (1) for the engine oil is located on the right side of the engine above the oil filter.

Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for information that pertains to obtaining a sample of the engine oil. Refer to Special Publication, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of the engine oil.

i01906302

Engine Oil and Filter - Change

SMCS Code: 1308-510; 1318-510

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: Be sure that you obtain an S·O·S oil sample before you drain the engine oil.

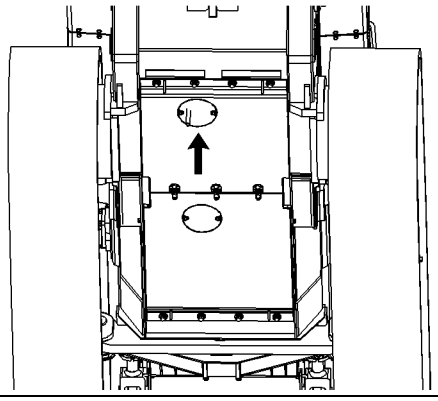


Illustration 124 g00992826

1. Remove the crankcase drain access cover, which is in the crankcase guard.

2. Remove the section of hose from the tool box. Remove the crankcase drain plug. Install the hose. Open the valve. Allow the oil to drain into a suitable container.

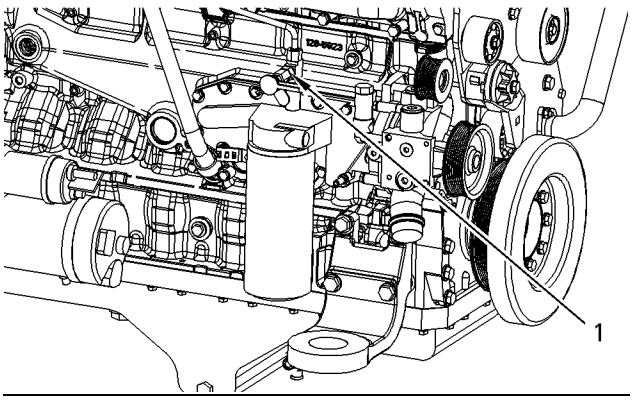


Illustration 125 g00993617

3. Open the access cover. Remove the crankcase oil filter element and discard the crankcase oil filter element properly. Make sure that all of the old filter seal is removed from the filter base.

4. Apply a thin coat of oil to the new filter seals. Install the new crankcase oil filter elements by hand. When the gaskets contact the filter base, tighten the filter elements by an additional turn of 270 degrees. Rotation index marks are on the new filter elements. These rotation index marks are spaced at 90 degree intervals. Use these rotation index marks as a guide for proper tightening.

5. Remove the hose. Close the valve. Return the hose to the tool box. Install the crankcase drain plug. Install the crankcase drain access cover.

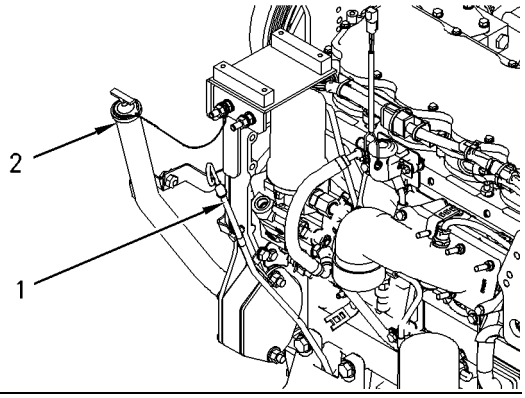


Illustration 126 g00974903

6. Remove the oil filler cap (2). Fill the crankcase with new oil. See Operation and Maintenance Manual, “Refill Capacities”. Clean the oil filler cap and install the oil filler cap.

7. Always measure the oil level with dipstick (1) in order to ensure that the correct amount of oil was added.

8. On the dipstick, maintain the oil level between the “ADD” mark and “FULL” mark.

9. Close the access cover.

i02021875

Engine Valve Lash - Check

SMCS Code: 1102-535; 1105-535

⚠ WARNING

Ensure that the engine can not be started while this maintenance is being performed. To help prevent possible injury, do not use the starting motor to turn the flywheel.

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

NOTICE

Only qualified service personnel should perform this maintenance. Refer to the Service Manual or your Caterpillar dealer for the complete valve lash adjustment procedure.

Operation of Caterpillar engines with improper valve adjustments can reduce engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

This maintenance is recommended by Caterpillar as part of a lubrication and preventive maintenance schedule in order to help provide maximum engine life.

Ensure that the engine is stopped before measuring the valve lash. To obtain an accurate measurement, allow the valves to cool before this maintenance is performed.

Refer to the Service Manual for more information.

i01145941

Equalizer Bar Pins - Inspect

SMCS Code: 7206-040-PN; 7207-040-PN

Illustration 127 g00661410

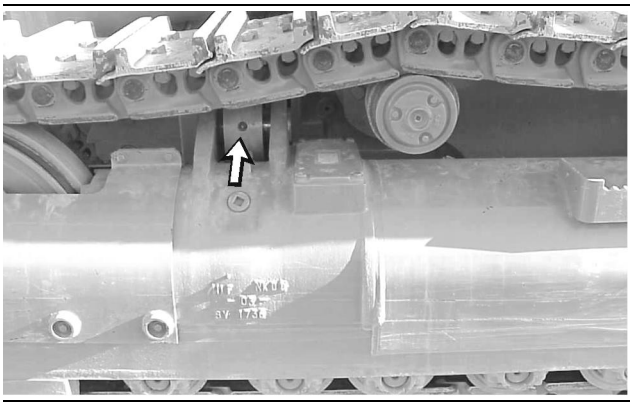


Illustration 128 g00608687

Check the equalizer bar pins for looseness and for unusual wear. The pins are located on the top of the track roller frame behind the idler.

If unusual wear is evident, see the Service Manual or consult your Caterpillar dealer for an inspection and for repair instructions.

i01906333

Equalizer Bar Pins - Lubricate

SMCS Code: 7206-086-PN; 7207-086-PN

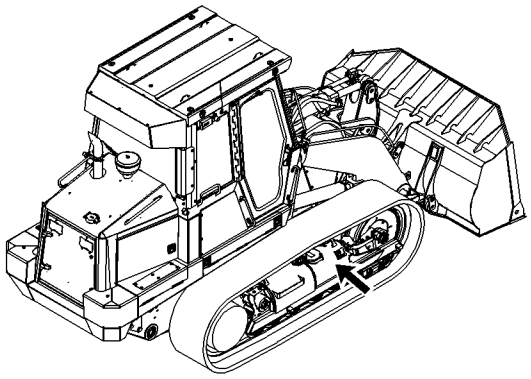


Illustration 129 g00992855

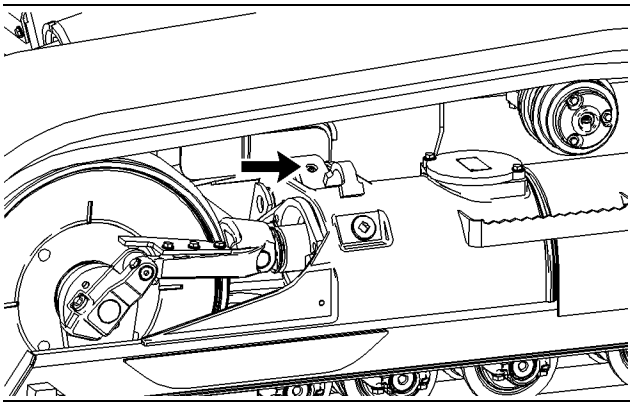


Illustration 130 g00990059

Lubricate the equalizer bar pins through the fittings. There is one fitting on each side of the machine.

i02639467

Final Drive Oil - Change

SMCS Code: 4050-044-FLV

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Wipe the covers and the surfaces around openings before checking or adding oil.

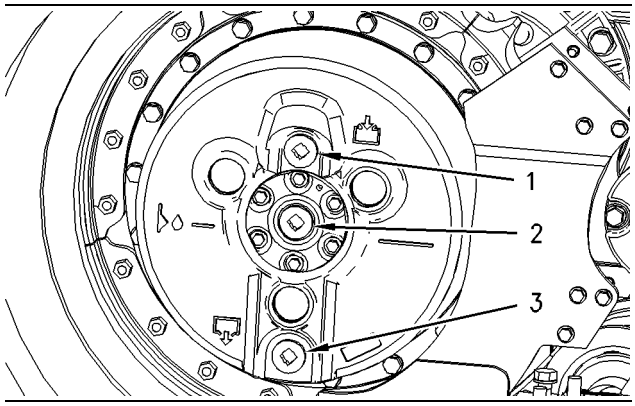


Illustration 131 g00992892

Note: Perform the following procedure to the final drive on each side of the machine.

Lube Fill – This symbol indicates the location for filling the final drive.

Lube Level – This symbol indicates the location for checking the oil level of the final drive.

Lube Drain – This symbol indicates the location for draining the final drive.

Note: All three plugs for the final drive are magnetic.

1. Move the machine so that drain plug (3) is located on the bottom of the final drive.

2. Remove filler plug (1). Remove drain plug (3) in the outer compartment. Drain the oil into a suitable container.

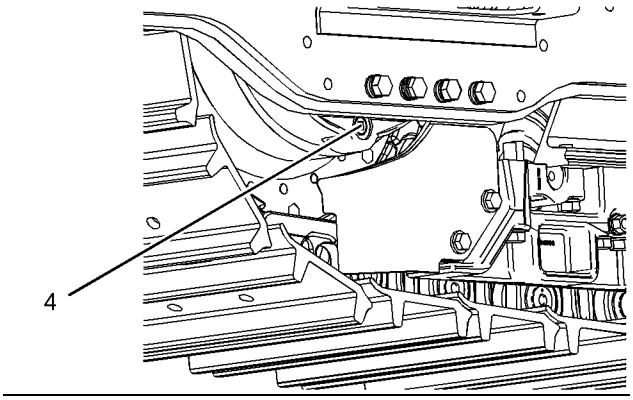


Illustration 132 g01251941

3. Remove drain plug (4) from the inner compartment. Allow the oil to drain into a suitable container.

4. Clean the drain plugs and install the drain plugs.

5. Slowly fill the final drive with oil. The oil level is at the bottom of opening (2). Refer to Operation and Maintenance Manual, “Refill Capacities” for the refill capacity of each final drive.

