



Operation and Maintenance Manual

D3K, D4K and D5K Track-Type Tractors

JTD1-Up (Machine)
FFF1-Up (Machine)
JLF1-Up (Machine)
LLL1-Up (Machine)
MMM1-Up (Machine)
RRR1-Up (Machine)
WWW1-Up (Machine)
YYY1-Up (Machine)

Important Safety Information

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

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

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

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

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



The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

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

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

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

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



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

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

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

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Foreword

Literature Information

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

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

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

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

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

Safety

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

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

Operation

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

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

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

Maintenance

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

Maintenance Intervals

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

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

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

California Proposition 65 Warning

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

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

Certified Engine Maintenance

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

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

Machine Capacity

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

Caterpillar Product Identification Number

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

*** C A T 0 7 8 9 B G 6 S L 1 2 3 4 5 ***

Illustration 1

g00751314

Where:

1. Caterpillar's World Manufacturing Code (characters 1-3)
2. Machine Descriptor (characters 4-8)

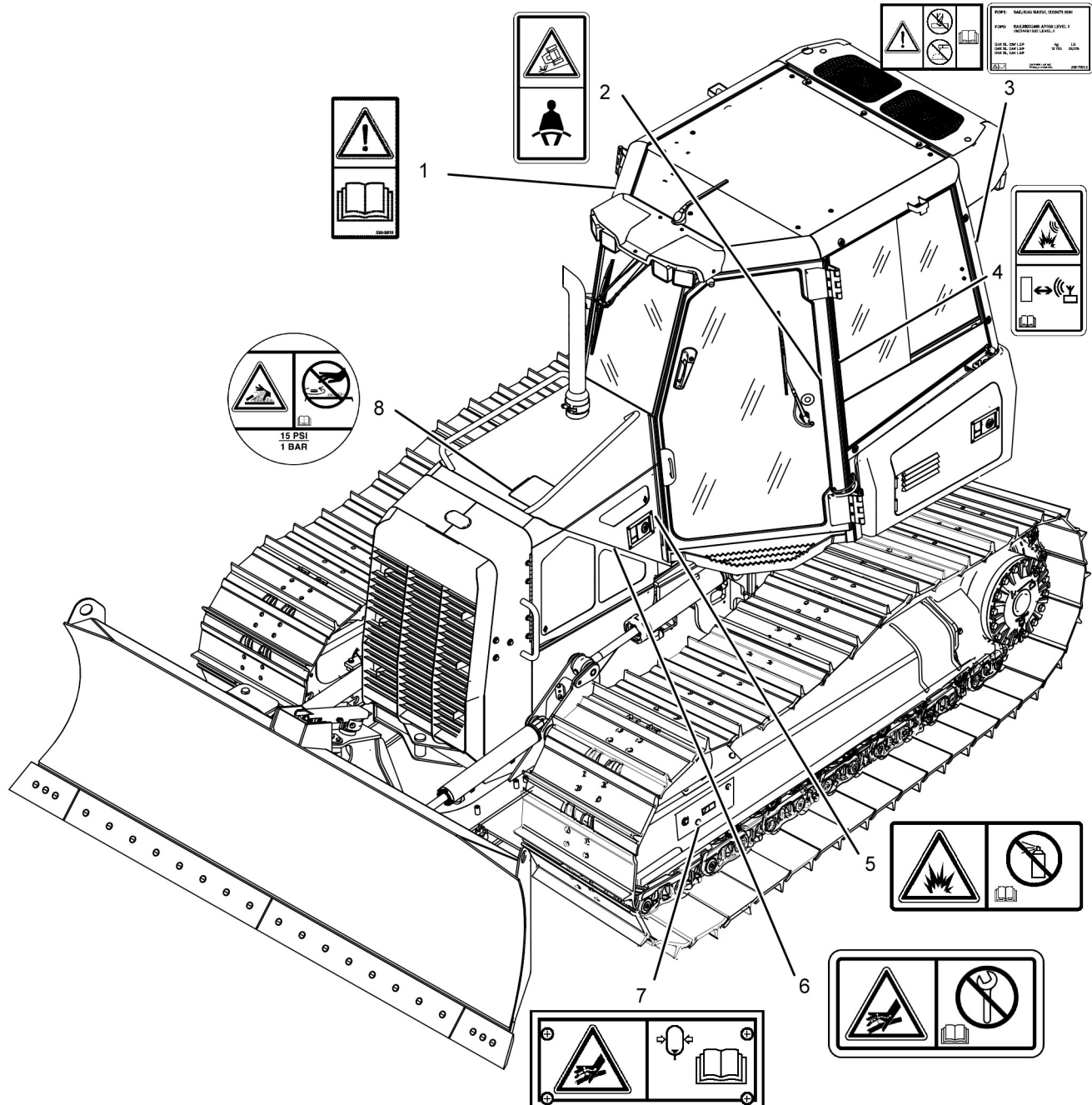
3. Check Character (character 9)

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

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

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

SMCS Code: 7000; 7405



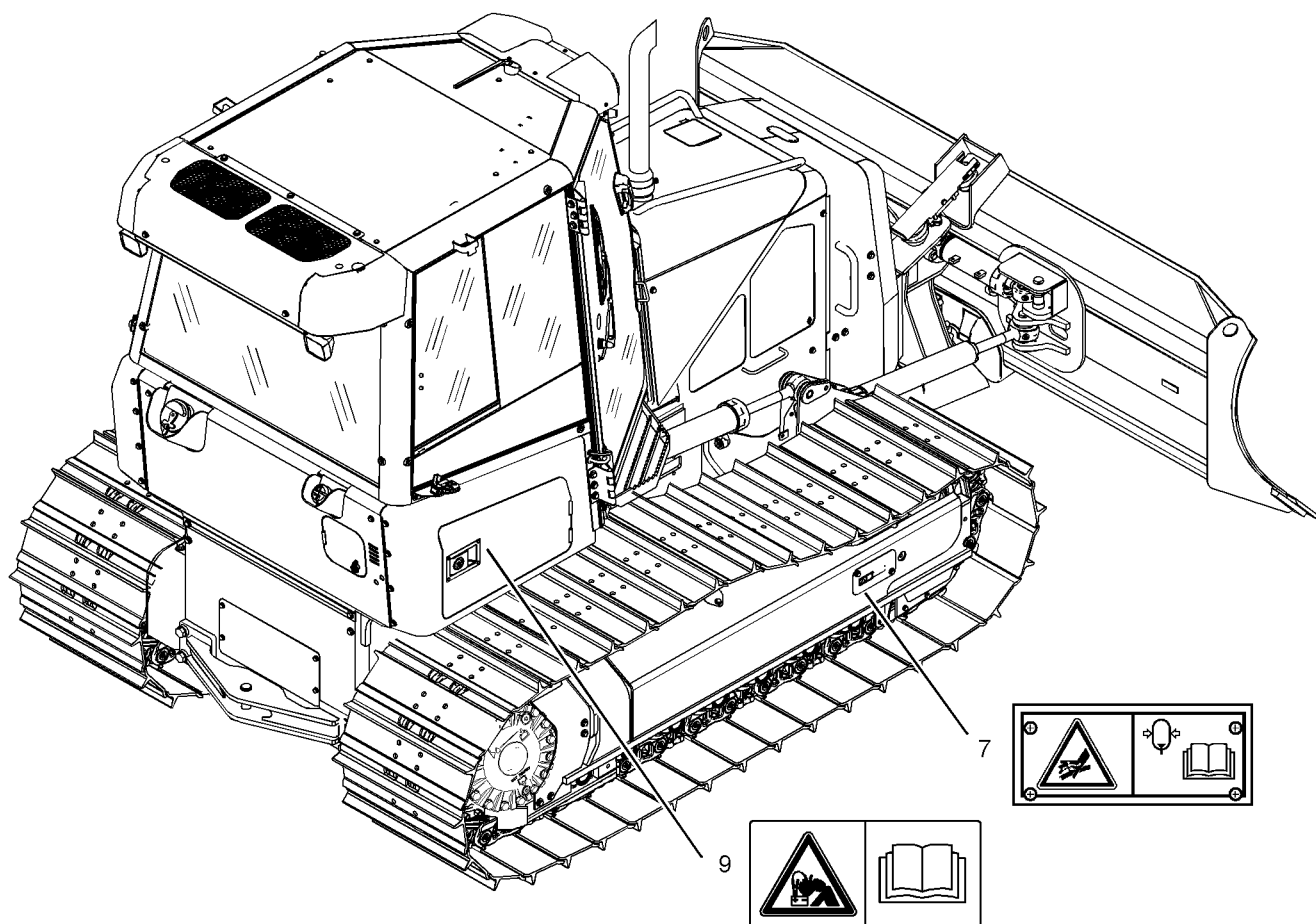


Illustration 3

g01357376

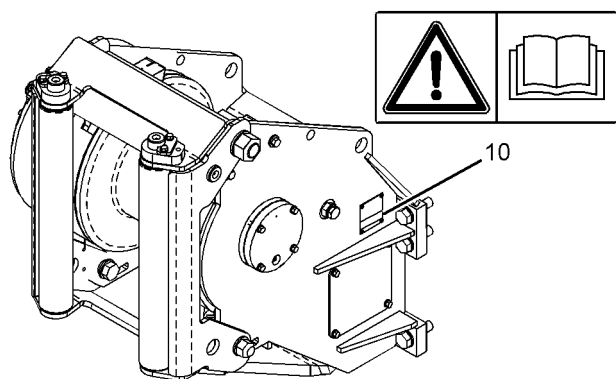


Illustration 4

g01359794

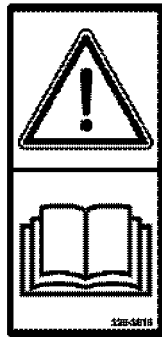
There are several specific safety messages on this machine. The exact location of the hazards and the description of the hazards are reviewed in this section. Please become familiarized with all safety messages.

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 side of the cab post in view of the operator.



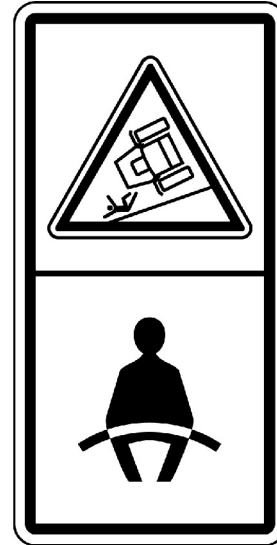
g01030982

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 side of the cab post in view of the operator.



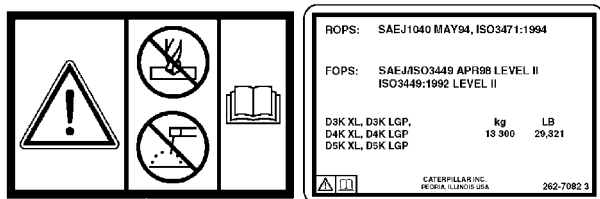
g01371636

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 (3)

Safety Message (3) is positioned on the left rear side of the cab post.



g01398698

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 in the left side of the cab on the front support.



g01108685

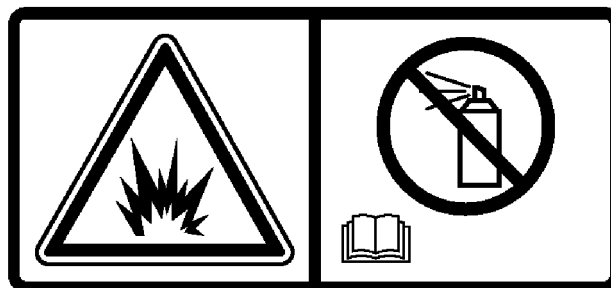
WARNING

This machine is equipped with a Caterpillar Product Link communication device which must be deactivated within 12 m (40 ft) of a blast zone. Failure to do so could 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.



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.



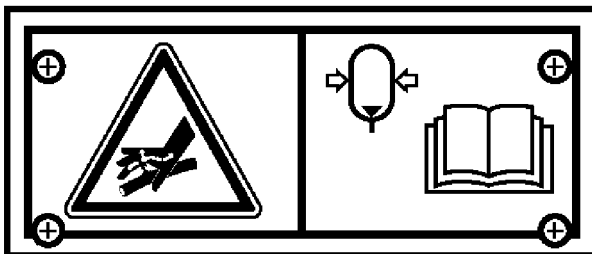
g01381180

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.



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.



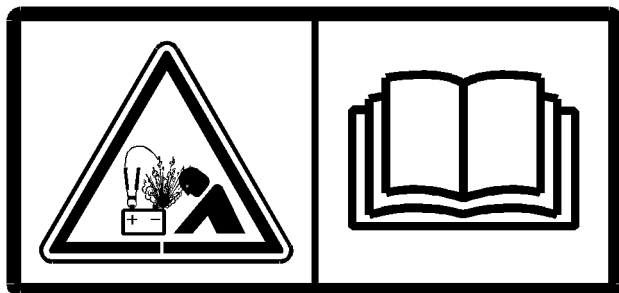
g01370913

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.



g01055411

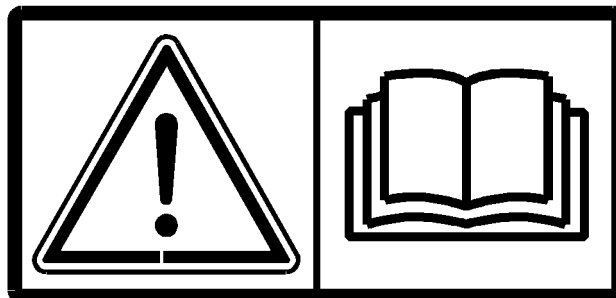
WARNING

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 Starting 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.



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.



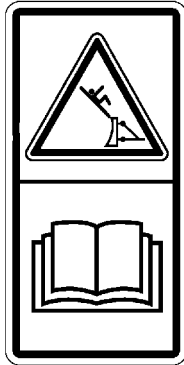
g01282876

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.



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.

i02798976

Additional Messages

SMCS Code: 7000; 7405

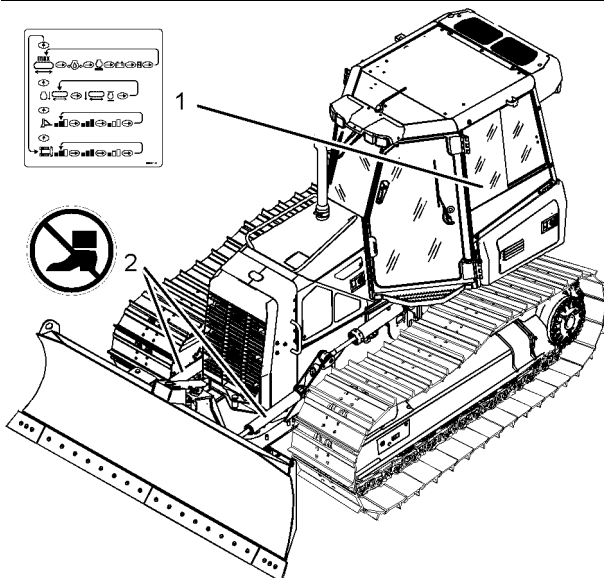


Illustration 5

g01398718

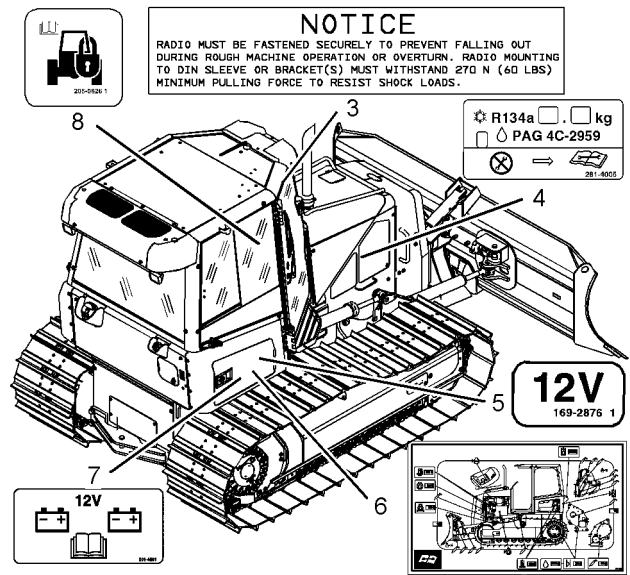


Illustration 6

g01398723

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

Make sure that all of the messages are legible. Clean the messages or replace the messages if 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.

“Gauge Display” (1)

This message is located on the inside door of the cab glove box.

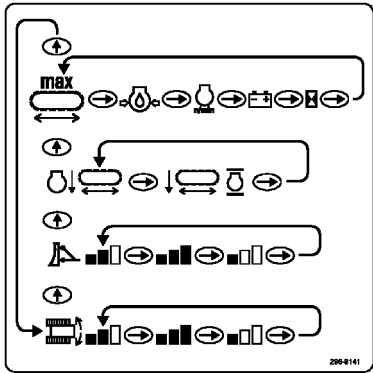


Illustration 7
Compact Instrument Cluster Film

No Step (2)

This message is located on the cover for the angle cylinders (if equipped).



Illustration 8

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

Radio (3)

This message is located on the cover for the radio.

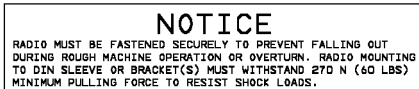


Illustration 9

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 (4) (If equipped)

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

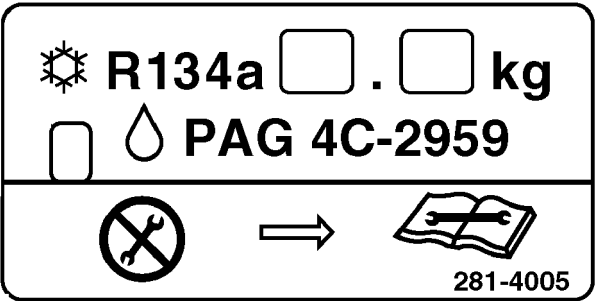


Illustration 10

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 (5)

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



Illustration 11

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.

Lubrication Chart (6)

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

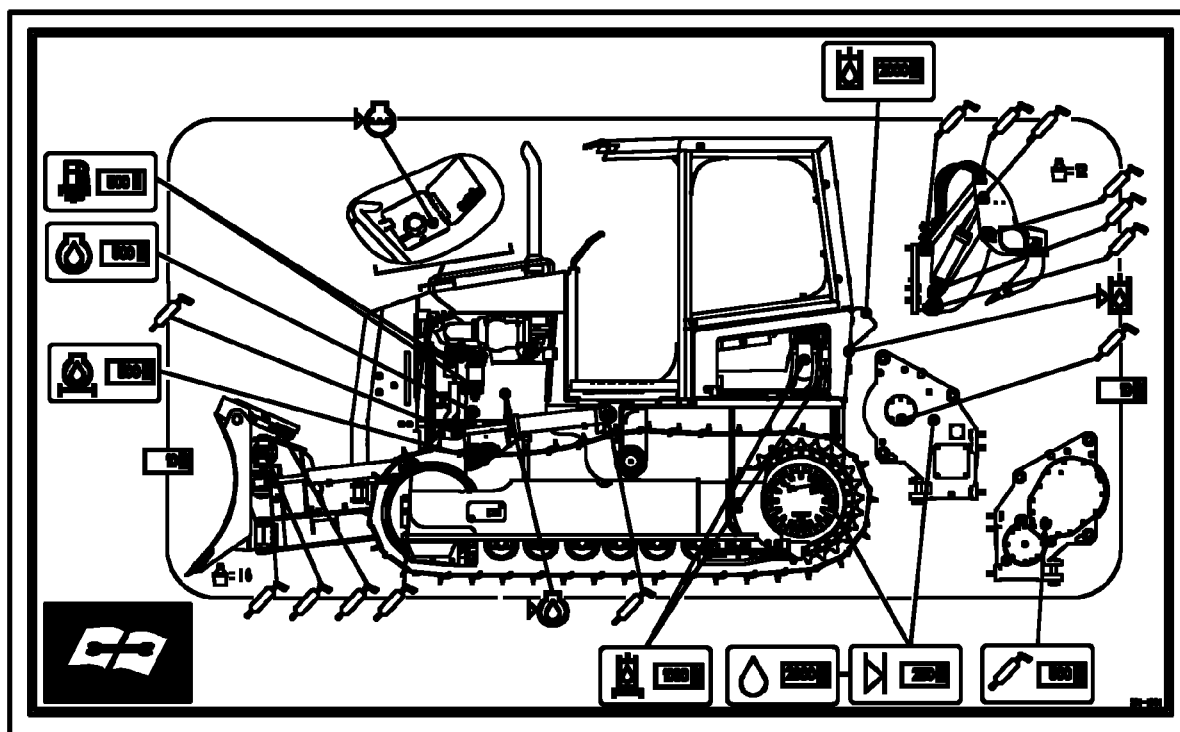


Illustration 12

g01398836

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.

i03559343

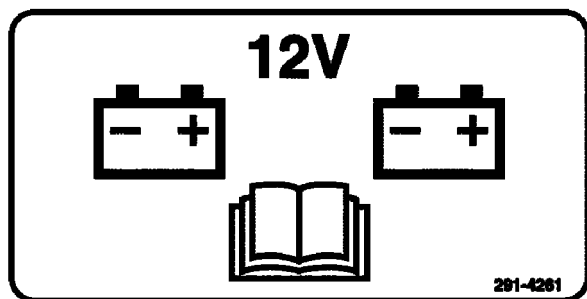


Illustration 13

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.

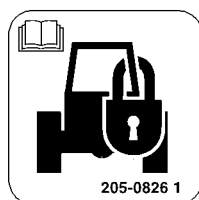


Illustration 14

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.

General Hazard Information

SMCS Code: 7000

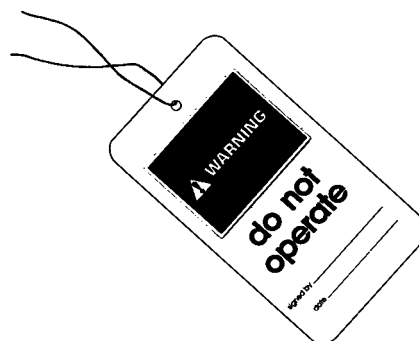


Illustration 15

g00104545

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

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

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

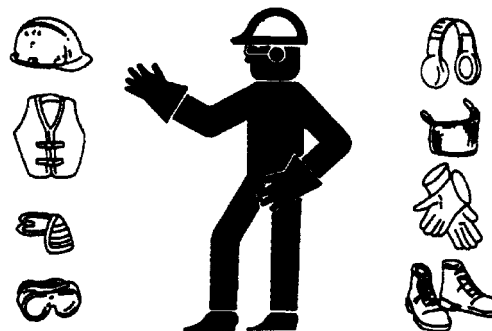


Illustration 16

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. This could result in personal injury.

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

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

Trapped Pressure

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

Fluid Penetration

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

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

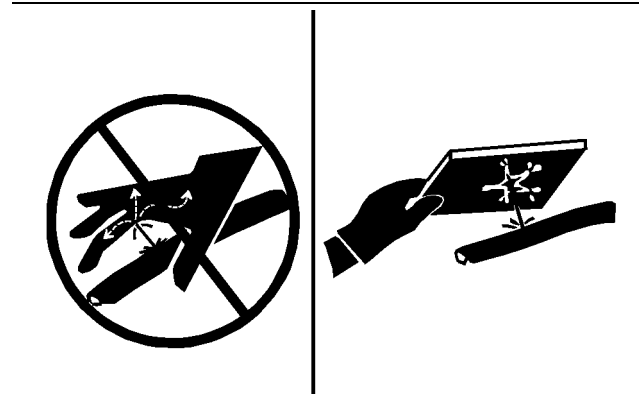


Illustration 17

g00687600

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

Containing Fluid Spillage

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

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

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

Obey all local regulations for the disposal of liquids.

Asbestos Information

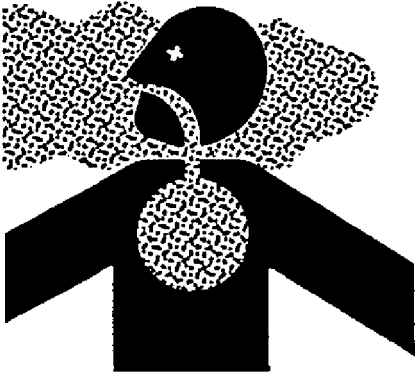


Illustration 18

g00702022

Caterpillar equipment and replacement parts that are shipped from Caterpillar are asbestos free. Caterpillar recommends the use of only genuine Caterpillar 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 usually bound in a resin or sealed in some way. Normal handling is not hazardous unless airborne dust that contains asbestos is generated.

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

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

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

Dispose of Waste Properly

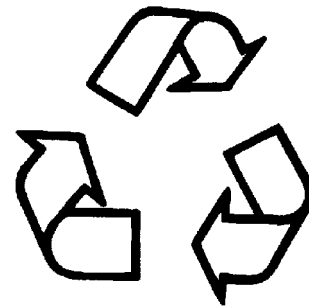


Illustration 19

g00706404

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

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

i01359664

Crushing Prevention and Cutting Prevention

SMCS Code: 7000

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

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

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

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

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

Stay clear of all rotating and moving parts.

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

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

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

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

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

i01329099

Burn Prevention

SMCS Code: 7000

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

Coolant

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

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

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

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

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

Oils

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

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

Batteries

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

i03659986

Fire Prevention and Explosion Prevention

SMCS Code: 7000



Illustration 20

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 Caterpillar 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, etc. 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 21

g00704059

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

Follow practices for safe fueling that are described in the "Operation" section of the Operation and Maintenance Manual section and follow local regulations. Never store flammable fluids in the operator compartment of the machine.

Battery and Battery Cables

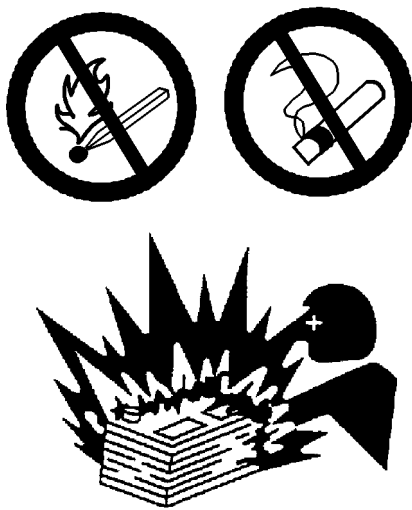


Illustration 22

g00704135

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 Caterpillar dealer for service.

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

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

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

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

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

- Fraying
- Abrasion
- Cracking

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

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

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

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

WARNING

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

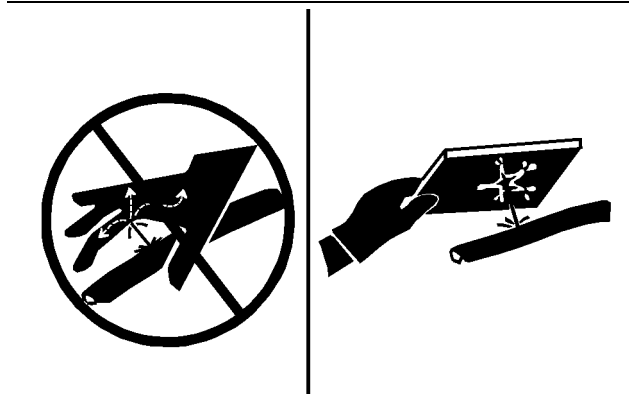


Illustration 23

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 Caterpillar dealer for repair or for replacement parts. Use genuine Caterpillar parts or the equivalent, for capabilities of both the pressure limit and temperature limit.

Ether

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

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

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

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

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

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

Fire Extinguisher

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

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

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

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.

i03721411

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.

Engage the parking brake switch.

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 well 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.

i03162317

Visibility Information

SMCS Code: 7000

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

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

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

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

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

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

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.

i02780235

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 on slopes.

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

i02801029

Engine Stopping

SMCS Code: 1000; 7000

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

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

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.

i03739322

Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information

The measurement for operator sound pressure level L_{eq} 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 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.

Machines with Logging Cab

The dynamic operator sound pressure level is 80 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.

i03656846

Guards (Operator Protection)

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

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

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

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

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

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

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

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

Other Guards (If Equipped)

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

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

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

- Rock quarries
- Forestry products

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

- Demolition applications

Product Information Section

General Information

Specifications

SMCS Code: 1000; 6700; 7000; 7426

i03738887

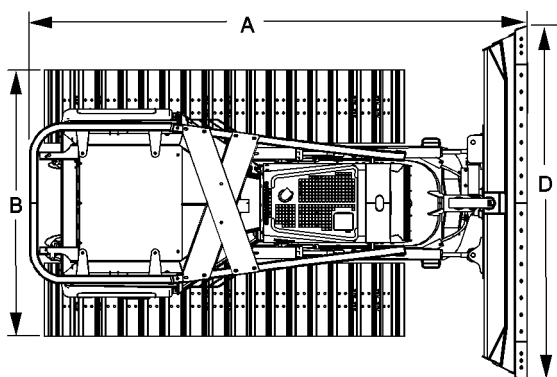


Illustration 24

g01398729

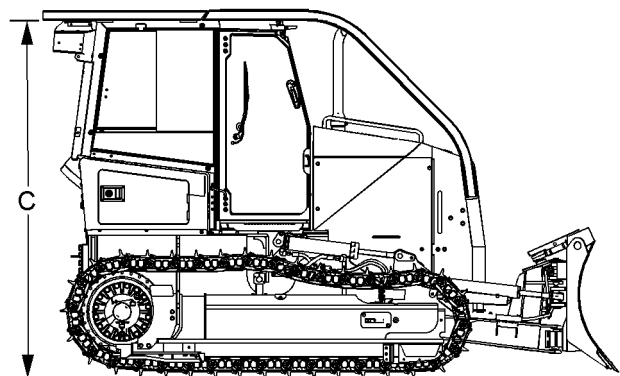


Illustration 25

g01256233

Table 2

D3K HYSTAT TRACK-TYPE TRACTOR	
Operating Weight (LGP) ⁽¹⁾	8093 kg (17842 lb)
Operating Weight (XL) ⁽¹⁾	7795 kg (17185 lb)
Operating Weight (SLGP) ⁽²⁾	8190 kg (18055 lb)
Length (LGP) (A) ⁽³⁾	4255 mm (167.5 inch)
Length (XL) (A)	4266 mm (168 inch)
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)	2763 mm (108.8 inch)
Blade width (LGP) (D)	3149 mm (124 inch)
Blade width (XL) (D)	2646 mm (104.2 inch)
Blade width (SLGP) (D)	3149 mm (124 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.

