SEBU8498-04 (en-us)
April 2019

Operation and Maintenance Manual

D3K2, D4K2, D5K2 Track-Type Tractors

KFF 1-UP (D3K2)
KLL 1-UP (D3K2)
GAE 1-UP (D3K2)
KMM 1-UP (D4K2)
KRR 1-UP (D4K2)
KWW 1-UP (D5K2)
KYY 1-UP (D5K2)
TRF 1-UP (D5K2)

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, including human factors that can affect safety. 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 verify that you are authorized to perform this work, and 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 you are authorized to perform this work, and 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.

Failure to follow this warning may 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

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.

WARNING – This product can expose you to chemicals including ethylene glycol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to:

www.P65Warnings.ca.gov

Do not ingest this chemical. Wash hands after handling to avoid incidental ingestion.

WARNING – This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information go to:

www.P65Warnings.ca.gov

Wash hands after handling components that may contain lead.

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 Cat 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 the calendar intervals provide more convenient servicing schedules and approximate the indicated service hour meter reading. Perform the recommended service at the interval that occurs first.

Under 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.

Certified Engine Maintenance

Proper maintenance and repair are 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 to render inoperative, any emission-related device or element of design installed on or in an engine or machine that is in compliance with all applicable regulations of the intended country to which it has been shipped. 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 Cat dealer for further information.

Product Identification Number

Effective First Quarter 2001 the Product Identification Number (PIN) has changed from 8 to 17 characters. To provide uniform equipment identification, 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 machines and generator sets. The PIN plates and frame marking will display the 17 character PIN. The new format will look like the following:

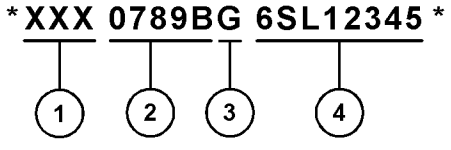

Illustration 1 g03891925

Where:

1. 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, and work tools will continue to use an 8 character Serial Number (S/N).

Safety Section

i04001015

Safety Messages

SMCS Code: 7000; 7405

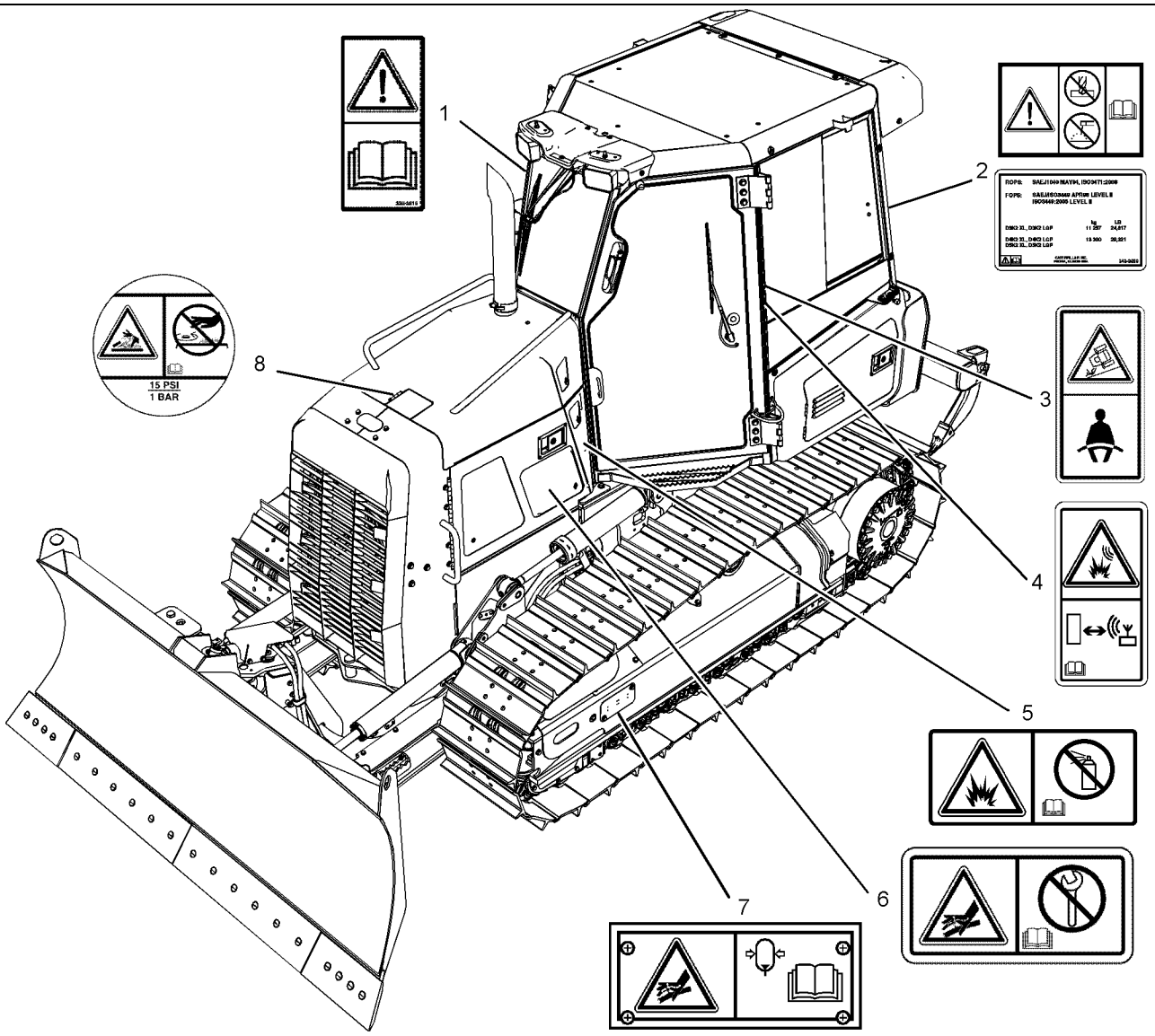

Illustration 2 g02391882

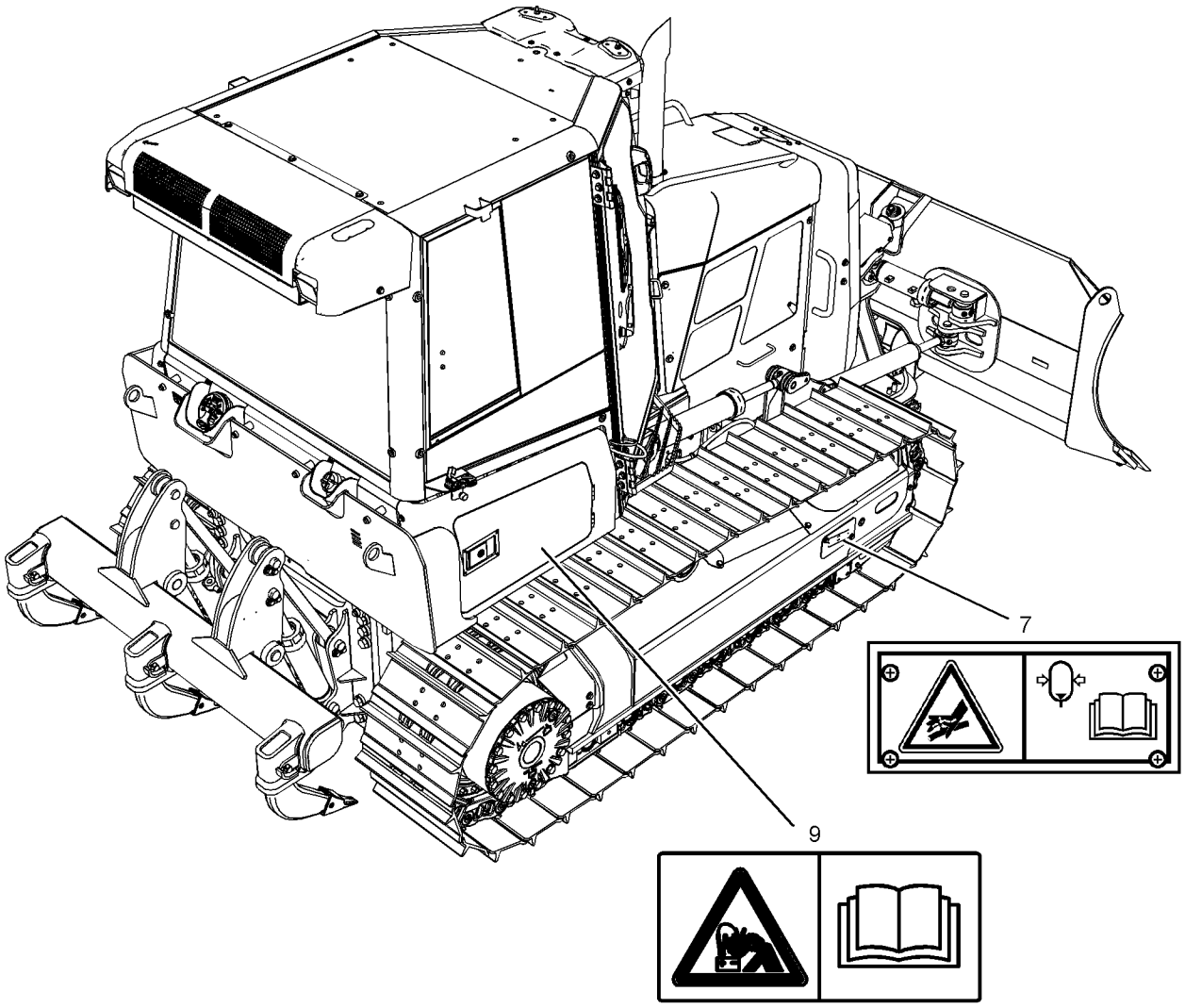

Illustration 3 g02391958

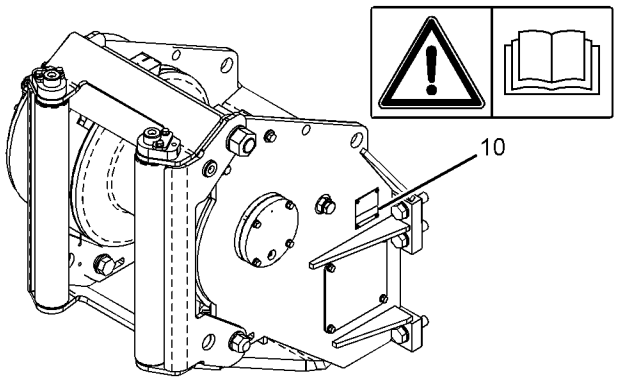

Illustration 4 g01359794

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

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

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

Do Not Operate (1)

Safety Message (1) is positioned on the right-hand cab post in view of the operator.

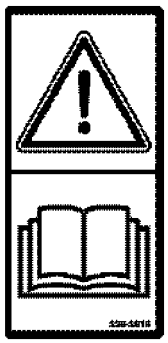

Illustration 5 g01030982

⚠ 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)

Safety Message (2) is positioned on the left-hand cab post in view of the operator.

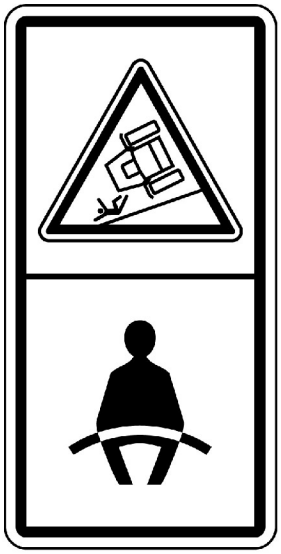

Illustration 6 g01371636

⚠ 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.

Do Not Weld On the ROPS/FOPS (3)

Safety Message (3) is positioned on the left-hand rear cab post.

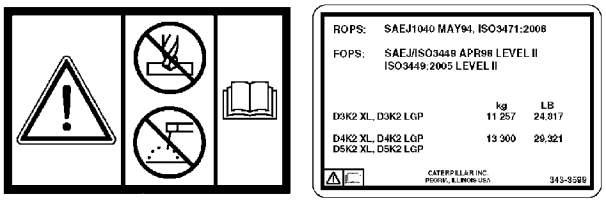

Illustration 7 g02391415

⚠ WARNING

Structural damage, an overturn, modification, alteration, or improper repair, can impair this structure's protective 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.

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.

Product Link (4) (if equipped)

Safety message (4) is located on the left-hand cab post in view of the operator.

Illustration 8 g01108685

⚠ 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.

Refer to Special Instruction, REHS1642, “Operation of the Product Link System” for additional information.

No Ether in Air Inlet (5)

Safety Message (5) is located on the left side of the engine on the air cleaner cover. Only use the ether starting aid group that is factory installed for safety.

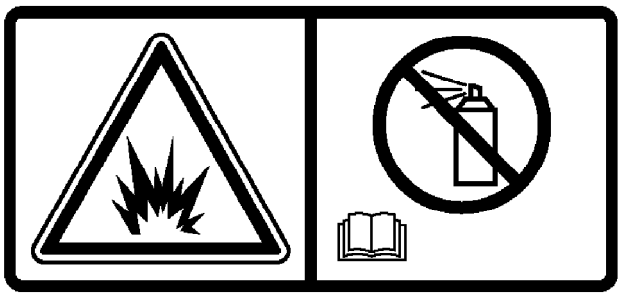

Illustration 9 g01055438

⚠ WARNING

Do not use ether. This machine is equipped with glow plugs. Using ether can create explosions or fires that can cause personal injury or death. Read and follow the engine starting procedure in the Operation and Maintenance Manual.

High Pressure Fuel Lines (6)

Safety Message (6) is located on the left side of the engine on the high-pressure fuel rail.

Illustration 10 g01381180

⚠ 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.

High Pressure Cylinder (7)

Safety Message (7) is located on the track adjuster cover that is on the outside of the track roller frame.

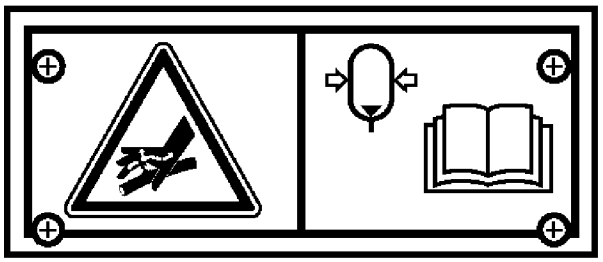

Illustration 11 g01357122

⚠ WARNING

High Pressure Cylinder. Do not remove any parts from the cylinder until all of the pressure has been relieved. This will prevent possible personal injury or death.

Hot Fluid Under Pressure (8)

Safety Message (8) is located under the access door on the expansion tank filler cap.

Illustration 12 g01370913

⚠ 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.

Improper Connections for Jump Start Cables (9)

Safety Message (9) is located on the right access door outside the operator station.

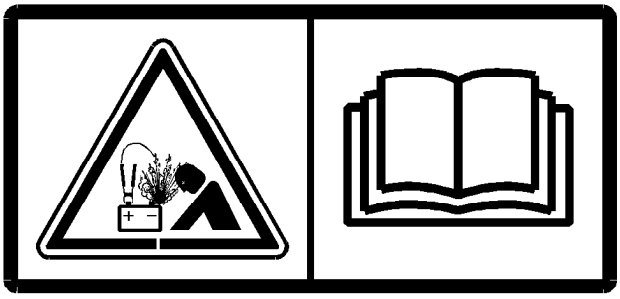

Illustration 13 g01055411

⚠ 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.

Refer to Operation and Maintenance Manual, “Engine Staring with Jump Start Cables”.

Do Not Operate (10) (Winch)

Safety message (10) is located on the right side of the machine on the vertical wall of the winch frame.

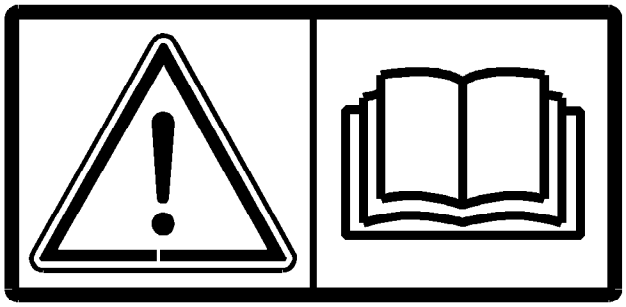

Illustration 14 g01055734

⚠ WARNING

Do not operate or work on this equipment unless you have read and understand the instructions and warnings in the Operation and Maintenance Manual. 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.

Laser

If your machine is equipped with the AccuGrade - Laser System, this safety message is located on each leg of the tripod for the laser.

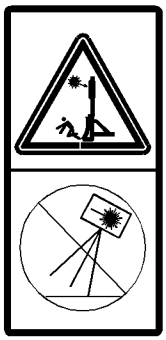

Illustration 15 g01282876

⚠ WARNING

Movement of the transmitter could cause unexpected blade movement. Death or serious injury could occur. Turn off the transmitter before you move the transmitter or before you adjust the transmitter.

Blade and Mast

When you use the AccuGrade - Laser System, this safety message is located on the rear of each mast at eye level from the ground.

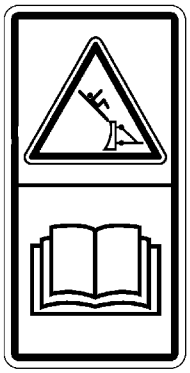

Illustration 16 g01282878

⚠ WARNING

To prevent possible personal injury during installation and removal of the laser receivers, lower the mast to the minimum height and use an approved access system to reach the mounting locations of the laser receivers at the top of the mast. Do not climb on the blade.

i04014493

Additional Messages

SMCS Code: 7000; 7405

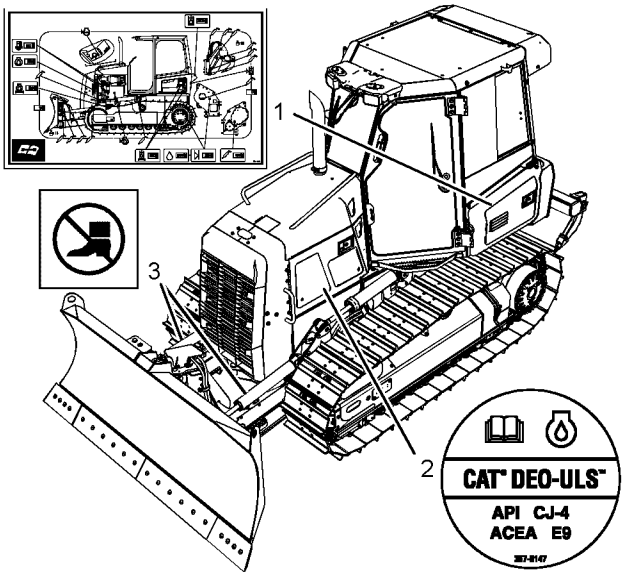

Illustration 17 g02444798

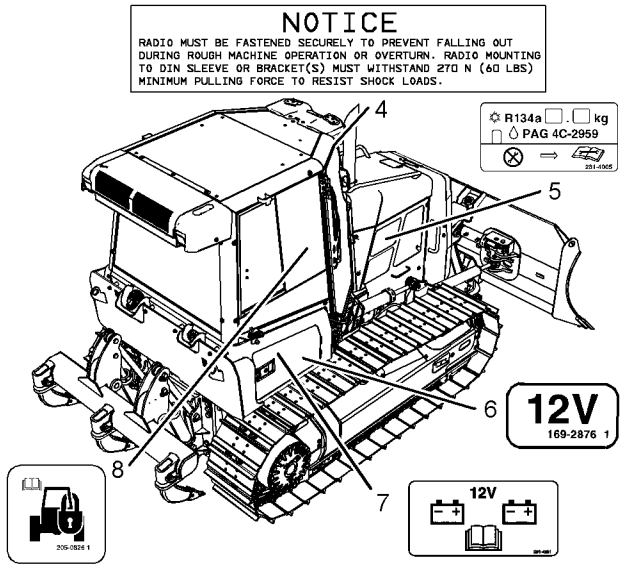

Illustration 18 g02444838

There are several specific messages on this machine. The location of the messages and the description of the messages are reviewed in this section. Become familiarized with all messages.

Make sure that all of the messages are legible. Clean the messages or replace the messages if you cannot read the words. Replace the illustrations if the illustrations are not legible. 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.

Lubrication Chart (1)

This message is located on the left side of the machine behind the lower access door.

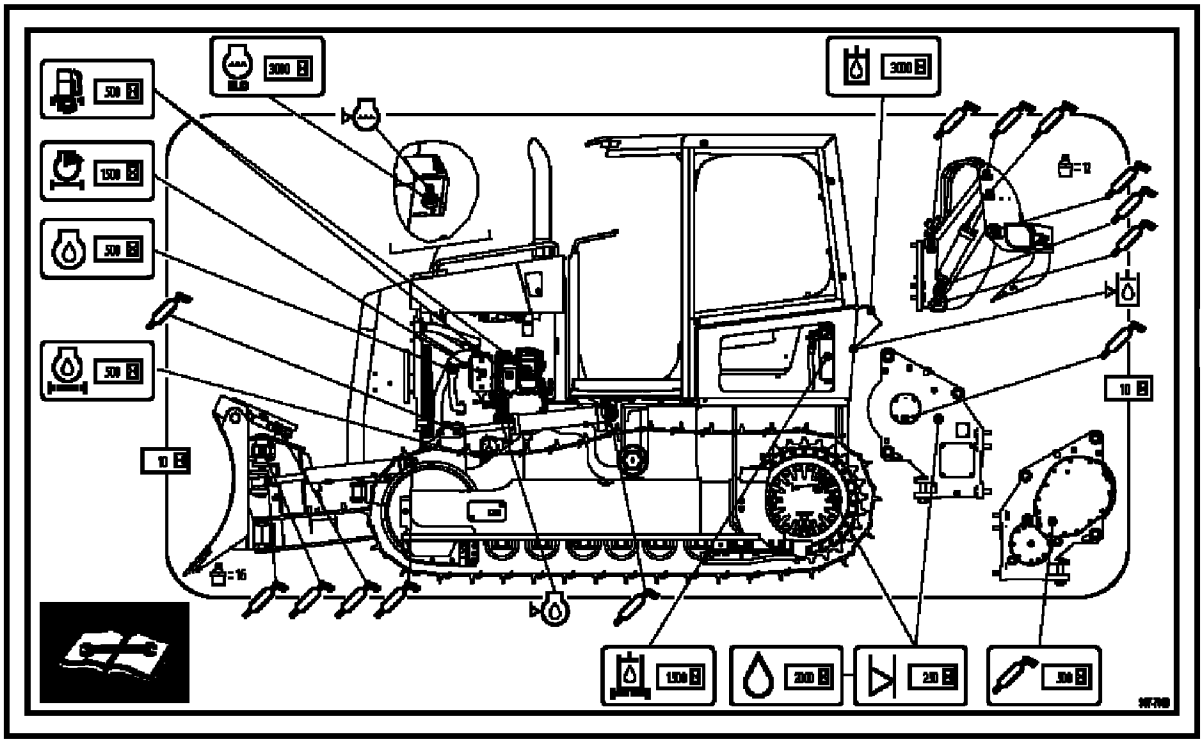

Illustration 19 g02444890

Required Engine Oil (2)

This message is located on the engine oil filler tube.

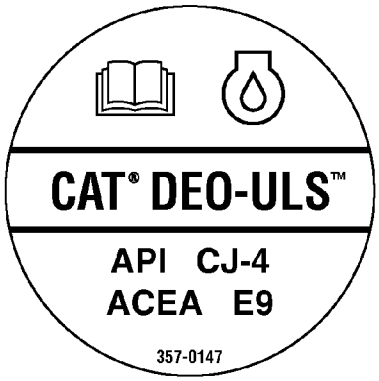

Illustration 20 g02782016

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

No Step (3)

If equipped, this message is located on the cover for the angle cylinders.

Illustration 21 g01150425

Do not step on the angle cylinders. Follow this instruction in order to perform work safely.

Radio (4)

This message is located on the cover for the radio.

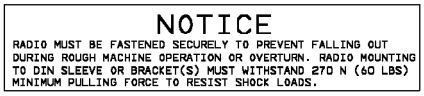

Illustration 22 g00907584

NOTICE
Radio must be fastened securely to prevent falling out during rough machine operation or overturn. Radio mounting to DIN sleeve or bracket(s) must withstand 270 N (60 lb) minimum pulling force to resist shock loads.

Air Conditioner (5) (If equipped)

This message is located behind the air conditioner compressor on the right side of the engine.

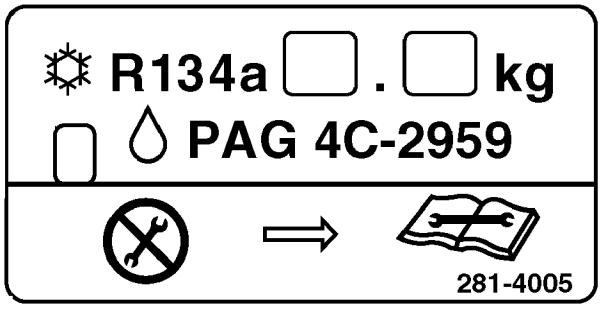

Illustration 23 g01399514

This message for the air conditioner has the appropriate information for the following services: the air conditioner lubricant, the refrigerant charge and the refrigerant capacity.

Battery (6)

This message is located on the inside of the access door for the battery.

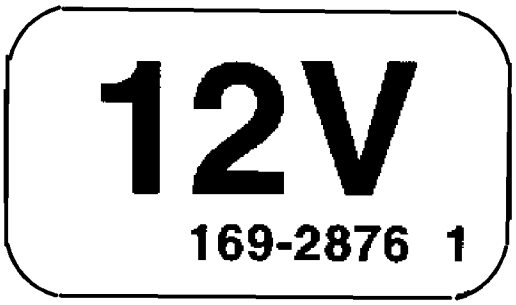

Illustration 24 g01399516

NOTICE
When starting from another machine, make sure that the machines do not touch. This could prevent damage to engine bearings and electrical circuits.

Turn on (close) the battery disconnect switch prior to the boost connection to prevent damage to electrical components on the stalled machine.

Severely discharged maintenance free batteries do not fully recharge from the alternator after jump starting. The batteries must be charged to proper voltage with a battery charger. Many batteries thought to be unusable are still rechargeable.

This machine has a 12 volt starting system. Use only the same voltage for jump starting. Use of a higher voltage damages the electrical system.

Batteries in Parallel Configuration (7)

This message is located on the inside of the access door for the battery. The machine uses two 12V batteries in a parallel arrangement. See the Service Manual for proper instructions.

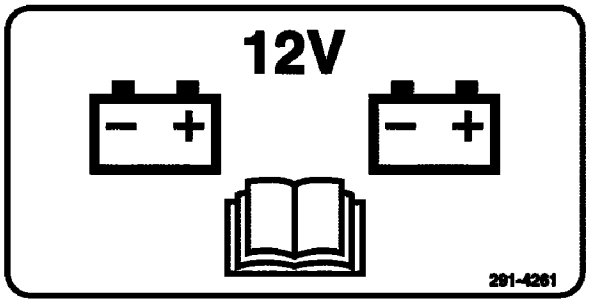

Illustration 25 g01274048

NOTICE
Use only 12 volts to start the engine. Damage to the engine may occur if more than 12 volts are used to start the engine.

Machine Security System (8)

If equipped, this message is located on the dash under the indicator lamps.

Illustration 26 g00951606

This machine is equipped with a security system. Read the Operation and Maintenance Manual before you operate the machine.

Reference: See Operation and Maintenance Manual, “Maintenance Interval Schedule” for all maintenance recommendations.

i07746355

General Hazard Information

SMCS Code: 7000

Illustration 27 g00104545
Typical example

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. Warning tag SEHS7332 is 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 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.

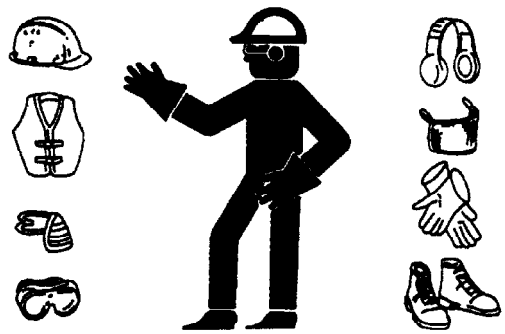

Illustration 28 g00702020

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).

Avoid direct spraying of water on electrical connectors, connections, and components. When using air for cleaning, allow the machine to cool to reduce the possibility of fine debris igniting when re-deposited on hot surfaces.

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 machine 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.

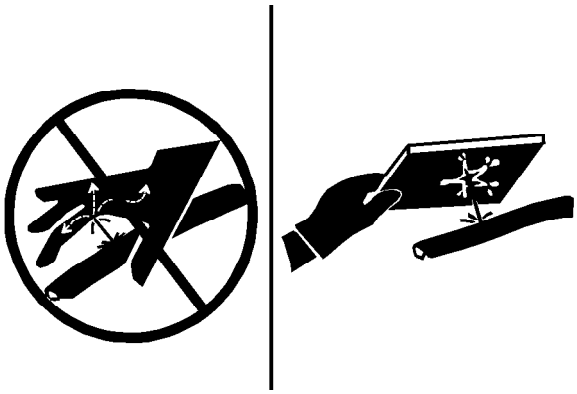

Illustration 29 g00687600

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, “Cat 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 30 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”. In Japan, use the requirements found in the “Ordinance on Prevention of Health Impairment due to Asbestos” in addition to the requirements of the Industrial Safety and Health Act.
- Obey environmental regulations for the disposal of asbestos.
- Stay away from areas that might have asbestos particles in the air.

Dispose of Waste Properly

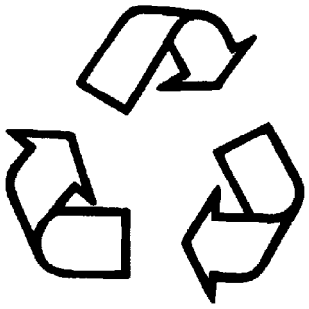

Illustration 31 g00706404

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.

i07399130

Burn Prevention

SMCS Code: 7000

Do not touch any part of an operating engine. Allow machine systems to cool before any maintenance is performed. 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.

Induction System

⚠ WARNING

Sulfuric Acid Burn Hazard may cause serious personal injury or death.

The exhaust gas cooler may contain a small amount of sulfuric acid. The use of fuel with sulfur levels greater than 15 ppm may increase the amount of sulfuric acid formed. The sulfuric acid may spill from the cooler during service of the engine. The sulfuric acid will burn the eyes, skin and clothing on contact. Always wear the appropriate personal protective equipment (PPE) that is noted on a material safety data sheet (MSDS) for sulfuric acid. Always follow the directions for first aid that are noted on a material safety data sheet (MSDS) for sulfuric acid.

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 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 to remove the hydraulic tank filler cap.

Batteries

The liquid in a battery is an electrolyte. Electrolyte is an acid that can cause personal injury. Do not allow electrolyte to contact the skin or the eyes.

Do not smoke while checking the battery electrolyte levels. Batteries give off flammable fumes which can explode.

Always wear protective glasses when you work with batteries. Wash hands after touching batteries. The use of gloves is recommended.

i07746336

Fire Prevention and Explosion Prevention

SMCS Code: 7000

Illustration 32 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 33 g03839130

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. Do not use cell phones or other electronic devices while you are refueling. Always stop the engine before fueling. Fill the fuel tank outdoors. Properly clean areas of spillage.

Avoid static electricity risk when fueling. Ultra low sulfur diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with a higher sulfur content. Avoid death or serious injury from fire or explosion. Consult with your fuel or fuel system supplier to ensure that the delivery system is in compliance with fueling standards for proper grounding and bonding practices.

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

Battery and Battery Cables

Illustration 34 g03839133

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. Do not use cell phones or other electronic devices 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.

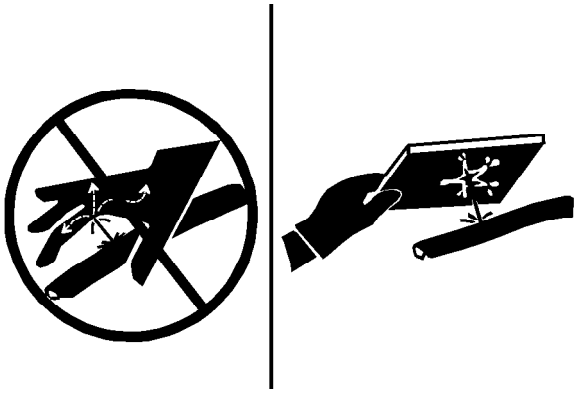

Illustration 35 g00687600

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.

Only use approved Ether canisters for the Ether dispensing system fitted to your machine, do not spray Ether manually into an engine, follow the correct cold engine starting procedures. Refer to the section in the Operation and Maintenance Manual with the label “Engine Starting” .

Use ether in ventilated areas. Do not smoke while you are replacing an ether cylinder.

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.

i07041871

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 are 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. 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.

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 the fluids on the machine are flammable, including coolant and oils. Additionally, plastics, rubbers, fabrics, and resins in fiberglass panels are also flammable.

i01834364

Fire Extinguisher Location

SMCS Code: 7000; 7419

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher. Obey the recommendations on the instruction plate.

Mount the fire extinguisher in the accepted location per local regulations.

Do not weld the ROPS structure in order to install the fire extinguisher. Also, do not drill holes in the ROPS structure in order to mount the fire extinguisher on the ROPS.

Strap the mounting plate to a leg of the ROPS in order to mount the fire extinguisher, as needed. If the weight of the fire extinguisher exceeds 4.5 kg (10 lb), mount the fire extinguisher near the bottom of the ROPS. Do not mount the fire extinguisher at the upper one-third area of the ROPS.

Consult your Caterpillar dealer for the proper procedure for mounting the fire extinguisher.

i01329108

Track Information

SMCS Code: 4170; 7000

Track adjusting systems use either grease or oil under high pressure to keep the track under tension.

Grease or oil under high pressure coming out of the relief valve can penetrate the body causing injury or death. Do not watch the relief valve to see if grease or oil is escaping. Watch the track or track adjustment cylinder to see if the track is being loosened.

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

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.

i01896223

Before Starting Engine

SMCS Code: 1000; 7000

Start the engine only from the operator's compartment. Do not short across the battery terminals and do not short across the batteries. Bypassing the engine neutral start system can damage the electrical system.

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

Adjust the seat so that full pedal travel can be achieved. Make sure that the operator's back is against the back of the seat.

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 you start the engine or before you move the machine, make sure that no one is working on the machine, working underneath the machine or working close to the machine. Make sure that the area is free of personnel.

i04638809

Engine Starting

SMCS Code: 1000; 7000

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

Move all hydraulic controls to the HOLD position before you start the engine.

Make sure that the parking brake is engaged. (The system defaults to this locked position at engine shutdown.)

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 engine in a ventilated area. If you are in an enclosed area, vent the exhaust to the outside.

Check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine.

Briefly sound the horn before you start the engine.

i01963896

Before Operation

SMCS Code: 7000

Clear all personnel from the machine and from the area.

Remove all obstacles from the path of the machine. Beware of hazards such as wires, ditches, etc.

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

Adjust the rearview mirrors (if equipped) for best vision close to the machine. Make sure that the machine horn, the backup alarm (if equipped) and all other warning devices are working properly.

Reference: Refer to Operation and Maintenance Manual, “Daily Inspection” in this manual.

Fasten the seat belt securely.

i07746368

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”. If equipped, the Cat Detect Object Detection shall be adjusted according to the Operation and Maintenance Manual, “Cat Detect Object Detection” for your machine.

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 safe movement of traffic
- 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.

i03721461

Operation

SMCS Code: 7000

Machine Operating Temperature Range

The standard machine configuration is intended for use within an ambient temperature range of −40 °C (−40 °F) to 50 °C (122 °F). Special configurations for different ambient temperatures may be available. Consult your Caterpillar dealer for additional information on special configurations of your machine.

Operation

Only operate the machine while you are in a seat. The seat belt must be fastened while you operate the machine. Only operate the controls while the engine is running.

Check for proper operation of all controls and protective devices while you operate the machine slowly in an open area.

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

Do not allow riders on the machine unless the machine has the following equipment:

- additional seat
- additional seat belt
- Rollover Protective Structure (ROPS)

Never use the work tool for a work platform.

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

Carry attachments close to the ground, approximately 40 cm (15 inches) higher than ground level. Do not go close to the edge of a cliff, an excavation, or an overhang.

If the machine begins to sideslip, perform the following procedure:

- Discard the load.
- Turn the machine downhill.

Be careful to avoid any condition which could lead to tipping. Tipping can occur when you work on hills, banks and slopes. Also, tipping can occur when you cross ditches, ridges or other unexpected obstructions.

Whenever it is possible, operate the machine up the slopes and down the slopes. Avoid operating the machine across the slope, when possible.

Keep the machine under control. Do not overload the machine beyond capacity.

Be sure that the towing devices are adequate.

Never straddle a wire cable or allow other personnel to straddle a wire cable.

Know the maximum dimensions of your machine.

Always keep the Rollover Protective Structure (ROPS) installed during machine operation.

i02801025

Parking

SMCS Code: 7000

Park on a level surface. If you must park on a grade, use blocks to prevent the machine from rolling.

Apply the service brake in order to stop the machine. The service brake is applied by fully depressing the decel/brake pedal. Move the transmission control to NEUTRAL position and the speed control to LOW IDLE position. Engage the parking brake switch.

Lower all attachments to the ground.

Stop the engine.

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

Turn the key for the battery disconnect switch to the OFF position. Remove the key when you exit the machine for an extended period of time.

Turning the battery disconnect switch to the OFF position will provide the following benefits:

- Prevent battery discharge that is caused by a battery short circuit.
- Prevent battery discharge that is caused by some of the components.
- Prevent battery discharge that is caused by vandalism.

i07746366

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: Operators with lots of experience and proper equipment for specific applications are also required. Safe operation on steep slopes may also require special machine maintenance. Refer to Lubricant Viscosities and Refill Capacities in this manual for the proper fluid level requirements and intended machine use. Fluids must be at the correct levels to ensure that systems will operate properly on a slope.

i07483613

Engine Stopping

SMCS Code: 1000; 7000

Do not stop the engine immediately after the machine has been operated under load. This operation 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 5 minutes at LOW IDLE before shutdown. This procedure allows hot areas of the engine to cool gradually.

For more information, refer to the following topics in the Operation Section of the Operation and Maintenance Manual:

- "Stopping the Engine"
- "Stopping the Engine if an Electrical Malfunction Occurs"

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.

i04644418

Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information

The measurement for operator sound pressure level Leq was obtained with the procedures that are specified in “ANSI/SAE J1166 FEB2008”. The procedure specifies the requirements of the work cycle to use while the measurement is obtained. The operator sound pressure level is 80 dB(A) for the cab that is offered by Caterpillar. This reading is correct under the following conditions: proper installation of the cab, proper maintenance of the cab, closed cab doors and closed cab windows.

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 exterior sound pressure level for the standard machine is 78dB(A). This measurement was obtained with the test procedures that are specified in “SAE J88 FEB2006”. The measurement was obtained under the following conditions: distance of 15 m (49.2 ft), machine in middle speed range and moving.

Sound Performance for Machines that are Offered in European Union Countries and in Countries with the “EU Directives”

The information below applies to machine configurations that only have the “CE mark” on the product information plate (PIN).

Machines with Standard Cab

The dynamic operator sound pressure level is 77 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.

Machines with Logging Cab

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.

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

Vibration Data for Track-Type Tractors

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 track-type tractors.

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**
Track-Type Tractors	dozing	0,74	0,58	0,70	0,31	0,25	0,31
	ripping	1,25	1,19	1,02	0,40	0,41	0,28
	transfer	0,87	0,80	0,97	0,43	0,40	0,34

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 Supplement , SEBU8257 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 EM6”. The seat has a transmissibility factor of “SEAT<0.7”.

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 1.61 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 Track-Type Tractors.

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 the 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 Supplement , SEBU8257 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

Cab Internal Clearance

If a machine is equipped with a cab, the position of the operator conforms to industry standards. These standards are “SAE J154” and “ISO 3411”. An item should not protrude into the space of the cab. The following items should not protrude into the cab.

- Radio
- Fire extinguisher
- Lunch box

Objects in the cab should be secured. The objects must remain in place during operations in rough terrain. The objects must remain in place during a rollover of the machine.

i07746362

Operator Station

SMCS Code: 7300

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.

i07746359

Guards
(Operator Protection)

SMCS Code: 7000; 7150-MCH; 7150; 7325

There are different types of guards that are used to protect the operator. The machine and the machine application determine 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 Cat 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. Refer to Operation Maintenance manual, "Demolition" for additional information. Consult your Cat dealer for additional information.

Product Information Section

General Information

i06043309

Specifications

SMCS Code: 1000; 6700; 7000; 7426

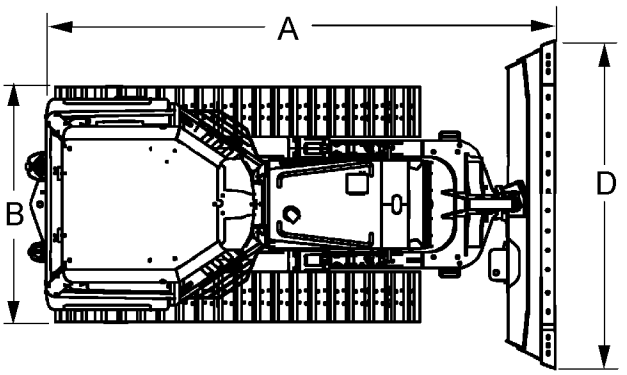

Illustration 36 g02389762

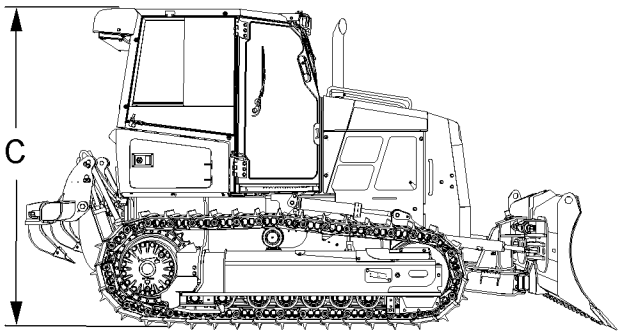

Illustration 37 g02389764

Table 2

D3K2 HYSTAT TRACK-TYPE TRACTOR	
Operating Weight (LGP)(1)	8365 kg (18442 lb)
Operating Weight (XL)(1)	7922 kg (17465 4 lb)
Operating Weight (SLGP)(2)	8609 kg (18980 lb)
Length (LGP) (A)(3)	4255 mm (167.5 inch)
Length (XL) (A)	4266 mm (168.0 inch)

(continued)

(Table 2, contd)

D3K2 HYSTAT TRACK-TYPE TRACTOR	
Length (SLGP) (A)	4255 mm (167.5 inch)
Width (LGP) (B)	2360 mm (92.9 inch)
Width (XL) (B)	1901 mm (74.8 inch)
Width (SLGP) (B)	2630 mm (103.5 inch)
Height to top of ROPS (C)(4)	2754 mm (108.4 inch)
Height to top of ROPS (C)(5)	2748 mm (108.2 inch)
Blade width (LGP) (D)	3149 mm (124.0 inch)
Blade width (XL) (D)	2646 mm (104.2 inch)
Blade width (SLGP) (D)	3149mm (124.0 inch)

(1) The operating weight includes the ROPS canopy, the dozer blade, the backup alarm, the lubricants, the coolant, a full fuel tank, and the operator 75 kg (165 lb).
(2) SLGP machine uses 760 mm (30 inch) track shoes.
(3) Each length (A) includes the blade.
(4) Overall height with SystemOne track
(5) Overall height with SALT track

Table 3

D4K2 HYSTAT TRACK-TYPE TRACTOR	
Operating Weight (LGP)	8476 kg (18686 lb)
Operating Weight (XL)	8108 kg (17875 lb)
Length (LGP) (A)	4255 mm (167.5 inch)
Length (XL) (A)	4274 mm (168.3 inch)
Width (LGP) (B)	2360 mm (92.9 inch)
Width (XL) (B)	2010 mm (79.1 inch)
Height to top of ROPS (C)	2754 mm (108.4 inch)
Height to top of ROPS (C)	2748 mm (108.2 inch)
Blade width (LGP) (D)	3149 mm (124 inch)
Blade width (XL) (D)	2646 mm (104.2 inch)

Table 4

D5K2 HYSTAT TRACK-TYPE TRACTOR	
Operating Weight (LGP)	9522 kg (20992 lb)
Operating Weight (XL)	9214 kg (20313 lb)
Operating Weight (SLGP)	9723 kg (21435 lb)
Length (LGP) (A)	4309 mm (169.6 inch)
Length (XL) (A)	4309 mm (169.6 inch)
Length (SLGP) (A)	4439 mm (174.7 inch)
Width (LGP) (B)	2410 mm (94.9 inch)

(continued)

(Table 4, contd)

D5K2 HYSTAT TRACK-TYPE TRACTOR	
Width (XL) (B)	2110 mm (83.0 inch)
Width (SLGP) (B)	2410 mm (94.9 inch)
Height to top of ROPS (C)	2716 mm (106.9 inch)
Height to top of ROPS (C)	2692 mm (106.0 inch)
Blade width (LGP) (D)	3220 mm (126.8 inch)
Blade width (XL) (D)	2782 mm (109.5 inch)
Blade width (SLGP) (D)	3220 mm (126.8 inch)

Note: Add 250 kg (551 lb) to the operating weight for machines with “EROPS” .

