SEBU9031-08 (en-us)
April 2021

Operation and Maintenance Manual

301.7D CR Mini Hydraulic Excavator

LJD 1-UP (301.7D CR)
LJ8 1-UP (301.7D CR)

Language: Original Instructions

Scan to find and purchase genuine Cat® parts and related service information.

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Important Safety Information

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

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

Do not operate or perform any lubrication, maintenance or repair on this product, until you verify that you are authorized to perform this work, and have read and understood the operation, lubrication, maintenance and repair information.

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

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

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

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

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

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

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

NOTICE

When replacement parts are required for this product Caterpillar recommends using original Caterpillar® replacement parts.

Other parts may not meet certain original equipment specifications.

When replacement parts are installed, the machine owner/user should ensure that the machine remains in compliance with all applicable requirements.

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

California Proposition 65 Warning

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

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

www.P65Warnings.ca.gov

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

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

www.P65Warnings.ca.gov

Wash hands after handling components that may contain lead.

Literature Information

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

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

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

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

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

Safety

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

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

Operation

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

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

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

Maintenance

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

Maintenance Intervals

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

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

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

Certified Engine Maintenance

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

It is prohibited for any person engaged in the business of repairing, servicing, selling, leasing, or trading engines or machines to remove, alter, or to render inoperative, any emission-related device or element of design installed on or in an engine or machine that is in compliance with all applicable regulations of the intended country to which it has been shipped. Certain elements of the machine and engine such as the exhaust system, fuel system, electrical system, intake air system, and cooling system may be emission-related and should not be altered unless approved by Caterpillar.

Machine Capacity

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

Product Identification Number

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

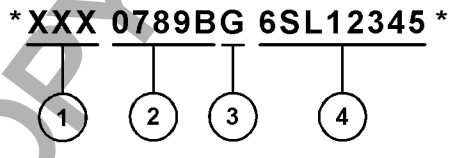

Illustration 1 g03891925

Where:

1. World Manufacturing Code (characters 1-3)

2. Machine Descriptor (characters 4-8)

3. Check Character (character 9)

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

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

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

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Safety Section

i05356646

Safety Messages

SMCS Code: 7000; 7405

There are several specific safety messages on this machine. The exact location of the hazards and the description of the hazards are reviewed in this section. Become familiar 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 legible. 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 that is replaced, install a new safety message on the replacement part. Any Cat dealer can provide new safety messages.

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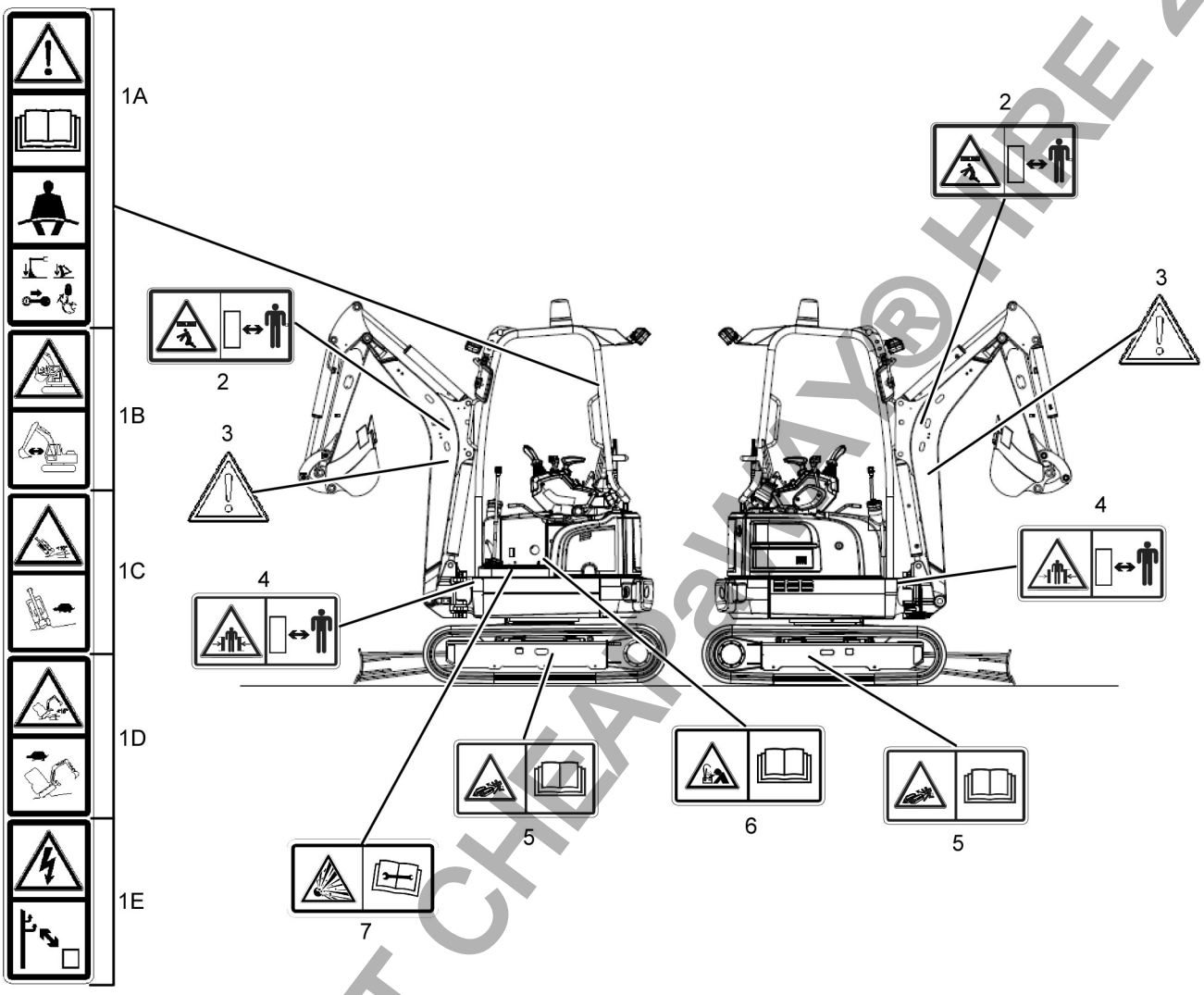

Illustration 2 g03393184

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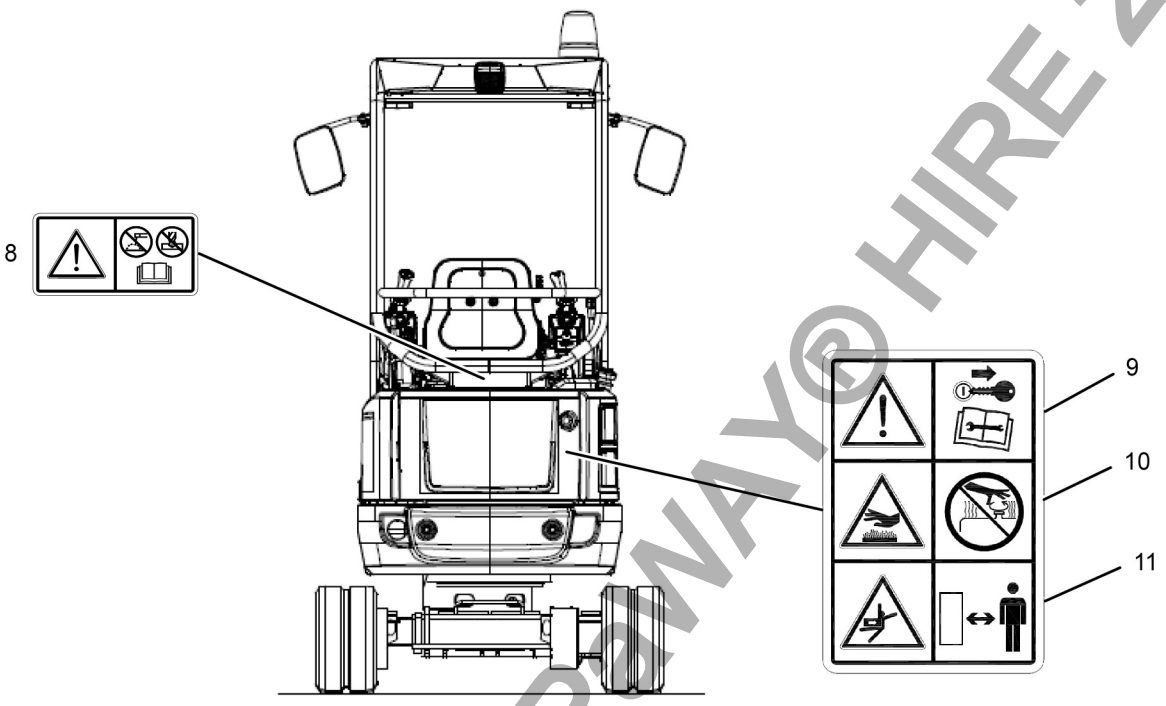

Illustration 3 g03393191

Do Not Operate, Seat Belt, and Leaving the Machine(1A)

This safety message is located on the canopy.

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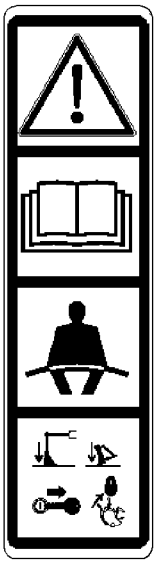

Illustration 4 g03110057

⚠ WARNING

Do not operate or work on this machine 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. Consult any Cat dealer for replacement manuals. Proper care is your responsibility.

A seat belt is to 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.

Before leaving the machine, lower the boom and dozer blade to the ground, shut off the engine, move the hydraulic lockout control to the RAISED position, and remove the key.

Crushing Hazard (1B)

This safety message is located on the canopy.

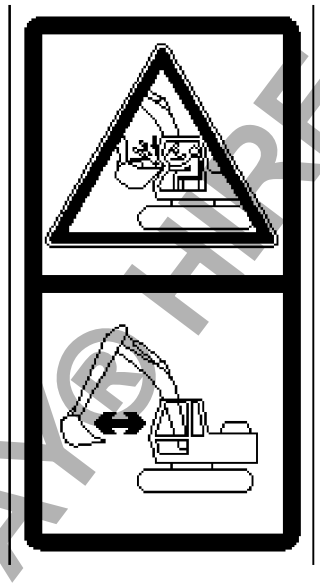

Illustration 5 g03110606

⚠ WARNING

Crushing Hazard! Certain machine front linkage combinations (boom, stick, quick coupler, work tool) may require keeping the work tool away from the canopy during operation. Machine damage, personal injury, or death may result if the work tool contacts the canopy.

Tip Over Hazard (1C)

This safety message is located on the canopy.

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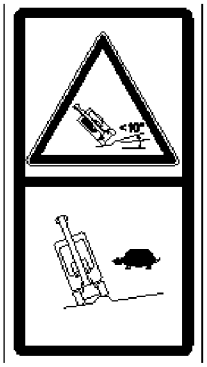

Illustration 6 g03110676

⚠ WARNING

When traveling across a slope, travel slowly. The machine can tip at angles that are 10 degrees or more, which could cause serious injury or death. Refer to the Operation and Maintenance Manual for the proper traveling procedure.

Overloading the machine could impact the machines stability. Only use work tools that have been approved by Cat.

Tip Over Hazard (1D)

This safety message is located on the canopy.

Illustration 7 g03110677

⚠ WARNING

When traveling up or down a slope, travel slowly. The machine can tip at angles that are 15 degrees or more, which could cause serious injury or death. Refer to the Operation and Maintenance Manual for the proper traveling procedure.

Electrical Power Lines (1E)

This safety message is located on the canopy.

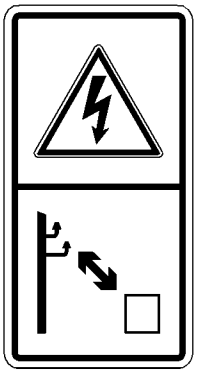

Illustration 8 g02471299

⚠ DANGER

Electrocution Hazard! Keep the machine and attachment a safe distance from electric power. The owner of the electric line should advise a minimum clearance distance. The minimum clearance is 6 m (20 ft) for 220V to 33 kV (Europe) and 5 m (17 ft) for 50kV (USA). Read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions and warnings will cause serious injury or death.

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Refer to Operation and Maintenance Manual, “Specifications” for additional information.

Crushing Hazard (2)

This safety message is located on both sides of the boom.

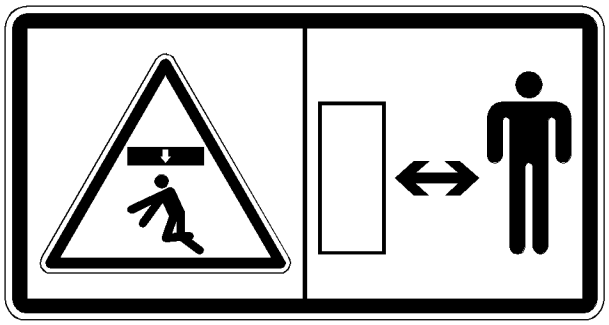

Illustration 9 g02470918

WARNING

A crushing hazard exists when the stick and boom are in motion and when the machine is being used in object handling applications. Failure to stay clear of the stick and boom when the machine is in operation can result in personal injury or death. Stay clear of the stick and boom when the machine is in operation.

Warning (3)

This safety message is located on both sides of the boom.

Illustration 10 g03393281

WARNING

Hot parts or hot components can cause burns or personal injury. Do not allow hot parts or components to contact your skin. Use protective clothing or protective equipment to protect your skin.

Crushing Hazard (4)

This safety message is located on the left side and right side of the front of the machine.

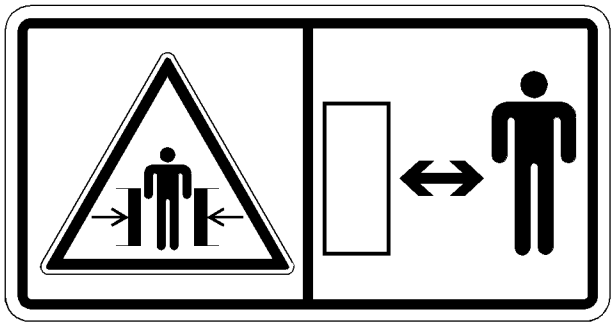

Illustration 11 g02471097

WARNING

Crushing Hazard! Stay back a safe distance. There is no clearance for a person in this area when the machine turns. Failure to follow these instructions could cause serious injury or death.

High Pressure Cylinder (5)

This safety message is located on the undercarriage.

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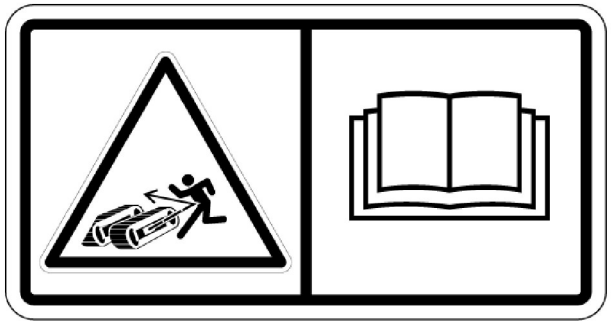

Illustration 12 g02471560

⚠ WARNING

High Pressure Cylinder! Do not remove any parts from the cylinder until all of the pressure has been relieved. Grease under pressure can penetrate the body causing personal injury or death.

Read and understand the Operation and Maintenance Manual before performing adjustments to the track tensioner.

Refer to Operation and Maintenance Manual, “Track Adjustment - Adjust” for further information.

Jump Start Cables (6)

This safety message is located at the operator station.

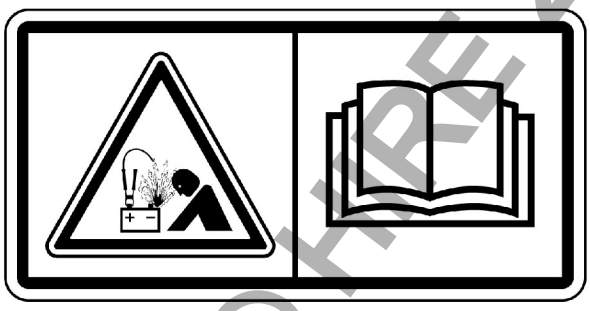

Illustration 13 g01370909

⚠ WARNING

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

Refer to Operation and Maintenance Manual, “Engine Starting with Jump Start Cables” for further information.

High Pressure Gas (7)

This safety message is located at the operator station.

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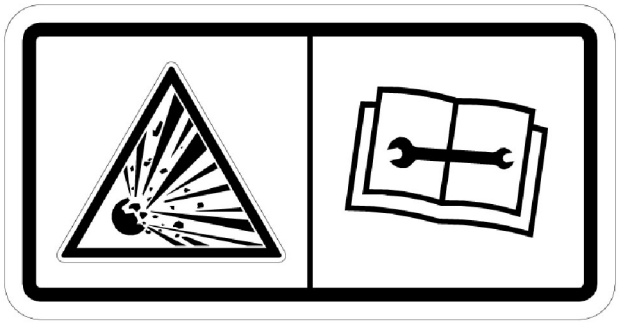

Illustration 14 g02626586

⚠ WARNING

This system contains high pressure gas. Failure to follow the instructions and warnings could cause an explosion, resulting in possible injury or death.

Do not expose to fire. Do not weld. Do not drill. Relieve pressure before discharging.

See Operation and Maintenance Manual for charging and discharging. See your Caterpillar Dealer for tools and detailed information.

Refer to Operation and Maintenance Manual, “Equipment Lowering with Engine Stopped” for further information.

Do Not Weld or Drill on ROPS (8)

This safety message is located above the engine door.

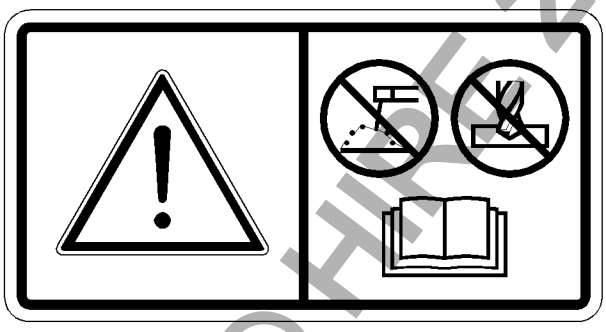

Illustration 15 g02470856

⚠ WARNING

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

Crushing Hazard (9)

This safety message is located on the engine door.

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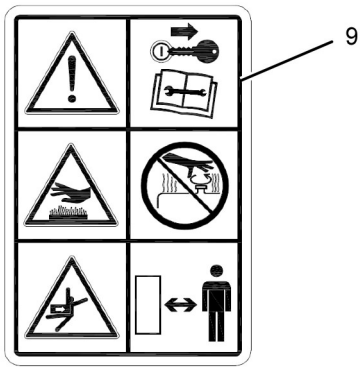

Illustration 16 g03393181

⚠ WARNING

The machine can move unexpectedly and without warning resulting in personal injury or death. Before performing maintenance or repair work on the machine, shut off the engine, move the hydraulic lockout control to the RAISED position, and remove the key. Read the Operation and Maintenance Manual.

Hot Surface and Pressurized System (10)

This safety message is located on the engine door.

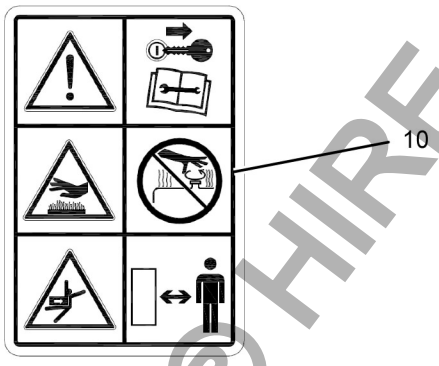

Illustration 17 g03393288

⚠ WARNING

Hot parts or hot components can cause burns or personal injury. Do not allow hot parts or hot components to contact your skin. Use protective clothing or protective equipment to protect your skin.

The hydraulic tank contains hot oil under pressure. Hot hydraulic oil can cause serious burns. Wear suitable protective clothing and goggles. To prevent burns from the sudden release of hot oil, shut off the engine, wait until the tank is cool. Slowly loosen the breather in order to relieve the tank pressure.

Hot coolant can cause serious burns. Wear suitable protective clothing and goggles. To prevent burns from the sudden release of hot coolant, shut off the engine and wait until the cooling system components are cool. Slowly loosen the cooling system pressure cap in order to relieve the tank pressure.

Crushing Hazard (11)

This safety message is located on the engine door.

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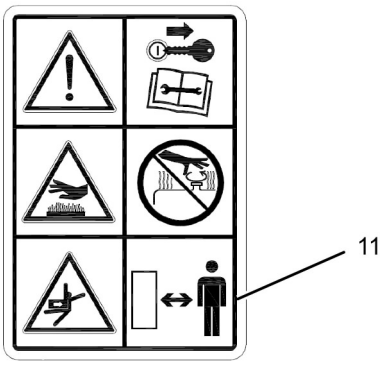

Illustration 18 g03393282

⚠ WARNING

Machine swings. Stay back. Crushing hazard could cause serious injury or death.

i07920557

General Hazard Information

SMCS Code: 7000

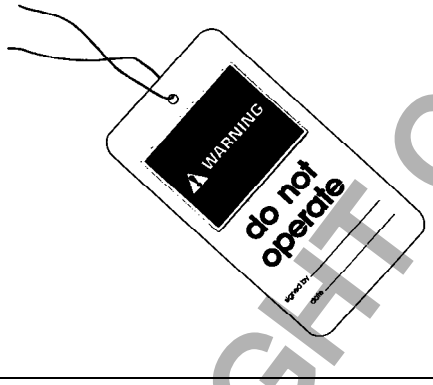

Illustration 19 g00104545

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

⚠ WARNING

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

Know the width of your equipment 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.

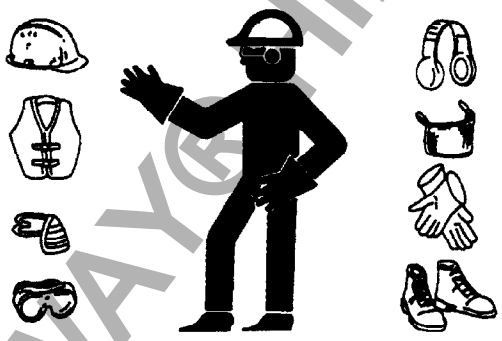

Illustration 20 g00702020

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 and from the steps.

Remove 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.

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.

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

Pressurized Air and Water

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

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

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

Trapped Pressure

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

Fluid Penetration

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

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

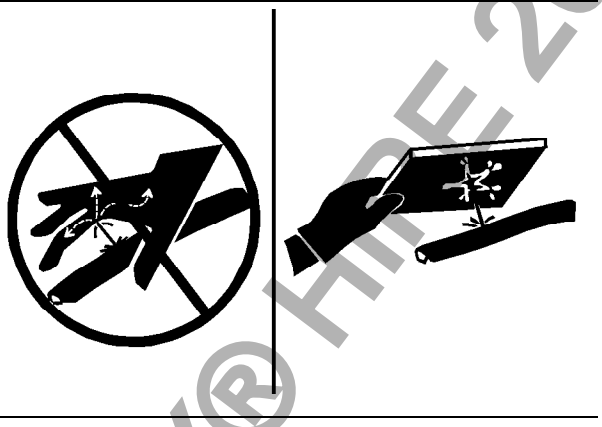

Illustration 21 g00687600

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 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

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Obey all local regulations for the disposal of liquids.

Inhalation

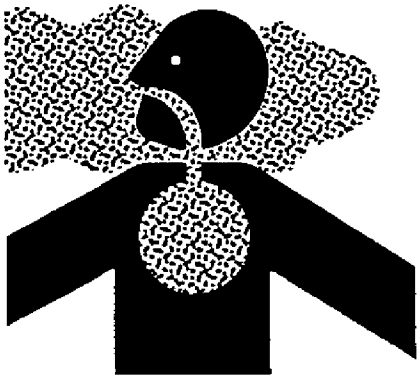

Illustration 22 g02159053

Exhaust

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

Asbestos Information

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

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

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

- Never use compressed air for cleaning.
- Avoid brushing materials that contain asbestos.
- Avoid grinding materials that contain asbestos.
- Use a wet method to clean up asbestos materials.
- A vacuum cleaner that is equipped with a high efficiency particulate air filter (HEPA) can also be used.
- Use exhaust ventilation on permanent machining jobs.
- Wear an approved respirator if there is no other way to control the dust.
- Comply with applicable rules and regulations for the work place. In the United States, use Occupational Safety and Health Administration (OSHA) requirements. These OSHA requirements can be found in “29 CFR 1910.1001”. In Japan, use the requirements found in the “Ordinance on Prevention of Health Impairment due to Asbestos” in addition to the requirements of the Industrial Safety and Health Act.
- Obey environmental regulations for the disposal of asbestos.
- Stay away from areas that might have asbestos particles in the air.

Dispose of Waste Properly

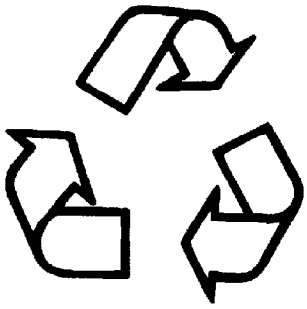

Illustration 23 g00706404

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.

i05374155

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 were to break.

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Do not work beneath the canopy of the machine unless the canopy 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 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.

i07746334

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 to relieve pressure.

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

Oils

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

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

Batteries

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

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

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

i05374600

Fire Prevention and Explosion Prevention

SMCS Code: 7000

Illustration 24 g00704000

General

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

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

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

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

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

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

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

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

Do not operate the machine near any flame.

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

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

Dust that is generated from repairing nonmetallic hoods or fenders may be flammable and/or explosive. Repair such components in a 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 25 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.

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

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

Battery and Battery Cables

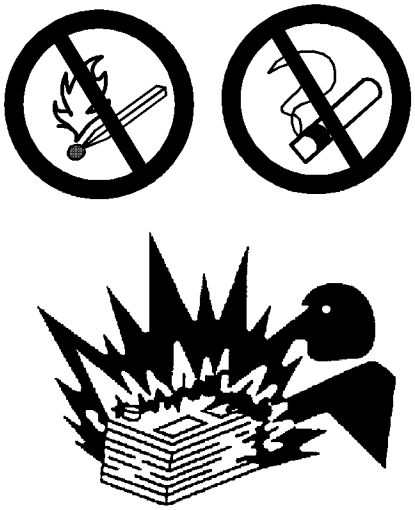

Illustration 26 g02298225

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

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

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

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

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

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

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

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

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

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

⚠ WARNING

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

Wiring

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

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

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

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

Consult your Cat dealer for repair or for replacement parts.

Keep wiring and electrical connections free of debris.

Lines, Tubes, and Hoses

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

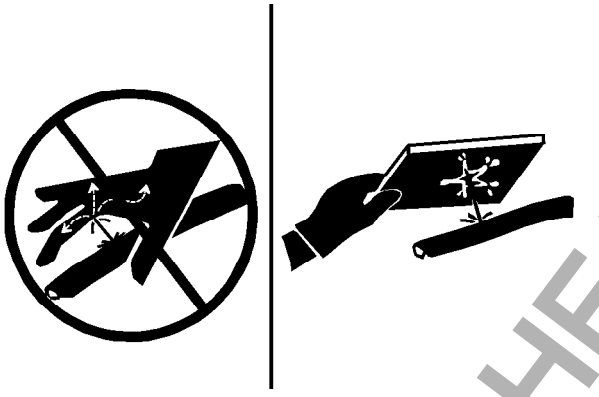

Illustration 27 g00687600

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

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

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

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

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

Ether

Ether is flammable and poisonous. Do not spray ether into an engine if the machine is equipped with a thermal starting aid for cold weather starting. Follow the correct cold engine starting procedures. Refer to the section in the Operation and Maintenance Manual, “Engine Starting”.

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.

i05332655

Fire Extinguisher Location

SMCS Code: 7000; 7419

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

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Illustration 28 g03380353

A fire extinguisher can be installed at the rear, right pillar.

Consult your Cat dealer for the installation of a fire extinguisher according to “DIN-EN 3”.

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.

i04243389

Electrical Storm Injury Prevention

SMCS Code: 7000

When lightning is striking in the vicinity of the machine, stop the work that is being performed. Leave the area, and stay away from the vicinity of the machine.

i04415163

Before Starting Engine

SMCS Code: 1000; 7000

Start the engine only from the operator seat. Do not short across the battery terminals. Bypassing the engine neutral start system can damage the electrical system.

Inspect the condition of the seat belt and the condition of the mounting hardware. Replace any damaged parts or worn parts. Regardless of appearance, replace the seat belt after 3 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. Adjust the seat so that full lever travel can be achieved. Make sure that your 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.

Make sure that the hydraulic lockout control is in the RAISED position. When the hydraulic lockout control is in the RAISED position, the controls and drive levers will be deactivated.

⚠ WARNING

Deactivation of the hydraulic controls does not prevent the blade, boom swing, or auxiliary circuit functions from moving under gravity or other external forces. Gravity or other external forces can move the blade, boom swing, or auxiliary circuit functions suddenly if a hydraulic control lever is moved.

Personal injury or death may occur from sudden machine movement.

Before you start the engine and before you move the machine, make sure that no personnel are underneath the machine, around the machine, or on the machine. Make sure that the area is free of personnel.

i04450732

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.

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Your machine may be equipped with visual aids. Examples of visual aids are 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.

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 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.

Restricted Area

The restricted area is the area in which persons are in danger due to the movements of the:

- machine
- work equipment
- additional equipment or
- material

This also includes the area affected by falling material, equipment, or by parts which are thrown out.

The danger area must be extended by 0.5 m (20 inch) in the immediate vicinity of:

- buildings
- scaffolds or
- other elements of construction

Seal off the restricted area if not possible to keep a safe distance. Stop work if persons do not leave the restricted area in spite of warning. Keep out of the danger area.

i05333241

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.

Before you start the engine, make sure that all hydraulic control levers and pedals are at the neutral position.

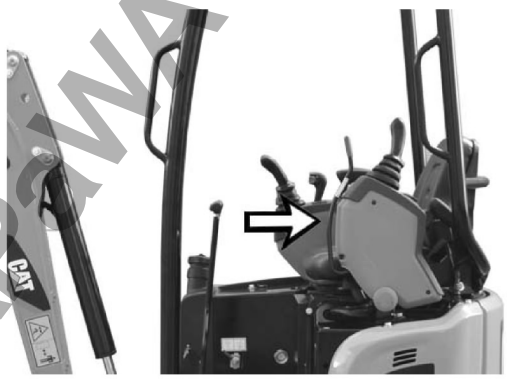

Illustration 29 g03378529

Put the hydraulic lockout control in the RAISED position.

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

i05333446

Before Operation

SMCS Code: 7000

Clear all personnel from the machine and from the area.

Clear all obstacles from the path of the machine. Beware of hazards for example such as wires, ditches.

Make sure that all windows are clean. Secure the weather protection in the open position or in the closed position (if equipped).

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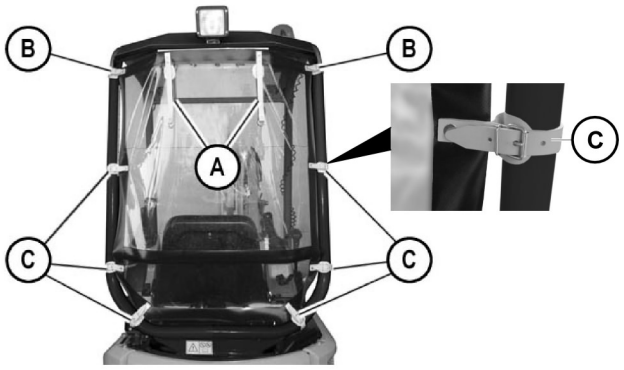

Illustration 30 g03392040

In order to install the weather protection, unhook the two straps (A) inside of the canopy. Fold the weather protection down and fasten the six straps (C) to the frame.

In order to store the weather protection, unhook the six straps (C) from the frame. The two straps (B) can remain fixed. Roll up the weather protection, and fasten the two straps (A) inside of the canopy.

For the best vision of the area that is close to the machine, adjust the rear view mirrors (if equipped).

Make sure that the machine horn, the travel alarm (if equipped) and all other warning devices are working properly.

Fasten the seat belt securely.

i05333458

Work Tools

SMCS Code: 6700

Only use work tools that are approved by Caterpillar for use on Cat machines.

Use of work tools, including buckets, which are outside of Caterpillar's recommendations or specifications for weight, dimensions, flows, pressures, and so on, may result in less-than-optimal vehicle performance, including but not limited to reductions in production, stability, reliability, and component durability. Caterpillar recommends appropriate work tools for our machines to maximize the value our customers receive from our products. Caterpillar understands that special circumstances may lead a customer to use tools outside of our specifications. In these cases, customers must be aware that such choices can reduce vehicle performance and will affect their ability to claim warranty in the event of what a customer may perceive as a premature failure.

Work tools and work tool control systems, that are compatible with your Cat machine, are required for safe machine operation and/or reliable machine operation. If you are in doubt about the compatibility of a particular work tool with your machine, consult your Cat dealer.

Make sure that all necessary guarding is in place on the host machine and on the work tool.

A polycarbonate shield must be used when a work tool could throw debris.

Do not exceed the maximum operating weight that is listed on the ROPS certification.

Always wear protective glasses. Always wear the protective equipment that is recommended in the operation manual for the work tool. Wear any other protective equipment that is required for the operating environment.

To prevent personnel from being struck by flying objects, ensure that all personnel are out of the work area.

While you are performing any maintenance, any testing, or any adjustments to the work tool stay clear of the following areas: cutting edges, pinching surfaces and crushing surfaces.

Never use the work tool for a work platform.

i08437974

Operation

SMCS Code: 7000

Machine Operating Temperature Range

The machine must function satisfactorily in the anticipated ambient temperature limits that are encountered during operation. The machine configuration is intended for use within an ambient temperature range of −15 °C (5 °F) to 45 °C (113 °F).

Limiting Conditions and Criteria

Limiting conditions are immediate issues with this machine that must be addressed prior to continuing operation.

The Operation and Maintenance Manual, Safety Section describes limiting condition criteria for replacing items such as safety messages, seat belt and mounting hardware, lines, tubes, hoses, battery cables and related parts, electrical wires, and repairing any fluid leak.

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The Operation and Maintenance Manual, Maintenance Interval Schedule describes limiting condition criteria that require repair or replacement for items (if equipped) such as alarms, horns, braking system, steering system, and rollover protective structures.

The Operation and Maintenance Manual, Monitoring System (if equipped) provides information on limiting condition criteria, including a Warning Category 3 that requires immediate shutdown of the engine.

Critical Failures

The following table provides summary information on several limiting conditions found in this Operation and Maintenance Manual. The table provides criteria and required action for the limiting conditions listed. Each System or Component in this table, together with the respective limiting condition, describes a potential critical failure that must be addressed. Not addressing limiting conditions with required actions may, in conjunction with other factors or circumstances, result in a risk of personal injury or death. If an accident occurs, notify emergency personnel and provide location and description of accident.

Table 1

System or Component Name	Limiting Condition	Criteria for Action	Required Action
Line, tubes, and hoses	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.	Visible corrosion, loose, or damaged lines, tubes, or hoses. Visible fluid leaks.	Immediately repair any lines, tubes, or hoses that are corroded, loose, or damaged. Immediately repair any leaks as these may provide fuel for fires.
Electrical Wiring	Signs of fraying, abrasion, cracking, discoloration, cuts on the insulation	Visible damage to electrical wiring	Immediately replace damaged wiring
Battery cable(s)	Signs of fraying, abrasion, cracking, discoloration, cuts on the insulation of the cable, fouling, corroded terminals, damaged terminals, and loose terminals	Visible damage to battery cable(s)	Immediately replace damaged battery cables
Operator Protective Structure	Structures that are bent, cracked, or loose. Loose, missing, or damaged bolts.	Visible damage to structure. Loose, missing, or damaged bolts.	Do not operate machine with damaged structure or loose, missing, or damaged bolts. Contact your Cat dealer for inspection and repair or replacement options.
Seat Belt	Worn or damaged seat belt or mounting hardware	Visible wear or damage	Immediately replace parts that are worn or damaged.
Seat Belt	Age of seat belt	Three years after date of installation	Replace seat belt three years after date of installation
Safety Messages	Appearance of safety message	Damage to safety messages making them illegible	Replace the illustrations if illegible.
Audible Warning Device(s) (if equipped)	Sound level of audible warning	Reduced or no audible warning present	Immediately repair or replace audible warning devices not working properly.
Camera(s) (if equipped)	Dirt or debris on camera lens	Dirt or debris obstructing camera view	Clean camera before operating machine.

(continued)

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(Table 1, contd)

System or Component Name	Limiting Condition	Criteria for Action	Required Action
Cab Windows (if equipped)	Dirt, debris, or damaged windows	Dirt or debris obstructing operator visibility. Any damaged windows.	Clean windows before operating machine. Repair or replace damaged windows before operating machine.
Mirrors (if equipped)	Dirt, debris, or damaged mirror	Dirt or debris obstructing operator visibility. Any damaged mirrors.	Clean mirrors before operating machine. Repair or replace damaged mirrors before operating machine.
Braking System	Inadequate braking performance	System does not pass Braking System - Test(s) included in Maintenance Section or in the Testing and Adjusting Manual	Contact your Cat dealer to inspect and, if necessary, repair the brake system.
Cooling System	The coolant temperature is too high.	Monitoring System displays Warning Category 3	Stop the engine immediately. Check the coolant level and check the radiator for debris. Refer to Operation and Maintenance Manual, Cooling System Coolant Level - Check. Check the fan drive belts for the water pump. Refer to Operation and Maintenance Manual, Belts - Inspect/Adjust/ Replace. Make any necessary repairs.
Engine Oil System	A problem has been detected with the engine oil pressure.	Monitoring System displays Warning Category 3	If the warning stays on during low idle, stop the engine and check the engine oil level. Perform any necessary repairs as soon as possible.
Engine system	An engine fault has been detected by the engine ECM.	Monitoring System displays Warning Category 3	Stop the engine immediately. Contact your Cat dealer for service.
Fuel System	A problem has been detected with the fuel system.	Monitoring System displays Warning Category 3	Stop the engine. Determine the cause of the fault and perform any necessary repairs.
Hydraulic Oil System	The hydraulic oil temperature is too high.	Monitoring System displays Warning Category 3	Stop the engine immediately. Check the hydraulic oil level and check the hydraulic oil cooler for debris. Perform any necessary repairs as soon as possible.
Steering System	A problem has been detected with the steering system. (If equipped with steering system monitoring.)	Monitoring System displays Warning Category 3	Move machine to a safe location and stop the engine immediately. Contact your Cat dealer to inspect and, if necessary, repair the steering system.
Overall Machine	Machine service is required.	Monitoring System displays Warning Category 3	Stop the engine immediately. Contact your Cat dealer for service.

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 of all protective devices while you operate the machine slowly in an open area.

When the machine is moving watch the clearance of the boom. Uneven ground can cause the boom to move in all directions.

Make sure that no personnel will be endangered before you move the machine. Do not allow riders on the machine.

Never use the work tool for a work platform.

Report any machine damage that was noted during machine operation. Make any necessary repairs.

Hold attachments approximately 40 cm (15 inches) above ground level while you drive the machine. Do not drive the machine close to an overhang, to the edge of a cliff, or to the edge of an excavation.

If the machine begins to sideslip on a grade, immediately dump the load and turn the machine downhill.

Be careful to avoid any ground condition which could cause the machine to tip. Tipping can occur when you work on hills, on banks, or on slopes. Tipping can also occur when you cross ditches, ridges, or other unexpected obstructions.

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

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

Avoid changing the direction of travel on a slope. This could result in tipping or side slipping of the machine.

Bring the load close to the machine before Traveling any distances.

Bring the load close to the machine before swinging the load.

Lifting capacity decreases as the load is moved further from the machine.

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Make sure that the towing eyes and the towing devices are adequate for your needs.

Never connect trailing equipment to the machine.

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

Check the local regulations, state codes, and/or directives of the job site for a specific minimum distance from obstacles.

Before you operate the machine, check with local utilities for the locations of underground pipes and for the locations of buried cables.

Know the maximum dimensions of your machine.

Watch the load at all times.

Do not operate the machine without the counterweight. The machine can tip when the boom is over the side.

The boom and the stick linkage can allow the work tool to contact the undercarriage and/or the canopy. This could result in personal injury. Be aware of the position of the work tool.

i04258934

Engine Stopping

SMCS Code: 1000; 7000

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

After the machine is parked, allow the engine to run for 2 minutes before shutdown. Running the engine for 2 minutes before shutdown allows hot areas of the engine to cool gradually.

i07920664

Lifting Objects

SMCS Code: 7000

Obey the local regulations and/or government regulations that govern the use of excavators which lift objects.

Obey the local regulations and/or government regulations that govern the lifting of loads.

⚠ DANGER

Crushing hazard. The excavator may be used for applications with lifting gear only if the prescribed safety devices are in place and functional.

Failure to follow this precautionary measure will lead to serious injury or death.

- **Acoustic and optical warning device**
- **Boom lowering control device**
- **Suitable equipment for fastening and securing loads**
- **The lift capacity table must be observed**
- **Approved bucket linkage with lifting point**

If this machine is used to lift objects within Japan, Japanese regulations require the machine to be equipped with a shovel crane configuration. Contact your Cat Cat dealer for additional information.

i05333460

Parking

SMCS Code: 7000

When the engine is turned off, movement of the hydraulic equipment can occur under the following conditions:

- The work tool is not positioned on the ground.
- The work tool drifts when the equipment is not supported.

⚠ WARNING

Deactivation of the hydraulic controls does not prevent the blade, boom swing, or auxiliary circuit functions from moving under gravity or other external forces. Gravity or other external forces can move the blade, boom swing, or auxiliary circuit functions suddenly if a hydraulic control lever is moved.

Personal injury or death may occur from sudden machine movement.

1. Park on a level surface. If necessary to park on a grade, chock the tracks.

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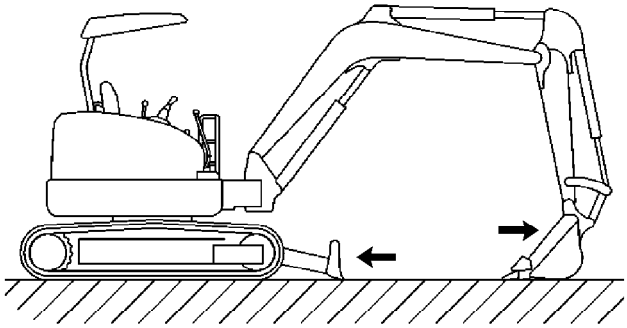

Illustration 31 g00811194

2. Lower the work tools and the blade to the ground.

3. Move the governor control lever to the LOW idle position and operate the engine at low idle for 5 minutes in order to allow the engine to cool down.

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

Illustration 32 g03378529

5. Place the hydraulic lockout control in the RAISED position.

i04258937

Slope Operation

SMCS Code: 7000

⚠ WARNING

When traveling up or down a slope, travel slowly. The machine can tip at angles that are 15 degrees or more, which could cause serious injury or death. Refer to the Operation and Maintenance Manual for the proper traveling procedure.

⚠ WARNING

When traveling across a slope, travel slowly. The machine can tip at angles that are 10 degrees or more, which could cause serious injury or death. Refer to the Operation and Maintenance Manual for the proper traveling procedure.

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 machine traction and machine 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.

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

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

Operating techniques – Keep all work tools low to the ground for optimum stability.

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

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

i08229294

Equipment Lowering with Engine Stopped

SMCS Code: 7000-II

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.

i08437874

Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information

Hearing protection may be needed when the machine is operated for extended periods or in a noisy environment.

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

The dynamic operator sound pressure level is 79 dB (A) when “ISO6396: 2008” is used.

The average exterior sound power level is 93 dB(A) when the “ISO 6395 - Dynamic Test” procedure is used to measure the value for the standard machine.

The machine sound power level meets the criteria that are specified in “European Directive 2000/14 EC” modified by “2005/88/EC”.

The uncertainty is 0.9 dB(A) and meets “ISO 4871”. The sound pressure level at the operators ear had been measured according to “85/532/EWG”, “89/514/EWG”, and “95/27/EWG”. All measurements were carried out on an asphalted surface.

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

Vibration Data for Compact Track Excavator

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 m/s2.

Information Concerning Whole Body Vibration Level

This section provides vibration data and a method for estimating the vibration level for Compact track excavators.

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 2 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.

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

Table 2

"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**
Compact Track Excavator	excavating	0,33	0,21	0,19	0,19	0,12	0,10
	hydraulic breaker application	0,49	0,28	0,36	0,20	0,13	0,17
	transfer	0,45	0,39	0,62	0,17	0,18	0,28

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

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. 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 excavators.

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.

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

Sources

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

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

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

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

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

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

Caterpillar, Inc.
www.cat.com

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Operator Station

SMCS Code: 7300; 7301; 7325

Any modifications to the operator station should not project into the operator space. The addition of a fire extinguisher, and other equipment must be installed so that the defined operator space is maintained. Do not bring any items into the operator station. A lunch box or other loose items must be removed. Objects must not pose an impact hazard in rough terrain or in the event of a rollover.

Note: Apart from the operator, no other persons are allowed to ride on the machine.

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Guards
(Operator Protection)

SMCS Code: 7000; 7150

There are different types of guards that are used to protect the operator. The machine and the machine application will determine the type of guard that has to be used. The decision regarding the necessary protective structures must be made by the machine owner. The machine owner must observe the national regulations and must inform the operator on the protective structure to be used in a specific work situation.

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.

Roll Over Protective Structure (ROPS), Falling Object Protective Structure (FOPS), and Tip Over Protection Structure (TOPS)

The ROPS/TOPS structure (canopy) and if equipped, the FOPS structure (roof guard) on your machine is designed, tested, and certified for that machine. Any alteration or any modification to the ROPS/TOPS and 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 ROPS/TOPS and FOPS structure. The protection that is offered by the ROPS/TOPS and FOPS structure will be impaired if the ROPS/TOPS and 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/TOPS and FOPS structure or by drilling holes in the ROPS/TOPS and FOPS structure. Welding brackets or drilling holes in the ROPS/TOPS and FOPS structures can weaken the structures. Consult your Cat dealer for mounting guidelines.

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Note: Operating the machine without a ROPS structure is not permitted.

Other Guards (If Equipped)

Protection from flying fragments/objects and/or falling objects is required for special applications. Demolition applications is an example that requires special protection. Safety glasses are recommended when flying hazards exist for machines with cabs and machines with open canopies.

Operating the machine in areas with danger of falling objects from above is only permitted with a FOPS structure (roof guard). The protective FOPS structure corresponds to category I and protects the operator against falling material according to “EN ISO 3449:1992”.

Note: Only carry out work that does not require any higher-level protection!

Definition of Category I: – Protection against small falling objects (FOPS) or small objects penetrating into the cab from the front (Front Guard), such as bricks, small pieces of concrete, tools, for machines that are used for repairing roads, landscaping work and for working on other construction sites.

Definition of Category II: – Protection against heavy falling objects (FOPS) or heavy objects penetrating into the cab from the front (Front Guard), such as trees, pieces of rock, for machines that are used for clearance work, demolition work and forestry work.

When a work tool that creates flying fragments is used, a Polycarbonate shield that is approved by Caterpillar has to be installed (optional equipment). A Polycarbonate shield fulfills the function of a front window but not of a front guard. However, the limited operating range has to be observed, which depends on the used work tool. Graphics 33 and 34 shows the limited operating range on the example of a hydraulic hammer.