Table 3

D4K HYSTAT TRACK-TYPE TRACTOR	
Operating Weight (LGP) ⁽¹⁾	8501 kg (18741 lb)
Operating Weight (XL) ⁽¹⁾	8147 kg (17961 lb)
Length (LGP) (A) ⁽³⁾	4266 mm (168 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)	2763 mm (108.8 inch)
Blade width (LGP) (D)	3149 mm (124 inch)
Blade width (XL) (D)	2782 mm (109.5 inch)

Table 4

D5K HYSTAT TRACK-TYPE TRACTOR	
Operating Weight (LGP) ⁽¹⁾	9683 kg (21347 lb)
Operating Weight (XL) ⁽¹⁾	9408 kg (20741 lb)
Operating Weight (SLGP) ⁽²⁾	9800 kg (21605 lb)
Length (LGP) (A) ⁽³⁾	4294 mm (169 inch)
Length (XL) (A)	4321 mm (170.1 inch)
Length (SLGP) (A)	4294 mm (169 inch)
Width (LGP) (B)	2410 mm (94.9 inch)
Width (XL) (B)	2110 mm (83.0 inch)
Width (SLGP) (B)	2410 mm (94.9 inch)
Height to top of ROPS (C)	2769 mm (109 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)

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

Note: Add 235 kg (518 lb) to the operating weight for machines with “EROPS”.

Intended Use

This Track-Type Tractor is an earthmoving machine that is described by “ISO 6165:2001”. The Track-Type Tractor is classified as a Tractor-dozzer. The tractor-dozzer 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 is 13300 kg (29321 lb).
- Maximum drawbar pull (165 kN (37100 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.

Identification Information

i03739400

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.

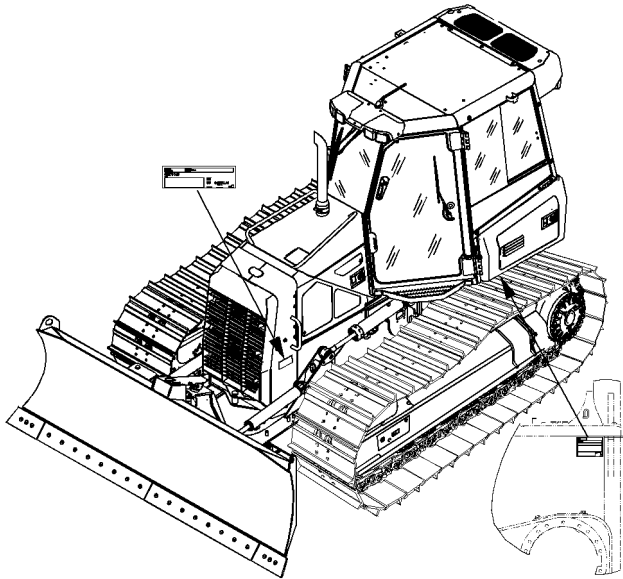


Illustration 26

g01621727

MODEL NUMBER	PRODUCT IDENTIFICATION NUMBER
CATERPILLAR INC. PEORIA, IL 61629 USA	
CAT [®] CATERPILLAR [®] CB [®]	
MADE IN	
239-6967	PARTS ORDER

Illustration 27

g01057083

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) _____

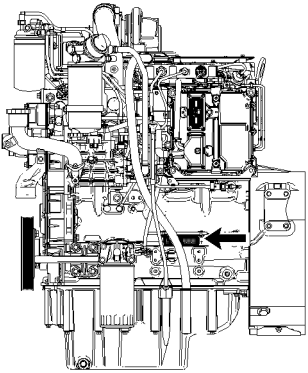


Illustration 28

g01400193

The Engine Serial Number Plate is located on the left side of the cylinder block to the rear of the front engine mounting.

CATERPILLAR	CAT [®]	TPL No]
○		○
LIST No	SERIAL No	TYPE

Illustration 29

g01274351

Engine Serial Number _____

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

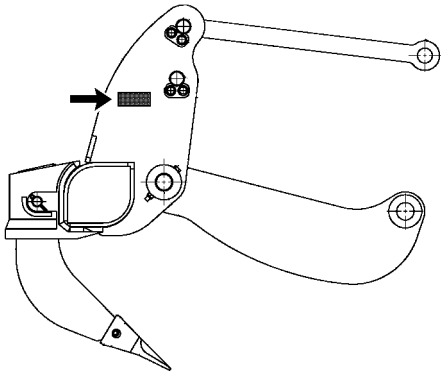


Illustration 30 g01256144

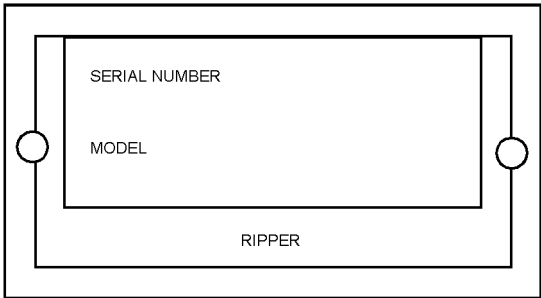


Illustration 31 g01057104

Ripper Serial Number _____

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

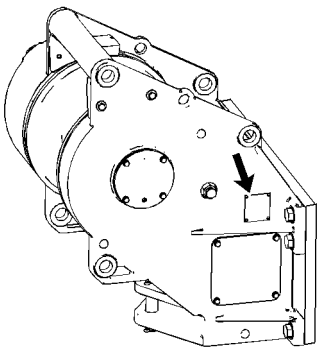


Illustration 32 g01256165

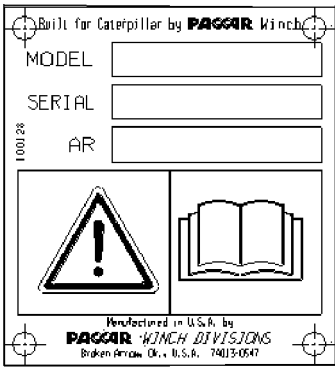


Illustration 33 g01323812

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 in conjunction 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.

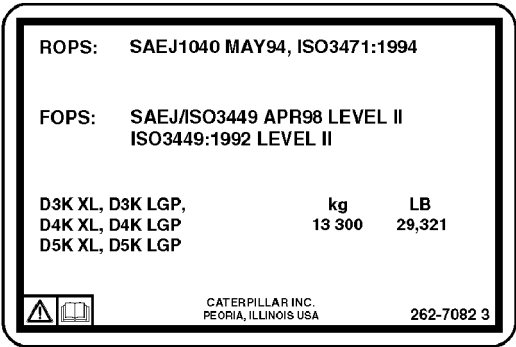


Illustration 34 g01398757

! 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

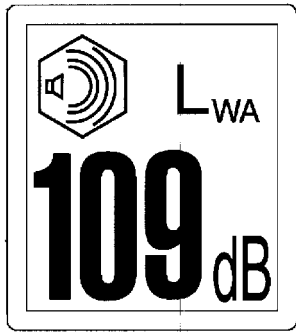


Illustration 35

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

This plate is positioned on the bottom left side of the Machine PIN (1) at the rear of the machine.

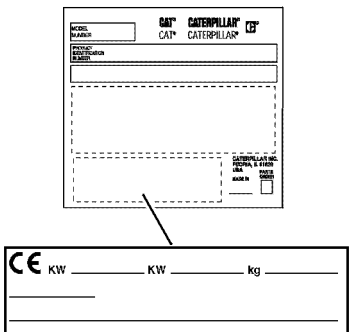


Illustration 36

g01883459

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

CE	KW _____	kg _____
	KW _____	

Illustration 37

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 machines that are compliant to "1998/37/EC", the following information is stamped onto the "CE" plate.

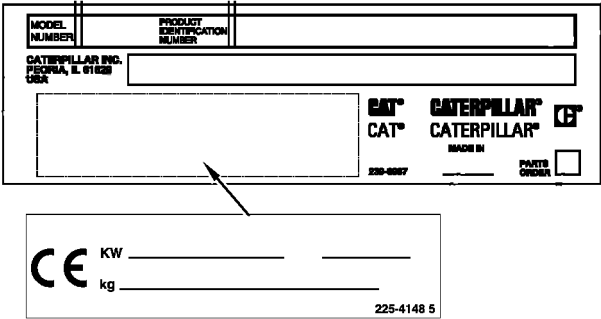


Illustration 38

g01062968

Front of machine

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

- Engine Power of primary engine (kW) _____
- Typical operating weight of machine for European market (kg) _____
- Year _____

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

i03722740

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:	D3K, D4K, D5K
	Serial Number:	
	Commercial Name:	Caterpillar

Fulfills 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 October 2009, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

i03638040

Emissions Certification Film

SMCS Code: 1000; 7000; 7405

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

Consult your Caterpillar dealer for an Emission Control Warranty Statement.

This label is located on the engine.

Operation Section

Before Operation

i03727105

Mounting and Dismounting

SMCS Code: 7000

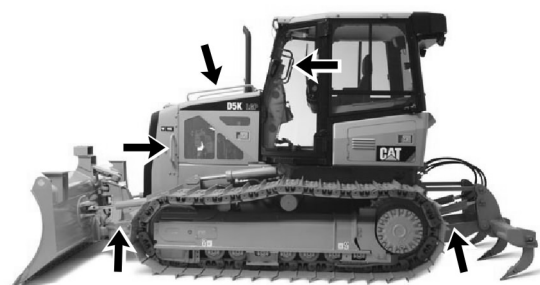


Illustration 39
Handholds and steps

g02009719

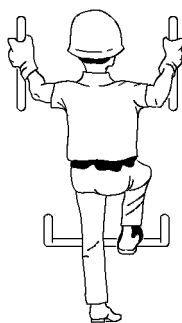


Illustration 40

g00037860

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

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

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

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

i02799054

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.

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, “Braking System - Test”
 - Operation and Maintenance Manual, “Bulldozer Power Angling Tilt Hinge Pins - Lubricate”
 - Operation and Maintenance Manual, “Cab Filter (Fresh Air) - Clean/Inspect/Replace”
 - Operation and Maintenance Manual, “Cooling System Coolant Level - Check”
 - Operation and Maintenance Manual, “Engine Oil Level - Check”
 - Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”
 - Operation and Maintenance Manual, “Seat Belt - Inspect”
 - Operation and Maintenance Manual, “Winch Fairlead Rollers - Lubricate”

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

Machine Operation

Alternate Exit

i01930019

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.

Seat

i02520662

SMCS Code: 7312-025; 7324

Note: The operator's 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.

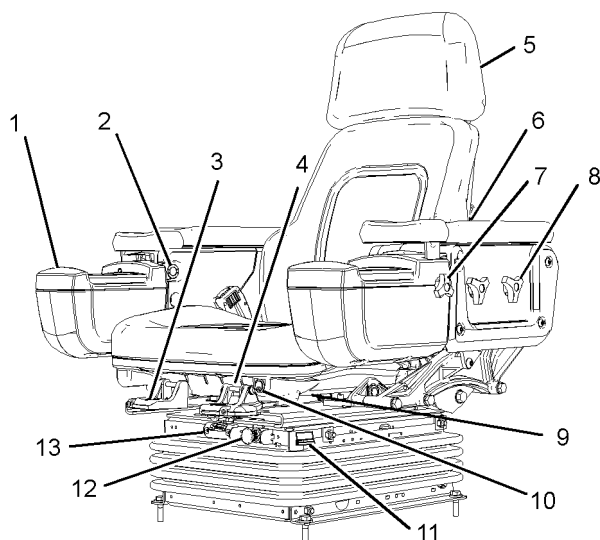


Illustration 41

g01261692

 **Adjustment control (2)** – Press on the appropriate side of the button in order to move joystick support (1) forward or backward.



Back Cushion Angle Adjustment (3) – 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 (4) – 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(5) – Pull up on back extension (5) in order to remove the back extension.



Lumbar Support (6) – Rotate the knob counterclockwise in order to increase lumbar support. Rotate the knob clockwise in order to decrease lumbar support.



Adjustment knob (7) – Make a height adjustment to the wrist rest for comfort. Tighten the knob in order to lock the support arm in place.



Armrest Adjustment Knobs (8) – Make a height adjustment to the armrests for comfort. Loosen the knobs and pull back the armrest. Adjust the height and push the armrest forward into position. Tighten the knobs in order to lock the armrest in place.



Seat Cushion Tilt (9) – 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 Seat (10) (If equipped) – Press the rocker switch in order to activate the seat heater. A red light will turn ON.



Ride Firmness (11) – Push down on the lever in order to increase the ride firmness. Pull up on the lever in order to decrease the ride firmness.



Seat Height (12) – Push in knob (12) in order to raise the seat height. Pull out on the knob in order to lower the seat height.

Note: The engine start switch key must be turned ON or the engine must be running in order to adjust the height of the seat.

 **Ride Zone Indicator (13)** – Use this indicator in order to determine if the suspension is adjusted too high or the adjustment is too low. When the operator sits in the seat, the white bar should be in the green zone of ride zone indicator (13).

i03172921

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 standards. See your Caterpillar 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

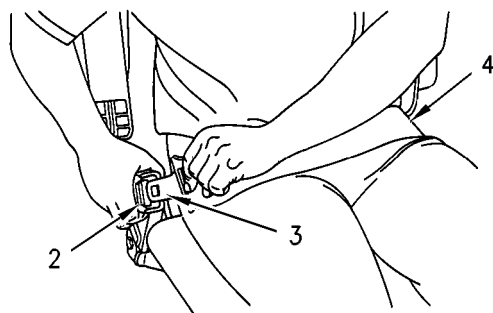


Illustration 42

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

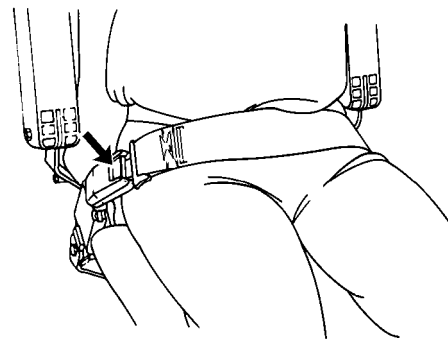


Illustration 43

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.

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

i03105875

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 standards. See your Caterpillar 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

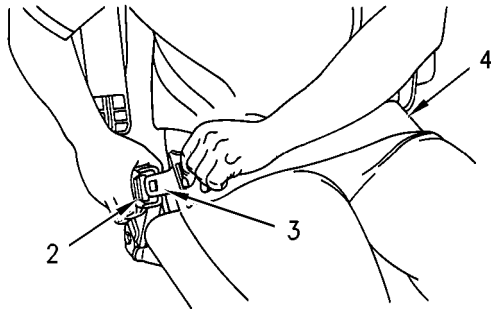


Illustration 44

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

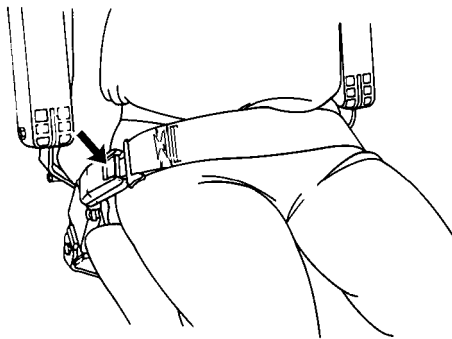


Illustration 45

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.

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

i03325047

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's 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

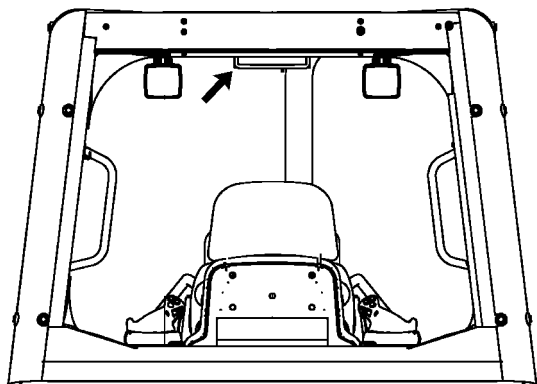


Illustration 46

g01702814

Rear view of interior mirror

The interior mirror can be adjusted to a position in order to allow the operator to see preferred areas at the rear of the machine during operations such as backing up, reversing the machine, or moving backward.

Right Side Rear View Mirror

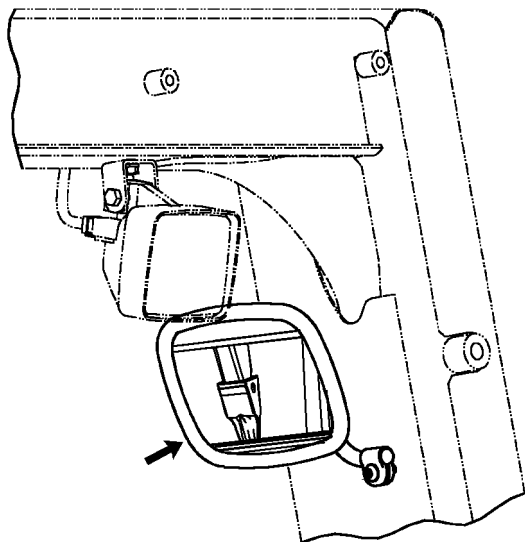


Illustration 47

g01703233

Left ripper tooth in mirror

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED 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: You may need to use hand tools in order to adjust certain types of mirrors.

i03160840

Operator Controls

SMCS Code: 7300; 7301; 7451

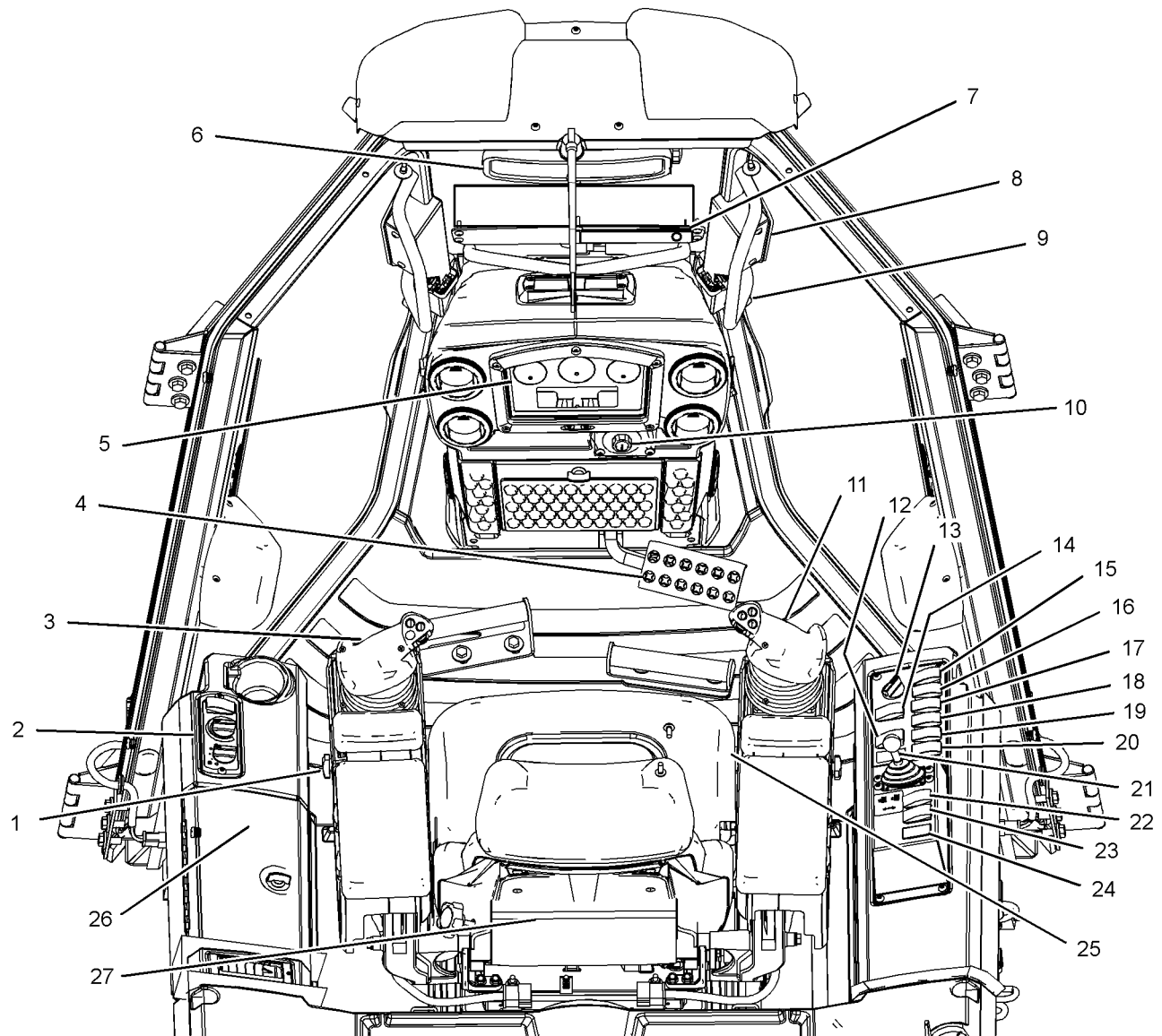


Illustration 48

g01391162

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

Adjustable Armrests (1)

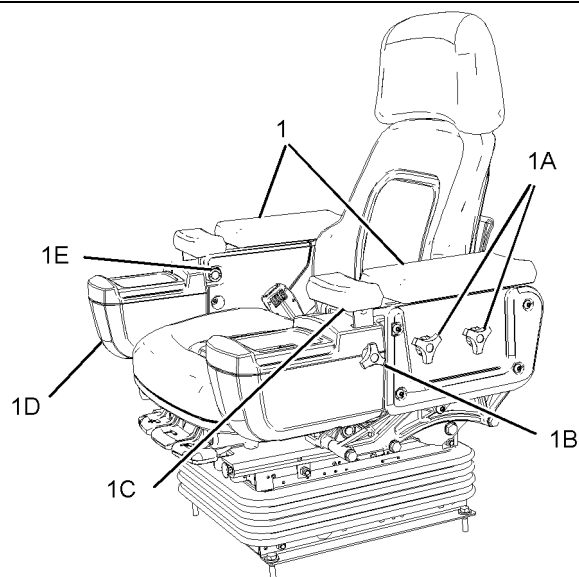


Illustration 49

g01269364

See “Seat” in this manual for information on adjusting the left armrest and right armrest (1).

Control Supports

Use the following procedure in order to adjust both of the control supports (1D) and wrist rests (1C), if necessary.

1. Loosen knob (1B) on the outside of the wrist rest (1C).
2. Pull wrist rest (1C) in an upward direction or push the wrist rest downward. Move the wrist rest to the desired height.
3. Tighten the knob.
4. When the appropriate button (1E) on armrest (1) is pushed, the operator must slide the seat controls to the desired location. This moves seat control (1D) forward or backward.

Air Conditioning and Heating Control (2)

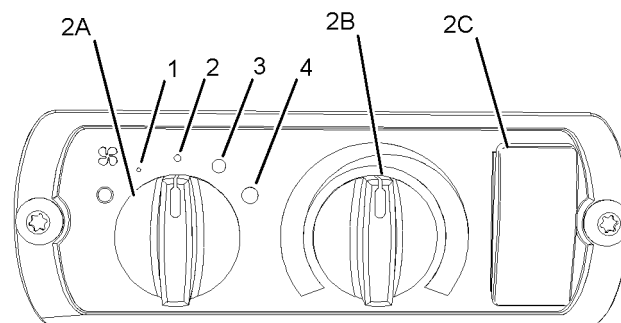


Illustration 50

g01269368

Enclosed ROPS

Open ROPS enclosure arrangement has heating only.

(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



Air Conditioner – Press in the top of switch (2C) in order to turn on the air conditioner. Return the switch to the middle position (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 enclosure 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)

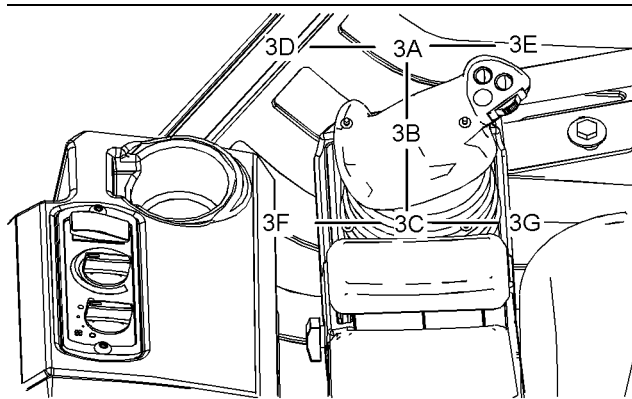


Illustration 51

g01258402

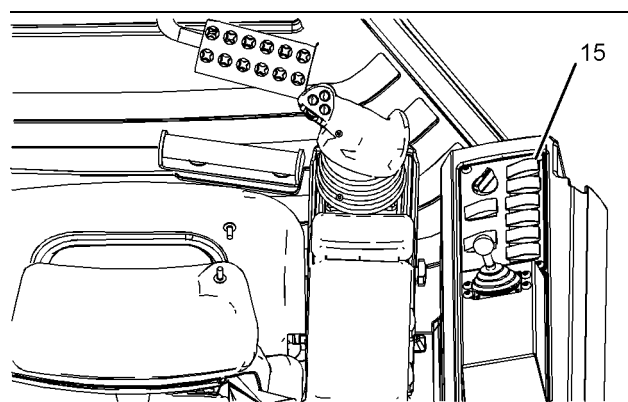


Illustration 52

g01399951

Note: Make sure that parking brake switch (15) is disengaged in order to use steering and transmission control (3).

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.

For smooth directional changes, smoothly move lever (3) to the NEUTRAL position and away from the NEUTRAL position. Also, deceleration of the engine speed makes for easier directional changes. However, this 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)

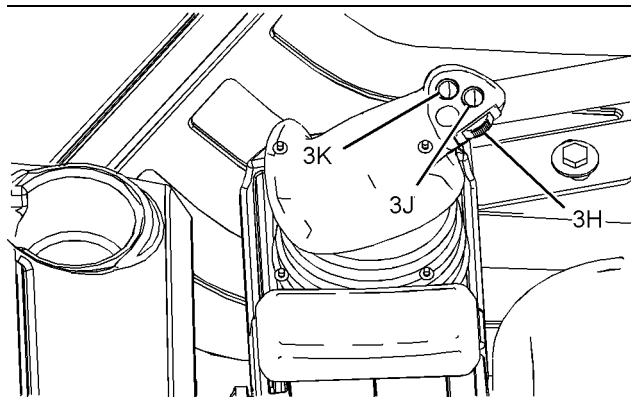


Illustration 53

g01399958



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 REVERSE speed is totally independent of the speed of the machine in the FORWARD position.

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.

Speed Recall Button (3J)

Preset the Speed Values

The power train ECM programs the preset values for a forward speed and a reverse speed with input from speed recall button (3J).

In order to program the preset values, the operator should hold down the button for at least 3 seconds under the following conditions.

“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.

Forward – The “FNR” status is FORWARD when the programmed criteria are met. Then, only the forward joystick input (speed value) is captured.

Reverse – The “FNR” status is REVERSE when the programmed criteria are met. Then, only the reverse joystick input (speed value) is captured.

Neutral – The “FNR” status is NEUTRAL when the programmed criteria are met. Both the current forward and reverse joystick inputs (speed values) are captured.

1. Ensure that parking brake switch (14) is disengaged.
2. Move the steering and transmission control to the FORWARD position.

3. Roll thumb wheel (3H) to the desired FORWARD speed, while the steering and transmission control is in forward.
4. Move the steering and transmission control to the REVERSE position.
5. Roll thumb wheel (3H) to the desired REVERSE speed, while the steering and transmission control is in reverse.
6. Move the steering and transmission control to NEUTRAL. Hold the Speed Recall Button for 3 seconds.
7. Press Speed Recall Button (3J) briefly while the machine is moving forward in order to return to the preset speed.
8. Press Speed Recall Button (3J) briefly while moving reverse and the machine will return to the preset speed.

No Preset to the Speed Values

Note: The operator must program the preset values after each shutdown of the keyswitch circuit. Refer to Steps 1 through 6 in order to preset the speed values.

If the values have not been programmed since the last shutdown of the keyswitch circuit, pressing the speed recall button will not result in any change in the speed value for the corresponding direction.

Forward – If only the FORWARD preset value is programmed since the last shutdown of the keyswitch circuit, the depressing of the button briefly permits only the FORWARD speed value to be changed to the preset value.

Reverse – If only the REVERSE preset value is programmed since the last shutdown of the keyswitch circuit, the depressing of the button briefly permits only the REVERSE speed value to be changed to the preset value.

