

SAFETY.CAT.COM™

MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt



Operation and Maintenance Manual

216B, 226B, 232B, 236B, 242B, 246B, 248B, 252B, 262B and 268B Skid Steer Loaders

RLL1-6799 (216B Machine)
MJH1-10574 (226B Machine)
SCH1-2474 (232B Machine)
HEN1-6749 (236B Machine)
BXM1-4224 (242B Machine)
SCL1-Up (248B Machine)
PAT1-Up (246B Machine)
PDT1-Up (252B Machine)
SCP1-4599 (262B Machine)
LBA1-Up (268B Machine)

i02743799

Maintenance Interval Schedule

SMCS Code: 7000

S/N: LBA1-Up

S/N: SCL1-Up

S/N: HEN1-6749

S/N: SCP1-4599

S/N: PAT1-Up

S/N: PDT1-Up

When Required

Battery - Recycle	111
Battery or Battery Cable - Inspect/Replace	111
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Every 10 Service Hours or Daily

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Work Tool - Lubricate	144
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Every 250 Service Hours

Engine Oil Sample - Obtain	127
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Every 250 Service Hours or Monthly

Belts - Inspect/Adjust/Replace	111
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Every 500 Service Hours

Hydraulic Oil Sample - Obtain	134
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Every 500 Service Hours or 3 Months

Drive Chain Tension - Check/Adjust	121
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Every 500 Service Hours or 6 Months

Fuel System Primary Filter (Water Separator) Element - Replace	132
Hydraulic System Oil Filter - Replace	136

Every 500 Service Hours or 1 Year

Engine Oil and Filter - Change	129
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Every 1000 Service Hours

Engine Valve Lash - Check	131
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Every 1000 Service Hours or 6 Months

Drive Chain Case Oil - Change	121
Rollover Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) - Inspect ...	140

Every 2000 Service Hours

Refrigerant Dryer - Replace	139
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Every 2000 Service Hours or 1 Year

Fuel Injection Timing - Check	131
Hydraulic System Oil - Change	134

Every 3000 Service Hours or 2 Years

Cooling System Water Temperature Regulator - Replace	120
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Every 3 Years After Date of Installation or Every 5 Years After Date of Manufacture

Seat Belt - Replace	141
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Every 5000 Service Hours

Engine Crankcase Breather (Closed Circuit) - Replace	125
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Every 6000 Service Hours or 3 Years

Cooling System Coolant Extender (ELC) - Add ...	118
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Every 12 000 Service Hours or 6 Years

Cooling System Coolant (ELC) - Change	116
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Backup Alarm - Test

SMCS Code: 7406-081

To prevent injury, make sure that no people are working on the machine or near the machine. To prevent injury, keep the machine under control at all times.

1. Get into the operator's seat. Fasten the seat belt and pull the armrest downward.
2. Start the engine.
3. Disengage the parking brake.
4. Move the speed/direction control lever to the REVERSE position.

The backup alarm (if equipped) should sound immediately. The backup alarm should continue to sound until the speed/direction control lever is returned to the HOLD position or to the FORWARD position.

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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

i01719520

Battery or Battery Cable - Inspect/Replace

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

1. Turn the engine start switch to the OFF position. Turn all switches to the OFF position.
2. Disconnect the negative battery cable from the starter.

Note: Do not allow the disconnected battery cable to contact the frame of the machine.

3. Disconnect the negative battery cable at the battery.
4. Perform the necessary repairs. Replace the cable or the battery, as needed.
5. Connect the negative battery cable at the battery.
6. Connect the battery cable to the starter of the machine.
7. Install the engine start switch key.

Repeat the process for the positive battery cable.

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Belts - Inspect/Adjust/Replace

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

If a new belt is installed, check the belt adjustment after 30 minutes of operation. A belt is considered to be used after 30 minutes of operation.

1. Stop the engine in order to inspect the belt.
2. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".

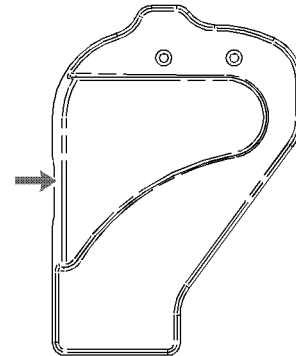


Illustration 98

g01017605

3. Remove the guard for the V-belt.

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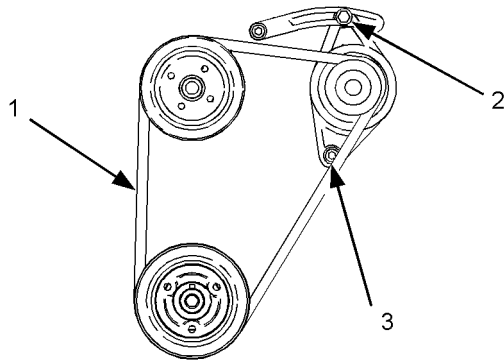


Illustration 99

g01017632

4. Inspect the condition of the belt (1) and the adjustment of the belt. The belt should deflect 10 mm (0.39 inch) under a straight pull of 44 N (10 lb). This measurement should be taken between the alternator pulley and the crankshaft pulley.

Note: A 144-0235 Borroughs Belt Tension Gauge may be used to measure belt tension. This measurement should be taken between the alternator pulley and the crankshaft pulley. Refer to the following table for belt tension.

Table 39

Belt Tension Initial	Belt Tension Used
534 ± 22 N (120 ± 5 lb)	400 ± 44 N (90 ± 10 lb)

5. Loosen the mounting bolt (2). Loosen the adjusting locknut (3).
6. Move the alternator until the correct tension is reached.
7. Tighten the adjusting locknut. Tighten the mounting bolt.
8. Recheck the belt deflection. If the amount of deflection is incorrect, repeat step 4 to step 7.
9. Install the guard for the V-belt.
10. Close the engine access door.

Blade Frame - Adjust

SMCS Code: 6060-025-BG

Height Adjustment

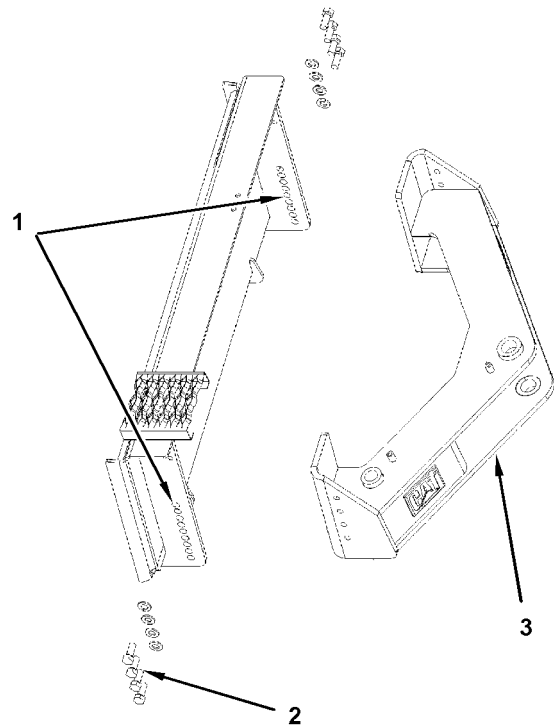


Illustration 100

g01161532

- (1) Height Adjustment for the Frame
- (2) Adjusting Bolts
- (3) Frame

The height of the frame may be adjusted in order to compensate for the wear on the cutting edge. The front portion of the frame needs to be lowered as the cutting edge wears. Remove the bolts (2) and lower the frame (3). Install the bolts. This will keep the blade level with the ground and this will prevent the blade from digging into the ground.

Note: In order to properly adjust the blade, the work tool coupler needs to be vertical. The position of the pivot point of the blade is perpendicular to the ground. Follow this procedure in order to ensure that the cutting edge will remain flat on the ground during operation.

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Trunnion Joint

Note: The trunnion is a dry joint. Adding grease to the trunnion simply attracts abrasive particles. The tightness of the joint should be monitored. Shims should be removed when the joint becomes too loose. This may be indicated by excessive movement in the blade.

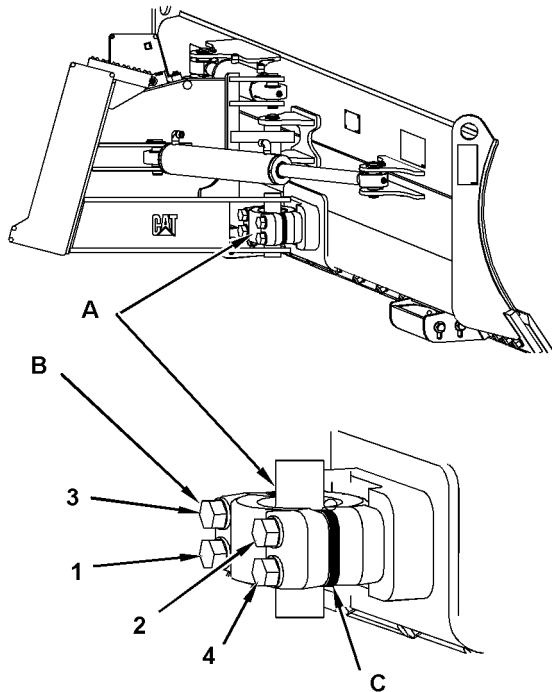


Illustration 101

g01173519

(A) Trunnion Joint
(B) Bolts
(C) Shims

- Remove the four retaining bolts (B) and the cap.
- Remove the necessary shims.
- Replace the cap and bolts.
- The tightening sequence is shown in illustration 101.
- Torque the bolts to 530 ± 70 N·m (391 ± 52 lb ft).

Note: Some noise is typical and the noise does not indicate a problem.

Bucket Cutting Edges - Inspect/Replace

SMCS Code: 6801-040; 6801-510

WARNING

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket cutting edges.

1. Lower the lift arms fully. Tilt back the bucket so that the bucket cutting edge is accessible.
2. Place blocks under the raised edge of the bucket.
3. Remove the bolts. Remove the cutting edge and the end bits.
4. Clean the contact surfaces.
5. Use the opposite side of the cutting edge, if this side is not worn.
6. Install a new cutting edge, if both edges are worn.
7. Install the bolts.
8. Remove the blocks that are under the bucket.
9. After a few hours of operation, check the bolts for proper torque.

i01764331

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 cutting edges.

1. Lower the lift arms fully. Tilt back the bucket so that the bucket tips are accessible.
2. Place blocks under the raised edge of the bucket.
3. Remove the mounting bolts. Remove the bucket tips.

4. Clean the mounting surface.
5. Replace the bucket tips.
6. Install the bolts.
7. Remove the blocks that are under the bucket.
8. After a few hours of operation, check the bolts for proper torque.

i01962545

Cab Air Filter - Clean/Replace (If Equipped)

SMCS Code: 7342-070; 7342-510

Fresh Air Filter

1. Raise the loader lift arms. Install the brace for the loader lift arm. Refer to Operation and Maintenance Manual, "Loader Lift Arm Brace Operation".

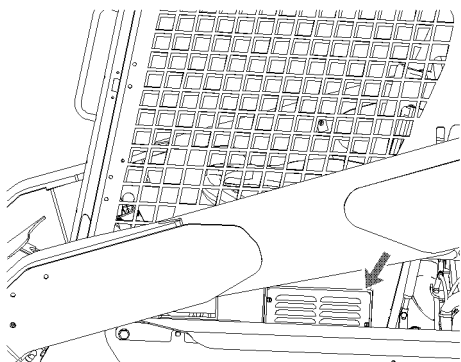


Illustration 102

g01019732

2. Remove the filter cover.
3. Remove the seal from the cover and inspect the seal. If the seal is damaged replace the seal.
4. Remove the air filter element from the cover and clean the filter element with low pressure air. Replace the element if the element is damaged.
5. Install the seal onto the filter cover and install the filter element.
6. Install the filter cover on the machine.
7. Remove the brace for the loader lift arms and return the brace to the stored position. Refer to Operation and Maintenance Manual, "Loader Lift Arm Brace Operation".

Recirculation Filter

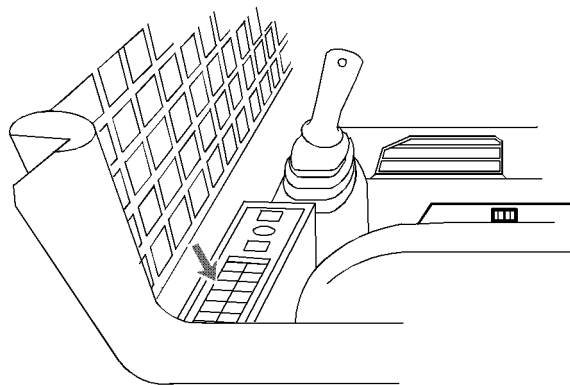


Illustration 103

g01024691

1. Remove the cover in order to access the air filter element.
2. Remove the air filter element and clean the element with soap and water. Replace the element if the element is damaged.
3. Install the element and replace the cover.

i02429415

Circuit Breakers and Fuses - Reset/Replace

SMCS Code: 1417-510; 1420-529

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

NOTICE

Replace the fuses with the same type and size only. Otherwise, electrical damage can result.

If it is necessary to replace fuses frequently, an electrical problem may exist. Contact your Caterpillar dealer

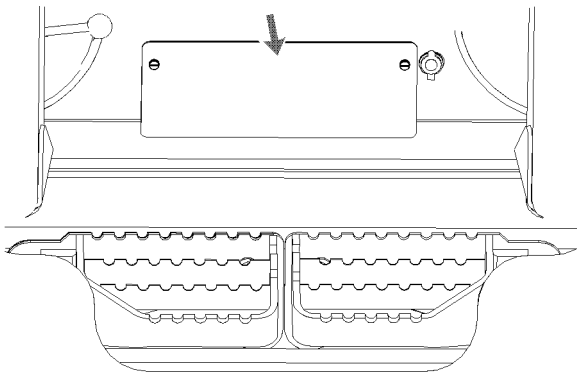


Illustration 104

g01019673

The fuse panel is located behind the cover underneath the seat. Remove the cover in order to access the fuse panel.