6. Clean the filler plug and the oil level plug. Install the plugs.

7. Repeat this procedure for the opposite side of the machine.

i01908656

Final Drive Oil Level - Check

SMCS Code: 4050-535-FLV

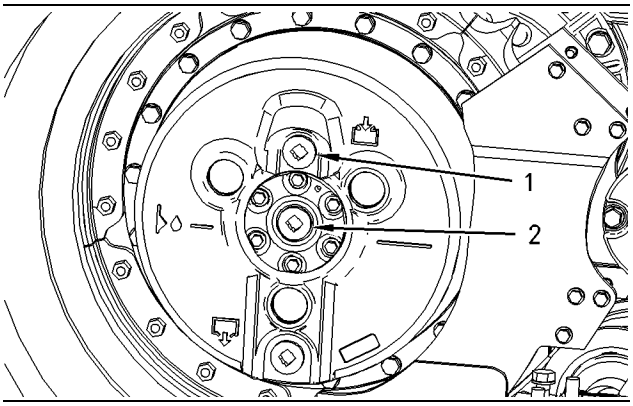


Illustration 133 g00994661

1. Remove center oil level plug (2).

2. Maintain the oil level to the bottom of the opening for plug (2).

3. If oil is required, remove oil filler plug (1) and add oil.

4. Clean the plugs and reinstall the plugs.

5. Check for leakage or excessive sprocket wear.

6. Repeat the procedure on the other side of the machine.

i01908670

Final Drive Oil Sample - Obtain

SMCS Code: 4050-008

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact the skin.

Obtain the Sample and the Analysis

In addition to a good preventive maintenance program, Caterpillar recommends using S·O·S oil analysis at regular scheduled intervals in order to monitor the condition of the final drives.

Each oil sample should be taken when the oil is warm and when the oil is well mixed in order to ensure that the sample is representative of the oil in the final drive.

Obtain the S·O·S Sample

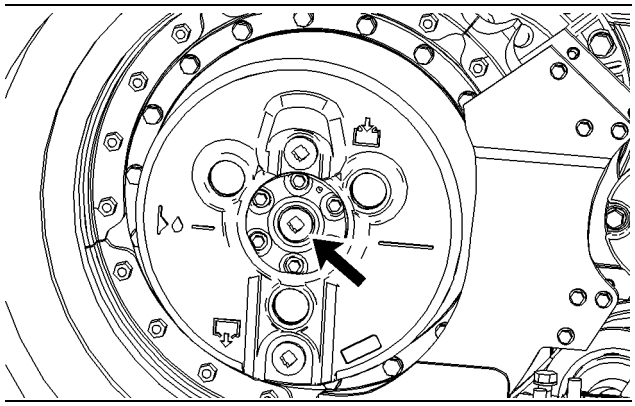


Illustration 134 g00994668

Remove the center plug in order to obtain a sample of the oil.

NOTICE
Always use a designated pump for oil sampling, and use a separate designated pump for coolant sampling. Using the same pump for both types of samples may contaminate the samples that are being drawn. This contaminate may cause a false analysis and an incorrect interpretation that could lead to concerns by both dealers and customers.

Use a 1U-5718 Vacuum Pump or an equivalent pump. Insert the suction tube into the final drive and draw an oil sample from the final drive.

Clean the plug and install the plug.

The recommended interval for oil samples is every 500 service hours or every three months. The recommended oil change interval is every 2000 hours.

Refer to Special Publication, PEHP6001 for more information on obtaining a good oil sample. Consult your Caterpillar dealer for complete information and assistance in establishing an S·O·S program for your machine.

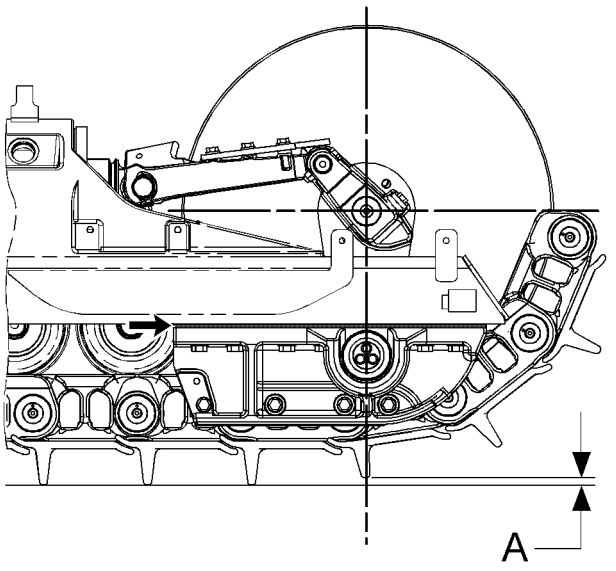
i02294831

Front Idler Position - Check (If Equipped)

SMCS Code: 4159

SystemOne Undercarriage

The following check is for Caterpillar SystemOne Undercarriages that have the center tread idler.



g01153090

Illustration 135

953C Track-Type Loader front idler (SystemOne)

Adjustment shim (center tread idler)

1. Park the machine on a hard, flat surface. Make sure that the bottom track is tight and that the measured grouser lies directly below the track idler shaft.

2. Measure the height (A) from the flat ground surface to the grouser tip that is centered below the track idler shaft.

3. Maintain the grouser height (rise) to the following dimensions.

   a. (A) Front Idlers

      Minimum – 0 mm (0 inch)

      Maximum – 16 mm (0.63 inch)

4. Repeat Steps 1 through 3 in order to determine the proper height dimension under each front idler.

5. For machines with the SystemOne Undercarriage, remove the shim between the track roller frame and the idler guard when the wear on the link and roller system is at 50%.

Consult your Caterpillar dealer for detailed information about adjustments to the center tread idler.

See Operation and Maintenance Manual, “Track Adjustment - Adjust” for information on needed track adjustments.

Reference: See Operation and Maintenance Manual, “Reference Material” for publications and Special Instructions on removal and installation of SystemOne Track, as needed.

i01874056

Fuel System - Prime

SMCS Code: 1258

If the engine does not start, air may be trapped in the fuel lines to the engine. Use the following procedure in order to purge air from the fuel lines.

Fuel Priming Pump

1. Open the forward engine access door in order to access the fuel priming pump. The fuel priming pump is located on the right side of the machine.

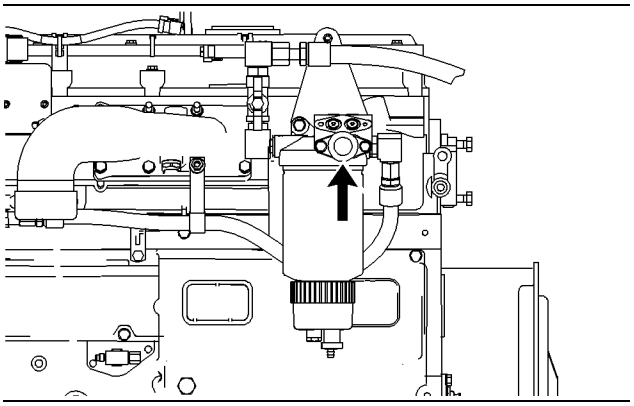


Illustration 136 g00954071

2. Unlock the priming pump plunger. Operate the plunger until you feel resistance.
3. Push in the plunger. Hand tighten the plunger.
4. Start the engine. If the engine does not start, or if the engine continues to misfire or smoke, additional priming is necessary.
5. Run the engine at the LOW IDLE position until the engine runs smoothly.

Electric Fuel Priming Pump (If Equipped)

Your machine may be equipped with an electric fuel priming pump. The priming pump is located on the right side of the engine above the primary fuel filter.

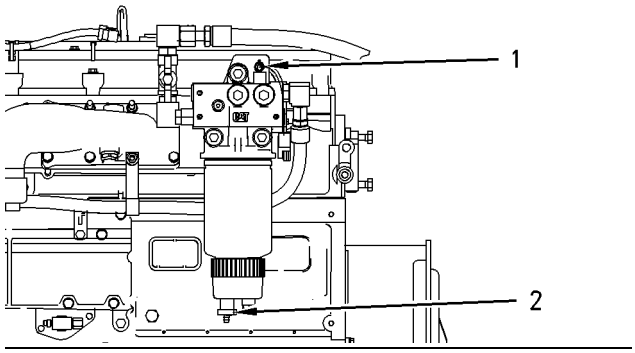


Illustration 137 g00992172

1. Open the forward engine access door in order to access the fuel priming pump. The fuel priming pump is located on the right side of the machine.
2. Attach a drain hose to drain valve (2). Place the drain hose into a suitable container in order to catch the fuel. Open drain valve (2). Move the toggle switch (1) in order to activate the priming pump.
3. Operate the priming pump until fuel comes out of the drain hose. Operate the priming pump until the fuel that flows from the drain hose has no air bubbles. Turn off the drain valve. Turn off the priming pump.

i01874442

Fuel System Primary Filter (Water Separator) Element - Replace

SMCS Code: 1260-070; 1260-510; 1261

⚠ WARNING

Personal injury can result from air pressure.

Personal injury can result without following proper procedure. When using pressure air, wear a protective face shield and protective clothing.

Maximum air pressure at the nozzle must be less than 205 kPa (30 psi) for cleaning purposes.

⚠ WARNING

Personal injury or death can result from engine overspeed.

If the engine overspeeds, it can cause injury or parts damage.

Be prepared to stop the engine by closing the air off to the air inlets or by manually pushing downward on the governor shutdown rod.

⚠ WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE
Do not fill fuel filter with fuel before installing the fuel filter. Contaminated fuel causes accelerated wear to fuel system parts.

1. Open the access door for the engine compartment. The access door is located on the left side of the machine.

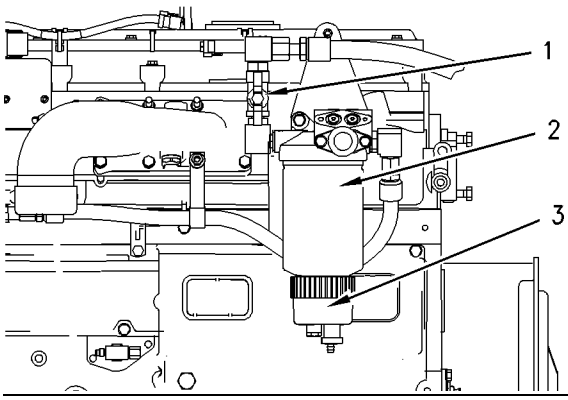


Illustration 138 g00975326

2. Turn red handle (1) of the fuel shutoff valve in order to shut off the fuel supply.
3. Remove water collection bowl (3). Unscrew the bowl from element (2).
4. Unscrew element (2).
5. Install the new element onto the filter base.
6. Clean the water collection bowl. Install the bowl on the new element.