Horn (3K)



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

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 brakes on a downgrade in order to maintain a safe operating mode. Release pedal (4) in order to allow the machine to move. Release pedal (4) in order to increase ground speed.

The decelerator/brake pedal is configured through ET or the gauge display. The decelerator/brake pedal has the two following configurations: Transmission Brake Only and Transmission Brake and Engine Deceleration.

Note: ET is the Electronic Technician service tool for use with Caterpillar machines.

Transmission Brake Only

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 pedal (4) is completely depressed beyond the detent spring, 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.

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 Compact Instrument Cluster.

Compact Instrument Cluster

Refer to Monitoring System, KENR6339, “Systems Operation” for more information on the Compact Instrument Cluster.

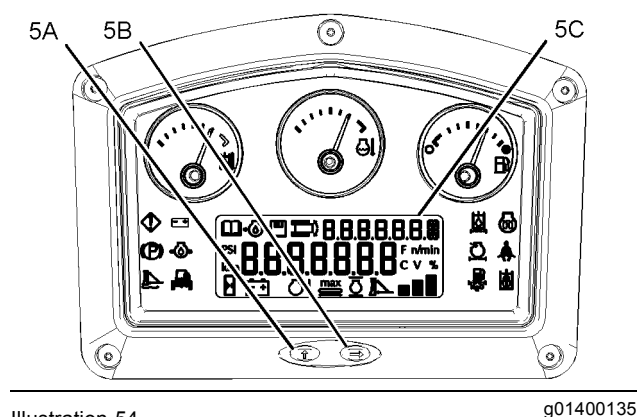


Illustration 54

g01400135

CIC LCD Screen

(5A) Mode Button

(5B) Scroll Button

(5C) Compact Instrument Cluster LCD Display

The Compact Instrument Cluster LCD Display (45) shows the four 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 – Steering Modulation Settings

Mode 2 – Implement Modulation Settings

Mode 3 – Brake/Decel Pedal Settings

See Table 6 for details of the CIC Operator menu.

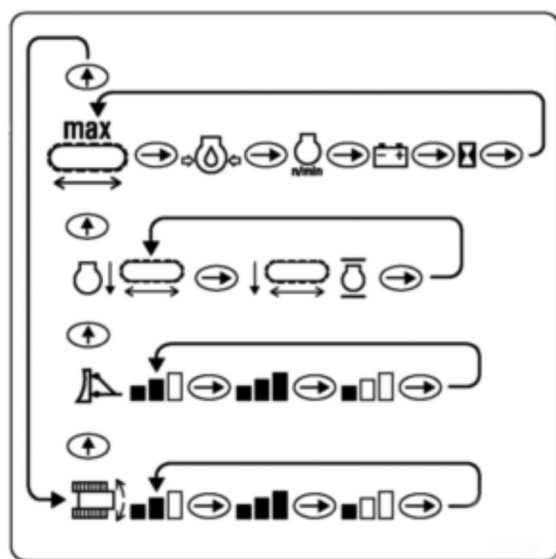


Illustration 55

g01359688

Diagram of CIC Navigation

Table 6

CIC Menu	
Operator Modes	
Mode 0 Default	Maximum Forwards Speed
	Maximum Reverse Speed
	Engine Oil Pressure
	Engine Speed
	System Voltage
	Service Hour Meter
Mode 1 Steering Modulation Settings	Fine
	Medium
	Coarse
Mode 2 Implement Modulation Settings	Fine
	Standard
	Fast
Mode 3 Brake/Decel Pedal Settings	Brake Only
	Brake And Engine Decel

Following is the content of the CIC Operator Modes menu.

Mode 0 - Default



Illustration 56
Mode 0 - Default LCD Screen
g01328919

The Mode 0 - Default screen has the following submenus:

Maximum Forward Speed

The Maximum Forward Speed screen indicates the maximum forward speed of the machine.

Maximum Reverse Speed

The Maximum Reverse Speed screen indicates the maximum reverse speed of the machine.

Engine Oil Pressure



Illustration 57
Mode 0 Engine Oil Pressure LCD Screen
g01328962

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

Engine Speed

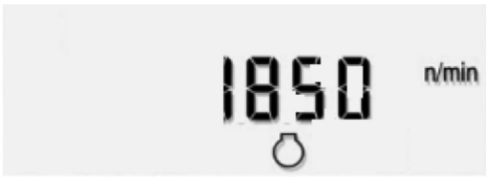


Illustration 58
Mode 0 Engine Speed LCD Screen
g01328963

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

System Voltage



Illustration 59

g01329052

Mode 0 System Voltage LCD Screen

The System Voltage screen indicates the current system voltage.

Service Hour Meter



Illustration 60

g01329053

Mode 0 Service Hour Meter LCD Screen

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

Mode 1 - Steering Modulation Settings

The Mode 1 - Steering Modulation Settings screen has the following submenus:

Fine



Illustration 61

g01328924

Mode 1 - Steering Modulation Settings - Fine LCD Screen

Medium



Illustration 62

g01328926

Mode 1 - Steering Modulation Settings - Medium LCD Screen

Coarse



Illustration 63

g01328936

Mode 1 - Steering Modulation Settings - Coarse LCD Screen

Mode 2 - Implement Modulation Settings

The Mode 2 - Implement Modulation Settings screen has the following submenus:

Fine



Illustration 64

g01328942

Mode 2 - Implement Modulation - Fine LCD Screen

Standard

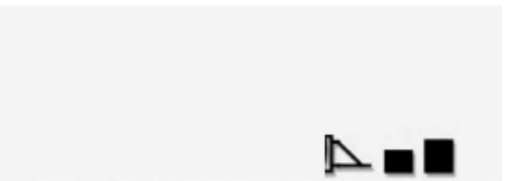


Illustration 65

g01328946

Mode 2 - Implement Modulation - Standard LCD Screen

Fast



Illustration 66

g01328944

Mode 2 - Implement Modulation - Fast LCD Screen

Mode 3 - Brake/Decel Pedal Settings

Brake Pedal Only

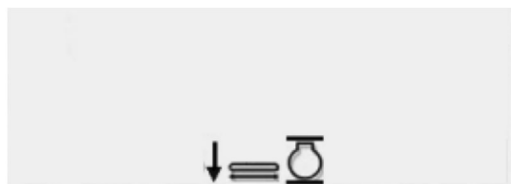


Illustration 67

g01328958

Mode 3 - Brake Pedal Only LCD Screen

Brake Pedal and Decelerate Pedal



Illustration 68

g01328959

Mode 3 - Brake Pedal and Decelerate Pedal LCD Screen

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

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 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 (8) 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 in order to attempt to start the engine again.

Bulldozer Control (11)

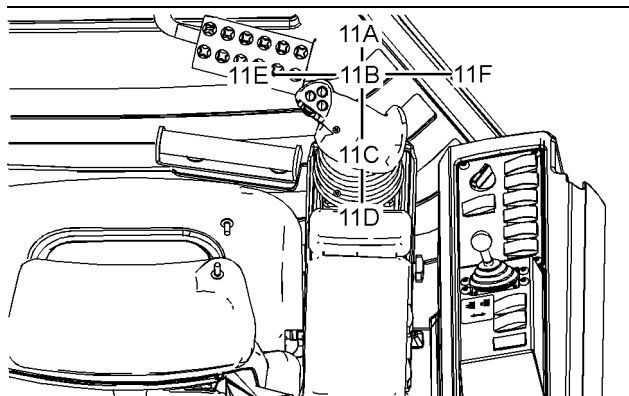


Illustration 69

g01257156



FLOAT (11A) – Push lever (11) forward past the detent force. This 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 cancelled, if you turn the engine start key to the OFF position, or the hydraulic lockout (15) 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.



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



TILT LEFT (11E) – Pull 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) – Push 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)

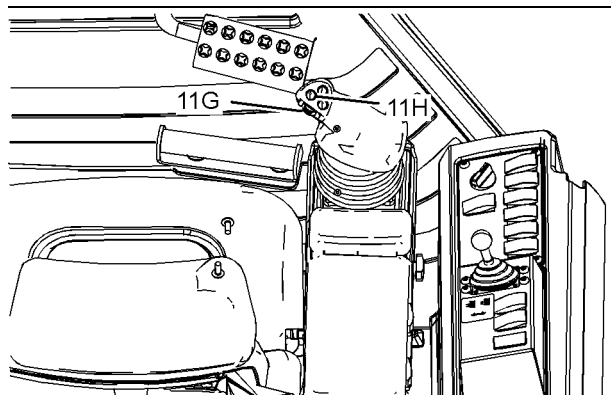


Illustration 70

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

Blade control mode (11H)

Push 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 allows removal of debris from the bulldozer blade.

Right Operator Console

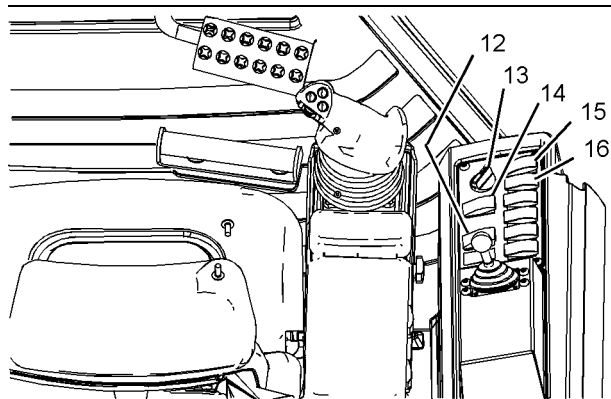


Illustration 71

g01391309

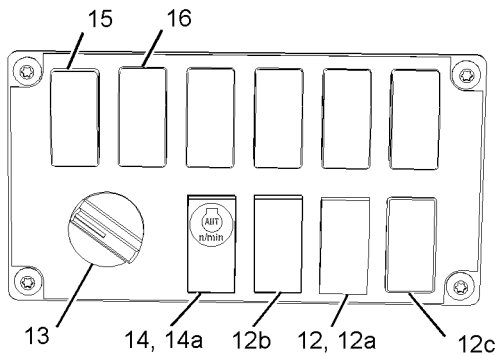


Illustration 72 g01693534

- (12) Work lights
- (12a) Front floodlights (If equipped)
- (12b) Front lights for long range (If equipped)
- (12c) Rear cab lights (If equipped)
- (13) Engine throttle control (knob)
- (14) Fuel efficient reverse
- (14a) Indicator light for seat belt (If equipped)
- (15) Parking brake switch
- (16) Hydraulic lockout

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.

Front Floodlights (12a) (If equipped)



Front Floodlights – Use this switch to operate the front floodlights, if equipped.

Front Cab Lights for Long Range (12b) (If equipped)



Front Cab Lights for Long Range – Use this switch to operate the front cab lights for the long range, if equipped.

Rear Cab Lights (12c) (If equipped)



Rear Cab Lights – Use this switch to operate the rear cab lights, if equipped.

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	1100
3	1175
4	1250
5	1400
6	1550
7	1700
8	1850
9	2000
10	2150

Note: The engine speed does not increase above 2000 RPM until the hydraulic oil temperature exceeds 15 °C (59.0 °F). Then, the engine speed will slowly increase up to 2150 RPM.

Fuel Efficient Reverse (14)

Fuel Efficient Reverse (14) automatically reduces engine speed when the machine is traveling in reverse. Fuel Efficient Reverse is designed to reduce fuel consumption and noise.

The engine rpm will recover automatically to the setting of the engine speed dial when the machine is commanded to travel forward or when the machine is in neutral. The engine rpm will also increase as you increase the desired REVERSE speed.



Fuel Efficient Reverse – Fuel efficient reverse is activated when the engine start switch is turned to the ON position. The indicator light on the switch will light. When you press fuel efficient reverse switch (14), the function changes from ON to OFF, and vice versa.

Indicator Light for Seat Belt (14a) (If equipped)



Seat belt – This light indicates when the seat belt is not used.

Parking Brake Switch (15)

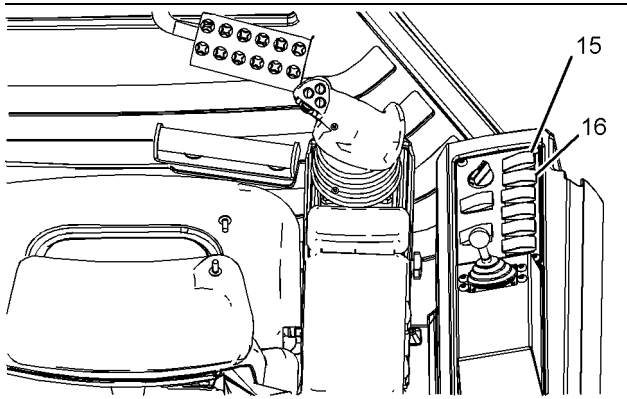


Illustration 73

g01695273



Parking Brake – This switch engages the parking brake. This switch also locks the transmission in NEUTRAL. The machine should 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 – Push switch (15) away from the operator in order to engage the parking brake.

Disengaged – Push switch (15) toward the operator in order to disengage the parking brake.

Hydraulic lockout (16)

Hydraulic lockout (16) shuts down the implement hydraulics to the machine.



Locked – Push the switch away from the operator in order to lock out the implement hydraulic system.



Unlocked – Push the switch toward the operator in order to unlock the implement hydraulic system.

Window Wiper and Window Washer (17) (18) (19) (20) (If Equipped)

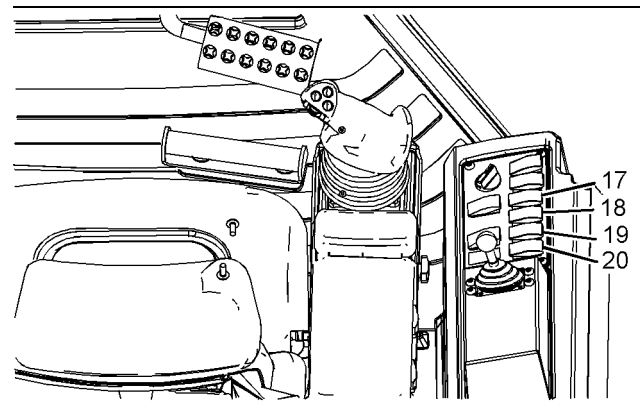


Illustration 74

g01391319



Front Window Wiper Switch (17) – Press the top of switch (17) in order to activate the window wiper for the front window. Press the bottom of switch (17) one time in order to turn off the window wiper for the front window. Press the top of switch (17) and hold switch (17) in order to activate the window washer for the front window.



Left Side Window Wiper Switch (18) – Press the top of switch (18) in order to activate the window wiper for the left window. Press the bottom of switch (18) one time in order to turn off the window wiper for the left window. Press the top of switch (18) and hold switch (18) in order to activate the window washer and the window wiper for the left window.



Right Side Window Wiper Switch (19) – Press the top of switch (19) in order to activate the window wiper for the right window. Press the bottom of switch (19) one time in order to turn off the window wiper for the right window. Press the top of switch (19) and hold switch (19) in order to activate the window washer and the window wiper for the right window.



Rear Window Wiper Switch (20) – Press the top of switch (20) in order to activate the window wiper for the rear window. Press the bottom of switch (20) one time in order to turn off the window wiper for the rear window. Press the top of switch (20) and hold switch (20) in order to activate the window washer for the rear window.

Note: Make sure that the window is wet before operating window wipers.

Winch Controls or Ripper Controls (21)

Winch Controls 21, 22, 23 (If Equipped)

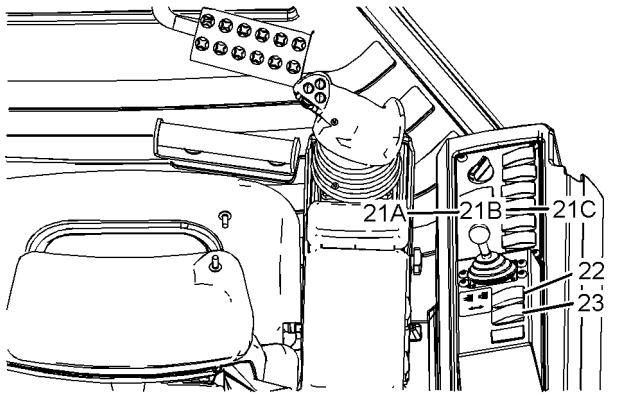


Illustration 75

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 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)

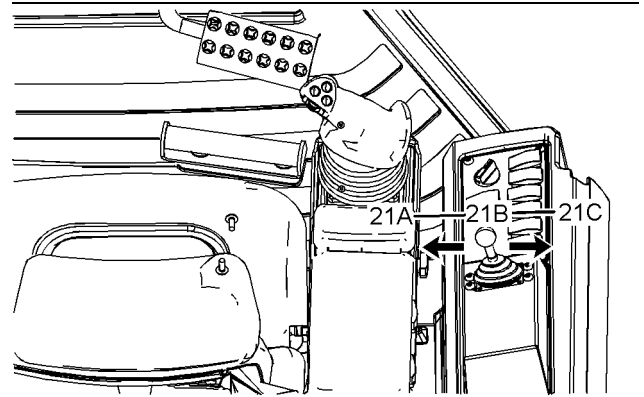


Illustration 76

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)

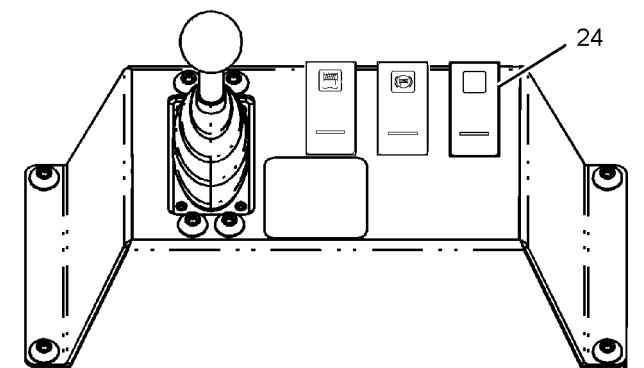


Illustration 77

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)

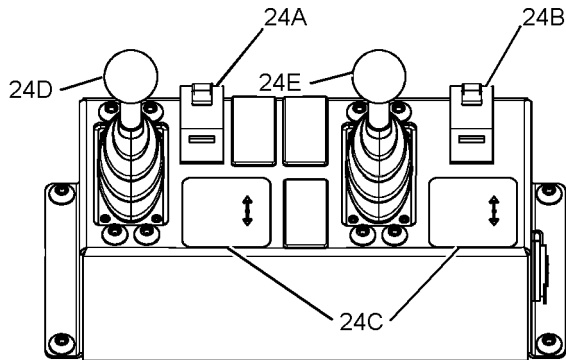


Illustration 78

g01623055

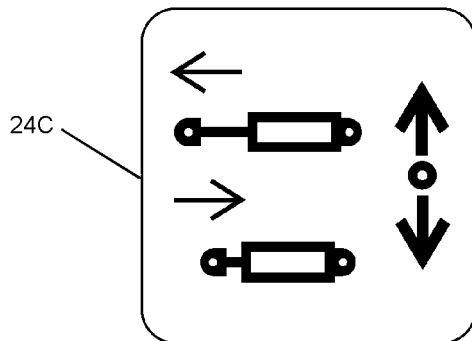


Illustration 79

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 Switch (Tractor Operator)



The Operator is Not Present – The seat switch in the operator seat prevents movement of the machine or implements that is not commanded if the operator is out of the seat. The switch communicates with the ECM software when the machine operator is sitting in the seat or when the operator leaves the operator seat.

The parking brake will not disengage and the implements will not unlock unless the operator is seated.

Note: The hystat control system and the implement operation will not shut down when the machine is moving and the operator raises from the seat.

Power Receptacle (26)

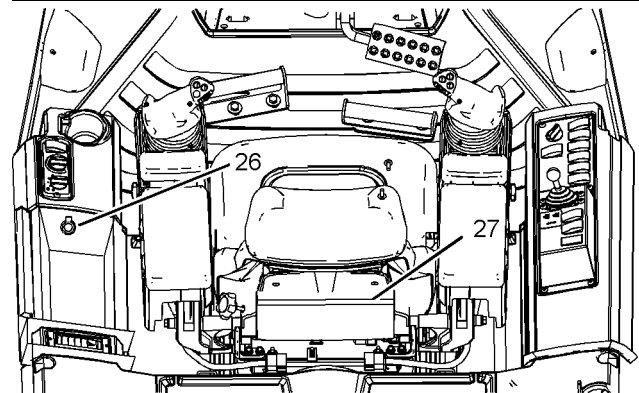


Illustration 80

g01391373

Power Receptacle – A twelve volt 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 backrest (27)

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

Fuel Shutoff Control in Cab (If equipped)

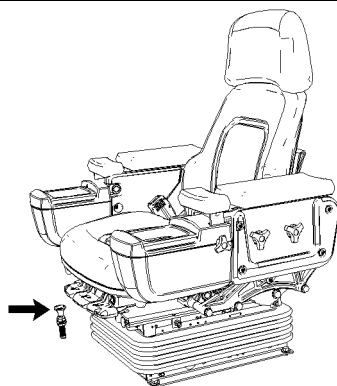


Illustration 81

g01625983

Fire plow

Control Panel for the AccuGrade - Laser System (If equipped)

If equipped, the GPS display and the AccuGrade - Laser System is located below the compact instrument cluster (CIC).

For more information regarding the operation of the control panel for the AccuGrade - Laser System, refer to Operation and Maintenance Manual, SEBU8161, "AccuGrade - Laser System". For more information regarding the operation of the control panel for the AccuGrade - GPS, refer to Operation and Maintenance Manual, SEBU8280, "AccuGrade - GPS (CD700)".

i02539833

Battery Disconnect Switch

SMCS Code: 1411-B11; 1411

The battery disconnect switch is located at the rear of the machine. Open the access door.

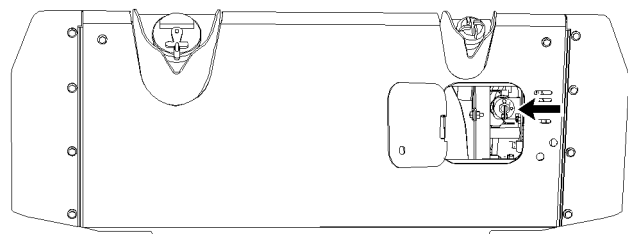


Illustration 82

g01271477



ON – Insert the battery disconnect switch key, and turn the battery disconnect switch key clockwise in order to activate the electrical system. The switch must be ON before you start the engine.



OFF – Turn the battery disconnect switch key counterclockwise in order to shut off the entire electrical system.

The battery disconnect switch and the engine start switch serve different functions. When the battery disconnect switch is turned off, the entire electrical system is disabled. When only the engine start switch is turned off, the battery remains connected to the electrical system.

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

Turn the battery disconnect switch key to the OFF position and remove the battery disconnect switch key when the machine is left for an extended period of one month or longer. This procedure will prevent a short circuit from draining the battery. This procedure will also prevent the components from draining the battery. This procedure will also prevent the battery from being drained by vandalism.

Close the access door.

NOTICE

Never turn the battery disconnect switch key to OFF with the engine running. Electrical system damage could result.

i02513591

Backup Alarm

SMCS Code: 7406

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

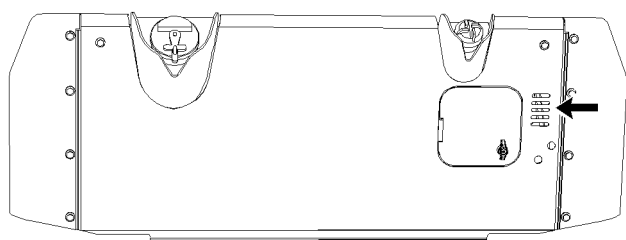


Illustration 83

g01257741

Backup alarm – The alarm will sound when the steering and transmission control (lever) is in the REVERSE position. The alarm is used to alert people behind the machine that the machine is backing up.

i03182441

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 three seconds long.

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

Alert Indicators

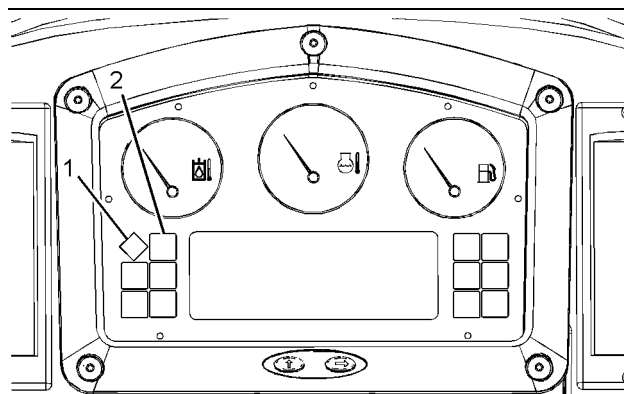


Illustration 84

g01211250



Action Lamp (1) – The action lamp is on the Gauge cluster. If the action lamp is ON, then attention to service is required.

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



Electrical System (2) – This indicator indicates a malfunction in the electrical system. If this alert indicator flashes, the system voltage is too high or too low for machine operation.

Increase the engine speed to high idle, if the electrical loads are high. The electric loads consist of the air conditioning and/or the lighting. An alternator will generate more output when the engine is at high idle. If the alert indicator for the electrical system stops within one minute, the electrical system is operating normally. During the periods of low engine speeds, the alternator is overloaded.

Modify the operating cycle. This will prevent the electrical system from overloading. This will also prevent the electrical system from discharging the batteries. You can also reduce the loads on the electrical system. Use the medium fan speed in the cab instead of the high fan speed.

Run the engine speed at normal rpm. Run the electrical system at a light load. If the light remains on, drive the machine to a convenient stop. Investigate the cause of the problem. The cause may be a loose alternator belt, a broken alternator belt, a faulty battery, a faulty alternator, etc.

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. The machine operation must be altered in order to reduce the excessive temperature in one of the systems or in more than one 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

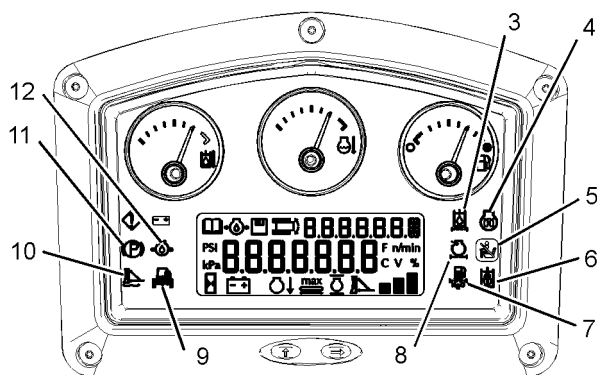


Illustration 85

g01625704



Hydraulic Oil Filter (3) – 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.



Glow Plug (4) – This indicator is illuminated when the glow plugs are on.



Operator Seat (5) – This indicator will illuminate if the operator leaves the seat unoccupied.



Hydraulic Lockout (6) – This indicator is illuminated when the hydraulic lockout is activated. The implement hydraulics are OFF.



Fuel/Water Separator(7) – The indicator will illuminate when either of two items occurs. The fuel/water separator must be drained or the fuel/water separator should be changed.

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



Engine Air Filter(8) – This indicator is illuminated when the filter is clogged or when the filter is dirty.



Machine Security System(9) – The indicator will illuminate when the machine security system is activated and an attempt to start the machine is made.



Float (10) – This indicator is illuminated when the float mode is selected.



Parking Brake (11) – This indicator is illuminated when the parking brake is engaged. If the operator leaves the seat with the parking brake switch OFF, the parking brake is applied automatically and the indicator flashes. Toggle the parking brake switch in order to disengage the parking brake.



Engine Oil Pressure (12) – This indicator is illuminated when engine oil pressure is low.

Gauges

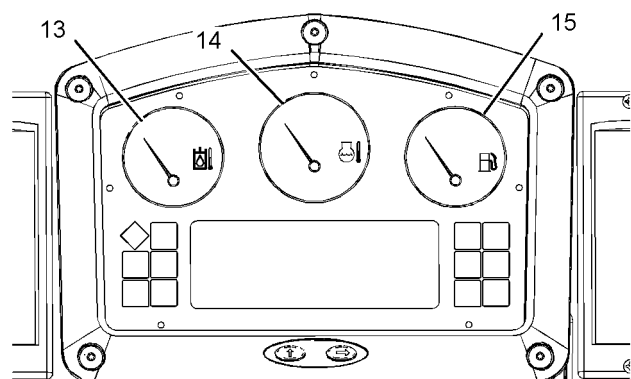


Illustration 86

g01211370



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.

Digital Display Window (17)

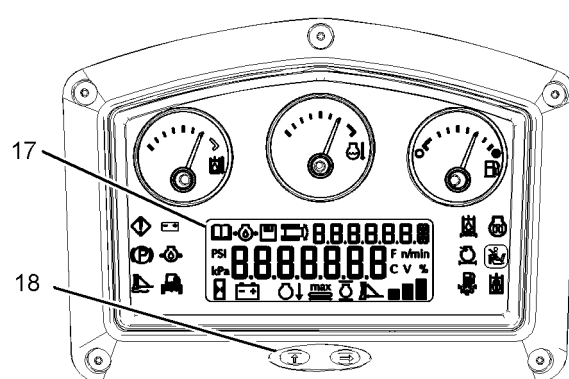


Illustration 87

g01625713

Gauge display (Compact Instrument Cluster)

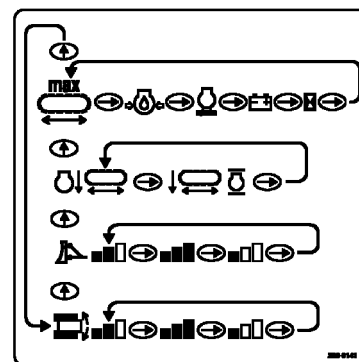


Illustration 88

g01270291

"CIC" Film

Digital display window (17) provides readouts that show the following items:

- Operational hours (service hours)
- Engine speed (tachometer)
- Diagnostic codes
- Selected speed and direction
- Hydraulic Oil Temp
- Implement Control Modes
- Steering Control Modes
- System Voltage
- Oil Pressure

Press up arrow button (18) until the desired function is displayed. Press the right arrow button (18) in order to access the parameters of the displayed function.

i03555467

Machine Speed (Indicator)

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.

