

SAFETY.CAT.COM™

MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt



Operation and Maintenance Manual

308C CR Excavator

KCX1-Up (Machine)

i04339272

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.

Note: If Cat HYDO Advanced 10 hydraulic oil is used, the hydraulic oil change interval is extended to 3000 hours. S·O·S services may extend the oil change to a longer interval. Consult your Caterpillar dealer for details.

When Required

Air Conditioner/Cab Heater Filter (Recirculation) - Inspect/Replace	116
Battery - Recycle	116
Battery or Battery Cable - Inspect/Replace	117
Blade Cutting Edges - Inspect/Replace	118
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Radiator Core - Clean	154
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Windows - Clean	164

Every 10 Service Hours or Daily for First 100 Hours

Blade Linkage - Lubricate	119
Boom and Stick Linkage - Lubricate	119
Bucket Linkage - Lubricate	121

Every 10 Service Hours or Daily

Cooling System Coolant Level - Check	128
Engine Oil Level - Check	134
Fuel System Water Separator - Drain	142
Fuel Tank Water and Sediment - Drain	143
Fuel Tank Water and Sediment - Drain	143
Hydraulic System Oil Level - Check	151
Indicators and Gauges - Test	153
Seat Belt - Inspect	155
Track (Rubber) - Inspect/Replace	160
Track Adjustment - Inspect	162
Travel Alarm - Test	163
Undercarriage - Check	163

Every 10 Service Hours or Daily for Machines Used in Severe Applications

Blade Linkage - Lubricate	119
Bucket Linkage - Lubricate	121

Initial 100 Service Hours

Engine Oil and Filter - Change	135
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Every 100 Service Hours or 2 Weeks

Blade Linkage - Lubricate	119
Bucket Linkage - Lubricate	121
Swing Gear - Lubricate	158

Every 100 Service Hours or 2 Weeks for Machines Used in Severe Applications

Boom and Stick Linkage - Lubricate	119
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Every 100 Service Hours of Continuous Hammer Use

Hydraulic System Oil Filter (Pilot) - Replace	148
Hydraulic System Oil Filter (Return) - Replace ..	150

Initial 250 Service Hours

Engine Valve Lash - Check	137
Final Drive Oil - Change	138
Hydraulic System Oil Filter (Pilot) - Replace	148
Hydraulic System Oil Filter (Return) - Replace ...	150
Swing Drive Oil - Change	156

Every 250 Service Hours

Cooling System Coolant Sample (Level 1) - Obtain	129
Engine Oil Sample - Obtain	135
Final Drive Oil Sample - Obtain	139

Every 250 Service Hours or Monthly

Belts - Inspect/Adjust/Replace	117
Condenser (Refrigerant) - Clean	125
Swing Bearing - Lubricate	156
Swing Drive Oil Level - Check	157

Every 250 Service Hours of Partial Hammer Use (50% of Service Hours)

Hydraulic System Oil Filter (Pilot) - Replace	148
Hydraulic System Oil Filter (Return) - Replace ...	150

Initial 500 Hours (for New Systems, Refilled Systems, and Converted Systems)

Cooling System Coolant Sample (Level 2) - Obtain	130
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Every 500 Service Hours

Hydraulic System Oil Sample - Obtain	152
Swing Drive Oil Sample - Obtain	158

Every 500 Service Hours or 3 Months

Engine Oil and Filter - Change	135
Fuel System Filter - Replace	139
Fuel System - Prime	140
Fuel System Priming Pump Strainer - Clean	141
Fuel Tank Cap and Strainer - Clean	142
Hydraulic System Oil Filter (Pilot) - Replace	148
Hydraulic System Oil Filter (Return) - Replace ...	150

Every 600 Service Hours of Continuous Hammer Use

Hydraulic System Oil - Change	145
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Every 1000 Service Hours

Timing Chain Tensioner - Inspect	160
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Every 1000 Service Hours or 6 Months

Battery - Clean	116
Battery Hold-Down - Tighten	116
Boom and Stick Linkage - Lubricate	119
Engine Valve Lash - Check	137
Final Drive Oil Level - Check	139
Swing Drive Oil - Change	156

Every 1000 Service Hours of Partial Hammer Use (50% of Service Hours)

Hydraulic System Oil - Change	145
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Every 2000 Service Hours or 1 Year

Final Drive Oil - Change	138
Hydraulic System Oil - Change	145
Swing Gear and Bearing - Inspect	159

Every Year

Cooling System Coolant Sample (Level 2) - Obtain	130
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Every 3000 Service Hours or 18 Months

Hydraulic System Oil - Change	145
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Every 3 Years After Date of Installation or Every 5 Years After Date of Manufacture

Seat Belt - Replace	155
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Every 6000 Service Hours or 3 Years

Cooling System Coolant Extender (ELC) - Add ..	127
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Every 12 000 Service Hours or 6 Years

Cooling System Coolant (ELC) - Change	126
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i01644425

Air Conditioner/Cab Heater Filter (Recirculation) - Inspect/Replace

SMCS Code: 1054-040-A/C; 1054-510-A/C

NOTICE

An air recirculation filter element plugged with dust will result in decreased performance and service life to the air conditioner or cab heater.

To prevent decreased performance, clean the filter element, as required.

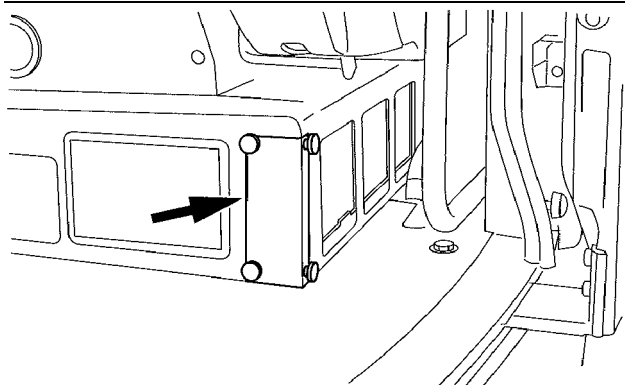


Illustration 109

g00849969

The recirculation filter is on the left side of the operator seat.

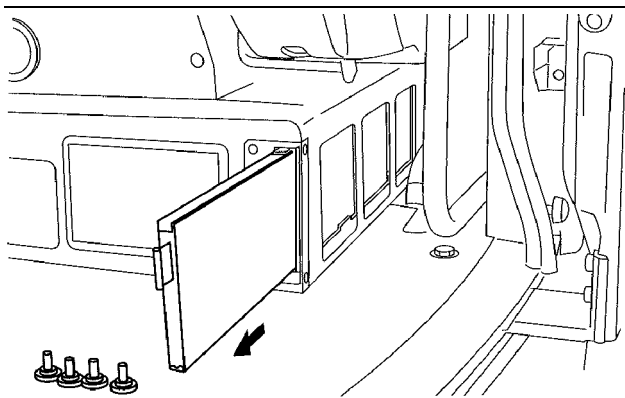


Illustration 110

g00849975

1. To remove the filter element, remove the cover bolts.
2. To remove the filter, pull the filter away from the operator seat.
3. Refer to Operation and Maintenance Manual, "General Hazard Information" before using pressure air to clean the air filter element.

4. Clean the filter element with a maximum of 200 kPa (30 psi) pressure air.
5. After you clean the filter element, inspect the filter element. If the filter element is damaged or badly contaminated, use a new filter element. Make sure that the filter element is dry.

i00934864

Battery - Clean

SMCS Code: 1401-070

Clean the battery surface with a clean cloth. Keep the terminals clean and keep the terminals coated with petroleum jelly. Install the post cover after you coat the terminal post with petroleum jelly.

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

i00934872

Battery Hold-Down - Tighten

SMCS Code: 7257

Tighten the hold-downs for the battery in order to prevent the batteries from moving during machine operation.

i04064489

i01914481

Battery or Battery Cable - Inspect/Replace

SMCS Code: 1401-040; 1401-510; 1401-561; 1401; 1402-040; 1402-510

WARNING

Personal injury can result from battery fumes or explosion.

Batteries give off flammable fumes that can explode. Electrolyte is an acid and can cause personal injury if it contacts the skin or eyes.

Prevent sparks near the batteries. Sparks could cause vapors to explode. Do not allow jumper cable ends to contact each other or the engine. Improper jumper cable connections can cause an explosion.

Always wear protective glasses when working with batteries.

1. Turn all of the switches to the OFF position. Turn the engine start switch key to the OFF position.
2. Turn the battery disconnect switch to the OFF position. Remove the key.
3. Disconnect the negative battery cable at the battery.
4. Disconnect the positive battery cable at the battery.
5. Disconnect the battery cables at the battery disconnect switch. The battery disconnect switch is connected to the machine frame.
6. Make necessary repairs or replace the battery.
7. Connect the battery cable at the battery disconnect switch.
8. Connect the positive battery cable of the battery.
9. Connect the negative battery cable of the battery.
10. Install the key and turn the battery disconnect switch to the ON position.

Belts - Inspect/Adjust/Replace

SMCS Code: 1357-025; 1357-040; 1357-510; 1397-025; 1397-040; 1397-510

NOTICE

The V-belt must be tensioned correctly. Failure to tension the belt properly could cause damage to the belt and/or to the air conditioner compressor.

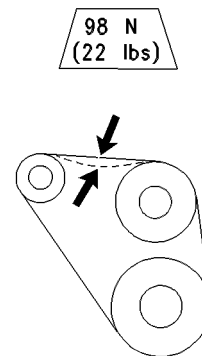


Illustration 111

g00102670

Your engine can be equipped with a water pump, with a fan drive, and with an alternator. Your engine can also be equipped with accessory drive belts. For maximum engine performance and maximum utilization of your engine, inspect the belts for wear and for cracking. Check the belt tension. Adjust the belt tension in order to minimize belt slippage. Belt slippage will decrease the belt life. Belt slippage will also cause poor performance of the alternator and of any driven equipment.

If new belts are installed, recheck the belt adjustment after 30 minutes of operation. If two belts or more are required for an application, replace the belts in belt sets. If only one belt of a pair is replaced, the new belt will carry more load. This is due to the fact that the older belts are stretched. The additional load on the new belt could cause the new belt to break.

Water Pump Belt, Fan Drive Belt, and Alternator Belt

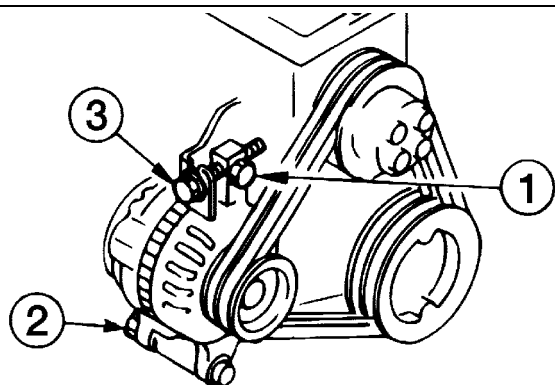


Illustration 112

g00418343

- (1) Alternator mounting bolt
(2) Nut
(3) Adjusting bolt

1. Open the engine hood.
2. Apply approximately 98 N (22 lb) of force midway between the pulleys.
3. Measure the deflection of the belt. The belt should deflect 8 to 11 mm (5/16 to 7/16 inch).
4. If the deflection is not correct, loosen alternator mounting bolt (1) and nut (2). Turn adjusting bolt (3) in order to adjust the belt tension.
5. When the adjustment is correct, tighten bolt (1) to a torque of 21 ± 4 N·m (15 ± 3 lb ft). Tighten nut (2) to a torque of 41 ± 8 N·m (30 ± 6 lb ft).
6. Check the deflection of the belt again.

Note: If a new belt is installed, check the belt adjustment again after 30 minutes of engine operation at the rated engine speed.

Air Conditioner Belt

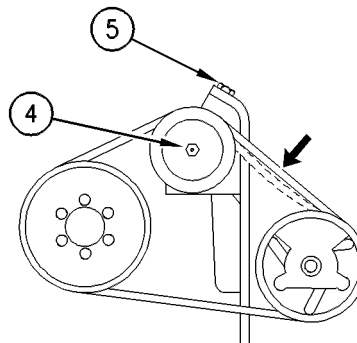


Illustration 113

g00418344

- (4) Collar
(5) Adjusting bolt

1. Apply approximately 98 N (22 lb) of force midway between the pulleys.
2. Measure the deflection of the belt. The belt should deflect 7 to 10 mm (1/4 to 3/8 inch).
3. If the deflection is not correct, loosen collar (4). Turn adjusting bolt (5) in order to adjust the belt tension.
4. When the adjustment is correct, tighten collar (4) to a torque of 100 ± 20 N·m (75 ± 15 lb ft).
5. Check the deflection again.

Note: If a new belt is installed, recheck the belt adjustment again after 30 minutes of operation.

6. Close the engine hood.

i01914958

Blade Cutting Edges - Inspect/Replace

SMCS Code: 6801

WARNING

Personal injury or death can result from a falling blade.

Block the blade before changing the cutting edges and the end bits.

Check the cutting edge of the blade and the end bits of the blade for wear. If any of the parts have signs of unusual wear or damage, replace the part.

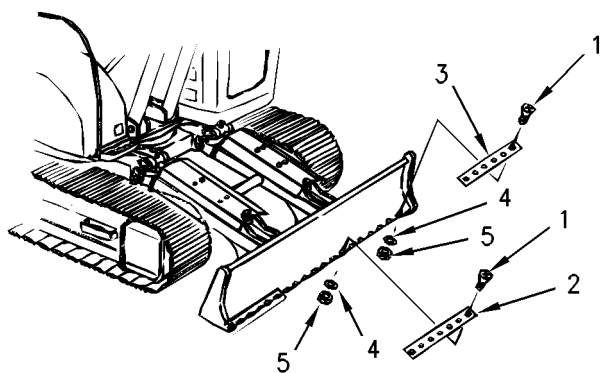


Illustration 114

g00997509

1. Raise the blade and place blocking underneath the blade.
2. Lower the blade onto the blocking.
3. Remove bolts (1), washers (4) and nuts (5).
4. Remove cutting edge (2) and end bits (3).
5. Clean the surface between the cutting edge and the end bits.
6. Turn the cutting edge and/or the end bits upside-down if those edges are not worn.
7. If both sides of the cutting edge and the end bits are worn, replace the parts with new parts.
8. Install the new parts or the rotated parts with bolts (1). Tighten the bolts to a torque of $270 \pm 40 \text{ N}\cdot\text{m}$ ($200 \pm 30 \text{ lb}\cdot\text{ft}$).
9. Raise the blade and remove the blocking.
10. Lower the blade to the ground.
11. After a few hours of operation, tighten bolts (1) to the torque that is specified in Step 8.

i02055581

Blade Linkage - Lubricate

SMCS Code: 6060-086-KL

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the blade linkage. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on molybdenum grease.

Wipe all fittings before you apply lubricant.

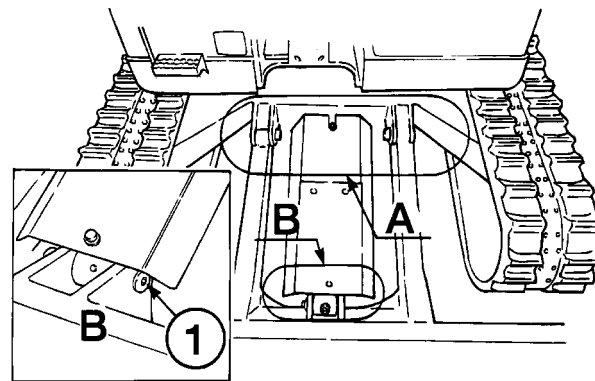


Illustration 115

g00413980

1. Apply lubricant through fitting (1). This fitting is located on the head end of the blade cylinder.
2. Apply lubricant through fitting (2). This fitting is located on the rod end of the blade cylinder.

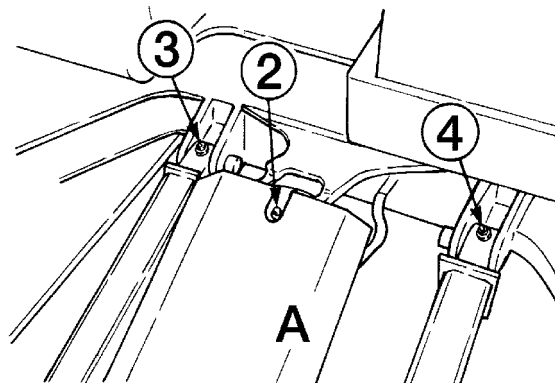


Illustration 116

g00413982

3. Apply lubricant through fitting (3) and through fitting (4). These fittings are located on the bar that supports the blade.

i01664167

Boom and Stick Linkage - Lubricate

SMCS Code: 6501-086; 6502-086

Note: Caterpillar recommends the use of 5P - 0960 Molybdenum Grease for lubricating the boom, stick and bucket control linkage. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on molybdenum grease.

Apply lubricant through all fittings after operation under water.

Wipe all fittings before you apply lubricant.

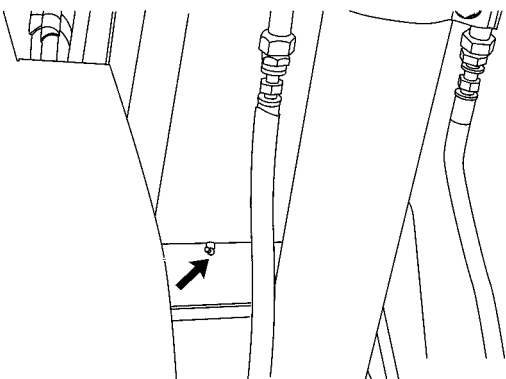


Illustration 117

g00859235

1. Apply lubricant through the fitting at the base of the boom.

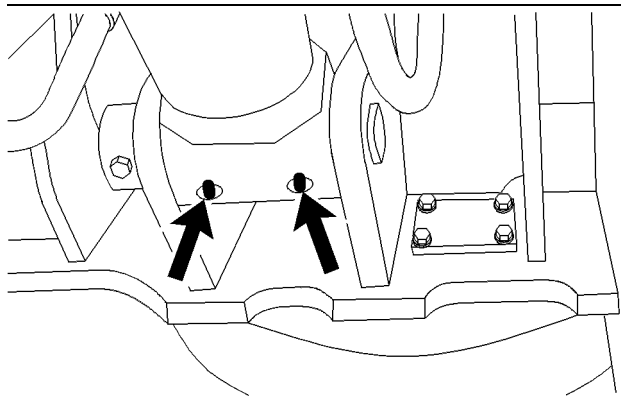


Illustration 118

g00411721

2. Apply lubricant through the fittings at the base of the boom cylinder.

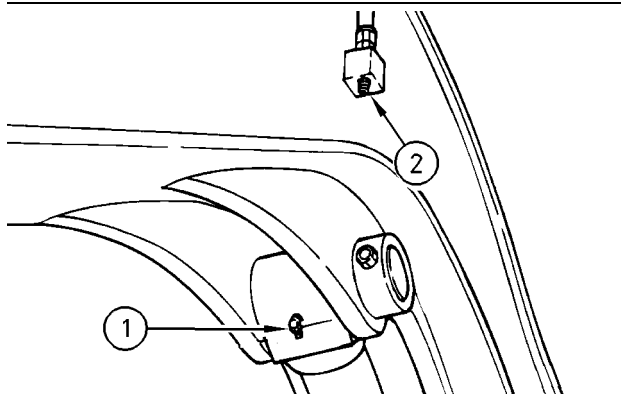


Illustration 119

g00746217

3. Apply lubricant through fitting (1). This fitting is located on the rod end of the boom cylinder.
4. Apply lubricant through fitting (2). This fitting is located on the head end of the stick cylinder.

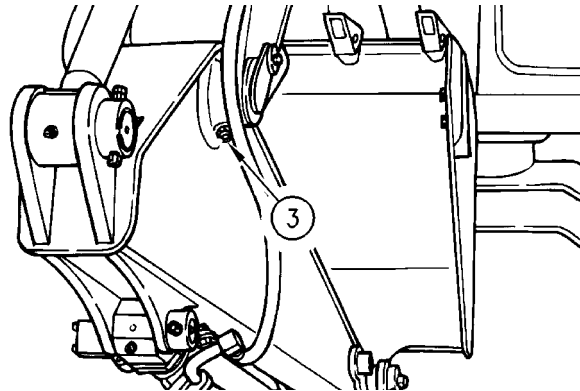


Illustration 120

g00746218

5. Apply lubricant through fitting (3). This fitting is located at the junction of the boom and the stick.

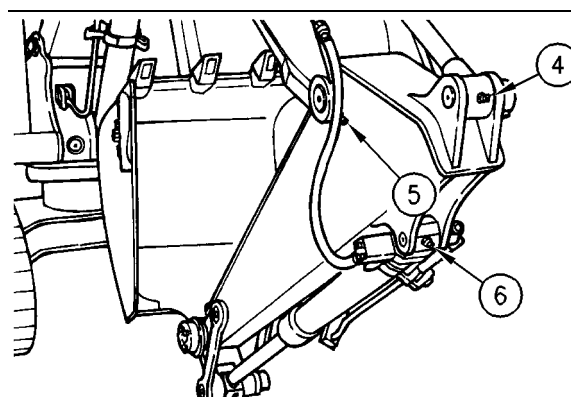


Illustration 121

g00746219

6. Apply lubricant through fitting (4). This fitting is located on the rod end of the stick cylinder.
7. Apply lubricant through fitting (5). This fitting is located at the junction of the boom and the stick.
8. Apply lubricant through fitting (6). This fitting is located on the head end of the bucket cylinder.

i01995001

Bucket Linkage - Inspect/Adjust

SMCS Code: 6513-025; 6513-040

WARNING

Unexpected machine movement can cause injury or death.