Note: The water collection bowl is reusable. When you can no longer see the contents of the bowl, replace the bowl.

7. Open the fuel shutoff valve.
8. Prime the fuel system. Refer to Operation and Maintenance Manual, “Fuel System - Prime” for more information. Close the access door.

Replace the Inverted Secondary Fuel Filter

Replace the inverted secondary fuel filter at every 500 service hour interval. Refer to Operation and Maintenance Manual, “Fuel System Secondary Filter - Replace” at every 500 service hour interval.

i01874724

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

⚠ WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

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

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

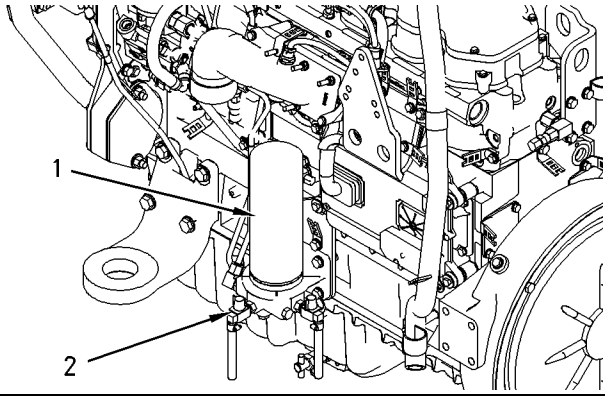


Illustration 139 g00954156

This machine is equipped with an inverted secondary fuel filter. Always drain the inverted filter before you remove the filter.

1. Shut off the fuel tank supply valve. Shut off the return valve for the fuel tank.

2. Drain secondary fuel filter (1). Place a suitable container under the drain valve. Open drain valve (2). Drain the fuel into a suitable container. When the fuel stops draining, keep the drain valve open. Loosen the inverted filter for 1/4 turn. As the filter is loosened, additional fuel may drain from the drain valve. When the fuel stops draining, loosen the filter for an additional 1/4 turn. Observe the flow of the fuel. Repeat this procedure until fuel does not drain from the drain valve. Close the drain valve. Properly dispose of the fuel.

3. Remove secondary fuel filter (1).

4. Clean the filter mounting base. Make sure that the old seal is removed.

5. Coat the seal of the new filter with clean diesel fuel.

6. Install new secondary fuel filter (1). Hand tighten the filter. When the seal contacts the base, tighten the filter for an additional 3/4 turn.

   Rotation index marks are positioned on the filter at 90 degree intervals. Use these rotation index marks as a guide when you tighten the filter.

Note: Install a new, dry filter. Never fill a new filter with fuel before you install the filter. Dirty fuel can damage the fuel injectors. This damage will cause premature problems in the fuel system.

7. Open the fuel tank supply valve. Open the return valve for the fuel tank.

8. Prime the fuel system. Refer to Operation and Maintenance Manual, “Fuel System - Prime” for additional information. When you are priming the fuel system, open drain valve (2) in order to allow air to escape.

9. In order to unlock the priming pump plunger, turn the handle of the priming pump counterclockwise. Operate the priming pump until the fuel begins to flow out of drain valve (2). When the fuel begins to drain from the drain, close the drain valve. Operate the priming pump for an additional ten strokes. These additional strokes will ensure that the remainder of the fuel system is primed. All of the air will be purged from the lines. Push the priming pump plunger downward. Turn the handle for the plunger clockwise until the priming pump plunger is locked in the down position.

10. Before you start the engine, make sure that the drain valves are completely closed. Start the engine. Check for leaks.

i01874744

Fuel System Water Separator - Drain

SMCS Code: 1263-543

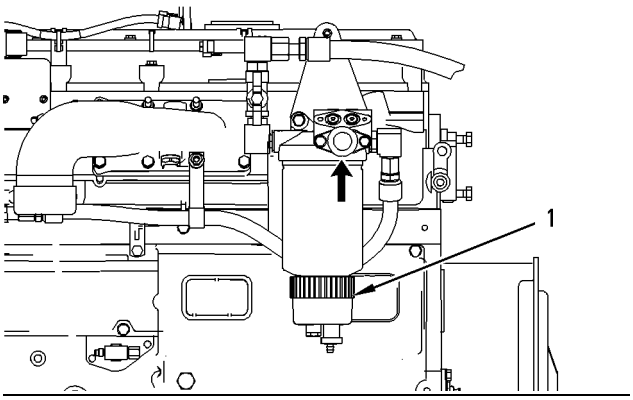


Illustration 140 g00975276

1. Attach a rubber hose to the drain of water separator bowl (1), which is located under the primary filter/water separator. Extend the hose into a suitable container.

2. Open the drain for a 1/2 turn.

3. Open the vent in order to allow the water to drain into a suitable container.

4. After the separator is completely drained, close the vent. Close the drain.

i01905395

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-STR; 1273-070-Z2

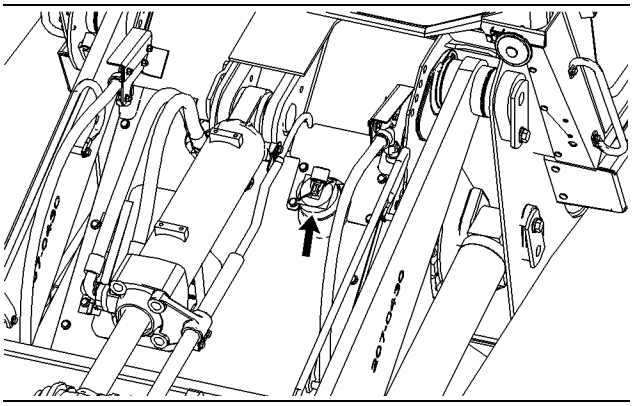


Illustration 141 g00992194

1. Remove the fuel tank cap and the strainer.

2. Disassemble the fuel cap. Wash the cap and the strainer. Wash these components in a clean, nonflammable solvent.

3. Inspect the seal of the fuel cap. Replace the seal if the seal is damaged.

4. Put a light coat of oil on the cap components.

5. Install the strainer.

6. Assemble the fuel cap and install the fuel cap.

i01908934

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

The drain valve is located at the bottom of the fuel tank.

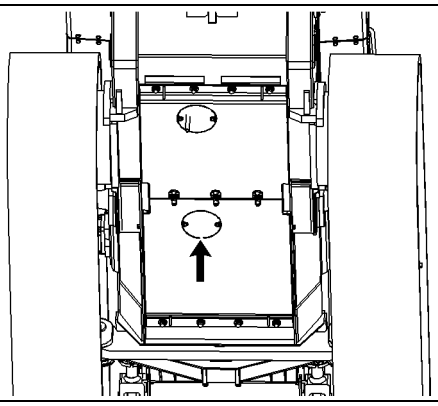


Illustration 142 g00994818

1. Remove the access plate for the drain valve.

2. Remove the drain line from the opening.

3. Open the drain valve in order to drain the sediment. Allow the water and the sediment to drain into a suitable container.

4. Close the drain valve. Place the drain line back into the opening.

5. Install the access plate.

i01903359

Hydraulic System Oil - Change

SMCS Code: 5050-044

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

⚠ WARNING

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

Note: The following procedure is for draining the hydraulic tank. Consult your Caterpillar dealer or refer to the Service Manual for instructions on completely draining the hydraulic system.

Operate the machine in order to warm the oil.

Park the machine on level ground. Lower all attachments to the ground with a slight downward pressure. Place the transmission lever in the PARK position. Place the parking brake switch in the PARK position.

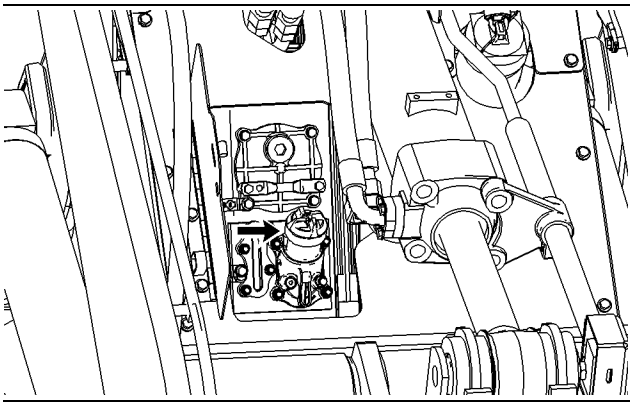


Illustration 143 g00990542

1. Remove the hydraulic tank filler cap slowly in order to relieve any pressure. Check the cap seal. If the cap seal is cut or damaged, replace the cap seal.

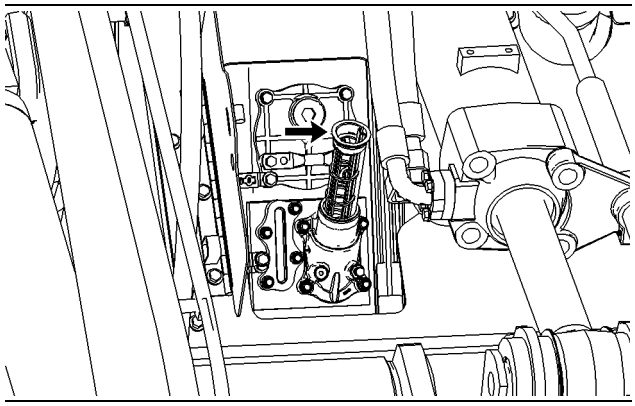


Illustration 144 g00990562

2. Remove the filler strainer. Wash the filler strainer in a clean nonflammable solvent.

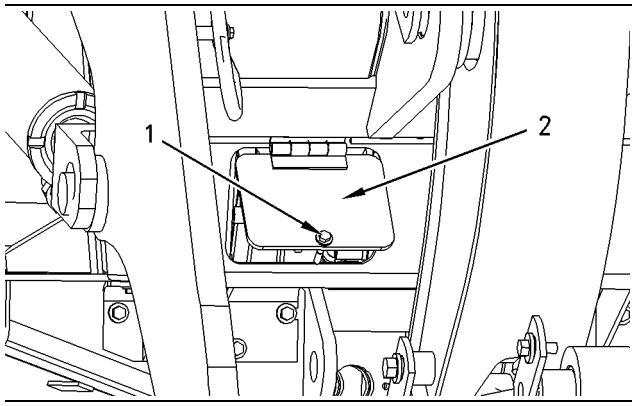


Illustration 145 g00990563

3. Loosen the cover bolt (1) and open the drain cover (2). Remove the oil drain hose . Open the drain valve. Drain all the oil into a suitable container. Close the drain valve.