Tachometer

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.

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.

Service Code

Reference: The Gauge Display in the digital display window will display the appropriate service codes when the service codes are activated.



Electronic Monitoring System

The electronic monitoring system has screens for the service mode that may indicate that a problem exists. These units of measurement display the diagnostic codes.

Contact your Caterpillar dealer for more information on the service modes.

Product Link (If Equipped)

SMCS Code: 7606

The Product Link PL121SR is a satellite communication device that transmits information regarding the machine to Caterpillar, Caterpillar dealers, and Caterpillar customers. The unit contains a Global Positioning System receiver (GPS receiver) and a satellite transceiver.

The Product Link PL121SR is capable of two-way communication between the machine and a remote user. The remote user can be a dealer or a customer. At any time, a user can request updated information from a machine such as hours of use or the location of the machine. Also, the system parameters for Product Link PL121SR can be changed. Data is transmitted from the machine to a satellite. Next, the data is transmitted to a ground station. The receiving station transmits the data to Caterpillar Inc. The data can then be sent to a Caterpillar dealer and to the customer.

Data Broadcasts

Machine data about the machine's condition and operation is being transmitted by Product Link to Caterpillar and/or Caterpillar dealers in order to better serve the customer and to improve Caterpillar products and services. The information that is transmitted may include the following data: machine serial number, location of the machine, fault codes, emissions data, fuel usage, service meter hours, version numbers for software and hardware, and installed attachments.

Caterpillar and/or Caterpillar dealers may use this information for various purposes: providing services to the customer and/or the machine, checking or maintaining Product Link equipment, monitoring the machine's health or performance, helping to maintain the machine, improving the machine's efficiency, evaluating or improving Caterpillar products and services, complying with legal requirements and valid court orders, performing market research, and offering the customer new products and services.

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

Operation in a Blast Site

If the machine is required to work within 12 m (40 ft) of a blast site, then Product Link PL121SR must be disabled. In order to disable the Product Link PL121SR install a Product Link Disconnect Switch in the machine cab that will allow the Product Link PL121SR module to be shut off. Refer to Special Instruction, REHS2365, "An Installation Guide for the Product Link PL121SR and for the PL300" for more details and installation instructions. You may also disconnect the Product Link PL121SR module from the main power source by disconnecting the wiring harness at the Product Link module.

This blast site warning does not supersede the published requirements or regulations found in "Title 30 of the Code of Federal Regulations (CFR)". This warning does not allow deviation from the published requirements or regulations found in "Title 30 of the Code of Federal Regulations (CFR)". A hazard assessment should be conducted by each customer. Every customer should meet all of the requirements of "Title 30 of the Code of Federal Regulations (CFR)" in order to ensure the safe storage, transportation, loading, and blasting of any explosive.

The following Product Link PL121SR specifications are provided in order to aid in conducting any related hazard assessment and to ensure compliance with all local regulations:

- The transmit power rating for the Product Link PL121SR transmitter is five to ten watts
- The operating frequency range for the Product Link PL121SR module is 148 MHz to 150 MHz.

Consult your Caterpillar dealer if there are any questions.

Information for the initial installation of the Product Link PL121SR is available in Special Instruction, REHS2365, "Installation Guide for the Product Link PL121SR".

Operation, configuration, and troubleshooting information for the Product Link PL121SR can be found in System Operation Troubleshooting Testing and Adjusting, RENR7911.

Regulatory Compliance

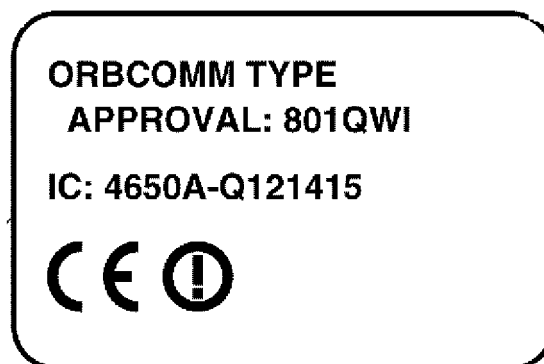


Illustration 89

g01131982

NOTICE

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

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

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

 **QUAKE®**
GLOBAL

MONITORING REMOTE ASSETS WORLDWIDE

DECLARATION OF CONFORMITY

We, **Quake Global Inc (Previously Quake Wireless, Inc. up to January 2001)**
of **9765 Clairemont Mesa Blvd, Suite A (Previously 5575 Ruffin Road, Suite 100 up to March 2002)**
San Diego
CA 92124, USA (Previously 92123)

declare under our sole responsibility that the product
QHE2500, Q2000, Q1500, Q1400, Q1200S, Q1200SG, Q1200SH, Q1200SM and Q1200SV
to which this declaration relates, is in conformity with the following standards and/or other normative documents.
EN 301 721 V1.2.1 (June 2001)
EN 300 489-20 V1.2.1 (November 2002)
EN 60950-1/A11:2004, 1st Edition

We hereby declare that all essential radio test suites have been carried out and that the above named product is in conformity to all the essential requirements of Directive 1999/5/EC.

The conformity assessment procedure referred to in Article 10 and detailed in Annex [IV] of Directive 1999/5/EC has been followed with the involvement of the following Notified Body:
BABT, Claremont House, 34 Molesey Road, Walton-on-Thames, KT12 4RQ, UK

Identification mark: **0168** The equipment will also carry the
Class 2 equipment identifier 

The technical documentation relevant to the above equipment will be held at:
Quake Global Inc (Previously Quake Wireless, Inc. up to January 2001)
9765 Clairemont Mesa Blvd, Suite A
San Diego, CA 92124, USA

Polina Braunstein
(name)
President
(title)
(signature of authorised person) (date)

Note: A translated extract of the above document is provided below.

Table 8

DECLARATION OF CONFORMITY

We, **Quake Global, Inc (Previously Quake Wireless, Inc up to January 2001)**

of **9765 Clairemont Mesa Blvd, Suite A (Previously 5575 Ruffin Road, Suite 100 up to March 2002)**

San Diego

CA 92124, Usa (Previously 92123)

declare under our sole responsibility that the product

QHE2500, Q2000, Q1500, Q1400, Q1200S, Q1200SG, Q1200SH, Q1200SM and Q1200SV

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9765 Clairemont Mesa Blvd, Suite A

San Diego, CA 92124, USA

Polina Braunstein

President

(signature of authorized person)

(date)



Class 2 equipment identifier

i03739620

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 buttons for speed control.

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

1. Adjust the operator's seat.
2. Fasten the seat belt.
3. Raise all lowered attachments in order to negotiate any obstacles.

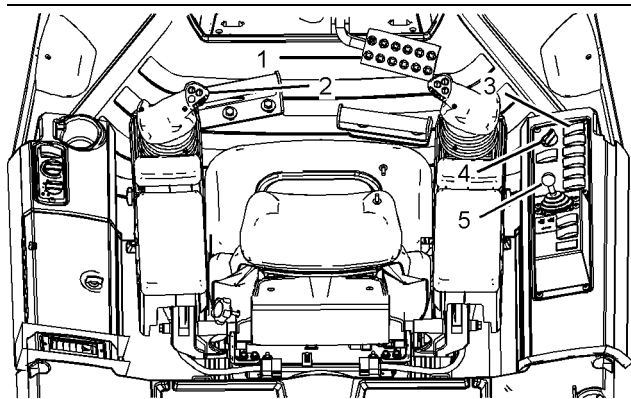


Illustration 91

g01258916

- (1) Decelerator/brake pedal
- (2) Steering and transmission control (lever)
- (3) Parking brake switch
- (4) Engine throttle control (knob)
- (5) Winch control lever or ripper control lever (if equipped)

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

5. Move switch (3) toward the operator to the DISENGAGED position.

6. Turn knob (4) in order to set the desired engine speed.

Note: The decelerator/brake pedal can be depressed in order to temporarily reduce travel speed.

7. Move lever (2) for the desired direction.

8. Release pedal (1).

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

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 in conjunction 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 is capable of reducing flow independently. This allows one track to be driven at a slower speed in order to cause the machine to turn.

Slowing the machine or stopping the machine is done by reducing the flow of oil to the drive motors or by stopping the flow of 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 (3) 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 (2) to the NEUTRAL position. Either movement causes an immediate stop.

For all turns that are on level ground or on side hill operations, move lever (2) toward the RIGHT position for right turns. Move lever (2) toward the LEFT position for left turns.

Brakes are applied under the following conditions.

- Pedal (1) is fully depressed.
- Steering and transmission control (2) is in NEUTRAL.
- Parking brake switch (3) is in the ENGAGED position.
- The engine is OFF.

Operating Principle for the Winch

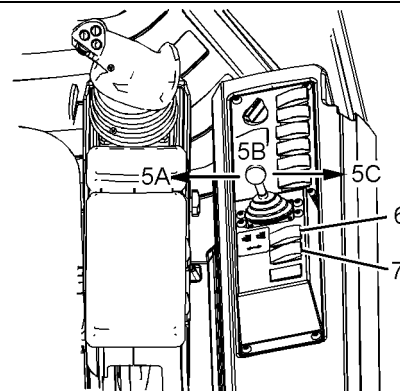


Illustration 92

g01261391

- (5) Winch control lever
- (6) Winch freespool switch
- (7) 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 will secure the load while control lever (5) 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 (5) 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 (5) 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 will force the piston for the freespool mechanism against the coil spring. This will disengage the splined connection. This 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 the winch drive away switch 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 prevents the drive motor from spinning too fast. This provides a controlled release of the winch cable. This 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 to maximize the life of the winch case and the life of 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 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 careful to keep hands and clothing away from the winch drum and rollers.

3. Press switch (6) 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 (6) one time in order to turn off the FREESPOOL mode. This allows REEL IN position (5A) 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 (5C). Reel out the winch cable in order to release tension.
2. Press switch (6) one time away from the operator into the FREESPOOL position. With switch (6) 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 (5A). Slowly reel in the cable until the cable is completely wound.

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).
- Clean the cab filter (fresh air) or replace 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.
- Check the transmission oil level.
- Perform the walk around inspection.

Engine Starting

i03322101

Engine Starting

SMCS Code: 1000; 7000

1. Move the battery disconnect switch to the ON position.
2. Move the implement controls to the HOLD position.

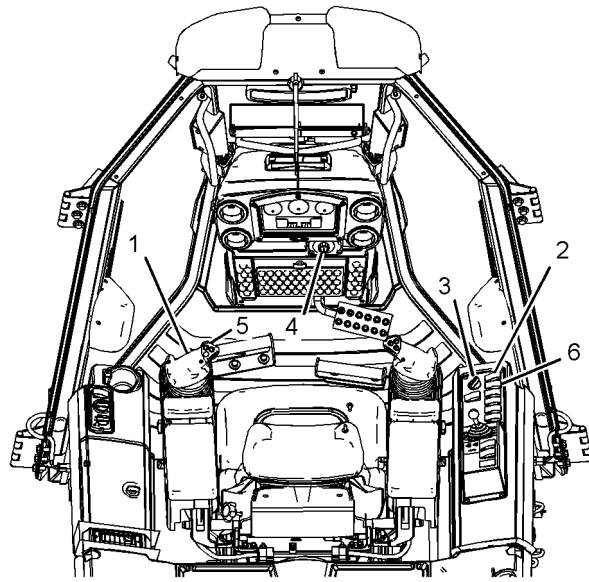


Illustration 93

g01700454

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

3. Move lever (1) into the NEUTRAL position.
4. Move switch (2) to the ENGAGED position.

Note: The engine will not start unless switch (2) is in the ENGAGED position.

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

- The operator must be seated in the seat.
- The parking brake must be engaged.
- The implements must be in the LOCK OUT position. Use hydraulic lockout (6) in order to lock out the implements.

- The steering and transmission control must be in NEUTRAL.
- The implement control lever must be in the HOLD position.

5. 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 (5) before you start the engine.
6. Turn knob (3) to one-third of the full travel before you 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.

7. Turn engine start switch (4) to the START position.

NOTICE

Do not crank the engine for more than 30 seconds. Allow the starter to cool for two minutes before cranking again. Turbocharger damage can result if the engine rpm is not kept low until the oil gauge display verifies that the oil pressure is sufficient.

8. Release the engine start switch key after the engine starts.
9. Allow the engine to warm up at LOW IDLE. Refer to Operation and Maintenance Manual, "Engine and Machine Warm-up".

Ether Starting Aid (If Equipped)

If the temperature of the coolant is below 0 °C (32 °F) a premeasured amount of ether is automatically injected into the engine air intake when you crank the engine.

1. Perform Step 1 through Step 6 of the Engine Starting procedure.
2. Turn start switch key (4) to the START position. Crank the engine.

NOTICE

Do not crank the engine for more than 30 seconds. Allow the starter to cool for two minutes before cranking again. Turbocharger damage can result if the engine rpm is not kept low until the oil gauge display verifies that the oil pressure is sufficient.

3. Release start switch key (4) when the engine starts.

For starting below -18°C (0°F), the use of one of the following cold weather starting aids is recommended:

- Coolant heater
- Fuel heater
- Jacket water heater
- Extra battery capacity

Reference: At temperatures below -23°C (-10°F), consult your Caterpillar 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

Bulldozer Blade Tip

i02799322

SMCS Code: 6060; 7000

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

Tip the blade forward in order to obtain a cutting edge angle up to 60 degrees. Tipping 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. Tipping the blade rearward provides a better carrying capability of soft material.

Adjustment of Bulldozer Blade Pitch

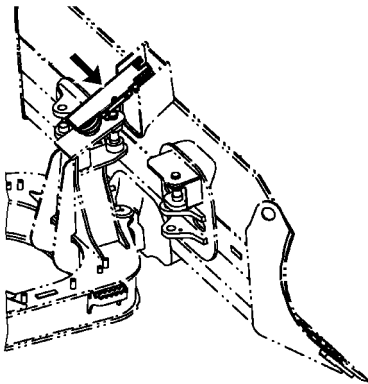


Illustration 94

g01258184

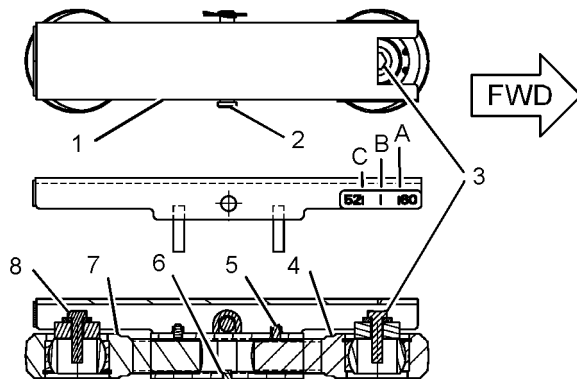


Illustration 95

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.

i02515382

Ripper Tip and Shank Protector

SMCS Code: 6808; 6810; 6812

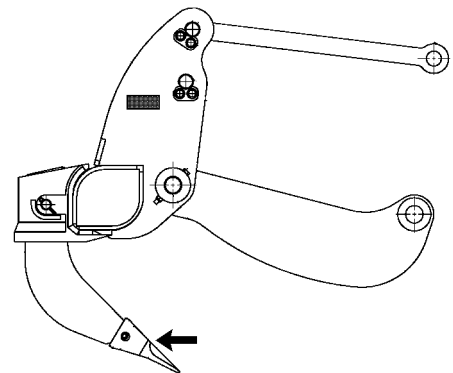


Illustration 96

g01258327

Replace the ripper tip and the shank protector (if equipped) before wear occurs on the shank. Follow the replacement procedures in the Operation and Maintenance Manual, "Ripper Tip and Shank Protector - Inspect/Replace".

i02799338

Cutting Edges and End Bits

SMCS Code: 6801; 6804

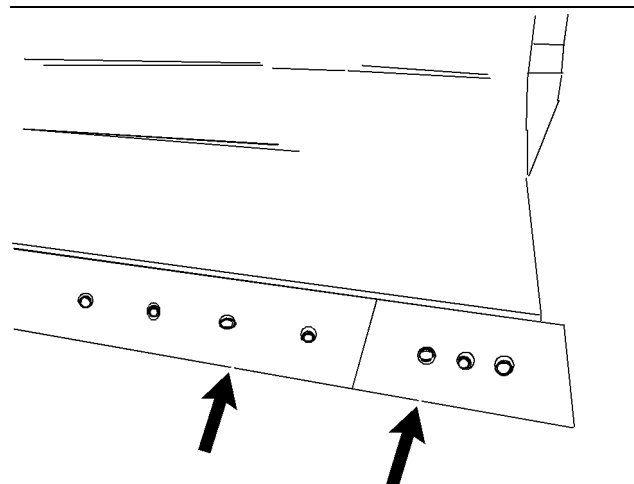


Illustration 97

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".

Parking

i02799345

Stopping the Machine

i02808917

SMCS Code: 7000

NOTICE

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

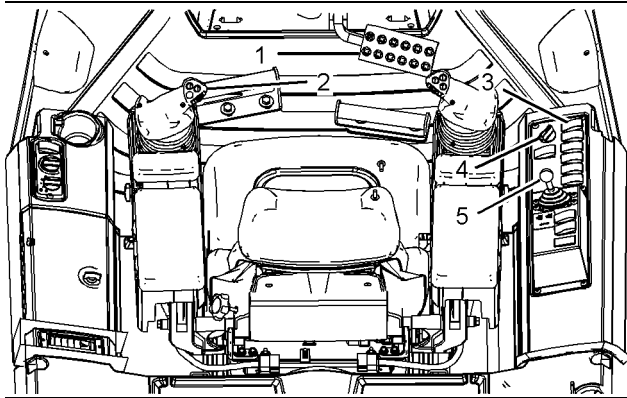


Illustration 98

g01258916

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. Push parking brake switch (3) away from the operator to the **ENGAGED** position.
5. Release pedal (1).
6. Use lever (5) in order to lower all attachments to the ground and apply slight downward pressure.
7. Move all attachment controls to the **NEUTRAL** position.

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 five minutes at low idle with no load.

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

2. Move all control levers into the **HOLD** position.

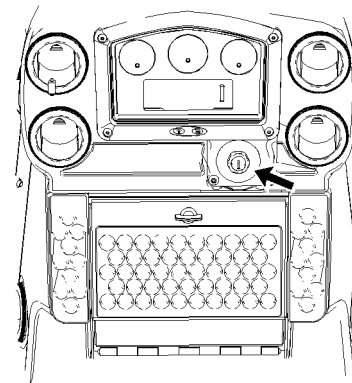


Illustration 99

g01270374

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

i02789742

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.

i03316659

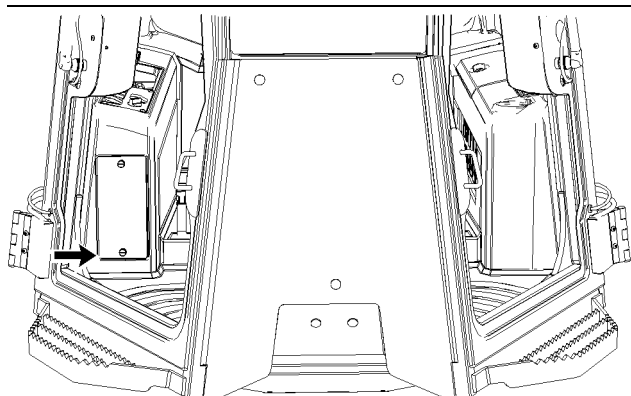


Illustration 100

g01259901

4. Open the access door for the fuse panel.

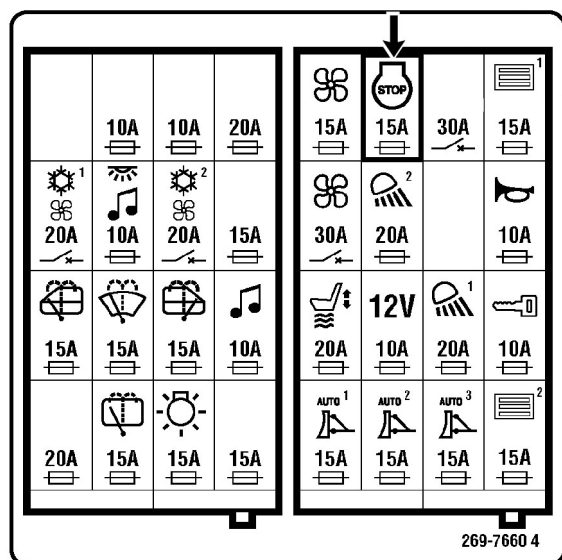


Illustration 101

g01393642

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

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

Equipment Lowering with Engine Stopped (Electrohydraulic Implement Valve)

SMCS Code: 7000

Dead Engine Lower

Actuator Spools

Relieve the pressure in the hydraulic tank.

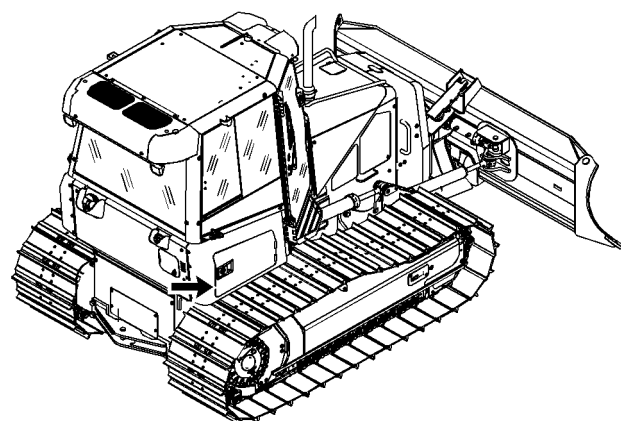


Illustration 102

g01399056

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.

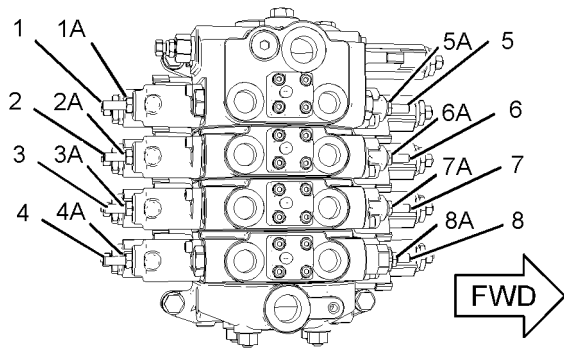


Illustration 103

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 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 relieves head pressure to the tilt angle cylinder. This tilts the dozer blade to the right.
4. Loosen locknut (4A) and turn adjustment screw (4) inward. This relieves rod pressure from the ripper cylinder to the tank. This raises the ripper.
5. Loosen locknut (5A) and turn adjustment screw (5) inward. This relieves rod pressure from the lift cylinder to the tank. This lowers the dozer blade.
6. Loosen locknut (6A) and turn adjustment screw (6) inward. This 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 relieves the rod pressure from the tilt cylinder to the tank. This tilts the dozer blade left.

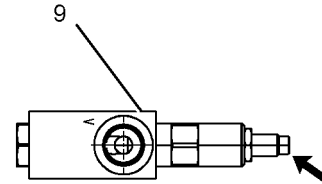


Illustration 104

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 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 relieves the head pressure from the ripper cylinder to the tank. This 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.

i02801552

Leaving the Machine

SMCS Code: 7000

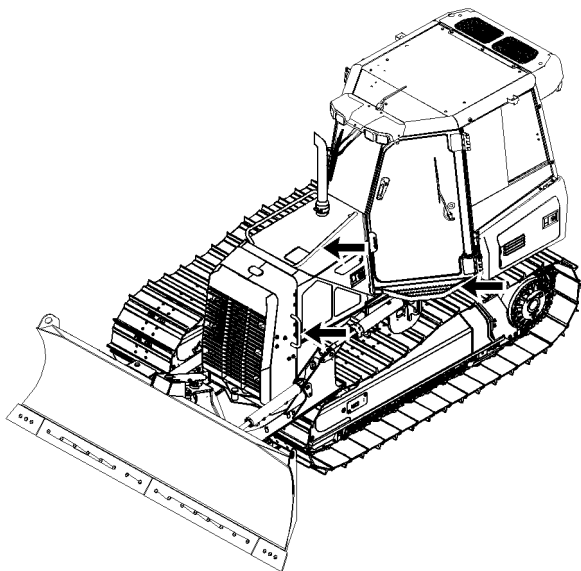


Illustration 105

g01259039

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 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

i03739521

Shipping the Machine

SMCS Code: 7000; 7500

Investigate the travel route for overpass clearances. Make sure that there is adequate clearance for the machine that is being transported. This is especially 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.

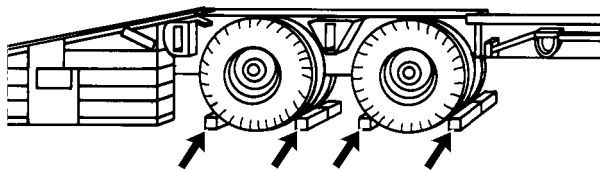


Illustration 106

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 9

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 7795 kg (17185 lb)	D3K LGP 8093 kg (17842 lb)	D4K XL 8147 kg (17961 lb)	D4K LGP 8501 kg (18742 lb)	D5K XL 9408 kg (20741 lb)	D5K LGP 9683 kg (21347 lb)
Radiator grill (HD) 43 kg (95 lb)	+	+	+	+	+	+
Rear guard 116 kg (256 lb)	+	+	+	+	+	+
ROPS cab 235 kg (518 lb)	+	+	+	+	+	+
ROPS cab (logging machine) 324 kg (715 lb)	+	+	+	+	+	
Auxiliary drive	+31 kg (68 lb)	+31 kg (68 lb)	+32 kg (71 lb)	+32 kg (71 lb)	-12 kg (26 lb)	-12 kg (26 lb)
Installation AR (winch)	+91 kg (201 lb)	+91 kg (201 lb)	+93 kg (205 lb)	+93 kg (205 lb)	+47 kg (104 lb)	+47 kg (104 lb)
Ripper 612 kg (1350 lb)	+	+	+	+	+	+
Winch mounting 111 kg (245 lb)	+	+	+	+	+	+
Front counterweight 286 kg (630 lb)	+	+	+	+	+	+
Accugrade Installation (Attachment ready option) 16 kg (35 lb)	+	+	+	+	+	+
Hydraulic system (4 valve) 19 kg (42 lb)	+	+	+	+	+	+
Front sweep assembly 132 kg (291 lb)	+	+	+	+	+	+
Rear sweep assembly 56 kg (124 lb)	+	+	+	+	+	+
Screens (canopy) at the front and the door 67 kg (148 lb)	+	+	+	+	+	+
Side screen 55 kg (121 lb)	+	+	+	+	+	+
Rear screen (cab) 43 kg (95 lb)	+	+	+	+	+	+
Rear screen (canopy) 39 kg (86 lb)	+	+	+	+	+	+
Full track roller guard	+74 kg (163 lb)	+74 kg (163 lb)	+85 kg (187 lb)	+85 kg (187 lb)	+105 kg (232 lb)	+105 kg (232 lb)
Guide guard (center track)	+24 kg (53 lb)	+24 kg (53 lb)	+26 kg (57 lb)	+26 kg (57 lb)	+31 kg (68 lb)	+31 kg (68 lb)
Sound suppression (EEC) 5 kg (11 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.

i03727347

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.

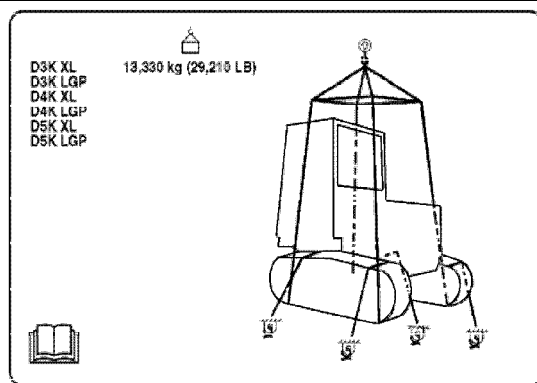


Illustration 107

g01355253

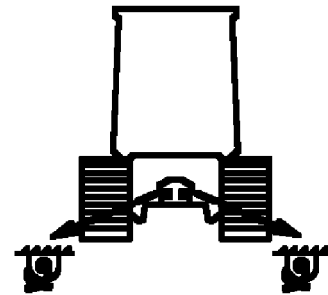


Illustration 108

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.

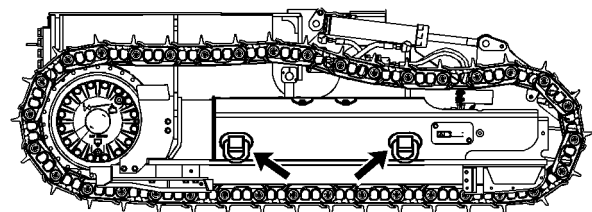


Illustration 109

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

i02801575

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's Service Manual for the procedure. Consult your Caterpillar 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 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 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 30 degree angle from the straight ahead position.