To avoid possible machine movement, move the hydraulic lockout control to the locked position and attach a Special Instruction, SEHS7332, "Do Not Operate" or similar warning tag to the hydraulic lockout control.

NOTICE

Improperly adjusted bucket clearance could cause galling on the contact surfaces of the bucket and stick, resulting in excessive noise and/or damaged O-ring seals.

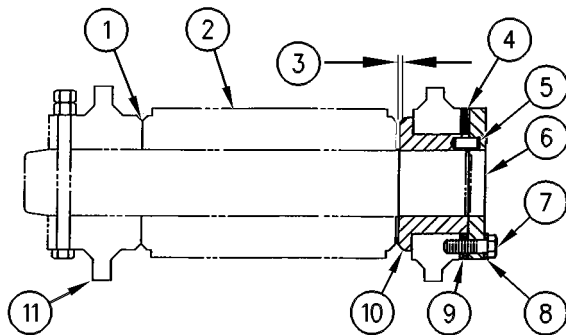


Illustration 122

g00101687

- (1) No gap
- (2) Stick boss
- (3) Bucket clearance
- (4) Shims
- (5) Pin
- (6) Plate
- (7) Bolts
- (8) Washers
- (9) Location
- (10) Flange
- (11) Bucket boss

The clearance of the bucket linkage on this machine can be adjusted by shimming. If the gap between the bucket and the stick becomes excessive, adjust bucket clearance (3) to 0.5 to 1 mm (.02 to .04 inch).

Two shims of different thickness are used at location (9). The thicknesses of the shims are 0.5 mm (0.02 inch) and 1.0 mm (0.04 inch).

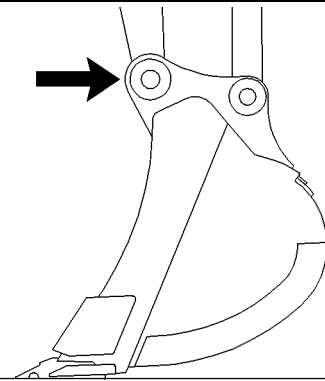


Illustration 123

g00428258

Area for linkage adjustment

1. Position the machine on a level surface and lower the bucket to the ground.
2. Slowly operate the swing control lever until stick boss (2) and bucket boss (11) are in full face contact at no gap (1). This will help to determine the total clearance of the connection point of the stick and the bucket.
3. Move the hydraulic lockout control to the LOCKED position. Stop the engine.
4. Measure bucket clearance (3), which is the existing total clearance.
5. Determine the number of shims that need to be removed from shims (4) by using the following calculation:

Subtract 0.5 mm (0.02 inch) or 1.0 mm (0.04 inch) from bucket clearance (3).
6. Remove the appropriate number of shims at location (9) in order to meet the above thickness. Make sure that you use a minimum of three 0.5 mm (.02 inch) shims. To remove the shims, remove bolts (7), washers (8), and plate (6).
7. After the correct number of shims have been removed and pin (5) is aligned with the pin hole, install plate (6), washers (8), and bolts (7). Tighten bolts (7) to a torque of $100 \pm 20 \text{ N}\cdot\text{m}$ ($70 \pm 15 \text{ lb}\cdot\text{ft}$).
8. After installation, make sure that bucket clearance (3) is still correct.

i01664209

Bucket Linkage - Lubricate

SMCS Code: 6513-086

Wipe all fittings before you apply lubricant.

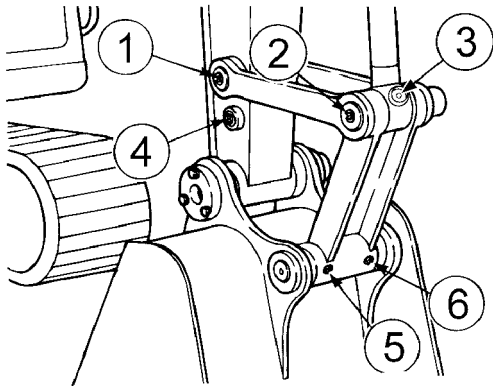


Illustration 124

g00859285

Note: Completely fill all cavities of the bucket control linkage with grease when you initially install a bucket.

1. Apply lubricant through fittings for the linkages (1), (2), (3), and (4).
2. Apply lubricant through fittings for the bucket (5) and (6).

Note: Service the above fittings after you operate the bucket under water.

i02420572

Bucket Tips - Inspect/Replace

SMCS Code: 6805-040; 6805-510

WARNING

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket tips or side cutters.

Bucket Tips

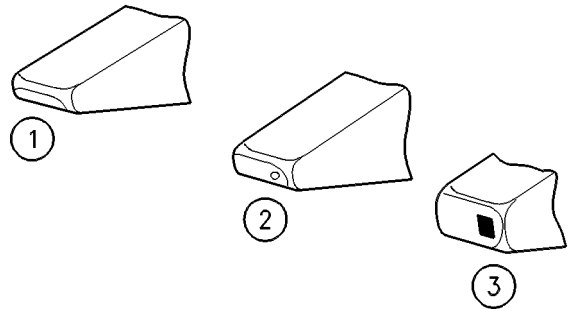


Illustration 125

g00101352

- (1) Usable
(2) Replace this bucket tip.
(3) Overworn

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

1. Remove the pin from the bucket tip. The pin can be removed by one of the following methods.
 - Use a hammer and a punch from the retainer side of the bucket to drive out the pin.
 - Use a Pin-Master. Follow Step 1.a through Step 1.c for the procedure.

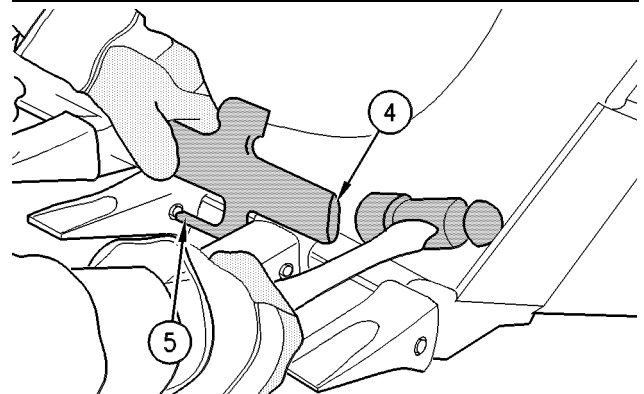


Illustration 126

g00590670

- (4) Back of Pin-Master
(5) Extractor

- a. Place the Pin-Master on the bucket tip.
- b. Align extractor (5) with the pin.
- c. Strike the Pin-Master at the back of the tool (4) and remove the pin.

Note: Discard the old pin and the retainer assembly. When you change tips, use a new pin and a new retainer assembly. Refer to the appropriate parts manual for your machine.

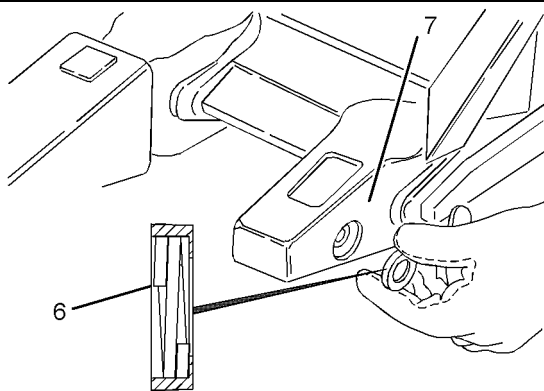


Illustration 127

g01194448

(6) Retainer assembly
(7) Adapter

2. Clean the adapter and the pin.

- 3. Fit retainer assembly (6) into the counterbore that is in the side of adapter (7). Make sure that the face of the retainer assembly with the marking "OUTSIDE" is visible.**

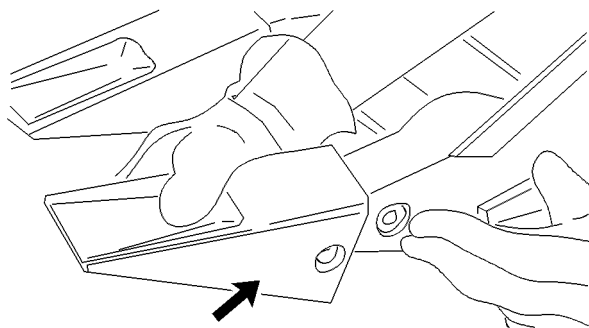


Illustration 128

g00101359

4. Install the new bucket tip onto the adapter.

Note: The bucket tips can be rotated by 180 degrees in order to allow the tip to wear evenly. You may also move the tips from the outside teeth to the inside teeth. Check the tips often. If wear is present on the tips, rotate the tips. The outside teeth generate the most wear.

5. Drive the pin through the bucket tip. The pin can be installed by using one of the following methods:

- From the same side of the retainer, drive the pin through the bucket tip, the retainer assembly, and the adapter.
- Use a Pin-Master. Follow Step 5.a through Step 5.e for the procedure.

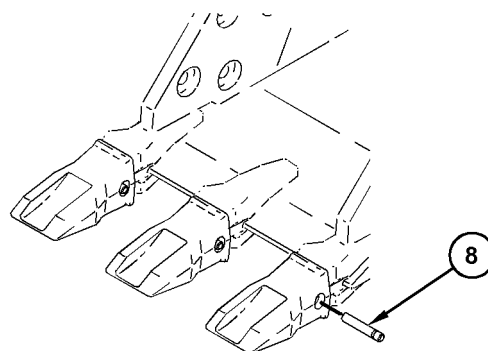


Illustration 129

g01209166

(8) Pin

a. Insert pin (8) through the bucket tip.

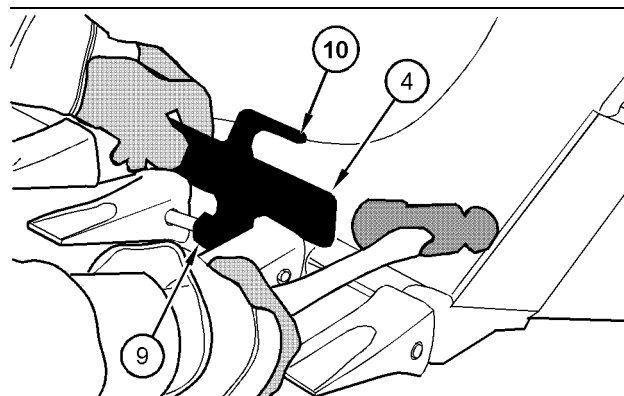


Illustration 130

g01209140

(4) Back of Pin-Master
(9) Pin holder
(10) Pin setter

- b. Place the Pin-Master over the bucket tips so that the pin will fit into the counterbore of the pin holder (9).**
- c. Strike the Pin-Master with a hammer at the back of the tool (4) in order to insert the pin.**
- d. Slide pin holder (9) away from the pin and rotate the tool slightly in order to align pin setter (10) with the pin.**

i01914851

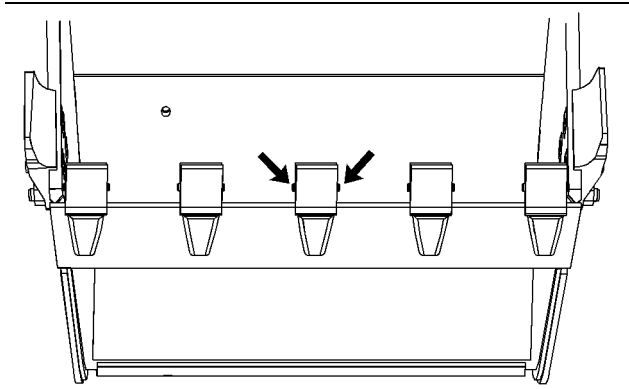


Illustration 131

g01209159

Final assembly of pin into bucket tip.

- e. Strike the end of the tool until the pin is fully inserted.

Side Cutters

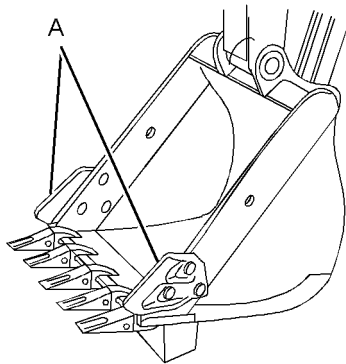


Illustration 132

g01092808

Bucket With Side Cutters

(A) Side cutters

1. Remove the mounting bolts and the side cutters.
2. Clean the mounting surface of the side plate on the bucket and of the side cutter. Remove any burrs or protrusions on the mating surfaces.

Note: Some side cutters may be rotated for additional wear.

3. Install the side cutter.

Note: Certain bolts may require thread compound.

4. Hand tighten the bolts.
5. Torque the mounting bolts to the correct specification.

Cab Air Filter (Fresh Air) - Clean/Replace

SMCS Code: 7342-070; 7342-510

S/N: KCX252-Up

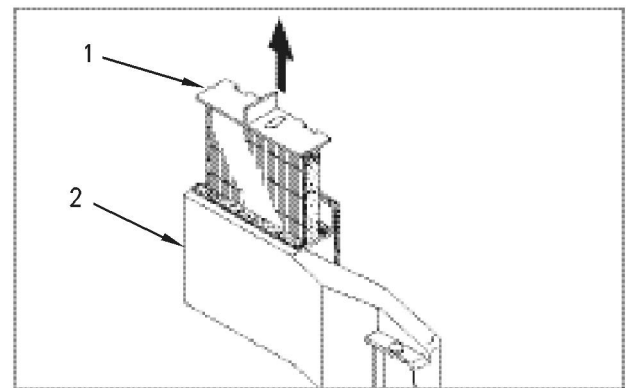


Illustration 133

g00997487

- (1) Air Filter
- (2) Duct

The fresh air filter is located behind the operator's seat.

1. Remove the air filter from the duct by pulling the air filter upward.
2. Clean the air filter with a maximum of 200 kPa (30 psi) pressure air.
3. After you clean the air filter, inspect the air filter. If the air filter is damaged or badly contaminated, use a new air filter.
4. Install the air filter.

Note: Make sure that the arrow on top of the air filter is facing forward.

i01418993

i01644685

Circuit Breakers - Reset

SMCS Code: 1420-529

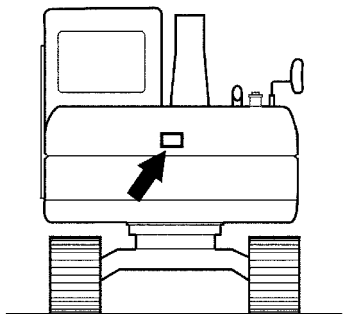


Illustration 134

g00744821

1. Open the engine hood.

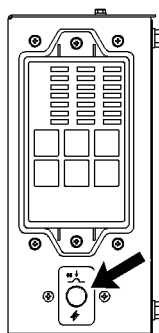


Illustration 135

g00414158

The circuit breaker is located behind the cab on the left side of the machine.

2. Push down on the circuit breaker button in order to reset the circuit breaker.
3. Close the engine hood.



Alternator Circuit – This circuit breaker is designed to protect the alternator. If the batteries are installed with reversed polarity, the circuit breaker would prevent the alternator from damaging the rectifier.

Alternator Circuit 60 Amp

Condenser (Refrigerant) - Clean

SMCS Code: 1805-070

NOTICE

If excessively dirty, clean condenser with a brush. To prevent damage or bending of the fins, do not use a stiff brush.

Repair the fins if found defective.

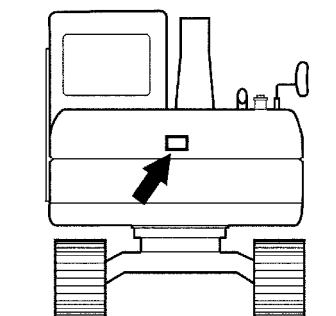


Illustration 136

g00744821

1. Open the engine hood.

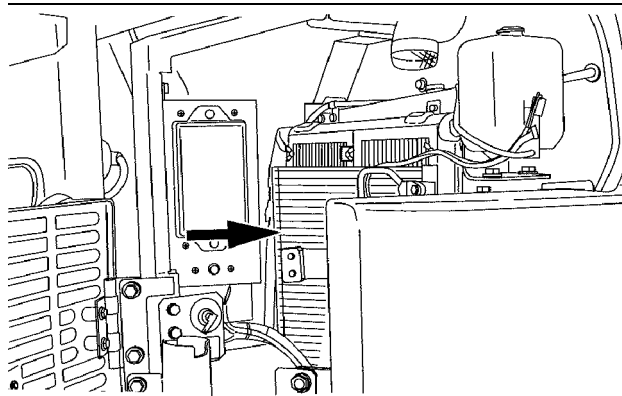


Illustration 137

g00850108

2. Inspect the condenser for debris. Clean the condenser, if necessary.
3. Use clean water to wash off all dust and dirt from the condenser.
4. Close the engine hood.

i02250048

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044

NOTICE

Do not change the coolant until you read and understand the cooling system information in Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

Failure to do so could result in damage to the cooling system components.

NOTICE

Mixing ELC with other products will reduce the effectiveness of the coolant.

This could result in damage to cooling system components.

If Caterpillar products are not available and commercial products must be used, make sure they have passed the Caterpillar EC-1 specification for pre-mixed or concentrate coolants and Caterpillar Extender.

Note: This machine was filled at the factory with Caterpillar Extended Life Coolant.

If the coolant in the machine is changed to Extended Life Coolant from another type of coolant, see Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

1. Open the engine hood.

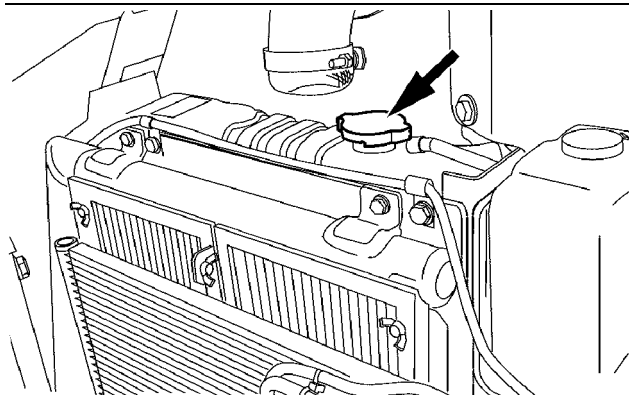


Illustration 138

g00850305

2. Slowly loosen the cooling system pressure cap in order to relieve cooling system pressure. Remove the pressure cap.

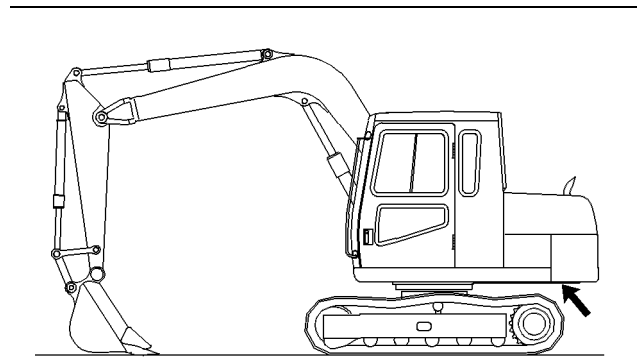


Illustration 139

g00419907

3. Remove the access cover that is located under the radiator.

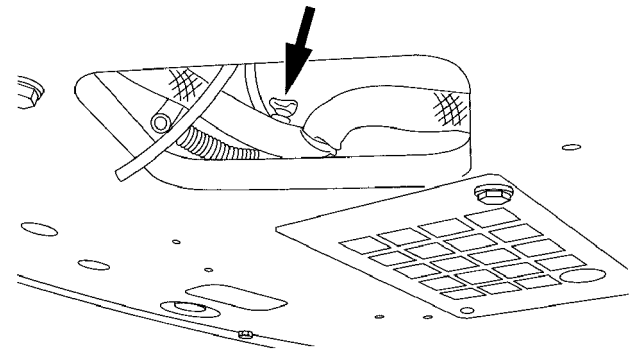


Illustration 140

g00850311

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

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

Note: Dispose of drained fluids according to local regulations.