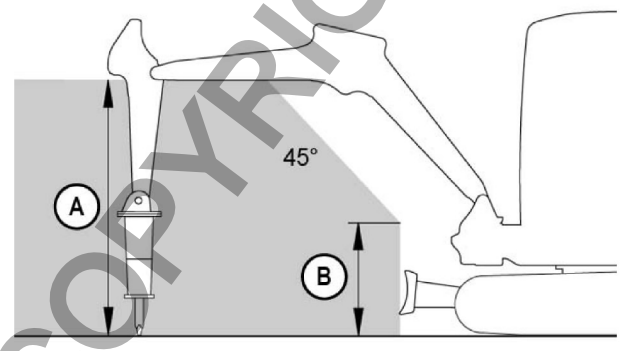

Illustration 33 g03392773

(A) 120 cm (47 inch)
(B) 50 cm (20 inch)

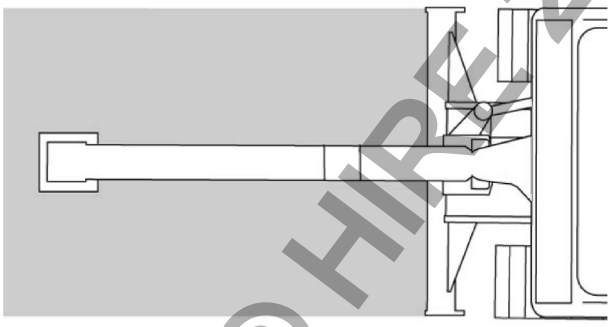

Illustration 34 g03392776

When visibility is restricted due to rain, snowfall, dust etc., the work has to be stopped. Resume work only if visibility is no longer restricted.

Note: Operating the machine in areas with danger from objects from the front is NOT permitted.

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 Cat dealer for additional information.

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Product Information Section

General Information

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Specifications

SMCS Code: 7000

Intended Use

The intended use of this machine is for excavating with an approved bucket or working with approved work tools. The machine should be operated with the undercarriage in a stationary position since the upper structure is normally capable of 360 degree swing with mounted equipment.

Every other application is regarded as not designated for the use of the machine. Caterpillar will not be liable for damage resulting from use other than mentioned above. The user alone will bear the risk. Designated use also include observing the instructions set forth in the Operation and Maintenance Manual and observing the maintenance and service conditions.

The safety of the machine can be negatively affected by carrying out machine modifications without proper authority and by using spare parts, equipment, attachments, and optional equipment which have not been checked and released by Caterpillar. Caterpillar will not be liable for damage resulting from this.

Caterpillar shall not be liable for personal injury and/or damage to property caused by failure to observe the safety instructions and the Operator Manual, and by the negligence of the duty to exercise due care when:

- handling
- operating
- servicing and carrying out maintenance work
- repairing the machine.

This is also applicable in those cases in which special attention has not been drawn to the duty to exercise due care, in the safety instructions, the Operation and Maintenance Manual.

Read and understand the Operation and Maintenance Manual before starting up, servicing or repairing the machine. Observe the safety instructions!

The machine may not be used for transport jobs on public roads.

Operating the machine in areas with danger of falling objects from above is only permitted with additional guards (optional equipment).

Operating the machine in areas with danger from objects from the front is NOT permitted.

The quick coupler is only used for locking a work tool.

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Hammer operation is only allowed with a Polycarbonate shield (optional equipment) and in specified areas.

Specification Data

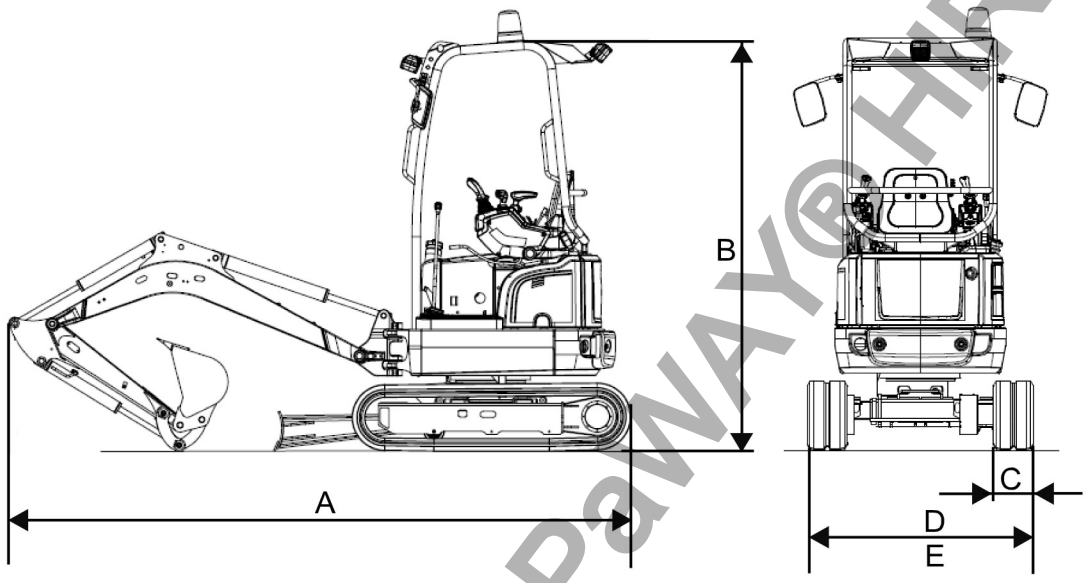

Illustration 35 g03393649

Table 3

301.7D CR	
Service weight	kg (lb)
Transport weight	kg (lb)
Transport length standard stick (A) Transport length long stick (A)	3584 mm (11 ft 9 inch) 3551 mm (11 ft 8 inch)
Height (B)	2362 mm (7 ft 9 inch)
Track width (C)	230 mm (9 inch)
Width(1) (D)	990/1300 mm (3 ft 3 inch/4 ft 3 inch)
Width (2) (E)	990/1300 mm (3 ft 3 inch/4 ft 3 inch)

(1) Retracted/extended telescopic undercarriage
(2) Retracted/extended blade

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Working Ranges

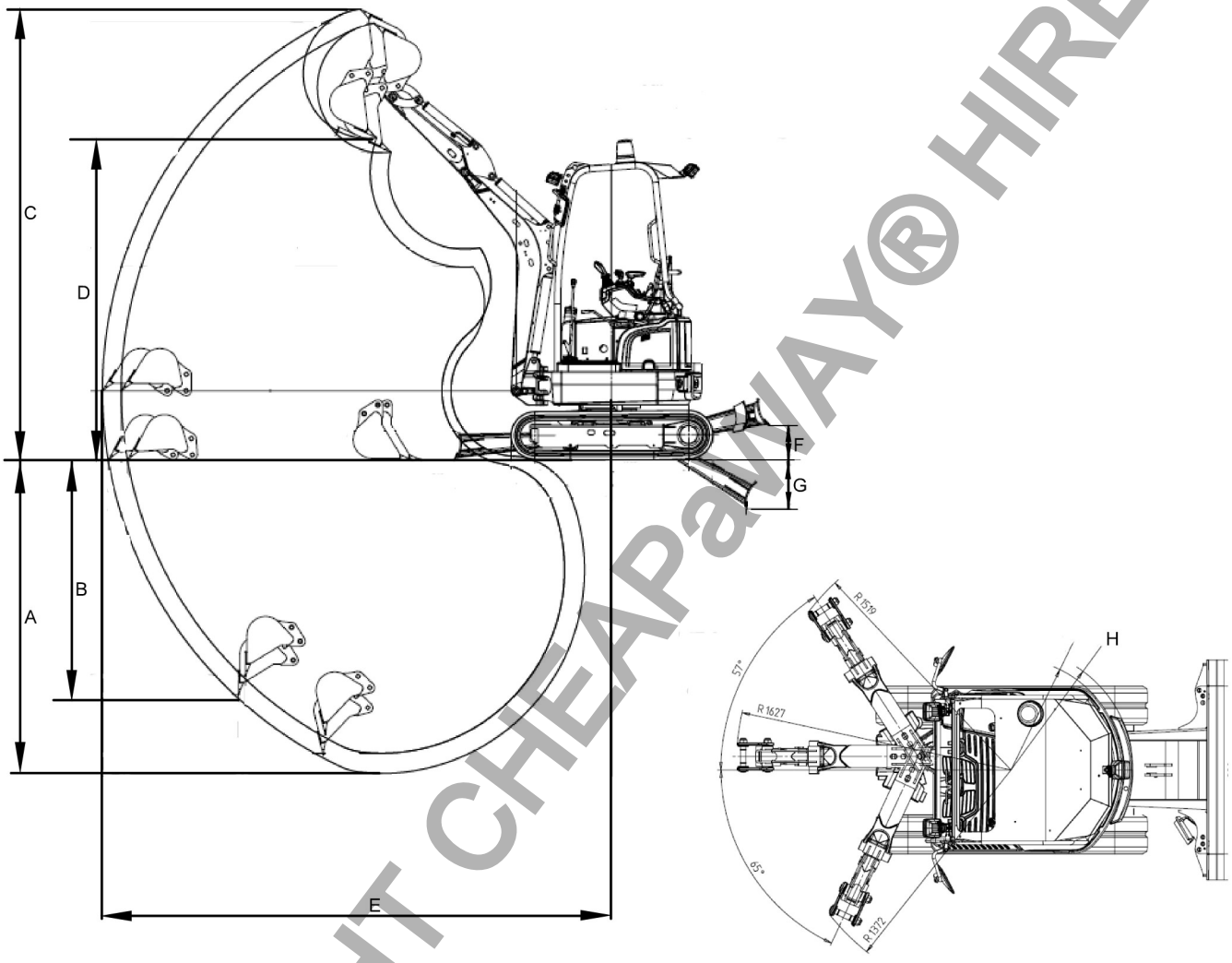

Illustration 36 g03393669

Table 4

301.7D CR	
Maximum digging depth (Short Stick) (A) Maximum digging depth (Long Stick) (A)	2326 mm (7 ft 8 inch) 2486 mm (8 ft 2 inch)
Maximum verticle digging depth (Short Stick) (B) Maximum verticle digging depth (Long Stick) (B)	1713 mm (5 ft 7 inch) 1863 mm (6 ft 1 inch)
Maximum digging height (Short Stick) (C) Maximum digging height (Long Stick) (C)	3462 mm (11 ft 4 inch) 3576 mm (11 ft 9 inch)

(continued)

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(Table 4, contd)

Maximum dump height (Short Stick) (D) Maximum dump height (Long Stick) (D)	2436 mm (8 ft) 2550 mm (8 ft 4 inch)
Maximum digging radius (Short Stick) (E) Maximum digging radius (Long Stick) (E)	3848 mm (12 ft 8 inch) 4002 mm (13 ft 2 inch)
Blade raised (F)	271 mm (10.7 inch)
Blade lowered (G)	390 mm (15.3 inch)
Minimum tail end swing radius (H)	722 mm (2 ft 4 inch)
Maximum breakout force at bucket tooth	22.5 kN (5058 lb-ft)
Maximum tear out force (Short Stick) Maximum tear out force (Long Stick)	13.6 kN (3057 lb-ft) 21.9 kN (4923 lb-ft)
Maximum reach at ground level (Short Stick) Maximum reach at ground level (Long Stick)	4481 mm (14 ft 8 inch) 4681 mm (15 ft 4 inch)
Maximum tail end lateral projection (90° rotation of upper carriage)	0 mm (0 ft 0 inch)
Maximum boom displacement to bucket center (right-hand side)	533 mm (1 ft 9 inch)
Maximum boom displacement to bucket center (left-hand side)	764 mm (2 ft 6 inch)
Stick length Short Stick length Long	1050 mm (3 ft 5 inch) 1250 mm (4 ft 1 inch)

i05333484

Boom/Stick/Bucket Combinations

SMCS Code: 6000; 6700

This machine can be equipped with a variety of boom-stick-bucket combinations in order to meet the needs of various applications.

As a rule, use a bucket with a smaller capacity when you are using a longer stick. Conversely, use a bucket with a larger capacity when you are using a shorter stick. This rule ensures better machine stability and protection against structural machine damage.

Note: The selection of a compatible boom-stick-bucket combination is a guide. Work tools, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on machine performance. The operator is responsible for being aware of these effects.

Using work tools of other manufactures, or work tools which have been released for other excavators, can reduce the machines output and stability considerably, and can also damage to the machine and injuries to the operator or other personnel.

Consult your Cat dealer for information on selecting the correct boom-stick-bucket combination.

The following table shows available work tools. Select the most suitable work tool according to the working conditions and according to the type of work that is being done. Always compare the weight of the work tool and its maximum payload with the indications in the lift capacity table. Never exceed the maximum payload stated in the lift capacity table.

Table 5

301.7D CR Buckets for use with Pin-On and Pin Grabber Coupler				
Type	**Width**	**Weight**	**Capacity**	**Teeth**
Digging	230 mm (9 inch)	29 kg (64 lb)	0.018 m^3 (0.023 yd^3)	3
	300 mm (12 inch)	31 kg (68 lb)	0.022 m^3 (0.029 yd^3)	3
	400 mm (16 inch)	35 kg (78 lb)	0.033 m^3 (0.043 yd^3)	3
	460 mm (18 inch)	38 kg (84 lb)	0.040 m^3 (0.052 yd^3)	3
	500 mm (20 inch)	41 kg (90 lb)	0.045 m^3 (0.059 yd^3)	4
	600 mm (24 inch)	45 kg (100 lb)	0.056 m^3 (0.073 yd^3)	4
Ditch Cleaning	800 mm (32 inch)	41 kg (90 lb)	0.044 m^3 (0.057 yd^3)	0
	1000 mm (39 inch)	43 kg (95 lb)	0.056 m^3 (0.073 yd^3)	0
Angle Bucket	1000 mm (39 inch)	75 kg (165 lb)	0.056 m^3 (0.073 yd^3)	0

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Table 6

301.7D CR Buckets for use with CW Coupler Only				
Type	**Width**	**Weight**	**Capacity**	**Teeth**
Digging	300 mm (12 inch)	31 kg (68 lb)	0.022 m^3 (0.029 yd^3)	3
	400 mm (16 inch)	35 kg (78 lb)	0.033 m^3 (0.043 yd^3)	3
	460 mm (18 inch)	42 kg (92 lb)	0.035 m^3 (0.046 yd^3)	3
	500 mm (20 inch)	41 kg (90 lb)	0.045 m^3 (0.059 yd^3)	4
	600 mm (24 inch)	45 kg (100 lb)	0.056 m^3 (0.073 yd^3)	4
Ditch Cleaning	1000 mm (39 inch)	47 kg (104 lb)	0.056 m^3 (0.073 yd^3)	0
Angle Bucket	1000 mm (39 inch)	84 kg (185 lb)	0.056 m^3 (0.073 yd^3)	0

i05343367

Lifting Capacities

SMCS Code: 7000

⚠ WARNING

Failure to comply to the rated load can cause possible personal injury or property damage. Review the rated load of a particular work tool before performing any operation. Make adjustments to the rated load as necessary for non-standard configurations.

Note: Rated loads are based upon a standard machine with the following conditions:

- lubricants
- full fuel tank
- Canopy
- 75 kg (165 lb) operator

Rated loads will vary with different work tools. Consult your Caterpillar dealer regarding the rated load for specific work tools.

Note: Rated loads should be used as a guide. Work tools, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on rated loads. The operator is responsible for being aware of these effects.

Special hazards (toxic gases, ground conditions, etc.) require special precautions. The operator must determine whether special hazards exist in each application. The operator shall perform the appropriate steps in order to eliminate the hazard. The operator shall perform the appropriate steps in order to reduce the hazard.

For North American applications, the rated operating load is defined by " SAE J1097 1988". For European applications, the rated operating load is defined by "ISO 10567 1992". The rated operating load is defined as the lower value of 75% of the static tipping capacity or 87% of the hydraulic lift capacity.

Note: In European countries, regulations require a load sensing indicator and a boom lowering control device if more than 1000 kg (2200 lb) is lifted during object handling applications. Regulations also require a load sensing indicator and a boom lowering control device if a moment that is greater than 40000 N·m (29500 lb ft) is created during object handling applications.

Note: European regulations require the machine to be equipped with a mechanism that locks the dozer blade into position if the dozer blade is used to increase stability. If a mechanism that locks the dozer blade into position is not installed, use the values that are given in the tables for the machine when the blade is up. If a mechanism that locks the dozer blade into position is installed, use the values that are given in the tables for the machine when the blade is down.

Symbols Found in the Lifting Capacity Charts

Below are symbols that are commonly found on lifting capacity charts for track excavators.

Note: Depending on the machine configuration, some symbols may not be used.

A **Reach from swing center**

B **Load hook height**

Authorized lift capacity with horizontal boom

Blade in front

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With or without blade, 90° to front

Blade UP

Blade DOWN

Undercarriage extended

Undercarriage retracted

Standard Counterweight

A / B	max	3,0 m (9'-10")			2,5 m (98 in)			2,0 m (79 in)			1,5 m (59 in)		
2,5 m (98 in)	474 (1,045)	302 (666)	274 (603)	- -	- -	- -	469 (1,034)	306 (674)	277 (611)	- -	- -	- -	- -	- -	- -
2,0 m (79 in)	468 (1,032)	231 (510)	207 (456)	- -	- -	- -	431 (950)	308 (678)	279 (615)	- -	- -	- -	- -	- -	- -
1,0 m (39 in)	435 (959)	182 (402)	161 (355)	491 (1,083)	218 (481)	194 (428)	591 (1,303)	291 (641)	262 (577)	781 (1,722)	410 (903)	374 (824)	- -	- -	- -
0,0 m (0.0 in)	404 (891)	179 (394)	157 (346)	493 (1,087)	208 (459)	184 (405)	653 (1,440)	271 (598)	242 (534)	916 (2,020)	376 (828)	339 (747)	- -	- -	- -
-1,0 m (-39 in)	384 (847)	221 (487)	195 (431)	- -	- -	- -	511 (1,127)	269 (593)	239 (528)	705 (1,555)	375 (827)	338 (746)	1034 (2,280)	602 (1,328)	555 (1,224)
-1,5 m (-59 in)	386 (851)	293 (646)	262 (579)	- -	- -	- -	- -	- -	- -	540 (1,191)	383 (845)	346 (764)	811 (1,788)	614 (1,353)	567 (1,250)

Illustration 37 g03385048
Short Stick

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A / B	max			3,0 m (9'-10")			2,5 m (98 in)			2,0 m (79 in)			1,5 m (59 in)		
2,5 m (98 in)	434 (957)	264 (582)	238 (524)	- -	- -	- -	375 (827)	310 (684)	282 (621)	- -	- -	- -	- -	- -	- -
2,0 m (79 in)	431 (950)	209 (462)	186 (411)	423 (933)	226 (498)	202 (446)	362 (798)	310 (683)	281 (620)	- -	- -	- -	- -	- -	- -
1,0 m (39 in)	405 (893)	168 (371)	148 (326)	471 (1,039)	218 (481)	194 (428)	549 (1,211)	291 (643)	263 (579)	686 (1,513)	414 (913)	378 (834)	- -	- -	- -
0,0 m (0.0 in)	380 (838)	165 (363)	144 (317)	497 (1,096)	206 (454)	182 (400)	655 (1,444)	269 (594)	240 (529)	929 (2,048)	373 (823)	336 (742)	- -	- -	- -
-1,0 m (-39 in)	364 (803)	198 (437)	174 (384)	385 (849)	204 (449)	179 (395)	540 (1,191)	264 (581)	234 (517)	745 (1,643)	368 (812)	331 (731)	1119 (2,467)	591 (1,304)	543 (1,198)
-1,5 m (-59 in)	365 (805)	251 (553)	223 (491)	- -	- -	- -	413 (911)	269 (593)	240 (529)	596 (1,314)	375 (826)	338 (745)	903 (1,991)	602 (1,327)	554 (1,222)

Illustration 38 g03385049

Long Stick

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Additional Counterweight

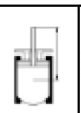
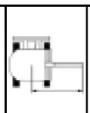
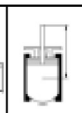
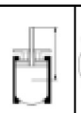
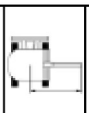
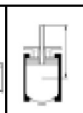
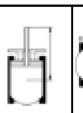
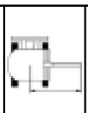
A / B				3,0 m (9'-10")			2,5 m (98 in)			2,0 m (79 in)			1,5 m (59 in)		
																
																
2,5 m (98 in)	474 (1,045)	326 (719)	299 (659)	- -	- -	- -	469 (1,034)	330 (728)	303 (668)	- -	- -	- -	- -	- -	- -
2,0 m (79 in)	468 (1,032)	251 (553)	228 (502)	- -	- -	- -	431 (950)	332 (732)	305 (672)	- -	- -	- -	- -	- -	- -
1,0 m (39 in)	435 (959)	199 (440)	179 (394)	491 (1,083)	238 (524)	215 (473)	591 (1,303)	315 (694)	287 (633)	781 (1,722)	442 (975)	408 (901)	- -	- -	- -
0,0 m (0.0 in)	404 (891)	196 (432)	175 (386)	493 (1,087)	227 (501)	204 (450)	653 (1,440)	296 (652)	268 (590)	916 (2,020)	408 (901)	374 (824)	- -	- -	- -
-1,0 m (-39 in)	384 (847)	241 (532)	217 (478)	- -	- -	- -	511 (1,127)	293 (646)	266 (584)	705 (1,555)	408 (899)	373 (822)	1034 (2,280)	653 (1,439)	609 (1,343)
-1,5 m (-59 in)	386 (851)	318 (702)	289 (638)	- -	- -	- -	- -	- -	- -	540 (1,191)	416 (917)	381 (841)	811 (1,788)	664 (1,465)	621 (1,370)

Illustration 39 g03385051
Short Stick with Additional Counterweight

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A / B	max			3,0 m (9'-10")			2,5 m (98 in)			2,0 m (79 in)			1,5 m (59 in)		
2,5 m (98 in)	434 (957)	285 (629)	260 (574)	- -	- -	- -	375 (827)	334 (737)	307 (677)	- -	- -	- -	- -	- -	- -
2,0 m (79 in)	431 (950)	228 (502)	206 (453)	423 (933)	245 (541)	222 (490)	362 (798)	334 (737)	307 (677)	- -	- -	- -	- -	- -	- -
1,0 m (39 in)	405 (893)	184 (406)	165 (363)	471 (1,039)	237 (523)	214 (472)	349 (1,211)	316 (696)	288 (636)	686 (1,513)	447 (985)	413 (911)	- -	- -	- -
0,0 m (0.0 in)	380 (838)	181 (398)	161 (354)	497 (1,096)	225 (496)	202 (445)	655 (1,444)	293 (647)	265 (585)	929 (2,048)	406 (895)	371 (818)	- -	- -	- -
-1,0 m (-39 in)	364 (803)	217 (478)	194 (428)	385 (849)	223 (491)	200 (440)	540 (1,191)	288 (635)	260 (573)	745 (1,643)	401 (885)	366 (808)	1119 (2,467)	642 (1,415)	598 (1,318)
-1,5 m (-59 in)	365 (805)	273 (603)	247 (544)	- -	- -	- -	413 (911)	293 (647)	265 (585)	596 (1,314)	408 (899)	373 (822)	903 (1,991)	652 (1,438)	609 (1,342)

Illustration 40 g03385052

Long Stick with Additional Counterweight

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Identification Information

i08435992

Plate Locations and Film Locations

SMCS Code: 1000; 7000

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.

If equipped, this plate is positioned on the right side of the frame.

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

The engine serial number is located on the engine.

Engine Serial Number _____

Product Identification Number (PIN) and CE Plate

This plate is positioned on the front of the machine, close to the operator compartment.

- Model _____
- PIN _____

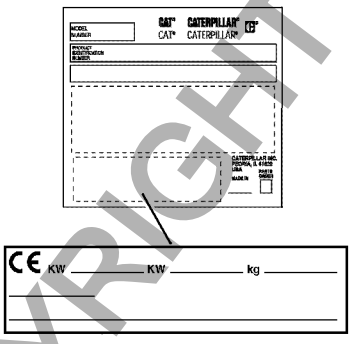

Illustration 41 g01883459

Note: This plate is on machines that are going into the European Union.

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

If the machine is equipped with the plate for the European Union, this plate will be attached to the PIN plate. Several pieces of information are stamped onto the “CE” plate.

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

- Primary Engine Power (kW) _____
- Additional Engine Power (kW) _____
- Typical Machine Weight (kg) _____
- Year of Construction _____
- Machine Type _____

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

Certification

Sound Certification

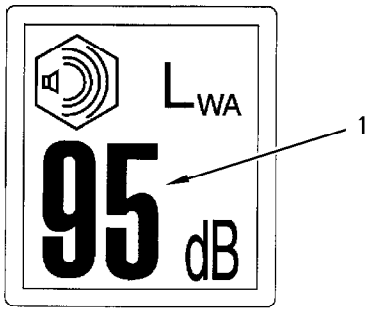

Illustration 42 g00919897

A typical example of this label is shown. Your machinery may have a different value.

If equipped, the certification label is used to verify the requirements of environmental sound of the European Union. The value (1) that is listed on the label indicates the guaranteed exterior sound power level L_{WA} at the time of manufacture for the conditions that are specified in “2000/14/EC”.

i08085827

Emissions Certification Film

SMCS Code: 1000; 7000; 7405

Consult your Cat dealer for an Emission Control Warranty Statement.

The emission certification film is on the engine.

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Declaration of Conformity

SMCS Code: 1000; 7000

S/N: LJD1–Up

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Table 7

An EC or EU 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 or EU Declaration of Conformity provided with the machine. The extract shown below from an EC or EU 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.

Original EC or EU DECLARATION OF CONFORMITY

Manufacturer: Wacker Neuson Linz GmbH, Flughafenstrasse 7, A-4063 Hörsching

Product

Description:	Generic Denomination:	Earth-moving Equipment	
	Machine Designation	Hydraulic Excavator	
	Model/Type:	301.7DCR	
	Serial Number:		
	Output (kW):	13.8 kW	for engine 3TNV76-SNSE12
		13.4 kW	for engine 3TNV80F-SSNS1
	Measured sound power level:	93.3 dB (A)	
	Guaranteed sound power level:	93 dB (A)	

Declaration of conformity

Notified body according to Directive 2006/42/EC, appendix XI:

DGUV Test-, Prüf- und Zertifizierungsstelle

Fachbereich Bauwesen, Landsberger Str. 309, 80687 Munich, Germany

Distinguishing EU number 0515

For 2000/14/EG notified body involved in procedure

TÜV SÜD Industrie Service GmbH
Westendstr. 199
D-80686 Munich

Directives and standards

We hereby declare that this product corresponds to the relevant regulations and requirements of the following Directives and standards:

2006/42/EG, 2005/88/EG, 2000/14/EG, 2014/30/EU, 2017/53/EU (if telematics option is installed) Appendix VIII;

DIN EN ISO 12100:2010, DIN EN 474-1:2006+A1:2009, DIN EN 474-6:2010 (except 5.2.3 AND 5.2.5), DIN EN ISO 3471:2010

Signature

Date: **Name/Position**

Note: The above information was correct as of **June 2013**, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

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Work Tool Declaration of Conformity

Table 8

An EC or EU 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 or EU Declaration of Conformity provided with the machine. The extract shown below from an EC or EU 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.

Original EC or EU DECLARATION OF CONFORMITY

Manufacturer: Caterpillar Inc., 100 N.E. Adams Street, Peoria, Illinois 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, 38000 Grenoble, France

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

Description:	Generic Denomination:	Earth-moving Equipment
	Function:	Hydraulic Bucket
	Model/Type:	Hydraulic Ditch Cleaning Bucket
	Serial Number:	
	Commercial Name:	Caterpillar

Fulfills all the relevant provisions of the following Directives

Directives	Notified Body	[CTE_CURSOR]Document No.	
2000/14/EC amended by 2005/88/EC, Note (1)			
2006/42/EC	N/A		
2004/108/EC	N/A		
2014/30/EU	N/A		

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

Done at: **Signature**

Date: **Name/Position**

Note: The above information was correct as of **December 2009**, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

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Operation Section

Before Operation

i05333496

Mounting and Dismounting

SMCS Code: 6700; 7000

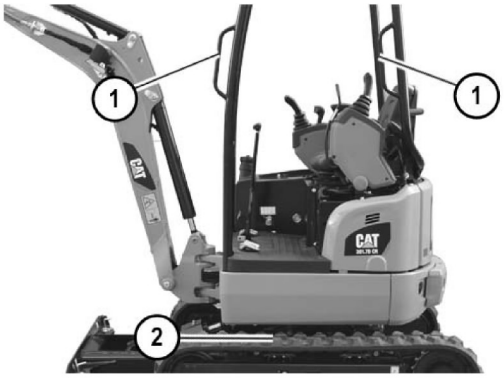

Illustration 43 g03378588

Use handholds whenever you mount the machine. Use handholds whenever you dismount the machine. Before you mount the machine, clean the handholds. Inspect the 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 ground, track (2) and with the handholds (1).

Note: Do not use any of the operator/control levers as a handhold.

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. Do not use any controls as handholds when you mount or dismount the machine.

Machine Access System Specifications

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

i04555675

Daily Inspection

SMCS Code: 1000; 6319; 6700; 7000

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.

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

Inspect the hydraulic system for leaks. Inspect the hydraulic cylinders and inspect the cylinder rods and seals for damage or for excessive wear. Inspect the linkage and the work tool for damage or for excessive wear. Inspect the linkage for any missing or deformed pins. Make any necessary repairs.

Inspect the following additional components:

- the hydraulic tank
- the hoses
- the tubes
- the plugs
- the connecting joints
- the hydraulic fittings

Correct any leaks in the hydraulic system.

Inspect the final drives for leaks. Make any necessary repairs. Check the oil level if you see leakage.

Inspect the tracks for deep cracks, or steel cords that are cut.

Inspect the lights for broken bulbs and for broken lenses. Replace any broken components.

Inspect the films in the machine. Make sure that the films are legible.

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Inspect the engine compartment for any trash buildup. Remove any trash buildup from the engine compartment.

Inspect the cooling system for any leaks, for faulty hoses, and for any trash buildup. Correct any leaks, and remove any trash from the radiator.

Inspect the fuel system for any leaks, or faulty hoses. Check the fuel level and refill the tank if necessary.

Inspect all of the belts for the engine attachments. Replace any belts that are worn, frayed, or broken.

Inspect the air filter housing for cracks, loose clamps, or broken tubing. Squeeze the outlet tube slightly into a container in order to purge the dirt from the outlet tube.

Inspect the exhaust system for loose connections or loose clamps.

Make sure that all covers and guards are securely attached. Inspect the covers and the guards for damage.

Inspect the handholds. Clean the handholds. Make any necessary repairs.

Inspect the polycarbonate shield (if equipped) for damage. Tighten any loose bolts on the ROPS and other guards, that might be attached to the ROPS. If repairs are needed, consult your Cat dealer.

Inspect the operator station for trash buildup. Check for trash buildup under the floor mat. Keep these areas clean.

Inspect the foot pedals for proper operation. Remove any dirt buildup in and around the foot pedals. Replace any missing hardware.

Make sure that the Operation and Maintenance Manual is located in the operator station and in good condition.

Inspect the operator station for the following conditions:

- Broken lenses on the gauges
- Broken indicator lights
- Broken switches
- Other broken components

Adjust the rearview mirrors (if equipped) for the best operator vision. Check the mounting bolts for tightness and get broken mirrors replaced immediately.

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Machine Operation

i05333888

Alternate Exit

SMCS Code: 7310

⚠ WARNING

Warning of personal injury.

Use the front or rear window opening as an exit only in an emergency!

The machine does not have footholds or handles at the alternate exit.

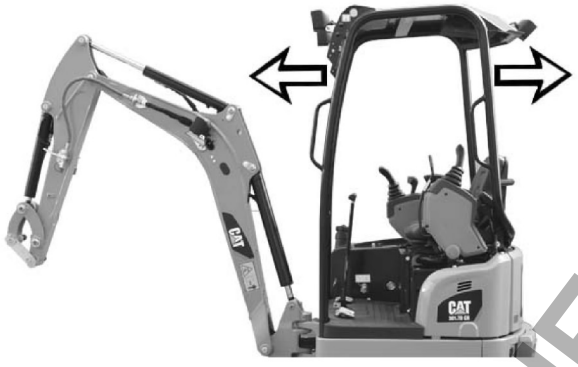

Illustration 44 g03392071

Alternate Exit – The front window opening serves an alternative exit. If the machine is equipped with a polycarbonate shield , the rear window opening serves as an alternate exit.

i05333952

Seat

SMCS Code: 5258-025; 7312-025; 7324; 7327

Note: Check for correct seat adjustment at the beginning of each work period.

Do not adjust the seat while you are operating the machine. Always ensure that the seat has locked into position after any adjustments are made.

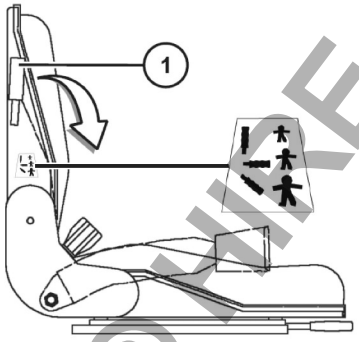

Illustration 45 g03379031

To adjust the seat suspension to a higher weight, turn lever (1) downward. To adjust the seat suspension to a lower weight, turn lever (1) upwards.

Note: Adjust the seat suspension correctly to ensure a high level of ride comfort. Use the lever to adjust the seat suspension. Weight adjustment: 50-120 kg (110-265 lb).

Note: Adjust the weight only if not seated.

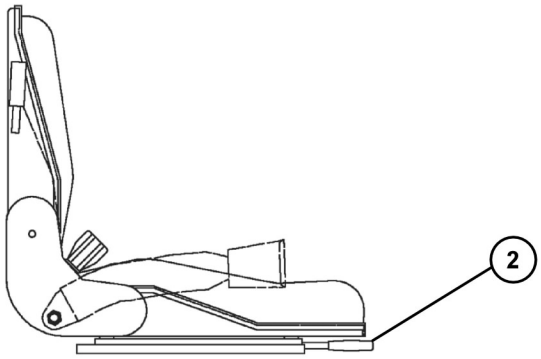

Illustration 46 g03379034

Pull the fore/aft lever (2) upwards. Hold the lever and slide the seat forward or backward to the desired position. Release the lever and slide the seat forward or backward in order to lock the seat into position.

The seat should be adjusted so that full travel of the controls and pedals is allowed. Adjusting the seat should only be done while the operator is seated against the back of the seat.

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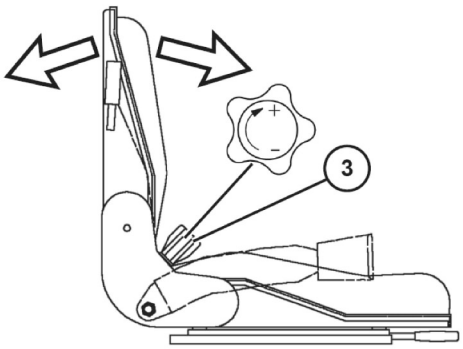

Illustration 47 g03379035

Turn rotary knob (3) in the required direction in order to adjust the seat back tilt. Turn the knob clockwise to adjust the seat back tilt towards the rear. Turn the knob counterclockwise to adjust the seat back tilt towards the front.

i04415316

Seat Belt

SMCS Code: 7327

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

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

Seat Belt Adjustment for Retractable Seat Belts

Fastening The Seat Belt

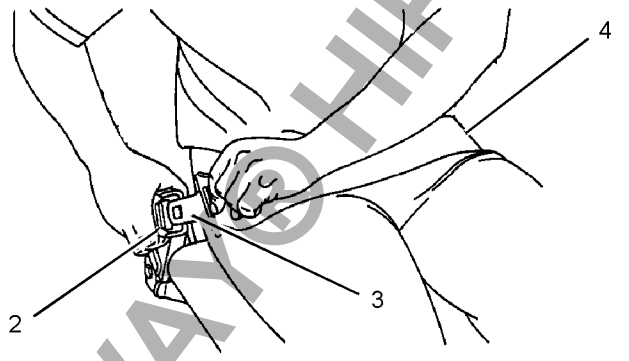

Illustration 48 g02475770

⚠ 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.

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

Fasten the seat belt catch (3) into buckle (2), until the seat belt clicks with an audible click. 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.

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Releasing The Seat Belt

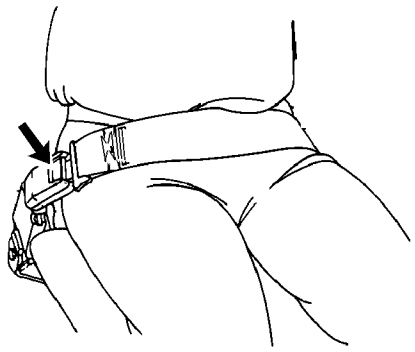

Illustration 49 g02475772

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

i07511740

Operator Controls

SMCS Code: 7300; 7301; 7451

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

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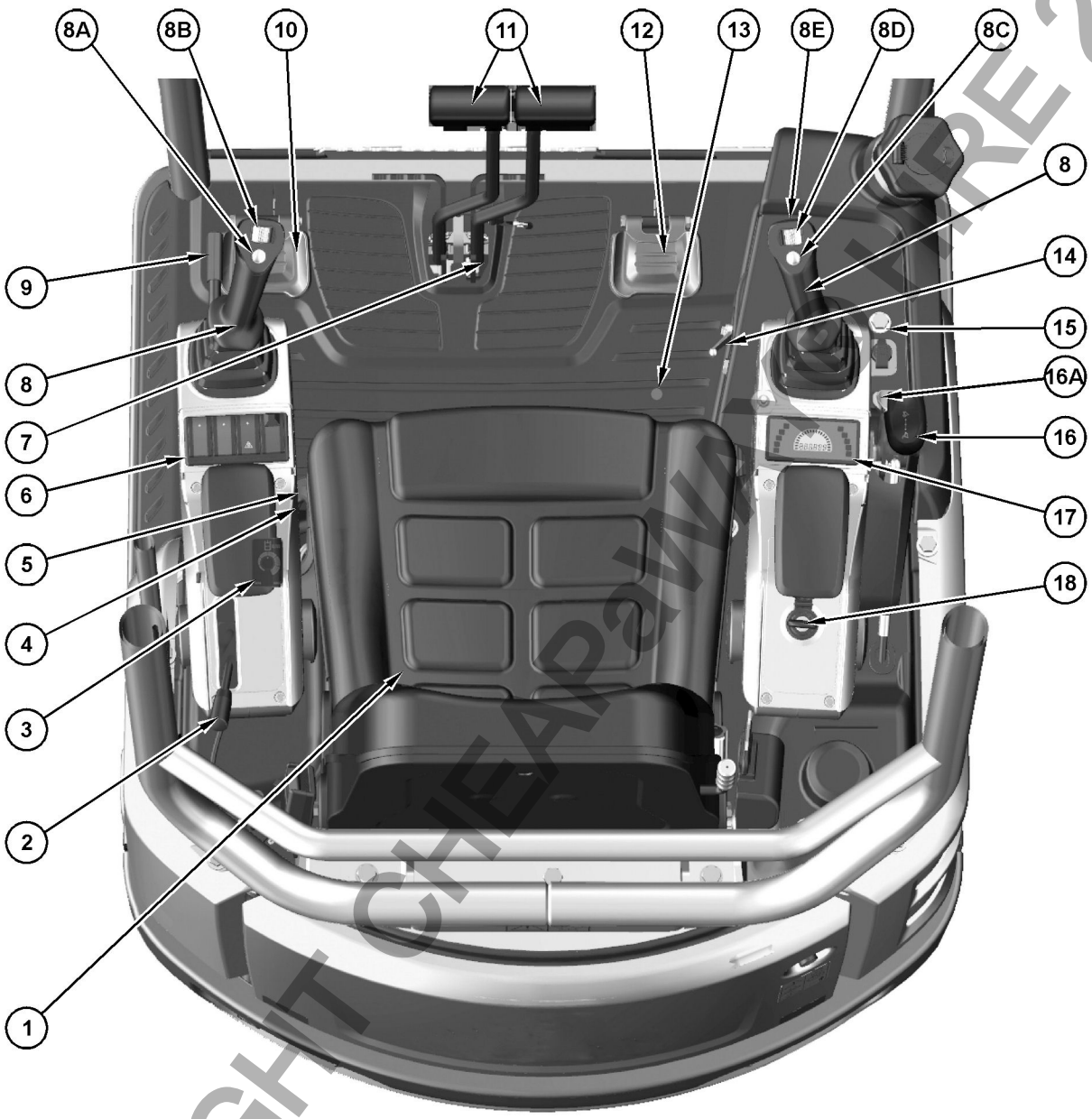

Illustration 50 g06344501

(1) Seat
(2) Governor Control Lever
(3) Auxiliary (AUX II/III) Potentiometer
(4) Pattern Changer
(5) Adjustable Undercarriage Control and Dozer Blade Control Selection Lever
(6) Left Switch Panel
(7) Swing Lock Pin
(8) Joystick Controls
(8A) Not Used
(8B) Auxiliary (AUX II/III) Switch
(8C) Horn
(8D) Auxiliary (AUX I) Switch
(8E) Hammer Switch
(9) Hydraulic Lockout Control
(10) Boom Swing Control Pedal
(11) Travel Control
(12) Auxiliary Control Pedal
(13) Quick Coupler Ready Activation Switch
(14) Work Tool Control Lever
(15) Power Outlet 12V
(16) Dozer Blade Lever
(16A) Travel Speed Control
(17) Monitoring System
(18) Engine Start Switch

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Operators Seat (1)

The operators seat has various adjustments to meet a wide range of operators. For more information, refer to Operation and Maintenance Manual, “Seat”.

Governor Control Lever (2)

After machine starting and machine warm-up, select the desired engine speed with the governor control lever.

Illustration 51 g03381500

Low engine idle (A) – The engine operates in the low rpm range.

High engine idle (B) – The engine operates in the high rpm range.

Auxiliary (AUX II/III) Potentiometer (3)

If equipped, the position of potentiometer (3) determines which flow rate AUX II/III delivers.

When potentiometer (3) is rotated to the left (MIN), AUX II/III delivers the minimum flow. When potentiometer (3) is rotated to the right (MAX), AUX II/III delivers the maximum flow.

Alternate Joystick Pattern Changer (4)

This machine may be equipped with a joystick control selector. The alternate position allows the operator to change the functions of the joysticks. For more information refer to Operation and Maintenance Manual, “Joystick Controls Alternate Patterns”.

Adjustable Undercarriage Control and Dozer Blade Control Selection Lever (5)

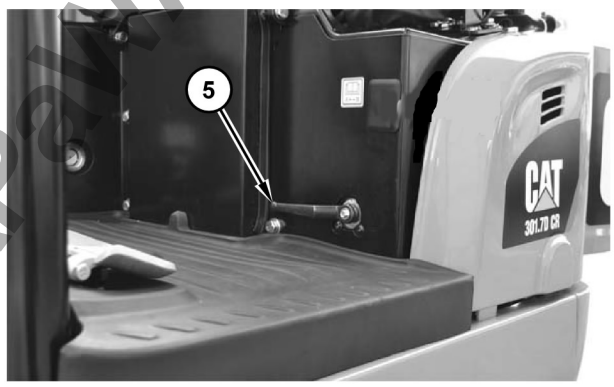

Illustration 52 g03392103

If equipped, the position of lever (5) determines which function lever (16) controls.

Note: Before operating the dozer blade control, refer to “Dozer Blade Lever (16)”.

When lever (5) is rotated to the horizontal position, lever (16) will control the adjustable undercarriage functions.

When lever (5) is rotated to the vertical position, lever (16) will control the dozer blade functions.

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Note: Before operating the adjustable undercarriage control, refer to this Operation and Maintenance Manual, “Adjustable Gauge Undercarriage Frame”.

Left Switch panel (6)

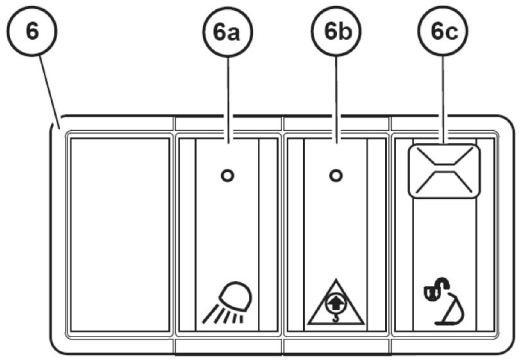

Illustration 53 g03382049

Work Light Switch (6a)

The switch for the work lights is on the left side console. The light switch has two positions.

Lights – Press the top of the switch to turn on the work lights. Press the bottom of the switch to turn off the work lights.

Overload Warning (If Equipped) (6b)

If equipped, the switch for the overload warning device is on the left switch panel.

⚠ WARNING

In lifting applications, always activate the overload warning device.

Ignoring the overload warning device alert can lead to the machine losing stability and tipping over, which could result in personal injury or death. Contact your Cat dealer if the overload warning device is not adjusted correctly.

Overload Warning Device – The overload warning device activates a buzzer and the overload alert indicator illuminates when there is an unstable load condition. When the buzzer sounds/the alert indicator illuminates, reduce the bucket load or move the stick inward.

For more information on the overload alert indicator refer to Operation and Maintenance Manual, “Monitoring System”.

⚠ CAUTION

The hose burst valve feature is activated as soon as a hose or a pipe burst.

Have damage to the hydraulic system and to the hose burst valves immediately repaired by a Cat dealer.

NOTICE
The hose burst valve feature avoids the boom/arm from being lowered without being braked, in the event of a hose or pipe bursting.

Quick Coupler Ready Activation Switch (6c)

The switch for the Quick Coupler Ready Activation is on the left side console. The switch has two positions.

Move the switch lock backwards and press the top of the switch to activate the Quick Coupler Ready system. Press the bottom of the switch to deactivate the Quick Coupler Ready system.

Swing Lock Pin Control (7)

⚠ WARNING

Visually check to ensure the swing lock pin has properly engaged the swing lock pin block to the lower structure, especially before lifting or transporting the machine.

If the pin is not properly engaged, the upper structure can swing and can result in personal injury.

NOTICE
Engage the pin only when the upper structure is aligned with the lower carriage structure.

Do not attempt to engage the pin when the upper structure is rotating. Machine damage can result.

Do not attempt to swing the upper structure when the pin is locked. Damage to the machine can result.

The swing lock pin control is located next to the travel control levers.

Pin Engaged – Align the upper structure so that the swing lock block is above the slot. Turn the lever and lower the lever. The upper structure will not swing when the lever is down. Always engage the swing lock pin before traveling with the machine or shipping the machine.

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Pin Disengaged – The upper structure can swing when the lever is up and when the lever is in the detent.

Joystick Controls (8)

The joystick controls are used to control the functions of the work tools. For more information on the individual functions of the joysticks, refer to Operation and Maintenance Manual, “Joystick Controls”.

Auxiliary (AUX II/III) Switch (8B), Auxiliary (AUX I) Switch (8D), and Hammer Switch (8E)

These switches are used to control the functions of the various work tools. For more information on the individual functions, refer to Operation and Maintenance Manual, “Work Tool Control”.

Horn (8C)

Horn (8C) – The horn button is on the right side joystick. Depress the horn button to sound the horn. Use the horn before starting the engine, or for alerting or signaling personnel.

Hydraulic Lockout Control (9)

⚠ WARNING

Deactivation of the hydraulic controls does not prevent the blade, boom swing, or auxiliary circuit functions from moving under gravity or other external forces. Gravity or other external forces can move the blade, boom swing, or auxiliary circuit functions suddenly if a hydraulic control lever is moved.