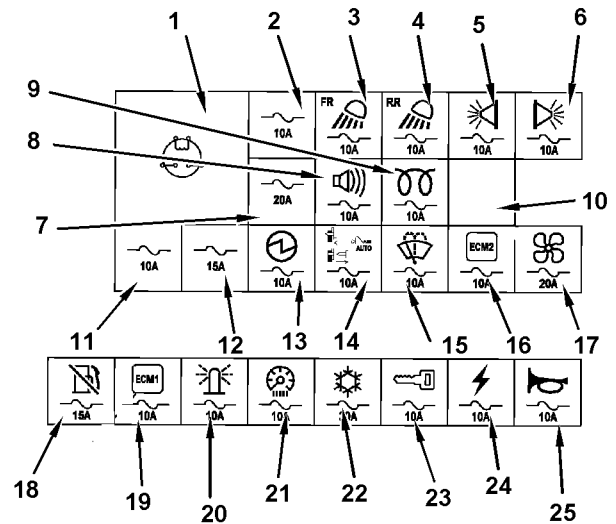
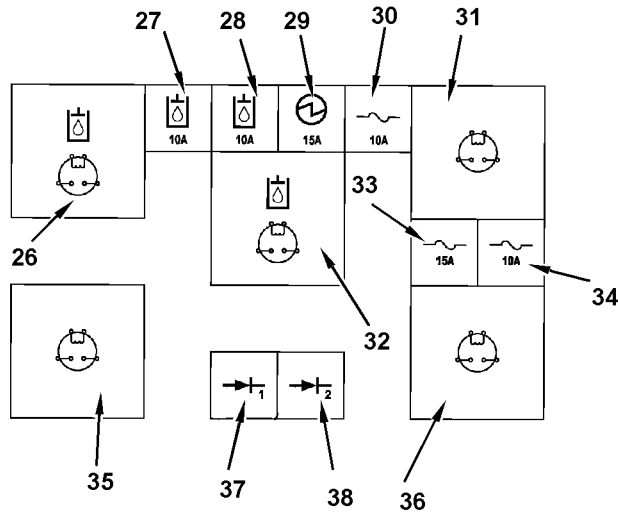


Illustration 105

Fuses and Relays

g01213939

- **Fuses**
- (2) Finger Trigger for the Work Tool
- (3) Front Work Lights
- (4) Rear Work Lights
- (5) Left Tail Lamp
- (6) Right Tail Lamp
- (7) Spare
- (8) Backup Alarm
- (9) Cold Start
- (10) Radio
- (11) Spare
- (12) Spare
- (13) 12 volt power socket
- (14) Hydraulic Quick Coupler
- (15) Wiper
- (16) Auxiliary Hydraulic ECM
- (17) HVAC Blower Fan and the Solenoid for the Compressor

- (18) Fuel Shutoff solenoid
- (19) Interlock ECM
- (20) Beacon
- (21) Gauges
- (22) The fan for the air conditioner condenser
- (23) Ignition Switch
- (24) Miscellaneous Power
- (25) Horn
- (27) Auxiliary Hydraulic C-
- (28) Auxiliary Hydraulic C+
- (29) Auxiliary Tools
- (30) Auxiliary Electrical Control C1
- (33) Spare
- (34) Auxiliary Electrical Control C2
- **Relays**
 - (1) Finger Trigger for the Work Tool
 - (26) Auxiliary Hydraulic C-Solenoid
 - (31) Auxiliary Electric Control C1
 - (32) Auxiliary Hydraulic C+Solenoid
- (35) ECM signal for the Auxiliary Hydraulic C+ and the Auxiliary Hydraulic C-
- (36) Auxiliary Electric Control C2
- **Diodes**
 - (37) C-
 - (38) C+

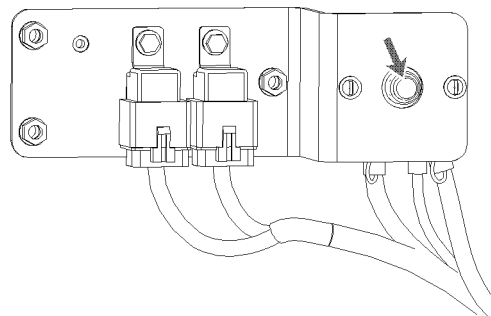


Illustration 106
Circuit Breaker

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The main circuit breaker is located in the engine compartment on the left side. Press the switch and release the switch in order to reset the circuit breaker.

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Cooling System Coolant (ELC) - Change

SMCS Code: 1395-044-NL

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

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: The machine was shipped from the factory with Extended Life Coolant (ELC) in the cooling system.

For information about the addition of Extender to your cooling system, see the Operation and Maintenance Manual, "Cooling System Coolant (ELC) Extender - Add" or consult your Caterpillar dealer.

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

The radiator cap is located under the radiator guard on the top of the engine compartment.

Allow the machine to cool before you change the coolant.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Raise the radiator guard. Refer to Operation and Maintenance Manual, "Radiator Tilting".

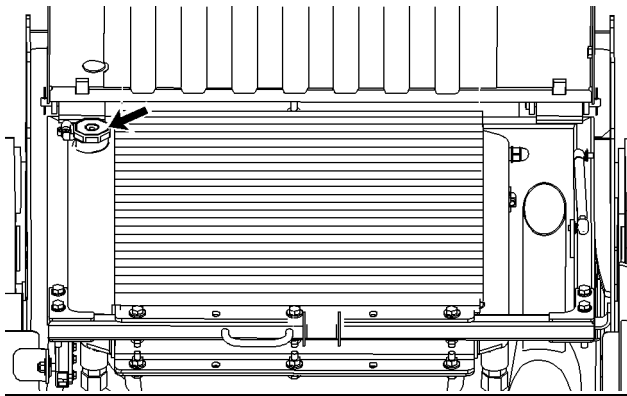


Illustration 107

g00956151

Note: The radiator cap is located on the left side of the radiator on machines that are equipped with the 3024 engine. The radiator cap is located on the right side of the radiator on machines that are equipped with the 3044 engine.

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

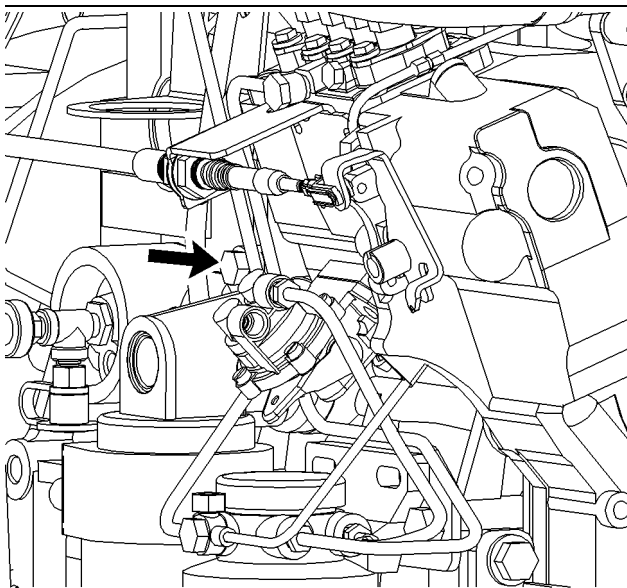


Illustration 108

3024 drain valve

g00954319

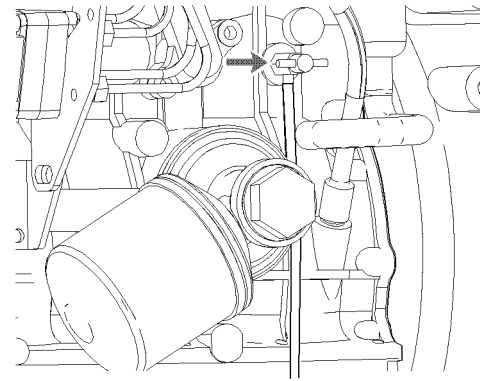


Illustration 109

3044 drain valve

g01018862

4. Remove the drain plug and allow the coolant to drain into a suitable container.
5. Install the drain plug.
6. Replace the thermostat. See Operation and Maintenance Manual, "Cooling System Water Temperature Regulator - Replace" for the process for replacing the thermostat.
7. Add the coolant solution. Refer to Operation and Maintenance Manual, "Capacities - (Refill)". Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

Note: Premix the coolant solution before filling the cooling system. The coolant solution should contain 50 percent coolant and 50 percent distilled water.

Note: Add the coolant solution at a maximum rate of five liters per minute. This will reduce the chance of trapping air inside the engine block. A large amount of trapped air can cause localized heating to occur upon start-up. Localized heating may result in engine damage, which may lead to failure of the engine.

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

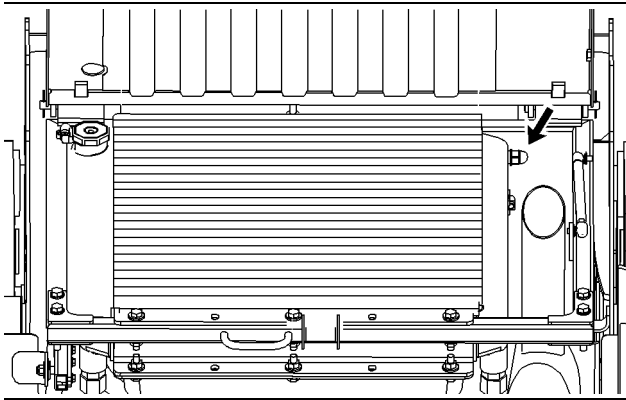


Illustration 110

g00956179

Note: The sight gauge for the coolant level is located on the right side of the radiator on machines that are equipped with the 3024 engine. The sight gauge for the coolant level is located on the left side of the radiator on machines that are equipped with the 3044 engine.

9. Maintain the coolant level in the sight gauge.
10. Stop the engine. Inspect the radiator cap and the gasket. Replace the cap if the cap or the gasket is damaged. Install the radiator cap.
11. Pull the radiator guard downward.
12. Close the engine access door.

i01962081

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352-544-NL

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

When a Caterpillar Extended Life Coolant is used, an extender must be added to the cooling system periodically.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Tilt the radiator guard upward. Refer to Operation and Maintenance Manual, "Radiator Tilting".

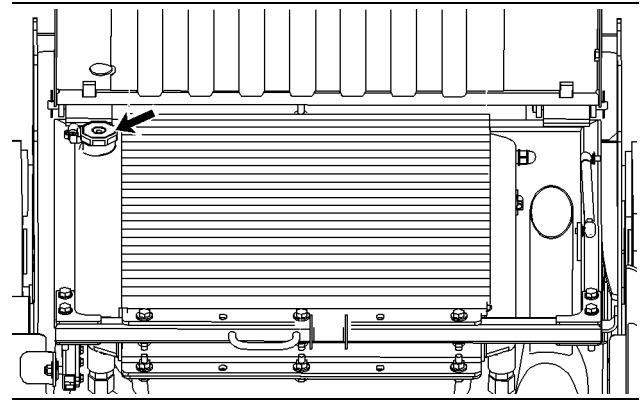


Illustration 111

g00956151

Note: The radiator cap is located on the left side of the radiator on machines that are equipped with the 3024 engine. The radiator cap is located on the right side of the radiator on machines that are equipped with the 3044 engine.

3. Slowly loosen the radiator cap in order to relieve system pressure. Remove the radiator cap.
4. If necessary, drain enough coolant from the radiator in order to allow the addition of the coolant additive.
5. Add 0.17 L (0.18 qt) of cooling system additive.
6. Inspect the radiator cap and the gasket. If the cap or the gasket is damaged, replace the cap. Install the radiator cap.

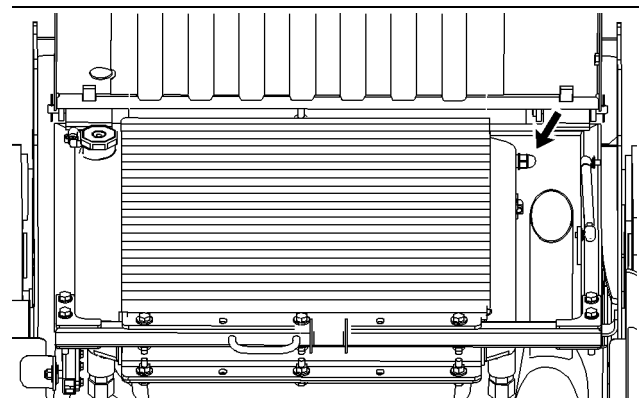


Illustration 112

g00956179

Note: The sight gauge for the coolant level is located on the right side of the radiator on machines that are equipped with the 3024 engine. The sight gauge for the coolant is located on the left side of the radiator on machines that are equipped with the 3044 engine.

7. Check the coolant level in the sight gauge on the radiator. Maintain the coolant level to the top of the sight gauge with the radiator in the LOWERED position.

8. Tilt the radiator guard downward.
9. Close the engine access door.

For additional information on the addition of extender, see Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

i01959244

Cooling System Level - Check

SMCS Code: 1350-040-HX; 1350-535-FLV;
1382-070; 1382-510

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Tilt the radiator guard upward. Refer to Operation and Maintenance Manual, "Radiator Tilting".

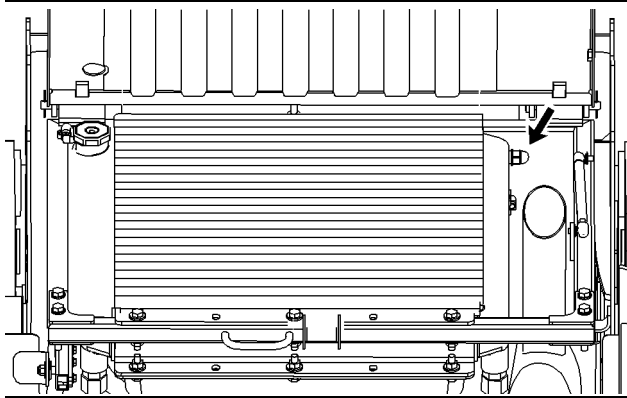


Illustration 113

g00956179

Note: The sight gauge for the coolant level is located on the right side of the radiator on machines that are equipped with the 3024 engine. The sight gauge for the coolant level is located on the left side of the radiator on machines that are equipped with the 3044 engine.

3. Maintain the coolant to the top of the sight gauge with the radiator in the LOWERED position.

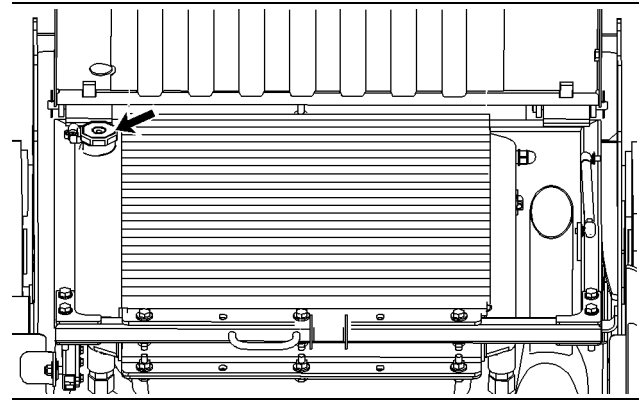


Illustration 114

g00956151

Note: The radiator cap is located on the left side of the radiator on machines that are equipped with the 3024 engine. The radiator cap is located on the right side of the radiator on machines that are equipped with the 3044 engine.