5. Flush the cooling system with clean water until the draining water is transparent.
6. Close the drain valve.
7. Add the Extended Life Coolant. Refer to the following topics:

- Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations"
- Operation and Maintenance Manual, "Capacities (Refill)"

i02250068

8. Start the engine. Operate the engine without the cooling system pressure cap until the water temperature regulator opens and the coolant level stabilizes.
9. Maintain the coolant level within 13 mm (.5 inches) of the bottom of the filler pipe.
10. Inspect the gasket of the cooling system pressure cap. If the gasket is damaged, replace the pressure cap.
11. Install the cooling system pressure cap.
12. Stop the engine.

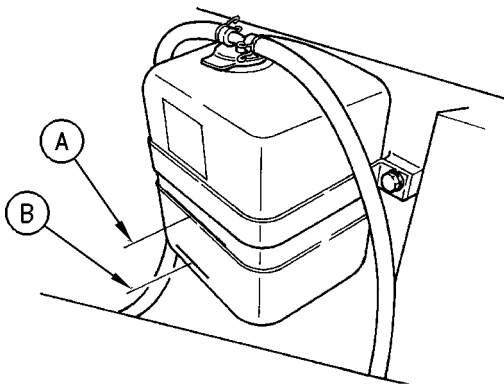


Illustration 141

g00737547

- (A) "FULL" level
(B) "LOW" level

13. Check the coolant level of the coolant reservoir. Maintain the coolant level between the "FULL" mark and the "LOW" mark.
14. If additional coolant is necessary, remove the reservoir cap and add the appropriate coolant solution.
15. Install the reservoir cap.
16. Install the access cover that is located under the radiator.
17. Close the engine hood.

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352; 1353; 1395

When Caterpillar Extended Life Coolant (ELC) is used, 119-5152 Coolant Extender must be added to the cooling system. See Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for all cooling system requirements.

Use a 8T-5296 Coolant Conditioner Test Kit to check the concentration of the coolant.

NOTICE

Mixing ELC with other products will reduce the effectiveness of the coolant.

This could result in damage to cooling system components.

If Caterpillar products are not available and commercial products must be used, make sure they have passed the Caterpillar EC-1 specification for pre-mixed or concentrate coolants and Caterpillar Extender.

Note: This machine was filled at the factory with Caterpillar Extended Life Coolant.

1. Open the engine hood.

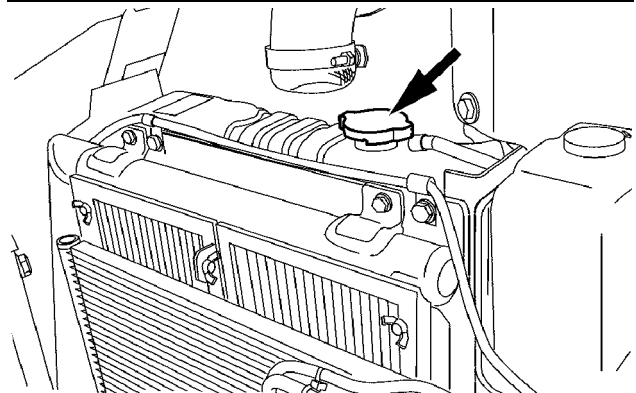


Illustration 142

g00850305

2. Make sure that the cooling system has cooled down. Slowly loosen the cooling system pressure cap in order to relieve system pressure. Remove the pressure cap.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

3. It may be necessary to drain some coolant from the radiator so that Caterpillar Extender can be added to the cooling system.

Use Steps 3.a through 3.d in order to drain the coolant.

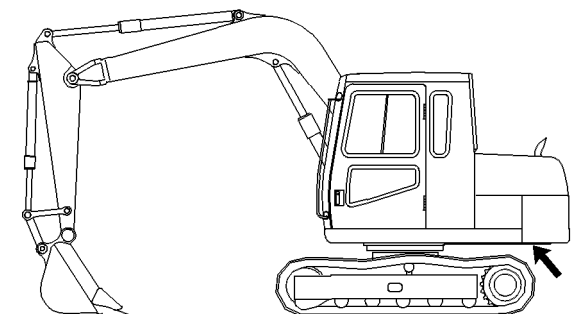


Illustration 143

g00419907

- a. Remove the access cover that is located under the radiator.

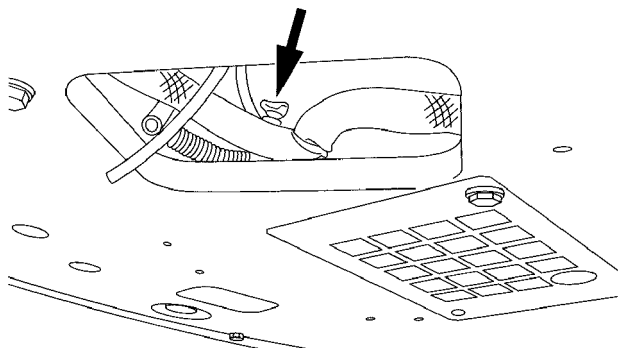


Illustration 144

g00850311

- b. Open the drain valve that is located on the bottom of the radiator. Drain enough coolant in order to allow enough space for the coolant additive. Allow the coolant to drain into a suitable container.

Note: Dispose of drained fluids according to local regulations.

- c. Close the drain valve.
 - d. Install the access cover that is located under the radiator.
4. Add 119-5152 Coolant Extender to the cooling system. Refer to the following topics for the proper amount of Caterpillar Extender:
 - Special Publication, SEBU6250, "Extended Life Coolant (ELC)"

- Operation and Maintenance Manual, "Capacities (Refill)"

5. Inspect the gasket of the cooling system pressure cap. If the gasket is damaged, replace the pressure cap.

6. Install the cooling system pressure cap.

7. Close the engine hood.

i02017898

Cooling System Coolant Level - Check

SMCS Code: 1350-040; 1350-535-FLV;
1395-535-FLV

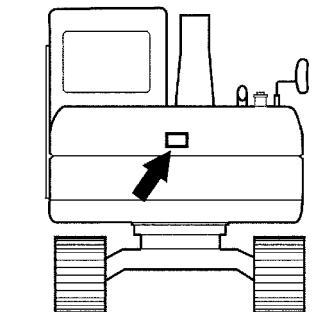


Illustration 145

g00744821

1. Open the engine hood.

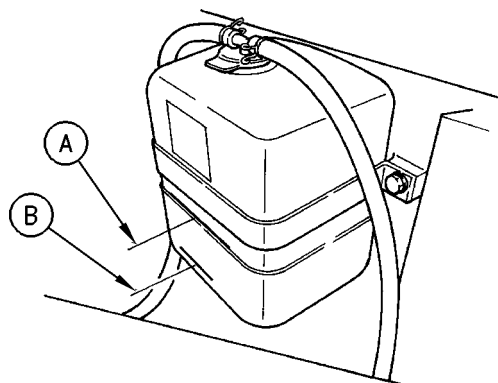


Illustration 146

g00737547

The coolant reservoir is located on the left side behind the cab.

- (A) "FULL" level
(B) "LOW" level

2. Check the coolant level of the coolant reservoir. Maintain the coolant level between the "FULL" mark and the "LOW" mark.

If the reservoir is empty, use steps 2.a through 2.g.

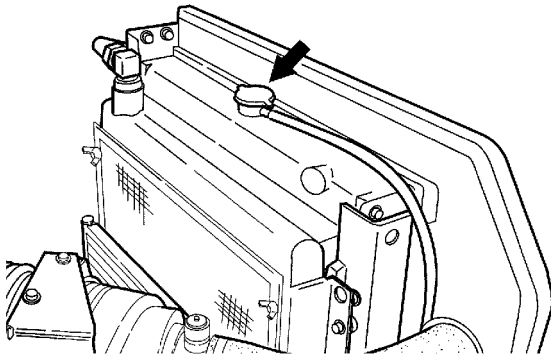


Illustration 147

g00737545

- a. Slowly loosen the cooling system pressure cap in order to relieve system pressure. Remove the pressure cap.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

- b. Add the appropriate coolant solution to the cooling system. Refer to the following topics:
 - Special Publication, SEBU6250, "S-O-S Coolant Analysis"
 - Operation and Maintenance Manual, "Capacities (Refill)"
- c. Start the engine. Operate the engine without the cooling system pressure cap until the water temperature regulator opens and the coolant level stabilizes.
- d. Maintain the coolant level within 13 mm (0.5 inch) of the bottom of the radiator filler pipe.

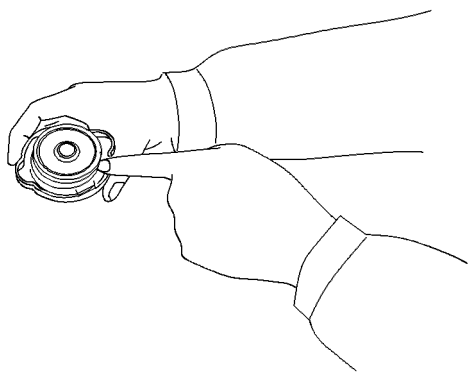


Illustration 148

g00102170

- e. Inspect the gasket of the cooling system pressure cap. If the gasket is damaged, replace the pressure cap.

- f. Install the cooling system pressure cap.
- g. Stop the engine.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

3. If additional coolant is necessary, remove the reservoir cap and add the appropriate coolant solution.
4. Install the reservoir cap.
5. Close the engine hood.

i02425978

Cooling System Coolant Sample (Level 1) - Obtain

SMCS Code: 1395-008; 1395-554; 7542

Note: It is not necessary to obtain a Coolant Sample (Level 1) if the cooling system is filled with Cat ELC (Extended Life Coolant). Cooling systems that are filled with Cat ELC should have a Coolant Sample (Level 2) that is obtained at the recommended interval that is stated in the Maintenance Interval Schedule.

Note: Obtain a Coolant Sample (Level 1) if the cooling system is filled with any other coolant instead of Cat ELC. This includes the following types of coolants.

- Commercial long life coolants that meet the Caterpillar Engine Coolant Specification -1 (Caterpillar EC-1)
- Cat Diesel Engine Antifreeze/Coolant (DEAC)
- Commercial heavy-duty antifreeze/coolant solution

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.

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

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.

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 250 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.

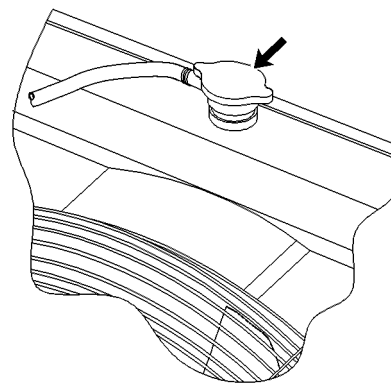


Illustration 149

g00544510

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. Carefully remove the radiator cap.
5. Use a vacuum pump and draw the sample. 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.
7. Install the radiator cap.

i02049802

Cooling System Coolant Sample (Level 2) - Obtain

SMCS Code: 1395-008; 1395-554; 7542

Reference: Refer to Operation and Maintenance Manual, "Cooling System Coolant Sample (Level 1) - Obtain" for the guidelines for proper sampling of the coolant.

Obtain the sample of the coolant as close as possible to the recommended sampling interval. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Submit the sample for Level 2 analysis.

Reference: For additional information about coolant analysis, refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" or consult your Caterpillar dealer.

i02197700

Engine Air Filter Element - Clean/Replace

SMCS Code: 1054-070; 1054-510

NOTICE

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

1. Open the engine hood.
2. Start the engine.

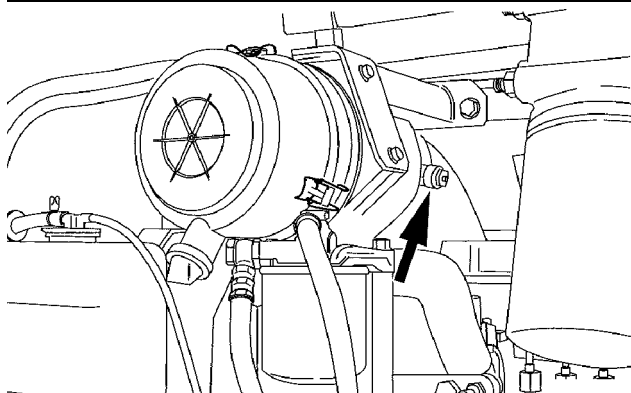


Illustration 150

g00850425

3. Service the air cleaner if the yellow piston in the filter element indicator moves into the red zone.
4. Stop the engine.

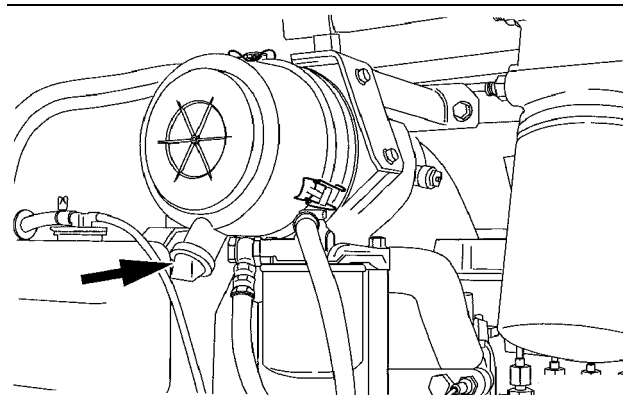


Illustration 151

g00850430

5. Squeeze the outlet tube slightly in order to purge the dirt from the outlet tube.

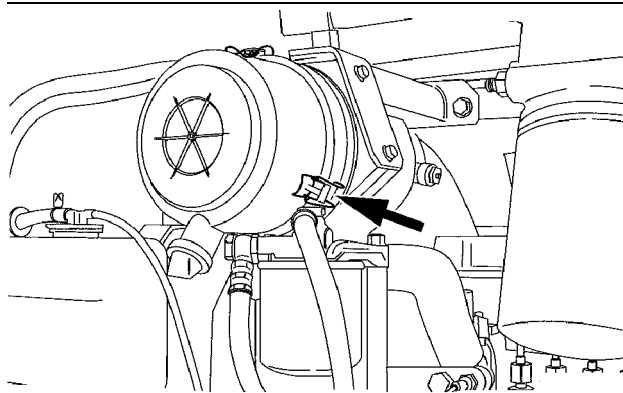


Illustration 152

g00850433

6. Loosen the three cover latches and remove the air cleaner cover.

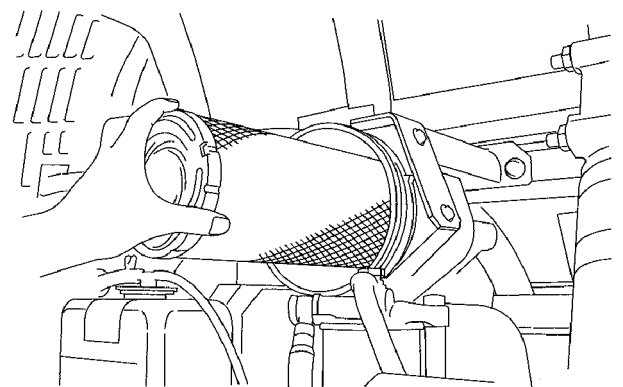


Illustration 153

g00850434

7. Remove the primary filter element from the air cleaner housing.
8. Clean the air cleaner cover.

9. Inspect the O-ring seal on the air cleaner cover. Replace the O-ring seal if the O-ring seal is worn or damaged.

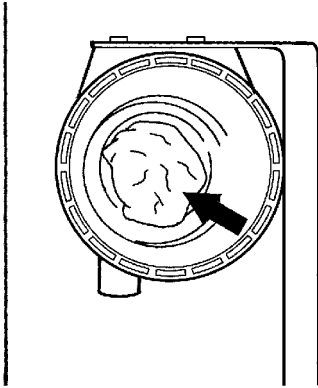


Illustration 154

g00740782

10. Cover the opening of the air inlet to the engine.

11. Clean the inside of the air cleaner housing.

12. Clean the primary filter element and inspect the filter element.

Note: Refer to "Cleaning Primary Air Filter Elements".

13. Install the clean primary filter element.

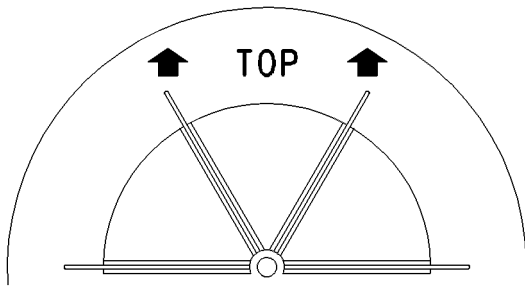


Illustration 155

g00103800

14. Install the air cleaner cover. The arrows on the front must point upward. Close the latches securely.

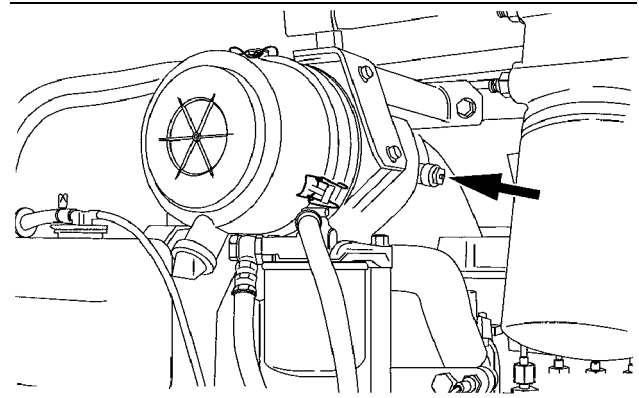


Illustration 156

g00850438

15. Reset the filter indicator by pushing in the reset button on top of the indicator.

16. Install a new primary filter element if one of the following problems occurs after starting the engine.

- The piston of the air filter indicator moves into the red zone.
- The color of the exhaust smoke is black.

Note: The primary filter can be cleaned up to six times. Replace the filter after one year.

17. Close the engine hood.

Cleaning Primary Air Filter Elements

NOTICE

Caterpillar recommends certified air filter cleaning services available at participating Caterpillar dealers. The Caterpillar cleaning process uses proven procedures to assure consistent quality and sufficient filter life.

Observe the following guidelines if you attempt to clean the filter element:

Do not tap or strike the filter element in order to remove dust.

Do not wash the filter element.

Use low pressure compressed air in order to remove the dust from the filter element. Air pressure must not exceed 207 kPa (30 psi). Direct the air flow up the pleats and down the pleats from the inside of the filter element. Take extreme care in order to avoid damage to the pleats.

Do not use air filters with damaged pleats, gaskets, or seals. Dirt entering the engine will cause damage to engine components.

The primary air filter element can be used up to six times if the element is properly cleaned and if the element is properly inspected. When the primary air filter element is cleaned, check for rips or tears in the filter material. The primary air filter element should be replaced at least one time per year. This replacement should be performed regardless of the number of cleanings.

NOTICE

Do not clean the air filter elements by bumping or tapping. This could damage the seals. Do not use elements with damaged pleats, gaskets, or seals. Damaged elements will allow dirt to pass through. Engine damage could result.

Visually inspect the primary air filter elements before cleaning. Inspect the air filter elements for damage to the seal, the gaskets, and the outer cover. Discard any damaged air filter elements.

There are two common methods that are used to clean primary air filter elements:

- Pressurized air
- Vacuum cleaning

Pressurized Air

Pressurized air can be used to clean primary air filter elements that have not been cleaned more than two times. Pressurized air will not remove deposits of carbon and oil. Use filtered, dry air with a maximum pressure of 207 kPa (30 psi).

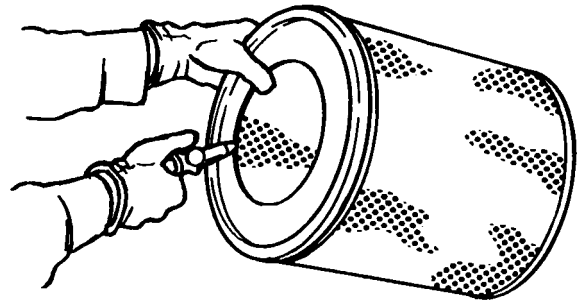


Illustration 157

g00281692

Note: When the primary air filter elements are cleaned, always begin with the clean side (inside) in order to force dirt particles toward the dirty side (outside).

Aim the hose so that the air flows inside the element along the length of the filter in order to help prevent damage to the paper pleats. Do not aim the stream of air directly at the primary air filter element. Dirt could be forced further into the pleats.

Vacuum Cleaning

Vacuum cleaning is another method for cleaning primary air filter elements which require daily cleaning because of a dry, dusty environment. Cleaning with pressurized air is recommended prior to vacuum cleaning. Vacuum cleaning will not remove deposits of carbon and oil.

