CATERPILLAR®

SEBU8345
March 2011

Operation and Maintenance Manual

735B and 740B Articulated Trucks

L4D1-Up (Machine)
L4E1-Up (Machine)
T4P1-Up (Machine)
T4R1-Up (Machine)

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

A non-exhaustive list of operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. You must not use this product in any manner different from that considered by this manual without first satisfying yourself that you have considered all safety rules and precautions applicable to the operation of the product in the location of use, including site-specific rules and precautions applicable to the worksite. If a tool, procedure, work method or operating technique that is not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or become unsafe by the operation, lubrication, maintenance or repair procedures that you intend to use.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Cat dealers have the most current information available.

⚠ WARNING

When replacement parts are required for this product Caterpillar recommends using Cat replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

In the United States, the maintenance, replacement, or repair of the emission control devices and systems may be performed by any repair establishment or individual of the owner's choosing.

Table of Contents

Foreword

Literature Information

This manual should be stored in the operator's compartment in the literature holder or seat back literature storage area.

This manual contains safety information, operation instructions, transportation information, lubrication information and maintenance information.

Some photographs or illustrations in this publication show details or attachments that can be different from your machine. Guards and covers might have been removed for illustrative purposes.

Continuing improvement and advancement of product design might have caused changes to your machine which are not included in this publication. Read, study and keep this manual with the machine.

Whenever a question arises regarding your machine, or this publication, please consult your Caterpillar dealer for the latest available information.

Safety

The safety section lists basic safety precautions. In addition, this section identifies the text and locations of warning signs and labels used on the machine.

Read and understand the basic precautions listed in the safety section before operating or performing lubrication, maintenance and repair on this machine.

Operation

The operation section is a reference for the new operator and a refresher for the experienced operator. This section includes a discussion of gauges, switches, machine controls, attachment controls, transportation and towing information.

Photographs and illustrations guide the operator through correct procedures of checking, starting, operating and stopping the machine.

Operating techniques outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and its capabilities.

Maintenance

The maintenance section is a guide to equipment care. The Maintenance Interval Schedule (MIS) lists the items to be maintained at a specific service interval. Items without specific intervals are listed under the "When Required" service interval. The Maintenance Interval Schedule lists the page number for the step-by-step instructions required to accomplish the scheduled maintenance. Use the Maintenance Interval Schedule as an index or "one safe source" for all maintenance procedures.

Maintenance Intervals

Use the service hour meter to determine servicing intervals. Calendar intervals shown (daily, weekly, monthly, etc.) can be used instead of service hour meter intervals if they provide more convenient servicing schedules and approximate the indicated service hour meter reading. Recommended service should always be performed at the interval that occurs first.

Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the maintenance intervals chart might be necessary.

Perform service on items at multiples of the original requirement. For example, at every 500 service hours or 3 months, also service those items listed under every 250 service hours or monthly and every 10 service hours or daily.

California Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Battery posts, terminals and related accessories contain lead and lead compounds. **Wash hands after handling.**

Certified Engine Maintenance

Proper maintenance and repair is essential to keep the engine and machine systems operating correctly. As the heavy duty off-road diesel engine owner, you are responsible for the performance of the required maintenance listed in the Owner Manual, Operation and Maintenance Manual, and Service Manual.

It is prohibited for any person engaged in the business of repairing, servicing, selling, leasing, or trading engines or machines to remove, alter, or render inoperative any emission related device or element of design installed on or in an engine or machine that is in compliance with the regulations (40 CFR Part 89). Certain elements of the machine and engine such as the exhaust system, fuel system, electrical system, intake air system and cooling system may be emission related and should not be altered unless approved by Caterpillar.

Machine Capacity

Additional attachments or modifications may exceed machine design capacity which can adversely affect performance characteristics. Included would be stability and system certifications such as brakes, steering, and rollover protective structures (ROPS). Contact your Caterpillar dealer for further information.

Caterpillar Product Identification Number

Effective First Quarter 2001 the Caterpillar Product Identification Number (PIN) has changed from 8 to 17 characters. In an effort to provide uniform equipment identification, Caterpillar and other construction equipment manufacturers are moving to comply with the latest version of the product identification numbering standard. Non-road machine PINs are defined by ISO 10261. The new PIN format will apply to all Caterpillar machines and generator sets. The PIN plates and frame marking will display the 17 character PIN. The new format will look like the following:

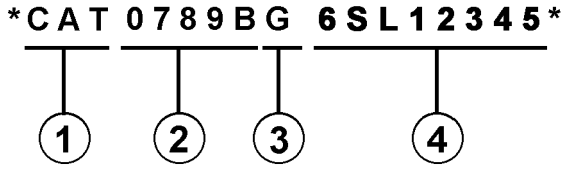


Illustration 1 g00751314

Where:

1. Caterpillar's World Manufacturing Code (characters 1-3)

2. Machine Descriptor (characters 4-8)

3. Check Character (character 9)

4. Machine Indicator Section (MIS) or Product Sequence Number (characters 10-17). These were previously referred to as the Serial Number.

Machines and generator sets produced before First Quarter 2001 will maintain their 8 character PIN format.

Components such as engines, transmissions, axles, etc. and work tools will continue to use an 8 character Serial Number (S/N).

Safety Section

i03900823

Safety Messages

SMCS Code: 7000

There are several specific warning messages on this machine. The exact location of the hazards and the description of the hazards are reviewed in this section. Please become familiarized with all warning messages.

Make sure that all of the warning messages are legible. Clean the warning messages or replace the warning messages if you cannot read the words. Clean the warning messages or replace the warning messages if the illustrations are not legible. When you clean the warning messages, use a cloth, water, and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the warning messages. Solvent, gasoline, or harsh chemicals could loosen the adhesive that secures the warning message. Loose adhesive will cause the warning message to fall off the machine.

Replace any warning messages that are damaged, or missing. If a warning message is attached to a part that is replaced, install a warning message on the replacement part. Any Caterpillar dealer can provide new warning messages.

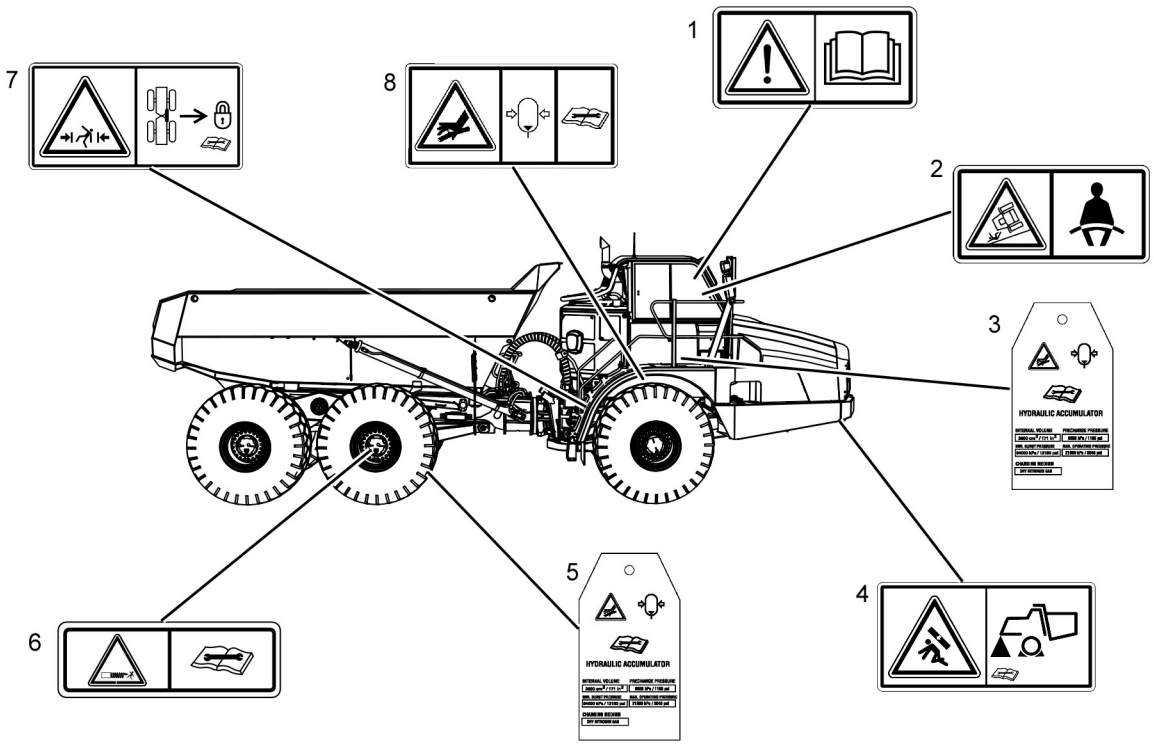


Illustration 2

g02143735

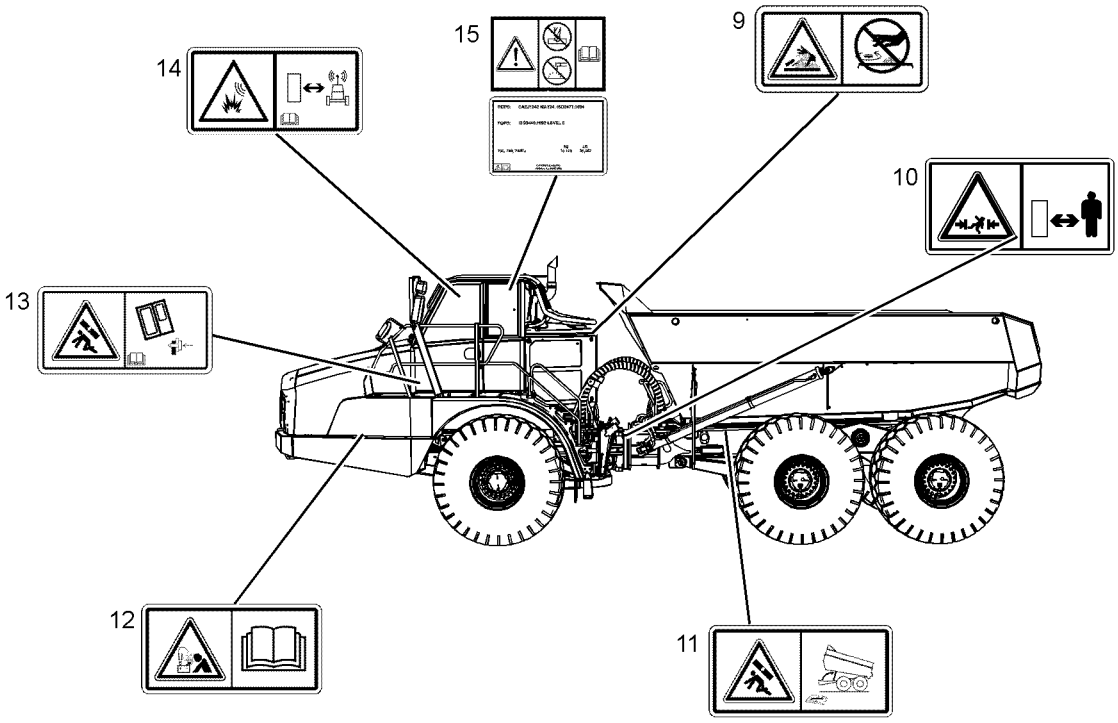


Illustration 3 g02143736

Do Not Operate (1)

This warning message is located in the cab.

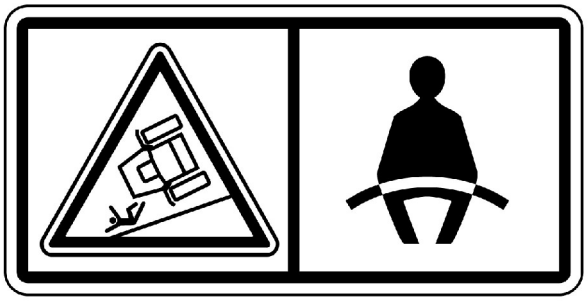
g01370904

⚠ WARNING

Do not operate or work on this machine unless you have read and understand the instructions and warnings in the Operation and Maintenance Manuals. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Caterpillar dealer for replacement manuals. Proper care is your responsibility.

Seat Belt (2)

This warning message is located in the cab.



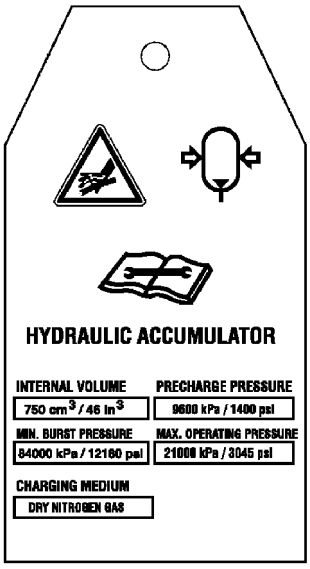
g01370908

⚠ WARNING

A seat belt should be worn at all times during machine operation to prevent serious injury or death in the event of an accident or machine overturn. Failure to wear a seat belt during machine operation may result in serious injury or death.

High Pressure Cylinders (3)

This warning message is located on both of the service brake accumulators. The service brake accumulators are located behind the right side panel of the cab.



g01130902

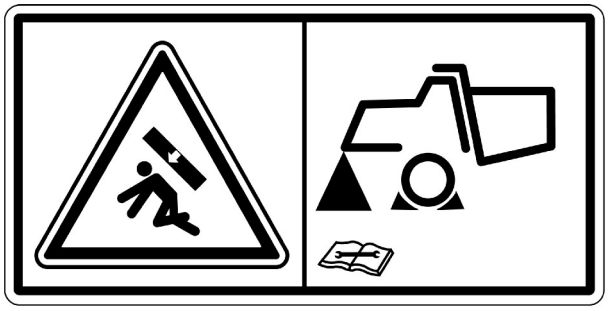
WARNING

High pressure cylinder. Do not remove any parts until pressure has been relieved or personal injury may occur.

See your Caterpillar dealer for tools and detailed information required for charging cylinders.

Blocking the Machine (4)

This warning message is located above the front wheel on both sides of the machine.



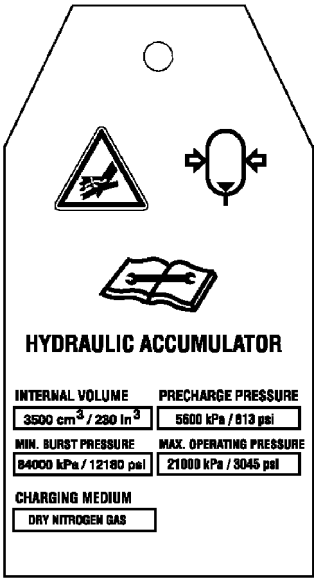
g01430344

WARNING

Personal injury or death by crushing can result from improper servicing procedures. The machine frame must be blocked and the pressure relieved before servicing. Failure to do so may cause serious injury or death. Read the Service Manual for the proper procedure.

High Pressure Cylinder (5)

This warning message is located on the parking brake accumulator. The parking brake accumulator is located on the right side of the rear frame.



g01130903

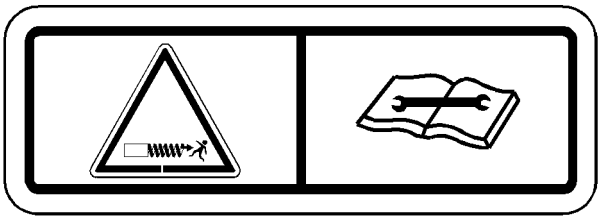
WARNING

High pressure cylinder. Do not remove any parts until pressure has been relieved or personal injury may occur.

See your Caterpillar dealer for tools and detailed information required for charging cylinders.

High Compressed Spring (6)

This warning message is located on the brake actuator.



g01065910

WARNING

Personal injury or death can result from a compressed recoil spring being released suddenly using incorrect disassembly procedures.

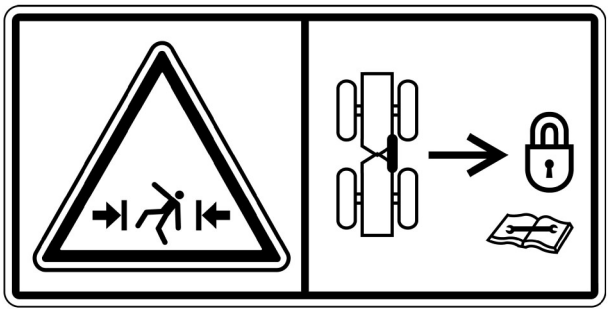
A recoil spring that is still held in compression can result in the recoil spring being released unexpectedly with extreme force which could cause serious injury or death.

Make sure that the correct disassembly procedure is used, if a front track roller frame that has a crack in the parent metal or weld connection (or a tubular section that has separated from the front of the frame assembly) when the recoil spring is still held in compression.

Refer to Special Instruction, SMHS8273 which contains the disassembly procedure that must be used to decrease the possibility of injury while performing service on the track roller frame.

No Clearance (7)

This warning message is located on the fenders on both sides of the machine.



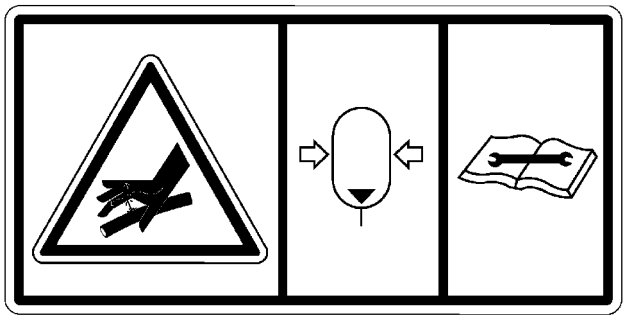
g01371647

WARNING

Connect the steering frame lock between the front and the rear frames before lifting, transporting, or servicing the machine in the articulation area. Disconnect the steering frame lock and secure the steering frame lock before resuming operation. Severe injury or death could occur.

Suspension Cylinder Strut (8)

This warning message is located on the suspension cylinder struts on both sides of the front of the machine.



g01142855

WARNING

High Pressure Cylinder.

Do not remove any valve, hydraulic fitting, or valve core nor disassemble any cylinder parts until pressure is relieved. Personally injury or death may occur.

See service manual for correct procedure to relieve pressure and to charge cylinders.

Hot Coolant Under Pressure (9)

This warning message is located behind the operator compartment.

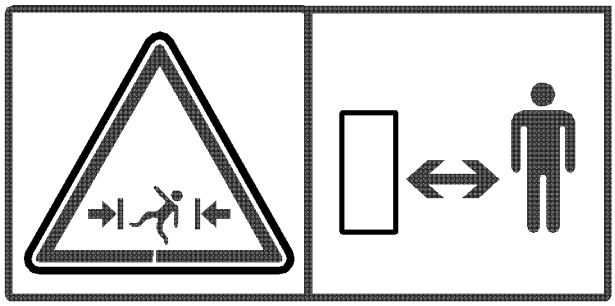
g01371640

⚠ WARNING

The coolant is hot and the coolant is under pressure. Do not touch the hot surfaces. Refer to the Operation and Maintenance Manual for the procedure to follow when you check the radiator.

No Clearance (10)

This warning message is located on the fenders on both sides of the machine.



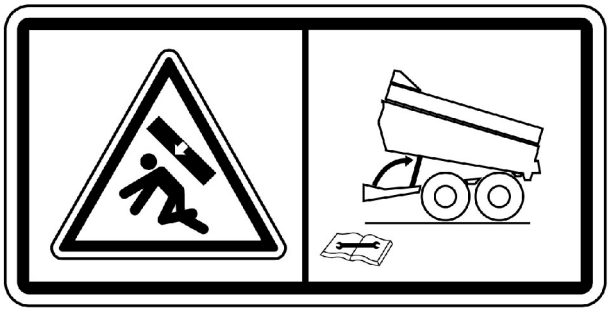
g01053243

⚠ WARNING

Stay back a safe distance. No clearance for a person in this area when the machine turns. Severe injury or death from crushing could occur.

Body Prop (11)

This warning message is located on both sides of the rear frame.



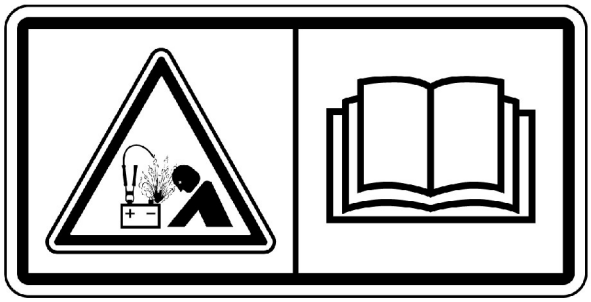
g01430347

⚠ WARNING

Install dump body prop before working under a raised dump body to prevent it from falling which could result in personal injury or death.

Proper Connections for Jump Start Cables (12)

This warning message is located on the front side of the hood on both sides of the machine.



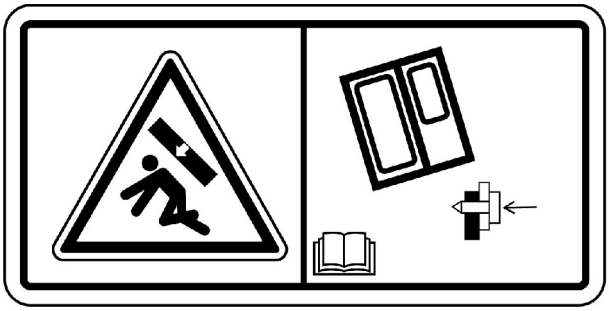
g01370909

⚠ WARNING

Explosion Hazard! Improper jumper cable connections can cause an explosion resulting in serious injury or death. Batteries may be located in separate compartments. Refer to the Operation and Maintenance Manual for the correct jump starting procedure.

Prop for the Cab (13)

This warning message is located on the manual hand pump for tilting the cab.



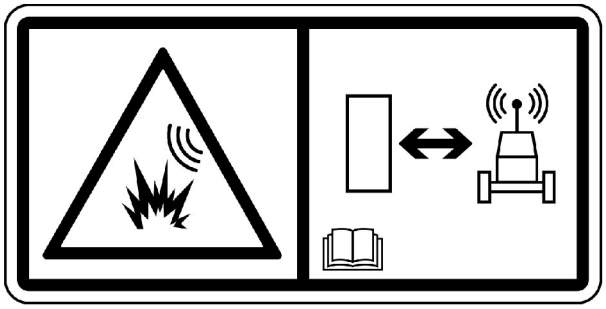
g01430342

WARNING

Install cab prop pin before working under raised cab to prevent it from falling which could result in injury or death.

Product Link (14)

If the machine is equipped with Product Link, this warning message is located in the cab.



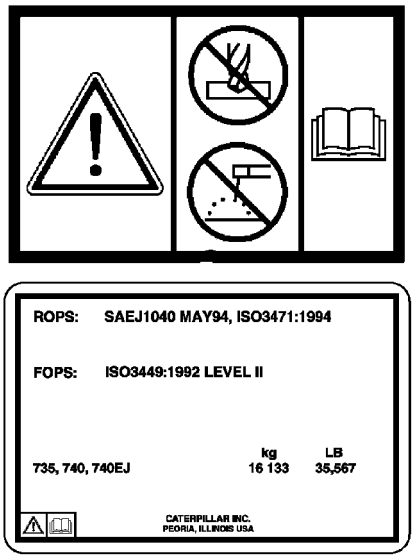
g01370917

WARNING

This machine is equipped with a Caterpillar Product Link communication device. When electric/electronic detonators are used, this communication device should be deactivated within 12 m (40 ft) of a blast site, or within the distance mandated under applicable legal requirements. Failure to do so could cause interference with blasting operations and result in serious injury or death.

ROPS Certification (15)

This warning message is located on the back of the cab.



g01131392

WARNING

Structural damage, an overturn, modification, alteration, or improper repair can impair this structure's protection capability thereby voiding this certification. Do not weld on or drill holes in the structure. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

i03906066

Additional Messages

SMCS Code: 1000; 7000; 7405

There are several specific messages on these machines. The exact location of the messages and the description of the messages are reviewed in this section. Please become familiarized with all messages.

Make sure that all of the messages are legible. Clean the messages or replace the messages if the words or images are unreadable. When you clean the messages, use a cloth, water and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the messages. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the messages. Loose adhesive will allow the messages to fall.

Replace any message that is damaged, or missing. If a message is attached to a part that is replaced, install a message on the replacement part. Any Caterpillar dealer can provide new messages.

Retarding Guidelines

This message is located inside the cab.

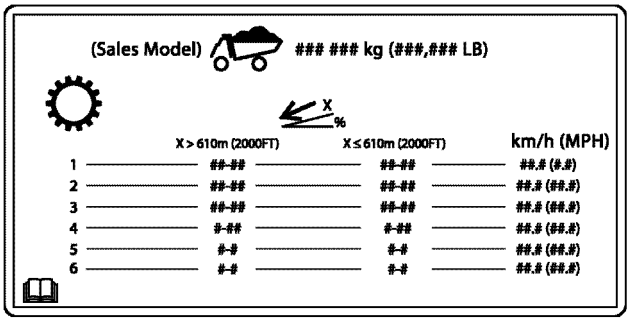


Illustration 4 g01319966

Typical example

Information for Air Conditioner System Service

This message is located inside the cab.

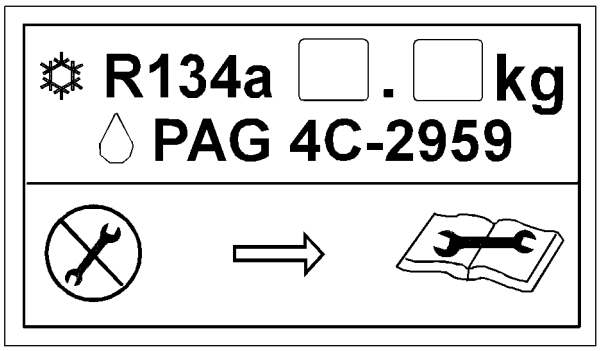


Illustration 5 g01294295

Do not work on the air conditioning system until you have read the service manual and you understand the service manual.

Product Link Data Privacy

This message is located in the cab.

Illustration 6 g01418953

The Product Link System is a satellite communication device that transmits information regarding the machine back to Caterpillar and Caterpillar dealers and customers. All logged events and diagnostic codes that are available to the Caterpillar Electronic Technician (ET) on the CAT data link can be sent to the satellite. Information can also be sent to the Product Link System. The information is used to improve Caterpillar products and Caterpillar services.

ELC (Extended Life Coolant) Cooling System

This message is located behind the cab near the cap for the cooling system.

This machine is shipped from the factory with ELC.

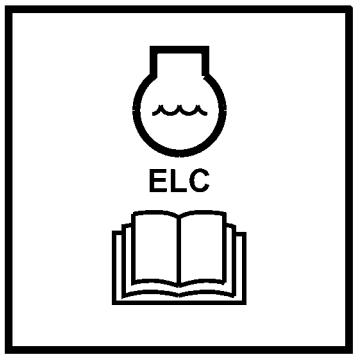


Illustration 7 g00955999

24 Volt Electrical System

This message is located near the batteries and the auxiliary start receptacle on the left front of the machine.

Illustration 8 g01126478

This machine is equipped with a 24 volt electrical system.

Alternate Exit

This message is located on the right side rear cab window.

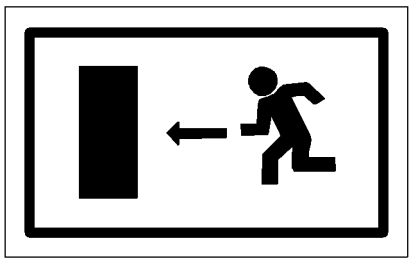


Illustration 9 g01002993

This film identifies an alternate exit. for more information on the alternate exit, refer to Operation and Maintenance Manual, “Alternate Exit”.

Diesel Fuel Requirements

This message is located by the fuel tank.

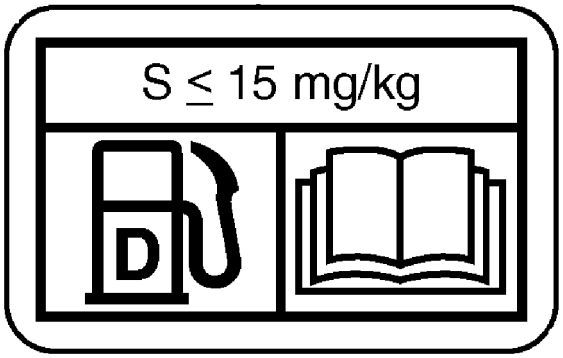


Illustration 10 g02052934

Use only ultralow sulfur diesel fuel.

Refer to Operation and Maintenance Manual, “Lubricant Viscosities”.

i04010649

General Hazard Information

SMCS Code: 7000

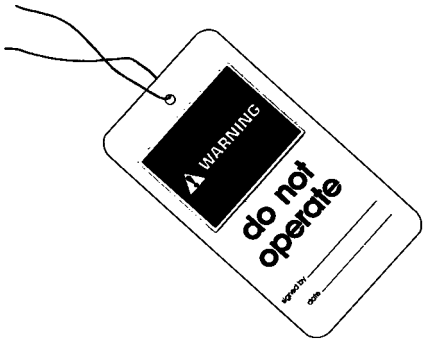


Illustration 11 g00104545

Attach a “Do Not Operate” warning tag or a similar warning tag to the start switch or to the controls. Attach the warning tag before you service the equipment or before you repair the equipment. These warning tags (Special Instruction, SEHS7332) are available from your Cat dealer.

⚠ WARNING

Operating the machine while distracted can result in the loss of machine control. Use extreme caution when using any device while operating the machine. Operating the machine while distracted can result in personal injury or death.

Know the width of your equipment in order to maintain proper clearance when you operate the equipment near fences or near boundary obstacles.

Be aware of high voltage power lines and power cables that are buried. If the machine comes in contact with these hazards, serious injury or death may occur from electrocution.

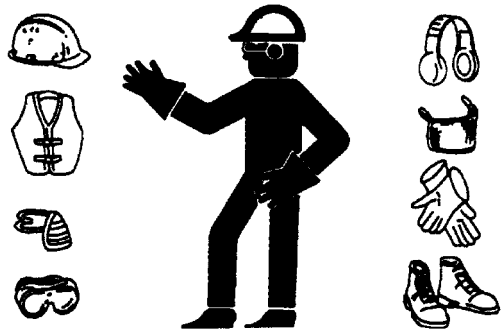


Illustration 12 g00702020

Wear a hard hat, protective glasses, and other protective equipment, as required.

Do not wear loose clothing or jewelry that can snag on controls or on other parts of the equipment.

Make sure that all protective guards and all covers are secured in place on the equipment.

Keep the equipment free from foreign material. Remove debris, oil, tools, and other items from the deck, from walkways, and from steps.

Secure all loose items such as lunch boxes, tools, and other items that are not a part of the equipment.

Know the appropriate work site hand signals and the personnel that are authorized to give the hand signals. Accept hand signals from one person only.

Do not smoke when you service an air conditioner. Also, do not smoke if refrigerant gas may be present. Inhaling the fumes that are released from a flame that contacts air conditioner refrigerant can cause bodily harm or death. Inhaling gas from air conditioner refrigerant through a lighted cigarette can cause bodily harm or death.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

Obey all local regulations for the disposal of liquids.

Use all cleaning solutions with care. Report all necessary repairs.

Do not allow unauthorized personnel on the equipment.

Unless you are instructed otherwise, perform maintenance with the equipment in the servicing position. Refer to Operation and Maintenance Manual for the procedure for placing the equipment in the servicing position.

When you perform maintenance above ground level, use appropriate devices such as ladders or man lift machines. If equipped, use the machine anchorage points and use approved fall arrest harnesses and lanyards.

Pressurized Air and Water

Pressurized air and/or water can cause debris and/or hot water to be blown out. The debris and/or hot water could result in personal injury.

When pressurized air and/or pressurized water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.

The maximum air pressure for cleaning purposes must be reduced to 205 kPa (30 psi) when the nozzle is deadheaded and the nozzle is used with an effective chip deflector and personal protective equipment. The maximum water pressure for cleaning purposes must be below 275 kPa (40 psi).

Trapped Pressure

Pressure can be trapped in a hydraulic system. Releasing trapped pressure can cause sudden machine movement or attachment movement. Use caution if you disconnect hydraulic lines or fittings. High-pressure oil that is released can cause a hose to whip. High-pressure oil that is released can cause oil to spray. Fluid penetration can cause serious injury and possible death.

Fluid Penetration

Pressure can be trapped in the hydraulic circuit long after the engine has been stopped. The pressure can cause hydraulic fluid or items such as pipe plugs to escape rapidly if the pressure is not relieved correctly.

Do not remove any hydraulic components or parts until pressure has been relieved or personal injury may occur. Do not disassemble any hydraulic components or parts until pressure has been relieved or personal injury may occur. Refer to the Service Manual for any procedures that are required to relieve the hydraulic pressure.

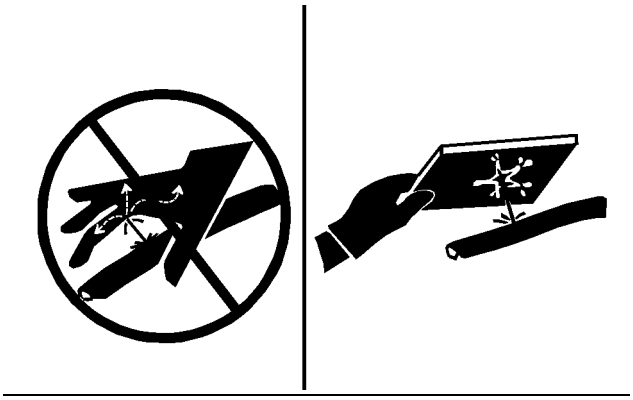


Illustration 13 g00687600

Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Containing Fluid Spillage

Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the equipment. Prepare to collect the fluid with suitable containers before opening any compartment or disassembling any component that contains fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for the following items:

- Tools that are suitable for collecting fluids and equipment that is suitable for collecting fluids
- Tools that are suitable for containing fluids and equipment that is suitable for containing fluids

Obey all local regulations for the disposal of liquids.

Inhalation

Illustration 14 g02159053

Exhaust

Use caution. Exhaust fumes can be hazardous to your health. If you operate the machine in an enclosed area, adequate ventilation is necessary.

Asbestos Information

Cat equipment and replacement parts that are shipped from Caterpillar are asbestos free. Caterpillar recommends the use of only genuine Cat replacement parts. Use the following guidelines when you handle any replacement parts that contain asbestos or when you handle asbestos debris.

Use caution. Avoid inhaling dust that might be generated when you handle components that contain asbestos fibers. Inhaling this dust can be hazardous to your health. The components that may contain asbestos fibers are brake pads, brake bands, lining material, clutch plates, and some gaskets. The asbestos that is used in these components is bound in a resin or sealed in some way. Normal handling is not hazardous unless airborne dust that contains asbestos is generated.

If dust that may contain asbestos is present, there are several guidelines that should be followed:

- Never use compressed air for cleaning.
- Avoid brushing materials that contain asbestos.
- Avoid grinding materials that contain asbestos.
- Use a wet method in order to clean up asbestos materials.
- A vacuum cleaner that is equipped with a high efficiency particulate air filter (HEPA) can also be used.

- Use exhaust ventilation on permanent machining jobs.
- Wear an approved respirator if there is no other way to control the dust.
- Comply with applicable rules and regulations for the work place. In the United States, use Occupational Safety and Health Administration (OSHA) requirements. These OSHA requirements can be found in “29 CFR 1910.1001”.
- Obey environmental regulations for the disposal of asbestos.
- Stay away from areas that might have asbestos particles in the air.

Dispose of Waste Properly

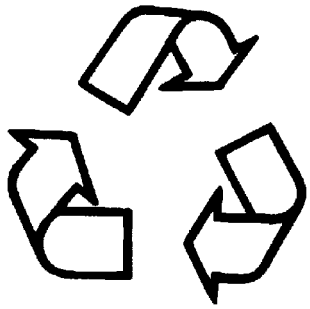


Illustration 15 g00706404

Improperly disposing of waste can threaten the environment. Potentially harmful fluids should be disposed of according to local regulations.

Always use leakproof containers when you drain fluids. Do not pour waste onto the ground, down a drain, or into any source of water.

i01359664

Crushing Prevention and Cutting Prevention

SMCS Code: 7000

Support the equipment properly before you perform any work or maintenance beneath that equipment. Do not depend on the hydraulic cylinders to hold up the equipment. Equipment can fall if a control is moved, or if a hydraulic line breaks.

Do not work beneath the cab of the machine unless the cab is properly supported.

Unless you are instructed otherwise, never attempt adjustments while the machine is moving or while the engine is running.

Never jump across the starter solenoid terminals in order to start the engine. Unexpected machine movement could result.

Whenever there are equipment control linkages the clearance in the linkage area will change with the movement of the equipment or the machine. Stay clear of areas that may have a sudden change in clearance with machine movement or equipment movement.

Stay clear of all rotating and moving parts.

If it is necessary to remove guards in order to perform maintenance, always install the guards after the maintenance is performed.

Keep objects away from moving fan blades. The fan blade will throw objects or cut objects.

Do not use a kinked wire cable or a frayed wire cable. Wear gloves when you handle wire cable.

When you strike a retainer pin with force, the retainer pin can fly out. The loose retainer pin can injure personnel. Make sure that the area is clear of people when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

Chips or other debris can fly off an object when you strike the object. Make sure that no one can be injured by flying debris before striking any object.

i01329099

Burn Prevention

SMCS Code: 7000

Do not touch any part of an operating engine. Allow the engine to cool before any maintenance is performed on the engine. Relieve all pressure in the air system, in the oil system, in the lubrication system, in the fuel system, or in the cooling system before any lines, fittings or related items are disconnected.

Coolant

When the engine is at operating temperature, the engine coolant is hot. The coolant is also under pressure. The radiator and all lines to the heaters or to the engine contain hot coolant.

Any contact with hot coolant or with steam can cause severe burns. Allow cooling system components to cool before the cooling system is drained.

Check the coolant level only after the engine has been stopped.

Ensure that the filler cap is cool before removing the filler cap. The filler cap must be cool enough to touch with a bare hand. Remove the filler cap slowly in order to relieve pressure.

Cooling system conditioner contains alkali. Alkali can cause personal injury. Do not allow alkali to contact the skin, the eyes, or the mouth.

Oils

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

Remove the hydraulic tank filler cap only after the engine has been stopped. The filler cap must be cool enough to touch with a bare hand. Follow the standard procedure in this manual in order to remove the hydraulic tank filler cap.

Batteries

Electrolyte is an acid. Electrolyte can cause personal injury. Do not allow electrolyte to contact the skin or the eyes. Always wear protective glasses for servicing batteries. Wash hands after touching the batteries and connectors. Use of gloves is recommended.

i04218233

Fire Prevention and Explosion Prevention

SMCS Code: 7000

Illustration 16 g00704000

General

All fuels, most lubricants, and some coolant mixtures are flammable.

To minimize the risk of fire or explosion, Caterpillar recommends the following actions.

Always perform a Walk-Around Inspection, which may help you identify a fire hazard. Do not operate a machine when a fire hazard exists. Contact your Cat dealer for service.

Understand the use of the primary exit and alternative exit on the machine. Refer to Operation and Maintenance Manual, “Alternative Exit”.

Do not operate a machine with a fluid leak. Repair leaks and clean up fluids before resuming machine operation. Fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. A fire may cause personal injury or death.

Remove flammable material such as leaves, twigs, papers, trash, and so on. These items may accumulate in the engine compartment or around other hot areas and hot parts on the machine.

Keep the access doors to major machine compartments closed and access doors in working condition in order to permit the use of fire suppression equipment, in case a fire should occur.

Clean all accumulations of flammable materials such as fuel, oil, and debris from the machine.

Do not operate the machine near any flame.

Keep shields in place. Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in case of a break in a line, in a hose, or in a seal. Exhaust shields must be installed correctly.

Do not weld or flame cut on tanks or lines that contain flammable fluids or flammable material. Empty and purge the lines and tanks. Then clean the lines and tanks with a nonflammable solvent prior to welding or flame cutting. Ensure that the components are properly grounded in order to avoid unwanted arcs.

Dust that is generated from repairing nonmetallic hoods or fenders may be flammable and/or explosive. Repair such components in a well ventilated area away from open flames or sparks. Use suitable Personal Protection Equipment (PPE).

Inspect all lines and hoses for wear or deterioration. Replace damaged lines and hoses. The lines and the hoses should have adequate support and secure clamps. Tighten all connections to the recommended torque. Damage to the protective cover or insulation may provide fuel for fires.

Store fuels and lubricants in properly marked containers away from unauthorized personnel. Store oily rags and flammable materials in protective containers. Do not smoke in areas that are used for storing flammable materials.

Illustration 17 g00704059

Use caution when you are fueling a machine. Do not smoke while you are fueling a machine. Do not fuel a machine near open flames or sparks. Always stop the engine before fueling. Fill the fuel tank outdoors. Properly clean areas of spillage.

Never store flammable fluids in the operator compartment of the machine.

Battery and Battery Cables

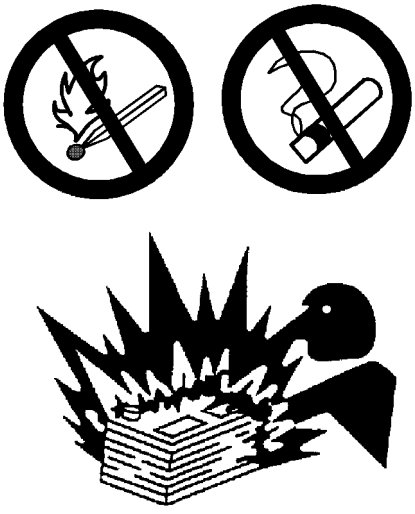


Illustration 18 g02298225

Caterpillar recommends the following in order to minimize the risk of fire or an explosion related to the battery.

Do not operate a machine if battery cables or related parts show signs of wear or damage. Contact your Cat dealer for service.

Follow safe procedures for engine starting with jump-start cables. Improper jumper cable connections can cause an explosion that may result in injury. Refer to Operation and Maintenance Manual, “Engine Starting with Jump Start Cables” for specific instructions.

Do not charge a frozen battery. This may cause an explosion.

Gases from a battery can explode. Keep any open flames or sparks away from the top of a battery. Do not smoke in battery charging areas.

Never check the battery charge by placing a metal object across the terminal posts. Use a voltmeter in order to check the battery charge.

Daily inspect battery cables that are in areas that are visible. Inspect cables, clips, straps, and other restraints for damage. Replace any damaged parts. Check for signs of the following, which can occur over time due to use and environmental factors:

- Fraying
- Abrasion
- Cracking
- Discoloration
- Cuts on the insulation of the cable
- Fouling
- Corroded terminals, damaged terminals, and loose terminals

Replace damaged battery cable(s) and replace any related parts. Eliminate any fouling, which may have caused insulation failure or related component damage or wear. Ensure that all components are reinstalled correctly.

An exposed wire on the battery cable may cause a short to ground if the exposed area comes into contact with a grounded surface. A battery cable short produces heat from the battery current, which may be a fire hazard.

An exposed wire on the ground cable between the battery and the disconnect switch may cause the disconnect switch to be bypassed if the exposed area comes into contact with a grounded surface. This may result in an unsafe condition for servicing the machine. Repair components or replace components before servicing the machine.

⚠ WARNING

Fire on a machine can result in personal injury or death. Exposed battery cables that come into contact with a grounded connection can result in fires. Replace cables and related parts that show signs of wear or damage. Contact your Cat dealer.

Wiring

Check electrical wires daily. If any of the following conditions exist, replace parts before you operate the machine.

- Fraying
- Signs of abrasion or wear
- Cracking
- Discoloration
- Cuts on insulation
- Other damage

Make sure that all clamps, guards, clips, and straps are reinstalled correctly. This will help to prevent vibration, rubbing against other parts, and excessive heat during machine operation.

Attaching electrical wiring to hoses and tubes that contain flammable fluids or combustible fluids should be avoided.

Consult your Cat dealer for repair or for replacement parts.

Keep wiring and electrical connections free of debris.

Lines, Tubes, and Hoses

Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install any lines that are bent or damaged. Use the appropriate backup wrenches in order to tighten all connections to the recommended torque.

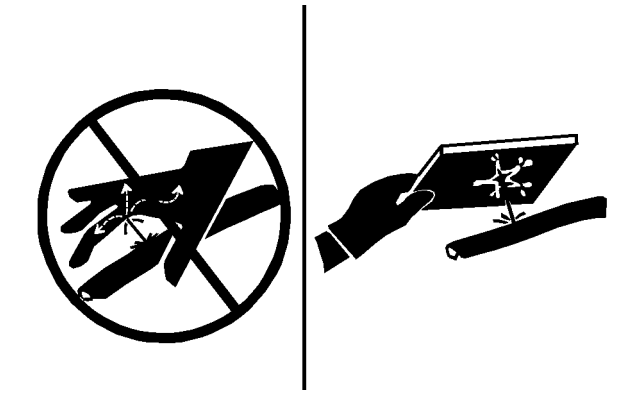


Illustration 19 g00687600

Check lines, tubes, and hoses carefully. Wear Personal Protection Equipment (PPE) in order to check for leaks. Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Replace the affected parts if any of the following conditions are present:

- End fittings are damaged or leaking.
- Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are swelling or ballooning.
- Flexible parts of the hoses are kinked.
- Outer covers have exposed embedded armoring.
- End fittings are displaced.

Make sure that all clamps, guards, and heat shields are installed correctly. During machine operation, this will help to prevent vibration, rubbing against other parts, excessive heat, and failure of lines, tubes, and hoses.

Do not operate a machine when a fire hazard exists. Repair any lines that are corroded, loose, or damaged. Leaks may provide fuel for fires. Consult your Cat dealer for repair or for replacement parts. Use genuine Cat parts or the equivalent, for capabilities of both the pressure limit and temperature limit.

Ether

Ether (if equipped) is commonly used in cold-weather applications. Ether is flammable and poisonous.

Follow the correct cold engine starting procedures. Refer to the section in the Operation and Maintenance Manual with the label “Engine Starting”.

Do not spray ether manually into an engine if the machine is equipped with a thermal starting aid for cold weather starting.

Use ether in well ventilated areas. Do not smoke while you are replacing an ether cylinder or while you are using an ether spray.

Do not store ether cylinders in living areas or in the operator compartment of a machine. Do not store ether cylinders in direct sunlight or in temperatures above 49° C (120.2° F). Keep ether cylinders away from open flames or sparks.

Dispose of used ether cylinders properly. Do not puncture an ether cylinder. Keep ether cylinders away from unauthorized personnel.

Fire Extinguisher

As an additional safety measure, keep a fire extinguisher on the machine.

Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Follow the recommendations on the instruction plate.

Consider installation of an aftermarket Fire Suppression System, if the application and working conditions warrant the installation.

i04025591

Fire Safety

SMCS Code: 7000

Note: Locate secondary exits and how to use the secondary exits before you operate the machine.

Note: Locate fire extinguishers and how to use a fire extinguisher before you operate the machine.

If you find that you are involved in a machine fire, your safety and that of others on site is the top priority. The following actions should only be performed if the actions do not present a danger or risk to you and any nearby people. At all times you should assess the risk of personal injury and move away to a safe distance as soon as you feel unsafe.

Move the machine away from nearby combustible material such as fuel/oil stations, structures, trash, mulch, and timber.

Lower any implements and turn off the engine as soon as possible. If you leave the engine running, the engine will continue to feed a fire. The fire will be fed from any damaged hoses that are attached to the engine or pumps.

If possible, turn the battery disconnect switch to the OFF position. Disconnecting the battery will remove the ignition source in the event of an electrical short. Disconnecting the battery will eliminate a second ignition source if electrical wiring is damaged by the fire, resulting in a short circuit.

Notify emergency personnel of the fire and your location.

If your machine is equipped with a fire suppression system, follow the manufacturers procedure for activating the system.

Note: Fire suppression systems need to be regularly inspected by qualified personnel. You must be trained to operate the fire suppression system.

Use the on-board fire extinguisher and use the following procedure:

1. Pull the pin.
2. Aim the extinguisher or nozzle at the base of the fire.
3. Squeeze the handle and release the extinguishing agent.
4. Sweep the extinguisher from side to side across the base of the fire until the fire is out.

Remember, if you are unable to do anything else, shut off the machine before exiting. By shutting off the machine, fuels will not continue to be pumped into the fire.

If the fire grows out of control, be aware of the following risks:

- Tires on wheeled machines pose a risk of explosion as tires burn. Hot shrapnel and debris can be thrown great distances in an explosion.
- Tanks, accumulators, hoses, and fittings can rupture in a fire, spraying fuels and shrapnel over a large area.

- Remember that nearly all of the fluids on the machine are flammable, including coolant and oils. Additionally, plastics, rubbers, fabrics, and resins in fiberglass panels are also flammable.

i03909281

Fire Extinguisher Location

SMCS Code: 7000

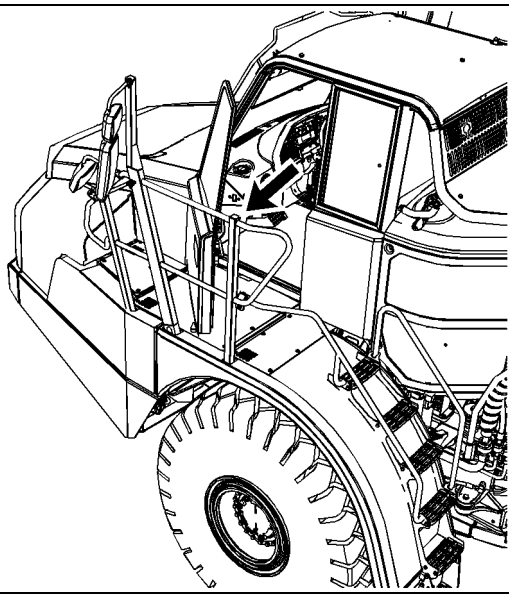


Illustration 20 g02149153

The fire extinguisher must be mounted in the cab. Mount the fire extinguisher on the front wall of the cab under the dash on the left side next to the door.

Do not mount the fire extinguisher on the ROPS.

The fire extinguisher mounting must be capable of withstanding a force that is equivalent to twenty times the effect of gravity.

i04160129

Tire Information

SMCS Code: 7000

Explosions of air inflated tires have resulted from heat-induced gas combustion inside the tires. Explosions can be caused by heat that is generated by welding, by heating rim components, by external fire, or by excessive use of brakes.

A tire explosion is much more violent than a blowout. The explosion can propel the tire, the rim components, and the axle components from the machine. Stay out of the trajectory path. Both the force of the explosion and the flying debris can cause property damage, personal injury, or death.

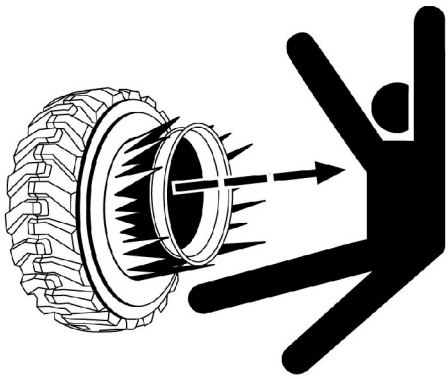


Illustration 21 g02166933

Typical example of tire is shown

Do not approach a hot or an apparently damaged tire.

Caterpillar recommends against using water or calcium as a ballast for the tires except in machines designed for this additional mass. For those applicable machines, the maintenance section will contain instructions on the correct tire inflation and filling procedures. Ballast, such as fluid in the tires, increases overall machine weight and may affect braking, steering, power train components, or the certification of the protective structure such as the ROPS. The use of tire/rim rust preventatives or other liquid additives is not required.

Dry nitrogen gas is recommended for inflation of tires. If the tires were originally inflated with air, nitrogen is still preferred for adjusting the pressure. Nitrogen mixes properly with air.

Nitrogen inflated tires reduce the potential of a tire explosion because nitrogen does not aid combustion. Nitrogen helps to prevent oxidation of the rubber, deterioration of rubber, and corrosion of rim components.

To avoid overinflation, proper nitrogen inflation equipment and training in the usage of the equipment are necessary. A tire blowout or a rim failure can result from improper equipment or from misused equipment.

When you inflate a tire, stand behind the tread and use a self-attaching chuck.

Servicing tires and rims can be dangerous. Only trained personnel that use proper tools and proper procedures should perform this maintenance. If correct procedures are not used for servicing tires and rims, the assemblies could burst with explosive force. This explosive force can cause serious personal injury or death. Carefully obey the specific instructions from your tire dealer.

i01122596

Electrical Storm Injury Prevention

SMCS Code: 7000

When lightning is striking in the vicinity of the machine, the operator should never attempt the following procedures:

- Mount the machine.
- Dismount the machine.

If you are in the operator's station during an electrical storm, stay in the operator's station. If you are on the ground during an electrical storm, stay away from the vicinity of the machine.

i04275490

Before Starting Engine

SMCS Code: 1000; 7000

Both steering frame locks must be removed in order to articulate the machine. The steering frame locks must be stored in the proper locations for normal operation of the machine. The proper storage locations for the steering frame locks are at the front of the rear frame on each side of the machine.

Start the engine only from the operator compartment. Never short across the starter terminals or across the batteries. Shorting could bypass the engine neutral start system. Shorting could also damage the electrical system.

Inspect the condition of the seat belt and the condition of the mounting hardware. Replace any damaged parts and any worn parts. Regardless of appearance, replace the seat belt after three years of use. Do not use a seat belt extension on a retractable seat belt.

Adjust the seat so that full pedal travel can be achieved. The back of the operator must be in contact with the back of the seat. Adjust the steering column.

Make sure that the machine is equipped with a lighting system that is adequate for the job conditions. Make sure that all lights are working properly.

Before starting the engine or before moving the machine, make sure that no one is on the machine, underneath the machine, or around the machine. Make sure that there are no personnel in the area.

i01995114

Engine Starting

SMCS Code: 1000; 7000

If a warning tag is attached to the engine start switch or to the controls, do not start the engine. Also, do not move any controls.

Move the hoist control to the HOLD position before you start the engine.

Move the transmission control to the N position before you start the engine.

Move the parking brake control to the ENGAGED position before you start the engine.

Diesel engine exhaust contains products of combustion which can be harmful to your health. Always start the engine in a well ventilated area. Always operate the machine in a well ventilated area. If you are in an enclosed area, vent the exhaust to the outside.

i01447235

Before Operation

SMCS Code: 7000

Move all personnel from the machine and from the area.

Move all obstacles from the machine's path. Beware of hazards (wires, ditches, etc).

Be sure that all windows are clean. Secure the windows in the open position or in the shut position.

Adjust the mirrors for the best visibility close to the machine. Make sure that the horn, the backup alarm, and all other warning devices are working properly.

Fasten your seat belt securely.

A person that occupies the companion seat must wear the seat belt for the companion seat.

i03162317

Visibility Information

SMCS Code: 7000

Before you start the machine, perform a walk-around inspection in order to ensure that there are no hazards around the machine.

While the machine is in operation, constantly survey the area around the machine in order to identify potential hazards as hazards become visible around the machine.

Your machine may be equipped with visual aids. Some examples of visual aids are Closed Circuit Television (CCTV) and mirrors. Before operating the machine, ensure that the visual aids are in proper working condition and that the visual aids are clean. Adjust the visual aids using the procedures that are located in this Operation and Maintenance Manual. If equipped, the Work Area Vision System shall be adjusted according to Operation and Maintenance Manual, SEBU8157, “Work Area Vision System”.

It may not be possible to provide direct visibility on large machines to all areas around the machine. Appropriate job site organization is required in order to minimize hazards that are caused by restricted visibility. Job site organization is a collection of rules and procedures that coordinates machines and people that work together in the same area. Examples of job site organization include the following:

- Safety instructions
- Controlled patterns of machine movement and vehicle movement
- Workers that direct traffic to move when it is safe
- Restricted areas
- Operator training
- Warning symbols or warning signs on machines or on vehicles
- A system of communication
- Communication between workers and operators prior to approaching the machine

Modifications of the machine configuration by the user that result in a restriction of visibility shall be evaluated.

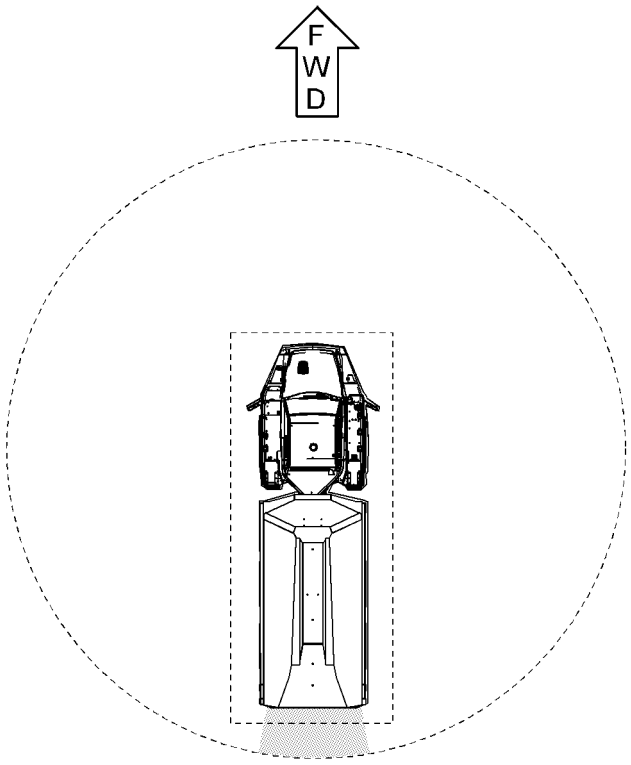
i03304240

Restricted Visibility

SMCS Code: 7000

The size and the configuration of this machine may result in areas that can not be seen when the operator is seated. Illustration 22 provides an approximate visual indication of areas of significant restricted visibility. Illustration 22 indicates restricted visibility areas at ground level inside a radius of 12.00 m (39.37 ft) from the operator on a machine without the use of optional visual aids. This illustration does not provide any indication on areas of restricted visibility for distances outside a radius of 12.00 m (39.37 ft).

This machine may be equipped with optional visual aids that may provide visibility to some of the restricted visibility areas. For areas that are not covered by the optional visual aids, job site organization must be utilized to minimize hazards of this restricted visibility. For more information regarding job site organization refer to Operation and Maintenance Manual, “Visibility Information”.



g01687496

Illustration 22

Top view of the machine

Note: The shaded areas indicate the approximate location of areas with significant restricted visibility.

i01439977

Operation

SMCS Code: 7000

Only operate the machine while you are seated in the operator seat. The seat belt must be fastened while you operate the machine. A passenger must sit on the seat that is provided. If a passenger is carried the seat belt must be fastened.

Before you move the machine, you must make sure that no one will be endangered.

Check the proper operation of the steering controls and of the braking controls for the machine while the machine is moving slowly in an open area.

Do not allow riders on the machine.

Note any needed repairs during machine operation. Report any needed repairs.

Stay away from the edge of cliffs, overhangs and slide areas. Do not go close to the edge of a cliff, an excavation, or an overhang.

If the machine begins to sideslip downward on a grade, turn the machine downhill.

Avoid any conditions that can lead to tipping the machine. The machine can tip when you work on hills, on banks and on slopes. Also, the machine can tip when you cross ditches, ridges or other obstacles.

Avoid operating the machine across the slope. When possible, operate the machine up the slopes and down the slopes.

Maintain control of the machine. Do not load the machine beyond the machine capacity.

Stay in the cab while the machine is being loaded.

Travel with the dump body lowered to the frame.

Before operating a machine up a grade, select the gear that will give you full control under all conditions.

Know the maximum dimensions of your machine.

Inspect tires periodically during your shift. Allow tires to cool before going near the tires. Refer to Operation and Maintenance Manual, “Tire Information” for additional information.

Do not coast with the transmission in neutral.

Use a person to give signals when you enter a building. Use a person to give signals when you leave a building.

i02624835

Engine Stopping

SMCS Code: 1000; 7000

Do not stop the engine immediately after the machine has been operated under load. This can cause overheating and accelerated wear of engine components.

After the machine is parked and the parking brake is engaged, allow the engine to run for two minutes before shutdown. This allows hot areas of the engine to cool gradually.

i01522321

Parking

SMCS Code: 7000

Park the machine on a level surface. If you must park on a grade, chock the machine's wheels.

Apply the service brakes in order to stop the machine. Move the transmission control to the NEUTRAL position. Move the accelerator control to the LOW IDLE position. Move the parking brake control to the ENGAGED position.

The dump body must be lowered to the frame.

The hoist control must be in the FLOAT position.

Run the engine at low idle for five minutes.

Stop the engine.

Turn the engine start switch to the OFF position and remove the engine start switch key.

Turn the battery disconnect switch to the OFF position. Remove the battery disconnect switch key if you do not operate the machine for an extended period of time. This will prevent drainage of the battery. A battery short circuit, any current draw from certain components, and vandalism can cause drainage of the battery.

i03745198

Slope Operation

SMCS Code: 7000

Machines that are operating safely in various applications depend on these criteria: the machine model, configuration, machine maintenance, operating speed of the machine, conditions of the terrain, fluid levels, and tire inflation pressures. The most important criteria are the skill and judgment of the operator.