Personal injury or death may occur from sudden machine movement.

Locked – Place the hydraulic lockout control in the RAISED position to deactivate the hydraulic controls.

Make sure that the hydraulic lockout control is in the RAISED position before you exit the machine.

Note: Always put the left hydraulic lockout control in the RAISED position before starting the engine. The engine start switch will not function if the left hydraulic control is in the LOWERED position.

Unlocked – Place the hydraulic lockout control in the LOWERED position. When the hydraulic lockout control is in the LOWERED position, the hydraulic controls are operable.

Boom Swing Control Pedal (10)

⚠ WARNING

Unexpected operation of the boom swing control can cause injury or death.

A RAISED hydraulic lockout control does not mean that the boom swing function is locked out.

To prevent unexpected activation of the boom swing control while traveling or whenever the boom swing control is not being used, make sure the foot is not place on or near the boom swing control pedal.

The boom swing pedal is used to swing the boom to the right or to the left. The boom swing pedal is on the floor on the left side.

Swing Left – Push down on the left half of the boom swing pedal to swing the boom to the left.

Swing Right – Push down on the right half of the boom swing pedal to swing the boom to the right.

Note: Operate the boom swing control pedal carefully until you become familiar with how boom swing reacts to the controls.

Travel Controls (11)

Note: Normal steering occurs when the operator station is facing the blade. The travel lever information given below is for when the blade is in front of the operator station. Reverse steering occurs when the blade is behind the operator station. The directional functions and the steering will be reversed.

When you travel, make sure that the blade is in front of the operator station.

When the travel levers are moved in the forward direction, the machine will always travel toward the blade. When the travel levers are moved in the reverse direction, the machine will always travel away from the blade.

If you move a travel lever farther in the forward direction, the forward travel speed will increase. If you move a travel lever farther in a backward direction, the reverse travel speed will increase.

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Move both of the travel levers equally in the same direction to travel in a straight line.

Note: In steep downhill operation, carefully operate the travel levers.

Right Travel Lever

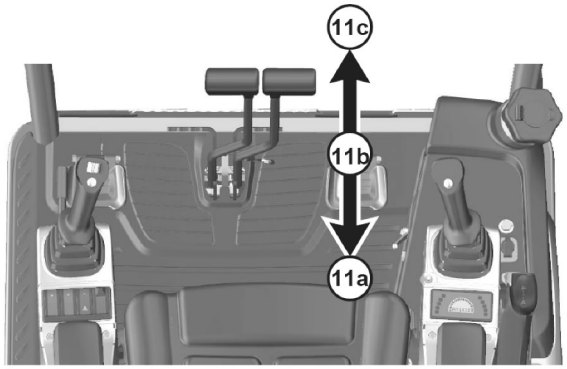

Illustration 54 g03382054

REVERSE (11a) – Move the right travel lever backward to operate the right track in a reverse direction.

STOP (11b) – Release the right travel lever to stop the right track.

FORWARD (11c) – Move the right travel lever forward to operate the right track in a forward direction.

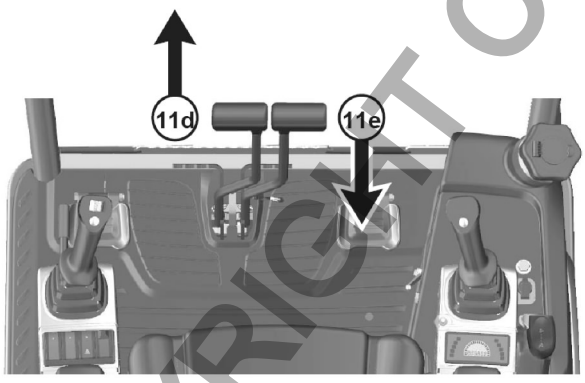

Illustration 55 g03382055

Spot Right Turn – Move the right travel lever (11e) backward. Move the left travel lever (11d) forward at the same time. This method will turn the machine quickly to the right.

Pivot Right Turn – Move the left travel lever (11e) forward. This method will turn the machine to the right.

Left Travel Lever

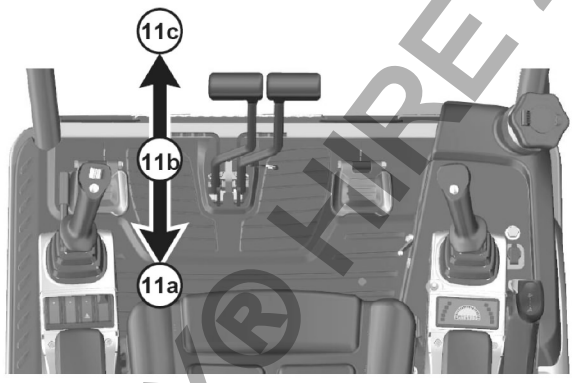

Illustration 56 g03382056

REVERSE (11a) – Move the left travel lever backward to operate the left track in a reverse direction.

STOP (11b) – Release the left travel lever to stop the left track.

FORWARD (11c) – Move the left travel lever forward to operate the left track in a forward direction.

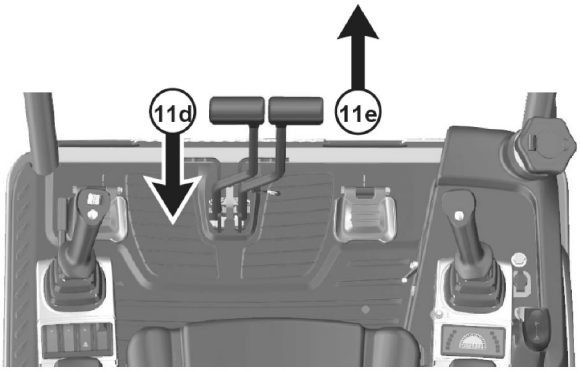

Illustration 57 g03382058

Spot Left Turn – Move the left travel lever (11d) backward. Move the right travel lever (e) forward at the same time. This method will turn the machine quickly to the left.

Pivot Left Turn – Move the right travel lever (11e) forward. This method will turn the machine to the left.

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Auxiliary Control Pedal (12)

The auxiliary control pedal is used to control the work tools. For more information on the auxiliary controls, refer to Operation and Maintenance Manual, “Work Tool Control”.

Quick Coupler Ready Activation Switch (13)

The Quick Coupler Ready Activation Switch is used to operate the quick coupler ready system. For more information on the individual functions, refer to Operation and Maintenance Manual, “Quick Coupler Operation (Quick Coupler Ready System)”.

Work Tool Control Lever (14)

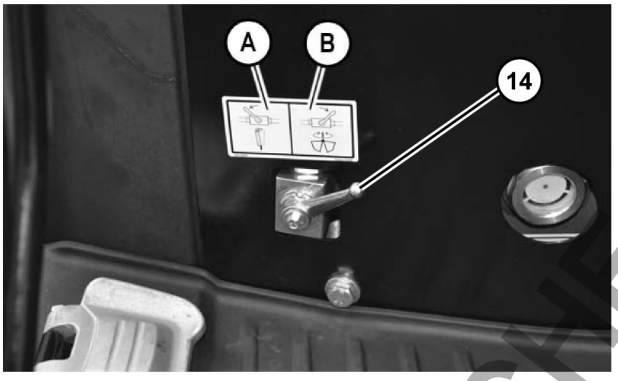

Illustration 58 g03382648

The auxiliary control pedal has different functions in one-way flow and in two-way flow. One-way flow is used when you operate work tools such as hammers. Two-way flow is used when you operate work tools such as grapples. Refer to Operation and Maintenance Manual, “Work Tool Control” for more information.

One-Way Flow (A) – Move lever (14) to this position when one-way flow is required.

Two-Way Flow (B) – Move lever (14) to this position when two-way flow is required.

Power Outlet (15)

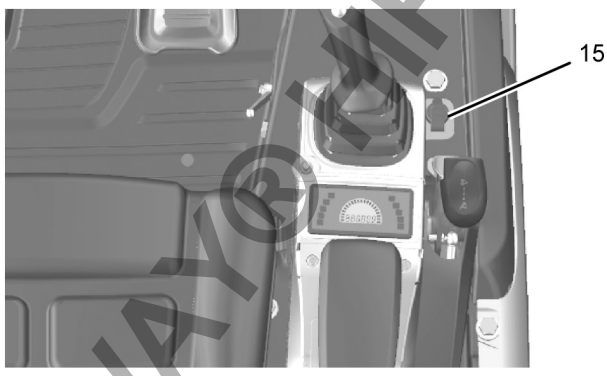

Illustration 59 g03383190

A 12V power receptacle is located next to the right side console/joystick. This power receptacle can be used for powering automotive electrical equipment or accessories. Raise the cap before use.

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Note: This receptacle can also be used for the service light.

Beacon (If Equipped) (15A)

Illustration 60 g03392124

Insert the connector for the beacon into power outlet (15) to provide power for the beacon.

Dozer Blade Lever (16)

Illustration 61 g06344506

Lower – Push lever (16) forward to lower the blade. The lever will return to the HOLD position when you release the lever. The blade will remain in the selected position.

Hold – Lever (16) will return to the HOLD position when the lever is released from the RAISED or LOWERED position.

Raise – Pull lever (16) backward to raise the blade. The lever will return to the HOLD position when you release the lever. The blade will remain in the selected position.

Travel Speed Control (16A)

Illustration 62 g06344507

The high-speed travel switch is on the blade control lever. Use the switch to change the travel speed.

Move the switch to the high-speed position to make the machine travel in high speed. The indicator light on the instrument panel is active when the machine is in the high-speed mode.

Move the switch to the low speed position to return to low speed.

Always travel at slow speeds on slopes and rough ground.

Monitoring System (17)

The machine alert indicators are located in the monitoring panel.

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

Engine Start Switch (18)

Note: Always place the hydraulic lockout lever in the RAISED position when you are starting the engine. The engine start switch will not function if the left hydraulic control is in the LOWERED position.

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.

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

ON – Turn the engine start switch key to the ON position to energize all the electrical circuits. The fuel pump is on and the indicator lights illuminate. The engine start switch returns to this position once the engine has been started.

GLOW PLUGS – Turn the engine start switch key to the GLOW PLUGS position to activate the glow plugs.

Note: Leave the engine start switch key in the GLOW PLUGS position for 20 seconds to heat the glow plugs. Attempt to start the engine.

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

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

i07509774

Battery Disconnect Switch

SMCS Code: 1411-B11

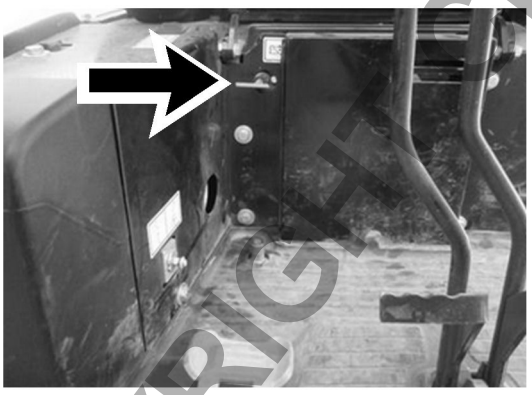

Illustration 63 g06343720

The battery disconnect switch is located below the operator seat on the right side.

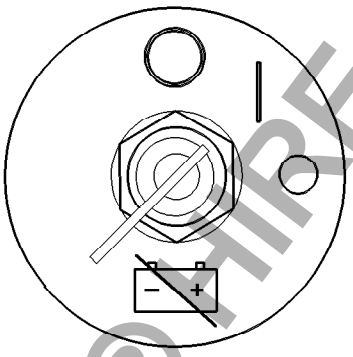

Illustration 64 g00406959

Battery disconnect switch

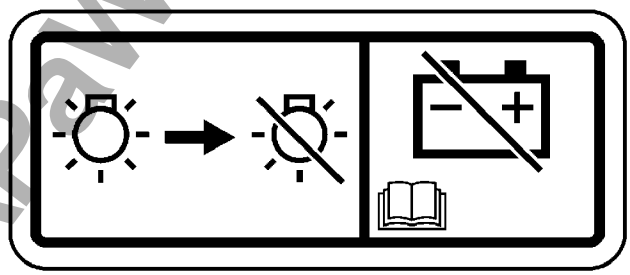

Illustration 65 g03422337

Wait to disconnect lamp film

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

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

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

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The battery disconnect switch and the engine start switch perform different functions. The entire electrical system is disabled when you turn the battery disconnect switch to the OFF position. The battery remains connected to the electrical system when you turn the engine start switch to the OFF position.

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

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

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

Perform the following procedure to check the battery disconnect switch for proper operation:

1. With the battery disconnect switch in the ON position, verify that the following components are functioning:
   - Electrical components in the operator compartment
   - Hour meter is displaying information
   - Engine will crank
2. Turn the battery disconnect switch to the OFF position.
3. Verify that the following items are not functioning:
   - Electrical components in the operator compartment,
   - Hour meter
   - Engine cranking

   If any of these items continue to function with the battery disconnect switch in the OFF position, consult your Caterpillar dealer.

i07549047

Monitoring System

SMCS Code: 7451; 7490

The monitoring system alerts the operator of a problem or of an impending problem. The monitoring panel is designed to alert the operator of faulty machine systems. When powering on the panel, there will be an LED test for the first 2 seconds (all LEDs on). During this period, the panel will display the actual service counter value. The panel will switch automatically to the hour meter display.

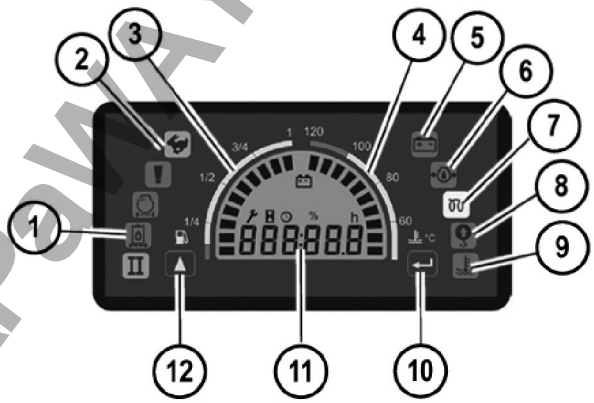

Illustration 66 g02724534

Alert Indicators

(1) Hydraulic Oil Filter Back Pressure – Indicator (1) will illuminate when the back pressure in the hydraulic oil filter is too high. In this case, the filter element needs to be replaced.

Note: The indicator light can come on briefly if the hydraulic oil is cold, but goes out once operating temperature is reached.

(2) High-Speed Travel – If the travel speed switch is moved to the high-speed position, the high-speed travel indicator illuminates.

(3) Fuel System – The displayed segments indicate the current fuel level. If the segments reach the red area, the fuel level is too low to continue machine operation.

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(4) Engine Coolant Temperature – With the help of the displayed segments, the current cooling temperature can be read. Under normal working conditions, only the first segment of the engine coolant temperature will flash. If the engine coolant reaches a temperature above 110° C (230° F), then the segments will go into the red area. If the segments reach the red area, stop the engine immediately and check the coolant level. Let the engine cool down before you start the engine again.

(5) Battery Charging – Indicator (5) will illuminate when there is a malfunction in the electrical system. If this alert indicator comes on, the system voltage is too high, or too low, for normal machine operation.

Note: Indicator (5) also illuminates when the engine start switch key is turned to the RUN position. The indicator goes off after the engine is started.

When the electrical load is high and the engine speed is near idle, increase the engine speed to high idle. Increasing the engine speed to high idle will generate more output from the alternator. If the alert indicator for the electrical system turns off within 1 minute, the electrical system is probably operating in a normal manner. However, the electrical system may be overloaded during periods of low engine speeds. when an overload occurs at low engine speed, one, or both, of the following actions should be performed:

- Increase the engine speed.
- Turn off any auxiliary electrical equipment.
- Lower the heater fan or turn off the heater fan,

If the alert indicator does not turn off, consult your Caterpillar dealer.

(6) Engine Oil Pressure – If the alert indicator illuminates and the buzzer sounds, stop the engine immediately and check the engine oil level. If the engine oil level is at the correct level, consult your Cat dealer.

Note: Indicator (6) also illuminates when the engine start switch key is turned to the RUN position. The gauge goes off after the engine is started. In cold weather, indicator may remain on for more than 10 seconds after the engine is started.

(7) Glow Plug – The alert indicator will light when the engine start switch key is turned to the ON position. If the alert indicator does not turn off after 20 seconds, consult your Cat dealer.

(8) Overload Alert Indicator – When the overload warning device is switched on, the overload alert indicator illuminates and the buzzer sounds, when there is an unstable load condition.

For more information on the auxiliary controls, refer to Operation and Maintenance Manual, “Operator Controls - Overload Warning Device”.

(9) Engine Coolant Temperature – If the displayed segments (4) reach the red area, the engine coolant alert indicator comes on and the buzzer sounds. Stop the engine immediately and check the coolant level. Let the engine cool down before you start the engine again.

Service Hour Meter

(11) Service Hour Meter – This display indicates the total operating hours of the engine. It will run when LED 5 (Battery Charging) is off. Use the display to determine the service hour maintenance intervals. In normal operation the hour meter value is displayed. Push the left button (12) to show the service counter value on the LCD. Push the left button (12) again and the display will return to the hour meter value.

(11) Service Counter – The service counter will start at 500.0h. It counts down toward 0.0h. When the service counter reaches this value, a flat spanner symbol will start to flash. The counter will keep counting downwards (-0.1h, -0.2h, etc.).

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Reset the Service Counter (12)

When the service counter value is displayed, push the right button (10). The LCD will show up “COde” alternating with “- - - - -” . To increase the first code position, push the left button (12) until the desired number is displayed. When the right button is pushed, the first position is then confirmed. Repeat this procedure for the other digits until the default code “12345” is entered. When confirming the fifth position, the entered code is checked. If it is correct, the service counter will be reset to its default “500.0h” . If it is not correct, the service counter will not be reset and the LCD will display “FAUlt” . After 5 seconds, the service counter value will be shown again.

i05334546

Storage and Literature Compartment

SMCS Code: 7268

Illustration 67 g03379499

The compartment on the canopy ceiling is used in order to store the literature for the machine.

i04437891

Mirror
(If Equipped)

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.

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

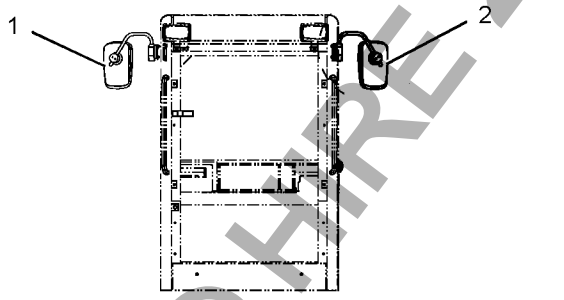

Illustration 68 g02626650

(1) Right Side Mirror
(2) Left Side Mirror

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

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”.

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

Mirror Adjustment

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Move the hydraulic lockout lever to the LOCKED position. For further details on this procedure, refer to Operation and Maintenance Manual, “Operator Controls”
- Stop the engine.
- Adjust rear view mirrors in order to provide visibility behind the machine at a maximum distance of 30 m (98 ft) from the rear corners of the machine.

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

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Right Side Rear View Mirror (1)

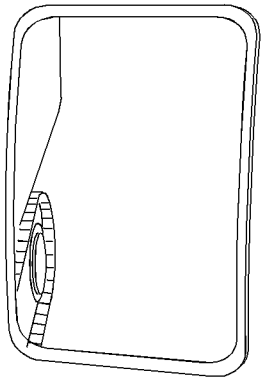

Illustration 69 g01624274

If equipped, adjust the right side rear view mirror (1) so that an area of at least 1 m (3.3 ft) from the side of the machine can be seen from the operator seat. Additionally, provide as much visibility to the rear as possible.

Left Side Rear View Mirror (2)

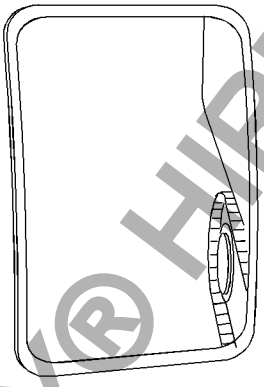

Illustration 70 g01592477

If equipped, adjust the left side rear view mirror (2) so that an area of at least 1 m (3.3 ft) from the side of the machine can be seen from the operator seat. Additionally, provide as much visibility to the rear as possible.

i05334640

Window (Front)

SMCS Code: 7310-FR

Polycarbonate Window (If Equipped)

⚠ WARNING

When installing or removing the polycarbonate shield, be extra careful to prevent any personal injury. Also, the hydraulic lockout control must be in the RAISED position to prevent any possibility of sudden movement of the machine due to inadvertent contact with the hydraulic controls.

Do not install/remove the polycarbonate shield until the following items have been done:

- Park the machine on a level surface.
- Lower the work tools and the blade to the ground.
- Cycle the joystick controls. Move the hydraulic lockout control to the RAISED position.
- Remove the engine start switch key.

Perform the following procedure in order to install the polycarbonate shield.

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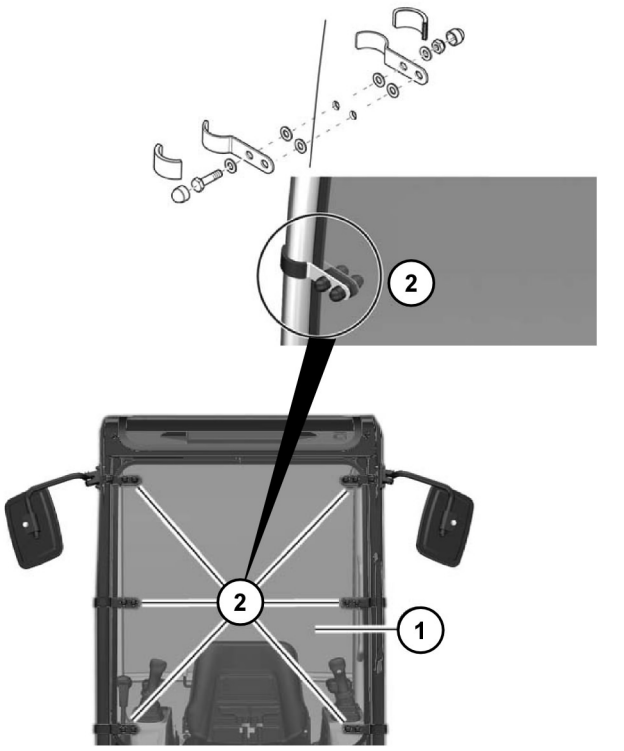

Illustration 71 g03400388

1. Put polycarbonate shield (1) with the help of another person into position.

2. Secure the polycarbonate shield with the six fasteners attached (2).

Perform the following procedure in order to remove the polycarbonate shield.

1. Remove six fasteners (2).

2. Remove polycarbonate shield (1) with the help of another person.

Note: Protect the polycarbonate shield from damage while in storage.

i05334689

Joystick Controls

SMCS Code: 5705

The machine control pattern is set at the factory to the SAE J1177 and ISO 10968 pattern for an excavator.

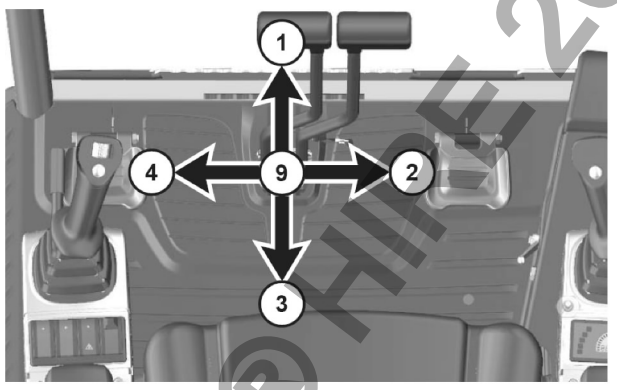

Illustration 72 g03379640

STICK OUT (1) – Move the left joystick to this position in order to move the stick outward.

Swing Right (2) – Move the left joystick to this position in order to swing the upper structure to the right.

STICK IN (3) – Move the left joystick to this position in order to move the stick inward.

Swing Left (4) – Move the left joystick to this position in order to swing the upper structure to the left.

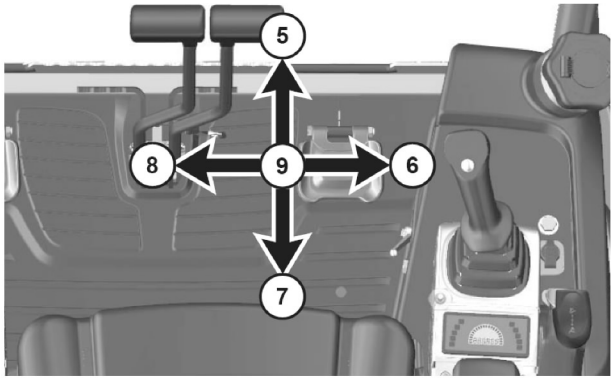

Illustration 73 g03379642

BOOM LOWER (5) – Move the right joystick to this position in order to lower the boom.

BUCKET DUMP (6) – Move the right joystick to this position in order to dump the bucket or the work tool.

BOOM RAISE (7) – Move the right joystick to this position in order to raise the boom.

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BUCKET CLOSE (8) – Move the right joystick to this position in order to close the bucket or the work tool.

HOLD (9) – When you release a joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

Two functions may be performed at the same time by moving the joysticks diagonally.

i07937299

Work Tool Control

SMCS Code: 6700

Auxiliary lines are equipped with coupler assemblies. Wipe all coupler assemblies before you connect the work tools. The auxiliary lines must be relieved of pressure to connect the coupler assemblies to the work tool. Relieve the pressure in the auxiliary hydraulic lines by performing the following steps:

1. Operate the machine to charge the accumulator.

2. Lower implements to the ground.

3. Turn off the engine and turn the key switch to the START position without starting the engine.

4. Ensure that the Hydraulic Lockout control is in the UNLOCKED position to provide function to the hydraulic circuits.

5. Actuate the auxiliary circuit in both directions several times.

Note: Pressure can build up in the auxiliary lines if the attachment is not coupled/uncoupled immediately after the pressure has been released.

Primary Auxiliary Hydraulic Circuit (AUX I)

⚠ WARNING

Unexpected operation of the auxiliary control circuit can cause injury or death.

A RAISED hydraulic lock lever does not mean that the auxiliary control function is locked out.

In order to prevent unexpected operation of the auxiliary control circuit, make sure that the foot is not placed on or near the work tool control pedal.

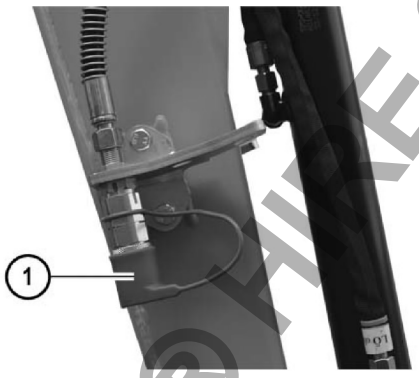

Illustration 74 g03382756

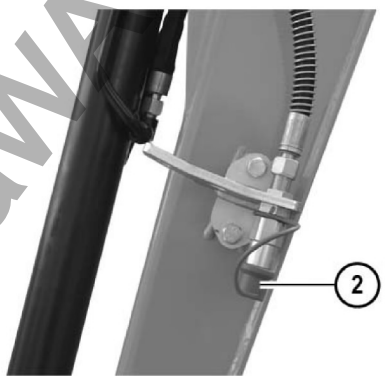

Illustration 75 g03382757

There are two primary auxiliary lines that are routed to the stick.

Line (1) is located on the right side of the stick and is an oil feed/return line. Line (2) is located on the left side of the stick and is an oil feed/return line.

The primary auxiliary lines can be equipped with coupler assemblies. Wipe all coupler assemblies before you connect the work tools.

The primary auxiliary lines must be relieved of pressure to connect the coupler assemblies to the work tool. Relieve the pressure in the primary auxiliary hydraulic lines by performing the following steps:

1. Turn the engine start switch key to the OFF position.

2. Move the control levers in all directions repeatedly.

3. Uncouple the attachment immediately after the pressure has been released.

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Note: Pressure can build up in the primary auxiliary lines if the attachment is not uncoupled immediately after the pressure has been released.

Coupler Assemblies AUX I (If Equipped)

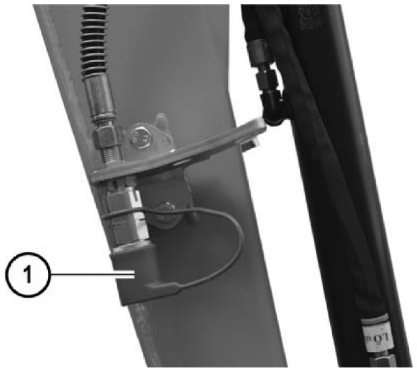

Illustration 76 g03382756

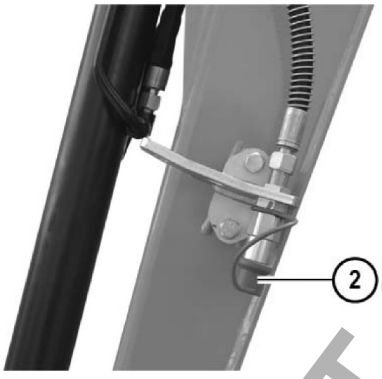

Illustration 77 g03382757

Wipe all coupler assemblies before you connect the work tools. The auxiliary lines must be relieved of pressure to connect the coupler assemblies to the work tool. Relieve the pressure in the auxiliary hydraulic lines by performing the following steps:

1. Turn the engine start switch key to the OFF position.
2. Move the control levers in all directions repeatedly. The pressure in the sections that have been actuated will be released.
3. Uncouple the attachment immediately after the pressure has been released.

Note: Pressure can build up in the auxiliary lines if the attachment is not uncoupled immediately after the pressure has been released.

Secondary Auxiliary Hydraulic Circuit (AUX II) (If Equipped)

⚠ WARNING

Unexpected operation of the secondary auxiliary control circuit can cause injury or death.

In order to prevent unexpected operation of the secondary auxiliary control circuit, make sure that the thumb is not placed on or near the switch on the left joystick.

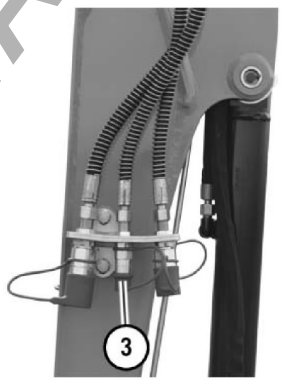

Illustration 78 g03382760

Illustration 79 g03382762

There are two secondary auxiliary lines that are routed to the stick.

Line (3) is located on the right side of the stick and is an oil feed/return line. Line (4) is located on the left side of the stick and is an oil feed/return line.

The secondary auxiliary lines are equipped with coupler assemblies. Wipe all coupler assemblies before you connect the work tools.

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The secondary auxiliary lines must be relieved of pressure to connect the coupler assemblies to the work tool. Relieve the pressure in the secondary auxiliary hydraulic lines by performing the following steps:

1. Turn the engine start switch key to the OFF position.
2. Move the control levers in all directions repeatedly.
3. Uncouple the attachment immediately after the pressure has been released.

Note: Pressure can build up in the secondary auxiliary lines if the attachment is not uncoupled immediately after the pressure has been released.

Powertilt Control Circuit (AUX III) (If Equipped)

WARNING

Danger of crushing due to the rotating movements of the Powertilt unit. The Powertilt unit extends the swivel radius of attachments.

Danger of severe crushing of body and of death!

Do not allow anyone to stay in the danger area!

WARNING

The Powertilt unit modifies the geometry of the machine.

Danger of severe injuries and of damage to the machine.

When working with the Powertilt unit and the work tool, ensure that they do not touch the boom or the operator station.

WARNING

Unexpected operation of the Powertilt control circuit can cause injury or death.

In order to prevent unexpected operation of the Powertilt control circuit, make sure that the thumb is not placed on or near the switch on the left joystick.

The Powertilt functions are operated with the switch on the left-hand joystick.

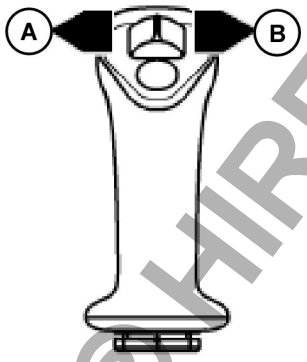

Illustration 80 g02736717

Move the switch on the joystick to position (A) to turn the Powertilt to the left.

Move the switch on the joystick to position (B) to turn the Powertilt to the right.

Auxiliary Bucket Cylinder Diverter Circuit (AUX V) (If Equipped)

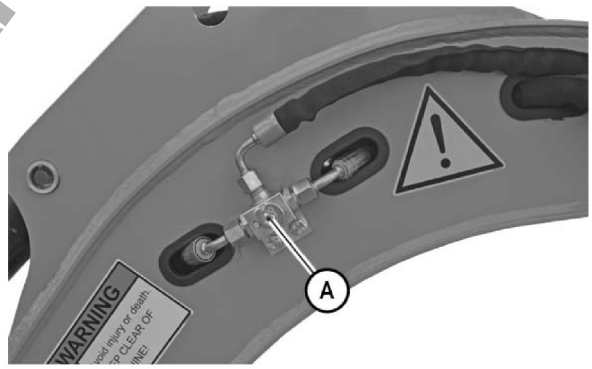

Illustration 81 g03382767

(A) Diverter Valve

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Illustration 82 g03382769

Illustration 83 g03382770

Diverter valves are used to divert oil from the bucket cylinder to the auxiliary lines. These valves (A) are attached on the left and right side of the boom. The bucket auxiliary circuit is open when the left ball valve handle has been turned counter-clockwise as far as it will go and the right ball valve handle has been turned clockwise as far as it will go. The bucket auxiliary circuit is closed when the left ball valve handle has been turned clockwise as far as it will go and the right ball valve handle has been turned counter-clockwise as far as it will go.

The line (5) that is located on the right side of the stick is for oil feed/return. The line (6) that is located on the left side of the stick is used as an oil feed/return line.

The bucket auxiliary circuit lines are equipped with coupler assemblies. Wipe all coupler assemblies before you connect the work tools.

The bucket auxiliary circuit lines must be relieved of pressure to connect the coupler assemblies to the work tool. Relieve the pressure in the auxiliary hydraulic lines by performing the following steps:

1. Turn the engine start switch key to the OFF position.
2. Move the control levers in all directions repeatedly.
3. Uncouple the work tool immediately after the pressure has been released.

Note: Pressure can build up in the bucket circuit auxiliary lines if the work tool is not uncoupled immediately after the pressure has been released.

Auxiliary Control Pedal (AUX 1) (Two-Way Flow)

⚠ WARNING

Unintended operation of the Auxiliary Control pedal can cause injury or death. A RAISED hydraulic lock lever does not mean that the auxiliary line is locked out.

To Prevent unintended activation of the Auxiliary Control pedal while traveling or whenever the auxiliary line is not being used, make sure the foot is not placed on or near the Auxiliary Control pedal.

Note: Operate the Auxiliary Control pedal carefully until you become familiar with how AUX 1 reacts to the controls.

The right Auxiliary Control pedal controls the two-way flow auxiliary line circuit (AUX 1).

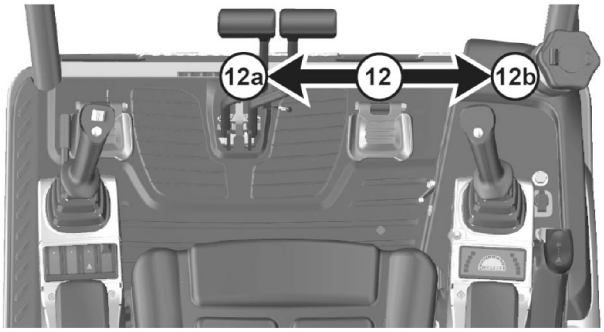

Illustration 84 g03382771

To pressurize the line that is connected to the left-hand side of the stick, apply pressure to the left half of the pedal.

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To pressurize the line that is connected to the right-hand side of the stick, apply pressure to the right of the pedal.

Boom Swing Control

⚠ WARNING

Unintended operation of the Boom Swing Control pedal can cause injury or death. A RAISED hydraulic lock lever does not mean that the boom swing function is locked out.

To Prevent unintended activation of the Boom Swing Control pedal while traveling or whenever the boom swing function is not being used, make sure the foot is not placed on or near the Boom Swing Control pedal.

Note: Operate the Boom Swing Control pedal carefully until you become familiar with how the boom swing reacts to the controls.

The Boom Swing Control controls the boom swing function.

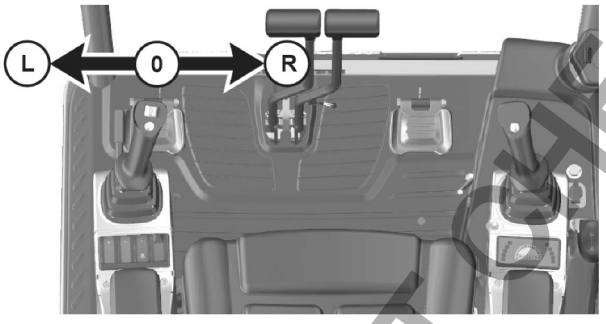

Illustration 85 g03382773

To swing the boom to the left, apply pressure to the left half of the pedal.

To swing the boom to the right, apply pressure to the right half of the pedal.

Secondary Auxiliary Control (AUX II) via the Switch on the Joystick (Two-way flow) (If Equipped)

⚠ WARNING

Unintended operation of the switch for the Auxiliary Control can cause injury or death.

To prevent unintended activation of the switch for the Auxiliary Control while traveling or whenever the auxiliary line is not being used, make sure that the thumb is not placed on or near the switch for the Auxiliary Control.

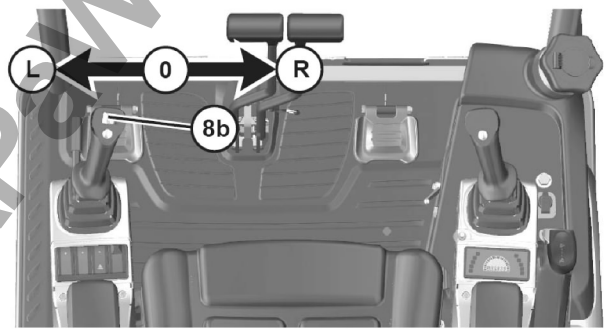

Illustration 86 g03382774

The switch (8B) on the left joystick is the secondary auxiliary control (AUX II).

To pressurize the line that is connected to the right-hand side of the stick, push switch (8B) to the right.

To pressurize the line that is connected to the left-hand side of the stick, push switch (8B) to the left.

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Note: Operate the switch for the Secondary Auxiliary Control carefully until you become familiar with how AUX II reacts to the controls.

Primary Auxiliary Control (AUX I) via the Switch on the Joystick (If Equipped)

⚠ WARNING

Unintended operation of the switch for the Auxiliary Control can cause injury or death.

To prevent unintended activation of the switch for the Auxiliary Control while traveling or whenever the auxiliary line is not being used, make sure that the thumb is not placed on or near the switch for the Auxiliary Control.

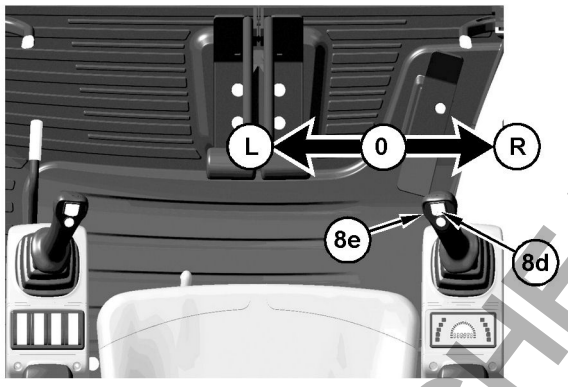

Illustration 87 g06348059

The switch (8d) on the right joystick is the primary auxiliary control (AUX I).

To operate the hydraulic hammer, press push button (8e) on the backside of the joystick

Auxiliary Bucket Cylinder Diverter Circuit Control (If Equipped)

If the diverter valves on the boom are open, the bucket auxiliary circuit can be operated via the right joystick.

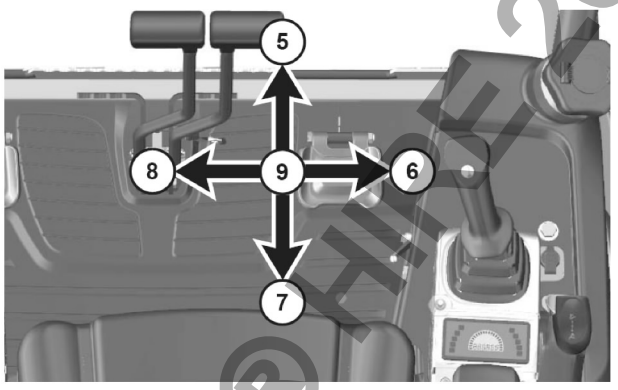

Illustration 88 g03379642

Move the right joystick to position (6) to turn the work tool to the right.

Move the right joystick to position (8) to turn the work tool to the left.

When you release the joystick from any position, the joystick will return to the HOLD position (9). The functions will stop.

Two functions (bucket auxiliary circuit and boom) may be performed at the same time by moving the joystick diagonally.

i05341330

Joystick Controls Alternate Patterns

SMCS Code: 5059; 5137

⚠ WARNING

Check if control pattern 1 (Standard) or control pattern 2 (Alternate) is selected before operating the machine.

Refer to Operation and Maintenance Manual.

Failure to understand control functions could result in injury or death.

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Joystick Control Selector (If Equipped)

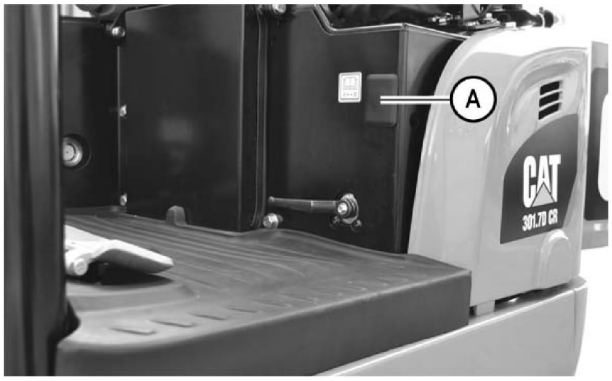

Illustration 89 g03383381

The joystick control selector (A) is located on the left side below the operator seat.

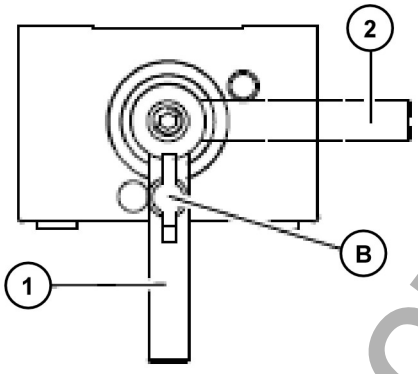

Illustration 90 g02742257

The machine may be equipped with a joystick control selector (A). The machine control pattern can be varied by turning the valve on the left side behind the operator seat. Position (1) is the factory setting. This is the standard position. Position (2) is the alternate position. The alternate position allows the operator to change the functions of the joysticks.

1. Loosen wing nut (B).

2. Move the lever to position (1) or to position (2).

3. Tighten wing nut (B).

Alternate Joystick Control Pattern

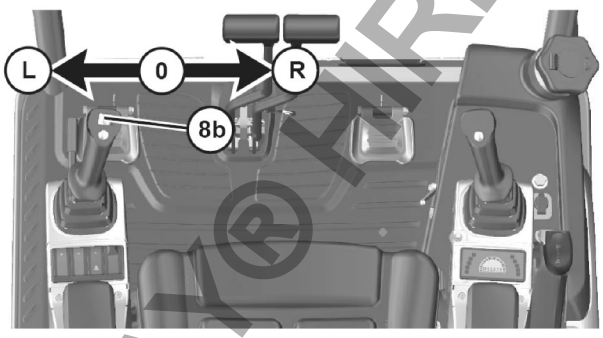

Illustration 91 g03382774

Left-hand joystick

BOOM LOWER (1) – Move the joystick to this position in order to lower the boom.

SWING RIGHT (2) – Move the joystick to this position in order to swing the upper structure to the right.

BOOM RAISE (3) – Move the joystick to this position in order to raise the boom.

SWING LEFT (4) – Move the joystick to this position in order to swing the upper structure to the left.

HOLD (9) – When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

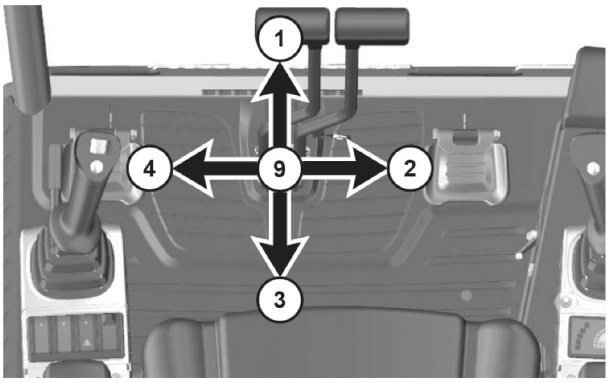

Illustration 92 g03379640

Right-hand joystick

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STICK OUT (5) – Move the joystick to this position in order to move the stick outward.

BUCKET DUMP (6) – Move the joystick to this position in order to dump the bucket or the work tool.

STICK IN (7) – Move the joystick to this position in order to move the stick inward.

BUCKET CLOSE (8) – Move the joystick to this position in order to close the bucket or the work tool.

HOLD (9) – When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

Two functions may be performed at the same time by moving the joysticks diagonally.

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Engine Starting

i07549027

Engine Starting

SMCS Code: 1000; 1090; 1456; 7000

⚠ WARNING

Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

⚠ WARNING

Do not hold the engine start switch in the GLOW PLUG "II" position for longer than 20 seconds. Holding the engine start switch in this position can damage glow plugs and other engine components.

1. Move all hydraulic controls to the HOLD position or to the NEUTRAL position.
2. Move the hydraulic lockout control to the RAISED position.

Note: The engine will not start unless the hydraulic lockout control is in the RAISED position.

3. Move the governor control lever to the low idle position before you start the engine.
4. Before you start the engine, 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.
5. If the engine is cold, turn the engine start switch key to the GLOW PLUG II position. Hold the key in this position for 20 seconds and then start the engine by turning the key to the STARTposition.

NOTICE
Do not crank the engine for more than 10 seconds. If the engine does not start, allow the starter to cool for 2 minutes before cranking again. The engine start switch must be turned to the OFF position before trying to restart.

6. Turn the engine start switch key to the START position.
7. When the engine starts, release the engine start switch key.
8. If the engine does not start, release the engine start switch key and allow the starter to cool. Then, repeat steps 5 through step 7.
9. After the engine starts, leave the engine in low idle for at least 20 to 30 seconds. If the engine is cold, refer to Operation and Maintenance Manual, "Engine and Machine Warm-Up".

Note: (For machines with LJ81–Up prefix): When the engine has been started at an altitude of 800 m (2625 ft) or higher, the engine has slightly less power. However, when working this reduction is not noticeable.

i04316864

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

NOTICE
Keep the engine speed low until the engine oil pressure registers on the gauge or until the engine oil indicator light goes out.

If it does not register or the light does not go out within ten seconds, stop the engine and investigate the cause before starting again. Failure to do so, can cause engine damage.

Note: The hydraulic lockout control must be in the LOWERED position before the hydraulic controls will function.