Inspecting the Primary Air Filter Elements

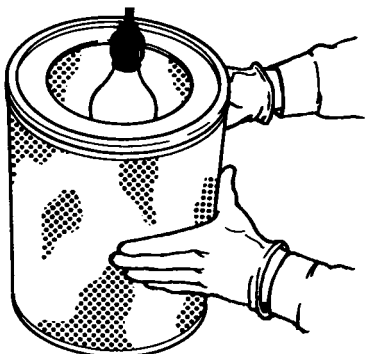


Illustration 158

g00281693

Inspect the clean, dry primary air filter element. Use a 60 watt blue light in a dark room or in a similar facility. Place the blue light in the primary air filter element. Rotate the primary air filter element. Inspect the primary air filter element for tears and/or holes. Inspect the primary air filter element for light that may show through the filter material. If it is necessary in order to confirm the result, compare the primary air filter element to a new primary air filter element that has the same part number.

Do not use a primary air filter element that has any tears and/or holes in the filter material. Do not use a primary air filter element with damaged pleats, gaskets or seals. Discard damaged primary air filter elements.

Storing Primary Air Filter Elements

If a primary air filter element that passes inspection will not be used, the primary air filter element can be stored for future use.

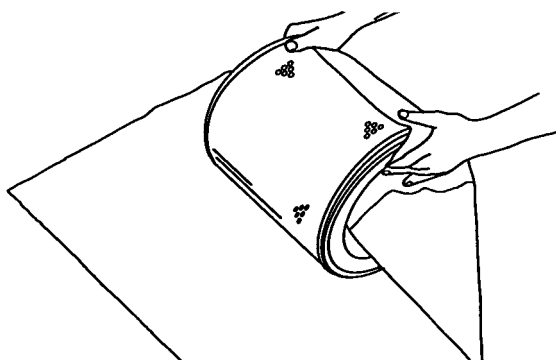


Illustration 159

g00281694

Do not use paint, a waterproof cover, or plastic as a protective covering for storage. An airflow restriction may result. To protect against dirt and damage, wrap the primary air filter elements in Volatile Corrosion Inhibited (VCI) paper.

Place the primary air filter element into a box for storage. For identification, mark the outside of the box and mark the primary air filter element. Include the following information:

- Date of cleaning
- Number of cleanings

Store the box in a dry location.

i01995008

Engine Oil Level - Check

SMCS Code: 1000-535

NOTICE

Do not overfill the crankcase. Engine damage can result.

Park the machine on level ground. The oil level should only be checked after the engine has been stopped for at least 30 minutes.

Check the oil level while the engine is stopped. Do not check the oil level while the engine is running.

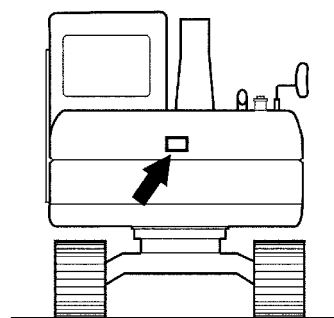


Illustration 160

g00744821

1. Open the engine hood.

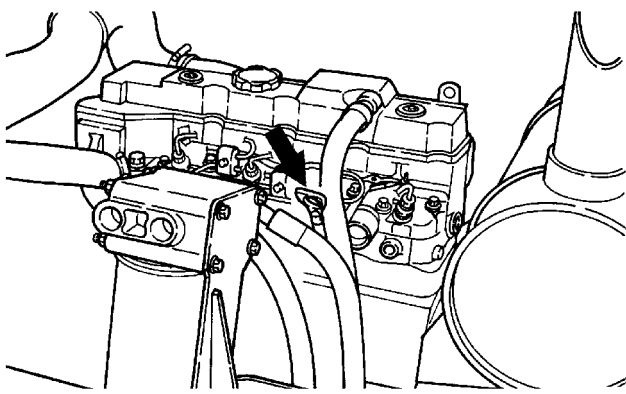


Illustration 161

g00740809

2. Remove the dipstick and wipe off the oil.
3. Reinsert the dipstick.
4. Remove the dipstick and check the oil level on the dipstick.

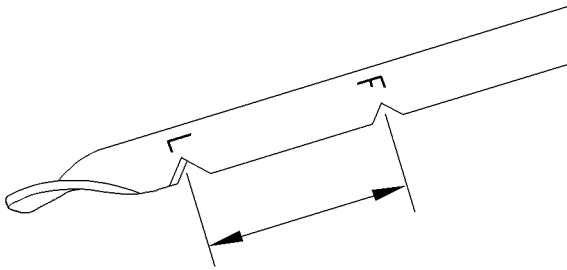


Illustration 162

g00422898

5. Maintain the oil level between the "L" and the "F" marks on the dipstick.

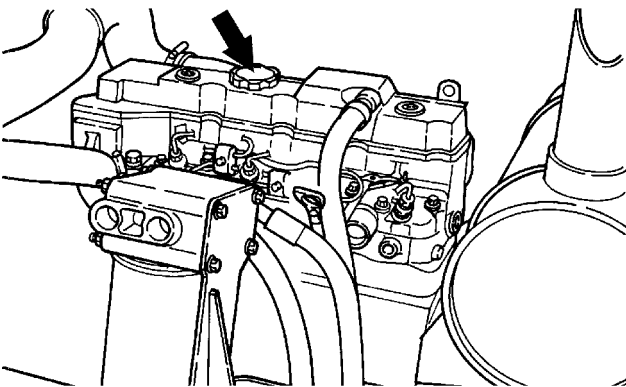


Illustration 163

g00740810

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

6. Remove the oil filler plug in order to add oil, if necessary. Refer to Operation and Maintenance Manual, "Capacities (Refill)", and Operation and Maintenance Manual, "Lubricant Viscosities" for more information.

Note: If the oil is deteriorated or badly contaminated, change the oil regardless of the maintenance interval.

7. Clean the oil filler plug.
8. Install the oil filler plug.
9. Close the engine hood.

i01914383

Engine Oil Sample - Obtain

SMCS Code: 1000-008; 1000; 1348-008; 1348-554-SM; 7542-008; 7542-554-OC, SM

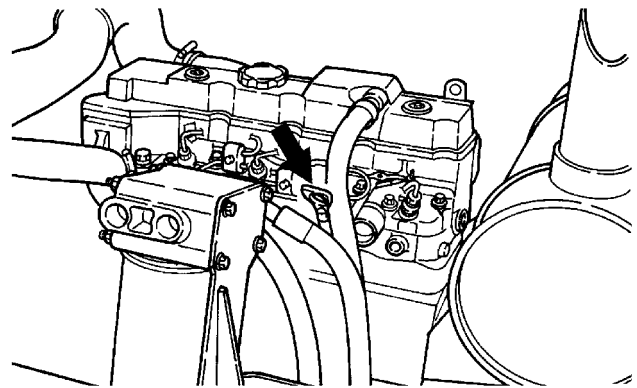


Illustration 164

g00740809

Obtain a sample of the engine oil through the opening for the dipstick. 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.

i02250100

Engine Oil and Filter - Change

SMCS Code: 1318-510

Note: If the sulfur content in the fuel is greater than 1.5% by weight, use an oil that has a TBN of 30 and reduce the oil change interval by one-half.

Park the machine on a level surface. Stop the engine.

Note: Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase. The particles will not be removed by draining the oil and the particles will recirculate in the engine lubrication system with the new oil.

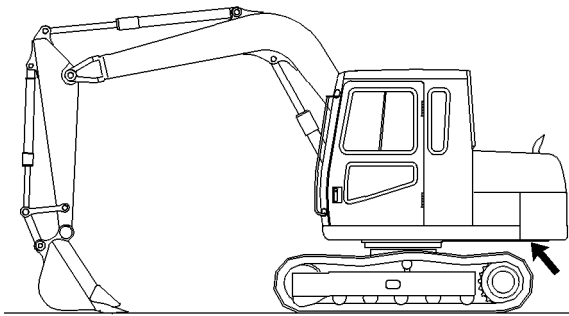


Illustration 165

g00419907

1. Open the crankcase access cover that is under the rear of the machine. Remove the bolts that secure the access cover.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

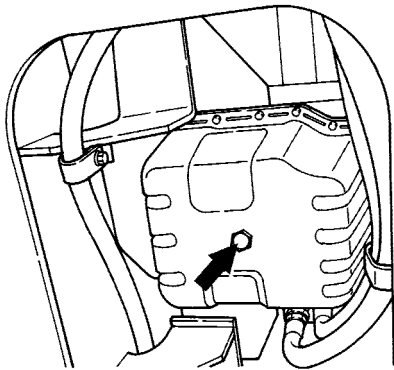


Illustration 166

g00740812

2. Remove the crankcase drain plug. Allow the oil to drain into a suitable container.

Note: Discard any drained fluids according to local regulations.

3. Clean the drain plug and install the drain plug.
4. Install the crankcase access cover.

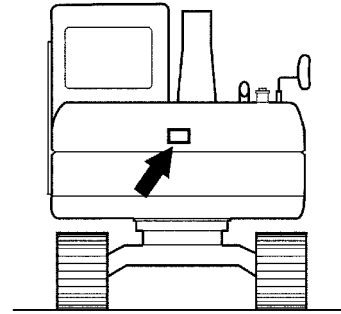


Illustration 167

g00744821

5. Open the engine hood.

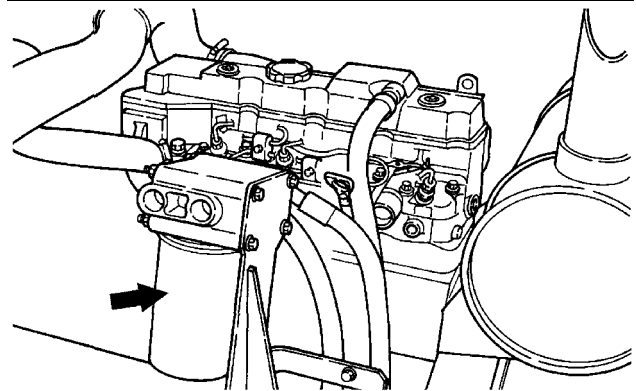


Illustration 168

g00740831

6. Remove the oil filter. Refer to Operation and Maintenance Manual, "Oil Filter - Inspect". Discard the used oil filter properly.
7. Clean the filter housing base. Make sure that all of the former filter gasket is removed.

Note: This oil filter is a cartridge type filter. This type of filter cannot be reused.

Note: Always discard used filters according to local regulations.

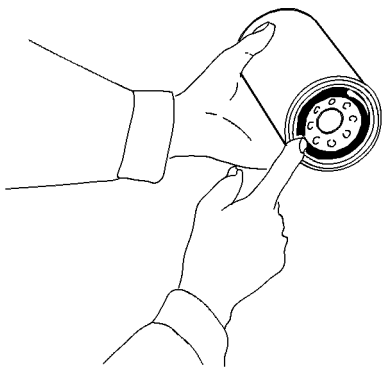


Illustration 169

g00101634

8. Apply a thin coat of engine oil to the gasket of the new filter.
9. Install the new filter by hand. When the gasket contacts the filter base, turn the filter by 270 degrees more. This will tighten the filter sufficiently.

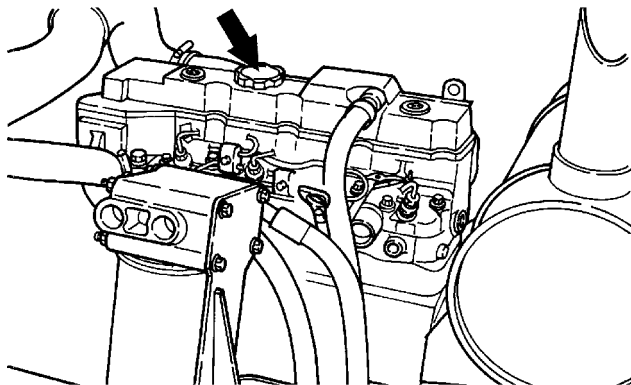


Illustration 170

g00740810

10. Remove the oil filler plug.
11. Fill the crankcase with new oil. Refer to Operation and Maintenance Manual, "Capacities (Refill)" and Operation and Maintenance Manual, "Lubricant Viscosities".

NOTICE

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

12. Clean the oil filler plug and install the oil filler plug.
13. Start the engine and allow the oil to warm.
14. Check the engine for leaks.
15. Stop the engine.
16. Wait for thirty minutes in order to allow the oil to drain back into the crankcase.

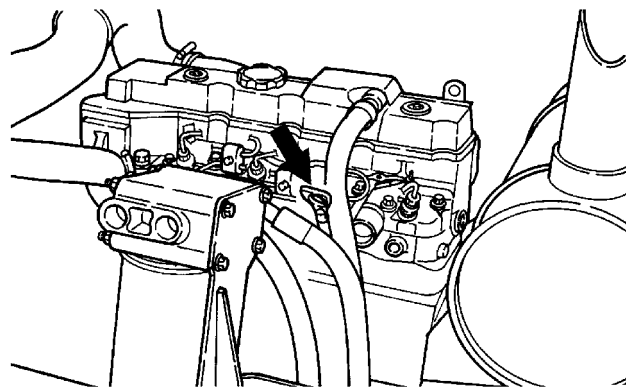


Illustration 171

g00740809

17. Remove the dipstick and wipe off the oil.
18. Reinsert the dipstick.
19. Remove the dipstick and check the oil level on the dipstick.

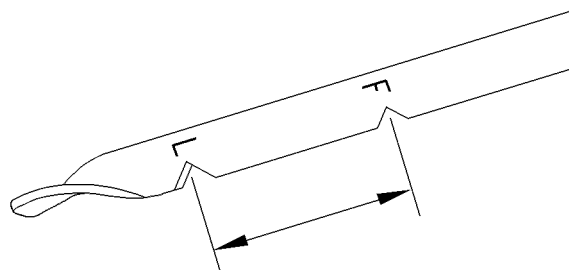


Illustration 172

g00422898

20. Maintain the oil between the "L" and "F" marks on the dipstick.
21. Close the engine hood.

i01747875

Engine Valve Lash - Check

SMCS Code: 1102-082; 1102-535; 1102; 1105-025; 1105-535; 1121-535; 1209-082; 1209-535; 1209; 7527

Refer to Engine Systems Operation/Testing and Adjusting in order to perform the complete procedure for the valve lash adjustment.

i03149045

Final Drive Oil - Change

SMCS Code: 4050-044-FLV

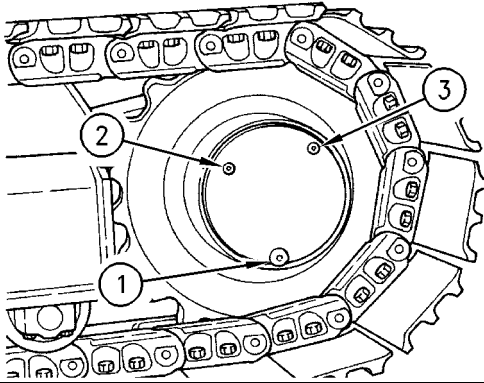


Illustration 173

g00740859

Type 1

- (1) Oil drain plug
- (2) Oil level plug
- (3) Oil filler plug

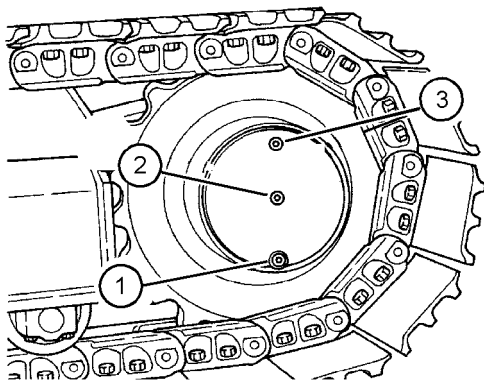


Illustration 174

g01619618

Type 2

- (1) Oil drain plug
- (2) Oil level plug
- (3) Oil filler plug

Note: Your machine may be equipped with a “Type 1” final drive or your machine may be equipped with a “Type 2” final drive.

1. Position one final drive so that oil drain plug (1) is at the bottom.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on containing fluid spillage.

2. Remove oil drain plug (1), level plug (2) and filler plug (3). Allow the oil to drain into a suitable container.

3. Clean the plugs and inspect the plugs. Replace a worn plug or a damaged plug.
4. Apply pipe sealant to oil drain plug (1), level plug (2) and filler plug (3).
5. Install drain plug (1).
6. Add oil through the opening of filler plug (3).
7. Fill the final drive to the bottom of the opening for level plug (2). Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.
8. Install level plug (2) and filler plug (3).
9. Perform Step 1 to Step 8 on the other final drive. Do not combine the oil for the final drives in the same container. The oil from the final drives must be kept separate for the check that is performed in Step 15.
10. Completely remove any oil that has spilled.
11. Start the engine and allow the final drives to operate through several cycles.
12. Stop the engine.
13. Check the oil level.
14. Maintain the oil level to the bottom of the opening for level plug (2).
15. Check the drained oil for metal chips or for particles. If there are any chips or particles, consult your Caterpillar dealer.

Note: Dispose of drained fluids according to local regulations.

i01407687

Final Drive Oil Level - Check

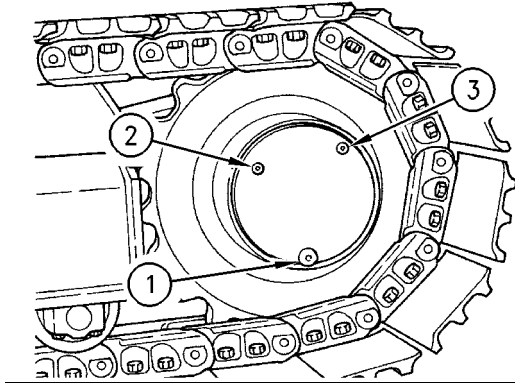
SMCS Code: 4050-535-FLV

Illustration 175

g00740859

- (1) Oil drain plug
- (2) Oil level plug
- (3) Oil filler plug

1. Position one final drive so that oil drain plug (1) is at the bottom.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

2. Remove oil level plug (2).
3. Check the oil level. The oil should be near the bottom of the opening of level plug (2).
4. Add oil through the opening of filler plug (3), if necessary.

Note: Overfilling the final drive will cause the seals on the travel motor to allow hydraulic oil or water to enter the final drive. This may contaminate the final drive.

5. Clean oil level plug (2) and filler plug (3).
6. Apply pipe sealant to oil level plug (2) and filler plug (3).
7. Install oil level plug (2).
8. Install oil filler plug (3).
9. Repeat the procedure for the other final drive.

i01914400

Final Drive Oil Sample - Obtain

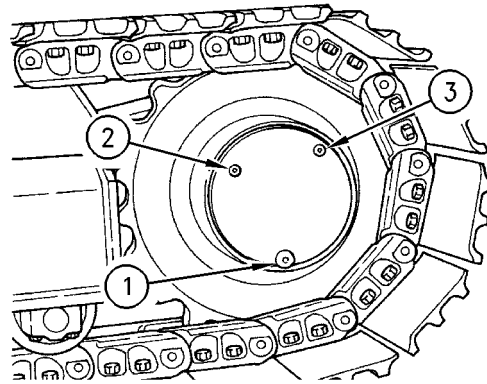
SMCS Code: 4011-008; 4050-008; 4050-SM; 7542-008

Illustration 176

g00740859

- (1) Oil drain plug
- (2) Oil level plug
- (3) Oil filler plug

Obtain an oil sample of the final drive oil by removing the oil level plug (2) and taking the sample directly from the final drive housing. Refer to Special Publication, SEBU6250, "S-O-S Oil Analysis" for information that pertains to obtaining an oil sample from the final drive housing. Refer to Special Publication, PEHP6001, "How To Take A Good Oil Sample" for more information about obtaining an oil sample from the final drive housing.

i02250087

Fuel System Filter - Replace

SMCS Code: 1261-510

NOTICE

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

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

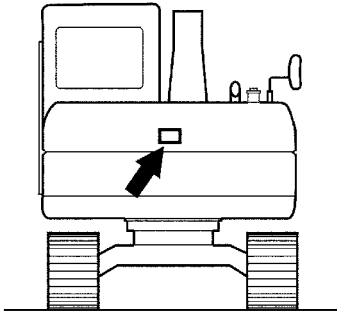


Illustration 177

g00744821

1. Open the engine hood.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

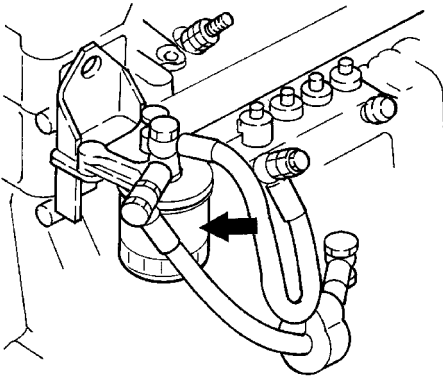


Illustration 178

g00740900

2. Slowly loosen and remove the filter element.

Note: This fuel filter is a cartridge type filter. This type of filter cannot be reused.

Note: Always discard used filters according to local regulations.