A well trained operator that follows the instructions in the Operation and Maintenance Manual has the greatest impact on stability. Operator training provides a person with the following abilities: observation of working and environmental conditions, feel for the machine, identification of potential hazards, and operating the machine safely by making appropriate decisions.

When you work on side hills and when you work on slopes, consider the following important points:

Speed of travel – At higher speeds, forces of inertia tend to make the machine less stable.

Roughness of terrain or surface – The machine may be less stable with uneven terrain.

Direction of travel – Avoid operating the machine across the slope. When possible, operate the machine up the slopes and operate the machine down the slopes. Place the heaviest end of the machine uphill when you are working on an incline.

Mounted equipment – Balance of the machine may be impeded by the following components: equipment that is mounted on the machine, machine configuration, weights, and counterweights.

Nature of surface – Ground that has been newly filled with earth may collapse from the weight of the machine.

Surface material – Rocks and moisture of the surface material may drastically affect the machine's traction and machine's stability. Rocky surfaces may promote side slipping of the machine.

Slippage due to excessive loads – This may cause downhill tracks or downhill tires to dig into the ground, which will increase the angle of the machine.

Width of tracks or tires – Narrower tracks or narrower tires further increase the digging into the ground which causes the machine to be less stable.

Implements attached to the drawbar – This may decrease the weight on the uphill tracks. This may also decrease the weight on the uphill tires. The decreased weight will cause the machine to be less stable.

Height of the working load of the machine – When the working loads are in higher positions, the stability of the machine is reduced.

Operated equipment – Be aware of performance features of the equipment in operation and the effects on machine stability.

Operating techniques – Keep all attachments or pulled loads low to the ground for optimum stability.

Machine systems have limitations on slopes – Slopes can affect the proper function and operation of the various machine systems. These machine systems are needed for machine control.

Note: Safe operation on steep slopes may require special machine maintenance. Excellent skill of the operator and proper equipment for specific applications are also required. Consult the Operation and Maintenance Manual sections for the proper fluid level requirements and intended machine use.

i01329161

Equipment Lowering with Engine Stopped

SMCS Code: 7000

Before lowering any equipment with the engine stopped, clear the area around the equipment of all personnel. The procedure to use will vary with the type of equipment to be lowered. Keep in mind most systems use a high pressure fluid or air to raise or lower equipment. The procedure will cause high pressure air, hydraulic, or some other media to be released in order to lower the equipment. Wear appropriate personal protective equipment and follow the established procedure in the Operation and Maintenance Manual, “Equipment Lowering with Engine Stopped” in the Operation Section of the manual.

i04278132

Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information for Machines in European Union Countries and in Countries that Adopt the “EU Directives”

The dynamic operator sound pressure level is 79 dB(A) when “ISO 6396:2008” is used to measure the value for an enclosed cab. The cab was properly installed and maintained. The test was conducted with the cab doors and the cab windows closed.

Hearing protection may be needed when the machine is operated with an open operator station for extended periods or in a noisy environment. Hearing protection may be needed when the machine is operated with a cab that is not properly maintained or when the doors and windows are open for extended periods or in a noisy environment.

“The European Union Physical Agents (Vibration) Directive 2002/44/EC”

Vibration Data for Articulated Trucks

Information Concerning Hand/Arm Vibration Level

When the machine is operated according to the intended use, the hand/arm vibration of this machine is below 2.5 meter per second squared.

Information Concerning Whole Body Vibration Level

This section provides vibration data and a method for estimating the vibration level for articulated trucks.

Note: Vibration levels are influenced by many different parameters. Many items are listed below.

- Operator training, behavior, mode, and stress
- Job site organization, preparation, environment, weather, and material
- Machine type, quality of the seat, quality of the suspension system, attachments, and condition of the equipment

It is not possible to get precise vibration levels for this machine. The expected vibration levels can be estimated with the information in Table 1 in order to calculate the daily vibration exposure. A simple evaluation of the machine application can be used.

Estimate the vibration levels for the three vibration directions. For typical operating conditions, use the average vibration levels as the estimated level. With an experienced operator and smooth terrain, subtract the Scenario Factors from the average vibration level in order to obtain the estimated vibration level. For aggressive operations and severe terrain, add the Scenario Factors to the average vibration level in order to obtain the estimated vibration level.

Note: All vibration levels are in meter per second squared.

Table 1

"ISO Reference Table A - Equivalent vibration levels of whole body vibration emission for earthmoving equipment."							
Machine Type	Typical Operating Activity	Vibration Levels			Scenario Factors		
		X axis	Y axis	Z axis	X axis	Y axis	Z axis
Articulated Trucks	loading process	0,29	0,41	0,24	0,17	0,23	0,16
	travel loaded	0,64	0,89	0,67	0,21	0,29	0,21
	travel unloaded	0,82	1,02	0,81	0,26	0,26	0,28
	unloading	0,49	0,42	0,30	0,25	0,33	0,18

Note: Refer to "ISO/TR 25398 Mechanical Vibration - Guideline for the assessment of exposure to whole body vibration of ride on operated earthmoving machines" for more information about vibration. This publication uses data that is measured by international institutes, organizations and manufacturers. This document provides information about the whole body exposure of operators of earthmoving equipment. Refer to Operation and Maintenance Manual, SEBU8257, "The European Union Physical Agents (Vibration) Directive 2002/44/EC" for more information about machine vibration levels.

The Caterpillar suspension seat meets the criteria of "ISO 7096". This represents vertical vibration level under severe operating conditions. This seat is tested with the input "spectral class EM1". The seat has a transmissibility factor of "SEAT<1.1".

The whole body vibration level of the machine varies. There is a range of values. The low value is 0.5 meter per second squared. The machine meets the short-term level for the design of the seat in "ISO 7096". The value is 1.02 meter per second squared for this machine.

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

Properly adjust machines. Properly maintain machines. Operate machines smoothly. Maintain the conditions of the terrain. The following guidelines can help reduce the whole body vibration level:

1. Use the right type and size of machine, equipment, and attachments.
2. Maintain machines according to the manufacturer's recommendations.
   - **a.** Tire pressures
   - **b.** Brake and steering systems
   - **c.** Controls, hydraulic system and linkages
3. Keep the terrain in good condition.
   - **a.** Remove any large rocks or obstacles.
   - **b.** Fill any ditches and holes.
   - **c.** Provide machines and schedule time in order to maintain the conditions of the terrain.
4. Use a seat that meets "ISO 7096". Keep the seat maintained and adjusted.
   - **a.** Adjust the seat and suspension for the weight and the size of the operator.
   - **b.** Inspect and maintain the seat suspension and adjustment mechanisms.
5. Perform the following operations smoothly.
   - **a.** Steer
   - **b.** Brake
   - **c.** Accelerate.
   - **d.** Shift the gears.
6. Move the attachments smoothly.
7. Adjust the machine speed and the route in order to minimize the vibration level.
   - **a.** Drive around obstacles and rough terrain.
   - **b.** Slow down when it is necessary to go over rough terrain.
8. Minimize vibrations for a long work cycle or a long travel distance.
   - **a.** Use machines that are equipped with suspension systems.
   - **b.** Use the ride control system on articulated trucks.
   - **c.** If no ride control system is available, reduce speed in order to prevent bounce.
   - **d.** Haul the machines between workplaces.

9. Less operator comfort may be caused by other risk factors. The following guidelines can be effective in order to provide better operator comfort:

   a. Adjust the seat and adjust the controls in order to achieve good posture.

   b. Adjust the mirrors in order to minimize twisted posture.

   c. Provide breaks in order to reduce long periods of sitting.

   d. Avoid jumping from the cab.

   e. Minimize repeated handling of loads and lifting of loads.

   f. Minimize any shocks and impacts during sports and leisure activities.

Sources

The vibration information and calculation procedure is based on “ISO/TR 25398 Mechanical Vibration - Guideline for the assessment of exposure to whole body vibration of ride on operated earthmoving machines”. Harmonized data is measured by international institutes, organizations and manufacturers.

This literature provides information about assessing the whole body vibration exposure of operators of earthmoving equipment. The method is based on measured vibration emission under real working conditions for all machines.

You should check the original directive. This document summarizes part of the content of the applicable law. This document is not meant to substitute the original sources. Other parts of these documents are based on information from the United Kingdom Health and Safety Executive.

Refer to Operation and Maintenance Manual, SEBU8257, “The European Union Physical Agents (Vibration) Directive 2002/44/EC” for more information about vibration.

Consult your local Caterpillar dealer for more information about machine features that minimize vibration levels. Consult your local Caterpillar dealer about safe machine operation.

Use the following web site in order to find your local dealer:

Caterpillar, Inc.
www.cat.com

i03634321

Operator Station

SMCS Code: 7000

Any modifications to the inside of the operator station should not project into the operator space or into the space for the companion seat (if equipped). The addition of a radio, fire extinguisher, and other equipment must be installed so that the defined operator space and the space for the companion seat (if equipped) is maintained. Any item that is brought into the cab should not project into the defined operator space or the space for the companion seat (if equipped). A lunch box or other loose items must be secured. Objects must not pose an impact hazard in rough terrain or in the event of a rollover.

i03656846

Guards (Operator Protection)

SMCS Code: 7000; 7150; 7325

There are different types of guards that are used to protect the operator. The machine and the machine application determines the type of guard that should be used.

A daily inspection of the guards is required in order to check for structures that are bent, cracked or loose. Never operate a machine with a damaged structure.

The operator becomes exposed to a hazardous situation if the machine is used improperly or if poor operating techniques are used. This situation can occur even though a machine is equipped with an appropriate protective guard. Follow the established operating procedures that are recommended for your machine.

Rollover Protective Structure (ROPS), Falling Object Protective Structure (FOPS) or Tip Over Protection Structure (TOPS)

The ROPS/FOPS Structure (if equipped) on your machine is specifically designed, tested and certified for that machine. Any alteration or any modification to the ROPS/FOPS Structure could weaken the structure. This places the operator into an unprotected environment. Modifications or attachments that cause the machine to exceed the weight that is stamped on the certification plate also place the operator into an unprotected environment. Excessive weight may inhibit the brake performance, the steering performance and the ROPS. The protection that is offered by the ROPS/FOPS Structure will be impaired if the ROPS/FOPS Structure has structural damage. Damage to the structure can be caused by an overturn, a falling object, a collision, etc.

Do not mount items (fire extinguishers, first aid kits, work lights, etc) by welding brackets to the ROPS/FOPS Structure or by drilling holes in the ROPS/FOPS Structure. Welding brackets or drilling holes in the ROPS/FOPS Structures can weaken the structures. Consult your Caterpillar dealer for mounting guidelines.

The Tip Over Protection Structure (TOPS) is another type of guard that is used on mini hydraulic excavators. This structure protects the operator in the event of a tipover. The same guidelines for the inspection, the maintenance and the modification of the ROPS/FOPS Structure are required for the Tip Over Protection Structure.

Other Guards (If Equipped)

Protection from flying objects and/or falling objects is required for special applications. Logging applications and demolition applications are two examples that require special protection.

A front guard needs to be installed when a work tool that creates flying objects is used. Mesh front guards that are approved by Caterpillar or polycarbonate front guards that are approved by Caterpillar are available for machines with a cab or an open canopy. On machines that are equipped with cabs, the windows should also be closed. Safety glasses are recommended when flying hazards exist for machines with cabs and machines with open canopies.

If the work material extends above the cab, top guards and front guards should be used. Typical examples of this type of application are listed below:

- Demolition applications
- Rock quarries
- Forestry products

Additional guards may be required for specific applications or work tools. The Operation and Maintenance Manual for your machine or your work tool will provide specific requirements for the guards. Consult your Caterpillar dealer for additional information.

i04195690

Body Support

SMCS Code: 0635; 7258-S4

Whenever possible, lower the dump body to the frame when parking or performing any type of service. Install the body support if the machine must be parked with the dump body raised, or whenever performing any service that requires the dump body to be in the raised position.

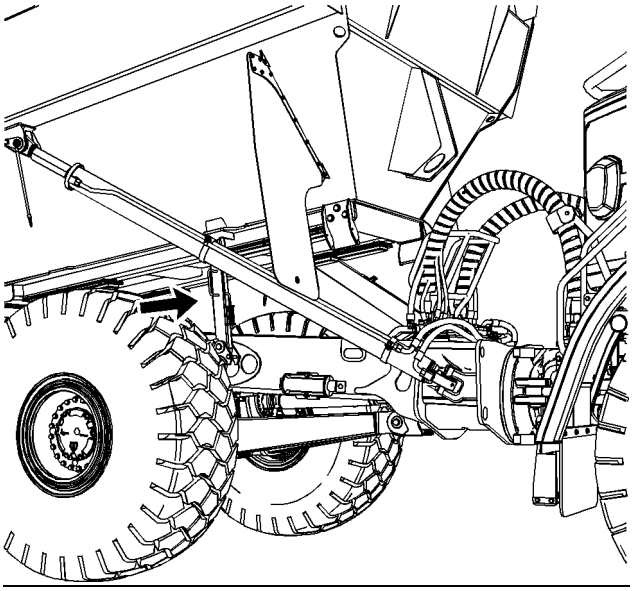
Park the machine on a level surface. Move the parking brake control to the ENGAGED position. Lower the body and move the hoist control to the FLOAT position.

Install the steering frame locks before entering the area around the oscillating hitch. Refer to Operation and Maintenance Manual, “Steering Frame Lock” for information on the installation of the steering frame lock.

Perform the following procedure in order to install the body support.

Note: The body must be empty before the body support is installed.

1. Raise the body enough to lift the body support and then move the hoist control to the HOLD position.



g02370196

Illustration 23
Body support
Typical example

2. The body support is located on the right-hand side of the rear frame. Release the securing pin and lift the body support to the fully raised position.

3. Move the hoist control to the FLOAT position. This will allow the body to lower slowly until the weight of the body is supported by the body support.

Note: The body must be raised before the body support can be lowered.

4. Move the hoist control to the HOLD position and shut off the engine.

Allow only one operator on the machine. Keep all other personnel away from the machine. Also, all personnel should be visible to the operator.

Product Information Section

General Information

i03885505

Specifications

SMCS Code: 7000

The specifications may vary depending on the configuration and the options.

Table 2

735B Dimensions		
	Metric Unit	**English Unit**
Overall Height with body down (excluding exhaust)	3702 mm	12 ft 2inch
Height with body raised	6809 mm	22 ft 4 inch
Width over tires (excluding mirrors)	3366 mm	11 ft 1 inch
Overall Length with body down	11000 mm	36 ft 1 inch

Table 3

740B Dimensions		
	Metric Unit	**English Unit**
Overall Height with body down (excluding exhaust)	3745 mm	12 ft 3 inch
Height with body raised	7092 mm	23 ft 3 inch
Width over tires (excluding mirrors)	3430 mm	11 ft 3 inch
Overall Length with body down	11000 mm	36 ft 1 inch

Table 4

Operating Weights with 75 kg (165 lb) operator and full tank of fuel		
Sales Model (S/N)	**Metric Unit**	**English Unit**
735B (T4P)	32500 kg	71650 lb
735B (L4D)	32300 kg	71210 lb
740B (T4R)	34400 kg	75840 lb
740B (L4E)	34200 kg	75400 lb

Intended Use

The Articulated Truck is an earthmoving machine. The Articulated Truck is classified as a dumper as described in ISO 6165:2001. This is a self-propelled wheeled machine that uses frame articulation in order to steer. This dumper has an open body that is intended for the following applications: transporting loose material, dumping loose material, and spreading loose material

Application/Configuration Restrictions

The Gross Machine Operating Weight (including payload) for the 735B Articulated Truck is 65173 kg (143682 lb).

The Gross Machine Operating Weight (including payload) for the 740B Articulated Truck is 73975 kg (163087 lb).

Use the machine only in environments that do not contain explosive gases.

Identification Information

i03885506

Plate Locations and Film Locations

SMCS Code: 1000; 7000; 7557

The Product Identification Number (PIN) will be used to identify a powered machine that is designed for an operator to ride.

Caterpillar products such as engines, transmissions, and major attachments that are not designed for an operator to ride are identified by Serial Numbers.

For quick reference, record the identification numbers in the spaces that are provided below the illustration.

Product Identification Number (PIN)

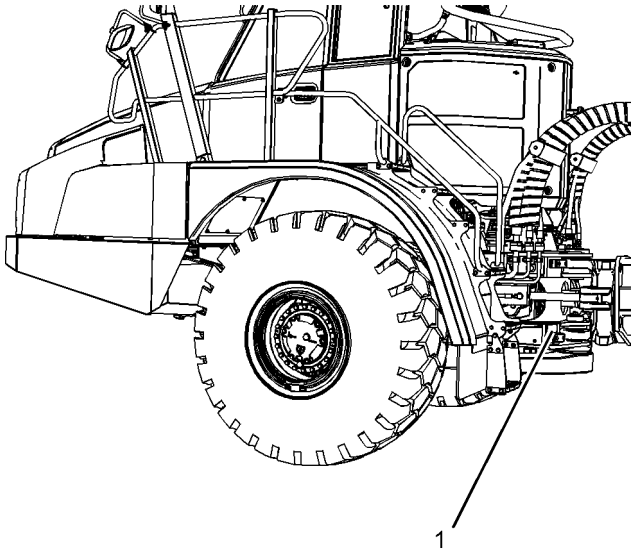


Illustration 24 g02417777

The PIN plate (1) for this machine is located on the left side of the front frame.

Machine PIN _____

Year of manufacture (if provided)_____

European Union

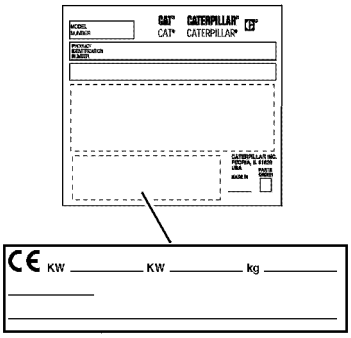


Illustration 25 g01880193

This plate is positioned on the bottom left side of plate (1) for the PIN.

Note: The CE plate is on machines that are certified to the European Union requirements that were effective at that time.

For machines compliant to 2006/42/EC, the following information is stamped onto the CE plate. For quick reference, record this information in the spaces that are provided below.

- Engine Power Primary Engine (kW)_____
- Engine Power for Additional Engine (If Equipped) _____
- Typical Machine Operating Weight for European Market (kg)_____
- Year of Construction_____
- Machine Type _____

For the name and the address of the manufacturer, and the country of origin of the machine, refer to the PIN plate.

Serial Number Plates (SN)

Engine Serial Number

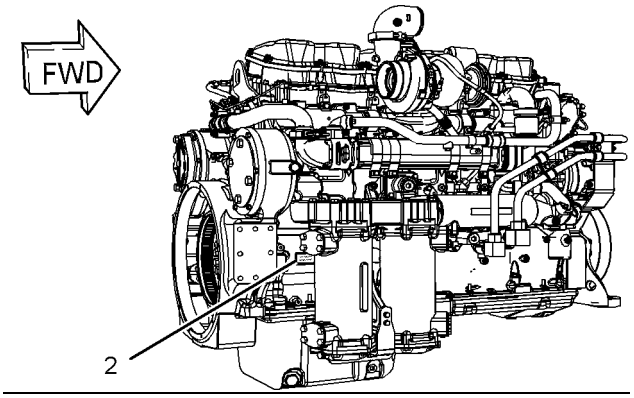


Illustration 26 g02144926

Engine serial number plate (2) is located on the right side of the engine.

Transmission Serial Number

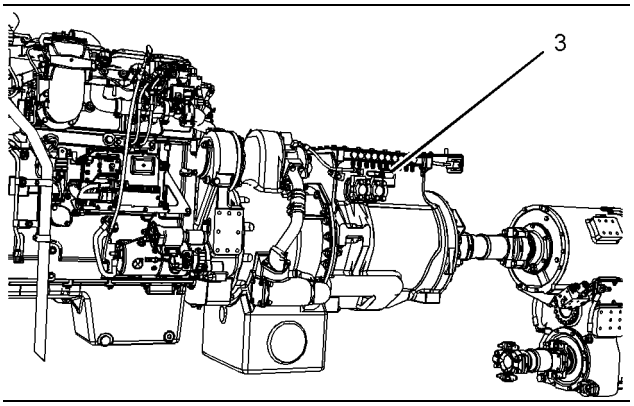


Illustration 27 g02417801

Transmission serial number plate (3) is located on the left side of the transmission.

Suspension Cylinder Strut

The following information is stamped onto the suspension cylinder:

- ACC. 200-4300 EC08
- CAT INC. ITALY
- SN: XXXXXXXXX
- YEAR: XXXX
- V: 4L
- PS: 222 BAR
- PT: 320 BAR
- TS: -40C 50C
- TEST DATE:
- CE 0948

Note: Make sure that all of the information is legible. Clean the information if you cannot read the words.

Certification

ROPS/FOPS Plate

These films are located inside the cab.

⚠ WARNING

Structural damage, an overturn, modification, alteration, or improper repair can impair this structure's protection capability thereby voiding this certification. Do not weld on or drill holes in the structure. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

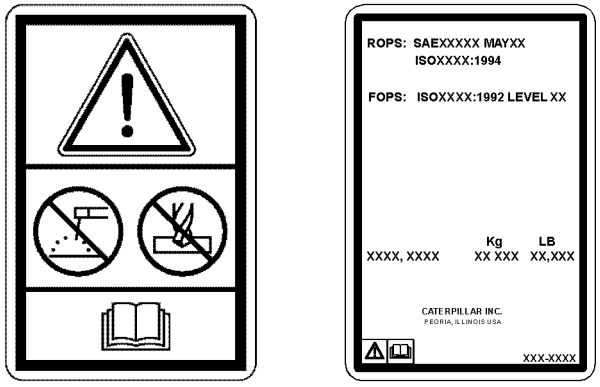


Illustration 28 g01294651

This machine has been certified to the standards that are listed on the certification plate. The maximum mass of the machine, which includes the operator and the attachments without a payload, should not exceed the mass on the certification plate.

Sound

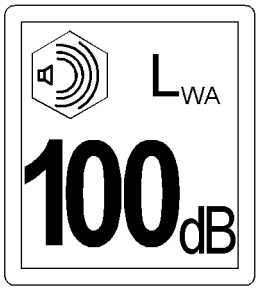


Illustration 29 g01447432

A typical example of this film is shown. Your machine may have a different value.

A certification film is used to verify the environmental sound certification on machines that are certified to the European Union requirements. The value that is listed on the film indicates the guaranteed exterior sound power level L_{WA} at the time of manufacture for the conditions that are specified in “ISO 6395:2008” and “EU 2000/14/EC”.

i04019095

Emissions Certification Film

SMCS Code: 1000; 7000

Note: This information is pertinent in the United States, in Canada and in Europe.

Consult your Cat dealer for an Emission Control Warranty Statement.

This label is located on the engine.

i03885508

Declaration of Conformity

SMCS Code: 1000; 7000

S/N: T4P1-Up

S/N: T4R1-Up

Table 5

An EC Declaration of Conformity document was provided with the machine if it was manufactured to comply with specific requirements for the European Union. In order to determine the details of the applicable Directives, review the complete EC Declaration of Conformity provided with the machine. The extract shown below from an EC Declaration of Conformity for machines that are declared compliant to “2006/42/EC” applies only to those machines originally “CE” marked by the manufacturer listed and which have not since been modified.

(continued)

(Table 5, contd)

EC DECLARATION OF CONFORMITY OF MACHINERY

Manufacturer: Caterpillar, Inc.,Peoria, Illinois, 61628, U.S.A.

Person authorized to compile the Technical File and to communicate relevant part (s) of the Technical File to the Authorities of European Union Member States on request:

Standards & Regulations Manager,Caterpillar France S.A.S 40, Avenue Leon-Blum, B.P. 55, 38041 Grenoble Cedex 9, France

I, the undersigned, _____, hereby certify that the construction equipment specified hereunder

Description:	Generic Denomination:	**Earth-moving Equipment**
	Function:	**Dumper**
	Model/Type:	**735B or 740B**
	Serial Number:	
	Commercial Name:	**Caterpillar**

Fulfils all the relevant provisions of the following Directives

Directives	Notified Body	Document No.
2006/42/EC	N/A	
2000/14/EC amended by 2005/88/EC, Note (1)		
2004/108/EC	N/A	

Note (1) Annex -_____ Guaranteed Sound Power Level -_____dB (A)
Representative Equipment Type Sound Power Level - _____dB (A)
Engine Power per ____-____ kW Rated engine speed - _____ rpm
Technical Documentation accessible through person listed above authorized to compile the Technical File

Done at: **Signature**

Date: **Name/Position**

Note: The above information was correct as of **March 2011**, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

Operation Section

Before Operation

i04027420

Mounting and Dismounting

SMCS Code: 7000

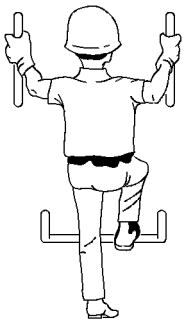


Illustration 30 g00037860

Use steps and handholds whenever you mount the machine. Use steps and handholds whenever you dismount the machine. Before you mount the machine, clean the step and the handholds. Inspect the step and handholds. Make all necessary repairs.

Face the machine whenever you mount the machine and whenever you dismount the machine. Maintain a three-point contact with the step and with handholds.

Note: Three-point contact can be two feet and one hand. Three-point contact can also be one foot and two hands.

Do not mount a moving machine. Do not dismount a moving machine. Never jump off the machine. Do not try to mount the machine when you carry tools or supplies. Do not try to dismount the machine when you are carrying tools or supplies. Use a hand line to pull equipment onto the platform. Do not use any controls as handholds when you enter the operator compartment or when you exit the operator compartment.

Machine Access System Specifications

The machine access system has been designed to meet the intent of the technical requirements in “ISO 2867 Earth-moving Machinery – Access Systems”. The access system provides for operator access to the operator station and to conduct the maintenance procedures described in Maintenance section.

i02253073

Daily Inspection

SMCS Code: 1000; 7000

For a maximum service life of the machine, complete a thorough walk-around inspection before you mount the machine and before you start the engine.

Inspect the area around the machine and under the machine. Look for loose bolts, trash buildup, oil, coolant leakage, broken parts, or worn parts.

Note: Watch closely for leaks. If you observe a leak, find the source of the leak and correct the leak. If you suspect a leak or you observe a leak, check the fluid levels more frequently.

Inspect the condition of the equipment and of the hydraulic components.

Check the condition of the tires. Adjust the inflation pressure, if necessary.

Check all of the oil levels, all of the coolant levels, and all of the fuel levels.

Remove any trash buildup and debris. Make all necessary repairs before you operate the machine.

Make sure that all covers and guards are securely attached.

Adjust the mirrors for the correct rear view of the machine.

Remove the steering frame lock and store the lock in the stowed position. The lock must be in the stowed position in order to steer the machine.

Daily, perform the procedures that are applicable to your machine:

- Operation and Maintenance Manual, “Backup Alarm - Test”
- Operation and Maintenance Manual, “Brakes, Indicators and Gauges - Test”
- Operation and Maintenance Manual, “Engine Oil Level - Check”
- Operation and Maintenance Manual, “Seat Belt - Inspect”

i04245770

Steering Frame Lock

SMCS Code: 7506

The steering frame lock must be kept in the stowed position during normal machine operation.

Do not remove the steering frame lock from the machine. The steering frame lock must be available for use at all times.

The steering frame lock must be installed before anyone enters the area around the oscillating hitch.

1. Park the machine on a level surface in the straight ahead position.
2. Engage the parking brake. Move the transmission control to the N position and shut off the engine.

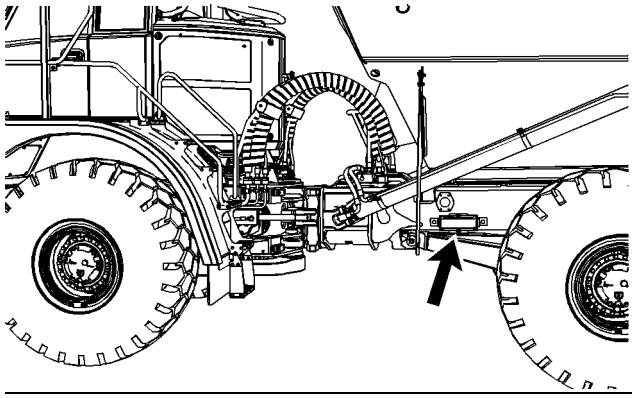


Illustration 31 g02417837

Left steering frame lock in the stowed position.

3. Remove the steering frame lock from the stowed position.

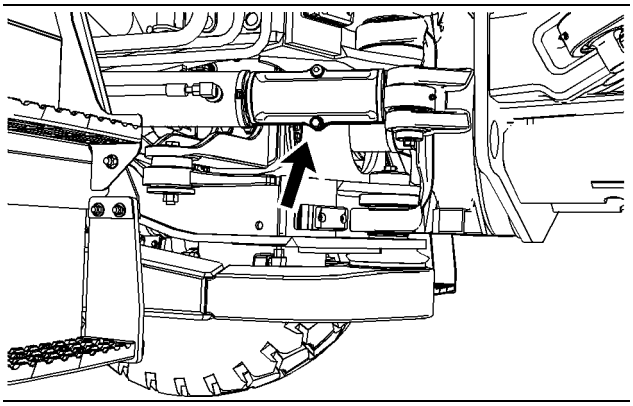


Illustration 32 g02417856

Left steering frame lock in the installed position.

4. Install the steering frame lock and the two bolts onto the steering cylinder rod on each side of the oscillating hitch.

Personnel may now enter the area around the oscillating hitch.

Each steering frame lock must be in the stowed position before you operate the machine.

1. Before you return each steering frame lock to the stowed position, check that the parking brake is engaged. Also, check that the transmission control is in the N position. Do not start the engine until each steering frame lock is the stowed position and all personnel are clear.

2. Remove the steering frame lock and the two bolts from the steering cylinder rod on each side of the oscillating hitch.

3. Inspect the steering frame lock. A damaged steering frame lock may not be capable of withstanding the steering forces that can be generated. If the steering frame lock has any of the following damage replace the steering frame lock:

   - Bent
   - Twisted
   - Permanent Deformation

4. Stow one steering frame lock on each side of the rear frame.

Machine Operation

i04256051

Alternate Exit

SMCS Code: 7308; 7310

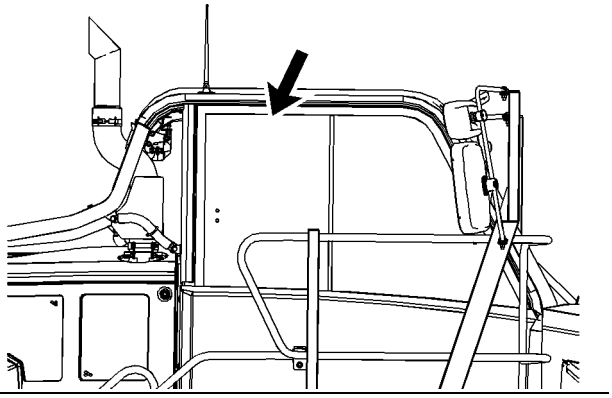


Illustration 33 g02426637

The right side rear cab window can be used as an alternate exit. The window can only be opened from the inside of the cab. To open the window, refer to Operation and Maintenance Manual, “Windows”.

Only use the alternate exit when an exit is not possible via the cab door.

i02247196

Seat

SMCS Code: 7312

Note: Adjust the seat for a different operator or at the beginning of each shift.

The operator should be seated against the seat backrest. Adjust the seat so that the operator is allowed full travel of the foot controls.

Seat Adjustment

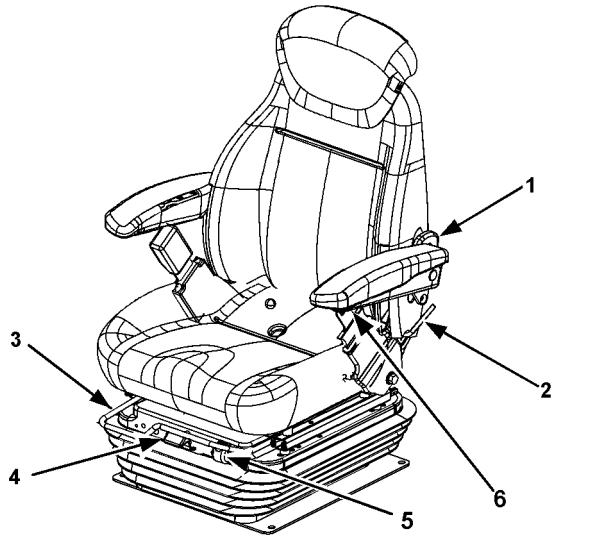


Illustration 34 g01041280

Lumbar Knob (1) – Turn knob (1) clockwise in order to increase the amount of support to the lower back. There are four settings. Reset the lumbar knob by turning the knob clockwise to the first position.

Seat Angle Lever (2) – Push lever (2) in order to release the locking mechanism for the backrest. The backrest will tilt forward. Push the backrest to the desired position. Release the lever in order to lock the backrest in position.

Fore/Aft Bar (3) – Pull up on the fore/aft bar in order to move the seat forward or backward. Release the bar in order to lock the seat into the desired position.

Seat Suspension (4) – Pull up on lever (4) in order to move the seat upward. Push down on the lever in order to move the seat downward. Release the lever in order to lock the seat in the desired position.

Note: The engine start switch must be turned to the ON position in order to increase the height of the seat.

Check indicator (5) in order to ensure that the indicator shows green. If the indicator shows red, readjust the seat suspension.

Seat Armrest Knobs (6) – Adjustment knobs (6) are used in order to adjust the angle of the armrests when the armrests are lowered. A knob is located on the bottom side of each armrest.

i04200349

Seat Belt

SMCS Code: 7327

Note: This machine was equipped with a seat belt when the machine was shipped from Caterpillar. At the time of installation, the seat belt and the instructions for installation of the seat belt meet the SAE J386 and ISO 6683 standards. Consult your Cat dealer for all replacement parts.

Always check the condition of the seat belt and the condition of the mounting hardware before you operate the machine.

Seat Belt Adjustment for Non-Retractable Seat Belts

Adjust both ends of the seat belt. The seat belt should be snug but comfortable.

Lengthening the Seat Belt

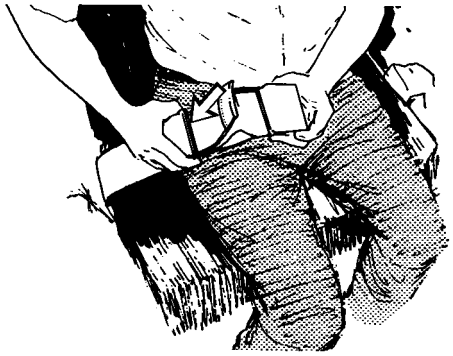


Illustration 35 g00100709

1. Unfasten the seat belt.

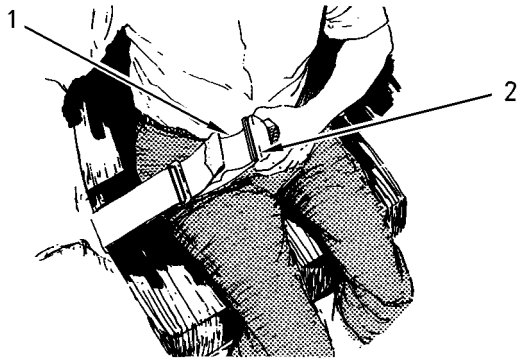


Illustration 36 g00932817

2. To remove the slack in outer loop (1), rotate buckle (2). This will free the lock bar. This permits the seat belt to move through the buckle.

3. Remove the slack from the outer belt loop by pulling on the buckle.

4. Loosen the other half of the seat belt in the same manner. If the seat belt does not fit snugly with the buckle in the center, readjust the seat belt.

Shortening the Seat Belt

Illustration 37 g00100713

1. Fasten the seat belt. Pull out on the outer belt loop in order to tighten the seat belt.

2. Adjust the other half of the seat belt in the same manner.

3. If the seat belt does not fit snugly with the buckle in the center, readjust the seat belt.

Fastening The Seat Belt

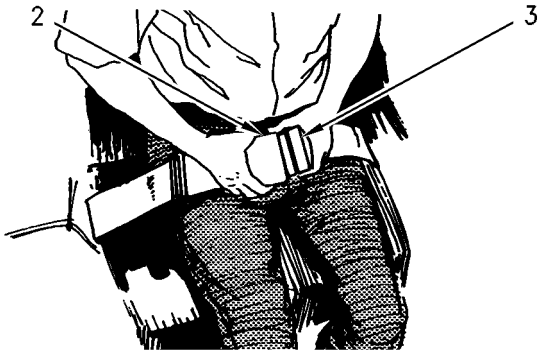


Illustration 38 g00932818

Fasten the seat belt catch (3) into the buckle (2). Make sure that the seat belt is placed low across the lap of the operator.

Releasing The Seat Belt

Illustration 39 g00100717

Pull up on the release lever. This will release the seat belt.

Seat Belt Adjustment for Retractable Seat Belts

Fastening The Seat Belt

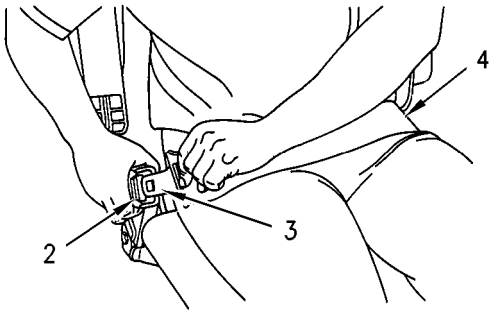


Illustration 40 g00867598

Pull seat belt (4) out of the retractor in a continuous motion.

Fasten seat belt catch (3) into buckle (2). Make sure that the seat belt is placed low across the lap of the operator.

The retractor will adjust the belt length and the retractor will lock in place. The comfort ride sleeve will allow the operator to have limited movement.

Releasing The Seat Belt

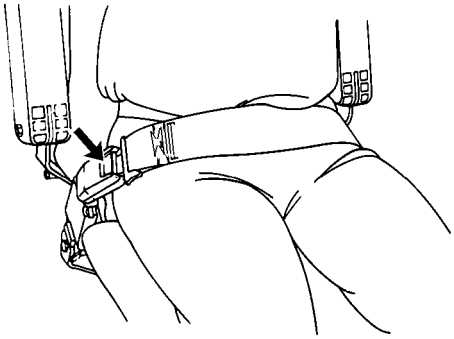


Illustration 41 g00039113

Push the release button on the buckle in order to release the seat belt. The seat belt will automatically retract into the retractor.

Extension of the Seat Belt

⚠ WARNING

When using retractable seat belts, do not use seat belt extensions, or personal injury or death can result.

The retractor system may or may not lock up depending on the length of the extension and the size of the person. If the retractor does not lock up, the seat belt will not retain the person.

Longer, non-retractable seat belts and extensions for the non-retractable seat belts are available.

Caterpillar requires only non-retractable seat belts to be used with a seat belt extension.

Consult your Cat dealer for longer seat belts and for information on extending the seat belts.

i03902712

Mirror

SMCS Code: 7319

⚠ WARNING

Adjust all mirrors as specified in the Operation and Maintenance Manual. Failure to heed this warning can lead to personal injury or death.

⚠ WARNING

Slips and falls can result in personal injury. Use the machines access systems when adjusting the mirrors. If the mirrors cannot be reached using the machine access systems follow the instructions found within the Operation and Maintenance Manual, “Mirror” in order to access the mirrors.

Note: Your machine may not be equipped with all of the mirrors that are described in this topic.

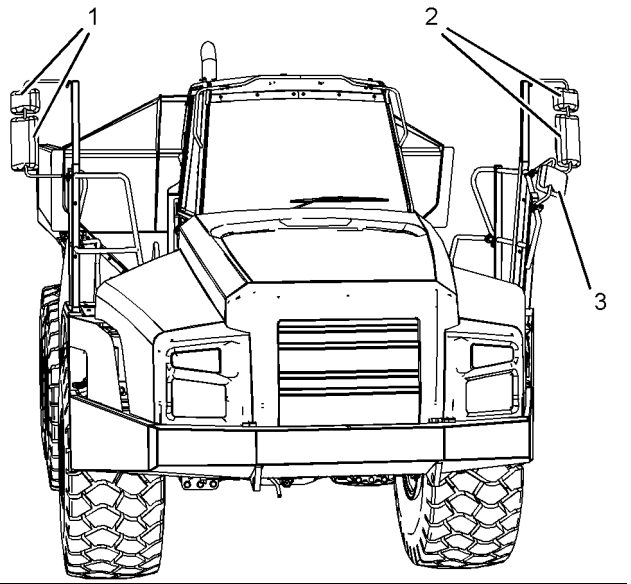


Illustration 42 g02144937

(1) Right Side Mirrors
(2) Left Side Mirrors
(3) Left Side Bottom Auxiliary Mirror

Mirrors provide additional visibility around your machine. Make sure that the mirrors are in proper working condition and that the mirrors are clean. Adjust all mirrors at the beginning of each work period and adjust the mirrors when you change operators.

Modified machines or machines that have additional equipment or attachments may influence your visibility.

Mirror Adjustment

- Park the machine on a level surface.
- Fully lower the dump body (if equipped).
- Stop the engine.

Note: You may need to use hand tools in order to adjust certain types of mirrors.

Right Side Rear View Mirrors (1)

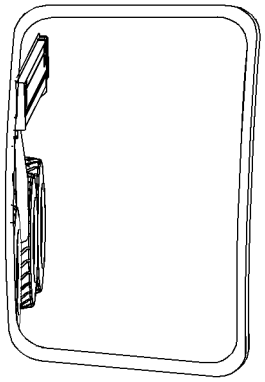


Illustration 43 g01690619

Adjust the right side rear view mirrors (1) so that an area of at least 1 m (3.3 ft) from the side of the machine can be seen. Refer to illustration 43. Also adjust the right side rear view mirrors in order to see the following:

- a point on the ground behind the machine at a maximum distance of 30 m (98 ft) from the right rear corner of the machine
- use the top auxiliary mirror in order to widen the scope of visibility to the rear of the machine

Left Side Rear View Mirrors (2)

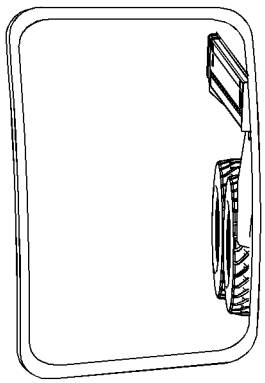


Illustration 44 g01690620

Adjust the left side rear view mirrors (2) so that an area of at least 1 m (3.3 ft) from the side of the machine can be seen. Refer to illustration 44. Also adjust the left side rear view mirrors in order to see the following:

- a point on the ground behind the machine at a maximum distance of 30 m (98 ft) from the left rear corner of the machine
- use the top auxiliary mirror in order to widen the scope of visibility to the rear of the machine

Left Side Bottom Auxiliary Mirror (3)

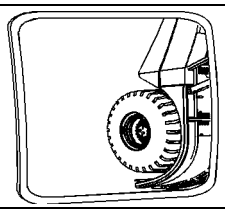


Illustration 45 g02444638

Adjust the left side bottom auxiliary mirror to see the edge of the left fender and the area to the side of the front left wheel. Refer to illustration 45

i04219650

Diesel Particulate Filter Regeneration

SMCS Code: 108F

S/N: T4P1-Up

S/N: T4R1-Up

Regeneration

Regeneration is the removal of soot from the Diesel Particulate Filter (DPF). The Caterpillar Regeneration System (CRS) is used to regenerate the DPF. The DPF traps both soot and ash. The ash is removed through a cleaning process. Refer to Operation and Maintenance Manual, “Diesel Particulate Filter - Clean/Replace” for more information on the service of the DPF.

Regeneration Indicators

Regeneration Active – This indicator will illuminate in order to show that the CRS is active. This indicator shows that elevated emission temperatures are possible. This indicator will turn off when regeneration is complete.

DPF – This indicator will illuminate in order to show that a regeneration is needed. This indicator will illuminate when the soot level reaches 90%.

Regeneration Disabled – This indicator will illuminate in order to show that a regeneration has been disabled.

Regeneration Switch

Force Regeneration – Press in the top of the switch for 2 seconds in order to begin regeneration.

Disable Regeneration – Press in the bottom of the switch for 2 seconds in order to disable regeneration.

Note: The MIDDLE position of the regeneration switch is the default position for automatic regeneration.

Note: You may return to normal operation at any point during a regeneration.

Note: To re-enable automatic regeneration, cycle the engine start switch key or press and hold down the force regeneration switch for 2 seconds. If the soot level is above 15%, regeneration will begin if the machine is at low idle and is parked.

Note: If the engine start switch key is cycled while the regeneration system is disabled through the disable regeneration switch, press and hold the disable regeneration switch for 2 seconds to reinitiate the disable regeneration.

Soot Level Monitoring

Illustration 46 g02228033

The soot level monitor indicates the level of soot that has accumulated within the DPF. The five marks on the monitor represent a percentage of soot within the DPF. The first mark indicates 0% soot level. The second mark indicates 25% soot level. The middle mark indicates 50% soot level. The fourth mark indicates 75% soot level. The last mark indicates 100% soot level. The soot level monitor can be used to optimize DPF regenerations based upon the work cycle of your machine. If machine conditions do not allow for an automatic regeneration, a manual regeneration should be performed before the soot level gauge indicates 100%.

Modes of Regeneration

Automatic: The engine ECM uses multiple inputs from the engine and the machine to determine the best time to perform an automatic regeneration. Automatic regenerations can take place throughout the operating cycle of the engine. The regeneration active indicator will be illuminated when a regeneration is being performed. Interruptions of the regeneration are acceptable. If a regeneration is in progress and needs to be stopped for any reason, it is permissible to press the disable regeneration switch or turn off the engine.

Note: Automatic adjustments of engine speed may be noticed during automatic regenerations. If a regeneration is taking place and the engine is taken to low idle, the engine speed may remain elevated in order to maintain the regeneration.

Note: If an automatic regeneration is started while the engine is at low idle and the machine is taken back to work, this may stop the regeneration. The engine ECM will continue to monitor inputs to determine the best time to restart the regeneration.

Manual: A manual regeneration is initiated by pressing the force regeneration switch. A manual regeneration is allowed when the soot level is equal to or greater than 15%. The machine must be stationary, the parking brake must be applied, and the engine must be at low idle in order to perform a manual regeneration.

Disabled: When the regeneration system is in disabled mode, automatic regenerations will not be performed.

Regeneration System Warning Indicators

Illustration 47 g02117258

Indicator will illuminate when DPF soot load is greater than 90%

Regeneration should be performed as soon as possible. Machine operation may not allow an automatic regeneration to take place. A manual regeneration should be performed as soon as possible.

Indicator will turn off once DPF regeneration has started.

Note: In some situations, the DPF indicator may stay illuminated when the soot load is below 90%. The illuminated DPF indicator indicates that a complete regeneration has **not** been performed. A complete regeneration is when the soot level is reduced to 0%. If the DPF indicator stays illuminated, perform a regeneration without interruption until the soot level is reduced to 0%. A complete regeneration will reset the DPF indicator.

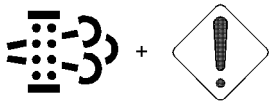


Illustration 48 g02117259

If the amount of soot collected in the DPF has reached a level that a regeneration is **required**, the DPF indicator and an action lamp will illuminate. Stop the machine and apply the parking brake. With the engine at low idle, initiate a manual regeneration. Engine power will be slightly derated if the machine continues to operate.

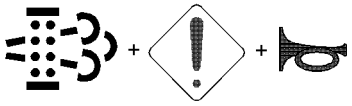


Illustration 49 g02117261

After a certain period, if no action is taken to regenerate an action alarm will activate. After 5 minutes with the action alarm active, the engine will automatically be taken to low idle.

A manual regeneration is required at this time. A complete regeneration will unlock the forced low idle speed. Cycling the engine start switch key will unlock the forced low idle speed.

Once the engine has been in the forced low idle strategy for approximately 10 minutes, regeneration will be locked out. At this time, a regeneration can only be done through Caterpillar Electronic Technician (ET), by an authorized Cat dealer.

After a certain amount of time, engine will automatically shut down. Engine can be restarted but will only run for 30 seconds before shutting down again.

Finally, if the engine is still allowed to run through multiple forced engine shutdowns, all types of regenerations are locked out. The DPF must be replaced. Consult your local Cat dealer if the DPF needs to be replaced.

Delayed Engine Shutdown (If Enabled)

The Delayed Engine Shutdown allows the engine to run for a time after the engine start switch is turned to the OFF position to cool the engine and the machine system components. The engine start switch key may be removed.

Note: There may be regulations that define the requirements for the operator and/or support personnel to be present when the engine is running.

⚠ WARNING

Leaving the machine unattended when the engine is running may result in personal injury or death. Before leaving the machine operator station, neutralize the transmission, apply the parking brake, lower work tools to the ground, and deactivate all work tools.

Refer to Operation and Maintenance Manual, “Parking” for more information.

Note: Leaving the machine unattended when the engine is running may result in property damage in the event of a malfunction.

Turn the engine start switch to the OFF position.

Delayed Engine Shutdown – The delayed engine shutdown indicator will illuminate or the following text will be displayed, **ENGINE COOLDOWN ACTIVE**.

Delayed engine shutdown will run for a minimum of 30 seconds and will continue to run until the engine and machine system components are cooled. The maximum run time is 10 minutes,

Note: To override delayed engine shutdown and stop the engine, turn the engine start switch to the STOP position. Overriding delayed engine shutdown may reduce engine and machine system component life. A warning message and/or audible alarm will be initiated and a fault code will be logged for improper engine shutdown.

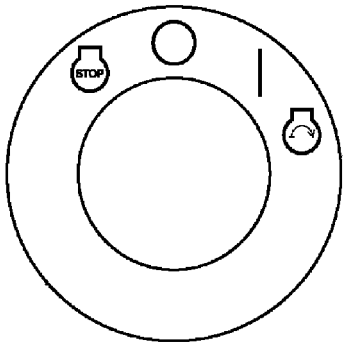


Illustration 50 g02362719

Note: At any time during a delayed engine shutdown, the engine start switch may be turned to the ON position. The machine may be placed back into service.

i03865909

Operator Controls

SMCS Code: 7300; 7451

Note: Your machine may not be equipped with all the controls or features that are described in this section.

Dash Controls, Console Controls, and Foot Controls

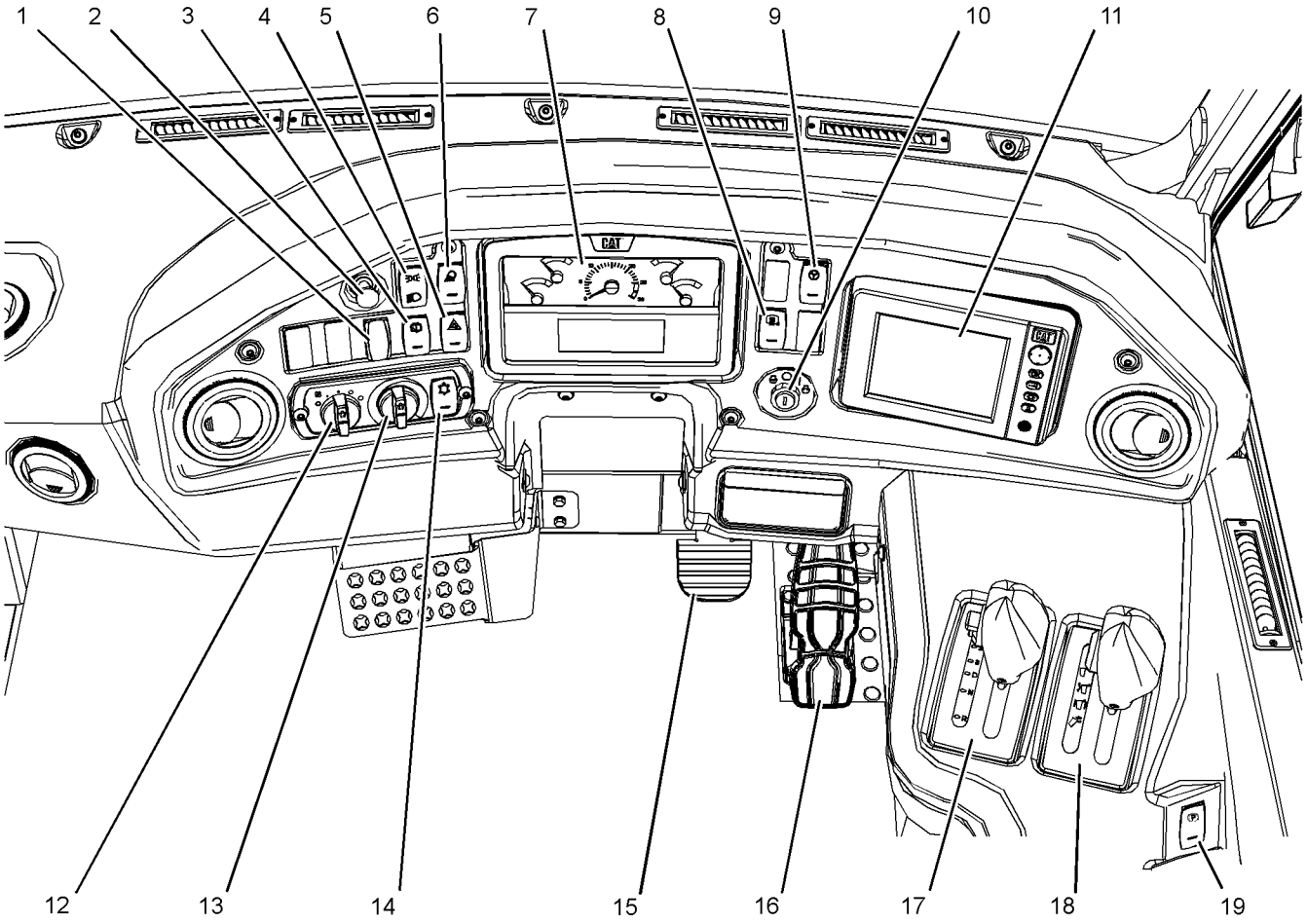


Illustration 51 g02120553

(1) Panel Dimmer switch
(2) Cigar Lighter (24V)
(3) Switch for the Rear Wiper/Washer
(4) Switch for the Headlight-Parking Light
(5) Hazard Flasher Switch
(6) Floodlight Switch
(7) Monitoring System Panel
(8) Heated Mirror Switch
(9) Secondary Steering Test Switch
(10) Engine Start Switch
(11) Color Multi Purpose Display
(12) Fan Speed Switch
(13) Temperature Variable Control
(14) Air Conditioning Switch
(15) Service Brake Control
(16) Accelerator Control
(17) Transmission Control
(18) Hoist Control
(19) Parking Brake Control

Panel Dimmer (1)

Panel Dimmer – Depress the top half of the switch and release the switch in order to increase the backlight intensity. Depress the bottom half of the switch and release the switch in order to decrease the backlight intensity.

Cigar Lighter (24 V) (2)

Cigar Lighter – Push the lighter inward and release the lighter. When the lighter is ready to use, the lighter will move outward. The lighter can also be used as a 24 volt power receptacle.

Switch for the Rear Wiper/Washer (3)

Switch for the Rear Wiper/Washer – The switch for the rear wiper/washer is a three-position switch. Move the switch to the middle position in order to activate the rear window wiper. Hold the switch in the top position in order to activate the rear window washer. Move the switch to the bottom position in order to turn off the rear window wiper.

Switch for the Headlight-Parking Light (4)

Parking Lights – Place the switch in the top position in order to activate headlights and the parking lights.

Headlights – Place the switch in the middle position in order to activate the parking lights only.

OFF – Place the switch in the bottom position in order to turn off the headlights and the parking lights.

Hazard Flasher Switch (5)

Hazard Flashers – Push the top half of the switch in order to turn on the hazard flashers. Push the bottom half of the switch in order to turn off the hazard flashers.

Floodlight Switch (6)

Floodlight – Press the top of the switch in order to activate the floodlight. Press the bottom of the switch in order to deactivate the floodlight. The floodlight illuminates the dump body.

Monitoring System Panel (7)

Monitoring System Panel – For information on the monitoring system, refer to Operation and Maintenance Manual, “Monitoring System”.

Heated Mirror Switch (8)

Heated Mirror Switch – Press the top of the switch in order to activate the heated mirrors. Press the bottom of the switch in order to deactivate the heated mirrors.

Secondary Steering Test Switch (9)

Secondary Steering Test Switch – The secondary steering test switch is used to test the secondary steering motor for correct operation. Hold the switch in the top position in order to activate the secondary steering motor. The momentary switch will automatically return to the OFF position when the switch is released.

Engine Start Switch (10)

The engine start switch is operated by a key. The engine start switch has the following four positions:

Shut Down – This position can be used only as an emergency stop to override the features that allow the engine to run after key-off. The engine will continue to run after key-off in order to allow additional shutdown features to complete a cycle. The key must be held in this momentary position for the key-off override to take effect.

OFF – To stop the engine, turn the engine start switch to the OFF position. The key can only be inserted into the engine start switch when the engine start switch is in the OFF position. The key can only be removed from the engine start switch when the engine start switch is in the OFF position.

Note: If this machine is equipped with delayed engine shutdown feature, the engine will not shut down until the cycle is completed.

If equipped with delayed engine shutdown, move the engine start switch to the OFF after machine operation in order to activate the delayed engine shutdown. This function shuts down the engine after a period of time.

Refer to Operation and Maintenance Manual, “Diesel Particulate Filter Regeneration” for more information.

ON – To activate the electrical circuits in the cab, turn the engine start switch to the ON position.

START – To start the engine, turn the engine start switch to the START position. When the engine start switch key is released, the engine start switch will return to the ON position.

Refer to Operation and Maintenance Manual, “Engine Starting” for more information.

Color Multi Purpose Display (CMPD) (11)

Color Multi Purpose Display – For information on the CMPD, refer to Operation and Maintenance Manual, “Monitoring System”.

Fan Speed Switch (12)

Fan Speed Switch – The fan speed switch controls the four-speed blower fan.

Off – Move the switch to this position in order to turn off the blower fan.

Low – Move the switch to this position for a low fan speed.

Medium – Move the switch to this position for a medium fan speed.

High – Move the switch to this position for a high fan speed.

Max – Move the switch to this position for the maximum fan speed.

Temperature Variable Control (13)

Temperature Variable Control – Adjust the control anywhere between MINIMUM position (left) and MAXIMUM position (right). This will control the amount of heating and the amount of cooling.

Air Conditioning Switch (14)

Air Conditioning Switch – Press the top of the switch in order to activate the air conditioning system. Press the bottom of the switch in order to deactivate the air conditioning system.

Service Brake Control (15)

Service Brake Control

For information on the service brake control, refer to Operation and Maintenance Manual, “Service Brake Control”.

Accelerator Control (16)

Accelerator Control – The accelerator pedal controls the fuel flow to the engine. As the accelerator pedal is depressed, the engine rpm will increase. When the transmission is engaged in a forward or reverse gear, the travel speed will increase as the engine rpm increases.

Transmission Control (17)

Transmission Control

For information on the transmission control, refer to Operation and Maintenance Manual, “Transmission Control”.

Hoist Control (18)

Hoist Control

For information on the hoist control, refer to Operation and Maintenance Manual, “Hoist Control” .

Parking Brake Control (19)

Parking Brake Control

For information on the parking brake control, refer to Operation and Maintenance Manual, “Parking Brake Control”.

Steering Column Controls

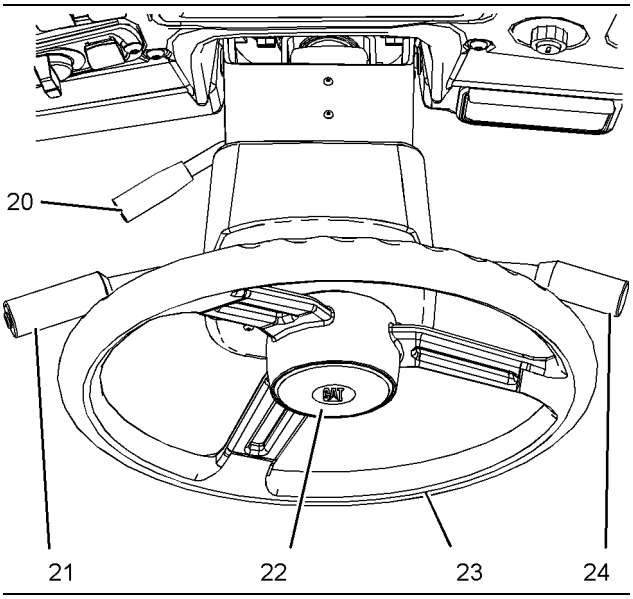


Illustration 52 g02127313

(20) Steering Wheel Tilt and Steering Column Telescope Control
(21) Multifunction Switch
(22) Horn Button
(23) Steering Wheel Control
(24) Engine Compression Brake Control

Steering Wheel Tilt and Steering Column Telescope Control (20)

Tilt Control – Pull the lever upward in order to release the steering wheel from the locked position. Adjust the tilt position of the steering wheel while the lever remains held upward. Release the lever in order to lock the steering wheel in the desired position.