Quick machine movement could overload the tow line or the tow bar. This 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 may require a larger towing machine or additional machines that are connected to the rear of the disabled machine. This 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 Caterpillar 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

i03727400

Lubricant Viscosities

SMCS Code: 7000; 7581

Selecting the Viscosity

The proper oil viscosity grade is determined by the minimum outside temperature. This is 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 in order to select the oil viscosity grade for operating the machine at the highest temperature that is anticipated. Use the highest oil viscosity that is allowed for the ambient temperature when you start the machine.

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. Consult your dealer if additional information is needed.

Lubricant Viscosities for Ambient Temperatures

Note: When you operate the machine at temperatures below 20°C (4°F), refer to Special Publication, SEBU5898, “Cold Weather Recommendations For All Caterpillar Equipment”. This is available from your Caterpillar dealer.

Table 10

LUBRICANT VISCOSITIES FOR AMBIENT TEMPERATURES ⁽¹⁾						
Compartment or System	Oil Type and Classification	Oil Viscosities	°C		°F	
			Min	Max	Min	Max

(continued)

(Table 10, contd)

LUBRICANT VISCOSITIES FOR AMBIENT TEMPERATURES ⁽¹⁾						
Compartment or System	Oil Type and Classification	Oil Viscosities	°C		°F	
			Min	Max	Min	Max
Engine Crankcase ⁽²⁾⁽³⁾	Cat DEO Multigrade Cat DEO SYN Cat Arctic DEO SYN ⁽⁴⁾ CAT ECF-1, CAT ECF-2, CAT ECF-3 ⁽⁵⁾	SAE 0W20	-40	10	-40	50
		SAE 0W30	-40	30	-40	86
		SAE 0W40	-40	40	-40	104
		SAE 5W30	-30	30	-22	86
		SAE 5W40	-30	50	-22	122
		SAE 10W30 ⁽⁶⁾	-18	40	0	104
		SAE 10W40	-18	50	0	122
		SAE 15W40	-9.5	50	15	122
Hydrostatic Transmission Hydraulic Systems	Cat HYDO Advanced 10 ⁽⁷⁾ Cat HYDO ⁽⁸⁾ Cat DEO Cat MTO Cat TDTO-TMS Cat TDTO Cat DEO SYN Cat Arctic DEO SYN Cat Arctic TDTO SYN Cat TO-4 commercial TO-4 Cat BIO HYDO Advanced (HEES) commercial BF-2 ⁽⁹⁾ Cat ECF-1a Cat ECF-2, Cat ECF-3, Cat TO-4M	SAE 0W20	-40	40	-40	104
		SAE 0W30	-40	40	-40	104
		SAE 5W30	-30	40	-22	104
		SAE 5W40	-30	40	-22	104
		SAE 10W ⁽⁷⁾	-20	40	-4	104
		SAE 10W	-20	40	-4	104
		SAE 10W30	-20	40	-4	104
		SAE 15W40	-15	50	5	122
		Cat MTO	-25	40	-4	104
		Cat TDTO-TMS ⁽¹⁰⁾	-15	50	5	122
Gear Case for the Winch	Cat TDTO Cat TDTO-TMS Cat Arctic TDTO SYN commercial TO-4	SAE 0W-20 ⁽¹¹⁾	-40	10	-40	50
		SAE 0W-30 ⁽¹²⁾	-40	20	-40	68
		SAE 5W30 ⁽¹²⁾	-30	20	-22	68
		SAE 10W	-20	10	-4	50
		SAE 30 ⁽¹³⁾	0	35	32	95
		SAE 50 ⁽¹³⁾⁽¹⁴⁾	10	50	50	122
		Cat TDTO-TMS ⁽¹³⁾⁽¹⁰⁾	-20	43	-4	110
Final Drives	Cat TDTO Cat TDTO-TMS Cat Arctic TDTO SYN commercial TO-4	SAE 0W20 ⁽¹¹⁾	-40	0	-40	32
		SAE 0W30 ⁽¹²⁾	-40	10	-40	50
		SAE 5W30 ⁽¹²⁾	-30	10	-22	50
		SAE 10W	-30	0	-22	32
		SAE 30	-25	25	-13	77
		SAE 50	-15	50	5	122
		Cat TDTO-TMS ⁽¹⁰⁾	-30	25	-22	77

(continued)

Maintenance Section
Lubricant Viscosities and Refill Capacities

(Table 10, contd)

LUBRICANT VISCOSITIES FOR AMBIENT TEMPERATURES ⁽¹⁾						
Compartment or System	Oil Type and Classification	Oil Viscosities	°C		°F	
			Min	Max	Min	Max
Track Pins	Cat GO (Gear Oil) ⁽¹⁵⁾ Cat Synthetic GO ⁽¹⁶⁾ commercial API GL-5 gear oil	SAE 75W90	-30	40	-22	104
		SAE 75W-140	-30	45	-22	113
		SAE 80W90	-20	40	-4	104
		SAE 85W140	-10	50	14	122
		SAE 90	0	40	32	104
Track Idlers and Track Rollers	Cat DEO Cat DEO SYN Cat ECF-1a, Cat ECF-2, Cat ECF-3 API CF	SAE 30	-20	25	-4	77
		SAE 40	-10	40	14	104
		SAE 5W40	-35	40	-31	104

(1) When you operate the machine at temperatures below 20°C (4°F), refer to Special Publication, SEBU5898, "Cold Weather Recommendations for All Caterpillar Machines". This is available from your Caterpillar dealer.

(2) Supplemental heat is recommended for cold soaked starts below the minimum ambient temperature. Supplemental heat may be required for cold soaked starts that are above the minimum temperature that is stated, depending on the parasitic load and other factors. Cold soaked starts occur when the engine has not been operated for a period of time. This allows the oil to become more viscous due to cooler ambient temperatures.

(3) API CF oils are not recommended for Caterpillar 3500 Series and smaller Direct Injection (DI) diesel engines. API CF-4 oils are not recommended for Caterpillar machines with diesel engines.

(4) Cat Arctic DEO SYN is an SAE 0W-30 oil viscosity grade.

(5) API CJ-4, API CI-4, API CI-4 PLUS, and API CH-4 oils are acceptable if the requirements of Caterpillar's ECF-1-a (Engine Crankcase Fluid specification - 1 -a) are met. API CJ-4, API CI-4, API CI-4 PLUS, and API CH-4 oils that have not met the requirements of Caterpillar's ECF-1-a or ECF-2 specification may cause reduced engine life. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluid Recommendations" for more information to the CAT ECF specifications and other commercial oils.

(6) SAE 10W-30 is the preferred viscosity grade for the 3116, 3126, C7, C-9 and the C9 diesel engines when the ambient temperature is between -18° C (0° F) and 40° C (104° F).

(7) Cat HYDO Advanced 10 is the preferred oil for use in most Caterpillar machine hydraulic and hydrostatic transmission systems when ambient temperature is between -20 °C (-4 °F) and 40 °C (104 °F). Cat HYDO Advanced 10 has an SAE viscosity grade of 10W. **Cat HYDO Advanced 10 has 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 following 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. Contact your Cat dealer for details. In order to gain the most benefit from the improved performance designed into Cat HYDO Advanced 10, when switching to Cat HYDO Advanced 10, cross contamination with the previous oil should be kept to less than 10%.

(8) **Second choice** oils are Cat HYDO, Cat MTO, Cat DEO, Cat DEO-ULS, Cat TDTO, Cat Arctic TDTO, Cat TDTO-TMS, Cat DEO SYN, Cat Arctic DEO SYN. **Third choice** oils are commercial oils that meet Cat ECF-1-a, Cat ECF-2, Cat ECF-3, Cat TO-4, or the Cat TO-4M specifications, and that have a minimum zinc additive level of 0.09 percent (900 ppm). Commercial biodegradable hydraulic oil must meet the Cat BF-2 specification. Refer to the machine Operation and Maintenance Manual and/or contact your local Caterpillar dealer before using commercial oils that meet Cat BF-2 in Cat Hydraulic Excavators. The minimum viscosity for commercial alternative oils used in most Cat machine hydraulic and hydrostatic transmission systems is 6.6 cSt at 100 °C (212 °F) ("ASTM D445").

(9) Commercial biodegradable hydraulic oil (HEES) must meet the Caterpillar BF-2 specification.

(10) Cat TDTO-TMS ("Transmission Multi-Season") (synthetic blend that exceeds the specifications of TO-4M multigrade oil)

(11) The First Choice is Cat Arctic TDTO SYN with SAE 0W-20 viscosity grade. The Second Choice is oils of full synthetic base stock without viscosity index improvers that meet the performance requirements of the TO-4 specification for the SAE 30 viscosity grade. Typical lubricant viscosity grades are SAE 0W-20, SAE 0W-30, and SAE 5W-30. The Third Choice is oils that contain a TO-4 additive package and a lubricant viscosity grade of SAE 0W-20, SAE 0W-30, or SAE 5W-30.

(12) The First Choice is oils of full synthetic base stock without viscosity index improvers that meet the performance requirements of the Cat TO-4 specification for the SAE 30 viscosity grade. Typical viscosity grades are SAE 0W-20, SAE 0W-30, and SAE 5W-30. The Second Choice is oils with a TO-4 additive package and a lubricant viscosity grade of SAE 0W-20, SAE 0W-30, or SAE 5W-30.

(13) Except for the winch hydraulic system, use SAE 30 viscosity grade for 0°C (32°F) to 43°C (110°F) or Cat TDTO-TMS for -20°C (-4°F) to 50°C (122°F).

(14) Do not use SAE 50 oil viscosity grade in transmissions with "ICM" control. Do not use SAE 50 oil viscosity grade for the winch cases with hydraulic drive.

(15) Cat GO (Gear Oil) is available in SAE 80W-90 and SAE 85W-140 viscosity grades.

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

i02516980

Capacities (Refill)

SMCS Code: 7000; 7560

Table 11

APPROXIMATE REFILL CAPACITIES			
Compartment or System	Liters	US Gal	Imp Gal
Engine Crankcase	11	2.9	2.4
Each Final Drive D3K	8.2	2.2	1.8
Each Final Drive D4K	9.5	2.5	2.1
Each Final Drive D5K	9.5	2.5	2.1
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	7.5	2.0	1.6
Cooling System	22.4	5.9	4.9
Gear Case for the Winch	4.7	1.2	1.0

i01822901

S·O·S Information

SMCS Code: 7542

S·O·S Services is a highly recommended process for Caterpillar customers to use in order to minimize owning and operating cost. Customers provide oil samples, coolant samples, and other machine information. The dealer uses the data in order to provide the customer with recommendations for management of the equipment. In addition, S·O·S Services can help determine the cause of an existing product problem.

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluid Recommendations" for detailed information concerning S·O·S Services.

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

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

Maintenance 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 ECM 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.

i03653330

Maintenance Interval Schedule

SMCS Code: 7000

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

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

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

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

Note: If Cat HYDO Advanced 10 hydraulic oil is used, the hydraulic oil change interval will change. The normal interval of 2000 hours is extended to 3000 hours. S-O-S services may extend the oil change even longer. Consult your Caterpillar dealer for details.

When Required

Battery - Recycle	91
Battery or Battery Cable - Inspect/Replace	92
Circuit Breakers - Reset	96
Condenser (Refrigerant) - Clean	97
Cutting Edges and End Bits - Inspect/Replace ...	103
Engine Air Filter Primary Element - Clean/ Replace	103
Engine Air Filter Secondary Element - Replace ..	105
Engine Air Precleaner - Clean	106
Ether Starting Aid Cylinder - Replace	109
Free Spool Drag - Adjust	111
Fuel System - Prime	113
Fuel System Water Separator - Drain	115
Fuel Tank Cap - Clean	118
Fuses - Replace	119
Oil Filter - Inspect	126
Radiator Core - Clean	126
Radiator Pressure Cap - Clean/Replace	127
Ripper - Inspect/Replace	128
Winch Cable - Replace	133
Window Washer Reservoir - Fill	135
Window Wipers - Inspect/Replace	136
Windows - Clean	136

Every 10 Service Hours or Daily

Backup Alarm - Test	91
Brakes, Indicators and Gauges - Test	94
Bulldozer Power Angling Tilt Hinge Pins - Lubricate	95
Cab Filter (Fresh Air) - Clean/Inspect/Replace	96
Cooling System Coolant Level - Check	100
Engine Oil Level - Check	107
Hydraulic System Oil Level - Check	124
Seat Belt - Inspect	129
Winch Cable - Inspect	132
Winch Fairlead Rollers - Lubricate	135

Every 50 Service Hours or Weekly

Cab Filter (Recirculation) - Clean/Inspect/ Replace	96
Front Idler Position - Check/Adjust	111
Ripper Linkage and Cylinder Bearings - Lubricate	127
Track - Check/Adjust	130
Track Pins - Inspect	131

Every 250 Service Hours or Monthly

Belt - Inspect/Replace	93
Engine Oil Sample - Obtain	108
Final Drive Oil Level - Check	110
Fuel Tank Water and Sediment - Drain	118
Track Roller Frame - Inspect	132
Winch Oil Level - Check	134

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

Cooling System Coolant Sample (Level 2) - Obtain	101
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Every 500 Service Hours

Cooling System Coolant Sample (Level 1) - Obtain	100
Engine Air Precleaner - Clean	106
Final Drive Oil Sample - Obtain	111
Hydraulic System Oil Sample - Obtain	125
Winch Oil Sample - Obtain	134

Every 500 Service Hours or 3 Months

Engine Oil and Filter - Change	108
Fuel System Secondary Filter - Replace	114
Fuel System Water Separator - Replace	116

Every 500 Service Hours or 1 Year

Trunnion - Adjust	132
Winch Drum Bearing - Lubricate	135

Every 1000 Service Hours or 6 Months

Battery - Inspect	91
Engine Valve Lash - Check	109

Hydraulic System Oil Filter - Replace	123
Rollover Protective Structure (ROPS) - Inspect ..	129
Winch Oil Filter - Replace	133

Every 2000 Service Hours or 1 Year

Cooling System Coolant Sample (Level 2) - Obtain	101
Final Drive Oil - Change	110
Hydraulic System Oil - Change	120
Winch Oil - Change	133
Winch Vent Plug - Clean	134

Every 3000 Service Hours or 2 Years

Cooling System Water Temperature Regulator - Clean/Replace	102
Engine Air Filter Primary Element - Clean/ Replace	103
Engine Air Filter Secondary Element - Replace ..	105

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

Seat Belt - Replace	129
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Every 6000 Service Hours or 3 Years

Cooling System Coolant Extender (ELC) - Add	99
--	----

Every 12 000 Service Hours or 6 Years

Cooling System Coolant (ELC) - Change	97
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i01989120

Backup Alarm - Test

SMCS Code: 7406

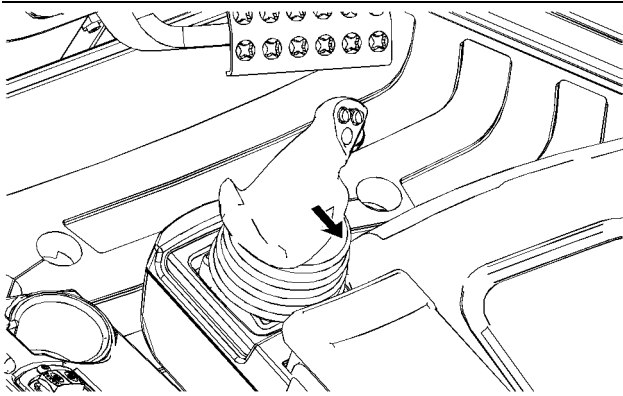


Illustration 110

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.

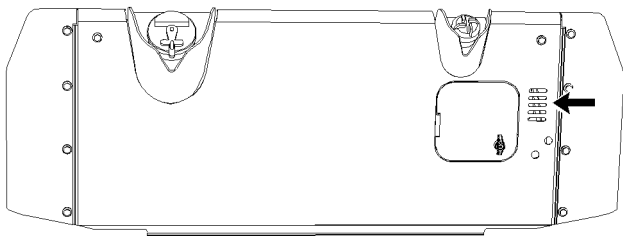


Illustration 111

g01257741

The backup alarm is on the rear of the machine.

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

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.

i00993589

Battery - Recycle

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

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Battery or Battery Cable - Inspect/Replace

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

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.

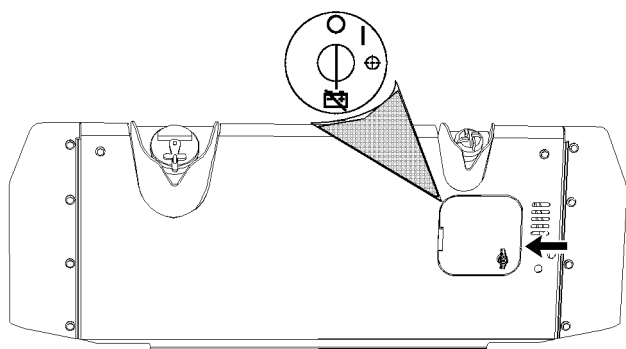


Illustration 112

g01259128

2. Turn the battery disconnect switch 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.

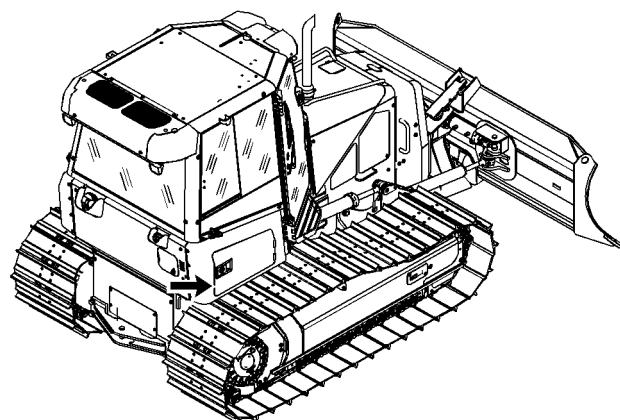


Illustration 113

g01399056

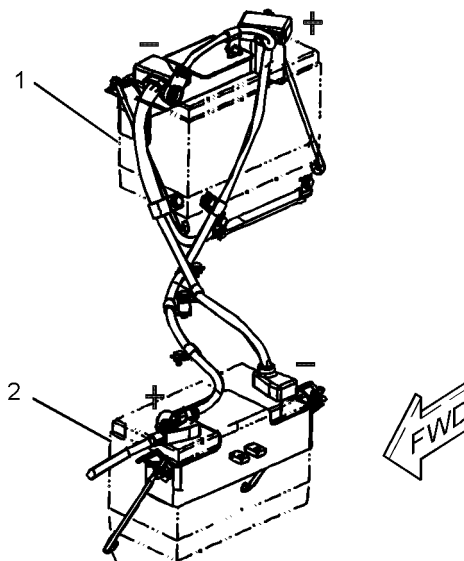


Illustration 114

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: Replace the secondary battery carrier (strap) when the battery is replaced. 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.

i03722700

Belt - Inspect/Replace

SMCS Code: 1357-040; 1357-510

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.

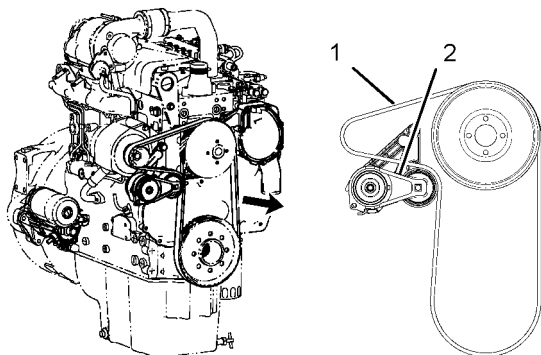


Illustration 115

g01275091

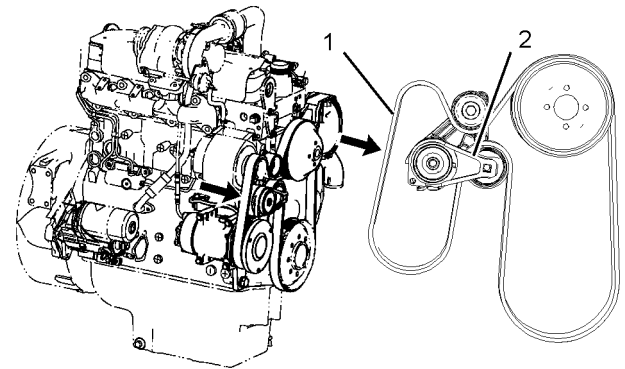


Illustration 116

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.

Replace

Contact your Caterpillar dealer in order to replace the belt, if necessary.

i02801609

Brakes, Indicators and Gauges - Test

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

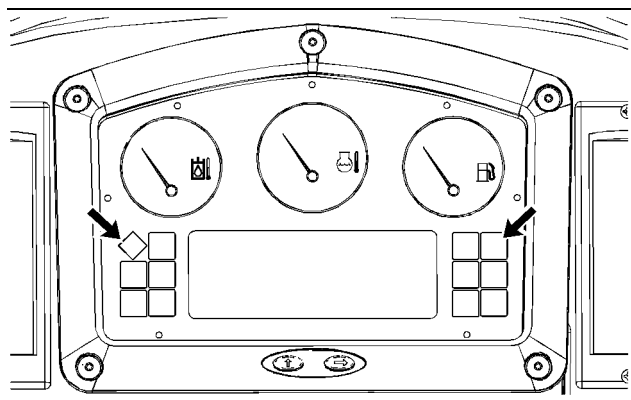


Illustration 117

g01213312

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.

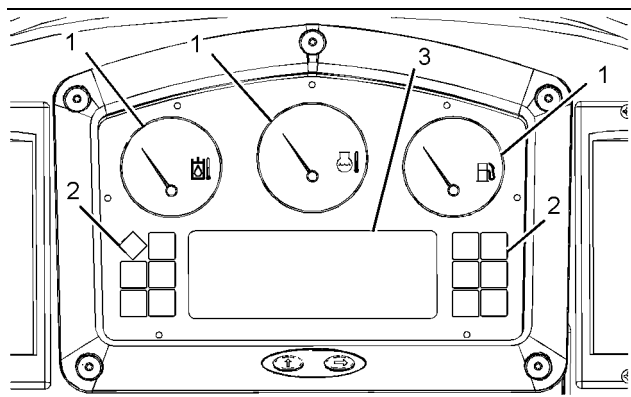


Illustration 118

g01213323

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

During the self test, all alert indicators flash.

The digital display shows the following readouts:

- All indicators of units (Deg C, kPa, rpm, and liters)

- "X10" readout
- Symbol for the hour meter
- "8.8.8.X.8.8" readout

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

- The 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.

i02801610

Bulldozer Power Angling Tilt Hinge Pins - Lubricate

SMCS Code: 6050

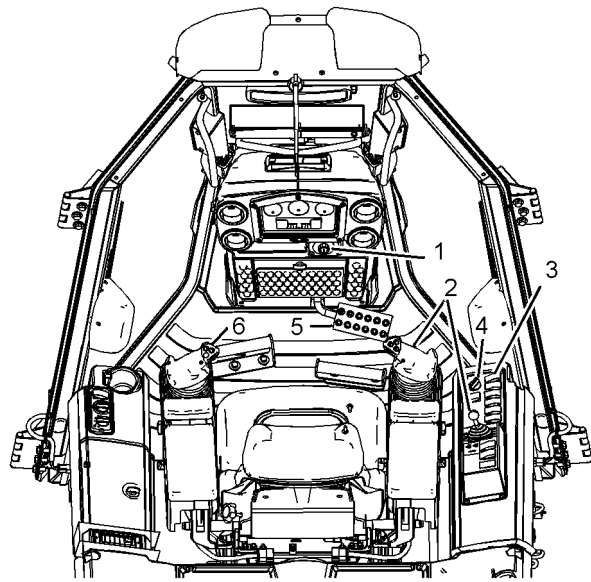


Illustration 119

g01270816

1. Start the engine (1).
2. Raise all attachments (2).
3. Fully depress decel/brake pedal (5).
4. Release parking brake switch (3).
5. While decel/brake pedal (5) is fully depressed, move the steering and transmission control (6) to the FORWARD position.
6. Gradually increase the engine speed (4) to full load speed. The machine should not move.
7. Move the steering and transmission control (6) to the NEUTRAL position.
8. Reduce the engine speed (4) to LOW IDLE. Engage the parking brake (3). Lower all attachments (2) to the ground. Apply a slight down pressure. Stop the engine (1).
9. 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.

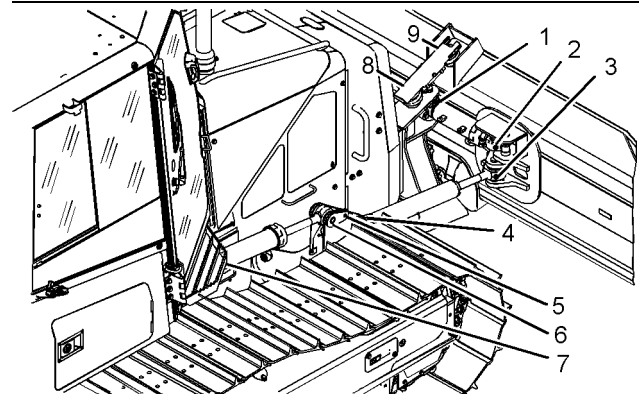


Illustration 120

g01400115

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).

i02801611

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

SMCS Code: 7342-040; 7342-070; 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 the access cover for the filter on the left side of the machine.

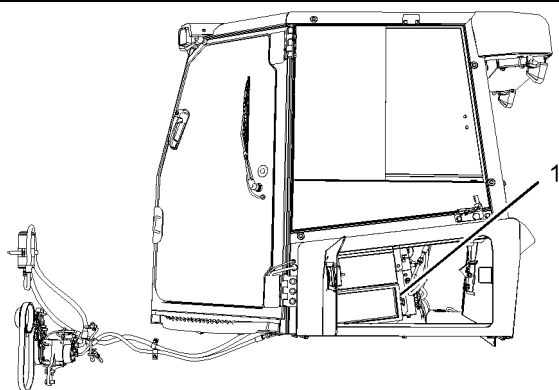


Illustration 121

g01259839

2. Remove filter element (1). 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. Install the access cover.

i02801612

Cab Filter (Recirculation) - Clean/Inspect/Replace

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

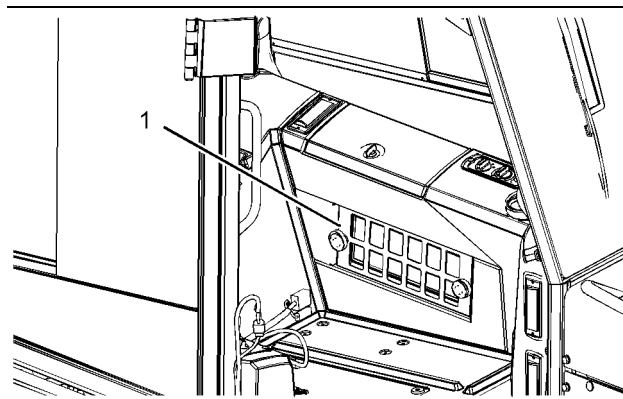


Illustration 122

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.

i02801613

Circuit Breakers - Reset

SMCS Code: 1417; 1420

The main circuit breaker is located in the front of the right console behind the cover plate.

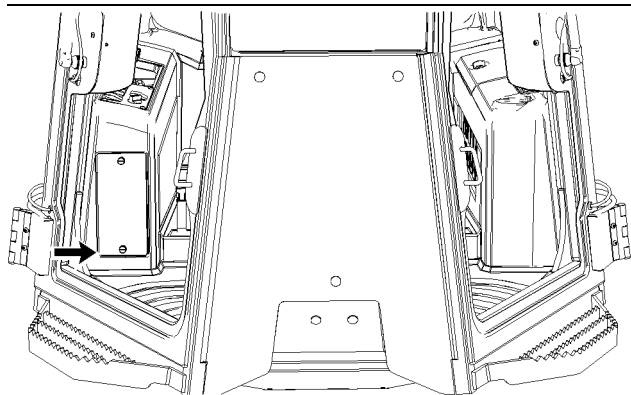


Illustration 123

g01259901

Front view

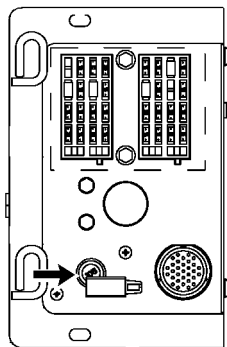


Illustration 124

g01400116

Main Circuit Breaker – The 105 Amp main circuit breaker is the only circuit breaker. Push the button in order to reset the main circuit breaker. The button will stay depressed if the circuit is working properly. Check the appropriate electrical circuit if the button does not stay depressed.

i02518214

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.

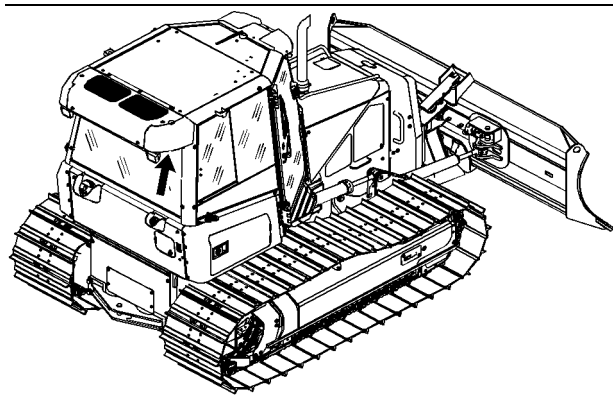


Illustration 125

g01259914

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.

i02808933

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 pre-mixed 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, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: This 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.