1. Allow the engine to warm up at low idle for 5 minutes. Engage the joysticks for the work tool control and disengage the joysticks for the work tool control. This method will speed up the warm-up of the hydraulic components. If the temperature is cold or if hydraulic functions are sluggish, additional time may be required.
2. To warm up the hydraulic oil, turn the engine speed dial to the medium engine speed. Run the engine for approximately 5 minutes and move the joystick intermittently from the BUCKET DUMP position to the HOLD position. Do not hold the joystick in the BUCKET DUMP position with the bucket cylinder fully extended for more than 10 seconds.
3. Move the governor control lever to the maximum engine speed. Repeat Step 2.

   This allows the oil to attain relief pressure, which causes the oil to warm up more rapidly.
4. Cycle all controls in order to circulate warm oil through all hydraulic cylinders and through all hydraulic lines.

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⚠ WARNING

When you cycle the machine controls, the machine can move suddenly. Contact between the machine and external objects or ground personnel can result in serious injury or death. Before you cycle the machine controls, the machine should be located in an unobstructed, hazard-free work area that is away from external objects and ground personnel.

5. Observe the gauges and the indicators frequently during the operation.

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Operation

i04278055

Operation Information

SMCS Code: 7000

Make sure that no personnel are on the machine or near the machine in order to prevent any personal injury. Keep the machine under control at all times in order to prevent injury.

If the boom is in the raised position and if the engine is stopped, refer to Operation and Maintenance Manual, “Equipment Lowering with Engine Stopped” for the procedure to lower the boom.

Reduce the engine speed when you maneuver the machine in tight quarters and when you drive over an incline.

Select the necessary travel speed range before you drive downgrade. Do not change the speed range while you drive downhill.

Use the same travel speed on a downgrade and on an upgrade.

When you travel for any distance, keep the stick inward and carry the boom in a low position. A machine that is equipped with a blade should travel with the blade in the highest position.

When you travel on a steep grade, keep the work tool as close to the ground as possible on the downhill side of the machine.

When you travel on moderate uphill grades, keep the boom on the uphill side of the machine.

Operating Procedure

1. Adjust the operator seat.

2. Fasten the seat belt.

3. Start the machine and refer to Operation and Maintenance Manual, “Engine and Machine Warm-Up” for information about warming the engine and warming the hydraulic oil.

4. Raise the boom enough in order to provide sufficient ground clearance.

5. Make sure that the position of the upper structure and of the undercarriage is known before you move the machine. The dozer blade should be in front of the machine.

Note: The travel levers will operate normally if the dozer blade is in front of the machine. The travel levers will operate backward if the dozer blade is behind the machine.

6. Rotate the engine speed dial clockwise in order to increase the engine speed to the desired speed.

7. Push both travel levers forward at the same time in order to travel forward. If both travel levers are pushed farther, the travel speed at the selected engine speed will be faster.

Note: If the machine does not operate or if the machine does not travel in a straight line, consult your Caterpillar dealer.

8. See Operation and Maintenance Manual, “Operator Controls” for information on “Travel Control”. This instruction is about spot turning and about pivot turns.

9. When you make turns in soft material, travel in a forward direction occasionally in order to clear the tracks.

10. Slowly move both of the travel levers to the center position in order to stop the machine.

i02365199

Frozen Ground Conditions

SMCS Code: 7000

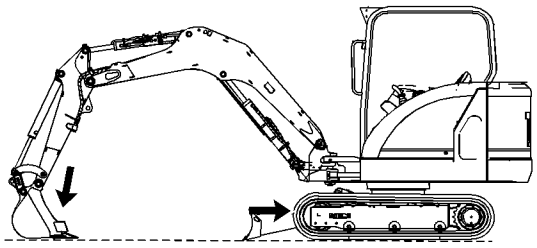

Illustration 93 g01181354

To free the tracks from frozen ground, swing the boom to the front of the machine. Use boom down pressure to free the idler end of the machine.

Swing the boom to the rear of the machine. Use boom down pressure to free the sprocket end of the machine.

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i04904389

Equipment Lowering with Engine Stopped

SMCS Code: 7000

⚠ WARNING

Personal injury or death can result from boom lowering.

The boom can drop when lowering it with the engine stopped.

Keep all personnel away from the boom drop area when lowering the boom with the engine stopped.

Be sure no one is under or near the front linkage before manually lowering the boom.

If electrical power is available and the accumulator is charged, the boom can be lowered from the operator station with the boom control lever.

1. Turn the engine start switch key to the ON position.

2. Lower the console for the hydraulic lockout control.

3. Slowly move the boom control lever to the BOOM LOWER position in order to lower the boom slowly.

Blade (If Equipped)

In order to lower the blade, place the hydraulic lockout control in the UNLOCKED position. Move the blade control lever to the BLADE LOWER position. If the accumulator is still charged, the blade will lower.

If the blade does not lower, the accumulator is empty. The blade will need to be blocked in the raised position until the engine can be started again.

Additional instructions can be found in the service manual and/or consult your Cat dealer.

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Operating Techniques

i07929204

Operating Technique Information

SMCS Code: 7000

⚠ WARNING

Know the maximum height and reach of your machine. Serious injury or death by electrocution can occur if machine, work tools, or attachments are not kept a safe distance from electrical power lines. Keep distance at least 3 m (10 ft) Plus additional 10 mm (.4 inch) for each 1,000 volts over 50,000 volts.

For safety, the local codes, the state codes, or the requirements of the job site may require a greater distance.

NOTICE

When swinging into a ditch, do not use the ditch to stop the swinging motion. Inspect the machine for damage if the boom is swung into a bank or an object.

Repeated stopping by an object can cause structural damage if the boom is swung into a bank or an object.

Always swing as slowly as possible. Sudden swing start/stop motion can cause machine instability.

With certain work tool combinations, the work tool can hit the canopy or the front of the machine. Always check for interference when first operating a new work tool.

Whenever the tracks of the machine raise off the ground while digging, lower the machine back to the ground smoothly. Do not drop or catch the machine with the hydraulics. Damage to the machine can result.

Do not move hydraulic cylinders to the end of the stroke. This could cause structural damage to the cylinders.

When digging, do not allow the stick cylinder or the bucket cylinder to contact the edge of the excavation.

Do not dig or excavate while the machine is traveling. This could cause damage to the work tool or to the machine.

Do not use the bucket as a pile driver or a hydraulic hammer.

With certain combinations of work tools, the auxiliary hydraulic pedal can have different functions. Always check the function of the auxiliary hydraulic pedal before you use the pedal.

Know the location of any buried cables. Mark the locations clearly before you dig.

Consult your Cat dealer for special bucket tips that are available for use in severe applications.

Move the machine whenever the position for digging is not efficient. The machine can be moved forward or backward at any time during the operating cycle.

When you perform work in close places, utilize the bucket or other work tools in order to perform the following functions:

- Pushing the machine
- Pulling the machine
- Lifting the tracks

Use consistent, comfortable speeds while you operate the machine.

For efficient operation, use more than one control at a time, when possible.

Never swing the bucket or a load over a truck cab or any personnel.

Position a truck so that the machine can load material into the truck from the rear or from the side. Load the truck evenly so that the rear axles are not overloaded.

Do not use oversize buckets or oversize work tools, as this could make the machine unstable.

Machines which are equipped with a canopy, a polycarbonate shield must be installed when a work tool that may create flying objects is used. Always remember to wear your safety glasses even when the polycarbonate shield is in place. Consult your work tool Operation and Maintenance Manual in order to determine if using a work tool will require the polycarbonate shield.

Digging

1. Lower the blade to the ground in order to ensure better machine stability while you are digging.
2. Position the stick at a 90 degree angle to the boom.
3. Position the bucket cutting edge at a 120 degree angle to the ground. Maximum breakout force can now be exerted with the bucket.

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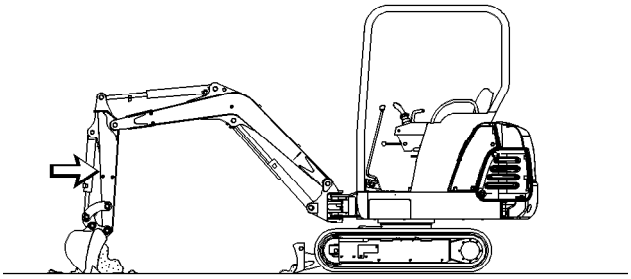

Illustration 94 g00394783

4. Move the stick toward the canopy and keep the bucket parallel to the ground.

5. If the stick stops due to the load, raise the boom and/or perform a curl in order to adjust the depth of the cut.

6. To apply the greatest force at the cutting edge, decrease the down pressure as you move the stick toward the canopy.

7. Maintain a bucket attitude that ensures a continuous flow of material into the bucket.

8. Continue the pass in a horizontal direction so that material peels into the bucket.

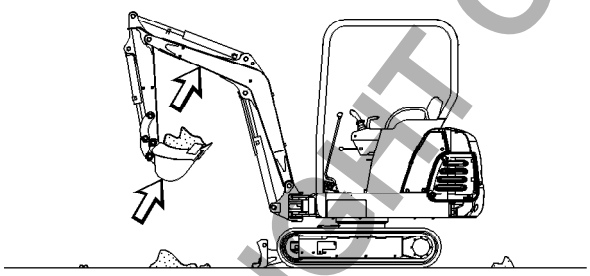

Illustration 95 g00394917

9. Close the bucket and raise the boom when the pass has been completed.

10. Engage the swing control when the bucket is clear of the excavation.

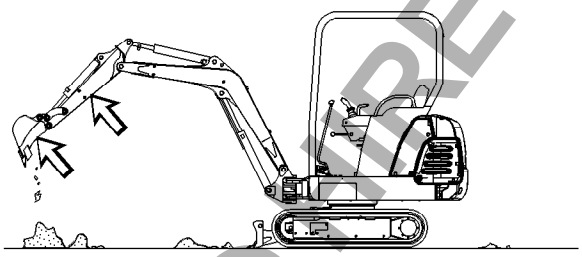

Illustration 96 g00394937

11. To dump a load, move the stick outward and open the bucket in a smooth motion.

Lifting Objects

Obey the local regulations and/or government regulations that govern the use of excavators which lift objects.

Obey the local regulations and/or government regulations that govern the lifting of loads.

Japan regulations require a shovel crane configuration to lift certain objects. Contact your Caterpillar ® dealer for more information.

⚠ DANGER

Crushing hazard. The excavator may be used for applications with lifting gear only if the prescribed safety devices are in place and functional.

Failure to follow this precautionary measure will lead to serious injury or death.

- **Acoustic and optical warning device**
- **Boom lowering control device**
- **Suitable equipment for fastening and securing loads**
- **The lift capacity table must be observed**
- **Approved bucket linkage with lifting point**

⚠ WARNING

To prevent injury, do not exceed the rated object handling capacity of the machine. If the machine is not on level ground, the rated object handling capacities will vary.

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⚠ WARNING

When lifting a load with the blade on the ground, do not raise the blade once the load has been lifted. This action may cause instability and sudden movement of the machine and of the object that is being lifted.

Sudden movement of the machine or the lifted object can cause personal injury.

NOTICE
Damage to bucket cylinder, bucket or linkage could result if slings are placed incorrectly.

Secure the load to prevent the load from falling.

Short slings will prevent excessive load swing. In order to avoid oscillating movements:

- Carry out smooth, slow movements with the machine
- Bear in mind the weather conditions (e.g. wind force, etc.)

Only use the approved lifting point on the Cat bucket linkage in order to lift objects. Lifting capacities are calculated from this point. Adjust to this capacity accordingly. Refer to Operation and Maintenance Manual, “Lifting Capacities” for more information on lifting objects with the machine.

The connection must be made with a sling or with a chain, so that it is not possible to unhook the sling or chain unintentionally.

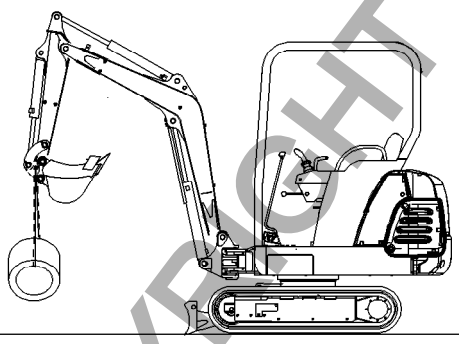

Illustration 97 g00394957

An unstable condition can exist if a load exceeds the machine load rating or if a heavy load is swung over an end or over a side. Lower the blade to the ground in order to increase the stability of the machine.

The most stable lifting position is over a corner of the machine.

For the best stability, carry a load close to the machine and to the ground.

Lift capacity decreases as the distance from the swing centerline is increased. Obey the load charts that are given in Operation and Maintenance Manual, “Boom/Stick/Bucket Combinations”.

Position the lifting gear ensuring the sling is not deflected by other parts.

Do not use any lifting gear and slings that are damaged or not sufficiently dimensioned.

The lifting gear must be designed to withstand the loads that can arise in the different positions of the work equipment or parts of the boom. Lateral loads and diagonal tensile forces must also betakeninto account.

The sling must be checked regularly by a qualified technician, at least once a year. Replace damaged slings immediately.

Fasten lifting gear and slings to avoid risk, such as rotating parts and crushing or shearing. Furthermore, neither must the work equipment be affected by the lifting gear, nor must the functions of the lifting gear be affected by external influences, such as dirt that cannot be removed by simply cleaning.

Do not place slings over sharp edges.

The persons attaching or securing loads may approach the boom from the side only, and only after the machine operator has given permission. The machine operator may give permission only after the machine is at a standstill and the work attachment no longer moves.

Staying under the suspended loads, in the danger area or under the machine attachment, is forbidden.

Have loads fastened and operators instructed by a qualified person competent in ranging operation and standard hand signals. The person giving instructions to the operator must be in sight of the operator during load attachment and disconnection.

The machine operator must guide the load near the ground and avoid any oscillating or swinging movements.

Machine travel with a raised load must be done carefully on a level surface. Move slowly to avoid sudden motion that can cause swinging or oscillation of the load.

The machine operator must not raise loads over persons.

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The machine operator may not leave the seat or stop the engine as long as the load is raised.

i04302418

Travel in Water and Mud

SMCS Code: 7000-V6

NOTICE
When working in or around any body of water, around a stream or river, or in conditions of heavy mud, be careful that the swing bearing, the swing drive gear, and the swivel joint do not dip into water, mud, sand, or gravel. If the swing bearing dips into water, mud, sand, or gravel, immediately grease the swing bearing until the used grease leaks from the outer circle of the swing bearing. Failure to carry out this procedure may cause premature wear in the swing bearing.

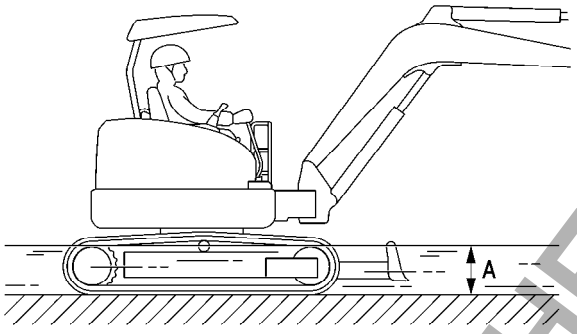

Illustration 98 g00818869

Maximum depth of water to the top edge of the idler wheel.

The following guidelines pertain to travel across water and through mud, sand, or gravel.

The machine can travel across a river only under the following conditions:

- The bed of the river is flat.
- The flow of the river is slow.
- The machine dips into the water only to the center of the track carrier roller (dimension A).

While you cross the river, carefully confirm the depth of the water with the bucket. Do not move the machine into an area that has a water depth that is greater than Dimension A.

The machine may sink gradually on soft ground. Therefore, frequently check the height of the undercarriage from ground level and the depth of water on the ground.

If you have any doubts that the water might have been too deep, contact your Cat dealer for the required check.

After you travel through water, carefully clean the machine in order to remove any salt, sand, or other foreign matter.

Procedure for Removing the Machine from Water or Mud

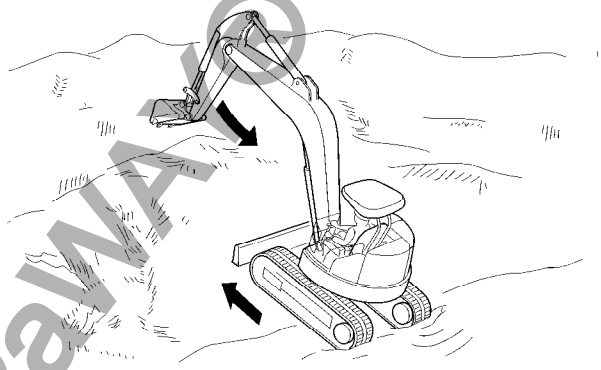

Illustration 99 g00818886

1. You may not be able to move the machine by using the travel controls only. In this case use both the travel control levers/pedals and the stick to pull the machine out of the water or ground.

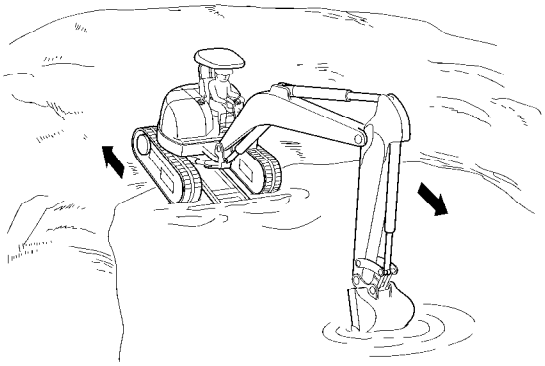

Illustration 100 g00818890

2. The machine may slip because of a steep slope. The procedure in Step 1 may not work. In this case, first rotate the upper structure by 180°. Then use both the travel control levers/pedals and the stick to move the machine up the slope.

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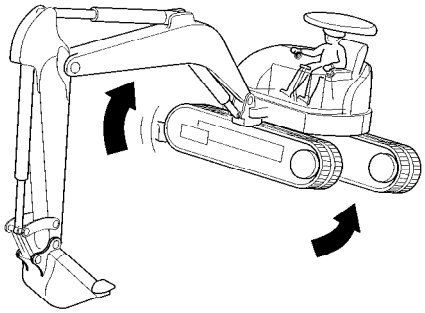

Illustration 101 g00818893

3. It may be impossible to travel because the bottom of the frame comes into contact with the ground or the undercarriage is clogged with mud or gravel. In this case, operate the boom and the stick together. Raise the track and rotate the track forward and backward in order to remove the mud and the gravel.

i05374164

Quick Coupler Operation
(Manual Pin Grabber Quick Coupler (If Equipped))

SMCS Code: 6129; 6522; 7000

NOTICE
The vibration caused by extensive use of a hydraulic hammer as well as the added weight of certain demolition tools such as shears, crushers, and pulverizers may cause premature wear and decreased service life of the coupler.

Be sure to inspect the coupler daily for cracks, bent components, or wear when operating with any of the above work tools.

Coupling the Work Tool

⚠ WARNING

Improper attachment of work tools could result in injury or death.

Do not operate this machine until you have positive indication that the coupler pins are fully engaged. Check for engagement by:

1. Position the work tool on the ground.

2. Apply slight down pressure on the work tool.

3. Retract and extend the stick cylinder in order to push the work tool against the ground. Visually confirm that there is no movement between the coupler and the work tool.

⚠ WARNING

Place the work tool or bucket in a safe position before engaging the quick coupler. Ensure that the work tool or bucket is not carrying a load.

Serious injury or death may result from engaging the work tool or bucket when it is in an unstable position or carrying a load.

⚠ WARNING

Crush injury. Could cause serious injury or death. Always confirm that the quick coupler is engaged onto the pins. Read the Operator's Manual.

NOTICE
With certain work tool combinations, including quick couplers, the work tool can hit the canopy or the front of the machine. Always check for interference when first operating a new work tool.

1. Start the engine. Position the work tool on a level surface.

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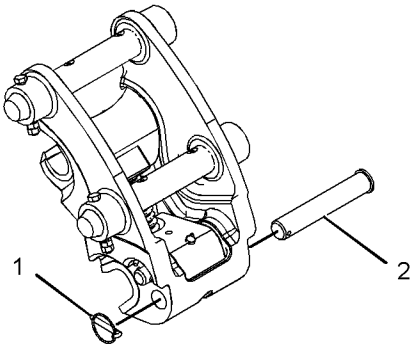

Illustration 102 g02165934

2. Remove lynch pin (1) and the safety pin (2).

3. Retract the work tool cylinder. Position the open hook on the quick coupler over the top pin of the work tool.

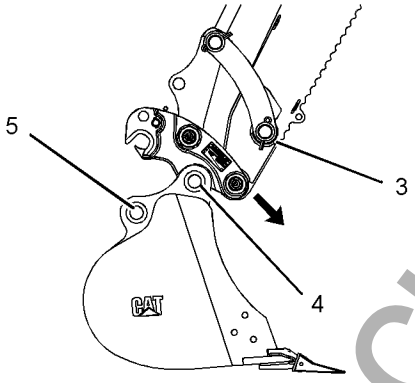

Illustration 103 g02165936

4. Move stick (3) inward and lower the stick until the hook engages the top pivot pin (4) of the work tool.

5. Rotate the quick coupler toward the machine and lift the bucket from the ground.

6. With increased engine speed, extend the work tool cylinder in order to rotate the quick coupler and the bucket toward the stick. When the cylinder is almost at the end of the stroke, reverse the direction of the cylinder. This will cause the bucket to swing. The bucket will drop into the quick coupler and the lower pin (5) of the bucket will engage. Stop the engine.

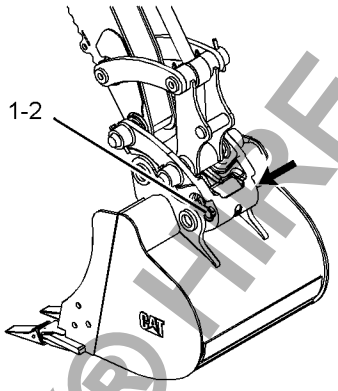

Illustration 104 g02193894

7. Fully insert the safety pin (2) into the bore of the quick coupler. Install the lynch pin (1) in order to secure the safety pin.

8. In order to verify the engagement of the work tool, perform the following procedure.

a. Start the engine. Retract and extend the stick cylinder in order to push the work tool against the ground.

b. Ensure that there is no movement between the work tool and the quick coupler.

c. Visually confirm the engagement of the work tool.

Uncoupling the Work Tool

⚠ WARNING

Disengaging the coupler pins will release the work tool from control of the operator.

Serious injury or death may result from disengaging the work tool when it is in an unstable position or carrying a load.

Place the work tool in a safe position before disengaging the coupler pins.

NOTICE
Auxiliary hoses for work tools must be disconnected before the Hydraulic Quick Coupler is disengaged.

Pulling the work tool with the auxiliary hoses could result in damage to the host machine or the work tool.

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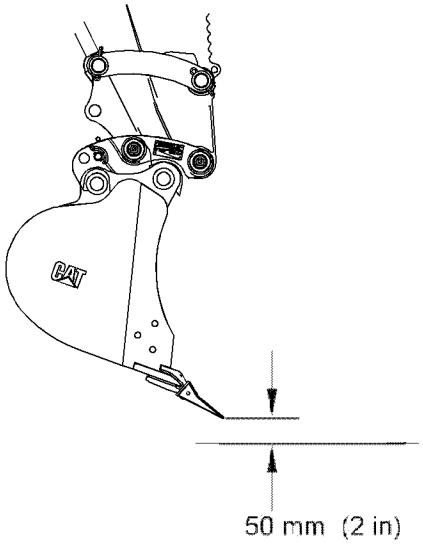

Illustration 105 g01502436

1. Lower the bucket to approximately 50 mm (2 inch) above the ground. The cutting edge should be slightly lower than the rear of the bucket. Other work tools may need to be lowered to the ground.

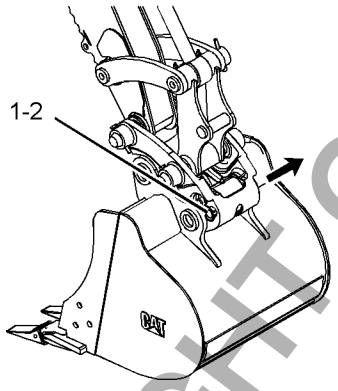

Illustration 106 g02165954

2. Remove lynch pin (1) and safety pin (2) from the quick coupler.

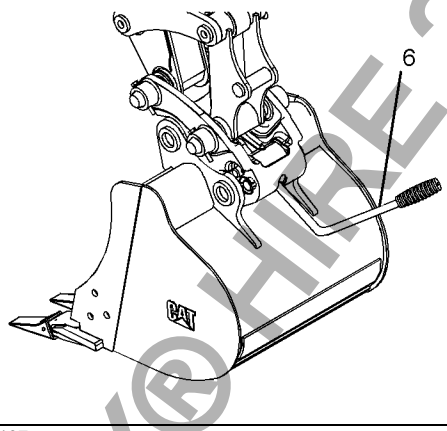

Illustration 107 g02165973

3. Insert the release lever (6). Push down on the release lever (6) in order to open the hook. The work tool will swing away from the coupler.

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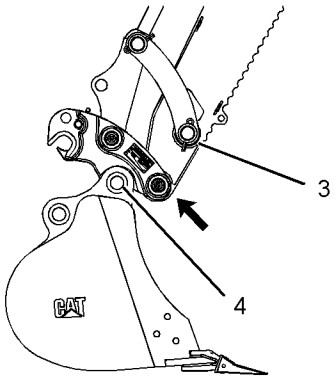

Illustration 108 g02193895

4. Raise stick (3) and move stick (3) away from the work tool in order to release the quick coupler from pivot pin (4) of the work tool.

i05505856

Quick Coupler Operation (Mechanical Pin Grabber Quick Coupler (If Equipped))

SMCS Code: 6129; 6522; 7000

NOTICE
The vibration caused by extensive use of a hydraulic hammer as well as the added weight of certain demolition tools such as shears, crushers, and pulverizers may cause premature wear and decreased service life of the coupler.

Be sure to inspect the coupler daily for cracks, bent components, or wear when operating with any of the above work tools.

General Operation

The quick coupler is used to change work tools, with minimal effort on the operators part. The quick coupler can be used with a broad range of buckets and work tools. Each work tool must have a set of pins in order for the quick coupler to work properly.

The work tools are held onto the quick coupler by two independent locking mechanisms. The work tool rear pin locking mechanism consists of a wedge that is actuated by a mechanical threaded actuator. This actuator provides a positive lock and is adjustable to ensure a rigid, tight interface between the work tool and the quick coupler. Additionally, a fully independent locking system exists on the front pin of the work tool. This system is spring applied, ensuring that the work tool is locked immediately after the front pin of the work tool is seated. Always ensure that both locking mechanisms are working properly before using the quick coupler.

Installation

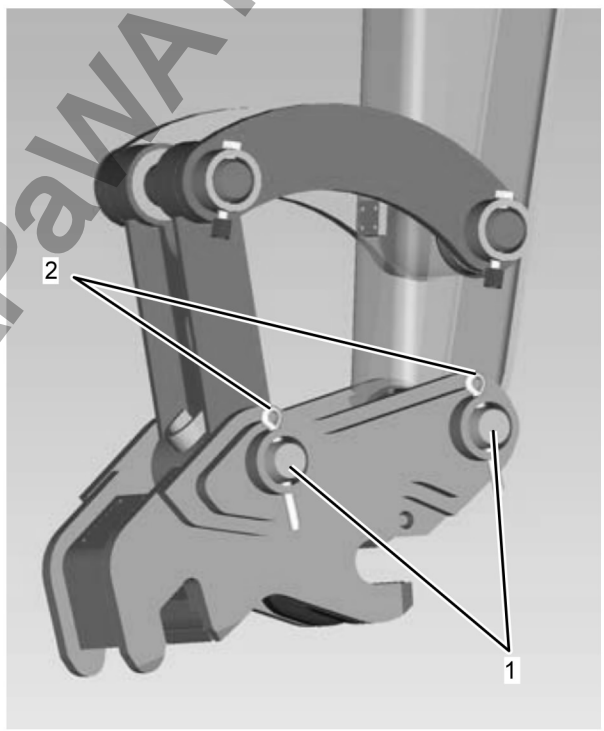

Illustration 109 g02869245

1. The quick coupler comes with two linkage pins (1) for installation on the machine. Lubricate the linkage pins (1) and pin bores before assembly on the machine.

2. Install the coupler and the linkage pins (1).

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3. Install the cotter pins (2).

Coupling the Work Tool

⚠ WARNING

Improper attachment of work tools could result in serious injury or death.

Do not operate this machine until you have positive indication that the locking mechanisms are fully engaged. Check for engagement by:

1. **Visually confirm the engagement of the work tool. Ensure that both the front and rear pin locking mechanisms for the work tool are locked and secure the work tool to the quick coupler.**
2. **Retract the bucket cylinder and drag the work tool on the ground.**
3. **Visually confirm that there is no movement between the work tool and the quick coupler.**

⚠ WARNING

Place the work tool or bucket in a safe position before engaging the quick coupler. Ensure that the work tool or bucket is not carrying a load.

Serious injury or death may result from engaging the work tool or bucket when it is in an unstable position or carrying a load.

⚠ WARNING

Crush injury. Could cause serious injury or death. Always confirm that the quick coupler is engaged onto the pins. Read the Operator's Manual.

NOTICE
With certain work tool combinations, including quick couplers, the work tool can hit the cab or the front of the machine. Always check for interference when first operating a new work tool.

1. Start the engine. Retract the bucket cylinder, positioning the quick coupler front locking mechanism over the front pin of the work tool.

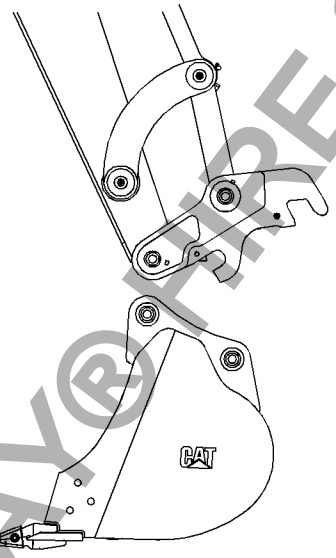

Illustration 110 g02163290

2. Align the quick coupler front locking mechanism over the front pin of the work tool. Extend the stick cylinder until the automatic front locking mechanism of the quick coupler engages and secures the front pin of the work tool.

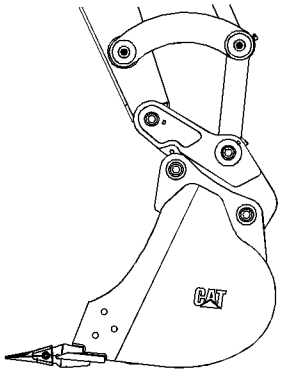

Illustration 111 g02163292

3. Extend the bucket cylinder in order to rotate the quick coupler toward the work tool until the quick coupler contacts the rear pin of the work tool. Position the work tool so that the work tool is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket. Stop the engine.

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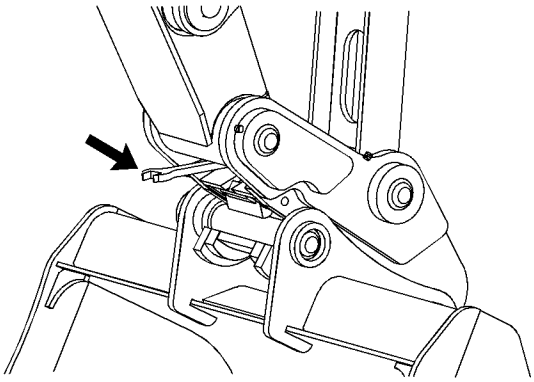

Illustration 112 g02165065

4. Using the supplied wrench, if equipped, and insert the ratcheting end onto the hex drive mechanism. Turn the ratchet in a clockwise direction in order to tighten the rear locking mechanism.

5. In order to verify the engagement of the work tool, perform the following procedure:

a. Visually confirm the engagement of the work tool. Ensure that both the work tool front and rear pin locking mechanisms are locked and securing the work tool to the coupler.

b. Retract the bucket cylinder and drag the work tool on the ground.

c. Visually confirm that there is no movement between the work tool and the quick coupler.

Uncoupling the Work Tool

⚠ WARNING

Place the work tool or bucket in a safe position before disengaging the coupler. Disengaging the coupler will release the work tool or bucket from control of the operator.

Serious injury or death may result from disengaging the work tool or bucket when it is in an unstable position or carrying a load.

NOTICE

Auxiliary hoses for work tools must be disconnected before the Hydraulic Quick Coupler is disengaged.

Pulling the work tool with the auxiliary hoses could result in damage to the host machine or the work tool.

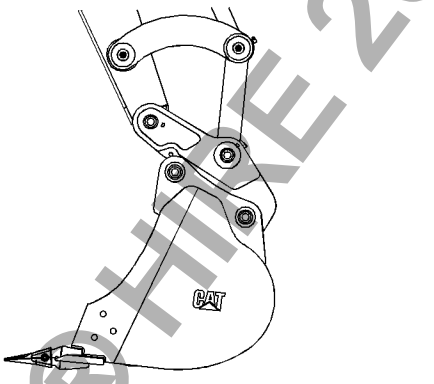

Illustration 113 g02163292

1. In order to unlock the coupler, position the work tool so that the work tool is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket. Other work tools may need to be lowered to the ground. Stop the engine.

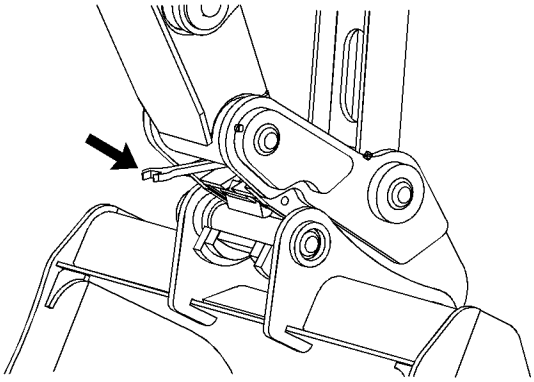

Illustration 114 g02165065

2. Using the supplied wrench, if equipped, and insert the ratcheting end onto the hex drive mechanism. Turn the wrench in a counterclockwise direction in order to release the rear locking mechanism.

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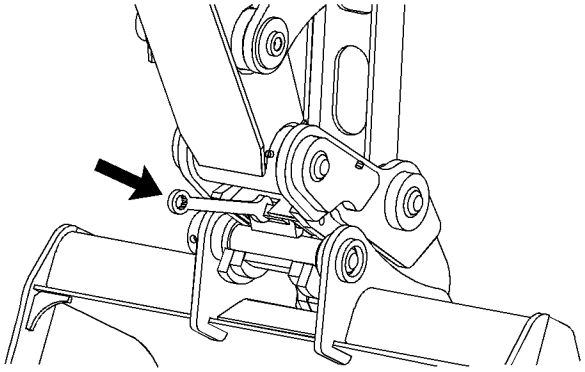

Illustration 115 g02165068

3. Using the supplied wrench, if equipped, and insert the open wrench end onto the front lock actuator. Push down on the wrench to rotate the front lock into an unlocked, detent position.

4. Start the engine. Lower the work tool to the ground.

5. Retract the bucket cylinder in order to rotate the quick coupler away from the work tool until the quick coupler disengages the rear pin of the work tool.

6. Move the stick away from the work tool in order to release the quick coupler from the front pin of the work tool. The front locking mechanism will automatically reset. The quick coupler is now ready to engage the next work tool.

Quick Coupler use with a Bucket that is Reversed

NOTICE
When some Cat buckets are used in the reverse position, it can be more difficult to couple the bucket and uncouple the bucket than in the normal position.

Care must be taken to ensure that the position of the boom, stick, and bucket are aligned to ensure smooth coupling. The coupler must be in position between the bucket bosses.

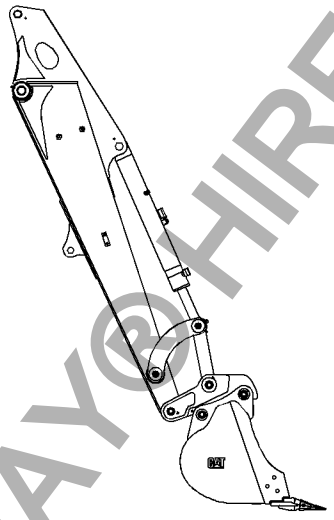

Illustration 116 g02163425

1. Follow the same steps for coupling and uncoupling the work tool in order to operate the coupler with a bucket that is reversed. Refer to “Coupling the Work Tool” and “Uncoupling the Work Tool” for the proper procedure.

i07396465

Quick Coupler Operation (CW (Single Lock) Quick Coupler (If Equipped))

SMCS Code: 6129; 6522; 7000

NOTICE
The vibration caused by extensive use of a hydraulic hammer and the added weight of certain demolition tools such as shears, crushers, and pulverizers may cause premature wear and decreased service life of the coupler.

Be sure to inspect the coupler daily for cracks, bent components, or wear when operating with any work tools.

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General Operation

The CW coupler is used to change work tools quickly. The quick coupler can be used with a broad range of buckets and work tools.

Installation Procedure

⚠ WARNING

Personal injury or death can result from improperly checking for a leak.

Always use a board or cardboard when checking for a leak. Escaping air or fluid under pressure, even a pin-hole size leak, can penetrate body tissue causing serious injury, and possible death.

If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

Note: Hydraulic oil may be trapped in the lines if the hydraulic lines are plugged or if the hydraulic lines are connected. The trapped oil may be under pressure. Use care when you open the hydraulic lines.

Note: The quick coupler must be controlled by the excavator's hydraulic system.

Perform this procedure as described in the following steps:

Ensure that the quick coupler is compatible with the host machine. For more information, consult your Caterpillar dealer.

To provide a stable operating condition, the host machine must be on flat, level ground. The host machine must be blocked to prevent inadvertent movement.

The quick coupler must be supported to prevent inadvertent movement. Position the quick coupler to prevent unnecessary climbing and unnecessary bending.

Optimum alignment of the bores will prevent the use of unnecessary force when you install the pins. Never check the alignment of the bores with your fingers. Use the proper tools to check the alignment of the bores.

A retaining pin can fly out when the retaining pin is struck with force. The area must be clear of people when you drive retaining pins.

When you strike objects, chips and other debris can fly. Before you strike any object, make sure that no one can be injured by the flying debris. Always wear appropriate PPE, including safety glasses.

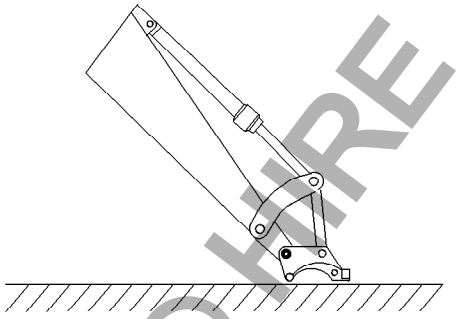

Illustration 117 g00741430

1. Position the quick coupler on the ground in front of the host machine. Make sure that the wedge faces away from the host machine.

2. Install the mounting pins.

3. Lubricate all the mounting points.

4. Connect the hydraulic lines to the quick coupler (if equipped).

5. After mounting the quick coupler on the excavator, or after working on the quick coupler hydraulic system, it is necessary to purge all the air from the cylinder and the control system. Refer to the “Hydraulic System Air Purge” for additional information.

Quick Coupler Removal Procedure

1. Lay the quick coupler flat on the ground.

2. Release the pressure from the hydraulic lines (if equipped).

a. Extend the wedge to the UNLOCKED position.

b. Stop the engine on the host machine. Turn the ignition to OFF.

c. Turn the ignition to the ON position without starting the engine.

d. Move the hydraulic control levers repeatedly through the full range of motion. This will release any pressure that may be present in the hydraulic system. Actuate the quick coupler using the machine control monitor. Cycle through locking and unlocking the quick coupler several times to release trapped hydraulic pressure within the quick coupler circuit.

e. The wedge should begin to move inward due to the spring force.

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f. Turn the ignition to the OFF position.

g. Release the pressure in the host machine's hydraulic tank.

⚠ WARNING

Personal injury or death can result from improperly checking for a leak.

Always use a board or cardboard when checking for a leak. Escaping air or fluid under pressure, even a pin-hole size leak, can penetrate body tissue causing serious injury, and possible death.

If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

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, PERJ1017, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat ® products.

Dispose of all fluids according to local regulations and mandates.

3. Place a suitable container below the hydraulic fittings to catch any hydraulic oil that may escape. Slowly disconnect the hydraulic lines. Plug the ends of the hydraulic lines or connect the hydraulic lines.
4. Dispose of the hydraulic oil in a suitable manner.
5. Remove the pins from the quick coupler.

Daily Inspection

⚠ WARNING

Personal injury or death can result from improperly checking for a leak.

Always use a board or cardboard when checking for a leak. Escaping air or fluid under pressure, even a pin-hole size leak, can penetrate body tissue causing serious injury, and possible death.

If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

NOTICE
Accumulated grease and oil on a work tool is a fire hazard.

Remove debris with steam cleaning or high pressure water at any time a significant quantity of oil is spilled on the work tool.

Note: If major repairs to the quick coupler are required, consult your Caterpillar dealer.

1. For the maximum service life of the work tool, make a thorough daily inspection before you mount a work tool to the host machine.
2. Inspect the quick coupler for the following conditions: loose bolts, oil leaks, broken parts, missing parts and cracked components. Check the overall condition of the quick coupler. Check the overall condition of the hydraulic system.
3. Inspect the warning signs and labels. Replace warning signs or labels that are missing. Replace warning signs or labels when you cannot read the warning signs or labels.
4. If equipped, inspect the condition of the hydraulic lines and the hydraulic fittings.
5. Check the mounting pins for the quick coupler.
6. Inspect the bolts for the wedge when you remove the wedge.
7. Check the lifting device, if equipped. If damage is present, do not use the lifting device. Contact your Caterpillar dealer for repairs.
8. Perform all repairs before you put the quick coupler into service.
9. Perform an UNLOCK and LOCK cycle of the wedge to provide a smooth operation of the wedge. This procedure is for the quick coupler with hydraulic coupling only.

Operation

Coupling the Work Tool

⚠ WARNING

Place the work tool or bucket in a safe position before engaging the quick coupler. Ensure that the work tool or bucket is not carrying a load.

Serious injury or death may result from engaging the work tool or bucket when it is in an unstable position or carrying a load.

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⚠ WARNING

Crush injury. Could cause serious injury or death. Always confirm that the quick coupler is engaged onto the pins. Read the Operator's Manual.

Reference: For more information on connecting the quick coupler to the host machine, contact your dealer for special instructions.

Quick Coupler with Hydraulic Coupling

⚠ WARNING

Place the work tool or bucket in a safe position before engaging the quick coupler. Ensure that the work tool or bucket is not carrying a load.

Serious injury or death may result from engaging the work tool or bucket when it is in an unstable position or carrying a load.

NOTICE
The buzzer will not sound when the switch is in the lock position. The position of the switch does not confirm that the quick coupler locking system is properly engaged with the attachment pins. Visually confirm positive engagement of the locking system. A physical test is required by dragging the work tool on the ground to confirm that the coupler is properly engaged with the work tool.

NOTICE
Always confirm that the buzzer sounds when the switch is in the unlock position. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

NOTICE
With certain work tool combinations, including quick couplers, the work tool can hit the cab or the front of the machine. Always check for interference when first operating a new work tool.

1. Verify that the wedge is in the unlocked position. If the wedge is not extended, extend the bucket cylinder. Then, extend the wedge.

⚠ WARNING

Ensure that the wedge is extended before coupling the work tool. Severe damage may occur. Failing to extend the wedge before coupling the work tool could result in a poorly coupled work tool or an uncoupled work tool.

Serious injury or death may result from an improperly coupled work tool.

2. Ensure that the mounting bracket of the work tool is in line with the host machine. The work tool must be facing the host machine. The mounting bracket must be at the top of the work tool.

Coupling a Bucket

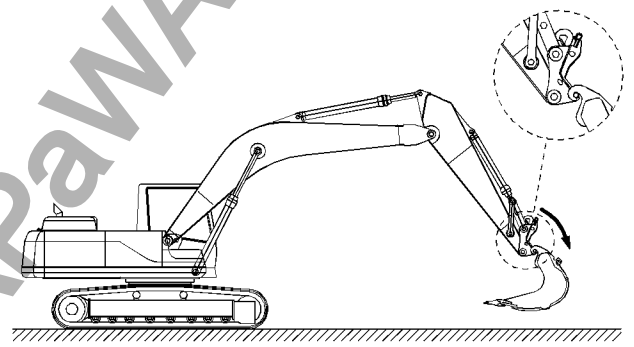

Illustration 118 g01285027

1. Hook the forward pivot of the quick coupler into the hooks of the mounting bracket.

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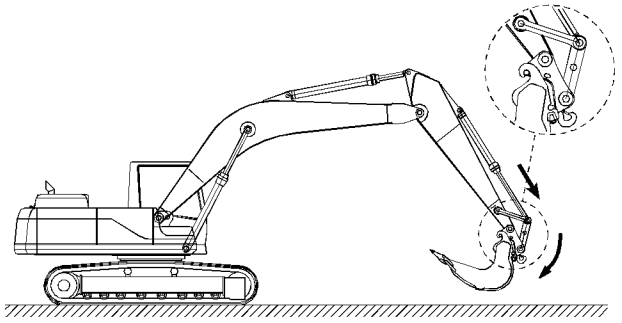

Illustration 119 g01285038

2. Select “UNLOCK” on the monitor display and confirm that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer. Extend the bucket cylinder until the coupler contacts the work tool.

3. Tilt the quick coupler against the work tool by extending the bucket cylinder.

4. Select “LOCK” on the monitor display and the beep will stop and the rear lock (wedge) will slide back into place. The monitor will return to the home screen.

5. Visually confirm that the wedge has engaged the work tool hook and is properly locked. If this visual confirmation cannot be performed from the machine cab due to obstruction, lighting, etc., place the machine in a safe state, exit the cab, and visually confirm proper engagement at the quick coupler.

⚠ WARNING

Inspect the quick coupler engagement before operating the machine.

Serious injury or death may result from improperly engaged coupler.

NOTICE
Visually confirm that the quick coupler engagement system is properly locked to the work tool. Confirm that the wedge has engaged the work tool hook and is properly locked.

6. Verify the engagement of the quick coupler and the work tool.

a. Place the work tool on the ground.

b. Apply pressure to the work tool against the ground.

c. Drag the work tool forward and backward.

Quick Coupler with Mechanical Coupling

⚠ WARNING

Place the work tool or bucket in a safe position before engaging the quick coupler. Ensure that the work tool or bucket is not carrying a load.

Serious injury or death may result from engaging the work tool or bucket when it is in an unstable position or carrying a load.

1. Ensure that the work tool mounting bracket is in line with the host machine. The work tool must be facing the host machine. The mounting bracket must be at the top of the work tool.