3. Clean the filter mounting base. Make sure that all of the used seal is removed.

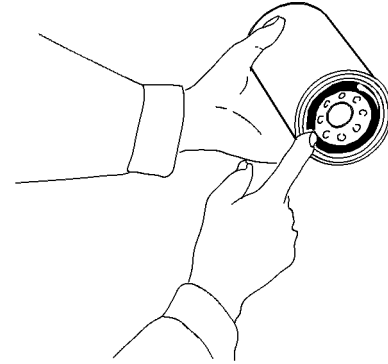


Illustration 179

g00102044

4. Coat the seal of the new filter with clean diesel fuel.
5. Install the new fuel filter by hand. When the seal contacts the filter mounting base, tighten the filter by an additional 1 turn.
6. Prime the fuel system. See Operation and Maintenance Manual, "Fuel System - Prime" for instructions.
7. Close the engine hood.

i02250104

Fuel System - Prime

SMCS Code: 1258

After the strainer is cleaned, fill up the fuel tank and the fuel system priming pump. Use the following procedure. If the engine stalled due to no fuel, top up the fuel tank and the fuel system priming pump using the following procedure.

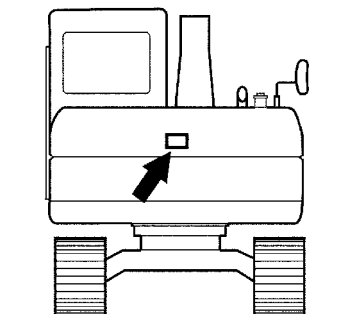


Illustration 180

g00744821

1. Open the engine hood.

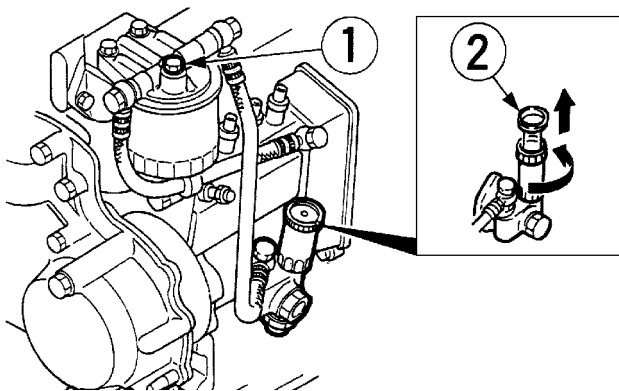


Illustration 181

g00416801

2. Loosen air vent (1) on the fuel filter.
3. Unlock the priming pump by turning plunger (2) counterclockwise. Pull the plunger up. Operate the priming pump by moving plunger (2) up and down until the fuel that is free of air bubbles flows out of air vent (1).
4. When the fuel flows free of air bubbles, lock the priming pump. Push the plunger inward and rotate the plunger in a clockwise motion. This motion will lock the priming pump.
5. Tighten air vent (1).

Note: Lock the priming pump before the vent plug is tightened. The pressure in the fuel system could make locking the plunger in place difficult. Wipe away any spilled fuel.

6. After priming the fuel system, operate the engine at low idle for several minutes. Check the fuel system for leaks.
7. Close the engine hood.

i01425194

Fuel System Priming Pump Strainer - Clean

SMCS Code: 1258

Clean the strainer whenever a loss of engine power is still apparent after changing the fuel filter.

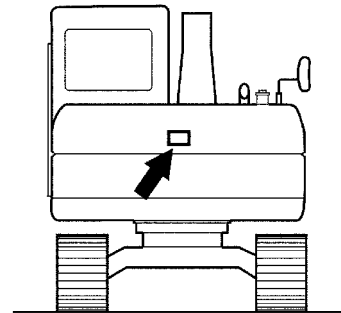


Illustration 182

g00744821

1. Open the engine hood.

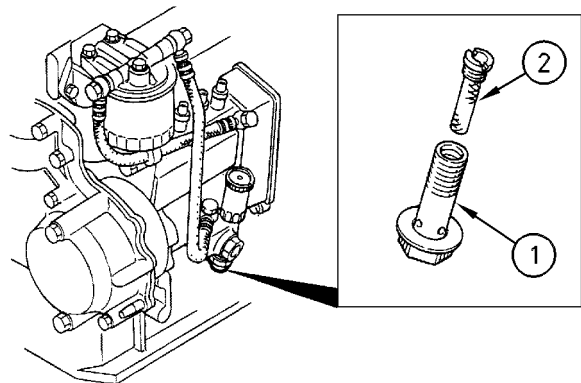


Illustration 183

g00416878

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

2. Disconnect the fuel line at the fuel transfer pump. Use a plug to stop the fuel leakage.
3. Remove bolt (1).
4. Remove screen (2) from bolt (1). Wash the screen in a clean, nonflammable solvent.
5. Install the screen into the bolt.
6. Install bolt (1). Remove the plug from the fuel line and reconnect the fuel line to the fuel transfer pump.
7. Prime the fuel system. Refer to Operation and Maintenance Manual, "Fuel System Priming Pump - Operate" for instructions.
8. Close the engine hood.

i01645424

Fuel System Water Separator - Drain (If Equipped)

SMCS Code: 1263

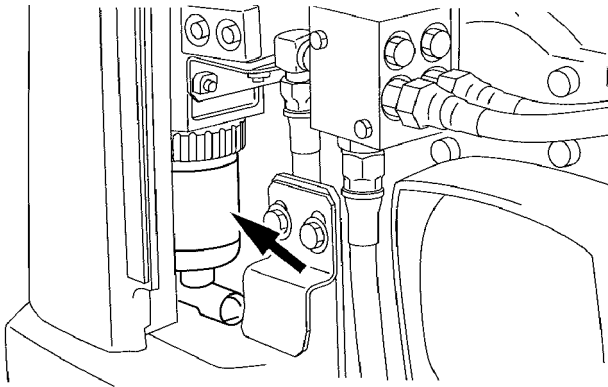


Illustration 184

g00850457

The water separator is located in the service compartment on the front right side.

If the red ring in the bowl reaches the level line, drain the water separator. The drain valve is located on the bottom of the water separator.

Note: Fill the fuel tank with fuel before draining the water and sediment from the water separator.

1. Turn the drain valve counterclockwise in order to open.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

2. Drain the water and drain the sediment into a suitable container.

Note: Drained fluids should always be disposed of according to local regulations.

3. Close the drain valve.

i01407838

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-STR

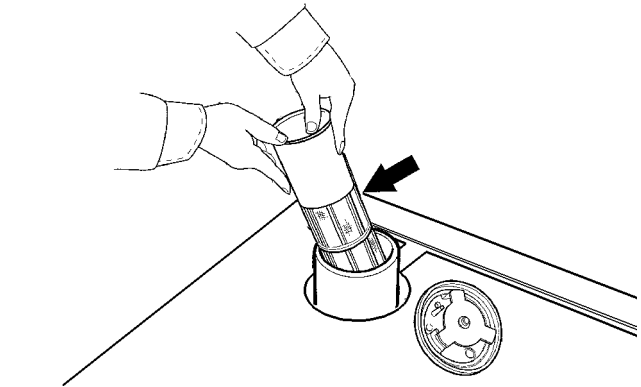


Illustration 185

g00740953

1. Remove the fuel cap and the fuel fill screen.

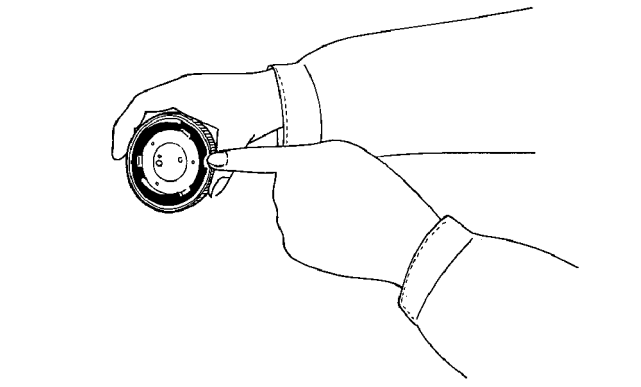


Illustration 186

g00104238

2. Inspect the cap. Replace the cap if the cap is damaged.

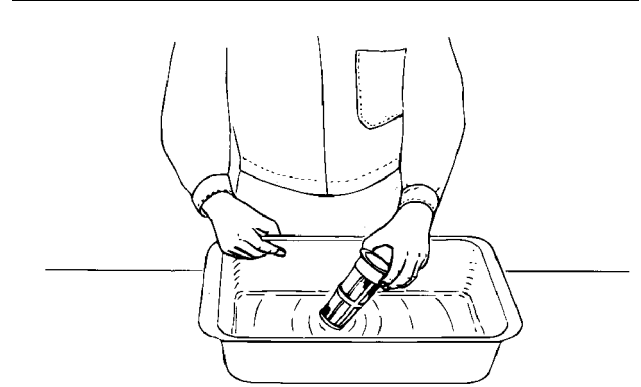


Illustration 187

g00104239

3. Wash the fuel fill screen in a clean, nonflammable solvent and dry the fuel fill screen.

4. Install the fuel fill screen.
5. Put a light coating of fuel oil on the cap gasket.
6. Install the fuel cap.

i02171270

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543

S/N: KCX1-599

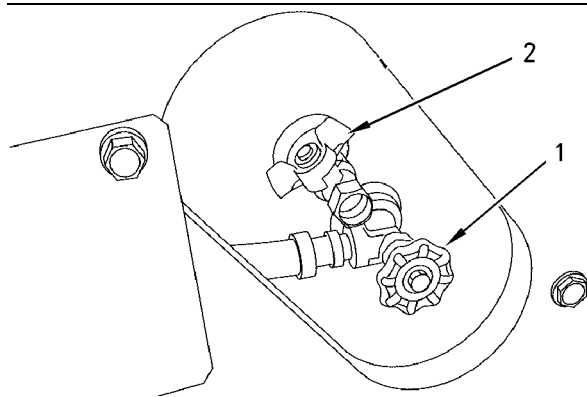


Illustration 188

g00849190

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

1. Open the drain valve (2) that is located under the fuel tank. Allow the water and the sediment to drain into a suitable container.

Note: Discard the drained fluids according to local regulations.

2. Close the drain valve (2).

Fill the Fuel Tank

You can now add fuel to the fuel tank, if necessary. Remove the fuel tank cap and pump fuel through the opening.

Make sure that you lock the fuel tank cap after the refueling is complete.

i02149525

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543

S/N: KCX600-Up

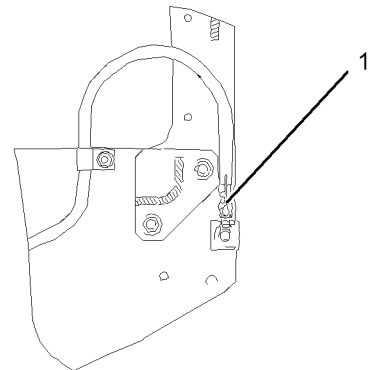


Illustration 189

g01091848

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

1. Open the drain valve (1) that is located in the front RH compartment of the machine. Allow the water and the sediment to drain into a suitable container.

Note: Discard the drained fluids according to local regulations.

2. Close the drain valve.

Fill the Fuel Tank

You can now add fuel to the fuel tank, if necessary. Remove the fuel tank cap and pump fuel through the opening.

Make sure that you lock the fuel tank cap after the refueling is complete.

i01664242

Fuses - Replace

SMCS Code: 1417-510

Open the engine hood.

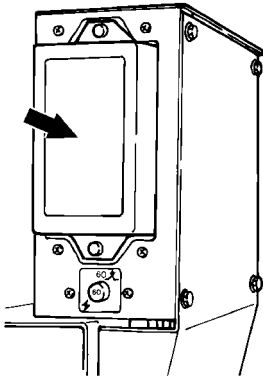


Illustration 190

g00745768

The circuit breaker panel is located behind the cab on the left side of the machine.

The fuse panel is located on the circuit breaker panel. Open the access cover for fuse access.



Fuses – Fuses protect the electrical system from damage that is caused by overloaded circuits. Change a fuse if the element separates. If the element of a new fuse separates, check the circuit and/or repair the circuit.

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.

To replace a fuse, use a puller that is stored in the fuse panel. One fuse of 10 Amperes is contained in the fuse panel as a spare fuse.

The following list identifies the circuits that are protected by each fuse. The amperage for each fuse is included with each circuit.

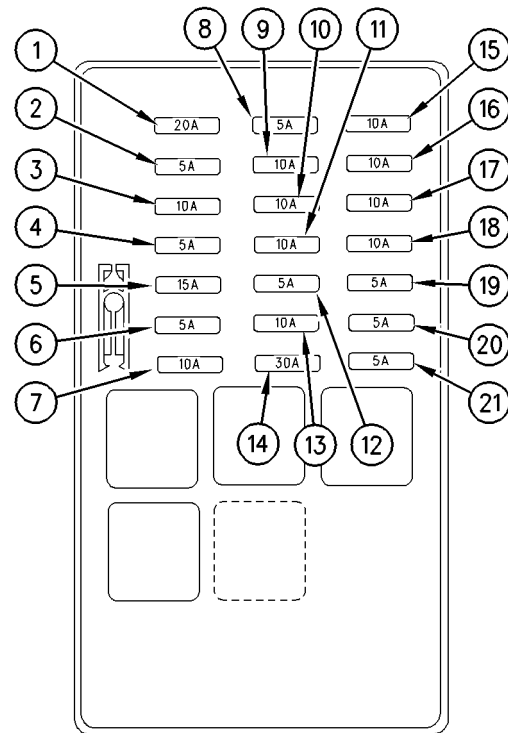


Illustration 191

g00850487

- (1) Air Conditioner Blower – 20 Amp
- (2) Cab Dome Light – 5 Amp
- (3) Linkage (Control) – 10 Amp
- (4) Horn – 5 Amp
- (5) Engine shutdown – 15 Amp
- (6) Indicator (Glow plug) – 5 Amp
- (7) Spare – 10 Amp
- (8) Travel alarm (If Equipped) – 5 Amp
- (9) Governor Actuator – 10 Amp
- (10) Window Wiper and Window Washer – 10 Amp
- (11) Boom light – 10 Amp
- (12) Chassis light – 5 Amp
- (13) Cab light (If Equipped) – 10 Amp
- (14) Engine start switch – 30 Amp
- (15) Auxiliary Circuit – 10 Amp
- (16) Radio (If Equipped) – 10 Amp

(17) Air conditioner and heater – 10 Amp

(18) Hydraulic Lock Limit Switch or Hydraulic Lock Solenoid – 10 Amp

(19) Solenoid (Alternator) – 5 Amp

(20) Signal for Engine Start Switch Key – 5 Amp

(21) Monitor – 5 Amp

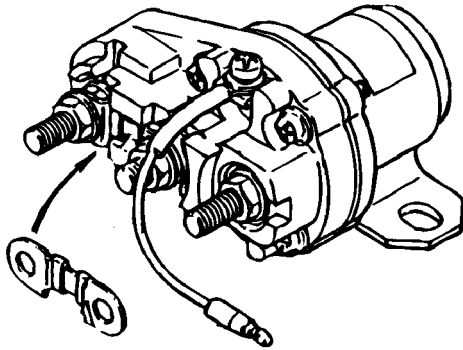


Illustration 192

g00859321

A 127 Amp fuse is located on the glow plug relay. The relay is located in the circuit breaker panel. Determine the cause for the blown fuse. Repair the machine. Replace the fuse.

Close the engine hood.

i03603971

Hydraulic System Oil - Change

SMCS Code: 5056-044

Cat HYDO Oil Change Interval

The standard Cat HYDO oil change interval is every 2000 service hours or 1 year.

A maintenance interval of 4000 service hours or 2 years for changing the hydraulic oil is available. The extended interval requires S-O-S monitoring of the hydraulic oil. The interval for S-O-S monitoring is every 500 hours. The maintenance interval for the hydraulic oil filter is not changed.

Machines with hammers are not included in the maintenance interval of 4000 service hours or 2 years. Machines with hammers must use the intervals that are listed in the Maintenance Interval Schedule. Machines that are used in severe conditions are not included in the maintenance interval of 4000 service hours or 2 years. Machines that are used in severe conditions must use the interval in the Maintenance Interval Schedule.

Cat HYDO Advanced 10 Oil Change Interval

The standard Cat HYDO Advanced 10 oil change interval is every 3000 service hours or 18 months.

A maintenance interval of 6000 service hours or 3 years for changing the hydraulic oil is available. The extended interval requires S-O-S monitoring of the hydraulic oil. The interval for S-O-S monitoring is every 500 hours. The maintenance interval for the hydraulic oil filter is not changed.

Machines with hammers are not included in the maintenance interval of 6000 service hours or 3 years. Machines with hammers must use the intervals that are listed in the Maintenance Interval Schedule. Machines that are used in severe conditions are not included in the maintenance interval of 6000 service hours or the 3 years. Machines that are used in severe conditions must use the interval in the Maintenance Interval Schedule.

Procedure to Change the Hydraulic Oil

WARNING

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

1. Park the machine on level ground. Lower the work tool to the ground with the stick in the vertical position.

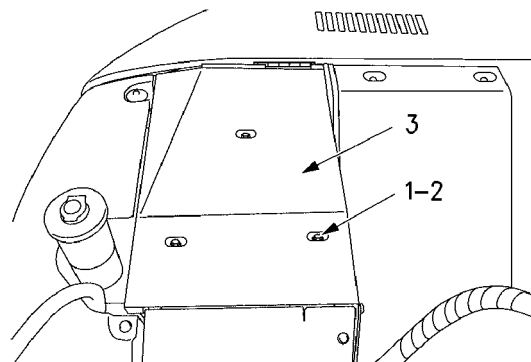


Illustration 193

g00849277

- (1) Bolt
- (2) Washer
- (3) Cover

2. Remove bolts (1), washers (2) and access cover (3) from the top of the hydraulic tank.

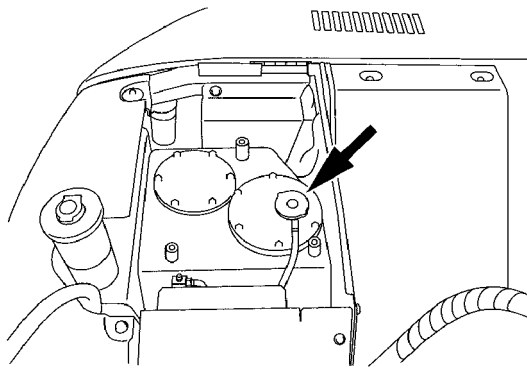


Illustration 194

g00850539

3. Clean the area thoroughly in order to keep dirt out of the screen cover. Clean the area thoroughly in order to keep dirt out of the pressure cap.
4. Relieve the internal pressure from the hydraulic tank by loosening the pressure cap. After the pressure is relieved, remove the pressure cap.

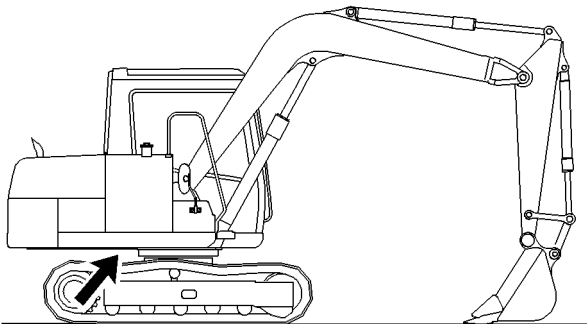


Illustration 195

g00418723

5. The oil drain valve is located under the hydraulic tank.
6. Remove the hydraulic tank access cover that is located under the upper structure. This will allow access to the drain valve.

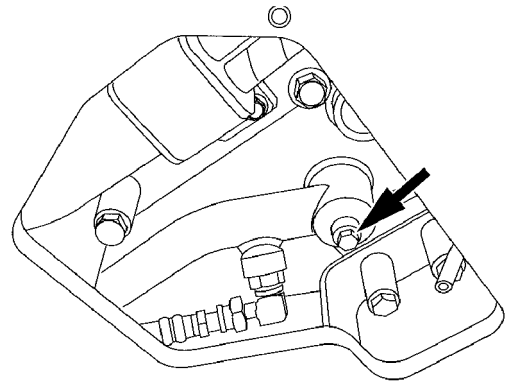


Illustration 196

g00850546

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

7. Remove the oil drain valve plug.

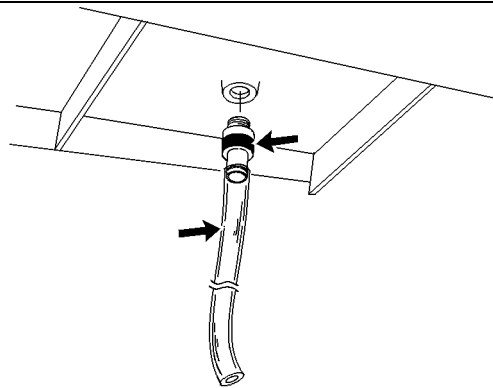


Illustration 197

g00293719

8. Install a swivel hose with clear plastic tubing in order to open the drain valve. Drain the oil into a suitable container.
9. Remove the swivel hose in order to close the drain valve.
10. Inspect the O-ring. Replace the O-ring if wear or damage is evident.
11. Clean the drain plug. Install the drain plug.