4. Replace the drain hose.

5. Close the cover. Tighten the cover bolt.

6. See Operation and Maintenance Manual, “Hydrostatic Transmission and Hydraulic System Oil Filters - Replace”. Change the hydraulic system filter.

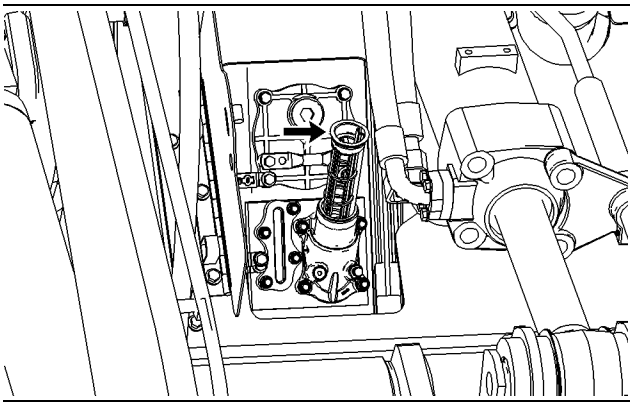


Illustration 146 g00990917

7. Install the filler strainer.

8. See Operation and Maintenance Manual, “Capacities (Refill)” in order to determine the amount of hydraulic oil that is needed to fill the hydraulic oil tank. Fill the hydraulic oil tank.

9. Install the filler cap.

10. Start the engine. Run the engine for a few minutes.

11. Stop the engine.

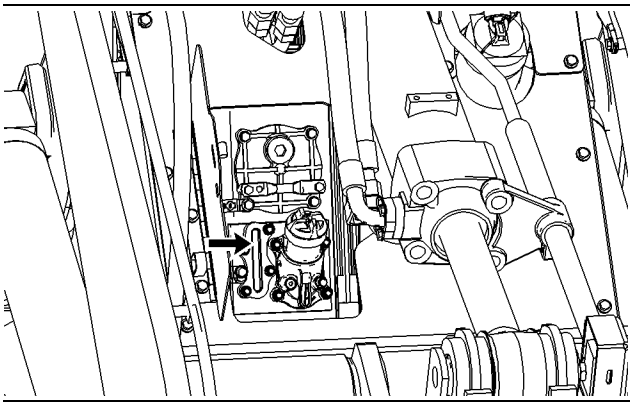


Illustration 147 g00990787

12. Maintain the oil level in the green area in the sight gauge. Add oil, if necessary.

i01903792

Hydraulic System Oil Level - Check

SMCS Code: 5056-535-FLV; 7479

⚠ WARNING

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

1. Park the machine on level ground. Lower all attachments to the ground with a slight downward pressure. Place the transmission lever in the PARK position. Place the parking brake switch in the PARK position.

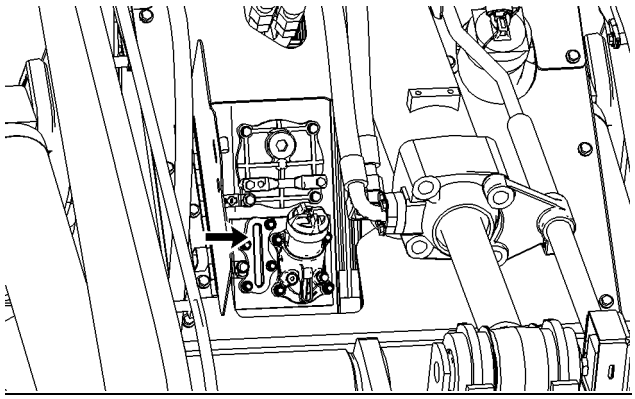


Illustration 148 g00990831

2. The sight gauge for the hydraulic tank is located on the front of the machine beneath the tank cover. Maintain the oil level in the green area in the sight gauge.

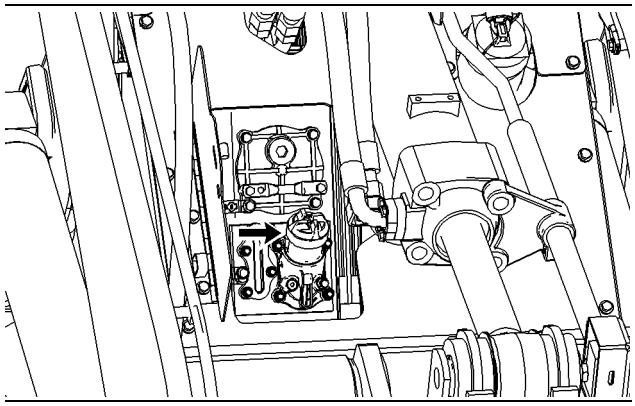


Illustration 149 g00990832

3. If the hydraulic system requires additional hydraulic oil, remove the filler cap and add oil through the filler tube.

4. Clean the filler cap and install the filler cap.

i01903848

Hydrostatic Transmission and Hydraulic System Filters - Replace

SMCS Code: 3067-510-FI

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

⚠ WARNING

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

Operate the machine in order to warm the oil.

Park the machine on level ground. Lower all attachments to the ground with a slight downward pressure. Move the transmission lock switch into the LOCKED position. Stop the engine.

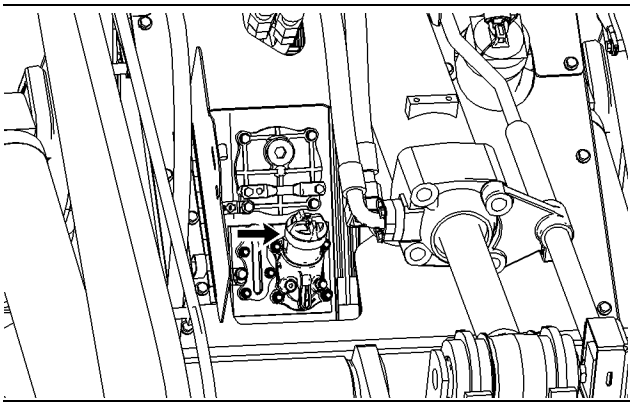


Illustration 150 g00990796

1. Open the tank cover .

2. Slowly remove the hydraulic tank filler cap in order to relieve the system pressure.

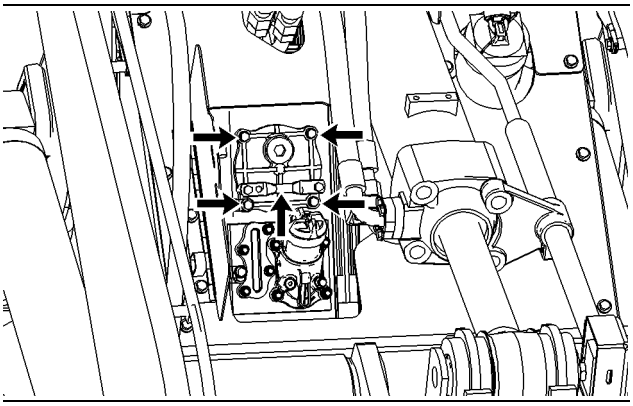


Illustration 151 g00990797

3. Remove the bolts from the filter cover. Use the handle to pull up the filter assembly. Remove the filter assembly.

4. Remove the filter element. Properly discard the filter element.

Apply a thin coat of oil to the seal on the new filter.

5. Install the new filter element by hand. When the seal contacts the base, tighten the filter element for an additional 3/4 turn.

6. Check the condition of the seal for the filter cover. If the seal is damaged or if the seal is cut, replace the seal. Lubricate the seal with clean hydraulic oil.

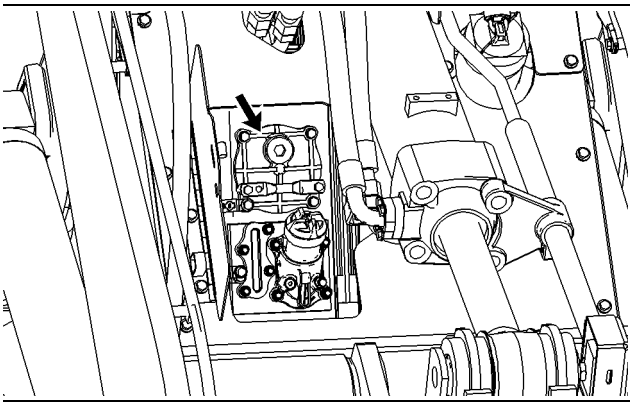


Illustration 152 g00990800

7. Install the filter assembly in the filter housing. Use caution to align the filter assembly properly. Install the cover and tighten the cover bolts.

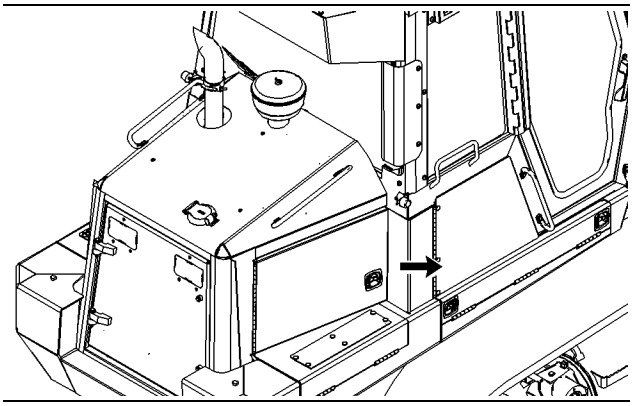


Illustration 153 g00990903

8. Open the access door on the right side of the machine.

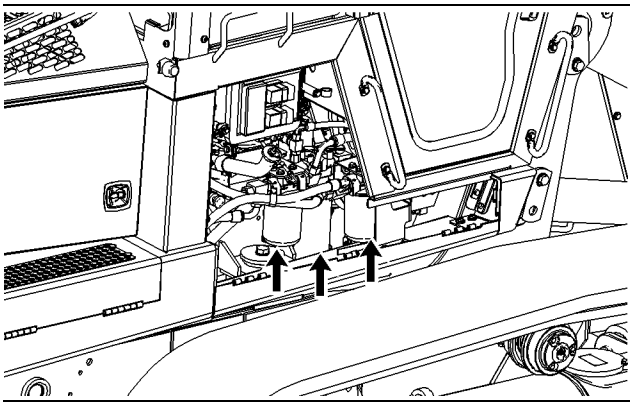


Illustration 154 g00990908

9. Remove the charge filter and the two case drain filters.

10. Wipe the sealing surfaces of the filter bases. Make sure that you remove all of the former filter seal.

11. Apply a thin coat of oil to the seals of the new filters. Install a new charge filter and two new case drain filters.