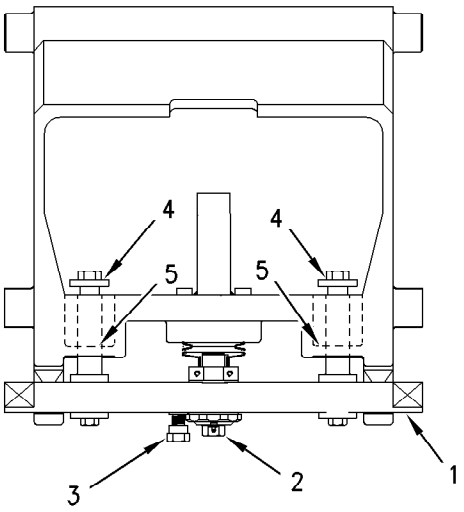

Illustration 120 g00928845

2. To move wedge (1) to the UNLOCKED position, perform the following steps:

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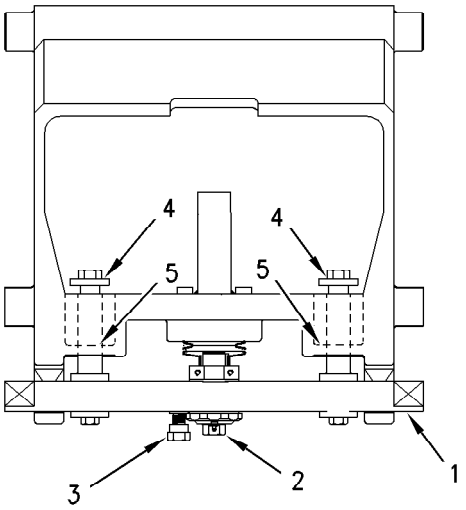

Illustration 121 g00928845

3. Loosen lock bolt (3) until you can turn spindle (2).

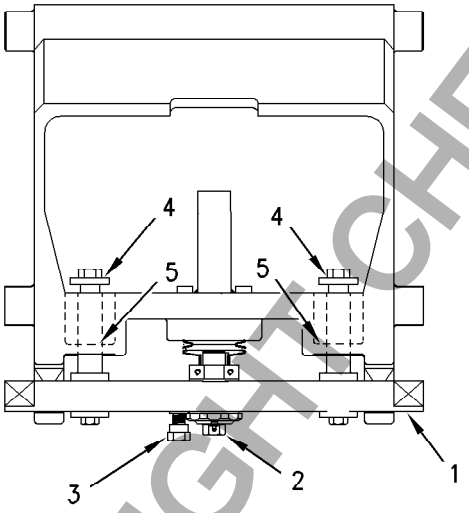

Illustration 122 g00928845

4. Turn spindle (2) until the bolts (4) lightly contact the coupler (5).

5. Position the coupler with the wedge in an UPWARD position.

Coupling a Bucket

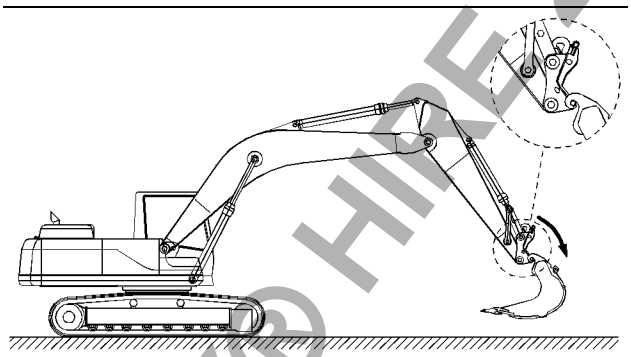

Illustration 123 g01285027

1. Hook the front pivots into the hooks of the mounting bracket on the work tool.

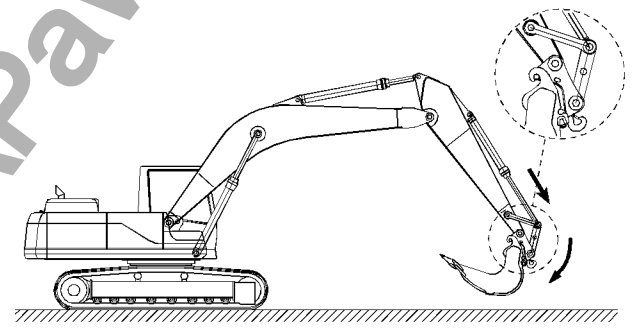

Illustration 124 g01285038

2. Tilt the quick coupler against the work tool by extending the bucket cylinder. Stop the engine of the host machine.

3. Turn the spindle inward. Tighten the spindle.

Note: If necessary, tighten the spindle until the next notch is aligned with the locking bolt.

4. Tighten the locking bolt.

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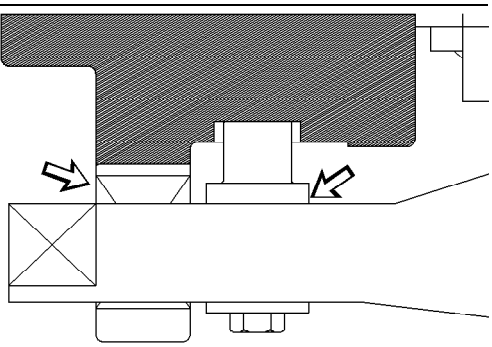

Illustration 125 g00583309

5. Ensure that there is a visible space between the wedge and the quick coupler frame. If there is not a space, the mounting bracket or the quick coupler may be damaged.

⚠ WARNING

Inspect the quick coupler engagement before operating the machine.

Serious injury or death may result from improperly engaged coupler.

6. Verify the engagement of the quick coupler and the work tool.

a. Place the work tool on the ground.

b. Apply pressure to the work tool against the ground.

c. Drag the work tool forward and backward.

Uncoupling the Work Tool

Use the following steps to prepare the quick coupler for uncoupling.

NOTICE

Auxiliary hoses for work tools must be disconnected before the Hydraulic Quick Coupler is disengaged.

Pulling the work tool with the auxiliary hoses could result in damage to the host machine or the work tool.

1. Disconnect any auxiliary hoses from the work tool (if equipped).

2. Ensure that the work tool is clear of the ground.

3. Fully extend the bucket cylinder. Extend the stick cylinder until the wedge is pointing downward. The load is now released from the wedge.

Quick Coupler with Hydraulic Coupling

⚠ WARNING

Place the work tool or bucket in a safe position before disengaging the coupler. Disengaging the coupler will release the work tool or bucket from control of the operator.

Serious injury or death may result from disengaging the work tool or bucket when it is in an unstable position or carrying a load.

1. Extend the wedge cylinder.

2. Select UNLOCK on the monitor display and confirm that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is place in a stable and safe position. Turn off the engine. Consult your Cat dealer.

3. Retract the bucket cylinder until the coupler is no longer in contact with the work tool. The work tool is now suspended by the front pivot.

4. Place the work tool on the ground.

5. Unhook the quick coupler from the mounting bracket.

Quick Coupler with Mechanical Coupling

⚠ WARNING

Place the work tool or bucket in a safe position before disengaging the coupler. Disengaging the coupler will release the work tool or bucket from control of the operator.

Serious injury or death may result from disengaging the work tool or bucket when it is in an unstable position or carrying a load.

1. Stop the engine of the host machine.

2. Loosen the locking bolt until you can turn the spindle.

3. Turn the spindle outward. If necessary, strike the wedge with a hammer to release the wedge.

4. Retract the bucket cylinder. The work tool will be suspended by the front pivot.

5. Place the work tool on the ground.

6. Unhook the quick coupler from the mounting bracket.

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Lifting Loads

⚠ WARNING

Lifting loads with the quick coupler is only permitted when there is no work tool attached. Lifting loads when there is a work tool attached may result in serious injury or death.

NOTICE
If used to lift loads, then the excavator must comply with the requirements for lifting machinery. These are given in standard EN 474-5. For more information, consult your Caterpillar dealer.

Note: When you lift loads with the lifting yoke or the lifting hook, the wedge must be retracted or the wedge must be removed from the coupler.

Lifting Hook (If Equipped)

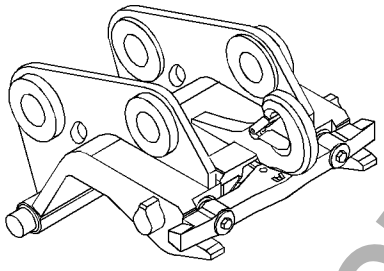

Illustration 126 g03219216

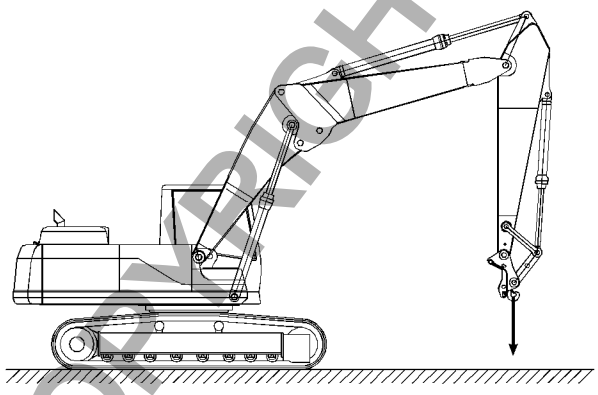

Illustration 127 g01285467

1. Fully extend the bucket cylinder.

2. Make sure that the wedge has been retracted or that the wedge has been removed.

⚠ WARNING

Use an appropriate lifting device that is rated for the specific load. Failure to do so can result in serious injury or death.

3. Fasten an appropriate chain, cable, or a lifting strap to the lifting hook. Do not perform any lifting operations if the safety latch is missing. Do not perform any lifting operations if the safety latch is damaged. Contact your supplier.

Lifting Objects

⚠ WARNING

To prevent injury, do not exceed the rated load capacity of the machine. If the machine is not on level ground, load capacities will vary.

The quick coupler and attached lifting hook have unique rated load capacities. Each capacity is marked on the corresponding component. Do not exceed the maximum capacity of any component used in a lifting operation. Quick coupler capacities are listed in the table below:

Table 9

Quick Coupler Rated Capacities(1)	
Quick Coupler Model	**Rated Capacity**
CW05	600 kg (1322 lb)
CW10	1400 kg (3086 lb)

(1) Capacities rated in accordance with EN 474–1:2006+A4:2013 Annex E and ASS 1418.8–2008 standards

Refer to the load charts in the Operation and Maintenance Manual of the host machine. Use the load charts and account for the mass of the work tool. Calculate the load capacity relative to the location of the lifting point on your specific host machine.

Use a sling or a shackle to attach to the lifting point and lift the object. The sling or the shackle must have a rated capacity that is greater than the mass of the load.

If the machine is equipped with the CE plate per requirements for the European Union, and used to lift objects, then the machine must be equipped with the optional boom and stick lowering control valves and an overload warning device.

A fit for purpose test was completed to confirm that a properly equipped machine meets the requirements of the European Union Machinery Directive “2006/42/EC” for lifting objects.

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The setting for the overload warning device should be checked by an authorized dealer.

i07423158

Quick Coupler Operation (If Equipped)

SMCS Code: 6129; 6522; 7000

Quick Coupler Ready (If Equipped)

Quick Coupler Ready is the definition for the installation of an additional hydraulic control circuit, which is routed to the end of the stick.

If a Hydraulic Quick Coupler is installed, ensure that the machine is equipped with the Quick Coupler Ready System and that the Hydraulic Quick Coupler and the matching work tools are approved for that machine. Caterpillar will not be liable for personal injury and/or damage to property caused by failure to observe the following:

Obey the instructions described in the Operation and Maintenance Manual of the Hydraulic Quick Coupler.

Store the Operation and Maintenance Manual of the Hydraulic Quick Coupler in the machines literature compartment.

The installation of a non-approved Hydraulic Quick Coupler may change the machines original operating functions and its description in the machines Operator and Maintenance Manual.

Furthermore, the following points have to be considered:

- If necessary, modifications and/or supplements have to be carried out at the machine (for example, safety decals), and/or its manuals (for example, changes to the described functionality).
- The Intended Use of the machine might have to be limited.
- The machines EC or EU-Declaration of Conformity might be compromised by fitting a Hydraulic Quick Coupler that does not match with the machine and its interface (for example, provided pressures).
- The Hydraulic Quick Couplers EC or EU-Declaration of Conformity might be compromised by installing the Hydraulic Quick Coupler on a host machine that does not match with the Hydraulic Quick Coupler and its interface (for example, required pressures).

General Operation

The hydraulic quick coupler is used to change work tools while the operator remains in the operator station.

As for how the work tools are held onto the hydraulic quick coupler and how the hydraulic quick coupler is operated refer to the Hydraulic Quick Coupler Operation and Maintenance Manual. Always ensure that the hydraulic system and the locking mechanisms are working properly before using the hydraulic quick coupler.

If a lifting eye is included on the Hydraulic Quick Coupler, release the work tool from the Hydraulic Quick Coupler in order to use the lifting eye to pick up loads. In order to lift a load with the lifting eye, extend the bucket cylinder until the Hydraulic Quick Coupler is in a vertical position. Do not exceed the rated load for the machine.

Obey the local regulations and/or government regulations that govern the use of excavators which lift objects.

Obey the local regulations and/or government regulations that govern the lifting of loads.

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Refer to Operation and Maintenance Manual, “Lifting Objects”, for more information on lifting objects with the machine.

Installation

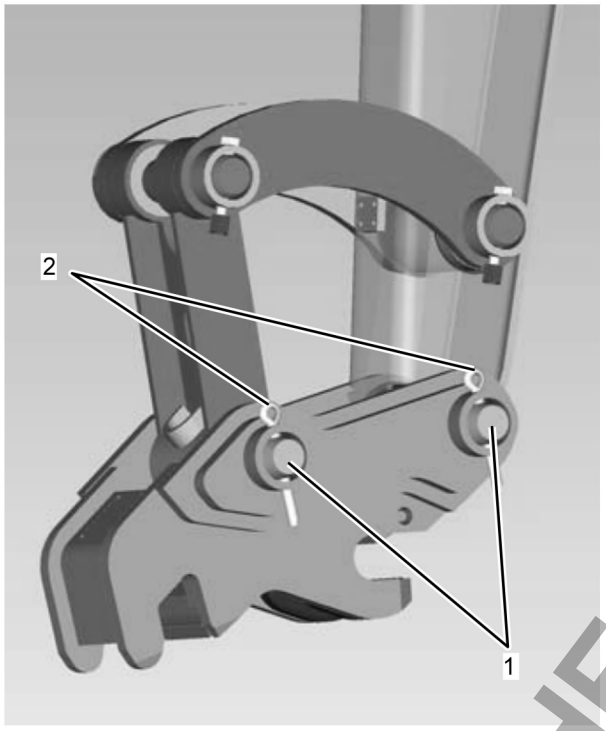

Illustration 128 g02869245

Note: The selection and installation of a Hydraulic Quick Coupler is subject to Cat dealers only.

1. Make sure that the linkage pins (1) fit the machine. Lubricate the linkage pins (1) and pin bores before assembly on the machine.

Note: If the machine is filled with biodegradable oil, make sure that the Hydraulic Quick Coupler is approved for that type of hydraulic oil. Flush the Hydraulic Quick Couplers hydraulic system with the same biodegradable oil as used in the machine.

2. Install the Hydraulic Quick Coupler and the linkage pins (1).
3. Secure the retaining pins (2) properly.
4. Connect the hydraulic lines following the instructions in the Hydraulic Quick Coupler Operation and Maintenance Manual.
5. Purge the system.
6. Perform a functional test and make sure that everything works properly as described in the Operation and Maintenance Manual of the machine and the Hydraulic Quick Coupler.
7. Check the Hydraulic Quick Coupler and its lines/ connectors for any leakage.

Quick Coupler Operation

Coupling the Work Tool

⚠ WARNING

Improper attachment of work tools could result in serious injury or death.

Do not operate this machine until you have positive indication that the locking mechanisms are fully engaged. Check for engagement by:

1. **Visually confirm the engagement of the work tool. Ensure that all locking mechanisms for the work tool are locked and secure the work tool to the quick coupler.**
2. **Retract the bucket cylinder and drag the work tool on the ground.**
3. **Visually confirm that there is no movement between the work tool and the quick coupler.**

⚠ WARNING

Place the work tool or bucket in a safe position before engaging the quick coupler. Ensure that the work tool or bucket is not carrying a load.

Serious injury or death may result from engaging the work tool or bucket when it is in an unstable position or carrying a load.

⚠ WARNING

Crush injury. Could cause serious injury or death. Always confirm that the quick coupler is engaged. Read the Operator's Manuals.

NOTICE
The buzzer will not sound when the switch is in the lock position. The position of the switch does not confirm the Hydraulic Quick Coupler is engaged. A physical test is required by dragging the work tool on the ground to confirm the Hydraulic Quick Coupler is engaged.

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NOTICE
Always confirm that the buzzer sounds when the switch is in the unlock position. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

NOTICE
With certain work tool combinations, including quick couplers, the work tool can hit the cab/canopy or the front of the machine. Always check for interference when first operating a new work tool.

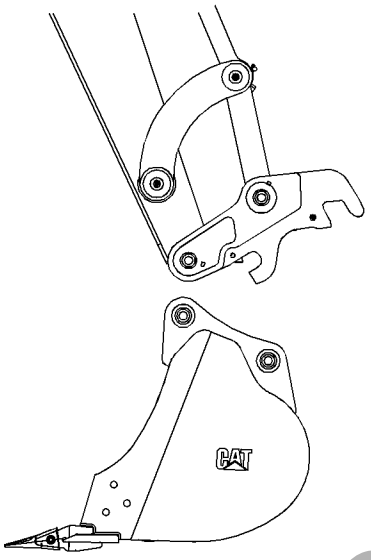

Illustration 129 g02163290

1. Align the Hydraulic Quick Coupler with the work tool as described in the Hydraulic Quick Coupler Operation and Maintenance Manual.

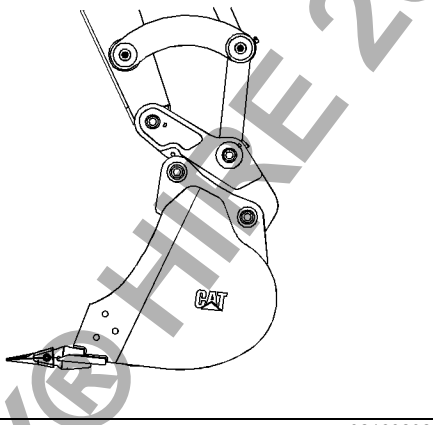

Illustration 130 g02163292

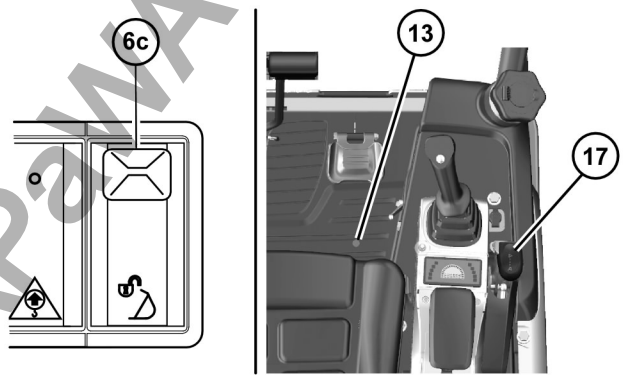

Illustration 131 g03395331

2. Unlock and press switch (6C). The buzzer will sound and the Quick Coupler Ready System will be enabled and can be operated.

Note: If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

3. Press and hold the foot-operated switch (13). Pull the dozer blade lever (17) backwards as far as the lever will go and hold the lever in this position. The Quick Coupler Ready System provides the adjusted pressure to the Hydraulic Quick Coupler. The dozer blade lever can be released once the Hydraulic Quick Coupler is open.

4. Attach the Hydraulic Quick Coupler to the work tool as described in the Hydraulic Quick Coupler Operation and Maintenance Manual.

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⚠ WARNING

Crush injury. Could cause serious injury or death. Always confirm that the quick coupler is engaged. Read the Operator's Manual.

NOTICE
For system-specific reasons, the Quick Coupler Ready System opens and closes with the dozer blade function, the swing function and the AUX II function (if equipped). For practical reasons, only use the described function “Dozer Blade” to operate the Quick Coupler Ready System.

5. Release the foot-operated switch (13). Pull the dozer blade lever (17) backwards as far as the lever will go and hold the lever in this position. The dozer blade lever can be released once the Hydraulic Quick Coupler is closed. Move switch (6C) to the OFF position, the buzzer will stop.

6. In order to verify the engagement of the work tool, perform the following procedure:

a. Visually confirm the engagement of the work tool. Ensure that the locking mechanisms of the work tool are locked and securing the work tool to the Hydraulic Quick Coupler.

b. Retract the bucket cylinder and drag the work tool on the ground.

c. Visually confirm that there is no movement between the work tool and the Hydraulic Quick Coupler.

NOTICE
Back drag the work tool on the ground to ensure the Hydraulic Quick Coupler is properly locked.

Do not strike the work tool on the ground to ensure the Hydraulic Quick Coupler is properly locked. Striking the work tool on the ground may result in damage to the Hydraulic Quick Coupler and the host machine.

Uncoupling the Work Tool

⚠ WARNING

Place the work tool or bucket in a safe position before disengaging the coupler. Disengaging the coupler will release the work tool or bucket from control of the operator.

Serious injury or death may result from disengaging the work tool or bucket when it is in an unstable position or carrying a load.

NOTICE
Auxiliary hoses for work tools must be disconnected before the Hydraulic Quick Coupler is disengaged.

Pulling the work tool with the auxiliary hoses could result in damage to the host machine or the work tool.

NOTICE
Always confirm that the buzzer sounds when the switch is in the unlock position. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

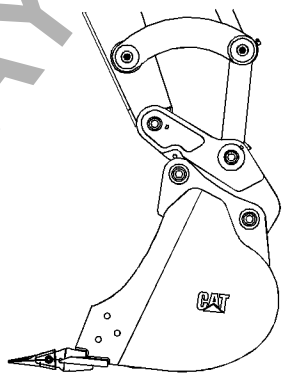

Illustration 132 g02163292

1. In order to unlock the Hydraulic Quick Coupler, position the work tool as described in the Hydraulic Quick Coupler Operation and Maintenance Manual .

NOTICE
For system-specific reasons, the Quick Coupler Ready System opens and closes with the dozer blade function, the swing function and the AUX II function (if equipped). For practical reasons, only use the described function “Dozer Blade” to operate the Quick Coupler Ready System.

2. Unlock and press switch (6C). The buzzer will sound and the Quick Coupler Ready System will be enabled and can be operated.

Note: If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

3. Press and hold the foot-operated switch (13). Pull the dozer blade lever (17) backwards as far as the lever will go and hold the lever in this position. The dozer blade lever can be released once the Hydraulic Quick Coupler is open.

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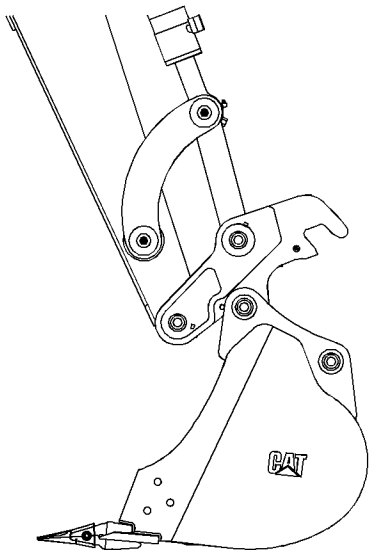

Illustration 133 g02163415

4. Disengage the work tool from the Hydraulic Quick Coupler as described in the Hydraulic Quick Coupler Operation and Maintenance Manual.

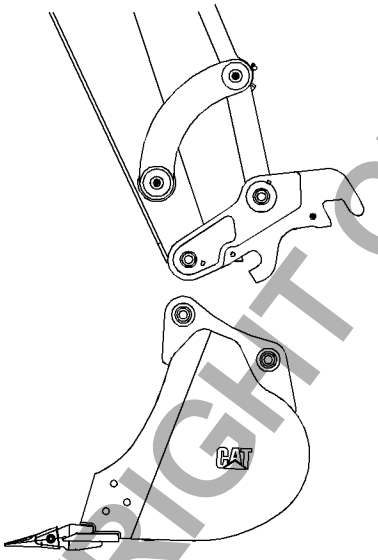

Illustration 134 g02163290

5. Ensure that the work tool is in a stable and safe storage position on the ground.

6. Release the foot-operated switch (13). Pull the dozer blade lever (17) backwards as far as the lever will go and hold the lever in this position. The dozer blade lever can be released once the Hydraulic Quick Coupler is closed. Move switch (5C) to the OFF position, the buzzer will stop.

Coupling a Bucket that is Reversed

NOTICE
When some buckets are used in the reverse position, it can be more difficult to couple the bucket and uncouple the bucket than in the normal position.

Care must be taken to ensure that the position of the boom, stick, and bucket are aligned to ensure smooth coupling.

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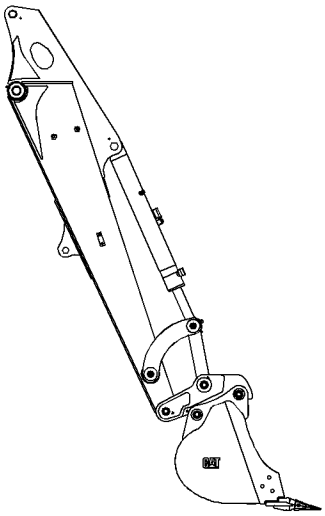

Illustration 135 g02163425

Follow the same steps for coupling and uncoupling the work tool in order to operate the Hydraulic Quick Coupler with a bucket that is reversed. Refer to “Coupling the Work Tool” and “Uncoupling the Work Tool” for the proper procedure.

i04420313

Bucket - Remove and Install

SMCS Code: 6001-011; 6001; 6001-012; 6101; 6102; 6523

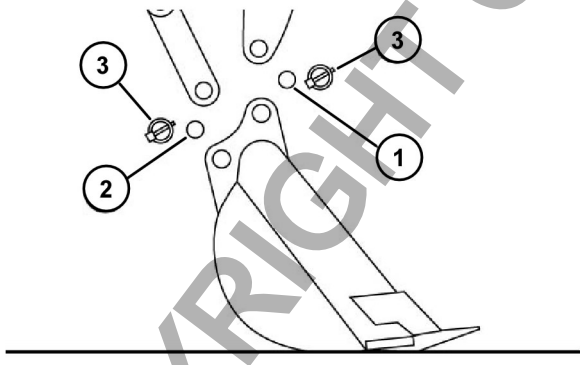

Illustration 136 g02466698

(1) Pin
(2) Pin
(3) Locking Pin

Removal Procedure

⚠ WARNING

Driving in linkage pins with a hammer can cause the pins to splinter, which can cause severe personal injury.

Always use personal protective equipment (protective goggles, helmets, gloves, and other protective equipment) when installing linkage pins.

⚠ WARNING

When the pin assembly is removed, the linkage assembly may swing out of the bucket. To prevent possible personal injury, do not stand in front of, or do not stand behind the linkage assembly when the pin assembly is being removed. Do not place any part of the body (hands, feet, etc.) beneath the bucket.

1. Start the engine. Park the machine on a hard, level surface and lower the bucket to the ground. Shut off the engine.

Note: Make sure that the bottom side of the bucket is facing downward.

2. Remove locking pin (3) from support pin (2) and remove the pin that connects the connecting link to the bucket.
3. Remove locking pin (3) from support pin (1) and remove the pin that connects the stick to the bucket.
4. Start the engine and raise the stick out of the bucket.

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Note: After the support pins have been removed, make sure that the support pins do not become contaminated with sand or dirt. Make sure that the stick and the linkage do not become damaged.

Installation Procedure

⚠ WARNING

Failure to follow the instruction below for the installation of a work tool may result in personal injury or death. Special care must be taken if more than one person is installing the work tool.

- **Confirm the verbal communication and the hand signals that will be used during the installation.**
- **Be alert for sudden movement of the front linkage and the work tool.**
- **Do not insert fingers into the bores of the support pins when the support pins and the bores are being aligned.**

⚠ WARNING

Driving in linkage pins with a hammer can cause the pins to splinter, which can cause severe personal injury.

Always use personal protective equipment (protective goggles, helmets, gloves, and other protective equipment) when installing linkage pins.

⚠ WARNING

When the pin assembly is removed, the linkage assembly may swing out of the bucket. To prevent possible personal injury, do not stand in front of, or do not stand behind the linkage assembly when the pin assembly is being removed. Do not place any part of the body (hands, feet, etc.) beneath the bucket.

1. Start the engine. Park the machine on a hard, level surface. Position the bucket on a hard, level surface with the bottom side facing downward.
2. Clean each pin and each pin bore. Lubricate each pin bore with molybdenum grease.
3. Start the engine and lower the stick into the bucket until the pin bores are in alignment with each other. Stop the engine and put the hydraulic lockout control in the RAISED position.
4. Install support pin (1) in order to connect the stick to the bucket. Secure the pin with locking pin (3).
5. Install support pin (2) in order to connect the connecting link to the bucket. Secure the pin with locking pin (3).
6. In order to verify a proper work tool installation, perform the following procedure:
   a. Start the engine. Position the work tool on the ground.
   b. Apply a slight down pressure on the work tool.
   c. Retract and extend the stick cylinder in order to push the work tool against the ground. Visually confirm that there is no movement between the linkage and the work tool and the locking pins are properly fixed.

i05356675

Hammer Operation
(If Equipped)

SMCS Code: 5705-WTL

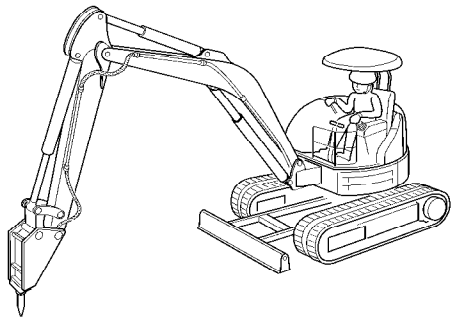

Illustration 137 g00821410

NOTICE
Selection of a hydraulic hammer must be done with extra care. Use of a hydraulic hammer not recommended by Caterpillar could result in structural damage to the machine. Consult your Caterpillar dealer for hydraulic hammer information.

Only use the hydraulic hammer to break rocks, concrete, and other hard objects. Before you start hydraulic hammer operation, place the machine on a level, stable surface. If the machine must be placed on a slope or on a rough surface, be careful during operation.

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If the machine is equipped with a canopy, make sure that the machine is equipped with a polycarbonate shield. However, the limited operating range has to be observed, see illustrations 138 and 139 . When visibility is restricted due to rain, snowfall, dust etc., the work has to be stopped. Resume work only if visibility is no longer restricted. Wear protective equipment such as a hard hat and protective goggles before you start hydraulic hammer operation.

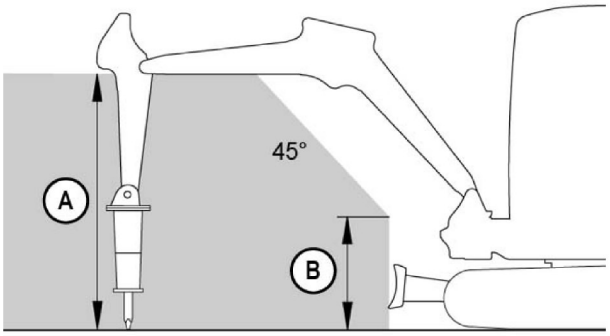

Illustration 138 g03392773

(A) 120 cm (47 inch)
(B) 50 cm (20 inch)

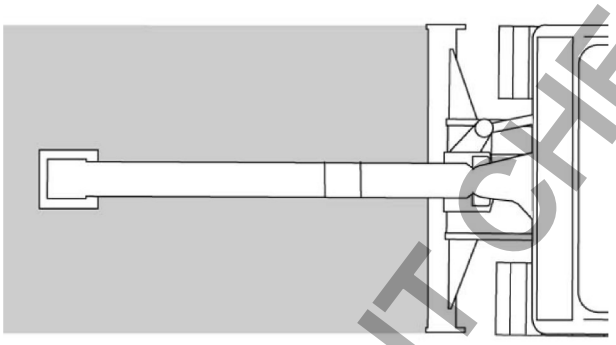

Illustration 139 g03392776

NOTICE
In order to avoid structural damage to the host machine or the hydraulic hammer, comply with the following:

Do not attempt to break rocks or concrete by burying the hammer tool completely into the rocks or concrete.

Do not apply a prying force to the hammer tool in order to remove the hammer tool from the material.

NOTICE
Frequent idle strokes (blank firing) have a deteriorating effect on the hammer. Do not operate the hammer without proper down pressure against the object.

Do not allow the hydraulic hammer to continuously operate at one location and for more than 1 minute. Change the location of the machine and repeat the procedure. Failure to change the location of the machine could cause the hydraulic oil to overheat. Overheated hydraulic oil could damage the accumulator or the cylinder seals.

Stop hydraulic hammer operation immediately if any of the hydraulic hoses are twisting rapidly. This indicates that the accumulator is punctured. Consult your Cat dealer for the necessary repairs.

NOTICE
Do not use the dropping force of the hydraulic hammer to break rocks or other hard objects. This could cause structural damage to the machine.

Do not use the sides or back of the hydraulic hammer to move rocks or other hard objects. Doing this could cause damage not only to the hammer but to stick or boom cylinder.

Do not operate the hydraulic hammer with any of the cylinders fully retracted or extended. Doing this could cause structural damage to the machine, resulting in reduced machine life.

Do not use the hydraulic hammer to lift an object.

Do not operate the hydraulic hammer while the stick is vertical to the ground. This type of operation could allow the stick cylinder to vibrate excessively.

Do not operate the hydraulic hammer on objects in water. This type of operation could cause the chisel to rust and the seal on the sliding section to be damaged.

Operate the attachment control levers carefully in order to keep the hydraulic hammer's chisel from hitting the boom.

Do not operate the hydraulic hammer with the upper structure sideways to the undercarriage. Before you start hydraulic hammer operation, place the upper structure in the recommended position that is shown in the following illustration. Any other operating positions could make the machine unstable. Any other operating positions could place excessive loads on the undercarriage.

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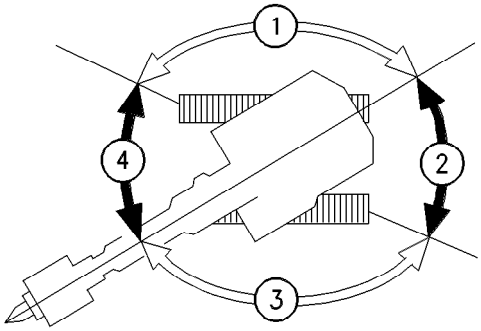

Illustration 140 g00101503

(1) Incorrect position
(2) Correct position
(3) Incorrect position
(4) Correct position

i04458009

Blade Operation

SMCS Code: 6060

NOTICE
The machine can be damaged if the adjustable gauge undercarriage and the stabilizer blade are set to different widths (for instance when driving through a door).

Adjust the stabilizer blade and the adjustable gauge undercarriage to the same widths when operating the machine.

Reducing the Width of the Stabilizer Blade

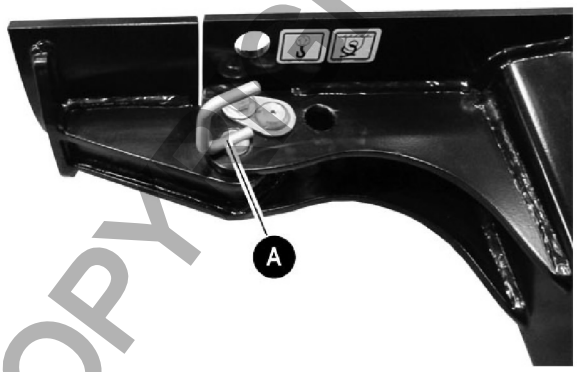

Illustration 141 g02643458

1. Raise the stabilizer blade to about 1-2 cm (0.39-0.79 inch).

2. Pull out pins (A) on either side.

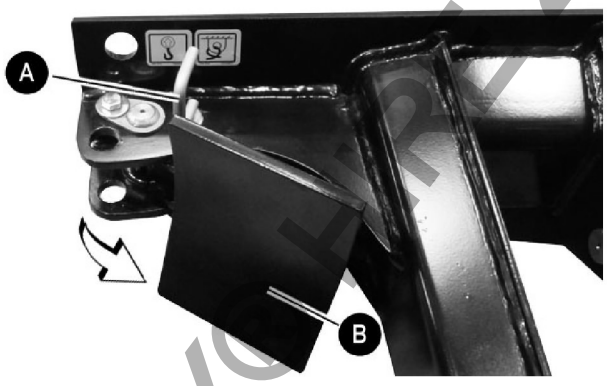

Illustration 142 g02643459

3. Fold in the stabilizer blade extensions (B) on either side.

4. Insert pins (A) on either side.

Increasing the Width of the Stabilizer Blade

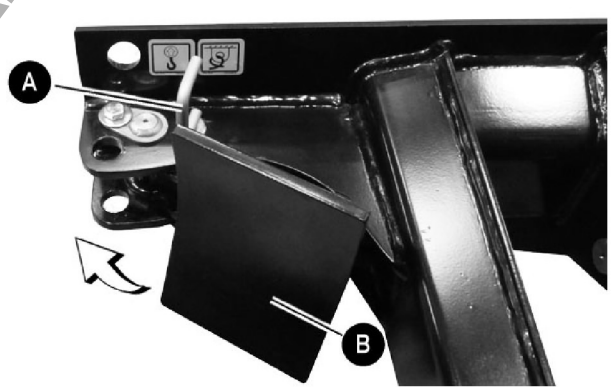

Illustration 143 g02643460

1. Raise the stabilizer blade to about 1-2 cm (0.39-0.79 inch).

2. Pull out pins (A) on either side.

3. Fold out the stabilizer blade extensions (B) on either side.

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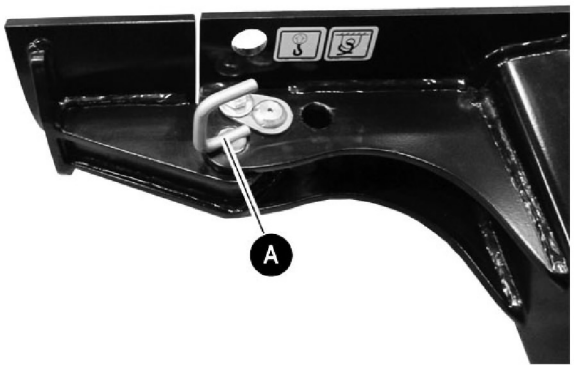

Illustration 144 g02643458

4. Insert pins (A) on either side.

i05334780

Rubber Belt Track Operation

SMCS Code: 4198

The rubber part of the track assembly can easily be damaged during operation. Operate the machine with the rubber belt only if damage to the rubber belt is shallow and the damage is not harmful. However, any harmful damage to the rubber can cause the following serious problems to the entire track assembly:

- Early wear of iron core.
- Early wear of track grousers.
- Fracture of iron core.
- Fracture of track grousers.
- Cuts of steel cords
- Rubber flaking off
- Disengagement of sprocket

Such a failed track assembly needs to be replaced as a unit. In order to minimize the replacement of the track, observe the following items. In order to maximize the performance of the track, observe the following items:

- Avoid Traveling at sites for demolition.
- Traveling at these sites should be avoided particularly when the machine is being swung at the same time.
- Avoid operation under salty conditions.
- Avoid combined operation of travel and swing with excessive load at rough terrain.
- Avoid operation at rocky sites.
- Avoid suddenly swinging the machine when the machine is Traveling on pavement.
- Use the rubber belt tracks at temperatures within −15 °C (5 °F) to 45 °C (113 °F). Avoid operation on hot surfaces.
- Rubber belt tracks are less stable than steel tracks. Side-to-side movement of the machine should be done carefully.
- If the sprockets are badly worn, use a new sprocket for replacement.
- Be sure that the tracks are free of oily materials such as fuel, hydraulic oil, grease, etc.
- Avoid going over sharp obstacles. Decreased life of the track, fracture of the track grousers and cut steel cords can occur.
- Track Tension must be correctly maintained and checked regularly.
- Disengagement of the track could occur if the track gets clear of the track roller. This could happen while the machine travels over an obstacle.

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Parking

i05338147

Stopping the Machine

SMCS Code: 7000

⚠ WARNING

Deactivation of the controls and drive levers does not prevent the blade, boom swing, or auxiliary circuit functions from moving if the blade lever or a foot pedal is moved.

Personal injury or death may occur from sudden machine movement.

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

Park on a level surface. If the machine must be parked on a grade, chock the tracks securely.

Illustration 145 g03381500

1. Push forward (A) on the governor control lever in order to reduce engine speed.

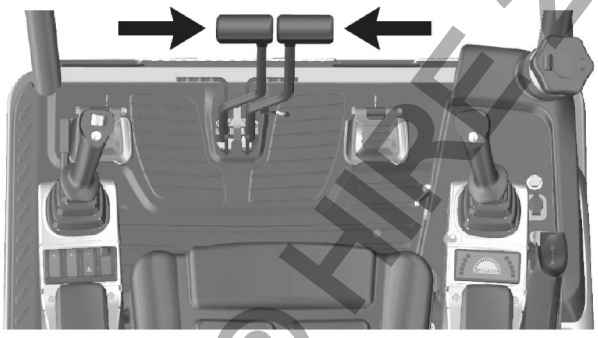

Illustration 146 g03381502

2. Move the left and right travel levers slowly to the STOP position in order to stop the machine.

Note: Avoid sudden stops. Sudden stops can damage the machine. Slow down and bring the machine to a smooth stop.

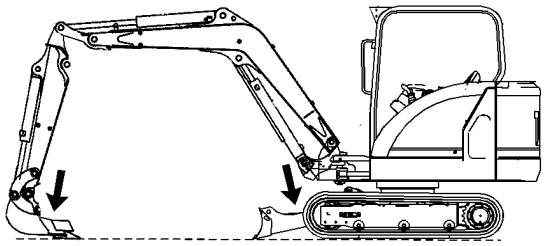

Illustration 147 g01178608

3. Lower the work tool and the blade to the ground. Apply a slight downward pressure.

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Illustration 148 g03378529

4. Raise the hydraulic lockout control to the RAISED position in order to deactivate the controls and drive levers.

i02220234

Freezing Conditions

SMCS Code: 7000

If freezing temperatures are expected, remove the mud and the dirt from each track roller frame. Park the machine on wood planks. Use the following procedure to clean each track roller frame.

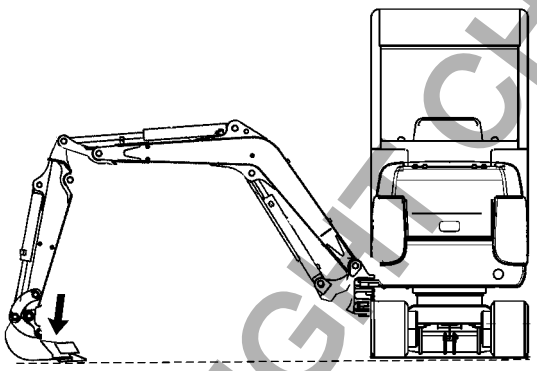

Illustration 149 g01123798

1. Position the boom over one side of the machine.

2. Use boom down pressure in order to lift the track on one side off the ground. Operate the track in the forward direction. Then operate the track in reverse. Continue this procedure until the maximum amount of material is thrown off the track.

3. Lower the track onto the wood planks.

4. Repeat the procedure for the other track.

5. Clean the area around the skid plate that is located on top of the track roller frame and around the track rollers.

6. Lower the attachment onto a wood plank.

i05334850

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.

1. Stop the machine and lower all work tools to the ground.

2. Turn off all auxiliary electrical equipment.

3. Run the engine at low idle for 5 minutes.

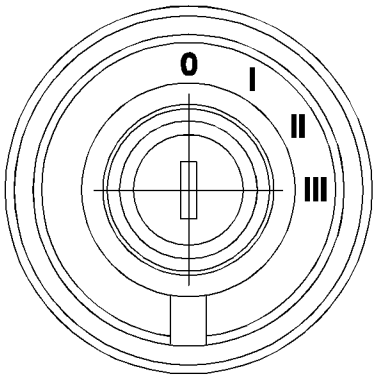

Illustration 150 g02475385

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

0 **Off – The engine is stopped with the key in this position.**

Stop the Engine if an Electrical Malfunction Occurs

Lower all attachments and the blade to the ground. Turn the engine start switch key to the OFF position. If the engine does not stop, perform the following procedure.

1. Open the engine access door that is located in the rear of the machine.

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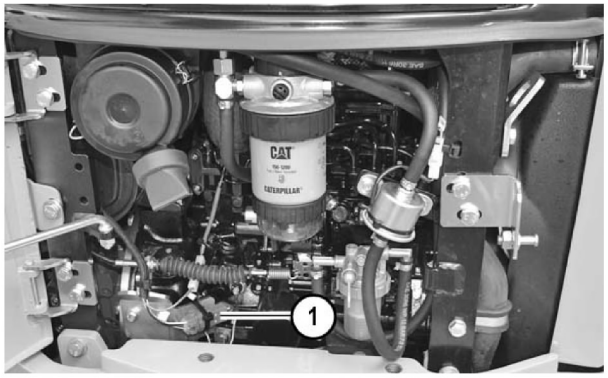

Illustration 151 g03379759

2. Disconnect the engine stop solenoid plug from the wiring loom and the engine will stop.

Note: Do not operate the machine again until the malfunction has been corrected, and the plug reconnected and fixed with cable straps.

i04278009

Leaving the Machine

SMCS Code: 7000

1. Remove the engine start switch key.

Removing the key will prevent unauthorized persons from starting the engine or from turning on the lights.

2. Use the handholds when you exit the machine. Face the machine and use both hands. Step from the operator stand to the ground. Make sure that the rubber mat is clear of debris before you dismount.

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

4. Lock the engine cover.

i04452820

Machine Storage

SMCS Code: 7000

Preparatory Work Before Taking the Machine out of Service

The measures indicated below refer to putting the machine out of operation for 30 days or longer.

- Check whether oil or other fluids leak from the machine.
- Clean the engine with a high-pressure cleaner in a suitable place.
- Carefully clean and dry the entire machine.
- Spray an anticorrosion agent onto bare metal parts of the machine (for example, piston rods of hydraulic cylinders).
- Apply grease to all lubrication points.
- Change engine oil.
- Check the hydraulic and engine oil level and the coolant level, fill up if necessary.
- Store the machine indoors if possible.
- If the machine is stored outdoors, place the machine on a wooden base and cover the machine with a watertight tarp to protect the machine against humidity.
- Fill up the fuel tank to the maximum level.
- Lower the boom and the stabilizer blade to the ground.
- Shut off the engine and cycle the joystick controls. Move the hydraulic lockout control to the RAISED position.
- Switch off the fuel prefilter on the upper carriage and the fuel filter on the engine (turn to OFF).
- Remove the battery and store the battery in a safe place. Charge the battery and carry out battery maintenance at regular intervals.
- After the exhaust system has cooled down, seal the exhaust pipe and the air intake opening of the air filter system.

Putting the Machine into Operation Again

The following measures must be taken if the machine is out of service for more than 30 days.

- Remove anticorrosion agent from the piston rods.
- Charge (if required), install and connect the battery.
- Remove the seals from the exhaust pipe and the air filter intake.
- Check the condition of the air filter elements and replace the elements if necessary.
- Check the dust valve.

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- Switch on the fuel prefilter on the upper carriage and the fuel filter on the engine (turn to ON).
- Turn the ignition to position “I” for 2 minutes (to supply the engine with fuel).
- Check whether oil or other fluids leak from the machine.
- Apply grease to all lubrication points.
- Check the hydraulic and engine oil level and the coolant level, fill up if necessary.
- If the machine was out of service for over 6 months, change the hydraulic oil, the engine oil, the oil in the final drives and also replace the hydraulic oil filter and the breather.
- Remove the fuse for the cutoff solenoid.
- Crank the engine for 15 seconds. Wait 15 seconds. Crank the engine again for 15 seconds.
- Install the fuse.
- Start the engine.
- Let the engine run at idling speed at least 15 minutes without load.

Check the oil levels in the final drives. Operate the machine and make sure that every function and all the safety and warning devices are working properly, before putting the machine back into service.