Intended Use

This Track-Type Tractor is an earthmoving machine that is described by “ISO 6165:2012”. The Track-Type Tractor is classified as a Dozer. The dozer is a self-propelled crawler with equipment such as a dozing attachment which cuts, moves, and grades material through forward motion of the machine or a mounted attachment that is used to exert a push or a pull force such as a ripper or towing winch. Additional applications include pushing scrapers during loading and pulling towed equipment when the drawbar is used.

Application/Configuration Restrictions

- Maximum approved Operating Weight for the D3K2 is 11257 kg (24817 lb)
- Maximum approved Operating Weight for the D4K2 and D5K2 is 13300 kg (29321 lb).
- Maximum drawbar pull (170 kN (38218 lb))
- Maximum vertical drawbar load (43 kN (9650 lb))
- The maximum fore and aft slope on this machine in a static condition that maintains the proper lubrication is a 100 percent grade or a 45 degree slope.
- The brake capacity (slope) of this machine is 45 degrees.
- Do not use the machine in explosive environments.

Special attachments and operating instructions are required for Waste Handling applications and other Custom configurations.

Identification Information

i04280971

Plate Locations and Film Locations

SMCS Code: 1000; 7000

Product Identification Plates

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.

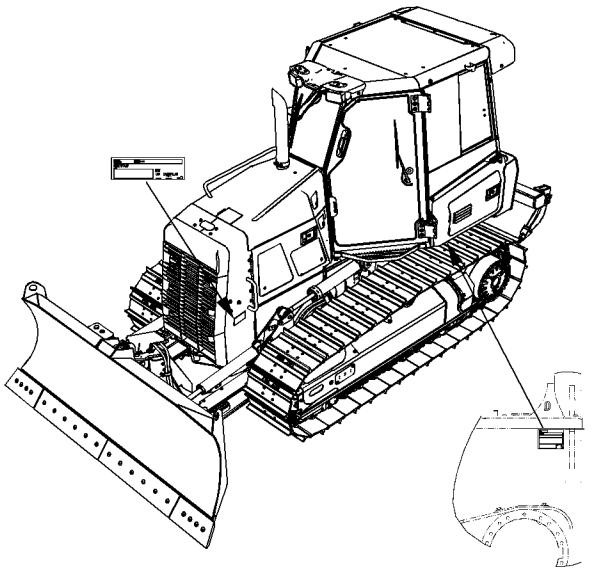

Illustration 38 g02448218

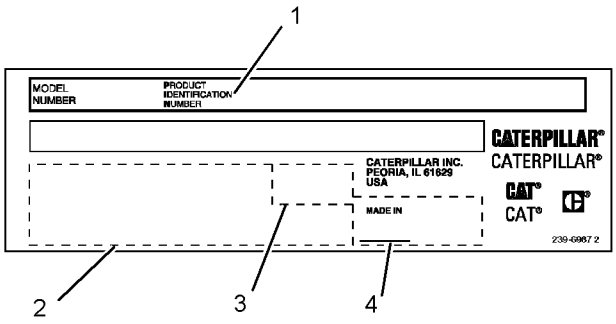

Illustration 39 g02448364

The plate for Machine PIN (1) is located to the left of the case on the rear of the machine. The second plate for Machine PIN (1) is located on the left side of the radiator guard on the front of the machine.

Machine PIN (1)_____

CE Plate (2)_____

Year of Manufacture (If required) (3)_____

Country of Origin (4)_____

The Engine Serial Number Plate is located on the left side of the engine block directly behind the dip stick tube.

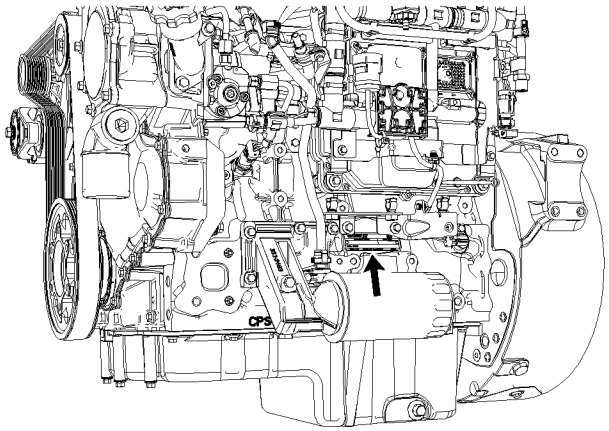

Illustration 40 g02790071

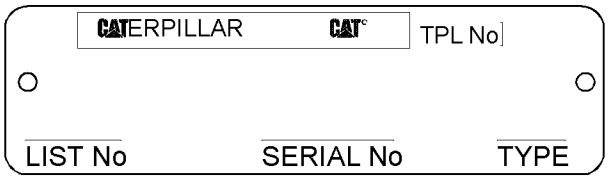

Illustration 41 g01274351

Engine Serial Number _____

The serial number plate for the ripper is located on the side of the ripper.

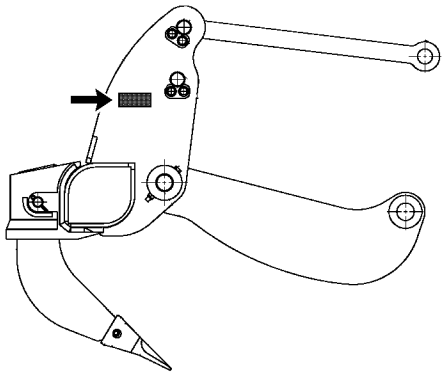

Illustration 42 g01256144

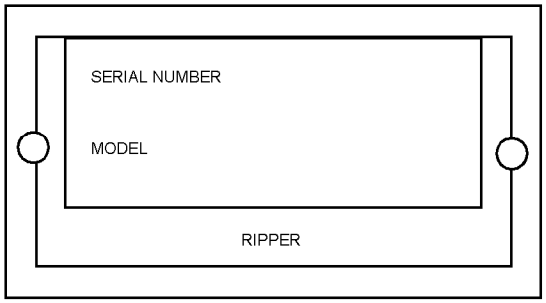

Illustration 43 g01057104

Ripper Serial Number _____

The serial number plate for the winch is located on the side of the winch.

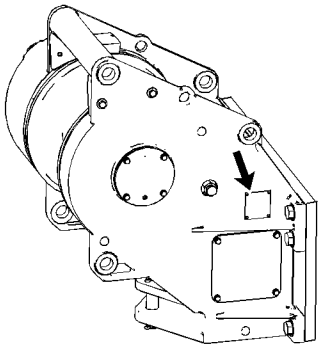

Illustration 44 g01256165

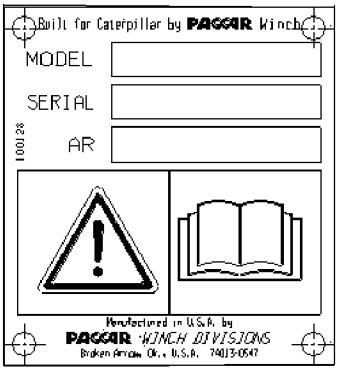

Illustration 45 g01323812

The winch serial number is located on the right vertical wall of the winch frame. Do not operate or service the winch unless your first read the Operation and Maintenance Manual with understanding the instructions for the safe operation of the winch.

Winch Serial Number _____

Model _____

Certifications

ROPS/FOPS Plate

The message is positioned on the outside left canopy.

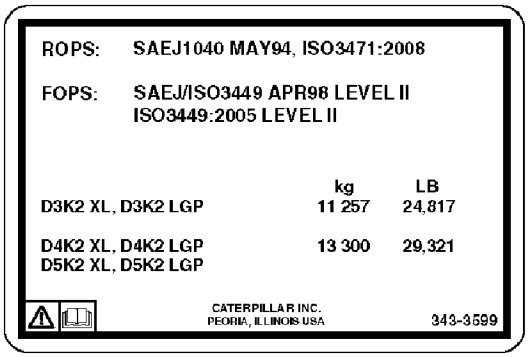

Illustration 46 g02448310

⚠ WARNING

Structural damage, an overturn, modification, alteration, or improper repair, can impair this structure's protective 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.

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 payload, should not exceed the mass on the certification plate.

A typical example of the certification film is shown above.

Refer to Operation and Maintenance Manual, “Guards (Operator Protection)” for more information.

Sound Certification

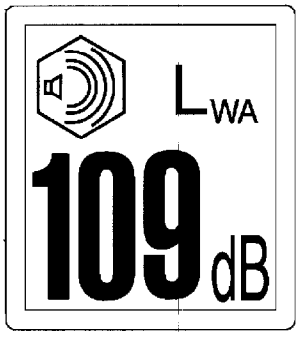

Illustration 47 g00933634

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

If equipped, the certification film is used to verify the environmental sound certification of the machine. The value that is listed on the film indicates the guaranteed sound power level. The guaranteed sound power level is measured at the time of manufacture. The guaranteed sound power level is measured according to the conditions that are specified in “2000/14/EC”.

European Union

The machines are compliant to “2006/42/EC”. The CE plate is positioned on the bottom left side of the Machine PIN (1) at the rear of the machine.

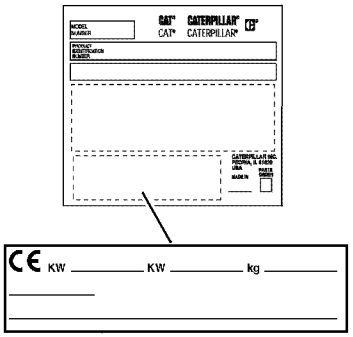

Illustration 48 g01883459

For quick reference, record this information in the spaces that are provided below.

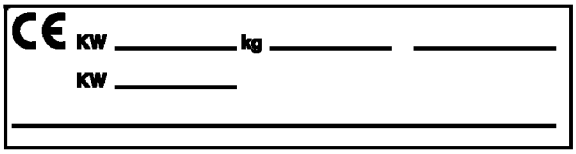

Illustration 49 g02019094

- Engine Power of primary engine (kW)_____
- Engine Power for additional engine (kW) (if equipped) _____
- Typical operating weight of machine for European market (kg)_____
- Year of construction_____
- Machine Type_____

For the name, the address and the country of origin for the manufacturer, see the PIN plate.

Declaration of Conformity

SMCS Code: 1000; 7000

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.

EC DECLARATION OF CONFORMITY OF MACHINERY

Manufacturer: Caterpillar Inc., 100 N.E. Adams Street, Peoria, IL 61629 USA

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:	Steel track dozer
	Model/Type:	D3K2, D4K2, D5K2
	Serial Number:	
	Commercial Name:	Caterpillar

Fulfils all the relevant provisions of the following Directives

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

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 November 2011, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

i07709181

Emissions Certification Film

SMCS Code: 1000; 7000; 7405

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.

Operation Section

Before Operation

i04203489

Mounting and Dismounting

SMCS Code: 7000

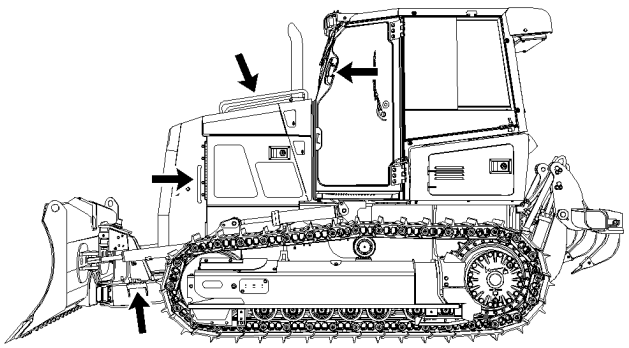

Illustration 50 g02392096

Handholds and steps

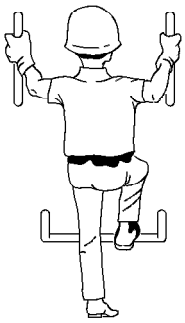

Illustration 51 g00037860

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 2 feet and one hand. Three-point contact can also be 1 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.

i07487178

Daily Inspection

SMCS Code: 1000; 7000

⚠ WARNING

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

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

Steam can cause personal injury.

Check the coolant level only after the engine has been stopped and the cooling system pressure cap is cool enough to touch with your bare hand.

Remove the cooling system pressure cap slowly to relieve pressure.

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

NOTICE

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

Note: For maximum service life of the machine, make a thorough daily inspection before you operate the machine. Inspect the machine for leaks. Remove any debris from the engine compartment and the undercarriage. Ensure that all guards, covers, and caps are secured. Inspect all hoses and belts for damage. Inspect all lights and mirrors for damage. Check the condition of the fan drive belt. Make the needed repairs before you operate the machine.

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.

Perform the following procedures on a daily basis.

- Operation and Maintenance Manual, “Backup Alarm - Test”
- Operation and Maintenance Manual, “Brakes, Indicators, and Gauges - Test”
- Operation and Maintenance Manual, “Bulldozer Power Angling Tilt Hinge Pins - Lubricate”
- Operation and Maintenance Manual, “Cab Filter (Fresh Air) - Clean/Inpsect/Replace”
- Operation and Maintenance Manual, “Cooling System Coolant Level - Check”
- Operation and Maintenance Manual, “Engine Oil Level - Check”
- Operation and Maintenance Manual, “Fuel System Water Separator - Drain”
- Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”
- Operation and Maintenance Manual, “Seat Belt - Inspect”
- Operation and Maintenance Manual, “Winch Cable - Inspect”
- Operation and Maintenance Manual, “Winch Fairlead Rollers - Lubricate”
- Operation and Maintenance Manual, “Ripper Linkage and Cylinder Bearing - Lubricate”
- Operation and Maintenance Manual, “Camera - Clean/Adjust”

Refer to the Maintenance Section for the detailed procedures. Refer to the Maintenance Interval Schedule for a complete list of scheduled maintenance.

Machine Operation

i05063109

Alternate Exit

SMCS Code: 7308; 7310

Machines with cabs are equipped with alternate exits. If a door becomes disabled, the other door can be used as an alternate exit. Release the latch and open the door.

Fire Suppression Arrangement (If Equipped)

Hinged Side Screens (If Equipped)

Illustration 52 g03226059

Fire plow option

Use the internal release that is inside of the window for an emergency exit, if necessary.

i07059455

Alternate Exit

SMCS Code: 7308; 7310

S/N: GAE1–Up

Rear Window with Ring Seal (If Equipped)

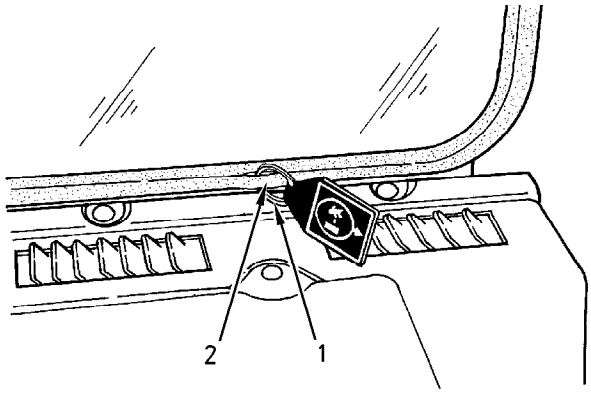

Illustration 53 g00681020

(1) Ring
(2) O-ring seal

Alternate Exit – The rear window serves as an alternate exit.

To remove the rear window, pull ring (1) and push out the glass.

Completely remove O-ring seal (2) from the seal that supports the glazing support seal. This will provide enough clearance so that the seal can hinge and the glazing can pass outward. Climb through the opening of the rear window in order to exit the cab.

Rear Window with Lever (If Equipped)

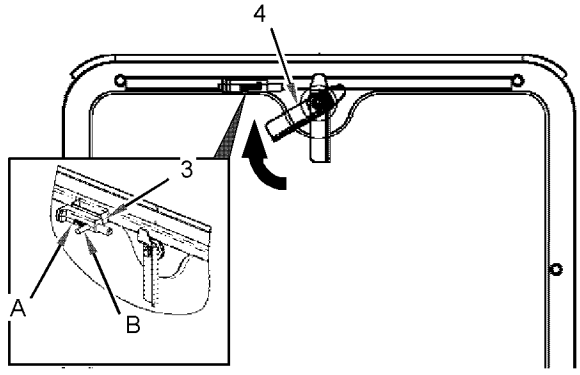

Illustration 54 g01137161

(3) Lock pin
(4) Lever
(A) Unlocked position
(B) Locked position

The rear window serves as an alternate exit. The rear window can be removed from the inside of the cab or from the outside of the cab.

Note: When lock pin (3) is in the locked position (B), the rear window cannot be removed. When you operate the machine, place lock pin (3) in unlocked position (A).

Removing Rear Window from the Inside

1. Place lock pin (3) in unlocked position (A).
2. Grip the lever (4). Fully turn the lever in the direction of the arrow and push the rear window outward.

Removing Rear Window from the Outside

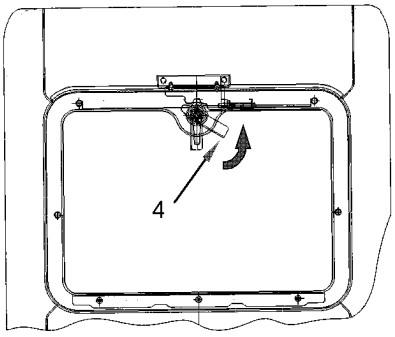

Illustration 55 g01137162

1. Make sure that lock pin (3) is in the unlocked position (A).
2. Grip lever (4). Fully turn the lever in the direction of the arrow and pull backward in order to remove the window.

Hammer (If Equipped)

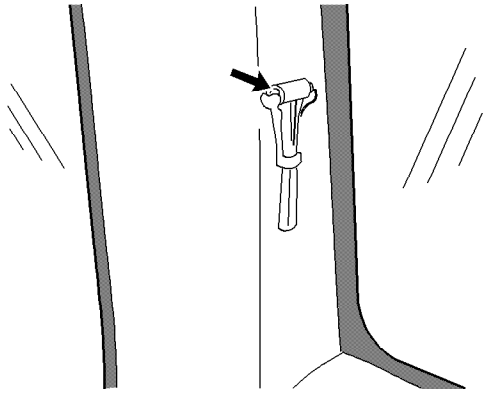

Illustration 56 g00748659

Alternate Exit – The rear window serves as an alternate exit.

Break Glass – Strike the rear window with the hammer in order to break the glass.

A hammer is mounted on the left side of the cab. Strike the rear window with the hammer in order to break the glass. Climb through the opening of the rear window in order to exit the cab.

i04311630

Seat

SMCS Code: 7312-025; 7324

Note: The operator seat that is provided with this machine is in compliance with the appropriate class of ISO 7096.

Note: Adjust the air suspension seat at the beginning of each shift and for each new operator.

Adjust the seat in order to allow full travel of the pedals. Make the seat adjustments when the operator is sitting against the back of the seat.

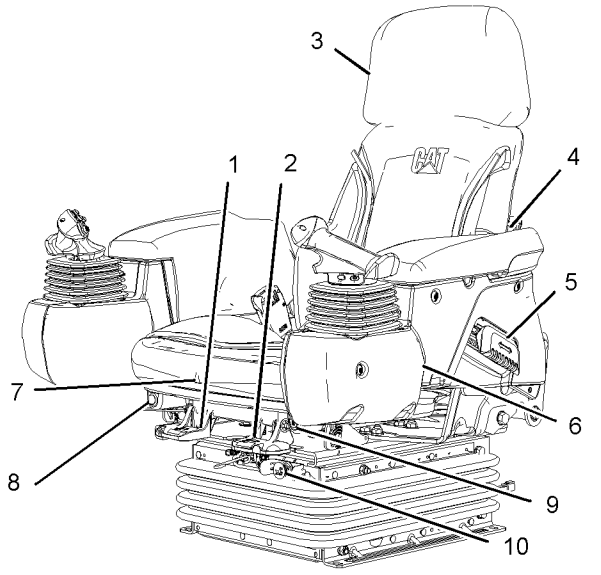

Illustration 57 g02473018

Back Cushion Angle Adjustment (1) – Pull the lever upward. Permit the back cushion spring forward or lean backward into the cushion. Release the lever at the desired position.

Fore and Aft Position (2) – Pull the lever upward. Move the seat in the desired direction. Release the lever at the desired forward position or the desired rearward position.

Back Extension(3) – Pull up on back extension (3) in order to remove the back extension.

Lumbar Support (4) – Turn the knob or press the switch (if equipped) to increase or decrease lumbar support.

Adjustment Control (5) – Lift handle (5) and slide the armrest and joystick support (6) forward or backward. Release handle (5) at the desired position.

Seat Cushion Tilt (7) – The front of the seat cushion is pinned in a groove. Grasp the seat pan and rotate the pin “forward−up−and−back” into the steep angle position. Grasp the seat pan and rotate the pin “forward-down-and-back” into the nominal position.

Heated and Ventilated Seat (8) (If equipped) – Press the left side of the two position rocker switch for the heating mode. Press the right side of the rocker switch for the ventilation operation.

Heated Seat (9) (If equipped) – Press the top of the rocker switch for heat. Press the bottom of the rocker switch to turn OFF.

Heated and Ventilated Seat (9) (If equipped) – Press the top of the rocker switch for high heat. Press the bottom of the rocker switch for low heat. The center switch position is OFF.

Seat Height (10) – Push in knob (10) in order to raise the seat height. Pull out on the knob in order to lower the seat height.

i04575638

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 Retractable Seat Belts

Fastening The Seat Belt

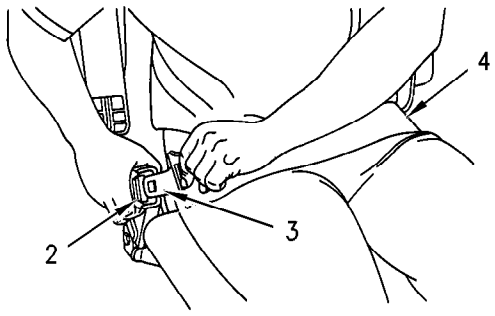

Illustration 58 g00867598

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

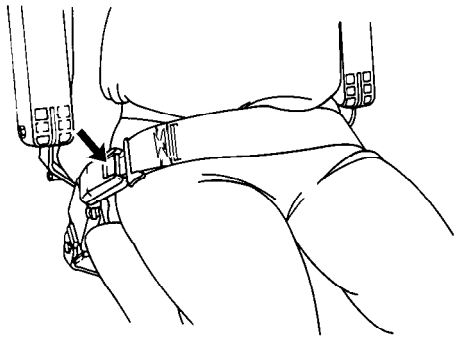

Illustration 59 g00039113

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.

i06046411

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 machine's 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.

Make sure that the mirror is in proper working condition and that the mirror is clean. Adjust the mirror at the beginning of each work period and adjust the mirror when you change operators.

The appropriate job site organization is also recommended in order to minimize visibility hazards. For more information refer to this Operation and Maintenance Manual, “Visibility Information”.

Mirror Adjustment

Interior Mirror

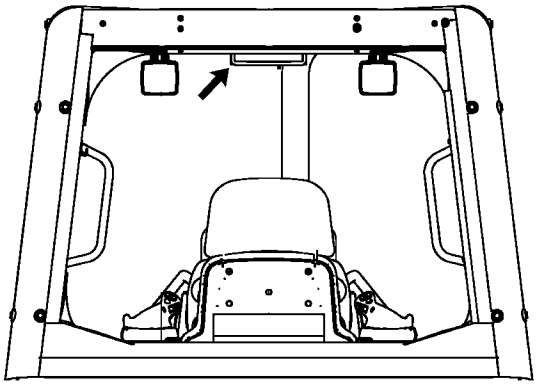

Illustration 60 g01702814

Rear view of interior mirror

The interior mirror can be adjusted to a position that allows the operator to see preferred areas at the rear of the machine. This action assists visibility during operations such as backing up, reversing the machine, or moving backward.

Right Side Rear View Mirror

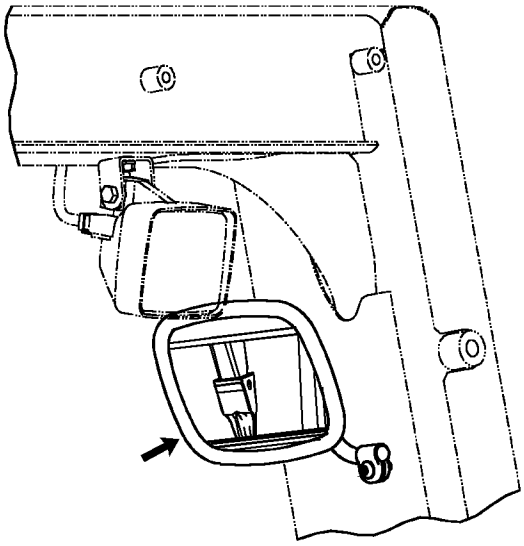

Illustration 61 g01703233

Left ripper tooth in mirror

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Move the bulldozer control or ripper control (if equipped) to the HOLD position. For further details on this procedure, refer to Operation and Maintenance Manual, “Operator Controls”
- Stop the engine.
- Adjust the right side rear view mirror in order to view the rear work tool, if equipped. Additionally, provide as much visibility to the rear as possible.

Note: Use a hand tool to adjust this mirror.

i05033406

Operator Controls

SMCS Code: 7300; 7301; 7451

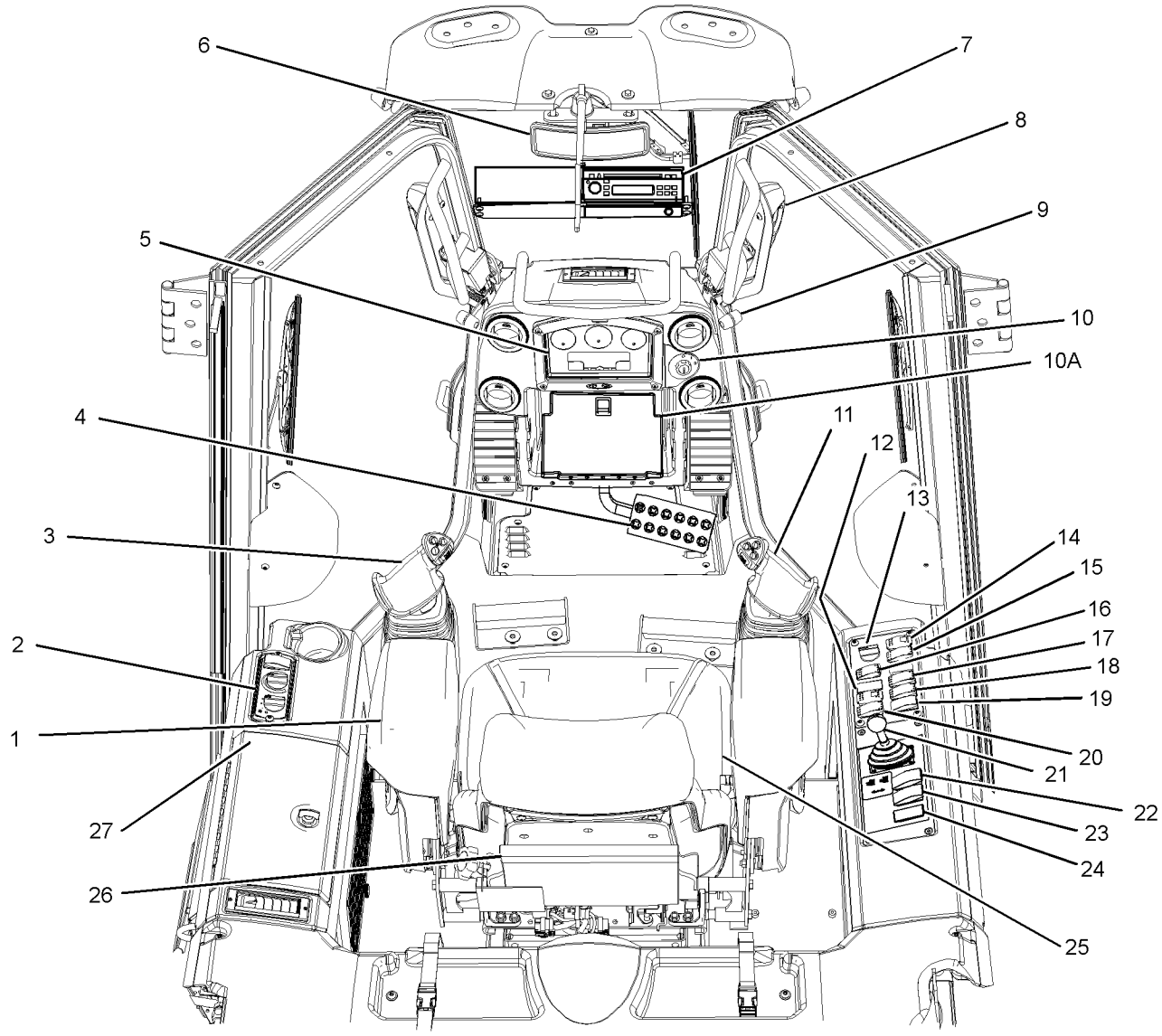

Illustration 62 g02455041

(1) Armrest
(2) Air conditioning and heating Controls
(3) Steering and Transmission Control
(4) Decelerator/Brake Pedal
(5) Gauges and Indicators
(6) Mirror
(7) AM/FM Radio (if equipped)
(8) Exterior cab door release lever
(9) Interior cab door release lever
(10) Engine Start Switch
(10A) Vandalism guard (if equipped)
(11) Bulldozer Control
(12) Work lights
(13) Engine throttle control
(14) Parking brake switch
(15) Hydraulic lockout
(16) Stable blade control
(17) Front window wiper (if equipped)
(18) Front wiper delay (if equipped)
(19) Rear window wiper (if equipped)
(20) Heated joystick switch (if equipped)
(21) Winch Controls or Ripper Controls (if equipped)
(22) Winch freespool switch (if equipped)
(23) Winch driveaway switch (if equipped)
(24) Auxiliary function (if equipped)
(25) Air suspension seat
(26) Pocket in seat backrest (Operation and Maintenance Manual)
(27) Power Receptacle inside storage box

Armrest Adjustments (1)

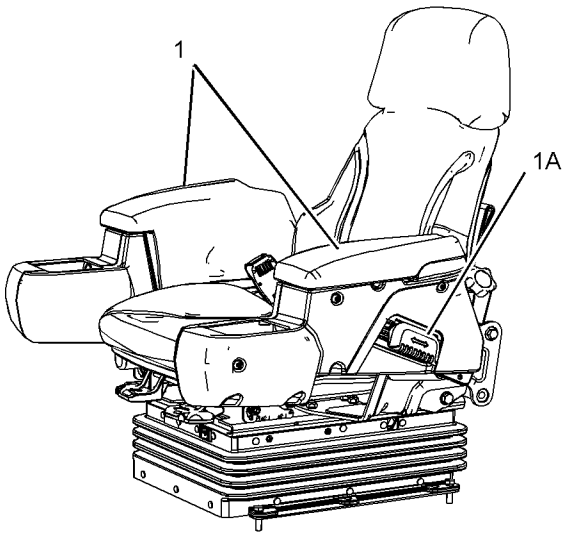

Illustration 63 g02456607

Control Supports

Use the following procedure in order to adjust both of the control supports (1), if necessary.

1. Pull lever (1A) upward that is on the outside of armrest (1).

2. Pull control support (1) in a forward direction or rearward direction to a comfortable position.

3. Release lever (1A).

Air Conditioning and Heating Control (2)

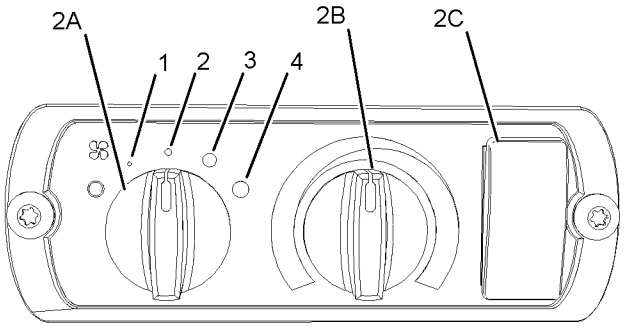

Illustration 64 g01269368

Enclosed ROPS

Open ROPS arrangement only has heating.

(2A) Fan control knob
(2B) Temperature control knob
(2C) Air conditioner switch

Fan Control

OFF – Move knob (2A) to this position in order to stop the blower fan motor.

Fan Speed Switch (2A) – This knob controls the four-speed blower fan motor.

LOW (1) – Move knob (2A) to this position for the lowest fan speed.

MEDIUM LOW (2) – Move knob (2A) to this position for a medium low fan speed.

MEDIUM HIGH (3) – Move knob (2A) to this position for a medium high fan speed.

MAXIMUM (4) – Move knob (2A) to this position for a maximum fan speed.

Temperature Control

Temperature Control Knob (2B) – Turn knob(2B) counterclockwise to COOL. Turn knob (2B) clockwise to WARM.

Air Conditioner Switch (If Equipped)

Air Conditioner – Press in the top of switch (2C) in order to turn on the air conditioner. Press the bottom of switch (2C) in order to turn off the air conditioner.

Heating and Air Conditioning System Operation

The heating and air conditioning system performs five functions:

Note: The Open ROPS arrangement has a heating system only.

Heating – Turn knob (2A) to the desired speed (LOW, MEDIUM LOW, MEDIUM HIGH, or MAXIMUM). Adjust knob (2B) in order to obtain the desired temperature.

Cooling – Press switch (2C) in order to turn on the air conditioner. Turn knob (2A) to the desired speed (LOW, MEDIUM LOW, MEDIUM HIGH, or MAXIMUM). Adjust knob (2B) in order to obtain the desired temperature.

Defrosting – Press switch (2C) in order to turn on the air conditioner. Turn knob (2A) to the desired fan speed (LOW, MEDIUM LOW, MEDIUM HIGH, or MAXIMUM). Adjust knob (2B) in order to obtain the desired temperature.

Pressurizing – When heating or cooling is not desired, pressure inside the cab will help keep out dust.

Turn knob (2B) in order to obtain the desired temperature. To produce the volume of air that is necessary to keep out dust, turn knob (2A) to MEDIUM LOW or to MEDIUM HIGH.

Defogging – Press switch (2C) in order to turn on the air conditioner. Turn knob (2A) to the desired speed (LOW, MEDIUM LOW, MEDIUM HIGH, or MAXIMUM). Adjust knob (2B) until the moisture level is lowered and the front window and side windows are free of moisture.

Steering and Transmission Control (3)

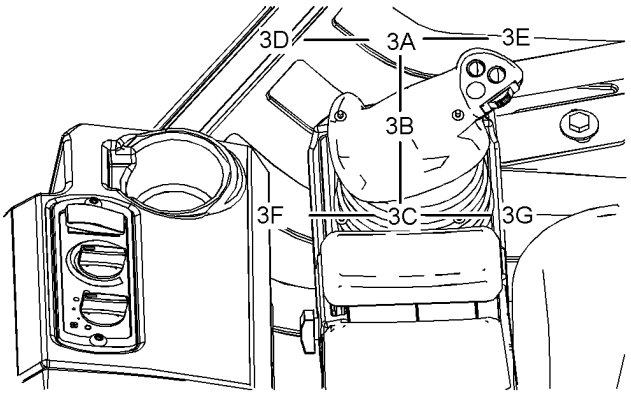

Illustration 65 g01258402

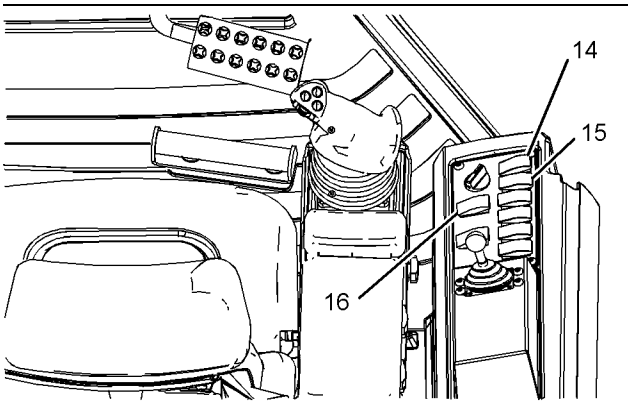

Illustration 66 g02675557

Note: Make sure that parking brake switch (14) is disengaged in order to use steering and transmission control (3).

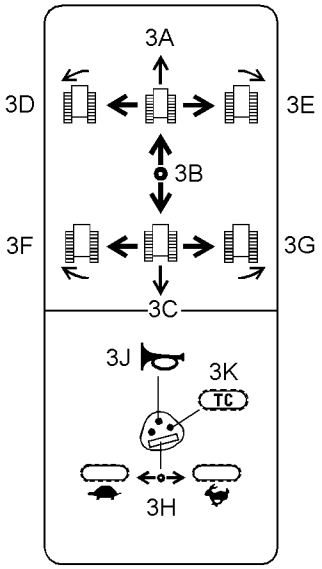

Illustration 67 g02725450

FORWARD (3A) – Move lever (3) forward past the detent position in order to move the machine forward.

NEUTRAL (3B) – Move lever (3) to the center position in order to put the machine in the NEUTRAL position.

REVERSE (3C) – Move lever (3) backward past the detent position in order to move the machine backward.

FORWARD LEFT (3D) – Move lever (3) to the left in order to turn the machine to the left. The turning radius for the machine is proportional to the control lever position. In order to slightly turn the machine to the left, slightly move lever (3) to the left. If you want to increase your turn, move lever (3) further to the left. If you want the machine to counterrotate, move lever (3) all the way to the left past the detent. When the tracks counterrotate, the right side track will rotate forward, while the left track rotates backward.

FORWARD RIGHT (3E) – Move lever (3) to the right in order to turn the machine to the right. The turning radius for the machine is proportional to the control lever position. In order to slightly turn the machine to the right, slightly move lever (3) to the right. If you want to increase your turn, move lever (3) further to the right. If you want the machine to counterrotate, move lever (3) all the way to the right past the detent. When the tracks counterrotate, the left side track will rotate forward, while the right track rotates backward.

REVERSE LEFT (3F) – Move lever (3) to the left in order to turn the machine to the left. The turning radius for the machine is proportional to the control lever position. In order to slightly turn the machine to the left, slightly move lever (3) to the left. If you want to increase your turn, move lever (3) further to the left. If you want the machine to counterrotate, move lever (3) all the way to the left past the detent. When the tracks counterrotate, the right side track will rotate backward, while the left track rotates forward.

REVERSE RIGHT (3G) – Move lever (3) to the right in order to turn the machine to the right. The turning radius for the machine is proportional to the control lever position. In order to slightly turn the machine to the right, slightly move lever (3) to the right. If you want to increase your turn, move lever (3) further to the right. If you want the machine to counterrotate, move lever (3) all the way to the right past the detent. When the tracks counterrotate, the right side track will rotate forward, while the left track rotates backward.

Changing the direction of the machine is performed by first moving lever (3) to the NEUTRAL position. Then move lever (3) in the opposite direction. Deceleration of the engine speed makes for easier directional changes. However, this action is not required.

Note: In order to turn the machine, lever (3) must be placed in either the FORWARD detent position or in the REVERSE detent position.

Track Speed (3H)

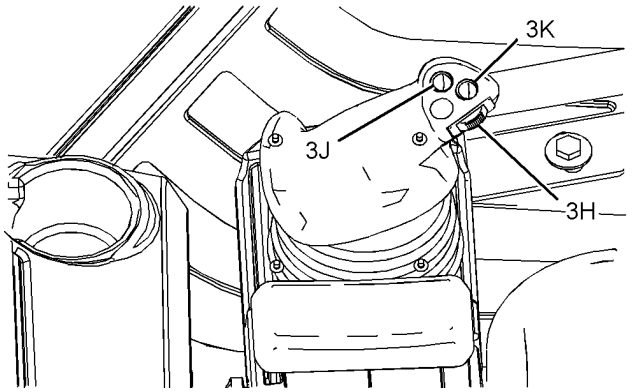

Illustration 68 g02725525

LOW – Roll the wheel (3H) to the left when a lower speed is desired.

Note: Wheel (3H) allows variable speeds via the incremental rotation of the wheel.

HIGH – Roll the wheel (3H) to the right when a higher speed is desired.

The machine is set with the following factory settings.

- Maximum forward speed of 9.0 km/h (5.6 mph)
- Maximum reverse speed of 10.0 km/h (6.2 mph)

REVERSE and FORWARD Speeds – The forward and reverse speed is independent of each other. Changing one speed does not change the other.

Note: There is a maximum limit of 10.0 km/h (6.2 mph) on the forward speed and on the reverse speed. Consult your Caterpillar dealer in order to change the speed settings.

Horn (3J)

Horn – Push down button (3J) in order to activate the horn.

Traction Control Button (3K)

Traction control button (3K) reduces unwanted track slip in cases of heavy blade load and a poor underfoot condition.

“FNR”

F – The steering and transmission control allows machine travel in the FORWARD direction.

N – The steering and transmission control is in the NEUTRAL position.

R – The steering and transmission control allows machine travel in the REVERSE direction.

Manual Engagement - Traction Control

1. Place the “FNR” in FORWARD.

Illustration 69 g02666364

2. Under heavy blade load and poor underfoot conditions, press traction control button (3K) briefly to enable the Traction Control System. The traction control indicator (TC) is shown on the gauge display.

Illustration 70 g02790334

Illustration 71 g02666516

3. After blade load has been reduced or underfoot conditions have improved, press the traction control button (3K) briefly to disable the Traction Control System. The traction control indicator (TC) is removed from the gauge display.

4. Placing the “FNR” into the NEUTRAL or REVERSE position disables the Traction Control System.

5. Repeat Steps 1 and 2 to enable the Traction Control System again.

Automatic Engagement - Traction Control

1. Place the “FNR” in NEUTRAL.

2. Hold traction control button (3K) for 3 seconds or use the CIC Operator Modes Menu to enable (or disable) the automatic Traction Control System.

Illustration 72 g02666725

a. To use the CIC Operator Modes Menu, navigate to the Auto Traction Control System menu using the up arrow. Then, use the right arrow to toggle between OFF and ON.

Illustration 73 g02666733

3. In the auto traction control engagement mode each time the “FNR” is placed in FORWARD, traction control is enabled. The traction control (TC) indicator is now shown on the gauge display.

Note: The operator can disable traction control during the FORWARD cycle using the 3K switch, as needed.

4. When the “FNR” is in FORWARD, Steps 2 and 3 of “Manual Engagement - Traction Control” can be used at any time, as required by blade load and underfoot conditions.

5. Placing the “FNR” into the NEUTRAL or REVERSE position disables the Traction Control System.

Bidirectional Shift Control

Bidirectional shift control allows the operator to program FORWARD and REVERSE preset speed values. The speed values are automatically recalled each time the 'FNR' is shifted into FORWARD or REVERSE.

“FNR”

F – The steering and transmission control allows machine travel in the FORWARD direction.

N – The steering and transmission control is in the NEUTRAL position.

R – The steering and transmission control allows machine travel in the REVERSE direction.

In order to program the preset speed values, the operator must first enable “Bidirectional Shift Control” .

Enabling and Disabling

Use the CIC Operator Modes Menu to enable (or disable) bidirectional shift control. Navigate to the Bidirectional Shift Control menu using the up arrow and then use the right arrow to toggle between OFF and ON.

Illustration 74 g02667176

Illustration 75 g02667177

The “Tractor with Arrows” indicator appears in the gauge display window when the “Bidirectional Mode” is enabled. The indicator is removed when the “Bidirectional Mode” is disabled.

Note: The operator must enable Bidirectional Shift Control after each shutdown of the keyswitch circuit. If the Bidirectional Shift Control has not been enabled since the last shutdown of the keyswitch circuit, shifting the “FNR” into FORWARD or REVERSE will not result in any change in the speed values.

Programming with the Decelerator/Brake Pedal (4)

1. Push decelerator/brake pedal (4) all the way downward to stop the machine with the “FNR” already in FORWARD.

2. Roll the track speed wheel (3H) to increase or decrease the desired preset speed.

Note: One of the arrows next to the bidirectional indicator (tractor) will be flashing along with the corresponding desired preset speed value.

3. Release decelerator/brake pedal (4) to store the preset speed value for the desired direction.

4. Repeat Steps 1 through Step 3 in the REVERSE direction to program the REVERSE speeds.

Programming Using the Momentary parking brake Switch (14)

1. Place the “FNR” into NEUTRAL.

2. Set the parking brake with the momentary parking brake switch (14).

3. Place the “FNR” into FORWARD.

4. Roll the track speed wheel (3H) to increase or decrease the desired preset speed.

Note: One of the arrows next to the bidirectional indicator (tractor) will be flashing along with the corresponding desired preset speed value

5. Repeat Steps 3 and 4 for REVERSE.

6. Place the “FNR” into NEUTRAL.

7. Remove the parking brake with the momentary parking brake switch (14).

Recalling Preset Speed Values

When the “FNR” is shifted into FORWARD, the preset REVERSE speed setting is recalled. This action makes sure that the preset REVERSE speed is ready for the next time the 'FNR' is shifted into REVERSE.

When the “FNR” is shifted into REVERSE , the preset FORWARD speed setting is recalled. This action makes sure that the preset FORWARD speed is ready for the next time the “FNR” is shifted into FORWARD.

Note: Shifting to NEUTRAL or from NEUTRAL will not recall the preset speed values.

Preset Speed Values Retention

Programmed preset speed setting values are saved before each shutdown of the keyswitch circuit. Then, the active speed values are already preset at the activation of the keyswitch circuit. The preset speed setting values become available once bidirectional shift control is enabled.

Note: If the preset speed setting values have never been programmed, then the default FORWARD and REVERSE speed setting values are used.

Operator Not Present System

This machine is equipped with an Operator “Not Present” System. This system prevents the machine from being accidentally put in gear if an operator is not present. The system considers the operator to be “Present” if any of the following conditions are met.