12. Close the access door.

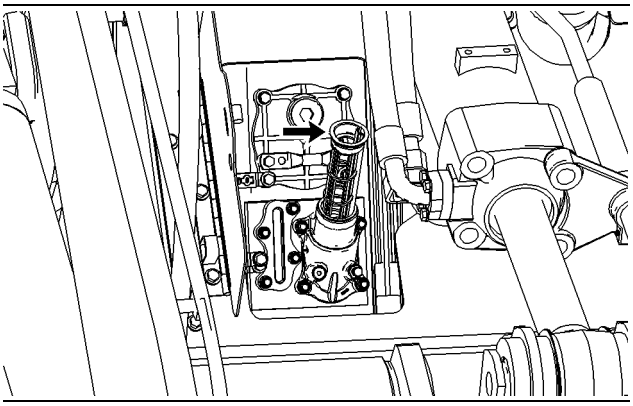


Illustration 155 g00992205

13. Remove the filler strainer and clean the filler strainer. Install the filler strainer and the filler cap.

i02648093

Hydrostatic Transmission and Hydraulic System Oil Sample - Obtain

SMCS Code: 7542-008

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact the skin.

Obtain the Sample and the Analysis

In addition to a good preventive maintenance program, Caterpillar recommends using S·O·S oil analysis at regular scheduled intervals in order to monitor the condition of the hydraulic system and the maintenance requirements of the hydraulic system.

Each oil sample should be taken when the oil is warm and when the oil is well mixed in order to ensure that the sample is representative of the oil in the hydraulic system.

Obtain the S·O·S Sample

⚠ WARNING

At operating temperature, the hydraulic tank is hot and under pressure.

Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

Remove the filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand. Remove the filler cap slowly in order to relieve pressure.

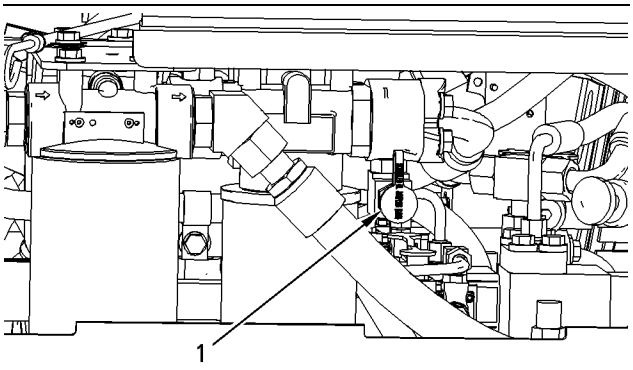


Illustration 156 g00977494

1. Open the engine access door on the right side of the machine.

2. Sampling port (1) is for the hydrostatic transmission and the hydraulic system.

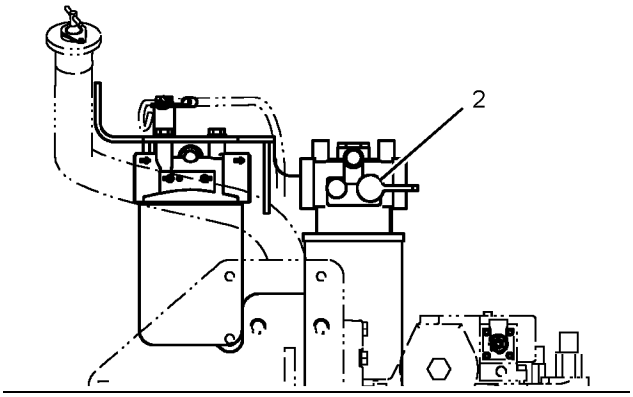


Illustration 157 g01328934
BBX2000-Up

3. Sampling port (2) is for the hydrostatic transmission and the hydraulic system for 953C Track-Type Loaders with higher PIN numbers.

Refer to Special Publication, PEHP6001 for more information on obtaining a good oil sample. Consult your Caterpillar dealer for complete information and assistance in establishing an S·O·S program for your machine.

The recommended interval for oil samples is every 500 hours. The recommended hydraulic oil change interval is 2000 hours. Refer to the Operation and Maintenance Manual, “S·O·S Oil Analysis”.

i01908957

Idler Swing Link - Lubricate

SMCS Code: 4159-086

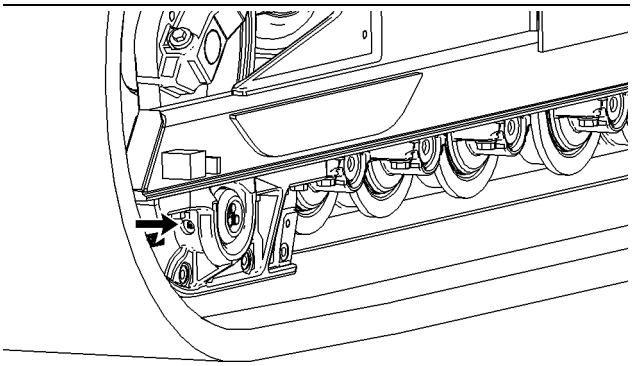


Illustration 158 g00994895

Apply lubricant to a total of 2 fittings. The fittings are located on the inside of each idler.

Note: Use 6V-3155 Brace Assembly in order to support the bucket whenever the lift cylinders are in the RAISE position.

i01876791

Indicators and Gauges - Test

SMCS Code: 4100-081; 7000-081; 7450-081

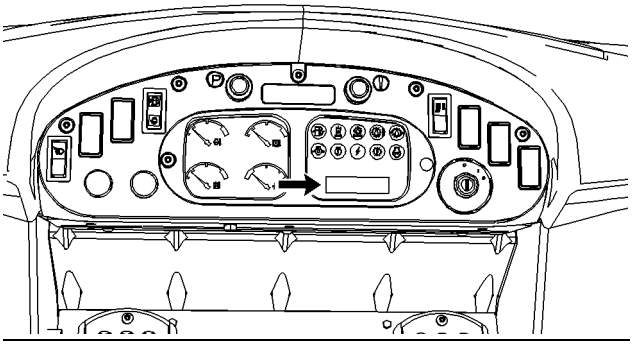


Illustration 159 g00960071

Check the operation of the Caterpillar Monitoring System. Observe the self test when you start the engine.

The system performs an automatic self test when you turn the engine start switch to the ON position.

The self test verifies that the monitoring panel and the display modules are operating properly.

The internal circuits, the indicators, and the gauges are automatically checked.

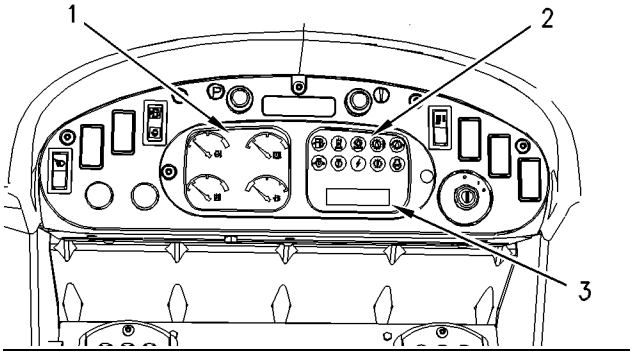


Illustration 160 g00960072

The operator must observe the indicators and the gauges in order to determine whether module (1), module (2), module (3), the indicators, and the gauges are operating properly. The self test lasts for approximately three seconds.

During the self test, all alert indicators flash.

The digital display shows the following readouts:

- All indicators of units (Deg C, kPa, rpm, and liters)
- “X10” readout
- Symbol for the hour meter
- “8.8.8.X.8.8” readout

The pointers in the gauges point upward. Then, the pointers point to the left. Then, the pointers point to the right. Then, the pointers point to the final positions.

- The speed readout shows “188”, “MPH”, and “km/h”.
- The action light stays illuminated.
- The action alarm sounds once.

The monitoring panel is then in the normal operating mode.

If the above tests are not correctly completed, the system will not function in the normal operating mode. Consult your Caterpillar dealer for an electrical system check. Any repairs must be made before you start the engine.

Turn on all of the machine lights. Check for proper operation. Sound the forward horn.

Stop the engine.

Make any necessary repairs before you operate the machine.

i02489423

Loader Linkage Pins - Lubricate

SMCS Code: 6118-086-PN

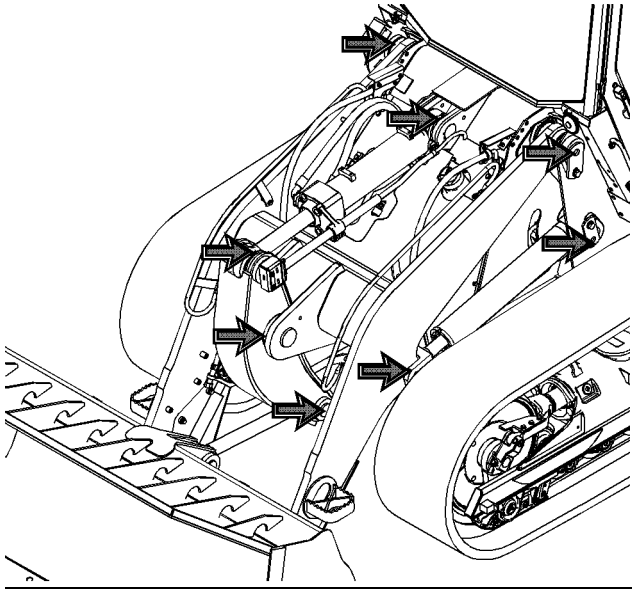


Illustration 161 g01243466

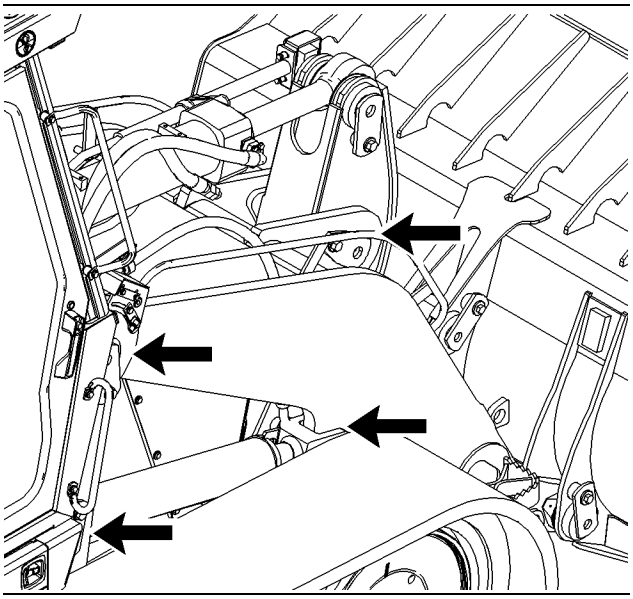


Illustration 162 g00990128

Lubricate all fittings.

i00649279

Multipurpose Bucket - Lubricate

SMCS Code: 6104-086

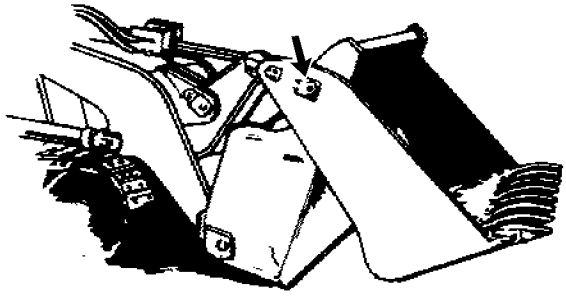


Illustration 163 g00289095

Apply lubricant through one fitting on each side of the bucket.