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Transportation Information

i02005176

Shipping the Machine

SMCS Code: 7000; 7500

Investigate the travel route for overpass clearances. Make sure that there will be adequate clearance for the machine.

Before you load the machine onto the trailer, remove ice, snow, or other slippery material from the loading dock and from the truck bed. Removal of ice, snow, or other slippery material will prevent the slipping of the machine as you load the machine. Removing ice, snow, or other slippery material will prevent the machine from moving in transit.

NOTICE
Obey all state and local laws governing the weight, width and length of a load.

Make sure the cooling system has proper antifreeze if moving machine to a colder climate.

Observe all regulations governing wide loads.

Do not use a fork lift to lift the machine. Using a fork lift to move your machine can result in property damage.

Choose the flattest ground when you load the machine or when you unload the machine.

1. Before you load the machine and before you unload the machine, chock the trailer wheels or chock the rail car wheels.
2. When you use loading ramps, make sure that the loading ramps have adequate length, adequate width, and adequate strength. In addition, make sure that the surfaces of the loading ramps are clean. This will help prevent the machine from sliding in all types of weather conditions. This will allow the machine to move on the ramps smoothly.
3. Maintain the slope of the loading ramps within 15 degrees of the ground.
4. Minimize any step between the base of the loading ramps and the ground.
5. Clean the tracks on the machine in order to prevent any slippage.

Loading The Machine

1. Position the machine so that the machine can drive straight up the loading ramps. Position the machine so that the front linkage and the dozer blade will be the first machine components to travel up the loading ramps. Make sure that the dozer blade is raised up.
2. Extend the front linkage forward over the trailer bed in order to help maintain balance.
3. Use caution when you travel over the areas around the loading ramp joints. Maintain the balance point of the machine.
4. After you load the machine onto the trailer be sure that the machine is properly positioned on the trailer bed.
5. Slowly, swing the upper structure for 180° and carefully move the machine toward the front of the trailer or the rail car.
6. Refer to the Operation and Maintenance Manual, “Lifting and Tying Down the Machine” for information on tying down the machine.

Unloading The Machine

1. Position the machine so that the machine can drive straight down the loading ramps. Position the machine so that the front linkage will be the first machine component to travel down the loading ramps. Position the machine so that the dozer blade will be the last machine component to travel down the loading ramps. Make sure that the dozer blade is raised up.
2. Extend the front linkage forward over the ramps. While you travel down the loading ramps, adjust the front linkage in order to allow the work tool to remain close to the ground. This will prevent the machine from tipping forward.

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3. Use caution when you travel over the areas around the loading ramp joints in order to maintain the balance point of the machine.

i05357360

Adjustable Gauge Undercarriage Frame

SMCS Code: 4150-VAR

The undercarriage will not expand evenly. When you are expanding the undercarriage, be sure to expand the undercarriage completely. If the undercarriage is not fully expanded, the upper structure can slide when the machine is operated. The machine can overturn if the upper structure slides.

The undercarriage will not retract evenly. When you are retracting the undercarriage, be sure to retract the undercarriage completely. If the undercarriage is not fully retracted, the upper structure can slide when the machine is operated. The machine can overturn if the upper structure slides.

Expand the undercarriage in an open area on flat, solid ground. The undercarriage should always be expanded except when you travel through narrow passages.

Expanding the Undercarriage and Retracting the Undercarriage

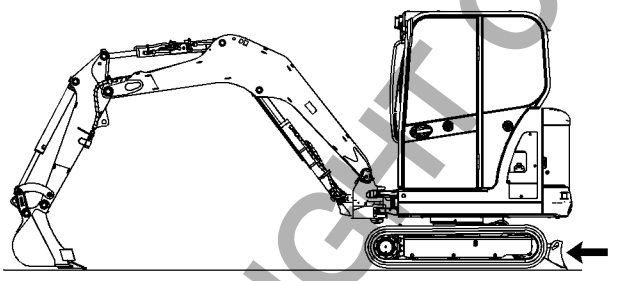

Illustration 152 g01178667

1. Swing the upper structure in order to position the dozer blade behind the operator.

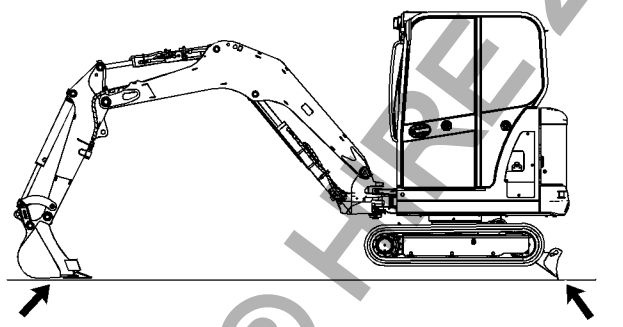

Illustration 153 g01178668

2. Apply down pressure with the dozer blade in order to lift the rear of the machine off the ground. Simultaneously hold the joystick controls in the BOOM LOWER position and the STICK OUT position until the tracks are off the ground.

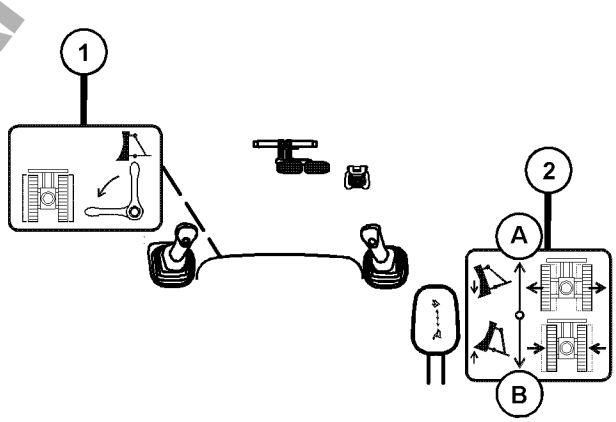

Illustration 154 g03392842

3. Rotate lever (1) to the horizontal position in order to control the adjustable gage undercarriage.

4. Move the control lever (2) forward (B) in order to expand the undercarriage. Move the control lever (2) backward (A) in order to retract the undercarriage. Release control lever (2).

Note: While expanding and retracting the undercarriage, the dozer blade may lift slightly and may cause the rear of the machine to lift or lower slightly.

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5. Rotate lever (1) to the vertical position in order to control the blade.

6. Simultaneously hold the joystick controls in the BOOM RAISE position and the STICK IN position in order to lower the front of the machine to the ground. Carefully lower the rear of the machine to the ground by using the dozer blade control.

7. Swing the upper structure in order to place the dozer blade in the front of the machine.

i05335202

Lifting and Tying Down the Machine

SMCS Code: 7000; 7500

⚠ WARNING

Tighten the four ROPS screw connections to the specific torque before raising the machine. Refer to Operation and Maintenance Manual, "Rollover Protective Structure (ROPS) - Inspect" for more information.

Tighten the four ROPS screw connections to the specific torque before raising the machine. Refer to Operation and Maintenance Manual, "Rollover Protective Structure (ROPS) - Inspect" for more information.

NOTICE
Improper lifting or tiedowns can allow load to shift and can cause injury and damage.

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

Use proper rated cables and slings for lifting. The crane should be positioned so that the machine is lifted parallel to the ground.

Positioning the Machine for Lifting

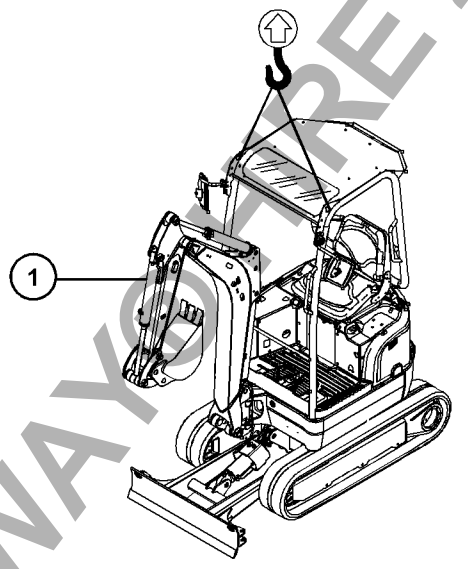

Illustration 155 g03392846

1. Raise the blade.

2. Position the boom in a straight ahead position.

3. Retract the boom cylinder, extend the stick cylinder, and work tool cylinder (1) to the end of the stroke.

4. Engage the swing lock pin.

5. Stop the engine. Raise the hydraulic lockout control and dismount the machine. Lock the engine door.

Lifting the Machine

Note: Ensure that the undercarriage is fully expanded before you lift the machine. Ensure that an empty standard bucket is installed on the machine.

1. Attach shackles to the lifting eyes on the top of the canopy and fasten slings to the shackles.

2. Use lifting gears that match the required lengths.

Table 10

(A)	1300 mm (51 inch)

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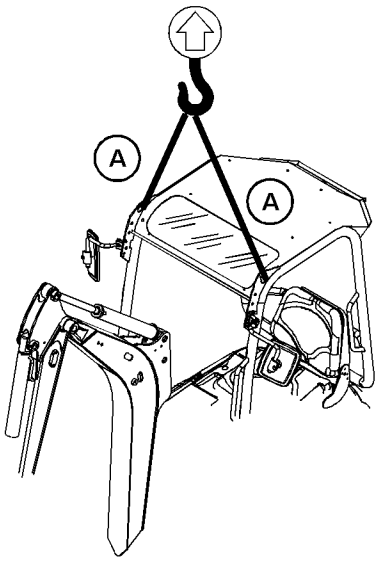

Illustration 156 g03380280

3. Raise the machine slowly in order to make sure that the machine stays in a horizontal position.

Tying Down the Machine

Note: Do not allow anyone in the machine during the transport of the machine.

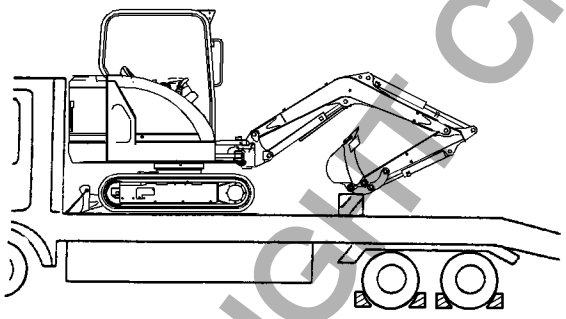

Illustration 157 g01178554

1. Lower the blade to the trailer.

2. Extend the bucket and stick cylinders to the end of the stroke.

3. Lower the boom slowly in order to rest the bucket control linkage on a block of wood.

4. Stop the engine and remove the key.

5. Move all of the hydraulic control levers several times in order to relieve any trapped pressure.

6. Engage the swing lock pin.

7. Move the hydraulic lockout control to the RAISED position.

8. Close the engine door, remove the polycarbonate shield (if equipped), and the weather protection (if equipped).

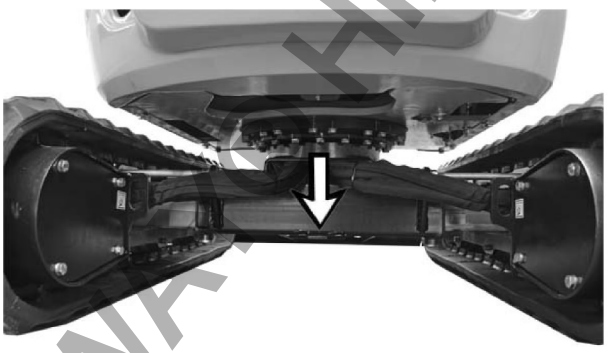

Illustration 158 g03379984

9. Chock the tracks. Install tie-downs on the front eye on the blade in order to prevent shifting in transit. Install tie-downs on the bucket control linkage in order to prevent the boom from shifting. Install tie-downs on the rear eye on the lower frame in order to prevent shifting in transit.

Note: Use protectors between the machine and tie-downs.

10. Separately tie down all work tools that will accompany the machine. Refer to the operation manual for the work tools for instructions on tying down the individual work tools.

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Towing Information

i05335152

Towing the Machine

SMCS Code: 7000

Towing the machine:

- Ensure that the excavator can be towed safely
- Use the towing bracket for towing the machine.
- Use the towing bracket only for towing the machine
- Use a shackle pin with a lock pin
- Take off slowly!
- Ensure that there are no persons close to the towing equipment (towing bar, cable)!

⚠ WARNING

Personal injury or death could result when towing a disabled machine incorrectly. Keep all personnel clear of the disabled machine until the machine has been towed to a safe place. Follow the towing procedure.

The maximum admissible load of the towing bracket is one and a half times the machine weight.

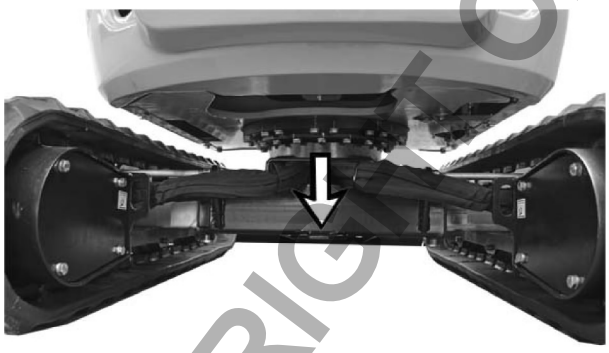

Illustration 159 g03379984

Use the towing bracket on the undercarriage.

Use a shackle and secure the shackle with the shackle pin and a lock pin.

Mount a towing bar or cable of adequate size to the towing eye.

Pull the machine slowly.

NOTICE

Follow the following instructions under all circumstances:

Do not tow the machine if the machine is at a standstill or broken down, otherwise the final drives of the machine can be damaged.

The manufacturer's warranty shall not apply to accidents or damage caused by towing the excavator.

Do not tow other things (for example, machines, trailers, etc.) with the towing bracket.

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Engine Starting (Alternate Methods)

i02016499

Engine Starting with Jump Start Cables

SMCS Code: 1000; 7000

⚠ WARNING

Failure to properly service the batteries may cause peronal 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 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.

Always connect the battery positive (+) to battery positive (+) and the battery negative (−) to battery negative (−).

Jump start only with an energy source with the same voltage as the stalled machine.

Turn off all lights and accessories on the stalled machine. Otherwise, they will operate when the energy source is connected.

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

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.

Use only equal voltage for starting. Check the battery and starter voltage rating of your machine. Use only the same voltage for jump starting. Use of a welder or higher voltage damages the electrical system.

Refer to Special Instruction, SEHS7633, “Battery Test Procedure” available from your Caterpillar dealer, for complete testing and charging information.

1. Lower the equipment to the ground. Move all controls to the HOLD position. Move the hydraulic lockout control (lever) to the LOCKED position.
2. Turn the start switch on the stalled machine to the OFF position. Turn off all accessories.
3. Move the machine that is being used as an electrical source near the stalled machine so that the jump start cables reach the stalled machine. **Do not allow the machines to contact each other.**
4. Stop the engine of the machine that is being used as an electrical source. If you are using an auxiliary power source, turn off the charging system.
5. Ensure that battery caps on both machines are tight and correctly placed. Ensure that batteries in the stalled machine are not frozen. Make sure that the batteries have enough electrolyte.

Note: The positive terminal of the 12 volt system of the source and the negative terminal of the 12 volt system of the source must be identified correctly before the jumper cables are connected. The positive terminal of the 12 volt system of the discharged battery must be identified correctly before the jumper cables are connected.

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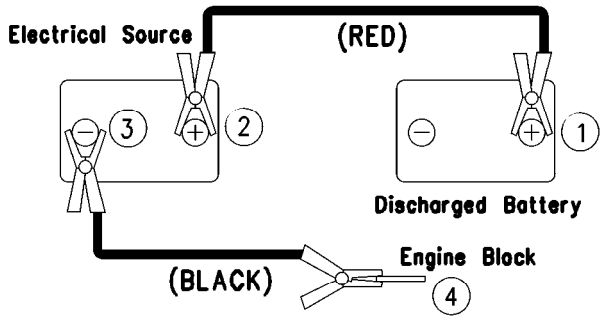

Illustration 160 g00818210

6. The positive ends of the jump start cable are red. Connect one positive end of the jump start cable to positive cable terminal (1) of the discharged battery.

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

7. Connect the other positive end of the jump start cable to positive cable terminal (2) of the electrical source.

8. Connect one negative end of the jump start cable to negative cable terminal (3) of the electrical source.

9. Finally, connect the other negative end of the jump start cable to engine block (4) of the stalled machine. Do not connect the jump start cable to the battery post. Do not allow the jump start cables to contact the battery cables, the fuel lines, the hydraulic lines, or any moving parts.

10. Start the engine of the machine that is being used as an electrical source or energize the charging system on the auxiliary power source.

11. Wait at least two minutes before you attempt to start the stalled machine. This will allow the batteries in the stalled machine to partially charge.

12. Attempt to start the stalled engine. See Operation and Maintenance Manual, “Engine Starting” for the correct starting procedure.

13. Immediately after you start the stalled engine, disconnect the jump start cables in reverse order.

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Maintenance Section

Maintenance Access

i05344497

Access Door and Cover Locations

SMCS Code: 726A-CH

Engine Door

Illustration 161 g03385687

Open the engine door by unlocking the lock with the ignition key, pushing the lock inside, and opening the door towards you completely, so that lock bar (A) locks the engine door against closing.

To close the engine door, raise lock bar (A) on the left side, close the engine door, and firmly press the door towards the machine and lock the engine door with the ignition key.

Left Side Cover

Illustration 162 g03385692

1. To open left side cover (A), first open the engine door.

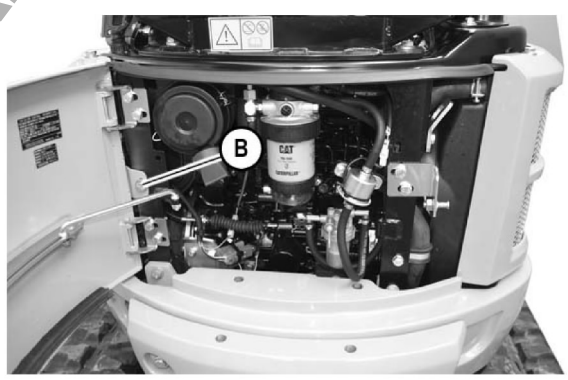

Illustration 163 g03385695

2. Remove all three screws (B).

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Illustration 164 g03385697

3. Fold left side cover A towards you and remove the cover by pulling the cover upwards.

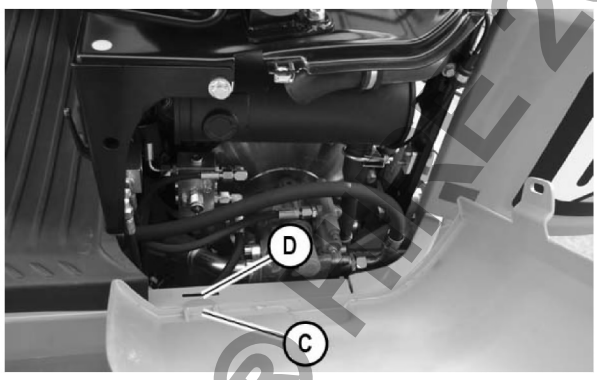

Illustration 165 g03385717

4. To close the left side cover (A), hook the cover bracket (C) into the cut (D) and close the left side cover in reverse order.

Right Side Cover

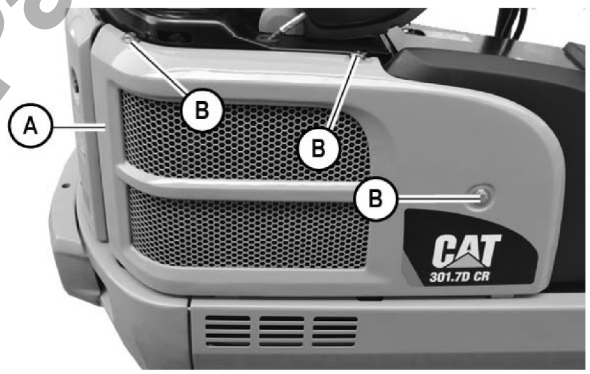

Illustration 166 g03385720

1. To open the right side cover (A), remove all three screws (B).

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Illustration 167 g03385721

2. Fold right side cover (A) towards you and remove the cover by pulling the cover upwards.

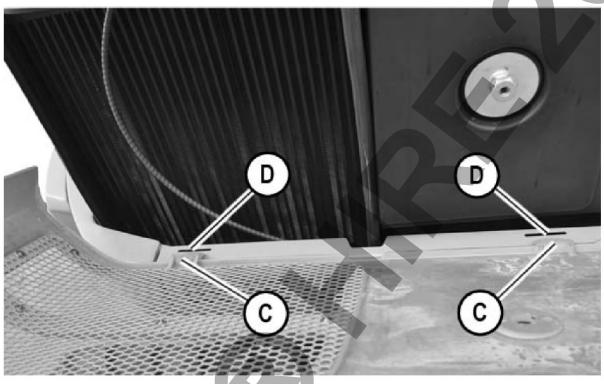

Illustration 168 g03385726

3. To close the right side cover (A), hook the cover brackets (C) into the two cuts (D) and close the right side cover in reverse order.

Access Opening Beneath Seat

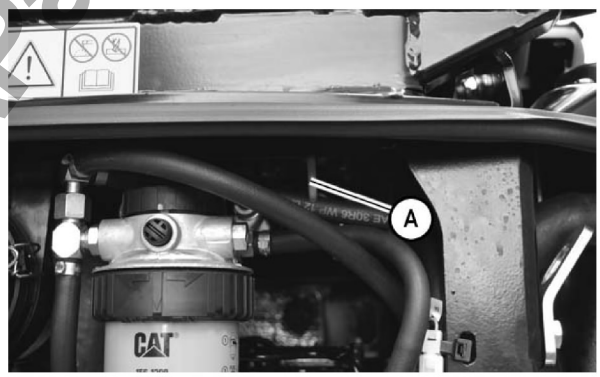

Illustration 169 g03385731

1. To fold the seat, first open the engine door.

2. Pull locking system (A) towards you, hold the locking system and fold the seat towards the boom.

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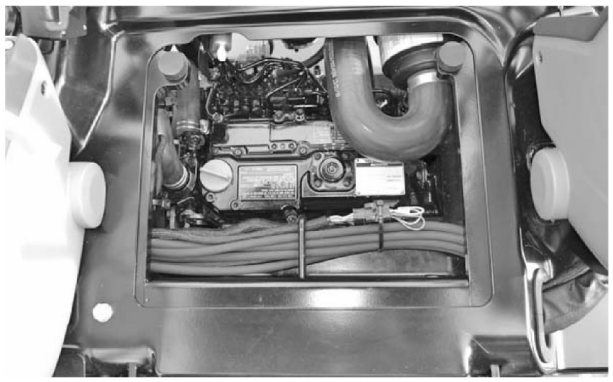

Illustration 170 g03385737

3. The seat is locked when an audible click is heard and the seat cannot be folded forward.

Note: When folding the seat back, pay attention to the seat belt buckle.

⚠ WARNING

Never operate a machine with a defective locking mechanism. Personal injury or death can result.

4. Close and lock the engine door.

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Lubricant Viscosities and Refill Capacities

i08015287

Lubricant Viscosities

SMCS Code: 7581

General Information for Lubricants

The footnotes are a key part of the tables. Read ALL footnotes that pertain to the machine compartment in question.

Selecting the Viscosity

To select the proper oil for each machine compartment, refer to the “Lubricant Viscosity for Ambient Temperature” table. Use the oil type AND oil viscosity for the specific compartment at the proper ambient temperature.

The proper oil viscosity grade is determined by the minimum ambient temperature (the air in the immediate vicinity of the machine). Measure the temperature when the machine is started and while the machine is operated.

Consult your Cat dealer if additional information is needed.

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

Engine Oil

Cat oils have been developed and tested to provide the full performance and life that has been designed and built into your machines engine.

Table 11

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance Requirements	Oil Viscosities	°C		°F	
			Min	Max	Min	Max
Engine Crankcase	Cat DEO	SAE 10W-30	−20	30	-4	86
		SAE 15W-40	−15	40	5	104

Hydraulic Systems

The following are the approved oils for use in this Cat machine hydraulic system:

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Table 12

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	**Oil Type and Performance Requirements**	**Oil Viscosities**	**°C**		**°F**	
			Min	**Max**	**Min**	**Max**
Hydraulic System	**Cat HYDO Advanced 10**	SAE 10W	−20	40	−4	104
	Cat BIO HYDOTM Advanced	SAE 10W	-30	45	-22	113

Final Drives

Table 13

Lubricant Viscosities for Ambient Temperatures					
Compartment or System	**Oil Type and Performance Requirements**	**°C**		**°F**	
		Min	**Max**	**Min**	**Max**
Final Drives	API GL4	−20	40	−4	104
	SAE 80W-90				

Special Lubricants

Grease

Each pin joint should be flushed with the new grease. Ensure that all old grease is removed. Failure to meet this requirement may lead to failure of a pin joint.

Table 14

Recommended Grease						
Compartment or System	**Grease Type**	**NLGI Grade**	**°C**		**°F**	
			Min	**Max**	**Min**	**Max**
Lubrication Points	**Cat Advanced 3 Moly**	NLGI Grade 2	−20	40	−4	104

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Diesel Fuel Recommendations

Illustration 171 g03042683

Diesel fuel must meet “Caterpillar Specification for Distillate Fuel” and the latest versions of “ASTM D975” or “EN 590” to ensure optimum engine performance. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for the latest fuel information and for Cat fuel specification. This manual may be found on the web at Safety.Cat.com.

Failures that result from the use of improper fuels are not Caterpillar factory defects. Therefore the cost of repairs would not be covered by a Caterpillar warranty.

Note: Ultra Low Sulfur Diesel Fuel (ULSD) is recommended, however, Caterpillar does not require the use of ULSD in engines that are not equipped with after treatment devices.

Biodiesel

Note: Up to B7 biodiesel blend level is acceptable for use. Diesel with a higher biodiesel portion or pure biodiesel is NOT acceptable.

Biodiesel is a fuel that can be made from various renewable resources that include vegetable oils, animal fat, and waste cooking oil. Soybean oil and rapeseed oil are the primary vegetable oil sources. To use any of these oils or fats as fuel, the oils, or fats are chemically processed (esterified). The water and contaminants are removed.

U.S. distillate diesel fuel specification “ASTM D975-09a” includes up to B5 (5 percent) biodiesel. Currently, any diesel fuel in the U.S. may contain up to B5 biodiesel fuel.

European distillate diesel fuel specification “EN 590” includes up to B5 (5 percent) and in some regions up to B7 (7 percent) biodiesel. Any diesel fuel in Europe may contain up to B5 or in some regions up to B7 biodiesel fuel.

Note: The diesel portion used in the biodiesel blend must be Ultra Low Sulfur Diesel (15 ppm sulfur or less, per “ASTM D975”). In Europe the diesel fuel portion used in the biodiesel blend must be sulfur free diesel (10 ppm sulfur or less, per “EN 590”). The final blend must have 15 ppm sulfur or less.

All the guidelines and requirements are provided in the latest revision of Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”. This manual may be found on the web at Safety.Cat.com.

Coolant Information

The information provided in this “Coolant Recommendation” section should be used with the “Lubricants Information” provided in the latest revision of Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”. This manual may be found on the web at Safety.Cat.com.

The following type of coolants may be used but not mixed with each other:

Approved for
S/N: LJD1–00299; LJ81–0099
– A coolant that fulfills “ASTM D4985” plus distilled water.

Approved for
S/N: LJD00300–Up; LJ800200–Up
– Cat ELC (Extended Life Coolant)

NOTICE
Never use water alone as a coolant. Water alone is corrosive at engine operating temperatures. In addition, water alone does not provide adequate protection against boiling or freezing.

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

This could result in damage to cooling system components.

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

i05618965

Capacities (Refill)

SMCS Code: 1000; 7000

Table 15

Approximate Refill Capacities				
Component or System		**Liters**	**US gal**	**Recommended Type**
Fuel Tank		**22**	**5.80**	**Diesel Fuel**
Cooling System	**S/N:** LJD1–00299; LJ81–00199	3.5	0.90	"ASTM D4985"
	S/N: LJD00300–Up; LJ800200–Up			Caterpillar Extended Life Coolant (ELC)
Engine Crankcase with Filter		3.5	0.90	Refer to Operation and Maintenance Manual, "Lubricant Viscosities".
Final Drive		0.6	0.16	
Hydraulic System(1)		11	2.90	

(1) The amount of hydraulic fluid that is needed to refill the hydraulic system after performing Operation and Maintenance Manual, "Hydraulic System Oil - Change"

i07445339

S·O·S Information

SMCS Code: 1000; 1348; 3080; 4050; 5050; 7000; 7542-008

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

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

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

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

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

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Maintenance Support

i07477696

Prepare the Machine for Maintenance

SMCS Code: 1000; 7000

Refer to the following procedure before you perform any maintenance to the machine.

⚠ WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

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, PERJ1017, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat ® products.

Dispose of all fluids according to local regulations and mandates.

Note: Permit only one operator on the machine. Keep all other personnel away from the machine or in view of the operator.

1. Park the machine on a dry, level, solid surface that is free of any debris.

Note: The surface must be solid enough to support the weight of the machine and any tooling that is used to support the machine.

2. Engage the parking brake. Place wheel blocks in front and behind the wheels or tracks.

3. Lower all work tools to the ground.

4. Stop the engine.

5. Release the pressure in the hydraulic system. Refer to Operation and Maintenance Manual, “System Pressure Release” for more information.

Perform a visual inspection first. If the visual checks are completed but the problem has not been identified, perform operational checks. If the problem has not been identified, perform instrument tests. This procedure will help to identify system problems.

i05345713

Service Interval Chart

SMCS Code: 7000

The service interval chart is located on the roof window.

Refer to this Operation and Maintenance Manual, “Maintenance Interval Schedule” for the correct maintenance intervals and procedures that are specific to your machine.

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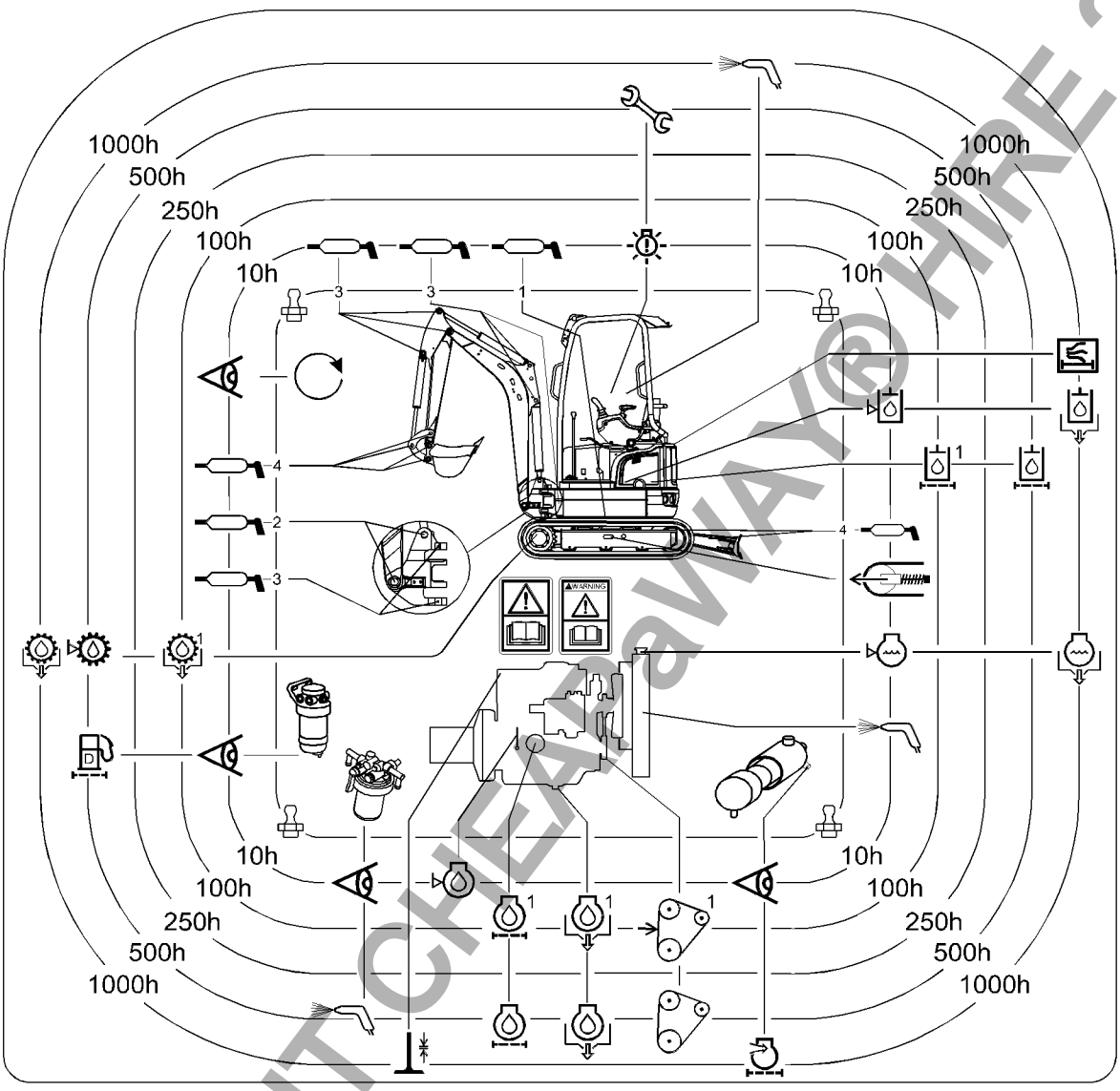

Illustration 172 g03396368

Visual check – Perform a visual check.

Coolant level – Check the coolant level.

Cooling system coolant – Change the cooling system coolant.

Engine valve lash – Check the engine valve lash and adjust if necessary.

Engine oil level – Check the engine oil level.

Engine oil – Change the engine oil.

Engine oil filter – Change the engine oil filter.

Belt – Check the belt tension.

Fuel system filter – Replace the fuel system filters.

Fuel system water separator – Drain the water separator.

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Grease zerk – Lubricate the designated locations.

Hydraulic oil level – Check the hydraulic oil level.

Hydraulic oil – Change the hydraulic oil.

Hydraulic oil filter – Change the hydraulic oil filter.

Track tension – Check the track tension.

i07937301

System Pressure Release

SMCS Code: 1250-553-PX; 1300-553-PX; 1350-553-PX; 5050-553-PX; 6700-553-PX; 7540-553-PX

⚠ WARNING

Personal injury or death can result from sudden machine movement.

Sudden movement of the machine can cause injury to persons on or near the machine.

To prevent injury or death, make sure that the area around the machine is clear of personnel and obstructions before operating the machine.

Coolant System

⚠ WARNING

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

To relieve the pressure from the coolant system, turn off the machine. Allow the cooling system pressure cap to cool. Remove the cooling system pressure cap slowly to relieve pressure.

Hydraulic System

⚠ WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

1. Lower the work tools to the ground.
2. Shut off the engine.
3. Move the joysticks through the full range of travel. Cycling the joysticks will relieve any pressure that may be present in the hydraulic system.

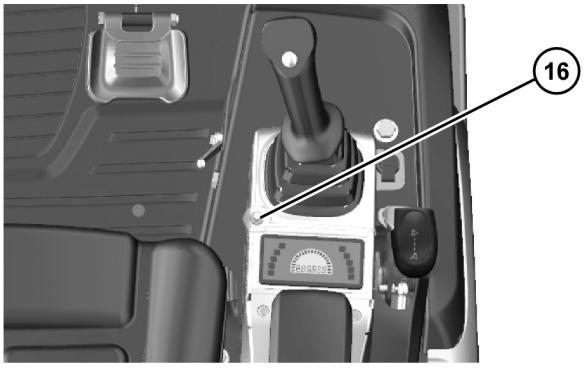

Illustration 173 g03399695

4. Actuate tank ventilation (16).
5. The pressure in the hydraulic system has been released.

Auxiliary Lines

Auxiliary lines are equipped with coupler assemblies. Wipe all coupler assemblies before you connect the work tools. The auxiliary lines must be relieved of pressure to connect the coupler assemblies to the work tool. Relieve the pressure in the auxiliary hydraulic lines by performing the following steps:

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1. Operate the machine to charge the accumulator.

2. Lower implements to the ground.

3. Turn off the engine and turn the key switch to the START position without starting the engine.

4. Ensure that the Hydraulic Lockout control is in the UNLOCKED position to provide function to the hydraulic circuits.

5. Actuate the auxiliary circuit in both directions several times.

Note: Pressure can build up in the auxiliary lines if the attachment is not coupled/uncoupled immediately after the pressure has been released.

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Maintenance Interval Schedule

SMCS Code: 7000

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

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

Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, to determine the maintenance intervals. Products that operate in severe operating conditions may require more frequent maintenance. Refer to the maintenance procedure for any other exceptions that may change the maintenance intervals.

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

The following guidelines should be followed if the service hours are not met:

Items listed between 10 and 100 service hours should be performed at least every 3 months.

Items listed between 250 and 500 service hours should be performed at least every 6 months.

Items listed between 1000 service hours and 2500 service hours should be performed at least every year.

When Required

Every 10 Service Hours or Daily

Initial 50 Service Hours

Every 50 Service Hours

Initial 100 Service Hours

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Every 250 Service Hours

Every 500 Service Hours

Every 750 Service Hours

Every 1000 Service Hours

Every 1500 Service Hours

Every 2000 Service Hours

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i04903891

Accumulator - Check

SMCS Code: 5077; 5077-PLT

⚠ WARNING

Gas under pressure. Rapid discharge from disconnecting or disassembly could cause personal injury or death. See service manual before relieving pressure or charging.

Consult your Cat dealer for service to the accumulator.

i08316356

Battery - Recycle

SMCS Code: 1401-561

Always recycle a battery. Never discard a battery.

Always return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- Recycling facility

i05347957

Battery Electrolyte Level - Check

SMCS Code: 1401-535-FLV; 1401-535; 1401

⚠ 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.

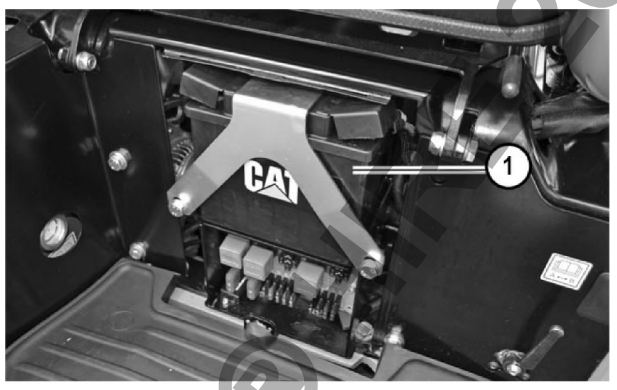

Illustration 174 g03387442

Battery (1) is located below the seat. Have the battery checked at regular intervals to make sure that the electrolyte level is between the “MIN” and “MAX” marks.

Checking the battery requires the battery to be removed from the machine. Consult your Cat dealer.

i00934872

Battery Hold-Down - Tighten

SMCS Code: 7257

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

i06881458

Battery or Battery Cable - Inspect/Replace

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

⚠ WARNING

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

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

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

Always wear protective glasses when working with batteries.

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1. Turn the engine start switch to the OFF position. Remove the engine start switch key from the switch. Turn all switches to the OFF position.
2. Remove the battery hold-down.
3. Disconnect the negative battery cable at the battery.
4. Disconnect the positive battery cable at the battery.
5. Inspect the battery terminals for corrosion. Clean the battery terminals and the surfaces of the batteries with a clean cloth.
6. Inspect the battery cables for wear or damage.
7. For necessary repairs, consult your Cat dealer. Replace the cable or the battery, as needed.
8. Connect the positive battery cable at the battery.
9. Connect the negative battery cable at the battery.
10. Coat the battery terminals with petroleum jelly to prevent corrosion.
11. Reinstall the battery hold-down. Tighten the hold-downs for the battery to prevent the batteries from moving during machine operation.
12. Install the engine start switch key.

Checking the Battery Electrolyte Level

⚠ 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.

Illustration 175 g02722192

Battery (1) is located in the engine compartment, on the right side of the radiator. Have the battery checked at regular intervals to make sure that the electrolyte level is between the “MIN” and “MAX” marks.

Checking the battery requires the battery to be removed from the machine. Consult your Cat dealer.

Checking the Battery Gas Drainage Hose

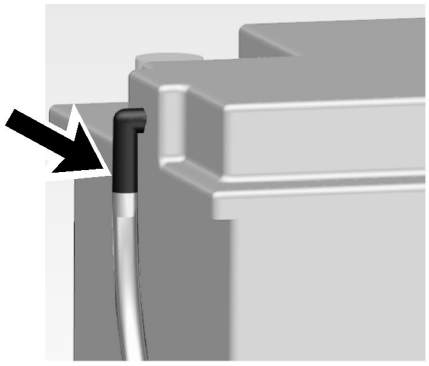

Illustration 176 g06152008

Check the battery gas drainage hose for proper venting.

Check to make sure that the battery gas drainage hose is not kinked or clogged.

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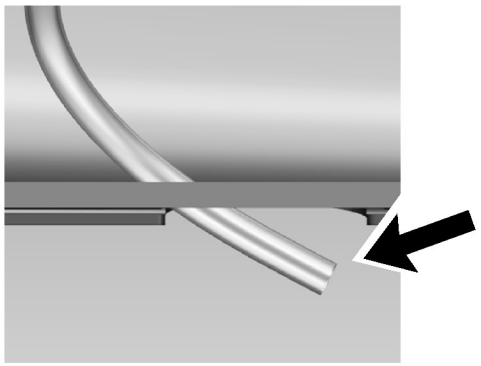

Illustration 177 g06152011

Check that the end of the battery gas drainage hose is not obstructed.

If the battery drainage hose is damaged, consult your Cat dealer.

Battery Recycle

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

i05348077

Belt - Inspect

SMCS Code: 1357-040; 1397-040

NOTICE
The V-belt must be tensioned correctly. Failure to tension the belt properly could damage the belt and/or to the belt guide, or water pump bearing.

Do not allow the belt to come in contact with any foreign substance such as oil or grease as damage to the V-belt may occur.

For maximum engine performance and maximum utilization of your engine, inspect the belts for wear and for cracking. Check the belt tension. Belt slippage will decrease the belt life. Belt slippage will also cause poor performance of the alternator and of any driven equipment.

If new belts are installed, recheck the belt adjustment after 5 minutes of operation. If two belts or more are required for an application, replace the belts in belt sets. If only one belt of a pair is replaced, the new belt will carry more load. This is because the older belts are stretched. The additional load on the new belt could cause the new belt to break.

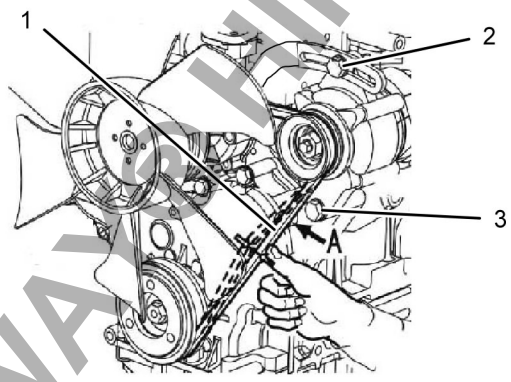

Illustration 178 g02460819

(1) Belt
(2) Adjusting bolt
(3) Mounting bolt

1. Fold the seat over. Refer to Operation and Maintenance Manual, “Access Door and Cover Locations” for more information.
2. Apply approximately 100 N (22 lb) of force midway between the pulleys.
3. Measure the deflection of the belt. The belt should deflect 6 to 8 mm (4/16 to 5/16 inch).
4. If the deflection is not correct, consult your Cat dealer.
5. Fold the seat back over until the seat locks into place with an audible click.

Note: If a new belt is installed, check the belt adjustment again after 5 minutes of engine operation at the rated engine speed.

i05348011

Blade Linkage - Lubricate

SMCS Code: 6060-086

Dozer

Lower all the work tools and the blade to the ground.

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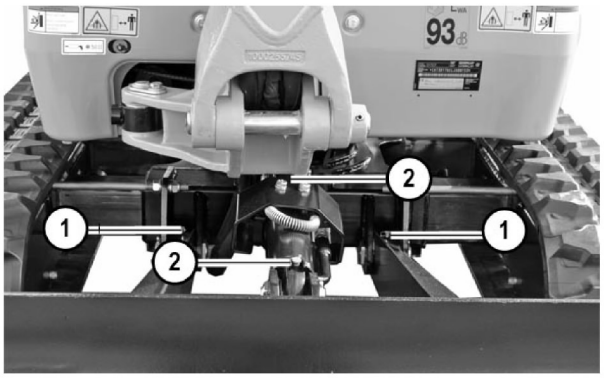

Illustration 179 g03387465

Wipe all fittings before lubricating.

1. Apply lubricant to the fittings for the arms (1) that support the blade.

2. Apply lubricant to the fittings of the blade cylinder (2).

i04552416

Boom, Stick and Bucket Linkage - Lubricate

SMCS Code: 6501-086; 6502-086; 6513-086

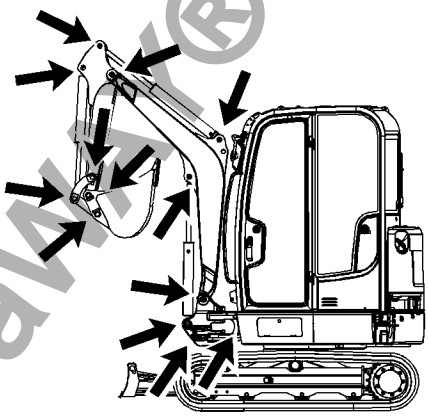

Illustration 180 g02722596

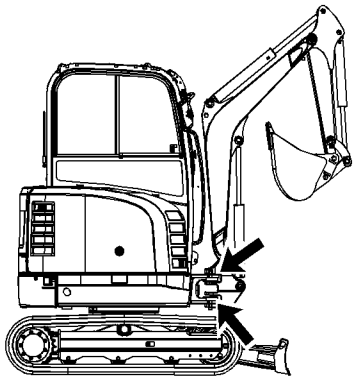

Illustration 181 g02722597

Wipe all fittings before you apply lubricant.

1. Park the machine on Level ground.

2. Lower the boom and work tool to the ground.

3. Lower the blade to the ground.

4. Stop the engine.

5. Remove the ignition key.

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6. Cycle the joystick controls. Move the hydraulic lockout control to the RAISED position.

7. Apply lubricant to the grease fittings.

i05348086

Boom, Stick, and Frame - Inspect

SMCS Code: 6501; 6502; 6506

All earthmoving equipment is prone to a high degree of wear. Regular inspections for structural damage are necessary.

The interval between these inspections depends on the factors that follow.

- The age of the machine
- The severity of the application
- The loads that have been carried on the machine
- The amount of routine servicing that has been carried out

If the machine has been involved in any accident, the machine must be inspected thoroughly. Inspect the machine regardless of the date of the last inspection.

The machine must be clean before the machine is inspected.

Proper repair of frames and structures requires specific knowledge of the following subjects.

- Materials that have been used to manufacture the frame members
- Frame member construction
- Repair techniques that are recommended by the manufacturer.

Consult your Cat dealer if repairs are necessary. Your Cat dealer is qualified to carry out repairs on your behalf.

All repairs should be carried out by a Cat dealer. If you carry out your own repairs, contact your Cat dealer for advice about proper repair techniques.