4. If you need to add coolant to the radiator, Remove the radiator cap slowly in order to relieve system pressure.

Note: Inspect the cooling system hoses for any leaks, cracks, or signs of deterioration. Replace any damaged hoses.

5. Inspect the radiator cap and the gasket. Replace the cap if the cap or the gasket is damaged. Install the radiator cap.
6. Tilt the radiator guard downward.

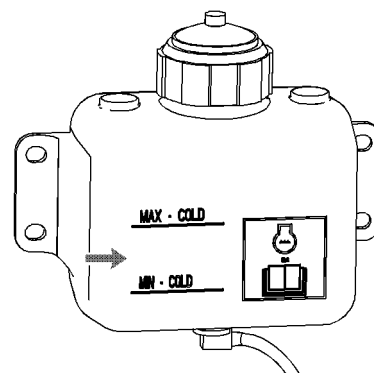


Illustration 115

g01018341

7. The coolant reservoir is located on the left side of the engine compartment or the left side of the engine access door. Maintain the coolant level in the coolant reservoir between the "MIN" and "MAX" lines.
8. Close the engine access door.

i01958427

Cooling System Water Temperature Regulator - Replace

SMCS Code: 1355-510; 1393-010

Replace the thermostat on a regular basis in order to reduce the chance of unscheduled downtime and of problems with the cooling system. Failure to replace the engine's thermostat on a regularly scheduled basis could cause severe engine damage.

The thermostat should be replaced after the cooling system has been cleaned. Replace the thermostat while the cooling system is completely drained or while the cooling system coolant is drained to a level that is below the thermostat housing.

Caterpillar engines incorporate a shunt design cooling system. It is mandatory to always operate the engine with a thermostat.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Drain the coolant from the machine. See Operation and Maintenance Manual, "Cooling System Coolant (ELC) - Change" for the procedure to drain the cooling system.

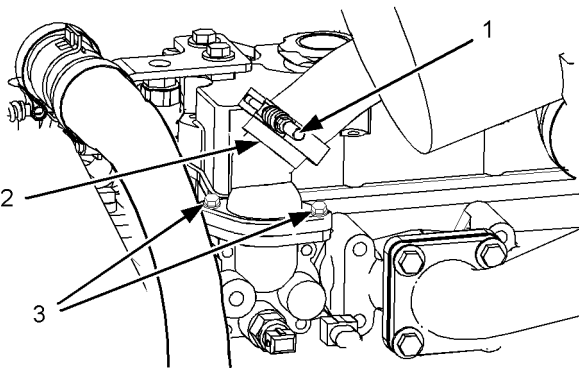


Illustration 116
3024 engine

g01018412

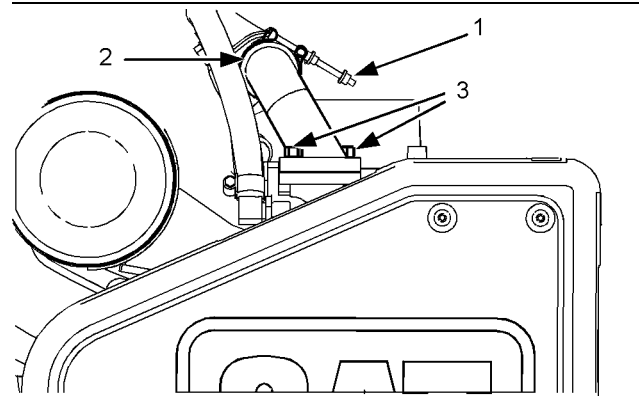


Illustration 117
3044 engine

g01018146

3. Loosen the hose clamp (1) and remove the hose from the thermostat housing assembly (2).
4. Remove the two bolts (3) from the thermostat housing assembly. Remove the thermostat housing assembly.
5. Remove the seal and the thermostat from the thermostat housing assembly.
6. Install a new thermostat and a new seal. Install the thermostat housing assembly on the engine cylinder head.
7. Install the hose. Tighten the hose clamp.
8. Refill the cooling system. See Operation and Maintenance Manual, "Capacities - (Refill)". Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluid Recommendations" for coolant information.
9. Close the engine access door.

i01990833

Drive Chain Case Oil - Change

SMCS Code: 3261-543-OC; 3261-544-OC

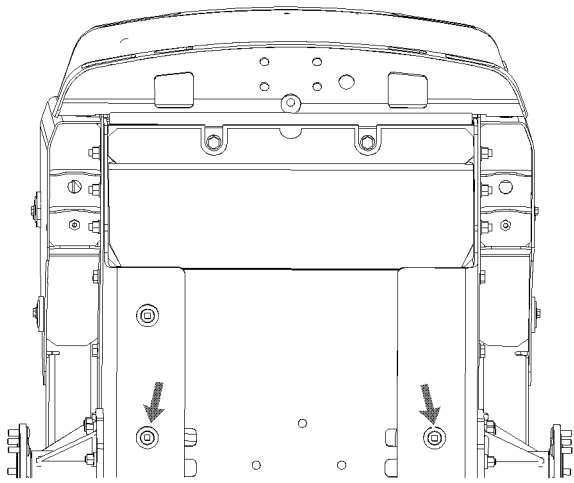


Illustration 118

g01025459

The plugs for the drive chain cases as the plugs are viewed from the underside of the machine.

1. Remove the drain plug for the left drive chain case and the right drive chain case. Allow the oil to drain into a suitable container.
2. Apply 169-5464 Quick Cure Primer and 5P-3413 Pipe Sealant to the threads on the drain plugs. Install the drain plugs.

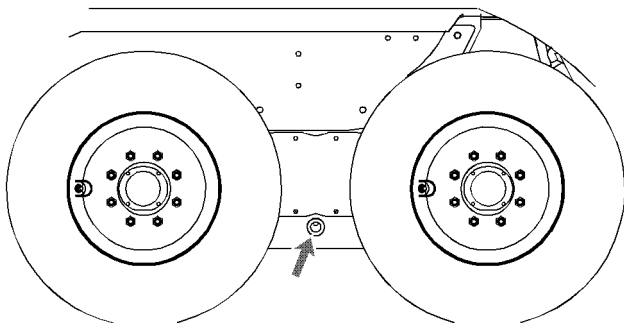


Illustration 119

g01025470

3. Remove the filler plug for the right side drive chain case. Fill the drive chain case with oil to the bottom of the threads on the fill port. Refer to Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities".

4. Apply 169-5464 Quick Cure Primer and 5P-3413 Pipe Sealant to the threads on the filler plug. Install the filler plug.
5. Repeat the process for the left side drive chain case.

Drive Chain Case Breathers

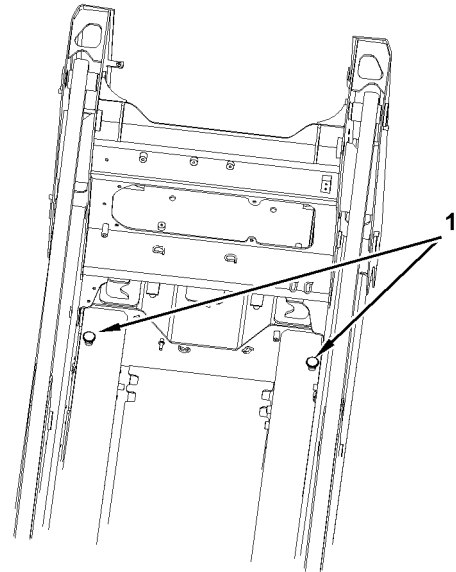


Illustration 120

g01031152

The breathers for the drive chain cases are located underneath the cab (1). Refer to Operation and Maintenance Manual, "Cab Tilting".

Remove the breathers and inspect the breathers when the oil in the drive chain cases is changed. In order to clean the breathers, use solvent and low pressure air. If the breather is badly plugged, replace the breather.

i02711772

Drive Chain Tension - Check/Adjust

SMCS Code: 3261-025; 3261-535

Note: Steel tracks that go over the tires should only be used with pneumatic tires. When you use steel tracks that go over tires or any drive train device except tires, the interval for checking the drive chains should be reduced to every 100 Service Hours. The use of rubber tracks that go over the tires is not recommended.

Note: There are four drive chains on the skid steer loader that must be checked and adjusted.

1. Park the machine on level ground and stable ground.
2. Chock the rear tires.
3. Use an appropriate floor jack to lift the front of the machine so that the front tires are off of the ground. Block up the front of the machine with two 1U-9758 Jack Stands.

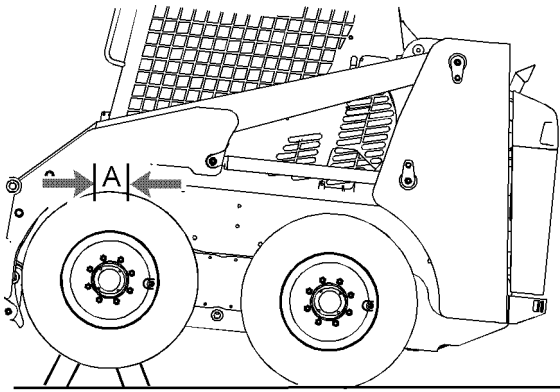


Illustration 121

g01025514

4. Rotate the wheel forward and backward. Measure the total free play (A).

Note: If the total free play does not exceed 15 mm (0.6 inch) the chain tension does not need further inspection. If the total free play exceeds 15 mm (0.6 inch), you should continue with the inspection.

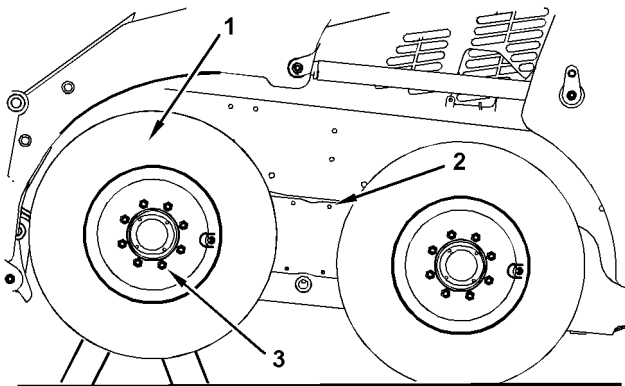


Illustration 122

g01025547

5. Remove the eight wheel nuts (3). Use an appropriate nylon lifting strap and a hoist in order to remove the tire and rim (1). The weight of the standard tire and rim is 51 kg (113 lb).
6. Remove bolts and the cover (2) for the drive chain case.

Note: Remove the sealant from the cover and from the machine.

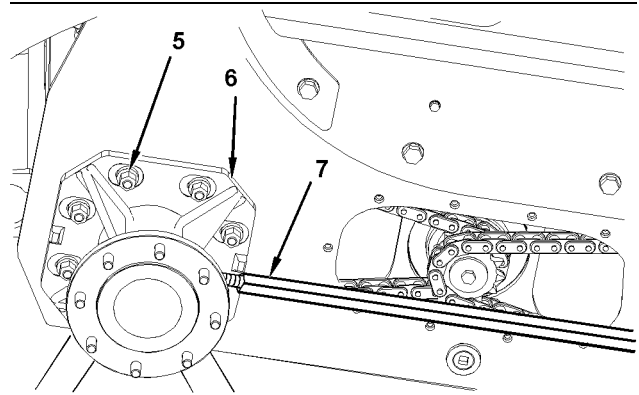


Illustration 123

g01025571

7. Loosen the eight bolts (5) for the axle housing. Place 159-3337 Chain Tension Adjuster (7) between the axle housings (6).

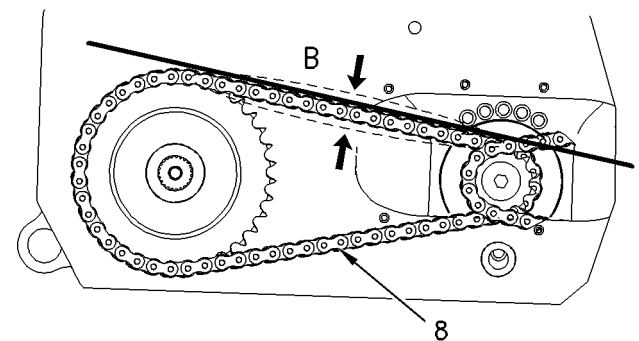


Illustration 124

g00867842

8. Rotate the axle in order to ensure that the chain (8) is taut below the sprockets. Place a straight edge across the top of the sprockets. Measure the total amount of movement in the chain (B). Set the chain tension so that there is a total of 15 mm (0.6 inch) movement in the chain. This is equal to 7.5 mm (0.3 inch) of movement above the straight edge and 7.5 mm (0.3 inch) of movement below the straight edge.

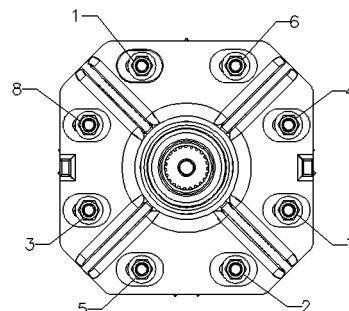


Illustration 125

g00554036

9. Tighten the bolts for the axle housing in the order that is shown above to $50 \pm 15 \text{ N}\cdot\text{m}$ ($37 \pm 11 \text{ lb ft}$). Torque all nuts again to $50 \pm 15 \text{ N}\cdot\text{m}$ ($37 \pm 11 \text{ lb ft}$) and turn an additional $90 \pm 5^\circ$ in the same order.
 10. Remove the chain tension adjuster.
 11. Install the bolts and the cover for the drive chain case.
- Note:** Use 8T-9022 Silicone Gasket in order to seal the cover to the machine.
12. Use an appropriate nylon lifting strap and a hoist in order to position the tire and rim to the axle. The weight of the tire and rim is 51 kg (113 lb). Refer to Operation and Maintenance Manual, "Wheel Nuts - Tighten" for the procedure to tighten the wheel nuts.
 13. Lower the front of the machine to the ground. Repeat the procedure on the opposite side of the machine if it is necessary.
 14. Repeat the adjustment procedure on the rear drive chains if it is necessary.

i01961088

Engine Air Filter Primary Element - Clean/Replace

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

NOTICE

Never service the air cleaner when the engine is running, to avoid engine damage.

NOTICE

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

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

Never tap or strike the filter element in order to remove dust.

Never wash the filter element.

Use low pressure compressed air in order to remove the dust from the filter element. Air pressure must not exceed 206 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 tearing or voiding the pleats.