Telescope Control – Push the lever downward in order to release the steering column from the locked position. Adjust the telescopic position of the steering column while the lever remains held downward. Release the lever in order to lock the steering column in the desired position.

Multifunction Switch (21)

The multifunction switch controls the window wipers, the window washer, the brightness of the headlights, and the turn signals.

Dimmer Switch

Dimmer Switch – Push the dimmer switch away from the steering wheel in order to change the headlight beams from low beam to high beam. Also, pull the dimmer switch toward the steering wheel in order to change the headlight beams from high beam to low beam.

Directional Turn Signal Control

Turn Signal Left – Move the lever downward in order to activate the left turn signal. When the left turn signal is activated, an indicator will illuminate on the dash panel. The turn signal will remain on until the lever is manually returned to the Middle position.

Turn Signal Right – Move the lever upward in order to activate the right turn signal. When the right turn signal is activated, an indicator will illuminate on the dash panel. The turn signal will remain on until the lever is manually returned to the Middle position.

Window Wiper/Washer Switch

Front Window Wiper Switch – The wiper control knob has six positions. Select each position by twisting the knob clockwise and by twisting the knob counterclockwise.

OFF Position

Intermittent Operation with Long Delay – The front window wiper will operate intermittently and the delay will be long.

Intermittent Operation with Medium Delay – The front window wiper will operate intermittently and the delay will be medium.

Intermittent Operation with Short Delay – The front window wiper will operate intermittently and the delay will be short.

Continuous Operation at Low Speed – The front window wiper will operate continuously at slow speed.

Continuous Operation at High Speed – The front window wiper will operate continuously at high speed.

Front Window Washer – Press the button in order to activate the front window washer pump.

Horn Button (22)

Horn Button – Depress the large button in the center of the steering wheel in order to sound the horn.

Steering Wheel Control (23)

Steering Wheel Control – This machine is equipped with a closed centered, hydraulic steering system. There is no mechanical connection between the steering wheel and steering cylinders that move the front wheels. Under normal conditions, when the engine is running, movement of the steering wheel will turn the front wheels. When the steering wheel is turned clockwise, the front wheels will turn to the right. When the steering wheel is turned counterclockwise, the front wheels will turn to the left. When the steering wheel is released, the front wheels will remain in the selected position.

Secondary Steering System

⚠ WARNING

Personal injury or death can occur if steering is lost completely during operation.

Do not continue to operate the machine using the secondary steering.

If the secondary steering activates during operation, immediately park the machine in a safe location. Inspect the machine and correct the condition which made the use of the secondary steering necessary.

Secondary Steering System – This machine is equipped with a secondary steering system. If a failure of the primary steering system occurs, a category 3 warning will be issued and the primary steering indicator will be illuminated. The secondary steering system will activate automatically and the secondary steering system will provide steering for a limited amount of time. The secondary steering indicator will illuminate when the secondary steering is active. The secondary steering system uses an electric driven steering pump to allow steering of the machine. The secondary steering system will provide steering for a minimum of 1 minute when a typical single component failure occurs. The secondary steering system operates when the machine is stationary or when the machine is traveling in forward or reverse direction.

Engine Compression Brake Control (24)

Engine Compression Brake Control – For information on the compression brake control, refer to Operation and Maintenance Manual, “Engine Compression Brake Control”.

Overhead Controls

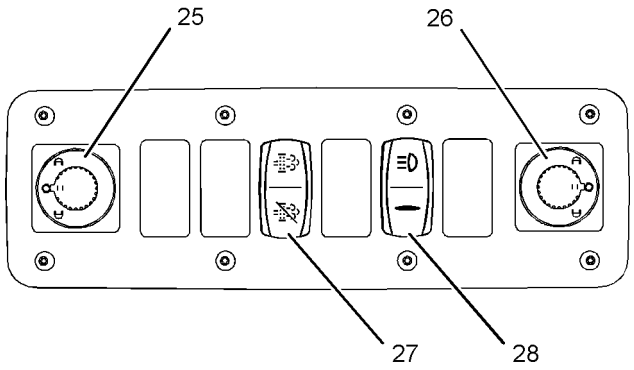


Illustration 53 g02129899

(25) Mirror Control (Left)
(26) Mirror Control (Right)
(27) Regeneration Switch
(28) High Intensity Discharge (HID) Light Switch

Mirror Control (Left) (25) and Mirror Control (Right) (26) (If Equipped)

Mirror Controls – Turn the knob to the upper position in order to enable the adjustment of the convex corner mirror. Turn the knob to the lower position in order to enable the adjustment of the main rear view mirror. Turn the knob to the middle position in order to disable the mirror control. When the mirror control is enabled, depress the knob in the desired direction of view for the mirror.

Regeneration Switch (27) (S/N T4P and T4R Only))

Force Regeneration – Press the top of the switch for 2 seconds in order to begin regeneration.

Disable Regeneration – Press the bottom of the switch for 2 seconds in order to disable regeneration.

Note: The MIDDLE position of the regeneration switch is the default position for automatic regeneration.

For information on regeneration, refer to Operation and Maintenance Manual, “Diesel Particulate Filter Regeneration”.

Auxiliary Lights (28) (If Equipped)

Auxiliary Lights (If Equipped) – Press the top of the switch in order to activate the lights mounted on the top of the cab. Press the bottom of the switch in order to deactivate the lights mounted on the top of the cab.

Other Controls

Heated Seat Switch (29) (If Equipped)

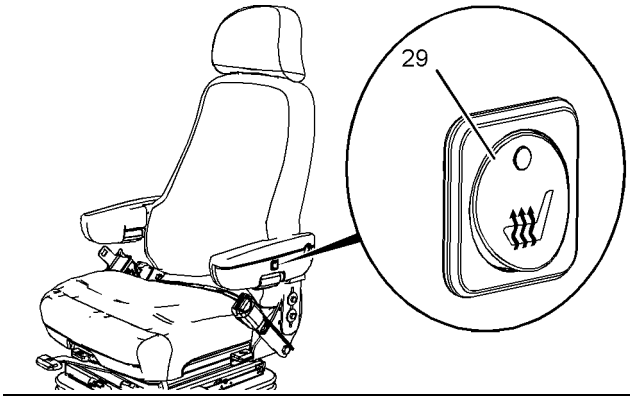


Illustration 54 g02129021

(29) Heated Seat Switch

Heated Seat Switch – Press the top of the switch in order to activate the heated operator seat. An indicator light on the switch will illuminate when the heated seat switch is on. Press the bottom of the switch in order to deactivate the heated seat.

Hood Tilt Control (30)

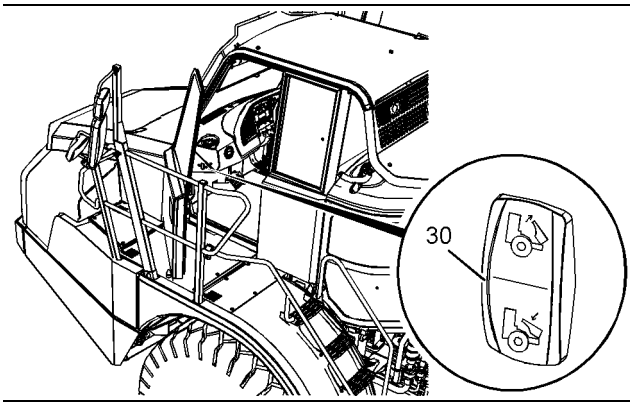


Illustration 55 g02127554

(30) Hood Tilt Control

Hood Tilt Control – For information on the hood tilt control, refer to Operation and Maintenance Manual, “Hood Tilt Control”.

Camera System

The camera system is a closed circuit video monitoring system. The camera system consists of an LCD display and a camera. The display for the camera is integrated into the Color Multi Purpose Display. The camera is mounted on the frame at the rear of the machine.

Power is supplied to the camera system when the engine start switch is turned to the ON position.

The camera lens and the display screen will require periodic cleaning. Cleaning instructions for the camera lens and the display are described in the Maintenance section.

Camera

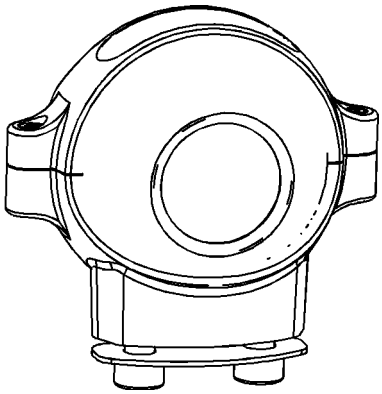


Illustration 56 g01223051

WAVS camera

The orientation of the camera is set during installation. The rear camera is set to provide a reverse image that is similar to a mirror view.

After installation, there should be no need to make any physical adjustments to any of the cameras under normal operating conditions. The camera system uses a fixed-focused camera that has been installed at the factory, a Cat dealer, or a qualified technician.

Display

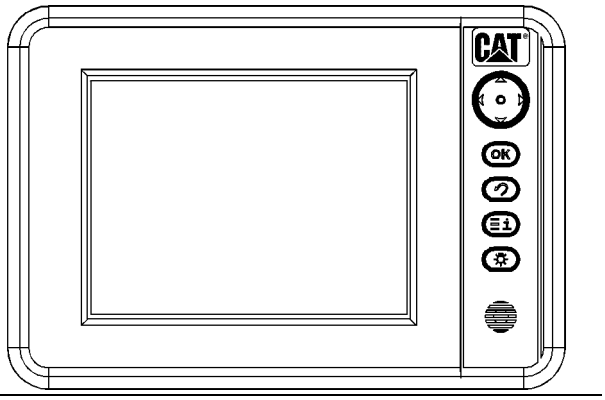


Illustration 57 g02127574

CMPD Display

The view from the camera is displayed on the CPMD display. The screen will automatically display the rear camera when reverse is selected on the transmission control. The camera view can also be selected at any time through the display menu. Refer to Operation and Maintenance Manual, “Monitoring System” for more information on the display screen and the display menu.

i03886779

Battery Disconnect Switch

SMCS Code: 1411

NOTICE

Never move the battery disconnect switch to the OFF position while the engine is operating. Serious damage to the electrical system could result.

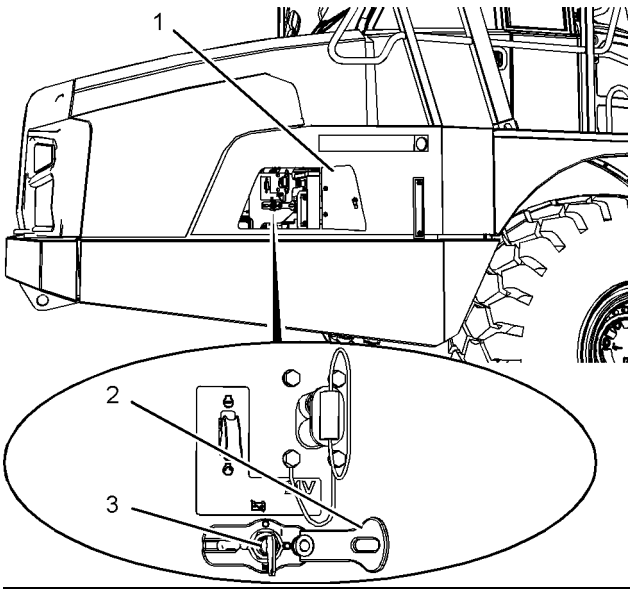


Illustration 58 g02132059

The battery disconnect switch is located on the front left side of the tractor behind access cover (1).

Open the access cover. Remove the lock and open latch (2) in order to insert the key into switch (3).

Battery Disconnect Switch – The battery disconnect switch can be used in order to disconnect the battery from the machine electrical system. The key must be inserted into the battery disconnect switch before the battery disconnect switch can be turned.

OFF – To disconnect the electrical system, turn the battery disconnect switch counterclockwise to the OFF position.

ON – To activate the electrical system, turn the battery disconnect switch clockwise to the ON position. The battery disconnect switch must be turned to the ON position before you can start the engine.

If you remove the key from the battery disconnect switch, the latch can be locked over the switch in order to prevent the insertion of a key into the switch.

After you turn the battery disconnect switch ON or after you turn the battery disconnect switch OFF, close the access cover.

Note: The battery disconnect switch does not deplete the brake oil pressure from the brake accumulators. When the engine start switch is moved to the OFF position, solenoid valves will fully deplete the brake oil pressure from both brake accumulators.

Verify that the engine is fully operational before cranking the engine in order to ensure that no damage will occur to the engine. Do not crank an engine that is not fully operational.

Perform the following procedure in order to check the functionality of the battery disconnect switch:

1. With the battery disconnect switch in the ON position, verify that electrical components in the operator compartment are functioning. Verify that the hour meter is displaying information. Verify that the engine will crank.

2. Turn the battery disconnect switch to the OFF position.

3. Verify that the following items are not functioning: the electrical components in the operator station, the hour meter, and the engine starter. If any of the items continue to function with the battery disconnect switch in the OFF position, contact your Cat dealer.

i03887289

Engine Shutdown Control

SMCS Code: 1265; 7418

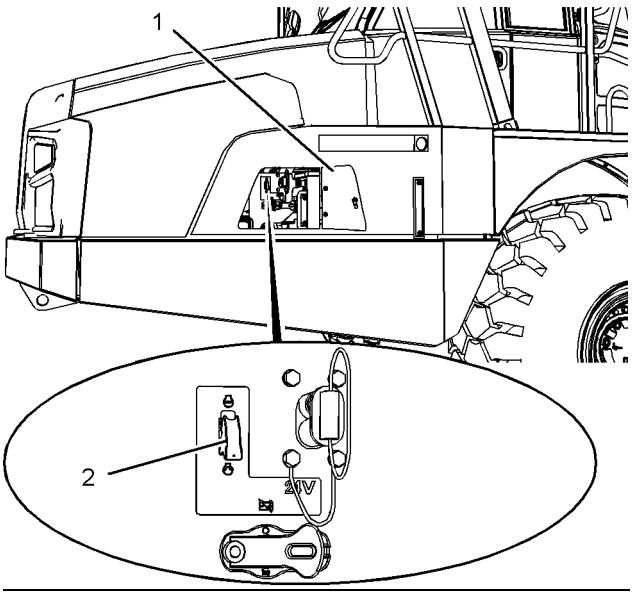


Illustration 59 g02132154

The engine shutdown control is located on the front left side of the tractor behind access cover (1).

Engine Shutdown Control – Use the engine shutdown control to stop the engine from the ground level. In order to use the engine shutdown control, raise guard (2). Move the toggle switch up to the STOP position. This will stop the engine. After the engine stops, lower the guard. Lowering the guard will turn the toggle switch to the RUN position.

During normal operation, use the engine start switch to stop the engine.

The engine shutdown control does not deactivate the machine electrical system. When the engine shutdown control is in the STOP position, the engine starter is still enabled.

Note: The engine shutdown control does not deplete the brake oil pressure from the brake accumulators. When the engine start switch is moved to the OFF position, solenoid valves will fully deplete the brake oil pressure from both brake accumulators.

i03924870

Monitoring System

SMCS Code: 7451; 7490

The monitoring system is designed to alert the operator to an immediate problem with any of the machine systems that are monitored. The Monitoring System is also designed to alert the operator to an impending problem with any of the machine systems that are monitored.

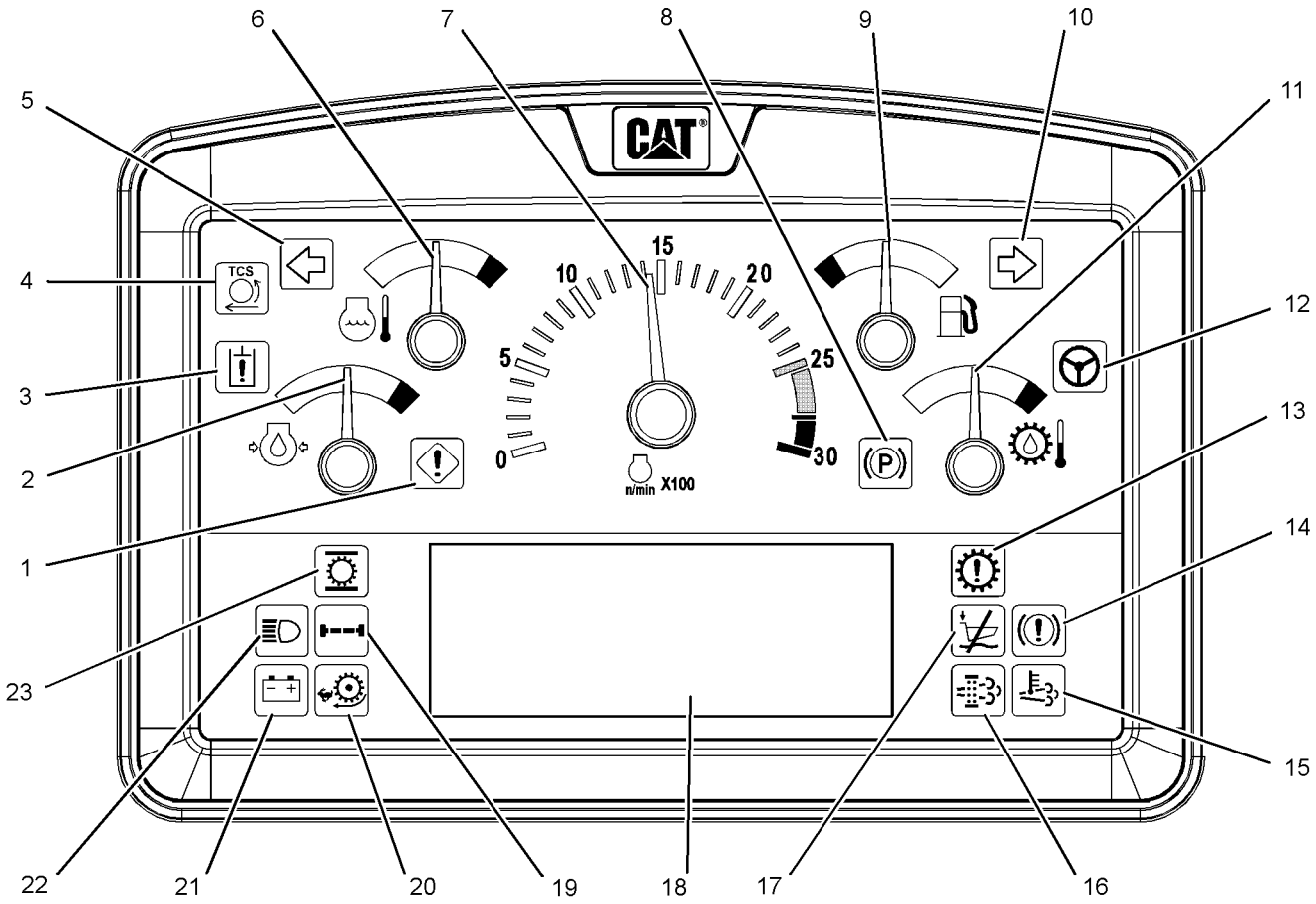


Illustration 60

g02152529

Action Light (1) – This indicator illuminates in order to alert the operator that there is a malfunction in a machine system.

Engine Oil Pressure (2) – When the engine oil pressure gauge is in the red zone, the engine oil pressure is low. Also, the action light will flash and the action alarm will sound. Stop the machine immediately. Do not operate the machine until the engine oil pressure is normal.

Hydraulic System (3) – This indicator illuminates in order to alert the operator that the hydraulic system has a general fault. A category 2S warning requires an immediate change of the machine operation. A category 3 warning alerts the operator to stop the machine immediately. Stop the engine and investigate the cause.

Traction Control System (TCS) (4) – This indicator illuminates in order to alert the operator that the Traction Control System is active. Wheel slippage will cause the TCS to activate.

Left Turn Signal (5) – Left turn signal light indicator.

Coolant Temperature (6) – When the coolant temperature gauge is in the red zone, the coolant temperature is high. The action light will flash when the coolant temperature exceeds 107 °C (225 °F). Stop the machine at a convenient location and investigate the cause.

Tachometer (7) – The tachometer will indicate the engine rpm.

Parking Brake (8) – For Warning Category 1, this indicator illuminates in order to alert the operator that the parking brake is engaged. For Warning Category 2S, this indicator illuminates in order to alert the operator that the parking brake is engaged while you are operating the machine. An immediate change of the machine operation is required.

Fuel Level (9) – When the fuel level gauge is in the red zone, the fuel level is 10% of the tank capacity.

Right Turn Signal (10) – Right turn signal light indicator.

Transmission Oil Temperature (11) – When the transmission oil temperature gauge is in the red zone, the transmission oil temperature is high. The action light will flash when the transmission oil temperature exceeds 124 °C (255 °F). Stop the machine at a convenient location and investigate the cause.

Primary Steering System (12) – This indicator illuminates in order to alert the operator that the primary steering system pressure is low. Stop the machine immediately. Stop the engine and investigate the cause. Do not operate the machine until the primary steering system pressure is normal.

Transmission (13) – This indicator illuminates in order to alert the operator of a condition in the transmission. A category 2S warning alerts the operator of an overheating condition in the output transfer gear. An immediate change of the machine operation is required. A category 3 warning alerts the operator of a general fault in the transmission. Stop the machine immediately. Stop the engine and investigate the cause.

Brake System (14) – This indicator illuminates in order to alert the operator that the brake system has a general fault. A category 2S warning requires an immediate change of the machine operation. A category 3 warning alerts the operator to stop the machine immediately. Stop the engine and investigate the cause.

Regeneration Active (15) (S/N T4P and T4R Only) – This indicator illuminates in order to show that the regeneration function is engaged. This indicator will remain illuminated until the diesel particulate filter (DPF) temperature is less than 400° C (752° F) or the machine returns to operation. Refer to Operation and Maintenance Manual, “Diesel Particulate Filter Regeneration” for further information.

Regeneration Needed (16) (S/N T4P and T4R Only) – This indicator illuminates in order to show that regeneration is needed. Refer to Operation and Maintenance Manual, “Diesel Particulate Filter Regeneration” for further information.

Hoist Control (17) – This indicator illuminates in order to alert the operator that the hoist control is not in the FLOAT position and/or the body is not fully down for machines that are installed with a sensor in order to monitor the position of the body.

LCD display (18) – The LCD display is used to display the following information:

- Alert indicator
- Selected gear and direction
- Speed or Auto shift
- Review Operation and Maintenance Manual
- Primary steering failure
- Seat belt warning

- Secondary steering failure
- DPF regeneration filter (S/N T4P and T4R Only)
- MSS machine lock-out
- Secondary steering energy source engaged
- Soot gauge
- Hour meter
- Auto retarder active

Filter Warning (19) – This indicator illuminates in order to alert the operator that a filter requires service. A category 1 warning alerts the operator that the air filter is restricted and/or the fuel filter has been restricted for at least 1 hour. The air filter and/or the fuel filter requires immediate service. A category 2 warning alerts the operator that the air filter is plugged and/or restriction of the fuel filter has continued for more than 4 hours. The air filter must be serviced in order to avoid black smoke and loss of engine power. The fuel filter must be serviced in order to avoid loss of engine power. A category 3 warning alerts the operator that either the transmission filter or the OTG filter is plugged. The plugged filter requires immediate service.

Refer to the following table for a breakdown of the categories of warnings and the reasons for generating the warnings that are indicated by the filter warning:

Table 6

Category	Possible Causes
1	The air filter is restricted. The fuel filter has been restricted for at least 1 hour.
2	The air filter is plugged. The fuel filter has been restricted for more than 4 hours.
3	The transmission filter is plugged. The OTG filter is plugged.

Note: Because a variety of different filters can cause a category 1 warning, a category 2 warning and a category 3 warning, it is important to use ET, or the messenger display (If equipped), in order to check the cause of the warning.

Engine Overspeed (20) – This indicator illuminates in order to alert the operator that the machine is increasing speed. The transmission is within 250 rpm of making an upshift. The retardation effect of the retarder will be temporarily lost because the retarder disengages during a gearshift. When the upshift is complete, the retarder will engage again but the retarder will be less effective due to the higher gear that is being engaged. Prevent the upshift by using the service brakes to slow the machine.

Charging System (21) – For Warning Category 1, this indicator illuminates in order to alert the operator that the charging system is operating higher than normal or lower than normal. For Warning Category 3, this indicator illuminates in order to alert the operator that there is a problem with the charging circuit that may cause damage to the machine. Stop the machine immediately and investigate the cause of the problem. Do not operate the machine until the problem has been corrected.

High Beam (22) – This indicator illuminates in order to alert the operator that the high beam headlights are on.

Transmission Hold (23) – This indicator illuminates in order to alert the operator that the transmission hold is selected.

Color Multi Purpose Display

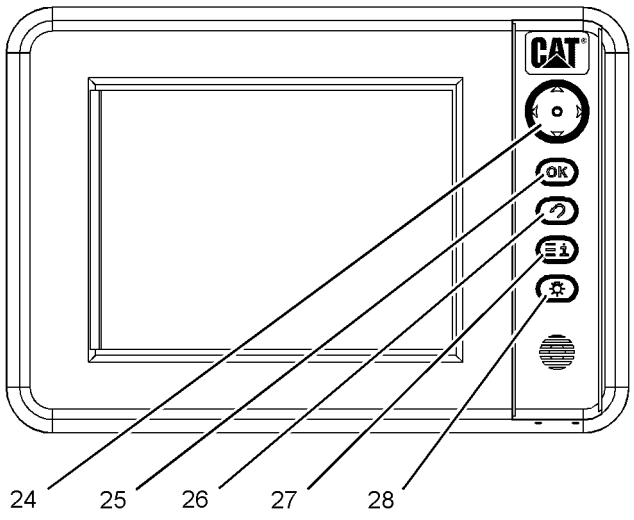


Illustration 61 g02152635

Navigation Button (24)

Up

The up navigation button can be used for the following functions:

- Navigating a menu list in the upward direction
- Scrolling a highlighted letter in a letter entry screen up
- Scrolling a highlighted number in a number entry screen up
- Navigating to the previous performance page

Right

The right navigation button can be used for the following functions:

- Navigating to the next quadrant within a performance page
- Highlighting the next letter in an entry screen
- Highlighting the next number in an entry screen
- Increase a value that is represented by a bar
- Scrolling through popups when more than one popup is active

Down

The down navigation button can be used for the following functions:

- Navigating a list in the downward direction
- Scrolling a highlighted letter in an entry screen
- Scrolling a highlighted number in an entry screen

Left

The left navigation button can be used for the following functions:

- Navigating to the previous quadrant within a performance page
- Highlighting the previous letter in an entry screen
- Highlighting the previous number in an entry screen
- Decrease a value that is represented by a bar

OK Button (25)

The OK button can be used for the following functions:

- Selecting the highlighted entry in a list
- Opening the configuration screen for a highlighted performance page quadrant
- Selecting a highlighted item
- Confirming an action when a popup is visible
- Snooze a warning or information popup

Back Button (26)

The back button can be used for the following functions:

- Navigating to the previous screen
- Cancel an action when a popup is visible

Menu Button (27)

The menu button can be used for the following functions:

- Navigate to main menu screen from anywhere in the menu structure
- If the Main Menu is visible, the menu button will return to performance pages

Brightness Button (28)

The brightness button can be used for the following functions:

- Press and Release: Displays brightness popup (if not already visible)
- Press and Release: When popup is visible, the brightness button will increase or decrease the brightness level
- If the brightness button is pressed and held for 3 seconds, the display will toggle between day mode and night mode

CMPD Menu Structure

Table 7

Basic Menu Structure			
Select Operator	Name		
Performance Pages	Configurable	ARD Regeneration Mode ARD Regeneration Status Hydraulic Oil Temp Steering Fluid Temp Engine Coolant Temp Fuel Level Battery Voltage Retarder Mode Requested Top Drive Gear Engine Speed	
	Non-Configurable	Machine Grade Torque Conv Temp Hours of Fuel Remaining Operator Total Load Count	
Settings	Display	Language Units Day Backlight Night Backlight Performance Page Layout (1, 2, and 3)	
	Machine	Top Gear Select Traction Control	
	Autolube	Status	
		Active Duty Mode	Light Medium Heavy
Totals	Cycle Data Operator Totals Jobsite Totals Lifetime Totals		
Service	Diagnostics System Info		
Machine Status	Engine Transmission Chassis()Traction Control Hoist Brake Shift Filter Fan		
Operator	Select Edit Create Delete		
Rear Camera			

Popups

The OK button clears all popups except Level 3 warnings.

Confirmation

The confirmation popup will allow the operator to confirm or cancel the selection.

Brightness

When the user presses the brightness button, the button release will trigger the brightness popup. While this popup is shown, pressing the brightness button decrease the brightness level. Pressing the left or right buttons while this popup is shown will cause the brightness level to decrease or increase accordingly. If the brightness level is decreased when the brightness level is zero, the level will wrap around to 100%. If the brightness level is increased when the brightness level is 100%, the level will wrap around to zero.

Info Popups

Info popups will provide non-safety critical messages to the operator. These messages will have a high level of configurability, allowing each popup to be individually customized to provide required information.

Warning Popups

Level 2

A level 2 warning will supersede any active information popups. These warnings may be snoozed for a period of time, after which it will reappear if the event generating the warning is still active. An arrow will indicate when multiple warnings are active. Pressing the right and left keys will allow the operator to scroll through all active warning screens. If the user has not pressed the left or right key for 3 seconds, the display will automatically page through active level 2 warnings when there are no level 3 warnings active.

Level 3

Level 3 Warnings are of the highest priority. A level 3 warning will always supersede an active level 2 warning. These warnings may not be snoozed. An arrow will indicate when multiple warnings are active. Pressing the right and left keys will allow the operator to scroll through all active warning screens. If the user has not pressed the left or right key for 3 seconds, the display will automatically page through active level 3 warnings only. Every 10 seconds the display will return to the most recent level 3 warning.

Functional Test

To ensure the proper operation of the monitoring system, check the system daily.

The battery disconnect switch must be in the ON position.

When you turn the engine start switch key from the OFF position to the ON position, the Caterpillar monitoring system will perform an automatic self-diagnostic test.

The self-diagnostic test verifies that the outputs (gauges, alert indicators, and alarms) are operating correctly.

When you turn the engine start switch key to the ON position, the following systems are tested for approximately one second: Alert indicators, Gauges, and LCD displays

The gauges must go to the far right positions. All alert indicators must come on momentarily. All segments of the LCD displays must come on momentarily. The action alarm must sound.

Warning Categories

The Monitoring System provides four warning categories. The first warning category requires only operator awareness. The second warning category requires a change to machine operation or performance of maintenance to the system. The third warning category requires an immediate change of the machine operation. The fourth category requires the operator to immediately stop the machine. The fourth category also requires the operator to immediately shut down the engine.

Warning Category 1

In this category, the following conditions will occur:

- An alert indicator will illuminate or a gauge will indicate in the red zone.

The alert indicator that illuminates or the gauge that indicates in the red zone identifies the machine system that needs attention. Warning category 1 requires operator awareness. The indicators that illuminate with a green or amber color indicate warning category 1.

The following systems have indications in Warning Category 1:

- Filter Warning (Restricted Air Filter)
- Parking Brake
- Charging System
- Retarder
- Hoist Control
- Transmission Hold

- Fuel

Warning Category 2

In this category, one of the following conditions will occur:

- An alert indicator will illuminate or a gauge will indicate in the red zone.
- The action light will flash.

A change in machine operation or maintenance is required in order to eliminate the problem.

The following systems have indications in Warning Category 2:

- Filter Warning (Plugged Air Filter)
- Secondary Steering
- Drive Train Overspeed
- Coolant Temperature
- Transmission Oil Temperature

Warning Category 2S

In this category, one of the following conditions will occur:

- An alert indicator will illuminate.
- The action light will flash.
- A steady action alarm will sound.

An immediate change of the machine operation is required.

The following systems have Warning Category 2S indications:

- Brake Oil Temperature
- Transmission Fault
- Parking Brake
- Engine Overspeed

Warning Category 3

n this category, one of the following conditions will occur:

- An alert indicator will illuminate.
- The action light will flash.
- A steady action alarm will sound.

Immediate shutdown of the machine is required in order to prevent damage.

The following systems have indications in Warning Category 3:

- Filter Warning (Plugged Transmission Filter)
- Primary Steering System
- Brake Oil Pressure
- Transmission Fault
- Charging System
- Engine Oil Pressure

i04246950

Product Link (If Equipped)

SMCS Code: 7606

The Product Link 121SR system utilizes satellite technology to communicate machine information. The Product Link 522/523 is a cellular based communication device that transmits machine information. This information is communicated to Caterpillar, Cat dealers, and Caterpillar customers. Both Product Link systems contain Global Positioning System (GPS) satellite receivers.

The capability of two-way communication between the machine and a remote user is available with the Product Link 121SR and 522/523 system. The remote user can be a dealer or a customer. At any time, a user can request updated information from a machine such as hours of use or the location of the machine. Also, the system parameters for Product Link 121SR system and the Product Link 522/523 system can be changed.

Data Broadcasts

Data concerning this machine, the condition of the machine, and the operation of the machine is being transmitted by Product Link to Caterpillar and/or Cat dealers. The data is used to serve the customer better and to improve upon Caterpillar products and services. The information transmitted may include: machine serial number, machine location, and operational data, including but not limited to: fault codes, emissions data, fuel usage, service meter hours, software and hardware version numbers, and installed attachments.

Caterpillar and/or Cat dealers may use this information for various purposes. Refer to the following list for possible uses:

- Providing services to the customer and/or the machine
- Checking or maintaining Product link equipment
- Monitoring the health of the machine or performance
- Helping maintain the machine and/or improve the efficiency of the machine
- Evaluating or improving Caterpillar products and services
- Complying with legal requirements and valid court orders
- Performing market research
- Offering the customer new products and services

Caterpillar may share some or all of the collected information with Caterpillar affiliated companies, dealers, and authorized representatives. Caterpillar will not sell or rent collected information to any other third party and will exercise reasonable efforts to keep the information secure. Caterpillar recognizes and respects customer privacy. For more information, please contact your local Cat dealer.

Operation in a Blast Site

If the machine is required to work within 12 m (40 ft) of a blast site, then Product Link 121SR system or the Product Link 522/523 system should be disabled in compliance with applicable legal requirements. One of the following are suggested methods in order to disable the Product Link 121SR system or the Product Link 522/523 system: (a) Install a Product Link disconnect switch in the machine cab that will allow the Product Link 121SR system or the Product Link 522/523 system module to be shut off. Refer to Special Instruction, REHS2365, “An Installation Guide for the Product Link PL121SR and for the PL300” and Special Instruction, REHS2368, “Installation Procedure For Product Link PL522/523 (Cellular)” for more details and installation instructions. Or, (b) Disconnect the Product Link 121SR system or the Product Link 522/523 module from the main power source by disconnecting the wiring harness at the Product Link module.

The following Product Link 121SR system and the Product Link 522/523 system specifications are provided in order to aid in conducting any related hazard assessment and to ensure compliance with all local regulations:

- The transmit power rating for the Product Link 121SR transmitter is 5 to 10 W.
- The operating frequency range for the Product Link 121SR system is 148 to 150 MHz
- The transmit power rating for the Product Link 522/523 transmitter is approximately 1 W.
- The operating frequency range for the Product Link 522/523 system is 824 to 849 MHz, 880 to 915 MHz, 1710 to 1785 MHz, and 1850 to 1910 MHz.

Consult your Cat dealer if there are any questions.

Information for the initial installation of the Product Link 121SR system is available in Special Instruction, REHS2365, “An Installation Guide for the Product Link PL121SR and for the PL300”. Information for the initial installation of the Product Link 522/523 system is available in Special Instruction, REHS2368, “Installation Procedure For Product Link PL522/523 (Cellular)”.

Operation, configuration, and troubleshooting information for the Product Link 121SR system can be found in the Systems Operation, Troubleshooting, Testing and Adjusting, RENR7911, “Product Link 121/321”.

Operation, configuration, and troubleshooting information for the Product Link 522/523 system can be found in the Systems Operation, Troubleshooting, Testing and Adjusting, RENR8143, “Product Link - PL522/523”.

Regulatory Compliance

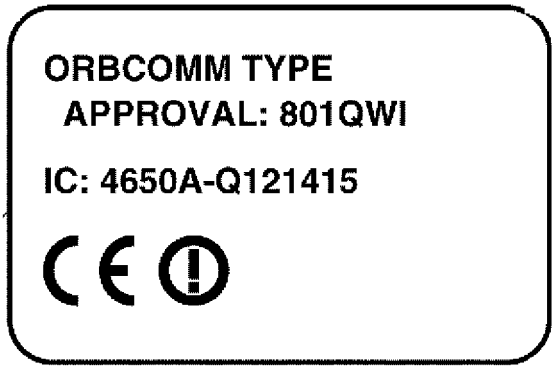


Illustration 62 g01131982

NOTICE

Transmission of information using Product Link is subject to legal requirements that may vary from location to location, including, but not limited to, radio frequency use authorization. The use of Product Link must be limited to those locations where all legal requirements for the use of the Product Link communication network have been satisfied.

In the event that a machine outfitted with Product Link is located in or relocated to a location where (i) legal requirements are not satisfied or (ii) transmitting or processing of such information across multiple locations would not be legal, Caterpillar disclaims any liability related to such failure to comply and Caterpillar may discontinue the transmission of information from that machine.

Consult your Cat dealer with any questions that concern the operation of the Product Link in a specific country.

EC DECLARATION OF CONFORMITY OF MACHINERY

Manufacturer: CATERPILLAR INC., 100 N.E. ADAMS STREET, PEORIA, IL 61626, U.S.A.

Person authorised to compile the Technical File and to communicate relevant part(s) of the Technical File to the Authorities of European Union Member States on request:
Standards & Regulations Manager, Caterpillar France S.A.S 40, Avenue Leon-Blum B.P.55 F38041, Grenoble Cedex 9

I, the undersigned, Michael R Verheyen, hereby certify that the construction equipment specified hereunder

Description:	Generic Denomination:	Earth-moving Equipment
	Function:	Asset Management
	Model/Type:	PL121SR
	Commercial Name:	Product Link

Fulfils all the relevant provisions of the following Directives

Directives	Notified Body	Document No.
2004/108/EC	..... N/A	PL121SR-PEO101
1999/5/EC	..... N/A	PL121SR-PEO101

Harmonised Standards Taken Into Consideration: EN 13309, EN 301 389-1, EN 301 489-02, EN 55022, EN 60950-1, EN 301 721

Done at
CATERPILLAR INC.
100 N.E. Adams Street
AB 5410
Peoria, IL 61629 U.S.A.
Date
2010-06-10

Signature

Name / Position
Michael R Verheyen / Product Manager

Illustration 63
g02348438

Trimble Navigation Limited
935 Stewart Drive
Post Office Box 3642
Sunnyvale, CA 94085

Industry Canada Declaration of Conformity

Trimble Navigation Limited declares, under sole responsibility, that the following products conform to Class B digital apparatus complies with Canadian ICES-003.

Product Name: Trimble MTS523, Caterpillar 523, Trimble MTS522, Caterpillar 522, Trimble MTS521

Product Description: Telematics with M2M cell and GPS Receiver

Antenna used in MTS500 family of telematics has overall antenna gain which complies with limits per Cinterion requirements for GSM antennas in Canada.

S = 850/(150*10) 0.56667 mW/cm^2
R = 20 cm
P = 1771 mW
Maximum Gain = 2.06 dBi

Laird antenna: TRP GSM strongest measurements: Frequency 848.8 Mhz, Antenna Port Power 33 dBm, Maximum Gain 0.255211 dBi, Maximum Power / Peak EIRP 33.2552 dBm

Mobile Mark Antenna: CVS-900/1900 uses CVS RG-174 cable:
Antenna transmission gains up to 2.5dB, based on data based on Azimuth plot. However, cable loss of 0.34dB/ft and data sheet specify 8 foot cable, resulting in 2.5 – (8* 0.34) = -0.22 db maximum gain.

Both product antennas comply with FCC requirements.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

This document is maintained under Trimble part number 78356-00-DC, and the technical file is maintained under Trimble part number 78356-00-CE at:

Manufacturer: Trimble Navigation Limited, 935 Stewart Drive
Post Office Box 3642, Sunnyvale, CA 94085-3642, USA

Declaration Approved:

Signature

July 13, 2012
Date

Name: Chuck Maniscalco
Title: Director of Engineering
Trimble Navigation Limited
935 Stewart Drive, Post Office Box 3642, Sunnyvale, CA 94085-3642, USA
Telephone: (408) 481-8000

FCC DoC Rev A

Trimble Navigation Limited
935 Stewart Drive
Post Office Box 3642
Sunnyvale, CA 94085

FCC Declaration of Conformity

Trimble Navigation Limited declares, under sole responsibility, that the following product(s) conforms to FCC Part 15 Subpart B Section 15.109:

Product Name: Trimble MTS523, Caterpillar 523, Trimble MTS522, Caterpillar 522, Trimble MTS521

Product Description: Telematics with M2M cell and GPS Receiver

This device complies with Part 15 class B of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This document is maintained under Trimble part number 78356-00-DC, and the technical file is maintained under Trimble part number 78356-00-CE at:

Manufacturer: Trimble Navigation Limited, 935 Stewart Drive
Post Office Box 3642, Sunnyvale, CA 94085-3642, USA

Declaration Approved:

Signature

July 13, 2010
Date

Name: Chuck Maniscalco
Title: Director of Engineering
Trimble Navigation Limited
935 Stewart Drive, Post Office Box 3642, Sunnyvale, CA 94085-3642, USA
Telephone: (408) 481-8000

Trimble MTS500 FCC DoC Rev A

Trimble Navigation Limited
935 Stewart Drive, Post Office Box 3642, Sunnyvale, CA 94085-3642

CE Declaration of Conformity

Trimble Navigation Limited declares, under sole responsibility, that the following product(s):

Product Name: **Trimble MTS523, Trimble MTS522, Trimble MTS521, Caterpillar 523, Caterpillar 522**

Product Description: Telematics

Complies with the essential requirements of the R&TTE Directive 1999/5/EC, as described in Article 10, using the following particular standards in full or in part:

Article 3.1a - EMC:	EN 55022 : 2006 +A1:2007
Article 3.1b - EMC:	EN 55024 : 1998 +A1 :2001 +A2 :2003
	ISO 7637-2 : 2004
	EN 301 489-1 v1.8.1
	EN 301 489-3 v.1.4.1
	EN 301 489-7 v1.3.1
Article 3.2 - R&TTE:	TS 51.010-1 v8.3.0 [3GPP]
	EN 300 440-2 V1.2.1 [GPS]
	EN 301 511 V9.0.2 [GSM/GPRS]
Article 3.1a - Safety:	EN 60950-1 : 2006
	EN 62311 : 2008

Mark First Applied: 2009

This document is maintained under Trimble part number 78356-00-DC, and the technical file is maintained under Trimble part number 78356-00-CE at:

Manufacturer: Trimble Navigation Limited, 935 Stewart Drive
Post Office Box 3642, Sunnyvale, CA 94085-3642, USA

Declaration Approved:

Chuck Maniscalco — Signature

July 13, 2010 — Date

Name: Chuck Maniscalco
Title: Director of Engineering
Trimble Navigation Limited
935 Stewart Drive, Post Office Box 3642, Sunnyvale, CA 94085-3642, USA
Telephone: (408) 481-8000

MTS500 series CE DoC Rev A

Illustration 66

g02346208

i02304792

Backup Alarm

SMCS Code: 7406

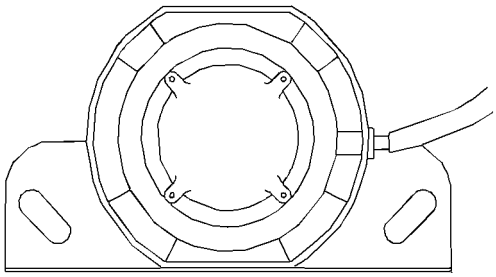


Illustration 67 g01117861

The backup alarm will sound when the transmission control lever is in the REVERSE position. The backup alarm warns people that the machine is backing up.

The backup alarm is located at the rear of the machine.

i03885513

Parking Brake Control

SMCS Code: 4284

NOTICE
Do not engage the parking brake while the machine is moving unless the service brakes fail. The use of the parking brake as a service brake in regular operation will cause severe damage to the parking brake.

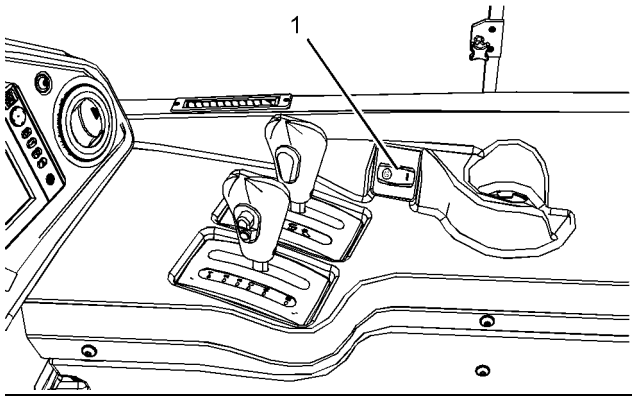


Illustration 68 g02133053

Parking Brake Control – The parking brake control is located in the console on the right side of the cab.

Parking Brake Engaged – Depress the front of the switch in order to engage the parking brake.

Parking Brake Disengaged – Depress the rear of the switch in order to disengage the parking brake.

Note: The parking brake is applied by the spring. The parking brake is disengaged by oil pressure which is developed when the engine is running. The parking brake can be disengaged four times with oil pressure which is retained immediately after the engine is shut off and the engine start switch is in the ON position.

During normal operation, the parking brake control must only be used when the machine is stationary. Engage the parking brake after the machine has stopped and the transmission control has been moved to the N position. Disengage the parking brake before you drive the machine.

The parking brake should only be used to stop the machine if the service brakes fail to stop the machine. Do not operate the machine until the service brakes and the parking brake are operating correctly.

Note: The parking brake also acts as the tertiary brake.

i03885516

Service Brake Control

SMCS Code: 4269

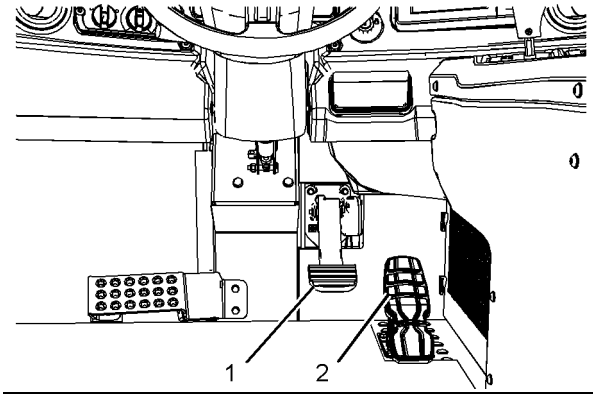


Illustration 69 g02134072

Service brake control (pedal) (1) is located to the left of accelerator control (2).

Use the service brakes for stopping the machine and use the service brakes in order to avoid an engine overspeed.

Engage – Press the pedal in order to engage the service brakes. Use the service brakes for reducing ground speed or for stopping the machine.

Disengage – Release the pedal in order to disengage the service brakes.

Use correct gear selection and the engine compression brake in order to control the speed of the machine on downgrades. Supplement the engine compression brake with the service brakes if the machine requires additional retardation to avoid an engine overspeed.

Note: Repeated engagement of the service brakes on downgrades may cause excessive wear and overheating of the service brakes. Refer to Operation and Maintenance Manual, “Engine Compression Brake Control”.

Note: The service brake is the primary braking system on the machine. Also, in the event of failure within the service brake system, the service brake control provides the secondary brake function on the machine in order to allow the operator to bring the machine to a stop.

i03885519

Engine Compression Brake Control

SMCS Code: 1119; 3121

The engine compression brake allows the operator to slow the machine without the service brakes. This reduces brake wear and overheating.

Use the engine compression brake in order to regulate the speed of the machine.

The engine compression brake is a device that is used to slow the machine. The engine compression brake is not a substitute for the service brakes. The engine compression brake cannot stop the machine and the engine compression brake cannot hold the machine stationary. The service brakes must be used to stop the machine completely. To hold the machine stationary, move the parking brake control to the ENGAGED position.

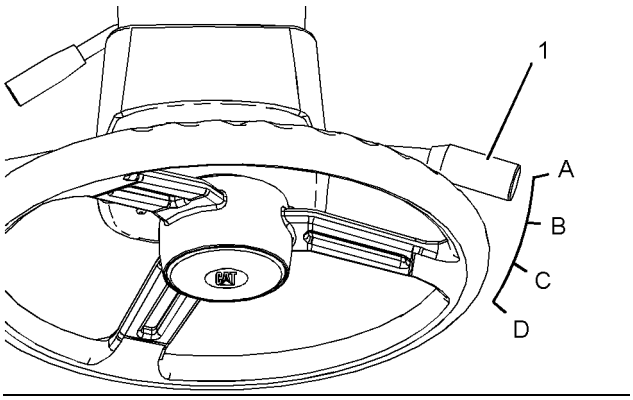


Illustration 70 g02134117

Engine compression brake control (1) is located to the right side of the steering column. The control has four positions:

DISENGAGED position – When the engine compression brake control is in position (A), the engine compression brake will disengage.

FIRST STAGE position – Move the engine compression brake control to position (B). This will provide a minimum engagement of the engine compression brake. The engine compression brake will be engaged on two cylinders.

SECOND STAGE position – Move the engine compression brake control to position (C). This will provide medium engagement of the engine compression brake. The engine compression brake will be engaged on four cylinders.

THIRD STAGE position – Move the engine compression brake control to position (D). This will provide the maximum engagement of the engine compression brake. The engine compression brake will be engaged on six cylinders.

The engine compression brake will engage automatically when the accelerator control is in the LOW IDLE position and the control for the engine compression brake is in any of the following position:

- FIRST STAGE position
- SECOND STAGE position
- THIRD STAGE position

The amount of engine compression brake that is selected depends on the grade and the conditions of the site.

It is important to select the correct transmission speed and it is important to approach the grade at a suitable speed in order to maximize the retardation effect of the engine compression brake.

The service brakes may be used in conjunction with the engine compression brake in order to supplement the retardation effect on severe grades. Use the service brakes in order to avoid an engine overspeed.

Use the compression brake in the first stage when the machine is operating in the following situations:

- The machine is lightly loaded and the machine is operated on level ground.
- The machine is lightly loaded and the machine is operated on shallow grades.

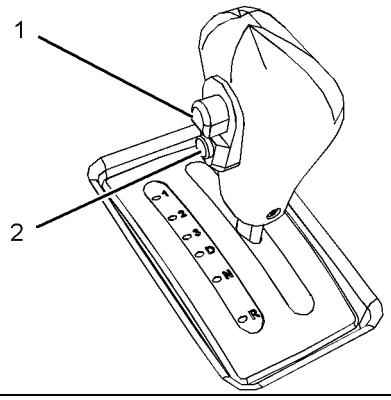
As the engine compression brake control is moved to the second and third stages, the level of retarding is progressively increased. Use the compression brake in the second and third stages when the machine is fully loaded and the machine is operated on steep grades.

Note: The engine compression brake depends on a free flow of engine lubricating oil for correct operation. Before the engine compression brake is used, the engine should be operating at normal operating temperature.

i03890693

Transmission Control

SMCS Code: 3065



g02134953

Illustration 71

Transmission Control

The transmission has seven forward gears, neutral, and two reverse gears.

The transmission control incorporates the following three switches:

- Neutral lock button (1)
- Transmission hold switch (2)

Transmission hold allows the operator to hold the transmission in the gear that is currently engaged.

The neutral lock button prevents the transmission control from being accidentally moved. The neutral lock button must be depressed in order to move the transmission control from the NEUTRAL position. The neutral lock button also prevents the transmission control from being moved into the NEUTRAL position from the Drive position or from the REVERSE position.

The transmission hold switch also controls the shift sequence for R1 and R2.

When the transmission control is in the D position, the high gear limit can be configured through the CMPD screen. The high gear limit can be configured from “7F” to “4F”. Refer to Operation and Maintenance Manual, “Monitoring System” for the location of the top gear selection in the menu.

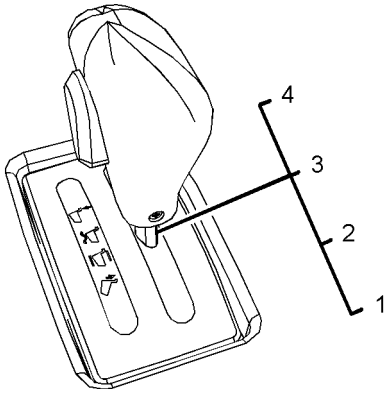
Refer to Operation and Maintenance Manual, “Operation Information” for additional information on the operation of the transmission control.

i03892510

Hoist Control

SMCS Code: 5063; 5136

NOTICE
The body must be lowered to the frame and the hoist control lever must be in the FLOAT position when driving the machine. If the hoist control lever is in any position except FLOAT, the transmission will remain in FIRST gear. Normal gear shifting will not take place until the hoist control lever is moved to the FLOAT position.



g02136374

Illustration 72
Hoist Control

RAISE (1) – Move the hoist control to the RAISE position in order to raise the body. Hold the hoist control fully back for maximum speed. Reduce hand force on the hoist control in order to reduce the speed. Hold the hoist control until the body is raised. Release the hoist control when the body is raised. The hoist control will return to the HOLD position.

HOLD (2) – Move the hoist control to the HOLD position in order to hold the body in the current position. The body is held in position by the hoist cylinders.

FLOAT (3) – Move the hoist control to the FLOAT position in order to allow the body to rest on the frame.

LOWER (4) – Move the hoist control to the LOWER position in order to lower the body. Push the hoist control fully forward for maximum speed. Reduce hand force on the hoist control in order to reduce the speed. Hold the hoist control until the body is approximately 600 mm (24 inch) above the rear frame. Release the hoist control. The hoist control will return to the FLOAT position. The body will continue to lower under the effect of gravity until the body rests on the rear frame.

The correct operation of the hoist control is important. Whenever you require the body to remain in a raised position, the hoist lever must be placed in the HOLD position. The hoist lever must not be placed in the FLOAT position even if the body is over the center of balance of the pivots and the body is able to maintain a raised position because of gravity.

Because of the combination of the hydraulic oil for the brake system and the hoist system, a slight pressure differential across the piston heads in the hoist cylinders can occur under certain operating conditions. If the machine is left in the FLOAT position, this pressure differential will gradually return the body over the center of balance of the pivots and the body will subsequently lower onto the chassis. Proper use of the RAISE, HOLD, LOWER and FLOAT positions of the hoist control is important for the correct operation of the machine.

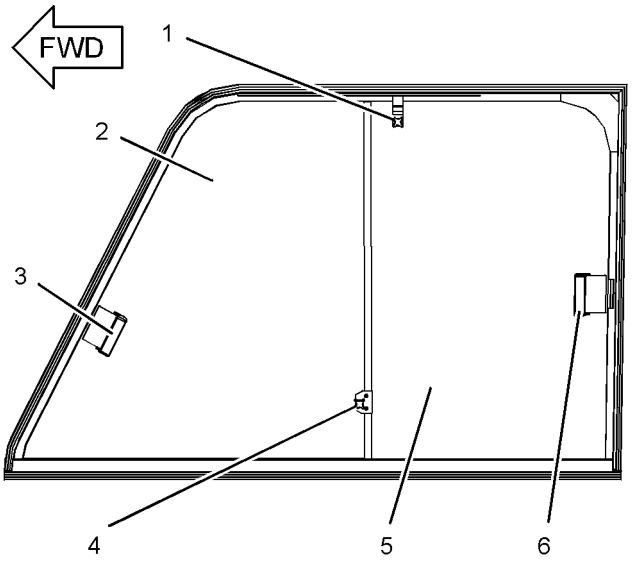
i04255869

Windows

SMCS Code: 7310

The right side windows and the left side rear window of the cab can be opened in order to provide ventilation. The windows in the cab can only be opened from the inside.

Right Side Windows



g02426596

Illustration 73

Turn knob (1) and knob (4) counterclockwise in order to allow motion of right side front window (2) and right side rear window (5).

Open the right side front window by squeezing latch (3) and sliding the window toward the rear of the machine. Open the right side rear window by squeezing latch (6) and sliding the window toward the front of the machine.

Turn knob (1) and knob (4) clockwise in order to lock the windows in the desired OPEN position.

To close the windows, turn knob (1) and knob (4) counterclockwise. This allows motion of right side front window (2) and right side rear window (5).

Slide the right side front window firmly toward the front of the machine in order to engage latch (3). Slide the right side rear window firmly toward the rear of the machine in order to engage latch (6).

Rotate knob (1) and knob (4) clockwise in order to secure the windows in the CLOSED position.

Note: The right side rear window serves as an alternate exit.

Left (Rear) Side Window

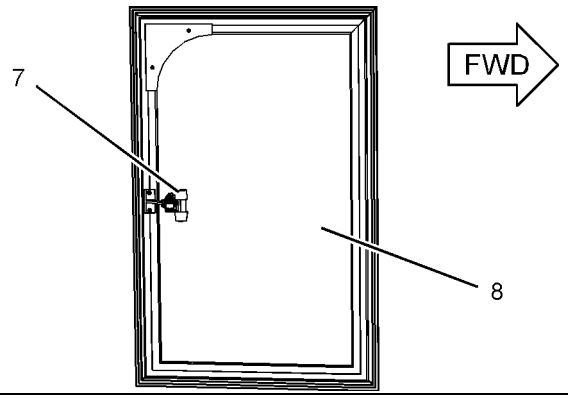


Illustration 74 g02426616

Disengage latch (7) and slide open left side window (8). The latch can lock the window in four different OPEN positions.

Pull the latch in order to close the window. Engage the latch in order to lock the window in the CLOSED position.

i03892753

Operation Information

SMCS Code: 7000

Keep the machine straight and level when loading or dumping is carried out. These actions are beneficial in several ways:

- The possibility of spills onto the tractor is reduced.
- The required effort to pull away is reduced.
- The possibility of tire damage is reduced.

Stay in the cab while the machine is being loaded.

The machine must be loaded evenly. Uneven loading of the machine will cause uneven loading in the tires and axles. Uneven loading can cause excessive wear of tires and axles.

Do not exceed the rated capacity of the machine.

Use caution when dumping the load.

Do not get too close to the edge of cliffs, excavations, and overhangs.

All six wheels must be in contact with firm ground. Dumping without firm ground support under the rear wheels changes the balance of the machine. The tractor or the trailer can overturn if dumping is performed incorrectly.

The trailer can overturn if the wheels on one side of the trailer suddenly sink into soft ground. The possibility of overturn can increase if material sticks in the dump body.

When dumping the load on an incline, the balance of the machine can alter. The wheels at the front of the machine can be lifted off the ground if the machine becomes unbalanced. The possibility the machine becomes unbalanced increases if material sticks in the dump body.

Avoid dumping while on an incline. Use caution when dumping the load with the machine on a shallow slope.

Operating The Machine

1. Check for adequate clearance around the machine.
2. Adjust the operator seat.
3. Adjust the mirrors.
4. Adjust the steering column.
5. Fasten the seat belt.
6. Depress the service brake control in order to prevent the machine from moving.
7. Release the parking brake.

NOTICE
For operator comfort and maximum service life of power train components, deceleration and/or braking is recommended before any directional shifts are made.

8. Move the transmission control to the desired direction and the appropriate gear speed.

9. Release the service brake control.

10. Depress the accelerator control until the desired engine speed is achieved.

11. Drive the machine forward in order to have the best visibility and the best control.

Loading

1. Take care when driving into the loading area. Maintain a safe distance from other machines.

2. Position the machine in the loading area.

3. The operator of the machine should stay in the cab while the machine is being loaded.

4. Stop the machine with the service brake control and move the parking and secondary brake control to the ENGAGED position.

5. Move the transmission control to the N position.

6. Ensure that the hoist control is in the FLOAT position.

7. Load the machine.

8. When the machine is loaded, move the transmission control to the 1 position. Move the parking and secondary brake control to the DISENGAGED position. Drive the machine slowly away from the loading area.

9. Leave the loading area with care.

Dumping

1. Clear the area of personnel and obstructions before dumping. If a spotter is present, follow the spotters directions.

2. Position the machine straight ahead before dumping. Ensure that all the wheels are in contact with firm ground.

3. Stop the machine with the service brake control. Move the parking brake control to the ENGAGED position.

4. Move the transmission control to the N position.

5. The machine must be stationary with the parking brake control in the ENGAGED position. The transmission control must be in the N position before the body is raised. Move the hoist control to the RAISE position and increase the engine speed.

6. As the hoist cylinders approach full extension, reduce engine speed. Reduce hand pressure on the hoist control in order to slow the movement of the body. This slower movement will avoid damage to the hoist cylinders.

7. Dump the load. Move the transmission control to the 1 position and move the parking brake control to the DISENGAGED position. Drive the machine slowly forward until the machine is clear of the load.