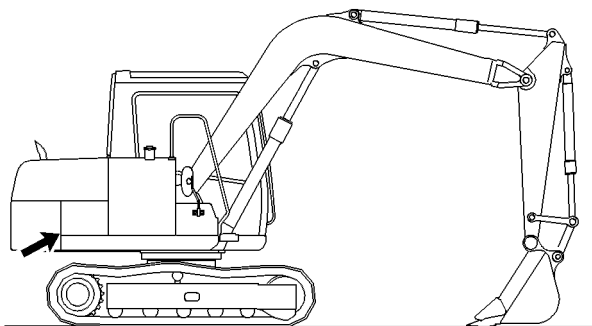


Illustration 198

g00424624

12. Remove the access cover that is located on the right side of the machine.

13. Clean the pump, the hydraulic lines and the hydraulic tank.

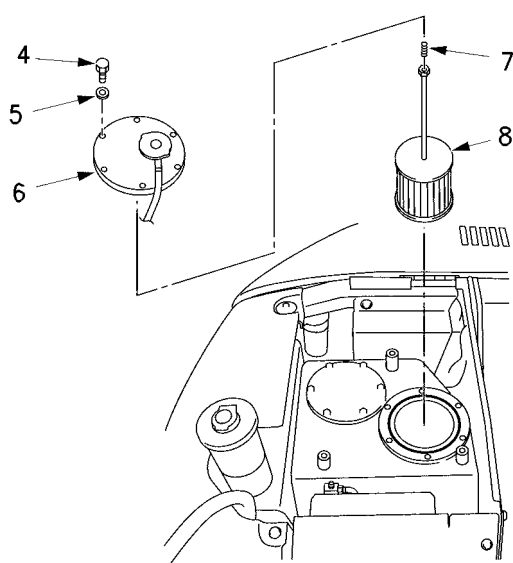


Illustration 199

g00850554

- (4) Bolts
- (5) Washers
- (6) Cover
- (7) Spring
- (8) Screen

14. Remove bolts (4), washers (5), and cover (6).

Note: Dispose of used filters and used fluids according to local regulations.

Note: Do not allow spring (7) to fall into the tank.

15. Remove spring (7) and screen (8).

Note: Refer to Operation and Maintenance, "General Hazard Information" for information on containing fluid spillage.

16. Wash the screen in a clean nonflammable solvent. Allow the screen to dry. Inspect the screen. Replace the screen, if the screen is damaged.

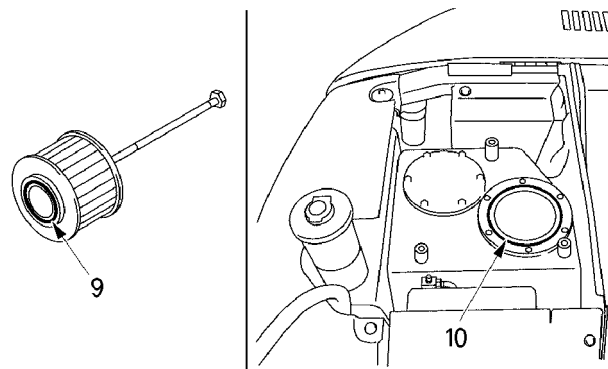


Illustration 200

g00850566

- (9) O-ring seal
- (10) O-ring seal

17. Remove O-ring seals (9) from the old screen.

18. Inspect O-ring seals (9) and (10). Replace the O-ring seals if wear or damage is evident.

19. Install O-ring seal (9) on screen (8).

20. Install screen (8) and spring (7). Then install cover (6), washers (5), and bolts (4).

Note: Make sure that the O-ring seals and the spring are properly positioned during installation.

21. Fill the hydraulic system oil tank. Refer to Operation and Maintenance Manual, "Capacities (Refill)".

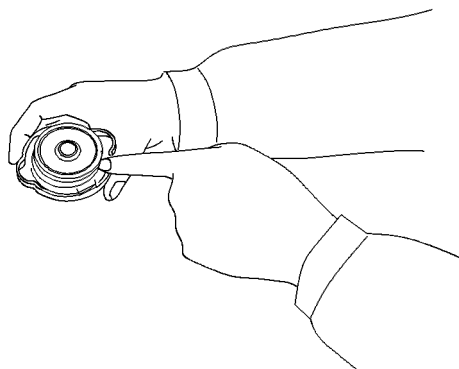


Illustration 201

g00101462

22. Inspect the pressure cap. Clean the pressure cap. Replace the pressure cap if damage is evident.

23. Install the pressure cap.

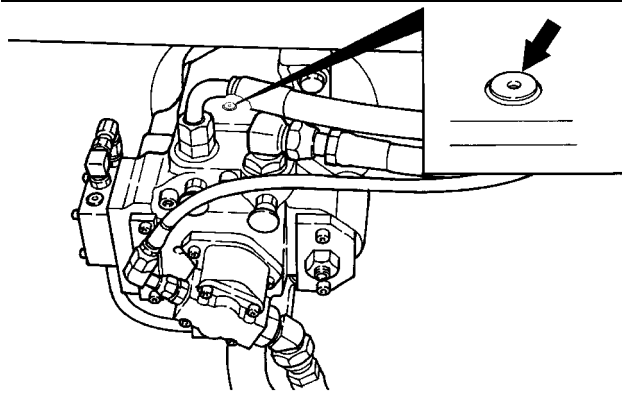


Illustration 202

g00741027

Note: Make no attempt to start the engine until the pump has been filled with hydraulic oil. Serious damage to the hydraulic components can result.

24. When the hydraulic oil has been replaced, the air must be removed from the hydraulic oil system. Use the following procedure to remove the air from the hydraulic oil system.

- a. Stop the engine.
- b. Slowly loosen the pressure cap on the top of the hydraulic tank.
- c. Slowly loosen the vent plug on the top of the hydraulic pump.
- d. Leave the plug loose until hydraulic oil starts to flow out of the plug. This indicates that the air has been released from the hydraulic system.
- e. Install the vent plug to a torque of 19 to 23 N·m (14 to 17 lb ft).
- f. If necessary, add hydraulic oil through the opening for the pressure cap.
- g. Tighten the pressure cap securely.

25. Install the access cover that is located on the right side of the machine.

26. Install the hydraulic tank access cover that is located under the upper structure.

27. Install the access cover that is located on the top of the hydraulic tank.

28. Start the engine. Operate the engine at idling speed for five minutes.

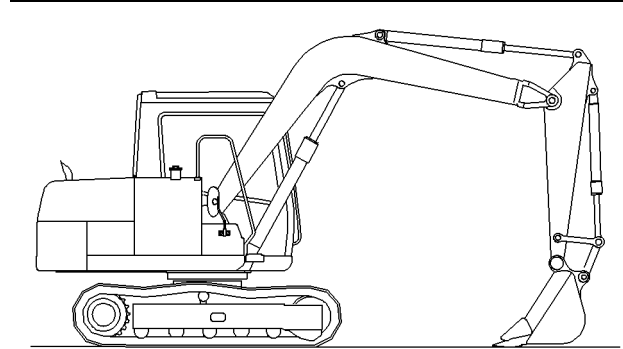


Illustration 203

g00741012

29. Operate the joysticks in order to circulate the hydraulic oil. Lower the work tool to the ground so that the stick is vertical to the ground. Stop the engine.

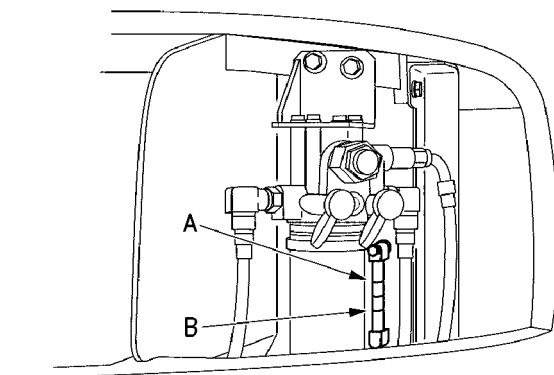


Illustration 204

g00850576

(A) High temperature range
(B) Low temperature range

30. Maintain the oil level between the marks on the sight gauge in the appropriate temperature range.

i01645780

Hydraulic System Oil Filter (Pilot) - Replace

SMCS Code: 5068-510; 5068-510-PS; 5092-510

1. Open the engine hood.

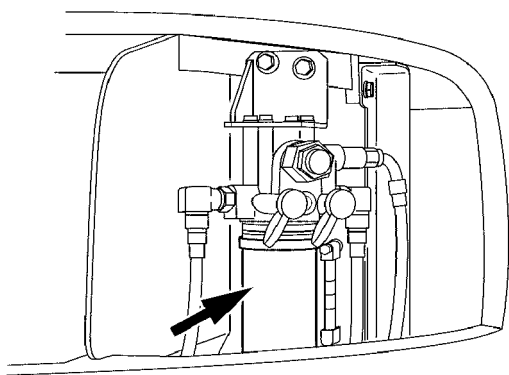


Illustration 205

g00850607

2. Clean the area around the filter in order to keep dirt out of the filter base.
3. Remove the used pilot filter element from the filter base.

Note: This element is a cartridge type filter. The element cannot be reused.

Note: Used filters should always be disposed of according to local regulations.

4. Clean the filter base.

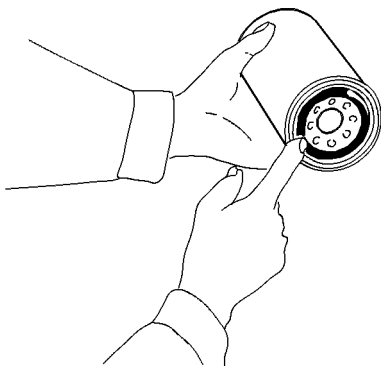


Illustration 206

g00101502

5. Coat the seal of the new pilot filter with clean hydraulic oil. Install the new pilot filter in the filter base. Tighten the pilot filter hand tight.
6. Drive the machine slowly for 10 minutes to 15 minutes. Move each cylinder evenly through several cycles.

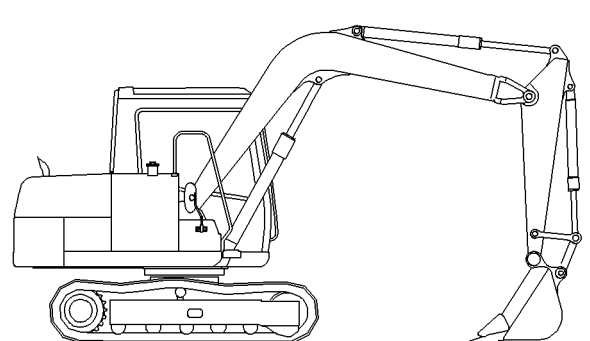


Illustration 207

g00741012

7. Return the machine to the service position. Check the machine for oil leaks.
8. Stop the engine.

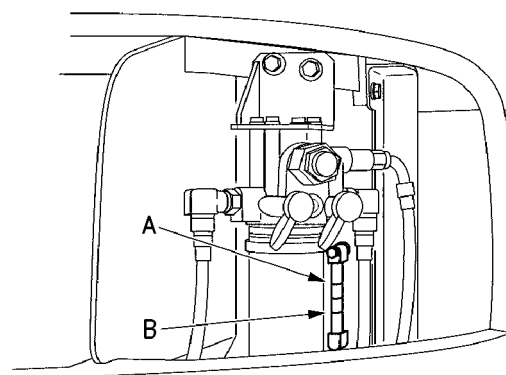


Illustration 208

g00850576

- (A) High temperature range
(B) Low temperature range

9. Maintain the oil level in the low temperature range for a cold machine. Maintain the oil level in the high temperature range for a machine that is at a normal operating temperature.
10. Slowly loosen the pressure cap in order to relieve any pressure. Remove the pressure cap in order to add oil, if necessary.
11. Clean the pressure cap and install the pressure cap.
12. Close the engine hood.

i01645793

Hydraulic System Oil Filter (Return) - Replace

SMCS Code: 5068-510-RJ

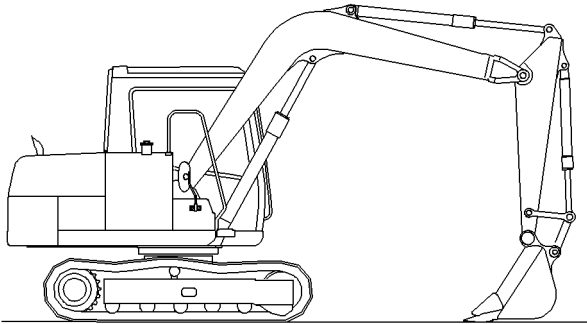


Illustration 209

g00741012

1. Park the machine on level ground. Lower the bucket to the ground with the stick in a vertical position.

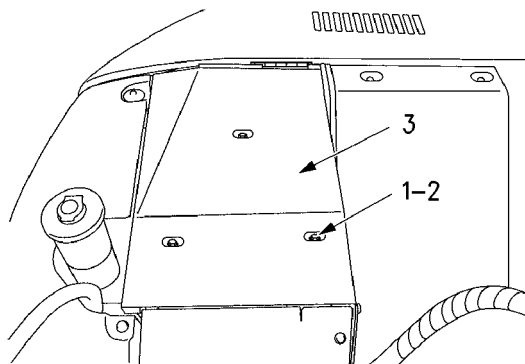


Illustration 210

g00849277

- (1) Bolts
- (2) Washers
- (3) Cover

2. Remove bolts (1), washers (2) and access cover (3) from the top of the hydraulic tank.

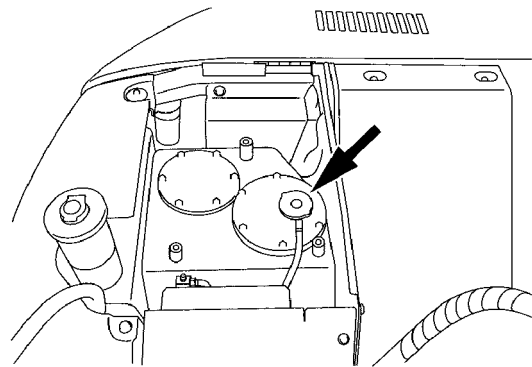


Illustration 211

g00850539

3. Clean the area thoroughly in order to keep dirt out of the return filter cover and the pressure cap.
4. Relieve the internal pressure from the hydraulic tank by loosening the pressure cap. After the pressure is relieved, remove the pressure cap.

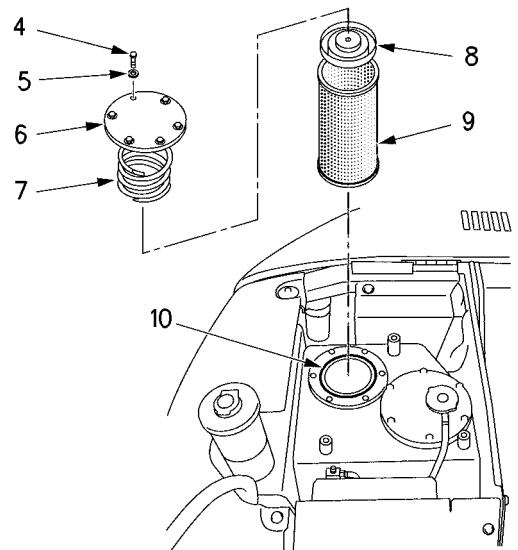


Illustration 212

g00850625

- (4) Bolts
- (5) Washers
- (6) Cover
- (7) Spring
- (8) Valve
- (9) Element
- (10) O-ring seal

5. Remove bolts (4), washers (5) and access cover (6).
6. Remove spring (7), valve (8) and element (9) from the tank.
7. Inspect O-ring seal (10). Replace the O-ring seal if wear or damage is evident.

8. Install a new element (9) into the tank. Install valve (8) and spring (7) onto the tank also.
9. Clean the pressure cap and install the pressure cap.
10. Install access cover (3) with bolts (1) and washers (2).

i01645848

Hydraulic System Oil Level - Check

SMCS Code: 5050-535

NOTICE

Never remove the fill/vent plug from the hydraulic tank if the oil is hot.

Air can enter the system and cause pump damage.

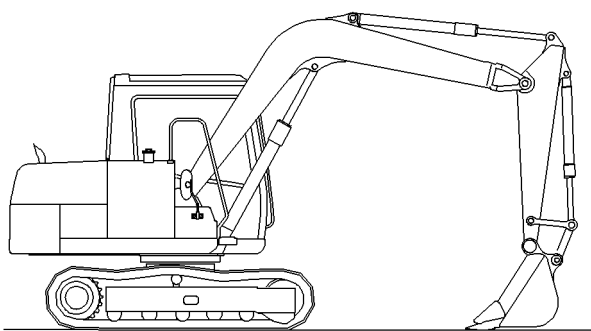


Illustration 213

g00741012

1. Park the machine on level ground. Lower the work tool to the ground with the stick in the vertical position.

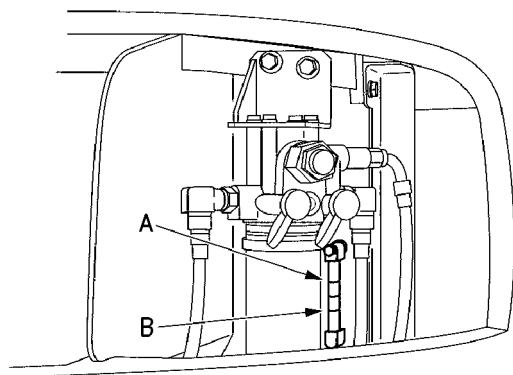


Illustration 214

g00850576

- (A) High temperature range
(B) Low temperature range

2. For a cold machine, maintain the hydraulic oil level in the low temperature range. For a machine that is at normal operating temperature, maintain the hydraulic oil level in the high temperature range.
3. Perform Step 3.a through Step 3.f if the oil level is low.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

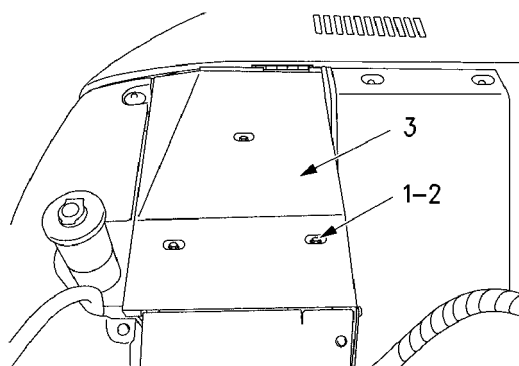


Illustration 215

g00849277

- a. Remove bolts (1), washers (2) and access cover (3) from the top of the hydraulic tank.

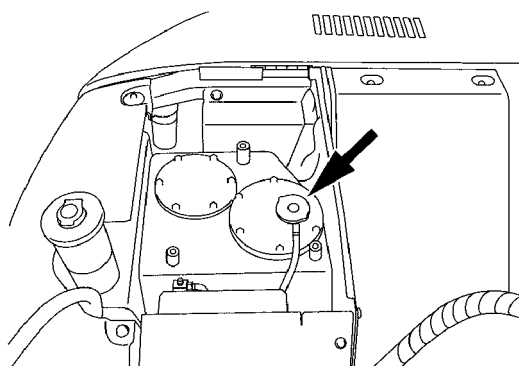


Illustration 216

g00850539

- b. Relieve the internal pressure from the hydraulic tank by loosening the pressure cap. After the pressure is relieved, remove the pressure cap.
- c. Add hydraulic oil to the tank through the opening for the pressure cap.