Service the air filter elements when the alert indicator for air filter restriction lights. Refer to Operation and Maintenance Manual, "Alert Indicators".

1. Open the engine access door.

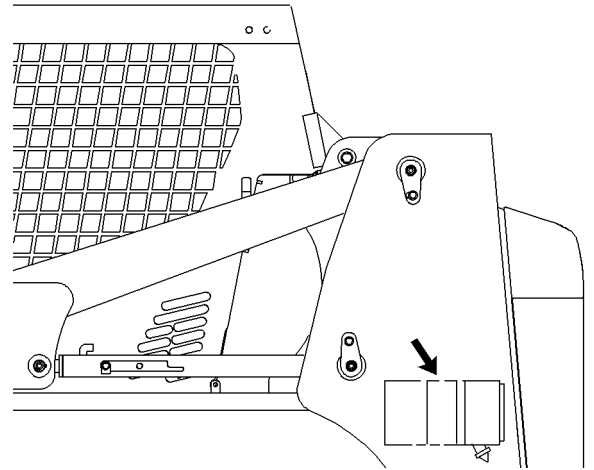


Illustration 126

g00891467

2. The air filter housing is located on the left side of the engine compartment on machines that are equipped with the 3024 engine. The air filter housing is located on the right side of the engine compartment on machines that are equipped with the 3044 engine.

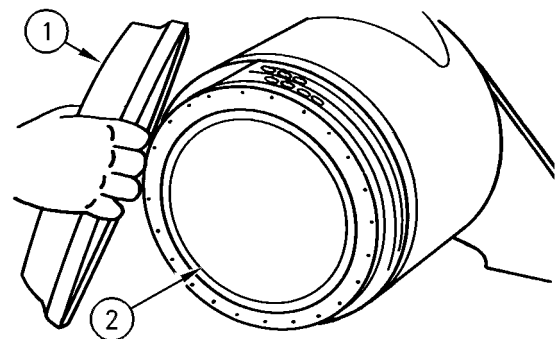


Illustration 127

g00101864

3. Unlatch the air cleaner housing cover (1). Rotate the cover and remove the cover.
4. Remove the primary filter element (2).
5. Install a clean filter element into the filter housing and install the cover for the filter housing.
6. Close the engine access door.

7. Start the engine. The alert indicator for air filter restriction should turn off. If the alert indicator continues to light, replace the secondary air filter. Refer to Operation and Maintenance Manual, "Engine Air Filter Secondary Element - Replace".

i02020796

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510-SE

NOTICE

Always replace the secondary air filter element. Never attempt to reuse it by cleaning. The secondary air filter element should be replaced at the time the primary element is serviced for the third time. The secondary filter element should also be replaced if the alert indicator for air filter restriction lights.

1. Open the engine access door.

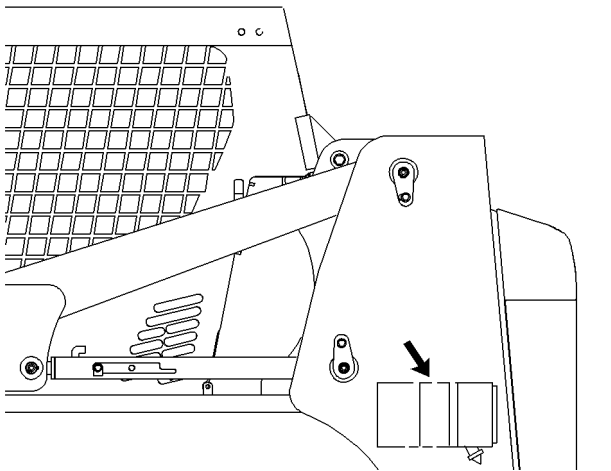


Illustration 128

g00891467

2. The air filter housing is located on the left side of the engine compartment on machines that are equipped with the 3024 engine. The air filter housing is located on the right side of the engine compartment on machines that are equipped with the 3044 engine.

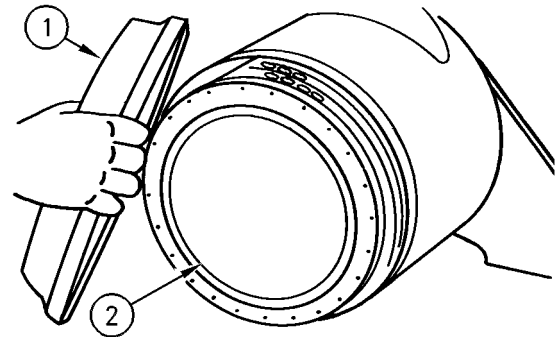


Illustration 129

g00101864

3. Unlatch the air cleaner housing cover (1). Rotate the cover and remove the cover.
4. Remove the primary filter element (2).

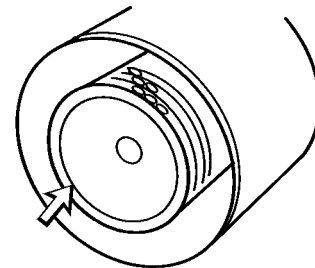


Illustration 130

g00038606

5. Remove the secondary filter element.
6. Cover the air inlet opening. Clean the inside of the air cleaner housing.
7. Inspect the gasket between the air inlet pipe and the air cleaner housing. Replace the gasket if the gasket is damaged.
8. Uncover the air inlet opening. Install a new secondary element.
9. Install the primary element and the air cleaner housing cover.
10. Close the engine access door.

i01961301

Engine Crankcase Breather (Closed Circuit) - Replace

SMCS Code: 1317-510

S/N: LBA1-Up

S/N: SCL1-Up

S/N: HEN1-6749

S/N: SCP1-4599

S/N: PAT1-Up

S/N: PDT1-Up

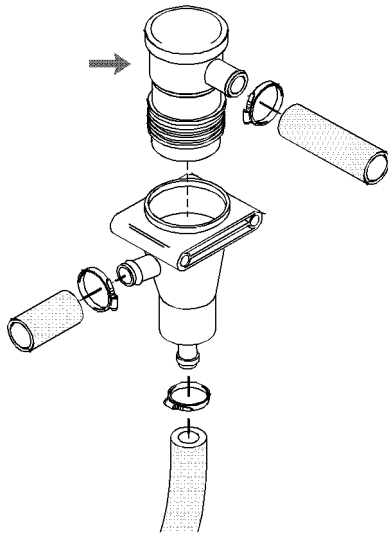


Illustration 131

g01018922

The breather is located on the right side of the 3044 engine.

NOTICE

Ensure that the breather pipe connections are tight. Do not overfill the engine crankcase. If there is too much oil in the crankcase oil may enter the breather. Oil entering the breather may cause the engine speed to increase rapidly without control.

1. Firmly grasp the breather and pull up on the breather in order to remove the breather.
2. Remove the breather hoses. Clean the hoses with nonflammable solvent.
3. Install a new breather. Ensure that the breather is properly seated in the base.

4. Install the breather hoses. Ensure that the connections are tight.

i02022498

Engine Crankcase Breather - Clean

SMCS Code: 1317-070

S/N: MJH1-10574

S/N: SCH1-2474

S/N: RLL1-6799

S/N: BXM1-4224

Note: Ensure that the area around the vent hole on the breather cover is clean and that the vent hole is not restricted. Ensure that the components of the breather assembly are seated in the correct positions. Otherwise, engine damage could result.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Tilt the radiator upward. Refer to Operation and Maintenance Manual, "Radiator Tilting".

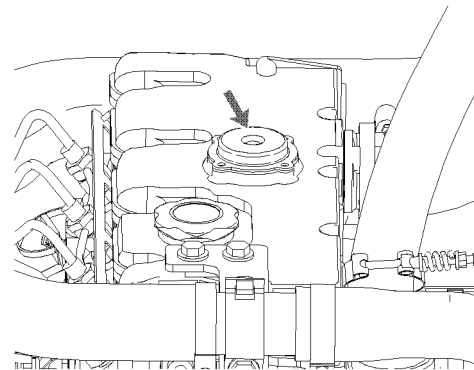


Illustration 132

g01018945

i01959002

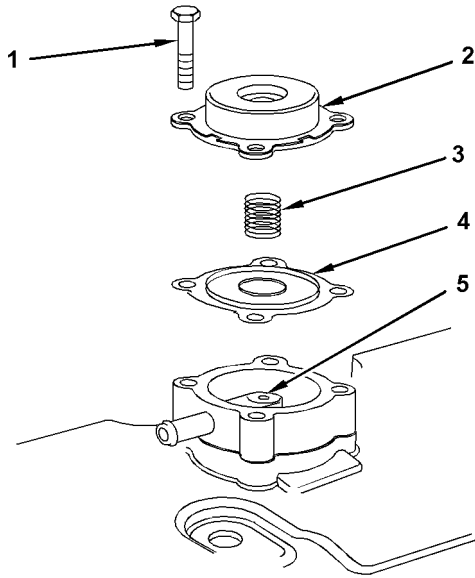


Illustration 133

g01044243

3. The breather is located on top of the valve cover on the 3024 engine. Remove the screws (1). Remove the breather cover (2).
4. Remove the diaphragm assembly (4). Remove the spring (3). The diaphragm assembly consists of the diaphragm and the locating ring.
5. Clean the cavity for the breather (5).
6. Remove the gauze that is located below the cavity for the breather.
7. Clean the following items with a clean diesel fuel:
 - Breather
 - Breather cover
 - Diaphragm assembly
 - Location ring assembly
 - Spring
 - Gauze
8. Allow the parts to dry. Pressure air may be used to dry the parts.
9. Install the gauze and install the components of the breather. Install the breather cover.
10. Tilt the radiator downward.
11. Close the engine access door.

Engine Oil Level - Check

SMCS Code: 1348-535-FLV

NOTICE

Do not overfill the crankcase. Engine damage can result.

1. Stop the engine and allow the oil to drain back into the oil pan.
2. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
3. Tilt the radiator upward. Refer to Operation and Maintenance Manual, "Radiator Tilting".

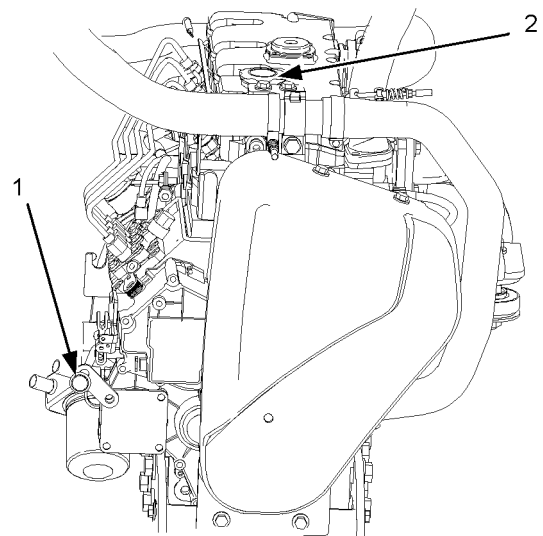


Illustration 134

3024 engine

g01018561

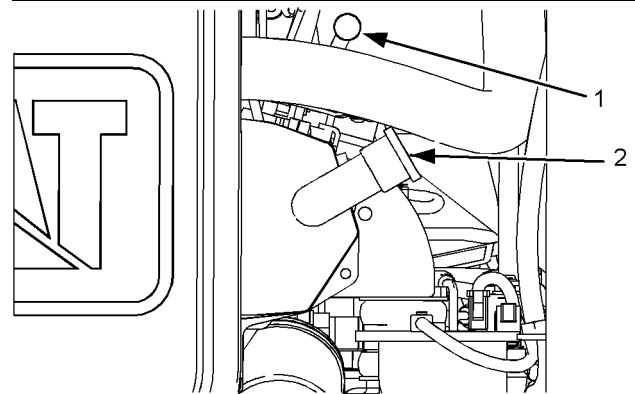


Illustration 135

3044 engine

g01018171

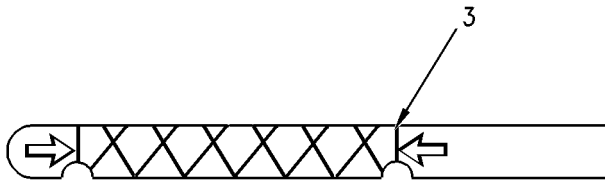


Illustration 136

g00850465

4. Maintain the oil level to the "FULL" mark (3) on the dipstick (1).
5. If necessary, remove the oil filler cap (2) and add oil.
6. Clean the oil filler cap and install the oil filler cap.
7. Tilt the radiator downward.
8. Close the engine access door.

i01959048

Engine Oil Sample - Obtain

SMCS Code: 1348-554-SM; 7542-008

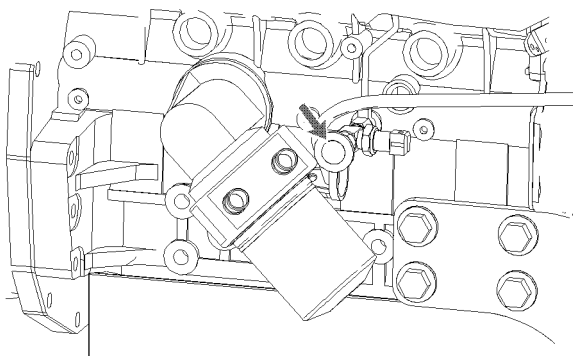


Illustration 137

g01018202

3024 engine

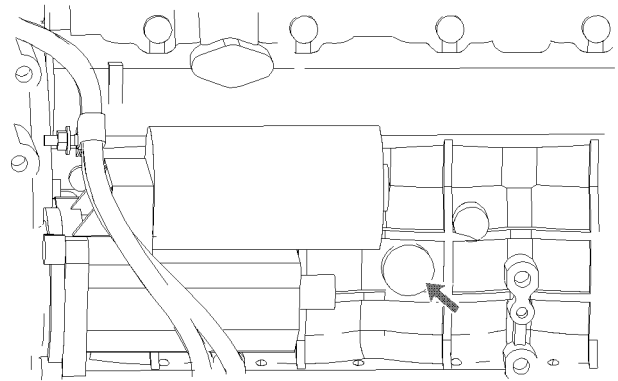


Illustration 138

g01018203

3044 engine

The sampling port for the engine oil is located on the left side of the engine block.

i02811482

Engine Oil and Filter - Change

SMCS Code: 1308-510; 1348-044

S/N: MJH1-10574

S/N: SCH1-2474

S/N: RLL1-6799

S/N: BXM1-4224

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.

The normal oil change interval for the machine is Every 250 Service Hours or every year when the following conditions are met:

- Caterpillar oil, API Specification CI-4, CH-4 or CG-4 multigrade oil is used.
- Caterpillar filters are used.
- The altitude does not exceed 2300 m (7545 ft).