8. Stop the machine with the service brake control. Move the parking brake control to the ENGAGED position.

9. Move the transmission control to the N position.

10. Move the hoist control to the LOWER position and increase the engine speed.

11. Hold the hoist control until the body is about 600 mm (24 inch) from the frame. Release the hoist control and reduce the engine speed. The hoist control will move to the FLOAT position. The body will continue to lower under the effect of gravity until the body rests on the rear frame.

12. Move the transmission control to the D position. Move the parking brake control to the DISENGAGED position and drive the machine to the new location.

Note: When a machine is equipped with a tailgate, the capacity of the body is increased and material spillage is reduced. The tailgate is either a mechanically activated scissors tailgate or a hydraulically activated underslung tailgate. However, material must be free flowing in order to eliminate hang-up at the gate.

Changing Speed and Direction

the transmission on this machine is equipped with forward seven gears and two reverse gears.

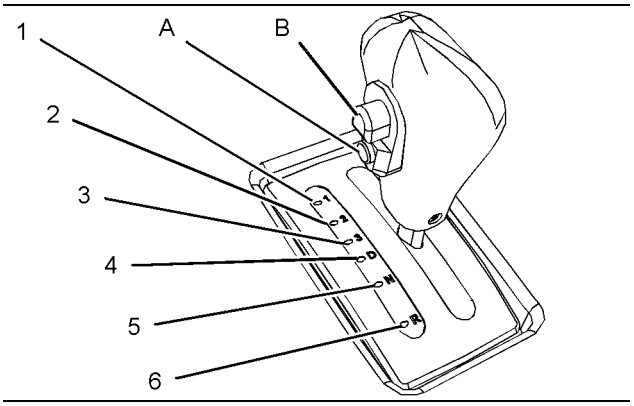


Illustration 75 g02136640

(A) Transmission hold switch
(B) Neutral Lock switch
(1) 1 position
(2) 2 position
(3) 3 position
(4) D position
(5) N position
(6) R position

Refer to Operation and Maintenance Manual, “Transmission Control”.

NOTICE
The machine must be stopped and the engine at low idle before changing direction. After moving the transmission control, do not accelerate until after hearing or feeling the transmission clutches engage.

If the transmission control is in the N position, the neutral lock will prevent the transmission control from being accidentally moved into a gear position.

The operator must press neutral lock switch (B) in order to move the transmission control from the N position. The neutral lock switch must be held until the transmission control has been moved from the N position.

Disengage the neutral lock and move the transmission control forward in order to select the following gear positions:

- DRIVE (D)
- THIRD GEAR (3)
- SECOND GEAR (2)
- FIRST GEAR (1)

Stop the machine and ensure that the engine is at low idle before moving the transmission control from the N position.

If the transmission control is moved to the D position, first gear and torque converter drive will be engaged. As the engine speed and ground speed increases, the transmission will upshift. As the ground speed continues to increase, the transmission will upshift automatically.

If the ground speed or the engine speed is reduced by an increased load, the transmission will automatically downshift in order to select the correct gear. The transmission downshifts one gear at a time.

A downshift inhibitor, which is a function of the ECM, prevents the operator from forcing a downshift that would result in engine overspeed. When the machine is in motion, and the transmission control is moved to a lower gear, the transmission will not downshift until the proper ground speed is achieved.

If the transmission control is moved to the 1 position, the 2 position, or the 3 position, the transmission will be prevented from shifting to a gear higher than the selected position.

In the event of an engine overspeed, the transmission will be allowed to shift up one gear.

When the transmission control is in the D position, the high gear limit can be configured through the CMPD screen. The high gear limit can be configured from “7F” to “4F”. Refer to Operation and Maintenance Manual, “Monitoring System” for the location of the top gear selection in the menu.

Use the high gear limit in order to restrict speed when conditions such as speed limitations on the site, or rough ground exist.

Press the neutral lock switch and pull the transmission control backward to the R position in order to select reverse gear. Transmission hold is automatically activated when reverse gear is selected. The machine must be stationary before selecting reverse.

Transmission hold switch (A) allows the operator to hold the transmission in the gear that is currently engaged.

Transmission hold is activated by pressing the transmission hold switch once. Transmission hold is canceled by pressing the transmission hold switch for a second time.

Note: The transmission will automatically downshift when the machine speed falls below the minimum speed for the selected gear. If the transmission is in first gear and the machine speed falls below the minimum speed, the torque converter will automatically unlock.

Use the following procedure in order to select the second reverse gear.

With the machine in REVERSE, press and release transmission hold switch (7). Once the machine reaches the appropriate ground speed, the transmission will automatically shift into the second reverse gear. When the ground speed is reduced, the transmission will automatically downshift into the first reverse gear. In order to shift back into the second reverse gear, the operator must press transmission hold switch (7).

The transmission should be held in gear under the following conditions.

- When driving the machine down a grade with the engine compression brake selected, consider the ground conditions and the degree of the down grade. Select the gear that will give the best performance from the retarder. When approaching the down grade, manually select the appropriate gear. Drive the machine at a safe speed down the grade. At the bottom of the down grade, select the gear that is suitable for the ground conditions.
- When approaching the up grade, press the transmission hold switch in order to hold the transmission in the selected gear and prevent unwanted upshifts. When the machine is in first gear and the machine ground speed decreases, the Power Train ECM will unlock the torque converter. When any other forward gear has been selected, the Power Train ECM will override the transmission hold and the transmission will downshift one gear below the selected gear. This override will only occur when the engine rpm and the ground speed fall below the downshift point. In order to allow the transmission to shift normally through the gears, press the transmission hold switch again at the top of the up grade.
- When driving in soft ground conditions, the transmission might shift frequently between gears. If frequent shifting occurs, select the lower gear of the two gears in order to retain the selected gear. In order to allow the transmission to shift normally through the gears, press the transmission hold switch again when the ground conditions improve.

At all times, drive the machine at a safe speed according to the following conditions.

- The condition of the site
- The condition of the weather
- The loaded state of the machine

Maintain the correct stopping distance under all conditions.

i03894415

Cab - Tilt

SMCS Code: 7000; 7341

⚠ WARNING

Install cab prop pin before working under raised cab to prevent it from falling which could result in injury or death.

Tilting the Cab

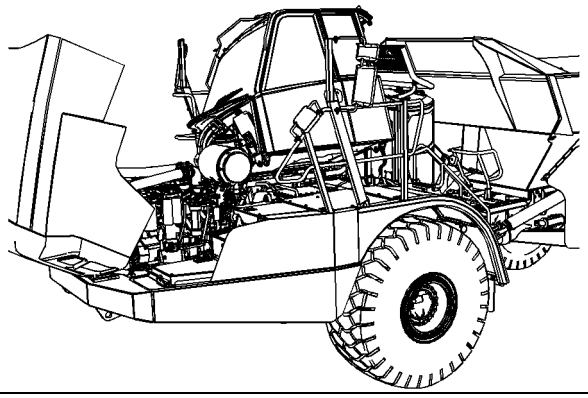


Illustration 76 g02137964

Two mounting pins must be removed in order to tilt the cab. The mounting pins are located on the left side of the cab. One mounting pin is located at the front of the cab. The other mounting pin is located at the rear of the cab.

1. Park the machine on a hard, level surface. Engage the parking brake and shut off the engine.
2. Raise the hood in order to access the left side front cab mount. Refer to the Operation and Maintenance Manual, “Hood Control”.

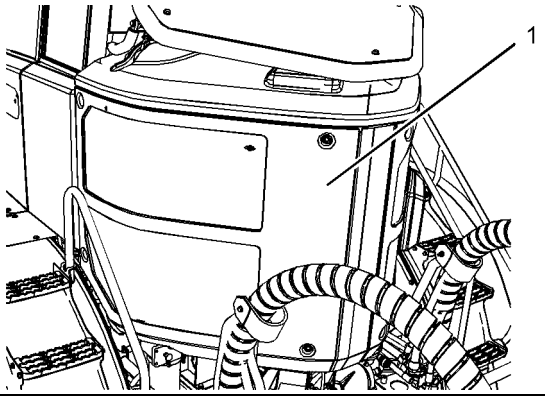


Illustration 77 g02137965

3. Remove cover panel (1).

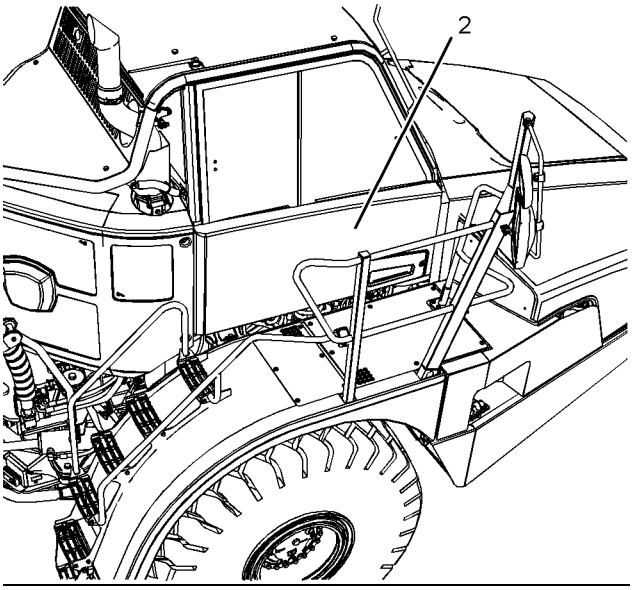


Illustration 78 g02378738

4. Remove cover panel (2) in order to prevent damage during the tilting of the cab.

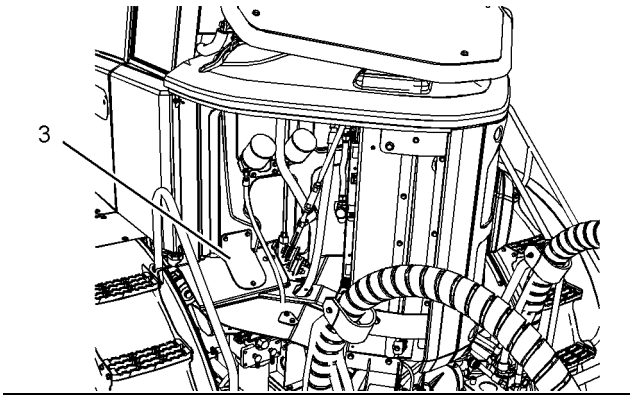


Illustration 79 g02137994

5. Remove access cover (3) in order to gain access to the left side rear cab mount.

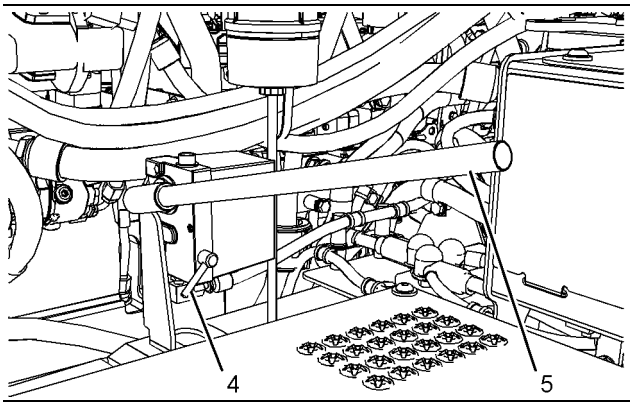


Illustration 80 g02137967

6. The cab tilt pump is located under the hood on the left side of the engine. Turn control lever (4) on the pump to the downward position. Insert handle (5) into the pump. Operate the pump in order to raise the cab enough to take the load from the mounting pins.

Note: The handle for the cab tilt pump is located in the machine tool kit.

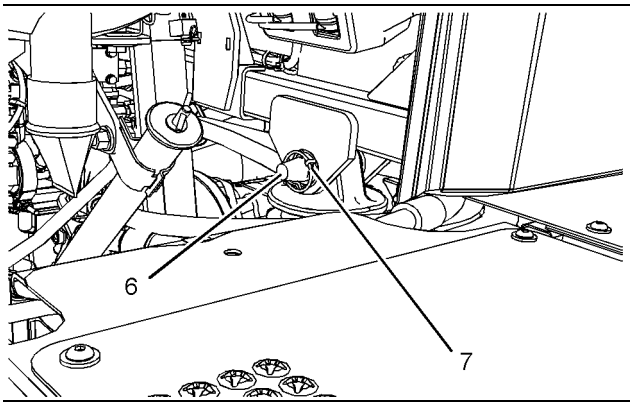


Illustration 81 g02138006

7. Remove keeper pin (7) and mounting pin (6) at the front of the cab. Remove the mounting pin toward the front of the machine.

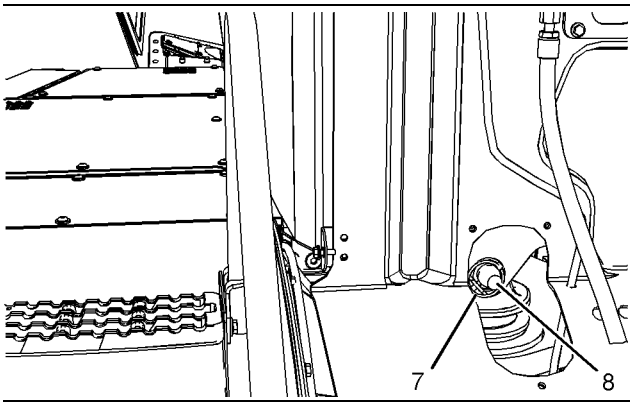


Illustration 82 g02138007

8. Remove keeper pin (8) and mounting pin (9) at the rear of the cab. Remove the mounting pin toward the rear of the machine.

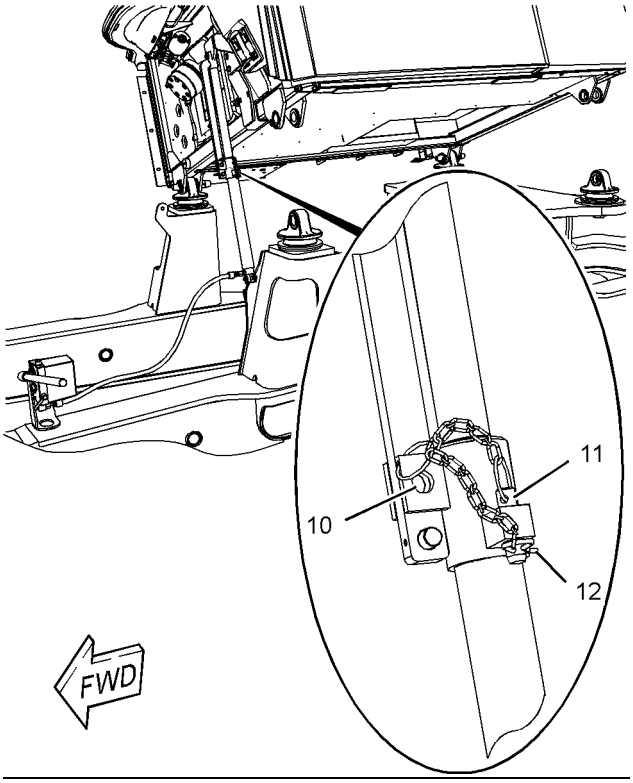


Illustration 83 g02138010

9. Use the cab tilt pump to tilt the cab until the holes (10) in the cylinder support bracket are aligned. Remove the keeper pin (12) and locking pin (11) from the storage location. Install the locking pin into the holes in the cylinder support bracket. Install the keeper pin into the locking pin.

10. Allow the cab to rest on the locking pin in the cylinder support bracket by slowly turning the control lever on the pump upward.

11. Fully turn the control lever on the pump to the down position.

Lowering the Cab

Perform the following steps in order to lower the cab:

1. Use the cab tilt pump in order to take the load off the locking pin for the cylinder support bracket. Remove the locking pin from the cylinder support bracket.

2. Slowly turn the control lever on the cab tilt pump in an upward direction and hold in this position until the cab is fully lowered. Return the control lever to the down position.

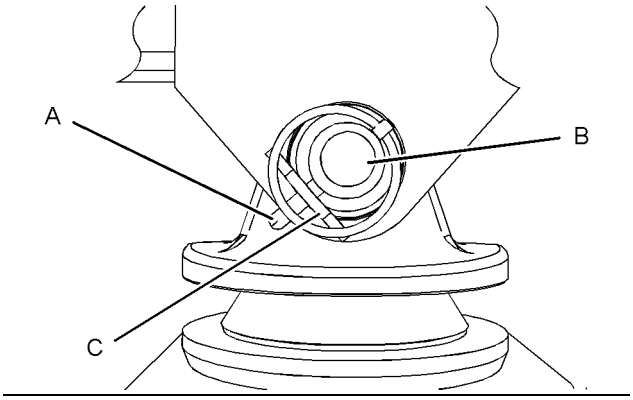


Illustration 84 g02138269

3. Install the mounting pin and install the keeper pin in the rear cab mount. The mounting pin for the rear cab mount should be installed from the rear. Install the mounting pin and install the keeper pin in the front cab mount. The mounting pin for the front cab mount should be installed from the front.

Note: If necessary, use the cab tilt pump to align the holes in order to install the mounting pin.

Note: Ensure that shaft (A) of the keeper pin goes all the way through mounting pin (B) and loop (C) on the side of the mounting brackets. Also, ensure that the keeper pin is installed correctly in order to allow the spring tension in the ring to keep the ring against the shaft of the keeper pin.

4. Turn the control lever on the cab tilt pump in an upward direction in order to fully lower the cab onto the mounting pins.

5. Install the access cover and install the cover panel.

6. Lower the hood. Refer to the Operation and Maintenance Manual, “Hood Control”.

i01995422

Secondary Steering

SMCS Code: 4300-SE; 7000

If the hydraulic pressure for the steering system is lost during machine operation, the secondary steering system will automatically become active. A warning category 3 will be given by the Monitoring System. Secondary steering must only be used in order to steer the machine to a stop.

Note: Do not operate the machine if the primary steering is not operating correctly.

i02253478

Tailgate

SMCS Code: 7000; 7271

If the machine is equipped with a tailgate, the tailgate will operate automatically.

When the hoist control is moved into the RAISE position, the tailgate will open as the body is raised.

When the hoist control is moved into the LOWER position, the tailgate will close as the body is lowered.

The machine must be moved slowly forward until the machine is clear of the load. The LOWER position is then selected. This prevents the tailgate from moving material back into the body. Damage to the tailgate is also avoided.

When a machine is equipped with a tailgate, the capacity of the body is increased and material spillage is reduced. The tailgate is either a mechanically activated scissors tailgate or a hydraulically activated underslung tailgate. However, material must be free flowing in order to eliminate hang-up at the gate.

i04275862

Oscillating Hitch

SMCS Code: 7000; 7113

Articulated trucks have different operating characteristics from the operating characteristics of rigid frame trucks. Twisting stress between the front frame and the rear frame of an articulated truck is eliminated by an oscillating hitch. The oscillating hitch is installed between the tractor and the trailer. **The oscillating hitch allows unlimited oscillation between the tractor and the trailer.**

It is possible for the trailer to overturn while the tractor remains upright.

A sudden shift in momentum or in load distribution can cause the trailer to overturn. This shift can be caused by sudden steering and/or severe braking action on slopes or in turns, or excessive speed in turns or on sloping or rough ground.

Unlimited oscillation between the tractor and the trailer is normal. The operator receives no warning of an overturn.

The following steps must be observed to prevent the machine from overturning:

1. The rated load of the machine must not be exceeded.

2. Distribute the load evenly in the body and avoid excessively heavy loading in the front section.

3. Avoid sudden steering and/or severe braking action in turns or on sloping ground.

4. Avoid traveling across slopes. If this operation is unavoidable, reduce speed. Stay alert and avoid any sudden steering and/or severe braking action.

5. Use caution before dumping/ejecting. A combination of material that is stuck in the body and soft ground conditions can cause the trailer to overturn.

6. Do not load the body with oversized material that can become lodged in the body or is unable to clear the end of the body.

7. Always drive at an appropriate speed. Maintain the appropriate stopping distance under all conditions. Operate the machine according to load condition. Be aware of weather conditions and the condition of the site.

i03865933

Hood Control

SMCS Code: 1435-HK; 7251

Park the machine on a level surface. Ensure that the parking brake is fully engaged.

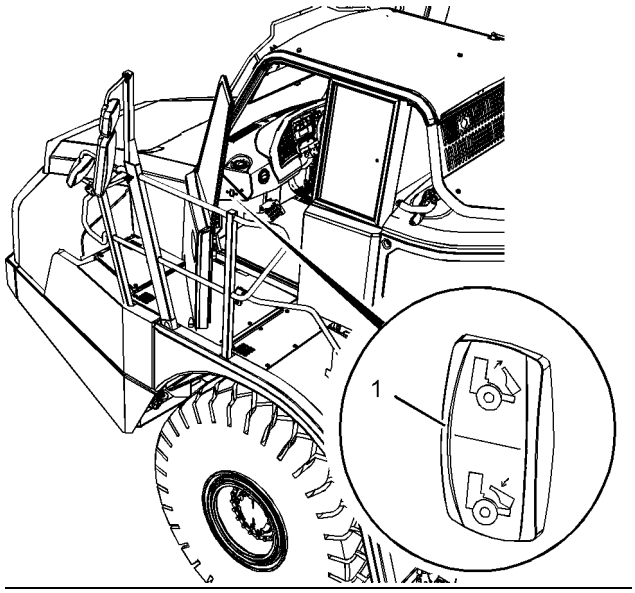


Illustration 85 g02118313

Hood control switch (1) is located inside the cab on the left side of the dash panel.

Raising the hood – Hold the top half of the hood control switch in the depressed position in order to raise the hood. Release the hood control switch when the hood is in the fully raised position.

Note: A repetitive clicking noise will sound when the hood has reached the fully raised position.

Lowering the hood – Hold the bottom half of the hood control switch in the depressed position in order to lower the hood. Release the hood control switch when the hood is in the fully lowered position.

Note: A repetitive clicking noise will sound when the hood has reached the fully lowered position. Do not release the hood control switch until the hood is fully lowered.

Engine Starting

i02887531

Engine Starting

SMCS Code: 1000; 7000

Engine Starting Above 0°C (32°F)

⚠ WARNING

Diesel engine exhaust contains products of combustion which may be harmful to your health

Always start and operate the engine in a well-ventilated area and, if in an enclosed area, vent the exhaust to the outside.

1. Before the engine is started, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the forward horn before you start the engine.
2. Move the parking brake control to the ENGAGED position. The parking brake control must be in the ENGAGED position before the engine will crank.
3. Move the transmission control to the N position. The transmission control must be in the N position before the engine will crank.
4. Adjust the steering column.
5. Move the hoist control to the HOLD position.
6. Turn the engine start switch to the ON position in order to check the Caterpillar Monitoring System for correct operation.
7. Turn the engine start switch to the START position in order to start the engine. Release the engine start switch key when the engine starts.
8. Operate the engine at low idle until the Caterpillar Monitoring System verifies that the engine oil pressure is normal.

Note: If the engine fails to start, return the engine start switch to the OFF position before you attempt to start the engine again.

NOTICE

Do not crank the engine for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking again.

Turbocharger (if equipped) damage can result, if the engine rpm is not kept low until the engine oil light/gauge verifies the oil pressure is sufficient.

Engine Starting Below 0°C (32°F) with Ether Starting Aid

The ether starting aid functions automatically under a combination of all of the following conditions:

- The engine coolant temperature is below 0 degrees celsius.
- The engine has been idling for less than 10 seconds.
- The engine speed is below 500 rpm.

When the temperature is below -18°C (0°F), the use of optional cold weather starting aids is recommended.

Before you operate the machine below -23°C (-9°F), consult your Caterpillar dealer or refer to Special Publication, SEBU5895, “Cold Weather Recommendations” for additional information.

i02672556

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

As soon as the engine starts, observe all gauges and indicators. All gauges should indicate in the proper range. Indicators should be on or off according to the function of the indicator.

The Monitoring System must not be giving any warnings. The Monitoring System must have completed the self-diagnostic routine successfully before the engine is started.

When the engine is cold, operate the engine at low idle for at least five minutes. Observe the following recommendations.

- If the temperature is greater than 0°C (32°F), warm up the engine for approximately 5 minutes.
- If the temperature is less than 0°C (32°F), warm up the engine for approximately 10 minutes.

- If the temperature is less than −18°C (0°F), warm up the engine for approximately 15 minutes.

Do not drive the machine until the steering oil is warm enough to give a normal steering response. The steering wheel will be difficult to turn if the steering oil has not been warmed up enough.

Ensure that the dump body is lowered onto the frame. Run the engine at low idle and move the hoist control to the LOWER position.

Immediately after the warm up period, turn the steering wheel in order to fully articulate the machine. Turn the steering wheel several times in both directions.

Refer to Special Publication, SEBU5898, “Cold Weather Recommendations” for more information.

Warm-Up and Break-In of the Differential

Note: Correct oil levels are critical in the axle housings. Check the oil level prior to operation. Allow sufficient time for the oil to fill all of the compartments in the final drive housing. Allow sufficient time for the oil to fill all of the compartments in the differential housing.

Warm-Up

At start-up, operate the machine in fourth gear or in a lower gear until the oil is warm. Allowing the oil to warm-up gradually permits bearing components to maintain optimum operating positions. High speeds during a cold start-up will cause the temperatures of the rotating components to be very different from the temperatures of the stationary components. High temperature differences within the bearing may result in less durability of the bearing component.

Break-In

The running surfaces of the gears and the bearings are conditioned during break-in. Break-in brings bearing components to optimum operating positions.

1. For 15 to 20 minutes, load the machine with 60% to 75% of the capacity.

2. Limit the top speed to fourth gear for approximately 15 to 20 minutes.

Placing a significant load on the bearing components at a lower speed creates a favorable condition of contact between the mating surfaces.

Parking

i01388332

Stopping the Machine

SMCS Code: 7000

1. Drive the machine onto a level surface.

Note: Avoid stopping the machine on a grade.

2. Engage the service brakes in order to stop the machine.
3. Move the transmission control to the N position.
4. Move the parking brake control to the ENGAGED position.
5. Disengage the service brakes. Ensure that the machine is held when the service brakes are disengaged.
6. If it is necessary to stop the machine on a grade, block the wheels securely.

i01174829

Stopping the Engine

SMCS Code: 1000; 7000

NOTICE
Stopping the engine immediately after it has been working under load can result in overheating and accelerated wear of the engine components.

Refer to the following stopping procedure, to allow the engine to cool, and to prevent excessive temperatures in the turbocharger center housing, (if equipped) which could cause oil coking problems.

1. Stop the machine and run the engine at low idle for five minutes. Do not stop the engine immediately after the engine has been working under load. This can result in overheating and in accelerated wear of the engine components.
2. Turn the engine start switch to the OFF position and remove the engine start switch key.

i03894869

Stopping the Engine if an Electrical Malfunction Occurs

SMCS Code: 1000; 7000

Turn the engine start switch to the OFF position. If the engine does not stop, perform the following procedure.

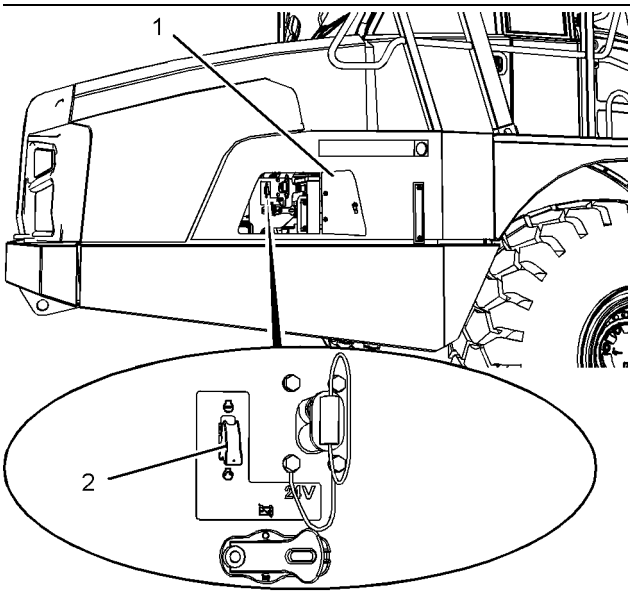


Illustration 86 g02132154

1. Dismount the machine. Open access cover (1).
2. Move engine shutdown switch (2) to the STOP position.

Note: The protective cover for the engine shutdown switch should also be returned to the original position before the engine is started.

Close the access cover.

If the engine continues to run, open the hood. Cover the air intake with a strong, clean board in order to starve the engine of air. Use this procedure as a last resort. Refer to Operation and Maintenance Manual, “Hood Control”.

i03903121

Lowering the Body with Engine Stopped

SMCS Code: 1000; 7000

⚠ WARNING

Be sure all personnel are clear of equipment while equipment is being lowered.

Failure to stay clear may result in personal injury.

Table 8

Required Tooling			
Item	**Part Number**	**Part Name**	**Qty**
A	1U-5754	Hose	1
	6V-4143	Coupler	2

If a fault has occurred on the machine and the engine has stopped, the dump body may need to be lowered.

Note: Make an assessment of the location of the machine and of the ground conditions. If the machine may become unstable, carefully move the machine to a level surface before you lower the body. Refer to Operation and Maintenance Manual, “Towing the Machine” for more information.

Note: The batteries for the machine must be fully charged in order to perform this procedure.

Note: During this procedure, oil is transferred from the tank for the steering system to the hoist system. Ensure that the oil level of each tank is correct before you operate the machine. Refer to Operation and Maintenance Manual, “Hoist System and Brake System Oil Level - Check” and Operation and Maintenance Manual, “Steering System Oil Level - Check”.

1. Move the parking brake control to the ENGAGED position. Block the wheels. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

2. Tilt the cab in order to access the hoist control valve. Refer to Operation and Maintenance Manual, “Cab - Tilt”.

Note: The hoist control valve is located under the cab on the left side of the front frame under the tread plate.

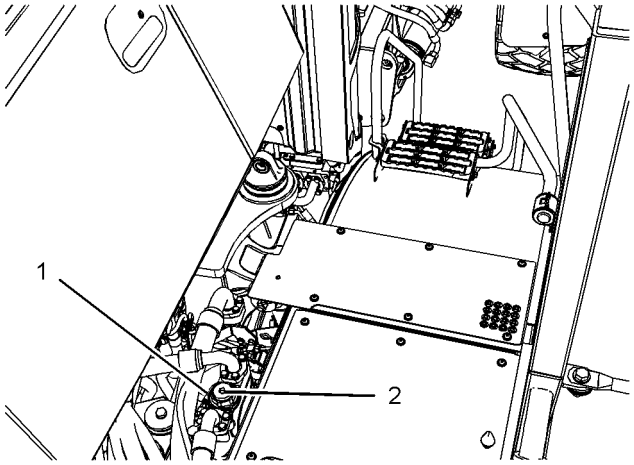


Illustration 87 g02145424

3. Loosen nut (1). Insert a 3/8 hex wrench into valve (2). Turn the valve counterclockwise until the valve contacts the stop.

Note: If the body is not overcenter, then Step 3 may be sufficient enough for the body to lower to the frame. In that case, once the body has lowered completely, go to Step 14. If the body will not lower, then the remaining steps must be performed.

4. Lower the cab but do not install the pins for the cab. Refer to Operation and Maintenance Manual, “Cab - Tilt”.

5. Carefully loosen the cap on the hydraulic tank.

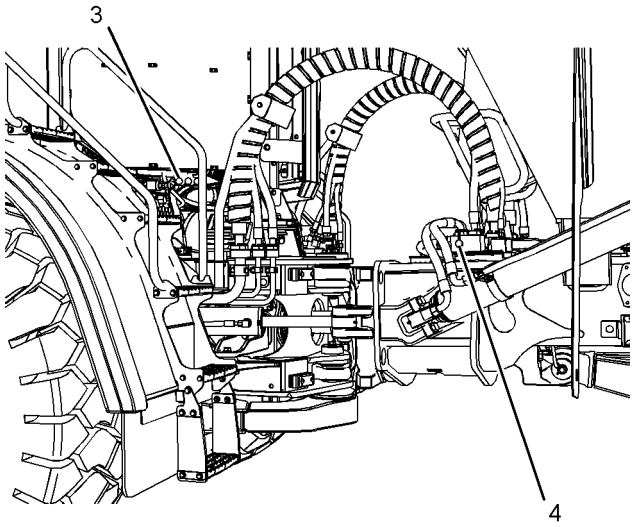


Illustration 88 g02145425

6. Install Tooling (A) between test port (3) and fitting (4) on the manifold that is on the front left-hand side of the rear frame.

7. Tighten the cap on the hydraulic tank.

8. Turn the engine start switch to the ON position.

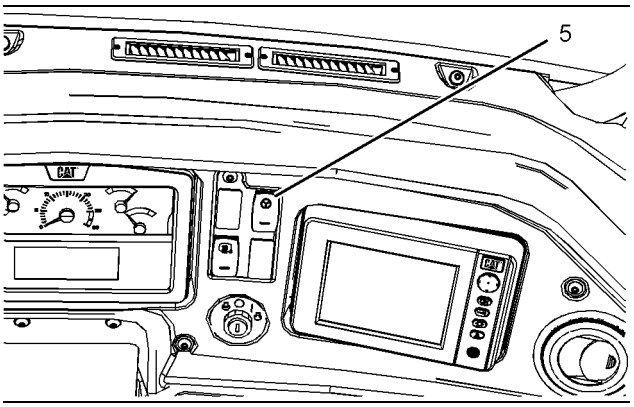


Illustration 89 g02145427

9. Press secondary steering test switch (5) and turn the steering wheel to the RIGHT (against the steering frame lock). Hold the switch for 30 seconds. Release the switch. Wait for at least 3 minutes. This will allow the batteries to recover.

10. Repeat Step 9 until the body begins to lower under the bodys own weight.

Note: Do not operate the switch for the secondary steering after the body begins to lower under the bodys own weight.

11. When the body is completely lowered, turn the engine start switch to the OFF position.

12. Remove Tooling (A).

13. Raise the cab. Refer to Operation and Maintenance Manual, “Cab - Tilt”.

14. Turn valve (2) clockwise until the valve is closed. Tighten nut (1) to a torque of 50 ± 7 N·m (37 ± 5 lb ft).

15. Lower the cab and secure the cab in place with the pins for the cab. Refer to Operation and Maintenance Manual, “Cab - Tilt”.

16. Remove the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”. Remove any blocks from the wheels.

i00962142

Leaving the Machine

SMCS Code: 7000

1. Lock the cab door.

2. Use the steps and the handholds when you dismount. Refer to Operation and Maintenance Manual, “Mounting and Dismounting”.

3. Inspect the engine compartment for debris. Clean out any debris in order to avoid a fire hazard.

4. Turn the key for the battery disconnect switch to the OFF position. When the machine is left for an extended period of one month or longer, you should remove the key for the battery disconnect switch. This will help to prevent a battery short circuit. Removing the key will also help to protect the battery from vandalism and from the current draw that is made by certain components.

5. Lock all vandalism caps and covers (if equipped).

Transportation Information

i04210252

Shipping the Machine

SMCS Code: 7000; 7500

Investigate the travel route for overpass clearances. Make sure that there is adequate clearance for the machine that is being transported. This is especially important for machines that are equipped with a ROPS, with a FOPS, with a cab, or with a canopy.

Remove ice, snow, or other slippery material from the loading dock and from the truck bed before loading the machine onto the transport machine. Removing ice, snow, or other slippery material will help to prevent the machine from slipping in transit.

NOTICE

Obey all state and local laws governing the weight, width and length of a load.

Remove the starting aid (ether) cylinder, if equipped.

Make sure the cooling system has proper antifreeze if moving machine to a colder climate.

Observe all regulations governing wide loads.

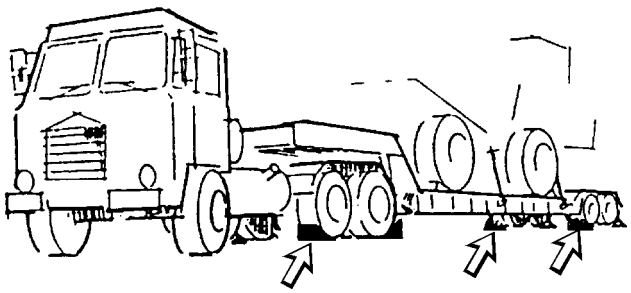


Illustration 90 g00614904

1. Before loading the machine, block the trailer wheels or the rail car wheels, as shown.

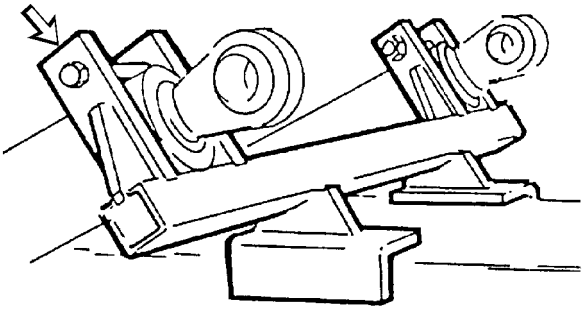


Illustration 91 g00614905

2. Lower the dump body. When transporting a machine without a dump body, suitable retainers must be installed in order to support the hoist cylinders. Consult your Caterpillar dealer for more information.
3. When the machine is positioned on the transport machine, install the steering frame lock.

   Refer to Operation and Maintenance Manual, “Steering Frame Lock”.
4. Move the transmission control to the N position.
5. Engage the parking brake.
6. Shut off the engine.
7. Turn the engine start switch to the OFF position and remove the key.
8. Turn the battery disconnect switch to the OFF position and remove the key.
9. Lock the cab door. Attach any vandalism protection.
10. Block the wheels. Secure the machine with tie-downs.

    Refer to Operation and Maintenance Manual, “Lifting and Tying Down The Machine”.

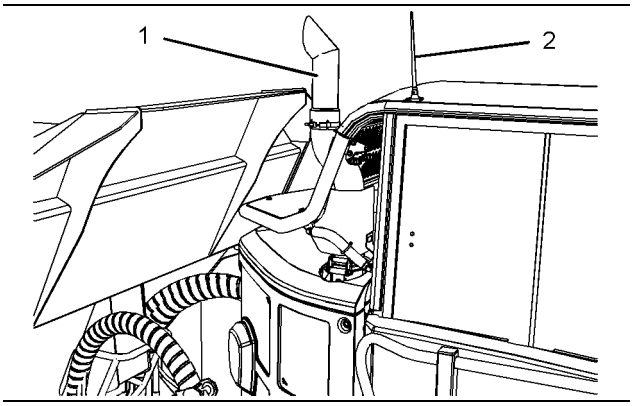


Illustration 92 g02394917

11. Loosen band clamp and remove the exhaust tube (1) from the exhaust stack. Store the exhaust tube and clamp in the cab. Cover the exhaust opening in order to prevent the turbocharger from windmilling in transit.

12. Loosen adjustment for antenna (2) and lower the antenna. Tighten the antenna adjustment in the lower position.

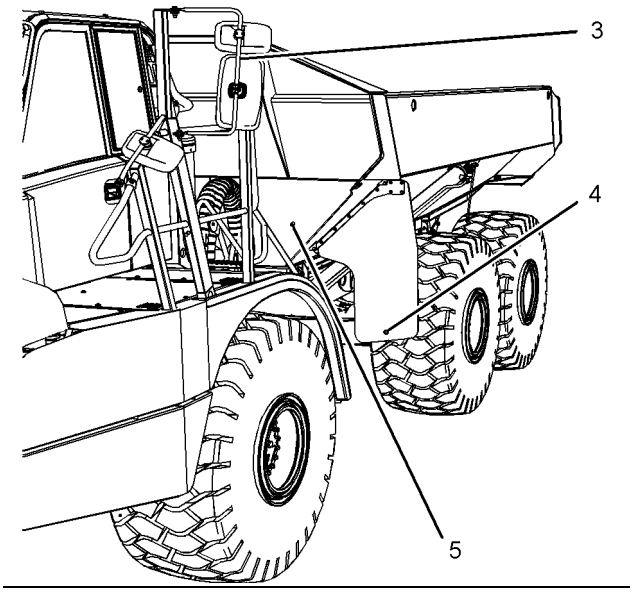


Illustration 93 g02394918

13. Fold the mirrors (3) to the proper orientation toward the cab. Perform this step on both sides of the machine.

Note: If necessary, loosen adjustment bolts, and retighten the bolts when the mirrors are in the folded position.

14. Lift the mud flaps and bolt eyelet (4) to fastener (5) in order to lock the mud flaps in position. Perform this step on both sides of the machine.

15. Perform a walk-around inspection .

Travel at a moderate speed. Observe all speed limitations when roading the machine.

Consult your Caterpillar dealer for shipping instructions for your machine.

i01442284

Roading the Machine

SMCS Code: 7000; 7500

Note: Driving this machine on roads in certain countries is illegal. Before you road the machine, you should check with the proper officials in order to obtain the required licenses and authorization.

Before you road a machine, consult your tire dealer for recommended tire pressures and for speed limitations.

Limitations for TON-kilometer per hour (TON-mile per hour) must be obeyed. Consult your tire dealer for the speed limit of the tires that are used.

When you travel for long distances, schedule stops in order to allow the tires and the components to cool. Stop for 30 minutes after every 40 km (25 miles) or after every hour.

Inflate the tires to the correct pressure. Use a self-attaching inflation chuck and stand behind the tire tread during the tire inflation.

Refer to Operation and Maintenance Manual, “Tire Information”.

Perform a walk-around inspection and measure the fluid levels in the various compartments.

Travel at a moderate speed. Observe all speed limitations when you road the machine.

i03894982

Lifting and Tying Down the Machine

SMCS Code: 7000; 7500

WARNING

A machine may shift if improper procedures or equipment are used for lifting and tying down for transport. Ensure that proper equipment and procedures are used for lifting and tying machines down for transport. If a machine shifts it could cause personal injury or death.

Lifting the Machine

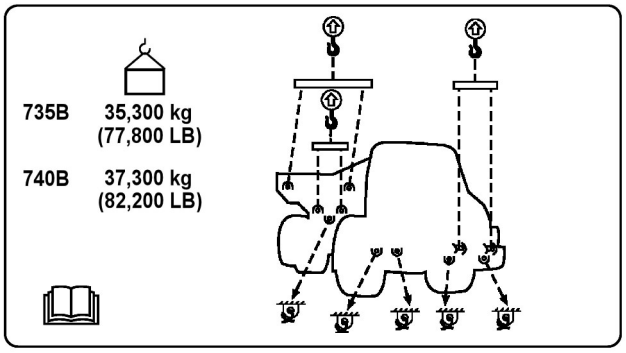


Illustration 94 g02138464

This film is located on the left frame rail near the front of the dump body.

Only use the charts in order to lift and tie down a machine that is assembled as the original shipment from the factory. If attachments have been installed, the weight and the center of gravity of your machine may vary.

The machine shipping weight of the machine will depend on the configuration and the options.

Park the machine on a level surface. Engage the parking brake. Lower the dump body and shut off the engine.

Install the steering frame locks. Refer to the Operation and Maintenance Manual, “Steering Frame Lock”.

Lifting Points

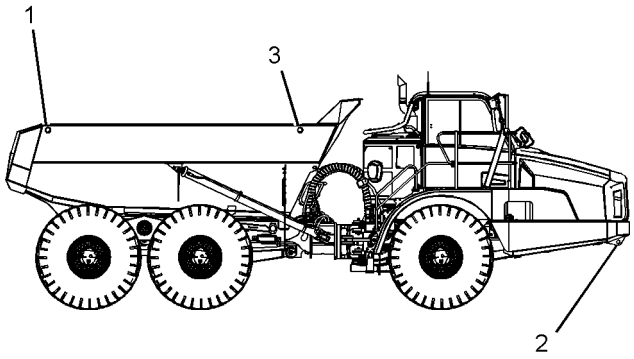


Illustration 95 g02379696

Two lifting holes (1) are located at the rear of the machine in the dump body. Two tow points (2) are located at the front of the machine.

Note: Do not use lifting holes (3) to lift the machine. These holes are provided in order to enable the body to be lifted off the machine.

Perform the following steps in order to lift the machine:

1. Install the steering frame locks.
2. Attach a Caterpillar 359-3896 Machine Lifting Gp to the front tow points.
3. Select proper rated cables, proper rated chain shackles, proper rated slings, and proper rated lifting beams for lifting the machine. The lifting beam must be wide enough to prevent contact of the cables and slings with the machine.
4. Position the crane in order to lift the machine in a level plane.
5. Remove the slings, cables, beams, and lifting devices after the machine has been lowered.

Tying Down the Machine

Each machine is equipped with brackets for tying down the machine.

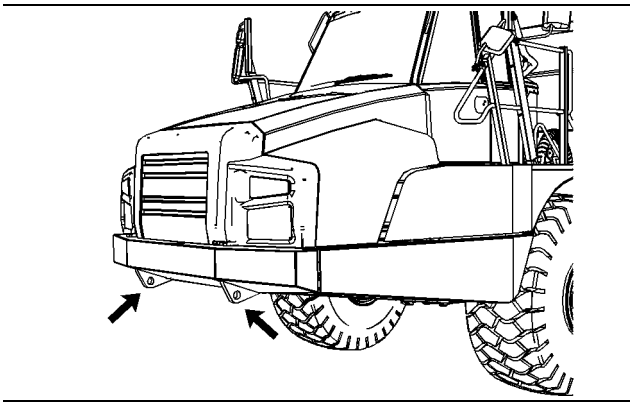


Illustration 96 g02138479

Use the two front tow points for tying down the front of the machine.

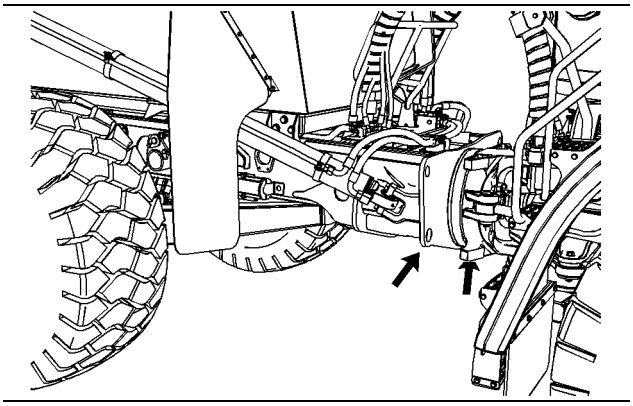


Illustration 97 g02138481

Two points for tying down are located at the center of the machine.

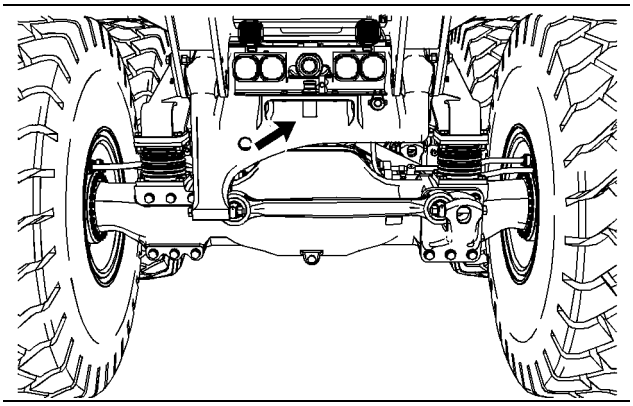


Illustration 98 g02138482

Use the rear tow point for tying down the rear of the machine.

Attach tie-downs at these locations. Place blocks around the front wheels and around the rear wheels.

Obey all of the laws that govern the actual load weight, the actual load width, and the actual load length.

Consult your Cat dealer for shipping instructions for your machine. Refer to Operation and Maintenance Manual, “Shipping the Machine”.

Jacking Location Information

i04188989

Jacking/Blocking Locations

SMCS Code: 7000

Empty the dump body before the machine is jacked up.

Park the machine on a level surface. Move the parking brake control to the ENGAGED position. Lower the dump body and stop the engine.

Raising with a Jack and Supporting with Blocks

Place the jack in a location that will sustain the weight of the machine such as a frame member. The frame member should be parallel to the ground. The head of the jack should be against a flat surface. Use a jack which will support the weight of the machine.

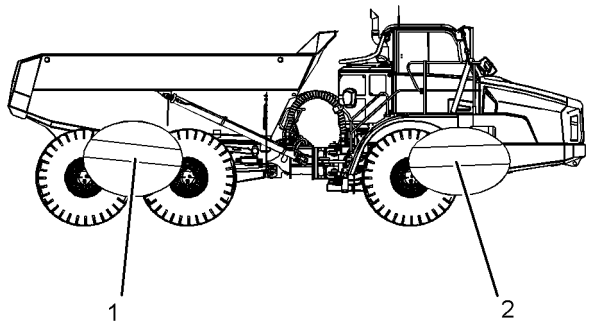


Illustration 99 g02380252

Suitable places (1) and (2) for jacking up the machine are shown in illustration 99. These locations are part of the front frame and the rear frame.

Jack up the machine to the required height. Place wood blocks at suitable locations under the machine. The blocks should be placed on a level ground. The blocks should provide a large base for support. The wood blocks should be no less than 15 cm (6 inches) wide,15 cm (6 inches) high, and 76 cm (30 inches) long. Only use wood blocks which will support the weight of the machine.

Once the wood blocks are in place, lower the jack until the machine is supported by the blocks.

Make sure that the machine is stable before you proceed to work on the machine.

Note: A stand is available from your Caterpillar dealer which may be substituted for wood blocks. Stands should only be used on a concrete surface. Consult your Caterpillar dealer for further information.

Raising and Supporting with a Lift Stand

A Lift Stand is available from your Caterpillar dealer. The Lift Stand combines lifting and supporting functions. Two Lift Stands should be used if you are lifting both sides of the machine. Lift Stands should only be used on concrete surfaces.

Place the Lift Stand in a location that will sustain the weight of the machine such as a frame member. The frame member should be parallel to the ground. The head of the Lift Stand should be against a flat surface. Use a Lift Stand which will support the weight of the machine.

Make sure that the machine is stable before you proceed to work on the machine.

Towing Information

i04258190

Towing the Machine

SMCS Code: 7000

⚠ WARNING

Improper hookup and towing is dangerous and could result in injury or death to yourself or others.

The towing connection must be rigid, or towing must be done by two machines of the same size as the towed machine. If two machines are used, connect a machine on each end of the towed machine.

If only one machine is used for towing, that machine must be larger than the towed machine.

Be sure that all necessary repairs and adjustments have been made before a machine that has been towed to a service area is put back into operation.

Follow the recommendations that are listed below in order to perform the towing procedure correctly.

Note: To prevent the machine from moving, place blocks under the machine wheels. Blocking the wheels must be done before you release the parking brake.

The machine is equipped with a spring applied, oil pressure released parking brake. The parking brake is mounted on the center axle.

If the engine cannot be run, the brake piston pump will be inoperable. The inoperable pump may prevent the release of the parking brake.

The parking brake can be released manually when there is not enough oil pressure in the system.

Refer to Operation and Maintenance Manual, “Parking Brake Manual Release”.

The following towing instructions are for moving a disabled machine for a short distance at low speed.

Note: Empty the truck body and lower the truck body before towing a disabled machine. Do not tow the machine with material in the truck body. Ensure that the body is lowered before the machine is towed. Do not tow the machine with the truck body in the raised position. Failure to dump the load will result in damage to the frame and other components.

The towing force on the rear or on the front of the machine must not exceed the following structural limits:

- 524000 N (117800 lb)

Move the machine at a speed of 2 km/h (1.2 mph) or less to a convenient location for repair. Always haul the machine if long distance moving is required.

Do not allow an inexperienced operator onto a machine that is being towed. The operator must know the location of the machine controls. The operator must be familiar with the steering operation and with the braking operation of the machine.

Shielding must be provided on both machines.

Before you tow the machine, make sure that the tow line or the tow bar is in good condition. Make sure that the tow line or the tow bar has enough strength for the towing procedure that is involved. The strength of the tow line or of the tow bar should be at least 150% of the gross weight of the towing machine. This increased capacity is required for a disabled machine that is stuck in the mud and for towing on a grade.

Keep the tow line angle to a minimum. Do not exceed a 15° angle from the straight ahead position.

Quick machine movement could overload the tow line or the tow bar. Quick machine movement could cause the tow line or the tow bar to break. Gradual, steady machine movement will be more effective.

Normally, the towing machine should be as large as the disabled machine. Make sure that the towing machine has enough brake capacity, enough weight, and enough power. The towing machine must be able to control both machines for the grade that is involved and for the distance that is involved.

Provide sufficient control and sufficient braking when you are moving a disabled machine downhill in order to prevent the machine from rolling away. A larger towing machine or additional machines that are connected to the rear may be required.

If the machine is being towed downhill and the machine requires articulation, the steering frame locks can be removed. This maneuver will require two towing machines. One towing machine must be attached to the front of the disabled machine in order to control the tractor. An additional towing machine must be attached to the rear of the disabled machine in order to control the trailer.

Do not release the parking brake or remove the blocks from the wheels, until the weight of the disabled machine is held or controlled by the towing machine.

The requirements of all situations cannot be listed. Minimum towing machine capacity is required on smooth, level surfaces. Maximum towing machine capacity is required on inclines or on uneven surfaces.

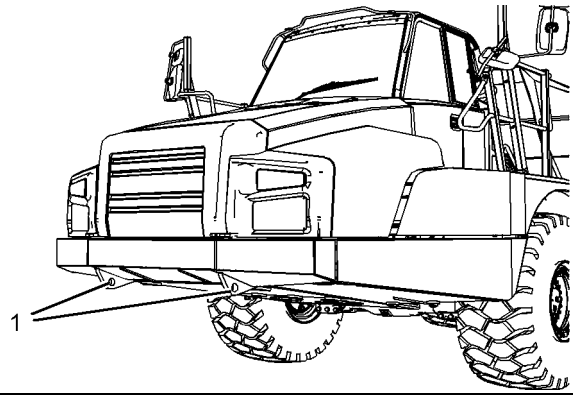


Illustration 100 g02428659

When the machine is towed from the front , use tow both points (1). Configure the tow bar or the tow line in a Y configuration. Failure to configure the front towing device in a Y configuration will cause damage to the disabled machine.

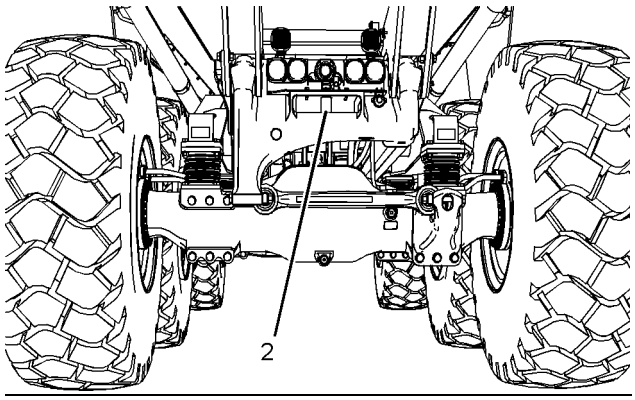


Illustration 101 g02428684

3

When the machine is towed from the rear, use tow point (2).

Note: Tow points (1) and tow point (2) are to be used to retrieve a disabled machine only. The tow points are not provided to allow the machine to tow any form of attachment.

Note: Consult your Cat dealer for more information about towing a disabled machine.

Towing with Inoperable Engine

If the engine is inoperable, the transmission pump will also be inoperable. This may cause premature wear on components in the transmission and in the transfer gear. Therefore, the machine can only be towed at low speed for short distances. Do not exceed a road speed of 2 km/h (1.2 mph).

If the machine is in the straight ahead position and the machine needs towing for only a short distance, it is unnecessary for the steering system to be disabled.

If the machine is not in the straight ahead position, adjustment will be necessary. Adjust the position of the machine by using the secondary steering.

Note: The secondary steering system will only operate with a charged battery.

If the machine is not in the straight ahead position and the secondary steering is inoperable, it will be necessary to disable the steering system. This will allow the machine to articulate.

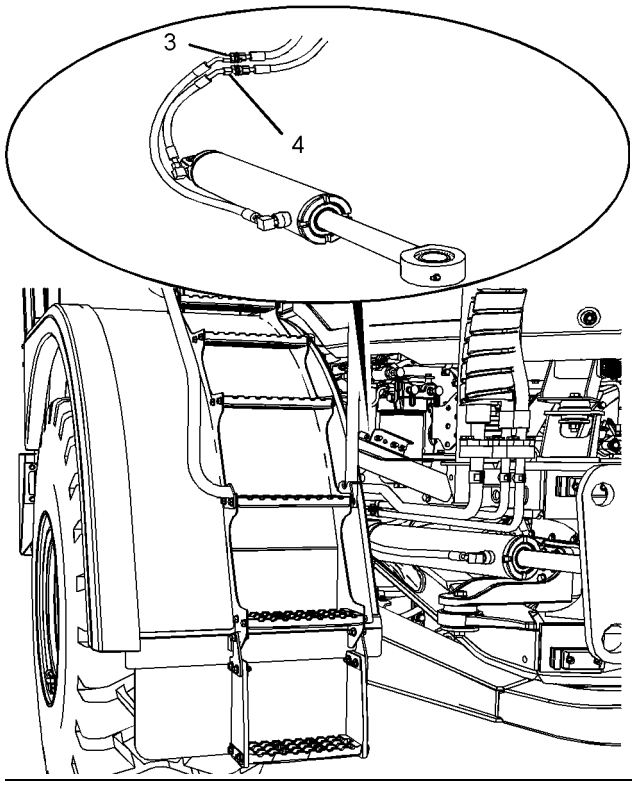


Illustration 102 g02428716

1. Locate the hydraulic hoses behind the left front wheel.

2. Place a suitable container under the hydraulic hoses and disconnect the hydraulic hoses. The container will catch oil when the hydraulic hoses are disconnected. Remove the hose clips that secure the hydraulic hoses to the machine frame. Reverse hydraulic hose (3) and hydraulic hose (4). This will allow the machine to articulate without spilling oil.

3. Block the wheels securely.

4. Hook up the towing machine or towing machines to the disabled machine. Ensure that the combination of towing machines is enough for the towing of the disabled machine.

5. The parking brake must be released manually if the oil pressure in the system is not enough to keep the brake released.

6. Start the engine of the towing machine. Move the machine forward slowly in order to take the weight of the disabled machine. Remove the blocks and very slowly tow the disabled machine.

7. When the machine is at the required destination, block the wheels again.

8. Manually engage the parking brake.

9. Return hydraulic hose (3) and hydraulic hose (4) to the original positions.

Towing with Operable Engine

If the engine can be run during towing and there is no fault with the steering system, an operator can steer the disabled machine.

If the braking system is working correctly, an operator can use the service brakes to slow down the machine during towing. If the braking system is working correctly, the manual release of the parking brake will be unnecessary. The parking brake will engage when the engine stops regardless of the position of the parking and secondary brake control.

Failure in any of the following machine systems will require machine towing:

- final drive
- differential
- transmission
- transfer gear

Remove the corresponding drive shafts and axle shafts in order for the machine to be towed.

Reference: Refer to Disassembly and Assembly, UENR0207, “735B and 740B Articulated Truck Power Train” or consult your Cat dealer.

i04210370

Parking Brake Manual Release

SMCS Code: 4267; 7000

WARNING

When the parking brakes are released manually, the machine has no brakes.

To avoid possible personal injury, the tires must be blocked securely before the parking brakes are manually released.

The parking brake can be released manually when insufficient pressure in the braking system prevents the parking brake from being released with the parking brake control.

The machine must be parked on a level surface before the parking brake is manually released.

1. Block the wheels in order to prevent the machine from moving when the parking brake is released.

2. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

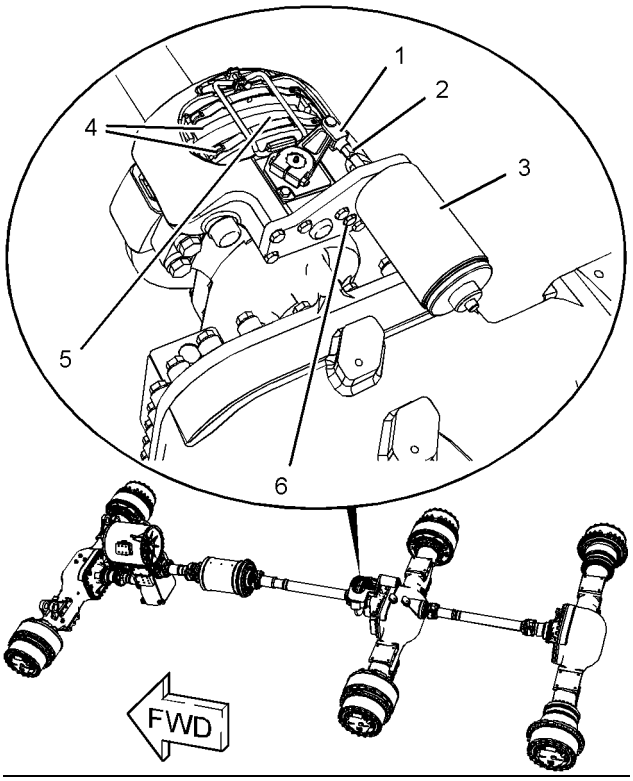


Illustration 103 g02395039

(1) Actuator rod
(2) Yoke
(3) Parking brake actuator
(4) Brake pads
(5) Brake disc
(6) Plug

3. Raise the dump body in order to access parking brake actuator (3). If the dump body cannot be raised, access to the parking brake actuator can be gained from a position underneath the machine.