There is a total of two fittings.

i00543304

Oil Filter - Inspect

SMCS Code: 1318-507; 3067-507; 5068-507

Inspect A Used Filter for Debris

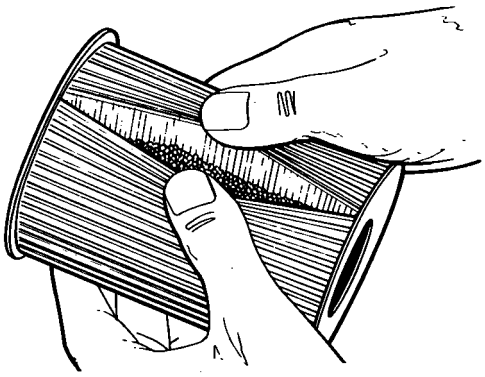


Illustration 164 g00100013

The element is shown with debris.

Use a 4C-5084 Filter Cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

If metals are found in the filter element, a magnet can be used to differentiate between ferrous metals and nonferrous metals.

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

Nonferrous metals can indicate wear on the aluminum parts of the engine such as main bearings, rod bearings, or turbocharger bearings.

Small amounts of debris may be found in the filter element. This could be caused by friction and by normal wear. Consult your Caterpillar dealer in order to arrange for further analysis if an excessive amount of debris is found.

Using an oil filter element that is not recommended by Caterpillar can result in severe damage to the engine and/or the hydraulic system. Engine bearings, the crankshaft, pumps, valves, cylinders and other parts may be damaged. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i01902672

Pivot Shaft Oil Level - Check

SMCS Code: 4153-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

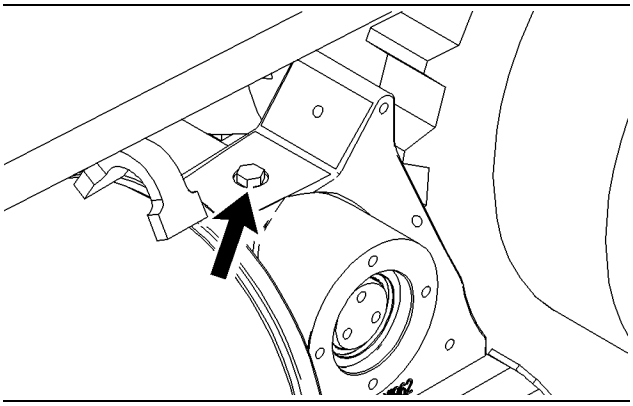


Illustration 165 g00990083

The oil filler plugs are located on both sides of the machine.

Remove the plug on one side of the machine. Check the oil level. Maintain the oil level within 13 mm (0.5 inch) of the bottom of the filler plug opening. If necessary, add oil.

Repeat the procedure on the other side of the machine.

i01905431

Pump Drive Gearbox Oil - Change

SMCS Code: 3080-044

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

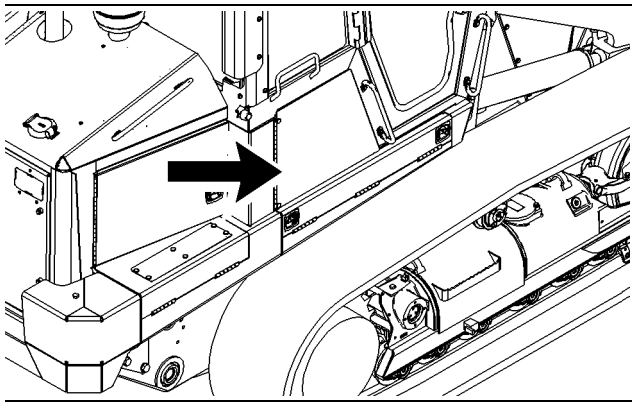


Illustration 166 g00992221

Open the engine compartment access cover on the right side of the machine. Also, open the bottom access door.

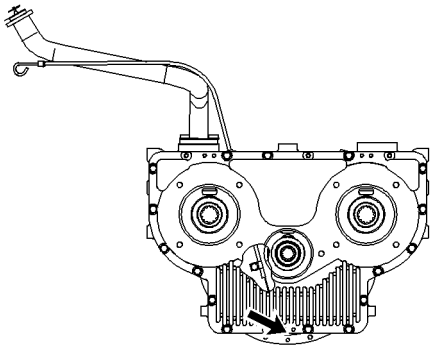


Illustration 167 g00630330

Front view of the pump drive gear box

1. The capacity of the gear box is 3.8 L (1.0 US gal). Remove the drain plug at the bottom of the gear box and drain the oil into a suitable container.

2. Clean the drain plug. Inspect the O-Ring seal for the plug. If the seal is worn or damaged, install a new seal. Install the drain plug.

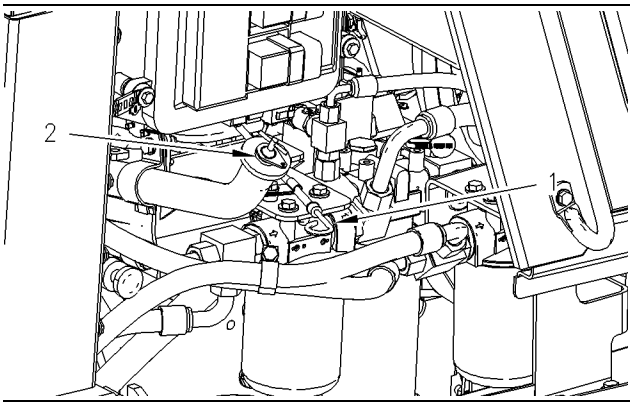


Illustration 168 g00992225

3. Remove filler cap (2) and add the required amount of oil. See the Operation and Maintenance Manual, “Refill Capacities” for the correct amount of oil.

4. Check the oil level on dipstick (1). Maintain the oil level between the “ADD” and the “FULL” marks on the dipstick.

5. Replace the cap on the filler tube. Close both access doors.

i01905452

Pump Drive Gearbox Oil Level - Check

SMCS Code: 3080-535

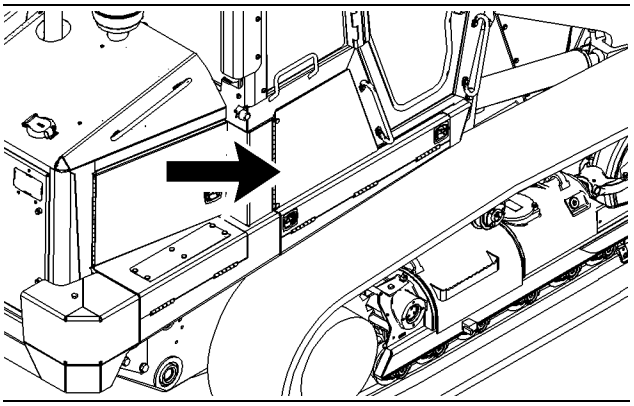


Illustration 169 g00992233

1. Open the front engine compartment access cover on the right side of the machine. Also, open the bottom access door.

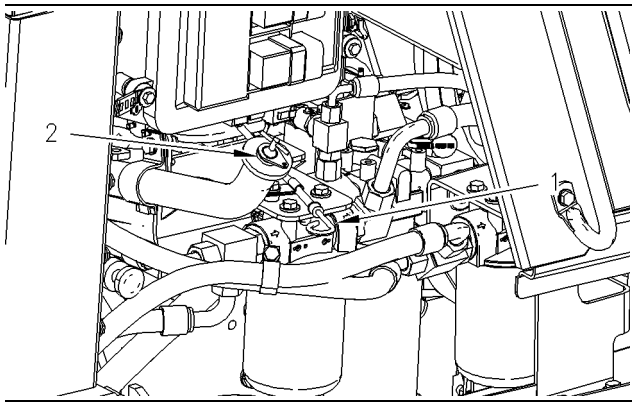


Illustration 170 g00992225

2. Check dipstick (1). Maintain the oil level between the “ADD” and the “FULL” marks. If it is necessary to add oil, remove oil filler cap (2) and add oil through the filler tube.

3. Close both access doors.

i01905461

Pump Drive Gearbox Oil Sample - Obtain

SMCS Code: 3080-554

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact the skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Obtain the Sample and the Analysis

In addition to a good preventive maintenance program, Caterpillar recommends using S·O·S oil analysis at regular scheduled intervals in order to monitor the condition of the pump drive gear box and the maintenance requirements of the pump drive gear box.

Each oil sample should be taken when the oil is warm and the oil is well mixed in order to ensure that the sample is representative of the oil in the gear box.

NOTICE
Always use a designated pump for oil sampling, and use a separate designated pump for coolant sampling. Using the same pump for both types of samples may contaminate the samples that are being drawn. This contaminate may cause a false analysis and an incorrect interpretation that could lead to concerns by both dealers and customers.