Particular attention should be given to all welded structures. Inspect the following items thoroughly for cracks and for defects:

- Boom
- Stick
- Blade
- Lifting points
- Upper frame
- Lower frame

NOTICE
The areas highlighted are of particular importance but other areas must not be neglected. The entire structure must be carefully examined.

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Boom

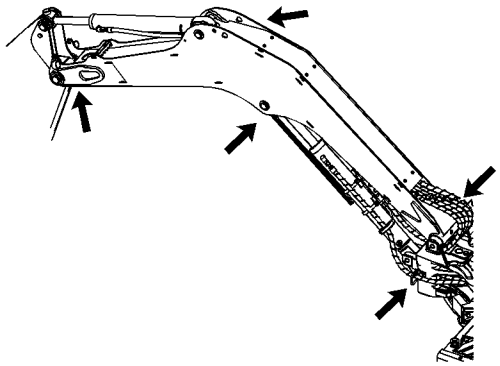

Illustration 182 g01425291

Check all welded joints and check the mounting points for the cylinder.

Stick

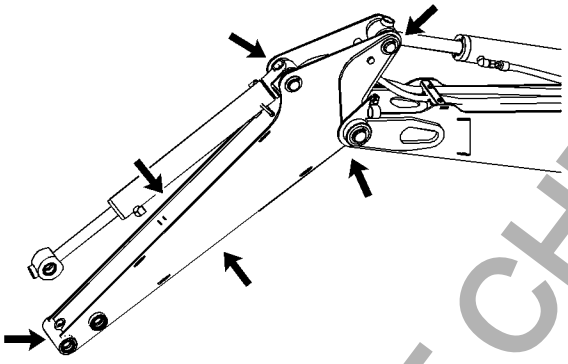

Illustration 183 g01425293

Check all welded joints and check the mounting points for the cylinder.

Blade

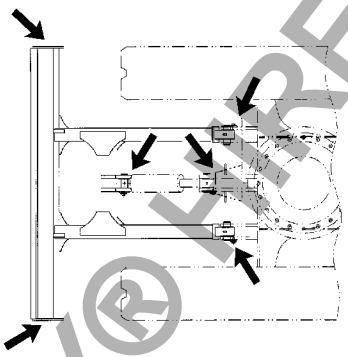

Illustration 184 g01425286

Check all welded joints and check the mounting points for the cylinder.

Lifting Eye

Immediately replace lifting eyes with inadmissible wear (beyond max. tolerance, for example), damage, deformations, surface cracks, and corrosion.

The nominal size must not be worn more than 5% (max. tolerance). Measurement can be performed with the accuracy of a slide gauge.

Welding is not allowed!

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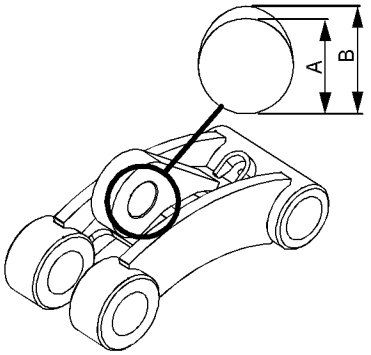

Illustration 185 g03387921

Table 16

Lifting Eye	Nominal Size (A)	Maximum Tolerance (B)
301.7D CR	32 mm (1.25 inch)	33.6 mm (1.32 inch)

Lifting Points

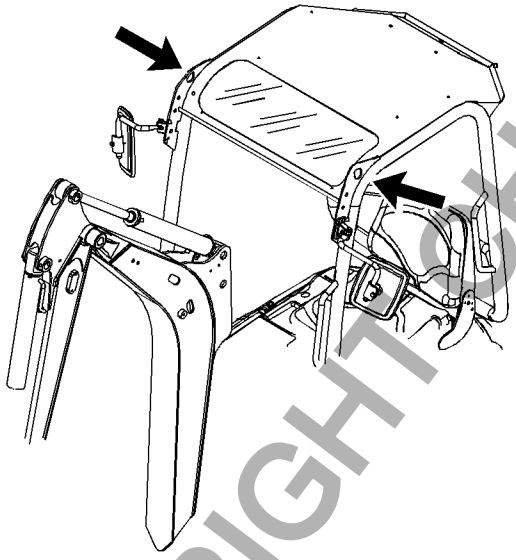

Illustration 186 g03396075

Check the approved lifting points carefully. Check the welds. Check that the plates are not excessively bent. Check that the lifting holes are not deformed.

Upper Frame

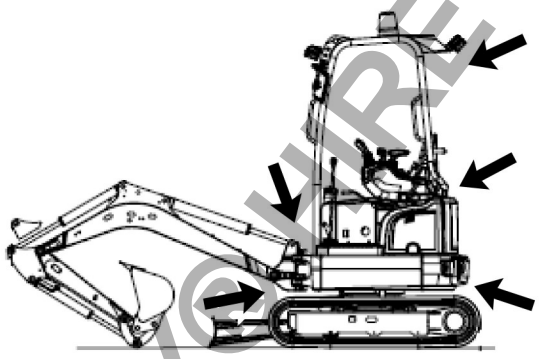

Illustration 187 g03396015

Check for damaged panels. Specifically look for any damage to the canopy that might invalidate the certification. The canopy is a safety device that must be maintained in good condition. Check for loose hardware or missing hardware.

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Note: Replace any hardware that is loose, damaged, or missing with original replacement parts only.

Lower Frame

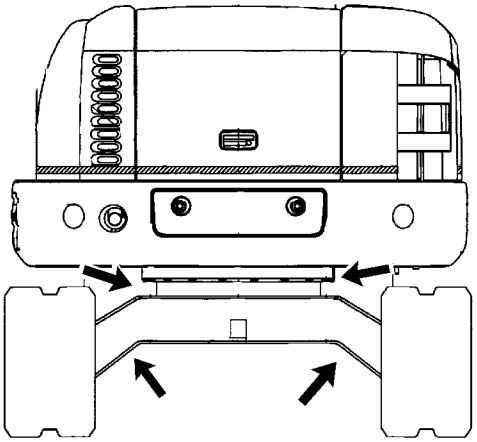

Illustration 188 g02461697

Check the weld joints in the lower structure. Check for loose hardware or missing hardware. Check the ring of bolts that secure the swing gear.

i04317011

Bucket Tips - Inspect/Replace

SMCS Code: 6805-040; 6805-510

⚠ WARNING

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket tips or side cutters.

Bucket Tips

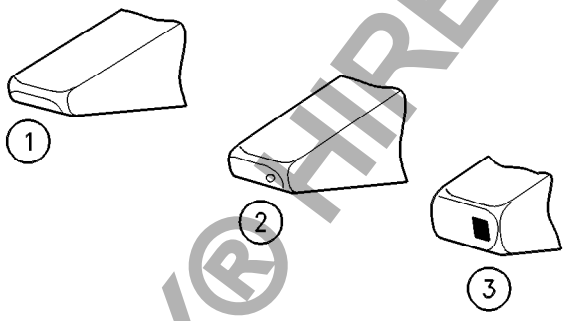

Illustration 189 g00101352

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

Check the bucket tips for wear. Consult your Cat dealer if the bucket tips need to be replaced. Your Cat dealer is qualified to carry out repairs on your behalf.

i04317357

Coolant System - Flush

SMCS Code: 1350; 1352; 1395

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, PERJ1017, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat ® products.

Dispose of all fluids according to local regulations and mandates.

Note: During the warranty period, this procedure may be performed by Cat dealers only.

Refer to Operation and Maintenance Manual, “Cooling System Coolant - Change” for information on draining and filling the cooling system.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” that pertains to containing fluid spillage.

1. Flush the system with clean water in order to remove any debris.

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2. Use a cooling system cleaner to clean the system. Follow the instructions on the label.

3. Drain the cleaner into a suitable container. Flush the cooling system with clean water.

4. Fill the cooling system with clean water and operate the engine until warm.

NOTICE
Improper or incomplete rinsing of the cooling system can result in damage to copper and other metal components.

To avoid damage to the cooling system, make sure to completely flush the cooling system with clear water. Continue to flush the system until all signs of the cleaning agent are gone.

5. Drain the cooling system into a suitable container and flush the cooling system with clean water.

Note: Flush the cooling system cleaner thoroughly from the cooling system. Cooling system cleaner that is left in the system will contaminate the coolant. The cleaner may also corrode the cooling system.

6. Repeat Steps 4 and 5 until the system is clean.

7. Fill the cooling system with coolant.

i05619064

Cooling System Coolant - Change

SMCS Code: 1350-044; 1352; 1395-044; 1395

⚠ 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.

⚠ WARNING

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

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

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

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

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

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

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

NOTICE
“ASTM D4985” coolant may not be mixed with any other coolants. Do not add any extender.

Mix the coolant with distilled water at the rate of 1/1. Ordinary water is not suitable. The use of more distilled water/coolant as well as the use of pure distilled water/coolant is not allowed.

Improper mixing could result in damage to cooling system/engine components.

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

This could result in damage to cooling system components.

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

Note: During the warranty period, this procedure may be performed by Cat dealers only.

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Machines
S/N: LJD1–00299; LJ81–00199
are shipped from the factory with coolant that fulfills “ASTM D4985”. Coolant that fulfills “ASTM D4985” is required when you are changing the coolant.

Machines
S/N: LJD00300–Up; LJ800200–Up
are shipped from the factory with Cat 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”.

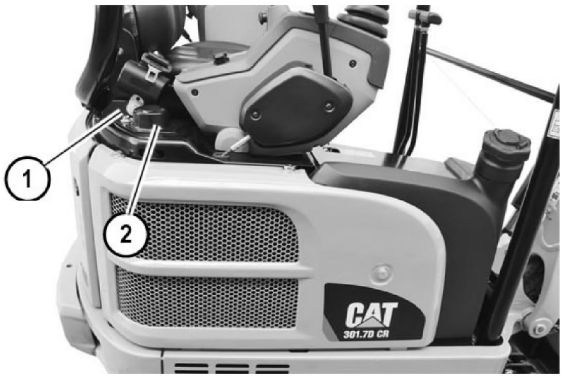

Illustration 190 g03389761

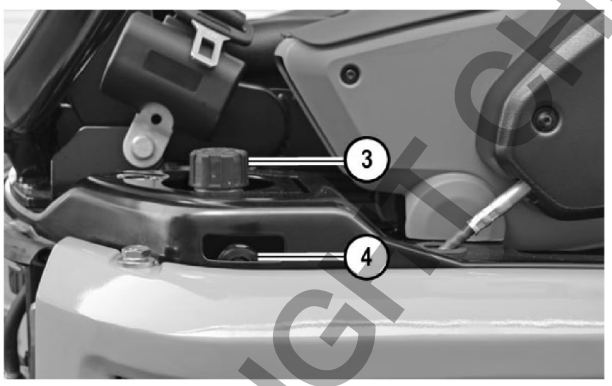

Illustration 191 g03390007

1. Remove screw (1) and remove cap (2). Loosen the radiator cap (3) slowly in order to release pressure. Remove the radiator cap.

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

2. Remove the lower radiator hose and allow the coolant to drain into a suitable container.

Note: Dispose of drained fluids according to local regulations.

3. Flush the cooling system with clean water until the draining water is clean.

4. Install the lower radiator hose.

5. Fill with the appropriate coolant mixture to the proper level in sight gauge (4). See Operation and Maintenance Manual, “Capacities (Refill)”.

6. Start the engine. Operate the engine without the radiator cap until the thermostat opens and the coolant level stabilizes.

7. Check the coolant level. Maintain the coolant level on the site gauge (4).

8. If additional coolant is necessary, add the appropriate coolant mixture.

9. Install radiator cap (3).

10. Stop the engine.

11. Reinstall the cap (2) and tighten screw (1).

i05351765

Cooling System Coolant Level - Check

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

WARNING

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

1. Maintain the coolant level on the site gauge (4).

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

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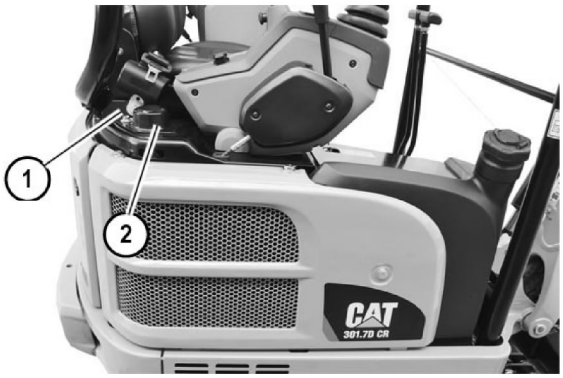

Illustration 192 g03389761

2. If additional coolant is necessary, remove screw (1) and remove cap (2).

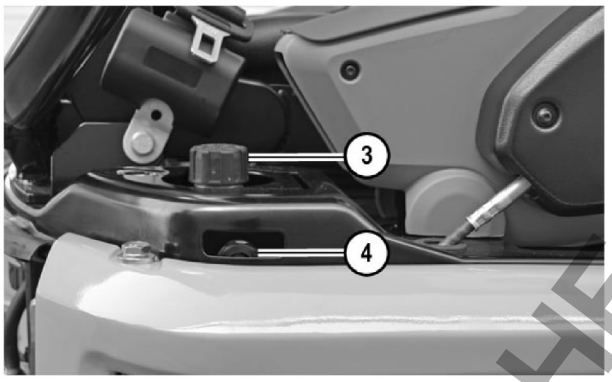

Illustration 193 g03390007

3. Loosen the radiator cap (3) slowly in order to release pressure. Remove the radiator cap and add the appropriate coolant mixture.

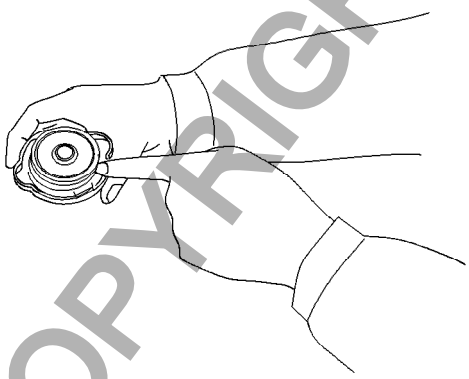

Illustration 194 g00102170

4. Inspect the condition of the cap gasket. If necessary, replace the cap.

5. Install the radiator cap (3).

6. Reinstall the cap (2) and tighten screw (1).

i05351886

Engine Air Filter Primary and/or Secondary Element - Replace

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

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

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

The air filter elements should be replaced immediately if the elements are damaged.

Note: Replace the air filter elements if “SERVICE” (red mark) is shown on the service indicator.

1. Open the engine door.

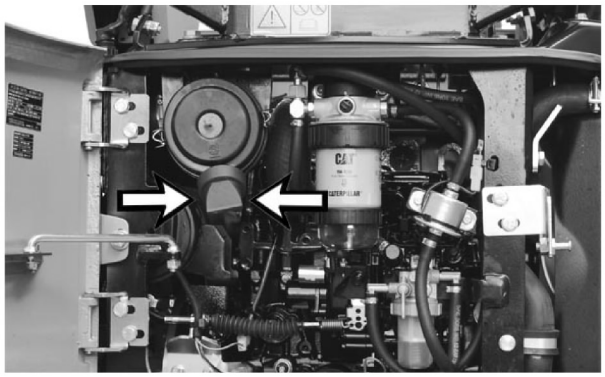

Illustration 195 g03390069

2. Squeeze the outlet tube slightly into a container in order to purge the dirt from the outlet tube.

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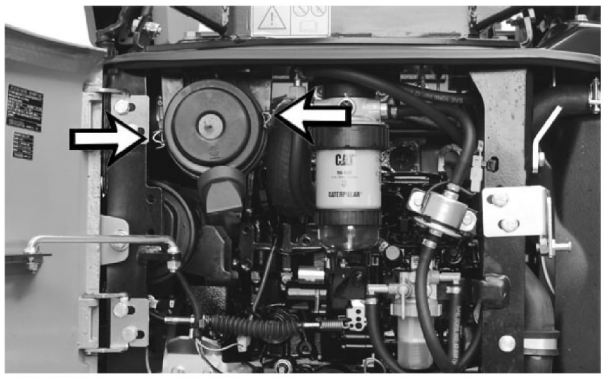

Illustration 196 g03390070

3. Unclamp the access cover and remove the access cover to the air cleaner.

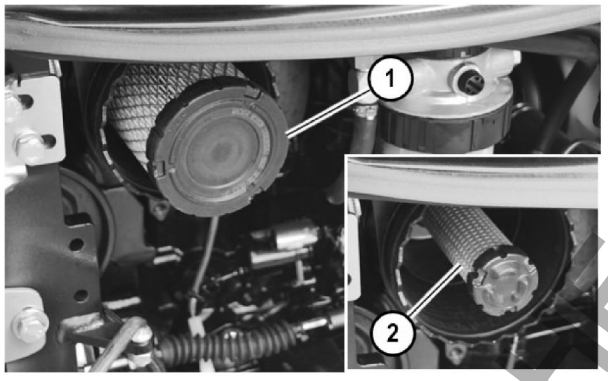

Illustration 197 g03390071

4. Remove both filter elements (1) and (2) from the air cleaner housing.

5. Cover the air inlet port in order to prevent dirt from getting inside the engine.

6. Inspect the filter elements. If the pleats, the gaskets or the seals are damaged, discard the filter element. Replace a damaged filter element with a new filter element.

7. Wipe dust from the interior of the air cleaner housing. Remove the cover from the air inlet port.

8. Put the clean air filter elements into the air cleaner housing and push the air filter elements into position.

9. Install the access cover and clamp the access cover.

Note: When installing the access cover, make sure that the outlet tube points downward.

10. Close the engine door.

i05352053

Engine Air Filter Service Indicator - Inspect

SMCS Code: 7452-040-DJ

NOTICE
Service the air cleaner only with the engine stopped. Engine damage could result if the air cleaner is serviced while the engine is running.

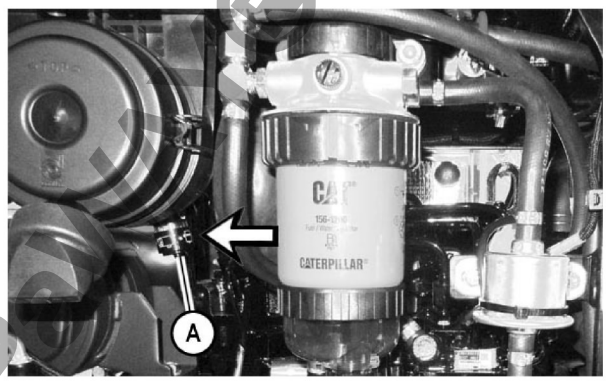

Illustration 198 g03390078

1. Open the engine door.

2. If the piston in the engine air filter service indicator is in the red zone, push button (A) in order to reset. Service the air cleaner.

Note: See the Operation and Maintenance Manual, “Engine Air Filter Element - Replace”.

3. Close the engine door.

i05352584

Engine Oil Level - Check

SMCS Code: 1000-535

⚠ WARNING

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

NOTICE
Do not overfill the crankcase. Engine damage can result.

1. Open the engine door.

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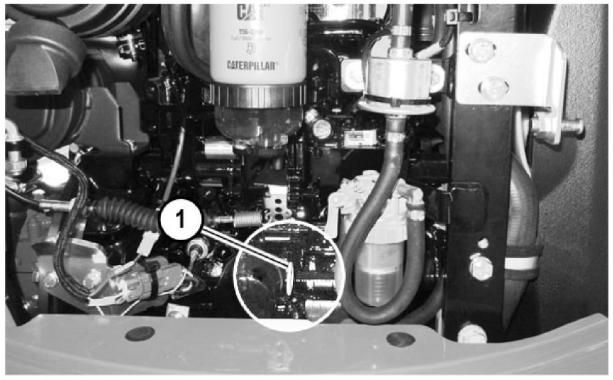

Illustration 199 g03390226

2. While the engine is stopped, maintain the oil level in the crosshatched area on the dipstick (1).

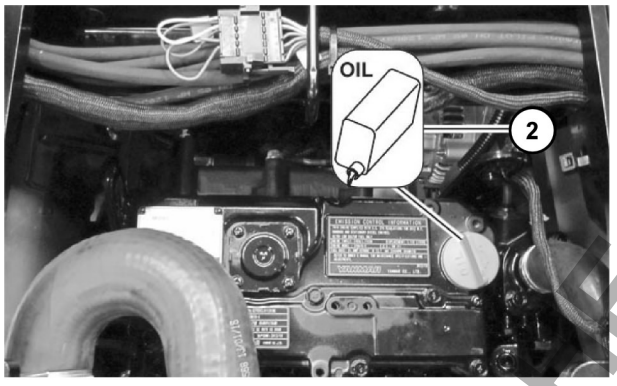

Illustration 200 g03390224

3. If necessary, fold the seat forward and remove the oil filler cap (2) and add oil. Allow the oil to drain into the crankcase before you check the oil level.

4. Close the engine door and fold the seat back so that the seat locks with an audible click.

i05352103

Engine Oil Sample - Obtain

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

Illustration 201 g03390217

Obtain a sample of the engine oil through the dipstick tube. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” “S·O·S Oil Analysis” for information that pertains to obtaining a sample of the engine oil. Refer to Special Publication, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of the engine oil.

i08437935

Engine Oil and Filter - Change

SMCS Code: 1318-510

⚠ WARNING

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

NOTICE
Do not overfill the crankcase. Engine damage can result.

Change the oil while the machine is parked on flat ground. Lower all attachments to the ground.

1. Open the engine door.

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

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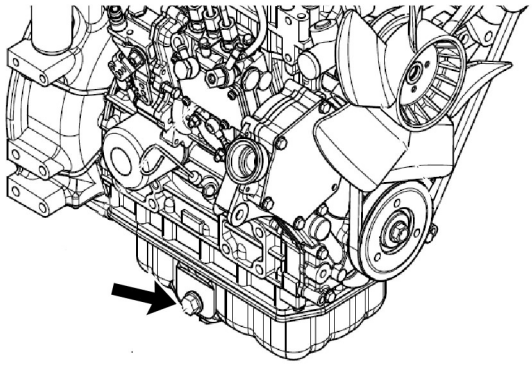

Illustration 202 g02461772

2. Remove the crankcase drain plug and allow the oil to drain into a suitable container. After you drain the oil, clean the drain plug and clean the plug hole. Inspect the seal for damage. If damaged, replace the seal. Install the drain plug.

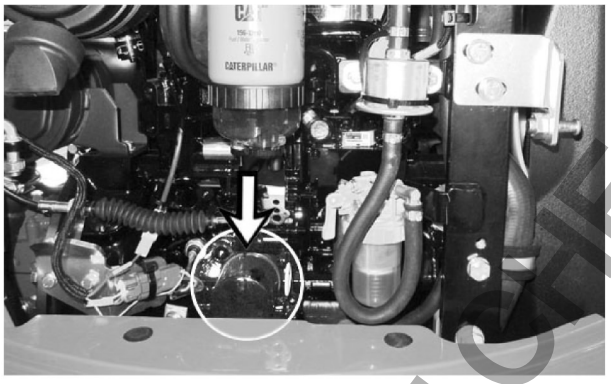

Illustration 203 g03390241

3. Remove the filter element with a filter wrench.

4. Install the new filter element by hand. When the gasket contacts the filter base, tighten the filter for an additional three quarters of a turn.

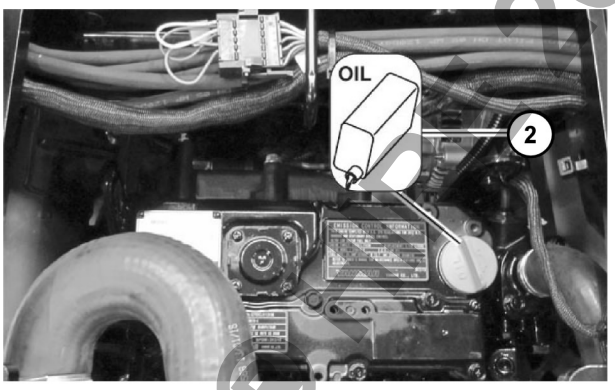

Illustration 204 g03390224

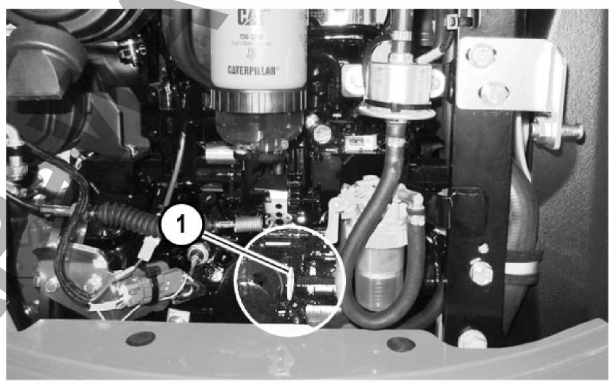

Illustration 205 g03390226

5. Fold the seat forward and remove the oil filler cap (2) and add the appropriate amount of oil. Maintain the oil level in the crosshatched area on dipstick (1). Allow the oil to drain into the crankcase before starting the engine.

6. Start the engine and operate the engine at low idle for several minutes. While the engine is running, check the filter base for oil leaks.

7. Stop the engine and allow the oil to drain back into the crankcase. Maintain the oil level in the crosshatched area on the dipstick (1).

8. Close the engine door and fold the seat back so that the seat locks with an audible click.

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i08423522

Engine Valve Lash - Check/ Adjust

SMCS Code: 1105-025; 1105-535

⚠ WARNING

Ensure that the engine cannot be started while this maintenance is being performed. To help prevent possible injury, do not use the starting motor to turn the flywheel.

Hot engine components can cause burns. Allow additional time for the engine to cool before measuring/adjusting valve lash clearance.

NOTICE
Only qualified service personnel should perform this maintenance. Refer to the Systems Operation/Testing and Adjusting Manual, “Valve Lash and Valve Bridge Adjustment” article or consult your Caterpillar dealer for the complete valve lash adjustment procedure.

Operation of Caterpillar engines with improper valve adjustments can reduce engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

Note: For procedures on adjusting the valve lash and adjusting the valve bridge, refer to Systems Operation/Testing and Adjusting, “Valve Lash and Valve Bridge Adjustment”. Consult your Cat ® dealer for assistance.

i04319613

Fasteners - Check

SMCS Code: 7553-535

NOTICE
Be careful never to mix metric with U.S. customary (standard) fasteners. Mismatched or incorrect fasteners causes machine damage or malfunction and can result in personal injury.

Original fasteners removed from the machine should be saved for reassembly whenever possible. If new fasteners are needed, the new fasteners must be of the same size and grade as the ones that are being replaced.

Check all the fasteners on the machine for tightness. Tighten any loose fasteners.

i08192490

Film (Product Identification) - Clean

SMCS Code: 7405-070; 7557-070

Prepare the machine for maintenance. Refer to Operation and Maintenance Manual, “Prepare the Machine for Maintenance”.

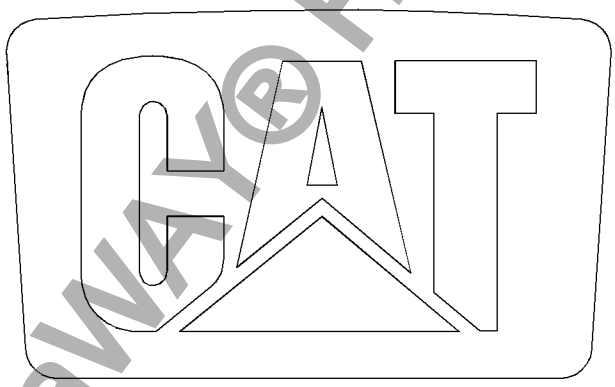

Illustration 206 g02174985

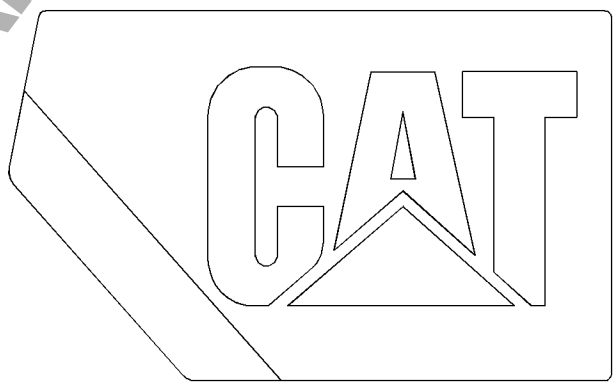

Illustration 207 g02175297

Illustration 208 g06394021

Typical example of the Product Identification Films.

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Cleaning of the Films

Make sure that all of the product identification films are legible. Make sure that the recommended procedures are used in order to clean the product identification films. Ensure that all the product identification films are not damaged or missing. Clean the product identification films or replace the films.

Hand Washing

Use a wet solution with no abrasive material that contains no solvents and no alcohol. Use a wet solution with a “pH” value between 3 and 11. Use a soft brush, a rag, or a sponge in order to clean the product identification films. Avoid wearing down the surface of the product identification films with unnecessary scrubbing. Ensure that the surface of the product identification films is flushed with clean water and allow the product identification films to air dry.

Power Washing

Power washing or washing with pressure may be used in order to clean product identification films. However, aggressive washing can damage the product identification films.

Excessive pressure during power washing can damage the product identification films by forcing water underneath the product identification films. Water lessens the adhesion of the product identification film to the product, allowing the product identification film to lift or curl. These problems are magnified by wind. These problems are critical for the perforated film on windows.

To avoid lifting of the edge or other damage to the product identification films, follow these important steps:

- Use a spray nozzle with a wide spray pattern.
- A maximum pressure of 83 bar (1200 psi)
- A maximum water temperature of 50° C (120° F)
- Hold the nozzle perpendicular to the product identification film at a minimum distance of 305 mm (12 inch).
- Do not direct a stream of water at a sharp angle to the edge of the product identification film.

i05352632

Final Drive Oil - Change

SMCS Code: 4050-044-FLV

Note: At the time of changing oil, observe the oil for presence of metallic particles or other foreign matters. If you find something that needs attention, consult your Cat dealer.

1. Warm up the oil by roading the tracks. Draining the oil should be done when the oil is hot. Draining the oil when hot will help to prevent sludge.
2. Move the machine to level ground.

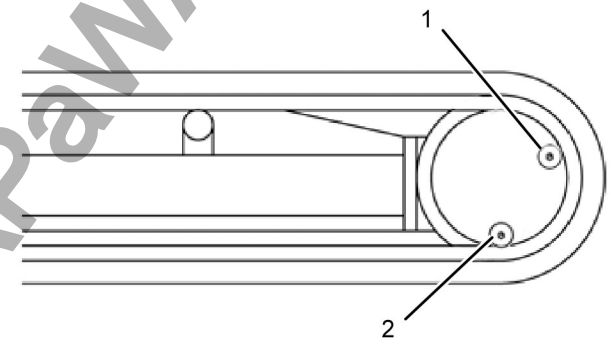

Illustration 209 g03390248

3. Position one of the final drives as shown in illustration 209 .

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

4. Remove the oil level plug (1).
5. Remove the oil drain plug (2). Allow the oil to drain into a suitable container.
6. Clean the drain plug (2). Apply pipe sealant to the threads of the drain plug in order to prevent leakage. Reinstall the drain plug.
7. Add oil to the final drive through the opening for the oil level plug (1) until the oil is level with the plug threads (1). See Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “ Capacities (Refill)”.
8. Clean the oil level plug (1). Apply pipe sealant to the threads of the oil level plug in order to prevent leakage. Reinstall the oil level plug.

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9. Repeat the procedure for the other final drive.

10. Start the engine and allow the final drives to run through several cycles.

11. Stop the engine. Check the oil level in both final drives.

12. Apply pipe sealant on the threads of the oil level plug. Reinstall the oil level plug.

13. Properly dispose of the drained material. Obey local regulations for the disposal of the material.

i05353078

Final Drive Oil Level - Check

SMCS Code: 4050-535-FLV

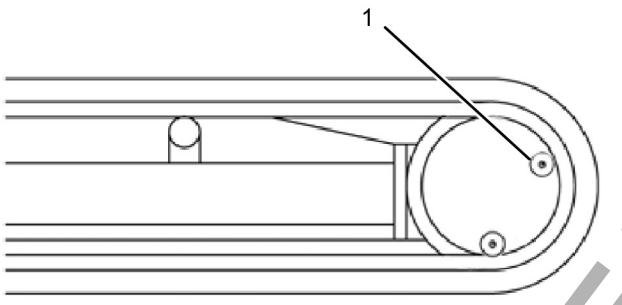

Illustration 210 g03390556

1. Position one of the final drives as shown in illustration 210 .

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

2. Remove the oil level plug (1).

3. Check the oil level. The oil level should be near the bottom of the opening for the oil level plug (1).

4. If necessary, add oil to the final drive through the opening for oil level plug (1) until the oil is level with the plug threads.

5. Clean the oil level plug. Reinstall the plug. Apply pipe sealant on the threads in order to prevent leakage.

6. Repeat the procedure for the other final drive.

i05353099

Final Drive Oil Sample - Obtain

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

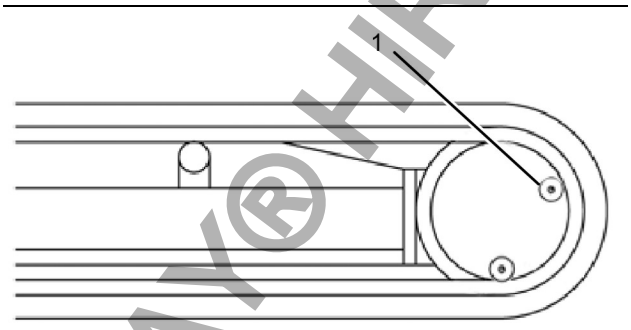

Illustration 211 g03390556

1. Position the final drive as shown in illustration 211 .

2. Remove oil level plug (1).

3. Obtain a sample of the final drive oil through the hole for the oil level plug.

4. Clean the oil level plug. Apply pipe sealant on the threads in order to prevent leakage. Reinstall the plug.

Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for more information on obtaining a sample of the final drive oil. For additional information about taking an oil sample, refer to Special Publication, PEGJ0047, “How To Take A Good Oil Sample”.

i04459396

Fuel Injection Nozzles - Check/ Adjust

SMCS Code: 1254-535; 1254-025

Note: During the warranty period, this procedure may be performed by Cat dealers only.

Refer to the Service Manual for the complete procedure for checking/adjusting the injector pressure or for cleaning the injection nozzles.

Note: Make sure that a qualified mechanic works on the injection system. Special tools and training are required.

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i05372885

Fuel System - Prime

SMCS Code: 1250-548

⚠ WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn off the start switch and let the engine cool down when changing fuel filters or water separator elements. Clean up fuel spills immediately.

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

Refer to Special Publication, PERJ1017, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat ® products.

Dispose of all fluids according to local regulations and mandates.

NOTICE
Do not loosen the fuel lines at the fuel manifold. The fittings may be damaged and/or a loss of priming pressure may occur when the fuel lines are loosened.

Prime the fuel system in order to fill the fuel filter, and prime the fuel system in order to purge trapped air. The fuel system should be primed under the following conditions:

- The fuel tank is running low.
- The machine has been stored.
- The fuel filter is being replaced.
- The fuel lines have been replaced.

1. Fill the fuel tank. Move the hydraulic lockout lever to the RAISED position. Turn the ignition key to the first position.
2. Wait 5 minutes while the fuel system primes automatically.

NOTICE
Do not crank the engine continuously for more than 10 seconds. Allow the starting motor to cool for two minutes before cranking the engine again.

3. Start the engine.
4. Check the fuel system for leaks.
5. Run the engine at low idle for 5 minutes.

Note: If the engine runs smoothly, and then stops, or the engine runs rough, more priming may be necessary.

6. If more priming is necessary, turn off the engine.
7. Move the hydraulic lockout lever to the RAISED position.
8. Turn the engine start switch key to the first position.
9. Prime the fuel system again.

Note: If the fuel system does not prime correctly, consult your Cat dealer.

i05365689

Fuel System Filter and Water Separator Element - Replace

SMCS Code: 1261-510; 1263-510-FQ

⚠ 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.

Disconnect the battery when changing fuel filters.

NOTICE
Do not fill the fuel filters with fuel before installing the fuel filters. The fuel will not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts.

Note: During the warranty period, this procedure may be performed by Cat dealers only.

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

1. Open the engine door.

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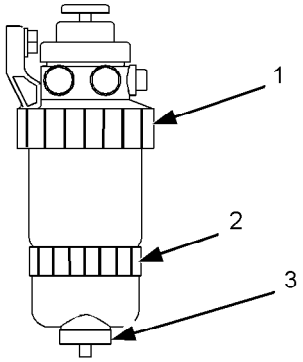

Illustration 212 g01017292

2. Open the drain on the fuel filter/water separator (3) in a clockwise direction. Allow the water and fuel to drain into a suitable container.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” that pertains to containing fluid spillage.

3. Close the drain valve by hand.

4. Support the fuel filter/water separator and rotate the locking ring (1) counterclockwise. Remove the fuel filter/water separator.

5. Rotate the locking ring (2) counterclockwise. Remove the bowl assembly.

Note: The water separator bowl is reuseable. Do not discard the water separator bowl.

6. Clean the mounting base for the fuel filter/water separator.

7. Clean the bowl assembly for the fuel/water separator. Inspect the O-ring seal of the water separator bowl for damage. Replace the O-ring seal, if necessary.

8. Lubricate the O-ring seal with clean diesel fuel or lubricate the O-ring seal with motor oil.

9. Install the collar onto the base of the filter housing.

10. Install the bowl assembly onto the new fuel/water separator and rotate the locking ring clockwise by hand.

11. Install the new fuel filter/water separator onto the mounting base. Turn the locking ring clockwise in order to fasten the fuel filter/water separator to the mounting base by hand.

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”.

12. Close the engine door.

i05353116

Fuel System Water Separator - Drain

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.

Disconnect the battery when changing the fuel filters.

The water separator is located on the right side of the engine compartment, beneath the electric fuel pump.

1. Open the engine door.

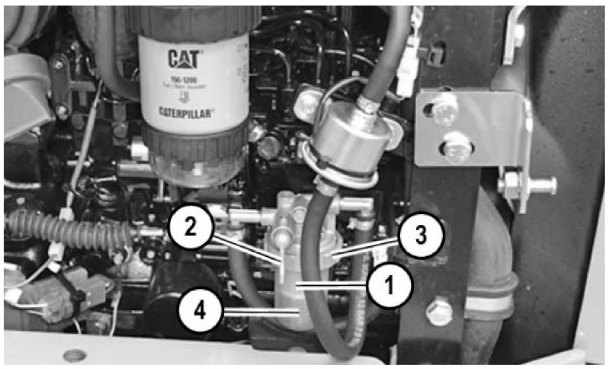

Illustration 213 g03390695

2. If the red indicator ring is at position (1), the collected water will need to be drained.

3. Move fuel shutoff lever (2) to the OFF position.

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

4. Unscrew retainer ring (3) and drain the water and the sediment into a suitable container.

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5. Install the bowl. Make sure that the indicator is in position (4).

6. Turn the fuel shutoff lever to the ON position.

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”.

7. Close the engine door.

i05353330

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-STR

Illustration 214 g03390742

1. Unlock fuel cap (1) with the engine start switch key.

2. Remove the fuel cap.

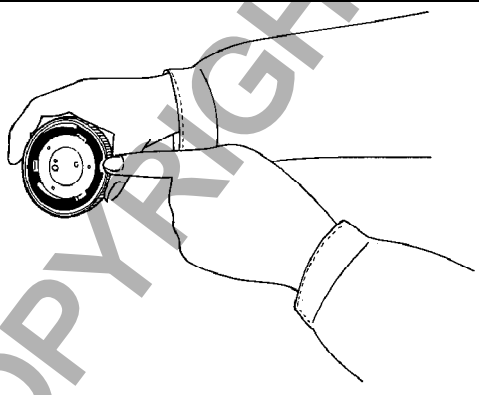

Illustration 215 g00104238

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

4. Remove the strainer that is located in the filler opening.

5. Wash the strainer and the fuel tank cap in a clean, nonflammable solvent.

6. Install the strainer into the filler opening.

7. Put a light coating of fuel on the cap gasket.

8. Install fuel cap (1).

9. Lock the fuel cap with the engine start switch key.

i05372873

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543

1. Open the fuel tank cap and pump out the fuel and sediment with a suitable pump. Allow the water and the sediment to drain into a suitable container.

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

2. Install the fuel tank cap.

Note: Discard the drained fluids according to local regulations.

i05353343

Fuses - Replace

SMCS Code: 1417-510

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. If necessary, consult your Cat dealer.

NOTICE
Always replace fuses with the same type and capacity fuse that was removed. Otherwise, electrical damage could result.

NOTICE
If it is necessary to replace fuses frequently, an electrical problem may exist.

Contact your Cat dealer.

The fuses are located below the seat/battery.

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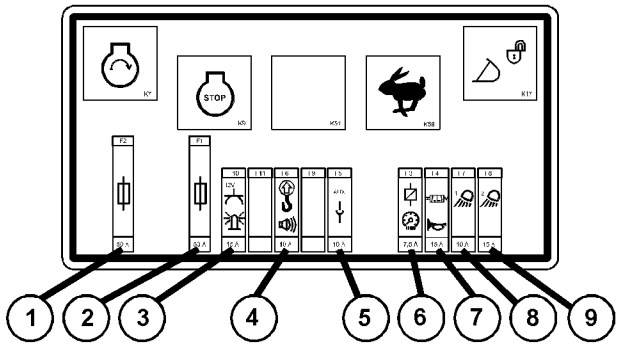

Illustration 216 g03390759

(1) Main Fuse (Ignition Lock and (Atmospheric Pressure Sensor and Power Reduction Solenoid LJ81–Up)) – 50 amp

(2) Main Fuse (Start and Preheat) – 50 amp

(3) Power Outlet (Rotating Beacon) – 15 amp

(4) Overload Warning Device and Buzzer – 10 amp

(5) Auxiliary – 10 amp

(6) Cutoff Solenoid and Display – 7.5 amp

(7) Valves and Horn – 15 amp

(8) Boom Working Light – 10 amp

(9) Canopy Working Light – 15 amp

Relays

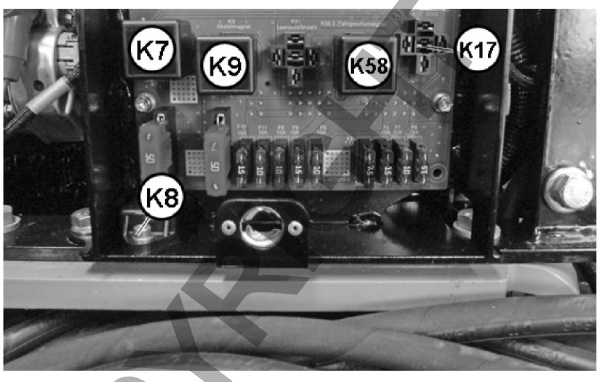

Illustration 217 g03390761

(K7) Starting – Relay

(K8) Time Lag Cutoff Solenoid 4 – Relay

(K9) Switching Cutoff Solenoid – Relay

(K17) Quick Coupler Ready (If Equipped) – Relay

(K58) Second Travel Gear – Relay

i02054663

Horn - Test

SMCS Code: 7402-081

Test the horn on a daily basis. Press downward on the horn button in order to sound the horn. If the horn does not sound, make the necessary repairs before you operate the machine.

i04319614

Hydraulic System - Purge

SMCS Code: 5050-542

WARNING

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

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

Condensation can build up in the hydraulic tank and will need to be drained. Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change” for information on draining the hydraulic tank.

Open the drain valve and allow the oil and water mixture to drain into a suitable container. When no more water is seen coming from the drain valve, close the drain valve.

i05348967

Hydraulic System Breather - Replace

SMCS Code: 5050

WARNING

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

Note: During the warranty period, this procedure may be performed by Cat dealers only.

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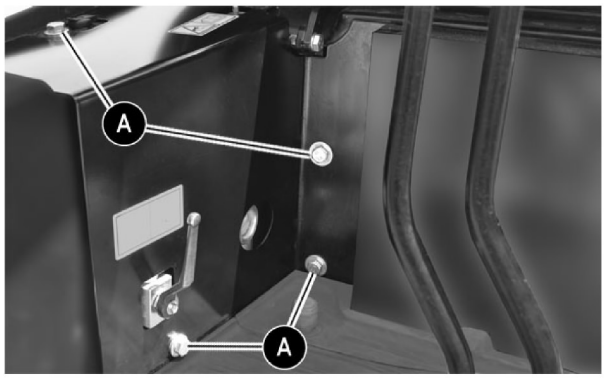

Illustration 218 g03394838

1. Remove the four bolts (A). Remove the oil tank cover plate.

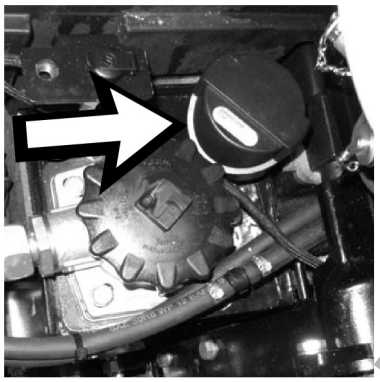

Illustration 219 g03394753

2. Slowly loosen the breather in order to relieve the pressure in the hydraulic oil tank.

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

3. Install a new breather and tighten by hand.

4. Install the oil tank cover plate. Install four bolts (A).

i05354158

Hydraulic System Oil - Change

SMCS Code: 5056-044

⚠ WARNING

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

NOTICE
If the machine is filled with non-biodegradable hydraulic oil and biodegradable hydraulic oil is wanting to be used, consult a Cat dealer. Biodegradable hydraulic oil can NOT be added to the system by performing an ordinary hydraulic oil change. Damage to the hydraulic system can occur.

Note: During the warranty period, this procedure may be performed by Cat dealers only.

1. Park the machine on level ground.

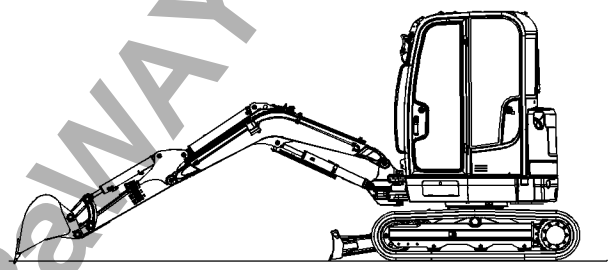

Illustration 220 g02723423

2. Extend the stick and the bucket fully. Lower the boom so that the bucket is rested on the ground. Lower the blade to the ground.