Note: Install the body prop if the dump body is raised.

4. Loosen actuator rod (2) from yoke (1). This action allows a parking brake lever to move and relieves the pressure from the brake pads.

   Loosen the actuator rod until brake pads (4) do not contact brake disc (5), releasing the parking brake.

Adjusting the Parking Brake

Note: The machine must be fully operational before the parking brake can be set.

1. Raise the body enough to lift the body prop and then move the hoist control to the HOLD position.

2. Lift the body prop.

3. Move the hoist control to the FLOAT position. This will allow the body to lower slowly until the weight of the body is supported by the body prop.

4. Fully thread actuator rod (2) on to yoke (1). Refer to illustration 103.

5. Start the engine and move the parking brake control to the DISENGAGED position.

6. Remove plug (6) and the washer. Refer to illustration 103. Insert a 6mm hexagonal drive into the hole and rotate the hexagonal drive clockwise until resistance is felt. The gap between the brake pads and the disc should now be zero.

7. To set the initial running clearance, rotate the hexagonal drive counterclockwise. You will feel a click on the hexagonal drive. Rotate the hexagonal drive for eight clicks.

8. Use a feeler gauge to check the gaps between the brake pads and the disc. The total running clearance between the disc and the brake pads should be 1.15 ± 0.15 mm (0.045 ± 0.006 inch).

9. If the running clearance is incorrect, increase or reduce the number of clicks. Refer to steps 6 through 8.

10. Install plug (6) and the washer. Refer to illustration 103. Tighten the plug to a torque of 14 ± 3 N·m (10 ± 2 lb ft).

11. Move the parking brake control to the ENGAGED position. Lower the body and shut off the engine.

12. Remove the blocks from the wheels and then remove the steering frame lock.

Engine Starting (Alternate Methods)

i01995977

Engine Starting with Jump Start Cables

SMCS Code: 1000; 1401; 7000

⚠ WARNING

Failure to properly service the batteries may cause personal injury.

Prevent sparks near the batteries. They could cause vapors to explode. Do not allow the jump start cable ends to contact each other or the machine.

Do not smoke when checking battery electrolyte levels.

Electrolyte is an acid and can cause personal injury if it contacts the skin or eyes.

Always wear eye protection when starting a machine with jump start cables.

Improper jump start procedures can cause an explosion resulting in personal injury.

When using jumper cables, always connect the positive (+) jumper cable to the positive (+) battery terminal first. Next, connect the negative (-) jumper cable to the frame away from the batteries. Follow the procedure in the Operation and Maintenance Manual.

Jump start only with an energy source of the same voltage as the stalled machine.

Turn off all lights and accessories on the stalled machine. Otherwise, they will operate when the energy source is connected.

NOTICE

Ensure that the machine that is used as an electrical source does not touch the stalled machine. This could prevent damage to engine bearings and electrical circuits.

Turn on the disconnect switch on the electrical source. This will help to prevent damage to electrical components on the stalled machine.

This machine has a 24 volt starting system. Use only equal voltage for jump starting. Use of a higher voltage will damage the electrical system.

Severely discharged maintenance free batteries will not fully recharge from the alternator alone after you jump start the machine. The batteries must be charged to the proper voltage with a battery charger. Many batteries that are considered to be unusable can still be recharged.

Refer to Special Instruction, SEHS7633, “Battery Test Procedure” for complete information about testing and about charging. This document is available from your Caterpillar dealer.

When auxiliary start receptacles are not available, use the following procedure.

1. Determine the reason that the engine fails to crank.
2. Engage the parking brake on the stalled machine. Move the transmission control into the NEUTRAL position. Move the hoist control into the HOLD position.
3. Turn the engine start switch key on the stalled machine to the OFF position. Turn off all accessories.
4. Turn the battery disconnect switch on the stalled machine to the ON position.
5. Move the machine that is being used as an electrical source near the stalled machine in order for the jump start cables to reach the stalled machine.

   Do not allow the machines to contact each other.
6. Stop the engine of the machine that is being used as an electrical source. If you are using an auxiliary power source, turn off the charging system.

7. Ensure that the battery caps on both machines are tight. Ensure that the battery caps on both machines are correctly placed. Ensure that the batteries in the stalled machine are not frozen. Make sure that the batteries have enough electrolyte.

8. The positive ends of the jump start cable are red. Connect one positive end of the jump start cable to the positive cable terminal of the discharged battery. Some machines have battery sets.

Note: Batteries that are in series may be in separate compartments. Use the terminal that is connected to the starter solenoid. This battery or battery set is normally on the same side of the machine as the starting motor.

Do not allow the positive cable clamps to contact any metal except for the battery terminals.

9. Connect the other positive end of the jump start cable to the positive cable terminal of the electrical source.

10. Connect one negative end of the jump start cable to the negative cable terminal of the electrical source.

11. Finally, connect the other negative end of the jump start cable to the frame of the stalled machine.

Do not connect the jump start cable to the battery post.

Do not allow the jump start cables to contact any of the following components: fuel lines, hydraulic lines, and moving parts.

12. Start the engine of the machine that is being used as an electrical source, or energize the charging system on the auxiliary power source.

13. Wait at least two minutes before you attempt to start the stalled machine. This will allow the batteries in the stalled machine to partially charge.

14. Attempt to start the stalled engine.

15. Immediately after you start the stalled engine, disconnect the jump start cables in reverse order.

16. Conclude the failure analysis on the starting system of the stalled machine and/or on the charging system of the stalled machine.

i03895002

Engine Starting with Auxiliary Start Receptacle

SMCS Code: 1000; 1450; 1463; 7000

Some Caterpillar products may be equipped with an auxiliary start receptacle as a standard part. If your machine is not equipped with an auxiliary start receptacle, the machine can be equipped with an auxiliary start receptacle from parts service. An auxiliary start receptacle will ensure that a permanent receptacle is always available in order to jump-start the machine.

Two cable assemblies are available in order to jump-start the stalled machine from another machine that is equipped with an auxiliary start receptacle, or from an auxiliary power pack. Your Cat dealer can provide the correct cables for your application.

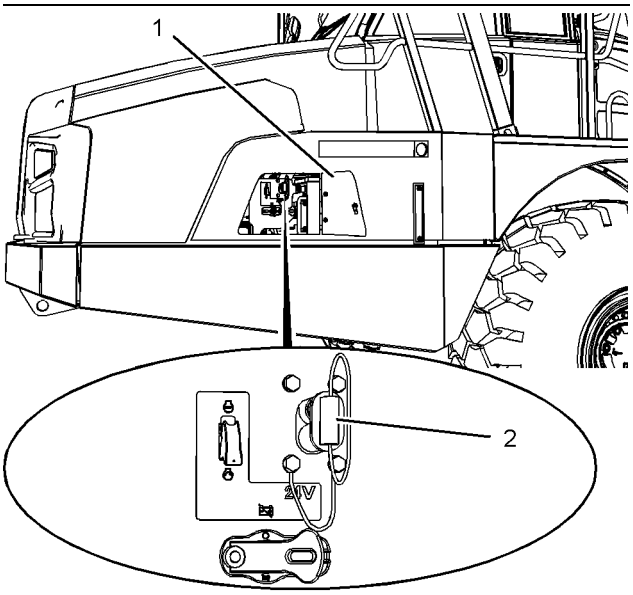


Illustration 104 g02417878

The auxiliary start receptacle is located on the front left side of the tractor behind access cover (1).

1. Make the initial determination that the machine has inadequate electrical power.

2. Move the transmission control of the stalled machine to the N position and engage the parking brake. Move the hoist control to the HOLD position.

3. Turn the engine start switch of the stalled machine to the OFF position. Turn off all accessories.

4. Turn the battery disconnect switch of the stalled machine to the ON position.

5. The machine that is providing the electrical source should be positioned close to the stalled machine in order to allow the jump-start cables to reach the stalled machine. Do not allow the machines to contact each other.

6. Stop the engine on the machine that is being used as an electrical source. If you are using an auxiliary power source, turn off the charging system.

7. Ensure that the battery caps are tight. Ensure that the battery caps are correctly placed on both machines. Ensure that the batteries in the stalled machine are not frozen. Ensure that there is enough electrolyte in the batteries.

8. On the stalled machine, open the access cover and connect the appropriate jump-start cable to auxiliary start receptacle (2).

9. Connect the other end of the jump-start cable to the auxiliary start receptacle that is on the power source.

10. Start the engine on the machine that is being used as an electrical source. If you are using an auxiliary power source, energize the charging system on the auxiliary power source.

11. Wait for a minimum of two minutes while the batteries in the stalled machine partially charge.

12. Attempt to start the stalled engine.

13. Immediately after you start the stalled engine, disconnect the jump-start cable from the electrical source.

14. Disconnect the other end of the jump-start cable from the stalled machine.

15. Close the access cover.

16. When the engine is running and the charging system is in operation, conclude the failure analysis on the starting system and on the charging system of the stalled machine, as required.

Maintenance Section

Tire Inflation Information

i00072696

Tire Inflation with Nitrogen

SMCS Code: 4203

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 serious personal injury or death can occur.

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

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.

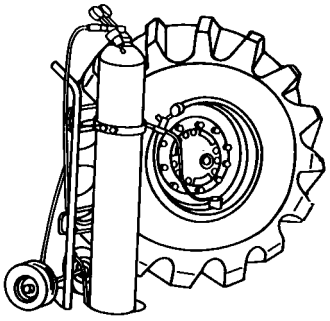


Illustration 105 g00103698

⚠ WARNING

Personal injury or death could result with improper tire inflation techniques.

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

Note: Do not set the tire inflation equipment regulator higher than 140 kPa (20 psi) over the recommended tire pressure.

Use 6V-4040 Nitrogen Tire Inflation Group or an equivalent part to inflate tires from a nitrogen gas cylinder. Refer to Special Instruction, SMHS7867 for tire inflation instructions.

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

i04278743

Tire Shipping Pressure

SMCS Code: 4203; 7500

As shown, the tire inflation pressure is cold inflation shipping pressure.

Table 9

735B			
Tire Type Size	**Axle**	**Inflation Pressure (kPa)**	**Inflation Pressure (psi)**
Bridgestone VLT 26.5R25 E3	Front	434	63
	Center and Rear	407	59
Bridgestone VLTS 26.5R25 E4	Front	434	63
	Center and Rear	407	59
Continental STL2+ 26.5R25 L3T/E3T CS	Front	503	73
	Center and Rear	476	69
Continental STL3 26.5R25 L3/E3 CS	Front	503	73
	Center and Rear	476	69
Goodyear RL-2+ 26.5R25 E3 6S	Front	434	63
	Center and Rear	407	59
Goodyear GP-2B 26.5R25 E2 4S	Front	434	63
	Center and Rear	407	59
Goodyear GP-4B 26.5R25 E4/L4 4S	Front	437	63
	Center and Rear	407	59
Goodyear TL-3A+ 26.5R25 193B E4 6S	Front	434	63
	Center and Rear	407	59
Michelin XADN 26.5R25 193B E2/E3	Front	434	63
	Center and Rear	407	59
Michelin XADT 26.5R25 193B E3	Front	434	63
	Center and Rear	407	59

Table 10

740B

(continued)

(Table 10, contd)

740B			
Tire Type and Size	**Axle**	**Inflation Pressure (kPa)**	**Inflation Pressure (psi)**
Michelin XADN 29.5R25 200B E3	Front	359	52
	Center and Rear	345	50
Michelin XADT 29.5R25 200B E4T	Front	359	52
	Center and Rear	345	50
Michelin XAD-65 850/65R255 196B E3	Front	345	50
	Center and Rear	331	48
Goodyear GP-2B 29.5R25 4S	Front	379	55
	Center and Rear	379	55
Goodyear RL-2+ 29.5R25 E3 6S	Front	379	55
	Center and Rear	379	55
Goodyear TL-3A+ 29.5R25 200B E4 6S	Front	400	58
	Center and Rear	400	58
Bridgestone VLT 29.5R25 E3	Front	359	52
	Center and Rear	345	50
Bridgestone VKT 29.5R25 E2	Front	448	65
	Center and Rear	428	62
Bridgestone VLTS 29.5R25 E4	Front	359	52
	Center and Rear	345	50
Bridgestone VMT 29.5R25 E3	Front	448	65
	Center and Rear	428	62
Continental STL2+ 29.5R25 L3T/E3T CS	Front	448	65
	Center and Rear	448	65

(continued)

(Table 10, contd)

740B			
Continental STL3 29.5R25 L3/E3 CS	Front	448	65
	Center and Rear	448	65
Continental STL3 29.5R25 L3/E3 WS	Front	448	65
	Center and Rear	448	65
Triangle TB516 29.5R25 E3 T3	Front	448	65
	Center and Rear	428	62

The operating inflation pressure is based on the weight of a ready-to-work machine, at the rated payload and in average operating conditions. The inflation pressure for each application may vary. Tire air pressure should always be obtained from your tire supplier.

i02247473

Tire Inflation Pressure Adjustment

SMCS Code: 4203

The tire pressure in a warm shop area 18° to 21°C (65° to 70°F) will significantly change when you move the machine into freezing temperatures. If you inflate the tire to the correct pressure in a warm shop, the tire will be underinflated in freezing temperatures. Low pressure shortens the life of a tire.

When you operate the machine in freezing temperatures, see Special Publication, SEBU5898, “Cold Weather Recommendations”.

Lubricant Viscosities and Refill Capacities

i03895278

Lubricant Viscosities (Fluids Recommendations)

SMCS Code: 1000; 7000; 7581

General Information for Lubricants

When the machine is operating in temperatures below −20°C (−4°F), refer to Special Publication, SEBU5898, “Cold Weather Recommendations”. This publication is available from your Cat dealer.

For cold-weather applications where transmission oil SAE 0W-20 is recommended, Cat Cold Weather TDTO is recommended.

Refer to the “Lubricant Information” section in the latest revision of the Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for a list of Cat engine oils and for detailed information. This manual may be found on the Web at Safety.Cat.com. The footnotes are a key part of the tables. Read ALL footnotes that pertain to the machine compartment in question.

Supplemental heat is recommended for cold-soaked engine starting below the minimum ambient temperature. The parasitic load and other factors will determine if supplemental heat is required for cold-soaked starts that are above the minimum temperature that is stated. Cold-soaked starts occur when the engine has not been operated for a period of time. The oil becomes more viscous due to cooler ambient temperatures.

Perform the warm-up procedures in the Operation and Maintenance Manual, “Engine and Machine Warm-Up”, prior to operation.

Selecting the Viscosity

In order to select the proper oil for each machine compartment, refer to the “Lubricant Viscosity for Ambient Temperature” table. Use the oil type AND oil viscosity for the specific compartment at the proper ambient temperature.

The proper oil viscosity grade is determined by the minimum ambient temperature (the air in the immediate vicinity of the machine). Measure the temperature when the machine is started and while the machine is operated. In order to determine the proper oil viscosity grade, refer to the “Min” column in the table. This information reflects the coldest ambient temperature condition for starting a cold machine and for operating a cold machine. Refer to the “Max” column in the table for operating the machine at the highest temperature that is anticipated. Unless specified otherwise in the “Lubricant Viscosities for Ambient Temperatures” tables, use the highest oil viscosity that is allowed for the ambient temperature.

Machines that are operated continuously should use oils that have the higher oil viscosity in the final drives and in the differentials. The oils that have the higher oil viscosity will maintain the highest possible oil film thickness.

NOTICE
Not following the recommendations found in this manual can lead to reduced performance and compartment failure.

Engine Oil for Tier 4 Machines

Refer to the “General Information for Lubricants” for important lubricant information.

Cat oils have been developed and tested in order to provide the full performance and life that has been designed and built into Cat engines.

Cat DEO-ULS or oils that meet the Cat ECF-3 specification and the API CJ-4 are required for use in the applications listed below. Cat DEO-ULS and oils meeting Cat ECF-3 specification and the API CJ-4 and ACEA E9 oil categories have been developed with limited sulfated ash, phosphorus, and sulfur. These chemical limits are designed to maintain the expected aftertreatment devices life, performance, and service interval. If oils meeting the Cat ECF-3 specification and the API CJ-4 specifications are not available, oils meeting ACEA E9 may be used. ACEA E9 oils meet the chemical limits designed to maintain aftertreatment device life. ACEA E9 oils are validated using some but not all ECF-3 and API CJ-4 standard engine performance tests. Consult your oil supplier when considering use of an oil that is not Cat ECF-3 or API CJ-4 qualified.

Failure to meet the listed requirements will damage aftertreatment-equipped engines and can negatively impact the performance of the aftertreatment devices. The Diesel Particulate Filter (DPF) will plug sooner and require more frequent DPF ash service intervals.

Typical aftertreatment systems include the following:

- Diesel Particulate Filters (DPF)
- Diesel Oxidation Catalysts (DOC)
- Selective Catalytic Reduction (SCR)
- Lean NOx Traps (LNT)

Other systems may apply.

Table 11

Engine Lubricant Viscosities for Ambient Temperatures (S/N T4P and T4R)						
Compartment or System	**Oil Type and Performance Requirements**	**Oil Viscosities**	**°C**		**°F**	
			Min	**Max**	**Min**	**Max**
Engine Crankcase	**Cat DEO-ULS Cold Weather**	SAE 0W-40	−40	40	−40	104
	Cat DEO-ULS SYN	SAE 5W-40	−30	50	−22	122
	Cat DEO-ULS	SAE 10W-30	−18	40	0	104
	Cat DEO-ULS	SAE 15W-40	−9.5	50	15	122

Engine Oil for Non-Tier 4 Machines

Refer to the “General Information for Lubricants” for important lubricant information.

Cat oils have been developed and tested in order to provide the full performance and life that has been designed and built into Cat engines.

Cat DEO-ULS multigrade and Cat DEO multigrade oils are formulated with the correct amounts of detergents, dispersants, and alkalinity in order to provide superior performance in Cat diesel engines where recommended for use.

Table 12

Engine Lubricant Viscosities for Ambient Temperatures (S/N L4D and L4E)						
Compartment or System	**Oil Type and Performance Requirements**	**Oil Viscosities**	**°C**		**°F**	
			Min	**Max**	**Min**	**Max**
Engine Crankcase	**Cat DEO-ULS Cold Weather**	SAE 0W-40	−40	40	−40	104
	Cat DEO-ULS SYN Cat DEO SYN	SAE 5W-40	−30	50	−22	122
	Cat DEO-ULS Cat DEO	SAE 10W-30	−18	40	0	104
	Cat DEO-ULS Cat DEO	SAE 15W-40	−9.5	50	15	122

When fuels of sulfur level of 0.1 percent (1000 ppm) or higher are used, Cat DEO-ULS may be used if S·O·S oil analysis program is followed. Base the oil change interval on the oil analysis.

Articulated Trucks

Refer to the “General Information for Lubricants” for important lubricant information.

For Differentials and Final Drives, Cat TDTO SAE 50 or commercial oil that meets Cat TO-4 SAE 50 performance requirements is preferred in most applications, particularly continuous operation. If the ambient temperature is below −15° C (5° F), warm up the oil prior to operation. The oil must be maintained to a temperature above −15° C (5° F) during operation. Perform the warm-up procedures in the Operation and Maintenance Manual, “Engine and Machine Warm-Up”, prior to operation. If the ambient temperature is below −25° C (−13° F), consult your Cat dealer for instructions. Failure to warm up the oil prior to operation will cause damage to the machine.

For Differentials and Final Drives, do NOT use SAE 0W-20 oils when the typical daily maximum ambient temperature is above −10° C (14° F).

Table 13

Articulated Truck Lubricant Viscosities for Ambient Temperatures						
Compartment or System	**Oil Type and Performance Requirements**	**Oil Viscosities**	**°C**		**°F**	
			Min	**Max**	**Min**	**Max**
Transmission/Torque Converter System	**Cat TDTO Cat TDTO-TMS Cat Cold Weather TDTO Cat TO-4, Cat TO-4M**	SAE 0W-20	−40	10	−40	50
		SAE 10W	−20	10	−4	50
		SAE 30	0	50	32	122
		Cat TDTO-TMS	−10	50	14	122
Steering, Hoist (or Ejector)/Brake System, Brake Control Valve Damper, and Suspension Hydraulic System	**Cat TDTO Cat Cold Weather TDTO Cat TO-4**	SAE 0W-20(1)	−40	40	−40	104
		SAE 10W(1)	−20	50	−4	122
Differentials/Final Drives	**Cat TDTO Cat TDTO-TMS Cat Cold Weather TDTO Cat TO-4, Cat TO-4M**	SAE 0W-20	−40	−10	−40	14
		SAE 50	−15	40	5	104
		SAE 60	−10	50	14	122
		Cat TDTO-TMS	−25	22	−13	72
Output Transfer Gear	**Cat TDTO Cat Cold Weather TDTO Cat TO-4**	SAE 0W-20	−40	−10	−40	14
		SAE 30	−20	50	−4	122

(1) The maximum allowable oil viscosity at 100°C is 6.6 cSt (ASTM D445).

Lubricating Grease

Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for more details about lubricating grease. This manual may be found on the Web at Safety.Cat.com.

In order to use a non-Cat grease, the supplier must certify that the lubricant is compatible with Cat grease.

Each pin joint should be flushed with the new grease. Ensure that all old grease is removed. Failure to meet this requirement may lead to failure of a pin joint.

Grease Recommendations

Table 14

Type of Caterpillar Grease for Articulated Trucks								
Application Point	**Typical Load and Speed**	**Load Factor**	**Ambient Temperature Range**				**NLGI Grade**	**Grease Type**
			° C		**° F**			
			Min	**Max**	**Min**	**Max**		
Belt Tightener, Drive Shaft Slip Spline, Fan Drive Pulley, Hoist /Ejector Control Bellcrank, Hoist Cylinder Bearings, Ejector Bearings, Rear Axle A-Frame Bearing, Steering Cylinder End, Steering Linkage, Steering Tie Rod and Pin Bearings, Tachometer Drive, Tailgate Bearings	High	Long haul time with frequent adverse grades. Continuous use on very poorly maintained haul roads with high rolling resistance.	−35	40	−31	104	1	Ultra 5Moly Grease
			−30	50	−22	122	2	
	Medium	Normal load and haul time. Varying load and haul road conditions. Some adverse grades. Some high rolling resistance	−20	40	−4	104	2	Advanced 3Moly Grease
	Low	Large amount of idling. Short to medium hauls on well maintained level haul roads. Minimum total resistance.	−30	40	−22	104	2	Multipurpose Grease
Fan Drive Bearings			−20	40	−4	104	2	High Speed Ball Bearing Grease

Grease for the Autolube System

The grease used with the automatic lubrication system must not contain any graphite or PTFE.

Note: Pumpability is based on “US Steel Mobility and Lincoln Ventmeter Tests”. Performance may vary depending on lubrication equipment and the length of the lines.

Table 15

Recommended Grease for the Autolube System				
Compartment or System	**GreaseType**	**NLGI Grade**	**°C**	**°F**
			Min	**Min**
Cat Autolube System	**Cat 3Moly Grease**	NLGI Grade 2	−18	0
	Cat Ultra 5Moly	NLGI Grade 2	−7	20
		NLGI Grade 1	−18	0
		NLGI Grade 0	−29	−20
	Cat Arctic Platinum	NLGI Grade 0	−43	−45
	Cat Desert Gold	NLGI Grade 2	2	35

Diesel Fuel Recommendations

Tier 4 Diesel Fuel Recommendations

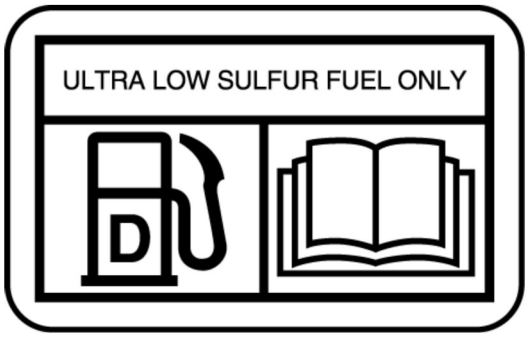


Illustration 106 g02157153
NACD Film

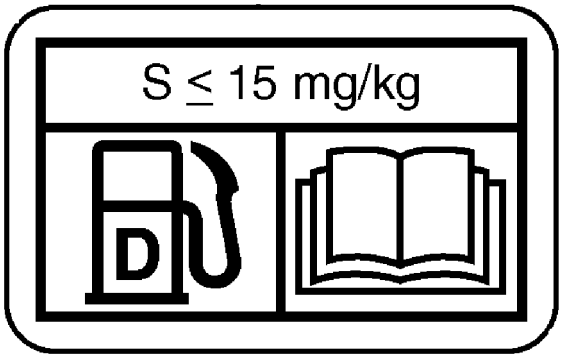


Illustration 107 g02052934
EAME Film

Diesel fuel must meet “Cat Specification for Distillate Fuel” and the latest versions of “ASTM D975” or “EN 590” in order to ensure optimum engine performance. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for the latest fuel information and for Cat fuel specification. This manual may be found on the Web at Safety.Cat.com.

NOTICE
Ultra Low Sulfur Diesel (ULSD) fuel 0.0015 percent (≤15 ppm (mg/kg)) sulfur is required by regulation for use in engines certified to nonroad Tier 4 standards (U.S. EPA Tier 4 certified) and that are equipped with exhaust aftertreatment systems.

European ULSD 0.0010 percent (≤10ppm (mg/kg)) sulfur fuel is required by regulation for use in engines certified to European nonroad Stage IIIB and newer standards and are equipped with exhaust aftertreatment systems.

Misfueling with fuels of higher sulfur level will invalidate the warranty and have the following negative effects:

- **Shorten the time interval between aftertreatment device service intervals (cause the need for more frequent service intervals)**
- **Adversely impact the performance and life of aftertreatment devices (cause loss of performance)**
- **Reduce regeneration intervals of aftertreatment devices**
- Reduce engine efficiency and durability
- Increase the wear
- Increase the corrosion
- Increase the deposits
- Lower fuel economy
- Shorten the time period between oil drain intervals (more frequent oil drain intervals)
- Increase overall operating costs

Failures that result from the use of improper fuels are not Cat factory defects. Therefore the cost of repairs would not be covered by a Cat warranty.

Caterpillar does not require the use of ULSD in off road and machine applications that are not Tier 4/Stage IIIB certified engines. ULSD is not required in engines that are not equipped with after treatment devices. For Tier 4/Stage IIIB/Stage IV certified engines always follow operating instructions. Fuel tank inlet labels are installed in order to ensure that the correct fuels are used.

Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for more details about fuels, lubricants, and Tier IV requirements. This manual may be found on the Web at Safety.Cat.com.

Non-Tier 4 Diesel Fuel Recommendations

Diesel fuel must meet “Caterpillar Specification for Distillate Fuel” and the latest versions of “ASTM D975” or “EN 590” in order to ensure optimum engine performance. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for the latest fuel information and for Cat fuel specification. This manual may be found on the Web at Safety.Cat.com.

The preferred fuels are distillate fuels. These fuels are commonly called diesel fuel, furnace oil, gas oil, or kerosene. These fuels must meet the "Caterpillar Specification for Distillate Diesel Fuel for Off-Highway Diesel Engines". Diesel Fuels that meet the Caterpillar specification will help provide maximum engine service life and performance.

Misfueling with fuels of high sulfur level can have the following negative effects:

- Reduce engine efficiency and durability
- Increase the wear
- Increase the corrosion
- Increase the deposits
- Lower fuel economy
- Shorten the time period between oil drain intervals (more frequent oil drain intervals)
- Increase overall operating costs
- Negatively impact engine emissions

Failures that result from the use of improper fuels are not Caterpillar factory defects. Therefore the cost of repairs would not be covered by a Caterpillar warranty.

Caterpillar does not require the use of ULSD in off road and machine applications that are not Tier 4/Stage IIIB certified engines. ULSD is not required in engines that are not equipped with after treatment devices.

Follow operating instructions and fuel tank inlet labels, if available, in order to ensure that the correct fuels are used.

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more details about fuels and lubricants. This manual may be found on the Web at Safety.Cat.com.

Biodiesel

Biodiesel is a fuel that can be made from various renewable resources that include vegetable oils, animal fat, and waste cooking oil. Soybean oil and rapeseed oil are the primary vegetable oil sources. In order to use any of these oils or fats as fuel, the oils or fats are chemically processed (esterified). The water and contaminants are removed.

U.S. distillate diesel fuel specification "ASTM D975-09a" includes up to B5 (5 percent) biodiesel. Currently, any diesel fuel in the U.S. may contain up to B5 biodiesel fuel.

European distillate diesel fuel specification "EN 590" includes up to B5 (5 percent) and in some regions up to B7 (7 percent) biodiesel. Any diesel fuel in Europe may contain up to B5 or in some regions up to B7 biodiesel fuel.

Note: For Tier 4 machines, the diesel portion used in the biodiesel blend must be Ultra Low Sulfur Diesel (15 ppm sulfur or less, per "ASTM D975"). In Europe the diesel fuel portion used in the biodiesel blend must be sulfur free diesel (10 ppm sulfur or less, per "EN 590"). The final blend must have 15 ppm sulfur or less.

When biodiesel fuel is used, certain guidelines must be followed. Biodiesel fuel can influence the engine oil, aftertreatment devices, non-metallic, fuel system components, and others. Biodiesel fuel has limited storage life and has limited oxidation stability. Follow the guidelines and requirements for engines that are seasonally operated and for standby power generation engines.

In order to reduce the risks associated with the use of biodiesel, the final biodiesel blend and the biodiesel fuel used must meet specific blending requirements.

All the guidelines and requirements are provided in the latest revision of Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations". This manual may be found on the Web at Safety.Cat.com.

Fuel Additives

Cat Diesel Fuel Conditioner and Cat Fuel System Cleaner are available for use when needed. These products are applicable to diesel and biodiesel fuels. Consult your Cat dealer for availability.

Coolant Information

The following two types of coolants may be used in Cat diesel engines:

Preferred – Cat ELC (Extended Life Coolant)

Acceptable – Cat DEAC (Diesel Engine Antifreeze/Coolant)

NOTICE
Never use water alone without Supplemental Coolant Additives (SCA) or without inhibited coolant. Water alone is corrosive at engine operating temperatures. In addition, water alone does not provide adequate protection against boiling or freezing.

i03903250

Capacities (Refill)

SMCS Code: 1000; 7000; 7560

The refill capacities will vary depending on the service procedures and conditions. Observe all sight gauges and level indicators in order to ensure that the systems and/or compartments are refilled to the proper levels.

Table 16

APPROXIMATE REFILL CAPACITIES			
Compartment or System	**Liters**	**US Gal**	**Imp Gal**
Cooling System	80	21.1	17.6
Fuel Tank	565	149.3	124.3
Engine Oil with filters	34	9.0	7.5
Transmission	72	19.0	15.8
Transfer Gear	18	4.8	4.0
Front Axle	66	17.4	14.5
Center Axle	67	17.7	14.7
Rear Axle	67	17.7	14.7
Final Drive (each)	5	1.3	1.1
Hoist and Brake Tank	225	59.4	49.5
Steering Tank	97	25.6	21.3

Table 17

APPROXIMATE REFILL CAPACITIES			
Compartment or System	**Milliliters**	**US Ounce**	**Imp Ounce**
Brake Control Valve Damper	50	1.69	1.76

Use the procedures in this manual in order to establish the correct fluid levels.

i01822901

S·O·S Information

SMCS Code: 1000; 7000; 7542

S·O·S Services is a highly recommended process for Caterpillar customers to use in order to minimize owning and operating cost. Customers provide oil samples, coolant samples, and other machine information. The dealer uses the data in order to provide the customer with recommendations for management of the equipment. In addition, S·O·S Services can help determine the cause of an existing product problem.

Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluid Recommendations” for detailed information concerning S·O·S Services.

Refer to the Operation and Maintenance Manual, “Maintenance Interval Schedule” for a specific sampling location and a service hour maintenance interval.

Consult your Caterpillar dealer for complete information and assistance in establishing an S·O·S program for your equipment.

Maintenance Locations

i04272149

Sampling Interval and Location of Sampling Valve

SMCS Code: 1000; 1318; 1348; 3080; 4070; 4250; 4300; 5050; 7000; 7542

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, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

Obtain S·O·S samples as close as possible to the recommended sampling interval. In order to receive the full effect of S·O·S analysis, establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Cat dealer. Consult your Cat dealer for complete information and for assistance in establishing an S·O·S program for your equipment.

Operate the machine for a few minutes before you obtain the oil sample. The operation of the machine will thoroughly mix the oil for a more accurate sample.

Use the following guidelines for proper fluid sampling:

- Complete the information on the label for the sampling bottle before obtaining the samples.
- Keep the unused sampling bottles stored in plastic bags.
- Obtain samples directly from the sampling valve. If a sampling valve is not available, obtain the samples where stated. Do not obtain the samples from any other location.
- Keep the lids on empty sampling bottles until you are ready to collect the sample.
- Place the sample in the mailing tube immediately after obtaining the sample in order to avoid contamination.
- Never collect samples from expansion bottles.
- Never collect samples from a system drain location.

Sampling Interval

Table 18

Type of Fluid	Change Interval	Sampling Interval	Sampling Valve
Coolant	6000 Hr	Initial 500 Hr(2)	Yes
Coolant	6000 Hr	3000 Hr(3)	Yes
Coolant	6000 Hr	Every Year(4)	Yes
Differential / Final Drive Oil(5)	2000 Hr	500 Hr	No
Engine Oil	500 Hr	500 Hr	Yes
Hoist / Brake Oil	2000 Hr	500 Hr	Yes
Steering Oil	4000 Hr	500 Hr	Yes
Torque Converter / Transmission Oil	1000 Hr	500 Hr	Yes
Transfer Gear Oil	1000 Hr	500 Hr	Yes

(2) For New Systems, Refilled Systems, and Converted Systems
(3) Level 1 Sample
(4) Level 2 Sample
(5) There are three sets of differential/final drives.

Sampling Locations

For systems equipped with a sampling valve, take sample with engine running at low idle. For systems without a sampling valve, take sample with engine stopped. Take ALL samples with transmission in neutral, parking brake applied, dump body lowered (except when the body support is installed), and steering frame lock Installed.

Take ALL samples with transmission in neutral, parking brake applied, dump body lowered (except when the body support is installed), and steering frame lock Installed.

Wipe the area around the sampling valve or the plug before taking a sample in order to prevent contamination. Use a clean sampling gun when accessing an oil sample through a plug opening. Clean and inspect the plug after obtaining an oil sample through a plug opening.

Cooling System Coolant Sample (Level 1 and 2)

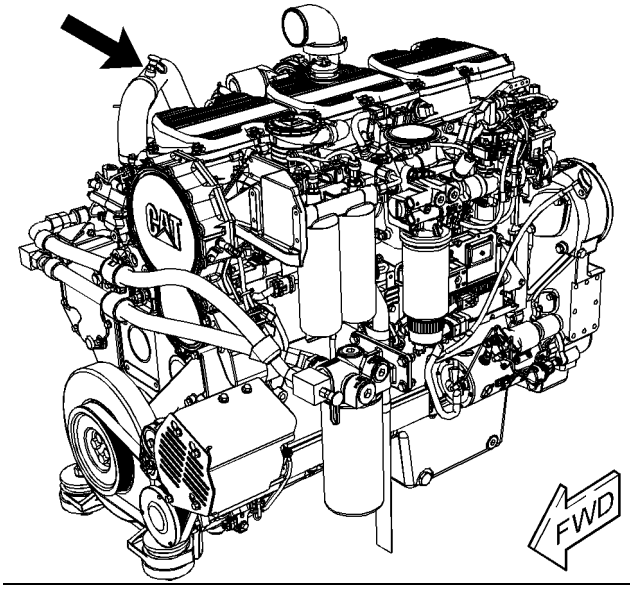


Illustration 108 g02384076

The sampling valve for the coolant is located under the hood on the coolant line above the engine.

Differential and Final Drive(s) Oil Sample

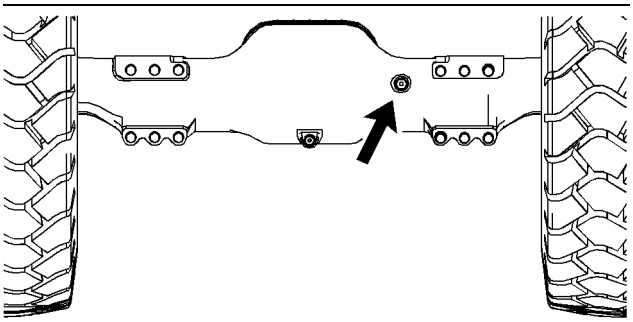


Illustration 109 g02441656

Plug location for sampling the differential/final drive oil. Obtain the differential/final drive oil samples through the plug openings with a clean sampling gun.

Obtain an oil sample from each of the three differential/final drive sets.

Engine Oil Sample

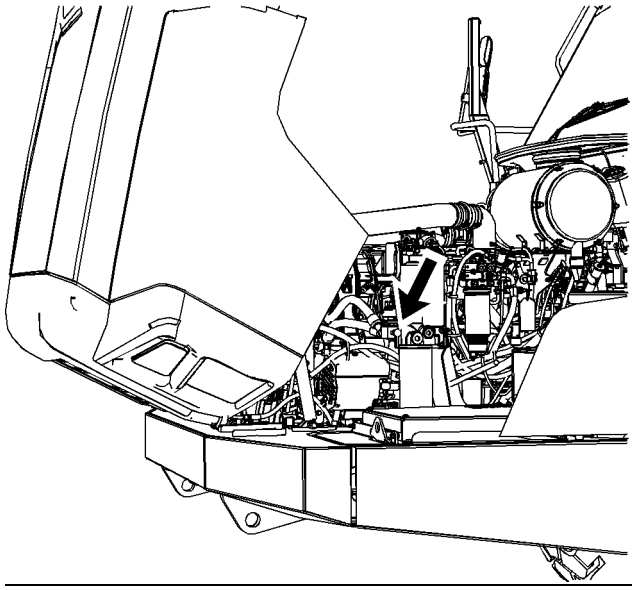


Illustration 110 g02149140

The sampling valve for the oil is located under the hood on the oil filter base at the left front side of the engine.

Hoist System and Brake System Oil Sample

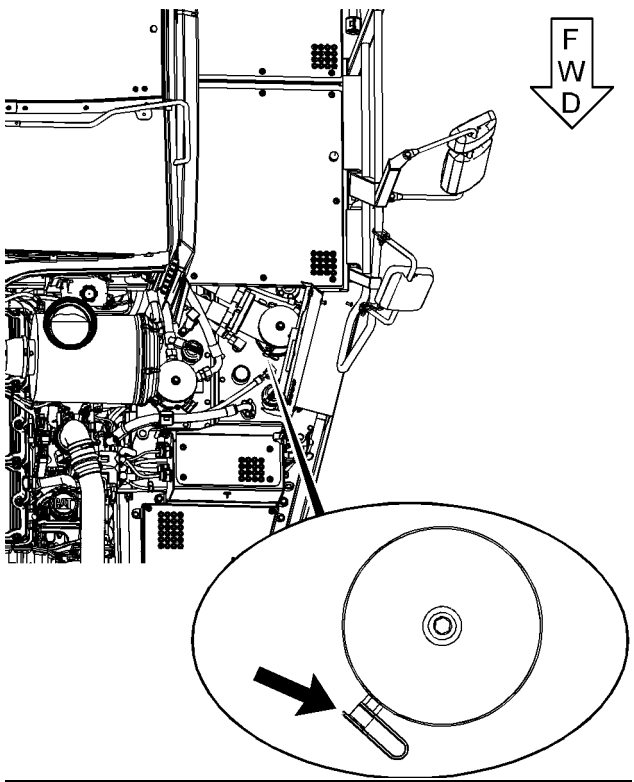


Illustration 111 g02432637

The sampling valve for the hoist/brake oil is located on the top of the hoist/brake tank. The hoist/brake tank is located on the left side of the machine under the hydraulic tank access cover.

Steering System Oil Sample

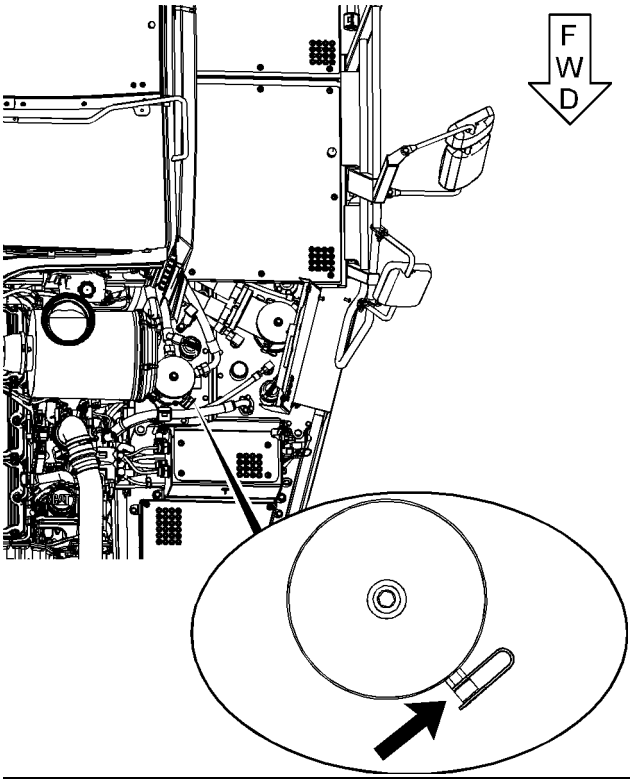


Illustration 112 g02434377

The sampling valve for the steering oil is located on the top of the steering tank. The steering tank is located on the left side of the machine under the hydraulic tank access cover.

Torque Converter and Transmission Oil Sample

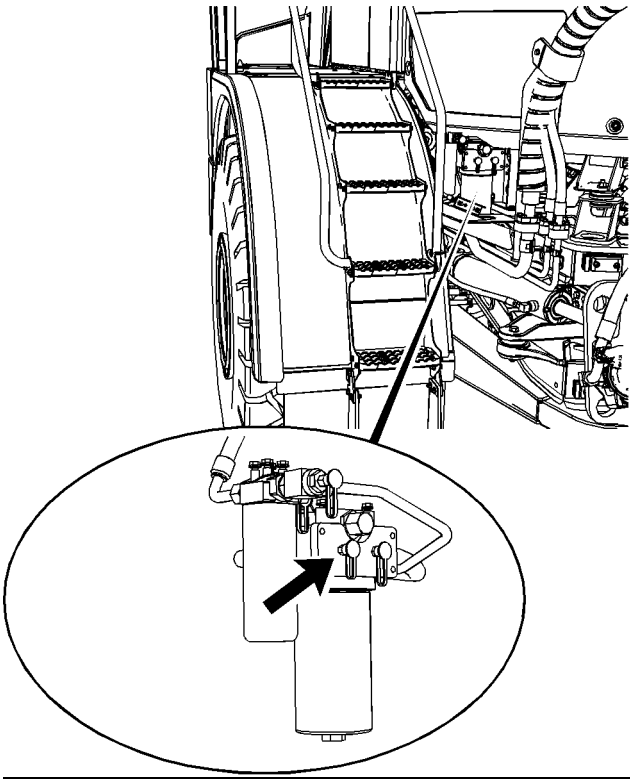


Illustration 113 g02148773

The sampling valve for the torque converter/transmission oil is located on the oil filter base behind the left front wheel.

Transfer Gear Oil Sample

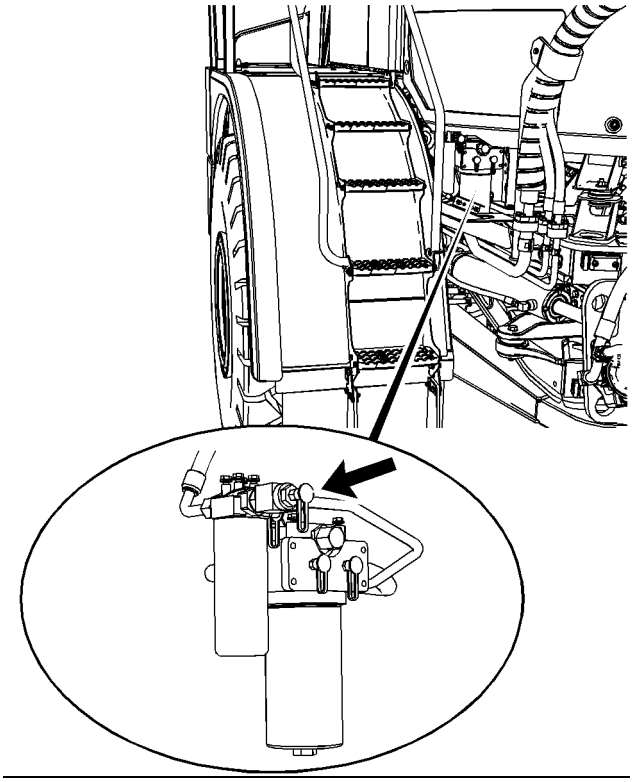


Illustration 114 g02149174

The sampling valve for the transfer gear oil is located on the oil filter base behind the left front wheel.

Additional S·O·S Information:

Refer to the following publications for additional S·O·S information:

- Operation and Maintenance Manual, “S·O·S Information”
- Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”, “S·O·S Services Analysis”
- Special Publication, PEGJ0047, “How to Take a Good S·O·S Sample”
- Special Publication, PEGJ0046, “S·O·S Services: Understanding Your Results”
- Special Publication, PEHJ0191, “S·O·S Fluid Analysis”

Maintenance Support

i03643352

System Pressure Release

SMCS Code: 1250-553-PX; 1300-553-PX; 1350-553-PX; 3000-553-PX; 4250-553-PX; 4300-553-PX; 5050-553-PX; 7540-553-PX

Coolant System

⚠ 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.

To relieve the pressure from the coolant system, move the engine start switch to the OFF position. Allow the cooling system pressure cap to cool. The cap must be cool enough to touch with a bare hand. Remove the cooling system pressure cap slowly in order to relieve pressure.

Fuel System

To relieve the pressure from the fuel system, move the engine start switch to the OFF position.

High Pressure Fuel Lines

⚠ WARNING

Contact with high pressure fuel may cause fluid penetration and burn hazards. High pressure fuel spray may cause a fire hazard. Failure to follow these inspection, maintenance and service instructions may cause personal injury or death.

The high pressure fuel lines are the fuel lines that are between the high pressure fuel pump and the high pressure fuel manifold and the fuel lines that are between the fuel manifold and cylinder head. These fuel lines are different from fuel lines on other fuel systems.

This is because of the following differences:

- The high pressure fuel lines are constantly charged with high pressure.
- The internal pressures of the high pressure fuel lines are higher than other types of fuel system.

Before any service or repair is performed on the engine fuel lines, perform the following tasks:

1. Move the engine start switch to the OFF position.
2. Wait for ten minutes.

Note: Fuel pressure can be monitored by Caterpillar Electronic Technician (ET).

Do not loosen the high pressure fuel lines in order to purge trapped air from the fuel system.

Hydraulic System

⚠ WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

Hoist

To relieve the pressure from the hoist circuit, completely lower the truck body and move the hoist control to the FLOAT position. Then move the engine start switch to the OFF position.

Steering

To relieve the pressure from the steering system, move the engine start switch to the OFF position and rotate the steering wheel several times in both directions.

Brake

To relieve the pressure from the brake circuit, move the engine start switch to the OFF position. This will activate a solenoid valve in order to release the hydraulic brake pressure from the brake accumulators.

Brake Accumulators

⚠ WARNING

Hydraulic accumulator contains gas and oil under high pressure. Improper removal or repair procedures could cause severe injury. To remove or repair, instructions in the service manual must be followed. Special equipment is required for testing and charging.

Relieving the pressure in the brake circuit will not release the nitrogen precharge pressure in the brake accumulators.

Engine Oil System

To relieve the pressure from the engine oil system, move the engine start switch to the OFF position.

i03636245

Welding on Machines and Engines with Electronic Controls

SMCS Code: 1000; 7000

Do not weld on any protective structure. If it is necessary to repair a protective structure, contact your Caterpillar dealer.

Proper welding procedures are necessary in order to avoid damage to the electronic controls and to the bearings. When possible, remove the component that must be welded from the machine or the engine and then weld the component. If you must weld near an electronic control on the machine or the engine, temporarily remove the electronic control in order to prevent heat related damage. The following steps should be followed in order to weld on a machine or an engine with electronic controls.

1. Turn off the engine. Place the engine start switch in the OFF position.

2. If equipped, turn the battery disconnect switch to the OFF position. If there is no battery disconnect switch, remove the negative battery cable at the battery.

NOTICE
Do NOT use electrical components (ECM or sensors) or electronic component grounding points for grounding the welder.

3. Clamp the ground cable from the welder to the component that will be welded. Place the clamp as close as possible to the weld. Make sure that the electrical path from the ground cable to the component does not go through any bearing. Use this procedure in order to reduce the possibility of damage to the following components:

   - Bearings of the drive train
   - Hydraulic components
   - Electrical components
   - Other components of the machine

4. Protect any wiring harnesses and components from the debris and the spatter which is created from welding.

5. Use standard welding procedures in order to weld the materials together.

i03769097

Maintenance Interval Schedule

SMCS Code: 1000; 7000

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

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

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

Note: The aftertreatment system can be expected to function properly for the useful life of the engine (emissions durability period), as defined by regulation. All prescribed maintenance requirements must be followed.

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

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

When Required

Every 10 Service Hours or Daily

Every 50 Service Hours

Initial 500 Service Hours

Every 500 Service Hours

Every 1000 Service Hours

Every 2000 Service Hours

Every Year

Every 3000 Service Hours

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

Every 3000 Service Hours or 3 Years

Every 4000 Service Hours

Every 4500 Service Hours

Every 5000 Service Hours

Every 5000 Service Hours or 3 Years

Every 6000 Service Hours

i04195595

Aftercooler Core - Inspect/Clean

SMCS Code: 1064-571

⚠ WARNING

Personal injury can result from air pressure.

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

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

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

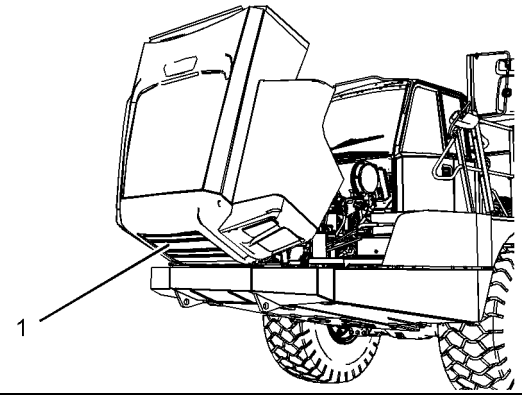


Illustration 115 g02385336

3. Remove grill (1) in order to access the aftercooler core.

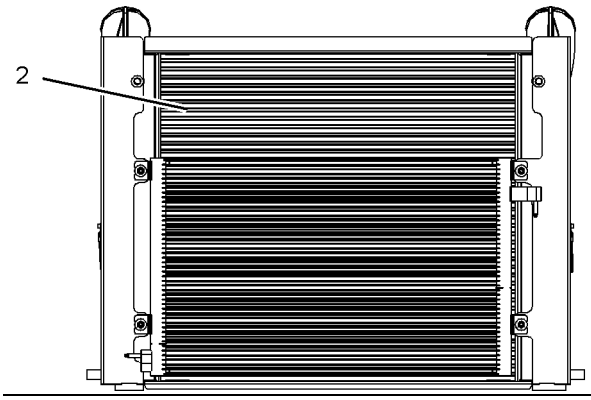


Illustration 116 g02385338

4. Inspect and clean aftercooler core (2). Use compressed air, high-pressure water, or steam to remove dust and other debris from the aftercooler core. However, the use of compressed air is preferred.

5. Install the grill and lower the hood.

i03864770

ARD Spark Plug - Replace

SMCS Code: 1408; 1555-510

S/N: T4P1-Up

S/N: T4R1-Up

NOTICE
If the engine is running or the key is in the ON position the ARD plug will continue to fire. Turn the key to the OFF position before servicing the ARD plug.

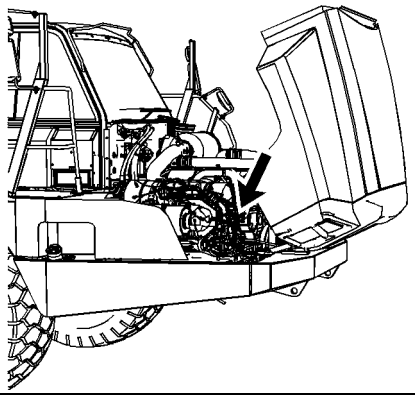


Illustration 117 g02108202
Location of the ARD spark plug

1. Park the machine on a level surface. Engage the parking brake and stop the engine.

2. Allow the exhaust system to cool before performing this procedure.

3. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

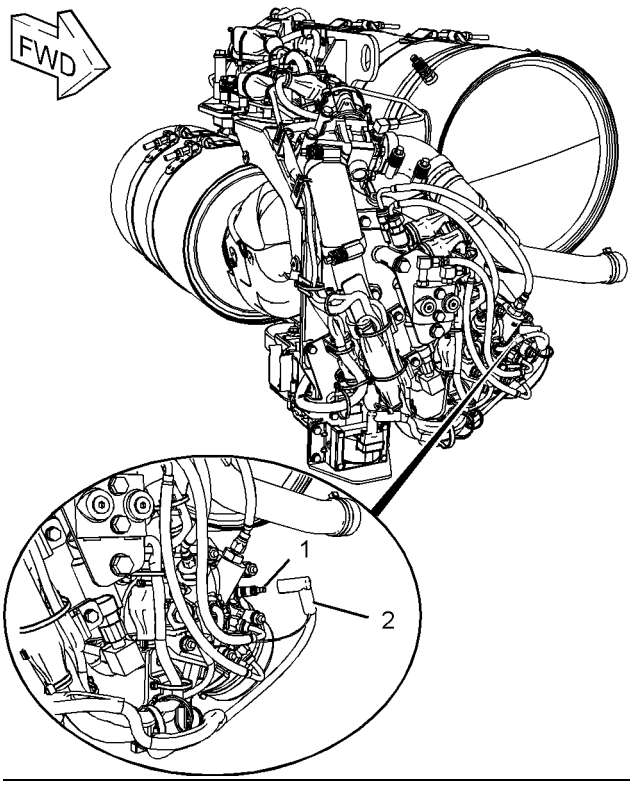


Illustration 118 g02108120

4. Remove any dirt or debris from the area around ARD spark plug (1).

5. Remove spark plug wire (2) from the ARD spark plug.

6. Use a deep well socket and a breaker bar to loosen the ARD spark plug. If necessary, see your Caterpillar dealer for the part number of the socket. After the spark plug has been loosened, use the socket to remove the spark plug by hand in order to detect problems with the threads.

7. Use a plug bore brush in order to clean the ground electrode.

NOTICE

Do not overtighten the spark plug. The shell can be cracked and the gasket can be deformed. The metal can deform and the gasket can be damaged. The shell can be stretched. This will loosen the seal that is between the shell and the insulator, allowing combustion pressure to blow past the seal. Serious damage to the engine can occur.

Use the proper torque.

8. Install the new ARD spark plug by hand. Tighten the spark plug to 47 ± 4 N·m (35 ± 3 lb ft).

9. Connect the spark plug wire.

10. Lower the hood.

i04203550

Automatic Lubrication Grease Tank - Fill (If Equipped)

SMCS Code: 7540-544-TNK

Fill the automatic lubrication grease tank (reservoir) when the monitoring system indicates that the minimum grease level in the reservoir has been reached.

1. Ensure that the filler hose is primed with grease in order to prevent air from being introduced in the grease reservoir.

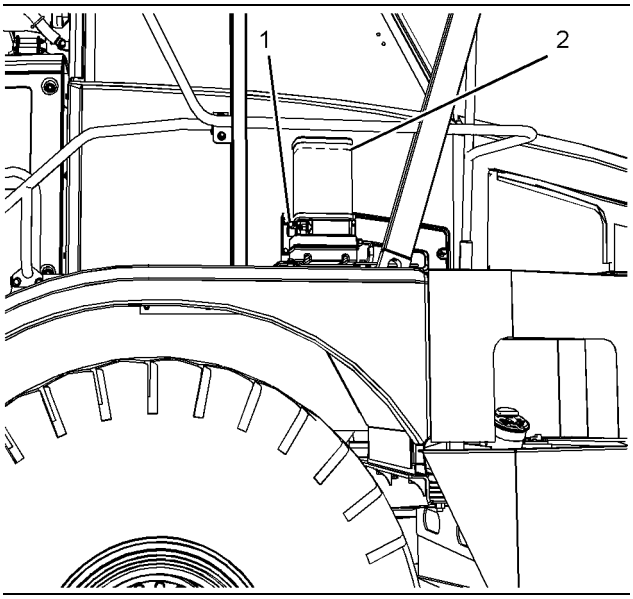


Illustration 119 g02392879

2. Remove the dust cap from the coupling (1) for the filler. Carefully clean the coupling for the filler and the coupling on the filler hose. The coupler for the filler hose is supplied with each Autolube system.

3. Connect the filler hose on the coupling for the filler.

4. Fill the reservoir up to maximum level (2) that is indicated on the reservoir.

5. Disconnect the filler hose and fit the dust cap

6. Place the filler hose back in the proper place in order to ensure that the coupling of the filler hose remains clean.

Note: Every 500 service hours replace the filter or every 500 service hours clean the filter for the filler on the lubrication pump. The filter is behind the connector on the reservoir.

Note: If the pumping action seems to go heavy, check the filter behind the coupling for the filler on the lubrication pump. Gently clean the filter or replace the filter. If the filter is damaged, the filter must be replaced.

Note: If too much grease is pumped into the reservoir, the surplus grease will exit the vent at the side of the lubrication pump. Any air that is introduced during the filling procedure will also escape via this route.

Note: Due to the slow capability of a hand held grease gun, the use of a grease gun is not recommended in order to fill the reservoir.

Periodic Checks

- Check the grease level in the reservoir. Refill the reservoir on time.
- Check that the signal lamp is functioning.
- Check that the duty cycle that is indicated on the signal lamp is correct for the operating conditions.
- Check the lubrication pump for damage and check the lubrication pump for leakage.
- Check the grease lines for damage and check the grease lines for leakage.
- Check the conditions of the grease points that are served by the system. Sufficient fresh grease should be present.
- Check the operation of the system. Perform a cycle test. Refer to System Operation, Testing and Adjusting, RENR6739 for more information.
- Clean the lubrication pump and clean the surroundings of the lubrication pump.
- Every 500 hours replace the filter or every 500 hours clean the filter.

Note: When you use high-pressure water or high-pressure air to clean the machine, do not spray directly onto the lubrication pump. Water or dirt may enter the lubrication pump through the de-arating openings.

Note: The automatic lubrication system reduces the time and effort that is taken in order to grease the machine significantly. However, do not neglect grease points that are not served by the automatic lubrication system.

Grease Recommendations

Grease should not contain graphite or PTFE. Use the correct grease in the automatic lubrication system.

The use of a partially fluid grease that is above the maximum temperature that is indicated in Table 19 is not permitted. Use of a partially fluid grease that is above the maximum indicated temperature can lead to the following.

- Excessive component wear
- A reduction in the efficiency of the system

Table 19

Minimum operating temperature of the system	Maximum operating temperature of the system	Prescribed NLGI Grade
−25 °C (−13 °F)	80 °C (176 °F)	2
−25 °C (−13 °F)	0 °C (32 °F)	0/1
−25 °C (−13 °F)	80 °C (176 °F)	SYNTHETIC 2
−25 °C (−13 °F)	0 °C (32 °F)	SYNTHETIC 0/1

i04207050

Axle Breathers - Clean/Replace

SMCS Code: 3278-070-BRE; 3278-510-BRE

1. Park the machine on a level surface. Move the parking brake control to the ENGAGED position and shut off the engine.
2. Install the Steering Frame Lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

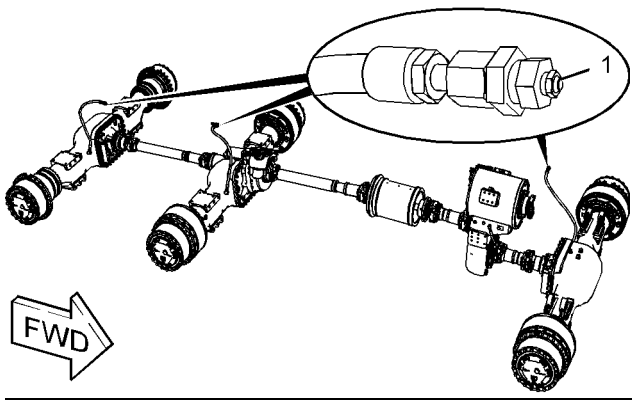


Illustration 120 g02393618

3. Remove breather (1) for each axle.
4. Wash each breather in clean, nonflammable solvent.

5. Shake each breather and allow each breather to dry.

6. Install each breather.

If any of the axle breathers are damaged, replace the damaged breather.