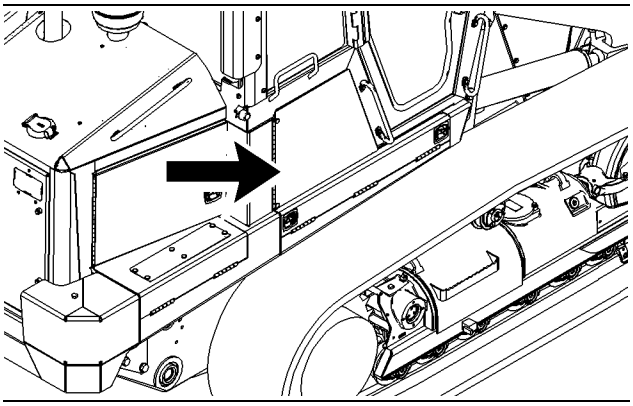


Illustration 171 g00992221

1. Open the front engine compartment access cover on the right side of the machine. Also, open the bottom access door.

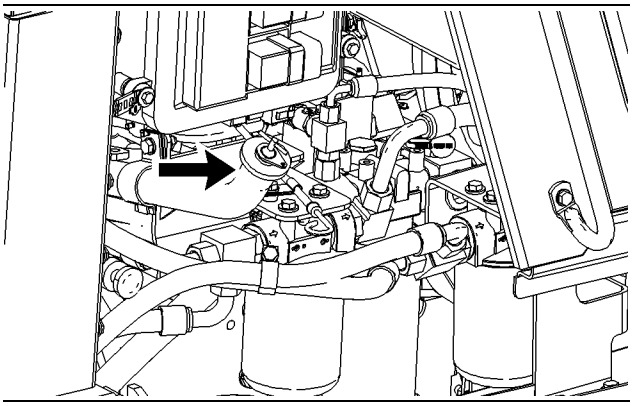


Illustration 172 g00992234

2. Remove the cap for the filler tube for the pump drive gear box. Use a 1U-5718 Vacuum Pump or an equivalent pump. Insert the suction tube in the filler tube and draw an oil sample.
3. Replace the cap on the filler tube.
4. Close both access doors.

Refer to Special Publication, PEHP6001 for more information on obtaining a good oil sample. Consult your Caterpillar dealer for complete information and assistance in establishing an S·O·S program for your machine.

i00682275

Radiator Core - Clean

SMCS Code: 1353-070; 1805; 1810

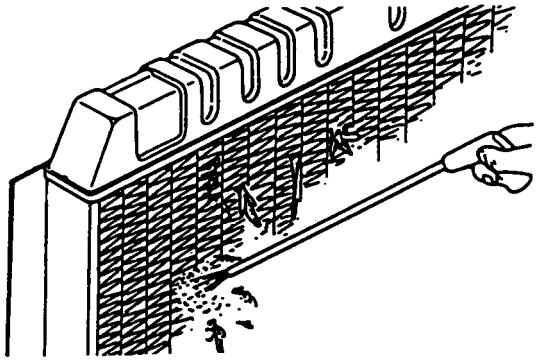


Illustration 173 g00101939

You can use compressed air (30 psi maximum), high pressure water, or steam to remove dust and other debris from the radiator core. However, the use of compressed air is preferred.

See Special Publication, SEBD0518, “Know Your Cooling System” for the complete procedure on cleaning the radiator core.

i01876897

Radiator Pressure Cap - Clean/Replace

SMCS Code: 1353-070-Z2; 1353-510-Z2

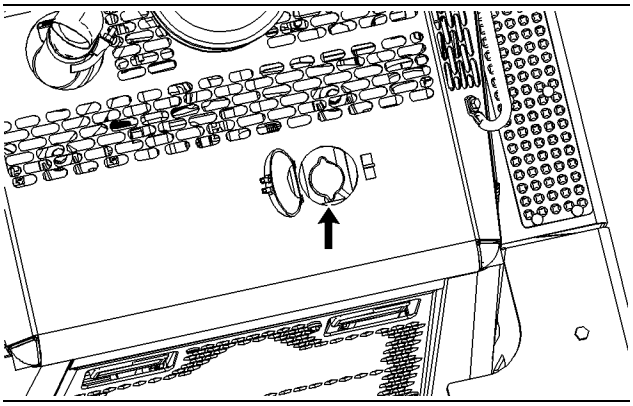


Illustration 174 g00960331

1. Slowly remove the radiator cap in order to relieve system pressure.
2. Inspect the radiator cap for damage, for deposits, or for foreign material. Clean the radiator cap with a clean cloth. Replace the radiator cap if the radiator cap is damaged.
3. Install the radiator cap.

i01902681

Recoil Piston - Lubricate

SMCS Code: 4157-086

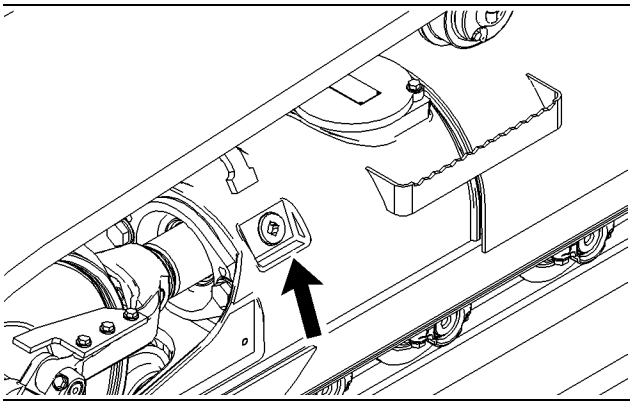


Illustration 175 g00990088

1. Remove the plug in the track roller frame.
2. Connect a grease gun to the fitting. Lubricate the recoil piston through the fitting.
3. Install the plug in the track roller frame.
4. Repeat the procedure for the other recoil compartment.

i01876936

Refrigerant Dryer - Replace

SMCS Code: 7322-510

⚠ WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

NOTICE

If the refrigerant system has been open to the outside air (without being plugged) for more than 30 minutes, the receiver-dryer must be replaced. Moisture will enter an open refrigerant system and cause corrosion which will lead to component failure.

Refer to Service Manual, SENR5664, “Air Conditioning and Heating R-134a For All Caterpillar Machines” for the proper procedure to change the receiver-dryer assembly and for the procedure to reclaim the refrigerant gas.

i00541342

Ripper Tip and Shank Protector - Inspect/Replace

SMCS Code: 6808-040; 6808-510; 6810; 6812-040; 6812-510

When the ripper tip is worn close to the shank, replace the ripper tip. When the shank protector is worn close to the shank, replace the shank protector. If the tip is too blunt, the tip will not penetrate properly.

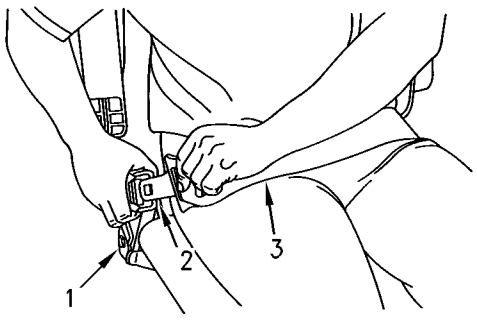
1. Raise the ripper. Place blocking under the ripper. Lower the ripper onto the blocking. The ripper should be high enough so that the ripper tip or the shank protector can be removed. Do not place the ripper too high.
2. If the ripper tip is worn, drive out the pin. Remove the tip and the shank pin retainer.
3. Clean the shank pin retainer and the pin.
4. Install the new tip and the retainer.
5. Install the pin from the opposite side of the retainer.
6. Raise the ripper and remove the blocking.
7. Lower the ripper to the ground.

i02429589

Seat Belt - Inspect

SMCS Code: 7327-040

Always check the condition of the seat belt and the condition of the seat belt mounting hardware before you operate the machine. Replace any parts that are damaged or worn before you operate the machine.



g00932801

Illustration 176

Typical example

Check the seat belt mounting hardware (1) for wear or for damage. Replace any mounting hardware that is worn or damaged. Make sure that the mounting bolts are tight.

Check buckle (2) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect the seat belt (3) for webbing that is worn or frayed. Replace the seat belt if the seat belt is worn or frayed.

Consult your Caterpillar dealer for the replacement of the seat belt and the mounting hardware.

Note: Within three years of the date of installation or within five years of the date of manufacture, replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to the seat belt, the seat belt buckle, and the seat belt retractor.

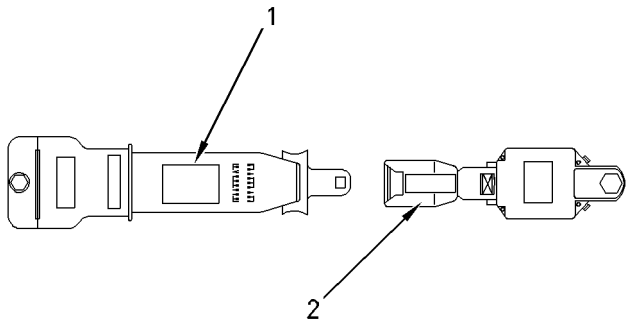
If your machine is equipped with a seat belt extension, also perform this inspection procedure for the seat belt extension.

i01922107

Seat Belt - Replace

SMCS Code: 7327-510

Within three years of the date of installation (2) or within five years of the date of manufacture (1), replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to each seat belt.



g01000223

Illustration 177

(1) Date of Manufacture
(2) Date of Installation

Contact your Caterpillar dealer for the replacement of the seat belt.

i01908314

Track - Check/Adjust

SMCS Code: 4170-025; 4170-036

Check

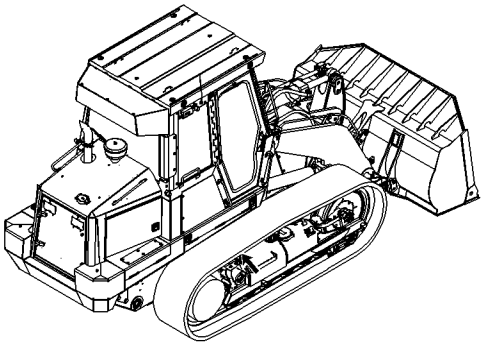


Illustration 178 g00994333

Check the track adjustment. Check the track for wear and for excessive dirt buildup. Replace the track if the track is worn. Clean the track, if necessary.

1. Move the machine forward for a distance of two times the length of the machine. Allow the machine to stop without the use of the service brake. Shut off the engine.

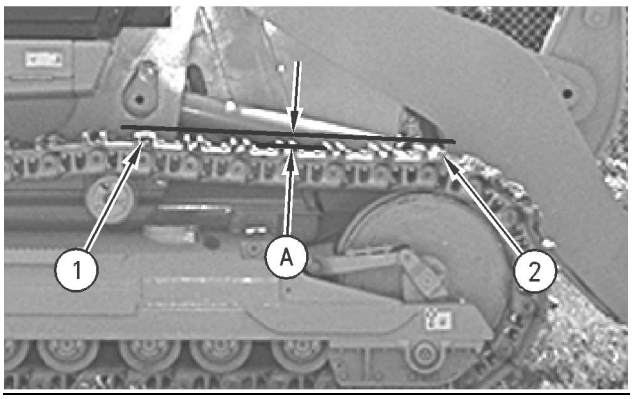


Illustration 179 g00655990

2. Stand on the track between the front idler and the track carrier roller in order to produce as much track sag as possible.