- The seat cushion sensor is activated.
- The operator is pressing down the decel/brake pedal to any position other than the fully released position.
- The steering and transmission control is in the Forward or Reverse position with track speed detected.

If none of these conditions are met, the operator is considered “Not Present”. Then, the system will lock the transmission in neutral, apply the parking brake, and cause the parking brake light on the dash to flash.

Note: When the parking brake light is flashing, the parking brake switch must be cycled in order to release the parking brake. Release, apply, then release the parking brake.

If the system activates with the steering and transmission control not in neutral, the steering and transmission control will need to be cycled through neutral in order to put the machine into gear.

To release the parking brake, the steering and transmission control must be in Neutral and the operator must be present. If both of these conditions are met, the parking brake will release when the parking brake switch is pressed. If both of these conditions are NOT met, the parking brake light will flash.

Operator Not Present – The operator is considered “Not Present” when NONE of the following conditions are met.

- The seat cushion sensor is activated.
- The operator is pressing down the decel/brake pedal to any position other than the fully released position.
- The steering and transmission control is in the Forward or Reverse position with track speed detected.

If any of these conditions are met, the operator is considered “Present”.

Note: Make sure to understand that the seat belt has no connection with the operator “Present” status.

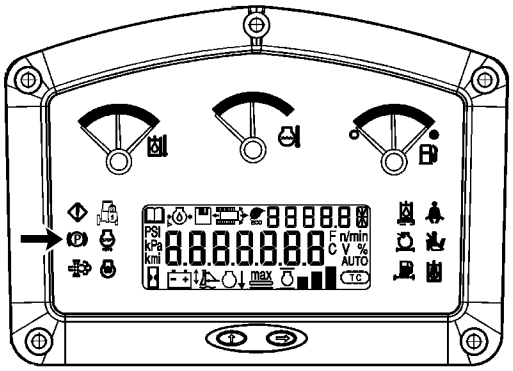

Illustration 76 g02727111

When the “Operator Not Present” system is active, the parking brake light on the dash will flash. When the parking brake light flashes, this condition requires cycling parking brake switch (14).

- Release - Apply - Release switch (14)

Decelerator/Brake Pedal (4)

Push decelerator/brake pedal (4) all the way downward in order to apply the brakes or use the brakes to stop the machine. Use the decelerator/brake pedal (4) on a downgrade in order to maintain a safe operating mode. Release decelerator/brake pedal (4) in order to allow the machine to move. Release pedal (4) in order to increase ground speed.

Decelerator/brake pedal (4) can operate in two ways.

- Decrease both engine and track speed
- Decrease only track speed

This feature is changed at the gauge display or by using Cat ET (electronic technician).

Transmission Brake Only

Note: Change the configuration of the decelerator/brake pedal with the gauge display or with Caterpillar electronic technician (ET).

Configure the decelerator/brake pedal as a hydrostatic braking in order to slow the machine with the hydrostatic transmission only. The engine speed does not change when you press the decelerator/brake pedal.

When decelerator/brake pedal (4) is completely depressed, the parking brake will engage. The gauge display (Compact Instrument Cluster) can change the decelerator/brake pedal. so that the engine maintains a constant speed when the pedal is depressed.

Transmission Brake and Engine Deceleration

Configure the decelerator/brake pedal so that the hydrostatic braking and the engine deceleration are done at the same time.

When the decelerator/brake pedal is pressed, the engine speed will be reduced proportionally. When decerator/brake pedal (4) is completely depressed, the parking brake will engage.

Note: Change the configuration of the decelerator/ brake pedal with the gauge display or with Caterpillar electronic technician (ET).

Gauges and Indicators (5)

The following text is operator information for use with the Gauge Display.

Compact Instrument Cluster

Refer to Monitoring System, KENR5959, “Systems Operation” and the Operation and Maintenance Manual, “Monitoring System” for more information on the Compact Instrument Cluster (gauge display).

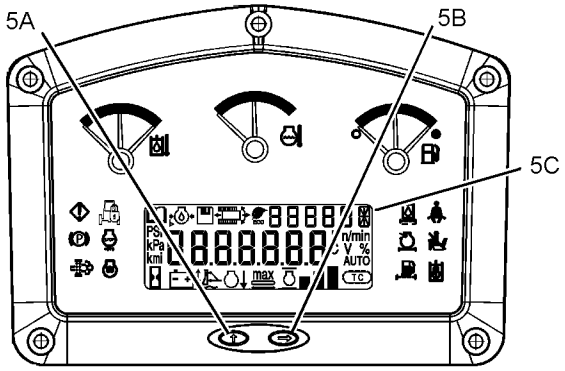

Illustration 77 g02453109

Gauge Display

(5A) Mode Button
(5B) Scroll Button
(5C) Gauge Display (CIC)

The Gauge Display (Compact Instrument Cluster or CIC) (5) shows the five Operator modes.

The Mode button (5A) and the Scroll button (5B) are used in order to navigate the CIC Menu structure.

Following is the operation of the Mode button (5A) and the Scroll button (5B).

Move to different modes – Press and release the Mode button (5A).

Scroll through the submodes or the screens within each mode – Press and release the Scroll button (5B).

CIC Operator Modes Menu

The following is displayed on the CIC Operator Modes menu:

Mode 0 – Default

Mode 1 – Bidirectional Speed Setting

Mode 2 – Auto Traction Control Setting

Mode 3 – Decel/Brake Pedal Settings

Mode 4 – Steering Modulation Settings

Mode 5 – Implement Modulation Settings

See Table 6 for details of the CIC Operator menu.

Table 6

CIC Menu	
Operator Modes	
Mode 0 Default	Maximum Forward Speed and Maximum Reverse Speed
	Engine Oil Pressure
	Engine Speed
	System Voltage
	Odometer
	Service Hour Meter
	ECO mode Fuel Savings %
Mode 1 Bidirectional Speed Setting	On/Off
Mode 2 Auto Traction Control Setting	On/Off
Mode 3 Decel/Brake Pedal Settings	Brake And Engine Decel
	Brake Onlyl
Mode 4 Steering Modulation Settings	Medium
	Coarse
	Fine
Mode 5 Implement Modulation Settings	Standard
	Fast
	Fine

Following is the content of the CIC Operator Modes menu.

Mode 0 - Default

Illustration 78 g01328919

Mode 0 - Default Home LCD Screen

The Mode 0 - Default screen has the following submenus:

Maximum Forward Speed

The Maximum Forward Speed is shown on the center of the screen. This number indicates the maximum forward speed of the machine.

Maximum Reverse Speed

The Maximum Reverse Speed is shown on the upper right-hand side of the screen. This number indicates the maximum reverse speed of the machine.

Engine Oil Pressure

Illustration 79 g01328962

Mode 0 Engine Oil Pressure LCD Screen

The Engine Oil Pressure screen indicates the current engine oil pressure.

Engine Speed

Illustration 80 g01328963

Mode 0 Engine Speed LCD Screen

The Engine Speed screen indicates the current engine speed of the machine.

System Voltage

Illustration 81 g01329052

Mode 0 System Voltage LCD Screen

The System Voltage screen indicates the current system voltage.

Total Distance Traveled

Illustration 82 g02453178

The Total Distance Traveled screen displays the total number of kilometers or miles that the machine has traveled.

Service Hour Meter

Illustration 83 g01329053

Mode 0 Service Hour Meter LCD Screen

The Service Hour Meter screen indicates the total operating hours of the machine.

ECO mode Fuel Savings

Illustration 84 g02453159

The ECO screen displays the instantaneous percentage of fuel saved when operating in ECO mode or when using decelerator pedal (4).

Mode 1 - Bidirectional Speed Setting

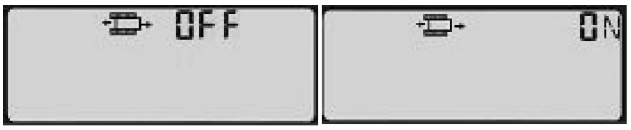

Illustration 85 g02667876

The control setting mode for bidirectional speed is set to the ON or OFF position.

Mode 2 - Traction Control Setting

Illustration 86 g02669101

The Auto Traction Control setting is set to the ON or OFF position.

Mode 3- Decel/Brake Pedal Settings

Decelerator and Brake Pedal

Illustration 87 g01328959

Mode 3- Decelerator Pedal and Brake Pedal LCD Screen

This feature can be changed and the modifications stored through the key cycle. Press and hold the right display button to store the setting. (Hold the right display button until the computer disk on the display flashes.)

Brake Pedal Only

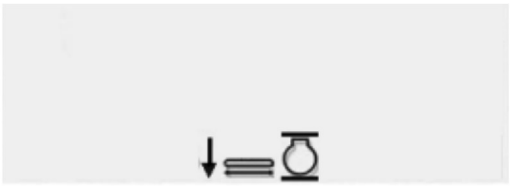

Illustration 88 g01328958

Mode 3- Brake Pedal Only LCD Screen

Refer to Operations and Maintenance Manual, “Monitoring System” or the Service Manual for more information.

Mode 4 - Steering Modulation Settings

The Mode 4 - Steering Modulation Settings screen has the following submenus:

Medium

Illustration 89 g01328926

Mode 4 - Steering Modulation Settings - Medium LCD Screen

This feature can be changed and the modifications stored through the key cycle. Press and hold the right display button to store the setting. (Hold the right display button until the computer disk on the display flashes.)

Coarse

Illustration 90 g01328936

Mode 4 - Steering Modulation Settings - Coarse LCD Screen

Fine

Illustration 91 g01328924

Mode 4 - Steering Modulation Settings - Fine LCD Screen

Mode 5 - Implement Modulation Settings

The Mode 5 - Implement Modulation Settings screen has the following submenus:

Standard

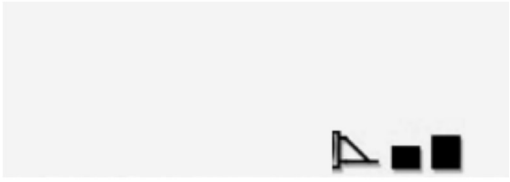

Illustration 92 g01328946

Mode 5 - Implement Modulation - Standard LCD Screen

This feature can be changed and the modifications stored through the key cycle. Press and hold the right display button to store the setting. (Hold the right display button until the computer disk on the display flashes.)

Fast

Illustration 93 g01328944
Mode 5 - Implement Modulation - Fast LCD Screen

Fine

Illustration 94 g01328942
Mode 5 - Implement Modulation - Fine LCD Screen

Mirror (6)

For best operator vision, adjust the rear view mirror. Adjust the mirror before you operate the machine and after operators change.

AM/FM/CD Radio (7) (If equipped)

⚠ WARNING

If a radio other than one available from your Caterpillar dealer is installed, an in-line fuse must be provided. Failure to do so can damage the electrical system if an electrical short occurs in the radio circuit.

Note: Multiple radio installation groups are available. If a radio is not installed, a cover is available for the opening. Consult your Caterpillar dealer for additional information.

Cab Door Release Lever (8)

Machines with cabs are equipped with two entrances. Release latch (9) and open the door.

Enter the cab and close the door until the door latches. Close both doors in order to operate the machine properly.

Cab Door Release Lever (9)

Machines with cabs are equipped with alternate exits. If a door becomes disabled, the other door can be used as an alternate exit. Release the latch and open the door.

Release latch (9) in order to unlock the cab door.

Fully open the door until the door latches.

Releasing the Fully Opened Door and Latched Door

Use the correct method in order to release the door when the door is latched open against the side of the machine.

- Open the side window and release the platform door latch.
- Also, you may stand on the ground in order to release the platform door latch.

Engine Start Switch (10)

OFF – Insert the engine start switch key only from the OFF position and remove the engine start switch key only from the OFF position. In the OFF position, there is no power to most electrical circuits in the cab.

Turn the engine start switch key to the OFF position in order to stop the engine.

ON – Turn the engine start switch key clockwise to the ON position in order to activate all of the cab circuits.

START – Turn the engine start switch key clockwise to the START position in order to crank the engine. Release the engine start switch key after the engine starts and the engine start switch key returns to the ON position.

Note: If the engine fails to start, the engine start switch key must be returned to the OFF position. Then, attempt to start the engine again.

Vandalism Guard (10A) (If Equipped)

Vandalism guard (10A) offers vandalism protection (if equipped).

Bulldozer Control (11)

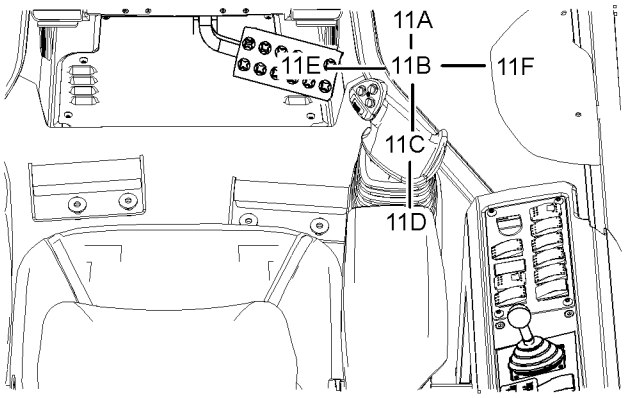

Illustration 95 g02456703

FLOAT (11A) – Push lever (11) forward past the detent force. This action activates the blade float function (implement valve). Release the lever. The lever returns to the NEUTRAL position (HOLD). In the FLOAT position, the blade moves up and down with the ground contour.

The implement valve will remain in the FLOAT position until you manually move lever (11) to the raise or lower direction. The valve spool position then returns to the HOLD position.

The float position of the spool is also canceled, if you turn the engine start key to the OFF position. The same action occurs when the hydraulic lockout (16) is activated.

Note: Lever travel corresponds to the speed of blade movement for the dozer functions that are listed.

LOWER (11B) – Push lever (11) forward in order to lower the blade. Do not pass the detent position. Release lever (11). Lever (11) will return to the HOLD position.

HOLD (11C) – Lever (11) will return to the HOLD position, when you release lever (11) anytime. The movement of the blade will stop unless the lever is set in FLOAT.

RAISE (11D) – Pull back on lever (11) in order to raise the blade. Release lever (11). Lever (11) will return to the HOLD position.

TILT LEFT (11E) – Push lever (11) to the left in order to lower the left side of the blade. Lever (11) returns to the HOLD position when the lever is released.

TILT RIGHT (11F) – Pull lever (11) to the right in order to lower the right side of the blade. Lever (11) returns to the HOLD position when the lever is released.

Blade Angle (11G)

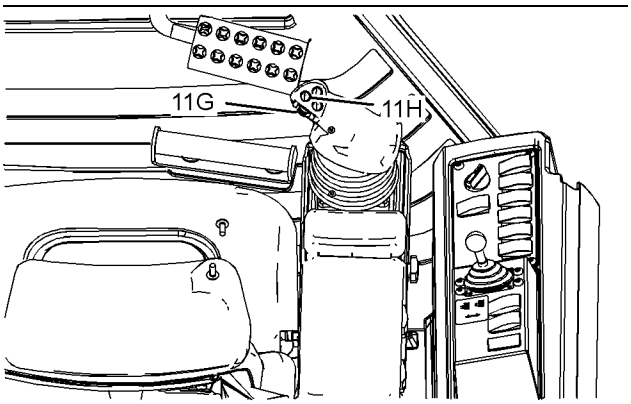

Illustration 96 g01258499

ANGLE LEFT – Roll the thumb wheel (11G) to the right in order to angle the blade to the left.

ANGLE RIGHT – Roll the thumb wheel (11G) to the left in order to angle the blade to the right.

Bulldozer Blade Shake (11H)

Press button (11H) in order to send a command to the tilt cylinder that begins a high vibration application. The blade will shake until button (11H) is released or a timeout of 3 seconds is completed. This procedure allows removal of debris from the bulldozer blade.

Bulldozer Blade Pitch (11J)

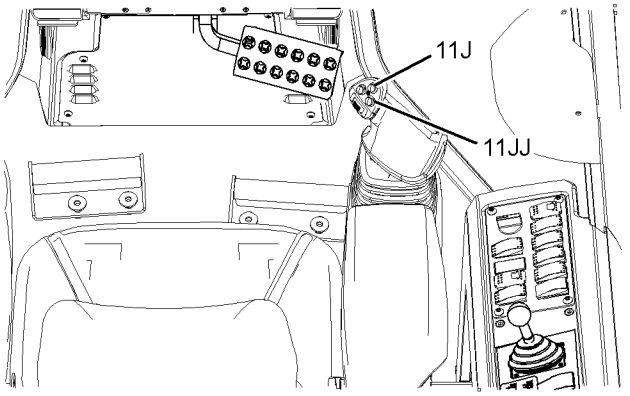

Illustration 97 g02457217

Power pitch control mode, if equipped

Press button (11J) in order to pitch the blade at a forward angle.

Press button (11JJ) in order to pitch the blade at a rearward angle.

Right Operator Console

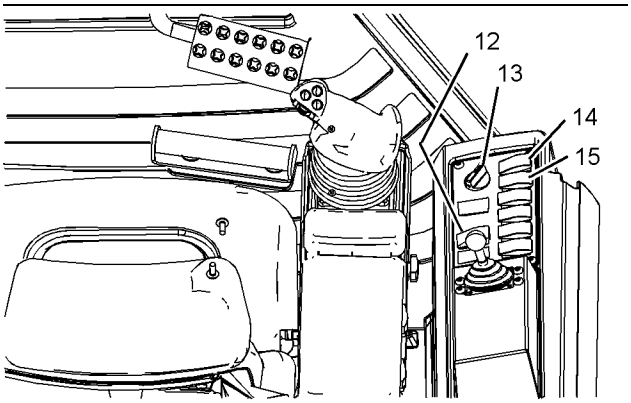

Illustration 98 g02675636

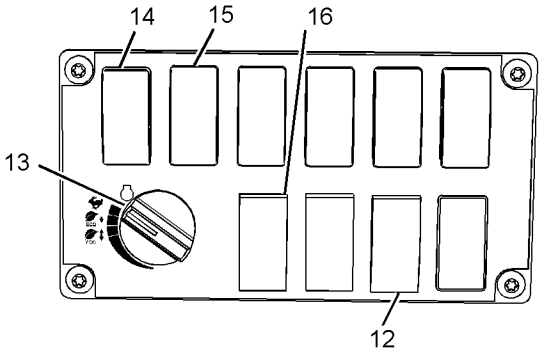

Illustration 99 g02457459

(12) Work lights
(13) Engine throttle control (knob)
(14) Parking brake switch
(15) Hydraulic lockout
(16) Stable blade control switch

Depress the work light switch (12) in order to turn on all of the machine lights.

Work Lights (12)

Work lights – This switch turns on all the lights.

Engine Throttle Control (13)

Engine throttle control (13) controls the engine speed.

Low Idle – Rotate knob (13) counterclockwise in order to lower the idle speed.

High Idle – Rotate knob (13) clockwise in order to increase the idle speed.

Table 7

Throttle Position	Engine RPM
1	950
2	1150
3	1350
4	1550
5	1700
6	1850
7	2000
8(1)	2100
9(2)	2100
10	2100

(1) FERF - Fuel efficient reverse and forward. See “ECO Mode” for engine derating.
(2) FER - Fuel Efficient Reverse (only). See “ECO Mode” for engine derating.

Automatic Engine Control

NEUTRAL Position – At throttle position 8 or 9, when the machine is stopped in the NEUTRAL for 3 seconds without any lever or direction activated, the engine will decrease to LOW IDLE.

ECO Mode

Fuel Economy (ECO) Mode – The ECO mode is controlled by the position of engine throttle control (13). This ECO mode is designed to reduce fuel consumption and noise. The ECO symbol is illuminated in the display window on the Compact Instrument Cluster when the fuel economy mode is active.

FERF – FERF will automatically decrease engine speed in REVERSE and FORWARD.

FER – FER will automatically decrease engine speed in REVERSE only.

Note: Engine speed will automatically control between 1600 rpm and 2100 rpm.

Note: This feature does not affect track speed. The machine will still maintain the desired ground speed.

Parking Brake Switch (14)

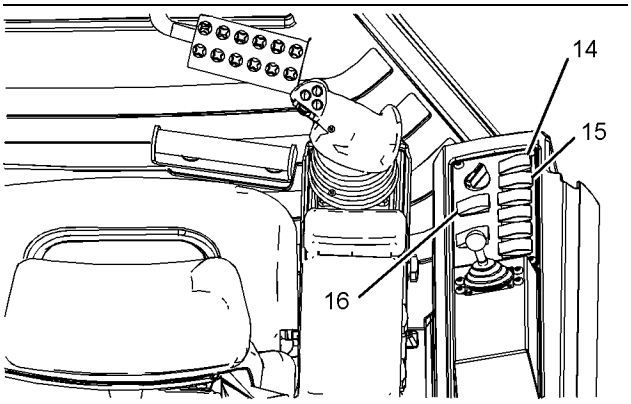

Illustration 100 g02675557

Parking Brake – This switch is a momentary switch. When the parking brake is ON, the indicator light in the instrument cluster is illuminated. This switch also locks the transmission in NEUTRAL. The machine will not move when the parking brake switch is engaged. After the parking brake switch is disengaged, the parking brake will not turn off until a direction is chosen. When the parking brake switch is engaged, the parking brake indicator on the dashboard will light. Do not use the parking brake for stopping the machine.

Engaged – Press switch (14) one time to engage the parking brake.

Disengaged – Press switch (14) one time to disengage the parking brake.

Note: To release the parking brake, the steering and transmission control must be in Neutral and the operator must be present. If both of these conditions are met, the parking brake will release when the parking brake switch is pressed. If both of these conditions are NOT met, the parking brake light will flash.

Hydraulic Lockout (15)

This switch is a momentary switch. When the hydraulic lockout is ON (active), the indicator light in the instrument cluster is illuminated. The switch for hydraulic lockout (15) shuts down the implement hydraulics to the machine.

Stable Blade Control (16)

Stable blade switch (16) provides lift and lower compensation that increases stability of the dozer blade when the machine is operating.

Note: Stable Blade Control makes fine grading easier.

Window Wiper and Window Washer (17) (18) (19) (If Equipped)

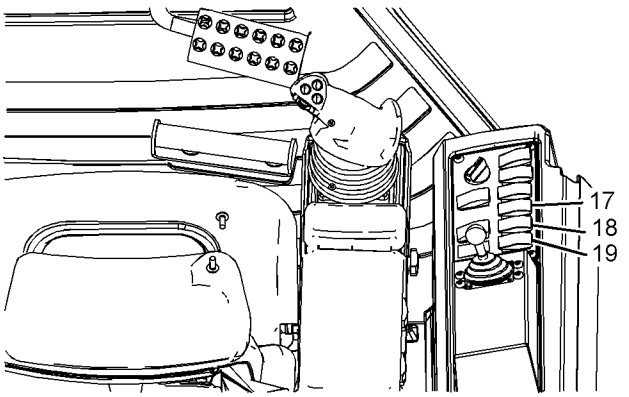

Illustration 101 g02675598

Front Window Wiper Switch (17) – Press the top of switch (17) to activate the window wipers for the front window and doors. Press the bottom of switch (17) to turn off the window wipers for the front window and doors. Press the top of switch (17) and hold switch (17) in order to activate the window washers for the front window and doors.

Front Window Wiper Intermittent Switch (18) – This intermittent switch is a three position switch. The bottom position is no delay, middle position is a 3 second delay, and the top position is a 5 second delay. This intermittent switch turns on the intermittent operation of the front and door window wipers.

Rear Window Wiper Switch (19) – Press the top of switch (19) to activate the window wiper for the rear window. Press the bottom of switch (19) to turn off the window wiper for the rear window. Press the top of switch (19) and hold switch (19) to activate the window washer for the rear window.

Note: Do not operate the window wipers on dry windows. The rear window wiper does not have an intermittent wiper mode.

Heated Joystick Switch (20) (If Equipped)

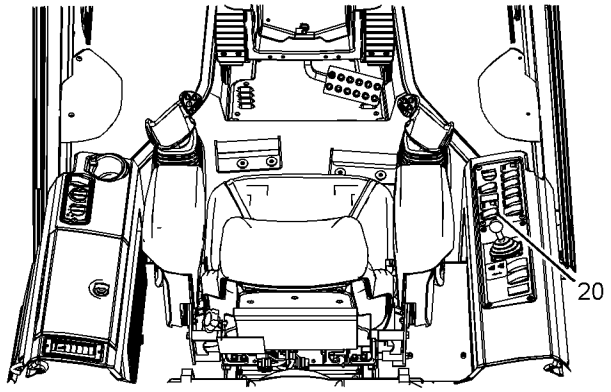

Illustration 102 g02788703

Use this switch to activate heating elements in the right-hand and left-hand joysticks, if equipped. Three settings are available for the heated joystick: OFF, low temperature and high temperature.

Winch Controls or Ripper Controls (21)

Winch Controls 21, 22, 23 (If Equipped)

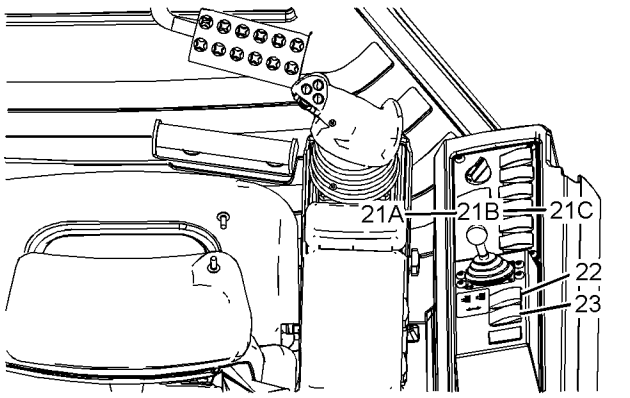

Illustration 103 g01391320

REEL IN (21A) – Move the lever to the left in order to reel in the winch cable. The winch cable should move toward the winch under power. Speed for the winch cable is proportional to the lever position. Release the lever. The lever will return to the HOLD position.

Hold (21B) – Release the lever. The lever will return to HOLD position. This action maintains the current position of the winch cable. The winch brake is applied in the HOLD position.

REEL OUT (21C) – Move the lever to the right in order to reel out the winch cable. The winch cable reels out under power. Speed for the winch cable is proportional to the lever position. Release the lever. The lever will return to the HOLD position.

Both FREE SPOOL and DRIVE AWAY modes have three conditions that must be met in order to activate the function.

- The operator must be present.
- The implement levers must be released.
- The hydraulic lockout switch must be in the UNLOCKED position.

FREE SPOOL (22) – Press the freespool switch one time in order to release the winch cable. The winch cable unreels by manually pulling the winch cable. No machine or hydraulic assistance is needed. The winch will remain in the FREE SPOOL position until you press the switch again or the lever is moved from the HOLD position.

Note: Do not activate the winch freespool when the machine is moving.

DRIVE AWAY (23) – Press the winch drive away switch one time in order to activate this mode. This mode allows the operator to drive the tractor away from a load as the winch reels out the cable under power and the cable is attached to the load. DRIVE AWAY (23) releases the winch brake (BRAKE OFF).

Ripper Controls 21 (If Equipped)

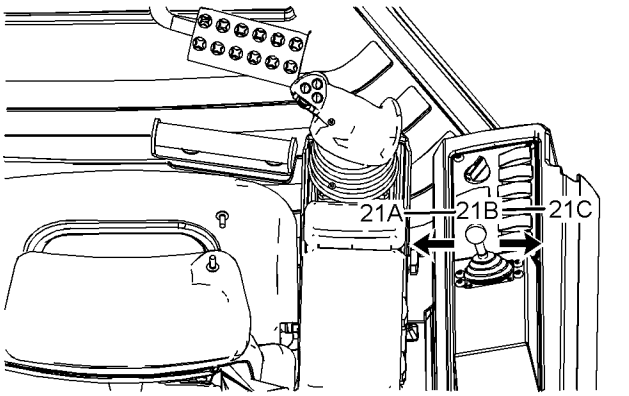

Illustration 104 g01391351

RAISE (21A) – Pull the lever to the left in order to raise the ripper. Release the lever. The lever will return to the HOLD position.

HOLD (21B) – Release the lever. The lever will return to HOLD position. Ripper movement stops in the current position.

LOWER (21C) – Push the lever to the right in order to lower the ripper. Release the lever. The lever will return to the HOLD position.

Auxiliary Control 24 (If equipped)

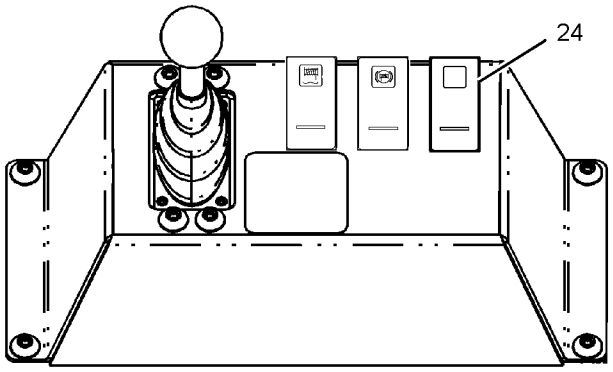

Illustration 105 g01391360

Use auxiliary switch (24) in order to activate the rear hydraulics when the machine has a winch or a rear attachment.

Fire Plow Controls (If Equipped)

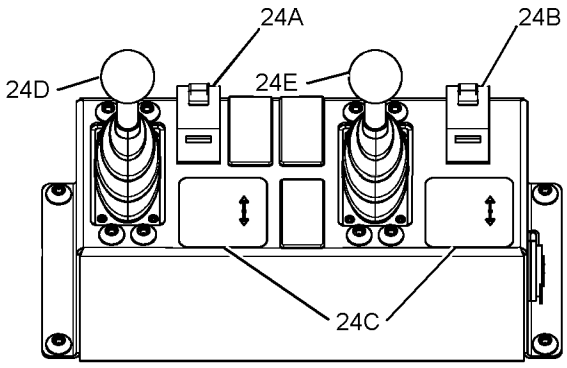

Illustration 106 g01623055

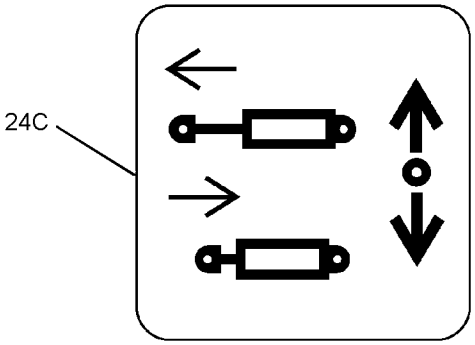

Illustration 107 g01625918

For machines that are equipped with the fire plow, use auxiliary switch (24A) in order to engage the fourth float valve. Use lever (24D) for the fourth valve function. Use auxiliary switch (24B) in order to engage the fifth float valve. Use lever (24E) for the fifth valve function.

1. Push the auxiliary lever away from the operator in order to extend the cylinder.
2. Pull the auxiliary lever toward the operator in order to retract the cylinder.

Air Suspension Seat (25)

The air suspension seat offers a safe, comfortable, stable ride that is less fatiguing for the operator.

See “Seat” in this manual for more information.

Seat Sensor (Tractor Operator)

Operator Not Present – The operator is considered “Not Present” when NONE of the following conditions are met.

- The seat cushion sensor is activated.
- The operator is pressing down the deceerator/ brakel pedal to any position other than the fully released position.
- The steering and transmission control is in the Forward or Reverse position with track speed detected.

If any of these conditions are met, the operator is considered “Present” .

Power Receptacle (26)

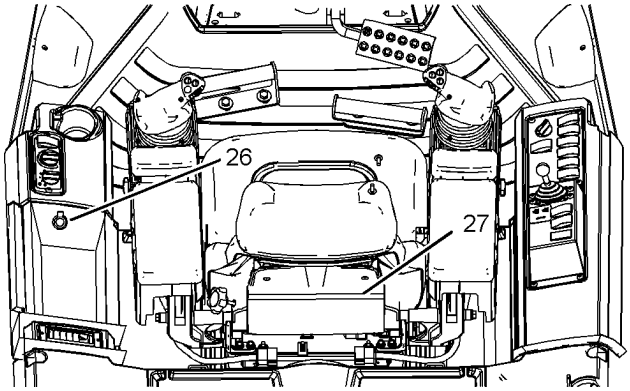

Illustration 108 g01391373

Power Receptacle – A 12 V, 10 Amp power receptacle is located inside the storage box on left-hand side of seat. Power receptacle (26) can be used for powering automotive electrical equipment or accessories. Remove the cap before use.

Note: Do not use the power supply as a lighter for a cigarette.

Pocket in Seat Back (27)

Place the Operation and Maintenance Manual into the pocket in seat back (27). Hold other pertinent material in this pocket that maintains information that is useful to operate the machine effectively.

Control Panel for the AccuGrade Machine Control (Laser and GPS) (If equipped)

If equipped, the GPS and Laser control system display is located below the gauge display.

For more information regarding the operation of the control panel for the AccuGrade Machine Control system, contact your Cat dealer.

Additional Features of Fire Suppression Arrangement (If Equipped)

Fuel Shutoff Control in Cab (If equipped)

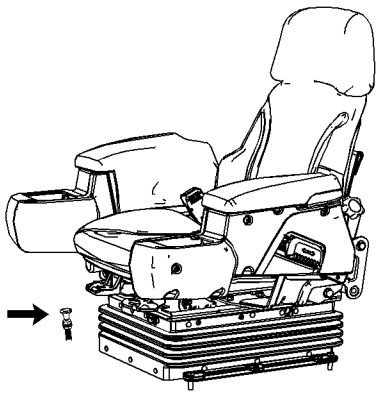

Illustration 109 g03207638

Location of fire plow fuel shutoff control

Quick Release Cab Floorplate (If Equipped)

Illustration 110 g03207758

Quick Release Right Engine Panel (If Equipped)

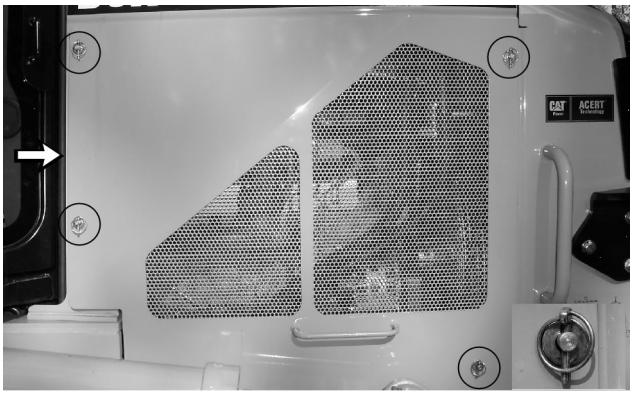

Illustration 111 g03207856

Release the right-side engine panel by removing the four fast pins, as shown.

Seat Belt Warning Light (If Equipped)

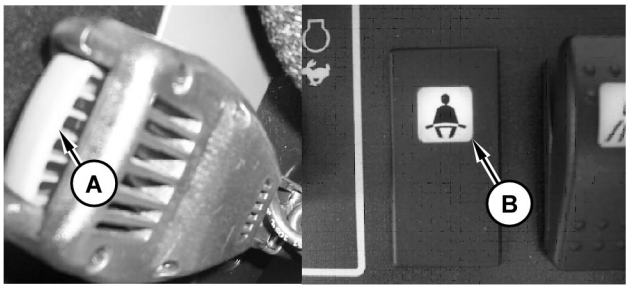

Illustration 112 g03207919

(A) Seat belt warning light
(B) Console warning light for seat belt

Independent Work Light Switches (If Equipped)

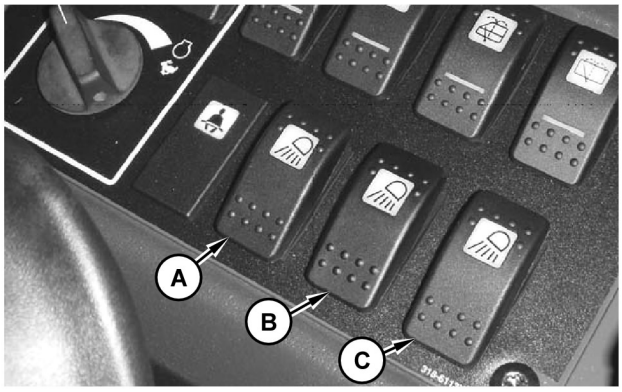

Illustration 113 g03224258

(A) Long range lights
(B) Front flood lights
(C) Rear lights

Hinged Door and Side Screens (If Equipped)

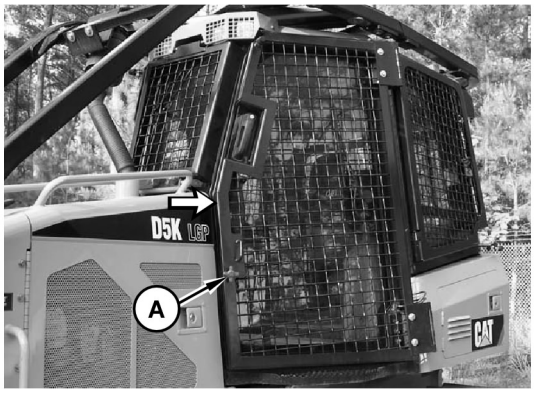

Illustration 114 g03224297

Use external release (A) to open the screen to clean the door.

Illustration 115 g03226059

Use the internal release that is inside of the window for an emergency exit, if necessary.

Hinged Radiator Grill Guard (If Equipped)

Illustration 116 g03224336

Release the two top latches to swing the heavy duty grill forward.

Auxiliary Hydraulic Functions with Float and Winch (If Equipped)

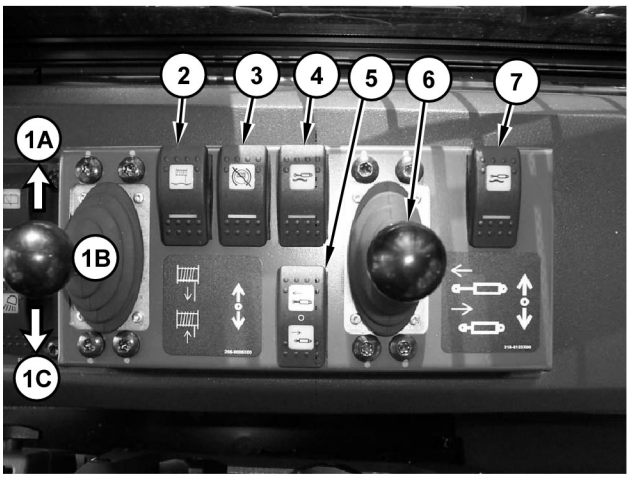

Illustration 117 g03228436

(1) Winch control lever
(2) Winch freespool switch
(3) Winch brake off
(4) Fourth valve float switch
(5) Fourth valve function (extend/retract)
(6) Fifth function lever
(7) Fifth valve float switch

REEL OUT (1A) – Move the lever to this position in order to reel out the winch cable. The winch cable reels out under power. Speed for the winch cable is proportional to the lever position. Release the lever. The Lever will return to the HOLD position.

HOLD (1B) – Move the lever into this position in order to maintain the current position of the winch cable. The winch brake is applied at this time.

REEL IN (1C) – Move the lever to the left in order to reel in the winch cable. The winch cable should move toward the winch under power. Speed for the winch cable is proportional to the lever position. Release the lever. The Lever will return to the HOLD position.

FREESPOOL (2) – Press freespool switch (2) one time to release the winch cable. The winch cable unreels by manually pulling the winch cable. No machine or hydraulic assistance is needed. The winch will remain in the FREESPOOL position until you press the switch again or until you activate any other function for the winch.

Note: Do not activate the winch freespool when the machine is moving.

DRIVE AWAY (3) – Press winch DRIVE AWAY switch (3) to release the winch brake (BRAKE OFF). This function will also activate the DRIVE AWAY solenoid. The winch brake will be released. The winch clutch will be engaged and hydraulic flow will bypass the winch pump. To unwind the winch cable, tie the cable to a permanent object. Then, drive the machine away from the permanent object at a speed that is less than 3 km/h (1.8 mph). The winch will remain in the DRIVE AWAY position until you press the switch again or until you activate any other function for the winch.

Fourth Valve Function

Remote Cylinder - Float – Press float switch (4) to engage the fourth valve function.

Remote Cylinder - Extend – Press top of switch (5) to extend the cylinder.

Remote Cylinder - Retract – Press bottom of switch (5) to retract the cylinder.

Fifth Valve Function Control

Press float switch (7) to engage the fifth valve function.

1. Push fifth function lever (6) away from the operator in order to extend the cylinder.
2. Pull fifth function lever (6) toward the operator in order to retract the cylinder.

i04574643

Diesel Particulate Filter Regeneration

SMCS Code: 108F

Regeneration

Regeneration is the removal of soot from the Diesel Particulate Filter (DPF). The DPF traps both soot and ash. Passive regeneration of the DPF is removing the soot. A back pressure valve is used if needed to heat the exhaust gas.

Note: During normal operation a hissing noise may be heard during low load, low engine speed conditions. No action is needed.

Soot Level Monitoring

During the normal working cycle of the engine the ECM will control when the regeneration will occur. Regeneration will take place by low speed automatic regeneration or by enhanced automatic regeneration.

DPF Light On

DPF light – This indicator illuminates when soot level is high in the diesel particulate filter (DPF).

Note: If the DPF light turns on, do NOT contact the CAT dealer. Simply change the machine operation to increase exhaust temperature.

If the soot level is elevated, the DPF light will come on. The light will remain on until the soot level reduces. The engine is safe to operate with the DPF light on as long as no other warning lights are active. Do one of the following actions to help reduce the soot level.

- Allow the machine to idle with no operator input for 30 to 60 minutes. This action activates the backpressure valve that continuously raises the exhaust temperature for an improved regeneration rate.
- Achieving higher engine exhaust temperatures

The following methods are ways to achieve a higher exhaust temperature.

- Turn off the ECO mode

- Operate the engine at higher speeds
- Change the decel/brake pedal functionality so that engine speed does not decrease when the pedal that is activated
- Increase the machine load by continuously pushing a heavy load for 30 to 60 minutes

If the DPF light and a Warning Category 2 or Warning Category 3 light turns ON, the operator must contact the Cat dealer for service of the engine diesel particulate filter (DPF).

i04020225

Battery Disconnect Switch

SMCS Code: 1411; 1411-B11

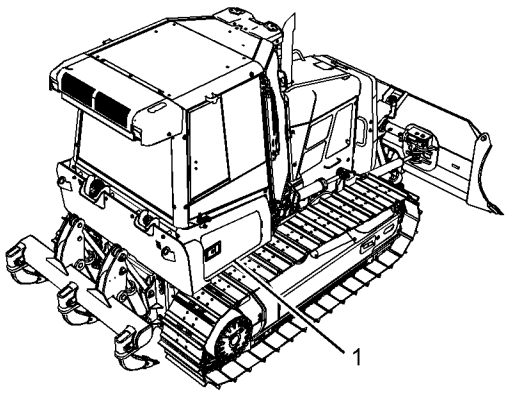

Illustration 118 g02459478

Open access door (1) on the right side of the machine.

Disconnect Switch ON – To activate the electrical system, insert the key for the battery disconnect switch and turn the key clockwise. The battery disconnect switch must be turned to the ON position before you start the engine.

Disconnect Switch OFF – To deactivate the electrical system, turn the key for the battery disconnect switch counterclockwise to the OFF position.

The battery disconnect switch and the engine start switch perform different functions. To disable the entire electrical system, turn off the battery disconnect switch. When you only turn off the engine start switch, the battery remains connected to the electrical system.

Turn the battery disconnect switch to the OFF position and remove the key when you service the electrical system or any other machine components.

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

Checking the Battery Disconnect System

NOTICE
To ensure no damage to the engine occurs, verify that the engine is fully operational before cranking the engine. Do not crank an engine that is not fully operational.

Perform the following procedure in order to check the battery disconnect system.

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: electrical components in the operator compartment, hour meter and engine cranking, If any of the items continue to function with the battery disconnect switch in the OFF position, contact your Cat dealer.

i04292917

Backup Alarm

SMCS Code: 7406

The backup alarm is mounted on the rear of the machine.

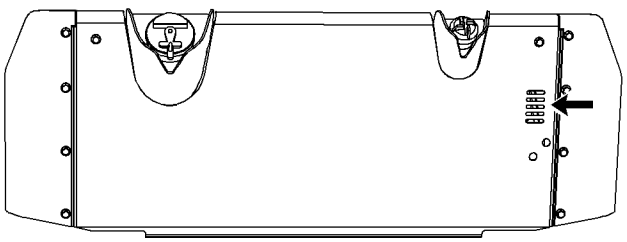

Illustration 119 g02459536

Backup alarm – The alarm will sound when the steering and transmission control is in the REVERSE

position. The alarm is used to alert people behind the machine that the machine is backing up.

i04292989

Monitoring System

SMCS Code: 7490

Functional Test

The monitoring system informs the operator of the status of the machine systems. The monitoring system informs the operator of problems or of an impending problem.

⚠ WARNING

If the action alarm does not sound during this test or machine monitoring displays are not functioning, do not operate the machine until the cause has been corrected. Machine operation with faulty action alarms or displays could result in injury or death as any Warning Category 3 notifications will not be relayed to the operator.

When the engine starts, the monitoring system runs a test. The operator must observe the monitoring system during the test to determine proper operation.

The self testing feature verifies that the modules of the monitoring system are properly operating. The self testing feature verifies that the display module is properly operating.

The operator must observe the outputs in order to determine if the modules are operating properly. This self testing feature is 3 seconds long.

The monitoring panel will then return to the normal operating mode.