Remove the Steering Frame Lock after all the axle breathers are installed. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

i02305428

Backup Alarm - Test

SMCS Code: 7406-081

The backup alarm is on the rear of the machine.

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

Apply the service brakes. Move the transmission control lever to the REVERSE position.

The backup alarm should start to sound immediately. The backup alarm will continue to sound until the transmission control lever is moved to the NEUTRAL position or to the FORWARD position.

i00993589

Battery - Recycle

SMCS Code: 1401-561

Always recycle a battery. Never discard a battery.

Always return used batteries to one of the following locations:

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

i01951790

Battery or Battery Cable - Inspect/Replace

SMCS Code: 1401-510; 1402-510

Inspect the condition of the cables to the batteries and inspect the condition of the batteries.

Note: When you replace the batteries, always use the same type of battery.

Use the following procedure in order to isolate the batteries if any repairs are necessary.

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

2. Turn the battery disconnect switch to the OFF position. Remove the key.

3. At the battery disconnect switch, disconnect the negative battery cable that is connected to the frame.

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

4. Disconnect the negative battery cable from the terminals of the batteries.

5. Perform the necessary repairs. Replace the cables or the batteries, as needed.

6. Connect the negative battery cable to the terminals of the battery.

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

8. Install the key for the battery disconnect switch. Turn the key to the ON position.

i04189612

Belt - Inspect/Replace

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

The engine is equipped with a serpentine belt that drives the alternator and the air conditioner.

Note: The engine is equipped with a belt tensioner that automatically adjusts the belt to the correct tension.

1. Park the machine on a level surface. Engage the parking brake. Shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

3. Inspect belt (1) for the following conditions: cracks, wear, stretch, frayed areas, and missing pieces.

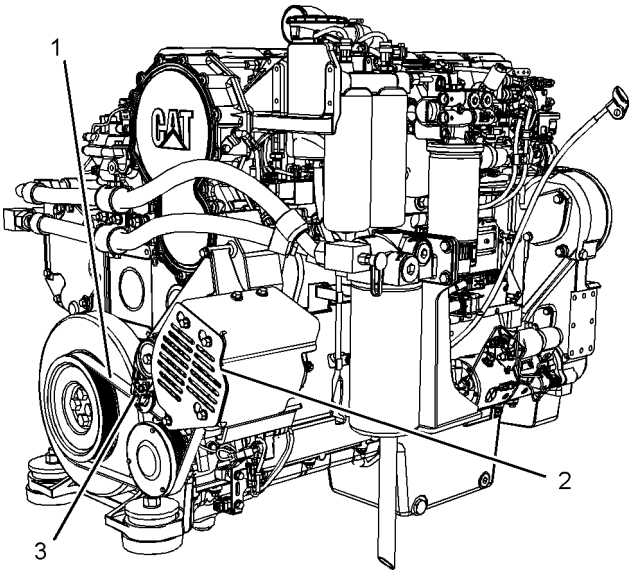


Illustration 121 g02380623

4. If the belt requires replacement, perform the following:

   a. Loosen fasteners for belt guard (2), and remove belt guard.

   b. Insert a square drive onto the belt tensioner (3). Turn clockwise in order to release the tension from the belt and remove the old belt.

   c. Insert a square drive onto the belt tensioner and turn clockwise. Install the new belt in the following order: drive pulley , air conditioning compressor pulley , alternator pulley , and belt tensioner .

   d. Install belt guard and tighten fasteners.

5. Lower the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

i04260409

Body Pivot Bearings - Lubricate

SMCS Code: 7258-086-BD; 7424-086

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the dump body and stop the engine.

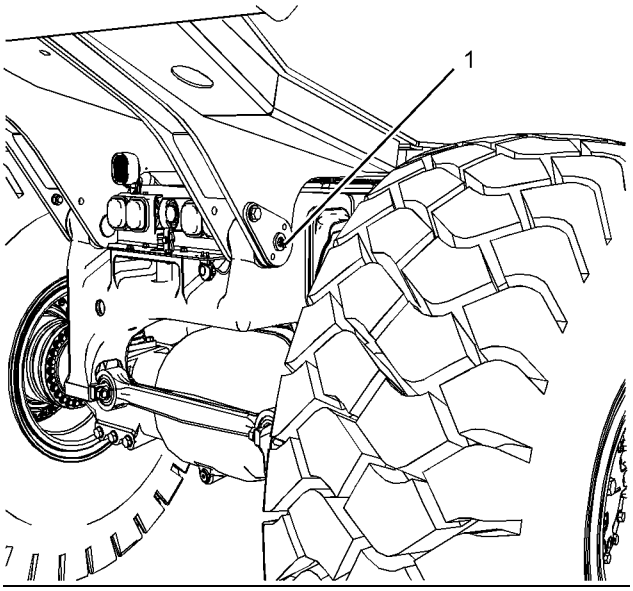


Illustration 122 g02430796

1. Remove the caps and wipe clean grease fittings (1) on the left side of the machine and on the right side of the machine.

2. Lubricate the body pivot bearings through the fittings on the left side of the machine and on the right side of the machine. One or two shots will be required at each fitting if lubrication is carried out at the recommended interval. Install the caps after lubricant has been applied.

i02253515

Brake Accumulator (Service) - Check

SMCS Code: 4263-535

⚠ WARNING

Personal injury or death can result from improper accumulator charging.

Dry Nitrogen is the only gas approved for use in the accumulator. Charging the accumulator with oxygen will cause an explosion. This danger will not happen if nitrogen cylinders with standard CGA (Compressed Gas Association, Inc.) Number 580 connections are used.

When ordering nitrogen gas, be sure that the cylinders are equipped with CGA Number 580 connections. Do not use color codes or other methods of identification to tell the difference between nitrogen and oxygen cylinders

Never use an adapter to connect your nitrogen charging group to a valve outlet used on both nitrogen, oxygen, or other gas cylinders. BE SURE YOU USE DRY NITROGEN (99.8% purity).

Refer to Systems Operation, Testing and Adjusting, “Brake Accumulator (Service) - Test and Charge” for more information.

i04201832

Brake Control Valve Damper Breather - Replace

SMCS Code: 4251-510-BRE; 4265-510-BRE

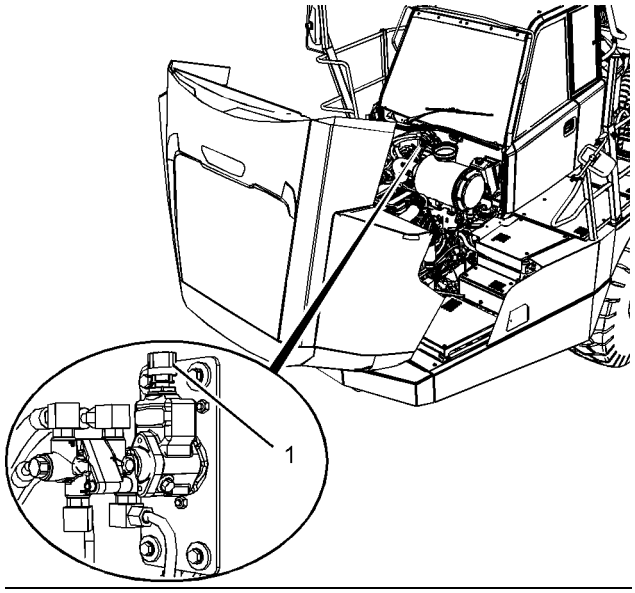


Illustration 123 g02391281

1. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.
2. Remove brake control valve damper breather (1).
3. Replace the breather.
4. Lower the hood.

i04202189

Brake Control Valve Damper Oil - Change

SMCS Code: 4251-044; 4265-044

⚠ WARNING

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

Park the machine on a level surface. Engage the parking brake and shut off the engine.

Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

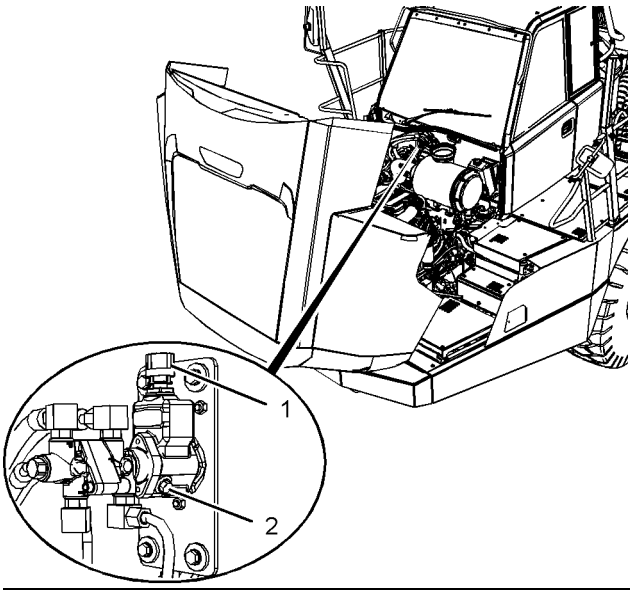


Illustration 124 g02391756

1. Remove cap/breather (1) for the brake control valve damper.
2. Remove drain plug (2). Allow the oil to drain into a suitable container.
3. Install the drain plug.
4. Fill the brake control valve with new oil. Refer to the Operation and Maintenance Manual, “Capacities (Refill)”, Operation and Maintenance Manual, “Lubricant Viscosities”.
5. Install the brake control valve damper cap/breather.
6. Lower the hood.

i02239865

Brake System Air - Purge

SMCS Code: 4250-ABL; 4251

Routine purging of the service brake lines ensures that the system is free of air. Purge the brake groups for the center axle and purge the brake groups for the front axle.

Refer to the appropriate Systems Operation, Testing and Adjusting, “Service Brake Air - Purge” for more information.

i01514959

Brakes, Indicators and Gauges - Test

SMCS Code: 4251-081; 4267-081; 7000; 7450-081; 7490-081

Before you operate the machine, perform the following checks and make any necessary repairs.

- Look for broken lenses on the gauges, broken indicator lights, broken switches, and other broken components in the cab.
- Start the engine.
- Look for inoperative gauges.
- Turn on all machine lights. Check for proper operation.
- Sound the forward horn.
- Test the service brakes. Refer to Operation and Maintenance Manual, “Braking System - Test”.
- Test the parking brake. Refer to Operation and Maintenance Manual, “Braking System - Test”.
- Stop the engine.

i04046777

Braking System - Test

SMCS Code: 3077-081; 4251-081; 4267-081

⚠ WARNING

Personal injury can result if the machine moves while testing.

If the machine begins to move during test, reduce the engine speed immediately and engage the parking brake.

The service brake holding ability test determines whether the service brake is functional. This test is not intended to measure the maximum brake holding ability.

The holding ability of the service brakes at a specific engine rpm will be different for each machine.

The results of the test should be recorded. The results should be compared to previous test results and subsequent test results. Use the comparison as an indication of system deterioration for a particular machine.

1. Before you perform the test, ensure that you can test the brakes on a surface which is level, dry, and clear of obstacles. Fasten your seat belt. Ensure that the transmission control is in the N position and that the parking brake control is in the ENGAGED position.

   Start the engine and wait until the brake system is fully charged.

2. Engage the service brakes. Move the transmission control to the 1 position. Move the parking brake control to the DISENGAGED position.

3. Gradually increase the engine speed until the machine moves forward. Record the engine speed when the machine moves.

   Reduce the engine speed immediately and move the parking brake control to the ENGAGED position. Move the transmission control to the N position. Shut off the engine.

4. If the machine moves at an engine speed below 1400 rpm, the service brakes require service.

NOTICE
If the machine moved while testing the service brakes, contact your Caterpillar dealer.

Have the dealer inspect and, if necessary, repair the service brakes before returning the machine to operation.

Parking Brake Check

⚠ WARNING

The parking brake holding test is a maintenance test procedure only. The machine should never be parked on a grade with only the parking brake engaged. If necessary to stop the machine on a grade, block the wheels securely. Refer to Operation and Maintenance Manual, "Jacking/Blocking Locations" for more information. Failure to block the wheels securely could result in unintended machine movement. Personal injury or death could result if the machine moves.

The test for the parking brake must be carried out with the rated load in the body.

Test the service brakes and the secondary steering system on level ground before you carry out this procedure.

1. Drive the machine onto an incline of 15%. The machine must be pointing down the incline.

Note: If required by local regulations, the 15% incline can be replaced. An incline that represents the maximum grade that the machine will be operated on at the site may be used. If the machine moved during the maximum grade test, the parking brake may require service. The machine operation may need to be modified to reduce the maximum grade that the machine is operated on in order to meet local regulatory requirements.

2. Engage the service brakes in order to stop the machine on the incline. The area around the machine must be clear of personnel and obstacles.

3. Move the parking brake control to the ENGAGED position. Move the transmission control to the N position.

4. Shut off the engine.

5. Gradually disengage the service brakes.

6. If the machine moves forward, engage the service brakes immediately. Start the engine. Disengage the parking brake and drive the machine onto level ground. Shut off the engine.

7. Check the thickness of the brake pad linings and check the thickness of the brake disc. Refer to Specifications, RENR6724, "Parking Brake". Replace parts if the specification is not met.

If the machine moved during the test, the parking brake requires service.

NOTICE
If the machine moved while testing the parking brake, inspect the parking brake components for wear or damage. Repair or replace the worn or damaged parking brake components as required before returning the machine to service.

i04191346

Cab Air Filter - Clean/Replace

SMCS Code: 7342-070; 7342-510

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

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

Both cab air filters must be serviced at regular intervals. Operating conditions will influence the service interval for the cab air filters. Inspect the filters more often in dustier conditions. Both cab air filters are located in the right side wall of the cab.

Replace both air filters if the air filter elements have been in service for one year.

1. Park the machine on a level surface. move the parking brake control to the ENGAGED position and shut off the engine.

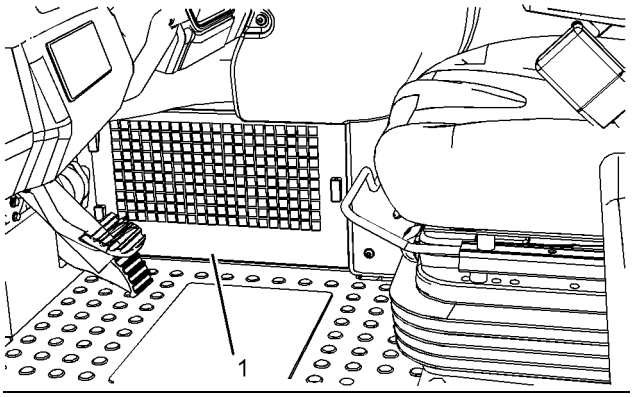


Illustration 125 g01125350

2. Remove cover (1) and remove the air filter.

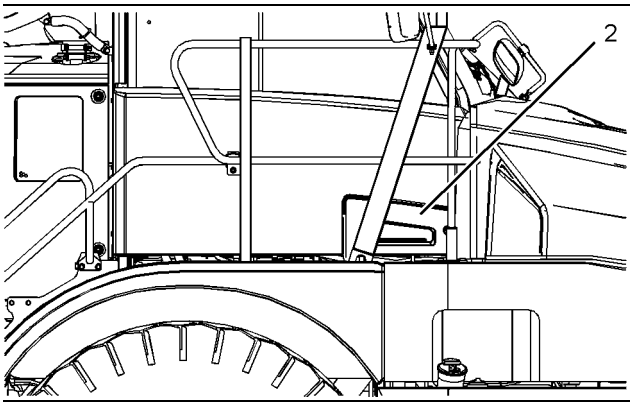


Illustration 126 g02381619

3. Remove cover (2) and remove the air filter.

4. Clean the inside of both air filter housings.

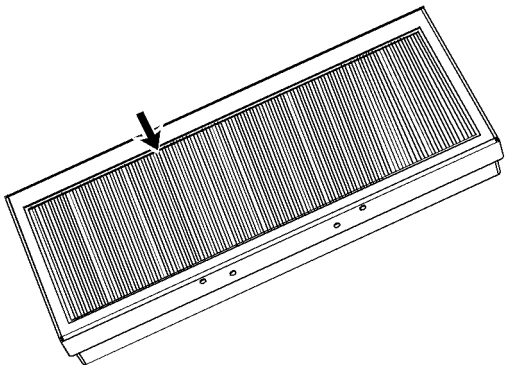


Illustration 127 g01125369

5. Inspect each air filter. If the pleats or the seals are damaged, replace the air filter.

6. If the air filter is not damaged, clean the air filter with pressurized air. the maximum air pressure for cleaning is 205 kPa (30 psi).

Direct pressurized air along the pleats from no closer than 160 mm (6 inch) from the air filter.

If the air filter is damaged, replace the air filter.

7. Install the air filters. Use the arrows on the air filters as a guide for correct installation.

8. Install cover (2) and cover (1).

i04194670

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044-NL

⚠ WARNING

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

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

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

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

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

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

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

NOTICE
Mixing Extended Life Coolant (ELC) with other products reduces the effectiveness of the coolant and shortens coolant life. Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specification for premixed or concentrate coolants. Use only Caterpillar Extender with Caterpillar ELC. Failure to follow these recommendations could result in the damage to cooling systems components.

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, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

If the coolant is dirty or if you observe any foaming in the cooling system, change the coolant before the recommended interval.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine. Do not perform this procedure until the coolant has fully cooled.

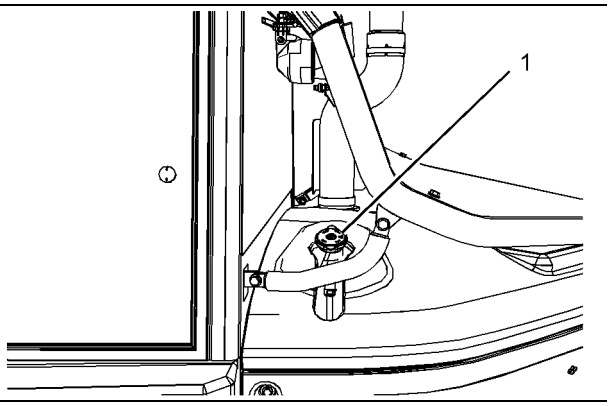


Illustration 128 g02384336

2. Slowly remove the cap in order to gradually relieve any system pressure.

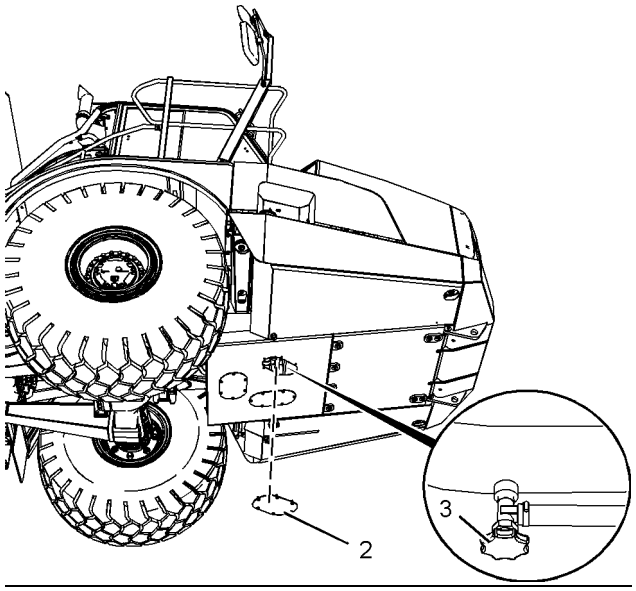


Illustration 129 g02384961

3. Remove cover plate (2).

4. Open drain valve (3) and drain the coolant into a suitable container.

5. Close the drain valve.

6. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

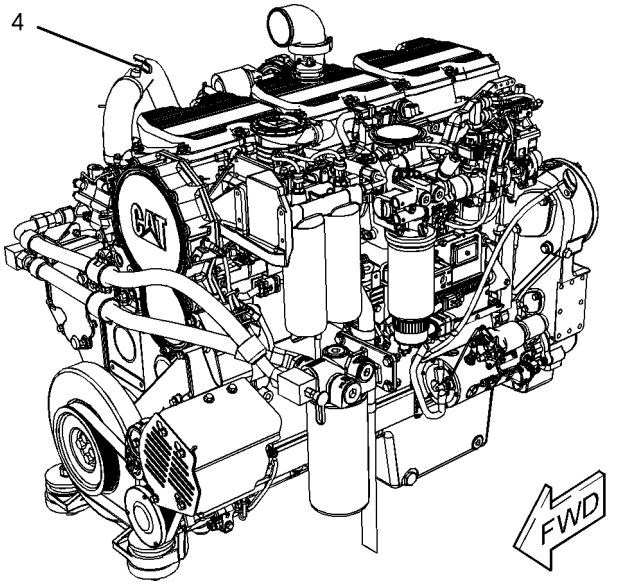


Illustration 130 g02384818

7. Open vent (4) on the top of the engine in order to vent the air in the cooling system.

8. Add the Extended Life Coolant until coolant comes out of the vent and close the vent.

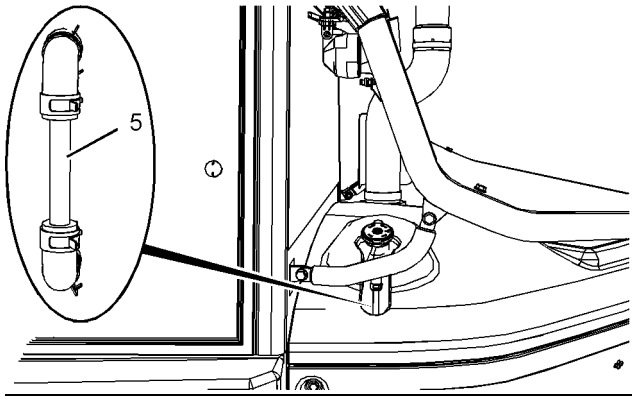


Illustration 131 g02384897

9. Add Extended Life Coolant until the coolant level is halfway between the top and the bottom of sight glass (5) for the coolant tank. Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the required amount of Extended Life Coolant.

10. Start the engine. Run the engine until the water temperature regulator opens and the coolant level stabilizes.

Note: Do not install the cap.

11. Add Extended Life Coolant in order to maintain the coolant level halfway between the top and the bottom of the sight glass.

12. Inspect the cap. If the cap is damaged, replace the cap.

13. Install the cap.

14. Start the engine and allow the coolant to warm. Inspect for coolant leaks. Stop the engine and make any necessary repairs.

15. Install the cover plate and lower the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

i01865470

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352-544-NL

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

Table 20

Cooling System Capacity	Recommended Amount of Caterpillar Extender
22 to 30 L (6 to 8 US gal)	0.57 L (20 oz)
30 to 38 L (8 to 10 US gal)	0.71 L (24 oz)
38 to 49 L (10 to 13 US gal)	0.95 L (32 oz)
49 to 64 L (13 to 17 US gal)	1.18 L (40 oz)
64 to 83 L (17 to 22 US gal)	1.60 L (54 oz)
83 to 114 L (22 to 30 US gal)	2.15 L (72 oz)
114 to 163 L (30 to 43 US gal)	3.00 L (100 oz)
163 to 242 L (43 to 64 US gal)	4.40 L (148 oz)

For additional information about adding an extender, see Special Publication, SEBU6250 or consult your Caterpillar Dealer.

i04195549

Cooling System Coolant Level - Check

SMCS Code: 1350-535-FLV

⚠ 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.

Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

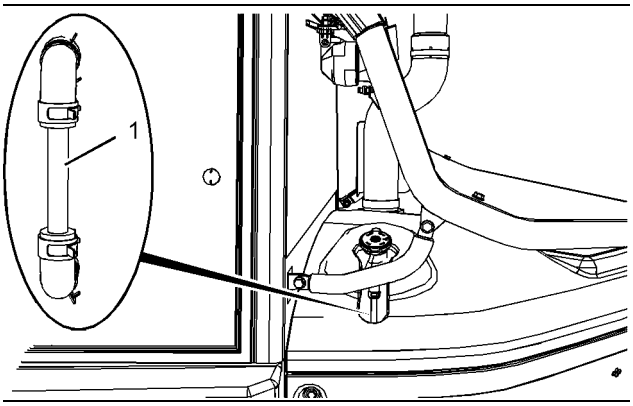


Illustration 132 g02385218

The tank for the cooling system is located at the rear of the cab.

The tank for the cooling system features a sight glass (1).

Check the cooling system level in the coolant tank. The coolant level should be maintained halfway between the top and the bottom of the sight glass on the coolant tank.

Add coolant, if necessary. Refer to Operation and Maintenance Manual, “Cooling System Coolant - Change” for information on adding coolant.

i04289089

Cooling System Pressure Cap - Clean/Replace

SMCS Code: 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. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine. Do not perform this procedure until the coolant has fully cooled.

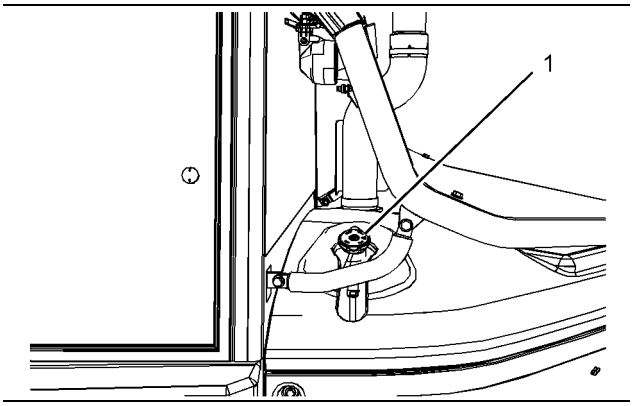


Illustration 133 g02384336

2. Remove cooling system pressure cap (1) slowly in order to gradually relieve any system pressure.

3. Inspect the cap for damage, for foreign material, and for deposits. If the cap is damaged, replace the cap. If the cap is not damaged, clean the cap with a clean cloth.

4. Install the cap.

i04191789

Crankshaft Vibration Damper - Inspect

SMCS Code: 1205-040

Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

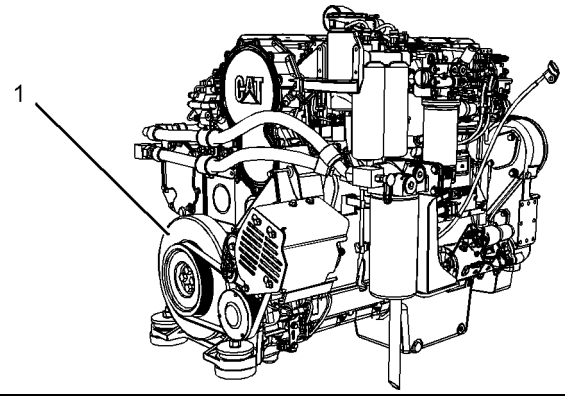


Illustration 134 g02382076

Crankshaft vibration damper (1) can be viewed from the right side of the engine compartment.

Damage to the vibration damper or failure of the vibration damper will increase torsional vibrations. These vibrations will result in damage to the crankshaft and other engine components. A deteriorating vibration damper will cause excessive gear train noise at variable points in the speed range.

Caterpillar recommends replacing the vibration damper for any of the following reasons.

- The engine has had a failure because of a broken crankshaft.
- The S·O·S analysis detected a worn crankshaft front bearing.
- The S·O·S analysis detected a large amount of gear train wear that is not caused by a lack of oil.

Continue to use the crankshaft vibration damper if none of the above conditions are found or if the damper is not damaged.

i04218211

Diesel Particulate Filter - Clean/Replace

SMCS Code: 108F-070; 108F-510; 1091-070; 1091-510

S/N: T4P1-Up

S/N: T4R1-Up

Consult your Cat dealer when the DPF needs to be cleaned.

The approved Caterpillar DPF maintenance procedure requires that one of the following actions be taken when the DPF needs to be cleaned:

- The DPF from your machine can be replaced with a new DPF
- The DPF from your machine can be replaced with a remanufactured DPF
- The DPF from your machine can be cleaned by your local authorized Cat dealer, or a Caterpillar approved DPF cleaning machine, and reinstalled

Note: In order to maintain emissions documentation, the DPF that is removed from the machine when the DPF is cleaned must be reinstalled on the same machine.

Note: A specific ash service regeneration must be performed before removing a DPF that will be cleaned. All three scenarios listed above require a reset of the ash monitoring system in the engine ECM.

i04192289

Differential and Final Drive Oil - Change

SMCS Code: 3258-044; 4050-044

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, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

1. Operate the machine until the differential oil is warm. Park the machine on a level surface.

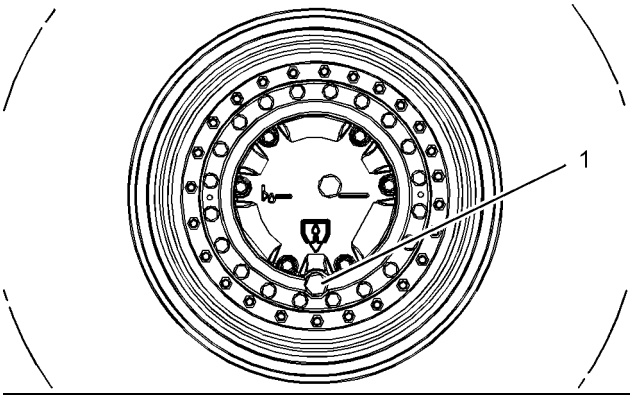


Illustration 135 g02382416

2. Slowly move the machine until plug (1) is at the lowest point on the rear left final drive. Engage the parking brake and shut off the engine.

3. Wipe the area around plug (1) on the final drive. Remove plug (1). Remove the plug slowly in order to gradually release any system pressure. Allow the oil to drain into a suitable container.

4. Clean plug (1) and inspect the O-ring seal for damage. Lubricate the O-ring seal with gear oil and install the plug.

Note: The plug is magnetic. Check the plug for ferrous particles that may indicate wear of the differential and final drive components.

5. Start the engine and disengage the parking brake.

6. Repeat Step 2 through Step 4 for the rear right final drive.

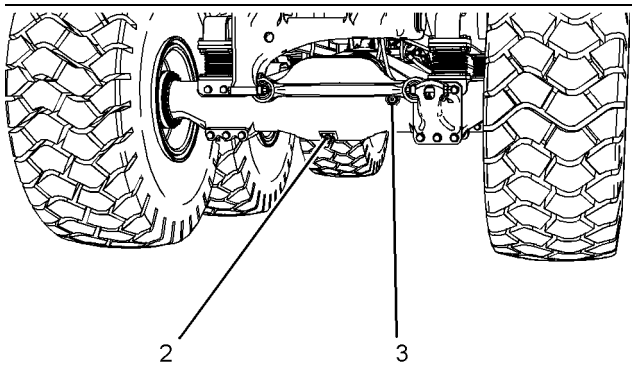


Illustration 136 g02382417

7. Remove drain plug (2) and level plug (3) from the rear axle. Remove the drain plug slowly in order to gradually release any system pressure. Allow the oil to drain into a suitable container.

8. Clean the drain plug and inspect the O-ring seal for damage. Lubricate the O-ring seal with gear oil and install the drain plug.

Note: The drain plug is magnetic. Check the plug for ferrous particles that may indicate wear of the differential and final drive components.

9. Start the engine and disengage the parking brake.

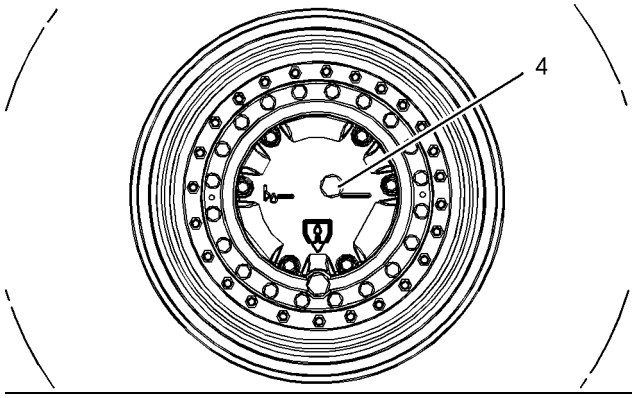


Illustration 137 g02382418

10. Slowly move the machine until “Oil Level” mark (4) on the rear right final drive is horizontal. Engage the parking brake and shut off the engine.

11. Remove plug (1) from the front right final drive and add oil to the final drive. Refer to Operation and Maintenance Manual, “Capacities (Refill)” and Operation and Maintenance Manual, “Lubricant Viscosities”.

Fill the final drive to the bottom of the plug hole. Allow the oil to flow along the axle housing and settle at a common level.

12. Install plug (1).

13. Repeat steps 9 through 12 for the rear left final drive.

14. Remove level plug (3) from the rear axle. Add oil to the differential until the differential is full. Refer to Operation and Maintenance Manual, “Capacities (Refill)” and Operation and Maintenance Manual, “Lubricant Viscosities”.

15. Install the plug.

16. Repeat the procedure for the center differential and final drives.

Repeat the procedure for the front differential and final drives.

17. Start the engine.

18. Operate the machine for a few minutes in order to circulate the oil.

19. Shut off the engine.

20. Check the oil level of the differential and final drives. Refer to Operation and Maintenance Manual, “Differential and Final Drive Oil Level - Check”.

i04192331

Differential and Final Drive Oil Level - Check

SMCS Code: 3258-535-FLV; 4050-535-FLV

1. Park the machine on a level surface and stop the engine. Perform the following steps on each of the three axles:

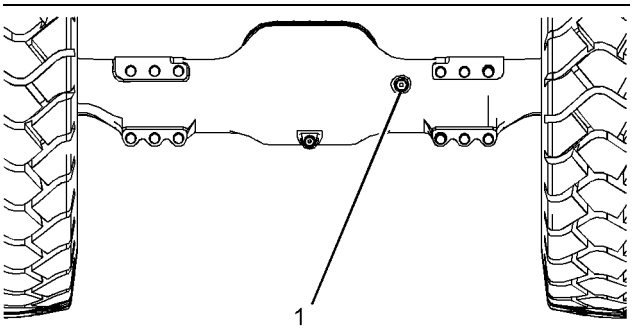


Illustration 138 g02382425

2. Remove differential filler plug (1) and clean the area around the opening.

3. Check the oil level. Maintain the oil level to the bottom of the filler plug opening.

4. If necessary, add oil. Install the filler plug.

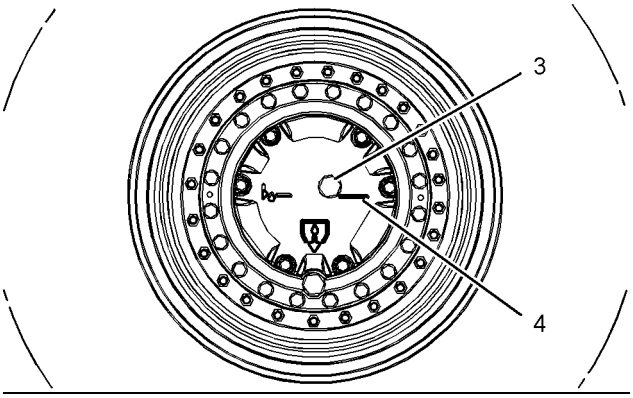


Illustration 139 g02382426

Note: The differential and final drives share a common oil compartment. When the machine is parked on a level surface and when the final drive oil level mark (3) is horizontal, the final drive filler plug (2) will be at the same level as the differential filler plug (1). Allow the oil to fill all of the compartments before rechecking the oil level.

i03896470

Display and Camera - Clean

SMCS Code: 7347-070; 7348-070

In order to maintain sufficient vision, keep the camera lens and the display clean.

Display

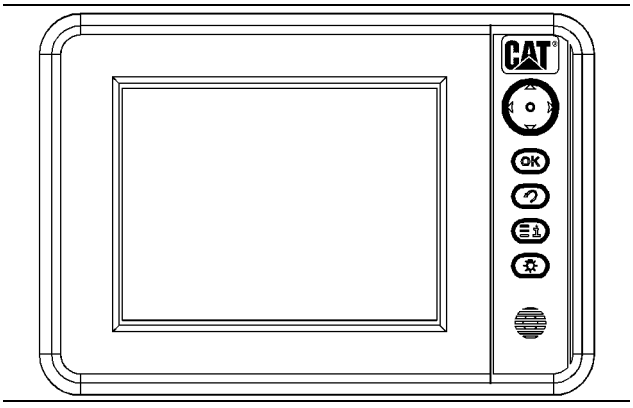


Illustration 140 g02140113

CMPD display

Use a soft, damp cloth in order to clean the display. The display has a soft plastic surface that can be easily damaged by an abrasive material. **The display is not sealed. Do not immerse the display with liquid.**

Camera

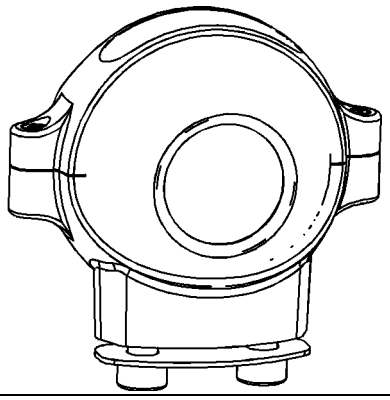


Illustration 141 g01223051

The camera is located on the rear of the machine near the taillights.

Use a damp cloth or water spray in order to clean the camera lens. The camera is a sealed unit. The camera is not affected by high-pressure spray.

The camera is equipped with an internal heater to help counteract the effects of condensation, snow, or ice.

i04289109

Drive Shaft Universal Joints - Inspect/Replace

SMCS Code: 3251-040; 3251-510

Park the machine on a level surface and engage the parking brake and stop the engine.

Inspect

1. Place a dial indicator on the drive shaft so that the vertical end play in the spider can be measured. If the drive shaft moves more than 0.15 mm (0.006 inch) of movement relative to the yoke, the spider needs to be replaced.
2. Place the dial indicator so that the horizontal end play in the spider can be measured. If the spider has more than 0.15 mm (0.006 inch) of movement relative to the yoke, the spider needs to be replaced.

Replace

Do not reuse drive shaft bolts. Always use new drive shaft bolts when you reassemble the drive shaft.

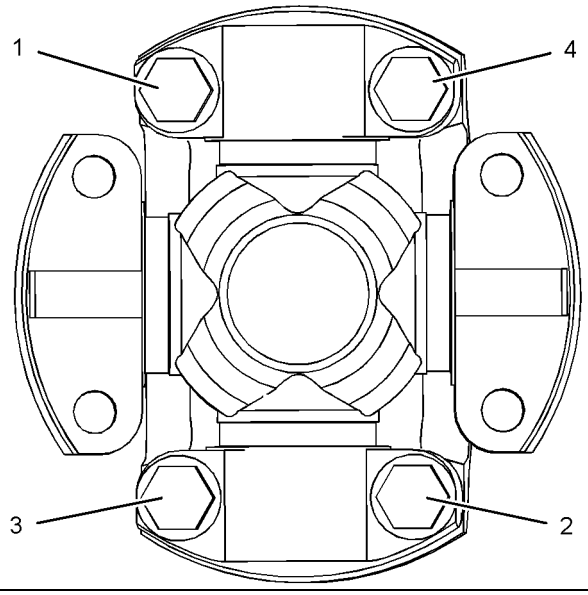


Illustration 142 g02460557

Torque sequence

1. Use four used bolts as alignment bolts. Install the used bolts. Tighten the bolts in the pattern that is shown in Illustration 142. Make sure that the yoke is fully seated against the spider. Torque the used bolts to the designed specification.
2. Remove the used bolts one at a time. Follow the pattern that is shown in Illustration 142. Install the new bolt. Torque the new bolt before removing the next alignment bolt in the pattern.
3. Check the torque of the new bolts by using the pattern that is shown in Illustration 142.

i04194030

Engine Air Filter Primary Element - Clean/Replace

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

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

Service the primary air filter element under the following conditions:

- The indicator for the air filter is illuminated. Refer to Operation and Maintenance Manual, “Monitoring System”.

- The primary air filter element has been in service for 1000 hours.

Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

1. Raise the hood. Refer to the Operation and Maintenance Manual, “Hood Control”.

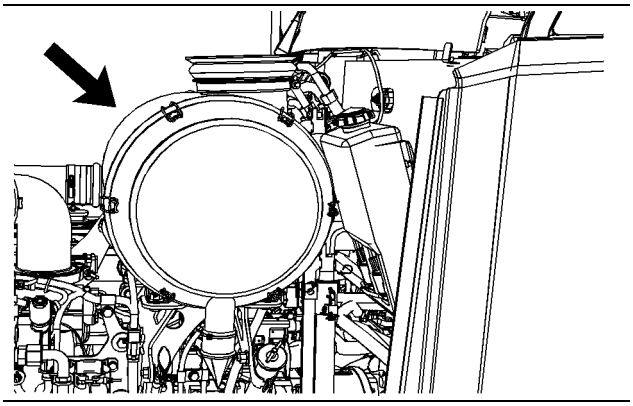


Illustration 143 g02383837

2. Remove the air cleaner cover.

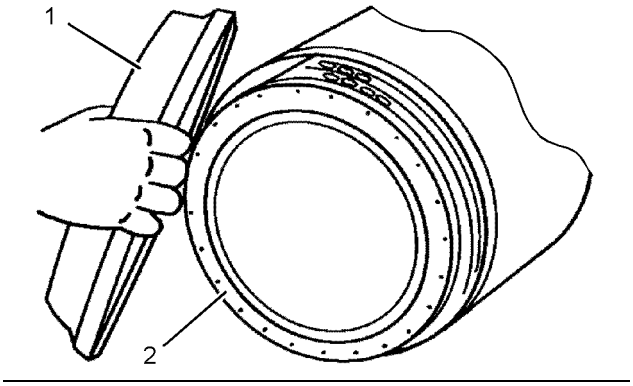


Illustration 144 g01217472

3. Remove cover (1) for the air filter housing.

4. Remove primary filter element (2) from the air filter housing.

5. Clean the inside of the air filter housing.

6. Clean the dust valves on the bottom for the air filter housing.

7. Clean the primary air filter element and inspect the primary air filter element. Refer to “Cleaning Primary Air Filter Element” and “Inspecting the Primary Air Filter Element”.

8. Install the clean primary air filter element. Install the cover for the air filter housing.

9. Lower the hood.

10. Start the engine. If the indicator for the air filter is illuminated, replace the secondary air filter element.

Refer to the Operation and Maintenance Manual, “Engine Air Filter Secondary Element - Replace”.

Cleaning Primary Air Filter Element

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

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

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

Do not wash the filter element.

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

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

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

Visually inspect the primary air filter element before cleaning. Inspect the air filter element for damage to the seal, the gaskets, and the outer cover.

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

- Pressurized air
- Vacuum cleaning

Pressurized Air

Wear the proper personal protection equipment when pressurized air is used.

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

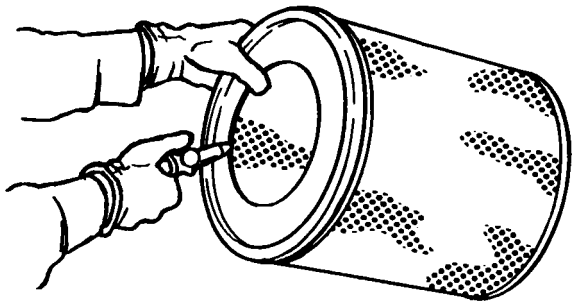


Illustration 145 g00281692

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

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

Vacuum Cleaning

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

Inspecting the Primary Air Filter Element

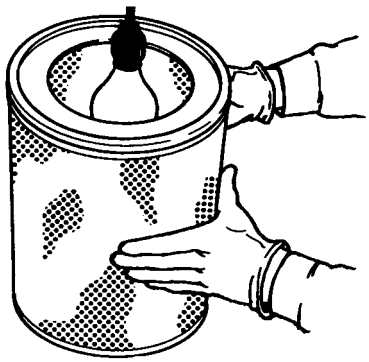


Illustration 146 g00281693

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

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

i04194102

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510-SE

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

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

Replace the secondary air filter element under the following conditions.

- The primary air filter element is serviced for the third time.
- The indicator for the air filter is illuminated after the primary air filter element has been serviced. Refer to Operation and Maintenance Manual, “Monitoring System”.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.
2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.
3. Remove the air filter cover and remove the primary filter element from the air filter housing. Refer to Operation and Maintenance Manual, “Engine Air Filter Primary Element-Clean/Replace”.

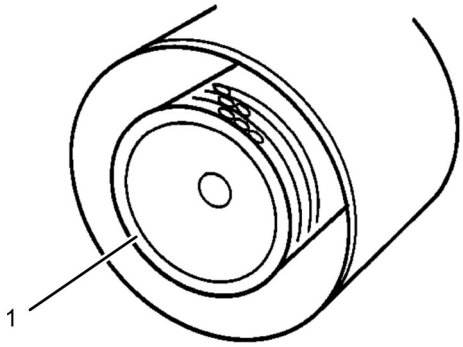


Illustration 147 g01903515

(1) Secondary filter element

4. Remove secondary filter element (1) and properly discard the secondary element.

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

6. Uncover the air inlet opening. Install the new secondary filter element.

7. Install the primary filter element and install the air filter cover.

8. Lower the hood.

i04278790

Engine Compression Brake Valve Lash - Check

SMCS Code: 1119-535

⚠ WARNING

Be sure the engine cannot be started while this maintenance is being performed. To prevent possible injury, do not use the starting motor to turn the flywheel.

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

⚠ WARNING

Be sure the engine cannot be started while this maintenance is being performed. To prevent possible injury, do not use the starting motor to turn the flywheel.

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

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

For information on checking the engine compression brake valve lash, refer to Systems Operation, Testing and Adjusting, UENR0637, “C15 Engine for 735B and 740B Caterpillar Machines”, “” or consult your Cat dealer.

i04193954

Engine Oil Level - Check

SMCS Code: 1000-535-FLV

⚠ WARNING

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

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

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”

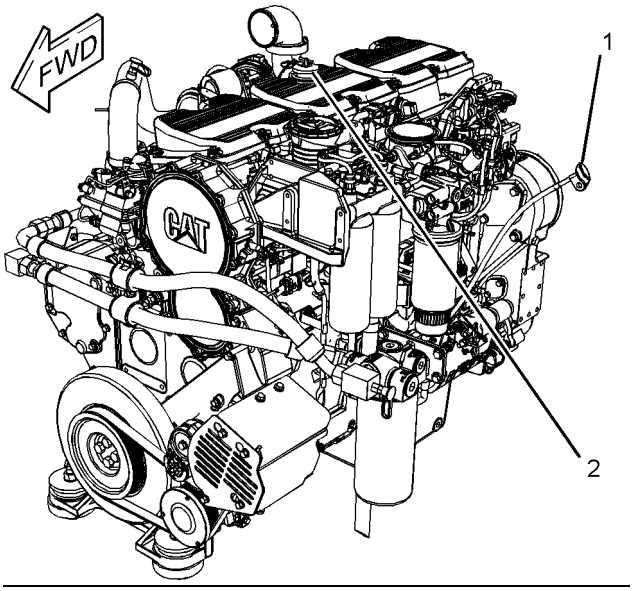


Illustration 148 g02383777

3. Remove oil level gauge (dipstick) (1). Inspect the oil level on the dipstick when the engine is stopped and the oil is cold (ambient temperature).

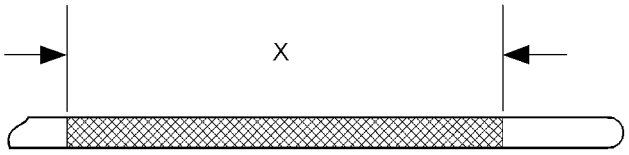


Illustration 149 g01214971

4. Maintain the oil level within shaded range (X) of the dipstick.

Refer to the Operation and Maintenance Manual, “Lubricant Viscosities”.

5. If necessary, remove oil filler cap (2) and add oil. Clean the filler cap and install the filler cap.

6. Lower the hood.

i04193350

Engine Oil and Filter - Change

SMCS Code: 1318-510

Oil Change Interval

NOTICE
A 500 hour engine oil change interval is available, provided that the operating conditions and recommended multigrade oil types are met. When these requirements are not met, shorten the oil change interval to 250 hours, or use an S·O·S Services oil sampling and analysis program to determine an acceptable oil change interval.

If you select an interval for oil and filter change that is too long, you may damage the engine.

Operating the engine in the following conditions will shorten the service life of the engine oil which will require reduced oil change intervals:

- Low ambient temperatures
- Short operating durations
- Long idle times
- Altitudes above 1830 m (6000 ft)
- Poor maintenance of air filters or of fuel filters

See your Caterpillar dealer for more information if this product will experience abnormally harsh operating cycles or harsh environments.

Changing Engine Oil and Filter

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”, and to Special Publication, GECJ0001, “Cat Shop Supplies and Tools” guide for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

Note: Drain the crankcase while the oil is warm and while the oil is well circulated. This ensures that waste particles will be suspended in the oil and that these particles will be removed as the oil is drained.

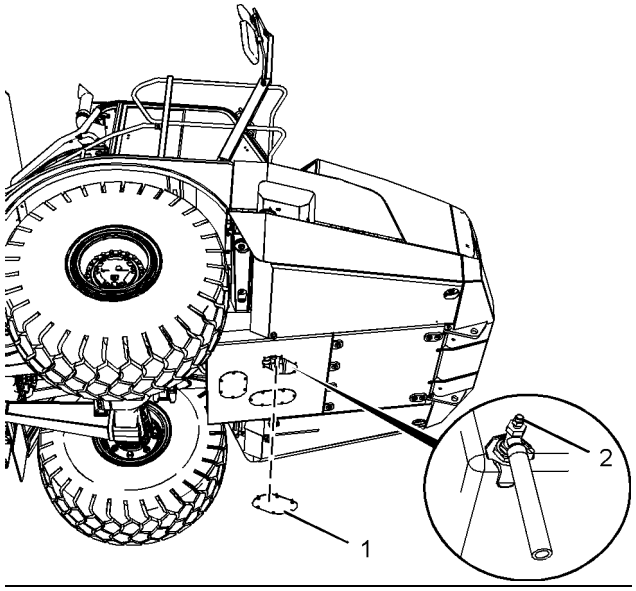


Illustration 150 g02383340

1. Remove cover plate (1).

2. Open drain valve (2) and drain the oil into a suitable container.

3. Close the drain valve.

4. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

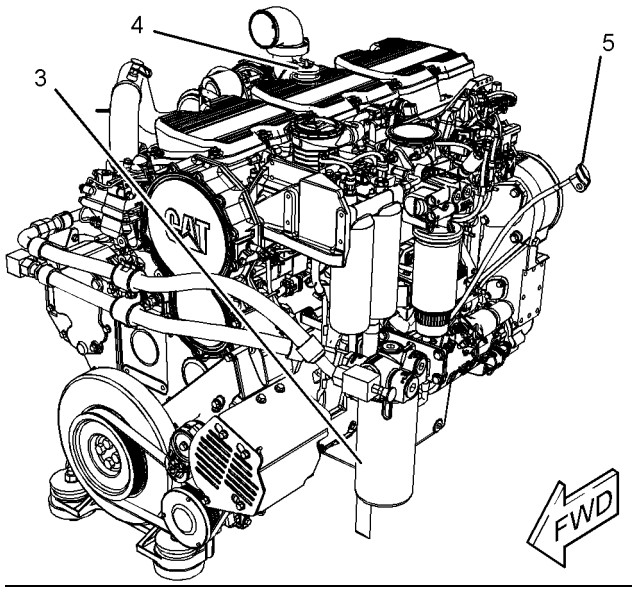


Illustration 151 g02383445

5. Remove engine oil filter (3) with a strap type wrench. Inspect the used engine oil filter.

Refer to the Operation and Maintenance Manual, “Oil Filter - Inspect”.

6. Clean the oil filter base. Make sure that the former gasket is removed.

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

8. Install the filter by hand. Tighten each filter until the sealing surface contacts the base. Note the position of the index marks on each filter in relation to a fixed point on the filter base.

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

9. Tighten each filter according to the instructions that are printed on the filter.

Note: A Caterpillar strap wrench, or another suitable tool, may be needed 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.

10. Remove oil filler cap (4). Fill the crankcase with new oil.

Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill) ”.

11. Remove oil level gauge (dipstick) (5). Clean the dipstick and reinstall the dipstick.

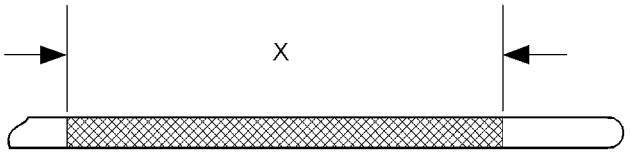


Illustration 152 g01214971

12. Remove the dipstick and check the oil level. Maintain the oil level within shaded area (X). If necessary, add oil.

13. Install the oil filler cap.

14. Start the engine and allow the oil to warm. Inspect the engine oil filter for oil leaks. Stop the engine and make any necessary repairs.

15. Install the cover plate and lower the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

i04276229

Engine Valve Lash - Check

SMCS Code: 1105-535

⚠ WARNING

Be sure the engine cannot be started while this maintenance is being performed. To prevent possible injury, do not use the starting motor to turn the flywheel.

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

NOTICE
Operation of Caterpillar Engines with improper engine valve lash adjustments will reduce the engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

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

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

Maintain the valve lash adjustments in order to provide maximum engine life.

For information on checking the engine valve lash, refer to Systems Operation, Testing and Adjusting, UENR0637, “C15 Engine for 735B and 740B Caterpillar Machines”, “” or consult your Cat dealer.

i04277451

Engine Valve Rotators - Inspect

SMCS Code: 1109-040

⚠ WARNING

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

NOTICE
A valve rotator which does not operate properly will accelerate valve face wear and valve seat wear and shorten valve life. If a damaged rotator is not replaced, valve face guttering could result and cause pieces of the valve to fall into the cylinder. This can cause piston and cylinder head damage.

Engine valve rotators rotate the valves when the engine runs. This rotation deters deposits from building up on the valves and the valve seats.

Perform the following steps after the engine valve lash is set, but before the valve covers are installed:

1. Start the engine and operate the engine at low idle.

2. Observe the top surface of each valve rotator. The valve rotators should turn slightly when the valves close.

If a valve fails to rotate, consult your Cat dealer.

i04292430

Ether Starting Aid Cylinder - Replace

SMCS Code: 1456-510-CD

⚠ WARNING

Breathing ether vapors or repeated contact of ether with skin can cause personal injury. Personal injury may occur from failure to adhere to the following procedures.

Use ether only in well ventilated areas.

Do not smoke while changing ether cylinders.

Use ether with care to avoid fires.

Do not store replacement ether cylinders in living areas or in the operator's compartment.

Do not store ether cylinders in direct sunlight or at temperatures above 49 °C (120 °F).

Discard cylinders in a safe place. Do not puncture or burn cylinders.

Keep ether cylinders out of the reach of unauthorized personnel.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.
2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”. The ether starting aid cylinder is located on the left side of the engine near the air filter for the engine.

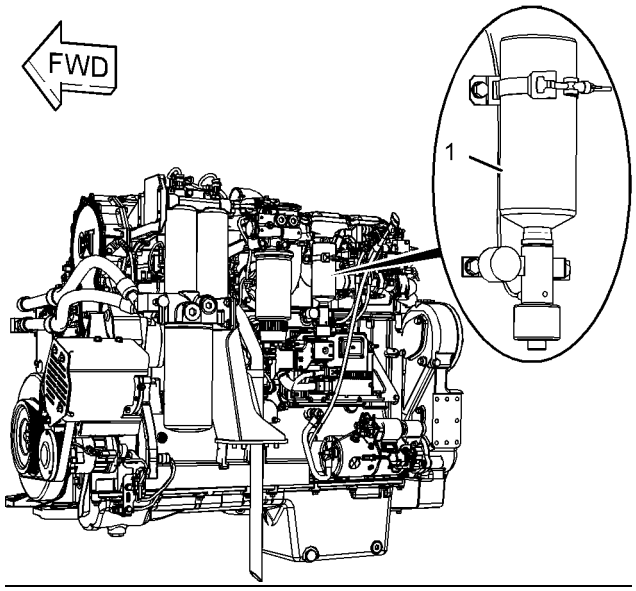


Illustration 153 g02459083

3. Loosen the cylinder retaining clamp. Unscrew and discard empty ether starting aid cylinder (1).
4. Remove the gasket. Install a new gasket. A new gasket is provided with each new ether starting aid cylinder.
5. Install a new ether starting aid cylinder. Tighten the ether starting aid cylinder hand tight. Tighten the cylinder retaining clamp securely.
6. Lower the hood.

i03997106

Film (Product Identification) - Clean

SMCS Code: 7405-070; 7557-070

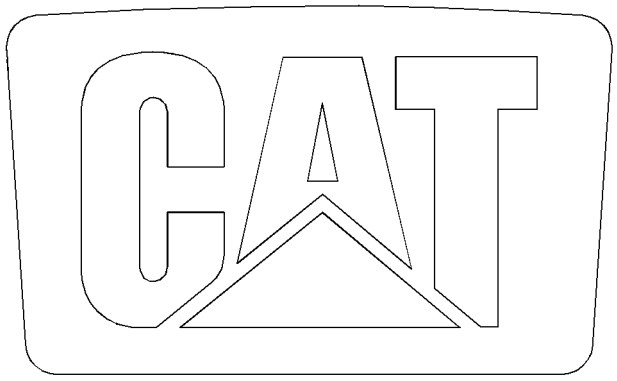


Illustration 154 g02174985

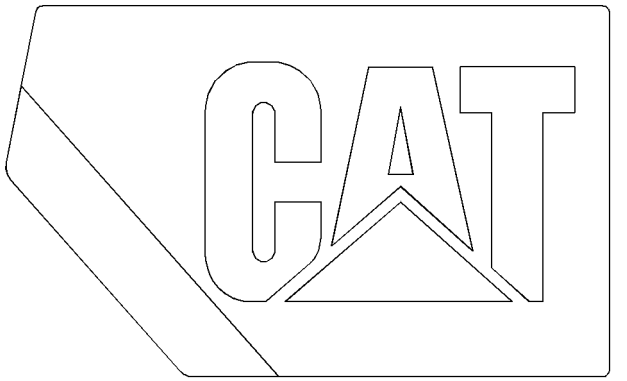


Illustration 155 g02175297

Typical example of the Product Identification Films.

Cleaning of the Films

Make sure that all of the product identification films are legible. Make sure that the recommended procedures are used in order to clean the product identification films. Ensure that all the product identification films are not damaged or missing. Clean the product identification films or replace the films.

Hand Washing

Use a wet solution with no abrasive material that contains no solvents and no alcohol. Use a wet solution with a “pH” value between 3 and 11. Use a soft brush, a rag, or a sponge in order to clean the product identification films. Avoid wearing down the surface of the product identification films with unnecessary scrubbing. Ensure that the surface of the product identification films is flushed with clean water and allow the product identification films to air dry.

Power Washing

Power washing or washing with pressure may be used in order to clean product identification films. However, aggressive washing can damage the product identification films.

Excessive pressure during power washing can damage the product identification films by forcing water underneath the product identification films. Water lessens the adhesion of the product identification film to the product, allowing the product identification film to lift or curl. These problems are magnified by wind. These problems are critical for the perforated film on windows.

To avoid lifting of the edge or other damage to the product identification films, follow these important steps:

- Use a spray nozzle with a wide spray pattern.
- A maximum pressure of 83 bar (1200 psi)
- A maximum water temperature of 50° C (120° F)
- Hold the nozzle perpendicular to the product identification film at a minimum distance of 305 mm (12 inch).
- Do not direct a stream of water at a sharp angle to the edge of the product identification film.

i02252582

Frame and Body - Inspect

SMCS Code: 3250-040; 3260-040; 3268-040; 7000-040; 7050-040; 7113-040; 7258-040

All earthmoving equipment is prone to a high degree of wear. Regular inspections for structural damage are necessary.

These inspections are particularly important for this type of machine as the machines can experience difficult work cycles.

Regular inspections can minimize the risk of accidents. Regular inspections can reduce down time.

The interval between these inspections depends on the following factors:

- The age of the machine
- The severity of the application
- The loads that have been carried in the machine
- The condition of the haul road
- The amount of routine servicing that has been carried out

These inspections should be carried out at intervals no longer than 2000 service hours. Older machines, or machines that are operating in severe applications will require more frequent inspections.

If the machine has been involved in a collision, or if the machine has been involved in any kind of accident, the machine must be inspected thoroughly. Inspect the machine regardless of the date of the last inspection.

The machine must be clean before the machine is inspected.

Proper repair of frames and structures requires specific knowledge of the following subjects:

- Materials that have been used to manufacture the frame members
- Frame member construction
- Repair techniques that are recommended by the manufacturer

Consult your Caterpillar dealer if repairs are necessary. Your Caterpillar dealer is qualified to carry out repairs on your behalf.

All repairs should be carried out by a Caterpillar dealer. If you carry out your own repairs, contact your Caterpillar dealer for advice about proper repair techniques.

Particular attention should be given to all welded structures. The following items should be thoroughly inspected for cracks and for defects:

- Front frame
- Front suspension a-frame
- Rear frame
- Oscillating hitch
- Body

NOTICE
The areas highlighted are of particular importance but other areas must not be neglected. The entire structure must be carefully examined.