- Sulfur content in the fuel is between 0.05% and 0.50%.

An oil change interval of Every 200 Service Hours or every six months is required when the following conditions occur:

- Caterpillar oil, API Specification CI-4, CH-4 or CG-4 multigrade oil is not used.
- The altitude exceeds 2300 m (7545 ft).
- Sulfur content in the fuel is between 0.50% and 1.00%.

An oil change interval of Every 125 Service Hours is required when the following condition occurs:

- Sulfur content in the fuel is above 1.00%.

Refer to the results of the S-O-S oil analysis in order to determine if the oil change interval should be decreased. Consult your Caterpillar Dealer for detailed information regarding the optimum oil change interval.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Tilt the radiator upward. Refer to Operation and Maintenance Manual, "Radiator Tilting".

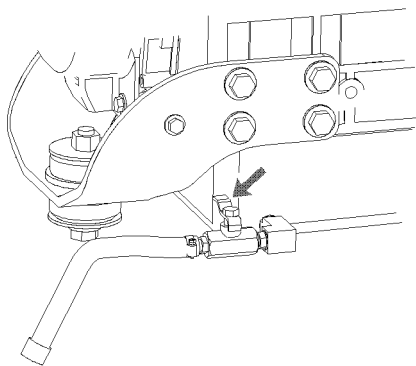


Illustration 139
3024 engine

Note: The crankcase drain is located on the right side of the oil pan.

3. Pull the drain hose for the crankcase through the opening in the rear of the machine and remove the plug in the end of the drain hose. Open the crankcase drain valve and drain the oil into a suitable container. Close the crankcase drain valve. Install the plug in the drain hose.

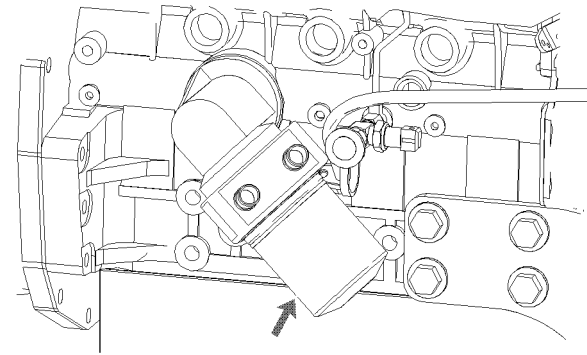


Illustration 140
3024 engine

g01022354

4. Remove the filter element with a 187-2718 Filter Wrench. Refer to Operation and Maintenance Manual, "Oil Filter - Inspect" in order to inspect the used filter for debris.
5. Apply a thin film of clean engine oil to the sealing surface of the new filter element.
6. Install a new engine oil filter hand tight until the seal of the engine oil filter contacts the base. Note the position of the index marks on the filter in relation to a fixed point on the filter base.
7. Tighten the filter according to the instructions that are printed on the filter. Use the index marks as a guide.

Note: There are rotation index marks on the engine oil filter that are spaced 90 degrees or 1/4 of a turn away from each other. When you tighten the engine oil filter, use the rotation index marks as a guide.

Note: You may need to use a Caterpillar strap wrench, or another suitable tool, in order to turn the filter to the amount that is required for final installation. Make sure that the installation tool does not damage the filter.

i02742743

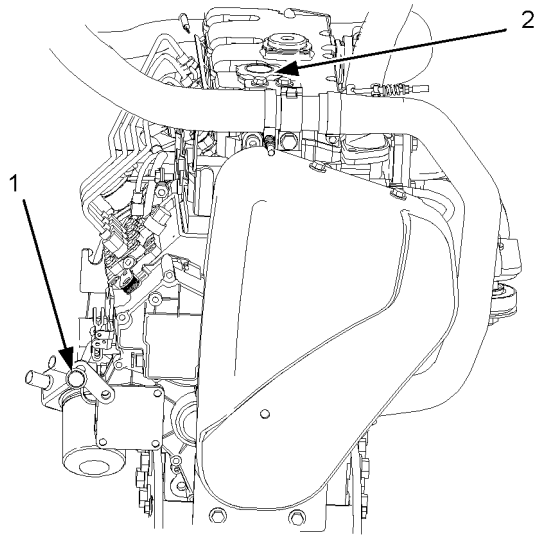


Illustration 141
3024 engine

g01018561

8. Remove the oil filler plug (1). Fill the crankcase with new oil. See Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities". Clean the oil filler plug and install the oil filler plug.
9. Start the engine and allow the oil to warm. Check for leaks.

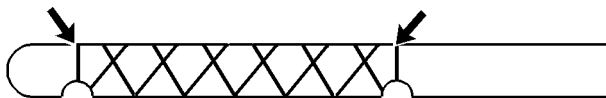


Illustration 142

g00849728

10. Stop the engine and allow the oil to drain back into the oil pan. Fill the crankcase to the "FULL" mark on the dipstick (1). **Do not exceed the "FULL" mark on the dipstick.** Add oil or drain oil if it is necessary.
11. Tilt the radiator downward.
12. Close the engine access door.

Engine Oil and Filter - Change

SMCS Code: 1308-510; 1348-044

S/N: LBA1-Up

S/N: SCL1-Up

S/N: HEN1-6749

S/N: PAT1-Up

S/N: PDT1-Up

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.

The normal oil change interval for the machine is Every 500 Service Hours or every year when the following conditions are met:

- Caterpillar oil, API Specification CI-4, CH-4 or CG-4 multigrade oil is used.
- Caterpillar filters are used.
- The altitude does not exceed 2300 m (7545 ft).
- Sulfur content in the fuel is between 0.05% and 0.50%.

An oil change interval of Every 250 Service Hours or every six months is required when the following conditions occur:

- Caterpillar oil, API Specification CI-4, CH-4 or CG-4 multigrade oil is not used.
- The altitude exceeds 2300 m (7545 ft).
- Sulfur content in the fuel is between 0.50% and 1.00%.

An oil change interval of Every 125 Service Hours is required when the following condition occurs:

- Sulfur content in the fuel is above 1.00%.

Refer to the results of the S-O-S oil analysis in order to determine if the oil change interval should be decreased. Consult your Caterpillar Dealer for detailed information regarding the optimum oil change interval.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Tilt the radiator upward. Refer to Operation and Maintenance Manual, "Radiator Tilting".

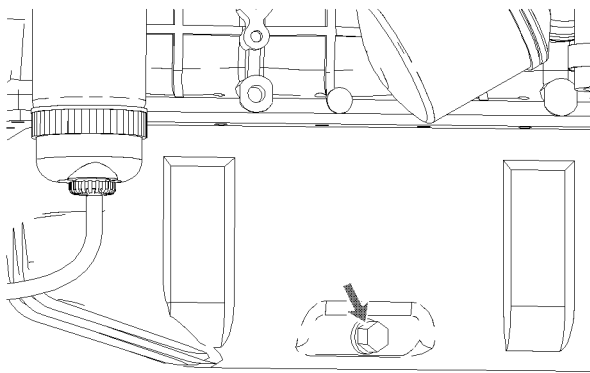


Illustration 143
3044 engine

g01031090

Note: The crankcase drain is located on the right side of the oil pan.

3. Remove the access panel that is located below the drain plug. Remove the drain plug and allow the oil to drain into a suitable container. Install the drain plug and install the access panel.

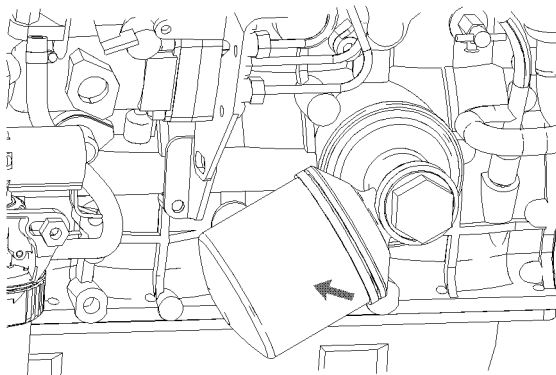


Illustration 144
3044 engine

g01022355

4. Remove the filter element with a 187-2718 Filter Wrench. Refer to Operation and Maintenance Manual, "Oil Filter - Inspect" in order to inspect the used filter for debris.

5. Apply a thin film of clean engine oil to the sealing surface of the new filter element.
6. Install a new engine oil filter hand tight until the seal of the engine oil filter contacts the base. Note the position of the index marks on the filter in relation to a fixed point on the filter base.

Note: There are rotation index marks on the engine oil filter that are spaced 90 degrees or 1/4 of a turn away from each other. When you tighten the engine oil filter, use the rotation index marks as a guide.

7. Tighten the filter according to the instructions that are printed on the filter. Use the index marks as a guide.

Note: You may need to use a Caterpillar strap wrench, or another suitable tool, in order to turn the filter to the amount that is required for final installation. Make sure that the installation tool does not damage the filter.

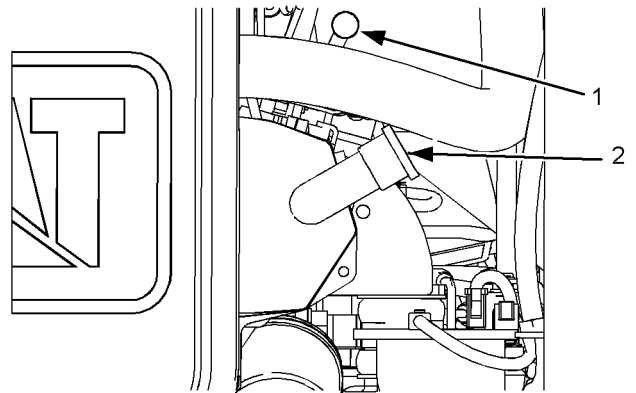


Illustration 145
3044 engine

g01018171

8. Remove the oil filler plug (1). Fill the crankcase with new oil. See Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities". Clean the oil filler plug and install the oil filler plug.
9. Start the engine and allow the oil to warm. Check for leaks.

i02645127

Fuel System Primary Filter (Water Separator) - Drain

SMCS Code: 1263-543

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.

The fuel system water separator is located in the left side of the engine compartment.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".

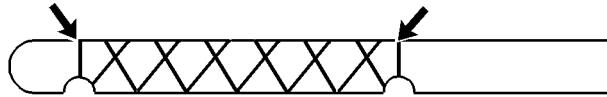


Illustration 146

g00849728

10. Stop the engine and allow the oil to drain back into the oil pan. Fill the crankcase to the "FULL" mark on the dipstick (1). **Do not exceed the "FULL" mark on the dipstick.** Add oil or drain oil if it is necessary.

11. Tilt the radiator downward.

12. Close the engine access door.

i01020861

Engine Valve Lash - Check

SMCS Code: 1105-025

Refer to the Service Manual for the complete adjustment procedure for the engine valve lash.

A qualified mechanic should adjust the engine valve lash and the fuel injector timing because special tools and training are required.

i00916186

Fuel Injection Timing - Check

SMCS Code: 1251-531

Note: The correct fuel timing specification is found on the Engine Information Plate. Fuel timing specifications may vary for different engine applications and/or for different power ratings.

A qualified mechanic should adjust the fuel injection timing because special tools and training are required.

Refer to the Service Manual for the complete adjustment procedure for the fuel injection timing. Refer to your Caterpillar dealer for the complete adjustment procedure for the fuel injection timing.

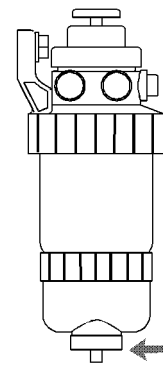


Illustration 147

g01023095

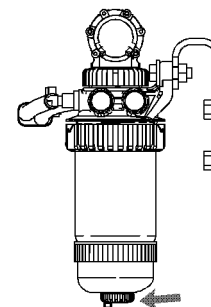


Illustration 148

g01023096

2. Loosen the drain valve on the bottom of the water separator. Allow the water and the sediment to drain into a suitable container.
3. Tighten the drain valve by hand. Do not tighten the drain valve with a tool. Damage to the valve or to the seals may occur.
4. Close the engine access door.

i02645133

Fuel System Primary Filter (Water Separator) Element - Replace

SMCS Code: 1260-510-FQ; 1263-510-FQ

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.

Note: This unit has a dual purpose. The element serves as a water separator and a fuel filter.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".

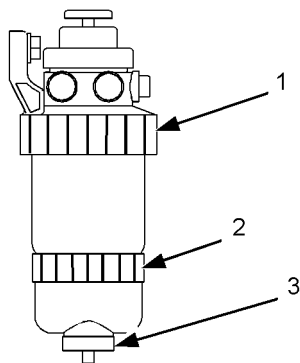


Illustration 149

g01017292

Fuel Filter/Water Separator for the 3024 engine that is located on the left side of the engine compartment

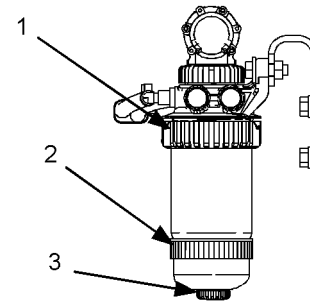


Illustration 150

g01017293

Fuel Filter/Water Separator for the 3044 engine that is located on the right side of the engine compartment

2. Open the drain on the fuel filter/water separator (3). Allow the water and fuel to drain into a suitable container.
3. Close the drain valve by hand. Do not tighten the drain valve with a tool. Damage to the valve or to the seals may occur.
4. Support the fuel filter/water separator and rotate the locking ring (1) counterclockwise. Remove the fuel filter/water separator.
5. Rotate the locking ring (2) counterclockwise. Remove the bowl assembly.
6. Clean the mounting base for the fuel filter/water separator.
7. Clean the bowl assembly for the fuel/water separator.
8. Install the bowl assembly onto the new fuel/water separator and rotate the locking ring clockwise.
9. Install the new fuel filter/water separator onto the mounting base. Rotate the locking ring clockwise in order to fasten the fuel filter/water separator to the mounting base.
10. Prime the fuel system in order to fill the fuel filter/water separator with fuel. Refer to Operation and Maintenance Manual, "Fuel System Priming Pump - Operate".
11. Close the engine access door.

i02509334

Fuel System Priming Pump - Operate

SMCS Code: 1258-548

3024 Engine

The fuel priming pump is located on top of the fuel filter/water separator.