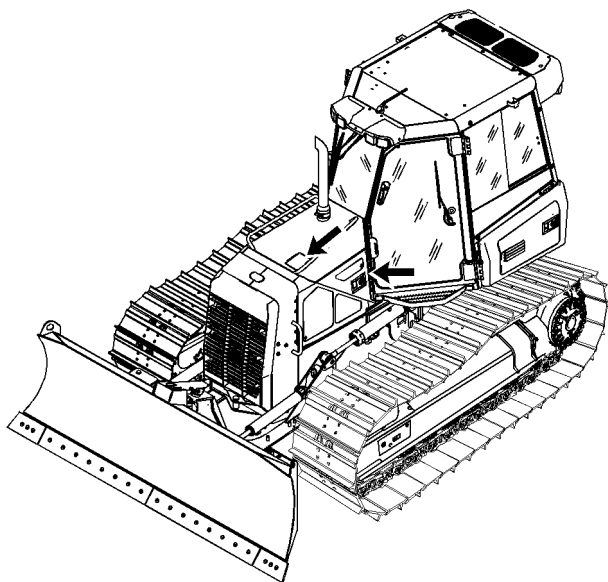


Illustration 126

g01259916

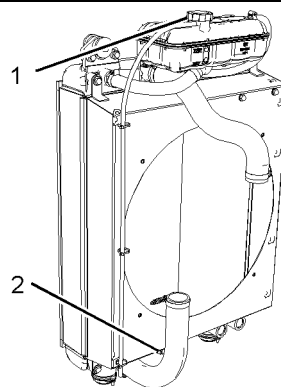


Illustration 127

g01259915

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.

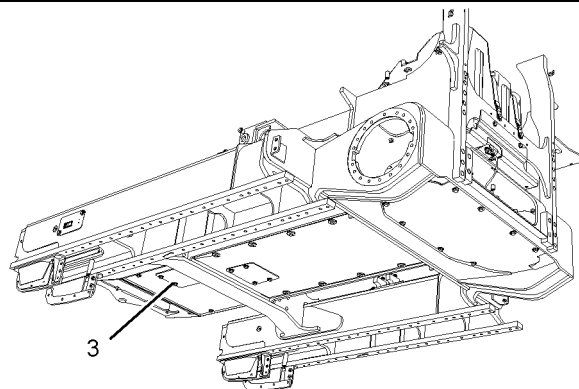


Illustration 128

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 7.a through Step 7.h in order to properly flush the cooling system.
 - a. Close drain valve (2).
 - b. Fill the cooling system with clean water.
 - c. Install pressure cap (1).

i02336986

- 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 top shunt 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.

Cooling System Coolant Extender (ELC) - Add

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

WARNING

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

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

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

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

Cooling System Conditioner contains alkali. Avoid contact with skin and eyes.

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

Table 12

Amount of Caterpillar Extender (ELC)	
Cooling System Capacity	Recommended Amount of Caterpillar Extender
22 to 30 L (6 to 8 US gal)	0.57 L (20 oz)
31 to 38 L (8 to 10 US gal)	0.71 L (24 oz)
39 to 49 L (10 to 13 US gal)	0.95 L (32 oz)
50 to 64 L (13 to 17 US gal)	1.18 L (40 oz)
65 to 83 L (17 to 22 US gal)	1.60 L (54 oz)
84 to 114 L (22 to 30 US gal)	2.15 L (72 oz)
115 to 163 L (30 to 43 US gal)	3.00 L (100 oz)
164 to 242 L (43 to 64 US gal)	4.40 L (148 oz)

Note: For cooling systems with larger capacities, use the formula in Table 13 in order to determine the correct amount of extender.

Table 13

Calculation of ELC Extender
$V^{(1)} \times 0.02 = X^{(2)}$

(1) V is the total volume of the cooling system.
(2) X is the amount of ELC Extender that is required.

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

i02801616

Cooling System Coolant Level - Check

SMCS Code: 1353; 1354; 1395; 7520

1. Open the left engine access door.

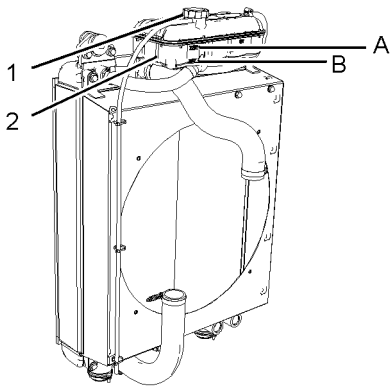


Illustration 129

g01260015

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.

i02806920

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 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.

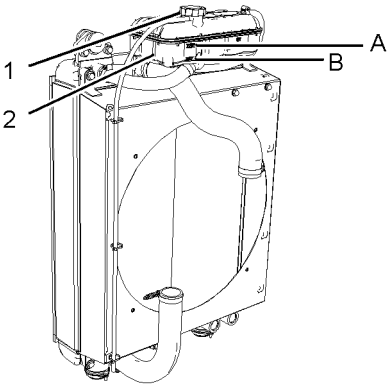


Illustration 130

g01260015

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 top tank and collect the sample into the proper sampling bottle.

Note: Always discard drained fluids according to local regulations.

i02806909

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, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

- Complete the information on the label for the sampling bottle before you begin to take the samples.
 - Keep the unused sampling bottles stored in plastic bags.
 - Obtain coolant samples directly from the coolant sample port. You should not obtain the samples from any other location.
 - Keep the lids on empty sampling bottles until you are ready to collect the sample.
 - Place the sample in the mailing tube immediately after obtaining the sample in order to avoid contamination.
 - Never collect samples from expansion bottles.
 - Never collect samples from 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) onto 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.

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, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

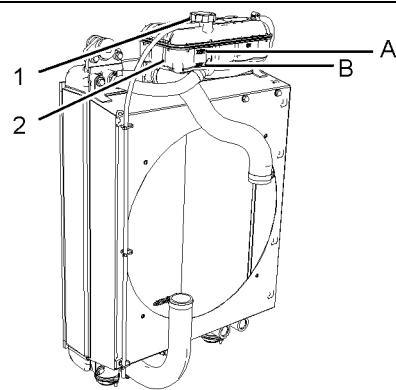


Illustration 131

g01260015

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 top 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, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

- Complete the information on the label for the sampling bottle before you begin to take the samples.
 - Keep the unused sampling bottles stored in plastic bags.
 - Obtain coolant samples directly from the coolant sample port. You should not obtain the samples from any other location.
 - Keep the lids on empty sampling bottles until you are ready to collect the sample.
 - Place the sample in the mailing tube immediately after obtaining the sample in order to avoid contamination.
 - Never collect samples from expansion bottles.
 - Never collect samples from 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) onto 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.

i02538687

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 completely drained or while the cooling system coolant is drained to a level that is below the thermostat housing.

NOTICE

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

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

1. Loosen the hose clamp and remove the hose from the elbow. Disconnect the hose assembly from the thermostat housing assembly.
2. Remove the bolts from the elbow. Remove the elbow and the thermostat housing assembly.
3. Remove the thermostat and the O-ring seal from the thermostat housing.

NOTICE

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

NOTICE

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

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

NOTICE

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

4. Install a new O-ring seal in the thermostat housing. Install the new thermostat. Install the thermostat housing on the engine cylinder head.
5. Install the elbow and the hose. Tighten the hose clamp.

i02807176

Cutting Edges and End Bits - Inspect/Replace

SMCS Code: 6801; 6804

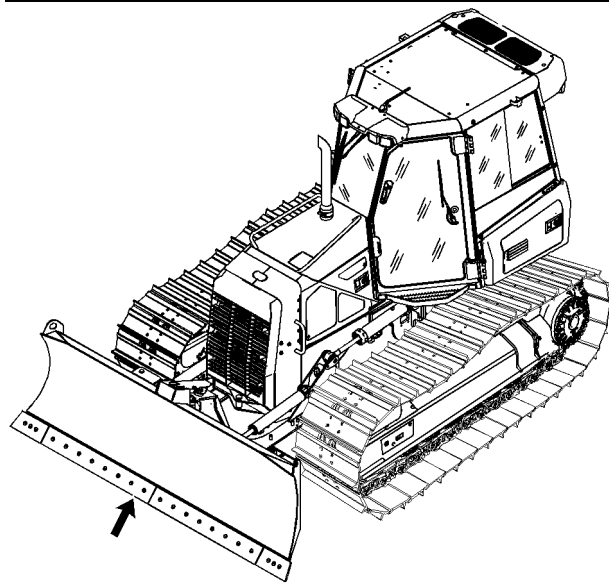


Illustration 132

g01260096

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.

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.

i02801617

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1051; 1054

NOTICE

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

Observe the following 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.

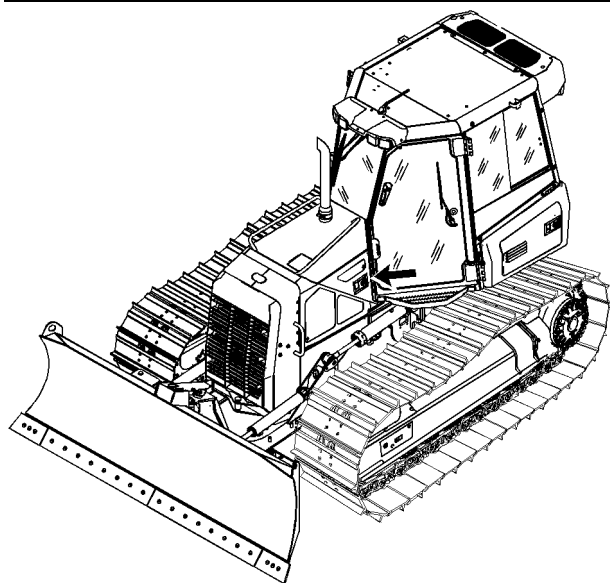


Illustration 133

g01260135

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

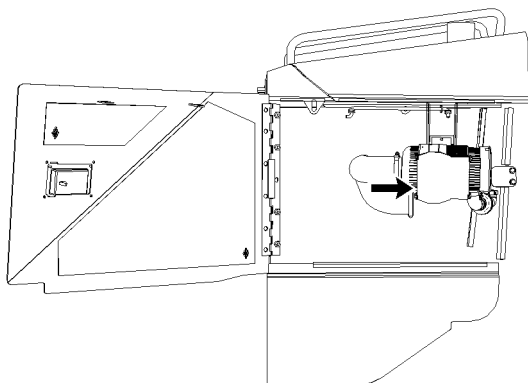


Illustration 134

g01260141

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.

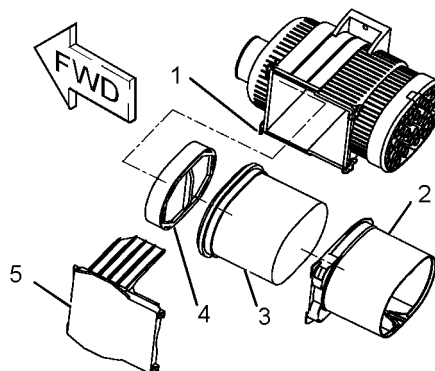


Illustration 135

g01260197

3. Remove primary filter element (3) from air cleaner housing (2). 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 (3) over engine air filter secondary element (4). 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 (5) 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 two year 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.

i02801618

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

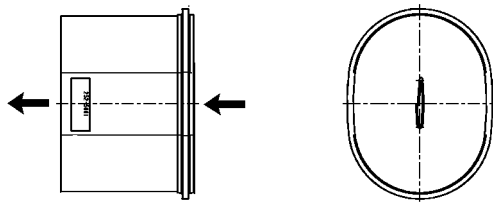


Illustration 136

g01205120

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 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.

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. If a clean primary element has been installed and the filter element indicator still enters the red zone, replace the secondary filter element. Also if the exhaust smoke remains black and a clean primary filter element has been installed, replace the secondary filter element.

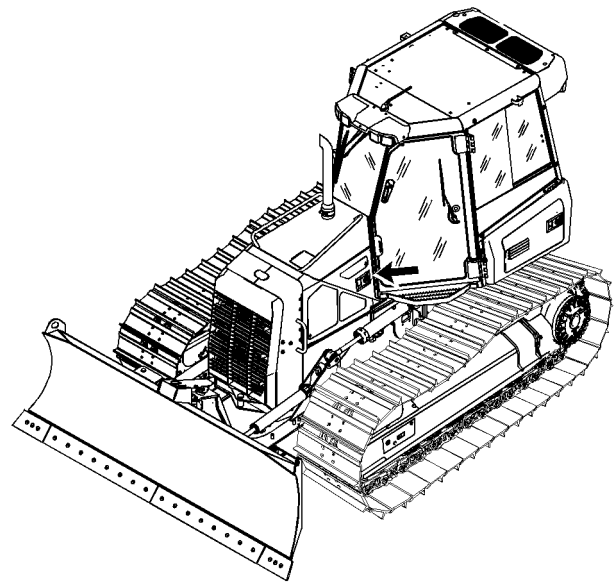


Illustration 137

g01260135

1. Open the left engine access door.
2. Remove the housing cover to the precleaner body assembly.

i02518587

Engine Air Precleaner - Clean

SMCS Code: 1050

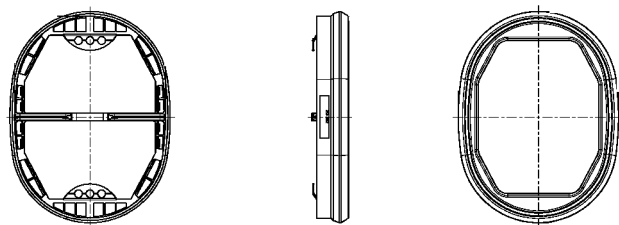


Illustration 138

g01192559

Secondary air cleaner element

3. Remove the secondary element. The secondary element is on the end of the air cleaner group away from the cab.
 4. Cover the air inlet opening. Clean the inside of the air cleaner housing.
 5. Inspect the gasket between the air inlet and the housing. If the gasket is damaged, replace the element.
 6. Uncover the air inlet opening. Install a new secondary element.
 7. Reinstall the primary air filter element.
- Reference:** See "Engine Air Filter Primary Element - Clean/Replace" for more information.
8. Install the air cleaner housing cover.
 9. Close the engine access door.

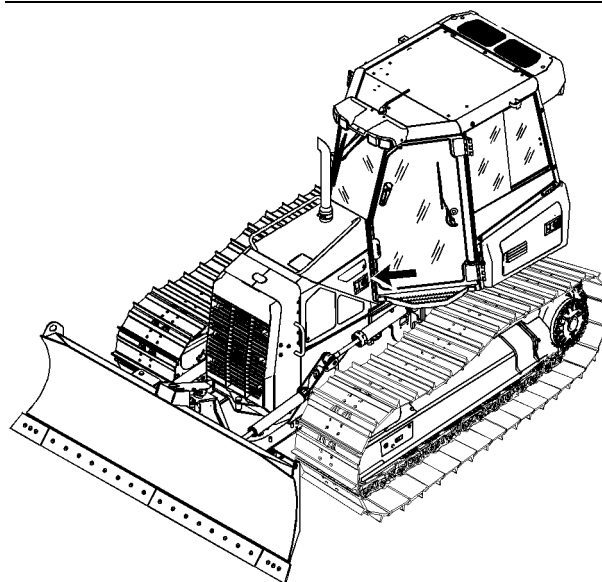


Illustration 139

g01260135

1. Open the left engine access cover.

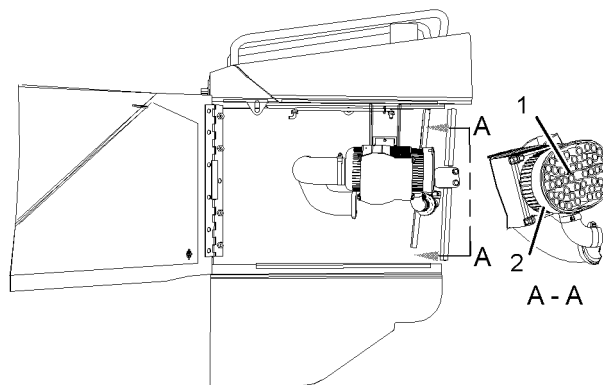


Illustration 140

g01260248

2. Inspect the engine air pre-cleaner for dirt and for trash.
3. Unscrew M6 allen head screw (1) in order to remove the integrated pre-cleaner body (2) 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 loosens up the dirt.
 - a. Loosen hard deposits of dust on the pre-cleaner body by soaking in an appropriate cleaning agent. Then, wash the pre-cleaner body with a spray of water.

- b. Blow dry the precleaner body completely.
5. Install precleaner body (2) into the engine air precleaner. Latch the precleaner body in place.
6. Install allen head screw (1). Tighten the allen head screw to $6 \pm 2 \text{ N}\cdot\text{m}$ ($5 \pm 1 \text{ lb ft}$) only.
7. Close the left engine access door.

NOTICE

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

i02801875

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.

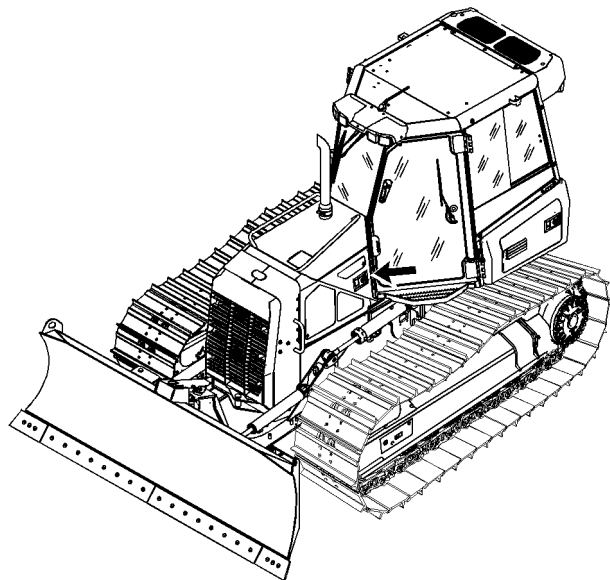


Illustration 141

g01260135

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

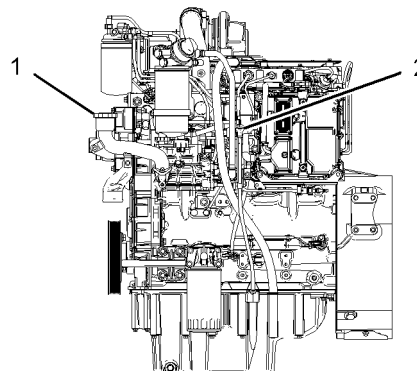


Illustration 142

g01400187

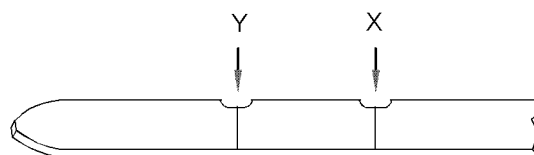


Illustration 143

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 two hours or more. This will allow all of the oil to drain back into the engine crankcase.

i02801890

Engine Oil Sample - Obtain

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

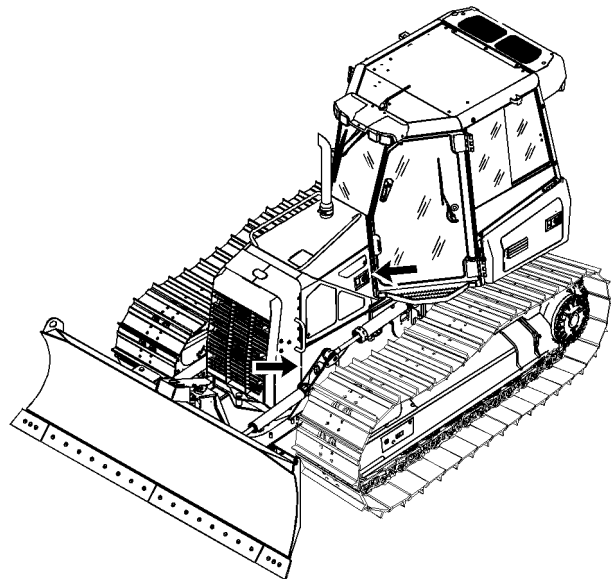


Illustration 144

g01260285

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.

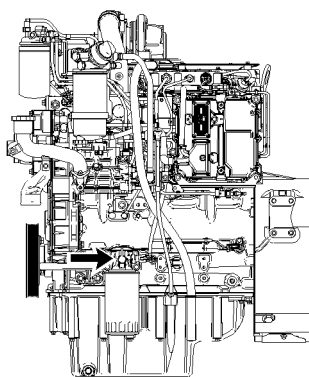


Illustration 145

g01400188

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.

i02799428

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.

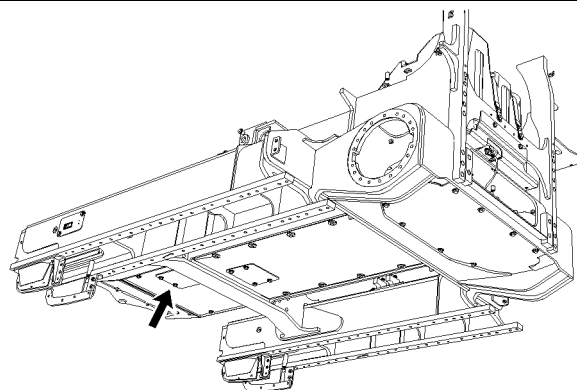


Illustration 146

g01260287

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

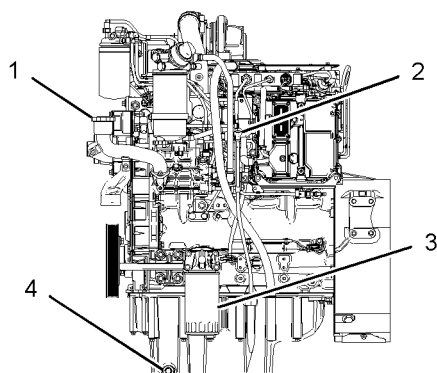


Illustration 147

g01400180

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.

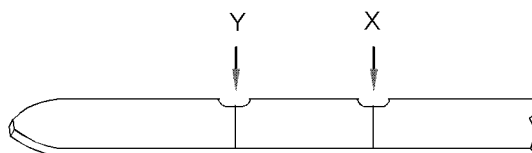


Illustration 148

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.

i01181536

Engine Valve Lash - Check

SMCS Code: 1102; 1209

For the correct procedure, refer to the appropriate Service Manual module for your machine's engine or consult your Caterpillar dealer.

Note: A qualified mechanic should adjust the engine valve lash because special tools and training are required.

i02624244

Ether Starting Aid Cylinder - Replace

SMCS Code: 1456

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

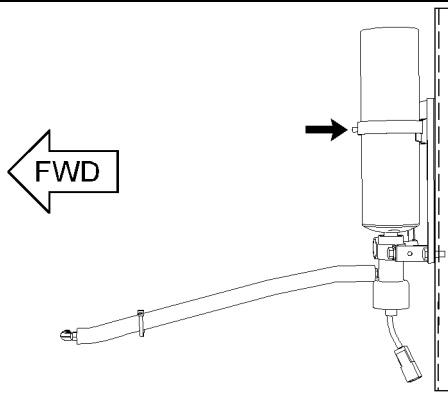


Illustration 149

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.

Final Drive Oil - Change

SMCS Code: 4050

i02807240

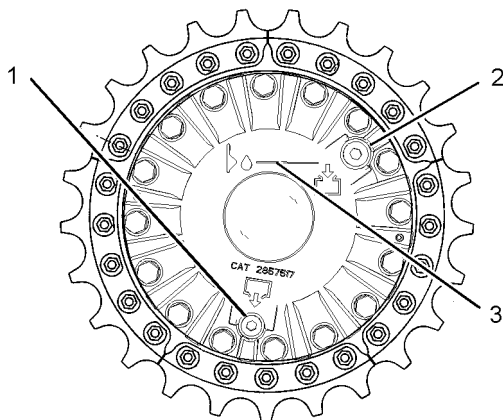


Illustration 150

g01260414

1. Move the machine so that final drive oil level mark (3) is horizontal and 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 $175 \pm 15 \text{ N}\cdot\text{m}$ ($130 \pm 10 \text{ lb}\cdot\text{ft}$).
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 $285 \pm 30 \text{ N}\cdot\text{m}$ ($210 \pm 20 \text{ lb}\cdot\text{ft}$).
6. Repeat this procedure for the other final drive.

i02807243

Final Drive Oil Level - Check

SMCS Code: 4050

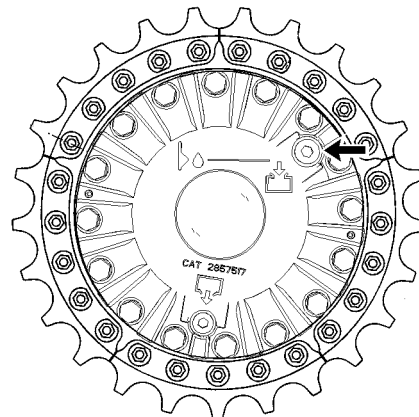


Illustration 151

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 285 ± 30 N·m (210 ± 20 lb ft).
5. Repeat the procedure for the other final drive.

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.

i02798008

Front Idler Position - Check/Adjust

SMCS Code: 4159-036

SystemOne Undercarriage

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

Check

The SystemOne undercarriage requires shim adjustment when the wear on the link and the roller system is at 25%, 50%, and 75%. Move a 4.5 mm (0.180 inch) shim from the bottom of the idler bearing block to the top.

Check the shim adjustment after moving the 4.5 mm (0.180 inch) shim.

Final Drive Oil Sample - Obtain

SMCS Code: 3258-008; 4050-008; 7542-008

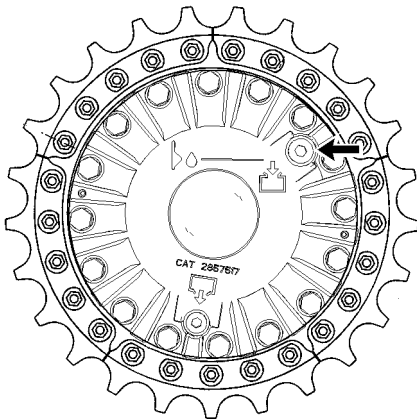


Illustration 152

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 285 ± 30 N·m (210 ± 20 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.

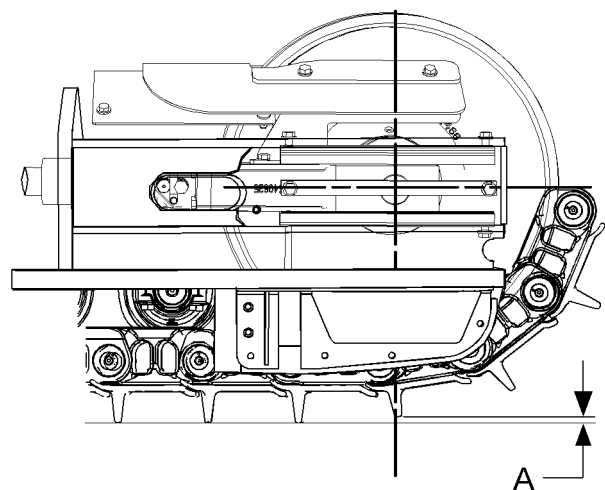


Illustration 153

g01263398

Some components are removed for clarity.

1. Park the machine on a hard, flat surface.
2. Raise the blade to three inches off the ground.
3. Move the machine in reverse until a track shoe grouser is directly below the center of the front idler shaft.
4. Measure the height (A) from the flat ground surface to the grouser tip that is centered below the track idler shaft.
5. Maintain the grouser height (rise) to the following dimensions.
 - a. (A) Front Idlers
 - Minimum** – 0.5 mm (0 inch)
 - Maximum** – 4 mm (0.160 inch)

Adjust

6. If the grouser height is not acceptable, add shims to the lower shim pack.
7. Add shims to the upper shim pack. Make sure that a gap is spaced between the bearing block and the upper shim pack. 2 mm (0.080 inch) to 4 mm (0.160 inch)
8. Measure the gap between the side shims and the idler block.
9. Add shims to both side shim packs until the total amount of gap is between 4 mm (0.160 inch) and 8 mm (0.320 inch).

Note: Be sure to add the same number of shims to both the left and right side so the idler will remain centered in the track roller frame.

Fine Tuning the Idler Height

If the machine performance remains unacceptable after the shim adjustments, try the following steps.

1. If the ride is unsatisfactory or short about the length of the track pitch scalloped edges appear. Then, the idler may be too low. Move a 2.3 mm (0.090 inch) shim from the bottom shim pack to the top. This happens during grading with an adequate link pitch (track pitch length).
2. If the balance is poor or the balance is long about half the machine length, scalloped edges appear. Then, the idler may be too high. Move a 2.3 mm (0.090 inch) shim from the top shim pack to the bottom.

Moving the Top Shims

1. Remove the track shoe directly in front of the top shim pack.
2. Remove the rock guards from the front track idler.
3. Raise the machine so the idler is off the ground.
4. Lower the machine so the first track roller or the second roller rests on a block and the idler remains in the air.
5. Unscrew the bolts that hold the top shims.
6. Remove a shim or add a shim.
7. Replace the bolts that hold the shims. Torque the M12 bolts to 100 ± 20 N·m (75 ± 15 lb ft).

Moving the Bottom Shims

1. Remove the track shoe directly in front of the bottom shim pack.
2. Raise the machine so the idler is off the ground.
3. Lower the machine so the idler rests on a block.
4. Unscrew the bolts that hold the bottom shims.
5. Remove a shim or add a shim.
6. Replace the bolts that hold the shims. Torque the M12 bolts to 100 ± 20 N·m (75 ± 15 lb ft).

Reassembly

1. Replace the idler guards. Torque the M12 bolts to 100 ± 20 N·m (75 ± 15 lb ft).
2. Replace the track shoes. Torque the track shoe bolts for the D3K and D4K and D5K Track-Type Tractors.