Alert Indicators

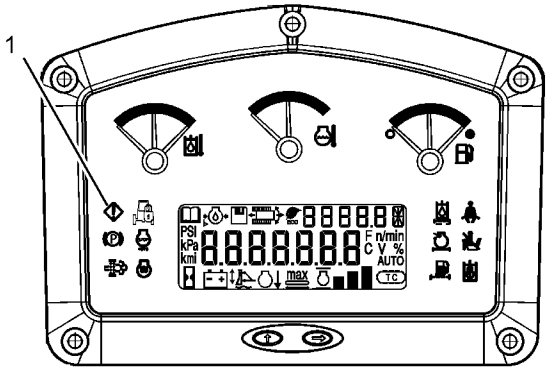

Illustration 120 g02459656

Action Lamp (1) – The action lamp is on the Compact Instrument Cluster (CIC). If the action lamp is ON, then attention to service is required.

Reference: See “Warning Categories” for information on indicated service.

Warning Categories

Warning Category 1

In category 1, the action light is solid amber. This category alerts the operator that the machine system needs attention.

Warning Category 2

In this category, the action light flashes red. The warning category requires you to change the machine operation. Examples include the following conditions.

- The machine operation must be altered in order to reduce the excessive temperature in one or more of the systems.
- If the engine speed is too high, change the machine operation in order to reduce the excessive engine speed.

If the alert indicator continues to flash, do not operate the machine.

Warning Category 3

In this category, the action lamp flashes red. Also, the action alarm will sound. This category requires immediate shutdown of the operation in order to prevent severe damage to the system and/or to the machine.

Do not operate the machine until the cause has been corrected.

Note: If the action lamp flashes amber there is a communication failure.

Indicators

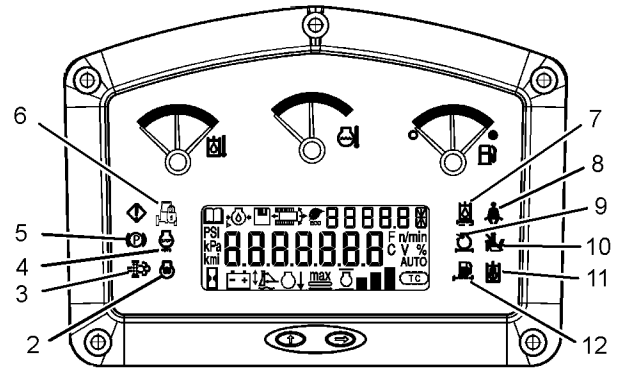

Illustration 121 g02459660

Glow Plugs (2) – This indicator is illuminated when the glow plugs are on. Start the engine when this indicator turns OFF.

Soot Load (3) – This indicator illuminates when soot level is high in the diesel particulate filter (DPF). See "Diesel Particulate Filter Regeneration" in this manual for more information when the DPF light is on for lowering the soot level.

AUTO

Engine Idle Shutdown (4) – If this feature is enabled in ET (electronic technician), this indicator will illuminate and the alarm will sound 20 seconds before the engine shuts down.

Parking Brake (5) – This indicator is illuminated when the parking brake is engaged. If the parking brake indicator flashes, see additional information in this "Operation and Maintenance Manual".

Machine security system (6) – This indicator will illuminate when the machine security system is activated.

Hydraulic Oil and Winch Oil Filter (7) – This indicator is illuminated when the filter is clogged or when the filter is dirty. In extreme cold, this indicator may illuminate until the hydraulic oil temperature warms up.

Inactive Function (8)

Engine Air Filter(9) – This indicator is illuminated when the filter is clogged or when the filter is dirty.

Operator Not Present (10) – This indicator will illuminate if the operator is NOT present. The operator is considered "Not Present" when NONE of the following conditions are met.

- The seat cushion sensor is activated.
- The operator is pressing down the decel/brake pedal to any position other than the fully released position.
- The steering and transmission control is in the Forward or Reverse position with track speed detected

If any of these conditions are met, the operator is considered "Present" .

Hydraulic Lockout (11) – This indicator is illuminated when the hydraulic lockout is activated. The implement hydraulics are OFF.

Fuel/Water Separator(12) – The indicator will illuminate when either of two items occurs. The fuel/water separator must be drained or change the three fuel filters (fuel screen, primary element, and secondary element).

Note: When the fuel filters are plugged, action lamp (1) may illuminate in a solid amber color or a flashing red color. This occurrence depends on the amount of plugging of the fuel/water separator.

Gauges

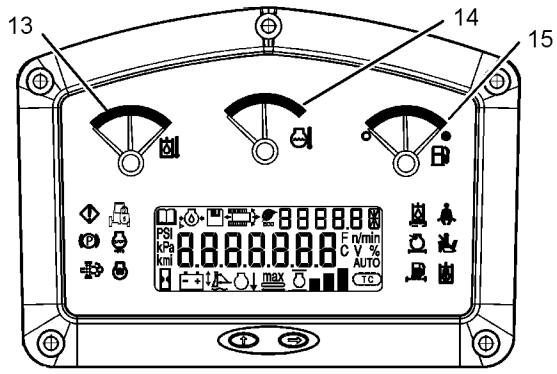

Illustration 122 g02460756

Hydraulic Oil Temperature (13) – The gauge indicates the temperature of the hydraulic oil in the hydraulic oil sump for the steering and implement circuits. If the gauge needle enters the red zone, the hydraulic oil temperature is excessive. The Compact Instrument Cluster will display a warning. If necessary, reduce the load that is on the machine until the hydraulic oil temperature decreases.

Engine Coolant Temperature (14) – The water temperature regulator regulates the coolant temperatures. If the gauge needle enters the red zone, the coolant temperature is excessive. Increased temperatures will sound the warning alarm. Continued operation of the machine during the sounding of the warning alarm or the gauge needle in the red zone may damage the engine. Stop the machine in a safe place and investigate the cause.

Fuel Level (15) – The fuel level gauge indicates the amount of fuel that remains in the fuel tank. A gauge needle in the red zone indicates a low fuel level.

NOTICE
Running out of fuel can cause engine damage. Do not continue to operate the machine when critically low on fuel.

Compact Instrument Cluster

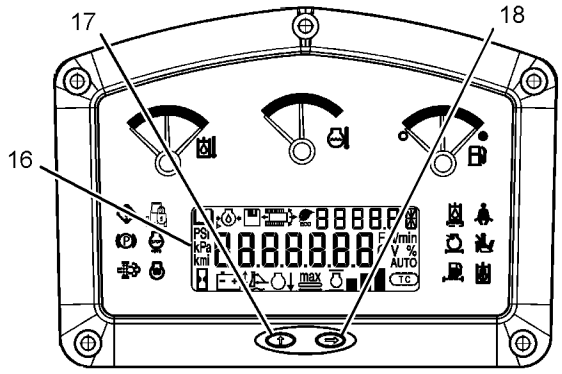

Illustration 123 g02460763

Compact Instrument Cluster (CIC)

(16) Display display window
(17) Menu button
(18) Scroll button

Digital display window (16) provides readouts that show the following items:

- Maximum speed forward and reverse (default readout)
- Engine Oil Pressure
- Engine Speed
- Volt - system voltage
- Total distance traveled
- Service hour meter
- Instantaneous Fuel Savings

Press up arrow button (17) until the desired function is displayed. Navigate from the default readout to additional readouts by pressing scroll button (18).

Machine Speed

Speed setting – The indicator displays the speed setting during machine operation.

Engine Oil Pressure

Engine oil pressure – The indicator displays the status of the engine oil pressure during machine operation.

Engine Speed

Digital tachometer – The tachometer displays the engine rpm during machine operation.

System Voltage

System voltage – System voltage displays the status of the electrical system during machine operation.

Total Distance Traveled

This display indicated the total distance traveled by the machine.

Service Hour Meter

Service Hour Meter – This display indicates the total operating hours of the engine. Use the display in order to determine the service hour maintenance intervals.

Percentage of Fuel Saved

This display indicates the amount of real-time savings in fuel consumption.

Menu Screens

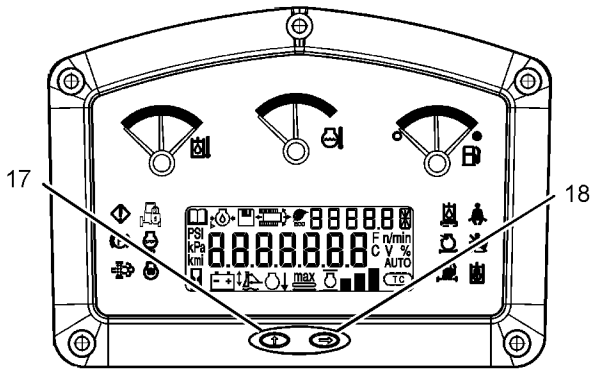

Illustration 124 g02623303

Toggle between the Operator Menu and the Service Menu by depressing both mode button (17) and scroll button (18) for 3 seconds.

Menu button (17) – Press the up arrow button (17) until the desired menu is displayed.

Scroll button (18) – Press the right arrow button (18) in order to access the parameters of the displayed menu/ mode.

Operator Menu

The “Operator” menu is the default menu that is displayed at machine startup.

The operator adjusts the machine operation within the following parameters: operating conditions, preferences of the operator and requirements for efficient operation. The operator uses the Operator Menu to view and set the variable parameters of the machine. The monitoring system display reviews the version of the software in order to determine the set of parameters that are displayed and variable.

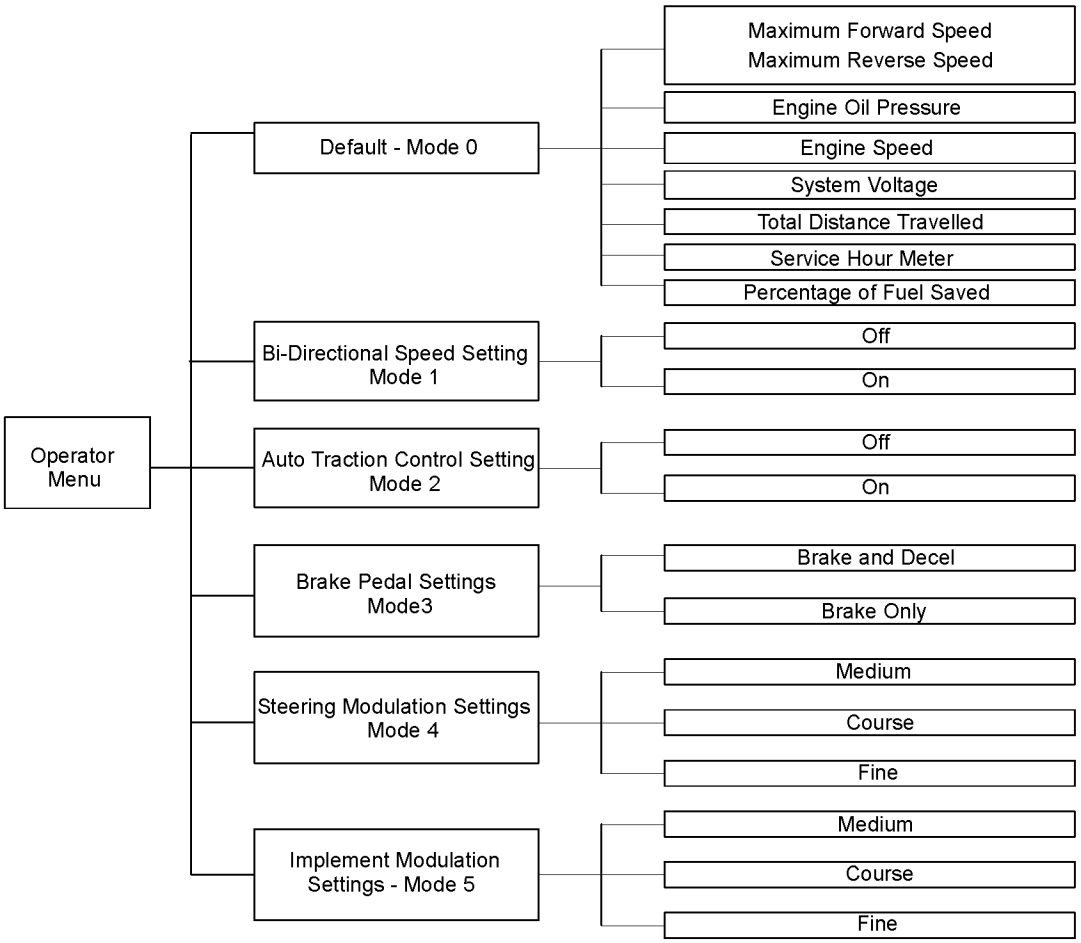

Illustration 125 g02725618

Operator menu

The Operator Menu allows the user to adjust parameters for the following modes:

- Default mode (mode 0)
- Bidirectional speed (mode 1)
- Auto traction control (mode 2)
- Brake/decel pedal (mode 3)
- Steering modulation (mode 4)
- Implement modulation (mode 5)

To move between the different modes, press and release mode button (17). To scroll through the associated parameters press and release scroll button (18), until the desired category is highlighted.

Default (Mode 0)

The Default mode allows the operator to access pertinent information about the machine systems.

- “Maximum forward speed”
- “Maximum reverse speed”
- “Engine oil pressure”
- “Engine speed”
- “System voltage”
- “Total distance traveled”
- “Service hour meter”
- “Percentage of fuel saved”

i07742538

Product Link

SMCS Code: 7606

Note: Your machine may be equipped with the Cat ® Product Link™ system.

The Cat Product Link communication device utilizes cellular and/or satellite technology to communicate equipment information. This information is communicated to Caterpillar, Cat dealers, and Caterpillar customers. The Cat Product Link communication device uses Global Positioning System (GPS) satellite receivers.

The capability of two-way communication between the equipment and a remote user is available with the Cat Product Link communication device. The remote user can be a dealer or a customer.

Data Broadcasts

Data concerning this machine, the condition of the machine, and the operation of the machine is being transmitted by Cat Product Link to Caterpillar and/or Cat dealers. The data is used to serve the customer better and to improve upon Cat 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 Cat 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 Cat 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 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 for Product Link Radios

⚠ WARNING

This equipment is equipped with a Cat® Product Link communication device. When electric detonators are being used for blasting operations, radio frequency devices can cause interference with electric detonators for blasting operations which can result in serious injury or death. The Product Link communication device should be deactivated within the distance mandated under all applicable national or local regulatory requirements. In the absence of any regulatory requirements Caterpillar recommends the end user perform their own risk assessment to determine safe operating distance.

Refer to your products Operation and Maintenance Manual Supplement, “Regulatory Compliance Information” for more information.

For information regarding the methods to disable the Cat Product Link communication device, please refer to your specific Cat Product Link manual listed below:

- Operation and Maintenance Manual, SEBU8142, “ Product Link - PL121, PL321, PL522, and PL523”
- Operation and Maintenance Manual, SEBU8832, “ Product Link PLE702, PLE602, PLE601, PL641, PL631, PL542, PL240, PL241, PL141, PL131, PL161, and PL042 Systems”

Note: If no radio disable switch is installed and the equipment will be operating near a blast zone, a Product Link radio disable switch may be installed on the equipment. The switch will allow the Cat Product Link communication device to be shut off by the operator from the equipment control panel. For more details and installation procedures, refer to the following:

- Special Instruction, REHS7339, “Installation Procedure for Product Link PLE640 Systems”
- Special Instruction, REHS8850, “Installation Procedure for the Elite Product Link PLE601, PLE641, and PLE631 Systems”
- Special Instruction, SEHS0377, “Installation Procedure for the Product Link PL131, PL141, and PL161 Systems”

- Special Instruction, REHS9111, “Installation Procedure for the Pro Product Link PL641 and PL631 Systems”

i04305089

Operation Information

SMCS Code: 7000

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

Reduce machine speed when you maneuver in tight quarters or when you are going over a hill.

Select the necessary travel speed before you start downhill.

When you go downhill, use the same speed that would be used to go uphill.

Use the decelerator/brake pedal on a downgrade in order to maintain a safe operating mode. Use the following controls in order to slow down the travel speed of the machine: decelerator/brake pedal and thumb wheel.

When the load will be pushing the machine, turn the speed selector to LOW speed before you start downhill.

1. Adjust the operator seat.

2. Fasten the seat belt.

3. Raise all lowered attachments in order to negotiate any obstacles.

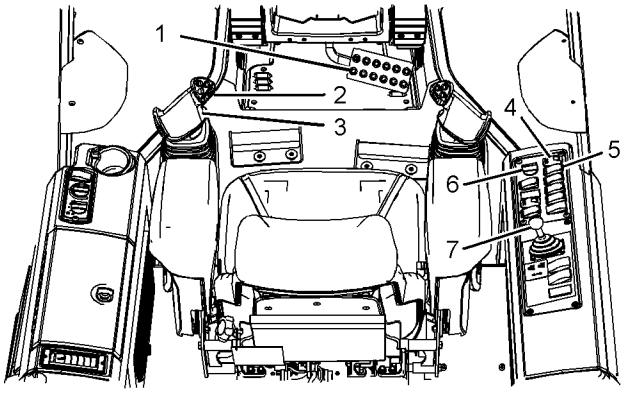

Illustration 126 g02468719

(1) Decelerator/brake pedal
(2) Thumb wheel
(3) Steering and transmission control (lever)
(4) Parking brake switch
(5) Hydraulic lockout switch
(6) Engine throttle control
(7) Winch control lever or ripper control lever (if equipped)

4. Push down on pedal (1) in order to prevent the machine from moving.

5. Disengage parking brake switch (4) and hydraulic lockout switch (5).

6. Rotate engine throttle control (6) in order to set the desired engine speed.

Note: Decelerator/brake pedal (1) can be depressed in order to reduce travel speed temporarily. Also, thumb wheel (2) may be used to reduce travel speed.

7. Move steering and transmission control lever (3) for the desired direction.

8. Release pedal (1).

9. Roll thumb wheel (2) for the ground speed control in order to set the desired ground speed. The thumb wheel for the ground speed control is located on lever (3).

10. Drive the machine forward for best visibility and for best control.

Hydrostatic Drive Operating Principle

This machine has a hydrostatic drive system which transfers power from the engine to the tracks. The hydrostatic drive system eliminates the conventional type of transmission. The hydrostatic drive system does not use a bevel gear and a driveline. The hydrostatic drive system also eliminates the steering clutch and brake arrangement.

In the simplest form, a hydrostatic drive system is a system which contains the following components: a hydraulic pump with a control system, a hydraulic motor and high-pressure lines that carry oil between the components. The pump converts mechanical power to hydraulic power in the form of oil flow and oil pressure.

To meet requirements, the machine must be able to move forward and rearward. The machine must also be able to turn. The pumps are designed to deliver varying flows of oil to either the forward side or the reverse side of the hydraulic motors.

The track can be driven at varying speeds in either a forward direction or in a reverse direction.

Since there are two tracks, there are two hydraulic pumps, two sets of hydraulic lines, and two hydraulic motors.

For the forward modes or the reverse modes, the pumps and the motors work with each other. The pumps can produce flow to either the forward side of the motors or to the reverse side of the motors. The pumps can vary the amount of flow in either direction in order to produce infinitely variable speed capabilities. To turn the machine, each pump reduces flow independently. This action allows one track to be driven at a slower speed in order to cause the machine to turn.

Slowing or stopping the machine is done by reducing the flow of oil to the drive motors or stopping oil to the drive motors. Braking of the machine is caused by hydrostatic braking of the tracks.

The parking brakes are engaged while the brake pedal (1) is fully depressed. The parking brakes are engaged in the following conditions: parking brake switch ON , the transmission control NEUTRAL and the engine OFF.

The parking brakes are attached to the final drives. The parking brake is spring-applied and oil pressure released. The engine must be running in order to release the parking brakes.

The parking brakes disengage when switch (4) is moved from ENGAGED position. The parking brakes also disengage when brake pedal (1) is released.

General Operational Safety Tips

The seat belt must be fastened at all times.

For a prompt stop, quickly depress decelerator/brake pedal (1) or quickly move lever (3) to the NEUTRAL position. Either movement causes an immediate stop.

For all forward turns that are on level ground or on side hill operations, move lever (3) forward. Then, move lever (3) toward the RIGHT position for right turns. Move lever (3) toward the LEFT position for left turns.

Changing the direction of the machine is performed by first moving lever (3) to the NEUTRAL position.

For all reverse turns that are on level ground or on side hill operations, move lever (3) in the reverse direction. Then, move lever (3) toward the RIGHT position for right turns. Move lever (3) toward the LEFT position for left turns.

The brakes are applied in any of the following conditions.

- Pedal (1) is fully depressed.
- Steering and transmission control (3) is in NEUTRAL.
- Parking brake switch (4) is in the ENGAGED position.
- The engine is OFF.

Operating Principle for the Winch

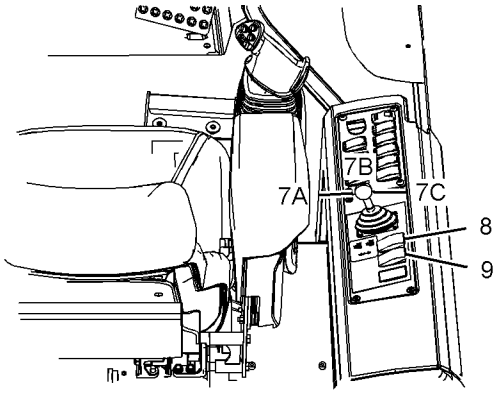

Illustration 127 g02468817

(7) Winch control lever
(7A) Reel-In
(7B) Winch brake ON
(7C) Reel-Out
(8) Winch freespool switch
(9) WINCH DRIVE AWAY SWITCH

The winch for this Caterpillar machine is a hydraulically driven winch that utilizes a dedicated piston pump for power input. The winch includes both planetary gears and standard spur gears. The winch brake is applied by spring pressure. This action will secure the load while control lever (7) is in the HOLD position. The winch brake is released hydraulically. The winch case is designed to bolt directly to the rear of the machine.

When the winch is operated in either the REEL IN or the REEL OUT direction, a hydraulic motor drives the gear train. The control lever supplies oil to the winch motor by the hydrostatic control system. The control lever for the winch is a proportionate control. The amount of hydraulic oil that will be sent to the winch motor will increase as lever (7) is moved. The speed of the winch cable increases as the amount of hydraulic oil to the winch motor increases. The winch brake will be released by pilot pressure when lever (7) is moved into either the REEL IN or the REEL OUT directions.

The mechanism for the free spool for the winch is a splined gear. The mechanism for the free spool is spring-engaged and hydraulically released. Press the FREESPOOL switch once in order to activate the freespool function. Then, hydraulic oil is ported through the logic valve for the winch. The hydraulic oil flows from the logic valve for the winch into a cylinder for the freespool mechanism. This action will force the piston for the freespool mechanism against the coil spring and will disengage the splined connection. This action allows the winch cable to be pulled off the winch drum by hand.

The DRIVE AWAY function allows the operator to drive the tractor away from a load while the winch cable is attached to the load. When winch driveaway switch (9) is turned on, a spool shifts in the winch drive away valve in order to open an oil flow passage in the motor drive from one port to another port. Then, the throttle spool inside the valve controls the rate of oil through the valve. This action prevents the drive motor from spinning too fast and provides a controlled release of the winch cable. This operation will also provide a maximum ground speed for the tractor of approximately 3.2 km/h (2 mph).

An optional assembly of three fairlead rollers or four fairlead rollers is available. The optional fairlead assemblies would be used when slight side directional pulls are routinely encountered. The use of the optional fairlead assemblies will help maximize the life of the winch case and the winch cable by eliminating wear.

Warm-Up Procedure for the Winch

Note: Warm up the winch at each start-up.

1. Warm up the hydraulic system for the machine. For more information, refer to Operation and Maintenance Manual, “Engine and Machine Warm-Up”.
2. Use the reel-in and reel-out function to operate the winch. This operation will allow the hydraulic oil to circulate throughout the winch.

Note: The winch should be operated under a no-load condition during warm-up.

⚠ WARNING

The warm-up procedure is recommended at each start-up and is mandatory when temperatures are below 4 °C (40 °F).

Using the Winch

Attaching the Winch Cable

⚠ WARNING

Personal injury or death can result from unexpected movement of objects. Be sure all persons are clear of cable and objects before a machine is winched or moved. A safe distance of at least one and a half times the working length of the cable should be maintained. The tail end of a moving object can throw debris at bystanders.

A minimum of five complete wraps of cable must be maintained on the winch drum. Do not handle a load with a winch drum that has less than five wraps.

⚠ WARNING

Do not operate the winch under loads that exceed the maximum rated bare drum line pull. If excessive loads are encountered, use a multi-part line and sheave blocks. Any attempt to exceed the capacity of one winch is extremely hazardous. Never try to couple two or more tractors together.

NOTICE
If at all possible, always line up the rear end of the machine with the load, so that the load can be winched in a straight path. This avoids unnecessary strain and wear on the side rollers. It also helps to wind the cable onto the winch drum in level layers.

NOTICE
The winches described in this manual are neither designed nor intended for use or application used in the lifting or moving of persons.

1. If you are working on a hill, maneuver the machine above the load and align the rear of the machine with the object.
2. If you are working on a level surface, align the rear of the machine with the object.

⚠ WARNING

Wear leather gloves when handling the winch cable.

NOTICE
When winding the winch cable on the drum, never attempt to maintain tension by allowing the winch cable to slip through the hands. Always use hand-over-hand technique, being very carefull to keep hands and clothing away from the winch drum and rollers.

3. Press switch (8) one time into the FREESPOOL position. Pull out the cable and attach the cable to the load.

Note: Never operate the winch when there is less than five wraps of the winch cable around the load drum. Use red paint in order to paint the last five complete wraps of the winch cable for a visual warning.

Note: Make sure that there is enough clearance between the object and the machine so that the machine can turn.

Note: Make sure that the ground is stable before winching in a load.

4. To tighten the main cable, make sure that the drum is not rotating. Press switch (8) one time in order to turn off the FREESPOOL mode. This action allows REEL IN position (7A) to operate.

Note: Avoid sudden shock of a load or jerking of a load. This type of operation may cause heavy loads in excess of the rated capacity, which may result in failure of the cable or the winch.

Unhooking the Winch Cable

⚠ WARNING

Personal injury or death can result from persons too close to the machine.

When reeling in the cable, make sure that all persons are clear from rolling objects or cable whiplash.

1. Move the lever to REEL OUT position (7C). Reel out the winch cable in order to release tension.

2. Press switch (8) one time away from the operator into the FREESPOOL position. With switch (8) in the FREESPOOL position, pull out enough cable in order to unfasten the cables or the chokers.

3. Move the lever to REEL IN position (7A). Slowly reel in the cable until the cable is wound 100 percent.

i04308464

Prestart Checks

SMCS Code: 7000

Before the start of each operational shift, or every 10 hours of operation, perform the checks and tests. The checks and tests are in the Maintenance Interval Schedule.

- Test the backup alarm.
- Test the brakes.
- Check the indicators and gauges.
- Inspect the cab filter (fresh air).
- Check the cooling system level.
- Check the engine oil level.
- Drain the water separator at the fuel filter.
- Drain the water and sediment from the fuel tank.
- Check the hydraulic system oil level.
- Inspect the seat belt.
- Perform the "Daily Inspection".

Engine Starting

i04307304

Engine Starting

SMCS Code: 1000; 7000

1. Turn the battery disconnect switch to the ON position.

2. Move the implement controls to the HOLD position.

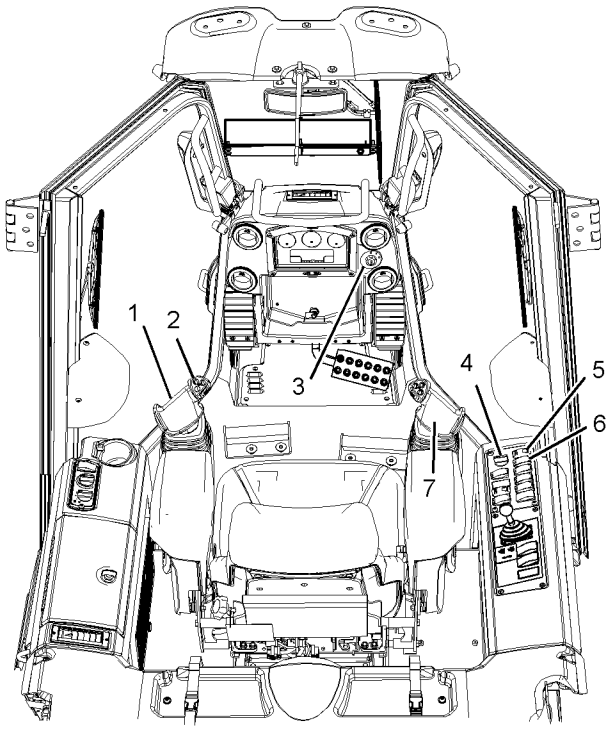

Illustration 128 g02470159

(1) Steering and transmission control (lever)
(2) Forward horn
(3) Engine start switch
(4) Engine throttle control (knob)
(5) Parking brake switch
(6) Hydraulic lockout
(7) Implement control lever

3. Move steering and transmission control lever (1) into the NEUTRAL position.

Five conditions must be satisfied in order to start the engine.

- The operator must be seated in the seat.
- Parking brake (5) must be engaged. This engagement has occurred when the key switch is turned OFF.
- Hydraulic lockout (6) of the implements must be engaged. This engagement has occurred when the key switch is turned OFF
- Steering and transmission control (1) must be in NEUTRAL.
- Implement control lever (7) must be in the HOLD position.

4. 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 forward horn (2) before you start the engine.

5. Put engine throttle control (4) at the low idle position to start the engine.

Note: If the machine is cold, wait until the glow plug indicator light turns off. Then, turn on the engine start switch.

6. Turn engine start switch (3) to the START position.

NOTICE
Do not crank the engine for more than 30 seconds. Allow the starter to cool for 2 minutes before cranking again. Turbocharger damage may result if the engine rpm is not kept low until the oil pressure is sufficient.

7. Release the engine start switch key after the engine starts.

8. Allow the engine to warm up at LOW IDLE. Refer to Operation and Maintenance Manual, “Engine and Machine Warm-up”.

Starting Aid (If Equipped)

Ether starting aid system is completely automatic. The system injects a premeasured amount of ether into the engine air intake when the engine is cranking.

If the temperature is below −18° C (−0° F), the following procedures are recommended to aid starting.

- Change the engine oil as stated in Operation and Maintenance Manual
- Change the hydraulic oil as stated in Operation and Maintenance Manual
- Install an ether stating aid
- Install an engine breather canister heater

If temperature is below −25° C (−13° F), the following procedure is recommended to aid starting.

- Install an engine jacket water heater.

1. Perform Step 1 through Step 5 of the Engine Starting procedure.

2. Turn start switch key (3) to the START position. Crank the engine.

NOTICE
Do not crank the engine for more than 30 seconds. Allow the starter to cool for 2 minutes before cranking again. Turbocharger damage may result if the engine rpm is not kept low until the oil pressure is sufficient.

3. Release start switch key (3) when the engine starts.

Reference: At temperatures below −25° C (−13.0° F), consult your Cat dealer for additional information or refer to Special Publication, SEBU5898, “Cold Weather Recommendations for all Caterpillar Machines”.

i02801522

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

NOTICE
Keep the engine speed slow until the indicator light for the engine oil pressure goes out.

If the light does not go out within ten seconds, stop the engine and investigate the cause before starting the engine again. Failure to correct the problem can cause engine damage.

1. Allow the engine to warm up at low idle.

2. Look at the indicators and the gauges frequently during operation.

Note: During extreme cold conditions, the alert indicator for the hydraulic oil filter bypass may come on. As the hydraulic oil warms up, the alert indicator should go out.

Also, in order to help the hydraulic oil to warm up, hold the bulldozer blade control lever in the LIFT position for periods of ten seconds or less. This will allow the hydraulic oil to reach relief pressure, which causes the hydraulic oil to warm up more rapidly.

Cycle all controls in order to allow warm hydraulic oil to circulate through all hydraulic cylinders and through all hydraulic lines.

When you idle the machine for warm-up, 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 15 minutes.
- If the temperature is less than − 18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.

Adjustments

i04659631

Bulldozer Blade Pitch

SMCS Code: 6060; 7000

The standard position for the cutting edge angle is 56 degrees. This position provides optimum performance under normal conditions.

Tip the blade forward in order to obtain a cutting edge angle up to 60 degrees. Pitching the blade forward provides improved penetration in hard materials.

Tip the blade rearward in order to obtain a cutting edge angle up to 52 degrees. Pitching the blade rearward provides a better carrying capability of soft material.

Manual Adjustment of Bulldozer Blade Pitch

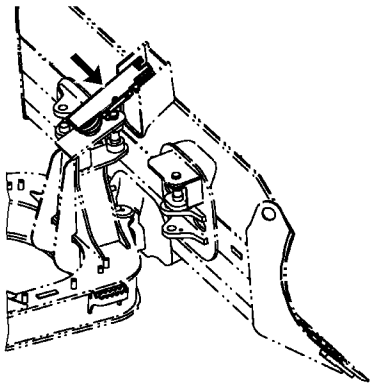

Illustration 129 g01258184

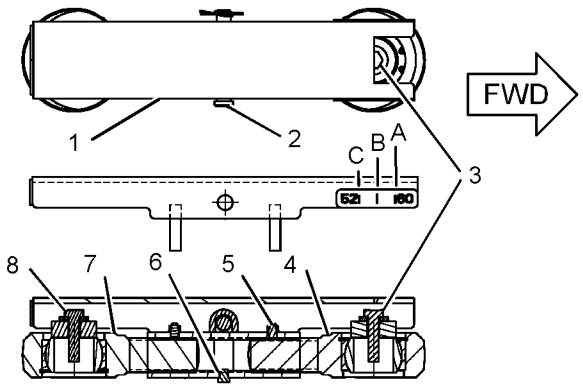

Illustration 130 g01258266

The bulldozer blade can be placed in several pitch positions such as the following pitches: the extended position (A), the middle position (B) and the retracted position (C).

1. Lower the bulldozer blade to the ground. Place the control for the lift cylinder in the FLOAT position.

2. Actuate the tilt cylinder in order to remove all force from the tilt brace. Boss (5) must be loose and able to move freely. Stop the engine.

3. Remove pin (2) and cover (1), if necessary.

NOTICE
Keep fingers clear. Do not place your fingers into the pin holes in the tilt brace and/or push arm bracket at any time during the adjustment procedure.

4. Install the slotted end of cover (1) onto boss (5).

5. Turn the top link until the desired cutting angle is set.

6. Install the cover (1) and replace locking pin (2).

Note: If the cover plate does not cover both mounting bolt (3) and retainer bolt (8), then the top link is incorrectly adjusted.

Power Adjustment of Bulldozer Blade Pitch

The bulldozer blade can be moved into the following pitch positions with implement control lever (9), if equipped: the extended position (D) and the retracted position (E).

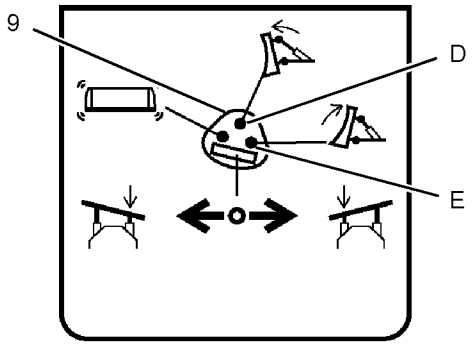

Illustration 131 g02470778

1. Press button (D) to pitch the blade forward to the extended position.

2. Press button (E) to pitch the blade rearward to the retracted position.

i06173975

Ripper Tip and Shank Protector

SMCS Code: 6808; 6810; 6812

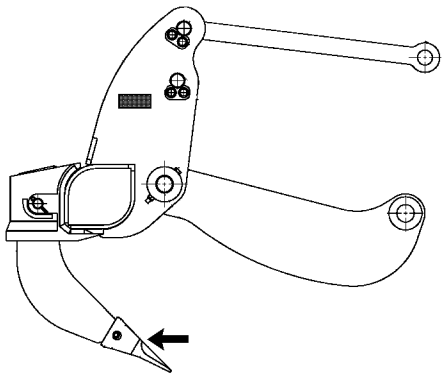

Illustration 132 g01258327

Replace the ripper tip before wear occurs on the shank. Follow the replacement procedures in the Operation and Maintenance Manual, “Ripper - Inspect/Replace”.

i04309453

Cutting Edges and End Bits

SMCS Code: 6801; 6804

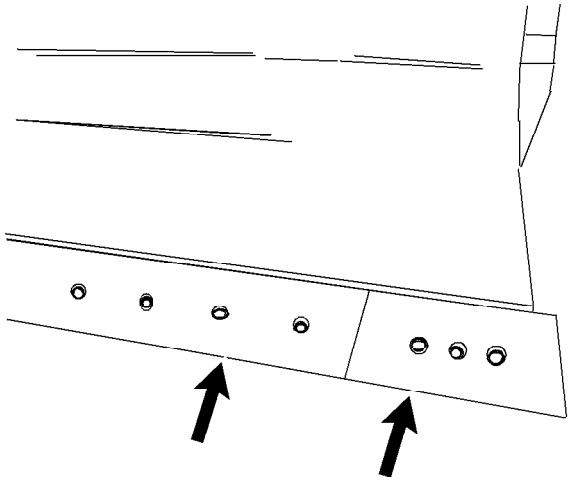

Illustration 133 g01097854

Replace the cutting edges or reverse the cutting edges. Replace the end bits. These processes must be performed before wear occurs on the blade base. For the replacement procedures, see the Operation and Maintenance Manual, “Cutting Edges and End Bits - Inspect/Replace”.

Note: Make sure to replace or flip the cutting edges to prevent damage to the blade base plate. Preventing damage to the base blade is of utmost importance.

Parking

i04309547

Stopping the Machine

SMCS Code: 7000

NOTICE
Park on a level surface. If it is necessary to park on a grade, chock the tracks securely.

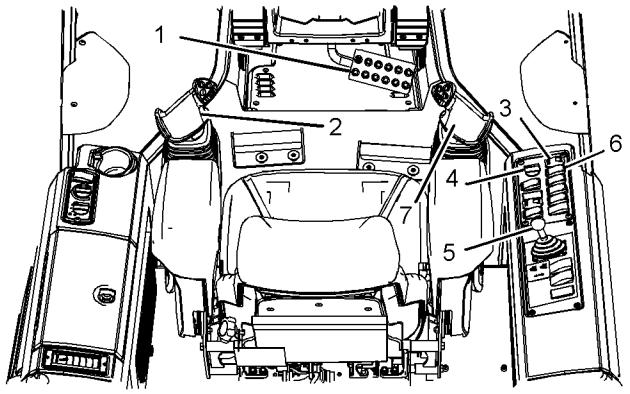

Illustration 134 g02471301

1. Move steering and transmission control lever (2) to the NEUTRAL position in order to stop the machine.

2. Apply decel/brake pedal (1) in order to hold the machine in position.

3. Turn the engine throttle control (knob) (4) to the LOW IDLE position.

4. Press parking brake switch (3) to engage the parking brake.

5. Release pedal (1).

6. Use lever (5) and implement control lever (7) to lower all attachments to the ground or HOLD position and apply slight downward pressure.

7. Move all attachment controls to the NEUTRAL position. Engage hydraulic lockout (6).

i04309748

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 procedure, to allow the engine to cool, and to prevent excessive temperatures in the turbocharger housing (if equipped), which could cause oil coking problems.

1. Operate the engine for 5 minutes at low idle with no load.

This operation allows hot areas in the engine to cool gradually and will extend the engine life.

2. Move all control levers into the HOLD position.

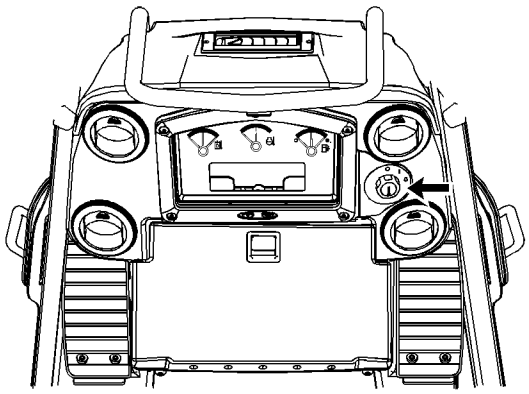

Illustration 135 g02471438

3. Turn the engine start switch key to the OFF position in order to stop the engine.

Note: Turn the battery disconnect switch to the OFF position and remove the key when the machine is left for an extended period.

i04310095

Stopping the Engine if an Electrical Malfunction Occurs

SMCS Code: 1000; 7000

Engine Start Switch Key ON or OFF

Emergency Engine Shutdown

Engine Start Switch Key ON or OFF

1. Apply the parking brake.

2. Lower the dozer blade or the ripper, if necessary.

3. Dismount the machine.

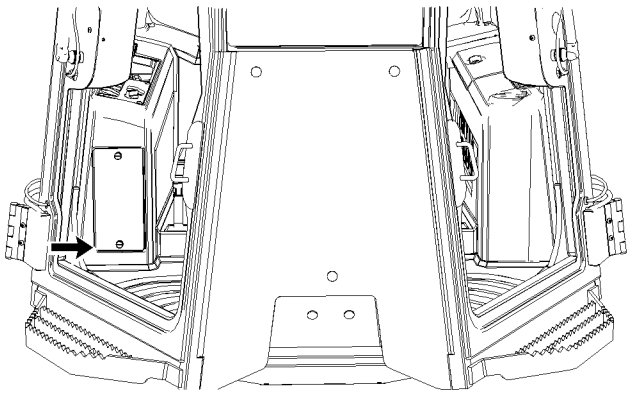

Illustration 136 g01259901

4. Open the panel door for the fuse panel.

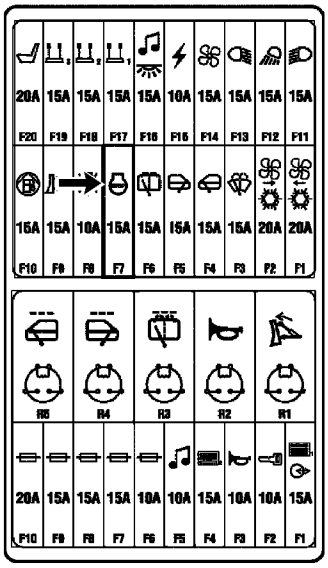

Illustration 137 g02788924

5. Use the fuse puller that is located behind the panel door (not shown). Pull the 15 Amp fuse for the Engine Stop from the fuse panel.

6. Turn off the battery disconnect switch inside the rear access door on the right side of the machine,

Note: Do not operate the machine again until the malfunction has been corrected.

i04360096

Equipment Lowering with Engine Stopped (Electrohydraulic Implement Valve)

SMCS Code: 7000

Dead Engine Lower

Actuator Spools

Relieve the pressure in the hydraulic tank.

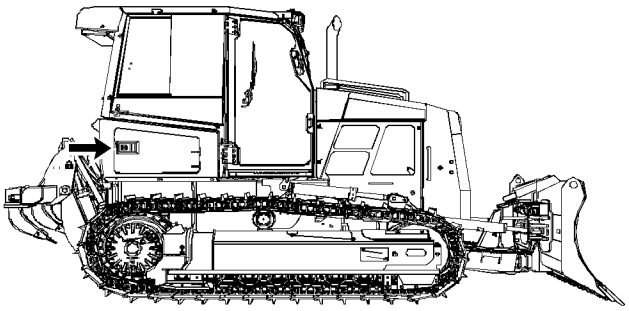

Illustration 138 g02513456

There is an access door for the dozer/ripper valves on the right side of the machine. Open the access door.

This procedure requires two people. One person must operate the control valves and the other person remains at the dozer blade. Care must be taken when you perform this procedure. The person at the dozer blade must make sure that the area is clear.

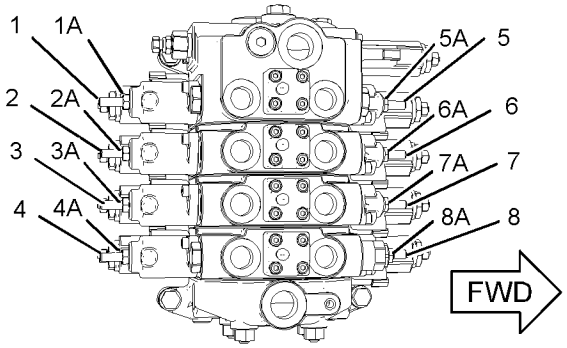

Illustration 139 g01400073

Top view

(1) Adjustment screw to lift control valve
(2) Adjustment screw to angle control valve
(3) Adjustment screw to tilt control valve
(4) Adjustment screw to ripper control valve
(5) Adjustment screw to lift control valve
(6) Adjustment screw to angle control valve
(7) Adjustment screw to tilt control valve
(8) Adjustment screw to ripper control valve

1. Loosen locknut (1A) and turn adjustment screw (1) inward.

Note: After completing the dead engine lower for each function, back out the adjustment screw fully. Then, tighten the locknut.

Note: Before you screw in all dead engine lower screws, clean all the dirt and paint from the adjustment screw.

Note: Perform steps 2 through 4 in order to change the angle or lower the equipment.

2. Loosen locknut (2A) and turn adjustment screw (2) inward. This action relieves head pressure to the right angle cylinder and rod pressure to the left angle cylinder. This angles the dozer blade to the right.

3. Loosen locknut (3A) and turn adjustment screw (3) inward. This action relieves head pressure to the tilt angle cylinder. This procedure tilts the dozer blade to the right.

4. Loosen locknut (4A) and turn adjustment screw (4) inward. This action relieves rod pressure from the ripper cylinder to the tank. This procedure raises the ripper.