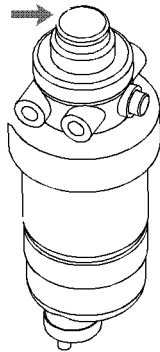


Illustration 151

g01019689

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Push down on the top of the fuel priming pump plunger and release the fuel priming pump plunger in order to operate the fuel priming pump. Operate the fuel priming pump plunger in order to fill the new filter element with fuel. Continue to pump until increased resistance is felt. This resistance will indicate that the filter element is full of fuel.
3. Attempt to start the engine. If the engine starts and the engine runs rough or the engine misfires, operate the engine at low idle until the engine runs smoothly. If the engine fails to start or if the engine continues to misfire or smoke repeat the priming procedure.
4. Close the engine access door.

3044 Engine

Machines that are equipped with the 3044 engine are equipped with a fuel transfer pump that is electric.

1. Momentarily turn the engine start switch to the START position and then return the engine start switch to the ON position.

Note: Do not start the engine. This operation only starts the fuel pump.

2. Leave the engine start switch in the ON position for thirty seconds.
3. Attempt to start the engine. If the engine starts and the engine runs rough or the engine misfires, operate the engine at low idle until the engine runs smoothly. If the engine fails to start or if the engine continues to misfire or smoke, repeat the priming procedure.

i01819309

Fuel Tank Cap - Clean

SMCS Code: 1273-070-Z2

1. Remove the fuel cap.

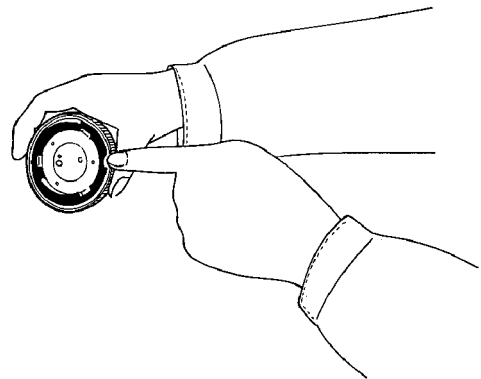


Illustration 152

g00104238

2. Inspect the cap. Replace the cap if the cap is damaged.
3. Wash the fuel cap in a clean, nonflammable solvent and dry the fuel cap.
4. Put a light coating of fuel on the cap gasket.
5. Install the fuel cap.

i01971189

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

NOTICE

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

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

Dispose of all fluids according to local regulations and mandates.

Note: Drain the water and the sediment from the fuel tank when the tank is almost empty.

1. Slowly remove the fuel tank cap in order to relieve the tank pressure.

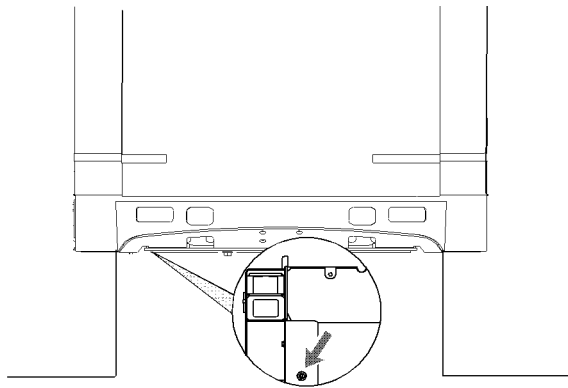


Illustration 153

g01023153

2. The fuel tank drain plug is located underneath the machine at the left rear corner. Loosen the plug.
3. Allow the water and the sediment to drain into a suitable container.
4. Install the fuel tank drain plug.

Note: Apply 5P-3413 Pipe Sealant to the threads on the drain plug.

5. Install the fuel tank cap.

i01957445

Hydraulic Oil Sample - Obtain

SMCS Code: 5050-008; 7542-008

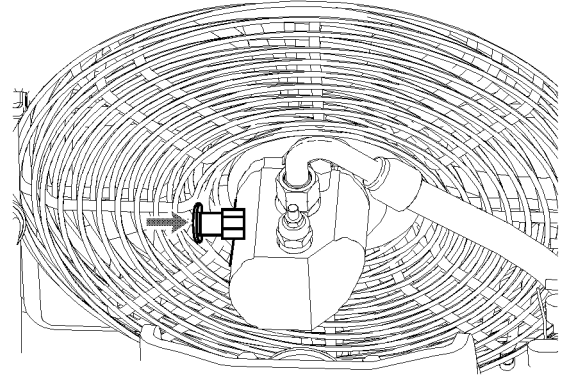


Illustration 154

g01026057

The sampling port for the hydraulic oil is located on the fan motor.

i01962605

Hydraulic System Oil - Change

SMCS Code: 5095-044

NOTICE

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

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

Dispose of all fluids according to local regulations and mandates.

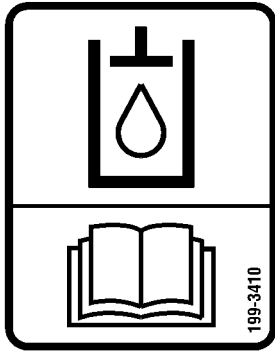


Illustration 155

g00956818

Note: This film is located near the hydraulic filler cap on machines that are filled with synthetic oil.

Operate the machine for a few minutes in order to warm the hydraulic system oil.

⚠ WARNING

Personal injury or death can result without releasing all of the hydraulic pressure.

Release all the pressure from the hydraulic system before any lines are disconnected.

The machine should be on level ground. Lower the bucket to the ground and apply slight downward pressure. Engage the parking brake and stop the engine. Keep the armrest lowered. Turn the engine start switch key to the ON position. Push the parking brake switch. Move all of the hydraulic control levers while you press several times on each side of the auxiliary hydraulic control (if equipped) in order to relieve hydraulic pressure. Move the engine start switch key to the OFF position.

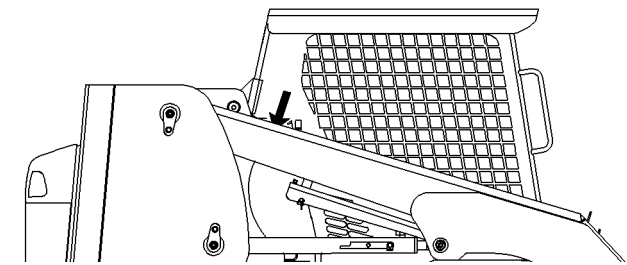


Illustration 156

g00926534

1. Remove the hydraulic tank filler cap.

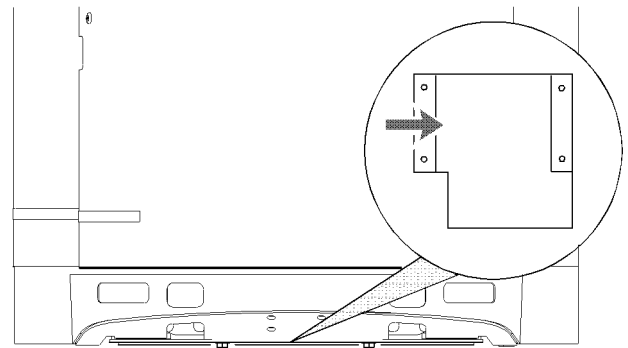


Illustration 157

g01021146

2. Remove the access panel in the belly guard underneath the machine.

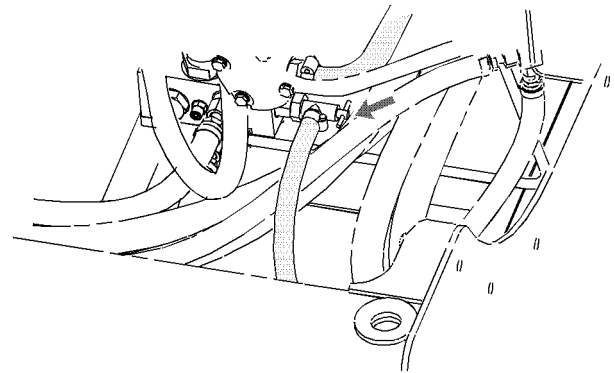


Illustration 158

g01030411

3. Remove the plug from the end of the drain hose. Pull the drain hose through the access panel in the belly guard. Open the drain valve and drain the oil into a suitable container.
4. Close the drain valve and pull the drain hose back into the machine. Install the drain plug into the drain hose.
5. Change the hydraulic system filter. Refer to Operation and Maintenance Manual, "Hydraulic System Oil Filter - Change".
6. Fill the hydraulic system oil tank. Refer to Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Capacities (Refill)".
7. Maintain the hydraulic oil level approximately in the middle of the sight gauge.

Check the oil level with the loader arms in the fully lowered position.

Note: The oil must be free of bubbles. If bubbles are present in the oil, air is entering the hydraulic system. Inspect the suction hoses and hose clamps.

8. Install the hydraulic tank filler cap.

i02742828

Hydraulic System Oil Filter - Replace

SMCS Code: 5068-510

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.

The hydraulic oil filter is located in the engine compartment.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".

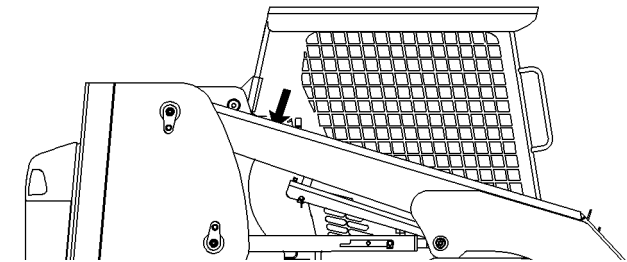


Illustration 159

g00926534

2. Remove the hydraulic tank filler cap.

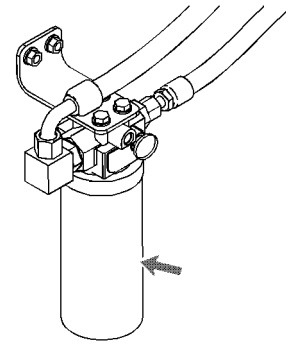


Illustration 160

g01017252

The hydraulic filter is located on the left side of the engine compartment.

3. Remove the filter with a strap type wrench.

Note: Place a suitable nonconductive container under the hydraulic oil filter. Use this container in order to catch any oil that may spill from the filter or the filter element mounting base.

4. Clean the filter element mounting base. Remove any part of the filter element gasket that remains on the filter element mounting base.

5. Apply a light coat of oil to the gasket of the new filter element gasket.

6. Install a new filter hand tight until the seal of the filter contacts the base. Note the position of the index marks on the filter in relation to a fixed point on the filter base.

Note: There are rotation index marks on the filter that are spaced 90 degrees or 1/4 of a turn away from each other. When you tighten the filter, use the rotation index marks as a guide.

7. Tighten the filter according to the instructions that are printed on the filter. Use the index marks as a guide.

Note: You may need to use a Caterpillar strap wrench, or another suitable tool, in order to turn the filter to the amount that is required for final installation. Make sure that the installation tool does not damage the filter.

8. Maintain the hydraulic oil level to the middle of the sight gauge. Refer to Operation and Maintenance Manual, "Hydraulic System Oil Level - Check". **Do not overfill the hydraulic tank.**

9. Inspect the gasket on the hydraulic tank filler cap for damage. Replace the hydraulic tank filler cap, if necessary. Install the hydraulic tank filler cap.

10. Close the engine access door.

i01957050

Hydraulic System Oil Level - Check

SMCS Code: 5095-535-FLV

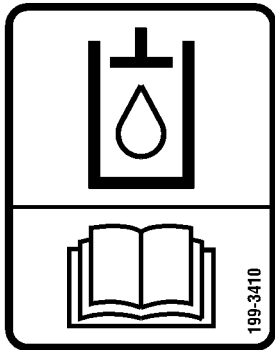


Illustration 161

g00956818

Note: This film is located near the hydraulic filler cap on machines that are filled with synthetic oil.

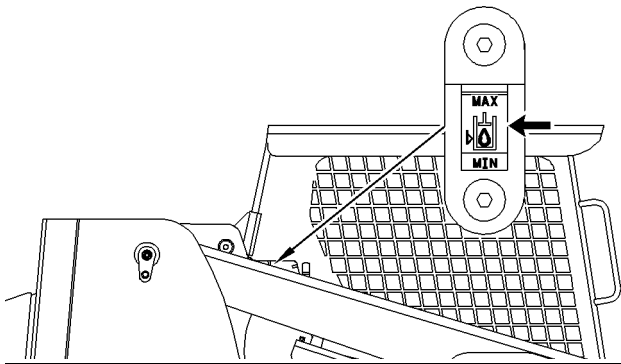


Illustration 162

g00926177

1. Park the machine on level ground.
2. Lower the work tool to the ground. Turn off the engine.
3. Wait for about five minutes before checking the level of the hydraulic oil.
4. Maintain the oil level to the middle of the sight gauge. **Do not overfill the hydraulic tank.**

i01957078

Lift Arm and Cylinder Linkage - Lubricate

SMCS Code: 5102-086-BD; 6107-086-BD

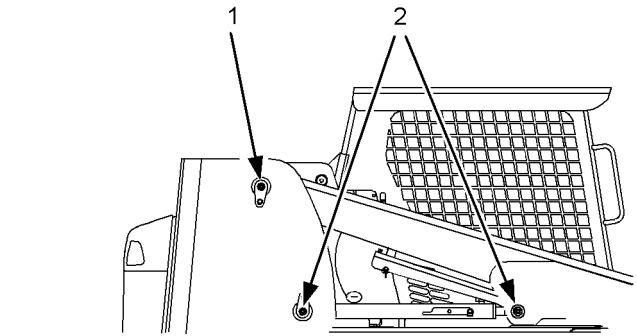


Illustration 163

g01017352

Radial Lift

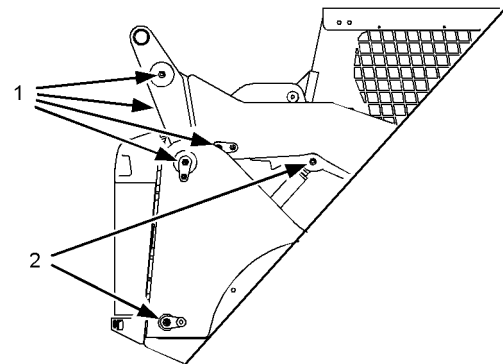


Illustration 164

g01017361

Extended Reach

Apply lubricant to the grease fittings (1) for the lift arm linkage.

Apply lubricant to the grease fittings (2) for the lift cylinder bearings.