D3K and D4K Track-Type Tractors with SALT track – 90 ± 20 N·m (65 ± 15 lb ft)

D5K Track-Type Tractor with SALT track – 170 ± 40 N·m (125 ± 30 lb ft)

D3K and D4K Track-Type Tractors with SystemOne track – 145 ± 40 N·m (105 ± 30 lb ft)

D5K Track-Type Tractor with SystemOne track – 300 ± 50 N·m (220 ± 35 lb ft)

Tighten all of the track bolts for an additional 120 degrees.

SALT Track (Sealed and Lubricated Track)

The following check is for Caterpillar SALT Undercarriages that have the standard idler.

Check

Check shim adjustment when the wear on the link and the roller system for the SALT undercarriage is at 25%, 50%, and 75%.

1. Put the machine on a hard, flat surface.
2. Raise the blade to three inches off the ground.
3. Move the machine in reverse until a track shoe grouser is directly below the center of the front idler shaft.
4. Measure the height from the flat ground surface to the grouser tip that is centered below the track idler shaft.
5. Maintain the grouser height (rise) to the following dimensions.
 - a. Grouser height under the front idlers

Minimum – 0.5 mm (0 inch)

Maximum – 4 mm (0.160 inch)

Adjust

6. If the grouser height is not acceptable, add shims to the lower shim pack.
7. Add shims to the upper shim pack. Make sure that a gap is spaced between the bearing block and the upper shim pack. 2 mm (0.080 inch) to 4 mm (0.160 inch)
8. Measure the gap between the side shims and the idler block.
9. Add shims to both side shim packs until the total amount of gap is between 4 mm (0.160 inch) and 8 mm (0.320 inch).

Note: Be sure to add the same number of shims to both the left and right side so the idler will remain centered in the track roller frame.

See “Fine Tuning the Idler Height”, if necessary.

See Operation and Maintenance Manual, “Track - Check/Adjust” for information on needed track adjustment procedures.

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

Dispose of all fluids according to local regulations and mandates.

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.

Hand Fuel Priming Pump

Use the following procedures in order to remove air from the fuel system:

Note: Do not fill fuel filters before installation in any circumstance. Do not open high pressure fuel lines in order to bleed air from the fuel system.

1. Ensure that the fuel system is in working order.

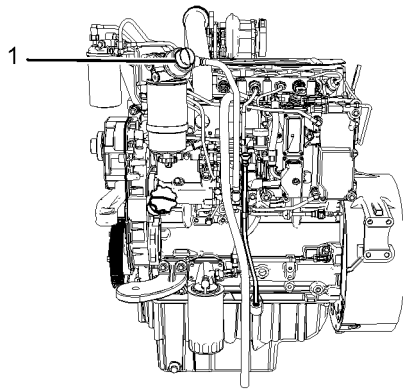


Illustration 154

g01260423

2. Operate the engine fuel priming pump (1) manually. Depress the priming pump and repress the priming pump until firm pressure is felt.
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. Start the engine.
5. After the engine has started, run the engine at the LOW IDLE position until the engine runs smoothly.

i02801620

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.

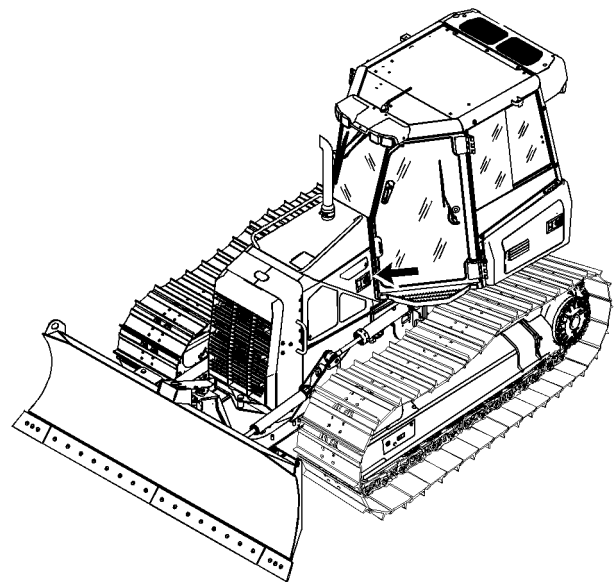


Illustration 155

g01260135

Note: Do not fill fuel filters before installation in any circumstance. Do not open high pressure fuel lines in order to bleed 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.

i02807412

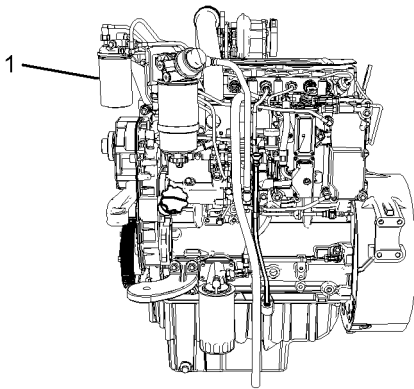


Illustration 156

g01260442

2. Place a suitable container under the fuel filter in order to catch any fuel that might spill. Clean up any spilled fuel.
 3. Clean the outside of secondary fuel filter (1). Use a suitable tool in order to remove the fuel filter from the engine and dispose of the filter in a safe place.
 4. If maintenance is required, remove the filter.
 5. Clean filter mounting base. Make sure that the old seal is removed.
 6. Ensure that dirt can not enter the new fuel filter. Do not fill the filter with fuel before the fuel filter is installed.
 7. Apply a thin coat of clean diesel fuel to the seal on the new filter. Install a new fuel 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.
8. Prime the fuel system. Refer to the Operation and Maintenance Manual, "Fuel System - Prime" for more information.
 9. Before you start the engine, make sure that the drain valves are completely closed. Start the engine. Check for leaks.
 10. Close the left engine access door.

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, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

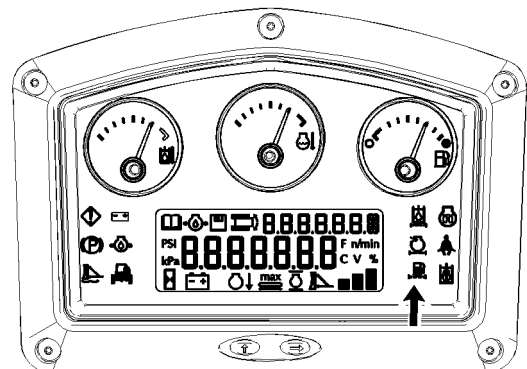


Illustration 157

g01270798

i03180960

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 bleed air from the fuel system.

1. Open the 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.

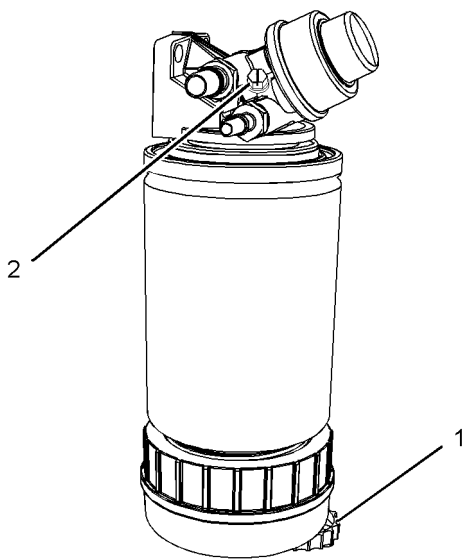


Illustration 158
Typical example

g01371846

Note: This primary fuel filter has vent screw (2).

3. Install a suitable tube onto drain (1). Loosen vent screw (2).
4. Open drain (1). Allow the fluid to drain into the container.
5. Tighten drain (1) 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.

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, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: Do not fill fuel filters before installation in any circumstance. Do not open high pressure fuel lines in order to bleed air from the fuel system.

1. Open the access cover on the left side of the machine.
2. 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 of the water separator.

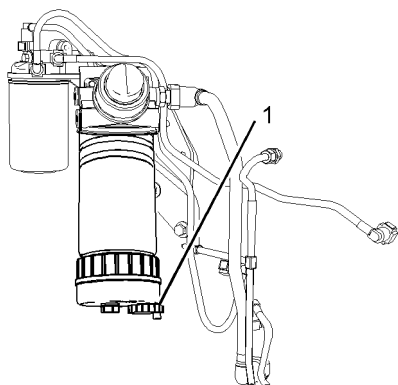


Illustration 159

g01625262

3. Install a suitable tube onto drain (1). Open the drain (1). Allow the fluid to drain into a suitable container.
4. Tighten the drain (1) by hand.
5. If equipped, remove the wiring harness from the sensor on the bottom of the glass bowl by depressing the clip on the wire connector.

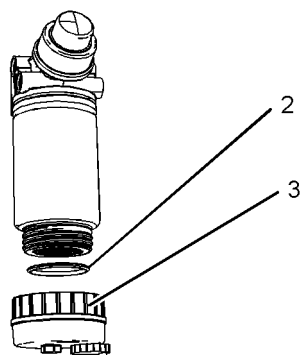


Illustration 160

g01625335

6. Rotate bowl (3) counterclockwise in order to remove the bowl. Remove O ring seal (2). Clean the bowl.

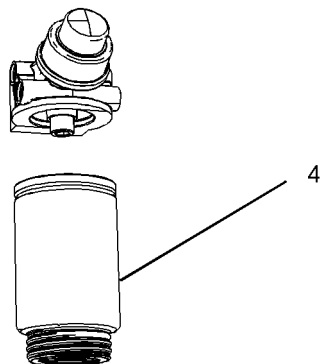


Illustration 161

g01625343

7. Use 1U-8760 Chain Wrench in order to remove old canister (4).

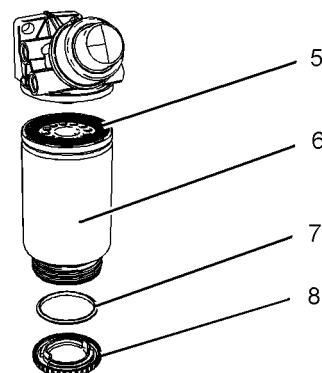


Illustration 162

g01625346

8. Lubricate O ring seal (5) with clean engine oil on the new canister. Install new canister (6). Spin on the canister until the O ring seal contacts the sealing surface. Then rotate the canister 360 degree in order to tighten the canister correctly.
 9. Remove cap (8) from the threaded end of the new canister and remove new O ring seal (7). Install the new O ring seal into bowl (3).
 10. Lubricate O ring seal (7) with clean engine oil. Install the bowl onto the new canister. Tighten the bowl to 15 N·m (11 lb ft).
 11. If equipped, install the wiring harness to the sensor. Open the fuel supply valve.
 12. Remove the container and dispose of the fluid in a safe place.
 13. The secondary filter must be replaced at the same time as the water separator element. Refer to the Operation and Maintenance Manual, "Fuel System Secondary Filter - Replace".
- Note:** Do not start the engine until all service to the fuel system is complete. For instructions about priming the fuel system, refer to Operation and Maintenance Manual, "Fuel System - Prime".
14. Close the access cover on the left side of the machine.

i02807464

Fuel Tank Cap - Clean

SMCS Code: 1273

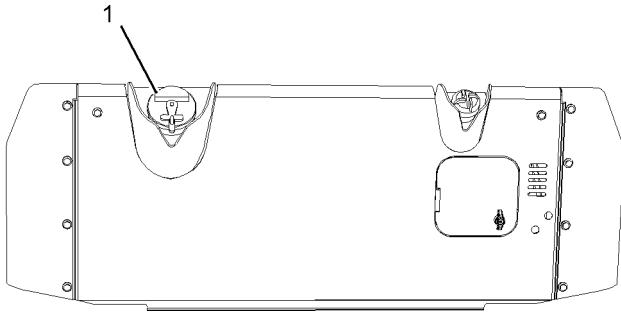


Illustration 163

g01260576

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).

i03173740

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273

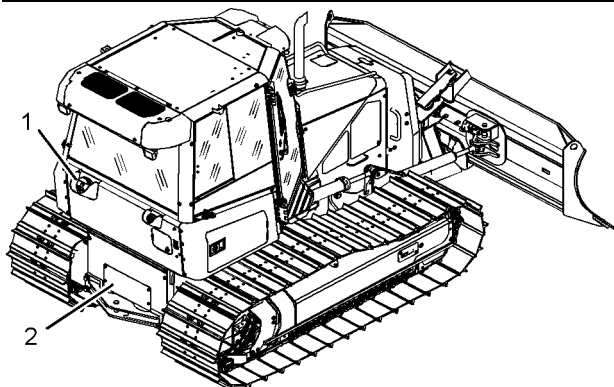


Illustration 164

g01260454

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.

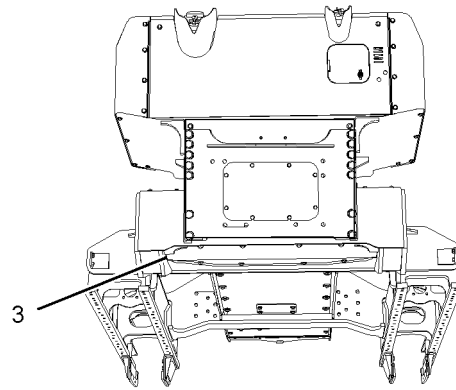


Illustration 165

g01260461

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.

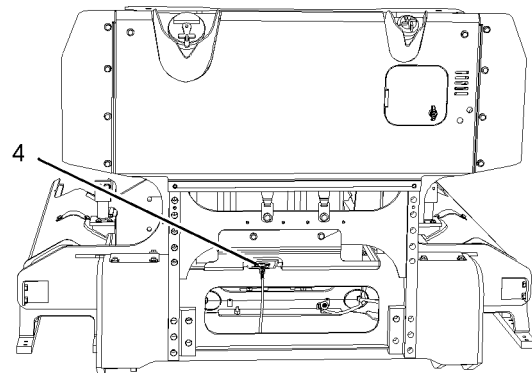


Illustration 166

g01260568

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).

i03160982

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

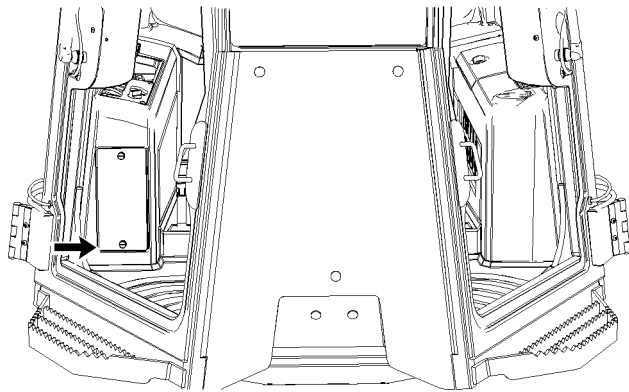


Illustration 167

g01259901

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.

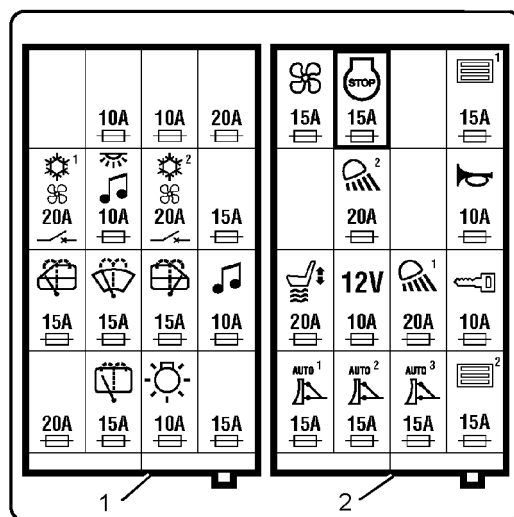


Illustration 168

g01621671

Layout for fuse panel

- (1) Fuse block 1
(2) Fuse block 2

Fuse Block 1



Spares – Two 10 Amp, 15 Amp, and 20 Amp fuses



Window wiper for the left door and window washer pump – 15 Amp



Window wiper for the front window and front window washer pump – 15 Amp



Rear window wiper and rear window washer pump – 15 Amp



Window wiper for the right door and window washer pump – 15 Amp



Condenser fan 1 – 20 Amp Mini breaker



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.

On a machine that is equipped for the fire plow, three 15 amp circuit breakers protect the lighting electrical circuit.



Condenser fan 2 – 20 Amp mini circuit breaker



Dome light (Radio) – 10 Amp



Radio – 10 Amp



Lighting switches – 10 Amp

Fuse Block 2



Circuit breaker – 30 Amp (spare)



ECM1 – 15 Amp machine ECM



Indicators on the dash – 15 Amp



Fan – 15 Amp



Heating and air conditioning blower fan – 30 Amp mini circuit breaker



Engine stop – 15 Amp (engine electrical system)



Rear working lights and front working lights ² – 20 Amp



Horn – 10 Amp



Raise/lower switch (Heat switch) – 20 Amp



Power port – 10 Amp



Dash lights and left front working light ¹ – 20 Amp



Key start switch – 10 Amp



Dozer blade – Three 15 Amp fuses (Grade Control)

The following power port fuse is instead of one for the dozer blade, if equipped.



Power port – 15 Amp (fire plow)

i03323501

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, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

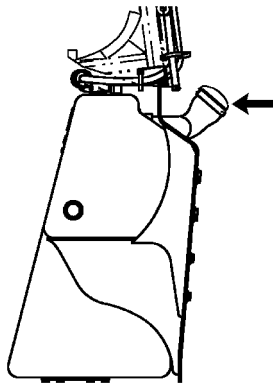


Illustration 169

g01701734

Left view of new tank (oil filler cap)

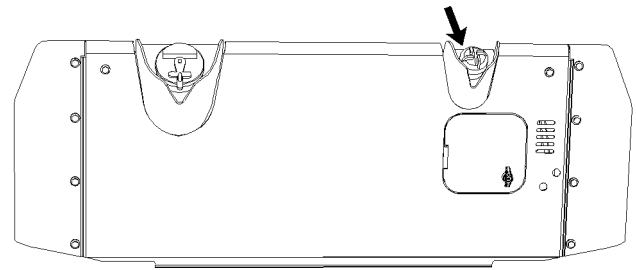


Illustration 170

g01259742

1. Remove hydraulic tank filler cap that is above the access door on the rear of the machine, if equipped.

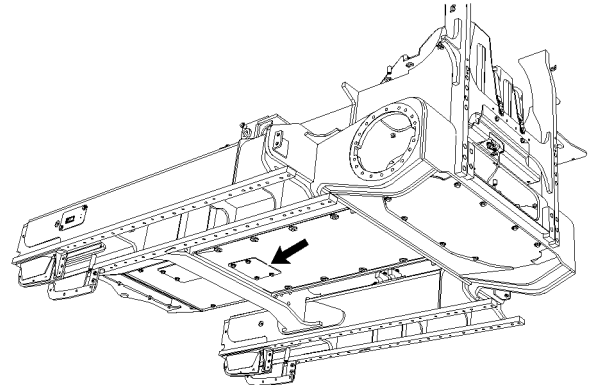


Illustration 171

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)".

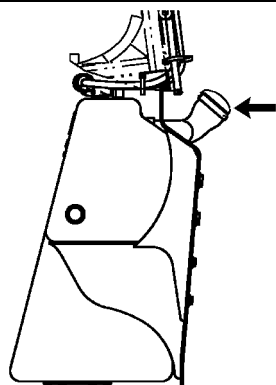


Illustration 172

g01701734

Left view of new tank

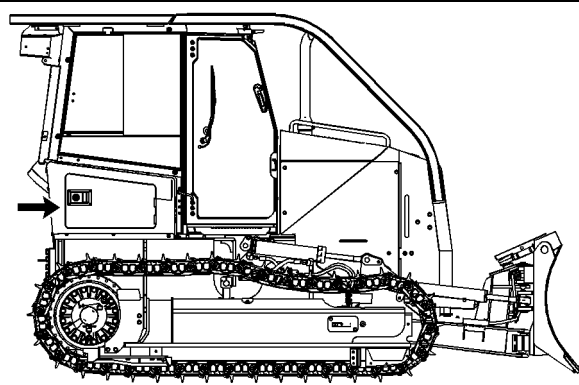


Illustration 175

g01701714

New location of sight gauge

10. Open the right rear access door.

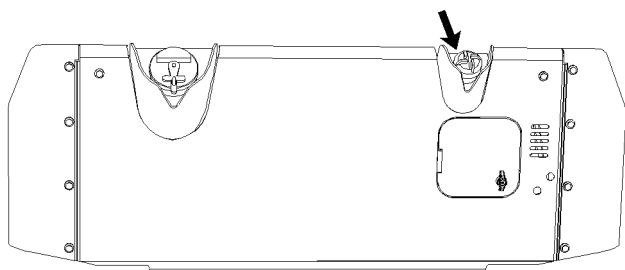


Illustration 173

g01259742

7. Install the hydraulic cap.

8. Start the engine and run the engine for a few minutes.

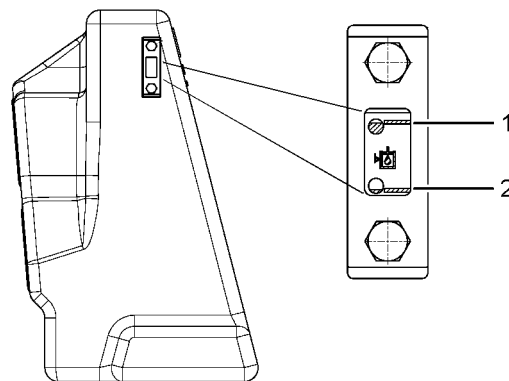


Illustration 176

g01701774

Right side view of new tank

(1) Full mark
(2) "ADD" mark

11. View the sight gauge through the slot above the rear access door on the back of the machine. 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.

12. Stop the engine.

13. If necessary, tighten any loose clamps and any loose connections. Replace any damaged hoses.

14. Close the access door.

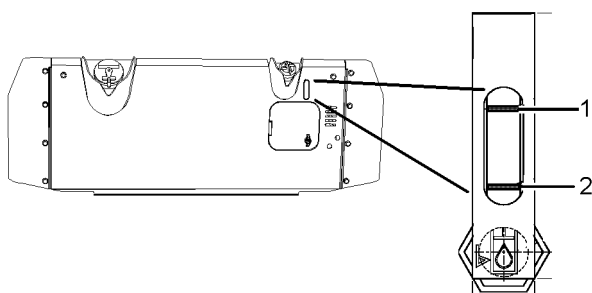


Illustration 174

g01400117

(1) Full mark
(2) "ADD" mark

9. View the sight gauge through the slot above the rear access door on the back of the machine. Maintain the hydraulic oil level above the "ADD" mark (2) on the sight gauge. Add oil, if necessary.

i03323916

Hydraulic System Oil Filter - Replace

SMCS Code: 5068

Note: The Hystat transmission and the hydraulic system use a common tank.

1. Two hydraulic filters are located on the left side of the machine. Open the access door on the left side of the machine.

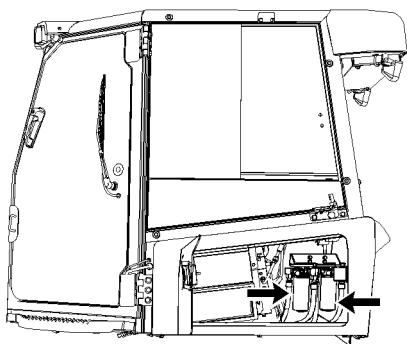


Illustration 177

g01260638

2. Remove both filter elements with a strap type wrench.
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.

6. Close the access door on the left side of the machine.

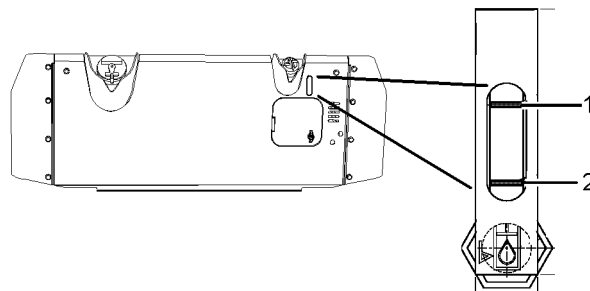


Illustration 178

g01400117

- (1) Full mark
- (2) "Add" mark

7. View the sight gauge through the slot above the rear access door on the back of the machine. Maintain the hydraulic oil level above the "ADD" mark (2) on the sight gauge. Add oil, if necessary.

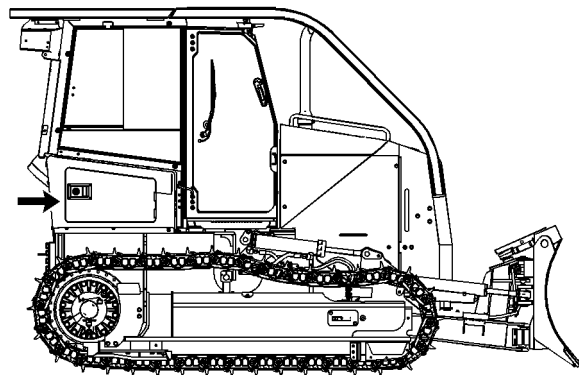


Illustration 179

g01701714

New location of sight gauge

8. Open the right rear access door.

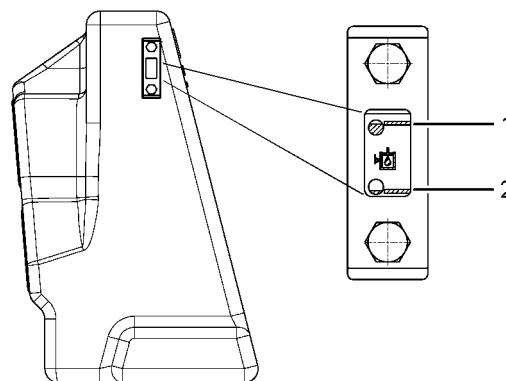


Illustration 180

g01701774

Right side view of new tank

- (1) Full mark
- (2) "ADD" mark

9. View the sight gauge inside the right rear access door, if equipped. Maintain the hydraulic oil level above the “ADD” mark (2) on the sight gauge. Add oil, if necessary.

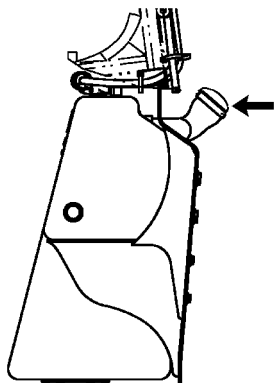


Illustration 181
Left view of new tank

g01701734

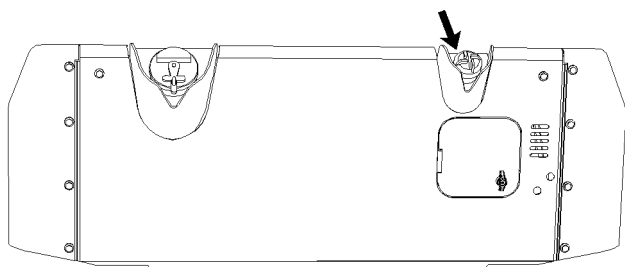


Illustration 182

g01259742

10. Inspect the gasket on the cap for damage. Replace the gasket, if necessary.

11. Install the cap .

i03160925

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.

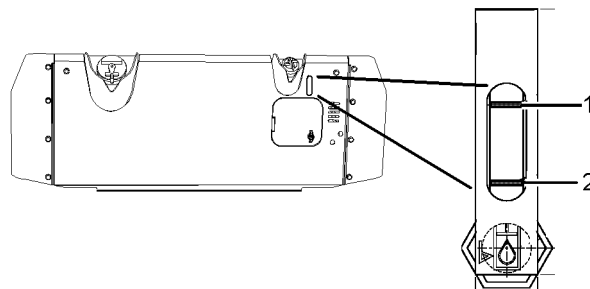


Illustration 183

g01400117

- (1) Full mark
- (2) “Add” mark

2. View the sight gauge through the slot above the rear access door on the back of the machine.

3. Maintain the hydraulic oil level above the “ADD” mark (2) on the sight gauge.

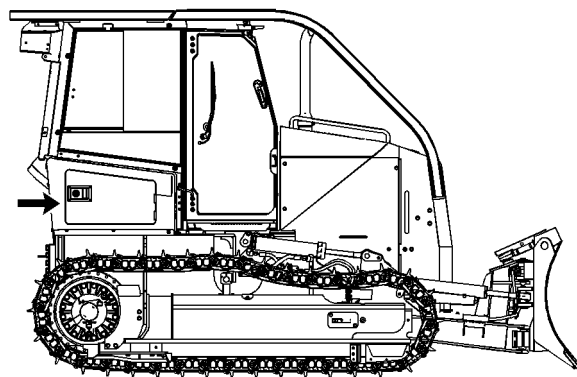


Illustration 184

g01701714

New location of sight gauge

4. Open the right rear access door.

i02519232

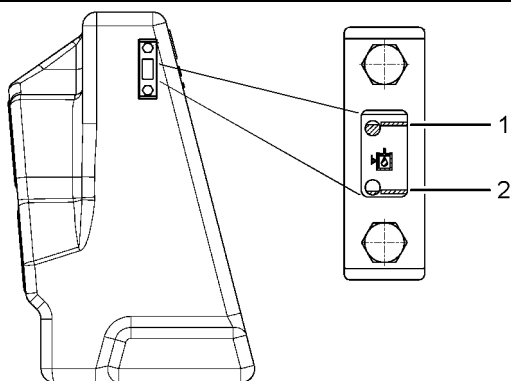


Illustration 185

g01701774

Right side view of new tank

- (1) Full mark
- (2) "ADD" mark

5. View the sight gauge inside the right rear access door, if equipped. Maintain the hydraulic oil level above the "ADD" mark (2) on the sight gauge.