5. Loosen locknut (5A) and turn adjustment screw (5) inward. This action relieves rod pressure from the lift cylinder to the tank. This procedure lowers the dozer blade.

6. Loosen locknut (6A) and turn adjustment screw (6) inward. This action relieves rod pressure to the right angle cylinder and head pressure from the left angle cylinder to the tank. This angles the dozer blade left.

7. Loosen locknut (7A) and turn adjustment screw (7) inward. This action relieves the rod pressure from the tilt cylinder to the tank. This procedure tilts the dozer blade left.

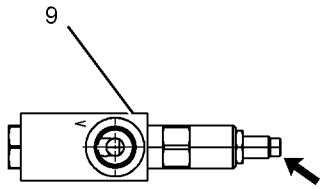

Illustration 140 g01700573

Anti-drift valve

8. Before releasing pressure on the fourth valve (8, 8A), completely back off adjustment screw on anti-drift valve (9). This action will make sure that the pressure is fully released.

a. Mark the location of the adjuster valve. Then, back off the adjustment screw completely.

9. Loosen locknut (8A) and turn adjustment screw (8) inward. This action relieves the head pressure from the ripper cylinder to the tank. This procedure lowers the ripper.

Close the access door. Close the hydraulic oil tank cap.

Note: After completing the work for the dead engine lower, cycle each section of the implement valve 10 times in order to remove any air from the valve sections.

i04360009

Leaving the Machine

SMCS Code: 7000

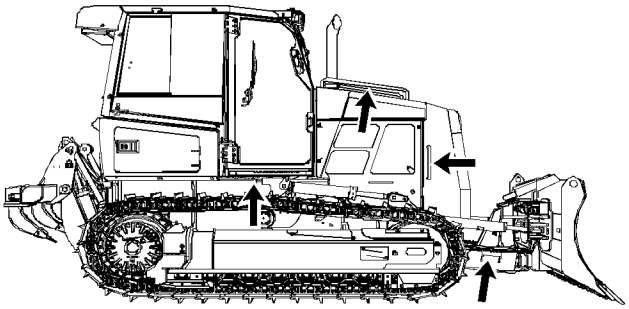

Illustration 141 g02513396

1. Use the steps and the handholds when you get off the machine. Face the machine and use both hands. Make sure that the steps are clear of debris before you dismount.

Note: Do not use the angle cylinders as a step.

2. Inspect the engine compartment for debris. Clean out any debris and any paper in order to avoid a fire.

3. Turn the key for the battery disconnect switch to the OFF position. This action will help to prevent a battery short circuit and the current draw that is made by certain components. When the machine is not operated for an extended period, remove the key from the battery disconnect switch. Removing the key will help to protect the machine from vandalism.

4. Install all vandalism protection locks and vandalism covers. Lock the doors.

Transportation Information

i04315150

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 clearance is especially true for machines that are equipped with a cab, or a canopy.

Remove ice, snow, or other slippery material from the loading dock and from the truck bed before loading. Removing ice, snow, or other slippery material will prevent the machine from slipping as you load the machine. Removing ice, snow, or other slippery material will 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.

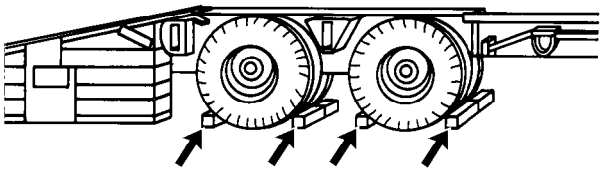

Illustration 142 g00040011

1. Place blocks under the trailer wheels or under the rail car wheels before loading, as shown.

2. Lower all attachments to the floor of the transport machine. Move the transmission control lever to the NEUTRAL position.

3. Engage the parking brake switch.

4. Stop the engine.

5. Turn the start switch key to the OFF position. Lock the parking brake switch. Remove the key.

6. Turn the battery disconnect switch to the OFF position. Remove the key.

7. Lock the door and lock the access covers. Attach any vandalism protection.

8. Install the tie-downs at several locations and block the tracks in the front and in the rear.

Consult your Caterpillar dealer for shipping instructions for your machine.

Calculating the Mass of the Machine

Use the following table to calculate the mass of your Caterpillar machine. Start with the mass of the machine that is in the first row. Add the additional weight of the various attachments and work tools that are consistent with your machine.

Table 8

D3K, D4K, and D5K Track-Type Loaders						
The machine is operated with the dozer blade, the ROPS canopy, the backup alarm, the operator (75 kg (165 lb)), coolant, lubricants, and the full fuel tank. (1)	D3K XL 7958 kg (17544 lb)	D3K LGP 8403 kg (18525 lb)	D4K XL 8201 kg (18080 lb)	D4K LGP 8510 kg (18761 lb)	D5K XL 9314 kg (20534 lb)	D5K LGP 9646 kg (21266 lb)
Pump Aux Drive 14 kg (31 lb)	+	+	+	+	+ 5 kg (11 lb)	+ 5 kg (11 lb)
Winch 88 kg (194 lb)	+	+	+	+	+ 80 kg (176 lb)	+ 80 kg (176 lb)
4 Valve 18 kg (40 lb)	+	+	+	+	+	+
4 Valve for Winch 11 kg (25 lb)	+	+	+	+	+	+
Drawbar 8 kg (18 lb)	+	+	+	+	+	+
Ripper Ar 111 kg (245 lb)	+	+	+	+	+	+
Winch Mounting Plate 612 kg (1349 lb)	+	+	+	+	+	
EROPS 217 kg(479 lb)	+	+	+	+	+	+
EROPS with Poly Glass 217 kg(479 lb)	+	+	+	+	+	+
6 Lights 1 kg (2 lb)	+	+	+	+	+	+
Sound Suppressed NACD 8 kg (18 lb)	+	+	+	+	+	+
Sound Suppressed EU 8 kg (18 lb)	+	+	+	+	+	+
Undercarriage Ar (SystemOne)	-5 kg (11 lb)	-5 kg (11 lb)	+6 kg (13 lb)	+6 kg (13 lb)	+42 kg (92 lb)	+42 kg (92 lb)
Track Ar SystemOne	+64 kg (141 lb)	-6 kg (13 lb)	+27 kg (60 lb)	-6 kg (13 lb)	-42 kg (92 lb)	-54 kg (119 lb)
Radiator Guard (HD) 46 kg (101 lb)	+	+	+	+	+	+
Rear guard 115 kg (254 lb)	+	+	+	+	+	+
Front Counterweight 286 kg (631 lb)	+	+	+	+	+	+
Power Pitch 24 kg (53 lb)	+	+	+	+	+	+
Accugrade Grade Control 13 kg (29 lb)	+	+	+	+	+	+

(continued)

(Table 8, contd)

Power Pitch and Grade Control 38 kg (83 lb)	+	+	+	+	+	+
Front Sweeps 56 kg (123 lb)	+	+	+	+	+	+
Rear Sweeps 134 kg (296 lb)	+	+	+	+	+	+
OPROPS Front Screens 78 kg (172 lb)	+	+	+	+	+	+
OROPS/EROPS Side Screens 55 kg (121 lb)	+	+	+	+	+	+
EROPS Rear Screen 39 kg (86 lb)	+	+	+	+	+	+
OROPS Rear Screen 43 kg (95 lb)	+	+	+	+	+	+
Full Length Guards SystemOne	+82 kg (181 lb)	+82 kg (181 lb)	+83 kg (183 lb)	+83 kg (183 lb)	+95 kg (209 lb)	+95 kg (209 lb)
Full Length Guards SALT	+82 kg (181 lb)	+82 kg (181 lb)	+86 kg (190 lb)	+86 kg (190 lb)	+113kg (249 lb)	+113kg (249 lb)
Center Guides SystemOne	+28 kg (62 lb)	+28 kg (62 lb)	+26 kg (57 lb)	+26 kg (57lb)	+31 kg (68 lb)	+31 kg (68 lb)
Center Guides SALT	+27 kg (60 lb)	+27 kg (60 lb)	+26 kg (57 lb)	+26 kg (57lb)	+32 kg (70 lb)	+32 kg (70 lb)
Jacket Water Heater 1 kg (2 lb)	+	+	+	+	+	+
Starting Aid - Ether 2 kg (5 lb)	+	+	+	+	+	+
Machine Security System 0.2 kg (0.5 lb)	+	+	+	+	+	+
Product Link PL321SR (World View) 13 kg (29 lb)	+	+	+	+	+	+
Product Link PL121SR (World View) 7 kg (15 lb)	+	+	+	+	+	+
Other Approved Attachments or Work tools	+	+	+	+	+	+
The Total Mass of the Machine without the operator	=	=	=	=	=	=

(1) The weights that are given herein describe the machine as the machine is manufactured by Caterpillar Inc.

i05056331

Lifting and Tying Down the Machine

SMCS Code: 7000; 7500

⚠ WARNING

Improper lifting and improper tie-downs can allow the load to shift or fail and cause injury or damage. Use only properly rated cables and slings with lift and tie down points provided.

Follow the instructions in Operation and Maintenance Manual, "Lifting and Tying Down the Machine" for the proper technique for securing the machine. Refer to Operation and Maintenance Manual, "Specifications" for specific weight information.

NOTICE
Improper lifting and improper tie-downs can allow the load to shift and cause injury or damage.

The weight and the instructions that are given herein describe the machine as the machine is manufactured by Caterpillar.

Refer to the Operation and Maintenance Manual, "Specifications" for specific weight information.

1. Engage the parking brake.

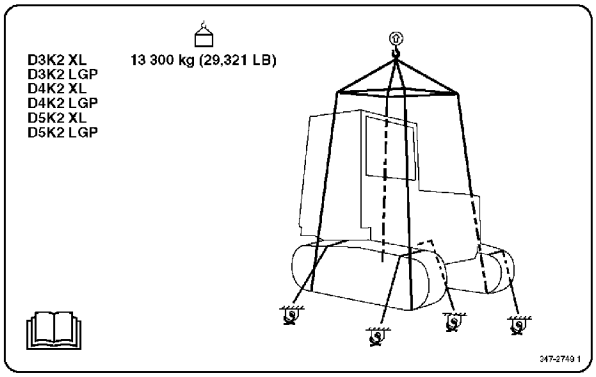

Illustration 143 g02786285

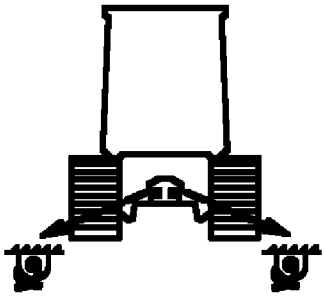

Illustration 144 g01355314
Rear view

2. Use proper rated cables and slings for lifting. The crane should be positioned so that the machine is lifted parallel to the ground. Position the slings beneath the front of the track and beneath the rear of the track.

3. On sharp corners, use corner protectors.

4. To prevent contact with the machine, lifting cables should have sufficient length.

5. The width of the spreader bar and the strength of the spreader bar should be sufficient to prevent contact with the machine.

When the wire cables are lifted, the wire cables should slide to front track rollers and to the rear track rollers.

Tie-Down Points For Fire Plow Machines (If Equipped)

When a machine with attachments for the fire plow is tied down, the four external tie-down points must be used.

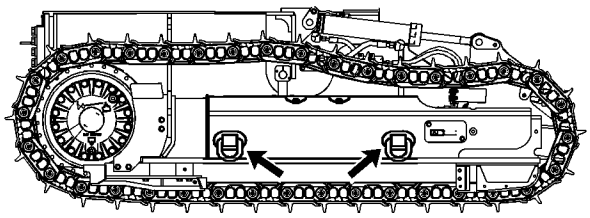

Illustration 145 g01627047

Right track roller frame

Some components are removed for clarity.

1. Use properly rated cables in order to tie down the machine that is a fire plow.

2. Use the additional two tie-down points on each track roller frame in order to stabilize the machine.

Note: Do not attempt to lift the machine from the tie-down points.

Towing Information

i06057815

Towing the Machine

SMCS Code: 7000

⚠ WARNING

Personal injury or death could result when towing a disabled machine incorrectly.

Block the machine to prevent movement before final drives are disengaged. The machine can roll free if it is not blocked. With final drives disengaged, the machine cannot be stopped or steered.

Follow the recommendations below, to properly perform the towing procedure.

Relieve the hydraulic tank and line pressure before any disassembly.

Even after the machine has been turned off, the hydraulic oil can still be hot enough to burn. Allow the hydraulic oil to cool before draining.

NOTICE
To tow the machine, both final drives must be disengaged. Otherwise, damage could result.

This machine is equipped with spring-applied brakes. These brakes are also oil pressure released brakes. If the engine or the system for pressure oil is inoperable, the brakes are applied and the machine cannot be moved.

Note: Do not tow the machine with the sun gears in place. Remove the sun gear from each final drive.

Reference: See the publication Power Train Disassembly and Assembly in the machine Service Manual for the procedure. Consult your Cat Dealer for the proper procedure in order to remove the sun gear, if necessary.

These towing instructions are for moving a disabled machine for a short distance at low speed. 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.

Shields must be provided on both machines. This action will protect the operator if the tow line or the tow bar breaks.

Do not allow any person on the disabled machine except the operator. Only allow the operator on the disabled machine if the operator can control the steering and/or braking.

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 percent of the gross weight of the towing machine. This requirement is for a disabled machine that is stuck in the mud and for towing on a grade.

Attach the cable to the towing eye on the front of the machine if you are towing the machine forward. Attach the cable to the drawbar pin on the rear of the machine if you are towing the machine backward.

Do not use a chain for pulling a disabled machine. A chain link can break. This action may cause personal injury. Use a wire cable with ends that have loops or rings. Put an observer in a safe position in order to watch the pulling procedure. The observer can stop the procedure if the wire cable starts to break. Stop pulling whenever the towing machine moves without moving the towed machine.

Keep the tow line angle to a minimum. Do not exceed a 15 degree angle from the straight ahead position.

Quick machine movement could overload the tow line or the tow bar. This action 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.

You must provide sufficient control and sufficient braking when you are moving a disabled machine downhill. This activity may require a larger towing machine or additional machines that are connected to the rear of the disabled machine. This action will prevent the machine from rolling away out of control.

All situation requirements cannot be listed. Minimal towing machine capacity is required on smooth, level surfaces. On inclined surfaces or surfaces that are in poor condition, maximum towing machine capacity is required.

Do not tow a loaded machine.

Consult your Cat dealer for the equipment that is necessary for towing a disabled machine.

Engine Starting (Alternate Methods)

i02799419

Engine Starting with Jump Start Cables

SMCS Code: 1000; 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.

⚠ WARNING

Do not attempt to charge a battery that has ice in any of the cells.

Charging a battery in this condition can cause an explosion that may result in personal injury or death.

Always let the ice melt before attempting to charge.

NOTICE
When starting from another machine, make sure that the machines do not touch. This could prevent damage to engine bearings and electrical circuits.

Turn on (close) the battery disconnect switch prior to the boost connection to prevent damage to electrical components on the stalled machine.

Severely discharged maintenance free batteries do not fully recharge from the alternator after jump starting. The batteries must be charged to proper voltage with a battery charger. Many batteries thought to be unusable are still rechargeable.

This machine has a 12 volt starting system. Use only the same voltage for jump starting. Use of a higher voltage damages the electrical system.

Use of Jump Start Cables

1. Place the transmission control on the stalled machine in the NEUTRAL position. Engage the parking brake. Lower all attachments to the ground. Move all controls to the HOLD position.

Note: See “Equipment Lowering with Engine Stopped” for more information.

2. On the stalled machine, turn the engine start switch to the OFF position. Turn off the accessories.
3. On the stalled machine, turn the battery disconnect switch to the ON position.
4. Move the machine or the auxiliary power source close to the stalled machine so that the cables can reach. **DO NOT ALLOW THE MACHINE OR THE AUXILIARY POWER SOURCE TO CONTACT THE STALLED MACHINE.**
5. Stop the engine on the machine that is the electrical source. (If you are using an auxiliary power source, turn off the charging system.)
6. Check the battery caps for correct placement and for correct tightness. Make these checks on both machines. Make sure that the batteries in the stalled machine are not frozen. Check the batteries for low electrolyte.
7. Connect the positive jump start cable to the positive cable terminal of the discharged battery.

   Do not allow positive cable clamps to contact any metal except for battery terminals.

Note: This machine is equipped with two batteries. Only the battery terminals inside the right access door should be used in order to jump start the machine.

8. Connect the positive jump start cable to the positive terminal of the electrical source.

9. Connect one end of the negative jump start cable to the negative terminal of the electrical source.

10. Make the final connection. Connect the negative cable to the frame of the stalled machine. Make this connection away from the battery, away from the fuel, away from the hydraulic lines, and away from all moving parts.

11. Start the engine of the machine that is the electrical source. (If you are using an auxiliary power source, energize the charging system on the auxiliary power source.)

12. Allow the electrical source to charge the batteries for two minutes.

13. Attempt to start the stalled engine.

Reference: For more information, refer to Operation and Maintenance Manual, “Engine Starting”.

14. Immediately after the stalled engine starts, disconnect the jump start cables in reverse order.

Maintenance Section

Lubricant Viscosities and Refill Capacities

i04321533

Lubricant Viscosities (Fluids Recommendations)

SMCS Code: 7000; 7581

General Information for Lubricants

When you are operating the machine in temperatures below −18°C (−0°F), refer to Special Publication, SEBU5898, “Cold Weather Recommendations for all Caterpillar Machines”. 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.

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. Refer to “General Information for Lubricants” article, “Lubricant Viscosities” tables, and any associated footnotes. Consult your Cat dealer if additional information is needed.

NOTICE
Not following the recommendations found in this manual can lead to reduced performance and compartment failure.

Engine Oil

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 9

Lubricant Viscosities for Ambient Temperatures						
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	SAE 10W-30	−18	40	0	104
	Cat DEO-ULS	SAE 15W-40	−9.5	50	15	122

Hydraulic Systems

Refer to the “Lubricant Information” section in the latest revision of the Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for detailed information. This manual may be found on the Web at Safety.Cat.com.

The following are the preferred oils for use in most Cat machine hydraulic systems:

- Cat HYDO Advanced 10 SAE 10W
- Cat HYDO Advanced 30 SAE 30W
- Cat BIO HYDO Advanced

Cat HYDO Advanced fluids have a 50% increase in the standard oil drain interval for machine hydraulic systems (3000 hours versus 2000 hours) over second and third choice oils when you follow the maintenance interval schedule for oil filter changes and for oil sampling that is stated in the Operation and Maintenance Manual for your particular machine. 6000 hour oil drain intervals are possible when using S·O·S Services oil analysis. Consult your Cat dealer for details. When switching to Cat HYDO Advanced fluids, cross contamination with the previous oil should be kept to less than 10%.

Second choice oils are listed below.

- Cat MTO
- Cat DEO
- Cat DEO-ULS
- Cat TDTO
- Cat TDTO Cold Weather
- Cat TDTO-TMS
- Cat DEO-ULS Cold Weather

Table 10

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	**Oil Type and Performance Requirements**	**Oil Viscosities**	**°C**		**°F**	
			Min	**Max**	**Min**	**Max**
Hydraulic System	**Cat HYDO Advanced 10** Cat TDTO	SAE 10W	−20	40	−4	104
	Cat HYDO Advanced 30 Cat TDTO	SAE 30	0	50	32	122
	Cat BIO HYDO Advanced	“ISO 46” Multi-Grade	−30	45	−22	113
	Cat MTO Cat DEO-ULS Cat DEO	SAE10W-30	−20	40	−4	104
	Cat DEO-ULS Cat DEO	SAE15W-40	−15	50	5	122
	Cat TDTO-TMS	Multi-Grade	−15	50	5	122
	Cat DEO-ULS Cold Weather	SAE0W-40	−40	40	−40	104
	Cat TDTO Cold Weather	SAE 0W-20	−40	40	−40	104

Transmission, Axles, Final Drive

Refer to the “Lubricant Information” section in the latest revision of the Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for detailed information. This manual may be found on the Web at Safety.Cat.com.

When you are operating the machine in temperatures below −20°C (−4°F), refer to Special Publication, SEBU5898, “Cold Weather Recommendations for all Caterpillar Machines”. This publication is available from your Cat dealer.

Where recommended for use, Cat FDAO SYN Cat FDAO or commercial oil that meets Cat FD-1 are the preferred oil types to maximize gear and bearing life. Do not use Cat FDAO, Cat FDAO SYN, or Cat FD-1 in compartments containing clutches and/or brakes. Cat TDTO, Cat TDTO-TMS, or commercial oil that meets Cat TO-4 oil types must be used in any compartment containing friction material unless specified otherwise by Caterpillar.

For the Final Drives in severe usage or in continuous operations, WARMUP is required. Exercise the final drives for several minutes with the engine at a partial throttle in order to warm up the oil prior to production operation

Table 11

Lubricant Viscosities for Ambient Temperatures							
Compartment or System	**Application**	**Oil Type and Classification**	**Oil Viscosities**	**°C**		**°F**	
				Min	**Max**	**Min**	**Max**
Final Drive	Moderate Usage or Intermittent Operation	**Cat FDAO commercial FD-1 Cat TDTO COLD WEATHER Cat TDTO Cat TDTO-TMS commercial TO-4**	SAE 60	−7	50	19	122
			SAE 50	−15	32	5	90
			SAE 30	−25	15	−13	59
			Cat TDTO-TMS	−35	15	−31	59
	Severe Usage or Continuous Operation (Multiple Shifts/Day)	**Cat FDAO commercial FD-1 Cat TDTO COLD WEATHER Cat TDTO Cat TDTO-TMS commercial TO-4**	SAE 60	−25	50	−13	122
			SAE 50	−33	14	−27	58
			SAE 30	−40	0	−40	32
			Cat TDTO-TMS	−40	0	−40	32

Special Applications

Cat Synthetic GO is an SAE 75W-140 viscosity grade oil.

Table 12

Lubricant Viscosities for Ambient Temperatures							
Compartment or System	**Application**	**Oil Type and Classification**	**Oil Viscosities**	**°C**		**°F**	
				Min	**Max**	**Min**	**Max**
Pins, and Track Pins	Normal	**Cat GO Cat Synthetic GO commercial API GL-5 gear oil**	SAE 75W-90	−30	40	−22	104
			SAE 75W-140	-30	45	-22	113
			SAE 80W-90	−20	40	−4	104
			SAE 85W-140	−10	50	14	122
			SAE 90	0	40	32	104
Winches (winch gear oil)	Normal	**Cat TDTO Cat TDTO-TMS commercial TO-4**	SAE 0W20	−40	10	−40	50
			SAE 0W30	−40	20	−40	68
			SAE 5W30	−30	20	−22	68
			SAE 10W	−20	10	−4	50
			SAE 30	0	43	32	110
			Cat TDTO-TMS	−10	35	14	95
Track Idlers and Track Rollers	**Normal**	**Cat DEO Cat DEO SYN Cat ECF-1 API CG-4 API CF**	SAE 30	−20	25	−4	77
			SAE 40	−10	40	14	104
			SAE 5W-40	−35	40	−31	104

Special Lubricants

Grease

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.

Table 13

Recommended Grease						
Compartment or System	GreaseType	NLGI Grade	°C		°F	
			Min	Max	Min	Max
External Lubrication Points (End bearings, blade pivots, C-frame pivot, winch rollers, drum)	Cat Advanced 3Moly	NLGI Grade 2	−20	40	−4	104
	Cat Ultra 5Moly	NLGI Grade 2	−30	50	−22	122
		NLGI Grade 1	−35	40	−31	104
		NLGI Grade 0	−40	35	−40	95
	Cat Arctic Platinum	NLGI Grade 0	−50	20	−58	68
	Cat Desert Gold	NLGI Grade 2	−20	60	−4	140

Reference: Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for additional information about grease. This manual may be found on the Web at Safety.Cat.com.

Diesel Fuel Recommendations

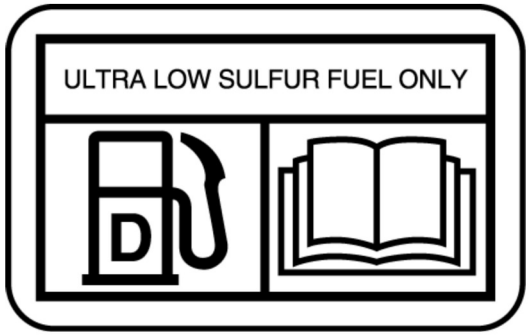

Illustration 146 g02157153

NACD Film

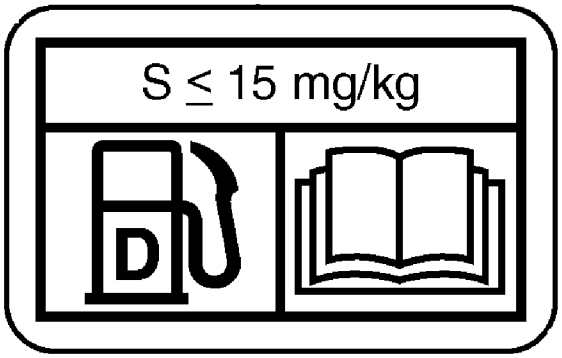

Illustration 147 g02052934

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 4 requirements. 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.

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: 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.

Note: B20 biodiesel blend level is acceptable for use in D3K2, D4K2, D5K2 machine engines.

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.

Coolant Information

The information provided in this “Coolant Recommendation” section should be used with the “Lubricants Information” 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.

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)

Coolant Additives

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.

If the coolant exhibits any of the following issues, refer to PELJ1330 for the proper coolant conditioner additives.

- Ammonia odor coming from the coolant
- Elevated pH, such as pH>10
- Aluminum corrosion elevated when measured by coolant analysis by S·O·S Services
- Change in coolant color, such as a change from strawberry red to light pink with ELC (Extended Life Coolant)

At no point during the life of this machine should Cooling System Coolant Extender (ELC) be added.

i04311390

Capacities (Refill)

SMCS Code: 7000; 7560

Table 14

APPROXIMATE REFILL CAPACITIES			
Compartment or System	**Liters**	**US Gal**	**Imp Gal**
Engine Crankcase	11	2.9	2.4
Each Final Drive D3K	10.0	2.6	2.2
Each Final Drive D4K	10.0	2.6	2.2
Each Final Drive D5K	10.0	2.6	2.2
Hydraulic Tank	60	15.8	13.2
Hydraulic System	84	22.2	18.4
Fuel Tank	195	51.5	42.9
Radiator for the Cooling System	7.9	2.1	1.7
Cooling System	23.0	6.1	5.1
Gear Case for the Winch	4.7	1.2	1.0

Note: When you are operating on severe slopes, the quantity of oil in the power train can be increased up to 10 percent. When you are operating with the increased oil quantity, prolonged operation in some machines can cause high-power train oil temperatures. After the work on the severe slopes has been completed, drain the excessive oil quantity from the bevel gear case.

i07445339

S·O·S Information

SMCS Code: 7542

S·O·S Services is a highly recommended process for Cat 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.

The effectiveness of S·O·S Services is dependent on timely submission of the sample to the laboratory at recommended intervals.

Refer to the Operation and Maintenance Manual, “Maintenance Interval Schedule” for a specific sampling location and a service hour maintenance interval.

Consult your Cat dealer for complete information and assistance in establishing an S·O·S program for your equipment.

Maintenance Support

i02801604

Welding on Machines and Engines with Electronic Controls

SMCS Code: 1000; 6700; 7000

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. Turn the battery disconnect switch to the OFF position.

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 from the debris which is created from welding. Protect any wiring harnesses from the splatter which is created from welding.

5. Use standard welding procedures in order to weld the materials together.

i07754735

Maintenance Interval Schedule

SMCS Code: 7000

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

The user is responsible for the performance of maintenance. 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 12 000 Service Hours or 6 Years

Every 10 Service Hours or Daily

Every 50 Service Hours or Weekly

Every 100 Service Hours or 2 Weeks

Initial 250 Service Hours

Every 250 Service Hours or Monthly

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

Every 500 Service Hours

Every 500 Service Hours or 6 Months

Every 500 Service Hours or 1 Year

Every 1500 Service Hours

Every 2000 Service Hours

Every 3000 Service Hours

Every 3 Years

i02320208

Alternator and Fan Belts - Replace

SMCS Code: 1357-510

Refer to Disassembly and Assembly Manual , “ Alternator Belt - Remove and Install”.

i04315472

Backup Alarm - Test

SMCS Code: 7406

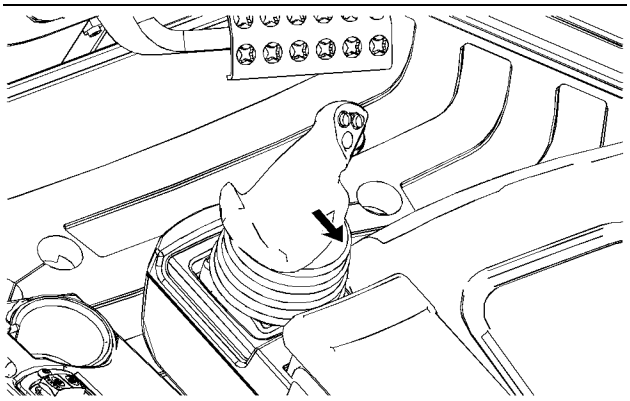

Illustration 148 g01217394

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

Apply the decel/brake pedal. Disengage the parking brake switch. Move the transmission control lever to the REVERSE position.

The backup alarm should sound immediately. The alarm alerts the people behind the machine that the machine is backing up. The backup alarm should continue to sound until the transmission control lever is moved to the NEUTRAL position or to the FORWARD position.

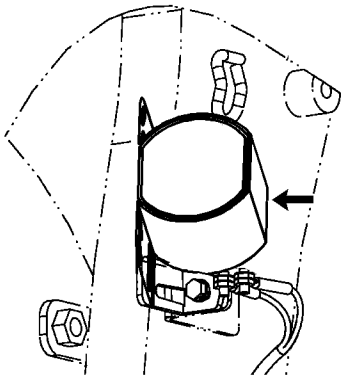

Illustration 149 g02475774

The backup alarm is attached to the right rear ROPS post.

The nonadjustable backup alarm is set at the appropriate sound level when the machine is shipped from the factory.

i01989120

Battery - Inspect

SMCS Code: 1401-040

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

1. Open the battery access cover.

2. Clean the top of the batteries with a clean cloth. Keep the terminals clean and coated with petroleum jelly. Install the terminal covers after you coat the terminals.

3. Close the battery access cover.

i07746330

Battery - Recycle

SMCS Code: 1401-535; 1401-561; 1401-510; 1401-005; 1401

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

i04315506

Battery or Battery Cable - Inspect/Replace

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

⚠ WARNING

Personal injury may occur from failure to properly service the batteries.

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

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

Always wear protective glasses when working with batteries.

1. Turn the engine start switch key OFF. Turn all of the switches OFF.

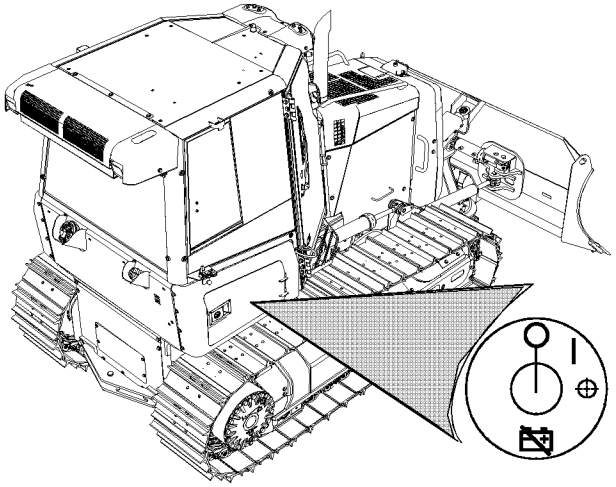

Illustration 150 g02475833

2. Open the right rear access door. Turn the battery disconnect switch to the OFF. Remove the key.

3. Disconnect the negative battery cable from the disconnect switch.

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

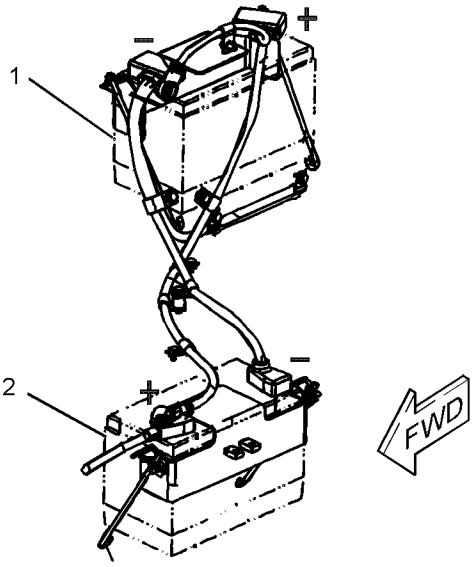

Illustration 151 g01400107

There are two batteries on this machine.

(1) Primary battery
(2) Secondary battery

4. Disconnect the negative battery cable at battery (1). The primary battery is located behind the right side access door.

5. Disconnect the positive battery cable at the battery.

6. Remove the mat and the floorplate in the cab in order to access the secondary battery. Perform steps 4 and 5 in order to disconnect the secondary battery.

7. Inspect the battery terminals for corrosion. Inspect the battery cables for wear or damage.

8. Make any necessary repairs. If necessary, replace the battery cables or the batteries.

Note: Do not exceed a change interval of 48 months when the secondary battery carrier (strap) is replaced.

9. Connect the positive battery cable to the battery positive terminals.

10. Connect the negative battery cable to the battery negative terminals.

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

12. Install the key and turn the battery disconnect switch ON.

13. Close the right rear access door.

i07532505

Belts - Inspect

SMCS Code: 1357-040; 1397-040

Inspect

1. Park the machine on level ground. Lower the dozer blade to the ground. Move the transmission control to the NEUTRAL position and engage the parking brake. Shut off the engine.

2. Open the engine enclosure.

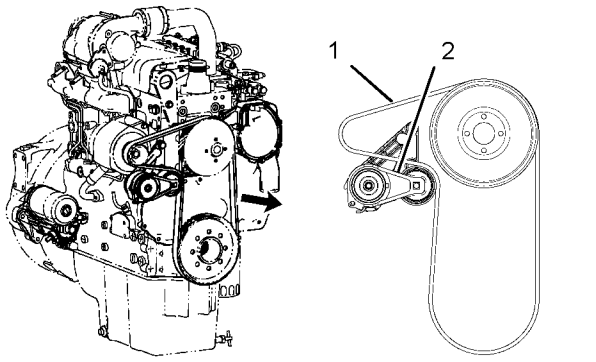

Illustration 152 g01275091

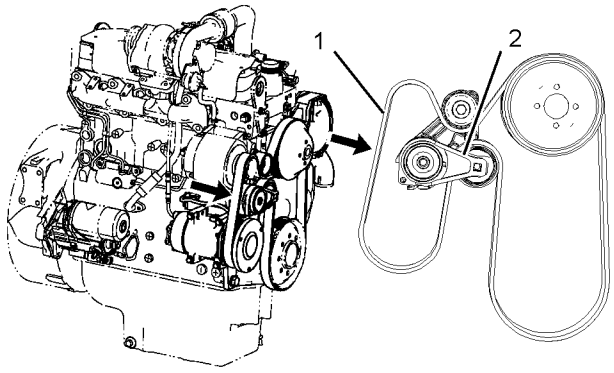

Illustration 153 g01259370

A/C compressor

3. Inspect the condition of the serpentine belt (1) for any of the following conditions:

- excessive cracking
- excessive wear
- excessive damage

The belt deflection should not be more than 14 to 20 mm (.56 to .81 inch) under 110 N (25 lb) of force. Use a 144-0235 Belt Tension Gauge in order to measure the tension.

Note: The deflection of the serpentine belt has the same limit with an alternator only.

Note: This machine is equipped with one belt tensioner (2). The belt tensioner automatically adjusts the belt to the correct position.

4. Close the engine enclosure.

i03868550

Belt Tensioner - Inspect

SMCS Code: 1358-040

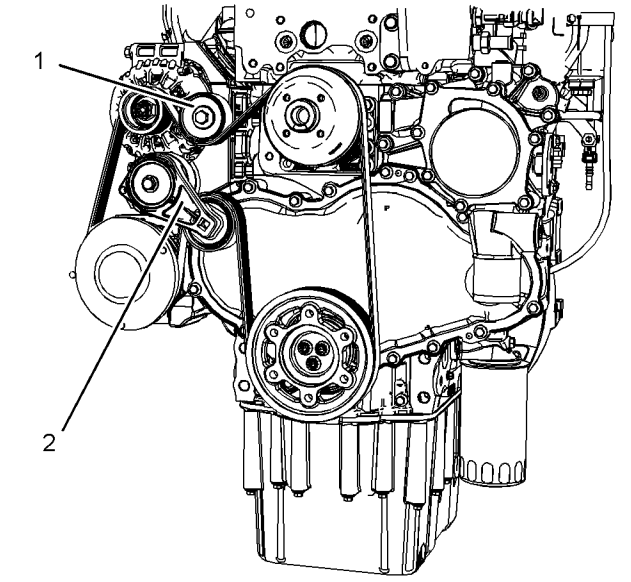

Illustration 154 g02111454

Typical example

Remove the belt. Refer to Disassembly and Assembly, “Alternator Belt - Remove and Install”.

Ensure that the belt tensioner is securely installed. Visually inspect the belt tensioner (2) for damage. Check that the pulley on the tensioner rotates freely and that the bearing is not loose. Some engines have an idler pulley (1). Ensure that the idler pulley is securely installed. Visually inspect the idler pulley for damage. Ensure that the idler pulley can rotate freely and that the bearing is not loose. If necessary, replace damaged components.

Install the belt. Refer to Disassembly and Assembly, “Alternator Belt - Remove and Install”.

i04316503

Brakes, Indicators and Gauges - Test

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

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

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

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

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

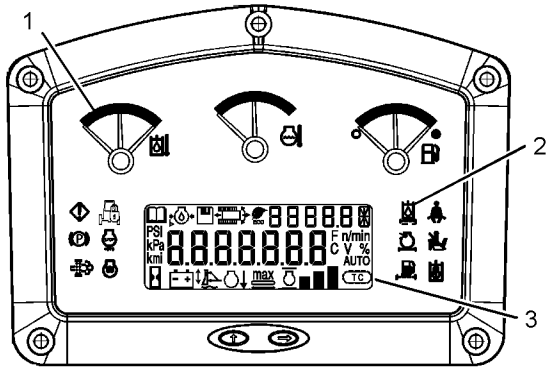

Illustration 155 g02476311

The operator must observe whether gauges (1), indicators (2), and displays (3) are operating properly. The self test lasts for approximately 3 seconds.

During the self test, all alert indicators flash.

The digital display shows the following readouts:

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

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

- The action light stays illuminated.
- The action alarm sounds once for one second.

The monitoring panel is then in the normal operating mode.

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

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

Move the machine forward and test the service brakes.

Braking System (Test)

⚠ WARNING

If the machine moves during the test, reduce the engine speed immediately, and engage the parking brake.

If the machine moved while testing the brakes, consult your Caterpillar dealer for brake inspection and repair. Damaged brakes must be repaired before returning the machine to operation.

Make sure that the area around the machine is clear of personnel and clear of obstacles.

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

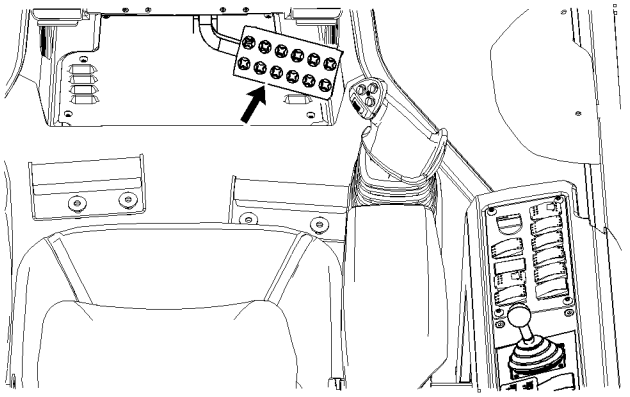

Illustration 156 g02637276

1. Start the engine.
2. Raise all attachments.
3. Use the ET service tool in order to perform the Transmission Stall Test. Refer to the Testing and Adjusting manual for your machine for more information.
4. Reduce the engine speed to LOW IDLE. Engage the parking brake. Lower all attachments to the ground. Apply a slight down pressure. Stop the engine.

5. Make any necessary repairs before you operate the machine.

NOTICE
If the machine moved while testing the brakes, contact your Caterpillar dealer. Have the dealer inspect and, if necessary, repair the service brake before returning the machine to operation.

i04316818

Bulldozer Power Angling Tilt Hinge Pins - Lubricate

SMCS Code: 6050

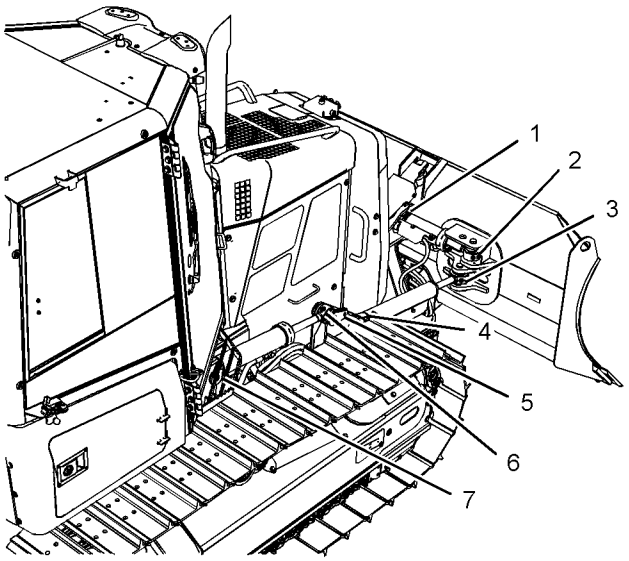

Illustration 157 g02476415

Apply lubricant to the grease fitting for the head end of the tilt cylinder (1).

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

Apply lubricant to the grease fitting for the rod end of the angle cylinder (3). Repeat for the left and right side angle cylinders.

Apply lubricant to the grease fitting for the head end of the angle cylinder (4). Repeat for the left and right side angle cylinders.

Apply lubricant to the grease fitting for the pivot pin on the main C-frame (5). Repeat for the left and right side angle cylinders.

Apply lubricant to the grease fitting for the rod end of the lift cylinder (6). Repeat for the left and right side lift cylinders.

Apply lubricant to the grease fitting for the head end of the lift cylinder (7). Repeat for the left and right side lift cylinders.

Apply lubricant to the grease fittings for the pitch link (8, 9).

i05063231

Cab Filter (Fresh Air) - Clean/ Inspect/Replace
(If Equipped)

SMCS Code: 7342-070; 7342-040; 7342-510

Note: Clean the filter element more often in dusty conditions. If there is a noticeable reduction in the air flow from the air vents, check the filter element.

Note: Enclosed ROPS only

1. Open left access door (1) for the filter.

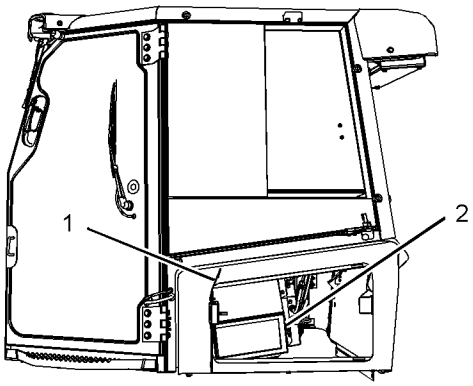

Illustration 158 g02507896

2. Remove filter element (2). Clean the filter element with compressed air.

Note: Do not clean the filter elements while the filter elements are installed on the machine.

Note: Do not wash the filter element with water.

Note: Keep the filter element dry.

3. Install the filter element. Close access door (1).

Fire Suppression Arrangement (If Equipped)

HEPA Cab Air Intake Filter

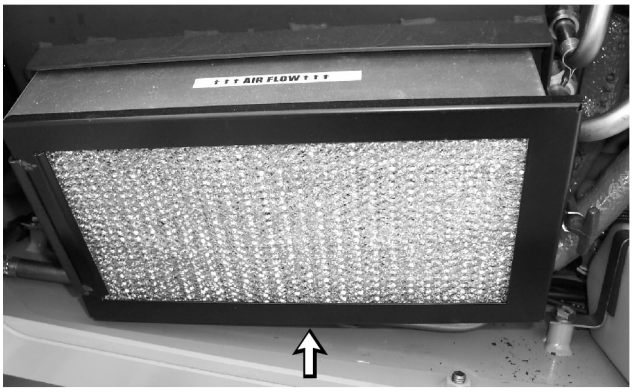

Illustration 159 g03229881

Fire plow HEPA air filter

Note: Use a soft brush to clean the outside of the HEPA filter of dust and other particles. A gentle knock on the mesh can dislodge the stuck particles. Use compressed air to remove stuck particulates in the mesh. Do not use a hard brush.

After cleaning, soak the HEPA filter in a mild germicidal solution. Allow the HEPA filter to air dry before installing the filter.

Contact your Cat dealer to replace the HEPA (High-Efficiency Particulate Air) air filter with the proper equipment, as needed.

i02801612

Cab Filter (Recirculation) - Clean/Inspect/Replace

SMCS Code: 7342-070; 7342-040; 7342-510

Note: Clean the filter element more often in dusty conditions. If there is a noticeable reduction in the air flow from the air vents, check the filter element.