Front Frame

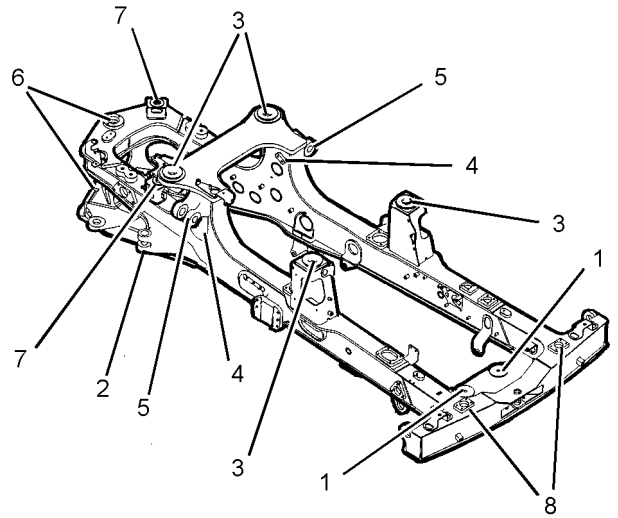


Illustration 156 g01134271

Inspect the following areas:

- Front engine mountings (1)
- Steering cylinder lugs (2)
- Cab mounts (3)
- Suspension towers (4)
- Mounting bosses (5) for the Front suspension cylinders
- Rear subassembly and hitch lugs (6)
- Radiator Mounts (7)
- ATAAC Mounts (8)

Front Suspension A-Frame

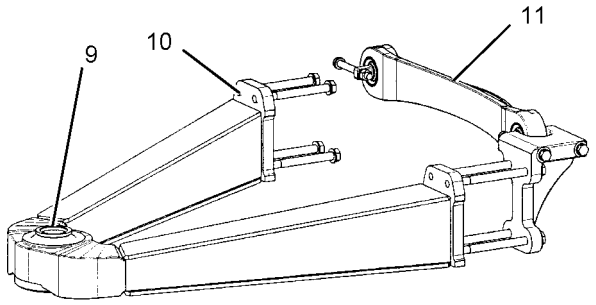


Illustration 157 g01134326

Inspect the following areas:

- Pivot (9) for the A-frame
- Axle mountings (10)
- Stabilizer rod and mountings (11)

Oscillating Hitch

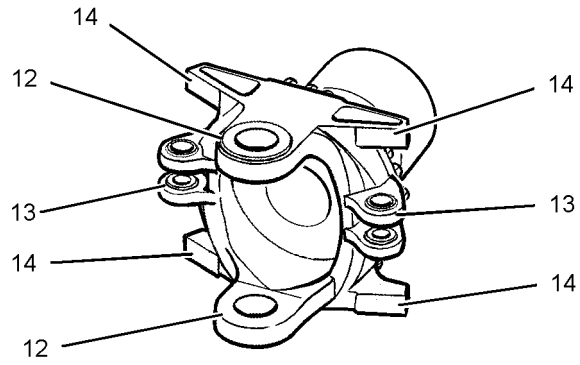


Illustration 158 g01134329

Inspect the entire oscillating hitch and pay particular attention to the following areas:

- The hitch pin lugs (12)
- The steering cylinder lugs (13)
- The stop pads (14)

Rear Frame

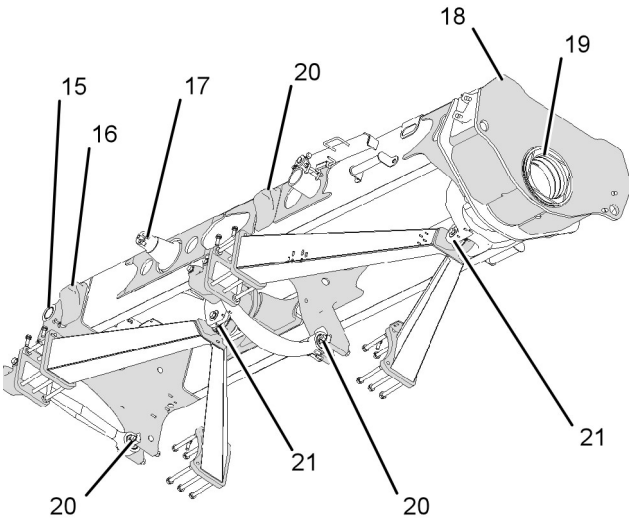


Illustration 159 g01134331

Inspect the following areas:

- Mountings for dump body (15)
- Stops (16)
- Spindles (17) for equalizer arms
- Front plate (18)
- Oscillating hitch tube (19)
- Mounting brackets for stabilizer rods (20)
- Suspension frame mountings (21)

Body

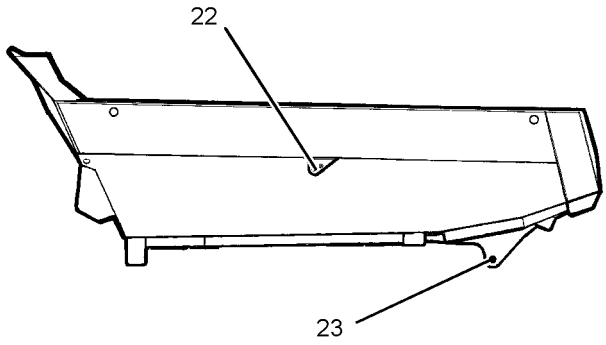


Illustration 160 g01134332

Inspect the following areas:

- The mountings (22) for the hoist cylinders
- The mountings (23) for the body

Mounts for the Suspension

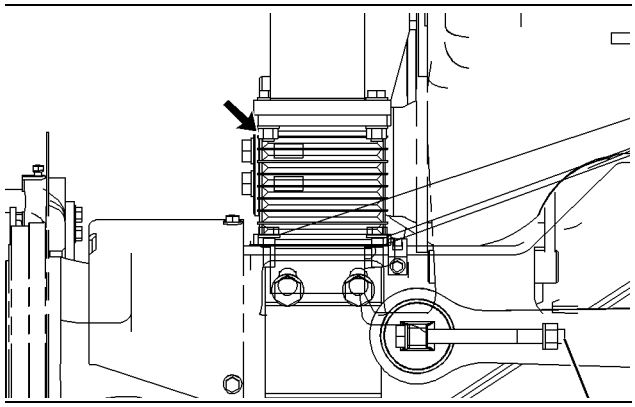


Illustration 161 g00954460

Check the mounts for cracks and for damage. If damage is visible, contact your Caterpillar dealer for more information.

Note: Inspect the mounts for the suspension after the initial 2000 service hours and every 250 service hours thereafter.

i04286078

Fuel Pump (ARD, Priming) - Replace

SMCS Code: 1258-510

S/N: T4P1-Up

S/N: T4R1-Up

The fuel priming pump supplies the fuel to the Aftertreatment Regeneration Device (ARD).

For instruction on the replacement of the ARD fuel priming pump, refer to Disassembly and Assembly, KENR8151, “C15 Caterpillar Machine Engine”, “Fuel Priming Pump - Remove and Install” or consult your Cat dealer.

i03903277

Fuel System - Prime

SMCS Code: 1250-548

⚠ WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. Clean up fuel spills immediately.

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.

Prime the fuel system in order to fill the fuel filter with fuel. Prime the fuel system after the fuel filters have been changed.

1. Park the machine on a level surface. Engage the parking brake and stop the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

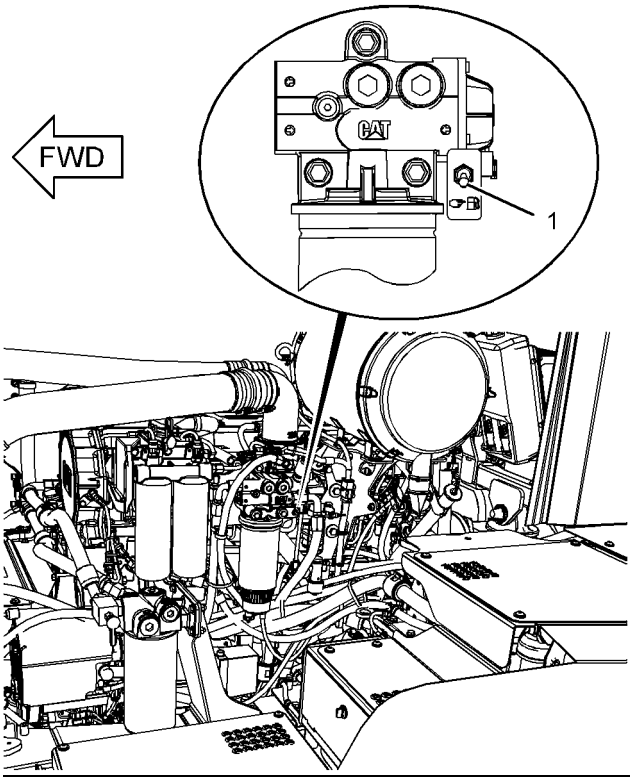


Illustration 162 g02148224

3. Hold switch (1) upward in order to operate the electric fuel priming pump. The electric fuel priming pump will fill the engine fuel lines and the fuel filters with fuel.

Note: The engine start switch must be in the OFF position in order to prime the fuel system.

4. Lower the hood.

5. Operate the priming pump in order to build fuel pressure. As the fuel pressure increases, the priming pump will come under load. Listen for the priming pump to come under load. Do not continue priming the fuel system after the priming pump is under load. Do not operate the pump for more than two minutes.

6. Start the engine. If the engine starts but the engine runs rough, continue to run the engine at low idle until the engine runs smoothly. If the engine will not start after several attempts, consult your Caterpillar dealer.

i04261110

Fuel System Primary Filter - Clean/Inspect/Replace

SMCS Code: 1260-510; 1260-571

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

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

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

Dispose of all fluids according to local regulations and mandates.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and stop the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

3. Clean the outside of the primary fuel filter element.

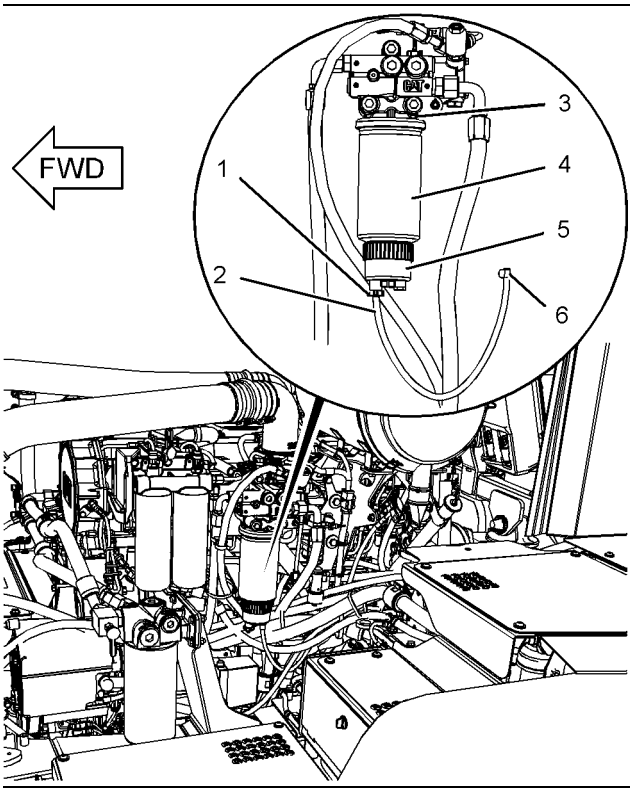


Illustration 163 g02431498

4. Insert drain hose (2) into a suitable container. Open valve (1) in order to drain the fuel from the filter. Close the valve.

5. Use a strap wrench to remove filter element (4) from filter base assembly (3).

6. Detach bowl (5) from the filter element. Properly discard the used filter.

7. Clean the filter base assembly.

8. Coat the new seal with clean diesel fuel prior to installation.

9. Attach the bowl to the new filter element.

10. Install the new filter element by hand. When the seal contacts the filter base assembly, tighten the filter by 270 degrees more.

Note: The filter element has indicator marks at every 90 degrees.

11. Ensure that the end of the drain hose is attached to clip (6).

12. Prime the fuel system.

    Refer to the Operation and Maintenance Manual, “Fuel System - Prime”.

13. Start the engine and check for leaks.

14. Close the hood.

i03906509

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

NOTICE
Do not fill the secondary fuel filter with fuel before installing. The fuel would not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts.

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

Refer to Special Publication, NENG2500, “Caterpillar 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: Before you replace the secondary fuel filters, the primary fuel filter must be replaced. Refer to the Operation and Maintenance Manual, “Fuel System Primary Filter - Clean/Inspect/Replace”.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the dump body and shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

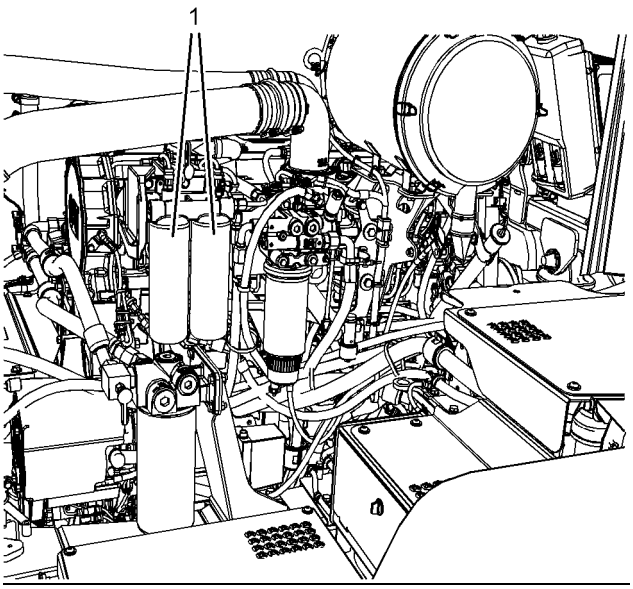


Illustration 164 g02148239

3. Use a strap wrench and remove secondary fuel filters (1). Discard the secondary fuel filters properly.

4. Clean the fuel filter bases.

5. Coat the seals on the new secondary fuel filters with clean diesel fuel prior to installation.

6. Install the new secondary fuel filters by hand. **Do not use a tool for installation of the secondary fuel filters.** When the new filter base gasket contacts the fuel filter base, tighten the secondary fuel filter by an additional 270°.

Note: The secondary fuel filter has indicator marks at every 90 degrees.

7. Prime the fuel system.

Refer to the Operation and Maintenance Manual, “Fuel System - Prime”.

8. Start the engine and check for leaks.

9. Lower the hood.

i04261269

Fuel System 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, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

1. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

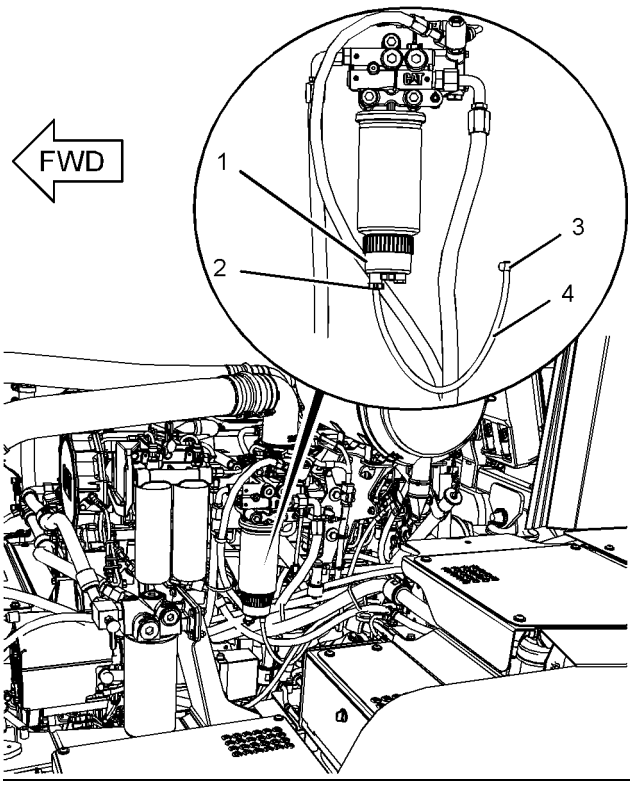


Illustration 165 g02431638

Note: The water separator is located below the primary fuel filter element.

2. Insert drain hose (4) into a suitable container. Open drain (2) on water separator bowl (1).

3. Drain the water from the bowl. Close the drain.

4. Ensure that the end of the drain hose is attached to clip (3).

5. Lower the hood.

i03903308

Fuel Tank Cap and Strainer - Clean

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

Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

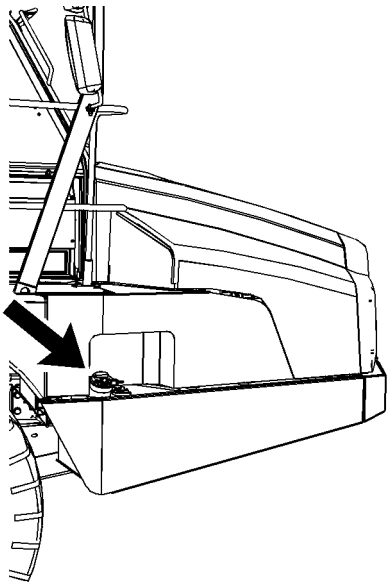


Illustration 166 g02145516
Location of the fuel tank cap and fuel strainer

1. Remove the fuel tank cap.

2. Clean the fuel tank cap in nonflammable solvent. If the fuel tank cap is damaged, replace the fuel tank cap.

3. Inspect the O-ring seal in the fuel cap for damage. Replace the O-ring seal if the O-ring seal is damaged.

4. Remove the fuel strainer from the filler tube for the fuel tank.

5. Clean the fuel strainer in clean, nonflammable solvent. If the fuel strainer is damaged, replace the fuel strainer.

6. Allow the fuel strainer and the fuel tank cap to dry.

7. Reinstall the fuel strainer.

8. Reinstall the fuel tank cap.

i03909213

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 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.

NOTICE
Fill the fuel tank at the end of each day of operation to drive out moist air and to prevent condensation.

Do not fill the tank to the top. Fuel expands as it gets warm and may overflow.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the dump body and shut off the engine.

Drain water and sediment from the fuel tank after the fuel tank has been filled. Allow the machine to stand for ten minutes before draining the fuel tank.

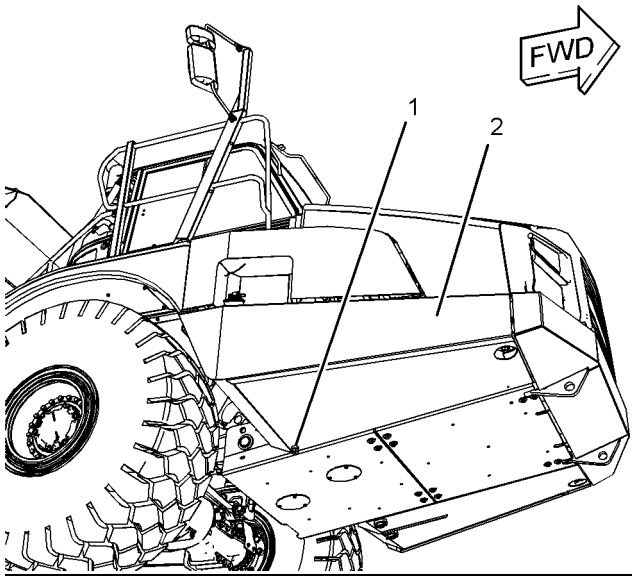


Illustration 167 g02149128

Purge screw (1) for the fuel tank is located on the bottom of fuel tank (2). The fuel tank is located on the right side of the tractor.

1. Remove the fuel tank cap.

The fuel tank cap is located on top of the fuel tank.

2. Open the purge screw until fluid and sediment starts to flow from the drain hole.

3. Allow the fluid and sediment to flow into a suitable container.

4. When the flow from the fuel tank is free of water and sediment, close the purge screw.

i03888409

Fumes Disposal Filter Element - Replace

SMCS Code: 1074

S/N: T4P1-Up

S/N: T4R1-Up

⚠ WARNING

Burn Hazard: Engine components may be hot during and after machine operation.

Hot components can cause serious personal injury. Do not contact hot components with bare skin.

1. Park the machine on a level surface. Engage the parking brake and shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

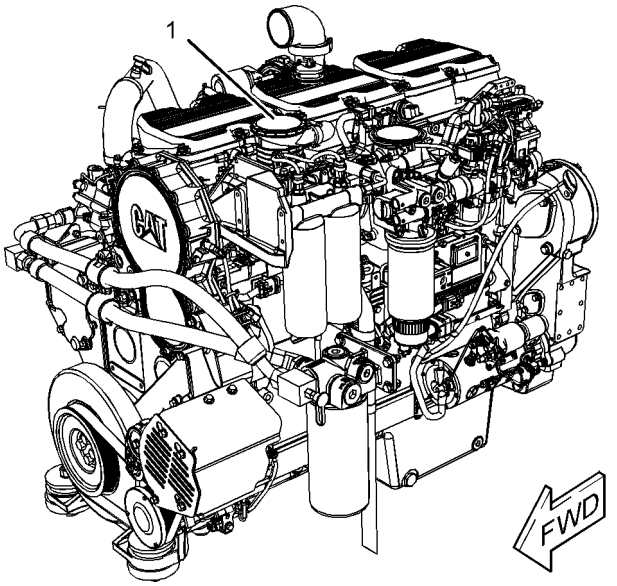


Illustration 168 g02132994

3. Remove cap (1) from the top of the fumes disposal filter.

4. Remove the filter element from the fumes disposal system. Dispose of the used filter element properly.

5. Install the new filter element in the fumes disposal system. Install the cap on the top of the fumes disposal filter.

6. lower the hood.

i03895806

Fuses, Circuit Breakers and Relays - Replace/Reset

SMCS Code: 1417-510; 1420-510; 1422-510

Fuses

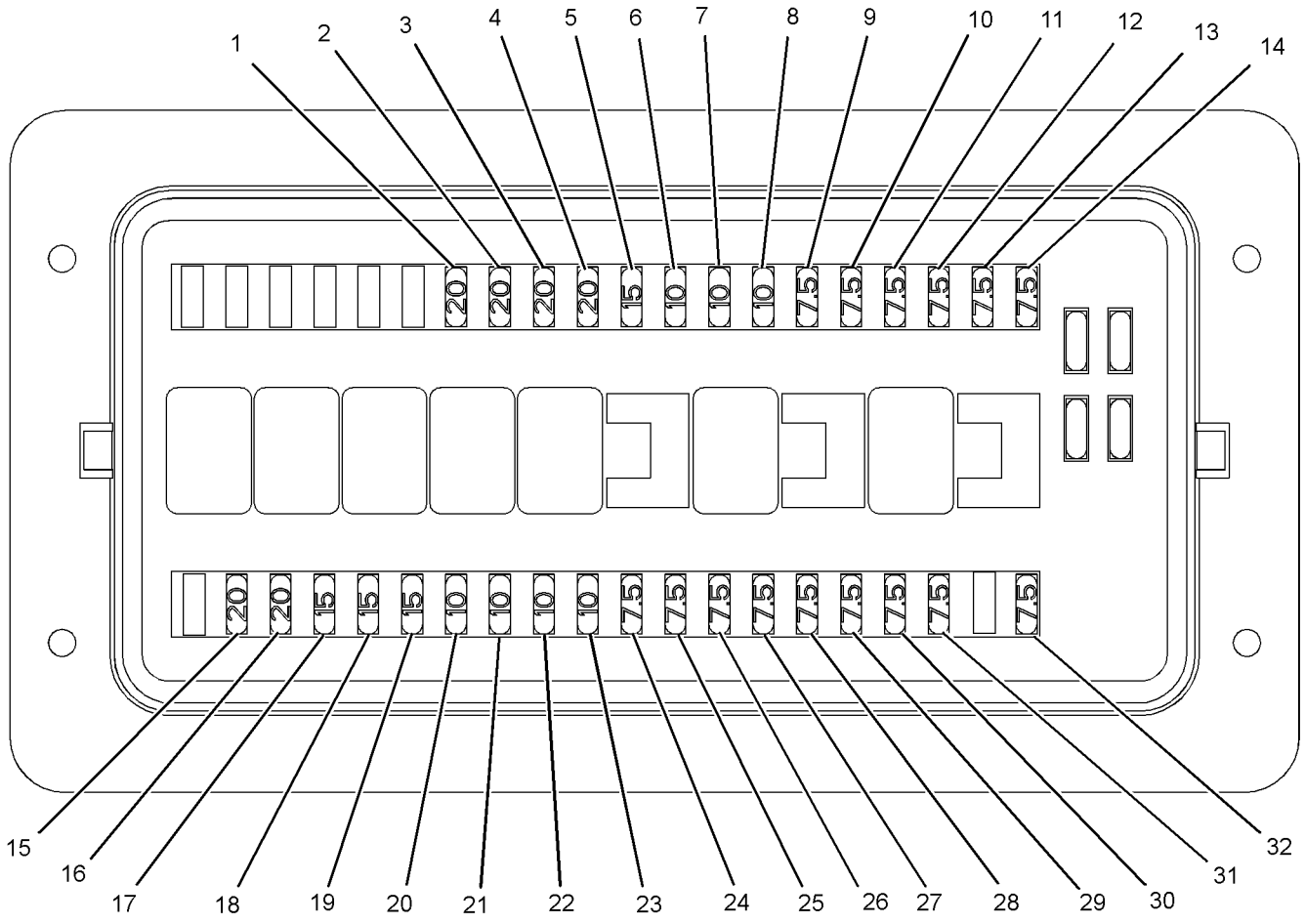


Illustration 169 g02139415

The fuse panel is located behind the operator seat.

(1) Fuel Priming Pump – 20 Amp

(2) Hood Tilt – 20 Amp

(3) Transmission ECM and ET – 20 Amp

(4) Traction Control ECM – 20 Amp

(5) Clearance Lights – 15 Amp

(6) Directional Turn Signals – 10 Amp

(7) 24 Volt to 12 Volt Converter (unswitched) – 10 Amp

(8) Product Link – 10 Amp

(9) Stop Lights – 7.5 amp

(10) Backup Alarm – 7.5 amp

(11) Dome Light – 7.5 amp

(12) Horn – 7.5 amp

(13) Monitoring System – 7.5 amp

(14) Engine Start Switch – 7.5 amp

(15) HVAC – 20 Amp

(16) Engine Emission System Fuel Pump – 20 Amp

(17) Window Wiper – 15 Amp

(18) Intermittent Wiper – 15 Amp

(19) Long Range Lamps (HID) – 15 Amp

(20) 24 Volt to 12 Volt Converter (switched) – 10 Amp

(21) Heated Seat – 10 Amp

(22) Cigar Lighter – 10 Amp

(23) Autolube – 10 Amp

(24) Engine Emission System Soot Sensor – 7.5 Amp

(25) Differential Lock – 7.5 Amp

(26) Secondary Steering – 7.5 Amp

(27) ECM Key Switch – 7.5 Amp

(28) Level Sensors

(29) Beacon Light – 7.5 amp

(30) Work Lights – 7.5 amp

(31) Heated Mirror – 7.5 Amp

(32) Secondary Steering Switch – 7.5 Amp

Circuit Breakers

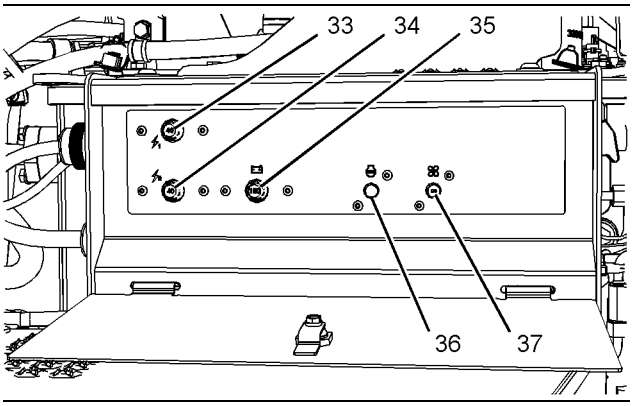


Illustration 170 g02139899

The breaker panel is located on the front left of the machine.

Primary Electrical (33) – 40 Amp

Secondary Electrical (34) – 40 Amp

Battery (35) – 150 Amp

Engine ECM (36) – 30 Amp

CEM Fan (Tier 4 Only) (37) – 20 Amp

Relays

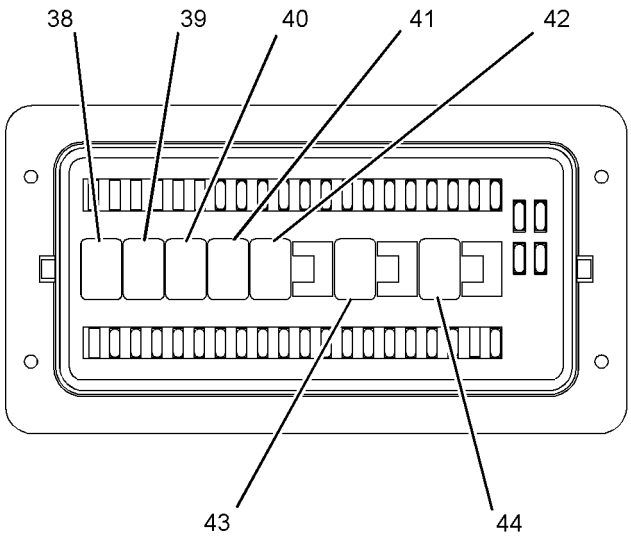


Illustration 171 g02140030

The relay panel is located behind the operator seat.

(38) Horn

(39) Fuel Priming Pump

(40) Backup Alarm

(41) Fuel Priming Pump

(42) Secondary Steering

(43) Intermittent Wiper

(44) Fuel Pump

i04261369

Hoist Cylinder Bearings - Lubricate

SMCS Code: 5102-086-BD

If regular lubrication is performed at the recommended interval, only one or two shots of grease will be required at each fitting.

1. Wipe all the fittings before you lubricate the hoist cylinder bearings.

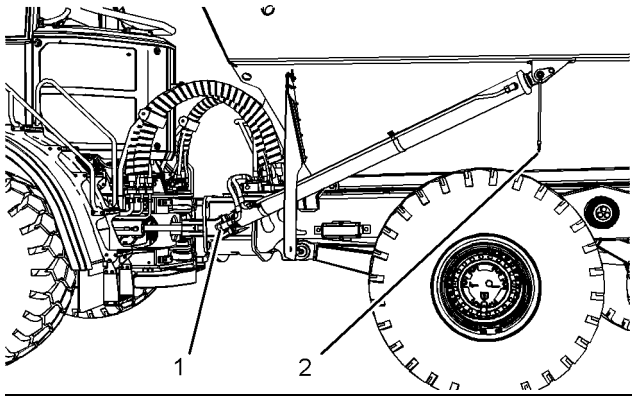


Illustration 172 g02431655

2. Lubricate the lower hoist cylinder bearings through fitting (1) on each side of the machine.

Note: In order to ensure proper lubrication of the lower hoist cylinder bearings, raise the body and install the body prop.

3. Lubricate the upper hoist cylinder bearings through fitting (2) on each side of the machine.

i03903328

Hoist System and Brake System Breather - Replace

SMCS Code: 5056-510-BRE

Note: A hose is connected from the top of the steering tank vent to the top of the hoist/brake tank. This hose will vent the steering system through the breather for the hoist/brake system.

1. Park the machine on a level surface and engage the parking brake and shut off the engine.

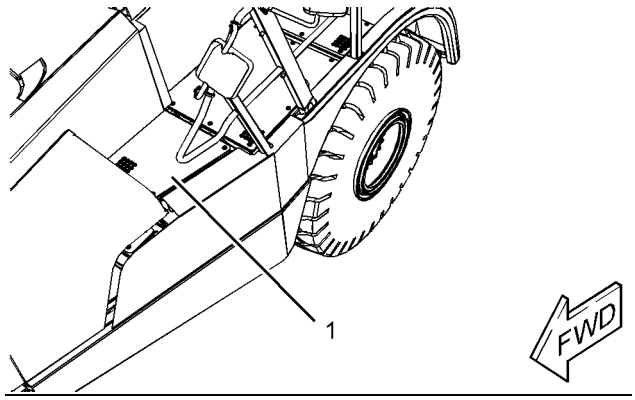


Illustration 173 g02145527

2. The breather is located on the top of the tank for the hoist and brake system oil. The tank for the hoist and brake system oil is on the left side of the machine. Open cover(1) in order to access the top of the tank.

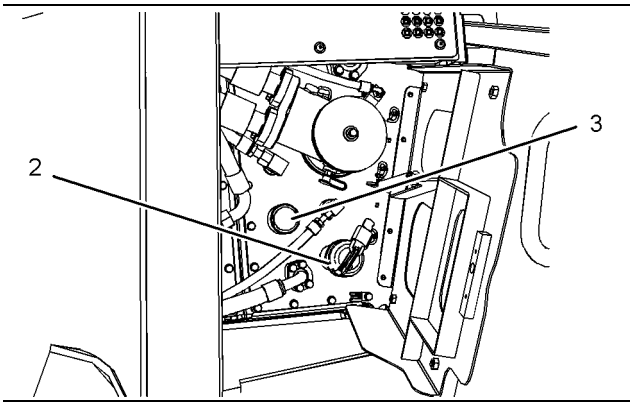


Illustration 174 g02145528

3. Remove filler cap (2) slowly in order to gradually relieve any system pressure.

4. Unscrew breather (3) and remove the breather from the machine.

5. Install a new breather.

6. Install the filler cap.

7. Install the tread plate.

i03909135

Hoist System and Brake System Oil - Change

SMCS Code: 5056-044

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 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.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the dump body and shut off the engine. Allow the oil to cool.

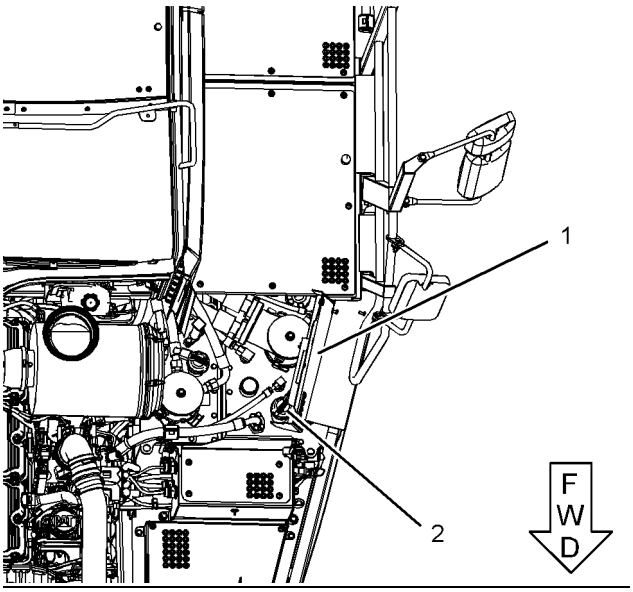


Illustration 175 g02149105

Top view of the left side of the tractor

2. The hoist/brake tank is located on the left side of the tractor. Release the latch and lift cover plate (1) in order to access the top of the tank.

3. Filler cap (2) is located on top of the tank. Remove the filler cap slowly in order to gradually relieve any system pressure.

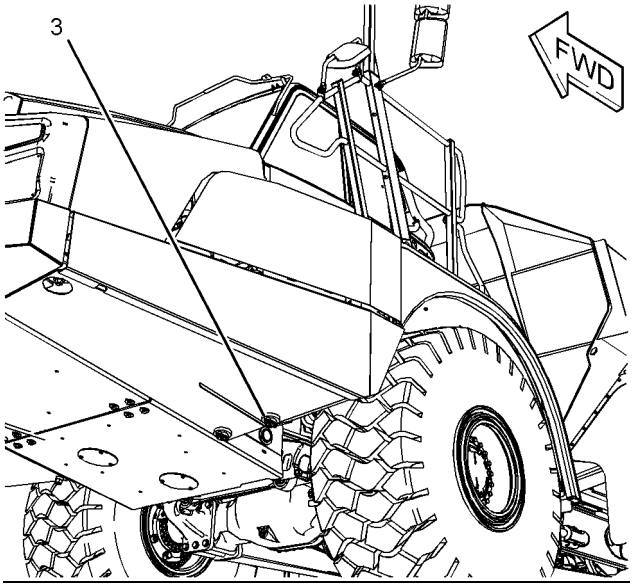


Illustration 176 g02149106

4. Drain plug (3) is located on the bottom of the hoist/brake tank.

   Remove the drain plug. Install 6B-3156 Pipe Nipple in order to unseat the drain valve. Allow the oil to drain into a suitable container.

5. Remove the pipe nipple. Inspect the drain plug and the seal for damage. If the drain plug or the seal are damaged, replace the damaged components.

   Install the drain plug and the seal.

6. Fill the tank with new oil through the filler tube.

   Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.

7. Check the filler cap and the seal for damage. Replace any damaged components. Install the filler cap.

8. Start the engine and run the engine at low idle.

9. Check that there is adequate vertical clearance. Raise the dump body and lower the dump body.

10. Stop the engine.

11. Check the oil level. Add oil, if necessary.

    Refer to Operation and Maintenance Manual, “Hoist System and Brake System Oil Level - Check”.

12. Lower the cover plate.

13. Clean up oil spills.

14. Purge the brakes.

    Refer to Operation and Maintenance Manual, “Brake System Air - Purge”.

i03909095

Hoist System and Brake System Oil Filter and Screen - Clean/Replace

SMCS Code: 5056-070-Z3; 5056-510-Z3; 5068-070; 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.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the dump body and shut off the engine. Allow the oil to cool.

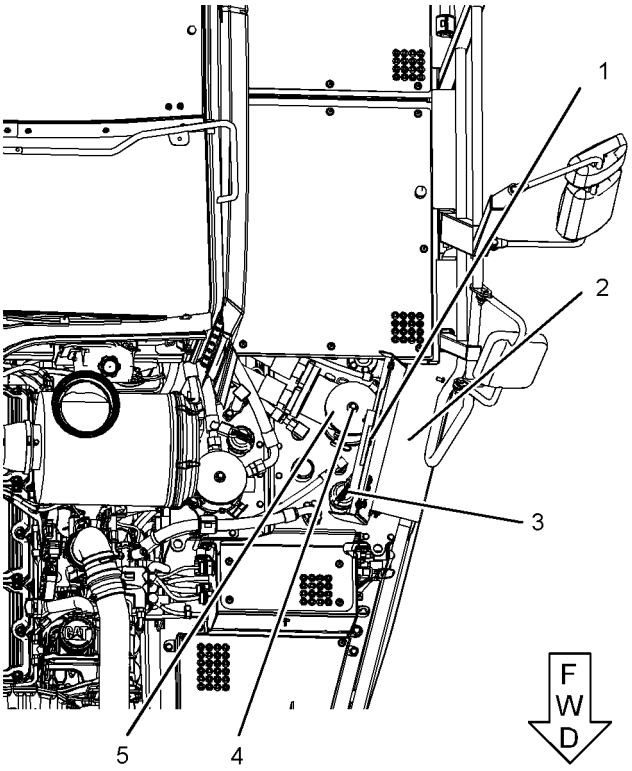


Illustration 177 g02149089

Top view of the left side of the tractor

2. The oil filter elements and the screen are located inside the tank for the hoist/brake system. The tank is located on the right side of the machine. Release latch (1) and lift cover plate (2) in order to access the top of the tank.

3. Remove filler cap (3) slowly in order to gradually relieve any system pressure.

4. Unscrew bolt (4) and lift cover (5). The screen assembly is fastened to the cover.

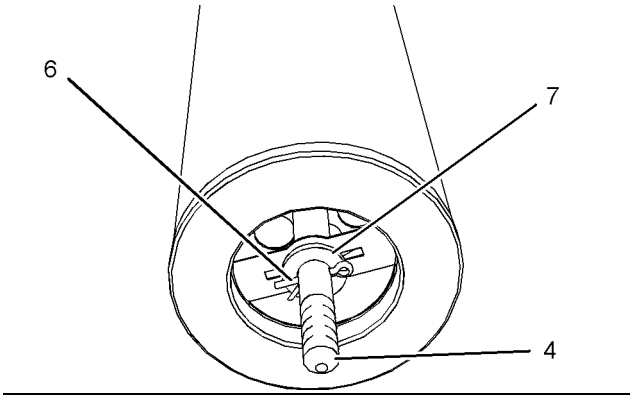


Illustration 178 g02434784

5. Remove cotter pin (6) and washer (7) from bolt (4). This will allow the removal of the filter elements from inside of the screen.

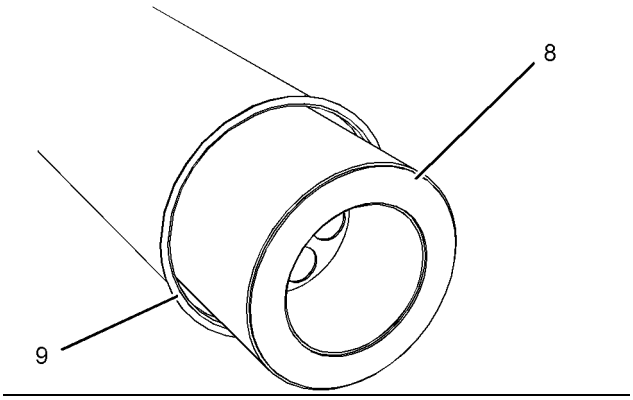


Illustration 179 g02434838

6. There are three filter elements (8) within screen (9). Remove all filter elements and discard all filter elements.

7. Wash the screen in clean nonflammable solvent. Inspect the screen for damage. If necessary, replace the screen. Allow the screen to dry.

8. Install three new filter elements into the clean screen.

9. Reassemble the screen assembly and reinstall the screen assembly. If necessary, replace the O-ring seal between cover (5) and the screen assembly.

10. Install the filler cap.

11. Lower and latch the cover plate.

i04262169

Hoist System and Brake System Oil Level - Check

SMCS Code: 5056-535-FLV

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

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

Dispose of all fluids according to local regulations and mandates.

Note: Before operating the machine, ensure that the oil level is within the operating range.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged.

2. Shut off the engine and allow the level of the oil to stabilize.

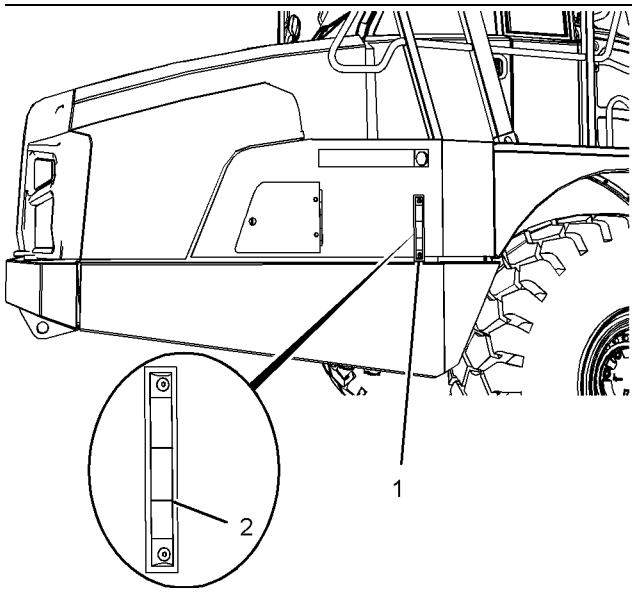


Illustration 180 g02432477

3. Sight glass (1) is located on the left side of the machine. Check the oil level in the sight glass.

4. When the oil is at operating temperature, oil must be above the level mark (2) on the sight glass. Ensure that the oil remains above this level.

If necessary, add oil through the oil filler tube.

Refer to Operation and Maintenance Manual, “Steering System Oil - Change” and Operation and Maintenance Manual, “Lubricant Viscosities”.

i03909110

Hoist System and Brake System Strainer - Clean

SMCS Code: 5056-070-STR

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.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

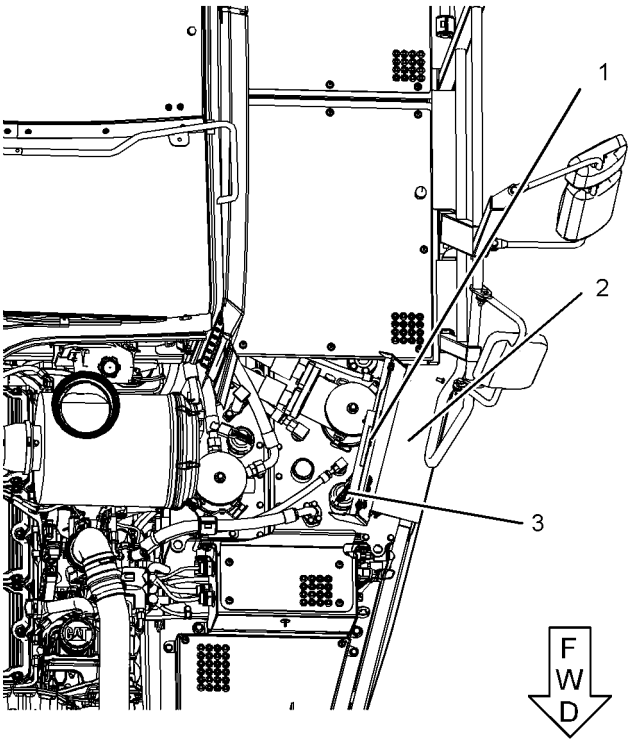


Illustration 181 g02149097

Top view of the left side of the tractor

2. The strainer is located inside the filler tube on the tank for the hoist system and the brake system oil. The tank is located on the left side of the machine. Release latch (1) and lift cover plate (2) in order to access the top of the tank.

3. Remove filler cap (3) slowly in order to gradually relieve any system pressure.

4. Remove the retaining ring and remove the strainer from the filler tube.

5. Wash the strainer in nonflammable solvent. Allow the strainer to dry before the strainer is reinstalled.

6. If the strainer is damaged, replace the strainer.

7. Inspect the filler cap and the gasket which is inside of the filler cap. Replace any damaged components.

8. Install the strainer and the retaining ring.

9. Install the filler cap.

10. Lower and latch the cover plate.

i02106227

Oil Filter - Inspect

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

Inspect a Used Filter for Debris

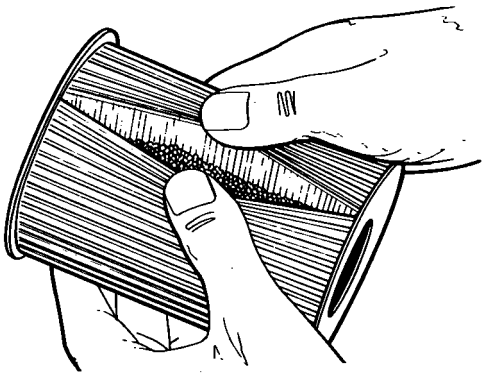


Illustration 182 g00100013

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.

i04265653

Oscillating Hitch - Adjust

SMCS Code: 7113-025

1. Relieve the tension from the oscillating hitch. Place a large block of timber behind the rear wheels of the machine and reverse the machine against the block.

2. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

Adjusting Hitch Pin Clearance

1. To relieve the downward force, position a hydraulic jack under the tractor portion of the hitch and slightly raise the hitch.

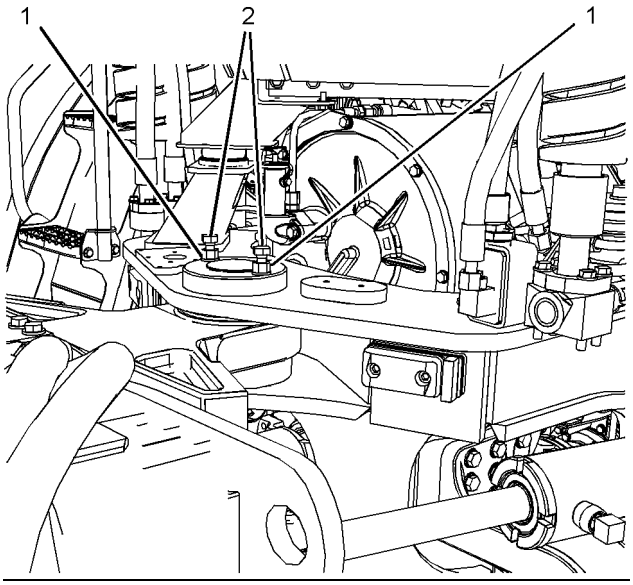


Illustration 183 g02435120

2. Loosen jam nuts (1). Turn adjusting screws (2) clockwise onto the top of the thrust ring. Turn the adjustment screws evenly in order to take up excessive clearance. **Do not overtighten the screws.**

3. Tighten jam nuts (1).

Adjusting the Thrust Plate

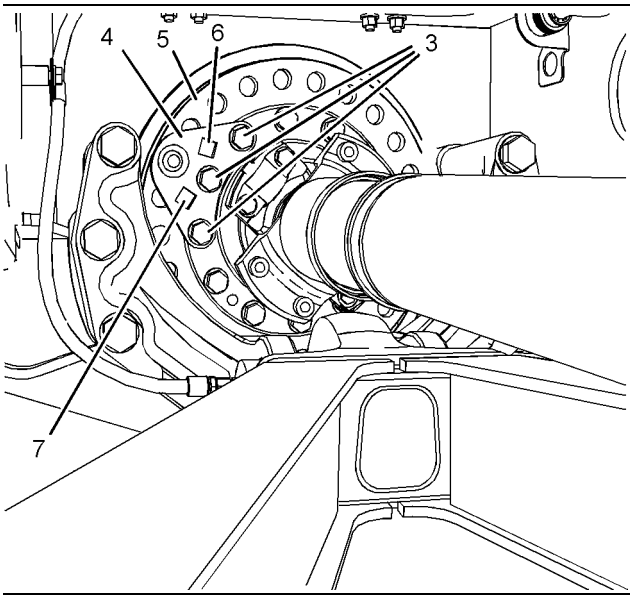


Illustration 184 g02435136

1. Remove three bolts (3) and remove locking plate (4).

2. Reposition locking plate (4) so that hole (6) is outside of the circumference of thrust flange (5).

3. Insert a 3/4 inch square drive through hole (6) so that the square drive contacts the outside of thrust flange (5). The square drive will prevent locking plate (4) from rotating clockwise.

4. Use a suitable wrench on the square drive in order to turn thrust flange (5) clockwise until all end play has been removed.

5. If necessary, turn the thrust flange counterclockwise in order to line up the holes. Insert the square drive into hole (7) in order to rotate the thrust flange counterclockwise. Rotate the thrust flange as far as the first correct hole alignment.

6. Remove the square drive and reposition locking plate (4) and bolts (3).

7. Remove the hydraulic jack.

8. Remove the steering frame lock.

i04266789

Oscillating Hitch - Lubricate

SMCS Code: 7113-086

NOTICE
Check that lines attached to remote grease fittings are undamaged. If the lines are split grease will not reach the bearings or pins. Machine damage will result.

The hitch bearings must be lubricated regularly. Rapid wear will result from inadequate lubrication.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the dump body and stop the engine.

If regular lubrication is carried out at the recommended interval, the fittings for the oscillating hitch pins should only need one or two shots of grease. As many as twenty shots of grease may be used in order to lubricate the bearings for the oscillating hitch.

1. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

2. Before lubricating the fittings, wipe the fittings in order to clean the fittings.

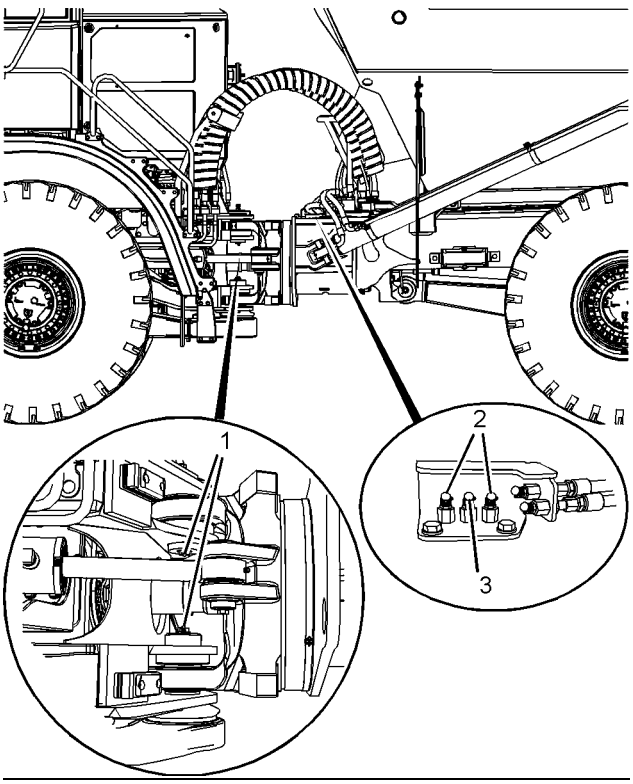


Illustration 185 g02436419

3. Lubricate the hitch pins through two fittings (1).

4. Lubricate the hitch bearings through fittings (2). Fitting (3) is initially used to fill the cavity between the two hitch bearings. This fitting does not require regular lubrication.

5. Remove the steering frame lock.

i04195770

Radiator Core - Clean

SMCS Code: 1353-070-KO

⚠ WARNING

Personal injury can result from air pressure.

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

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

1. Park the machine on a level surface. Engage the parking brake and shut off the engine.

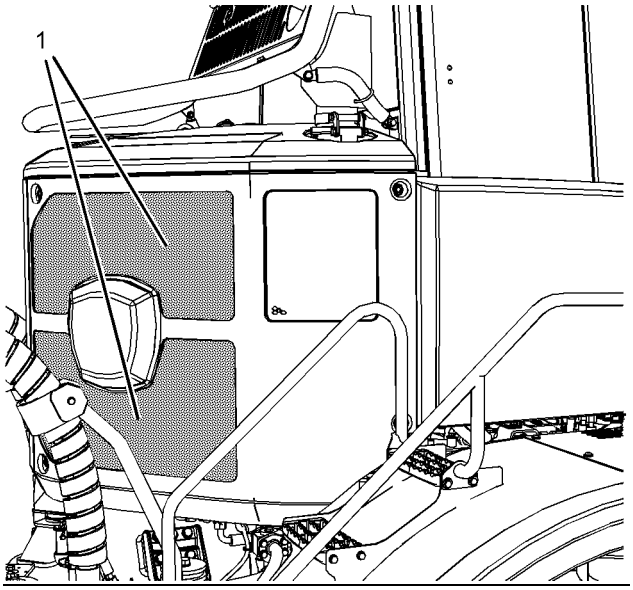


Illustration 186 g02385498

2. Clean the radiator core through grill area (1) in the cover.

Use compressed air, high-pressure water, or steam to remove dust and other debris from the radiator core. However, the use of compressed air is preferred.

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

i04200823

Refrigerant Dryer - Replace

SMCS Code: 7322-510

⚠ WARNING

Personal injury can result from contact with refrigerant.

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

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

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

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

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

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

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

Park the machine on a level surface. Engage the parking brake and shut off the engine.

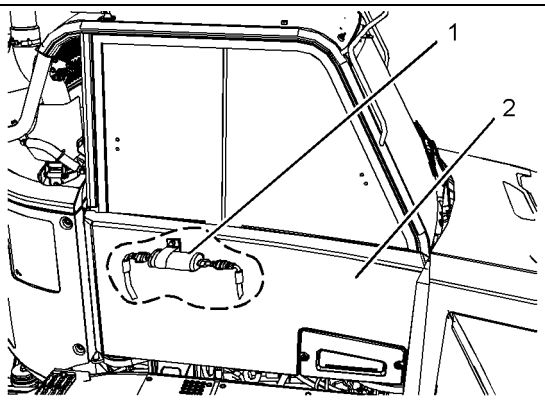


Illustration 187 g02390216

Cutaway view of panel.

The in-line refrigerant dryer (1) is located behind panel (2) on the right side of the cab.

Remove the panel in order to gain access to the in-line refrigerant dryer.

Refer to Service Manual, SENR5664, “In-Line Refrigerant Dryer - Remove and Install” for the replacement procedure of the in-line refrigerant dryer.

Note: When operating the machine in a climate with high humidity, replace the in-line refrigerant dryer after every 1000 service hours or 6 months.

i04265433

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7323-040; 7325-040

NOTICE

Do not attempt to straighten the ROPS structure. Do not repair the ROPS by welding reinforcement plates to the structure.

If there are any cracks in the welds, in the castings, or in any metal section of the ROPS, consult your Caterpillar dealer for repairs.

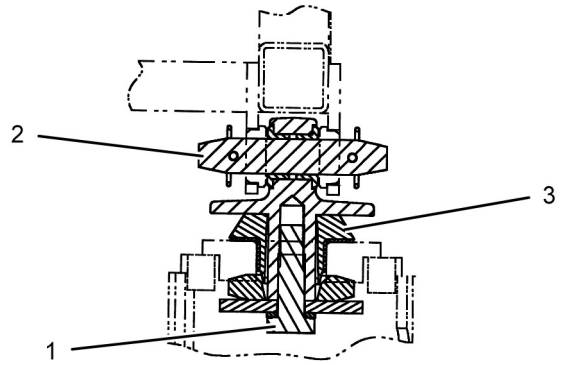


Illustration 188 g02434959

The ROPS is held in position by four mounting bolts (1), four pins (2) and four rubber mounts (3). One mounting bolt, one pin, and one rubber mount is located on each corner of the ROPS.

Carry out the following steps in order to inspect the ROPS:

1. Park the machine on a level surface. Move the parking brake control to the ENGAGED position and shut off the engine.

2. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

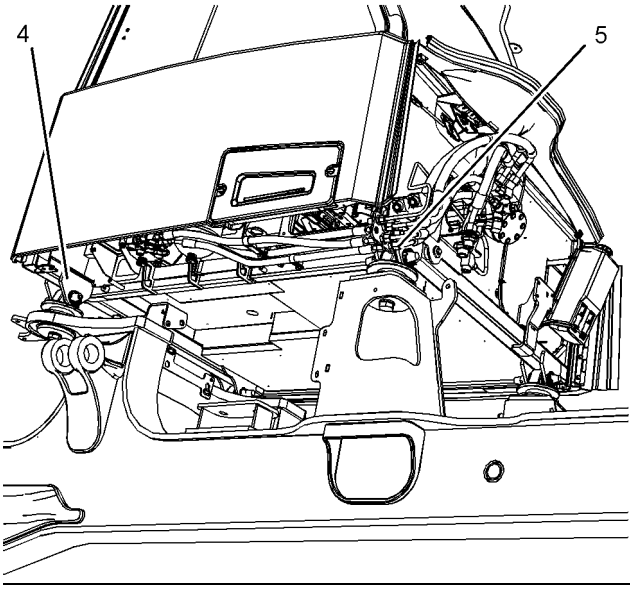


Illustration 189 g02435037

ROPS mounting (4) on the right side rear of the cab.

ROPS mounting (5) on the right side front of the cab.

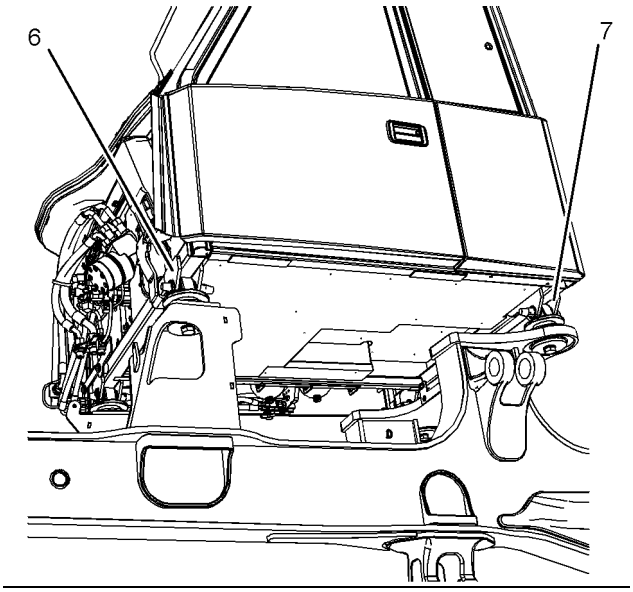


Illustration 190 g02435056

ROPS mounting (6) on the left side front of the cab.

ROPS mounting (7) on the left side rear of the cab.

3. Raise the hood in order to access the front ROPS mountings. Refer to Operation and Maintenance Manual, “Hood Control”.

4. Inspect the following items: mounting bolts (1), pins (2), and rubber mounts (3). Replace any damaged pins, bolts, or rubber mounts with original equipment parts.

5. Inspect the ROPS for bolts that are loose or damaged. Bolts that are loose, damaged, or missing should be replaced by original equipment parts only.

6. Ensure that bolts (1) are tightened to a torque of 775 N·m (572 lb ft).

7. Close the hood. Refer to Operation and Maintenance Manual , “Hood Control”.

8. Remove the steering frame lock. Refer to Operation and Maintenance Manual , “Steering Frame Lock”.

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.