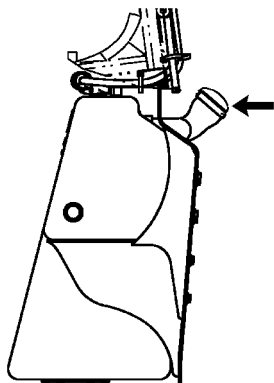


Illustration 186

g01701734

Left view of new tank

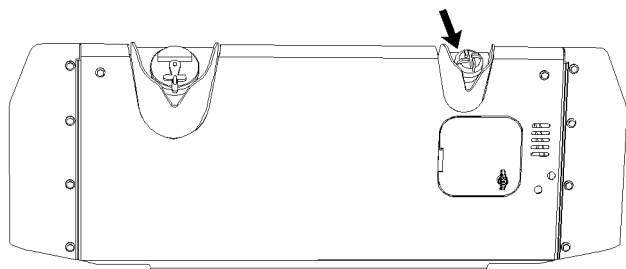


Illustration 187

g01259742

6. Remove hydraulic tank filler cap and add hydraulic oil, if necessary.
7. Clean the cap. Install the cap.

Hydraulic System Oil Sample - Obtain

SMCS Code: 5095-008

Note: The Hystat transmission and the hydraulic system use a common tank.

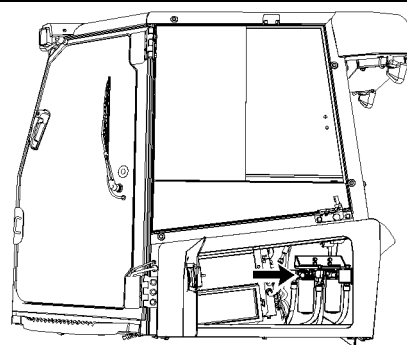


Illustration 188

g01260693

The sampling valve for the hydraulic system oil is located on the filter base of the left oil filter for the hydraulic system.

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.

i00060978

Oil Filter - Inspect

SMCS Code: 1318; 3067; 5068

Inspect A Used Filter for Debris

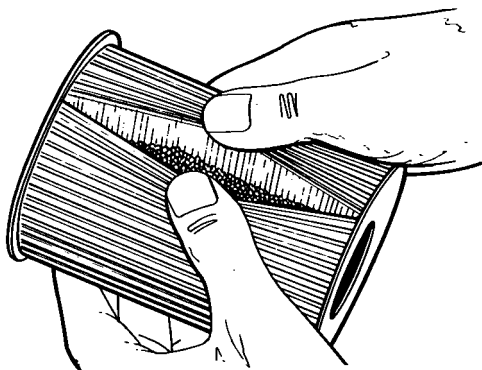


Illustration 189

g00100013

The element is shown with debris.

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

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

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

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

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

Using an oil filter element that is not recommended by Caterpillar can result in severe engine damage to engine bearings, to the crankshaft, and to other parts. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

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.

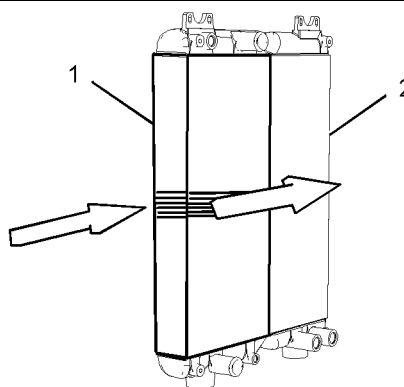


Illustration 190

g01260698

- (1) Radiator core
- (2) Hydraulic oil cooler

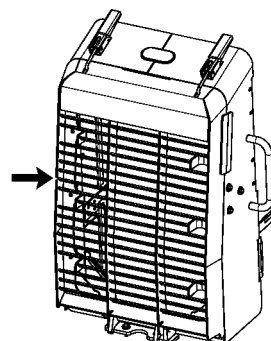


Illustration 191

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.

i02519256

Radiator Pressure Cap - Clean/Replace

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

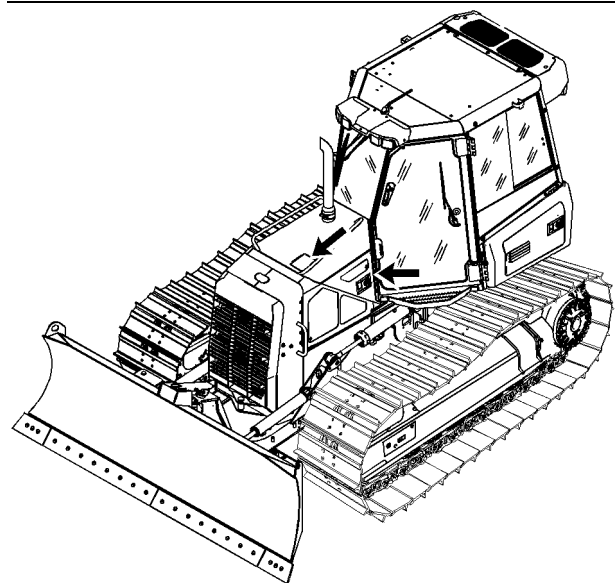


Illustration 192

g01259916

1. Open the access panel on top of the engine compartment.

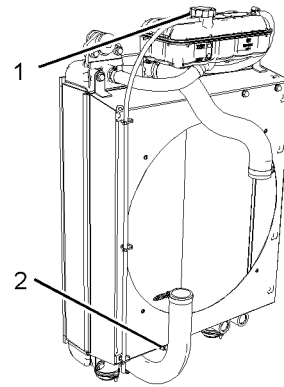


Illustration 193

g01259915

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.

i02519439

Ripper Linkage and Cylinder Bearings - Lubricate

SMCS Code: 5352; 6300; 6313

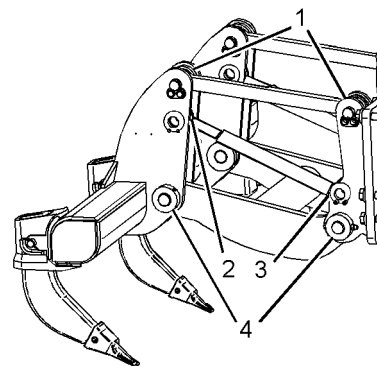


Illustration 194

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.

i01574318

Ripper - Inspect/Replace

SMCS Code: 6808-510; 6812-510

Tips

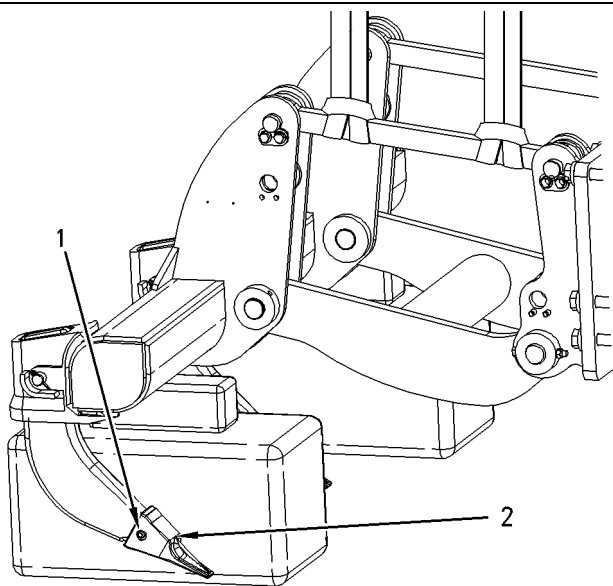


Illustration 195

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

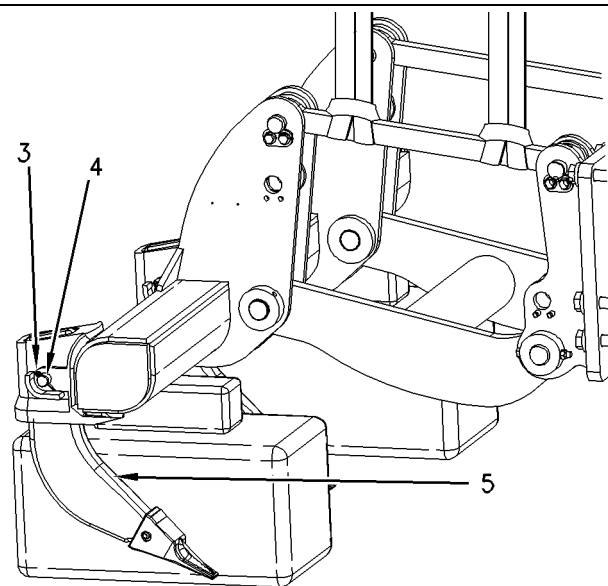


Illustration 196

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.

i02427444

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7325

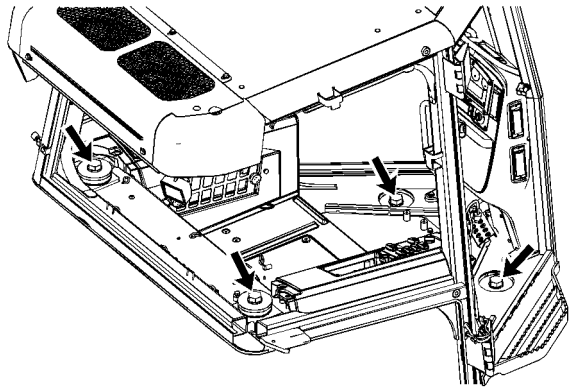


Illustration 197

g01213227

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.

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.

If the ROPS has any cracks in the welds, in the castings, or in any metal section, consult your Caterpillar dealer for repairs.

i02429589

Seat Belt - Inspect

SMCS Code: 7327

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

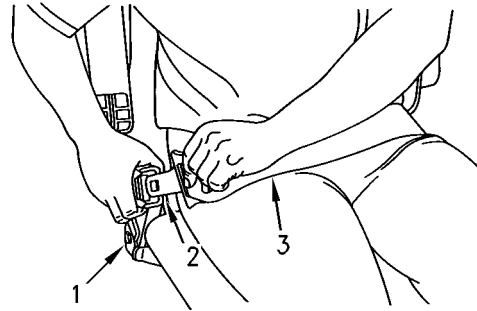


Illustration 198

g00932801

Typical example

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

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

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

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

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

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

i02429594

Seat Belt - Replace

SMCS Code: 7327-510

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

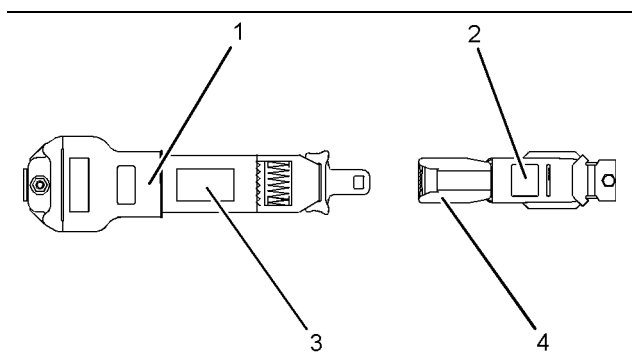


Illustration 199

g01152685

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

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

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

i02710408

Track - Check/Adjust

SMCS Code: 4170-025; 4170-036

Check

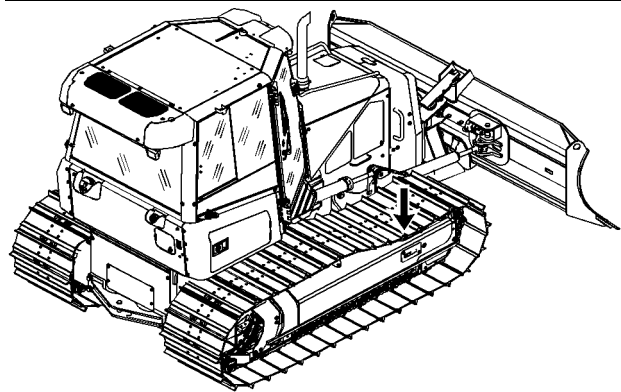


Illustration 200

g01266539

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.

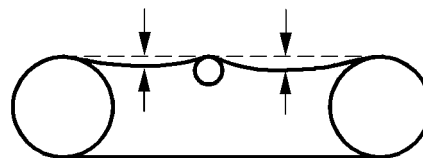


Illustration 201

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 14 in order to determine the correct sag.

Table 14

	Minimum	Target	Maximum
D3K, D4K, D5k	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 machine's typical operating conditions. If packing conditions prevail on the job, the tracks should be adjusted with packing material.

Note: Perform Steps 2 through 4 on both sides of the machine.

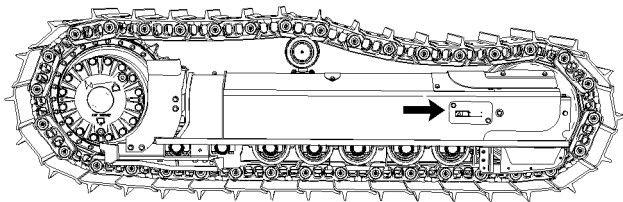


Illustration 202

g01266564

2. Remove the cover for the track adjusting mechanism.

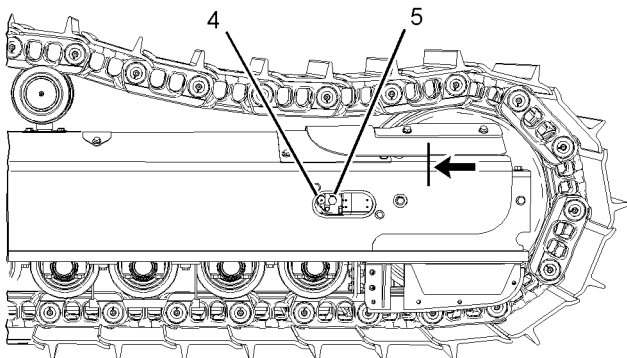


Illustration 203

g01360290

3. By using a manual grease gun, add multipurpose grease (MPGM) through track adjustment valve (4) in order to tighten the track. To loosen the track, rotate relief valve (5) counterclockwise. Then, open the track adjustment valve by one full turn and allow the grease to escape. Then close relief valve (5).
4. Close the valve cover.
5. Repeat the procedure for the other track.

i02801631

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

1. During the machine operation, listen for unusual squeaking and for unusual squealing. This can indicate a dry joint.
2. Check the machine for dry joints weekly. Check for dry joints immediately after machine operation. After machine operation, lightly touch the end of each track pin or bushing. Touch the track pin or the track bushing with the back of your hand. Make a mark on any dry track pin joint that is very hot to the touch.

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

Alternative Inspection

Use an infrared thermometer or a thermal camera in order to inspect the temperature of the track pins.

i02519571

Track Roller Frame - Inspect

SMCS Code: 4151

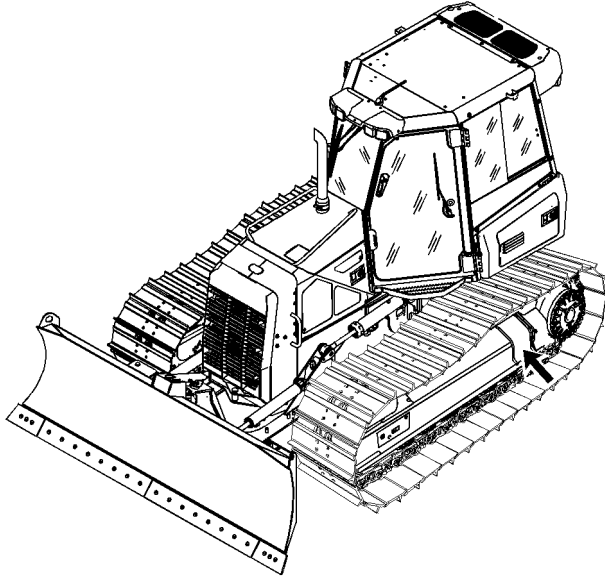


Illustration 204

g01260875

Inspect the track roller frame on both sides of the machine for cracks.

i02539528

Trunnion - Adjust

SMCS Code: 6060-025-TI

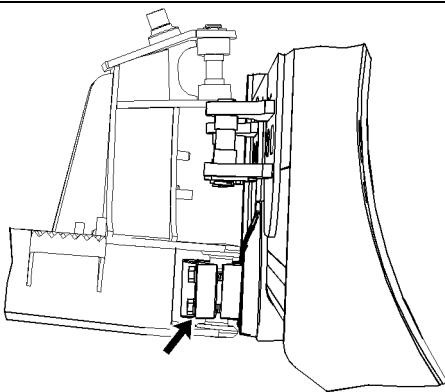


Illustration 205

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)

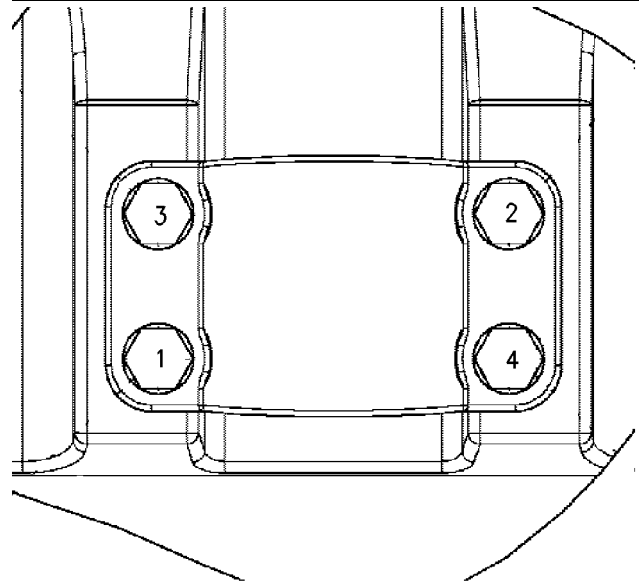


Illustration 206

g00820011

Trunnion bolts

7. Tighten the bolts in the following order: 1, 2, 3, and 4.

i02450171

Winch Cable - Inspect

SMCS Code: 5154-040; 5163-040

WARNING

Wear leather gloves when handling the winch cable.

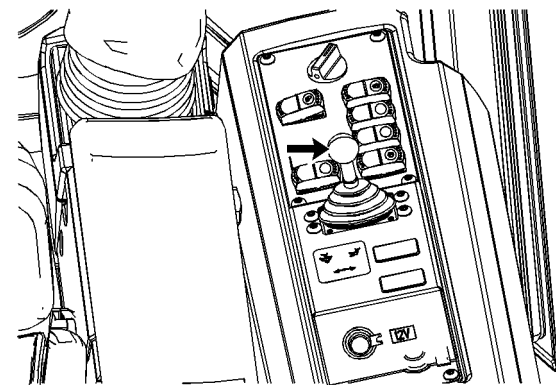


Illustration 207

g01223226

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 15

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 16

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) ⁽²⁾	63 m/min (207 ft/min) ⁽²⁾

⁽²⁾ 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.

i03188188

Winch Oil - Change

SMCS Code: 5163-044; 5163

1. Park the machine on level ground.

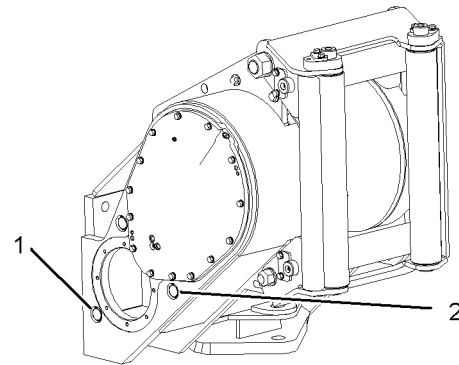


Illustration 208

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 $175 \pm 15 \text{ N}\cdot\text{m}$ ($130 \pm 10 \text{ lb}\cdot\text{ft}$).

4. Refill the winch to the proper level. Install plug (2).

i02808921

Winch Oil Filter - Replace

SMCS Code: 5177-510

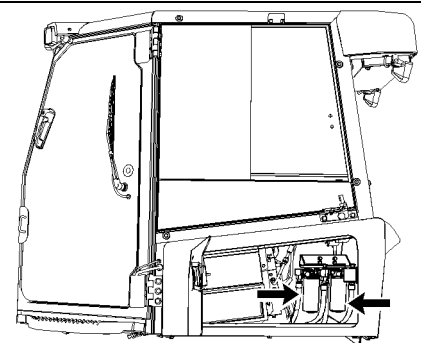


Illustration 209

g01260638

1. Open the access panel on the left side of the machine in order to access the winch oil filter. The winch oil filter is located beside the hydraulic oil filters.
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 panel.

i03188221

Winch Oil Level - Check

SMCS Code: 5163-535-FLV; 5163

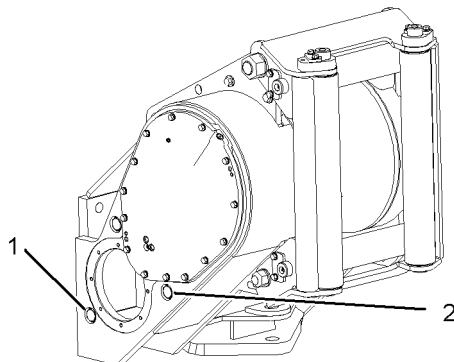


Illustration 210

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 175 ± 15 N·m (130 ± 10 lb ft).

i01953481

Winch Oil Sample - Obtain

SMCS Code: 5163-008; 7542-008

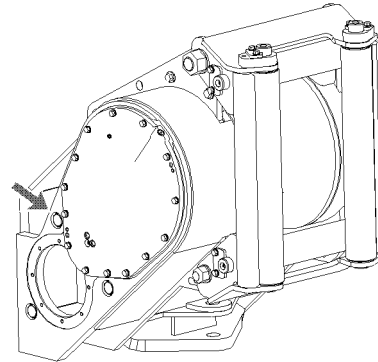


Illustration 211

g01011913

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.

i01941200

Winch Vent Plug - Clean

SMCS Code: 5163-070-VN

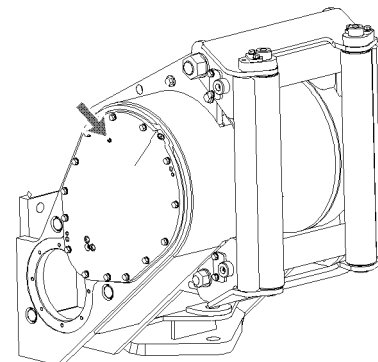


Illustration 212

g01010194

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.

i01941203

Winch Drum Bearing - Lubricate

i01941201

SMCS Code: 5159-086-BD

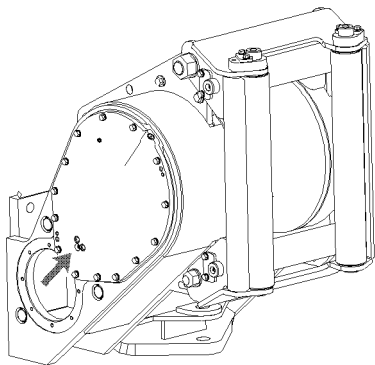


Illustration 213

g01010198

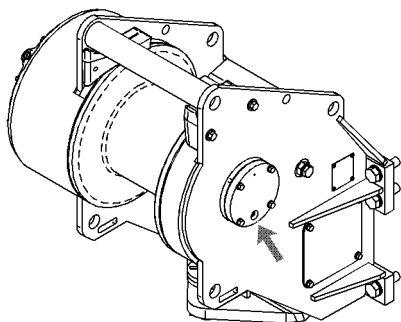


Illustration 214

g01010176

Apply lubricant to the fittings for the winch drum.

Winch Fairlead Rollers - Lubricate

SMCS Code: 5163-086-RLR

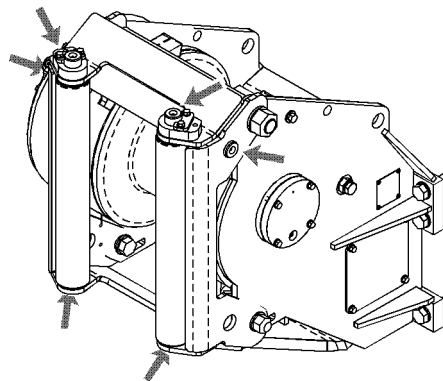


Illustration 215

g01010852

Apply lubricant to all six of the fairlead grease fittings.

i02517473

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.

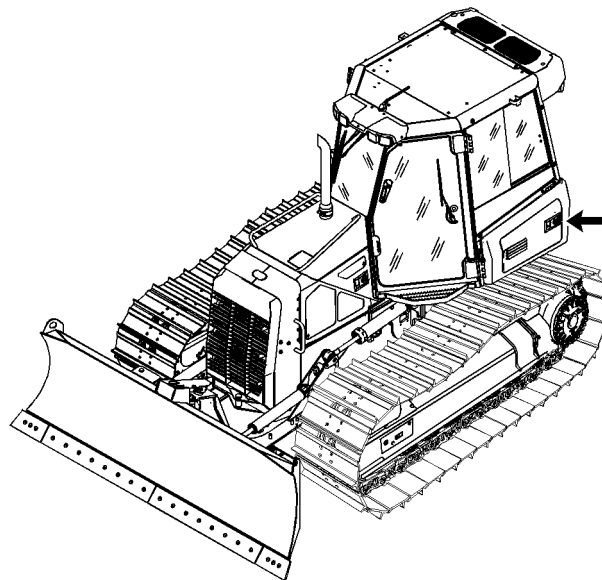


Illustration 216

g01259569

i02517456

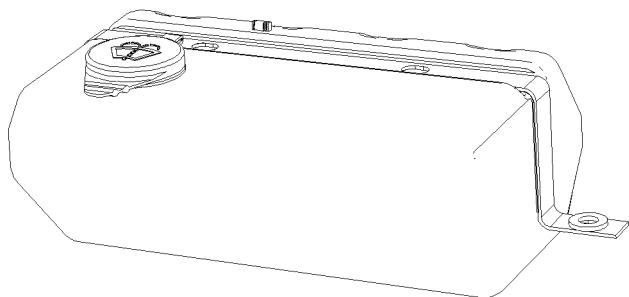


Illustration 217

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. Maintain the level in the washer fluid bottle between the maximum mark and the minimum marks.

i02421301

Window Wipers - Inspect/Replace

SMCS Code: 7305-040; 7305-510

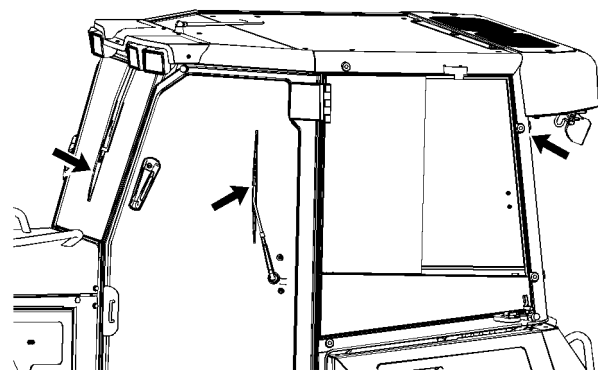


Illustration 218

g01209798

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.

Windows - Clean

SMCS Code: 7310; 7340

Use commercially available window cleaning solutions to clean the windows.

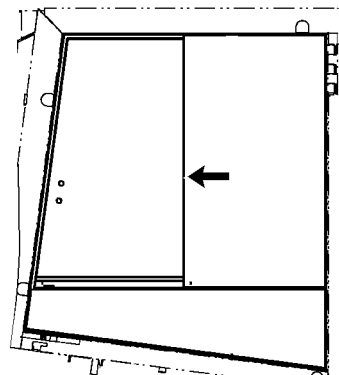


Illustration 219

g01259534

Reference Information Section

Reference Materials

i02710196

Reference Material

SMCS Code: 1000; 7000

The following literature can be obtained from any Caterpillar 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 Rollover Protective Structures (ROPS) and Attachment Installation Guidelines"
- 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"
- 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, 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)"
- Specifications, SENR3130, "Torque Specifications"
- Service Manual, RENR2014, "Caterpillar Monitoring System"
- Service Manual, RENR5701, "D3K, D4K and D5K Track-Type Tractor"
- Parts Manual, SEBP4572,(S/N: WWW1-UP; YYY1-UP; JLF1-UP)
- Parts Manual, SEBP4573,(S/N: FFF1-UP; LLL1-UP; JTD1-UP)
- Parts Manual, SEBP4574,(S/N: MMM1-UP; RRR1-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 can normally be obtained from your local technological society, from your local library, or from your local college.

SAE J313, "Diesel Fuels" This can be found in the SAE handbook. Also, this publication can be obtained from your local technological society, from your local library, or from your local college.

SAE J754, "Nomenclature" This can normally be found in the SAE handbook.

SAE J183, "Classification" This can normally be found in the SAE handbook.

Engine Manufacturers Association Lubricating Oils Data Book

Engine Manufacturers Association
Two North LaSalle Street, Suite 2200
Chicago, Illinois, USA 60602
E-mail: ema@enginemanufacturers.org
(312) 827-8700
Facsimile: (312) 827-8737

Facsimilie
(312) 826-8387

i03728401

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 17

Caterpillar Approved Work Tools						
Front Work Tool ⁽¹⁾	D3K		D4K		D5K	
Blade width	XL	LGP	XL	LGP	XL	LGP
VPAT 21.52 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 Hystat Winch	X	X	X	X	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.

i03156325

Decommissioning and Disposal

SMCS Code: 1000; 7000

When the machine is removed from service, local regulations for the machine decommissioning will vary. Disposal of the machine will vary with local regulations. Consult the nearest Caterpillar dealer for additional information.

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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: _____

	<u>Dealer Contact</u>	<u>Phone Number</u>	<u>Hours</u>
Sales:	_____	_____	_____
Parts:	_____	_____	_____
Service:	_____	_____	_____