Repeat the process for the opposite side of the machine.

i01963869

Lower Machine Frame - Clean

SMCS Code: 7050-070

1. Tilt the cab upward. Refer to Operation and Maintenance Manual, "Cab Tilting".

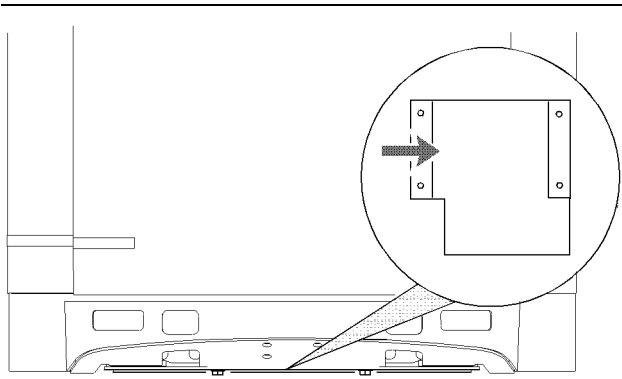


Illustration 165

g01020241

2. Remove the access panel in the frame that is located underneath the machine.
3. Remove any debris or dirt from the inside of the frame.
4. Reinstall the access panel and tilt the cab downward.

i02106227

Oil Filter - Inspect

SMCS Code: 1308-507; 3067-507; 5068-507

Inspect a Used Filter for Debris

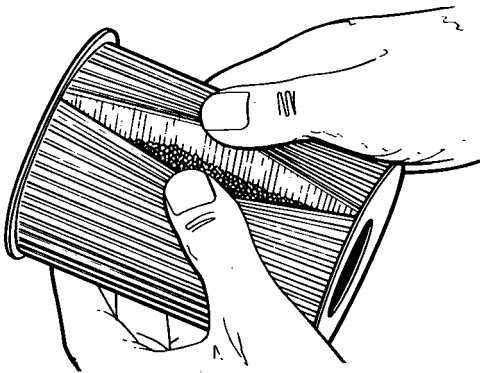


Illustration 166

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.

i01734746

Quick Coupler - Inspect

SMCS Code: 6129-040

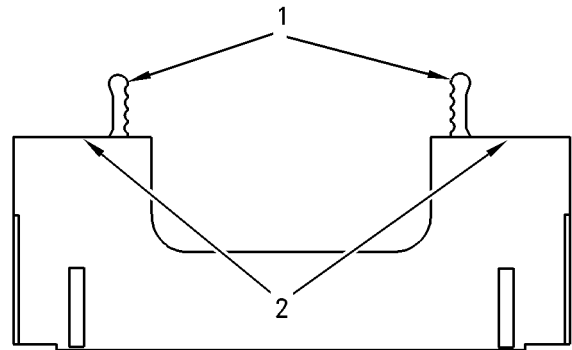


Illustration 167

g00889446

1. Move the quick coupler levers (1) to the disengaged position. Ensure that the levers are not bent or broken.
2. Check the top edges of the quick coupler assembly (2) for wear or for damage.

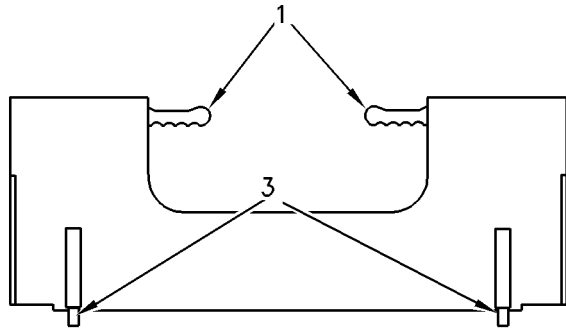


Illustration 168

g00889412

3. Move the quick coupler levers (1) to the engaged position. Ensure that the levers move freely without restriction.
4. Make sure that the coupler pins (3) extend through the bottom of the quick coupler assembly. Check the pins for wear and check the pins for damage.
5. Move the quick coupler levers to the disengaged position.

If any wear is suspected or damage is suspected, consult your Caterpillar dealer before you use a work tool.

i01488851

Radiator Core - Clean

SMCS Code: 1353-070-KO

The radiator is located at the rear of the machine above the engine compartment.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
2. Tilt the radiator guard upward. Refer to Operation and Maintenance Manual, "Radiator Tilting".

NOTICE

When you are using compressed air or high pressure water to clean the radiator fins, ensure that the air or water is directed parallel to the fins. If the compressed air or high pressure water is not directed parallel to the radiator fins, the radiator fins could be bent or damaged.

Note: You can use compressed air, high pressure water, or steam to remove dust and other debris from the radiator fins. However, the use of compressed air is preferred.

3. Clean the radiator core.

NOTICE

Do not clean a running fan with high pressure water. Fan blade failure can result.

4. Remove any dirt or debris from the fan, the fan hub, the oil cooler, the radiator guard and the fan guard.

Note: Dirt or debris on the cooling fan can cause an imbalance.

5. Tilt the radiator guard downward.
6. Close the engine access door.

i01968724

Refrigerant Dryer - Replace (If Equipped)

SMCS Code: 7322-510

WARNING

Personal injury can result from contact with refrigerant.

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

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

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

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

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

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

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

NOTICE

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

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

Note: The receiver-dryer must also be replaced when the air conditioning system is evacuated.

i02798931

Rollover Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) - Inspect

SMCS Code: 7323-040; 7325-040

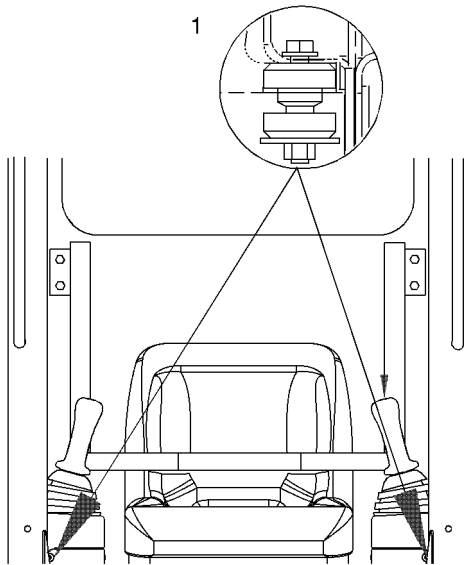


Illustration 169

g01022156

(1) Front ROPS retaining bolt (one bolt per side)

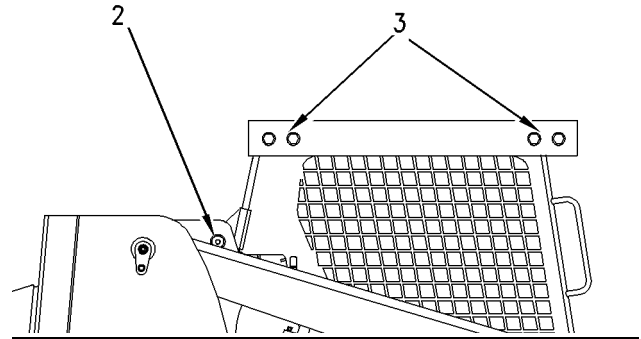


Illustration 170

g00925477

(2) Rear ROPS retaining bolt (one bolt per side)
 (3) Retaining bolts for the FOPS 2

Note: There is a total of four retaining bolts for the ROPS. There is a total of eight retaining bolts for the FOPS 2.

1. Inspect the ROPS and the FOPS for loose bolts. Tighten the bolts (1) to the following torque 125 ± 10 N·m (92 ± 7 lb ft). Tighten the bolts (2) to the following torque 55 ± 5 N·m (41 ± 4 lb ft). Tighten the bolts (3) to the following torque 240 ± 40 N·m (177 ± 30 lb ft). ROPS and the FOPS for damaged bolts or missing bolts. Replace any damaged bolts or missing bolts with original equipment parts only.
2. Operate the machine on a rough surface. Replace the ROPS mounting supports if the ROPS emits a noise. Replace the ROPS mounting supports if the ROPS rattles.

Do not straighten the ROPS or the FOPS. Do not repair the ROPS or the FOPS by welding reinforcement plates to the ROPS or the FOPS.

Consult your Caterpillar dealer for repair of any cracks in the ROPS or the FOPS.

Inspect the Flying Object Guard (if equipped) for damage.

Consult your Caterpillar dealer for repair of any cracks in the Flying Object Guard.

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.

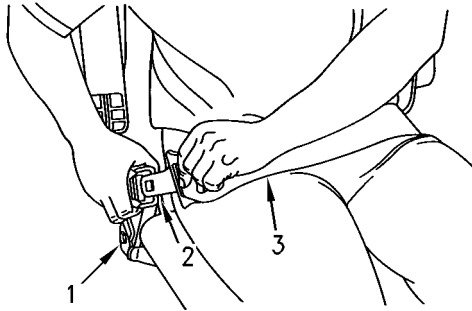


Illustration 171

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.

i01970036

Seat Belt - Replace

SMCS Code: 7327-510

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

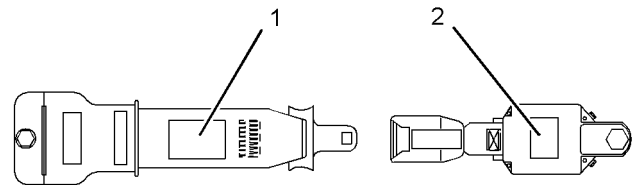


Illustration 172

g01022746

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

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

i01878236

Tilt Cylinder Bearings and Bucket Linkage Bearings - Lubricate

SMCS Code: 5104-086-BD; 6107-086-BD

Wipe all of the grease fittings before you apply lubricant.

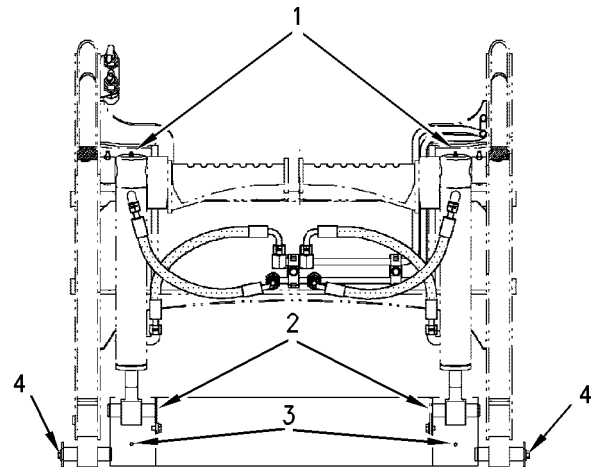


Illustration 173

g00955895

Note: Lubricate the fittings with the loader lift arms in the fully lowered position.

Apply lubricant to the grease fittings (1) for the upper bearings for the tilt cylinders.

Apply lubricant to the grease fittings (2) for the lower bearings for the tilt cylinders.

Apply lubricant to the grease fittings (3) for the coupler engagement pins.

Apply lubricant to the grease fitting (4) for the pivot pin of the quick coupler assembly.

There are a total of 8 grease fittings.

i02124717

Tire Inflation - Check

SMCS Code: 4203-535-AI

Measure the tire pressure on each tire. Consult your Caterpillar dealer for the correct load rating and for the correct operating pressures. These correct load ratings and correct operating pressures can also be obtained from your tire dealer.

Inflate the tires, if necessary.

Tire Inflation with Air

WARNING

Use a self-attaching inflation chuck and stand behind the tread when inflating a tire.

Proper inflation equipment, and training in using the equipment, are necessary to avoid overinflation. A tire blowout or rim failure can result from improper or misused equipment.

Before inflating tire, install on the machine or put tire in restraining device.

NOTICE

Set the tire inflation equipment regulator at no more than 140 kPa (20 psi) over the recommended tire pressure.

Tire Inflation with Nitrogen

Caterpillar recommends the use of dry nitrogen gas for tire inflation and for tire pressure adjustments. This includes all machines with rubber tires. Nitrogen is an inert gas that will not aid combustion inside the tire.

WARNING

Proper nitrogen inflation equipment, and training in using the equipment, are necessary to avoid over inflation. A tire blowout or rim failure can result from improper or misused equipment and personal injury or death can occur.

A tire blowout and/or rim failure can occur if the inflation equipment is not used correctly, due to the fact that a fully charged nitrogen cylinder's pressure is approximately 15000 kPa (2200 psi).

There are other benefits to using nitrogen in addition to reducing the risk of an explosion. The use of nitrogen for tire inflation lessens the slow oxidation of the rubber. Use of nitrogen also slows gradual tire deterioration. This is especially important for tires that are expected to have a long service life of at least four years. Nitrogen reduces the corrosion of rim components. Nitrogen also reduces problems that result from disassembly.

WARNING

A tire blowout or a rim failure can cause personal injury.

Use a self-attaching inflation chuck and stand behind the tread when inflating a tire, to prevent personal injury.

NOTICE

Set the tire inflation equipment regulator at no more than 140 kPa (20 psi) over the recommended tire pressure.

Use 6V-4040 Inflation Group or an equivalent inflation group to inflate tires with a nitrogen gas cylinder.

Reference: For tire inflation instructions, refer to Special Instruction, SMHS7867, "Nitrogen Tire Inflation Group".

For nitrogen inflation, use the same tire pressures that are used for air inflation. Consult your tire dealer for operating pressures.

i01445212

Tire Segment - Replace (Removal)

SMCS Code: 4203-510-SEG

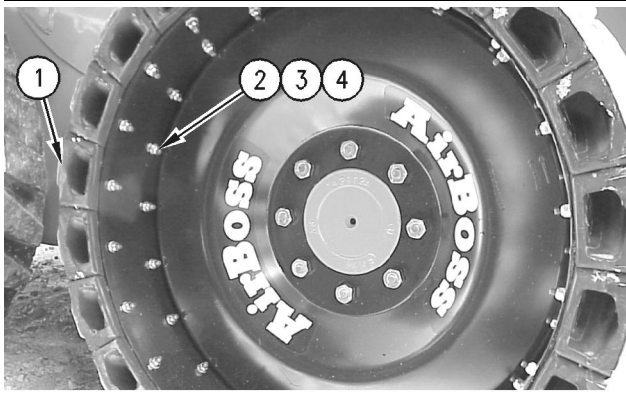


Illustration 174

g00756820

1. Remove any dirt buildup from the segment (1). Remove any dirt buildup from the stud threads (2).
2. Remove the locknuts (3) and washers (4). There are four locknuts and washers per segment.
3. Remove the segment from the rim.

Installation

1. Clean the inner surface of the rim. Clean the outer surface of the rim.
2. Align the studs in the segment with the holes in the rim. Install the segment, the washers and the locknuts.

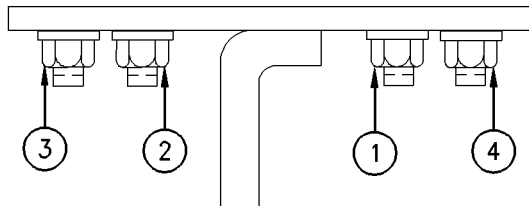


Illustration 175

g00756806

3. Tighten the locknuts (1), (2), (3) and (4) in order. Refer to the table below for the correct torque.

Table 40

The Recommended Torques for the Locknuts	
All Sizes Except 19.5L-24 & 17.5-25	19.5L-24 & 17.5-25
15 ± 1 N·m (11 ± 1 lb ft)	35 ± 1 N·m (26 ± 1 lb ft)

i01203574

Wheel Nuts - Tighten

SMCS Code: 4210-527

Check the torque on new wheels or reinstalled wheels after every one service hour until the specified torque is maintained. After the specified torque is maintained, check the torque on the nuts after every ten service hours or every day.