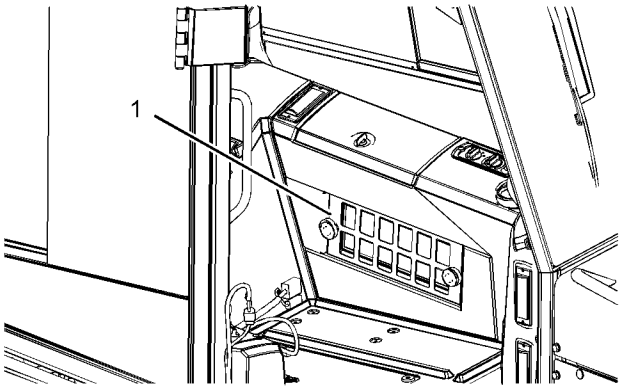

Illustration 160 g01213198

1. Remove filter element (1). The filter element is located next to the seat on the left side. Clean the filter element with compressed air.

Note: Do not clean the filter element while the filter element is installed on the machine.

Note: Do not use water in order to clean the filter element.

Note: The filter must be thoroughly dried before you install the filter.

2. Replace any filter element that is worn or damaged.

3. Install the filter element and replace the filter cover.

Note: Install the filter element with the filter media toward the inside of the cavity.

i04352110

Condenser (Refrigerant) - Clean

SMCS Code: 1805-070

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

Repair the fins if found defective.

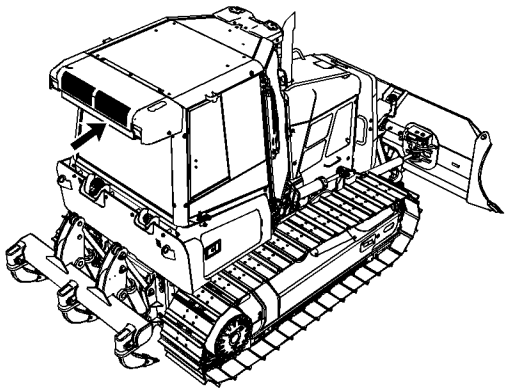

Illustration 161 g02507517

1. Remove the cover for the condenser.

2. Inspect the condenser for debris. Clean the condenser, if necessary.

3. Use clean water to wash all of the dust and dirt from the condenser.

4. Install the cover for the condenser.

i04359909

Cooling System Coolant (ELC) - Change

SMCS Code: 1352-044; 1395-044

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

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

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

This could result in damage to cooling system components.

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

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

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

1. Open the left engine access door first in order to access the latch for the top access panel.

2. Open the access panel on top of the engine compartment in order to remove the cooling system pressure cap.

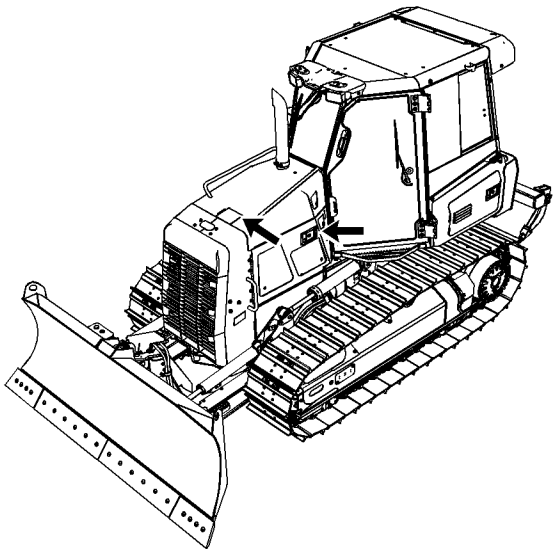

Illustration 162 g02512842

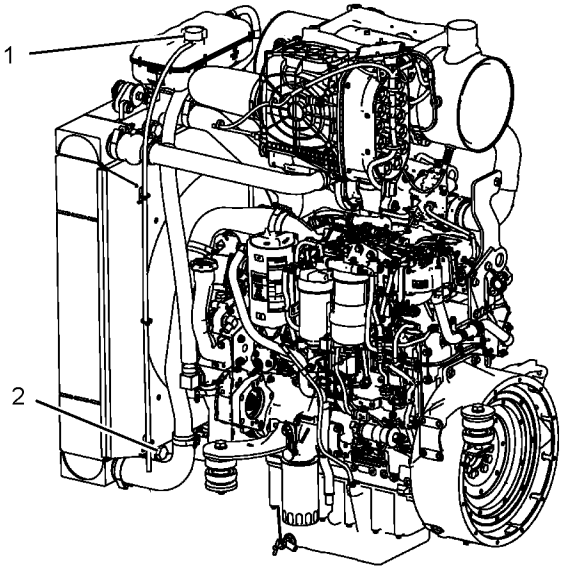

Illustration 163 g02789034

3. Loosen cooling system pressure cap (1) slowly when you are inside the engine compartment in order to release the pressure from the cooling system.

4. Remove the pressure cap.

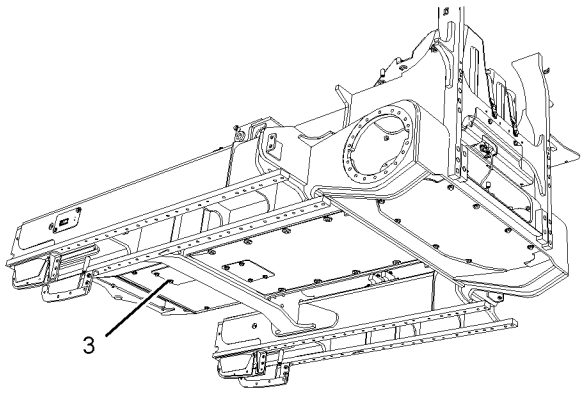

Illustration 164 g01260273

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

5. Remove access cover (3) that is in the engine guard.

6. Open drain valve (2) and allow the coolant to drain into a suitable container. The drain valve is located on the bottom of the radiator.

7. Flush the cooling system. Follow Step 7a through Step 7h in order to flush the cooling system properly.

a. Close drain valve (2).

b. Fill the cooling system with clean water.

c. Install pressure cap (1).

d. Start the engine and run the engine until the engine reaches operating temperature.

e. Stop the engine and allow the engine to cool.

f. Loosen pressure cap (1) slowly in order to relieve any pressure in the cooling system.

g. Open drain valve (2) and allow the coolant to drain into a suitable container.

h. Flush the radiator with clean water until the draining water is transparent.

8. Close the drain valve and install the access cover underneath the engine.

9. Add the Extended Life Coolant. Refer to the following topics:

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

10. Start the engine. Operate the engine without the cooling system pressure cap until the water temperature regulator opens and the coolant level stabilizes.

11. Maintain the coolant level between the maximum mark and the minimum mark on the expansion tank.

Note: Refer to Operation and Maintenance Manual, “Cooling System Coolant Level - Check” for additional information.

12. Inspect the O-ring of the cooling system pressure cap. If the O-ring is damaged, replace the pressure cap.

13. Install the cooling system pressure cap.

14. Stop the engine.

15. Close the access panel on top of the engine compartment.

16. Close the left engine access door.

i04646169

Cooling System Coolant Level - Check

SMCS Code: 1353; 1354; 1395; 7520

1. Open the left engine access door.

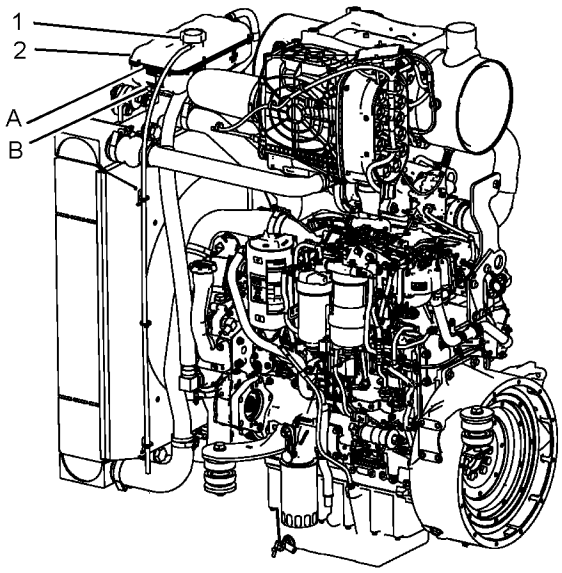

Illustration 165 g02789037

2. Maintain the coolant level between minimum mark (B) and maximum mark (A) on expansion tank (2). If you need to add coolant daily, check the cooling system for leaks.

3. Close the left engine access door.

i04646430

Cooling System Coolant Sample (Level 1) - Obtain

SMCS Code: 1395-554

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

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

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

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

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

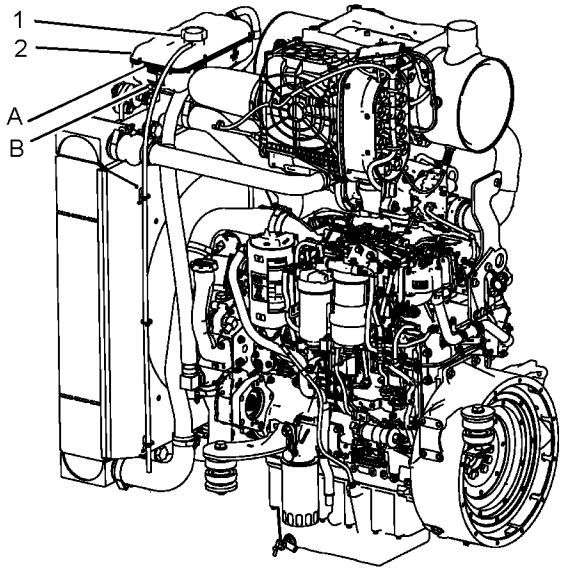

Illustration 166 g02789037

1. Open the left engine access door.

2. Open the access panel on top of the engine compartment.

3. The cooling system pressure cap (1) is located on the top of expansion tank (2). Remove the cooling system pressure cap slowly in order to relieve system pressure.

4. Obtain the coolant sample from the expansion tank and collect the sample into the proper sampling bottle.

Note: Always discard drained fluids according to local regulations.

Obtain the sample of the coolant 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 Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

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

4. Maintain the coolant level between minimum mark (B) and maximum mark (A). Add coolant, if necessary.

5. Install cooling system pressure cap (1) on to expansion tank (2). Close the access panel on top of the engine compartment. Close the left engine access door.

Submit the sample for Level 1 analysis.

For additional information about coolant analysis, see Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i04646456

Cooling System Coolant Sample (Level 2) - Obtain

SMCS Code: 1395-554

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

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.

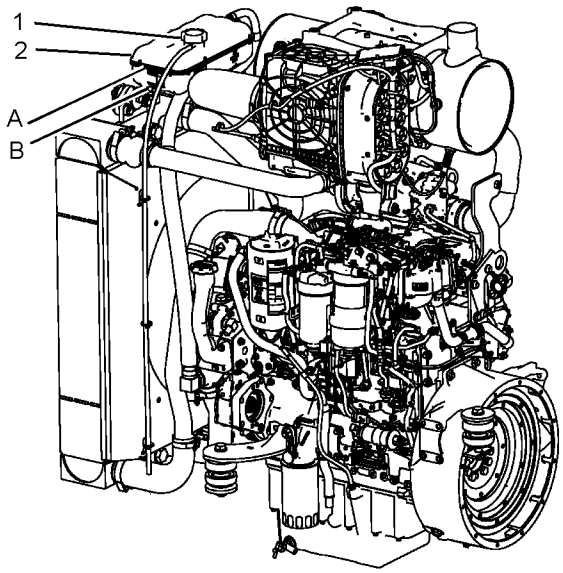

Illustration 167 g02789037

1. Open the left engine access door.

2. Open the access panel on top of the engine compartment.

3. The cooling system pressure cap (1) is located on the top of expansion tank (2). Remove the cooling system pressure cap slowly in order to relieve system pressure.

4. Obtain the coolant sample from the expansion tank and collect the sample into the proper sampling bottle.

Note: S·O·S coolant samples should be pulled from the shunt bottle. Always discard drained fluids according to local regulations.

Obtain the sample of the coolant 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 Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

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

4. Maintain the coolant level between minimum mark (B) and maximum mark (A). Add coolant, if necessary.

5. Install cooling system pressure cap (1) on to expansion tank (2). Close the access panel on top of the engine compartment. Close the left engine access door.

Submit the sample for Level 2 analysis.

For additional information about coolant analysis, see Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i05791119

Cooling System Water Temperature Regulator - Clean/Replace

SMCS Code: 1355; 1393

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

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

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

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

1. Loosen the hose clamp and remove the hose from the elbow. (The thermostat is integrated into the elbow housing.)
2. Remove the bolts and the thermostat housing assembly and discard.

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

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

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

3. Install the new thermostat housing assembly on the engine cylinder head.
4. Install the hose. Tighten the hose clamp.
5. Top off the coolant tank with ELC coolant.

i04317389

Cutting Edges and End Bits - Inspect/Replace

SMCS Code: 6801; 6804

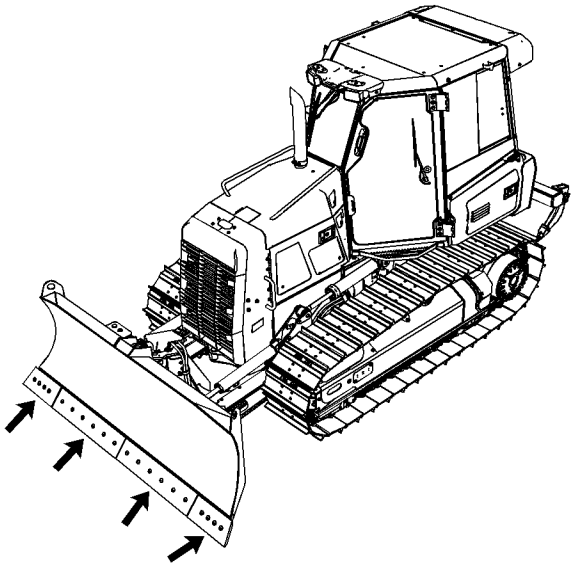

Illustration 168 g02511521

1. Raise the bulldozer blade and block up the bulldozer blade. When you remove the cutting edges and the end bits, maintain the bulldozer blade at a minimum height.
2. Remove the bolts.
3. Remove the cutting edge and the end bits.
4. Thoroughly clean all contact surfaces.
5. Inspect the opposite side of the cutting edge. If the opposite side of the cutting edge is not worn, turn the opposite side of the cutting edge downward and install the cutting edge.
6. If both sides of the cutting edge are worn, install a new cutting edge.
7. Install new end bits, as required.
8. Install all bolts and tighten the bolts to the specified torque.

Note: Always install new bolts and nuts when installing new cutting edges or flipping cutting edges.

Reference: For more information, refer to Specifications, SENR3130, “Torque Specifications”.

9. Raise the bulldozer blade and remove the blocking. Lower the bulldozer blade to the ground.

10. After you operate the machine for a few hours, check all bolts for the proper torque.

i04021794

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1051; 1054

NOTICE
Caterpillar recommends certified air filter cleaning services that are available at Cat dealers. The Cat 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.

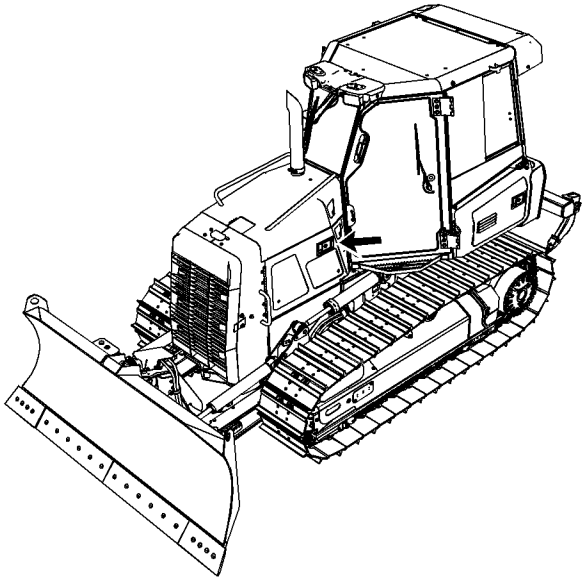

Illustration 169 g02502123

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

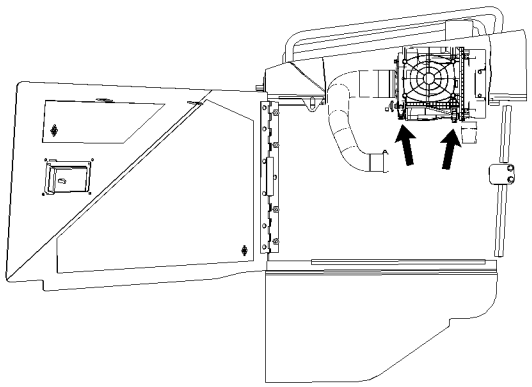

Illustration 170 g02501796

2. Loosen the four cover latches and remove the air cleaner cover.

Note: The latches for the air cleaner housing may snap open when you release the latches.

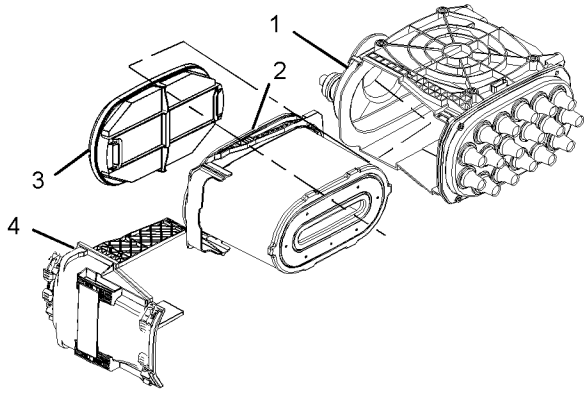

Illustration 171 g02198654

346-6686 Air Cleaner Group D3K2

3. Remove primary filter element (2) from air cleaner housing (1). In order to remove the engine air filter primary element, slide the element outward. While you pull the element outward, rock the element.

NOTICE
Do not use a filter if the media, the gaskets, or the seals are damaged.

4. Install clean primary filter element (2) over engine air filter secondary element (3). Apply firm pressure to the end of the primary element as you gently rock the filter element. This seats the primary element.

5. Clean cover (4) and install the cover.

6. Close the left engine access door.

7. Start the engine. The indicator on the gauge cluster will illuminate when the filter needs attention.

Cleaning Primary Air Filter Elements

The primary air filter element can be used up to three times if the element is properly cleaned and properly inspected. When the primary air filter element is cleaned, check for rips or tears in the filter material. The primary air filter element should be replaced at least one time per 2 yr period. This replacement should be performed regardless of the number of cleanings.

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

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

Pressurized air is the best method to clean primary air filter elements.

Pressurized Air

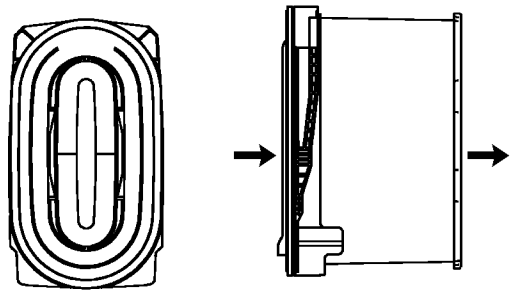

Illustration 172 g02199434
Direction of air flow

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

Note: When the primary air filter element is cleaned, always blow the air from the clean side in order to force dirt particles toward the dirty side. This action helps prevent damage to the paper pleats.

Do not touch the tip of the air gun to the primary air filter element. Dirt could be forced further into the pleats.

Before you reuse the primary air filter element, check for any damage to the seals, the gaskets, and the bellows. Discard any damaged air filter elements.

Inspecting the Primary Air Filter Elements

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

i04022167

Engine Air Filter Secondary Element - Replace

SMCS Code: 1051; 1054

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

Note: Replace the secondary filter element when you service the primary element for the third time.

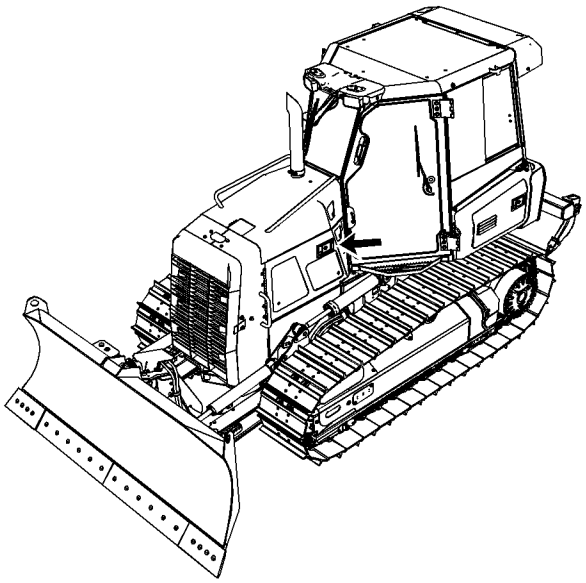

Illustration 173 g02502123

1. Open the left engine access door.

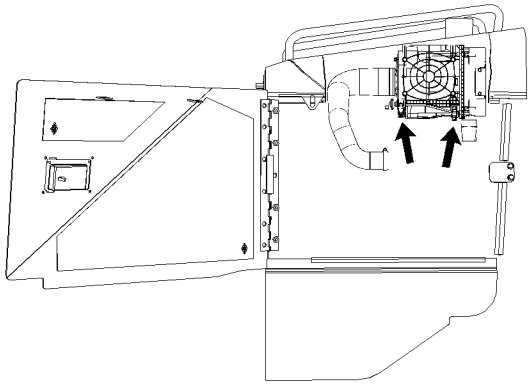

Illustration 174 g02501796

2. Loosen the four cover latches and remove the air cleaner cover.

Note: The latches for the air cleaner housing may snap open when you release the latches.

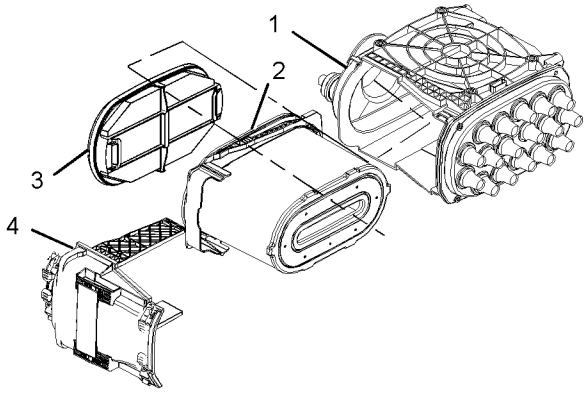

Illustration 175 g02198654

346-6686 Air Cleaner Group D3K2

3. Remove primary filter element (2) from air cleaner housing (1). In order to remove the engine air filter primary element, slide the element outward. While you pull the element outward, rock the element.

4. Remove housing cover to the precleaner body assembly.

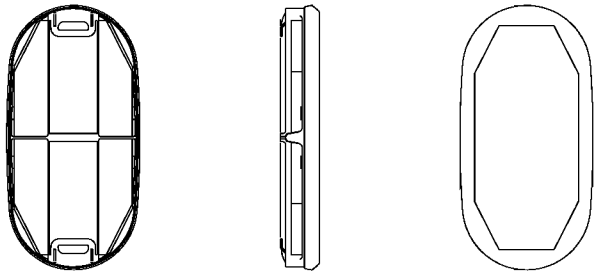

Illustration 176 g02199816

Secondary air cleaner element

5. Remove secondary element (3). The secondary element is on the end of the air cleaner group away from the cab.

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

7. Inspect the gasket between the air inlet and the housing. If the gasket is damaged, replace the element.

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

9. Reinstall the primary air filter element.

Reference: See “Engine Air Filter Primary Element - Clean/Replace” for more information.

10. Install the air cleaner housing cover.

11. Close the engine access door.

i04021449

Engine Air Precleaner - Clean

SMCS Code: 1050

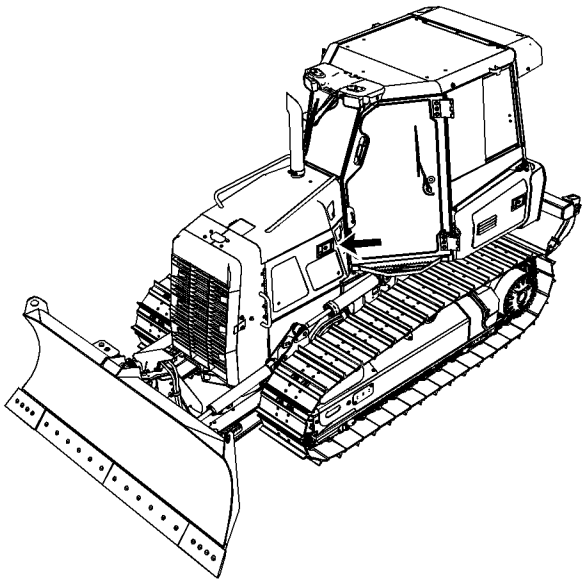

Illustration 177 g02502123

1. Open the left engine access cover.

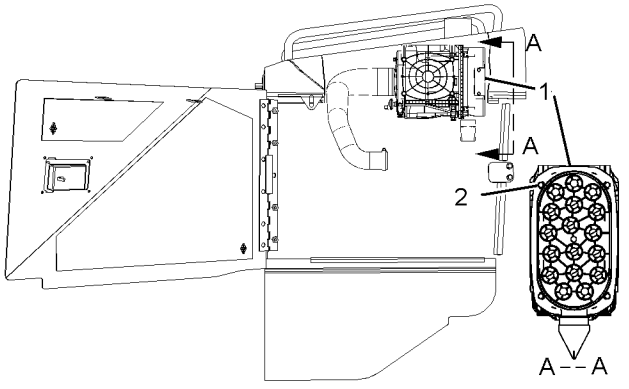

Illustration 178 g02502196

2. Inspect the engine air precleaner for dirt and for trash.

3. Remove M6 bolts (2) in order to remove the integrated precleaner body (1) completely.

4. Use pressurized air to clean the tubes. Put the tubes on a flat surface. Direct the pressurized air into the tubes from the top. This operation loosens up the dirt.

a. Loosen hard deposits of dust on the precleaner body by soaking in an appropriate cleaning agent. Then, wash the precleaner body with a spray of water.

b. Blow dry the precleaner body completely.

5. Install precleaner body (1) into the engine air precleaner. Latch the precleaner body in place.

6. Install bolts (2). Tighten the bolts to 8 ± 2 N·m (6 ± 1.5 lb ft) only.

7. Close the left engine access door.

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

i04321550

Engine Crankcase Breather Element - Replace

SMCS Code: 1317-510-FQ

⚠ WARNING

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

NOTICE
Ensure that the engine is stopped before any servicing or repair is performed.

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, “Cat Dealer Service Tool Catalog” or refer to Special Publication, PECJ0003, “Cat Shop Supplies and Tools 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 crankcase breather is a very important component in order to keep your engine emissions compliant.

- The filter element within the crankcase breather must be serviced at the prescribed service interval.
- The correct filter element must be installed before the engine is operated.

- The installation of the filter element is very important.
- The quality of the filter element that is installed is very important.

For information on aftermarket products, refer to Operation and Maintenance Manual, “Engine Description”. Within that section, refer to the title “Aftermarket Products and Caterpillar Engines”.

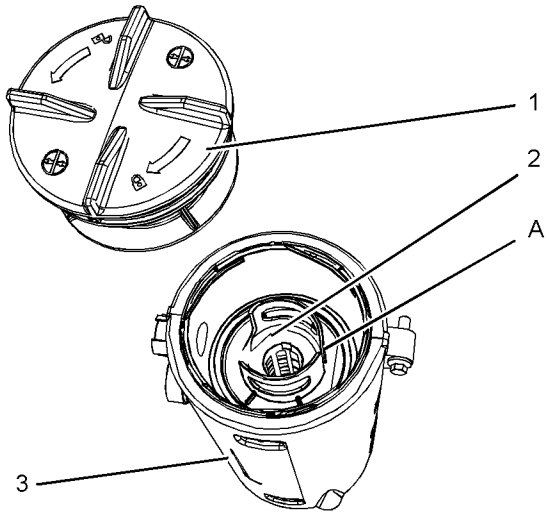

Illustration 179 g02477425

Typical example

1. Ensure that dirt cannot enter the breather assembly. Ensure that the outside body of the breather assembly is clean and free from damage. Place a container under the breather assembly.

2. Rotate the cap (1) counterclockwise into the unlocked position. Remove the cap from the body of the breather (3).

3. Note the orientation of the filter element (2). Remove the filter element .

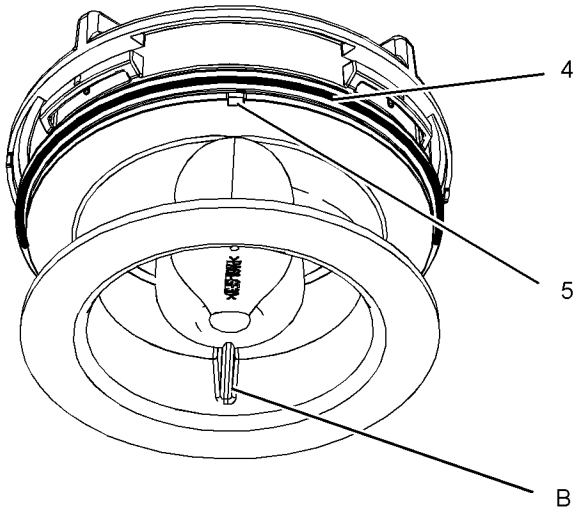

Illustration 180 g01884135

(B) Alignment position

Note: The cut away from section (5) in the cap allows access to the seal.

4. Remove the old seal (4) and install a new seal.

5. Install a new filter element into the breather body (3) and orient the filter element so that position (A) is aligned. Refer to illustration 179 . Align position (A) on the filter element to position (B) on the cap.

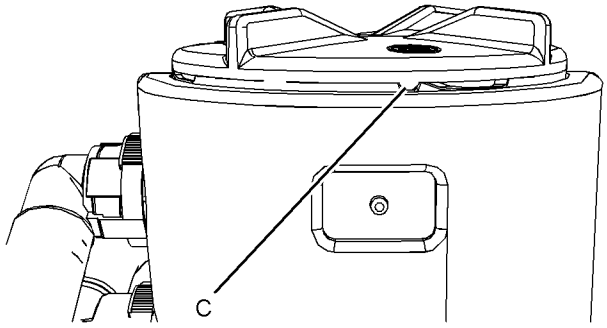

Illustration 181 g02477423

Typical example

6. Install the cap (1). Rotate the cap by hand clockwise until the cap locks into the locked position C on the breather body.

Check the System

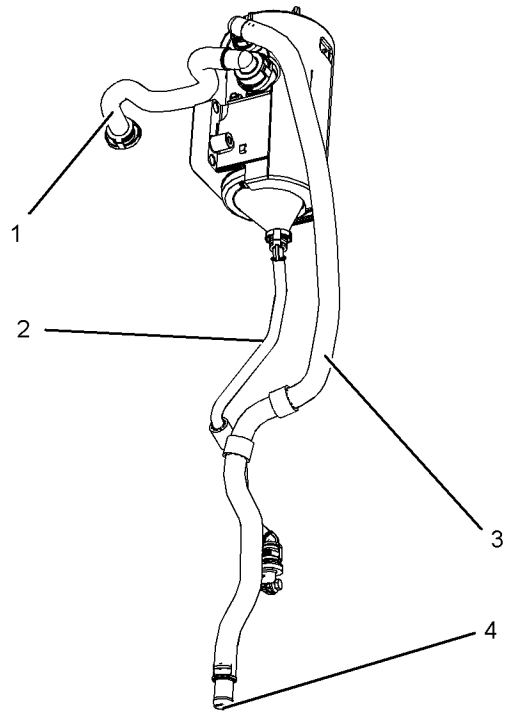

Illustration 182 g02477424

(1) Connection to breather cap for the engine
(2) Oil drain
(3) Tube assembly to atmosphere
(4) Outlet

Check the system for damage. Replace any component that is damaged. Ensure that the outlet (4) is clear and free from obstructions.

i04358109

Engine Oil Level - Check

SMCS Code: 1302; 1318; 1326

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE
Perform this maintenance with the engine stopped.

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

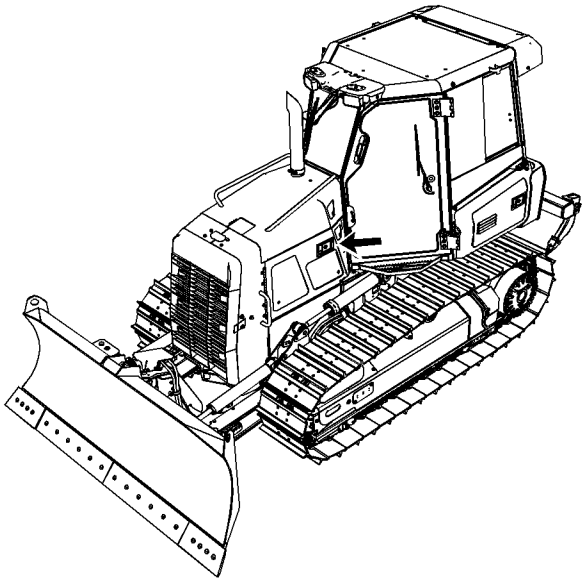

Illustration 183 g02502123

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

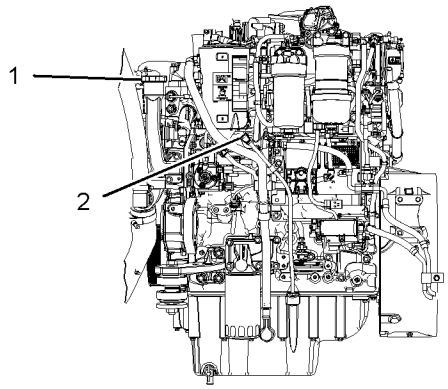

Illustration 184 g02511536

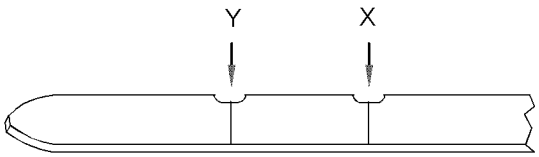

Illustration 185 g01165836

(Y) “Min” mark. (X) “Max” mark.

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

Note: Ensure that the engine is level in order to obtain a true level indication.

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

3. Remove oil filler cap (1). If necessary, add oil.

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

5. Close the left engine access door.

Note: For the best results, check the engine oil level after the engine has been off for 2 hours or more. This time will allow all of the oil to drain back into the engine crankcase.

i04358613

Engine Oil Sample - Obtain

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

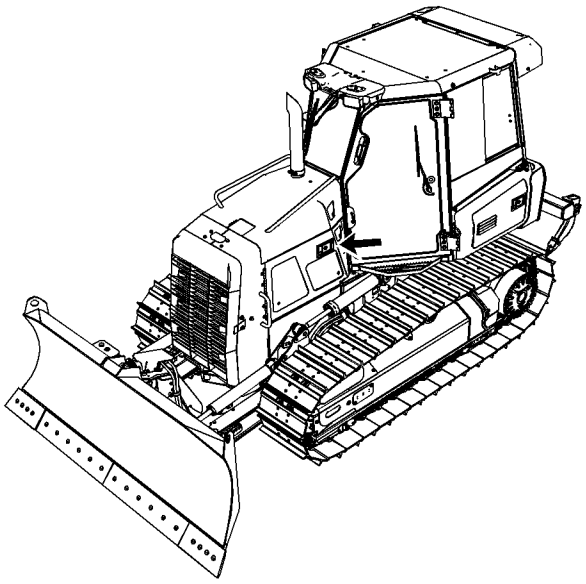

Illustration 186 g02502123

1. Open the left engine access door.

2. Remove the lower service access door on left side of the machine. Refer to Operation and Maintenance Manual, “General Hazard Information” for information that pertains to containing fluid spillage.

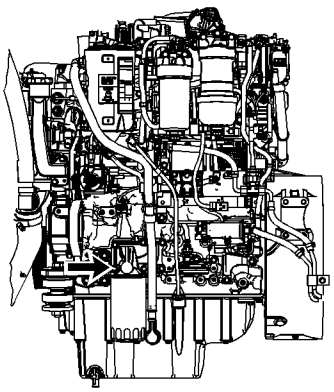

Illustration 187 g02511945

3. Obtain the regularly scheduled oil sample.

a. Use the oil sampling valve. Refer to Special Publication, PEHP6001, “How To Take A Good Oil Sample”.

Reference: See Special Publication, SEBU6250, “Caterpillar Fluids and Recommendations” “S·O·S Oil Analysis” and “Sampling Interval and Location of Sampling Valve” for more information.

i04358749

Engine Oil and Filter - Change

SMCS Code: 1318

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

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.

1. Open the left engine access door.

2. Remove the lower service access door on the left side of the machine.

a. Obtain the regularly scheduled oil sample, if necessary.

See Operation and Maintenance Manual, “Engine Oil Sample - Obtain” for the proper procedure.

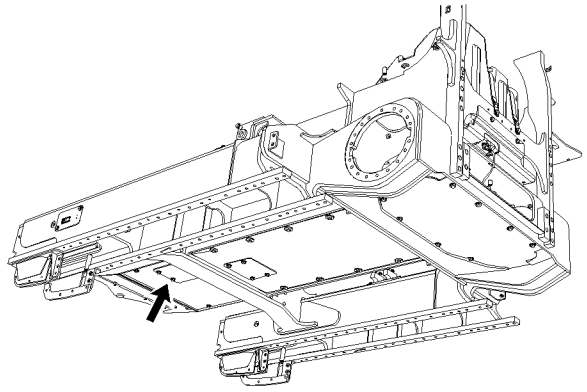

Illustration 188 g01260287

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

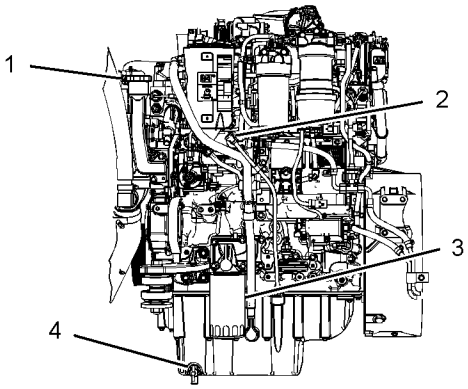

Illustration 189 g02512058

4. Open crankcase drain valve (4). Allow the oil to drain into a suitable container.

5. Remove engine oil filter element (3) and discard the engine oil filter element properly. Make sure that all of the old filter seal is removed from the filter base.

6. Apply a thin coat of clean engine oil to the seal on the new filter. Install new engine oil filter element (3) by hand.

Instructions for the installation of the filters are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

7. Close crankcase drain valve (4). Replace the crankcase drain access cover that is in the crankcase guard.

8. Remove the oil filler cap (1). Fill the crankcase with new oil. See Operation and Maintenance Manual, “ Capacities (Refill)”. Clean the oil filler cap and install the oil filler cap.

9. Always measure the oil level with dipstick (2) in order to ensure that the correct amount of oil was added.

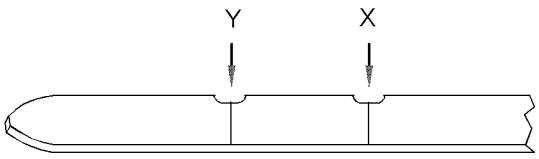

Illustration 190 g01165836

(Y) Min mark
(X) Max mark

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

11. Replace the lower service access door on the left side of the machine.

12. Close the left engine access door.

i02624244

Ether Starting Aid Cylinder - Replace

SMCS Code: 1456

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

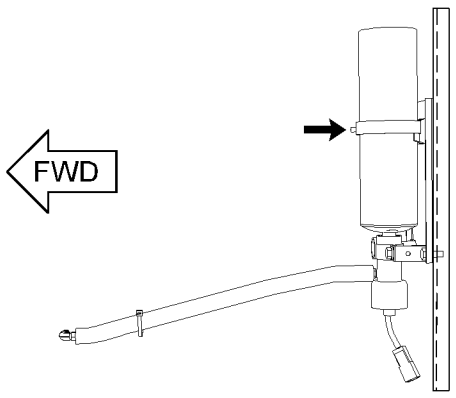

Illustration 191 g01260289

2. Loosen the cylinder retaining clamp. Unscrew the empty ether starting aid cylinder and remove the empty ether starting aid cylinder.

3. Remove the used gasket. Install the new gasket that is provided with each new ether starting aid cylinder.

4. Install the new ether starting aid cylinder. Tighten the ether starting aid cylinder hand tight. Tighten the cylinder retaining clamp securely.

5. Close the engine access door.

i06060041

Final Drive Oil - Change

SMCS Code: 4050

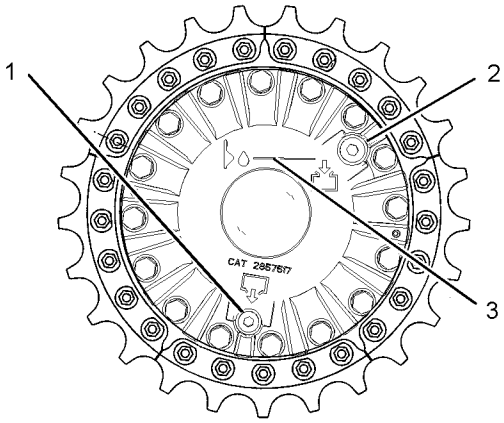

Illustration 192 g01260414

1. Move the machine so that final drive oil level mark (3) is horizontal. The final drive drain plug (1) is at the bottom of the final drive.

2. Remove final drive drain plug (1) and allow the oil to drain into a suitable container.

3. Clean drain plug (1) and replace the plug . Tighten the drain plug to a torque of 180 ± 27 N·m (132 ± 20 lb ft).

4. Remove oil filler plug (2). Add oil until the oil is level with the plug threads. Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.

5. Clean oil filler plug (2) and install the plug . Tighten the oil filler plug to a torque of 300 ± 45 N·m (220 ± 33 lb ft).

6. Repeat this procedure for the other final drive.

i06060064

Final Drive Oil Level - Check

SMCS Code: 4050

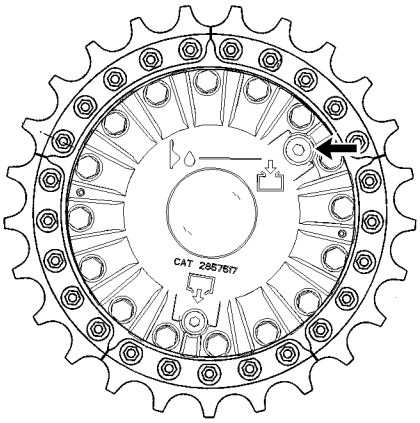

Illustration 193 g01260346

Oil – See “Lubricant Viscosities” in this manual for the proper final drive oils.

Final Drive Oil Level Mark – Fill the final drive with oil until the oil is level with this horizontal mark.

1. Position the final drive oil level mark at a horizontal position in order to check the oil level, as shown.
2. Remove the oil filler plug in order to check the oil level.
3. The oil should be level with the bottom of the plug threads.
4. Clean the plug and install the plug. Tighten the oil filler plug to a torque of 300 ± 45 N·m (220 ± 33 lb ft).
5. Repeat the procedure for the other final drive.

i06060080

Final Drive Oil Sample - Obtain

SMCS Code: 3258-008; 4050-008; 7542-008

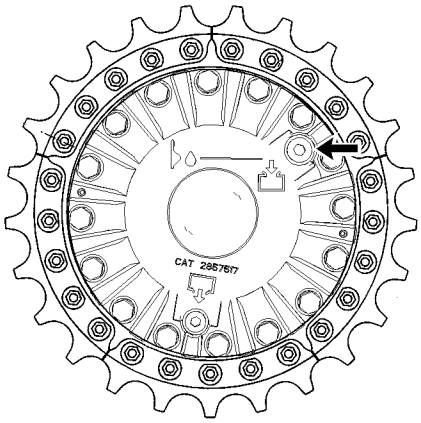

Illustration 194 g01260346

Remove the oil filler plug for the final drive. Obtain a sample of the final drive oil by pulling a sample through the filler plug opening.

When the oil sample is completed, clean the plug and install the plug. Tighten the oil filler plug to a torque of 300 ± 45 N·m (220 ± 33 lb ft).

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

i01942475

Free Spool Drag - Adjust

SMCS Code: 5163-025

Adjust the free spool drag to the operator's preference. For the correct procedure to adjust the free spool drag, refer to Specifications, Systems Operation, Testing and Adjusting, Disassembly and Assembly, “Free Spool - Test” for the winch hydrostatic systems.

i05429511

Front Idler Position - Check/ Adjust

SMCS Code: 4159-036

See the Testing and Adjusting manual for this machine for the check and adjustment procedure.

The procedure is for both the Caterpillar SystemOne undercarriages that have the center tread idler and SALT undercarriages with a conventional idler.

The SystemOne undercarriage and the SALT undercarriage require shim adjustment when the wear on the link and the bottom roller system is at 25%, 50%, and 75%. The adjustment is based on a Custom Track Service (CTS) report.

Reference: Refer to Testing and Adjusting, UENR1357, “D3K2, D4K2, D5K2 Track-Type Tractor Systems” “Front Idler Position - Check and Adjust”.

i04347810

Fuel System - Prime

SMCS Code: 1258

⚠ WARNING

Personal injury or death may result from failure to adhere to the following procedures.

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

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

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

⚠ 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.

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

Electric Lift Pump

This machine is equipped with an electric lift pump. The electric lift pump is located underneath the primary fuel filter on the left side of the engine.

Note: Do not fill fuel filters before installation in any circumstance. Do not open high-pressure fuel lines in order to purge air from the fuel system.