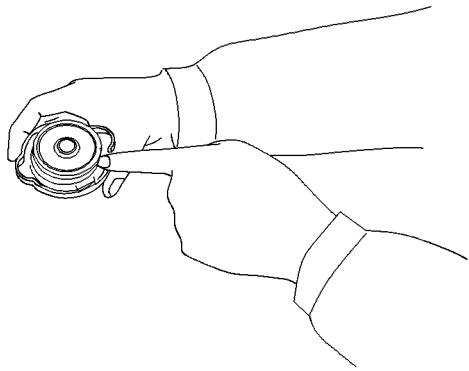


Illustration 217

g00101462

- d. Inspect the pressure cap. Replace the cap if damage is evident.
- e. Clean the pressure cap and install the cap.
- f. Install access cover (3), washers (2) and bolts (1).

i01914373

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008-OC; 5095-008; 5095-SM; 7542-008; 7542

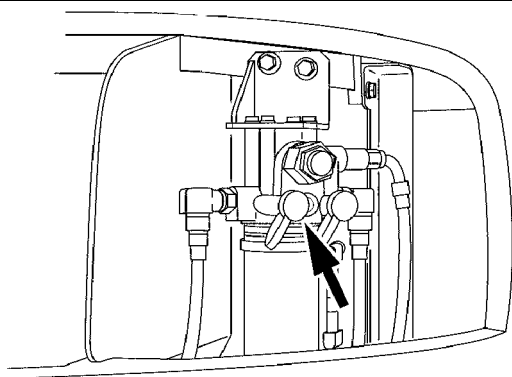


Illustration 218

g00844324

The hydraulic oil sampling valve is near the pilot filter. Obtain a sample of the hydraulic oil from the hydraulic oil sampling valve. Refer to Special Publication, SEBU6250, "S-O-S Oil Analysis" for information that pertains to obtaining a sample of the hydraulic oil. Refer to Special Publication, PEHP6001, "How To Take A Good Oil Sample" for more information about obtaining a sample of the hydraulic oil.

i01645960

Hydraulic Tank Screen - Clean

SMCS Code: 5056-070-Z3

1. Park the machine on level ground. Lower the work tool to the ground so that the stick is vertical.

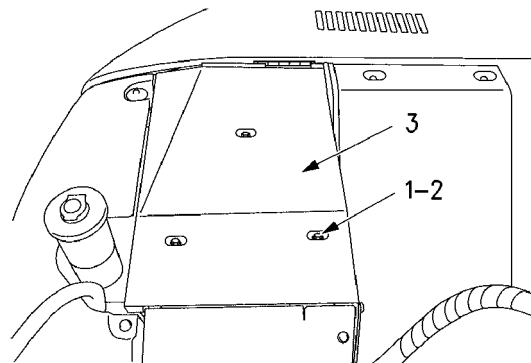


Illustration 219

g00849277

- (1) Bolts
- (2) Washers
- (3) Cover

2. Remove bolts (1), washers (2) and cover (3) from the top of the hydraulic tank.

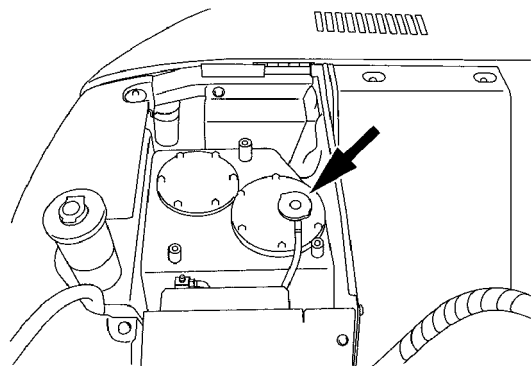


Illustration 220

g00850539

3. Clean the area thoroughly in order to keep dirt out of the screen cover. Clean the area thoroughly in order to keep dirt out of the pressure cap.
4. Relieve the internal pressure from the hydraulic tank by loosening the pressure cap. After the pressure is relieved, remove the pressure cap.

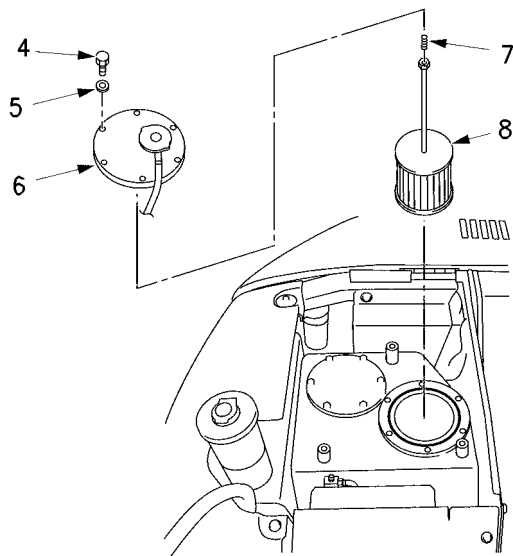


Illustration 221

g00850554

- (4) Bolts
- (5) Washers
- (6) Cover
- (7) Spring
- (8) Screen

5. Remove bolts (4), washers (5) and cover (6).

Note: Do not allow spring (7) to fall into the tank.

6. Remove spring (7) and screen (8).

Note: Refer to Operation and Maintenance, "General Hazard Information" for information on containing fluid spillage.

7. Wash the screen in a clean nonflammable solvent. Allow the screen to dry. Inspect the screen. Replace the screen, if the screen is damaged.

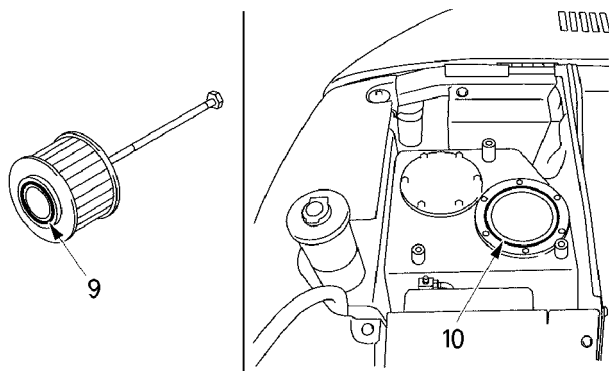


Illustration 222

g00850566

- (9) O-ring seal
- (10) O-ring seal

8. Remove O-ring seal (9) from screen (12).

9. Inspect O-ring seals (9) and (10). Replace the O-ring seals if wear or damage is evident.

10. Install O-ring seal (9) on screen (12).

11. Install screen (8) and spring (7). Then install cover (6), washers (5), and bolts (4).

Note: Make sure that the O-ring seals and the spring are properly positioned during installation.

12. Inspect the pressure cap. Clean the pressure cap. Replace the pressure cap if damage is evident.

13. Install cover (3) with bolts (1) and washers (2).

i01645967

Indicators and Gauges - Test

SMCS Code: 7450-081; 7490-081

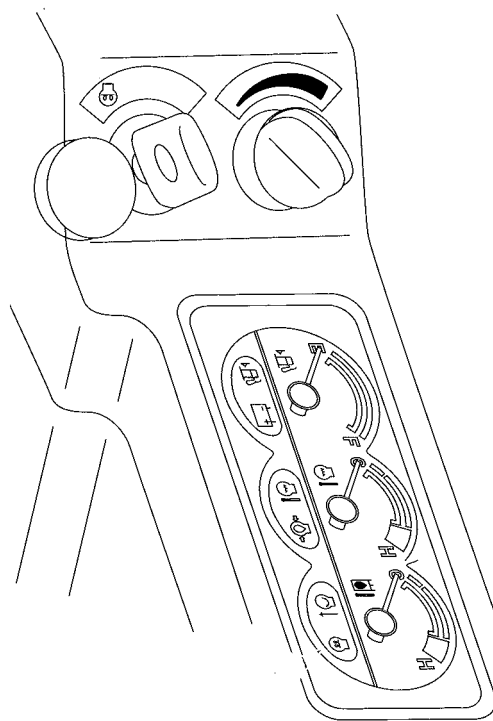


Illustration 223

g00850725

1. Look for broken lenses on the gauges, broken indicator lights, broken switches, and other broken components in the cab.

2. Start the engine.

3. Look for inoperative gauges.

4. Turn on all machine lights. Check for proper operation.

5. Move the machine forward. Release the travel levers and the travel pedals. The machine should stop.
6. Stop the engine.
7. Make any repairs that are required before operating the machine.

i02106227

Oil Filter - Inspect

SMCS Code: 1308-507; 5068-507

Inspect a Used Filter for Debris

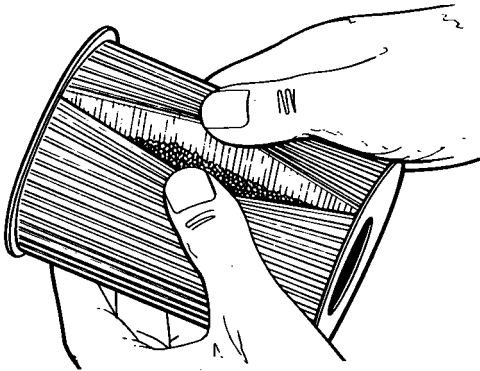


Illustration 224

g00100013

The element is shown with debris.

Use a 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 engine damage to engine bearings, to the crankshaft, and to other parts. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i01645989

Radiator Core - Clean

SMCS Code: 1353-070

1. Open the engine hood.

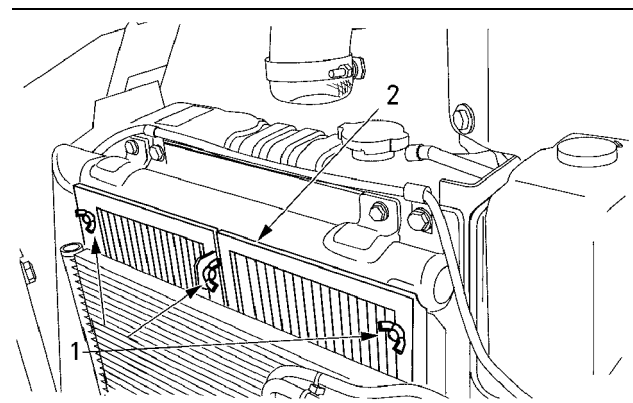


Illustration 225

g00850741

2. Loosen wing nuts (1) on the front of the radiator. Remove screen (2) from the radiator.

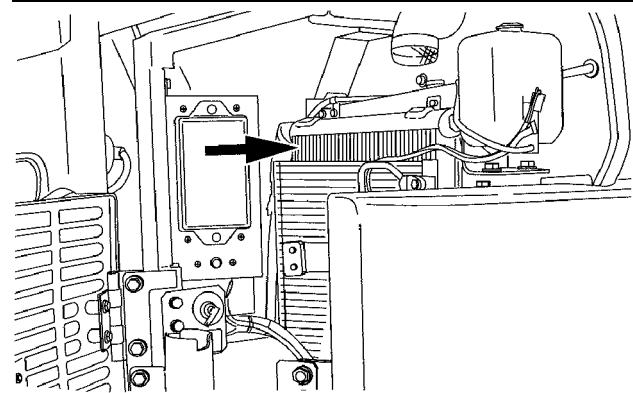


Illustration 226

g00850742

3. Check the fins of the radiator for debris.

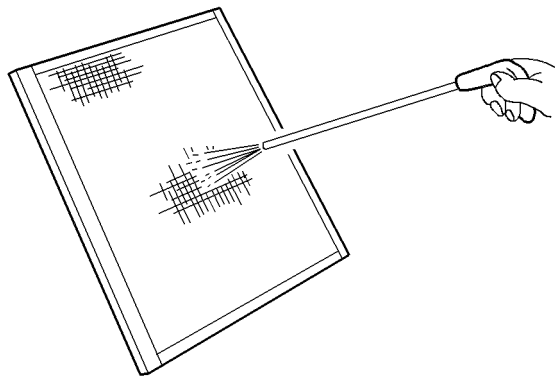


Illustration 227

g00424879

4. Remove dust and debris from the radiator fins and from the screen of the radiator.

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

Refer to Special Publication, SEBD0518, "Know Your Cooling System" for more detailed information about cleaning radiator fins.

5. Install screen (2) and wing nuts (1) to the radiator.

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.

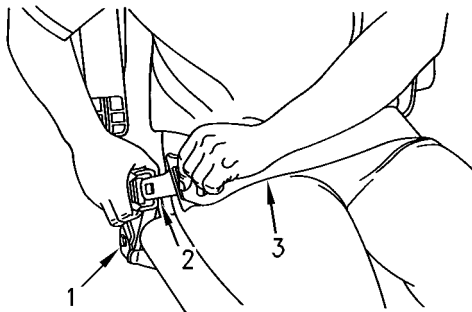


Illustration 228

g00932801

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.

i04270251

Seat Belt - Replace

SMCS Code: 7327-510

Within 3 years of the date of installation or within 5 years of the date of manufacture, Caterpillar recommends replacing 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.

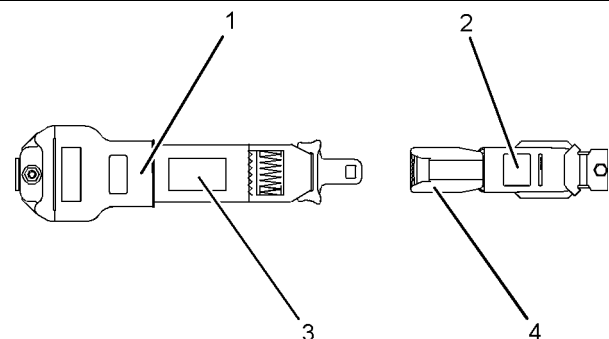


Illustration 229

g01152685

- (1) Date of installation (retractor)
- (2) Date of installation (buckle)
- (3) Date of manufacture (tag) (fully extended Web)
- (4) Date of manufacture (underside) (buckle)

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

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

i01408427

Swing Bearing - Lubricate

SMCS Code: 7063-086

Wipe the fittings before lubricating the swing bearings.

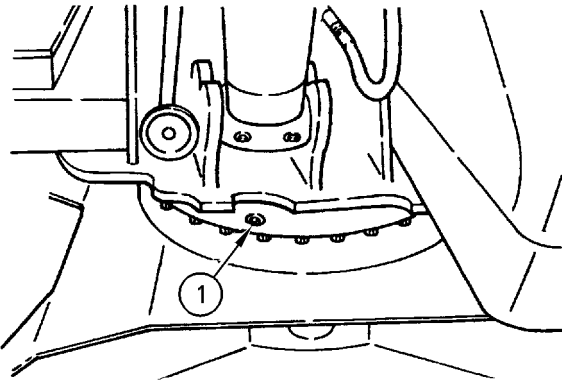


Illustration 230

g00741282

Fitting (1) is on the front of the swing bearing.

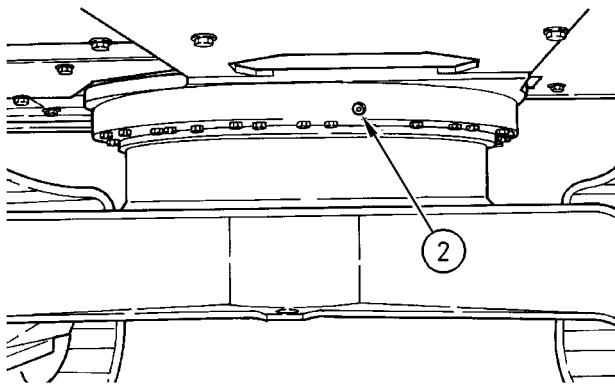


Illustration 231

g00741283

Fitting (2) is on the rear of the swing bearing.

Apply lubricant through fitting (1) and fitting (2) until the lubricant overflows the bearing seals.

i01646023

Swing Drive Oil - Change

SMCS Code: 5459-044

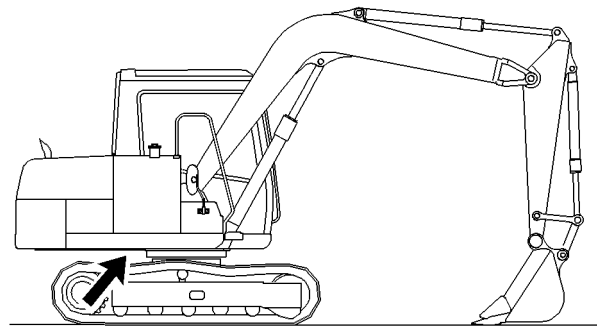


Illustration 232

g00418723

The oil drain plug is under the center of the upper structure.

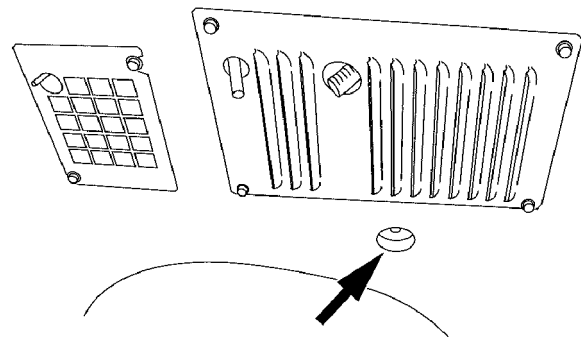


Illustration 233

g00850779

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

1. Remove the drain plug. Allow the oil to drain into a suitable container.
2. Use a clean, nonflammable solvent to clean the oil drain plug. Apply pipe sealant to the plug.
3. Install the oil drain plug.

i01646053

Swing Drive Oil Level - Check

SMCS Code: 5459-535-FLV

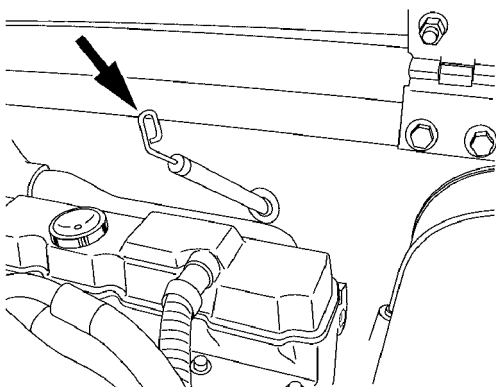


Illustration 234

g00850767

4. Remove the dipstick and clean the dipstick.
5. Add the specified quantity of oil through the dipstick tube. Refer to Operation and Maintenance Manual, "Capacities (Refill)".
6. Reinsert the dipstick.
7. Remove the dipstick and check the oil level on the dipstick.

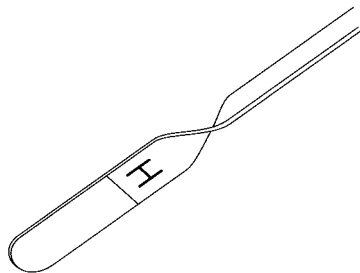


Illustration 235

g00850768

8. Maintain the oil level between the marks on the dipstick.
9. Check the oil that has been drained for metal chips or metal particles. Consult your Caterpillar dealer if any metal chips or metal particles are found.
10. Dispose of any drained fluids according to local regulations.

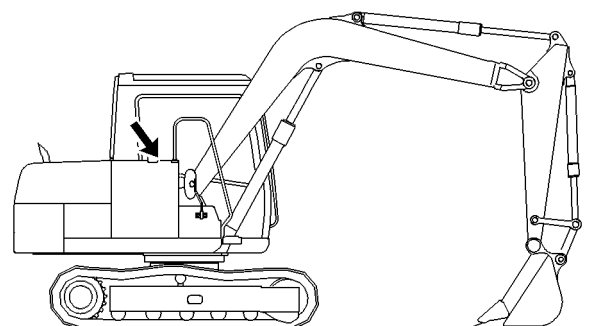


Illustration 236

g00419098

The dipstick for the swing drive is located on the swing drive at the base of the boom.

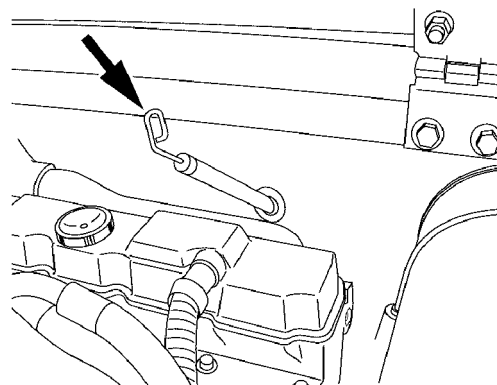


Illustration 237

g00850767

1. Remove the dipstick and wipe off the oil.
2. Reinsert the dipstick.
3. Remove the dipstick and check the oil level on the dipstick.

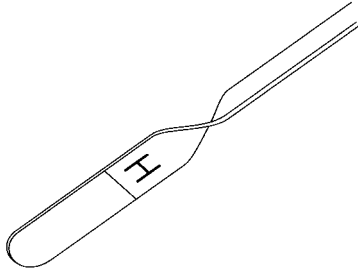


Illustration 238

g00850768

4. Maintain the oil level between the tip of the dipstick and the mark on the dipstick.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

5. Add oil through the dipstick tube, if necessary.
6. Reinsert the dipstick.

Swing Drive Oil Sample - Obtain

SMCS Code: 5459-008; 5459-008-OC;
5459-554-OC; 5459-OC; 7542-008

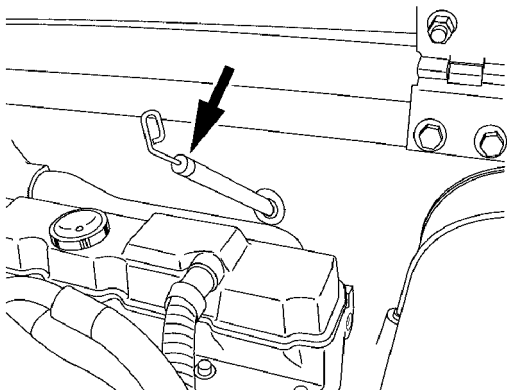


Illustration 239

g00844328

Obtain an oil sample of the swing drive oil through the opening for the dipstick. Refer to Special Publication, SEBU6250, "S-O-S Oil Analysis" for information that pertains to obtaining an oil sample from the swing drive housing. Refer to Special Publication, PEHP6001, "How To Take A Good Oil Sample" for more information about obtaining an oil sample from the swing drive housing.

i01424849

Swing Gear - Lubricate

SMCS Code: 7063-086

NOTICE

Improper lubrication can cause damage to machine components.