3. Turn the engine switch to the OFF position.

4. Cycle the joysticks in order to relieve any pressure remaining in the hydraulic lines.

5. Move the hydraulic lockout control lever to the RAISED position.

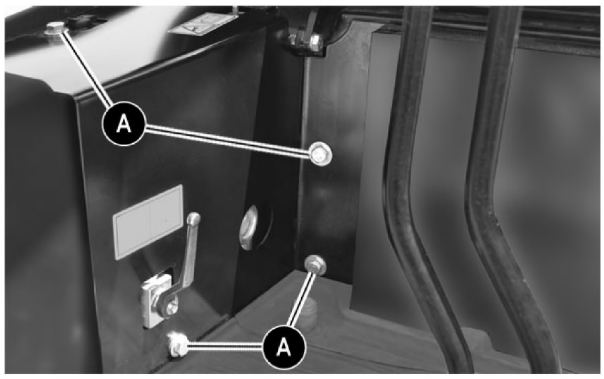

Illustration 221 g03394838

6. Remove the four bolts (A). Remove the oil tank cover plate.

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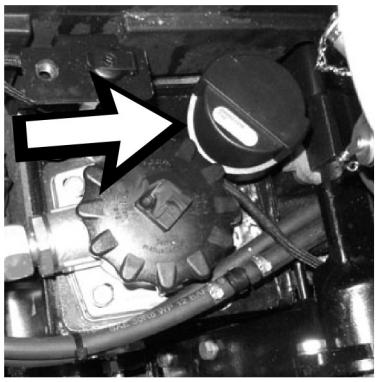

Illustration 222 g03394753

7. Relieve the internal pressure in the hydraulic tank by slowly loosening the breather.

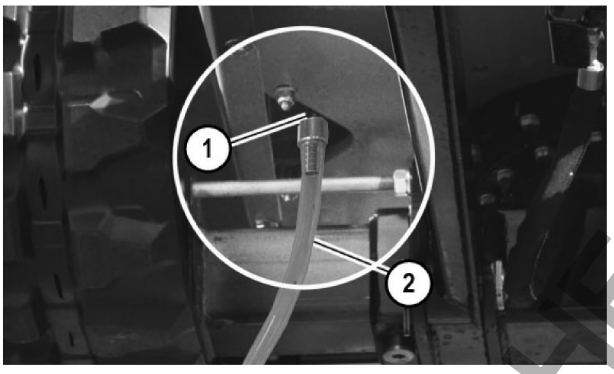

Illustration 223 g03391503

8. The hydraulic oil drain plug is located on the bottom side of the hydraulic oil tank/upper carriage.

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

9. Open drain valve (1) and attach drain hose (2). Allow the oil to drain into a suitable container.

10. Check the hydraulic tank for contamination and clean if necessary.

11. Remove the drain hose. Clean the drain valve and reinstall the plug.

12. Open the hydraulic oil filter plug and fill the hydraulic system oil tank with the same type of oil that was in it before. Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “ Capacities (Refill)”.

13. Inspect the gasket on the hydraulic tank filter plug for damage. Replace the O-ring, if necessary.

14. Install the hydraulic tank filter plug.

15. Reinstall the oil tank cover plate. Tighten four bolts (A).

16. Start the engine and run the engine for a few minutes. Operate the control levers in order to cause the hydraulic oil to flow through the circuits.

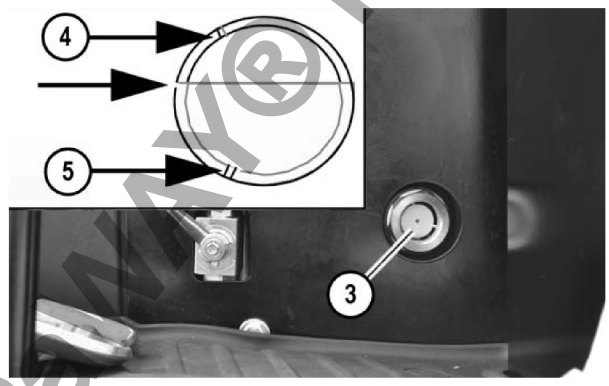

Illustration 224 g03394852

(4) High
(5) Low

17. Maintain the hydraulic oil level in the middle of the sight gauge (3), which is located on the oil tank cover plate.

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, the hose clamps, and the hydraulic oil filter.

⚠ CAUTION

Bleed the hydraulic pump after performing a hydraulic oil change and using a vacuum pump - otherwise severe damage to the pump can occur.

18. Stop the engine.

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

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i05354137

Hydraulic System Oil Filter (Return) - Replace

SMCS Code: 5068-510-RJ

⚠ WARNING

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

Note: During the warranty period, this procedure may be performed by Cat dealers only.

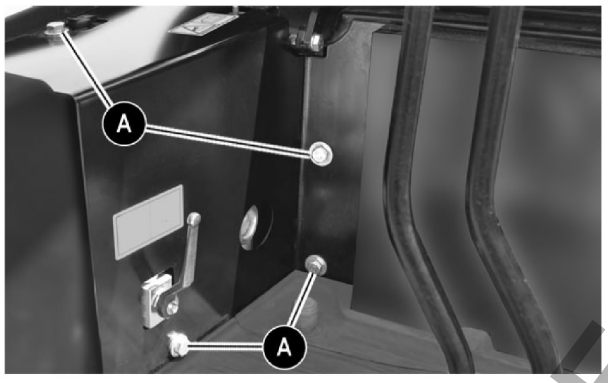

Illustration 225 g03394838

1. Remove four bolts (A). Remove the oil tank cover plate.

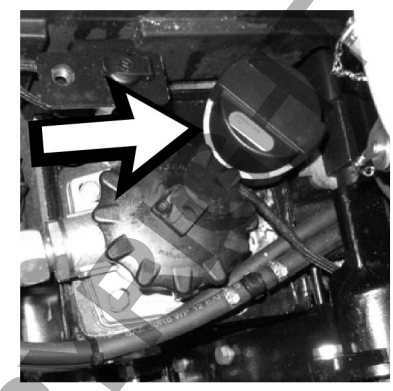

Illustration 226 g03394753

2. Slowly loosen the breather in order to relieve the pressure in the hydraulic oil tank. Clean the breather.

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

3. Clean the area thoroughly in order to prevent dirt from entering the filter.

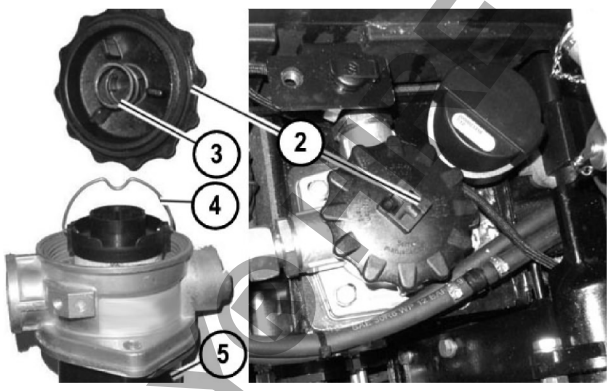

Illustration 227 g03391456

4. Place a suitable container under the filter.

5. Unscrew the cover (2) and collect the hydraulic oil as the oil drains.

6. Remove the spring (3) if the spring is not seated on the cover.

7. Remove the filter element (4) by pulling up on the handle and remove dirt from the housing and the sealing surface of the cover (2) if necessary. Check the surface of the removed filter element for dirt residue and coarse particles. If dirt residue and/or coarse particles are found, consult your Cat dealer.

8. Clean the drip and dirt collector (5).

9. Install the new filter element.

10. Screw on cover (2) with spring (3) and tighten by hand.

11. Retighten the breather, reinstall the oil tank cover plate. Tighten four bolts (A). Start the engine and cycle the controls. Check the hydraulic system for leaks.

i05353356

Hydraulic System Oil Level - Check

SMCS Code: 5050-535

⚠ WARNING

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

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Note: Check the hydraulic system oil level with the machine on a level surface.

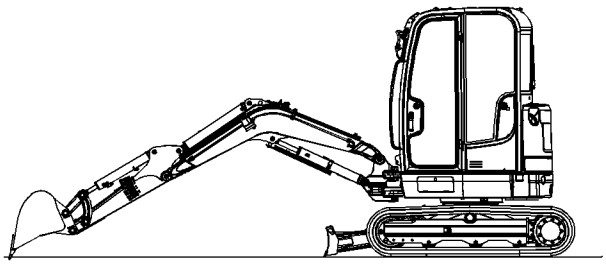

Illustration 228 g02723423

1. Extend the stick and the bucket fully. Lower the boom so that the bucket is rested on the ground. Lower the blade to the ground.

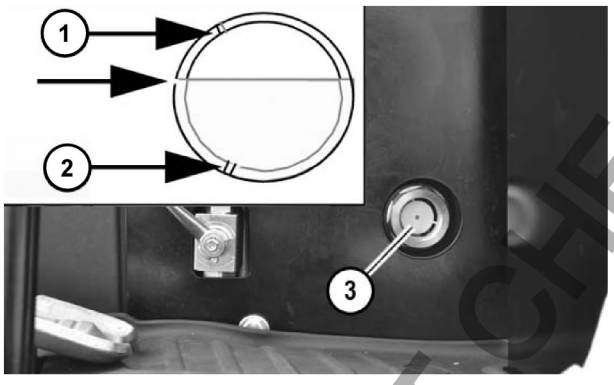

Illustration 229 g03390786

(1) High
(2) Low

2. The sight gauge (3) is located on the oil tank cover plate.

3. Maintain the hydraulic system oil level in the middle of the sight gauge.

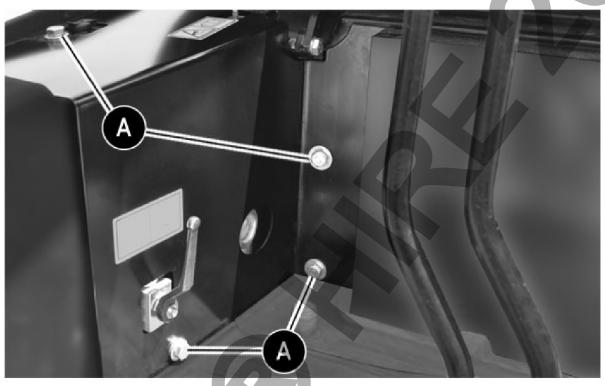

Illustration 230 g03394838

4. Remove the four bolts (A). Remove the oil tank cover plate.

NOTICE
Never remove the breather from the hydraulic tank if the oil is hot.

Air can enter the system and cause pump damage.

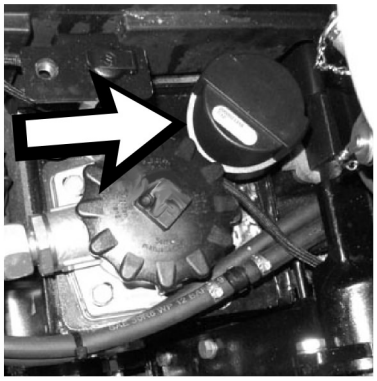

Illustration 231 g03394753

5. Slowly loosen the breather in order to relieve any pressure and add hydraulic oil, if necessary.

6. Clean the breather. Install the breather.

7. Reinstall the oil tank cover plate. Tighten the four bolts (A).

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i05353355

Hydraulic System Oil Sample - Obtain

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

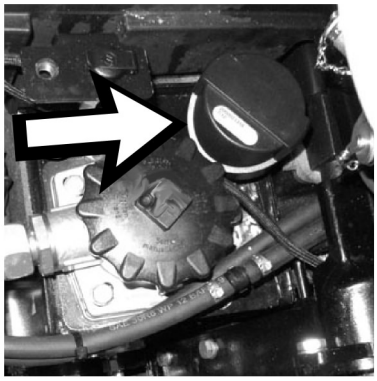

Illustration 232 g03394753

Obtain a sample of the hydraulic oil through the filler tube. Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for information that pertains to obtaining a sample of the hydraulic oil. Refer to Special Publication, PEGJ0047, “How To Take A Good Oil Sample” for more information about obtaining a sample of the hydraulic oil.

i07203750

Lifting Hook - Inspect

SMCS Code: 6459-040

S/N: LJ81–Up

Note: Designate a person to inspect the hook frequently. The designated person should inspect the hook prior to operation and during operation. The designated person will determine if the conditions that are found are a hazard. The designated person will determine if a more detailed inspection is required.

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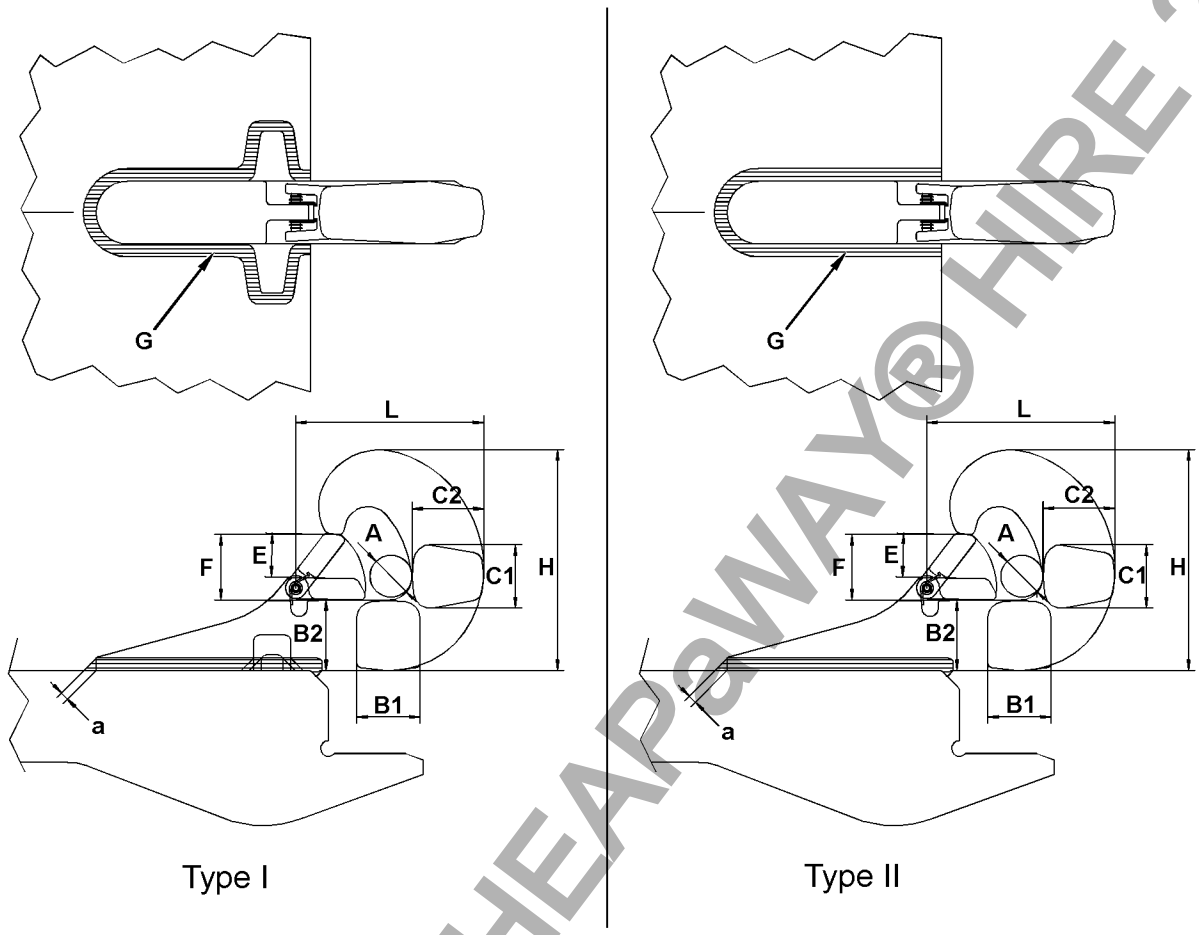

Illustration 233 g01540013

(A) Maximum diameter of bar
(B1) Nominal width of bottom
(B2) Nominal height of bottom
(C1) Nominal width of front
(C2) Nominal height of front
(E) Actual throat clearance
(F) Full throat clearance
(G) Required height of weld (a)
(H) Nominal height of hook
(L) Nominal length of hook

1. Inspect the hook for any distortion such as bends in the hook or twists in the hook.

2. Inspect the dimensions of the throat (E) and (F). An increase in the dimensions of the throat must not exceed 5% of the original dimensions of the throat. Refer to Illustration 233 for the dimensions of the throat.

3. Inspect the hook for wear. An increase in the nominal dimensions (B1), (B2),(C1),(C2),(H), and (L) of the hook must not exceed 10% of the original nominal dimensions of the hook. Refer to Illustration 233 for the nominal dimensions of the hook.

4. Inspect the hook for cracks, nicks, or gouges.

5. Ensure that the latch properly engages. Inspect the latch for any damage. Ensure that the latch is not malfunctioning.

Note: Before continuing to operate the hook, the hook must be repaired or replaced if any of the above conditions exist. Refer to Special Instruction, REHS3357, “Procedure for Installation or Replacement of a Lifting Hook or a Lifting Yoke on Certain Quick Couplers” for additional information.

i04432083

Light - Test

SMCS Code: 1429-081

Turn on the switch. Observe the lights and replace any that are not working.

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i04317069

Main Relief Valve - Check

SMCS Code: 5069-535

Consult your Cat dealer for service to the main valve.

i02106227

Oil Filter - Inspect

SMCS Code: 1308-507; 5068-507

Inspect a Used Filter for Debris

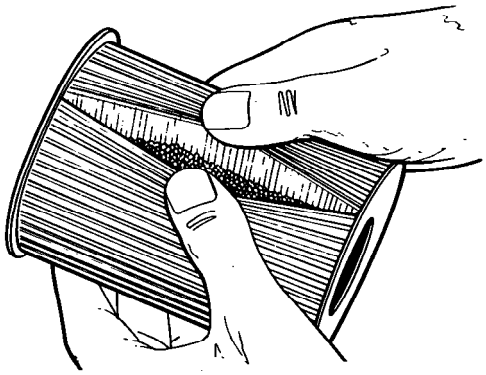

Illustration 234 g00100013

The element is shown with debris.

Use a filter cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

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

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

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

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

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

i01819738

Quick Coupler - Check

SMCS Code: 6129-535; 6700-535

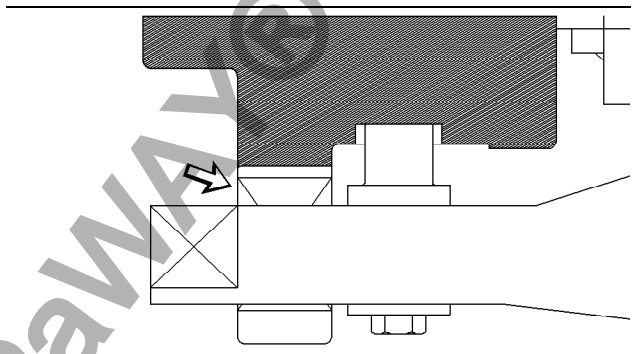

Illustration 235 g00584367

1. Ensure that there is a visible space between the wedge and the quick coupler frame. If there is no space, the mounting bracket or the quick coupler may be damaged or worn. Contact your Caterpillar dealer.

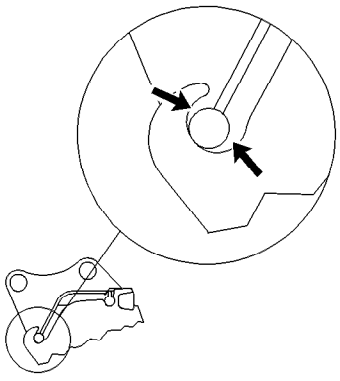

Illustration 236 g00584389

2. Check if there is play between the quick coupler and the mounting bracket. Contact your Caterpillar dealer.

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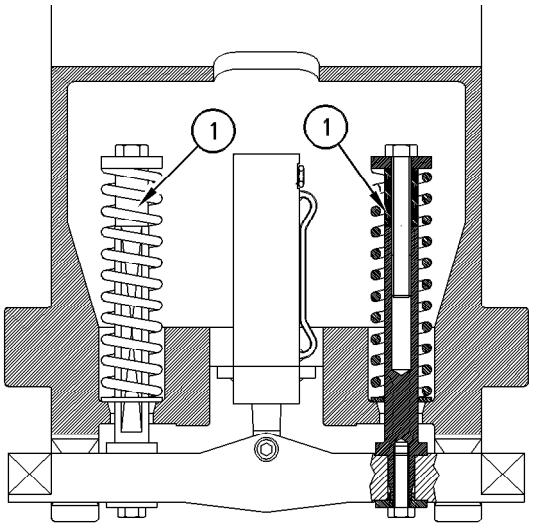

Illustration 237 g00584390

3. Visually inspect the shafts (1). The shafts (1) must be straight. Replace the shafts (1) if the shafts are bent.

i04673589

Quick Coupler - Clean

SMCS Code: 6129-070

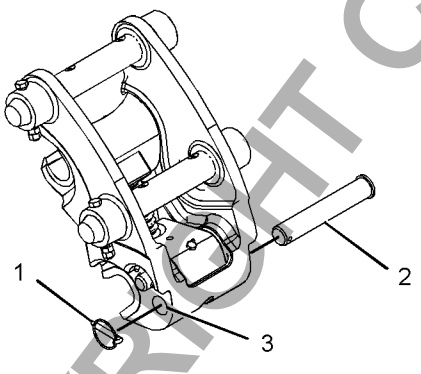

Illustration 238 g01155173

Typical example

1. Remove pin (1).

2. Remove safety pin (2) from the quick coupler. The pin may be located on the right side or located on the rear of the quick coupler.

3. Clean safety pin (2).

4. Clean out bore (3) on either side of the coupler.

5. Remove any trash or buildup from the quick coupler.

6. Apply grease to safety pin (2).

Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluid Recommendations” for more information about the selection of grease.

7. Insert safety pin (2) into bore (3) on the right side.

8. Insert pin (1) into safety pin (2) on the left side of the quick coupler.

i02166325

Quick Coupler - Clean/Inspect

SMCS Code: 6129-040; 6129-070

⚠ WARNING

Personal injury or death can result from improperly checking for a leak.

Always use a board or cardboard when checking for a leak. Escaping air or fluid under pressure, even a pin-hole size leak, can penetrate body tissue causing serious injury, and possible death.

If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

Note: Do not weld on the quick coupler without consulting your Caterpillar dealer.

Note: Clean the quick coupler prior to inspection in order to properly inspect the quick coupler.

Note: Refer to Operation and Maintenance Manual, “Daily Inspection” for additional information.

1. Inspect the hydraulic lines and the hydraulic fittings for damage or for wear. Repair any worn components or replace any worn components. Repair any leaking components.

2. Inspect the locking pins that secure the quick coupler to the host machine.

3. Inspect the steel material of the quick coupler for cracks.

4. Inspect the warning signs and labels. Replace warning signs or labels that are missing. Replace warning signs or labels when you cannot read the warning signs or labels. Refer to Operation and Maintenance Manual, “Safety Messages” for additional information.

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i02973110

Quick Coupler - Lubricate (If Equipped)

SMCS Code: 6129-086

1. Lower all work tools to the ground.

2. Wipe off the fittings before you lubricate the fitting.

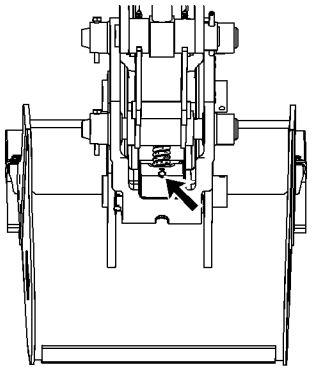

Illustration 239 g01167510

Typical example

3. Apply grease to the fittings of the quick coupler.

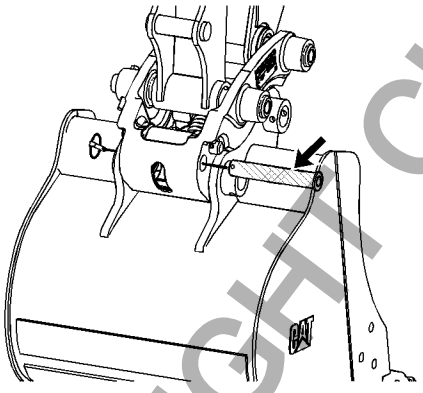

Illustration 240 g01167518

Typical example

4. Apply grease to the external surface of the pin in the lock assembly.

Note: The lock assembly may be located on the side of the coupler or located on the rear of the coupler.

5. Check the overall condition of the quick coupler. Look for the following conditions: loose bolts, worn parts, broken parts, missing parts and damaged parts. Make any necessary repairs.

i05815772

Quick Coupler - Lubricate (Mechanical Pin Grabber Quick Coupler (If Equipped))

SMCS Code: 6129-086

1. Release the work tool from the quick coupler. Ensure that the work tool is in a stable and safe storage position on the ground. Refer to Operation and Maintenance Manual, “Quick Coupler Operation - Mechanical Pin Grabber Quick Coupler” for the proper procedure.

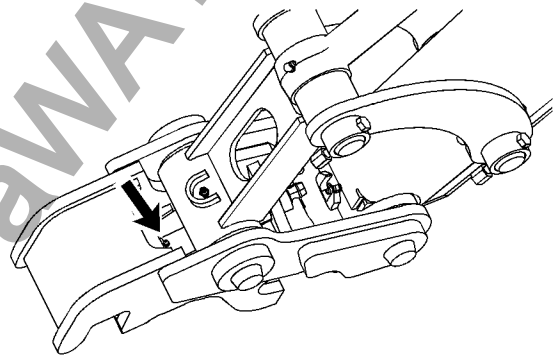

Illustration 241 g03681390

2. Wipe off the fitting before you lubricate the fitting.

3. Apply grease to the fitting of the quick coupler.

4. Check that all pin retainers are in place and that all bolts and nuts are tight.

5. Check the full operation of all the moving parts within the quick coupler. Repair or replace immediately if required.

6. Check that there is no material buildup around the rear locking mechanism, threaded actuator, or wedge plate. Check that there is no material buildup around the front locking mechanism.

7. Check the quick coupler for cracks, bent components, or wear.

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i06514107

Quick Coupler - Lubricate

SMCS Code: 6129-086

Spindle Lubricate

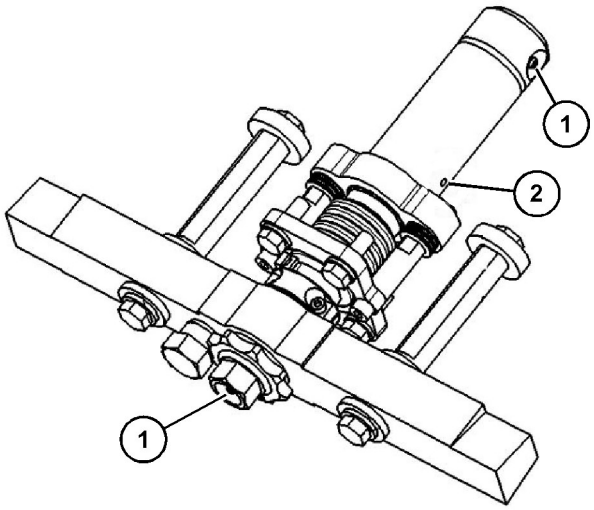

Illustration 242 g06005591

Note: On quick couplers with spindle coupling, the spindle must be lubricated.

1. Uncouple the work tool to lubricate the spindle housing. Refer to Uncoupling the Work Tool - Quick Coupler with Spindle Coupling for information.
2. Turn the spindle inward completely, in a CLOCKWISE direction. Grease the spindle at both grease points (1) until the grease becomes visible at the grease release hole (2).
3. Turn the spindle outward completely, in a COUNTER-CLOCKWISE direction. Remove any excess grease from the spindle.
4. Couple the work tool.

i05348096

Radiator Core - Clean

SMCS Code: 1353-070

1. Open the engine door and remove the right side cover.

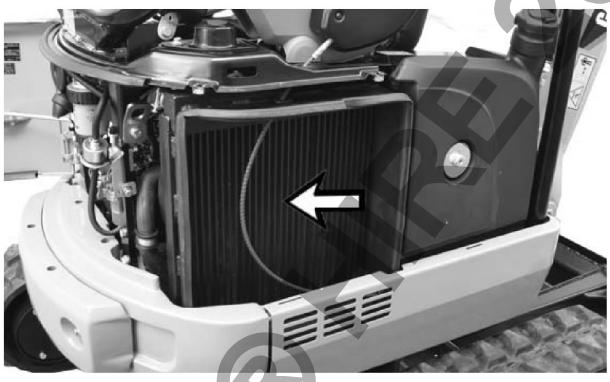

Illustration 243 g03387502

2. You can use compressed air or water to remove dust and other debris from the radiator fins. The compressed air should be oil free and 200 kPa (29 psi) maximum.
3. Close the engine door and reinstall the right side cover.

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i05348957

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7323-040; 7325-040

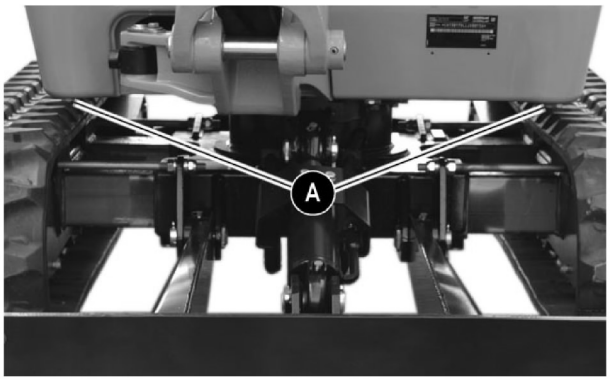

Illustration 244 g03399550

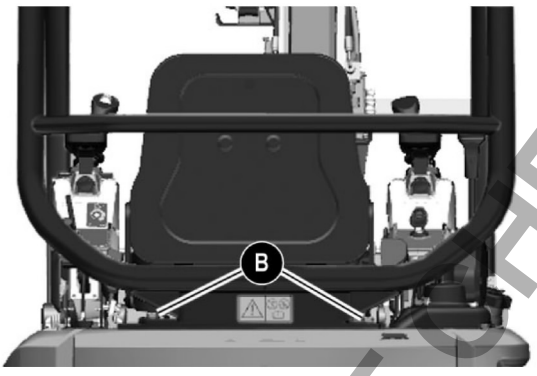

Illustration 245 g03399551

Inspect the canopy for hardware that is loose, damaged, or missing. Replace any hardware that is loose, damaged, or missing with original replacement parts only. Torque the four bolts (A-B) to 110 N·m (81 lb ft).

Do not weld reinforcement plates to the canopy in order to straighten the canopy. Do not weld reinforcement plates to the canopy in order to repair the canopy.

Consult your Cat dealer for inspection of any potential damage or repair of any damage to any operator protective structure (Including ROPS, FOPS, TOPS, OPS, and OPG). Refer to Special Instruction, SEHS6929 , “Inspection, Maintenance, and Repair of Operator Protective Structures (OPS) and Attachment Installation Guidelines for All Earthmoving Machinery”.

i04289114

Seat Belt - Inspect

SMCS Code: 7327-040

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

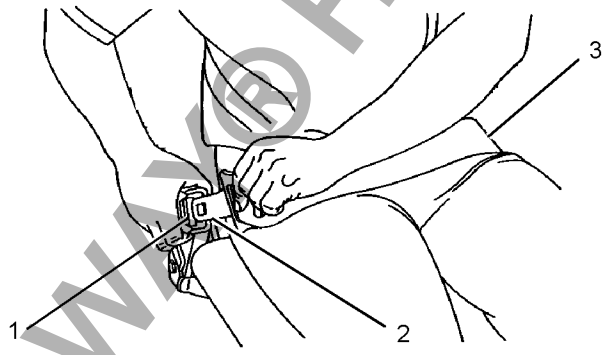

Illustration 246 g02477000
Typical example

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

i05345988

Sound Suppression (Covers, Panels) - Inspect/Replace

SMCS Code: 1801-040; 1801-510; 7261-510; 7261-040

1. Open the engine cover and the right and left access cover.
2. Inspect the insulating mats for deterioration. Look for any insulating mats that may be missing. Replace any insulating mats that may be torn or missing.
3. Close the engine cove and the right and left access cover.

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i05345965

Swing Bearing - Lubricate

SMCS Code: 7063-086

⚠ WARNING

Do not rotate the machine during lubrication. Danger of sever crushing that can cause severe injury or death.

1. Park the machine on a level surface. Lower all work tools to the ground. Place the hydraulic lockout control in the RAISED position.

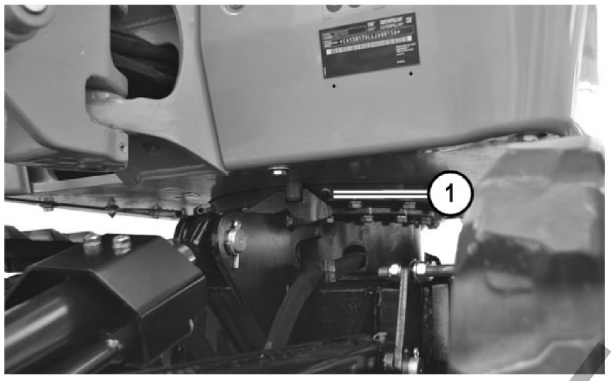

Illustration 247 g03386386

2. The fitting (1) for the swing bearing is located on the underside of the upper carriage.

3. Wipe the fitting (1) and lubricate the fitting.

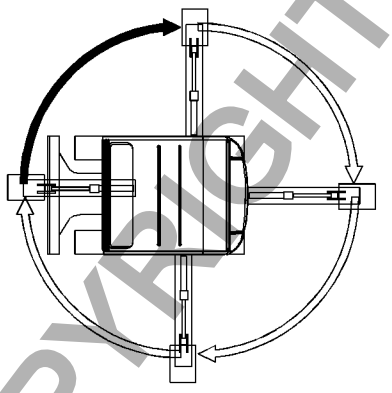

Illustration 248 g02626583

4. Rotate the upper structure for 90°.

5. Apply grease to the fitting for the swing bearing.

6. Repeat Step 4 and Step 5 until the upper structure has rotated 360° three times.

7. Rotate the upper structure 360° twice.

i05345930

Swing Frame and Cylinder Bearings - Lubricate

SMCS Code: 5105-086-BD; 6506-086-BD; 6507-086-BD

1. Park the machine on level surface. Lower all work tools to the ground.

2. Turn the engine switch to the OFF position.

3. Cycle the joysticks in order to relieve any pressure remaining in the hydraulic lines.

4. Place the hydraulic lockout control lever in the RAISED position.

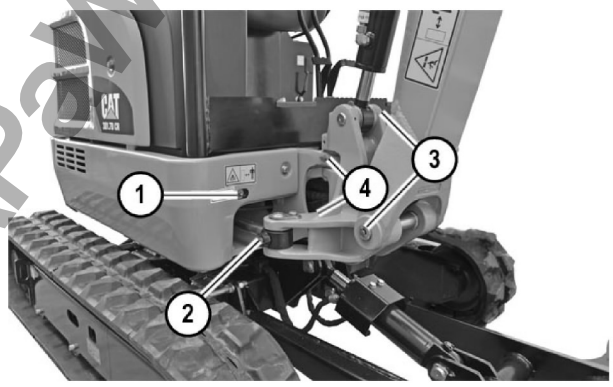

Illustration 249 g03386345

5. Wipe the fittings before you lubricate the fittings.

Note: Keep the grease fittings clean and remove any remaining grease.

6. Apply lubricant to the fittings (1), (2), (3), and (4).

i04319616

Swing Motor and Swing Gear - Check

SMCS Code: 7063-535; 79PA-535

Consult your Cat dealer for service to the swing gear and the swing motor.

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i04288321

Track Adjustment - Adjust

SMCS Code: 4170-025

Tightening the Tracks

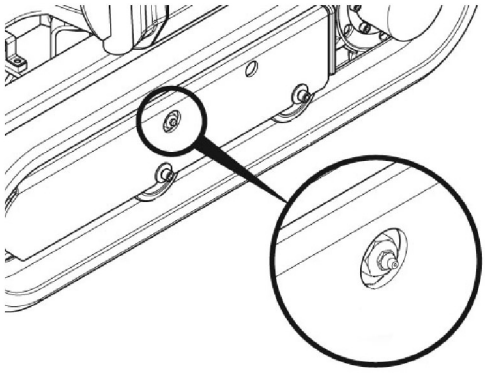

Illustration 250 g02455137

1. Wipe the fitting before you add grease.

2. Add grease through the valve fitting until the correct tension is reached.

3. Operate the track back and forth in order to equalize the pressure.

4. Check the amount of sag. Adjust the track, as needed. Refer to Operation and Maintenance, “Track Adjustment - Inspect”.

5. Repeat the same procedure for the other track.

Loosening the Track

⚠ WARNING

Personal injury or death can result from grease under pressure.

Grease coming out of the relief valve under pressure can penetrate the body causing injury or death.

Do not watch the relief valve to see if grease is escaping. Watch the track or track adjustment cylinder to see if the track is being loosened.

Loosen the relief valve one turn only.

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

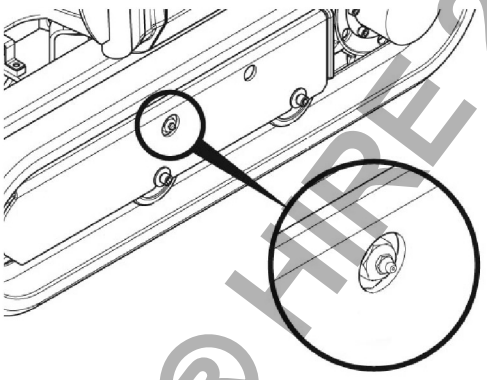

Illustration 251 g02455137

1. Loosen the filler valve carefully until the track begins to loosen. One turn should be the maximum.

2. Tighten the filler valve when the desired track tension is reached.

3. Operate the track back and forth in order to equalize pressure.

4. Check the amount of sag in the track. Adjust the track, as needed. Refer to Operation and Maintenance, “Track Adjustment - Inspect”.

5. Repeat the same procedure for the other track.

If the correct adjustment cannot be achieved, consult your Cat dealer.

i06573190

Track Adjustment - Inspect

SMCS Code: 4170-040

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

Check the rubber tracks for the following conditions:

- Steel cords that are cut
- Core irons that are fractured
- Rubber flaking off to the point of showing steel cords or core irons
- Loss of traction or grousers are worn down to approximately 5 mm (0.2 inch) in height.

If any of the above conditions or a combination of the above conditions are observed, replace the track.

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Measuring Rubber Track Tension

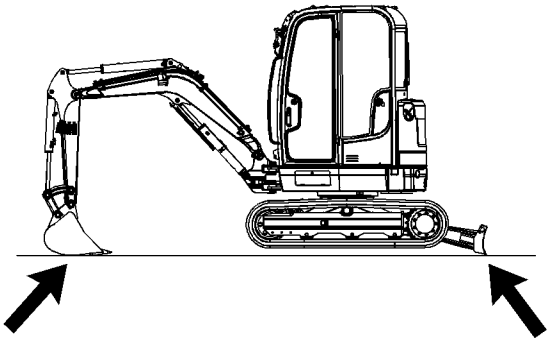

Illustration 252 g02723432

1. Park the machine on a level surface.

2. Place the blade at the rear of the machine.

3. Lower the bucket to the ground with the stick in a vertical position.

4. Apply boom down pressure and at the same time lift the machine with the blade until the tracks have cleared the ground.

5. Place the machine in a horizontal position.

6. Clean the track rollers and the area around the skid plate.

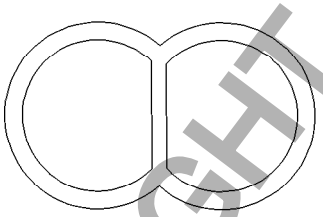

Illustration 253 g00484245

7. For a machine that is equipped with the rubber tracks, locate the “omega” mark on the inside flat of the track.

8. Locate the “omega” mark under the center track roller.

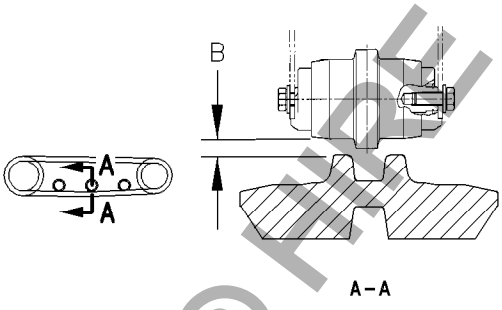

Illustration 254 g00522663

9. Measure the sag in the track. The sag is measured from the bottom of the roller to the surface on the top of the track. A properly adjusted track will have 20 mm to 25 mm (0.78 inch to 0.98 inch) of sag (B).

Measuring Steel Track Tension

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

Follow the same procedures for measuring rubber track tension. There is not an “omega” mark on the steel tracks. You do not need to align the steel tracks. The proper amount of sag for steel tracks is 20 mm to 25 mm (0.78 inch to 0.98 inch).

If the correct adjustment cannot be achieved consult your Cat dealer.

i05345916

Travel Alarm - Test

SMCS Code: 7429-081

Move the machine in order to test the travel alarm.

1. Start the engine. Lower the hydraulic lockout control to the UNLOCKED position.

2. Raise the work tool. Make sure that there is adequate overhead clearance.

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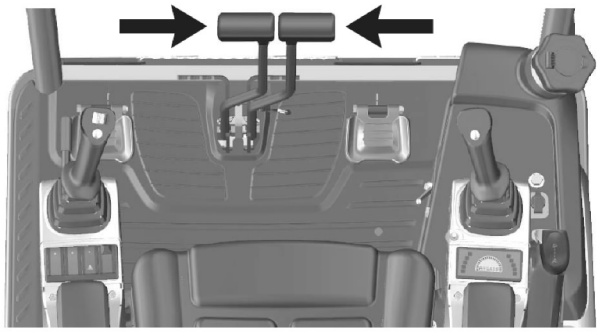

Illustration 255 g03381502

3. Use the travel levers to move the machine forward. The travel alarm should sound.

4. Release the travel levers in order to stop the machine.

5. Use the travel levers to move the machine backward. The travel alarm should sound.

6. Release the travel levers in order to stop the machine. Lower the work tool to the ground. Deactivate the hydraulic control and drive levers by placing the hydraulic lockout control in the RAISED position. Stop the engine.

i04288151

Undercarriage - Check

SMCS Code: 4150-535

1. Check the track rollers and the idler wheels for possible leakage.

2. Check the surface of the track, the track rollers, the idler wheels, and the drive sprockets. Look for signs of wear and loose mounting bolts.

3. Listen for any abnormal noises while you are moving slowly in an open area.

4. If abnormal wear exists or abnormal noises or leaks are found, consult your Cat dealer.

i04319623

Undercarriage - Inspect

SMCS Code: 4150-040

Inspect the bearing play of the tread rollers, track carrier rollers, and front idlers.

Consult your Cat dealer for service to the undercarriage components.

i04319618

Visual Inspection

SMCS Code: 7553-040

Perform a visual inspection of the alternator, starter, and electrical connections.

Check for cracks in the housings, loose, or frayed wires. Check for loose electrical connections. Check the alternator for bearing play.

Check the function of the preheating system. Check for loose electrical connections.

i05867976

Windows - Clean

SMCS Code: 7310-070; 7340-070

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

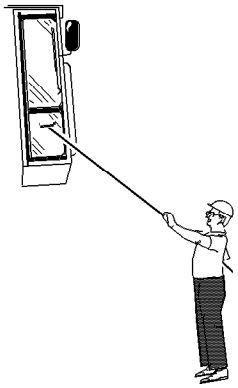

Illustration 256 g00566124

Typical example

Cleaning Methods

Aircraft Window Cleaner

Apply the cleaner with a soft cloth. Rub the window with moderate pressure until all the dirt is removed. Allow the cleaner to dry. Wipe off the cleaner with a clean soft cloth.

Soap and Water

Use a clean sponge or a soft cloth. Wash the windows with a mild soap or with a mild detergent. Also use plenty of lukewarm water. Rinse the windows thoroughly. Dry the windows with a moist chamois or with a moist cellulose sponge.

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Stubborn Dirt and Grease

Wash the windows with a good grade of naphtha, of isopropyl alcohol, or of Butyl Cellosolve. Then, wash the windows with soap and with water.

Polycarbonate Windows (If equipped)

Special care is needed in order to clean polycarbonate windows.

Wash polycarbonate windows with mild soap and warm water that does not exceed 50° C (122° F). Use a soft sponge, or damp cloth. Never use a dry cloth or paper towels on polycarbonate windows. Rinse the windows with a sufficient amount of clean cold water.

Note: Naphtha or kerosene can be used in order to remove labels, films, paint, or marking pen from polycarbonate windows.

Note: Do not use abrasive, or highly alkaline cleaners. Do not use sharp instruments, such as squeegees or razor blades on polycarbonate windows. Do not clean polycarbonate windows in the hot sun or at elevated temperatures.

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Reference Information Section

Reference Materials

i08292374

Reference Material

SMCS Code: 1000; 7000

Additional literature regarding your product may be purchased from your local Cat dealer or by visiting publications.cat.com. Use the product name, sales model, and serial number to obtain the correct information for your product.

publications.cat.com

i08292382

Decommissioning and Disposal

SMCS Code: 1000; 7000

When the product is removed from service, local regulations for the product decommissioning will vary. Disposal of the product will vary with local regulations.

Improperly disposing of waste can threaten the environment. Obey all local regulations for the decommissioning and disposal of materials.

Utilize appropriate personal protective equipment when decommissioning and disposing product.

Consult the nearest Cat dealer for additional information. Including information for component remanufacturing and recycling options.

i08420999

Caterpillar Approved Work Tools

SMCS Code: 6700; 7007

NOTICE
Use only work tools that are recommended by Caterpillar. The use of work tools that are not recommended by Caterpillar could damage your machine. Consult your Cat dealer for information on recommended work tools.

The following work tools have been approved by Caterpillar. Refer to Operation and Maintenance Manual for each work tool for proper operation, maintenance, and servicing of the work tools.

Using work tools of other manufactures, or work tools which have been released for other excavators, can reduce the machines output and stability considerably, and can also damage the machine and cause injuries to the operator or other personnel.

Always compare the weight of the work tool and maximum payload of work tool with the indications in the lift capacity table. Never exceed the maximum payload stated in the lift capacity table.

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Table 17

Caterpillar Approved Work Tools for Mini Hydraulic Excavators					
Work Tool	**Machine Model**				
	301.5	**301.6**	**301.7 CR**	**301.8**	**302 CR**
Quick Coupler	Manual Pin Grabber				
	Manual CW05				
	Manual CW05 Hook				
	Hydraulic CW05				
	Hydraulic CW05 Hook				
Thumb	Hydraulic Thumb				
Hammer	H45D				
	B1	B1	B1	B1	-
	-	-	B2	B2	B2
Mud Bucket	Mud Bucket with cubic capacity of 8.5 m^3 (11.12 yd^3)				
General Purpose Bucket	General Purpose Bucket with cubic capacity of 0.02 m^3 (0.034 yd^3)				
Ditch Cleaning Bucket	-				Ditch Cleaning Bucket with cubic capacity of 0.03 m^3 (0.046 yd^3)
Compaction Wheel	DC-12 SKH				
	DC-18 SKH				
	DC-24 SKH				
Other Buckets	(1)				

(1) Refer to Operation and Maintenance Manual, Boom/Stick/Bucket Combinations for more information.

The use of hammers shortens the life of hydraulic oil. If a hammer is used, the following measures should be taken:

Table 18

Application		**Hydraulic Oil**	**Hydraulic System Oil Filter**
Normal Work (Excavation Work)		Replace the first time after 500 service hours, then every 1000 service hours	Replace the first time after 50 service hours, then every 500 service hours
Percentage of Hammer Work	20%	Every 800 service hours	300 service hours
	40%	Every 400 Service hours	
	60%	Every 300 service hours	100 service hours
	Over 80%	Every 200 service hours	

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

This list was completed at the time of publication. There may be additional work tools that have been approved since that time. Consult your Cat ® dealer for an updated list of approved work tools.

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Product and Dealer Information

Note: For product identification plate locations, see the section “Product Identification Information” in the Operation and Maintenance Manual.

Delivery Date: _____

Product Information

Model: _____

Product Identification Number: _____

Engine Serial Number: _____

Transmission Serial Number: _____

Generator Serial Number: _____

Attachment Serial Numbers: _____

Attachment Information: _____

Customer Equipment Number: _____

Dealer Equipment Number: _____

Dealer Information

Name: _____ Branch: _____

Address: _____

_____

_____

	Dealer Contact	Phone Number	Hours
Sales:	_____	_____	_____
Parts:	_____	_____	_____
Service:	_____	_____	_____

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