1. Ensure that the fuel system is in working order.

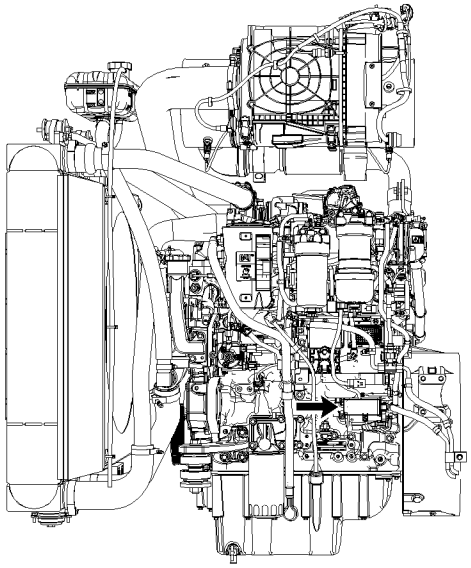

Illustration 195 g02502857

Note: When the engine start switch key is turned to the ON position, priming of the fuel system begins.

2. When the key switch is moved to the ON position and there is no engine speed present, the electric lift pump will run for 2 minutes before automatically stopping . This operation is the automatic fuel priming feature.

3. The engine fuel system should now be primed and the engine should now be able to start.

NOTICE
Do not crank the engine continuously for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking the engine again.

4. Crank the engine. If the engine does not start, or if the engine continues to misfire, additional priming in the key ON position may be necessary. Cycle the key switch from ON to OFF, the back to ON. This action will restart the automatic priming system.

5. Run the engine at the LOW IDLE position until the engine runs smoothly.

i04900092

Fuel System Filter (In-Line) - Replace

SMCS Code: 1261-510

⚠ WARNING

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

NOTICE
Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over disconnected fuel system component.

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. Turn off the engine.

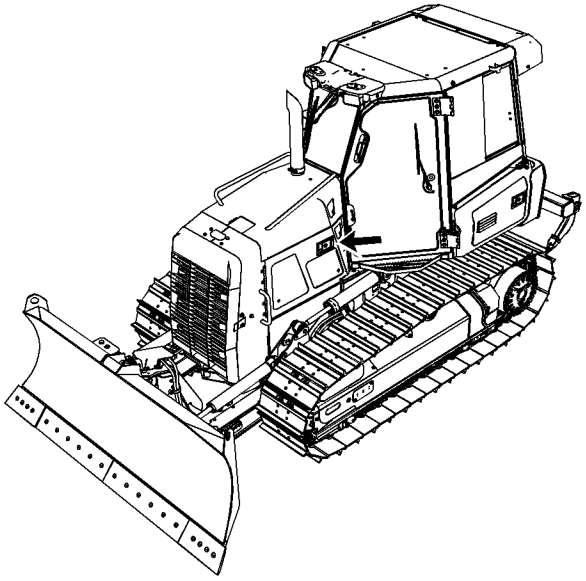

Illustration 196 g02502123

2. Open the left engine access door on the machine.

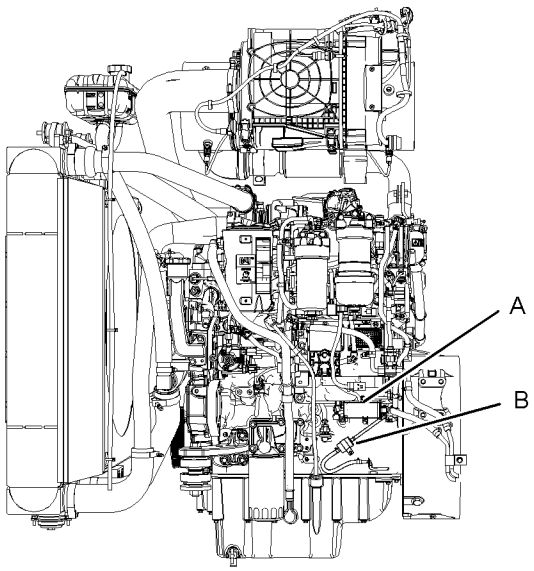

Illustration 197 g03053118

Some components are removed for clarity.

(A) Fuel pump
(B) In-line fuel filter

3. Remove in-line fuel filter (B).

4. Install the new in-line fuel filter.

5. Clean up any fuel that remains on any surface area.

Note: Do not start the engine until all the necessary service to the fuel system section is completed. See the Operation and Maintenance Manual, “Fuel System - Prime” for the engine starting procedure that follows service to the fuel system.

6. Start the engine and check the fuel system for leaks.

7. Close the left engine access door on the machine.

i05383103

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

⚠ WARNING

Personal injury can result when using cleaner solvents.

To help prevent personal injury, follow the instructions and warnings on the cleaner solvent container before using.

⚠ WARNING

Personal injury or death can result from a fire.

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

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

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

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

Remove the Element

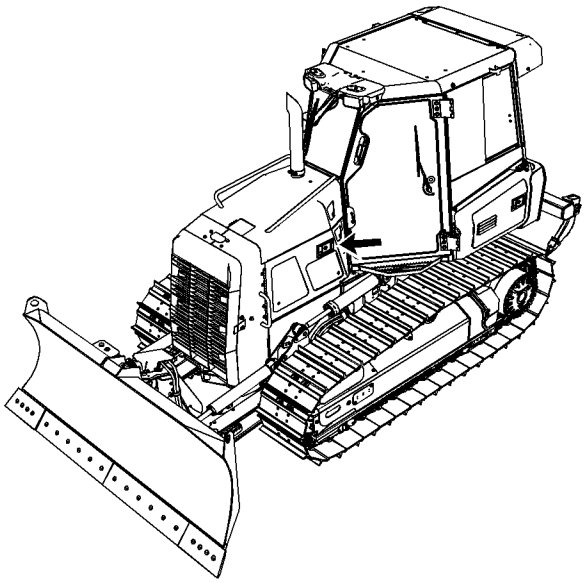

Illustration 198 g02502123

Note: Do not fill fuel filters before installation in any circumstance. Do not open high-pressure fuel lines in order to purge air from the fuel system.

1. The secondary fuel filter is located on the front of the engine on the left side. Open the left engine access door.

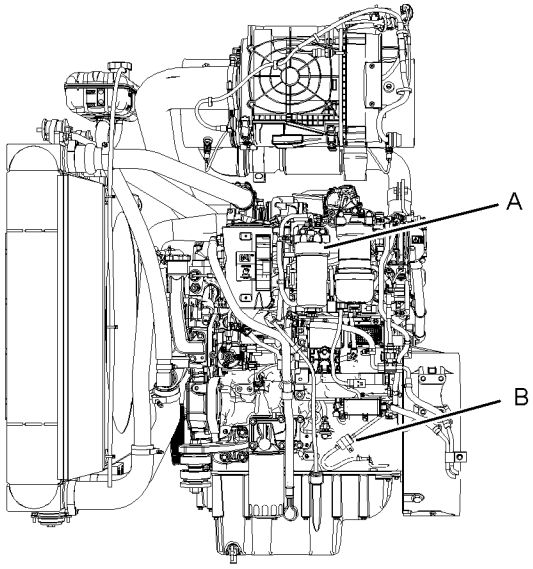

Illustration 199 g02503296

Some components are removed for clarity.

2. Place a suitable container under the fuel filter in order to catch any fuel that might spill. Clean up any spilled fuel. Clean the outside of secondary fuel filter (A).

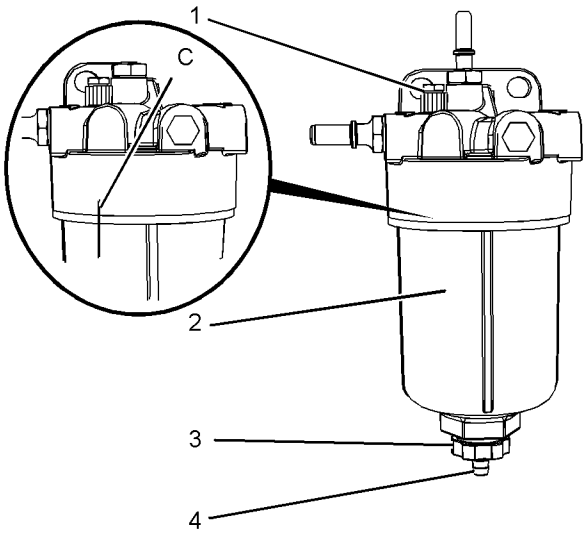

Illustration 200 g02789133

3. Make a temporary Mark (C) across the filter before the assembly is removed. Install a suitable tube onto drain (4). Open the drain valve (3). Rotate the drain valve counterclockwise. Two full turns are required. Loosen vent screw (1).

4. Allow the fuel to drain into the container. Remove the tube.

5. Tighten the vent screw (1) securely.

6. Remove the filter bowl (2). Rotate the filter assembly counterclockwise in order to remove the assembly.

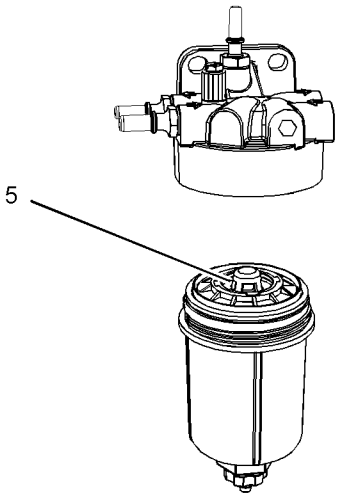

Illustration 201 g02789153

7. Rotate the filter element counterclockwise and remove the filter element (5). Clean the filter bowl.

Note: Replace fuel screen (B) on the same schedule as secondary fuel filter (A).

Reference: See Operation and Maintenance Manual, “Fuel System (In-Line) Filter - Replace” for instructions.

Install the Element

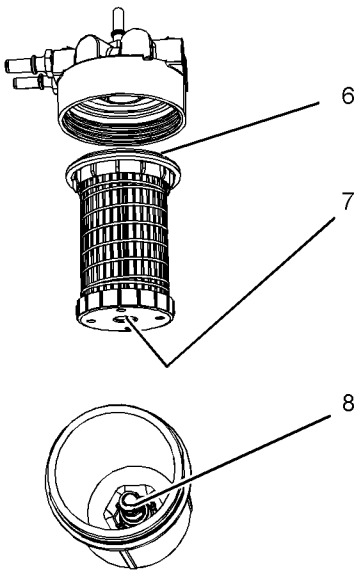

Illustration 202 g01937616

1. Locate the thread in the filter element (7) onto the threads (8). Spin on the element. Do not tighten.

2. Lubricate the O ring seal (6) with clean engine oil. Do NOT fill the filter bowl (2) with fuel before the filter assembly is installed.

3. Do not use a tool in order to install the filter assembly. Tighten the assembly by hand. Install the filter bowl (2) and align with your temporary Marks.

4. Prime the fuel system. Refer to the Operation and Maintenance Manual, “Fuel System - Prime” for more information.

5. Start the engine. Check for leaks.

6. The primary filter element must be replaced at the same time as the secondary filter element. Refer to the Operation and Maintenance Manual , “Fuel System Water Separator - Replace”.

7. Close the left engine access door.

i04317467

Fuel System Water Separator - Drain

SMCS Code: 1263-543; 1263

⚠ WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE
Ensure that the engine is stopped before any servicing or repair is performed.

NOTICE
The water separator can be under suction during normal engine operation. Ensure that the drain valve is tightened securely to help prevent air from entering the fuel system.

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.

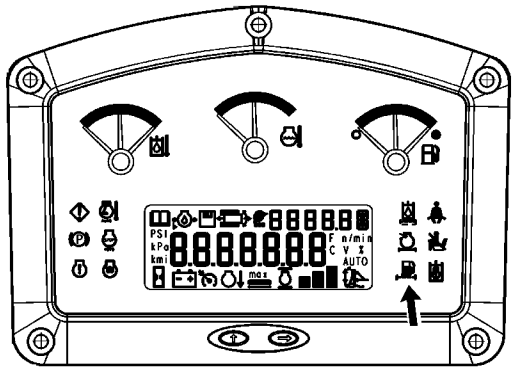

Illustration 203 g02476878

When the water separator element for the fuel system needs to be drained, an indicator light on the dash will be illuminated. The water separator is located in the compartment on the left side of the machine.

Note: Do not fill fuel filters before installation in any circumstance. Do not open high-pressure fuel lines in order to purge air from the fuel system.

1. Open the left engine access door.

2. Place a suitable container under the water separator in order to catch any fuel that might spill. Clean up any spilled fuel.

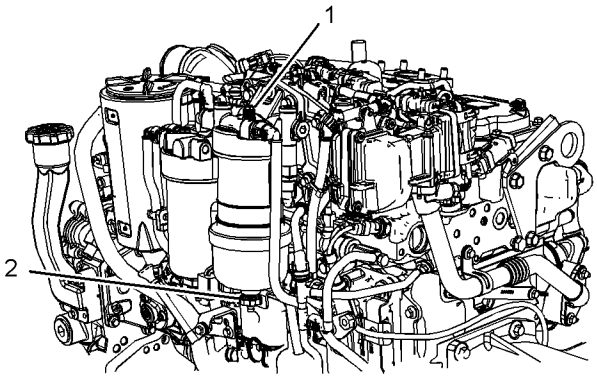

Illustration 204 g02504156

Note: This primary fuel filter has vent screw (1).

3. Install a suitable tube onto drain (2). Loosen vent screw (1).

4. Open drain (2). Allow the fluid to drain into the container.

5. Tighten drain (2) by hand pressure only. Remove the tube and dispose of the drained fluid in a safe place.

6. Tighten vent screw to 6 N·m (53 lb in).

7. Close the access door.

If the engine fails to start, change the fuel filter. If there is a power loss, change the fuel filter.

i05399033

Fuel System Water Separator - Replace

SMCS Code: 1263

⚠ WARNING

Personal injury or death may result from failure to adhere to the following procedures.

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

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

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

NOTICE
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.

Remove the Element

1. Turn the fuel supply valve (if equipped) to the OFF position before performing this maintenance.

2. Open the left engine access door.

3. Place a suitable container under the water separator in order to catch any fuel that might spill. Clean up any spilled fuel. Clean the outside body of the filter assembly.

4. Make a temporary Mark (A) across the filter before the assembly is removed.

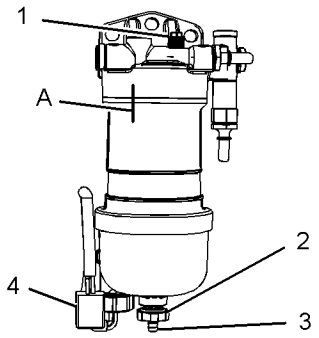

Illustration 205 g02504397

5. Install a suitable tube onto drain (3). Open the drain valve (2). Rotate the drain valve counterclockwise. Two full turns are required. Loosen vent screw (1).

Note: Two complete rotations of the valve will release the valve from the filter element.

6. Allow the fuel to drain into the container. Remove the tube and install the valve into the filter element. Engage the threads of the valve into the filter element. Do not secure the valve.

7. Tighten the vent screw (1) securely . Remove the wiring harness from connection (4).

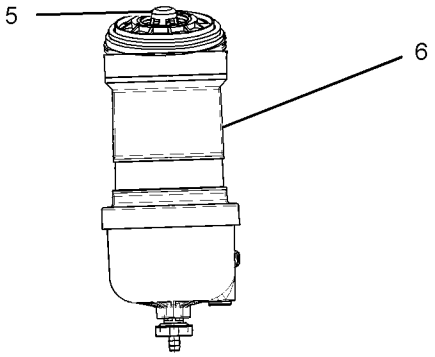

Illustration 206 g02789165

8. Remove the filter bowl (6). Use a standard filter strap wrench and rotate the filter assembly counterclockwise to remove the assembly.

9. Rotate the filter element counterclockwise and remove the filter element (5). Clean the filter bowl.

Install the Element

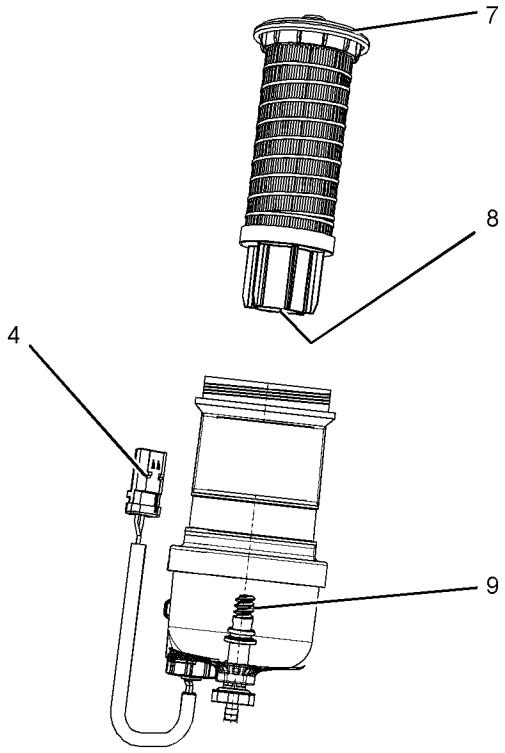

Illustration 207 g02504457

1. Locate the thread in the filter element (8) onto the threads (9). Spin on the element. Do not tighten.

2. Lubricate the O ring seal (7) with clean engine oil. Do NOT fill the bowl with fuel before the assembly is installed.

3. Do not use a tool in order to install the filter assembly. Tighten the filter bowl (6) by hand. Install the filter bowl (6) and align with your temporary marks (A).

4. Tighten the drain valve (2) securely. Remove the container and dispose of the fuel in a safe place. Install the wiring harness to connection (4).

5. Turn the fuel supply valve to the ON position. Prime the fuel system. Refer to the Operation and Maintenance Manual, “Fuel System - Prime” for more information.

6. Start the engine. Check for leaks.

7. The secondary filter element must be replaced at the same time as the primary filter element. Refer to the Operation and Maintenance Manual , “Fuel System Secondary Filter - Replace”.

8. Close the left engine access door.

i04358834

Fuel Tank Cap - Clean

SMCS Code: 1273

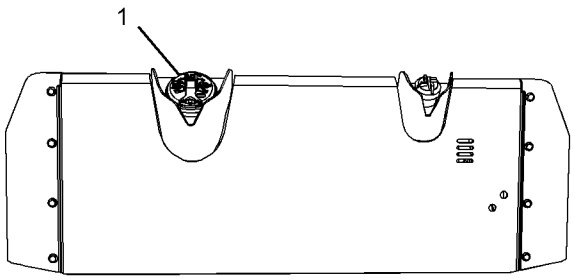

Illustration 208 g02512159

Fuel tank cap (1) is located on the left side on the rear of the machine.

1. Clean fuel tank cap (1) and the surrounding area.

2. Remove the fuel tank cap and disassemble the fuel tank cap.

3. Inspect the seal for damage. Replace the seal, if necessary. Lubricate the seal on the fuel tank cap.

4. Replace the element on the fuel tank cap.

5. Assemble the fuel tank cap and install fuel tank cap (1).

i04358874

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273

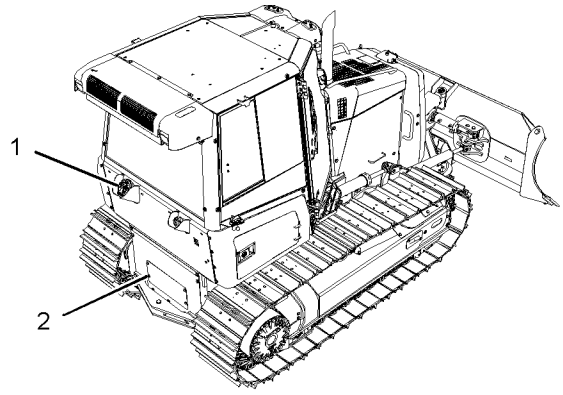

Illustration 209 g02512558

1. Slowly, remove fuel tank cap (1) in order to relieve pressure.

2. Remove plate (2). The drain valve for the fuel tank is located on the center of the machine below the fuel tank.

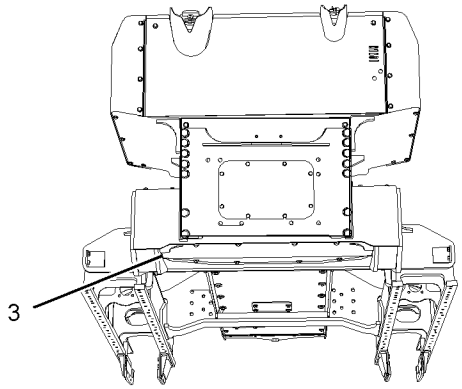

Illustration 210 g02512598

3. Perform the following procedure for a machine with a winch (if equipped). Remove plate (3). The drain valve for the fuel tank is located on the left side of the machine beneath the fuel tank.

Note: Drain the fuel underneath the fuel tank when a rear attachment is installed on the machine.

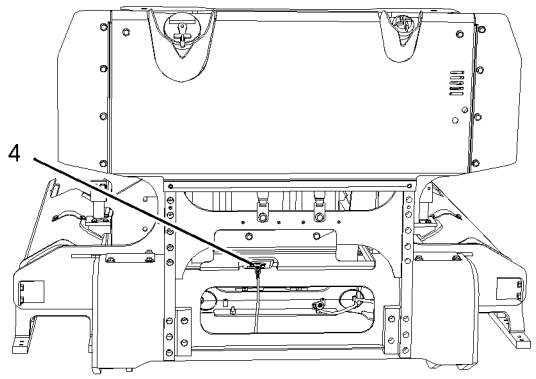

Illustration 211 g02512616

Some components are removed for clarity.

4. Open drain valve (4). Allow the water and the sediment to drain into a suitable container. Close drain valve (4).

i05056269

Fuel Tank Water and Sediment - Drain

(Equipped with Winch or Other Rear Attachment)

SMCS Code: 1273

Perform the following Fuel Tank and Water Sediment - Drain" procedure every two weeks for fire suppression tractors.

Fire Plow Only

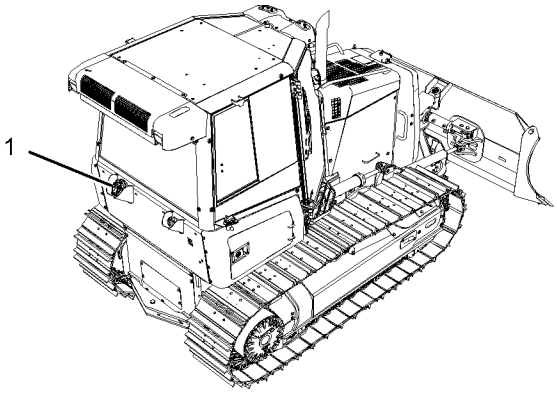

Illustration 212 g03384616

1. Slowly, remove fuel tank cap (1) in order to relieve pressure.

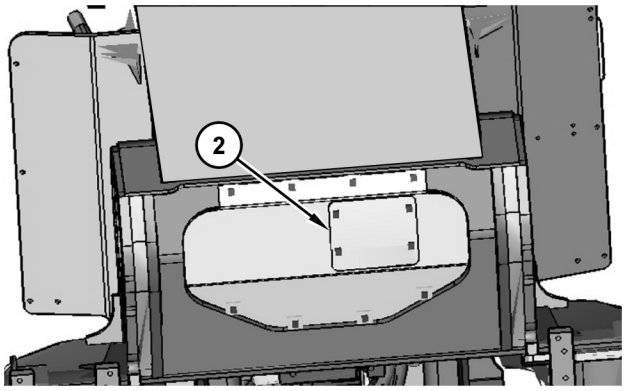

Illustration 213 g03384610

Bottom view

2. Remove plate (2) under the rear of the machine to access the remote drain valve for the fire plow machine. The drain valve for the fuel tank is located toward the rear and right side of the machine underneath the fuel tank.

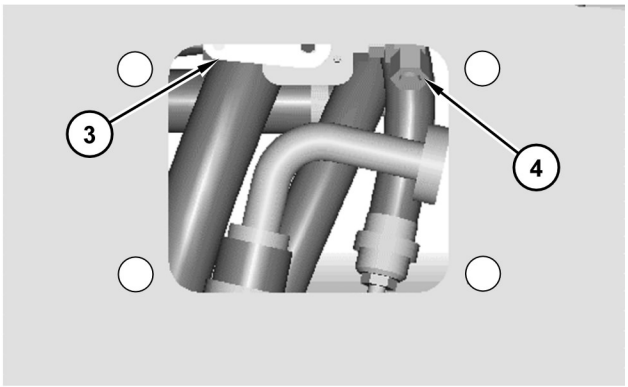

Illustration 214 g03384636

Drain valve (3) shown open

3. Remove drain cap from drain line (4). Make sure that an appropriate drain hose is connected to drain line (4). Open drain valve (3) . Allow the water and the sediment to drain into a suitable container.

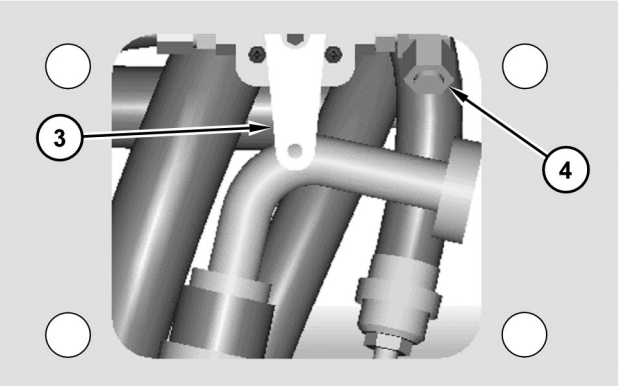

Illustration 215 g03384651

Drain valve (3) shown closed

4. Close drain valve (3), remove drain hose and replace cap on drain line (4). Place the drain hose into the machine and install plate (2).

i04318020

Fuses - Replace

SMCS Code: 1417

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

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

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

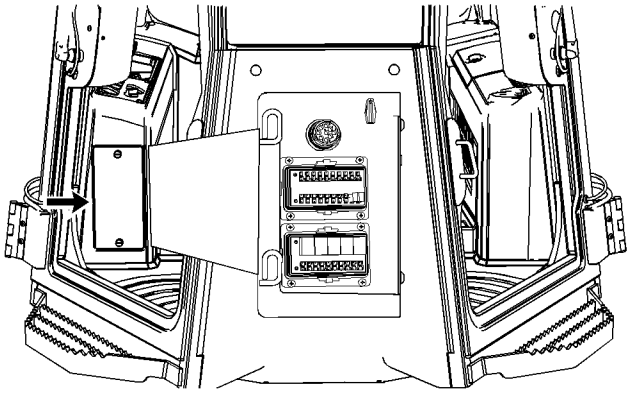

Illustration 216 g02506957

Access for the fuse panel

Note: The fuse panel for this machine is equipped with all of the available options.

The fuse panel is located on the front panel next to the right side of the seat.

In order to change the fuses, remove the cover to the fuse block in the following manner.

- Push the locking tabs on the cover toward the center of the fuse block.
- Pull the cover away from the fuse block.

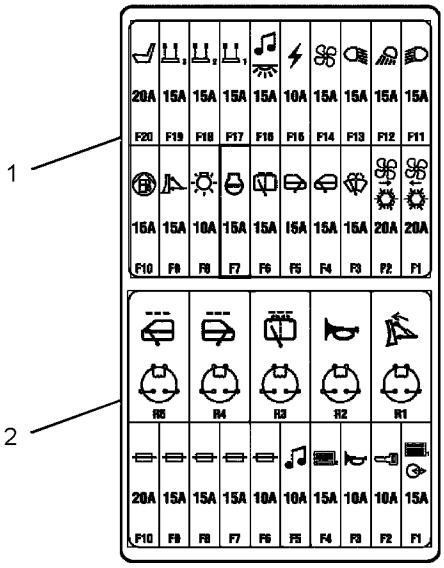

Illustration 217 g02476936

Enclosed ROPS fuse panel

(1) Fuse block 1
(2) Fuse block 2

Enclosed ROPS Fuse Panel

Machine with an enclosed Rollover Protection System (cab)

Fuse Block 1

Condenser fan 1 (F1) – 20 Amp Mini breaker

Condenser fan 2 (F2) – 20 Amp mini circuit breaker

Window wiper for the front window and front window washer pump (F3) – 15 Amp

Window wiper for the left door (F4) – 15 Amp

Window wiper for the right door (F5) – 15 Amp

Rear window wiper and rear window washer pump (F6) – 15 Amp

Engine stop (F7) – 15 Amp (engine electrical system)

Lighting switches (F8) – 10 Amp

Power Pitch Blade (9) – 15 Amp

Fuel Pump (F10) – 15 Amp

Front lights (F11) – 15 amp

Front attachment lights (F12) – 15 Amp

Rear working lights (F13) – 15 Amp

Blower (low, medium) (F14) – 15 Amp

Power Port (F15) – 10 Amp

Dome light/radio (F16) – 10 Amp

Blade Control 1 (F17) – 15 Amp

Blade Control 2 (F18) – 15 Amp

Blade Control 3 (F19) – 15 Amp

Seat (F20) – 20 Amp

Fuse Block 2

Note: Mini circuit breakers protect the electrical system from damage that is caused by overloaded circuits. Replace the mini circuit breakers if the blower fan motor or condenser fans are intermittent or inoperable. Repair the circuit or replace the component, if necessary.

ECM 1 Machine/Service Port (F1) – 15 Amp

Key start switch (F2) – 10 Amp

Horn (F3) – 10 Amp

ECM 2 Attachments (F4) – 15 Amp

Radio (F5) – 10 Amp

Spares – One 10 Amp (F6), three 15 Amp (F7, F8, F9) and one 20 Amp (F10) fuses

Open ROPS Fuse Panel

Machine with an Open Rollover Protection System

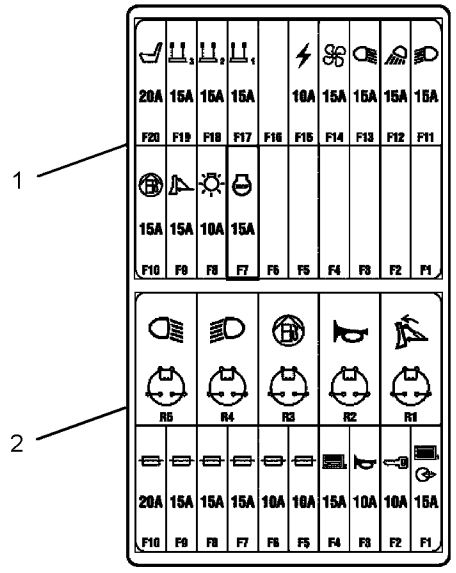

Illustration 218 g02508656

Fuse Block 1 (OROPS)

Engine stop (F7) – 15 Amp (engine electrical system)

Lighting switches (F8) – 10 Amp

Power Pitch Blade (9) – 15 Amp

Fuel Pump (F10) – 15 Amp

Front lights (F11) – 15 amp

Front attachment lights (F12) – 15 Amp

Rear working lights (F13) – 15 Amp

Blower (low, medium) (F14) – 15 Amp

Power Port (F15) – 10 Amp

Dome light/radio (F16) – 10 Amp

Blade Control 1 (F17) – 15 Amp

Blade Control 2 (F18) – 15 Amp

Blade Control 3 (F19) – 15 Amp

Seat (F20) – 20 Amp

Fuse Block 2 (OROPS)

Note: Mini circuit breakers protect the electrical system from damage that is caused by overloaded circuits. Replace the mini circuit breakers if the blower fan motor or condenser fans are intermittent or inoperable. Repair the circuit or replace the component, if necessary.

ECM 1 Machine/Service Port (F1) – 15 Amp

Key start switch (F2) – 10 Amp

Horn (F3) – 10 Amp

ECM 2 Attachments (F4) – 15 Amp

Spares – Two 10 Amp (F5, F6), three 15 Amp (F7, F8, F9) and one 20 Amp (F10) fuses

Fuse Panel Behind Cab

There is an additional fuse panel behind the cab inside the right access door.

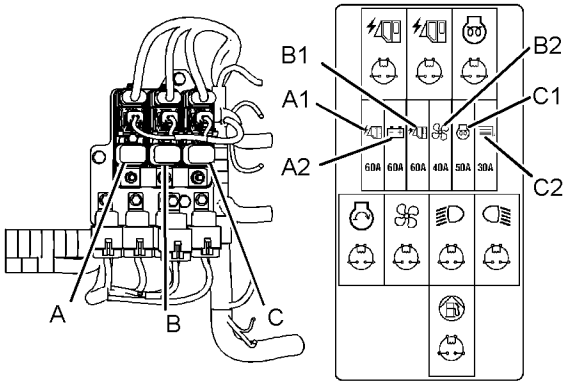

Illustration 219 g02507158

Enclosed ROPS machine

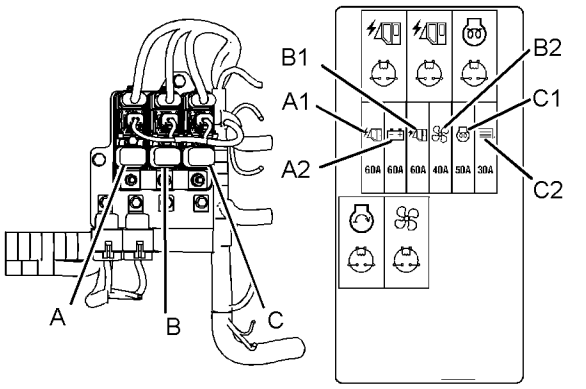

Illustration 220 g02508516

Open ROPS machine

First pair (A) – Two 60 Amp fuses

Second pair (B) – One 60 Amp fuse and one 40 Amp fuse

Third pair (C) – One 50 Amp fuse and one 30 Amp fuse

This panel has six fuses. In order to change these fuses, push down on the locking tab on the fuse cover. Pull the cover away from the back of the cab.

Main cab fuse 1 (A1) – 60 Amp

Unswitched battery fuse (A2) – 60 Amp

Main cab fuse 2 (B1) – 60 Amp

High speed blower (B2) – 40 Amp

Glow plugs (C1) – 50 Amp

ECM Engine (C2) – 30 Amp

i04355469

Hydraulic System Oil - Change

SMCS Code: 5050

Note: S·O·S oil analysis must be performed at every 500 service hours or 3 months in order to extend the hydraulic oil change interval. The normal hydraulic oil change interval is every 2000 service hours or 1 year. By performing S·O·S oil analysis, the hydraulic oil change interval may be extended to 4000 service hours or 2 years. If S·O·S oil analysis is not available, the hydraulic oil change interval must remain at every 2000 service hours or 1 year.

⚠ WARNING

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

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

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

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

Park the machine on level ground. Lower all attachment to the ground. Move the parking brake switch to the ENGAGED position. Stop the engine.

Note: The Hystat transmission and the hydraulic system use a common tank.

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.

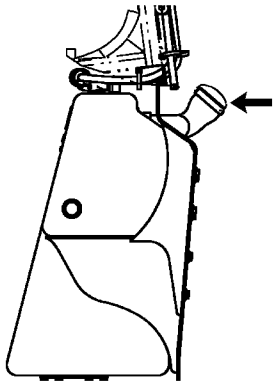

Illustration 221 g01701734

Left view of hydraulic tank (oil filler cap)

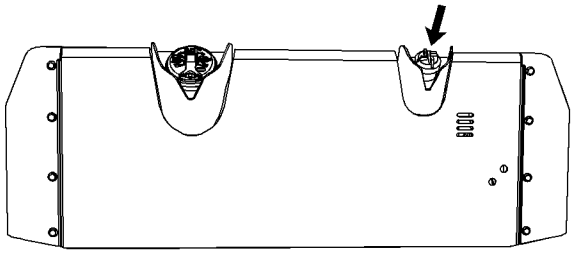

Illustration 222 g02510456

1. Remove hydraulic tank filler cap that is above the access door on the rear of the machine, if equipped.

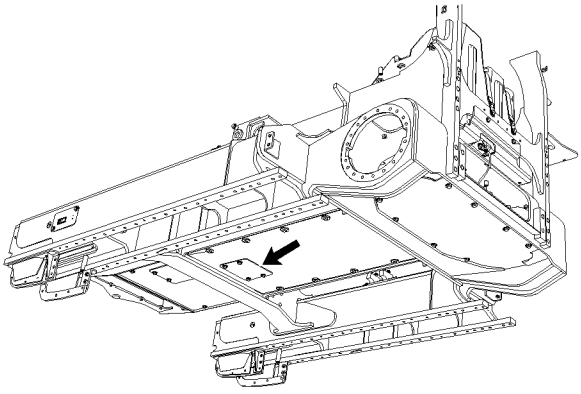

Illustration 223 g01259694

2. Remove the oil drain access cover on the bottom plate.

3. Hook a hose up to the drain valve of the hydraulic tank and drain the hydraulic oil into a suitable container.

4. Install the oil drain access cover on the bottom plate .

5. Change the hydraulic system filters. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Filter - Replace”.

6. Fill the hydraulic system oil tank. Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.

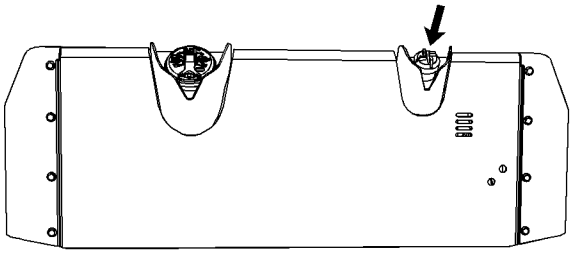

Illustration 224 g02510456

7. Install the hydraulic cap.

8. Start the engine and run the engine for a few minutes.

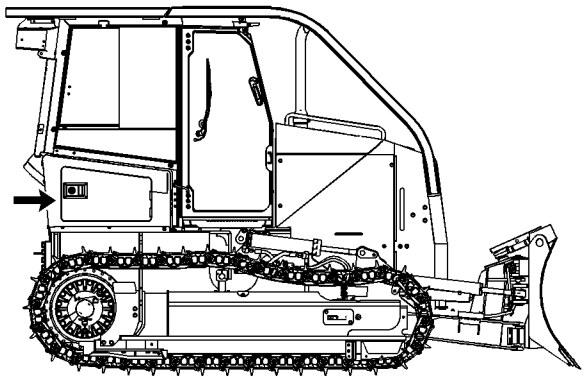

Illustration 225 g01701714

Location of sight gauge

9. Open the right rear access door.

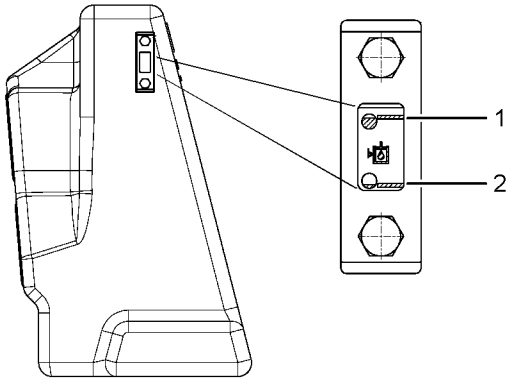

Illustration 226 g01701774

Right side view of hydraulic tank

(1) Full mark
(2) “ADD” mark

10. View the sight gauge inside the right rear access door. Maintain the hydraulic oil level above the “ADD” mark (2) on the sight gauge. Add oil, if necessary.

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

11. Stop the engine.

12. If necessary, tighten any loose clamps and any loose connections. Replace any damaged hoses.

13. Close the access door.

i04355635

Hydraulic System Oil Filter - Replace

SMCS Code: 5068

Note: The hystat transmission and the hydraulic system use a common tank.

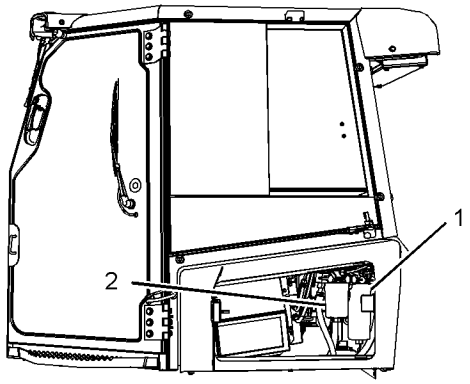

Illustration 227 g02510701

1. Hydraulic filter (1) is located on the left side of the machine. Open the access door on the left side of the machine.

2. Remove both filter elements with a strap type wrench, if equipped. Winch filter (2) is for the optional winch attachment.

3. Clean the filter element mounting bases. Remove any part of the filter element gasket that remains on the filter element mounting bases.

4. Apply a light coat of oil to the gasket of the new filter elements.

5. Install the new filter elements by hand.

Note: Instructions for the installation of the filters are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

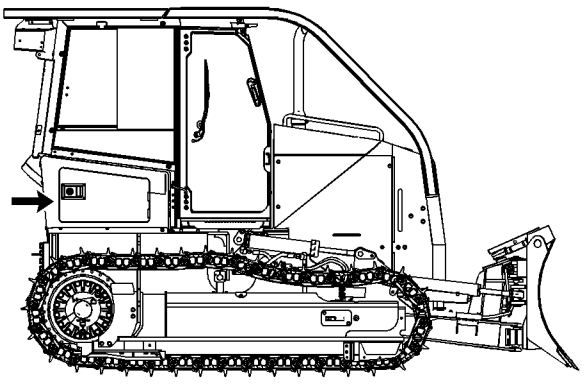

Illustration 228 g01701714

Location of sight gauge

6. Open the right rear access door.

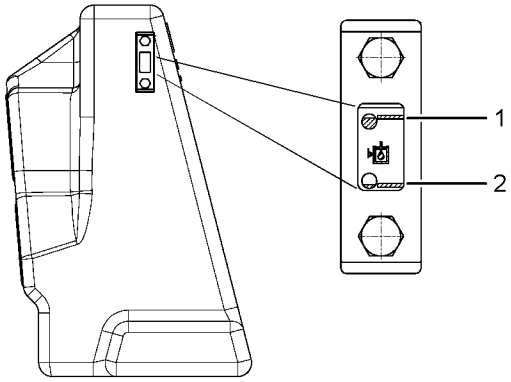

Illustration 229 g01701774

Right side view of hydraulic tank

(1) Full mark
(2) “ADD” mark

7. View the sight gauge inside the right rear access door. Maintain the hydraulic oil level above the “ADD” mark (2) on the sight gauge. Add oil, if necessary.

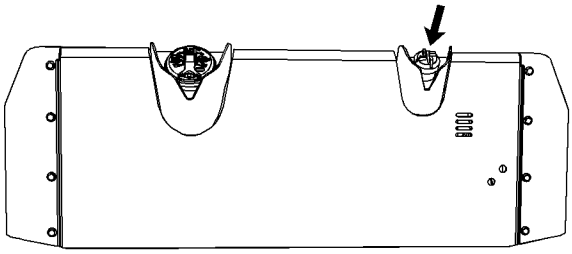

Illustration 230 g02510456

8. Inspect the gasket on the cap for damage. Replace the gasket, if necessary.

9. Install the cap .

i04356115

Hydraulic System Oil Level - Check

SMCS Code: 5056; 7479

Note: The Hystat transmission and the hydraulic system use a common tank.

1. Park the machine on a level surface before you check the hydraulic system oil level.

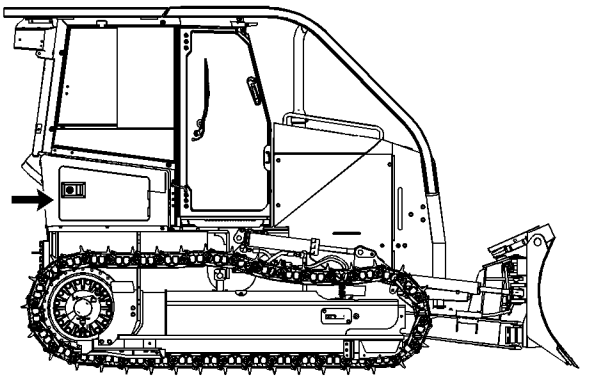

Illustration 231 g01701714

Location of sight gauge

2. Open the right rear access door.

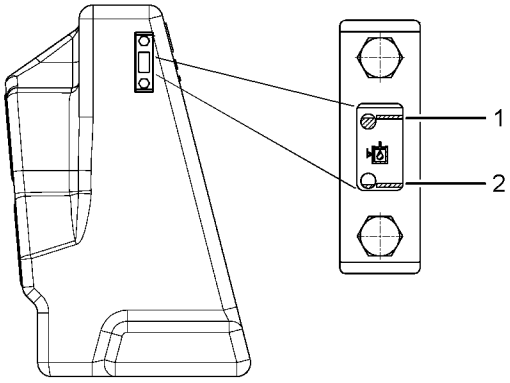

Illustration 232 g01701774

Right side view of hydraulic tank

(1) Full mark
(2) “ADD” mark

3. View the sight gauge inside the right rear access door. Maintain the hydraulic oil level above the “ADD” mark (2) on the sight gauge.

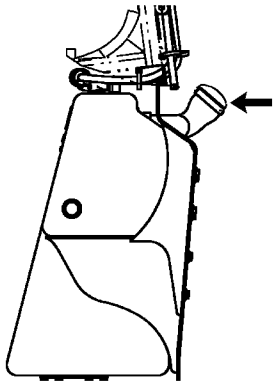

Illustration 233 g01701734
Left view of hydraulic tank

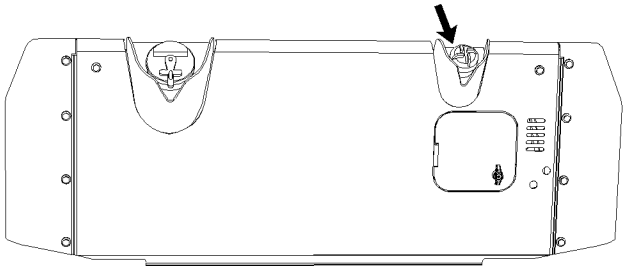

Illustration 234 g01259742

4. Remove hydraulic tank filler cap and add hydraulic oil, if necessary.

5. Clean the cap. Install the cap.

i04356125

Hydraulic System Oil Sample - Obtain

SMCS Code: 5095-008

Note: The Hystat transmission and the hydraulic system use a common tank.