To avoid damage, make sure that the proper amount of grease is applied to the swing drive.

When the amount of grease in the compartment becomes too large, the agitation loss becomes large, thereby accelerating grease deterioration.

Grease deterioration can cause damage to the pinion gear of the swing drive and swing internal gear.

Not enough grease will result in poor gear lubrication.

Wipe all of the fittings before you apply lubricant.

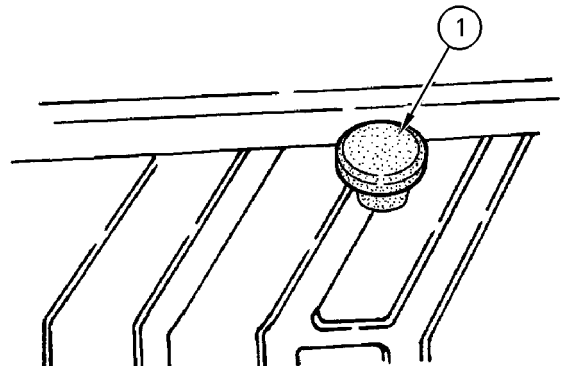


Illustration 240

g00741490

1. Remove cap (1) in the cab on the floor.

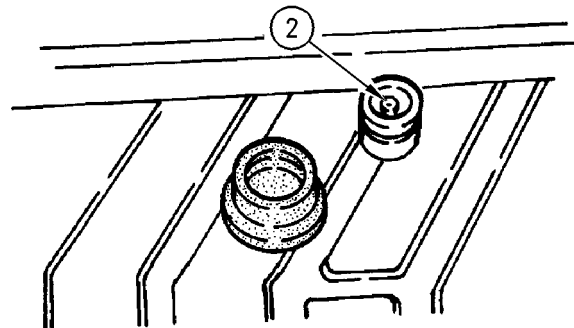


Illustration 241

g00741491

2. Add lubricant through fitting (2).

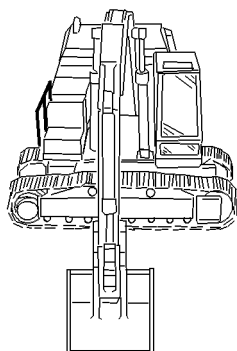


Illustration 242

g00101644

3. Raise the boom and turn the upper structure by 90 degrees. Lower the bucket to the ground.
4. Repeat Step 2 at every 90 degrees in 4 places.

i01646092

Swing Gear and Bearing - Inspect

SMCS Code: 7063-040

NOTICE

Improper lubrication can cause damage to machine components.

To avoid damage, make sure that the proper amount of grease is applied to the swing drive.

When the amount of grease in the compartment becomes too large, the agitation loss becomes large, thereby accelerating grease deterioration.

Grease deterioration can cause damage to the pinion gear of the swing drive and swing internal gear.

Not enough grease will result in poor gear lubrication.

Remove the inspection cover that is located near the base of the boom. Inspect the lubricant.

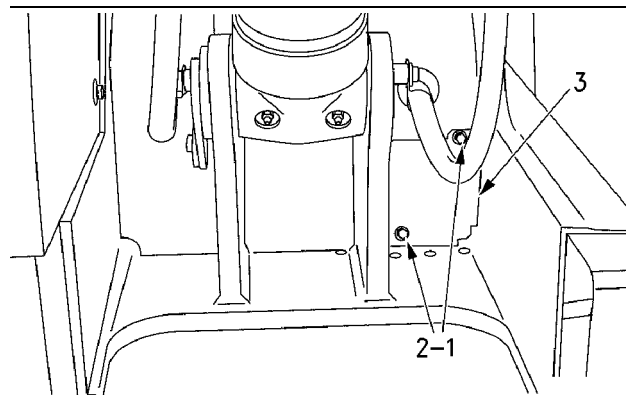


Illustration 243

g00850828

1. Remove bolts (1) and washers (2).
2. Remove cover (3).

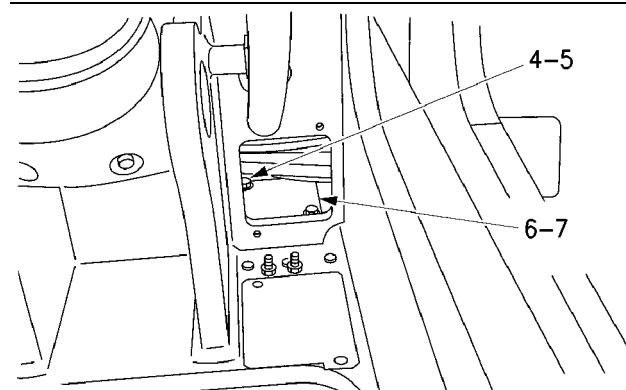


Illustration 244

g00850829

3. Remove bolts (4) and washers (5).
4. Remove cover (6) and gasket (7).
5. Inspect gasket (7). Replace the gasket if damage is evident.
6. Check the level of the lubricant. The lubricant should be evenly distributed on the floor of the pan.

The capacity of the pan is 4.3 L (1.1 US gal) or 3.9 kg (8.6 lb).

Add and remove lubricant, as needed. Too much lubricant will result in the deterioration of the lubricant because of excessive movement of the lubricant. Too little lubricant will result in poor lubrication of the swing gear.

7. Check for contamination and for discolored lubricant.
8. If the lubricant is contaminated or discolored with water, change the lubricant.

Note: Refer to Operation and Maintenance Manual, "Swing Gear - Lubricate" for the lubricating procedure.

9. Install the gasket and covers.

i04333238

Timing Chain Tensioner - Inspect

SMCS Code: 1241-040-T7

The extension of the timing chain tensioner should be checked. Remove the tensioner and measure the protrusion of the plunger.

1. Open the engine hood.

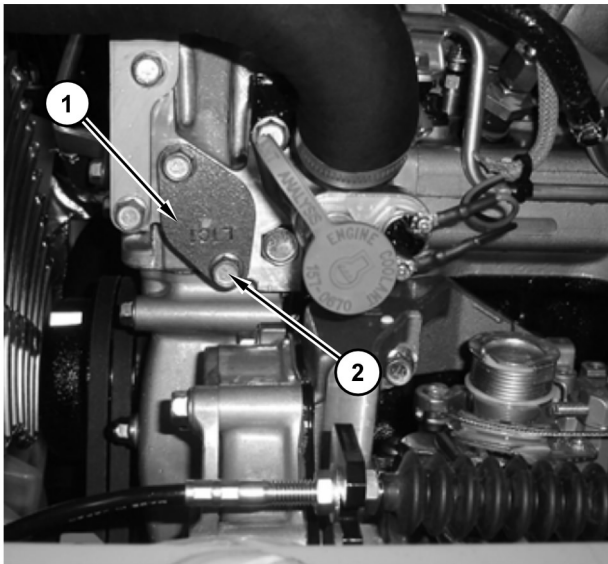


Illustration 245

g02489396

2. Remove bolts (2).



Illustration 246

g02456756

3. Remove tensioner (1).

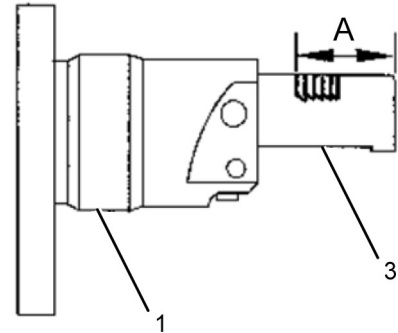


Illustration 247

g02490656

4. Measure the protrusion of plunger (3). If the protrusion of the plunger exceeds measurement (A), 26 mm (1.02 inch), replace the timing chain.

Note: Refer to Service Manual, KENR5078, "4M40-TL Engine Manual" for more information.

i01627666

Track (Rubber) - Inspect/Replace (If Equipped)

SMCS Code: 4198-040; 4198-510

Note: Consult your Caterpillar dealer when the steel track is replaced with a rubber track.

1. Inspect the rubber track for damage. The rubber track can be repaired in certain cases. Repair the rubber track if the track is damaged in one of the following manners.
 - The rubber track is cut by hard materials with sharp edges.
 - The rubber track has a shoe that is broken from a quick turn.
 - The rubber track has a crack that is produced by bending fatigue.
 - The rubber track has fine cracks in a shoe from exposure to the sunlight.
2. In order to replace a damaged shoe with a new segment of shoe, perform the following procedures.

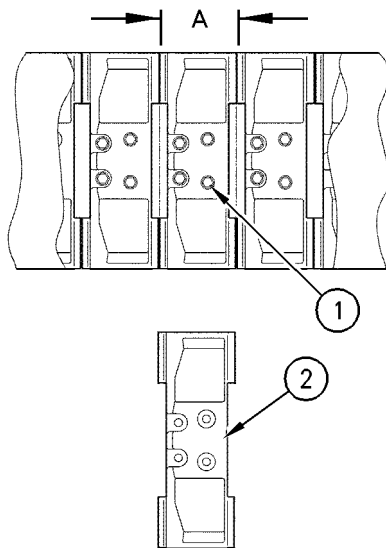


Illustration 248

g00741518

- a. Cut out area (A) of the damaged shoe.
- b. Remove four bolts (1).
- c. Remove the damaged shoe.
- d. Install new shoe (2).
- e. Fasten four bolts (1).
- f. Tighten bolts (1) to a torque of $175 \pm 40 \text{ N}\cdot\text{m}$ ($129 \pm 29 \text{ lb ft}$).

i03091797

Track Adjustment - Adjust

SMCS Code: 4170-025

WARNING

Personal injury or death can result from grease under 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 one turn only.

If track does not loosen, close the relief valve and contact your Caterpillar dealer.

NOTICE

Keeping the track properly adjusted will increase the service life of the track and drive components.

Note: The track tension must be adjusted according to the current operating conditions. Keep the track as slack as possible if the soil is heavy.

Measuring Track Tension

1. Operate the machine in the direction of the idlers.

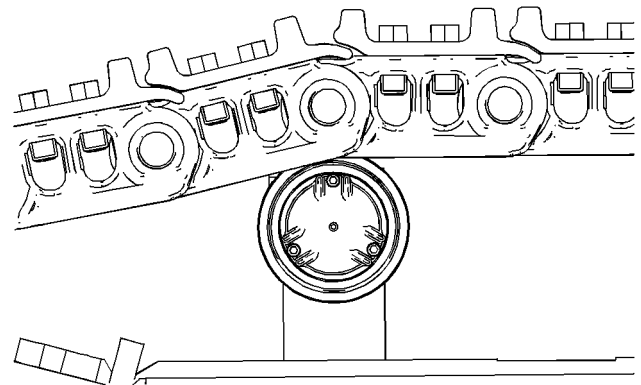


Illustration 249

g01103855

2. Stop with one track pin directly over the front carrier roller. Park the machine and turn off the engine.

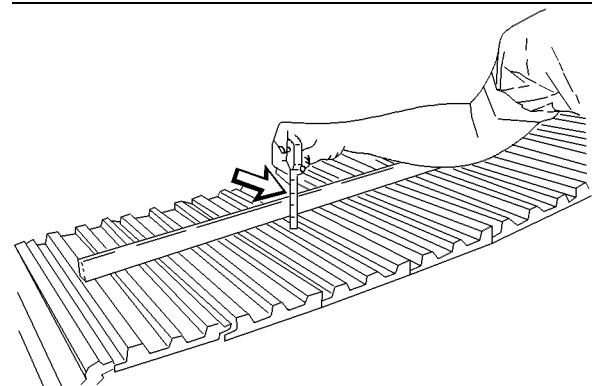


Illustration 250

g00101752

3. Place a straight edge on top of the track grousers between the front carrier roller and the idler. The straight edge should be long enough to reach from the front carrier roller to the idler.

Note: If your machine is equipped with three carrier rollers, place a straight edge on the tracks between the carrier rollers. The straight edge should be long enough to reach from one carrier roller to another carrier roller.

4. Measure the maximum amount of sag in the track. The sag is measured from the highest point of the track grouser to the bottom of the straight edge. A track that is properly adjusted will have a sag of 40.0 to 55.0 mm (1.57 to 2.17 inch).
5. If the track is too tight, or if the track is too loose, adjust the track tension according to the appropriate procedure below.

Adjusting Track Tension

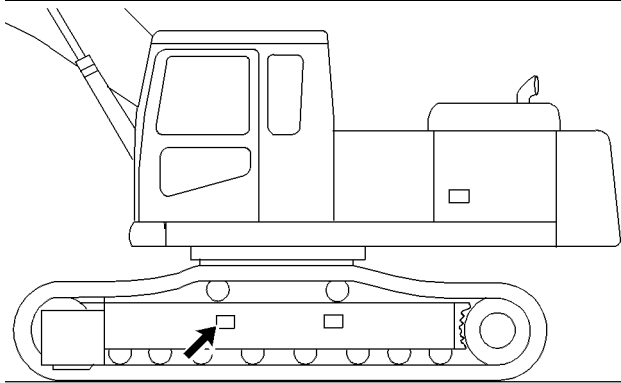


Illustration 251

g00270405

Typical example

The track adjuster is located on the track frame.

Tightening the Track

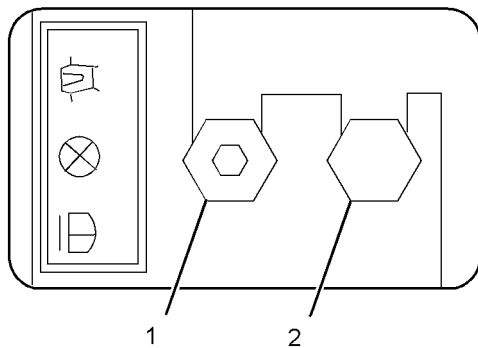


Illustration 252

g01091134

- (1) Grease fitting
- (2) Relief valve

Wipe the fitting before you add grease.

1. Add grease through grease fitting (1) until the correct track tension is reached.
2. Operate the machine back and forth in order to equalize the pressure.
3. Check the amount of sag. Adjust the track, as needed.

Loosening the Track

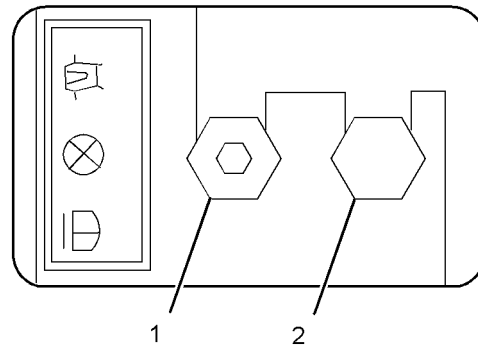


Illustration 253

g01091134

- (1) Grease fitting
- (2) Relief valve

1. Loosen relief valve (2) carefully until the track begins to loosen. One turn should be the maximum.
2. Tighten relief valve (2) to $34 \pm 5 \text{ N}\cdot\text{m}$ ($25 \pm 4 \text{ lb ft}$) when the desired track tension is reached.
3. Operate the machine back and forth in order to equalize the pressure.
4. Check the amount of sag. Adjust the track, as needed.

i01590290

Track Adjustment - Inspect

SMCS Code: 4170-040

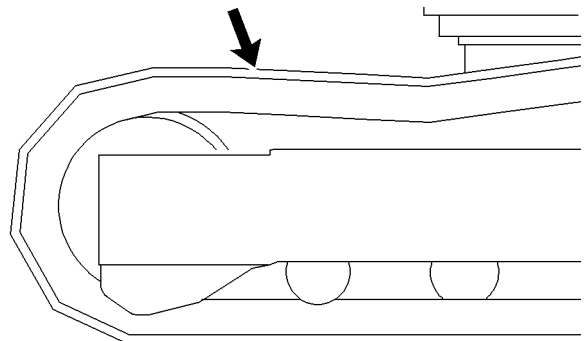


Illustration 254

g00824541

Check the track adjustment. Check the track for wear and for excessive dirt buildup.

If the track appears to be too tight or too loose, refer to Operation and Maintenance Manual, "Track Adjustment - Adjust".

Travel Alarm - Test (If Equipped)

i01646099

SMCS Code: 7429-081

You must move the machine in order to test the travel alarm.

1. Start the engine. Move the hydraulic activation control lever to the UNLOCKED position.
2. Raise the work tool in order to avoid any obstacles. Make sure that there is adequate overhead clearance.

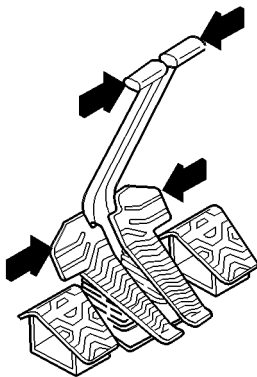


Illustration 255

g00560313

3. Use the travel levers or the travel pedals to move the machine forward. The travel alarm should sound.
4. Release the travel levers and the travel pedals in order to stop the machine.
5. Use the travel levers and the travel pedals to move the machine backward. The travel alarm should sound.

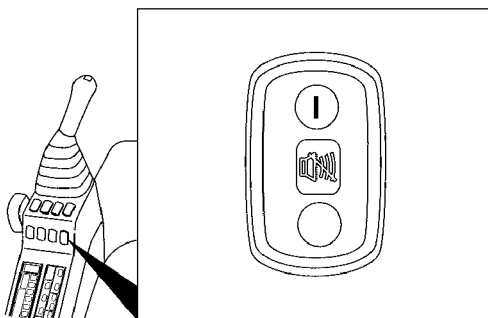


Illustration 256

g00841252

6. Push the alarm cancel switch. The travel alarm should shut off.

7. Stop the machine. Lower the work tool. Move the hydraulic activation control lever to the LOCKED position. Stop the engine.

i00854400

Undercarriage - Check

SMCS Code: 4150-535

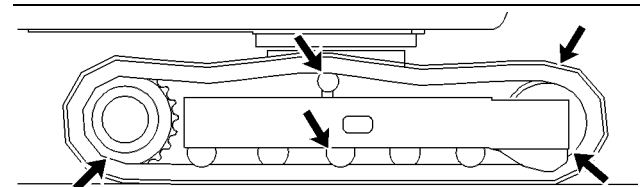


Illustration 257

g00425258

1. Check the carrier rollers, the track rollers, and the idler wheels for possible leakage.
2. Check the surface of the track, the carrier rollers, the track rollers, the idler wheels, the track shoes, and the drive sprockets. Look for signs of wear and loose mounting bolts.
3. Listen for any abnormal noises while you are moving slowly in an open area.
4. If abnormal wear exists or abnormal noises or leaks are found, consult your Caterpillar dealer.

i01646110

Window Washer Reservoir - Fill

SMCS Code: 7306-544-KE

NOTICE

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

1. Open the engine hood.

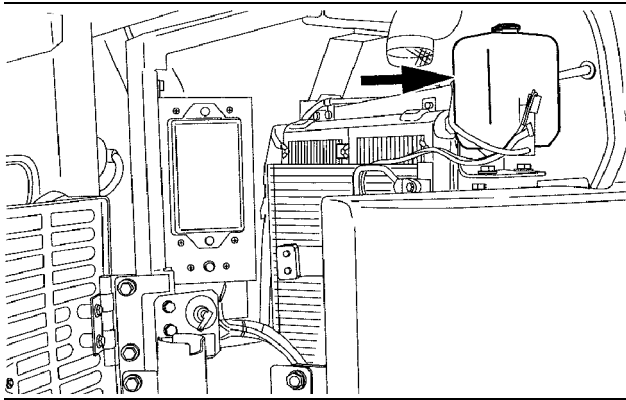


Illustration 258

g00850836

The window washer reservoir is located behind the cab.

2. Remove the filler cap.
3. Fill the window washer reservoir with washer fluid through the filler opening.
4. Install the filler cap.
5. Close the engine hood.
6. The window washer nozzles can be adjusted so that the washer fluid will be sprayed in the desired direction.

i01258249

Window Wiper - Inspect/Replace

SMCS Code: 7305-040; 7305-510

Inspect the condition of the wiper blades. Replace the wiper blades if the wiper blades are worn or damaged or if streaking occurs.

i03912371

Windows - Clean

SMCS Code: 7310-070; 7340-070

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

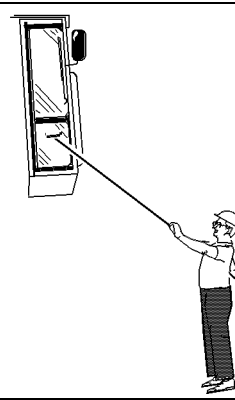


Illustration 259

g00566124

Typical example

Cleaning Methods

Aircraft Window Cleaner

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, of isopropyl alcohol, or of Butyl Cellosolve. Then, wash the windows with soap and with water.

Polycarbonate Windows (If equipped)

Wash polycarbonate windows with a mild soap or detergent. Never use a cleaning solvent on polycarbonate windows.

Wash polycarbonate windows with warm water and a soft sponge, or damp cloth. Never use a dry cloth or paper towels on polycarbonate windows.

Rinse the windows with a sufficient amount of clean water.