3. Attach one end of a string to the grouser tip on the track shoe that is directly above track carrier roller (1). Make the string tight by pulling on the string. Attach the opposite end of the string to the grouser tip on the track shoe that is directly above front idler (2).

4. Measure the distance between the string and the tip of the grouser that is on the track shoe directly between the front idler and the track carrier roller in order to obtain dimension (A).

5. Dimension (A) should be approximately 50.0 mm (2.0 inch). If dimension (A) is not correct, adjust the track.

Adjust

⚠ WARNING

Grease is under high pressure.

Grease coming out of the relief valve under pressure can penetrate the body causing injury or death.

Do not watch the relief valve to see if grease is escaping. Watch the track or track adjustment cylinder to see if the track is being loosened.

Loosen the relief valve only one turn.

1. Move the machine in a forward direction approximately 15.25 m (50 ft). Allow the machine to stop without the use of the service brakes. Shut off the engine. Adjust the tracks while you are in the machine's typical operating conditions. If packing conditions prevail on the job, the tracks should be adjusted without removing any packed material.

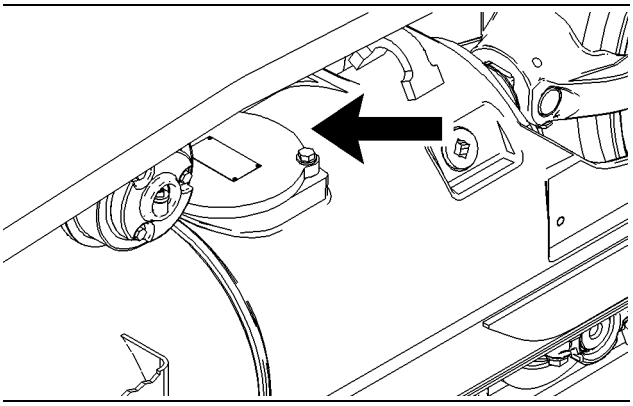


Illustration 180 g00994405

2. Loosen the bolts and remove the cover for the track adjusting mechanism.

3. Add grease with a grease gun in order to move the idler forward until the track is fully tight.

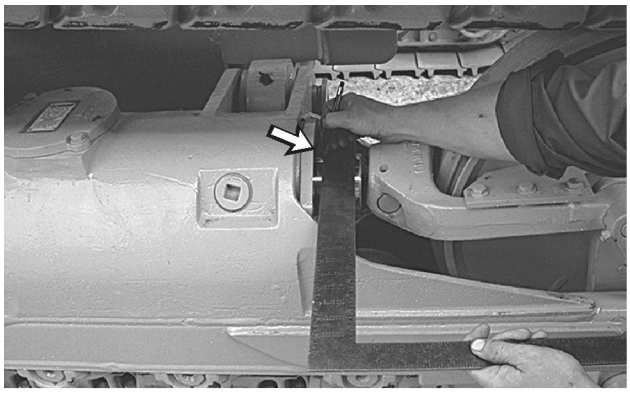


Illustration 181 g00289130

4. Use a straight edge against the face. Mark the rod with a pencil or with a marking pen. Make a mark that is in line with the face.

5. Mark the rod 10 mm (.40 inch) toward the idler from the first mark.

6. Open the relief valve. Allow the idler to move back until the second mark is behind the face. Close the relief valve.

7. Use the grease gun to move the idler forward until the second mark is in line with the face.

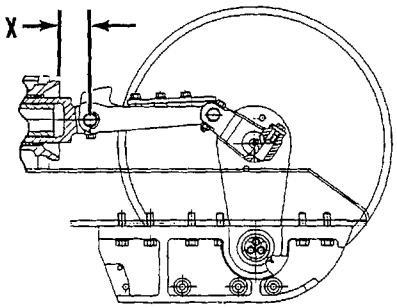


Illustration 182 g00484870

8. Measure dimension (X), as shown above. Dimension (X) is the distance from the face of the bulkhead to the center of the pin in the yoke. If dimension (X) is less than 134 mm (5.3 inch), proceed to Step 9.

   If dimension (X) is greater than 134 mm (5.3 inch), the front idler must be moved forward to a secondary position. Refer to Power Train Disassembly and Assembly, SENR1877, “Track - Adjust” for this procedure.

9. Install the cover and tighten the bolts to a torque of 75 ± 15 N·m (55.50 ± 11 lb ft).

10. Repeat Step 2 through Step 9 for the other track.

Bolt Torque for Track Shoes

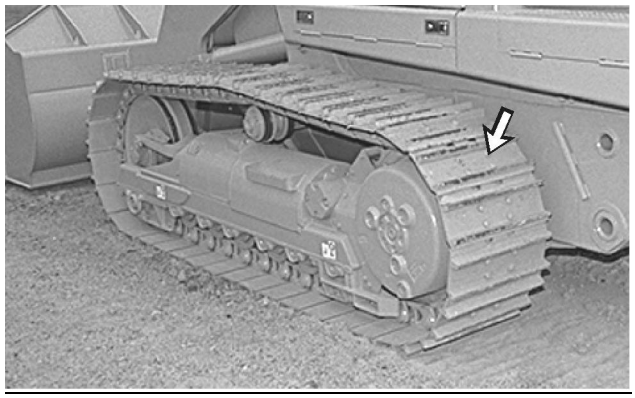


Illustration 183 g00289131

The torque requirement for track shoe bolts is 170 ± 40 N·m (120 ± 30 lb ft). Tighten the bolts for an additional 120 degrees. If you are using bolts with a master link, tighten the bolts to a torque of 170 ± 40 N·m (120 ± 30 lb ft). Tighten the bolts for an additional 180 degrees.

i01989298

Track Pins - Inspect

SMCS Code: 4175-040-PN

⚠ WARNING

Fingers can be burned from hot pins and bushings.

The pins and bushings in a dry joint can become very hot. It is possible to burn the fingers if there is more than brief contact with these components.

Use the recommendations in order to extend the life of the undercarriage. Use the recommendations in order to avoid excessive downtime.

1. During the machine operation, listen for unusual squeaking and for unusual squealing. This can indicate a dry joint.

2. Check the machine for dry joints weekly. Check for dry joints immediately after machine operation. After machine operation, lightly touch the end of each track pin or bushing. Touch the track pin or the track bushing with the back of your hand. Make a mark on any dry track pin joint that is very hot to the touch.

Consult your Caterpillar dealer's Custom Track Service expert if you detect dry joints or leaks. Your Caterpillar dealer's Custom Track Service expert can perform track inspection.

i01876958

Window Washer Reservoir - Fill

SMCS Code: 7306-544

NOTICE
When operating in freezing temperatures, use Caterpillar or any commercially available nonfreezing window washer solvent.

The window washer reservoir is located on the left side of the machine in the engine compartment.

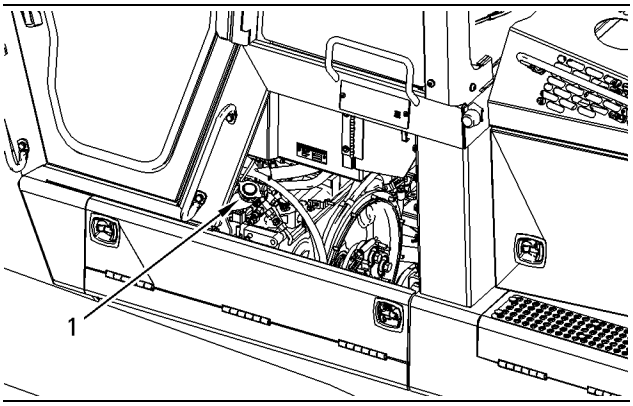


Illustration 184 g00955883

Window Washer Reservoir – Remove cap (1) from the filler tube in order to fill the reservoir.

i01876960

Window Wiper - Inspect/Replace

SMCS Code: 7305-040; 7305-510

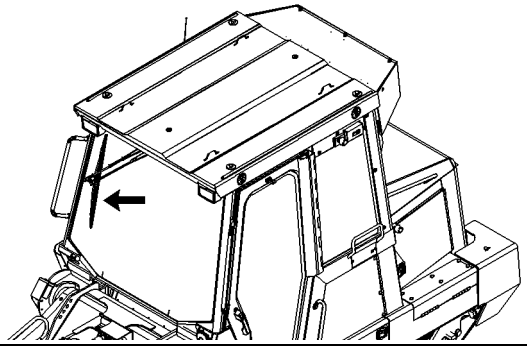


Illustration 185 g00964072

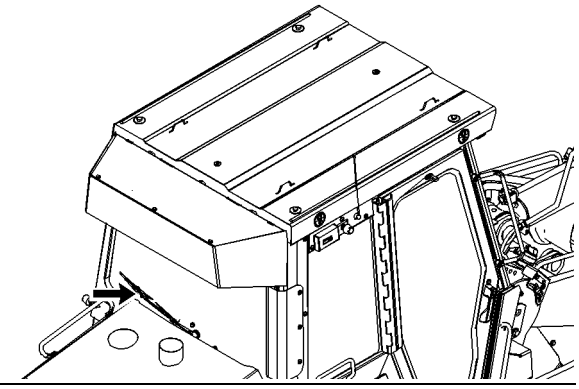


Illustration 186 g00964078

Inspect the front window wiper blades and the rear window wiper blades.

Replace the window wiper blades if any of the following conditions exist:

- The window wiper blades are excessively worn.
- The window wiper blades are damaged.
- The window wiper blades streak the windows.

i01876957

Windows - Clean

SMCS Code: 7310-070; 7340-070

Use commercially available window cleaning solutions in order to clean the windows.

Clean the outside of the windows from the ground unless handholds are available.

Cleaning Methods

Apply the cleaner with a soft cloth. Rub the window with moderate pressure until all the dirt is removed. Allow the cleaner to dry. Wipe off the cleaner with a clean soft cloth.

Soap and Water

Use a clean sponge or a soft cloth. Wash the windows with a mild soap or with a mild detergent. Also use plenty of lukewarm water. Rinse the windows thoroughly. Dry the windows with a moist chamois or with a moist cellulose sponge.

Stubborn Dirt and Grease

Wash the windows with a good grade of naphtha, isopropyl alcohol, or Butyl Cellosolve. Then, wash the windows with soap and with water.