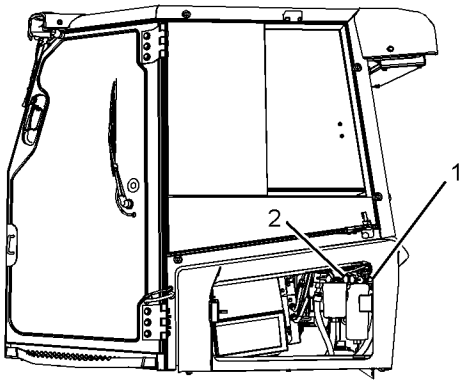

Illustration 235 g02510957

Sampling valve (1) for the hydraulic system oil is located on the filter base of the hydraulic oil filter for the hydraulic system.

Sampling valve (2) for the hydraulic system oil is located on the filter base of the winch oil filter for the hydraulic system, if equipped.

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

i04642249

Hydraulic Tank Breather - Replace

SMCS Code: 5050-510-BRE; 5056-510-BRE; 5118-510

The breather filters for the hydraulic tank are located inside the rear “C” posts.

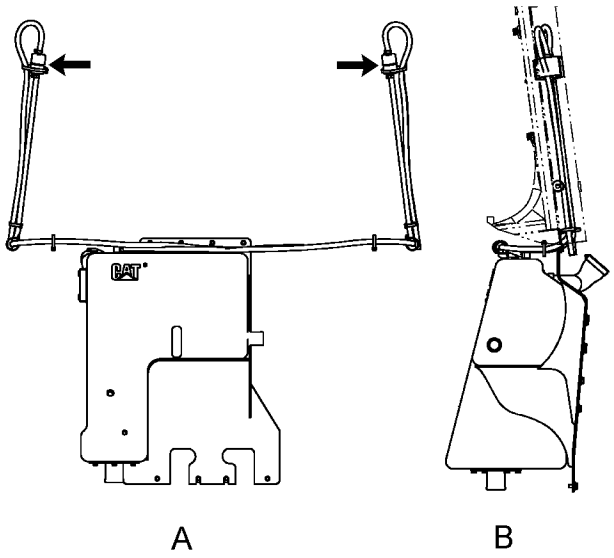

Illustration 236 g02787021

Two breather assemblies

(A) Front view
(B) Left view

Open the rear access doors on both sides of the machine. Remove the hydraulic lines with the breather filters. Replace both of the old breather filters with a new breather assembly. Make sure that the hoses are not clogged or kinked. Install each hydraulic line and breather filter to the original position.

i04653512

Oil Filter - Inspect

SMCS Code: 1318; 3067; 5068

Inspect a Used Filter for Debris

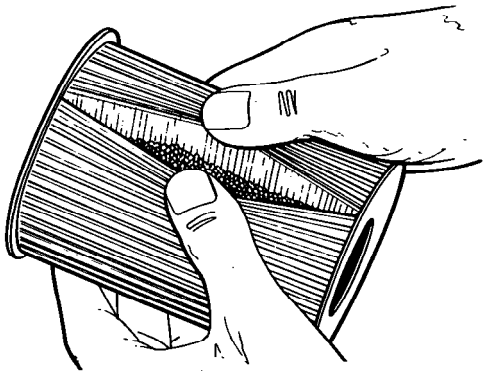

Illustration 237 g00100013

The element is shown with debris.

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 condition could be caused by friction and by normal wear. Consult your Cat 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 occurrence can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i03182603

Radiator Core - Clean

SMCS Code: 1353; 1805; 1810

Inspect the radiator for these items: damaged fins, corrosion, dirt, grease, insects, leaves, oil and other debris. Clean the radiator, if necessary.

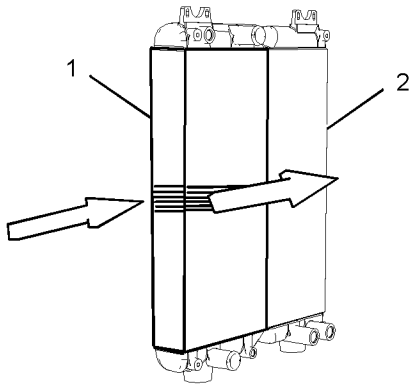

Illustration 238 g01260698

(1) Radiator core
(2) Hydraulic oil cooler

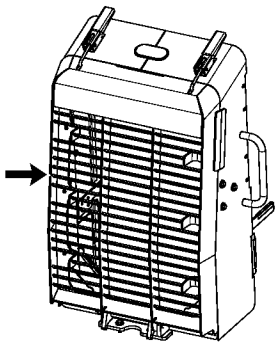

Illustration 239 g01625733

The radiator grill for the fire plow is shown, if equipped.

You can 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.

Inspect the radiator for these items: damaged fins, corrosion, dirt, grease, insects, leaves, oil and other debris. Clean the radiator, if necessary.

⚠ 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.

Pressurized air is the preferred method for removing loose debris. Direct the air in the opposite direction of the fan's air flow. Hold the nozzle approximately 6 mm (0.25 inch) away from the fins. Slowly move the air nozzle in a direction that is parallel with the tubes. This will remove debris that is between the tubes.

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

i04359492

Radiator Pressure Cap - Clean/Replace

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

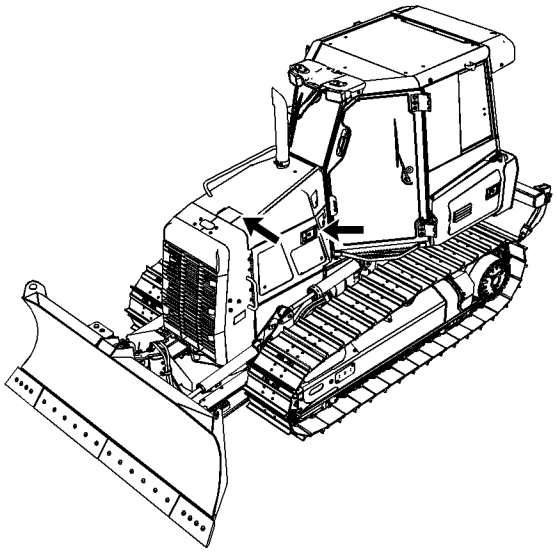

Illustration 240 g02512842

1. Open the access panel on top of the engine compartment.

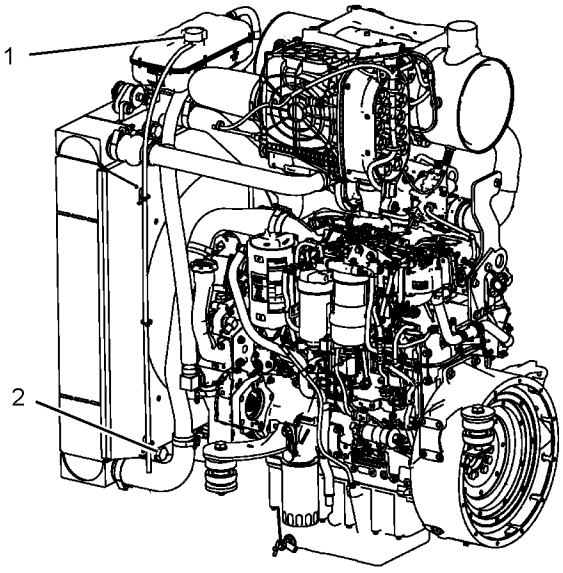

Illustration 241 g02789034

2. Slowly loosen pressure cap (1) in order to release pressure from the cooling system.

3. Remove the pressure cap.

4. Inspect the pressure cap for damage, for deposits, or for foreign material. Clean the pressure cap with a clean cloth. Replace the pressure cap if the cap is damaged.

5. Install the pressure cap.

i01574318

Ripper - Inspect/Replace

SMCS Code: 6808-510; 6812-510

Tips

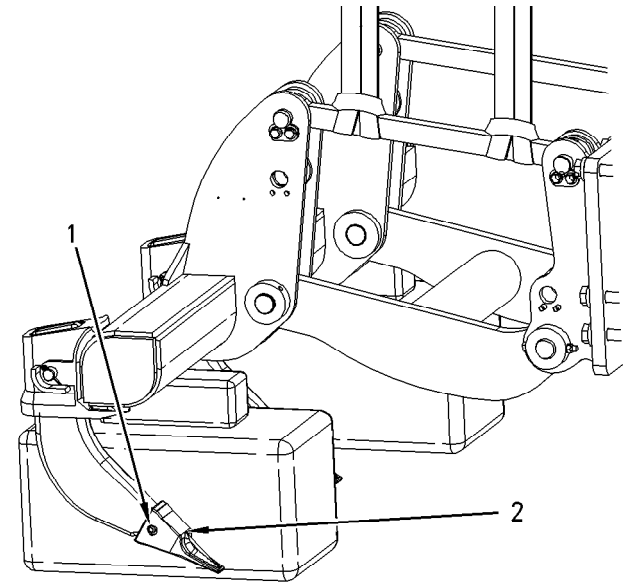

Illustration 242 g00818031

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

1. Raise the ripper. Place blocking under the ripper. Lower the ripper onto the blocking. The ripper should be high enough so that the ripper tip can be removed. Do not place the ripper too high.

2. If the ripper tip is worn, drive out pin (1). Remove tip (2) and the shank pin retainer.

3. Clean the shank pin retainer and the pin.

4. Install the new tip and the retainer.

5. Install pin (1) from the opposite side of the retainer.

6. Raise the ripper and remove the blocking.

7. Lower the ripper to the ground.

Shank

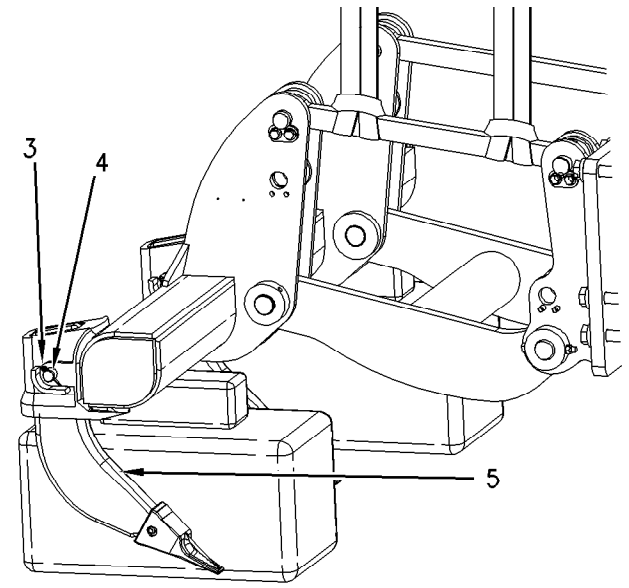

Illustration 243 g00818038

When the ripper shank is worn or damaged, replace the ripper shank.

1. Raise the ripper. Place blocking under the ripper. Lower the ripper onto the blocking. The ripper should be high enough so that the ripper shank can be removed. Do not place the ripper too high.

2. If the shank is worn or damaged, remove cotter pin (3). Then drive out pin (4). Remove shank (5).

3. Install the new shank and pin (4).

4. Install cotter pin (3).

5. Raise the ripper and remove the blocking.

6. Lower the ripper to the ground.

i02519439

Ripper Linkage and Cylinder Bearings - Lubricate

SMCS Code: 5352; 6300; 6313

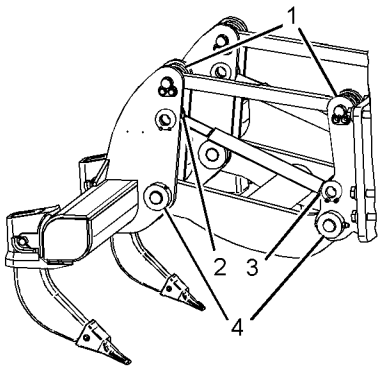

Illustration 244 g01260808

1. Lubricate the two fittings (1) for the upper link pin on each side of the ripper.

2. Lubricate two fittings (2) at the top of the cylinder. Lubricate two fittings (3) at the bottom of the cylinder.

3. Lubricate two fitting (4) on each side for the lower link.

i05399089

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7325

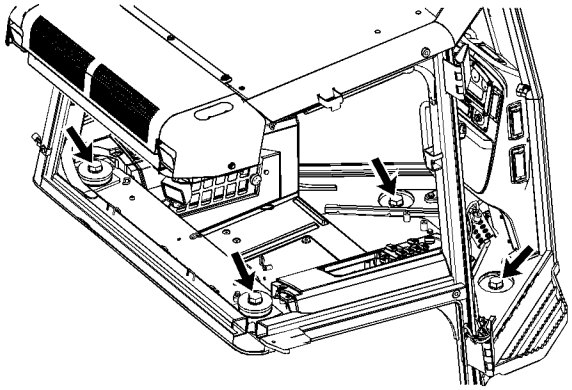

Illustration 245 g02510976

Inspect the Rollover Protective Structure (ROPS) for bolts that are loose or damaged. Replace any damaged bolts and any missing bolts with original replacement parts only.

Note: Apply oil to all bolt threads for the ROPS before you install the ROPS bolts.

Do not weld reinforcement plates to the ROPS in order to straighten the ROPS. Do not weld reinforcement plates to the ROPS in order to repair the ROPS.

Consult your Cat dealer for inspection of any potential damage or repair of any damage to any Operator Protective Structure, including ROPS, FOPS, TOPS, OPS, and OPG. Refer to Special Instruction, SEHS6929, “Inspection, Maintenance, and Repair of Operator Protective Structures (OPS) and Attachment Installation Guidelines for All Earthmoving Machinery” for more information.

i04423622

Seat Belt - Inspect

SMCS Code: 7327

Always inspect 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.

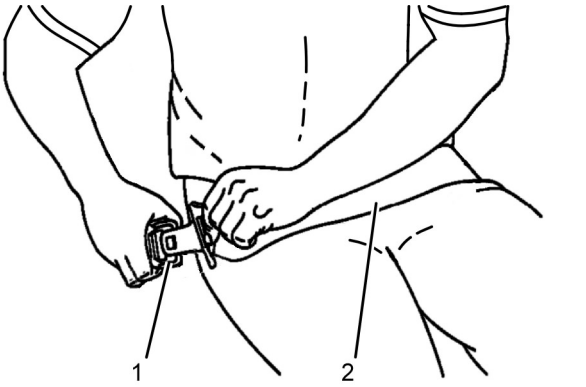

Illustration 246 g02620101

Typical example

Inspect buckle (1) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect seat belt (2) for webbing that is worn or frayed. Replace the seat belt if the webbing is worn or frayed.

Inspect all seat belt mounting hardware for wear or for damage. Replace any mounting hardware that is worn or damaged. Make sure that the mounting bolts are tight.

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

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

Note: The seat belt should be replaced within 3 years of the date of installation. A date of installation label is attached to the seat belt retractor and buckle. If the date of installation label is missing, replace belt within 3 years from the year of manufacture as indicated on belt webbing label, buckle housing, or installation tags (non-retractable belts).

i06891605

Seat Belt - Replace

SMCS Code: 7327-510

The seat belt should be replaced within 3 years of the date of installation. A date of installation label is attached to the seat belt retractor and buckle. If the date of installation label is missing, replace belt within 3 years from the year of manufacture as indicated on belt webbing label, buckle housing, or installation tags (non-retractable belts).

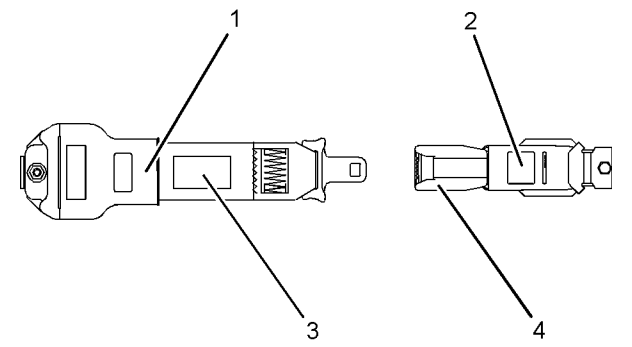

Illustration 247 g01152685

Typical Example

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

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

Determine age of new seat belt before installing on seat. A manufacture label is on belt webbing and imprinted on belt buckle. Do not exceed install by date on label.

Complete seat belt system should be installed with new mounting hardware.

Date of installation labels should be marked and affixed to the seat belt retractor and buckle.

Note: Date of installation labels should be permanently marked by punch (retractable belt) or stamp (non-retractable belt).

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

i05032254

Track - Check/Adjust

SMCS Code: 4170-036; 4170-025

Check

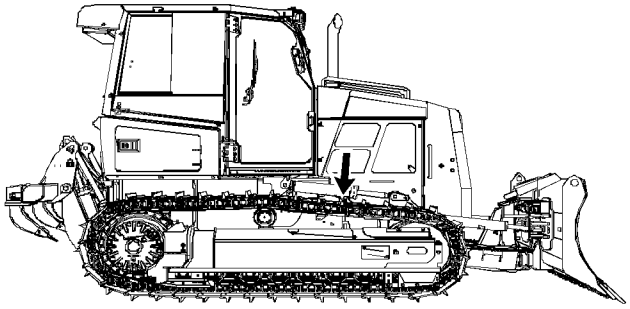

Illustration 248 g02512897

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

If tracks are too tight, wear of the components will accelerate. If tracks are too loose, wear of the components will accelerate.

1. Move the machine forward for a distance of two times the length of the machine. Allow the machine to stop without the use of the service brake. Shut off the engine.
2. Stand on the track between the front idler and the track carrier roller in order to produce as much track sag as possible.

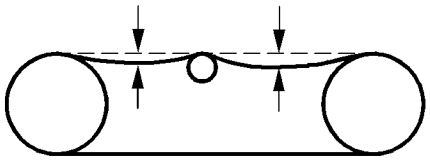

Illustration 249 g01161092

3. Measure the track sag in two places on each track.
   a. Place a tight string or a straight edge on top of the grousers between the carrier roller and front idler. Measure the distance from the straight edge to the grouser tip at the lowest point of sag.
   b. Place a tight string or a straight edge on top of the grousers between the carrier roller and sprocket. Measure the distance from the straight edge to the grouser tip at the lowest point of sag.
4. Total the two measurements. Refer to Table 15 in order to determine the correct sag.

Table 15

	Minimum	Target	Maximum
D3K2, D4K2, D5k2	50 mm (2.0 inch)	60 mm (2.36 inch)	70 mm (2.75 inch)

5. If this dimension is not correct, adjust the track.

If the track appears to be too tight or too loose, proceed to “Track Adjustment”.

Track Adjustment

⚠ WARNING

Do not remove any parts until all pressure has been relieved to avoid possible personal injury. Relieve pressure by opening relief valve one turn maximum. See maintenance guide for track adjustment procedure.

⚠ WARNING

Grease is under high pressure.

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

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

Loosen the relief valve only one turn.

1. Move the machine forward for a distance of two times the length of the machine. Allow the machine to a stop without the use of the service brakes. Shut off the engine. Adjust the tracks while you are in the typical operating conditions for the machine. If packing conditions prevail on the job, the tracks should be adjusted with packing material.

Note: Perform Steps 2 through 6 on both sides of the machine.

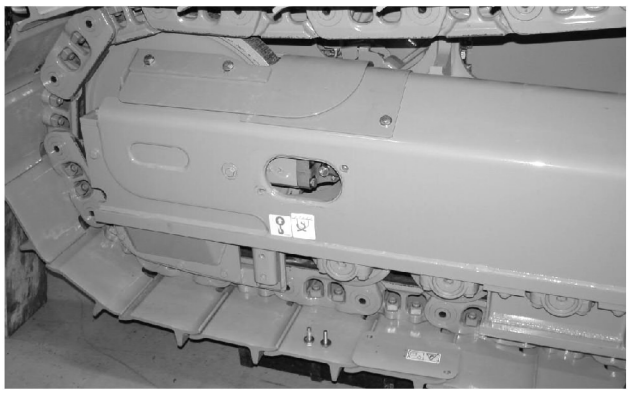

Illustration 250 g03203084

Outer cover removed

2. Remove the cover for the track adjusting mechanism.

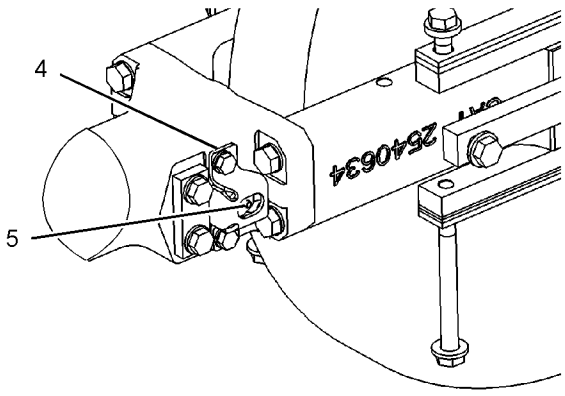

Illustration 251 g03203094

3. Remove protection guard (4) for fill and relief valve (5).

4. By using a manual grease gun, add multipurpose grease (MPGM) through fill and relief valve (5) to tighten the track. To loosen the track, turn fill and relief valve (5) counterclockwise until the idler reverses and the track relaxes. Then, close fill and relief valve (5) at the proper track sag dimension listed in Table 15 .

5. Install protection guard (4) over fill and relief valve (5).

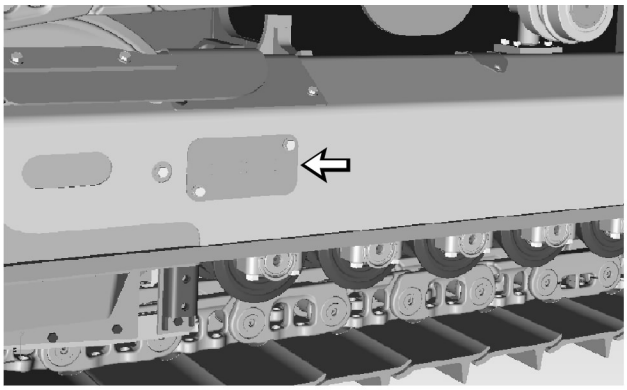

Illustration 252 g03203785

6. Install the outer cover for the track adjusting mechanism.

7. Repeat the procedure for the other track.

i06565539

Track Pins - Inspect

SMCS Code: 4175

⚠ WARNING

Fingers can be burned from hot pins and bushings.

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

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

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

2. Check the machine for dry joints weekly. Check for dry joints immediately after machine operation. After machine operation, use a 164-3310 Infrared Thermometer to check the pins for dry joints. Make a mark on any dry track pin that is too hot.

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

i02539528

Trunnion - Adjust

SMCS Code: 6060-025-TI

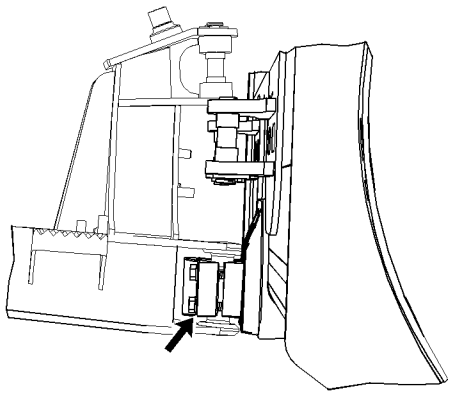

Illustration 253 g01271242

1. Assemble the cap for the trunnion without shims.

2. Tighten the bolts and maintain equal spacing on each side.

3. Measure the gap.

4. Remove the cap for the trunnion.

5. Add shims in order to fill in the gap. Use the same number of shims on both sides. Then add one additional shim to each side.

6. Tighten the bolts.

Bolts . . . . . 530 ± 70 N·m ((390 ± 52 lb ft))

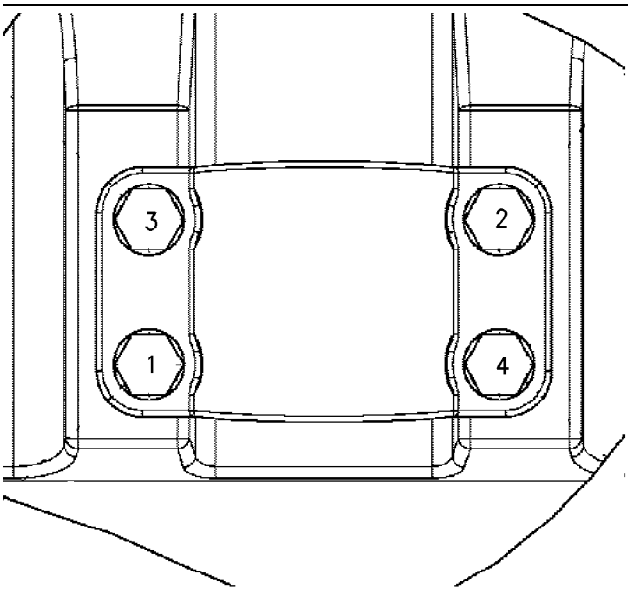

Illustration 254 g00820011

Trunnion bolts

7. Tighten the bolts in the following order: 1, 2, 3 and 4.

i04319828

Winch Cable - Inspect

SMCS Code: 5154-040; 5163-040

⚠ WARNING

Wear leather gloves when handling the winch cable.

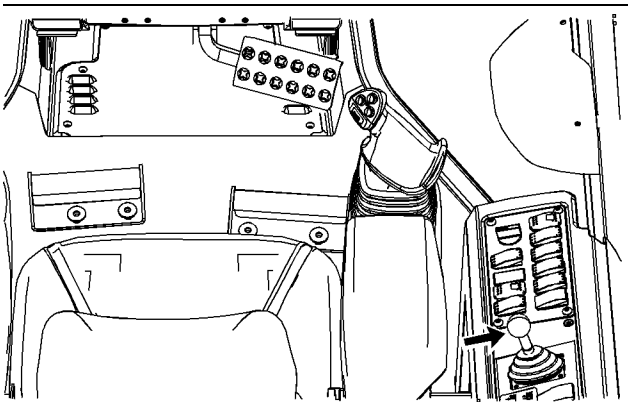

Illustration 255 g02477245

1. Move the winch control lever to the FREE SPOOL position.

2. Unreel the winch cable by manually pulling the winch cable.

3. Inspect the entire cable for fraying or kinking. If fraying or kinking is present, replace the winch cable.

i03186277

Winch Cable - Replace

SMCS Code: 5154-510; 5163-510

⚠ WARNING

Wear leather gloves when handling the winch cable.

NOTICE
Unroll the wire rope cable from the spool. Never lift the wire rope off the spool in coils.

NOTICE
Use the correct size ferrule for the winch cable in order to attach the winch cable to the load drum. Never use a knot in order to secure the winch cable to the load drum.

Table 16

Line Load		
Wire Rope	**Diameter**	**Load Drum**(1)
Recommended	16 mm (0.63 inch)	113 m (371 ft)
Optional	19 mm (0.75 inch)	78 m (256 ft)

(1) Capacity

Table 17

Winch Capacity		
Winch	**Bare Drum**	**Full Drum**
Maximum Line Pull	18144 kg (40000 lb)	11340 kg (25000 lb)
Maximum Line Speed	40 m/min (131 ft/min)(1)	63 m/min (207 ft/min)(1)

(1) Maximum line speed is the no-load speed at maximum line pull.

For the correct procedure to replace the winch cable, refer to Specifications, Systems Operation, Testing and Adjusting, Disassembly and Assembly, “Cable - Remove and Install” for the winch hydrostatic systems.

i04825744

Winch Drum Bearing - Lubricate

SMCS Code: 5159-086-BD

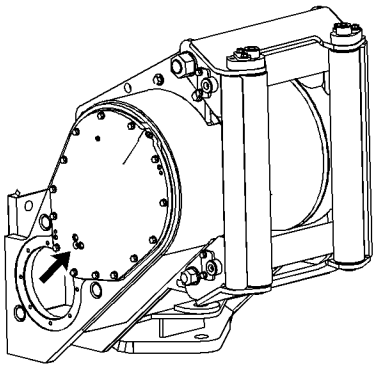

Illustration 256 g02957658

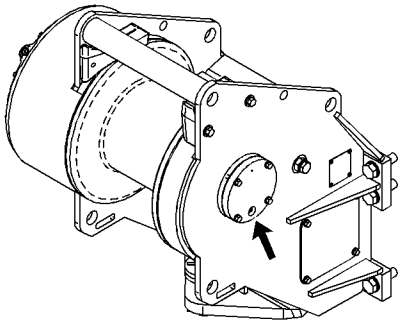

Illustration 257 g02957696

Apply lubricant to the fittings for the winch drum.

i04461002

Winch Fairlead Rollers - Lubricate

SMCS Code: 5163-086-RLR

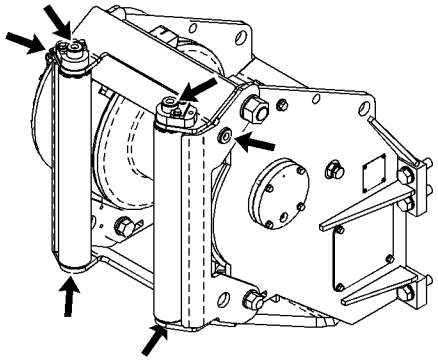

Illustration 258 g02646588

Apply lubricant to all six of the fairlead grease fittings.

i06060110

Winch Oil - Change

SMCS Code: 5163-044; 5163

1. Park the machine on level ground.

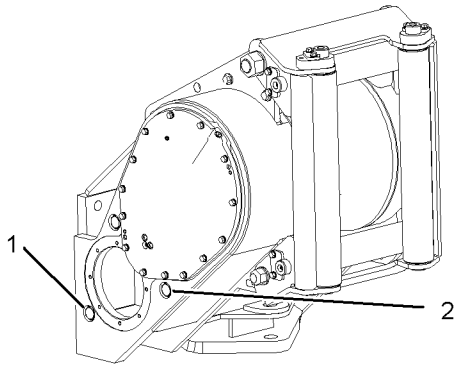

Illustration 259 g01626970

(1) Oil drain plug
(2) Oil filler plug

2. Remove drain plug (1) and allow the oil to drain in a suitable container.

Note: To help drain the oil, remove oil filler plug (2).

3. Install plug (1) after all of the oil has been drained. Tighten plug (1) to a torque of 180 ± 27 N·m (133 ± 20 lb ft).

4. Refill the winch to the proper level. Install plug (2).

i04359709

Winch Oil Filter - Replace

SMCS Code: 5177-510

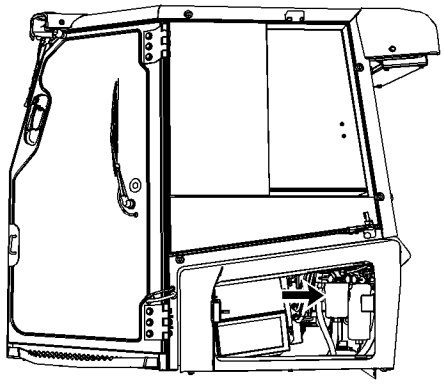

Illustration 260 g02513058

1. Open the access door on the left side of the machine in order to access the winch oil filter. The winch oil filter is located next to the hydraulic oil filter.

2. Use a strap type wrench to remove the oil filter. Clean the filter base and dispose of the used filter properly.

3. Apply a thin coat of oil to the seal of the new filter. Install a new winch oil filter by hand.

Note: Instructions for the installation of the filters are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

4. Close the access door.

i06060184

Winch Oil Level - Check

SMCS Code: 5163; 5163-535-FLV

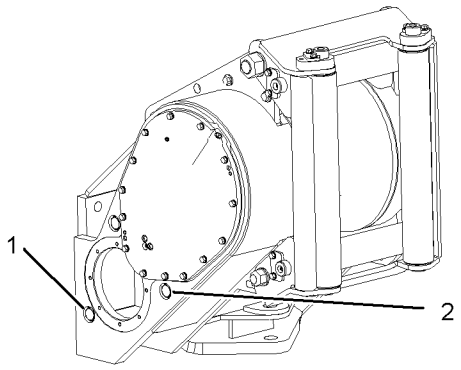

Illustration 261 g01626970

(1) Drain plug
(2) Oil filler plug and oil level check

1. Position the machine on a flat, level surface.

2. Inspect the winch for leaks. Repair any leaks.

3. Remove oil level check plug (2) for a quick check of the oil level.

Note: The oil must be filled to the bottom of the port of the oil level check plug.

4. Fill the winch case with oil until the oil is at the proper level.

5. Install plug (2). Tighten to a torque of 180 ± 27 N·m (133 ± 20 lb ft).

i05812007

Winch Oil Sample - Obtain

SMCS Code: 5163-008; 7542-008

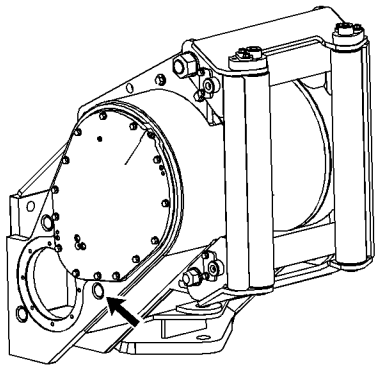

Illustration 262 g03679207

Remove the filler plug for the winch. Obtain a sample of the winch oil by pulling a sample through the filler plug opening.

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

i04461095

Winch Vent Plug - Clean

SMCS Code: 5163-070-VN

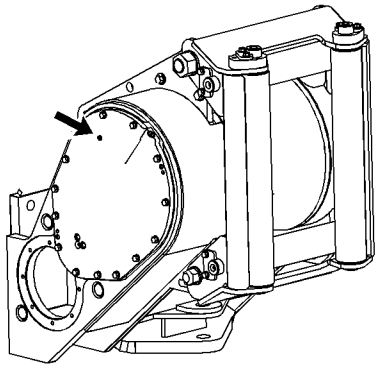

Illustration 263 g02646681

1. Remove the vent plug.

2. Clean the vent plug in a suitable solvent.

3. Install the vent plug.

Note: Do not replace the vent plug with a solid plug. Damage to the winch will occur.

i04359769

Window Washer Reservoir - Fill

SMCS Code: 7306-544-KE

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

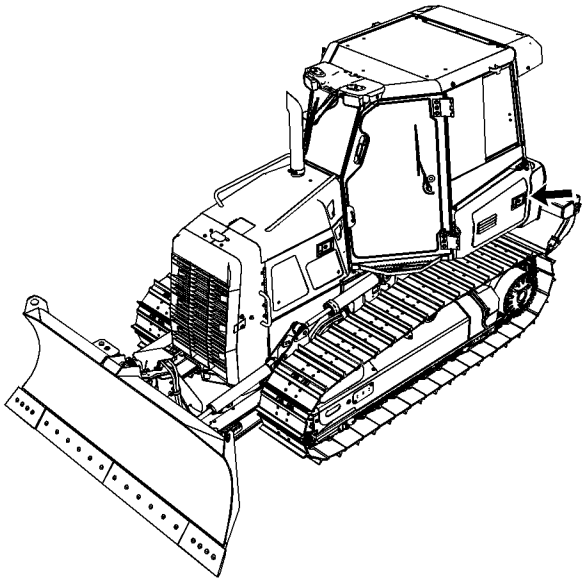

Illustration 264 g02513119

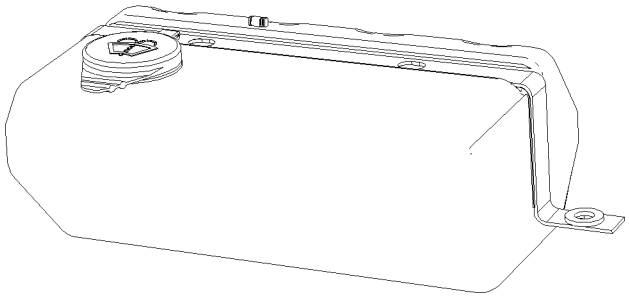

Illustration 265 g01259545

Window Washer – Open the access door on the left side of the machine. Open the fluid bottle cap in order to fill the washer fluid bottle.

i04359812

Window Wipers - Inspect/ Replace

SMCS Code: 7305-510; 7305-040

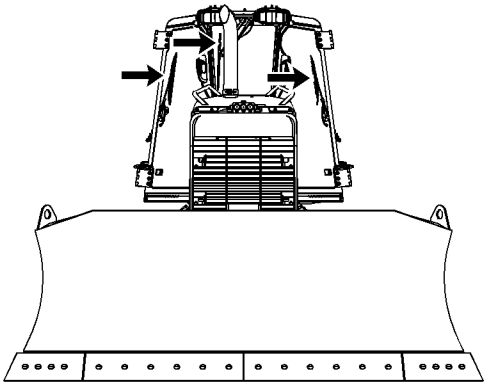

Illustration 266 g02513159

Inspect the front window wiper blade, the right window wiper blade, the left window wiper blade, and the rear window wiper blade. Replace any wiper blades that are damaged or worn. Replace any wiper blades that streak the window.

i04360149

Windows - Clean

SMCS Code: 7310; 7340

Use commercially available window cleaning solutions to clean the windows.

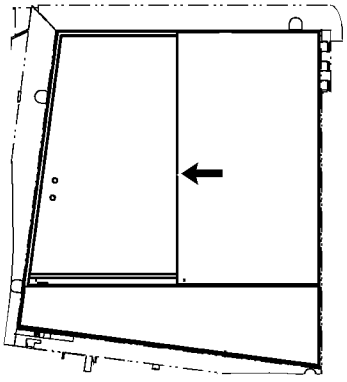

Illustration 267 g01259534

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

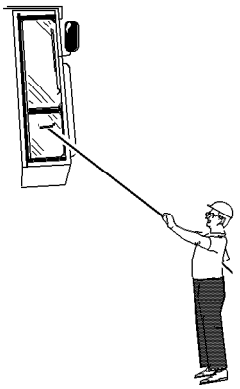

Illustration 268 g00566124

Typical example

Cleaning Methods

Aircraft Window Cleaner

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

Soap and Water

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

Stubborn Dirt and Grease

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

Polycarbonate Windows (If equipped)

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

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

Rinse the windows with a sufficient amount of clean water.

Warranty Section

Warranty Information

i06044323

Emissions Warranty Information

SMCS Code: 1000

The certifying engine manufacturer 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 (including Tier 1 and Tier 2 marine engines < 37 kW, but excluding locomotive and other marine engines) 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 (including Tier 1 and Tier 2 marine propulsion engines < 37 kW and Tier 1 through Tier 4 marine auxiliary engines < 37 kW, but excluding locomotive and other marine 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 engine manufacturer's application for certification for the warranty period.

3. New non-road diesel engines installed in construction machines conforming to the South Korean regulations for construction machines manufactured after January 1, 2015, and operated and serviced in South Korea, 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 in the Enforcement Rule of the Clean Air Conservation Act promulgated by South Korea MOE.

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.

The aftertreatment system can be expected to function properly for the lifetime of the engine (emissions durability period) subject to prescribed maintenance requirements being followed.

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 a supplemental Special Publication. Consult your authorized Cat dealer to determine if your engine is subject to an Emission Control Warranty and to obtain a copy of the applicable Special Publication.

Reference Information Section

Reference Materials

i05399099

Reference Material

SMCS Code: 1000; 7000

The following literature can be obtained from any Cat dealer:

- Special Publication, SEBD0518, “Know Your Cooling System”
- Special Publication, SEBD0970, “Coolant and Your Engine”
- Service Magazine, SEBD1587,28 October 1985, “What ROPS/FOPS Certification Means”
- Special Instruction, SEHS6929, “Inspection, Maintenance, and Repair of Operator Protective Structures (OPS) and Attachment Installation Guidelines For All Earthmoving Machines, If Equipped”
- Special Publication, SEBD0717, “Diesel Fuels and Your Engine”
- Special Instruction, SEHS7392, “Storage of Diesel Engines”
- Special Instruction, SEHS7633, “Battery Test Procedure”
- Special Instruction, SEHS7633, “6V-2150 Starting/ Charging Analyzer Group”
- System Operation, Troubleshooting, Testing and Adjusting, RENR8143, “Product Link PL522/523”
- Special Instruction, REHS2368, “An Installation Guide for the Product Link PL522/523”
- Special Instruction, REHS1642, “Operation of the Product Link System”
- Special Instruction, SEHS9031, “Storage Procedure for Caterpillar Products”
- Special Publication, SEBU5898, “Cold Weather Recommendations for All Caterpillar Machines”
- Special Publication, SEBD0640, “Oil and Your Engine”
- Special Publication, SEBU6250, “Caterpillar Machine Lubricant Recommendations”
- Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog”
- Special Publication, SEBU7803, “Grade Control System”
- Special Publication, SEBU6981, “Emissions Control Warranty Information”
- Operation and Maintenance Manual, SEBU8257, “The European Union Physical Agents (Vibration) Directive 2002/44/EC”
- Operation and Maintenance Manual, SEBU8161, “AccuGrade - Laser System ”
- Operation and Maintenance Manual, SEBU8280, “AccuGrade - GPS (CD700) ”
- Safety Manual, SEBU5311, “Crawler Tractor/ Loader Safety Manual AEM Form CLT80-1 ”
- Specifications, SENR3130, “Torque Specifications”
- Service Manual, RENR2014, “Caterpillar Monitoring System”
- Service Manual, KENR5640, “D3K, D4K, and D5K Track-Type Tractor (Tier IV Interim)”
- D3K2 Parts Manual, SEBP5912, **S/N:** KFF1–UP; KLL1–UP; GAE1–UP
- D4K2 Parts Manual, SEBP5913, **S/N:** KMM1–UP; KRR1–UP
- D5K2 Parts Manual, SEBP5914, **S/N:** KWW1–UP; KYY1–Up; TRF1–Up

Operation and Maintenance Manuals are available in other languages. Consult your Caterpillar dealer for information about obtaining these Operation and Maintenance Manuals.

Additional Reference Material

ASTM D2896, “TBN Measurements” This reference can normally be obtained from your local technological society, from your local library, or from your local college.

SAE J313, “Diesel Fuels” This reference 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 refence can normally be found in the SAE handbook.

SAE J183, “Classification” This reference can normally be found in the SAE handbook.

Engine Manufacturers Association, “ Engine Fluids Data Book”

Engine Manufacturers Association
Two North LaSalle Street, Suite 2200
Chicago, Illinois, USA 60602
E-mail: ema@enginemanufacturers.org
(312) 644-6610
Facsimile: (312) 827-8737

The “Society of Automotive Engineers (SAE) Specifications” can be found in your SAE handbook. This publication can also be obtained from the following locations: local technological society, local library and local college. If necessary, consult SAE at the following address:

SAE International
400 Commonwealth Drive
Warrendale, PA, USA 15096-0001
Telephone (724) 776-4841

The International Organization for Standardization (ISO) offers information and customer service regarding international standards and standardizing activities. ISO can also supply information on the following subjects that are not controlled by ISO: national standards, regional standards, regulations, certification and related activities. Consult the member of ISO in your country.

International Organization for Standardization (ISO)
1, rue de Varembé
Case postale 56
CH-1211 Genève 20
Switzerland
Telephone +41 22 749 01 11
Facsimile +41 22 733 34 30
E-mail central@iso.ch
web site http://www.iso.ch

i07489788

Caterpillar Approved Work Tools

SMCS Code: 6700; 7007

Only use Caterpillar approved work tools on this machine.

Note:

Do not use a Caterpillar work tool on a machine that is not approved by Caterpillar.

Table 18

Caterpillar Approved Work Tools			
Front Work Tool(1)	**D3K2**	**D4K2**	**D5K2**

(continued)

(Table 18, contd)

Blade width	XL	LGP	XL	LGP	XL	LGP
VPAT (2) 1.52 m^3 (1.99 yd^3) 2646 mm (104.2 inch)	X					
VPAT 1.66 m^3 (2.17 yd^3) 3149 mm (124 inch)		X				
VPAT 1.42 m^3 (1.86 yd^3) 2921 mm (115 inch)	X		X			
VPAT 1.98 m^3 (2.59 yd^3) 2782 mm (109.5 inch)			X			
VPAT 1.85 m^3 (2.42 yd^3) 3149 mm (124 inch)				X		
VPAT 2.19 m^3 (2.86 yd^3) 2886 mm (113.6 inch)					X	
VPAT 2.34 m^3 (3.06 yd^3) 3220 mm (126.7 inch)						X
VPAT 2.19 m^3 (2.86 yd^3) (Forestry product) 2886 mm (113.6 inch)(3)					X	
VPAT 2.09 m^3 (2.73 yd^3) 2921 mm (115 inch)					X	
Rear Work Tool						
Small Track-Type Tractor Ripper	X	X	X	X	X	X
Small Track-Type Tractor Retrieval Winch	X	X	X	X	X	X
Premium Winch	X	X	X	X	X	X
D3K2 Mulcher	X	X				

(1) All front work tools are approved for all models that are shown. The chart indicates factory recommendation for usage.
(2) VPAT blade is variable pitch, power angle and tilt
(3) Includes brush guard and thicker moldboard liner

See “Specifications” in this manual for additional information on the machine specifications or configurations.

Contact your Caterpillar dealer concerning specific work tools that are approved by Caterpillar for this machine. Consult your Caterpillar dealer for an updated list of approved work tools.

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Decommissioning and Disposal

SMCS Code: 1000; 7000

When the product is removed from service, local regulations for the product decommissioning will vary. Disposal of the product will vary with local regulations. Consult the nearest Cat dealer for additional information.

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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:	_____	_____	_____