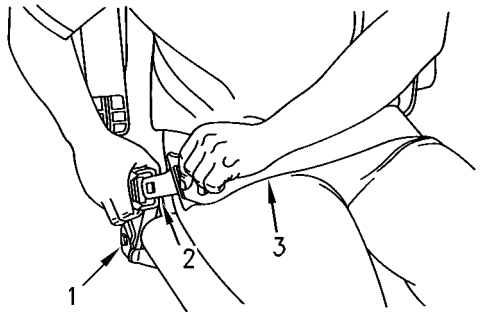


Illustration 191 g00932801

Typical example

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

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

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

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

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

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

i04270251

Seat Belt - Replace

SMCS Code: 7327-510

Within 3 years of the date of installation or within 5 years of the date of manufacture, Caterpillar recommends replacing the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to the seat belt, the seat belt buckle, and the seat belt retractor.

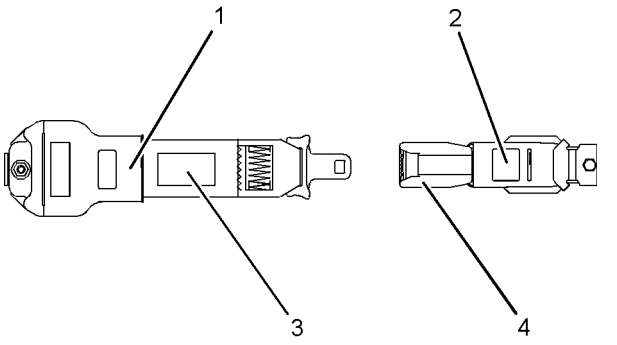


Illustration 192 g01152685

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

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

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

i03896471

Secondary Steering - Test

SMCS Code: 4324-081

Test the secondary steering by using the following procedure:

1. Park the machine on a hard level surface. Lower the dump body and shut off the engine. Leave the engine start switch in the ON position.

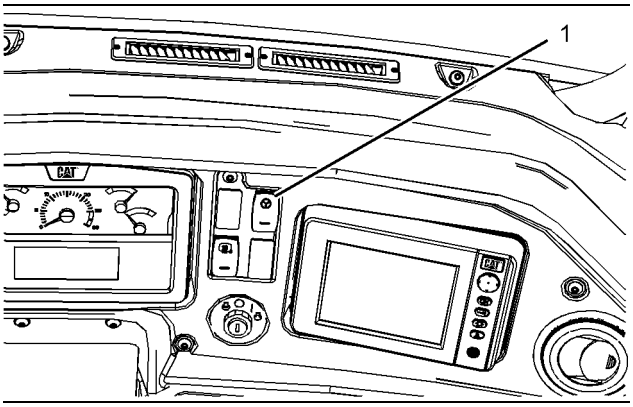


Illustration 193 g02140133

2. Press and hold the top of secondary steering test switch (1)in order to activate the secondary steering motor.

3. Turn the steering wheel fully from left to right. If the steering system responds, the secondary steering is operating. If the steering system does not respond, contact you Cat dealer.

4. Release the secondary steering test switch. Spring force will return the secondary steering test switch to the OFF position. This will deactivate the secondary steering motor. Do not run the secondary steering motor longer than 12 seconds while you are testing the secondary steering.

   Do not operate the machine if the secondary steering is not operating correctly.

i02253078

Service Brake - Adjust

SMCS Code: 4251-025

Note: The service brakes should not need to be adjusted more than every 4000 service hours unless S·O·S analysis indicates wear to the brakes.

Refer to the appropriateSystems Operation, Testing and Adjusting for your machine.

If S·O·S analysis indicates a problem with the service brakes, see your Caterpillar dealer.

i04269209

Steering Cylinder Bearings - Lubricate

SMCS Code: 4303-086-BD

NOTICE
Check that the lines attached to all the remote grease fittings are undamaged. If the grease lines are split, grease will not reach the components that require lubricating. Machine damage will result.

If regular lubrication is carried out at the recommended intervals, only one or two shots of grease will be required at each fitting. If more than two shots of grease per fitting are required, the lines may be split or damaged, and grease will not reach the steering cylinder pins.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and stop the engine. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

Note: Remove the plastic caps and clean the fittings before you apply grease. Reinstall the plastic caps once grease has been applied.

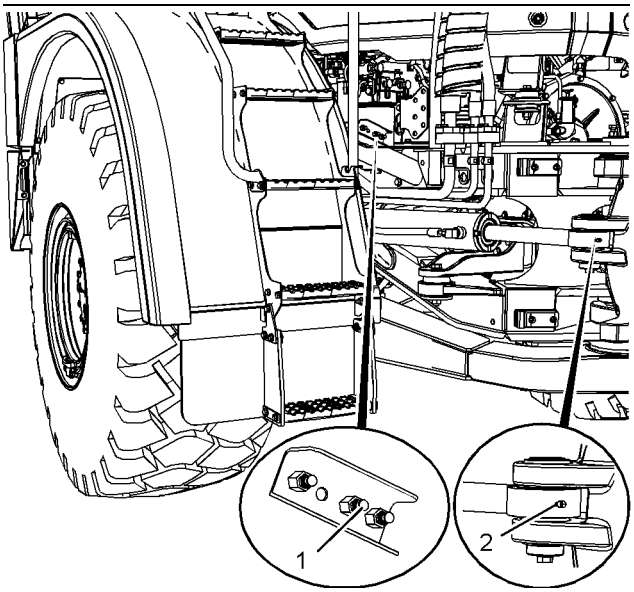


Illustration 194 g02438860

2. Lubricate the left front steering cylinder bearings through the fitting (1).

3. Lubricate the left rear steering cylinder bearings through fitting (2).

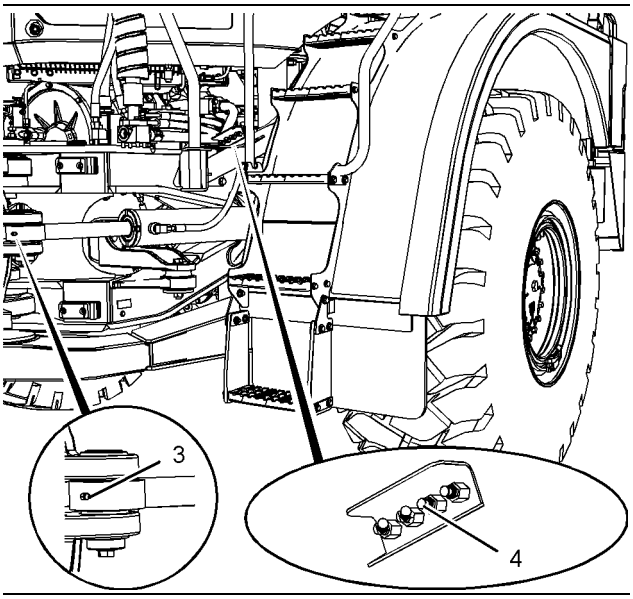


Illustration 195 g02441118

4. Lubricate the right rear steering cylinder bearings through the fitting (3).

5. Lubricate the right front steering cylinder bearings through fitting (4).

6. Remove the steering frame locks.

i03907940

Steering System Oil - Change

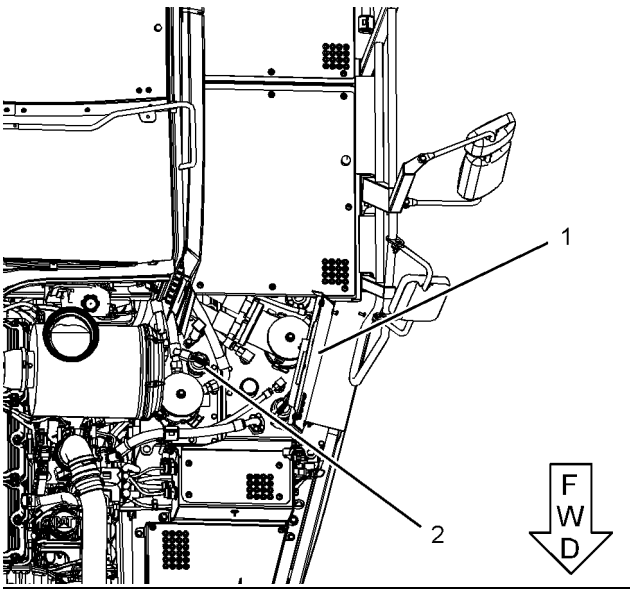
SMCS Code: 4332-044

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 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.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine. Allow the oil to cool.



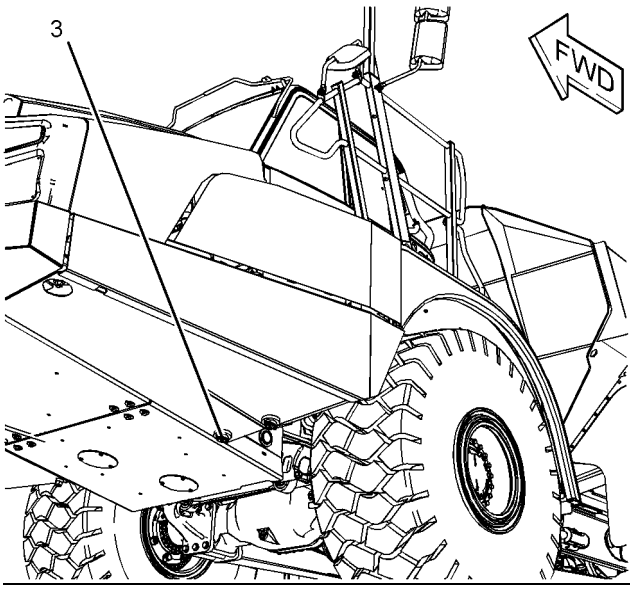
g02148812

Illustration 196

Top view of the left side of the tractor

2. The steering tank is located on the left side of the tractor. Release the latch and lift cover plate (1) in order to access the top of the tank.

3. Filler cap (2) is located on top of the tank. Remove the filler cap slowly in order to gradually relieve any system pressure.



g02148813

Illustration 197

4. Drain plug (3) is located on the bottom of the steering tank.

Remove the drain plug. Install 6B-3156 Pipe Nipple in order to unseat the drain valve. Allow the oil to drain into a suitable container.

5. Remove the pipe nipple. Inspect the drain plug and the seal for damage. If the drain plug or the seal are damaged, replace the damaged components.

Install the drain plug and the seal.

6. Fill the tank with new oil through the filler tube.

Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.

7. Check the filler cap and the seal for damage. Replace any damaged components. Install the filler cap.

8. Start the engine and run the engine at low idle.

9. Check that there is adequate sideways clearance. Steer the machine fully to the left and steer the machine fully to the right.

10. Stop the engine.

11. Check the oil level. Add oil, if necessary.

Refer to Operation and Maintenance Manual, “Steering System Oil Level - Check”.

12. Lower the cover plate.

13. Clean up oil spills.

i03907924

Steering System Oil Filter and Screen - Clean/Replace

SMCS Code: 431F-070; 431F-510; 4332-070-Z3; 4332-510-Z3

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.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine. Allow the oil to cool.

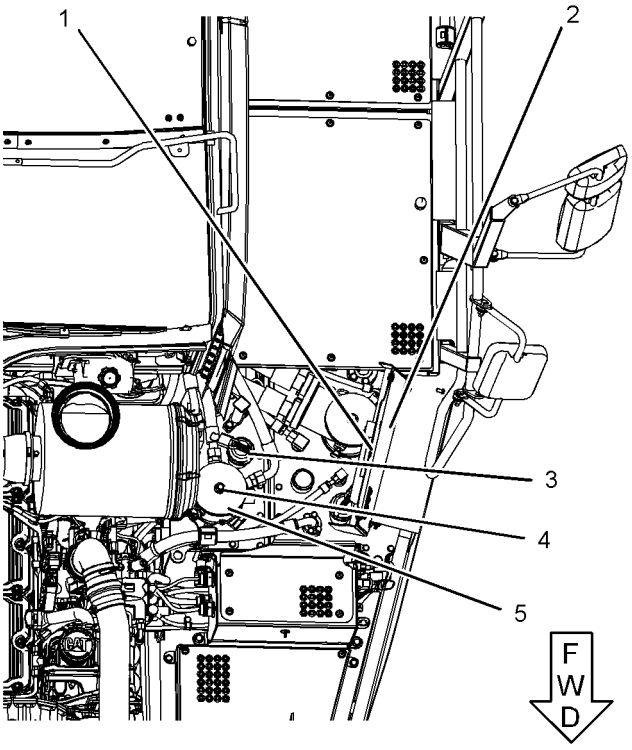


Illustration 198 g02148796

Top view of the left side of the tractor

2. The oil filter elements and the screen are located inside the tank for the steering system. The tank is located on the right side of the machine. Release latch (1) and lift cover plate (2) in order to access the top of the tank.

3. Remove filler cap (3) slowly in order to gradually relieve any system pressure.

4. Unscrew bolt (4) and lift cover (5). The screen assembly is fastened to the cover.

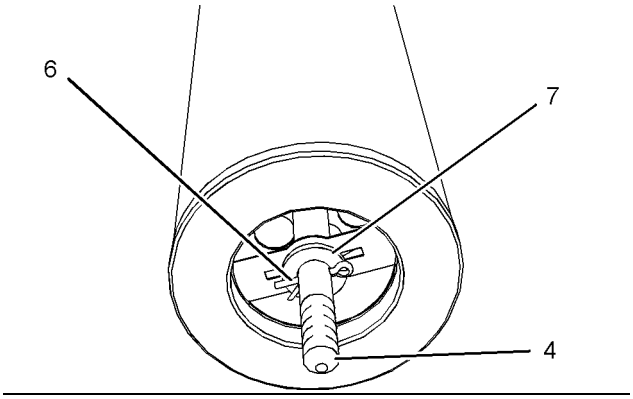


Illustration 199 g02434784

5. Remove cotter pin (6) and washer (7) from bolt (4). This will allow the removal of the filter elements from inside of the screen.

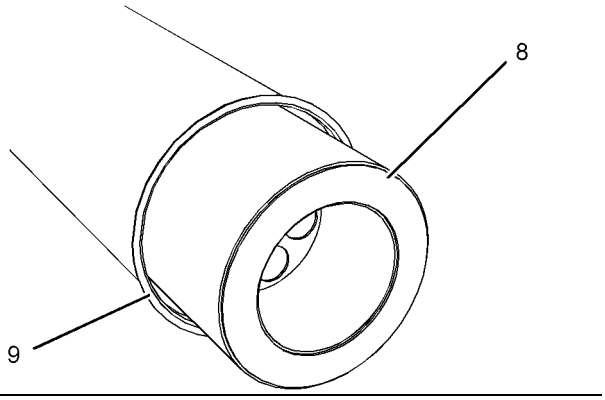


Illustration 200 g02434838

6. There are two filter elements (8) within screen (9). Remove both filter elements and discard both filter elements.

7. Wash the screen in clean nonflammable solvent. Inspect the screen for damage. If necessary, replace the screen. Allow the screen to dry.

8. Install two new filter elements into the clean screen.

9. Reassemble the screen assembly and reinstall the screen assembly. If necessary, replace the O-ring seal between cover (5) and the screen assembly.

10. Install the filler cap.

11. Lower and latch the cover plate.

i03905974

Steering System Oil Level - Check

SMCS Code: 4332-535-FLV

NOTICE

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

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

Dispose of all fluids according to local regulations and mandates.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged.

2. Shut off the engine and allow the level of the oil to stabilize.

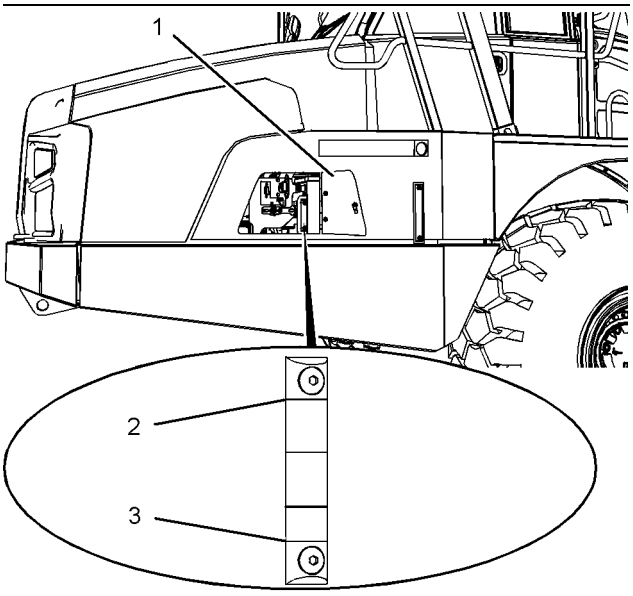


Illustration 201 g02434316

3. The sight glass for the steering system oil level is located on the front left side of the tractor behind access cover (1).

4. Check the oil level in sight glass. The oil must be at highest level mark (2) when the oil is at operating temperature. When the oil is cold, the oil must be halfway between the highest level mark and lowest level mark (3) on the sight glass. Maintain the oil at these levels.

   If necessary, add oil through the oil filler tube.

   Refer to Operation and Maintenance Manual, “Steering System Oil - Change” and Operation and Maintenance Manual, “Lubricant Viscosities”.

i03909124

Steering System Strainer - Clean

SMCS Code: 4332-070-STR

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.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

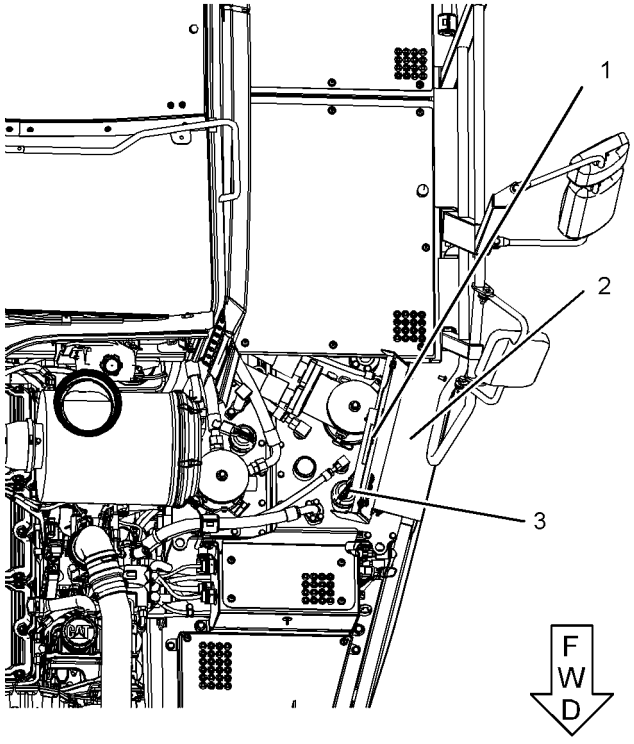


Illustration 202 g02149101

Top view of the left side of the tractor

2. The strainer is located inside the filler tube on the tank for the steering system oil. The tank is located on the left side of the machine. Release latch (1) and lift cover plate (2) in order to access the top of the tank.

3. Remove filler cap (3) slowly in order to gradually relieve any system pressure.

4. Remove the retaining ring and remove the strainer from the filler tube.

5. Wash the strainer in nonflammable solvent. Allow the strainer to dry before the strainer is reinstalled.

6. If the strainer is damaged, replace the strainer.

7. Inspect the filler cap and the gasket which is inside of the filler cap. Replace any damaged components.

8. Install the strainer and the retaining ring.

9. Install the filler cap.

10. Lower and latch the cover plate.

i02021470

Suspension System - Check

SMCS Code: 7200-535

⚠ WARNING

The suspension system may drop the machine suddenly leaving no clearance between the axle housing, main frame, tires, and mud guards.

Working in these areas can result in personal injury or death by crushing.

Park the machine on level ground and block the front frame before you go under the machine.

1. Disengage the differential locks. Bring the machine to a gentle stop on firm level ground.

2. Release the service brake. Wait for one second before applying the parking brake.

3. Install suitable stands under the front frame.

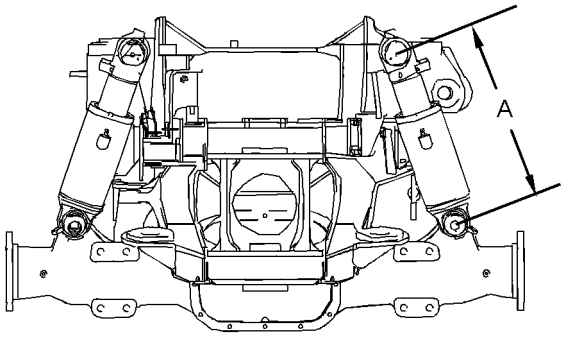


Illustration 203 g01043895

4. Measure distance (A). Distance (A) is the distance between the mounting pins of the suspension cylinder. Dimension (A) should be 700 ± 10 mm (27.6 ± 0.39 inch).

Note: Measure distance (A) when the machine is cool.

5. If the suspension height is not correct, consult your Caterpillar dealer. Special tools and procedures are required in order to adjust the height of the front suspension.

6. Remove the stands.

i04271884

Suspension and Suspension Cylinder Bearings - Lubricate

SMCS Code: 7200-086-BD; 7201-086-BD

NOTICE
Check that the lines attached to all the remote grease fittings are undamaged. If the grease lines are split, grease will not reach the components that require lubricating. Machine damage will result.

If regular lubrication is performed at the recommended intervals, only one or two shots of grease will be required at each fitting.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and stop the engine. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

Note: The fittings for lubrication of the front suspension cylinders are located on the rear supports for the fenders on the tractor.

2. Remove the caps and clean all the fittings by wiping before you lubricate the fittings.

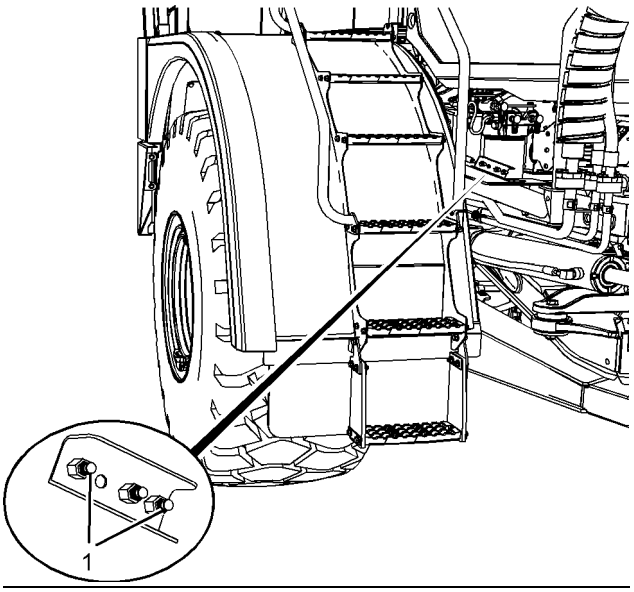


Illustration 204 g02441237

3. Lubricate the left front suspension cylinder bearings through fittings (1).

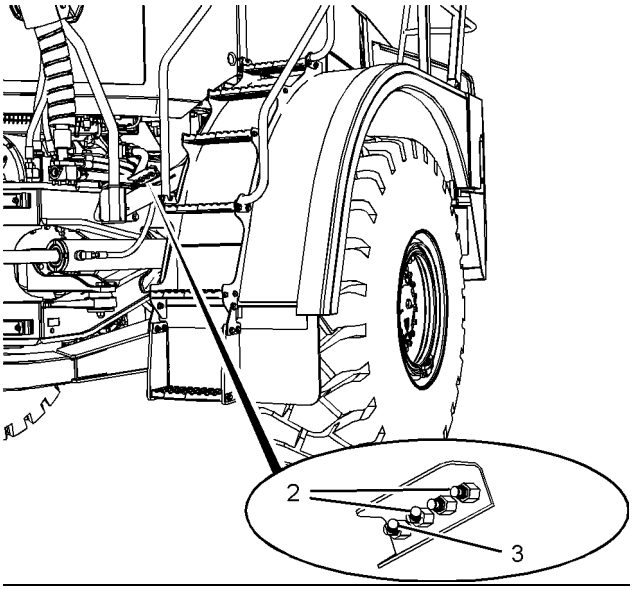


Illustration 205 g02441238

4. Lubricate the right front suspension cylinder bearings through fittings (2). Lubricate the spherical bearing on the front suspension a-frame through fitting (3).

Note: The fittings for lubrication of the spherical bearings on the rear suspension a-frames are located at the front of the trailer on the left side.

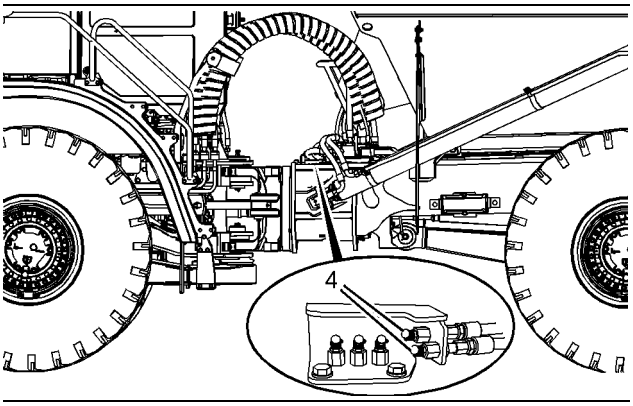


Illustration 206 g02441317

5. Lubricate the spherical bearings on the rear suspension a-frames through fittings (4).

6. Install the caps onto the fittings.

7. Remove the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

i03747942

Tailgate Pivot Bearings - Lubricate (If Equipped)

SMCS Code: 7271-086-BD

If regular lubrication is performed at the recommended interval, only one or two shots of grease will be required at each fitting.

1. Remove the cap and wipe the fittings before lubricating the tailgate pivot bearings.

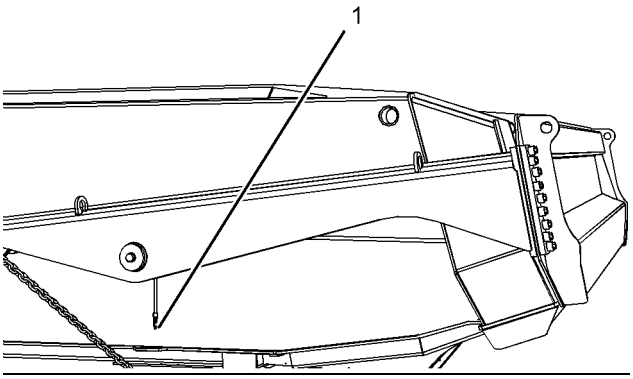


Illustration 207 g02023156

2. Lubricate the tailgate pivot bearings through fitting (1). Lubricate the tailgate pivot bearing that is located on each side of the machine.

i00062438

Tire Inflation - Check

SMCS Code: 4203-535-AI

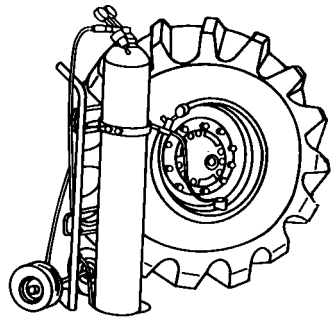


Illustration 208 g00103147

Measure the air pressure on each tire. Consult your Caterpillar dealer for the correct load rating and for the correct operating pressures.

If necessary, inflate the tires. Refer to the following additional information about tire inflation:

- Operation and Maintenance Manual, “Tire Inflation with Nitrogen”
- Operation and Maintenance Manual, “Tire Shipping Pressure”
- Operation and Maintenance Manual, “Tire Inflation Pressure Adjustment”

i03905771

Torque Converter Scavenge Screen - Clean

SMCS Code: 3101-070-Z3

⚠ WARNING

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

NOTICE

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

Refer to Special Publication, NENG2500, “Caterpillar 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 screen is serviced at the same maintenance interval as the oil change for the transmission and the torque converter. Clean the screen when the oil has been drained from the torque converter and the transmission. Fill the torque converter and the transmission with oil once the screen has been installed.

Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil - Change”.

1. Ensure that the machine is parked on a level surface and that the parking brake control is in the ENGAGED position. Ensure that the engine is shut off.

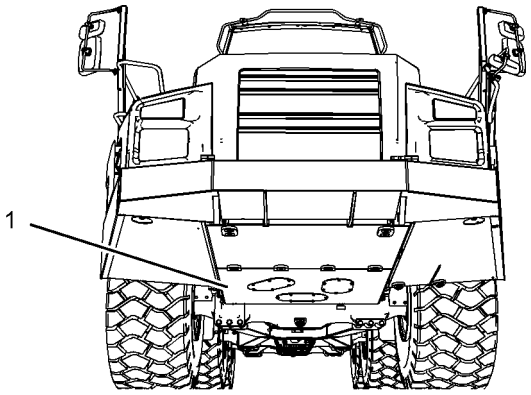


Illustration 209 g02147777

2. Support bottom guard (1) and remove the bolts from the front of the bottom guard. Carefully lower the front of the bottom guard in order to access the transmission.

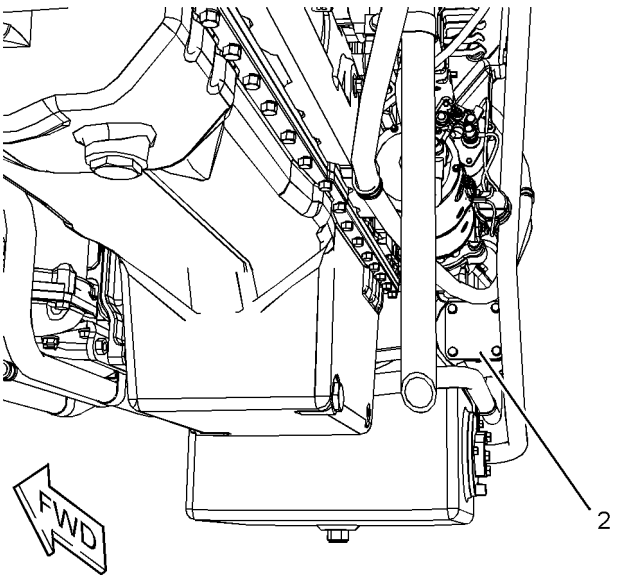


Illustration 210 g02147778

3. Remove cover (2) from the torque converter housing. The screen is located behind the cover.

Note: A face seal and a wave washer are located between the cover and the torque converter housing.

4. Remove the screen and clean all the components that were removed in clean, nonflammable solvent. Replace any damaged components.

5. Lubricate the seals with the oil that is being sealed and then install the screen.

6. Install the cover on the torque converter housing.

7. Raise the front of the bottom guard (1) and secure the bottom guard.

i04198429

Torque Converter and Transmission Oil - Change

SMCS Code: 3030-044-OC; 3101-044-OC

⚠ WARNING

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

NOTICE

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

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

Dispose of all fluids according to local regulations and mandates.

Operate the machine until the torque converter and transmission oil is warm. Park the machine on a level surface. Engage the parking brake and shut off the engine.

1. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

The oil level dipstick is integral with the oil filler cap for the torque converter and transmission oil. The oil filler cap is located on the left side of the engine near the air cleaner housing.

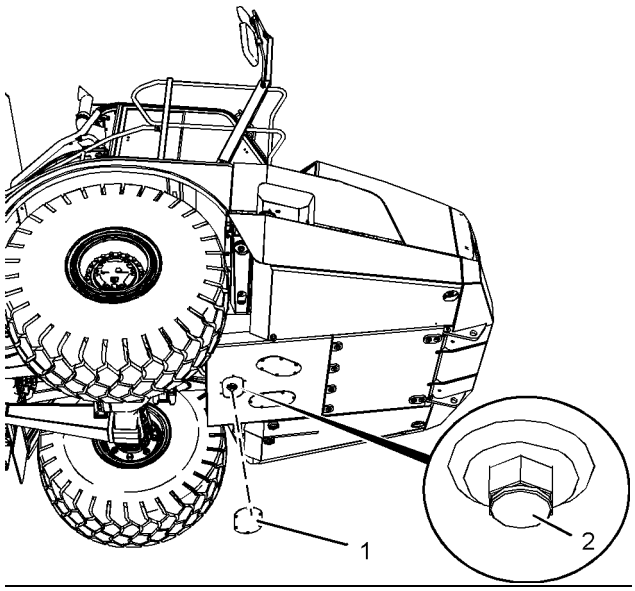


Illustration 211 g02387962

2. Remove cover plate (1).

3. Clean the area around drain plug (2). Remove the drain plug.

4. Install 6B-3156 Pipe Nipple in order to unseat the drain valve. Allow the oil to drain into a suitable container.

5. Remove the pipe nipple. Inspect the drain plug and the seal for damage. If the drain plug or the seal are damaged, replace the damaged components.

   Install the drain plug and the seal.

6. Remove the oil filter for the torque converter and transmission oil. Discard the oil filter. Install a new oil filter. Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil Filter - Replace”.

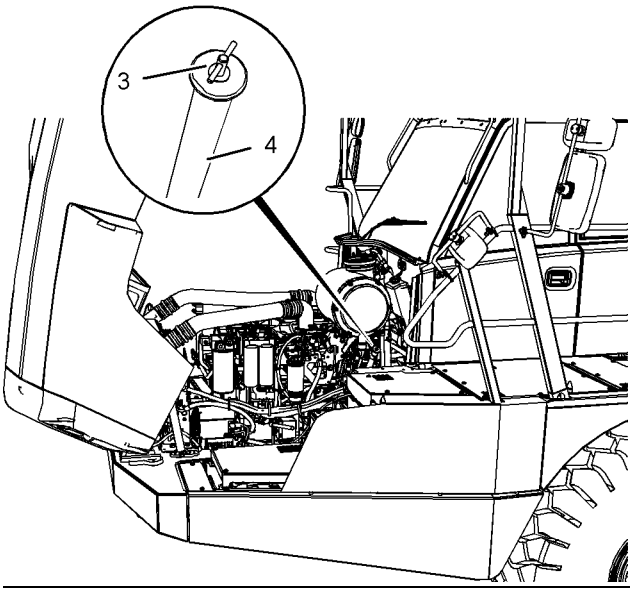


Illustration 212 g02389399

7. Clean the area around the top of oil level gauge (dipstick) (3) and filler tube (4) for the torque converter/transmission.

8. Fill the torque converter/transmission system with new oil through the filler tube . Fill the system to the “COLD SAFE START” range on the dipstick. Refer to the Operation and Maintenance Manual, “Capacities (Refill)”, Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Torque Converter and Transmission Oil Level - Check”.

9. Guide the dipstick down the filler tube and turn the handle on the dipstick in order to make the seal between the filler tube and the filler cap.

10. Start the engine. Run the engine at low idle.

11. Ensure that the parking brake is engaged. Engage the service brakes. Slowly operate the transmission control in order to circulate the oil.

12. Inspect the torque converter/transmission system for leaks. Shut off the engine and make any necessary repairs.

13. Install the cover plate.

14. Wait for five minutes before removing the dipstick. Turn the handle on the dipstick in order to remove the dipstick.

15. Wipe off the dipstick.

16. Install the dipstick fully.

17. Check the oil level on the COLD SAFE START portion of the dipstick. The engine can be started if the oil is anywhere within the shaded area. If necessary, add oil.

18. Lower the hood.

19. Start the engine. Operate the machine until the torque converter/transmission system oil is at normal operating temperature.

20. Raise the hood.

21. Check the torque converter/transmission oil level on the “FULL HOT LOW IDLE” portion of the dipstick. Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil Level - Check”. If necessary, add oil.

22. Shut off the engine.

23. Close the hood.

i03905880

Torque Converter and Transmission Oil Filter - Replace

SMCS Code: 3067-510; 3101-510-FI

⚠ WARNING

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

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

Refer to Special Publication, NENG2500, “Caterpillar 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.

1. Park the machine on a level surface. Move the parking brake control to the ENGAGED position and shut off the engine.

2. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

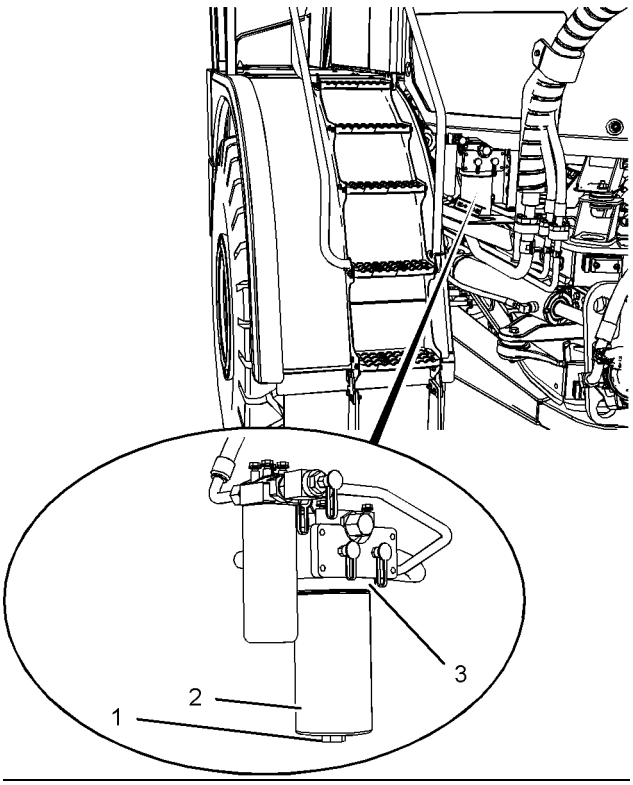


Illustration 213 g02147894

The torque converter and transmission oil filter is located to the rear of the cab on the left side of the machine.

3. Remove oil filter drain plug (1) from oil filter housing (2) and allow the oil to drain into a suitable container.

4. Clean the outer surface of the oil filter housing . Use a wrench, in order to remove the oil filter housing from oil filter base(3).

5. Remove the element from the oil filter housing . Discard the used element.

6. Wash the oil filter housing in clean, nonflammable solvent. Wipe the oil filter housing dry.

7. Install the oil filter drain plug and a new element into the oil filter housing.

8. Inspect the seal in the oil filter base. Install a new seal if the seal is damaged.

9. Install the oil filter housing with the new element into the oil filter base . Use a wrench to tighten the housing until the housing is tight against the oil filter base.

10. Start the engine and check for leaks.

11. Check the torque conver/transmission oil level. If necessary, add oil. Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil Level - Check”.

12. Stop the engine.

13. Remove the steering frame lock. Refer to Operation and Maintenance Manual, “Steering frame lock”.

i04200398

Torque Converter and Transmission Oil Level - Check

SMCS Code: 3030-535-FLV; 3101-535-FLV

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

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

Dispose of all fluids according to local regulations and mandates.

The oil level should be checked before starting the engine.

1. Park the machine on a level surface and engage the parking brake. Shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

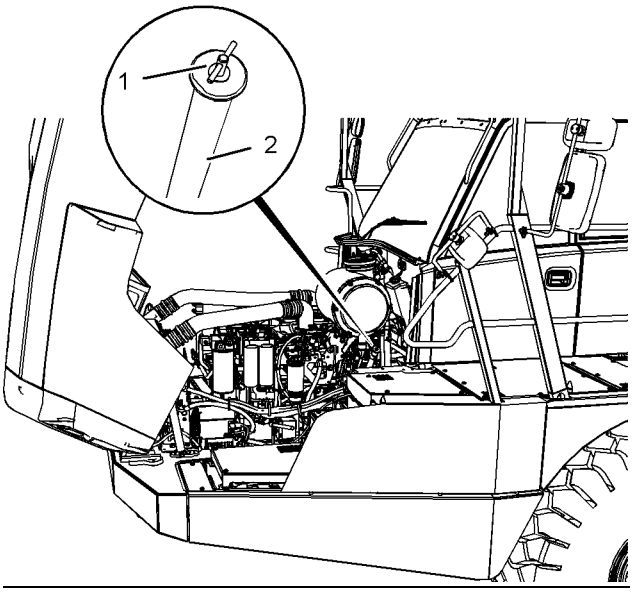


Illustration 214 g02389596

3. Wipe oil filler cap (1) and oil filler tube (2).

Note: The oil level dipstick is integral with the oil filler cap for the transmission oil.

4. Turn the handle on the oil level dipstick in order to remove the dipstick. Remove the oil level dipstick.

5. Clean the dipstick by wiping with a clean cloth.

6. Install the dipstick fully.

7. Remove the dipstick.

Illustration 215 g00788077

Note: The oil level dipstick is marked “COLD SAFE START” and “HOT LOW IDLE”.

8. Check the oil level on the “COLD SAFE START” portion of the dipstick.

   The engine can be started if the oil is anywhere within the shaded area. **Do not add oil if the level is toward the bottom of the “COLD SAFE START” shaded area.** An oil level that is anywhere in this range is normal.

9. Guide the dipstick down the filler tube and turn the handle on the dipstick in order to make the seal between the filler tube and the filler cap.

10. Lower the hood.

11. Start the engine. Operate the machine until the temperature of the oil is at normal operating temperature.

12. Park the machine on a level surface. Engage the parking brake. Allow the engine to operate at low idle.

13. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”. Turn the handle on the dipstick in order to remove the dipstick. The portion of the oil level dipstick that is marked “HOT LOW IDLE” indicates the correct transmission oil level. Refer to illustration 215.

14. Clean the dipstick by wiping.

15. Install the dipstick fully.

16. Remove the dipstick and check the oil level.

17. Check the oil level on the “HOT LOW IDLE” portion of the dipstick. Maintain the oil level within the shaded area on the dipstick. If necessary, add oil through the filler tube. Refer to Operation and Maintenance Manual, “Lubricant Viscosities”.

18. Guide the dipstick down the filler tube and turn the handle of the dipstick in order to make the seal between the filler tube and the filler cap.

19. Shut off the engine and close the hood.

i03907821

Transfer Gear Oil - Change

SMCS Code: 3159-044-OC

⚠ WARNING

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

NOTICE

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

Refer to Special Publication, NENG2500, “Caterpillar 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.

Operate the machine until the oil is warm and the oil is well circulated. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

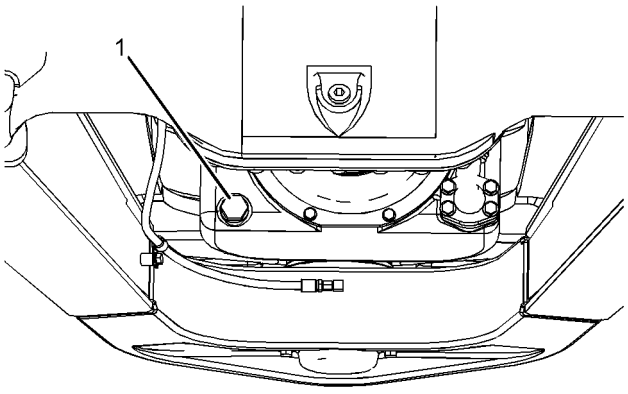


Illustration 216 g01266105

Drain plug (1) for the transfer gear is located on the bottom of the transfer gear case.

1. Remove the drain plug and allow the oil to drain into a suitable container.

2. Clean the drain plug and install the drain plug.

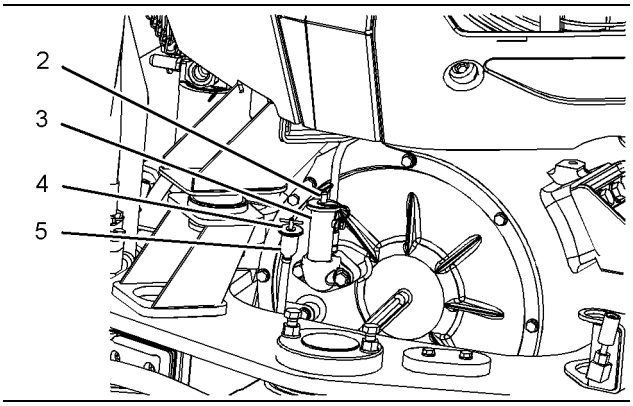


Illustration 217 g01266115

3. Clean oil filler tube (3) and oil level gauge tube (5). Clean oil filler cap (2) and oil level gauge cap (4).

4. Oil filler cap (2) for the transfer gear is located in front of the upper pin for the oscillating hitch. Oil level gauge (4) is located on the left of the filler tube.

5. Unscrew and remove oil filler cap (2). Add the oil for the transfer gear.

   Refer to Operation and Maintenance Manual, “Capacities (Refill)” and refer to Operation and Maintenance Manual, “ Lubricant Viscosities”.

6. Install the oil filler cap.

7. Start the engine.

8. Remove oil level gauge (4) and clean the oil level gauge. Install the oil level gauge.

Illustration 218 g01266148

9. Remove the oil level gauge and check the oil level on the oil level gauge. Maintain the oil level within the shaded area on the oil level gauge. Add oil, if necessary. Refer to Operation and Maintenance Manual, “Transfer Gear Oil Level - Check”.

10. Clean the oil level gauge and install the oil level gauge.

11. Clean up oil spills.

i03905960

Transfer Gear Oil Filter - Replace

SMCS Code: 3159-510-FI

⚠ WARNING

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

NOTICE

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

Refer to Special Publication, NENG2500, “Caterpillar 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.

1. Park the machine on a level surface. Move the parking brake control to the ENGAGED position and shut off the engine.

2. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

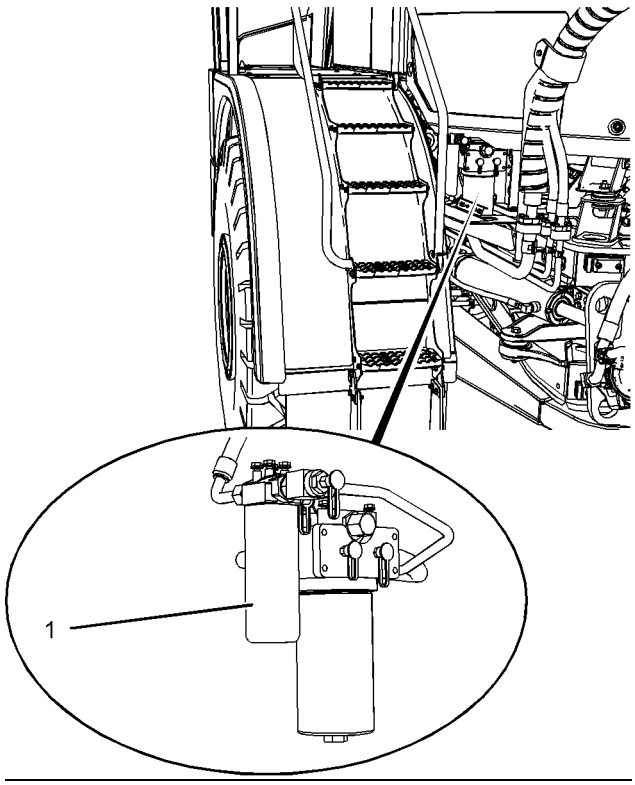


Illustration 219 g02147903

The transfer gear oil filter is located to the rear of the cab on the left side of the machine.

3. Remove filter element (1) with a strap type wrench. Discard the filter element properly.

4. Lubricate the seal on the new filter element with the oil that is being sealed.

5. Install the new filter element and hand tighten.

6. Start the engine and check for leaks.

7. Check the transfer gear oil level. If necessary, add oil. Refer to Operation and Maintenance Manual, “Transfer Gear Oil Level - Check”.

8. Stop the engine.

9. Remove the steering frame lock. Refer to Operation and Maintenance Manual, “Steering frame lock”.

i03907831

Transfer Gear Oil Level - Check

SMCS Code: 3159-535-FLV; 3159-535-OC

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 oil level for the transfer gear should be checked before the machine is run at the beginning of the day. The oil level gauge has markings on both sides in order to allow the oil level to be checked when the oil is hot.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged and shut off the engine.

   Install the steering frame locks. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

2. Start the engine and run the engine at low idle.

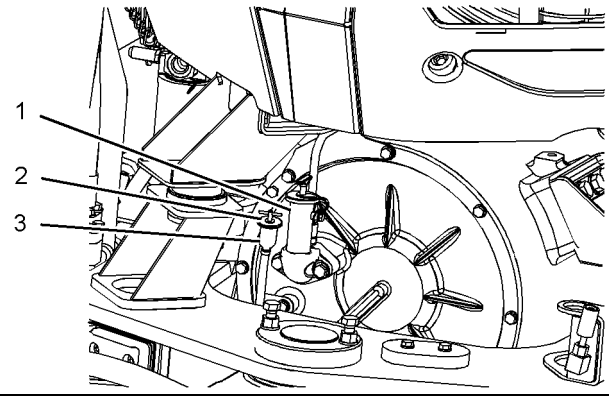


Illustration 220 g01266304

3. The oil level gauge is located in front of the upper pin for the oscillating hitch. Wipe oil level gauge (2) and oil level gauge tube (3).

4. Start the engine.

5. Remove oil level gauge (2) and clean the oil level gauge.

6. Install the oil level gauge fully.

7. Remove the oil level gauge.

Illustration 221 g01266148

8. Check the oil on the oil level gauge.

9. If necessary, add oil through oil filler tube (1) until the level is on the shaded area of the oil level gauge. Refer to Operation and Maintenance Manual, “Lubricant Viscosities”.

Note: Do not overfill the output transfer gear housing.

10. Install the oil level gauge into the oil level gauge tube.

i04198344

Transmission and Transfer Gear Breather - Replace

SMCS Code: 3030-510-BRE; 3159-510-BRE

The breathers for the transfer gear and the transmission are located to the rear of the cab on the left side of the machine.

1. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

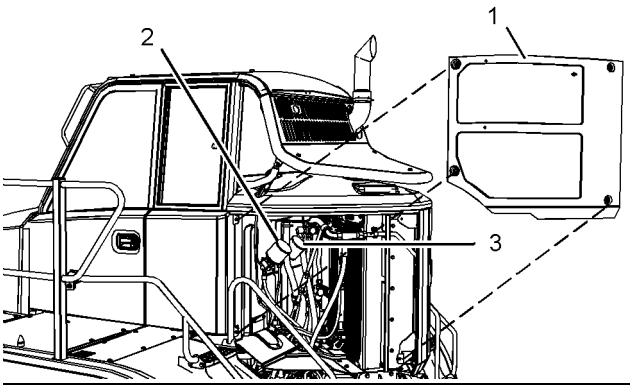


Illustration 222 g02387816

2. Remove cover (1).

3. Remove transfer gear breather (2) and transmission breather (3). Properly discard the used breathers.

Note: The breathers for the transmission and the transfer gear are sealed units and the breathers cannot be cleaned.

4. Install the new breathers.

5. Install the cover and remove the steering frame lock.

i04198270

Wheel Nut Torque - Check

SMCS Code: 4210-535

Check the wheel nut torque on any wheel that has been mounted or remounted. Continue to check the wheel nut torque at every 10 service hours or on a daily basis until the wheel nuts maintain the specified torque.

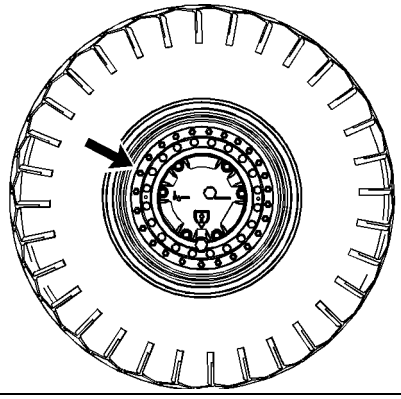


Illustration 223 g02387716

Tighten the wheel nuts to a torque of 475 ± 60 N·m (350 ± 44 lb ft).

i04200451

Window Washer Reservoir - Fill

SMCS Code: 7306-544

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

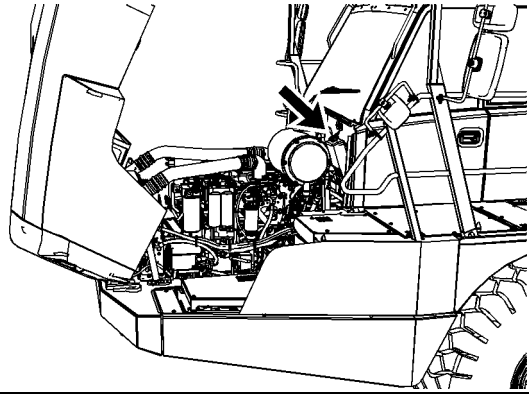


Illustration 224 g02389636

The window washer reservoir is located inside the engine compartment on the left side.

Perform the following operations in order to access and fill the window washer reservoir:

1. Park the machine on a level surface. Engage the parking brake and shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

3. Remove the filler cap of the reservoir.

4. Fill the reservoir through the filler opening.

5. Replace the filler cap of the reservoir and lower the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

i04198029

Window Wiper - Inspect/Replace

SMCS Code: 7305-040; 7305-510

Park the machine on a level surface. Engage the parking brake and shut off the engine.

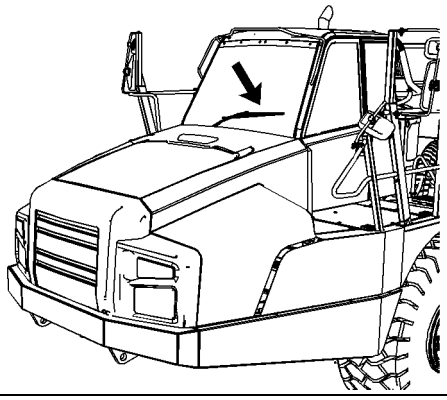


Illustration 225 g02387556

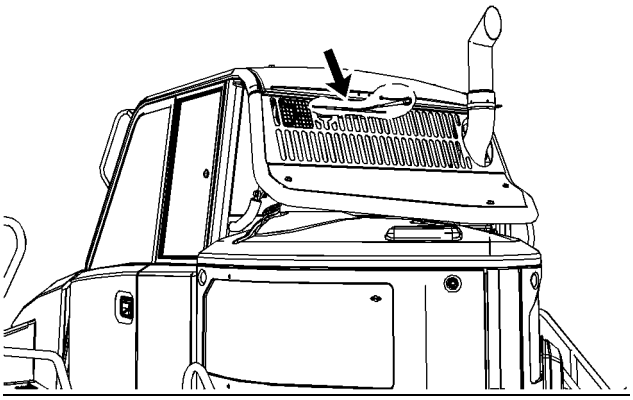


Illustration 226 g02387537

Cutaway view of rear window guard.

Inspect the front wiper blade and inspect the rear wiper blade.

Replace a wiper blade when the following conditions occur:

- The wiper blade is causing streaks on the front window.
- The wiper blade is causing streaks on the rear window.
- The wiper blade is worn.
- The wiper blade is damaged.

Note: Damaged wiper blades may permanently damage the cab windows.

i04197970

Windows - Clean

SMCS Code: 7310-070

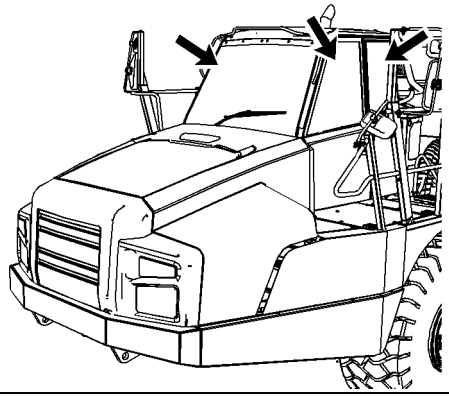


Illustration 227 g02387440

Use commercially available window cleaning solutions and a clean cloth to clean the windows. Clean the outside of the windows from the ground unless handholds can be utilized from positions on the deck.

Use a device with a long handle or steps in order to clean the windows from the ground.

Warranty Section

Warranty Information

i04141951

Emissions Warranty Information

SMCS Code: 1000

Caterpillar Inc. (Caterpillar) warrants to the ultimate purchaser and each subsequent purchaser that:

1. New non-road diesel engines and stationary diesel engines less than 10 liters per cylinder operated and serviced in the United States and Canada, including all parts of their emission control systems (“emission related components”), are:

   a. Designed, built, and equipped so as to conform, at the time of sale, with applicable emission standards prescribed by the United States Environmental Protection Agency (EPA) by way of regulation.

   b. Free from defects in materials and workmanship in emission-related components that can cause the engine to fail to conform to applicable emission standards for the warranty period.

2. New non-road diesel engines operated and serviced in the state of California, including all parts of their emission control systems (“emission related components”), are:

   a. Designed, built, and equipped so as to conform, at the time of sale, to all applicable regulations adopted by the California Air Resources Board (ARB).

   b. Free from defects in materials and workmanship which cause the failure of an emission-related component to be identical in all material respects to the component as described in the Caterpillar application for certification for the warranty period.

A detailed explanation of the Emission Control Warranty that is applicable to new non-road and stationary diesel engines, including the components covered and the warranty period, is found in supplement Special Publication, SELF9001, “Federal Emission Control Warranty” and “Emission Control Warranty for California”. Consult your authorized Cat dealer to determine if your engine is subject to an Emission Control Warranty.

Reference Information Section

Reference Materials

i04278192

Reference Material

SMCS Code: 1000; 7000

Operation and Maintenance Manuals are available in other languages. Consult your Cat Dealer for information about obtaining these Operation and Maintenance Manuals.

The following literature can be obtained from any Cat Dealer:

Complete Service Manual

Service Manual, UENR0200, “735B, 740B, and 740B Ejector Articulated Truck”

Parts Manuals

Parts Manual, SEBP5909, “(S/N: T4P)735B Articulated Truck”

Parts Manual, SEBP5910, “(S/N: L4D)735B Articulated Truck”

Parts Manual, SEBP5906, “(S/N: T4R)740B Articulated Truck”

Parts Manual, SEBP5908, “(S/N: L4E)740B Articulated Truck”

Parts Manual, SEBP5907, “(S/N: T4S)740B Ejector Articulated Truck”

Parts Manual, SEBP5911, “(S/N: L4F)740B Ejector Articulated Truck”

Miscellaneous Publications

Refer to Special Publication, PEHP1026, “CF-4 Caterpillar Diesel Engine Oil (DEO) Data Sheet” for selected countries that are outside of North America.

Special Publication, PEHP1021, “Caterpillar Biodegradable Hydraulic Oil (BIO HYDO) Data Sheet”

Special Publication, PEHP7508, “Caterpillar Gear Lubricant Data Sheet”

Special Publication, PEHP3050, “Caterpillar Multipurpose Tractor Oil (MTO) Data Sheet”

Special Publication, PEHP7506, “Caterpillar Transmission/Drive Train Oil (TDTO) Data Sheet”

Special Publication, PEHP0003, “Caterpillar Fluids - Lithium Grease Data Sheet”

Special Publication, PEHP0002, “Molybdenum Grease Data Sheet”

Service Parts, PECP9067, “One Safe Source”

Special Publication, SEBD0640, “Oil and your Engine”

Special Publication, PEHP6001, “How to Take a Good Oil Sample”

Special Publication, SEBD0518, “Know Your Cooling System”

Special Publication, SEBD0970, “Coolant and Your Engine”

Special Publication, SEBD0717, “Diesel Fuels and Your Engine”

Special Instruction, SEHS7633, “Battery Test Procedure”

Special Instruction, SEHS9031, “Storage Procedure for Caterpillar Products”

Special Instruction, SEBU5898, “Cold Weather Recommendations”

Special Instruction, SEBU6250, “Caterpillar Machine Fluids Recommendations”

Special Instruction, SELF9001, “Federal Emission Control Warranty”

Special Publication, SENR5664, “Air Conditioning and Heater R-134a for All Caterpillar Machines”

Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog”

Special Publication, SEHS6929, “Inspection, Maintenance and Repair of ROPS and Attachment Installation Guidelines”

Specifications Manual, SENR3130, “Torque Specifications”

Special Publication, SMBU6981, “Emissions Control Warranty Information”

S·O·S Information

Special Publication, PEGJ0046, “S·O·S Services: Understanding Your Results”

Special Publication, PEGJ0047, “How to Take a Good Oil Sample”

Special Instruction, PEHJ0191, “S·O·S Fluid Analysis”

Special Publication, PEHP5033, “S·O·S Coolant Analysis Data Sheet”

Additional Reference Material

SAE J183, “Classification” This can normally be found in the SAE handbook.

SAE J313, “Diesel Fuels” This can be found in the SAE handbook. Also, this publication can be obtained from your local technological society, from your local library, or from your local college.

SAE J754, “Nomenclature” This can normally be found in the SAE handbook.

Engine Manufacturers Association Lubricating Oils Data Book

Engine Manufacturers Association
Two North LaSalle Street, Suite 2200
Chicago, Illinois USA 60602
E-mail: ema@enginemanufacturers.org
Facsimile: (312) 827-8737
Phone: (312) 644-6610

i03156325

Decommissioning and Disposal

SMCS Code: 1000; 7000

When the machine is removed from service, local regulations for the machine decommissioning will vary. Disposal of the machine will vary with local regulations. Consult the nearest Caterpillar dealer for additional information.

Index

O

P

R

S

T

V

W

Product and Dealer Information

Note: For product identification plate locations, see the section “Product Identification Information” in the Operation and Maintenance Manual.

Delivery Date: _____

Product Information

Model: _____

Product Identification Number: _____

Engine Serial Number: _____

Transmission Serial Number: _____

Generator Serial Number: _____

Attachment Serial Numbers: _____

Attachment Information: _____

Customer Equipment Number: _____

Dealer Equipment Number: _____

Dealer Information

Name: _____ Branch: _____

Address: _____

_____

_____

	Dealer Contact	Phone Number	Hours
Sales:	_____	_____	_____
Parts:	_____	_____	_____
Service:	_____	_____	_____