Check the nuts on all four wheels. Use a star pattern when you are tightening the nuts.

The torque specifications are given in the following table.

Table 41

Tightening Torque for Wheels	
Airboss and Solid Tires	163 ± 7 N·m (120 ± 5 lb ft)
Pneumatic Tires	149 ± 7 N·m (110 ± 5 lb ft)

i01982402

Window Washer Reservoir - Fill (If Equipped)

SMCS Code: 7306-544-KE

NOTICE

When operating in freezing temperatures, use Caterpillar nonfreezing window washer solvent or equivalent. System damage can result from freezing.

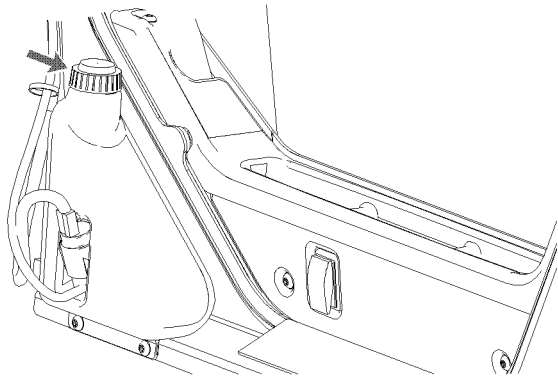


Illustration 176

g01027404

The reservoir for the window washer solvent is located inside the cab on the left side.

Fill the reservoir with window washer solvent.

i02810705

Window Wiper - Inspect/Replace (If Equipped)

SMCS Code: 7305-040; 7305-510

Inspect the condition of the front window wiper blade. Replace the window wiper blade if the window wiper blade is worn or damaged. If the window wiper blade streaks the window, replace the window wiper blade.

i01981264

Windows - Clean

SMCS Code: 7310-070

Use commercially available window cleaning solutions in order to clean the windows. The side windows of the cab can be removed for cleaning. Refer to the following procedure in order to remove the side windows.

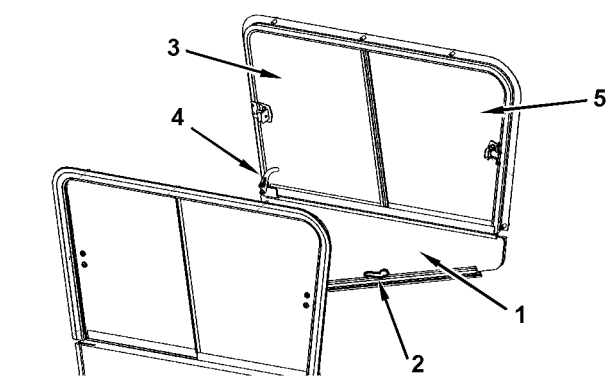


Illustration 177

g01026875

1. Release the latch (2) in order to remove the window (1). Pull downward on the window in order to remove the window. Pull outward on the window in order to remove the window.
2. Release the latch (4) in order to remove the window (3). Pivot the channel for the window downward. Pull the window outward in order to remove the window.
3. Slide the window (5) forward. Pull the window outward in order to remove the window.

i02728710

Work Tool - Lubricate

SMCS Code: 6700-086

Multipurpose Bucket

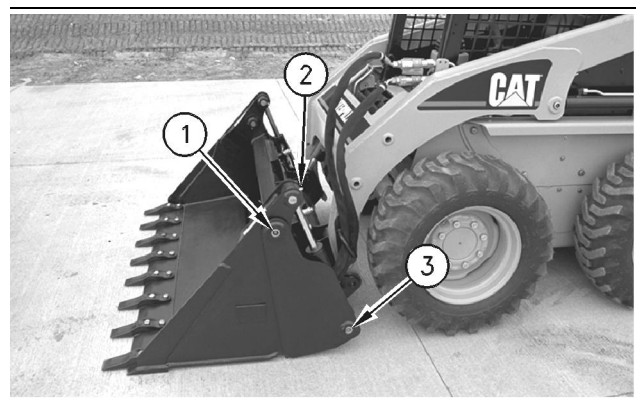


Illustration 178

g00534457

Apply lubricant to the grease fitting (1) for the pivot pin of the apron.

Apply lubricant to the grease fitting (2) for the rod end of the multipurpose bucket cylinder.

Apply lubricant to the grease fitting (3) for the head end of the multipurpose bucket cylinder.

Repeat for the other side of the bucket.

There are six grease fittings.

Utility Grapple Tools

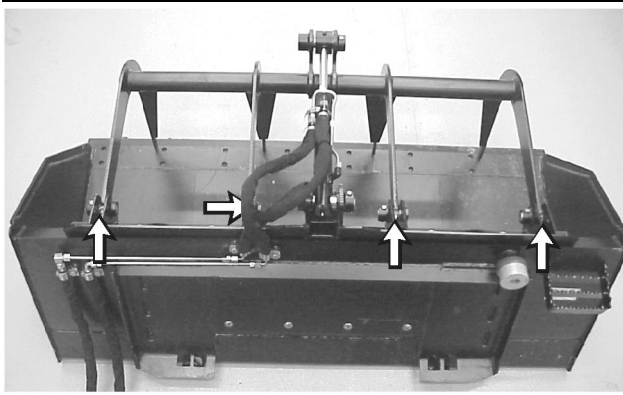


Illustration 179

g00647980

Apply lubricant to the four grease fittings for the grapples.

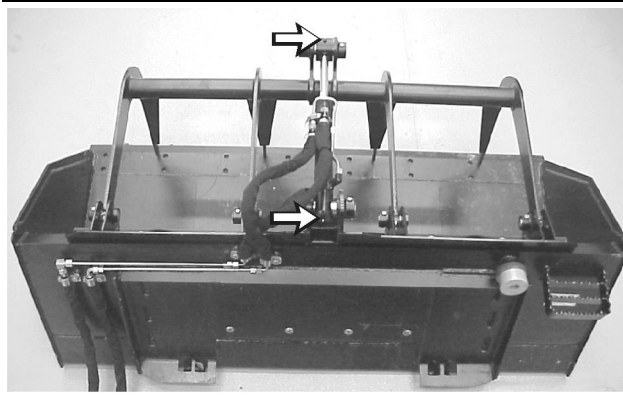


Illustration 180

g00647988

Apply lubricant to the two fittings for the grapple cylinder.

There are six grease fittings.

Industrial Grapple Tools

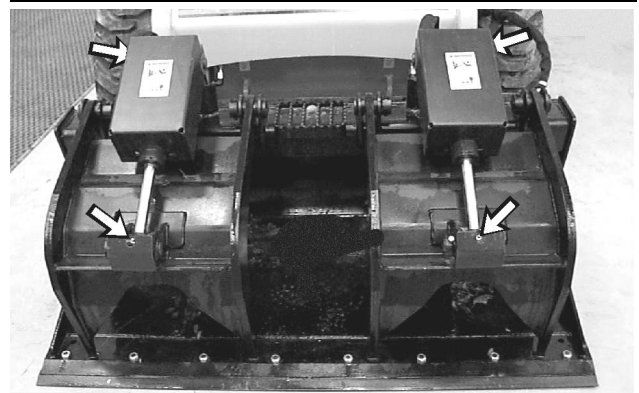


Illustration 181

g00645995

Apply lubricant to the four grease fittings for the fork cylinders.

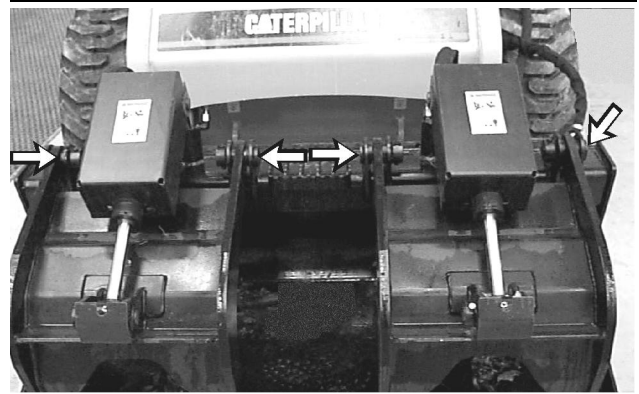


Illustration 182

g00646004

Apply lubricant to the four grease fittings for the two forks.

There are eight grease fittings.

Grapple Rake

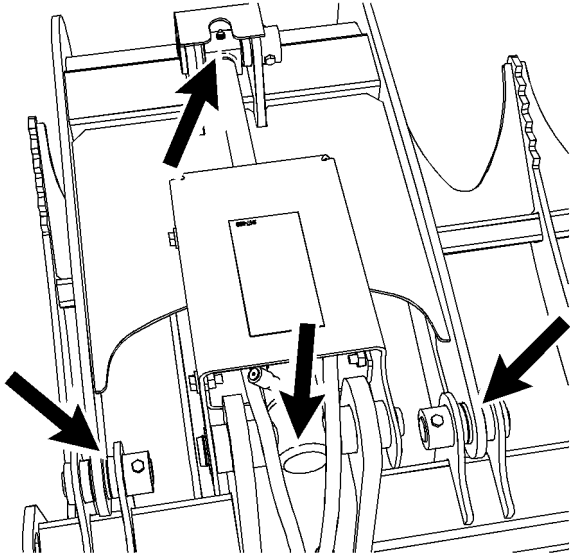


Illustration 183

g01368386

Apply lubricant to the four grease fittings for the grapple cylinders.

Apply lubricant to the four grease fittings for the two grapples.

There are eight grease fittings.

Angle Blade



Illustration 184

g00648033

Apply lubricant to the grease fitting on the rod end of the angle cylinder.

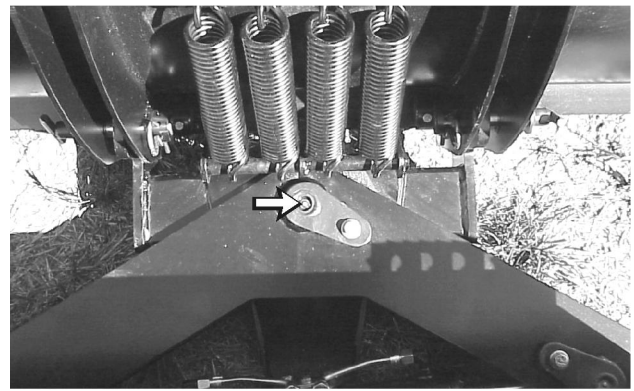


Illustration 185

g00648037

Apply lubricant to the grease fitting on the horizontal pivot point of the blade.

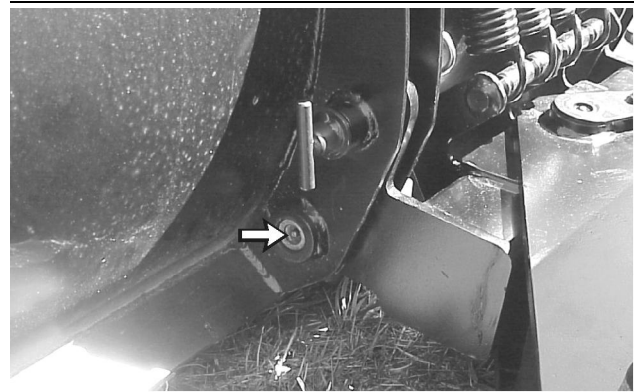


Illustration 186

g00648038

Apply lubricant to the grease fitting on the vertical pivot point of the blade. Repeat for opposite side of the blade.

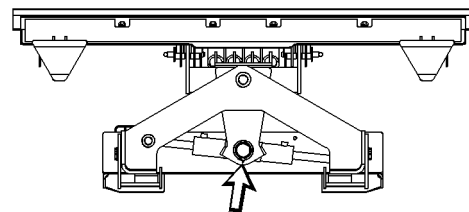


Illustration 187

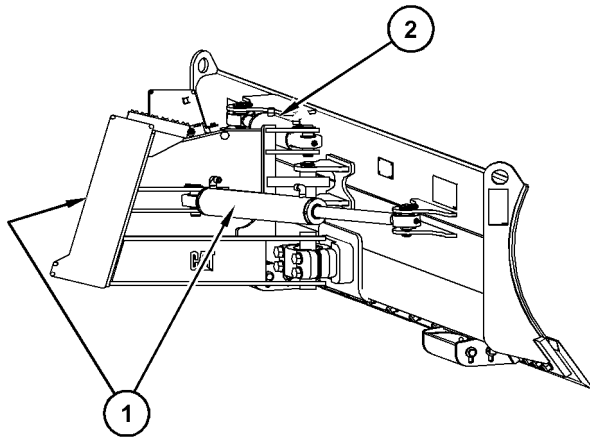
g00677570

This is a bottom view of the angle blade.

Apply lubricant to the grease fitting on the pivot point of the cylinder.

There are five grease fittings.

Dozer Blade



Inspect upper angled plate (1) and ensure that the plate is not bent or otherwise damaged. Inspect holes (2) for wear and for damage. Inspect lower angled plate (3) and ensure that the plate is not bent or otherwise damaged. If any wear is suspected or any damage is suspected, consult your Caterpillar dealer before you use the work tool.

Illustration 188

g01073259

Apply lubricant to the grease fitting on both ends of the right hand angle cylinder (1). Repeat for opposite side of the blade.

Apply lubricant to the grease fitting on the pivot points on each end of the tilt cylinder (2).

There are six grease fittings.

i01809997

Work Tool Mounting Bracket - Inspect

SMCS Code: 6700-040-BK

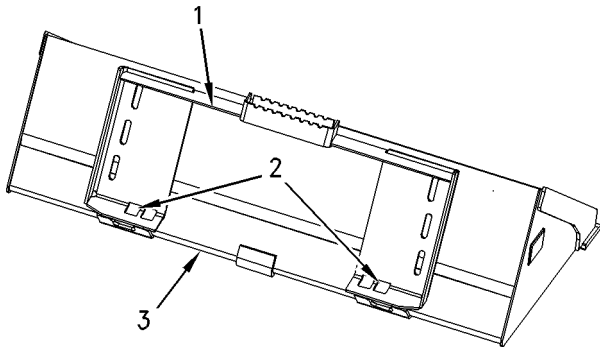


Illustration 189

g00925058